NZTA M25:2019
Retroflective sheeting - SPECIFICATION

Ron Minnema
April 2019
VERSION 1.0

Retroflective sheeting for road signs and vehicle number plates
<table>
<thead>
<tr>
<th>Amendment Number</th>
<th>Subject</th>
<th>Effective Date</th>
<th>Updated by</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>Document issued</td>
<td>April 2019</td>
<td>Ron Minnema</td>
</tr>
</tbody>
</table>
Table of contents

1. Introduction................................................................. 6
   1.1 Scope................................................................. 6
   1.2 General.............................................................. 6
2 Approval process .......................................................... 9
   2.1 Traffic sign sheeting............................................... 9
      2.1.1 Interim approval................................................. 9
      2.1.2 Approved material............................................. 9
   2.2 Vehicle number plate sheeting................................. 10
3 Continuance of approval.................................................. 11
APPENDIX A........................................................................ 12
Foreword

The objective of this new NZTA M25 Specification is to provide guidance for retroreflective sheeting manufacturers wishing to sell their retroreflective sheeting in New Zealand. The Specification was prepared by Technical Services, Operational Planning, Policy and Performance, New Zealand Transport Agency, Wellington(1) subsequent to the release of the AS/NZS 1906.1:2017 Standard – *Retroreflective materials and devices for road traffic control purposes: Part 1 Retroreflective sheeting*(2).

The main changes to the revised Standard that have been incorporated into this Specification include:

- Introduction of a new class numbering system (refer Clause 2 Table 1 herein or Standards Clause 1.5)
- Introduction of a new photometric Class 1100 (refer Clause 2 Table 1 herein or Standards Clause 2.2.2 Table 2.1)
- Revised photometrics for Class 900 (previously Class 1W – refer Clause 2 Table 1 or Standards Clause 2.2.2 Table 2.2)
- Deletion of Class 2A
- Addition of new luminance factor values (Standards Clause 2.2.2 Table 2.8 and 2.9)
- Removal of indoor accelerated weathering test
- Revised photometric values for process coloured sheeting (Standards Clause 2.7.2 (a))
- Additional requirement for sheeting identity marks (Standards Clause 2.11)

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(1) Hereafter referred to as the Transport Agency
(2) Hereafter referred to as AS/NZS 1906.1:2017 or Standard
1. INTRODUCTION

1.1 SCOPE

This Specification covers the requirements that manufacturers and suppliers must comply with before retroreflective sheeting can be approved for use in New Zealand for:

a. Permanent and temporary retroreflective sheetings for use on traffic signs

b. Retroreflective sheeting for use in the manufacture of vehicle number plates

This Specification must be read in conjunction with AS/NZS 1906.1:2017 - Part 1 using the same descriptions, definitions, classifications of retroreflective sheeting and colour processed formats.

1.2 GENERAL

The Transport Agency requires new retroreflective sheeting to be tested and registered compliant with AS/NZS 1906.1:2017 plus any amendments that may be published (3) (also refer to NZTA M25 NOTES) in order to be used in the manufacture of:

a. Permanent and temporary traffic signs on New Zealand roads

b. Retroreflective vehicle number plates

To gain approval for retroreflective sheeting, manufacturers and suppliers shall comply with the approval process outlined in Clause 3 (Traffic Sign Sheeting) and Clause 4 (Vehicle Number Plate Sheeting) and bear the costs of testing and reporting.

Compliance must be for a single photometric performance class (Table 1), identified by brand, sheeting series number and colour number. Any post factory sheeting process coloured sheeting formats that can be used in the production of traffic signs must also be identified using identification numbers or letters in the test report, (Table 2).

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(3) Retesting is only required for such amended items that increase a photometric value or revise a performance value such as chromaticity or luminance or physical property. If a photometric value is decreased retesting is not required.
<table>
<thead>
<tr>
<th>Photometric Class</th>
<th>2017 Standard</th>
<th>2007 Standard</th>
<th>2017 Standard Photometric Table</th>
<th>Typical Technology</th>
<th>Generic description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 100</td>
<td>Class 2*</td>
<td>2.5</td>
<td>Enclosed lens glass bead and Prismatic</td>
<td>Engineer Grade</td>
<td></td>
</tr>
<tr>
<td>Class 300</td>
<td>Class 1</td>
<td>2.4</td>
<td>Encapsulated lens glass bead</td>
<td>High Intensity Glass Bead</td>
<td></td>
</tr>
<tr>
<td>Class 400</td>
<td>Class 1</td>
<td>2.3</td>
<td>Prismatic</td>
<td>High Intensity Prismatic</td>
<td></td>
</tr>
<tr>
<td>Class 900</td>
<td>Class 1W</td>
<td>2.2</td>
<td>Prismatic</td>
<td>Standard Wide Observation Angle</td>
<td></td>
</tr>
<tr>
<td>Class 1100</td>
<td>N/A</td>
<td>2.1</td>
<td>Prismatic</td>
<td>Premium Wide Observation Angle</td>
<td></td>
</tr>
<tr>
<td>Class NP090</td>
<td>Class NP</td>
<td>3.1</td>
<td>Enclosed lens glass bead &amp; emerging Prismatic</td>
<td>Flat Plate Sheeting</td>
<td></td>
</tr>
<tr>
<td>Class NP090 (EMB)</td>
<td>NP(EMB)</td>
<td>3.1</td>
<td>Enclosed lens glass bead &amp; emerging Prismatic</td>
<td>Embossed Plate Sheeting</td>
<td></td>
</tr>
<tr>
<td>Class with Suffix “T”</td>
<td>Suffix WZ</td>
<td>Relative as above</td>
<td>Encapsulated lens glass bead and Prismatic</td>
<td>Temporary Sheeting</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** (*) Class 2A sheeting specified in AS/NZS 1906.1:2007 has no comparative class in AS/NZS 1906.1:2017. 
(†) Class 900 photometric values differ from previous Class 1W photometrics in AS/NZS 1906.1:2007.

Compliance to AS/NZS 1906.1:2017 must be confirmed using a *Test Summary Certificate* (Appendix A herein and NZTA M25 Certificate SET) signed by an independent testing laboratory with IANZ or NATA accreditation approved by the Transport Agency or be an independent testing laboratory approved by the Transport Agency(4).

(4) Hereafter referred to as approved testing laboratory.
The outcome of all tests completed must register either a Pass or Uncertain \(^{(5)}\) or Not tested result for each individual test.

Each Test Summary Certificate must include only one specific sheeting series or one specific process colour format and be issued by the approved testing laboratory as an original PDF document.

The Test Summary Certificate may include multiple colours within a sheeting series or process colour format provided all colours included have been subjected to the same tests and have the same Pass or Uncertain or Not tested result.

The detailed laboratory test reports shall not be attached to the Test Summary Certificate, but shall be provided to the Transport Agency if required. The Transport Agency will not accept detailed laboratory test reports on their own where Transport Agency staff may be required to adjudge actual compliance.

**TABLE 2:**

<table>
<thead>
<tr>
<th>Retroreflective Sheeting Testing</th>
<th>(Format components requiring identification)*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sheeting Format</strong></td>
<td><strong>Performance Class Identification</strong></td>
</tr>
<tr>
<td>Factory Produced Sheeting</td>
<td>✓</td>
</tr>
<tr>
<td>Permanent or Temporary</td>
<td></td>
</tr>
<tr>
<td>Process Screen Print Ink</td>
<td>✓</td>
</tr>
<tr>
<td>Permanent or Temporary</td>
<td></td>
</tr>
<tr>
<td>Colour Overlay Film</td>
<td>✓</td>
</tr>
<tr>
<td>Permanent or Temporary</td>
<td></td>
</tr>
<tr>
<td>Digital Printing Process</td>
<td>✓</td>
</tr>
<tr>
<td>Permanent or Temporary</td>
<td></td>
</tr>
</tbody>
</table>

\(^{*}\) Manufacturer designated series number or identification letters

\(^{†}\) Signs may use digital printing without clear overlay if the testing has been so completed. Compliance shall only be awarded when printing is completed using a sheeting manufacturer’s recommended digital printer.

\(^{(5)}\) NOTE: Appendix K, AS/NZS 1906.1:2017, Application of Uncertainty of Measurement explains the protocol by which a testing laboratory is able to declare a “pass” result or issue a fail result subsequent to completing each specific test. It also explains the “uncertain” result, a situation where a result may be within the accuracy of the laboratory equipment and operating procedure. In such instances the Transport Agency recognises that such a result is close to compliance and because of this the Transport Agency will typically accept an uncertain outcome as a pass.
2. APPROVAL PROCESS

2.1 TRAFFIC SIGN SHEETING

The Transport Agency has two types of approval for retroreflective sheeting for use on traffic signs:

a. Interim Approval (New Zealand Gazette - Schedule 2)
b. Approved Material (New Zealand Gazette - Schedule 1)

Interim Approval and Approved Material for retroreflective sheeting for traffic signs only become effective after notification appears in the New Zealand Gazette “Reflectorised Material Approved for Use on Traffic Signs” (6). (Refer to NZTA M25 NOTES)

2.1.1 Interim approval:

Interim Approval is awarded by the Transport Agency to a manufacturer or supplier of retroreflective sheeting after submitting proof that the sheeting complies with AS/NZS 1906.1:2017. This must be the signed Test Summary Certificate confirming sheeting compliance prior to outdoor durability testing commencing, together with an A4 size sample of the sheeting.

Within three calendar months of submitting this Test Summary Certificate the manufacturer or supplier must confirm a date to the Transport Agency that sheeting samples have been sent to and established at the Allunga Outdoor Exposure Laboratory in Townsville Australia. The sheeting must remain in place for the exposure period specified in AS/NZS 1906.1:2017.

The Interim Approval is confirmed by the Transport Agency after notice has been published in the New Zealand Gazette, with the approval remaining valid until the interim approval expiry date. This time equates to the time the outdoor durability testing process requires for completion.

Interim Approval permits the manufacturer or supplier to market sheeting for use in the manufacture of traffic signs up to a maximum of four square metres (4.7m²). In the event that the sheeting fails the outdoor durability testing the Interim Approval will be withdrawn and the sheeting may no longer be used for traffic sign manufacture. The Transport Agency may require nominated signs to be removed and replaced at the sign manufacturers cost.

2.1.2 Approved material:

At the completion of the durability testing period, a Test Summary Certificate, issued by the approved testing laboratory supervising the outdoor weathering and durability testing programme, must be submitted to the Transport Agency as an original PDF document.

Different sheeting classes must remain in the outdoor weathering test programme until a minimum exposure, in mega joules per square metre (MJ/m²) has been reached, (Table 3).

Retroreflective sheeting for traffic signs qualifies as *Approved Material* for use on traffic signs once the outdoor weathering test results confirm compliance to AS/NZS 1906.1:2017.

Final *Approved Material* status does not take effect until after it has been notified by publication in the New Zealand Gazette.

At this point the sheeting may be actively marketed in New Zealand for traffic sign manufacture.

### TABLE 3: **TYPICAL DURATION FOR OUTDOOR WEATHERING TESTING**

<table>
<thead>
<tr>
<th>Sheeting Class</th>
<th>Radiant Energy Exposure</th>
<th>Typical duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 100 Permanent Sheeting</td>
<td>15,000 MJ/m²</td>
<td>2 Years</td>
</tr>
<tr>
<td>Class 1100, 900, 400, 300 Permanent Sign sheeting</td>
<td>22,500 MJ/m²</td>
<td>3 Years</td>
</tr>
<tr>
<td>Class 1100T, 900T, 400T, 300T Temporary sign sheeting</td>
<td>3,750 MJ/m²</td>
<td>6 Months</td>
</tr>
<tr>
<td>Class NP090 &amp; NP090(EMB) Vehicle Number Plate Sheet</td>
<td>15,000 MJ/m²</td>
<td>2 Years</td>
</tr>
</tbody>
</table>

### 2.2 **VEHICLE NUMBER PLATE SHEETING**

Retroreflective sheeting for use in the manufacture of vehicle number plates is not awarded an *Interim Approval* stage.

Manufacurers or suppliers of this sheeting are required to confirm new sheeting compliance in conjunction with outdoor weathering and durability test compliance, from the Allunga Outdoor Exposure Laboratory in Townsville Australia, at which time the Transport Agency will confirm *Approved Material* status.

Compliance to AS/NZS 1906.1:2017 in both instances must be confirmed using a *Test Summary Certificate* (NZTA M25 Certificate SET) signed by an approved testing laboratory.

The outcome of all tests completed must register either a *Pass* or *Uncertain* or *Not tested* result for each individual test. Each *Test Summary Certificate* must include only one specific sheeting series or one specific process colour format and be issued by the approved testing laboratory as a PDF document.

*Approved Material* status does not take effect until after it has been notified by publication in NZTA M25 NOTES.
3. CONTINUANCE OF APPROVAL

Providing no changes are made to the sheeting materials, or manufacturing process, retroreflective sheeting will continue to be approved by the Transport Agency for a period to be confirmed up to a maximum of ten (10) years.

If the Transport Agency considers the sheeting performance to be satisfactory then the approval will be renewed for an additional period. However, if the Transport Agency has concerns regarding performance the sheeting will be required to be re-tested for compliance with this specification before Approved Material status can be considered again.

If a manufacturer makes changes to the sheeting that could be considered to affect or alter previous test outcomes the Transport Agency must be informed and subsequently reserves the right to ask for renewed testing to be completed. (NZTA M25 NOTES)
APPENDIX  A

TEST SUMMARY CERTIFICATE INTRODUCTION

A1  DESIGN

A Test Summary Certificate is designed for factory sheeting and for each colour processed sheeting format for traffic signs and for vehicle number plates (Table 2). A complete set of Test Summary Certificates is available to download from the Transport Agency’s website as NZTA M25 Certificate SET.

NZTA M25 Test Summary Certificates may be downloaded by the sheeting manufacturer or supplier for their approved testing laboratory use or, alternatively, they can be downloaded directly by the testing laboratory.

The Test Summary Certificate does not include actual detailed laboratory test results. Subsequent to performing each individual test, the test laboratory is required to:

- Confirm the result has passed the minimum performance requirements
- Register a Pass or Uncertain or Not tested result in the Test Summary Certificate

The Test Summary Certificate must be signed and dated by the testing laboratory technician who completed the testing process and approved by an authorised laboratory manager.

The Transport Agency reserves the right to request the detailed laboratory test report(s) should circumstances require.