

Combustion Rules Boiler MACT, Boiler Area Source, CISWI, NHSM

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Agenda

- Overview of sections 112 and 129 of CAA
- Applicability—are you burning fuel or waste?
- Boiler MACT
- Boiler Area Source Rule
- CISWI Rule
- Questions



Section 112 of CAA

- Mandates MACT standards for HAP for both major and area sources
- The Administrator may distinguish among classes, types, and sizes of sources within a category in establishing such standards.
- **Major source:** Means any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year or more of any HAP or 25 tons per year or more of any combination of HAP.
- **Area source:** Means any stationary source of HAP that is not a major source.

Section 129 of CAA

- Shall establish performance standards and other requirements for each category of solid waste incineration units.
- Shall include emissions limitations applicable to new units and guidelines applicable to existing units.
- May distinguish among classes, types, and sizes.
- Shall specify numerical emission limits for: PM, opacity, SO₂, HCl, NO_x, CO, Pb, Cd, Hg, and dioxins/furans.
- “Solid waste incineration unit” means a distinct operating unit of any facility which combusts any solid waste material from commercial or industrial establishments or the general public.
- Does not include:
 - Hazardous waste incinerators
 - Metal recovery facilities,
 - Qualifying small power production facilities which burn homogeneous waste (such as tires or used oil),
 - Air curtain incinerators provided that such incinerators only burn wood wastes, yard wastes.
- Terms for “solid waste” shall have the meanings established by the Administrator pursuant to the Solid Waste Disposal Act

Applicability: Are You Burning Fuel or Waste?

Applicability- Are You Burning Fuel or Waste?

- The non-hazardous secondary material (NHSM) regulation identifies which non-hazardous secondary materials are, or are not, solid wastes when burned in combustion units.
 - Promulgated March 21, 2011
 - Amended on February 7, 2013
- Units that burn NHSM that are **not** solid waste would be subject to section 112 requirements.
- Units that burn NHSM that are solid waste would be subject to the section 129 requirements.

What is NHSM?

- **Secondary material** means any material that is not the primary product of a manufacturing or commercial process.
- **Traditional fuels** means materials that are produced as fuels and are unused products that have not been discarded.
- **Processing** means any operations that transform discarded non-hazardous secondary material into a non-waste fuel or non-waste ingredient product.



Applicability-Are You Burning Fuel or Waste?

- Traditional fuels are not solid waste
 - Fossil fuels (coal, oil, natural gas)
 - Their derivatives (e.g., pet coke, refinery gas)
 - Cellulosic biomass (virgin wood)
 - Agricultural and forest-derived biomass
 - Urban wood
 - Biomass crops used for production of biofuels
 - Bagasse and other crop residues
 - Trees and clean wood in disaster debris
 - Clean biomass from land cleaning
 - Clean construction and demolition wood
 - Alternative fuels from virgin materials
 - On-spec used oil, currently mined coal refuse
- Note: These fuels are not considered solid waste unless they have been discarded prior to being burned as fuel.

Applicability-Are You Burning Fuel or Waste?

- Non-hazardous secondary materials that are not solid waste when used as a fuel:
 - Scrap tires under a tire collection program
 - Resinated wood
 - off-specification resonated wood products that do not meet a manufacturing quality or standard.
 - Coal refuse recovered from legacy piles
 - Dewatered pulp and paper sludges generated and burned on-site
- Any person may submit a petition to identify additional NHSM to be listed.



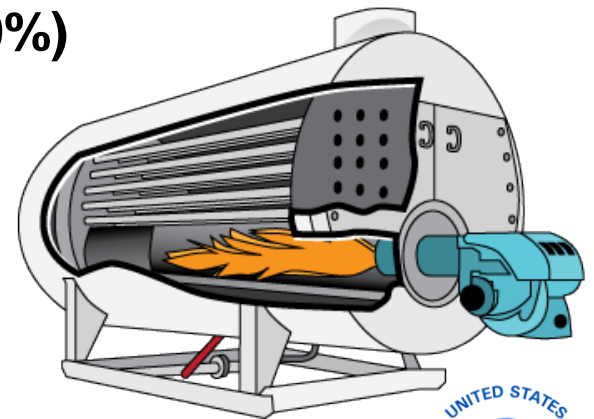
MAJOR SOURCE BOILER RULE

40 CFR Part 63, Subpart DDDDD



Boiler MACT Source Category

- **Source categories regulated**
 - Industrial Boilers
 - Commercial and Institutional Boilers
 - Process Heaters
- **There are about 14,100 boilers and process heaters located at major sources in the United States. The following fuels are commonly combusted in boilers:**
 - Natural gas and other gases (More than 80%)
 - Liquid fuels (6%)
 - Coal (4.2%)
 - Biomass (3%)
 - Non-hazardous secondary materials
 - Combinations of fuels



Definitions

- **Boiler** means an enclosed device using controlled flame combustion in which water is heated to recover thermal energy in the form of steam or hot water.
 - Waste heat boilers are excluded from this definition.
- **Process heater** means a device use to transfer heat indirectly to a process material or to a heat transfer material for use in a process unit, instead of generating steam.
 - Process heaters are devices in which the combustion gases do not come into direct contact with process materials.

Units Not Subject to Boiler MACT

- Electric utility steam generating units (EGU) covered by subpart UUUUU (i.e. MATS)
- Recovery boiler/furnace covered by subpart MM
- Boiler or process heater
 - Used specifically for research and development
 - Any boiler or process heater that is part of the affected source subject to another NESHAP
 - Used as a control device, provided that at least 50% of the average annual heat input is provided by regulated gas streams that are subject to another standard
- Hazardous waste boiler

Units Not Subject to Boiler MACT (cont.)

- Hot water heater, as defined:
 - A capacity of no more than 120 gallons or
 - Heat input capacity of 1.6 MMBtu/hr or less (not generating steam) heated by gaseous fuel, liquid fuel, or biomass
- *Temporary boilers*- any gaseous or liquid fuel boiler that does not remain at a location for more than 12 consecutive months
- Blast furnace gas fuel-fired boilers and process heaters
- Boilers specifically listed as an affected source in any standard(s) established under CAA section 129
- Residential boilers

Boiler MACT – Subcategories

- **19 subcategories based on design type:**
 - Solid fuel
 - Pulverized coal units
 - Coal-fired stokers
 - Coal-fired fluidized bed (FB) combustion units
 - Coal-fired FB combustion units with FB heat exchanger
 - Biomass-fired stokers burning kiln-dried biomass
 - Biomass-fired stokers burning wet biomass
 - Biomass-fired FB combustion units
 - Biomass-fired Dutch Ovens
 - Biomass-fired Suspension burners
 - Biomass-fired fuel cells
 - Biomass-fired hybrid suspension/grate units
 - Heavy Liquid fuel-fired units
 - Light Liquid fuel-fired units
 - Liquid fuel-fired units located in non-continental States and territories
 - Gas 1 (Natural gas/ refinery gas)
 - Gas 2 (other gases)
 - Metal processing furnaces (natural gas-fired)
 - Limited-Use

Existing Boilers Compliance Requirements

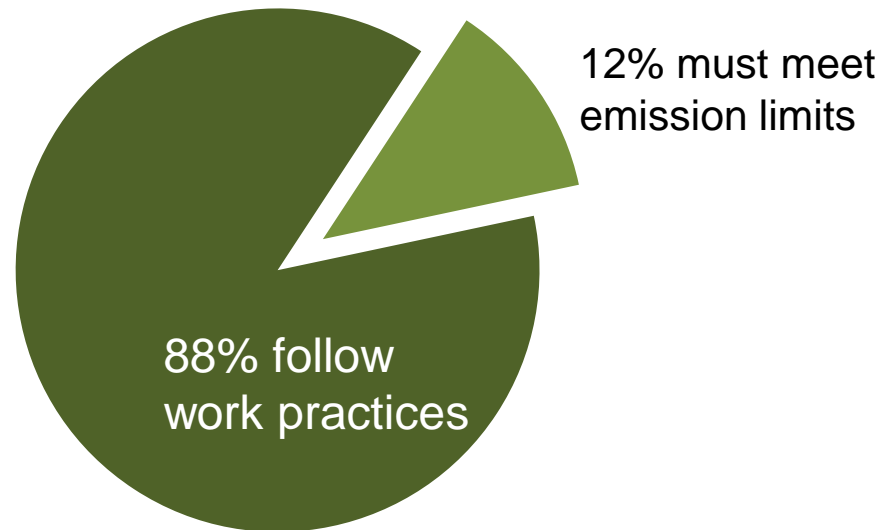
- **Large boilers (≥ 10 MMBtu/hr)**
 - **Clean gas**
 - Annual tune-up
 - 1-time energy assessment
 - **Solid fuel (coal or biomass), Oil, Process gas that is not “clean” gas**
 - Numeric emission limits for Hg, PM (or TSM), HCl, CO
 - Annual tune-up
 - 1-time energy assessment
 - **Limited Use**
 - Tune-up every other year
- **Small boilers (< 10 MMBtu/hr)**
 - **Gas, solid fuel, oil**
 - Tune-up every other year
 - 1-time energy assessment

New Boilers Compliance Requirements

- **Large boilers (≥ 10 MMBtu/hr)**
 - **Clean gas**
 - Annual tune-up
 - **Solid fuel (coal or biomass), Oil, Process gas that is not “clean” gas**
 - Numeric emission limits for Hg, PM (or TSM), HCl, CO
 - Annual tune-up
 - **Limited Use**
 - Tune-up every other year
- **Small boilers (< 10 MMBtu/hr)**
 - **Gas, solid fuel, oil**
 - Tune-up every other year

Breakdown of Major Source Boilers

- **About 14,100 covered units**



- 88% (about 12,300) would need to follow work practice standards, such as annual tune ups, to minimize toxics.
- 12% (about 1,750) would need to meet numeric emission limits to minimize toxics.

Key Adjustments to Boiler MACT

- “CO CEMS-based” alternative emission limits to stack test-based CO emission limits
- Work practices standards in lieu of numeric emission limits for dioxin
- Alternative “Total Selected Metals” (TSM) emission limits to the PM limits
 - arsenic, beryllium, cadmium, chromium, lead, manganese, nickel and selenium
- Extended compliance date

Key Adjustments to Boiler MACT

- Added to and refined the list of subcategories
 - Split the biomass stoker subcategory into:
wet biomass stoker & kiln-dried biomass stoker
 - Split the liquid fuel subcategory into two:
heavy liquid & light liquid
- Work practices – Startup & Shutdown
 - Revised definitions from based on operating load to based on starting & stopping supplying steam
 - Require clean fuel at startup and engaging control devices when coal, biomass or heavy oil is fired

Emission Limits- Boiler MACT

Subcategory	Existing units, lb/MMBtu unless noted					New units, lb/MMBtu, unless noted				
	Hg lb/TBtu	HCl	PM	CO, ppm (CEMS-based)	D/F	Hg lb/TBtu	HCl	PM	CO, ppm (CEMS-based)	D/F
Coal Stoker	5.7	0.022	0.04	160 (340)	Work practice	0.8	0.022	0.001	130 (340)	Work practice
Coal Fluidized Bed			0.04	130 (230)	Work practice			0.001	130 (230)	Work practice
Pulverized Coal			0.04	130 (320)	Work practice			0.001	140 (150)	Work practice
Biomass wet stoker-revised subcategory			0.037	1,500 (720)	Work practice			0.03	620 (390)	Work practice
Biomass fuel cell			0.02	1,100	Work practice			0.02	910	Work practice
Biomass Fluidized Bed			0.11	470 (310)	Work practice			0.01	230 (310)	Work practice
Biomass Dutch oven/Pile burner			0.28	770 (520)	Work practice			0.003	330 (520)	Work practice
Biomass Susp./grate			0.44	2,800 (900)	Work practice			0.026	1,100 (900)	Work practice
Biomass suspension			0.051	2,400 (2000)	Work practice			0.03	2,400 (2000)	Work practice
Biomass dry stoker			0.32	460	Work practice			0.03	460	Work practice
Heavy liquid	2	0.0011	0.062	130	Work practice	0.48	0.0004	0.013	130	Work practice
Light liquid	2	0.0011	0.008	130	Work practice	0.48	0.0004	0.001	130	Work practice
New gas 2	7.9	0.0017	0.007	130	Work practice	7.9	0.0017	0.007	130	Work practice
New non-cont. liquid	2	0.0011	0.27	130	Work practice	0.48	0.0004	0.023	130	Work practice

New and existing small (<10 MMBtu/hr) units, natural gas-fired units, metal process furnaces, units combusting other clean gases, and limited use units will be subject to work practice standards.



Compliance Dates

- Existing Sources

- January 31, 2016
- As EPA noted, the CAA allows title V permitting authorities to grant sources an additional 1-year past January 31, 2016 extension, if needed to install controls

- New Sources

- January 31, 2013 or upon startup
- Sources which commenced construction or reconstruction on or after June 4, 2010 pursuant to section 112(a)(4).

BOILER AREA SOURCE RULE

40 CFR Part 63, Subpart JJJJJ



Boiler Area Source Rule

- **Source categories covered:**
 - Industrial Boilers
 - Commercial and Institutional Boilers
- **Three subcategories based on design type:**
 - **Coal-fired units**
 - 3,700 units
 - 2% of area source boilers
 - 89% less than 10 MMBtu/hr
 - **Biomass-fired units**
 - 11,000 units
 - 6% of area source boilers
 - 93% less than 10 MMBtu/hr
 - **Liquid fuel-fired units**
 - 168,000 units
 - 92% of area source boilers
 - 95% less than 10 MMBtu/hr



Compliance Requirements Existing Area Source Boilers

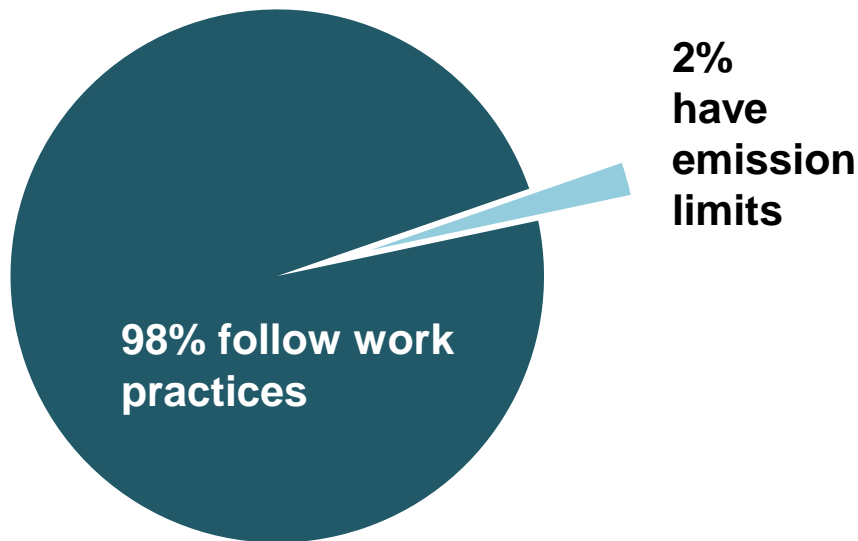
- **Existing large boilers (≥ 10 MMBtu/hr)**
 - **Coal-fired**
 - Numeric emission limits for 2 pollutants: *Mercury, CO*
 - 1-time energy assessment
 - **Biomass-fired and Oil-fired**
 - Tune-up every other year
 - 1-time energy assessment
- **Existing small boilers (< 10 MMBtu/hr)**
 - **Coal -fired, Biomass-fired, Oil-fired**
 - Tune-up every other year

Compliance Requirements New Area Source Boilers

- **New large boilers (≥ 10 MMBtu/hr)**
 - **Coal-fired**
 - Numeric emission limits for 3 pollutants: *Mercury, CO, PM*
 - **Biomass-fired, Oil-fired**
 - Numeric emission limit for 1 pollutant: *PM*
 - Tune-up every other year
- **New small boilers (< 10 MMBtu/hr)**
 - **Coal-fired, Biomass-fired, Oil-fired**
 - Tune-up every other year

Breakdown of Area Source Boilers

- About 187,000 covered units, but no natural gas boilers



- 98% (about 183,300) need to follow work practice standards to minimize toxics.
- 2% (about 3,700) would need to meet emission limits to minimize toxics

Key Adjustments to Boiler Area Source Rule

- Adjusted emission limits
 - Revised mercury emission limit for new and existing large coal-fired boilers from 4.8 lb/TBtu to 22 lb/TBtu
- Extended by two years the compliance date for existing boilers to comply with the tune-up requirement to March 21, 2014 (was March 21, 2012)

Key Adjustments (cont.)

- Added to and refined the list of subcategories
 - Clarified that temporary boilers, residential boilers, and electric boilers are not part of the source categories
 - Revised definition for “Hot water heater” to clarify that the definition includes small hot water boilers
 - Added subcategories for seasonally-operated boilers and limited-use boilers

Key Adjustments (cont.)

- Reduced tune-up frequency for certain boilers
 - Requiring tune-ups every 5 years, instead of every 2 years, for:
 - seasonally-operated boilers
 - limited-use boilers
 - oil-fired boilers with heat input capacity of 5 MMBtu/hr or less
 - boilers with oxygen trim systems
 - Specifying that initial tune-ups are not required for new boilers

Emission Limits for Area Source Rule

	Subcategory	2011 Final Rule Emission Limits			Reconsideration Final Rule		
		Hg (lb/TBtu)	CO (ppm)	PM (lb/MMBtu)	Hg (lb/TBtu)	CO (ppm)	PM (lb/MMBtu)
New	Coal (≥ 10 MMBtu/hr)	4.8	400	0.03 (≥ 30 MMBtu/h) 0.42 (10 to 30 MMBtu/h)	22	420	No Change
	Biomass (≥ 10 MMBtu/hr)	-	-	0.03 (≥ 30 MMBtu/hr) 0.07 (10 - 30 MMBtu/hr)	-	-	No Change
	Oil (≥ 10 MMBtu/hr)	-	-	0.03	-	-	No Change
Existing	Coal (≥ 10 MMBtu/hr) ~ 600 units	4.8	400	-	22	420	No Change
	Coal (< 10 MMBtu/hr) ~ 3,100 units	-	-	-	-	-	-
	Biomass ~ 168,000 units	-	-	-	-	-	-
	Oil ~ 11,000 units	-	-	-	-	-	-

- All new and existing small (<10 MMBtu/h) are subject to a biennial tune-up requirement.
- New and existing seasonal boilers, limited-use boilers, oil-fired boilers with heat input capacity ≤ 5 MMBtu/hr, and boilers with an oxygen trim system are subject to a 5-year tune-up requirement.
- Existing coal-fired, biomass-fired, or oil-fired boilers with heat input capacity ≥ 10 MMBtu/h (not including limited-use boilers) are subject to a one-time energy assessment requirement.

Compliance Dates

- Existing Sources
 - March 21, 2014
- New Sources
 - May 20, 2011 or upon startup
 - Sources which commenced construction or reconstruction on or after June 4, 2010 pursuant to section 112(a)(4).

COMMERCIAL & INDUSTRIAL SOLID WASTE INCINERATION (CISWI) Rule

**NSPS - 40 CFR Part 60, Subpart CCCC
Emission Guidelines - 40 CFR Part 60, Subpart DDDD**

CISWI Rule

- Covers four subcategories:
 - Incinerators
 - Energy recovery units - *solid and liquid*
 - Waste burning kilns
 - Small incinerators in very remote locations
- No major and area source distinction - Unit that combusts **any** solid waste material from commercial or industrial establishments or the general public. Includes all size sources.

CISWI Rule (cont.)

- Existing units
 - Comply no later than three years after EPA approves a state plan to implement these standards or five years after the CISWI rule is published in the Federal Register (Feb 7, 2013), whichever is earlier.
- New, reconstructed or modified units
 - Comply by August 7, 2013 or upon startup
 - New unit if constructed after June 4, 2010; reconstructed or modified unit if commenced reconstruction or modification after August 7, 2013.
- Does not cover space heaters, burn-off ovens, soil treatment units, cyclonic burn barrels, laboratory analysis units, or agricultural units

Emission Limits for New CISWI

Pollutant (units) ¹	CISWI Subcategories				
	Incinerators ²	Energy Recovery Units - Liquid/Gas ²	Energy Recovery Units - Solids	Waste-burning Kilns	Small, Remote Incinerators ²
	Reconsid. Final	Reconsid. Final	Reconsid. Final	Reconsid. Final	Reconsid. Final
HCl (ppmv)	0.091	14	0.20 (biomass units) / 13 (coal units)	3.0	200
CO (ppmv)	17	35	240 (biomass units) / 95 (coal units)	90 (long kilns) / 190 (preheater/precalciner)	13
Pb (mg/dscm)	0.015	0.096	0.014 (biomass units) / 0.14 (coal units)	0.014	2.0
Cd (mg/dscm)	0.0023	0.023	0.0014 (biomass units) / 0.0095 (coal units)	0.0014	0.67
Hg (mg/dscm)	0.00084	0.00056	0.0022 (biomass units) / 0.016 (coal units)	0.0037	0.0035
PM, filterable (mg/dscm)	18	110	5.1 (biomass units) / 160 (coal units)	2.2	270
Dioxin, Furans, total (ng/dscm)	0.58	(no limit)	0.52 (biomass units) / 5.1 (coal units)	0.51	1,800
Dioxin, Furans, TEQ (ng/dscm)	0.13	0.093	0.076 (biomass units) / 0.075 (coal units)	0.075	31
NO _x (ppmv)	23	76	290 (biomass units) / 340 (coal units)	200	170
SO ₂ (ppmv)	11	720	7.3 (biomass units) / 650 (coal units)	28	1.2

1 All emission limits are measured at 7% oxygen.

2 Emission limits did not change from final to reconsideration proposal for this subcategory.



Emission Limits for Existing CISWI Units

Pollutant (units) ¹	CISWI Subcategories ²				
	Incinerators ³	Energy Recovery Units - Liquid/Gas ³	Energy Recovery Units - Solids	Waste-burning kilns	Small, Remote Incinerators ³
	Reconsid. Final	Reconsid. Final	Reconsid. Final	Reconsid. Final	Reconsid. Final
HCl (ppmv)	29	14	0.20 (biomass units) / 13 (coal units)	3.0	300
CO (ppmv)	17	35	260 (biomass units) / 95 (coal units)	110 (long kilns) / 790 (preheater/precalciner)	64
Pb (mg/dscm)	0.015	0.096	0.014 (biomass units) / 0.14 (coal units)	0.014	2.1
Cd (mg/dscm)	0.0026	0.023	0.0014 (biomass units) / 0.0095 (coal units)	0.0014	0.95
Hg (mg/dscm)	0.0048	0.0024	0.0022 (biomass units) / 0.016 coal units	0.011	0.0053
PM, filterable (mg/dscm)	34	110	11 (biomass units) / 160 (coal units)	4.6	270
Dioxin, Furans, total (ng/dscm)	4.6	2.9	0.52 (biomass units) / 5.1 (coal units)	1.3	4400
Dioxin, Furans, TEQ (ng/dscm)	0.13	0.32	0.12 (biomass units) / 0.075 (coal units)	0.075	180
NO _x (ppmv)	53	76	290 (biomass units) / 340 (coal units)	630	190
SO ₂ (ppmv)	11	720	7.3 (biomass units) / 650 (coal units)	600	150

1 All emission limits are measured at 7% oxygen.

2 Number of units in each subcategory: **27** incinerators; 6 ERUs-liquid/gas; **22** ERUs-solids (**18** biomass/**4** coal); 23 waste-burning kilns; and, **28** small, remote incinerators.

3 Emission limits did not change from final to reconsideration proposal for this subcategory.



INFORMATION & CONTACTS

- Information available on EPA's web site at:

- www.epa.gov/ttn/atw/boiler/boilerpg.html
- www.epa.gov/boilercompliance/
- www.epa.gov/airquality/combustion

- Rule Contacts

- ❑ EPA HQ

- ❑ Boiler MACT – Jim Eddinger, (919) 541-5426 or eddinge.jim@epa.gov
 - ❑ Boiler Area Source Rule – Mary Johnson, (919) 541-5025 or johnson.mary@epa.gov
 - ❑ CISWI – Toni Jones, (919) 541-0316 or Jones.toni@epa.gov
 - ❑ NHSM – George Faison, (703) 305-7652 or faison.george@epa.gov

- ❑ EPA Region 9

- ❑ CISWI – Shaheerah Kelly, (415) 947-4156 or kelly.shaheerah@epa.gov
 - ❑ NHSM – Steve Wall, (415) 972-3381 or wall.steve@epa.gov

Questions?

