# Conformance Testing

DIPL Roadworks Master – May 2019

## General

The Superintendent will carry out all conformance testing nominated to be the Superintendent's responsibility through Panel Period Contracts.

The Contractor will be responsible for ordering the conformance tests.

## Standards, Codes, and Test Methods

Northern Territory Test Methods (NTTM) and NT Codes of Practice (NTCP) for materials testing are given in the Northern Territory Road Projects Materials Testing Manual (NTMTM). The methods contained in the Materials Testing Manual shall take precedence over all other test methods and procedures, and are used in conjunction with relevant Australian Standards.

When testing cannot be performed to the test methods stated below, these methods may be substituted with State Road Authority test methods so testing can be performed.

The following standards, codes and test methods are referred to in this section;

AUSTRALIAN STANDARDS

AS 1141(set) Methods for testing and sampling aggregates

AS 1141.11.1 - Particle size distribution – Sieving method.

AS 1141.14 - Particle shape, by proportional calliper.

AS 1141.15 - Flakiness index.

AS 1141.18 - Crushed particles in coarse aggregate derived from gravel.

AS 1141.20.1 - Average least dimension - Direct measurement (nominal size 10 mm and greater).

AS 1141.20.2 - Average least dimension - Direct measurement (nominal sizes 5 mm and 7 mm).

AS 1141.23 - Los Angeles value.

AS 1141.24 - Aggregate soundness – Evaluation by exposure to sodium sulphate solution.

AS 1141.40 - Polished aggregate friction value - Vertical road-wheel machine.

AS 1141.41 - Polished aggregate friction value – Horizontal bed machine.

AS 1289(set) Methods of testing soils for engineering purposes

AS 1289.3.1.1 - Soil classification tests - Determination of the liquid limit of a soil – Four point Casagrande method.

AS 1289.3.2.1 - Soil classification tests – Determination of the plastic limit of a soil – Standard method.

AS 1289.3.3.1 - Soil classification tests – Calculation of the plasticity index of a soil.

AS 1289.3.4.1 - Soil classification tests – Determination of the linear shrinkage of a soil – Standard method.

AS 1289.3.6.1 - Soil classification tests – Determination of the particle size distribution of a soil – Standard method of analysis by sieving.

AS 1289.5.1.1 - Soil compaction and density tests - Determination of the dry density or moisture content relation of a soil using standard compactive effort.

AS1289.5.2.1 - Soil compaction and density tests - Determination of the dry density or moisture content relation of a soil using modified compactive effort.

AS1289.5.4.1 - Soil compaction and density tests – Compaction control test – Dry density ratio, moisture variation and moisture ratio

AS 1289.5.8.1 - Soil compaction and density tests – Determination of field density and field moisture content of a soil using a nuclear surface moisture-density gauge – Direct transmission mode.

AS 1289.6.1.1 - Soil strength and consolidation tests - Determination of the California Bearing Ratio of a soil – Standard laboratory method for a remoulded specimen.

AS 2341(set) Methods of testing bitumen and related road making products.

AS/NZS 2341.2 - Determination of dynamic (coefficient of shear) viscosity by flow through a capillary tube.

AS 2341.3 - Determination of kinematic viscosity by flow through a capillary tube.

AS/NZS 2341.4 - Determination of dynamic viscosity by rotational viscometer.

AS 2341.12 - Determination of penetration

AS/NZS 2341.13 - Long-term exposure to heat and air.

AS 2891(set) Methods of sampling and testing asphalt.

AS/NZS 2891.3.1 - Binder content and aggregate grading – Reflux method.

AS/NZS 2891.3.2 - Binder content and aggregate grading – Centrifugal extraction method.

AS/NZS 2891.3.3 - Binder content and aggregate grading – Pressure filter method.

AS/NZS 2891.5 - Determination of stability and flow – Marshall procedure

AS/NZS 2891.7.1 - Determination of maximum density of asphalt – Water displacement method

AS/NZS 2891.7.3 - Determination of maximum density of asphalt – Methylated spirit displacement

AS/NZS 2891.8 - Voids and density relationships for compacted asphalt mixes.

AS/NZS 2891.9.1 - Determination of bulk density of compacted asphalt – Waxing procedure.

AS/NZS 2891.9.2 - Determination of bulk density of compacted asphalt – Presaturation method.

AS/NZS 2891.9.3 - Determination of bulk density of compacted asphalt – Mensuration method.

AS 4049.3 Paints and related materials – Pavement marking materials Part 3: Waterborne paint – for use with surface applied glass beads.

NT CODES OF PRACTICE

NTCP 102.1 Testing field compaction for conformance

NTCP 103.1 Site selection by the stratified random technique.

NTCP 107.1A Surface Roughness

NT TEST METHODS

NTTM 204.1 Cement content of stabilised materials – Heat of neutralisation

NTTM 204.7 Rate of spread of lime or cement

NTTM 204.8 Stabiliser distribution

NTTM 215.1 Standard ball penetration test

NTTM 216.1 Measurement of layer thickness

NTTM 304.1 Determination of skid resistance with the portable skid tester

NTTM 305.1 Determination of pavement surface texture depth - sand patch method

NTTM 404.1 Retroreflectivity testing of pavement marking

NTTM 404.3 Retroreflectivity testing of pavement marking – wet condition

AUSTROADS TEST METHODS

AGPT04H Austroads Guide to Pavement Technology Part 4H: Test Methods

AGPT/T103 Pre-treatment and Loss on Heating of Bitumen Multigrade and polymer Binders (rolling thin film oven [RTFO] test)

AGPT/T111 Handling Viscosity of Polymer Modified Binders (Brookfield Thermosel)

AGPT/T112 Flash Point of Polymer Modified Binders

AGPT/T121 Shear Properties of Polymer Modified Binders (ARRB ELASTOMETER)

AGPT/T122 Torsional Recovery of Polymer Modified Binders

AGPT/T124 Toughness of Polymer Modified Binders (ARRB Extensiometer)

AGPT/T131 Softening Point of Polymer Modified Binders

AGPT/T231 Deformation Resistance of Asphalt Mixtures by the Wheel Tracking Test.

MAIN ROADS WESTERN AUSTRALIA, TEST METHODS (MRWATM).

WA 730.1 Bitumen Content and Aggregate Grading.

## Definitions

CBR California Bearing Ratio.

CONFORMANCE TESTING The testing to be carried out by the Superintendent to ensure that the work complies with the contract documents.

ITP Inspection Test Plan

NATA National Association of Testing Authorities, Australia.

NTCP Northern Territory Codes of Practice

NTTM Northern Territory Test Method

NTMTM Northern Territory Materials Testing Manual – available via <https://transport.nt.gov.au/infrastructure/technical-standards-guidelines-and-specifications/materials-testing-manual>

PROCESS TESTING Testing carried out by the Contractor to self-ensure that the work is in accordance with the contract documents.

## ITP submission – hold point

ITPs are required for all construction processes.

**Hold Point** - Submit: ITPs, detailing all procedures and test plans to be undertaken to complete the project, before commencing work.

## Specific Tests

Conduct field density testing using Nuclear Density Gauges in accordance with NTCP 102.1 and AS 1289.5.8.1.

Conduct CBR moulding using a compaction rammer / hammer conforming with the requirements of AS 1289.5.1.1 or AS 1289.5.2.1.

Where tests are required that are not included in the manual use the appropriate Australian Standard.

## Panel Period Contractors

The Principal has in place Panel Period Contracts with NATA accredited testing companies. The Superintendent will provide a list of the Panel Period Contractors to be used for conformance testing on this contract when the contract is awarded. The Superintendent reserves the right to use other NATA accredited laboratories when panel contractors are unable to carry out specific tests.

## Ordering Testing

When required, in accordance with the contract documents, order the conformance testing in writing directly from the Panel Period Contractors. Order all testing using the Department’s Test Request Form. Include on the order the following information:

* Lot boundaries including start and finish chainages, length and width
* Type of layer
* Type of tests required
* Date and time when lot will be ready for testing

Start with the first Contractor on the list and rotate in sequence for each set of tests. Do not bypass any Panel Period Contractor on the list unless that Panel Period Contractor provides a written explanation that he is unable to carry out the required testing to the time frames listed in the ***Table - Testing and Reporting Completion Times***. In this instance, the written explanation must be provided to the Superintendent at the same time as the order for testing. Panel Period Contractors that are unable to carry out the required testing will be placed at the end of the rotation sequence.

### Conformance Testing

The Superintendent will pay for all conformance testing directly to the Panel Period Contractor selected to perform the conformance tests required under this contract and nominated as the Superintendent’s responsibility.

If any tests fail to meet specification, all retesting costs will be a negative variation to the contract.

Failures in bitumen tests refer to Superintendent.

When testing has been ordered and the site is not ready for testing at the time specified by the Contractor, the Contractor will bear the cost of time and travel incurred by the Panel Period Contractor and the Superintendent, where applicable.

### Process Testing

The Contractor is responsible for the ordering up of, and payment for, all process tests carried out.

## Notice Of Testing – witness point

Give the Panel Period Contractor written notice in advance of each stage of the works requiring conformance testing, including re-testing.

**Witness point** - Provide the Superintendent with a copy of the order for testing simultaneously with the order being sent to the Panel Period Contractor.

Any communication with the Panel Period Contractors, other than the ordering of testing or inquiring on the timing of test results, must be forwarded through the Superintendent.

Provide the Superintendent with the results of process control testing as identified in the relevant ITP with all requests for conformance testing.

**Witness point** - Notify the Superintendent prior to any rework of failed lots.

## Tables - Test Frequencies, Compliance Testing

Test frequencies as per tables;

***Table – Test Frequencies for Bitumen Spray Sealing.***

***Table – Asphalt Testing Frequencies - During Works***

***Table – Asphalt Testing Frequencies– After Works Completed***

***Table – Asphalt Testing - Number of Cores per Lot***

***Table - Test Frequencies for Soils – Parts 1, 2 and 3,***

***Table - Test Frequencies for Aggregates And Pavement Surfaces,***

***Table - Sampling Frequencies for Fresh* Concrete**

***Table – Test Frequencies for Surface Roughness Testing, and***

***Table - MMDD Minimum Curing Times.***

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| **Table – Test Frequencies for Bitumen Spray Sealing** | | | | | |
| **Test Method.** | **Property Tested** | **Cutback Bitumen/ Emulsions** | **Straight Run Binder -Initial Seal on New Works** | **Polymer Modified Bitumen -Initial Seals on New Works** | **Polymer Modified Bitumen -Reseal Works** |
| AS 2341.2, AS 2341.3 or AS 2341.4 | Dynamic Viscosity (60ºC) | 1 per 15,000L | 1 per 15,000L | - | - |
| Dynamic Viscosity (135ºC) | - | 1 per 15,000L | - | - |
| AS 2341.12 | Penetration (25ºC) | - | 1 per 15,000L | - | - |
| AGPT/T121 | Consistency (60ºC) | - | - | 1 per 15,000L | 1 per 20,000L |
| AGPT/T121 | Stiffness at 150C (kPa) |  | - | 1 per 15,000L | 1 per 20,000L |
| AGPT/T111 | Dynamic Viscosity (165ºC) | - | - | 1 per 15,000L | 1 per 20,000L |
| AGPT/T122 | Torsional Recovery at 25ºC, 30s (%) | - | - | 1 per 15,000L | 1 per 20,000L |
| AGPT/T131 | Softening Point (oC) | - | 1 per 15,000L | 1 per 15,000L | 1 per 20,000L |
| AS 2341.13 | Durability of base binder | 1 per project | 1 per project |  |  |
| AGPT/T112 | Flash Point (oC) min. | 1 per project | 1 per project | 1 per project | 1 per project |
| AGPT/T103 | Loss on Heating (%mass) max. | 1 per project | 1 per project | 1 per project | 1 per project |
| AGPT/T124 | Toughness at 4oC, 100mm(Nm) min. | 1 per project | 1 per project | 1 per project | 1 per project |

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| **Table – Asphalt Testing Frequencies - During Works** | | | |
| **Test Method** | **Property Tested** | **Minimum Test Frequency** | |
| **Daily Production <100 tonnes** | **Daily Production >100 tonnes** |
| - | Mixing temperature | Every mix | Every mix |
| - | Laying temperature | Every 30 minutes | Every 30 minutes |
| - | Asphalt surface temperature at commencement of compaction | Every Mix | Every mix |
| AS 2891.3 or WA730.1 | Bitumen content | 1 No. | 1 per 100 t \* |
| AS 2891.3 or WA730.1 | Particle size distribution | 1 No. | 1 per 100 t \* |
| AS 2891.5 | Stability | 1 No. | 1 per 100 t \* |
| AS 2891.5 | Flow | 1 No. | 1 per 100 t \* |
| AS/NZS 2891.7.1  AS/NZS 2891.7.3 | Maximum Density | 1 No. | 1 per 100 t \* |
| AS 2341.3 | Viscosity of Binder | 1 per shift | 1 per shift |
| \* One test per nominated tonnage or part thereof. | | | |

All sampling is to be performed at the plant from safe sampling platforms.

Binder sampling is to be conducted on the binder in actual use, either at transfer to the bitumen tank on the asphalt plant or from the tank itself.

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| **Table – Asphalt Testing Frequencies - After Works Completed** | | |
| **Test Method** | **Property Tested** | **Frequency** |
| AS 2891 | Thickness of layer | 1 per core |
| AS 2891.8 | Air Voids of compacted asphalt layer | 1 per core |
| AS 2891.9 | Insitu Density | 1 per core |
| AGPT04H - AGPT/T231 | Wheel track testing (composite sample) | 1 per Type or 1 per 1000 t |

Carry out density testing as soon as practicable after completion of works.

Do not test within 200mm of an edge and longitudinal joint and within 1 metre of a transverse joint. Do not test odd shaped areas completed by hand placing of asphalt.

Conform to the following number of cores per lot:

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| **Table – Asphalt Testing - Number of cores per lot** | | | |
| **Area (m2)** | **<100** | **100 – 1500** | **>1500** |
| **No. of Cores** | 1 | Minimum 3 | 1 per 500m2 (minimum 3) |

| **Table - Test Frequencies For Soils – Part 1 of 3** | | | | | | | | | | |
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| **Type Of Test** | **General Fill** | **Standard Fill** | **Select Fill/Sand Clay Fill** | **Subgrade** | **Sub‑Base** | **Basecourse** | **Bridge Backfill Using Std. Fill** | **Bridge Backfill Using Select Fill** | **Culvert Backfill Using Std.Fill** | **Culvert Backfill Using Select Fill** |
| Field Density (FDD) by  NTCP 102.1 and  AS 1289.5.8.1 | 1 in 3,000 m2 (min. of 3 tests per lot) | 1 in 3,000 m2 (min. of 3 tests per lot) | 1 in 3,000m2 (min. of 3 tests per lot) | 1 in 1,000 m2 (min. of 3 tests per lot) | 1 in 1,000 m2 (min. of 3 tests per lot) | 1 in 1,000 m2 (min. of 3 tests per lot) | 3 tests per 100 m3 | 3 tests per 100 m3 | 3 tests per 10 m3 | 3 tests per 10 m3 |
| Modified Compaction (MMDD) by  AS 1289.5.2.1 | 1 per FDD | 1 per FDD | 1 per FDD | 1 per FDD | 1 per FDD | 1 per FDD | 1 per FDD | 1 per FDD | 1 per FDD | 1 per FDD |
| Particle Size Distribution by AS 1289.3.6.1 | - | - | 1 per each 2,000 m3 | - | 1 in 5000 m2 (min.of 1 test per lot) | 1 in 5000 m2 (min.of 1 test per lot) | - | 1 per 300 m3 | - | 1 per 300 m3 |
| Plasticity Index by  AS 1289.3.1.1, AS 1289.3.2.1, AS 1289.3.3.1 | 1 per each 2,000 m3 | 1 per each 2,000 m3 | 1 per each 2,000 m3 | 1 in 5,000 m2 (min.of 1 test per lot) | 1 in 5000 m2 (min.of 1 test per lot) | 1 in 5000 m2 (min.of 1 test per lot) | 1 per each 300 m3 | 1 per each 300 m3 | 1 per each 300 m3 | 1 per each 300 m3 |
| Linear Shrinkage by AS 1289.3.4.1 | 1 per each 2,000 m3 | 1 per each 2,000 m3 | 1 per each 2,000 m3 | 1 in 5,000 m2 (min.of 1 test per lot) | 1 in 5000 m2 (min.of 1 test per lot) | 1 in 5000 m2 (min.of 1 test per lot) | 1 per each 300 m3 | 1 per each 300 m3 | 1 per each 300 m3 | 1 per each 300 m3 |
| California Bearing Ratio by  AS 1289.6.1.1 | 1 per each 2,000 m3 | 1 per each 2,000 m3 | 1 per each 2,000 m3 | 1 in 5 FDD (min.1 of test per lot) | 1 in 5 FDD (min.1 of test per lot) | 1 in 5 FDD (min.1 of test per lot) | 1 per each 300 m3 | 1 per each 300 m3 | 1 per each 300 m3 | 1 per each 300 m3 |
| \* run = 1 pass of cement spreader; FDD – Field Dry Density; MMDD – Maximum Modified Dry Density | | | | | | | | | | |

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| **Table - Test Frequencies For Soils – part 2 of 3** | | | |
| **Type Of Test** | **Subgrade** | **Sub-Base** | **Basecourse** |
| Pavement Layer Thickness by  NTTM 216.1 | - | 1 per FDD | 1 per FDD |
| Ball Embedment by NTTM 215.1 | - | - | 1 in 5,000 m2 |
| Dry Back – Moisture ratio as per AS 1289.5.4.1 | - | - | 1 per 1,000 m2 |
| Stabiliser Spread Rate  by NTTM 204.7 | 1 per run | 1 per run | 1 per run |
| Stabiliser Content by NTTM 204.1 | 1 per 1000m2 with a min. of 3 tests | 1 per 1000m2 with a min. of 3 tests | 1 per 1000m2 with a min. of 3 tests |
| Stabiliser Distribution by NTTM 204.8 | 1 per 1000m2 with a min. of 3 tests | 1 per 1000m2 with a min. of 3 tests | 1 per 1000m2 with a min. of 3 tests |
| Soluble Salt Content of Construction Water | - | - | 1 per water source |
| \* run = 1 pass of cement spreader; FDD – Field Dry Density; MMDD – Maximum Modified Dry Density | | | |

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| **Table - Test Frequencies for Soils - Part 3 of 3** | |
| **Type of Test** | **Unpaved areas (including unpaved medians, batters, table drains and blocks)** |
| Field Density (FDD) by NTCP 102.1 and AS 1289.5.8.1 | 1 for every 100 lineal metres or part thereof |
| Modified Compaction (MMDD) by AS 1289.5.2.1 | 1 per each 3 FDD tests |
| Plasticity Index by AS 1289.3.1.1, AS 1289.3.2.1, AS 1289.3.3.1 | For Table Drain blocks only - 1 per each 3 blocks |

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| **Table - Test Frequencies For Aggregates And Pavement Surfaces** | | | |
| **Type Of Test** | **Aggregate** | **Pavement Marking** | **Pavement Surface** |
| Particle Size Distribution by AS 1141.11.1 | 1 in 250 t (Minimum of 3) | - | - |
| Los Angeles Abrasion Value by AS 1141.23 | 1 in 250 t | - | - |
| Particle Shape by AS 1141.14 at 2:1 ratio | 1 in 250 t | - | - |
| Flakiness Index by AS 1141.15 | 1 in 250 t (Minimum of 3) | - | - |
| Average Least Dimension by AS 1141.20.1, AS 1141.20..2 **\*** | 1 in 250 t (Minimum of 3) | - | - |
| Sulphate Soundness by AS 1141.24 | 1 in 1,000 t | - | - |
| Percentage of Crushed Faces by AS 1141.18 | 1 in 250 t | - | - |
| Polished Aggregate Friction Value by AS 1141.40 or AS 1141.41 | - | - | 1 in 20,000 m2 |
| Surface Texture Depth by NTTM 305.1 | - | - | 1 in 5,000 m2 |
| Skid Resistance by NTTM 304.1 | - | - | As nominated by Superintendent |
| Roughness | - | - | As nominated by Superintendent |
| Retroreflectivity of Pavement Marking by NTTM 404.1, NTTM 404.3 | - | 1 per 1,000 lin. m | - |
| Wear Assessment of Road Marking Paints – Image Analysis to AS 4049.3:2005, Appendix K, Method A Photographic Method | - | As nominated by Superintendent | - |
| **\*** Take Average Least Dimension samples only from the stockpile on the project site. | | | |

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| **Table - Sampling Frequencies for Fresh Concrete** | | |
| **Structures – excluding kerbs and gutters, and excluding floodway margins** | | |
| **Type of Test** | **Frequency** | **Number of samples** |
| Slump - AS 1012.3 | Per truck | Per truck as required |
| Making, curing and compressive strength of concrete - AS 1012.8 and AS 1012.9 | 1 truck pour | 1 set of cylinders \* |
| 2 truck pour | 2 sets of cylinders \* |
| 3 - 5 truck pour | 3 sets of cylinders \* |
| 6 - 10 truck pour | 4 sets of cylinders \* |
| 11 + truck pour | 4 sets of cylinders plus 1 additional set of cylinders per every additional 1 to 5 trucks after the first 10 trucks \* |
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| **Kerbs\*\*\* and gutters, and floodway margins** | | |
| **Type of Test** | **Frequency** | **Number of samples** |
| Slump - AS 1012.3 | Per each set of cylinders \*\* | Per each set of cylinders |
| Making, curing and compressive strength of concrete - AS 1012.8 and AS 1012.9 | 1 set of cylinders per 25m3 , or each lot. \*\* | 1 set of cylinders \* |
| \* A set of cylinders consists of 3 cylinders unless directed otherwise.  \*\* Or as directed by the Superintendent.  \*\*\* For urban projects include side entry pits and similar structures. | | |

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| **Table – Test Frequencies for Surface Roughness Testing** | | |
| **Type of test** | **Frequency** | **Required value (IRI)** |
| Lane Roughness Value – Pavement and Shoulders – NTCP 107.1A | 3 runs per constructed traffic lane | Maximum value |
| Lot Average Surface Roughness Value – Dense Graded Asphalt – NTCP 107.1A | 3 runs per constructed traffic lane | Mean value |

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| **Table – Maximum Dry Density (MDD) Minimum Curing Times (AS 1289.5.2.1:2017)** | | |
| **Plasticity** | **Condition of Prepared Sample** | |
| **Within 2% of OMC** | **Greater than 2% from OMC** |
| Sands and Granular Material (NP) | 2 hours | 2 hours |
| Low Plasticity (LL ≤ 35%) | 24 hours | 48 hours |
| Medium Plasticity (LL > 35% to ≤ 50%) | 48 hours | 96 hours (4 days) |
| High Plasticity (LL > 50%) | 96 hours (4 days) | 168 hours (7 days) |
| NP – Non plastic  LL – Liquid limit  OMC – Optimum moisture content | | |

## Conformance Testing Results

The Panel Period Contractor will provide NATA endorsed test results to the Contractor within the following scheduled times (in days – Monday to Saturday) from the time of ordering the tests.

For work in remote areas increase the testing and reporting completion times by a minimum of 2 days.

[ In specific cases this extra time allowance may be altered to suit the project.]

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| **Table - Testing and Reporting Completion times - Part 1 of 3** | |
| **Attribute being tested** | **Time Allowed for NATA Endorsed Report in Days (Monday to Saturday)** |
| **SOILS** | |
| Field Density | 5 |
| Modified Compaction | \*\* 5 |
| Modified Compaction – Oversize |
| Pavement Layer Thickness | 4 |
| Particle Size Distribution | 5 |
| Plasticity Index (Liquid Limit, Plastic Limit) | \*\* 5 |
| Linear Shrinkage | 5 |
| Moisture Content | 3 |
| CBR – Soaked (Completion time includes Modified Compaction) | \*\* 9 |
| Cement Content of Stabilised Materials (Heat of Neutralisation) | 5 |
| Bitumen Content of Stabilised Materials | 4 |
| Stabiliser Spread Rate | 3 |
| Soluble Salt Content of Construction Water | 4 |
| Standard Ball Penetration Test | 3 |
| Unconfined Compressive Strength (7 Day result) excluding compaction | 10 |
| **AGGREGATE** | |
| Specific Gravity | 4 |
| Particle Size Distribution |
| Particle Shape, by Proportional Calliper |
| Flakiness Index |
| Average Least Dimension (Direct Measurement) |
| Clay and Fine Silt (Settling Method) |
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| \*\* Time for completion may be extended by each additional day required for the curing of materials and each additional overnight stay. | |

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| **Table - Testing and Reporting Completion Times - Part 2 of 3** | |
| **Attribute being tested** | **Time Allowed for NATA Endorsed Report in Days (Monday to Saturday)** |
| AGGREGATES (cont’d) | |
| Particle Density and Water Absorption of Fine Aggregate | 5 |
| Particle Density and Water Absorption of Coarse Aggregate |  |
| Los Angeles Value | 4 |
| Pavement Surface Texture Depth |
| Crushed Particles |
| Sulphate Soundness | 10 |
| **CONCRETE** | |
| Consistency of Concrete – Slump Test | 3 |
| Making, Curing and Compressive Strength (28 day result) | \*\*\* 31 |
| Making, Curing and Compressive Strength (7 day result) | \*\*\* 10 |
| **ASPHALT** | |
| Bitumen Content and Aggregate Grading | 5 |
| Stability and Flow of Mix |
| Air Voids and Density Relationship | 6 |
| Density of Thin Lift Asphalt by Nuclear Gauge | 4 |
| Bulk Density of Asphalt | 6 |
| Kinematic Viscosity of Bitumen | 5 |
| **BITUMEN** | |
| Dynamic Viscosity (60ºC) | 3 |
| \*\* Time for completion may be extended by each additional day required for the curing of materials and each additional overnight stay. | |
| \*\*\* From Date of Sampling. | |

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| **Table - Testing and Reporting Completion Times - Part 3 of 3** | |
| **Attribute being tested** | **Time Allowed for NATA Endorsed Report in Days (Monday to Saturday)** |
| SURFACE ROUGHNESS | |
| IRI – Dense graded asphalt | 3 |
| IRI – Pavements and shoulders | 3 |
| Interim reports are to be issued immediately after testing | |

## Lot Testing Generally

Conformance of compaction for soils and asphalt will be based on lots.

Give each lot a lot number. Number the lots using a logical system. Maintain a register of all lots and lot numbers. Include the location of each lot on the lot register. Provide a copy of the lot register to the Superintendent upon request.

Lots defined by the contractor must be clearly marked out on the construction site.

Lots of work will be selected by the Contractor, based upon:

* A lot will represent no more than one shift's production.
* A lot will be continuous and will have been brought to completion at the same time.
* A lot will be composed of essentially homogeneous material with no distinct changes in attribute values.

Each lot will be subject to conformance testing in accordance with NTCP 102.1.

Defective sections will be excluded from the lot to be tested and identified as a separate lot, and will also be subjected to lot testing.

Quality of the lot will be judged as conformance or non‑conformance of each lot. This will be based on all tests conducted on the lot in accordance with NTCP 102.1.

Conformance of materials is based on samples from the finished works.

When lots fail to satisfy the conformance criteria, reprocess the entire lot and resubmit for retesting.

Should the lot under consideration be subdivided then each subdivision will be classed as a lot and each subdivided lot will be subject to lot testing.

Non‑conforming lots which are subdivided after testing will be treated as separate lots and each and every subdivided lot will be retested.

### Conformance of Compaction for Soils

In situ density is expressed as a percentage of the Maximum Modified Dry Density. One Modified Dry Density test for each in situ density test will apply.

In situ density will be determined and reported in accordance with NTCP 102.1 and relevant Australian Standards.

A minimum of three tests will apply to each and every lot.

**The Mean Dry Density Ratio (R)** is calculated as follows:



*xi*= an individual test result

*n* = the number of results in the lot.

**The Characteristic Mean Dry Density Ratio (*Rc*)** is calculated as follows:



where:

*R* = the mean dry density ratio for the lot

*k* = the multiplier in the ***Table. – Multiplier Values for Soils***.

*s* = the standard deviation.

**The Standard Deviation (*s*)** is calculated as follows:



where:

*xi*= an individual test result

*R* = the mean of n results

*N* = the number of test results in the lot.

When less than six tests are used to determine conformance of a lot the Mean Dry Density Ratios in the ***Table - Dry Density Ratios For Conformance*, Column A** apply.

When six or more tests are used to determine conformance of a lot the Characteristic Mean Dry Density Ratios in the ***Table - Dry Density Ratios For Conformance,*** **Column B**, apply.

### Conformance of Compaction for Asphalt

Air Voids Ratio is the difference between the maximum density of a mix and the bulk density of that compacted mix expressed as a percentage of the maximum density.

A minimum of three tests will apply for each lot greater than 100m².

The Mean Air Voids Ratio is calculated as follows:



*xi*= an individual test result

*n* = the number of results in the lot.

| **Table - Dry Density Ratios for Conformance** | | | |
| --- | --- | --- | --- |
| **Works Components** | **A**  **Mean Dry**  **Density Ratio**  **(R) %**  **(“n” is 3 to 5)** | **B**  **Characteristic Mean Dry Density Ratio**  **(Rc) %**  **(“n” is 6 or greater)** |  |
| Natural surface to subgrade, fill, batters, table drain blocks, fill for water course, unpaved areas | 95.0 or greater | 94.0 or greater | Conformance |
| 94.9 or less | 93.9 or less | Non‑conformance |
| Subgrade, shoulder sub‑base, unsealed pavement base, shoulder base, select fill, levees, structures and culverts in fill, bridge foundation backfill, bridge abutment fill | 95.0 or greater | 94.0 or greater | Conformance |
| 94.9 or less | 93.9 or less | Non‑conformance |
| Sealed pavement basecourse | 100.0 or greater | 99.0 or greater | Conformance |
| 99.9 or less | 98.9 or less | Non‑conformance |
| Sealed pavement sub-base, Stabilised and modified basecourse, Subgrade treatment for Reconstruction and Rehabilitation of Existing Pavements clause in PAVEMENTS AND SHOULDERS, or as directed by Superintendent. | 98.0 or greater | 97.0 or greater | Conformance |
| 97.9 or less | 96.9 or less | Non‑conformance |
| Contractor to backfill all pavement layer test excavations with the material and density ratio specified for that layer, treated as follows:   * Base and sub-base layers stabilised with 3% cement. * Other layers may be unstabilised. | | | |

|  |  |
| --- | --- |
| **Table – Multiplier Values for Soils** | |
| Values of the Multiplier k for Characteristic Mean Dry Density Ratio (Rc) | |
| **Number of tests per lot (n)** | **k** |
| 6 | 0.50 |
| 7 | 0.54 |
| 8 | 0.56 |
| 9 | 0.59 |
| 10 | 0.61 |
| 15 | 0.68 |
| 20 | 0.72 |