

ENVIRONMENTAL MALFUNCTION ABATEMENT – OPERATION & MAINTENANCE PLAN

For

LACKS Enterprises, Inc.

AIRLANE NORTH PLATER

4260 Airlane S.E.

Kentwood, Michigan

Michigan SRN # N0895

Permit: MI-ROP-N0895-2012

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TABLE OF CONTENTS

Page

Facility Wide Requirements	2
Chrome Etch and Chrome Plate Tanks	3
Conditioner, Electroless Copper, and Strip Tanks	5
Neutralizer, Catalyst, Accelerator, Copper Plate and Nickel Plate Tanks	6

Facility Wide

Maintenance records will consist primarily of the computer based preventive maintenance system. Additional maintenance records may include PM Work Orders, Maintenance Work Requests, checklists, purchase orders, and other documents which describe the maintenance tasks and corrective actions. All records will be maintained for a minimum of five (5) years.

All **Malfunction Alarms** will be activated immediately within the building and will consist of both audible and visual alarms and will be recorded by the automated system. The alarm will also appear in the plating laboratory on a system monitor.

Operating Variable	Monitoring Method	Monitoring Frequency	Normal Operating Range	Recordkeeping Requirements
Opacity	Non-certified visual observation	Once each week during operation	Other than uncombined water vapor, there must be no visible emission (0% opacity) from a stack.	Record the following observations for each stack: date, time, visible emissions observed (yes/no).
Condition of the automated alarm system	Test each alarm for proper operation	Each quarter	The sensor sends an alarm signal and the alarm is recorded.	The test results and corrective actions will be recorded in preventive maintenance computer program.
<u>Malfunction Corrective Actions:</u> If visible emissions are observed, notify the plating supervisor to initiate immediate shut down of the affected process and begin an inspection of the system. Prepare a Maintenance Work Request (MWR) to perform a determination of the cause of the visible emissions and initiate the necessary corrective actions. Record the date, time, duration of the malfunction, who was notified and the corrective actions on the MWR.				
<u>Malfunction Reporting Requirements:</u> 1.) All malfunctions will be reported immediately to the Maintenance Manager and/or Plater Supervisor who in turn will report the malfunction to the Plant Manager and the Protective Services Central Dispatch at 554-7180. 2.) The Environmental Coordinator, or designate, will make the required notifications to the MDEQ in accordance with the applicable rules and permit requirements.				
<u>Primary Responsibility:</u> Maintenance Manager				

Chrome Etch Tanks and Chrome Plate Tanks – Composite Mesh Pad Scrubbers and Surface Tension

Operating Variable	Monitoring Method	Monitoring Frequency	Normal Operating Range	Recordkeeping Requirements
Pressure drop across the CMP system	Continuous pressure drop monitoring device, inches of water gauge ("WG)	Continuously during operation	Cr Etch: 2.5-7.5" WG Evaporator: 0 - 4" WG Cr Plate: 1.13 - 5.13" WG Evaporator: 0.5 -4.5" WG	1.) Alarms will be recorded by the automated system. 2.) Daily pressure drop readings will be recorded by lab personnel.
<u>Chrome Etch</u> Wash down water flow rate to each pad.	Flow meter (GPM)	During pad wash down	30 GPM minimum wash rate Pad #1: each hour for a minimum of 1 minute Pad #2: each day for a minimum of 1 minute Pad#3: each week manually until clear	Alarms for low flow will be recorded by the automated monitoring system.
<u>Chrome Plate</u> Wash down water flow rate to each pad.	Flow meter (GPM)	During pad wash down	30 GPM minimum wash rate Pad #1: each hour for a minimum of 1 minute Pad #2: each day for a minimum of 1 minute Pad#3: each week manually until clear	Alarms for low flow will be recorded by the automated monitoring system.
Confirmation of pad wash down	Visual	Each week of operation	Flow to the wash down water collection tank	Maintenance records
Ductwork, transitions, scrubber base, wash down plumbing, blower, housing, and motor.	Visual inspection	Monthly	No leaks, cracks, gaps, damage, or missing components. No audible signs of air leaks or bypass. No abnormal vibration or noise.	Maintenance records and photographs of each side and top of the ductwork and scrubber body.
Condition of CMP system	Visual inspection	Once per quarter	Proper drainage, no chromic acid build-up on the pads or gaps allowing bypass, no evidence of chemical attack on the structural integrity.	Maintenance records
Condition of the back portion of the mesh pad closest to the fan.	Visual inspection	Once per quarter	No breakthrough of chromic acid mist	Maintenance records
Ductwork from tanks to the scrubber	Visual inspection	Once per quarter	No leaks, cracks or gaps	Maintenance records

Operating Variable	Monitoring Method	Monitoring Frequency	Normal Operating Range	Recordkeeping Requirements
Condition of pads	Visual inspection performed under the supervision of the Plant Engineer – Plating Operations or designate.	Annual	Remove top covers – inspect for gaps around the pads which would allow air to bypass.	Composite Mesh Pad Scrubber System – Annual PM's checklist.
Chrome etch tanks surface tension	Tensiometer	Each day of operation	Less than 45 dynes/cm	Surface tension results will be recorded each day by lab personnel.
Chrome plate tanks surface tension	Tensiometer	Each day of operation	Less than 45 dynes/cm	Surface tension results will be recorded each day by lab personnel.

Malfunction Corrective Actions:

- 1.) Notify the plating supervisor to initiate immediate shut down of the affected process and begin an inspection of the system. Cease operating until normal operation of the scrubber is restored.
- 2.) Prepare a Maintenance Work Request (MWR) to perform a determination of the cause of the malfunction and initiate the necessary corrective actions. Record the date, time, duration of the malfunction, who was notified and the corrective actions on the MWR.
- 3.) If applicable, modify the MAP to incorporate the actions taken to correct and to prevent a reoccurrence of the malfunction.

Additional Requirements:

Each quarterly inspection report will include a description of the working condition of the scrubber, any observed problems, corrective actions and will be reviewed by the inspector's supervisor as evidenced by the supervisor's name and review date.

Training Requirements:

All maintenance staff conducting inspections of the control equipment shall be trained on the specifics of the inspections, how to properly conduct them, and conditions to look for that may indicate an abnormal condition.

Malfunction Reporting Requirements:

- 1.) All malfunctions will be reported immediately to the Maintenance Manager and/or Plater Supervisor who in turn will report the malfunction to the Plant Manager and the Protective Services Central Dispatch at 554-7180.
- 2.) The Environmental Coordinator, or designate, will make the required notifications to the MDEQ in accordance with the applicable rules and permit requirements.

Primary Responsibility:

Maintenance Manager

Conditioner Tank, Electroless Copper Tanks and Strip Tanks Packed Bed Scrubbers

Operating Variable	Monitoring Method	Monitoring Frequency	Normal Operating Range	Recordkeeping Requirements
Pressure drop across the packed bed	Continuous pressure drop monitoring device, inches of water gauge ("WG)	Continuously during operation	Recommended pressure drop Conditioner : 0.1 – 3.0" WG EC copper : 0.1 –3.0" WG Strip : 0.1 – 3.0" WG	1.) Alarms will be recorded by the automated system.
Water flow to the packed bed (circulating rate)	Continuous flow meter (GPM).	Continuously during operation	Scrubber minimum flow rate Conditioner: 50 GPM EC copper: 50 GPM Strip: 80 GPM	Alarms for low flow will be recorded by an automated system.
Water bleed-off rate	Continuous flow meter (GPM).	Continuously during operation	Conditioner: 1.0 GPM minimum EC copper: 3.0 GPM minimum Strip: 5.0 GPM minimum	Alarms for low flow will be recorded by an automated system.
Condition of packed bed	Visual inspection	Once per quarter	Proper drainage, no build-up on beds, no evidence of chemical attack on the structural integrity.	Maintenance records
Condition of back portion of the mist eliminator	Visual inspection	Once per quarter	No evidence of chemical breakthrough.	Maintenance records
Ductwork from tanks to the scrubber	Visual inspection	Once per quarter	No leaks, cracks or gaps	Maintenance records

Malfunction Corrective Actions:

- 1.) Notify the plating supervisor to initiate immediate shut down of the affected process and begin an inspection of the system. Cease operating until normal operation of the scrubber is restored.
- 2.) Prepare a Maintenance Work Request (MWR) to perform a determination of the cause of the visible emissions and initiate the necessary corrective actions. Record the date, time, duration of the malfunction, who was notified and the corrective actions on the MWR.
- 3.) If applicable, modify the MAP to incorporate the actions taken to correct and to prevent a reoccurrence of the malfunction.

Additional Requirements:

Each quarterly inspection report will include a description of the working condition of the scrubber, any observed problems, corrective actions and will be reviewed by the inspector's supervisor as evidenced by the supervisor's name and review date.

Malfunction Reporting Requirements:

- 1.) All malfunctions will be reported immediately to the Maintenance Manager and/or Plater Supervisor who in turn will report the malfunction to the Plant Manager and the Protective Services Central Dispatch at 554-7180.

2.) The Environmental Coordinator, or designate, will make the required notifications to the MDEQ in accordance with the applicable rules and permit requirements.

Primary Responsibility:

Maintenance Manager

Neutralizer, Catalyst, Accelerator, Copper Plating, and Nickel Plating Tanks Fan and Ventilation Systems

Operating Variable	Monitoring Method	Monitoring Frequency	Normal Operating Range	Recordkeeping Requirements
Fan operation	Electrical current draw	Continuous – automated monitoring system	Electrical current draw when the plater is in operation.	Alarms for loss of electrical current draw will be recorded by an automated system.
Condition of the ductwork, fans, motors, belts, support structures and stacks.	Visual inspection	Once per quarter	No leaks, cracks, gaps in the ductwork and stacks or operating problems with the fans and motors.	Maintenance records

Malfunction Corrective Actions:

If problems are observed, notify the plating supervisor to initiate inspection of the system. Prepare a Maintenance Work Request (MWR) to perform a determination of the cause of the malfunction and initiate the necessary corrective actions. Record the date, time, duration of the malfunction, who was notified and the corrective actions on the MWR.

Malfunction Reporting Requirements:

- 1.) All malfunctions will be reported immediately to the Maintenance Manager and/or Plater Supervisor.
- 2.) The Environmental Coordinator, or designate, will make the required notifications to the MDEQ in accordance with the applicable rules and permit requirements.

Primary Responsibility:

Maintenance Manager