

**DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: Scheduled Inspection**

N664642943

FACILITY: Owosso Graphic Arts		SRN / ID: N6646
LOCATION: 151 N Delaney Rd, OWOSSO		DISTRICT: Lansing
CITY: OWOSSO		COUNTY: SHIAWASSEE
CONTACT: Craig Ellenberg , Plant Manager & Owner		ACTIVITY DATE: 12/05/2017
STAFF: Julie Brunner	COMPLIANCE STATUS: Compliance	SOURCE CLASS: SM OPT OUT
SUBJECT: Partial Compliance Evaluation (PCE) activity, conducted as part of a Full Compliance Evaluation (FCE)		
RESOLVED COMPLAINTS:		

On December 5, 2017, I conducted an unannounced, scheduled inspection of Owosso Graphic Arts, Inc. (OGA). This inspection was a Partial Compliance Evaluation (PCE) activity, conducted as part of a Full Compliance Evaluation (FCE). The last inspection was on December 9, 2014.

Contacts:

Craig Ellenberg, Plant Manager, 989-725-7112, craig@owosso.com
Dottie Roy, Office Manager, 989-725-7112, dottie@owosso.com

Facility Description and Regulatory Overview:

OGA is America's largest producer of brass, copper, and magnesium dies. The company produces dies using copper and magnesium plates coated with a photosensitive material. The dies can then be used to imprint, cut, and/or emboss paper products and thin metals. The dies may also be used to stamp and cut adhesive decals, which is a large part of their business. They have been in business since 1949. Mr. Ellenberg recently purchased the plant. He is a longtime employee and now the owner/operator.

There are 36 employees. Operations are one shift per day for 5 days per week. In the fall, operating hours are from 7:00 am to 7:00 pm and the rest of the year the operating hours are 8:00 am to 5:30 pm.

The facility is on the westside outskirts of Owosso just north of M-21 on Delaney Road. The surrounding area is commercial with a church located northeast of the facility and a skate center to the south, and farm fields beyond. To the east with a farm field between is a senior citizen living complex, apartment complex, and residential housing.

This facility is a minor source due to the potential to emit (PTE) of less than 250 tons per year (tpy) of any regulated air contaminant. The facility is a synthetic minor for emissions of hazardous air pollutants (HAPs) with opt-out limits of less than 9.0 tpy of any single HAP and 22.5 tpy of aggregate HAPs. The facility is not subject to the Title V - Renewable Operating Permit Program.

The largest source of HAP emissions associated with the current operations is hydrogen chloride (HCl). The opt-out permit is Permit to Install (PTI) No. 272-99E which was revised in 2013 to include an additional magnesium etching line. During this permit action, the permit restrictions for nitric acid were removed. The PTE for nitrogen oxides (NOx) was calculated at 52.6 tpy in the PTI 272-99E, but with the removal of any enforceable limits, NOx emissions are unrestricted.

The emission units on PTI 272-99E, the facility emission unit (EU) names, and other exempt equipment at the facility are as follows:

EU ID or Names	Emission Unit Description	Facility Names & Description
EUMAGETCH1 (PTI 272-99E)	Large magnesium plate etching machine controlled by a 10,000 cubic feet per minute (CFM) scrubber.	OMEM - Owosso Magnesium Etching Machine 3180 Liters
EUMAGETCH2 (PTI 272-99E)	Four (4) magnesium plate etching machines controlled by an 8,000 CFM scrubber.	Tasope #3 - Tasope 30x40 (300 Liters), Tasope #4 - Tasope 30x40 (227 Liters),

EU ID or Names	Emission Unit Description	Facility Names & Description
		Tasope #5 - Tasope 30x40 (400 Liters), Tasope #7 - Tasope 30x40 (300 Liters, installed in 9/2015 but never put into operation)
EUMAGETCH3 (PTI 272-99E)	Three (3) magnesium plate etching machines controlled by a 5,000 CFM scrubber.	Tasope #1 - Tasope 30x40 (320 Liters), Tasope #2 - Tasope 30x40 (214 Liters), Tasope #6 - Tasope 18x24 (6 150 Liters)
EUCOPPERETCH (PTI 272-99E)	Two (2) copper plate etching machines.	EU Unit #8 Copper 1, EU Unit #9 Copper 2, EU Unit #? Copper 3, EU Unit #? Copper 4
Teflon coating	Spray booth and associated bake oven; exempt under Rule 287(2)(c).	Teflon coating process
Roller coating booth	Roll coating machine, for coating copper plates; exempt under Rule 287(2)(c).	Roller coating booth
Lab hood in copper etch room	Hood over lab area used to test ferric chloride solution; exempt under Rule 283(2)(b).	Testing hood
EUROUTER	A router for engraving magnesium dies exempt under Rule 285(2)(l)(vi).	CNC routing unit
Machining room	Room for machining metal, with Torit baghouse; exempt under Rule 285(2)(l)(vi).	Machining room
Band trim saw, and older CNC router	Metal working processes with baghouse; exempt under Rule 285(2)(l)(vi).	Machining

Michigan Air Emissions Reporting System (MAERS):

The facility reports to MAERS as an SM Opt-Out fee subject. For the 2016 year, the following emissions were reported:

NOx = 10.5 tons

Hydrogen Chloride (HCl) = 392.2 lbs

Inspection:

Arrived: 2:00 pm

Departed: 4:00 pm

Weather: 37°F, wind WSW @ 22 MPH, UV 1 Low

No visible emissions (VEs) were observed from any of the facility exhaust stacks upon arrival. No odors were identified surrounding the facility.

A pre-inspection meeting was conducted with Mr. Craig Ellenberg, Plant Manager/Owner. The facility operations were discussed. He had purchased the facility approximately 6 months before. He has worked at the facility for approximately 30 years. There are no emergency generators and the facility is heated by natural gas-fired heaters.

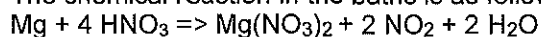
FGMAGETCH - EUMAGETCH1, EUMAGETCH2, and EUMAGETCH3 (PTI 272-99E):

They have three (3) emission units defined on PTI 272-99E for etching magnesium plates. There are actually eight (8) etching machines controlled by three (3) aqueous scrubbers that make up a flexible group on the PTI. The process begins when they receive a customer's graphic or artwork, which they would like to be made into a die. Magnesium plates of various sizes and thicknesses are kept in stock at the plant, coated by the

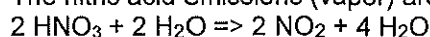
manufacturer with a polyvinyl photosensitive material. The plate is exposed to ultraviolet light in the negative or positive of the image desired, and the light hardens the coating. The material which was not exposed to the light remains soft, and it is removed from the plates in one of two washing stations which use n-methylpyrrolidone. Years ago, this was once done in a trichloroethylene (TCE) solvent degreaser. They voluntarily moved away from using TCE, to the ecologically safer material they now use.

The magnesium plate, with the hardened coating, is then placed in one of the magnesium etching machines, where it is sprayed with nitric acid, while being rotated. A number of factors, including speed, strength of the acid bath, temperature, and time in the machine all affect how much metal is removed from the plate. The more metal that is removed, the deeper the etch will be. Emissions from the etching process are controlled by scrubbers, which use water as the scrubbing solution. The nitric acid bath is 20% nitric acid, 5% etching additive, and the rest is water. Once a plate has been etched, it is rinsed in a wash station with used n-methylpyrrolidone stripping solution.

The chemical reaction in the baths is as follows:



The nitric acid emissions (vapor) are converted to NO_2 when scrubbed with water as follows:



EUMAGETCH1 is the largest magnesium etch machine in the US, and is controlled by a 10,000 CFM scrubber that is expected to be 90% efficient in reducing acid emissions. It handles magnesium plates 30" wide by 10' long. It could actually process wider metal plates than that, but the 30" wide metal plates are the largest size of coated magnesium plate currently on the market. The process runs a couple of times per week. In the recordkeeping, it is identified as the Owosso Magnesium Etching Machine (OMEM).

EUMAGETCH2 and EUMAGETCH3 each have an associated sink or washing stations where n-methylpyrrolidone is used. The etching machines are controlled by an 8,000 CFM scrubber and a 5,000 CFM scrubber, respectively. The scrubbers are expected to be 70% efficient in reducing acid emissions. There were no visible emissions from the vertical scrubber exhaust stacks.

The scrubbers operate 24/7 whether production is occurring or not. A litmus paper test is done daily on the scrubber water to ensure pH is in the 6-8 range. The control devices appeared to be operating properly per the requirements of Special Condition (SC) IV.1. A Malfunction Abatement Plan (MAP) for FGMAGETCH is maintained per SC III.1, but does not include operating parameters for the scrubbers. This needs to be added to the MAP to demonstrate that the scrubbers are operating satisfactorily. This has been discussed with the facility and a satisfactory response was received on January 12, 2018:

"Currently the MAP describes the maintenance completed on the scrubbers. In general, the operators track the pH and note the draw from the scrubbers during daily operation. When Derenzo is completing the HAP calculation spreadsheets, we will use their assistance to update the MAP as well to reflect all the ways the scrubbers are monitored for proper function."

Also, PTI 272-99E was for the installation of a 4th etching machine in EUMAGETCH2. The permit was issued November 8, 2013 and they were finishing up the installation of the 4th etching machine as of the date of my inspection. General Condition (GC) No. 2 allows 18 months to commence construction once the permit is issued, or the installation of the equipment is void. The facility apparently had some issues with the installation. They checked to see when installation was started, and if there was a break of greater than 18 months during the installation. September 2015 was the installation date of the Tasope #7 machine. It was longer than 18 months from permit issuance before installation was started, and then the machine was not operational and/or installation not completed for greater than 18 months. A modification to PTI 272-99E will be needed for the installation of 4th etching machine in EUMAGETCH2 because that portion of the permit is technically void.

The usage of n-methylpyrrolidone for stripping is not part of the emission unit or flexible group on the permit. The emission unit or flexible group descriptions on PTI 272-99E appear incomplete. Stripping with n-methylpyrrolidone may fit under an exemption but potential to emit needs to be completed and an exemption identified. It looks like it needs to be included in the PTI.

EUCOPPERETCH (PTI 272-99E):

The copper etch room is where all copper etching machines are located. Copper is more durable than magnesium, so it is used for making dies for customers who need to produce large quantities of an image. If a customer needed a die for limited production, they would go with magnesium.

Copper plates which have been coated with a photosensitive material (much of it done in their roller coating booth) are exposed to ultraviolet light, in the positive or negative of the desired image. The ultraviolet light hardens the coating. The unexposed coating material is washed away, in a wash station. The plates are then submerged in a ferric chloride solution for 10 to 30 minutes. The solution, which is 66 to 67% ferric chloride, and 33% water, etches away the copper that is not protected by the hardened photosensitive coating. A mask washing solution, sodium silicate, is used to wash away the remaining photosensitive coating.

HCl (Muriatic acid) is used to wash oils from the copper plates in a large sink in the middle of the room before etching. They have four (4) copper etching machines, and three (3) hoods in the room that vent to one external exhaust stack (SVCOPPERETCH). Two (2) of the copper etch machines (EU Unit #8 Copper 1 and EU Unit #9 Copper 2) are on PTI 272-99E and two (2) copper etch machines (EU Unit #? Copper 3 and EU Unit #? Copper 4) are not. Two of the machines used to be by the Teflon coater and two were installed in 2006 when the copper etch room was built. Because the room is vented to the ambient air, the two (2) copper etch machines do not meet the exemption from permitting, Rule 285(2)(r). Another exemption needs to be identified or the two (2) machines need to be included on the permit. This emission unit should be looked at to include all processes in the room including the washing, and the PTI revised accordingly.

The copper etch room has a small lab style hood that is used by technicians to test the ferric chloride bath. This unit is uncontrolled, and is exempt under Rule 283(2)(b), for laboratory equipment.

Roller Coating Booth; Rule 287(2)(c):

The roller coating booth was installed on January 25, 2011. The rollers apply a photosensitive coating to copper plates. They are able to coat most of the copper plates they use, although they do purchase some pre-coated copper for customers who have very specific tolerances. On a monthly basis, they use about 1/4 gallon of the photosensitive coating material, far below the 200 gallons per month of coatings allowed by the Rule 287(2)(c) exemption for coating lines. They use about 5 gallons of a cleaner, glycol acetate, per month, to clean the process. An electric bake oven is part of the process, and it exhausts to the outside air. This process appears to be exempt under Rule 287(2)(c), but the records need to be kept.

Teflon Coating Process; Rule 287(2)(c):

They have a small spray booth where they apply a Teflon coating to certain dies. The booth has an associated natural gas-fire bake oven. The spray applicators are high volume low pressure (HVLP) and paint spray is controlled by a panel filter. This process appears to be exempt under Rule 287(2)(c), but the records need to be kept.

Machining room; Rule 285(2)(l)(vi):

They have a machining and tooling room where grinders, bandsaws, and other cutting and grinding equipment are. These are considered exempt under Rule 285(2)(l)(vi)(B). The room is controlled by a small, blue Torit baghouse, which self-cleans its bags with a vibrating mechanism. The Torit baghouse vents inside. There is also a brown baghouse which serves a band trim saw, and an older CNC router. This device also self-cleans its bags with a vibrating mechanism. The baghouses are cleaned once per week.

EUROUTER, Rule 285(2)(l)(vi):

They have a CNC routing unit, in a dedicated room, for engraving magnesium dies. Because magnesium is highly flammable, the unit is enclosed, and does not emit the shavings. It is considered exempt under Rule 285(2)(l)(vi)(B).

EUBOILER, Rule 282(2)(b)(i):

A small natural gas-fired boiler (less than 1 MMBtu/hr) is on site. It appears that the boiler is exempt from the area source Boiler MACT, 40 CFR Subpart JJJJJJ due to the size and type of fuel used.

Waste Treatment; Rule 285(2)(m):

Spent ferric chloride solution from the copper etching process is stored in a tank onsite. This spent solution is treated and the resulting filter cake is taken offsite as solid waste to be used as a raw material for another industry.

Spent nitric acid from the etching machines is pumped to a storage tank, where it is neutralized with sodium hydroxide. Sediment settles out, and is harvested, and disposed of as a non-hazardous waste. The water is sent to the City of Owosso's waste water treatment plant.

Metal scrap and shavings from the processes are sent to Owosso Iron and Metal for recycling.

Records Review:

The facility records for 2017 were provided, as was the current copy of the Malfunction Abatement Plan (MAP) for FGMAGETCH. The MAP for FGMAGETCH will be revised to include operating parameters for the scrubbers.

The facility tracks the amount of nitric acid, ferric chloride, metals, and materials throughput and purchased on a monthly basis. Emissions of NOx and HCl are calculated annually for MAERS reporting. Records of coating usage in the roll coating process and the Teflon coating process are not being kept. Based on information provided, AQD staff estimate that permit limits and exemption requirements are not being exceeded.

The records are attached, and the facility is in the process of revising records and the MAP.

Summary:

The facility appears to be in compliance with PTI No. 272-99E but revisions to the permit, MAP, and records are needed. See attached "January 2018, Questions from Julie Brunner at MDEQ, Answers from Owosso Graphic Arts." Follow-up will be necessary while these items get resolved.

NAME Julie Brunner DATE 1/16/18 SUPERVISOR B.M.

