Meeting MACT Compliance: Are you ready?

What is MACT?

Section 112 of the 1990 Clean Air Act (CAA) Amendments establishes new emission regulations and limits for Hazardous Air Pollutants (HAPs) from particular industrial sources. The Act requires the US Environmental Protection Agency to regulate emissions of these HAPs by developing and promoting technology-based standards based on the best-performing similar facilities in operation. The National Emission Standards for Hazardous Air Pollutants (NESHAPs) established by the EPA are commonly called "Maximum Achievable Control Technology" (MACT) standards. MACT standards are designed to reduce HAP emissions to a maximum achievable degree, taking into consideration the cost of reductions and other factors. The new policies impose new emission limits on industrial boilers for particulates, mercury, dioxins, hydrogen chloride and carbon monoxide.

Why should you be concerned?

These new emission limits are aggressive and will be difficult to achieve even on high performing units. Smaller units may not have numeric limits, but there are still guidelines to meet. Is your plant ready? Now is the time to start planning to meet these goals.

What areas of MACT can Storm address?

Storm Technologies can help you make the most of your current system to limit CO production at the source. However, not all systems are forgiving and CO control can be difficult especially with the low emission limits MACT will impose (as low as 7ppm for solid fuel firing).

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While back-end technologies exist to help control many of these limits, there is not a significant "reactive solution" to control CO. Back-end technologies react to the problem, not prevent it. The best way to control CO is not at the back-end, but in the boiler where combustion begins (where high CO formation can be prevented). Storm Technologies specializes in reducing emission production related to the combustion process (CO, NO_x and through better heat rate, CO_2). In addition, improved combustion and carbon in ash can improve particulate matter as well.

How are you currently performing?

Before any changes or actions can be taken, a good understanding of what your current level of performance should be investigated. Can you meet some of these limits by simply decreasing your heat rate? What role does air in-leakage play in your emissions levels? How does coal fineness impact opacity and particulate matter? While each of the control emissions will need to be addressed, combustion optimization is a pre-requisite before any back end tuning or emission control technology is implemented.

When you need to comply:

The owner or operator of an existing source subject to a work practice or management practice standard of a tune-up is required to comply with this final rule no later than one year after the date of publication of the final rule in the federal register. The owner or operator of an existing source subject to emission limits or an energy assessment requirement is required to comply with this final rule no later than three years after the date of publication of the final rule in the federal register.

What the EPA says and key facts:

The industrial MACT ruling places limits on the following:

(All)

- Dioxin/Furans
- Particulate matter (as a surrogate for non-mercury metals)
- Carbon monoxide (as a surrogate for non-dioxin organic air toxics)
- Mercury

Major Source Industrial, Commercial and Institutional Boilers and Process Heaters:

- Hydrogen chloride (as a surrogate for acid gases)
- The largest major source boilers must continuously monitor their particle emissions as a surrogate for metals such as lead and chromium.

Area Source Industrial, Commercial and Institutional Boilers:

- Lead
- Cadmium
- Formaldehyde
- Hydrochloric acid

Major Source Industrial, Commercial and Institutional Boilers and Process Heaters:

- A major source facility emits or has the potential to emit 10 or more tons per year of any single air toxic of 25 tons per year or more of any combination of air toxics.
- All units larger than 10 MMBtu/hr must monitor oxygen as a measure of good combustion.
- Existing major source facilities are required to conduct a one-time energy assessment to identify cost-effective energy conservation measures.
- The most recent ruling set up the following:
    - Created a solid fuel category instead of separate biomass and coal subcategories for particulate matter, mercury and hydrogen chloride.
    - Added work practice standards, in lieu of numeric emission limits, for periods of startup and shutdown.

Who else can help?

At UDC, we stand firmly behind our products and services. Our priority is quality job performance and customer satisfaction. All repair recommendations through our inspection program are unbiased; based on sound engineering judgment, experience, and data for justification purposes with an understanding of the current plant economic environment. www.udc.net

Neundorfer is first and foremost a consulting organization serving power utilities and process-based heavy industry. Our goal is the same as yours: improve air pollution control and reduce energy consumption using electrostatic precipitators and fabric filters (baghouses). We listen to our customers, work to understand root causes of problems and engineer solutions that are cost and performance effective. www.neundorfer.com

David N. French Metallurgists specialize in boiler tube failure analysis, weld failure analysis and life assessments. Our engineering staff is able to determine the failure mechanisms and perform evaluations assuring industry specification conformance. www.davidnfrench.com

High Temperature Technologies is proud to be the sole proprietor of ISOMEMBRANE® which has been used for decades to seal boiler dead air spaces and leaky duct work expansion joints. An alternative to welding and refractory, ISOMEMBRANE® has proven time and again to be successful in addressing those areas with both high temperatures and multi plane movement. Our team is quick to respond with all materials in house, enabling on the spot customized solutions. www.isomembrane.com

Area Source Industrial, Commercial and Institutional Boilers:

- An area source facility emits or has the potential to emit less than 10 tons per year of any single air toxic of less than 25 tons per year of any combination of air toxics.
- For all new and existing units with a heat input capacity less than 10 MMBtu/hr, the final rule establishes a work practice standard instead of numeric emission limits. By improving the combustion efficiency of the boiler, fuel usage can be reduced and losses from combustion imperfections can be minimized. Minimizing and optimizing fuel use will reduce emissions of mercury and all other air toxics.
    - The operator will be required to perform a tune-up for each unit once every 2 years.
    - The same policy applies for "limited use" boilers that operate less than 10 percent of the year as emergency and backup boilers.

What the actual MACT limits are:

The emissions you meet are dependent on the size of your boiler and fuels you fire. There are specific limits for each category.

Subcategory	Heat Input (MMBtu/h)	Pollutants)	Emission Limits
New coal-fired boiler	≧30	a. Particulate Matter	0.03 lb per MMBtu of heat input.
		b. Mercury	0.0000048 lb per MMBtu of heat input.
		c. Carbon Monoxide	300 ppm by volume on a dry basis corrected
	≧10 and < 30	a. Particulate Matter	0.42 lb per MMBtu of heat input.
		b. Mercury	0.0000048 lb per MMBtu of heat input.
		c. Carbon Monoxide	300 ppm by volume on a dry basis corrected to 3 percent oxygen
New biomass-fired boiler	≧30	Particulate Matter	0.03 lb per MMBTu of heat input.
	≧10 and < 30	Particulate Matter	0.07 lb per MMBtu of heat input.
New oil-fired boiler	≧30	Particulate Matter	0.03 lb per MMBTu of heat input.
	≧10 and < 30	Particulate Matter	0.03 lb per MMBtu of heat input.
Existing coal-fired boiler	≧10	a. Mecury	0.0000048 lb per MMBtu of heat input.
		b. Carbon Monoxide	400 ppm by volume on a dry basis corrected to 7 percent oxygen

Subcategory	Particulate Matter (PM)	Hydrogen Chloride (HCl)	Mercury (Hg)	Carbon Monoxide (CO) (ppm@ 3% oxygen)	Dioxin/Furan (TEQ) (ng/dscm)
Existing - Coal Stoker	0.039	0.035	0.0000046	270	0.003
Existing - Coal Fluidized Bed	0.039	0.035	0.0000046	82	0.002
Existing - Pulverized Coal	0.039	0.035	0.0000046	160	0.004
Existing - Biomass Stoker/other	0.039	0.035	0.0000046	490	0.005
Existing - Biomass Fluidized Bed	0.039	0.035	0.0000046	430	0.02
Existing - Biomass Dutch Oven/Suspension Burner	0.039	0.035	0.0000046	470	0.2
Existing - Biomass Fuel Cells	0.039	0.035	0.0000046	690	4
Existing - Biomass Suspension/Grate	0.039	0.035	0.0000046	3500	0.2
Existing - Liquid	0.0075	0.00033	0.0000035	10	4
Existing - Gas 2 (Other Process Gases)	0.043	0.0017	0.000013	9	0.08
Existing - non-continental liquid	0.0075	0.0003	0.00000078	160	4
New - Coal Stoker	0.0011	0.0022	0.0000035	6	0.003
New - Coal Fluidized Bed	0.0011	0.0022	0.0000035	18	0.002
New - Pulverized Coal	0.0011	0.0022	0.0000035	12	0.003
New - Biomass Stoker	0.0011	0.0022	0.0000035	160	0.005
New - Biomass Fluidized Bed	0.0011	0.0022	0.0000035	260	0.02
New - Biomass Dutch Oven/Suspension Burner	0.0011	0.0022	0.0000035	470	0.2
New - Biomass Fuel Cells	0.0011	0.0022	0.0000035	470	0.003
New - Biomass Suspension/Grate	0.0011	0.0022	0.0000035	1500	0.2
New - Liquid	0.0013	0.0031	0.00000021	3	0.002
New - Gas 2 (Other Process Gases)	0.0067	0.0017	0.0000079	3	0.08
New - non-continental liquid	0.0013	0.0013	0.00000078	51	0.002

How can you prepare?

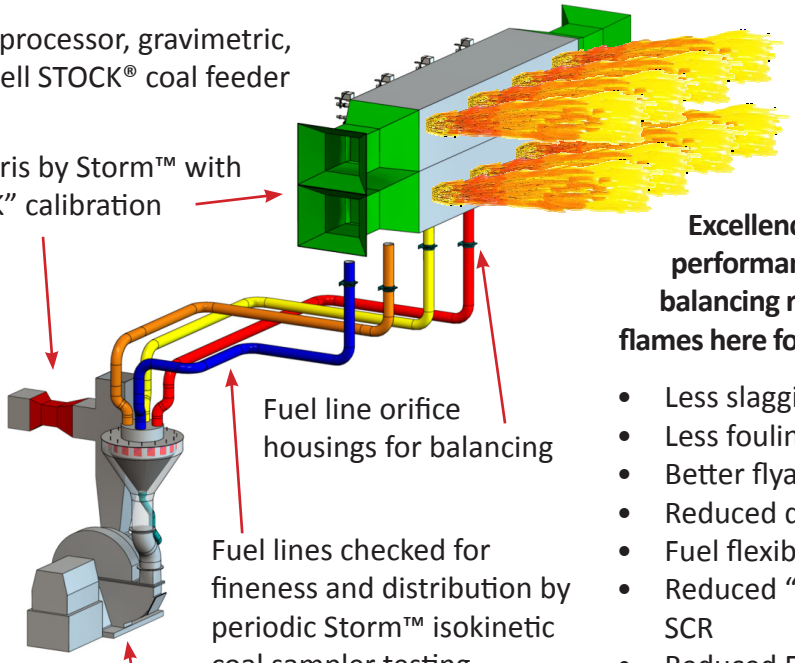
Let us help you prepare for MACT by working together to optimize the inputs. The bottom line is that Storm Technologies is prepared to help you meet these stringent emission goals. Make sure that you are too.

Industrial MACT limits provided by the EPA (www.epa.gov).

Typical Storm recommendations for improving boiler performance

Microprocessor, gravimetric, load cell STOCK® coal feeder

Venturis by Storm™ with hot "K" calibration



Fuel line orifice housings for balancing

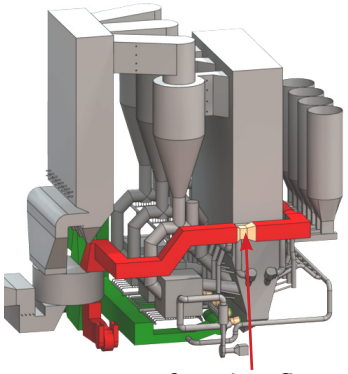
Fuel lines checked for fineness and distribution by periodic Storm™ isokinetic coal sampler testing

Pulverizers mechanically tuned to Storm™ specifications

Excellence in pulverizer performance and fuel line balancing results in uniform flames here for the advantages of:

- Less slagging
- Less fouling
- Better flyash LOI
- Reduced dry gas loss
- Fuel flexibility
- Reduced "popcorn" ash to SCR
- Reduced FEGT
- Less de-superheating water flows
- Reduced sootblowing

CFB/pulverized coal boilers with Storm recommendations to measure and control airflow more precisely



Storm retrofitted airflow measurement devices

What is the Storm approach? Get the inputs right!

For almost 20 years, Storm Technologies has focused on our "13 Essentials of Optimum Combustion for Low NO_x Burners in PC Boilers." The 13 Essentials focus on getting the inputs right. We recommend balancing the fuel flows, measuring and controlling airflows and obtaining an oxidizing furnace atmosphere. Please visit our website (www.stormeng.com) to view the full list.

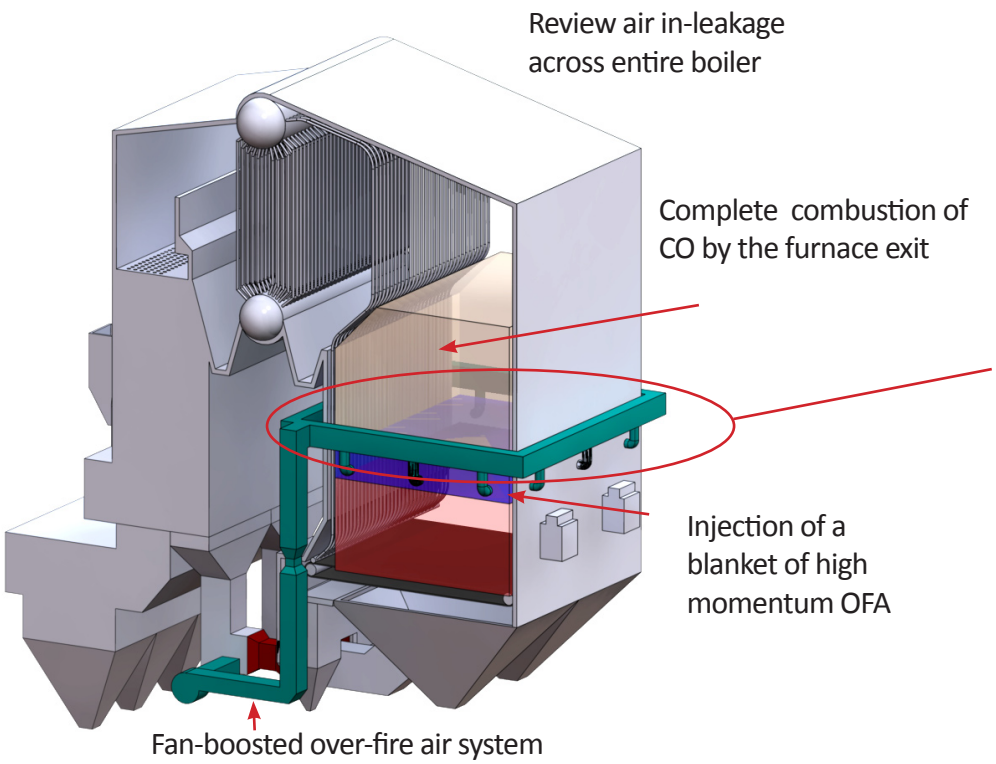
Storm has always recommended the concept of performance driven maintenance where maintenance is based upon the performance of the equipment instead of timelines or hours of operations. In addition, performance driven maintenance focuses on calibrations of primary and secondary air flow, fineness, proper air-to-fuel ratios, and settings within the mill. There have been many instances where our teams performed before-and-after testing while the mill was overhauled during the outage. The results did not show any improvement. While the mill needed to be overhauled, the focus was not on performance. Therefore, using the performance driven maintenance model, not only are the worn components replaced, but performance is incorporated into measuring efficiency.

How can Storm help? Our solutions:

To achieve "best furnace performance," Storm provides the following:

- Comprehensive diagnostic testing: Before making any changes or recommendations, data must be collected to identify and quantify the opportunities for improvement
- Storm Engineered Solutions: Storm's in-house fabrication facilities manufactures and designs performance driven components to improve your performance. Whether the components are in the pulverizers, air-flow measurement devices or other key components, our engineering staff has developed a strong reputation by solving challenging problems with cost-effective engineered solutions.

Storm Technologies can provide a comprehensive solution to your air and fuel system whether it is improved airflow monitoring venturis or mill components to improve fuel fineness.



Stoker boiler with Storm Fan-Boosted Over-Fire Air Concept

Storm Fan-Boosted Over-Fire Air

As a part of your overall plan, consider the Storm Fan-Boosted Over-Fire Air System. Most people associate over-fire air with NO_x reduction. However, this system does equally well burning the remaining CO before it enters the superheater. In fact, the concept for the fan-boosted system was introduced long before NO_x restrictions ever came into the picture as a way to improve CO and LOI. These systems come with the added benefit of decreased slagging/fouling, lower LOI, less sootblower media consumption, lower furnace exit gas temperatures, increased superheater tube life, decreased de-superheating spray flow and decreased fan power consumption.