



Coat Hook Assembly

1 Introduction

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

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

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

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

1.1.1 This standard establishes performance requirements, design constraints, and validation requirements for a Coat Hook Assembly. The requirements contained in this document only apply to parts released under this version of requirements when included in supplier Statement of Requirements (SOR).

1.1.2 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).

1.2 Applicability. The main purpose of the Coat Hook Assembly is to provide a decorative, and functional trim covering of the underside of the vehicle's roof. The Coat Hook Assembly Subsystem also provides packaging provisions for all other functional or decorative elements in this region of the vehicle interior. The main purpose of the hook is to support a jacket/coat or hangers for clothing.

1.3 Remarks. The Coat Hook Assembly is listed under the following Uniform Parts Classification (UPC), Functional Name Address (FNA) and Bill of Material (BOM) nomenclature.

- **UPC** = 1C4J
- **FNA** = 5900A Hook Assembly (ASM)-Coat
- **BOM Row** = 433.07 Coat Hook Assembly Row

2 References

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

2.1 External Standards/Specifications.

CMVSS 201	FMVSS 201	GSO 98	TRIAS 48
ECE R21.01	FMVSS 302	ISO/TS 16949	

2.2 GM Standards/Specifications.

GMW3059	GMW3121	GMW14011	GMW14573
GMW3115	GMW7293	GMW14089	GMW14797
GMW3116	GMW7294	GMW14234	GMW16331
GMW3118	GMW8518	GMW14444	GMW17078

2.3 Additional References.

- Assembly Best Practices
- Best Practice Number KPAC MVSS201-1
- Best Practice Number KPAC MVSS201-4
- Bill of Process for Coat Hook Assembly Systems
- CG3500
- Coat Hook CTS
- Design Appearance Requirements (DAR)
- Development Planning Schedule
- Dimensional Technical Specification (DTS)
- Design Best Practices
- GM Engineering Materials and Process Standards
- GM Ergonomic and Assembly Requirements
- GM Global Legal Database
- GM Legal Staff Requirements
- GM Material Specification
- GM Supply Power
- Incomplete Vehicle Document
- Manufacturing Technical Specification (MTS)
- Master Process Documents (MPD)
- Owner's Manual
- Program Plan
- Recycled Materials File
- Roof Rail Air Bag (RRAB) Subsystem Technical Specification (SSTS)
- Service Manual
- SOR Appendix B
- SOR Appendix C2
- SOR Appendix F5
- SOR Appendix F7
- SOR Appendix F10
- SOR Appendix H
- SOR Validation Appendix G2
- Squeak and Rattle Noise Glossary
- Supplier Process Monitoring Plan
- Vehicle Technical Specification (VTS)
- World Vehicle Regulation Manual (WVRM)

3 Requirements

3.1 System/Subsystem/Component/Part Definition. The Coat Hook Assembly for a vehicle interior is defined as the part that is shipped to the assembly plant for installation of the component to the vehicle. This typically includes:

- Coat Hook
- Base Plate (optional)
- Fastener(s)
- Damper/Springs

3.1.1 Appearance. The Coat Hook Assembly shall reflect the vehicle interior-styling theme in accordance with the brand character. It also reflects the design quality as expressed in surface attributes such as material texture, grain, color and gloss, as well as the execution of joints, interfaces (fit, flush and alignment). Statement of Requirements (SOR) Appendix F5 and/or SOR Appendix F10 defines the program grain, color and gloss requirements. The SOR Appendix F7 defines the fit and finish Dimensional Technical Specification (DTS) requirements for execution of joints, and interfaces. The SOR Appendix F7 also provides Key Product Characteristics/Perceived Quality Characteristic (KPC/PQC) and part drawing tolerance and locating requirements.

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

3.1.2.1 Physical Content. The required physical and functional content for the Coat Hook Assembly are identified in SOR Appendix B - general program description, (e.g., see items; 3.1.2.1a thru 3.1.2.1d).

- a. Coat Hook
- b. Base Plate (optional)
- c. Fastener(s)
- d. Damper/Springs

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.

3.1.2.2 Functional Content. The Coat Hook Assembly should provide the basic functions described in the following:

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

3.1.2.2.2 Kinetic energy absorption to satisfy CMVSS 201U and FMVSS 201U Head Impact requirements.

3.1.2.2.3 A soft feel (tactility) for intentional and unintentional vehicle occupant contacts.

3.1.2.2.4 Color fastness, durability, clean-ability, resistance to environmental influences, and retention of physical integrity.

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

3.1.2.2.6 A means for retaining garments and hangers (Coat hook function).

3.1.3 Ambient Environment. Reference the Vehicle Technical Specification (VTS) for ambient environment. The Coat Hook Assembly must meet the performance requirements identified in this specification while operating within these environmental conditions. Temperature ranges recommended are -30 °C to 85 °C unless otherwise defined in the VTS. VTS documents calling out temperatures outside this range will require parts to be able to be operated, but not necessarily be fully functional at extreme temperature. Full function shall return to the assembly within the recommended temperature range.

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

Table 1: Low Temperature Deviation Temperatures

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

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

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

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

3.1.4 Interfaces.

3.1.4.1 External-To-Vehicle to Subsystem: General Assembly Process. Vehicle Assembly Process imposes product requirements for the Coat Hook Assembly.

3.1.4.1.1 Modularity: Component Retention to Substrate. The extent of modularity is program and/or region specific. When modularity is required, the Coat Hook Assembly shall be securely retained to the Overhead Substrate in such a manner as to withstand the rigors of shipping and the vehicle assembly process.

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

3.1.4.2 Subsystem to Subsystem. The following paragraphs describe interfaces between Coat Hook Assembly and other subsystems with which it has a physical or functional relationship.

3.1.4.2.1 Coat Hook Assembly Best Practices. The Coat Hook Assembly shall conform to the Coat Hook Assembly Best Practices located in Enterprise Engineering Knowledge System, (E2KS). The Coat Hook Assembly Best Practice Knowledge Set is stored in Interior Community of Practice (CoP).

3.1.4.2.2 Safety Management.

3.1.4.2.2.1 Head Impact. The Coat Hook Assembly contributes to vehicle compliance with FMVSS 201U - Upper Interior Impact. The Coat Hook Assembly shall include energy absorbing features that contribute to vehicle-level compliance to the requirements of FMVSS 201U. The Coat Hook Assembly shall be designed to meet all applicable Best Practices included in the FMVSS 201U Knowledge Set. Contact the appropriate safety performance engineer for details and requirements.

3.1.4.2.2.1.1 The initial design of the Coat Hook Assembly shall be restricted to the design features listed in Best Practice Number KPAC MVSS201-1, and packaging boundaries found in KPAC MVSS201-4, or its most recent successor. Deviations from these Best Practices require the approval of the responsible FMVSS 201 Performance Engineer and the BOM Leader.

3.1.4.2.2.2 Roof Rail Airbag. For all vehicles, which incorporate Roof Rail Air Bags (RRAB), are to meet the following:

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

3.1.4.2.2.2.1 Attachments/Anchors. The Coat Hook Assembly shall have sufficient points of attachment to withstand the deployment loads of the RRAB without substantially dislodging from design. The number and location of added fasteners will vary depending on included hard fastening points and deployment forces imparted to the Roof Trim Subsystem (RTS).

3.1.4.2.2.2.2 Deployment: The Coat Hook Assembly structural/mechanical properties shall meet the deployment mode requirements by flexing as necessary.

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

Any components or fragments of the Coat Hook Assembly that partially or fully separate from the Roof Trim 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 and Coat Hook Assembly Product Development Team (PDT) members.

The Coat Hook Assembly shall not damage the RRAB itself during deployment.

The Coat Hook Assembly shall not present sharp or rough edges that may cut or snag the RRAB during deployment.

The Coat Hook Assembly shall not prevent the RRAB from meeting the deployment requirements as specified in GMW3115, GMW3118 and GMW3121.

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

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

3.2 Product Characteristics. The extent of modularity is program and/or region specific. When modularity is required, the Coat Hook Assembly shall be securely retained to the Overhead Substrate in such a manner as to withstand the rigors of shipping and the vehicle assembly process.

3.2.1 Performance Requirements. The following paragraphs specify the functional performance requirements for the Coat Hook Assembly. The component 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 Coat Hook Assembly shall meet the appropriate material related part performance requirements per GMW14444. **Note:** The following approvals shall be required as applicable: plastic, paint, textile, construction and color approval as defined in SOR Appendix F10. Additionally, adhesive requirements will be contained in the SOR Appendix F10.

3.2.1.2 Color/Gloss/Grain/Appearance. The requirements for the Coat Hook Assembly relative to color/gloss/grain/appearance are identified in SOR Appendix F5 and later a Color and Trim Design Appearance Requirements (DAR).

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

3.2.1.4 Other Regulatory Requirements. The Coat Hook Assembly shall meet FMVSS 302 and other Flammability requirements, including TRIAS 48 and GSO 98.

3.2.1.5 Coat Hook Assembly (Roof Rail Mounted). The Coat Hook Assembly aids occupants in hanging coats/jackets, or hangers. It shall also meet the following:

3.2.1.5.1 The Coat Hook Assembly shall have a primary attachment to the body structure using Taptite 2000 threaded fasteners or other GM approved fasteners. In-mold Coat Hooks will not be required to meet this fastening requirement.

3.2.1.5.2 For installation, there shall be an operator assist feature to hold the cover open, allowing access to install the threaded fastener.

3.2.1.5.3 For attachment clips, the installation loads shall be less than 50 N for palm installation, 15 N for finger or thumb installation, and shall meet the ergonomics guidelines as called for in 3.1.4.1.2.

3.2.1.6 Coat Hook Assembly. The Coat Hook Assembly retains garments and hangers in the vehicle. It may be integral to other components such as assist handles. The stand-alone coat hook shall have a primary attachment to the body structure using M-6 threaded fasteners or other GM approved fasteners. Throughout the Coat Hook Component Technical Specification (CTS), the hanger size definition is: 8.5 mm for large hanger, 2.5 mm for wire hanger.

3.2.1.6.1 Dynamic Road Performance. See Best Practice (BP) to define optimal position and mounting angle for Corporate Common Component (CCC) designed coat hook (angle range and clearance to trim required.) The supplier shall work with the GM Design Release Engineer to comprehend this requirement. If packaged within the BP criteria, dynamic testing will not be required for CCC Coat Hook Assemblies.

3.2.1.6.1.1 The coat hook shall retain hangers, with and without load, under severe driving conditions. A dynamic road test for hanger retention should be conducted to evaluate this capability. This test consists of swerving at 88 kph to 96 kph (55 mph to 60 mph), bumpy roads at 40 kph to 48 kph (25 mph to 30 mph), severe cornering at 48 kph to 56 kph (30 mph to 35 mph), and emergency stopping from 96 kph (60 mph). This test should emulate testing conducted at the GM Proving Ground Ride and Handling Loop, Belgian Block Road, and Seven Sisters Loop.

3.2.1.6.1.2 With load conditions, use two wire hangers (2.5 mm each) loaded to 1.35 kg (3 lb each of weight). Total weight should be less than 2.7 kg (6 lb). Without load conditions, use two empty wire hangers (2.5 mm each-laundry hangers).

3.2.1.6.1.3 New CCC or Program-specific Coat Hooks shall run a component level test, to define the packaging envelope using the criteria in 3.2.1.6.1.1 and 3.2.1.6.1.2.

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

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

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