

SMAQMD BACT CLEARINGHOUSE

ACTIVE

CATEGORY Type:

MISCELLANEOUS

BACT Category: Minor Source BACT and Small Emitter

BACT Determination Number: 311	BACT Determination Date: 7/12/2022
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Equipment Information

Permit Number: N/A -- Generic BACT Determination
Equipment Description: MAKE-UP AIR UNIT
Unit Size/Rating/Capacity: Small Emitter BACT (PTE < 10 lb/day) and less than or equal to 10 MMBtu/hr
Equipment Location:

BACT Determination Information

District Contact: Jeff Quok Phone No.: (279) 207-1145 email: jquok@airquality.org

ROCs	Standard:	No Standard
	Technology Description:	
	Basis:	
NOx	Standard:	See Description Below
	Technology Description:	For units with a process temperature < 1,200°F: 30 ppmv corrected to 3% O2 or 0.036 lb/MMBtu For units ≥ 5 MMBtu/hr and a process temperature ≥ 1,200°F: 60 ppmv corrected to 3% O2 or 0.073 lb/MMBtu
	Basis:	Achieved in Practice
SOx	Standard:	No Standard
	Technology Description:	
	Basis:	
PM10	Standard:	No Standard
	Technology Description:	
	Basis:	
PM2.5	Standard:	No Standard
	Technology Description:	
	Basis:	
CO	Standard:	400 ppmv of CO corrected to 3% O2
	Technology Description:	
	Basis:	Achieved in Practice
LEAD	Standard:	
	Technology Description:	
	Basis:	

Comments: This is a generic BACT determination based on BACT determinations made, and published, by other air agencies in California and/or other States.



BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION

DETERMINATION NO.: 311
DATE: 7/12/22
ENGINEER: Jeffrey Quok

Category/General Equip Description: Make-Up Air Units (MAU)
Equipment Specific Description: #311 – Make-Up Air Units (MAU) ≥ 325,000 Btu/hr and ≤ 10 MMBtu/hr
Equipment Size/Rating: Minor Source BACT and Small Emitter
Previous BACT Det. No.: N/A

This determination will focus on make-up air units (MAU), which are units designed to provide buildings with heated or cooled outdoor air to offset exhaust air from mechanical equipment.

The District's Small Emitter and "Otherwise-Exempt Equipment" BACT Determinations policy states that units which are classified as small emitters (less than 10 lbs/day of VOC, NO_x, SO_x, PM₁₀, or PM_{2.5} and less than 550 lbs/day of CO) and are located at non-major stationary sources are only required to meet BACT standards that have been achieved in practice. Therefore, this BACT determination will only be based on what is achieved in practice and will only be applied to small emitters at non-major sources. BACT will be evaluated on a case-by-case basis for units that do not fit this criteria.

BACT ANALYSIS

A: ACHIEVED IN PRACTICE (Rule 202, §205.1a)

The following control technologies are currently employed as BACT for make-up air units less than or equal to 10 MMBtu/hr by the following air pollution control districts:

US EPA

BACT

Source: [EPA RACT/BACT/LAER Clearinghouse](#)

No determinations were found for make-up air units (MAU).

RULE REQUIREMENTS:

None.

California Air Resource Board (CARB)

BACT

Source: [ARB BACT Clearinghouse](#)
[CARB BACT Guidelines Search](#)

No determinations were found for make-up air units (MAU).

RULE REQUIREMENTS:

None

Sacramento Metropolitan AQMD

BACT

Source: [SMAQMD BACT Clearinghouse](#)

No determinations were found for make-up air units (MAU).

RULE REQUIREMENTS:

[Rule 419 – NOx from Miscellaneous Combustion Units](#) (10/25/18)

This Rule applies to any miscellaneous combustion unit or cooking unit with a total rated heat input capacity of 2 MMBtu/hr or greater that is located at a major stationary source of NOx and to any miscellaneous combustion unit or cooking unit with a total rated heat input capacity of 5 MMBtu/hr or greater that is not located at a major stationary source of NOx.

The requirements of this rule do not apply to combustion equipment where its primary function is to operate as an air pollution control device including, but not limited to, afterburners, catalytic oxidizers, flares, thermal oxidizers, or vapor incinerators.

TABLE 1: Miscellaneous Combustion Units ≥ 5 MMBtu/hr Emission Limits Expressed as PPMV, corrected to 3% O₂			
Equipment Category	NOx Limit ppmv, corrected to 3% O₂ (lb/MMBtu)		CO Limit ppmv, corrected to 3% O₂ (lb/MMBtu)
Gaseous Fuel-Fired Equipment	Process Temperature		All Temperatures
	< 1200°F	≥ 1200 °F	
Other miscellaneous combustion unit not listed above	30 (0.036)	60 (0.073)	400 (0.30)

MAUs fall under the miscellaneous combustion unit category since it does not fit any of the other categories listed in this rule.

South Coast AQMD

BACT

Source: [SCAQMD BACT Guidelines for Non-Major Polluting Facilities, page 117 \(2/5/2021\)](#)

Make-up Air Unit (A)	
VOC	No Standard
NOx	Compliance with SCAQMD Rules 1147 (see below)
SOx	No standard
PM10	No standard
PM2.5	No standard
CO	No standard

(A) SCAQMD does not have a specific BACT for make-up air units (MAUs). However, a BACT NOx standard for MAUs is listed under SCAQMD's spray booth category.

RULE REQUIREMENTS:

[Reg II, Rule 219 – Equipment Not Requiring A Written Permit Pursuant to Regulation II \(Last amended 1/7/2022\)](#)

Permits are not required for boilers, process heaters, or any combustion equipment that has a rated maximum heat input capacity of 2,000,000 Btu per hour or less and are equipped to be heated exclusively with natural gas, methanol, liquefied petroleum gas, or any combination thereof.

[Reg XI, Rule 1147 – NOx Reductions from Miscellaneous Sources \(Last amended 7/7/2017\)](#)

This rule applies to ovens, dryers, dehydrators, heaters, kilns, calciners, furnaces, crematories, incinerators, heated pots, cookers, roasters, fryers, closed and open heated tanks and evaporators, distillation units, afterburners, degassing units, vapor incinerators, catalytic or thermal oxidizers, soil and water remediation units and other combustion equipment with nitrogen oxide emissions that require a District permit and are not specifically required to comply with a nitrogen oxide emission limit by other District Regulation XI rules. The NOx emission limits in the table below apply to units greater than or equal to 325,000 Btu/hr.

Equipment Category	NOx Emission Limit ≥ 5 MMBtu/hr PPM @ 3% O2, dry or pound/MMBtu heat input		
	Process Temperature		
	≤ 800° F	> 800° F and < 1200° F	≥ 1200 ° F
Make-Up air heater or other air heater located outside of building with temperature controlled zone inside building	30 ppm or 0.036 lb/MMBtu	30 ppm or 0.036 lb/MMBtu	-

San Diego County APCD

BACT

Source: [NSR Requirements for BACT \(June 2011\)](#)

No determinations were found for make-up air units (MAU).

RULE REQUIREMENTS:

None.

Bay Area AQMD

BACT

Source: [BAAQMD BACT Workbook](#)

No determinations were found for make-up air units (MAU).

RULE REQUIREMENTS:

None.

San Joaquin Valley Unified APCD

BACT

Source: [SJVUAPCD BACT Guideline](#)

No determinations were found for make-up air units (MAU).

RULE REQUIREMENTS:

None.

The following control technologies have been identified and are ranked based on stringency:

SUMMARY OF ACHIEVED IN PRACTICE CONTROL TECHNOLOGIES

SUMMARY OF ACHIEVED IN PRACTICE CONTROL TECHNOLOGIES	
VOC	No standard – [EPA, ARB, SMAQMD, SCAQMD, SDAPCD, BAAQMD, SJVAPCD]
NOx	1. For process temperature < 1,200°F: 30 ppmv corrected to 3% O ₂ or 0.036 lb/MMBtu – [SCAQMD] 2. For units ≥ 5 MMBtu/hr and a process temperature < 1,200°F: 30 ppmv corrected to 3% O ₂ or 0.036 lb/MMBtu For units ≥ 5 MMBtu/hr and a process temperature ≥ 1,200°F: 60 ppmv corrected to 3% O ₂ or 0.073 lb/MMBtu – [SMAQMD]
SOx	No standard – [EPA, ARB, SMAQMD, SCAQMD, SDAPCD, BAAQMD, SJVAPCD]
PM10	No standard – [EPA, ARB, SMAQMD, SCAQMD, SDAPCD, BAAQMD, SJVAPCD]
PM2.5	No standard – [EPA, ARB, SMAQMD, SCAQMD, SDAPCD, BAAQMD, SJVAPCD]
CO	1. 400 ppm of CO corrected to 3% O ₂ – [SMAQMD] 2. No Standard – [EPA, ARB, SCAQMD, SDAPCD, BAAQMD, SJVAPCD]

Therefore, the following control technologies have been identified as the most stringent, achieved in practice control technologies:

BEST CONTROL TECHNOLOGIES ACHIEVED		
BACT #311 – Make-up Air Units (MAU) ≥ 325,000 Btu/hr and ≤ 10 MMBtu/hr		
Pollutant	Standard	Source
VOC	No Standard	EPA, ARB, SMAQMD, SCAQMD, SDAPCD, BAAQMD, SJVAPCD
NOx	A. For units with a process temperature < 1,200°F: 30 ppmv corrected to 3% O ₂ or 0.036 lb/MMBtu B. For units ≥ 5 MMBtu/hr and a process temperature ≥ 1,200°F: 60 ppmv corrected to 3% O ₂ or 0.073 lb/MMBtu	SCAQMD, SMAQMD
SOx	No Standard	EPA, ARB, SMAQMD, SCAQMD, SDAPCD, BAAQMD, SJVAPCD
PM10	No Standard	EPA, ARB, SMAQMD, SCAQMD, SDAPCD, BAAQMD, SJVAPCD
PM2.5	No Standard	EPA, ARB, SMAQMD, SCAQMD, SDAPCD, BAAQMD, SJVAPCD

BEST CONTROL TECHNOLOGIES ACHIEVED		
BACT #311 – Make-up Air Units (MAU) ≥ 325,000 Btu/hr and ≤ 10 MMBtu/hr		
Pollutant	Standard	Source
CO	400 ppmv of CO corrected to 3% O ₂	SMAQMD

B: TECHNOLOGICALLY FEASIBLE AND COST EFFECTIVE (Rule 202, §205.1.b.)

The District's Small Emitter and "Otherwise-Exempt Equipment" BACT Determinations policy (dated 5/16/2019) states that units which are classified as small emitters (less than 10 lbs/day of VOC, NO_x, SO_x, PM₁₀, or PM_{2.5} and less than 550 lbs/day of CO) and are located at non-major stationary sources are only required to meet BACT standards that have been achieved in practice. Therefore, this BACT determination will only be based on what is achieved in practice and will only be applied to small emitters at non-major sources. BACT will be evaluated on a case-by-case basis for units that do not fit these criteria.

C: SELECTION OF BACT

Based on the above analysis, BACT for VOC, NOx, SOx, PM10, PM2.5 and CO will be the most stringent standards of what is currently achieved in practice.

BACT #311 – Make-up Air Units (MAU) 325,000 Btu/hr and ≤ 10 MMBtu/hr		
Pollutant	Standard	Source
VOC	No Standard	EPA, ARB, SMAQMD, SCAQMD, SDAPCD, BAAQMD, SJVAPCD
NOx	A. For units with a process temperature < 1,200°F: 30 ppmv corrected to 3% O ₂ or 0.036 lb/MMBtu B. For units ≥ 5 MMBtu/hr and a process temperature ≥ 1,200°F: 60 ppmv corrected to 3% O ₂ or 0.073 lb/MMBtu	SCAQMD, SMAQMD
SOx	No Standard	EPA, ARB, SMAQMD, SCAQMD, SDAPCD, BAAQMD, SJVAPCD
PM10	No Standard	EPA, ARB, SMAQMD, SCAQMD, SDAPCD, BAAQMD, SJVAPCD
PM2.5	No Standard	EPA, ARB, SMAQMD, SCAQMD, SDAPCD, BAAQMD, SJVAPCD
CO	400 ppmv of CO corrected to 3% O ₂	SMAQMD

D: SELECTION OF T-BACT:

Toxics are in the form of VOCs and particulate matter. Since toxic emissions from natural gas and LPG fired units in the less than or equal to 10 MMBtu/hr size range are so small and the cancer risk is expected to be well below 1 in a million, T-BACT was not evaluated for this determination.

APPROVED BY: Brian F Krebs

DATE: 07-12-2022

Attachment A

**Review of BACT Determinations published by
California Air Districts**

**SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Best Available Control Technology (BACT) Guidelines for Non-Major Polluting Facilities***

10-20-2000 Rev. 0
2-1-2019 Rev 1
2-5-2021 Rev. 2

Equipment or Process: Spray Booth

Subcategory/ Rating/Size	Criteria Pollutants					Inorganic
	VOC	NOx	SOx	CO	PM ₁₀	
Fully-enclosed, Down-Draft Type, < 667 Lbs/Month of VOC Emissions (2-5-2021)	Compliance with Applicable Regulation XI Rules (10-20-2000)	If booth has a Make-up Air Unit or a Heater; Compliance with Rule 1147 (2-5-2021)			Dry Filters or Waterwash (1990)	
Other Types, < 1170 Lbs/Month of VOC Emissions	Compliance with Applicable Regulation XI Rules (10-20-2000)	If booth has a Make-up Air Unit or a Heater; Compliance with Rule 1147 (2-5-2021)			Same as Above (1990)	
Fully-enclosed, Down-Draft Type, ≥ 22 Lbs/Day of VOC Emissions (2-5-2021)	<ul style="list-style-type: none"> - Compliance with Applicable Regulation XI Rules, and VOC Control System with ≥ 90% Collection Efficiency and ≥ 95% Destruction Efficiency, or - Use of Super Compliant Materials (<50 grams of VOC per liter of material); or - Use of Low-VOC Materials Resulting in an Equivalent Emission Reduction (10-20-2000) 	If booth has a Make-up Air Unit or a Heater; Compliance with Rule 1147 (2-5-2021)			Same as Above (1990)	

* Means those facilities that are not major polluting facilities as defined by Rule 1302 - Definitions

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Best Available Control Technology (BACT) Guidelines for Non-Major Polluting Facilities*

Other Types, ≥ 1170 Lbs/Month of VOC Emissions	<ul style="list-style-type: none"> - Compliance with Applicable Regulation XI Rules, and VOC Control System with ≥ 90% Collection Efficiency and ≥ 95% Destruction Efficiency, or - Use of Super Compliant Materials (<50 grams of VOC per liter of material); or - Use of Low-VOC Materials Resulting in an Equivalent Emission Reduction (10-20-2000) 	If booth has a Make-up Air Unit or a Heater; Compliance with Rule 1147 (2-5-2021)			Same as Above (1990)	
Enclosed with automated spray nozzles for wood cabinets, < 1170 Lbs/Month of VOC Emissions (2-5-2021)	Compliance with Rule 1136 or use of Rule 1136 compliant UV/EB or water-based coatings.	If booth has a Make-up Air Unit or a Heater; Compliance with Rule 1147				

Note: The sum of all VOC emissions from all spray booths within the same subcategory applied for in the previous two years at the same facility are considered toward the emission threshold.

* Means those facilities that are not major polluting facilities as defined by Rule 1302 - Definitions