

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

B188938893

FACILITY: HOWMET CORPORATION, Plants 1 & 3		SRN / ID: B1889
LOCATION: One Misco Drive, WHITEHALL		DISTRICT: Grand Rapids
CITY: WHITEHALL		COUNTY: MUSKEGON
CONTACT: Dan Gezon , Environmental Engineer		ACTIVITY DATE: 03/15/2017
STAFF: Eric Grinstern	COMPLIANCE STATUS: Compliance	SOURCE CLASS: SM OPT OUT
SUBJECT: Compliance Inspection		
RESOLVED COMPLAINTS:		

Howmet Corporation- Plants 1 & 3 (SRN: B1889)

FACILITY DESCRIPTION

Howmet recently became a Division of Arconic.

Plants 1 and 3 constitute one stationary source for air permitting and regulation. The plants are located on the company's North Campus. Both of the plants are investment super alloy casting operations that manufacture aerospace turbine components.

Plant 1 conducts casting in ceramic molds produced in Plant 3. Prior to casting, molds received from Plant 3 are processed through a boiler clave to remove the wax, after which they are fired in a burn-off oven to cure the ceramic. The cured molds are poured under a vacuum with metal from induction melting furnaces. After knockout and cutoff the castings are sent to Plant 3 to be finished.

Plant 3 also conducts investment casting, as well as a number of finishing and inspection operations.

REGULATORY ANALYSIS

The stationary source has as an Opt-out permit (No. 125-14) that covers all permitted processes.

The stationary source has processes subject to Subpart ZZZZZZ (Area Source Aluminum, Copper, and other Nonferrous Foundries NESHAP)

COMPLIANCE EVALUATION

At the facility, AQD staff, consisting of Eric Grinstern (EG), met with Dan Gezon and Chris Rohrer. Mr. Gezon accompanied EG on a tour of Plants 1 & 3.

PLANT 1

Prior to entering the facility, a slight to moderate "hot metal" odor was noted downwind from Plant 1. No visible emissions were observed from Plant 1.

Emissions units in Plant 1 listed in Opt-out permit No. 125-14 include *EU-FNG-101*, *EU-DC-103*, *EU-DC-104*, *EU-DC-106*, *EU-DC-107* and *EU-DC-108*. *EU-FNG-101* is not addressed in a specific emission unit or flex group table, however it is covered by *FGFACILITY*. Emission units *EU-DC-103*, *EU-DC-104*, *EU-DC-106*, *EU-DC-107* and *EU-DC-108* are part of *FGEXTDCS*, and also restricted by *FGFACILITY*. Plant 1 has numerous emission units that they have designated as exempt from permitting and are only restricted under the facility-wide emission limits in *FGFACILITY*.

Mold Making

Ceramic molds are received from Plant 3 and processed through one of two steam boilerclaves to remove the wax pattern. Each steam boilerclave has a hood over the door that exhausts steam to the outside atmosphere when the door is opened. After being processed through the steam boilerclaves the molds are sent through a natural gas-fired burn-off oven (FNG-101). The burn-off oven acts as a kiln to cure/fire the ceramic molds. The facility only cures molds in the oven that are dewaxed. The facility previously designated the burn-off oven as exempt from permitting under Rule 282(2)(a)(iii), however, the process is contained in the Opt-out permit under *EU-FNG-101*. There are no emission unit specific conditions that address the burn-off oven; however it is covered by *FGFACILITY*.

Melting/Pouring

After the burn-off oven, the molds are poured under vacuum with molten metal from one of the 15 induction melting furnaces. Charge material for the furnaces is prepared via cutoff units and a bar breaker. Emissions from the cut-off saws and torching are controlled by DC-106. Emissions from the bar breaker are controlled by baghouse DC-108. Processes associated with DC-106 and DC-108 are identified in the Opt-out permit as *EU-DC-106* and *EU-DC-108*. Each of the emission units are contained in *FGEXTDCS*. *FGEXTDCS* addresses multiple particulate sources with baghouse control in Plant 1 and Plant 3. Compliance with the permit requirements for *FGEXTDCS* is addressed below.

Each of the furnaces exhaust through a vacuum pump exhaust outlet. Previously all of the furnaces had vacuum pumps with oil filters. Since the last inspection, the facility has started the gradual process of switching to dry filters. The use of dry filters will eliminate the occasional emissions associated with the oil filters. The facility has designated the induction melting furnaces as exempt from permitting under Rule 282(2)(a)(iv). In addition to the vacuum pump exhaust points, the top chambers of the casting furnaces are combined and exhausted through three emission points called the elephant trunks. The facility has designated these points exempt from permitting under Rule 28(2)(a)(iv).

Knockout/Finishing

Processes associated with knockout include, ceramic mold knockoff, cut-off saws, grinding and a shotblast machine. Emissions from knockoff are controlled by DC-107. Emissions from pre-finishing, including cutting, grinding and the shotblast unit are controlled by baghouses DC-103 and DC-104. Each of the emission units are identified in the Opt-out permit as *EU-DC-103*, *EU-DC-104*, and *EU-DC-107*. Each of the emission units are contained in *FGEXTDCS*.

Miscellaneous

In addition to the above processes, Plant 1 also has the following equipment.

Chill Plate Wash Stations – utilize ammonia and grinding, designated by the facility as exempt from permitting via Rule 281(2)(e).

Heat Treat Furnaces – Electric heat treat furnaces, designated by the facility as exempt from permitting via Rule 282(2)(a)(i).

PLANT 3

Prior to entering the facility, no visible emissions or odors were observed.

Emission units in Plant 3 that are listed in Opt-out permit No. 125-14, include *EU-FNG-301*, *EU-ETCHTANKS*, *EUHCLRINSE*, *EU-DC-301*, *EU-DC-302*, *EU-DC-303*, *EU-DC-305*, *EU-DC-307*, *EU-DC-308* and *EU-DC-317*. Emission units *EU-FNG-301*, *EU-ETCHTANKS* and *EUHCLRINSE* are addressed in specific emission unit tables. Emission units *EU-DC-103*, *EU-DC-104*, *EU-DC-106*, *EU-DC-107* and *EU-DC-108* are part of *FGEXTDCS*, and also restricted by *FGFACILITY*. Plant 3 also has numerous emission units that the facility has designated as exempt from permitting and are only restricted under the facility-wide emission limits in *FGFACILITY*.

Mold Making

Within the Wax Department, wax patterns are formed and assembled utilizing wax pellets received from Plant 5. The facility has designated the operations within the Wax Department as exempt from permitting under Rule 287(2)(b).

From the Wax Department, the patterns are then sent to Monoshell, where they are slurry/stucco coated, which generally consists of numerous dips into cobalt and zircon alumina. Emissions from Monoshell are controlled by DC-304, which is exhausted back into the Monoshell area. The facility has designated the Monoshell operations controlled by DC-304 as exempt from permitting under Rule 285(2)(l)(vi)(c).

After Monocoat, the molds are sent through a drying tunnel that is temperature and humidity controlled. After drying, molds are either sent to Plant 1 for processing or are retained at Plant 3 for casting and finishing.

Molds retained at Plant 3 are processed through a steam boilerclave. The boilerclave has a hood that captures steam emissions when the door is opened and vents emissions uncontrolled. After the boilerclave, the molds are processed through a burn-off oven. Occasionally molds are processed through the burn-off oven that have not gone through the boilerclave to remove the wax pattern. When this "flash-off" process occurs, the facility operates the afterburner to control emissions. The burn-off oven is addressed in emission unit table *EU-FNG-301*.

EU-FNG-301

Natural gas-fired ceramic kiln oven used to sinter ceramic materials after the wax patterns have been removed from the ceramics by a steam boilerclave.

EMISSION LIMITS/MATERIAL LIMITS/ PROCESS RESTRICTION

No emission unit specific limitations.

DESIGN/EQUIPMENT PARAMETERS

Requires that an afterburner is installed and operated.

The facility has an afterburner installed.

Melting/Pouring

The molds are then preheated in one of three vacuum preheat furnaces, prior to being placed inside of one of the two equiax electric induction vacuum casting furnaces. The facility has designated the preheat furnaces as exempt from permitting under Rule 282(2)(a)(iii) and the casting furnaces exempt under Rule 282(2)(a)(iv).

After pouring, a ferrux exothermic coating is placed on top of the molten casting. The coating is added in hooded stations that vent through one stack uncontrolled. The facility calls this process the "Lazy Suzan-Hot Topping" and has designated the process exempt from permitting under Rule 290(2)(a)(ii).

Knockout/Finishing

The facility employs numerous processes to mechanically remove the ceramic mold and finish the cast part. Processes include knockoff, cut-off saws, grinding and blasting machine. Emissions are controlled by DC-301, DC-302, DC-303, DC-305, DC-307, DC-308 and DC-317. Each of the emission units associated with the control devices is contained in *FGEXTDCS* of Opt-out permit No. 125-14.

To remove the cores from the blades and vanes, the facility utilizes a heated salt bath process consisting of potassium hydroxide (KOH). The exhaust from three of the tanks is vented uncontrolled, while the exhaust from one of the tanks is controlled by a scrubber. The facility has exempted the salt baths from permitting under Rule 285(2)(l)(iii).

After the salt baths, the castings are processed through a dilute solution of hydrochloric acid (HCL) to neutralize the caustic salt solution. The acid rinse processes are addressed in emission unit table *EU-HCLRINSE*.

EU-HCLRINSE

One Hydrochloric Acid (HCl) rinse line consisting of an acid bath followed by a cold water and a hot water bath. Process is for neutralizing parts and is located in the Salt Bath area. Controlled by a wet scrubber.

PROCESS/OPERATIONAL RESTRICTIONS

Requires the installation and operation of the wet scrubber.

The wet scrubber was observed installed and operating during the inspection.

Requires that the scrubber be equipped with devices to measure pressure drop, scrubber flow rate and scrubber pH.

The scrubber is equipped with devices to monitor pressure drop, flow rate and pH.

Acid Room

Castings are processed through an acid etch process to allow for grain analysis. The acid etch lines are addressed in emission unit table *EU-ETCHTANKS*.

EU-ETCHTANKS

Acid Etch Line 1 and Acid Etch Line 2 consisting of acid baths (HCl, FeCl, and HNO₃ or H₃PO₄) and rinse baths, located in the Main Acid Room; and a 3,800 gal HCl storage tank. Controlled by a wet scrubber.

EMISSION LIMITS

Limits HCL emissions to 16.8 pounds per day and 3.10 tons per year.

The facility provided daily records for the month of December 2016, which documented compliance with the daily limit. The highest single day emission amount was 1.52 pounds. Review of the previous 12-month rolling emission records showed compliance with the 3.10 ton limit. Emissions were calculated at 0.050 tons per year.

In December 2016/January 2017, the scrubber had a malfunction that caused the flow rate to be approximately 130 gpm instead of 150-180 gpm. Per the equipment manufacturer, the control rate would still be greater than 90%. The facility assumed 90% control for the period of reduced flow. The emission limits were still met during this period of time.

PROCESS/OPERATIONAL RESTRICTIONS

Requires the installation and operation of a scrubber.

The scrubber was observed installed and operating during the inspection.

Requires that the scrubber be equipped with devices to measure pressure drop, scrubber flow rate

and scrubber pH.

The scrubber is equipped with devices to monitor pressure drop, flow rate and pH. The facility provided records for the month of January 2017 documenting the pressure drop, flow rate, pH and intake static pressure.

MONITORING /RECORDKEEPING

Requires that the facility maintain daily records of acid concentration and the amount of acid added.

The facility provided records documenting acid concentration and acid usage.

Material Processing and Handling Operations

Material processing and handling operations in Plants 1 and 3 with baghouse control are included in flex group *FGEXTDCS*.

FGEXTDCS

EMISSION LIMITS

Limits PM, PM10, PM2.5 on a pound per 1,000 pounds of exhaust gas as well as tons per year basis. Additionally limits VE to 0% opacity.

The facility provided records demonstrating compliance with the emission limits.

The most recent 12 month PM emission records were:

PM	2.6 tons	Limit: 66.9 tons
PM2.5	0.03 tons	Limit: 66.9 tons
PM10	0.13 tons	Limit: 66.9 tons

DESIGN/EQUIPMENT PARAMETERS

Requires that each baghouse is installed and operated.

Each baghouse was observed to be installed and operated.

Requires that each baghouse be equipped with a pressure drop device.

All observed baghouses were equipped with a pressure drop device.

MONITORING /RECORDKEEPING

Requires PM emission records documenting compliance with the 12-month rolling time period limits.

The facility provided copies of the required records.

NESHAP SUBPART ZZZZZZ

The stationary source is subject to the requirements of the aluminum, copper and other nonferrous foundry NESHAP, Subpart ZZZZZZ.

The facility has prepared and operates in accordance with a written management plan as required by Subpart ZZZZZZ

The facility has previously been determined to be in compliance with Subpart ZZZZZZ. Including furnace cover and enclosure requirements, scrap charge material requirements, and management practices.

Opt-Out Limits

The stationary source opt-out limits are contained in *FGFACILITY*.

EMISSION LIMITS/RECORDKEEPING

Restricts PM, PM10 and PM2.5 emissions to 89.9 tons per year individually.

The facility provided records documenting PM emissions in compliance with the limit. The highest 12-month emission rate was 11.58 tons.

CONCLUSION

Based on the information and observations made as part of this inspection, the facility appears to be in compliance with applicable air quality rules and regulations.

NAME 

DATE 4/13/17

SUPERVISOR 