

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

P053147940

FACILITY: TiAL Cast		SRN / ID: P0531
LOCATION: 450 South Shiawassee Street, OWOSSO		DISTRICT: Lansing
CITY: OWOSSO		COUNTY: SHIAWASSEE
CONTACT: Gregg Jones , President		ACTIVITY DATE: 02/05/2019
STAFF: Julie Brunner	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MINOR
SUBJECT: Scheduled inspection for compliance with PTI 103-14A		
RESOLVED COMPLAINTS:		

On February 5, 2019, I conducted an unannounced, scheduled inspection of TiAL Cast and TiAL Products (TiAL Sport) in Owosso. This facility was last inspected on November 29, 2016.

Arrived: 1:12 pm

Departed: 2:45 pm

Weather: 31°F, wind NNE@ 8 mph, cloudy

Facility Contacts:

Mr. Batuhan Ak, TiAL Cast, Foundry Manager, 989-729-8553, batuhan.ak@tialsport.com

Mr. Gregg Jones, TiAL Sport, President, 989-729-8553, gregg@tialsport.com

Facility Description and Regulatory Review:

TiAL Cast is a casting operation residing within the same facility as TiAL Sport/Products. TiAL Sport is a manufacturer of aftermarket high performance automobile turbo boosters established in 1993. TiAL Sport used to purchase steel castings and machined them into their product. With the addition of the casting operation, TiAL Sport has eliminated the outside supplier for castings.

TiAL Sport/Products is located in central Owosso. The area surrounding the plant is mixed use with residential and commercial properties surrounding it.

The facility is a minor source of any regulated air contaminants including hazardous air pollutants (HAPs) and not subject to the Title V Renewable Operating Permit (ROP) program.

Commencement of Operations: Casting operations up and operational, email dated: 10/28/2015

TiAL Cast Staff: 6 Shifts/Day: 1 (6:00 AM to 4:30 PM)

Days of Operation/Week: Monday to Friday

TiAL Products Staff: 42 Shifts/Day: 2 (8-hours)

Days of Operation/Week: Monday to Friday

Boilers for Facility Heat? No

Emergency Generators? No

List of Active Air Use Permits:

Permit to Install (PTI) 103-14A for a small casting operation.

Flexible Group (FG) / Emission Unit (EG) ID	FG / EG Description	Associated EU IDs
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Flexible Group (FG) / Emission Unit (EG) ID	FG / EG Description	Associated EU IDs
FG-Foundry	Investment casting operation with an afterburner-controlled dewaxing furnace.	EU-BurnoutPreHeat, EU-DewaxFurnace2, EU-MoldForming, EU-Melt1, EU-Melt2, EU-VacuumMelt, EU-Shakeout, EU-SurfaceTreat
EU-BurnoutPreHeat	The burnout pre-heat furnace (nominal 500,000 Btu/hr) heat input rating and afterburner (nominal 871,000 Btu/hr) burn natural gas and operates in one mode. While in wax burnout and pre-heat mode, the afterburner operates.	
Void as not installed within 18-months: EU-DewaxFurnace2 (in storage on-site)	The dewaxing furnace (nominal 670,000 Btu/hr heat input rating) with afterburner (nominal 703,500 Btu/hr) burn natural gas operates in two modes. In wax melting mode, the afterburner does not operate, and in wax burnout and mold preheat mode, the afterburner operates.	
EU-MoldForming	Ceramic shells/molds are formed to the desired thickness on wax patterns as alternating layers of ceramic and sand. Ceramic layers are applied by dipping the pattern into a ceramic slurry. Rainfall sanders are used to apply sand layers between the ceramic layers. A dust collector that exhausts to the general in-plant environment controls particulate matter emissions from the rainfall sander area.	
EU-Melt1	Induction melting furnace with a nominal capacity of 300 pounds.	
EU-Melt2 (installed, not used)	Induction melting furnace with a nominal capacity of 100 pounds.	
Void (as not purchased): EU-VacuumMelt	A vacuum melting/casting process, inside an enclosure, used to cast small parts.	
EU-Shakeout	Ceramic molds are broken from cooled castings, and a grinder and cut-off saw are used to remove excess metal from the castings. The grinder and cut-off saw are exhausted to the in-plant environment through a particulate matter control system.	
EU-SurfaceTreat (electric)	Miscellaneous surface treatment operations exhausted to the general in-plant environment, such as a citric acid leaching and rinse tank <u>and a heated caustic tank (not installed as caustic not needed).</u>	

Michigan Air Emissions Reporting System (MAERS):

The TiAL Cast facility is required to pay an annual air quality fee as a Category III source. Emission information is not required to be reported to MAERS.

Applicable Federal Regulations:

40 CFR 63 Subpart ZZZZZ, National Emission Standards for Hazardous Air Pollutants for Iron and Steel Foundries Area Sources – TiAL Cast is subject as a new small foundry. TiAL Cast became subject to 40 CFR 63, Subpart ZZZZZ upon start-up. All requirements for this Area Source MACT are not on PTI 103-14A, and the state took delegation for this regulation after the PTI was issued. The requirements for initial notification and notification of compliance status are listed in §63.10890.

§63.10890 What are my management practices and compliance requirements?

(a) You must comply with the pollution prevention management practices for metallic scrap and mercury switches in §63.10885 and binder formulations in §63.10886.

(b) You must submit an initial notification of applicability according to §63.9(b)(2).

(c) You must submit a notification of compliance status according to §63.9(h)(1)(i). You must send the notification of compliance status before the close of business on the 30th day after the applicable compliance date specified in §63.10881....

TiAL Cast receives their metal from an out of state supplier and does not take in scrap metal. The binder used does not contain furfural alcohol, resin or methanol and is in compliance with §63.10886. The facility provided notice on October 28, 2015 that their casting operations were up and operational, and submitted all information for the initial notification on December 21, 2016. The last semi-annual compliance report was submitted for the period from 7-1-2018 to 12-31-2018 on February 11, 2019.

Inspection:

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

The inspection was conducted with Mr. Batuhan Ak (TiAL Cast, Foundry Manager) and Mr. Gregg Jones (TiAL Sport, President). The purpose of my visit and the status of the facility operations were discussed, and a tour was taken of the casting operation.

1st Step – Five (5) wax injection presses are used to mold the wax patterns. The wax is heated to 125°F to a paste-like consistency to inject into the mold. The wax injection presses are not listed on the permit and are considered to have no air emissions.

2nd Step – Assembly of wax patterns for slip casting.

3rd Step – Ceramic molds are slip cast from the wax patterns in EU-MoldForming. Three (3) layers of ceramic are applied and dried at 70°F between each layer. There are two (2) tanks of ceramic slurry and one (1) tank of binder solution that the wax patterns are dipped in to form the ceramic mold. Sand is applied in rainfall sanders between each application of ceramic. A dust collector collects particulate emissions from the sander area. It has a 55-gallon drum that is emptied of particulate every 2-months and is generally about ½ to ¾ full when emptied. This process is not vented to the ambient air. The mold forming process operates 3-days per week for about 8-hours.

4th Step – Dewaxing of the ceramic mold is done in an electric heated autoclave furnace. The autoclave uses steam to melt the wax out of the molds. The melted wax is collected in a pan and sent back to the supplier. The wax is melted out at 356°F, not burned out. This process has no air emissions and is not on the permit. The autoclave furnace (existing) is used instead of EU-DewaxFurnace2 which was never installed.

5th Step – Wax burnout from the molds is done in EU-BurnoutPreHeat which has an afterburner for control. The burnout process operates at 1850°F, and the afterburner is required to be operated at a minimum of 1500°F in order to meet the permitted destruction efficiency of 99%. Emissions from this process are vented through a vertical square exhaust stack. The wax burnout process operates 2 to 3 days per week.

6th Step – Pouring of molten metal into the molds. Metal ingots are heated in induction furnaces (EU-Melt1 & 2) to between 2850°F to 3100°F. The induction melting furnaces are vented out the sidewall by a horizontal stack. The stack requirements are not on the permit. This was looked at for the last inspection and was deemed not to be an issue. If the permit is modified, I would recommend that the horizontal stack parameters be added to the permit since the permit should match what was installed to eliminate future questions. The melting process operates less than 8-hours per day.

7th Step and 8th Step – This step is the removal of the metal part from the mold. This is done in EU-Shakeout. Ceramic molds are broken from the cooled castings, and a grinder and cut-off saw are used to remove excess metal from the castings. The grinder and cut-off saw are exhausted to the in-plant environment through a dust collector. The dust collector does have a pressure gauge to show that it is operating properly. It has a 55-gallon drum that is emptied of particulate every 6 to 7 months, and is generally about ½ full when emptied. The process operates 2 days per week at most.

The metal steel used in the casting process comes in the form of ingots in 55-gallon drums. Metal cut off from the castings is stored inside in 55-gallon drums and reused in the process.

The visible emissions (VEs) from FGOVENS? are limited to 10% opacity per Special Condition (SC) I.1. Since there is no flexible group FGOVENS on the permit, this is assumed to be emissions from the EU-BurnoutPreHeat stack, SV-Afterburner1. The stack is checked about twice a month and no VEs have been observed according to Batuhan.

Only natural gas is combusted in the afterburner on EU-BurnoutPreHeat meeting the intent of SC III.1. SC III.1 actually lists emission units EU-DewaxFurnace1 (typo?) and EU-DewaxFurnace2 (never installed).

SC IV.1 requires that the afterburner on EU-BurnoutPreHeat be operated at a minimum of 1500°F. If the afterburner is being operated at 1500°F or greater, and based on proper operation and the vender guarantee, it is assumed that the permit requirement for 99% destruction efficiency of volatile organic compounds (VOC) is being achieved. A spot check of the afterburn temperature disc records show that on 12-27-17, 12-28-17, 12-29-17, 1-17-18, and 1-19-18, the afterburner temperatures appear below the minimum temperature (on average). It looks like on 1-30-17, 2-2-2017, 2-3-2017, 12-20-18 and 12-21-18, the afterburner was operating at 1500°F and above. More information on the afterburner operating temperature and if any adjustments are necessary to meet SC IV.1 on a consistent basis were requested. This was investigated by Batuhan, and it turned out that the input signal wire to the chart recorder had come loose. The afterburner is set to run a little higher than 1500°F, and after the fix, pictures were sent showing the afterburner reading above 1600°F. For future operations, they are going to start recording the output signal from the chart recorder to make sure that the logged data matches the actual performance of the afterburner, and to make sure that the chart recorder is functioning properly continuously.

SC IV.2 requires that the afterburner have a temperature indicator. The afterburner has a paper chart recorder on it to indicate and record the temperature. This meets the requirements of the special condition.

The stacks on the permit are for EU-BurnoutPreHeat and EU-DewaxFurnace2 (never installed). EU-BurnoutPreHeat (SV-Afterburner1) has a square stack. The estimated size is 18" x 18" with the internal refractory stack liner. The stack was also built to 34' tall. The permit requirement is an equivalent diameter of 26" which is an area of 530.9 in². The 18" x 18" vent has an area of 324 in² so it is less than the maximum requirements of the permit. The stack meets the minimum required height and maximum diameter. The permit requirement is for vertically unobstructed. A stack cap was originally installed, and was removed (on 12/23/16) from the stack on EU-BurnoutPreHeat. An acceptable rain guard was installed.

Records Review:

Copies of the following records were obtained:

1. Afterburner temperature disc chart recordings dated 1-30-17, 2-2-2017, 2-3-2017, 12-27-17, 12-28-17, 12-29-17, 1-17-18, 1-19-18, 12-20-18 and 12-21-18.
2. Monthly and 12-month rolling metal melted for 2017 and 2018.
3. Recordkeeping sheets (Heat Log) with process information started for each new crucible (and ladle) on 1-17-18 and 12-6-18.

SC VI.2. The permittee shall record the quantity of steel melted in FG-Foundry monthly, for the preceding 12-month rolling time period, in a manner acceptable to the AQD District Supervisor.

- For 2017, there were 56.5 tons of metal melted for the 12-month period.

- For 2018, there were 68.4 tons of metal melted for the 12-month period.

The tons of metal melted are below the permit limit of 400 tons per year and the recordkeeping is acceptable.

SC VI.3. The permittee shall keep, in a satisfactory manner, a log of the number of wax burnout cycles conducted during each shift that burnout cycles are conducted in FG-Foundry.

- The number of burnout cycles is recorded on the paper temperature discs. The most burnout cycles logged of the records obtained were six (6) wax burnouts per shift.

They are permitted for seven (7) wax burnouts per shift.

SC VI.4. The permittee shall keep, in a satisfactory manner, a monthly record of the afterburner temperature during each wax burnout cycle.

- The two (2) Heat Log records show that the afterburner is operating at 1500°F as recorded by the operator. Some of the temperature log discs obtained show afterburner operating temperatures not always reaching 1500°F during each wax burnout cycle. This was investigated. (See attached email.) It was a loose wire, and the afterburner was operating above the minimum temperature requirements for satisfactory operation of the afterburner.

TiAL Products/Sport:

TiAL Products was discussed with Mr. Gregg Jones (TiAL Sport, President) after the TiAL Cast inspection. TiAL Cast and TiAL Products are two separate companies. The operations at TiAL Products include machining of metal rods or billets and metal castings, and assembly to manufacture turbo systems, blow-off valves, and waste gates. They make aftermarket parts for sport cars and racing cars, and sale to distributors.

Current production of blow-off valves is 800 per month and ~9600 per year, production of waste gates is about 15,000 to 18,000 per year, and the number of turbo systems was not requested.

TiAL Products has a large number of manual and automated lathes for parts production. Metal machining processes that are not vented outside the building appear exempt under Rule 285(2)(l)(vi)(B). Many of the metal machining processes use cutting fluids that are mainly water containing approximately 6% of organic glycol-based materials. Hand grinding of castings is done on down-draft tables with built in dust collectors meeting the exemption under Rule 285(2)(l)(vi)(B). Sand blasters with dust collectors that vent internally also meet the permit exemption under Rule 285(2)(l)(vi)(B).

Hand TIG welding is used in the assembly of parts. Welding is exempt under Rule 285(2)(i).

Shot blast machines are used to clean off metal castings and remove the ceramic residuals. The media used to clean the parts is ceramic. The machines have small dust collectors that vent internally. This equipment is exempt under Rule 285(2)(l)(vi)(B).

Water jet cutters and band saws are used to cut metal parts and rods. There are 5-axis, 4-axis, and 3-axis mills used to cut metal parts and vibratory mills to polish parts. An EDM machine is used to drill holes in metal. All are exempt per Rule 285(2)(l)(vi)(B).

An HVOF plasma system in a booth is installed. The system is automated and sprays a metal coating on parts to create a hard coating. The system has a dust collector that vents outside and is exempt per Rule 285(2)(i).

Maintenance Shop - There is grinding, milling, manual saws, cutters, routers, drill presses, and lathes in the maintenance areas. These processes are not vented to the ambient air and qualify for exemption per Rule 285(2)(l)(vi)(B).

In the parts assemble areas is a laser engraver for logos, and there is quality control and storage in the facility.

All metal scrap, turnings, etc. are sent out for recycling by a contracted hauler.

There are a couple of parts washers. One uses a water-based detergent and is exempt per Rule 281 (2)(e). There is a small parts degreaser that is serviced by Safety-Kleen that uses an organic solvent (petroleum distillate). The parts degreaser is exempt per Rule 281(2)(h).

All equipment in the TiAL Products/Sport facility appears to be exempt from permitting or not a source of air pollution.

Summary:

The TiAL facilities appeared to be in compliance with all applicable rules, regulations, and PTI 103-14A. All process equipment at TiAL Products is operating under permit exemptions.

NAME Julie L. Bruner DATE 2/28/19 SUPERVISOR B. M.