

TRANSPORT FOR NSW (TfNSW)

QA SPECIFICATION R93

DIAMOND GRINDING OF CONCRETE PAVEMENT

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REVISION REGISTER

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 1/Rev 0		First issue	GM, IC	17.11.11
Ed 1/Rev 1	Global	Clauses rearranged and reworded to improve clarity.	GM, CPS Peter Letts	17.03.14
	Guide Notes	Guide notes deleted.		
	1.1	Preceding explanatory statement added to last paragraph on interpretation of limiting values, and entire clause moved to new sub-clause 1.3.1 "Interpretations".		
	1.3.1	New sub-clause "Interpretations" added. Subsequent sub-clauses renumbered.		
	1.3.2	"Concrete", "Slab anchor", "Slag jacking" and "Slab stabilisation" deleted from Definitions. Explanatory notes added in definitions of "Dogtails" and "Feathering". Minor edits to definition of "Groove" and "Slab".		
	2.2	Reuse after treatment of waste water produced during diamond grinding permitted.		
	3	Heading title changed.		
	3.1	Requirements to determine wear rate of diamond blades deleted. Statement on providing details of grinding equipment and procedures moved to clause 4.2 "Equipment". Headings added to form new sub-clauses 3.1.1 to 3.1.4.		

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 1/Rev 1 (cont'd)	3.1.1	New sub-clause titled "Primary Purpose", consolidating all statements on primary purpose of diamond grinding. Primary purpose to correct pavement surface levels added under this sub-clause.		
	3.1.4	Moved here from previous clause 5.5.		
	3.2.1	Statement on responsibility for carrying out pre-grinding survey added.		
	4.1	Previous sub-clauses dealing with finished surface requirements moved to clause 5 "Finished Surface Requirements". Statement on moist concrete surface deleted. Content of previous clause 4.2 "Equipment" moved under this clause, and headings added to form new sub-clauses 4.1.1 to 4.1.4. Subsequent clauses 4.3 to 4.6 renumbered.		
	4.1.2	1,200 mm nominal width of grinding drum added to grinding machine requirement.		
	4.1.3	Nominal thickness of blade spacer and blade added.		
	4.1.4	Previous clause 4.7, on secondary grinding process when working near kerbs and medians, moved here. Use of cold milling machines for secondary grinding prohibited.		
	4.3	Clause reworded to improve clarity.		
	5.1	Sub-clauses dealing with finished surface requirements consolidated here with other similar sub-clauses. Steps between longitudinal grinding runs reduced from 5 mm to 3 mm. Maximum width of feathering increased to 1,000 mm.		
	5.2, 5.4	Clauses numbers exchanged between previous clauses 5.2 and 5.4.		
	5.4	Test Method T240 as alternative for measuring texture depth deleted. Testing at right angles to direction of texturing specified for Test Method T192. Reduced frequency of testing of texture depth permitted if results are conforming.		

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 1/Rev 1 (cont'd)	5.3 5.4.1 5.6 Annex A Annex B Annex M	<p>Test Method T187 for laser profilometer replaced by T188.</p> <p>Class 1 profiler (T369) added as acceptable alternative.</p> <p>Frequency of testing amended.</p> <p>Feathered runs excluded from transverse profile measurements.</p> <p>Dispositions of nonconformities moved here from Annex B.</p> <p>Test results submitted to have nonconformities highlighted.</p> <p>Headings added to form sub-clauses 5.6.1 to 5.6.3.</p> <p>Tables reorganised, and some items changed to reflect changes in main body of spec.</p> <p>Dispositions of nonconformities moved to clause 5.6.</p> <p>Reference documents updated.</p>		
Ed 1/Rev 2	Global	References to “Roads and Maritime Services” or “RMS” changed to “Transport for NSW” or “TfNSW” respectively.	DCS	22.06.20



DIAMOND GRINDING OF CONCRETE PAVEMENT

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VERSION FOR: DATE:

CONTENTS

CLAUSE	PAGE
FOREWORD	ii
TfNSW Copyright and Use of this Document	ii
Revisions to Previous Version	ii
Project Specific Changes	ii
1 GENERAL	1
1.1 Scope	1
1.2 Structure of the Specification	1
1.3 Interpretations, Definitions and Acronyms	2
2 MATERIALS	3
2.1 General	3
2.2 Water	3
3 DIAMOND GRINDING REQUIREMENTS	3
3.1 General	3
3.2 Survey	4
4 DIAMOND GRINDING OPERATION	5
4.1 Methods and Equipment	5
4.2 Diamond Grinding Trial	6
4.3 Preparation of Surface	7
4.4 Collection and Disposal of Slurry Residue	7
4.5 Utility Markers	7
5 FINISHED SURFACE REQUIREMENTS	7
5.1 General	7
5.2 Surface Profile	8
5.3 Ride Quality	8
5.4 Texture Depth	9
5.5 Conformity	9
ANNEXURE R93/A – PROJECT SPECIFIC REQUIREMENTS	11
ANNEXURE R93/B – MEASUREMENT AND PAYMENT	13
ANNEXURE R93/C – SCHEDULES OF HOLD POINTS AND WITNESS POINTS	15
C1 Schedule of Hold Points and Witness Points	15
ANNEXURE R93/D – PLANNING DOCUMENTS	15
ANNEXURES R93/E TO R93/L – (NOT USED)	15
ANNEXURE R93/M – REFERENCED DOCUMENTS	16
LAST PAGE OF THIS DOCUMENT IS	16

FOREWORD

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REVISIONS TO PREVIOUS VERSION

This document has been revised from Specification TfNSW R93 Edition 1 Revision 1.

All revisions to the previous version (other than minor editorial and project specific changes) are indicated by a vertical line in the margin as shown here, except when it is a new edition and the text has been extensively rewritten.

PROJECT SPECIFIC CHANGES

Any project specific changes are indicated in the following manner:

- (a) Text which is additional to the base document and which is included in the Specification is shown in bold italics e.g. ***Additional Text***.
- (b) Text which has been deleted from the base document and which is not included in the Specification is shown struck out e.g. ~~Deleted Text~~.

TfNSW QA SPECIFICATION R93

DIAMOND GRINDING OF CONCRETE PAVEMENT

1 GENERAL

1.1 SCOPE

This Specification sets out the requirements for diamond grinding of concrete pavements.

Diamond grinding is used to achieve one or all of the following:

- (a) correction of pavement surface levels;
- (b) improvements to ride characteristics;
- (c) restoration of surface texture.

1.2 STRUCTURE OF THE SPECIFICATION

This Specification includes a series of annexures that detail additional requirements.

1.2.1 Project Specific Requirements

Project specific details of the pavement surfaces to be grinded are given in Annexure R93/A.

1.2.2 Measurement and Payment

The method of measurement and payment is detailed in Annexure R93/B.

1.2.3 Schedules of HOLD POINTS and WITNESS POINTS

The schedules in Annexure R93/C list the **HOLD POINTS** and **WITNESS POINTS** that must be observed. Refer to Specification TfNSW Q for the definitions of **HOLD POINTS** and **WITNESS POINTS**.

1.2.4 Planning Documents

The PROJECT QUALITY PLAN must include each of the documents and requirements listed in Annexure R93/D and must be implemented.

In all cases where this Specification refers to the manufacturer's recommendations, these must be included in the PROJECT QUALITY PLAN.

1.2.5 Referenced Documents

Unless specified otherwise, the applicable issue of a referenced document, other than a TfNSW Specification, is the issue current at the date one week before the closing date for tenders, or where no issue is current at that date, the most recent issue.

Standards, specifications and test methods are referred to in abbreviated form (e.g. AS 1234). For convenience, the full titles are given in Annexure R93/M.

1.3 INTERPRETATIONS, DEFINITIONS AND ACRONYMS

1.3.1 Interpretations

Grinding blades and spacers are manufactured overseas and are specified in inches. When these values are converted to metric measurements, limiting values will be interpreted in accordance with the “rounding method” in AS 2706.

1.3.2 Definitions

The terms “you” and “your” mean “the Contractor” and “the Contractor’s” respectively.

The following definitions apply to this Specification:

Dogtails:	The portion of the surface that has not been grinded because of a lack of horizontal overlap between two consecutive grinding passes. Dogtails typically occur at the start of the grinding run.
Feathering:	A tapering of the grooves to a nominal zero grinding depth at the nominated boundary to the specified extent of grinding. Feathering may be in the longitudinal and transverse directions.
Grinding depth:	The depth of concrete material removed, determined from the differences in level of the concrete surface before and after grinding.
Groove:	The recess remaining after grinding.
Hidden object:	Any “objects” not visible to the naked eye and requiring identification by means of a “location device” or metal detector.
Holidays:	Ungrinded areas resulting from isolated low spots.
Location device:	Device capable of identifying “hidden objects” using a non-destructive technique; specifically a metal detector (or equivalent) for metal objects.
Lot:	As defined in TfNSW Q.
Minor depressions:	An isolated low spot typically less than 5 mm in depth formed during machine or hand placed concrete paving.
Object:	Metal objects, utility service pipes or conduits, old tram tracks, etc.
Slab:	A portion of concrete pavement bounded by joints and/or edges.

1.3.3 Acronyms

NATA: National Association of Testing Authorities, Australia

PCP: Plain concrete pavement (Base)

PCP-R: Discrete reinforced slabs within PCP (Base)

CRCP: Continuously reinforced concrete pavement (Base)

JRCP: Jointed reinforced concrete pavement (Base)

SFCP: Steel fibre reinforced concrete pavement (Base)

2 MATERIALS

2.1 GENERAL

Materials required for carrying out the Works in accordance with this Specification include the following:

- (a) diamond grinding blades fixed on a drum with blade spacers;
- (b) water to cool the blades;
- (c) any other materials as required.

2.2 WATER

Water for use in the Works must be free from deleterious materials such as oils, salts, acids, alkalis, and vegetable substances.

Reclaimed water may be used in the Works provided that it meets the above requirements, and the requirements in Specification TfNSW G36, with a maximum concentration of 1000 thermotolerant coliforms per 100 ml when tested in accordance with TfNSW T1015.

Include details of the source of water for use in the Works in the PROJECT QUALITY PLAN.

Reuse of the waste water produced from the diamond grinding, after in-place treatment by dedicated slurry recycling equipment close by the grinding equipment (refer Clause 4.4), is permitted provided that the recycled water meets the grinding machine manufacturer's requirements.

3 DIAMOND GRINDING REQUIREMENTS

3.1 GENERAL

3.1.1 Primary Purpose

The primary purpose of diamond grinding the pavement is stated in Annexure R93/A.

Where the primary purpose of the diamond grinding is to correct concrete pavement surface levels which are out of tolerance, high spots of the pavement surface must be grinded to the extent sufficient to bring the pavement levels to within tolerance, but extra depth grinding will not be required to eliminate minor depressions. The existing and target surface levels of the pavement surface will be shown on the drawings provided.

Where the primary purpose of diamond grinding is to improve concrete pavement ride quality, the Principal may, in conjunction with you and with reference to the survey of the existing pavement surface (refer Clause 3.2.1), determine the areas to be grinded and the grinding depths required.

Where the primary purpose of the diamond grinding is to improve concrete pavement surface texture, the entire area designated in Annexure R93/A must be grinded and a survey of the existing pavement

surface will not normally be required. Transverse feathering is not permitted in the traffic lanes, and where feathering is required, it must be carried out in the shoulders.

3.1.2 Coarse Aggregate in Pavement

Where the type and source of the coarse aggregate used in the pavement base is known, its details will be provided in Annexure R93/A.

3.1.3 Holidays

The maximum extent of holidays per 100 m of carriageway is 5% of the surface area to be grinded, but excluding the feathering, unless specified otherwise in Annexure R93/A. Dogtails are permitted in holidays.

3.1.4 Overlaps

Unless specified otherwise in Annexure R93/A, overlaps between adjoining grinding passes must not be wider than 50 mm, except at merging or turning lanes where the overlap must not be wider than 75 mm, and must not occur at longitudinal joints.

3.2 SURVEY

3.2.1 General

The responsibility for carrying out a survey of the existing pavement surface prior to commencing the diamond grinding is stated in Annexure R93/A.

The existing and target surface levels are defined in terms of either:

- (a) actual centreline levels and crossfalls, with the survey levels taken using a survey staff with a flat base of area between 400 mm² and 4,000 mm²;

or

- (b) a laser based system which maps the surface level transversely across the lane width, in 40 mm to 60 mm increments and at 5 m longitudinal spacing.

Describe the method of survey before (if required) and after grinding in the PROJECT QUALITY PLAN.

3.2.2 Hidden Objects

The approximate locations of known hidden objects are listed in Annexure R93/A and may be shown on the sketch plans and/or drawings provided by the Principal.

Make enquiries with the relevant Authorities to confirm the exact locations of all objects listed in Annexure R93/A, as shown on the sketches and/or drawings, or brought to your attention otherwise.

Survey the area to be grinded for hidden objects using a locating device or metal detector. Clearly mark on site the locations and extent of any objects detected (metal objects, utility service pipes and conduits, and other objects). Determine whether the hidden object is within the depth of grinding.

3.2.3 Setting Out of Work Area

Unless directed otherwise by the Principal, set out the surfaces to be grinded specified in Annexure R93/A and/or shown on the sketches and/or drawings. The setting out must include the marking of diamond grinding depths and locations of all hidden objects.

Submit documented verification that the work has been set out in accordance with Annexure R93/A, the sketches and/or drawings, or as directed by the Principal.

HOLD POINT

Process Held: Diamond grinding of work area.

Submission Details: Submission of setting out details, including marking of diamond grinding depths and locations of all hidden objects, and calculations of the areas to be worked for payment purposes.

Release of Hold Point: The Principal will consider the submitted documents before authorising the release of the Hold Point.

4 DIAMOND GRINDING OPERATION

4.1 METHODS AND EQUIPMENT

4.1.1 General

Provide details of your methods and equipment to produce uniform grinding and achieve the nominated depth of diamond grinding in the PROJECT QUALITY PLAN.

4.1.2 Diamond Grinding Machine

The diamond grinding machine must possess the following features:

- (a) self propelled machine that is specifically designed to smooth and texture concrete pavements with closely spaced diamond grinding blades;
- (b) grinding drum of nominal 1,200 mm width, with ability to tilt to allow feathering at the edges of the work;
- (c) minimum engine power of 500 kW;
- (d) of sufficient mass to allow grinding depths to be varied according to existing and new pavement profiles;
- (e) of a shape and dimension such that it does not encroach on traffic movement more than 1 m outside of the work area;
- (f) capable of grinding the surface without causing spalls at cracks, joints, or other locations;
- (g) capable of collecting the slurry residue from the concrete pavement surface after diamond grinding and storing the slurry before transporting it to a designated area.

4.1.3 Thickness of Blade Spacer and Blade

The blade spacers must be nominally 2.5 mm (0.100 inch) wide, combined with a blade thickness of nominally 3.2 mm (0.125 inch).

4.1.4 Grinding Areas Adjacent to Kerbs and Medians

Areas adjacent to any medians or lips of gutters, if and where present within the limits of the Works, and which are inaccessible to grinding by your primary equipment (refer to Clause 4.2), must be grinded using a secondary process. Use of cold milling machines for this secondary grinding process is not permitted.

Provide details of this secondary grinding process in the PROJECT QUALITY PLAN.

4.2 DIAMOND GRINDING TRIAL

If specified in Annexure R93/A, carry out diamond grinding of a trial section of concrete pavement using the proposed methods and equipment prior to grinding of the whole of the works. The trial section must cover the width of the concrete pavement subject to diamond grinding for a length of about 100 m, or longer when directed by the Principal.

Give the Principal at least seven days written notice of your intention to commence the trial.

WITNESS POINT

Process Witnessed: Diamond grinding trial.

Submission Details: Notification of the diamond grinding trial, at least 7 working days prior to commencement of the trial diamond grinding operation.

After the trial, provide results of a minimum two texture depth measurements obtained in accordance with Test Method TfNSW T192.

HOLD POINT

Process Held: Diamond grinding of the rest of the Works.

Submission Details: Submission of planning documents, test results, and survey results of trial section of diamond grinding.

Release of Hold Point: The Principal will inspect the trial and consider the submitted documents, before authorising the release of the Hold Point.

In the event of nonconformity in the trial section, the Principal may require a new trial section to be worked, which must be treated as the first.

The Principal may call for a new trial section at any stage of the work if:

- (a) significant changes are made by you to the equipment or methods of operation; or
- (b) the process, materials, equipment or finished product fail to comply with this Specification.

4.3 PREPARATION OF SURFACE

Prior to commencing diamond grinding of the pavement surface:

- (i) remove all raised pavement markers, unless specified otherwise in Annexure R93/A;
- (ii) sweep the surface of the pavement to remove debris;
- (iii) provide a temporary seal to all unsealed transverse and longitudinal pavement joints.

After grinding, remove the temporary joint seals if they will adversely impact on the final sealing of pavement joints.

Provide details of the method of temporary sealing of pavement joints in the PROJECT QUALITY PLAN.

4.4 COLLECTION AND DISPOSAL OF SLURRY RESIDUE

Collect and remove the slurry residue produced from the diamond grinding process off the road surface and recycle or dispose of the slurry. Do not spread the slurry residue on to the verge or median of the roadway or allow it to run off into drainage pits or watercourses.

Provide details of the proposed method of disposal of the residue in the PROJECT QUALITY PLAN.

Clean up, as soon as possible, any spillage of residue on site or at any unloading location within the site and, in any event, within 24 hours of the occurrence of the spill.

Provide details of procedures for cleaning up any spillage in the PROJECT QUALITY PLAN.

4.5 UTILITY MARKERS

Restore utility markers if damaged during your grinding operations, and include details of the restoration procedures in the PROJECT QUALITY PLAN.

5 FINISHED SURFACE REQUIREMENTS

5.1 GENERAL

After diamond grinding, the resulting grinded pavement surface must be true to grade and uniform in appearance with a longitudinal line-type texture. The uniform appearance does not include the surface appearance at holidays and feathering at edges of the grinded width.

The grinded pavement surface must have a uniform slope in the transverse direction to allow lateral drainage, without any steps between grinding runs exceeding 3 mm.

At the edges of the grinded pavement, feather the ungrinded pavement to maintain surface drainage and to provide a smooth ride quality.

Where the adjacent lane is not grinded, the step at the edge between the grinded and ungrinded lanes must not be more than 3 mm. Feather the step between the grinded lanes and the ungrinded lanes as necessary to meet this requirement.

Feather the area abutting the start and finish of the work, so that the step between the grinded area and the ungrinded area is not more than 5 mm.

The maximum width of such feathering is 1,000 mm.

5.2 SURFACE PROFILE

5.2.1 Transverse Profile

After grinding, deviations under a 3 m straight-edge laid in the transverse direction must not exceed 5 mm, except for areas within 10 m of superelevation transitions where deviations must not exceed 3 mm. Where the surface deviation is convex, place the straight-edge so that the cantilever length does not exceed 0.75 m. Do not measure feathered runs or place any part of the 3 m straight edge in the feathered run.

Commencing with trial grinding and then for the grinding for the remainder of the Works, test for conformity with the straight-edge criteria as follows:

- (a) at random locations within each grinding shift or part thereof at a minimum frequency of:
 - (i) one test per 15 lineal m of grinding run, until four conforming results are recorded; and thereafter
 - (ii) one test per 50 lineal m of grinding run.
- (b) across longitudinal joints, at a minimum frequency of:
 - (i) one test per 15 lineal m of joint, until four conforming results are recorded; and thereafter
 - (ii) one test per 50 lineal m of joint.

Upon detection of a nonconformity for either (a) or (b) above during a lesser frequency of testing permitted under part (ii), the frequency of testing must revert back to that in part (i).

- (c) In addition to the above, undertake testing at each superelevation transition at three random locations within 10 m, at mid-slab (between longitudinal joints) and at longitudinal joints.

Reground areas which fail to meet the surface profile requirements at no additional cost to the Principal.

5.2.2 Holidays

Measure and report the area of holidays for every 100 m or part thereof of traffic lane and shoulder. Express the area as the percentage of the holiday areas to the total area of the grinded pavement. Do not include holidays within the feathering run.

5.3 RIDE QUALITY

If required in Annexure R93/A, measure the ride quality of the grinded pavement surface using either:

- (a) laser profilometer in accordance with Test Method TfNSW T188; or
- (b) Class 1 profiler in accordance with Test Method TfNSW T369.

Report the longitudinal profile in terms of the International Roughness Index (IRI), with units of “metres level change per kilometre (m/km)”.

Report results at intervals as follows:

- for test lengths of 100 m or less, at 10.0 m test intervals;
- for test lengths greater than 100 m, at both 10.0 m and 100 m test intervals.

For testing under TfNSW T188, use a test speed of:

- (i) 50 km/h where the posted speed limit is less than 80 km/h; and
- (ii) 80 km/h where the posted speed is 80 km/h or greater.

The ride quality on the grinded pavement surface of trafficked lanes must not exceed an IRI of 1.56 when measured by TfNSW T188 over a 100 m lane length, or as specified in Annexure 93/A.

Any areas not meeting the ride quality requirements must be grinded to meet the requirements at no additional cost to the Principal.

5.4 TEXTURE DEPTH

If required in Annexure R93/A, measure the grinded pavement surface for texture depth in accordance with Test Method TfNSW T192. When testing to TfNSW T192, test at right angles to the direction of texturing and for a minimum length of 7 m. Where the width of grinding is less than 7 m, test at 45° to the direction of grinding for a minimum length of 7 m.

Do not measure texture depth in the feathering run.

Undertake texture depth testing immediately after grinding and submit the results to the Principal at a frequency of one test every 200 m of lane length spread across grinding runs until a minimum of 30 conforming results are obtained for each concrete surface type, such as new PCP, existing PCP, CRCP, JRCP, and cold milled surfaces.

The texture depth after grinding must not be less than 0.65 mm, or as specified in Annexure R93/A.

If the results obtained conform to this Specification, the Principal may reduce the frequency of testing to one test every 400 m of lane length spread across grinding runs.

5.5 CONFORMITY

5.5.1 Conformity

Submit to the Principal at weekly intervals a signed certificate verifying conformity to the requirements of Clause 5. Where tests are specified, submit the certificate together with a summary of test results from a laboratory accredited by NATA, with any nonconformities highlighted.

5.5.2 Pre-determined Dispositions

You may propose in writing to the Principal pre-determined dispositions for application to nonconformities in respect of the following properties:

- (a) Remaining pavement life;
- (b) Water film depth in holidays which will not cause hydroplaning in wet weather at the posted design speed;
- (c) Surface profile survey before and after grinding.

5.5.3 Cost of Rectification

The cost of rectifying nonconformities, including any restoration work to any underlying or adjacent surface or structure which becomes necessary as a result of such replacement or correction, will be borne by you.

ANNEXURE R93/A – PROJECT SPECIFIC REQUIREMENTS

NOTES TO TENDER DOCUMENTER: (Delete this boxed text after customising Annexure R93/A)

Insert the appropriate letter code (whether C, R or T) in the right hand side column of Table R93/A.1 to specify the primary purpose:

Where “Yes / No” options are shown below, delete whichever is not applicable.

Table R93/A.1 – Primary Purpose (Clause 3.1.1)

Location	Lanes	Control / Chainage	Primary Purpose
Through Carriageways			
Shoulders			

C: correct out of tolerance pavement surface levels

R: improve ride quality

T: improve pavement surface texture

Table R93/A.2 – Diamond Grinding Requirements

Clause	Description	
3.2.1	Survey of existing pavement surface by Contractor, prior to commencement of diamond grinding, required:	Yes / No ⁽¹⁾
3.1.2	Type and source of aggregates in pavement base:	
	Type ⁽²⁾ :	
	Source:	
3.1.1	Nominated grinding depth , if not shown on the drawings provided: mm
3.1.3	Allowable percentage of holidays (per lane width per 100 m length):	5 % ⁽³⁾
3.1.4	Maximum width of overlap , if different to specified values	
	Main carriageway lanes:	50 mm ⁽³⁾
	Merging or turning lanes:	75 mm ⁽³⁾
4.2	Grinding trial required:	Yes / No
4.3	Removal of raised pavement markers required:	Yes / No

Notes:

⁽¹⁾ If “No”, details of the surface levels and survey method will be made available by the Principal to the Contractor.

⁽²⁾ The blade and spacer width set out in Clause 4.1.3 is based on typical hard aggregates specified in TfNSW concrete pavement specifications.

⁽³⁾ Default values shown. Amend as appropriate.

Table R93/A.3 – Texture Depth and Ride Quality

Clause	Description	
5.3	Ride quality after grinding	
	Measure ride quality:	Yes / No
	Maximum ride quality IRI value:	1.56 IRI ⁽¹⁾
5.4	Texture depth after grinding	
	Measure texture depth:	Yes / No
	Minimum texture depth:	0.65 mm ⁽¹⁾

Notes:

⁽¹⁾ Default values shown. Amend as appropriate.

Table R93/A.4 – Schedule of Hidden Objects (Clause 3.2.2)

Description / Name of Object	Owner of Object	Contact Person & Phone Number	Confirmation with Owner Required?	Approximate Location⁽¹⁾

Note:

⁽¹⁾ Sketch plans or drawings, where appropriate, will be provided by the Principal.

ANNEXURE R93/B – MEASUREMENT AND PAYMENT

Payment will be made for all costs associated with completing the work detailed in this Specification in accordance with the following Pay Items.

Where no specific pay items are provided for a particular item of work, the costs associated with that item of work are deemed to be included in the rates and prices generally for the Work Under the Contract.

Unless specified otherwise, a lump sum price for any of these items will not be accepted.

Pay Item R93P1 - Diamond Grinding of Concrete Pavement

The unit of measurement is the square metre.

The lane and its length is as specified in Annexure R93/A, or as directed by the Principal. The width of grinding is the lane width and does not include feathering.

This Pay Item includes the preparation of the surface, the grinding operation, profilometer survey before and after grinding where specified, the collection and disposal of residue, and the replacement of worn or damaged diamond grinding blades.

Pay Item R93P2 - Feathering of Diamond Grinding

The unit of measurement is the square metre.

The width and length is as agreed or as directed by the Principal. The width of feathering must not exceed 1,000 mm and is outside the lane width.

This Pay Item includes the preparation of the surface, the grinding operation, the collection and disposal of residue, and the replacement of worn or damaged diamond grinding blades.

Pay Item R93P3 - Extra-over for Work in Vicinity of Objects

The unit of measurement is the square metre.

This Pay Item provides for any costs, additional to that paid for under Pay Item R93P1, for work in the vicinity of objects.

R93P3.1 Affected area up to 10 m²

R93P3.2 Affected area over 10 m² and up to 25 m²

R93P3.3 Affected area over 25 m² and up to 50 m²

R93P3.4 Affected area over 50 m²

Provide a separate unit rate in the Schedule of Rates for each range of affected area.

Pay Items R93P3.1 to R93P3.4 inclusive are not cumulative. An area of work paid under any one of the sub-pay items under R93P3 will not be paid concurrently under another sub-pay item under R93P3.

After completion of the diamond grinding operation, measure each affected area for payment, as follows (see Figure R93.B1):

- (a) The transverse width must be measured between the extremities of the object plus an offset of 1 m at each end, except that where an extremity is within 2.5 m of a longitudinal edge, that edge must be the limit for the width;
- (b) The longitudinal length must be measured between the extremities of the object plus an offset of 1 m at each end;
- (c) If the extremities of two or more objects are within 2 m of each other, the objects must be grouped together and regarded as one object.

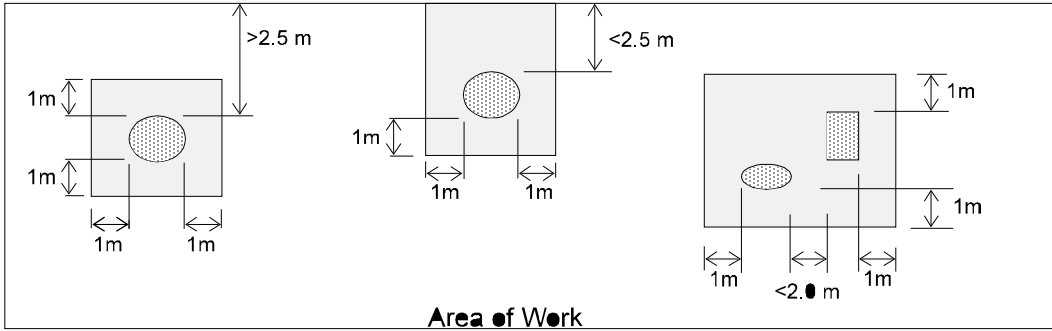


Figure R93.B1 - Measurement of Work Area in Vicinity of Objects.

ANNEXURE R93/C – SCHEDULES OF HOLD POINTS AND WITNESS POINTS

Refer to Clause 1.2.3.

C1 SCHEDULE OF HOLD POINTS AND WITNESS POINTS

Clause	Type	Description
3.2.3	Hold	Submission of setting out details and calculations of areas to be worked for payment purposes.
4.2	Witness	Diamond grinding trial.
4.2	Hold	Submission of results of diamond grinding trial section.

ANNEXURE R93/D – PLANNING DOCUMENTS

Refer to Clause 1.2.4.

The following documents are a summary of documents that must be included in the PROJECT QUALITY PLAN. The requirements of this Specification and others included in the Contract must be reviewed to determine additional documentation requirements.

Clause	Description
2.2	Source of water for use in grinding process
3.2	Method of survey
4.1.2	Methods and equipment for grinding
4.1.4	Secondary grinding process for areas in proximity to kerbs and medians
4.3	Temporary sealing of joints before grinding
4.4	Collection and disposal of slurry residue, and removal of any spillage of residue
4.5	Restoration of utility markers

ANNEXURES R93/E TO R93/L – (NOT USED)

ANNEXURE R93/M – REFERENCED DOCUMENTS

Refer to Clause 1.2.5.

TfNSW Specifications

TfNSW Q	Quality Management System
TfNSW G36	Environmental Protection

TfNSW Test Methods

TfNSW T188	Project Ride Quality (Vehicular Laser Profilometer)
TfNSW T192	Texture Depth Using TRL Meter
TfNSW T1015	Microbiology of Water Used in Roadworks (Thermotolerant Coliforms)

Australian Standards

AS 2706	Numerical values – Rounding and interpretation of limiting values
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