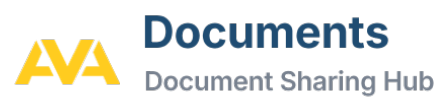


Specification for Testing Automotive Halogen Light Sources

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SPECIFICATION FOR TESTING AUTOMOTIVE HALOGEN LIGHT SOURCES

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SUMMARY OF CONTENTS

1	SCOPE*	3
2	SAFETY PRECAUTIONS	3
3	REFERENCE STANDARDS	4
4	DIAGRAMS AND DEFINITIONS	5
4.1	APPENDICES	5
5	GENERAL REQUIREMENTS	5
5.1	RECORD RETENTION	5
5.2	SAMPLE DOCUMENTATION AND RETENTION.....	6
5.3	POWER SOURCES	6
5.4	EQUIPMENT TOLERANCES.....	6
5.5	MEASUREMENT ACCURACY	7
5.6	TEST REPEATABILITY AND CALIBRATION.....	7
5.7	TEST DEFAULT CONDITIONS	8
5.8	TEST SHARING WITHIN BULB FAMILIES.....	8
5.9	TEST FAILURE PROCEDURE	8
5.10	CONTROL PLANS.....	9
5.11	RELIABILITY PROGRAMS AND METHODS	9
5.12	HAZARDOUS MATERIAL RESTRICTION	9
6	PHYSICAL PERFORMANCE	10
6.1	PHYSICAL DIMENSIONS.....	10
6.2	MEAN SPHERICAL CANDELA (MSCD).....	10
6.3	EXTERNAL VISUAL EXAMINATION	11
6.4	COLOR.....	12
6.5	LEAK/SEALABILITY THROUGH TERMINALS AND SEAL	13
6.6	DEFLECTION	13

6.7	FLUID COMPATIBILITY*	14
6.8	TERMINAL RETENTION*	15
6.9	RESONANT FREQUENCIES*	16
6.10	AGED RESONANT FREQUENCY*	17
6.11	SALT SPRAY	18
6.12	OUTGASSING TEMPERATURE REQUIREMENT	18
7	DURABILITY	18
7.1	LABORATORY LIFE AT 14.0 VDC*	18
7.2	LUMINOUS INTENSITY MAINTENANCE*	19
7.3	VIBRATION DURABILITY*	20
7.4	SHOCK*	22
7.5	AGED VIBRATION DURABILITY*	23
7.6	TERMINAL REQUIREMENTS*	25
7.7	DRL (SAE J2087)*	25
8	QUALITY/RELIABILITY PROGRAMS	26
8.1	RELIABILITY GROWTH	26
8.2	ONGOING QUALITY IMPROVEMENTS	26
8.3	QUALITY/RELIABILITY IMPROVEMENT TOOLS	26
9	REPORT REQUIREMENTS	27
9.1	CALIBRATION SHEETS	27
9.2	DATA REQUIREMENTS	27
APPENDIX A: GLOSSARY OF TERMS*		28
APPENDIX B: FLUID SOURCES*		30
APPENDIX C: REVISIONS*		31

1 SCOPE*

The procedures contained in this specification cover the laboratory testing of replaceable halogen incandescent bulbs for use in automotive road illumination. The following tests are intended to be run under the following conditions.

- New bulb design
- Design or process change made to an existing bulb, which could affect the outcome of the test
- The completion of one calendar year, accept as noted in the following Test Schedule Table.

Test Title	Yearly
Physical Dimensions	X
Mean Spherical Candela (MSCD)	X
External Visual Examination	X
Color	X
Leak/Sealability Through Terminals and Seals	X
Deflection	X
Fluid Compatibility	
Terminal Retention	X
Resonant Frequencies	
Aged Resonant Frequency	
Salt Spray	
Outgassing Temperatures Requirement	
Laboratory Life at 14.0 VDC	X
Luminous Intensity Maintenance	X
Vibration Durability	
Shock	
Aged Vibration Durability	
Terminal Requirements	
DRL (SAE J2087)	

2 SAFETY PRECAUTIONS

Halogen bulbs have pressurized gas inside and require special handling. They can burst or shatter if scratched or dropped.

- Wear appropriate eye protection, gloves, and shielding when performing any tests on bulbs covered by this specification.
- Use precaution in handling a bulb that has recently been energized. These bulbs operate at a very high temperature.

- Protect operating lamps from contact with liquid and moisture. Liquid contacting a hot bulb can cause it to shatter.
- Hold the bulb only by the base. Do not touch the glass portion of the bulb with bare hands.

This specification may involve hazardous materials, operations, and equipment. This specification does not purport to address all the safety concerns associated with its use. It is the responsibility of whoever uses this specification to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

3 REFERENCE STANDARDS

DaimlerChrysler, Ford, and General Motors Advanced Product Quality Planning and Control Plan Reference Manual
Measurement Systems Analysis Reference Manual (AIAG)
Potential Failure Mode and Effects Analysis Reference Manual (SAE J1739)
DaimlerChrysler, Ford, and General Motors Production Part Approval Process Manual
ANSI (C78.390)
ASTM B117 (Standard Practice for Operating Salt Spray [Fog] Testing Apparatus)
DaimlerChrysler, Ford, and General Motors Quality System Requirements—QS-9000 Manual
SAE J1330, Photometry Laboratory Accuracy Guidelines
SAE J578, Color Specification
SAE J1383, Performance Requirements for Motor Vehicle Headlamps
SAE J2087, Daytime Running Lamps for Use on Motor Vehicles

Unless otherwise specified or required by law, suppliers shall use the most recent versions of any applicable reference documents or standards.

4 DIAGRAMS AND DEFINITIONS

4.1 Appendices

Diagrams are provided at the end of this specification to clarify the details of the test procedures. A Glossary of Terms is also included in the Appendix.

5 GENERAL REQUIREMENTS

5.1 Record Retention

Supplier must maintain a file for the storage of laboratory reports and calibration records, and establish a record retention policy concerning these records in accordance with QS-9000 and PPAP requirements. These records need not follow a standard format, but must present the required data in an orderly, professional manner. The file must be made available to any and all customer personnel upon request, including—but not limited to—representatives from the following areas: product engineering, purchasing, quality, and reliability.

5.1.1 Objectives of Record Retention

Following are the main objectives for retention of test documents or records:

1. Retain records that will evidence compliance so that the supplier can appropriately respond when or if product compliance is challenged. Files must exist for the storage of all laboratory records, data, and calibration records. The files must be available at any time for audit or inspection.
2. Retain records as needed to assist in evidencing the exercise of "due care" in matters relating to product compliance, government requirements, or product liability.
3. Comply with statutory requirements for the maintenance and retention of specific records.

5.1.2 Retention Methods

Methods of retention may include retention of original documents, the use of film, or the use of electronic storage equipment. Records shall be stored so that they are accessible in a reasonable amount of time. Storage areas should provide adequate protection from unauthorized access, moisture, and fire.

5.2 Sample Documentation and Retention

Engineering test samples must be identified by ANSI Trade Number and serial number unless otherwise noted. Documentation must identify the type of test performed and describe special tests that are not a part of this specification. (Reference QS-9000 and PPAP requirements.)

5.2.1 Required Data Package

Supplier must submit the data package for the appropriate level of submission to the customer's responsible engineer and purchasing division for approval signatures.

5.2.2 Sample Retention

Samples tested to attain part approval must be retained by the bulb manufacturer for a period of time specified in the PPAP Manual.

5.3 Power Sources

Supplier must use voltage regulated DC power sources for all tests to simulate an automotive battery and charging system.

5.3.1 Output Current

The power source must be capable of supplying a continuous output current as required by the design loads, including inrush current. Where required to simulate automotive inrush current conditions, an automotive battery or batteries with sufficient cold cranking amps may be connected in parallel with the power supply.

5.3.2 Output Voltage

The power source must be capable of supplying an output voltage that must not deviate more than 1.0 volt from the nominal setting over the entire load range (including surges). The power source must recover 63% of its maximum excursion within 5.0 milliseconds. Ripple voltage must not exceed 300 mV peak to peak. Power supplies used for photometric measurements must conform to SAE J1330.

5.4 Equipment Tolerances

Supplier must use test setups and equipment capable of measuring test parameters (expressed in nominals) within the limits found in Equipment Tolerance Table.

Equipment Tolerance Table

Test Chamber Temperature	nominal $\pm 3^{\circ}\text{C}$
Time	nominal $\pm 0.5\%$
Forces	nominal $\pm 0.01\text{ N}$
Distances	nominal $\pm 0.01\text{ mm}$
Voltages	nominal $\pm 0.01\text{ V}$ for photometrics
	nominal $\pm 0.1\text{ V}$ for all other tests
MSCD	nominal $\pm 2.0\%$

NOTE: This table is not to be used for performance dependent variable (refer to section Measurement Accuracy).

5.5 Measurement Accuracy

Meters and gages used to assess the performance dependent variable, as defined by the basic function of the test sample, must have a smallest unit of measure one order of magnitude less than the least significant digit specified. For example, even though a 0.6 mm and 0.60 mm wire might be the same diameter, calipers capable of 0.01 mm resolution may be used to measure the first wire, but a micrometer with 0.001 mm resolution is needed for the second wire.

5.6 Test Repeatability and Calibration

5.6.1 Equipment Repeatability

All measurement equipment used for product evaluation must be repeatable to within 10% of the part tolerance according to DaimlerChrysler, Ford, and General Motors Measurement Systems Analysis Reference Manual.

5.6.2 Equipment Calibration

Equipment re-calibration/re-certification timing is to be calculated based on the capability of any individual instrument to retain its "Manufacture Stated Accuracy" between recall periods. However, this time shall not exceed one year.

5.6.3 Laboratory Masters (Photometry Only)

Lamps which are traceable to known standards are laboratory masters. Each supplier must use laboratory masters for comparison measurements, calibration of test equipment, and for evaluating long-term drift in test equipment.

5.7 Test Default Conditions

When specific test conditions are not given, the following basic conditions apply:

1. Test the bulb in its normal operating orientation.
2. Perform tests or measurements at the following ambient conditions:

Room Temperature.....23°C +/- 5°C

3. Season the bulbs for 1% of the laboratory life, 10 hours maximum at 14VDC.
4. When testing dual filament bulbs, each filament can be tested in the same capsule or in separate capsules, unless otherwise specified. When testing both filaments in the same capsule, the sequence of testing must be recorded. Both filaments should never be lit at the same time during any test.

5.8 Test Sharing Within Bulb Families

The results of tests performed on one bulb type may, in some cases, be used to indicate the capability of another bulb type within the same bulb family. For example, a crush test performed on a clear, 800 series bulb type may be used as a demonstration of the glass strength of all clear, 800 series bulb types made by the same process from the same glass from the same source. Sound judgment must guide this practice. Bulbs within the same bulb family that share components such as glass envelopes, lead wires, filaments, bases, fill gases, etc., may be able to share test results. The customer will be the final authority on whether this surrogate data may be used.

5.9 Test Failure Procedure

Should a test failure occur, the customer (Quality, Purchasing, and Design/Release Engineer) shall be notified immediately. When contact cannot be immediately made, stop the test until the requesting party can be contacted.