WORLDWIDE ENGINEERING STANDARDS	General Specification	GMW17255

Overhead and Garnish Countermeasures

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 Countermeasures must be in accordance with the application regulations of Section 2.

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

1.1 Purpose. The main purpose of the Overhead Countermeasures are to assist in absorbing energy. This standard established performance requirements, design constraints, and validation requirements for the countermeasures.

1.2 Applicability. The requirements contained in this document only apply to parts released under this version of requirements when included in supplier Statement of Requirements (SOR).

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 Overhead Countermeasures are listed under the following Uniform Parts Classification (UPC), Functional Name Address (FNA) and Bill of Material (BOM) nomenclature.

- **UPC** = 1C3J
- **FNA** = 3300A Countermeasure
- **BOM Row** = 43.34 Countermeasure Row

2 References

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

2.1 External Standards/Specifications.

CMVSS 201	FMVSS 201	KMVSS 101	TS 16949
CMVSS 302	FMVSS 302	KMVSS Article 95	
ECE R21.01	GSO 98	TRIAS 48	

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2.2 GM Standards/Specifications.

GMW3059	GMW3232	GMW14011	GMW14573
GMW3115	GMW6992	GMW14089	GMW14892
GMW3116	GMW7293	GMW14124	GMW15609
GMW3118	GMW7294	GMW14234	GMW16331
GMW3121	GMW8518	GMW14444	

2.3 Additional References.

- Best Practices (The supplier shall work with the GM Design Release Engineer to comprehend this requirement).
- Best Practice Number Knowledge Packet (K-PAC) FMVSS 201-3 and FMVSS 201-4, FMVSS 201-5, FMVSS 201-7 and FMVSS 201-9
- Best Practice FMVSS 201U Knowledge Set
- Component Technical Specification (CTS)
- Countermeasure Best Practice Knowledge Set
- Design Appearance Requirements (DAR)
- Development Planning Schedule
- Dimensional Technical Specification (DTS)
- GM Engineering Materials and Process Standards
- GM Global Legal Database
- GM K-PAC of (ROOFTR-xx)
- GM Legal Staff Requirements
- GM Materials Specification
- GM Supply Power
- Incomplete Vehicle Document
- Manufacturing Technical Specification (MTS)
- Roof Rail Airbag (RRAB) Subsystem Technical Specification (SSTS)
- RRAB Validation Specification
- Service Manual
- SOR Appendix B (CG2360 Molded Roof Trim SOR Appendix B _ Performance Based)
- SOR Appendix C2 (CG2180, ROOF TRIM APPENDIX C2)
- SOR Appendix F5 (CG2186; Appendix F5 Materials Appearance Engineering Requirements Integrated Interior System)
- SOR Appendix F7
- SOR Appendix F10
- SOR Appendix H (CG1054 Appendix H GM Location Specific Requirements)
- SOR Validation Appendix G2 (CG1419 Appendix G2 For Overhead Systems)
- Squeak and Rattle Noise Glossary
- Statement of Requirements (SOR)
- Subsystem Drawing
- Vehicle Technical Specifications (VTS)
- World Vehicle Regulation Manual (WVRM)

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3 Requirements

3.1 System/Subsystem/Component/Part Definition. The Overhead Countermeasures shall assist in energy management without causing noise or distortion of the Overhead system.

The Overhead Countermeasures for a vehicle interior are defined as the parts that are shipped to the assembly plant or a sub-assembly location for installation to the vehicle or Overhead assembly. This typically includes:

- Right Hand (RH) Countermeasures
- Left Hand (LH) Countermeasures

Features may need to be provided for a Value Added Assembler (VAA) to assemble the countermeasures to an Overhead Trim System. The Countermeasures support safety requirements for interior occupant impact and field of vision. Additional requirements follow.

3.1.1 Appearance. The Overhead Countermeasures shall reflect the vehicle interior-styling theme in accordance with the brand character, if visible to the customer. They support 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 material requirements, grain, color and gloss requirements. The SOR Appendix F7 defines the fit and finish Dimensional Technical Specifications (DTS) requirements for execution of joints, and interfaces. The SOR Appendix F7 also provides Key Product Characteristics/Perceived Quality Characteristics (KPC/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.

3.1.2 Content. The Overhead Countermeasures physical and functional content is identified in the following.

3.1.2.1 Physical Content. The typical content of the Overhead Countermeasures shall consist of the various countermeasures required to meet vehicle level impact requirements. The required physical and functional content for the countermeasures are identified in SOR Appendix B - General Program Description.

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

3.1.2.2 Functional Content. The Overhead Countermeasures should provide the basic functions described in the following:

3.1.3 Ambient Environment. Reference the Vehicle Technical Specification (VTS) for ambient environment. The Overhead Countermeasures 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.

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.

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%

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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 countermeasures and the shipping containers.

3.1.3.4.1 Adhesion in Shipping and Storage Environment. Adhesively applied components shall remain retained to the Overhead 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 countermeasures 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 Overhead Countermeasures 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 Overhead Countermeasures.

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 Overhead Countermeasures 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 Overhead and Overhead Countermeasures 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. The following paragraphs describe interfaces between Overhead Countermeasures and other subsystems with which it has a physical or functional relationship.

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

3.1.4.2.2 Safety Management.

3.1.4.2.2.1 Overhead Head Impact. The Overhead Assembly is a significant contributor to vehicle compliance with FMVSS 201U-Upper Interior Impact. The Overhead Assembly shall include energy absorbing features that contribute to vehicle-level compliance to the requirements of FMVSS 201U. The Overhead Assembly and Countermeasures shall be designed to meet all applicable Best Practices included in the FMVSS 201U Knowledge Set. Contact the appropriate safety performance engineer for the latest details and requirements. (The supplier shall work with the GM Design Release Engineer to comprehend this requirement).

3.1.4.2.2.1.1 The initial design of the Overhead Assembly and Countermeasures shall be restricted to the design features and packaging criteria listed in Best Practice Number Knowledge Packet (K-PAC) FMVSS 201-3 and FMVSS 201-4, or its most recent successor. Deviations from this Best Practice require the written approval of the responsible FMVSS 201 Performance Engineer and Design Release Engineer (DRE) on the program. All countermeasures must meet the requirements of the Materials Specification GMW15609. (The supplier shall work with the GM Design Release Engineer to comprehend this requirement).

3.1.4.2.2.2 Garnish Head Impact. The Garnish Trim Assembly is a significant contributor to vehicle compliance with FMVSS 201U-Upper Interior Impact. The Garnish Trim Assembly shall include energy absorbing features that contribute to vehicle-level compliance to the requirements of FMVSS 201U. The Garnish Trim Assembly and Countermeasures shall be designed to meet all applicable Best Practices included in the FMVSS 201U Knowledge Set. Contact the appropriate safety performance engineer for the latest details and requirements.

3.1.4.2.2.2.1 The initial design of the Garnish Trim Assembly and Countermeasures shall be restricted to the design features and packaging criteria listed in Best Practice Number K-PAC FMVSS 201-3, FMVSS 201-5,

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FMVSS 201-7 and FMVSS 201-9, or its most recent successor. Deviations from this Best Practice require the written approval of responsible FMVSS 201 Performance Engineer and the DRE on the program. All countermeasures must meet the requirements of the Materials Specification GMW15609. (The supplier shall work with the GM Design Release Engineer to comprehend this requirement).

3.1.4.2.2.2.2 Computer Aided Engineering (CAE) Material properties shall be provided as detailed in SOR Appendix B and SOR Validation Appendix G2.

3.1.4.2.2.3 Roof Rail Airbag. For all vehicles, which incorporate Roof Rail Airbags (RRAB), the following requirements apply:

The Overhead Countermeasures shall provide all necessary requirements and accommodations for the Roof Rail Airbag by performing as further indicated in this section.

3.1.4.2.2.3.1 Attachments/Anchors. The Overhead Countermeasures 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 attachment features will vary depending on included hard fastening points and deployment forces imparted to the countermeasures.

3.1.4.2.2.3.2 Deployment. The Overhead Countermeasures shall be designed to not impede the deployment trajectory of the RRAB system.

The interfaces with Garnish, Overhead and the countermeasure structural/mechanical properties shall meet the deployment mode requirements by flexing as necessary. It may be necessary to modify the design to support RRAB deployment requirements.

3.1.4.2.2.3.3 Airbag Performance. The 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 countermeasures 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 Overhead Countermeasures shall not damage the RRAB itself during deployment.
c. The Overhead Countermeasures shall not present sharp or rough edges that may cut or snag the RRAB during deployment.
d. The Overhead Countermeasures 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 Overhead Countermeasures 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 Overhead Countermeasures from External to Vehicle. No portion of the countermeasures will be visible from outside the vehicle, if the countermeasure is not intended to be observable.

3.1.5 Usage Definition. The range of physical dimensions of the user population for which the Countermeasure 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, the Overhead Countermeasures shall be securely retained to the Overhead in such a manner as to withstand the rigors of shipping, vehicle assembly process, and general usage of the vehicle during its normal lifespan.

3.2.1 Performance Requirements. The following paragraphs specify the functional performance requirements for the Overhead Countermeasures. The overhead assembly, including the countermeasures, 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 Overhead Countermeasures shall meet the appropriate material related part performance requirements per GMW14444. **Note:** The following approvals shall be required as applicable:

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