



REGULATING AIR CURTAIN BURNERS

INTRODUCTION

This brochure is intended to provide guidance and insight to the purpose, the benefits and the regulations concerning Air Curtain Burners.

Air Curtain Burners, also known as Air Curtain Incinerators are machines designed as an environmentally friendly alternative to open burning or grinding of wood and other vegetative waste. Air Burners, Inc. are the originators and the leading manufacturers of air curtain machines. This brochure will give you a brief overview of the principles behind the Air Curtain machine and it will provide guidance to more in-depth information regarding the environmental benefits of these machines, official testing results and the Federal regulations governing the use of these machines.

The first question you might ask; why should I be interested in Air Curtain Burners? As most environmentally concerned people know, Black Carbon is one of the most significant components of climate change. Most of the scientific community now consider Black Carbon the number two concern behind CO₂. (see www.StopBlackCarbon.com for more detailed information) Black Carbon has risen in attention not only because of its effect in the atmosphere, but also because of all the climate change contributors, Black Carbon is the one we can correct the quickest. Compared to CO₂ with an atmospheric life of 100 years, Black Carbon's life span seldom exceeds 5 years. Air Curtain Burners are the only machines available today that were designed specifically to eliminate Black Carbon.

The common process of grinding wood and other vegetative waste is one of the worst contributors to climate change with large releases of both non-biogenic CO₂ and Black Carbon both from the large engines and from the grinding process. (see www.WoodWasteBurners.com for an environmental comparison of grinding vs. Air Curtain Burners) Grinding is a "process" it is not an "end solution." Open burning, landfill and Air Curtain Burners are end solutions, and Air Curtain Burners have the lowest impact on the environment.

If you are considering regulations for your state, county and/or town regarding Air Curtain Burners we would suggest you consider two levels of permitting: 1) Temporary and 2) Stationary.

- 1) **Temporary Use** - As an alternative to open burning and to encourage a move away from open burning, allow permits under a similar system as was used for open burning. This generally means a local permit easily and quickly obtained from a local authority such as the fire department or the forestry department. Typical applications would be for land clearing, forest fuels reduction, pipeline clearing, roads and parks cleanup, invasive species removal, etc. Typically these machines would not be allowed to operate at a location for more than 6 months.
- 2) **Stationary Use** - These applications would include county landfill, parks, transfer stations, industrial sites, etc. These applications would require Title V permitting through the State air quality office. The Code of Federal Regulations provides for a simplified system to allow an abbreviated Title V permit for these applications as Air Curtain Burners are exempt from all performance requirements except opacity (EPA method 9). The combustion of clean vegetative waste is considered carbon neutral, therefore the concern in permitting a stationary unit should be 1) Particulate release and 2) local effects or impacts.

Air Curtain Burners are a well proven technology that when implemented can significantly reduce your Black Carbon and provide you a means to reduce open burning. They are also the most cost effective "end solution" for wood and vegetative waste. In these times of difficult municipal budgets, communities can benefit by reducing their load on the local landfills and at the same time take one more step forward in the battle on climate change. The following sections will provide you more details on the machines and the federal regulations. You can find addition resources at www.AirBurners.com or by calling our offices.

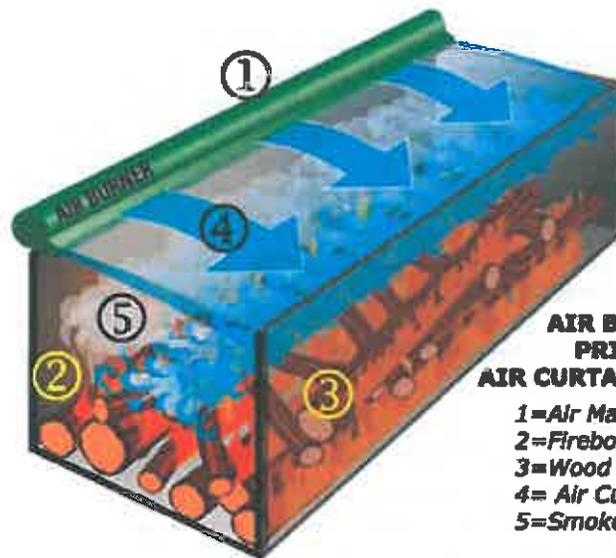


PRINCIPLE OF OPERATION

Air Curtain Burners were designed principally as a pollution control device. The primary objective of an air curtain machine is to reduce the particulate matter (PM) or smoke, that results from burning clean wood waste. It is sometimes hard to visualize without seeing a machine in operation (see video at: www.AirBurners.com), but the machines do not burn anything, rather they control the results of something burning. You could look at it as a pollution control device for open burning. Clean wood waste is loaded into the FireBox, an accelerant like diesel is poured onto the wood and the pile is ignited. Once the fire is ignited the vegetative waste burns naturally, no additional fuels are used. Very similar to starting a campfire. The air curtain is not fully-engaged until the fire has grown in strength or the air curtain may blow the fire out. Once the fire has reached suitable strength, usually in 15 to 20 minutes, the air curtain is engaged. The air curtain then runs at steady-state throughout the burning operations and the waste wood is loaded at a rate consistent with the rate of burn.

Principle

The purpose of the air curtain is to stall or slow down the smoke particles on their way out of the FireBox. In doing this the particles (PM) are subjected to the highest temperatures in the FireBox. Stalling the smoke particles in this region just under the air curtain causes them to re-burn, further reducing their size to an acceptable limit. The result is a very clean burn with opacities well under 10 on the Ringelmann scale (as compared to open burning which typically can run at 80 to 100 on the Ringelmann scale).



Operation

You can see in the picture to the right two standard Air Burners FireBoxes completely full and burning while in the background a pile of wood is open burned. This is a photograph taken by BC Hydro in Canada at one of their hydro-electric dams during the first test of the Air Burners machines. The wood is regularly removed from the water intakes.

The wood pile that is open burning continued to burn for several days. That open burning pile could have been eliminated with the FireBox in less than 2 hours with significantly less impact on the environment.



REGULATIONS

Air Curtain Burners are typically regulated in two ways:

- 1) under the States authority for control of open burning ,
- 2) by an abbreviated Title V permit in accordance with 40 CFR part 60.

1) Alternative to open burning - Temporary site location

Air Curtain Burners are a “tool” to help regulators move away from hazardous practices such as open burning and grinding. They are a sound alternative to open burning and the process of grinding and hauling of wood and vegetative waste. In both cases Air Curtain Burners are significantly better for the environment, and they offer the user a significant reduction in overall cost for waste disposal as well, everyone benefits. (see white paper ACB vs. Grinders by visiting www.WoodWasteBurner.com)

The authority to regulate open burning resides with the States, most States familiar with Air Curtain machines permit the use of these machines using the same process as is used to permit open burning. In some areas burning is only allowed if an air curtain machine is used. An applicant would typically apply for their permit at either the local fire department or the local office of the State Forestry Department. In these instances the air curtain machine will be temporarily located at a site for no more than 6 months and must meet the Federal guidelines for air quality as defined in 40 CFR 60.

2) Title V permit - Stationary site location

If an air curtain machine is to be used at a stationary site then an abbreviated Title V permit is required in accordance with 40 CFR 60. In the Federal regulations Air Curtain Burners burning clean wood and vegetative waste as defined by these regulations are required only to meet the EPA Method 9 type opacity test. The reasoning behind this is twofold; first, the contributions to the atmosphere from the burning of clean wood and vegetative wastes are well know as it is a natural process that is part of the Earth’s carbon cycle. As Air curtain machines do not use any supplementary fuels to support combustion then the combustion in an Air Curtain machine is well understood and is considered “carbon neutral.” Second, the purpose of an Air Curtain machine is to reduce particulate matter (PM) therefore the most applicable test is a visual opacity test. Air Curtain machines are required to meet a maximum 10 percent opacity reading for steady state operation. This is of course significantly better than any type of open burning which regularly runs 80 to 100 percent opacity. Even whole log grinding operation can’t meet the ten percent opacity limits.

Typical results for an Air Burners FireBox

Listed below are typical test results for an Air Burners, Inc. air curtain FireBox. These test result have been generated during various testing programs that include the US EPA, the USDA Forest Service, the US Military and company hired consultants. Some of these test results are available on our website at; www.AirBurners.com and we can provide more details upon request. Air Burners is proud to be a CRADA partner with the USEPA. We regularly participate in training and test program with environmental agencies to help create a better understanding of the use and benefit of an Air Curtain Burner from Air Burners.

USDA Forest Service	CO2	CO	CH4	NMHC	PM2.5	CE
lbs per ton of waste burned	(lbs/ton of waste)	%				
Air Curtain Burner Test Results	3616	2.6	1.4	1.1	1.1	99

Federal Regulations Concerning Air Curtain Incinerators

- CODE of FEDERAL REGULATIONS (CFR)
 - Title 40 – Protection of the Environment
 - Chapter 1 – Environmental protection
 - Sub Chapter C – Air programs
 - Part 60 – Standards of performance for new stationary sources
 - Sub Part CCCC (CSWI) and/or Sub part EEEE (OSWI)

The following pages will provide some excerpts from 40 CFR 60

Sub Part CCCC (CSWI)

Sub part EEEE (OSWI)



EXCEPTS FROM 40 CFR PART 60

Sub Part CCCC (CSWI)

§ 60.2020 What combustion units are exempt from this subpart?

This subpart exempts fifteen types of units described in paragraphs (a) through (o) of this section.

Note: We only included the paragraphs between (a) and (q) that are applicable to Air Curtain Incinerators.

(i) *Air curtain incinerators.* Air curtain incinerators that burn only the materials listed in paragraphs (i)(1) through (3) of this section are only required to meet the requirements under "Air Curtain Incinerators" (§§ 60.2245 through 60.2260).

- (1) 100 percent wood waste.
- (2) 100 percent clean lumber.
- (3) 100 percent mixture of only wood waste, clean lumber, and/or yard waste.

AIR CURTAIN INCINERATORS

§ 60.2245 What is an air curtain incinerator?

(a) An air curtain incinerator operates by forcefully projecting a curtain of air across an open chamber or open pit in which combustion occurs. Incinerators of this type can be constructed above or below ground and with or without refractory walls and floor. (Air curtain incinerators are not to be confused with conventional combustion devices with enclosed fireboxes and controlled air technology such as mass burn, modular, and fluidized bed combustors.)

(b) Air curtain incinerators that burn only the materials listed in paragraphs (b)(1) through (3) of this section are only required to meet the requirements under "Air Curtain Incinerators" (§§ 60.2245 through 60.2260).

- (1) 100 percent wood waste.
- (2) 100 percent clean lumber.
- (3) 100 percent mixture of only wood waste, clean lumber, and/or yard waste.

§ 60.2250 What are the emission limitations for air curtain incinerators?

(a) Within 60 days after your air curtain incinerator reaches the charge rate at which it will operate, but no later than 180 days after its initial startup, you must meet the two limitations specified in paragraphs (a)(1) and (2) of this section.

- (1) The opacity limitation is 10 percent (6-minute average), except as described in paragraph (a)(2) of this section.
- (2) The opacity limitation is 35 percent (6-minute average) during the startup period that is within the first 30 minutes of operation.

(b) Except during malfunctions, the requirements of this subpart apply at all times, and each malfunction must not exceed 3 hours.

§ 60.2250 What are the emission limitations for air curtain incinerators?

Within 60 days after your air curtain incinerator reaches the charge rate at which it will operate, but no later than 180 days after its initial startup, you must meet the two limitations specified in paragraphs (a) and (b) of this section.

- (a) Maintain opacity to less than or equal to 10 percent opacity (as determined by the average of three 1-hour blocks consisting of ten 6-minute average opacity values), except as described in paragraph (b) of this section.
- (b) Maintain opacity to less than or equal to 35 percent opacity (as determined by the average of three 1-hour blocks consisting of ten 6-minute average opacity values) during the startup period that is within the first 30 minutes of operation.

§ 60.2255 How must I monitor opacity for air curtain incinerators?

- (a) Use Method 9 of appendix A of this part to determine compliance with the opacity limitation.
- (b) Conduct an initial test for opacity as specified in § 60.8.
- (c) After the initial test for opacity, conduct annual tests no more than 12 calendar months following the date of your previous test.

§ 60.2260 What are the recordkeeping and reporting requirements for air curtain incinerators?

(a) Prior to commencing construction on your air curtain incinerator, submit the three items described in paragraphs (a)(1) through (3) of this section.

(1) Notification of your intent to construct the air curtain incinerators.

(2) Your planned initial startup date.

(3) Types of materials you plan to burn in your air curtain incinerator.

(b) Keep records of results of all initial and annual opacity tests onsite in either paper copy or electronic format, unless the Administrator approves another format, for at least 5 years.

(c) Make all records available for submittal to the Administrator or for an inspector's onsite review.

(d) You must submit the results (each 6-minute average) of the initial opacity tests no later than 60 days following the initial test. Submit annual opacity test results within 12 months following the previous report.

(e) Submit initial and annual opacity test reports as electronic or paper copy on or before the applicable submittal date.

(f) Keep a copy of the initial and annual reports onsite for a period of 5 years.

Sub part EEEE (OSWI)

§ 60.2887 What combustion units are excluded from this subpart?

This subpart excludes the types of units described in paragraphs (a) through (q) of this section, as long as you meet the requirements of this section.

Note: We only included the paragraphs between (a) and (q) that are applicable to Air Curtain Incinerators.

(o) *Temporary-use incinerators and air curtain incinerators used in disaster recovery.*

Your incineration unit is excluded if it is used on a temporary basis to combust debris from a disaster or emergency such as a tornado, hurricane, flood, ice storm, high winds, or act of bioterrorism and you comply with the requirements in § 60.2969.

(p) *Units that combust contraband or prohibited goods.*

Your incineration unit is excluded if the unit is owned or operated by a government agency such as police, customs, agricultural inspection, or a similar agency to destroy only illegal or prohibited goods such as illegal drugs, or agricultural food products that can not be transported into the country or across State lines to prevent biocontamination. The exclusion does not apply to items either confiscated or incinerated by private, industrial, or commercial entities.

§ 60.2888 Are air curtain incinerators regulated under this subpart?

(a) Air curtain incinerators that burn less than 35 tons per day of municipal solid waste or air curtain incinerators located at institutional facilities burning any amount of institutional waste generated at that facility are subject to all requirements of this subpart, including the emission limitations specified in table 1 of this subpart.

(b) Air curtain incinerators that burn only less than 35 tons per day of the materials listed in paragraphs (b)(1) through (4) of this section collected from the general public and from residential, commercial, institutional, and industrial sources; or, air curtain incinerators located at institutional facilities that burn only the materials listed in paragraphs (b)(1) through (4) of this section generated at that facility, are required to meet only the requirements in §§ 60.2970 through 60.2974 and are exempt from all other requirements of this subpart.

(1) 100 percent wood waste.

(2) 100 percent clean lumber.

(3) 100 percent yard waste.

(4) 100 percent mixture of only wood waste, clean lumber, and/or yard waste.

For additional information please visit

www.AirBurners.com

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