UNDER PUBLIC REVIEW SMAQMD BACT CLEARINGHOUSE

CATEGORY: **FIBERGLASS OPERATION**

BACT Size: Minor Source BACT **FIBERGLASS MFG PROCESS**

BACT Determination Number: 161	**BACT Determination Date:**

Equipment Information

Permit Number: 24673
Equipment Description: FIBERGLASS MFG PROCESS
Unit Size/Rating/Capacity: <1,170 lb VOC /month and <=4,071 lb VOC/year
Equipment Location: AA PRODUCT ASSEMBLY LLC
9266 BEATTY DR, STE B
SACRAMENTO, CA

BACT Determination Information

ROCs	**Standard:**	
	Technology Description:	Open molding using compliant resins and gel coats (See comments), and the use of vapor suppressed Tub/Shower resins; or Closed Molding
	Basis:	Achieved in Practice
NOx	**Standard:**	N/A
	Technology Description:	No standard
	Basis:	
SOx	**Standard:**	N/A
	Technology Description:	No standard
	Basis:	
PM10	**Standard:**	
	Technology Description:	Spray booth with exhaust filters and HVLP or equivalent application equipment as specified in applicable District Rule
	Basis:	Achieved in Practice
PM2.5	**Standard:**	
	Technology Description:	Spray booth with exhaust filters and HVLP or equivalent application equipment as specified in applicable District Rule
	Basis:	Achieved in Practice
CO	**Standard:**	N/A
	Technology Description:	No standard
	Basis:	
LEAD	**Standard:**	N/A
	Technology Description:	No standard
	Basis:	

Comments: Maximum momomer content percent by weight: clear marble resin gel coats = 40%; All other clear gel coats = 44%; White and off-white gel coats = 30%; non-white gel coats = 37%; primer pigmented gel coats = 28%; specialty gel coats = 48%; tooling gel coat = 40%; Marble resins = 10% with fillers or 32% without; solid surface resins = 17%; Tub/Shower resins = 24% with fillers or 35% without; lamination resins = 31% with fillers or 35% without; fire retardant resins = 38%; corrosion resistant resins = 48%; high strength resins = 40%; atomized tooling resins = 39%; non-atomized tooling resins = 30%; all

District Contact: Matt Baldwin Phone No.: (916) 874 - 4858 email: mbaldwin@airquality.org

UNDER PUBLIC REVIEW SMAQMD BACT CLEARINGHOUSE

CATEGORY: **FIBERGLASS OPERATION**

BACT Size: Minor Source BACT **FIBERGLASS MFG PROCESS**

BACT Determination Number: 162	**BACT Determination Date:**

Equipment Information

Permit Number: 24673
Equipment Description: FIBERGLASS MFG PROCESS
Unit Size/Rating/Capacity: >=1,170 lb VOC/month or >4,071 lb VOC/year
Equipment Location: AA PRODUCT ASSEMBLY LLC
9266 BEATTY DR, STE B
SACRAMENTO, CA

BACT Determination Information

ROCs	**Standard:**	
	Technology Description:	Compliant with Rule 465 and VOC Control System with >= 90% Collection Efficiency and >= 95% Destruction Efficiency, or the use of super compliant materials (<5% VOC by weight); or the Use of Low-VOC Materials resulting in equal emssions reduction
	Basis:	Achieved in Practice
NOx	**Standard:**	N/A
	Technology Description:	No Standard
	Basis:	
SOx	**Standard:**	N/A
	Technology Description:	No Standard
	Basis:	
PM10	**Standard:**	
	Technology Description:	Spray booth with exhaust filters and HVLP or equivalent application equipment as specified in Rule 465
	Basis:	Achieved in Practice
PM2.5	**Standard:**	
	Technology Description:	Spray booth with exhaust filters and HVLP or equivalent application equipment as specified in Rule 465
	Basis:	Achieved in Practice
CO	**Standard:**	N/A
	Technology Description:	No Standard
	Basis:	
LEAD	**Standard:**	N/A
	Technology Description:	No Standard
	Basis:	

Comments: Additional VOC controls are achived in practice for monthly VOC emissions >= 1,170 lb and cost effective for annual VOC emissions > 4,071 lb

District Contact: Matt Baldwin Phone No.: (916) 874 - 4858 email: mbaldwin@airquality.org

777 12th Street, Third Floor

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Sacramento, CA 95814

BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION

DETERMINATION NOS.: 161 & 162

DATE: 07/25/17

ENGINEER: Matt Baldwin

Category/General Equip Description: Polyester Resin Operation

Equipment Specific Description: Polyester Resin Operation

Equipment Size/Rating: <1,170 lbs VOC/month and ≤ 4,071 lbs VOC/year, Minor Source (BACT #161)
≥1,170 lbs VOC/month or >4,071 lbs VOC/year, Minor Source (BACT #162)

Previous BACT Det. No.: None

This is a new BACT/T-BACT determination for polyester resin operations that are not boat manufacturers; are not major sources of hazardous air pollutants (HAP), and are not located at major sources of HAP.

Polyester resin operations are facilities that manufacture or repair a wide range of products (boat repair, tubs, showers, vehicle bumpers and fenders, storage tanks, etc.) using liquid polyester resin reinforced with glass fibers or carbon fibers, mixed with a catalyst (such as methyl ethyl ketone), and extended with various inorganic filler materials such as calcium carbonate, talc, mica, or small glass spheres. These composite materials are often referred to as fiberglass-reinforced plastics, or commonly “fiberglass”. VOCs are emitted during the fabrication process when the cross-linking agent (typically styrene) contained in the liquid resin evaporates during curing and application. Application methods using atomized spray lay-up or hand lay-up (open molding) expose more of the monomer surface area to atmosphere and thus are more emissive, whereas closed molds reduce evaporation and allow more of the monomer to cross-link and thus not be emitted.

Large facilities that manufacture boats (not just repair) and other major sources of HAP are regulated under 40 CFR Part 63 Subpart VVV (Boat Manufacturing) and Subpart WWWW (Reinforced Plastic Composite Production) have specific requirements and are thus outside the scope of this determination. Boat manufacturing and polyester resin operations that are major sources of HAP will require a separate BACT determination.

BACT/T-BACT ANALYSIS

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

The following control technologies are currently employed as BACT/T-BACT for fiberglass operations / polyester resin operations:

US EPA

BACT

Source: EPA RACT/BACT/LAER Clearinghouse

For fiberglass/reinforced polymer products manufacturing, except fiberglass boat manufacturing.	
VOC	No emission limits, BACT is VOC content limits and transfer efficiency requirement. All add-on control technologies were found to be cost-prohibitive. California content limits were used as BACT. The permit includes limits on VOC content in resins, gel coats, and transfer efficiencies to reduce VOC emissions.
NOx	N/A – Not applicable to process
SOx	N/A – Not applicable to process
PM10	N/A – No BACT determinations found
PM2.5	N/A – No BACT determinations found
CO	N/A – Not applicable to process

RBLC ID: OR-0045 (08/04/2005)

T-BACT

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

RULE REQUIREMENTS:

40 CFR Part 63 Subpart WWWW – National Emissions Standards for Hazardous Air Pollutants: Reinforced Plastic Composites Production. This regulation applies to reinforced plastic composites production facilities that are located at a major source of HAP. [40 CFR §63.5785]

This regulation applies only to reinforced plastic composites production operations that are major sources of HAP (10 tons/year single HAP, or 25 tons/year any combination of HAP) or are located at a major source of HAP. Therefore, this regulation is not considered achieved in practice for non-major sources.

Air Resources Board (ARB)

BACT
Source: ARB BACT Clearinghouse

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

Note: ARB has determinations for polystyrene foam manufacturing and for fiber impregnation (polymer-impregnated fiber material). The District determined that these determinations are not applicable to this source category.

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

RULE REQUIREMENTS:
There are no regulations for this source category.

Sacramento Metropolitan AQMD

BACT
Source: SMAQMD BACT Clearinghouse

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

T-BACT
There are no T-BACT standards published in the clearinghouse for this category. However, since the primary VOCs controlled by the applicable District Rule are HAPs (styrene and methyl methacrylate), compliance with the District Rule is considered T-BACT.

RULE REQUIREMENTS:
Rule 465 – Polyester Resin Operations
This rule requires the following:

a. Each polyester resin operation shall comply with one of the following process or control requirements:
    1. The use of low-VOC polyester resins with the following monomer content:
        i. Resins, except for specialty resins and gel coats, which contain no more than 35% by weight as applied, as determined by Section 502.3.
        ii. Pigmented gel coats which contain no more than 45% by weight as applied, as determined by Section 502.3.
        iii. Specialty resins and clear gel coats which contain no more than 50% by weight as applied, as determined by Section 502.3.
    2. A polyester resin material containing a vapor suppressant, such that weight loss from VOC emissions does not exceed 60 grams per square meter of exposed surface area during resin polymerization, as determined by Section 502.1.
    3. The use of a closed-mold system.

Sacramento Metropolitan AQMD

b. In lieu of using the aforementioned controls, the source may install air pollution control equipment capable of overall capture and control efficiency of 90%.
c. The use of HVLP, LVLP, airless, air assisted airless, electrostatic, or an otherwise approved spray method when spray-applying resins.
d. The use of low-VOC cleaning solvents (< 25 g VOC/L)

This rule provides an exemption from the above requirements if the source uses less than 20 gallons of resin per month.

South Coast AQMD

BACT

Source: SCAQMD BACT Guidelines for Non-Major Polluting Facilities, page 51, 93 & 115

Rating/Size	VOC	NOx	SOx	CO	PM10
Fiberglass Operations – Fabrication Hand & Spray Layup					
All	Compliance with AQMD Rule 1162 (10-20-2000)	N/A	N/A	N/A	Airless Spray Equipment and Spray Booth with Mesh Type Filter (1988)
Polyester Resin Operations - Molding and Casting					
All	Compliance with AQMD's Rule 1162 and Use of Aqueous Emulsion Cleaner or Acetone for Clean-Up to Maximum Extent Possible (1988/10-20-2000)	N/A	N/A	N/A	N/A
Spray Booth – Other Than Automotive, Down-draft Type					
<1,170 lbs/month of VOC emissions	Compliance with Applicable SCAQMD Regulation XI Rules (10-20-2000)	N/A	N/A	N/A	Dry Filters or Waterwash (1990)

South Coast AQMD

Rating/Size	VOC	NOx	SOx	CO	PM10
≥1,170 lbs/month of VOC emissions	Compliance with Applicable SCAQMD Regulation XI Rules, and VOC Control System with ≥ 90% Collection Efficiency and ≥ 95% Destruction Efficiency, or - Use of Super Compliant Materials (< 5% VOC by weight): or - Use of Low-VOC Materials Resulting in an Equivalent Emission Reduction (10-20-2000)	N/A	N/A	N/A	Dry Filters or Waterwash (1990)

T-BACT

There are no T-BACT standards published in the clearinghouse for this category. However, since the primary VOCs controlled by the applicable District Rule are HAPs (styrene and methyl methacrylate), compliance with the District Rule is considered T-BACT.

RULE REQUIREMENTS:

Reg. XI, Rule 1162 – Polyester Resin Operations

This rule requires the following:

a. Application of resins using non-atomizing spray application techniques (as listed in section (c)(1)(A), and application of gel coats using the methods listed in (c)(1)(A), or using air-assisted airless, electrostatic or HVLP methods.
b. The use of the following:
   i. Low-VOC polyester resins and gel coats listed in (c)(2)(A);
   ii. Additionally, for tub/shower open molding, the use of vapor-suppressed resins (≤ 50 g/m^2) [Section (c)(2)(C)];
   iii. the use of a closed-mold system [Section (c)(3)(A)].
   iv. In lieu of using the aforementioned controls, the source may install air pollution control equipment capable of overall capture and control efficiency of 90% [Section (d)].
c. The use of solvents that comply with Rule 1171 – Solvent Cleaning Operations

South Coast AQMD

This rule does not allow the use of vapor suppressed resins in lieu of resins that meet the monomer content limits. SCAQMD staff determined that equivalent reductions could not be verified, since vapor suppressants tend to only reduce emission during curing and not application. (Final Staff Report for Proposed Amended Rule 1162 – Polyester Resin Operations, November 2001, pg. 31-32)

This rule does not provide an exemption for low-use facilities, however, Reg. II, Rule 219 provides a permitting exemption for polyester resin operations that can demonstrate the following:

1. The facility uses less than 1 gallon/day or 22 gallons per month of materials related to the polyester resin operation, and [§ (l)(6)(E)]
2. The facility uses less than 3 gallons/day or 66 gallons per month of coatings, adhesive, and polyester resin and gel coat type materials, and [§ (l)(6)]
3. Total facility emissions do not exceed 4.0 tons per year of VOC. [§ (s)(3)]

Section (c)(2)(A) Table:

Polyester Resin Materials	**Monomer Percentage by Weight as Applied**
Clear Gel Coat	-
For Marble Resins	40%
For Other Resins	44%
Pigmented Gel Coat	-
White and Off White	30%
Non-White	37%
Primer	28%
Specialty Gel Coats	48%
General Purpose Resin	
Marble Resins	10% or (32% as supplied, no fillers)
Solid Surface Resins	17%
Tub/Shower Resins	24% or (35% as supplied, no fillers)
Lamination Resins	31% or (35% as supplied, no fillers)
Others	35%
Fire Retardant Resin	38%
Corrosion Resistant Resins	48%
High Strength Resin	40%

Reg. XI, Rule 1132 – Further Control of VOC Emissions from High-Emitting Spray Booth Facilities

This rule requires further control of VOC emissions from sources that use VOC-containing materials that amount to more than 40,000 pounds per year of VOC emissions. Sources subject to this rule are required to do the following:

(a) Install and operate an emission control system that has an overall efficiency of 65% by weight; or
(b) Use VOC-containing materials that have a VOC content at least 65% lower than any applicable rule limit in effect as of January 19, 2001; or

Any combination of the above which reduces VOC emission by at least 65% by weight.

San Joaquin Valley Unified APCD

BACT
Source: SJVUAPCD BACT Guideline 4.8.2

Polyester Resin Products - Synthetic Marble Casting	
VOC	N/A – No achieved in practice standard
NOx	N/A – Not applicable to process
SOx	N/A – Not applicable to process
PM10	Spray booth with exhaust filters and HVLP or equivalent application equipment as specified in Rule 4684 (Polyester Resin Operations)
PM2.5	No standard
CO	N/A – Not applicable to process

BACT
Source: SJVUAPCD BACT Guideline 4.8.5

Polyester Resin Products - Chop Spray, Spray, and Hand Lay-Up, < or = 600 gallons resin/day	
VOC	Low-VOC resin compliant with District Rule 4684
NOx	N/A – Not applicable to process
SOx	N/A – Not applicable to process
PM10	95% control (spray booth with filtered exhaust, or equal), and air-assisted airless application equipment
PM2.5	No standard
CO	N/A – Not applicable to process

BACT
Source: SJVUAPCD BACT Guideline 4.8.9

Fiberglass Products Manufacturing - Fiberglass Mat Forming	
VOC	Low VOC Resin (containing less than 0.25% formaldehyde and less than 0.45% methanol) and Whitewater (containing less than 0.1% VOC).
NOx	N/A – Not applicable to process
SOx	N/A – Not applicable to process
PM10	No standard
PM2.5	No standard
CO	N/A – Not applicable to process

T-BACT
There are no T-BACT standards published in the clearinghouse for this category. However, since the primary VOCs controlled by the applicable District Rule are HAPs (styrene and methyl methacrylate), compliance with the District Rule is considered T-BACT.

San Joaquin Valley Unified APCD

RULE REQUIREMENTS:
Rule 4684 – POLYESTER RESIN OPERATIONS

This rule requires the following:

a. The use of low-VOC polyester resins (as listed in Table 1 of the rule), the use of vapor-suppressed resins (≤ 50 g/m^2), or the use of a closed-mold system. In lieu of using the aforementioned controls, the source may install air pollution control equipment capable of overall capture and control efficiency of 90%.
b. The use of airless, air assisted airless, HVLP spray equipment, or electrostatic spray equipment when spray-applying resins.
c. The use of low-VOC cleaning solvents (< 25 g VOC/L)

This rule provides an exemption from the above requirements if the source uses less than 20 gallons of resin per month. This exemption does not apply to fiberglass boat manufacturers.

Rule 4684 Table 1

Polyester Resin Materials	Monomer Percentage by Weight as Applied
General Purpose Resin	-
Marble Resins	10% or (32% as supplied, no fillers)
Solid Surface Resins	17%
Tub/Shower Resins	24% or (35% as supplied, no fillers)
Lamination Resins	31% or (35% as supplied, no fillers)
Tooling Resin	-
Atomized (spray)	30%
Non-atomized	39%
Specialty Resin	-
Fire Retardant Resin	38%
High Strength Materials	40%
Corrosion Resistant Resin	48%
All Other Resin	35%
Tooling Gel Coat	40%
Pigmented Gel Coat	-
White and Off White	30%
Non-White	37%
Primer	28%
Clear Gel Coat	-
Marble Resin	40%
Other Resin	44%
Specialty Gel Coat	48%

San Diego County APCD

BACT

Source: NSR Requirements for BACT

Fiberglass Manufacturing Line (<10 tons/yr).

	VOC	NOx	SOx	CO	PM10
BACT Emission Rate Limit	Not Determined	N/A	N/A	N/A	Not Determined
BACT Control Option	Compliance with Rule 67.12.1, Polyester Resin Operations.	N/A	N/A	N/A	Airless spray equipment & spray booth with mesh type filters.

T-BACT

There are no T-BACT standards published in the clearinghouse for this category. However, since the primary VOCs controlled by the applicable District Rule are HAPs (styrene and methyl methacrylate), compliance with the District Rule is considered T-BACT.

RULE REQUIREMENTS:

Regulation 4, Rule 67.12.1 – Polyester Resin Operations

This rule requires the following:

a. The use of low-VOC polyester resins (as listed in § (d)(1)(i)) or the use of a closed-mold system. In lieu of using the aforementioned controls, the source may install air pollution control equipment capable of overall capture and control efficiency of 90%.
b. The use of airless, air assisted airless, HVLP spray equipment or electrostatic spray equipment when spray-applying resins.
c. The use of low-VOC cleaning solvents (< 25 g VOC/L)

This rule provides an exemption from the above requirements if the source uses less than 20 gallons of resin per month. This exemption does not apply to fiberglass boat manufacturers.

Vapor suppressed resins are defined and when used, must have VOC emissions that do not exceed 50 grams per square meter of exposed surface area during resin polymerization. However, the rule doesn't require them for certain processes, nor does it allow vapor suppressants to be used in lieu of meeting the monomer limits.

San Diego County APCD

Category	Monomer Weight %
Clear Gel Coat	
Marble Gel Coat	40%
Other Clear Gel Coats	44%
Pigmented Gel Coat	
White and Off-white Gel Coats	30%
Other Non-white Gel Coats	37%
Primer Gel Coat	28%
Specialty Gel Coat	48%
Resins	
Marble Resin	10% or 32% without fillers
Solid Surface Resins	17%
Tub/Shower Resins	24% or 35% without fillers
Lamination Resins	31% or 35% without fillers
Fire Retardant Resins	38%
Corrosion Resistant Resins	48%
High Strength Resins	40%
Other Resins	35%

Bay Area AQMD

BACT
Source: BAAQMD BACT Guideline 129.1.1

Polyester Resin Operations - Molding and Casting	
VOC	Compliance w/ BAAQMD Reg. 8, Rule 50 and use of aqueous emulsion cleaner instead of acetone for clean-up to maximum extent possible
NOx	No standard
SOx	No standard
PM10	No standard
PM2.5	No standard
CO	No standard

Bay Area AQMD

Source: BAAQMD BACT Guideline 129.2.1

Polyester Resin Operations - Hand and Spray Layup	
VOC	Compliance w/ BAAQMD Reg. 8, Rule 50, use of polyester resin material with a monomer content of no greater than 34 percent(A) by weight and use of aqueous emulsion cleaner or acetone for clean-up to maximum extent possible.
NOx	No standard
SOx	No standard
PM10	Airless spray equipment and spray booth w/ mesh type filters
PM2.5	No standard
CO	No standard

(A) This BACT was based on BAAQMD Application No. 12563. The comments regarding BACT state that BACT is compliance with Rule 8-50, Section 8-50-301 (1996 version), which are resins that contain no more than 35% monomer content. The discussion in this application incorrectly lists the monomer content as 34%.

Source: BAAQMD BACT Guideline 129.4.1

Polyester Resin Operations - Pultrusion	
VOC	Compliance w/ BAAQMD Reg. 8, Rule 50; use of styrene suppressed resin; and use of aqueous emulsion cleaner for clean-up to maximum extent possible
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. However, since the primary VOCs controlled by the applicable District Rule are HAPs (styrene and methyl methacrylate), compliance with the District Rule is considered T-BACT.

RULE REQUIREMENTS:

Reg 8, Rule 50 – Polyester Resin Operations

This rule requires the following:

a. The use of low-VOC polyester resins (as listed in Table 1 of the rule), the use of vapor-suppressed resins (≤ 50 g/m^2), or the use of a closed-mold system. In lieu of using the aforementioned controls, the source may install air pollution control equipment capable of overall capture and control efficiency of 85% by weight.
b. The use of airless, air assisted airless, HVLP, or electrostatic spray equipment when spray-applying resins.
c. The use of low-VOC cleaning solvents (< 25 g VOC/L).

Bay Area AQMD

Table 1

Gel Coats and Resins	Monomer Percentage by Weight
Gel Coats	
Clear Gel Coats	
Marble Resin Gel Coats	42%
Boat Manufacturing Gel Coats	48%
All Other Clear Gel Coats	44%
Pigmented Gel Coats	
White and Off-White Gel Coats	30%
Non-White Boat Manufacturing Gel Coats	33%
Other Non-White Gel Coats	37%
Primer Gel Coats	28%
Specialty Gel Coats	48%
Resins	
Marble Resins	10% with fillers or 32% without fillers*
Solid Surface Resins	17%
Tub/Shower Resins	24% with fillers or 35% without fillers*
Boat Manufacturing (atomized)	28%
Boat Manufacturing (non-atomized)	35%
Lamination Resins	31% with fillers or 35% without fillers*
Fire Retardant Resins	38%
Corrosion Resistant, High Strength and Tooling Resins	
Non-atomizing Mechanical Application	46%**
Filament Application	42%**
Manual Application	40%**
Other Resins	35%

Monomer percent by weight includes the addition of any VOC-containing materials.

* An owner or operator of a polyester resin operation may meet the monomer content limits by adding filler to a resin to reduce the monomer content to the applicable limit or by using resin with a monomer content that complies with the applicable limit without the addition of fillers.

**If the owner or operator manufactures a composite product by using more than one technology to apply corrosion-resistant, high strength or tooling resins, the highest permissible resin monomer content is the applicable limit.

Touch-up and repair resins and gel coats may have a monomer limit up to 10% more than the applicable limit, provided it is applied by hand-held atomized spray technologies with a container that is part of the gun with a maximum capacity of 1 quart.

Comparison of District Rule Limits					
Gel Coats and Resins	**Monomer Percentage by Weight**				
	SMAQMD	**SCAQMD**	**SJVUAPCD**	**SDAPCD**	**BAAQMD**
Gel Coats					
Clear Gel Coats					
Marble Resin Gel Coats	50%	**40%**	**40%**	**40%**	42%
All Other Clear Gel Coats	50%	**44%**	**44%**	**44%**	**44%**
Pigmented Gel Coats					
White and Off-White Gel Coats	45%	**30%**	**30%**	**30%**	**30%**
Non-White Gel Coats	45%	**37%**	**37%**	**37%**	**37%**
Primer Gel Coats	45%	**28%**	**28%**	**28%**	**28%**
Specialty Gel Coats	50%	**48%**	**48%**	**48%**	**48%**
Tooling Gel Coat	50%	**-**	**40%**	**-**	**-**
Resins					
Marble Resins	35%	**10% with fillers or 32% without fillers**			
Solid Surface Resins	35%	**17%**	**17%**	**17%**	**17%**
Tub/Shower Resins	35%	**24% with fillers or 35% without fillers**			
Lamination Resins	35%	**31% with fillers or 35% without fillers**			
Fire Retardant Resins	50%	**38%**	**38%**	**38%**	**38%**
Corrosion Resistant (not application method dependent)	50%	**48%**	**48%**	**48%**	-
High Strength (not application method dependent)	50%	**40%**	**40%**	**40%**	-
Tooling Resins					
Atomized (spray)	50%	48%	**39%**(A)	48%	-
Non-atomized	50%	48%	**30%**(A)	48%	-
Corrosion Resistant, High Strength and Tooling Resins					
Non-atomizing Mechanical Application	50%	-	-	-	46%(B)
Filament Application	50%	-	-	-	42%(B)
Manual Application	50%	-	-	-	40%
Other Resins	**35%**	**35%**	**35%**	**35%**	**35%**

(A) The SJVUAPCD determined that the tooling resin limits listed in 40 CFR 63 Subpart VVVV were technologically feasible even when not used for boat manufacturing. (Final Draft Staff Report, Proposed Rule 4654, June 16, 2011 pg. 12)

(B) The SJVUAPCD determined in their staff report for Rule 4684 that the BAAQMD limits for Corrosion Resistant were technologically infeasible. The BAAQMD limits would reduce the styrene levels below what is required to form the necessary cross-links. (Final Draft Staff Report, Proposed Rule 4654, June 16, 2011 pg. 13)

(C) **Bolded** limits were considered most stringent.

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

SUMMARY OF ACHIEVED IN PRACTICE CONTROL TECHNOLOGIES	
VOC	1. For emission units ≥1,170 lbs/month of VOC emissions: Compliance with Applicable SCAQMD Regulation XI Rules(A), **and** VOC Control System with ≥ 90% Collection Efficiency and ≥ 95% Destruction Efficiency, or - Use of Super Compliant Materials (< 5% VOC by weight): or - Use of Low-VOC Materials Resulting in an Equivalent Emission Reduction [SCAQMD] 2. 65% control from rule levels, when actual emissions are ≥ 40,000 lb/year. [SCAQMD] 3. Compliance with applicable District Rule [SCAQMD; SJVUAPCD; SDAPCD; BAAQMD] 4. Compliance with applicable District Rule [SMAQMD] 5. California content limits [EPA]
NOx	Not applicable
SOx	Not applicable
PM10	1. Spray booth with exhaust filters and HVLP or equivalent application equipment as specified in applicable District Rule [SJVUAPCD] 2. Airless spray equipment and spray booth w/ mesh type filters [SCAQMD, SDAPCD; BAAQMD] 3. Compliance with application methods required by District Rule [SCAQMD; SJVUAPCD; SDAPCD; BAAQMD]
PM2.5	Not applicable
CO	Not applicable
Styrene/ Methyl Methacrylate (T-BACT)	Same as achieved in practice BACT for VOC.

(A) In lieu of complying with the applicable monomer content limits of SCAQMD Rule 1162 and SMAQMD Rule 465, a VOC capture and control system may be used. The capture and control system must meet a 90% total control efficiency in both rules.

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

<table>
<tr><th colspan="3">BEST CONTROL TECHNOLOGIES ACHIEVED</th></tr>
<tr><th>Pollutant</th><th>Standard</th><th>Source</th></tr>
<tr><td>VOC</td><td>1. Open Molding using the resins and gel coats meeting the following monomer content limits:
<table><tr><th>Gel Coats & Resins</th><th>Monomer Content (wt %)</th></tr><tr><td>Gel Coats</td><td></td></tr><tr><td>Clear Gel Coats</td><td></td></tr><tr><td>Marble Resin Gel Coats</td><td>40%</td></tr><tr><td>All Other Clear Gel Coats</td><td>44%</td></tr><tr><td>Pigmented Gel Coats</td><td></td></tr><tr><td>White and Off-White Gel Coats</td><td>30%</td></tr><tr><td>Non-White Gel Coats</td><td>37%</td></tr><tr><td>Primer Gel Coats</td><td>28%</td></tr><tr><td>Specialty Gel Coats</td><td>48%</td></tr><tr><td>Tooling Gel Coat</td><td>40%</td></tr><tr><td>Resins</td><td></td></tr><tr><td>Marble Resins</td><td>10% with fillers or
32% without fillers</td></tr><tr><td>Solid Surface Resins</td><td>17%</td></tr><tr><td>Tub/Shower Resins</td><td>24% with fillers or
35% without fillers</td></tr><tr><td>Lamination Resins</td><td>31% with fillers or
35% without fillers</td></tr><tr><td>Fire Retardant Resins</td><td>38%</td></tr><tr><td>Corrosion Resistant</td><td>48%</td></tr><tr><td>High Strength</td><td>40%</td></tr><tr><td>Tooling Resins</td><td></td></tr><tr><td>Atomized (spray)</td><td>39%</td></tr><tr><td>Non-atomized</td><td>30%</td></tr><tr><td>Other Resins</td><td>35%</td></tr></table>2. The use of Vapor Suppressed Tub/Shower Resins that meet the above monomer content limits
or,
3. Closed molding system.
4. AND for units ≥1,170 lb/month VOC: 90% collection and 95% destruction efficiency, or equivalent.</td><td>SCAQMD, SJVUAPCD, SDAPCD, BAAQMD</td></tr>
<tr><td>NOx</td><td>No standard</td><td></td></tr>
<tr><td>SOx</td><td>No standard</td><td></td></tr>
<tr><td>PM10/PM2.5</td><td>Spray booth with exhaust filters and HVLP or equivalent application equipment as specified in applicable District Rule</td><td>SJVUAPCD</td></tr>
<tr><td>CO</td><td>No standard.</td><td></td></tr>
<tr><td>Styrene/ Methyl Methacrylate (T-BACT)</td><td>Same as achieved in practice BACT for VOC.</td><td>SCAQMD, SJVUAPCD, SDAPCD,</td></tr>
</table>

		BAAQMD

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	Technology	Source
VOC	1. VOC capture and control (thermal/catalytic incineration or carbon adsorption) 2. Vapor Suppressed Resins in addition to rule limits.	SJVUAPCD, BAAQMD, SCAQMD
NOx	Not applicable	--
SOx	Not applicable	--
PM10	No technologically feasible alternatives identified	--
PM2.5	No technologically feasible alternatives identified	--
CO	Not applicable	--
Styrene/Methyl Methacrylate (T-BACT)	Compliance with NESHAP WWWW	US EPA

Vapor Suppressed Resins (VSR)
The SCAQMD reviewed the feasibility of vapor suppressed resins (VSR) during the rulemaking process to amend Rule 1162 in November, 2001. (Final Staff Report for Proposed Amended Rule 1162 – Polyester Resin Operations, November 2001). They discussed the effects of using VSR in addition to the rule limits and decided that requiring VSR is not feasible for all applications. The vapor suppressants used in VSR are typically waxes. During the curing process of a suppressed resin, vapor suppressant forms a layer on the surface of the resin and minimizes the outward diffusion of monomers into the atmosphere. The drawback of vapor suppressants usage is the "secondary bonding", which often requires sanding or grinding the surface of parts if additional laminate layers are to be applied after curing. Such grinding is labor intensive, produces solid waste, may compromise the chemical resistance of the product, and may not be possible for parts with complex shapes (pg. 13). Additionally, industry commented that vapor suppressants may compromise the finished product and cause delamination (pg. 31). SCAQMD staff agreed and limited the requirement of using VSR to tub/shower resins.

National Emissions Standards for Hazardous Air Pollutants: Reinforced Plastic Composites Production (40 CFR 63 Subpart WWWW)
Although this NESHAP only applies to major sources of HAP or operations located at major sources of HAP, the measure is being reviewed as technologically feasible for T-BACT.

§63.5805. What standards must I meet to comply with this subpart?

Existing centrifugal casting or continuous casting/lamination operation	
HAP ≥ 100 TPY Reduce total organic HAP emissions by 95% by weight; or Meet HAP emissions limits of Table 5 (centrifugal casting); or Organic HAP emission limit of 1.47 lb/ton neat resin plus and neat gel coat plus applied (continuous lamination/casting).	HAP < 100 TPY Meet the appropriate requirements in Table 3 of the subpart.
All other existing operations	
Meet organic HAP emissions limits in Table 3 and work practice standards in Table 4.	
New operations	
HAP ≥ 100 TPY Except as provided in the subpart, reduce total organic HAP emissions by 95% by weight and meet work practice standards in Table 4.	HAP < 100 TPY Meet organic HAP emissions limits in Table 3 and work practice standards in Table 4.

Subpart WWWW allows facilities to average process streams, monomer content of resins, control equipment, and application methods to demonstrate compliance with this regulation. Facilities emitting less than 100 tons/year of HAP must meet the mass emission rates listed in Table 3. Subpart WWWW also allows a source to demonstrate compliance using Table 7, which uses the weight percent of HAP present in the resin. The following table is a comparison based on Tables 3 and 7 and the achieved in practices BACT

	Achieved in Practice BACT	**NESHAP WWWW**	
Gel Coats & Resins	**Monomer Content (wt %)**	**Maximum HAP Content**	**Source**
Gel Coats			
Clear Gel Coats			
Marble Resin Gel Coats	40%	44%	Table 3
All Other Clear Gel Coats	44%	44%	Table 3
Pigmented Gel Coats			
White and Off-White Gel Coats	30%	30%	Table 3
Non-White Gel Coats	37%	37%	Table 3
Primer Gel Coats	28%	37%	Table 3
Specialty Gel Coats	48%	48%	Table 3
Tooling Gel Coat	40%	40%	Table 3
Resins			
Marble Resins	10% with fillers or 32% without fillers	38.5%	Table 7
Solid Surface Resins	17%	38.5%	Table 7
Tub/Shower Resins	24% with fillers or 35% without fillers	38.5%	Table 7
Lamination Resins	31% with fillers or 35% without fillers	38.5%	Table 7

	Achieved in Practice BACT	NESHAP WWWW	
Fire Retardant Resins	38%	60%	Table 3
Corrosion Resistant	48%	46.4%	Table 7
High Strength	40%	46.4%	Table 7
Tooling Resins			
Atomized (spray)	39%	43.0%	Table 7
Non-atomized	30%	45.9%	Table 7
Other Resins	35%	38.5%	Table 7

Except for corrosion resistant resins, the monomer contents of the Achieved in Practice BACT standard are more stringent. As noted earlier, the SJVUAPCD determined that the corrosion resistant resin limit approved by the BAAQMD was technologically infeasible. This limit appears to be based on the NESHAP limits. Additionally, because facilities have the option to average their resins to meet the NESHAP standards, facilities may actually use resins that exceed the content limits listed above, as long as they average them out using some other allowable method. Thus, in general, the Achieved in Practice BACT standards are more stringent than NESHAP WWWW for T-BACT.

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 (except coating operations):

Pollutant	Maximum Cost ($/ton)
ROG	17,500
NOx	24,500
PM10	11,400
SOx	18,300
CO	TBD if BACT is triggered

Cost Effectiveness Analysis Summary

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 8.5% as approved on 10/17/16. The electricity (11.24 cents/kWh) and natural gas (6.41 dollars/1,000 cubic feet) rates were based on an industrial application as approved by the District on 10/17/16. 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 the next higher integer rate. The labor (Occupation Code 51-9191: Adhesive bonding machine operators and tenders) and maintenance (Occupation Code 49-9099: Installation, maintenance, and repair workers, all others) rates were based on data from the Bureau of Labor Statistics.

Carbon Adsorption System

Equipment Life	=	10 years
Total Capital Investment	=	$10,210.98
Annualized total Capital Investment	=	$1,481.46 per year
Direct Annual Cost	=	$5,771.49 per year
Indirect Annual Cost	=	$2,824.88 per year
Cost of Carbon per year	=	$21,983.40
Total Annual Cost	=	$32.061.23 per year
VOC Removed	=	1.83 tons per year
Cost of VOC Removal	=	$17,501.15 per ton reduced

A detailed calculation of the cost effectiveness for VOC removal with a carbon adsorption unit is shown in Appendix B. Uncontrolled VOC emissions of 4,071 lb/year or greater is the cost effective threshold for control equipment using carbon adsorption control technology.

Thermal Oxidizer:

Equipment Life	=	10 years
Total Capital Investment	=	$217,390
Annualized total Capital Investment	=	$41,858 per year
Direct Annual Cost	=	$144,643.40 per year
Indirect Annual Cost	=	$42,657.73 per year
Total Annual Cost	=	$187,301.14 per year
VOC Removed	=	10.7 tons per year
Cost of VOC Removal	=	$17,500.20 per ton reduced

A detailed calculation of the cost effectiveness for VOC removal with a thermal oxidizer is shown in Appendix B. Uncontrolled VOC emissions of 23,784 lb/year or greater is the cost-effective threshold for control equipment using thermal oxidation control technology.

Conclusion: In this analysis, different emission operating levels are presented with the corresponding total cost per ton of VOC controlled using either a carbon adsorption control or a thermal oxidizer. Uncontrolled VOC emission level of 4,071 lb per year or greater must be

reached in order for the carbon absorption control option to be cost effective. Uncontrolled VOC emission level of 17,388 lb per year or greater must be reached in order for a thermal oxidizer to be cost effective. The emissions levels for the cost effectiveness of controls are based on the District cost effective limit for ROC of $17,500 per ton controlled.

C. SELECTION OF BACT:
Based on the above analysis, BACT for VOC, NOx, SOx, PM10, PM2.5, and CO is as follows:

<table>
<tr><th colspan="3">BACT FOR POLYESTER RESIN OPERATION
<1,170 lbs VOC/month and ≤ 4,071 lbs VOC/year, Minor Source (BACT #161)</th></tr>
<tr><th>Pollutant</th><th>Standard</th><th>Source</th></tr>
<tr><td>VOC</td><td>1. Open Molding using the resins and gel coats meeting the following monomer content limits:
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or,
3. Closed molding system.</td><td>SCAQMD, SJVUAPCD, SDAPCD, BAAQMD</td></tr>
<tr><td>NOx</td><td>No standard</td><td></td></tr>
<tr><td>SOx</td><td>No standard</td><td></td></tr>
<tr><td>PM10</td><td>Spray booth with exhaust filters and HVLP or equivalent application equipment as specified in applicable District Rule</td><td>SJVUAPCD</td></tr>
</table>

BACT FOR POLYESTER RESIN OPERATION <1,170 lbs VOC/month and ≤ 4,071 lbs VOC/year, Minor Source (BACT #161)		
PM2.5	Spray booth with exhaust filters and HVLP or equivalent application equipment as specified in applicable District Rule	SJVUAPCD
CO	No standard	
T-BACT	Same as achieved in practice BACT for VOC	SCAQMD, SJVUAPCD

BACT FOR POLYESTER RESIN OPERATION ≥1,170 lbs VOC/month or >4,071 lbs VOC/year, Minor Source (BACT #162)		
Pollutant	**Standard**	**Source**
VOC	1. Compliance with Rule 465, **and** VOC Control System with ≥ 90% Collection Efficiency and ≥ 95% Destruction Efficiency, or - Use of Super Compliant Materials (< 5% VOC by weight): or - Use of Low-VOC Materials Resulting in an Equivalent Emission Reduction	SCAQMD
NOx	No standard	
SOx	No standard	
PM10	Spray booth with exhaust filters and HVLP or equivalent application equipment as specified in applicable District Rule	SJVUAPCD
PM2.5	Spray booth with exhaust filters and HVLP or equivalent application equipment as specified in applicable District Rule	SJVUAPCD
CO	No standard	
T-BACT`	Same as achieved in practice BACT for VOC	SCAQMD, SJVUAPCD

REVIEWED BY: _____ **DATE:** _____

APPROVED BY: _____ **DATE:** _____

Attachment A

Review of BACT Determinations published by EPA

List of BACT determinations published in EPA's RACT/BACT/LAER Clearinghouse (RBLC) for Fiberglass Manufacturing (except boats):

RBLC#	Permit Date	Process Code [B], [C]	Equipment	Pollutant	Standard	Case-By-Case Basis
IN-0162	08/19/2010	49.005	FIBERGLASS PRODUCTION LINE ONE	VOC	COMPLIANCE WITH 40 CFR 63 WWWW AND COMPLIANCE WITH OPERATOR TRAINING REQUIREMENTS IN 326 IAC 20-56-2	BACT-PSD
IN-0162	08/19/2010	49.005	FIBERGLASS PRODUCTION LINE TWO	VOC		BACT-PSD
WA-0338	07/11/2007	49.005	WOOL FIBERGLASS INSULATION – FORMING AND COLLECTION	CO	24.95 LB/HR	BACT-PSD
				NOx	1.07 LB/HR	
				PM	14.90 LB/HR	
				VOC	11.34 LB/HR	
OR-0045	08/04/2005	49.005	FIBERGLASS LAMINATION	VOC	NO EMISSION LIMITS, BACT IS VOC CONTENT LIMITS AND TRANSFER EFFICIENCY REQUIREMENTS. ALL ADD-ON CONTROL TECHNOLOGIES WERE FOUND TO BE COST-PROHIBITIVE. CALIFORNIA CONTENT LIMITS WERE USED AS BACT. THE PERMIT INCLUDES LIMITS ON VOC CONTENT IN RESINS, GEL COATS AND TRANSFER EFFICIENCIES TO REDUCE VOC EMISSIONS	BACT-PSD;

= Not applicable to this determination. Equipment is for production of fiberglass wool insulation.

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

COMPREHENSIVE REPORT
Report Date:07/25/2017

Facility Information

RBLC ID:	IN-0162 (final)	**Date Determination Last Updated:**	05/04/2016
Corporate/Company Name:	FRONTLINE MANUFACTURING, INC.	**Permit Number:**	085-28953-00077
Facility Name:	FRONTLINE MANUFACTURING, INC.	**Permit Date:**	08/19/2010 (actual)
Facility Contact:	KARL SCHMUCKER 5744532902	**FRS Number:**	110000863003
Facility Description:	STATIONARY FIBERGLASS PRODUCTS (SHOWER TUBS) MANUFACTURING OPERATION	**SIC Code:**	3088
Permit Type:	A: New/Greenfield Facility	**NAICS Code:**	326191
Permit URL:	HTTP://PERMITS.AIR.IDEM.IN.GOV/28953F.PDF		
EPA Region:	5	**COUNTRY:**	USA
Facility County:	KOSCIUSKO		
Facility State:	IN		
Facility ZIP Code:	46580		
Permit Issued By:	INDIANA DEPT OF ENV MGMT, OFC OF AIR (Agency Name) MR. MATT STUCKEY(Agency Contact) (317) 233-0203 mstuckey@idem.in.gov		
Other Agency Contact Info:	PERMIT WRITER: LAURA SPRIGGS 317-233-5693 LSPRIGGS@IDEM.IN.GOV SECTION CHIEF: MATT STUCKEY 317-233-0203 MSTUCKEY@IDEM.IN.GOV		
Permit Notes:			

Process/Pollutant Information

PROCESS NAME:	FIBERGLASS PRODUCTION LINE ONE
Process Type:	49.005 (Fiberglass/Reinforced Polymer Products Manufacturing (except 49.004))
Primary Fuel:	

Throughput: 15.00 FIBERGLASS UNITS/H

Process Notes: FIBERGLASS PRODUCTION LINE, IDENTIFIED AS LINE 1, CONSISTS OF ONE (1) CHOP RESIN APPLICATION BOOTH, CONSISTING OF ONE (1) NON-ATOMIZED FLUID IMINGEMENT CHOP GUN, IDENTIFIED AS SG1, EXHAUSTING TO STACK SG1X THAT CONTAINS DRY FILTERS FOR PARTICULATE CONTROL, AND ONE (1) GET COATING APPLICATION BOOTH, IDENTIFIED AS SG3, CONSISTING OF TWO (2) STATIONARY NON-ATOMIZED FLUID IMPINGEMENT APPLICATORS AND TWO (2) PORTABLE NON-ATOMIZED FLUID IMPINGEMENT APLLICATORS, USING A MAXIMUM OF TWO APPLICATORS AT A TIME, EXHAUSTING TO STACK SG3X USING DRY FILTERS FOR PARTICULATE CONTROL.

POLLUTANT NAME: Volatile Organic Compounds (VOC)

CAS Number: VOC

Test Method: Unspecified

Pollutant Group(s): (Volatile Organic Compounds (VOC))

Emission Limit 1:

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown

Case-by-Case Basis: OTHER CASE-BY-CASE

Other Applicable Requirements:

Control Method: (P) COMPLIANCE WITH 40 CFR 63, SUBPART WWWW AND COMPLIANCE WITH OPERATOR TRAINING REQUIREMENTS IN 326 IAC 20-56-2

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: COMPLIANCE WITH THE FOLLOWING REQUIREMENTS OF 326 IAC 20-56-2, OPERATOR TRAINING: (1) EACH OWNER OR OPERATOR SHALL TRAIN ALL NEW AND EXISTING PERSONNEL, INCLUDING CONTRACT PERSONNEL, WHO ARE INVOLVED IN RESIN AND GEL COAT SPRAYING AND APPLICATIONS THAT COULD RESULT IN EXCESS EMISSIONS IF PERFORMED IMPROPERLY ACCORDING TO THE FOLLOWING SCHEDULE: (A) ALL PERSONNEL HIRED SHALL BE TRAINED WITHIN THIRTY (30) DAYS OF HIRING. (B) TO ENSURE TRAINING GOALS LISTED IN SUBPARAGRAPH (B)(2) ARE MAINTAINED, ALL PERSONNEL SHALL BE GIVEN REFRESHER TRAINING ANNUALLY. (C) PERSONNEL WHO HAVE BEEN TRAINED BY ANOTHER OWNER OR OPERATOR SUBJECT TO THIS RULE ARE EXEMPT FROM SUBPARAGRAPH (B)(1)(A) IF WRITTEN DOCUMENTATION THAT THE EMPLOYEE'S TRAINING IS CURRENT IS PROVIDED TO THE NEW EMPLOYER. (2) THE LESSON PLANS SHALL COVER, FOR THE INITIAL AND REFRESHER TRAINING, AT A MINIMUM, ALL OF THE FOLLOWING TOPICS: (A) APPROPRIATE APPLICATION TECHNIQUES. (B) APPROPRIATE EQUIPMENT CLEANING PROCEDURES. (C) APPROPRIATE EQUIPMENT SETUP AND ADJUSTMENT TO MINIMIZE MATERIAL USAGE AND OVERSPRAY. (3) THE OWNER OR OPERATOR SHALL MAINTAIN THE FOLLOWING TRAINING RECORDS ON SITE AND MAKE THEM AVAILABLE FOR INSPECTION AND REVIEW: (A) A COPY OF THE CURRENT

TRAINING PROGRAM. (B) A LIST OF THE FOLLOWING: (I) ALL CURRENT PERSONNEL, BY NAME, THAT ARE REQUIRED TO BE TRAINED. (II) THE DATE THE PERSON WAS TRAINED OR THE DATE OF THE MOST RECENT REFRESHER TRAINING, WHICHEVER IS LATER. (4) RECORDS OF PRIOR TRAINING PROGRAMS AND FORMER PERSONNEL ARE NOT REQUIRED TO BE MAINTAINED. ADD ON CONTROLS NOT ECONOMICALLY FEASIBLE. STATE BACT.

Process/Pollutant Information

PROCESS NAME: FIBERGLASS PRODUCTION LINE TWO

Process Type: 49.005 (Fiberglass/Reinforced Polymer Products Manufacturing (except 49.004))

Primary Fuel:

Throughput: 30.00 FIBERGLASS UNITS/H

Process Notes: FIBERGLASS PRODUCTION LINE, IDENTIFIED AS LINE 2, CONSISTS OF ONE (1) CHOP RESIN APPLICATION BOOTH, CONSISTING OF TWO (2) NON-ATOMIZED FLUID IMPINGEMENT CHOP GUNS, IDENTIFIED AS SG7 AND SG8, EXHAUSTING TO STACKS SG7X, SG8X, AND SG9X, WITH DRY FILTERS FOR PARTICULATE CONTROL, AND ONE (1) GEL APPLICAITON BOOTH, IDENTIFIED AS SG5, CONSISTING OF TWO (2) STATIONARY NON-ATOMIZED FLUID IMPINGEMENT APPLICATORS AND TWO (2) PORTABLE NON-ATOMIZED FLUID IMPINGEMENT APPLICATORS, USING TWO APPLICATORS AT A TIME, EXHAUSTING TO STACK SG5X USING DRY FILTERS FOR PARTICULATE CONTROL.

POLLUTANT NAME: Volatile Organic Compounds (VOC)

CAS Number: VOC

Test Method: Unspecified

Pollutant Group(s): (Volatile Organic Compounds (VOC))

Emission Limit 1:

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown

Case-by-Case Basis: OTHER CASE-BY-CASE

Other Applicable Requirements:

Control Method: (P) COMPLIANCE WITH 40 CFR 63 WWWW AND COMPLIANCE WITH THE OPERATOR TRAINING REQUIREMENTS IN 326 IAC 20-56-2

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified:	Unknown
Pollutant/Compliance Notes:	COMPLIANCE WITH THE FOLLOWING REQUIREMENTS OF 326 IAC 20-56-2, OPERATOR TRAINING: (1) EACH OWNER OR OPERATOR SHALL TRAIN ALL NEW AND EXISTING PERSONNEL, INCLUDING CONTRACT PERSONNEL, WHO ARE INVOLVED IN RESIN AND GEL COAT SPRAYING AND APPLICATIONS THAT COULD RESULT IN EXCESS EMISSIONS IF PERFORMED IMPROPERLY ACCORDING TO THE FOLLOWING SCHEDULE: (A) ALL PERSONNEL HIRED SHALL BE TRAINED WITHIN THIRTY (30) DAYS OF HIRING. (B) TO ENSURE TRAINING GOALS LISTED IN SUBPARAGRAPH (B)(2) ARE MAINTAINED, ALL PERSONNEL SHALL BE GIVEN REFRESHER TRAINING ANNUALLY. (C) PERSONNEL WHO HAVE BEEN TRAINED BY ANOTHER OWNER OR OPERATOR SUBJECT TO THIS RULE ARE EXEMPT FROM SUBPARAGRAPH (B)(1)(A) IF WRITTEN DOCUMENTATION THAT THE EMPLOYEE'S TRAINING IS CURRENT IS PROVIDED TO THE NEW EMPLOYER. (2) THE LESSON PLANS SHALL COVER, FOR THE INITIAL AND REFRESHER TRAINING, AT A MINIMUM, ALL OF THE FOLLOWING TOPICS: (A) APPROPRIATE APPLICATION TECHNIQUES. (B) APPROPRIATE EQUIPMENT CLEANING PROCEDURES. (C) APPROPRIATE EQUIPMENT SETUP AND ADJUSTMENT TO MINIMIZE MATERIAL USAGE AND OVERSPRAY. (3) THE OWNER OR OPERATOR SHALL MAINTAIN THE FOLLOWING TRAINING RECORDS ON SITE AND MAKE THEM AVAILABLE FOR INSPECTION AND REVIEW: (A) A COPY OF THE CURRENT TRAINING PROGRAM. (B) A LIST OF THE FOLLOWING: (I) ALL CURRENT PERSONNEL, BY NAME, THAT ARE REQUIRED TO BE TRAINED. (II) THE DATE THE PERSON WAS TRAINED OR THE DATE OF THE MOST RECENT REFRESHER TRAINING, WHICHEVER IS LATER. (4) RECORDS OF PRIOR TRAINING PROGRAMS AND FORMER PERSONNEL ARE NOT REQUIRED TO BE MAINTAINED. ADD ON CONTROLS NOT ECONOMICALLY FEASIBLE. STATE BACT.

Facility Information

RBLC ID:	WA-0338 (final)	**Date Determination Last Updated:**	11/30/2010
Corporate/Company Name:	GUARDIAN FIBERGLASS, INC.	**Permit Number:**	PSD-06-03
Facility Name:	GUARDIAN FIBERGLASS, MOSES LAKE	**Permit Date:**	07/11/2007 (actual)
Facility Contact:	GROVER THOMAS 5176299464 GROVERTHOMAS@BP.GUARDIAN.COM	**FRS Number:**	UNKNOWN
Facility Description:	THE PROPOSED PROJECT, REFERRED TO AS THE WOOL FIBERGLASS INSULATION PROJECT, IS A NEW FACILITY (GREENFIELD) AND WILL HAVE THE CAPABILITY OF PRODUCING RESINATED AND NON-RESINATED WOOL FIBERGLASS PRODUCTS. THE PROPOSED FACILITY WILL CONSIST OF TWO MANUFACTURING LINES. LINE 1 WILL PRODUCE EITHER RESINATED OR NON-RESINATED PRODUCT DEPENDING ON MARKET CONDITIONS. LINE 2 WILL PRODUCE ONLY NON-RESINATED PRODUCT.	**SIC Code:**	3296
Permit Type:	A: New/Greenfield Facility	**NAICS Code:**	327993

Permit URL:

EPA Region: 10 **COUNTRY:** USA

Facility County: GRANT

Facility State: WA

Facility ZIP Code:

Permit Issued By: WASHINGTON STATE DEPARTMENT OF ECOLOGY (ECY); AIR QUALITY PROGRAM (Agency Name)
MR. MARC CROOKS(Agency Contact) (360)407-6803 marc.crooks@ecy.wa.gov

Other Agency Contact Info: THIS PERMIT WAS ACTUALLY PREPAIRED BY RICHARD B HIBBARD
EMAIL RHIB461@ECY.WA.GOV
PHONE: (360) 407-6896

Permit Notes:

Affected Boundaries:

Boundary Type:	Class 1 Area State:	Boundary:	Distance:
CLASS1	WA	Alpine Lakes	100km - 50km
CLASS1	WA	Glacier Peak	100km - 50km
CLASS1	WA	Goat Rocks	100km - 50km
CLASS1	WA	Mount Adams	100km - 50km
CLASS1	WA	Mount Rainier NP	100km - 50km
CLASS1	WA	North Cascades NP	100km - 50km

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Carbon Monoxide	273.0000 (Tons/Year)
Nitrogen Oxides (NOx)	92.0000 (Tons/Year)
Particulate Matter (PM)	160.0000 (Tons/Year)
Sulfur Oxides (SOx)	0.2200 (Tons/Year)
Volatile Organic Compounds (VOC)	198.0000 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: Melting and Refining

Process Type: 11.310 (Natural Gas (includes propane and liquefied petroleum gas))

Primary Fuel: electric and natural gas

Throughput: 0

Process Notes: 2.2.2.2 Melting and Refining Aggregate raw materials are mechanically transferred to continuous cold-top melting furnaces from the mixed batch storage silo or day bins. The raw materials are electrically melted into molten glass. Molten glass leaves the furnaces and travels through conditioning channels to the forehearth. The forehearth will be a natural gas fired “muffled” forehearth or an electric forehearth with natural gas backup, but it is assumed to be natural gas fired for this analysis. The forehearth divides the molten glass into glass streams, which feed each of the fiberazation units.

POLLUTANT NAME: Particulate matter, filterable (FPM)

CAS Number: PM
Test Method: EPA/OAR Mthd 5
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.9200 LB/H 1-HR
Emission Limit 2: 4.0200 T/YR 12 MONTH ROLLING
Standard Emission: 0.2040 LB/T GLASS PULLED 12 MONTH ROLLING
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (A) fabric filter
Est. % Efficiency: 99.000
Cost Effectiveness: 295 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: Guardian has proposed the use of cartridge fabric filters for the control of particulate from melting and refining operations. Ecology agrees with Guardian's proposal.

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102
Test Method: EPA/OAR Mthd 7E
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 0.0910 LB/H 1-HR AVE
Emission Limit 2: 0.4000 T/YR 12-MONTH ROLLING
Standard Emission: 0.2100 LB/T OF GLASS 12-MONTH ROLLING
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (N) Good Combustion Practices
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: For this project good combustion practices consists of using an electric melter. Guardian has proposed good combustion practices as BACT for treating NOX emissions from the melter.

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0

Test Method: EPA/OAR Mthd 10

Pollutant Group(s): (InOrganic Compounds)

Emission Limit 1: 2.5700 LB/H 1-HR AVE

Emission Limit 2: 11.2600 T/YR 12-MONTH ROLLING

Standard Emission: 0.5700 LB/T GLASS 12-MONTH ROLLING

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (N)

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: Guardian has proposed to use good combustion practices to control CO emissions from the melting and refining operations.

POLLUTANT NAME: Volatile Organic Compounds (VOC)

CAS Number: VOC

Test Method: EPA/OAR Mthd 18

Pollutant Group(s): (Volatile Organic Compounds (VOC))

Emission Limit 1: 2.0700 LB/H 1-HR AVE

Emission Limit 2: 9.0700 T/YR 12-MONTH ROLLING

Standard Emission: 0.4600 LB/T GLASS 12-MINTH ROLLING

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (N)

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: Guardian has proposed to use proper operation as BACT for controlling VOC emissions from the melting and refining operations.

Process/Pollutant Information

PROCESS NAME: forming and collection

Process Type: 49.005 (Fiberglass/Reinforced Polymer Products Manufacturing (except 49.004))

Primary Fuel:

Throughput: 0

Process Notes: The fibers are spinning discs that rotate at high speeds (rotary spin). The molten glass flows through small holes in the spinning discs, thus creating glass fibers. A stream of compressed air around each rotary spinner conditions and cools the fibers as they are formed. Line 1 will have eleven spinners, nine associated with the resinated process and two with the non-resinated process. Line 2 will have nine spinners, all for the non-resinated process. For resinated product production, water, de-dusting oil, and binder are sprayed onto the glass fibers. The dedusting oil may be replaced with a water-soluble, petroleum-based wax emulsion. For non-resinated product production, a silicone copolymer is sprayed onto the glass fibers.

POLLUTANT NAME: Particulate matter, total (TPM)

CAS Number: PM

Test Method: EPA/OAR Mthd 5D and 202

Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1: 14.9000 LB/H 1-HR AVE

Emission Limit 2: 64.7000 TO/YR 12-MONTH ROLLING

Standard Emission: 3.2800 LB/T GLASS 12-MONTH ROLLING

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (A) A wet scrubber has been selected as BACT for controlling particulate emissions from forming and collection operations

Est. % Efficiency: 76.500

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: The proposed scrubber for the forming and collection operation is a Venturi scrubber. A Venturi scrubber works by forcing the gas through a narrow throat at high pressure. A Venturi scrubber will remove approximately 420 tons per year of particulate. Guardian did not present the cost per ton of pollutant removed. A wet scrubber has been selected as BACT for controlling particulate emissions from forming and collection operations.

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102

Test Method: EPA/OAR Mthd 7E

Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))

Emission Limit 1: 1.0700 LB/H 1-HR AVE

Emission Limit 2: 4.1700 T/YR 12-MONTH ROLLING

Standard Emission: 0.2400 LB/T GLASS 12-MONTH ROLLING

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (N) Good combustion practices has been selected as BACT for controlling NOX emissions from forming and collection operations.

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0

Test Method: EPA/OAR Mthd 10

Pollutant Group(s): (InOrganic Compounds)

Emission Limit 1: 24.9500 LB/H 1-HR

Emission Limit 2: 109.2700 T/YR 12-MONTH ROLLING

Standard Emission: 5.5400 LB/T GLASS 12-MONTH ROLLING

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (N) Good combustion practices has been selected to control CO emissions from the melting and refining operations.

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Volatile Organic Compounds (VOC)

CAS Number: VOC

Test Method: EPA/OAR Mthd 25A

Pollutant Group(s): (Volatile Organic Compounds (VOC))

Emission Limit 1: 11.3400 LB/H 1-HR AVE

Emission Limit 2: 49.6600 T/YR 12-MONTH ROLLING

Standard Emission: 2.5200 LB/T GLASS 12-MONTH ROLLING

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (N) Good combustion practices has been selected as BACT for controlling VOC emissions from forming and collection operations.

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes:

Process/Pollutant Information

PROCESS NAME: curing and cooling

Process Type: 11.310 (Natural Gas (includes propane and liquefied petroleum gas))

Primary Fuel: natural gas

Throughput: 0

Process Notes: Once the fiber is cooled, they are collected and distributed on a moving conveyor using exhaust air from the forming chamber. The fiber mat is conveyed to a natural gas-fired curing oven. The fiberglass mat is sized to the proper thickness and the binder is cured resulting in a color change from white to yellow. The mat is cooled by drawing ambient air through it while it is on the cooling table.

POLLUTANT NAME: Particulate matter, total (TPM)

CAS Number: PM

Test Method: EPA/OAR Mthd 5 and 202

Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1: 3.6700 LB/H 1-HR AVE

Emission Limit 2: 16.0700 T/YR 12-MONTH ROLLING

Standard Emission: 0.8200 LB/T GLASS 12-MONTH ROLLING

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: OTHER CASE-BY-CASE

Other Applicable Requirements:

Control Method: (A) wet gass scrubber

Est. % Efficiency: 76.500

Cost Effectiveness: 10498 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: For a description of a wet gas scrubber, see Section 3.5.1.3.4. While Guardian has selected a wet gas scrubber to control particulate emissions from the curing and cooling operations the cost of removing one ton of particulate is $10,489. This number places this technology as cost prohibitive. Therefore, this is not considered BACT. Instead, it is classified as "other" but will still be installed to control particulate emissions from curing and cooling operations.

POLLUTANT NAME: Acetaldehyde

CAS Number: 75-07-0

Test Method: Unspecified

Pollutant Group(s): (Hazardous Air Pollutants (HAP) , Organic Compounds (all) , Volatile Organic Compounds (VOC))

Emission Limit 1: 17.3400 LB/H 1-HR AVE

Emission Limit 2: 3.8500 LB/T GLASS PULLED 12-MONTH ROLLING

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (A) Low Nox burners

Est. % Efficiency: 15.000

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: . Low-NOX burners will remove approximately 11 tons per year of NOX. Guardian did not estimate the cost of this technology. Low-NOX burners have been selected as BACT for controlling NOX emissions from curing and cooling operations.

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0
Test Method: EPA/OAR Mthd 10
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 5.6600 LB/H 1-HR AVE
Emission Limit 2: 1.5800 LB/T GLAS PULLED 12-MONTH ROLLING
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (A) Thermal oxidizer
Est. % Efficiency: 90.000
Cost Effectiveness: 4156 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: A RTO has been selected as BACT for controlling CO emissions from curing and cooling operations.

POLLUTANT NAME: Volatile Organic Compounds (VOC)

CAS Number: VOC
Test Method: EPA/OAR Mthd 25A
Pollutant Group(s): (Volatile Organic Compounds (VOC))
Emission Limit 1: 0.6900 LB/H 1-HR AVE
Emission Limit 2: 1.5800 LB/T GLASS 12-MONTH ROLLING
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (A) Thermal oxidizer
Est. % Efficiency: 96.000
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: Guardian did not estimate the cost of installing and operating a thermal oxidizer but has proposed to use a RTO to control the VOC emissions from curing part of the operation.

Process/Pollutant Information

PROCESS NAME: Facing Sizing and Packaging Operations

Process Type: 99.999 (Other Miscellaneous Sources)

Primary Fuel: none

Throughput: 0

Process Notes: From the cooling table the resinated fiberglass mat is conveyed to a slitting area where the batts are sized for length and width. In some cases, a vapor barrier is applied to the product by heat. The finished product is packaged, stored and shipped. From the forming chamber, non-resinated fiberglass is conveyed to dicers where de-dusting oil is applied to the fibers. The diced fiberglass is then placed into bags, stored in the warehouse, and shipped.

POLLUTANT NAME: Acetaldehyde

CAS Number: 75-07-0

Test Method: Unspecified

Pollutant Group(s): (Hazardous Air Pollutants (HAP) , Organic Compounds (all) , Volatile Organic Compounds (VOC))

Emission Limit 1: 19.0200 T/LINE 12-MONTH ROLLING

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: OTHER CASE-BY-CASE

Other Applicable Requirements:

Control Method: (N)

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes:

Facility Information

RBLC ID: OR-0045 (final)

Date Determination Last Updated: 09/30/2005

Corporate/Company Name: COUNTRY COACH, INC.

Permit Number: 201279

Facility Name:	COUNTRY COACH, INC.	**Permit Date:**	08/04/2005 (actual)
Facility Contact:	JIM LEARY 5419986291 JLEARY@COUNTRYCOACH.COM	**FRS Number:**	110000488446
Facility Description:	ACTIVITES AT THE FACILITY INCLUDE FIBERGLASS LAMINATION AND FINISHING, COACH, CHASSIS, AND COACH PARTS SURFACE COATING, AND CABINET MANUFACTURING AND FINISHING. THE FACILITY HAS THE ABILITY TO MANUFACTURE APPROXIMATELY 1,200 COACHES PER YEAR.	**SIC Code:**	3716
Permit Type:	C: Modify process at existing facility	**NAICS Code:**	336213
Permit URL:			
EPA Region:	10	**COUNTRY:**	USA
Facility County:	LANE		
Facility State:	OR		
Facility ZIP Code:	97448		
Permit Issued By:	LANE REGIONAL AIR PROTECTION AGENCY (Agency Name) MR. MAX HUEFTLE(Agency Contact) (541)736-1056 max@lrapa.org		
Permit Notes:	COUNTRY COACH HAS OPERATED A MOTOR HOME MANUFACTURING FACILITY IN JUNCTION CITY, OR SINCE THE EARLY 70'S. THE OPERATION STARTED AS A SMALL CAMPER SHELL MANUFACTURING CONCERN AND GREW UNTIL, AT PRESENT, IT IS MANUFACTURING MOTOR COACHES AND CHASSIS. THE FACILITY IS LOCATED IN AN AREA CONSIDERED TO ATTAIN ALL NATIONAL AMBIENT AIR QUALITY STANDARDS. PERMIT AUTHORIZES CONSTRUCTION OF 3 NEW COACH COATING BOOTHS, 1 RELOCATED CABINET COATING BOOTH, AND MISC. VOC USAGE.		

Affected Boundaries:

Boundary Type:	Class 1 Area State:	Boundary:	Distance:
CLASS1	OR	Diamond Peak	100km - 50km
CLASS1	OR	Three Sisters	100km - 50km

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Particulate Matter (PM)	11.9000 (Tons/Year)
Volatile Organic Compounds (VOC)	98.8000 (Tons/Year)

Process/Pollutant Information

PROCESS NAME:	COACH PAINTING AND FINISHING, PRETREATMENT
Process Type:	41.002 (Automobiles and Trucks Surface Coating (OEM))
Primary Fuel:	
Throughput:	1246.00 units/yr
Process Notes:	THROUGHPUT IS COACHES/YEAR

POLLUTANT NAME:	Volatile Organic Compounds (VOC)
CAS Number:	VOC

Test Method: Unspecified
Pollutant Group(s): (Volatile Organic Compounds (VOC))
Emission Limit 1: 6.5000 LB/GAL AS APPLIED FOR PRETREATMENT
Emission Limit 2:
Standard Emission: 6.5000 LB/GAL CALCULATED
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NESHAP , MACT , OPERATING PERMIT
Control Method: (P) BACT WAS DETERMINED TO CONSIST OF LOW-VOC COATINGS, TRANSFER EFFICIENCY, OPERATOR TRAINING AND CLOSED CONTAINER REQUIREMENTS.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Yes
Pollutant/Compliance Notes: VOC CONTENT LIMITS FROM CALIFORNIA WERE USED AS BACT FOR THE COATING EMISSION UNIT

Process/Pollutant Information

PROCESS NAME: FIBERGLASS LAMINATION
Process Type: 49.005 (Fiberglass/Reinforced Polymer Products Manufacturing (except 49.004))
Primary Fuel:
Throughput: 1246.00 units/yr
Process Notes: THROUGHPUT IS COACHES/YEAR

POLLUTANT NAME: Volatile Organic Compounds (VOC)
CAS Number: VOC
Test Method: Unspecified
Pollutant Group(s): (Volatile Organic Compounds (VOC))
Emission Limit 1: SEE NOTE
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: OPERATING PERMIT , NESHAP , MACT

Control Method: (P) FIBERGLASS VOC CONTENT LIMITS AND TRANSFER EFFICIENCY REQUIREMENTS WERE DETERMINED TO BE BACT FOR THIS FACILITY.

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: NO EMISSION LIMITS, BACT IS VOC CONTENT LIMITS AND TRANSFER EFFICIENCY REQUIREMENTS. ALL ADD-ON CONTROL TECHNOLOGIES WERE FOUND TO BE COST-PROHIBITIVE. CALIFORNIA CONTENT LIMITS WERE USED AS BACT. THE PERMIT INCLUDES LIMITS ON VOC CONTENT IN RESINS, GEL COATS AND TRANSFER EFFICIENCIES TO REDUCE VOC EMISSIONS.

Process/Pollutant Information

PROCESS NAME: CABINET FINISHING

Process Type: 41.025 (Wood Products/Furniture Surface Coating (except 41.006))

Primary Fuel:

Throughput: 1246.00 units/yr

Process Notes: THROUGHPUT IS COACHES/YEAR. FACILITY MANUFACTURES AND FINISHES CABINETS FOR LUXURY COACHES.

POLLUTANT NAME: Volatile Organic Compounds (VOC)

CAS Number: VOC

Test Method: Unspecified

Pollutant Group(s): (Volatile Organic Compounds (VOC))

Emission Limit 1: SEE NOTES

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NESHAP , MACT , OPERATING PERMIT

Control Method: (P) CALIFORNIA VOC CONTENT LIMITS WERE USED AS THE BASIS FOR THIS BACT-PSD DETERMINATION.

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: NO EMISSION RATE LIMITS. VOC CONTENT FOR SEALERS, TOPCOATS, PRIMERS, ETC WERE USED AS BACT FOR THIS FACILITY AND THIS EMISSION UNIT.

Process/Pollutant Information

PROCESS NAME: COACH PAINTING AND FINISHING, PRIMER/ SURFACE SEALER

Process Type: 41.013 (Miscellaneous Metal Parts and Products Surface Coating)

Primary Fuel:

Throughput: 1246.00 units/yr

Process Notes: THROUGHPUT IS COACHES PER YEAR

POLLUTANT NAME: Volatile Organic Compounds (VOC)

CAS Number: VOC

Test Method: Unspecified

Pollutant Group(s): (Volatile Organic Compounds (VOC))

Emission Limit 1: 2.1000 LB/GAL LB VOC/GAL AS APPLIED

Emission Limit 2:

Standard Emission: 2.1000 LB/GAL CALCULATED

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NESHAP , MACT , OPERATING PERMIT

Control Method: (P) BACT WAS DETERMINED TO BE LOW-VOC COATINGS, TRANSFER, EFFICIENCY, OPERATOR TRAINING, AND CLOSED CONTAINER REQUIREMENTS.

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Yes

Pollutant/Compliance Notes: VOC CONTENT LIMITS FROM CALIFORNIA WERE USED AS BACT FOR THE COATING EMISSION UNIT

Attachment B
Cost Effectiveness Analysis

COST EFFECTIVENESS ANALYSIS FOR CARBON ADSORPTION

This cost effectiveness analysis was performed using EPA's OAQPS Control Cost Manual
EPA publication no. 450/3-90-006

FACILITY NAME: AA Product Assembly
LOCATION: 9266 Beatty Dr. STE B
PERMIT NO.: 24673
EQUIPMENT DESCRIPTION: Polyester Resin Operation

VOC Parameters

VOC of concern	Styrene
Cost of pure VOC ($/ton)	100
Molecular weight of VOC (Refer to Control Cost Manual, pg 3-63)	104.15
Emission rate (lbs/hr - inlet)	1.96
Inlet concentration (ppm)	19
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)	0.000281908

Gas Parameters

Total gas flow rate (acfm - inlet)	6,500
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)	((1.9 lbs VOC/hr)*(0.9)*(8 hours/day)*(5 days/week)*(52 weeks/year))/(2000 lbs/ton)	1.8
VOC Emissions BACT add on limit (lbs/year)		4071
Controlled VOC Emissions BACT add on limit (tons/year)	(4071 lbs/year)*0.9	1.8
Carbon working capacity (lb VOC/lb carbon)		0.25
Amount of carbon needed (lbs)	(4071 lbs voc)/(0.25 lb VOC/lb carbon)	14,656
Carbon cost	($1.5/lb carbon)*(14656 lbs carbon)	$21,983
Carbon life (years)		1

Direct Costs:

Purchased Equipment Cost		
Adsorber and auxiliary equipment		$7,800.00
Instrumentation	1% of equipment cost ($7800)*0.1	$780.00
Sales taxes	(7800)*0.085 (CA sales tax)	$663.00
Freight	5% of equipment cost ($7800)*0.05	$390.00
Purchased Equipment Cost	($7800+$780+$663+$390)	$9,633.00

Direct installation costs — Cannister 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		2% of equipment cost ($9663)*0.02	$ 192.66
Performance test		1% of equipment cost ($9663)*0.01	$ 96.33
Contingencies		3% of equipment cost ($9663)*0.03	$ 288.99
Total Indirect Costs		($192.66+$96.33+$288.99)	$ 577.98
Total Capital Investment		($9633.00+$577.98)	$10,210.98
Interest Rate			0.04
Equipment Life (years)			10
Capital Recovery Factor (CRF)			0.1233
Capital recovery cost		($10210.98*0.1233)	$1,258.92
Capital Recovery Inflation adjustment		$1258.92*[(1+0.0275)^6]	$1,481.46
Direct Annual Costs			
Labor wage ($/hr)			15.49
operator hour (hrs/shift)			0.5
shifts per day (shift/day)			1
days of work per year (days/year)			260
Operator labor	Bureau of Labor Statistics. Occupation Code: 51-2091 (Fiberglass Laminators and Fabricators - CA)		
Operator		($15.49)*(0.5 hours/shift)*(1 shift/day)*(260 days	$2,013.70
Supervisor			$0.00
Material		equal to operator costs	$2,013.70
Replacement labor			$0.00
Utilities			
Electrical Cost			
kW/hp			0.746
hp			10
hours/year			2080
kWh price	(Based on District's Avg. Electricity Rate for an Industrial Operation - 10/17/16)		0.1124
Electrical	(0.746 kw/hp)*(10 hp)*(1,040 hours/year)*($0.1124/kwh)		$1,744.09
Total Direct Annual Costs (without carbon costs)			$5,771.49
Indirect Annual Costs			
Overhead		60% of maintenance labor and materials	$2,416.44
Administrative Charges		2% of Total Capital Investment	$ 204.22
Property Tax		1% of Total Capital Investment	$ 102.11
Insurance		1% of Total Capital Investment	$ 102.11
Total Indirect Annual Costs (without Capital Recovery)			$2,824.88
Ton VOC controlled			1.83
Carbon needed			14,656
Cost of Carbon per year		(13,428 lb carbon)*($1.50/lb carbon)	$21,983.40
Total Annual Costs		($1,481.46+$5,690.89+$2,776.52+$21,702.60)	$32,061.23

Cost of VOC Removal	($32,061.23)/(1.83 tons voc)	$17,501.15

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

Annual Direct Operating Cost (without carbon costs)	$5,771.49
Annual Indirect Operating Cost	$4,306.34
Carbon working capacity (lb carbon/lb VOC)	0.25
Annual lb VOC PTE	4071
Annual tons Controlled VOC	1.8
Control Efficiency	0.900
Amount of Carbon Needed	14655.6
Cost of Carbon	$21,983.40
Total Annual Cost	$32,061.23
Cost per ton VOC Controlled	$17,501.15

COST EFFECTIVENESS ANALYSIS FOR THERMAL INCINERATION

This cost effectiveness analysis was performed using EPA's OAQPS Control Cost Manual
EPA publication no. 450/3-90-006

FACILITY NAME: AA Product Assembly, LLC
LOCATION: 9266 Beatty Dr., STE B
PERMIT NO.: 24673
EQUIPMENT DESCRIPTION: POLYESTER RESIN OPERATION SPRAY BOOTH

VOC Parameters

VOC of concern	Styrene
Molecular weight of VOC (see Control Cost Manual, p 3-63)	104.15
Heat of combustion (Btu/lb - see Control Cost Manual, p 3-63)	17,690
Heating value of VOC (Btu/scf)	4,629
Emission rate (lbs/hr - inlet)	11
Inlet concentration (ppm)	48

Gas Parameters

Total gas flow rate (scfm - inlet)	14000
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)	0.22
Heat of combustion per pound of effluent (Btu/lb)	3.03
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)	$0.06
System fan (kWh/yr)	107,889.60
Total Power Used (kWh/yr)	107,889.60

Gas Usage

Price of gas ($/1000 cu.ft.)	$3.30
Auxiliary fuel required (scfm)	150.74

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 (0.0775A)	$8,525
Freight (0.05A)	$5,500
Total Equipment Cost (B)	**$135,025**

Direct Installation Costs:

Foundation & Supports (0.08B)	$10,802
Handling & erection (0.14B)	$18,904
Electrical (0.04B)	$5,401
Piping (0.02B)	$2,701
Insulation for duct work (0.01B)	$1,350
Painting (0.01B)	$1,350
Direct Installation Cost	**$40,508**
Site preparation	$0
Facilities & buildings	$0
Total Direct Costs	**$175,533**

Indirect Costs (installation)

Engineering (0.10B)	$13,503
Construction & field expenses (0.05B)	$6,751
Contractor fees (0.10B)	$13,503
Start-up (0.02B)	$2,701
Performance test (0.01B)	$1,350
Contingencies (0.03B)	$4,051
Total Indirect Costs	**$41,858**

TOTAL CAPITAL INVESTMENT	**$217,390**

ANNUAL COST

Direct Annual Costs

Operating Cost	
Operator (@ $12.96/hr & .5 hr per shift)	$3,369.60
Supervisor (15% of operator)	$505.44
Operating materials	$0.00
Maintenance	
Labor (@15.49/hr & .5 hr per shift)	$4,027.40
Material (same as labor)	$4,027.40
Utilities	
Price of electricity ($/kWh)	$0.11
Price of gas ($/1000 cu.ft.)	$6.41
Electricity ($/yr)	$12,126.79
Natural Gas ($/yr)	$120,586.77
Total Direct Costs	**$144,643.40**

Indirect Annual Costs

Overhead	$7,157.90
Administrative charges	$4,347.81
Property taxes	$2,173.90
Insurance	$2,173.90
Interest rate (%)	4%
Equipment life (years)	10
CRF	0.1233
Capital recovery	$26,804.22
Total Indirect Costs	**$42,657.73**

TOTAL ANNUAL COST	**$187,301.14**

Annual Cost ($/yr)		$187,301.14
Annual Emissions Reductions	(lb/yr)	23,784
	(ton/yr)	10.7

(annual emissions based on BACT determination limit for add-on controls)

COST PER TON OF VOCs REDUCED ($/ton)	**$17,500.20**