



Heated Seat Measurements

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 objectively measure the heated seat system in a seat assembly on a bench or in a vehicle. This test measures the seated surface when fully contacted by an occupant. Additionally this test verifies the logic and controls, when tested in conjunction with GMW16052, for the vehicle seat control system.

1.2 Applicability. This test procedure is applicable to all seating systems with heated seats.

1.3 Remarks. This test procedure is intended to measure the seat heater heat transfer to the top of the seat cover and occupant for validation of the seat subsystem. A vehicle level test can be conducted in conjunction with GMW16052 to include the complete seat control subsystem. When testing a seat subsystem outside of the vehicle, the vehicle logic needs to be simulated and applied at the heated seat module in order to verify the module in within the seat.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW14264 GMW16052

2.3 Additional References.

Anthropometric Reference Data for Children and Adults: United States, 2003-2006 from the Centers for Disease Control and Prevention (CDC) available at Uniform Resource Locator (URL): <http://wwwn.cdc.gov/nchs/nhanes/bibliography/Pubs.aspx?CatID=45&name=Anthropometry>

3 Resources

3.1 Facilities. A GM approved test lab with a controlled environment is the optimum condition, however, a garage with controllable ambient temperature may be utilized. In this case, a ventilation system is required for the vehicle exhaust.

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 Data Acquisition Computer. A portable computer with measurement software capable of capturing 0 V to 20 V voltage and 0 A to 50 A current at 1 Hz acquisition rate. The computer must be capable of capturing the measured data and converting the measured current shunt voltage to current in amperes.

3.2.2 Thermocouples/Thermistors. Twenty (20) thermocouples or thermistors for determination of the seat surface temperature (placed on the seat) and seat controls.

3.2.3 Nonconductive tape or Thermal Masses. Twenty (20) nonconductive tape or copper foil thermal masses to place at the ends of the thermocouples/thermistors. The nonconductive tape or thermal masses are 15 mm x 15 mm x 0.782 mm.

3.2.4 Thermographic Camera. For the locating and mapping the heating wires and heated surface area.

3.2.5 Current Shunt (0 A to 50 A). For measuring heater current.

3.2.6 Onboard Computer Timer Function. For measuring time intervals during data collection of time, voltage, amperage, and temperature.

3.3 Test Vehicle/Test Piece. For a vehicle level test, a vehicle with heated seat option. For bench testing outside of vehicle, a seat with heated seat option.

3.4 Test Time. Test time is dependent upon the control design of the heater to be tested, cumulative test times, including data recording time, are as follows.

Calendar time: 2 d

Test hours: 8 h

Coordination hours: 8 h

3.5 Test Required Information. See Section 5 and Appendix A data sheets.

3.6 Personnel/Skills.

3.6.1 Evaluator. This test procedure requires an evaluator that approximately represents 50% male human factors anthropometric measurements. See Table 1. The evaluator must wear jeans or similar material, such as khaki, without long underwear, a cotton t-shirt or light pullover, e.g., medium thick sweat shirt. No jackets, no winter or ski wear, no belts or braces. See the Anthropometric Reference Data for Children and Adults: United States, 2003-2006 from the Centers for Disease Control and Prevention (CDC) available at Uniform Resource Locator (URL): <http://wwwn.cdc.gov/nchs/nhanes/bibliography/Pubs.aspx?CatID=45&name=Anthropometry>.

Table 1: Evaluator Measurement Percentile Chart

Measurement	50% Male
Standing Height	178 cm $\pm$ 3 cm (5 ft 10 in $\pm$ 1 in)
Average Weight	75 kg $\pm$ 5 kg (165 lb $\pm$ 11 lb)

3.6.2 Test Engineer/Laboratory Technician. A Test Engineer or Laboratory Technician familiar with heated seats and voltage, current and temperature measurement equipment.

4 Procedure

4.1 Preparation.

4.1.1 Vehicle. Insure that the heated seat and all related electrical controls, wiring and controllers and software at the desired release level, e.g., production intent, Record part numbers and software levels on Data Sheet A1, Appendix A. Install vehicle exhaust gas ventilation.

4.1.2 Bench. Insure that the heated seat has all electrical controls, wiring and latest controllers and modules. Record seat part numbers and software level of the module on Data Sheet A1, Appendix A.

4.1.3 Thermocouples/Thermistors. Attached each thermocouple/thermistor with the thermally nonconductive tape and/or thermal masses as needed.

4.1.4 Seat Thermal Map. Map the location of the heater wires using the thermographic camera thermometer. See Figure 1, 4.3.1.2 and 4.3.2.2.

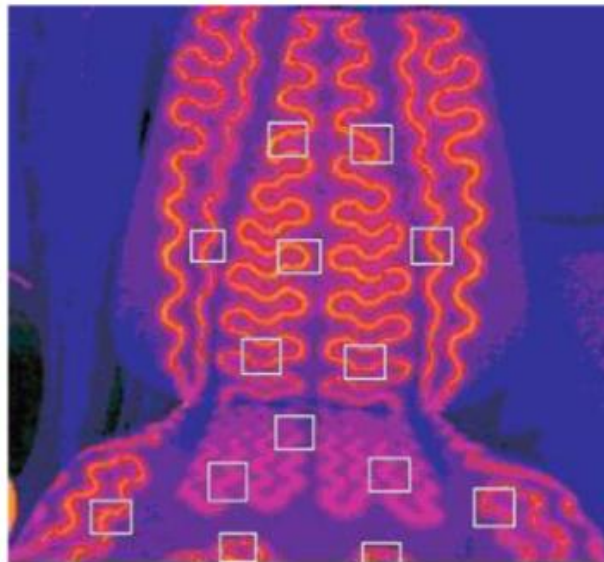


Figure 1: Typical Thermal Map of a Heated Seat

4.1.5 Temperature Measuring Points on the Seat. Attach fourteen (14) thermocouples onto the upholstered seat surface. Seven (7) on the seat cushion and seven (7) on the seat back. See Figure 2. The thermocouples/thermistors shall be placed over the heating wires unless a seam or stitches exist in the measurement area. In this case, the temperature sensor shall be positioned next to the seam/stiches and as close to the heating wire as possible, ensuring that the thermocouples are within the heated zone.

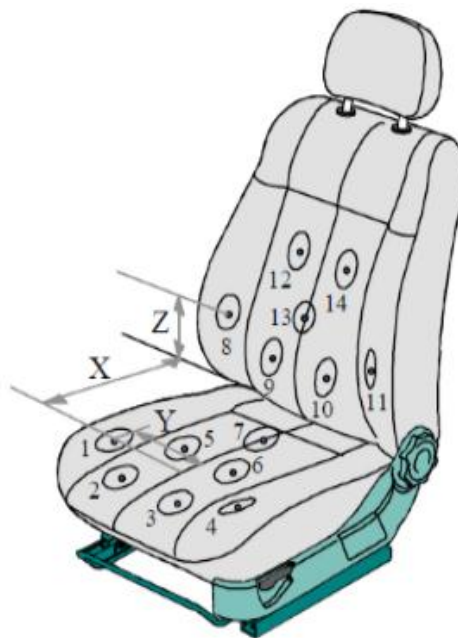


Figure 2: Typical Placement of the Thermocouple/Thermistors

4.1.6 Vehicle Interior Temperature. For a vehicle level test, install one (1) thermocouple/thermistor in the vehicle interior to measure the vehicle interior temperature.