

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

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| FACILITY: ENGINEERED HEAT TREAT INC | | SRN / ID: N3027 |
| LOCATION: 31271 STEPHENSON HWY, MADISON HTS | | DISTRICT: Southeast Michigan |
| CITY: MADISON HTS | | COUNTY: OAKLAND |
| CONTACT: Keith Pilibosian, President | | ACTIVITY DATE: 08/19/2019 |
| STAFF: Joe Forth | COMPLIANCE STATUS: Compliance | SOURCE CLASS: MINOR |
| SUBJECT: On-Site Inspection | | |
| RESOLVED COMPLAINTS: | | |

On August 19, 2019, AQD staff Joseph Forth conducted scheduled inspection of Engineered Heat Treat, Inc. located at 31271 Stephenson Hwy., Troy, Michigan. The purpose of this inspection was to determine the facility's compliance with the Federal Clean Air Act Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act of 1994, PA 451, as amended, and Michigan's Air Pollution Control Rules, and Permit to Install (PTI) No. 176-96 and PTI No. 178-96.

Engineered Heat Treat performs heat treating services of metal parts. About half of the heat treating is for aircraft, aerospace and military applications. The remainder of the heat-treating activity is for general industrial applications.

PTI No. 176-96 addresses visible emissions from six batch heat treat furnaces with integral oil quench. These heat-treating furnaces are not exempt from permitting per R 336.1282 because oil quenching is part of the process. All furnaces at this facility are heated electrically.

PTI No. 178-96 addresses visible emissions from four molten salt bath furnaces and two oil quench tanks.

FACILITY INSPECTION

I arrived at the facility at 1:30 pm, and was met by Mr. Keith Pilibosian, President. I introduced myself, presented my credentials, and explained the purpose of the inspection.

I observed the following equipment and processes during the escorted facility tour.

The Straightening Department contained four (4) Eitel presses, which are used to straighten parts that had warped due to the heat-treating process.

Deep Freeze unit. This freezer chills materials to the range of -90 degrees F to -120 degrees F. This process appears to be exempt from permitting per R 336.1280(2)(a).

Vacuum Furnace - The Vacuum Furnace uses electricity to heat parts from 1750 degrees F to 2200 degrees F. The process steps are; vacuum, heat, and add argon. The original vacuum furnace was replaced with a new vacuum furnace in 2007. The new furnace follows the same process steps as the original furnace. This process appear to be exempt from permitting per R 336.1282(2)(a)(i) (metal treating furnaces not involving ammonia, molten materials, oil coated parts or oil quenching).

Saturated Core Reactors (SCR) used in the gas nitriding process. Gas nitriding is an

electrically heated case-hardening process whereby nitrogen is introduced into the surface of a solid ferrous alloy by holding the metal at a suitable temperature in contact with a nitrogenous gas, usually ammonia. The nitriding temperature for all steel alloys is between 495 and 565°C (925 and 1050°F). Principal reasons for nitriding are:

- To obtain high surface hardness
- To increase wear resistance and antigalling properties
- To improve fatigue life
- To improve corrosion resistance
- To obtain a surface that is resistant to the softening effect of heat at temperatures up to the nitriding temperature.

The original SCR heat treating ovens were replaced approximately 5 years ago, with new models of the same process. At the time of the last inspection (2012), these units appeared to be exempt from permitting. The exemption changed in 2016 to no longer include heat treating processes utilizing ammonia. However, after discussion with the permit section, the AQD will be allowing the facility to continue operating under the exemption as the equipment was installed before the exemption was changed.

Molten salt bath furnaces and two oil quench tanks are operating per PTI No. 178-96. Mr. Pillibosian showed me the stack for these processes. The processes were operating at the time of inspection, and there did not appear to be any visible emissions coming from the exhaust stacks.

Batch heat treat furnaces with integral oil quench were observed by me. All furnaces are heated electrically. These emission units are operating per PTI No. 176-96. Mr. Pillibosian showed me the stack for these processes as well. The processes were operating at the time of inspection, and there did not appear to be any visible emissions coming from the exhaust stacks.

Ten draw furnaces operate between 300 and 1200 degrees F. They are used to temper (reduce hardness) parts. This process uses only air to cool the parts. These furnaces appear to be exempt from permitting per R 336.1282(2)(a)(i) (metal treating furnaces not involving ammonia, molten materials, oil coated parts or oil quenching).

The Gleason quench area consists of a rotary hearth furnace, two quench tanks and a deep freeze unit 4. It appears that the two oil quench tanks in this process are permitted per PTI No. 178-96. This process uses either a press or a plug to maintain part dimensions during the quench process. The press is used to maintain flatness and concentricity for flat parts like sun gears, and a plug is used to maintain shape when quenching cylindrical gears or splined parts. The processes were operating at the time of inspection and did not appear to produce any visible emissions coming from the exhaust stacks.

A brine tank containing a 7% salt (NaCl) solution is not generally used. The intended purpose of quenching is to rapidly reduce the temperature of the metal, which increases hardness. Quench severity influences the amount of hardness generated in the process. The order of quench severity from high to low is: Brine (salt water), Oil, Marquench, 1000 degree F salt, and air. This process appears to be exempt from the requirements of R 336.1201 per R 336.1282(2)(a)(i).

Carburizing furnace A9 inspected. The process associated with this furnace does not use oil quench. This process appears to be exempt from the requirements of R 336.1201 per R 336.1285(2)(l)(iv).

Pit Furnaces, for carburizing, are used to harden large parts. I observed three pit furnaces (M3, M4 and M7). A pit furnace is typically installed partially below grade. This helps conserve heat and reduces the expense of building a structure with a high ceiling. This process appear to be exempt from the requirements of R 336.1201 per R 336.1282(2)(a)(i).

I observed two storage tanks located on the north side of the building exterior. One storage tank contains 900 gallons of Argon and the other tank contains 1250 gallons of anhydrous ammonia. The storage tank of Argon appears to be exempt from the requirements of R201 per R284(2)(j). The storage tank of anhydrous ammonia appears to be exempt from the permitting requirements of R 336.1201 because it was installed prior to August 15, 1967.

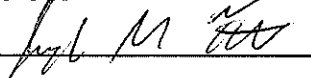
Tempering Furnaces: Electrically heated furnaces are used to adjust the hardness of metal parts. All parts are washed prior to tempering because a baked on oil coating would render the parts unusable per customer specifications. This process appear to be exempt from the requirements of R 336.1201 per R 336.1282(2)(a)(i).

Steel shot blasters consisting of one tumbler, and two table blaster machines. The shot blast material is recycled and the exhaust is controlled by a baghouse, which exhausts to the facility interior. The ground around the baghouse outside did not appear to have any fugitive particulate. This process appears to be exempt from R 336.1201 per R 336.1285(2)(l)(vi)(B).

I observed three atmosphere generators used in connection with the metal heat treating process. The generators crack natural gas, which is then used to control the atmosphere in the carburizing process. The atmosphere generator appears to be exempt from permitting per R 336.1282(2)(a)(i).

CONCLUSION

Engineered Heat Treat, Inc. appears to be operating in compliance with the requirements of the Federal Clean Air Act Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act of 1994, PA 451, as amended, and Michigan's Air Pollution Control Rules, and Permit to Install (PTI) No. 176-96 and PTI No. 178-96.

NAME 

DATE 9-30-19

SUPERVISOR SK