HEALTH & SAFETY LABORATORY

Slip resistance testing of GRP flooring surfaces for Anglia Composites Ltd

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EXECUTIVE SUMMARY

This report presents the results of laboratory based slip resistance testing of four GRP flooring samples supplied by Anglia Composites Limited, at the request of Mr. Keith Bareham. Testing was carried out by Mr. Mark Liddle on the 23rd January 2018.

Slip resistance assessments were undertaken in accordance with the United Kingdom Slip Resistance Group (UKSRG) Guidelines, Issue 5, 2016, and BS 7976-2:2002+A1:2013 where appropriate, as recommended by the Health and Safety Executive. Measurements of the floor surface Pendulum Test Value (PTV) were made using a calibrated Munro Stanley pendulum instrument, with Slider 96 test rubber. Testing was carried out in three directions across the floor surface, with test direction 2 at 90° to test direction 1, and test direction 3 at 45° to directions 1 and 2.

The results generated for all four flooring samples suggest that they would present a low slip potential in both dry and water contaminated conditions.

The suitability of flooring should be determined by means of a risk assessment, which should take into account the level and type of pedestrian activity, the user demographic, the type of footwear, the type and prevalence of contamination, and the presence of any slopes.

CONTENTS

1 INTRODUCTION

Slip, trip or falls remain a significant contributor to the risk of injury or ill health at work. Recent statistics for Great Britain show that almost 60% of specified injuries to employees were due to a slip, trip or fall on the same level, or a fall from height (HSE, 2016).

This report presents the results of slip resistance testing of four GRP flooring samples supplied by Anglia Composites Ltd. Testing was carried out by Mr. Mark Liddle on the 23rd January 2018.

2 METHOD

Four different samples of GRP flooring were supplied by Anglia Composites Limited for testing, the details of which are presented in Table 1. Photographs of each sample are presented in section 3.

Table 1 Floor surfaces supplied for testing

HSL I.D.	Sample details
FAL/18/1	GRP grating with aggregate on walking surface
FAL/18/2	GRP plate with aggregate on walking surface
FAL/18/3	GRP stair tread and nosing with aggregate on walking surface
FAL/18/4	GRP insert strips with aggregate on walking surface

Slip resistance assessments were undertaken in accordance with the United Kingdom Slip Resistance Group Guidelines, Issue 5.0 (UKSRG, 2016) and BS 7976-2:2002+A1:2013 where appropriate, as recommended by the Health and Safety Executive (HSE) (HSE, 2012).

Measurements of the floor surface Pendulum Test Value (PTV) were made using a calibrated Munro Stanley pendulum instrument (TE507). The test rubber used was Slider 96, which is considered to be representative of a shoe sole with moderate slip resistance. The test rubber was conditioned in accordance with the requirements of the UKSRG Guidelines prior to testing each surface. Testing was carried out in three directions across the surface, with test direction 2 at 90° to test direction 1, and test direction 3 at 45° to directions 1 and 2. Measurements were carried out in the clean, dry condition, and under the water contaminated condition.

The GRP insert strips were approximately 52 mm wide and so multiple strips were positioned side by side to create a test area large enough to accommodate the pendulum footprint.

Verification of the pendulum was undertaken immediately prior to testing to ensure the reliability of the pendulum data. Details of the verification procedure and results are given in Appendix A.

2.1 EVALUATION OF RESULTS

The pendulum test results were interpreted in accordance with the classification system for slip potential used by the UKSRG, which is based on research undertaken by the Building Research Establishment (Pye and Harrison, 2003). Table 2 presents the UKSRG slip potential classifications and how they relate to PTV.

Table 2 Slip potential classifications on a level surface

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

The classifications shown in Table 2 apply to normal walking on a level surface. Sloped surfaces and activities such as rushing, turning, pushing or pulling, are likely to require a higher level of friction than normal walking. Other factors, such as the level and type of pedestrian activity and user demographic (such as age and physical ability) also have an influence and an assessment of the slip risk should be conducted in all situations.

3 RESULTS

HSL Sample I.D. FAL/18/1

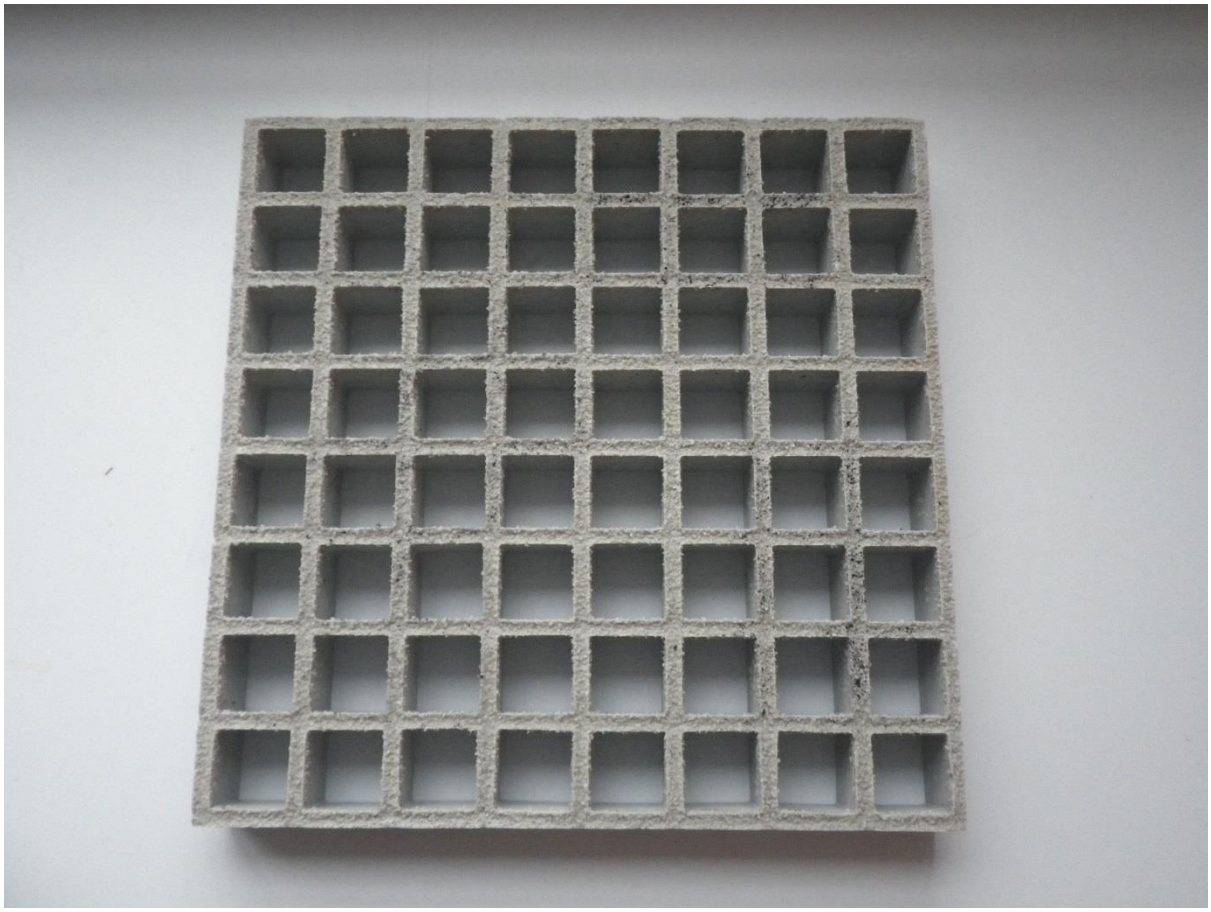

Table 3 Pendulum test results for FAL/18/1

Sample details GRP grating with aggregate on walking surface

Slider	Test Condition	Test Direction	PTV	Slip Potential on level
96	Clean, dry	1	84	Low
		2	88	Low
		3	82	Low
	Water contaminated	1	79	Low
		2	78	Low
		3	74	Low

HSL Sample I.D. FAL/18/2

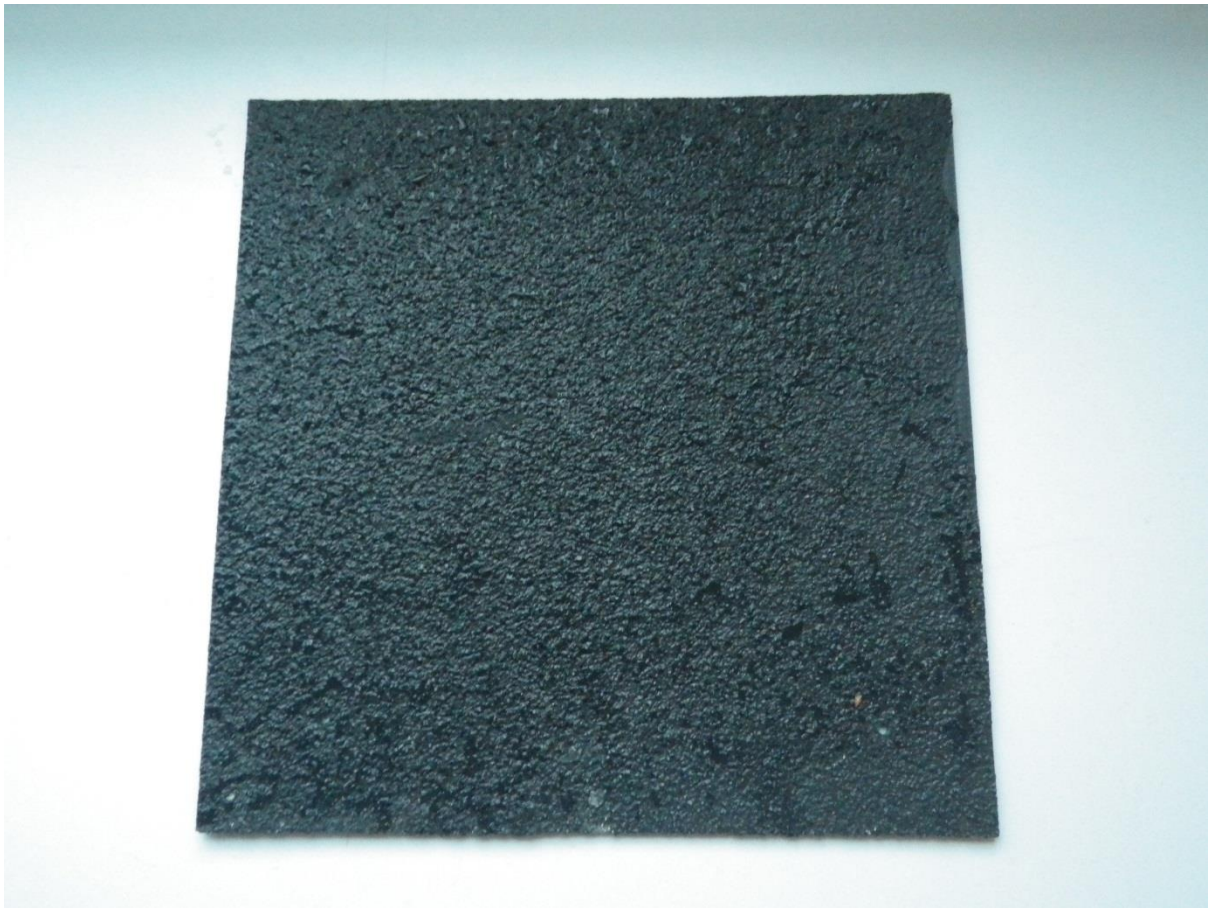

Table 4 Pendulum test results for FAL/18/2

Sample details	GRP plate with aggregate on walking surface			
Slider	**Test Condition**	**Test Direction**	**PTV**	**Slip Potential on level**
96	Clean, dry	1	71	Low
		2	68	Low
		3	73	Low
	Water contaminated	1	67	Low
		2	67	Low
		3	73	Low

HSL Sample I.D. FAL/18/3

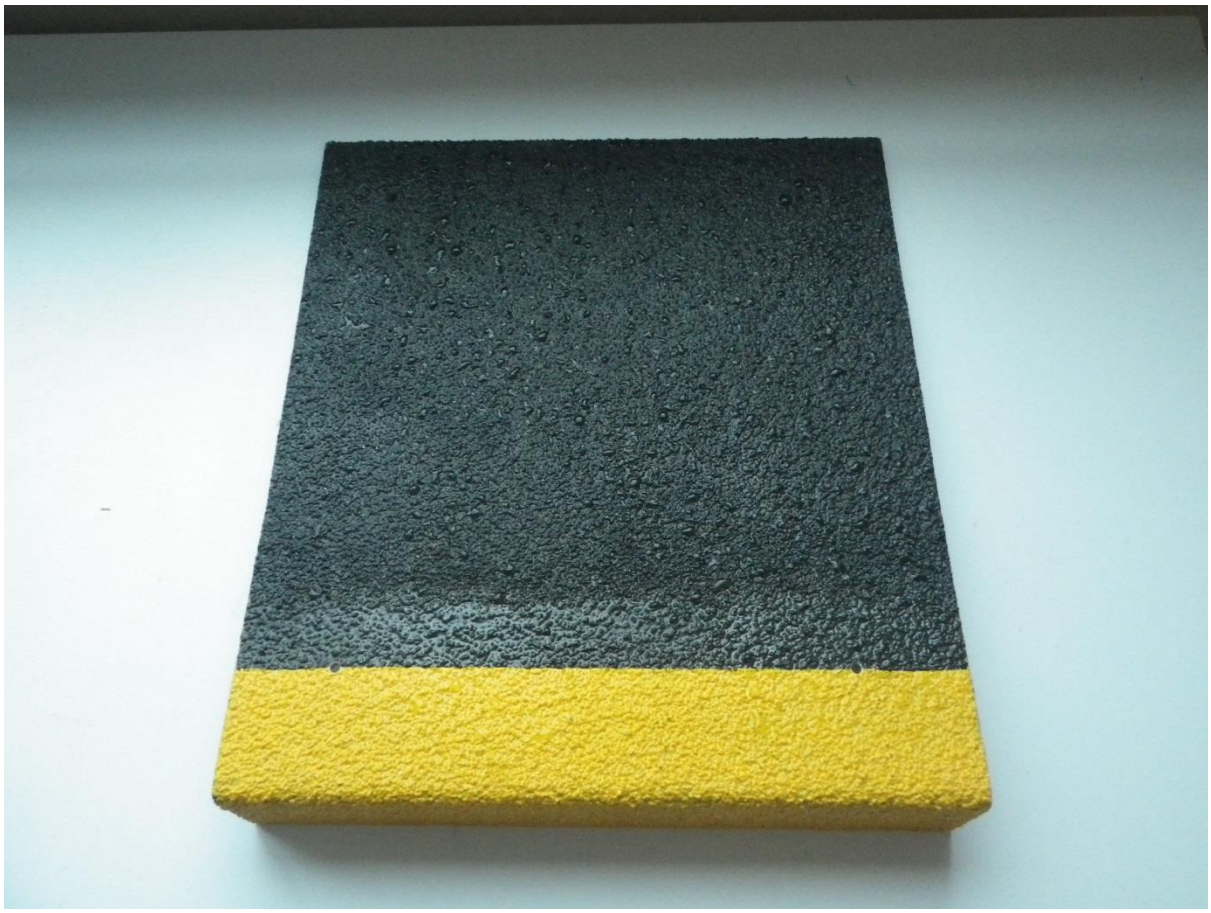

Table 5 Pendulum test results for FAL/18/3

Sample details GRP stair tread and nosing with aggregate on walking surface

Slider	Condition	Test Direction	PTV	Slip Potential on level
96	Clean, dry	1	66	Low
		2	67	Low
		3	68	Low
	Water contaminated	1	63	Low
		2	62	Low
		3	63	Low

Note: Testing was undertaken on the black tread area, as opposed to on the nosing.

HSL Sample I.D. FAL/18/4

Table 6 Pendulum test results for FAL/18/4

Sample details GRP insert strips with aggregate on walking surface

Slider	Condition	Test Direction	PTV	Slip Potential on level
96	Clean, dry	1	78	Low
		2	77	Low
		3	77	Low
	Water contaminated	1	75	Low
		2	74	Low
		3	69	Low

Note: Multiple strips were positioned side by side (as shown above) to create a large enough test area to accommodate the pendulum footprint.

4 CONCLUSIONS

The results of the testing suggest that all four samples will present a low slip potential in the clean, dry and water contaminated conditions.

It should be noted that low slip potential presented by the GRP insert strips (FAL/18/4) is based on results generated when the strips are placed side by side with minimal gaps, to maximise contact with the pendulum slider. This however may not reflect how the strips will be used. If there is spacing between the GRP strips large enough for a pedestrians foot to make contact with the substrate to which they are attached, the slip potential of the walking surface will be influenced by the slip resistance of the substrate.

The suitability of flooring should be determined by means of a risk assessment, which should take into account the level and type of pedestrian activity, the user demographic, the type of footwear, the type and prevalence of contamination, and the presence of any slopes.

5 REFERENCES

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6 APPENDIX

APPENDIX A: VERIFICATION TESTS

Verification of the pendulum was carried out according to the UKSRG Guidelines by making measurements on three surfaces in the water contaminated condition:

1. A 3M™ 216X 3µm Pink Lapping Film surface (PLF).
2. A float glass surface.
3. A Pavigrés vitrified ceramic tile (HSL ID FAL/17/62, PTV = 35).

The PTV range required to meet the verification requirements for each surface and the results are shown in Table A.1.

Table A.1 Verification conditions and the required PTV range

Surface	Test Condition	PTV Verification Range	Measured PTV
Pink Lapping Film	Water contaminated	59 - 64	62
Float Glass	Water contaminated	5 - 10	6
Pavigrés Ceramic Tile	Water contaminated	32 - 36	36

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