



Trailer Hitch Platform

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 document provides the general requirements for the trailer hitch platform. The functional, performance, reliability and validation requirements for the trailer hitch platform are specified in this and other referenced documents. This document must be combined with Appendix C2 of the Program-Specific Statement of Requirements (SOR). Specific trailer hitch platform assembly application and usage information, part number and math data references are contained in Appendix B of the SOR, Program Description.

1.2 Applicability. This specification applies to chassis trailer hitch platform assemblies for Body Frame Integral (BFI) or Body-On-Frame (BOF) vehicle architectures.

1.3 Remarks. The trailer hitch platform provides an interface for towed vehicle attachment. This includes the coupling and may include safety chain attachments.

2 References

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

2.1 External Standards/Specifications.

AWS A2.4	AWS A5.10M	AWS A5.18	ISO/TS 16949
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2.2 GM Standards/Specifications.

GMN3903	GMW3224	GMW14375	GMW16057
GMW3059	GMW14058	GMW14573	GMW17000
GMW3116	GMW14089	GMW15272	

2.3 Additional References.

- Appendix A2 of the Subsystem Technical Specification (STS)
- Appendix A3 of the SOR
- Appendix B of the SOR
- Appendix C2 of the SOR
- Appendix D of the SOR
- Appendix E3 of the SOR
- Component Technical Specification (CTS)
- GM3640, Serviceability Design Best Practices, 8th Edition
- Production Weld Drawing
- Program-Specific Statement of Requirements (SOR)
- Subsystem Technical Specification (STS)
- TMC003 Material Safety Data Sheet guidance documents (available at www.gmsupplypower.com)
- Vehicle Technical Specification (VTS)

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3 Requirements

3.1 Subsystem Definition. The trailer hitch platform is defined in terms of required functions and performance characteristics as described in 3.1.1 thru 3.1.4.2.2.2.

3.1.1 Appearance. The trailer hitch platform color shall be black for steel and natural for aluminum.

3.1.2 Content.

3.1.2.1 Physical Content. Refer to Appendix B of the Program-Specific SOR.

A GM concept design is supplied with the SOR package in math data and the Part Breakdown Assumptions listed in Appendix A2 of the Subsystem Technical Specification (SSTS). Suppliers are encouraged to propose detailed refinement and improvement of this design in areas not designated to be **carryover**. Large-scale reconfiguration proposals, however, are not encouraged, except as defined in Appendix B of the SOR, or with explicit written instructions from the GM Lead Engineer. Any alterations of or deviations from the GM Concept Design must be explicitly identified in writing by the supplier and approved in writing by the GM Lead Engineer in order to be eligible to include as a basis for any commercial quote.

3.1.2.2 Functional Content. The trailer hitch platform provides attachment for a towed vehicle (trailer).

3.1.3 Ambient Environment. The trailer hitch platform shall be subject to an ambient environment as described in 3.1.3.1 thru 3.1.3.3.

3.1.3.1 Temperatures. Refer to Appendix C2 of the SOR.

3.1.3.2 Contaminants. The trailer hitch platform must withstand exposure to the following environmental elements to the level as specified in Table 1.

Table 1: Contaminant Exposure Level

Element	Prolonged	Intermittent	Not Applicable
Water/Snow/Ice	X		
Engine Coolant		X	
Windshield Fluid		X	
Brake Fluid		X	
Power Steering Fluid		X	
Diesel Fuel		X	
Gasoline		X	
Engine Oil		X	
Road Salt	X		
Battery Fluid		X	
Dirt (Dust/Grit)	X		
Differential Fluid		X	
Ultraviolet Light	X		
Transmission Fluid		X	
Car Wash Chemicals and Detergents		X	
Tire Cleaners and Engine Cleaners		X	
Ammonia Glass Cleaner		X	
Fuel Additives		X	
Air Conditioning Refrigerant		X	
Deicers		X	
Acid Rain		X	
Sand/Gravel	X		
Mud	X		

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Element	Prolonged	Intermittent	Not Applicable
Road Tar		X	
Road Oil		X	
Leaves		X	
Insects		X	
High Pressure Water Wash/Steam Cleaning		X	

Note: Due to material properties, specific materials selected may require protection from, as opposed to, resistance against the listed contaminants.

3.1.3.3 Corrosion Resistance. The trailer hitch platform shall meet the corrosion performance and validation requirements as specified in GMW15272.

3.1.4 Interfaces. The trailer hitch platform interfaces with various entities that will affect or constrain its functionality and design. These interfaces are discussed in 3.1.4.1 thru 3.1.4.2.2.2.

3.1.4.1 External-To-Vehicle to Subsystem. Interface items that may affect the trailer hitch platform designs which shall comply with the applicable requirements stated in GM3640, Serviceability Design Best Practices, 8th Edition, Sections and Appendices stated as:

Note: The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement.

Serviceability requirements: Section 20.05 Chassis Structure.

- Vehicle shipping (haulaway/ocean) and shipping attachments on the trailer hitch platform (if applicable): Appendix E, Shipping.
- Ground clearances (wash rack, parking blocks, curbs, railroad crossings, potholes, ramps and other on/off-road obstructions, etc.): Appendix D Washability. Also reference Vehicle Approach and Departure Angle Requirements.
- Towing clearances (packaging envelope) and recovery devices: Appendix B Towing and Recovery.
- Jacking: Appendix C Jacking and Lifting.

3.1.4.2 Interfaces – Components to Subsystem. Interface items that may affect the trailer hitch platform design and must be considered in the design include:

- Static packaging requirements.
- Local proximity to heat sources (conductive, radiant and convective). Minimum clearance between trailer hitch platform and exhaust system components shall be 45 mm to allow for thermal expansion of exhaust components.

3.1.4.2.1 Physical Interface at Attachment Locations. The trailer hitch platform interfaces with vehicle subsystems at various attachment points. These interfaces are discussed in 3.1.4.2.1.1 thru 3.1.4.2.1.7.

3.1.4.2.1.1 Contact area: must be clean and free of weld slag and burrs.

3.1.4.2.1.2 Surface finish and flatness: see Geometric Dimensioning and Tolerancing (GD&T) drawing.

3.1.4.2.1.3 Tolerances, GD&T scheme: see GD&T drawing. Any deviations in the GD&T scheme must receive approval from the GM Dimensional Management Applications Group and the GM Design Release Engineer (DRE).

3.1.4.2.1.4 Attachment method.

3.1.4.2.1.5 Type, number, grade and finish of fasteners.

3.1.4.2.1.6 Joint integrity (service loading, fastener torque tension and torque retention, etc.)

3.1.4.2.1.7 At interfaces where the potential for galvanic corrosion exists, proper protective coatings shall be used.

3.1.4.2.2 Assembly Interfaces.

3.1.4.2.2.1 Trailer hitch platform design shall allow clearance to be provided for assembly of all attachments with normal assembly plant tooling, processes and procedures, as specified in the Bill of Process.

3.1.4.2.2.2 All assembly interfaces shall be properly error-proofed so that only correct assembly is possible (see 3.3.3).

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3.2 Product Characteristics. Identifying the verifiable technical requirements for the trailer hitch platform.

3.2.1 Performance Requirements.

3.2.1.1 Crashworthiness. The trailer hitch platform should aid in vehicle crashworthiness. It should deform and absorb kinetic energy in a manner deemed acceptable by the GM Safety Group. The buckling locations, loads and modes will be determined by GM Safety Group simulations.

The supplier shall deliver typical manufacturing and handling features (i.e., paint holes, tooling slots) throughout the design process so their effects can be evaluated before design finalization.

Confirmation of trailer hitch platform performance will be done by full vehicle barrier test run under the direction of the GM Safety Vehicle Integration Engineer. The GM safety engineer would be responsible for assessment of vehicle level crashworthiness performance (which comprehends the trailer hitch platform crashworthiness performance) and the supplier shall support the GM Safety Group to achieve the requirements.

3.2.1.2 Load Cases and Strength. Refer to Appendix C2 of the SOR.

3.2.1.2.1 Jacking and Hoisting. Trailer hitch platform designs shall comply with the applicable requirements stated in GM3640, Serviceability Design Best Practices, 8th Edition, Appendix C for Automotive Lift, Vehicle Emergency Jack and Hydraulic Service Jack. The supplier shall work with the GM Design Responsible Engineer to comprehend this requirement. The trailer hitch platform design should allow lifting either the front of the rear of the vehicle off the ground at a midpoint between the wheels.

3.2.1.2.2 Vehicle Shipping. When used as a tiedown interface for ocean shipment, the trailer hitch platform shall comply with the following:

- a. The trailer hitch platform shall not incur any detrimental damage from the static and dynamic loads generated during ocean shipping.
- b. Damage to fitting or surrounding structure shall not impair their shipping function. Damage to fittings or surrounding areas shall not diminish vehicle function.

3.2.1.3 No Self-Generated Noises. The trailer hitch platform shall not generate any type of self-generated noise (pop, click, squeak, rattle, creak, etc.) that may be audible inside the passenger compartment. The transmission path of this self-generated noise may be airborne or structure-borne.

3.2.1.4 Vehicle to Subsystem Squeak and Rattle Performance. (GM3640, Stakeholders: OC Noise and Vibration; 25 Chassis Structures.)

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

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 the 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.

3.2.2 Physical Characteristics. Identifying the required physical characteristics for the trailer hitch platform.

3.2.2.1 Dimensions and Capacity. The physical size and shape of the trailer hitch platform shall be contained within the boundaries of the packaging math data file included in the sourcing documents.

3.2.2.2 Mass Properties. Refer to Appendix C2 of the SOR.

3.2.3 Reliability and Dependability. Dependability is the ability of the subsystem to meet its performance requirements throughout its target life.

3.2.3.1 Reliability Requirements. Defining the reliability requirements for the trailer hitch platform.

3.2.3.1.1 Target Life. Refer to Appendix C2 of the SOR.

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