GM WORLDWIDE ENGINEERING STANDARDS	Test Procedure	GMW17228

Brake Flange Ultimate 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. The purpose is to evaluate the axle brake flange ultimate strength.

1.2 Applicability. This specification is for any brake flange(s) on axle housings in Rear Wheel Drive (RWD)/Front Wheel Drive (FWD) trucks having a Gross Vehicle Mass Rating (GVMR) of 4536 kg or less.

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.

- Component Test Specification (CTS)
- Statement of Requirements (SOR)
- Subsystem Technical Specification (SSTS) (for Axle or Rear Drive Module)
- Validation Cross Reference Index (VCRI)
- Vehicle Technical Specification (VTS)

3 Resources

3.1 Facilities. The test facility shall have a valid International Organization for Standardization (ISO) certificate which is noted in the test report.

The tests shall be performed in a facility approved by GM. The environment of the test facility must be specified in the Vehicle Technical Specification (VTS), and used for validation purposes**.**

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.

3.1.3 Bedplate. A bedplate large enough for securing the test rig and capable of withstanding dynamic loading of the rig/specimen is required.

3.1.4 Control System. The control system shall consist of hardware to interface with the test cell systems and the test specimen, a computer, and software. The software shall manage measurements of key test cell and test specimen parameters and oversee safety monitoring.

3.2 Equipment.

3.2.1 The test equipment shall be capable of producing the loads required in this document. The equipment must also be capable producing the speed required at the input.

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3.2.2 Fixturing to hold the brake flange/rear axle in position. This may include angle stands, V-blocks, heim joints (rod end bearings), and other fasteners to complete the setup.

3.3 Test Vehicle/Test Piece. At least (3) rear axle housings with both left-hand and right-hand brake flange.

3.4 Test Time.

Calendar time:	5 days
Test hours:	8 hours (each piece)
Coordination hours:	8 Hours

3.5 Test Required Information. Possible sources are:

- Statement of Requirements (SOR)
- Subsystem Technical Specification (SSTS)
- Validation Cross Reference Index (VCRI)

3.6 Personnel/Skills. Test Technician. Should be proficient in proper selection and operation of the equipment listed in 3.2.

4 Procedure

4.1 Preparation. Fixturing should be designed and made to mount the test specimen to a bedplate. The axle must be held stationary with fixturing. The brake flange must be mounted to the actuator.

4.1.1 All samples shall be inspected for geometrical conformance with the appropriate specimen drawing (and weld specification, if applicable). Any non-compliant specimens must be set aside and a compliant specimen be tested in its place.

4.1.2 Check that all parts and fixtures needed are included for the mounting.

4.1.3 Paint critical areas with an appropriate color (e.g., white) to make it easier to find cracks.

4.1.4 Test Stand Review. The test setup and methodology must be reviewed with the GM System Validation Engineer (SVE). The GM SVE may request review by the Design Release Engineer (DRE) and/or the Bill of Material Family Owner (BFO). Photographs and/or computer aided design images of the test must be provided.

4.2 Conditions.

4.2.1 Environmental Conditions. Not applicable.

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. Fixture the axle housing in a test stand that is capable of required loading. The hydraulic actuation equipment should interface with the axle through a fixture that mounts in the same manner as the brake assembly. A torque should be applied to the brake flange until failure.

4.3.1 Unless otherwise specified, the GM SVE is to approve test setup.

4.3.2 Take photograph or digital image of test configuration.

4.3.3 New test samples shall be used. For product validation testing off-tool parts are mandatory. For design validation testing prototype parts may be used.

4.3.4 The test sample orientation on the test bench shall be the same as within the vehicle. Any deviation needs to be approved by the GM SVE and/or the DRE.

4.3.5 Test shall be controlled and monitored by a computer program. Load, displacement and cycles of the specimen shall be monitored through entire test until failure.

4.3.6 Failure mode is to be recorded and failure location shall be identified for each test specimen. Pictures shall be taken for typical failure modes and any anomalous failures documented and photographed.

5 Data

5.1 Calculations. Not applicable.

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