

# Nuclear Gauge Testing Manual

## Publication Update

Edition 4, Amendment 2 of the *Nuclear Gauge Testing Manual* (NGTM) was issued 30 September 2024.

### Implementation

Notwithstanding any contractual requirements for projects current as at September 2024 or any requirements for NATA accreditation, the NGTM 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 *Nuclear Gauge 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 4 – Amendment 2 – September 2024

Section	Test Method	Description of change
All	All	<ul style="list-style-type: none"> <li>Change equations and symbols from Mathtype to Microsoft Word</li> </ul>
1	Introduction	<ul style="list-style-type: none"> <li>Amend Section 1 to align with the Materials Testing Manual - Introduction</li> </ul>
3	N01	<ul style="list-style-type: none"> <li>Add requirement to re-determine a bias whenever the nuclear gauge is calibrated to Clause 4.2.2 a) and 4.3.2</li> <li>Amend Clause 4.2.2 a) to 'following the compaction of not more than 10,000 tonnes of material.'</li> <li>Amend Clause 4.2.3 a) to align with the requirements of AS Test Method 1289.5.4.2. Replace 'compaction of every 10,000 tonnes of materials.' with 'compaction of not more than 10,000 tonnes of material or 14 days whichever produces the lesser number of checks.'</li> <li>Amend Clause 4.2.3 b) to align with requirements of Test Method AS 1289.5.8.1. Replace 'if the moisture bias has not been used with the nuclear gauge for two months or more' with 'if the time between the determination or checking of the moisture bias and use is greater than 3 months.'</li> <li>Remove requirement to check wet density bias when an assigned value is re-determined in accordance with Test method Q144A from Clause 4.3.3</li> <li>Amend Clause 4.3.3 a) to align with the requirements of Test Method AS 1289.5.4.2. Add 'or 14 days whichever produces the lesser number of checks.'</li> <li>Amend Clause 4.3.3 b) to align with requirements of Test Method AS 1289.5.4.2. Replace 'if the wet density bias has not been used with the nuclear gauge for two months or more' with 'if the time between the determination or checking of the wet density bias and use is greater than 3 months.'</li> <li>Replace 'at least 2 m' with 'at least 1 m' in Step 6.1.1 to align with requirements of test method AS 1289.5.8.1</li> </ul>

Section	Test Method	Description of change
		<ul style="list-style-type: none"> <li>• Replace 'Use the stratified random number method for selection of a test site within a test area in accordance with Test Method AS 1289.1.4.2 to determine each test location' with 'Use random stratified sampling to determine sampling and test locations in accordance with the requirements of the specification, sampling plan or testing methodology as appropriate' in Clause 7.1</li> <li>• Replace 'insitu wet density' with 'compacted wet density' in Clauses 9.2.2, 9.2.3, 9.2.4 and 10 a) to align with the terminology in Test Method Q140A</li> </ul>
	N02	<ul style="list-style-type: none"> <li>• Replace 'the stratified random number method for selection of a test site within a test area in accordance with Test Method AS 1289.1.4.2 (unless otherwise specified)' with 'random stratified sampling to determine sampling and test locations in accordance with the requirements of the specification, sampling plan or testing methodology as appropriate' in Clause 3.1</li> <li>• Add requirement that data pairs that are rejected/removed cannot be used in the current bias determination or future bias checks to Clauses 4.2.3 and 4.3.4 c) iv.</li> <li>• Add requirement to report nuclear gauge make, model and serial in Section 6</li> </ul>
	N03	<ul style="list-style-type: none"> <li>• Replace 'the stratified random number method for selection of a test site within a test area in accordance with Test Method AS 1289.1.4.2 (unless otherwise specified)' with 'random stratified sampling to determine sampling and test locations in accordance with the requirements of the specification, sampling plan or testing methodology as appropriate' in Clause 3.1</li> <li>• Remove 'to one of the following depths' from Step 3.2.4</li> <li>• Remove Step 3.2.4 b), earthworks testing is performed with AS test methods</li> <li>• Add requirement that data pairs that are rejected/removed cannot be used in the current bias determination or future bias checks to Clauses 4.2.3 and 4.3.4 c) iv.</li> <li>• Add requirement to report nuclear gauge make, model and serial in Section 6</li> </ul>
	N04	<ul style="list-style-type: none"> <li>• Change calibration density uncertainty from 0.08 t/m<sup>3</sup> to 0.06 t/m<sup>3</sup> in Clause 3.1 b) to align with the requirements of Test Method AS 2891.14.3</li> <li>• Add requirement to re-determine a bias whenever the nuclear gauge is calibrated to Clause 4.2.1 a) to align with the requirements of Test Method AS 2891.14.3</li> <li>• Replace 'at least 2 m' with 'at least 1 m' in Step 6.1.1 to align with requirements of test method AS 1289.5.8.1</li> <li>• Replace 'Use the stratified random number method for selection of a test site within a test area in accordance with Test Method AS 1289.1.4.2 to determine each test location' with 'Use random stratified sampling to determine sampling and test locations in accordance with the requirements of the specification, sampling plan or testing methodology as appropriate' in Clause 7.1</li> </ul>

Section	Test Method	Description of change
	N05	<ul style="list-style-type: none"> <li>Replace 'the stratified random number method for selection of a test site within a test area in accordance with Test Method AS 1289.1.4.2 (unless otherwise specified)' with 'random stratified sampling to determine sampling and test locations in accordance with the requirements of the specification, sampling plan or testing methodology as appropriate' in Clause 3.1</li> <li>Remove references to Test Method Q306B from Step 3.2.3</li> <li>Add requirement that data pairs that are rejected/removed cannot be used in the current bias determination or future bias checks to Clauses 4.2.3 and 4.3.4 c) iv.</li> <li>Add requirement to report nuclear gauge make, model and serial in Section 6</li> </ul>

#### **Edition 4 – Amendment 1 – October 2023**

Section	Test Method	Description of change
All	All	<ul style="list-style-type: none"> <li>Change equations from Mathtype to Microsoft Word</li> <li>Change symbols from Mathtype to either Microsoft equations, text or symbols, as appropriate</li> </ul>
1	Introduction	<ul style="list-style-type: none"> <li>Add VicRoads Test Method RC 900.07 to Table 4.1</li> <li>For calibration of Nuclear thin-layer gauge replace Test Method AS 2891.14.3 with AS 2891.14.3 or RC 900.07 in Clause 6.1</li> <li>Add 'and VicRoads Test Method' to Clause 6.1</li> </ul>
2	Calibration	<ul style="list-style-type: none"> <li>For calibration of Nuclear thin-layer gauge replace Test Method AS 2891.14.3 with AS 2891.14.3 or RC 900.07 in Clause 6.1</li> <li>Add 'and VicRoads Test Method' to Clause 6.1</li> </ul>
3	N01	<ul style="list-style-type: none"> <li>Replace 'at least 2 m' with 'at least 1 m' in Steps 5.1.1 and 5.2.1 to align with requirements of test method AS 1289.5.8.1</li> <li>Replace 'x.xxx' with 'x.xx' in Clause 10 e)</li> <li>Replace '%' with 't/m<sup>3</sup>' and 'x.x' with x.xx' in Clause 10 f)</li> </ul>
	N04	<ul style="list-style-type: none"> <li>For calibration of Nuclear thin-layer gauge replace Test Method AS 2891.14.3 with AS 2891.14.3 or RC 900.07 in Clause 4.1</li> <li>Add 'and VicRoads Test Method' to Clause 4.1</li> <li>Replace 'at least 2 m' with 'at least 1 m' in Steps 5.1.1 and 5.2.1 to align with requirements of test method AS 1289.5.8.1301</li> </ul>
4	N301	WITHDRAWN
	N302	WITHDRAWN
	N303	WITHDRAWN
	N304	WITHDRAWN
	N313	WITHDRAWN
	N314	WITHDRAWN
	N319	WITHDRAWN
N320	WITHDRAWN	

Section	Test Method	Description of change
	N321	WITHDRAWN
	N322	WITHDRAWN
	N323	WITHDRAWN
	N324	WITHDRAWN
	N327	WITHDRAWN
	N328	WITHDRAWN
	N329	WITHDRAWN
	N330	WITHDRAWN
	N331	WITHDRAWN
	N332	WITHDRAWN
	N333	WITHDRAWN
	N334	WITHDRAWN