Materials Testing Manual

Publication Update

Edition 5, Amendment 8 of the *Materials Testing Manual* (MTM) was issued 8 December 2022.

Implementation

Notwithstanding any contractual requirements for projects current as of the issue date or any requirements for NATA accreditation, the MTM should be implemented immediately.

For existing projects, testing should continue using the methods published at the start of the contract. It is not the intention to force unnecessary rework on existing projects.

The *Materials Testing Manual* applies to all road projects and other work the department is responsible for and is, therefore, applicable to our Consultants and Contractors.

Edition 5, Amendment 8 – December 2022

Part	Test method	Description of change
All	All	• Replace 'complying' with 'conforming' as appropriate. • Include requirement to report method used in the form 'The number of this test method, that is Q###'.
1	Introduction	• Add Transport and Main Roads Technical Specification MRTS43 *Supply of Armourstone* to subsection 3.2.
5	Q133	• Include modifications from test method ASTM D6276 to Section 1. • Replace last sentence in Section 2 with 'The lime demand test provides lime contents that correspond well with minimum lime contents required for effective long-term stabilisation.' • Add water bath with temperature limits to Section 3. • Add extra bottles for storing distilled water to Section 3. • Add temperature limit for standard buffer solutions to Step 5.3.1. • Add temperature limit for distilled water to Steps 5.3.2 and 5.4.3. • Include extra detail on staggering additions of distilled water to Step 5.4.3. • Include extra details for mixing and placing beaker in water bath to Steps 5.4.4 and 5.4.5. • Remove testing of soil-lime mixture from subsection 5.4 and place in new subsection 5.5 for the testing of soil-lime mixtures. • Add Steps 5.5.10 and 5.5.11 to either test additional test portions if pH is less than 12.3 or define an invalid test if the pH does not exceed 12.3. • Amend Step 6.2 to align definition of lime demand with test method ASTM D6276. • Add requirements to report source of lime and available lime index, plot of pH v hydrated lime content to Section 7. • Add new Note 8.2 with details of *Technical Tip* for care and maintenance of pH electrodes. • Add new Note 8.4 with details for storage of wash bottle, extra distilled water, pH electrode and buffer solutions in water bath to minimise equilibration time during testing.

Part	Test method	Description of change
		• Add 'or provide a test certificate from the lime supplier that includes the result for available lime index' to Note 8.5.
	Q250	• Add the recording of oversize sieve size to Step 4.1a). • Add test methods AS 1289.5.1.1 and AS 1289.5.2.1 to Step 4.1.3b). • Amend Step 4.2.1 to remove reference to test method Q050 and include a general clause for sampling. • Add 'of a representative portion that does not include oversize material' to Step 4.2.3 to exclude oversize material from moisture content test portion. • Amend Step 5.1 for calculation of relative moisture ratio of pavement or stabilised materials. • Insert new Step 5.2 for calculation of relative moisture ratio of earthworks excluding stabilised materials. • Add new Note 7.2 to allow calculation of relative moisture ratio without adjusting for oversize material when specified.
6	Q168	NEW METHOD
7	Q201	• Remove reference to not allowing slotted sieves from Section 1. • Add reference to sample divider figure in AS 1141.2 to Section 4. • Add reference to thickness gauge in AS 1141.2 to Section 4. • Add slotted sieves to Section 4. • Add 63.0 mm, 53.0 mm and 31.5 mm test sieves to Section 4 to align apparatus with AS 1141.15. • Add mechanical sieve shaker to Section 4. • Remove references to test method AS 1141.11.1 from Steps 5.1.1 and 5.1.4. • Add 'and the fractions required in Table 1' to Step 5.1.3. • Amend calculation in Step 5.2.3c)ii to include Md, that is $m_2 - m_1$ from test method Q103A. • Remove subsection 5.3. • Add new subsection 5.3 *Load on slotted sieves.* • Add new subsection 5.4 *Method of shaking slotted sieves.* • Remove Steps 5.4.1 to 5.4.4. • Add new subsection 5.5 for determining the flakiness index using either a slotted sieve or gauge. • Replace m_5 with m_1 in Step 6.2. • Replace 'mass of test portion' with 'mass of each test fraction' in Step 6.2. • Add new Note 8.1. • Add new Note 8.3. • Add Table 1 with dimensions of slotted sieves. • Add Table 3 with recommended maximum slotted sieve loadings.
	Q232	• Replace 'MRTS306' with 'MRTS43' in Table 3 note.
	Q233	NEW METHOD

Edition 5, Amendment 7 – August 2022

Part	Test method	Description of change
All	All	• Replace 'complying' with 'conforming' as appropriate. • Include requirement to report method used in the form 'The number of this test method, that is Q###'. • Include the statement 'For the purpose of this method, the following definition shall apply:' to the start of a section with definitions.
1	Introduction	• Add Austroads test methods AG:AM/T002, AG:AM/T003 and AG:AM/T005 to Table 4.1. • Add Transport for NSW test method T171 to Table 4.1. • Add ASTM test method ASTM C1611 to Table 4.2. • Add Concrete Institute of Australia *Test Method Practice Guide* CIA Z17 to Table 4.2. • Add prefix for Transport for NSW test methods to Section 5 and Table 8 Note. • Add new prefix 'ATM' for Austroads test methods to Section 5 and Table 8 Note. • Remove test methods Q306D, Q336 and Q358 from Table 8. • Add test methods AG:PT/T232, Q103B, Q136, Q202, Q205A, Q205B, Q205C, Q214A, Q214B, Q215, Q217 and Q723 to Table 8.
2	Application	• Update curing requirements in Clause 4.4.4 to align with MRTS08 *Plant-Mixed Heavily Bound (Cemented) Pavements.*
4	Q050	• Correct references to Notes in Sections 7 and 8.
	Q060	• Add reference to figure containing apparatus example in AS 1141.3.1 to Section 3. • Add reference to figure containing apparatus examples in AS 1141.2 to Section 3. • Define the purpose of sampling from stockpiles for single samples and multiple samples in Step 6.2. • Replace Step 7.3.1 with 'At the predetermined sampling interval, have an authorised operator discharge at least 1 m³ of material into a loader bucket'.
	Q061	• Add reference to figure containing apparatus examples in AS 1141.2 to Section 3. • Replace Step 7.1.1 with 'At the predetermined sampling interval, have an authorised operator discharge at least 1 m³ of material into a loader bucket'.
5	Q101E	• Replace 'Roads and Maritime Services' with 'Transport for New South Wales' in Section 1. • Remove Step 6.3. • Add Steps 6.2 and 6.3 to include screening of material over 53.0 mm sieve during preparation and determination of mass retained on before final screening of material in Step 6.4. • Add reporting of percent retained on 53.0 mm sieve to Section 9.

Part	Test method	Description of change
	Q103A	• Add '% < 0.075 mm / % < 0.300 mm ratio' and reference to Note 9.2 to Section 2. • Add calculations for % < 0.075 mm / % < 0.300 mm ratio to Section 7. • Add reference to Notes 9.1 and 9.2 to Step 7.4.2. • Add reporting of % < 0.075 mm / % < 0.300 mm ratio to Section 8. • Add new Note 9.2.
	Q104A	• Minor editorial changes through the method to provide consistent terminology and improve grammar. • Change terminology from 'test receptacles' to 'test cup' throughout the test method. • Add references to ISO and JIS standards for dial gauges and callipers rules to Clause 3.1. • Add requirement for displacement transducers or similar devices to be of equal performance with a dial gauge to Clause 3.1. • Amend requirements for test cup to align with AS 1289.3.9.1 in Section 3 and Table 1. • Add 'mortar and pestle' to Section 3. • Add apparatus such as cloth and wash bottle to Section 3. • Move potable water from Section 3 to Section 4. • Remove drying oven from Clause 3.7.2. • Add requirement to check the penetrometer base is level to Step 5.3. • Remove Steps 5.6 and 5.22, replace with Step 6.22. • Include the use of a mixing bowl with an airtight lid to minimise moisture loss in Step 6.9. • Allow for the use of penetrometers without a fixed zero point in Steps 6.12 and 6.14. • Add 'The test shall always be performed with the cured soil proceeding from the drier to wetter condition' to Step 6.2.3. • Replace AS 1984 with ISO 13385-1 in Note 10.1.

Part	Test method	Description of change
	Q104D	• Minor editorial changes through the method to provide consistent terminology and improve grammar. • Change terminology from 'test receptacles' to 'test cup' throughout the test method. • Add references to ISO and JIS standards for dial gauges and callipers rules to Clause 3.1. • Add requirement for displacement transducers or similar devices to be of equal performance with a dial gauge to Clause 3.1. • Amend requirements for test cup to align with AS 1289.3.9.1 in Section 3 and Table 1. • Add 'mortar and pestle' to Section 3. • Add apparatus such as cloth and wash bottle to Section 3. • Move potable water from Section 3 to Section 4. • Remove drying oven from Clause 3.7.2. • Add requirement to check the penetrometer base is level to Step 5.3. • Include the use of a mixing bowl with an air-tight lid to minimise moisture loss in Step 6.1.9 and 6.2.9. • Allow for the use of penetrometers without a fixed zero point in Steps 6.1.12, 6.1.14, 6.2.12 and 6.2.14. • Replace AS 1984 with ISO 13285-1 in Note 9.1. • Remove Note to Table 1.
	Q113A	• Replace 'logarithmic scale' with 'semi-logarithmic scale' in Step 6.5.4. • Replace 'graph of bearing ratio' with 'semi-logarithmic graph of bearing ratios' in Step 7.1.3.
	Q113B	• Replace 'logarithmic scale' with 'semi-logarithmic scale' in Step 6.5.4. • Replace 'graph of bearing ratio' with 'semi-logarithmic graph of bearing ratios' in Step 7.1.3.
	Q113C	• Remove reference to modified compaction from Section 2. • Remove reference to 10-day soaking from Sections 2 and 7. • Add paragraph limiting use of this test method for Type 4 unbound material and Western Queensland materials to Section 2. • Add references to figures containing apparatus examples in AS 1289.6.1.1 to Section 3. • Remove references to modified compaction apparatus from Clause 3.9. • Remove references to modified compaction from Step 5.1.5, Step 5.3.1, Note 8.4 and Note 8.6. • Remove reference to 10-day soaking from Step 5.4.3. • Remove Note 8.10.
	Q115	• Add special gypsum plaster, a minimum compressive strength and testing requirement for capping materials in Section 4. • Add requirement to calculate achieved moisture content and achieved percentage of OMC to Step 9.2.2.

Part	Test method	Description of change
	Q135B	• Remove immersed water curing environment from Section 3. • Remove air-drying environment from Section 3. • Remove requirements for handling immersed water curing or air-drying of specimens from Step 4.3. • Separate plant-mixed from insitu-mixed requirements, where appropriate, in Table 1. • Amend curing requirements in Table 1 to align with MRTS08 *Plant-Mixed Heavily-Bound (Cemented) Pavements.* • Amend requirements in Table 1 to separate requirements for production and design testing for both cement and cementitious blends (bound) and cement and cementitious blends (lightly bound) materials. • Remove Table Note*** and Note##.
	Q136A	• Replace 'Roads and Maritime Services' with 'Transport for New South Wales' in Section 1. • Add new Note 10.9 with the typical relationship of the smooth curve of best fit in Steps 8.1.2 and 8.2.2.
	Q136B	• Replace 'Roads and Maritime Services' with 'Transport for New South Wales' in Section 1. • Replace AS 1984 with ISO 13385-1 and JIS B1904 with JIS B 7507 in Clause 4.7.
.	Q137	• Include requirement to plot permanent strain limits on plot of permanent strain as a function of cycle number in Section 9. • Add Table 4 with permanent strain limits.
	Q138A	• Add a time limit for the delay between mixing and compaction in Step 7.3.8.
	Q138B	• Add a time limit for the delay between mixing and compaction in Step 6.3.8.
	Q139	• Amend Steps 6.4.4 to 6.4.6 to continue adjusting the peak load so that it approaches the mid-point of the specified range. If the first pulse is not within the specified range, adjust the estimated peak load and start the process from Step 6.4.3. This process continues until a peak load produces five preconditioning pulses that are within the specified range. • Amend Step 6.4.7 to terminate the testing of the specimen if recovered horizontal strain is not within the limits of Step 6.2.1 or 6.3.1. • Change the reference from Clause 7.4 to subsection 6.4 in Step 6.5.1. • Add measuring and recording of peak load after each pulse to Step 6.5.2. • Remove reporting of specimens where recovered horizontal strain is not within the limits of Step 6.2.1 or 6.3.1 from Clause 8.3. • Add guidance for limit on recovered horizontal strain after preconditioning pulses to Note 9.4.

Part	Test method	Description of change
	Q141B	• Add references to figures containing apparatus examples in AS 1289.5.3.1 to Section 3. • Add requirement for a rule longer than 300 mm to Clause 3.10. • Add 'test method AS 1289.2.1.1 or one of the subsidiary test methods' to Step 8.4.1.
	Q144A	• Include minimum stockpile lot size or daily production of 250 tonnes in Steps 3.1.1, 3.2.1 and 3.3.1 to align with test method AS 1141.3.1 Clause 5.2.
	Q148	• Add reference to figure containing apparatus examples in AS 1141.2 to Section 3.
	Q251A	• Amend Step 5.4 to allow compaction in both 3 layers (standard) and 5 layers (modified).
	Q251B	• Add sealable containers to Section 3. • Add scarifying tool to Section 3. • Add mixing apparatus to Section 3. • Amend Step 6.1.1 to allow compaction in both 3 layers (standard) and 5 layers (modified). • Add requirement to scarify between layers to Step 6.2.5, to align with equivalent requirement in test method Q145A. • Change the number of layers from 3 to 5 and the number of blows per layer from 42 to 25 for modified compaction in Table 1. This will align the requirements with test method Q142B.
	Q253	• Add a list of test sieves required to determine coefficient of uniformity and coefficient of curvature to Section 3. • Add new Note 7.1.
6	Q160	• Remove 'and classifies the soils wettability using a classification developed by Louis W. Decker, 1988' from Section 1.
	Q164	• Update source reference in Section 1 and add a reference for material used in Note 9.2. • Change reference from Black (1956) to Klute (1965) in Section 2.
	Q185	• Remove duplicate 'BCS' from Step 6.1.

Part	Test method	Description of change
	Q188	• Minor editorial changes throughout the document, such as remove unnecessary capitalisation. • Clarify scope of document by replacing 'quarried materials' with 'quarried materials, natural sand and natural gravels' to Section 2. • Add definition for 'felspathoids' to Table 3. • Change definition for 'Fines' to 'Natural fines' in Table 3. • Add definition for 'Natural gravel' to Table 3. • Add 'in concrete and asphalt products' to the definition of glass in Table 3. • Add 'that generally passes 2.36 mm test sieve' to the definition of manufactured sand in Table 3. • Add definition for 'Quarry' to Table 3. • Change definition for 'Silica oversaturated' to 'Silica oversaturated (or oversaturated)' and replace 'free' with 'reactive' in Table 3. • Change definition for 'Silica undersaturated' to 'Silica undersaturated (or undersaturated)' in Table 3. • Change column title in Table 6.11 from 'Basalt nomenclature' to 'Petrographic nomenclature'. • Add a column titled 'Simplified nomenclature' to Table 6.11 to align with terminology in MRTS05 *Unbound pavements.* • Add extra paragraph explaining basalt nomenclature to Clause 6.11.
	Q192	NEW TEST METHOD
7	Q230	• Add terminology for products to be tested from MRTS03 *Drainage Structures, Retaining Structures and Embankment Slope Protections* to Section 2. • Add additional test sieves required in MRTS03 to Clause 4.2. • Remove 'The sampling process is to provide a representative sample of the material' from Step 5.1.
	Q231	NEW TEST METHOD
	Q232	NEW TEST METHOD
8	Q306D	WITHDRAW
	Q322	WITHDRAW
10	Q462	WITHDRAW
	Q462A	WITHDRAW
	Q463B	WITHDRAW
	Q470	• Add references to figures containing apparatus examples in AS 1012.13.1 to Section 3.
	Q471	WITHDRAW
12	Q704	• Replace 'SRVt' with 'SRV_t' in Step 7.1.

Part	Test method	Description of change
	Q708B	• Change section length from 100 m to 10 m in Clause 3.4. • Change accuracy requirement for laser displacement transducer from 0.38 mm (1 x standard deviation) to 0.5 mm in Clause 4.1 c). • Replace 'Roads and Maritime Services' with 'Transport for New South Wales' in Clause 5.2.2 a). • Replace reference to 'ARRB walking profilometer' with 'walking profiler' in Clause 5.2.2 b). • Amend Step 6.1 to include the lean-in and lead-in in the test length and to mark them as lead-in and lead-out. Include reference to Note 9.3. • Amend reporting requirements by removing the driver from Clause 8.1 d). • Amend reporting requirements by replacing job with project in Clause 8.1 e). • Amend reporting requirements by adding a reference to Step 6.7 to Clause 8.1 i). • Amend reporting requirements by adding a reference to Step 6.8 to Clause 8.1 j). • Add new Note 9.3.
	Q708C	• Amend reporting requirements by replacing job with project in Clause 7.1 d). • Remove requirement to report NAASRA roughness from Clause 7.2 e). • Change interval for IRI computations from 20 m to 10 m in Note 8.3 to align with Q708B.
	Q708D	• Amend reporting requirements by replacing job with project in Clause 7.1 d). • Remove requirement to report NAASRA roughness from Clause 7.2 e). • Change interval for IRI computations from 20 m to 10 m in Note 8.3 to align with Q708B.
	Q712	• Replace 'Roads and Maritime Services' with 'Transport for New South Wales' in Section 1. • Add broom / brush to apparatus in Section 3. • Add reference to broom / brush to Step 4.1.

Edition 5, Amendment 6 – June 2021

Part	Test Method	Description of change
	All	• Replace 'complying' with 'conforming' as appropriate. • Include requirement to report method used in the form 'The number of this test method, that is Q###'. • Replace 'AS' with 'AS/NZS' for joint Australian / New Zealand standards.

Part	Test Method	Description of change
1	Introduction	• Add abbreviation BPN to Table 3.3. • Add AS 2341.12 and AS 2341.18 to Table 4.1. • Add AS 4663 to Table 4.1. • Add ASTM D5, BS 7976 and CEN/TS 16165 to Table 4.2. • Add test method prefix 'N' to Section 5. • Add withdrawn test methods Q302A, Q476 and Q706 to Table 8.
2	Application	• Add test method Q136B to Table 6.4. • Add details of working time determination to clause 6.4.8 to support the process for extending working time in MRTS09 *Plant Mixed Foamed Bitumen Stabilised Pavements.*
4	Q050	• Replace 'AS 1289.4.1' with 'AS 1289.1.4.1' in Step 6.1.
5	Q101E	• Replace 'gauge / mesh' with 'wire gauze / mesh' in Step 2.2.6. • Add requirement for one stirring device per tray to avoid cross-contamination to Step 7.5.2.
	Q103A	• Add reference to fines to sand ratio (FSR) in Section 2. • Add calculations for fines to sand ratio (FSR) in Step 7.4.2. • Add reporting for fines to sand ratio (FSR) in clause 8.4. • Add reference to source of term fines to sand ratio (FSR) to Note 9.1. • Update reference in Note 9.1 from *Unsealed Roads Manual* to new *Road Materials Best Practice Guide 1*.
	Q113A	• Add references to figures containing apparatus examples in AS 1289.6.1.1 to Section 3. • Renumber the reference to penetration from 5.7 to 5.5 in Step 5.4.7.
	Q113B	• Add references to figures containing apparatus examples in AS 1289.6.1.1 to Section 3. • Replace 177 mm with 117 mm in Step 5.3.8.
	Q136A	• Add requirement for 7-day curing to Section 2 and Step 7.2.1 o). • Replace reference to withdrawn Australian Standard AS 1984 with ISO 13385 1 in clause 4.11. • Add 'using a Type A mould' to Step 6.4. • Remove 'for standard compaction or 42 rammer blows per layer for modified compaction' from Step 7.2.1 h). • Change Table 1 to align with AS 1289.5.2.1 Table 2.

Part	Test Method	Description of change
	Q136B	• Add 'If all material passes the 19.0 mm sieve in test methods Q142A/B Step 5.2, use a Type A mould; otherwise, use the Type B mould.' to Step 6.5 to clarify the selection of compaction moulds. • Amend moisture adjustment for dry stabilised agent in Step 7.2.3. • Replace references to test method Q138 with Q138A in subsection 9.2. • Replace Steps 9.3.1 to 9.3.3 with new Steps 9.3.1 to 9.3.4 to align process with Steps 5.1.4 to 5.1.7 in test method Q138A. This also includes references to test method Q135C for curing. • Add calculation of three day cured modulus and retained modulus to Step 9.3.5. • Update references to Notes. • Add WLM 30 to Note 12.1. • Recommended limit to the test portion size to indicate test portions of similar size should be compacted in Note 12.11.
	Q138A	• Add 'If all material passes the 19.0 mm sieve in test methods Q142A/B Step 5.2, use a Type A mould; otherwise, use the Type B mould." to Step 5.5 to clarify the selection of compaction moulds. • Amend Note 9.1 to align with terminology in test method Q136B Note 12.1.
	Q138B	• Remove Step 5.4.
	Q139	• In Step 5.1.5, replace reference to Step 6.1.5 with Step 6.1
	Q140A	• Remove interference factor 'r' from equation in Step 5.1.
	Q251C	• Change Table 1 to align with AS 1289.5.2.1 Table 2.
	Q253	• Add calculations for fines to sand ratio (FSR) in Step 4.1.1. • Add reporting for fines to sand ratio (FSR) in clause 5.2. • Add reference to source of term fines to sand ratio (FSR) to Note 6.1. • Update reference in Note 6.1 from *Unsealed Roads Manual* to new *Road Materials Best Practice Guide 1*.
	Q258B	• Amend test method number in clause 7.10.
6	Q128	• Replace 'C295' with 'ASTM C295' throughout the test method. • Amend definition of 'glass' in Table 3. • Add definitions for 'Silica oversaturated' and 'Silica undersaturated' to Table 3. • Replace 'Qz' with 'Quartz' in Table 6.4 (a). • Amend the definition of 'non-silica' / 'saturated silica glass' using the terms 'silica undersaturated' and 'silica oversaturated' in clause 6.11. • Add 'or silica undersaturated' and 'or silica oversaturated' to Table 6.11 and clause 7.2. • Add the terms 'glassy' and 'undersaturated' to Table 6.11 as appropriate.

Part	Test Method	Description of change
8	Q305	• Add references to AS/NZS 2891.5 Figures 2, 3 and 4 to Section 3. • Replace 'stiffness' with 'stiffness (Marshall Quotient)' throughout the test method to align terminology with test method AS 2891.5. • Remove 'for 101.6 mm test specimens' from clause 3.2. • Replace 'Step 3.6.1' with 'clause 3.4 a)' in clause 3.4 b). • Add 'Discard the mix test portion if it has not reached the specified temperature range' to Step 5.10 to align practice with AS/NZS 2891.5. • Remove Step 6.7.2 and replace Step 6.7.3 with '6.7.2 For the load cell and transducer system, apply the load until shear failure causes the load cell reading to decrease. Record the maximum load reading and the flow reading' to align practice with AS/NZS 2891.5. • Add 'Where a mechanical compactor is used or a hand compactor is used, alignment with interlaboratory assessment or proficiency testing schemes for mean density of a compacted specimen is required' to new Note 9.2. • Remove Note 9.4. • Remove correction factors for 150 mm mould from Table 4.
	Q327	NEW TEST METHOD
9	Q386	NEW TEST METHOD

Part	Test Method	Description of change
10	Q478	• Amend Note 5.1 to include references to Figures X1.1 to X1.4 in ASTM C1611.
	Q485	• Minor formatting changes.
12	Q704	• Replace reference to AS 1141.42 with AS 4663 in Section 1. • Include variations to AS 4663 in Section 1. • Includes reference to figures from AS 4663 in Section 3. • Include references to BS 7976 and CEN/TS 16165 for details of pendulum friction tester. • Remove requirement to use control specimens from clause 3.1. • Move rubber slider requirements from clause 3.1 to new clause 3.2 and Note 9.1. • Add a device for locating abrasive paper and lapping film to clause 3.1 g). • Amend dimensions of rubber slider in clause 3.2 a) to align with AS 4663. • Add requirement to discard slider when chamfer wear exceeds to limits in clause 3.2 b) iii. • Add measuring gauge, abrasive paper, lapping film and lint free cloth to Section 3. • Replace thermometer in Section 3 with two thermometers, one for measuring ambient temperature and the second for measuring the surface temperature. • Add Section 5 for preparation, including subsections for adjusting the friction tester, conditioning rubber sliders, recording environmental conditions and test conditions. • Add option to measure surface texture depth in Step 6.1. • Add some procedural requirements from AS 4663 to Steps 6.2 to 6.8. • Add requirement to record wet skid resistance value to nearest one BPN to Step 6.10. • Clarify the term 'wet surface' and when it should be rewetted in Steps 6.8 and 6.11. • Add requirement to measure the ambient temperature to Step 6.14. • Add units (BPN) to Steps 7.1 and Clause 8.6. • Add reporting of test location, environmental conditions, direction of test, date tested, ambient temperature and surface temperature to Section 8. • Add option to report surface texture depth in Clause 8.7. • Remove Note 8.1. • Add Note 9.4 with source of temperature correction relationship. • Move rubber slider requirements from Table 1 to Table 2. • Add Figure 1 with definitions of direction of test.

Edition 5, Amendment 5 – March 2021

Part	Test Method	Description of change
	All	• Replace 'complying' with 'conforming' as appropriate. • Include requirement to report method used in the form 'The number of this test method, that is Q###'. • Replace 'AS' with 'AS/NZS' for joint Australian / New Zealand standards.
1	Introduction	• Add a definition for granular (mechanical stabilisation) to Table 3.1. • Update the title of MRTS09 in subsection 3.2. • Remove reference to withdrawn specification MRTS35 from subsection 3.2. • Add test methods AS 1012.1, 2, 3.1, 3.5, 8.1, 8.3, 8.4 and 14 to Table 4.1. • Add test methods AS 1141.3.1, 4, 5, 6.1, 7, 11.1, 15 and 23 to Table 4.1. • Add Austroads test methods AG:PT / T220, T234, T236, T250 and T301 to Table 4.1. • Add test method AS/NZS 2891.1.1, 3.1, 5, 7.1, 8 and 9.3 to Table 4.1 • Add test method AS 1289.1.2.1, 1.4.1, 1.4.2, 2.1.1, 2.1.2, 2.1.4, 2.1.5, 2.1.6, 2.3.1, 3.1.1, 3.1.2, 3.2.1, 3.3.1, 3.3.2, 3.4.1, 3.5.1, 3.6.1, 3.6.3, 4.2.1, 5.1.1, 5.4.1, 5.5.2, 5.7.1, 6.3.2 and 6.4.1 to Table 4.1. • Add test method AS 2341.2, 23 and 29 to Table 4.1. • Add prefix 'AS/NZS' for methods published jointly by Standards Australia and Standards New Zealand Standards to Section 5. • Amend the identifier for RMS test methods in the Table 8 Notes.
2	Application	• Replace 'AS' with 'AS/NZS' for joint Australian / New Zealand standards. • Replace 'field mix' with 'field mixed' in Tables 3.6, 4.5, 5.4, 5.6, 6.4, 6.6 and 7.6. • Replace 'laboratory mix' with 'laboratory mixed' in Tables 3.4, 4.4 and 7.4.
3	Q020	• Remove reference to withdrawn test method Q314 in Clause 6.1.
4	Q050	• Remove Section 9 for systematic random stratified sampling. This technique is not used in the MRTS series of Technical Specifications. • In Step 6.1, replace references to computer-generated random numbers and Table 1 with references to AS 1289.1.4.1 and AS 1289.1.4.2 for the selection of random numbers. • Remove Notes 12.2, 12.4 and 12.7. • Remove Table 1.

Part	Test Method	Description of change
5	Q101	• Align the dispersing solution requirements in Clause 4.1 with AS 1289.3.6.1; that is, make a stock solution that is diluted by 10 to one when used to wash soils. • Add test methods AS 1289.2.1.2 and AS 1289.2.1.5 to Steps 5.2.2 and 6.1.2. • Replace sodium carbonate decahydrate with hydrated sodium carbonate in Clause 4.1 and Note 7.24. • Replace the terminology 'dispersing agent' with 'dispersing solution' in Clause 4.1 and Note 7.12.
	Q103A	• Align the dispersing solution requirements in Clause 4.1 with AS 1289.3.6.1; that is, make a stock solution that is diluted by 10 to one when used to wash soils. • Change reference in Clause 3.1 from Note 9.1 to Note 9.2. • Remove reference to Note 9.7 from Step 6.5.7. • Replace sodium carbonate decahydrate with hydrated sodium carbonate in Clause 4.1 and Note 9.4. • Add new Note 9.5 with guidance on maximum loading of test sieves. • Replace the terminology 'dispersing agent' with 'dispersing solution' in Clause 4.1 and Note 9.6.
	Q103F	WITHDRAWN.
	Q106	• Replace 'e.g.' with 'for example' in Clause 3.3. • Remove Table 2.
	Q113A	• Add calibration requirements for load cell to Clause 3.1b). • Add calibration requirements for penetration gauge to Clause 3.1d). • Add calibration requirements for swell gauge to Clause 3.7. • Renumber the reference to penetration from 5.7 to 5.5 in Step 5.4.7. • Amend Note 8.4 to align with the format of materials height gauge information in test method Q113C.
	Q113B	• Add calibration requirements for load cell to Clause 3.1b). • Add calibration requirements for penetration gauge to Clause 3.1d). • Add calibration requirements for swell gauge to Clause 3.7. • Amend the compaction requirements to 53 blows / layer and five layers in Steps 5.3.2 to 5.3.8 and Note 8.4. • Amend Note 8.4 to align with the format of materials height gauge information in test method Q113C.
	Q113C	• Add calibration requirements for load cell to Clause 3.1b). • Add calibration requirements for penetration gauge to Clause 3.1d). • Add calibration requirements for swell gauge to Clause 3.7.
	Q135C	• Replace 'laboratory and field moulded' with 'laboratory mixed and field mixed' in Section 2. • Remove 'Insitu stabilisation' from Laboratory mix specimen type in Table 1. • Replace 'Laboratory mix' with 'Laboratory mixed' in Table 1.
	Q136A	• Add Note 10.8 to Step 7.2.1h) to make simultaneous compaction of layers optional.

Part	Test Method	Description of change
	Q138B	• Replace 'field mix' with 'field mixed' in test method title.
	Q139	• Remove '(insitu and plant mixed)' from Section 2. • Remove references to 'insitu materials' and 'insitu stabilisation process' from subsection 5.1. • Replace 'insitu materials' with 'from insitu stabilisation' in title of subsection 5.2. • Replace 'plant mixed materials' with 'from plant mixed stabilisation' in title of subsection 5.3. • Replace 'laboratory' with 'laboratory mixed' in title of subsection 6.2. • Replace 'insitu mixed' with 'from insitu mixed stabilisation' in title of Clause 8.1. • Replace 'plant mixed' with 'plant mixed stabilisation' in Clause 8.1. • Remove reference to 'for insitu mixed' from Clause 8.1. • Remove references to 'insitu mixed materials' from Clause 8.7. • Replace 'For 'insitu mixed materials' with 'From insitu stabilisation' in Clause 8.8.1. • Replace 'For plant mixed materials' with 'From plant mixed stabilisation' in Clause 8.8.2.
	Q140A	• Remove reference to oversize from Section 1. • Replace '35% of oversize rock' with '20% of oversize rock' in Section 2. • Replace 'For pavements materials excluding stabilised materials' with 'For pavements materials including granular stabilisation and excluding stabilised materials with a stabilising agent' to Step 4.1.3b)i. • Add 'excluding granular stabilisation' to Step 4.1.3b)ii. • Remove 'interference factor' from calculations in Clause 5.1. • Remove Table 1, oversize greater than 20% no longer permitted in test methods Q142A or Q142B.
	Q141B	• Increase the maximum test depth from 300 mm to 350 mm in Step 5.1 and Table 1. • Add test methods AS 1289.2.1.2 and AS 1289.2.1.5 to Step 8.4.1. • Add new Note 11.2 guidance on using larger calibration cylinders.
	Q142A	• Renumber Clause 7.9.3 to 7.10. • Remove reference to 'coarseness of material permitted' from Section 1. • Replace 19.0 mm sieve with 37.5 mm sieve in Clause 3.1.2. • Add test methods AS 1289.2.1.2 and AS 1289.2.1.5 to Steps 5.6.2 and 5.15. • Change Table 2 to align with AS 1289.5.1.1 Table 2.
	Q142B	• Remove reference to 'coarseness of material permitted' from Section 1. • Replace 19.0 mm sieve with 37.5 mm sieve in Clause 3.1.2 • Add test methods AS 1289.2.1.2 and AS 1289.2.1.5 to Steps 5.6.2 and 5.15. • Change Table 2 to align with AS 1289.5.2.1 Table 2.

Part	Test Method	Description of change
	Q144A	• Remove requirement to sample from 'not less than three days' production or from three stockpiled lots' from Steps 3.1.1 and 3.2.1. • Add 'excluding granular stabilisation' to Step 3.4. • Add new subsection 3.5 for granular stabilisation. • Remove requirement that samples be obtained 'such that the check is on the lot that contains the last of the 10,000 tonnes' from Step 5.1.1a). • Renumber Steps 4.2 to 4.7 to 4.1.1 to 4.3.
	Q145A	• Add Note 10.3 to Step 7.5 to allow simultaneous compaction of layers. • Add Step 7.11 to allow compaction of multiple specimens.
	Q146	• Replace 're-establishing an updated' with 'determining new' in Step 3.3. • In Step 3.3, amend frequencies for determining new soil particle densities to align with frequencies for assigned values in test method Q144A. • Add new Note 6.1.
	Q149	• Amend the reporting accuracy of rut depth 0.2 mm in Clauses 6.3 and 6.6 to reflect the measurement uncertainty of the test method.
	Q250	• Add test methods AS 1289.2.1.2 and AS 1289.2.1.5 to Step 4.2.3.
	Q251A	• Replace 'laboratory mix' with 'laboratory mixed' in test method title. • Add Note 8.9 to Step 5.4 to allow simultaneous compaction of layers. • Amend the number of layers and blows / layer to align with requirements in test method Q142B in Table 1. • Amend Note 8.2 to include measurements for modified compaction in Type A mould.
	Q251B	• Replace 'field mix' with 'field mixed' in test method title and Section 2. • Add Note 8.9 to Step 6.1.1 and 6.2.5 to allow simultaneous compaction of layers. • Amend the number of layers and blows / layer to align with requirements in test method Q142B in Step 6.2.5 and Table 1. • Amend Note 9.2 to include measurements for modified compaction in Type A mould.
	Q251C	• Replace 'laboratory mixed material' with 'UCS specimens' in Clause 7.2. • Add Note 8.9 to Step 5.8 to allow simultaneous compaction of layers. • Amend Note 8.1 to include measurements for modified compaction in Type A mould.

Part	Test Method	Description of change
	Q258A	• Renumber test method from Q726B to Q258A. • Amend Section 2 to restrict the use to quality control for earthworks. This aligns the test method with the MRTS specifications. • Add additional requirements to Sections 2, 3, 4, 5 and 7 to align test method with requirements of TP BF-StB Part B 8.3: *Dynamic Plate Load Testing with the Light Drop Weight Tester*, 2012. • Add new Section 6 with calculations from TP BF-StB Part B 8.3: *Dynamic Plate Load Testing with the Light Drop Weight Tester*, 2012. • Add Note 8.1 with guidance on the types of apparatus that may comply with this test method. • Add Table 1 with test apparatus requirements from TP BF-StB Part B 8.3: *Dynamic Plate Load Testing with the Light Drop Weight Tester*, 2012.
	Q258B	• Renumber test method from Q726A to Q258B. • Amend Section 2 to restrict the use to quality control for earthworks. This aligns the test method with the MRTS specifications. • Add additional requirements to Sections 2, 5 and 7 to align test method with recommendations in Fleming P.R, Edwards J.P, *LWD Best Practice Guide*, Loughborough University, Institutional Repository, 2013. • Add new Section 6 with calculations. • Add Note 8.1 with guidance on the types of apparatus that may comply with this test method. • Add new Notes 8.2 and 8.3.
6	Q160	• Amend test method title. • Include full reference for test method source in Section 1. • Add new Note 7.1.
	Q161	• Amend test method title. • Add new Section 3 with test method background. • Add new Notes 9.1, 9.2 and 9.3. • Include details of source reference in Note 9.4. • Add photographs of slaking class to Table 1.
	Q162	• Amend test method title. • Add new Section 3 with test method background. • Add new Note 9.1. • Include details of source reference in Note 9.4. • Add photographs of clouding class to Table 1.
	Q163	NEW TEST METHOD.
	Q164	NEW TEST METHOD.
	Q165	NEW TEST METHOD.
	Q166	NEW TEST METHOD.
	Q167	NEW TEST METHOD.

Part	Test Method	Description of change
7	Q203	Replace references to withdrawn AS 4518.2 with ISO 8486-2 in Clauses 4.2 and 4.3.
8	Q304B	• Replace 'relative compaction' with 'air voids' to align terminology with test method Q311 in Section 2. • Include reference to Table 2 – *Mix Compaction Temperatures* in Clause 3.5. • Add test method AS 2891.7.1 to Step 5.1. • Replace reference to withdrawn test method Q314 with Q311 in Step 5.2. • Add Step 5.3 requiring oven temperature meet the requirements of Table 2. • Replace relative compaction target of 91% with an air voids target of 9% in Step 5.2. • Replace 'relative compaction' with 'air voids' to align terminology with test method Q311 in Steps 5.5 and 5.11. • Replace temperature range of 150 ± 3ºC with reference to compaction temperature range in Table 2. • Add test methods AS 2891.9.2 and AS 2891.9.3 to Step 5.13. • Replace relative compaction target of 93% with an air voids target of 7% in Step 5.14. • Replace relative compaction target of 95% with an air voids target of 5% in Step 5.15. • Add Table 2 – *Mix Compaction Temperatures* from test method Q305.
	Q308C	• Replace '@' with 'Q' in Step 4.3.
	Q309	• Add test method AS 2891.7.1 to Step 7.23. • Add test methods AS 2891.3.1, Q308D and AG:PT/T234 to Steps 7.3 and 7.24.
	Q310	• WITHDRAWN.
	Q311	• Add test methods AS 2891.9.2 and AS 2891.9.3 to Step 3.1. • Add test method AS 2891.7.1 to Step 3.2. • Add test methods AS 2891.3.1 and AG:PT/T234 to Step 3.3. • Add test method AS 2891.8 and the property 'binder absorbed' to Step 3.5. • Remove test method Q316 from Step 3.5. • Add the term 'bulk density' to the calculation in Steps 4.1, 4.2.1 and 4.2.2. • Remove effective binder volume calculation using binder absorption from test method Q316 from Step 4.2. • Add effective binder volume calculation using binder absorbed from test method AS 2891.8 to Step 4.2. • Report option to report effective binder volume to Section 5. • Add new Figure 1.

Part	Test Method	Description of change
	Q315	• Replace reference to withdrawn test method Q301 with AS 2891.1.1 in Step 5.1. • Add test method AS 2891.7.1 to Step 5.3. • Add test method AS 2891.9.2 to Step 5.6. • Add the term 'bulk density' to Step 5.6.
	Q316	• WITHDRAWN.
	Q317	• Add test methods AS 2891.3.1 and AG:PT/T234 to Step 3.5. • Add test method AS 2891.8 and the property 'binder absorbed' to Step 3.6. • Remove test method Q316 from Step 3.6. • Add effective binder volume calculation using binder absorbed from test method AS 2891.8 to Step 4.3.
	Q318	• Add test methods AS 2891.3.1 and AG:PT/T234 to Step 3.1.
	Q321	• Add test methods AS 2891.3.1 and AG:PT/T234 to Step 3.1. • Add test method AS 2891.8 and the property 'binder absorbed' to Step 3.2. • Remove test method Q316 from Step 3.2. • Add test method AS 2891.9.2 to Step 3.4. • Add the effective binder volume calculation using binder absorption from test method Q211 or an established binder absorption / water absorption relationship to Step 4.1. • Remove effective binder volume calculation using binder absorption from test method Q316 from Step 4.1. • Add effective binder volume calculation using binder absorbed from test method AS 2891.8 to Step 4.1.
	Q322	• Add test method AS 2891.7.1 to Step 5.10.2.
	Q325	• Replace 'AS 2891 Clause 8' with 'AS 2891.1.2 Clause 8' in Step 5.5.2.
9	Q372	• Replace reference to withdrawn test method Q301 with AS 2891.1.1 in Step 5.2.1. • Add test methods AS 2891.3.1, Q308D and AG:PT/T234 to Note 9.7.
12	Q708B	• Remove references to NAASRA roughness meter from Section 2 and Clauses 3.2, 3.5, 7.3 and 8.2e). Calculation and reporting of NAASRA values is no longer required in the MRTS specifications.
	Q708C	• Remove references to NAASRA roughness meter from Section 2 and Clauses 3.7, 5.3.3, 6.6 and 7.2e). Calculation and reporting of NAASRA values is no longer required in the MRTS specifications.

Part	Test Method	Description of change
	Q708D	• Remove references to NAASRA roughness meter from Section 2 and Clauses 3.5, 6.6 and 7.2e). Calculation and reporting of NAASRA values is no longer required in the MRTS specifications. • Replace references to 'ARRB walking profiler' with 'walking profiler' in test method title, Section 2 and Clause 4.1. • Amend Section 1 and Clauses 3.2, 4.5, and 5.3 to remove or make optional requirements specific to walking profiler. • Move specific requirements for walking profiler from Section 3 *Definitions* to Section 3 *Apparatus.* • Remove Steps 5.4, 5.6, 5.7, 6.2 and 6.3 that were specific to the ARRB walking profiler. • Add new Note 8.2.
	Q714	• Add 'withdrawn' to reference to test method Q705 in Section 1.
	Q721	• Remove reference to AS 4115 from Clause 3.3
	Q726A	• WITHDRAWN.
	Q726B	• WITHDRAWN.

Edition 5, Amendment 4 – September 2020

Part	Test method	Description of change
	All	• Replace 'complying' with 'conforming' as appropriate. • Include requirement to report test method used in the form 'The number of this test method, that is Q###'.
1	Introduction	• Mark AS 2103 and AS 1984 as withdrawn in Table 4.1. • Add ISO standards 463 and 13385 1 to Table 4.2. • Add JIS standard B 7503 to Table 4.2. • Add test methods Q105 and Q358 to Table 8.
2	Application	• Amend references throughout to align with *Pavement Rehabilitation Manual*, February 2020. • Add references to test method Q135B to Tables 3.6, 4.5 and 7.6. • Add references to test method Q251A to Tables 3.4, 4.4 and 7.4. • Add references to test method Q251B to Tables 3.6, 4.5 and 7.6. • Add references to test method Q251C to Table 7.4.
4	Q058	• Replace 'available area' with 'available perimeter' in Step 8.2.2. • Replace 'available area' with 'interval' in Step 8.3.
5	Q101A	• Add rotary sample divider to Section 3. • Add new Section 6 with instructions for use of rotary sample divider.
	Q101B	• Add rotary sample divider to Section 3. • Add new Section 6 with instructions for use of rotary sample divider.
	Q101D	• Replace reference to Australian Standard AS 1152 with ISO 3310 in Section 3.
	Q113B	• Amended rammer details in Table 2 to align with requirements in subsection 3.9.

Part	Test method	Description of change
	Q115	• Amend Section 2 to add the testing recycled materials to the scope. • Replace reference to withdrawn Australian Standard AS 1984 with ISO 13385 1 and JIS B 7507 in Section 3.2. • Add new subsection 5.3 for testing recycled materials. • Amend Section 10 to add reporting requirements for recycled materials.
	Q135A	• Replace both curing container and airtight container with sealable container throughout the test method. • Amend Steps 7.2.5 and 7.3.5 to include guidance on loosening material adhering to the inside of the mixer.
	Q135B	• Amend Table 1 to add the standard curing conditions for recycled materials.
	Q135C	• Replace 'environmental chamber' with 'environmental cabinet' in Table 1 to align terminology with Sections 3 and 5. • Remove standard curing conditions for laboratory mixed – plant mixed stabilisation from Table 1. • Remove as received modulus curing requirements for field mixed materials from Table 1. • Remove initial curing in an environmental chamber for seven and fourteen-day cured modulus specimens from Table 1. • Amend times for curing in drying oven to reflect changes in test method Q139.
	Q138A	• Amend the compaction process in Steps 7.3.5 and 7.3.7 to discard the filter papers after compaction is completed and require the specimen be in contact with the base plate after the specimen is inverted. • Add the recording of the date and time of compaction to Step 7.3.8. • Add the reporting of date and time of compaction to Section 8. • Remove reference to field mixed materials from Note 9.4. • Change test portion mass in Note 9.11 to 2700 g. Recommended limit to the test portion size to indicate test portions of similar size should be compacted.
	Q138B	• Remove callipers from Section 3. • Amend the compaction process in Steps 6.1.5 and 6.1.7 to discard the filter papers after compaction is completed and require the specimen be in contact with the base plate after the specimen is inverted. • Add the recording of the date and time of compaction to Step 6.1.8. • Add the reporting of date and time of compaction to Section 7. • Remove reference to laboratory mixed materials from Note 9.2. • Change test portion mass in Note 8.3 to 2700 g. Recommended limit to the test portion size to indicate test portions of similar size should be compacted.

Part	Test method	Description of change
	Q139	• Replace reference to withdrawn Australian Standard AS 1984 with ISO 13385 1 and JIS B 7507 in subsection 4.5. • Replace references to Steps 7.1, 7.1.4 and 7.5 with 6.1, 6.1.4 and 6.5 in subsection 5.1. • Amend Step 5.1.1 to allow for the preparation of six test specimens. • Amend Steps 5.1.1 to 5.1.3 to allow for the preparation and compaction of three test specimens for initial modulus. These specimens are then discarded. • Amend Steps 5.1.4 to 5.1.7 to allow for testing of the three remaining specimens prepared in Step 5.1.1 for cured and soaked modulus. • Add requirement to test cured modulus specimens at 72 hours after compaction in Step 5.1.5. • Remove subsection 5.2. • Add '(insitu materials)' to title of subsection 5.2. • Add requirement to test cured modulus specimens at 72 hours after compaction in Step 5.2.2. • Replace references to Steps 6.1.2 and 6.1.7 with 5.1.2 and 5.1.7 in subsections 5.2 and 5.3. • Remove references to as received modulus from Steps 5.2.1 and 5.3.2. • Add '(plant mixed materials)' to title of subsection 5.3. • Add requirement to test cured modulus specimens at 72, 168 and 336 hours after compaction in Steps 5.3.2, 5.3.3 and 5.3.4 respectively. • Replace references to Steps 6.1.2 and 6.1.3 with 5.1.2 and 5.1.3 in subsection 5.4. • Replace references to Steps 6.1.6 and 6.1.7 with 5.1.6 and 5.1.7 in subsection 5.4. • Replace references to Steps 7.4.3 with 6.4.3 in subsection 6.4. • Remove reference to plant mixed material from subsection 8.1. • Remove requirements to report for laboratory mixed – plant-mixed materials in subsection 8.7.2. • Remove reference to as received modulus from subsection 8.8.1. • Remove reference to initial modulus from subsection 8.8.2. • Replace references to Steps 7.4.3 and 7.4.6 with 6.4.3 and 6.4.6 in Note 9.4.
	Q144A	• Insert calculations for mean maximum dry density, mean optimum moisture content, mean oversize density and mean percentage of oversize in Section 4.

Part	Test method	Description of change
	Q148	• Amend mould requirements in subsection 3.1. • Amend mixing apparatus in subsection 3.3 to allow mixing of test portions before compaction. • Add greaseproof paper to Section 4. • Reduce test portion size in Step 5.4. • Include Step 6.9 to reference test method Q135A for mixing by either hand or machine for materials without stabilising agent. • Amend the compaction process in Section 7 to include greaseproof paper and match current practice. • Include reporting of target dry density and achieved moisture content to Section 9.
	Q149	• Remove wheel tracker mould from Section 3. • Add plastic film to Section 4. • Remove Section 5. • Add test temperature and one-hour equilibration to Step 5.2. • Add the covering of test specimen to reduce moisture loss to Steps 5.4 and 5.5. • Amend Step 5.5 to add additional criteria for termination of test; that is, when granular materials start falling into the rut. • Add requirement to report reason for terminating test prior to specified number of cycles to Section 7. • Add requirement to report rut depth at specified cycles to Section 7. • Add requirement to include a semi-logarithmic plot of rut depth versus cycles in Section 7. • Add Table 1 with apparatus tolerances.
	Q251A	• Remove references to testing materials in their natural state from Section 2 and Table 2.
	Q251C	• NEW TEST METHOD.
	Q257	• Replace reference to withdrawn Australian Standard AS 2103 with ISO 463 and JIS B 7503 in Clause 3.1b). • Replace 'meeting' with 'conforming' in Clauses 3.1a) and 3.1b). • Add calliper to apparatus in Section 3. • Amend calculation in Step 9.5.2 to change the divisor from 1000 to 1,000,000 to obtain the correct conversion from g to kN.
6	Q171	• WITHDRAWN.
	Q172	• WITHDRAWN.

Part	Test method	Description of change
	Q181C	• Replace reference to withdrawn Australian Standard AS 1984 with ISO 13385 1 and JIS B 7507 in subsection 3.5. • Remove last paragraph from Section 2. Requirement for particle size distribution to be performed is no longer a requirement of the test method. • Remove reference to ASTM D6027 from Clause 3.1d) and Table 1 Note 1. • Remove reference to determination of particle size distribution from Step 4.3. • Remove requirements from Step 4.4 that are not required when samples passing 19.0 mm test sieve are used as defined in Step 4.2. • Amend Step 5.4.1 to allow a small load to be applied to the sample when assembling the normal loading system. • Add requirements for maximum indicated error and maximum repeatability to Table 1. • Change requirement for minimum resolution from 0.002 mm to 0.01 mm.
	Q185	• Replace reference to withdrawn Australian Standard AS 1984 with ISO 13385 1 and JIS B 7507 in subsection 3.4.
	Q188	• Major revision of the test method to include specific requirements for assessing quarried materials used on Transport and Main Roads projects.
7	Q229A	• Add reference to ASTM D6928 Figure 1 to Section 3.
	Q229B	• Add reference to ASTM D6928 Figure 1 to Section 3.
8	Q308C	• Remove all references to Dean and Stark apparatus for removing water from mix. • Remove all apparatus, procedural and calculation requirements for determination of binder content and particle size distribution. • Include 105–110°C drying oven in Section 3. • Add oven drying procedure to Section 4. • Add references to test methods AS 2891.3.1, Q308A, Q308D or AG:PT/T234 for determination of binder content and particle size distribution to Section 4. • Add requirements for reporting the oven drying process to Section 5. • Add requirements to report binder content and particle size distribution as detailed in test methods AS 2891.3.1, Q308A, Q308D or AG:PT/T234 to Section 5.
	Q312	• WITHDRAWN.
	Q314	• WITHDRAWN.
	Q325	• Replace reference to test method Q319 with Austroads test method AG:PT/T220 in Step 5.2.1.
9	Q334	• WITHDRAWN.
	Q336	• WITHDRAWN.
	Q358	• WITHDRAWN.

Part	Test method	Description of change
10	Q460A	• Replace reference to withdrawn Australian Standard AS 2103 with ISO 463 and JIS B 7503 in subsection 3.3.
	Q460B	• Replace reference to withdrawn Australian Standard AS 2103 with ISO 463 and JIS B 7503 in subsections 3.4 and 3.6.
	Q460C	• Replace reference to withdrawn Australian Standard AS 1984 with ISO 13385 1 and JIS B 7507 in subsection 3.3.
	Q461	• Replace reference to withdrawn Australian Standard AS 1984 with ISO 13385 1 and JIS B 7507 in subsection 3.12. • Replace reference to withdrawn Australian Standard AS 2103 with ISO 463 and JIS B 7503 in subsection 3.13.
	Q463A	• Replace reference to withdrawn Australian Standard AS 1984 with ISO 13385 1 and JIS B 7507 in subsection 3.1.
	Q463B	• Replace reference to withdrawn Australian Standard AS 1984 with ISO 13385 1 and JIS B 7507 in subsection 3.1.
	Q473	• Replace reference to withdrawn Australian Standard AS 1984 with ISO 13385 1 and JIS B 7507 in subsection 3.7.
	Q474	• Replace reference to withdrawn Australian Standard AS 2103 with ISO 463 and JIS B 7503 in subsection 3.7. • Replace reference to withdrawn Australian Standard AS 1984 with ISO 13385 1 and JIS B 7507 in subsection 3.4.
	Q475	• Replace reference to withdrawn Australian Standard AS 1984 with ISO 13385 1 and JIS B 7507 in subsection 3.4.
12	Q708B	• Add reference to ASTM D950 to Section 1. • Add new subsection 3.5 with requirements for two laser profilometer including requirement to be a Class 1 standard device. • Add resolution and accuracy requirements for laser displacement transducers to Clause 4.1c). • Amend sampling interval requirements in Clauses 4.1e) and 4.1f) to meet Class 1. • Add 'using an ARRB walking profilometer' to Step 5.2.2b).
	Q712	• Remove reference to withdrawn Australian Standard AS 1003 from Section 1.
	Q726A	• NEW TEST METHOD.
	Q726B	• NEW TEST METHOD.

Edition 5, Amendment 3 – January 2020

Part	Test method	Description of change
1	Introduction	• Add standard EN 1426 to Table 4. • Add test methods Q478 and Q479 to Table 5. • Add CIA – Concrete Institute of Australia to the Notes for Table 5.

Part	Test method	Description of change
5	Q104A	• Add reference to standard EN 1426 to subsection 3.1, to align general apparatus requirements for cone penetrometer with AS 1289.3.9.1. • Include requirement to report test method used in the form 'The number of this test method, that is Q###' to Section 7.
	Q104D	• Add reference to standard EN 1426 to subsection 3.1, to align general apparatus requirements for cone penetrometer with AS 1289.3.9.1. • Include requirement to report test method used in the form 'The number of this test method, that is Q###' to Section 7.
	Q113A	• Replace 'compactive effort (596 kJ/m³)' with 'standard compactive effort (596 kJ/m³)' in Section 2. • Amend references to other clauses in Steps 5.3.10 to 5.3.12. • Include units of measurement for CBR in Step 6.4.5 and Table 4.
	Q113B	• Replace 'compactive effort (2703 kJ/m³)' with 'modified compactive effort (2703 kJ/m³)' in Section 2. • Amend references to other clauses in Steps 5.3.10 to 5.3.12. • Include units of measurement for CBR in Step 6.4.5 and Table 4.
	Q113C	• Include units of measurement for CBR in Step 6.6.5 and Table 4.
	Q115	• Change constant from 0.899268 to 0.899651 in Step 9.3.2.
	Q138A	• Include reporting of maximum dry density and optimum moisture content in Section 3.
	Q142B	• Replace 'standard compactive effort (596 kJ/m³)' with 'modified compactive effort (2703 kJ/m³)' in Section 2. • Replace 'three layers' with 'five layers' in Step 5.11.1a).
6	Q181C	• Change resolution of force measuring device for shear from 1 N to not greater than 5 N in Clause 3.1c). • Remove resolution requirements for displacement measuring devices from Clause 3.1d). • Add reference to ASTM D6027 for calibration requirements of displacement measuring devices in Clause 3.1d) to align with ASTM D3080. • Refer to Table 1 for resolution and percent error requirements of displacement measuring devices in Clause 3.1d) to align with ASTM D3080. • Add requirements for checking masses where used in vertical loading system in Clause 3.1e) to align with ASTM D3080. • Add requirements for load cell complying with AS 2193 where used in vertical loading system in Clause 3.1e). • Include requirement to report test method used in the form 'The number of this test method, that is Q###' to Section 7. • Amend Table 1 to include resolution and percent error requirements for displacement measuring devices to align with ASTM D6027.

Part	Test method	Description of change
10	Q478	NEW TEST METHOD
	Q479	NEW TEST METHOD

Edition 5, Amendment 2 – October 2019

Part	Test method	Description of change
1	Introduction	• Add abbreviation APHA to Table 2.
5	Q106	• Remove reference to Note 8.6 from Step 5.1.5.
	Q135A	• Renumber Clauses 3.2.7 and 3.2.8 to 3.3 and 3.4.
	Q135B	• Add curing requirements for lime, lime / flyash and lime / slag for UCS, RLT, CR and AWT testing to Table 1.
	Q135C	• Align oven curing temperatures in Table 1 with the requirements for the oven in Clause 3.2.
	Q136A	• Replace achieved dry density with UCS in Clause 9.3.
	Q142B	• Amend Step 5.11.1, Note 9.2 and Table 1 to align compaction requirements for layer and blows to AS 1289.5.2.1.
12	Q708B	• Amend Clause 6.7i) to only record defects related to culverts. • Remove Clause 7.2 and related reporting requirement in Clause 8.1i). • Remove requirement to report calibration relationship used in Clause 8.1d). • Include requirement to report surface type in Clause 8.1. • Remove requirement to report GNSS coordinates from Clause 8.2.

Edition 5, Amendment 1 – July 2019

Part	Test method	Description of change
	All	• Include requirement to report test method used in the form 'The number of this test method, that is Q###'.
1	Introduction	• Add reference to *Austroads Glossary of Terms* for definitions to subsection 3.2. • Add reference to *Austroads Glossary of Terms* for abbreviations to subsection 3.4. • Add reference to *ASTM International methods* to Section 5. • Remove definitions for earthworks, insitu stabilisation, nominal size and stabilisation from Table 1. These definitions are now contained in the *Austroads Glossary of Terms*. • Remove abbreviations GNSS, GPS, IRI, LS, MDD, OMC, PI, PMB and UCS from Table 2. These abbreviations are now contained in the *Austroads Glossary of Terms*. • Remove reference to ISO 11648-2 from Table 4. • Remove test methods Q202, Q205A, Q205B, Q205C, Q214A, Q214B, Q217, Q319, Q320, Q705 and Q706 from Table 5. • Add test methods Q050 and Q060 to Table 2.

Part	Test method	Description of change
2	Application	• Add Section 1 – *Purpose* to the document. • Consolidate all references in the document into a new Section 2. • Rewrite *Introduction* and *Background* sections throughout the document. • Replace any requirements or tables that are reproductions from other sources with a reference to the original source. • Update parts of the document to align with the latest editions of Transport and Main Roads Technical Specifications MRTS07A, MRTS07B, MRTS07C and MRTS09. • Update parts of the document to align with the proposed new edition of the *Pavement Rehabilitation Manual*.
3	Q020	• Remove references to MRTS04, MRTS30 and MRTS40 from Section 1. • Include Step 3.2 referencing MRTS01 for acceptance constant. • Amend reporting requirements for mean and standard deviation in Step 5.1. • Add Step 5.2 to report characteristic value and reference to MRTS01. • Add Step 5.4 including reporting of source of acceptance constant, identification of specification requiring reporting of characteristic value and requirement to report use of unrounded data. • Remove test methods Q134 and Q482 from Note 6.1. • Add test methods AS 2891.9.2 and AS 2891.9.3 to Note 6.2. • Add test method AS 2891.9.2 to Note 6.3. • Remove Tables 1, 2, 3, 4 and 5.
4	Q050	• Replace relevant sections with references to equivalent parts of AS 1289.1.4.1 and AS 1289.1.4.2. • Allow use of computer-generated random numbers.
	Q060	• Remove sampling frame, shield board and mechanical stream cutter from apparatus list in Section 4. • Adjust number sample increments to align with AS 1141.3.1 in Step 5.1. • Replace techniques in subsections 7.1, 7.2, 8.1, 8.3, 8.4, 8.6, 9.1, 9.3, 10.1 and 10.2 with references to equivalent parts of AS 1141.3.1. • Adjust sampling process to align with AS 1141.3.1 in subsections 7.3, 7.4, 8.4, 9.2 and 9.3. • Remove subsection 8.2. • Remove Section 11. • Remove Notes 14.4 and 14.5. • Adjust minimum sample and sample increment masses to align with AS 1141.3.1 in Tables 1 and 2.
	Q061	• Remove Farmers Friend shovel from apparatus, Clause 3.3.3. • Remove sampling using Framers Friend shovel from Step 6.5.1. • Include Step 6.1.7 for stabilised materials to mark or otherwise identify the sampling location so additional testing may be performed at the location after compaction is complete.

Part	Test method	Description of change
5	Q106	• Remove Steps 5.1.5 and 5.1.6 from Section 5. • Remove Note 8.6.
	Q113A	• Correct reference to Note 8.3 in Clause 3.1. • Remove the specific blow distribution requirements from Step 5.3.3.
	Q113B	• Remove the specific blow distribution requirements from Step 5.3.3.
	Q113C	• Remove levelling plate, level and rigid foundation and straightedge from Section 3. • Remove mould oil from Section 4. • Remove Note 8.5.
	Q115	• Correct references to notes in Steps 5.3.2 and 10.3c). • Remove rounding of calculated results from Steps 9.1.1, 9.1.2 and 9.3.3. • Remove Note 11.4 to align test method with requirements of Technical Specifications such as MRTS10.
	Q125D	• Remove levelling plate, level and rigid foundation, mallet and straightedge from Section 3. • Remove mould oil from Section 4. • Remove Note 11.2.
	Q135A	• Include apparatus for machine mixing in subsection 3.1. • List apparatus for amelioration separately in subsection 3.2. • Align requirements for rammer with AS test methods in Clause 3.2.5. • Add a balance and measuring cylinder to Section 3. • Exclude the use of bagged supplies of dry stabilising agents in Section 4. • Exclude the use of quicklime in Section 4. • Replace the term 'conditioning' with ‘amelioration' throughout the test method. • Add new Section 7 for machine mixing.
	Q135B	• Include techniques for curing slab specimens in Steps 4.2a), 4.3 and Table 1.
	Q136A	• Add sealable containers and scarifying tool to Section 4. • Include reporting a table of working time data in Section 9. • Include reporting a plot of working time data in Section 9. • Replace Figures 1 and 2 with examples showing curves of best fit.
	Q136B	• Include reporting a table of working time data in Section 11. • Include reporting a plot of working time data in Section 11.

Part	Test method	Description of change
	Q137	• Add steel rammer, material height gauge, sealable containers and mixing apparatus to Section 3. • Add mould oil to Section 4. • Add Note 10.2 with dimensions of material height gauge. • Add Note 10.2 for mould oil. • Add Table 1 with dimensions of RLT equipment. • Add Table 2 with dimensions of rammers.
	Q138A	• In Clause 3.2.1, change collar thickness from 9.5 mm to 4.75 mm to align requirements of ASTM D5581. • Amend moisture adjustment for dry stabilised agent in Step 6.1.3.
	Q138B	• In Clause 3.1.1, change collar thickness from 9.5 mm to 4.75 mm to align requirements of ASTM D5581.
	Q139	• Replace reference to test method Q138 with Q138A and Q138B in Section 2. • Amend reporting requirements for individual specimens and average results in Clauses 8.7, 8.8 and 8.9.
	Q140A	• Include requirement to sample using test method Q061 Section 6 in Step 4.1.3b)ii. • Add requirement that moisture content samples be placed in a drying oven within the same work shift as the material is placed to Steps 4.1.3b)ii and 4.2.2. • Add requirement to complete wet density testing within 24 hours of the end of the work shift in which the material is placed.
	Q142A	• Remove the specific blow distribution requirements from Step 5.11.2b). • In Step 5.15, add requirement that moisture content samples be placed in a drying oven within the same work shift as the material is placed. • In Step 5.10b), remove reference to test method Q140A.
	Q142B	• Remove the specific blow distribution requirements from Step 5.11.2b). • In Step 5.15, add requirement that moisture content samples be placed in a drying oven within the same work shift as the material is placed. • In Step 5.10b), remove reference to test method Q140A.
	Q144A	• Include reference to test method Q061 Section 6 for sampling in Step 3.4.1.
	Q145A	• Add balance, levelling plate, rubber mallet, level and rigid foundation, straightedge, mixing apparatus and scarifying tool to Section 3. • Add mould oil to Section 4. • Add Note 10.1 for mould oil. • Remove Note 11.2.

Part	Test method	Description of change
	Q148	• Add scarifying tool to Section 3. • Remove reference to test method Q145A from Section 3. • Add mould oil to Section 4. • Include techniques for preparing and compacting stabilised specimens in Section 5. • Include compacted material in Step 7.17.
	Q149	• Remove Step 4.6.
	Q251A	• Remove level and rigid foundation, levelling plate, straightedge, mallet from Section 3. • Remove mould oil from Section 4. • Remove Note 9.3. • Remove reference to Technical Note 151 – *Testing of Materials for Lime Stabilisation* from Note 9.6.
	Q251B	• Remove dimension requirements for rubber mallet from Clause 3.9. • Add calculations for achieved compacted dry density to Section 7. • Amend Notes 8.5 and 8.6 to allow target compaction moisture contents other than OMC to be used.
	Q252	• Include requirements to determine, calculate and report WPI using cone plasticity index to Sections 3, 4 and 5. • Remove reference to Note 9.8 in Step 4.1.
	Q257	• NEW TEST METHOD.
7	Q202	• WITHDRAWN.
	Q205A	• WITHDRAWN.
	Q205B	• WITHDRAWN.
	Q205C	• WITHDRAWN.
	Q214A	• WITHDRAWN.
	Q214B	• WITHDRAWN.
	Q215	• WITHDRAWN.
	Q217	• WITHDRAWN.
	Q227	• NEW TEST METHOD.
8	Q308	• Remove Table 5 and Figure 1 and replace with references to 101.6 mm apparatus in AS 2891.5 Clause 4(b) and Figure 1. • Remove references to 150 mm apparatus in Section 3 and Table 2. • Replace reference to withdrawn test method Q301 with AS 2891.1.1 in Step 5.6.
	Q319	• WITHDRAWN.
	Q320	• WITHDRAWN.

Part	Test method	Description of change
12	Q708B	• Replace the term 'lane' with 'section' throughout the test method. • Remove reference to test lot minimum and maximum size from Section 2. • Include a definition for section in Section 3. • Add the option of using an automatic trigger with the two laser profilometer in Section 4. • Add the option to use Austroads test method AG:AM/T002 for roughness measurement validation. • Define the test length as containing a maximum number of 100 m test sections in Step 6.1. • Reduce the lead-in length from 100 m to 30 m in Step 6.1. • Require no testing be performed when raining in Step 6.5. • Increase the number of runs required from one to three in Step 6.6. • Add more events during testing to be recorded in Step 6.7. • Add a list of features that may provide location references in Step 6.8. • Calculate IRI for each wheel path based on three runs in Step 7.1. • Include criteria for excluding data in Step 7.2. • Include requirement to report areas excluded from analysis in Section 8. • Include requirement to report any location references in Section 8. • Remove requirement for two operators to be used when automatic trigger is used in Note 9.2. • Remove Note 9.4.
	Q721	• NEW TEST METHOD.
	Q723	• NEW TEST METHOD.

Edition 5 – November 2018

Part	Test method	Description of change
All	All	• Minor editorial, format and style changes. • Replace 'must' with 'shall'. • Improve style by replacing passive voice with active voice. • Improve style by breaking long sentences and simplifying sentences. • Review Notes to test methods and amend as appropriate to ensure they are for guidance. Move any mandatory requirements in Notes to the main body of the test method.

Part	Test method	Description of change
1	Introduction	• Add new Section 4 for referenced documents, including Table 4.1 for Australian Standards and Table 4.2 for international Standards. • Revise Section 5 to reflect the more common use of national and international Standards in Transport and Main Roads Technical Specifications. • Add Section 7 to indicate that Notes to test methods are for guidance within this Manual. • Add definitions for constant mass, coarse-grained soil, medium-grained soil and fine-grained soil to Table 1. • Remove test methods Q212A, Q301, Q302A, Q302B and Q313 from Table 2. • Add test methods Q103B, Q201, Q202, Q205A, Q205B, Q205C, Q214A, Q214B, Q215, Q217, Q319 and Q320 to Table 2.
2	Application	• Add new Part to Manual. • Include contents of Technical Notes TN149, TN150, TN151, TN178 and TN179. • Replace reference to 'this Technical Note' with 'this Section'. • Remove Appendix A and place contents in Section 6. Replace references to Appendix A with Section 6.
3	Q010	• WITHDRAWN.
	Q020	• Remove reference to test method Q306A in Note 6.2. • Add references to AS 1289.3.4.1 and AS 1289.5.7.1 to Note 6.1, Table 2 and Table 5. • Remove reference to MRTS04 from Table 1.
4	Q050	• Correct reference for random stratified sampling in Section 3. • Correct references to Notes in Sections 7 and 8.
	Q060	• Replace references to AS 2884.1 with ISO 11648-2. • Add new subsection 7.3 to allow sampling of a moving stream using a loader bucket. • Add new subsection 7.4 to allow sampling of a moving stream using discharge into a truck. • Move the content of Note 14.3 to Step 7.1.3. • Move the content of Note 14.4 to Steps 7.2, 7.4, 8.1.6b), 8.2.5, 8.3.4, 8.4.2c), 8.5.6b), 8.6.6b), 9.1.2c), 9.2.2b), 9.3.3, 10.1.4, 10.2.4b), 11.1.8 and 11.2.6. • Move the content of Note 14.5 to Steps 8.1.5, 8.5.5 and 8.6.5. • Move the content of Note 14.6 to Steps 8.1.6, 8.2.4. 8.3.3, 8.5.6 and 8.6.6.
	Q061	• Amend Section 2 to include the sampling of discharge from plant. • Add new subsection 7.1 to allow sampling of a moving stream using a loader bucket. • Add new subsection 7.2 to allow sampling of a moving stream using discharge into a truck.

Part	Test method	Description of change
	Q070	• Amend to improve clarity of application of test method in Section 2. • Add specimen preparation to scope in Section 2. • Add specimen preparation apparatus to Section 3. • Add Section 6 – *Preparation of specimens*, previously part of test method Q303A. • Add specimen preparation notes to Section 9. • Move the content of Note 9.2 to Step 5.1.
	Q080	• Replace the term 'bitumen' with 'binder' or 'bituminous binder' throughout the test method. • Move references to examples of sampling cocks from Section 3 to Note 10.2 • Remove Section 4. • Move the content of Note 9.2 to Step 5.1. • Separate the sampling from spray bars from other locations in Section 4. • Move the content of Note 10.2 to Section 3. • Move the content of Note 10.3 to subsection 4.8. • Move the content of Note 10.5 to Steps 4.5 and 6.5. • Move the content of Note 10.6 to Steps 4.6, 5.4, 6.6 and 7.7.
5	Q101	• Replace references to AS 1152 with ISO 3310. • Replace references to test method Q102A with AS 1289.2.1.1. • Replace references to test method Q102B with AS 1289.2.1.4. • Replace references to test method Q102D with AS 1289.2.1.6. • Replace references to test method Q010 with AS 1289.2.3.1. • Move the content of Note 7.3 to Clause 4.2.
	Q101B	• Add a flat-bottomed scoop to Section 3. • Move the content of Note 6.1 to Steps 4.2.6 and 5.2.8.
	Q101C	• Replace references to AS 1152 with ISO 3310. • Replace references to test method Q102A with AS 1289.2.1.1.
	Q101D	• Replace references to AS 1152 with ISO 3310. • Move the content of Note 6.3 to Clause 4.5. • Remove 'shall' from Note 6.5.
	Q101E	• Replace references to AS 1152 with ISO 3310. • Move the content of Note 10.2 to Clause 3.3.2. • Replace 'shall' with 'should' in Note 10.6.
	Q101F	• Include Note 11.5 from test method Q129 in Clause 3.5, to exclude mills and grinders that heat material above 50°C. • Replace references to AS 1152 with ISO 3310. • Remove Note 8.2 containing definition of drying to constant mass. This definition is now in the *Introduction* Table 1.
	Q102A	WITHDRAWN.
	Q102B	WITHDRAWN.

Part	Test method	Description of change
	Q102D	WITHDRAWN.
	Q103A	• Replace references to AS 1152 with ISO 3310. • Move the content of Note 9.5 to Section 4. • Remove Note 9.6 containing definition of drying to constant mass. This definition is now in the *Introduction* Table 1. • Move the content of Note 9.7 to subsection 6.1. • Move the content of Notes 9.9, 9.10 and 9.11 to subsection 6.2. • Move the content of Note 9.13 to Step 6.5.8.
	Q103B	WITHDRAWN.
	Q103C	WITHDRAWN.
	Q103F	• Replace references to AS 1152 with ISO 3310. • Move Note 10.2 to Clause 5.1. • Replace 'must' with 'should' in Note 10.4.
	Q104A	• Replace references to AS 1152 with ISO 3310. • Replace references to test method Q102A with AS 1289.2.1.1.
	Q104D	• Replace references to AS 1152 with ISO 3310. • Replace references to test method Q102A with AS 1289.2.1.1.
	Q105	• Replace references to test method Q102A with AS 1289.2.1.1. • Remove reference to low plasticity materials from Step 4.1. • Remove Step 4.2. • Replace 'shall' with 'is' in Note 8.2.
	Q106	• Remove 2nd paragraph from Section 2. • Remove subsection 5.3 for air-drying of specimens. • Remove requirement to report air-drying from Section 7. • Remove Note 8.7 containing definition of drying to constant mass. This definition is now in the *Introduction* Table 1.
	Q109	WITHDRAWN.
	Q109A	WITHDRAWN.
	Q109B	WITHDRAWN.
	Q113A	• Replace references to AS 1152 with ISO 3310. • Replace references to test method Q102A with AS 1289.2.1.1. • Replace references to test method Q109 with AS 1289.3.5.1. • Replace references to 'apparent particle density' to 'soil particle density'. • Allow the use of a mechanical compactor in Clause 3.12.
	Q113B	• Replace references to AS 1152 with ISO 3310. • Replace references to test method Q102A with AS 1289.2.1.1. • Replace references to test method Q109 with AS 1289.3.5.1. • Replace references to 'apparent particle density' to 'soil particle density'. • Allow the use of a mechanical compactor in Clause 3.12.

Part	Test method	Description of change
	Q113C	• Replace references to AS 1152 with ISO 3310. • Replace references to test method Q102A with AS 1289.2.1.1. • Add Step 5.2.2 for the calculation of the target compaction moisture content. • Replace 'optimum moisture content' with 'target compaction moisture content' in Step 5.2.6.
	Q114B	• Remove Table 1 and include references to AS 1289.6.3.2 Figure 1 for example of apparatus and tolerances in Section 3. • Replace references to test method Q102A with AS 1289.2.1.1.
	Q115	• Replace references to AS 1152 with ISO 3310. • Remove mixing and moulding apparatus from Section 3. • Remove laboratory mix procedure from Section 5 and replace with a reference to new test method Q251A. Remove related Notes and tables. • Remove field mix procedure from Section 5 and replace with a reference to new test method Q251B. Remove related Notes and tables. • Replace reference to test method Q303A with test method Q070 in Step 5.3.2. • Remove moulding procedure for laboratory mixed material from Section 6 and replace with a reference to new test method Q251A. Remove related Notes and tables. • Remove moulding procedure for field mixed material from Section 6 and replace with a reference to new test method Q251B. Remove related Notes and tables. • Add requirement to report ATIC registration number to Section 11.
	Q118	• Replace references to AS 1152 with ISO 3310. • Move the content of Note 8.5 to Step 6.2.
	Q120B	• Replace references to AS 1152 with ISO 3310.
	Q122A	• Replace references to AS 1152 with ISO 3310.
	Q122B	• Replace references to AS 1152 with ISO 3310.
	Q125D	• Replace references to AS 1152 with ISO 3310. • Replace references to test method Q102A with AS 1289.2.1.1. • Remove Note 11.6 containing definition of drying to constant mass. This definition is now in the *Introduction* Table 1.
	Q129	Move part of Note 11.2 to Clause 4.1.
	Q131B	Move the content of Note 10.5 to Step 7.18.
	Q133	• Replace references to AS 1152 with ISO 3310. • Replace references to test method Q102A with AS 1289.2.1.1. • Correct reference to test method Q101B in Step 5.4.1. • Update reference to available lime index to test method AS 4489.6.1 in Note 8.3.
	Q134	• Replace references to test method Q102A with AS 1289.2.1.1. • Add requirement to report ATIC registration number to Section 8.

Part	Test method	Description of change
	Q135A	• Add requirement to obtain ATIC registration number to Section 4. • Replace 'overnight' in Step 6.2.3b) with 'at least 12 hours and not exceeding 72 hours'. • Add Note 7.11 to reference MRTS07A.
	Q135B	• Remove soaked and unsoaked CBR testing from Table 1. • Remove bitumen emulsion curing from Table 1. • Add allowable working time testing to Table 1. • Align curing times of bound and lightly bound material to the relevant Technical Specifications.
	Q135C	NEW TEST METHOD.
	Q136A	• Replace 'additive' with 'stabilising agent'. • Replace references to AS 1152 with ISO 3310. • Replace references to test method Q102A with AS 1289.2.1.1. • Replace 'design additive' with 'target stabilising agent content' in Section 2. • Move the content of Note 10.1 to Clause 4.2. • Include standard test conditions in subsection 7.2. • Include reference to test method Q145A in subsection 7.2 for determining the target moisture content. • Include reference to test method Q135A in subsection 7.2 for determining the mass of additive / water and the mixing of the test portions. • Add requirement to report ATIC registration number to Section 9.
	Q136B	• Replace references to AS 1152 with ISO 3310. • Replace references to test method Q102A with AS 1289.2.1.1. • Amend times for storing in 40°C oven and 25°C environmental cabinet to align with test method Q135C in Step 9.3.2.
	Q137	• Replace references to AS 1152 with ISO 3310. • Replace references to test method Q102A with AS 1289.2.1.1. • Replace references to test method Q109 with AS 1289.3.5.1. • Replace references to 'apparent particle density' to 'soil particle density'. • Amend Step 5.1.6 to specify the use of a minimum curing time from Table 1. • Add Table 1 with curing times for materials.

Part	Test method	Description of change
	Q138A	• Renumber test method from Q138 to Q138A. • Remove references to 'GP cement or cement' and replace with 'blended lime / flyash or lime / flyash'. • Replace 'foaming agent' with 'foaming additive' throughout the test method. • Remove references to field mixing material from Section 2. • Replace references to AS 1152 with ISO 3310. • Include apparatus requirements for the foamed bitumen plant in Section 3.1.1. • Include the use of a clamp ring for the compaction block in Section 3. • Amend oven temperature requirement in Clause 3.1.5 from 180°C to 100°C. • Include apparatus requirements for the mixer in Section 3.1.4. • Amend thickness of cylinder mould in Step 3.2.1 from 12.7 mm to 6.35 mm to align with ASTM D5581. • Add subsection 3.3 to include apparatus for checking the foaming characteristics of bitumen. • Include 9.5 mm sieve in Step 5.2. • Replace references to test method Q102A with AS 1289.2.1.1. • Remove subsection 5.3 for field mixing samples. • Add reference to Austroads test method AG:PT/T301 to Note 8.9. • Replace 'overnight' in Note 8.10 with 'at least 12 hours and not exceeding 72 hours'.
	Q138B	• NEW TEST METHOD.
	Q139	• Replace references to AS 4115 with ISO 6789. • Remove curing apparatus from Section 4. • Remove Section 5. • Remove specific curing details from Section 6 and replace with references to new test method Q135C. • Add requirement for specimen condition and squareness of ends in Step 6.1.1. • Replace reference to test method Q303A with test method Q070 in Step 6.5.2. • Change layout of reporting requirements in Section 9. • Remove Note 10.2.

Part	Test method	Description of change
	Q140A	• Remove references to wet density ratio from Section 1. • Remove references to wet density ratio from Section 2. • Remove definition of relative compaction (wet density ratio) from Section 3. • Remove requirements for testing earthworks from Step 4.1.3. • Remove subsection 5.2 containing calculations related to reference wet density. • Remove reporting requirements related to test method Q143C from Section 6. • Remove reporting requirements related to test method Q143C from Notes 7.2 and 7.3.
	Q141B	• Replace references to test method Q102A with AS 1289.2.1.1. • Replace references to test method Q102B with AS 1289.2.1.4. • Replace references to test method Q102D with AS 1289.2.1.6. • Replace references to test method Q010 with AS 1289.2.3.1. • Remove Section 5 containing definitions for fine-grained, medium-grained and coarse-grained soils. These definitions are in the *Introduction* to this Manual.
	Q142A	• Replace references to AS 1152 with ISO 3310. • Replace references to test method Q102A with AS 1289.2.1.1. • Replace references to test method Q102B with AS 1289.2.1.4. • Replace references to test method Q102D with AS 1289.2.1.6. • Replace references to test method Q010 with AS 1289.2.3.1. • Replace references to test method Q109 with AS 1289.3.5.1. • Replace references to 'apparent particle density' to 'soil particle density'. • Amend Step 5.10 to clarify the time limits on compaction of test portions containing stabilising agents. • Add requirement to report ATIC registration number to Section 7. • Replace sender's number with sample number in Section 7. • Amend Table 2 to allow the use of a Type B mould where there are small amounts of oversize retained on the 19.0 mm sieve. • Move the content of Note 9.1 to Clause 3.2.

Part	Test method	Description of change
	Q142B	• Replace references to AS 1152 with ISO 3310. • Replace references to test method Q102A with AS 1289.2.1.1. • Replace references to test method Q102B with AS 1289.2.1.4. • Replace references to test method Q102D with AS 1289.2.1.6. • Replace references to test method Q010 with AS 1289.2.3.1. • Replace references to test method Q109 with AS 1289.3.5.1. • Replace references to 'apparent particle density' to 'soil particle density'. • Amend Step 5.10 to clarify the time limits on compaction of test portions containing stabilising agents. • Add requirement to report ATIC registration number to Section 7. • Replace sender's number with sample number in Section 7. • Amend Table 2 to allow the use of a Type B mould where there are small amounts of oversize retained on the 19.0 mm sieve. • Move the content of Note 9.1 to Clause 3.2.
	Q142C	• WITHDRAWN.
	Q143	• Remove reference to density and percentage of oversize on a wet basis from Section 1. • Remove references to test method Q143C from Section 5. • Remove calculations for density and percentage of oversize on a wet basis from Section 5. • Remove requirement to report the condition of the oversize (wet or dry) from Section 6. • Remove Note 7.1 containing definition of drying to constant mass. This definition is now in the *Introduction* Table 1. • Remove Note 7.2. • Remove references to test method Q143C from Note 7.3.
	Q144A	• Replace sender's number with sample number in Section 6. • Remove references to earthworks from Sections 2 and 5.
	Q145A	• Replace references to test method Q102A with AS 1289.2.1.1. • Replace references to test method Q109 with AS 1289.3.5.1. • Replace references to 'apparent particle density' to 'soil particle density'.
	Q14[illegible]	• Replace references to test method Q109 with AS 1289.3.5.1. • Replace references to 'apparent particle density' to 'soil particle density'. • Move the content of Note 6.1 to Step 3.2.
	Q147B	• Replace reference to test method Q303A with test method Q070 in Step 5.1.1. • Remove Note 8.2 containing definition of drying to constant mass. This definition is now in the *Introduction* Table 1.

Part	Test method	Description of change
	Q148	• Replace references to AS 1152 with ISO 3310. • Replace references to test method Q102A with AS 1289.2.1.1. • Replace references to test method Q109 with AS 1289.3.5.1. • Replace references to 'apparent particle density' to 'soil particle density'. • Amend Step 5.6 to specify the use of a minimum curing time from Table 1. • Add Table 1 with curing times for materials.
	Q149	• Replace references to test method Q102A with AS 1289.2.1.1.
	Q171	• Remove requirements for moisture containers to have lids from Sections 3, 4 and 5. • Replace the drying to constant mass definition in Step 4.16 with requirements from AS 1289.2.1.1. • Include reference to table in reporting requirements in Section 6. • Include Table 1 with rounding requirements for reported moisture content values.
	Q250	• Replace references to test method Q102A with AS 1289.2.1.1. • Replace references to test method Q102B with AS 1289.2.1.4. • Replace references to test method Q102D with AS 1289.2.1.6. • Replace references to test method Q010 with AS 1289.2.3.1.
	Q251A	NEW TEST METHOD.
	Q251B	NEW TEST METHOD.
	Q252	NEW TEST METHOD.
	Q253	NEW TEST METHOD.
6	Q171	• Remove requirement for containers with lids from Clause 3.6. • Remove references to lids from Step 4.10 to 4.14 and Step 5.1. • Change the process for drying samples to constant mass in Step 4.16 to align with AS 1289.2.1.1. • Add reference to Table 1 to Clause 6.1. • Replace 'must' with 'should' in Note 7.1. • Replace 'shall' with 'should' in Note 7.4. • Move the content of Note 7.7 to Step 4.16. • Add Table 1 with reporting requirements for moisture content.
	Q172	• Replace 'shall' with 'should' in Note 8.1.
	Q181A	• WITHDRAWN.
	Q181C	• Replace references to AS 1152 with ISO 3310. • Replace references to test method Q102A with AS 1289.2.1.1. • Replace references to test method Q142A with AS 1289.5.1.1.
	Q188	• Move the content of Note 8.1 to Step 5.5.1.

Part	Test method	Description of change
7	Q201	• Replace references to AS 1152 with ISO 3310. • Remove references to test method Q103B. • Remove references to cover aggregate from Sections 1 and 2. • Replace reference to test method Q103B with AS 1141.11.1 in Step 5.1.1. • Remove 19.0 mm – 16.0 mm and 16.0 mm to 13.2 mm fractions and associated Note from Table 1. • Remove Note 8.1 containing definition of drying to constant mass. This definition is now in the *Introduction* Table 1.
	Q202	• Test method amended to directly reference an Australian Standard test method.
	Q203	• Replace references to AS 1152 with ISO 3310. • Replace test method BS 903: Part A8 with BS ISO 4662 in Table 2 Notes. • Replace test method BS 903: Part A26 with BS ISO 48 in Table 2 Notes.
	Q205A	• Test method amended to directly reference an Australian Standard test method.
	Q205B	• Test method amended to directly reference an Australian Standard test method.
	Q205C	• Test method amended to directly reference an Australian Standard test method.
	Q208A	• WITHDRAWN.
	Q208B	• Replace references to standard AS 1152 with ISO 3310. • Remove Note 10.7 containing definition of drying to constant mass. This definition is now in the Introduction Table 1.
	Q211	• Replace references to AS 1152 with ISO 3310. • Replace test method Q214 with AS 1141.6.1 in Section 1. • Remove Note 10.2 containing definition of drying to constant mass. This definition is now in the *Introduction* Table 1.
	Q212A	• WITHDRAWN.
	Q212B	• Include temperature tolerance for oven in Section 3. • Include temperature tolerance for water bath in Section 3. • Move Note 9.2 to Clause 4.1.
	Q214	• WITHDRAWN.
	Q214A	• Test method amended to directly reference an Australian Standard test method.
	Q214B	• Test method amended to directly reference an Australian Standard test method.
	Q215	• Test method amended to directly reference an Australian Standard test method.
	Q217	• Test method amended to directly reference an Australian Standard test method.

Part	Test method	Description of change
	Q221A	• WITHDRAWN.
	Q221B	• WITHDRAWN.
	Q224A	• WITHDRAWN.
	Q224B	• WITHDRAWN.
	Q225	• WITHDRAWN.
	Q226	• WITHDRAWN.
	Q227	• WITHDRAWN.
	Q228	• Replace references to AS 1152 with ISO 3310. • Remove Note 9.3 containing definition of drying to constant mass. This definition is now in the *Introduction* Table 1.
	Q229A	• Replace references to AS 1152 with ISO 3310. • Remove Note 9.3 containing definition of drying to constant mass. This definition is now in the *Introduction* Table 1.
	Q229B	• Replace references to AS 1152 with ISO 3310. • Remove Note 9.2 containing definition of drying to constant mass. This definition is now in the *Introduction* Table 1.
	Q230	• Replace references to AS 1152 with ISO 3310. • Include reference to ASTM C519 Figure 1 for example of apparatus in Clauses 4.3 and 4.9.
8	Q301	• WITHDRAWN.
	Q302A	• WITHDRAWN.
	Q302B	• WITHDRAWN.
	Q303A	• Remove masonry saw from Section 3. • Remove subsection 4.2 for trimming specimens using a masonry saw. • Amend Step 4.4 to allow either air-drying or vacuum drying using test method Q324. • Move the first sentence of Note 5.1 to Step 4.4. • Move the second sentence of Note 5.1 to Section 3. • Remove Notes related to the use of a masonry saw from Section 5.
	Q304A	• Replace reference to withdrawn test method Q302B with AS 2891.1.2 in Step 5.1. • Amend Step 5.1 to allow either air-drying or vacuum drying using test method Q324.
	Q305	• Replace reference to withdrawn test method Q301 with AS 2891.1.1 in Step 5.6. • Move the contents of Note 8.2 to Section 3.
	Q306A	• WITHDRAWN.

Part	Test method	Description of change
	Q306C	• Amend Step 5.1.1 to allow sample preparation by either test methods Q303A or AS 2891.1.2. • Amend Step 5.1.2 to allow either air-drying or vacuum drying using test method Q324. • Replace reference to withdrawn test method Q302A with AS 2891.1.2 in Note 8.2. • Move the contents of Note 8.3 to Section 3. • Replace '0.54°C' with '0.54C' in Note 8.5.
	Q308A	• Replace references to AS 1152 with ISO 3310. • Insert missing '±' symbol in Step 5.9.4. • Replace reference to withdrawn test method Q301 with AS 2891.1.1 in Step 5.3. • Move the contents of Note 10.4 to Steps 6.2.1 and 6.3.1. • Move the contents of Note 10.9 to subsection 7.2. • Move the contents of Note 10.10 to subsection 7.1. • Move the contents of Note 10.11 to Step 7.3.7.
	Q308C	• Replace references to AS 1152 with ISO 3310. • Replace reference to withdrawn test method Q301 with AS 2891.1.1 in Step 5.2. • Move the contents of Note 10.3 to Step 5.7. • Move the contents of Note 10.5 to Steps 6.2.1 and 6.3.1. • Move the contents of Note 10.7 to subsection 7.2. • Move the contents of Note 10.8 to subsection 7.1. • Move the contents of Note 10.9 to Step 7.3.7.
	Q309	• Replace references to AS 1152 with ISO 3310. • Replace test method Q103B with AS 1141.11.1 in Steps 5.9, 5.11, 5.13 and 5.14. • Replace reference to withdrawn test method Q301 with AS 2891.1.1 in Step 7.17. • Replace reference to withdrawn test method Q313 with AG:PT/T236 in Step 7.22. • Move the contents of Note 9.7 to Step 7.11.
	Q310	• Replace reference to withdrawn test method Q301 with AS 2891.1.1 in Step 5.2. • Amend Note 8.1 to more clearly define the test temperature requirements.
	Q311	• Remove reference to withdrawn test method Q306A in Step 3.1. • Amend Note 6.3 to include an adjustment to the water absorption for the proportion of added filler. • Delete reference to test method Q214 in Note 6.3.
	Q312	• Replace references to AS 1152 with ISO 3310.
	Q313	• WITHDRAWN.
	Q314	• Remove reference to withdrawn test method Q306A in Step 3.1.

Part	Test method	Description of change
	Q315	• Replace reference to withdrawn test method Q301 with AS 2891.1.1 in Step 5.1.
	Q317	• Replace test method Q214B with AS 1141.6.1 in Step 3.2. • Replace test method Q214A with AS 1141.5 in Step 3.3. • Replace 'm' with 'mm' in Step 4.2.
	Q318	• Replace references to test method Q221B with AS 1141.4. • Replace references to 'compacted unit mass' to 'compacted bulk density'. • Replace test method Q214B with AS 1141.6.1 in Step 3.2.
	Q319	• Test method amended to directly reference an Austroads test method.
	Q320	• Test method amended to directly reference an Austroads test method.
	Q321	• Remove reference to withdrawn test method Q306A in Step 3.4. • Delete reference to test method Q214 in Note 6.2 and 6.3.
	Q325	• Amend Step 5.5.2 to allow sample preparation by either test methods Q303A or AS 1289.1.2.
9	Q358	• Replace references to AS 1152 with ISO 3310.
	Q372	• Replace reference to withdrawn test method Q301 with AS 2891.1.1 in Step 5.2.1.
10	Q456	• Move the contents of Note 10.6 to Section 3.
	Q470	• Replace 'overnight' in Step 4.2.4 and 4.2.6 with 'at least 12 hours'. • Update references from AS 1012.13 to AS 1012.8.4 for sampling concrete, moulding and curing specimens in Section 4.1.
	Q476	• WITHDRAWN.
	Q477	• Replace references to AS 1152 with ISO 3310.
11	Q601	• WITHDRAWN.
	Q604	• Replace references to AS 2163 with ISO 4788.
	Q605	• WITHDRAWN.
	Q606	• WITHDRAWN.
	Q630	• WITHDRAWN.
	Q631	• WITHDRAWN.
12	Q704	• Replace references to AS 1152 with ISO 3310. • Replace test method BS 903: Part A8 with BS ISO 4662 in Table 2 Notes. • Replace test method BS 903: Part A26 with BS ISO 48 in Table 2 Notes.
	Q705	WITHDRAWN.
	Q705B	Replace 'shall' with 'should' in Note 8.1.
	Q706	WITHDRAWN.

Part	Test method	Description of change
	Q708B	• Remove 'shall' from Steps 5.1.1c), 5.1.3a), 5.1.3b), 5.3.3 and 6.1. • Remove 'must' from subsection 5.2. • Remove 'shall' from Notes 9.3, 9.4, 9.5 and 9.6.
	Q708D	• Remove 'shall' from Step 4.5.
	Q711A	• Replace references to test method Q221A with AS 1141.4. • Replace references to 'loose unit mass' to 'uncompacted bulk density'.
	Q720	• Replace references to AS 1152 with ISO 3310.
	Q721	• WITHDRAWN.

Edition 4, Amendment 4 – December 2017

Part	Test method	Description of change
1	Introduction	• Add test methods Q101E and Q136 to Table 1. • Remove test methods Q116A, Q124 and Q181A from Table 2.
2	Q020	• Add Table 2 with acceptance constants for MRTS04. • Add Table 3 with acceptance constants for MRTS30.
3	Q060	• Correct references to Notes in Steps 8.2.4 and 8.3.3.
4	Q101E	• Remove publication date from *Pavement Design Supplement* in Note 10.4.
	Q104A	• Add 0.425 mm sieve to apparatus. • Add new Note 9.2 to clarify the mixing process.
	Q104D	• Add 0.425 mm sieve to apparatus. • Add new Note 8.1 to clarify the mixing process.
	Q113A	• Replace Table 3 with curing times published in test method Q113B.
	Q115	• Change nominal diameter of levelling plate from 104 mm to 140 mm. • Amend Step 8.1 to clarify the requirements for capping specimens.
	Q116A	• WITHDRAWN.
	Q124	• WITHDRAWN.
	Q136	• Renumber test method from Q136 to Q136A. • Include compaction process from test method Q115 Section 6.3 November 2014 into Step 7.2.1. • Replace maximum dry density and symbol (MDD) with achieved dry density and symbol (ADD) throughout the test method.
	Q136B	• NEW TEST METHOD.
	Q140A	• Remove Steps 5.1.5 and 5.2.6. • Replace reference to test method Q136 with test method Q136A in Note 7.1
	Q143	• Replace symbols for dry mass of oversize with symbols for wet mass of oversize in Step 5.1.

Part	Test method	Description of change
	Q145A	• Correct references to Notes in Steps 6.4 and 6.5.
5	Q172	• Replace reference to withdrawn test method Q173A with AS 1289.6.4.1 in Step 4.1.
	Q181A	• WITHDRAWN.

Edition 4, Amendment 3 – September 2017

Part	Test method	Description of change
1	Introduction	• Replace *Pavement Design Manual* with *Pavement Design Supplement* in the list of departmental publications in Section 1. • Add MRTS10 *Plant-mixed Lightly Bound Pavements* to the list of Transport and Main Roads Technical Specifications in subsection 3.2. • Table 2 containing equivalent methods revised.
2	Q020	• Allow the use of results from test methods Q306B and Q306C in the same lot by referencing Note 6.3 from Step 3. • Add a note to Table 1 to allow linear interpolation of values. • Change the rounding of the relative compaction for test method Q140A in Table 3 from 0.1 to 0.5%. • Change the rounding of the stabilising agent content for test method Q314 in Table 3 from 0.01% to 0.1%. • Change the description of the test in Table 3 from relative density (asphalt) to relative compaction.
3	Q050	• Remove Section 5. Definitions for random sampling, stratified random sampling and systematic stratified random sampling are included in MRTS01 *Introduction to Technical Specifications*.
	Q060	• Remove some definitions in Section 5. Definitions for lot and sub-lot are included in MRTS01 *Introduction to Technical Specifications*. Definitions for nominal size, sample and sampling location are included in the *Introduction* to this Manual. • Add new Section 11 for representative sampling from compacted or uncompacted layers of pavement or earthworks.
	Q061	• Remove Section 4. Definition for lot is included in MRTS01 *Introduction to Technical Specifications*. Definitions for nominal size, sample and sampling location are included in the *Introduction* to this Manual. • Amend Step 5.3.4 to align with the requirements of *Nuclear Gauge Testing Manual* test method N01. • Include subsection 5.4 for sampling for stabilisation testing. • Add plant required for subsection 5.4 to Section 3.
	Q080	• NEW TEST METHOD.

Part	Test method	Description of change
4	Q101E	• Incorporate most requirements of Road and Maritime Services test methods T102 and T103 into test method.
	Q103A	• Add 0.212 mm sieve to apparatus to reflect changes in AS 1726.
	Q103C	• Minor editorial changes. • Add 0.212 mm sieve to apparatus to reflect changes in AS 1726. • Add 0.425 mm sieve to apparatus to allow calculation of fines ratio. • Amend calculation in Step 6.1.5b) by removing '1000' and 'A'. • Remove the graphing of effective depth against hydrometer reading from Step 6.1.6a). • Remove the requirement to report hydrometer calibration data from Step 6.2.7 and replace with the determination of a linear regression relationship. • Include the recording of the elapsed time of hydrometer reading in minutes in Step 7.6.5b). • Include calculations for sieve results and fines ratio in Section 8. • Include reporting of sieve results and fines ratio in Section 9. • Remove Note 10.7.
	Q109	• Amend Section 1 to remove reference to reporting interval. • Change the rounding of the apparent particle density in Section 6 from 0.001 t/m³ to 0.01 t/m³.
	Q109A	• Amend Section 1 to remove reference to reporting interval. • Change the value for comparing duplicate tests in Step 6.2 from 0.020 t/m³ to 0.02 t/m³. • Change the rounding of the apparent particle density (fine fraction) in Section 7 from 0.001 t/m³ to 0.01 t/m³. • Change the water density values in Table 1 from four significant figures to three significant figures.
	Q109B	• Amend Section 1 to remove reference to reporting interval. • Change the value for comparing duplicate tests in Step 5.2 from 0.020 t/m³ to 0.02 t/m³. • Change the rounding of the apparent particle density (coarse fraction) in Section 6 from 0.001 t/m³ to 0.01 t/m³. • Change the water density values in Table 1 from four significant figures to three significant figures.

Part	Test method	Description of change
	Q113A	• Amend preparation requirements in Step 5.1.2 to discard material retained on 19.0 mm sieve and thoroughly remix the sieved material. • Amend preparation requirements in Step 5.1.3 to include a reference to test method Q101 Steps 6.2.4 to 6.2.6. • Add requirement to record the times for the commencement and completion of curing and a reference to Note 8.9 to Step 5.1.5. • Remove rounding of calculated values in Step 6.1.1. • Reference test method Q102A for rounding of moisture content values in Section 7. • Change the rounding of the compacted dry density in Section 7 from 0.001 t/m³ to 0.01 t/m³. • Change the rounding of the optimum moisture content (OMC) in Section 7 to 0.5% for all moisture content values. • Include definition of CBR MDD for reporting in Step 7.1.4. • Include definition of CBR OMC for reporting in Step 7.1.5. • Add requirement to report the duration of curing and the method to determine plasticity in Section 7. • Include the use of visual / tactile assessment of plasticity to determine the curing period in Note 8.9. • Amend Table 4 to change reporting intervals for CBR values.
	Q113B	• Amend preparation requirements in Step 5.1.2 to discard material retained on 19.0 mm sieve and thoroughly remix the sieved material. • Amend preparation requirements in Step 5.1.3 to include a reference to test method Q101 Steps 6.2.4 to 6.2.6. • Add requirement to record the times for the commencement and completion of curing and a reference to Note 8.9 to Step 5.1.5. • Remove rounding of calculated values in Step 6.1.1. • Reference test method Q102A for rounding of moisture content values in Section 7. • Change the rounding of the compacted dry density in Section 7 from 0.001 t/m³ to 0.01 t/m³. • Change the rounding of the optimum moisture content (OMC) in Section 7 to 0.5% for all moisture content values. • Include definition of CBR MDD for reporting in Step 7.1.4 • Include definition of CBR OMC for reporting in Step 7.1.5 • Add requirement to report the duration of curing and the method to determine plasticity in Section 7. • Include the use of visual / tactile assessment of plasticity to determine the curing period in Note 8.9. • Amend Table 4 to change reporting intervals for CBR values.

Part	Test method	Description of change
	Q113C	• Amend preparation requirements in Step 5.1.2 to discard material retained on 19.0 mm sieve and thoroughly remix the sieved material. • Amend preparation requirements in Step 5.1.3 to include a reference to test method Q101 Steps 6.2.4 to 6.2.6. • Add requirement to record the times for the commencement and completion of curing and a reference to Note 8.9 to Step 5.2.5. • Align Step 5.5.6 with reporting requirements, that is, final moisture contents are obtained and reported. • Change the value for comparing achieved and target compacted dry density in Step 6.2 from 0.020 t/m³to 0.02 t/m³. • Align Step 6.5 with reporting requirements, that is, swell is measured and reported. • Change the rounding of the target compacted dry density in Section 7 from 0.001 t/m³ to 0.01 t/m³. • Change the rounding of the nominated relative compaction in Section 7 from 0.1% to 0.5%. • Reference test method Q102A for rounding of moisture content values in Section 7. • Add requirement to report the duration of curing and the method to determine plasticity in Section 7. • Include the use of visual / tactile assessment of plasticity to determine the curing period in Note 8.9. • Amend Table 4 to change reporting intervals for CBR values.
	Q114B	• Amend Table 2 to change reporting intervals for CBR values.
	Q115	• Amend preparation requirements in Step 5.1.2 to discard material retained on 19.0 mm sieve and thoroughly remix the sieved material. • Amend Step 5.1.3 to require a minimum of three UCS test portions to be prepared. • Add Notes 12.6 and 12.7 to provide guidance on preparing test specimens. • Replace subsection 6.2 with a reference to test method Q145A for the compaction of field mixed specimens. • Amend Step 8.1.1 to allow specimens with ends levelled using a surface plate to be tested uncapped. • Add Step 8.1.2 to not require the capping of the surface compacted against the mould baseplate. • Include the reporting of achieved compacted dry density and achieved compaction moisture content for field in Section 11 for field mixed materials.
	Q134	• Include a four-hour time limit between mixing and completion of test in Section 2. • Add subsection 5.3 to check the minimum sample size and buffer solution volume will provide a temperature rise of at least 4°C.
	Q135B	• Amend Table 1 to allow 28-day curing for lightly bound cement / cementitious blended materials.

Part	Test method	Description of change
	Q136	• Include a default target moisture content of OMC in Section 2. • Amend preparation requirements in Step 6.2 to discard material retained on 19.0 mm sieve and thoroughly remix the sieved material. • Amend subsection 8.1 to clarify the plotting of the working time v mean achieved maximum dry density and the use of the plot to determine the working time for MDD. • Amend subsection 8.2 to clarify the plotting of the working time v mean UCS and the use of the plot to determine the working time for UCS. • Correct reference in Step 7.3.1. • Change symbol in Step 7.2.1f) from MRR to MDD.
	Q137	• Include a definition of the gauge length for the extensometer in Section 3. • Amend preparation requirements in Step 4.4 to include a reference to test method Q101 Steps 6.2.4 to 6.2.6. • Add Note 9.4 to allow the dimensions of the mould to be used in place of trying to measure fragile specimen dimensions.
	Q138	• Replace reference to 19.0 mm sieve with a 37.5 mm sieve in Section 2. • Include Interfoam as a suggested foaming additive in Section 4. • Amend preparation requirements in Step 5.2 to include a reference to test method Q101 Steps 6.2.4 to 6.2.6. • Modify the calculations in Step 6.1.5 to ensure the correct bitumen mass in used to calculate the mass of foaming agent required. • Amend Steps 7.1.2 to 7.1.6 to ensure the correct process is used to determine the mass of foaming agent required.
	Q139	• Include a reference to test method Q070 for obtaining cored specimen in Section 2. • Relax the tolerance on oven curing times from two hours to four hours in subsections 6.1 to 6.4. • Provide additional detail to specimen setup in subsection 7.1 and Note 10.3. • Amend the process for preconditioning and test setting determination to clarify the use of computer and software control in subsection 7.4 and Notes 10.4 and 10.5. • Allow the reporting of testing where the preconditioning did not achieve a resilient strain within the specified range in Step 9.3.

Part	Test method	Description of change
	Q140A	• Include an option to calculate a maximum characteristic relative compaction for a lot in Steps 5.1.6 and 5.2.7. • Include an option to calculate a minimum characteristic relative compaction for a lot in Steps 5.1.7 and 5.2.8. • Add the calculation and reporting of adjusted moisture variation in Sections 5 and 6. • Change the rounding of the relative compaction in Section 6 from 0.1% to 0.5%. • Change the rounding of the adjusted laboratory reference dry or wet density in Section 6 from 0.001 t/m³ to 0.01 t/m³. • Change the rounding of the maximum dry density or maximum converted wet density in Section 6 from 0.001 t/m³ to 0.01 t/m³. • Change the rounding of the optimum moisture content or the estimated optimum moisture content in Section 6 from 0.1% to 0.5%. • Change the rounding of the density of the dry or wet oversize in Section 6 from 0.001 t/m³ to 0.01 t/m³. • Change the rounding of the compacted dry or wet density in Section 6 from 0.001 t/m³ to 0.01 t/m³. • Remove Table 1. • Include a reference to relevant Technical Specifications or Annexures as the source of working times for materials in Note 7.1 to replace Table 1.
	Q141B	• Amend Section 1 to include reference to maximum test-hole depth. • Amend the definition of depth limits in Step 6.1 and Table 1 from 'maximum practical depth' to 'maximum depth'. • Amend the maximum test-hole depth in Step 6.1 and Table 1 from 250 mm to 300 mm. • Remove the rounding of calculated values from Steps 10.1 to 10.3. • Change the rounding of the compacted dry or wet density in Section 11 from 0.001 t/m³ to 0.01 t/m³.

Part	Test method	Description of change
	Q142A	• Add requirement to record the times for the commencement and completion of curing to Steps 5.7.1, 5.7.2 and 5.7.3. • Include curing times aligned with test method Q113C by adding a reference to Note 9.9, Note 9.10 and Table 3 to Step 5.7.1. • Change the rounding of the standard maximum dry density in Section 7 from 0.001 t/m³ to 0.01 t/m³. • Change the rounding of the standard optimum moisture content in Section 7 from 0.1% to 0.5%. • Remove 'standard' from Clauses 7.2 and 7.3. • Include reporting of compactive effort (standard) used in Section 7. • Add requirement to report the duration of curing and the method to determine plasticity in Section 7 for materials without stabilising agents. • Amend Note 9.1 to allow the use of mechanical compaction, provided it is comparable to manual compaction. • Include the use of visual / tactile assessment of plasticity to determine the curing period in Note 9.9. • Include a relaxation of curing times for compaction control testing in Note 9.10.
	Q142B	• Add requirement to record the times for the commencement and completion of curing to Steps 5.7.1, 5.7.2 and 5.7.3. • Include curing times aligned with test method Q113C by adding a reference to Note 9.9, Note 9.10 and Table 3 to Step 5.7.1. • Change the rounding of the standard maximum dry density in Section 7 from 0.001 t/m³ to 0.01 t/m³. • Change the rounding of the standard optimum moisture content in Section 7 from 0.1% to 0.5%. • Remove 'modified' from Clauses 7.2 and 7.3. • Include reporting of compactive effort (standard) used in Section 7. • Add requirement to report the duration of curing and the method to determine plasticity in Section 7 for materials without stabilising agents. • Amend Note 9.1 to allow the use of mechanical compaction, provided it is comparable to manual compaction. • Include the use of visual / tactile assessment of plasticity to determine the curing period in Note 9.9. • Include a relaxation of curing times for compaction control testing in Note 9.10.

Part	Test method	Description of change
	Q142C	• Replace reference to Appendix C with test method Q101C in Step 5.6. • Add calculation of moisture correction to Section 6. • Add calculation and reporting of moisture variation to Sections 6 and 7. • Change the rounding of the maximum converted wet density in Section 7 from 0.001 t/m³ to 0.01 t/m³. • Remove the reporting of the optimum added / removed moisture content in Section 7. • Change the rounding of the estimated optimum moisture content in Section 7 from 0.1% to 0.5%. • Include reporting of compactive effort (standard) used in Section 7. • Amend Note 9.1 to allow the use of mechanical compaction, provided it is comparable to manual compaction. • Add Note 8.9 to define the range of application for moisture correction.
	Q143	• Amend Step 5.1 to allow the use of the wet mass of oversize material when calculating the volume of oversize. • Change the rounding of the density of the dry or wet oversize in Section 6 from 0.001 t/m³ to 0.01 t/m³.
	Q144A	• Amend subsection 3.1 to apply to sampling of quarry materials only. • Add subsection 3.2 for sampling of plant mixed materials other than foamed bitumen. • Add subsection 3.3 for sampling of plant mixed foamed bitumen. • Add Step 5.5.2 for checking the assigned values for plant mixed materials other than foamed bitumen. • Add Step 5.5.3 for checking the assigned values for plant mixed foamed bitumen. • Change the rounding of the assigned maximum dry density in Section 6 from 0.001 t/m³ to 0.01 t/m³. • Change the rounding of the assigned optimum moisture content in Section 6 from 0.1% to 0.5%. • Change the rounding of the assigned density of the dry or wet oversize in Section 6 from 0.001 t/m³ to 0.01 t/m³. • Remove 'standard or modified' from Clauses 6.1 and 6.2. • Include requirement to report the sieve used to determine oversized material, that is, 19.0 mm or 37.5 mm. • Include reporting of compactive effort (standard) used in Section 7

Part	Test method	Description of change
	Q145A	• Include the scarification of layers to promote bonding and interlock in Step 6.5. • Remove the rounding of calculated values from Steps 7.1 to 7.4. • Change the rounding of the target compacted dry density in Section 8 from 0.001 t/m³ to 0.01 t/m³. • Change the rounding of the nominated relative compaction in Section 8 from 0.1% to 0.5%. • Change the rounding of the achieved compacted dry density in Section 8 from 0.001 t/m³ to 0.01 t/m³. • Change the rounding of the achieved relative compaction in Section 8 from 0.1% to 0.5%.
	Q146	• Change the rounding of the compacted dry density in Section 5 from 0.001 t/m³ to 0.01 t/m³. • Change the rounding of the apparent particle density in Section 5 from 0.001 t/m³ to 0.01 t/m³.
	Q147B	• Change the rounding of the compacted density in Section 7 from 0.001 t/m³ to 0.01 t/m³. • Change the water density values in Table 1 from four significant figures to three significant figures.
	Q148	• Amend preparation requirements in Step 4.4 to include a reference to test method Q101 Steps 6.2.1 to 6.2.6.
5	Q181C	• Amend placement conditions in Table 2.
	Q190	• WITHDRAWN.
6	Q201	• Change reference to test method Q103A in Step 5.2.3a) from Step 6.2 to 6.1.
	Q214	• Change the rounding of the apparent particle density in Section 7 from 0.001 t/m³ to 0.01 t/m³. • Change the rounding of the particle density on a dry basis in Section 7 from 0.001 t/m³ to 0.01 t/m³. • Change the rounding of the particle density on a saturated surface-dry basis in Section 7 from 0.001 t/m³ to 0.01 t/m³. • Change the rounding of the water absorption in Section 7 from 0.01% to 0.1%.
	Q214A	• Change the rounding of the apparent particle density (fine fraction) in Section 7 from 0.001 t/m³ to 0.01 t/m³. • Change the rounding of the particle density on a dry basis (fine fraction) in Section 7 from 0.001 t/m³ to 0.01 t/m³. • Change the rounding of the particle density on a saturated surface-dry basis (fine fraction) in Section 7 from 0.001 t/m³ to 0.01 t/m³. • Change the rounding of the water absorption (fine fraction) in Section 7 from 0.01% to 0.1%. • Change the water density values in Table 2 from four significant figures to three significant figures.

Part	Test method	Description of change
	Q214B	• Change the rounding of the apparent particle density (coarse fraction) in Section 6 from 0.001 t/m³ to 0.01 t/m³. • Change the rounding of the particle density on a dry basis (coarse fraction) in Section 6 from 0.001 t/m³ to 0.01 t/m³. • Change the rounding of the particle density on a saturated surface-dry basis (coarse fraction) in Section 6 from 0.001 t/m³ to 0.01 t/m³. • Change the rounding of the water absorption (coarse fraction) in Section 6 from 0.01% to 0.1%. • Change the water density values in Table 1 from four significant figures to three significant figures.
7	Q304B	• Minor editorial changes. • Add new Step 5.17 and remove Note 8.3 to replace the assumed permeability value for low permeability or impermeable specimens and require testing of replacement specimens with lower compaction.
	Q306B	• Permit the testing of prepared production mix without drying by adding an exception to the test method.
	Q306C	• Amend Step 5.1.6 to refer to mass of silicone in Table 1 as a guide to the mass of sealant required. • Amend the title for Table 1 to reflect the change in Step 5.1.6.
	Q306D	• Minor editorial change to test method.
	Q307A	• Permit the use of a larger pycnometer for mixes with a nominal size of 20 mm or greater.
	Q308A	• Test method directly referencing an Australian Standard test method, replaced by a full text test method. • Include an oven in the apparatus in Section 3. • Include Step 5.2 for warming the asphalt using an oven. • Include a reference to Note 10.6 in Step 5.9.4 which clarifies the process for heating binders where fumes are not evident.
	Q308D	• Permit the use of ignition furnaces with, for example, infrared heating, to be used at lower operating temperatures.
	Q317	• Test method directly referencing either an Australian Standard or Austroads test method, replaced by a full text test method.

Part	Test method	Description of change
11	Q708B	• Include reference to Austroads test method in Section 1. • Remove redundant references from Section 1. • Align definitions in Section 3 with definitions in the Austroads test method AG:AM/T001. • Include apparatus for calibration of laser displacement transducers in Clause 4.3. • Include validation of the system for distance measurement using Austroads test method AG:AM/T005 in subsection 5.2. • Include validation of the system for roughness measurement using Austroads test method AG:AM/T003 in subsection 5.2, except that the Roads and Maritime Services loop in New South Wales must be used. • Replace subsection 5.3 for equipment validation with a subsection for pre-test checks. Include the requirement to check demountable equipment each time it is fitted to a vehicle. • Change the method of measurement from the half-car model to quarter-car model to align the test method with the Austroads test method AG:AM/T001. The changes have been made to Sections 2, 3, 7 and 8. • Include a requirement to ensure sudden braking or acceleration of the vehicle is avoided in Step 6.6.3. • Change the relationship for converting the IRI results to NAASRA results from half-car model to quarter-car model in Section 7.
	Q708C	• Include reference to Austroads test method in Section 1. • Remove redundant references from Section 1. • Align definitions in Section 3 with definitions in the Austroads test method AG:AM/T001. • Change the method of measurement from the half-car model to quarter-car model to align the test method with the Austroads test method AG:AM/T001. The changes have been made to Sections 2, 3, 6 and 7. • Change the relationship for converting the IRI results to NAASRA results from half-car model to quarter-car model in Section 6. • Amend Section 7 to no longer require the reporting of NAASRA results.

Part	Test method	Description of change
	Q708D	• Include reference to Austroads test method in Section 1. • Remove redundant references from Section 1. • Align definitions in Section 3 with definitions in the Austroads test method AG:AM/T001. • Change the method of measurement from the half-car model to quarter-car model to align the test method with the Austroads test method AG:AM/T001. The changes have been made to Sections 2, 3, 6 and 7. • Change the relationship for converting the IRI results to NAASRA results from half-car model to quarter-car model in Section 6. • Amend Section 7 to no longer require the reporting of NAASRA results.
	Q721	• NEW TEST METHOD.

Edition 4, Amendment 2 – December 2016

Part	Test method	Description of change
1	Introduction	• Add definitions for bulk sample, nominal size, sample, sample increment, sampling location, size fraction, sub-sample, test location and test portion to Table 1. • Add references for MRTS06 *Reinforced Soil Structures*, MRTS09 *Plant-mixed Pavement Layers Stabilised using Foamed Bitumen* and MRTS35 *Recycled Materials for Pavements* to Section 3.
4	Q138	• Amend apparatus requirements to align with new Austroads test method. The mould and compaction hammer requirements now comply with the requirements of ASTM D5581 in Section 3.2, Note 8.2 and Table 1. • Increase the maximum particle size from 19.0 mm to 37.5 mm in Clause 3.4 and Section 5. • Allow the use of a Type A mould for determining the maximum dry density and optimum moisture content in Step 5.1.5. Add Note 8.6 to explain part of the mixing water calculation in Step 6.1.3. • Amend Note 8.7 to include comment on monitoring and adjusting the binder loss factor. • Amend the suggested compaction portion size in Note 8.11.

Part	Test method	Description of change
	Q139	• Editorial changes to ensure consistency of terminology. • Amend the scope to include a reference to plant mixed foamed bitumen. • Include requirements for preparing samples to be used for plant mixed foamed bitumen stabilisation in subsection 6.2. • Remove optionality for testing of three-day cured modulus in Step 6.3.1. • Include requirements for testing field mixed samples obtained from plant mixed foamed bitumen stabilisation in subsection 6.4. • Include reference to three, seven and fourteen-day modulus and retained modulus testing in Sections 8 and 9. • Include plant mixed reporting requirements to Section 9. • Include requirement to report if the field mixed material is sampled from an insitu mixed or plant mixed in Section 9. • Include requirement to report if the laboratory mixed material is to be used as an insitu mixed or plant mixed material in Section 9.
	Q250	NEW TEST METHOD.

Edition 4, Amendment 1 – March 2016

Part	Test method	Description of change
All	All	• Use standard definitions from Transport and Main Roads Technical Specifications and *Materials Testing Manual*. • Minor editorial changes to documents. • All test methods updated with new corporate logo header. Blue line in each footer removed.
1	Introduction	• Include standard definitions in Section 3 and Table 1. • Table 2 containing equivalent methods revised.
2	Q020	• For concrete test method Q482, add new Table 2 for k values and add rounding requirements to Table 3. • Add test method Q311 to Note 6.1, Table 1 and Table 3. • Amend Sections 2, 3 and 6 to state that test methods used in determining the properties of a lot must be the same. • Change the description of the test in Table 3 from relative dry density to relative compaction.
3	Q050	• Correct reference to Note in Step 9.1.1.
	Q070	• NEW TEST METHOD.
4	Q101	• Add a 9.50 mm sieve to Section 3. • Replace 4.75 mm sieve with 9.50 mm sieve in Step 6.2.3.
	Q102A	• Amend Sections 1, 3 and 5 to remove requirement for close fitting lids for coarse and medium-grained materials. • Amend Section 6 and add Table 2 to change reporting intervals.
	Q102B	• Amend Sections 1, 3 and 5 to remove requirement for close fitting lids for coarse and medium-grained materials. • Amend Section 6 and add Table 2 to change reporting intervals.

Part	Test method	Description of change
	Q102D	• Amend Sections 1, 3 and 5 to remove requirement for close fitting lids for coarse and medium-grained materials. • Amend Section 6 and add Table 2 to change reporting intervals.
	Q103A	• Add calculation and reporting of grading coefficient. • Add 2.00 mm sieve to apparatus. • Add fines ratio, Cu, Cc and grading coefficient to scope. • Add Note 9.1 with reference for grading coefficient.
	Q103F	• NEW TEST METHOD.
	Q104D	• Amend source statement to remove reference to Table 1.
	Q105	• Amend Step 4.1 to select oven drying procedure for low plasticity materials. • Amend Step 4.2 to select air drying procedure for medium and high plasticity materials. • Include Table 2 with definitions of low, medium and high plasticity materials.
	Q106	• Add Note 8.3. • Remove Note 8.5. • Amend Step 5.1.5 to select oven drying procedure for low plasticity materials. • Amend Step 5.1.6 to select air drying procedure for medium and high plasticity materials. • Amend Steps 5.4.1c) and 5.4.2c) to require the scalpel to be used to mark the length of the bar. • Include Table 2 with definitions of low, medium and high plasticity materials.
	Q113A	• Amend Step 5.1.5 to specify the use of a minimum curing time from Table 3. This aligns the test methods with the latest Australian Standard test method. • Remove Note 8.9. • Process for removing water and draining the specimen in Steps 5.4.5 to 5.4.6 has been amended.
	Q113B	• Amend Step 5.1.5 to specify the use of a minimum curing time from Table 3. This aligns the test methods with the latest Australian Standard test method. • Remove Note 8.9. • Process for removing water and draining the specimen in Steps 5.4.5 to 5.4.6 has been amended.
	Q113C	• Amend Steps 5.1.5 and 5.2.5 to specify the use of a minimum curing time from Table 3. This aligns the test methods with the latest Australian Standard test method. • Remove Note 8.9. • Process for removing water and draining the specimen in Steps 5.4.5 to 5.4.6 has been amended. • Correct material height gauge dimensions in Note 8.4.2.

Part	Test method	Description of change
	Q115	• Change reference to coring method in Step 5.3.1 from test method Q302A to test method Q070. • Remove reference to scarifying layers from Step 6.2.5. • Correct references to Notes throughout test method.
	Q131B	• Remove Step 6.8
	Q135A	• Correct references to Notes throughout test method. • Add compaction apparatus to Section 3. • Add Table 1 and Note 7.2 for compaction apparatus. • Amend conditioning processes in Section 6 to be specific for lime (two-day mixing process) and other dry additives such as cement, blended cements, lime / flyash and so on.
	Q135B	• Correct references to Notes throughout test method. • Add requirements for placing soaking weights on CBR specimens during air curing and immersed water curing in Step 4.2.1.
	Q136	• Replace nominated working time limit with allowable working time throughout the test method. • Include definition for allowable working time from test method Q140A. • Include missing symbol in Step 7.2.1f).
	Q137	• Replace various terms such as 'unbound pavement material' with 'unbound material' throughout the test method. • Amend Step 5.5 to change the degree of saturation limit from greater than 2.0% to greater than 4.0%. • Remove the requirement to sample a moisture content after testing in Step 6.2.1.
	Q138	• Replace 30–60-minute delay period in the foaming and mixing process in subsection 7.2 with 45-minute conditioning period. This aligns the process and terminology with test method Q135A. • Add requirement for C170 bitumen to be free of cutter, flux and other additives. • Amend apparatus definition for an extrusion jack in Clause 3.2.4.
	Q139	• Change reference to coring method in Step 6.3.1 from test method Q302A to test method Q070.
	Q140A	• Use standard definitions for materials in Step 4.1.3 from the *Introduction* to this Manual and Transport and Main Roads Technical Specifications.
	Q141B	• Add crushed rock and stabilised materials to the scope of the test method. • Amend particle size criteria and test hole depths in Table 1.
	Q142A	• Replace a reference to a 19.0 mm sieve in the scope to a 37.5 mm sieve.
	Q142B	• Replace a reference to a 19.0 mm sieve in the scope to a 37.5 mm sieve.
	Q142C	• Replace a reference to a 19.0 mm sieve in the scope to a 37.5 mm sieve.

Part	Test method	Description of change
	Q144A	• Use standard definitions for materials in the scope and Sections 3 and 5 from the *Introduction* to this Manual and Transport and Main Roads Technical Specifications.
	Q146	• Use standard definitions for materials in the scope, Section 3 and Notes from the *Introduction* to this Manual and Transport and Main Roads Technical Specifications.
6	Q201	• Amend test method to allow the use of fractions obtained from particle size distribution method AS 1141.11.1. • Correct reference to test method Q103A in Step 5.2.3.
	Q214	• NEW TEST METHOD.
	Q229A	• Remove requirement for constant temperature environment in Section 3 and Step 6.3. • Amend Step 6.3 to require storing of test portion and water in the abrasion jar in a room at 23°C ± 3°C before testing.
	Q229B	• Remove requirement for constant temperature environment in Section 3 and Step 6.3. • Amend Step 6.3 to require storing of test portion and water in the abrasion jar in a room at 23°C ± 3°C before testing.
	Q230	• NEW TEST METHOD.
7	Q301	• Test method amended to directly reference an Australian Standard test method.
	Q302A	• Test method amended to directly reference an Australian Standard test method.
	Q302B	• Test method amended to directly reference an Australian Standard test method.
	Q303A	• Amend Note 5.1 to clarify the requirements for air drying of core samples.
	Q305	• Remove reference to hammer face from hotplate requirement in Clause 3.9. Remove reference to hammer face from Step 5.4. • Amend Steps 5.11 and 5.13 to remove requirement for 50 hammer blows and replace with reference to a specified number of blows. • Amend Steps 6.4, 6.5 and Note 9.14 to require the immersion of breaking head segments in water where practicable. • Add requirement to report number of blows applied to each face of the test specimens to Section 8. • Amend Note 9.10 to require the application of 50 blows to the face of each specimen if a number is not specified.
	Q306A	• Clarify the use of air drying in Step 5.1.2 and Note 8.2. • Amend rounding of known density of paraffin wax to 0.001 t/m³ in Clause 4.1.
	Q306B	• Test method amended to directly reference an Australian Standard test method.

Part	Test method	Description of change
	Q306C	• Clarify the use of air drying in Step 5.1.2 and Note 8.2. • Amend rounding of known density of paraffin wax to 0.001 t/m³ in Clause 4.1.
	Q306D	• Test method amended to directly reference an Australian Standard test method.
	Q307A	• Test method amended to directly reference an Australian Standard test method.
	Q308A	• Test method amended to directly reference an Australian Standard test method.
	Q308D	• Test method amended to directly reference an Austroads test method.
	Q311	• Add test methods Q306D and Q306E to Step 3.1. • Include calculation and reporting of minimum and maximum characteristic percentage by volume of air voids in Sections 4 and 5. • Amend the binder absorption calculations in Note 6.3.
	Q315	• Amend Clause 3.1 to allow the sampling of both laboratory mix or plant produced mix. • Allow compacted density to be determined using test method Q306B by amending Step 5.6 and adding Note 8.1. • Amend the calculation in Step 6.2 to calculate a tensile strength in kPa. • Amend Step 6.3 to round the average tensile strength to the nearest 10 kPa. • Change the average tensile strength units to units in kPa in Step 6.4. • Amend the rounding of reported results in Steps 7.3 and 7.4. • Amend Section 7 to allow the reporting of tensile strength in kPa.
	Q317	• Method amended to directly reference an Australian Standard or Austroads test method.
	Q320	• Amend Section 3.1.2 to align the requirements of the wheel tracker table with the current Austroads test method.
	Q321	• Amend the binder absorption calculations in Note 6.2.
	Q322	• Amend the apparatus specifications and working tolerances in Table 1.
	Q324	• NEW TEST METHOD.
	Q325	• NEW TEST METHOD.
9	Q456	• Amend Note 10.5.
	Q473	• Amend test method to include testing of moulded specimens.
	Q477	• Amend the foreign materials definitions in Table 2.
	Q482	• NEW TEST METHOD.
	Q483	• NEW TEST METHOD.
	Q484	• NEW TEST METHOD.

Part	Test method	Description of change
	Q485	• NEW TEST METHOD.
10	Q603	• Amend Step 5.2.8 to align the mass of sample to provide a similar binder film thickness as the Australian Standard.
11	Q712	• Amend the apparatus definition in Clause 3.1.

Edition 4 – November 2014

Part	Test Method	Description of change
All	All	• Reissued with minor editorial, format and style changes. • References to test method Q101 have been updated. • Replace Material Safety Data Sheet (MSDS) with Safety Data Sheet (SDS). • Amend the definition of oven dry constant mass to '… is considered to have reached a constant mass when the difference between successive weighings, after a further one-hour drying at 105°C–110°C, is not more than one percent of the total of the previous moisture losses' as appropriate. • Amend the definition of oven dry constant mass to '… is considered to have reached a constant mass when the difference between successive weighings, after a further four hours drying at 45°C–50°C, is not more than one percent of the total of the previous moisture losses' as appropriate. • Amend the definition of air dry constant mass to '… is considered to have reached a constant mass when the difference between successive weighings, after a further 24 hours air drying, is not more than 0.03 percent' as appropriate. • Remove references to test methods Q102C and Q102E. • Standard formats for test method titles have been applied.
1	Introduction	• Tables containing equivalent methods revised.
2	Q020	• NEW TEST METHOD
3	Q050	• Add recording and reporting requirements to test method.
	Q060	• Remove reference to 'Farmers Friend Shovel' in Section 3. • Add reporting requirements to test method.
	Q061	• Remove Figure 1. • Add reporting requirements to test method.
4	Q101	• Test method reviewed and rewritten. • Remove Appendices 1 to 4. Include references to previously published test methods Q101A, Q101B, Q101C, Q101D, Q101E and Q101F. • Include contemporary equipment such as shredder and mulching style sample preparation machines. • Include a section on pre-treatment. • Include special preparation requirements for a non-standard material, Winton sandstone.

Part	Test Method	Description of change
	Q101E	• Amend to allow pre-treatment of materials other than Winton sandstone.
	Q102C	• WITHDRAWN.
	Q102E	• WITHDRAWN.
	Q105	• Source amended to allow sub-sampling of material at different moisture contents. Where testing is for compliance, sub-sampling remains at a moisture content higher than the liquid limit. Otherwise, sub-sampling may be undertaken when the material is plastic enough to be shaped into a ball. • Steps 4.1 and 4.2 have been amended to reflect this change.
	Q109A	• Amended the requirements for a water bath in Section 3 to require it operates at a constant temperature within the range of 20°C to 30°C to within ± 1.0°C. • Amend the vacuum requirement in Step 5.8 and add Note 9.3 to assist consistent interpretation of this requirement. • The density of water is determined using the temperature of the constant temperature environment. Remove requirements to measure the temperature of the contents of the bottle. • Allow for the determination of the mass of bottle filled with water to be undertaken either after each determination of soil volume or at a regular interval.
	Q113A	• Include a 19.0 mm and 9.50 mm sieve in Section 3. • Amend Section 7 to separate mandatory from optional reporting requirements.
	Q113B	• Include a 19.0 mm and 9.50 mm sieve in Section 3. • Amend Section 7 to separate mandatory from optional reporting requirements.
	Q113C	• Include a 19.0 mm and 9.50 mm sieve in Section 3.
	Q114B	• Amend Section 7 to remove reporting requirements already specified in sampling methods, NATA requirements or that are no longer required.
	Q115	• Amend Section 11 to remove reporting requirements already specified in sampling methods, NATA requirements or that are no longer required.
	Q117A	• WITHDRAWN.
	Q121	• WITHDRAWN.
	Q125A	• WITHDRAWN.
	Q125B	• WITHDRAWN.
	Q131A	• WITHDRAWN.

Part	Test Method	Description of change
	Q134	• The calculations for determining the relationship between stabilizing agent content and temperature rise have been included in Section 7. • The calculations of determining the calibration constants have been included in Section 7. The calculation of test data has been revised to allow for the use of a simpler format of the calibration relationship. • The reporting requirements in Section 8 have been amended to report the new calibration relationship determined in Section 7. • A requirement to check the temperature difference between the test portion and buffer solution has been added in Step 6.6 and Notes 9.4 and 9.6. The allowable temperature difference is the same as the similar Australian Standard test method. • Requirements for the test environment have been relaxed in Step 5.1.4 and included in Notes 9.3 and 9.4. • Techniques for warming or cooling the test portion have been included in Note 9.6. • Amend Section 8 to remove reporting requirements already specified in sampling methods, NATA requirements or that are no longer required.
	Q136	• Insert Table 1 and remove references to Table 2.
	Q137	• Amend Section 8 to remove reporting requirements already specified in sampling methods, NATA requirements or that are no longer required.
	Q138	• Replace references to 37.5 mm sieve with 19.0 mm sieve in Sections 2, 3 and 5. • Amend Step 5.1.5 to require the use of a Type A mould for compaction testing. • Add a moisture adjustment for dry stabilized agent in Step 6.1.3. • Change the calculation for foaming agent to a mass required rather than volume. • Amend the foaming process in subsection 7.1. • Add a 30–60-minute delay or dwell period into the foaming and mixing process in subsection 7.2.
	Q139	• Amend the vacuum requirement in subsections 6.1 and 6.2 and add Note 10.2 to assist consistent interpretation of this requirement. • Amend the preparation requirements for laboratory, field and core samples in Section 6. • Add calculation and reporting of average modulus values in Sections 8 and 9. • Change reporting requirements to reflect changes in Sections 6, 8 and 9.
	Q140A	• Include the calculation of characteristic values of a lot by referencing test method Q020 in Section 5. • Include the reporting of characteristic values of a lot by referencing test method Q020 in Section 6. • Method amended to reflect a change in sampling for determination of oversize percentage and density. These samples are now taken from the material obtained for moisture density relationship testing (test methods Q142A, Q142B or Q142C).

Part	Test Method	Description of change
	Q140B	• WITHDRAWN.
	Q141B	• Amend Section 11 to remove reporting requirements already specified in sampling methods, NATA requirements or that are no longer required. • Test method amended to reflect a change in sampling for determination of oversize percentage and density. These samples are now taken from the material obtained for moisture density relationship testing (test methods Q142A, Q142B or Q142C). Determination of oversize content in subsection 9.5 and reporting of oversize percentage and density in Section 11 have been removed.
	Q142A	• Some additional information required for reports has been removed from Section 7. • Include reporting of sieve used to determine percentage oversize in Section 7. • Method amended to reflect a change in sampling for determination of oversize percentage and density. These samples are now taken from the material obtained for moisture density relationship testing. subsections 5.3 to 5.7 and Section 7 have been amended to allow for the determination and reporting of oversize percentage and density. • Amend Step 5.7.2 to only prepare portions where the stabilizing agent in incorporated in the laboratory. Add Step 5.7.3 for portions prepared from samples where the stabilizing agent was incorporated insitu.
	Q142B	• Some additional information required for reports has been removed from Section 7. • Include reporting of sieve used to determine percentage oversize in Section 7. • Method amended to reflect a change in sampling for determination of oversize percentage and density. These samples are now taken from the material obtained for moisture density relationship testing. subsections 5.3 to 5.7 and Section 7 have been amended to allow for the determination and reporting of oversize percentage and density. • Amend Step 5.7.2 to only prepare portions where the stabilizing agent in incorporated in the laboratory. Add Step 5.7.3 for portions prepared from samples where the stabilizing agent was incorporated insitu.

Part	Test Method	Description of change
	Q142C	• Remove reference to ASTM 5080 from scope and calculations from Section 6. • Some additional information required for reports has been removed from Section 7. • Include reporting of sieve used to determine percentage oversize in Section 7. • Method amended to reflect a change in sampling for determination of oversize percentage and density. These samples are now taken from the material obtained for moisture density relationship testing. subsections 5.3 to 5.7 and Section 7 have been amended to allow for the determination and reporting of oversize percentage and density. • Reporting requirements in Sections 7.4 and 7.5 changed from mandatory to as required. • References to field moisture content changed to insitu moisture content.
	Q142E	• WITHDRAWN
	Q143	• Include the definition for drying to constant mass in Note 7.1. • The calculations of oversize percentage and density in Section 5 have been amended to reflect changes in test methods Q142A, Q142B and Q142C.
	Q144A	• Section 3 amended to clarify the requirements for obtaining samples of manufactured, insitu stabilized and unprocessed materials. • Section 3 amended to include requirements for checking insitu stabilized and unprocessed materials. • Some additional information required for reports has been removed from Section 6. • The terminology for obtaining a new assigned value if the check infringes the criteria in Table 1 has been modified to align with the requirements in test method N01 subsection 4.5.2.
	Q145A	• Remove the use of subsidiary moisture content test methods from Section 6. • Remove requirement to scarify compacted surface from Section 6. • Amend Section 8 to remove reporting requirements already specified in sampling methods, NATA requirements or that are no longer required.
	Q14[illegible]	• Include the calculation of characteristic values of a lot by referencing test method Q020 in Section 4. • Include the reporting of characteristic values of a lot by referencing test method Q020 in Section 5. • Amend Section 5 to remove reporting requirements already specified in sampling methods, NATA requirements or that are no longer required.
	Q147B	• Amend the vacuum requirement in Step 5.1.3 and add Note 8.1 to assist consistent interpretation of this requirement. • Update the process for drying the specimen to constant mass in subsection 5.3.

Part	Test Method	Description of change
	Q148	• Amend Section 8 to remove reporting requirements already specified in sampling methods, NATA requirements or that are no longer required.
	Q149	• Amend Section 6 to remove reporting requirements already specified in sampling methods, NATA requirements or that are no longer required.
5	Q152A	• WITHDRAWN.
	Q171	• Amend Section 6 to remove reporting requirements already specified in sampling methods, NATA requirements or that are no longer required.
	Q172	• Amend Section 7 to remove reporting requirements already specified in sampling methods, NATA requirements or that are no longer required.
	Q173A	• WITHDRAWN.
	Q177	• WITHDRAWN.
	Q178	• WITHDRAWN.
	Q181B	• WITHDRAWN.
	Q181C	• Include a 19.0 mm and 9.50 mm sieve in Section 3. • The reporting requirements in Section 7 have been amended to report the moisture content at placement and after shearing to the nearest 0.1%. Some additional information required for reports has been removed.
	Q183	• WITHDRAWN.
	Q185	• Test method reviewed and rewritten.

Part	Test Method	Description of change
6	Q201	• Test method amended to allow the use of particle size distribution test methods Q103A and Q103B.
	Q203	• Amend source to include change to slotted sieve and the use of UK reference aggregate. • Remove Figures 1 and 2 and replace with references to AS 1141.40 Figure 1 and AS 1141.42 Figure 1. • Change specification for slotted sieve aperture to 7.2 mm in Section 3 and Table 1. • Amend Section 4 and Note 8.1 to include the use of UK reference aggregate and details of suppliers of both Panmure and UK reference aggregates. • Amend the acceptance range for unpolished reference specimens to 65 to 80 for Panmure and 60 to 68 for UK in Step 5.2.7. • Amend grit feed rate to 2.0 ± 0.5 g/min in Steps 5.3.2b and 5.4.5. • Amend the minimum acceptable value for polished reference specimens to 48 for Panmure and 43 for UK in Step 5.6.8 and Notes 8.8 and 8.9. • Amend the minimum acceptable value for sample mean value for polished reference specimens to 49 to 54 for Panmure and 43 to 49 for UK in Step 6.2.4 and Notes 8.8 and 8.11. • Amend the calculation in Step 6.3.5 to allow the use of values of 51 for Panmure and 46 for UK reference aggregates. • Include a requirement to report the source of reference aggregate used in Section 7. • Amend Section 7 to remove reporting requirements already specified in sampling methods, NATA requirements or that are no longer required.
	Q205A	• Remove Figure 1 and replace with reference to AS 1141.22 Figure 1.
	Q205B	• Remove Figure 1 and replace with reference to AS 1141.22 Figure 1.
	Q206	• WITHDRAWN.
	Q208A	• Move the constant mass definition from Step 5.6.3 to Note 10.6.
	Q208B	• Move the constant mass definition from Step 5.2.5 to Note 10.6.
	Q209	• WITHDRAWN.
	Q212B	• Test method reviewed and rewritten.
	Q212C	• Test method reviewed and rewritten.
	Q214A	• Amended the requirements for a water bath in Section 3 to require it operates at a constant temperature within the range of 20°C to 30°C to within ± 1.0°C. • The density of water is determined using the temperature of the constant temperature environment. Remove requirements to measure the temperature of the contents of the flask. • Allow for the determination of the mass of the flask filled with water to be undertaken either after each determination of particle volume or at a regular interval.

Part	Test Method	Description of change
	Q215	• Amend the scope to limit the tests to aggregates derived from rounded gravel.
	Q228	• NEW TEST METHOD.
	Q229A	• NEW TEST METHOD.
	Q229B	• NEW TEST METHOD.
7	Q301	• Add recording and reporting requirements to test method.
	Q302A	• Amend recording requirements. • Add reporting requirements to test method.
	Q302B	• Amend recording requirements. • Add reporting requirements to test method.
	Q307A	• Amend the vacuum requirement in subsection 6, Step 6.12 and add Note 9.10 to assist consistent interpretation of this requirement.
	Q314	• Include the calculation of characteristic values of a lot by referencing test method Q020 in Section 4. • Include the reporting of characteristic values of a lot by referencing test method Q020 in Section 5.
	Q315	• Amend the vacuum requirement in subsection 3 to assist consistent interpretation of this requirement.
	Q319	• Test method reviewed and rewritten.
	Q320	• Test method reviewed and rewritten.
	Q323	• NEW TEST METHOD.
9	Q457A	• WITHDRAWN. Test method to be revised and reissued in 2015.
	Q457B	• Test method reviewed and rewritten.
	Q458	• WITHDRAWN.
	Q476	• Reissued with reference to new Australian Standards.
11	Q704	• Some additional information required for reports has been removed from Section 7.
	Q705B	• Amend Section 6 to remove reporting requirements already specified in sampling methods, NATA requirements or that are no longer required.
	Q708A	• WITHDRAWN.
	Q720	• Amend Section 6 to remove reporting requirements already specified in sampling methods, NATA requirements or that are no longer required.