



## Michigan Assembly Plant

### Title V Renewable Operating Permit MI-ROP-A8650-2016a

### Operating and Maintenance Plan For Flexible Group - FGCONTROLS

Modified October 2020

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## DESCRIPTION OF CONTROL EQUIPMENT

A typical paint booth emission control systems consists of two steps: filtration and destruction. Filtration is achieved through the used of dry filters in a Filter House or Wet Electrostatic Precipitators (WEPS). The air stream is then routed to a Regenerative Thermal Oxidizer for destruction. Emissions from paint oven operations are routed directly to a Regenerative Thermal Oxidizer for destruction.

## PREVENTATIVE MAINTENANCE PROGRAM

### Identification of Supervisory Personnel

The Paint Area Manager and Paint Manufacturing Engineering Manager are responsible for overseeing the inspection, maintenance and repair of emission control devices at the Michigan Assembly Plant.

### Description of Items and/or Conditions that Shall Be Inspected/Frequency of Inspection or Maintenance

Recommended equipment inspections are performed on a routine basis. Specific inspection and maintenance tasks are incorporated into the facility's electronic Total Equipment Maintenance System (TEMS) that stores inspection and maintenance task information automatically generates work orders and tracks completion dates. The table below lists the minimum preventive maintenance activities performed to assure optimum operating performance of the emission controls systems at the Michigan Assembly Plant. All records of maintenance inspections including the dates, inspection results and dates and reasons for repairs, if made, are located at the Paint Shop and maintained for five years. Preventive maintenance tasks are subject to change based on best engineering judgment and technological/equipment improvements.

Control Device	Frequency	TEMS PM Number	Preventative Maintenance TEMS Task Title/Description of Maintenance Activity
Regenerative Thermal Oxidizer	Annually	PNX04365 PNX04249	<u>Combustion Chamber Temperature Calibration</u> Validation of thermocouple accuracy or recalibration of each thermocouple a minimum of once every 12 months. The thermocouple can be replaced in lieu of validation.
Regenerative Thermal Oxidizer	Annually	PNX04272 PNX04373 PNX04343 PNX04234	<u>Cold Face Check / Heat Exchange-Heat Transfer Media Inspection</u> Perform a heat exchange/heat transfer media inspection a minimum of once every 18 months. <sup>1</sup>
Regenerative Thermal Oxidizer	Annually	PNX04285 PNX04386 PNX04357 PNX04245	<u>Inlet/Outlet Valve Check /Valve Seals Condition Inspection</u> Perform an inspection of the valve seals condition a minimum of once every 18 months. <sup>1</sup>

<sup>1</sup> The requirement to address this issue is satisfied if a performance test (i.e., stack test) has been performed on the control device within the prior 18 month period.

### Identification of Major Replacement Parts to be Maintained in Inventory for Quick Replacement

The emission control devices are equipped with Programmable Logic Controllers to identify conditions that may contribute to malfunctions by generating warning faults and alarms. Typically, only small minor repairs are required (i.e., replacement of proximity switches). However, each facility maintains a list of recommended major replacement parts in the TEM system and routinely verifies part availability (i.e., quarterly). The following is a list of the spare parts maintained at the Michigan Assembly Plant.

## TYPICAL EMISSION CONTROL EQUIPMENT REPLACEMENT PARTS INVENTORY

Part Name	Storage Location
SLA VFD	General Stores
Thermocouples, Honeywell	General Stores

Motors for Blowers	General Stores
Variable Frequency Drive Components	General Stores
Honeywell Flame Detection Components	General Stores
PLC Processors, Allen Bradley	General Stores
Gas Train regulators/switches/valves	General Stores
Gas Firing Controllers	General Stores
Hydraulic Cylinders and Valves	General Stores
Filters	General Stores
Pneumatic Cylinders	General Stores

## **CONTROLLED EMISSION SOURCES**

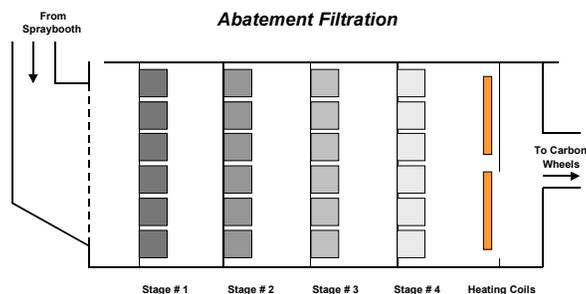
One Regenerative Thermal Oxidizer for control of VOC emissions from the EU-ECOAT dip tank and oven. One regenerative thermal oxidizer for control of VOC emissions from the EU-GUIDECOAT oven and EU-TOPCOAT curing ovens. One regenerative thermal oxidizer to control VOC emissions from EU-GUIDECOAT oven and EU-TOPCOAT booth automatic sections. One regenerative thermal oxidizer to control VOC emissions from EU-TOPCOAT booth automatic sections.

**Emission Units:** All emission units and flexible groups associated with automotive painting.

## **EMISSION CONTROL EQUIPMENT**

### **Filter House – Abatement Filtration**

As the solvent laden air passes through four different stages of filtration, smaller and smaller particulate sizes are removed before being directed to the Rotary or Fluidized Bed Concentrator. Differential pressure gauges are located between filtration stages and are monitored to determine the frequency of filter changes. Typical ranges for differential pressures stages are <1.0 inches water column for Stage 1, <1.25 inches water column for Stage 2, <1.25 inches water column for Stage 3 and <1.5 inches water column for Stage 4. Depending on the type and age of the equipment, the Programmable Logic Controller (PLC) may be programmed to sound an alarm if the differential pressure is outside an acceptable safety margin value. The facility may also inspect and trend the differential pressures on a routine basis to schedule the next required filter change.



### **Regenerative Thermal Oxidizer (RTO)**

The Regenerative Thermal Oxidizer consists of multiple towers installed in a line, each containing a packed bed of inert ceramic based media. Ford RTOs typically consist of three towers that continuously alternate from inlet, outlet and purge stages. Incoming solvent-laden exhaust from the Filter House System flows into the bottom of the first tower and up through the hot ceramic saddles or ceramic block. Air is preheated to within 60-100°F of the combustion temperature of approximately 1400°F. The clean hot exhaust gas then flows down through the second ceramic filled tower and transmits most of its thermal energy to the ceramic media before being discharged. After 1-2 minutes the dampers change positions and the air flow is reversed. Solvent laden air flows through the second tower that was preheated. The combustion chamber temperature is monitored through the Programmable Logic Controller. Depending on the type and age of the equipment, the Programmable Logic Controller (PLC) may be programmed to sound an alarm if the combustion chamber temperature is outside an acceptable safety margin value.

## **CORRECTIVE PROCEDURES**

### **Description of the Corrective Procedures Taken in the Event of a Malfunction or Failure**

When an abatement equipment fault condition/fault status occurs for more than 15 minutes, the facility Plant Environmental Control Engineer (PECE), Paint ME Manager and Paint Maintenance Superintendent are contacted. The notification includes the piece of abatement equipment the fault occurred on and the time the fault occurred. If the abatement equipment fault condition/fault status continues for more than 2 hours, a follow-up notification will be sent stating the current status of the incident and information on the cause of the fault. If the PECE cannot be immediately reached by telephone or radio, a text page message is sent. If the PECE does not respond to the text page within 15 minutes, the Paint Area Manager or the Environmental Management Representative (EMR) is contacted.

Once the abatement equipment is back on-line, an Air Emission Control Equipment Breakdown Report is completed with details on the piece of abatement equipment the fault occurred on, the duration of the breakdown (i.e., date, times, shift type), interim corrective actions, root cause of the fault, names and times that any service representatives were contacted and permanent corrective actions. The completed report is submitted to the PECE. The information is also routed to the Environmental Quality Office for review and analysis.

The information on the Air Emission Control Equipment Breakdown Report will be used to adjust emission calculations to account for the breakdown. The PECE will notify the MDEQ Air Quality Division in accordance with Rule 912. The notification is made as soon as reasonably possible. The downtime will be included in the 6 month report.

### **COMPLIANCE ASSURANCE MONITORING (CAM) REQUIREMENTS**

The requirements of Compliance Assurance Monitoring (CAM), as promulgated under 40 CFR 64.2, apply to a pollutant-specific emissions unit at a major source that is required to obtain a part 70 or 71 permit if the unit satisfies all of the following criteria:

- (1) The unit is subject to an emission limitation or standard for the applicable regulated air pollutant (or a surrogate thereof), other than an emission limitation or standard that is exempt under 40 CFR 64.2(b)(1) of this section;
- (2) The unit uses a control device to achieve compliance with any such emission limitation or standard; and
- (3) The unit has potential pre-control device emissions of the applicable regulated air pollutant that are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source. For purposes of this paragraph, "potential pre-control device emissions" shall have the same meaning as "potential to emit," as defined in Sec. 64.1, except that emission reductions achieved by the applicable control device shall not be taken into account.

In accordance with 40 CFR 64.3, to provide a reasonable assurance of compliance with emission limitations or standards for the anticipated range of operations at a pollutant-specific emissions unit, monitoring under this part, the CAM Plan shall meet the following general criteria:

- (1) The owner or operator shall design the monitoring to obtain data for one or more indicators of emission control performance for the control device and any associated capture system. Indicators of performance may include, but are not limited to, direct or predicted emissions, process and control device parameters that affect control device (and capture system) efficiency or emission rates, or recorded findings of inspection and maintenance activities conducted by the owner or operator.
- (2) The owner or operator shall establish an appropriate range(s) or designated condition(s) for the selected indicator(s) such that operation within the ranges provides a reasonable assurance of ongoing compliance with emission limitations or standards for the anticipated range of operating conditions. In addition, unless specifically stated otherwise by an applicable requirement, the owner or operator shall monitor indicators to detect any bypass of the control device (or capture system) to the atmosphere, if such bypass can occur based on the design of the pollutant-specific emissions unit.
- (3) The design of indicator ranges or designated conditions may be based on a single maximum or minimum value if appropriate, may be expressed as a function of process variables, may be expressed as maintaining the applicable parameter in a particular operational status or designated condition, or may be established as interdependent between more than one indicator.

Under 40 CFR 64.4(b), for a CAM Plan, the owner or operator shall submit a justification for the proposed elements of the monitoring plan and if the proposed performance specifications include differences from manufacturer recommendations, the plan shall explain the reasons for the differences. If the CAM Plan relies on presumptively acceptable monitoring, no further justification for the appropriateness of that monitoring should be necessary.

At the Michigan Assembly Plant, the following sources are subject to CAM under the above requirements:

- EU-ECOAT (utilizing regenerative thermal oxidizer for compliance)
- EU-GUIDECOAT (utilizing regenerative thermal oxidizer for compliance)
- EU-TOPCOAT (utilizing regenerative thermal oxidizer for compliance)

In conjunction with this O&M Plan, the following control device parameters and associated inspection and maintenance activities serve as presumptively acceptable monitoring based on known performance of thermal oxidizers for the emission units subject to CAM at the Michigan Assembly Plant:

#### Regenerative Thermal Oxidizers

Combustion Chamber Temperature and Calibration: Monitor combustion chamber temperature to ensure it is not more than 50 degrees Fahrenheit below the most recent performance test and calibrate or replace the thermocouple a minimum of once every 12 months to ensure air stream is maintained at a temperature necessary to destroy the volatile organic compound within the regenerative thermal oxidizer.

Cold Face Check / Heat Exchange-Heat Transfer Media Inspection: Perform a heat exchange/heat transfer media a minimum of once every 18 months to ensure that solvent-concentrated air may pass into the oxidizer as designed (unless tested within the prior 18 months).

Inlet/Outlet Valve Check /Valve Seals Condition Inspection: Perform an inspection of the valve seals condition and verify valve timing/synchronization a minimum of once every 18 months to ensure that the proper retention time for destruction of volatile organic compounds within the oxidizer is maintained (unless tested within the prior 18 months).

Monitoring of these key operational parameters described in this section meet the requirements of CAM as defined in 40 CFR Part 64 for each of the affected emission units.

### **OPERATING AND MAINTENANCE PLAN REVIEWS**

This Operating and Maintenance Plan will be reviewed and updated as required to ensure emission control devices are operated in a manner consistent with good air pollution control practices for minimizing emissions. Preventive maintenance tasks and actions taken to respond to malfunctions/faults will be periodically reviewed and changed (if necessary) based on best engineering judgment and technological/equipment improvements.

Reviews of this Operating and Maintenance Plan will be periodically conducted by the PECE and the Paint ME Manager or his designee. Reviews will be completed at least.

Records of the Operating and Maintenance Plan review will be maintained by the PECE for a period of 5 years.