

DEPARTMENT OF ENVIRONMENTAL QUALITY  
 AIR QUALITY DIVISION  
 ACTIVITY REPORT: Self Initiated Inspection

N636328827

FACILITY: Machine Tool & Gear Inc.	SRN / ID: N6363
LOCATION: 1021 N SHIAWASSEE, CORUNNA	DISTRICT: Lansing
CITY: CORUNNA	COUNTY: SHIAWASSEE
CONTACT: Jane Johnson , Operating Systems Coordinator	ACTIVITY DATE: 03/17/2015
STAFF: Daniel McGeen	SOURCE CLASS: MINOR
SUBJECT: Self-initiated inspection of facility, subsequent to meeting at the site to discuss exemption applicable to proposed changes.	
RESOLVED COMPLAINTS:	

Emission Unit ID, Flexible Group ID	Emission Unit description	Permit or rule	Compliance status
EUFUR001; FGHEATTREAT	0.5 MMBtu/hr natural gas fired heat treat furnace with internal oil quench, one of two heated electric washers, one of two natural gas-fired endothermic generators serving all furnaces to provide atmosphere, and one of three 0.5 MMBtu/hr natural gas-fired draw furnaces.	PTI No. 83-14	Compliance
EUFUR002; FGHEATTREAT	0.5 MMBtu/hr natural gas fired heat treat furnace with internal oil quench, one of two heated electric washers, one of two natural gas-fired endothermic generators serving all furnaces to provide atmosphere, and one of three 0.5 MMBtu/hr natural gas-fired draw furnaces.	PTI No. 83-14	Compliance
EUFUR003; FGHEATTREAT	0.5 MMBtu/hr natural gas fired heat treat furnace with internal oil quench, one of two heated electric washers, one of two natural gas-fired endothermic generators serving all furnaces to provide atmosphere, and one of three 0.5 MMBtu/hr natural gas-fired draw furnaces.	PTI No. 83-14	Compliance
EUFUR004; FGHEATTREAT	0.5 MMBtu/hr natural gas fired heat treat furnace with internal oil quench, one of two heated electric washers, one of two natural gas-fired endothermic generators serving all furnaces to provide atmosphere, and one of three 0.5 MMBtu/hr natural gas-fired draw furnaces.	PTI No. 83-14	Compliance
EUFUR005; FGHEATTREAT	1.2 MMBtu/hr natural gas fired heat treat furnace with internal oil quench, one of two heated electric washers, one of two natural gas-fired endothermic generators serving all furnaces to provide atmosphere, and one of three 0.5 MMBtu/hr natural gas-fired draw furnaces.	PTI No. 83-14	Compliance
EU-Evaporator1	Samsco waste water evaporator, natural gas-fired	PTI 148-09	Did not observe
Machining processes	Numerous metal machining processes, which exhaust into the in-plant environment	Rule 285(l) (vi)(B)	Compliance

On 3/17/2015, the Department of Environmental Quality (DEQ), Air Quality Division (AQD) met with representatives of Machine Tool and Gear Inc., to discuss an exemption, and to conduct a self-initiated inspection of the facility.

**Environmental contacts:**

 Jane Johnson; Operating Systems Coordinator; 989-743-3936, ext. 262; [JJJohnson@newcor.com](mailto:JJJohnson@newcor.com)

 Marc Irvine, BSME, MSME, Plant Sr. Mfg. Engineer; 989-743-3936, ext. 235; [MIrvine@newcor.com](mailto:MIrvine@newcor.com)

**Facility description:**

Machine Tool and Gear's Corunna facility manufactures automotive drive train components, in a number of metal machining processes. They perform heat treating and oil quenching of metal pins, in order to harden the exterior surface.

**Regulatory overview:**

This facility is classified as a true minor source, rather than a major source, for particulate emissions, and so is not subject to the Renewable Operating Permit program. Major sources are those which have a potential to emit (PTE) of 100 tons per year (TPY) or more for any single criteria pollutant. Criteria pollutants are those for which a National Ambient Air Quality Standard (NAAQS) exist: carbon monoxide, nitrogen oxides, sulfur dioxide, volatile organic compounds (VOCs), lead, particulate matter smaller than 10 microns, and particulate matter smaller than 2.5 microns. The facility has a Permit to Install (PTI) for five heat treating furnaces, a PTI for a wastewater evaporator, and numerous processes which are considered exempt from the requirement to obtain an air use permit. It is not considered to be a major source for Hazardous Air Pollutants (HAPs), because it does not have a PTE of 10 TPY or more for a single HAP, nor a PTE of 25 TPY or more for aggregate HAPs.

**Fee status:**

This facility is not considered fee-subject, for the following reasons. Because it is not a major source for criteria pollutants, it is not classified as Category I. Additionally, because it is not a major source for HAPs, and is not subject to federal New Source Performance Standards, it is not classified as Category II. Finally, because it is not subject to federal Maximum Achievable Control Technology standards, it is not classified as Category III. The facility is not required to submit an annual air emissions report via the Michigan Air Emissions Reporting System (MAERS).

**Location:**

This facility is located on the eastern edge of a small industrial park. There are industries to the immediate south and west of the plant, with an office building about 200 feet to the north. Further north are other businesses. To the east are farm fields and woods. About 700 feet to the southeast is an apartment complex. These appear to be the closest residences.

**Recent history:**

On 3/9/2015, Mr. Marc Irvine contacted AQD Permit Engineer Jeff Rathbun regarding a modification the company would like to make. They have 5 induction hardening machines at the plant that utilize a polymer/water quench, and currently vent to the in-plant environment. They would like to add two exhaust fans and two stacks, and vent the machines to the ambient air. There is currently a mist inside the plant from these processes, which they would like to vent outside. Plus, they would like to replace the current Poly Quench solution with Aqua Quench, which is expected to lower emissions. The goal of these changes is to improve workplace air quality.

**Arrival:**

Mr. Irvine had invited J. Rathbun and myself to the site. He was agreeable to my request to conduct a self-initiated inspection of the facility, after the meeting. "Self-initiated" refers to an inspection that was not initially planned by the AQD, at the start of the current fiscal year.

We arrived at 9:48 AM. There were no odors or visible emissions detected from the plant. Conditions were sunny, clear, and 35 degrees F, with winds out of the north at 15-20 miles per hour. Per AQD procedures, we presented our identification/credentials upon arrival. We met with Ms. Jane Johnson, who is the Operating Systems Coordinator, and with Mr. Marc Irvine, Plant Sr. Manufacturing Engineer. I provided a copy of the DEQ brochure *Environmental Inspections: Rights and Responsibilities*, also per our procedures.

Mr. Irvine explained the changes they would like to make, to vent the exhaust from 5 of their 16 induction hardening machines to the outside air through 2 stacks. A 2,800 cfm fan and a stack would be shared by 4 machines, and the fifth would get its own fan and stack. All 16 induction machines currently vent indoors. They would also like to replace the current polymer and water-based quench solution with Aqua Quench. This is a polymer and water quench solution and rust inhibitor which has already been used in 2 of their other induction machines, and resulted in noticeably reduced emissions of mist. Plus, they go through it only 1/10 as fast as with Poly Quench. By the end of 2015, they expect to have all the induction machines switched over to Aqua Quench.

They were expecting that a permit would be needed to exhaust these 5 machines to the outside air. However, we discussed using the Rule 290 exemption for all 16 induction machines, as they would eventually like all of them to exhaust to the outside air. For the quench solution to be used, it appears that Rule 290 would allow 1,000 lbs of uncontrolled emissions of VOCs per month, per each emission unit. J. Rathbun provided guidance on doing the calculations for the Rule 290 recordkeeping. The 4 machines which would share a single fan should each qualify as an emission unit, he explained. The company expects their emissions would be much lower than the Rule 290 threshold.

Note: The Rule 282(a)(l) exemption for quenching could not be used for the above change, because there is a very slight film of oil on the parts that are to be quenched, and that exemption does not extend to oil-coated parts.

#### Inspection:

##### 16 induction hardening machines, Rule 290:

These were the processes discussed during our pre-inspection meeting today, regarding the Rule 290 exemption. Of 16 induction hardening machines in the plant, which use a magnetic field to harden metal parts, 5 of those would be exhausted to the outside air, in the near future. A 2,800 cfm fan would be shared by 4 of the 5 units, while the fifth would get its own fan.

There did appear to be a very faint mist visible in the general indoors environment. We observed the 5 induction machines which will soon be exhausted to the outside air, and switched to the Aqua Quench solution. There were visible mist emissions rising into the general, in-plant atmosphere from these units. The fifth machine is currently equipped with a "Mist Buster" control device.

When we were shown 2 separate induction machines (units 26 and 27) elsewhere in the plant that have already been switched to Aqua Quench, it was apparent that mist emissions were considerably less. We were informed that Aqua Quench is such an efficient solution, that they add a gallon to each machine every 2 weeks, to replenish what has been lost to the air. With the previous solution, they reported adding a gallon every other day.

Mr. Irvine showed us one of the axles that was to be treated in an induction hardening machine. The axle had a trace of oil on its surface, and this confirmed that the Rule 282(a)(l) exemption could not be used, as that exemption is for parts which are not oil-coated. They will pursue using Rule 290 for the induction processes.

##### Five natural gas heat treating furnaces, PTI No. 83-14:

We went to the carburizing area, where there are now five heat treating furnaces. PTI No. 83-14 was approved on 7/23/2014, allowing the company to install this fifth heat treating furnace, which has its own stack, and a second endo gas generator. There were no visible emissions from the furnace exhaust stacks, which we observed from atop a small hill, east of the plant. The original four stacks come off of an outside wall horizontally, and then exhaust unobstructed, vertically upwards, to a height of 30 feet. The fifth stack exhausts through the roof.

At ground level, near the above stacks were five air to oil coolers, where oil from the heat treating quench baths is cooled. These function like large radiators, using heat exchanger plates. There is no direct contact between the oil and the air.

The heat treating process begins with "green" (unhardened) metal parts entering a furnace, and going through a thermal cycle. The furnace temperature undergoes a specific series of elevations, decreases, and plateaus. Cycle length depends on the needs of the parts being treated, but is usually about 8 hours. The parts are then quenched in oil, which is either at 100 or 350 degrees F. Quenched parts are then transferred into one of two parts washers, which use water-based cleaning solutions. The parts are removed, and then are taken to a draw furnace to be tempered.

The five heat treating furnaces each utilize a flame curtain, primarily for safety, to prevent gases inside the furnace from exiting through an open door, but also to prevent air from entering the furnaces. This is because the parts inside need an oxygen-free environment. Natural gas and ammonia are the gases used for this. From a safe distance, we observed the flame curtain of one of the original four furnaces, as the doors were remotely opened, to admit parts.

**ENDO-001 and ENDO-002, endo gas generators; Rule 285(l)(iv):**

There is one original endo gas generator, ENDO-001, manufactured by AFC-Holcroft. A second endo gas generator, ENDO-002, also an AFC-Holcroft unit, was installed with the fifth heat treat furnace. Atmosphere generators used in metal heat treating processes are exempt from needing an air use permit under Rule 285(l)(iv), but these units are incorporated into the emission units in PTI No. 83-14.

**Parts washers, WASH-002 and WASH-003; Rule 285(l)(iii):**

Their two parts washers at the plant use a water-based solution. These parts washers are incorporated into the emission units in the permit, although they could qualify as exempt under either Rule 285 (l)(iii), or Rule 281(e).

**Draw furnaces; Rule 282(b)(l):**

There are two electrically heated draw furnaces, which do not utilize quenching. They do not appear to be subject to Rule 201, being electrically heated. There are also three natural gas-fired draw furnaces, which are each rated at 500,000 Btu/hr heat input capacity, and therefore appear to be exempt from needing an air use permit under Rule 282(b)(l).

**Samsco wastewater evaporator, natural gas-fired; PTI No. 148-09:**

The wastewater evaporator heats oil-containing wastewater to remove the water. We did not examine the unit during the inspection, but from outside the building, it could be seen that there were no visible emissions from the roofline of the plant, other than steam from a parts washing exhaust stack. They periodically have Mr. Vince Leigh, Heat Treat Supervisor, go up on the roof, and photograph the roof area around the evaporator exhaust stack, to check for signs of oily fallout. So far, they have never observed oil on the roof.

**Machining operations; Rule 285(l)(vi)(B):**

We observed a number of metal machining processes in the plant. They perform cutting, grinding, drilling, and turning of metal parts. These processes exhaust into the general, in-plant environment, and appear to satisfy the exemption criteria of Rule 285(l)(vi)(B). A number of their processes are CNC machines. Some minor assembly of parts also takes place.

**Miscellaneous:**

Cold rolling of metal parts to form splines appears to be exempt under Rule 285(l)(l), which exempts "Equipment used exclusively for bending, forming, expanding, rolling, forging, pressing, drawing, stamping, spinning, or extruding either hot or cold metals."

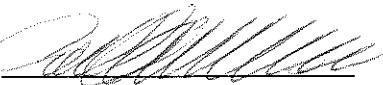
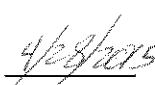
**Facility recordkeeping:**

Ms. Johnson provided copies of their Monthly Quench Oil Addition and Usage Log, for the past 2 months, which are attached for reference. Their current PTI, No. 83-14, allows for 2,700 gallons per year of quench oil use in the flexible group, FG-HeatTreat. In 2014, they only used 730 gallons total. In January 2015, they added 230 gallons of oil overall, taking into account subtractions from the reclaiming of quench oil. In February 2015, because of oil reclamations exceeding the amount of additions, they had an overall reduction of 35 gallons. They use a spreadsheet to calculate the 12-month rolling average.

**Conclusion:**

We left the facility at 11:15. I could not find any instances of noncompliance during the inspection, nor any areas of concern. Facility staff were very helpful, and professional.

Note: On 3/26/2015, Mr. Irvine e-mailed a spreadsheet (attached) to J. Rathbun, with calculations to demonstrate compliance with Rule 290. Both J. Rathbun and I found the calculations to be acceptable for demonstrating compliance with Rule 290. Please see the attached e-mails for reference.

NAME DATE SUPERVISOR 

