

Boiler MACT Proposed Revisions

- ▶ Amend 34 emission standards for several categories of boilers
 - Three years to demonstrate compliance
- ▶ Additional explanation for using CO as surrogate for organic HAP

Boiler MACT Proposed Revisions – New Units

Subcategory	Pollutant*	Current Emission Limit	Proposed Emission Limit	Emission Limit Units (3-hour Average)	Percent Change in Limit
Units in all subcategories designed to burn solid fuel	HCl	2.2E-02	3.0E-04	lb/MMBtu of Heat Input	-99%
		2.5E-02	4.1E-04	lb/MMBtu of Steam Output	-98%
		0.28	3.9E-03	lb/MWh	-99%
Stokers/sloped grate/others designed to burn wet biomass fuel	CO	620	590	ppmvd, 3% Oxygen	-5%
		0.58	0.61	lb/MMBtu of Steam Output	5%
		6.8	6.5	lb/MWh	-4%
	PM	3.0E-02	1.3E-02	lb/MMBtu of Heat Input	-57%
		3.5E-02	1.4E-02	lb/MMBtu of Steam Output	-60%
		0.42	0.19	lb/MWh	-55%
Stokers/sloped grate/others designed to burn kiln-dried biomass fuel	TSM	4.0E-03	5.0E-03	lb/MMBtu of Heat Input	25%
		4.2E-03	5.2E-03	lb/MMBtu of Steam Output	24%
		5.6E-02	7.0E-02	lb/MWh	25%
Fluidized bed units designed to burn biomass/bio-based solids	CO	230	130	ppmvd, 3% Oxygen	-43%
		0.22	0.13	lb/MMBtu of Steam Output	-41%
		2.6	1.5	lb/MWh	-42%
	PM	9.8E-03	4.1E-03	lb/MMBtu of Heat Input	-58%
		1.2E-02	5.0E-03	lb/MMBtu of Steam Output	-58%
		0.14	5.8E-02	lb/MWh	-59%
	TSM	8.3E-05	8.4E-06	lb/MMBtu of Heat Input	-90%
		1.1E-04	1.1E-05	lb/MMBtu of Steam Output	-90%
		1.2E-03	1.2E-04	lb/MWh	-90%

Boiler MACT Proposed Revisions – New Units

Suspension burners designed to burn biomass/bio-based solids	CO	2,400	220	ppmvd, 3% Oxygen	-91%
		1.9	0.18	lb/MMBtu of Steam Output	-91%
		27	2.5	lb/MWh	-91%
	TSM	6.5E-03	8.0E-03	lb/MMBtu of Heat Input	23%
		6.6E-03	8.1E-03	lb/MMBtu of Steam Output	23%
		9.1E-02	0.12	lb/MWh	32%
Dutch Ovens/Pile burners designed to burn biomass/bio-based solids	PM	3.2E-03	2.5E-03	lb/MMBtu of Heat Input	-22%
		4.3E-03	3.4E-03	lb/MMBtu of Steam Output	-21%
		4.5E-02	3.5E-02	lb/MWh	-22%
Fuel cell units designed to burn biomass/bio-based solids	PM	2.0E-02	1.1E-02	lb/MMBtu of Heat Input	-45%
		3.0E-02	2.0E-02	lb/MMBtu of Steam Output	-33%
		0.28	0.16	lb/MWh	-43%
Hybrid suspension grate boiler designed to burn biomass/bio-based solids	CO	1,100	180	ppmvd, 3% Oxygen	-84%
		1.4	0.22	lb/MMBtu of Steam Output	-84%
		12	2.0	lb/MWh	-83%
Units designed to burn liquid fuel	HCl	4.4E-04	7.0E-05	lb/MMBtu of Heat Input	-84%
		4.8E-04	7.7E-05	lb/MMBtu of Steam Output	-84%
		6.1E-03	9.7E-04	lb/MWh	-84%
Units designed to burn heavy liquid fuel	PM	1.3E-02	1.9E-03	lb/MMBtu of Heat Input	-85%
		1.5E-02	2.1E-03	lb/MMBtu of Steam Output	-86%
		0.18	2.7E-02	lb/MWh	-85%
	TSM	7.5E-05	6.1E-06	lb/MMBtu of Heat Input	-91%
		8.2E-05	6.7E-06	lb/MMBtu of Steam Output	-92%
		1.1E-03	8.5E-05	lb/MWh	-92%

Boiler MACT Proposed Revisions – New Units

Units designed to burn gas 2 (other) gases	PM	6.7E-03	7.3E-03	lb/MMBtu of Heat Input	9%
		1.2E-02	1.3E-02	lb/MMBtu of Steam Output	8%
		7.0E-02	7.6E-02	lb/MWh	9%

Boiler MACT Proposed Revisions – Existing Units

Subcategory	Pollutant*	Current Emission Limit	Proposed Emission Limit	Emission Limit Units (3-hour Average)	Percent Change in Limit
Units in all subcategories designed to burn solid fuel	HCl	2.2E-02	2.0E-02	lb/MMBtu of Heat Input	-9%
		2.5E-02	2.3E-02	lb/MMBtu of Steam Output	-8%
		0.27	0.26	lb/MWh	-4%
	Hg	5.7E-06	5.4E-06	lb/MMBtu of Heat Input	-5%
		6.4E-06	6.2E-06	lb/MMBtu of Steam Output	-3%
		7.3E-05	6.9E-05	lb/MWh	-5%
Units design to burn coal/solid fossil fuel	PM	4.0E-02	3.9E-02	lb/MMBtu of Heat Input	-3%
		4.2E-02	4.1E-02	lb/MMBtu of Steam Output	-2%
		0.49	0.48	lb/MWh	-2%
Stokers/others designed to burn coal/solid fossil fuel	CO	160	150	ppmvd, 3% Oxygen	-6%
		0.14	0.14	lb/MMBtu of Steam Output	0%
		1.7	1.6	lb/MWh	-6%
Stokers/sloped grate/others designed to burn wet biomass fuel	CO	1,500	1,100	ppmvd, 3% Oxygen	-27%
		1.4	1.1	lb/MMBtu of Steam Output	-21%
		17	13	lb/MWh	-24%
	PM	3.7E-02	3.4E-02	lb/MMBtu of Heat Input	-8%
		4.3E-02	4.0E-2	lb/MMBtu of Steam Output	-7%
		0.52	0.48	lb/MWh	-8%
	TSM	2.4E-04	2.0E-04	lb/MMBtu of Heat Input	-17%
		2.8E-04	2.4E-04	lb/MMBtu of Steam Output	-14%
		3.4E-04	2.8E-03	lb/MWh	724%**

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Stokers/sloped grate/others designed to burn kiln-dried biomass fuel	TSM	4.0E-03	5.0E-03	lb/MMBtu of Heat Input	25%
		4.6E-03	5.9E-03	lb/MMBtu of Steam Output	28%
		5.6E-02	7.0E-02	lb/MWh	25%
Fluidized bed units designed to burn biomass/bio-based solid	CO	470	210	ppmvd, 3% Oxygen	-55%
		0.46	0.21	lb/MMBtu of Steam Output	-54%
		5.2	2.3	lb/MWh	-56%
	PM	0.11	2.1E-02	lb/MMBtu of Heat Input	-81%
		0.14	2.6E-02	lb/MMBtu of Steam Output	-81%
		1.6	0.30	lb/MWh	-81%
	TSM	1.2E-03	6.4E-05	lb/MMBtu of Heat Input	-95%
		1.5E-03	8.0E-05	lb/MMBtu of Steam Output	-95%
		1.7E-02	9.0E-04	lb/MWh	-95%
Suspension burners designed to burn biomass/bio-based solid	PM	5.1E-02	4.1E-02	lb/MMBtu of Heat Input	-20%
		5.2E-02	4.2E-02	lb/MMBtu of Steam Output	-19%
		0.71	0.58	lb/MWh	-18%
	TSM	6.5E-03	8.0E-03	lb/MMBtu of Heat Input	23%
		6.6E-03	8.1E-03	lb/MMBtu of Steam Output	23%
		9.1E-02	0.12	lb/MWh	32%
Dutch Ovens/Pile burners designed to burn biomass/bio-based solid	PM	0.28	0.18	lb/MMBtu of Heat Input	-36%
		0.39	0.25	lb/MMBtu of Steam Output	-36%
		3.9	2.6	lb/MWh	-33%
Units designed to burn liquid fuel	Hg	2.0E-06	7.3E-07	lb/MMBtu of Heat Input	-64%
		2.5E-06	8.8E-07	lb/MMBtu of Steam Output	-65%
		2.8E-05	1.1E-05	lb/MWh	-61%

Boiler MACT Proposed Revisions – Existing Units

Units designed to burn heavy liquid fuel	PM	6.2E-02	5.9E-02	lb/MMBtu of Heat Input	-5%
		7.5E-02	7.2E-02	lb/MMBtu of Steam Output	-4%
		0.86	0.82	lb/MWh	-5%
Units designed to burn liquid fuel that are non-continental units	PM	0.27	0.22	lb/MMBtu of Heat Input	-19%
		0.33	0.27	lb/MMBtu of Steam Output	-18%
		3.8	3.1	lb/MWh	-18%
Units designed to burn gas 2 (other) gases	PM	6.7E-03	7.3E-03	lb/MMBtu of Heat Input	9%
		1.2E-02	1.3E-02	lb/MMBtu of Steam Output	8%
		7.0E-02	7.6E-02	lb/MWh	9%

Boiler MACT Technical Corrections (Jul 8, 2020)

- ▶ A grammatical change to 40 CFR 63.7500(a)
- ▶ Removal of the requirement to collect samples during the test period at 1-hour intervals in 40 CFR 63.7521(c)(1)(ii)
- ▶ Clarification that the establishment of a pH operating limit is not required for a PM wet scrubber in 40 CFR 63.7530(b)(4)(iii) [Note that a pH operating limit is still required for wet acid gas scrubbers]
- ▶ Clarification that certification requirements only apply to PM CEMS and not to PM continuous parameter monitoring systems (PM CPMS) in 40 CFR 63.7540(a)(9), as no performance specification exists for PM CPMS
- ▶ Technical correction of the definition of "Other Gas Fuel" in 40 CFR 63.7575 to clarify that the maximum concentration is "40 micrograms per cubic meter of gas" rather than "40 micrograms per cubic meter of mercury"
- ▶ Addition of the definition of "12-month Rolling Average" in 40 CFR 63.7575
- ▶ Technical correction of the definition of "Steam Output" in 40 CFR 63.7575 to refer to "steam headers" instead of "steam heaters"
- ▶ Revision of the alternative PM emission standard for new stoker/sloped grate/others designed to burn kiln-dried biomass fuel in [Table 1 to Subpart DDDDD](#) from 4.2E-01 lb/MMBtu to 4.3E-01 lb/MMBtu to correct a rounding error
- ▶ Revision of footnote "b" in [Table 7 to Subpart DDDDD](#) to state that when multiple performance tests are conducted, the maximum operating load should be selected as the lower of the maximum values established during performance testing
- ▶ Revision of the equation reference in [Table 8 to Subpart DDDDD](#) for boilers that comply with emission limits using fuel analysis

U.S. Climate Alliance

- ▶ 24 states covered under US Climate Alliance have or are in the process of enacting laws/rules to phase out HFCs
- ▶ Formed after President Trump announced withdrawal from Paris Agreement
- ▶ Goal to reduce GHG emissions by 26-28 percent below 2005 by 2025
- ▶ Most states are initially adopting EPA SNAP Rules 20 and 21 as originally intended
- ▶ Many of the laws establish general framework for additional, more stringent rules
 - For example CA has release draft Phase 2 rules that limit GWP of refrigerants used in large appliances (≥ 50 lbs) in the retail food/commercial refrigeration, industrial process refrigeration, and cold storage end-use categories

