SURFACE VEHICLE RECOMMENDED PRACTICE

J1469™ MAR2026

Issued 1988-06
Reaffirmed 1995-08
Revised 2026-03

Superseding J1469 MAR2019

Air Brake Actuator Test Procedure, Truck-Tractor, Bus, and Trailers

RATIONALE

This revision, based on feedback from document users, includes the following updates:

- Added 10 lbf/in^2 test pressure to the service force output in 7.3.2.10.
- Added an upper limit to the caging time allowed in 5.2.1.2 and 7.2.1.2.
- Clarified 7.2.1.1 excludes Test Unit A which performs Power Spring Preset in 5.2.1.
- Increased upper preload limit for 7.2.2.7, 7.2.2.8, 7.3.2.7, and 7.3.2.8 to 90 N.
- Changed 13.1.2.1, 13.2.2.2, and 13.3.2.2 from a specified cycle rate to a minimum rate and cycle count.

1. SCOPE

This SAE Recommended Practice provides procedures and methods for testing service, spring applied parking, and combination brake actuators with respect to durability, function, and environmental performance. A minimum of six test units designated A, B, C, D, E, and F are to be used to perform all tests per 1.1 and 1.2.

1.1 Test Procedures

a. Leak Rate – Parking and Service Chambers (see Section 4)

b. Maximum Release and Hold-Off Pressure – Parking Chamber (see Section 5)

c. Minimum Pressure Response – Service Chambers (see Section 6)

d. Force Output and Stroke – Parking and Service Chambers (see Section 7)

e. Low-Temperature Leakage (Arctic Option Included) – Parking and Service Chambers (see Section 8)

f. Low-Temperature Maximum Release and Hold-Off Pressure – Parking Chamber (see Section 9)

g. Low-Temperature Force Output – Parking Chamber (see Section 10)

SAE Executive Standards Committee Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2026 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, or used for text and data mining, AI training, or similar technologies, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: **Tel: 1-877-606-7323 (U.S. and Canada only)**
Tel: 1-724-776-4970 (outside U.S. and Canada)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: http://www.sae.org

For more information on this standard, visit
https://www.sae.org/standards/content/J1469_202603/

Document Sharing Hub
Full document details: SAE J1469-2026 Air Brake Actuator Test Procedure, Truck-Tractor, Bus, and Trailers

h. Low-Temperature Operational Tests – Service Chamber (see Section 11)

i. Chamber Volume – Parking and Service Chambers (see Section 12)

j. Corrosion Resistance – Combination, Parking, and Service Chambers (see Section 13)

k. Mechanical Back-Off Release Mechanism (see Section 14)

l. Elevated Temperature Cycle Test – Parking and Service Chambers (see Section 15)

m. Cycle Test – Parking (see Section 16) and Service Chambers (see 16.2)

n. Proof Pressure Test – Parking and Service Chambers (see Section 17)

o. Vibration Test (see Section 18)

1.2 Test Sequence Chart

The test sequence as charted in the “Test Sequence Chart” shall be mandatory except where indicated as optional (see Figure 1).

TEST DESCRIPTION		Test Procedure Section NO.	TESTS FOR SERVICE CHAMBERS ONLY						TESTS FOR PARKING CHAMBERS ONLY						TESTS FOR COMBINATIONS					
			TEST UNIT DESIGNATION						TEST UNIT DESIGNATION						TEST UNIT DESIGNATION					
			A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F
Leakage Rate	Park	4.1							X	X	X	X	X	X	X	X	X	X	X	X
	Service	4.2	X	X	X	X	X	X							X	X	X	X	X	X
Max Release & Hold-Off		5							X						X					
Min. Pressure Response		6	O												O					
Force Output and Stroke	Park	7.1							X	X	X	X	X	X	X	X	X	X	X	X
	Service	7.2	X	X	X	X	X	X							X	X	X	X	X	X
Low Temp. Leakage	Park	8.1							X						X					
	Service	8.2	X												X					
Low Temp. Max Release and Hold-Off		9							O						O					
Low Temp. Force Output	Park	10							O						O					
Low Temp. Operational		11	X												X					
Chamber Volume	Park	12.1							O						O					
	Service	12.2	X												X					
Corrosion		13						X						X						X
Mechanical Back-Off and Release		14							X					X	X					X
Elevated Temp. Test	Park	15.1										X						X		
	Service	15.2				X												X		
Cycle Test	Park	16.1								X	X		X			X	X		X	
	Service	16.2		X	X		X									X	X		X	
Proof Pressure	Park	17.1							X						X					
	Service	17.2	X												X					
Vibration		18				X						X						X		

1. Items marked with "X" are mandatory.
2. Items marked with "O" are optional.

Figure 1 - Test sequence chart

Documents
Document Sharing Hub
Full document details: SAE J1469-2026 Air Brake Actuator Test Procedure, Truck-Tractor, Bus, and Trailers

1.3 Purpose

This document provides uniform procedures and methods for laboratory testing of brake actuators used in air brake systems.

2. REFERENCES

2.1 Applicable Documents

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 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 1-877-606-7323 (U.S. and Canada only) or 1-724-776-4970 (outside U.S. and Canada), www.sae.org.

SAE J2899 Brake Adjustment Limit for Air Brake Actuators

2.1.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9500, www.astm.org

ASTM B117 Method of Salt Spray (Fog) Testing

3. DEFINITIONS

3.1 HOLD-OFF PRESSURE

A decrease of parking chamber air pressure for parking brake application (extend power spring).

3.2 RELEASE PRESSURE

An increase of parking chamber air pressure to release the parking brake (compress power spring).

3.3 PARKING CHAMBER APPLY

Extend power spring.

3.4 PARKING CHAMBER RELEASE

Compress power spring.

3.5 FULL STROKE

Maximum stroke of a unit.

3.6 RATED STROKE

Minimum design stroke of a unit.

Documents
Document Sharing Hub
Full document details: SAE J1469-2026 Air Brake Actuator Test Procedure, Truck-Tractor, Bus, and Trailers

3.7 SERVICE BRAKE ACTUATOR

Air-activated actuator for applying the foundation brake.

3.8 PARKING BRAKE ACTUATOR

Mechanically applied actuator for restraining the vehicle.

3.9 COMBINATION BRAKE ACTUATOR

Combined service and parking section actuator.

3.10 ZERO STROKE

Brake actuator pushrod must be in retracted position (foundation brake full-off).

3.11 FULLY CAGED POWER SPRING

Power spring restrained in its most compressed position within the brake actuator.

NOTE: This may be accomplished either pneumatically or mechanically per the manufacturer's recommended procedure.

4. LEAK RATE - PARKING AND SERVICE CHAMBERS

4.1 Leakage - Parking Chamber

4.1.1 Conditions

4.1.1.1 27 °C ± 11 °C (80 °F ± 20 °F) ambient temperature.

4.1.1.2 Parking chamber is to be uncaged.

4.1.2 Test Procedure

4.1.2.1 Preconditioning Cycle

4.1.2.1.1 Pneumatically actuate the parking chamber from fully applied to fully released and back to fully applied three times using 620 to 830 kPa (90 to 120 lbf/in^2) (gage) air pressure.

4.1.2.2 Pressurize the parking chamber with air to 860 to 900 kPa (125 to 130 lbf/in^2) (gage).

4.1.2.3 Allow the air pressure in the unit to stabilize for a minimum of 5 minutes.

4.1.2.4 Establish air pressure at 860 kPa ± 7 kPa (125 lbf/in^2 ± 1 lbf/in^2) (gage).

4.1.2.5 Measure leakage rate with a flow meter.

4.1.2.6 Record leakage rate.

AVA Documents Document Sharing Hub

Full document details: SAE J1469-2026 Air Brake Actuator Test Procedure, Truck-Tractor, Bus, and Trailers

4.1.3 Alternate Test Procedure

4.1.3.1 Preconditioning cycles per 4.1.2.1.1.

4.1.3.2 Connect the parking chamber to a 20485 cm^3 ± 820 cm^3 (1250 in^3 ± 50 in^3) air tank. U.S. 5-gallon tank acceptable as alternative.

4.1.3.3 Connect a pressure gage (or equivalent device) to measure pressure change.

4.1.3.4 Pressurize the parking chamber and air tank to 860 to 900 kPa (125 to 130 lbf/in^2) (gage) air pressure.

4.1.3.5 Stabilize the air pressure for a minimum of 5 minutes.

4.1.3.6 Establish a pressure of 860 kPa ± 7 kPa (125 lbf/in^2 ± 1 lbf/in^2) (gage) in the parking chamber and air tank and close shut-off valve at the air tank inlet.

4.1.3.7 Record the pressure change after 10 minutes ± 0.1 minute.

4.2 Leakage - Service Chamber

4.2.1 Conditions

4.2.1.1 27 °C ± 11 °C (80 °F ± 20 °F) ambient temperature.

4.2.1.2 Limit the stroke to 75% ± 5% of rated stroke.

4.2.1.3 Maintain the parking chamber at 860 to 900 kPa (125 to 130 lbf/in^2) (gage), if applicable.

4.2.2 Test Procedure

4.2.2.1 Precondition Cycles

4.2.2.1.1 Cycle the service chamber three times pneumatically by applying 620 to 830 kPa (90 to 120 lbf/in^2) (gage) from full stroke to zero stroke and back to full stroke position.

4.2.2.2 Pressurize the service chamber with 860 to 900 kPa (125 to 130 lbf/in^2) (gage) air pressure.

4.2.2.3 Allow the air pressure in the unit to stabilize for a minimum of 5 minutes.

4.2.2.4 Establish a pressure of 860 kPa ± 7 kPa (125 lbf/in^2 ± 1 lbf/in^2) (gage) in the service chamber.

4.2.2.5 Measure leakage rate with a flow meter.

4.2.2.6 Record leakage rate.

Documents
Document Sharing Hub
Full document details: SAE J1469-2026 Air Brake Actuator Test Procedure, Truck-Tractor, Bus, and Trailers

4.2.3 Alternate Test Procedure

4.2.3.1 Preconditioning cycles per 4.2.2.1.1.

4.2.3.2 Connect the service chamber to a 20485 cm^3 ± 820 cm^3 (1250 in^3 ± 50 in^3) air tank. U.S. 5-gallon tank acceptable as alternative.

4.2.3.3 Connect a pressure gage (or equivalent device) to measure pressure change.

4.2.3.4 Pressurize the service chamber and air tank to 860 to 900 kPa (125 to 130 lbf/in^2) (gage).

4.2.3.5 Stabilize the air pressure in the service chamber and air tank for a minimum of 5 minutes.

4.2.3.6 Establish a pressure of 860 kPa ± 7 kPa (125 lbf/in^2 ± 1 lbf/in^2) (gage) in the service chamber and air tank and close shut-off valve at the air tank inlet.

4.2.3.7 Record the pressure change after 10 minutes ± 0.1 minute. Use a stroke limiting device to restrain the pushrod to the required test stroke.

5. MAXIMUM RELEASE AND HOLD-OFF PRESSURE - PARKING CHAMBER

5.1 Conditions

5.1.1 27 °C ± 11 °C (80 °F ± 20 °F) ambient temperature.

5.2 Test Procedure

5.2.1 Power Spring Preset - Parking Brake

5.2.1.1 Fully cage the power spring in the parking chamber either pneumatically or mechanically as specified by the manufacturer.

5.2.1.2 Maintain the power spring in the caged position for 24 to 192 hours.

5.2.1.3 Release the power spring to a full stroke position after the required preset period.

5.2.2 Preconditioning Cycles

5.2.2.1 Apply preconditioning cycles per 4.1.2.1.

5.2.3 On the third cycle, measure and record stroke versus air pressure in the apply and release direction for the full stroke of the brake actuator. It is recommended measurements be taken in 5.0-mm (0.20-inch) increments or as otherwise specified.

6. MINIMUM PRESSURE RESPONSE - SERVICE CHAMBERS

NOTE: This test is optional and shall be performed only if required by the vehicle manufacturer or customer.

6.1 Conditions

6.1.1 27 °C ± 11 °C (80 °F ± 20 °F) ambient temperature.

6.1.2 Maintain the parking chamber at 860 to 900 kPa (125 to 130 lbf/in^2) (gage), if applicable.

Documents
Document Sharing Hub
Full document details: SAE J1469-2026 Air Brake Actuator Test Procedure, Truck-Tractor, Bus, and Trailers

6.2 Test Procedure

6.2.1 Slowly apply air pressure to the service chamber port. Measure and record air pressure value at which the pushrod extends to 5 mm ± 0.5 mm (0.20 inch ± 0.02 inch). This is the chamber response pressure.

6.2.2 Alternate Test Procedure

6.2.2.1 Record plot of chamber pressure versus stroke from fully released to fully applied position. Pressurize chamber slowly such that the test time is 30 seconds; pushrod travel speed should be approximately 152 mm/min (6 in/min).

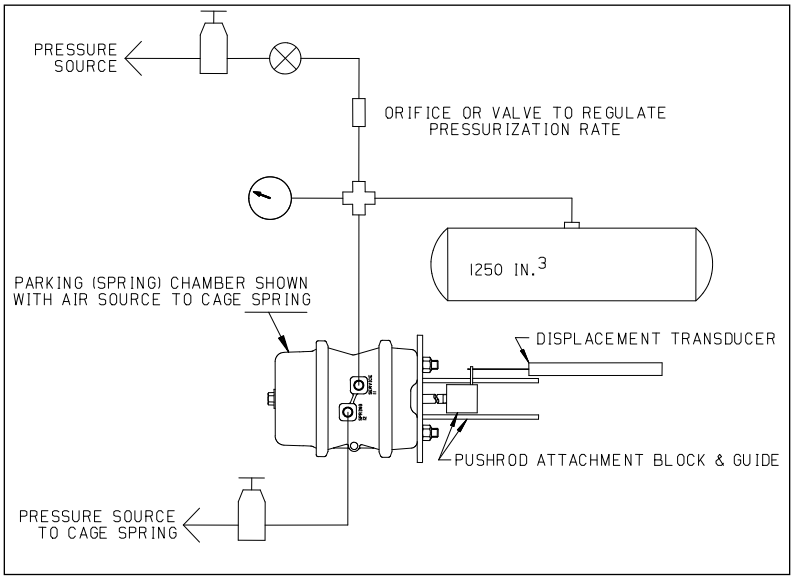


Figure 2 - Minimum pressure response test schematic

7. FORCE OUTPUT AND STROKE - PARKING AND SERVICE CHAMBER

7.1 Force Output and Stroke - Parking Chamber

7.1.1 Conditions

7.1.1.1 27 °C ± 11 °C (80 °F ± 20 °F) ambient temperature.

7.2 Power Spring Preset - Parking Brake

7.2.1.1 Fully cage the power spring in the parking chamber either pneumatically or mechanically as specified by the manufacturer except for Test Unit A (completed in 5.2.1).

7.2.1.2 Maintain the power spring in the caged position for 24 to 192 hours.

7.2.1.3 Release the power spring to a full stroke position after the required preset period.

Documents
Document Sharing Hub
Full document details: SAE J1469-2026 Air Brake Actuator Test Procedure, Truck-Tractor, Bus, and Trailers