FCA US LLC
Detroit Assembly Complex - Mack

Permit No.: Permit to Install 14-19A

Malfunction Abatement Plan

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1.0 Purpose and Use

This Malfunction Abatement Plan was developed in accordance with Michigan Department of Environmental Quality R336.1911, Permit to Install 14-19A for the regenerative thermal oxidizers, concentrator, water wash systems and dry particulate control devices used to control emissions from the Electrocoat and Paint process at FCA Detroit Assembly Complex - Mack (DACM). The purpose of the malfunction and abatement plan is to prevent, detect and correct malfunctions or equipment failures that may result in volatile organic compound (VOC) or particulate matter (PM) emissions exceeding any applicable emission limitation.

This plan includes a description of the following elements, consistent with the requirements established in state regulations (Michigan Air Pollution Control Rules, R336.1911) for malfunction abatement plans:

- The preventive maintenance program for the pollution control equipment;
- The operating variables that are monitored to detect a malfunction; and
- A description of corrective maintenance procedures and/or operational changes to be made in the event of a malfunction.

2.0 Applicability and Control Device List

This plan applies to the regenerative thermal oxidizer (RTO), concentrators, water wash system, and dry particulate filter systems at DACM. The sources and applicable air pollution control equipment are defined in Table 1 for the Paint Shop at DACM.

Table 1
Paint Shop List of Sources and Air Pollution Control Equipment

Emission Unit	Potential Air Pollutant	Applicable Air Pollutant Control Equipment
Electrocoat tank and ovens, primer ovens, topcoat ovens	VOC	Direct to RTO
Primer/topcoat/clearcoat coating booth, heated flash-off areas	PM and VOC	Dry Filters, Concentrator and RTO
Primer/topcoat/clearcoat booth overspray	PM	Water Wash System
Prep booth, flash prime booth, color prep, heavy reprocess, observation zone, spot repair, final repair	PM	Dry Filters

3.0 Preventive Maintenance Program

This section describes the procedures for maintaining the regenerative thermal oxidizers, concentrator, dry filter and water wash systems. It also identifies the frequency of inspection, the activities undertaken, and the personnel responsible for overseeing the inspection, maintenance and repair of this equipment.

3.1 Preventive Maintenance Activities

The preventive maintenance activities for the regenerative thermal oxidizer were established using the manufacturer's recommended general and preventive maintenance procedures, operational and maintenance experience with the regenerative thermal oxidizer as well as sound engineering practice in accordance with industry standards.

The maintenance and inspection activities records are maintained electronically in the plant's Total Maintenance System (TMS). Table 3 summarizes the preventive maintenance activities and associated frequencies.

Table 3
Summary of Preventive Maintenance Activities

Frequency	Preventive Maintenance Activity
Regenerative Thermal Oxidizer & Concentrators	
Monthly	• Inspect burner concentrator heater • Inspect valve proving device • Combustion air filter cleaning and replacement • Flushing fan drive inspection • RTO burner inspection • Damper flange bearing inspection
Every 2 Months	Fan shaft inspection
Semi-Annually	• Inspect fan vibration switch • Fan shaft coupling inspection • Hydraulic power unit air breather replacement • Hydraulic power unit oil inspection

Frequency	Preventive Maintenance Activity
Regenerative Thermal Oxidizer & Concentrators	
Annually	• Differential pressure switch replacement • Replace valve motor actuator • Replace gas motor regulator • Replace pilot solenoid valve • Replace Hi-Lo limit assembly • Recalibration and/or replacement of each thermocouple • Replace butterfly valve • Blocking valve replacement • Perform an inspection of the valve seals condition and verify valve timing/synchronization (min every 18 months) • Lubricate fan bearing • Inspect fan bearing RTD • Replace grease cartridge • Concentrator gearbox oil lubrication • Flushing fan belt replacement • Pressure transmitter service • Hydraulic power unit reservoir inspection
Every Two Years	• Replace concentrator drive belt
Every Four Years	• Replace damper proximity switch • Damper gland packing replacement
Every Five Years	• Flushing fan bushing replacement
As Needed	• Replace burner transformer • Replace fan motor • Replace concentrator drive and motor • Replace damper actuator • Replace limit switch • Can damper seal replacement • Burner air pressure switch replacement • Hydraulic power unit heater replacement • Hydraulic power unit level switch replacement • Engaging tower degrade mode (test) • Damper hydraulic flow control replacement
Dry Particulate Filters	
Weekly	• Inspection of Dry Particulate Filters (replaced as necessary)
Water Wash Systems	
Weekly	• Inspection of Water Wash System
Annually	• Water Wash Replacement

A list of the major replacement parts for the regenerative thermal oxidizer and concentrator systems that are inventoried, used and periodically re-stocked is provided in Table 4 and Table 5, respectively. DACM also maintains an inventory of dry filters used in the particulate matter control systems in the facility

Table 4
Major RTO Replacement Parts

Pressure Transmitter
Fan Bearing Temperature Thermocouples
Flushing Fan belts
Ignitors
Gaskets
Flushing Fan Motor
Thermocouples

Table 5
Major Concentrator Replacement Parts

Pressure gauges
Limit Switch
Rotation Drive Motor
Rotor Seals
Thermocouples
Drive Belt
Pulsation Damper

3.2 Preventive Maintenance Responsible Personnel

The following personnel share responsibility for ensuring that the inspection and maintenance activities for the regenerative thermal oxidizer, concentrator, water wash and dry filters are completed:

- Paint Shop Maintenance Manager
- Maintenance Area Manager
- Facility Engineers
- Millwrights, Pipefitters and Electricians

4.0 Operating Parameter Monitoring and Malfunction Detection

RTO and Concentrators The RTO and Concentrators are the pollution control devices for E-Coat tank and ovens, spray booths and their ovens. Their normal operating conditions are defined in terms of monitoring the following parameters:

- The operating temperature is established during regulatory testing for Destruction Efficiency.
- The temperature is electronically recorded every 15mins in DACM FIS
- No by-pass valve or stack dampers are open to the atmosphere during production
- In the event the DACM FIS data logger goes offline, operators manually record the data every 15 minutes as a back up
- If the operating temperature drops below the set point, the conveyor system leading into the spray booths and/or the Ecoat system are interlocked thus preventing vehicles from proceeding into the emission source.
- The spray booths, ovens and Ecoat system are stripped of any vehicles already in the system prior to the incident that engaged the interlock.

Dry Filters and Water Wash
The dry filters are inspected and evaluated weekly, and replaced on a regular basis as needed. The water wash system is inspected weekly to assess proper operation.

5.0 Malfunction Operating Scenarios

Permit conditions, requires the RTO and concentrator be operated at certain temperatures to achieve a minimum VOC destruction efficiency during production hours. A reportable malfunction occurs when the RTO/TO/concentrator malfunction results in excess emissions, as defined in the permit and Michigan Air Pollution Control rules.

In the event the RTO operating temperature or the concentrator desorb inlet temperature fall below the set point during production or just prior to production startup, the production stop interlock is activated in various entrance stage of the processes as listed below:

- Prior to tack off zone for all Spray booths and Ovens
- Pretreatment/Phosphate Pre-cleaning stage for the Ecoat system

Vehicles stranded within the process prior the incident are stripped out and production do not resume until the corresponding operating/desorb temperature is back to the appropriate set point.

The Paint Maintenance manager, through each shift's Paint Maintenance Supervisor, is responsible for maintaining the RTO in accordance with all Federal and Michigan State rules and permit conditions.

It is responsibility of the Paint Maintenance Manager and Paint Maintenance Supervisors to notify the EH&S Environmental Specialist if RTO/concentrator drops below normal operating temperature or if the interlock is engaged. During any incident of control equipment malfunction, the Paint Maintenance Manager, Paint Maintenance Supervisors and EHS staff will coordinate efforts to minimize emissions.

Any misplacement of, or problems with, the particulate matter dry filter or the water wash systems will be identified by the inspector during their weekly inspections and be expeditiously reported to EHS staff.

EHS staff is responsible for evaluating emissions during a malfunction to determine if emissions were in excess of any permit limit.

The Environmental Specialist will notify the Michigan Department of Environment, Great Lakes & Energy (EGLE) of a reportable malfunction as required pursuant to Michigan Rule R336.1912 and PTI # 14-19A.

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