

Approval and Acceptance Procedures

<b>DMC – 建築材料廳</b>	
<b>Traffic Signs and Road Markings</b>	Document no: <b>ARP/DMC/23</b>
	Rev. <b>A</b>
	Date: <b>2024-05-24</b>
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1. Reference Standards

GB/T 16311	Specification and test method for road traffic markings
GB/T 21383	Coefficient of initial retroreflected luminance of newly applied pavement marking and test method
GB/T 18833	Retroreflective sheeting for traffic control
GB/T 23827	Road traffic sign plate and support
JT/T 1327	Reflective marking coating
Hong Kong HIGHWAYS DEPARTMENT RD/GN/009	GUIDANCE NOTES ON ROAD TESTING
Hong Kong HIGHWAYS DEPARTMENT RD/GN/009 Appendix 1	Sample Particular Specification for Road Markings
Macao SAR Transport Bureau (DSAT)	General Guidelines on Traffic Signs and Road Markings

2. Approval Procedures

2.1 Material Submission for Approval

The following documents with valid reports within one year must be submitted for approval:

Document	Requirements
<b>Road Markings</b>	
A) Design Specifications	<ul style="list-style-type: none"> <li>● The models of raw materials used for markings.</li> <li>● The types of paints used for markings.</li> <li>● The types of glass beads used for markings.</li> </ul>
B) Reference Standards for Templates and Materials/Test Items	<ul style="list-style-type: none"> <li>● Standards                             <ul style="list-style-type: none"> <li>■ Templates (Decree-Law no. 17/93/M of April 28, as amended by Law no. 3/2007 and Administrative Regulation no. 15/2007 on Road Traffic Law and Road Traffic Regulations).</li> </ul> </li> </ul>

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	<ul style="list-style-type: none"> <li>■ Paints (JT/T 280 or BS EN 1871).</li> <li>■ Glass Beads (JT/T 446 or GB/T 24722).</li> <li>● Test Items Conduct tests according to the technical requirements in Part II: Technical Specifications for Road Markings of the General Guidelines for Traffic Signs and Road Markings of the Macao SAR Transport Bureau.</li> </ul>
C) Material Certificates/Test Reports	<ul style="list-style-type: none"> <li>● Must clearly show qualified testing institutions, validity period and reference standards.</li> <li>● Test items must include those specified in item B.</li> </ul>
<b>Traffic Signs</b>	
A) Design Specifications	<ul style="list-style-type: none"> <li>● The grades/models and related information for back plates, structural components, sign panels, sign posts, bolts, washers, nuts, clamps, ties, buckles, universal clips, slide tracks, rivets and retroreflective materials.</li> </ul>
B) Reference Standards for Templates and Materials/Test Items	<ul style="list-style-type: none"> <li>● Standards Refer to the standards indicated for the items listed in A, according to the General Guidelines for Traffic Signs and Road Markings of the Macao SAR Transport Bureau.</li> <li>● Test Items Conduct tests according to the technical requirements and quality standards in Part I: Technical Specifications for Traffic Signs of the General Guidelines for Traffic Signs and</li> </ul>

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	Road Markings of the Macao SAR Transport Bureau.
C) Material Certificates/Test Reports	<ul style="list-style-type: none"> <li>● Must clearly show qualified testing institutions, validity period and reference standards.</li> <li>● Test items must include those specified in item B.</li> </ul>

2.2 Submission of Acceptance Plan for Approval

The contractor shall submit the Traffic Signs and Road Markings Acceptance Plan for approval prior to the acceptance inspection. The plan must at least include the acceptance date, type and scope.

3. Acceptance Procedures

3.1 Material Acceptance Inspection

Upon arrival of traffic sign and road marking materials, a quantity list and product qualification documents shall be provided for on-site acceptance inspection. When required, sampling inspections shall be conducted on paints, glass beads and retroreflective sheeting. Test items shall include but not be limited to the following:

Item	Test Parameters	Reference Standards
Paints	Compressive strength	JT/T 280
	Pre-mixed glass bead content	
	Abrasion resistance	
	Softening point	GB/T 9284.1
Glass Beads	Sphericity/Defective percentage of glass bead	GB/T 24722
	Magnetic particle content	
	Moisture-proof coating	

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	performance	
	Particle size distribution	
	Density	
	Water resistance	
	Appearance quality	
	Refractive index	
Retroreflective Sheeting	Appearance quality	GB/T 18833
	Tensile load	
	Shrinkage performance	
	Adhesion performance	GB/T 23827
	Impact resistance	GB/T 18833

### 3.2 Acceptance Inspection of Completed Road Marking and Traffic Signs

#### 3.2.1 Markings

Thickness, retroreflective luminance coefficient and skid resistance (wet condition) tests.

#### 3.2.2 Signs

Paint layer thickness and retroreflective luminance coefficient of retro-reflective sheeting tests.

## 4. Acceptance Batches

### 4.1 Road Markings

#### 4.1.1 Longitudinal Solid Lines

##### 4.1.1.1 Length $\leq$ 300 meters

Along the line length, randomly select a 100 meter inspection range. Within this range, select approximately one test point every 5 meters for testing, for a total of 20 test points.

##### 4.1.1.2 Length 300 meters to 10 km

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If measurement range < 1 km, randomly select two 100 meter inspection ranges along the line length. If measurement range is 1 to 10 km, select 100 meter inspection ranges at the start, middle and end of the line length. Within these ranges, select approximately one test point every 5 meters for testing, for a total of 20 test points.

#### 4.1.1.3 Length > 10 km

Along the line length, select 100 meter inspection ranges at the start, end, and every 5 km. Within these ranges, select approximately one test point every 5 meters for testing, for a total of 20 test points.

#### 4.1.2 Longitudinal Broken Lines

##### 4.1.2.1 Length ≤ 300 meters

Randomly select one inspection range, and randomly select 10 line segments within that range for measurement. Take 2 test points per line segment, with at least 1 meter between test points, for a total of 20 test points.

##### 4.1.2.2 Length 300 meters to 10 km

Randomly select 10 line segments within each range for measurement. Take 2 test points per line segment, with at least 1 meter between test points, for a total of 20 test points per range.

##### 4.1.2.3 Length > 10 km

Select inspection ranges at the start, end, and every 5 km. Within each range, randomly select 10 line segments for measurement. Take 2 test points per line segment, with at least 1 meter between test points, for a total of 20 test points per range.

#### 4.1.3 Symbols, Characters, Transverse Lines and Pedestrian Crossings

##### 4.1.3.1 Symbols

Treat each symbol as one inspection range. Select 3 test points for

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measurement and take the average as the test result.

#### 4.1.3.2 Characters and Transverse Lines

Select one inspection range. If character height or transverse line width is  $\geq 2.4$  m, select 6 test points. If  $< 2.4$  m, select 3 test points. Take the average as the test result.

#### 4.1.3.3 Pedestrian Crossings

Randomly select 3 sections as inspection ranges. For each range, select 6 test points and take the average as the test result.

### 4.2 Traffic Signs

#### 4.2.1 Retro-reflective Sheeting

4.2.1.1 Provide finished products or ;

4.2.1.2 Randomly sample a full roll of retro-reflective sheeting, and randomly cut a 1 meter section along the width. Then cut test samples diagonally from the left, middle and right positions.

#### 4.2.2 Supporting Structural Components

4.2.2.1 For paint layer thickness acceptance procedures, refer to ARP/DMC/01.

### 5. Acceptance Criteria

The test results must meet the requirements specified in the reference standards. If any non-conformance is found during testing, retesting must be conducted for those non-conforming items. If no further non-conformance is found after the retesting, then all traffic signs and road markings for that project shall be deemed compliant with the standards. However, if non-conformance persists after the retesting, then that item shall be considered non-compliant with the standards.