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**Recommended
Practice for
Bar-Coded Vehicle
Identification Number
Label**

**SAE Recommended Practice
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**RECOMMENDED PRACTICE FOR BAR-CODED VEHICLE
IDENTIFICATION NUMBER LABEL**

1. PURPOSE:

This SAE Recommended Practice specifies a permanent label for the standard vehicle identification number that can be automatically identified through a bar-coded format.

2. SCOPE:

This recommended practice describes the basic content requirements, bar-code specifications, and functional test specifications of the vehicle identification number (VIN) label. On the vehicle, the VIN label is to be mounted in a readily accessible location for use of a bar-code scanning device.

3. DEFINITIONS (Reference AIAG B-2 Specification - Appendix A):

- 3.1 Vehicle Identification Number (VIN):** The VIN is a standardized series of letters and single-digit numbers that is assigned to a motor vehicle for identification purposes as required by Federal Motor Vehicle Safety Standard (FMVSS) 115 and Federal Motor Vehicle Safety Regulation (FMVSR) 567 and recommended under SAE J272 and J273.
- 3.2 Label:** The surface containing the information in bar-coded and human-readable formats.
- 3.3 Bar-Code Reader:** A device for machine reading of bar codes, which typically consists of a non-contact scanner, a decoder, and a data communications device.
- 3.4 Permanent Label:** A permanent label shall be intended to provide a scannable life the approximates the life of the vehicle as simulated by the test specification in Section 7.

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Comments on this Recommended Practice are invited from interested parties and can be submitted in writing to SAE Headquarters.

3.5 Verification: A procedure to compare dimensional and optical characteristics of a bar code to specified tolerances using mechanical or manual processes.

3.6 Measurement or Analysis: The process to arrive at actual dimensions, which are used for comparison to specifications.

4. LABEL SPECIFICATIONS (Reference AIAG B-2 - Appendix A):

4.1 Vehicle Identification Number: The VIN bar code shall consist of the 17 character vehicle identification number preceded by the data identifier "I." The bar code also contains a start and stop character.

4.2 Label Title: The bar code will contain a title, VIN, unless it is part of the federal certification label as required pursuant to FMVSR 567 or if it is part of the VIN label located on the upper left side of the dash panel as allowed pursuant to FMVSS 115.

4.3 Human-Readable Character Suppression: The human-readable characters for start, stop, and the data identifier shall be suppressed from printing.

4.4 Human Readable Character Height: The minimum height of the human-readable characters is 2.38 mm (0.094 in). This requirement is not intended to supersede government requirements. For example, FMVSR 567 dictates the minimum height of the characters when the VIN is placed on the certification label.

4.5 Horizontal or Vertical Printing: The symbols may be printed horizontally or vertically. When the bar codes are printed horizontally, the human-readable data should be printed directly above or below the bar codes and centered. When bar codes are printed vertically, the human-readable data should be printed vertically and centered to the left or right of the bar code.

5. GENERAL SYMBOLOGY SPECIFICATIONS:

5.1 Code 39 Symbology: The VIN bar code shall conform to "Bar Code Symbology for 3 of 9 Bar Codes" published by the Automotive Industry Action Group (AIAG B-1), which is effective as of this date. This specification is shown in Appendix B. All aspects of the bar-code symbology codes shall follow this specification except as described in the following sections.

5.2 Code Density and Dimensions (Reference AIAG B-2 - Appendix A): The average width of the narrow element shall be within the range of 0.19 mm (0.0075 in) and 0.317 mm (0.0125 in).

The ratio shall be 3 to 1 with an allowable range of 2.8 - 3.2.

The minimum bar height shall be 9.5 mm (0.375 in) or 15% of the bar code length.

6. SCANNING DEVICES (Reference AIAG B-2 - Appendix A):

To avoid damage to the label or vehicle surfaces, only non-contact bar-code scanners shall be used to scan the bar codes. Scanning devices shall use a light source at 8633 nanometer range or in the visible red light spectral band range.

7. FUNCTIONAL TEST SPECIFICATIONS:

- 7.1 Scope: This section defines the minimum laboratory performance testing requirements for new, original equipment, non-underhood labels that are to be mounted in a protected location. (A protected location on the vehicle is where the label is not exposed to ambient elements outside of the vehicle.) These testing requirements are not for field compliance testing purposes.
- 7.2 VIN Label: This label shall not be transferable from one vehicle to another. The label must have a pressure-sensitive adhesive on the back with a built-in self-destruct feature. Labels must be easily removed from the release liner with minimal effort with no damage to the label.
- 7.3 Panel Preparation for Laboratory Performance Testing: The preparation of panels or substrate will conform to each vehicle manufacturer's specifications in accordance with the approved vehicle manufacturer's test procedures.
- 7.4 Label Test Specification Procedure: Test specification detailed in this standard will conform to each vehicle manufacturer's approved test/laboratory/material specifications.
- 7.5 Label Appearance: Labels to be tested shall be free of streaks, blisters, wrinkles, ragged edges and any other surface imperfections which will make them unsuitable for the intended usage. The design and color are specified on the engineering drawing.
- 7.6 Label Release Specifications: The adhesive side of the labels shall have a protective release backing with sufficient strength to protect the adhesive film during shipment, storage and handling. The release backing shall not tear or delaminate while being removed from the label; also, it shall separate evenly and clearly from the adhesive and shall not cause the label to void. It shall be free of any contaminants or any other surface treatment that would be detrimental to the adhesive qualities of the label.
- 7.7 Label Identification/Qualification Requirements: Labels qualified to this specification shall be assigned a vehicle manufacturer's part number, after which time no change can be made to the material without approval of the purchaser.
- 7.8 Label Storage: Labels shall not be adversely affected by storage up to 30 days at room temperatures up to 40°C (104°F).
- 7.9 Environmental Test Specifications:

- 7.9.1 Label Legibility: Test shall be completed within 48 h after removal from the conditioning environment.

After each of the exposures, the label must not show evidence of delamination, loss of printing, loss of adhesion, or any other effect that would render it to be illegible.

- 7.9.2 Evidence of Tamperproof Feature: Test shall be completed within 48 h after removal from the conditioning environment.

The tamperproof feature shall be evaluated by removal of the label from the test panel after each test. The label will be removed by pulling the label from the test panel at a 90 deg angle to plane. Removal of the label from the test panel must cause permanent and obvious damage to the label, rendering it inappropriate to be transferred.

- 7.9.3 Humidity Test: Humidity cabinet for 96 h at 100% relative humidity and 37.7°C (100°F).

- 7.9.4 Oven Aging: Oven aging cabinet for seven days at 77°C (170°F).

- 7.9.5 Thermal Cycle Test: Subject the panel to the following temperature variations, 30 min at 120°C (248°F), 15 min at room temperature, 30 min at -40°C (-40°F) and 15 min at room temperature. Repeat this cycle five times.

- 7.9.6 Immersion in Water: Immerse the panel for 4 h in water at 32°C (90°F).

- 7.9.7 Ultra-Violet Light/Humidity Test: Panel will be controlled by standards as specified by ASTM #G53-77 except as follows: subject the panel to 8 h U.V. at 70°C (158°F), then 4 h at 50°C (122°F), (with condensation, no U.V.), repeat the process for 96 hours.

8. BAR CODE VERIFICATION PROCEDURES:

- 8.1 Scope: These procedures describe the equipment, calibration, and verification process for bar-coded labels. They are used to make a laboratory comparison of dimensional and optical characteristics of a bar code to specified tolerance using mechanical or manual processes.

These verification procedures are considered to be for laboratory auditing, not for auditing for in-field compliance. These procedures are to be performed randomly on independent labels, not as a concurrent test.

Verification equipment can be used from, but not limited to, the sources listed below or from any other equipment manufacturer that satisfies the verification procedures specified herein: Micro Plotter Engineering Ltd.; Photographic Science Corp.; RJS Inc.; Symbol Technologies.

- 8.2 Calibration:

- 8.2.1 The verification equipment is to be calibrated as described by the manufacturer of the verification equipment. Operation of the verification equipment is to be performed as described in the manufacturer's operating manual.
- 8.2.2 The verification equipment manufacturer's test label is to be verified once to proper calibration. If it fails to meet the manufacturer's tolerances to indicate the equipment is correctly calibrated, calibration should be repeated and the test label verified again.
- 8.3 Verification: The verification procedure is to be completed within 48 h after completion of the environmental testing for label performance and function. The label is to be wiped with a soft absorbent cloth (5 strokes) prior to the verification procedure. The procedure is to be performed on the label after each environmental test.
- 8.3.1 The label to be audited is to be mounted on the surface material for which it was intended and which facilitates the verification procedure.
- 8.3.2 Bar and Space Analysis/Measurement: The first measurement is to be taken approximately on the centerline of the bar code perpendicular to the bars. The measurements are to be taken in accordance with the equipment manufacturer's operating manual. The methodology is not intended to replace any other multiple-scan audits suggested by other sources. Symbology specifications are in accordance with AIAG B-1 with exceptions as noted.
- 8.3.2.1 The minimum nominal narrow element dimension is to measure 0.119 mm (0.0075 in), and the maximum nominal narrow element size is to measure 0.317 mm (0.0125 in). Tolerances are as specified in AIAG B-1.
- 8.3.2.2 If the bar code remains out of tolerance, a second analysis is to be taken just below or to the left of the first analysis.
- 8.3.2.3 If the bar code still remains out of tolerance, a third analysis is to be taken just above or to the right of the first analysis.
- 8.3.2.4 If the bar code still remains out of tolerance, the label is not acceptable and the audit is complete.
- 8.3.2.5 The enclosed flow chart describes the physical audit procedure.
- 8.3.3 Encodation: The human readable interpretation is to be compared to the encoded bar code to assure it is correct based on the applicable standard. (Note: The start/stop characters and the data identifiers are not to be included in the human readable interpretation.)
- 8.3.4 If the bar-code label meets or exceeds the specified tolerance and guidelines, the label is considered acceptable.

8.3.2.5 Flow Chart of Verification Procedure: