Noise Evaluation, Idle Rattle (Manual Transmission)

1 Scope

Note: Nothing in this standard supersedes 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. Testing transmission noise while engine is running at idle speed.

1.2 Foreword. This test procedure was formerly known as GMI R-7B-4.

1.3 Applicability. This procedure is applicable for testing all FWD, AWD and RWD transmission.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

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3 Resources

3.1 Facilities.

3.1.1 Public roads or proving ground.

3.1.2 Climatic chamber (if necessary).

3.2 Equipment.

3.2.1 Sensors for transmission oil temperature and ambient temperature.

3.2.2 Attached tachometer and speedometer.

3.2.3 Writing material.

3.3 Test Vehicle/Test Piece.

3.3.1 New Transmission, assembled according to specification.

3.3.2 The engine type and vehicle equipment shall correspond to the release.

3.4 Test Time.

Calendar time:	3 days
Technician/ Mechanical/hours	9 hours
Preparation/documentation/hours:	3 hours

3.5 Test Required Information. Possible sources are:

- SOR
- VTS (Vehicle Technical Specifications)
- SSTS (Sub System Technical Specifications)
- ADV Plan
- VCRI
- Application engineer
- Development Groups
- Drawings

3.6 Personnel/Skills. Not applicable.

4 Procedure

4.1 Preparation.

4.1.1 Install new transmission.

4.1.2 The vehicle shall be filled with fuel. The transmission oil level, the coolant and the tire air pressure shall be checked and topped if necessary.

4.1.3 Prepare data sheet.

4.2 Conditions.

4.2.1 Environmental Conditions. Test will be performed on a level car park or if necessary in a climatic chamber.

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.

Note: If transmission oil temperature exceeds +170 °C, terminate test.

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4.3.1 Rattling of Cold Transmission.

Note: The rattling of the cold transmission is critical if the engine reduces the idle speed in the warming-up phase while the transmission is still cold.

4.3.1.1 The vehicle shall be parked on level ground with in quiet surroundings with the parking brake applied and the shift lever shall be in neutral position.

4.3.1.2 The rattle noise and F_{max} / clatter shall be evaluated with electrical load in idle speed at transmission temperature value of (-20…+15) °C.

4.3.2 Rattling of Warm Transmission.

4.3.2.1 General Instructions.

4.3.2.1.1 The engine shall be run until the transmission oil reaches +90 °C.

4.3.2.1.2 The vehicle shall be parked on level ground park in quiet surroundings with the parking brake applied and the shift lever shall be in neutral position.

4.3.2.1.3 The rattle noise and F_{max} / clatter shall be evaluated with electrical load and without electrical load.

4.3.2.2 Testing without Electrical Loads.

4.3.2.2.1 All electrical loads, such as air conditioning, heated rear screen, seat heating, lighting, fan, radio, etc. shall be switched off.

4.3.2.2.2 The engine shall be allowed to idle and the engine speed be rated with the clutch pedal not depressed.

4.3.2.2.3 The transmission noise level emitted shall be compared with the clutch depressed and with the clutch not depressed – in order to isolate the idle rattling. Clutch engagement noises caused thereby shall not be evaluated.

4.3.2.2.4 As the rattling is not always immediately clearly audible, the clutch shall be depressed repeatedly or the engine shall be allowed to idle for a few minutes.

4.3.2.2.5 The loudest rattle shall be subjectively assessed and rated according to GMW14264.

4.3.2.3 Testing with Electrical Loads.

4.3.2.3.1 All quiet electrical loads, such as lighting, heated rear screen, seat heating, shall be switched on.

4.3.2.3.2 It shall be observed if there is a decrease/increase of engine speed.

4.3.2.3.3 The engine shall be allowed to idle.

4.3.2.3.4 The engine speed shall be rated with the clutch pedal not pressed. The idle rattle shall be assessed as specified in paragraphs 4.3.2.2.3 through 4.3.2.2.5.

4.3.2.4 Special Testing during Development Work.

4.3.2.4.1 Assess the vehicle over the whole range of engine idle speed from (600 to 1000) min^{-1}, in order to determine the potential present for idle rattle according to paragraphs 4.3.2.2 and 4.3.2.3.

4.3.2.4.2 The changes in engine speed shall be performed by the engine specialists by considering the engine's particular engineering specification (idling fuel mix, idling behaviour, etc.) the loudest rattle shall be subjectively assessed and rated according to GMW14264.

5 Data

5.1 Calculations. Record the following data (the Test Engineer may require additional data):

1. Oil temperature
2. Ambient temperature
3. Engine type / engine km
4. DMF type
5. DMF basic hysteresis
6. Clutch disk / tolerance

5.2 Interpretation of Results. The assessments of the idling rattle according to SSTS/VTS.

5.3 Test Documentation.

5.3.1 Transmission Data. Record name and number of all parts removed or installed (gear, reduction and overall ratio, type of oil and quantity), cell and transmission numbers, test hours on part and on transmission, together with reason part was eventual removed.

5.3.2 Comment. Report a detailed comment of the transmission performance and of individual components.

5.3.3 Rating. Record test rating of transmission as a whole (for evaluation criteria, see paragraph 5.2).

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