



Validation of Cover/Door Subcomponent for Frontal, Side and Roof Rail 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.

Note: In the case when multiple procedures are listed to conduct a validation test, the Vehicle Engineering Center (VEC) is the final arbiter on selecting the appropriate test method.

1.1 Scope. This standard sets forth the validation procedures and associated performance requirements for the airbag cover/door assembly that will be used as part of the airbag module restraint systems. This document shall be used in conjunction with GMW14444 (use GMW14444 as surrogate where appropriate) GMW3133 test requirements take precedence over GMW14444 if test condition is more severe in number of cycles or condition. VEC engineer is final arbitrator for test condition. This document does not address developmental test requirements. It shall be the responsibility of the supplier to identify and conduct a Development and Concept Validation Test Plan as defined in the program Statement of Requirements, and/or Design Failure Mode and Effects Analysis (DFMEA)/ Process Failure Mode and Effects Analysis (PFMEA). Airbag Cover/Door Development Testing should be completed prior to start of Design Validation (DV) Testing.

The Cover/Door Validation Test Plans shall be structured in accordance to the DV and Process/Production Validation (PV) Test Matrixes (see paragraphs 4.2.2.1 and 4.2.3.1) in this document. These requirements shall contain but not be limited to a minimum set of tests and sample sizes for validating doors/covers. It shall be the supplier's responsibility to evaluate the plans and determine if additional testing and/or larger sample sizes are recommended based on the supplier's developed DFMEA and PFMEAs. The Airbag Cover/Door Development, DV, and PV Test Plans shall be approved by the responsible VEC Engineer prior to implementation.

1.2 Mission/Theme. Not applicable.

1.3 Classification. Not applicable.

2 References

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

2.1 External Standards/Specifications.

SAE J1351 ISO 20433

2.2 GM Standards/Specifications.

GMW3059	GMW3232	GMW14162	GMW14698
GMW3109	GMW3235	GMW14334	GMW14729
GMW3115	GMW3402	GMW14444	GMW14864
GMW3121	GMW14093	GMW14445	GMW14892
GMW3205	GMW14124	GMW14651	GMW15432
GMW3208	GMW14130	GMW14688	

3 Requirements

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

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 VECs. **Should** requirements must be met unless noncompliance has been approved by the responsible VECs.

The term airbag refers to the airbag subsystem and not a specific component (i.e. the cushion).

Test Equipment **shall** be utilized as specified, by the indicated test procedures, standards and specifications.

Test Equipment. Unless otherwise specified elsewhere in this document, tests shall be conducted at local ambient pressure, relative humidity, and room temperature (+23 ± 3) °C.

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Unless otherwise specified in this document, test condition tolerances shall be as follows:

Table 1: Test Condition Tolerances

Temperature	$\pm 3^{\circ}\text{C}$
Relative Humidity (RH)	$\pm 5\%$ of RH
Vacuums	± 10 mm of Hg
Height	± 0.05 m
Acceleration	$\pm 2\%$ except where minimums are stated
Frequency	$\pm 4\%$ or ± 2 Hz, whichever is smaller
Amps	± 0.01 A
Volts	$\pm 5\%$
Ohms	$\pm 1.0\%$
Angle	$\pm 1.0^{\circ}$

All test conditions shall be within the above stated tolerances at the time of test. These tolerances shall not be used independently.

Test Samples. For test sample size requirements, reference paragraphs 4.2.2 and 4.2.3 "Design and Product Process Validation Requirements".

3.1 System/Subsystem/Component/Part Definition. Not applicable.

3.2 Product Characteristics.

3.2.1 Performance Requirements.

3.2.1.1 Cover/Door Material.

3.2.1.1.1 Color Fastness.

Purpose. To evaluate the airbag cover and door material resistance to artificial light. Natural weathering will be evaluated on module level testing.

Test Fixtures and Equipment. Refer to GMW14162 for test fixtures and equipment.

Test Procedure. Perform colorfastness test as described in GMW14162. Refer to GMW14444 for exposure levels.

Evaluation and Results. The cover/door material shall meet the colorfastness requirements stated in GMW3109, GMW3115 or GMW3121. Reference GMW14444 for evaluation criteria.

3.2.1.1.2 Cleaning Material Resistance.

Purpose. To evaluate the airbag cover/door appearance after exposure to and removal of typical cleaning materials.

Equipment.

- Refer to GMW3402 for list of equipment
- Test specimen to be subjected to the following cleaning materials. Cleaning material contaminants include:
 - Window cleaner with ammonia (Windex with ammonia or equivalent).
 - Surface cleaner (Fantastic, Formula 409 or equivalent).
 - Interior cleaner (Armoral (PN 1042911) or equivalent).
 - Interior protectant (Armoral (PN 12345002) or equivalent).
 - Spot lifter
 - Fabric cleaner (per 9981062 or equivalent).
 - Upholstery/carpet cleaner (GM part number 88861407 or equivalent).

Procedure. Perform test procedures as specified in GMW3402; Procedure B Cleaner Resistance.

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Evaluation and Results. The cover/door material shall meet the cleaning material resistance requirements stated in GMW3109, GMW3115 or GMW3121.

3.2.1.1.3 Color Crocking.

Purpose. To evaluate the airbag cover/door color crocking performance.

Equipment. Refer to ISO 20433 for complete list of equipment.

Procedure. Perform dry rubbing test procedures as specified in ISO 20433.

Note: Wet color crocking can be judged from cleaning material resistance paragraph 3.2.1.1.2 "Evaluation and Results". The cover/door material shall meet the color crocking requirements stated in GMW3109, GMW3115 or GMW3121.

3.2.1.1.4 Dimensional Stability.

Purpose. To evaluate the airbag cover/door dimensional stability after exposure to environment.

Equipment. Refer to GMW14124 and GMW14093 for complete list of equipment.

Procedure.

- Perform test procedures as specified in GMW14124, Cycle M, then
- Perform test procedure as specified in GMW14093. The material **shall** be conditioned at -30 °C. The impact energy **shall** be 3.9 J for material below the beltline and 2.0 J for the material above the beltline.

Evaluation and Results. The cover/door material shall meet the dimensional stability requirements stated in GMW3109, GMW3115 or GMW3121 after exposure to humidity and impact strength.

3.2.1.1.5 Variable Surface Temperature Heat Exposure.

Purpose. To evaluate the airbag cover/door stability after exposure to elevated surface temperature.

Application: For manmade I/P materials.

Equipment. Refer to GMW15432 for complete list equipment.

Procedure. Perform test procedures as specified in GMW15432. Code B is the default for all regions except GME and GMB. Code A is the default for GME and GMB. An Engineering region may specify the desired Code on the engineering drawing.

Evaluation and Results. The cover/door material shall meet the variable surface temperature heat exposure requirements stated in GMW3109, GMW3115 or GMW3121.

3.2.1.1.6 Humidity Resistance.

Purpose. To evaluate the airbag cover/door material resistance to humidity.

Equipment. Temperature chambers, capable of maintaining +40 °C, and up to 100 % relative humidity (RH). GMW14729 Option A.

Procedure.

- Condition cover/door material for 96 h minimum at +38 °C and 95 % RH.
- Perform visual inspection.

Evaluation and Results. The cover/door material **shall** meet the humidity resistance requirements stated in GMW3109, GMW3115 or GMW3121.

3.2.1.1.7 Adhesion.

Purpose. To evaluate the airbag cover/door material peel strength.

Application: For bonded material only.

Equipment. Refer to GMW14892 for complete list of equipment.

Procedure. Perform test procedures as specified in GMW14892.

Evaluation and Results. The cover/door material shall meet the adhesion requirements stated in GMW3109, GMW3115 or GMW3121 and GMW14444 (for as received part).

The cover/door material shall meet the adhesion requirements stated in GMW3109, GMW3115 or GMW3121 and GMW14444 after exposure to two cycle of GMW14124 - Cycle M humidity resistance.

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