



Rear Window Power Sunshade Assembly

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

Note: The use of **shall** in this document denotes a binding provision that must be adhered to unless a deviation is granted in writing by the responsible Program Team Leadership and/or the component/subsystem Bill of Material (BOM) Family Owner (BFO). The use of **should** denotes a preference or desired conformance, which if not adhered to, must be documented and disclosed to General Motors. Unless otherwise noted, all requirements apply over the conditions and useful life as described herein. General Motors shall be the final arbiter of performance if the requirements stated herein are not objectively defined. The design and execution of the Rear Window Power Sunshade (RWPS) Assembly must be in accordance with the application regulations of Section 2.

1.1 Purpose. This standard is a General Motors Global Document. All requirements herein shall be adhered to as GM Global Requirements for the Rear Window Power Sunshade Assembly except where noted for specific GM programs.

1.2 Applicability. This standard establishes performance requirements, design constraints, and validation requirements for a Rear Window Power Sunshade Assembly. The requirements contained in this document only apply to parts released under this version of requirements when included in supplier Statement of Requirements (SOR).

1.2.1 The Analysis Development Validation (ADV) plan shall be complete per Statement of Requirements (SOR) Validation Appendix G2 requirements and any new standards/Component Technical Specification (CTS) updates at Integration Vehicle Material Required Date (IV/MRD) be included in the Design Review Based on Failure Modes (DRBFM) and/or peer reviews, with validation considerations considered in that process, and effected via Engineering Work Order (EWO) for program specific standard updating. (The program team shall contact the Global Technology Engineering (GTE) to ensure the latest standard templates are being used).

1.3 Remarks. The main purpose of RWPS is to provide a controllable blocking of sunlight and headlights from vehicles which will shine into the passenger compartment through the rear window, while providing suitable transparency from the inside of the vehicle, looking outward.

1.3.1 Classification. The RWPS is listed under the following: Uniform Parts Classification (UPC), Functional Name Address (FNA) and Bill of Material (BOM) nomenclature.

- UPC = 1C4J
- FNA = 1330A
- BOM Row = 36 Rear Window Trim Sunshade Electric

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

ASTM D395	FMVSS 201	SAE/USCAR-21	TS 16949
CMVSS 201	FMVSS 302	SAE/USCAR-25	
ECE R21.01	GSO 98	TRIAS 48	

GM Confidential

© Copyright 2014 General Motors Company All Rights Reserved

November 2014

Page 1 of 22

2.2 GM Standards/Specifications.

GMW3059	GMW3172	GMW14124	GMW14669
GMW3091	GMW3191	GMW14155	GMW14797
GMW3097	GMW3431	GMW14233	GMW15010
GMW3103	GMW6992	GMW14234	GMW15841
GMW3115	GMW7293	GMW14264	GMW16331
GMW3116	GMW8518	GMW14444	GMW17000
GMW3118	GMW14011	GMW14553	
GMW3121	GMW14089	GMW14573	

2.3 Additional References.

- Best Practice (The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement).
- CG1663 (Controls Appendix C Template)
- CG2492 (Appendix B (or X) Interior Lighting General Program Description)
- CG3690 (Steady State Part Monitoring (SSPM) Rear Window Trim)
- Connector Request Form
- Customer Actuated Noise and Vibration Requirements
- Design Appearance Requirements (DAR)
- Dimensional Technical Specification (DTS)
- Electromagnetic Compatibility (EMC) Requirements and Verifications
- GM Engineering Materials and Process Standards
- GM Ergonomic and Assembly Requirements
- GM Global Legal Database
- GM Legal Staff Requirements
- GM Materials Specification
- GM North American Simultaneous Parts Release Process - See Web site: spo.gm.com/dept/eng/naspe/index.html
- GM Recommended Connector Catalog
- GM SupplyPower - Engineering Power - library, folder: GME/ITDC - Opel/Vehicle Recycling
- Manufacturing Technical Specification (MTS)
- Noise and Vibration Integration Web site
- Occupational Safety and Health Administration (OSHA) Requirements
- Owner's Manual
- Production Part Approval Process (PPAP)
- Program Plan
- Resource Center (Integration Driven Subsystem Requirement)
- Roof Rail Airbag (RRAB) Subsystem Technical Specification (SSTS)
- RRAB Validation Specification
- Service Manual
- Shake and Rattle (S & R) Statement of Requirement (SOR) Statement
- SOR Appendix B
- SOR Appendix C
- SOR Appendix C2

GM Confidential

© Copyright 2014 General Motors Company All Rights Reserved

November 2014

Page 2 of 22

- SOR Appendix F5
- SOR Appendix F7
- SOR Appendix F10
- SOR Appendix H
- SOR Appendix J
- SOR Appendix J2
- SOR Validation Appendix G2
- Squeak and Rattle Noise Glossary
- Supplier Process Monitoring Plan
- Vehicle Technical Specification (VTS)
- World Vehicle Regulation Manual (WVRM)

3 Requirements

3.1 System/Subsystem/Component/Part Definition. The Rear Window Power Sunshade Assembly for a vehicle interior is defined as the part that is shipped to the assembly plant for installation of the shade to the Rear Window Trim Assembly or the vehicle. This typically includes:

- a. Sunshade Electric Control Unit (ECU) - Standard GM architecture for function of shade with ECU. GM will provide connector information required for the selection of a connector.
- b. Drive Unit (motor and arms, rollers/wheels).
- c. Blind Fabric and Structure.
- d. Sunshade Structure Housing with Cover.
- e. Attachment/Mounting Hardware.
- f. Squeak and Rattle (S & R) Treatments.

3.1.1 Appearance. The Rear Window Power Sunshade Assembly shall reflect the vehicle interior-styling theme in accordance with the brand character. It also reflects the design quality as expressed in surface attributes such as material texture, grain, color and gloss, as well as the execution of joints, interfaces (fit, flush and alignment). SOR Appendix F5 defines the program grain, color and gloss requirements. The SOR Appendix F7 defines the fit and finish Dimensional Technical Specification (DTS) requirements for execution of joints, and interfaces. The SOR Appendix F7 also provides Key Product Characteristics/Perceived Quality Characteristic (KPC/PQC) and part drawing tolerance and locating requirements. Additionally, the following shall be met:

- a. The appearance characteristics of all visual surfaces of the sunshade shall be compatible with other vehicle content.
- b. When the sunshade is deployed, all of its visible parts, except for the top bar, shall have a black finish.
- c. In the retracted state, the top bar shall cover the outlet opening of the blind fabric in the Rear Window Trim without leaving any gaps.
- d. During the sunshade deployment, retraction, or in the full deployed state, the blind fabric shall remain taut without any folds or creases in the blind.
- e. The lateral side of blind fabric should be edge wrapped or pinch edged, as specified in SOR Appendix B.
- f. There shall be no visible metallic or internal components for the sunshade when stored or in any state of deployment. The top bar and caps shall be color coded to the vehicle interior unless specified in SOR Appendix B. Visible metallic and/or internal components shall be black unless specified in SOR Appendix B.

The following conditions shall not be visible (regardless of sunshade position) from a normal standing or sitting position, inside or outside of the vehicle:

- Pin Holes
- Cut Edges/Unfinished Edges (unless allowed in SOR Appendix B)
- Flow Lines

GM Confidential

© Copyright 2014 General Motors Company All Rights Reserved

November 2014

Page 3 of 22

- Blisters or Cracks
- Gate Marks
- Discoloring
- Varnish Burrs
- Sink Marks
- Flashing
- Visible Tool Parting Lines
- Frayed Material
- Delamination
- Binding of Materials

3.1.2 Content. The required physical and functional content for the Rear Window Power Sunshade Assembly are identified in SOR Appendix B - General Program Description.

3.1.2.1 Physical Content. The required physical and functional content for the Rear Window Power Sunshade Assembly are identified in SOR Appendix B - General Program Description, (e.g., see items; 3.1.2.1a thru 3.1.2.1f).

- a. Sunshade Electric Control Unit (ECU).
- b. Drive Unit (motor and arms, rollers/wheels).
- c. Blind Fabric and Structure.
- d. Sunshade Structure Housing with Cover.
- e. Attachment/Mounting Hardware.
- f. Squeak and Rattle (S & R) Treatments.

Note: Include sub-components that help define the subsystem such as acoustic materials, Rear Window Power Sunshade components, fasteners, sealing and anti-itch materials, etc.

3.1.2.2 Functional Content.

- a. The Sunshade should provide the following basic functions as applicable.
- b. Controllable Sunlight and Headlight Blocking.
- c. Vision/Light Transmission.

3.1.2.3 Operating Modes. The sunshade shall have features which allow the driver to select the following operating modes:

- a. Blind Fabric Deployment.
- b. Blind Fabric Retraction.
- c. Blind Fabric shall retract automatically when the vehicle is shifted into reverse.
- d. Drive Unit shall stop automatically when Blind Fabric movement is impeded.
- e. Sunshade module shall be capable at start up to recognize the shade's start position.
- f. When the Sunshade is in the open position, and the vehicle is put into reverse, the shade shall retract, then return automatically to the original shade setting when shifting out of reverse.

Note: See SOR Appendix B for other program specific operating modes, if applicable.

Design Release Engineer (DRE) Note: Provide very specific details on the operating modes detailing program specifics. Controlled through ECU or motor, etc., or in SOR Appendix B.

3.1.3 Ambient Environment. The RWPS subsystem must meet the performance requirements identified in this specification while operating within these environmental conditions. Temperature ranges recommended are -30 °C to 105 °C unless otherwise defined in the Vehicle Technical Specification (VTS).

VTS documents calling out temperatures outside this range will require parts to be able to be operated, but not necessarily be fully functional at extreme temperature. Full function shall return to the assembly within the recommended temperature range.

GM Confidential

© Copyright 2014 General Motors Company All Rights Reserved

November 2014

Page 4 of 22

AVA Documents
Document Sharing Hub

3.1.3.1 Thermal/Humidity Environment. The anticipated operating conditions relative to temperature and humidity are listed in the VTS.

Note: If no requirements are identified in the VTS then default to; 0% to 100% humidity.

3.1.3.2 Shipping and Storage Environment. The anticipated shipping and storage conditions relative to temperature and humidity are 90 °C and 50% Relative Humidity (RH) or program specific. There are shipping conditions which are unique and could be more severe than the environment inside a vehicle. These conditions must be anticipated and designed for when designing rear window power sunshade trim and when designing shipping containers.

3.1.4 Interfaces. The RWPS design must be coordinated with the interfacing systems of the vehicle and the processes of the assembly plant(s).

3.1.4.1 External-To-Vehicle to Subsystem: General Assembly Process. Vehicle assembly process imposes product requirements for the Rear Window Power Sunshade Assembly.

3.1.4.1.1 Modularity: Component Retention to Substrate. The extent of modularity is program and/or region specific. When modularity is required, the Rear Window Power Sunshade Assembly shall be securely retained to the Rear Window Trim (RWT) Substrate in such a manner as to withstand the rigors of shipping and the vehicle assembly process.

3.1.4.1.2 Ergonomics During Assembly. The installation process of the Rear Window Power Sunshade Assembly shall meet GM Ergonomic and Assembly Requirements in all regions (i.e., weight, fastener insertion force, etc.) Requirements can be found in GMW14234. Additionally, all installation related Occupational Safety and Health Administration (OSHA) Requirements shall be met in North America.

3.1.4.2 Subsystem to Subsystem. This section describes the interfaces between the RWPS and other subsystems with which it has a physical or functional relationship.

3.1.4.2.1 Rear Window Power Sunshade Assembly Best Practices. The sunshade shall conform to the sunshade interface Best Practices (BP) for design interfaces. The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement. Refer to Rear Window Trim Best Practices for detailed design criteria, located in Enterprise Engineering Knowledge System (E2KS)-Rear Window Trim (RWT).

3.1.4.2.2 Power Sunshade to Rear Window Trim.

3.1.4.2.2.1 Packaging of Module to Rear Window Trim. Packaging requirements for the sunshade blind fabric and lever arm clearance to outlet opening of the RWT are given in the BP. The Best Practice provides basic reference dimensions. The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.

3.1.4.2.2.2 Packaging of Module to Structure. If the sunshade module is a Part of Assembly (POA) part for the Rear Window Trim, the solid structure to attach sunshade module to rear window trim panel shall be provided by sunshade module. Normally metal brackets are used. The sunshade module supplier shall work with the Rear Window Trim supplier to make sure the sunshade module can be attached to the Rear Window Trim panel solidly and will not detach from the RWT during packaging, shipment, assembly and customer use over the target life of the vehicle.

3.1.4.2.3 Power Sunshade to Rear Window. Sunshade roller/wheels should keep a suitable and stable contact force (if sunshade has idler wheels to contact to rear glass) between the sunshade and rear glass to avoid noise and control operation/travel. Avoid overpressure of rollers/wheels to glass. There shall be adequate clearance between sunshade end caps and rear glass to avoid noise issues.

3.1.4.2.4 Sunshade to Headliner. Suitable clearance is required between the sunshade and headliner or Center High Mounted Stop Lamp (CHMSL) to avoid S & R issues and achieve suitable light obscuration. See SOR Appendix B or Best Practices for reference clearance dimensions. The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.

3.1.4.2.5 Sunshade to Sheet Metal. Sheet metal provisions shall be made for mounting or support surfaces and/or holes for the sunshade attachment, where required. See SOR Appendix B or Best Practices for reference dimensions. The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.

3.1.4.2.6 Sunshade to Garnish Trim. Suitable clearance is required between the sunshade and garnish trim to avoid S & R issues, to achieve suitable light obscuration and to meet sunshade performance requirements. See

GM Confidential

© Copyright 2014 General Motors Company All Rights Reserved

November 2014

Page 5 of 22

 **Documents**
Document Sharing Hub

SOR Appendix B or Best Practices for reference dimensions. The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.

3.1.4.2.7 Sunshade to Electric Communication System. The operation of the sunshade should not interfere with other electric subsystem/components (in the vehicle or including environment) operation, nor shall the sunshade's operation be affected by other electric subsystems/components or external vehicle electronics. Requirements for EMC testing are given in 3.2.1.6 Electrical Function. Interface Control Documents (ICD) are required to agree to locations or required clearances in the vehicle.

3.1.4.2.8 Sunshade to Body Wire Harness and Connectors. All connection systems, wire harness in-line applications, or new device applications (e.g., control units, switches, sensors, motors, etc.) to be utilized in the RWPS must use wiring connectors from the GM Recommended Connector Catalog. The GM Recommended Connector Catalog is maintained exclusively by GM Global Electrical Engineering. A selection from the catalog will require approval per the connector selection process and the supplier must comply with the requirements described in 3.1.4.2.8.1 thru 3.1.4.2.8.5.

3.1.4.2.8.1 All connectors being proposed by component suppliers and wiring suppliers must be approved in advance of the device development activity by the Global Connector Group within GM Global Electrical Engineering.

3.1.4.2.8.2 During component/subsystem sourcing (e.g., control units, switches, sensors, motors, etc.) the responsible group must include the wire harness connector impact in the decision process using the Connector Request Form.

3.1.4.2.8.3 The RWPS subsystem electrical interface shall comply with and be validated to 3.1.4.2.8.3.1 thru 3.1.4.2.8.3.4.

3.1.4.2.8.3.1 GMW3191, Connector Test and Validation Specification.

3.1.4.2.8.3.2 GMW15841, Connector and Terminal Design Specification.

3.1.4.2.8.3.3 SAE/USCAR-21, Revision 1, Performance Specification for Cable-to-Terminal Electrical Crimps.

3.1.4.2.8.3.4 SAE/USCAR-25, Electrical Connector Assembly Ergonomic Design Criteria.

3.1.4.2.8.4 The RWPS subsystem electrical connection system shall be designed and validated to 3.1.4.2.8.4.1 thru 3.1.4.2.8.4.3.

3.1.4.2.8.4.1 GMW3191, Vibration Class One (1).

3.1.4.2.8.4.2 GMW3191, Temperature Class One (1) and Temperature Class Three (3).

3.1.4.2.8.4.3 GMW3191, Sealing Class One (1) (Unsealed).

3.1.4.2.8.5 The supplier shall follow the design interfaces for connectors defined within CG2492 (Appendix B (or X) Interior Lighting General Program Description).

3.1.4.2.9 Roof Rail Airbag. The Rear Window Power Sunshade Assembly shall provide all necessary requirements and accommodations for the Roof Rail Airbag by performing as further indicated in this section.

3.1.4.2.9.1 Attachments/Anchors. The Rear Window Power Sunshade Assembly shall have sufficient points of attachment to withstand the deployment loads of the RRAB without substantially dislodging from design position. The number and location of added fasteners will vary depending on included hard fastening points and deployment forces imparted to the RWPS.

3.1.4.2.9.2 Deployment. The Rear Window Power Sunshade Assembly structural/mechanical properties shall meet the deployment mode requirements by flexing as necessary.

3.1.4.2.9.3 Airbag Performance. The Rear Window Power Sunshade Assembly shall not detrimentally delay airbag deployment per GMW3115, GMW3118 and GMW3121 or direction granted by the responsible vehicle performance engineer, through temperature ranges of -30 °C to +85 °C.

Any components or fragments of the Rear Window Power Sunshade Assembly that partially or fully separate from the RWPS (through fracture or dislodging) shall be evaluated for functional deficiency or injury potential to the occupant during the RRAB deployment through temperature ranges of -30 °C to +85 °C. Any component that diminishes the function of the RRAB or is judged to have injury potential shall be corrected as evaluated by the RRAB and Rear Window Power Sunshade Assembly Product Development Team (PDT) members.

The Rear Window Power Sunshade Assembly shall not damage the RRAB itself during deployment.

GM Confidential

© Copyright 2014 General Motors Company All Rights Reserved

November 2014

Page 6 of 22

The Rear Window Power Sunshade Assembly shall not present sharp or rough edges that may cut or snag the RRAB during deployment.

The Rear Window Power Sunshade Assembly shall not prevent the RRAB from meeting the deployment requirements as specified in GMW3121, GMW3115 and GMW3118.

For system validation with environmentally conditioned components, aging of the Rear Window Power Sunshade Assembly shall be completed according to GMW3118 unless otherwise stated in the SOR Validation Appendix G2; aging of the RRAB shall be completed according to the RRAB Subsystem Technical Specification (SSTS). System testing shall be completed according to RRAB Validation Specification.

3.1.5 Usage Definition. The range of physical dimensions of the user population for which the Rear Window Power Sunshade Assembly requirements herein apply are bounded by the 5th percentile female and the 95th percentile male.

3.2 Product Characteristics. This section describes the sunshade in terms of performance, reliability/durability, maintenance/service/repair, and user vehicle requirements. The sunshade shall satisfy all requirements, in this section, under the ambient environmental conditions defined in 3.1.3 and any additional conditions, which are indicated herein.

3.2.1 Performance Requirements. Sunshade Assembly (ASM) and its components.

3.2.1.1 Material and Part Performance. Material and material related part performance requirements are specified in the SOR Appendix F10. The Rear Window Power Sunshade Assembly shall meet the appropriate material related part performance requirements per GMW14444. **Note:** The following approvals shall be required as applicable: plastic, paint, textile, construction and color approval as defined in SOR Appendix F10. Additionally, adhesive requirements will be contained in the SOR Appendix F10.

3.2.1.2 Color/Gloss/Grain/Appearance. The requirements for the Rear Window Power Sunshade Assembly relative to color/gloss/grain/appearance are identified in SOR Appendix F5 and later a Color and Trim Design Appearance Requirements (DAR). The color, pattern, aesthetics and other related qualities shall be evaluated and approved by the responsible engineering department as an acceptable match to the engineering approval sample when viewed under conditions set forth in GMW6992.

3.2.1.2.1 Optical and Functional Requirements. Net material should be optimised regarding:

- Solar Radiation Through the Rear Window
- Blinding from Headlights of Following Vehicles
- Prevent View Into the Vehicles from Outside
- Rear View from Inside Should be as Far as Possible

3.2.1.3 Interior Fittings. The Rear Window Power Sunshade Assembly shall meet Export ECE R21.01, CMVSS 201 and FMVSS 201 requirements for all countries that a vehicle is being exported to per program.

3.2.1.4 Other Regulatory Requirements. The Rear Window Power Sunshade Assembly shall meet FMVSS 302 and other global flammability requirements, including TRIAS 48 and GSO 98, as required by the countries of sale. Additionally, the RWPS shall be designed to meet all state and federal regulations, as required by the countries of sale.

3.2.1.5 Operational Performance.

3.2.1.5.1 Subjective Evaluation. The sunshade shall run smoothly, with suitable open/close time, during the sunshade drive mechanism operation both in component lab testing and in vehicle testing, in all environments. The operation smoothness during cycling shall be evaluated per GMW14264 and shall be ranked at a seven (7) or higher.

3.2.1.5.2 Open/Close Time. The opening and closing time of the sunshade shall be less than eight (8) s in all test environments. Cold opening/closing time is allowed to cycle for up to 20 s.

3.2.1.5.3 Manage Rear Window Power Sunshade Assembly Noise and Vibrations. The Rear Window Power Sunshade Assembly shall support compliance with the program vehicle level Customer Actuated Noise and Vibration Requirements found in the current GM program Vehicle Technical Specification (VTS). The supplier must cooperate with GM in determining the root cause and resolution of any Rear Window Power Sunshade Assembly vehicle level noise and vibration deviations from the program VTS paragraphs.

3.2.1.5.3.1 Rear Window Power Sunshade Assembly – Sound.

GM Confidential

© Copyright 2014 General Motors Company All Rights Reserved

November 2014

Page 7 of 22



Documents
Document Sharing Hub