



Air Induction Add-on Component Attachment Integrity Testing

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 test is to measure the force required to separate a component from a base part of an air induction system. A component includes Positive Crankcase Ventilation (PCV) fitting, Secondary Air Injection (SAI) port, resonator, bracket, Intake Air Temperature (IAT) sensor, filter restriction indicator, and turbo charger by-pass port which are attached to a base part by means of welding, clamping, insert or over moulding, press fitting, riveting, etc. A base part includes inlet air duct, outlet air duct, noise attenuator, pre-plenum, air cleaner, etc.

1.2 Applicability. This test is for the air induction system. This test method may also be used to establish quality control assessment.

2 References

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

2.1 External Standards/Specifications.

ASTM D200 SAE J200

2.2 GM Standards/Specifications.

None

2.3 Additional References.

CG1136 – Appendix C2 Air Induction Subsystem Technical Specification (SSTS)

3 Resources

3.1 Facilities.

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.

3.2.1 Test Stand.

3.2.1.1 The test apparatus shall be capable of applying and measuring a load to the test sample until the component is separated from the base part.

3.2.2 Fixtures to hold the test part.

3.2.2.1 The fixtures must allow no slippage between the test part and the fixture, so that distortion is avoided.

3.2.3 Thermometer to measure room temperature.

3.2.4 Relative humidity indicator to measure room conditions.

3.3 Test Vehicle/Test Piece. Test specimens shall be clean, dry, and previously unused.

3.4 Test Time.

Calendar time: 1 day
Test hours: 5 hours
Coordination hours: 1 hour

3.5 Test Required Information. A picture of the testing setup must be provided.

3.6 Personnel/Skills. Prior experience in setting up and running similar tests and experience in the use of the referenced test equipment.

4 Procedure

4.1 Preparation. The test sample must be conditioned at $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ for not less than 4 h.

4.2 Conditions.

4.2.1 Environmental Conditions. Environmental temperature should be $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$. Record temperature and relative humidity of test facility.

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. Reference Figure A1, Appendix A.

4.3.1 Attach fixtures to the test stand in accordance with the manufacturer's instructions or in a manner consistent with the test sample geometry.

4.3.2 Place the test piece into the fixture. Secure the component to the movable crosshead. Adjust the test stand so that there is no force acting on the component.

4.3.3 Pull the component in its axial direction to the hole in the base part (or perpendicular direction to the welding surface of the base part) at the rate of 50 mm/minute.

4.3.4 Push the component in its shear direction at 50 mm/minute and push point should be 10 mm away from the interface of component and base part.

4.3.5 Stop the machine when the component has separated from the base part.

4.3.6 Observe and record the force in Newton (N) required to separate the component from the base part.

4.3.7 Take a picture of where the component and the base part separated.

5 Data

5.1 Calculations. Not applicable.

5.2 Interpretation of Results. Refer to program SSTS, CG1136.

5.3 Test Documentation. An engineering report should be written following completion of this procedure. Data should be recorded on Data Sheet B1, Appendix B. Include the information in 5.3.1 thru 5.3.5.

5.3.1 Report material specification according to ASTM D200, SAE J200, etc. Indicate the mechanical retention method of the component to the base part.

5.3.2 Report the number of samples tested.

5.3.3 Mean, minimum, maximum, and standard deviation of forces required to separate the component from the base part.

5.3.4 Description of the test apparatus.

5.3.5 Picture of test apparatus with the test part.

6 Safety

This standard may involve hazardous materials, operations, and equipment. This standard does not propose to address all the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.