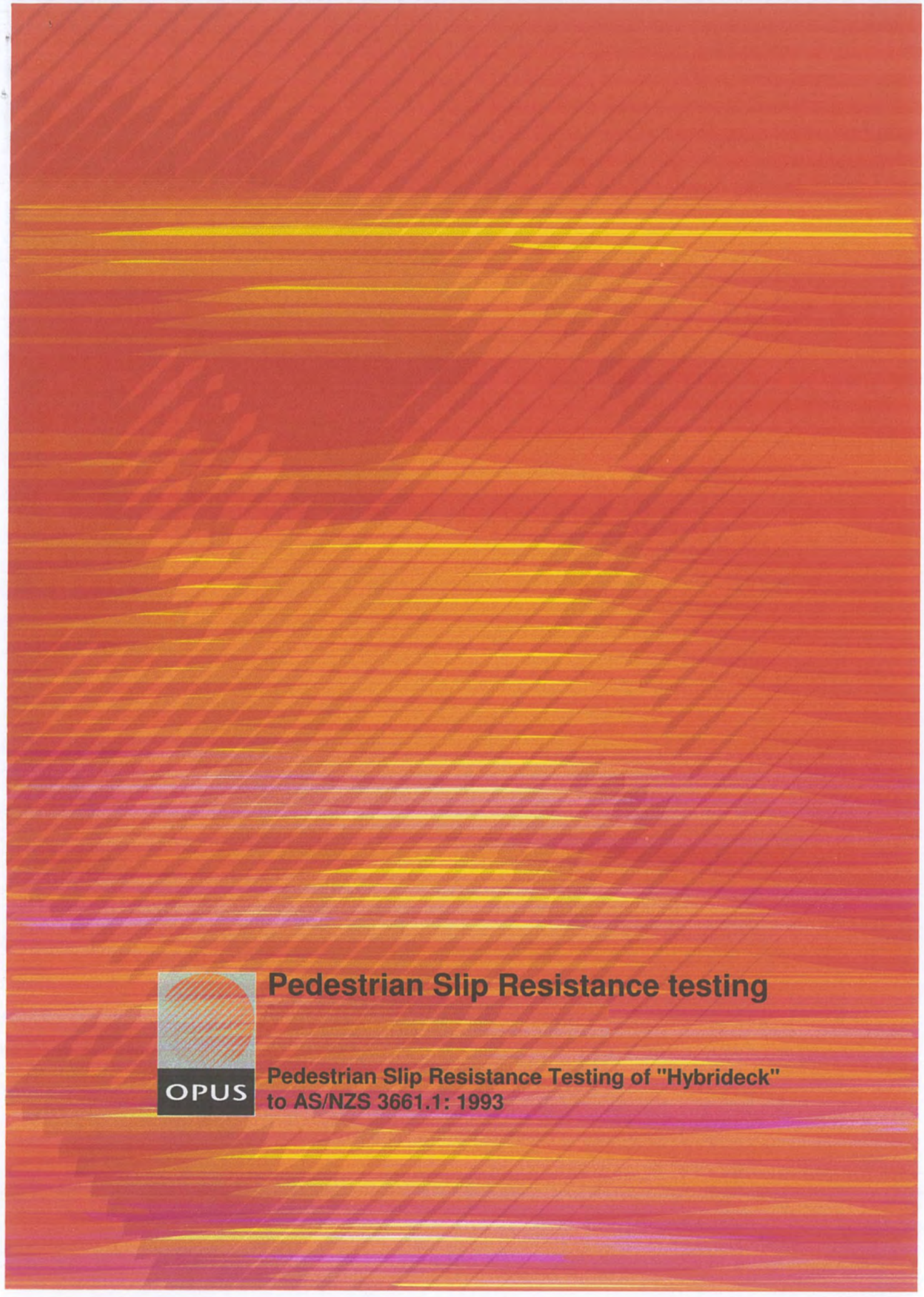


Pedestrian Slip Resistance testing

Pedestrian Slip Resistance Testing of "Hybrideck" to AS/NZS 3661.1: 1993

OPUS

Central Laboratories Report 08-527919.58

Pedestrian Slip Resistance Testing

Pedestrian Slip Resistance Testing of "Hybrideck" to AS/NZS 3661.1: 1993

Opus International Consultants
Central Laboratories
138 Hutt Park Road
PO Box 30845
Lower Hutt

Telephone: 04 587 0600
Facsimile: 04 587 0604

Date: August 2008
Reference: 527919.58
Status: Final

Test Report 08-527919.58

PEDESTRIAN SLIP RESISTANCE TESTING: HYBRIDECK

Tested by Shirley Potter Checked by Vince Dravitzki

Sample	Wood plastic composite, with one side "grooved" and the other side "not grooved". The sample could be installed with either side facing upwards as the pedestrian surface. Intended for use in areas where the surface could be wet.

Sampled by	Client	**Client**	
Number of specimens	5	**Material type**	Wood plastic composite
Specimen size	≈ 123 x 600 x 22 mm	**Manufacturer**	Access Lumber Ltd
Date received	14 July 2008	**Common name**	Hybrideck
Sample number	7/08/3	**Colour**	3x brown; 2x taupe
Project number	527919.57	**Surface finish**	Stated as "buffed"
		Surface coating	None

TESTING

Test	**AS/NZS 3661.1: 1993 Slip Resistance of Pedestrian Surfaces - Requirements Appendix A "Method for the Measurement of the Coefficient of Friction of Wet Surfaces**		
Preparation	A4 for laboratory testing	**Date of test**	05 August 2008
Type of test	Unfixed	**Location of test**	Central Laboratories
Surface	Wet	**Air temperature**	20ºC
		Relative humidity	41 percent

TEST REQUIREMENTS

AS/NZS 3661.1 requires that when tested wet the pedestrian surface shall have a mean coefficient of friction not less than 0.4, and no specimen in that sample shall have a mean coefficient of friction less than 0.35. Compliance with the slip resistant performance of NZBC D1.3.3(d) may be verified by referring to the acceptable solution (AS 1) of that clause which cites this test standard and acceptable values.
Further background to the testing and requirements is given on the following pages.

TEST RESULTS

Specimen number	7/08/3-1	7/08/3-2	7/08/3-3	7/08/3-4	7/08/3-5
Direction of test	Along	Along	Along	Along	Along
Side of sample	Grooved	Grooved	Grooved	Grooved	Grooved
Mean coefficient of friction	**0.25**	**0.27**	**0.27**	**0.27**	**0.28**
SAMPLE "GROOVED" MEAN WET COEFFICIENT OF FRICTION					**0.27**
Specimen number	7/08/3-1	7/08/3-2	7/08/3-3	7/08/3-4	7/08/3-5
Direction of test	Along	Along	Along	Along	Along
Side of sample	Not grooved	Not grooved	Not grooved	Not grooved	Not grooved
Mean coefficient of friction	**0.30**	**0.27**	**0.30**	**0.30**	**0.30**
SAMPLE "NOT GROOVED" MEAN WET COEFFICIENT OF FRICTION					**0.29**

COMMENTS

1. The sample specimens were prepared and supplied by the client.
2. These results are only valid for this material for the condition in which it was received. Manufacturing process variations have not been evaluated. Most surfaces wear under foot trafficking and the friction coefficient can change. Other factors, such as contamination, dirtying, or cleaning procedures, may also alter the surface properties and consequently its pedestrian slip resistance.

This information is provided so as to direct users to the appropriate standards and Building Code clauses when using the pedestrian slip resistance testing results.

AS/NZS 3661.1: 1993

The testing that was applied was in accordance with the joint Australian and New Zealand standard AS/NZS 3661.1: 1993 "Slip Resistance of Pedestrian Surfaces - Requirements". The scope of the standard states that these test methods are appropriate to determine the characteristics of surface materials either in the laboratory, under conditions in which the surface materials are intended to be installed, or in situ following installation.

The test method is selected on the basis of whether the material is to be used in either a wet or dry area. The "Method for the Measurement of the Coefficient of Friction of Wet Surfaces" is set out in Appendix A of the standard. Testing for the wet surface condition uses the pendulum friction tester.

The TRRL Pendulum (pendulum friction tester) has a rigid swinging arm, approximately 450 mm long, which contacts the surface with a spring loaded slider, about 75 by 20 mm in size, at a speed of about 2 m/sec. The slider is of a specially designed rubber material (Simulated Standard Shoe Sole, the 4S rubber) so that the instrument delivers, as far as possible, a response that is representative of a "typical" pedestrian wearing suitable footwear. This instrument is regarded as equating the action of pedestrians walking in unconstrained level spaces. It is believed it replicates the aquaplaning effect that can be particularly pronounced when smooth or highly glazed surfaces are wet.

AS/NZS 3661.1: 1993 and AS/NZS 4586: 2004

The requirements of AS/NZS 3661.1: 1993 and the test methods have been incorporated in Clause D1 (Access ways) of the New Zealand Building Code.

AS/NZS 3661.1 1993 has been superseded by AS/NZS 4586: 2004 "Slip resistance classification of new pedestrian surface materials", but AS/NZS 4586:2004 has not been incorporated into the New Zealand Building Code.

The test methods of AS/NZS 3661.1 :1993 (for the pendulum tester and the floor friction tester) are very similar to the test methods of AS/NZS 4586: 2004; but AS/NZS 4586: 2004 has differences, such as in the pendulum slider preparation compared to AS/NZS 3661.1: 1993. AS/NZS 4586: 2004 also has additional tests: a ramp test and a displacement volume test; which are tests more appropriate for some surface types or use situations.

While the requirements for a floor to be described as slip resistant are similar between AS/NZS 3661.1: 1993 and AS/NZS 4586: 2004, there are substantial differences. AS/NZS 3661.1: 1993 defines a coefficient of friction for which materials having greater values can be described as "slip resistant". In contrast, AS/NZS 4586: 2004 has only a set of friction categories. Designers must then refer to a handbook (HB 197) for guidance on how to use materials of the various friction categories, so as to achieve surfaces which contribute a reasonable extent to providing a slip resistant surface for pedestrian users.

Friction requirements of surfaces as defined in AS/NZS 3661.1: 1993 are:

Coefficient of friction: Wet
When tested in accordance with the method set out in Appendix A, the pedestrian surface shall have a mean coefficient of friction of not less than 0.4 and no specimen in that sample shall be less than 0.35.

Coefficient of friction: Dry
When tested in accordance with the method set out in Appendix B, the pedestrian surface shall have a mean coefficient of friction of not less than 0.4 and no specimen in that sample shall be less than 0.35.

Note: It would generally be expected that surfaces that have been shown to comply with the wet requirement would also comply with the dry requirement.

Ramps and other sloped areas:
For all sloped or graded surfaces with a gradient not less than 2 percent, the minimum required value for the coefficient of friction of either wet or dry surfaces as specified above shall be increased in accordance with the following equation, expressed to an accuracy of 0.01:

$$\mu_m = \frac{100\mu + M}{100 - M\mu}$$

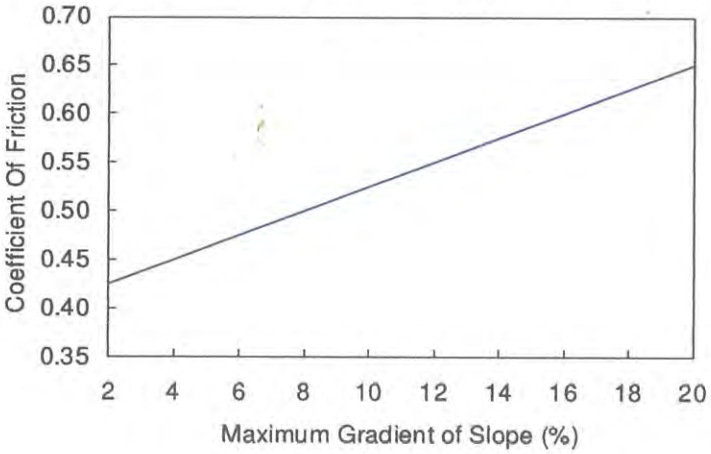
where μ_m = coefficient of friction required for a sloped surface

μ = coefficient of friction obtained on a horizontal surface

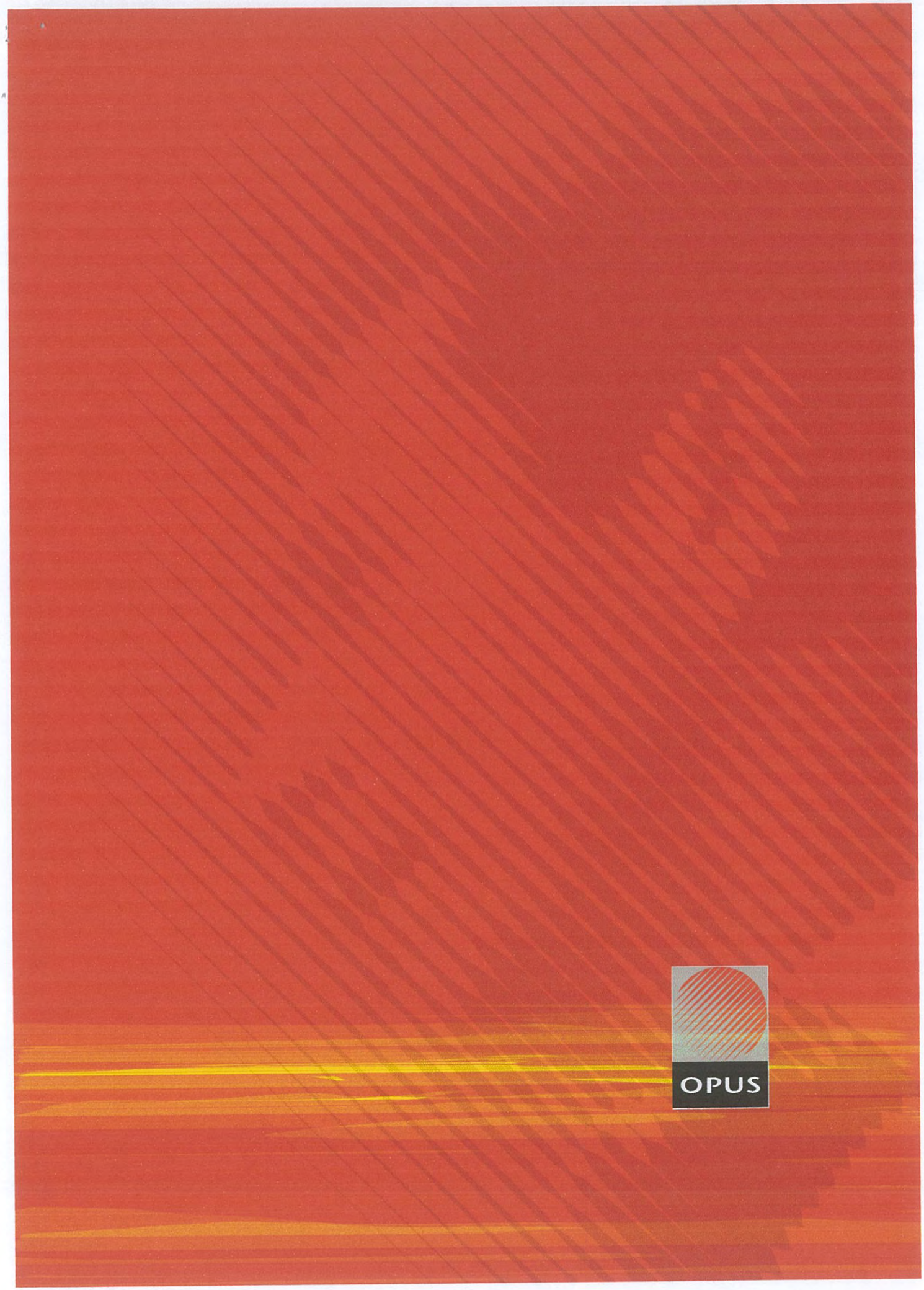
M = maximum gradient of slope, in percent

This equation is represented in graphical form below:

Coefficient of Friction Required for a Sloped Surface. Calculated for $\mu = 0.4$



For example, a surface with a slope of 8% would require a coefficient of friction of 0.5.


OPUS