

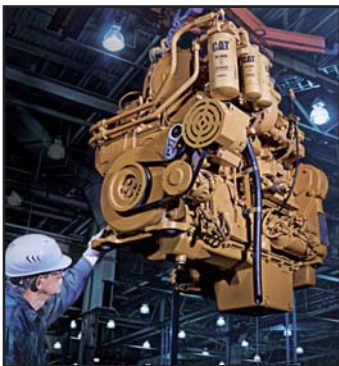
TIER 4 EMISSIONS REGULATIONS



OVERVIEW

The United States and European Union (EU) are implementing significant regulations that mandate the lowest emitting non-road equipment in history. These regulations, which are known in the United States as Tier 4, will result in non-road equipment approaching near-zero emissions of particulate matter (PM) and oxides of nitrogen (NOx).

Transition to these standards is challenging for non-road equipment manufacturers. For Caterpillar® alone, hundreds of complex products with unique and challenging application spectrums must be re-engineered to accommodate the lower emitting engines being developed to meet these standards.



Regulators recognize the challenge and the difficulty non-road equipment manufacturers would face if they had to introduce all of their new lower emitting products on one particular date. To address these transition challenges, the U.S. Environmental Protection Agency (EPA) has allowed for

implementation of the upcoming emission standards in two phases: Tier 4 Interim and Tier 4 Final. Tier 4 Interim is effective January 1, 2011 for 130-560 kW non-road engines and January 1, 2012 for 56-130 kW non-road engines. Tier 4 Final emission standards apply after the 2014 model year.

In addition, under its Transition Program for Equipment Manufacturers ("TPEM"), which is commonly known as the "flex" program, the EPA also allows equipment manufacturers to continue to introduce equipment powered with engines meeting prior Tier emission requirements for a certain limited percentage of their overall production volumes during the Tier 4 timeframe.

Caterpillar has a robust Tier 4 introduction plan, which is structured to transition from Tier 3 to Tier 4 products in a smooth and orderly fashion utilizing a variety of the transitional tools provided in the regulations in order to maximize value to our dealers and end-users.

QUESTIONS ABOUT TIER 4 EMISSIONS

What are U.S. EPA Tier 4 regulations?

In 2004 the EPA published the final rule introducing Tier 4 emission standards, which are to be phased in over the period of 2008-2015. The Tier 4 standards require that emissions of particulate matter (PM) and oxides of nitrogen (NOx) be further reduced by about 90%. Tier 4 emissions levels are similar to those required by the 2007-2010 standards for on-highway engines.

When do the new regulations begin to apply?

Tier 4 Interim emissions regulations will be phased in by engine power category, followed by Tier 4 Final standards. The Tier 4 engine power categories are expressed in kilowatts (kW). Tier 4 began in 2008 for all engines under 19 kW, and for those greater than or equal to 19 but less than 56 kW. For engines in the 130 kW to 560kW category and those in the category for above 560 kW, Tier 4 Interim applies in 2011. Finally, for the 56 to 130 kW category, Tier 4 Interim applies in 2012. Tier 4 Final standards generally are applicable three years after the Tier 4 Interim start date.

What is Tier 4 Interim vs. Tier 4 Final?

Tier 4 Interim regulations begin in 2011 for most power categories and Tier 4 Final is phased beginning in 2014. Tier 4 Interim is intended to enable a gradual phase in to final regulations for manufacturers. Tier 4 Final regulations require additional reductions in NOx. Alternative phase-in periods from Interim to Final are intended to provide time to transfer technology from highway engines to non-road engines.

How will Tier 4 Interim machines change to Tier 4 Final machines?

Tier 4 Interim machine engines will require an additional 50% reduction in NOx emissions at Tier 4 Final. Caterpillar is researching and developing additional NOx reduction technologies, above and beyond technology currently planned for Tier 4 Interim, to meet this emissions regulation.

What is the Caterpillar direction for Tier 4 Interim technology?

Caterpillar will build on the proven success of ACERT® Technology. ACERT is an integrated systems solution *(Continued)*

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of flexible technologies. Additional building block technologies, including after treatment devices, will be added and used on an as-needed basis, by application, to provide maximum customer value.

How will fuel economy compare from Tier 3 to Tier 4? In general, Cat® Tier 4 engines will have improved fuel consumption over our current Tier 3 engines. Fuel consumption could be up to 5% better, depending on application and load factor.

What fuel restrictions do your products have? Tier 4 Interim products will require Ultra Low Sulfur Diesel (ULSD) fuel containing a maximum of 15 ppm sulfur as opposed to current LSD (Low Sulfur Diesel) which contains 500 ppm sulfur maximum. ULSD by law must be widely available in the United States by June 2010. (Reference SEBU 6251-12 *Caterpillar Commercial Diesel Engine Fluids Recommendations.*)

Are there any oil restrictions for T4 Interim products? Tier 4 Interim products will require new oil formulations to support the new technology. We will provide Cat diesel engine oil (DEO) through the Cat dealer network with the appropriate formulation for Tier 4 Interim products. These new oils are expected to be commercially available as well.

What are Caterpillar's field test procedures prior to introduction? Tier 4 validation plans include testing installations at our proving grounds, prototype machine installations and customer pilot installations prior to first production. Total prototype and pilot machine engine hours accumulated in validating machine models with 4-32 liter engines will exceed 1 million hours of operation. Each phase of this validation plan is sequenced to enable Caterpillar time to address any and all issues prior to the next phase.

When will machines be shown with Tier 4 Interim engines? Caterpillar plans a public unveiling of Tier 4 machines in 2010.

When will Caterpillar announce product launch plans? Caterpillar will utilize various regulatory provisions to enable an orderly and coordinated transition from Tier 3 to Tier 4 products. This rational transition into Tier 4 is at the core of our decision-making about product releases. We expect all manufacturers to closely manage new product introduction and utilize the full spectrum of regulatory options available.

[For more detailed information, click here to download "Cat Tier 4 Interim/Stage IIIB Technologies."](#)



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