MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
AIR QUALITY DIVISION

August 9, 2024

PERMIT TO INSTALL
368-97F

ISSUED TO
Federal Mogul Powertrain, LLC

LOCATED AT
47001 Port Street
Plymouth, Michigan 48170

IN THE COUNTY OF
Wayne

STATE REGISTRATION NUMBER
N6327

The Air Quality Division has approved this Permit to Install, pursuant to the delegation of authority from the Michigan Department of Environment, Great Lakes, and Energy. 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: **July 24, 2024**	
DATE PERMIT TO INSTALL APPROVED: **August 9, 2024**	SIGNATURE:
DATE PERMIT VOIDED:	SIGNATURE:
DATE PERMIT REVOKED:	SIGNATURE:

PERMIT TO INSTALL

Table of Contents

COMMON ACRONYMS

AQD	Air Quality Division
BACT	Best Available Control Technology
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CEMS	Continuous Emission Monitoring System
CFR	Code of Federal Regulations
COMS	Continuous Opacity Monitoring System
Department/department/EGLE	Michigan Department of Environment, Great Lakes, and Energy
EU	Emission Unit
FG	Flexible Group
GACS	Gallons of Applied Coating Solids
GC	General Condition
GHGs	Greenhouse Gases
HVLP	High Volume Low Pressure*
ID	Identification
IRSL	Initial Risk Screening Level
ITSL	Initial Threshold Screening Level
LAER	Lowest Achievable Emission Rate
MACT	Maximum Achievable Control Technology
MAERS	Michigan Air Emissions Reporting System
MAP	Malfunction Abatement Plan
MSDS	Material Safety Data Sheet
NA	Not Applicable
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standard for Hazardous Air Pollutants
NSPS	New Source Performance Standards
NSR	New Source Review
PS	Performance Specification
PSD	Prevention of Significant Deterioration
PTE	Permanent Total Enclosure
PTI	Permit to Install
RACT	Reasonable Available Control Technology
ROP	Renewable Operating Permit
SC	Special Condition
SCR	Selective Catalytic Reduction
SNCR	Selective Non-Catalytic Reduction
SRN	State Registration Number
TBD	To Be Determined
TEQ	Toxicity Equivalence Quotient
USEPA/EPA	United States Environmental Protection Agency
VE	Visible Emissions

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

POLLUTANT / MEASUREMENT ABBREVIATIONS

acfm	Actual cubic feet per minute
BTU	British Thermal Unit
°C	Degrees Celsius
CO	Carbon Monoxide
CO_2e	Carbon Dioxide Equivalent
dscf	Dry standard cubic foot
dscm	Dry standard cubic meter
°F	Degrees Fahrenheit
gr	Grains
HAP	Hazardous Air Pollutant
Hg	Mercury
hr	Hour
HP	Horsepower
H_2S	Hydrogen Sulfide
kW	Kilowatt
lb	Pound
m	Meter
mg	Milligram
mm	Millimeter
MM	Million
MW	Megawatts
NMOC	Non-Methane Organic Compounds
NO_x	Oxides of Nitrogen
ng	Nanogram
PM	Particulate Matter
PM10	Particulate Matter equal to or less than 10 microns in diameter
PM2.5	Particulate Matter equal to or less than 2.5 microns in diameter
pph	Pounds per hour
ppm	Parts per million
ppmv	Parts per million by volume
ppmw	Parts per million by weight
psia	Pounds per square inch absolute
psig	Pounds per square inch gauge
scf	Standard cubic feet
sec	Seconds
SO_2	Sulfur Dioxide
TAC	Toxic Air Contaminant
Temp	Temperature
THC	Total Hydrocarbons
tpy	Tons per year
µg	Microgram
µm	Micrometer or Micron
VOC	Volatile Organic Compounds
yr	Year

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 Environment, Great Lakes, and Energy, 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 Rule 210 (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 Rule 219 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 Rule 219 and shall be sent to the District Supervisor, Air Quality Division, Michigan Department of Environment, Great Lakes, and Energy. **(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 Rule 301, 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 Rule 303 (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 Rule 370(2). **(R 336.1370)**

13. The Department may require the permittee to conduct acceptable performance tests, at the permittee's expense, in accordance with Rule 1001 and Rule 1003, under any of the conditions listed in Rule 1001. **(R 336.2001)**

EMISSION UNIT 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 (Including Process Equipment & Control Device(s))	Installation Date / Modification Date	Flexible Group ID
EU-TESTCELL1	A dynamometer test cell burning diesel, E-85, and gasoline fuel. This test cell can accommodate an engine rated up to 500 bhp.	11/01/98	FG-TESTCELLS
EU-TESTCELL2	A dynamometer test cell burning diesel, E 85, and gasoline fuel. This test cell can accommodate an engine rated up to 250 bhp.	11/01/98	FG-TESTCELLS
EU-TESTCELL3	A dynamometer test cell burning diesel, E-85, and gasoline fuel. This test cell can accommodate an engine rated up to 400 bhp.	11/01/98	FG-TESTCELLS
EU-TESTCELL4	A dynamometer test cell burning diesel, E-85, and gasoline fuel. This test cell can accommodate an engine rated up to 500 bhp.	11/01/98	FG-TESTCELLS
EU-TESTCELL5	A dynamometer test cell burning diesel, E-85, and gasoline fuel. This test cell can accommodate an engine rated up to 440 bhp.	11/01/98	FG-TESTCELLS
EU-TESTCELL6	A dynamometer test cell burning diesel, E-85, and gasoline fuel. This test cell can accommodate an engine rated up to 500 bhp.	11/01/98	FG-TESTCELLS
EU-TESTCELL7	A dynamometer test cell burning diesel, E-85, and gasoline fuel. This test cell can accommodate an engine rated up to 350 bhp.	11/01/98	FG-TESTCELLS
EU-TESTCELL8	A dynamometer test cell burning diesel, E-85, and gasoline fuel. This test cell can accommodate an engine rated up to 600 bhp.	11/01/98	FG-TESTCELLS
EU-TESTCELL9	A dynamometer test cell burning diesel, E-85, and gasoline fuel. This test cell can accommodate an engine rated up to 300 bhp.	11/01/98	FG-TESTCELLS
EU-TESTCELL10	A dynamometer test cell burning diesel, E-85, and gasoline fuel. This test cell can accommodate an engine rated up to 500 bhp.	11/01/98	FG-TESTCELLS
EU-TESTCELL11	A dynamometer test cell burning diesel, E-85, and gasoline fuel. This test cell can accommodate an engine rated up to 300 bhp.	11/01/98	FG-TESTCELLS

Emission Unit ID	Emission Unit Description (Including Process Equipment & Control Device(s))	Installation Date / Modification Date	Flexible Group ID
EU-TESTCELL12	A dynamometer test cell using diesel, natural gas, and hydrogen fuel equipped with an emission reduction system that includes a natural gas fired burner with a rated heat input of 1.56 MMBtu/hr and SCR with oxidation catalyst. This test cell can accommodate an engine rated up to 950 hp and no more than 8,059,000 Btu/hr.	11/01/98 TBD	FG-4CELLS
EU-TESTCELL13	A dynamometer test cell using diesel, E-85, and gasoline fuel. This test cell has 6 stands and can accommodate engines rated up to 45 bhp.	11/01/98	FG-TESTCELLS
EU-TESTCELL14	A dynamometer test cell using diesel, natural gas, and hydrogen fuel equipped with an emission reduction system that includes a natural gas fired burner with a rated heat input of 1.56 MMBtu/hr and SCR with oxidation catalyst. This test cell can accommodate an engine rated up to 950 hp and no more than 8,059,000 Btu/hr	11/01/98 TBD	FG-4CELLS
EU-TESTCELL15	A dynamometer test cell using diesel, natural gas, and hydrogen fuel equipped with an emission reduction system that includes a natural gas fired burner with a rated heat input of 1.56 MMBtu/hr and SCR with oxidation catalyst. This test cell can accommodate an engine rated up to 950 hp and no more than 8,059,000 Btu/hr	11/01/98 TBD	FG-4CELLS
EU-TESTCELL16	A dynamometer test cell using diesel, natural gas, and hydrogen fuel equipped with an emission reduction system that includes a natural gas fired burner with a rated heat input of 1.56 MMBtu/hr and SCR with oxidation catalyst. This test cell can accommodate an engine rated up to 950 hp and no more than 8,059,000 Btu/hr	11/01/98 TBD	FG-4CELLS

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 336.1291.

FLEXIBLE GROUP SPECIAL CONDITIONS

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-TESTCELLS	12 individual dynamometer test cells using diesel, E-85, and gasoline fuel. Eleven cells test engines ranging in size from 250 to 600 bhp and one cell tests small engines. Each cell has its own individual stack with identical parameters.	EU-TESTCELL1, EU-TESTCELL2 EU-TESTCELL3, EU-TESTCELL4 EU-TESTCELL5, EU-TESTCELL6 EU-TESTCELL7, EU-TESTCELL8 EU-TESTCELL9, EU-TESTCELL10 EU-TESTCELL11, EU-TESTCELL13
FG-4CELLS	4 individual dynamometer test cells using diesel, natural gas, and hydrogen fuel. Four cells test engines rated up to 950 horsepower.	EU-TESTCELL12, EU-TESTCELL14, EU-TESTCELL15, EU-TESTCELL16

FG-TESTCELLS
FLEXIBLE GROUP CONDITIONS

DESCRIPTION

Emission Units: 12 Gasoline/Diesel/E-85 Engine Test Cells. For the purposes of this permit, E-85 means ethanol-gasoline blends of up to 85% ethanol and the remainder gasoline and will be treated as gasoline.

Emission Unit: EU-TESTCELL1, EU-TESTCELL2, EU-TESTCELL3, EU-TESTCELL4, EU-TESTCELL5, EU-TESTCELL6, EU-TESTCELL7, EU-TESTCELL8, EU-TESTCELL9, EU-TESTCELL10, EU-TESTCELL11, EU-TESTCELL13

POLLUTION CONTROL EQUIPMENT

Federal-Mogul installed an Air Injection Control System (AICS) in 2004 to control CO and VOC emissions from the test cells. The AICS works by injecting a measured stream of air into the exhaust gas which is hotter than the auto ignition point of CO, causing the CO to oxidize in the exhaust pipe. The air injection rate (scfm) is dependent on the type of durability or deep thermal shock test being performed. The exhaust temperature is monitored before and after air injection to assure sufficient destruction efficiency. The exhaust temperature needs to reach 1100°F to oxidize CO; exhaust temperatures using the AICS usually exceed 1400°F. The AICS does, however, cause a minor increase in NO_x emissions. The AICS is used with durability and deep thermal shock testing for most gasoline engines but is not used with diesel or small engines or during developmental testing.

The facility also operates an Automatic Data Acquisition System, which monitors all operating parameters of the test cells on a continuous basis. These parameters include fuel usage, exhaust temperature, and air injection rate.

I. EMISSION LIMIT(S)

Pollutant	Limit	Time Period / Operating Scenario	Equipment	Monitoring / Testing Method	Underlying Applicable Requirements
1. VOC	5.6 tons per year[A]	12-month rolling time period	FG-TESTCELLS	SC VI.7, SC VI.16	R 336.1205(1)(a) & (3), R 336.1702(a)
2. CO	188 tons per year[A]	12-month rolling time period	FG-TESTCELLS	SC V.1, SC VI.6, SC VI.16	R 336.1205(1)(a) & (3)
3. NO_x	25 tons per year[A]	12-month rolling time period	FG-TESTCELLS	SC V.1, SC VI.5, SC VI.16	R 336.1205(1)(a) & (3)

Pollutant	Limit	Time Period / Operating Scenario	Equipment	Monitoring / Testing Method	Underlying Applicable Requirements
[A] This emission limit is federally enforceable based on the following emission factors and the fuel requirements. This emission calculations in SC VI.16 shall be based on the following emission factors.					
Test Cell Emission Factors					
Gasoline and E-85 Emission Factors: NOx – 0.024 lb pollutant/lb fuel Uncontrolled: VOC – 0.024 lb pollutant/lb fuel CO – 0.895 lb pollutant/lb fuel Controlled during Developmental and Durability Cycle C Testing: VOC – 0.012 lb pollutant/lb fuel CO – 0.448 lb pollutant/lb fuel Controlled during Deep Thermal Shock and Durability Cycle A, B, and D Testing: VOC – 0.001 lb pollutant/lb fuel CO – 0.206 lb pollutant/lb fuel			Diesel Emission Factors: NOx – 0.085 lb pollutant/lb fuel Uncontrolled: VOC – 0.007 lb pollutant/lb fuel CO – 0.018 lb pollutant/lb fuel		

II. MATERIAL LIMIT(S)

Material	Limit	Time Period / Operating Scenario	Equipment	Monitoring / Testing Method	Underlying Applicable Requirements
1. Gasoline including E-85	118,000 gal/yr	12-month rolling time period	FG-TESTCELLS	SC VI.1, SC VI.16	R 336.1205(1)(a) & (3), 40 CFR 52.21(c) & (d)
2. Gasoline including E-85	16,713 lb/day	Per day	FG-TESTCELLS	SC VI.1, SC VI.9	R336.1205(1)(a) & (3), R 336.1225
3. Gasoline including E-85	2,327 lb/hr	Per hour	FG-TESTCELLS	SC VI.1, SC VI.8	R 336.1205(1)(a) & (3), R 336.1225, 40 CFR 52.21(c) & (d)
4. Diesel or fuel oil	55,000 gal/yr	12-month rolling time period	FG-TESTCELLS	SC VI.2, SC VI.16	R 336.1205(1)(a) & (3), 40 CFR 52.21(c) & (d)
5. Diesel or fuel oil	19,143 lb/day	Per day	FG-TESTCELLS	SC VI.2, SC VI.9	R 336.1205(1)(a) & (3), 40 CFR 52.21 (c) and (d)
6. Diesel or fuel oil	0.30% sulfur content in fuel	Instantaneous	FG-TESTCELLS	SC VI.15	R 336.1402, Michigan State Implementation Plan

7. The permittee shall not exceed 45,000 gallons total usage of gasoline including E-85 during testing of small gasoline engines (engines less than 45 bhp) and for developmental testing where exhaust temperature is less than 1400 °F in FG-TESTCELLS 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), 40 CFR 52.21(c) & (d))**

8. The permittee shall not exceed 63,000 gallons total usage of gasoline including E-85 during small engines (engines less than 45 bhp), gasoline durability cycle C and developmental testing in FG-TESTCELLS 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), 40 CFR 52.21(c) & (d))**

9. The permittee shall not burn any fuels in FG-TESTCELLS other than gasoline, diesel, and an ethanol-gasoline blends consisting of up to 85% ethanol and the remainder gasoline. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), 40 CFR 52.21(c) & (d))**

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The permittee shall only perform the type of tests in FG-TESTCELLS described in Appendix 7. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), 40 CFR 52.21(c) & (d))**

2. The permittee shall not perform testing in FG-TESTCELLS without the AICS except during testing of small gasoline engines (engines less than 45 bhp) or diesel engines. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), 40 CFR 52.21(c) & (d))**

3. The permittee shall not test engines in FG-TESTCELLS that exceed the brake horsepower output listed in Appendix 9. **(R 336.1205, R 336.1225, R 336.1702)**

IV. DESIGN/EQUIPMENT PARAMETER(S)

1. The AICS shall maintain the air injection rate as stated below or establish an alternative minimum air injection rate based on a minimum average temperature differential of 190 °F between the exhaust temperature and a point downstream of the air injection location and a minimum oxygen concentration of 1 percent downstream of the air injection location. Operating below the minimum air injection rates in the table below, or alternative air injection rates, for more than 20 seconds is an excursion. Documentation of any alternative minimum air injection rates shall be kept on file for a period of at least five years. Proper operating parameters may be updated and applied by the permittee provided the changes have been submitted to and approved by the District Supervisor, AQD. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

Test	Minimum Air Injection Rate (scfm)
Durability Cycle A	45
Durability Cycle B	50
Durability Cycle C	72
Durability Cycle D	50
Deep Thermal Shock	45

V. TESTING/SAMPLING

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

1. Once, during the term of the ROP, verification of NO_x, CO, and VOC emission rates in SC I.1, SC I.2, and SC I.3 from a representative number of test cells included in FG-TESTCELLS, by testing at owner's expense, in accordance with Department requirements, will be required. The testing must include the largest available engine durability test on wide open throttle for both diesel and gasoline. A representative number of test cells shall be defined in the test plan and subject to AQD approval. No less than 30 days prior to testing, a complete test plan shall be submitted to the AQD. The final plan must be approved by the AQD 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)**

VI. MONITORING/RECORDKEEPING

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

1. The permittee shall install, calibrate, maintain and operate in a satisfactory manner the Automatic Data Acquisition System to monitor and record the gasoline flow for each engine tested, except for the small engine test cell (engines less than 45 bhp), on a continuous basis. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

2. The permittee shall install, calibrate, maintain and operate in a satisfactory manner the Automatic Data Acquisition System to monitor and record the diesel flow for each engine tested, on a continuous basis. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

3. The permittee shall install, calibrate, maintain and operate in a satisfactory manner the Automatic Data Acquisition System to monitor and record the exhaust gas temperature just upstream of the air injection point and downstream of the air injection point on a continuous basis during all periods of time when the AICS is operating. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

4. The permittee shall install, calibrate, maintain and operate in a satisfactory manner the Automatic Data Acquisition System to monitor and record the air injection rate (in scfm) on a continuous basis during all periods of time when the AICS is operating. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

5. The permittee shall keep, in a satisfactory manner, monthly and previous 12-month NO_x emission calculation records for FG-TESTCELLS. This calculation is based on the procedure as specified in Appendix 7. **(R 336.1205(1)(a) & (3), 40 CFR 52.21 (c) & (d))**

6. The permittee shall keep, in a satisfactory manner, monthly and previous 12-month CO emission calculation records for FG-TESTCELLS. This calculation is based on the procedure as specified in Appendix 7. **(R 336.1205(1)(a) & (3))**

7. The permittee shall keep, in a satisfactory manner, monthly and previous 12-month VOC emission calculation records for FG-TESTCELLS. This calculation is based on the procedure as specified in Appendix 7. (**R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

8. The permittee shall calculate the hourly gasoline usage rate for FG-TESTCELLS based upon calendar monthly recordkeeping prorated to an hourly rate using actual operating hours. **(R 336.1225, R 336.1702(a), 40 CFR 52.21 (c) & (d))**

9. The permittee shall calculate the daily diesel and gasoline usage rate for FG-TESTCELLS based upon calendar monthly recordkeeping prorated to a daily rate using actual operating days. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

10. The permittee shall keep, in a satisfactory manner, a written log of the hours of operation for FG-TESTCELLS. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), 40 CFR 52.21 (c) & (d))**

11. The permittee shall keep, in a satisfactory manner, records of the air injection rate (scfm) during all periods of time the AICS is operating. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

12. The permittee shall keep, in a satisfactory manner, records of the exhaust gas temperature just upstream of the air injection point and downstream of the air injection point during all periods of time the AICS is operating. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

13. The permittee shall keep, in a satisfactory manner, records of all periods of time the AICS is operating in any of the test cells included in FG-TESTCELLS. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

14. The permittee shall keep, in a satisfactory manner, annual average CO and VOC destruction efficiency calculation records. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

15. The permittee shall maintain a complete record of fuel oil specifications and/or fuel analysis for each delivery, or storage tank, of fuel oil or diesel fuel. These records may include purchase records for ASTM specification fuel oil, specifications or analyses provided by the vendor at the time of delivery, analytical results from laboratory testing, or any other records adequate to demonstrate compliance with the percent sulfur limit in fuel oil. **(R 336.1205(1)(a)(ii)(C))**

16. The permittee shall keep the following information on a monthly basis for FG-TESTCELLS:
    a) Total gallons of each fuel used per month and 12-month rolling time period.
    b) Total gallons of gasoline including E-85 used during small gasoline engine tests (engines less than 45 bhp) and developmental tests where exhaust temperature is less than 1400 °F per month and 12-month rolling time period for comparison to the fuel limit at SC II.7.
    c) Total gallons of gasoline including E-85 used during small engine (engines less than 45 bhp), developmental, and durability cycle C testing per month and 12-month rolling time period for comparison to the fuel limit at SC II.8.
    d) NO_x emission calculations determining the total annual emission rate in tons per 12-month rolling time period as determined at the end of each calendar month. This calculation is based on the emission factor for SC I.3 and actual fuel usage recorded in SC VI.16 a through c.
    e) CO emission calculations determining the total annual emission rate in tons per 12-month rolling time period as determined at the end of each calendar month. This calculation is based on the emission factor for SC I.2 and actual fuel usage recorded in SC VI.16 a through c.
    f) VOC emission calculations determining the total annual emission rate in tons per 12-month rolling time period as determined at the end of each calendar month. This calculation is based on the emission factor for SC I.1 and actual fuel usage recorded in SC VI.16 a through c.

    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)**

17. The permittee shall keep, in a satisfactory manner, a record of the size of engines tested in hp in FG-TESTCELLS updated at least once a month. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), 40 CFR 52.21 (c) & (d))**

VII. REPORTING

1. The permittee shall notify the Division if a change in equipment in FG-TESTCELLS occurs which could affect a change in emissions or emission factors relied upon to demonstrate compliance with R336.1225. The notification shall be submitted to the Division within 30 days of the actual equipment change.[1] **(R 336.1225)**

2. The permittee shall notify the Division if a change in land use occurs for property classified as industrial or as a public roadway, where this classification was relied upon to demonstrate compliance with R336.1225 for FG-TESTCELLS. The notification shall be submitted to the Division within 30 days of the actual land use change. Within 60 days of the land use change, the permittee shall submit to the Division a plan for complying with the requirements of R336.1225.[1] **(R 336.1225)**

VIII. STACK/VENT RESTRICTION(S)

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. Each of the 12 stacks included in SV-TESTCELLS	6	32	R 336.1225, 40 CFR 52.21 (c) & (d)

IX. OTHER REQUIREMENT(S)

1. The permittee shall comply with requirements listed in Appendix 10 until the emission reduction systems in FG-4CELLS are operating. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702, 40 CFR 52.21(c) & (d))**

Footnotes:
[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

FG-4CELLS
FLEXIBLE GROUP CONDITIONS

DESCRIPTION

Emission Units: 4 Diesel/Natural Gas/Hydrogen Engine Test Cells each equipped with an emission reduction system that includes a natural gas fired burner, particulate filter, and SCR with oxidation catalyst.

Emission Unit: EU-TESTCELL12, EU-TESTCELL14, EU-TESTCELL15, EU-TESTCELL16

POLLUTION CONTROL EQUIPMENT

Federal Mogul will equip each test cell in FG-4CELLS with a duct burner to heat the exhaust prior to entering the SCR. Each SCR will contain ammonia/urea injection to control the NO_x emissions and oxidation catalyst to control the CO and VOC emissions. The emission reduction system will be equipped with a particulate filter.

I. EMISSION LIMIT(S)

Pollutant	Limit	Time Period / Operating Scenario	Equipment	Monitoring / Testing Method	Underlying Applicable Requirements
1. VOC	11 tons per year[A]	12-month rolling time period	FG-4CELLS	SC VI.2	R 336.1205(1)(a) & (3), R 336.1702(a)
2. VOC	0.42 g/bhp-hr	Hourly when testing a natural gas engine	Each emission unit in FG-4CELLS	SC V.2	R 336.1205(1)(a) & (3), R 336.1702(a)
3. CO	8.9 tons per year[A]	12-month rolling time period	FG-4CELLS	SC VI.2	R 336.1205(1)(a) & (3), 40 CFR 52.21(d)
4. CO	0.018 lb pollutant/gal fuel	Hourly when testing a diesel engine	Each emission unit in FG-4CELLS	SC V.1	R 336.1205(1)(a) & (3), 40 CFR 52.21(d)
5. CO	0.372 lb/MMBtu	Hourly when testing a natural gas engine	Each emission unit in FG-4CELLS	SC V.2	R 336.1205(1)(a) & (3), 40 CFR 52.21(d)
6. NO_x	35 tons per year[A]	12-month rolling time period	FG-4CELLS	SC VI.2	R 336.1205(1)(a) & (3), 40 CFR 52.21(c) & (d)
7. $PM_{2.5}$	4.9 tons per year[A]	12-month rolling time period	FG-4CELLS	SC VI.2	R 336.1205(1)(a) & (3), 40 CFR 52.21(c) & (d)
8. $PM_{2.5}$	0.03 lb pollutant/gal	Hourly when testing diesel engines	Each emission unit in FG-4CELLS	SC V.1	R 336.1205(1)(a) & (3), 40 CFR 52.21(c) & (d)
9. Formaldehyde	3.31E-02 lb/MMBtu	Hourly when testing a natural gas engine	Each emission unit in FG-4CELLS	SC V.2	R 336.1225

[A] This emission limit is federally enforceable based on the burners running at full capacity (8760 hr/yr) and the following emission factors and the fuel requirements for the test cells. This emission calculations in SC VI.2 shall be based on the following emission factors and the burner emissions.

Controlled Test Cell Emission Factors

Diesel: NO_x – 0.018 lb pollutant/lb fuel CO – 0.018 lb pollutant/gal fuel VOC – 0.067 lb pollutant/gal $PM_{2.5}$ – 0.03 lb pollutant/gal (uncontrolled)	Natural Gas (engines): NO_x – 859 lb/MMscf CO – 0.372 lb/MMBtu VOC – 0.42 g/bhp-hr $PM_{2.5}$ – 0.048 lb/MMBtu (uncontrolled)

II. MATERIAL LIMIT(S)

1. As of the date reported in SC VII.1, the permittee shall only burn diesel, natural gas, or hydrogen gas as fuel in FG-4CELLS. **(R 336.1205(1)(a) & (3), R 336.1224, R 336.1225, R 336.1702, 40 CFR 52.21(c) & (d))**

2. The permittee shall not exceed 22,000,000 standard cubic feet total natural gas usage for FG-4CELLS per 12-month rolling time period as determined at the end of each calendar month. **(R 336.1205, R 336.1225, R 336.1702(a), 40 CFR 52.21(c) & (d))**

3. The permittee shall not exceed 35,000,000 standard cubic feet total natural gas and total hydrogen fuel combined usage for FG-4CELLS per 12-month rolling time period as determined at the end of each calendar month. **(R 336.1205, R 336.1225, R 336.1702(a), 40 CFR 52.21(c) & (d))**

4. As of the date reported in SC VII.1, the permittee shall not exceed 275,000 gallons total diesel fuel usage for FG-4CELLS per 12-month rolling time period as determined at the end of each calendar month. **(R 336.1205, R 336.1225, R 336.1702(a), 40 CFR 52.21(c) & (d))**

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. As of the date reported in SC VII.1, the permittee shall not perform testing in FG-4CELLS without the selective catalytic reduction (SCR) and oxidation catalyst. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), 40 CFR 52.21(c) & (d))**

2. The permittee shall only test 4-stroke engines when testing natural gas engines in FG-4CELLS. **(R 336.1225)**

3. The permittee shall only test engines rated up to 950 hp and no more than 8,059,000 Btu/hr in FG-4CELLS. **(R 336.1205, R 336.1225, R 336.1702)**

4. The permittee shall not operate FG-4CELLS unless a malfunction abatement plan (MAP) as described in Rule 911(2) is implemented and maintained. The MAP shall, at a minimum, meet the manufacturer's written instructions for operating and maintaining the test cells and emission control equipment including the burner and particulate filter and shall specify the following:
   a) A complete preventative maintenance program including identification of the supervisory personnel responsible for overseeing the inspection, maintenance, and repair of air-cleaning devices, a description of the items or conditions that shall be inspected, the frequency of the inspections or repairs, and an identification of the major replacement parts that shall be maintained in inventory for quick replacement.
   b) An identification of the source and air-cleaning device operating variables that shall be monitored to detect a malfunction or failure, the normal operating range of these variables, and a description of the method of monitoring or surveillance procedures. This shall include the minimum exhaust temperature that would trigger use of the natural gas-fired burner.
   c) A description of the corrective procedures or operational changes that shall be taken in the event of a malfunction or failure to achieve compliance with the applicable emission limits.
   d) A description of how emissions will be minimized during all startups, shutdowns and malfunctions.

   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 90 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 336.1205, R 336.1224, R 336.1225, R 336.1702, R 336.1910, R 336.1911, R 336.1912, 40 CFR 52.21(c) & (d))**

5. The permittee shall not exhaust more than one engine at a time to a single stack in FG-4CELLS. **(R 336.1225, 40 CFR 52.21(c) & (d))**

IV. DESIGN/EQUIPMENT PARAMETER(S)

1. As of the date reported in SC VII.1, the permittee shall equip and maintain each engine in FG-4CELLS with a selective catalytic reduction (SCR) and an oxidation catalyst with a 90% CO control efficiency, 80% NOx control efficiency, and 40% VOC control efficiency. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), R 336.1910, 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 the completion of the project as reported in SC VII.1, the permittee shall verify CO and $PM_{2.5}$ emission rates in SC I.4 and SC I.8 using diesel from a representative number of test cells from FG-4CELLS by testing at the owner's expense, in accordance with Department requirements. The testing must include the largest available engine durability test including wide open throttle. Testing shall be performed using an approved EPA Method listed in 40 CFR Part 60, Appendix A and 40 CFR Part 51, Appendix M. An alternate method, or a modification to the approved EPA Method, may be specified in an AQD approved Test Protocol and must meet the requirements of the federal Clean Air Act, all applicable state and federal rules and regulations, and be within the authority of the AQD to make the change. No less than 30 days prior to testing, the permittee shall submit a complete test plan to the AQD Technical Programs Unit and District Office. The AQD must approve the final plan prior to testing, including any modifications to the method in the test protocol that are proposed after initial submittal. The permittee must submit a complete report of the test results to the AQD Technical Programs Unit and District Office within 60 days following the last date of the test. **(R 336.1205, R 336.2001, R 336.2003, R 336.2004, 40 CFR 52.21(c) & (d))**

2. Within 180 days after the completion of the project as reported in SC VII.2, the permittee shall verify VOC, CO, and formaldehyde emissions rates in SC I.2, SC I.5, and SC I.9 using natural gas from a representative number of test cells at the owner's expense, in accordance with Department requirements. The testing must include the largest available engine durability test including wide open throttle if applicable. Testing shall be performed using an approved EPA Method listed in the table below.

Pollutant	Test Method Reference
CO	40 CFR Part 60, Appendix A
VOCs	40 CFR Part 60, Appendix A
Formaldehyde	40 CFR Part 63, Appendix A

An alternate method, or a modification to the approved EPA Method, may be specified in an AQD approved Test Protocol and must meet the requirements of the federal Clean Air Act, all applicable state and federal rules and regulations, and be within the authority of the AQD to make the change. No less than 30 days prior to testing, the permittee shall submit a complete test plan to the AQD Technical Programs Unit and District Office. The AQD must approve the final plan prior to testing, including any modifications to the method in the test protocol that are proposed after initial submittal. The permittee must submit a complete report of the test results to the AQD Technical Programs Unit and District Office within 60 days following the last date of the test. **(R 336.1205, R 336.1224, R 336.1225, R 336.1702, R 336.2001, R 336.2003, R 336.2004, 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 last day of the calendar month, for the previous calendar month, unless otherwise specified in any monitoring/recordkeeping special condition. **(R 336.1205(1)(a) & (c), 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 FG-4CELLS:
   a) A record of the total amount of each fuel used per 12-month rolling time period as determined at the end of each calendar month.

b) NO_x emission calculations determining the annual emission rate in tons per 12-month rolling time period as determined at the end of each calendar month. This calculation is based on the emission factor for SC I.6 and actual fuel usage recorded in SC VI.2(a).
c) 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. This calculation is based on the emission factor for SC I.3 and actual fuel usage recorded in SC VI.2(a).
d) 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. This calculation is based on the emission factor for SC I.1 and actual fuel usage recorded in SC VI.2(a).
e) $PM_{2.5}$ emission calculations determining the annual emission rate in tons per 12-month rolling time period as determined at the end of each calendar month. This calculation is based on the emission factor for SC I.7 and actual fuel usage recorded in SC VI.2(a).

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

3. The permittee shall keep, in a satisfactory manner, a record of the size of each engine tested in hp and Btu/hr in FG-4CELLS updated at least once a month. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), 40 CFR 52.21 (c) & (d))**

4. The permittee shall keep, in a satisfactory manner, a record demonstrating each engine tested in FG-4CELLS is in compliance with SC III.2 updated at least once a month. **(R 336.1225)**

5. The permittee shall maintain a record of all inspection and maintenance activities conducted according to the PM / MAP (pursuant to SC III.4). The permittee shall keep this record on file at a location approved by the AQD District Supervisor and make it available to the Department upon request. **(R 336.1205, R 336.1702(a), R 336.1911, 40 CFR 52.21(c) & (d))**

6. The permittee shall keep records of where each emission unit in FG-4CELLS is exhausted and shall be updated upon any changing configuration. **(R 336.1225, R 336.1910)**

VII. REPORTING

1. Within 30 days after completion of the installation, construction, reconstruction, relocation, or modification 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-4CELLS after installing the emissions reduction system. **(R 336.1201(7)(a))**

2. Within 30 days after initial burning of natural gas, the permittee or the authorized agent pursuant to Rule 204, shall notify the AQD District Supervisor, in writing, of the completion of the activity. **(R 336.1205, R 336.1224, R 336.1225, R 336.1702, 40 CFR 52.21(c) & (d))**

VIII. STACK/VENT RESTRICTION(S)

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. SV-TESTCELL12	14	60	R 336.1225, 40 CFR 52.21 (c) & (d)
2. SV-TESTCELL14	14	60	R 336.1225, 40 CFR 52.21 (c) & (d)

Stack & Vent ID	Maximum Exhaust Diameter / Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements
3. SV-TESTCELL15	14	60	R 336.1225, 40 CFR 52.21 (c) & (d)
4. SV-TESTCELL16	14	60	R 336.1225, 40 CFR 52.21 (c) & (d)

IX. OTHER REQUIREMENT(S)

1. The permittee shall comply with requirements listed in Appendix 10 until the emission reduction systems in FG-4CELLS are operating. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702, 40 CFR 52.21(c) & (d))**

Footnotes:
[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

APPENDIX 7

Emission Calculations

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-TESTCELLS.

A: Annual Destruction Efficiency Calculation for CO and VOC

1. Identify the gasoline fueled engine type and the type of test cycle being performed. Exclude the small (non-automotive) engines and those used for developmental testing.

2. Record the quantity of gasoline consumed during that test

3. Determine the uncontrolled emission rates by multiplying the appropriate lb pollutant per lb fuel emission factor for CO and VOC by the quantity of fuel consumed

4. Multiply the uncontrolled emission rates from Step 3 by the appropriate destruction efficiency from Table 2 of Section B of the Appendix.

5. Sum the total controlled and uncontrolled emission rates on an annual basis. Divide the annual controlled emission rate by the annual uncontrolled emission rate to determine the overall annual destruction efficiencies for CO and VOCs.

B: CO, VOC and NO_x Emission Calculations

Table 1. Uncontrolled Gasoline Engine Emission Factors

Automotive Engine	Overall Uncontrolled Emission Factors (lb pollutant /lb fuel)		
	CO	VOC	NO_x
2.0L	0.853	0.011	0.002
2.4T	0.895	0.024	0.009
2.7T	0.895	0.024	0.009
3.0L	0.895	0.024	0.020
4.6L	0.872	0.003	0.005
5.4L	0.551	0.024	0.024
L6 (4.2L)	0.528	0.017	0.004
5.3L	0.693	0.024	0.018
PV8	0.693	0.024	0.018
6.0L	0.693	0.024	0.018
Briggs & Stratton	0.551	0.024	0.016
Auto	0.551	0.024	0.016
Auto w/AICS	0.551	0.024	0.016
Diesel Engines	0.018	0.007	0.085

Table 2. Destruction Efficiencies Based on AICS

Test Cycles	CO Destruction Efficiency (%)	VOC Destruction Efficiency (%)
Durability Cycle A	95%	95%
Durability Cycle B	83%	95%
Durability Cycle C	57%	95%
Durability Cycle D	92%	95%
Deep Thermal Shock	95%	95%
Developmental		
If stack temp. > 1400 °F	50%	50%
If stack temp. < 1400 °F	0%	0%
Small Engines	0%	0%
Diesel Engines	0%	0%

The permittee shall apply the uncontrolled emission factors and control efficiency factors from Tables 1 and 2 appropriate for an engine in its class and for the type of test being conducted. If engine specific data is not available, the most conservative emission factor for the engine in its class will be used. If no data is available for the class, the most conservative factor for any class will be used. This data, along with the monthly fuel use, shall be used to calculate the monthly and previous 12-month NO_x, CO and VOC permit limits.

Durability Cycle A: The engine starts up at idle, no load for 30 minutes and then goes to wide open throttle at a speed which produces the peak torque for the specific engine (determined by initial power curves). Then it operates at no load at elevated speeds and back at the speed and load that produces peak power and peak power plus 6 percent. The cycle repeats as many times as necessary, often for 100 hours or more.

Durability Cycle B: Shaped like a saw tooth with the engine continuously ramping up and down.

Durability Cycle C: Consists of periods of steady operation interrupted by long periods of rapidly changing speed and load conditions.

Durability Cycle D: Similar to Cycle A

Deep Thermal Shock (DTS): This cycle alternates between high load (peak torque or peak horsepower) and idle in short intervals. About 1/4 of the time it is at peak horsepower, 1/4 at peak torque and 1/2 at idle.

Developmental: Variety of tests where the engines typically operate at low and intermediate loads. The engines are operated in rich burn conditions (O_2 less than 0.5 percent).

APPENDIX 9

Engine sizes to be tested in FG-TESTCELLS

The following table shows the engine sizes that were permitted during the last new source review in PTI 368-97C. The permittee would have to obtain a modified permit to install to increase any of these sizes.

Emission Unit	Maximum Engine Size
EU-TESTCELL1	500 bhp
EU-TESTCELL2	250 bhp
EU-TESTCELL3	400 bhp
EU-TESTCELL4	500 bhp
EU-TESTCELL5	440 bhp
EU-TESTCELL6	500 bhp
EU-TESTCELL7	350 bhp
EU-TESTCELL8	600 bhp
EU-TESTCELL9	300 bhp
EU-TESTCELL10	500 bhp
EU-TESTCELL11	300 bhp
EU-TESTCELL13	45 bhp

APPENDIX 10

Temporary Conditions for FG-TESTCELLS and FG-4CELLS

Due to the facility needing time to install the control equipment in FG-4CELLS, the following requirements are necessary until the completion of the emission reduction systems. Upon completion of the project as reported in FG-4CELLS SC VII.1, these requirements (FG-TESTCELLS SC IX.1, FG-4CELLS SC IX.1, and appendix 10) become void.

Appendix 10 applies to the following emission units: EU-TESTCELL1, EU-TESTCELL2, EU-TESTCELL3, EU-TESTCELL4, EU-TESTCELL5, EU-TESTCELL6, EU-TESTCELL7, EU-TESTCELL8, EU-TESTCELL9, EU-TESTCELL10, EU-TESTCELL11, EU-TESTCELL12, EU-TESTCELL13, EU-TESTCELL-14, EU-TESTCELL-15, EU-TESTCELL-16

I. EMISSION LIMIT(S)

Pollutant	Limit	Time Period / Operating Scenario	Equipment	Monitoring / Testing Method	Underlying Applicable Requirements
1. VOC	5.6 tons per year[A]	12-month rolling time period	FG-TESTCELLS and FG-4CELLS combined	SC VI.7	R 336.1205(1)(a) & (3), R 336.1702(a)
2. CO	223.3 tons per year[A]	12-month rolling time period	FG-TESTCELLS and FG-4CELLS combined	SC VI.6	R 336.1205(1)(a) & (3)
3. NO_x	62.1 tons per year[A]	12-month rolling time period	FG-TESTCELLS and FG-4CELLS combined	SC VI.5	R 336.1205(1)(a) & (3)

II. MATERIAL LIMIT(S)

Material	Limit	Time Period / Operating Scenario	Equipment	Monitoring / Testing Method	Underlying Applicable Requirements
1. Gasoline including E-85	425,000 gal/yr	12-month rolling time period	FG-TESTCELLS and FG-4CELLS combined	SC VI.1, SC VI.10	R 336.1205(1)(a) & (3), 40 CFR 52.21(c) & (d)
2. Gasoline including E-85	16,713 lb/day	Per day	FG-TESTCELLS and FG-4CELLS combined	SC VI.1, SC VI.9	R 336.1205(1)(a) & (3), 40 CFR 52.21(c) & (d)
3. Gasoline including E-85	2,327 lb/hr	Per hour	FG-TESTCELLS and FG-4CELLS combined	SC VI.1, SC VI.8	R 336.1205(1)(a) & (3), 40 CFR 52.21(c) & (d)
4. Diesel or fuel oil	200,000 gal/yr	12-month rolling time period	FG-TESTCELLS and FG-4CELLS combined	SC VI.2, SC VI.10	R 336.1205(1)(a) & (3), 40 CFR 52.21(c) & (d)
5. Diesel or fuel oil	19,143 lb/day	Per day	FG-TESTCELLS and FG-4CELLS combined	SC VI.2, SC VI.9	R 336.1205(1)(a) & (3), 40 CFR 52.21 (c) and (d)

Material	Limit	Time Period / Operating Scenario	Equipment	Monitoring / Testing Method	Underlying Applicable Requirements
6. Diesel or fuel oil	0.30% sulfur content in fuel	Instantaneous	FG-TESTCELLS and FG-4CELLS combined	SC VI.16	R 336.1402, Michigan State Implementation Plan

7. The permittee shall not burn any fuels in FG-TESTCELLS and FG-4CELLS other than gasoline, diesel, and an ethanol-gasoline blends consisting of up to 85% ethanol and the remainder gasoline. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), 40 CFR 52.21(c) & (d))**

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The permittee shall only perform the type of tests in FG-4CELLS described in Appendix 7. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), 40 CFR 52.21(c) & (d))**

2. The permittee shall not test engines in FG-4CELLS that exceed the brake horsepower output listed below. **(R 336.1205, R 336.1225, R 336.1702)**

Emission Unit	Maximum Engine Size
EU-TESTCELL12	500 bhp
EU-TESTCELL14	500 bhp
EU-TESTCELL15	400 bhp
EU-TESTCELL16	600 bhp

IV. DESIGN/EQUIPMENT PARAMETER(S)

1. The AICS shall maintain the air injection rate as stated below or establish an alternative minimum air injection rate based on a minimum average temperature differential of 190 °F between the exhaust temperature and a point downstream of the air injection location and a minimum oxygen concentration of 1 percent downstream of the air injection location. Operating below the minimum air injection rates in the table below, or alternative air injection rates, for more than 20 seconds is an excursion. Documentation of any alternative minimum air injection rates shall be kept on file for a period of at least five years. Proper operating parameters may be updated and applied by the permittee provided the changes have been submitted to and approved by the District Supervisor, AQD. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

Test	Minimum Air Injection Rate (scfm)
Durability Cycle A	45
Durability Cycle B	50
Durability Cycle C	72
Durability Cycle D	50
Deep Thermal Shock	45

V. TESTING/SAMPLING

NA

VI. MONITORING/RECORDKEEPING

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

1. The permittee shall install, calibrate, maintain and operate in a satisfactory manner the Automatic Data Acquisition System to monitor and record the gasoline flow for each engine tested, except for the small engine test cell (engines less than 45 bhp), on a continuous basis. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

2. The permittee shall install, calibrate, maintain and operate in a satisfactory manner the Automatic Data Acquisition System to monitor and record the diesel flow for each engine tested, on a continuous basis. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

3. The permittee shall install, calibrate, maintain and operate in a satisfactory manner the Automatic Data Acquisition System to monitor and record the exhaust gas temperature just upstream of the air injection point and downstream of the air injection point on a continuous basis during all periods of time when the AICS is operating. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

4. The permittee shall install, calibrate, maintain and operate in a satisfactory manner the Automatic Data Acquisition System to monitor and record the air injection rate (in scfm) on a continuous basis during all periods of time when the AICS is operating. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

5. The permittee shall keep, in a satisfactory manner, monthly and previous 12-month NO_x emission calculation records for FG-TESTCELLS and FG-4CELLS (combined). This calculation is based on the procedure as specified in Appendix 7. **(R 336.1205(1)(a) & (3), 40 CFR 52.21 (c) & (d))**

6. The permittee shall keep, in a satisfactory manner, monthly and previous 12-month CO emission calculation records for FG-TESTCELLS and FG-4CELLS (combined). This calculation is based on the procedure as specified in Appendix 7. **(R 336.1205(1)(a) & (3))**

7. The permittee shall keep, in a satisfactory manner, monthly and previous 12-month VOC emission calculation records for FG-TESTCELLS and FG-4CELLS (combined). This calculation is based on the procedure as specified in Appendix 7. (**R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

8. The permittee shall calculate the hourly gasoline usage rate for FG-TESTCELLS and FG-4CELLS (combined) based upon calendar monthly recordkeeping prorated to an hourly rate using actual operating hours. **(R 336.1225, R 336.1702(a), 40 CFR 52.21 (c) & (d))**

9. The permittee shall calculate the daily diesel and gasoline usage rate for FG-TESTCELLS and FG-4CELLS combined based upon calendar monthly recordkeeping prorated to a daily rate using actual operating days. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

10. The permittee shall keep, in a satisfactory manner, monthly and 12 month rolling time period as determined at the end of each calendar month diesel and gasoline fuel use records for FG-ALLCELLS and FG-4CELLS. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

11. The permittee shall keep, in a satisfactory manner, a written log of the hours of operation for FG-TESTCELLS and FG-4CELLS. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), 40 CFR 52.21 (c) & (d))**

12. The permittee shall keep, in a satisfactory manner, records of the air injection rate (scfm) during all periods of time the AICS is operating. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

13. The permittee shall keep, in a satisfactory manner, records of the exhaust gas temperature just upstream of the air injection point and downstream of the air injection point during all periods of time the AICS is operating. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

14. The permittee shall keep, in a satisfactory manner, records of all periods of time the AICS is operating in any of the test cells included in FG-TESTCELLS and FG-4CELLS. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

15. The permittee shall keep, in a satisfactory manner, annual average CO and VOC destruction efficiency calculation records. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**

16. The permittee shall maintain a complete record of fuel oil specifications and/or fuel analysis for each delivery, or storage tank, of fuel oil or diesel fuel. These records may include purchase records for ASTM specification fuel oil, specifications or analyses provided by the vendor at the time of delivery, analytical results from laboratory testing, or any other records adequate to demonstrate compliance with the percent sulfur limit in fuel oil. **(R 336.1205(1)(a)(ii)(C))**

17. The permittee shall keep, in a satisfactory manner, a record of the size of engines tested in hp in FG-TESTCELLS and FG-4CELLS updated at least once a month. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), 40 CFR 52.21 (c) & (d))**

VIII. STACK/VENT RESTRICTION(S)

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. Each of the 16 stacks included in SV-TESTCELLS	6	32	R 336.1225, 40 CFR 52.21 (c) & (d)

IX. OTHER REQUIREMENT(S)

NA