



Frontal Airbag Modules

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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. This standard details the requirements for a Frontal Airbag Module component (hereinafter referred to as the Module) to be considered for Airbag subsystems used on vehicles produced by General Motors Worldwide (GMW). As defined by the responsible Vehicle Engineering Center (hereinafter referred to as VEC), the Module consists of a Driver Airbag Module (DAB), a Passenger Airbag Module (PAB) and/or a Knee Airbag Module (KAB).

Any vehicle level and Module interface requirements contained herein shall be addressed by the responsible VECs. The Module supplier shall work cooperatively with the responsible VECs and any other component suppliers in resolving any identified interface, design or function issues. The responsible VECs shall be the final arbiter of any vehicle level and interface requirements.

1.2 Applicability. This document applies to all Frontal Airbag modules including Driver and Passenger airbags as well as both Driver and Passenger Knee airbags.

1.3 Remarks.

1.3.1 Mission/Theme. The Module supplements the restraint offered by the seat belt systems for frontal collisions. The objective of the Frontal Airbag System is to deploy the Module's cushion and potentially mitigate interior contacts in case of a frontal collision if a specified deceleration characteristic (collision pulse) during the crash of a vehicle is exceeded. Also, in cases of a high severity frontal collision the Roof Rail Airbag System may be co-deployed with the Frontal Airbag System to further mitigate injury. The Module is intended to reduce injury potential in those frontal accidents where there is a significant risk that drivers and outboard front seat passengers might otherwise be seriously injured, meet applicable regulations, and address General Motors Worldwide (GMW) performance goals.

1.3.2 Classification. The Airbag Modules are components of the Airbag subsystem. As defined by the responsible Vehicle Engineering Centers (VEC), the Airbag subsystem consists of a specified combination of Airbag Modules, Sensing and Diagnostic Module (SDM), vehicle wiring, Frontal Impact Sensors (FIS) and/or Automatic Occupant Sensing (AOS).

Airbag Module requirements consist of three parts:

Part 1: GMW3109 Frontal Airbag Modules

Part 2: GMW3115 Side Impact Airbag Modules

Part 3: GMW3121 Roof Rail Airbag Modules

Airbag Module Verification (Validation) consists of seven parts (two of which have no documents assigned to them):

Part 1. GMW3112 Verification of Requirements for Frontal Airbag Modules

Part 2. GMW3118 Verification of Requirements for Side Impact/Roof Rail Airbag Modules

Part 3. No Part 3 Exists

Part 4. SAE/USCAR-24 USCAR-Inflator Technical Requirements and Validation

Part 5. No Part 5 exists.

Part 6. SAE/USCAR-28 Initiator Technical Requirements and Validation

Part 7. GMW3133 Verification of Cover/Door Subcomponent for Frontal/Side/Roof Rail Airbags

2 References

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

2.1 External Standards/Specifications.

2000/53/EC	CMVSS 212	ISO 7000	TRIAS 48
2007/23/EC	CMVSS 302	ISO 20433	UN R12
49 CFR 107.105	EN 10204	KMVSS 95	UN R21

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78/632/EEC	EU No. 1025/2012	SAE J1128	UN R94
91/662/EEC	FMVSS 101	SAE J1344	
96/79/EEC	FMVSS 107	SAE J1351	
ADR 21/00	FMVSS 201	SAE J1794	
ADR 69/00	FMVSS 203	SAE/USCAR-21	
CMVSS 101	FMVSS 208	SAE/USCAR-24	
CMVSS 107	FMVSS 212	SAE/USCAR-28	
CMVSS 201	FMVSS 302	TRIAS 27	
CMVSS 203	IEC 60068-2-38	TRIAS 34	
CMVSS 208	ISO 1431-1	TRIAS 47	

2.2 GM Standards/Specifications.

GMW3059	GMW3205	GMW14124	GMW15520
GMW3091	GMW3208	GMW14162	GMW15432
GMW3097	GMW3286	GMW14334	GMW15443
GMW3103	GMW3191	GMW14444	GMW15626
GMW3112	GMW3232	GMW14573	GMW15862
GMW3115	GMW3235	GMW14595	GMW16323
GMW3116	GMW3402	GMW14599	GMW17261
GMW3118	GMW3417	GMW14688	
GMW3121	GMW14011	GMW14797	
GMW3133	GMW14089	GMW14864	
GMW3172	GMW14095	GMW14892	
GMW3176	GMW14096	GMW15010	

2.3 Additional References.

- Approved Paint on Plastic System (APOPS)
- CG Bar Code Content and Format Validation Form (ID)
- CG1948 Validation Cross Reference Index (VCRI) Appendix G3 template for Frontal Airbags
- CG2503 – Bar Code Content and Format Validation Form (ID)
- CG3378 Airbag Lot Acceptance Matrix (provided with this GMW)
- CG3756 PRTS Severity Code Guidelines (ID)
- CG5095 Acceptance Criteria for Airbag MME Testing (provided with this GMW)
- GM Materials Approved Source List
- GM part number 88861407 or equivalent
- Squeak and Rattle Glossary

(ID) = This standard is limited to internal distribution within General Motors and shall not be distributed outside this company. Contact the GM Lead Engineer for further instructions.

3 Requirements

This section, including all subsections, defines the requirements for the Modules. Specific validation procedures for each subsection are listed in Appendix G3 of the program specific Statement of Requirements (SOR) (CG1948 Validation Cross Reference Index (VCRI) template), see 4.2. The companion verification documents contain validation tests, procedures and documentation protocol.

The use of "**shall**" in this document denotes a binding provision that must be met unless a deviation is granted by the responsible VEC. Deviations to "**shall**" requirements will only be considered and, if approved, granted by the responsible VEC after evaluating appropriate available technologies and balancing all Module and restraint system performance considerations.

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"**Should**" denotes a preference, or desired conformance that must be tested and, if not met, must be documented and disclosed by the supplier and approved by the responsible VEC. **Should** requirements must be met unless noncompliance has been approved by the responsible VEC.

The term "**Airbag**" refers to the Airbag subsystem and not a specific component, e.g., the cushion.

Unless otherwise noted, all requirements apply over the environments (see 3.1.3, "Ambient Environment") and the "Reliability Evaluation Point" (see 3.2.3.1). If requirements stated herein are not objectively defined, the responsible VEC shall be the final arbiter of these requirements.

3.1 System/Subsystem/Component/Part Definition. The Driver Airbag Module (DAB) provides supplemental restraint for the vehicle's driver in frontal collisions above certain severities as described herein by deploying a cushion from the steering wheel area when commanded by the crash sensing unit, and may at the responsible VEC's option, include a horn actuation subcomponent and accessory control function subcomponents.

The Passenger Airbag Module (PAB) provides supplemental restraint for the vehicle's front seat passengers in frontal collisions above certain severities as described herein by deploying a cushion from the instrument panel area when commanded by the crash sensing unit.

Depending on location and orientation, Passenger Airbag Modules are defined as follows:

Top-Mount: Contains a cushion that deploys in an upward direction and reacts against the windshield during cushion fill.

3/4-Mount: Contains a cushion that deploys in an upward direction and does not react against the windshield during cushion fill.

Mid-Mount: Contains a cushion that deploys in a horizontal direction and does not react against the windshield during cushion fill.

Low-Mount: Contains a cushion that deploys from the lower portion of the instrument panel and provides torso and knee restraint.

The Knee Airbag Modules (KAB, DKAB or Passenger Knee Airbag Module (PKAB)) provide supplemental lower torso restraint for the vehicle's driver and/or outboard front passenger in frontal collisions above certain severities as described herein by deploying a cushion from the instrument panel area when commanded by the crash sensing unit. The terms Knee Airbag Module or KAB shall be understood to include both Driver Knee Airbag Module (DKAB) and Passenger Knee Airbag Module (PKAB).

The responsible VEC shall be the final arbiter of Module locations and definitions as specified in the program specific Statement of Requirements (SOR).

3.1.1 Appearance. Not applicable.

3.1.2 Content.

3.1.2.1 Physical Content. Program and VEC specific Module content and interface requirements shall be defined in a program specific SOR. All Module baseline and optional content shall be subject to the requirements stated within this document.

3.1.2.2 Functional Content. The Module shall provide the following functions:

- The Airbag Subsystem sensors will be in a constant state of readiness and will determine if the vehicle is in a crash scenario status or in a standby status.
- If the vehicle is in a crash scenario, the sensor will send a signal to the Sensing and Diagnostic Module (SDM) to deploy the Frontal Airbag Modules.
- Upon a signal from the sensor, the SDM will activate the Module inflation devices and dual depth mechanism (if present and when commanded) and cause the inflation of the Airbags.
- When the Module inflation devices and dual depth mechanism/active vent (if present) are activated, the Airbags shall deploy and inflate between the steering wheel/instrument panel and the driver/ front seat passengers.

The Frontal Airbag Module Functional Context diagram follows in Figure 1.

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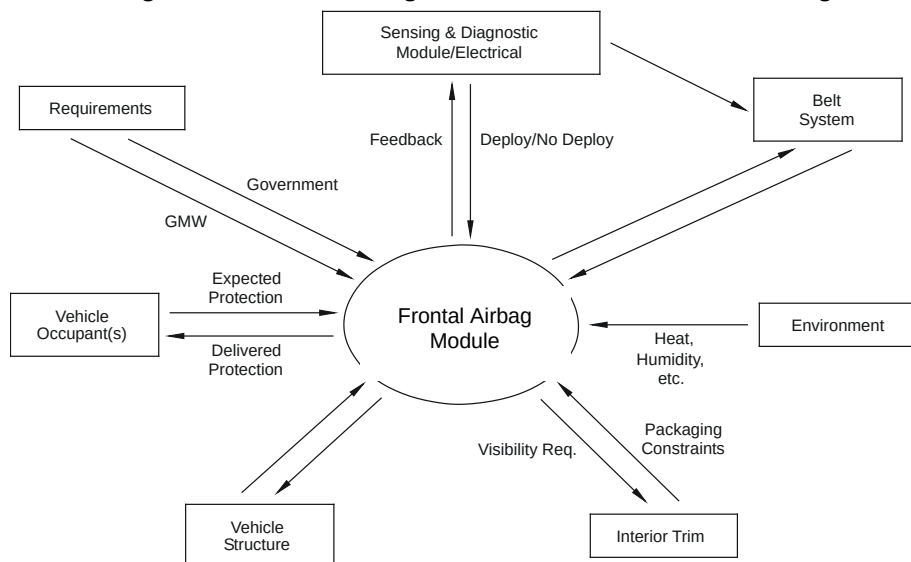
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Figure 1: Frontal Airbag Module Functional Context Diagram



3.1.3 Ambient Environment. The Module shall be exposed to the varying environmental conditions. Environmental elements which may impact the appearance, function and/or performance of the Module include, but are not necessarily limited to, altitude differentials, humidity, temperature, solar exposure, dust, ozone, salt spray, sulfur dioxide, perspiration, manufacturing contaminants, cleaning contaminants, vibrations, dynamic shock, electromagnetic interference, coffee, tea, cola, ketchup, milk chocolate, isopropyl alcohol and paint thinner.

3.1.4 Interfaces. Figure 2 shows the block diagram for the Module and interfaces prior to deployment.

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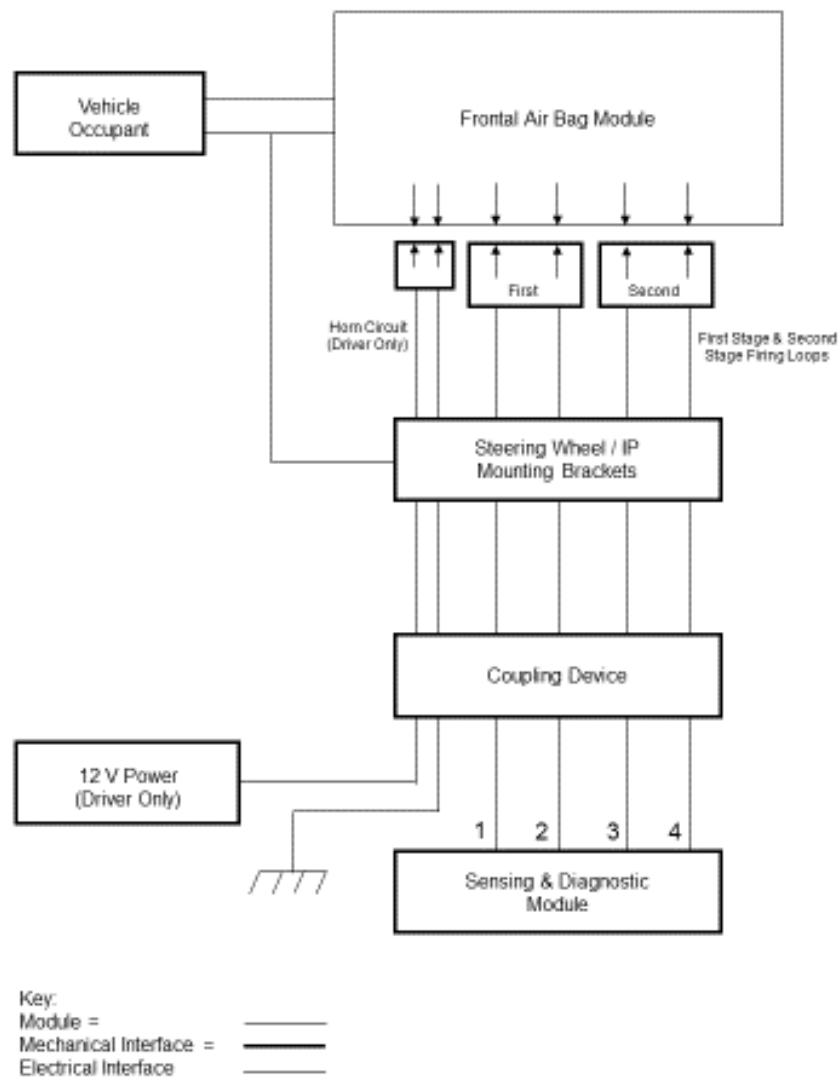
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Figure 2: Module Interfaces - Pre-Deployment



Note: The Second Stage Firing Loop may denote either the inflator's second stage (for a module with a dual level inflator), or a dual depth/active vent mechanism (for a dual depth module).

3.1.4.1 Mechanical Interface. Module interface development to meet the following requirements shall be jointly done on a systems basis by the responsible VEC and the Module supplier. The responsible VEC and Module supplier shall cooperate to resolve all design and functional interface issues.

The Driver Airbag Module shall be compatible with the steering wheel and/or the steering column attachment structure. The Driver Airbag Module shall also be compatible with VEC-specified horn designs and/or accessory control designs. Driver airbag mass dampener shall be compatible with the steering wheel and/or steering column.

The Passenger Airbag Module and the Knee Airbag Module shall be compatible with the instrument panel and/or vehicle attachment structure.

3.1.4.1.1 Material Interface/Compatibility. This requirement applies to material interfaces/compatibility for the Module and its subcomponents as well as for the Module and mating subsystem/component interfaces. The

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physical properties of all subcomponents of the Module shall be compatible so as not to adversely affect the requirements stated herein. All production Module cover/door colors shall be evaluated.

Module subcomponents and interface subsystems/components:

- Shall not adhere to other Module subcomponents or interface subsystems/components.
- Shall not chemically react with other Module subcomponents.
- Shall not be adversely affected by other Module subcomponents in any way.

The material expansion/contraction characteristics of the Module and the mating subsystems/components shall be compatible throughout the conditioning temperature ranges defined in 3.2.1.5.1.

The Module supplier shall cooperate with the responsible VEC to optimize Module-to-mating subsystem fit and compatibility over all conditioning temperatures. The responsible VEC shall judge and be the final arbiter of Module level fit and compatibility over all conditioning temperatures.

3.1.4.1.1.1 Material Transfer to Interior Components. The Module shall not transfer materials by off-gassing or other means to vehicle windows and other interior components. The aluminum foil sample shall be < 2 mg mass increase when tested according to GMW14444 (fogging GMW3235).

The responsible VECs shall be the final arbiter of material transfer.

3.1.4.1.1.2 Attachment. The Module shall be secured to the steering wheel, instrument panel and/or the vehicle structure in a manner that meets or exceeds all fit, vibration, deployment and life cycle requirements of this specification. Module attachment shall be designed to prevent rotation/movement that will impair deployment performance. All attachments shall be qualified per the Module layout drawing and/or as approved by GM fastener engineering prior to usage. The Module should be compatible with a design for assembly philosophy allowing installation and in vehicle removal of the Module with the steering wheel and instrument panel in place.

A special tool should not be required to disconnect a snap-in attachment or bolt.

With the exception of Driver Airbag Module/Steering Wheel assemblies in which horn actuation is achieved through Driver Airbag Module movement, there shall not be discernible movement of the Module relative to the steering wheel/instrument panel after the Module is installed in the steering wheel, instrument panel and/or the vehicle structure and while the vehicle is being used in its intended function.

The responsible VECs shall be the final arbiter for all Module attachment/movement requirements.

3.1.4.1.2.1 Push-in/Snap-in Attachment Insertion/Removal Cycles and Forces. The force required to insert and seat the Module into the steering wheel, instrument panel and/or the vehicle structure shall not exceed 80 N and should provide audible feedback when fully seated. The force required to remove the Module during service should not exceed 100 N. No damage that affects the fit or function of the Module, steering wheel, instrument panel and/or fastening elements shall occur during installation and removal. Removal shall be easily accomplished using standard servicing techniques.

The Driver Airbag Module Airbag design shall accommodate a total of 10 insertion/removal cycles.

For other threaded fasteners commonly used for the Passenger Airbag designs shall accommodate a total of 3 insertion/removal cycles and for Knee Airbag accommodate a total of 5 insertion/removal cycles.

The responsible VECs shall be the final arbiter for all Module related insertion/removal requirements.

3.1.4.1.2.2 Bolt-in Airbag Attachment.

The torque required to attach Driver Airbag Module into the steering wheel, shall not exceed 9 Nm. The force required to remove the Module during service should not exceed 12 Nm. No damage that affects the fit or function of the Module, steering wheel and/or fastening elements shall occur during installation and removal. Removal shall be easily accomplished using standard servicing techniques. Bolt cover insertion shall not exceed 74 N and the force to remove should not exceed 100 N.

The Driver Airbag Module Airbag design shall accommodate a total of 10 insertion/removal cycles.

For other threaded fasteners commonly used for the Passenger Airbag designs shall accommodate a total of 3 insertion/removal cycles and for Knee Airbag accommodate a total of 5 insertion/removal cycles.

The responsible VECs shall be the final arbiter for all Module related insertion/removal requirements.

3.1.4.1.3 Interface with Mating Subsystems/Components. The Module shall not pinch, cut or abrade any electrical wires when installed in mating subsystem/components, including the steering wheel, steering column,

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instrument panel and/or the vehicle structure. The Module suppliers shall assess Module fit before deployment and shall verify compatibility between the Module and the mating subsystems/components.

The responsible VECs shall be the final arbiter of all Module and mating subsystem/component interfaces.

3.1.4.2 Deployment Interface. In this section, the term **deployment system** encompasses the Module, the Module subcomponents and all interfacing deployment covers/doors, e.g., deployment doors designed into the mating instrument panel and/or vehicle structure.

3.1.4.2.1 During deployment, with or without occupant loading, the deployment systems shall not provide any sharp or rough surfaces for the cushion and/or the occupant to contact. The cushion shall not receive tears or cuts from the deployment systems or from other vehicle interior components, e.g., the windshield, side door windows, steering column, steering wheel, steering wheel/column mounted controls, instrument panel, interior rear view mirror, cup holders and sun visors which could result in impaired occupant restraint.

3.1.4.2.2 The cushion shall not cause any interior components to separate from the vehicle other than those designed to separate in a controlled manner. Refer to CG3756 PRTS Severity Code Guidelines for airbags, for acceptance criteria. The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.

Note: This requirement shall not relieve the interior component suppliers of the requirement to provide robust designs that shall withstand airbag deployment.

3.1.4.2.3 During deployment, with or without occupant loading, the deployment systems shall not fragment or separate in any manner that could result in impaired occupant restraint and should not be fragmented or separated due to interaction with the windshield. The deployment systems should not fracture or damage the windshield. Refer to CG3756 PRTS Severity Code Guidelines for airbags, for acceptance criteria. The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.

3.1.4.2.4 During deployment, any escaping gases and any residual module heat shall not cause combustion of, and should not cause damage to (melting, smoking, fragmentation, etc.) the surrounding vehicle components. Escaping gases may be produced by the dual depth Airbag module vent (if present), any other module vents, or any other possible gas paths.

3.1.4.2.5 During deployment, the instrument panel glove box and the steering wheel/steering wheel controls/instrument panel shall not inhibit the Module cover/door from opening properly or affect airbag kinematics.

3.1.4.2.6 Through film analysis of the deployment and occupant interaction as well as with post deployment inspections, the suppliers shall demonstrate that no cushion tears or interfaces which could impair occupant restraint are created as a result of deployment interfaces, the steering wheel, the instrument panel and/or the vehicle structure.

3.1.4.2.7 The deployment systems should be designed so that interface subsystem/component replacement after deployment is minimized. Following static Module deployments, the steering wheel/subcomponents, instrument panel/subcomponents and Module attachments should not be permanently deformed at the hot and cold inflator output and cover/door surface exposure temperatures specified in 3.2.1.5.1 "Temperature". The responsible VEC, the Module supplier and the interfacing subsystem/component supplier shall cooperate to resolve any deformation, replacement and/or serviceability issues.

3.1.4.2.8 All tolerance and performance issues resulting from deployment systems and their interface/reaction with other vehicle interior components shall be reviewed with the responsible VEC. The responsible VEC shall be the final arbiter of deployment cover/door, cushion, Module and vehicle interior component interface fit, damage and performance.

3.1.4.2.9 The Frontal and Roof Rail airbag systems shall be designed to be compatible (i.e., includes but not limited to cushion geometries, A-pillar kinematics) due to potential co-deployment events.

3.1.4.3 Electrical Interface. The Module shall electrically interface with a VEC specified coupling device through which deployment command signals are transmitted (see 3.7.1.7 "Harness Requirements") and, if specified by the responsible VEC, Airbag subsystem readiness shall be monitored via the Module's electrical leads as shown in Figure 2 (see 3.1.4).

If horn mechanism is part of DAB, the electrical interface shall be through specified coupling device in the wire harness.

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The design of the Module shall include provisions for the electrical bonding of the inflator to the vehicle ground. This can be accomplished by attachment brackets or dedicated conductive elements from the inflator to metallic body structure. If the module is not grounded to the body structure through the module attachment points, a separate dedicated body ground shall be provided. The installed Module is required to meet resistance $< 1 \text{ M}\Omega$ when measured with a test voltage of 500 V Direct Current (DC) maximum

All signal leads shall be isolated from vehicle chassis ground.

3.1.4.4 Vehicle to Component. Vehicle level requirements associated with interfaces between the Driver Airbag Module, Passenger Airbag Module, Knee Airbag Module and other elements of the vehicle are defined in this section. Module assembly requirements that result from these vehicle level requirements are given in 3.2.1.

3.1.4.4.1 Squeak, Rattle, and Other Audible Noise Avoidance - Vehicle Level. The requirement for this program shall be 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 responsible VEC 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" (see S&R Engineer).

The supplier shall accept full responsibility to produce squeak and rattle-free, "as delivered", subsystems and/or components. They shall cooperate with Buyer and/or other suppliers 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 shall 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 shall 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 shall be responsible for the Squeak and Rattle performance of their subsystem.

3.1.5 Usage Definition. The Module shall be exposed to monitoring current for a minimum of 75 000 cycles for 8550 h according to USCAR-28.

The responsible VEC may substitute vehicle specific usage definitions for these requirements.

3.2 Product Characteristics.

3.2.1 Performance Requirements. GM Worldwide vehicle design and execution tunes Module performance to meet Airbag Subsystem and total restraint system performance expectations.

The Module supplier shall work cooperatively with the responsible VEC and all mating subsystem/subcomponent suppliers to optimize Module performance. The responsible VEC shall judge and be the final arbiter of Module component level performance and corresponding total restraint system performance.

The Module and the dual depth/active vent mechanism (if present) shall meet the following functional requirements:

- Shall deploy the Module cushion when commanded.
- Shall not deploy when not commanded.
- Shall not show any signs of mechanical or heat related damage, including cushion burning, flame cutting of the cushion, fabric tearing, cushion holes, blow-through holes, popped stitches, ruptured stitches (unless the stitches are designed to be energy absorbing or are part of the deployment process), tether stress holes, tether separation, weld separation, rupture, or unwanted mechanical damage which affects Module performance before, during or after deployment.
- Shall not show any signs of fragmentation, tether fraying $> 50\%$ the width of the tether, selvage fraying, combed areas exceeding 3.0 mm width by 50.0 mm in length (fabric between stitches is present), scuffs, abrasions, vent hole squaring, tether chafing, stud hole elongation, cushion slippage at the mounting points, heat shield degradation, no damage to outer most heat shield (closest to main panel), or loosening of mechanical components/fasteners before, during, or after deployment which could result in impaired occupant restraint.
- Shall open the cover/door in a predetermined manner and time when commanded as specified in the program specific SOR. The cover/door and attached pieces (e.g., emblem, or deco ring, heat stake nuggets,

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emblem backing plates) shall remain connected to the Module and/or instrument panel as designed. No cover hinge tearing beyond tear stops, attachment tabs shall not pull through or release from baseplate.

- Shall deploy without unwanted gas leakage.
- Shall not contain exposed edges, tangs, burrs, corners or other mechanical features that may interfere with cushion deployment or cause injury to assembly plant or service personnel.
- Shall meet the deployment requirements in 3.1.4.2 "Deployment Interface".
- For dual level Modules and modules with dual depth mechanisms, the Module shall meet performance and functional requirements when exposed to both the inflator's minimum and maximum level of ballistic output, e.g., deploy low and high levels only. In addition, for dual depth modules, the extendable tethers shall not present a hazard to vehicle occupants when released during deployment of the dual depth mechanism. The responsible VEC shall be the final arbiter of all performance and functional requirements.
- The Module shall meet performance and functional requirements (per CG5095) when exposed to both the inflator's minimum and maximum limits of ballistic output, e.g., Manufacturing Margin Evaluation (MME).
- Tuned Absorber Requirements: The Driver Airbag Module tuned absorber (if specified in SOR and SOR Appendices) shall provide active damping of transmitted vibrational frequencies as specified in SOR and SOR Appendix or Engineering Work Order (EWO).

For air bag modules containing any feature (such as a dynamic vent or frangible feature) for modifying or directing deployment energy for out-of-position occupants, the Module and feature shall function as designed. The responsible VEC shall be the final arbiter of all performance and functional requirements.

Deviations to Module function will only be considered and, if approved, granted by the responsible VEC after evaluating appropriate available technologies and balancing all Module and restraint system performance considerations.

3.2.1.1 Comply with Government Regulations. The Module shall comply with all applicable government regulations. See 2.1. and the following:

2000/53/EC	CMVSS 203	FMVSS 203	TRIAS 47
49 CFR 107.105	CMVSS 208	FMVSS 208	SAE/USCAR-21
78/632/EEC	CMVSS 212	FMVSS 212	
91/662/EEC	UN R12	IEC 60068-2-38	
96/79/EEC	UN R21	ISO 1431-1	
ADR 21/00	UN R94	ISO 20433	
ADR 69/00	EN 10204	SAE J1351	
CMVSS 107	FMVSS 107	TRIAS 27	
CMVSS 201	FMVSS 201	TRIAS 34	

The Module and dual depth/active vent mechanism (if present) shall comply with all applicable government shipping regulations in countries where the Module and/or dual depth mechanism are manufactured and transported, as well as where the vehicle is manufactured and sold.

3.2.1.2 Odor. Prior to deployment and/or post environmental conditioning the Module shall not create unpleasant odors. Reference GMW3205.

The responsible VEC shall be the final arbiter of odor.

3.2.1.3 Squeak, Rattle, and Other Audible Noise Avoidance – Component Level. All configurations of the Frontal Airbag Modules shall have an Instationary Zwicker loudness of ≤ 3.0 sones N10 (90th percentile), when evaluated in the vertical, fore/aft, and lateral directions per the Squeak, Rattle, and Other Audible Noise Avoidance test of GMW3112. Reference GMW14011.

The Module shall not generate discernible audible noise prior to, during, or after sequential testing per GMW3112. Dust covers shall be taught to prevent fluttering or other discernible audible noise. Shall not generate audible noise from normal customer usage/ handling.

The responsible VEC shall be the final arbiter of discernible audible noise.

3.2.1.4 Module Cover/Door Feel. The Module cover/door and tear seam should not deform excessively with respect to the Module and all mating subsystems/components.

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The responsible VEC shall be the final arbiter of this requirement.

3.2.1.5 Resistance to Use and the Environment. The Module shall function as intended, according to 3.2.1 "Performance Requirements", and shall meet the minimum requirements stated in the following subsections. Module verification procedures are listed in the VCRI according to 4.2.

All production cover/door colors shall be tested.

3.2.1.5.1 Temperature. The Module may be exposed to in-vehicle operating temperatures of (-30 to +85) °C. Modules with approximately horizontal deployment cover/door surfaces may experience in-vehicle surface temperatures of (-30 to +110) °C. Modules with approximately vertical cover/door surfaces may experience in-vehicle top surface temperatures of (-30 to +100) °C as well as face surface temperatures of (-30 to +85) °C. The Module, when stored outside the vehicle, may be exposed to temperatures of (-40 to +90) °C.

Room temperature shall be defined as (+23 ± 3) °C.

The responsible VEC may substitute vehicle specific temperatures for these requirements.

3.2.1.5.2 Solar Exposure Resistance. The Module cover/door shall meet all requirements of 3.7.1.9.1 "Visible Color/Door Appearance" after Ultraviolet (UV) exposure at levels from (0.3 to 1.5) MJ/m² according to the GMW3112 protocol.

Additionally, as specified by the responsible VEC, the Module cover/door shall meet all requirements of 3.7.1.9.1 "Visible Cover/Door Appearance" after accumulated light exposure, e.g., solar exposure per the GMW3112 protocol.

3.2.1.5.2.1 Driver Airbag Modules perpendicular to the steering wheel plane shall be exposed to the accumulated light exposure levels shown in Table 1.

3.2.1.5.2.2 Driver Airbag Modules parallel to the steering wheel plane shall be exposed to the accumulated light exposure levels shown in Table 2.

3.2.1.5.2.3 Passenger Airbag Modules with approximately horizontal deployment surfaces shall be exposed to the accumulated light exposure levels shown in Table 3.

3.2.1.5.2.4 Passenger Airbag Modules with approximately vertical/low deployment door surfaces shall be exposed to the accumulated light exposure levels shown in Table 4.

Table 1: Accumulated Light Exposure Levels for Cover Surfaces Perpendicular to the Steering Wheel Plane

Windshield Glazing	Exposure Duration (Years)	Accumulated Light SASR Exposure Level in MJ/m ² (Langleys)	Max Limit Temperature in °C
Tinted	5	4181 (100 000)	102
Absorbing	5	2301 (55 000)	93
Reflective	5	1883 (45 000)	85

Max SASR Maximum Seasonally Adjusted Solar Radiation

Table 2: Accumulated Light Exposure Level for Cover Surfaces Parallel to the Steering Wheel Plane

Windshield Glazing	Exposure Duration (Years)	Accumulated Light SASR Exposure Level in MJ/m ² (Langleys)	Max Limit Temperature in °C
Tinted	5	837 (20 000)	85
Absorbing	5	628 (10 000)	85

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