



SURFACE VEHICLE STANDARD

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Superseding J1808 OCT1989

Vacuum Power Assist Brake Booster Test Procedure

RATIONALE

This standard is being revised because the state of the art for vacuum boosters has changed significantly since it was last published.

1. SCOPE

This document applies to direct acting vacuum power assist brake boosters only, exclusive of the master cylinder or other brake system prime mover devices for passenger cars and light trucks [4500 kg GVW (10 000 lb)]. It specifies the test procedure to determine minimum performance and durability characteristics.

1.1 Purpose

This document specifies standards for direct acting vacuum power assist brake boosters of current established designs. It is applicable to assemblies from commercial production, after production shipment, and remanufacture.

2. REFERENCES

2.1 Applicable Publication

The following publication forms a part of the specification to the extent specified herein. Unless otherwise indicated the latest revision of SAE publications shall apply.

JASO Standards C452:2005 "Automotive parts – Vacuum servo unit"

2.1.1 SAE Publication

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

3. DEFINITIONS

In order to establish and maintain a continuity of discussion throughout this document, the following definition of terms will be used.

NOTE: Figure 1 for illustration of terms as applied to a typical input-output force curve.

3.1 RELEASED

The unapplied, fully returned state with no force on the input push rod (with or without vacuum).

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3.2 POISE

The condition of placing the control valve in a steady state of force equilibrium so that the vacuum power assist brake booster is neither fully applied, nor fully released.

3.3 CUT-IN

The input force required to actuate the valving and produce an output force.

3.4 POWER SLOPE

The ratio of change in output force to change in input force in the area of performance above the initial rise and below the vacuum run-out point.

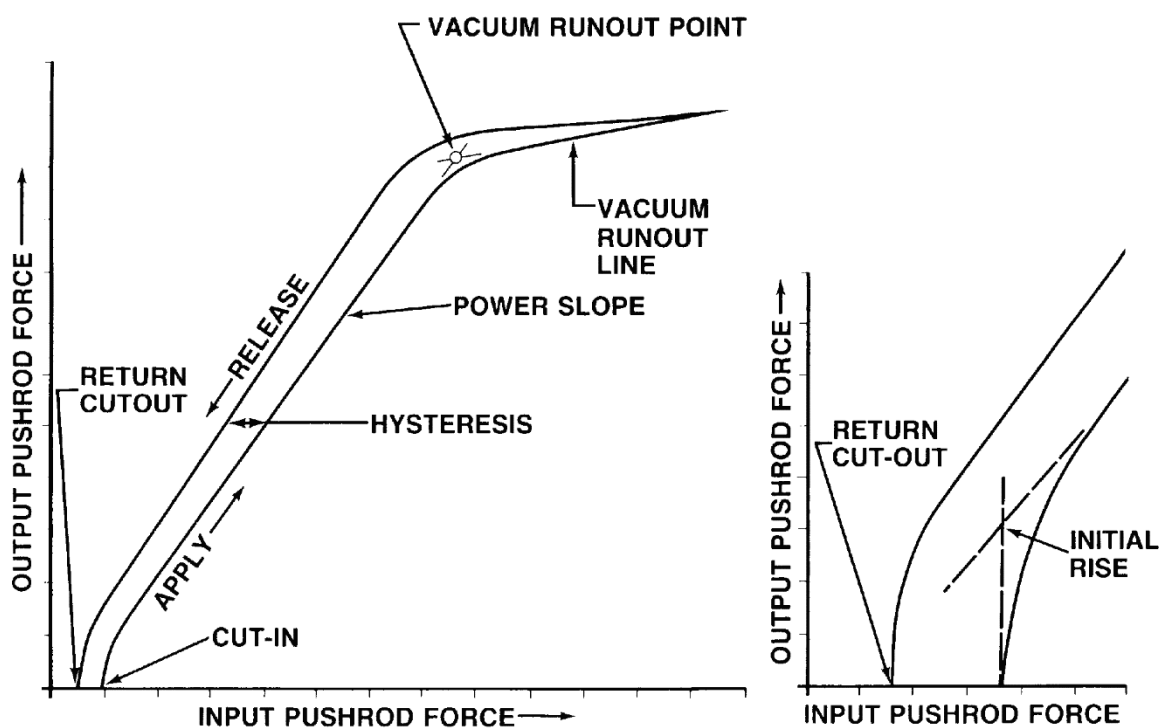


Figure 1 - Typical input-output (X-Y) curve

3.5 POWER BOOST

The output force minus the input force for a given vacuum level and with the maximum available pressure differential across the power piston(s), and at 80% of the usable output stroke of the booster.

3.6 VACUUM RUN-OUT LINE

The line defined by two or more points on the input-output curve beyond the input force at which all available pressure differential exists across the power piston(s).

3.7 VACUUM RUN-OUT POINT

The point defined by the intersection of the power slope line and the vacuum run-out line.

3.8 INITIAL RISE

The intersection of a vertical line through the cut-in point and the power slope line.

3.9 HYSTERESIS

The difference between apply and release input forces at a given output force during the power slope.

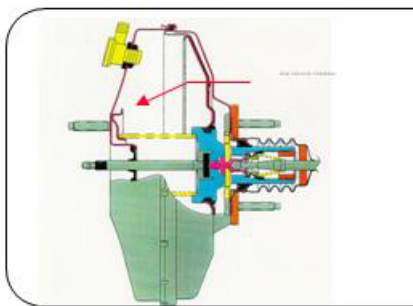
3.10 RETURN CUT-OUT

The input force at which the output force drops to zero or some specified level during release.

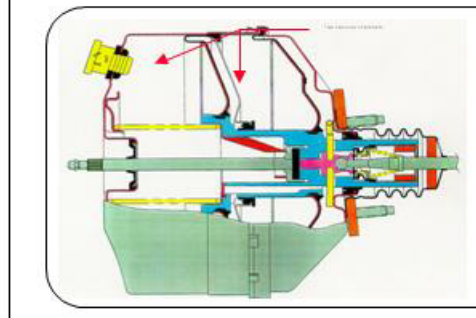
3.11 BOOSTER SIZE

Described by the maximum outside diameter, power boost at -80 kPa (23.62 in Hg) vacuum, and at 80% of the usable output stroke, and whether single or tandem.

Single



Tandem



4. TEST APPARATUS

The basic apparatus shall be that shown and as arranged in Figure 2 or equivalent. The apparatus shall operate per Section 4 and as called for in Section 6. It is desirable to have the test apparatus portable to facilitate cold, hot, and room temperature testing.

4.1 Force Absorbing Mechanism

The force absorbing mechanism shall be connected to the vacuum power assist brake booster front housing. This mechanism shall be capable of absorbing a minimum of 150% of booster vacuum run-out point output force, or 9000 N (2000 lb) output force, whichever is greater.