

Technical Specification

**Transport and Main Roads Specifications
MRTS01 Introduction to Technical Specifications**

March 2024



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1 Introduction

This Technical Specification serves as an introduction to Technical Specifications.

This Technical Specification contains definitions of terms and interpretation of clauses common to many Technical Specifications.

This Technical Specification shall be read in conjunction with other Technical Specifications.

In the Technical Specifications, reference to clause numbers shall be taken to mean reference to the clauses of that number within that Technical Specification, unless stated otherwise.

This Technical Specification forms part of the Transport and Main Roads Specifications Manual. All specifications forming the Transport and Main Roads Specifications Manual detail the technical requirements for work related to departmental projects.

Others may use these documents for non-departmental projects at their own risk. In some cases, a particular Technical Specification may be based on the assumption that a standard departmental contract is in place (that is, references to “contract” means a reference to a specific standard contract). A consistency check should be undertaken if the contract is not a departmental standard.

These specifications do not specifically cover non-technical issues associated with undertaking departmental works, for example Workplace Health and Safety, or environmental. Such issues are generally covered by legislative or other requirements and are generally beyond the scope of these specifications.

The Standard Work Items outlined in Specification (Measurement) ‘MRSxx’ documents have changed from a four-digit number to a five-digit number to enhance the sustainability of this system. Existing contracts tendered using the four-digit Standard Work Items will continue to be managed under this numbering system until finalisation. Contracts prepared after 31 July 2017 will be prepared with five-digit Standard Work Items.

2 Definition of terms

2.1 Standard definitions

The standard definitions listed in Table 2.1 shall apply to the Technical Specifications.

Table 2.1 – Definition of terms

Term	Definition
base line	The survey line actually pegged on the ground, which may also be the control line or the centreline
cell	A single chamber of a drainage structure which provides an opening
compliance testing	Testing carried out to determine if the product complies with the relevant standards and requirements. Compliance testing may also be referred to as conformance testing
conformance	Conformity as defined in AS/NZS ISO 9000
conformance report	Summary statement submitted by the Contractor to the Administrator of the evidence pertaining to each lot which demonstrates that the specified requirements for that lot have been met
contract	Refers to the related contract between the department and other party

Term	Definition
control testing	Testing used to monitor and control the construction process and material quality
culvert	A drainage structure which consists of one or more cells
height	The vertical distance of a point on a surface above or below the project survey datum. Height replaces the term “reduced level”
Hold Point	An identified point in a process past which the Contractor shall not proceed without a direction from the Administrator
localised excavation	A minor excavation which is not scheduled separately as a Work Item and whose dimensions are not specifically indicated in a standard and/or Drawing but which shall be carried out in order to correctly construct the work under the Contract
lot	<p>A portion of material or a section of the Works which has been constructed and/or supplied under essentially uniform conditions and contains material of essentially uniform quality, or</p> <p>A single finished item of work which includes several materials and/or work types (eg a culvert in place)</p>
Transport and Main Roads Specifications Manual	The manual containing the set of Specifications and Technical Specifications for road and bridge works published by Transport and Main Roads
mass concrete	Unreinforced concrete placed in a large mass which relies on its weight for stability
MDR	Abbreviation for moisture density relationship
Milestone	A point within a project where progress is verified by the completion of an activity or a point which marks the start of an activity
NATA	Abbreviation for the National Association of Testing Authorities Australia
natural ground surface	The ground surface existing prior to the commencement of any work under the Contract
nonconformance	Nonconformity as defined in AS/NZS ISO 9000
nonconformance report	A written report produced by the Contractor which indicates that a nonconformance has been identified
pavement marking	Any delineation device installed on the pavement including lines, symbols, chevrons and raised pavement markers
processing	Operations required to modify material for the purpose of altering its properties
proprietary product	A product obtained from a recognised manufacturer of that product which is recommended by the manufacturer as suitable for its intended use
random sampling	<p>A system in which the selection of sampling locations, sampling intervals or test locations is made for a lot or sub-lot so that each location or interval in the lot or sub-lot has an equal chance of being selected. Random sampling shall be performed in accordance with Test Method AS 12891.4.1 <i>Methods of testing soils for engineering purposes, Method 1.4.1: Sampling and preparation of soils – Selection of sampling or test sites – Random number method</i>, unless otherwise specified</p>

Term	Definition
random stratified sampling	A system in which selection of sampling locations, sampling intervals or test locations is made by dividing the lot or sub-lot into strata of equal size, followed by the random selection of a single location or interval for sampling or testing in each stratum so that each location or interval in the lot or sub-lot has an equal chance of being selected. Random stratified sampling shall be performed in accordance with Test Method AS 1289.1.4.2 <i>Methods of testing soils for engineering purposes, Method 1.4.2: Sampling and preparation of soils – Selection of sampling or test sites – Stratified random number method</i> , unless otherwise specified
relative compaction	Previously relative dry density, abbreviated to RDD, is the ratio, expressed as a percentage, of the insitu dry density of the material presented for compliance testing and the maximum dry density of a reference sample compacted in accordance with a specified procedure
road	The developed way devoted to public travel principally with motor vehicles
road furniture	Any roadside item or device including signs, guide posts, guardrails, barriers, fences and grids
road reserve	The whole width between abutting property boundaries of a section of land reserved for use for a road
specified	Given or described. When used without qualification it shall refer to information given or described in the Contract and/or information which can be derived from the Contract
Standard Drawing	A drawing published by the department as a Standard Drawing in the Manual of Standard Drawings Roads
subgrade	The trimmed or prepared portion of the formation on which the pavement is constructed
subgrade level	The level of the top surface of the prepared subgrade on which a pavement is constructed
sublot	A subdivision of a lot
supplementary technical specification	Any Technical Specification included in the Contract which is not a Technical Specification
Technical Specification	Any Technical Specification published by the department as a Technical Specification forming part of the <i>Transport and Main Roads Specifications Manual</i>
Transport and Main Roads	The Department of Transport and Main Roads, Queensland, its successors or assigns
Witness Point	An identified point in a construction process at which an activity is observed
WPI	Abbreviation for Weighted Plasticity Index = Plasticity Index × % passing 0.425 mm test sieve

2.2 Definitions in other documents

Further relevant definitions are contained in the following documents:

- a) a particular Transport and Main Road's Supplementary Technical Specification
- b) a particular Transport and Main Road's Technical Specification
- c) a particular Transport and Main Road's Technical Publication (Manual, Supplement to Austroads Guide, Supplement to Australian Standards, Technical Note, Engineering Policy and Guideline)
- d) Austroads Glossary of Terms, and
- e) AS/NZS ISO 9000.

2.3 Priority of definitions

In the event of conflict in definition, priority shall be assigned in the order that the documents are listed below:

- a) the relevant Transport and Main Road's Supplementary Technical Specification
- b) the relevant particular Transport and Main Road's Technical Specification
- c) this Technical Specification, MRTS01 *Introduction to Technical Specifications*
- d) a particular Transport and Main Road's Technical Publication (Manual, Supplement to Austroads Guide, Supplement to Australian Standards, Technical Note, Engineering Policy and Guideline)
- e) Austroads Glossary of Terms, and
- f) AS/NZS ISO 9000.

3 Referenced documents

Throughout the Technical Specifications, Australian Standards are referenced by their allocated "AS" number only. Unless an edition date accompanies the particular reference, the latest edition available 14 days prior to the date of lodgement of tenders shall apply. Where a Referenced Standard has been superseded or deleted by Australian Standards, the current relevant Australian Standard shall apply.

For all other documents referred to in the Contract (*including the Materials Testing Manual, the Nuclear Gauge Testing Manual, Austroads documents, ASTM International Standards, other state road authority standards, technical notes and design guidelines / supplements*), the latest edition available 14 days prior to the date of lodgement of tenders shall apply, unless an edition date accompanies the particular reference.

Table 3 lists documents referenced in this Technical Specification.

Table 3 – Referenced documents

Reference	Title
-	<i>Austrroads Glossary of Terms</i>
AS 1289.1.4.1	<i>Methods of testing soils for engineering purposes, Method 1.4.1: Sampling and preparation of soils – Selection of sampling or test sites – Random number method</i>
AS 1289.1.4.2	<i>Methods of testing soils for engineering purposes, Method 1.4.2: Sampling and preparation of soils – Selection of sampling or test sites – Stratified random number method</i>
AS/NZS ISO 9000	<i>Quality management systems – Fundamentals and vocabulary</i>
MRTS04	<i>General Earthworks</i>
MRTS05	<i>Unbound Pavements</i>
MRTS06	<i>Reinforced Soil Structures</i>
MRTS07A	<i>Insitu Stabilised Subgrades using Quicklime or Hydrated Lime</i>
MRTS07B	<i>Insitu Stabilised Pavements using Cement or Cementitious Blends</i>
MRTS07C	<i>Insitu Stabilised Pavements using Foamed Bitumen</i>
MRTS08	<i>Plant-Mixed Heavily Bound (Cemented) Pavements</i>
MRTS09	<i>Plant-Mixed Pavement Layers Stabilised using Foamed Bitumen</i>
MRTS10	<i>Plant-Mixed Lightly Bound Pavements</i>
MRTS30	<i>Asphalt Pavements</i>
Q020	<i>Calculation of characteristic value of a lot</i>

4 Standard test methods

Testing of all work carried out under the Contract shall be undertaken in accordance with test methods in the departments *Materials Testing Manual* or where specified, from national standards. Where these methods are referenced in the *Materials Testing Manual* and in the Transport and Main Roads Specifications Manual they are prefixed as follows:

- a) "Q" for methods published in the *Materials Testing Manual*
- b) "AS" for methods published by Standards Australia
- c) "AS/NZS" for Test Methods jointly published by Standards Australia and Standards New Zealand
- d) "AG:AM/T", "AG:PT/T" or "ATM" for methods published by Austrroads
- e) "ASTM" for method published by the ASTM International, formerly American Standards for Testing of Materials, or
- f) 'T' for Test Methods published by Transport for New South Wales, formerly Roads and
- g) Maritime Services New South Wales.

In some instances, however, test methods from other sources, such as, International Standards or other State Road Authorities, may be specified. Where this is the case, complete details of the test method references are given in the relevant Technical Specification.

5 Quality system requirements

5.1 General

The general quality system requirements for work covered by the Technical Specifications are set out in MRTS50 *Specific Quality System Requirements*.

Additional requirements, where applicable, are included in the relevant Technical Specification under a Clause titled “Quality System Requirements” (the “Quality clause”).

5.2 Hold points, Witness Points and Milestones

Where a Hold Point, Witness Point or Milestone applies in a Technical Specification, the text is highlighted at the appropriate point and a summary of all such points is included in the Quality Clause of the relevant Technical Specification.

- a) a Hold Point is indicated in the text as **Hold Point**
- b) a Witness Point is identified in the text as **Witness Point** and
- c) a Milestone is identified in the text as **Milestone**

The Hold Point to this Technical Specification is summarised in Table 5.2. There are no Milestone and Witness Points defined.

Table 5.2 – Hold Points, Witness Points and Milestones

Clause	Hold Point	Witness Point	Milestone
8	1. Design appropriateness of design setout with regard to the actual site conditions		

5.3 Conformance requirements

Where applicable, a summary of the conformance requirements for a lot is included in the Quality Clause of the relevant Technical Specification.

Additionally, minimum testing requirements may be specified in the Technical Specification or in the Annexure to the relevant Technical Specification.

6 Units of measurement

Dimensions and measurements in the Technical Specifications are consistently described by the set of units of measurement listed in Table 6.

Table 6 – Units of Measurement

Measurement	Unit	Abbreviation
distance	metre	m
	micrometre	µm
	millimetre	mm
	centimetre	cm
	kilometre	km
	track metre	track m ¹

Measurement	Unit	Abbreviation
area	square metre	m ²
	hectare	ha
volume	cubic metre	m ³
	kilolitre	kL
	litre	L
force	newton	N
	kilonewton	kN
pressure	kilopascal	kPa
	megapascal	MPa
temperature	degrees Celsius	°C
unit weight	kilonewtons per cubic metre	kN/m ³
velocity	metres per second	m/s
	kilometres per hour	km/h
mass	kilogram	kg
	tonne	t
mass per unit	grams per square metre	g/m ²
	kilograms per square metre	kg/m ²
density	tonnes per cubic metre	t/m ³
time	seconds	s
	minutes	min
	hours	h
frequency	hertz	Hz
	kilohertz	kHz

¹ Track metre shall be the length (in metres) along the centreline of the track as shown on or calculated from the Drawings including any length of turnouts, catchpoints, and diamonds.

7 Materials and workmanship

Where materials, material components, workmanship and procedures are not specifically described by the Contract, they shall be in accordance with the relevant Australian Standard. Where no Australian Standard is available, other specifications shall be used in the following order of priority:

- a) the contract specification of the local authority where work is being undertaken
- b) manufacturer's recommendations, and
- c) accepted industry standards.

At a minimum materials and workmanship shall be the best of their respective kinds and fit for the purpose for which they are intended.

8 Set out of individual installations

The Contractor shall set out an installation as shown on the Drawings in sufficient detail to identify the location, length and levels of the proposed installation.

Once the initial set out is complete the Administrator will determine the design appropriateness of the set out with regard to the actual site conditions **Hold Point 1** The Administrator may direct amendments to the set-out details. Payment for such amendments will be made at appropriate rates in the Schedule of Rates or, where such rates are not deemed by the Administrator to be appropriate, as determined by the Administrator.

Installations to be set out in accordance with the above requirements include:

- a) drainage pipes, culverts and structures
- b) landscaping, and
- c) traffic control and lighting ducts, pits, poles and equipment.

9 Ground slope

Where used in the Technical Specifications to identify ground surface slope or batter angles, the following terms shall all be taken to mean a slope of 1 unit in the vertical direction and n units in the horizontal direction:

- a) 1 on n
- b) 1 in n
- c) 1 : n, and
- d) N to 1.

10 Utilisation and disposal of surplus material

Demolished material which complies in all respects with specified requirements may be used in the Works.

Demolished material which does not comply with specified requirements or which is not required for the construction of the Works shall be disposed of:

- a) in accordance with the provisions specifically stated in any specification or Annexure thereto, or
- b) by removal from the Site.

Surplus excavated material shall be disposed of in accordance with the provisions of Clause 11 of MRTS04 *General Earthworks*.

Where material is disposed of outside the Site, the Contractor shall comply with all relevant Commonwealth and State Government laws and regulations and Local Government By-Laws and shall obtain all necessary approvals and permits and shall comply with all lawful directives.

11 Limits in the technical specifications

11.1 General

Any limits specified in the Technical Specifications shall be interpreted as set out in Clause 11.

11.2 Maximum and/or minimum limits and/or shapes

Any specified maximum or minimum limit or shape is an absolute limit / shape and shall not be used as a target value. The relevant limit / shape shall not be exceeded as the result of any variation in the construction and/or measurement process.

11.3 Specified values/shapes and tolerances

Any specified value or shape is to be regarded as a target value / shape and any specified tolerance shall be regarded as providing the absolute limit for any departure from the specified value/shape. The construction of the Works shall be controlled so that the relevant tolerance is not exceeded as the result of any variation in the construction and/or measurement process.

11.4 Characteristic value

Where a characteristic value is specified, a statistical procedure in accordance with Clause 12 shall be used to determine the value which represents the properties of a lot. The statistical procedure makes allowances for variations in the construction and measurement processes. The Works shall be constructed so that the characteristic value complies with the relevant requirements.

12 Calculation of the characteristic value

Where the compliance of a product is tested by the assignment of a characteristic value determined by the analysis of several individual tests or measurements using a statistical procedure, the following system shall be used:

- a) compliance testing / measurements shall be undertaken as specified in the relevant specification
- b) the characteristic value for the lot shall be determined using the individual test results or measurements and one of the following equations, as applicable:

for a minimum limit:

$$\text{CharacteristicValue} = X_{av} - ks$$

for a maximum limit:

$$\text{CharacteristicValue} = X_{av} + ks$$

where:

$$X_{av} = \frac{1}{n} \sum_{i=1}^n X_i$$

$$s = \sqrt{\frac{\sum_{i=1}^n (X_i - X_{av})^2}{(n - 1)}}$$

where:

n = number of test results or measurements

X_i = the individual test result or measurement for i = 1, 2, 3, ..., n, and

k = an acceptance constant dependent upon the number of tests or measurements.

- c) the relevant value of k shall be selected from either Table 12(a) for the relevant Technical Specifications or Table 12(b) unless otherwise specified, and
- d) the rounding of the characteristic value shall be as shown in Table 12(c).

Table 12(a) – Acceptance constants (MRTS04, MRTS05, MRTS06, MRTS07A, MRTS07B, MRTS07C, MRTS08, MRTS09 & MRTS10)

Number of Tests or Measurements	Acceptance Constant (k)	Number of Tests or Measurements	Acceptance Constant (k)
≤10	0.828	23	0.965
11	0.847	24	0.972
12	0.863	25	0.978
13	0.877	30	1.002
14	0.890	35	1.020
15	0.901	40	1.036
16	0.910	45	1.049
17	0.919	50	1.059
18	0.928	60	1.077
19	0.937	70	1.091
20	0.946	80	1.103
21	0.952	90	1.112
22	0.959	100	1.120

Table 12(b) – Acceptance constants

Number of Tests or Measurements	Acceptance Constant (k)	Number of Tests or Measurements	Acceptance Constant (k)
2	0.403	19	0.937
3	0.535	20	0.946
4	0.617	21	0.952
5	0.675	22	0.959
6	0.719	23	0.965
7	0.755	24	0.972
8	0.783	25	0.978
9	0.808	30	1.002
10	0.828	35	1.020
11	0.847	40	1.036
12	0.863	45	1.049
13	0.877	50	1.059
14	0.890	60	1.077
15	0.901	70	1.091
16	0.910	80	1.103

Number of Tests or Measurements	Acceptance Constant (k)	Number of Tests or Measurements	Acceptance Constant (k)
17	0.919	90	1.112
18	0.928	100	1.120

Table 12(c) – Rounding intervals

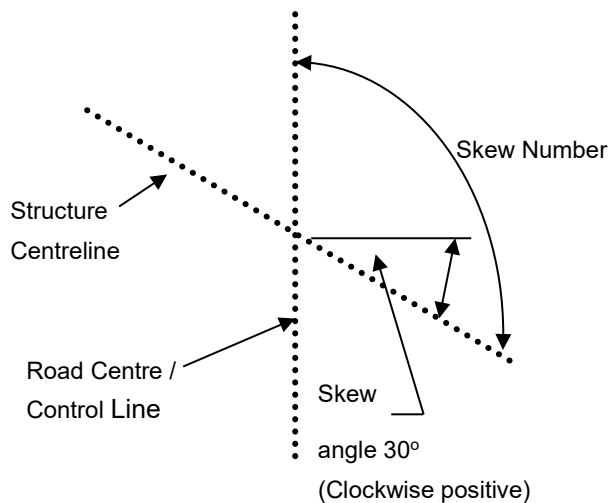
Property / Parameter	Rounding Value
dry density ratio	0.5%
Hilf density ratio	0.5%
relative compaction	0.5%
degree of saturation	1%
air voids	0.1%
relative compaction (asphalt)	0.1%
layer thickness	1 mm
wide strip tensile strength	0.1 kN/m
burst strength	0.1 kN
drop cone puncture resistance	1 mm
tensile strength (Ts) at 2% strain	? kN
X_{av}	to a number of significant figures which exceeds by one that normally reported for the property / parameter
s	to a number of significant figures which exceeds by one that normally reported for the property / parameter
k	0.001
characteristic value	to the same number of significant figures normally reported for the property / parameter

Where a characteristic value is included on NATA endorsed test reports, Test Method Q020 shall be used.

13 Methods of specifying skewed structures

The meaning of the “Skew Angle” and “Skew Number” which are used to specify the location of skewed culvert structures relative to the road centre line, are shown in Figure 13. “Skew Number” is required for ordering metal structures. The skew number is the number of degrees measured in a clockwise direction from the road centreline to the structure centreline.

Figure 13 – Skew number / Skew angle



14 The Administrator

The Administrator shall be as stated in the Contract with the role as defined in the Contract.

15 Supplementary requirements

The requirements of MRTS01 *Introduction to Technical Specifications* are varied by the supplementary requirements given in Clause 1 of Annexure MRTS01.1.

16 Commentaries

Transport and Main Roads Specifications includes commentaries. The Commentaries are placed within a shaded area of the document. It does not form part of the Technical Specification or Specification (Measurement).

Where an inconsistency occurs between the Technical Specification and the Commentary, the Technical Specification prevails.

