



Instrument Panel Structure Technical Specification

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. The purpose of this document is to establish the requirements for the Instrument Panel (IP) Structure used in General Motors vehicles. The required functions, performance, appearance, design constraints, and validation of the subsystem are defined by this document.

1.1.1 Certain sections or paragraphs are broad in scope as 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. The specific requirements for the variant (s), listed in the Statement of Requirements (SOR), Appendix B, should be developed and described in the SOR, Appendix C2.

1.2 Applicability. The IP Structure is the base support for the cockpit module, carrying the most of the load from the components of assembly, as well as acting as a build fixture. It is a safety critical reinforcement for the vehicle crash performance.

1.3 Remarks. Not applicable.

2 References

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

2.1 External Standards/Specifications.

CARB OBD II Section 1968.2	FMVSS 208	KMVSS 102	UN R 16
FMVSS 201	FMVSS 214	SAE J1962	UN R 21
FMVSS 203	KMVSS 88	TRIAS 18-J023-01	UN R 94
FMVSS 204	KMVSS 89	UN R 12	UN R 95

2.2 GM Standards/Specifications.

GMW3059	GMW14057	GMW15425	GMW17000
GMW3425	GMW14058	GMW15443	GMW17505
GMW3428	GMW14149	GMW15540	
GMW8738 (ID)	GMW14164	GMW16215	
GMW14056	GMW15272	GMW16772	

(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.

2.3 Additional References.

- Automotive Regulation Information Database (ARID) (ID)
- Dimensional Technical Specification (DTS) Internal Distribution (ID)
- Europe (EURO) EURO NCAP
- Global Bill of Process (GBOP) 2.0 (ID)
- GM Best Practice, (IPTRIM-75) to meet California Air Resources Board On-Board Diagnostic Two (CARB OBD II) Regulation Section 1968.2

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January 2018

Page 1 of 12



Documents

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- Japan New Car Assessment Program (JNCAP)
- Livermore Software Technology Corporation, Livermore, California, www.lstc.com
- Manufacturer's Service Manual
- New Car Assessment Programs (NCAP)
- SOR Appendix B
- SOR Appendix C2
- SOR Appendices E1 through E4
- SOR Appendix F
- SOR Appendix F3
- SOR Appendix F10
- SOR Appendix G3
- SOR Appendix H
- SOR Appendix N
- SOR Appendix O
- United States Lateral Impact New Car Assessment Program (US LINCAP) – non-regulatory
- Vehicle Synthesis, Analysis and Simulation (VSAS) 40-01-0017 (ID)
- Vehicle Synthesis, Analysis and Simulation (VSAS) 40-01-003 (ID)
- Vehicle Synthesis, Analysis and Simulation (VSAS) 40-01-017 (ID)
- Vehicle Synthesis, Analysis and Simulation (VSAS) 40-01-029 (ID)
- Vehicle Synthesis, Analysis and Simulation (VSAS) 40-01-053 (ID)
- Vehicle Synthesis, Analysis and Simulation (VSAS) 40-01-095 (ID)
- Vehicle Synthesis, Analysis and Simulation (VSAS) 40-10-091 (ID)
- Vehicle Technical Specification (VTS)

3 Requirements

3.1 System/Subsystem/Component/Part Definition. The IP Structure assembly consists of the cross-car beam, fasteners to attach IP Structure components and to secure it to the body, all brackets/reinforcements for the driver and passenger energy absorbing systems Knee Air Bags (KAB), and all body interfaces, steering column, passenger airbag (PAB), pedal, and park brake attachments. It supports and is a build fixture for components of other vehicle subsystems within the cockpit. The IP Structure is a critical component for the protection of the occupants within the vehicle. The IP Structure provides the datum strategy for the position of the cockpit module in the Vehicle assembly.

3.1.1 Appearance. Corrosion from the IP Structure must not be visible to any occupant while entering, exiting, or sitting. Optimize the IP Structure packaging size and geometry at the hinge pillar, plenum, and tunnel interfaces to balance performance, manufacturing, and styling requirements. The IP Structure tolerances, stiffness, and component attachments must enable the IP Trim and Console Dimensional Technical Specification (DTS) and Noise, Vibration, and Harshness (NVH) requirements.

3.1.2 Content. The IP structure Bill of Material (BOM) is listed in SOR, Appendix B.

3.1.2.1 Physical Content. Not applicable.

3.1.2.2 Functional Content. Not applicable.

3.1.3 Ambient Environment. The IP Structure shall meet all requirements from -40 °C to 90 °C.

3.1.4 Interfaces. The principal interfaces for the IP structure (see Figure 1).

3.1.5 Usage Definition. Not applicable.

3.2 Product Characteristics.

3.2.1 Performance Requirements.

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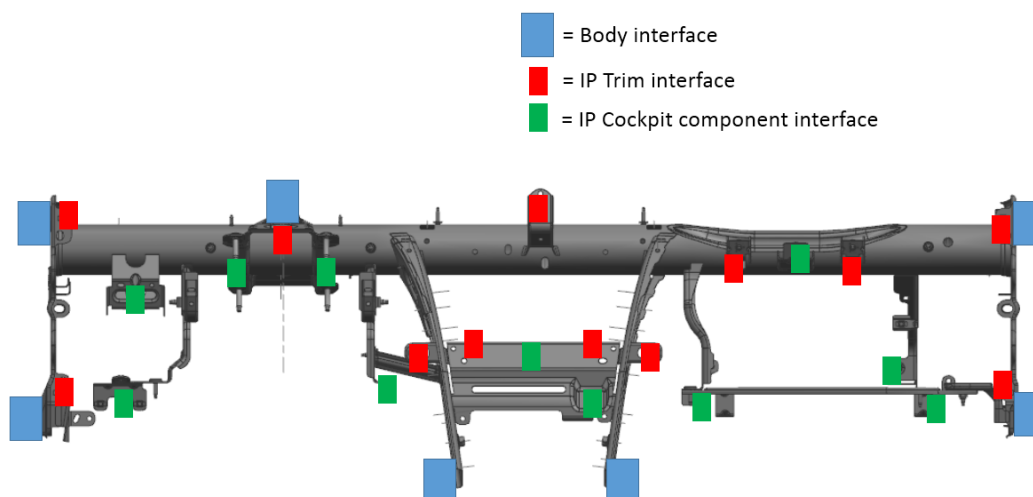
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January 2018

Page 2 of 12

3.2.1.1 Unless otherwise stated, performance requirements to meet government crash regulations are full vehicle requirements. Although subsystem analysis predicts the structure's performance, both full vehicle analysis and testing determine the actual performance. All modeling, subsystem and full vehicle requirements must comply with the GM Vehicle Synthesis, Analysis, and Simulation (VSAS) modeling standards. The VSAS group, GM Safety Performance Integration Team (PIT) Leader, and IP Structure Engineer must approve the entire modeling process and results to be an acceptable model and predictor of the structure's performance.

Figure 1: IP Structure Interfaces



Note: IP = Instrument Panel.

3.2.1.2 Governmental Regulations and Consumer Metric Crash Tests.

3.2.1.2.1 Governmental Regulations List. The IP Structure subsystem and components must comply with the latest government regulations in the country of sale listed in the GM Automotive Regulation Information Database (ARID) (reference Table 1) and in SOR Appendix C2.

Note: All IP subsystems and components must comply with European governmental regulation United Nations UN R 16 and UN R 21. These regulations can be found by going to <https://businessconnect.gm.com/sites/ARID/SitePages/Home.aspx> (reference Table 1).

Note: The GM Global Legal database supercedes all regulation information within SOR, Appendix C2.

3.2.1.2.2 Consumer Metric Requirements. The design of the IP Structure must meet the total vehicle requirements as defined in the (VTS). Unless otherwise stated, performance requirements to meet consumer metric crash tests, i.e., New Car Assessment Programs (NCAP) and Lateral Impact New Car Assessment Programs (LINCAP), e.g., Japan New Car Assessment Program (JNCAP), Korea TRIAS 18-J023-01, United States (US) NCAP and Europe (EURO) EURO NCAP, are full vehicle requirements. The IP subsystem and component designs must meet values for the consumer metric crash test requirements from 3.2.1.1, in the program specific VTS that are shown in SOR, Appendix C2.

Although subsystem analysis predicts performance, both full vehicle analysis and testing determines the actual performance. All modeling, subsystem, and full vehicle, must comply with the GM VSAS modeling standards per SOR, Appendix O. The VSAS group, GM Safety PIT Leader, and Design Engineer must approve the entire modeling process and results to be an acceptable model and predictor of performance.

3.2.1.2.3 Structural Integrity for Dynamic Side Impact (Applies to vehicles under 2722 kg (6000 lb) Gross Vehicle Weight (GVW)) Refer to SOR, Appendix C2.

3.2.1.2.4 Structural Integrity for Dynamic Side Impact (Applies to vehicles under (6000 lb) GVW).

3.2.1.3 Occupant Impact Protection.

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January 2018

Page 3 of 12



Documents
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3.2.1.3.1 Column Stroke Zone. The IP Structure shall be designed to provide a column stroke zone that accommodates full travel of the steering column energy absorbing components. Any brackets or components that attach to the IP structure or trim shall be packaged outside of this stroke zone. The packaging space must also clear the column stroke zone for the deformation of these parts.

3.2.1.3.2 Head Impact. The IP Structure subsystem, within the head impact zone, is to be designed for a Computer Aided Engineering (CAE) analysis result for head deceleration 20% less than the requirement within the selling country for regulations such as Federal Motor Vehicle Safety Standard (FMVSS) 201, UN R 21 and Korean Motor Vehicle Safety Standards (KMVSS) 88. To be analyzed per procedure VSAS 40-01-003.

3.2.1.3.3 Occupant Femur Load Limits. The occupant femur loads in Table 2 are target values to fulfill the legal requirements with an intended margin. The duration time and deflection over which the loads are applied are determined by balancing occupant kinematics for the vehicle pulse, which typically varies for each vehicle. The knee protection system shall meet the force versus time and force versus deflection curves. Set up analysis as described in SOR, Appendix C2, Appendix A.

Table 1: Regulations Affecting IP Structure Design

Legal Area	Document	Description
United Nations (UN)	UN R 12	Steering Impact
United Nations (UN)	UN R 21	Interior Fittings
United Nations (UN)	UN R 94	Protection of Occupants, Frontal Collision
United Nations (UN)	UN R 95	Side Impact Protection
United States (or selling country equivalent)	FMVSS 201	Occupant Protection in Interior Impacts
United States (or selling country equivalent)	FMVSS 203	Impact Protection for the Driver Steering Control System
United States (or selling country equivalent)	FMVSS 204	Steering Control Rearward Displacement
United States (or selling country equivalent)	FMVSS 208	Occupant Crash Protection
United States (or selling country equivalent)	FMVSS 214	Side Impact Protection
Korea (or selling country equivalent)	KMVSS 88	Interior Impact Instrument Panel
Korea (or selling country equivalent)	KMVSS 89	Steering Impact
Korea (or selling country equivalent)	KMVSS 102	Occupant crash protection

Note: FMVSS = Federal Motor Vehicle Safety Standards, IP = Instrument Panel, KMVSS = Korean Motor Vehicle Safety Standards.

3.2.1.3.4 The IP Structure subsystem is to package or package-protect parts that manage driver and passenger occupant kinematics and lower body energy for compliance with FMVSS 208 unless the vehicle architecture never has the potential of selling in North America.

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Page 4 of 12