

BOILER MACT

The United State Environmental Protection Agency (U.S. EPA) has finalized the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Industrial, Commercial, and Institutional Boilers and Process Heaters. The new rule is also known as the Boiler MACT and will be codified in 40 CFR 63, Subpart DDDDD. U.S. EPA estimates that when it is fully implemented, the rule will reduce Hazardous Air Pollutant (HAP) emissions by approximately 50,600 to 58,000 tons per year. HAP emission reductions include metals, chlorine, hydrogen chloride, hydrogen fluoride, and various organic HAP. Key elements of the final rule are presented below.

Effective Date of the Rule

November 12, 2004 (Federal Register Vol. 69, No. 176, pp. 55218-55286)

Compliance Dates

Existing affected sources must be in compliance by September 13, 2007 (3 years).

New or reconstructed boilers or process heaters must comply by November 12, 2004 or upon startup date, whichever is later. An area source that increases its emissions or its potential to emit so that it becomes a major source of HAP, the existing boiler or process heater must be in compliance within 3 years of the facility becoming a major source.

Potentially Affected Sources

The rule applies new, reconstructed, or existing industrial, commercial, or institutional boilers or process heaters located at or part of a major source of HAP, excluding units subject to regulation under another MACT standard. New sources are defined as sources that commenced construction after January 13, 2003. This cut-off date is also applicable to reconstruction.

Process heaters are defined as enclosed devices using a controlled flame for the primary purpose of transferring heat indirectly to a process material. Process heaters may also be used to heat a transfer material for use in a process unit. Process heater combustion gases do not directly come in contact with process materials. Boilers are defined as enclosed devices using a controlled flame for the primary purpose of recovering thermal energy

in the form of steam or hot water. Waste heat boilers are not included in this definition.

Requirements

Boilers and process heaters have the potential for numerous HAP in varying quantities. The Boiler MACT uses several selected surrogates to control HAP multiple HAP. HAP are grouped into four categories:

- Mercury;
- Non-mercury metallic HAP;
- Inorganic HAP; and
- Organic HAP.

Particulate matter (PM) was selected as a surrogate for metallic HAP emissions. In cases where the fuel metal content is very low and PM would not be an appropriate surrogate, total selected metals (TSM) may be used as an alternate emission limit.

Hydrochloric acid (HCl) was selected as a surrogate for inorganic HAP, because emission testing information indicated HCl was the primary inorganic HAP present.

As an indicator of incomplete combustion, the presence of carbon monoxide (CO) can be directly correlated to the formation of organic HAP; therefore, CO was selected as a surrogate for organic HAP.

Table 1 provides a matrix to the Boiler MACT rule source subcategories and Table 2 provides the emission limit for each subcategory.

- Sources Not Affected**
- *Temporary Boilers*
 - *Hot water heaters (<120 gallons)*
 - *Combustion units regulated by other MACT standards under 40 CFR 63 (e.g. solid waste incineration units)*
 - *Electric utility steam generating units that is fossil fuel-fired combustion unit of more than 25 MW and produces electricity for sale*
 - *Boilers or process heaters covered under Section 3005 of the Solid Waste Disposal Act or covered under 40 CFR 63 Subpart EEE*
 - *Recovery boilers or furnaces subject to 40 CFR 63 Subpart MM*
 - *Municipal waste incinerators*
 - *Hospital/medical/infectious incinerators*
 - *Research and development boilers or process*

Table 1. Source Subcategory Matrix

SOURCE SUBCATEGORY	UNIT TYPE(S)	FUEL			RATED CAPACITY (MM Btu/hr)	ANNUAL CAPACITY FACTOR
		GASEOUS	LIQUID	SOLID		
Large Gaseous Fuel	Watertube Boiler Process Heater	✓	E		>10	>10%
Large Liquid Fuel	Watertube Boiler Process Heater	✓	✓		>10	>10%
Large Solid Fuel	Watertube Boiler Process Heater	✓	✓	✓	>10	>10%
Small Gaseous Fuel	Firetube Boiler	✓	E			
	Any Other Boiler Process Heater	✓	E		≤10	
Small Liquid Fuel	Firetube Boiler	✓	✓			
	Any Other Boiler Process Heater	✓	✓		≤10	
Small Solid Fuel	Firetube Boiler	✓	✓	✓		
	Any Other Boiler Process Heater	✓	✓	✓	≤10	
Limited Use Gaseous Fuel	Watertube Boiler Process Heater	✓	E		>10	≤10%
Limited Use Liquid Fuel	Watertube Boiler Process Heater	✓	✓		>10	≤10%
Limited Use Solid Fuel	Watertube Boiler Process Heater	✓	✓	✓	>10	≤10%

Key to Fuel Matrix:

✓ – Fuel used either alone or in combination with another checked fuel
 E – fuel used during gas supply emergencies or gas curtailment periods

Table 2. Boiler MACT Emission Limits

NEW, RECONSTRUCTED, OR EXISTING	SOURCE SUBCATEGORY	EMISSION LIMITATIONS				
		PM	TSM	HCl	CO	Hg
New or Reconstructed	Large Solid Fuel	0.025	0.0003	0.02	400 @ 7% O ₂	0.000003
	Large Liquid Fuel	0.03	—	0.0005	400 @ 3% O ₂	—
	Large Gaseous Fuel	—	—	—	400 @ 3% O ₂	—
	Small Solid Fuel	0.025	0.0003	0.02	—	0.000003
	Small Liquid Fuel	0.03	—	0.0009	—	—
	Small Gaseous Fuel	—	—	—	—	—
	Limited Use Solid Fuel	0.025	0.0003	0.02	400 @ 7% O ₂	—
	Limited Use Liquid Fuel	0.03	—	0.0009	400 @ 3% O ₂	—
	Limited Use Gaseous Fuel	—	—	—	400 @ 3% O ₂	—
Existing	Large Solid Fuel	0.07	0.001	0.09	—	0.000009
	Limited Use Solid Fuel	0.21	0.004	—	—	—
	All Others	—	—	—	—	—

Note: TSM may be used as an alternate to the PM metallic surrogate limit.

Summary of Compliance Requirements

In general, the rule employs standard NESHAP 40 CFR 63 mechanisms for demonstrating compliance. Compliance may be demonstrated in several ways including conducting fuel analyses, establishing operating limits, and conducting CMS performance evaluations. Initial compliance for each affected source is determined by the subcategory and rated capacity of the boiler or process heater. Certain boilers are required to demonstrate continuous compliance using Continuous Emission Monitoring Systems (CEMS),

Continuous Opacity Monitoring Systems (COMS), and fuel gas analysis.

The rule provides health-based compliance alternatives for hydrochloric acid from large solid fuel boilers and for TSM from all boilers. Emission averaging is also allowed.

The rule requires the notifications, reports, and records subject to the provisions of 40 CFR 63. The requirements are not common to all sources and are determined by the subcategory of the boiler or process heater.

For further questions concerning this rule and other air quality management issues, please contact Yousheng Zeng, Ph.D., P.E. at (225) 766-7400 or youshengzeng@providencebr.com.



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