

DEPARTMENT OF ENVIRONMENTAL QUALITY  
AIR QUALITY DIVISION  
ACTIVITY REPORT: On-site Inspection

B188957440

<b>FACILITY:</b> HOWMET CORPORATION, Plants 1 & 3		<b>SRN / ID:</b> B1889
<b>LOCATION:</b> One Misco Drive, WHITEHALL		<b>DISTRICT:</b> Grand Rapids
<b>CITY:</b> WHITEHALL		<b>COUNTY:</b> MUSKEGON
<b>CONTACT:</b> Michelle Wazny , EHS Engineer		<b>ACTIVITY DATE:</b> 08/04/2021
<b>STAFF:</b> Eric Grinstern	<b>COMPLIANCE STATUS:</b> Compliance	<b>SOURCE CLASS:</b> SM OPT OUT
<b>SUBJECT:</b> On-site compliance inspection		
<b>RESOLVED COMPLAINTS:</b>		

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

### FACILITY DESCRIPTION

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 manufacturing operations for aerospace turbine components.

Plant 1 added approximately 100,000 square foot to the existing building as part of the air permit modification under PTI No. 125-14A, (and subsequent PTI No. 125-14B) issued in 2018. Plant 1 contains monoshell mold production, including wax pattern assembly, autoclave dewaxing and kiln firing of molds. Casting via vacuum furnaces is conducted on Plant 1, along with knockout, cutoff and other finishing operations. Additionally, Plant 1 conducts heat treating via vacuum furnaces.

Plant 3 contains monoshell mold production, including wax pattern assembly. Plant 3 no longer conducts autoclave dewaxing or kiln firing of molds. Molds are send to Plant 1 for dewaxing and kiln firing. Additionally, the vacuum melting furnaces operations have been removed from Plant 3. All molds are transferred to Plant 1 for casting. Plant 3 contains core removal operations along with finishing, heat treating, and cast inspection operations.

### REGULATORY ANALYSIS

The stationary source has as an Opt-out permit (No. 125-14B) 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

Due to COVID 19, records were requested and reviewed prior to the onsite inspection.

At the facility, AQD staff, consisting of Eric Grinstern (EG), met with Michelle Wazny, EHS Engineer, Tanner Ellens, Plant Engineer, and Roger Rake, Supervisor/Single Point Accountability (SPA).

### PLANT 1

Emission units in Plant 1, listed in Opt-out permit No. 125-14B, include EU-DC-103, EU-DC-104, EU-DC-106, EU-DC-107, EU-DC-108, EU-DC-109. All of the emissions units are contained in FGEXTDCS and are also restricted by FGFACILITY. Plant 1 has numerous emission units that they have been designated as exempt from permitting and are only restricted under the facility-wide emission limits in FGFACILITY.

### Mold Making

Since the last inspection, wax pattern assembly and monoshell mold production has been added to Plant 1. Emissions from drop points/conveying/prep are controlled by two baghouse that vent internally. The baghouses are designated as DC-110 (West Monoshell-slurry prep) and DC-111 (East monoshell-slurry prep). No portion of wax pattern assembly or monoshell production vents directly to the outside atmosphere.

Note: Adjacent to monoshell is a separate room that will house the tool room and associated dust collector DC-109. The baghouse was not installed at the time of the inspection.

### Mold Dewaxing

After the monoshell molds are dried, they are processed through a steam boilerclave to melt the wax from the mold. Plant 1 has two boilerclaves that were installed as part of the 2018 expansion. The facility has listed the boilerclaves as exempt under Rule 282(2)(b)(i). Each of the boilerclaves have a hood over the door that vent uncontrolled to the outside atmosphere. After being processed through one of the steam boilerclaves the molds are sent through a natural gas-fired burn-off oven. The facility has two burn-off ovens, one existing oven (FNG-101) and a second burn-off oven (FNG-102) installed in 2019 as part of the expansion. The burn-off ovens acts as a kiln to cure/fire the ceramic molds. The facility only cures molds in the oven that are dewaxed, therefore, neither of the units is equipped the afterburners. The facility has designated the burn-off ovens as exempt from permitting under Rule 282(2)(a)(iii).

### Melting/Pouring

After the burn-off oven, the molds are poured under vacuum with molten metal from one of the 21 induction melting furnaces. Fifteen of the furnaces are existing and six of the furnaces were installed as part of the recent expansion. Charge material for the furnaces is prepared via cutoff saws, torching and a bar breaker. Emissions from the cut-off saws, snag grinder and torching are controlled by DC-106. The processes and control are identified as EU-DC-106. The pressure drop reading was 5.0" at the time of the inspection. Emissions from the bar breaker are controlled by baghouse DC-108. The processes and control are identified as EU-DC-108. Observation of DC-108 showed a pressure drop of 3.8". Each of the emission units are contained in FGEXTDCS. FGEXTDCS addresses multiple particulate sources with baghouse control in Plant 1 and Plant 3. While on the roof of the facility, observation of stacks for each of te baghouses showed no visible emissions. Compliance with the permit requirements for FGEXTDCS is addressed below.

All of the melt furnaces are vacuum induction furnaces. The facility has designated the furnaces as exempt from permitting under Rule 282(2)(a)(iv). During previous inspections, occasional emissions were noted from the vacuum pump oil filters. The facility has since replaced the oil filters with dry filters on all of the existing furnaces, except one. The six new furnace are equipped with dry filters. While on the roof, no emissions were noted from the furnace vacuum exhaust vents. Staff discussed with the facility replacing the single furnace with an oil filter with a dry filter, to reduce the potential of visible emissions. In addition to the vacuum pump exhaust points, the top chambers of the existing 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 282(2)(a)(iv).

### Knockout/Finishing

Processes associated with knockout and prefinishing include, ceramic mold knockoff, cut-off saws, grinding and a shotblast machine. Emissions from one of the two knockout stations is controlled by DC-107, The process and control are identified as EU-DC-107. Observation of the pressure drop gage at the time of the inspection showed a reading of 6.2", which is slightly over the facility established upper limit of 6.0". The facility was subsequently requested to evaluated the condition of the baghouses operation. The facility inspects the pressure drop on a weekly basis and reported that the pressure drop returned to normal operation for the subsequent observations on 8/1/2021 and 8/17/2021. The second knockout station is ducted to DC-103 and DC-104 (Emission units EU-DC-103 and EU-DC-104. Observation of the pressure drop gages at

the time of the inspection showed a reading of 1.6" for DC-103 and a pressure drop reading of 2.9" for DC-104. Emissions from a cut-off saw are also ducted to DC-104. 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 – Chill plate handling.** Process previously utilized ammonia, which is no longer used. Designated by the facility as exempt from permitting via Rule 281(2)(e).

**Heat Treat Furnaces –** The facility has a total of seven electric vacuum heat treat furnaces. Five of the units are existing and two were installed as part of the expansion. The furnaces are designated by the facility as exempt from permitting via Rule 282(2)(a)(i). While on the facility roof, intermittent visible emissions were noted from one of the heat treat furnaces. Further evaluation determined that the visible emission were coming from Furnace No. 45, which is the only furnace out of the seven units that has an oil filter on the vacuum unit. Staff discussed with the facility replacing the oil filter with a dry filter. The observed VE was determined to no be a violation of Rule 301 at the time of the inspection.

### PLANT 3

Emission units in Plant 3 that are listed in Opt-out permit No. 125-14B, include EU-T-302, EUHCLRINSE, EU-DC-301, EU-DC-305, EU-DC-308, EU-DC-346 and EU-DC-347. Emission units EU-T-302 and EUHCLRINSE are addressed in specific emission unit tables. Emission units EU-DC-301 EU-DC-305, EU-DC-308, EU-DC-346 and EU-DC-347 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, both manually and automated. The facility has three small fume hoods in the core room for ceramic adhesive (Permabond/Xylene) that vent uncontrolled. The booths have very low usage and have been designated by the facility as exempt under Rule 290. Rule 290 records are incorporated into the facilities monthly air recordkeeping spreadsheet.

From the Wax Department, the patterns are then sent to monoshell. At the time of the inspection, wax patterns from Plant 3 were being sent to monoshell in Plant 1. Patterns can be processed through monoshell in Plant 3, as needed. Emissions from Monoshell are controlled by two new baghouses, DC-348 and DC-349. Monoshell was not operating, however the facility started the baghouses to observe the pressure drop readings. (DC-348: 0.4 inches, DC-349: 1.7 inches) The facility has designated the Monoshell operations controlled by DC-304 as exempt from permitting under Rule 285(2)(l)(vi)(c).

Since the last inspection, all dewaxing, kiln firing, melting and pouring operations have been transferred to Plant 1. After casting, knockout and prefinishing at Plant 1, castings are brought to Plant 3 for core removal, finishing and inspection.

### Core Removal/Finishing

The facility employs numerous processes to remove the ceramic core and finish the cast part. Processes include salt bath, knockoff, cut-off saws, grinding and blasting machine. Emissions are controlled by DC-301, DC-305, DC-308 and DC-346 and DC-347. Each of the emission units associated with the control devices is contained in FGEXTDCS of Opt-out permit No. 125-14B.

DC-301 (EU-DC-301) controls emissions from grinding, grit and shot blasting and is one of the older baghouses that has ben retrofitted with a horizontal stack. Observation of the baghouse during the inspection showed a pressure drop of 7.5 inches.

DC-305 (EU-DC-305) controls emissions from sanding and some blasting. Observation of the baghouse during the inspection showed a pressure drop of 6.6 inches.

DC-308 (EU-DC-308) controls emissions from the finishing room sanders and the Acme Polishing Cell. Observation of the baghouse during the inspection showed a pressure drop of 0.4 inches.

DC-346 (EU-DC-346) controls emissions from the finishing, grinding, and power packs. Observation of the baghouse during the inspection showed a pressure drop of 2.8 inches.

DC-347 (EU-DC-347) controls emissions from cut-off booths. Observation of the baghouse during the inspection showed a pressure drop of 1.5 inches.

Note: During the inspection a roof top observation showed no visible emissions from Plant 3.

To remove the cores from the blades and vanes, the facility utilizes a heated potassium hydroxide (KOH) salt bath process. The exhaust from three of the tanks is vented uncontrolled, while the exhaust from one of the tanks is vent through a scrubber, however, the scrubber is not operated. The facility has designated the salt baths as exempt 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.

The facility also utilizes sodium hydroxide autoclaves for core removal. The autoclaves are controlled by a caustic scrubber. The facility has previously designated the process as exempt under Rule 285(2)(l)(iii).

#### 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. During the inspection the observed pressure drop was 3.35" which is within the established operating range of 0.1-6.0 inches. The liquid flow rate was 69.33 gpm, which is within the established operating range of 64-80 gpm. The liquid pH was 7.95, which is above the established minimum pH of 7.0.

#### Monitoring/Recordkeeping

The facility is required to implement and maintain an operation and maintenance plan for the baths and scrubber. Additionally, the facility is required to maintain records in accordance with the O&M Plan for the purpose of compliance demonstration.

The facility previously submitted an O&M Plan. The facility provided requested records. They record and maintain daily records of the water flow rate, differential pressure drop, and pH. The establish water flow rate for the scrubber is 64-80 GM, the differential pressure drop range is 0.1 to 6 inches and the pH is 7.0 or above. Review of the records showed at total of six days in FY20 when the water flow rate was below the established range. Review of the pressure drop records showed a total of eight days for the 12 month period when the pressure drop was below the

established range. The facility provided a summary of work orders filed addressing the out of range readings. All but three of the the occurrences were addressed with work orders. The three occurrences that were not addressed with work orders were single reading events with the pressure drop returning to normal with the following recorded reading. Review of the pH records showed all readings to be greater than 7.0.

### **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-T-302.

#### **EU-T-302**

(Emission unit previously called EU-ETCHTANKS)

Two (2) Ferric Acid Etch lines, total of 12 tanks (consisting of Ferric Acid Etch tanks and rinse baths), located in Plant 3. Ferric Acid Etch tanks and hot water rinse tanks are controlled by a wet scrubber. The Ferric Acid Etch tanks compose of  $\text{FeCl}_3$ , HCl,  $\text{HNO}_3$ , and  $\text{H}_2\text{O}$ .

#### **EMISSION LIMITS**

Limits HCL emissions to 16.8 pounds per day and 3.10 tons per year on a 12-month rolling average.

Compliance with the emission limits is based on facility emission factor calculations.  $[\text{Heated tanks hrs} * \text{Emission factor} * 2 \text{ tanks}] + [\text{Room Temp tanks} * \text{EF} * 2 \text{ tanks}] + [\text{Spot etch Hours} * \text{EF}] = \text{Emissions}$  The facility provided daily requested records. Review of the records showed compliance with the 16.8 pounds per day emission limit. The records showed that for all days reviewed, emissions were below 3.0 pounds/day. Review of the previous 12-month rolling emission records showed compliance with the 3.10 ton per year limit on a 12-month rolling total.

#### **PROCESS/OPERATIONAL RESTRICTIONS**

Requires the installation and operation of the crossflow packed bed scrubber along with operation in accordance with an O&M Plan.

The scrubber was observed installed and operating during the inspection. The facility previously submitted an O&M Plan.

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 requested daily records documenting the pressure drop, flow rate and pH. The facility established flow rate is 150-250 GM, differential pressure 0 to 4 inches and pH of 7.0 or above. During the inspection the observed flow rate was 202.7 gpm, the differential pressure was 0.65 inches for the scrubber and 1.24 inches for the scrubber and demister. Some staining was observed on the body of the scrubber, which appeared to be historical.

Review of the daily flow rate records showed all recorded readings to be within the established flow ranges, except for the following days: February 16 & 17, 2020 and December 24, 2020. The facility provided a summary of work orders submitted to address the out of range readings. Additionally, the facility was not operating on December 24, 2020.

Review of the pressure drop records showed all recorded readings to be within the established range, except for the following days: May 30, 31, 2020 and July 18, 26, 2020. The facility provided a summary of work orders submitted to address the out of range readings, except for July 26, 2020, when the pressure drop was slightly over the established range. The pressure drop returned to normal with the following recorded reading

**MONITORING /RECORDKEEPING**

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

The facility is required to maintain records of daily, monthly and 12-month rolling time period HCL emission rates. The facility provided a copy of the required emission records, as requested.

**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**

FGEXTDCS includes the following emission units in Plant 1 and Plant 3: EU-DC-103, EU-DC-104, EU-DC-106, EU-DC-107, EU-DC-108, EU-DC-109, EU-DC-301, EU-DC-305, EU-DC-308, EU-DC-346, EU-DC-347.

**EMISSION LIMITS**

FGEXTDCS contains emission limits for PM, PM10, PM2.5 on a pound per 1,000 pounds of exhaust gas as well as tons per year basis. Each emission unit stack has a PM, PM10, PM2.5 limit of 0.02 lb/1,000 lb of exhaust gases, except for EU-DC-109, which has an emission limit of 0.01 lb/1,000 lb of exhaust gases. The ton per year limit is for all of the emission units combined.

Compliance with the lb/1,000 lb of exhaust gas limits is based upon proper operation of the baghouses to assure that the control efficiency is maintained. Additionally, upon request, verification of compliance via stack testing can be requested. To date, testing has not been requested.

The facility is required to maintain records of PM, PM10 and PM2.5 on a tons per 12-month rolling time period.

The facility provided records requested, which demonstrated compliance with the emission limits.

	12-month rolling	
PM	1.50 tons	Limit: 47.4 tons
PM2.5	0.02 tons	Limit: 46.7 tons
PM10	0.08 tons	Limit: 47.4 tons

**DESIGN/EQUIPMENT PARAMETERS**

Requires that each baghouse is installed, maintained, and operated in a satisfactory manner.

Each baghouse was observed to be installed and appeared to be operating properly.

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

All observed baghouses were equipped with a pressure drop device.

No emissions were observed from any of the baghouses during the inspection.

**MONITORING /RECORDKEEPING**

Requires that the facility maintain PM, PM10, and PM2.5 emission records documenting compliance with the 12-month rolling time period limits. The facility provided copies of the required records.

Requires that the facility monitor and record the pressure drop across each baghouse at least once per calendar week when the emission unit is operating.

The facility provided the weekly pressure drop records for FY 20. The established pressure drop range for EU-DC-103, EU-DC-104, EU-DC-106, EU-DC-107, EU-DC-108 is 0.1 - 6 inches for each unit. The established pressure drop range for EU-DC-301, EU-DC-305, EU-DC-308, EU-DC-346, EU-DC-347 is 0.1 - 12 inches for each unit. DC-109 has not been installed yet. Several of the dust collector pressure drop readings were observed to be outside of the established ranges. The facility provided a summary of work orders filed to address the readings. The facility also stated that they were reviewing the recommended DP ranges to ensure they are still applicable. The facility also noted that the collector with several readings outside of the established range (DC-108) is in an enclosed room and that the readings above the target range does not impact the dust collection exhaust, only the intake suction efficiency.

**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 provided a copy of the current plan, revised on July 13, 2020.

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.

Due to the specifications of the parts manufactured at the facility, scrap metal is not purchased for charging to the melt furnaces. The facility uses ingot created based on customer specifications. The facility utilizes vacuum casting furnaces, which require the equipment be fully enclosed to maintain a vacuum.

The facility is restricted to melting less than 6,000 tons of metal per calendar year. The facility provided multiple years of melt records documenting that the highest melt rate since 2006 was 761 tons, which occurred in 2019 and 2017.

The facility provided a copy of the list of employees that have received training regarding Subpart 6Z.

**Opt-Out Limits**

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

**EMISSION LIMITS/RECORDKEEPING**

Restricts PM, PM10 and PM2.5 emissions on a tons per year basis.

The facility provided monthly and 12-month total requested records documenting PM emissions in compliance with the applicable limits.

**12-month total**

<b>PM</b>	<b>3.32 tons</b>	<b>Limit: 65 tons</b>
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<b>PM2.5</b>	<b>1.21 tons</b>	<b>Limit: 75 tons</b>
<b>PM10</b>	<b>5.58 tons</b>	<b>Limit: 75 tons</b>

**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 Eric Grinstern

DATE 08/23/2021

SUPERVISOR HH