



**MISSOURI**  
DEPARTMENT OF  
NATURAL RESOURCES

**MISSOURI AIR CONSERVATION COMMISSION**

**PERMIT TO CONSTRUCT**

Under the authority of RSMo 643 and the Federal Clean Air Act the applicant is authorized to construct the air contaminant source(s) described below, in accordance with the laws, rules and conditions as set forth herein.

Permit Number: 01 2 0 1 7 - 0 0 8

Project Number: 2016-06-034  
Installation Number: 113-0029

Parent Company: Toyota Motor Engineering & Manufacturing North America, Inc.

Parent Company Address: 25 Atlantic Ave, Erlanger, KY 41018

Installation Name: Bodine Aluminum, Inc.

Installation Address: 100 Cherry Blossom Way, Troy, MO 63379

Location Information: Lincoln County, S38, T36N, R7W

Application for Authority to Construct was made for:

Phase II: Installation of new casting lines. This review was conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*.

Standard Conditions (on reverse) are applicable to this permit.

Standard Conditions (on reverse) and Special Conditions are applicable to this permit.

Prepared by  
Sam Anzalone  
New Source Review Unit

Director or Designee  
Department of Natural Resources

JAN 12 2017

Effective Date

**STANDARD CONDITIONS:**

Permission to construct may be revoked if you fail to begin construction or modification within two years from the effective date of this permit. Permittee should notify the Enforcement and Compliance Section of the Air Pollution Control Program if construction or modification is not started within two years after the effective date of this permit, or if construction or modification is suspended for one year or more.

You will be in violation of 10 CSR 10-6.060 if you fail to adhere to the specifications and conditions listed in your application, this permit and the project review. In the event that there is a discrepancy between the permit application and this permit, the conditions of this permit shall take precedence. Specifically, all air contaminant control devices shall be operated and maintained as specified in the application, associated plans and specifications.

You must notify the Enforcement and Compliance Section of the Department's Air Pollution Control Program of the anticipated date of start up of this (these) air contaminant source(s). The information must be made available within 30 days of actual startup. Also, you must notify the Department's regional office responsible for the area within which you are located within 15 days after the actual start up of this (these) air contaminant source(s).

A copy of the permit application and this permit and permit review shall be kept at the installation address and shall be made available to Department's personnel upon request.

You may appeal this permit or any of the listed special conditions to the Administrative Hearing Commission (AHC), P.O. Box 1557, Jefferson City, MO 65102, as provided in RSMo 643.075.6 and 621.250.3. If you choose to appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed. If it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC.

If you choose not to appeal, this certificate, the project review and your application and associated correspondence constitutes your permit to construct. The permit allows you to construct and operate your air contaminant source(s), but in no way relieves you of your obligation to comply with all applicable provisions of the Missouri Air Conservation Law, regulations of the Missouri Department of Natural Resources and other applicable federal, state and local laws and ordinances.

The Air Pollution Control Program invites your questions regarding this air pollution permit. Please contact the Construction Permit Unit using the contact information below.

**Contact Information:**  
Missouri Department of Natural Resources  
Air Pollution Control Program  
P.O. Box 176  
Jefferson City, MO 65102-0176  
(573) 751-4817

The regional office information can be found at the following website:  
<http://dnr.mo.gov/regions/>

**SPECIAL CONDITIONS:**

The permittee is authorized to construct and operate subject to the following special conditions:

*The special conditions listed in this permit were included based on the authority granted the Missouri Air Pollution Control Program by the Missouri Air Conservation Law (specifically 643.075) and by the Missouri Rules listed in Title 10, Division 10 of the Code of State Regulations (specifically 10 CSR 10-6.060). For specific details regarding conditions, see 10 CSR 10-6.060 paragraph (12)(A)10. "Conditions required by permitting authority."*

Bodine Aluminum, Inc.  
Lincoln County, S38, T36N, R7W

1. **Superseding Condition**
  - A. The conditions of this permit supersede all special conditions found in the previously issued construction permit 102015-005 issued by the Air Pollution Control Program.
  
2. **NO<sub>x</sub>, VOC and HAPs Emission Limitations**
  - A. Bodine Aluminum, Inc. shall emit less than 250 tons of NO<sub>x</sub> in any consecutive 12-month period from the entire installation, see Table 1 and Table 2 listed below.
  
  - B. Bodine Aluminum, Inc. shall emit less than 250.0 tons of VOCs in any consecutive 12-month period from the entire installation, see Table 1 and Table 2 listed below.
  
  - C. Bodine Aluminum, Inc. shall emit less than 10.0 tons individually and 25.0 tons combined of HAPs in any consecutive 12-month period from the entire installation see Table 1 and Table 2 listed below.
  
  - D. Attachment A, Attachment B and Attachment D or equivalent forms, such as electronic forms, approved by the Air Pollution Control Program shall be used to demonstrate compliance with Special Conditions 2.A, 2.B, and 2.C.
  
3. **PM<sub>10</sub> Emission Limitation**
  - A. Bodine Aluminum, Inc. shall emit less than 250 tons of PM<sub>10</sub> in any consecutive 12-month period from the entire installation see Table 1 and Table 2 listed below.
  
  - B. Attachment C or equivalent forms, such as electronic forms, approved by the Air Pollution Control Program shall be used to demonstrate compliance with Special Conditions 3.A.

**SPECIAL CONDITIONS:**

The permittee is authorized to construct and operate subject to the following special conditions:

**Table 1: Emission units subject to operational limitations of Special Condition 3 in permit 062014-002**

Emission units	Description
C01	Plantwide Natural Gas Combustion
G1	General Plant Exhaust
M1	Plantwide Machining Stations
O2	Cylinder Head Casting
O5	Cylinder Head Core Molding
OA7	Cylinder Head Heat Treatment Furnaces – Process Emissions
P01	Used Sand Crushing
P02	Used Sand Sieving
P03	Aluminum/Sand Separation
P04	Final Sand Crushing
P05	Sand Reclamation Furnace
P06	Sand Separation
P07	Sand Storage
P08	Sand Weighing
P09	Sand Dryer - Process Emissions
P10	Heated Sand Storage
P11	Resin Coating
P12	Resin Holding, Bin Charging
P14	Coated Sand Crushing/Cooling
P15	Coated Sand Sieving
P16	Coated Sand Storage
P30	High Pressure Die Casting
P35	Diesel Emergency Generator

**SPECIAL CONDITIONS:**

The permittee is authorized to construct and operate subject to the following special conditions:

**Table 2: Emission units from phase I – II**

Emission Units	Description	Phase
I01a	Sand Mixing	I
I01b	Sand Polisher	I
I01c	Sand Classifier	I
I01d	Sand Classifier	II
I01e	Sand Crushing	I
I01f (5 Units)	Core Molding	I
I02a	Sand Mixing	I
I02b	Sand Polisher	I
I02c	Sand Classifier	I
I02d	Sand Classifier	II
I02e	Sand Crushing	I
I02f (5 Units)	Core Molding	I
I03a	Sand Mixing	I
I03b	Sand Polisher	I
I03c	Sand Classifier	I
I03d	Sand Classifier	II
I03e	Sand Crushing	I
I03f (5 Units)	Core Molding	I
I04a	Sand Mixing	I
I04b	Sand Polisher	I
I04c	Sand Classifier	I
I04d	Sand Crushing	I
I04e (2 Units)	Core Molding	I
C01	Heat Treatment Natural Gas Combustion	I
Q01a	Sand Mixing	II
Q01b	Sand Polisher	II
Q01c	Sand Classifier	II
Q01d	Sand Classifier	II
Q01e	Sand Crushing	II
Q01f (5 Units)	Core Molding	II
Q02a	Sand Mixing	II
Q02b	Sand Polisher	II
Q02c	Sand Classifier	II
Q02d	Sand Classifier	II
Q02e	Sand Crushing	II
Q02f (5 Units)	Core Molding	II
C01	Heat Treatment Natural Gas Combustion	II

**SPECIAL CONDITIONS:**

The permittee is authorized to construct and operate subject to the following special conditions:

**4. Control Device Requirement-Baghouse**

A. Bodine Aluminum, Inc. shall control emissions from the listed equipment below using baghouses as specified in the permit application.

1) From Phase I:

- a) Baghouse 1: EU-I01e, EU-I02e, EU-I03e, EU-I04e
- b) Baghouse 2: EU-I01b, EU-I02b, EU-I03b, EU-I04b
- c) Baghouse 3: EU-I01c, EU-I02c, EU-I03c, EU-I04c
- d) Baghouse 4: EU- C01

2) From Phase II:

- a) Baghouse 3: EU-I01d, EU-I02d, EU-I03d
- b) Baghouse 4: EU-C01
- c) Baghouse 5: EU-Q01e, EU-Q02e
- d) Baghouse 6: EU-Q01b, EU-Q02b
- e) Baghouse 7: EU-Q01c, EU-Q01d, EU-Q02c, EU-Q02d
- f) Baghouse 8: EU-Q01a, EU-Q02a
- g) Baghouse 9: EU-Q01f, EU-Q02f

B. The baghouses shall be operated and maintained in accordance with the manufacturer's specifications. The baghouse shall be equipped with a gauge or meter, which indicates the pressure drop across the control device. These gauges or meters shall be located such that Department of Natural Resources' employees may easily observe them.

C. Replacement filters for the baghouses shall be kept on hand at all times. The bags shall be made of fibers appropriate for operating conditions expected to occur (i.e. temperature limits, acidic and alkali resistance, and abrasion resistance).

D. Bodine Aluminum, Inc. shall monitor and record the operating pressure drop across the baghouses at least once every 24 hours. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer's performance warranty.

E. Bodine Aluminum, Inc. shall maintain a copy of the baghouse manufacturer's performance warranty on site.

F. Bodine Aluminum, Inc. shall maintain an operating and maintenance log for the baghouses which shall include the following:

- 1) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
- 2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.

**SPECIAL CONDITIONS:**

The permittee is authorized to construct and operate subject to the following special conditions:

5. **Capture Device – Partial Enclosure**
  - A. Bodine Aluminum, Inc. shall capture emission from the emission units listed in Special Condition 4. A. using a partial enclosure. All emissions shall be routed to respective control devices.
  - B. Bodine Aluminum, Inc. shall maintain an operating and maintenance log for the enclosures which shall include the following:
    - 1) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
    - 2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
6. **Particulate Matter Emissions**
  - A. Bodine Aluminum, Inc shall calculate the potential to emit of PM filterable and submit to the Air Pollution Control Program's Permits Section including the equipment list, emission factors, emission factor sources, maximum hourly design rate, control efficiency and capture efficiency of all effected equipment.
  - B. Bodine Aluminum, Inc shall submit this information to the Air Pollution Control Program within 60 days of permit issuance.
  - C. If PM emissions are greater than 250 tpy, the installation needs to submit an amendment application to this permit or undergo PSD
7. **Record Keeping and Reporting Requirements**
  - A. Bodine Aluminum, Inc. shall maintain all records required by this permit for not less than five years and shall make them available immediately to any Missouri Department of Natural Resources' personnel upon request.
  - B. Bodine Aluminum, Inc. shall report to the Air Pollution Control Program's Compliance/Enforcement Section, P.O. Box 176, Jefferson City, MO 65102, no later than 10 days after the end of the month during which any record required by this permit shows an exceedance of a limitation imposed by this permit.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE  
SECTION (5) REVIEW

Project Number: 2016-06-034

Installation ID Number: 113-0029

Permit Number: 012017-008

Installation Address:

Bodine Aluminum, Inc.

100 Cherry Blossom Way

Troy, MO 63379

Parent Company:

Toyota Motor Engineering &  
Manufacturing North America, Inc.

25 Atlantic Ave

Erlanger, KY 41018

Lincoln County, S38, T36N, R7W

REVIEW SUMMARY

- Bodine Aluminum, Inc. has applied for authority to construct new casting lines.
- The application was deemed complete on July 11, 2016.
- HAP emissions are expected from the proposed equipment. HAPs emitted from this process are from the combustion process involving natural gas.
- None of the New Source Performance Standards (NSPS) apply to the project emission units.
- None of the NESHAPs apply to the project emission units. None of the currently promulgated MACT regulations apply to the proposed equipment.
- Baghouses are being used to control the particular matter emissions from the specified equipment in this permit.
- This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of PM, PM<sub>10</sub>, and PM<sub>2.5</sub> are conditioned below de minimis levels.
- This installation is located in Lincoln County, an attainment area for all criteria pollutants.
- This installation is not on the List of Named Installations found in 10 CSR 10-6.020(3)(B), Table 2. The installation's major source level is 250 tons per year and fugitive emissions are not counted toward major source applicability.



- Ambient air quality modeling was not performed since potential emissions of the application are below de minimis levels and individual HAP emissions are below their respective SMALs.
- Emissions testing is not required for the equipment as a part of this permit. Testing may be required as part of other state, federal or applicable rules.
- Submitting an application for the existing operating permit to include the new equipment and processes from this project is required before the next renewal of this facility's operating permit.
- Approval of this permit is recommended with special conditions.

### INSTALLATION DESCRIPTION

Bodine Aluminum, Inc. is an aluminum die casting installation located in Lincoln County. They are a wholly owned division of Toyota Motor Engineering and Manufacturing North America, Inc. They have operated an aluminum casting facility in Troy, Missouri since 1992. Bodine Aluminum, Inc. produces engine components to support Toyota's North American vehicle manufacturing operations. Processes at the installation include, aluminum casting, heat treating, core molding, and sand reclamation.

Bodine Aluminum, Inc. currently operates under Part 70 Operating Permit OP2012-122 which expires November 18, 2015. A Part 70 operating permit renewal application was submitted (on-time) for review by Missouri Air Pollution Control Program on May 14, 2015. Bodine Aluminum, Inc. shall provide the program with the changes pertaining to this project (2015-05-052) prior to issuance of the Part 70 operating permit renewal which is currently under review.

Bodine Aluminum, Inc is a minor source under New Source Review permits. The following New Source Review permits have been issued to Bodine Aluminum, Inc. from the Air Pollution Control Program.

**Table 3: Permit History**

Permit Number	Description
0591-003	Original permit for the installation of the plant
0593-008	Installation of a natural gas oven to dry recycled aluminum prior to melting
1193-006	Addition of six machining centers and a washing station to produce engine brackets
0194-014	Addition of a shot blaster to rework surface areas
0995-005	Increase production by 1,825 tons of poured aluminum
0196-019	Addition of new building and increased production
0996-011	Addition of natural gas fired die heating oven, 2 MMBtu/hr
1299-009 & 1299-009A	Addition of casting machines
112004-005	Replace casting and machine equipment
032006-004	New casting line
112008-006	Modify product mix
032012-006 & 032012-006A	Increase coolant to 5,000 gal/yr, reduce sand production to 58,500 tpy, install DC-10 furnace, startup four idle high pressure die casting machines
062014-002	Install casting machines, core machines, and a natural gas-fired heat treat furnace
102014-009	Removal of RTO from reclamation furnaces—modification of sand reclaim furnaces
102015-005	Install casting machines, core machines, and natural gas-fired heat treat furnace

### PROJECT DESCRIPTION

Bodine Aluminum, Inc. (BAI) is installing a process in the core-molding area of the existing facility. The core-molding process is done to make engine components for Toyota Motor Corporation's North American vehicle manufacturing operations. This process involves using a new core-molding process that does not emit VOC or HAPs.

In old operations, the aluminum came into contact with core molds that contained HAPs and VOCs; the new core-molding process does not have HAPs or VOCs associated with it. For this project, the particulate matter emissions that are associated with core-removal (after aluminum casting has taken place) are also accounted for in the calculations for the core-molding machines; in old casting processes, the emissions associated with core-removal were accounted for in a separate calculation. In addition to the sand-handling equipment in the core-molding process, there is a closed-loop, electric holding furnace that keeps the aluminum in the molten state in which it is delivered; therefore, there are no combustion emissions associated with the electric holding furnace.

This project is the second phase of the installation of new casting line projects that has been submitted by BAI. Phase I was the installation of 17 core-molding machines, 12 aluminum casting machines, 4 sand crushers, 4 sand polishers, 4 sand classifiers, 4 sand mixers, and a heat treatment for the process (Construction Permit 102015-005). In phase II, BAI is installing 15 core-molding machines, 6 aluminum casting machines, 2 sand crushers, 2 sand polishers, 2 sand classifiers, 2 sand mixers, and a heat treatment. This project is part of a phased project therefore the phased project's total potential emissions include the potential emission from the previous phase, as well as the potential emissions of this project

The core-molding process has multiple steps, each of the steps have particle matter emission. The sand is processed through a crusher, heated by an electric sand heater, and then the sand goes through a polisher. The sand is then classified by grain size in the sand classifier. The sand is then mixed with non-VOC-containing and non-HAP-containing binding agent. These steps are known as the sand reclamation which bottlenecks the core-molding process to 726 lb of sand/hr per sand reclamation grouping. One sand reclamation unit can feed up to 5 core machines. After the sand reclamation process the sand is molded to the correct specifications through the core-molding and the molded fixtures are allowed to set before moving to the casting process. After the casting process, there is heat treatment in place to add heat resistance and strength to the cast engine parts prior to shipping to the engine plant. The casted part is heat-treated with a 2.4 MMBtu/hr natural gas-fired heater in phase I and MMBtu/hr natural gas-fired heater in phase II.

In phase I, the particle matter emissions are controlled with a baghouse on EU-I01b, EU-I01c, EU-I01d, EU-I02b, EU-I02c, EU-I02f, EU-I03b, EU-I03c, EU-I03f, EU-I04b, EU-I04c, EU-I04f, EU-C01. In phase II the particle matter emissions are controlled with a baghouse on EU-I01e, EU-I02e, EU-I03e, EU-Q01a, EU-Q01b, EU-Q01c, EU-Q01d, EU-Q01e, EU-Q01f, EU-Q02a, EU-Q02b, EU-Q02c, EU-Q02d, EU-Q02e, EU-Q02f, EU-C01.

It is worth noting that this permit contains a completely new core-molding operation that does not affect the "Operational Limitations" set forth by "Special Condition 3" within Permit 062014-002.

### EMISSIONS/CONTROLS EVALUATION

The emission factors and control efficiencies used in this analysis were obtained from the EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, 11.19.1 "Sand & Gravel Processing" (November 1995) and EPA's WebFIRE database (SCC 3-050-2713, Sand Classifying). Several emission factors used in this analysis were taken from Toyota's researched design data – similar design data to what has been previously used by Missouri air Pollution Control Program. These emission factors were used because they are a more conservative representation than the EPA provided factors. These emission factors are associated with the sand polisher (EU-I01b, EU-I02b, EU-I03b, EU-I04b, EU-Q01b, EU-Q02c), the sand crushing (EU-I01c, EU-I02c,

EU-I03c, EU-I04c, EU-Q01c, EU-Q02c), and the core-molding machines (EU-I01e, EU-I02e, EU-I03e, EU-I04e, EU-Q01e, EU-Q02e). The emission factors provided by Toyota were for PM, for all intents and purposes, PM<sub>10</sub> and PM<sub>2.5</sub> are assumed to be equal to PM.

A capture efficiency of 50% was assumed for all equipment containing a baghouse because the equipment is partial enclosed with a vacuum. The baghouse were assumed to have a 99% efficiency which is standard for baghouses. The process is a closed loop, allowing for each sand reclamation process and associated core machines to be grouped together. A summary can be found in Table 4. (The plant will only need to track to total amount of sand entering the system of each grouping). All natural gas combustion equipment will be grouped into EU-C01. A summary of all equipment can be found in Table 5.

**Table 4. Emission unit grouping summary for new casting system**

<b>Emission Unit Group</b>	<b>Emission Units</b>	<b>Description</b>
<b>EU-I01</b>		
	I01a	Sand Mixing
	I01b	Sand Polisher
	I01c	Sand Classifier
	I01d	Sand Classifier
	I01e	Sand Crushing
	I01f (5 Units)	Core Molding
<b>EU-I02</b>		
	I02a	Sand Mixing
	I02b	Sand Polisher
	I02c	Sand Classifier
	I02d	Sand Classifier
	I02e	Sand Crushing
	I02f (5 Units)	Core Molding
<b>EU-I03</b>		
	I03a	Sand Mixing
	I03b	Sand Polisher
	I03c	Sand Classifier
	I03d	Sand Classifier
	I03e	Sand Crushing
	I03f (5 Units)	Core Molding
<b>EU-I04</b>		
	I04a	Sand Mixing
	I04b	Sand Polisher
	I04c	Sand Classifier
	I04d	Sand Crushing
	I04e (2 Units)	Core Molding
<b>EU-Q01</b>		
	Q01a	Sand Mixing

	Q01b	Sand Polisher
	Q01c	Sand Classifier
	Q01d	Sand Classifier
	Q01e	Sand Crushing
	Q01f (5 Units)	Core Molding
<b>EU-Q02</b>		
	Q02a	Sand Mixing
	Q02b	Sand Polisher
	Q02c	Sand Classifier
	Q02d	Sand Classifier
	Q02e	Sand Crushing
	Q02f (5 Units)	Core Molding

**Table 5. Summary of all natural gas equipment under EU-C01**

<b>Description</b>	<b>Use</b>	<b>Number of Units</b>	<b>Total Max Throughput (MMBtu)</b>
Sand Reclamation Furnace	Sand reclaimed by heating to eliminate leftover binders and residues	1	4.8
Sand Reclamation Furnace	Sand reclaimed by heating to eliminate leftover binders and residues	1	4.8
Resin Coating/Muller	Sand is pre-heated and mixed with resin to form cores	1	4
Regenerative Thermal Oxidizer	Destruction of emissions from sand reclamation	1	8.9
High Pressure Die Casting Die Heaters	Metal die heater	53	24.91
Toyota New Global Architecture (TNGA) Die Heaters	Die Heater/Casting Machine	9	0.234
HVAC Units	Heating for building	31	135.98
NG Generator	Backup generator	1	0.013
Water Heater	Water for showers, cafeteria and die wash	3	0.19
Conventional Heat Treatment	Heat treatment for cast aluminum parts	5	4.75
Simple Slim Heat Treatment	Heat treatment for cast aluminum parts	8	6.36
Simple Slim Heat Treatment	Heat treatment for cast aluminum parts	1	1.586
TNGA Heat Treatment	Heat treatment for cast aluminum parts	3	7.2

The following table provides an emissions summary for this project. Existing potential emissions were taken from Permit 062014-002. Existing actual emissions were taken from the installation's 2015 EIQ. Potential emissions of the application represent the potential of the new equipment, assuming continuous operation (8760 hours per year).

**Table 6: Emissions Summary (tpy)**

Pollutant	Regulatory De Minimis Levels	Existing Potential Emissions	Existing Actual Emissions (2015 EIQ)	Controlled Potential Emissions of Phase I	Controlled Potential Emissions of this project (Phase II)	Controlled Potential Emissions of Phase II	New Installation conditioned Potential
PM	25.0	N/D	N/D	0.928	0.00046	0.929	N/A
PM <sub>10</sub>	15.0	<250.0	28.17	0.929	0.002	0.931	<250.0
PM <sub>2.5</sub>	10.0	N/D	27.9	0.929	0.002	0.931	N/A
SO <sub>x</sub>	40.0	N/D	0.07	0.006	0.01	0.016	N/A
NO <sub>x</sub>	40.0	<250.0	48.6	1.94	2.28	4.22	<250.0
VOC	40.0	<250.0	115.2	0.06	0.07	0.13	<250.0
CO	100.0	N/D	5.44	0.859	1.01	1.869	N/A
GHG (CO <sub>2</sub> e)	100,000	N/D	N/D	1,226.9	1,442.8	2,669.7	N/A
HAPs	10.0/25.0	<25.0	N/D	0.02	0.02	0.04	<25.0
Benzene (71-43-2)	10.0 (SMAL = 2.0)	<10.0	0.71	0.000022	0.000025	0.000047	<10.0
Acetaldehyde (75-07-0)	10.0 (SMAL = 9.0)	<10.0	0.98	N/A	N/A	N/A	<10.0
Formaldehyde (50-00-0)	10.0 (SMAL = 2.0)	<10.0	0.54	0.00077	0.00090	0.00167	<10.0
Phenol (108-95-2)	10.0 (SMAL = 0.10)	<10.0	0.08	N/A	N/A	N/A	<10.0
Hexane (110-54-3)	10.0 (SMAL = 10.0)	<10.0	0.12	0.02	0.02	0.04	<10.0
Cresol (1319-77-3)	10.0 (SMAL = 1.0)	<10.0	0.17	N/A	N/A	N/A	<10.0

N/A = Not Applicable; N/D = Not Determined

<sup>1</sup>The controlled potential emissions of phase I include the use of a baghouse in Special Condition 4

<sup>2</sup>The controlled potential emissions of phase II include the use of a baghouse in Special Condition 4

## PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of all pollutants are below de minimis levels. Potential emissions of PM<sub>10</sub> are above insignificant levels.

## APPLICABLE REQUIREMENTS

Bodine Aluminum, Inc. shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations should be consulted for specific record keeping, monitoring, and reporting requirements. Compliance with these emission standards, based on information submitted in the application, has been verified at the time this application was approved. For a complete list of applicable requirements for your installation, please consult your operating permit.

## GENERAL REQUIREMENTS

- *Submission of Emission Data, Emission Fees and Process Information*, 10 CSR 10-6.110
  - Per 10 CSR 10-6.110(4)(B)2.B(II) and (4)(B)2.C(II) a full EIQ is required for the first full calendar year the equipment (or modifications) approved by this permit are in operation.
- *Operating Permits*, 10 CSR 10-6.065
- *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*, 10 CSR 10-6.170
- *Restriction of Emission of Visible Air Contaminants*, 10 CSR 10-6.220
- *Restriction of Emission of Odors*, 10 CSR 10-6.165

## STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*, it is recommended that this permit be granted with special conditions.

## PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated June 13, 2016, received June 15, 2016, designating Toyota Motor Engineering & Manufacturing North America, Inc. as the owner and operator of the installation.



## Attachment A – VOC Compliance Worksheet

Bodine Aluminum, Inc.  
 Lincoln County, S36, T36, R7W  
 Project Number: 2016-06-034  
 Installation ID Number: 113-0029  
 Permit Number: **012017-008**

This sheet covers the period from \_\_\_\_\_ to \_\_\_\_\_.  
 (month, year) (month, year)

Emission Source	Description	Monthly Usage	VOC Emission Factor	Monthly VOC Emissions (tons)
C01	Plantwide Natural Gas Combustion	MMscf	5.5 lb/MMscf	
M1	Plantwide Machining Stations	gal	1.8 lb/gal	
O2	Cylinder Head Casting	tons metal	3.75 lb/ton <sup>2</sup>	
O5	Cylinder Head Core Molding	tons sand	1.326 lb/ton <sup>3</sup>	
OA7	Cylinder Head Heat Treat Furnaces	tons metal	0.88 lb/ton <sup>4</sup>	
P05	Sand Reclamation Furnace	tons sand	2.32 lb/ton <sup>5</sup>	
P09	Sand Dryer	tons sand	0.002 lb/ton <sup>5</sup>	
P11	Resin Coating	tons sand	0.109 lb/ton <sup>5</sup>	
P30	High Pressure Die Casting	tons metal	1.15 lb/ton <sup>5</sup>	
P35	Emergency Generator	1,000 gal	11.5 lb/1,000 gal	
<b>Installation Monthly VOC Emissions<sup>6</sup> (tons)</b>				
<b>Installation 12-Month Rolling Total VOC Emissions<sup>7</sup> (tons)</b>				

<sup>1</sup> Monthly VOC Emissions (tons) = Monthly Usage x VOC Emission Factor x 0.0005 (ton/lb).

<sup>2</sup> The VOC Emission Factor for O2 already accounts for the scrubber, no additional control efficiency shall be used. After the stack testing required by Special Condition 6 in Permit 102014-009 is complete, the VOC Emission Factor for O2 shall be the approved stack tested emission factor. As the stack testing will occur at the scrubber outlet, no additional control efficiency shall be used.

<sup>3</sup> The VOC Emission Factor for O5 already accounts for the scrubber, no additional control efficiency shall be used. After the stack testing required by Special Condition 6 in Permit 102014-009 is complete, the VOC Emission Factor for O5 shall be the approved stack tested emission factor. As the stack testing will occur at the scrubber outlet, no additional control efficiency shall be used.

<sup>4</sup> After the stack testing required by Special Condition 6 in Permit 102014-009 is complete, the VOC Emission Factor for OA7 shall be the approved stack tested emission factor.

<sup>5</sup> The VOC Emission Factors for P05, P09, P11, and P30 are from Project 2011-03-044 and may be replaced by approved stack tested emission factors. No additional control efficiency shall be used.

<sup>6</sup> Installation Monthly VOC Emissions (tons) = the sum of each emission source's Monthly VOC Emissions (tons).

<sup>7</sup> Installation 12-Month Rolling Total VOC Emissions (tons) = the sum of the most recent 12 months' Installation Monthly VOC Emissions (tons) + SSM VOC emissions as reported to ACP Compliance/Enforcement Section. **Installation 12-Month Rolling Total VOC Emissions less than 250.0 tons indicates compliance with Special Condition 2.B.**

## Attachment B – NO<sub>x</sub> Compliance Worksheet

Bodine Aluminum, Inc.  
 Lincoln County, S36, T36, R7W  
 Project Number: 2016-06-034  
 Installation ID Number: 113-0029  
 Permit Number: **01 2017 - 008**

This sheet covers the period from \_\_\_\_\_ to \_\_\_\_\_.  
(month, year) (month, year)

Emission Source	Description	Monthly Usage	NO <sub>x</sub> Emission Factor	Monthly NO <sub>x</sub> Emissions (tons)
C01	Plantwide Natural Gas Combustion	MMscf	100 lb/MMscf	
OA7	Cylinder Head Heat Treat Furnaces	tons metal	1.5 lb/ton <sup>2</sup>	
P09	Sand Dryer	tons sand	1.6 lb/ton <sup>3</sup>	
P35	Emergency Generator	1,000 gal	438 lb/1,000 gal	
<b>Installation Monthly NO<sub>x</sub> Emissions (tons)</b>				
<b>Installation 12-Month Rolling Total NO<sub>x</sub> Emissions (tons)</b>				

<sup>1</sup> Monthly NO<sub>x</sub> Emissions (tons) = Monthly Usage x NO<sub>x</sub> Emission Factor x 0.0005 (ton/lb).

<sup>2</sup> After the stack testing required by Special Condition 6 in Permit 062014-002 is complete, the NO<sub>x</sub> Emission Factor for OA7 shall be the approved stack tested emission factor.

<sup>3</sup> The NO<sub>x</sub> Emission Factors for P09 is from Project 2011-03-044 and may be replaced by approved stack tested emission factors.

<sup>4</sup> Installation Monthly NO<sub>x</sub> Emissions (tons) = the sum of each emission source's Monthly NO<sub>x</sub> Emissions (tons).

<sup>5</sup> Installation 12-Month Rolling Total NO<sub>x</sub> Emissions (tons) = the sum of the most recent 12 months' Installation Monthly NO<sub>x</sub> Emissions (tons) + SSM NO<sub>x</sub> emissions as reported to ACP Compliance/Enforcement Section. **Installation 12-Month Rolling Total NO<sub>x</sub> Emissions less than 250.0 tons indicates compliance with Special Condition 2.A.**

## Attachment C – PM<sub>10</sub> Compliance Worksheet

Bodine Aluminum, Inc.  
 Lincoln County, S36, T36, R7W  
 Project Number: 2016-06-034  
 Installation ID Number: 113-0029  
 Permit Number: **012017-008**

This sheet covers the period from \_\_\_\_\_ to \_\_\_\_\_.  
(month, year) (month, year)

Emission Source	Description	Monthly Usage	PM <sub>10</sub> Emission Factor	Monthly PM <sub>10</sub> Emissions (tons)
C01	Plantwide Natural Gas Combustion	MMscf	7.6 lb/MMscf	
G1	General Plant Exhaust	tons sand	1.16 lb/ton <sup>4</sup>	
O2	Cylinder Head Casting	tons metal	0.411 lb/ton <sup>2</sup>	
O5	Cylinder Head Core Molding	tons sand	0.0104 lb/ton <sup>3</sup>	
P01	Used Sand Crushing	tons sand	0.1015 lb/ton <sup>4</sup>	
P02	Used Sand Sieving	tons sand	0.057 lb/ton <sup>4</sup>	
P03	Aluminum/Sand Separation	tons sand	0.057 lb/ton <sup>4</sup>	
P04	Final Sand Crushing	tons sand	0.0505 lb/ton <sup>4</sup>	
P05	Sand Reclamation Furnace	tons sand	0.2705 lb/ton <sup>4</sup>	
P06	Sand Separation	tons sand	0.0505 lb/ton <sup>4</sup>	
P07	Sand Storage	tons sand	0.0125 lb/ton <sup>4</sup>	
P08	Sand Weighing	tons sand	0.0125 lb/ton <sup>4</sup>	
P09	Sand Dryer	tons sand	0.0125 lb/ton <sup>4</sup>	
P10	Heated Sand Storage	tons sand	0.0125 lb/ton <sup>4</sup>	
P11	Resin Coating	tons sand	0.6 lb/ton <sup>4</sup>	
P12	Resin Holding, Bin Charging	tons sand	0.00064 lb/ton <sup>5</sup>	
P14	Coated Sand Cooling	tons sand	0.114 lb/ton <sup>4</sup>	
	Coated Sand Crushing	tons sand	0.1015 lb/ton <sup>4</sup>	
P15	Coated Sand Sieving	tons sand	0.114 lb/ton <sup>4</sup>	
P16	Coated Sand Storage	tons sand	0.1265 lb/ton <sup>4</sup>	
P30	High Pressure Die Casting	tons metal	0.37 lb/ton <sup>4</sup>	
P35	Emergency Generator	1,000 gal	11.5 lb/1,000 gal	
I01	Sand Reclamation and Core Molding	tons sand	0.1460 lb/ton <sup>6</sup>	
I02	Sand Reclamation and Core Molding	tons sand	0.1460 lb/ton <sup>6</sup>	
I03	Sand Reclamation and Core Molding	tons sand	0.1460 lb/ton <sup>6</sup>	
I04	Sand Reclamation and Core Molding	tons sand	0.1460 lb/ton <sup>6</sup>	
Q01	Sand Reclamation and Core Molding	tons sand	0.0428 lb/ton <sup>6</sup>	
Q02	Sand Reclamation and Core Molding	tons sand	0.0428 lb/ton <sup>6</sup>	
<b>Installation Monthly PM<sub>10</sub> Emissions (tons)</b>				
<b>Installation 12 Month Rolling Total PM<sub>10</sub> Emissions (tons)</b>				

\*The instructions for properly tracking emissions using this tracking sheet may be found on the following page.

<sup>1</sup>Monthly PM<sub>10</sub> Emissions (tons) = Monthly Usage x PM<sub>10</sub> Emission Factor x 0.0005 (ton/lb).

<sup>2</sup>The PM<sub>10</sub> Emission Factor for O2 already accounts for the scrubber, no additional control efficiency shall be used. After the stack testing required by Special Condition 6 in Permit 062014-002 is complete, the PM<sub>10</sub> Emission Factor for O2 shall be the approved stack tested emission factor. As the stack testing will occur at the scrubber outlet, no additional control efficiency shall be used.

<sup>3</sup>The PM<sub>10</sub> Emission Factor for O5 already accounts for the scrubber, no additional control efficiency shall be used). After the stack testing required by Special Condition 6 in Permit 062014-002 is complete, the PM<sub>10</sub> Emission Factor for O5 shall be the approved stack tested emission factor. As the stack testing will occur at the scrubber outlet, no additional control efficiency shall be used.

<sup>4</sup>The PM<sub>10</sub> Emission Factors for G1, P01, P02, P03, P04, P05, P06, P07, P08, P09, P10, P11, P14, P15, P16, and P30 are from Project 2011-03-044 and may be replaced by approved stack tested emission factors. The PM<sub>10</sub> Emission Factors already include controls; therefore, no additional control efficiency shall be used.

<sup>5</sup>The PM<sub>10</sub> Emission Factor for P12 is from FIRE for Process SCC 30502503 and may be replaced by approved stack tested emission factors. The PM<sub>10</sub> Emission Factors already include controls; therefore, no additional control efficiency shall be used.

<sup>6</sup>The PM<sub>10</sub> Emission Factor for EU-I01, EU-102, EU-103, EU-104, EU-Q01, and EU-Q02 are controlled composite emission factors. The emission factors include the sand mixing, sand crushing, sand polisher, sand classifier and up to 5 core machine per grouping. A table summarizing the emission units can be found in Table 4 of the permit. This emission factor already accounts for capture and controls; therefore no additional control efficiency shall be used.

<sup>7</sup>Installation Monthly PM<sub>10</sub> Emissions (tons) = the sum of each emission source's Monthly PM<sub>10</sub> Emissions (tons).

<sup>8</sup>Installation 12-Month Rolling Total PM<sub>10</sub> Emissions (tons) = the sum of the most recent 12 months' Installation Monthly PM<sub>10</sub> Emissions (tons) + SSM PM<sub>10</sub> emissions as reported to APCP Compliance/Enforcement Section. **Installation 12-Month Rolling Total PM<sub>10</sub> Emissions less than 250.0 tons indicates compliance with Special Condition 3.A.**

**Attachment D – HAP Compliance Worksheet**

Bodine Aluminum, Inc.  
 Lincoln County, S36, T36, R7W  
 Project Number: 2016-06-034  
 Installation ID Number: 113-0029  
 Permit Number: **012017-008**

This sheet covers the period from \_\_\_\_\_ to \_\_\_\_\_  
 (month, year) (month, year)

Emission Source & Description	Emission Factors										Emission Factor Units
	Acetaldehyde (75-07-0)	Benzene (71-43-2)	Cresol (1319-77-3)	Formaldehyde (50-00-0)	Hexane (110-54-3)	Phenol (108-95-2)	Styrene (100-42-5)	Toluene (108-88-3)	Xylene (1330-20-7)	HAP	
C01		0.0021		0.075	1.8			0.0034		1.8885	lb/MMscf
O2	0.0212 <sup>2</sup>	0.0264 <sup>2</sup>	0.0076 <sup>2</sup>	0.0191 <sup>2</sup>		0.0014 <sup>2</sup>				0.0757 <sup>2</sup>	lb/ton metal
O5	0.0212 <sup>3</sup>	0.0264 <sup>3</sup>	0.0076 <sup>3</sup>	0.0191 <sup>3</sup>		0.0014 <sup>3</sup>				0.0757 <sup>3</sup>	lb/ton sand
P05	0.3156 <sup>4</sup>	0.0915 <sup>4</sup>	0.4198 <sup>4</sup>	0.0489 <sup>4</sup>		0.164 <sup>4</sup>	0.1389 <sup>4</sup>	0.1326 <sup>4</sup>	0.4134 <sup>4</sup>	2.3256 <sup>4</sup>	lb/ton sand
P11	0.02 <sup>4</sup>	0.0058 <sup>4</sup>	0.0266 <sup>4</sup>	0.0031 <sup>4</sup>		0.0104 <sup>4</sup>	0.0088 <sup>4</sup>	0.0084 <sup>4</sup>	0.00262 <sup>4</sup>	0.1801 <sup>4</sup>	lb/ton sand

Emission Source	Monthly Usage	Monthly Emissions (tons)									
		Acetaldehyde	Benzene	Cresol	Formaldehyde	Hexane	Phenol	Styrene	Toluene	Xylene	HAP
C01 Plantwide Natural Gas Combustion	MMscf										
O2 Cylinder Head Casting	tons metal										
O5 Cylinder Head Core Molding	tons sand										
P05 Sand Reclamation Furnace	tons sand										
P11 Resin Coating	tons sand										
Installation Monthly Emissions (tons)											
Installation 12 Month Rolling Total Emissions (tons)											

\*The instructions for properly tracking emissions using this tracking sheet may be found on the following page.

<sup>1</sup>Monthly Emissions (tons) = Monthly Usage x Emission Factor x 0.0005 (ton/lb).

<sup>2</sup>The Emission Factors for O2 already account for the scrubber, no additional control efficiency shall be used. After the stack testing required by Special Condition 6 in Permit 102014-009 is complete, the Emission Factors for O2 shall be the approved stack tested emission factors. As the stack testing will occur at the scrubber outlet, no additional control efficiency shall be used.

<sup>3</sup>The Emission Factors for O5 already account for the scrubber, no additional control efficiency shall be used). After the stack testing required by Special Condition 6 in Permit 102014-009 is complete, the Emission Factors for O5 shall be the approved stack tested emission factors. As the stack testing will occur at the scrubber outlet, no additional control efficiency shall be used.

<sup>4</sup>The Emission Factors for P05 and P11 is from Project 2011-03-044 and may be replaced by approved stack tested emission factors.

<sup>5</sup>Installation Monthly Emissions (tons) = the sum of each emission source's Monthly Emissions (tons).

<sup>6</sup>Installation 12-Month Rolling Total Emissions (tons) = the sum of the most recent 12 months' Installation Monthly Emissions (tons) + SSM HAP emissions as reported to ACP Compliance/Enforcement Section. **Installation 12-Month Rolling Total Emissions less than 10.0 for each individual HAP and 25 for combined HAPs indicates compliance with Special Condition 2.C.**

## APPENDIX A

### Abbreviations and Acronyms

<b>%</b> .....	percent	<b>m/s</b> .....	meters per second
<b>°F</b> .....	degrees Fahrenheit	<b>Mgal</b> .....	1,000 gallons
<b>acfm</b> .....	actual cubic feet per minute	<b>MW</b> .....	megawatt
<b>BACT</b> .....	Best Available Control Technology	<b>MHDR</b> .....	maximum hourly design rate
<b>BMPs</b> .....	Best Management Practices	<b>MMBtu</b> ...	Million British thermal units
<b>Btu</b> .....	British thermal unit	<b>MMCF</b> .....	million cubic feet
<b>CAM</b> .....	Compliance Assurance Monitoring	<b>MSDS</b> .....	Material Safety Data Sheet
<b>CAS</b> .....	Chemical Abstracts Service	<b>NAAQS</b> ..	National Ambient Air Quality Standards
<b>CEMS</b> .....	Continuous Emission Monitor System	<b>NESHAPs</b>	National Emissions Standards for Hazardous Air Pollutants
<b>CFR</b> .....	Code of Federal Regulations	<b>NO<sub>x</sub></b> .....	nitrogen oxides
<b>CO</b> .....	carbon monoxide	<b>NSPS</b> .....	New Source Performance Standards
<b>CO<sub>2</sub></b> .....	carbon dioxide	<b>NSR</b> .....	New Source Review
<b>CO<sub>2e</sub></b> .....	carbon dioxide equivalent	<b>PM</b> .....	particulate matter
<b>COMS</b> .....	Continuous Opacity Monitoring System	<b>PM<sub>2.5</sub></b> .....	particulate matter less than 2.5 microns in aerodynamic diameter
<b>CSR</b> .....	Code of State Regulations	<b>PM<sub>10</sub></b> .....	particulate matter less than 10 microns in aerodynamic diameter
<b>dscf</b> .....	dry standard cubic feet	<b>ppm</b> .....	parts per million
<b>EIQ</b> .....	Emission Inventory Questionnaire	<b>PSD</b> .....	Prevention of Significant Deterioration
<b>EP</b> .....	Emission Point	<b>PTE</b> .....	potential to emit
<b>EPA</b> .....	Environmental Protection Agency	<b>RACT</b> .....	Reasonable Available Control Technology
<b>EU</b> .....	Emission Unit	<b>RAL</b> .....	Risk Assessment Level
<b>fps</b> .....	feet per second	<b>SCC</b> .....	Source Classification Code
<b>ft</b> .....	feet	<b>scfm</b> .....	standard cubic feet per minute
<b>GACT</b> .....	Generally Available Control Technology	<b>SDS</b> .....	Safety Data Sheet
<b>GHG</b> .....	Greenhouse Gas	<b>SIC</b> .....	Standard Industrial Classification
<b>gpm</b> .....	gallons per minute	<b>SIP</b> .....	State Implementation Plan
<b>gr</b> .....	grains	<b>SMAL</b> .....	Screening Model Action Levels
<b>GWP</b> .....	Global Warming Potential	<b>SO<sub>x</sub></b> .....	sulfur oxides
<b>HAP</b> .....	Hazardous Air Pollutant	<b>SO<sub>2</sub></b> .....	sulfur dioxide
<b>hr</b> .....	hour	<b>tph</b> .....	tons per hour
<b>hp</b> .....	horsepower	<b>tpy</b> .....	tons per year
<b>lb</b> .....	pound	<b>VMT</b> .....	vehicle miles traveled
<b>lbs/hr</b> .....	pounds per hour	<b>VOC</b> .....	Volatile Organic Compound
<b>MACT</b> .....	Maximum Achievable Control Technology		
<b>µg/m<sup>3</sup></b> .....	micrograms per cubic meter		



Eric R. Greitens, Governor • Todd Sampsell, Acting Director

# DEPARTMENT OF NATURAL RESOURCES

dnr.mo.gov

JAN 12 2017

Mr. Garth McLane  
Specialist - Environmental Engineering  
Bodine Aluminum, Inc.  
25 Atlantic Ave  
Erlanger, KY 41018

RE: New Source Review Permit - Project Number: 2016-06-034

Dear Mr. McLane:

Enclosed with this letter is your permit to construct. Please study it carefully and refer to Appendix A for a list of common abbreviations and acronyms used in the permit. Also, note the special conditions on the accompanying pages. The document entitled, "Review of Application for Authority to Construct," is part of the permit and should be kept with this permit in your files. Operation in accordance with these conditions, your new source review permit application and with your amended operating permit is necessary for continued compliance. The reverse side of your permit certificate has important information concerning standard permit conditions and your rights and obligations under the laws and regulations of the State of Missouri.

This permit may include requirements with which you may not be familiar. If you would like the department to meet with you to discuss how to understand and satisfy the requirements contained in this permit, an appointment referred to as a Compliance Assistance Visit (CAV) can be set up with you. To request a CAV, please contact your local regional office or fill out an online request. The regional office contact information can be found at the following website: <http://dnr.mo.gov/regions/>. The online CAV request can be found at <http://dnr.mo.gov/cav/compliance.htm>.

If you were adversely affected by this permit decision, you may be entitled to pursue an appeal before the administrative hearing commission pursuant to Sections 621.250 and 643.075.6 RSMo. To appeal, you must file a petition with the administrative hearing commission within thirty days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the administrative hearing commission, whose contact information is: Administrative Hearing Commission, United States Post Office Building, 131 West High Street, Third Floor, P.O. Box 1557, Jefferson City, Missouri 65102, phone: 573-751-2422, fax: 573-751-5018, website: [www.oa.mo.gov/ahc](http://www.oa.mo.gov/ahc).



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Mr. Garth McLane  
Page Two

If you have any questions regarding this permit, please do not hesitate to contact Sam Anzalone, at the Department of Natural Resources' Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or at (573) 751-4817. Thank you for your attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM



Susan Heckenkamp  
New Source Review Unit Chief

SH:saj

Enclosures

c: St. Louis Regional Office  
PAMS File: 2016-06-034

Permit Number: **01 2017 - 008**