

Interim Test Method for Verifying Fuel-Saving Components for SmartWay: Modifications to SAE J1321

SmartWay Tractor & Trailer Program

U.S. Environmental Protection Agency Designated SmartWay tractors and trailers are a new generation of long-haul rigs equipped with cleaner, fuel-saving features. SmartWay tractors and trailers can achieve fuel savings of 10 to 20 percent (saving carriers between 1,700 and 3,300 gallons of diesel fuel annually), lower greenhouse-gas emissions, and significantly reduce oxides of nitrogen, particulate matter, and other air pollutants.

This is an EPA document listing the U.S. Environmental Protection Agency how the Joint TMC/SAE Fuel Consumption Test Procedure – Type II SAE J1321 Surface Vehicle Recommended Practice (October, 1986) to create an interim test method to quantify the fuel consumption impact of fuel-saving equipment. This test method is intended for testing new class 8, sleeper cabs and certain trailer aerodynamic components for the purpose of determining eligibility for inclusion in SmartWay.



Modification to Joint SAE/TMC

The Joint TMC/SAE Fuel Consumption Test Procedure – Type II (SAE J1321 Surface Vehicle Recommended Practice (October, 1986) is modified by adding the following provisions:

1. Test must be conducted on a test track, not a roadway.
2. Test track length greater than 1.5 miles (5 miles recommended).
3. Track must be circular, figure eight, or oval in shape.
4. Track surface must be completely dry, well-maintained, and be comprised of a surface typical of highway surfaces (asphalt or cement).
5. Grade change on test track not greater than 2 degrees.
6. Altitude of test facility not greater than 4,000 feet above sea level.
7. No precipitation on the test track for duration of test.
8. Ambient air temperatures at the test track must be between 5 C to 35 C (41 F to 95 F) provided that the air temperature during the entire test does not fluctuate more than 30 degrees F (approximately 16.6 C).
9. Wind speed at the test track cannot exceed 12 mph for duration of test.
10. Wind gusts at the test track cannot exceed 15 mph for duration of test.
11. Top speed of test drive cycle not to exceed 65 mph.
12. Test trailer configuration must be a typical dry box semi-trailer, 53' long, 102" wide, and 13' 6" high.
13. Trailers must be the same model and similar age, mileage and condition.
14. Each trailer must have the same test payload. The combined weight of the trailer and payload must be approximately 46,000 pounds, +/- 500 pounds.
15. Test payload must be loaded over axle to be consistent with federal bridge laws. Payload must be secured so it does not shift during the test.
16. Tires must be inflated to manufacturer-recommended maximum cold inflation pressure prior to start of test.
17. Tires must be as similar as possible in size and condition, and have accumulated at least 500 miles wear-in prior to start of test.
18. The tractor-trailer gap must be the same on both trucks, as measured from the back of the tractor to the front of the trailer.
19. If testing a candidate tractor against a current SmartWay tractor model for the purpose of demonstrating SmartWay eligibility, the two tractors must have substantially similar drive train and power train configuration, including gear ratio, engine horsepower and size, transmission type, lubricant type, rear axle ratio, accumulated mileage, emissions aftertreatment system, etc.
20. If testing trailer modifications or trailer aerodynamic equipment, test tractors must be equipped with features typical of line haul combination trucks – e.g., high roof fairing, side cab extender fairings, and aerodynamic profile.
21. EPA must review and approve the test plan and the vehicle configuration prior to testing.

22. EPA reserves the right to review all test data and to reject any test it determines was not conducted in accordance with these provisions and / or SAE J1321, or otherwise not credible according to good engineering judgment.

General requirement

All provisions of SAE J1321 must be followed, in addition to the above EPA provisions. Trucks must be prepared and maintained according to SAE J1321, and results must be within SAE test minimum acceptable ratios to be a valid test. All measurement devices must be NIST-traceable. The fuel must meet all applicable ASTM standards for motor fuel for the intended application.

The manufacturers will submit a test report to EPA that includes signatures from the test facility and manufacturer certifying that the testing was conducted in an accordance with the SAE J1321 as modified by the most recent EPA requirements.

Testing Costs

The manufacturer bears all costs for testing.

Contact EPA

Interested organizations should contact EPA prior to testing. To contact us:

- send an e-mail to: Tech_center@epa.gov or
- write to Technology Assessment Center, US EPA, 1200 Pennsylvania Avenue NW Mail Code: 6406J, Washington DC 20460.

If you have questions regarding SmartWay Designated Tractors and Trailers or SmartWay verified technologies, contact the Technology Assessment Center at: Tech_center@epa.gov.