



Sun Visor

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.

1.1 Purpose. The main purpose of the Sun Visor Assembly is to provide the customer with the ability to block sunlight. Optional content may be provided to allow use of a vanity mirror, vanity lighting, provide a card/ticket holder, and provide Universal Garage Door Opener (UGDO) buttons and trim.

1.2 Applicability. This standard established performance requirements, design constraints, and validation requirements for a Sun Visor 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 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 Sun Visor Assembly is listed under the following Uniform Parts Classification (UPC), Functional Name Address (FNA) and Bill of Material (BOM) nomenclature.

- **UPC** = 1C3J
- **FNA** = 3300A Sunshade Assembly
- **BOM Row** = 43.34 Sun Visor Assembly Row

Note: This standard is a General Motors Global Document. All requirements herein shall be adhered to as GM Global Requirements for the Sun Visor Assembly except where noted for specific GM programs.

2 References

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

2.1 External Standards/Specifications.

CMVSS 201	GSO 98	KMVSS Article 95	UN R46.01
CMVSS 302	ISO 5740	SAE J964a	UN R46.02
FMVSS 201	JIS D5705	TRIAS 48	UN R94
FMVSS 208	KMVSS 101	TS 16949	
FMVSS 302	KMVSS 102	UN R21.01	

2.2 GM Standards/Specifications.

GMW3059	GMW3232	GMW14124	GMW14797
GMW3091	GMW6992	GMW14155	GMW14872
GMW3097	GMW7293	GMW14231	GMW14892
GMW3115	GMW7294	GMW14234	GMW15272
GMW3116	GMW8518	GMW14264	GMW16157
GMW3118	GMW14011	GMW14444	GMW16331

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GMW3121

GMW14089

GMW14573

GMW3172

GMW14118

GMW14698

2.3 Additional References.

- Best Practices (The supplier shall work with the GM Design Release Engineer to comprehend this requirement)
- CG3498, Overhead Sunvisors Steady State Part Monitoring
- Component Technical Specification (CTS)
- Design Appearance Requirements (DAR)
- Development Planning Schedule
- Dimensional Technical Specification (DTS)
- Electrical and Interior Lighting Standards
- Geometric Dimensioning and Tolerancing (GD&T) Requirements
- GM Engineering Materials and Process Standards
- GM Global Legal Database
- GM Legal Staff Requirements
- GM Supply Power
- Human Factors Design Objectives (HFDO)
- Incomplete Vehicle Document
- Labels and Literature Website Identification (ID)
- Manufacturing Technical Specification (MTS)
- Materials Specification
- Notice of Action (NOA) GICC-112 (ID)
- Owner's Manual
- Roof Rail Airbag (RRAB) Subsystem Technical Specification (SSTS)
- Service Manual
- SOR Appendix B
- SOR Appendix C2
- SOR Appendix F5
- SOR Appendix F7
- SOR Appendix F10
- SOR Appendix H
- SOR Validation Appendix G2
- Squeak and Rattle Noise Glossary
- Statement of Requirements (SOR)
- Supplier Process Monitoring Plan
- Utility Vehicle Handling Label (CIR 575.105)
- Vehicle Technical Specification (VTS)
- World Vehicle Regulation Manual (WVRM)

3 Requirements

The use of **shall** in this document denotes a binding provision that must be adhered to. **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.

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General Motors shall be the final arbiter of performance if the requirements stated herein are not objectively defined. The design and opinion of the Roof Trim Subsystem must be in accordance with the application regulations of Section 2.

3.1 System/Subsystem/Component/Part Definition. The Sun Visor Assembly shall give an integrated impression and convey a quality image. The components in the Visor Assembly shall include all fasteners and optional content.

The Sun Visor Assembly for a vehicle interior is defined as the part that is shipped to the assembly plant or a sub-assembly location for installation to the vehicle or overhead assembly. This typically includes:

- Sun Visor
- Center Support
- Fastener
- Retainer
- Screw Cover
- Protective Packaging
- Label

Features may need to be provided for a Value Added Assembler (VAA) to assemble the Sun Visor Assembly to an Overhead Trim System. The Sun Visor Assembly supports safety requirements for interior occupant impact and field of vision.

3.1.1 Appearance. The Sun Visor 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 and/or SOR Appendix F10 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 (KPC)/Perceived Quality Characteristics (PQC) and part drawing tolerance and locating requirements. 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.

3.1.1.1 Specific appearance requirements for the Sun Visor Assembly are provided in SOR Appendix B.

3.1.1.2 All visible Sun Visor trim edges shall be aesthetically concealed. The following conditions shall not be visible from a normal standing or sitting position, inside or outside of the vehicle.

- Pin Holes
- Cut Edges
- Flow Lines
- Blisters
- Cracks
- Intake Point
- Discoloring
- Varnish Burrs
- Sink Marks
- Flashes
- Tool Parting Lines
- Frayed Material
- Wrinkles
- Puckers
- Mottling
- Adhesive Voids

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- Substrate Read-through
- Other Visual Imperfections

3.1.1.3 Haptics. The haptic characteristics (tactile feel) of visor functions (vanity cover function, button activation, etc.) shall be evaluated subjectively. A rating of 7 or higher is required during evaluation according to GMW14264.

3.1.2 Content.

3.1.2.1 Physical Content. The typical content of a Sun Visor Assembly shall consist of the substrate, cover material, vanity mirror, vanity mirror cover, labels, attachment features and fastener covers. The required physical and functional content for the Sun Visor Assembly are identified in SOR Appendix B - general program description.

Note: Include sub-components that help define the subsystem such as interior lighting components (e.g., courtesy lamps, reading lamps), sun visor features, fasteners, sealing and anti-itch materials, etc.

3.1.2.2 Functional Content.

3.1.2.2.1 An aesthetic appearance that covers the sheet metal and is in harmony with the rest of the vehicle interior.

3.1.2.2.2 A secure and stable position for all components, which are functional to the occupants.

3.1.2.2.3 Kinetic energy absorption to satisfy CMVSS 201U, FMVSS 201U and UN R21 Head Impact requirements.

3.1.2.2.4 A soft feel (tactility) for intentional and unintentional vehicle occupant contacts, if applicable.

3.1.2.2.5 Color fastness, indentation recovery, durability, clean ability, resistance to environmental influences, and retention of physical and structural integrity.

3.1.2.2.6 Allow for Roof Rail Air Bag (RRAB) deployments.

3.1.2.2.7 A means for providing illumination of the occupant. (Vanity lighting function, if applicable.)

3.1.2.2.8 A means for providing ticket/map storage.

3.1.2.2.9 A means for providing a location for applicable labels

3.1.2.2.10 A controllable means of blocking the rays of the sun.

3.1.3 Ambient Environment. Reference the Vehicle Technical Specification (VTS) for ambient environment. The Sun Visor Assembly must meet the performance requirements identified in this specification while operating within these environmental conditions. Temperature ranges recommended are -30 °C to 85 °C unless otherwise defined in the 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.

3.1.3.1 Low Temperature Requirement. For the vehicles sold in selected countries only, see Appendix A, Table A1, the temperatures can be modified as shown in Table 1.

Table 1: Low Temperature Deviation Temperatures

Assumes Tinted Glass Usage	Low	Normal	High
Overhead/Visor Surfaces	-20 °C	Not applicable	95 °C
Relative Humidity	0%	10% to 80%	100%

3.1.3.2 High Temperature Requirement. For the vehicles sold in selected countries only, (See Appendix A, Table A2), the hot temperatures can be modified as shown in Table 2.

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Table 2: High Temperature Deviation Temperatures

Assumes Solar Glass Usage	Low	Normal	High
Overhead/Visor Surfaces	-30 °C	Not applicable	65 °C
Relative Humidity	0%	10% to 80%	100%

3.1.3.3 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.

3.1.3.4 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 the Sun Visor Assembly and the shipping containers.

3.1.3.4.1 Clip Retention in Shipping and Storage Environment. The retainer, once installed to an overhead, must meet a minimum retention of 30 N.

Note: Attachment screws shall be present and engaged to 1.2 mm ± 0.75 mm.

3.1.3.4.2 Adhesion in Shipping and Storage Environment. Adhesively applied components shall remain retained to the visor trim at the elevated temperatures used in shipping environments. Anticipated temperatures are 90 °C and 50% Relative Humidity (RH) or program specific. To check the adhesion, run the adhesion test per GMW14892, using the preceding temperature. Do not use the full environmental cycle, but soak the visor in a chamber for 4 h, prior to testing the adhesively bonded items.

3.1.3.5 Contaminants. The contaminants which may come in contact with the Sun Visor Assembly are described in the Potential Contaminants section of the program specific VTS.

3.1.4 Interfaces.

3.1.4.1 External-To-Vehicle to Subsystem: General Assembly Process. Vehicle assembly process imposes product requirements for the Sun Visor 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 Sun Visor Assembly shall be securely retained to the overhead 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 Sun Visor 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. Interfaces between Sun Visor Assembly and other subsystems with which it has a physical or functional relationship.

3.1.4.2.1 Sun Visor Assembly Best Practices. (The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement). The Sun Visor Assembly shall conform to the Sun Visor Assembly Best Practices located in Enterprise Engineering Knowledge System (E2KS). The Sun Visor Assembly Best Practices Knowledge Set is stored in Interior Community of Practice (CoP). (The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement).

3.1.4.2.2 Safety Management.

3.1.4.2.2.1 Roof Rail Airbag (RRAB). For all vehicles, which incorporate Roof Rail Air Bags (RRAB). The Sun Visor Assembly shall provide all necessary requirements and accommodations for the Roof Rail Airbag by performing as further indicated.

3.1.4.2.2.1.1 Attachments/Anchors. The Sun Visor Assembly shall have sufficient points of attachment to withstand the deployment loads of the RRAB without substantially dislodging from design position excepting the surfaces immediately over and outboard of the RRAB. The number and location of added fasteners will vary depending on included hard fastening points and deployment forces imparted to the Sun Visor Assembly.

3.1.4.2.2.1.2 Deployment: The Sun Visor Assembly will flex as necessary to meet the RRAB deployment requirements. The interfaces with garnish, overhead and the sun visor structural/mechanical properties shall

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meet the deployment mode requirements by flexing as necessary. It may be necessary to modify the design to support RRAB deployment requirements.

3.1.4.2.2.1.3 Airbag Performance. The Garnish Trim Subsystem (GTS)/Roof Trim Subsystem (RTS) 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.

- a. Any components or fragments of the Sun Visor Assembly that partially or fully separate from the subsystem (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/overhead Product Development Team (PDT) members.
- b. The Sun Visor Assembly shall not damage the RRAB itself during deployment.
- c. The Sun Visor Assembly shall not present sharp or rough edges that may cut or snag the RRAB during deployment.
- d. The Sun Visor Assembly shall not prevent the RRAB from meeting the deployment requirements as specified in GMW3121, GMW3115 and GMW3118.
- e. For system validation with environmentally conditioned components, aging of the Sun Visor 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.

3.1.4.3 Appearance of Sun Visor from External to Vehicle. All visible edges of the Sun Visor Assembly that are or may become visible from outside the vehicle shall be aesthetically covered.

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

3.2 Product Characteristics. The extent of modularity is program and/or region specific. When modularity is required all components, accessories, wiring, fasteners, etc., which comprise this subsystem shall be securely retained to the Sun Visor Assembly in such a manner as to withstand the rigors of shipping and the vehicle assembly process.

3.2.1 Performance Requirements. The assembly is to perform as specified prior to and after exposure to durability and environmental conditioning as designated.

3.2.1.1 Material and Part Performance. Material and material related part performance requirements are specified in the SOR Appendix F10. The Sun Visor 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 Sun Visor Assembly relative to color/gloss/grain/appearance are identified in SOR Appendix F5 and later a Color and Trim Design Appearance Requirements (DAR).

3.2.1.3 Human Vehicle Interface. The following Sun Visor Assembly components and interfaces shall comply with the Human Factors Design Objectives (HFDO). These requirements are summarized in the GM Best Practices. (The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement).

3.2.1.4 Interior Fittings. The Sun Visor Assembly shall meet export UN R21.01, KMVSS 101, CMVSS 201 and FMVSS 201 requirements for all countries that a vehicle is being exported to per program.

3.2.1.5 Flammability. The subsystem and its components, shall satisfy the burn resistance requirements of FMVSS 302, CMVSS 302 (Canada - where applicable), KMVSS Article 95, GSO 98 and TRIAS 48 according to GMW3232.

3.2.1.6 Other Regulatory Requirements. The Sun Visor Assembly shall meet FMVSS 208, KMVSS 102 and UN R94 for Air Bag labels.

3.2.1.7 Squeak and Rattle Requirement. Component Requirements. The requirement is to have absolutely no customer annoyance due to squeaks and rattles. The final authority for the determination of whether a noise is objectionable lies with the Buyer Lead Engineer and/or the Squeak and Rattle (S&R) Engineer. Squeaks and rattles include, but are not limited to all the noises described in the Squeak and Rattle Noise Glossary.

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3.2.1.7.1 Supplier Responsibility. The supplier is to accept full responsibility to produce squeak and rattle free, subsystems and/or components. The supplier shall cooperate with the buyer and/or other supplier's to assure that no squeak and rattle annoyance occurs at the interface of their subsystem/component to the body, chassis or other subsystem/component. If an objectionable noise is found during any phase of the program, it will be the supplier's responsibility, with buyer cooperation, to eliminate the noise and demonstrate resolution in a vehicle prior to exiting the program phase. If the noise is found in pilot or production, the supplier will be responsible to develop a containment plan (and fix), as well as short and long term solutions, as appropriate. Any issue raised during these processes, which is demonstrated to be the responsibility of the supplier, shall be corrected with urgency at no additional cost to GM. The supplier will be responsible for the Squeak and Rattle performance of their subsystem.

3.2.1.7.2 Objective Measurement. All configurations and operating positions of the sun visors shall have an Instationary Zwicker Loudness of less than or equal to 3 sones N 10 when evaluated in the vertical, fore-aft, and lateral directions per the test procedure GMW14011 Subsystem/Component Squeak and Rattle Test using the vibration input frequencies and amplitudes defined in Table 3.

Table 3: Vibration Input Frequencies and Amplitudes

Sun Visor and Overhead Console

Vertical Acceleration		Fore-aft Acceleration		Lateral Acceleration	
Frequency (Hertz)	Acceleration ((m/s ²) ² /Hz)	Frequency (Hertz)	Acceleration ((m/s ²) ² /Hz)	Frequency (Hertz)	Acceleration ((m/s ²) ² /Hz)
8	0.16599	8	0.08333	8	0.25561
11	1.04536	11	0.87711	10	0.51494
21	0.11826	14	0.35816	12	0.58321
34	0.18290	18	0.36575	23	0.13719
41	0.22629	26	0.04060	38	0.06653
58	0.15900	36	0.08272	56	0.03428
73	0.04505	57	0.04109	73	0.01906
87	0.01344	73	0.01320	100	0.00018
100	0.00100	100	0.00014	m/s ² RMS	2.80
m/s ² RMS	3.69	m/s ² RMS	2.77		

3.2.1.7.3 Subjective Rating (except United States only programs). The subjective rating of the S&R performance of the sun visors contains:

3.2.1.7.3.1 Rate Squeak and Rattle performance of the subsystem/component in all configurations and conditions according to GMW7293.

3.2.1.7.3.2 Rate Squeak and Rattle performance during adjusting/operating subsystem/component according to GMW8518.

3.2.1.7.3.3 Rate Squeak and Rattle performance during hand impacts, hand flexures and passenger motion where the customer would normally interface with the subsystem/component, and in a manner consistent with expected average customer behavior.

3.2.1.7.3.4 The minimum subjective rating under all conditions for any individual complaint and the overall rating for the subsystem determined according to GMW7294 is rating 8.0.

3.2.1.7.4 Subsystem in the Integration Environment (Interfaces). The requirement for this program is to have absolutely no customer annoyance due to squeaks and rattles. The final authority for the determination of whether a noise is objectionable lies with the Buyer Lead Engineer and/or the Squeak and Rattle (S&R) Engineer. Squeaks and rattles include, but are not limited to all the noises described in the Squeak and Rattle Noise Glossary.

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3.2.1.7.4.1 The Supplier is to accept full responsibility to produce squeak and rattle free, as delivered, subsystems and/or components, as defined by functional requirements in the SSTS and/or CTS. The supplier shall also cooperate with the buyer and/or other supplier's to assure that no squeak and rattle annoyance occurs at the interface of their subsystem/component to the body, chassis or other subsystem/component. If an objectionable noise is found during any phase of the program, it will be the supplier's responsibility, with Buyer cooperation, to eliminate the noise and demonstrate resolution in a vehicle prior to exiting the program phase. If the noise is found in pilot or production, the supplier will be responsible to develop a containment plan (and fix), as well a short and long term solutions, as appropriate. Any issue raised during these processes, which is demonstrated to be the responsibility of the supplier, shall be corrected with urgency at no additional cost to GM. The supplier will be responsible for the Squeak and Rattle performance of their subsystem.

3.2.1.8 Environmental Cycling and Heat Aging. The Sun Visor Assembly, as installed in a vehicle or roof, shall undergo the following two environmental cycle tests.

3.2.1.8.1 Environmental Cycling. All Components of the Sun Visor system, as installed in a vehicle (this can be tested in a fixture, in vehicle position), shall undergo the environmental cycle tests as called out in GMW14124 (Test Cycle M). Two cycles, run consecutively.

3.2.1.8.2 Heat Soak. A heat soak cycle of 168 h at 90 °C shall be performed on the same part that preceding environmental cycles were run on.

3.2.1.8.2.1 The Sun Visor Assembly shall not exhibit delamination, odor, staining, color, gloss or other visual appearance changes or dimensional variance, unless otherwise specified.

3.2.1.8.2.2 All components of the Sun Visor Assembly shall perform as specified prior to and after being subjected to the environmental cycles.

3.2.1.8.2.3 The sun visor shall be checked for impairment of function as a result of distortion, with measurements taken in each environment to evaluate distortion at the following locations, shown in Figure 1.

- Measure front edge of visor distance (S2) to vehicle or fixture (in vehicle orientation) metal. (Delta change in measurement of 2.0 mm or less allowed.)
- Measure pivot edge of visor distance (S3) to vehicle or fixture (in vehicle orientation) metal. (Delta change in measurement of 2.0 mm or less allowed.)
- Measure visor center support retention rod when visor is swung to side window position (S4). (Delta change in measurement of 4.0 mm or less allowed.)

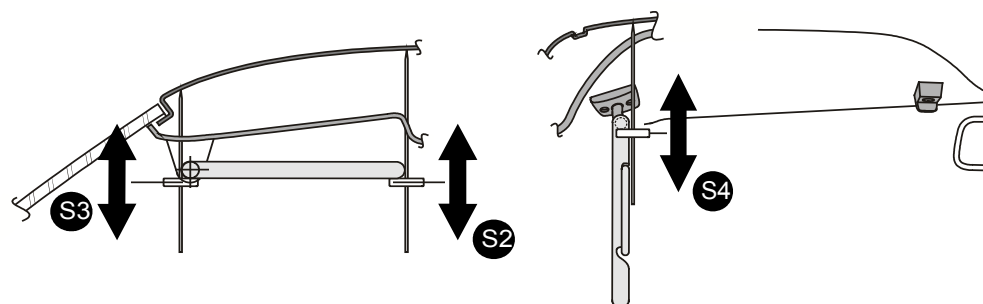


Figure 1: Distortion Subjective Evaluation

3.2.1.9 Interior Emissions. Evaluate the Sun Visor Assembly for interior emissions as specified in GMW14444 with consideration to any regional variations on this test for all countries of sale.

3.2.1.10 Adhesion Strength of Cover to Visor Substrate. The Sun Visor cover to visor substrate shall meet the minimum peel strength of 160 N/m, or cohesive failure of one or both of the adherents. Cohesive separation shall be present across the entire surface of the sample. For a bi-laminate cover stock the visible foam must be greater than 50% of the surface area of the sample, visible to the naked eye. For tri-laminate cover stocks use of a magnifying device may be used. In case of non-consistent cohesive separation, samples shall be reviewed by the GM Bill of Material (BOM) Family Owner (BFO)/Design Engineer (DE)/Subsystem Validation Engineer (SVE) for assessment.

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3.2.1.10.1 Test procedure according to GMW14892. Run the test as received, and within 60 s after removal from each of the environments in GMW14124 Test Cycle M, two (2) cycles with eight (8) peels, one after each environmental condition.

3.2.1.11 Abrasion, Resistance to Wear. Using a Visor Assembly run 300 cycles according to GMW14231. Rating of six (6) minimum.

3.2.1.12 Hydrolytic Stability. All foam laminated Sun Visor fabrics, the Sun Visor Assembly shall show no sign of hydrolytic degradation when subjected to the conditions of GMW14124 - Cycle Q with no failure (typically applies to components made of urethane foams).

3.2.1.13 Sun Visor Assembly.

3.2.1.13.1 Sun Visor Distortion.

3.2.1.13.1.1 In-Laboratory - For All Visors Except Emerging Markets (EM). The sun visor shall be clamped in the attachment across the whole width at the height of the fastening socket and thrust-bearing axle (see Figure 2). A torque of 5 Nm shall be applied to the center on the plane of symmetry and the turning angle shall be measured. EM may require a new turning angle. See BFO for requirement and place in SOR Appendix C2.

3.2.1.13.1.1.1 Turning angle shall be < 45 degrees at 5 Nm.

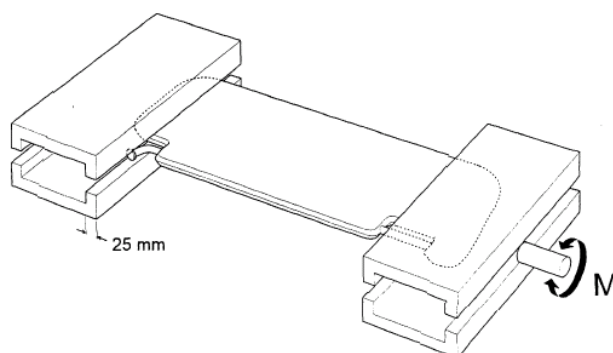


Figure 2: Distortion Test

3.2.1.13.2 Culmination Angle. Culmination Angle " α_1 " (see Figure 3) of the Sun Visor shall be 12 degrees $\pm$ 3 degrees. The clinometers shall be used for measuring the culmination angle of the sun visor. The culmination angle is derived from the difference from the angle when the sun visor is folded up to the angle in the culmination position (see Figure 3). The culmination position is the folding position at which the sun visor begins to fold upward automatically, or the angle at which the visor snaps back to the stowed position.

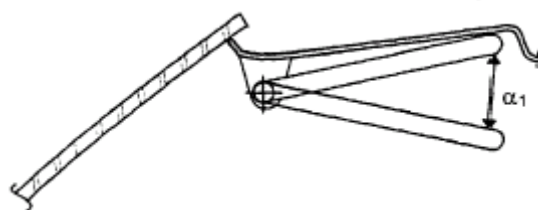


Figure 3: Culmination Angle

3.2.1.13.3 Sun Visor Return to Stow Feature. The Sun Visor when being stowed shall fully contact the headliner surface (as designed) and shall not droop or gap.

3.2.1.13.4 Sun Visor Operational Loads and Forces. The requirements apply both when the sun visor assembly is engaged and disengaged from the center support. All requirements are measured at normal operating ranges of 44 °C and -20 °C. Forces are measured at ambient after the full environmental test of the GMW14124, heat soak, and cycle testing are complete.

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3.2.1.13.4.1 Detent/Reset Force. The force the sun visor pushes to the headliner surface shall be $4\text{ N} \pm 1.5\text{ N}$ as measured 5 mm off headliner surface in "F1" when the sun visor is packaged in the sun visor detent window (see Figure 4).

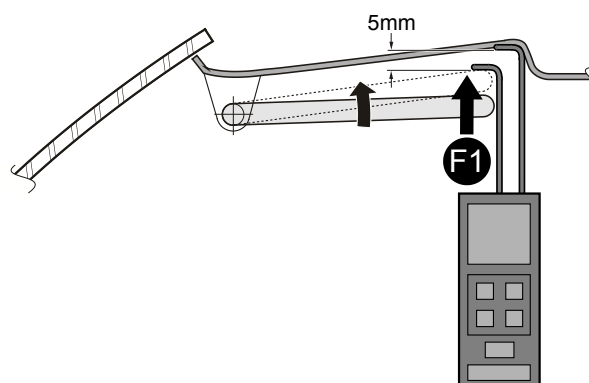


Figure 4: Detent/Reset Force

3.2.1.13.4.2 Actuation Force. Peak force (force for overcoming detent). The force to rotate the sun visor from its stowed position shall be $11\text{ N} \pm 4\text{ N}$ as measured starting 5 mm off headliner surface in "F2" and following through to the detent (see Figure 5).

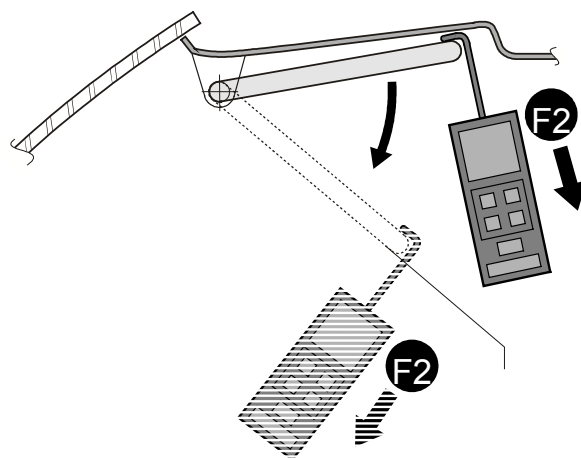


Figure 5: Actuation Force

3.2.1.13.4.3 Folding/Rotating Force. The force to rotate a sun visor to or away from the windshield (after release from headliner) shall be $8\text{ N} +4/-3\text{ N}$ as measured in Figure 6; "F3" before and after the durability test cycles shown in Table 5. Programs using a fully validated Corporate Common Component (CCC) Sun Visor shall run the initial Folding/Rotating Force test, but can use the surrogate data for the durability listed in 3.2.1.13.4.4. All other visors will test both the Folding/Rotating Force and Durability as stated.

3.2.1.13.4.4 Folding/Rotating Durability. The visor folding/rotating durability shall be cycled to the following number of cycles: 9000 cycles = one life; testing shall be run as listed in Table 5 in the order shown. Parts shall soak at each temperature for a minimum of 1 h before beginning cycling. This test shall be run to demonstrate program reliability requirements. A folding rate of six (6) cycles a minute shall be used. One cycle is; a full open and close of the visor.

Note: Table 4 does not exist in this document, therefore, there is not a Table 4 in this document to reference.

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Table 5: Sun Visor Folding/Rotating Force Cycle

9000 Cycles	Temperature
900 cycles	85 °C ± 3 °C
900 cycles	40 °C ± 3 °C at 90% RH
3150 cycles	23 °C ± 3 °C
900 cycles	-30 °C ± 3 °C
3150 cycles	23 °C ± 3 °C

Note: Use for all duty cycles

3.2.1.13.4.5 The sun visor shall retain its position (at any set location) when driving in all conditions.

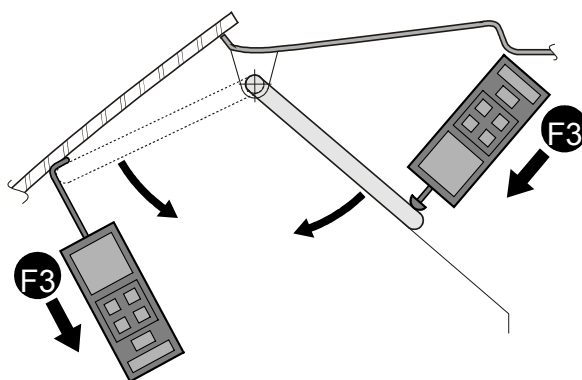


Figure 6: Folding/Rotating Force

3.2.1.13.4.6 Folding Torque-Component Level Only. The folding torque measurements shall be performed using the torque measurement procedure in 3.2.1.13.4.6.1 through 3.2.1.13.4.6.3.

3.2.1.13.4.6.1 The sun visor is mounted on the fastening base (bearing) and support (bracket). The torque is applied into the extension of the rotation axis.

3.2.1.13.4.6.2 The zero point of the measurement is the position in which the sun visor is unloaded and folded in. The torque shall be measured over the entire folding angle range when the visor is folded forward and backward and shall be illustrated in a torque/rotation angle diagram (see Figure 7). The maximum value until the culmination point is reached is the release torque "M_L"; the rotation angle from the drawing position to the culmination point is the culmination angle "α₁". Measurement of the folding torque is performed when folding forward and backward with a rotation angle of 3 degrees after the culmination angle "α₁" has been exceeded (see Figure 3).

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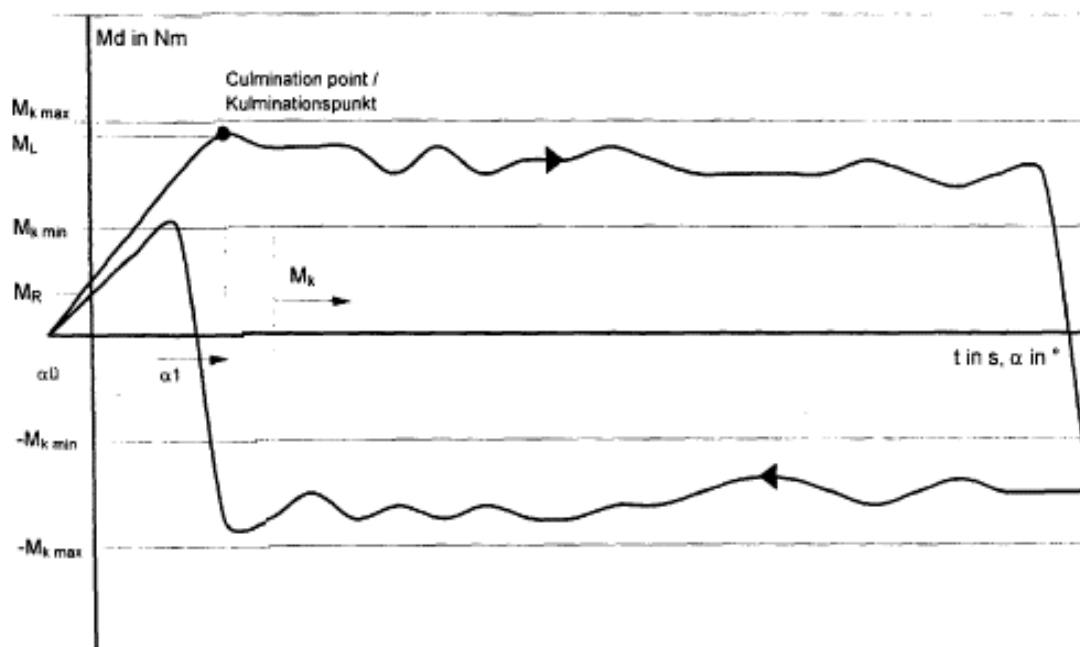


Figure 7: Evaluation of Torque Measurement When Folding

3.2.1.13.4.6.3 The permissible force or torque increase/decrease over the measured folding/swivel movement is 20% maximum.

3.2.1.13.5 Pivot/Swivel Force.

3.2.1.13.5.1 The initial force to pivot the sun visor to and from the front glass and side glass positions shall be $6 \text{ N} \pm 4 \text{ N}$ as measured in Figure 8.

3.2.1.13.5.2 All cycling in this test shall be run with electrical connectivity during the test. Confirmation of electrical performance is required at the start of test, as well as at the completion of each life of testing.

No evidence of damage or wear to the wire insulation is allowed.

3.2.1.13.5.3 When component testing, the force to pivot the sun visor to and from the front glass and side glass positions shall remain in the range called out in 3.2.1.13.5.1 after the test cycles in Table 6. The visor pivot/swivel force durability shall be cycled to the following number of cycles; 6000 cycles = one life; testing shall be run as listed in Table 6 in the order shown. Parts shall soak at each temperature for a minimum of 1 h before beginning cycling. This test shall be run to demonstrate program reliability requirements. A cycle rate of six (6) cycles a minute shall be used. One cycle is a full swing and return of the visor.

Table 6: Sun Visor Pivot/Swivel Force Cycle

6000 Cycles	Temperature
600 cycles	$85 \text{ }^{\circ}\text{C} \pm 3 \text{ }^{\circ}\text{C}$
600 cycles	$40 \text{ }^{\circ}\text{C} \pm 3 \text{ }^{\circ}\text{C}$ at 90% RH
2100 cycles	$23 \text{ }^{\circ}\text{C} \pm 3 \text{ }^{\circ}\text{C}$
600 cycles	$-30 \text{ }^{\circ}\text{C} \pm 3 \text{ }^{\circ}\text{C}$
2100 cycles	$23 \text{ }^{\circ}\text{C} \pm 3 \text{ }^{\circ}\text{C}$

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