SECTION 180 - RIDE QUALITY FOR PAVEMENTS

180.01 GENERAL

This section relates to ride quality performance for pavement construction.

The locations specified in Table 180.101 are exempt from the assessment of the lot testing undertaken in this Contract.

180.02 STANDARDS

Documents referred to in this section are listed in Table 180.021.

Table 180.021 Referenced Documents

Austroads	
AG:AM/T001	Pavement Roughness Measurement with an Inertial Profilometer

Section 175 details the revision dates of the relevant references in this section.

180.03 DEFINITIONS

Continuous Traffic Lane - A length of traffic lane which can be tested in a single test run.

Individual Lane Roughness Value - The Lane IRI values measured on a 100 m sub-section of a traffic lane.

International Roughness Index (IRI) - The IRI is a mathematical model of the dynamic response of a real motor vehicle travelling along a single wheelpath (or wheel track) of longitudinal road profile, referred to as the quarter-car (or World Bank) model. The IRI is expressed in terms of accumulated displacement of the simulated suspension in metres per measured kilometre (m/km). IRI can be reported in different ways, as follows:

- Single Track IRI

  The IRI based on a quarter-car model run at 80 km/h over a single wheelpath of longitudinal profile (ASTM E1926-08).

- Lane IRI

  This is a composite IRI value representing the roughness of a road lane section. Using the Single Track IRI averaging (quarter-car) method, Lane IRI is determined by averaging two individual Single Track IRI values obtained separately in each wheelpath of a lane (at 0.75 m on either side of the centre of the lane mid-track).

Intersection - The place at which two or more roads cross at a common level where traffic on all legs of the intersection are required at some point to stop or give way to traffic on the intersecting road. An intersection may be signalised or unsignalised.

Mean Lane Roughness Value - The mean of the Individual Lane Roughness Values within the lot as determined by the appropriate test method.

Measuring Device – The device used for measurement of roughness shall:

(a) be capable of measuring longitudinal road profile simultaneously in both wheel paths over the wavelength range of 0.5 m to 50 m over the appropriate range of operating speeds

(b) collect data for roughness measurement at no more than 50 mm intervals. Height measurement shall be at an accuracy of ± 0.2 mm

(c) be calibrated according to the relevant test methods.

180.04 PERFORMANCE REQUIREMENTS

The finished surface of the pavement shall have a smooth longitudinal profile and comply with the minimum ride quality requirements specified. The upper limits for roughness at various locations are specified in Table 180.102.

180.05 MEASUREMENT AND REPORTING OF RIDE QUALITY

(a) Scope of Testing

The surface of all pavement construction shall be tested for ride quality, excluding shoulders and turn lanes.

(b) Lot Testing

All work shall be tested in lots of continuous traffic lane. A lot shall be defined as the length and width of each continuous traffic lane constructed, including any freeway ramps.

The Contractor shall provide 24 hours' notice to Council of when ride quality testing will be undertaken and the limits for each lot.

The maximum length of the lot shall be restricted to 2 km of continuous traffic lane. For reporting purposes test data will be divided into 100 m sub-sections per traffic lane.

(c) Measurement of Ride Quality

The Contractor shall measure the longitudinal road surface profile of each lot in accordance with Austroads Test Method AG:AM/T001 *Pavement Roughness Measurement with an Inertial Profilometer*.

Ride quality measurement shall be undertaken within three months after the application of the final wearing surface.

*** ~~##(strikethrough if this paragraph not applicable):For contracts with a Defects Liability Period of two years or more, measurement of ride quality shall be repeated no earlier than three months or later than one month before the end of the Defects Liability Period.~~

(d) Exclusions from Ride Quality Assessment

Areas to be tested and reported but excluded from the ride quality assessment are:

- bridge joints, railway and tram lines (up to 30 m past the event)
- inspection pit covers within the traffic lane (up to 20 m past the event).

~~The following items as listed in Table 180.101 are excluded from ride quality assessment:~~
~~*## (delete this note before printing) - Table 180.101 must be populated by contract administrator:*~~
- ~~intersections (stop bar to stop bar)~~
- ~~side streets deemed to affect pavement ride quality (the width of the side street including 30 m past the event)~~
- ~~start joint in the direction of travel (up to 20 m past the event)~~
- ~~roundabouts (from entry point to exit point)~~
- ~~other identified areas.~~

(e) Processing and Reporting of Test Results

The Contractor shall provide Council with a copy of all test results, consisting of:

- individual lane roughness for each 100 m section (before areas of exclusions have been applied)
- individual lane roughness for each 100 m section (after exclusions have been applied)
- mean lane roughness for each lot (after exclusions have been applied).

Areas that have been excluded from ride quality assessment, as specified in Clause 180.05(d) and Table 180.101, shall be identified in the individual lane roughness results.

The resulting roughness, after removal of areas of exclusions, shall be processed and reported for each 100 m sub-section. Where exclusions are applied which results in less than 100 m of reportable data, the remaining data is to be reported as representative of that entire sub-section.

Any sub-sections at the end of a lot that are less than 100 m shall be included with the sub-section immediately preceding it and the individual roughness calculated over the longer sub-section.

180.06 PERFORMANCE STANDARDS

The Contractor shall comply with the requirements for both the Maximum Individual Lane Roughness and Maximum Mean Lane Roughness as follows:

(a) Individual Lane Roughness

Where an Individual Lane Roughness Value in any 100 m sub-section is greater than the specified Maximum Individual Lane Roughness Value specified in Table 180.102, the Contractor shall rectify work within the sub-section to comply with this requirement. The minimum length of rectification work undertaken shall be 100 m.

(b) Mean Lane Roughness

Where the Mean Lane Roughness Value of a lot is greater than the Mean Lane Roughness specified in Table 180.102, the work shall be rectified unless Council agrees to accept the work at a reduced payment. Where the lot is to be rectified, the minimum length for any rectification work undertaken shall be 100 m. Where Council agrees to accept the lot at a reduced payment, a deduction to the contract sum shall be made in accordance with clause 180.07.

The Contractor shall re-test the lot following completion of any rectification work and shall re-submit Individual Lane Roughness and Mean Lane Roughness for the lot. The Contractor shall comply with the requirements for both the Maximum Individual Lane Roughness and Maximum Mean Lane Roughness for the lot after rectification works have been completed.

180.07 PAYMENT DEDUCTION PROVISIONS

Where a deduction in payment is to be made for failure to comply with the specified Maximum Mean Lane Roughness for a lot, the deduction shall be made in accordance with the following formula:

$$\text{Deduction to Contract (\$)} = \frac{A \times D \times C}{100}$$

Where: A = Area of lot in square metres.
D = Percentage deduction as specified in Table 180.071
C = Unit Cost as specified in Table 180.103

Table 180.071 Percentage Deduction for Failure to Comply with the Specified Maximum Mean Lane Roughness Value

Increase in IRI	% Deduction
0.01 - 0.10	1
0.11 - 0.20	2
0.21 - 0.30	3
0.31 – 0.40	4
0.41 – 0.50	5
0.51 – 0.60	6
0.61 – 0.70	8
0.71 – 0.80	10
> 0.80	Rectify

180.08 PAYMENT RETENTION

Where the Contractor is required to carry out measurement of ride quality within three months of the end of the Defects Liability Period, retention of payment shall apply.

The amount of retention shall be calculated using the following formula:

$$\text{Retention (\$)} = 0.03 (A_1 \times C_1 + A_2 \times C_2 + \ldots\ldots) + E$$

where: A_1 = the total area of pavement with the same unit cost as shown in Table 180.103

C_1 = the appropriate unit cost from Table 180.103

E = an amount equal to the value of deductions calculated using clause 180.07 and the test results at Practical Completion

180.09 PAVEMENT RECTIFICATION

The Contractor shall bear the full cost of any necessary rectification work including the cost of any additional work required to the underlying or adjacent pavement to comply with this section. All rectification work shall be carried out in accordance with the requirements of the specification.

~~180.10 SCHEDULE OF DETAILS~~

~~(a) The locations shown in Table 180.101 are exempt from ride quality assessment.~~

~~Table 180.101 Locations Exempted from Ride Quality Assessment~~

~~Site Number~~	~~Location~~	~~Start Chainage~~	~~End Chainage~~
~~##:~~	~~##intersections:~~		
~~##:~~	~~##side streets deemed to affect pavement ride quality:~~		
~~##:~~	~~##start join in the direction of travel:~~		
~~##:~~	~~##roundabouts:~~		
~~##:~~	~~##other identified areas:~~		

(b) The ride quality to be achieved at each location is to be in accordance with Table 180.102.

Table 180.102 Standard of Ride Quality

Location	Maximum Individual Lane Roughness Value for any 100 m Subsection	Maximum Mean Lane Roughness Value for Lot
All	2.7	2.0

~~(c) The unit cost (C) to be used for calculation of any payment deduction made in accordance with the deduction provision specified in clause 180.07 shall be in accordance with Table 180.103.~~

~~**Table 180.103 Basis of Payment Deduction**~~

~~Location~~	~~Unit Cost $ per sq m~~
~~##specify locations by pavement type:~~	~~##refer to Table B of Guide Notes:~~