

operation not represented in nonroad diesel transient operation. Steady-state emission testing provides a benchmark as well for simpler test programs, like Selective Enforcement Audits (SEAs).

As explained in section III.C. above, EPA is proposing to supplement its steady-state emission testing in nonroad diesel engines with a transient duty emission test procedure for nonroad diesel engines, the Nonroad Transient Composite (NRTC)³⁰⁷ test cycle. The Agency's NRTC cycle is described in proposed regulations at 40 CFR part 1039. A detailed discussion of the proposed transient test cycle and its derivation is contained in Chapter 4 of the Draft RIA for this proposal. Like current nonroad diesel standards, any new emission standards would apply to certification, Selective Enforcement Audits (SEAs), and equipment in actual use for engines covered by the standards.

EPA's supplemental nonroad transient test will apply to a nonroad diesel engine when that engine must first show compliance with EPA's proposed Tier 4 PM and NO_x+NMHC emissions standards which are based on the performance of the advanced post-combustion emissions control systems (e.g. CDPFs and NO_x adsorbers), with the specific exception of engines under 25 hp for PM and under 75 hp for NO_x. The transient duty cycle would be applicable to Tier 4 phase-in engines, as well as the phase-out engines (as defined in section III.B.1.b of this preamble). However, we are seeking comment on whether the transient test procedure should only be required for the PM standard for phase out engines. The table VII.F.-1 below outlines the dates for implementation of this requirement and notes specific exceptions for phase-in of some engine standards.

TABLE VII.F.-1. IMPLEMENTATION MODEL YEAR FOR NONROAD TRANSIENT TESTING

Power category	Transient test implementation model year ^a
< 25 hp	2013
25 ≤ hp < 75	^b 2013
75 ≤ hp < 175	2012
175 ≤ hp ≤ 750 hp	2011
>750 hp	^c 2011

NOTE:

³⁰⁷ Memoranda to Docket A-2001-28: "Speed and Load Operating Schedule for the Nonroad Transient Composite test cycle" and "NRTC Cycle Construction".

^a We are taking comment on whether the transient test procedure should only be required for the PM standard for phase out engines under 750 hp and we are seeking comment on not requiring the transient test procedure for carry over engines over 750 hp.

^b The transient test would apply in 2012 for any engines in the 50-75 hp range that choose not to comply with the proposed 2008 transitional PM standard.

^c Beginning in 2014, when the phase-in has been completed, the transient test would apply to all nonroad engines >750 hp, however we are taking comment on this approach.

While manufacturers of nonroad diesel engines under 75 hp are not subject to the transient test procedure and therefore not required to submit data demonstrating that their engines will meet the Tier 4 nonroad PM emission standard beginning in 2008, it is our expectation that manufacturers, in anticipation of the transient test requirements and in accordance with applicable defeat device prohibitions, would design their engines with effective, in-use control over the expected range of operating conditions, including transients. Given this, we feel this affords a good balance to address workload constraints for these manufacturers as they prepare for addressing Tier 4 compliance. As explained earlier in section III of this preamble, actual submission of transient test data will not be required of engine manufacturers in these power categories until 2013.³⁰⁸ EPA recognizes that the timing of interim standards for these engines could otherwise force manufacturers of smaller engines to have to certify under the proposed NRTC duty cycle test requirement before the requirement applies to the broader market of engine manufacturers in the 2011 to 2013 time frame.

The Agency notes however that some manufacturers have reported difficulties measuring transient PM emissions in 750 hp and over engines under full-flow constant volume sampling (CVS) emission measurement systems. It has been reported that this may be due to difficulties apportioning the large exhaust volumes to sample emissions. Additionally, manufacturers have raised concerns regarding a requirement to conduct transient testing for engines over 750 hp, based on concerns related to facility impacts and sales volumes that are particular for engines over 750 hp. To address the concerns raised, the Agency is taking comment on not requiring the engine manufacturer to conduct transient testing for engines over 750 hp for purposes of certification. Manufacturers would have the option to submit an engineering

³⁰⁸ See Note "b" in Table VII-F-1 above for engines between 25 and 75 hp (19-56 kW).

analysis that demonstrates compliance with the applicable transient standard. This engineering analysis would have to include relevant test data, such as steady state test data, that would support the engineering analysis.

Similarly, PM exhaust emissions gathered from these large engines using partial flow sampling systems (PFSS) tend to be high in volatile PM fractions³⁰⁹ under some low load operating modes. To date, volatile PM measured from PFSS has not been proven to be consistently comparable to volatile PM measured by a full-flow CVS. The pressure across the filter and other sample zone conditions, coupled with differences in the dilution rate and method and residence time, may combine to yield a different PM composition in PFSS than in full-flow CVS systems at these operating conditions. EPA requests comment from manufacturers on the use of PFSS test practices for PM emission data collection in these large displacement engines.

EPA recognizes that there may be practical difficulties with emission testing in large nonroad diesel engines over 750 hp, systems which often have multiple exhaust manifolds and may incorporate several catalysts or other pieces of emission control equipment. Further, the Agency does not intend at this time to require that manufacturers use PFSS to determine PM emissions from their engines for certification. A large engine manufacturer may, however, choose to submit PM data to the Agency using PFSS as an alternative test method, if that manufacturer can demonstrate test equivalency using a paired-T test, as outlined in regulations at 40 CFR 86.1306-07.

EPA is also proposing, as an alternative to the NRTC for a limited class of engines, a Constant Speed Variable Load (CSVL) transient duty cycle. The CSVL transient duty cycle is derived from the EPA's Arc Welder Highly Transient Torque application duty cycle. The CSVL cycle is described in the proposed regulations at 40 CFR 1039.510. Because of the more limited range of engine operation in the CSVL cycle, manufacturers must ensure that engines certified with data generated with this cycle are used exclusively in constant-speed applications. Accordingly, these engines must include labeling information indicating this limited emission certification. An example of engines in this category of

³⁰⁹ Memorandum to Docket "Partial Flow Testing Concerns in Large Nonroad Diesel Engines as Regards Emission Testing Through Partial Flow Sampling", Docket A-2001-28.