§ 1048.110 How must my engines diagnose malfunctions?

The following engine-diagnostic requirements apply for engines equipped with three-way catalysts and closed-loop controls of air-fuel ratios:

(a) Equip your engines with a diagnostic system. Starting in the 2007 model year, equip each engine with a diagnostic system that will detect significant malfunctions in its emission-control system using one of the following protocols:

(1) If your emission-control strategy depends on maintaining air-fuel ratios at stoichiometry, an acceptable diagnostic design would identify malfunction whenever the air-fuel ratio does not cross stoichiometry for one minute of intended closed-loop operation. You may use other diagnostic strategies if we approve them in advance.

(2) If the protocol described in paragraph (a)(1) of this section does not apply to your engine, you must use an alternative approach that we approve in advance. Your alternative approach must generally detect when the emission-control system is not functioning properly.

(b) Use a malfunction-indicator light (MIL). The MIL must be readily visible to the operator; it may be any color except red. When the MIL goes on, it must display “Check Engine,” “Service Engine Soon,” or a similar message that we approve. You may use sound in addition to the light signal. The MIL must go on under each of the following circumstances:

(1) When a malfunction occurs, as described in paragraph (a) of this section.

(2) When the diagnostic system cannot send signals to meet the requirement of paragraph (b)(1) of this section.

(3) When the engine’s ignition is in the “key-on” position before starting or cranking. The MIL should go out after engine starting if the system detects no malfunction.

(c) Control when the MIL can go out. If the MIL goes on to show a malfunction or system error, it must remain on during all later engine operation until servicing corrects the malfunction. If the engine is not serviced, but the malfunction or system error does not recur for three consecutive engine starts during which the malfunctioning system is

Environmental Protection Agency

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§ 1048.115 What other requirements apply?

Engines that are required to meet the emission standards of this part must meet the following requirements:

(a) **Crankcase emissions.** Crankcase emissions may not be discharged directly into the ambient atmosphere from any engine throughout its useful life, except as follows:

1. Engines may discharge crankcase emissions to the ambient atmosphere if the emissions are added to the exhaust emissions (either physically or mathematically) during all emission testing. If you take advantage of this exception, you must do the following things:
   - Manufacture the engines so that all crankcase emissions can be routed into the applicable sampling systems specified in 40 CFR part 1065.
   - Account for deterioration in crankcase emissions when determining exhaust deterioration factors.

2. For purposes of this paragraph (a), crankcase emissions that are routed to the exhaust upstream of exhaust aftertreatment during all operation are not considered to be discharged directly into the ambient atmosphere.

(b) **Torque broadcasting.** Electronically controlled engines must broadcast their speed and output shaft torque (in newton-meters). Engines may alternatively broadcast a surrogate value for determining torque. Engines must broadcast engine parameters such that they can be read with a remote device, or broadcast them directly to their controller area networks. This information is necessary for testing engines in the field (see §1048.515). This requirement applies beginning in the 2007 model year. Small-volume engine manufacturers may omit this requirement.

(c) **EPA access to broadcast information.** If we request it, you must provide us any hardware or tools we would need to readily read, interpret, and record all information broadcast by an engine’s on-board computers and electronic control modules. If you broadcast a surrogate parameter for torque values, you must provide us what we need to convert these into torque units. We will not ask for hardware or tools if they are readily available commercially.