



Hard Trim

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 specification establishes the technical requirements for Hard Trim subsystems for General Motors vehicles. The technical requirements for the Hard Trim subsystem's product characteristics, both functional and physical are defined in this document along with interface, reliability, design, and construction requirements. Also, the requirements for validation of the Hard Trim subsystem to the technical requirements are identified.

Certain paragraphs are broad in scope because this document must cover many different constructions, design concepts, and content levels to meet the needs for the full range of GM vehicles. The user must follow the specific Vehicle Technical Specification (VTS) when developing the actual specification. Those portions of this template that are not applicable because of the described variations are to be omitted or revised to fit the exact needs for the Hard Trim under consideration.

1.2 Applicability. This specification addresses the Hard Trim components of the vehicle models listed in Appendix B of the Statement of Requirements (SOR) for Bill of Material (BOM) Row Number = 431.

Note: Door trim (BOM Row 432), rear window trim (BOM Row 436) and rear compartment trim (BOM Row 435) requirements are not included in this subsystem document. For BOM Row 432 see GMW14144, for BOM Row 436 see GMW14190 and for BOM Row 435 see GMW15446.

1.3 Remarks. The primary purpose of the Hard Trim subsystem is to provide a safe and attractive appearance for the occupants of the vehicle, while at the same time providing comfort and convenience and meeting or exceeding program regulatory and corporate requirements.

1.3.1 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 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 Hard Trim must be in accordance with the application regulations of Section 2.

2 References

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

2.1 External Standards/Specifications.

CMVSS 201	FMVSS 225	SAE J563	UN R94
CMVSS 302	FMVSS 302	SAE J839B	UN R95
FMVSS 101	GB 8410	SAE J941	
FMVSS 201	GSO 98	SAE 920104	
FMVSS 208	GSO 42	TRIAS 48	
FMVSS 209	KMVSS Article 111-3	TS 16949	

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FMVSS 214

KMVSS 95

UN R21.01

2.2 GM Standards/Specifications.

GMW3059	GMW14089	GMW14282	GMW16331
GMW3091	GMW14093	GMW14444	GMW16586
GMW3097	GMW14109	GMW14457	GMW16609
GMW3103	GMW14117	GMW14573	GMW16792
GMW3115	GMW14118	GMW14576	GMW16793
GMW3116	GMW14124	GMW14578	GMW16835
GMW3118	GMW14144	GMW14580	GMW17079
GMW3121	GMW14190	GMW14797	GMW17250
GMW3172	GMW14194	GMW14831	GMW17252
GMW3232	GMW14196	GMW14892	GMW17253
GMW3431	GMW14231	GMW15272	GMW17517
GMW7293	GMW14233	GMW15432	GMW17681
GMW7294	GMW14234	GMW15446	
GMW8518	GMW14264	GMW15465	
GMW14011	GMW14278	GMW15625	

2.3 Additional References.

- ARID Database
- Best Practices
- CG1947
- CG2175
- CG2886 VCRI
- CG3503
- Design Appearance Requirements (DAR)
- Design Best Practice Knowledge Set stored in Interior Speaker Grille Community of Practice (CoP) in Auros.
- Dimensional Technical Specification (DTS)
- Dynamic Object Oriented Requirements System (DOORS)
- Fixed Secondary Storage Requirements
- GM Engineering Materials and Process Standards
- GM Global Legal Database
- GM Human Vehicle Integration (HVI) Socrates website
- GM Legal Staff Requirements
- GM Supply Power
- Human Factors Criteria Index (HFCI)
- Human Factors Design Objectives (HFDO)
- Interior Best Practices for dimensional specifications that define gap, flush, and crush interface fits
- Manufacturing Technical Specification (MTS)
- Math Part Performance File/Data Creation Standards (DCS) Log
- Notice of Decision 005
- Owner's Manual

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- Service Manual
- SOR Appendices A, B, C2, F5, F7, F10 and H
- SOR Validation Appendix G2
- Squeak and Rattle Noise Glossary
- Statement of Requirements (SOR) Appendix B - General Program Description
- Storage Allocation List Tracker (SALT)
- Vehicle Technical Specifications (VTS)
- World Vehicle Regulations Manual (WVRM)

3 Requirements

3.1 System/Subsystem/Component/Part Definition. The interior Hard Trim subsystem, hereinafter referred to as Hard Trim, includes side wall trim such as; A, B, C, and D pillar moldings, quarter upper and lower moldings, hinge pillar moldings, lock pillar moldings, roof rail moldings, carpet retainers, liftgate/tailgate moldings and any side wall attached acoustic treatment for vehicle interiors Part of Assembly (POA) of garnish assembly.

Note: Door trim (BOM Row 432), rear window trim (BOM Row 436) and rear compartment trim (BOM Row 435) requirements are not included in this subsystem document. For BOM Row 432 see GMW14144, for BOM Row 436 see GMW14190 and for BOM Row 435 see GMW15446.

Hard Trim is to be designed for occupant comfort and to provide an aesthetic appearance to the vehicle interior. The Hard Trim provides durable coverage for sheet metal, body hardware, electrical wiring, and side impact provisions, and assists in the reduction of unwanted noise. The Hard Trim may provide mounting surfaces or storage areas for convenience items such as; cup holders, map pockets, and storage facilities for jacks, tools, charge cords, and occupant items. The Hard Trim may also provide or allow for sound transmission (speaker openings) or provisions for attaching speakers and covers.

The Hard Trim subsystem may include interior lighting components (courtesy, reading).

The Hard Trim should be an integral part of impact energy management system for occupant protection. Additional provisions are to be included for attaching or providing clearances for seats and occupant restraint systems.

The design and operation of the Hard Trim must be in accordance with the applicable regulations and laws of various countries per specific program/platform decisions.

3.1.1 Appearance. The Hard Trim 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). Statement of Requirements (SOR) Appendix B2 Tab F5 and/or F10 defines the program grain, color and gloss requirements. The SOR Appendix B2 Tab F7 defines the fit and finish DTS requirements for execution of joints, and interfaces. The SOR Appendix B2 Tab F7 also provides Key Product Characteristics (KPC)/Perceived Quality Characteristic (PQC) and part drawing tolerance and locating requirements.

3.1.2 Content. The required physical and functional content for the Hard Trim are identified in SOR Appendix B - General Program Description.

3.1.2.1 Physical Content. The required physical and functional content for the Hard Trim are identified in SOR Appendix B - general program description, (e.g., see items; 3.1.2.1(a) to 3.1.2.1(q)).

- a. A Pillar Trim
- b. B Pillar Trim (Upper and Lower if Applicable)
- c. C Pillar Trim
- d. Quarter Panel Trim with Armrest, Cloth Insert, Stowage, Ashtray, etc.
- e. Carpet Retainers/Sill Plates
- f. Hinge Pillar Trim

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- g. Lock Pillar (Upper and Lower)
- h. Rear Window Garnish Moldings
- i. Quarter Panel Upper Trim
- j. D Pillar Trim
- k. Roof Rail Molding
- l. Rear Sill Molding
- m. Rear Upper Molding
- n. Luggage Shade
- o. Liftgate Trim
- p. Sensor Farm Cover
- q. Convertible Trim including: Header Trim, Visors, Tonneau Covers, and Waterfall Trim

Note: Include sub-components that help define the subsystem such as acoustic materials, ingress/egress handles, interior lighting components (e.g., courtesy lamps, reading lamps), coat hooks, fasteners, sealing and anti-itch materials, etc.

3.1.2.1.1 Carryover Components. Carryover components are identified in SOR Appendix C2.

3.1.2.1.2 Commonization Constraints. Commonization constraints are identified in SOR Appendix C2.

3.1.2.1.3 Technology Constraints. Technology constraints are identified in SOR Appendix C2.

3.1.2.2 Functional Content.

3.1.2.2.1 The Hard Trim shall provide safe, pleasing occupant environment, comfort and convenience inside the passenger compartment while complying with human-factors guidelines.

3.1.2.2.2 The Hard Trim shall maintain appearance, shape, color, texture, fit, and alignment over the target life of the vehicle.

3.1.2.2.3 The Hard Trim shall assist in occupant impact-energy management, where applicable.

3.1.2.2.4 The Hard Trim shall contribute in reducing exterior noise transmission to the vehicle's interior.

3.1.2.2.5 The Hard Trim shall comply with all applicable governmental regulations and laws.

3.1.2.2.6 The Hard Trim shall comply with the side airbag and roof rail airbag curtain deployment requirements.

3.1.3 Ambient Environment. The Hard Trim subsystem must meet the performance requirements identified in this specification while operating within these environmental conditions. Temperature ranges recommended are (-30 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 B, Table B1, the cold temperatures can be modified as shown in Table 1.

Table 1: Low Temperature Deviation Temperatures

Assumes Tinted Glass Usage	Low	Normal	High
Garnish Horizontal Surfaces	-20 °C	Not applicable	95 °C
Garnish Vertical Surfaces	-20 °C	Not applicable	85 °C
Garnish Foot at Glass Surface	-20 °C	Not applicable	105 °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 B, Table B2), 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
Garnish Horizontal Surfaces	-30 °C	Not applicable	65 °C
Garnish Vertical Surfaces	-30 °C	Not applicable	65 °C
Garnish Foot at Glass Surface	-30 °C	Not applicable	85 °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 garnish trim and when designing shipping containers.

3.1.3.4.1 Clip Retention in Shipping and Storage Environment. The retention force of the clip to the fastener retaining feature shall not be < 30 N. The insertion force of the clip to the fastening retaining feature shall not exceed maximum force of 20 N for manually loaded clips.

3.1.3.4.2 Adhesion in Shipping and Storage Environment. Adhesively applied components shall remain retained to trim at the elevated temperatures used in shipping environments. Anticipated temperatures are 90 °C and 50% Relative Humidity or program specific. To check the adhesion, run the adhesion test per GMW14892 using the 90 °C temperature only. Do not use the full environmental cycle, but soak the trim in a chamber for 4 h, prior to testing the trim. Testing can be engineer-judged if the adhesive is tested through Dead Load testing per GMW14892 at normal test temperatures.

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

3.1.4 Interfaces. Requirements for the interfaces of the Hard Trim to Chassis (00.20) subsystem and those that the subsystem imposes on other subsystems.

Note: The Vehicle to Subsystem (Squeak and Rattle) vehicle level requirements associated with interfaces between the Garnish Trim and other elements of the vehicle are defined in the VTS.

3.1.4.1 Hard Trim to Fuel Storage and Handling (20.600). The Hard Trim to Fuel Storage and Handling subsystem interface requirement is that the Hard Trim should be designed to avoid inadvertent actuation of the fuel-filler release lever/switch.

3.1.4.2 Hard Trim to Interior Lighting (40.400). Interior Lighting subsystem components are to be packaged on or in other elements of the Hard Trim subsystem and both subsystems shall be designed to meet the specifications of this section. Refer to Interior Lighting Best Practices for detailed design criteria, located in Enterprise Engineering Knowledge System Auros-Passenger Compartment Lighting (PCOMLGT). The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.

3.1.4.2.1 If necessary, the Hard Trim subsystem shall provide a surrounding trim bezel that may contain other non-interior lighting components in addition to an interior lighting subsystem.

3.1.4.2.2 The Hard Trim subsystem shall allow the Interior Lighting subsystem to be located in a vehicle position and orientation to meet all Interior Lighting subsystem Technical Specifications contained in GMW14118.

3.1.4.2.3 The Hard Trim subsystem shall provide the necessary packaging space and clearance to allow for the execution of the desired interface, to allow the customer to easily interface with the Interior Lighting subsystem functional components, and to provide for the appropriate ventilation of the lighting element contained in the Interior Lighting subsystem. Detailed design specifications are identified in the Interior Lighting Best Practices, located in

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Auros-Passenger Compartment Lighting (PCOMLGT). The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.

3.1.4.2.4 All interior lighting electrical components, e.g., wiring harnesses and connectors shall not be visible to the customer in any seating position or while standing outside the vehicle with the doors open.

3.1.4.3 Hard Trim to Belts (40.600). Hard Trim to Belt subsystem interfaces are defined as:

- Belt Subsystem to B Pillar Upper and Lower Trim
- Belt Subsystem to Carpet Retainer
- Belt Subsystem to C Pillar Trim
- Belt Subsystem to Quarter Panel Trim

3.1.4.3.1 The Hard Trim shall not restrict seat belt or retractor operation. Belt openings in trim panels shall be wide enough to allow the seat belt to travel unimpeded throughout its range of motion (fore/aft as well as up/down) for 5th and 95th percentile occupants and should have minimum contact with the opening trim edge. Use the Preferred Material Chart (PMC) to select appropriate materials for the design contact condition.

3.1.4.3.2 The Belts subsystem shall define the D Ring location and range of motion, if adjustable.

3.1.4.3.3 The trim panel or bezel shall not cause any degradation/wear of the belt. This requirement is met through material selection (refer to the PMC) and adherence to the Belt Opening Best Practices. The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement. Otherwise parts must be physically tested per GMW14831.

3.1.4.3.4 The Hard Trim shall not detach from the sheet metal inner panel under all seat belt operating conditions.

3.1.4.3.5 Movement of the seat belt shall not erode the Hard Trim panel.

3.1.4.4 Hard Trim to Airbag (40.700). The Hard Trim to Airbag subsystem interfaces are defined as:

- Airbag Subsystem to A Pillar
- Airbag Subsystem to B Pillar Upper and Lower Trim
- Airbag Subsystem to Sail Panel, C Pillar
- Airbag Subsystem to Quarter Panel Upper or Lower Trim or Any Other Upper Side Wall Trim Panels

3.1.4.4.1 The Hard Trim to Airbag subsystem interface requirements are:

3.1.4.4.1.1 The Hard Trim shall not restrict or confine deployment of the Airbag subsystem, within system performance requirements, as defined by GMW3115, GMW3118 and GMW3121.

3.1.4.4.1.2 Hard Trim shall be designed with Airbag friendly surfaces.

3.1.4.4.1.2.1 Airbag friendly criteria will be located in the Best Practices and Roof Rail Airbag SSTs stored in Dynamic Object Oriented Requirements System (DOORS), etc. The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.

3.1.4.4.1.2.2 The Hard Trim shall not cause any tears or cuts in the airbag cushion during deployment of the Airbag subsystem.

3.1.4.4.1.3 The Hard Trim shall not fragment in any manner, which would result in impaired occupant restraint or injury-as evaluated by the Roof Rail Airbag/Side Impact Airbag (RRAB/SIAB)/ Hard Trim Product Development Team (PDT) members.

3.1.4.4.1.4 The Hard Trim should not detach from the vehicle body structure due to deployment of the Airbag subsystem.

3.1.4.4.1.5 There shall be adequate clearance between seat-mounted airbags and Hard Trim as defined in a best practice in Auros. The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.

3.1.4.5 Hard Trim to Roof Rail Airbag (RRAB) and Side Impact Airbag (SIAB) (General). For all vehicles, which incorporate RRAB and/or SIAB, the requirement is that the Hard Trim System (HTS) shall provide all necessary

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requirements and accommodations for the RRAB and/or SIAB by providing a deployment opening, and otherwise perform as further indicated in this section.

3.1.4.5.1 Attachments/Anchors. The HTS shall have sufficient points and types of attachment to withstand the deployment loads of the RRAB and/or SIAB without dislodging from design position unless designed to do so (tethers must be included where trim is designed to dislodge). The number and location of fasteners will vary depending on suitable body locations and deployment forces imparted to the HTS.

3.1.4.5.2 Deployment. The HTS will flex as necessary to meet the RRAB and/or SIAB deployment requirements. The interfaces with roof trim and the HTS substrate structural/mechanical properties shall meet the deployment mode requirements by flexing or remaining rigid as necessary. It may be necessary to adjust materials of construction, add stiffeners, scoring and/or formed bend-line(s), etc., in the B surface to retard/promote bending during deployment. Any HTS hinge or fold line shall be defined thereby, and be reproducible.

3.1.4.5.3 Labels. All vehicles that include roof rail airbags shall incorporate permanent identification using the word "AIRBAG".

Permanently locate the identification immediately adjacent to the pillar top(s) or along the rail(s) out of which the RRAB deploys.

The identification shall be of sufficient size and contrast to be easily visible by vehicle occupants. (Reference the Notice of Decision 005).

In vehicles with RRAB standard (100% content) the "AIRBAG" label may be molded into the Hard Trim. Any implementation in the HTS should be coordinated with the roof trim per the overall vehicle program requirements.

3.1.4.5.4 Performance. The Hard Trim System (HTS)/Roof Trim System (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 to + 85) °C. Any components or fragments of the HTS 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 and/or SIAB deployment through temperature ranges of (-30 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/SIAB/Hard Trim PDT members.

The HTS shall not damage the RRAB and/or SIAB itself during deployment.

The HTS shall not present sharp or rough edges that may cut or snag the RRAB and/or SIAB during deployment.

The HTS shall not prevent the RRAB and/or SIAB from meeting the deployment requirements as specified in GMW3121, GMW3115 and GMW3118.

For system validation with environmentally conditioned components, aging of the HTS shall be completed according to GMW3118 unless otherwise stated in the SOR Validation Appendix G2; aging of the RRAB and/or SIAB shall be completed according to the RRAB and/or SIAB Subsystem Technical Specification (SSTS). System testing shall be completed according to RRAB and/or SIAB validation specification.

3.1.4.5.5 Manufacturing Margin Evaluation (MME), if required, will be defined in SOR Appendix C2.

3.1.5 Usage Definition. Refer to the VTS for vehicle usage, some of which may be relevant to the Hard Trim.

3.1.5.1 Subsystem User Description. The range of physical dimensions of the user population for which the Hard Trim requirements herein apply are bounded by the 5th percentile female and the 95th percentile male.

3.2 Product Characteristics. The required product characteristics for the Hard Trim are identified in several categories in the following.

3.2.1 Performance Requirements. All requirements apply for the conditions specified in 3.1.3 (Ambient Environment) and 3.1.5 (Usage Definition), except where noted otherwise. Trim shall provide safe and pleasing occupant environment.

3.2.1.1 Material Part Performance. Material and material related part performance requirements are specified in the SOR Appendix B2 (eBOM) Tab F5 and/or F10. The Hard Trim shall meet the appropriate material related part performance requirements per GMW14444.

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3.2.1.2 Color/Gloss/Grain/Appearance. The requirements for the Hard Trim relative to color/gloss/grain/appearance are identified in SOR Appendix B2 Tab F5 and/or F10. The HTS may be required to support a vehicle level veiling glare calculation per SAE 920104 with a rating ≥ 8 according to GMW14264.

3.2.1.3 Alignment. The Hard Trim alignment requirements to enhance appearance are identified in the Dimensional Technical Specification (DTS) SOR Appendix B2 Tab F7, Best Practices located in Auros, and SOR Appendix B for Tuning requirements. The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.

3.2.1.4 Other Appearance Issues. Other performance requirements for the Hard Trim relative to providing a pleasing appearance.

Overall appearance of Hard Trim materials shall be in compliance with the program specific VTS.

Exposed fasteners (visible with doors open or closed) should be avoided. If exposed fasteners are necessary, their aesthetic treatment, e.g., plugs, recessed, color coded shall be negotiated and approved through the appropriate vehicle specific program process.

Access provisions for blind attachments, e.g., service notches shall be approved through the appropriate vehicle specific program process.

Unfinished trim edges at glass areas shall be concealed by paint black out or exterior trim components.

Visible body paint should be avoided.

Cloth cover Hard Trim shall not exhibit unintended holes, fraying, loose threads, or wrinkling.

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
- Resin Blow Through
- Gating

See SOR Appendix C2 for any additional program specific appearance issues.

3.2.1.5 Metal Components. Hard Trim metal component appearance requirements can be found in SOR Appendix B2 Tab F5 and/or F10.

3.2.1.6 Maintain Appearance. The Hard Trim requirements for maintaining shape, color, fit, and alignment.

The Hard Trim requirements for maintaining shape are identified in 3.2.1.34. Additionally, there shall be no visible carpet edges or backing material.

Hard Trim fabrics used in high abuse areas, e.g., wrapped over belt line or armrest shall not exhibit objectionable nap crush, use should be avoided. Test for Pile Distortion (GMW14231).

Note: Most velour type cloth materials are susceptible to nap crush and should not be wrapped over the belt line or armrest.

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Hard Trim components shall not exhibit objectionable bearding. Test for Hook Fastener Resistance (GMW14231).

Note: Needled carpets using long fibers tend to beard. Careful consideration should be given to carpet construction used at the bottom of the Hard Trim where an occupant may contact the Hard Trim with their shoes during egress.

3.2.1.7 Compatibility with Contaminants. The Hard Trim materials shall not deteriorate in function when exposed to the contaminants listed in "Potential Contaminants" of the program specific VTS.

3.2.1.8 Storage. Hard Trim storage shall meet the program VTS and Human Vehicle Integration (HVI) program Storage Allocation List Tracker (SALT) requirements.

3.2.1.9 Assist in Occupant Impact Energy Management. The Hard Trim requirements for assisting in occupant impact energy management are listed in 3.2.1.9.1 through 3.2.1.9.3.

3.2.1.9.1 Side Impact Protection (where applicable). The Hard Trim subsystem along with the body structure shall enable the vehicle's management of the energy associated with a side impact collision as required by FMVSS 214.

3.2.1.9.2 Occupant Protection in Interior Impacts per FMVSS 201. The Hard Trim subsystem contributes to vehicle compliance with FMVSS 201U -Upper Interior Impact (where applicable). Contact the appropriate safety performance engineer for details and requirements.

3.2.1.9.3 Occupant Protection in Interior Impacts - Additional Requirements. The Hard Trim subsystem potentially has additional FMVSS 201 compliance areas that need to be certified. Hard armrests, latching storage bins and Hard Trim released sun-visors have specific FMVSS information that require documentation. Armrest conformance to be demonstrated per GMW17681, when required. Latch calculations to be performed following GMW16609, when required.

3.2.1.10 Child Restraint Anchorage Systems FMVSS 225. Hard Trim shall have molded in features to identify child anchorage location when the feature interfaces to the HTS.

Note: Contact your label engineer for the proper feature requirement and coordinate implementation with the restraint or seat engineer.

3.2.1.11 Additional Regulatory Requirements. The Hard Trim subsystem can contribute to vehicle compliance to the following government regulations: FMVSS 101, FMVSS 208 and FMVSS 209. Contact the appropriate safety engineer for details.

3.2.1.11.1 Flammability. The subsystem and its components, shall satisfy the burn resistance requirements of FMVSS 302, CMVSS 302 (Canada - where applicable), GSO 98 and GSO 42 (Gulf State Countries where applicable), TRIAS 48 (Japan - where applicable), KMVSS 95 (Korea – where applicable), and GB 8410 (China - where applicable) according to GMW3232.

3.2.1.11.2 UN Economic Commission Europe (ECE) Regulations. The subsystem and its components, shall satisfy all UN ECE requirements that apply to the vehicle when exported per program. The UN ECE requirements can be confirmed in the ARID database and SOR Appendix C2.

3.2.1.11.2.1 Interior Fittings. The subsystem and its components shall aid in meeting Export UN R21.01 and CMVSS 201/FMVSS 201 requirements as well as requirements for all countries that a vehicle is being sold in per program.

3.2.1.11.2.2 Other UN ECE Regulatory Requirements. The Hard Trim subsystem can contribute to vehicle compliance to the following government regulations: UN R94 and UN R95. Contact the appropriate safety engineer for details.

3.2.1.11.3 Other Country of Sale Regulations. The subsystem and its components, shall meet all other regulatory requirements applicable to the vehicle countries of export. Updated regulations will be included in SOR Appendix C2. Requirements can also be found in the ARID database. The Hard Trim shall not degrade performance of the vehicle for any vehicle regulatory requirement.

3.2.1.12 Interior Emissions. The Hard Trim shall meet all Interior Emissions requirements per GMW14444. Additionally, for vehicles sold in China, GB 27630-201X testing is required. Additional details are documented in GMW16835.

3.2.1.13 Acoustic Performance Requirements. See SOR Appendix C2 and 3.3.1.1.1.10 for requirements.

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3.2.1.14 Lighting Performance. The Interior Lighting subsystem shall meet all performance specifications contained within the Interior Lighting GMW14118.

The Hard Trim subsystem shall provide mounting surfaces for the Interior Lighting subsystem to ensure a fit that:

- a. shall allow for the lens of the Interior Lighting subsystem to withstand a normal load of 45 N applied to the center of the lens
 - without loss of retention from the surrounding Interior Lighting subsystem trim **and**
 - without loss of retention from the surrounding Hard Trim subsystem that contains the Interior Lighting subsystem

The Hard Trim subsystem shall provide an interface to the Interior Lighting subsystem to ensure that the desired fit between subsystems is executed. The interface between the Interior Lighting subsystem to the Hard Trim subsystem shall be designed in a manner that will not allow visible light leaks through any interior subsystem per GMW14118. Refer to Interior Best Practices for dimensional specifications that define gap, flush, and crush interface fits. The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.

If the Interior Lighting subsystem contains a switch or functional component, then the functional component shall be actuated without perceived deflection of the Interior Lighting subsystem and without perceived deflection of the adjacent Hard Trim subsystem that contains the Interior Lighting subsystem. Subsystem deflections shall not exceed 3 mm with a 50 N applied force and 6 mm with a 100 N applied force. Test deflection shall be measured at 80 °C, 23 °C, and -30 °C, using a 10 mm diameter pad.

Light Pipes shall remain retained to the Hard Trim subsystem in all environments. The light pipes shall not twist or distort due to hard attachment features. Lighting intensity will remain consistent through the length of the pipe. Light Pipe Retention to the Hard Trim retaining features shall be tested to the requirements in GMW14118 and/or Lighting SOR Appendix C2 and/or Z (CG2175).

3.2.1.15 Seat Belt Adjuster.

3.2.1.15.1 Misuse Test of the Seat Belt Height Adjuster Push-in Force of Cover. Requirement: F = 50 N Function maintained per GMW16793.

3.2.1.15.2 Misuse Test of the Seat Belt Height Adjuster Release Button. Requirement: F = 50 N Function maintained per GMW16793.

3.2.1.15.3 Overpressure Force Release Button. Requirement: F = 50 N Function maintained per GMW16793.

3.2.1.15.3.1 Button Activation Force: Requirement shall be defined in the SOR Appendix C2/G2.

3.2.1.15.4 Adjuster (Slider) Effort.

3.2.1.15.4.1 Component Level. Requirement: F = 5-12 N, no part rattle, smooth movement at a component level. Push/pull force to be applied and measured on slider with force gage. Record the force to move slider in both directions parallel to the track. Because of differences in designs, the test details are to be determined by PDT, including the GM Design Engineer (DE), GM Subsystem Validation Engineer (SVE), and Tier 1 component supplier. Test per GMW16793.

3.2.1.15.4.2 Vehicle Level. For adjuster efforts tested in vehicle, the efforts when operated as a system must meet finger load ergonomic targets per GMW14234. Test per GMW16793. The adjuster shall show no part rattle, and demonstrate smooth movement.

3.2.1.15.5 Adjuster Durability. Number of cycles 500 = one life; testing shall be run as listed in Table 3, 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 (see 3.2.3.2). Test per GMW14831.

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Table 3: Adjuster Durability Life Cycle

500 Total Cycles	Environment
25	Hot (80 °C)
75	Humid (38 °C, 95% Relative Humidity)
187	Ambient (23 °C)
25	Cold (-30 °C)
188	Ambient (23 °C)

3.2.1.16 Pull Off Force (Retainer). This requirement tests for the Hard Trim dog house or fastener retainer separating from the main trim panel.

Parts shall remain intact (clips shall remain in the dog house or retainer) when evaluated by running Serviceability after Environmental Cycling, or after RRAB deployments. If parts are not meeting this requirement, the three (3) steps can be used to determine which part needs adjustment can be determined as follows:

1. Evaluate Clip efforts individually as installed to metal
2. Evaluate Part installation/removal efforts (multiple clip installation/removal at once)
3. Evaluate Pull off Force of the dog house or retainer per 3.2.1.16.1

3.2.1.16.1 Requirement: Replaced with serviceability as defined in 3.2.1.25.

3.2.1.16.2 Dog house Side Load Strength. If necessary, the requirements will be located in SOR Appendix C2.

3.2.1.17 Armrest.

3.2.1.17.1 Armrest Durability Vertical Load. Requirement: $F = 170\text{ N}$ (vertical durability), (50 mm x 100 mm area), 4000 cycles = one life; testing shall be run as listed in Table 4 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 (see 3.2.3.2). Test per procedure in GMW14109.

Table 4: Armrest Vertical Load Durability Life Cycle

4000 Total Cycles	Environment
200	Hot (80 °C)
600	Humid (38 °C, 95% Relative Humidity)
1500	Ambient (23 °C)
200	Cold (-30 °C)
1500	Ambient (23 °C)

3.2.1.17.2 Armrest Durability Horizontal Load. Requirement: $F = 170\text{ N}$ (horizontal durability), (50 mm x 100 mm area), 4000 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 (see 3.2.3.2). Test per GMW14109 (per Armrest Durability Vertical Load), applying the load at the front of the armrest in a horizontal direction toward the sheet metal, instead of applying the load vertically. (**Note:** this represents a knee load to the fixed armrest.)

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Table 5: Armrest Horizontal Load Durability Life Cycle

4000 Total Cycles	Environment
200	Hot (80 °C)
600	Humid (38 °C, 95% Relative Humidity)
1500	Ambient (23 °C)
200	Cold (-30 °C)
1500	Ambient (23 °C)

3.2.1.17.3 Armrest Maximum Vertical Load. Maximum vertical load requirement: $F = 250\text{ N}$, 500 N for convertible (50 mm x 100 mm area), per GMW14109, with load applied vertically to the front edge of the armrest.

3.2.1.17.4 Armrest Maximum Horizontal Load. Maximum horizontal load requirement: $F = 250\text{ N}$ (50 mm x 100 mm area), per GMW14109 per the Vertical Load test, with load applied horizontally to the front edge of the armrest.

3.2.1.18 Ingress/Egress Handles.

3.2.1.18.1 Ingress/Egress Handle Strength - Parallel to Handle Fasteners. This requirement is for the detaching force of the ingress/egress handle. Requirement: $F = 1200\text{ N}$ to be applied parallel to the handle fasteners. Test per GMW16792.

3.2.1.18.2 Ingress/Egress Handle Strength - Perpendicular to Handle Fasteners. Requirement: $F = 1200\text{ N}$ to be applied perpendicular to the handle. Test per GMW16792.

3.2.1.18.3 Ingress/Egress Handle Quality Feel Flex. Requirement: 2.5 mm flex at 200 N with no permanent deformation after the test. Load application speed: 70 N/s. Test per GMW16792.

3.2.1.18.4 Ingress/Egress Handle Durability. Requirement: $F = (500)\text{ N}$ to be applied with a 50 mm belt through the handle. Force shall be applied perpendicular to the fasteners. Number of cycles 10 000 = 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 (see 3.2.3.2). Cycle rate of six (6) cycles/minute.

Table 6: Ingress/Egress Handle Life Cycle

10 000 Total Cycles	Environment
500	Hot (80 °C)
1500	Humid (38 °C, 95% Relative Humidity)
3750	Ambient (23 °C)
500	Cold (-30 °C)
3750	Ambient (23 °C)

3.2.1.19 Deflection.

3.2.1.19.1 Deflection of Carpet Retainer. Requirement: 4 mm of deflection at 1250 N, (area of pad 100 mm x 40 mm). Foot pad definition: 100 mm width applied Fore/Aft on trim, the length to be defined by flat section of the trim Cross Car minus 5 mm, 40 mm minimum, 150 mm maximum. Test per GMW16793 measured between attachments or support formation locations. Trim shall not detach at any trim joints or pull out from under the door seal. There shall be no permanent damage to the trim being tested (cracking, stress marks, etc.)

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For Carpet Retainer sections that present an angle where the trim would not be stepped on, apply a 500 N representative Palm/Knee load using an 80 mm diameter soft surface. Surface should be a math representation of the area being tested, with a soft urethane coating. Apply a simulated knee load near seat cushion height with the direction of load angled downward from outside the vehicle (define angles). Apply a simulated palm load higher on trim, near the seat back top.

Deflection of Rear Carpet Retainer will also be checked when the rear seat is occupied with a 95% percentile occupant. Parts shall not permanently deform, create gaps to interfacing parts, become loose or crack.

3.2.1.19.2 Deflection of Pillar Trim. Requirement: maximum allowed deflection at applied force; 2.5 mm at 20 N. Test per GMW16793, tested at ambient only.

Computer Aided Engineering (CAE) analysis should be used for prediction of deflection at 10 N. Requirement is ≤ 1.5 mm.

CAE analysis should be used for prediction of deflection at 30 N. Requirement is ≤ 3.5 mm.

3.2.1.19.3 Deflection of Quarter Trim and Liftgate. Maximum allowed deflection per requirement is found in GMW14457.

Physically test the 100 N load with a 10 mm diameter piston, tested at ambient only.

CAE analysis should be used for prediction of deflection at 50 N. Requirement is found in GMW14457.

3.2.1.19.4 Misuse of Quarter Trim and Liftgate Trim. Requirement: No visible deformation or damage after 500 N force is applied. Test per GMW14457.

3.2.1.20 Hard Trim Open-Storage (Map Pocket Style) Pockets.

3.2.1.20.1 Deformation of the Storage Compartment. Requirement: GMW14109.

3.2.1.20.2 Misuse of the Storage Compartment. Requirement: GMW14109.

3.2.1.20.3 Durability Test of the Storage Compartment. Requirement: GMW14109.

3.2.1.21 Hard Trim Open-Storage (Fixed Secondary Map Pocket Style) Pockets. Pockets measuring < 150 mm across the opening shall meet the Fixed Secondary Storage Requirements.

3.2.1.21.1 Deformation of the Fixed Secondary Storage Compartment. Requirement: GMW14109.

3.2.1.21.2 Misuse of the Fixed Secondary Storage Compartment. Requirement: GMW14109.

3.2.1.21.3 Durability Test of the Fixed Secondary Storage Compartment. Requirement: GMW14109.

3.2.1.22 Underseat (Injection Molded) Storage Bin.

3.2.1.22.1 Open Bin.

3.2.1.22.1.1 Deformation of the Underseat Storage Bin. Requirement to be added in the SOR Appendix C2/G2.

3.2.1.22.1.2 Misuse of the Underseat Storage Bin.

3.2.1.22.1.2.1 Misuse of the Underseat Storage Bin through customer usage. Requirement: Must be capable of carrying a minimum load of 125 N.

3.2.1.22.1.2.2 Misuse of the Underseat Storage Bin through Customer Abuse and Seat Compression.

Requirement: Step on area, seat pressurized areas and the bin tubs should be capable of withstanding the total of 1250 N load, without any structural failures, cracking, whitening. If these areas are out of step in zone, the bin tubs must withstand the abuse load of the 1000 N (palm load) without any structural failures, cracking, or whitening.

3.2.1.22.1.3 Durability Test of the Underseat Storage Bin. Durability requirement as listed in Table 7.

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Table 7: Injection Molded Underseat Storage Bin Durability

7500 Total Cycles	Environment
375	Hot (80 °C), cycle time (2 to 4) s
1125	Humid (38 °C, 95% Relative Humidity), cycle time (2 to 4) s
2813	Ambient (23 °C), cycle time (2 to 4) s
375	Cold (-30 °C), cycle time (2 to 4) s
2812	Ambient (23 °C), cycle time (2 to 4) s

3.2.1.22.2 Compartment with Lid.

3.2.1.22.2.1 Deformation of the Underseat Storage Compartment. Requirement: Requirement to be added in the SOR Appendix C2/G2.

3.2.1.22.2.2 Misuse of the Underseat Storage Compartment Lid.**3.2.1.22.2.2.1 Misuse of the Underseat Storage Compartment Lid through Customer Usage.**

Stored items totaling minimum of 125 N will remain retained during all slam tests, safety and crash tests, and airbag deployments, including regulatory testing.

3.2.1.22.2.2.2 Misuse of the Underseat Storage Compartment from Seat Compression. Requirement: See requirement 3.2.1.22.1.2.2.

3.2.1.22.2.2.3 Opening and Closing Effort. Requirement: Requirement to be added in the SOR Appendix C2/G2.

3.2.1.22.2.3 Durability Test of the Underseat Storage Compartment. Durability requirements as listed in Table 8.

Table 8: Injection Molded Underseat Storage Compartment Durability

7500 Total Cycles	Environment
375	Hot (80 °C), cycle time (2 to 4) s
1125	Humid (38 °C, 95% Relative Humidity), cycle time (2 to 4) s
2813	Ambient (23 °C), cycle time (2 to 4) s
375	Cold (-30 °C), cycle time (2 to 4) s
2812	Ambient (23 °C), cycle time (2 to 4) s

3.2.1.22.2.4 Retention of Stored Items. Stored items will remain retained during all slam tests, safety and crash tests, and airbag deployments, including regulatory testing.

3.2.1.23 Cargo Hooks, Cargo Tie Down, Cargo Shade Tie Downs and Convenience Hooks. Must meet the appropriate requirements of GMW14282, as run by the Body Closures Validation Engineer.

3.2.1.24 Parking Lot Ticket Holder.

3.2.1.24.1 Parking Lot Ticket Holder Clamp Requirement to Windshield. Clamp load to windshield shall be (0.9 ± 0.4) N.

3.2.1.24.2 Parking Lot Ticket Holder Durability Requirement. Requirement: Clamp requirement to windshield shall be maintained during a 17 d heat age (per GMW3118); this can be combined with airbag heat ageing.

The ticket holder should be set up to test in a fixture with the design intent clamp load, and placed in the environment. Clamp load shall be checked once every 24 h.

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