PERMIT BOOK

STATE OF 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: 062014-002 Project Number: 2014-02-047
Installation Number: 113-0029

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

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

Installation Name: Bodine Aluminum, Inc.

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

Location Information: Lincoln County, S36, T36, R7W

Application for Authority to Construct was made for:
Install 12 new casting machines (O2), modify four existing core machines and install four new core machines (O5), and install a new natural gas-fired heat treat furnace (C01). This review was conducted in accordance with Section (6) of 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.

JUN 04 2014

EFFECTIVE DATE

Kyra L Moore

DIRECTOR OR DESIGNEE
DEPARTMENT OF NATURAL RESOURCES

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 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 Department's Air Pollution Control Program of the anticipated date of startup of these air contaminant sources. The information must be made available within 30 days of actual startup. Also, you must notify the Department of Natural Resources Regional office responsible for the area within which you are located within 15 days after the actual startup of these air contaminant sources.

A copy of this permit and permit review shall be kept at the installation address and shall be made available to Department of Natural Resources' 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 sources(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 at (573) 751-4817. If you prefer to write, please address your correspondence to the Missouri Department of Natural Resources, Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102-0176, attention: Construction Permit Unit.

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(12)(A)10. "Conditions required by permitting authority."

Bodine Aluminum, Inc.
Lincoln County, S36, T36, R7W

1. Superseding Condition
   A. The conditions of this permit supersede the following special conditions found in the following construction permits previously issued by the Air Pollution Control Program.
      1) Special Condition 2 of Construction Permit 032012-006A
      2) Special Condition 3 of Construction Permit 112008-006

2. Installation Emission Limitations
   A. Bodine Aluminum, Inc. shall emit less than 250.0 tons of VOCs in any consecutive 12-month period from the entire installation as listed in Table 1.

   B. Bodine Aluminum, Inc. shall emit less than 250.0 tons of PM_{10} in any consecutive 12-month period from the entire installation as listed in Table 1.

   C. Bodine Aluminum, Inc. shall emit less than 250.0 tons of NO_x in any consecutive 12-month period from the entire installation as listed in Table 1.

   D. Bodine Aluminum, Inc. shall emit less than 25.0 tons of combined HAP in any consecutive 12-month period from the entire installation as listed in Table 1.

   E. Bodine Aluminum, Inc. shall emit less than 10.0 tons of each individual HAP in any consecutive 12-month period from the entire installation as listed in Table 1.

SPECIAL CONDITIONS:

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

Table 1: Emission units subject to the emission limitations of Special Condition 2

Emission Unit	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

F. Attachments A, B, C, and D or equivalent forms approved by the Air Pollution Control Program shall be used to demonstrate compliance with Special Conditions 2.A through 2.E.

3. Operational Limitations

A. Bodine Aluminum, Inc. shall use less than 58,500 tons of sand in any consecutive 12-month period in the entire installation as listed in Table 1.

B. Bodine Aluminum, Inc. shall produce less than 78,000 tons of metal in any consecutive 12-month period from O2 Cylinder Head Casting.

C. Bodine Aluminum, Inc. shall use less than 7,000 gallons of machining coolant in any consecutive 12-month period in M1 Plantwide Machining Stations.

SPECIAL CONDITIONS:

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

D. Attachment E or an equivalent form approved by the Air Pollution Control Program shall be used to demonstrate compliance with Special Conditions 3.A through 3.C.

4. Control Device Requirement - Scrubbers

A. Bodine Aluminum, Inc. shall control emissions from O2 Cylinder Head Casting and O5 Cylinder Head Core Molding using packed tower wet scrubbers (OD3, OD4, OD5, and OD6) containing hydrogen peroxide and ferrous ion as specified in the permit application.

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

C. Bodine Aluminum, Inc. shall monitor and record the operating pressure drop across each scrubber at least once every 24 hours while O2 or O5 are in operation. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer's performance warranty.

D. Bodine Aluminum, Inc. shall maintain a copy of the scrubber manufacturer's performance warranty containing the design conditions on site.

E. Bodine Aluminum, Inc. shall monitor and record the liquid flow rate through each scrubber at least once every 24 hours while O2 or O5 are in operation. The flow rate shall be maintained within the design conditions specified by the manufacturer's performance warranty.

F. Bodine Aluminum, Inc. shall maintain an operating and maintenance log for the scrubbers 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. 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.

6. Performance Testing

A. Bodine Aluminum, Inc. shall perform testing on emissions at the outlet of Scrubber OD3 to verify the following emission rates from O2 Cylinder Head Casting:

1) VOC: 3.75 lb/ton metal produced
2) PM: 0.411 lb/ton metal produced
3) PM_{10}: 0.411 lb/ton metal produced
4) $PM_{2.5}$: 0.314 lb/ton metal produced
5) Combined HAP: 0.0757 lb/ton metal produced
6) Acetaldehyde: 0.0212 lb/ton metal produced
7) Benzene: 0.0264 lb/ton metal produced
8) Formaldehyde: 0.0191 lb/ton metal produced
9) Phenol: 0.0014 lb/ton metal produced
10) Cresol: 0.0076 lb/ton metal produced

B. Bodine Aluminum, Inc. shall perform testing on emissions at the outlet of Scrubber OD3 to verify the following emission rates from O5 Cylinder Head Core Molding:

1) VOC: 1.326 lb/ton sand used
2) PM: 0.0104 lb/ton sand used
3) PM_{10}: 0.0104 lb/ton sand used
4) $PM_{2.5}$: 0.0104 lb/ton sand used
5) Combined HAP: 0.0757 lb/ton sand used
6) Acetaldehyde: 0.0212 lb/ton sand used
7) Benzene: 0.0264 lb/ton sand used
8) Formaldehyde: 0.0191 lb/ton sand used
9) Phenol: 0.0014 lb/ton sand used
10) Cresol: 0.0076 lb/ton sand used

SPECIAL CONDITIONS:

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

C. Bodine Aluminum, Inc. shall perform testing to verify the following emission rates from one of the Cylinder Head Heat Treat Furnaces reported under OA7:
   1) NO_x: 1.5 lb/ton metal produced
   2) VOC: 0.88 lb/ton metal produced

D. The following EPA Test Methods shall be used to conduct the performance tests required by this permit:
   1) PM, PM_{10}, and $PM_{2.5}$: Method 5
   2) VOC and HAPs: Method 21
   3) NO_x: Method 7
   4) Other test methods upon approval by the Air Pollution Control Program Enforcement/Compliance Group.

E. Performance testing shall occur within ten percent of maximum production.

F. Bodine Aluminum, Inc. shall record the hourly sand usage and metal production rates of the 22 casting machines and 12 core molding machines that vent to Scrubber OD3 during the performance test of Scrubber OD3. As the emissions from Scrubber OD3 come from both casting and core molding, the emission factors shall be calculated as follows:
   1) O2: Average OD3 emission rate (lb/hr) / average hourly metal production rate (tph) x 22 / (22 + 12) = lb/ton metal produced
   2) O5: Average OD3 emission rate (lb/hr) / average hourly sand production rate (tph) x 12 / (22 + 12) = lb/ton sand produced

G. Bodine Aluminum, Inc. shall record the hourly metal production rate of the Cylinder Head Heat Treat Furnace being performance tested. As each Cylinder Head Heat Treat Furnace has its own stack, the OA7 emission factor shall be calculated as the average performance test emission rate (lb/hr) divided by the average recorded hourly metal production rate (tph).

H. The emission factors calculated by Special Conditions 6.F and 6.G shall be compared to the emission factors in Special Conditions 6.A. 6.B, and 6.C. If the emission factors calculated by Special Conditions 6.F and 6.G are in excess of the emission factors in Special Conditions 6.A, 6.B, or 6.C, an exceedance of the basis for this permit has occurred. This exceedance is not necessarily a violation of the permit; however, Bodine

SPECIAL CONDITIONS:

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

Aluminum, Inc. shall submit an amendment to this permit indicating the emission factors calculated by Special Conditions 6.F and 6.G.

I. These tests shall be performed within 60 days after achieving the maximum production rate of the installation, but not later than 180 days after initial start-up for commercial operation and shall be conducted in accordance with the Stack Test Procedures outlined in Special Condition 6.D.

J. A completed Proposed Test Plan Form (enclosed) shall be submitted to the Air Pollution Control Program 30 days prior to the proposed test date so that the Air Pollution Control Program may arrange a pretest meeting, if necessary, and assure that the test date is acceptable for an observer to be present. The Proposed Test Plan may serve the purpose of notification and shall be approved by the Director prior to conducting the required emission testing.

K. Two copies of a written report of the performance test results shall be submitted to the Director within 30 days of completion of any required testing. The report shall include legible copies of the raw data sheets, analytical instrument laboratory data, and complete sample calculations from the required U.S. EPA Method for at least one sample run.

L. The test report is to fully account for all operational and emission parameters addressed both in the permit conditions as well as in any other applicable state or federal rules or regulations.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (6) REVIEW
Project Number: 2014-02-047
Installation ID Number: 113-0029
Permit Number:

Bodine Aluminum, Inc.
100 Cherry Blossom Way
Troy, MO 63379

Complete: April 9, 2014

Parent Company:
Toyota Motor Engineering and Manufacturing North America, Inc.
25 Atlantic Avenue
Erlanger, KY 41018

Lincoln County, S36, T36, R7W

REVIEW SUMMARY

- Bodine Aluminum, Inc. has applied for authority to install 12 new casting machines (O2), modify four existing core machines and install four new core machines (O5), and install a new natural gas-fired heat treat furnace (C01).

- HAP emissions are expected from the proposed equipment. HAP will be emitted from the casting machines and core machines consisting of Acetaldehyde (75-07-0), Formaldehyde (50-00-0), Benzene (71-43-2), Phenol (108-95-2), and Cresol (1319-77-3). HAP will also be emitted from the combustion of natural gas in the new heat treat furnace (C1), the primary HAP of concern from natural gas combustion is Hexane (110-54-3).

- None of the currently promulgated New Source Performance Standards (40 CFR Part 60) apply to the installation.

- None of the currently promulgated National Emission Standards for Hazardous Air Pollutants (40 CFR Parts 61 and 63) apply to the installation.

- Scrubbers (OD3, OD4, OD5, and OD6) are being used to control emissions from O2 Cylinder Head Casting and O5 Cylinder Head Core Molding.

- This review was conducted in accordance with Section (6) of Missouri State Rule 10 CSR 10-6.060 *Construction Permits Required*. Potential emissions of VOC and PM are above 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 for this review. No model is currently available which can accurately predict ambient ozone concentrations caused by this installation’s VOC emissions. Potential PM emissions are above de minimis levels; however, there are no modeling requirements for PM at this time.

- Emissions testing is required for the equipment.

- Bodine Aluminum, Inc. shall include the new and modified emission units in their Part 70 Operating Permit renewal application required to be submitted by May 18, 2015.

- 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. In order to reach its present production capacity, they have had two plant expansions since the original construction in 1992. 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 is required by no later than May 18, 2015. Bodine Aluminum, Inc. shall include all new and modified emission units in their Part 70 operating permit renewal application.

The following New Source Review permits have been issued to Bodine Aluminum, Inc. by the Air Pollution Control Program:

Table 2: 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

PROJECT DESCRIPTION

Bodine Aluminum, Inc. has applied for authority to install 12 new casting machines (O2), modify four existing core machines and install four new core machines (O5), and install a new natural gas-fired heat treat furnace (C01).

The 12 new casting machines are being installed to replace ten existing casting machines which have been dismantled and removed. The MHDR of O2 Cylinder Head Casting will increase to 11.75 tph metal (102,943 tpy metal); however, the installation has accepted a federally enforceable operational limitation of 78,000 tpy metal in Special Condition 3.B in order to avoid PM_{10}, $PM_{2.5}$, Phenol, and Benzene modeling. Casting machines reported under O2 have historically been controlled by scrubbers. Special Condition 4 requires that the existing scrubbers be used on the new casting machines also.

The modification of four existing core machines and installation of four new core machines increases the MHDR of O5 Cylinder Head Core Molding to 11.52 tph sand (100,924 tpy sand); however, the installation has accepted a federally enforceable operational limitation of 58,500 tpy sand in Special Condition 3.A in order to avoid PM_{10}, $PM_{2.5}$, Phenol, and Benzene modeling. The 58,500 tpy sand was also used in the evaluation of NSR Permits 032012-006 and 032012-006A; therefore, all other sand operations (P01 – P12 and P14 – P16) were considered unmodified by this project. Core molding reported under O5 has historically been controlled by scrubbers. Special Condition 4 requires that the existing scrubbers be used on the new core molding machines also.

The new natural gas-fired heat treat furnace has a maximum hourly design heat input rate of 1.586 MMBtu/hr and will be reported under the existing emission point C01 Plantwide Natural Gas Combustion.

In NSR Permits 112008-006 and 032012-006, the maximum metal production rate evaluated for O2 Cylinder Head Casting was 73,957 tpy metal; therefore, a

debottlenecking has occurred due to the installation of the 12 new casting machines. The debottlenecking affects OA7, M1, and P34. In order to accommodate the additional metal by M1 Plantwide Machining Stations, the installation has requested to increase the 5,000 gal/yr coolant limit in NSR Permits 032012-006 and 032012-006A to 7,000 gal/yr (see Special Condition 3.C). Table 3 indicates the emission sources affected by this project.

The new casting and core molding machines are expected to increase the efficiency of the installation. In NSR Permit 112008-006 the installation indicated that their equipment could produce one ton of metal from 0.791 tons of sand (0.791:1 sand to metal ratio), the installation can now produce one ton of metal from 0.98 tons of sand (0.98:1 sand to metal ratio).

Table 3: Emission sources affected by this project.

Emission Unit	Description	Project Status
C01	Plantwide Natural Gas Combustion	New heat treat furnace
M1	Plantwide Machining Stations	Modified
O2	Cylinder Head Casting	Modified
O5	Cylinder Head Core Molding	Modified
OA7	Cylinder Head Heat Treatment Furnaces – Process Emissions	Debottlenecked
P34	Haul Roads	Debottlenecked

Project emissions were calculated based upon the emissions increase from the modified and debottlenecked emission units and the potential of new emission units as provided in Table 4.

Table 4: Emission sources affected by this project.

Emission Unit	Description	Project Emissions
C01	Plantwide Natural Gas Combustion	PTE
M1	Plantwide Machining Stations	PTE – BAE
O2	Cylinder Head Casting	PTE – BAE
O5	Cylinder Head Core Molding	PTE – BAE
OA7	Cylinder Head Heat Treatment Furnaces – Process Emissions	PTE – BAE
P34	Haul Roads	PTE – BAE

BAE were calculated as each emission sources average emissions from Bodine Aluminum, Inc.'s 2011 and 2012 EIQs. Each emission unit's BAE is listed in Table 5.

Table 5: O2 and O5 BAE (tpy)

Emission Unit	BAE				
	PM_{10}	$PM_{2.5}$	VOC	HAP	NO_x
M1	N/A	N/A	1.02	N/A	N/A
O2	6.02	3.48	54.92	0.41	N/A
O5	0.06	0.04	7.21	0.15	N/A
OA7	N/A	N/A	12.89	N/A	21.97
P34	0.05	0.005	N/A	N/A	N/A

EMISSIONS/CONTROLS EVALUATION

Emission factors for the new natural gas-fired heat treat furnace were obtained from the EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 1.4 “Natural Gas Combustion” (July 1998).

Emissions from P34 Haul Roads were calculated using the equations from AP-42, Section 13.2.1 “Paved Haul Roads” (January 2011).

Emissions from M1 Plantwide Machining Stations were calculated using a mass balance approach and assuming 100% of the VOC contained in the coolant is emitted. The manufacturer indicated the coolant contains a maximum of 1.8 pounds of VOC per gallon of coolant.

Emissions from O2 Cylinder Head Casting and O5 Cylinder Head Core Molding were calculated using emission factors from Project 2011-03-044 and from HAP emission factors submitted by the installation. The installation is being required to verify these emission factors by conducting stack testing (see Special Condition 6).

Emissions from OA7 Cylinder Head Heat Treat Furnaces were calculated using emission factors from Project 2011-03-044. The installation is being required to verify these emission factors by conducting stack testing (see Special Condition 6).

The following table provides an emissions summary for this project. Existing potential emissions were taken from NSR Permit 032012-006A. Existing actual emissions were taken from the installation’s 2012 EIQ. Potential emissions of the application represent the potential of the new, modified, and debottlenecked equipment, assuming continuous operation (8,760 hours per year).

Table 6: Emissions Summary (tons per year)

Pollutant	Regulatory *De Minimis* Levels	Existing Potential Emissions	Existing Actual Emissions (2012 EIQ)	Potential Emissions of the Application[1]	New Installation Conditioned Potential
PM	25.0	N/D	N/A	28.89	N/A
PM_{10}	15.0	<250.0	26.23	13.99	<250.0
$PM_{2.5}$	10.0	N/D	25.86	13.79	N/A
SO_x	40.0	N/D	0.06	0.004	N/A
NO_x	40.0	<250.0	40.78	37.18	<250.0
VOC	40.0	<250.0	90.18	149.64	<250.0
CO	100.0	N/D	4.21	0.57	N/A
GHG (CO_2e)	100,000	N/D	N/A	812.82	N/A
HAPs	25.0	N/D	1.23	4.11	<25.0
Benzene (71-43-2)	10.0 (SMAL = 2.0)	N/D	0.09	1.80	<10.0
Acetaldehyde (75-07-0)	10.0 (SMAL = 9.0)	N/D	0.25	1.45	<10.0
Formaldehyde (50-00-0)	10.0 (SMAL = 2.0)	N/D	0.29	1.30	<10.0
Phenol (108-95-2)	10.0 (SMAL = 0.10)	N/D	0.50	0.096	<10.0
Hexane (110-54-3)	10.0 (SMAL = 10.0)	N/D	N/D	0.01	<10.0
Cresol (1319-77-3)	10.0 (SMAL = 1.0)	N/D	0.08	0.52	<10.0

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

[1]The potential emissions of the application include the operational limitations in Special Condition 3 and the scrubbers required by Special Condition 4.

Potential emissions from the installation are unknown. In order to remain a minor source for NSR the installation has accepted 250.0 tpy limits on PM_{10}, NO_x, and VOC. In order to remain a minor source of HAPs the installation has accepted 10.0/25.0 HAP limits. It is likely that the PM_{10} and NO_x emission limitations may be removed if the installation submits a detailed PTE documenting that at MHDR emissions are below the major source thresholds. The only sources of CO, SO_x, and CO_2e at the installation are C01 Plantwide Natural Gas Combustion and P35 Emergency Generator. Based upon the MHDRs for these sources in MoEIS, the installation's potential emissions of CO, SO_x, and CO_2e were estimated to be 49.69 tpy, 0.45 tpy, and 67,418.66 tpy, respectively; therefore, major source emission limitations were deemed unnecessary for these pollutants.

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (6) of Missouri State Rule 10 CSR 10-6.060 *Construction Permits Required*. Potential emissions of VOC and PM are above de minimis 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.

GENERAL REQUIREMENTS

- 10 CSR 10-6.065 *Operating Permits*
- 10 CSR 10-6.110 *Submission of Emission Data, Emission Fees and Process Information*
- 10 CSR 10-6.165 *Restriction of Emission of Odors*
- 10 CSR 10-6.170 *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*
- 10 CSR 10-6.220 *Restriction of Emission of Visible Air Contaminants*

SPECIFIC REQUIREMENTS

- 10 CSR 10-6.400 *Restriction of Emission of Particulate Matter From Industrial Processes* may be applicable to O2 Cylinder Head Casting. The EPA fact sheet on packed tower wet scrubbers indicates a particulate control efficiency ranging from 50 to 95 percent. The control efficiency of the scrubbers has never been tested. With a process weight rate (P) of 11.75 tph, the calculated maximum allowable emission rate (E) is 21.37 lb/hr.
- C01 is a direct heating source and is; therefore, not subject to 10 CSR 10-6.405 *Restriction of Particulate Matter Emissions From Fuel Burning Equipment Used for Indirect Heating*.

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (6) of Missouri State Rule 10 CSR 10-6.060 *Construction Permits Required*, I recommend this permit be granted with special conditions.

_____ _____

Alana L. Rugen, P.E. Date
New Source Review Unit

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated February 14, 2014, received February 21, 2014, designating Toyota Motor Engineering and Manufacturing North America, Inc. as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.

Attachment A – VOC Compliance Worksheet

Bodine Aluminum, Inc.
Lincoln County, S36, T36, R7W
Project Number: 2014-02-047
Installation ID Number: 113-0029
Permit Number: _____

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

Emission Source	Description	Monthly Usage	VOC Emission Factor	Monthly VOC Emissions[1] (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[2]	
O5	Cylinder Head Core Molding	tons sand	1.326 lb/ton[3]	
OA7	Cylinder Head Heat Treat Furnaces	tons metal	0.88 lb/ton[4]	
P05	Sand Reclamation Furnace	tons sand	0.021 lb/ton[5]	
P09	Sand Dryer	tons sand	0.002 lb/ton[5]	
P11	Resin Coating	tons sand	0.109 lb/ton[5]	
P30	High Pressure Die Casting	tons metal	1.15 lb/ton[5]	
P35	Emergency Generator	1,000 gal	11.5 lb/1,000 gal	
Installation Monthly VOC Emissions[6] (tons):				
Installation 12-Month Rolling Total VOC Emissions[7] (tons):				

[1]Monthly VOC Emissions (tons) = Monthly Usage x VOC Emission Factor x 0.0005 (ton/lb).
[2]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 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.
[3]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 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.
[4]After the stack testing required by Special Condition 6 is complete, the VOC Emission Factor for OA7 shall be the approved stack tested emission factor.
[5]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. The VOC Emission Factors for P05 and P11 already account for the RTO, no additional control efficiency shall be used.
[6]Installation Monthly VOC Emissions (tons) = the sum of each emission source's Monthly VOC Emissions (tons).
[7]Installation 12-Month Rolling Total VOC Emissions (tons) = the sum of the most recent 12 months' Installation Monthly VOC Emissions (tons). **Installation 12-Month Rolling Total VOC Emissions less than 250.0 tons indicates compliance with Special Condition 2.A.**

Attachment B – PM_{10} Compliance Worksheet

Bodine Aluminum, Inc.
Lincoln County, S36, T36, R7W
Project Number: 2014-02-047
Installation ID Number: 113-0029
Permit Number: _____

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

Emission Source	Description	Monthly Usage	PM_{10} Emission Factor	Monthly PM_{10} Emissions[1] (tons)
C01	Plantwide Natural Gas Combustion	MMscf	7.6 lb/MMscf	
G1	General Plant Exhaust	tons sand	1.16 lb/ton[4]	
O2	Cylinder Head Casting	tons metal	0.411 lb/ton[2]	
O5	Cylinder Head Core Molding	tons sand	0.0104 lb/ton[3]	
P01	Used Sand Crushing	tons sand	0.1015 lb/ton[4]	
P02	Used Sand Sieving	tons sand	0.057 lb/ton[4]	
P03	Aluminum/Sand Separation	tons sand	0.057 lb/ton[4]	
P04	Final Sand Crushing	tons sand	0.0505 lb/ton[4]	
P05	Sand Reclamation Furnace	tons sand	0.2705 lb/ton[4]	
P06	Sand Separation	tons sand	0.0505 lb/ton[4]	
P07	Sand Storage	tons sand	0.0125 lb/ton[4]	
P08	Sand Weighing	tons sand	0.0125 lb/ton[4]	
P09	Sand Dryer	tons sand	0.0125 lb/ton[4]	
P10	Heated Sand Storage	tons sand	0.0125 lb/ton[4]	
P11	Resin Coating	tons sand	0.6 lb/ton[4]	
P12	Resin Holding, Bin Charging	tons sand	0.00064 lb/ton[5]	
P14	Coated Sand Cooling	tons sand	0.114 lb/ton[4]	
	Coated Sand Crushing	tons sand	0.1015 lb/ton[4]	
P15	Coated Sand Sieving	tons sand	0.114 lb/ton[4]	
P16	Coated Sand Storage	tons sand	0.1265 lb/ton[4]	
P30	High Pressure Die Casting	tons metal	0.37 lb/ton[4]	
P35	Emergency Generator	1,000 gal	11.5 lb/1,000 gal	
Installation Monthly PM_{10} Emissions[6] (tons):				
Installation 12-Month Rolling Total PM_{10} Emissions[7] (tons):				

[1]Monthly PM_{10} Emissions (tons) = Monthly Usage x PM_{10} Emission Factor x 0.0005 (ton/lb).
[2]The PM_{10} 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 is complete, the PM_{10} 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.
[3]The PM_{10} 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 is complete, the PM_{10} 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.
[4]The PM_{10} 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_{10} Emission Factors already include controls; therefore, no additional control efficiency shall be used.
[5]The PM_{10} Emission Factor for P12 is from FIRE for Process SCC 30502503 and may be replaced by approved stack tested emission factors. The PM_{10} Emission Factors already include controls (90% baghouse); therefore, no additional control efficiency shall be used.
[6]Installation Monthly PM_{10} Emissions (tons) = the sum of each emission source's Monthly PM_{10} Emissions (tons).
[7]Installation 12-Month Rolling Total PM_{10} Emissions (tons) = the sum of the most recent 12 months' Installation Monthly PM_{10} Emissions (tons). **Installation 12-Month Rolling Total PM_{10} Emissions less than 250.0 tons indicates compliance with Special Condition 2.B.**

Attachment C – NO_x Compliance Worksheet

Bodine Aluminum, Inc.
Lincoln County, S36, T36, R7W
Project Number: 2014-02-047
Installation ID Number: 113-0029
Permit Number: _____

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

Emission Source	Description	Monthly Usage	NO_x Emission Factor	Monthly NO_x Emissions[1] (tons)
C01	Plantwide Natural Gas Combustion	MMscf	100 lb/MMscf	
OA7	Cylinder Head Heat Treat Furnaces	tons metal	1.5 lb/ton[2]	
P09	Sand Dryer	tons sand	1.6 lb/ton[3]	
P35	Emergency Generator	1,000 gal	438 lb/1,000 gal	
Installation Monthly NO_x Emissions[4] (tons):				
Installation 12-Month Rolling Total NO_x Emissions[5] (tons):				

[1]Monthly NO_x Emissions (tons) = Monthly Usage x NO_x Emission Factor x 0.0005 (ton/lb).
[2]After the stack testing required by Special Condition 6 is complete, the NO_x Emission Factor for OA7 shall be the approved stack tested emission factor.
[3]The NO_x Emission Factors for P09 is from Project 2011-03-044 and may be replaced by approved stack tested emission factors.
[4]Installation Monthly NO_x Emissions (tons) = the sum of each emission source's Monthly NO_x Emissions (tons).
[5]Installation 12-Month Rolling Total NO_x Emissions (tons) = the sum of the most recent 12 months' Installation Monthly NO_x Emissions (tons). **Installation 12-Month Rolling Total NO_x Emissions less than 250.0 tons indicates compliance with Special Condition 2.C.**

Attachment D – HAP Compliance Worksheet

Bodine Aluminum, Inc.
Lincoln County, S36, T36, R7W
Project Number: 2014-02-047
Installation ID Number: 113-0029
Permit Number: _____

This sheet covers the period from _____ (month, year) to _____ (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)	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[2]	0.0264[2]	0.0076[2]	0.0191[2]		0.0014[2]			0.0757[2]	lb/ton metal
O5	0.0212[3]	0.0264[3]	0.0076[3]	0.0191[3]		0.0014[3]			0.0757[3]	lb/ton sand
P05	0.0076[4]	0.009[4]		0.0184[4]		0.025[4]	0.0053[4]		0.0653[4]	lb/ton sand
P11	0.00014[4]			0.00282[4]		0.0857[4]	0.00008[4]	0.00009[4]	0.21184[4]	lb/ton sand

Emission Source & Description	Monthly Usage	Monthly Emissions[1] (tons)								
		Acetaldehyde	Benzene	Cresol	Formaldehyde	Hexane	Phenol	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[5] (tons):										
Installation 12-Month Rolling Total Emissions[6] (tons):										

[1]Monthly Emissions (tons) = Monthly Usage x Emission Factor x 0.0005 (ton/lb).
[2]The Emission Factors for O2 already account for the scrubber, no addition control efficiency shall be used. After the stack testing required by Special Condition 6 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.
[3]The Emission Factors for O5 already account for the scrubber, no addition control efficiency shall be used). After the stack testing required by Special Condition 6 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.
[4]The Emission Factors for P05 and P11 is from Project 2011-03-044 and may be replaced by approved stack tested emission factors.
[5]Installation Monthly Emissions (tons) = the sum of each emission source's Monthly Emissions (tons).
[6]Installation 12-Month Rolling Total Emissions (tons) = the sum of the most recent 12 months' Installation Monthly Emissions (tons). **Installation 12-Month Rolling Total Emissions less than 10.0 for each individual HAP indicates compliance with Special Condition 2.E.**

Attachment E – Operational Limitations Worksheet

Bodine Aluminum, Inc.
Lincoln County, S36, T36, R7W
Project Number: 2014-02-047
Installation ID Number: 113-0029
Permit Number: _____

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

Month	Year	Plantwide Sand Usage (tons)	O2 Cylinder Head Casting Metal Production (tons)	M1 Machining Station Coolant Usage (gallons)
January				
February				
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				
12-Month Rolling Total[1] (tons):				

[1]12-Month Rolling Total (tons) = the sum of the twelve most recent months' usage/production. **12-Month Rolling Total Plantwide Sand Usage less than 58,500 tons indicates compliance with Special Condition 3.A. 12-Month Rolling Total O2 Cylinder Head Casting Metal Production less than 78,000 tons indicates compliance with Special Condition 3.B. 12-Month Rolling Total M1 Machining Station Coolant Usage less than 7,000 gallons indicates compliance with Special Condition 3.C.**

APPENDIX A

Abbreviations and Acronyms

% ..... percent

ºF ..... degrees Fahrenheit

acfm ..... actual cubic feet per minute

BACT ..... Best Available Control Technology

BAE..... Baseline Actual Emissions

BMPs ..... Best Management Practices

Btu..... British thermal unit

CAM ..... Compliance Assurance Monitoring

CAS..... Chemical Abstracts Service

CEMS ..... Continuous Emission Monitor System

CFR ..... Code of Federal Regulations

CO ..... carbon monoxide

CO_2..... carbon dioxide

CO_2e..... carbon dioxide equivalent

COMS..... Continuous Opacity Monitoring System

CSR..... Code of State Regulations

dscf ..... dry standard cubic feet

EIQ ..... Emission Inventory Questionnaire

EP..... Emission Point

EPA ..... Environmental Protection Agency

EU..... Emission Unit

fps ..... feet per second

ft ..... feet

GACT ..... Generally Available Control Technology

GHG ..... Greenhouse Gas

gpm..... gallons per minute

gr..... grains

GWP..... Global Warming Potential

HAP..... Hazardous Air Pollutant

hr..... hour

hp ..... horsepower

lb ..... pound

lbs/hr..... pounds per hour

MACT ..... Maximum Achievable Control Technology

$\mu g/m^3$.....micrograms per cubic meter

m/s .....meters per second

Mgal .....1,000 gallons

MW.....megawatt

MHDR.....maximum hourly design rate

MMBtu ....Million British thermal units

MMCF.....million cubic feet

MSDS.....Material Safety Data Sheet

NAAQS ...National Ambient Air Quality Standards

NESHAPs .....National Emissions Standards for Hazardous Air Pollutants

NO_x.....nitrogen oxides

NSPS.....New Source Performance Standards

NSR.....New Source Review

PM .....particulate matter

$PM_{2.5}$.....particulate matter less than 2.5 microns in aerodynamic diameter

PM_{10} .....particulate matter less than 10 microns in aerodynamic diameter

ppm.....parts per million

PSD .....Prevention of Significant Deterioration

PTE .....potential to emit

RACT .....Reasonable Available Control Technology

RAL.....Risk Assessment Level

SCC.....Source Classification Code

scfm.....standard cubic feet per minute

SIC .....Standard Industrial Classification

SIP.....State Implementation Plan

SMAL .....Screening Model Action Levels

SO_x.....sulfur oxides

SO_2.....sulfur dioxide

tph.....tons per hour

tpy.....tons per year

VMT.....vehicle miles traveled

VOC.....Volatile Organic Compound

Mr. Glen Kelley
General Manager of Manufacturing
Bodine Aluminum, Inc.
100 Cherry Blossom Way
Troy, MO 63379

RE: New Source Review Permit - Project Number: 2014-02-047

Dear Mr. Kelley:

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 submittal of a timely operating permit renewal application 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.

If you have any questions regarding this permit, please do not hesitate to contact Alana Rugen, 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:arl

Enclosures

c: St. Louis Regional Office
PAMS File: 2014-02-047

Permit Number: