



# Updates on the Commercial Harbor Craft Emissions Inventory

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## Summary of Updates

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- Incorporated EPA proposed Tier 3 & 4 standards
  - Our assumptions were close to EPA's standards
  - Emissions inventory changed very little



## EPA Marine Diesel Emission Standards

- EPA adopted Tier 1 & Tier 2 emission standards for C1 & C2 marine engines in 1999
  - Tier 1 standards are equivalent to MARPOL Annex VI NOx limits
    - Voluntary for all C1 & C2 engines through 2003
    - Mandatory for engines  $\geq 2.5$  l/cyl beginning in 2004
  - Tier 2 standards supersede Tier 1 by 2007
  - Incorporated into emission factors table
  
- EPA is proposing more stringent emission standards (Tier 3 & 4) for C1 & C2 engines

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## EPA Tier 3 Standards for Marine Diesel C1

Rated Power (kW)	Cylinder Displacement (liter)	Emission Standards (g/bhp-hr)		Model Year
		PM	NOx + HC	
< 19 kW	< 0.9	0.30	5.6	2009
		0.22	5.6	2009
19 - 75 kW	< 0.9	0.22	3.5	2014
		0.10	4.0	2012
75 - 3700 kW	0.9 - 1.2	0.09	4.0	2013
	1.2 - 2.5	0.08	4.2	2014
	2.5 - 3.5	0.08	4.2	2013
	3.5 - 7.0	0.08	4.3	2012

Source: <http://www.epa.gov/otaq/regs/nonroad/420d07001.pdf>

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## EPA Tier 3 Standards for Marine Diesel C2

Rated Power (kW)	Cylinder Displacement (liter)	Emission Standards (g/bhp-hr)		Model Year
		PM	NOx + HC	
<= 3700 kW	7 -15	0.10	4.6	2013
	15 - 20	0.20	6.5	2014
	20 - 25	0.20	7.3	2014
	25 - 30	0.20	8.2	2014

Source: <http://www.epa.gov/otaq/regs/nonroad/420d07001.pdf>

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## EPA Tier 4 Standards for Marine Diesel C1 & C2

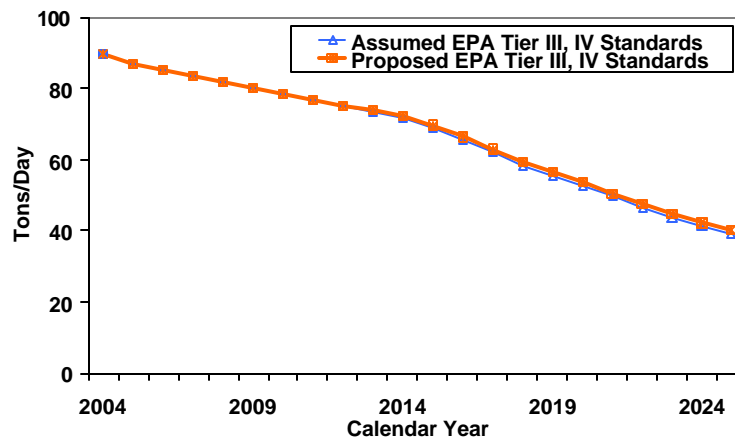
Rated Power (kW)	Emission Standards (g/bhp-hr)			Model Year
	PM	NOx	HC	
> 3700 kW	0.09	1.30	0.14	2014
	0.04	1.30	0.14	2016
1400 - 3700 kW	0.03	1.30	0.14	2016
600 - 1400 kW	0.03	1.30	0.14	2017

Source: <http://www.epa.gov/otaq/regs/nonroad/420d07001.pdf>

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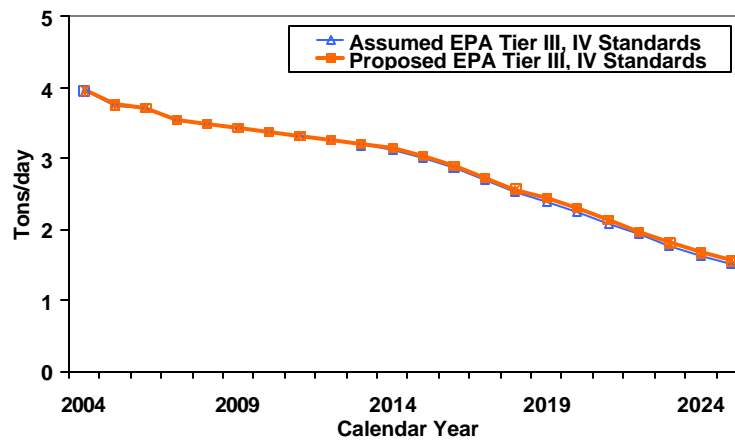
## Changes to NOx Emissions



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## Changes to PM Emissions



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## Next Steps

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- Continue QA Process
- Finalize emissions inventory in June
- Finalize methodology documentation in July

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Previous presentations on Commercial Harbor Craft Regulation can be found at :  
<http://www.arb.ca.gov/msprog/offroad/marinevess/harborcraft.htm>