



Performance Requirements for the Floor Carpet and Floor Mat Retainers

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 standard defines the component and subsystem performance requirements and test conditions for the floor carpets and floor mat button-style retainers. Section 4.2 describes the component level testing that should be performed by the Retainer Supplier and 4.3 comprehends the subsystem level testing that should be performed by General Motors.

1.2 Applicability. This standard applies to all button-style retainers for floor carpet, floor mats and floor liners.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW3059

2.3 Additional References.

- GM Part Number 11611769 Carpet Side Grommet (6 mm thickness)
- GM Part Number 11611770 Mat Side Grommet
- GM Part Number 11611771 Mat Side Grommet
- GM Part Number 11612271 Carpet Side Grommet (2.5 mm thickness)
- Statement of Requirements Appendix C2
- Subsystem Technical Specification (SSTS)

3 Test Preparation and Evaluation

3.1 Resources.

3.1.1 Facilities.

3.1.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.1.2 Equipment. The following apparatus shall be used:

3.1.2.1 Tensile Test Machine or similar type test machine as shown in Figure 1.

3.1.3 Material. The test samples consist as follows:

- Button style retainers and carpet posts for component level tests.
- Floor mats, all weather mats, floor liners or carpets for subsystem level tests.

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Figure 1: Tensile Test Machine

3.1.2.2 Metal test plate to attach the carpet button-style retainer. The test plate should have the dimensions specified in Figure 2. The panel should be 4.8 mm thick. The panel should be made out of steel.

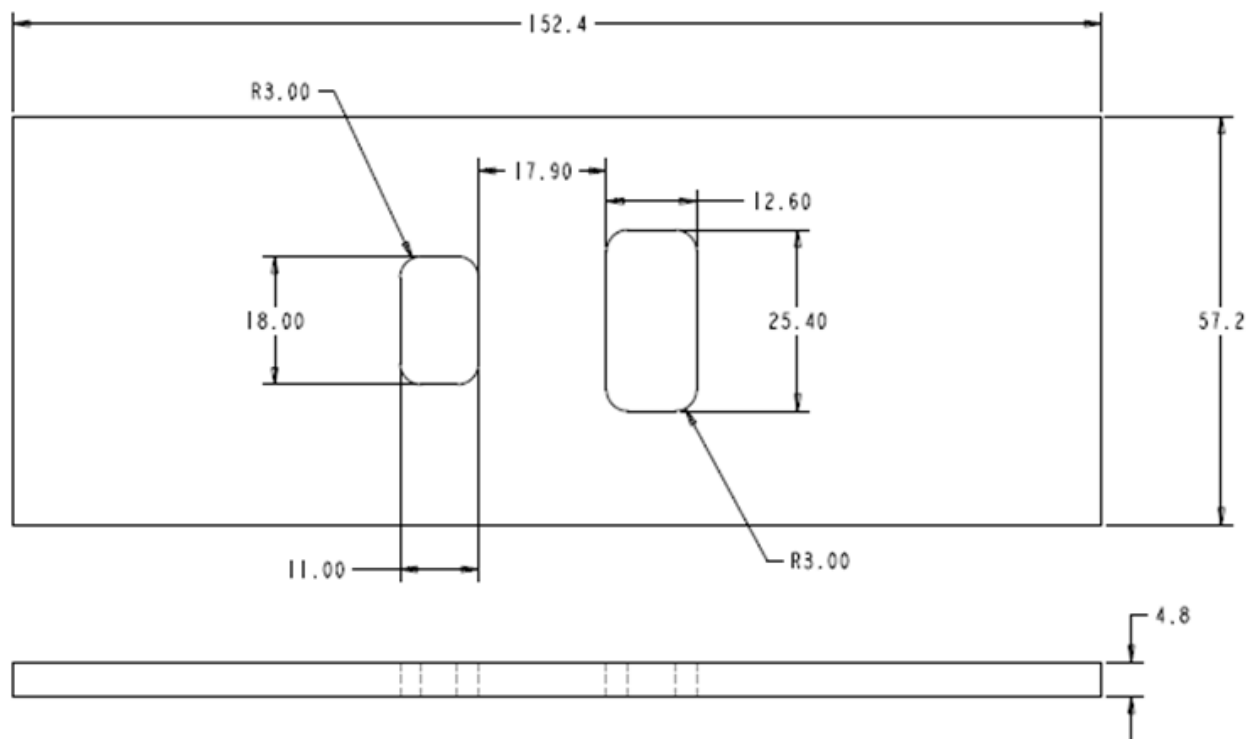


Figure 2: Metal Plate for Carpet Button-Style Retainer

3.1.2.3 Metal panel with a keyway or some method of attaching onto the male post of the carpet button-style retainer. The panel should be 2.00 mm thick and be made of steel or aluminum. Dimensions are specified in Figure 3.

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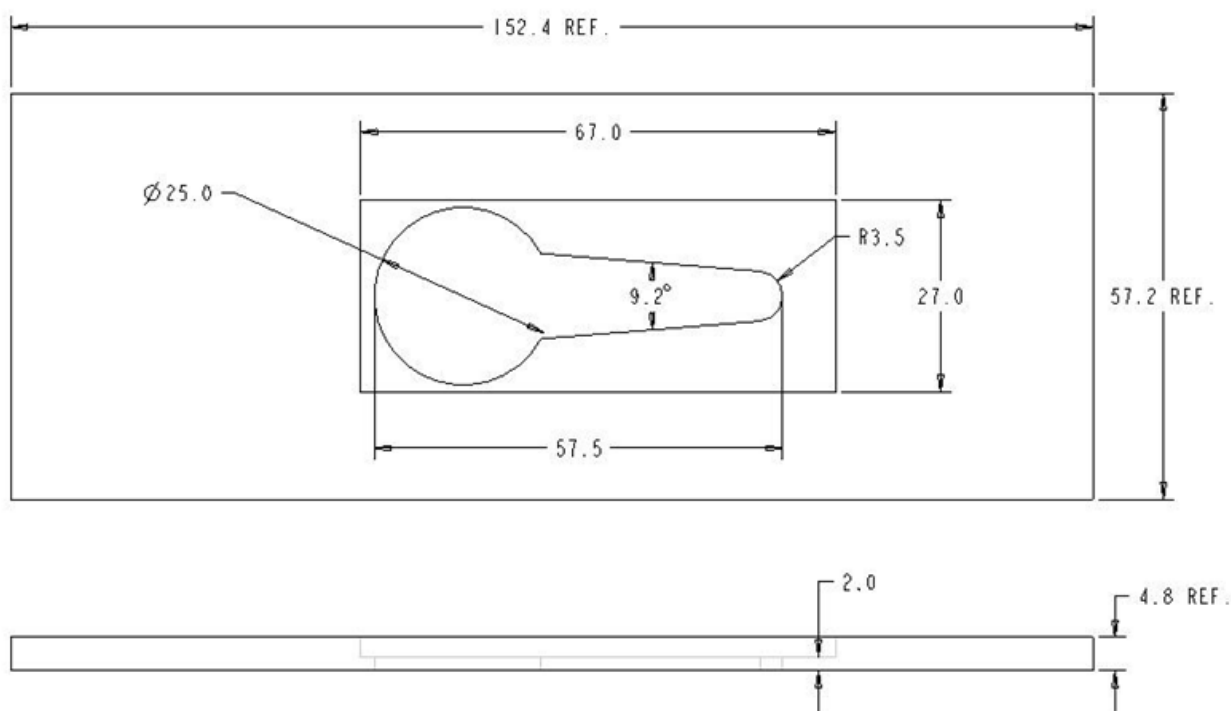


Figure 3: Metal Panel with a Keyway

3.1.2.4 Two U-Blocks made of steel or aluminum that will be used to perform the compressive loads. Dimensions are specified in Figure 4. Bolts will be required to fix the U-Blocks into the Tensile Test Machine.

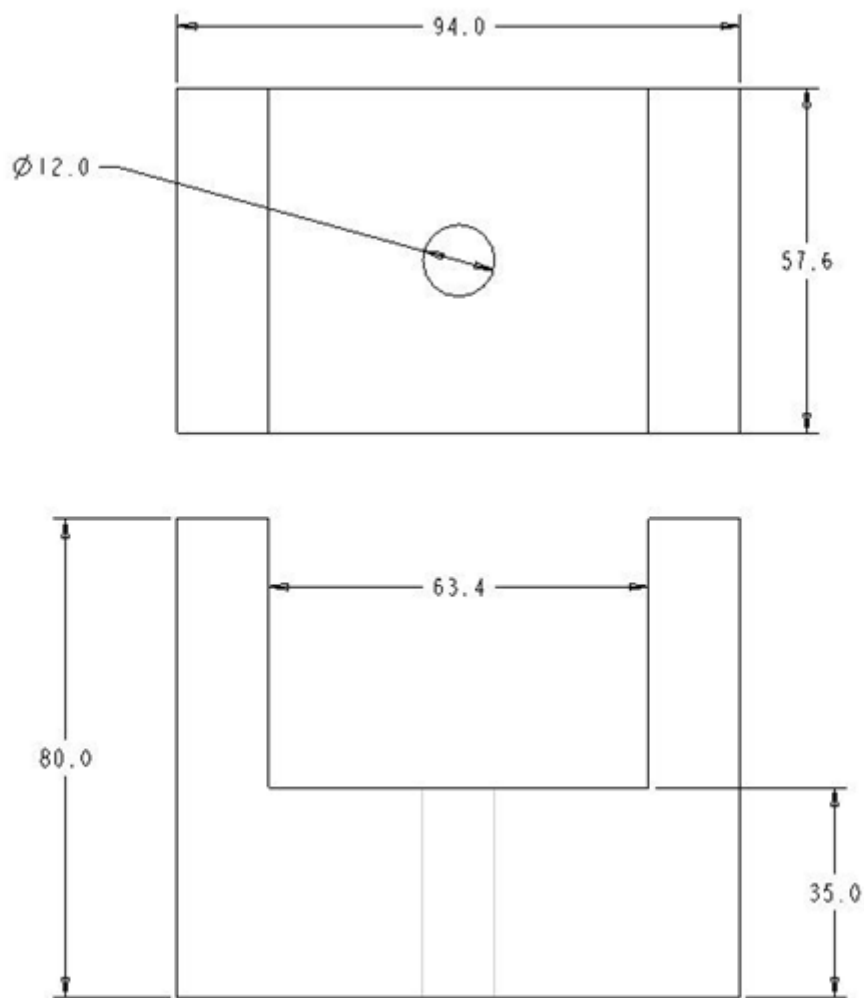
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**Figure 4: U-Blocks**

3.1.2.5 Metal plates for mat retainer. Dimensions are specified in Figures 5 and 6.

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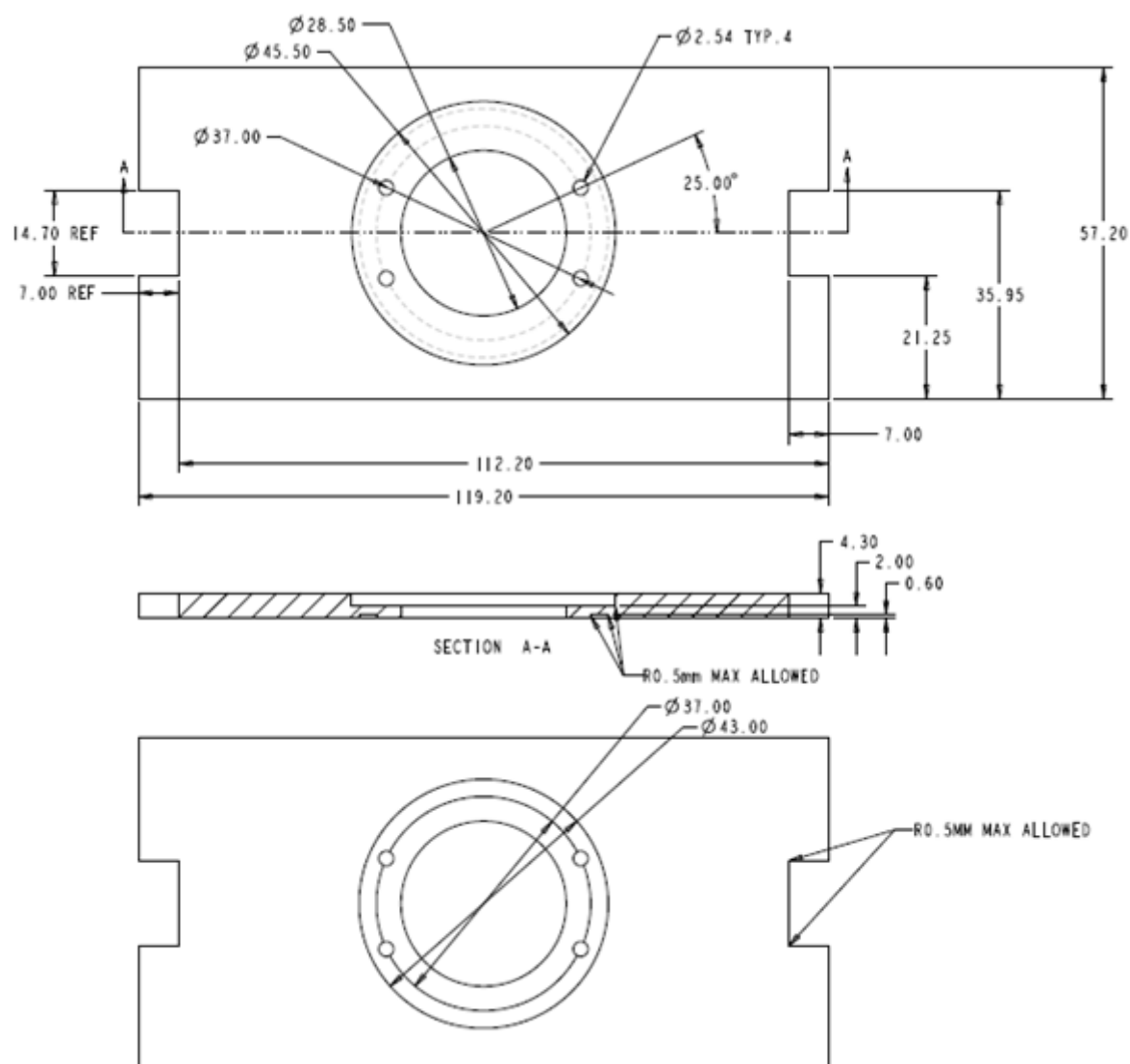


Figure 5: Metal Plate for Mat Retainer, Upper Test Panel

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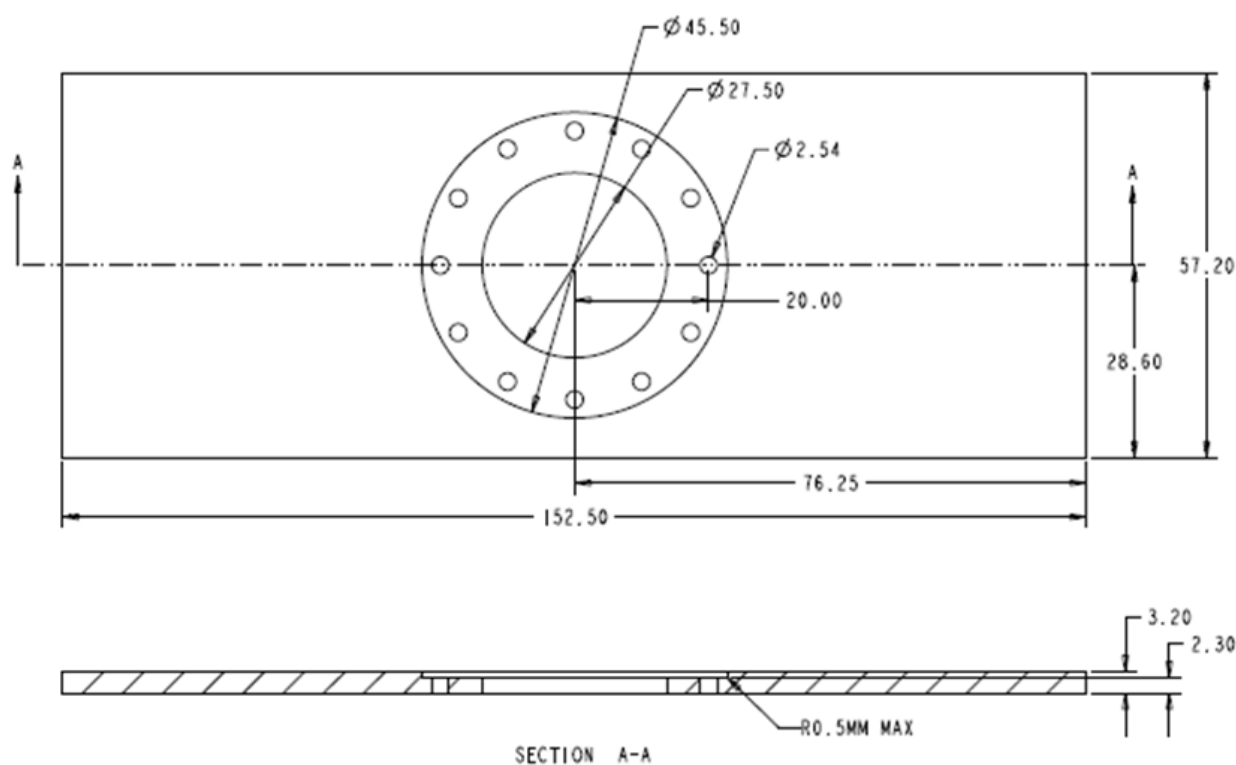


Figure 6: Metal Plate for Mat Retainer, Lower Test Panel

3.1.2.6 Clamp jaws made of aluminum or steel.

3.1.2.7 Metal test panels as shown in Figures 7 and 8.

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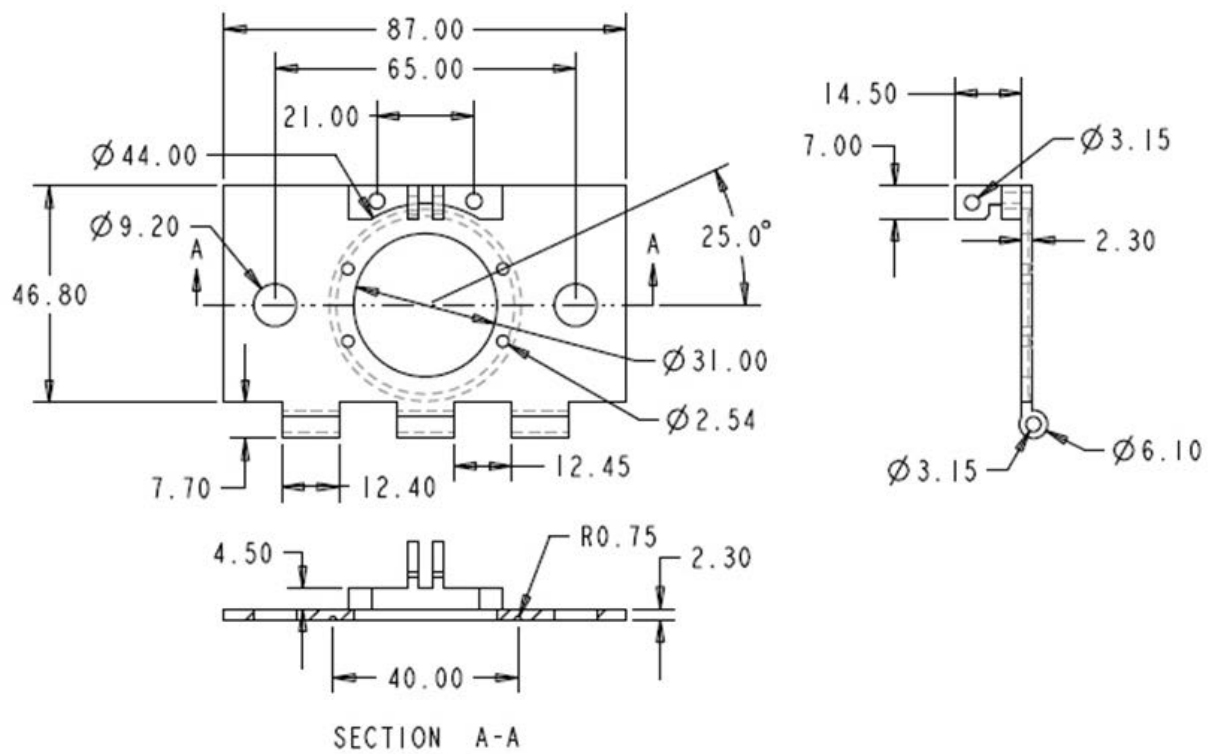


Figure 7: Top Panel

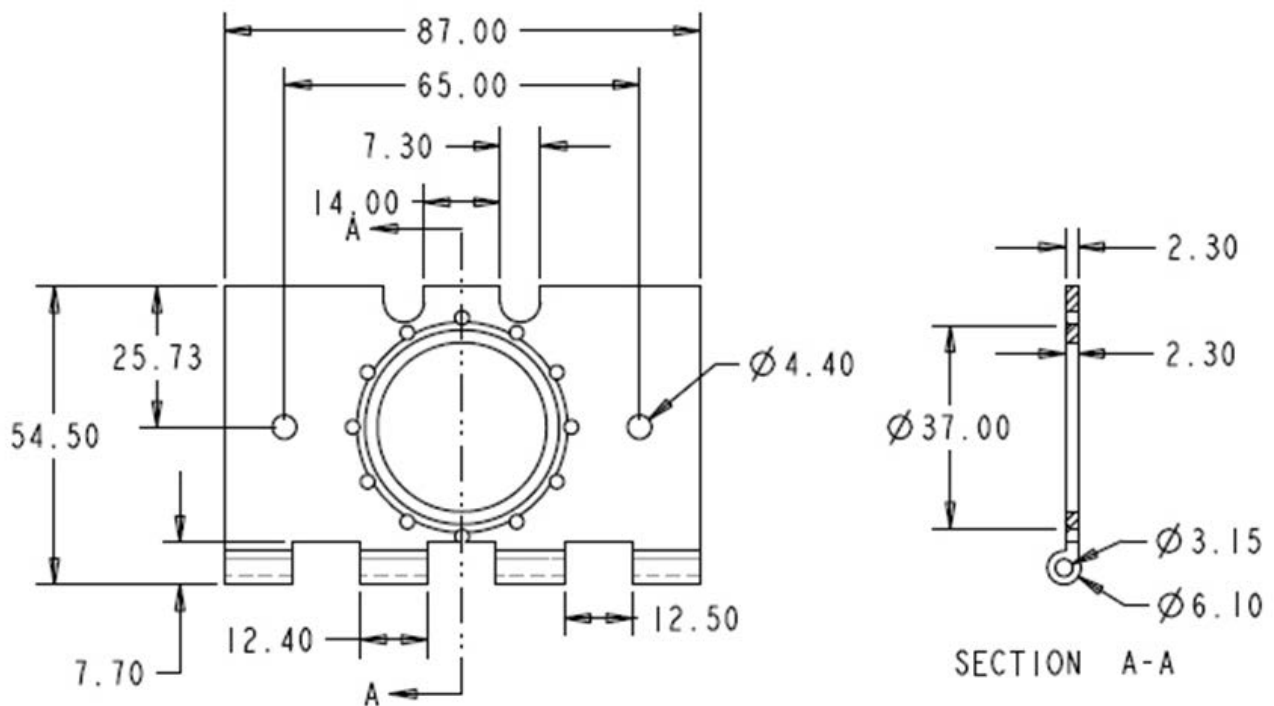


Figure 8: Bottom Panel

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3.1.2.7.1 The two plates will be connected using a hinge pin. The pin needs to be made to the dimensions shown in Figure 9.



Figure 9: Test Panels for the Peel Separation of Mat Grommets Test

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3.1.2.8 Hinge block as shown in Figure 10.

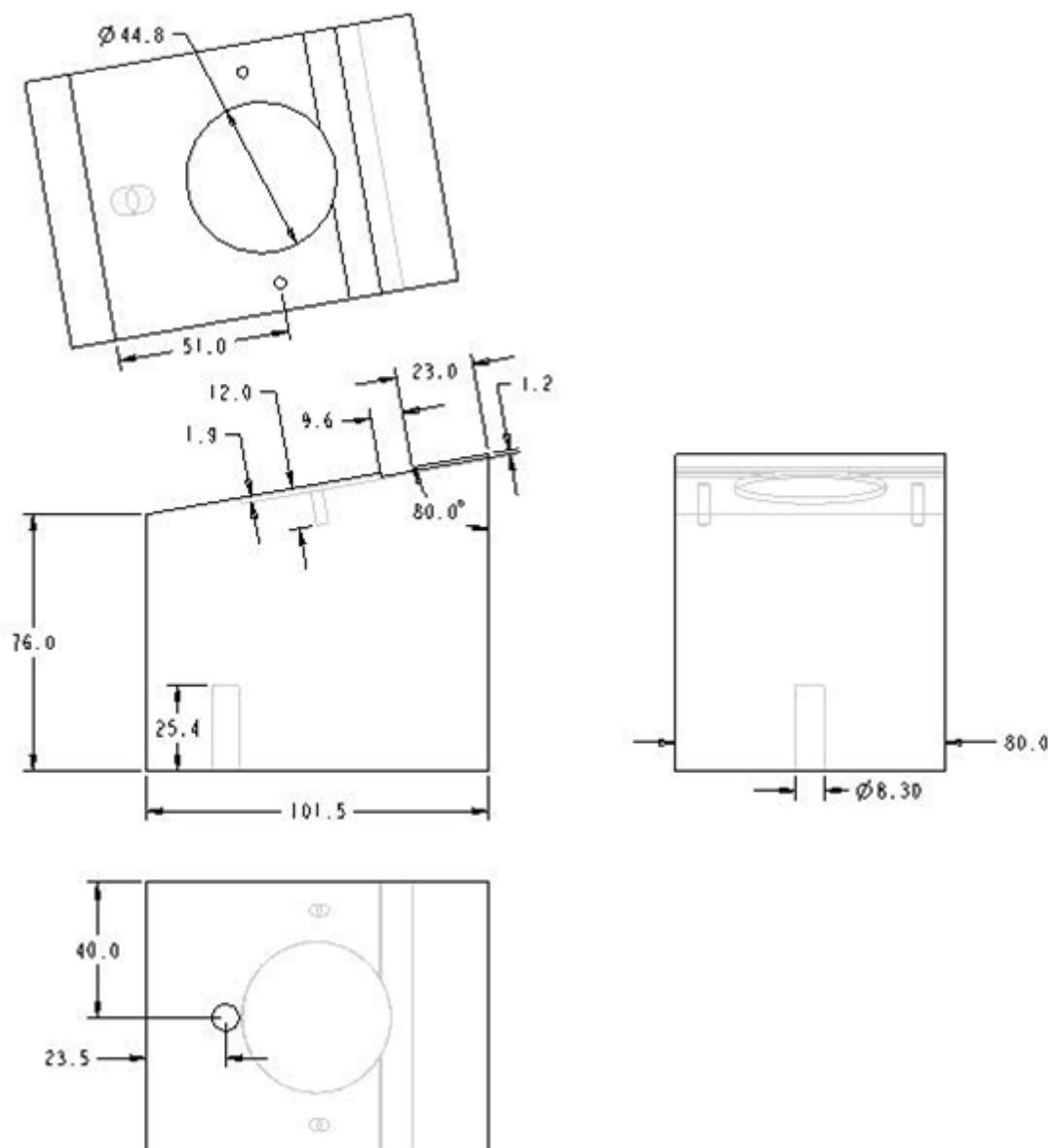


Figure 10: Hinge Block for the Peel Separation of Mat Grommets Test

3.1.3 Test Vehicle/Test Piece.

3.1.3.1 Test Vehicle. Not applicable.

3.1.3.2 Test Piece (Retainers). The finished button-style retainers, floor carpets and floor mats shall be tested. They should be production representative parts. Unless otherwise specified in the applicable Subsystem Technical Specification (SSTS), at least three test parts shall be tested at each environmental condition shown, if not otherwise agreed upon with the responsible Validation Engineer.

3.1.3.2.1 A new test part is to be used for each test/environmental condition.

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3.1.4 Test Time.

Calendar time: 7 days

Test time: 96 h

Coordination time: 24 h

3.1.5 Test Required Information. Not applicable.

3.1.6 Personnel/Skills. Not applicable.

3.2 Preparation. The button-style retainers, floor carpets, floor mats and floor liners shall be checked for conformance to the current development, drawing and release status before each test. Parts shall be undamaged and correctly installed. If this is not the case, the parts shall be replaced or corrected. Any modifications shall be noted in the test report.

3.3 Conditions.

3.3.1 Environmental Conditions. All testing is to be performed in the order shown.

3.3.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

All testing that is to be performed at ambient, cold, hot and humidity shall be conducted in the climatic chamber after a minimum part soak time of 1 h or as stated in the test instruction. The tests are to be performed in the chamber at the temperature specified. Parts to be tested are not to be soaked in the chamber and subsequently removed from the chamber for the duration of the test (i.e., soaking the parts in the chamber and bringing them into an ambient temperature lab for the duration of the test is not permissible under this specification).

3.4 Instructions. Refer to Section 4.

3.5 Data. The results of the testing shall be presented in a test report along with pictures of the floor mats and floor carpets prior to the testing and at the end of test. GM Evaluation Test Reports shall be stored in the Global Document Management (GDM) system.

3.6 Safety.

This Engineering Standard may involve safety requirements for hazardous materials, the method of operations and equipment. This standard does not propose to address all the safety issues associated with its use. It is the responsibility of the user of this standard to ensure compliance with all appropriate safety and health practices. This would include any specific training that may be required. The safety and health standards include site specific rules and procedures, company rules and procedures, and Government Standards. Contact shall be made with the appropriate site Safety and Health personnel for further direction and guidance in these matters.

3.7 Documentation. Samples of components or material released to this standard shall be tested for conformity with the requirements of this standard and approved by the responsible GM department prior to the start of delivery of production level components or materials.

Any change to the component or material, e.g., design, function, properties, manufacturing process and/or location of manufacture requires a new release of the product. It is the sole responsibility of the supplier to provide the customer, unsolicited, with documentation of any change or modification to the product/process, and to apply for a new release.

If not otherwise agreed to, the entire verification test shall be repeated and documented by the supplier prior to start of delivery of the modified or changed product. In some cases, a shorter test can be agreed to between the responsible GM department and the supplier.

3.7.1 Test Results. Test values are given within the text. Deviations from these values will be defined in the appropriate documents (e.g., program specific Statement of Requirements Appendix C2, part drawing, Engineering Work Order, and Subsystem Technical Specification).

4 Requirements and Procedure

4.1 General. The requirements and test procedures described in this specification should be performed on comparable button-style floor mat retainers (carpet and mat-side grommets) to GM part numbers 11611769 (carpet side grommet) and 11611771/11611770 (mat side grommets). Any deviation to the test procedures should be agreed upon with the responsible Subsystem Validation Engineer.

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Table 1 summarizes the component and subsystem level testing that should be performed on the floor trim retainers.

Table 1: Summary of Validation Tests for the Carpet Button-Style Retainer

Paragraph Number	Test Name	Test Requirements	Component/ Subsystem	Responsibility
4.2.1	Carpet Button-Style Retainer Unlatch Strength	Minimum tensile load of 675 N	Component	Retainer Supplier
4.2.2	Mat Vertical Engagement/ Disengagement Force	Insertion force 100 N maximum. Extraction force in the range of 80 N $\pm$ 20 N.	Component	Retainer Supplier
4.2.3	Mat Disengagement Peel	Extraction force shall be in the range of 75 N $\pm$ 25 N	Component	Retainer Supplier
4.2.4	Vertical Separation of Mat Grommets	Minimum extraction force of 600 N	Component	Retainer Supplier
4.2.5	Peel Separation of Mat Grommets	Minimum extraction force of 350 N	Component	Retainer Supplier
4.2.6	Vertical Drop Test	Must remain functional	Component	Retainer Supplier
4.2.7	Izod Impact Test	Minimum energy absorbed of 5.15 Joules	Component	Retainer Supplier
4.2.8	Step on Loading Test	Shall withstand an 890 N load	Component	Retainer Supplier
4.2.9	Force to Bend Carpet Retainer Post	Shall withstand a 650 N load	Component	Retainer Supplier
4.3.1	Floor Mat Button-Style Retainer to Floor Carpet Button-Style Retainer Durability Schedule	Retainers should remain functional	Subsystem	GM
4.3.2	Step On Loading	Shall withstand an 890 N load	Subsystem	GM
4.3.3	Mat Tear During a Peel Pull	Remain functional after a 135 N pull load. Note: Use a 1 kN Tensile Test Machine/Load Cell.	Subsystem	GM
4.3.4	Carpet Post Pull Test	Remain functional after a 250 N pull load	Subsystem	GM

4.2 Component Level Testing.

4.2.1 Carpet Button-Style Retainer Unlatch Strength. The test shall comply with the test requirements provided in Table 2.

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Table 2: Carpet Button-Style Retainer Unlatch Strength Requirements

General	
1	This table describes the test procedure to validate the carpet button-style retainer unlatch strength.
2	At least three test parts shall be tested (that are randomly selected from a minimum lot of 50 parts).
3	The test shall be run at ambient condition of $+23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$.
Equipment	
1	Tensile Test Machine
2	Metal plates described in Figures 2 and 3 are required for this test. In addition, the U-Blocks from Figure 4 will be used to hold the metal plates.
Instructions	
1	The test setup is shown in Figure 11.
2	The carpet button-style retainer will be mounted into the panel (Figure 2). The carpet button-style retainer will be latched and fully assembled around test panel from Figure 2. The test panel will be placed on top of the lower U-Block, with the carpet button-style retainer pointing downward.
3	Test panel from Figure 3 will be placed underneath test panel from Figure 2 and will be engaged around the male post of the carpet button-style retainer.
4	The top U-Block will be installed 90 degrees from the bottom U-Block on the crosshead of the test machine.
5	Test speed will be 102 mm/minute.
6	The test will be a compression test. The test will measure the maximum force required to pull the carpet button-style retainer out of test panel (Figure 2) or until failure of the button-style retainer.
Conditioning Sequences	
1	Ambient Condition. Soak test part for at least 1 h at $+23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ before testing. If a climatic chamber is used, test in the climatic chamber.
End of Test Requirements	
1	The button-style retainers shall not have any damage at the end of the test. (i.e., no cracks, no breakage, no white marks, no shape deformation, etc.)
2	The button-style retainers shall withstand a minimum tensile load of 675 N.
Alternative Test Method	
1	Not applicable.

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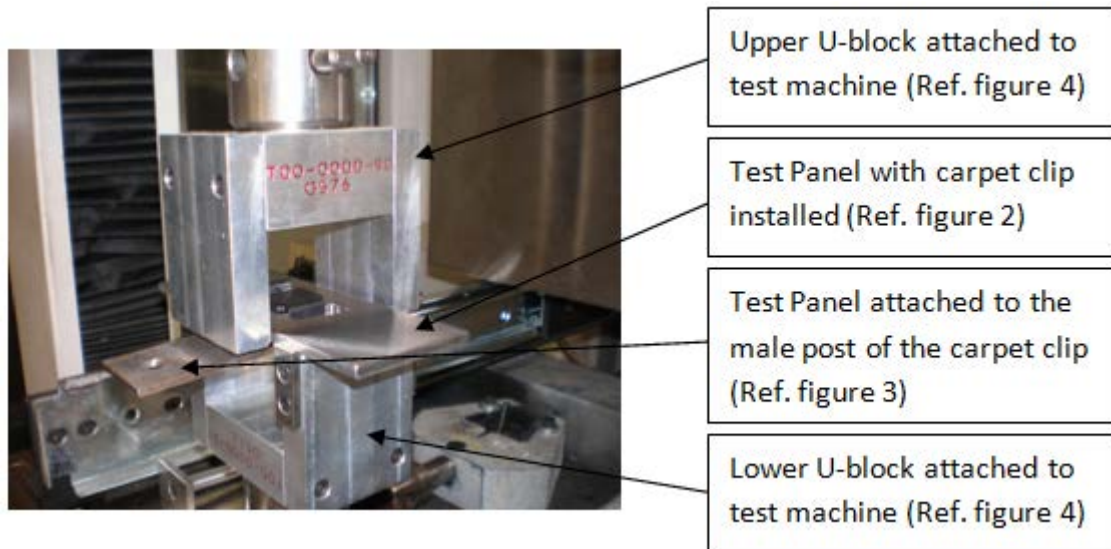


Figure 11: Test Setup for Carpet Button-Style Retainer Unlatch Test

4.2.2 Mat Vertical Engagement/Disengagement Force. The test shall comply with the test requirements provided in Table 3.

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