Brake System Road Test Code—Passenger Car and Light Duty Truck—Trailer Combinations—SAE J134b

SAE Recommended Practice
Last Revised August 1975

THIS IS A PREPRINT AND WILL APPEAR IN THE NEXT EDITION OF THE SAE HANDBOOK

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PREPRINT

BRAKE SYSTEM ROAD TEST CODE – PASSENGER CAR AND LIGHT DUTY TRUCK – TRAILER COMBINATIONS – SAE J134b

SAE Recommended Practice

Report of Brake Committee approved December 1970 and last revised August 1975.

1. INTRODUCTION–This recommended practice, in conjunction with SAE J135, is intended for use primarily by: (a) tow vehicle manufacturers testing with unbraked trailers to determine the maximum weight unbraked trailer which can be towed, and (b) by interested manufacturers to determine the adequacy of trailer brake systems. This procedure assumes a tow vehicle complying with existing applicable legal requirements.

2. SCOPE–This SAE recommended practice establishes a uniform procedure for the level road test of the brake systems of all combinations of new multipurpose passenger vehicles, new light-duty trucks up to and including 10,000 lb (4500 kg). GVW and new passenger cars when coupled with new trailers (braked or unbraked). For purposes of this test, adherence to each manufacturer's recommendations[1] is mandatory.

3. PURPOSE–The purpose of the test code is to establish a uniform test procedure to determine capabilities with regard to:

3.1 Deceleration versus input, as affected by vehicle speed, brake temperature and usage.

3.2 Brake system integrity within the limits of this test.

3.3 Stopping ability during:

3.3.1 Emergency conditions; and,

3.3.2 Inoperative power assist conditions.

4. INSTRUMENTATION

4.1 Tow vehicle line pressure and/or pedal force gage.

4.2 Decelerometer (U-tube or equivalent).

4.3 Direct reading temperature instrument.

4.4 Speedometer (calibrated vehicle unit or fifth wheel type).

4.5 Tire pressure gage.

4.6 Odometer (calibrated).

4.7 Thermometer–ambient (or ambient sensitive thermocouple).

4.8 Stopmeter (fifth wheel, distance only).

4.9 Voltmeter and Ammeter (where applicable).

4.10 Stop watch.

4.11 Trailer line pressure gage (where applicable).

4.12 Optional instrumentation.

4.12.1 Pedal travel gage.

4.12.2 Stop counter.

4.12.3 Strain gage ball or equivalent and required equipment to record fore and aft loads imposed on the tow vehicle.

5. INSTALLATION DETAILS

5.1 Friction Material Preparation–Attach and finish friction material per vehicle manufacturer's specifications.

5.2 Thermocouples–Install thermocouples in each tow vehicle and trailer brake per current SAE J843, BRAKE SYSTEM ROAD TEST CODE – PASSENGER CAR.

5.3 Brake Drum (or Rotor) and Hub Assembly–New drums (or rotors) recommended for each complete test (section 6). Surface finish and dimensional characteristics including runout of rubbing surface to be in accordance with manufacturer's specifications.

5.4 Brake Assembly

5.4.1 Towing Vehicle–Brakes to be prepared in accordance with manufacturer's specifications. New springs and linings recommended on all brakes for each complete test (section 6). Adjust brakes to manufacturer's specifications.

5.4.2 Towed Vehicle–Applicable only when evaluating trailer brake systems. For all other tests trailers should be unbraked. Brakes are to be prepared in accordance with manufacturer's specifications. New springs, linings, magnets and armatures where applicable are recommended on all brakes for each complete test (section 6). Adjust brakes to manufacturer's specifications.

5.5 Towing Vehicle Test Weight

5.5.1 Passenger Car–The manufacturer's recommended axle test loading

GENERAL DATA

TRAILER
TRAILER MAKE _____ MODEL _____ YEAR _____
NUMBER OF AXLES _____ NUMBER OF BRAKES _____ TIRE SIZE _____
TIRE MFG. AND TYPE _____ TIRE PRESSURE _____
WEIGHT _____ LB (KG) + _____ LB (KG) BALLAST = _____ LB (KG) (UNCOUPLED)
TONGUE LOAD AT COUPLING _____ PERCENT OF TOTAL _____ %
TYPE OF HITCH _____
TRAILER AXLE(S) WEIGHT (COUPLED): FRONT _____ LB (KG) REAR _____ LB (KG) TOTAL _____ LB (KG)
BRAKES
SIZE _____ TYPE _____ CYL DIA _____
LINING _____
TYPE OF ACTUATION _____

TOWING VEHICLE
MAKE _____ MODEL _____ YEAR _____
ENGINE _____ TRANSMISSION _____ AXLE RATIO _____
CURB WEIGHT: FRONT _____ LB (KG) REAR _____ LB (KG) TOTAL _____ LB (KG)
TEST WEIGHT: FRONT _____ LB (KG) REAR _____ LB (KG) TOTAL _____ LB (KG) (TRAILER COUPLED)
GVWR OR GCWR WEIGHTS _____ _____ _____ _____
MINIMUM WEIGHTS _____ _____ _____ _____
TIRE MFGR _____ SIZE _____ PRESSURE: F _____ R _____
BRAKES
FRONT SIZE _____ DESCRIPTION TYPE _____ CYL DIA _____
REAR SIZE _____ DESCRIPTION TYPE _____ CYL DIA _____
LINING FRONT _____ REAR _____
DRUM (DISC) TYPE: FRONT _____ REAR _____
MASTER CYL DIA _____ STROKE _____ SPLIT: FRONT _____ % REAR _____ %
PEDAL: PEDAL RATIO _____ AVAILABLE TRAVEL _____
POWER BRAKE YES _____ NO _____ TYPE _____
HYDRAULIC SYSTEM FRONT METERING _____ PSI REAR PROPORTIONING SPLIT _____ PSI SLOPE _____ OTHER _____

TEST INFORMATION
THERMOCOUPLE INSTALLATION METHOD _____
TESTED BY _____ LOCATION _____
DATE: TEST STARTED _____ TEST COMPLETED _____
AMBIENT TEMPERATURE RANGE: HIGH _____ F (C) LOW _____ F (C)

FIG. 1–GENERAL DATA SHEET

SUMMARY SHEET

TEST NO. _____
TEST PHASE

	ACTUAL
PREBURNISH CHECK	_____ MIN _____ MAX LB (N) PEDAL FORCE
EFFECTIVENESS TESTS	1ST 2ND 3RD
30 MPH (48 km/h) AT 16 FT/S^2 (5.2m/s^2)	_____ _____ _____ LB (N) PEDAL FORCE
60 MPH (97 km/h) AT 16 FT/S^2 (5.2m/s^2)	_____ _____ _____ LB (N) PEDAL FORCE
EMERGENCY BRAKE TEST	TYPE: POWER _____ MANUAL _____
WARNING SYSTEM ACTUATION	GVWR OR GCWR
60 MPH (97 km/h) STOPPING DISTANCE	FRONT OPERATING _____ FT (m) _____ LB (N) PEDAL FORCE
	FRONT OPERATING _____ FT (m) _____ LB (N) PEDAL FORCE
	REAR OPERATING _____ FT (m) _____ LB (N) PEDAL FORCE
	REAR OPERATING _____ FT (m) _____ LB (N) PEDAL FORCE
	MINIMUM TOW VEHICLE WEIGHT
	FRONT OPERATING _____ FT (m) _____ LB (N) PEDAL FORCE
	FRONT OPERATING _____ FT (m) _____ LB (N) PEDAL FORCE
	REAR OPERATING _____ FT (m) _____ LB (N) PEDAL FORCE
	REAR OPERATING _____ FT (m) _____ LB (N) PEDAL FORCE
INOPERATIVE POWER SYSTEM TEST	
60 MPH (97 km/h) STOPPING DISTANCE	_____ FT (m) _____ LB (N) PEDAL FORCE
	_____ FT (m) _____ LB (N) PEDAL FORCE
FIRST FADE AND RECOVERY TEST	
FADE STOPS 1–4	_____, _____, _____, _____ LB (N) PEDAL FORCE (OR MIN DECEL)
RECOVERY STOPS 1–5	_____ FT/S^2 (m/s^2) AT _____ LB (N) MAX PEDAL FORCE
RECOVERY STOPS 6–12	_____ LB (N) MAX PEDAL FORCE
SECOND FADE AND RECOVERY TEST	
FADE STOPS 1–8	_____, _____, _____, _____, _____, _____, _____, _____ LB (N) PEDAL FORCE (OR MIN. DECEL.)
RECOVERY STOPS 1–5	_____ FT/S^2 (m/s^2) AT _____ LB (N) MAX PEDAL FORCE
RECOVERY STOPS 6–12	_____ LB (N) MAX PEDAL FORCE
STABILITY DURING EFFECTIVENESS TESTS	CONTROLLABLE BRAKING THROUGH 16 FT/S^2 (5.2 m/s^2) YES _____ NO _____
FINAL INSPECTION	
LINING INTEGRITY	YES _____ NO _____
MECHANICAL INTEGRITY	YES _____ NO _____
HYDRAULIC INTEGRITY	YES _____ NO _____

COMMENTS _____

REPORTED BY: _____ DATE _____

FIG. 2–SUMMARY SHEET

[1]Tow vehicles shall incorporate that manufacturer's trailering package. Tow vehicle manufacturer's recommendations regarding hitching shall be followed. Hitches shall be set up according to hitch or tow vehicle manufacturer's recommendations, where applicable. Trailer brakes shall be set up according to recommendations of the brake system supplier. Trailer loading shall be in accordance with trailer manufacturer's recommendations except as modified in this procedure. Tires shall be inflated to vehicle manufacturer's recommendations.

TEST NO. _____ ODOMETER FINISH _____ WEATHER CONDITION _____
DATE _____ START _____ ROAD CONDITION _____
DRIVER _____ TOTAL _____ AMBIENT TEMPERATURE: HIGH _____ °F(°C)
OBSERVER _____ LOW _____ °F(°C)

INPUT CORRELATION

ENGINE IDLING IN NEUTRAL _____ IN HG (Pa) VACUUM
(POWER EQUIPPED TOWING VEHICLE ONLY)

		PEDAL FORCE, LB (N)		
LINE PRESSURE, PST (Pa)	1st RECORDING	2nd RECORDING	3rd RECORDING	AVERAGE

PREBURNISH CHECK

30 MPH (48 km/h) 10 FT/S^2 (3 m/s^2) IN GEAR - 1 MILE (1.6 km) INTERVAL

STOP NO.	TOW VEH. INPUT (LINE PRESSURE OR PEDAL FORCE	TRAILER INPUT	PEDAL TRAVEL, IN (mm)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

FINAL TEMPERATURES AFTER 19th STOP
TOWING VEHICLE
L.F. _____ °F (°C) R.F. _____ °F(°C)
L.R. _____ °F (°C) R.R. _____ °F (°C)
TRAILER:
L.F. _____ °F (°C) R.F. _____ °F (°C)
L.R. _____ °F (°C) R.R. _____ °F (°C)

SUMMARY OF PERFORMANCE: _____

FIG. 3–INPUT CORRELATION AND PREBURNISH CHECK DATA SHEET

TEST NO. _____ WEATHER CONDITION _____
DATE _____ ROAD AND TRACK CONDITION _____
DRIVER _____ AMBIENT TEMPERATURE: HIGH _____ °F(°C)
OBSERVER _____ LOW _____ °F(°C)
METHOD OF APPLICATION _____
ODOMETER: FINISH _____ START _____ TOTAL MILES (km) _____

FIRST (PREBURNISH) EFFECTIVENESS TEST

30 MPH (48 km/h) IN NEUTRAL - 200°F (93.3°C) IBT EACH APPLICATION

TOW. VEH. INPUT LP OR PF	TRAILER INPUT	DECELERATION FT/s^2 (m/s^2)	(OPT) PEDAL TRAVEL, IN (mm)	TOW VEH. TEMP. °F (°C) L.F.	R.F.	L.R.	R.R.	TRAILER TEMP. °F (°C) L.F.	R.F.	L.R.	R.R.	REMARKS

60 MPH (97 km/h) IN NEUTRAL, 200°F (93.3°C) IBT EACH APPLICATION

TOW. VEH. INPUT LP OR PF	TRAILER INPUT	DECELERATION FT/s^2 (m/s^2)	(OPT) PEDAL TRAVEL, IN (mm)	TOW VEH. TEMP. °F (°C) L.F.	R.F.	L.R.	R.R.	TRAILER TEMP. °F (°C) L.F.	R.F.	L.R.	R.R.	REMARKS

SUMMARY OF PERFORMANCE: _____

FIG. 4–FIRST (PREBURNISH) EFFECTIVENESS DATA SHEET

shall be maintained and not exceeded throughout the full test procedure on the axle on which the weight is proportionately nearest rated capacity. The axle test load shall be at least curb plus 600 lb (270 kg) for vehicles of four or more passengers including the tongue load. No ballast shall be added to

TEST NO. _____ WEATHER CONDITION _____
DATE _____ ROAD AND TRACK CONDITION _____
DRIVER _____ AMBIENT TEMPERATURE: HIGH _____ °F(°C)
OBSERVER _____ LOW _____ °F(°C)
ODOMETER: FINISH _____ START _____ TOTAL MILES (km) _____

BURNISH

40-0 MPH (64-0 km/h) 12 FT/S^2 (3.7 m/s^2) IN GEAR
250 F (121 C) IBT EACH STOP BUT 1 MILE (1.6 km) MAX INTERVAL

STOP NO.	TOW VEH. INPUT LP or PF	TRAILER INPUT	(OPT.) PEDAL TRAVEL IN (mm)	TOW VEH. TEMP °F(°C) L.F.	R.F.	L.R.	R.R.	TRAILER TEMP. °F(°C) L.F.	R.F.	L.R.	R.R.	REMARKS
1												
20												
40												
60												
80												
100												
120												
140												
160												
180												
200												

RECORD ANY OPERATIONS PERFORMED _____

WEATHER CONDITION _____
DATE _____ ROAD AND TRACK CONDITION _____
DRIVER _____ AMBIENT TEMPERATURE: HIGH _____ °F(°C)
OBSERVER _____ LOW _____ °F(°C)
ODOMETER: FINISH _____ START _____ TOTAL MILES (km) _____

INOPERATIVE POWER SYSTEM TEST

60-0 MPH (97-0 km/h) IN GEAR, 150°F (65.6°C) IBT EACH APPLICATION,
150 AND 200 LB (667 AND 890 N) PEDAL FORCE

TOW VEH. INPUT LP OR PF	TRAILER INPUT	STOPPING DISTANCE FT (m)	TOW VEH. TEMP. °F(°C) L.F.	R.F.	L.R.	R.R.	TRAILER TEMP. °F(°C) L.F.	R.F.	L.R.	R.R.	REMARKS
(667N) 150 lbs											
(667N) 150 lbs											
(667N) 150 lbs											
AVERAGE											
(890N) 200 lbs											
(890N) 200 lbs											
(890N) 200 lbs											
AVERAGE											

SUMMARY OF PERFORMANCE _____

FIG. 5

TEST NO. _____ WEATHER CONDITION _____
DATE _____ ROAD AND TRACK CONDITION _____
DRIVER _____ AMBIENT TEMPERATURE: HIGH _____ °F(°C)
OBSERVER _____ LOW _____ °F(°C)
ODOMETER: FINISH _____ START _____ TOTAL MILES (km) _____

EMERGENCY SYSTEM TEST

60-0 MPH (97-0 km/h) IN GEAR, 150°F (65.6°C) IBT EACH APPLICATION
150 AND 200 LB (667 AND 890 N) PEDAL FORCE

	SYSTEM OPERATING	TOW VEH. INPUT LP OR PF	TRAILER INPUT	STOPPING DISTANCE FT (m)	WARNING LIGHT ON YES	NO	TOW VEH. TEMP °F(°C) L	R	TRAILER TEMP. °F(°C) L.F.	R.F.	L.R.	R.R.	REMARKS
GVWR OR GCWR	FRONT												
	FRONT												
	FRONT												
	AVERAGE OF FRONT												
	FRONT												
	FRONT												
	FRONT												
	AVERAGE OF FRONT												
	REAR												
	REAR												
	REAR												
	AVERAGE OF REAR												
	REAR												
	REAR												
	REAR												
	AVERAGE OF REAR												

60-0 MPH (97-0 km/h) IN GEAR, 150°F (65.6°C) IBT EACH APPLICATION
150 AND 200 LB (667 AND 890 N) PEDAL FORCE

	SYSTEM OPERATING	TOW VEH. INPUT LP OR PF	TRAILER INPUT	STOPPING DISTANCE FT (m)	WARNING LIGHT ON YES	NO	TOW VEH. TEMP. °F(°C) L	R	TRAILER TEMP. °F(°C) L.F.	R.F.	L.R.	R.R.	REMARKS
MINIMUM TOW VEHICLE WEIGHT	FRONT												
	FRONT												
	FRONT												
	AVERAGE OF FRONT												
	FRONT												
	FRONT												
	FRONT												
	AVERAGE OF FRONT												
	REAR												
	REAR												
	REAR												
	AVERAGE OF REAR												
	REAR												
	REAR												
	REAR												
	AVERAGE OF REAR												

SUMMARY OF PERFORMANCE _____

FIG. 6

TEST NO. _____ WEATHER CONDITION _____
DATE _____ ROAD AND TRACK CONDITION _____
DRIVER _____ AMBIENT TEMPERATURE: HIGH _____ °F(°C)
OBSERVER _____ LOW _____ °F(°C)
METHOD OF APPLICATION _____
ODOMETER: FINISH _____ START _____ TOTAL MILES (km) _____

SECOND EFFECTIVENESS TEST

30 MPH (48 km/h) IN NEUTRAL, 200°F (93.3°C) IBT EACH APPLICATION

TOW VEH. INPUT LP OR PF	TRAILER INPUT	DECELERATION, FT/s² (m/s²)	(OPT) PEDAL TRAVEL IN (mm)	TOW VEH. TEMP. °F(°C)				TRAILER TEMP. °F(°C)				REMARKS
				L.F.	R.F.	L.R.	R.R.	L.F.	R.F.	L.R.	R.R.	

60 MPH (97 km/h) IN NEUTRAL, 200°F (93.3°C) IBT EACH APPLICATION

TOW VEH. INPUT LP OR PF	TRAILER INPUT	DECELERATION, FT/s² (m/s²)	(OPT) PEDAL TRAVEL IN (mm)	TOW VEH. TEMP. °F(°C)				TRAILER TEMP. °F(°C)				REMARKS
				L.F.	R.F.	L.R.	R.R.	L.F.	R.F.	L.R.	R.R.	

SUMMARY OF PERFORMANCE _____

FIG. 7–SECOND EFFECTIVENESS TEST DATA SHEET

TEST NO. _____ WEATHER CONDITION _____
DATE _____ ROAD AND TRACK CONDITION _____
DRIVER _____ AMBIENT TEMPERATURE: HIGH _____ °F (°C)
OBSERVER _____ LOW _____ °F (°C)

ODOMETER: FINISH _____ START _____ TOTAL MILES (km) _____

FIRST BASELINE CHECK

30 MPH (43 km/h), 10 FT/S² (3 m/s²) IN GEAR, 150°F (65.6°C) IBT FIRST STOP

STOP NO.	TOW VEH. INPUT, LP OR PF	TRAILER INPUT	*PEDAL TRAVEL IN (mm)	TOW VEH. TEMP. °F (°C)				TRAILER TEMP. °F(°C)				REMARKS
				L.F.	R.F.	L.R.	R.R.	L.F.	R.F.	L.R.	R.R.	
1												
2												
3												

START TIME _____ FINISH TIME _____ LAPSED TIME _____

FIRST FADE TEST

60 MPH (97 km/h) 15 FT/S² (4.6 m/s²) IN GEAR, 0.4 MILE (0.6 m) INTERVAL, 150°F (65.6°C) IBT FIRST STOP

STOP NO.	TOW VEH. INPUT LP OR PF	TRAILER INPUT	*PEDAL TRAILER IN (mm)	TOW VEH. TEMP. °F(°C)				TRAILER TEMP. °F(°C)				REMARKS
				L.F.	R.F.	L.R.	R.R.	L.F.	R.F.	L.R.	R.R.	
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												

SUMMARY OF PERFORMANCE: _____

*OPTIONAL

FIG. 8–FIRST BASELINE CHECK AND FIRST FADE TEST DATA SHEET

passenger cars if curb plus 600 lb (270 kg) loading is achieved by tongue load.

5.5.2 Light Trucks and Multipurpose Passenger Vehicles–The vehicle shall be ballasted to within ± 2% of the lesser of manufacturer's gross vehicle weight rating (GVWR) including the tongue load, or the gross combination weight rating (GCWR). When a GCWR restriction limits tow vehicle weight to less than GVWR, add passengers to the cab and then distribute ballast weight in the cargo area to attain, or approach as nearly as possible, the gross axle weight rating (GAWR) on the axle on which the weight, prior to the addition of ballast, is proportionately nearest to rated capacity. Do not exceed the GAWR on any axle.

TEST NO. _____ WEATHER CONDITION _____
DATE _____ ROAD AND TRACK CONDITION _____
DRIVER _____ AMBIENT TEMPERATURE: HIGH _____ °F(°C)
OBSERVER _____ LOW _____ °F(°C)
ODOMETER FINISH _____ START _____ TOTAL MILES (km) _____

FIRST RECOVERY

30 MPH (48 km/h), 10 FT/S² (S m/s²), IN GEAR, 1 MILE (1.6 km) INTERVAL, at 40 MPH (64 km/h)

STOP NO.	TOW VEH. INPUT LP OR PF	TRAILER INPUT	*PEDAL TRAVEL IN (mm)	TOW VEH. TEMP. °F(°C)				TRAILER TEMP. °F(°C)				REMARKS
				L.F.	R.F.	L.R.	R.R.	L.F.	R.F.	L.R.	R.R.	
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

SUMMARY OF PERFORMANCE: _____

FIRST EFFECTIVENESS SPOT CHECK

60 MPH (97 km/h), 15 FT/S² (4.6 m/s²) IN GEAR 200 F (93.3 C) IBT

STOP NO.	TOW VEH. INPUT LP OR PF	TRAILER INPUT	*PEDAL TRAVEL IN (mm)	TOW VEH. TEMP. °F(°C)				TRAILER TEMP. °F(°C)				REMARKS
				L.F.	R.F.	L.R.	R.R.	L.F.	R.F.	L.R.	R.R.	
1												
2												

FIRST REBURNISH

40-0 MPH (64-0 km/h), 12 FT/S² (3.7 m/s²) IN GEAR,
250 F (121 C) IBT EACH STOP, BUT 1 MILE (1.6 km) MAX INTERVAL

STOP NO.	TOW VEH. INPUT, LP OR PF	TRAILER INPUT	*PEDAL TRAVEL IN (mm)	TOW VEH. TEMP. °F(°C)				TRAILER TEMP. °F(°C)				REMARKS
				L.F.	R.F.	L.R.	R.R.	L.F.	R.F.	L.R.	R.R.	
1												
10												
25												
25												

SUMMARY OF PERFORMANCE: _____

*OPTIONAL

FIG. 9–FIRST RECOVERY, FIRST EFFECTIVENESS SPOT CHECK, AND FIRST REBURNISH DATA SHEET

TEST NO _____ WEATHER CONDITION _____
DATE _____ ROAD AND TRACK CONDITION _____
DRIVER _____ AMBIENT TEMPERATURE: HIGH _____ °F(°C)
OBSERVER _____ LOW _____ °F(°C)
ODOMETER: FINISH _____ START _____ TOTAL MILES (km) _____

SECOND BASELINE CHECK

30 MPH (48 km/h), 10 FT/S² (3 m/s²), IN GEAR, 150°F (65.6°C) IBT

STOP NO.	TOW VEH. INPUT LP OR PF	TRAILER INPUT	*PEDAL TRAVEL IN (mm)	TOW VEH. TEMP. °F(°C)				TRAILER TEMP. °F(°C)				REMARKS
				L.F.	R.F.	L.R.	R.R.	L.F.	R.F.	L.R.	R.R.	
1												
2												
3												

START TIME _____ FINISH TIME _____ LAPSED TIME _____

SECOND FADE TEST

60 MPH (97 km/h), 15 FT/S² (4.6 m/s²) IN GEAR, 0.4 MILE (0.6 km) INTERVAL, 150 F (65.6 C) IBT FIRST STOP

STOP NO.	TOW VEH. INPUT LP OR PF	TRAILER INPUT	*PEDAL TRAVEL IN (mm)	TOW VEH. TEMP. °F(°C)				TRAILER TEMP. °F(°C)				REMARKS
				L.F.	R.F.	L.R.	R.R.	L.F.	R.F.	L.R.	R.R.	
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												

SUMMARY OF PERFORMANCE: _____

*OPTIONAL

FIG. 10–SECOND BASELINE CHECK AND SECOND FADE TEST DATA SHEET

5.6 Towed Vehicle Test Weight–Vehicle manufacturer's gross trailer weight rating (GTWR) shall be maintained throughout the full test procedure. For purposes of testing, in order to achieve reproducible results, a static tongue load of 10% GTWR shall be used except for fifth wheel trailers, which shall follow manufacturer's recommendations.

6. TEST PROCEDURE

6.1 Test Notes

6.1.1 Effectiveness, stopping distance, fade and recovery test stops shall be conducted on a substantially level (not to exceed a ± 1% grade), dry, smooth, hard-surfaced roadway of Portland cement concrete (or other surface with equivalent coefficient of surface friction) that is free from loose materials.

6.1.2 During all phases of this procedure, any unusual performance such as wrap-up or noise characteristics are to be noted and recorded. Also note, at the appropriate stops, which wheel or wheels of the tow vehicle or trailer skidded. Note any uncontrollable braking action causing either of the vehicles to pull or swerve out of a 12 ft (3.7 m) wide roadway lane.

6.1.3 "Initial brake temperature" is defined as the average temperature of brakes on the hottest axle with brakes off 0.2 mile (0.3 km) before stop.

6.1.4 If brakes require warming to a prescribed temperature, use burnish procedure and shorten interval if necessary.

6.1.5 Because variations in ambient temperature have a significant effect on test results, fade and recovery tests must be conducted within a range of ambient temperature of 40 - 90°F (4.4 - 32.2°C).

6.1.6 Decelerations used in the various fade, recovery, or warm-up procedures refer to values at which the decelerometer is held approximately constant during the stop by varying the input pressure.

6.1.7 Deceleration and line pressure (pedal force) readings shall not be taken below 5 mph (8 km/h).

6.1.8 Vehicles with manual transmissions should be declutched below 10 mph when stops are made in normal driving gear.

6.2 Preburnish Check–In order to allow for a general check of instrumentation, brakes, and vehicle function, the following stops are to be run: 10 stops, 30 - 0 mph (48 - 0 km/h), 10 fpsps (3 m/s^2), 1 mile (1.6 km) interval, 40 mph (64 km/h) cooling speed in normal driving gear. Record tow vehicle line pressure (pedal force) and trailer brake input.

NOTE: Assuming instrumentation, brakes, and vehicle are functioning satisfactorily, proceed immediately with First Effectiveness Test.

6.3 First (Preburnish) Effectiveness Test–Initial brake temperature, 200°F (93.3°C) before each application.

Stop Speed–30 mph and 60 mph (48 and 97 km/h) (full stops in neutral).

Increments–Curve to be defined to point of loss of lateral control or 16 fpsps (4.9 m/s^2) by adequate number of points (wheel slide permitted).

Record–Deceleration, tow vehicle line pressure (pedal force), trailer brake input, and method of brake application (that is, machine or manual). When using manual method, full stops are to be made at each deceleration level and maximum line pressure (pedal force) recorded. Optional – Record fore and aft load at ball.

6.4 Burnish

Stop Speed–40-0 mph (64-0 km/h).

Stop Deceleration–12 fpsps (3.7 m/s^2) (in normal gear).

Stop Interval–As required to achieve 250°F (121°C) "initial brake temperature"[2] or a maximum of 1 mile (1.6 km).

NOTE: The 1 mile (1.6 km) maximum must be observed even though the initial temperature exceeds 250°F (121°C).

Cooling Speed–40 mph (64 km/h) (moderate acceleration to cooling speed).

Stops Required–200. Record tow vehicle line pressure (pedal force), trailer brake input and brake temperature for stops 1, 20 and each succeeding 20th stop.

Optional–Record fore and aft load at ball.

After burnish cycle:

a) Inspect and adjust trailer brakes.

b) Inspect and adjust towing vehicle brakes.

c) Record any operations performed.

6.5 Second Effectiveness Test–Repeat Item 6.3

If tow vehicle additional payload capacity with trailer coupled exceeds 1000 lbs (454 kg), repeat this test at minimum tow vehicle weight (curb weight plus tongue load plus 300 lb (136 kg) maximum.

6.6 Emergency Brake System Test

Initial Brake Temperature–150°F (65.6°C) before each stop.

[2]See Test Notes, Item 6.1.3

TEST NO. _____ WEATHER CONDITION _____
DATE _____ ROAD AND TRACK CONDITION _____
DRIVER _____ AMBIENT TEMPERATURE: HIGH _____ °F(°C)
OBSERVER _____ LOW _____ °F(°C)
ODOMETER: FINISH _____ START _____ TOTAL MILES (km) _____

SECOND RECOVERY

30 MPH (48 km/h), 10 FT/S^2 (3 m/s^2), IN GEAR, 1 MILE (1.6 km) INTERVAL AT 40 MPH (64 km/h)

STOP NO.	TOW. VEH INPUT, LP OR PF	TRAILER INPUT	*PEDAL TRAVEL IN (mm)	TOW VEH. TEMP. °F(°C) L.F.	R.F.	L.R.	R.R.	TRAILER TEMP. °F(°C) L.F.	R.F.	L.R.	R.R.	REMARKS
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

SUMMARY OF PERFORMANCE: _____

SECOND EFFECTIVENESS SPOT CHECK

60-0 MPH (97.0 km/h), 15 FT/S^2 (4.6 m/s^2) IN GEAR, 200°F (93.3°C) IBT

STOP NO.	TOW VEH. INPUT LP OR PF	TRAILER INPUT	*PEDAL TRAVEL IN (mm)	TOW VEH. TEMP. °F(°C) L.F.	R.F.	L.R.	R.R.	TRAILER TEMP. °F(°C) L.F.	R.F.	L.R.	R.R.	REMARKS
1												
2												

SECOND REBURNISH

40-0 MPH (64-0 km/h), 12 FT/S^2 (4.6 m/s^2) IN GEAR,
250°F (121° C) IBT EACH STOP, 1 MILE (1.6 km) MAX INTERVAL

STOP NO.	TOW VEH. INPUT LP OR PF	TRAILER INPUT	*PEDAL TRAVEL IN (mm)	TOW VEH. TEMP. °F(°C) L.F.	R.F.	L.R.	R.R.	TRAILER TEMP. °F(°C) L.F.	R.F.	L.R.	R.R.	REMARKS
1												
10												
25												
35												

SUMMARY OF PERFORMANCE: _____

*OPTIONAL

FIG. 11–SECOND RECOVERY, SECOND EFFECTIVENESS SPOT CHECK, SECOND REBURNISH DATA SHEET

TEST NO _____ WEATHER CONDITION _____
DATE _____ ROAD AND TRACK CONDITION _____
DRIVER _____ AMBIENT TEMPERATURE: HIGH _____ °F(°C)
OBSERVER _____ LOW _____ °F(°C)
METHOD OF APPLICATION _____
ODOMETER: FINISH _____ START _____ TOTAL MILES (km) _____

THIRD EFFECTIVENESS TEST

30 MPH (48 km/h) IN NEUTRAL, 200°F (93.3°C) IBT EACH APPLICATION

TOW VEH. INPUT, LP OR PF	TRAILER INPUT	DECELERATION FT/S^2 (m/s^2)	(OPT) PEDAL TRAVEL IN (mm)	TOW VEH. TEMP °F(°C) L.F.	R.F.	L.R.	R.R.	TRAILER TEMP. °F(°C) L.F.	R.F.	L.R.	R.R.	REMARKS

60 MPH (97 km/h) IN NEUTRAL, 200°F (93.3°C) IBT EACH APPLICATION

TOW VEH. INPUT, LP OR PF	TRAILER INPUT	DECELERATION FT/S^2 (m/s^2)	(OPT) PEDAL TRAVEL IN (mm)	TOW VEH. TEMP °F(°C) L.F.	R.F.	L.R.	R.R.	TRAILER TEMP. °F(°C) L.F.	R.F.	L.R.	R.R.	REMARKS

SUMMARY OF PERFORMANCE: _____

FIG. 12–THIRD EFFECTIVENESS TEST DATA SHEET

Procedure–With one subsystem of the tow vehicle brake system open to atmosphere determine the shortest stopping distances, a) with 150 lb (667 N) maximum allowable pedal force and, if no more than one wheel slides, b) with 200 lb (890 N) maximum allowable pedal force. Stops are