529/1

SPECIFICATION	SCHEDULE OF TECHNICAL REQUIREMENTS FOR ANODIZED ALUMINUM BRAILLE STICKERS FOR SIGNAGE ON RAILWAY COACHES	MMDTS-22001,Rev.: Nil Amnd. Slip no.-2 Date: 10.06.2024 Page 1 of 2

Name	Designation	Signature	Date	Level
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Amndt. History:

SN	Rev./Amndt.	Date	Change in brief
1.	0	25.06.2022	First issue
2.	Amndt. Slip no.-1	28.12.2023	Sub clause no. 9.6 added- Documents to be submitted by supplier along with offer during tender.
3.	Amndt. Slip no.-2	10.06.2024	SN-2 of clause no. 4.2 updated- Test method for Accelerated Weathering Test changed from ASTM G 53-93 to ASTM G 154-23.

1. **Amendment slip no.-1 of December, 2023 in Schedule of technical requirements for Anodized Aluminum Braille Stickers for Signage on Railway coaches.**

In MMDTS22001, Rev-nil following new sub clause 9.6 has been added as under.

Sub Clause 9.6:

The supplier shall submit Technical data sheets and material safety data sheet for the sticker, Test reports as per clause 4 by an accredited agency, Certificate from the National Association for Blind (NAB) or equivalent agency for readability and correctness of the Braille text on the stickers along with offer during tender. In the certificate from the NAB, the agency shall specify the language (English/Hindi/other) and the message of the Braille text on the sticker.

2. **Amendment slip no.-2 of June, 2024 in Schedule of technical requirements for Anodized Aluminum Braille Stickers for Signage on Railway coaches.**

In MMDTS22001, Rev-nil, SN-2 of clause no.4.2 has been updated as under.

SN-2 of clause no. 4.2:

S. N	Characteristics	Requirements	Test Method
2.	Accelerated Weathering Test	No deterioration of the image or pronounced loss of readability after 84 cycles (672 hours) of Fluorescent UV-Condensation test (cycle time: 8 hours; 4 Hrs. U.V. Light from UV-B lamps with a peak emission @ 313 n.m. and 4 hrs. condensation alternatively; Temperature: 50 °C	ASTM G 154-23

10/06/2024

Prepared by

Agreed by

SPECIFICATION	SCHEDULE OF TECHNICAL REQUIREMENTS FOR ANODIZED ALUMINUM BRAILLE STICKERS FOR SIGNAGE ON RAILWAY COACHES	MMDTS-22001 Rev.:NIL Date: 24.06.2022 Page 1 of 6

Name	Designation	Signature	Date	Level
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Lalit Kishore	Dy. CME / Design	27/6/22	25.06.2022	Reviewed
Mohammad Saquib	CDE		25.06.2022	Approved

Amendment History

Rev	Date	Changes in brief
0	25.06.2022	First issue

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1. SCOPE

This specification covers general and technical requirements of anodized aluminum Braille stickers to be used as signage for passengers on Indian Railways. These stickers may be provided onto the interior and exterior of coaches. Latest edition of the standards shall be applicable wherever mentioned without year.

2. OPERATING CONDITIONS

Ambient Condition: On fitment in the coaches, the sticker will be subjected to the following climatic conditions

2.1. Ambient temperature: -10 °C to 55 °C
2.2. Altitude: from sea level to 2500 meters
2.3. Maximum temperature under Sun 70 °C
2.4. Relative humidity: upto 95%
2.5. Coaches may operate in coastal areas with continued exposure to salt laden air
2.6. Coaches exteriors are cleaned with liquid cleaning agent to RDSO spec no. M&C/PCN/101/2007 using brushes with non-metallic bristles or in automatic car washing plants. The interiors are cleaned with wet/dry wiping.

3. TECHNICAL REQUIREMENTS

3.1. The sticker shall have two layers: base layer and Braille layer. The material for base and Braille layer shall be anodised aluminium (designation 19002 or 19500 as per IS 737). The base layer shall provide strength and rigidity to the sticker. The two layers shall be integrated with 3M 467MP Acrylic Adhesive or equivalent. Braille layer shall display the information along with tactile Braille script. The sticker shall be homogenous and layers shall be imperceptible.

3.2. The required text and graphic shall be impregnated and sealed with a transparent anodic oxide layer. The font style and size of the text shall be as per drawing. The sticker shall be free from dents and defects. No additional coating layer shall be used for protection of the exposed surface.

3.3. The thickness of the Braille layer shall be between 0.2 mm to 0.3 mm. The composite thickness of the sticker shall be 1 mm. Schematic cross section of sticker is shown in Appendix I.

3.4. The sticker shall have mounting holes (as per drawing) and adhesive tape (3M 467MP Acrylic Adhesive or equivalent) for installation in coaches.

3.5. The sticker shall conform to the performance/requirements as laid out in clause 4.

3.6. The stickers shall not have any harmful effect on living beings, coaches, or the environment.

3.7. The thickness and tolerance over dimensions of the sticker shall be as per the tender drawings and IS : 2676 - 1981, respectively.

4. PROPERTIES AND PERFORMANCE CHARACTERISTICS

4.1. Acceptance Tests

Each lot shall consist of a maximum of 50 coach sets of stickers. For every lot of supply, 3 samples shall be drawn at random as per IS 4905 (1968). None of the samples shall fail for following tests for the acceptability of the lot. If a sample fails in any of the tests, double the original sample size shall be drawn from the same lot and tested. In case any sample fails in re-testing, the entire lot shall be rejected.

S N	Characteristics	Requirements	Test Method
1.	Abrasion Resistance	No pronounced loss of readability after 7000 abrasion cycles on Taber Abraser (model 171 or equal) CS-17 Calibrase Wheels with 1 kg weight. Sample for testing should be free of Braille markings.	ASTM D 4060
2.	Acid Corrosion Resistance	Weight loss of anodized surface not to exceed 0.2 mg/cm^2	IS 5523:83 Sodium Sulphite Immersion Test
3.	Heat Resistance 120 °C for 3 hours	No pronounced loss or degradation of readability	Appendix-II
4.	Adhesion between Base and Braille layers test	Peel adhesion of 10-25 Newton/cm after 72 hours	ASTM D3330 Test Method A for Peel Adhesion at 180° angle
5.	Stain Resistance Test	There shall be no colour stain after the test	IS 5523:83 Marking Test
6.	Ease of Cleaning	Rating of 8 and above	Appendix-III
7.	Aluminium grade of Braille and Base layers	Should match the composition of 19002 or 19500	IS 504 (1963)

4.2. Type Tests

These tests are required to be furnished with supply of each lot. However, the reports for tests conducted in the last two years from the date of supply shall be valid.

S. N	Characteristics	Requirements	Test Method
1.	Corrosion resistance from neutral salt spray	No deterioration or softening of anodic layer after 720 hours	IS 9844 (1981)
2.	Accelerated Weathering Test	No deterioration of the image or pronounced loss of readability after 84	ASTM G 53-93

		cycles (672 hours) of Fluorescent UV-Condensation test (cycle time: 8 hours; 4 Hrs. U.V. Light from UV-B lamps with a peak emission @ 313 n.m. and 4 hrs. condensation alternatively; Temperature: 50 °C)	

5. TEST AND TEST CERTIFICATES

5.1. The stickers shall be accepted based on NABL, nationally or internationally accredited laboratory test certificates provided that the accreditation is made as per the requirements of ISO 17025. However, the purchaser shall reserve the right to conduct tests for any parameter at any point of time of whose charges shall be borne by the supplier.

5.2. Certificate against above parameters mentioned in clause 4.1 & 4.2 shall be submitted from accredited lab to ISO/IEC 17025 like NABL/national/international agency.

5.3. All tests prescribed in 4.1 and 4.2 shall be furnished with each lot of purchase order.

6. PROTOTYPE APPROVAL

6.1. The supplier shall supply sample stickers of each type (seat number sticker, chain pull alarm system, etc.) as per the properties and performance characteristics mentioned in clause 4 along with the test reports.

6.2. The prototype sample may be examined and tested as per the tests specified at clause 4. Suppliers shall incorporate changes suggested by railway in the prototype as well as in the bulk supply. The bulk manufacturing shall be undertaken only after approval of the prototype by the Design office. IR shall have the right to repeat prototype approval in subsequent orders also. The decision of the railway in this regard shall be final.

7. MARKING

7.1. The sticker must have the manufacturer's identification mark along with the date of manufacturing in MMYYYY format. The attributes of the identification mark shall be as shown below.

Font Style	Font Size (vertical length)	Location of Mark
ARIAL (BOLD)	1.5 mm	Right Bottom

8. PRINTING OF STICKERS

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8.1. The print has to be sub surface, sealed and non destructible by abrasion, solvents and acids.

8.2. Instructions in Braille should be embossed at a height of 0.6 mm minimum. The text, text size, distance between two text and word embossed on the sticker should be as per the Braille standard ISO 17049-2013.

8.3. Braille text may be positioned suitably or as per drawing to minimize the distortion of ordinary text/graphics.

9. DOCUMENTS TO BE SUBMITTED BY SUPPLIER

The supplier shall submit following documents along with the prototype and bulk supply.

9.1. Technical data sheets and material safety data sheet for the sticker

9.2. Invoice for raw material purchase (aluminium sheet)

9.3. Test reports as per clause 4 by an accredited agency.

9.4. Certificate from the National Association for Blind (NAB) or equivalent agency for readability and correctness of the Braille text on the stickers. In its certificate, the agency shall specify the language (English/Hindi/other) and the message of the Braille text on the sticker.

9.5. Clause wise comments and technical deviation, if any, in the offer.

10. WARRANTY

10.1. The anodized aluminum sticker supplied shall have warranty against defective material and performance for colour, text, graphics, and Braille text for a minimum period of 6 years from the date of installation for interior and exterior application.

10.2. In case the material shows any defect, fades, or fails to perform as per the specification within the warranty period, it shall be replaced free of cost by the supplier.

11. MANUFACTURING AND TESTING FACILITIES

Any tenderer for this item must be an OEM of the aluminium braille sticker. It must have the following manufacturing facilities.

11.1. Facility for aluminium sheet anodization with an approval from the central/state pollution control board OR MoU with a body having anodizing facility and pollution control certificate

11.2. Aluminium sheet graphic printing/development facility

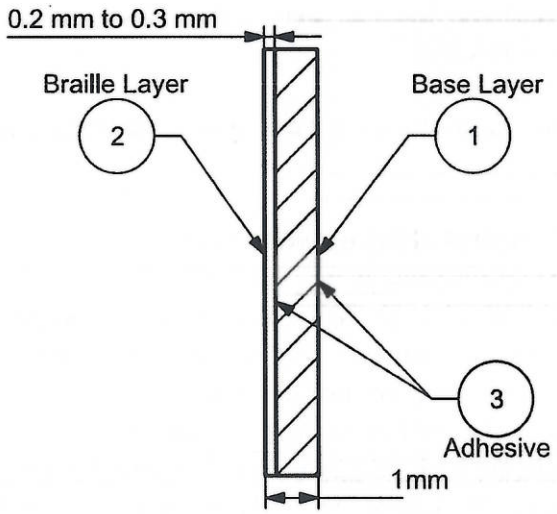
11.3. Braille embossing facility

11.4. Sheet metal operations (blanking, punching, cutting, drilling, others)

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APPENDIX-I: SCHEMATIC OF ALUMINIUM BRAILLE STICKER



APPENDIX-II: HEAT RESISTANCE

An electric oven capable of maintaining a continuous heat of 200 °C shall be used for this test. Sample shall be tested in an electric oven which has been preheated to 40 °C. The temperature of the oven is then increased to 120 °C and maintained at this temperature for 3 hours. Remove the sample from the oven and visually examine. There shall be no pronounced legibility loss or degradation.

APPENDIX-III: Ease of Cleaning

A regular cleaning agent, having a pH of 6.5-8.0, shall be diluted with water of any hardness in the ratio of 1:10 with which it shall be possible to achieve a cleaning rating of at least 8, as given in table A.

Table A

Surface Condition	Rating
Clean, no dirt or stains	10
Very slight dirt or stains visible	8
Slight dirt/stains visible	6
Moderate dirt and stains visible	4
Severe dirt and stains visible	2
Extremely dirty/stained	0

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for mtsl Ranjan

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