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40 C.F.R. § 1037.540

Special procedures for testing vehicles with hybrid power take-off.

This section describes optional procedures for quantifying the reduction in greenhouse gas emissions for vehicles as a result of running power take-off (PTO) devices with a hybrid energy delivery system. See § 1037.550 for powertrain testing requirements that apply for drivetrain hybrid systems. The procedures are written to test the PTO by ensuring that the engine produces all of the energy with no net change in stored energy (charge-sustaining), and for plug-in hybrid vehicles, also allowing for drawing down the stored energy (charge-depleting). The full charge-sustaining test for the hybrid vehicle is from a fully charged rechargeable energy storage system (RESS) to a depleted RESS and then back to a fully charged RESS. You must include all hardware for the PTO system. You may ask us to modify the provisions of this section to allow testing hybrid vehicles other than battery electric hybrids, consistent with good engineering judgment. For plug-in hybrids, use a utility factor to properly weight charge-sustaining and charge-depleting operation as described in paragraph (f)(3) of this section.

(a) Select two vehicles for testing as follows:

(1) Select a vehicle with a hybrid energy delivery system to represent the range of PTO configurations that will be covered by the test data. If your test data will represent more than one PTO configuration, use good engineering judgment to select the configuration with the maximum number of PTO circuits that has the smallest potential reduction in greenhouse gas emissions.

(2) Select an equivalent conventional vehicle as specified in § 1037.615.

(b) Measure PTO emissions from the fully warmed-up conventional vehicle as follows:

(1) Without adding a restriction, instrument the vehicle with pressure transducers at the outlet of the hydraulic pump for each circuit. Perform pressure measurements with a frequency of at least 1 Hz.

(2) Operate the PTO system with no load for at least 15 seconds. Measure gauge pressure and record the average value over the last 10 seconds ($p_{\sim min}$). For hybrid PTO systems the measured pressure with no load is typically zero. Apply maximum operator demand to the PTO system until the pressure relief valve opens and pressure stabilizes; measure gauge pressure and record the average value over the last 10 seconds ($p_{\sim max}$).