

	SURFACE VEHICLE RECOMMENDED PRACTICE		J1264 MAY2011
		Issued	1979-04
		Stabilized	2011-05
		Superseding J1264 OCT1986	
Joint RCCC/SAE Fuel Consumption Test Procedure (Short Term In-Service Vehicle) Type 1			

RATIONALE

This technical report covers processes which are mature and not likely to change in the foreseeable future. The committee cannot find a significant number of users for the technical report.

This document should only be used by experts in the field of use. Currently the document has limited application and use but is a valuable reference in the subject area that may be revised and made current in the future.

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1. **Scope**—This recommended practice provides minimum requirements for testing components or systems of the type which can be switched from one truck to another with relative ease; i.e., aerodynamic devices, clutch fans, radial tires, and the like. The test utilizes in-service fleet vehicles, operated over representative routes. The relative fuel effectiveness of the component or system under test is determined as a percentage improvement factor. This factor is calculated using the relative fuel usage of like vehicles operating with and without the specific component or system under evaluation. Accuracy capability employing this test technique is either $\pm 1\%$ or $\pm 2\%$, depending upon the method of fuel measured. (See paragraph 7.4.)
2. **References**—There are no referenced publications specified herein.
3. **Definitions**
 - 3.1 **Test Cycle**—The test cycle is comprised of two complete round test trips with two trucks, wherein the device or component or systems under evaluation have been switched from one truck to the other between the first and second round test trip.
 - 3.2 **Test Trip**—A test trip is one half of a complete test cycle wherein the device or component under evaluation is operating on one of the two trucks. A test trip always starts and stops at the same exact location. This may be accomplished by using either a closed loop of highways or single highway with one test leg of the test trip out, a turn-around point and one test leg of the test trip in.
 - 3.3 **Test Leg**—A test leg is one half of a test trip during a single highway test cycle.
 - 3.4 **Vehicles A and B**—The two vehicles being used for test purposes are randomly identified as Vehicle A and Vehicle B. This identification applies to the truck, its equipment, and driver as well as the trailer, in the case of tractor/trailer combinations.
4. **Identification**—Sufficient information is to be recorded to identify the vehicles under test and the route over which the test is conducted. Minimum information required is shown in Test Data Form #1.

5. *Recommended Fleet Test Preparation*

- 5.1 Test Route Selection**—A test route of not less than an aggregate of 50 miles (80 km) for each test leg is selected for conducting the test. The test route selected must not exceed the capacity of the portable fuel tanks (if used) and should allow high probability of an uninterrupted test cycle. Both vehicles selected should be able to maintain a speed reasonably close to the posted or legal maximum speed; however, the speed selected should be representative of average fleet operations as determined by fleet conducting the test.
- 5.2 Vehicle Test Speeds**—The test speeds selected should be well within the capability of both vehicles to be tested. The maximum test speed is determined by the ability of the vehicles to maintain spacing in all circumstances to be encountered. Each vehicle should be operated in the preselected engine rpm operating range.
- 5.3 Vehicle Specifications and Maintenance**—Two vehicles are selected. These vehicles are to be of the same specification and in similar mechanical condition as determined by the fleet conducting the test. Enter data on Test Data Form #1 (Vehicle Identification).
- 5.4 Vehicle Loads**—Load weights for the period of the test should be selected which result in gross vehicle weight within 5% of each other. Enter data on Test Data Form #1.
- 5.5 Test Component**—Component or system to be tested is incorporated into Vehicle A.
- 5.6 Fuel Measuring Device Requirement**
- 5.6.1 If the portable tank weight method is used, the scale must be calibrated in maximum increments of 1/4 lb (0.1 kg). (Use Fuel Economy Test Data Form #2 for recording data.)
- 5.6.2 If vehicles are fitted with on-board flowmeters, those meters must be calibrated to an accuracy of $\pm 1/2\%$ at a flow rate of 10 U.S. gal/h (37.85 L/h). (Use Fuel Economy Test Data Form #2 for recording data.)
- 5.7 Driver Selection**—Average drivers as determined by the fleet's driver records, are selected and assigned to their representative vehicles. They do not alternate between vehicles during the test cycle.
- 5.8 Vehicle Designation**—Vehicle and driver combinations are designated; Vehicles A and B.

6. *Recommended Fleet Test Procedure*—This technique involves the following steps:

- 6.1** Vehicles A and B follow the same start and warm-up procedures. Start and warm-up procedures to be representative of fleet operation or not less than 45 min of operation under conditions similar to the condition used in the test cycle.
- 6.2** Both Vehicles A and B are moved to the same location during fueling. Both vehicles are filled from the same fuel dispenser at the same fueling point. Tanks are topped off visually, and weighed, weight (mass) to be recorded, if weighing method is used. (Enter data on Test Data Form #2).
- 6.3** Record weather, road, traffic conditions, wind velocity, and wind direction before each test leg of a test trip. (Enter data on Test Data Form #2.)
- 6.3.1 Wind velocity may be checked with an inexpensive marine-type¹ hand-held wind indicator. Wind direction may be judged at start and finish points by referring to the approximate direction in relation to the basic direction of the highway, i.e., 0 deg headwind, 45 deg quartering headwind, 90 deg sidewind, 45 deg (or 135 deg) quartering tailwind, etc., or check with local weather bureau.

1. Edmond Scientific Co., Barrington, NJ, or Dwyer Instrument, Inc., Michigan City, IN, or equivalent.

- 6.4** Vehicles A and B move to marked starting point and park with engines stopped. Fuel measuring equipment (if on-board fuel meters are used) and odometers are read and recorded. (Enter data on Test Data Form #2.)
- 6.5** Vehicles A and B start engines simultaneously as time is recorded. (Enter data on Test Data Form #2.) Vehicles move out simultaneously on the test leg from the starting point with Vehicle A in the lead. Vehicle A accelerates to the selected top test speed while Vehicle B accelerates at a slower rate in order to obtain a vehicle separation of approximately 200-250 yd (180-230 m).
- 6.6** At a predetermined point on the test leg, suitably marked and one-half way of the total distance of the outbound test leg, Vehicle A reduces its speed by 5 mph (8 km/h) during the passing maneuver and allows Vehicle B to pass and take the lead. Vehicle B may accelerate 5 mph (8 km/h) during the passing maneuver but then must decelerate to the preselected maximum test speed. Vehicle A accelerates to maintain the 200-250 yd (180–230 m) behind Vehicle B.
- 6.7** At the end of this test leg, Vehicles A and B are stopped at a predetermined turn around point. Immediately after full stop at end of test, the engines are idled for 1 min and simultaneously shut down. Time of shut down is recorded. Fuel measuring equipment, if on-board fuel meters are used, and odometers are read and recorded. (Enter data on Test Data Form #2.) Tanks of Vehicles A and B are weighed, refilled, and weighed again, weights to be recorded, if weighing method is used. (Enter data on Test Data Form #2.) Record weather, road, traffic conditions, wind velocity, and wind direction. (Enter data on Test Data Form #2.) If a closed loop of highway is selected as the test route, a halfway point is to be selected for use as the turnaround measurement point.
- 6.8** Vehicles A and B make the turnaround and stop at predetermined start point for inbound test leg. If conditions require, all readings should be taken again and recorded. Engines are to be started and stopped simultaneously when making the turnaround.
- 6.9** Time is recorded as the two vehicles start the inbound test leg with Vehicle B in the lead. (Enter data on Test Data Form #2.)
- 6.10** At the midpoint on the inbound test leg, Vehicle A overtakes Vehicle B in the same manner as before (paragraph 6.6). The two test vehicles proceed in this order to the predetermined finish point which is opposite the inbound test leg starting point. Immediately after full stop at end of test trip, the engines are idled for 1 min and simultaneously shut down. Time of the shut down is recorded. Fuel meters and odometers are read and recorded. (Enter data on Test Data Form #2.) Tanks of Vehicles A and B are weighed, refilled, and weighed again.
- 6.11** A valid test cycle is comprised of two complete round test trips. The modification or equipment being tested must be switched from one truck to the other between the two round test trips. Repeat paragraphs 6.2 through 6.10.
- 6.12** Drivers of Vehicles A and B to be interviewed. (See paragraph 8.7 and Test Data Form #1.)
- 7. Calculation Procedure (See Calculation Procedure Form #3)**
- 7.1** Add fuel used by Vehicle A and Vehicle B for test trips when these vehicles were operating with the component or system under test.
- 7.2** Add fuel used by Vehicle A and Vehicle B for the test trips when these were operating without the component or system under test.