



## **Thrust Button Wear – Axle Assembly**

### **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.** To evaluate wear characteristics of the axle shaft thrust button as used in the full axle assembly.

**1.2 Applicability.** This specification applies to passenger cars and light duty trucks.

### **2 References**

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

#### **2.1 External Standards/Specifications.**

None

#### **2.2 GM Standards/Specifications.**

None

#### **2.3 Additional References.**

- CG4636 Data Sheet for Thrust Button Wear Test
- Component Technical Specification (CTS)
- GM1829 Analysis/Development/Validation Plan and Report (ADVP&R)
- Statement of Requirements (SOR)
- Subsystem Technical Specification (SSTS) (for Axle or Rear Drive Module)
- Validation Cross Reference Index (VCRI)

### **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.

Record instrumentation calibration details and date of calibration on CG4636.

**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** Variable speed electric motor or other suitable driver capable of rotating the drive pinion to give 55 rpm ring gear speed. See Appendix A, Figure A1.

**3.2.2** Air or hydraulic cylinder capable of applying load through a thrust bearing to the rotating axle shaft.

**3.2.3** Timer controlled relay valve to cycle pressure to the cylinder on and off.

**3.2.4** Temperature monitoring equipment for axle sump temperature maximum limit of 100 °C (212 °F).

**3.2.5** Speed measuring equipment to monitor rpm of the rotating axle shaft.

**3.2.6** Fixtures and adapters to mount the test axle and equipment.

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### 3.3 Test Vehicle/Test Piece.

**3.3.1** One (1) complete axle assembly, without brake components.

**3.3.2** New axle shafts and differential pinion cross shaft are required for each test. Sample size is to be determined by the requesting engineer; sample size of six (6) is recommended.

### 3.4 Test Time.

|                     |          |
|---------------------|----------|
| Calendar time:      | 5 days   |
| Test hours:         | 24 hours |
| Coordination hours: | 8 hours  |

### 3.5 Test Required Information.

- Component Technical Specification (CTS).
- Statement of Requirements (SOR).
- Subsystem Technical Specification (SSTS).
- GM1829 Analysis/Development/Validation Plan and Report (ADVP&R).
- Validation Cross Reference Index (VCRI).

#### 3.5.1 Vehicle parameters.

- WT = Gross Vehicle Weight; Newtons (pounds).
- WR = Vehicle Rear Weight; Newtons (pounds).
- Y = Center of Gravity Height; millimeters (inches).
- TR = Rear Tread Width; millimeters (inches).
- WB = Wheelbase; millimeters (inches).

**3.5.2** Record 3.5.2.1 through 3.5.2.3 on CG4636.

**3.5.2.1** Gear ratio(s) of axle being tested.

**3.5.2.2** Axle/ Rear Drive Module (RDM) allowable oil temperature range.

**3.5.2.3** Pinion inclination angle of axle being tested.

**3.5.3** Obtain appropriate requirements for thrust button wear from SSTS. Acquire concurrence from the program team Design Release Engineer (DRE).

**Note:** Thrust button wear can be defined by change in endplay, or by detailed dimensional measurements.

**3.5.4** Additional customer requests or requirements must be provided in writing prior to start of test.

**3.6 Personnel/Skills.** Test Technician should be proficient in operation of the facilities listed in 3.1, proper selection, and operation of the equipment listed in 3.2 and familiar with the general operation of axle assemblies.

## 4 Procedure

### 4.1 Preparation.

**4.1.1 Axle Assembly and Test Monitoring Equipment.** Take build-up measurements of the axle assembly components and record the following information on the table titled Measurement Worksheet in CG4636:

- Hardness, finish, thickness, and dimensions A through E of the axle shaft thrust button.
- Hardness, finish and diameter of the pinion shaft.
- Hardness, finish, thickness and diameter of the C-Lock.
- End play of the axle shafts.

**4.1.2** Install the axle assembly on the test fixture with the drive pinion aligned to the design angle.

**4.1.3** Install the load cylinder such that load can be applied to the rotating axle shaft.

**4.1.4** Ground the stationary axle shaft such that it resists the axle load applied to the rotating shaft (the carrier and tube assembly is to be mounted so that it does not resist axial loading). Ensure the stationary shaft thrust button does not contact the differential pin.

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