NONROAD ENGINE FAMILY BOXES

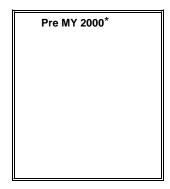
The engine family boxes shown below represent groupings of engine families with similar characteristics (i.e., the emissions standards that the engines were built to) for current and past model years. The boxes were grouped by the rated power categories and effective model years (for the emission standards). The number of engine families for each box were tabulated from an EPA engine certification database. All emission standards are in units of g/kW-hr.

These boxes serve as a guide to retrofit technology manufacturers who are interested in maximizing the number of engine families the retrofit device can be applied to, while minimizing the number of tests to demonstrate applicability. EPA/OTAQ staff shall determine the applicability of the retrofit device to the number of engine families on a <u>case-by-case</u> basis.

<u>NR1</u> kW<8

MY 2000-2004		
TIER 1		
CO:	8.0	
HC+NOx:	10.5	
PM:	1.0	
No. Of Families:		

MY 2005 - Present		
TIER 2		
CO:	8.0	
HC+NOx:	7.5	
PM:	0.80	
No. Of Families:		



NR2

8<u><</u> kW < 19

MY 2000-2004		
TIER 1		
CO:	6.6	
HC+NOx:	9.5	
PM:	0.80	
No. Of Families:		

MY 2005 - Present		
TIER 2		
CO:	6.6	
HC+NOx:	7.5	
PM:	0.80	
No. Of Families:		

Pre MY 2000*

NR3

19<u><</u> kW < 37

MY 1999-2003		
TIER 1		
CO:	5.5	
HC+NOx:	9.5	
PM:	0.8	
No. Of Families:		

MY 2004 - Present	
5.5	
7.5	
0.6	
	5.5 7.5

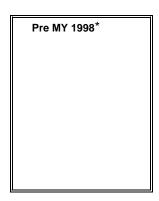
Pre MY 1999*	
	Pre MY 1999*

<u>NR4</u> 37<u><</u> kW < 75

MY 1998-2003		
TIER 1		_
NOx	9.2	
CO:	=	
HC+NOx:	-	
PM:	-	
	-	
No. Of Families:		

MY 2004 - 2007		
TIER 2		_
CO:	5.0	
HC + NOx:	7.5	
PM:	0.40	
No. Of Families:		

MY 2008 - Present		
TIER 3		_
CO:	5.0	
HC + NOx:	4.7	
PM:	0.40	
No. Of Families:		

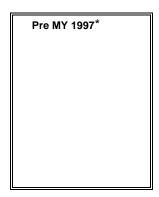


<u>NR5</u> 75 <u><</u> kW < 130

<u> </u>		
MY 1997-2002		
TIER 1		_
NOx	9.2	
CO:	-	
HC+NOx:	-	
PM:	=	
	-	
No. Of Families:		

MY 2003 - 2006		
TIER 2		Ī
CO:	5.0	
HC + NOx:	6.6	
PM:	0.30	
No. Of Families:		

MY 2007 - Present		
TIER 3		_
CO:	5.0	
HC + NOx:	4.0	
PM:	0.30	
No. Of Families:		



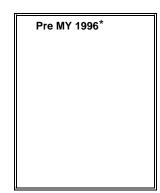
<u>NR6</u>

130<u><</u> kW < 225

MY 1996-2002		
TIER 1		_
NOx	9.2	
CO:	11.4	
HC+NOx:	-	
PM:	0.54	
HC	1.3	
No. Of Families:		

MY 2003 - 2005		
TIER 2		
CO:	3.5	
HC + NOx:	6.6	
PM:	0.20	
No. Of Families:		

MY 2006 - Present		
TIER 3		
CO:	3.5	
HC + NOx:	4.0	
PM:	0.20	
No. Of Families:		

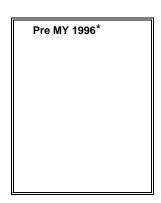


NR7 225<u><</u> kW < 450

MY 1996-2000		
TIER 1		_
NOx	9.2	
CO:	11.4	
HC+NOx:	-	
PM:	0.54	
HC	1.3	
No. Of Families:		

MY 2001 - 2005		
TIER 2		_
CO:	3.5	
HC + NOx:	6.4	
PM:	0.20	
No. Of Families:		

MY 2006 - Present		
CO:	3.5	
HC + NOx:	4.0	
PM:	0.20	
No. Of Families:		



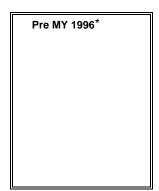
<u>NR8</u>

450 < kW < 560

MY 1996-2001		
TIER 1		
NOx	9.2	
CO:	11.4	
HC+NOx:	-	
PM:	0.54	
HC	1.3	
No. Of Families:		

MY 2002 - 2005		
TIER 2		
CO:	3.5	
HC + NOx:	6.4	
PM:	0.20	
No. Of Families:		

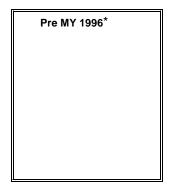
MY 2006 - Present		
TIER 3		
CO:	3.5	
HC + NOx:	4.0	
PM:	0.20	
No. Of Families:		



NR9 kW > 560

MY 2000 - 2005		
TIER 1		_
NOx	9.2	
CO:	11.4	
HC+NOx:	=	
PM:	0.54	
НС	1.3	
No. Of Families:		

MY 2006 - Present	
TIER 2	
NOx	-
CO:	3.5
HC + NOx:	6.4
PM:	0.20
HC	-
No. Of Families:	



POWER EQUIVALENTS:

= 0.117 (==111.0)	
kW	hp
8	10.7
19	25.5
37	49.6
75	100.5
130	174.2
225	301.5
450	603
560	750.4

NOTE:

* Although emission standards did not exist for pre regulated engine families, emission standard predictions can be sought with nonroad modeling software. EPA/OTAQ staff shall discuss with the retrofit manufacturer to determine the applicability of the retrofit device to non-regulated engine families also on a case-by-case basis.