SURFACE VEHICLE STANDARD

J2115™ JAN2026

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Superseding J2115 AUG2020

(R) Air Brake Performance and Wear Test Code Commercial Vehicle Inertia Dynamometer

RATIONALE

This revision was prompted by the Five-Year Review interval and contains editorial changes intended to make the document cleaner and more user friendly.

SAE J2115 has been reaffirmed to comply with the SAE Five-Year Review policy.

1. SCOPE

This SAE Standard provides test procedures for air and air-over-hydraulic disc or drum brakes used for on-highway commercial vehicles over 4536 kg (10000 pounds) GVWR. This recommended practice includes the pass/fail criteria of Federal Motor Vehicle Safety Standard No. TP-121D-01.

1.1 Purpose

To provide a standardized test version of the FMVSS TP-121D-01 brake performance test procedure, and a brake wear and effectiveness test procedure at increasing temperatures for disc and drum brake assemblies.

2. REFERENCES

2.1 Applicable Publications

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 Federal Publications

Available from the Superintendent of Documents, U. S. Government Printing Office, Mail Stop: SSOP, Washington, DC 20402-9320.

49 CFR 571.121 Air Brake Systems

TP-121D-01 Laboratory Test Procedure for FMVSS 121D Air Brake Systems - Dynamometer

3. THIS DOCUMENT PROCEDURE INCLUDES THE FOLLOWING INERTIA DYNAMOMETER TESTS

3.1 FMVSS TP-121D-01 Based Dynamometer Test Procedure

3.2 Brake Wear and Effectiveness at Temperature Test Procedure

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4. INSTRUMENTATION, EQUIPMENT, AND TEST CONDITIONS

4.1 Speed

4.1.1 Calculate rotational speeds based on the static loaded radius (SLR) for the tire size normally used to carry the requested test Gross Axle Weight Rating value.

4.2 Test Inertia

4.2.1 Test inertia should be equivalent to the loading conditions at which the brake normally operates within +0%, -2%.

4.2.2 Calculate the test inertia based upon the SLR and the wheel load as defined in 4.6.

4.3 Thermocouples

4.3.1 Plug type thermocouples shall be constructed as shown in Figure 1.

4.3.2 Lining Thermocouple

4.3.2.1 Install thermocouple in brake shoe lining as shown in Figures 2 and 3 for drum brakes.

4.3.2.2 Install thermocouple in brake pad lining as shown in Figure 5 for disc brakes (adjust installation location for grooves, chamfers, etc.)

4.3.3 Drum/Disc Thermocouple(s)

Note the two methods indicated below are not equivalent and may produce different results. The test report shall indicate the thermocouple method used.

4.3.3.1 Standard Method for Drum or Disc

Install thermocouple in drum or disc as shown in Figures 3, 4, and 6.

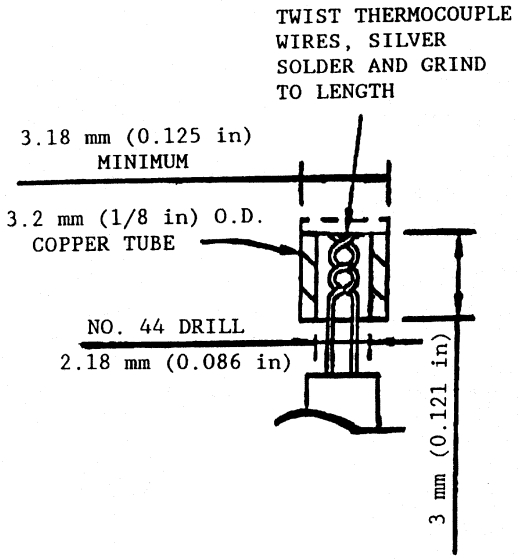


Figure 1 - Thermocouple construction

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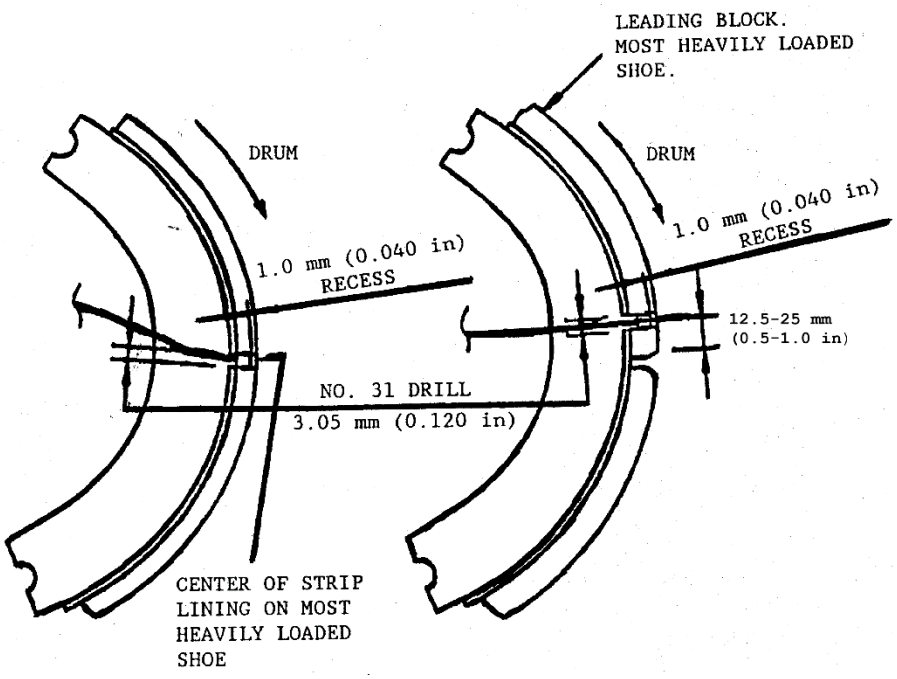


Figure 2 - Brake shoe thermocouple installation

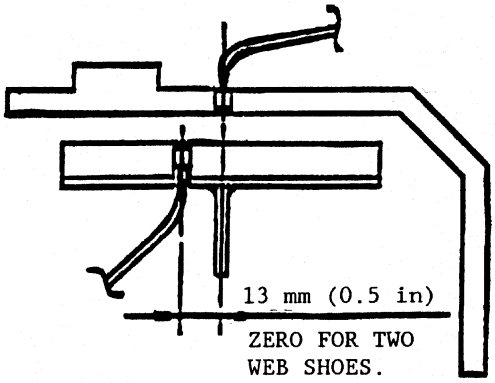


Figure 3 - Drum thermocouple and single web shoe thermocouple location

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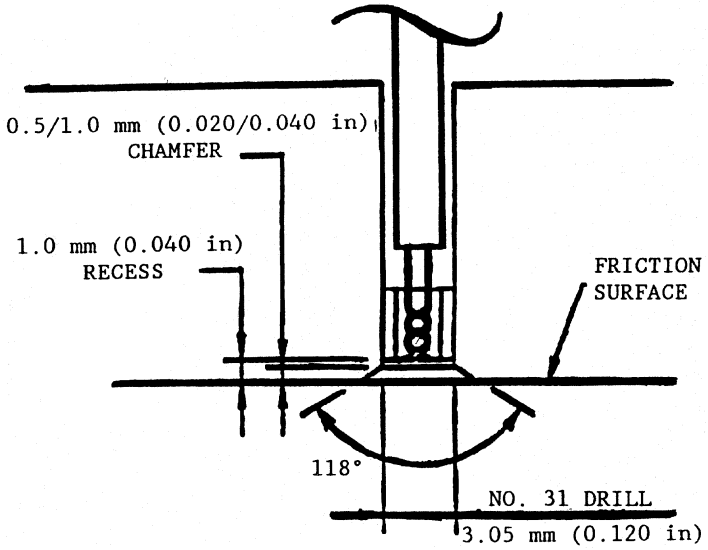


Figure 4 - Drum or disc thermocouple installation

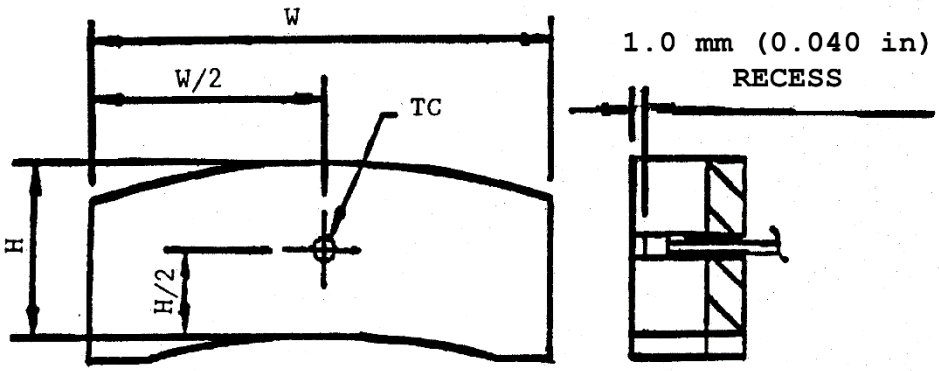


Figure 5 - Pad thermocouple location

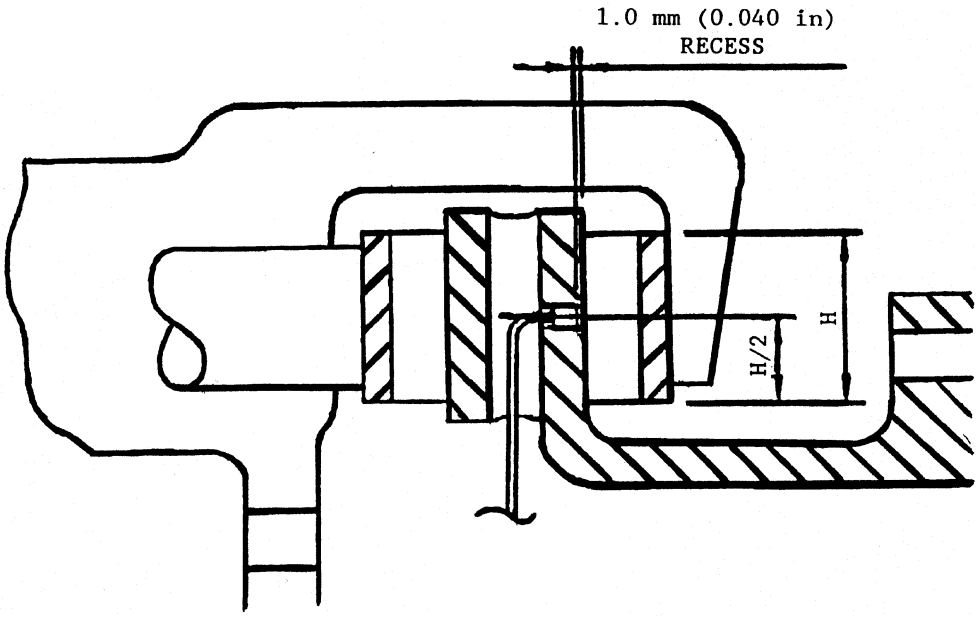


Figure 6 - Disc

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4.3.3.2 Optional Method for Drum or Disc

Install a 3 x 3 thermocouple array in drum or disc as shown in Photographs 1, 2, and 3 in Figures 7, 8, and 9. Place a group of three thermocouples every 120 degrees around the drum or disc circumference.



Figure 7 - Photograph 1: Disc inside diameter

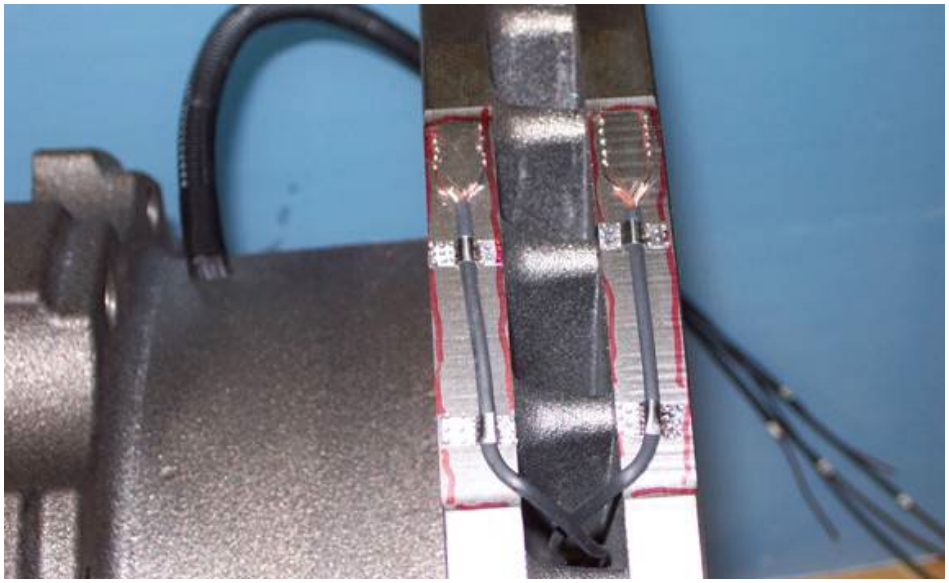


Figure 8 - Photograph 2: Disc outside diameter

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Figure 9 - Photograph 3: Drum

4.4 Cooling Air

4.4.1 Brake cooling air velocity shall be 609 to 730 m/min (2000 to 2400 ft/min) and directed uniformly and continuously over the brake at a temperature between 24 °C (75 °F) and 38 °C (100 °F) for both test procedures, except as specified in the brake wear and effectiveness at temperature test (see 7.6 and 7.7).

4.5 Brake Pressure Control

4.5.1 The brake pressure apply rate shall be 1660 kPa/s (240 psi/s) for all brake applications.

4.5.2 Brake pressure “over-shoot” shall not exceed 14 kPa (2 psi), with a duration not to exceed 0.2 second.

4.5.3 Brake pressure shall be controlled to ±7 kPa (±1 psi) of required test control values.

4.5.4 Average deceleration rate (not instantaneous) shall be controlled to ±0.1 m/s^2 (±0.33 ft/s^2) of required test control values with a maximum pressure modulation rate of 138 kPa/s (20 psi/s) after the onset of deceleration.

4.5.5 Do not exceed 745 kPa (108 psi) during any deceleration-controlled brake application.

5. DEFINITIONS

5.1 Anti-Lock Braking System (ABS)

Portion of the service brake system that automatically controls the degree of rotational wheel slip on one or more road wheels of the vehicle during braking. The ABS system uses wheel speed sensors, a control unit, and pressure modulating valves to perform the braking control.

5.2 Average Deceleration Rate

The change in velocity divided by the time elapsed measured from the onset of deceleration to final speed. Use the same interval (start and end points) for both the change in velocity and the elapsed time measurements.

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