

# MALFUNCTION ABATEMENT PLAN

TOEFCO ENGINEERED COATING SYSTEMS, INC.  
1220 NORTH 14<sup>TH</sup> STREET, NILES, MICHIGAN 49120  
RENEWABLE OPERATING PERMIT MI-ROP-N2610-2017

## 1.0 INTRODUCTION

This Malfunction Abatement Plan (“MAP”) is developed pursuant to the requirement set forth in the Renewable Operating Permit MI-ROP-N2610-2017 (the “ROP”) EU-METALCOAT Condition III.5, and Rule 336.1911(2) of Michigan’s Administrative Rules for Air Pollution Control. The purpose of this MAP is to describe the standard operating procedures that will be used to prevent, detect, and correct malfunctions of the regenerative thermal oxidizer (“RTO”) volatile organic compound (“VOC”) emissions control system associated with the Super Line and North Line coating operations at the Toefco Engineered Coating Systems, Inc. (“Toefco”) facility located in Niles, Michigan (the “Facility”).

Toefco operates the RTO system at all times during active coating operations on the Super Line and/or North Line, with the following exceptions:

- During periods of preventative maintenance when it is either not technically feasible to operate the RTO system or when operating the system will create a safety hazard for on-site personnel.
- During periods of malfunction when it is not technically feasible to operate the RTO system.
- During periods of operation when powder coatings are being applied by the North Line. These coatings contain no VOC but the particulate nature of the material would foul and blind the heat transfer media within the RTO, requiring the emissions from the application of these powder coatings to bypass the RTO.
- During periods of operation when a specially-formulated, low-VOC content coatings are being applied by the Super Line and/or North Line. These coatings are formulated using non-VOC, hydrochlorofluorocarbon (“HCFC”) materials as the solvent within the coating, which allow the coatings to meet the compliant material limitations contained within Special Condition II.1 of the PTI. The aggressively-corrosive nature of the chlorinated and fluorinated byproducts of combustion of these solvent replacement materials would severely damage the RTO internals, requiring the emissions from the coating operation to bypass the RTO when these materials are present within an applied coating.

The MAP consists of two parts: 1) the preventive maintenance program; and 2) the malfunction abatement and equipment monitoring program. The Facility Maintenance Manager is responsible for implementing the MAP, and overseeing the inspection, maintenance, and repair of the RTO system.

The preventive maintenance program includes the following elements:

- Identification of supervisory personnel responsible for overseeing the inspection, maintenance, and repair of the RTO system
- Description of the items or conditions that shall be inspected
- The frequency of inspection or repairs
- Identification of the major replacement parts that shall be maintained in inventory for quick replacement

The malfunction abatement and equipment monitoring program includes the following elements:

- RTO system operating variables that are to be monitored to detect any malfunction or failure
- Normal operating range of these variables
- Description of the method of monitoring
- Personnel responsible for monitoring
- Frequency of monitoring
- Description of the corrective procedures or operational changes aimed at abating a malfunction or equipment failure situation (also refer to **Attachment A – Malfunction Abatement Contingency Plan**)

## **2.0 FACILITY BACKGROUND**

Toefco owns and operates a miscellaneous metal parts coating operation at 1220 North 14<sup>th</sup> Street in Niles, Michigan. The Super Line and North Line coating operations at the Facility are covered under MI-ROP-N2610-2017.

The process emission units covered by the MAP include two (2) paint spray booths, two (2) flash-off areas, and one (1) curing oven on the Super Line, and one (1) paint spray booth, one (1) flash-off area, and one (1) curing oven on the North Line. VOC emissions from these units are collected via integrated spray booth and hoods. The captured emissions are subsequently transferred to an RTO control device.

## **3.0 PREVENTATIVE MAINTENANCE PROGRAM**

This program is designed to minimize the potential for equipment malfunctions by establishing an inspection schedule for all equipment and accessories associated with the RTO emissions control system. Components of the RTO system that will be inspected, the frequency of inspection, the person responsible for overseeing inspection activities, as well as replacement parts that will be maintained in inventory on-site, are listed in **Table 1**. By implementing this program, Toefco will be better equipped to identify the potential for an imminent malfunction of the RTO system prior to its occurrence.

Toefco will maintain a record of equipment inspection activities conducted in accordance with this preventative maintenance program. The records, which will be maintained for five years, will include the following information:

- Date of inspection
- Inspector's name or initials

- List of checks made
- Comments and additional information, as necessary

#### **4.0 MALFUNCTION ABATEMENT AND EQUIPMENT MONITORING PROGRAM**

This program is intended to identify any abnormal conditions or equipment malfunctions. **Table 2** lists the equipment for which a malfunction could cause a possible interruption in the operation of the control device. **Table 2** also lists the operating variables to be monitored, the normal operating range, the method of monitoring, the frequency of monitoring, the name or initials of the person monitoring the equipment, and the corrective actions to be taken during a malfunction or failure of the equipment. This program will help to detect any malfunctions and will be utilized to initiate the required corrective actions to achieve continued emission control system operation in a timely manner.

During a malfunction event, the following information will be recorded:

- Equipment identification
- The date the malfunction was detected
- A description of the malfunction
- A description of the required repair
- The initials or name of the person conducting the repair

#### **5.0 PROCEDURES TO MINIMIZE GENERATION OF FUGITIVE EMISSIONS**

This program is intended to minimize the potential to generate fugitive VOC emissions during the handling and management of process-related materials, waste materials, and spent coating spray booth filters.

Process-related materials, including: coatings, reducers, thinners, additives, catalysts, and purge and cleanup solvents are purchased and maintained within sealed containers. Process-related materials containers are opened only to provide materials required to support operations, and promptly resealed. Process-related materials recovered and/or reclaimed from coating operations are also placed and stored within sealed containers until they are reutilized or disposed as waste.

Process waste materials are captured and stored within sealed containers. Upon accumulation of sufficient waste quantities, the stored waste materials are disposed in an acceptable manner in compliance with all applicable state rules and federal regulations.

Spent coating spray booth filters are removed from operation following the completion of coating operations and after allowing sufficient time to allow VOC containing materials to evaporate from the filter for destruction by the RTO emission control system. Filters containing paint solids are handled and disposed appropriately to minimize the introduction of air contaminants to the outer air.

**Table 1 - Preventative Maintenance Program**

Items Inspected	Frequency of Inspection	Responsibility	Recordkeeping	Replacement Parts*
Regenerative Thermal Oxidizer (RTO) System	<b>Weekly Inspection:</b> Visually inspect the system for obvious structural problems and signs of damage.	Maintenance	PM Report	- 1 ea. TE504 - Thermocouple (200063570101)
	<b>Weekly Inspection:</b> Ensure all blower bearings are lubricated per the manufacturer's specifications.	Maintenance	PM Report	- 1 ea. TE511 - Thermocouple (200063570102)
	<b>Monthly Inspection:</b> Verify the ductwork diverter dampers/limit switches are operating properly.	Maintenance	PM Report	- 1 ea. TE516 - Thermocouple (200063570103)
	<b>Monthly Inspection:</b> Inspect safety shutoff valves on gas train for proper operation.	Maintenance	PM Report	- 1 ea. PDSL603 - Exhaust Blower DP Switch (200063570104)
	<b>Monthly Inspection:</b> Inspect gas train for leaks and signs of damage.	Maintenance	PM Report	- 1 ea. PSL505 - Combustion Air Switch (200063570107)
	<b>Quarterly Inspection:</b> Measure and record blower vibration levels. Correct any defects.	Maintenance	PM Report	- 1 ea. BE501 - UV Scanner (200063570108)
	<b>Quarterly Inspection:</b> Measure and record motor running currents. Correct any defects.	Maintenance	PM Report	
	<b>Quarterly Inspection:</b> Measure and record flame detector current. Any decrease should be noted.	Maintenance	PM Report	
	<b>Quarterly Inspection:</b> Inspect blowers and ducts for buildup of oils, resins, dust, and sludge. Remove any buildup.	Maintenance	PM Report	
	<b>Semi-Annual Inspection:</b> Inspect motor connection and drive coupling on blowers and belt alignment and tension.	Maintenance	PM Report	
	<b>Semi-Annual Inspection:</b> Lubricate motor bearings on blowers.	Maintenance	PM Report	
	<b>Semi-Annual Inspection:</b> Inspect process exhaust duct work for leaks.	Maintenance	PM Report	
	<b>Semi-Annual Inspection:</b> Inspect conduit and wiring for signs of damage.	Maintenance	PM Report	

**Table 1 - Preventative Maintenance Program (cont'd)**

Items Inspected	Frequency of Inspection	Responsibility	Recordkeeping	Replacement Parts*
Regenerative Thermal Oxidizer (RTO) System (cont'd)	Semi-Annual Inspection: Clean strainer, lubricate combustion air blower motor on gas train.	Maintenance	PM Report	- 1 ea. TE504 - Thermocouple (200063570101)
	Semi-Annual Inspection: Inspect combustion air blower filter on gas train.	Maintenance	PM Report	- 1 ea. TE511 - Thermocouple (200063570102)
	Semi-Annual Inspection: Inspect poppet valves and valve cover gaskets.	Maintenance	PM Report	- 1 ea. TE516 - Thermocouple (200063570103)
	Annual Inspection: Clean rotor assembly and inspect switch, door and cover gaskets and shaft seal on blower.	Maintenance	PM Report	- 1 ea. PDSL603 - Exhaust Blower DP Switch (200063570104)
	Annual Inspection: Clean and inspect burner on gas train.	Maintenance	PM Report	- 1 ea. PSL505 - Combustion Air Switch (200063570107)
	Annual Inspection: Inspect wiring, connections and relays on control panel.	Maintenance	PM Report	- 1 ea. BE501 - UV Scanner (200063570108)
	Annual Inspection: Check condition of ceramic heat-recovery media.	Maintenance	PM Report	
	Continuous Monitoring: Thermocouples monitor combustion chamber temperature so that automated adjustments can be made.	Maintenance	Real-time via PLC system	

\*Note: When a replacement part is put into use, a new replacement part shall be ordered within 30 days.

**Table 2 – Malfunction Abatement and Equipment Monitoring Program**

Equipment ID	Operating Variables Monitored	Normal Operating Range	Method of Monitoring	Frequency of Monitoring	Person Monitoring	Corrective Procedure or Operational Change in the Event of Equipment Malfunction* or Failure
Regenerative Thermal Oxidizer (RTO) system	Temperature	Minimum of 1,450 degrees Fahrenheit	Continuous temperature monitoring by thermocouple with screen display and alarm	Continuous	Maintenance	Do not operate the connected process equipment unless the RTO is installed, maintained and operating properly - except during use of by-pass mode. In the event of a malfunction causing an exceedance of permit limitations, follow the procedures in <b>Attachment A</b> .
	Combustion Chamber Flame	Presence of visible flame	Flame detector and supervisory system	Continuous	Maintenance	If a temperature fault occurs: the natural gas is turned "OFF", the unit will post-purge, the poppet valves will go to their lowest position, the process blower will shut down and alarms sound.  If blower stops, a gas pressure falls too low or too high, the poppet valve fails to move in allotted time, or a thermocouple falls below set point: the safety shutoff valves and natural gas injector solenoid valve immediately close, shutdown occurs, and alarms sound.
						In the event of a temperature fault: the controls will be "reset" or else the unit will slowly cool down until the only way to recover will be by a burner restart.  If flame detector indicates no combustion chamber flame: the natural gas is turned "OFF", the unit will post-purge, the poppet valves will go to their lowest position, the process blower will shut down and alarms sound.  In the event of a temperature fault: the controls will be "reset" or else the unit will slowly cool down until the only way to recover will be by a burner restart.

## Attachment A - Malfunction Abatement Contingency Plan

Condition	Decision	Response	Condition to Respond	Action
1. Malfunction discovered	Can site operators repair the malfunction?	Yes	Repairs can be completed within one (1) hour.	Complete repairs; notify maintenance and supervisor; review PM/MAP.
		No	Repairs cannot be completed within one (1) hour.	Inform maintenance and supervisor of malfunction immediately. Proceed to condition #2.
				Inform maintenance and supervisor of malfunction immediately. Proceed to condition #2.
2. Maintenance informed of malfunction	Can maintenance personnel repair the malfunction?	Yes	Repairs can be completed within one (1) hour.	Complete repairs; notify management; review PM/MAP.
		No	Repairs cannot be completed within one (1) hour.	Inform management personnel immediately. Proceed to condition #3.
				Inform management personnel immediately. Proceed to condition #3.
3. Management informed of malfunction	Is the malfunction likely to result in emissions that will exceed permit limits?	Yes	Repairs will exceed two (2) hours.	Management must take immediate action to minimize the potential to exceed permit limitations. Proceed to condition #4.
		No	Repairs will take <2 hours, but >1 hour.	Management must take immediate action to minimize the potential to exceed permit limitations. Proceed to condition #4.
			Repairs can be completed within one (1) hour.	Proceed with repairs; monitor time to complete repairs. If repairs continue for >1 hour, proceed to condition #4. Proceed with repairs; continue to monitor emission estimates. If repairs continue for >1 hour, proceed to condition #4.

## Attachment A - Malfunction Abatement Contingency Plan (cont'd)

Condition	Decision	Response	Condition to Response	Action
4. Reduction of potential to exceed permit emission limits.	Were permit emission limits exceeded?	Yes	Emission limits were exceeded for >2 hours.	Provide a notification of the malfunction to MDEQ-AQD within 48 hours of the occurrence and a written report to MDEQ-AQD within 10 days of the occurrence. Review/revise PM/MAP program to prevent any recurrence of the malfunction.
		Yes	Emission limits were exceeded for <2 hours, but >1 hour.	Provide a notification of the malfunction to MDEQ-AQD within 48 hours of the occurrence. Review/revise PM/MAP program to prevent any recurrence of the malfunction.
		No	Emission limits were exceeded for <1 hours.	Review/revise PM/MAP program to prevent any recurrence of the malfunction.
				Review/revise PM/MAP program to prevent any recurrence of the malfunction.