

**COMPLIANCE ASSURANCE MONITORING PLAN**  
Regenerative Thermal Oxidizer (RTO) for VOC Control  
AAR Mobility Systems

I. Background

A. Emission Unit

Description: Regenerative Thermal Oxidizer (RTO) used to control emissions from; Balsa Core, Skin or Rail, Clean up and two paint booths and associated ovens.

Identification: RTO

Facility: AAR Mobility Systems, 201 Haynes Street, Cadillac, MI 49601

B. Applicable Regulation and Emission Limit

Regulation: Renewable Operating Permit # MI-ROP-B4197-2016c

Emissions Limit (VOC): FG Coatings- 122.3 tons per year (12-month rolling time period), EUCONTAINERLINE- 8.2 tons per year, 0.9 tons per year- Diglycidyl ether of bisphenol a (CAS No 25036-25-3). Cleanup Solvent Emissions – 1.7 tons per year (12-month rolling time period). Monitoring Requirements: Monitor and record temperature from the RTO in the combustion chamber. See current permit

Monitoring Requirements: Monitor and record temperature from the RTO near the combustion chamber outlet.

C. Control Technology

Regenerative Thermal Oxidizer

II. Monitoring Approach

The key element of the monitoring approach for VOC is presented in the following table. The selected indicator of performance is the combustion chamber outlet temperature. The temperature is measured continuously while the RTO is in operation and recorded on a circle chart.

## MONITORING APPROACH

	Indicator
1. Indicator	RTO Combustion Chamber Outlet Temperature
Measurement Approach	The Temperature is measured using a Thermocouple.
2. Indicator Range	A malfunction has occurred when the combustion chamber outlet temperature drops below 1400°F for more than two hours. A malfunction will result in implementation of the malfunction abatement plan or change to an alternate operating scenario.
3. Performance Criteria	The RTO combustion chamber outlet temperature is measured using a thermocouple located near the outlet of the combustion chamber. The minimum acceptable accuracy of the meter is $\pm 2$ percent of the measured value and the range is 0 to 1600°F.
A. Data Representativeness	
B. Verification of Operational Status	
C. Quality Assurance and Control Practices	
D. Monitoring Frequency	The RTO combustion chamber outlet temperature is measured and recorded continuously during RTO operation.
Data Collection Procedure	The RTO combustion chamber outlet temperature is recorded continuously.
Averaging Period	None

## MONITORING APPROACH JUSTIFICATION

### I. Background

The RTO Emission unit consists of VOC emissions from the Regenerative Thermal Oxidizer (RTO) unit, which is used to control emissions from several sources. Those sources include the container line prime (197) and container paint booth along with the associated oven. Another source included is the Balsa Core machine. This process involves applying adhesive to the top, bottom and edges of wood cores used in panel construction. The RTO also controls emissions from the adhesive spray booth and Skin or Rail machines. In these operations, adhesive is sprayed onto aluminum sheets and rails used in panel construction. The RTO also controls emissions from a rail dip operation.

The Regenerative Thermal Oxidizer is a 5-canister regenerative-type thermal oxidizer with a 65,000 scfm design capacity. The system is designed with regenerative heat exchangers with a thermal efficiency of 95% to provide minimum fuel consumption. The system is also guaranteed by the manufacturer to remove 95% of the VOCs in the air stream flowing to the RTO.

### II. Justification of Performance Indicators

The regenerative thermal oxidizer is used to reduce VOC emissions from adhesive and paint coating lines associated with pallet, container and shelter manufacturing. All of these processes operate on an intermittent basis making it difficult to relate VOC emissions to production of units in the manufacturing process. Instead, emission rates are based on VOCs contained in coatings used at the various processes.

Based on VOC emission loading information supplied to the manufacturer of the RTO unit, the manufacturer has guaranteed the unit will operate at 95% destruction efficiency. The preheated VOC-containing gases exit the heat exchanger ceramic bed and enter the oxidizer retention chamber. Temperatures in the pre-heat exchanger ceramic beds and the oxidizer retention chamber are higher than the auto-ignition temperatures of the VOCs in the air stream. Therefore, VOC destruction occurs in both areas. The temperature of the gases exiting the oxidizer chamber is controlled to optimize destruction of VOCs.

### III. Justification of Performance Indicator Ranges

The indicator range was selected based on a process guarantee provided by the manufacturer of the regenerative thermal oxidizer system. Preheated VOC-containing gas exits the heat exchanger ceramic bed at approximately 1400°F and the operating temperature in the oxidizer retention chamber is maintained at 1500°F. The temperature in both these areas is above the auto-ignition temperature of the VOCs. When the system is operated at or below the design capacity of 65,000 scfm, the residence time in the oxidizer retention chamber is at least 1.5 seconds. Under these conditions, the manufacturer guarantees a minimum 95% destruction efficiency for VOCs contained in the air stream. If the temperature retention chamber drops exit temperature drops below 1400°F, the malfunction abatement plan in the renewable operating permit is implemented.

