



## **MALFUNCTION ABATEMENT PLAN**

*for the*

## **PAINT WATERWASH & PAINT APPLICATOR SYSTEMS**

*Magna Mirrors  
Newaygo, Michigan*

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## **PAINT WATERWASH SYSTEM PROCESS DESCRIPTION**

The paint line at Magna Mirrors, Newaygo, Michigan is equipped with three down draft water wash spray booths. The waterwash system is used to control particulate emissions. In each booth, paint overspray is directed downward into the waterwash system by means of air exhaust fans associated with each booth. As the water in each booth flows from the flood sheets into the lower area a water curtain is formed. Air carrying paint solids mixes with the turbulent water in the throat of the water curtain separating the paint solids from the gases. The water and paint solid mixture collects in the lower area it is directed to the waste water room for detackification.

Paint detackification is the chemical process by which paint solids are chemically treated to prevent them from conglomerating and adhering to system surfaces. During the detackification process, chemicals are added to aid in paint solid removal and ensure the system is operating at an optimal level. These may include chemicals to adjust pH, polymer to cause the paint solids to adhere to one another and float for ease of removal. After the detackification process is complete we have non hazardous material that is floated to the surface of the water by means of a palin system for disposal.

*Table 1 Waterwash System*

<b>Device Description</b>	<b>Task</b>	<b>Operating Variable</b>	<b>Monitoring Method</b>	<b>Frequency</b>	<b>Responsibility</b>	<b>Corrective Procedure or Operational Change in the Event of a Malfunction</b>
<b><i>UPPER FLOOD SHEETS</i></b>	Verify upper flood sheets are operating properly	Water flow, continuous  Pumps on	Visual	Daily	Paint Auditor	Notify Paint Engineer immediately. Paint system will be shut down until problem is identified and corrected.
<b><i>PALIN UNIT</i></b>	Verify palin unit is operating properly	Water level flowing over the overflow by 1 inch depth	Visual	Daily	Paint Auditor	Notify Paint Engineer immediately. Open inlet or outlet valves to achieve proper water level in palin.
	Verify palin transfer pump is operating properly.	Pump on	Visual	Daily	Paint Auditor	If not operating, notify Maintenance for repair.
	Remove accumulated paint solids waste	Full dewatering bags	Visual	Daily	Paint Auditor	Contact Paint Engineer if no accumulation is occurring.
<b><i>LOWER PIT</i></b>	Verify proper water level in lower pit	Proper level will let the transfer pumps fill the palin to its operating level	Visual	Daily	Paint Auditor	Notify Paint Engineer. If over maximum depth excess water must be pumped to reserve tank. If under minimum depth turn on City water supply and fill pit to proper level.
	Verify J-line pumps are operating properly	Pumps on	Visual	Daily	Paint Auditor	Notify Maintenance if not operating. Paint system will be shut down until problem is identified and corrected.
	Verify detack pump is operating properly	Pump on	Visual	Daily	Paint Auditor	Notify Paint Engineer immediately. Check valves for obstructions if there is no liquid flowing. Prime pump if no liquid flow.
	Verify pH is in required range	pH 7.5-9.6	Litmus paper or digital	Weekly	Paint Auditor	Notify Paint Engineer immediately. If pH is below 6 increase caustic soda addition to achieve proper range. If pH is above 9.6 shut caustic pump off until pH is in proper range.

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	Verify conductivity is at required level	Less than 30,000 Umhos	Meter	Weekly	Paint Auditor	Notify Paint Engineer immediately. If conductivity is greater than 30,000 Umhos schedule water removal with certified waste hauler.
	Verify MB slide bacteria is at required level	Less than or equal to $10^7$ ucfus	Dip slide	Weekly	Paint Auditor and Chemical Supplier	Notify Paint Engineer immediately. Add approved biocide at proper dosages to achieve target bacteria level.
	Verify SRB bacteria is at required level	Less than or equal to $10^5$ ucfus	SRB jars	Weekly	Paint Auditor and Chemical Supplier	Notify Paint Engineer immediately. Add approved biocide at proper dosages to achieve target bacteria level.

## **PAINT APPLICATOR SYSTEM PROCESS DESCRIPTION**

The paint application system operated by Magna Mirrors, Newaygo, Michigan includes three (3) downdraft waterwash paint spray booths, equipped with robotic electrostatic applicators. Paint is sprayed in a pattern necessary to cover a “window” of parts loaded on a rack. The process of applying paint requires that the paint applicators are functioning properly or parts may receive too little paint coverage, too much paint coverage or have dirt specs (paint cured on the gun tip and released onto the part).

Magna has implemented a plan for inspecting the application system prior to start up and after shut down, to minimize painting defects and optimize the application equipment. The following charts are examples of the start-up / shut-down procedures utilized by the paint team.

*Table 2 Paint Applicator System*

<b>Device Description</b>	<b>Task</b>	<b>Operating Variable</b>	<b>Monitoring Method</b>	<b>Frequency</b>	<b>Responsibility</b>	<b>Corrective Procedure in the Event of a Malfunction</b>
Prime Booth	Purge Air Injectors	40 psi +/- 10	Visual	Startup	Operator	Notify Paint Maintenance
	Ground Straps on waste cans & barrels	Straps must be secure	Visual	Startup	Operator	Secure
	Caps	Inspect holes	Visual	During flushes	Operator	Unplug/clean/replace
	Check KV's	80KV +/- 15 KV	KV gun	Startup	Operator	Notify paint maintenance
	Air regulator on booth valve stacks	80 psi	Visual	Startup	Operator	Notify paint maintenance
	Air regulator inside booth air injectors	70 psi	Visual	Startup	Operator	Notify paint maintenance
	Verify purge pressure	100 psi +/- 5	Visual	Startup	Operator	Notify paint maintenance
	Clean gun and nozzles		Manual	Startup	Operator	Clean
Base Booth	Main Air Valves	Must be on	Visual	Startup	Operator	Notify paint maintenance
	Solvent Valves (4)	Must be on	Visual	Startup	Operator	Notify paint maintenance
	Ground Straps for robots, dump cans	Must be secure	Visual	Startup	Operator	Secure
	Clean gun nozzles		Manual	Startup	Operator	Clean
	Caps	Inspect holes	Visual	During flushes	Operator	Unplug / clean / replace
	Check KVs	80 KV +/- 15 KV	KV gun	Startup	Operator	Notify paint maintenance
	Fluid Flow PLC test	Per Work Instruction	Visual	Startup	Operator	Notify paint maintenance / paint engineer
	Robots	Must be functioning	Visual	Startup	Operator	Notify paint maintenance
	Verify purge pressure	100 psi +/- 10	Visual	Startup	Operator	Notify paint maintenance
	Air injector pressure on piggable stack	90 psi +/- 10	Visual	Startup	Operator	Notify paint maintenance
	Verify Catalyst Pressure	350 psi +/- 50	Visual	Startup	Operator	Notify paint maintenance

<b>Device Description</b>	<b>Task</b>	<b>Operating Variable</b>	<b>Monitoring Method</b>	<b>Frequency</b>	<b>Responsibility</b>	<b>Corrective Procedure in the Event of a Malfunction</b>
Clear Booth	Ground Straps for robots, dump cans, waste drums	Must be secure	Visual	Startup	Operator	Secure
	Solvent Valves (4)	Must be on	Visual	Startup	Operator	Notify paint maintenance
	Clean gun nozzles		Manual	Startup	Operator	Clean
	Caps	Inspect holes	Visual	During flushes	Operator	Unplug / clean / replace
	Fluid Flow PLC test	Per Work Instruction	Visual	Startup	Operator	Notify paint maintenance / paint engineer
	Robots	Must be functioning	Visual	Startup	Operator	Notify paint maintenance
	Check KVs	80 KV +/- 15 KV	KV gun	Startup	Operator	Notify paint maintenance
	Verify purge pressure	100 psi +/- 10	Visual	Startup	Operator	Notify paint maintenance
	Air injector pressure	90 psi +/- 10	Visual	Startup	Operator	Notify paint maintenance
	Verify Catalyst Pressure	350 psi +/- 50	Visual	Startup	Operator	Notify paint maintenance

## **REGENERATIVE THERMAL OXIDIZER**

The facility operates two (2) separate Regenerative Thermal Oxidizers (RTO-1 and RTO-2) to control emissions of volatile organic compounds (VOCs) from the three paint application booths (prime, base and clear) associated with the wet coat paint line (EUWETCOAT). RTO-1 and RTO-2 also control VOC emissions associated with purge cleaning of the application equipment in the three paint booths (EUCLEANUP/PURGE).

Each RTO computer system has an interlock system with the paint line. The interlock system monitors the combustion zone temperature and if it falls below the minimum required operating temperature the conveyor line will shut down and the applicators automatically shut off. In addition, if the fan to either oxidizer fails, the same interlock system will shut the conveyor down and the paint applicators will be locked out.

The link between the coating line and each RTO, whereby the line shuts down if the either RTO malfunctions, represents the key safeguard in this malfunction abatement plan for the RTO.

The capture system is audited once per shift by dispensing smoke at the entrance and exit of the prime booth, the entrance of the base coat booth, and the exit of the clear coat booth. At all times, the smoke should enter the booth enclosures to demonstrate that the booths are under negative pressure. This ensures that the paint system is maximizing the capture of paint solvents to be controlled by the two RTO units.

Should an inspector note a positive pressure at any booth entrance or exit, they are to inform the paint maintenance supervisor and/or paint engineer who will investigate the air supply damper systems and make adjustments as necessary. Additionally, both RTO's are visually checked by an inspector to ensure each unit's average chamber temperature is greater than 1,400 degrees Fahrenheit.



## PREVENTATIVE MAINTENANCE (PM) PROGRAM

<b>Unit</b>	<b>Frequency</b>	<b>PM Detail / Purpose</b>
<i>RTO-1</i>	Annual	Outside contractor; offline inspection; replace thermocouples
	Monthly	Visual structural inspection; thermal imaging, hydraulic oil levels, pressure, leaks, bearing temperature on fan wheel, damper cylinders, bearings, fittings, exhaust fan bearing, drive belts, gas train piping, combustion blower filter; upload chart recorder data
<i>RTO-2</i>	Annual	Outside contractor; offline inspection; replace thermocouples
	Monthly	Thermal imaging, grease motor coupling, fan bearings
	Weekly	Visual inspection of unit for warpage, heat spots; combustion blower and burner; record fan temperatures for motor side and wheel side bearings, inlet/ outlet differential pressure, inlet static pressure, gas meter reading; drain compressed air accumulator, poppet valve reservoir tanks, moisture separator; compressed air and gas train piping
<i>RTO-1 Gas Meter</i>	Weekly	Record meter reading, bed differential pressure
<i>RTO-1 &amp; RTO-2</i>	Weekly	Filter Housing Replacement

The facility utilizes a contracted company that specializes in cleaning and conducting preventive maintenance for the water wash system in the spray booths. This involves weekly cleaning the upper and lower flood sheets of any obstructions and replacement of air supply filters on a weekly basis.

The facility has identified the following major replacement parts associated with the control system. These parts will be maintained in inventory for quick accessibility and replacement.

<b>M Number</b>	<b>Description</b>	<b>Part Number</b>
M 220883	ELOMATIC ED100 DOUBLE ACT	ED0100.U1A001
M 220884	ELOMATIC ED350 DOUBLE ACT	ED0350.U1A00A
M 223469	GAS VALVE	V710KBSV22
M 223470	GAS VALVE	V710KBSV25
M 223471	ACTUATOR	AH2E112S
M 223462	ACTUATOR	AH8D112S2