

Technical Support Document

Preparer: Piotr Nowinski, Sr. AQ Specialist
Date: December 27, 2010
Company: MasterBrand Cabinets, Inc.
Submitter: Same
Source: Same
Hydrographic Area: 212
Subject: MasterBrand Cabinets
3645 Losee Road, North Las Vegas, NV 89030
T20S, R61E, Section 11

Source Description

MasterBrand Cabinets, Inc., manufactures kitchen cabinets for homes. Wood processing includes cutting and sanding operations. Various coatings and paints are applied to the wood cabinets prior to shipment. These coatings include sealers, topcoat, stains and paints. The source is under Standard Industrial Classification (SIC) code 2434: Wood Kitchen Cabinets and North American Industry Classification System (NAICS) code 337110: Wood Kitchen Cabinet and Countertop Manufacturing. The maximum production capacity of the plant is 3,000 units per day.

The source is subject to 40 CFR 63, Subpart JJ and it is a Title V source.

Permitting Action

The source applied for an Authority to Construct (ATC) to increase source-wide VOC emission limits to 58.24 tons per year; to increase the size of the existing spray booth (EU: A14); and install an additional dry filter cross-flow paint spray booth (EU: A16) and one 1.1 MMBtu/hr air makeup unit (EU: B12).

The current Part 70 operating permit limits emissions of VOCs and HAPs (including VHAPs) as a result of the operation of the spray booths to 25 tons per year. According to AQR 12.5.2.1(a)(3), existing Part 70 OP prohibits an increase in emission limits and therefore the source must obtain a Part 70 OP revision before commencing operation of the proposed change. This ATC is issued for the construction of the emission units. The proposed source-wide VOC emission limit (cap) can be implemented only after the revision of the Part 70 OP.

ACRONYMS

Table 1: List of Acronyms

Acronym	Term
AQR	Clark County Air Quality Regulations
ATC	Authority to Construct Certificate or Authority to Construct
ATC/OP	Authority to Construct/Operating Permit
BCC	Clark County Board of County Commissioners

Acronym	Term
BHP	Brake Horse Power
CAO	Field Corrective Action Order
CE	Control Efficiency
CF	Control Factor
CFR	United States Code of Federal Regulations
CO	Carbon Monoxide
CPI	Urban Consumer Price Index
DAQEM	Clark County Department of Air Quality & Environmental Management
EF	Emission Factor
EPA	United States Environmental Protection Agency
EU	Emission Unit
HAP	Hazardous Air Pollutant
HP	Horse Power
kW	kilowatt
MMBtu	Millions of British Thermal Units
NAC	Nevada Administrative Code
NAICS	North American Industry Classification System
NEI	Net Emission Increase
NO _x	Nitrogen Oxides
NOV	Notice of Violation
NRS	Nevada Revised Statutes
NSPS	New Source Performance Standards
NSR	New Source Review
OP	Operating Permit
PM ₁₀	Particulate Matter less than 10 microns
ppm	Parts per Million
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
scf	Standard Cubic Feet
SCC	Source Classification Codes
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SO _x	Sulfur Oxides
TCS	Toxic Chemical Substance
TSD	Technical Support Document
VOC	Volatile Organic Compound

Calculation of Source PTE and NEI

The following emission units are the affected units subject to this modification. EU: A14 is a modified unit and EUs: A16 and B12 are new emission units.

Table 2: List of Emission Units

EU	Description	Rating	Make	Model No.	Serial No.
A14	Paint Spray Paint Booth	10.500 cfm	Dry Filter Crossflow	IFPG-1278-RM	0001100
A16	Paint Spray Paint Booth	10.500 cfm	Dry Filter Crossflow	IFPG-1278-RM	TBD
B12	Natural Gas Air Heater	1.1 MMBtu/hr	TBD	TBD	TBD

Table 3: Emission Unit PTE (tons per year)

EU	Conditions	Rating	PM ₁₀	NO _x	CO	SO _x	VOC ¹	HAP ¹
All Spraying Booths	8,760 hr/yr	Varies	0.92	0.00	0.00	0.00	58.00	24.40
			0.92	0.00	0.00	0.00		
B12	8,760 hr/year	1.1 MMBtu/hr	0.04	0.47	0.40	0.01	0.03	0.01
Total			1.88	0.47	0.40	0.01	58.03	24.41

¹ VOC and HAP, including volatile organic HAPs (VHAPs) emission limits are listed as a part of the source-wide limit for all spray booths, the average values and can vary depending on the production rate of the spray booth.

Table 4: Emission Unit PTE (pounds per hour)

EU	Conditions	Rating	PM ₁₀	NO _x	CO	SO _x	VOC	HAP
All Spraying Booths	1 hour	Varies	0.21	0.00	0.00	0.00	13.24	2.99
			0.21	0.00	0.00	0.00		
B12	1 hour	1.1 MMBtu/hr	0.01	0.11	0.09	0.01	0.01	0.01
Total			0.43	0.11	0.09	0.01	26.49	5.99

Table 5: Source-wide PTE (tons per year)

Pollutant	PM ₁₀	NO _x	CO	SO _x	VOC	HAP
Source Totals	10.98	3.83	3.22	0.04	58.24	24.44
Major Source Thresholds	70	100	100	100	100	25¹

¹25 tons for combination of all HAPs (no single HAP exceeds 10 tons).

The VOC and HAP emissions from the application of coating materials are emission caps proposed by the source and therefore, the allowable emissions of VOC and HAP from the surface coating operation is limited to the amount listed in Table 6, based on rolling 12-month total.

Table 6: Source Emission Limitations for Wood Cabinet Coating Operations

Regulated Air Pollutant	Tons/Year
VOCs	58.00
HAPs	24.40
Single HAP	9.44

Production Limits

Production throughput of various wood cabinet coating materials shall be limited so that emissions of VOCs and HAPs (including VHAPs) as a result of the operation of the spray booths will not exceed the permitted emission limits.

Review of AQR Sections 12 and 55

Table 7 indicates that this permitting action requires public notice. Pre- or postconstruction ambient air monitoring and an additional impact analysis are not required.

Table 7: AQR Review Summary

	PM ₁₀	NO _x	CO	SO ₂	VOC	HAP
Source PTE (tpy)	10.98	3.83	3.22	0.04	58.24	24.44
Source NEI (tpy)	10.30	3.47	2.85	0.02	51.31	24.11

	PM ₁₀	NO _x	CO	SO ₂	VOC	HAP
Source PTE (tpy)	10.98	3.83	3.22	0.04	58.24	24.44
Source NEI (tpy)	10.30	3.47	2.85	0.02	51.31	24.11
Major Source Threshold	70 tpy	100 tpy	100 tpy	100 tpy	100 tpy	If single HAP 10 tpy and all HAP 25 tpy
Notice of Proposed Action	If PTE or NEI ≥ 15 tpy	If PTE or NEI ≥ 20 tpy	If PTE or NEI ≥ 10 tpy	If PTE or NEI ≥ 40 tpy	If PTE or NEI ≥ 20 tpy	If PTE or NEI ≥ 10 tpy for all HAP

¹ NEI was calculated as the difference of the PTE and average actual emissions for 2008 and 2009.

Control Technology

The PTE increase for VOC is above 20 tons per year and requires RACT demonstration. The source conducted a review of the reasonably available controls for the industry in the US EPA Control Technique Guideline Series – *Control of Volatile Organic Compound Emissions for Wood Furniture Manufacturing Operations* published on May 20, 1996, and concluded that RACT consist of: reference control technologies and work practice standards.

The reference control technologies are based on the use of waterborne topcoats, or higher solids sealers and topcoats. The range of VOC content in the reference control technologies ranged from 0.8 to 2.0 lb VOC/lb solids, depending on the coating:

Table 8: Allowable VOC Content in Coatings (lb VOC/lb Solids)

Coating Type	Allowable VOC Content
Top Coat Only, or	0.8
Top Coat	1.8
Sealer	1.9
Acid-cured alkyd amino vinyl sealer	2.3
Acid-cured alkyd amino conversion varnish topcoats	2.0

The source is subject to 40 CFR 63, Subpart JJ and shall limit HAP emissions from strippable spray booth coatings by using coatings that contain no more than 0.8 kg VOC/kg solids (0.8 lb VOC/lb solids), as applied.

The RACT work practice standards include operator training on the spray booth equipment operations for all new hires and annual refresher training for all employees. Additionally, the source will adhere to spray gun requirements for limiting use of conventional air spray guns as specified in 40 CFR 63, Subpart JJ.

Other Applicable Regulations

The source is subject to 40 CFR 63, Subpart JJ.

Compliance Demonstration

The Permittee is required to comply with the compliance demonstration requirements of 40 CFR 63, Subpart JJ. The Permittee shall comply with the monitoring requirements by using any of the methods presented in 40 CFR 63.804. The opacity of emissions shall be visually determined in accordance with 40 CFR 60 Appendix A: Reference Method 9.

Performance Testing

The Permittee shall follow the performance testing requirements as specified in 40 CFR 63.805. The Permittee shall use EPA Method 311, (40 CFR Part 63, Appendix A) in conjunction with formulation data to determine the VHAP content of the liquid coating. Formulation data shall be used to quantify those VHAP present in the coating. The Permittee shall use the EPA Method 24 (40 CFR Part 60, Appendix A) to determine the solids content by weight and density coatings. The Permittee may request to use an alternative method for determining the VHAP content of the coating, in the event of any inconsistency between the EPA Method 24 or Method 311 test data and the Permittee's formulation data.

Mitigation

The source has no federal offset requirements as a result of this modification.

Increment

Masterbrand Cabinets is a major source in Hydrographic Area 212 (Las Vegas Valley). Permitted emission units include 16 spray booths, three dust collection systems and four heaters. Since minor source baseline dates for NO_x (October 21, 1988) and SO₂ (June 29, 1979) have been triggered, Prevention of Significant Deterioration (PSD) increment analysis is required. DAQEM modeled the source using AERMOD to track the increment consumption.

The source was modeled for the NO_x and SO₂ increment consumption. Stack data submitted by the applicant were supplemented with information available for similar emission units. Five years (1999 to 2003) of meteorological data from the McCarran Station and Desert Rock Station were used in the model. United States Geological Survey (USGS) National Elevation Dataset (NED) terrain data was used to calculate elevations. Table 8 presents the results of the modeling.

Table 9: PSD Increment Consumption

Pollutant	Averaging Period	PSD Increment Consumption by the Source (µg/m ³)	Location of Maximum Impact	
			UTM X (m)	UTM Y (m)
SO ₂	3-hour	2.17 ¹	668812	4010741
SO ₂	24-hour	0.98 ¹	668812	4010741
SO ₂	Annual	0.44	668812	4010741
NO _x	Annual	9.52	668812	4010741

¹Modeled 2nd High Concentration

Table 8 shows the location of the maximum impact and the potential PSD increment consumed by the source at that location. The impacts are below the PSD increment limits.

Public Notice

The PTE and NEI for VOC emitted by this source is above the thresholds indicated in AQR Sections 12; therefore, public notice is required.

Permitting History

1. DAQEM received the application on December 9, 2010.
2. The application was deemed complete and review began on December 27, 2010.
3. The revised draft permit and TSD were submitted for review on January 10, 2011.

Attachments

The emission calculations are attached for air heater (EU: B12).

EU:	B12		Emission Factor (lb/mmBtu)	Potential Emissions			
	Make:	TBD		lb/hr	lb/day	ton/yr	
Model:			PM10	0.0075	0.01	0.20	0.04
S/N:			NOx	0.0980	0.11	2.59	0.47
			CO	0.0824	0.09	2.18	0.40
	1.1 mmBtu/hr		SOx	0.0006	0.01	0.02	0.01
	24.0 hr/day		VOC	0.0054	0.01	0.14	0.03
	8760 hr/yr		HAP	1.900E-03	0.01	0.05	0.01
BACT:		%Oxygen					
	ppm NOx	3.0					
	ppm CO	3.0					
Fuel:	Natural Gas						