**SLIP RESISTANCE TEST REPORT**

| | |
|---|---|
| Project: | Service Cover Investigation |
| Location of Test: | Opus Auckland Laboratory |
| Client: | Trans Net |
| Slider type: | FOUR-S |
| Specimen Description: | TUDS325SLID Service Cover |
| Cleaning Procedure: | Tested in Dry Condition |

| | |
|---|---|
| Project Number: | 1-L0123.80 |
| Lab Ref. Number: | 001/12 |
| Client Ref. Number: | - |

**SLIP RESISTANCE TEST RESULTS**

| Specimen No. | | Mean BPN | Mean Coefficient of Friction* |
|---|---|---|---|
| 1 | Only three tests performed on sample due to surface area. | 61 | 0.68 |
| 2 | | 84 | 1.02 |
| 3 | | 65 | 0.74 |
| | | | |
| | | | |
| **Average (Of three tests)** | | **70** | **0.81** |

**TEST METHOD**

Tests were carried out in accordance with Apendix A, AS/NZS 4663:2004 Slip Resistance of Pedestrian Surface materials, Part 1 - Requirements, Appendix A "Method for the Measurement of the Coefficient of Friction of Wet Surfaces",

**Coefficient of friction obtained from: AS/NZS 3661.1 : 1993 Slip Resistance of Pedestrian Surfaces*

Tested By: OPUS - Z Davidson
Date Tested: 8/08/12

Approved: OPUS - G Sandford
Designation: Laboratory Technician
Date: 8/08/12



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**SLIP RESISTANCE TEST REPORT**

| | |
|---|---|
| Project: | Service Cover Investigation |
| Location of Test: | Opus Auckland Laboratory |
| Client: | Trans Net |
| Slider type: | FOUR-S |
| Specimen Description: | TUDS325SLID Service Cover |
| Cleaning Procedure: | Wiped with wet brush |

| | |
|---|---|
| Project Number: | 1-L0123.80 |
| Lab Ref. Number: | 001/12 |
| Client Ref. Number: | - |

**SLIP RESISTANCE TEST RESULTS**

| Specimen No. | | Mean BPN | Mean Coefficient of Friction* |
|---|---|---|---|
| 1 | Only three tests performed on sample due to surface area. | 51 | 0.55 |
| 2 | | 55 | 0.60 |
| 3 | | 58 | 0.64 |
| | | | |
| | | | |
| **Average (Of three tests)** | | **55** | **0.60** |

**TEST METHOD**

Tests were carried out in accordance with Apendix A, AS/NZS 4663:2004 Slip Resistance of Pedestrian Surface materials, Part 1 - Requirements, Appendix A "Method for the Measurement of the Coefficient of Friction of Wet Surfaces",

**Coefficient of friction obtained from: AS/NZS 3661.1 : 1993 Slip Resistance of Pedestrian Surfaces*

Tested By: OPUS - Z Davidson
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**SKID RESISTANCE**
**TEST REPORT**

| | |
|---|---|
| Project: | Service Cover Investigation |
| Location of Test: | Opus Auckland Laboratory |
| Client: | Trans Net |
| Slider type: | TTRL |
| Specimen Description: | TUDS325SLID Service Cover |
| Cleaning Procedure: | Tested in Dry Condition |

| | |
|---|---|
| Project Number: | 1-L0123.80 |
| Lab Ref. Number: | 001/12 |
| Client Ref. Number: | - |

**SLIP RESISTANCE TEST RESULTS**

| Specimen No. | | Mean BPN | |
|---|---|---|---|
| 1 | Only three tests performed on sample due to surface area. | 105 | |
| 2 | | 98 | |
| 3 | | 101 | |
| | | | |
| | | | |
| **Average (Of three tests)** | | **101** | |

**TEST METHOD**

(a) British Pendulum - TRRL Road Note 27. 2nd Edition

Tested By: OPUS - Z Davidson
Date Tested: 8/08/12

Approved: OPUS - G Sandford
Designation: Laboratory Technician
Date: 8/08/12



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**SKID RESISTANCE**
**TEST REPORT**

| | |
|---|---|
| Project: | Service Cover Investigation |
| Location of Test: | Opus Auckland Laboratory |
| Client: | Trans Net |
| Slider type: | TRRL |
| Specimen Description: | TUDS325SLID Service Cover |
| Cleaning Procedure: | Wiped with a wet brush |

| | |
|---|---|
| Project Number: | 1-L0123.80 |
| Lab Ref. Number: | 001/12 |
| Client Ref. Number: | - |

**SLIP RESISTANCE TEST RESULTS**

| Specimen No. | | Mean BPN | |
|---|---|---|---|
| 1 | Only three tests performed on sample due to surface area. | 47 | |
| 2 | | 51 | |
| 3 | | 53 | |
| | | | |
| | | | |
| **Average (Of three tests)** | | **50** | |

**TEST METHOD**

(a) British Pendulum - TRRL Road Note 27. 2nd Edition

Tested By: OPUS - Z Davidson
Date Tested: 8/08/12

Approved: OPUS - G Sandford
Designation: Laboratory Technician
Date: 8/08/12



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**TABLE 1**

**HOW DOES ONE EQUATE NON-SLIP WITH A COEFFICIENT OF FRICTION?**

| Equivalent slip resistance terminology | | | | Coefficient of friction range |
|---|---|---|---|---|
| Absolutely not slippery | Unquestionably safe | Safe for widest range of abnormal stride and pace | Slip highly improbable | ***Coarse bitumen*** |
| Noticeably less slippery | Adequately safe | Safe for rapid stride and pace | Non-slip at very rapid pace | **This will depend on the test method used as well as the anticipated exposure and traffic requirements** |
| Detectably less slippery | Acceptably safe | Safe for hurried stride and pace and minimal attention | Non-slip at rapid pace | |
| **Non-slip** | Safe | Safe for normal stride and pace and moderate attention | Non-slip at involuntary pace | Possibly 0.35 to 0.46 when tested wet according to AS/NZS 3661.1 |
| Detectably slippery | Marginally safe | Safe for normal stride, pace and attention | Non-slip with reasonable care | **This will depend on the test method used as well as the anticipated exposure and traffic requirements** |
| Noticeably slippery | Marginally unsafe | Safe for reduced stride and cautious pace | Non-slip with caution | |
| Extremely slippery | Unquestionably unsafe | Safe for short stride and extreme care | Slip highly probable without extreme caution | ***Wet ice*** |

NOTE: Adapted from ASTM D21.06 questionnaire reprinted in *Ergonomics*, 1985, 28(7), 1062.

Table 1 references AS/NZS 3661.1, partly since its in situ test methods are still in force. However, the safe range of coefficient of friction for a different slip resistance test method could be higher or lower, depending on the test methodology. As Table 2 shows, the choice of rubber slider also influences the classification. Such tests only provide an assessment of slip resistance, and need not be reported in terms of coefficients of friction. Indeed some of the logic in adopting British Pendulum Numbers was to prevent the inappropriate evaluation of coefficient of friction results derived using other test methods.

**TABLE 2**

**CLASSIFICATION OF PEDESTRIAN SURFACE MATERIALS ACCORDING TO THE AS/NZS 4586 WET PENDULUM TEST**

| Class | Pendulum mean (BPN)* | | Contribution of the floor surface to the risk of slipping when wet |
|---|---|---|---|
| | Four S rubber | TRRL rubber | |
| V | > 54 | > 44 | Very low |
| W | 45–54 | 40–44 | Low |
| X | 35–44 | — | Moderate |
| Y | 25–34 | — | High |
| Z | <25 | — | Very high |

*While either of these test methods may be used, the test report must specify which method was used.

NOTE: It is expected that these surfaces will be more slip resistive when dry.

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