

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

April 6, 2017

**PERMIT TO INSTALL**  
194-15A

**ISSUED TO**  
Ford Motor Company – Research & Engineering Center

**LOCATED AT**  
1701 Village Road  
Dearborn, Michigan

**IN THE COUNTY OF**  
Wayne

**STATE REGISTRATION NUMBER**  
B6230

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:

**March 7, 2017**

DATE PERMIT TO INSTALL APPROVED:

**April 6, 2017**

SIGNATURE:

DATE PERMIT VOIDED:

SIGNATURE:

DATE PERMIT REVOKED:

SIGNATURE:

## PERMIT TO INSTALL

### Table of Contents

<b>Section</b>	<b>Page</b>
Alphabetical Listing of Common Abbreviations / Acronyms .....	2
General Conditions .....	3
Special Conditions .....	5
Emission Unit Summary Table.....	5
Flexible Group Summary Table .....	9
Special Conditions for FG_WINGA.....	10
Special Conditions for FGTESTCELLS .....	12

**Common Abbreviations / Acronyms**

<b>Common Acronyms</b>		<b>Pollutant / Measurement Abbreviations</b>	
AQD	Air Quality Division	acfm	Actual cubic feet per minute
BACT	Best Available Control Technology	BTU	British Thermal Unit
CAA	Clean Air Act	°C	Degrees Celsius
CAM	Compliance Assurance Monitoring	CO	Carbon Monoxide
CEM	Continuous Emission Monitoring	CO <sub>2e</sub>	Carbon Dioxide Equivalent
CFR	Code of Federal Regulations	dscf	Dry standard cubic foot
COM	Continuous Opacity Monitoring	dscm	Dry standard cubic meter
Department/ department	Michigan Department of Environmental Quality	°F	Degrees Fahrenheit
EU	Emission Unit	gr	Grains
FG	Flexible Group	HAP	Hazardous Air Pollutant
GACS	Gallons of Applied Coating Solids	Hg	Mercury
GC	General Condition	hr	Hour
GHGs	Greenhouse Gases	HP	Horsepower
HVLP	High Volume Low Pressure*	H <sub>2</sub> S	Hydrogen Sulfide
ID	Identification	kW	Kilowatt
IRSL	Initial Risk Screening Level	lb	Pound
ITSL	Initial Threshold Screening Level	m	Meter
LAER	Lowest Achievable Emission Rate	mg	Milligram
MACT	Maximum Achievable Control Technology	mm	Millimeter
MAERS	Michigan Air Emissions Reporting System	MM	Million
MAP	Malfunction Abatement Plan	MW	Megawatts
MDEQ	Michigan Department of Environmental Quality	NMOC	Non-methane Organic Compounds
MSDS	Material Safety Data Sheet	NO <sub>x</sub>	Oxides of Nitrogen
NA	Not Applicable	ng	Nanogram
NAAQS	National Ambient Air Quality Standards	PM	Particulate Matter
NESHAP	National Emission Standard for Hazardous Air Pollutants	PM10	Particulate Matter equal to or less than 10 microns in diameter
NSPS	New Source Performance Standards	PM2.5	Particulate Matter equal to or less than 2.5 microns in diameter
NSR	New Source Review	pph	Pounds per hour
PS	Performance Specification	ppm	Parts per million
PSD	Prevention of Significant Deterioration	ppmv	Parts per million by volume
PTE	Permanent Total Enclosure	ppmw	Parts per million by weight
PTI	Permit to Install	psia	Pounds per square inch absolute
RACT	Reasonable Available Control Technology	psig	Pounds per square inch gauge
ROP	Renewable Operating Permit	scf	Standard cubic feet
SC	Special Condition	sec	Seconds
SCR	Selective Catalytic Reduction	SO <sub>2</sub>	Sulfur Dioxide
SNCR	Selective Non-Catalytic Reduction	TAC	Toxic Air Contaminant
SRN	State Registration Number	Temp	Temperature
TEQ	Toxicity Equivalence Quotient	THC	Total Hydrocarbons
USEPA/EPA	United States Environmental Protection Agency	tpy	Tons per year
VE	Visible Emissions	µg	Microgram
		µm	Micrometer or Micron
		VOC	Volatile Organic Compounds
		yr	Year

\*For HVLP applicators, the pressure measured at the gun air cap shall not exceed 10 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.

<b>Emission Unit ID</b>	<b>Emission Unit Description (Process Equipment &amp; Control Devices)</b>	<b>Installation Date / Modification Date</b>	<b>Flexible Group ID</b>
EU_1A	Durability Dynamometer Test Cell located in Wing A for testing engines with maximum of 1000 HP.	3/22/2016	FG_WINGA, FGTESTCELLS
EU_2A	Durability Dynamometer Test Cell located in Wing A for testing engines with maximum of 850 HP.	3/22/2016	FG_WINGA, FGTESTCELLS
EU_3A	Durability Dynamometer Test Cell located in Wing A for testing engines with maximum of 850 HP.	3/22/2016	FG_WINGA, FGTESTCELLS
EU_4A	Durability Dynamometer Test Cell located in Wing A for testing engines with maximum of 850 HP.	3/22/2016	FG_WINGA, FGTESTCELLS
EU_5A	Durability Dynamometer Test Cell located in Wing A for testing engines with maximum of 850 HP.	3/22/2016	FG_WINGA, FGTESTCELLS
EU_6A	Durability Dynamometer Test Cell located in Wing A for testing engines with maximum of 850 HP.	3/22/2016	FG_WINGA, FGTESTCELLS
EU_7A	Durability Dynamometer Test Cell located in Wing A for testing engines with maximum of 850 HP.	3/22/2016	FG_WINGA, FGTESTCELLS
EU_8A	Durability Dynamometer Test Cell located in Wing A for testing engines with maximum of 850 HP.	3/22/2016	FG_WINGA, FGTESTCELLS
EU_9A	Durability Dynamometer Test Cell located in Wing A for testing engines with maximum of 1000 HP.	3/22/2016	FG_WINGA, FGTESTCELLS
EU_10A	Durability Dynamometer Test Cell located in Wing A for testing engines with maximum of 850 HP.	3/22/2016	FG_WINGA, FGTESTCELLS
EU_11A	Durability Dynamometer Test Cell located in Wing A for testing engines with maximum of 850 HP.	3/22/2016	FG_WINGA, FGTESTCELLS
EU_12A	Durability Dynamometer Test Cell located in Wing A for testing engines with maximum of 850 HP.	3/22/2016	FG_WINGA, FGTESTCELLS
EU_13A	Durability Dynamometer Test Cell located in Wing A for testing engines with maximum of 850 HP.	3/22/2016	FG_WINGA, FGTESTCELLS
EU_14A	Durability Dynamometer Test Cell located in Wing A for testing engines with maximum of 850 HP.	3/22/2016	FG_WINGA, FGTESTCELLS

Emission Unit ID	Emission Unit Description (Process Equipment & Control Devices)	Installation Date / Modification Date	Flexible Group ID
EU_15A	Durability Dynamometer Test Cell located in Wing A for testing engines with maximum of 850 HP.	3/22/2016	FG_WINGA, FGTESTCELLS
EU_16A	Durability Dynamometer Test Cell located in Wing A for testing engines with maximum of 850 HP.	3/22/2016	FG_WINGA, FGTESTCELLS
EU_1C	Heavy Duty Truck Engine Development, Certification and Specialty Dynamometer Test Cell located in Wing C for testing engines with a maximum of 400-480 HP.	3/22/2016	FGTESTCELLS
EU_3C	Heavy Duty Truck Engine Development, Certification and Specialty Dynamometer Test Cell located in Wing C for testing engines with a maximum of 400-480 HP.	3/22/2016	FGTESTCELLS
EU_5C	Heavy Duty Truck Engine Development, Certification and Specialty Dynamometer Test Cell located in Wing C for testing engines with a maximum of 400-480 HP.	3/22/2016	FGTESTCELLS
EU_6C	Heavy Duty Truck Engine Development, Certification and Specialty Dynamometer Test Cell located in Wing C for testing engines with a maximum of 400-480 HP.	3/22/2016	FGTESTCELLS
EU_8C	Heavy Duty Truck Engine Development, Certification and Specialty Dynamometer Test Cell located in Wing C for testing engines with a maximum of 400-480 HP.	3/22/2016	FGTESTCELLS
EU_11C	Heavy Duty Truck Engine Development, Certification and Specialty Dynamometer Test Cell located in Wing C for testing engines with a maximum of 400-480 HP.	3/22/2016	FGTESTCELLS
EU_16C	Heavy Duty Truck Engine Development, Certification and Specialty Dynamometer Test Cell located in Wing C for testing engines with a maximum of 400-480 HP.	3/22/2016	FGTESTCELLS
EU_18C	Heavy Duty Truck Engine Development, Certification and Specialty Dynamometer Test Cell located in Wing C for testing engines with a maximum of 400-480 HP.	3/22/2016	FGTESTCELLS
EU_1D	Engine Development Dynamometer Test Cell located in Wing D for testing engines with a maximum of 300-670 HP.	3/22/2016	FGTESTCELLS
EU_2D	Engine Development Dynamometer Test Cell located in Wing D for testing engines with a maximum of 300-670 HP.	3/22/2016	FGTESTCELLS
EU_3D	Engine Development Dynamometer Test Cell located in Wing D for testing engines with a maximum of 300-670 HP.	3/22/2016	FGTESTCELLS
EU_5D	Engine Development Dynamometer Test Cell located in Wing D for testing engines with a maximum of 300-670 HP.	3/22/2016	FGTESTCELLS

<b>Emission Unit ID</b>	<b>Emission Unit Description (Process Equipment &amp; Control Devices)</b>	<b>Installation Date / Modification Date</b>	<b>Flexible Group ID</b>
EU_6D	Engine Development Dynamometer Test Cell located in Wing D for testing engines with a maximum of 300-670 HP.	3/22/2016	FGTESTCELLS
EU_8D	Engine Development Dynamometer Test Cell located in Wing D for testing engines with a maximum of 300-670 HP.	3/22/2016	FGTESTCELLS
EU_9D	Engine Development Dynamometer Test Cell located in Wing D for testing engines with a maximum of 300-670 HP.	3/22/2016	FGTESTCELLS
EU_10D	Engine Development Dynamometer Test Cell located in Wing D for testing engines with a maximum of 300-670 HP.	3/22/2016	FGTESTCELLS
EU_11D	Engine Development Dynamometer Test Cell located in Wing D for testing engines with a maximum of 300-670 HP.	3/22/2016	FGTESTCELLS
EU_13D	Engine Development Dynamometer Test Cell located in Wing D for testing engines with a maximum of 300-670 HP.	3/22/2016	FGTESTCELLS
EU_14D	Engine Development Dynamometer Test Cell located in Wing D for testing engines with a maximum of 300-670 HP.	3/22/2016	FGTESTCELLS
EU_16D	Engine Development Dynamometer Test Cell located in Wing D for testing engines with a maximum of 300-670 HP.	3/22/2016	FGTESTCELLS
EU_21D	Engine Development Dynamometer Test Cell located in Wing D for testing engines with a maximum of 130-850 HP.	Permit Issue Date	FGTESTCELLS
EU_26D	Engine Development Dynamometer Test Cell located in Wing D for testing engines with a maximum of 130-850 HP.	Permit Issue Date	FGTESTCELLS
EU_31D	Engine Development Dynamometer Test Cell located in Wing D for testing engines with a maximum of 130-850 HP.	Permit Issue Date	FGTESTCELLS
EU_39D	Engine Durability Dynamometer Test Cell for testing engines with a maximum of 400-2000 HP.	3/22/2016	FGTESTCELLS
EU_41D	Engine Durability Dynamometer Test Cell for testing engines with a maximum of 400-2000 HP.	3/22/2016	FGTESTCELLS
EU_42D	Engine Durability Dynamometer Test Cell for testing engines with a maximum of 400-2000 HP.	3/22/2016	FGTESTCELLS
EU_1E	Engine Development Dynamometer Test Cell located in Wing E for testing engines with a maximum of 130-850 HP.	3/22/2016	FGTESTCELLS
EU_2E	Engine Development Dynamometer Test Cell located in Wing E for testing engines with a maximum of 130-850 HP.	3/22/2016	FGTESTCELLS

Emission Unit ID	Emission Unit Description (Process Equipment & Control Devices)	Installation Date / Modification Date	Flexible Group ID
EU_3E	Engine Development Dynamometer Test Cell located in Wing E for testing engines with a maximum of 130-850 HP.	3/22/2016	FGTESTCELLS
EU_4E	Engine Development Dynamometer Test Cell located in Wing E for testing engines with a maximum of 130-850 HP.	3/22/2016	FGTESTCELLS
EU_5E	Engine Development Dynamometer Test Cell located in Wing E for testing engines with a maximum of 130-850 HP.	3/22/2016	FGTESTCELLS
EU_6E	Engine Development Dynamometer Test Cell located in Wing E for testing engines with a maximum of 130-850 HP.	3/22/2016	FGTESTCELLS
EU_7E	Engine Development Dynamometer Test Cell located in Wing E for testing engines with a maximum of 130-850 HP.	3/22/2016	FGTESTCELLS
EU_8E	Engine Development Dynamometer Test Cell located in Wing E for testing engines with a maximum of 130-850 HP.	3/22/2016	FGTESTCELLS
EU_9E	Engine Development Dynamometer Test Cell located in Wing E for testing engines with a maximum of 130-900 HP.	3/22/2016	FGTESTCELLS
EU_10E	Engine Development Dynamometer Test Cell located in Wing E for testing engines with a maximum of 130-900 HP.	3/22/2016	FGTESTCELLS
EU_11E	Engine Development Dynamometer Test Cell located in Wing E for testing engines with a maximum of 130-850 HP.	3/22/2016	FGTESTCELLS
EU_12E	Engine Development Dynamometer Test Cell located in Wing E for testing engines with a maximum of 130-850 HP.	3/22/2016	FGTESTCELLS
EU_13E	Engine Development Dynamometer Test Cell located in Wing E for testing engines with a maximum of 130-850 HP.	3/22/2016	FGTESTCELLS
EU_14E	Engine Development Dynamometer Test Cell located in Wing E for testing engines with a maximum of 130-850 HP.	3/22/2016	FGTESTCELLS
EU_15E	Engine Development Dynamometer Test Cell located in Wing E for testing engines with a maximum of 130-850 HP.	3/22/2016	FGTESTCELLS
EU_16E	Engine Development Dynamometer Test Cell located in Wing E for testing engines with a maximum of 130-850 HP.	3/22/2016	FGTESTCELLS
EU_17E	Engine Development Dynamometer Test Cell located in Wing E for testing engines with a maximum of 130-850 HP.	3/22/2016	FGTESTCELLS
EU_18E	Engine Development Dynamometer Test Cell located in Wing E for testing engines with a maximum of 130-850 HP.	3/22/2016	FGTESTCELLS

Emission Unit ID	Emission Unit Description (Process Equipment & Control Devices)	Installation Date / Modification Date	Flexible Group ID
EU_19E	Engine Development Dynamometer Test Cell located in Wing E for testing engines with a maximum of 130-850 HP.	3/22/2016	FGTESTCELLS
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_WINGA	16 Engine Durability Dynamometer Tests Cells located in Wing A	EU_1A, EU_2A, EU_3A, EU_4A, EU_5A, EU_6A, EU_7A, EU_8A, EU_9A, EU_10A, EU_11A, EU_12A, EU_13A, EU_14A, EU_15A, EU_16A
FGTESTCELLS	All Engine Dynamometer Test Cells located in Wings A, C, D, E, and eddy current durability cell area of the dynamometer laboratory	EU_1A, EU_2A, EU_3A, EU_4A, EU_5A, EU_6A, EU_7A, EU_8A, EU_9A, EU_10A, EU_11A, EU_12A, EU_13A, EU_14A, EU_15A, EU_16A, EU_1C, EU_3C, EU_5C, EU_6C, EU_8C, EU_11C, EU_16C, EU_18C, EU_1D, EU_2D, EU_3D, EU_5D, EU_6D, EU_8D, EU_9D, EU_10D, EU_11D, EU_13D, EU_14D, EU_16D, EU_21D, EU_26D, EU-31D, EU_39D, EU_41D, EU_42D, EU_1E, EU_2E, EU_3E, EU_4E, EU_5E, EU_6E, EU_7E, EU_8E, EU_9E, EU_10E, EU_11E, EU_12E, EU_13E, EU_14E, EU_15E, EU_16E, EU_17E, EU_18E, EU_19E

**The following conditions apply to:**  
**FG\_WINGA**

**DESCRIPTION:** 16 Engine Durability Dynamometer Tests Cells located in Wing A

**Emission Units:** EU\_1A, EU\_2A, EU\_3A, EU\_4A, EU\_5A, EU\_6A, EU\_7A, EU\_8A, EU\_9A, EU\_10A, EU\_11A, EU\_12A, EU\_13A, EU\_14A, EU\_15A, EU\_16A

**POLLUTION CONTROL EQUIPMENT:** Single stack for all test cells equipped with a thermal oxidizer system

**I. EMISSION LIMITS**

<b>Pollutant</b>	<b>Limit</b>	<b>Time Period/ Operating Scenario</b>	<b>Equipment</b>	<b>Testing / Monitoring Method</b>	<b>Underlying Applicable Requirements</b>
1. CO	3.0308 lb/MMBtu	Test Protocol*	FG_WINGA	SC V.1	R 336.1205(1)(a) & (3), 40 CFR 52.21(d)
2. VOC	0.0569 lb/MMBtu	Test Protocol*	FG_WINGA	SC V.1	R 336.1205(1)(a) & (3)

\*Test protocol shall specify averaging time

**II. MATERIAL LIMITS**

NA

**III. PROCESS/OPERATIONAL RESTRICTIONS**

- The permittee shall not operate FG\_WINGA unless a malfunction abatement plan (MAP) as described in Rule 911(2), for the thermal oxidizer system, has been submitted 60 days prior to operation, and is 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 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(d))**

**IV. DESIGN/EQUIPMENT PARAMETERS**

- The permittee shall not operate FG\_WINGA unless the thermal oxidizer system is installed, maintained and operated in a satisfactory manner. Satisfactory operation of the thermal oxidizer includes maintaining a minimum combustion zone temperature of 1400° F or the minimum combustion zone temperature from the most recent acceptable stack test, and a minimum retention time of 0.5 second. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), R 336.1910, 40 CFR 52.21(d))**
- The permittee shall install, calibrate, maintain and operate in a satisfactory manner, a temperature monitoring device in the thermal oxidizer near the combustion chamber outlet to monitor and record the temperature on a continuous basis, during operation of FG\_WINGA. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), R 336.1910, 40 CFR 52.21(d))**

**V. TESTING/SAMPLING**

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

1. Within 180 days after commencement of trial operation of the eighth new test cell in Wing A as authorized by this Permit to Install, the permittee shall verify CO and VOC emission factors by testing each thermal oxidizer at owner's expense, in accordance with Department requirements. No less than 60 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 336.1205(1)(a) & (3), R 336.2001, R 336.2003, R 336.2004, 40 CFR 52.21(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 records 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(d))**
2. The permittee shall monitor and record the temperature in the thermal oxidizer near the combustion chamber outlet, on a continuous basis, during operation of FG\_WINGA. Temperature data recording shall consist of measurements made at equally spaced intervals, not to exceed 15 minutes per interval. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), R 336.1910, 40 CFR 52.21(d))**
3. The permittee shall keep, in a satisfactory manner, records of the temperature in the thermal oxidizer near the combustion chamber outlet on a continuous basis, as required by SC VI.2. The permittee shall keep all records 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(d))**

**VII. REPORTING**

NA

**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. SV_WINGA	34	85.75	R 336.1225, 40 CFR 52.21(c) & (d)

**IX. OTHER REQUIREMENTS**

NA

**The following conditions apply to:**  
**FGTESTCELLS**

**DESCRIPTION:** All Engine Dynamometer Test Cells located in Wings A, C, D, E, and three eddy current durability cells in the dynamometer laboratory

**Emission Units:** EU\_1A, EU\_2A, EU\_3A, EU\_4A, EU\_5A, EU\_6A, EU\_7A, EU\_8A, EU\_9A, EU\_10A, EU\_11A, EU\_12A, EU\_13A, EU\_14A, EU\_15A, EU\_16A, EU\_1C, EU\_3C, EU\_5C, EU\_6C, EU\_8C, EU\_11C, EU\_16C, EU\_18C, EU\_1D, EU\_2D, EU\_3D, EU\_5D, EU\_6D, EU\_8D, EU\_9D, EU\_10D, EU\_11D, EU\_13D, EU\_14D, EU\_16D, EU\_21D, EU\_26D, EU\_31D, EU\_39D, EU\_41D, EU\_42D, EU\_1E, EU\_2E, EU\_3E, EU\_4E, EU\_5E, EU\_6E, EU\_7E, EU\_8E, EU\_9E, EU\_10E, EU\_11E, EU\_12E, EU\_13E, EU\_14E, EU\_15E, EU\_16E, EU\_17E, EU\_18E, EU\_19E

**POLLUTION CONTROL EQUIPMENT:** FG\_WINGA has a thermal oxidizer system. No other control required.

**I. EMISSION LIMITS**

<b>Pollutant</b>	<b>Limit</b>	<b>Time Period/ Operating Scenario</b>	<b>Equipment</b>	<b>Testing / Monitoring Method</b>	<b>Underlying Applicable Requirements</b>
1. NO <sub>x</sub>	101.2 tpy	12-month rolling time period as determined at the end of each calendar month.	FGTESTCELLS	SC VI.2	R 336.1205(1)(a) & (3), 40 CFR 52.21(c) & (d)
2. CO	1,028.7 tpy	12-month rolling time period as determined at the end of each calendar month.	FGTESTCELLS	SC VI.2	R 336.1205(1)(a) & (3)
3. VOC	1,730.4 lbs/day	Daily.	FGTESTCELLS	SC VI.3	R 336.1205(1)(a) & (3), R 336.1702(a)
4. VOC	35.5 tpy	12-month rolling time period as determined at the end of each calendar month.	FGTESTCELLS	SC VI.2	R 336.1205(1)(a) & (3), R 336.1702(a)
5. 1,3-Butadiene	22.4 lbs/day	Daily.	FGTESTCELLS	SC VI.3	R 336.1224, R 336.1225
6. 1,3-Butadiene	0.5 tpy	12-month rolling time period as determined at the end of each calendar month.	FGTESTCELLS	SC VI.2	R 336.1224, R 336.1225
7. Acetaldehyde	8.3 tpy	12-month rolling time period as determined at the end of each calendar month.	FGTESTCELLS	SC VI.2	R 336.1224, R 336.1225

Pollutant	Limit	Time Period/ Operating Scenario	Equipment	Testing / Monitoring Method	Underlying Applicable Requirements
<u>Uncontrolled Emission Factors</u>					
NOx for diesel: 4.409 lb/MMBTU NOx for gasoline: 0.785 lb/MMBTU CO for all fuels: 30.308 lb/MMBTU VOC for all fuels: 1.138 lb/MMBTU 1,3-Butadiene for all fuels: 0.0148 lb/MMBTU Acetaldehyde for alcohol: 0.3009 lb/MMBTU Acetaldehyde for gasoline: 0.0134 lb/MMBTU					
<u>Control</u> was assumed to be 90 percent for CO and 95 percent for VOCs and toxic air contaminants (1,3-butadiene and acetaldehyde).					
*Test protocol shall specify averaging time					

**II. MATERIAL LIMITS**

1. The permittee shall only burn unleaded gasoline, methanol/gasoline fuel blends, ethanol/gasoline fuel blends, alcohols, diesel, LPG (or propane), and natural gas in FGTESTCELLS. **(R 336.1205(1)(a) & (3), R 336.1224, R 336.1225, R 336.1702, R 336.2803, R 336.2804, 40 CFR 52.21(c) & (d))**
2. Upon initial operation of the first new testcell in Wing A, the maximum total fuel usage for FGTESTCELLS shall not exceed 31,849 MMBTU per calendar day and the maximum total uncontrolled fuel usage for FGTESTCELLS shall not exceed 1,451 MMBtu per calendar day. When burning both controlled and uncontrolled in a calendar day, the following equation shall be used to determine maximum allowed total fuel usage:

$$\text{Total Fuel Usage in MMBTU/day} = 31,849 \text{ MMBTU/day} - 20 * U$$

Where U is the total uncontrolled fuel in MMBTU per calendar day. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), 40 CFR 52.21(c) & (d))**

3. The total fuel usage for FGTESTCELLS shall not exceed 167,198 MMBTU per 12-month rolling time period as determined at the end of each calendar month.
  - a. Of the 167,198 MMBtu, the permittee shall not burn more than 56,847 MMBtu of total uncontrolled fuel per 12-month rolling time period as determined at the end of each calendar month.
  - b. Of the 167,198 MMBtu, the permittee shall not burn more than 19,435 MMBtu of total diesel fuel per 12-month rolling time period as determined at the end of each calendar month.
  - c. Of the 167,198 MMBtu, the permittee shall not burn more than 147,000 MMBtu of total alcohol fuel per 12-month rolling time period as determined at the end of each calendar month.
  - d. Included in the 147,000 MMBtu of total alcohol fuel and the 56,847 MMBtu of total uncontrolled fuel, the permittee shall not burn more than 49,980 MMBtu of total uncontrolled alcohol fuel per 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), R 336.2803, R 336.2804, 40 CFR 52.21(c) & (d))**

**III. PROCESS/OPERATIONAL RESTRICTIONS**

1. Within 90 days after completion of the installation of each new test cell in A wing of FGTESTCELLS, the permittee shall remove a corresponding test cell from the durability section of the dynamometer laboratory. Completion of the installation is considered to occur not later than commencement of trial operation of the test cell. **(R 336.1201(7)(a))**

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

1. The permittee shall install, calibrate, maintain and operate in a satisfactory manner, a device to monitor and record the fuel usage rates for FGTESTCELLS on a continuous basis. **(R 336.1205(1)(a) & (3), R 336.1224, R 336.1225, R 336.1301, R 336.1331, R 336.1702, R 336.1910, R 336.2803, R 336.2804, 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))**

1. Within 180 days after commencement of trial operation of the eighth new test cell in Wing A as authorized by this Permit to Install, the permittee shall verify NO<sub>x</sub> emission rates from FGTESTCELLS, by testing each thermal oxidizer at owner's expense, in accordance with Department requirements. No less than 60 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 336.1225, R 336.2001, R 336.2003, R 336.2004, R 336.2803, R 336.2804, 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) & (3), R 336.1225, R 336.1702(a), 40 CFR 52.21(c) & (d))**
2. The permittee shall keep the following information on a monthly basis for FGTESTCELLS:
  - a. A record of the days of operation.
  - b. MMBtu of each fuel, total and uncontrolled, used per month and 12-month rolling time period.
  - c. Total and uncontrolled combined fuel use calculations determining the annual usage rate in MMBtu per 12-month rolling time period as determined at the end of each calendar month.
  - d. NO<sub>x</sub>, CO, VOC, 1,3-butadiene, and acetaldehyde emission calculations determining the monthly emission rate in tons per calendar month.
  - e. NO<sub>x</sub>, CO, VOC, 1,3-butadiene, and acetaldehyde 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), R 336.1224, R 336.1225, R 336.1702(a), 40 CFR 52.21(c) & (d))**

3. Upon initial operation of the first new test cell in Wing A, the permittee shall keep the following information on a daily basis for FGTESTCELLS:
  - a. Daily total fuel and total uncontrolled fuel use.
  - b. VOC and 1,3-butadiene emission calculations determining the daily emission rate in pounds per calendar day.

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), R 336.1224, R 336.1225, R 336.1702(a), 40 CFR 52.21(c) & (d))**

4. The permittee shall keep a record of all gasoline deliveries to confirm that no leaded gasoline was used.. 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(d))**

5. The permittee shall keep, in a satisfactory manner, records of the maximum sulfur content in the diesel fuel for each delivery. The permittee shall keep all records on file and make them available to the Department upon request. **(R 336.1205(1)(a) & (3), R 336.1402(3) 40 CFR 52.21(c) & (d))**
6. The permittee shall keep, in a satisfactory manner, records of the dates of installation and removal of each test cell as required by SC III.1. The permittee shall keep all records on file and make them available to the Department upon request. **((R 336.1201(7)(a)), 40 CFR 52.21(c) & (d))**

**VII. REPORTING**

1. Within 30 days after the initial operation of each new test cell in Wing A, 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 removal of the last durability test cell. **(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. SV_WINGA	34	85.75	R 336.1225, 40 CFR 52.21(c) & (d)
2. SV_WINGC1	20	85.75	R 336.1225, 40 CFR 52.21(c) & (d)
3. SV_WINGC2	20	85.75	R 336.1225, 40 CFR 52.21(c) & (d)
4. SV_WINGD1	20	85.75	R 336.1225, 40 CFR 52.21(c) & (d)
5. SV_WINGD2	20	85.75	R 336.1225, 40 CFR 52.21(c) & (d)
6. SV_WINGE	18	85.75	R 336.1225, 40 CFR 52.21(c) & (d)

**IX. OTHER REQUIREMENTS**

N/A

**Footnotes:**

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