Increasing Safety by Reducing Risk

BS7976 -2 Pendulum Slip Test

UK SLIP RESISTANCE GROUP

Customer: Dura Composites
Test Number: FS41062
Operator: Glenn MacLaughlan
Date of Test: 18th June 2020
On Site: Sample Sent To Office
Pendulum Calibration Number: CN 642
Pendulum serial number: SK1595
Slider Type & Certificate No: FourS 96
Contaminate Description: Water
Surface: Dura Deck 18mm A2 Anthracite

Principal Direction

Calibration Checks Done:

lapping accepted 65+/-3	64	63	63	63	**62**
Glass accepted:7+/-3	9	8	8	8	**8**
Pavegras Tile:	37	36	36	36	**36**

Theory

A site assessment is an important component in determining the slip risk of any given floor. The HSE's pedestrian slip 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.

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 Health and Safety Laboratory has developed a "reliable and robust" test method that forms the basis of Floor Safes assessment procedure.

The pendulum skid 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 flooring surface for a known distance, then reads the "pendulum test value" on its over swing. 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) may be used to simulate a barefoot or casual shoe slip. Pendulum testing is one of the few methods that models the formation of a hydrodynamic squeeze film between the floor and shoe sole, a major factor in a wet slip.

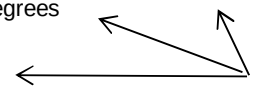
Test surfaces are subject to eight measurements of the PTV with the first three being discounted from calculations of the mean.

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. 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.

Tested Directions

75 Degrees **Closest to 90 degree when testing profiled decking**

45 Degrees



Principal

HSE Guidelines for pedestrian slip

0 – 24 High Risk for Slip potential

25 – 35 Moderate Risk for Slip Potential

36+ Low Risk for slip potential.

	1	2	3	4	5	6	7	8	Result PTV	Risk level of slip potential
Dry										
Principal	72	70	68	68	68	68	68	68	**68**	**Low**
45 degree	70	68	67	67	67	67	67	67	**67**	**Low**
75 degree	72	70	69	68	68	68	68	68	**68**	**Low**
					Classification of 3 Directions				**67 PTV**	**Low Risk**
Wet										
Principal	65	63	62	62	62	62	62	62	**62**	**Low**
45 degree	64	63	62	61	61	61	61	61	**61**	**Low**
75 degree	65	63	62	61	61	61	61	61	**61**	**Low**
				Classification / Average of 3 Directions					**61 PTV**	**Low Risk**
				Classification / Lowest of 3 Directions					**61 PTV**	**Low Risk**

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Statistics taken from the HSE and UKSRG show how the risk of slip potential decreases once the PTV increases

PTV	Accident risk exposure
19	1 in 2
24	1 in 20
27	1 in 200
29	1 in 10,000
34	1 in 100,000
36	1 in 1,000,000

Values of Tangents and the Relationship to Pendulum Floor Testing Values

Slope Angle	Exact Calculations	Rounded Figures (for ease of remembering)	New Minimum PTV Value Required (To Nearest Whole Figure)	Exact
1 degree	100 x Tangent of 1 degree (0.0174550) =	**1.75 PTV**	38	(37.75)
2 degrees	100 x Tangent of 2 degrees (0.034921) =	**3.50 PTV**	40	(39.50)
3 degrees	100 x Tangent of 3 degrees (0.052408) =	**5.25 PTV**	42	(41.25)
4 degrees	100 x Tangent of 4 degrees (0.069927) =	**7.00 PTV**	43	(43.00)
5 degrees	100 x Tangent of 5 degrees (0.087489) =	**8.75 PTV**	45	(44.75)

Clients include: .

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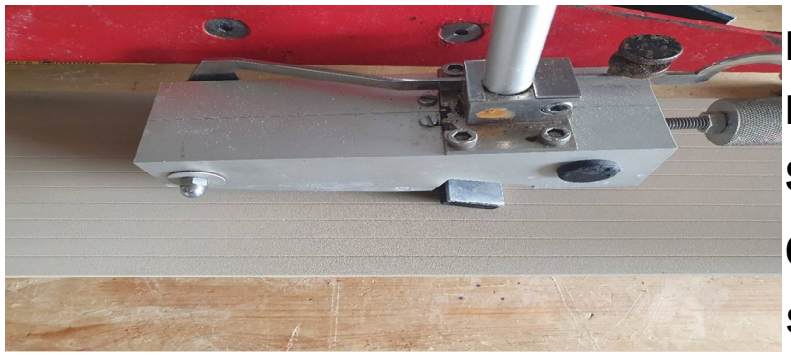

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← *Principal Direction*

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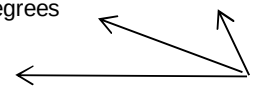

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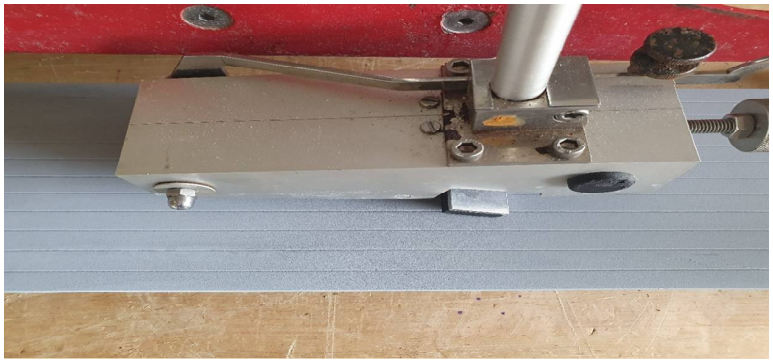

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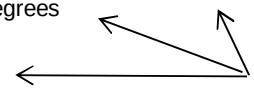

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Dry										
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45 degree	70	68	68	68	68	68	68	68	**68**	**Low**
75 degree	71	69	69	69	69	69	69	69	**69**	**Low**
					Classification of 3 Directions				**69 PTV**	**Low Risk**
Wet										
Principal	60	58	58	58	58	58	58	58	**58**	**Low**
45 degree	60	59	58	58	58	58	58	58	**58**	**Low**
75 degree	58	57	56	56	56	56	56	56	**56**	**Low**
				Classification / Average of 3 Directions					**57 PTV**	**Low Risk**
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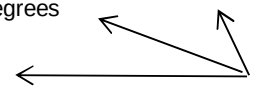

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1 degree	100 x Tangent of 1 degree (0.0174550) =	**1.75 PTV**	38	(37.75)
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Clients include: .

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Increasing Safety by Reducing Risk

Pendulum Slip Test

UK SLIP RESISTANCE GROUP

Customer: Dura Composites

Test Number: FS10174

Operator: Glenn MacLaughlan

Date of Test: January 2023

On Site: Tested at Dura Offices

Pendulum Calibration Number: CN642

Pendulum serial number: SK1595

Slider Type :FourS 96

Contaminate Description: Water

Surface: Dura Deck PD

Principal Direction

Calibration Checks Done:

lapping accepted 65+/-3	64	63	63	63	**62**
Glass accepted:7+/-3	9	8	8	8	**8**
Pavegras Tile:	37	36	36	36	**36**

Theory

A site assessment is an important component in determining the slip risk of any given floor. The HSE's pedestrian slip 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.

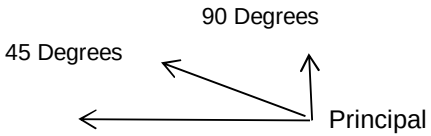
Research carried out by the Health and Safety Laboratory, in conjunction with the UK Slip Resistance Group (UKSRG), has shown that it is possible to assess the characteristics of floor surface materials needed for satisfactory slip resistance. The Health and Safety Laboratory has developed a "reliable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

The pendulum skid 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 flooring surface for a known distance, then reads the "pendulum test value" on its over swing. 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) may be used to simulate a barefoot or casual shoe slip. Pendulum testing is one of the few methods that models the formation of a hydrodynamic squeeze film between the floor and shoe sole, a major factor in a wet slip.

Test surfaces are subject to eight measurements of the PTV with the first three being discounted from calculations of the mean.

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. 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.

Tested Directions



HSE Guidelines for pedestrian slip

0 – 24 High Risk for Slip potential

25 – 35 Moderate Risk for Slip Potential

36+ Low Risk for slip potential.

	1	2	3	4	5	6	7	8	Result PTV	Risk level of slip potential
Dry										
Principal	62	61	60	58	58	58	58	58	**58**	**Low**
45 degree	66	65	64	64	64	64	64	64	**64**	**Low**
90 degree	68	67	66	66	66	66	66	66	**66**	**Low**
					Classification of 3 Directions				**62 PTV**	**Low Risk**
Wet										
Principal	56	55	54	54	54	54	54	54	**54**	**Low**
45 degree	53	52	51	51	51	51	51	51	**51**	**Low**
75 degree	56	55	54	54	54	54	54	54	**54**	**Low**
				Classification / Average of 3 Directions					**53 PTV**	**Low Risk**
				Classification / Lowest of 3 Directions					**51 PTV**	**Low Risk**

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