BRAKE SYSTEM PERFORMANCE REQUIREMENTS—TRUCK, BUS, AND COMBINATION OF VEHICLES—SAE J992 MAR85

SAE Recommended Practice

Report of the Brake Committee, approved July 1967, last revised, Brake and Automotive Safety Committee, May 1971, editorial change March 1978, reaffirmed without change March 1985.

1. Introduction—The performance requirements in this SAE Recommended Practice represent the accumulation of the best information available from investigation of the brake system performance of new motor vehicles designed for roadway use.

2. Scope—This SAE Recommended Practice presents performance requirements for the brake systems of motor vehicles intended for roadway use and falling into the following classifications:

Light trucks and buses: 6001–10 000 lb (2700–4500 kg) gvw

Truck and bus: Over 10 000 lb (4500 kg) gvw

Combination of vehicles [towing vehicle over 10 000 lb (4500 kg) gvw]

Acceptable performance requirements are based on data obtained from applicable sections of SAE J786a (March, 1978).

3. Purpose—The purpose of this recommended practice is to establish the minimum brake system performance requirements with regard to:

3.1 Stopping ability—of cold brakes, as affected by vehicle speed.

3.2 Stopping ability—of hot brakes, as affected by vehicle speed and duty cycle.

3.3 Pedal force (air pressure) requirements—maximum allowable.

3.4 Brake stability.

3.5 Stopping ability and recovery of wet brakes.

3.6 Stopping ability of emergency brake system.

3.7 Brake effectiveness distribution for vehicles in combination.

4. Instrumentation—See SAE J786a (March, 1978), Section 3.

5. Test Preparation—See SAE J786a (March, 1978), Section 4, except that drum, rotor, and lining measurements to establish wear are optional.

6. Test Procedure—See SAE J786a (March, 1978), Section 5.

7. Acceptable Performance Requirements

7.1 Preburnish Check—See SAE J786a (March, 1978), paragraph 5.3.

At some time during this test, the vehicle must attain a 14 ft/s² (4.3 m/s²) deceleration at less than 200 lb (890 N) pedal force.

7.2 Effectiveness Tests—See SAE J786a (March, 1978), paragraphs 5.6 and 5.12.

The maximum stopping distances and minimum decelerations listed in Table 1 shall be attained at a maximum pedal force of 200 lb (890 N), or at an air pressure less than the maximum value specified by the vehicle manufacturer, or less in each of the tests conducted under paragraphs 5.6 and 5.12, except for the optional hot curves. In all stops, the vehicle must be maintained in a 12 ft (3.7 m) roadway lane.

7.3 Emergency System Effectiveness Test—See SAE J786a (March, 1978), paragraph 5.7.

The maximum stopping distances and minimum decelerations listed in Table 2 shall be attained at a maximum pedal force of 200 lb (890 N), or at an air pressure less than the maximum value specified by the vehicle manufacturer, maintaining the vehicle in a 12 ft (3.7 m) roadway lane.

TABLE 1—EFFECTIVENESS TEST

Vehicle Classification	Max Stopping Distance from 20 mph (32 km/h), ft (m)	Min Deceleration, ft/s² (m/s²)	
		From 50 mph (80 km/h)[a]	From 60 mph (97 km/h)
Light trucks and buses [6001–10 000 lb (2700–4500 kg) gvw]	25 (7.6)	—	15 (4.6)
Truck and bus [over 10 000 lb (4500 kg) gvw]	35 (10.7)	12 (3.7)	—
Combination of vehicles	45 (13.7)	12 (3.7)	—

[a] Or maximum attainable under 50 mph (80 km/h).

TABLE 2—EMERGENCY SYSTEM EFFECTIVENESS

Vehicle Classification	Max Stopping Distance from 20 mph (32 km/h), ft (m)	Min Deceleration, ft/s² (m/s²)	
		From 50 mph (80km/h)[a]	From 60 mph (97 km/h)
Light trucks and buses [6001–10 000 lb (2700–4500 kg) gvw], empty and loaded	85 (26)	—	5.5 (1.7)
Truck bus and combination of vehicles [over 10 000 lb (4500 kg) gvw], loaded	85 (26)	5.5 (1.7)	—

[a] Or maximum attainable under 50 mph (80 km/h).

7.4 Brake Effectiveness Distribution for Air Braked Vehicle Used in Combinations in Interchange Operations—See SAE J786a (March, 1978), paragraph 5.8.

The service brakes on any vehicle in a combination shall have the capability of developing a deceleration at 20 mph (32 km/h) of 9½ ± 1½ ft/s² (2.9 m/s²) at the manufacturer's gvw rating at an application pressure from the service brake valve of 42 psi (290 kPa).

7.5 Fade and Recovery—See SAE J786a (March, 1978), paragraphs 5.9 and 5.13.

GENERAL DATA AND SUMMARY REPORT FORM

Vehicle: Make _____ Model _____ Year _____
Engine _____ Transmission _____ Axle _____
Weight—Loaded ____ lb Front ____ lb Rear ____ lb Trailer ____ lb
Empty ____ lb Front ____ lb Rear ____ lb Trailer ____ lb
Tires—Size _____ Make _____ Manufacturer's Designation _____
General Data _____

Brakes: Front—Size _____ Type _____
Rear—Size _____ Type _____
Trailer—Size _____ Type _____
Drum (Rotor) Type—Front: _____ Rear: _____ Trailer: _____
Hydraulic Break Data—
Power Type: _____ Model: _____ Dia: _____ Stroke: _____
Master Cyl: _____ Dia: _____ Stroke: _____
Pedal Ratio: _____ Avail. Travel: _____ Pressure at Runout: _____

Air Brake Data—	Front	Rear	Trailer
Chamber Type and Area			
Slack Adjuster (Lever Arm) Length			
Cam Radius or Wedge Ratio			

Test Information—Special Equipment _____

Tested by: _____ Location: _____ Date: _____

Test Phase	Required	Actual
Preburnish Check	14 fpsps at less than 200 lb pf	____ fpsps minimum at ____ lb
Effectiveness Test Light Trucks and Buses	At 200 lb pf or less and in a 12 ft lane 25 ft max at 20 mph 15 fpsps min at 60 mph	1st / 2nd Empty ____ ft ___ lb / ____ ft ___ lb Loaded ____ ft ___ lb / ____ ft ___ lb Empty ___ fpsps ___ lb / ___ fpsps ___ lb Loaded ___ fpsps ___ lb / ___ fpsps ___ lb
Effectiveness Test Trucks and Buses	At 200 lb pf or less and in a 12 ft lane 35 ft max at 20 mph 12 fpsps min at 50 mph	1st / 2nd ____ ft ___ lb / ____ ft ___ lb ____ fpsps ____ lb / ___ fpsps ___ lb
Effectiveness Test Combination of Vehicles	At 200 lb pf or less and in a 12 ft lane 45 ft max at 20 mph 12 fpsps min at 50 mph	1st / 2nd ____ ft ___ lb / ____ ft ___ lb ____ fpsps ____ lb / ___ fpsps ___ lb

Test Phase	Required	Actual
Emergency System Effectiveness Test Light Trucks and Buses	At 200 lb pf or less and in a 12 ft lane 85 ft max at 20 mph 5.5 fpsps min at 60 mph	20 mph System 1 / System 2 Empty ____ ft ___ lb / ___ ft ___ lb Loaded ____ ft ___ lb / ___ ft ___ lb 60 mph Empty ___ fpsps ___ lb / ___ fpsps ___ lb Loaded ___ fpsps ___ lb / ___ fpsps ___ lb
Emergency System Effectiveness Test Truck, Bus, and Combination of Vehicles	At 200 lb pf or less and in a 12 ft lane 85 ft max at 20 mph 5.5 fpsps min at 50 mph	20 mph System 1 ____ ft ____ lb ____ fpsps ____ lb 50 mph System 2 ____ ft ____ lb ____ fpsps ____ lb
Brake Effectiveness Distribution for Air Brake Vehicles Used in Combination in Interchange Operations	For Service Brakes Used on Any Vehicle Used in Interchange Operations 9-1/2 ± 1-1/2 fpsps From 20 mph at 42 psi	Tractor Brakes ____ fpsps Trailer Brakes ____ fpsps
Fade and Recovery Tests Avg Baseline pf or lp Fade Stops Recovery Stops	200 lb pf max ± 33% of Baseline Stop	Initial / 2nd lb / lb ____ psi / ____ psi ___ lb pf max / ___ lb pf max ___ % / ___ %
Water Recovery Test Avg Baseline pf or lp Recovery Stop 15	Within 20 lb or 20 psi of Average Baseline	Average baseline ____ lb ____ lb ____ psi
Stability During Effectiveness Tests	No uncontrollable Braking Causing Vehicle to Leave 12 ft Wide Lane	Controllable Braking Yes ____ No ____
Final Inspection Lining Integrity Mechanical Integrity Hydraulic Integrity	Intact and No Cracks Intact and No Functional Leak Free	Yes ____ No ____ Yes ____ No ____ Yes ____ No ____

Comments: _____

Reported by: _____ Date _____

NOTE: SI Equivalents are:

ft/s²	m/s²
5.5	= 1.7
9.5 ± 1.5	= 2.9 ± 0.5
12	= 3.7
14	4.3
15	4.6

20 lb = 89 N
200 lb = 890 N

ft	m
12	= 3.7
25	= 7.6
35	= 10.7
45	= 13.7
85	= 26

20 mph = 32 km/h
50 mph = 80 km/h
60 mph = 97 km/h

20 psi = 138 kPa
42 psi = 290 kPa

FIG. 1—GENERAL DATA AND SUMMARY REPORT FORM