



Brake Flange Durability 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 of this test is to evaluate the performance of the brake flange during durability testing.

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.

GMW14988

2.3 Additional References.

- Component Technical Specification (CTS)
- Statement of Requirements (SOR)
- Subsystem Technical Specification (SSTS)
- 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.

A bedplate large enough for securing the test rig to accommodate the largest rear axle on test and capable of withstanding dynamic loading of the rig/specimen is required.

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 The test equipment shall be capable of producing the loads required in this document. The equipment must also be capable producing the frequency specified by GM engineers.

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

3.3 Test Vehicle/Test Piece. An axle housing with both left-hand and right-hand brake flange.

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3.4 Test Time.

Calendar time: 7 days to 10 days
 Test hours: 56 hours to 80 hours
 Coordination hours: Not applicable

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.**

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 Load Calculations for Brake Corner.

Note: The vertical loads are always applied upward relative to the vehicle.

4.1.4.1 Vertical Load for One Rear Wheel.

For forward braking (**Note:** A = 0.8):

$$V_R = \frac{\text{Rear GAWR}}{2} - \frac{GVW \times A \times H}{2 \times L}$$

For reverse braking (**Note:** A = 0.5):

$$V'_R = \frac{\text{Rear GAWR}}{2} + \frac{GVW \times A \times H}{2 \times L}$$

Where:

GAWR = Gross Axle Weight Rating
 GVW = Gross Vehicle Weight
 A = Multiplier from GMW14988 Brake Test
 H = Center of Gravity Height
 L = Wheel Base

4.1.4.2 Forward Braking Load for One Rear Wheel.

$$F_R = V_R \times A$$

4.1.4.3 Reverse Braking Load for One Rear Wheel.

$$R_R = V_R \times A$$

4.1.5 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.

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