



Staking Joints Pull Out Strength Test

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 procedure establishes conditions and requirements for testing strength of stakes for door trim panel critical joints to be performed on regular production door trim assemblies as part of the steady state part monitoring. This test can be used earlier in the design process as a development test to either uncover failure modes through quick learning cycles or determine pull out strength requirements.

1.2 Applicability. This procedure shall be used for plastic interior components with thermoplastic staking joints unless otherwise specified.

2 References

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

2.1 External Standards/Specifications.

ISO 7500-1

2.2 GM Standards/Specifications.

None

3 Resources

3.1 Facilities. The test facilities should have a room capable to maintain environmental conditions per 4.2.1 when test is performed.

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

3.1.2 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.

3.2 Equipment. This procedure requires adequate physical equipment, installed and available, to meet the staking joints pull out strength. This includes the test machine, test specimen, fixtures, and tensile/compression gauges. The equipment required is in 3.2.1 through 3.2.4.

3.2.1 Test Machine. The force measuring device of the test machine shall correspond to ISO 7500-1 Class 1. The test machine shall be such that the required velocity can be maintained.

3.2.2 Test Holding Fixtures. Test fixtures shall be capable of securely holding the sample to be tested. The sample shall be held securely within the fixture such that the base of the specimen and the holding fixture are perpendicular to one another to apply a uniaxial load. Test fixtures are shown in Appendix A, Figure A1.

3.2.3 Test Gauges. The tensile/compression gauge with a measuring range of 0 N to 1000 N shall be used, connected to the test clamping hook to apply the load to the specimen. Test fixtures are shown in Appendix A, Figure A2.

3.2.4 Test Clamping Hook. The test clamping hook shall be used to securely hold the part of the specimen where the joint to be tested is subjected to an applied uniaxial load.

3.3 Test Vehicle/Test Piece.

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3.3.1 Test Specimen Size. Test samples of the critical staked joints for components, specified by the Design Release Engineer (DRE), have to be prepared by selecting door trim panels randomly from production, at the frequency specified per 3.3.2 and cut using mechanical methods, i.e., saw band, to the dimensions:

40 mm minimum (width) × 40 mm minimum (length)

Any other test sample dimension to facilitate either holding or to accommodate the testing hook shall be agreed with the DRE based on the feasibility of performing the test. One sample equals one door trim panel assembly. It shall be tested front and rear, both Left Hand (LH) and Right Hand (RH).

3.3.2 Number of Test Pieces.

3.3.2.1 For initial sample approval and arbitration purposes, the pull out strength of critical staking joints shall be determined on a minimum ten (10) test pieces.

3.3.2.2 For routine quality control a minimum of one (1) test sample shall be used per shift and model. Any other case shall be agreed upon with the DRE and the Supplier Quality Engineer (SQE). After demonstrated process stability, test frequency may change per agreement with the DRE and the SQE.

3.4 Test Time.

Calendar time: 1 days

Test hours: 2 to 4 hours

Coordination hours: 2 to 4 hours

3.5 Test Required Information. The DRE shall provide to the suppliers a map of the critical staking joints of the interior component to be tested. See Appendix A, Figure A3 for an example of the identification of critical joints.

3.6 Personnel/Skills.

3.6.1 Testers must be capable of operating the equipment including the instrumentation for data acquisition.

3.6.2 Testers must be capable to read drawings and diagrams for determination of the critical joints locations to be tested.

4 Procedure

4.1 Preparation.

4.1.1 Test Specimen Preparation.

4.1.1.1 Components for the first sample approval and arbitration purposes shall be tested not less than seven (7) days after manufacture.

4.1.1.2 Components for routine quality control purposes shall be tested not less than three (3) days after manufacture.

4.1.1.3 Prepare test samples of the components selected randomly from production per positions agreed on with the GM DRE, using the test specimen size per 3.3.1.

4.1.1.4 Label test samples indicating position number and production date.

4.2 Conditions.

4.2.1 Environmental Conditions. Perform test at ambient temperature; 23 °C.

4.2.2 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.

4.3 Instructions.

4.3.1 Test specimen shall be supported and secured to the test machine with test holding fixtures ensuring that the center line of the stake joint is aligned to the centerline of the test clamping hook to apply uniaxial tensile load.

4.3.2 Test clamping hook shall be positioned and tightened into the panel of the specimen to be pulled. See Appendix A, Figure A1 and Figure A4 for the test setup example.

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