ACTIVE SMAQMD BACT CLEARINGHOUSE

CATEGORY: **COATING - WOOD**

BACT Size: Minor Source BACT **PAINT SPRAY BOOTH**

BACT Determination Number: 190	**BACT Determination Date:** 8/29/2018

Equipment Information

Permit Number: N/A -- Generic BACT Determination
Equipment Description: PAINT SPRAY BOOTH
Unit Size/Rating/Capacity: Emissions ≤4219 lb VOC/year
Equipment Location:

EXPIRED

BACT Determination Information

ROCs	**Standard:**	See comments for BACT VOC limits
	Technology Description:	Compliance with Rule 463 and BACT VOC limits (see comments) and HVLP spray or equivalent application equipment.
	Basis:	Achieved in Practice
NOx	**Standard:**	30 ppmvd @ 3% O2 or 0.036 lb/MMBtu
	Technology Description:	For heaters, low NOx burner, 30 ppmvd @ 3% O2 or 0.036 lb/MMBtu
	Basis:	Achieved in Practice
SOx	**Standard:**	No Standard
	Technology Description:	
	Basis:	
PM10	**Standard:**	
	Technology Description:	Enclosed spray booth with properly maintained dry filters or water wash; HVLP spray or equivalent application equipment
	Basis:	Achieved in Practice
PM2.5	**Standard:**	
	Technology Description:	Enclosed spray booth with properly maintained dry filters or waterwash
	Basis:	Achieved in Practice
CO	**Standard:**	No Standard
	Technology Description:	
	Basis:	
LEAD	**Standard:**	No Standard
	Technology Description:	
	Basis:	

Comments: BACT for VOC limits are use of coatings, solvent cleaning, and strippers compliant with SCAQMD Regulation XI, Rule 1136. See BACT Determination #190 analysis Tables 1-3 for more details. T-BACT is the following: 1.HVLP spray or equivalent application equipment 2.Compliance with SMAQMD Rule 463 and SMAQMD BACT coating, solvent cleaning, and stripping VOC limits (see Tables 1-3). For major sources, emission limits of Tables 1 & 2 to Subpart QQQQ of Part 63 and emission limits of Table 3 to Subpart JJ of Part 63, whichever is more stringent.

District Contact: Jeff Quok Phone No.: (916) 874-4863 email: jquok@airquality.org

Printed: 8/29/2018

ACTIVE SMAQMD BACT CLEARINGHOUSE

CATEGORY: **COATING - WOOD**

BACT Size: Minor Source BACT **PAINT SPRAY BOOTH**

BACT Determination Number: 191	**BACT Determination Date:** 8/29/2018

Equipment Information

Permit Number: N/A -- Generic BACT Determination
Equipment Description: PAINT SPRAY BOOTH
Unit Size/Rating/Capacity: Emissions >4219 lb VOC/year
Equipment Location:

EXPIRED

BACT Determination Information

ROCs	**Standard:**	See comments for BACT VOC limits
	Technology Description:	Compliance with Rule 463 & BACT VOC limits, and VOC control system with ≥90% collection efficiency and ≥ 95% destruction efficiency; OR use of super clean materials (<5% VOC by weight); OR use of low-VOC materials with equivalent emission reduction
	Basis:	Achieved in Practice
NOx	**Standard:**	30 ppmvd @ 3% O2 or 0.036 lb/MMBtu
	Technology Description:	For heaters, low NOx burner, 30 ppmvd @ 3% O2 or 0.036 lb/MMBtu
	Basis:	Achieved in Practice
SOx	**Standard:**	No Standard
	Technology Description:	
	Basis:	
PM10	**Standard:**	
	Technology Description:	Enclosed spray booth with properly maintained dry filters or waterwash, HVLP spray or equivalent application equipment
	Basis:	Achieved in Practice
PM2.5	**Standard:**	
	Technology Description:	Enclosed spray booth with properly maintained dry filters or waterwash
	Basis:	Achieved in Practice
CO	**Standard:**	No Standard
	Technology Description:	
	Basis:	
LEAD	**Standard:**	No Standard
	Technology Description:	
	Basis:	

Comments: BACT VOC limits are use of coatings, solvent cleaning, and strippers compliant with SCAQMD Regulation XI, Rule 1136.
See BACT Determination #191 analysis Tables 1-3 for more details.
For T-BACT see page 30 of 32 of BACT Determination #191.

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777 12th Street, Third Floor

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Sacramento, CA 95814

BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION

EXPIRED

DETERMINATION NO.: 190 & 191

DATE: August 29, 2018

ENGINEER: Jeffrey Quok

Category/General Equip Description: Coating, Stripping, and Solvent Cleaning – Wood

Equipment Specific Description: Paint Spray Booth

Equipment Size/Rating: ≤4,219 lbs VOC/year for facilities emitting (BACT #190)

>4,219 lbs VOC/year for facilities emitting (BACT #191)

Previous BACT Det. No.: 118 & 119

This BACT determination will update Determinations #118 & #119 for paint spray booths used for wood coating operations. This BACT determination will also include stripping and solvent cleaning operations related to wood coating operations.

BACT/T-BACT ANALYSIS

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

The following control technologies are currently employed as BACT/T-BACT for paint spray booths used for wood coating operations by the following air pollution control districts:

US EPA

BACT
Source: EPA RACT/BACT/LAER Clearinghouse
RBLC ID: VA-0300 (12/15/2006)

* This BACT determination was found to be the most stringent Achieved in Practice BACT determination published in the EPA clearinghouse. See Attachment A for more information.

Paint Spray Booth, Wood Coating	
VOC	Proper spraying techniques and the use of high solids coatings whenever possible.
NOx	N/A – No BACT determinations
SOx	N/A – No BACT determinations
PM10	Dry filters, proper spray techniques, and work practice standards of 40 CFR 63 subpart JJ. Each filter shall be equipped with a device to continuously measure the differential pressure drop across the filter.
PM2.5	N/A – No BACT determinations
CO	N/A – No BACT determinations

T-BACT
There are no T-BACT standards published in the clearinghouse for this category.

RULE REQUIREMENTS:
40 CFR 63 Subpart JJ – National Emission Standards for Wood Furniture Manufacturing Operations
This regulation applies for facilities that are engaged, either in part or in whole, in the manufacture of wood furniture or wood furniture components and that are located at a plant site that is a major source as defined in 40 CFR subpart A, §63.2.

Subpart JJ limits volatile hazardous air pollutants (VHAP) of finishing operations and contact adhesives and also limits the VOC strippable spray booth material. The limits can be seen in the table below.

Table 3 to Subpart JJ of Part 63—Summary of Emission Limits

Emission point	Existing source	New source
Finishing Operations:		
(a) Achieve a weighted average VHAP content across all coatings (maximum kg VHAP/kg solids [lb VHAP/lb solids], as applied	[a]1.0	[a]0.8
(b) Use compliant finishing materials (maximum kg VHAP/kg solids [lb VHAP/lb solids], as applied):		
—stains	[a]1.0	[a]1.0
—washcoats	[a] [b]1.0	[a] [b]0.8
—sealers	[a]1.0	[a]0.8
—topcoats	[a]1.0	[a]0.8
—basecoats	[a] [b]1.0	[a] [b]0.8
—enamels	[a] [b]1.0	[a] [b]0.8
—thinners (maximum percent VHAP allowable); or	10.0	10.0
(c) As an alternative, use control device; or	[c]1.0	[c]0.8

Emission point	Existing source	New source
(d) Use any combination of (a), (b), and (c)	1.0	0.8
Cleaning Operations:		
Strippable spray booth material (maximum VOC content, kg VOC/kg solids [lb VOC/lb solids])	0.8	0.8
Contact Adhesives:		
(a) Use compliant contact adhesives (maximum kg VHAP/kg solids [lb VHAP/lb solids], as applied) based on following criteria:		
i. For aerosol adhesives, and for contact adhesives applied to nonporous substrates	[d]NA	[d]NA
ii. For foam adhesives used in products that meet flammability requirements	1.8	0.2
iii. For all other contact adhesives (including foam adhesives used in products that do not meet flammability requirements); or	1.0	0.2
(b) Use a control device	[e]1.0	[e]0.2
All Finishing Operations and Contact Adhesives:		
(a) Achieve total free formaldehyde emissions across all finishing operations and contact adhesives, lb per rolling 12 month period, as applied	400	400
(b) Use coatings and contact adhesives only if they are low-formaldehyde coatings and contact adhesives	[f]1.0	[f]1.0

[a]The limits refer to the VHAP content of the coating, as applied.
[b]Washcoats, basecoats, and enamels must comply with the limits presented in this table if they are purchased premade, that is, if they are not formulated onsite by thinning other finishing materials. If they are formulated onsite, they must be formulated using compliant finishing materials, i.e., those that meet the limits specified in this table, and thinners containing no more than 3.0 percent VHAP by weight.
[c]The control device must operate at an efficiency that is equivalent to no greater than 1.0 kilogram (or 0.8 kilogram) of VHAP being emitted from the affected emission source per kilogram of solids used.
[d]There is no limit on the VHAP content of these adhesives.
[e]The control device must operate at an efficiency that is equivalent to no greater than 1.0 kilogram (or 0.2 kilogram) of VHAP being emitted from the affected emission source per kilogram of solids used.
[f]The limits refer to the formaldehyde content by weight of the coating or contact adhesive, as specified on certified product data sheets.

40 CFR 63 Subpart QQQQ – National Emission Standards for Surface Coating of Wood Building Products

This regulation applies for to wood building product coating operations that use 1,100 gallons of coatings per year or is located at or is part of a major source of Hazardous Air Pollutants (HAPS).

Subpart QQQQ limits hazardous air pollutants (HAP) for surface coating of wood building products. The limits can be seen in the table below.

Table 1 to Subpart QQQQ of Part 63—Emission Limits for New or Reconstructed Affected Sources

You must comply with the emission limits that apply to your affected source in the following table as required by §63.4690.

If the affected source applies coating to products in the following subcategory. . .	Then, the organic HAP emission limit for the affected source, in grams HAP/liter solids (lb HAP/gal solids)[a] [b] is:
1. Exterior siding and primed door skins	0 (0.00)
2. Flooring	0 (0.00)
3. Interior wall paneling or tileboard	5 (0.04)
4. Other interior panels	0 (0.00)
5. Doors, windows, and miscellaneous	57 (0.48)

[a]Determined as a rolling 12-month emission rate according to the requirements in §63.4741, §63.4751, or §63.4761, as applicable.
[b]If the affected source applies coatings to products in more than one of the subcategories listed in the table, then you must determine the applicable emission limit according to §63.4690(c).

Table 2 to Subpart QQQQ of Part 63—Emission Limits for Existing Affected Sources

You must comply with the emission limits that apply to your affected source in the following table as required by §63.4690.

If the affected source applies coating to products in the following subcategory. . .	Then, the organic HAP emission limit for the affected source, in grams HAP/liter solids (lb HAP/gal solids)[a] [b] is:
1. Exterior siding and primed doorskins	7 (0.06)
2. Flooring	93 (0.78)
3. Interior wall paneling or tileboard	183 (1.53)
4. Other interior panels	20 (0.17)
5. Doors, windows, and miscellaneous	231 (1.93)

[a]Determined as a rolling 12-month emission rate according to the requirements in §63.4741, §63.4751, or §63.4761, as applicable.
[b]If the affected source applies coatings to products in more than one of the subcategories listed in the table, then you must determine the applicable emission limit according to §63.4690(c).

Air Resources Board (ARB)

BACT
Source: ARB BACT Clearinghouse
SMAQMD: Permit #18476 (11/28/2005)

* This BACT determination was found to be the most stringent Achieved in Practice BACT determination published in the ARB clearinghouse. See Attachment B for more information.

ARB BACT Clearinghouse*	
VOC	4,700 lb VOC/year limit, use of low VOC coatings
NOx	No standard
SOx	No standard
PM10	No standard
PM2.5	No standard
CO	No standard

T-BACT
There are no T-BACT standards published in the clearinghouse for this category.

RULE REQUIREMENTS:
None.

Sacramento Metropolitan AQMD

BACT

BACT Determination #118 (3/8/2016)

Paint Spray Booth, Wood Coating, <1,170 lb VOC/month & ≤4663 lb VOC/year	
VOC	Compliance with BACT VOC limits and high transfer efficiency application equipment.
NOx	No standard
SOx	No standard
PM10	Enclosed spray booth with properly maintained dry filters or water wash; high transfer efficiency application equipment
PM2.5	Enclosed spray booth with properly maintained dry filters or waterwash
CO	No standard

BACT Determination #119 (3/8/2016)

Paint Spray Booth, Wood Coating, ≥1170 lbs VOC/month or >4663 lb VOC/year	
VOC	Compliance with BACT VOC limits, and VOC control system with ≥90% collection efficiency and ≥ 95% destruction efficiency; OR use of super clean materials (<5% VOC by weight); OR use of low-VOC materials resulting in an equivalent emission reduction
NOx	No standard
SOx	No standard
PM10	Enclosed spray booth with properly maintained dry filters or water wash; high transfer efficiency application equipment
PM2.5	Enclosed spray booth with properly maintained dry filters or waterwash
CO	No standard

T-BACT

T-BACT Determination #118 (3/8/2016)

Paint Spray Booth, Wood Coating, <1,170 lb VOC/month & ≤4663 lb VOC/year	
HAP/ VHAP	1. HVLP spray or equivalent application equipment 2. Compliance with BACT coating, solvent cleaning, and stripping VOC limits (see Tables 1-3 below), emission limits of Tables 1 & 2 to Subpart QQQQ of Part 63, emission limits of Table 3 to Subpart JJ of Part 63, whichever is more stringent.

T-BACT Determination #119 (3/8/2016)

Paint Spray Booth, Wood Coating, ≥1170 lbs VOC/month or >4663 lb VOC/year	
HAP/ VHAP	1. Compliance with BACT coating, solvent cleaning, and stripping VOC limits (see Tables 1-3 below), emission limits of Tables 1 & 2 to Subpart QQQQ of Part 63, emission limits of Table 3 to Subpart JJ of Part 63, whichever is more stringent. With VOC control system with ≥90% collection efficiency and ≥ 95% destruction efficiency; OR 2. Use of Super Clean Materials (<5% VOC by weight); OR 3. Use of low-VOC materials resulting in an equivalent emission reduction

RULE REQUIREMENTS:

Rule 463 (Last amended 9/25/2008)

One of the following methods shall be used when applying wood product coatings to any wood products:

A. Electrostatic spray
B. High-volume low-pressure (HVLP) spray
C. Low-volume low-pressure (LVLP) spray
D. Roll coater, dip coat or flow coat
E. Hand application method, such as brush or roller
F. Air assisted airless, for touch-up and repair only
G. Any other method which has been approved in writing by the Air Pollution Control Officer and the U.S. EPA

No person shall apply any coating, to a **new wood product**, which has a VOC content exceeding the applicable limits below:

Coating Category (SMAQMD Rule 463 Definition)	Maximum Allowable VOC Content Excluding Water and Exempt Compounds grams/liter (lbs-VOC/lbs-solid)
Clear Topcoats	275 (0.35)
Conversion Varnish	550 (1.20)
Filler	275 (0.18)
High-solid stain	350 (0.42)
Inks	500 (0.96)
Mold-seal Coating	750 (4.20)
Multi-colored Coating	275 (0.33)
Pigmented Coating	275 (0.25)
Sealer	275 (0.36)

Coating Category (SMAQMD Rule 463 Definition)	Maximum Allowable VOC Content grams/liter (lb/gal)
Low-Solid Stains, Toners, Washcoats	120 (1.00)

VOC content of coatings used for **refinishing, repairing, preserving, or restoring wood products** shall not exceed the following limits:

Coating Category (SMAQMD Rule 463 Definition)	Maximum Allowable VOC Content Excluding Water and Exempt Compounds grams/liter (lbs-VOC/lbs-solid)
Clear Topcoats	680 (2.5)
Conversion Varnish	550 (1.20)
Filler	500 (0.96)
High-solid stain	700 (2.57)
Inks	500 (0.96)
Mold-seal Coating	750 (4.20)
Multi-colored Coating	680 (2.60)
Pigmented Coating	600 (1.60)
Sealer	680 (2.5)

Coating Category (SMAQMD Rule 463 Definition)	Maximum Allowable VOC Content grams/liter (lb/gal)
Low-Solid Stains, Toners, Washcoats	480 (4.00)

A person shall not use a stripper on wood products unless:

- It contains 350 grams of VOC per liter of material; or
- The VOC composite partial vapor pressure is 2 mm Hg (0.04 psia) or less at 20°C (68°F), as calculated pursuant to Section 402.

Requirements for Surface Preparation and Cleanup Materials:

- Until September 25, 2009, spray gun nozzles only, may be soaked in solvent-based materials for cleaning, provided the container (not to exceed five (5) gallons in size) is kept tightly covered at all times except when accessing the container.
- Closed containers shall be used for the disposal of cloth or paper used for surface preparation, cleanup, and coating removal.
- VOC-containing materials shall be stored in containers, which are closed when not in use, and shall be disposed of in a manner that the VOC are not emitted into the atmosphere.
- Until September 25, 2009, a person shall not use solvent-based VOC-containing materials for the cleanup of spray equipment used in wood products coating application operations, unless the spray equipment is disassembled and cleaned in an enclosed gun cleaner.
- Prior to September 25, 2009, a person shall not perform surface preparation or cleanup with a material containing VOC in excess of 200 grams per liter (1.67 pounds per gallon).
- Effective September 25, 2009, a person shall not perform surface preparation or cleanup with a material containing VOC in excess of 25 grams per liter (0.21 pounds per gallon).

South Coast AQMD

BACT
Source: SCAQMD BACT Guidelines for Non-Major Polluting Facilities, page 116.
(Last Revised 2/2/2018)

Spray Booths	
VOC	For non-automotive booths with <1170 lbs/month VOC Emissions 1. Compliance with applicable AQMD Regulation XI Rules For non-automotive booths with ≥1170 lbs/month VOC Emissions 1. Compliance with applicable AQMD Regulation XI Rules, and VOC control system with ≥90% collection efficiency and ≥ 95% destruction efficiency; OR 2. Use of Super Clean Materials (<5% VOC by weight); OR 3. Use of low-VOC materials resulting in an equivalent emission reduction
NOx	No standard
SOx	No standard
PM10	Dry filters or waterwash
PM2.5	No standard
CO	No standard

T-BACT
There are no T-BACT standards published in the clearinghouse for this category.

RULE REQUIREMENTS:

Reg XI, Rule 1132 (Last amended 5/5/2006)
This rule applies to any spray booth facility, except petroleum industry facilities, that uses VOC-containing materials that amount to more than 40,000 pounds (20 tons) per year of VOC emissions in any emission inventory year beginning in 1999.

A person shall not operate any spray booth facility subject to this rule, unless the VOC emissions from any equipment, activity or operation that applies, or is required by any District rule, regulation or permit to apply, VOC-containing materials in a spray booth are reduced through the use of the following:
1. An emission control system that has an overall efficiency of at least 65 percent by weight; or
2. VOC-containing materials that have a VOC content at least 65 percent lower than any applicable rule limit in effect as of January 19, 2001; or
3. A combination of methods specified in paragraphs (c)(1) and (c)(2), which when individually applied do not meet the specified reduction

The requirements listed above shall not apply to the following:

1. A facility that has applied for and been issued by the Executive Officer an enforceable permit condition that limits the facility-wide VOC emissions from the use of VOC-containing materials to no more than 40,000 pounds (20 tons) per emission inventory year.
2. A spray booth that meets the following condition:

Exhaust Flow Rate (standard cubic feet per minute)	**Allowable VOC Emissions (pounds per day)**
Less than 10,000	12
10,000 or greater but less than 30,000	25
30,000 or greater but less than 60,000	50
60,000 or greater but less than 90,000	100
90,000 or greater but less than 275,000	150
275,000 or greater	225

3. A spray booth for which the VOC emissions are reduced through the use of an existing emission control system in operation under a valid District permit as of December 1, 2000, that is not mandatory pursuant to any other District requirement or the requirement of any other governmental agency. This exemption is only valid for facilities that are subject to the alternative compliance plan specified in paragraph (d)(2).

Since this BACT determination is for facilities ≤20 tons this rule does not apply.

<u>Reg XI, Rule 1136</u> (Last amended 6/14/1996)

A person or facility shall not apply coatings to wood products subject to the provisions of this rule unless the coating is applied with properly operating equipment, according to the equipment manufacturer's operating procedures, and by the use of one of the following methods:

A. Electrostatic spray
B. Flow coat
C. Dip Coat
D. High-volume, low-pressure (HVLP) spray
E. Paint brush
F. Hand roller
G. Roll coater
H. Other coating application methods as are demonstrated to the Executive Officer to be capable of achieving at least 65 % transfer efficiency, and for which written approval of the Executive officer has been obtained

An operator shall not apply **any coating to a wood product** that exceeds the applicable limit specified below:

Coating Category (SCAQMD Rule 1136 Definition)	Maximum Allowable VOC Content Excluding Water and Exempt Compounds grams/liter, (lb/gal), [lbs-VOC/lbs-solid)]
Clear Sealers	275 (2.3) [0.36]
Clear topcoat	275 (2.3) [0.35]
Pigmented primers, sealers, & topcoats	275 (2.3) [0.21]
Pigmented topcoats	275 (2.3) [0.25]
Barrier coat – plastic components	275 (2.3) [0.28]
Composite wood edge filler	275 (2.3) [0.31]
Extreme performance coatings	275 (2.3) [0.33]
Fillers	275 (2.3) [0.18]
High-solid stains	350 (2.9) [0.42]
Inks	500 (4.2) [0.96]
Mold-seal coatings	750 (6.3) [4.2]
Multi-colored coatings	275 (2.3) [0.33]

Coating Category (SCAQMD Rule 1136 Definition)	Maximum Allowable VOC Content grams/liter (lb/gal)
Low-solid barrier coat – plastic components	120 (1.00)
Low-solid Stains, Toners, and Washcoats	120 (1.00)

A person shall not use a stripper on wood products unless:

- It contains 350 grams of VOC per liter of material; or
- The VOC composite partial vapor pressure is 2 mm Hg (0.04 psia) or less at 20°C (68°F)

Reg XI, Rule 1171 (Last amended 5/1/2009)
This rule applies to all persons who use solvent materials in solvent cleaning operations during the production, repair, maintenance, or servicing of parts, products, tools, machinery, equipment, or general work areas; all persons who store and dispose of these materials used in solvent cleaning operations; and all solvent suppliers who supply, sell, or offer for sale solvent cleaning materials for use in solvent cleaning operations.

Solvent Cleaning Activity	VOC limits g/l (lb/gal)
(A) Product cleaning during manufacturing process or surface preparation for coating, adhesive, or ink application	
(i) General	25 (0.21)
(ii) Electrical apparatus components & electronic components	100 (0.83)
(iii) Medical Devices & pharmaceuticals	800 (6.7)
(B) Repair and Maintenance Cleaning	
(i) General	25 (0.21)
(ii) Electrical apparatus components & electronic components	100 (0.83)
(iii) Medical Devices & pharmaceuticals	
(a) Tools, equipment, & machinery	800 (6.7)
(b) General work surfaces	600 (5.0)
(C) Cleaning of coatings or adhesives application equipment	25 (0.1)
(D) Cleaning of polyester resin application equipment	25 (0.21)

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.

Equipment Category	NOx Emission Limit 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	-	-

San Diego County APCD

BACT
Source: NSR Requirements for BACT, page 3-24. (June 2011)

Wood Products coating (<10 gal/day)	
VOC	Use of water-based coatings when compatible with the operation and compliance with all other provisions of Rule 67.11, Wood Products Coating Operations for the rest of the operation
NOx	No standard
SOx	No standard
PM10	Spray booth equipped with overspray filters
PM2.5	Spray booth equipped with overspray filters
CO	No standard

T-BACT
There are no T-BACT standards published in the clearinghouse for this category.

RULE REQUIREMENTS:

Regulation 4, Rule 67.11 (Effective 6/27/13)
No coatings shall be applied unless one of the following coating application methods is used:
A. Hand application method
B. Dip coat
C. Roll coat
D. Flow coat
E. Electronic spray
F. High-volume low-pressure (HVLP) spray. Facilities using an HVLP spray gun shall have available on site pressure gauges in proper operating condition to measure the air cap pressure or have available manufacturer's technical information regarding the correlation between the handle air inlet pressure and the air cap pressure. If the correlation option is

used to demonstrate compliance, a handle air inlet pressure gauge will be required on site in proper operating condition to measure the handle air inlet pressure; or

G. Other coating application methods that are demonstrated to have a transfer efficiency at least equal to one of the above application methods, and which are used in such a manner that the operating parameters under which they were demonstrated to achieve such transfer efficiency are permanent features of the method. Such coating application methods shall be approved in writing by the Air Pollution Control Officer prior to use.

A person shall not apply any coating to a **new wood product** with a VOC content in excess of the following limits expressed as either grams of VOC per liter of coating or pounds of VOC per gallon of coating, as applied, less water and exempt compounds:

Coating Category (SDCAPCD Rule 67.11 Definition)	Maximum Allowable VOC Content Excluding Water and Exempt Compounds grams/liter (lb/gal)
Clear Topcoats	275 (2.3)
Conversion Varnish	550 (4.6)
Filler	275 (2.3)
High-solid stain	350 (2.9)
Inks	500 (4.2)
Medium Density Fiberboard (MDF) Coatings	550 (4.6)
Multi-colored Coating	275 (2.3)
Pigmented Coating	275 (2.3)
Sealer	275 (2.3)
Any Other Coatings	275 (2.3)

Coating Category (SDCAPCD Rule 67.11 Definition)	Maximum Allowable VOC Content grams/liter (lb/gal)
Low-Solids coating, Toners, Washcoats	120 (1.00)

A person shall not apply any coating to a **refinished wood product** with a VOC content in excess of the following limits expressed as either grams of VOC per liter of coating or pounds of VOC per gallon of coating, as applied, less water and exempt compounds:

Coating Category (SDCAPCD Rule 67.11 Definition)	Maximum Allowable VOC Content Excluding Water and Exempt Compounds grams/liter (lb/gal)
Clear Topcoats	680 (5.7)
Conversion Varnish	550 (4.6)
Filler	500 (4.2)

Coating Category (SDCAPCD Rule 67.11 Definition)	Maximum Allowable VOC Content Excluding Water and Exempt Compounds grams/liter (lb/gal)
High-solid stain	700 (5.8)
Inks	500 (4.2)
Medium Density Fiberboard (MDF) Coatings	680 (5.7)
Multi-colored Coating	680 (5.7)
Pigmented Coating	600 (5.0)
Sealer	680 (5.7)
Any Other Coatings	420 (3.5)

A person shall not apply low-solids coatings to a refinished wood product with a VOC content in excess of the following limits expressed as either grams of VOC per liter of material or pounds of VOC per gallon of material, as applied:

Coating Category (SDCAPCD Rule 67.11 Definition)	Maximum Allowable VOC Content grams/liter (lb/gal)
Low-solid barrier coat – plastic components	700 (5.8)
Low-solid Stains, Toners, and Washcoats	480 (4.0)

A person shall not use VOC containing materials for surface preparation unless the material contains 25 grams or less of VOC per liter of material

A person shall not use VOC containing materials for stripping unless:
- The material contains 200 grams or less of VOC per liter of material; or
- The material has a total VOC vapor pressure of 2 mm Hg or less, at 20°C (68°F)

A person shall not use VOC containing materials for the cleaning of coating application equipment used in operations subject to this rule unless:
- The cleaning material contains 25 grams or less of VOC per liter of material; or
- The cleaning material is flushed or rinsed through the application equipment in a contained manner that will minimize evaporation into the atmosphere; or
- The application equipment or equipment parts are cleaned in a container which is open only when being accessed for adding, cleaning, or removing application equipment or when cleaning material is being added, provided the cleaned equipment or equipment parts are drained to the container until dripping ceases; or
- A system is used that totally encloses the component parts being cleaned during the washing, rinsing, and draining processes.

Bay Area AQMD

BACT
Source: BAAQMD BACT Guideline 161.8.1 (9/13/2000)

Spray Booth – Coating of Wood Products	
VOC	1. Coatings with VOC content less than that required by Reg. 8, Rule 32, and emissions controlled to overall capture/destruction efficiency ≥ 90% by weight (Technologically Feasible); or 2. Coatings with VOC content less than that required by Reg. 8, Rule 32 (Achieved in Practice)(A)
NOx	No standard
SOx	No standard
PM10	Dry filters or waterwash, properly maintained
PM2.5	No standard
CO	No standard

(A) Typical technology to meet this BACT is use of coatings with very low VOC contents (such as waterborne coatings, higher solids coatings, UV-cured coatings, polyester or polyurethane coatings, higher solids nitrocellulose lacquers, and solvent-substituted coatings).

T-BACT
There are no T-BACT standards published in the clearinghouse for this category.

RULE REQUIREMENTS:

Reg 8, Rule 32 (8/5/2009)
Any person who utilizes spray application equipment to apply coatings to wood products shall use one or more of the following application methods:
A. Airless spray
B. Air assisted airless spray
C. High Volume Low Pressure (HVLP) Spray
D. Electrostatic air spray
E. Detailing or Touch-up Guns
F. Other coating application methods demonstrated to the APCO to be capable of achieving at least 65% transfer efficiency as determined by the test method in 8-32-607, and for which written approval by the APCO has been obtained.

No person shall apply to any **general wood product**, any coating with a VOC content in excess of the limits set forth below; expressed as grams VOC per liter (pounds VOC per gallon) of coating or grams VOC per gram of solids, as applied (after thinning), unless emissions to the atmosphere are controlled to an equivalent level by air pollution abatement equipment with an abatement device efficiency of at least 85% that meets the requirements of Regulation 2, Rule 1.

Coating Category (BAAQMD Reg. 8 Rule 32 Definition)	Maximum Allowable VOC Content Excluding Water and Exempt Compounds grams/liter, (lb/gal), [g-VOC/g-solid)]
Clear Sealer	275 (2.3) [0.36]
Clear Topcoat	275 (2.3) [0.35]
Sanding Sealer	See clear or pigmented sealers
Pigmented Coating	See pigmented sealers or topcoats
Pigmented Primer, Sealer, And Undercoater	275 (2.3) [0.21]
Pigmented Topcoat	275 (2.3) [0.25]
High Solid Stain	350 (2.9) [0.42]
Filler	275 (2.3) [0.18]

Coating Category (BAAQMD Reg. 8 Rule 32 Definition)	Maximum Allowable VOC Content grams/liter (lb/gal)
Low-solid stain(A)	120 (1.0)
Low-solid Stains, Toners, and Washcoats	120 (1.0)

(A) Low-Solids Coatings VOC content is calculated including water and exempt compounds as set forth in Section 8-32-604. High-Solids Coatings VOC content is calculated excluding water and exempt compounds set forth in Section 8-32-605 and 8-32-606.

No person shall apply to any **wood furniture, custom cabinetry or custom architectural millwork**, any coating with a VOC content in excess of the limits set forth below; expressed as grams VOC per liter (pounds VOC per gallon) of coating or grams VOC per gram of solids, as applied (after thinning), unless emissions to the atmosphere are controlled to an equivalent level by air pollution abatement equipment with an abatement device efficiency of at least 85% that meets the requirements of Regulation 2, Rule 1.

Coating Category (BAAQMD Reg. 8 Rule 32 Definition)	Maximum Allowable VOC Content Excluding Water and Exempt Compounds grams/liter, (lb/gal), [g-VOC/g-solid)]
Clear Sealer	275 (2.3) [0.36]
Clear Topcoat	275 (2.3) [0.35]
Single Application Conversion Varnish(A)	550 (4.6) [0.36]
Sanding Sealer	See clear or pigmented sealers
Pigmented Coating	See pigmented sealers or topcoats
Pigmented Primer, Sealer, And Undercoater	275 (2.3) [0.21]
Pigmented Topcoat	275 (2.3) [0.25]

Coating Category (BAAQMD Reg. 8 Rule 32 Definition)	Maximum Allowable VOC Content Excluding Water and Exempt Compounds grams/liter, (lb/gal), [g-VOC/g-solid)]
High Solid Stain	350 (2.9) [0.42]
Filler	275 (2.3) [0.18]

(A) If more than one coating application is used, each sealer application must comply with the sealer VOC limits, and each topcoat application must comply with the topcoat VOC limits.

Coating Category (BAAQMD Reg. 8 Rule 32 Definition)	Maximum Allowable VOC Content grams/liter (lb/gal)
Low-solid stain(A)	120 (1.0)
Toner and Wash-coat(A)	120 (1.0)

(A) Low-Solids Coatings VOC content is calculated including water and exempt compounds as set forth in Section 8-32-604. High-Solids Coatings VOC content is calculated excluding water and exempt compounds set forth in Section 8-32-605 and 8-32-606.

No person shall apply to any **custom furniture**, any coating with a VOC content in excess of the limits set forth below; expressed as grams VOC per liter (pounds VOC per gallon) of coating or grams VOC per gram of solids, as applied (after thinning), unless emissions to the atmosphere are controlled to an equivalent level by air pollution abatement equipment with an abatement device efficiency of at least 85% that meets the requirements of Regulation 2, Rule 1.

Coating Category (BAAQMD Reg. 8 Rule 32 Definition)	Maximum Allowable VOC Content Excluding Water and Exempt Compounds grams/liter, (lb/gal), [g-VOC/g-solid)]
Clear Sealer	275 (2.3) [0.36]
Clear Topcoat	550 (4.6) [0.36]
Sanding Sealer	See clear or pigmented sealers
Pigmented Coating	See pigmented sealers or topcoats
Pigmented Primer, Sealer, And Undercoater	275 (2.3) [0.21]
Pigmented Topcoat	275 (2.3) [0.25]
Multi-colored Coating	275 (2.3) [0.33]
High Solid Stain	350 (2.9) [0.42]
Filler	275 (2.3) [0.18]

Coating Category (BAAQMD Reg. 8 Rule 32 Definition)	Maximum Allowable VOC Content grams/liter (lb/gal)

Low-solid stain(A)	120 (1.0)
Toner and Wash-coat(A)	120 (1.0)

(A) Low-Solids Coatings VOC content is calculated including water and exempt compounds as set forth in Section 8-32-604. High-Solids Coatings VOC content is calculated excluding water and exempt compounds set forth in Section 8-32-605 and 8-32-606.

Unless emissions to the atmosphere are controlled by an approved emission control system with an overall abatement efficiency of at least 85%, any person using organic solvent for surface preparation and/or cleanup in connection with coating of wood products, and any person mixing, using or disposing of coating, adhesive or stripper containing organic solvent in connection with coating of wood products shall comply with the following requirements:

A. The person shall use closed containers for the storage or disposal of cloth or paper used for solvent surface preparation and clean up.
B. The person shall store fresh or spent solvent in closed containers.
C. The person shall not use organic compounds for the cleanup of mixing or storage equipment unless for collecting the cleaning compounds and minimizing their evaporation to the atmosphere is used.
D. The person shall not use organic solvent for the cleanup of spray equipment, including coating lines, with VOC content in excess of 25 g/l (0.21 lb/gal) unless either
   i. The solvent is pressurized through the spray equipment with atomizing air off or dispensed from a small non-atomizing container, and collected and stored in a closed container until recycled or properly disposed of offsite, or
   ii. A spray gun washer subject to and in compliance with the requirements of Regulation 8, Rule 16 is used.
E. The person shall not leave containers of stripper, coating, adhesive, catalyst, solvent or thinner open to the atmosphere when not in use.

No person shall use a solvent with a VOC content that exceeds 25g/l (0.21 lbs/gal), as applied, for surface preparation in any operation subject to this Rule unless emissions to the atmosphere are controlled to an equivalent level by an approved emission control system with an overall abatement efficient of at least 85%.

San Joaquin Valley Unified APCD

BACT
Source: SJVAPCD BACT Guideline 4.4.1 (10/16/1996)

Wood Products Coating Operation – Non-continuous Batch Coating	
VOC	1. Utilizing HVLP or equivalent application equipment and using coatings compliant with District Rule 4606 (Achieved in practice); Or 2. Closed-face booth with thermal/catalytic incineration (Technologically feasible); Or 3. Closed-face booth with carbon adsorption (Technologically feasible)
NOx	No standard
SOx	No standard
PM10	Enclosed spray booth with exhaust filters and HVLP or equivalent application equipment
PM2.5	No standard
CO	No standard

T-BACT
There are no T-BACT standards published in the clearinghouse for this category.

RULE REQUIREMENTS:

Rule 4606 (Amended 10/16/2008)
An operator shall not apply coatings to wood products subject to the provisions of this rule unless the coating is applied with properly operating equipment, according to proper operating procedures, and by the use of one of the following methods:

A. Electrostatic application
B. High-Volume, Low-Pressure (HVLP) spray
   i. HVLP spray equipment shall be operated in accordance with manufacturer's recommendations.
   II. For HVLP spray guns manufactured prior to January 1, 1996, the end user shall demonstrate that the gun meets HVLP spray equipment standards. Satisfactory proof will be either in the form of manufacturer's published technical material or by a demonstration using a certified air pressure tip gauge, measuring the air atomizing pressure dynamically at the center of the air cap and at the air horns.
C. Hand roller
D. Flow coat
E. Roll coater
F. Dip coat
G. Paint brush
H. Detailing or touch-up guns; or
I. Other coating application methods which are demonstrated to the APCO to be capable of achieving at least 65% transfer efficiency as determined in accordance with Section 6.6. Prior written approval from the APCO shall be obtained for each alternative method used.

An operator shall not apply **any coating to a wood product**, which has a VOC content, as applied, that exceeds the applicable limit specified below:

Coating Category (SJVAPCD Rule 4606 Definition)	Maximum Allowable VOC Content Excluding Water and Exempt Compounds grams/liter (lb/gal)
Clear Topcoats	275 (2.3)
Filler	275 (2.3)
High-Solids Stain	240 (2.0)
Ink	500 (4.2)
Mold-Seal Coating	750 (6.3)
Multi-Colored Coating	275 (2.3)
Pigmented Coating	275 (2.3)
Sanding Sealer	275 (2.3)

Coating Category (SJVAPCD Rule 4606 Definition)	Maximum Allowable VOC Content grams/liter (lb/gal)
Low-Solids Stain	120 (1.0)
Stripper	350 (2.9)

An operator shall not apply **any coating to flat wood paneling product**, which has a VOC content, as applied, that exceeds the applicable limit specified below:

Coating Category (SJVAPCD Rule 4606 Definition)	Grams of VOC/liter (pounds of VOC/gallon) of coating, excluding water and exempt compounds, as applied	Grams of VOC/liter (pounds of VOC/gallon) of material, as applied
Printed interior panels made of hardwood plywood, or thin particle board	250 (2.1)	350 (2.9)
Natural finish hardwood plywood panels	250 (2.1)	350 (2.9)
Class II finishes on hardwood panels		
Tileboard		
Exterior siding		

An operator shall not use a strippable booth coating with a VOC content in excess of 450 g/l (3.8 lb/gal) as applied, excluding water and exempt compounds.

An operator shall not use organic solvents for cleaning operations that exceed the content limits specified in the table below:

Type of Solvent Cleaning Operation	**VOC Content Limit grams of VOC/liter of material (lb/gal)**
Product cleaning during manufacturing process or surface preparation for coating application	25 (0.21)
Repair and maintenance cleaning	25 (0.21)
Cleaning of coating application equipment	25 (0.21)

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

SUMMARY OF ACHIEVED IN PRACTICE CONTROL TECHNOLOGIES (D)	
VOC	<u>For booths with <4,663 lbs/year VOC Emissions</u> 1. 4,663 lb VOC/year limit, Compliance with SMAQMD Rule 463 and SMAQMD BACT #118 VOC limits and high transfer efficiency – [SMAQMD] 2. Compliance with SCAQMD Regulation XI, Rule 1136 – [SCAQMD] (A) 3. Coatings with VOC content less than that required by Reg. 8, Rule 32(B) – [BAAQMD] 4. Compliance with SDCAPCD Rule 67.11 and use of water based coatings when compatible(C) – [SDCAPCD] 5. Utilizing High-volume low-pressure (HVLP) spray or equivalent application equipment, compliance with SJVAPCD Rule 4606(D) - [SJVAPCD] <u>For booths with ≥4,663 lbs/year VOC Emissions</u> 1. Compliance with SMAQMD Rule 463 and SMAQMD BACT #119 VOC limits, and VOC control system with ≥90% collection efficiency and ≥ 95% destruction efficiency; OR – [SMAQMD] 2. Compliance with applicable AQMD Regulation XI Rules, and VOC control system with ≥90% collection efficiency and ≥ 95% destruction efficiency; OR – [SCAQMD] 3. Use of Super Clean Materials (<5% VOC by weight); OR – [SMAQMD, SCAQMD] 4. Use of low-VOC materials resulting in an equivalent emission reduction – [SMAQMD, SCAQMD]
NOx	1. For heaters, low NOx burner, 30 ppmvd @ 3% O2 or 0.036 lb/MMBtu [SCAQMD Rule 1147] 2. No Standard – [SMAQMD, SCAQMD, SDCAPCD, BAAQMD, SJVAPCD]
SOx	No Standard – [SMAQMD, SCAQMD, SDCAPCD, BAAQMD, SJVAPCD]
PM10	1. Enclosed spray booth with properly maintained dry filters or water wash; high transfer efficiency application equipment – [SMAQMD] 2. Enclosed spray booth with exhaust filters and HVLP or equivalent application equipment – [SJVAPCD] 3. Spray booth equipped with overspray filters [SDCAPCD] 4. Dry filters or waterwash, properly maintained – [SCAQMD, BAAQMD]
PM2.5	1. Enclosed spray booth with properly maintained dry filters or waterwash – [SMAQMD] 2. Spray booth equipped with overspray filters [SDCAPCD] 3. No Standard – [SCAQMD, BAAQMD, SJVAPCD]
CO	1. No Standard – [SMAQMD, SCAQMD, SDCAPCD, BAAQMD, SJVAPCD]

SUMMARY OF ACHIEVED IN PRACTICE CONTROL TECHNOLOGIES (D)	
Organic HAP/VHAP (T-BACT)	<u>For booths with <4,663 lbs/year VOC Emissions</u> 1. HVLP spray or equivalent application equipment, compliance with SMAQMD Rule 463 and SMAQMD BACT coating, solvent cleaning, and stripping VOC limits. For major sources, emission limits of Tables 1 & 2 to Subpart QQQQ of Part 63 and emission limits of Table 3 to Subpart JJ of Part 63. – [SMAQMD] 2. Meet emission limits of Tables 1 & 2 to Subpart QQQQ of Part 63. – [US EPA] 3. Meet emission limits of Table 3 to Subpart JJ of Part 63. – [US EPA] <u>For booths with ≥4,663 lbs/year VOC Emissions</u> 1a. Compliance with SMAQMD Rule 463 and SMAQMD BACT coating, solvent cleaning, and stripping VOC limits (see Tables 1-3 below). For major sources, emission limits of Tables 1 & 2 to Subpart QQQQ of Part 63 and emission limits of Table 3 to Subpart JJ of Part 63. With VOC control system with ≥90% collection efficiency and ≥ 95% destruction efficiency; OR – [SMAQMD] 1b. Use of Super Clean Materials (<5% VOC by weight); OR – [SMAQMD] 1c. Use of low-VOC materials resulting in an equivalent emission reduction – [SMAQMD] 2. Meet emission limits of Tables 1 & 2 to Subpart QQQQ of Part 63. – [US EPA] 3. Meet emission limits of Table 3 to Subpart JJ of Part 63. – [US EPA]

(A) The BACT threshold of 1,170 lbs/month from SCAQMD has been converted to an annual threshold since cost effectiveness calculations are based on annual cost and not monthly.

(B) Typical technology to meet this BACT is use of coatings with very low VOC contents (such as waterborne coatings, higher solids coatings, UV-cured coatings, polyester or polyurethane coatings, higher solids nitrocellulose lacquers, and solvent-substituted coatings).

(C) SDAPCD Rule 67.11 contains the most stringent VOC limit (200 g/l) for stripping materials. However, per conversations with SDAPCD, facilities in their county have been complying with this rule by meeting the alternate stripping requirement of the stripping material having a total VOC vapor pressure of 2 mm Hg or less, at 20°C (68°F). Therefore the 200 g/l won't be considered achieved in practice.

(D) SJVAPCD Rule 4606 contains the most stringent VOC limit (240 g/l) for high-solid stains. However, per BAAQMD's Wood Products Coatings Workshop Report (4/09), CARB and every coating manufacturer has indicated there are on-going implementation issues with high-solid stains meeting the 240 g/l VOC limit. Therefore this limit won't be considered achieved in practice.

SMAQMD's previous T-BACT determination was based on a technologically feasible determination. However, upon further review it was found that the T-BACT limits of the NESHAP Subparts QQQQ and JJ were not technologically feasible for small sources. These NESHAPs apply to only to large facilities in very specific source categories. Therefore, T-BACT will be updated to only apply the NESHAP standards of Subparts QQQQ and JJ to major sources of HAPs.

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

BEST CONTROL TECHNOLOGIES ACHIEVED		
Pollutant	**Standard**	**Source**
VOC	<u>For booths with VOC Emissions ≤4663 lb VOC/year</u> 1. HVLP spray or equivalent application equipment 2. Compliance with SMAQMD Rule 463 and SMAQMD BACT coating limits, solvent cleaning, and stripping VOC limits <u>For booths with VOC Emissions or >4663 lb VOC/year</u> 1. Compliance with SMAQMD Rule 463 and SMAQMD BACT coating, solvent cleaning, and stripping VOC limits and VOC control system with ≥90% collection efficiency and ≥ 95% destruction efficiency; OR 2. Use of Super Clean Materials (<5% VOC by weight); OR 3. Use of low-VOC materials resulting in an equivalent emission reduction	SMAQMD
NOx	1. For heaters, low NOx burner, 30 ppmvd @ 3% O2 or 0.036 lb/MMBtu	
SOx	No standard	
PM10	1. Enclosed spray booth with properly maintained dry filters or waterwash. 2. HVLP spray or equivalent application equipment	SMAQMD SJVAPCD SCAQMD BAAQMD
PM2.5	1. Enclosed spray booth with properly maintained dry filters or waterwash.	SMAQMD SDCAPCD SCAQMD BAAQMD
CO	No Standard	

BEST CONTROL TECHNOLOGIES ACHIEVED		
Pollutant	**Standard**	**Source**
Organic HAP/VHAP (T-BACT)	<u>For booths with VOC Emissions & ≤4,663 lb VOC/year</u> 1. HVLP spray or equivalent application equipment 2. Compliance with SMAQMD Rule 463 and SMAQMD BACT coating limits, solvent cleaning, and stripping VOC limits. For major sources, emission limits of Tables 1 & 2 to Subpart QQQQ of Part 63 and emission limits of Table 3 to Subpart JJ of Part 63. <u>For booths with VOC Emissions or >4,663 lb VOC/year</u> 1. Compliance with SMAQMD Rule 463 and SMAQMD BACT coating, solvent cleaning, and stripping VOC limits. For major sources emission limits of Tables 1 & 2 to Subpart QQQQ of Part 63 and emission limits of Table 3 to Subpart JJ of Part 63. With VOC control system with ≥90% collection efficiency and ≥ 95% destruction efficiency; OR 2. Use of Super Clean Materials (<5% VOC by weight); OR 3. Use of low-VOC materials resulting in an equivalent emission reduction.	SMAQMD NESHAP 40 CFR 63 Subpart QQQQ NESHAP 40 CFR 63 Subpart JJ SMAQMD NESHAP 40 CFR 63 Subpart QQQQ NESHAP 40 CFR 63 Subpart JJ

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

Technologically Feasible Alternatives:

Any alternative basic equipment, fuel, process, emission control device or technique, singly or in combination, determined to be technologically feasible by the Air Pollution Control Officer.

The table below shows the technologically feasible alternatives identified as capable of reducing emissions beyond the levels determined to be "Achieved in Practice" as per Rule 202, §205.1.a.

Pollutant	Technologically Feasible Alternatives
VOC	1. Carbon Adsorber 2. Thermal Oxidizer
NOx	No other technologically feasible option identified
SOx	No other technologically feasible option identified
PM10	No other technologically feasible option identified
PM2.5	No other technologically feasible option identified
CO	No other technologically feasible option identified

Cost Effective Determination:

After identifying the technologically feasible control options, a cost analysis is performed to take into consideration economic impacts for all technologically feasible controls identified.

Maximum Cost per Ton of Air Pollutants Controlled

1. A control technology is considered to be cost-effective if the cost of controlling one ton of that air pollutant is less than the limits specified below:

Pollutant	Maximum Cost ($/ton)
VOC	17,500
NO_X	24,500
PM10	11,400
SO_X	18,300
CO	TBD if BACT triggered

Cost Effectiveness Analysis Summary

A previous cost effectiveness analysis determined that 4,663 lb VOC/year was the highest allowable uncontrolled emission rate that did not require any add-on control devices. This BACT determination will revisit this limit by using new cost data. The resulting maximum annual VOC emission limit, 4,219 lb VOC/year, will be the set limit for this determination. The cost analysis was processed in accordance with the EPA OAQPS Air Pollution Control Cost Manual (sixth Edition). The sales tax rate was based on the District's standard rate of 8.25%. The electricity (11.24 cents/kWh) and natural gas (7.00 dollars/1,000 cubic feet) rates were based on an industrial application as approved by the District. The life of the equipment was based on the EPA cost manual recommendation. The interest rate was based on the previous 6-month average interest rate on United States Treasury Securities (based on the life of the equipment) and addition of two percentage points and rounding up to the next higher integer rate. The

labor (Occupation Code 51-9121: Coating, painting, and spraying machine setters, operators, and tenders) and maintenance (Occupation Code 49-9099: Installation, maintenance, and repair workers, all other) rates were based on data from the Bureau of Labor Statistics.

Carbon Adsorber:

As shown in Attachment C, the cost effectiveness for the add on carbon adsorber system to control VOC was calculated to be **$17,500.32/ton** (see attached Paint Spray Booth Cost for Wood Coating Effectiveness Analysis). The following basic parameters were used in the analysis.

Equipment Life = 10 years

Total Capital Investment = $10,190.31

Direct Annual Cost = $28,923.29 per year

Indirect Annual Cost = $4,301.95 per year

Total Annual Cost = $33,225.23 per year

VOC Removed = 1.9 tons per year

Cost of VOC Removal = $17,500.32 per ton reduced

Therefore, the add on carbon adsorber system is considered not cost effective and is eliminated.

Thermal Oxidizer:

Equipment Life = 10 years

Direct Cost = $176,248

Direct Annual Cost = $116,437.96 per year

Indirect Annual Cost = $45,293.63 per year

Total Annual Cost = $161,731.58 per year

VOC Removed = 9.2 tons per year

Cost of VOC Removal = $17,500.00 per ton reduced

C. SELECTION OF BACT/T-BACT:

Based on the review of SMAQMD, SCAQMD, SDCAPCD, BAAQMD, SJVAPCD, ARB, and EPA BACT Clearinghouses and cost effectiveness determinations, BACT for VOC, PM10, and PM2.5 will be the following:

BACT #190 For Paint Spray Booths for Wood Coatings Emissions ≤ 4,219 lbs VOC/year (A)		
Pollutant	**Standard**	**Source**
VOC	1. HVLP spray or equivalent application equipment 2. Compliance with SMAQMD Rule 463 and SMAQMD BACT coating, solvent cleaning, and stripping VOC limits (see Tables 1-3 below)	SMAQMD (Rule 463) SJVAPCD (Rule 4606) SCAQMD (Reg. XI, Rule 1136) SDCAPCD (Rule 67.11) BAAQMD (Reg. 8, Rule 32)
NOx	1. For heaters, low NOx burner, 30 ppmvd @ 3% O2 or 0.036 lb/MMBtu	SCAQMD (Reg. XI, Rule 1147)
SOx	No standard	
PM10	1. Enclosed spray booth with properly maintained dry filters or waterwash. 2. HVLP spray or equivalent application equipment	SJVAPCD SCAQMD BAAQMD
PM2.5	1. Enclosed spray booth with properly maintained dry filters or waterwash.	SDCAPCD SCAQMD BAAQMD
CO	No Standard	

(A) VOC yearly limit was recalculated using new cost data. See Attachment C – Cost Effectiveness Determination.

T-BACT #190 for Paint Spray Booths for Wood Coatings Emissions ≤ 4,219 lbs VOC/year		
Pollutant	**Standard**	**Source**
Organic HAP/VHAP (T-BACT)	1. HVLP spray or equivalent application equipment 2. Compliance with SMAQMD Rule 463 and SMAQMD BACT coating, solvent cleaning, and stripping VOC limits (see Tables 1-3 below). For major sources, emission limits of Tables 1 & 2 to Subpart QQQQ of Part 63 and emission limits of Table 3 to Subpart JJ of Part 63, whichever is more stringent.	SCAQMD NESHAP 40 CFR 63 Subpart QQQQ NESHAP 40 CFR 63 Subpart JJ

BACT #191 for Paint Spray Booths for Wood Coatings Emissions > 4,219 lb VOC/year		
Pollutant	**Standard**	**Source**
VOC	1. Compliance with SMAQMD Rule 463 and SMAQMD BACT coating, solvent cleaning, and stripping VOC limits (see Tables 1-3 below) and VOC control system with ≥90% collection efficiency and ≥ 95% destruction efficiency; OR 2. Use of Super Clean Materials (<5% VOC by weight); OR 3. Use of low-VOC materials resulting in an equivalent emission reduction	SCAQMD (BACT Guidelines for Non-Major Polluting Facilities, pg 112)
NOx	1. For heaters, low NOx burner, 30 ppmvd @ 3% O2 or 0.036 lb/MMBtu	SCAQMD (Reg. XI, Rule 1147)
SOx	No standard	
PM10	1. Enclosed spray booth with properly maintained dry filters or waterwash. 2. HVLP spray or equivalent application equipment	SJVAPCD SCAQMD BAAQMD
PM2.5	1. Enclosed spray booth with properly maintained dry filters or waterwash.	SDCAPCD SCAQMD BAAQMD
CO	No Standard	

T-BACT #191 for Paint Spray Booths for Wood Coatings Emissions > 4,219 lb VOC/year		
Pollutant	**Standard**	**Source**
Organic HAP/VHAP (T-BACT)	1. Compliance with SMAQMD Rule 463 and SMAQMD BACT coating, solvent cleaning, and stripping VOC limits (see Tables 1-3 below). For major sources, emission limits of Tables 1 & 2 to Subpart QQQQ of Part 63 and emission limits of Table 3 to Subpart JJ of Part 63. 2. VOC control system with ≥90% collection efficiency and ≥ 95% destruction efficiency; OR 3. Use of Super Clean Materials (<5% VOC by weight); OR 4. Use of low-VOC materials resulting in an equivalent emission reduction	SCAQMD (BACT Guidelines for Non-Major Polluting Facilities, pg 112) NESHAP 40 CFR 63 Subpart QQQQ NESHAP 40 CFR 63 Subpart JJ

An operator shall not apply **any coating to a wood product** that exceeds the applicable limit specified below:

Table 1: BACT Wood Coating VOC Limits(A)

Coating Category	Maximum Allowable VOC Content Excluding Water and Exempt Compounds grams/liter, (lb/gal), [lbs-VOC/lbs-solid)]
Clear Sealers	275 (2.3) [0.36]
Clear topcoat	275 (2.3) [0.35]
Pigmented primers, sealers, & topcoats	275 (2.3) [0.21]
Pigmented topcoats	275 (2.3) [0.25]
Barrier coat – plastic components	275 (2.3) [0.28]
Composite wood edge filler	275 (2.3) [0.31]
Extreme performance coatings	275 (2.3) [0.33]
Fillers	275 (2.3) [0.18]
High-solid stains	350 (2.9) [0.42]
Inks	500 (4.2) [0.96]
Mold-seal coatings	750 (6.3) [4.2]
Multi-colored coatings	275 (2.3) [0.33]

(A) VOC limits are based on SCAQMD Regulation XI, Rule 1136.

Table 1: BACT Wood Coating VOC Limits (continued)(A)

Coating Category	Maximum Allowable VOC Content grams/liter (lb/gal)
Low-solid barrier coat – plastic components	120 (1.00)
Low-solid Stains, Toners, and Washcoats	120 (1.00)

(A) VOC limits are based on SCAQMD Regulation XI, Rule 1136.

An operator shall not use organic solvents for cleaning operations that exceed the content limits specified in the table below:

Table 2: BACT Solvent Cleaning VOC Limits(A)

Type of Solvent Cleaning Operation	VOC Content Limit grams of VOC/liter of material (lb/gal)
Product cleaning during manufacturing process or surface preparation for coating, adhesive, or ink application	25 (0.21)
Repair and maintenance cleaning	25 (0.21)
Cleaning of adhesive and coating application equipment	25 (0.21)
Cleaning of polyester resin application equipment	25 (0.21)

(A) VOC limits are based on SCAQMD Regulation XI, Rule 1171.

A person shall not use VOC containing materials for stripping unless the material meets one of the following requirements:

Table 3: BACT Stripper VOC Limits(A)

Stripper Requirements	
VOC Limit	≤ 350 grams VOC/liter; OR
VOC vapor pressure limit	Total vapor pressure of 2 mm HG or less, at 20°C (68°F)

(A) VOC limits are based on SCAQMD Regulation XI, Rule 1136.

REVIEWED BY: _____ **DATE:** _____

APPROVED BY: _____ **DATE:** 8/29/18

Attachment A

Review of BACT Determinations published by EPA

List of BACT determinations published in EPA's RACT/BACT/LAER Clearinghouse (RBLC) for Wood Products/Furniture Surface Coating:

RBLC	Permit Date	Process Code [A]	Process/Equipment	Pollutant	Standard	Control Technology	Case-By-Case Basis
AL-0229	5/18/2007	41.025	Two Overhead Coating Lines	VOC	N/A	Coating Reformulation	BACT-PSD
AL-0224	4/18/2006	41.025	Glaze Booth, Toner Booth, Seater Booths, Natural Gas-fired Oven	VOC	N/A	Coating Reformulation	BACT-PSD
OR-0045	8/04/2005	41.025	Cabinet Finishing	VOC	N/A	California VOC Content limits were used as the basis for this BACT-PSD Determination	BACT-PSD
PA-0263	3/27/2006	41.025	Overhead line	VOC	N/A	Paint Filter	Other Case-By-Case
PA-0269	2/23/2006	41.025	Laboratory Spray Booth	VOC	N/A	No Controls Feasible	Other Case-By-Case
VA-0295	9/23/2011	41.025	Wood Finishing	VOC	N/A	Good Work Practices	MACT
				FPM10[D]	N/A	Dry Overspray Filters	MACT
VA-0300	4/26/2011	41.025	Spray Booths for Cabinets	VOC	N/A	Proper spraying techniques and the use of high solids coating whenever possible	BACT-PSD
				PM	N/A	Dry filters, proper spray techniques, and work practice standards of 40 CFR Subpart JJ. Each filter shall be equipped with a device to continuously measure the differential pressure drop across the filter.	BACT-PSD
				FPM10[D]	N/A		BACT-PSD

RBLC	Permit Date	Process Code (A)	Process/Equipment	Pollutant	Standard	Control Technology	Case-By-Case Basis
VT-0030	4/26/2011	41.025	Roll Coating Lines	VOC	N/A	Limiting the VOC content of the stains and coatings.	BACT-PSD

(A) Process Code 41.025 includes wood products/furniture surface coatings.
(B) Filterable particulate matter less than 10 micrometers.

= Determination is not for a spray paint booth.

= Selected as the most stringent BACT determination achieved in practice.

Attachment B

Review of BACT Determinations published by ARB

List of BACT determinations published in ARB's BACT Clearinghouse for flat wood paneling & wood flat stock coating ≥ 25 lb/day emission (uncontrolled):

Capacity	Source	Date	NOx	VOC	CO	PM10
14' x 9' x 26'	SMAQMD	11/28/2005		4,700 lb VOC/year limit(A), use of low VOC coatings		

(A) The 4,700 lb VOC/year limit to stay below District cost effectiveness thresholds for add on control technology.

Attachment C

Cost Effectiveness Determination for Carbon Adsorption and Thermal Oxidizers

COST EFFECTIVENESS ANALYSIS FOR CARBON ADSORPTION

This cost effectiveness analysis was performed using EPA's OAQPS Control Cost Manual
EPA publication no. 452/B-02-001

VOC Parameters

VOC of concern	Toluene
Cost of pure VOC ($/ton)	100
Molecular weight of VOC (Refer to Control Cost Manual, pg 3-63)	92.13
Emission rate (lbs/hr - inlet)	2.0
Inlet concentration (ppm)	15
k factor (Refer to Control Cost Manual, pg 4-11)	0.551
m factor (Refer to Control Cost Manual, pg 4-11)	0.11
Partial pressure (psi)	0.00021468

Gas Parameters

Total gas flow rate (acfm - inlet)	10,000
Total gas pressure (psi - inlet)	14.7

Equipment Parameters

Removal efficiency (%)	90.0%
Adsorption time (hours)	8
Desorption time (hours)	8
Number of adsorbing beds	1
Number of Desorbing beds	1
Equipment life (years)	10

Operating Parameters

Hours per day	8
Days per week	5
Weeks per year	52

Carbon Requirements

Controlled VOC Emissions with max operation (tons/year)	1.8986
VOC Emissions BACT add on limit (tons/year)	4219
Controlled VOC Emissions BACT add on limit (tons/year)	1.90
Carbon working capacity (lb VOC/lb carbon)	0.25
Amount of carbon needed (lbs)	15,188
Carbon cost	$22,783
Carbon life (years)	5

Direct Costs:			
Purchased Equipment Cost			
Adsorber and auxiliary equipment			$7,800.00
Instrumentation			$780.00
Sales taxes			$643.50
Freight			$390.00
Purchased Equipment Cost			$9,613.50
Direct installation costs	Canister carbon adsorption doesn't require site prep and building costs		
Foundations & supports		$	-
Handling & erection		$	-
Electrical		$	-
Piping		$	-
Insulation		$	-
Painting		$	-
Direct installation costs		$	-
Indirect Costs:			
Indirect Costs (installation)			
Engineering		$	-
Construction and field expenses		$	-
Contractor fees		$	-
Start-up		$	192.27
Performance test		$	96.14
Contingencies		$	288.41
Total Indirect Costs		$	576.81
Total Capital Investment			$10,190.31
Interest Rate			0.04
Equipment Life (years)			10
Capital Recovery Factor (CRF)			0.1233
Capital recovery cost			$1,256.37
Direct Annual Costs			
Labor wage ($/hr)			16.91
operator hour (hrs/shift)			0.5
shifts per day (shift/day)			1
days of work per year (days/year)			260
Operator labor			
Operator			$2,198.30
Supervisor			$0.00

Material		$2,198.30
Replacement labor		$0.00
Utilities		
Electrical Cost		
kW/hp		0.746
hp		10
hours/year		2080
kWh price		0.1124
Electrical		$1,744.09
Total Direct Annual Costs (without carbon costs)		$6,140.69
Indirect Annual Costs		
Overhead		$2,637.96
Administrative Charges	$	203.81
Property Tax	$	101.90
Insurance	$	101.90
Total Indirect Annual Costs (without Capital Recovery)		$3,045.57
Ton VOC controlled		1.9
Carbon needed		15,188
Cost of Carbon per year		$22,782.60
Total Annual Costs		$33,225.23
Cost of VOC Removal		$17,500.32

Determination of Maximum Annual VOC Limit Not Requiring Add-on Bact

Annual Direct Operating Cost (without carbon costs)	$6,140.69
Annual Indirect Operating Cost	$4,301.95
Carbon working capacity (lb carbon/lb VOC)	0.25
Annual lb VOC PTE	4219
Annual tons Controlled VOC	1.90
Control Efficiency	0.900
Amount of Carbon Needed	15188.4
Cost of Carbon	$22,782.60
Total Annual Cost	$33,225.23
Cost per ton VOC Controlled	**$17,500.32**

COST EFFECTIVENESS ANALYSIS FOR THERMAL INCINERATION

This cost effectiveness analysis was performed using EPA's OAQPS Control Cost Manual
EPA publication no. 452/B-02-001

VOC Parameters

VOC of concern	Toluene
Molecular weight of VOC (see Control Cost Manual, p 3-63)	92.13
Heat of combustion (Btu/lb - see Control Cost Manual, p 3-63)	17,601
Heating value of VOC (Btu/scf)	4,074
Emission rate (lbs/hr - inlet)	2.1
Inlet concentration (ppm)	15

Gas Parameters

Total gas flow rate (scfm - inlet)	10000
Total gas pressure (psi - inlet)	14.7
Inlet gas temperature (deg F)	71

Equipment Parameters

Level of energy recovery (0%, 35%, 50% or 70%)	70%
Control efficiency (%)	90.0%
Equipment life (years)	10

Operating Parameters

Hours per day	8
Days per week	5
Weeks per year	52
Shifts per day	2

Incinerator Parameters

Volumetric heat of combustion of effluent (Btu/scf)	0.06
Heat of combustion per pound of effluent (Btu/lb)	0.81
Temperature Required for incineration (deg F)	1,500.00
Gas temperature at exit of pre-heater (deg F)	1,071.30
Effluent gas temperature (deg F)	499.7

Electricity Usage

Price of electricity ($/kWh)	$0.11
System fan (kWh/yr)	77,064.00
Total Power Used (kWh/yr)	77,064.00

Gas Usage

Price of gas ($/1000 cu.ft.)	$7.00
Auxiliary fuel required (scfm)	109.58

CAPITAL COST

Direct Costs:

Incinerator	$110,000
Auxiliary equipment (if not included above)	$0
Equipment Cost (A)	**$110,000**
Instrumentation (0.1A if not included above)	$11,000
Sales taxes (0.0825A)	$9,075
Freight (0.05A)	$5,500
Total Equipment Cost (B)	**$135,575**

Direct Installation Costs:

Foundation & Supports (0.08B)	$10,846
Handling & erection (0.14B)	$18,981
Electrical (0.04B)	$5,423
Piping (0.02B)	$2,712
Insulation for duct work (0.01B)	$1,356
Painting (0.01B)	$1,356
Direct Installation Cost	**$40,673**
Site preparation	$0
Facilities & buildings	$0
Total Direct Costs	**$176,248**

Indirect Costs (installation)

Engineering (0.10B)	$13,558
Construction & field expenses (0.05B)	$6,779
Contractor fees (0.10B)	$13,558
Start-up (0.02B)	$2,712
Performance test (0.01B)	$1,356
Contingencies (0.03B)	$4,067
Total Indirect Costs	**$42,028**

TOTAL CAPITAL INVESTMENT	**$218,276**

ANNUAL COST

Direct Annual Costs

Operating Cost

Operator (@ $16.91/hr & .5 hr per shift)	$4,396.60
Supervisor (15% of operator)	$659.49
Operating materials	$0.00

Maintenance		
	Labor (@21.21/hr & .5 hr per shift)	$5,514.60
	Material (same as labor)	$5,514.60
Utilities		
	Price of electricity ($/kWh)	$0.11
	Price of gas ($/1000 cu.ft.)	$7.00
	Electricity ($/yr)	$4,623.84
	Natural Gas ($/yr)	$95,728.83
	Total Direct Costs	**$116,437.96**

Indirect Annual Costs

Overhead	$9,651.17
Administrative charges	$4,365.52
Property taxes	$2,182.76
Insurance	$2,182.76
Interest rate (%)	4%
Equipment life (years)	10
CRF	0.1233
Capital recovery	$26,911.42
Total Indirect Costs	**$45,293.63**

TOTAL ANNUAL COST	**$161,731.58**

Annual Cost ($/yr)	$161,731.58
Annual Emissions Uncontrolled (lbs/year)	20,537
Annual Emissions Reductions (tons/yr)	9.2
(annual emissions based on BACT determination limit for add-on controls)	

COST PER TON OF VOCs REDUCED ($/ton)	**$17,500.00**