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**Malfunction Abatement Plan**

**PERMIT TO INSTALL**

67-22

**ISSUED TO**

Kawasaki Motors Corp., U.S.A.

**LOCATED AT**

5080 36th St. SE

Grand Rapids, Michigan 49512

**IN THE COUNTY OF**

Kent

**STATE REGISTRATION NUMBER**

P0677

**DRAFTED NOVEMBER 2022 BY**

Paul Marvin, Regulatory Compliance Engineer

Permit 67-22, part III describes the “Process/Operational Restriction(s)” as requiring:

1. The permittee shall not operate EU-TEST1 through EU-TEST9 unless a malfunction abatement plan (MAP) as described in Rule 911(2), for the PCO, has been submitted within 180 days of permit issuance, and is implemented and maintained. The MAP shall include acceptable pressure and temperature ranges of operation based on the previous PCO performance test. 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 336.1702(a), R 336.1910, R 336.1911, 40 CFR 52.21(c) and (d))**

Permit 67-22, part IV describes the “Design/Equipment Parameter(s)” as requiring:

1. The permittee shall install and operate devices as necessary to measure the total fuel usage in both controlled and uncontrolled test cells in FG-TESTCELLS. **(R 336.1205(1)(a) & (3), R 336.1225, 40 CFR 52.21(d))**
2. The permittee shall not operate EU-TEST1 through EU-TEST9 unless the associated exhaust is routed to the PCO with a minimum control efficiency of 90% for CO and 95% for VOCs. The permittee shall install, maintain, and operate the PCO in a satisfactory manner acceptable to the AQD District Supervisor and in accordance with the MAP. **(R 336.1205, R 336.1224, R 336.1225** **R 336.1702, R 336.1910)**
3. The permittee shall not operate EU-TEST1 through EU-TEST9 unless a minimum operating temperature of 600°F is maintained in the PCO. **(R 336.1205, R 336.1224, R 336.1225 R 336.1702, R 336.1910)**
4. The permittee shall install an interlock to prevent engine operation until the PCO has reached a minimum operating temperature of 600°F. **(R 336.1205, R 336.1224, R 336.1225 R 336.1702, R 336.1910)**

In response to the above requirements, the design/equipment parameters are maintained as follows:

**PCO**

* **Information:** The installed PCO designed by PCE Monarch described in permit 67-22 affects EU-TEST1 through EU-TEST9.
* **Temperature**: Temperature is measured by a thermocouple placed just before the catalyst. The installed PCO maintains a minimum operating temperature of 600°F and a maximum operating temperature of 850°F. If the temperature of the PCO falls outside of this range, engine operation will be stopped and prevented until the operating temperature is corrected. An installed interlock built into the PCE Monarch computer system ensures this operation, and the main screen operator can view the temperature at any time. During engine testing, the PCO temperature is always visible to the main screen operator. warnings sound at 660°F and 800°F.
* **Pressure:** Pressure is measured at the inlet duct. The installed PCO maintains a minimum pressure of -5.0”Wc and a maximum pressure of 0.0”Wc. If the pressure within the PCO falls outside of this range, engine operation will be stopped and prevented until the pressure is corrected. An installed interlock built into the PCE Monarch computer system ensures this operation. Alarm warnings sound at -4.5”Wc and -0.1”Wc.
* **Maintenance:** Catalyst cleaning is performed every 6 months to ensure effective operation. The thermocouple used to monitor temperature is calibrated semi-annually. The pressure drop gauges are also calibrated semi-annually. The PCO is designed to need no other preventative maintenance. Given this, Kawasaki deems it necessary to stock one spare thermocouple and multiple fuses in case of an unexpected malfunction. Any other malfunction would be handled by an outside service that specializes in PCO systems. No other spare parts are kept on hand for this reason. Alarms are installed to monitor the dampers, and any random faults are dealt with on an individual basis.
* **Testing:** Testing is performed every 5 years to ensure a minimum control efficiency of 90% for CO and 95% for VOCs.

**Fuel Usage**

* **Monitoring/Testing Method:** Fuel is monitored/tested per SC VI.2. Fuel usage is measured daily, and the corresponding emissions are calculated daily. PCO performance is monitored as a result of this, ensuring that our rolling-average efficiency of CO and VOC reduction is above the levels specified above.
* **Tracking:** Fuel usage is tracked separately for controlled and uncontrolled cells by Lab Automation PLC, and uploads values to the log on the OneShot call.
* **Recordkeeping:** Fuel usage is recorded daily, and data is stored for 5 years.

**Contact**

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