

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY  
AIR QUALITY DIVISION**

March 31, 2017

**PERMIT TO INSTALL  
68-12B**


**ISSUED TO**  
Ford Motor Company – Automatic Transmission New Product Center

**LOCATED AT**  
35500 Plymouth Road  
Livonia, Michigan

**IN THE COUNTY OF**  
Wayne

**STATE REGISTRATION NUMBER**  
M4734

The Air Quality Division has approved this Permit to Install, pursuant to the delegation of authority from the Michigan Department of Environmental Quality. This permit is hereby issued in accordance with and subject to Section 5505(1) of Article II, Chapter I, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Pursuant to Air Pollution Control Rule 336.1201(1), this permit constitutes the permittee's authority to install the identified emission unit(s) in accordance with all administrative rules of the Department and the attached conditions. Operation of the emission unit(s) identified in this Permit to Install is allowed pursuant to Rule 336.1201(6).

DATE OF RECEIPT OF ALL INFORMATION REQUIRED BY RULE 203: <b>March 13, 2017</b>	
DATE PERMIT TO INSTALL APPROVED: <b>March 31, 2017</b>	SIGNATURE: 
DATE PERMIT VOIDED:	SIGNATURE:
DATE PERMIT REVOKED:	SIGNATURE:

**PERMIT TO INSTALL**

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### Common Abbreviations / Acronyms

Common Acronyms		Pollutant / Measurement Abbreviations	
AQD	Air Quality Division	BTU	British Thermal Unit
BACT	Best Available Control Technology	°C	Degrees Celsius
CAA	Clean Air Act	CO	Carbon Monoxide
CEM	Continuous Emission Monitoring	dscf	Dry standard cubic foot
CFR	Code of Federal Regulations	dscm	Dry standard cubic meter
CO <sub>2</sub> e	Carbon Dioxide Equivalent	°F	Degrees Fahrenheit
COM	Continuous Opacity Monitoring	gr	Grains
EPA	Environmental Protection Agency	Hg	Mercury
EU	Emission Unit	hr	Hour
FG	Flexible Group	H <sub>2</sub> S	Hydrogen Sulfide
GACS	Gallon of Applied Coating Solids	hp	Horsepower
GC	General Condition	lb	Pound
GHGs	Greenhouse Gases	kW	Kilowatt
HAP	Hazardous Air Pollutant	m	Meter
HVLP	High Volume Low Pressure *	mg	Milligram
ID	Identification	mm	Millimeter
LAER	Lowest Achievable Emission Rate	MM	Million
MACT	Maximum Achievable Control Technology	MW	Megawatts
MAERS	Michigan Air Emissions Reporting System	ng	Nanogram
MAP	Malfunction Abatement Plan	NO <sub>x</sub>	Oxides of Nitrogen
MDEQ	Michigan Department of Environmental Quality (Department)	PM	Particulate Matter
MSDS	Material Safety Data Sheet	PM10	PM with aerodynamic diameter ≤10 microns
NESHAP	National Emission Standard for Hazardous Air Pollutants	PM2.5	PM with aerodynamic diameter ≤ 2.5 microns
NSPS	New Source Performance Standards	pph	Pounds per hour
NSR	New Source Review	ppm	Parts per million
PS	Performance Specification	ppmv	Parts per million by volume
PSD	Prevention of Significant Deterioration	ppmw	Parts per million by weight
PTE	Permanent Total Enclosure	psia	Pounds per square inch absolute
PTI	Permit to Install	psig	Pounds per square inch gauge
RACT	Reasonably Available Control Technology	scf	Standard cubic feet
ROP	Renewable Operating Permit	sec	Seconds
SC	Special Condition	SO <sub>2</sub>	Sulfur Dioxide
SCR	Selective Catalytic Reduction	THC	Total Hydrocarbons
SRN	State Registration Number	tpy	Tons per year
TAC	Toxic Air Contaminant	µg	Microgram
TEQ	Toxicity Equivalence Quotient	VOC	Volatile Organic Compound
VE	Visible Emissions	yr	Year

\* For High Volume Low Pressure (HVLP) applicators, the pressure measured at the HVLP gun air cap shall not exceed ten (10) pounds per square inch gauge (psig).

### GENERAL CONDITIONS

1. The process or process equipment covered by this permit shall not be reconstructed, relocated, or modified, unless a Permit to Install authorizing such action is issued by the Department, except to the extent such action is exempt from the Permit to Install requirements by any applicable rule. **(R 336.1201(1))**
2. If the installation, construction, reconstruction, relocation, or modification of the equipment for which this permit has been approved has not commenced within 18 months, or has been interrupted for 18 months, this permit shall become void unless otherwise authorized by the Department. Furthermore, the permittee or the designated authorized agent shall notify the Department via the Supervisor, Permit Section, Air Quality Division, Michigan Department of Environmental Quality, P.O. Box 30260, Lansing, Michigan 48909-7760, if it is decided not to pursue the installation, construction, reconstruction, relocation, or modification of the equipment allowed by this Permit to Install. **(R 336.1201(4))**
3. If this Permit to Install is issued for a process or process equipment located at a stationary source that is not subject to the Renewable Operating Permit program requirements pursuant to R 336.1210, operation of the process or process equipment is allowed by this permit if the equipment performs in accordance with the terms and conditions of this Permit to Install. **(R 336.1201(6)(b))**
4. The Department may, after notice and opportunity for a hearing, revoke this Permit to Install if evidence indicates the process or process equipment is not performing in accordance with the terms and conditions of this permit or is violating the Department's rules or the Clean Air Act. **(R 336.1201(8), Section 5510 of Act 451, PA 1994)**
5. The terms and conditions of this Permit to Install shall apply to any person or legal entity that now or hereafter owns or operates the process or process equipment at the location authorized by this Permit to Install. If the new owner or operator submits a written request to the Department pursuant to R 336.1219 and the Department approves the request, this permit will be amended to reflect the change of ownership or operational control. The request must include all of the information required by subrules (1)(a), (b), and (c) of R 336.1219 and shall be sent to the District Supervisor, Air Quality Division, Michigan Department of Environmental Quality. **(R 336.1219)**
6. Operation of this equipment shall not result in the emission of an air contaminant which causes injurious effects to human health or safety, animal life, plant life of significant economic value, or property, or which causes unreasonable interference with the comfortable enjoyment of life and property. **(R 336.1901)**
7. The permittee shall provide notice of an abnormal condition, start-up, shutdown, or malfunction that results in emissions of a hazardous or toxic air pollutant which continue for more than one hour in excess of any applicable standard or limitation, or emissions of any air contaminant continuing for more than two hours in excess of an applicable standard or limitation, as required in Rule 912, to the Department. The notice shall be provided not later than two business days after start-up, shutdown, or discovery of the abnormal condition or malfunction. Written reports, if required, must be filed with the Department within 10 days after the start-up or shutdown occurred, within 10 days after the abnormal conditions or malfunction has been corrected, or within 30 days of discovery of the abnormal condition or malfunction, whichever is first. The written reports shall include all of the information required in Rule 912(5). **(R 336.1912)**
8. Approval of this permit does not exempt the permittee from complying with any future applicable requirements which may be promulgated under Part 55 of 1994 PA 451, as amended or the Federal Clean Air Act.
9. Approval of this permit does not obviate the necessity of obtaining such permits or approvals from other units of government as required by law.
10. Operation of this equipment may be subject to other requirements of Part 55 of 1994 PA 451, as amended and the rules promulgated thereunder.

11. Except as provided in subrules (2) and (3) or unless the special conditions of the Permit to Install include an alternate opacity limit established pursuant to subrule (4) of R 336.1301, the permittee shall not cause or permit to be discharged into the outer air from a process or process equipment a visible emission of density greater than the most stringent of the following. The grading of visible emissions shall be determined in accordance with R 336.1303. **(R 336.1301)**
  - a) A six-minute average of 20 percent opacity, except for one six-minute average per hour of not more than 27 percent opacity.
  - b) A visible emission limit specified by an applicable federal new source performance standard.
  - c) A visible emission limit specified as a condition of this Permit to Install.
  
12. Collected air contaminants shall be removed as necessary to maintain the equipment at the required operating efficiency. The collection and disposal of air contaminants shall be performed in a manner so as to minimize the introduction of contaminants to the outer air. Transport of collected air contaminants in Priority I and II areas requires the use of material handling methods specified in R 336.1370(2). **(R 336.1370)**
  
13. The Department may require the permittee to conduct acceptable performance tests, at the permittee's expense, in accordance with R 336.2001 and R 336.2003, under any of the conditions listed in R 336.2001. **(R 336.2001)**

**SPECIAL CONDITIONS**

**EMISSION UNIT SUMMARY TABLE**

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

Emission Unit ID	Emission Unit Description (Process Equipment & Control Devices)	Installation Date / Modification Date	Flexible Group ID
EU-PHASE3	Dynamometer testing facilities that include 20 engine-driven and engine-only dynamometer test cells. Three regenerative thermal oxidizers are used to control hydrocarbon and carbon monoxide emissions from the Phase 3 and Phase 3A test cells.	1/1/1995	FG-PHASE3
EU-PHASE3-21	Dynamometer capable of engine-driven and engine-only operation fueled with gasoline, alcohol blends/gasoline fuel blend, diesel, kerosene, hydrogen, LPG, and natural gas. Three regenerative thermal oxidizers are used to control hydrocarbon and carbon monoxide emissions from the Phase 3 and Phase 3A test cells.	2/8/2017	FG-PHASE3A
EU-PHASE3-22	Dynamometer capable of engine-driven and engine-only operation fueled with gasoline, alcohol blends/gasoline fuel blend, diesel, kerosene, hydrogen, LPG, and natural gas. Three regenerative thermal oxidizers are used to control hydrocarbon and carbon monoxide emissions from the Phase 3 and Phase 3A test cells.	2/8/2017	FG-PHASE3A
EU-PHASE3-23	Dynamometer capable of engine-driven and engine-only operation fueled with gasoline, alcohol blends/gasoline fuel blend, diesel, kerosene, hydrogen, LPG, and natural gas. Three regenerative thermal oxidizers are used to control hydrocarbon and carbon monoxide emissions from the Phase 3 and Phase 3A test cells.	TBD	FG-PHASE3A
EU-PHASE3-24	Dynamometer capable of engine-driven and engine-only operation fueled with gasoline, alcohol blends/gasoline fuel blend, diesel, kerosene, hydrogen, LPG, and natural gas. Three regenerative thermal oxidizers are used to control hydrocarbon and carbon monoxide emissions from the Phase 3 and Phase 3A test cells.	TBD	FG-PHASE3A

Emission Unit ID	Emission Unit Description (Process Equipment & Control Devices)	Installation Date / Modification Date	Flexible Group ID
EU-PHASE3-25	Dynamometer capable of engine-driven and engine-only operation fueled with gasoline, alcohol blends/gasoline fuel blend, diesel, kerosene, hydrogen, LPG, and natural gas. Three regenerative thermal oxidizers are used to control hydrocarbon and carbon monoxide emissions from the Phase 3 and Phase 3A test cells.	TBD	FG-PHASE3A
Changes to the equipment described in this table are subject to the requirements of R 336.1201, except as allowed by R 336.1278 to R 336.1290.			

**FLEXIBLE GROUP SUMMARY TABLE**

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

Flexible Group ID	Flexible Group Description	Associated Emission Unit IDs
FG-PHASE3	Dynamometer testing facilities that include 20 engine-driven and engine-only dynamometer test cells. Three regenerative thermal oxidizers are used to control hydrocarbon and carbon monoxide emissions from the Phase 3 and Phase 3A test cells.	EU-PHASE3
FG-PHASE3A	Five dynamometers housed in the same building as the Phase 3 dynamometers, which were installed at a later date. Three regenerative thermal oxidizers are used to control hydrocarbon and carbon monoxide emissions from the Phase 3 and Phase 3A test cells.	EU-PHASE3-21, EU-PHASE3-22, EU-PHASE3-23, EU-PHASE3-24, EU-PHASE3-25

**The following conditions apply to: FG-PHASE3**

**DESCRIPTION:** Dynamometer testing facilities that include 20 engine-driven and engine-only dynamometer test cells. Three regenerative thermal oxidizers are used to control hydrocarbon and carbon monoxide emissions from the Phase 3 and Phase 3A test cells.

**Emission Units:** EU-PHASE3

**POLLUTION CONTROL EQUIPMENT:** Regenerative Thermal Oxidizer 1, Regenerative Thermal Oxidizer 2, Regenerative Thermal Oxidizer 3

**I. EMISSION LIMITS**

Pollutant	Limit	Time Period/ Operating Scenario	Equipment	Testing / Monitoring Method	Underlying Applicable Requirements
1. NO <sub>x</sub>	2027.5 lb/day	Calendar Day (prorated from monthly).	FG-PHASE3	SC VI.5	40 CFR 52.21
2. NO <sub>x</sub>	52.2 tpy	12-month rolling time period as determined at the end of each calendar month.	FG-PHASE3	SC VI.4	R 336.1205(1)(a) & (b), R 336.2802(4)(d), 40 CFR 52.21(a)(2)(iv)(d), 40 CFR 52.21(c) & (d)
3. NO <sub>x</sub>	84.5 pph	Test Protocol*	FG-PHASE3	SC V.1	R 336.1205(1)(a) & (b), R 336.2802(4)(d), 40 CFR 52.21(a)(2)(iv)(d), 40 CFR 52.21(c) & (d)
4. NO <sub>x</sub>	544.0 lb/MMcf of natural gas	Test Protocol*	FG-PHASE3	SC V.2	R 336.1205(1)(a) & (b), R 336.2802(4)(d), 40 CFR 52.21(a)(2)(iv)(d), 40 CFR 52.21(c) & (d)
5. SO <sub>2</sub>	507.1 lbs/day	Calendar Day (prorated from monthly).	FG-PHASE3	SC VI.5, SC VI.7	40 CFR 52.21
6. SO <sub>2</sub>	10.8 tpy	12-month rolling time period as determined at the end of each calendar month.	FG-PHASE3	SC VI.4, SC VI.7	R 336.1205(1)(a) & (b), R 336.2802(4)(d), 40 CFR 52.21(a)(2)(iv)(d), 40 CFR 52.21(c) & (d)
7. VOC	228.1 lb/day	Calendar Day (prorated from monthly)	FG-PHASE3	SC VI.5	R 336.1702(c), 40 CFR 52.21
8. VOC	5.9 tpy	12-month rolling time period as determined at the end of each calendar month.	FG-PHASE3	SC VI.4	R 336.1205(1)(a) & (b), R 336.1702(a), R 336.2802(4)(d), 40 CFR 52.21(a)(2)(iv)(d)
9. VOC	9.5 pph	Test Protocol*	FG-PHASE3	SC V.1	R 336.1205(1)(a) & (b), R 336.1702(a), R 336.2802(4)(d), 40 CFR 52.21(a)(2)(iv)(d)
10. CO	128.5 tpy	12-month rolling time period as determined at the end of each calendar month.	FG-PHASE3	SC VI.4	R 336.1205(1)(a) & (b), R 336.2802(4)(d), 40 CFR 52.21(a)(2)(iv)(d), 40 CFR 52.21(d)



Pollutant	Limit	Time Period/ Operating Scenario	Equipment	Testing / Monitoring Method	Underlying Applicable Requirements
11. CO	208.0 pph	Test Protocol*	FG-PHASE3	SC V.1	R 336.1205(1)(a) & (b), R 336.2802(4)(d), 40 CFR 52.21(a)(2)(iv)(d), 40 CFR 52.21(d)
12. PM10	11.7 tpy	12-month rolling time period as determined at the end of each calendar month.	FG-PHASE3	SC VI.4	R 336.1205(1)(a) & (b), R 336.2802(4)(d), 40 CFR 52.21(a)(2)(iv)(d), 40 CFR 52.21(c) & (d)
13. PM2.5	11.7 tpy	12-month rolling time period as determined at the end of each calendar month.	FG-PHASE3	SC VI.4	R 336.1205(1)(a) & (b), R 336.2802(4)(d), 40 CFR 52.21(a)(2)(iv)(d), 40 CFR 52.21(c) & (d)

\*Test protocol shall specify averaging time

**Controlled Emission Factors with thermal oxidizer control**

Worst case for all fuels other than natural gas for NO <sub>x</sub>  NO <sub>x</sub> – 0.16 lb/gallon SO <sub>2</sub> – 0.29 lb/MMBtu for diesel and 0.084 lb/MMBtu for gasoline VOC – 0.018 lb/gallon CO – 0.394 lb/gallon PM10 – 0.0425 lb/gallon PM2.5 – 0.31 lb/MMBtu for diesel and 0.1 lb/MMBtu for gasoline	Natural Gas  NO <sub>x</sub> – 544.0 lb NO <sub>x</sub> /MMcf of natural gas
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Where: 0.125 MMBtu/gallon for gasoline, 0.138 MMBtu/gallon for diesel 1,028 Btu/cf for natural gas, and 121.5 cf natural gas equivalent to 1 gallon of gasoline

**II. MATERIAL LIMITS**

1. The fuel usage for FG-PHASE3 shall not exceed 12,672 gallons per calendar day. **(R 336.1205(1)(a) & (b), R 336.1225, R 336.1702(a), 40 CFR 52.21(c) & (d))**
2. The fuel usage for FG-PHASE3 shall not exceed 652,500 gallons per year based on a 12-month rolling time period as determined at the end of each calendar month. **(R 336.1205(1)(a) & (b), R 336.1225, R 336.1702(a), R 336.2802(4)(d), 40 CFR 52.21(a)(2)(iv)(d), 40 CFR 52.21(c) & (d))**
3. The fuel usage for FG-PHASE3 shall not exceed 500,000 gallons of diesel and diesel-like fuels of the 652,500 gallons total fuel restriction per year based on a 12-month rolling time period as determined at the end of each calendar month. **(R 336.1205(1)(a) & (b), R 336.1225, R 336.1702(a), R 336.2802(4)(d), 40 CFR 52.21(a)(2)(iv)(d), 40 CFR 52.21(c) & (d))**
4. The permittee shall burn only gasoline, alcohol blends/gasoline fuel blend (up to 100% ethanol), diesel (all variations, including European, Asian, South American, etc.), kerosene, hydrogen, LPG (or propane), and natural gas in FG-PHASE3. **(R 336.1205(1)(a) & (b), R 336.1224, R 336.1225, R 336.1901, R 336.2802(4)(d), 40 CFR 52.21(a)(2)(iv)(d), 40 CFR 52.21(c) & (d))**
5. The permittee shall not use leaded gasoline in FG-PHASE3. **(R 336.1205(1)(a) & (b), R 336.1224, R 336.1225, R 336.1901, 40 CFR 52.21(c) & (d))**

### **III. PROCESS/OPERATIONAL RESTRICTIONS**

1. The permittee shall not operate FG-PHASE3 unless a malfunction abatement plan (MAP) as described in Rule 911(2), for the Regenerative Thermal Oxidizers, has been implemented and maintained. If at any time the MAP fails to address or inadequately addresses an event that meets the characteristics of a malfunction, the permittee shall amend the MAP within 45 days after such an event occurs. The permittee shall also amend the MAP within 45 days, if new equipment is installed or upon request from the District Supervisor. The permittee shall submit the MAP to the AQD District Supervisor for review and approval. For any amendments to the MAP relating to requirements of Rule 911(2), the permittee shall submit the MAP and any amendments to the MAP to the AQD District Supervisor for review and approval. If the AQD does not notify the permittee within 90 days of submittal, the MAP or amended MAP shall be considered approved. Until an amended plan is approved, the permittee shall implement corrective procedures or operational changes to achieve compliance with all applicable emission limits. **(R 336.1225, R 336.1331, R 336.1702(a), R 336.1910, R 336.1911, 40 CFR 52.21(c) & (d))**

### **IV. DESIGN/EQUIPMENT PARAMETERS**

1. The permittee shall not operate Banks 5, 6, or 7 of FG-PHASE3 unless the sufficient regenerative thermal oxidizer capacity, is installed, maintained and operated in a satisfactory manner. Satisfactory operation includes maintaining a minimum temperature of 1400° F and a minimum retention time of 0.5 second in the associated regenerative thermal oxidizer. **(R 336.1910)**
2. The permittee shall not operate FG-PHASE3 unless the thermal oxidizer is installed, maintained and operated in a satisfactory manner. Satisfactory operation of the thermal oxidizer includes maintaining a minimum combustion chamber temperature of 1400°F and a minimum retention time of 0.5 seconds. In lieu of a minimum temperature, the permittee may use an average temperature of 1400°F based upon a three-hour rolling average. **(R 336.1205(1)(a) & (b), R 336.1225, R 336.1702(a), R 336.1910, 40 CFR 52.21(c) & (d))**
3. The permittee shall install, calibrate, maintain and operate in a satisfactory manner, a device to monitor and record the daily natural gas usage rate, on a continuous basis, in cubic feet per day. **(R 336.1205, R 336.2802, 40 CFR 52.21)**

### **V. TESTING/SAMPLING**

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. Once every five years, the following parameters shall be tested/recorded for the worst-case fuel for one of the regenerative thermal oxidizers:
  - a. NO<sub>x</sub>
  - b. VOC
  - c. CO

No less than 30 days prior to testing, the permittee shall submit a complete test plan to the AQD. The AQD must approve the final plan prior to testing. Verification of emission rates includes the submittal of a complete report of the test results to the AQD within 60 days following the last date of the test. Testing may be coordinated with the RO permit renewal issuance and testing shall continue to be completed for one of the regenerative thermal oxidizers once every five years. A different regenerative thermal oxidizer shall be tested every five years. **(R 336.1702(a), R 336.2003, R 336.2004, 40 CFR 52.21(c) & (d))**

2. Within 180 days after commencement of trial operation of operating natural gas fueled engines for purposes of testing natural gas fueled engines or engine systems, the permittee shall verify the natural gas NO<sub>x</sub> emission factor from FG-PHASE3, by testing at owner's expense, in accordance with Department requirements. No less than 30 days prior to testing, the permittee shall submit a complete test plan to the AQD. The AQD must approve the final plan prior to testing. Verification of emission rates includes the submittal of a complete report of the test results to the AQD within 60 days following the last date of the test. **(R 336.2001, R 336.2003, R 336.2004, R 336.2802(4)(d), 40 CFR 52.21(a)(2)(iv)(d), 40 CFR 52.21(c) & (d))**

## **VI. MONITORING/RECORDKEEPING**

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The permittee shall complete all required calculations in a format acceptable to the AQD District Supervisor by the 30th day of the calendar month, for the previous calendar month, unless otherwise specified in any monitoring/recordkeeping special condition. **(R 336.1205(1)(a) & (b), R 336.1225, R 336.1702(a), 40 CFR 52.21(c) & (d))**
2. The permittee shall monitor, in a satisfactory manner, the temperature in the combustion chamber of the thermal oxidizer on a continuous basis, during operation of FG-PHASE3. Temperature data recording shall consist of measurements made at equally spaced intervals, not to exceed 15 minutes per interval. **(R 336.1225, R 336.1702(a), R 336.1910, 40 CFR 52.21(c) & (d))**
3. The permittee shall monitor and record, in a satisfactory manner, the daily natural gas usage rate in cubic feet per day for FG-PHASE3. The permittee shall keep the records in a format acceptable to the AQD District Supervisor. The permittee shall keep all records on file and make them available to the Department upon request. **(R 336.1205, R 336.2802, 40 CFR 52.21)**
4. The permittee shall keep the following information on a monthly basis for FG-PHASE3:
  - a. A record of the days of operation.
  - b. Gallons of each fuel used per month and 12-month rolling time period.
  - c. NO<sub>x</sub> emission calculations determining the monthly emission rate in tons per calendar month.
  - d. NO<sub>x</sub> emission calculations determining the annual emission rate in tons per 12-month rolling time period as determined at the end of each calendar month.
  - e. SO<sub>2</sub> emission calculations determining the monthly emission rate in tons per calendar month.
  - f. SO<sub>2</sub> emission calculations determining the annual emission rate in tons per 12-month rolling time period as determined at the end of each calendar month.
  - g. VOC emission calculations determining the monthly emission rate in tons per calendar month.
  - h. VOC emission calculations determining the annual emission rate in tons per 12-month rolling time period as determined at the end of each calendar month.
  - i. CO emission calculations determining the monthly emission rate in tons per calendar month.
  - j. CO emission calculations determining the annual emission rate in tons per 12-month rolling time period as determined at the end of each calendar month.
  - k. PM10 emission calculations determining the monthly emission rate in tons per calendar month.
  - l. PM10 emission calculations determining the annual emission rate in tons per 12-month rolling time period as determined at the end of each calendar month.
  - m. PM2.5 emission calculations determining the monthly emission rate in tons per calendar month.
  - n. PM2.5 emission calculations determining the annual emission rate in tons per 12-month rolling time period as determined at the end of each calendar month.

The permittee shall keep the records in a format acceptable to the AQD District Supervisor. The permittee shall keep all records on file and make them available to the Department upon request. **(R 336.1205(1)(a) & (b), R 336.1224, R 336.1225, R 336.1702(a), R 336.2802(4)(d), 40 CFR 52.21(a)(2)(iv)(d), 40 CFR 52.21(c) & (d))**

5. The permittee shall keep the following information on a monthly basis for FG-PHASE3:
  - a. Daily fuel use calculations based upon the monthly fuel use divided by the number of days FG-PHASE3 operated during the calendar month.
  - b. Daily NO<sub>x</sub> emission calculations based upon the monthly NO<sub>x</sub> emissions divided by the number of days FG-PHASE3 operated during the calendar month.
  - c. Daily SO<sub>2</sub> emission calculations based upon the monthly SO<sub>2</sub> emissions divided by the number of days FG-PHASE3 operated during the calendar month.
  - d. Daily VOC emission calculations based upon the monthly VOC emissions divided by the number of days FG-PHASE3 operated during the calendar month.

The permittee shall keep the records in a format acceptable to the AQD District Supervisor. The permittee shall keep all records on file and make them available to the Department upon request. **(R 336.1205(1)(a) & (b), R 336.1224, R 336.1225, R 336.1702(a), 40 CFR 52.21(c) & (d))**

6. The permittee shall keep, in a satisfactory manner, operating temperature records for the thermal oxidizer as required by SC VI.2. If the measured operating temperature of the thermal oxidizer falls below 1400°F during operation of FG-PHASE3, the permittee may demonstrate compliance based upon a three-hour average temperature, by calculating the average operating temperature for each three hour period which includes one or more temperature readings below 1400°F. The permittee shall keep all records and calculations on file and make them available to the Department upon request. **(R 336.1205(1)(a) & (b), R 336.1225, R 336.1702(a), R 336.1910, 40 CFR 52.21(c) & (d))**
7. The permittee shall determine the maximum sulfur content in each fuel using an ASTM-approved method or fuel supplier certification. See Appendix 7. **(R 336.1205(1)(a) & (b), R 336.2802(4)(d), 40 CFR 52.21(a)(2)(iv)(d), 40 CFR 52.21(c) & (d))**

See Appendices 4 & 7

## VII. REPORTING

1. Within 30 days after beginning to operate a natural gas fueled engine for purposes of testing natural gas fueled engines or engine systems in FG-PHASE3 as authorized by this Permit to Install, the permittee or the authorized agent pursuant to Rule 204, shall notify the AQD District Supervisor, in writing, of the beginning of the activity. **(R 336.1201(7)(a))**

## VIII. STACK/VENT RESTRICTIONS

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:

Stack & Vent ID	Maximum Exhaust Diameter/ Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements
1. SVRTO1	44	68.5	R 336.1225, 40 CFR 52.21(c) & (d)
2. SVRTO2	44	68.5	R 336.1225, 40 CFR 52.21(c) & (d)
3. SVRTO3	44	68.5	R 336.1225, 40 CFR 52.21(c) & (d)

## IX. OTHER REQUIREMENTS

NA

### Footnotes:

<sup>1</sup>This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

**The following conditions apply to: FG-PHASE3A**

**DESCRIPTION:** Five dynamometers housed in the same building as the Phase 3 dynamometers, which were installed at a later date. Three regenerative thermal oxidizers are used to control hydrocarbon and carbon monoxide emissions from the Phase 3 and Phase 3A test cells.

**Emission Units:** EU-PHASE3-21, EU-PHASE3-22, EU-PHASE3-23, EU-PHASE3-24, EU-PHASE3-25

**POLLUTION CONTROL EQUIPMENT:** Regenerative Thermal Oxidizer 1, Regenerative Thermal Oxidizer 2, Regenerative Thermal Oxidizer 3

**I. EMISSION LIMITS**

Pollutant	Limit	Time Period/ Operating Scenario	Equipment	Testing / Monitoring Method	Underlying Applicable Requirements
1. NO <sub>x</sub>	35.5 tpy	12-month rolling time period as determined at the end of each calendar month.	FG-PHASE3A	SC VI.3	R 336.1205(1)(a) & (3)
2. CO	58.1 tpy	12-month rolling time period as determined at the end of each calendar month.	FG-PHASE3A	SC VI.3	R 336.1205(1)(a) & (3)
<b>Controlled Emission Factors with thermal oxidizer control</b>					
Worst case for all fuels other than natural gas  CO – 0.394 lb/gallon NO <sub>x</sub> – 0.3 lb/gallon diesel NO <sub>x</sub> – 0.2 lb/gallon gasoline/other fuels			Natural Gas NO <sub>x</sub> – 544.0 lb NO <sub>x</sub> /MMcf of natural gas		
Where: 0.125 MMBtu/gallon for gasoline, 0.138 MMBtu/gallon for diesel, 1,028 Btu/cf for natural gas, and 121.5 cf natural gas equivalent to 1 gallon of gasoline					

**II. MATERIAL LIMITS**

1. The fuel usage for FG-PHASE3A shall not exceed 4,752 gallons per calendar day. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), 40 CFR 52.21(c) & (d))**
2. The fuel usage for FG-PHASE3A shall not exceed 295,000 gallons per year based on a 12-month rolling time period as determined at the end of each calendar month. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), 40 CFR 52.21(c) & (d))**
3. The fuel usage for FG-PHASE3A shall not exceed 120,000 gallons of diesel and diesel-like fuels of the 295,000 gallons total fuel restriction per year based on a 12-month rolling time period as determined at the end of each calendar month. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), 40 CFR 52.21(c) & (d))**
4. The permittee shall burn only gasoline, alcohol blends/gasoline fuel blend (up to 100% ethanol), diesel (all variations, including European, Asian, South American, etc.), kerosene, hydrogen, LPG (or propane), and natural gas in FG-PHASE3A. **(R 336.1205(1)(a) & (3), R 336.1224, R 336.1225, 40 CFR 52.21(c) & (d))**
5. The permittee shall not use leaded gasoline in FG-PHASE3A. **(R 336.1205(1)(a) & (3), R 336.1224, R 336.1225, 40 CFR 52.21(c) & (d))**

### **III. PROCESS/OPERATIONAL RESTRICTIONS**

1. The permittee shall not operate FG-PHASE3A unless a malfunction abatement plan (MAP) as described in Rule 911(2), for the Regenerative Thermal Oxidizers, has been implemented and maintained. If at any time the MAP fails to address or inadequately addresses an event that meets the characteristics of a malfunction, the permittee shall amend the MAP within 45 days after such an event occurs. The permittee shall also amend the MAP within 45 days, if new equipment is installed or upon request from the District Supervisor. The permittee shall submit the MAP to the AQD District Supervisor for review and approval. For any amendments to the MAP relating to requirements of Rule 911(2), the permittee shall submit the MAP and any amendments to the MAP to the AQD District Supervisor for review and approval. If the AQD does not notify the permittee within 90 days of submittal, the MAP or amended MAP shall be considered approved. Until an amended plan is approved, the permittee shall implement corrective procedures or operational changes to achieve compliance with all applicable emission limits. **(R 336.1225, R 336.1331, R 336.1702(a), R 336.1910, R 336.1911, 40 CFR 52.21(c) & (d))**

### **IV. DESIGN/EQUIPMENT PARAMETERS**

1. The permittee shall not operate FG-PHASE3A unless the thermal oxidizer is installed, maintained and operated in a satisfactory manner. Satisfactory operation of the thermal oxidizer includes maintaining a minimum combustion chamber temperature of 1400°F and a minimum retention time of 0.5 seconds. In lieu of a minimum temperature, the permittee may use an average temperature of 1400°F based upon a three-hour rolling average. **(R 336.1910)**
2. The permittee shall install, calibrate, maintain, and operate, in a satisfactory manner, temperature monitoring devices in the thermal oxidizers in appropriate locations to monitor and record the temperature on a continuous basis as specified in SC VI.2, during operation of FG-PHASE3A. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), R 336.1910, 40 CFR 52.21(c) & (d))**
3. The permittee shall install, calibrate, maintain, and operate, in a satisfactory manner, a device to monitor and record the daily natural gas usage rate, on a continuous basis, in cubic feet per day. **(R 336.1205(1)(a) & (3), 40 CFR 52.21(c) & (d))**

### **V. TESTING/SAMPLING**

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

NA

### **VI. MONITORING/RECORDKEEPING**

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The permittee shall complete all required calculations in a format acceptable to the AQD District Supervisor by the 30th day of the calendar month, for the previous calendar month, unless otherwise specified in any monitoring/recordkeeping special condition. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), 40 CFR 52.21(c) & (d))**
2. The permittee shall monitor and record, in a satisfactory manner, the temperature in the combustion chamber of the thermal oxidizer on a continuous basis, during operation of FG-PHASE3A. Temperature data recording shall consist of measurements made at equally spaced intervals, not to exceed 15 minutes per interval. **(R 336.1225, R 336.1702(a), R 336.1910, 40 CFR 52.21(c) & (d))**

3. The permittee shall keep the following information on a monthly basis for FG-PHASE3A:
  - a. Usage of each fuel per calendar day, calendar month, and 12-month rolling time period.
  - b. Usage of diesel and diesel-like fuel per calendar month and 12-month rolling time period.
  - c. Usage of total fuel per calendar month and 12-month rolling time period.
  - d. NO<sub>x</sub> emission calculations determining the monthly emission rate in tons per calendar month.
  - e. NO<sub>x</sub> emission calculations determining the annual emission rate in tons per 12-month rolling time period as determined at the end of each calendar month.
  - f. CO emission calculations determining the monthly emission rate in tons per calendar month.
  - g. CO emission calculations determining the annual emission rate in tons per 12-month rolling time period as determined at the end of each calendar month.

The permittee shall keep the records in a format acceptable to the AQD District Supervisor. The permittee shall keep all records on file and make them available to the Department upon request. **(R 336.1205(1)(a) & (3), 40 CFR 52.21(c) & (d))**

4. The permittee shall keep, in a satisfactory manner, operating temperature records for the thermal oxidizer as required by SC VI.2. If the measured operating temperature of the thermal oxidizer falls below 1400°F during operation of FG-PHASE3A, the permittee may demonstrate compliance based upon a three-hour average temperature, by calculating the average operating temperature for each three hour period which includes one or more temperature readings below 1400°F. The permittee shall keep all records and calculations on file and make them available to the Department upon request. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), R 336.1910, 40 CFR 52.21(c) & (d))**
5. The permittee shall determine the maximum sulfur content in each fuel using an ASTM-approved method or fuel supplier certification. See Appendix 7. **(R 336.1205(1)(a) & (3), 40 CFR 52.21(c) & (d))**

**See Appendix 7**

**VII. REPORTING**

1. Within 30 days after completion of the installation, construction, reconstruction, relocation, or modification of each dynamometer authorized by this Permit to Install, the permittee or the authorized agent pursuant to Rule 204, shall notify the AQD District Supervisor, in writing, of the completion of the activity. Completion of the installation, construction, reconstruction, relocation, or modification is considered to occur not later than commencement of trial operation of FG-PHASE3A. **(R 336.1201(7)(a))**

**VIII. STACK/VENT RESTRICTIONS**

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:

<b>Stack &amp; Vent ID</b>	<b>Maximum Exhaust Diameter/ Dimensions (inches)</b>	<b>Minimum Height Above Ground (feet)</b>	<b>Underlying Applicable Requirements</b>
1. SVRTO1	44	68.5	R 336.1225, 40 CFR 52.21(c) & (d)
2. SVRTO2	44	68.5	R 336.1225, 40 CFR 52.21(c) & (d)
3. SVRTO3	44	68.5	R 336.1225, 40 CFR 52.21(c) & (d)

**IX. OTHER REQUIREMENTS**

NA

#### **APPENDIX 4: Recordkeeping**

The permittee shall use the following approved formats and procedures for the recordkeeping requirements referenced in FG-PHASE3. Alternative formats or procedures must be approved by the AQD District Supervisor.

1. Fuel usage rate, gallons, prorated per Appendix 7:
  - daily
2. Fuel usage rate, gallons, non-prorated:
  - monthly
  - rolling 12-month time period

Should the prorated daily fuel usage rate exceed 90% of the daily limit, the permittee shall commence daily recordkeeping for a minimum of two months until the prorated rate falls below 90% of the weekly limit as calculated at the end of the month.



### APPENDIX 7: Emission Calculations

#### FG-PHASE3

The permittee shall use the following calculations in conjunction with monitoring, testing or recordkeeping data to determine compliance with the applicable requirements referenced in FG-PHASE3. Alternative calculations must be approved by the AQD District Supervisor.

Prorated daily fuel usage, gallons = (Monthly fuel usage in gallons) / (days of operation per month).

Daily SO<sub>2</sub> emissions, pounds = (Prorated daily fuel usage in gallons) x (sulfur content of fuel, pounds per gallon) x (2 pounds SO<sub>2</sub> / pound sulfur) summed for each fuel (e.g., diesel, unleaded gasoline) used.

Annual SO<sub>2</sub> emissions, tons = (Annual fuel usage in gallons) x (sulfur content of fuel, pounds per gallon) x (2 pounds SO<sub>2</sub> / pound sulfur) x (ton / 2000 pounds) summed for each fuel (e.g. diesel, unleaded gasoline) used.

Daily NO<sub>x</sub> emissions, pounds = (Prorated daily fuel usage in gallons) \* (NO<sub>x</sub> emission factor, pounds per gallon) summed for each fuel (e.g. diesel, unleaded gasoline) used.

Annual NO<sub>x</sub> emissions, tons = (Annual fuel usage in gallons) \* (NO<sub>x</sub> emissions factor, pounds per gallon) \* (ton/2000 lbs) summed for each fuel (e.g. diesel, unleaded gasoline) used.

Daily VOC emissions, pounds = (Prorated daily fuel usage in gallons) \* (VOC emission factor, pounds per gallon) summed for each fuel (e.g. diesel, unleaded gasoline) used.

Annual VOC emissions, tons = (Annual fuel usage in gallons) \* (VOC emission factor, pounds per gallon) \* (ton/2000 pounds) summed for each fuel (e.g. diesel, unleaded gasoline) used.

Annual CO emissions, tons = (Annual fuel usage in gallons) \* (CO emission factor, pounds per gallon) \* (ton/2000 pounds) summed for each fuel (e.g. diesel, unleaded gasoline) used.

Annual PM<sub>10</sub> emissions, tons = (Annual fuel usage in gallons) \* (PM<sub>10</sub> emission factor, pounds per gallon) \* (ton/2000 pounds) summed for each fuel (e.g. diesel, unleaded gasoline) used.

Annual PM<sub>2.5</sub> emissions, tons = (Annual fuel usage in gallons) \* (PM<sub>2.5</sub> emission factor, pounds per gallon) \* (ton/2000 pounds) summed for each fuel (e.g. diesel, unleaded gasoline) used.

#### FG-PHASE3A

The permittee shall use the following calculations in conjunction with monitoring, testing or recordkeeping data to determine compliance with the applicable requirements referenced in FG-PHASE3A. Alternative calculations must be approved by the AQD District Supervisor.

Annual NO<sub>x</sub> emissions, tons = (Annual fuel usage in gallons) \* (NO<sub>x</sub> emissions factor, pounds per gallon) \* (ton/2000 lbs) summed for each fuel (e.g. diesel, unleaded gasoline) used.

Annual CO emissions, tons = (Annual fuel usage in gallons) \* (CO emission factor, pounds per gallon) \* (ton/2000 pounds) summed for each fuel (e.g. diesel, unleaded gasoline) used.