UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NATIONAL VEHICLE AND FUEL EMISSIONS LABORATORY
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OFFICE OF
AIR AND RADIATION

August 6, 2012

CD-12-09 (NRCI)

SUBJECT: Transient Emissions Testing of Nonroad Compression Ignition Engines below 19 kW

Dear Manufacturer:

This letter is to notify you that, in accordance with 40 CFR § 1065.10(c)(2), we are allowing special procedures for testing of nonroad compression-ignition engines with maximum engine power less than 19 kW. This exception generally applies to engines possessing the following characteristics: direct-injection, mechanically-controlled, hand-startable, 1 or 2 cylinders, air-cooled, and operate exclusively at two speeds. We believe these engines cannot satisfactorily be tested over the nonroad transient test cycle (NRTC) and that emissions measured over this cycle are not representative of the in-use emissions for these engines. Therefore, we are not requiring these engines to be tested over the NRTC.

Background

Starting with the 2013 model year, engines less than 37 kW that are not constant speed engines are required to demonstrate compliance with the emission standards of 40 CFR § 1039.102 through transient testing. A number of manufacturers of engines below 19 kW approached us asserting that not all of these engines should be subject to transient emissions testing. In support of their assertions, manufacturers provided data that show the high rotational inertia inherent to the design of certain engines prevents them from meeting the highly dynamic speed commands of the NRTC (see 40 CFR § 1039 Appendix VI). In addition to the inability of these engines to operate over the NRTC, the manufacturers provided data that demonstrate certain engines do not operate transiently in-use and therefore the emissions measured over the NRTC are not representative. These engines typically are direct-injection, mechanically-controlled, hand-startable, air-cooled, and have no more than 1 or 2 cylinders. They are designed to run at two speeds, idle and rated speed. The engines are designed with high inertia for better stabilization at high speed where they tend to operate most. Because of this high inertia, the engine accelerates and decelerates slowly.

These less than 19 kW engines have two speed throttle settings, “idle” and “run”. These engines are typically used in applications such as vibrating plates, compactors, water pumps, welders and air compressors. The engines are not designed to have operator adjusted engine speed or torque settings. These engines operate more like constant speed engines used in generators, except, with an idle setting.

Regulatory Authority

We are allowing special procedures for testing these engines through the provisions in 40 CFR § 1065.10(c).

40 CFR § 1065.10(c)(2) states:

> *You may request to use special procedures if your engine cannot be tested using the specified procedures. For example, this may apply if your engine cannot operate on the specified duty cycle. In this case, tell us in writing why you cannot satisfactorily test your engine using the part’s procedures and ask to use a different approach. We will approve your request if we determine that it would produce emission measurements that represent in-use operation and we determine that it can be used to show compliance with the requirements of the standard-setting part.*

We believe the emissions for these engines are best represented by the G2 discrete-modal or G2 ramped-modal test cycle which operates the engine only at maximum test speed (equivalent to rated speed, in this case) and idle speed. Detailed specifications for these test cycles can be found in Appendix II to 40 CFR Part 1039, paragraph (b).

Based on the data provided, we agree that testing over the NRTC is unrepresentative of how these engines operate and may result in emissions results which exceed the standards over operating conditions which will not occur in use. As mentioned above, these engines have high rotational inertia which makes running the NRTC difficult. Trying to rapidly accelerate and decelerate these engines could result in unrepresentatively high emissions which exceed the applicable standard. Modification of the engines to pass the transient test might increase emission over the G2 test which most accurately represents the operation of these engines in the field. Hence requiring testing over the more representative G2 test cycle gives us greater confidence that the emission reductions sought through these standards will be achieved in use.

40 CFR § 1065.10(c)(2) also states:

> *Where we approve special procedures that differ substantially from the specified procedures, we may preclude you from participating in averaging, banking, and trading with the affected engine families.*

Given that this special procedure removes the obligation for the manufacturer of these engines to conduct transient testing altogether, we do not think it appropriate to allow these engine families to participate in the averaging, banking, and trading program.

Please note that all other variable speed engines less than 19 kW must still meet emission standards over the NRTC. We are also still requiring all engines less than 19 kW to meet the NTE requirements of 40 CFR Part 1039.

For more information on this guidance letter, contact Greg Orehowsky at orehowsky.gregory@epa.gov or on 202-343-9292.

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Sincerely,

Byron J. Bunker, Acting Director
Compliance Division
Office of Transportation and Air Quality