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**Technical Support Document
Title V Permit
Kohler Co.
Permit #V20694.R01**

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1. Background

1.1 Applicant

Facility : Kohler
1495 North Ethington Road
Casa Grande, AZ 85193

Mailing Address: Kohler Co.
444 Highland Drive
Kohler, WI 53044

1.2 Attainment Classification

The facility is situated in an area classified as attainment for Volatile Organic Compounds (VOCs) and serious non-attainment for PM10.

2. Process Description

The principal operation at the facility is to mold Sheet Molding Compound (SMC) to create different molded fiberglass reinforced plastics parts and composite plumbing fixtures. The facility's SIC Codes is 3088 (Plastics Plumbing Fixtures). The facility is a major source of Volatile Organic compounds (VOCs) and Hazardous Air Pollutants (HAPs) with a potential to emit 232 tons of VOC and 226 tons of styrene, generated from the sixteen (16) sheet-molding compound (SMC) closed-molding processes. Matured SMC is conveyed to the closed molding presses which heat up and the SMC sheets conform to the shape of the mold in the press. Upon molding completion, the parts are removed from the mold and sent to be trimmed and cut before surface treatment. Other processes at the site which emit VOCs, HAPs, and PM10 are resin storage, SMC Mixing, SMC Compounding line, SMC Maturation, trimming stations presses, and touch-up painting. Baghouses with a control efficiency of 95% are used to control emissions from SMC mixing, SMC compounding, and trimming.

The main processes involved in the manufacturing of the final product are:

2.1 Resin Storage (EP001)

The raw materials and styrene-containing resins are stored in an outdoor tank farm and generate VOC and HAP emissions. The facility will process approximately 175,575,500 tons of raw material annually.

2.2 SMC Mixing (EP002)

The raw materials and styrene-containing resin are pumped into and mixed into the mixing tanks inside the building to form SMC. The emissions from the mixing process are VOCs and HAPs and PM10. Particulate matter emissions are controlled by dust collectors.

2.3 SMC Compounding Line (EP003)

The SMC mixture is compounded in the facility. Resins are mixed with inert fillers and the resulting paste is conveyed to the SMC machine where it is poured out into a sheet and covered top and bottom with a nylon containing film, and conveyed to festoon boxes.

2.4 SMC Maturation (EP004)

Festoon boxes with SMC are placed in a storage room for SMC to be matured to thicken for use. The VOC and HAP emissions from this step are fugitive and are released within the room.

2.5 SMC Closed Molding Presses (EP005)

Matured SMC is conveyed to the sixteen (16) closed molding presses. The presses heat up and the SMC sheets conform to the shape of the mold in the press. Once molding is completed, the

parts are removed from the mold and sent forward to be trimmed and cut before surface treatment. There are no planned volatile organic compounds and hazardous air pollutant containing materials used to clean the molds.

2.6 Trimming Stations (EP006)

The molded parts are sent through sixteen (16) trimmers to remove excess debris and flashing material from the molding process. The PM emissions are sent to dust collectors.

2.7 Touch-up Painting (EP007)

Parts painted in the touch-up area will have the paint applied by an employee using handheld spray cans and touch up paint pen. Emissions from this process are fugitive and include VOCs and HAPs only. No particulate matter (PM10) is emitted from this process.

2.8 Natural Gas Boilers (EP008-EP012)

There are five (5) natural gas boilers for the facility each rated at 15 MM Btu/hr. All five boilers are for the closed molding operation, but one will also be used for the SMC manufacturing units as well.

2.9 Emergency Generators (EP013-EP014)

Two diesel fueled emergency generators rated at 1500 kW and 1,000 kW will be installed at the site.

3. Control Devices

Process	Control Device ID	Control Device Description
SMC Resin Storage (EP001)	N/A	Fugitive
SMC Mixing (EP002)	CE001, CE002, and CE003	Baghouse Filters
SMC Compounding Line (EP003)	CE004	Baghouse Filter
SMC Maturation (EP004)	N/A	Fugitive
SMC Closed Molding Presses (EP005)	N/A	Fugitive
Trimming Stations (EP006)	CE006, CE007	Baghouse Filters
Rework, Touchup, and Equipment Cleaning (EP007)	N/A	Fugitive
Natural Gas Boilers (EP008-EP012)	N/A	N/A
Emergency Generators (EP013-EP014)	N/A	N/A

4. Emissions

4.1 Emission Factors Determination

Process	Controlled Emission Factors	Emission Factors Source
SMC Resin Storage (EP001)	0.00003 lbs. styrene./lbs. styrene in SMC	Composites Fabricators Association (CFA)
SMC Mixing (EP002)	0.00039 lbs. styrene/ lbs. styrene in SMC 0.005 (gr/dscf) grain loading emission factor for PM10	Composites Fabricators Association (CFA) Manufacturer's specification
SMC Compounding Line (EP003)	10.29 lbs. styrene/hr.	ACMA/UEF Emission Factors, Section 5.0 E = 0.1457xA _t -0.1454 Where: E = VOC emission rate, lb./hr., when paste is on the line A _t = Total wet area of SMC Machine = A _{dl} + A _{du} + W*(L _l + L _u), ft ² A _{dl} = Open are of the lower doctor box, ft ² A _{du} = Open area of the upper doctor box, ft ²

		W = Wet width of SMC, ft ² L _l = Lower wet length, ft L _u = Upper wet length, ft
SMC Maturation (EP004)	0.000009 lbs. styrene/ lbs. styrene in SMC	Composites Fabricators Association (CFA)
SMC Closed Molding Presses (EP005)	0.15 lbs. styrene/ lbs. styrene in SMC	ACMA/UEF Emission Factors, Section 6.0 E _{smc} = 0.015xweight of styrene monomer in SMC molded 1.5% of the styrene monomer content (weight) in the SMC materials
Trimming Stations (EP006)	1.12 lbs. PM10/hr.	Baghouse manufacturer recommendation
Rework, Touchup, and Equipment Cleaning (EP007)	7.05 lbs. VOC/gal. 3.47 lbs. HAPS/gal. 18.57 lbs. PM10/gal.	Highest content from MSDS
Natural Gas Boilers (EP008-EP012)	CO = 0.0187 lbs./MMBtu NOX = 0.035 lbs./MMBtu PM10 = 0.0075 lbs./MMBtu SOX = 0.0006 lbs./MMBtu VOC = 0.0036 lbs./MMBtu	Manufacturer's specification sheet Manufacturer's specification sheet Manufacturer's specification sheet Manufacturer's specification sheet Manufacturer's specification sheet
	HAPs = 1.85E-03 lbs./MMBtu	AP-42, Tables 1.4-3 and 1.4-4
	Pb = 0.0005 lbs./MMBtu	AP-42, Table 1.4-2
Emergency Engine (1,500 kW) (EP013)	NOX = 0.024 lbs./hp-hr CO = 5.5 E-3 lbs./hp-hr SOX = 4.05E-4 lbs./hp-hr PM10 = 7.0E-4 lbs./hp-hr VOC = 7.05E-4 lbs./hp-hr	AP-42, Tables 3.4-1 AP-42, Tables 3.4-1 AP-42, Tables 3.4-1 AP-42, Tables 3.4-1 AP-42, Tables 3.4-1
	HAP = 1.3E-04 lbs./10 ⁶ scf (highest for naphthalene)	AP-42, Tables 3.4-4
Emergency Engine (1,000 kW) (EP014)	NOX = 9.19E-03 lbs./hp-hr CO = 8.71E-04 lbs./hp-hr SOX = 1.21E-03 lbs./hp-hr PM10 = 9.86E-05 lbs./hp-hr VOC = 8.04E-04 lbs./hp-hr	Manufacturer's specification sheet Manufacturer's specification sheet AP-42, Tables 3.4-1 Manufacturer's specification sheet Manufacturer's specification sheet
	HAP = 1.3E-04 lbs./10 ⁶ scf (highest for naphthalene)	AP-42, Tables 3.4-4

4.2 Controlled Potential Emissions

Process	PM10 (tpy)	VOCs (tpy)	Styrene (tpy)	HAPs (tpy)	CO (tpy)	NOX (tpy)	SOX (tpy)
SMC Resin Storage (EP001)	-	0.35	0.35	0.35	-	-	-
SMC Mixing (EP002)	11.36	4.58	4.58	4.58	-	-	-
SMC Compounding Line (EP003)		45.06	45.06	45.06			
SMC Maturation (EP004)	-	0.011	0.011	0.011	-	-	-
SMC Closed Molding Presses (EP005)		176.04	176.04	176.04	-	-	-
Trimming Stations (EP006)	4.91	-	-	-	-	-	-
Rework, Touchup, and Equipment Cleaning (EP007)	7.63	3.86	-	1.90	-	-	-
Total Boilers Emissions (EP008-EP012)	2.30	1.10	-	0.15	5.73	10.72	0.19
1,500 kW Emergency Engine (EP013)	0.07	0.07	-	0.06	0.55	2.41	0.04
1,000 kW Emergency Generator (EP 014)	0.033	0.24	-	0.07	0.29	3.08	0.41
Total Emissions (tpy)	26.30	231.31	226.05	228.22	6.57	16.21	0.64

5. Regulatory Requirements and Monitoring

5.1 Title V/PSD/ Applicability

The facility is a major source of Volatile Organic compounds (VOCs) and Hazardous Air Pollutants (HAPs) with a potential to emit more than 100 tons of VOC and HAPs from the sheet-molding compound (SMC) closed-molding processes. However, since the potential to emit from the facility is less than 250 tons for VOCs and HAPs, the facility is qualified as a true minor source for PSD.

5.2 Applicable Requirements

5.2.1 National Emission Standards for Hazardous Air Pollutants: Reinforced Plastic Composites Production, 40 CFR 63, Subpart WWWW [40 CFR §§63.5780-63.5935]

Affected Sources: SMC Resin Storage (EP001), SMC Mixing (EP002), SMC Compounding Line (EP003), SMC Maturation (EP004), and SMC Closed Molding Presses (EP005).

5.2.2 National Emission Standards for Hazardous Air Pollutants: Surface Coating of Plastic Parts and Products, 40 CFR 63, Subpart PPPP [40 CFR §§63.4480-63.4581]

Affected Source: Rework, Touchup, and Equipment Cleaning (EP007).

5.2.3 National Emission Standards for Hazardous Air Pollutants: Industrial for Institutional, Commercial, and Industrial Boilers and Process Heaters, 40 CFR 63, Subpart DDDDD [40 CFR §§63.7480-63.7575]

Affected Sources: Natural gas fired boilers (EP008-EP012)

5.2.4 New Source Performance Standards: Small Industrial-Commercial-Institutional Steam Generating Units, 40 CFR 60, Subpart Dc [40 CFR §§60.40c-60.48c]

Affected Sources: Natural gas fired boilers (5) (EP008-EP012)

5.2.5 New Source Performance Standards: Stationary Compression Ignition Internal Combustion Engines, 40 CFR 60, Subpart IIII [40 CFR §§60.4200-60.4219]

Affected Sources: Diesel fired emergency generators (2) (EP013-EP014)

6. Ambient Impact Assessment – VOCs and HAPs Modeling

Air dispersion modeling was conducted by the facility to quantify the impact of styrene emissions. The modeling was conducted with the most recent version of AERMOD and followed the modeling guidance implemented by Arizona Department of Air Quality (ADEQ). The maximum hourly and maximum annual concentrations were compared with the acute ambient air concentration (AAAC) and chronic ambient air concentration (CAAC). The results from the analysis did not exceed the AAACs identified by ADEQ in their air quality modeling guidelines. The maximum anticipated emissions from this facility do not reach the quantity-threshold that would trigger a requirement to analyze the additional impact on any nearby ozone nonattainment areas.