

Frequently Asked Questions In-Use Off-Road Diesel Vehicle Regulation

Determining the Horsepower of an Engine FAQ Revised May 2011

Q - How is the maximum horsepower (hp) of an off-road engine defined in the regulation?

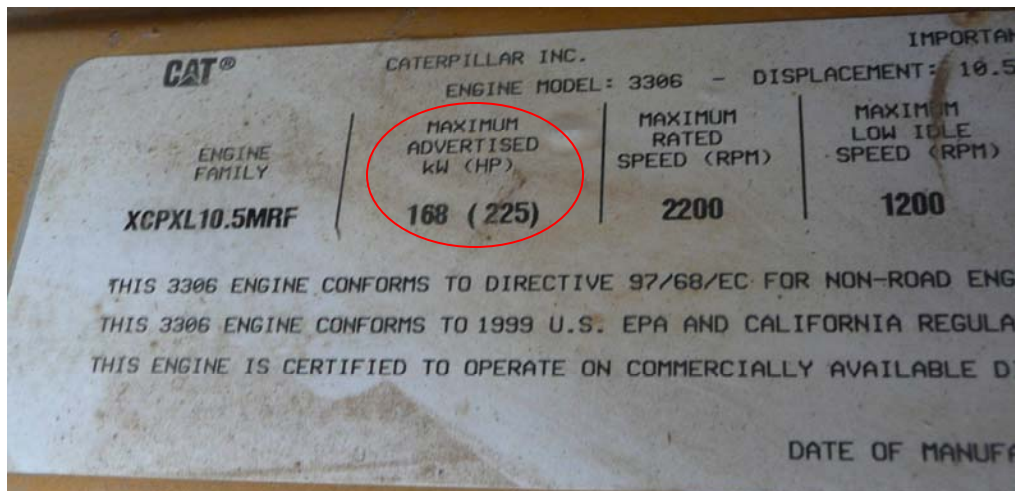
A - **“Maximum power” (Max Hp)** means the engine’s net horsepower or net flywheel power certified to Society of Automotive Engineers (SAE) Method J1349 or International Organization for Standardization (ISO) Method 9249. If the engine’s net horsepower or net flywheel power certified to SAE Method J1349 or ISO Method 9249 is not readily available, another net horsepower or net flywheel power from the manufacturer’s sales and service literature or horsepower from the engine label may be used.

Q – What is net flywheel power?

A - Net flywheel power is the rated power of the engine as-installed, with all accessories and standard intake and exhaust systems. Net flywheel power is the engine power measured at the flywheel, not counting drive train losses.

Q – Where do I find the max hp for my engine?

- First, check the engine label (see below).



- If you cannot find it there, then check the owner’s manual.
- If you cannot find it there, then check the sales/service literature.

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- If you cannot find it that way, then call the dealer and if you are able to obtain the information, keep a record of what was said, who you spoke with and the date and time.
- If that fails, then have the engine manufacturer or authorized representative determine the model year of the engine from the engine's components and determine the hp from that.
- If that fails too, then go on-line, find a similar machine for auction with hp listed, and use that hp.

You must report a max hp for each engine in order to meet the off-road regulation's reporting requirements. If a range is listed, then the maximum hp in the range must be used.

Q - Can you give me an example of how the manufacturer's sales and service literature can provide horsepower information?

A - You could cross-reference the machine serial number through an industry-wide published manual (see example below) to machine make and model, and then use machine manufacturer literature, which lists engine power. Product line catalogs may list power in several different ways (e.g., Power, Net Power, Gross Power, Flywheel Power, and Rated Power), even for similar machines. Be sure that you obtain the net horsepower or net flywheel power. In the example below, Power represents net flywheel power.



Track Loaders

Model	Power		Operating Weight*		Bucket Capacity	
	hp	kW	lb	kg	yd ³	m ³
939C GP	90	67	20,908	9484	1.5	1.2
953C	128	95	33,389	15 145	2.42	1.85
963C	158	118	43,096	19 589	3.2	2.45
973C	239	178	58,142	26 373	4.19	3.2

* Includes GP bucket plus long bolt-on teeth and segments.

Waste Handling Arrangements

Model	Power		Operating Weight*		Bucket Capacity	
	hp	kW	lb	kg	yd ³	m ³
953C WHA	128	95	34,936	15 847	3.0	2.3
963C WHA	158	118	45,501	20 639	4.05	3.1
973C WHA	239	178	61,295	27 803	6.2	4.7

* Includes GP Landfill bucket with bottom cutting edge.

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Q - How can I use the engine label to determine the maximum horsepower?

A - Nearly all engines started out with an engine label (see example on first page), also called an engine data tag, though for old engines that label may have been lost, or become difficult to read, over time. Certified engines (Tier 1 or higher) have an emissions label (see below) in addition to the engine label. Engine labels and emissions labels usually list a power rating, which is most commonly gross power measured with SAE J1995. Gross power is an engine's power running on a stand without accessories, mufflers, or emissions control devices (not as-installed like the net flywheel power), and is therefore always higher than the net flywheel power. For additional examples of emission labels, please see the Engine Family Names DOORS User Guide at: https://secure.arb.ca.gov/ssldoors/doors_reporting/doors_login.html



If all that is listed on the engine label is the gross power, which may not be used to determine Max Hp, you can still obtain the machine serial number listed on the engine label. As stated earlier, you can then cross reference that through an industry-wide published manual to machine make and model, and then use machine manufacturer literature to look up the engine power. An industry-wide published manual that may be used is a serial number guide published by Equipment Watch, which can be found at: http://equipmentwatch.com/Marketing/SNG_overview.jsp

Labels can be metal or plastic and are attached to the engine typically on the valve cover or timing chain case. Although, sometimes it is attached on other components like the fuel pump or oil cooler. The engine label and emission label are not always near one another.

Example: 123 Construction has a very large fleet and has compiled the maximum horsepower for each machine. Half of their vehicles' engines maximum horsepower were determined by the emission or engine label. For 45

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percent of their vehicles, they determined the maximum horsepower by cross-referencing the machine serial number (through an industry-wide published manual) to machine make and model, and then using machine manufacturer literature that listed engine horsepower. For roughly 5 percent of their machines, they could not find engine power. For those they used the engine power of a similar machine.

Q - Why do I need to have the maximum horsepower for the engine in my off-road vehicle?

A - Each year, each fleet must determine if it will be able to meet the fleet average target requirements for the next January 1 compliance date (and if not, the best available control technology (BACT) requirement must be met). The maximum horsepower is used to calculate the fleet average target rate and is also needed to determine if the BACT requirements have been met.

Q - What if I have derated my engine? Does that change the maximum hp that I report?

A - No, although the actual emissions from off-road vehicles will be impacted by the actual work performed by the engine, a fleet may not change the maximum hp based on the derating of an engine. Regardless of how the engine is derated, temporarily by electronic or mechanical means, or by permanent mechanical means, a change in maximum hp may not be reported. The emission factors the regulation uses to calculate fleet average compliance are based on the maximum hp; hence, using the derated hp would result in the use of an incorrect emission factor.

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