

	SURFACE VEHICLE RECOMMENDED PRACTICE	J1491		REV. JUL2006
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(R) Vehicle Acceleration Measurement				

RATIONALE

SAE J1491 Acceleration and Launch Performance is being updated to:

- reflect current practice,
- add standard test conditions, and
- clarify measurement parameters.

1. SCOPE

To define a test procedure that will provide a repeatable measure of a vehicle's launch response and maximum acceleration performance.

1.1 Purpose

This SAE Recommended Practice provides a standardized means of measuring launch response and acceleration performance of passenger cars and light-duty trucks.

2. REFERENCES

There are no referenced publications specified herein.

3. DEFINITIONS

3.1 Time Zero

The time used in the calculation for Launch Response Time and Acceleration Response Time. It is derived as specified in Section 9.

3.2 Launch Response Time

Vehicle response in seconds from driver control input measured by a) initial throttle pedal movement (automatic transmission) or b) clutch movement (manual transmission) to Initial Vehicle Movement. See 3.3.

3.3 Initial Vehicle Movement (IVM)

Movement of vehicle a distance of 0.3048 m (one foot) from rest position.

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3.4 Acceleration Response Time

Vehicle response in seconds from IVM to test end speed or distance. The Acceleration Response Time for distance is usually calculated at one quarter mile (0.402km).

3.5 Unloaded Vehicle Weight

The weight of the vehicle as built with production parts with maximum capacity of all fluids necessary for operation of the vehicle.

3.6 Miles per Hour

Miles per hour is a unit of speed, expressing the number of international miles covered per hour. The common abbreviation in everyday use is mph, although mi/h, using the SI method of expressing derived units, is sometimes used, especially in the United States. The preferred SI unit for velocity is m/s, although km/h is often used as a replacement for mph.

4. INSTRUMENTATION

(All instrumentation must be calibrated.)

4.1 Speed

Instrumentation to measure vehicle speed as a function of elapsed time meeting the following specifications:

a. Time

1. Accuracy ± 0.1 s
2. Resolution 0.1 s

b. Vehicle Speed

1. Accuracy ± 0.8 km/h (± 0.50 mph)
2. Resolution 0.4 km/h (0.25 mph)

c. Engine Speed (tachometer)

1. Accuracy ± 50 rpm
2. Resolution 25 rpm

4.2 Distance (One Foot) Optional

Equipment to measure Initial Vehicle Movement.

1. Accuracy ± 5 mm
2. Resolution 12.5 mm

NOTE: This equipment is optional since the one foot distance used in calculations may be made by integration of speed.

4.3 Temperature

The ambient temperature measurement devices must have a resolution of 1 °C (2 °F) and an accuracy of ± 1 °C (± 2 °F). The sensing elements must be shielded from radiant heat sources.

4.4 Atmospheric Pressure

A barometer with an accuracy of ± 0.7 kPa (± 0.2 in Hg).

4.5 Wind

Wind speed and direction during the test should be continuously monitored. Wind measurements should permit the determination of average longitudinal and crosswind components to within ± 2 km/h (± 1 mph).

4.6 Vehicle Weight

Vehicle weight should be measured to an accuracy of ± 5 kg (± 10 lb) per axle.

4.7 Tire Pressure

Should be measured to an accuracy of ± 7 kPa (± 1 psi).

4.8 Distance (optional)

A distance indicating device is required for the 402 m (1/4 mile) test so that driver knows when to end test. This device must be capable of indicating distance to within 1 ft and must be capable of accuracy within 1 m in 1 km (5 ft in 1 mile). Fixed markers at the side of the test road can also be used.

NOTE: The 0.3048 m (one foot) test point will be measured using the speed and time during the data calculations.

4.9 Throttle Position Monitor (optional)

A readout to monitor/regulate throttle position. This can be used to monitor/regulate wheel spin on some vehicles.

4.10 Accelerometer (optional)

An accelerometer may be used to help in the analysis of data by providing information on shift points. An accelerometer with 2.0 g capability, 1% accuracy and .005 g resolution is suggested.

5. TEST MATERIAL

5.1 Test Vehicle

The test vehicle will normally be representative of a standard production built vehicle; any nonstandard equipment must be noted (i.e., roof racks, optional mirrors, fog lamps, spoilers, optional axle ratio, etc.). Record any equipment that is removed for test. The vehicle mass shall be set for the intended test purpose and recorded.

Consideration should be made to test automatic transmission shift modes like "sport" or "power."

5.2 Test Fuel

Commercially available fuel as recommended by the manufacturer will normally be used for test purposes. If the information is available or if a special test fuel is used, the fuel specifications should be recorded, such as: fuel generic type, gasoline octane rating or diesel cetane rating, brand name, specific gravity, Reid vapor pressure.

5.3 Lubricants

Lubricants used shall conform to the manufacturer's recommendation for the predominant weather condition in which the vehicle is being tested.