

Standard for Cigar Lighters & Power Outlets

**SAE/
USCAR4-1
April 2016**



Documents

Document Sharing Hub

ISBN: 978-0-7680-8337-8



SAE/USCAR-4 REVISION 1

Issued	1997-11
Stabilized	2016-04

Standard for Cigar Lighters & Power Outlets

RATIONALE

OEMs have chosen to use SAE J563 as their preferred specification for Cigar Lights and Power Outlets.

STABILIZED NOTICE

This document has been declared "Stabilized" by the USCAR/EWCAP subcommittee for Cigar Lighters and Power Outlets and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

The research data, analysis, conclusion, opinions and other contents of this document are solely the product of the authors. Neither the SAE International (SAE) nor the United States Council for Automotive Research (USCAR) certifies the compliance of any products with the requirements of nor makes any representations as to the accuracy of the contents of this document nor to its applicability for purpose. It is the sole responsibility of the user of this document to determine whether or not it is applicable for their purposes.

Copyright © 2016 USCAR

All rights reserved.

QUESTIONS REGARDING THIS DOCUMENT: (248) 273-2470 FAX (248) 273-2494
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX (724) 776-0790

Full document details: SAE USCAR4-1



Documents
Printed in U.S.A.
Document Sharing Hub

SUMMARY OF CONTENTS

1. SCOPE.....	3	4.2.4 Knob Temperature	10
1.1 Authority	3	4.2.5 Knob Retention	10
1.2 Scope	3	4.2.6 Power Outlet Contact	11
1.3 Coverage	3	4.3 Mechanical Requirements	11
1.4 Purpose of the Part	3	4.3.1 Installation Forces	11
1.5 Part Description and Glossary	4	4.3.2 Mounting Retention	11
1.6 Hazardous Material Control	5	4.3.3 Orientation	11
		4.3.4 Element Shield	11
2. REFERENCE DOCUMENTS	5	4.3.5 Concentricity	11
2.1 Part Drawing	5	4.3.6 Actuation Forces	12
2.2 Customer & Industry Standards	6	4.3.7 Terminal/Connector Requirements	12
2.3 Failure Mode and Effect Analysis (FMEA)	6	4.4 Electrical Requirements	13
		4.4.1 Normal Voltage	13
3. GENERAL REQUIREMENTS	6	4.4.2 Current Draw	13
3.1 Interface Design Requirements	6	4.4.3 Parasitic Load	13
3.1.1 Electrical Interface	6	4.4.4 Electromagnetic Compatibility (EMC)	13
3.1.2 Mechanical Mounting	7	4.4.5 Thermal Protection	13
3.2 Supplier Responsibilities	7	4.4.6 Reverse Voltage	13
3.3 Record Retention	8	4.4.7 Over Voltage	14
3.4 Test Philosophy	8	4.4.8 Isolation Resistance	14
3.4.1 Design Verification Testing	8	4.5 Component Environmental Requirements	14
3.4.2 Production Validation Testing	8	4.5.1 Shock/Drop Tests	14
3.4.3 Continuing Conformance Testing	8	4.5.2 Thermal Shock	14
		4.5.3 Temperature Requirements	15
4. PERFORMANCE & TESTING REQUIREMENTS9		4.5.4 Humidity Testing	15
4.1 Duty Cycle Definition	9	4.5.5 Corrosion Resistance Requirements	15
4.1.1 Reliability Test Requirements	9	4.5.6 Liquid Spill Resistance Requirements	16
4.2 Functional Requirements	10	4.5.7 Vibration Resistance	16
4.2.1 SAE Standard	10	4.6 Reliability Requirements	17
4.2.2 Flammability	10	4.6.1 Reliability Test Schedule	17
4.2.3 Thermal Performance	10	4.6.2 Durability Requirements	17

5.	TESTING	18	5.3.2	Measurement Accuracy	19
5.1	Test Sequence	18	5.3.3	Test Repeatability	19
5.2	Test Samples	18	5.4	Test Plug	19
5.2.1	Sample Identification	18	5.4.1	Requirements	20
5.2.2	Sample Selection	18	5.5	Visual Inspection	20
5.2.3	Performance	18	5.6	Component Performance Checks	20
5.2.4	Sample Disposition	19			
5.3	Test Equipment	19	6.	REPORT REQUIREMENTS	21
5.3.1	Calibration	19	6.1	Required Data Package-AIAG Standard.....	21

1.SCOPE:

1.1 Authority:

This standard is promulgated by the United States Council for Automotive Research (USCAR), Electrical Wiring Component Application Partnership (EWCAP). Development was under a task force consisting of representatives from the USCAR participants. Application of this standard to the covered components is covered by the individual purchase documents of each customer. The intent of this document is to standardize the electrical interface to the vehicle, the mechanical interface to a mounting panel or surface, and the general operational specifications of these devices. The intent of this specification is to fully define industry-wide acceptance characteristics and testing required for installation and reliable operation. These criteria will ensure that commonality and enhanced interchangeability are achievable for all end users.

1.2 Scope:

This standard is intended to cover cigar or cigarette lighters as well as power outlets based on the form and dimensions of the cigar lighter. This standard is a full performance specification, it includes dimensional and operational parameters as well as performance characteristics which must be met when submitting a cigar lighter assembly or power outlet assembly for production approval. This standard constitutes an acceptance specification for a surface mounted, front-loaded cigar lighter or power outlet.

1.3 Coverage:

This standard covers the operational, reliability, durability, acceptance, and testing requirements for a front loaded, external contact, cigar lighter (lighter) for installation in production vehicles. This standard also covers power outlets that are based on the form and dimensions of the lighter receptacle.

Testing shall be done on part families as directed by the appropriate corporate engineering platform group(s). Part family definition shall be made by the purchaser as part of the purchase agreement.

1.4 Purpose of the Part:

The lighter is provided as a convenience, for use in lighting cigars and cigarettes, and for use as a power outlet. The intent is to provide a lighter which is usable with as little distraction as possible to the primary function of safe vehicle operation, and is relatively safe while using a device which may reach functional temperatures in excess of 650°C.

When designed as a power outlet, or as a lighter used as a power outlet, the device is exposed to a variety of devices beyond the automotive industry's control. Among the most important of these is the accessory plug which interfaces to the lighter or power outlet base. Recommended accessory plug design criteria is provided in paragraph 5.4 of this specification.

1.5 Part Description and Glossary:

Throughout this standard, descriptions will be employed to reference various components. Special names/terms will be defined at first usage in the text, with the usage name/term shown in parentheses immediately following. The text usage will be continued thereafter. For purposes of this document, the following will be used:

DEVICE - (Device) Any of the components separately or as a group.

LIGHTER ASSEMBLY - (Lighter) A complete system of components; including the element assembly, a receptacle, and some form of mounting ring which taken together constitute a cigar/cigarette igniting system.

ELEMENT ASSEMBLY- (Element) An assembly containing a heating element and knob, a shield or ash guard, and other internal components. Commonly referred to as the popout or knob/element assembly.

RECEPTACLE ASSEMBLY- (Receptacle) That portion of the system constituting the element well, the electrical connections, the over-temperature device, and thermal release mechanism. Usually installed in the passenger compartment, this device receives, heats, and stores the element when not in use. Alternatively called the housing or switch base.

HALO RING / MOUNT RING - This mounting ring, usually molded of an opaque plastic, serves to position and mount the receptacle to intended parent panel in the vehicle.

The "Halo" Ring is intended for illuminated operation. The "Halo" Ring is identical with the mounting ring, but is of a translucent colored material and usually contains a light source. Illumination is normally intended to be powered from the dimmable instrument panel light circuit. Color match with the rest of the illuminated I/P components is achieved through this material.

The mounting ring and the halo ring are intended to be interchangeable, both in function and application on the lighter or outlet receptacle and in the mounting hole, and may be substituted for one another depending on illumination requirements. When the halo ring contains a light source it shall get its B+ from the auxiliary contact of the receptacle and its ground from the ground of the receptacle through a connection that self-mates during installation of the receptacle into the ring.

POWER OUTLET or POWER POINT RECEPTACLE - (Receptacle) This device is similar in appearance to the lighter receptacle, but without thermal release or thermal over-temperature provisions, it is provided for the sole purpose of connecting after market devices to the vehicle electrical system. In this specification, the term receptacle shall refer to both the cigar lighter or power point receptacle, unless specifically identified.

POWER OUTLET PLUG - A plug specifically designed to insert into a receptacle making contact with the receptacle shell for the ground connection and to the B+ contact in the center bottom of the receptacle. For purposes of testing the receptacles as power outlets, a plug meeting the requirements paragraph 5.4 shall be used.

1.5 (Continued):

BUZZ, SQUEAK, AND RATTLE (BSR) - This term is applied to any number of annoying sounds within the vehicle. As vehicles become quieter, BSR becomes more important.

1.6 Hazardous Material Control:

Products furnished under the authority of this document and products and processes used by suppliers to manufacture those products must conform to health and safety requirements of the Occupational Safety and Health Administration.

2.REFERENCE DOCUMENTS:

Resolution of document precedence in the event of a conflict between performance standards, part drawings, and related standards or specifications shall be as follows unless otherwise specified below, or in a specific contract or purchase order:

- 1st-Applicable Part Drawing(s)
- 2nd-This standard
- 3rd-Other USCAR Performance standards and specifications
- 4th-Other related standards and specifications

Nothing in this specification, however, supersedes applicable laws and regulations unless specific exemption has been obtained.

Suppliers are expected to be aware of, and comply with, worldwide (e.g. North American, European, Asian, Gulf States) vehicle standards unless specific exemption has been obtained from the customer.

Any logo or symbol applied to the knob (when required) shall be configured to meet ISO requirements.

2.1 Part Drawing:

The component part drawing shall contain, at a minimum, the following information:

- . A reference to this specification for interface and testing requirements,
- . All part dimensional requirements not covered herein, including any orientation (keying) requirements,
- . Performance requirements not covered herein, such as material standards and component specifications,
- . Conformance requirements not covered herein, such as other corporate or industry standards or regulations, domestic or foreign,
- . Typical mating connector, terminal, and illumination requirements (including dimensions where required).

2.2 Customer & Industry Standards:

Suppliers are expected to subscribe to the Standards listed on the part drawing. Additional standards may be referenced throughout this document as required. Unless otherwise specified, suppliers should use the most recent versions of any referenced document(s) or standard(s).

2.2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J563 Six- and Twelve-Volt Cigar Lighter Receptacles

2.2.2 ASTM Publications: Available from ASTM, 100 Barr Harbor, West Conshohocken, PA 19428-2959.

ASTM B117 Standard Practice for Operating Salt Spray (Fog) Testing Apparatus

2.2.3 AIAG Publications: Available from AIAG, 26200 Lahser, Suite 200, Southfield, MI 48034.

AIAG Production Part Approval Process

AIAG Quality System Requirements - QS 9000

2.2.4 FMVSS Publications: Available from the Superintendent of Documents, U.S. Government Printing Office, Mail Stop SSOP, Washington, DC 20402-9320.

FMVSS-302 Federal Standard - Flammability of Interior Materials

2.3 Failure Mode and Effect Analysis (FMEA):

Within 90 days of source selection, per the Automotive Industry Action Group (AIAG) requirements, the supplier must submit a preliminary Design FMEA (DFMEA) based on the current design concept, to the project engineer for review. A revised FMEA must be submitted 10 weeks prior to program tooling release and must be approved by the project engineer prior to tooling release. The supplier must complete a Process FMEA (PFMEA) at least 90 days prior to production validation testing. The Process FMEA must be submitted to both the project engineer and the appropriate Supplier Quality representative for approval. It is recognized that these are "living" documents, and that change is expected, therefore, it is most important that FMEA status be maintained as current as possible.

3. GENERAL REQUIREMENTS:

3.1 Interface Design Requirements:

3.1.1 Electrical Interface: The electrical interface to the vehicle wiring harness shall be based on a three terminal connection consisting of a Primary B+ contact providing current for the primary function (lighter or outlet), a Ground contact providing a return path for all functions, and, if illumination is included, a Secondary B+ contact providing current for the illumination device. Pin locations are defined in Fig 2E. Detail dimensional requirements are shown in Fig 2.