Special Process: Coating System Assessment (Self Assessment *)

Facility Name:	**Curtis Metal Finishing Company**		
Address:	9917 North Alpine **Machesney Park, Illinois** 61115		
Phone Number:	815-633-6693	**Type(s) of Coating Processes at this Facility:**	
Fax Number:	815-633-9220	**Process Table A**	
		Aqueous Cleaning	**Yes**
Number of Coating Employees at this Facility:	~ 75	**Process Table B**	**Process Control Plans are reviewed**
		Mechanical Cleaning	**Yes**
Captive Coater (Y/N):	No	**Process Table C**	
Commercial Coater (Y/N):	**Yes**	Phosphating	**Yes**
		Process Table D	
Date of Assessment:	**August 12, 2011**	Powder Coating	**No**
		Process Table E	
Date of Previous Assessment:	**August 13, 2010**	Electrocoat	**Yes**
		Process Table F	
		Spray	**No**
		Process Table G	**Procedures are posted at all work**
		Dip/Spin	**Yes**
		Process Table H	
		Autophoretic	**No**
		Process Table I	
		Convective Cure	**Yes**
		Process Table J	
		Equipment	**Yes**

Current Quality Certification(s):	ISO 9001:2008
Date of Re-assessment (if necessary):	

Personnel Contacted:

Name:	Title:	Phone:	Email:
Kurt Hoensheid	VP & General Maanger	586-939-2850	
Arnie Schwerin	VP & Operations Manager	586-939-2850	
Steve Wasson	Plant Manager	815-633-6693	steve.wasson@curtismetal.com
Norbert Jaeger	Quality Manager	586-939-2850	norbert.jaeger@curtismetal.com
Chris Lawrence	Laboratory Manager	815-633-6693	chris.lawrence@curtismetal.com
Eric West	Plant Superintendent	815-633-6693	

Auditors/Assessors:

Name:	Company:	Phone:	Email:
Norbert Jaeger	Curtis Metal Finishing Co.	586-939-2850	norbert.jaeger@curtismetal.com
Chris Lawrence	Curtis Metal Finishing Co.	815-633-9963	chris.lawrence@curtismetal.com

(*) Self Assessment supporting data and documentation available for on-site review

Number of "Not Satisfactory" Findings:
0
Number of "Needs Immediate Action" Findings:
0
Number of "Fail" Findings in the Job Audit(s):
0

Special Process: Coating System Assessment (General Facility Overview)

Curtis Metal Finishing Company - Machesney Park, IL

Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment: N/A	Assessment: Satisfactory	Assessment: Not Satisfactory	Assessment: Needs Immediate Action
Section 1 - Management Responsibility and Quality Planning							
1.1	Is there a dedicated and qualified coating person on-site?	To ensure readily available expertise, there shall be a dedicated and qualified coating person on the site. This individual shall be a full-time employee and the position shall be reflected in the organization chart. A job description shall exist identifying the qualifications for the position including chemical and coating knowledge. The qualifications shall include a minimum of 5 years experience in coating operation or a combination of a minimum of 5 years of formal chemical education and coating experience.	**A dedicated and qualified, full time coating person is on site with chemical and coating knowledge.** **(REF001, REF002)**		X		
1.2	Does the coater perform advanced quality planning?	The organization shall incorporate a documented advanced quality planning procedure. A feasibility study shall be performed and internally approved for each new part or process. Similar parts can be grouped into part families for this effort as defined by the organization. After the part approval process is approved by the customer, no process changes are allowed unless approved by the customer. The coater shall contact the customer when clarification of process changes is required. This clarification of process changes shall be documented.	**All new parts and processes go through advanced quality planning where they are reviewed and the processing recipe is locked down for future orders.** **(REF003, REF004, REF005)**		X		

Special Process: Coating System Assessment (General Facility Overview)

Curtis Metal Finishing Company - Machesney Park, IL

Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment			
				N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
1.3	Are the coater's FMEA's up to date and reflecting current processing?	The organization shall incorporate the use of a documented Failure Mode and Effects Analysis (FMEA) procedure and ensure the FMEAs are updated to reflect current part quality status. The FMEA shall be written for each part or part family or they may be process-specific and written for each process. In any case, they shall address all process steps from part receipt to part shipment and all key coating process parameters as defined by the organization. A cross-functional team shall be used in the development of the FMEA. All special characteristics, as defined by the organization and its customers, shall be identified, defined, and addressed in the FMEA.	**Process FMEA's are reviewed each time that a concern is received and updated as required and appropriate. PFMEA's are reviewed once a year at a minimum and are AIAG compliant. (REF006)**		X		
1.4	Are finish process control plans up to date and reflecting current processing?	The organization shall incorporate the use of a documented Control Plan procedure and ensure the Control Plans are updated to reflect current controls. The Control Plans shall be written for each part or part family or they may be process-specific and written for each process. In any case, they shall address all process steps from part receipt to part shipment and identify all equipment used and all key coating process parameters as defined by the organization. A cross-functional team, including a production operator, shall be used in the development of Control Plans, which shall be consistent with all associated documentation such as work instructions, shop travelers, and FMEAs. All special characteristics, as defined by the organization and its customers, shall be identified, defined, and addressed in the Control Plans. Sample sizes and frequencies for evaluation of process and product characteristics shall also be addressed consistent with the minimum requirements listed in the Process Tables.	**Process Control Plans are reviewed each time that a concern is received and updated as required and appropriate. Control Plans are reviewed once a year at a minimum and are AIAG compliant. (REF007)**		X		

Special Process: Coating System Assessment (General Facility Overview)

Curtis Metal Finishing Company - Machesney Park, IL

Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment			
				N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
1.5	Are all coating related and referenced specifications current and available? For example: SAE, AIAG, ASTM, General Motors, Ford, and DaimlerChrysler.	To ensure all customer requirements are both understood and satisfied, the organization shall have all related coating and customer referenced standards and specifications available for use and a method to ensure that they are current. Such standards and specifications include, but are not limited to, those relevant documents published by SAE, AIAG, ASTM, General Motors, Ford, and DaimlerChrysler. The organization shall have a process to ensure the timely review, distribution, and implementation of all customer and industry engineering standards and specifications and changes based on customer-required schedule. This process shall be executed as soon as possible and shall not exceed two weeks. The organization shall document this process of review and implementation, and it shall address how customer and industry documents are obtained, how they are maintained within the organization, how the current status is established, and how the relevant information is cascaded to the shop floor within the two-week period. The organization shall identify who is responsible for performing these tasks.	**All coating specifications that are relevant to our processes are maintained and accessed via the internet. Finish requirements are printed out on the Process Router that follows each order.**		**X**		

Special Process: Coating System Assessment (General Facility Overview)

Curtis Metal Finishing Company - Machesney Park, IL

Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment			
				N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
1.6	Is there a written process specification for all active processes?	The coater shall have written process specifications for all active processes and identify all steps of the process including relevant operating parameters. Examples of operating parameters include process temperatures, cycle times, load rates, rectifier settings, etc. Such parameters shall not only be defined, they shall have operating tolerances as defined by the organization in order to maintain process control. All active processes should have a written process specification. These process specifications may take the form of work instructions, job card, computer-based recipes, or other similar documents.	**Processes are computer based recipe driven with Process Router travelers accompanying all work orders. Cycle times and setting are downloaded from the parts computer database for each part number and process via bar code data retrieval.**		**X**		
1.7	Has a valid product capability study been performed initially and after process change?	To demonstrate each process is capable of yielding acceptable product, the organization shall perform product capability studies for the initial validation of each process, after relocation of any process equipment, and after a major rebuild of any equipment. The organization shall define what constitutes a major rebuild. Initial product capability studies shall be conducted for all coating processes per line as defined in scope of work and in accordance with customer requirements. Capability study techniques shall be appropriate for the coating product characteristics, e.g., coating thickness, corrosion resistance, etc.. Any specific customer requirements shall be met. In the absence of customer requirements, the organization shall establish acceptable ranges for measures of capability. An action plan shall exist to address the steps to be followed in case capability indices fall outside customer requirements or established ranges.	**Process capability studies are done on each new process and if the processing parameters have been altered.**		**X**		

Special Process: Coating System Assessment (General Facility Overview)

Curtis Metal Finishing Company - Machesney Park, IL

Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment			
				N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
1.8	Does the coater collect and analyze data over time, and react to this data?	The analysis of products and processes over time can yield vital information for defect prevention efforts. The organization shall have a system to collect, analyze, and react to product or process data over time. Methods of analysis shall include ongoing trend or historical data analysis of special product or process parameters. The organization shall determine which parameters to include in such analysis.	**Historical data is collected on process trends and analyzed graphically and through the use of statistical computer programs and techniques. (REF008)**		X		
1.9	Are internal assessments being completed on an annual basis, at a minimum, incorporating AIAG CSA?	The organization shall conduct internal assessments on an annual basis, at a minimum, using the AIAG CSA. Concerns shall be addressed in a timely manner.	**Coating system assessments are done on an annual basis. Any concerns indicated are addressed in a timely manner.**		X		
1.10	Is there a system in place to authorize reprocessing and is it documented?	The quality management system shall include a documented process for reprocessing that shall include authorization from a designated individual. The reprocessing procedure shall describe product characteristics for which reprocessing is allowed as well as those characteristics for which reprocessing is not permissible. All reprocessing activity shall require a new processing control sheet issued by qualified technical personnel denoting the necessary coating modifications. Records shall clearly indicate when and how any material has been reprocessed. The Quality Manager or a designee shall authorize the release of reprocessed product.	**A computer based hold system is in effect where orders that are placed on hold or reworked are entered and a running log kept of that particular orders history. Work that needs to be re-processed is authorized and documented and a separate Router is generated. Rework is re-inspected as if it were virgin work. (REF009)**		X		
1.11	Does the Quality Department review, address, and document customer and internal concerns?	The quality management system shall include a process for documenting, reviewing, and addressing customer concerns and any other concerns internal to the organization. A disciplined problem-solving approach shall be used.	**An 8-D formatted computer data based system is used to answer Customer concerns. (REF010, REF011)**		X		

Special Process: Coating System Assessment (General Facility Overview)

Curtis Metal Finishing Company - Machesney Park, IL

Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment			
				N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
1.12	Is there a continual improvement plan applicable to each process defined in the scope of the assessment?	The coater shall define a process for continual improvement for each coating process identified in the scope of the CSA. The process shall be designed to bring about continual improvement in quality and productivity. Identified actions shall be prioritized and shall include timing (estimated completion dates). The organization shall show evidence of program effectiveness.	**Continual improvement projects in both quality and production are ongoing. Corporate updates reflect the progress to these goals.**		X		
1.13	Does the Quality Manager or designee authorize the disposition of material from quarantine status?	The Quality Manager or designee is responsible for authorizing and documenting appropriate personnel to disposition quarantine material.	**The Quality Manger and/or Supervisors and/or Account Coordinators all participate in the disposition of questionable or discrepant material.**		X		
1.14	Are there procedures or work instructions available to coating personnel that define the coating process?	There shall be procedures or work instructions available to coating personnel covering the coating process. These procedures or work instructions shall include methods of addressing potential emergencies (such as power failure), equipment start-up, equipment shut-down, product segregation (See 2.8), product inspection, and general operating procedures. These procedures or work instructions shall be accessible to shop floor personnel.	**Procedures are posted at all work stations to aid the operators / employees in the performance of their specific jobs duties.** **(REF012)**		X		
1.15	Is management providing employee training for coating?	The organization shall provide employee training for all coating operations. All employees, including backup and temporary employees, shall be trained. Documented evidence shall be maintained showing the employees trained and the evidence shall include an assessment of the effectiveness of the training. Management shall define the qualification requirements for each function, and ongoing or follow-up training shall also be addressed.	**All new employees are trained by a senior operator in the performance of their specific job duties. Cross training is done and the employees capabilities and qualifications are documented.** **(REF013, REF014)**		X		

Special Process: Coating System Assessment (General Facility Overview)

Curtis Metal Finishing Company - Machesney Park, IL

Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
1.16	Is there a responsibility matrix to ensure that all key management and supervisory functions are performed by qualified personnel?	The organization shall maintain a responsibility matrix identifying all key management and supervisory functions and the qualified personnel who may perform such functions. It shall identify both primary and secondary (backup) personnel for the key functions (as defined by the organization). This matrix shall be readily available to management at all times.	**The responsibility matrix is founded on the organizational chart .**		**X**		
1.17	Is there a preventive maintenance program? Is maintenance data being utilized to form a predictive maintenance program?	The organization shall have a documented preventive maintenance program for key process equipment (as identified by the organization). The program shall be a closed-loop process that tracks maintenance efforts from request to completion to assessment of effectiveness. Equipment operators shall have the opportunity to report problems, and problems shall also be handled in a closed-loop manner. Company data, e.g., downtime, quality rejects, first time-through capability, recurring maintenance work orders, and operator-reported problems, shall be used to improve the preventive maintenance program. Maintenance data shall be collected and analyzed as part of a predictive maintenance program.	**All equipment is on a computerized maintenance program. Preventative maintenance has been developed for all pieces of equipment based on historical data. Maintenance data is analyzed to develop predictive maintenance programs. All employees have the ability to generate work order for any maintenance issue found in the plant. Additional preventative maintenance / housekeeping items and their frequencies posted at each line and verified by supervison through weekly audits.**		**X**		
1.18	Has the coater developed a critical spare part list, and are the parts available to minimize production disruptions?	The coater shall develop and maintain a critical spare parts list and shall ensure the availability of such parts to minimize production disruptions.	**A spare parts computer based listing is maintained in the Plant Engineering/Maintenance office with a listing of all the spare parts and on hand quantities. Inventories are conducted and stock maintained.**		**X**		

Section 2 - Floor and Material Handling Responsibility

Special Process: Coating System Assessment (General Facility Overview)

Curtis Metal Finishing Company - Machesney Park, IL

Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment			
				N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
2.1	Does the facility ensure that the data entered in the receiving system matches the information on the customer's shipping documents?	Documented processes and evidence of compliance shall exist, e.g., shop travelers, work orders, etc. The facility shall have a detailed process in place to resolve receiving discrepancies.	**Incoming paperwork is carefully matched to the information in the computerized parts database. Any weight discrepancies are caught during the production records hard copy review. The system also flags the operator if there is weight discrepancies during processing.**		X		
2.2	Is product clearly identified and staged throughout the coating process?	Procedures for part and container identification help to avoid incorrect processing or mixing of lots. Appropriate location and staging within the facility also help to ensure that orders are not shipped until all required operations are performed. Customer product shall be clearly identified and staged throughout the coating process. Non-coated, in-process, and finished product shall be properly segregated and identified. All material shall be staged in a dedicated and clearly defined area.	**Procedures are in place (via bar code scanning) for the identification of each order and the proper routing steps. Unique shop order identification numbers are given to each lot and the associated Customer containers. (REF015)**		X		
2.3	Is lot traceability and integrity maintained throughout all processes?	Out-going lot(s) shall be traceable to the incoming lot(s). The descipline of precisely identifying lots and linking all pertinent information to them enhances the ability to do root cause analysis and continual improvement.	**Lot traceability is maintained by the unique Curtis Shop Order Control number that is issued to each lot. Multiple skids are linked together by this shop order number.**		X		
2.4	Are procedures adequate to prevent movement of non-conforming product into the production system?	The control of suspect or non-conforming product is necessary to prevent inadvertent shipment or contamination of other lots. Procedures shall be adequate to prevent movement of non-conforming product into the production system. Procedures shall exist addressing proper disposition, product identification and tracking of material flow in and out of hold area. Non-conforming hold area shall be clearly designated to maintain segregation of such material.	**All order movement are tracked with the unique Curtis Shop Order Control number. Bar code scanning prevents movement of incorrect material and keeps a log of part status**		X		

Special Process: Coating System Assessment (General Facility Overview)

Curtis Metal Finishing Company - Machesney Park, IL

Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment			
				N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
2.5	Is there a system to identify trap points in the entire process to reduce risk of mixed parts (inappropriate, unfinished or improperly coated parts)?	The coater shall have documented procedures to identify and monitor trap points for each process/equipment. Monitoring of potential trap points shall occur for every part changeover.	**Tramp points have been investigated on all lines by the operators and the maintenance department. Visual work instructions utilized to direct operators to pay particular attention to the end of orders and to use the provided equipment to prevent tramp part introduction.**		X		
2.6	Are containers free of inappropriate material?	Containers handling customer product shall be free of inappropriate material. After emptying and before re-using containers, containers shall be inspected to ensure that all parts and inappropriate material have been removed. The source of inappropriate material shall be identified and addressed. This is to ensure that no nonconforming coated parts or inappropriate material contaminate the finished lot.	**After emptying and before placing parts into containers they are to be inspected for retained parts.**		X		
2.7	Is part loading specified, documented and controlled?	Loading parameters shall be specified, documented and controlled. Examples include parts per rack and load size. Refer to Process Tables for frequency of checks.	**Loading of parts into the processing lines is bar code scan controlled with locked down recipes for the amount of weight that goes into a processing vessel.**		X		

Special Process: Coating System Assessment (General Facility Overview)

Curtis Metal Finishing Company - Machesney Park, IL

Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment			
				N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
2.8	Are operators trained in material handling, containment action and product segregation in the event of an equipment emergency including power failure?	Unplanned or emergency downtime greatly raises the risk of improper processing. Operators shall be trained in material handling, containment action, and product segregation in the event of an equipment emergency including power failure. Training shall be documented. Work instructions specifically addressing potential types of equipment emergencies and failures shall be accessible to and understood by equipment operators. These instructions shall address containment/reaction plans related to all elements of the process. Evidence shall exist showing disposition and traceability of affected product.	**Any interruptions in the normal process cycle are data logged to the processing program and a notification sent to the appropriate company individuals.**		X		
2.9	Is the handling, storage and packaging adequate to preserve product quality?	The coater's loading/unloading systems, in-process handling and shipping process shall be assessed for risk of part damage or other quality concerns.	**The loading and unloading systems have been designed with plastic lined chutes and slides to minimize part damage.**		X		
2.10	Are plant cleanliness, housekeeping, environmental and working conditions conducive to control and improved quality?	Plant cleanliness, housekeeping, environmental, and working conditions shall be conducive to controlling and improving quality. The coater should evaluate such conditions and their effect on quality. A housekeeping policy shall be clearly defined and executed. The facility shall be reviewed for the following items: loose parts on floor; spillage around tanks; overall plant lighting; fumes etc.	**Plant housekeeping is maintained by all operators through PM / Housekeeping boards at each production line. A riding floor scrubber is employed on a daily basis for plant floors. Operators have mops and buckets at the lines for cleanup as required.**		X		
2.11	Are process control parameters monitored per frequencies specified in Process Tables?	Process control parameters shall be monitored per frequencies specified in Process Tables. Computer monitoring equipment with alarms and alarm logs satisfy the verification requirement. A designated floor person shall verify the process parameters, e.g., by initialing a strip chart or data log.	**Process control parameters are monitored via log charting and electronic data logging and frequencies that exceed the requirements of the Process Tables.**		X		

Special Process: Coating System Assessment (General Facility Overview)

Curtis Metal Finishing Company - Machesney Park, IL

Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment			
				N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
2.12	Are out of control/specification parameters reviewed and reacted to?	There are documented reaction plans to both out of control and out of tolerance process parameters. There is documented evidence that reaction plans are followed.	**All out of parameter data readings are reacted to via notations on the back of log sheets or documented process changes**		X		
2.13	Are In-Process / Final Test Frequencies performed as specified in Process Tables?	In-Process / Final Test Frequencies shall be performed as specified in Process Tables. Refer to Process Tables	**In-process and final performance test frequencies exceed the minimum requirements indicated in the Process Tables.**		X		
2.14	Is product test equipment verified?	Test equipment shall be verified/calibrated per applicable customer specific standard or per an applicable consensus standard, e.g., ASTM, SAE, ISO, NIST, etc. Verification/calibration results shall be internally reviewed, approved and documented. Refer to Process Tables for frequency of checks.	**Test equipment is validated and calibrated (by an outside certified and qualified source) at a minimum of once per year. Calibrations and standards used are traceable to a nationally recognized standard.**		X		

Section 3 - Job Audit - Finished Product Review

Job Identity: **Dip/Spin Coating Process (MAGNI 565 System)**
Customer: Continental Midland
Shop Order Number: **653239**
Part Number: 018643AY39
Part Description: HEX FLG HD BOLT
Coating Requirements: WSS-M21P37-A1 / S-439 (MAGNI 565 system- 1-B06 + 1-B18)

Question #	Job Audit Question	Related CSA Question #	Customer or Internal Requirement	Job (Shop) Order or Reference Documentation Requirement	Actual Condition (Objective Evidence)	Pass / Fail / N/A	Comments
3.1	Is contract review and advanced quality planning, FMEA, control plans, etc., performed by qualified individuals?	1.1 1.2 1.3 1.4 1.6		N/A	Estimator doing Contract Review and APQP has 17+ years experience; PFMEA and Control Plans, etc. performed by Quality Manager with 31+ years experience	**P**	Verified by Chris
3.2	Does the Coater have the proper customer specifications for the part?	1.5	Specifications match incoming shipper	N/A	Specifications match the incoming paperwork per Customers request	**P**	
3.3	Is a shop traveler created to meet customer requirements?	1.6 2.1	Shop order traveler/ Process Routing Tag created for each lot	CMFC SO# 653239	Process Router/traveler created for this order	**P**	
3.4	Is material identification (part numbers, lot numbers, contract numbers, etc.) maintained throughout the coating process?	2.2 2.3 2.4	Part identification and lot integrity maintained throughout processing	CMFC SO# 653239	Unique shop order number with associated bar code information used to maintain lot integrity	**P**	
3.5	Is there documented evidence of Receiving Inspection?	2.1	Parts looked at upon arrival.	CMFC SO# 653239	Process Router distribution part of incoming inspection. Visual inspection on phosphate line for tramp parts and part incoming condition.	**P**	
3.6	Are the Loading / Racking requirements identified?	1.6 2.7 2.9	Load size to per specified recipe	P/N 018643AY39 part recipe	Bar code lock down of recipe load sizes established for this part	**P**	Locked down recipe followed
3.7	Is the proper procedure or process specification used? Refer to Process Tables for specific parameters. List parameters that were verified in this audit in the spaces provided below.	1.5 1.6 2.1 2.11 2.13	See below				
	Process Table G-Dip/Spin	**Item #**					
		G3.1	Proper basket weights	Bar coded recipe for basket weight	Basket wgt of 220 #	**P**	Per machine data recipe
		G3.2	Basket kept less than 2/3 full	Bar coded recipe for basket weight	Basket wgt recipe lock down is less than 2/3 basket	**P**	Less than 1/2 full
		G3.3	Dip time is controlled	Bar coded recipe for dip time	Dip time is 10 seconds for basecoat & 12 seconds for topcoat	**P**	Per machine data recipe
		G3.4	Spin speed (RPM) is controlled	Bar coded recipe for spin RPM	RPM is 320 +/- 10 for basecoat and 350 +/- 10 for topcoat	**P**	
		G3.5	Coating unit has an attached RPM indicator	Digital RPM indicator part of the computer control system	Presence of digital readout RPM indicator	**P**	
		G3.6	RPM's can be adjusted easily	RPM control is part of the digital locked down recipe	RPM's can be easily adjusted by authorized individuals only	**P**	
		G3.7	Spin time is controlled	Bar coded recipe for spin time	Spin time is 13 seconds	**P**	Per machine data recipe
		G3.8	The number of spins is adjustable	Bar coded recipe for number of spins	Spin number is 2 (double spin)	**P**	

Section 3 - Job Audit - Finished Product Review

Job Identity: **Dip/Spin Coating Process (MAGNI 565 System)**
Customer: Continental Midland
Shop Order Number: **653239**
Part Number: 018643AY39
Part Description: HEX FLG HD BOLT
Coating Requirements: WSS-M21P37-A1 / S-439 (MAGNI 565 system- 1-B06 + 1-B18)

Question #	Job Audit Question	Related CSA Question #	Customer or Internal Requirement	Job (Shop) Order or Reference Documentation Requirement	Actual Condition (Objective Evidence)	Pass / Fail / N/A	Comments
		G3.9	Tumble time is in/out of coating is controlled (if applicable)	Bar coded recipe for tumble time	Tumble time is set for basecoat and topcoat cycle when applicable	**P**	recipe
		G3.10	System to keep parts level	Dual belt design and side-to-side unloading thins out parts as they travel through the curing oven. Other lines have vibratory feed tables for parts leveling	Parts were thin coming off of the oven belt	**P**	
		G3.11	Vibratory tables are cleaned (if used)	Vibratory table are cleaned	On lines where vibratory table are used they are cleaned a minimum of every 2 hours of operations and logged on the processing log sheet.	**P**	Verified by Chris
		G3.12	Evidence of soft handling	Line designed with plastic line chutes and speed controlling baffles	Use of plastic deflection chutes and bumper boards verified	**P**	
		G3.13	Parts are cool to touch before each coating step	Air cooling units employed to cool down parts. Temperature verified by technicians	Parts were cool to touch before coating	**P**	
			Cure (per Process Table I - Convective Cure)				
		I1.1	Oven temperature set point and limits are checked and documented		Oven set points are recorded after setup for processes. High and low limit oven alarms are in place.	**P**	
		I1.2	Part temperature profile is monitored		Calibrated and certified twice a year by an approved outside calibration source.	**P**	
		I1.3	Proper cure time is maintained		Cure is maintained by digital readout temperature controller	**P**	
		I1.4	Conveyor speed is maintained		Conveyor speed is maintained and monitored by digital readout	**P**	
		I1.5	Airflow is measured		Not required for operation	**N/A**	
		I1.6	Air filter changed is scheduled		Air filter changed on ovens that have this requirement based on PM schedule or as required	**P**	
		I1.7	Thermocouple for oven is calibrated		Calibrated and certified twice a year by an approved outside calibration source.	**P**	
		I1.8	Cure testing is conducted by the laboratory		Cure testing is done on a monthly basis or as required. Also part of the final inspection part adhesion via rub off/transfer is checked.	**P**	

Section 3 - Job Audit - Finished Product Review

Job Identity: **Dip/Spin Coating Process (MAGNI 565 System)**
Customer: Continental Midland
Shop Order Number: **653239**
Part Number: 018643AY39
Part Description: HEX FLG HD BOLT
Coating Requirements: WSS-M21P37-A1 / S-439 (MAGNI 565 system- 1-B06 + 1-B18)

Question #	Job Audit Question	Related CSA Question #	Customer or Internal Requirement	Job (Shop) Order or Reference Documentation Requirement	Actual Condition (Objective Evidence)	Pass / Fail / N/A	Comments
		I1.9	Final color is monitored		Final color is evaluated during final tub inspection	**P**	
		I1.10	Film thickness/coating weight is monitored		Random representative parts are pulled each shift for coating thickness monitoring data	**P**	Parts pulled for testing each shift
		I1.11	Gageability is checked		Parts are randomly gaged for mating part acceptability at each line and at final inspection	**P**	
		I1.12	Paint adhesion is monitored		Physical inspection of each order for full cure and adhesion is done by the inspector at time of order approval	**P**	
3.8	What are the product inspection requirements?	1.5 2.13 2.14	Each part may have one or more requirements determined by the coating specification. Parts must meet each requirement. List each requirement below and validate. (Listed below are some examples)				
3.8.1	**Requirement: Coating Thickness**						
	Test Method:	L-P-102 - Coating Thickness Determination Procedure					Thickness testing conducted by lab techs as part of process monitoring
	Test frequency or quantity:	Coating thickness samples pulled each shift minimum or as requested			Presence of test samples verified	**P**	
	Selection of samples:	3 random sample pieces at a minimum			Samples tested	**P**	
	Specification:	S-439	12 - 20 microns typical for coating thickness		16.7 microns on actual parts	**P**	
3.8.2	**Requirement: Corrosion Resistance (if applicable).**						
	Test Method(s):	ASTM B117	Curtis internal LSS-P-203 / 204 SST Monitoring Procedure				
	Test frequency or quantity:		3 pieces from each shift as a minimum or as requested			**P**	
	Selection of samples:		3 random samples		Samples pulled	**P**	
	Specification:	S-439	840 hours with no red corrosion		Parts PASS 840 hour corrosion resistance requirement	**P**	
3.8.3	**Requirement: Hydrogen Embrittlement Relief (if**					**N/A**	
	Test Method:						
	Test frequency or quantity:						
	Selection of samples:						
	Specification:						
3.8.4	**Requirement: Adhesion**						
	Test Method(s):		L-P-107 (Curtis internal)-Tape Adhesion Testing Procedure				Per MAGNI recommendation
	Test frequency or quantity:	5 random samples two times per month or as requested				**P**	
	Selection of samples:	5 random samples				**P**	
	Specification:	S-439	No loss of adhesion after tape test		No loss of adhesion after tape test	**P**	
3.8.5	**Requirement: Cure**						

Section 3 - Job Audit - Finished Product Review

Job Identity: **Dip/Spin Coating Process (MAGNI 565 System)**
Customer: Continental Midland
Shop Order Number: **653239**
Part Number: 018643AY39
Part Description: HEX FLG HD BOLT
Coating Requirements: WSS-M21P37-A1 / S-439 (MAGNI 565 system- 1-B06 + 1-B18)

Question #	Job Audit Question	Related CSA Question #	Customer or Internal Requirement	Job (Shop) Order or Reference Documentation Requirement	Actual Condition (Objective Evidence)	Pass / Fail / N/A	Comments
	Test Method:	L-P-111 - Final Inspection Procedure -Visual and physical rub					
	Test frequency or quantity:	2 handfuls minimum every container (visual)				**P**	
	Selection of samples:	5 random samples (physical rub)				**P**	
	Specification	S-439	No rub off		Part had no rub off	**P**	
3.8.6	**Requirement: Torque Tension (if applicable)**						
	Test Method:	TTP01 (Curtis internal) to meet SAE/USCAR-11	Torque Tension testing of specified surrogate parts per automotive standard				Torque Tension tested at Sterling Heights
	Test frequency or quantity:	10 surrogate parts at prescribed interval				**P**	
	Selection of samples:	10 surrogate specified samples run with the parts				**P**	
	Specification:	S-439	Per Table 1 of the specification		46.7 Nm process avg.	**P**	
3.8.7	**Requirement: Appearance (Decorative)**					**N/A**	
	Test Method:						No appearance requirements for this finish
	Test frequency or quantity:						
	Selection of samples:						
	Specification						
3.8.8	**Requirement: Dimensional (if applicable)**					**N/A**	
	Test Method:						No dimensional requirements beyond proper thread fit
	Test frequency or quantity:						
	Selection of samples:						
	Specification:						
3.8.9	**Requirement: Color and Gloss (Decorative)**					**N/A**	
	Test Method:						
	Test frequency or quantity:						
	Selection of samples:						
	Specification:						
3.8.10	**Requirement: Customer Specific**						
	Test Method(s):	No Customer Specific Requirements for this part number and order				**P**	
	Test frequency or quantity:						
	Selection of samples:						
	Specification:	S-439		CMFC SO# 653239			
Operator or Inspector Responsibilities							
3.9	Were appropriate process steps signed off?	1.4 1.6 2.2 2.3 2.11	All process steps to be signed/initialed and dated	CMFC SO# 653239 Process Router	All steps initialed/ signed and entered in the computer database to generate shipping documentation	**P**	Verified by Chris
3.10	Were all inspection steps, as documented in the control plan performed?	1.2 1.4	Inspections done per Control Plan		Order approved for shipment after inspection by Quality Technicians	**P**	Approved by TCS

Section 3 - Job Audit - Finished Product Review

Job Identity: **Dip/Spin Coating Process (MAGNI 565 System)**
Customer: Continental Midland
Shop Order Number: **653239**
Part Number: 018643AY39
Part Description: HEX FLG HD BOLT
Coating Requirements: WSS-M21P37-A1 / S-439 (MAGNI 565 system- 1-B06 + 1-B18)

Question #	Job Audit Question	Related CSA Question #	Customer or Internal Requirement	Job (Shop) Order or Reference Documentation Requirement	Actual Condition (Objective Evidence)	Pass / Fail / N/A	Comments
3.11	Were steps/operations performed that were not documented in the control plan?	1.2 1.4 1.6	All process steps to be signed/initialed and dated	CMFC SO# 653239 Process Router	Order was processed per Process Router with no undocumented operations conducted	**P**	
3.12	If additional steps were performed, were they authorized?	1.2 1.4 1.6 1.10 1.16				**N/A**	No additional steps performed
3.13	Does the governing specification allow reprocessing or rework?	1.5 1.10	Nothing stated in the specification or on the print	S-439 specification	Order was not re-worked	**P**	Order was processed per Process Router and locked down recipe
3.14	If the order was certified, did the certification accurately reflect the process performed?	2.11 2.13	Certification of Conformance to be the same as the process performed	CMFC SO# 653239 Process Router	Process as stated on the Certification	**P**	
3.15	Was the certification signed by an authorized individual?	1.16	Certification to be signed by authorized individual		Test certs signed by Quality Manager (authorized stamp) and Process Certs signed with electronic signature	**P**	
3.16	Are the parts and containers free of inappropriate objects or contamination?	2.6	Orders to be contamination free	CMFC SO# 653239	Visual examine of the tubs did not show any foreign objects	**P**	Verified by TCS as part of the final inspection
	Packaging Requirements						
3.17	Are packaging requirements identified?	2.6 2.7 2.9	Parts to be returned in the same container as received	CMFC SO# 653239	Parts returned in customer containers	**P**	Verified by Chris
3.18	Are parts packaged to minimize mixed parts (for example, parts packed over height of container)?	2.6 2.7 2.9	Tubs are not to be overfilled	CMFC SO# 653239	Parts were well below the tub rim	**P**	
	Shipping Requirements						
3.19	Were the parts properly identified?	2.3 2.9	Parts to be properly identified. A reference example was sealed in a bag and stapled to the Process Router for identification	CMFC SO# 653239	Correct parts were in the tub. Sealed reference sample removed upon final approval	**P**	Verified by Chris
3.20	Were the containers properly labeled?	2.3 2.9	Customer tub identifications verified with process routers. (Skid # H229 & H541)	CMFC SO# 653239	Curtis Process router with identifications in each tub	**P**	

Section 3 - Job Audit - Finished Product Review

Job Identity: **Dip/Spin Coating Process (GEOMET 321 + Plus L)**
Customer: Specialty Screw Corp
Shop Order Number: **654355**
Part Number: 69WAOOM06051-0430S-1
Part Description: WFR HD KNURL SHLDR STUD
Coating Requirements: PS 5873L

Question #	Job Audit Question	Related CSA Question #	Customer or Internal Requirement	Job (Shop) Order or Reference Documentation Requirement	Actual Condition (Objective Evidence)	Pass / Fail / N/A	Comments
3.1	Is contract review and advanced quality planning, FMEA, control plans, etc., performed by qualified individuals?	1.1 1.2 1.3 1.4 1.6		N/A	Estimator doing Contract Review and APQP has 17+ years experience; PFMEA and Control Plans, etc. performed by Quality Manager with 31+ years experience	**P**	
3.2	Does the Coater have the proper customer specifications for the part?	1.5	Specifications match incoming shipper	N/A	Specifications match the incoming paperwork per Customers request	**P**	
3.3	Is a shop traveler created to meet customer requirements?	1.6 2.1	Shop order traveler/ Process Routing Tag created for each lot	CMFC SO# 654355	Process Router/traveler created for this order	**P**	
3.4	Is material identification (part numbers, lot numbers, contract numbers, etc.) maintained throughout the coating process?	2.2 2.3 2.4	Part identification and lot integrity maintained throughout processing	CMFC SO# 654355	Unique shop order number with associated bar code information used to maintain lot integrity	**P**	
3.5	Is there documented evidence of Receiving Inspection?	2.1	Parts looked at upon arrival.	CMFC SO# 654355	Process Router distribution part of incoming inspection. Visual inspection on phosphate line for tramp parts and part incoming condition.	**P**	
3.6	Are the Loading / Racking requirements identified?	1.6 2.7 2.9	Load size to per specified recipe	P/N 69WAOOM06051-0430S-1 part recipe	Bar code lock down of recipe load sizes established for this part	**P**	
3.7	Is the proper procedure or process specification used? Refer to Process Tables for specific parameters. List parameters that were verified in this audit in the spaces provided below.	1.5 1.6 2.1 2.11 2.13	See below				

Process Table A - Pretreatment (Aqueous)	**Item #**					
	1	**AQUEOUS CLEANING PROCESS (Alkaline or Acid)**				
	A1.1	Incoming part assessment procedure with criteria		PSR-P-201 is the incoming inspection procedure for all incoming work.	**P**	
	2	**Cleaning Bath(s)**				
	A2.1	The following cleaning checks shall be done during production				
	A2.2	Pressure/Agitation	Automatic	Air agitation is on constantly to all baths	**P**	
	A2.3	Temperature	Automatic	Temperature checks are done every two hours of production	**P**	Automatic temperature controllers
	A2.4	Time	Automatic	Each bath check time is recorded	**P**	

	A2.5	Chemical concentration	Manual	Each baths chemical concentration is checked and documented **every 2 hours** minimum during production	**P**	Verified by recorded processing data
	A2.6	Impurity content	Manual	Visual examination of the cleaner split at the time of each bath testing	**P**	
	A2.7	There is dump schedule for cleaning baths	Manual	Dump schedule is on a computer maintenance program	**P**	
	3	**Rinse Bath(s)**				
	A3.1	The following checks shall be done during production				
	A3.2	Pressure/Agitation	Automatic	Air agitation is on constantly to all baths	**P**	
	A3.3	Temperature	Automatic	Some tanks are kept at ambient and others are live steam injection heated	**P**	
	A3.4	Time	Automatic	Time in rinse tanks is computer controlled	**P**	
	A3.5	Impurity Concentration	Manual	All rinse tanks are on constantly with flow restrictors giving the same flow all the time	**P**	Verified by processing data
	A3.6	Overflow Rate	Automatic	All rinse tanks are on constantly with flow restrictors giving the same flow all the time	**P**	
	A3.7	There is dump schedule for rinse baths	Manual	Rinse tanks are constantly purged and cleaned at scheduled intervals	**P**	
	A3.8	Visual exam for water break after each post cleaning rinse	Manual	Cleanliness checked before blasting	**P**	
	A3.9	The final rinse shall be monitored for bacteria	Manual/Visual	Rinse tanks are constantly purged and cleaned at scheduled intervals so no bacteria growth is visible	**P**	
	A3.10	For Metals-Corrosion inhibitor concentration is checked		Not applicable to this processing	**NA**	
Process Table B - Pretreatment (Mechanical)	**Item #**					
	B1.1	There shall be an incoming part assessment procedure with criteria		PSR-P-201 is the incoming inspection procedure for all work.	**P**	
	B1.2	The following checks shall be performed during production:				
	B1.3	Abrasive media flow	Manual	Verified by operator	**P**	Verified by recorded processing data
	B1.4	Nozzle air pressure	Manual	Amps are monitored instead of pressure	**P**	
	B1.5	Dwell time	Automatic	1 1/2 minute-minimum	**P**	
	B1.6	Dust collector efficiency/air flow	Manual	Monitored visually and by maintenance	**P**	
	B1.7	Working mix	Manual	Monitored visually	**P**	
	B1.8	Surface cleanliness is checked after process	Manual	Wetability test done by technicians	**P**	
	B1.9	Surface profile is checked after process (if applicable)	Manual	Visual check after blasting and by gage study	**P**	

Process Table G-Dip/Spin	Item #					
	G3.1	Proper basket weights	Bar coded recipe for basket weight	Basket wgt of 180 #- basecoat 1: 180# basecoat 2; 180# topcoat: 180#	**P**	
	G3.2	Basket kept less than 2/3 full	Bar coded recipe for basket weight	Basket wgt recipe lock down is less than 2/3 basket	**P**	
	G3.3	Dip time is controlled	Bar coded recipe for dip time	Dip time is 10 seconds	**P**	
	G3.4	Spin speed (RPM) is controlled	Bar coded recipe for spin RPM	RPM is 300 +/- 10	**P**	
	G3.5	Coating unit has an attached RPM indicator	Digital RPM indicator part of the computer control system	Presence of digital readout RPM indicator	**P**	
	G3.6	RPM's can be adjusted easily	RPM control is part of the digital locked down recipe	RPM's can be easily adjusted by authorized individuals only	**P**	
	G3.7	Spin time is controlled	Bar coded recipe for spin time	Spin time is 10 seconds	**P**	
	G3.8	The number of spins is adjustable	Bar coded recipe for number of spins	Number of spins is 2	**P**	
	G3.9	Tumble time in/out of coating is controlled (if applicable)	Bar coded recipe for tumble time	Tumble time is set for basecoat and topcoat cycle on the appropriate machines	**P**	Verified by Chris and production data
	G3.10	System to keep parts level	Dual belt design and side-to-side unloading thins out parts as they travel through the curing oven. Other lines have vibratory feed tables for parts leveling	Parts were thin coming off of the oven belt	**P**	
	G3.11	Vibratory tables are cleaned (if used)	Vibratory tables are cleaned	On lines where vibratory table are used they are cleaned a minimum of every 2 hours of operations and logged on the processing log sheet.	**P**	
	G3.12	Evidence of soft handling	Line designed with plastic lined chutes and speed controlling baffles	Use of plastic deflection chutes and bumper boards verified	**P**	
	G3.13	Parts are cool to touch before each coating step	Air cooling units employed to cool down parts. Temprature verified by technicians	Parts were cool to touch before coating	**P**	
		Cure (per Process Table I - Convective Cure)				
	I1.1	Oven temperature set point and limits are checked and documented	Automatic	Per parts recipe	**P**	
	I1.2	Part temperature profile is monitored	Manual	Oven temperatrue profile checked 2x year minimum by maintence and as reqeusted by licensors of the applied coatings	**P**	
	I1.3	Proper cure time is maintained	Automatic	Cure is maintained by digital readout temperature controller and locked down recipe	**P**	
	I1.4	Conveyor speed is maintained	Automatic	Conveyor speed is maintained and monitored by digital readout and locked down recipe	**P**	
	I1.5	Airflow is measured		Not required for operation		
	I1.6	Air filter changed is scheduled	Manual	Changed as required by maintenance	**P**	
	I1.7	Thermocouple for oven is calibrated	Manual	Ovens calibrated by ouside source	**P**	

		I1.8	Cure testing is conducted by the laboratory	Manual	As part of final approval for DACROMET only. No cure test is available for the GEOMET coating	**P**	Verified
		I1.9	Final color is monitored	Manual	Final color is evaluated during final tub inspection	**P**	
		I1.10	Film thickness/coating weight is monitored	Manual	Random representative parts are pulled each shift for coating thickness monitoring data	**P**	
		I1.11	Gageability is checked	Manual	Parts are randomly gauged for mating part acceptability at each line and at final inspection	**P**	
		I1.12	Paint adhesion is monitored	Manual	Physical inspection of each order for full cure and adhesion is done by the inspector at time of order approval	**P**	
3.8	What are the product inspection requirements?	1.5 2.13 2.14	Each part may have one or more requirements determined by the coating specification. Parts must meet each requirement. List each requirement below and validate. (Listed below are some examples)				
3.8.1	**Requirement: Coating Thickness**						
	Test Method:	Coating Thickness Determination Procedure provided by licensor					
	Test frequency or quantity:	Coating thickness samples pulled each shift minimum or as requested			Presence of test samples verified	**P**	
	Selection of samples:		5 random sample pieces at a minimum		Surrogate SO# 654301	**P**	
	Specification:	PS-5873L	23 grams per square meter-minimum		25.41 grams per square meter	**P**	Performed by KJA
3.8.2	**Requirement: Corrosion Resistance (if applicable).**						
	Test Method(s):	ASTM B 117	Curtis internal LSS-P-203 / 204 SST Monitoring Procedure				
	Test frequency or quantity:	3 pieces from each shift as a minimum or as requested			Actual parts tested	**P**	
	Selection of samples:	3 random samples			Samples pulled	**P**	
	Specification:	PS-5873L	720 hours with no red corrosion		Parts PASS 720 hour corrosion resistance requirement	**P**	
3.8.3	**Requirement: Hydrogen Embrittlement Relief (if applicable)**	**N/A**					
	Test Method:						
	Test frequency or quantity:						
	Selection of samples:						
	Specification:						
3.8.4	**Requirement: Adhesion**						
	Test Method(s):	L-P-107 -Tape Adhesion Testing Procedure					
	Test frequency or quantity:	5 random samples two times per month or as requested				**P**	
	Selection of samples:	5 random samples				**P**	
	Specification:	PS-5873L	No loss of adhesion after tape test		No loss of adhesion after tape test	**P**	Performed by Scott
3.8.5	**Requirement: Cure**						
	Test Method:	L-P-111 - Final Inspection Procedure -Visual and physical rub					
	Test frequency or quantity:	5 pieces every container minimum (visual)				**P**	
	Selection of samples:	5 random samples (physical rub)				**P**	Performed by KJA
	Specification	PS-5873L	No rub off		Part had no rub off	**P**	

3.8.6	**Requirement: Torque Tension (if applicable)**						
	Test Method:	TTP01 (Curtis internal) to meet SAE/USCAR-11	Torque Tension testing of specified surrogate parts per automotive standard				
	Test frequency or quantity:	10 surrogate parts at prescribed interval				**P**	
	Selection of samples:	10 surrogate specified samples run with the parts				**P**	
	Specification:	PS-5873L	Per Table 1 of the specification		63.49 Nm process avg.	**P**	Performed by DeeDee
3.8.7	**Requirement: Appearance (Decorative)**	**N/A**					
	Test Method:						
	Test frequency or quantity:						
	Selection of samples:						
	Specification						
3.8.8	**Requirement: Dimensional (if applicable)**	**N/A**					
	Test Method:						
	Test frequency or quantity:						
	Selection of samples:						
	Specification:						
3.8.9	**Requirement: Color and Gloss (Decorative)**	**N/A**					
	Test Method:						
	Test frequency or quantity:						
	Selection of samples:						
	Specification:						
3.8.10	**Requirement: Customer Specific**						
	Test Method(s):	No Customer Specific Requirements for this part number and order				**P**	
	Test frequency or quantity:						
	Selection of samples:						
	Specification:	PS-5873L		CMFC SO# 654355			
Operator or Inspector Responsibilities							
3.9	Were appropriate process steps signed off?	1.4 1.6 2.2 2.3 2.11	All process steps to be signed/initialed and dated	CMFC SO# 654355 Process Router	All steps initialed/ signed and entered in the computer database to generate shipping documentation	**P**	
3.10	Were all inspection steps, as documented in the control plan performed?	1.2 1.4	Inspections done per Control Plan		Order approved for shipment after inspection by Quality Technicians	**P**	
3.11	Were steps/operations performed that were not documented in the control plan?	1.2 1.4 1.6	All process steps to be signed/initialed and dated	CMFC SO# 654355 Process Router	Order was processed per Process Router with no undocumented operations conducted	**P**	Order was processed per Process Router with no noted exceptions
3.12	If additional steps were performed, were they authorized?	1.2 1.4 1.6 1.10 1.16	N/A				
3.13	Does the governing specification allow reprocessing or rework?	1.5 1.10	Nothing stated in the specification or on the print	PS-5873L specifciaton	Order was not re-worked	**P**	
3.14	If the order was certified, did the certification accurately reflect the process performed?	2.11 2.13	Certification of Conformance to be the same as the process performed	CMFC SO# 654355 Process Router	Process as stated on the Certification	**P**	
3.15	Was the certification signed by an authorized individual?	1.16	Certification to be signed by authorized individual		Test certs signed by Quality Manager (authorized stamp) and Process Certs signed with electronic signature	**P**	
3.16	Are the parts and containers free of inappropriate objects or contamination?	2.6	Orders to be contamination free	CMFC SO# 654355	Visual examination of the tubs did not show any foreign material	**P**	

	Packaging Requirements						
3.17	Are packaging requirements identified?	2.6 2.7 2.9	Parts to be returned in the same container as received	CMFC SO# 654355	Parts returned in customer containers	**P**	Visually verified by Chris
3.18	Are parts packaged to minimize mixed parts (for example, parts packed over height of container)?	2.6 2.7 2.9	Tubs are not to be overfilled	CMFC SO# 654355	Parts were well below the tub rim	**P**	
	Shipping Requirements						
3.19	Were the parts properly identified?	2.3 2.9	Parts to be properly identified. Reference part was sealed in a bag and stapled to the Router for identification. Part image also on Router.	CMFC SO# 654355	Correct parts were in the tub. Sealed reference sample removed upon final approval	**P**	
3.20	Were the containers properly labeled?	2.3 2.9	Customer tub identifications verified with process routers. 1 tub	CMFC SO# 654355	Curtis Process router with identifications in each tub	**P**	

Section 3 - Job Audit - Finished Product Review

Job Identity: **Anodic E-Coat Process (PPG industries E-Coat Paint)**

Customer: CSM Fastener

Shop Order Number: **653538**

Part Number: 08-405447-AA

Part Description: WAFER HD MACH SCRW W/ SHLDR DOG

Coating Requirements: GM 6047-M Anodic Electrocoat + Oil

Question #	Job Audit Question	Related CSA Question #	Customer or Internal Requirement	Job (Shop) Order or Reference Documentation Requirement	Actual Condition (Objective Evidence)	Pass / Fail / N/A	Comments
3.1	Is contract review and advanced quality planning, FMEA, control plans, etc., performed by qualified individuals?	1.1 1.2 1.3 1.4 1.6		N/A	Estimator doing Contract Review and APQP has 17+ years experience; PFMEA and Control Plans, etc. performed by Quality Manager with 31+ years experience	**P**	
3.2	Does the Coater have the proper customer specifications for the part?	1.5	Specifications match incoming shipper	N/A	Specifications match the incoming paperwork per Customers request	**P**	
3.3	Is a shop traveler created to meet customer requirements?	1.6 2.1	Shop order traveler/ Process Routing Tag created for each lot	CMFC SO# 653538	Process Router/traveler created for this order	**P**	
3.4	Is material identification (part numbers, lot numbers, contract numbers, etc.) maintained throughout the coating process?	2.2 2.3 2.4	Part identification and lot integrity maintained throughout processing	CMFC SO# 653538	Unique shop order number with associated bar code information used to maintain lot integrity	**P**	
3.5	Is there documented evidence of Receiving Inspection?	2.1	Parts looked at upon arrival.	CMFC SO# 653538	Process Router distribution part of incoming inspection. Visual inspection on phosphate line for tramp parts and part incoming condition.	**P**	
3.6	Are the Loading / Racking requirements identified?	1.6 2.7 2.9	Load size to per specified recipe	P/N 08-405447-AA part recipe	Bar code lock down of recipe load sizes established for this part	**P**	Locked down recipe
3.7	Is the proper procedure or process specification used? Refer to Process Tables for specific parameters. List parameters that were verified in this audit in the spaces provided below.	1.5 1.6 2.1 2.11 2.13	See below				
	Process Table E-Electrocoat	**Item #**					
		1	**Pre-Electrocoat Paint Application Part Appearance**				
		E1.1	Incoming parts inspected for cleanliness and phosphate coating appearance		Parts checked by load operator prior to introduction to E-Coat load system	**P**	
		2	**Electrocoat Laboratory**				
		E2.1	Laboratory equipment is calibrated and in good working order		Equipment is calibrated at on a set schedule and operating properly	**P**	Calibration stickers attached
		E2.2	Laboratory standards and reagents are properly stored and not expired		Laboratory reagents and standards are properly stored and within expiration date on titrant and solvent standards	**P**	
		E2.3	Laboratory records are filed and accessible for review		Records are properly filed and easily accessible for review	**P**	

	3	**Electrocoat Tank / Bath**				
	E3.1	Bath parameters are checked and adjusted		Bath parameters are checked and adjusted on every shift	**P**	Checks done each shift verified by processing records
	E3.2	Line speed setup is checked		Line speed is computer program recipe driven	**P**	
	E3.3	Line speed is verified		Line speed is computer program recipe driven	**P**	
	E3.4	Paint bath circulation is verified		Pressure and paint flow is verified by the E-Coat technician. System is alarmed if pump fails	**P**	
	E3.5	Bag filter pressures are monitored		Pressure and flow is verified by the E-Coat technician. System is alarmed if flows fail	**P**	
	E3.6	Flow direction is checked (for Mono rail system)		N/A	**NA**	
	E3.7	Flow over the weir is checked		Visual check by technicians during bath monitoring each shift	**P**	
	E.3.8	Bath is checked for microbial contamination		Historically there has not been an issue with microbial contamination with this paint	**P**	Verified through monthly PM items
	E3.9	Incoming DI or RO water is checked for cleanliness (conductivity)		Deionized/RO water is checked monthly	**P**	
	E3.10	Paint racks are maintained		No racks are used. Barrels are periodically removed from the system and cleaned and serviced	**P**	
	E3.11	There is a paint rack maintenance schedule		The painting Barrels are routinely serviced - hubs, doors, superstructure	**P**	
	E3.12	There is a tank clean-up schedule		On the preventative maintenance schedule	**P**	
	4	**Anolyte system (for Cathodic electrocoat only)**				
	E4.1	Anolyte system is being controlled with required conductivity limits			**NA**	
	E4.2	The conductivity of the Anolyte system has been confirmed in the laboratory				
	E4.3	The pH of the Anolyte system has been checked				
	E4.4	Anodes have been inspected				
	E4.5	The Anolyte system is being circulated to each cell				
	E4.6	Dump and clean schedule for Anolyte has been maintained				
	E4.7	Amperage draw has been checked on each anode				
	5	**Rectifier**				
	E5.1	The proper voltage is being used for the load size	Automatic	Each part number has a locked down weight / voltage recipe	**P**	Locked down recipe
	E5.2	The ramp up time to full voltage has been verified	Automatic	Ramp up time is computer controlled.	**P**	
	E5.3	There is a safety beacon to alert personnel when the system is energized.	Automatic	Safety beacon/strobe working when a painting cell is energized.	**P**	
	E5.4	The ripple of the rectifier has been checked by an approved electrician	Manual	Ripple checked on initial setup. Not a factor in the process	**P**	
	6	**Rinse System**				
	E6.1	Immersion rinse tanks are operating at the proper levels and tanks are being agitated correctly.		Immersion tanks have overflow/counterflow weirs and are being agitated by mixers or air agitation.	**P**	

	E6.2	There is sufficient permeate supplied to the rinse tanks		Permeate flow is sufficient to purge drag out paint from the rinse tanks	**P**	Testing being down and verified by analytical data
	E6.3	The pH and conductivity of the rinse tank has been recorded.		Permeate pH and conductivity are checked and recorded daily	**P**	
	E6.4	There is microbial testing of rinses		Rinses are cleaned on a regular basis based on production. Historically there has been no problem with microbial growth.	**P**	Verified through monthly PM items
	E6.5	The ultrafilters are operating at proper pressures and bag filters are being used. What bag size?		Ultrafilters are working properly with the correct pressure differential to make permeate. Filter micron size is 100/50 microns	**P**	
	E6.6	Rinse have been cleaned per maintenance schedules		Rinses are cleaned on a regular basis based on production.	**P**	
	7	**Cure (per Process Table I - Convective Cure)**				
	I1.1	Oven temperature set point and limits are checked and documented		Oven temperature is checked by the operator on initial startup and by the E-Coat technicians during the shift. High and low temperature alarms are active.	**P**	
	I1.2	Part temperature profile is monitored		Calibrated twice a year by an approved outside calibration source.	**P**	Verified by sticker
	I1.3	Proper cure time is maintained		Cure is maintained by digital readout temperature controller	**P**	
	I1.4	Conveyor speed is maintained		Conveyor speed is maintained and monitored by digital readout	**P**	
	I1.5	Airflow is measured		Not required for operation	**NA**	
	I1.6	Air filter changed is scheduled		Not required for operation	**NA**	
	I1.7	Thermocouple for oven is calibrated		Calibrated twice a year by an approved outside calibration source.	**P**	
	I1.8	Cure testing is conducted by the laboratory		Cure testing for adhesion/rub off is done as part of the final physical inspection during the flattening of the parts in the tubs	**P**	
	I1.9	Final color is monitored		Color is always black with no specific color appearance criteria beyond uniform back. Parts are black in color	**P**	
	I1.10	Film thickness/coating weight is monitored		Random representative parts are pulled each shift for coating thickness monitoring data	**P**	Thickness checked on a shift basis at a minimum- 10.9 um on part
	I1.11	Gageability is checked		Parts are randomly gauged for mating part acceptability	**P**	
	I1.12	Paint adhesion is monitored		Physical inspection of each order for full cure and adhesion is done by the inspector at time of order approval	**P**	

3.8	What are the product inspection requirements?		Each part may have one or more requirements determined by the coating specification. Parts must meet each requirement. List each requirement below and validate. (Listed below are some examples)				
3.8.1	**Requirement: Coating Thickness**						
	Test Method:	L-P-102 - Coating Thickness Determination Procedure					
	Test frequency or quantity:	Coating thickness samples pulled each shift minimum or as requested			Presence of test samples verified	**P**	
	Selection of samples:	3 random sample pieces at a minimum			Samples tested	**P**	
	Specification:	GM 6047-M	10 - 20 microns		10.9 microns on actual parts	**P**	Performed by CWS
3.8.2	**Requirement: Corrosion Resistance (if applicable).**						
	Test Method(s):	ASTM B117	Curtis internal LSS-P-203 / 204 SST Monitoring Procedure				
	Test frequency or quantity:	3 pieces from each shift as a minimum or as requested				**P**	
	Selection of samples:	3 random samples			Samples pulled	**P**	
	Specification:	GM 6047-M	168 hours with no red corrosion		Parts PASS 168 hour corrosion resistance requirement	**P**	Surrogate parts pulled each shift
3.8.3	**Requirement: Hydrogen Embrittlement Relief (if applicable)**	**N/A**	**(Process does not trap hydrogen requiring relief)**			**NA**	
	Test Method:						
	Test frequency or quantity:						
	Selection of samples:						
	Specification:						
3.8.4	**Requirement: Adhesion**		**Adhesion testing only done on un-oiled versions/parts/panels**				
	Test Method(s):	GM 9071-P (B)	L-P-107 (Curtis internal)-Tape Adhesion Testing Procedure				
	Test frequency or quantity:	Panels run on an annual basis by PPG Industries for material/process re-validation				**P**	
	Selection of samples:	Test panels				**P**	
	Specification:	GM 6047-M	No loss of adhesion after tape test		No loss of adhesion after tape test when done by PPG laboratories	**P**	
3.8.5	**Requirement: Cure**						
	Test Method:	L-P-111 - Final Inspection Procedure					
	Test frequency or quantity:	Multiple handfuls every container				**P**	
	Selection of samples:	Random samples				**P**	
	Specification	GM 6047-M					
3.8.6	**Requirement: Torque Tension (if applicable)**						
	Test Method:	TTP01 (Curtis internal) to meet SAE/USCAR-11	Torque Tension testing of specified surrogate parts per automotive standard				
	Test frequency or quantity:	10 surrogate parts at prescribed interval				**P**	
	Selection of samples:	10 surrogate specified samples run with the parts				**P**	
	Specification:	GM 6047-M	Per Table 1 of the specification		44.7 Nm process avg.	**P**	
3.8.7	**Requirement: Appearance (Decorative)**	**N/A**				**NA**	
	Test Method:						
	Test frequency or quantity:						
	Selection of samples:						
	Specification						

3.8.8	**Requirement: Dimensional (if applicable)**	**N/A**				**NA**
	Test Method:					
	Test frequency or quantity:					
	Selection of samples:					
	Specification:					
3.8.9	**Requirement: Color and Gloss (Decorative)**	**N/A**				**NA**
	Test Method:					
	Test frequency or quantity:					
	Selection of samples:					
	Specification:					
3.8.10	**Requirement: Customer Specific**					
	Test Method(s):	No Customer Specific Requirements for this part number and order				**P**
	Test frequency or quantity:					
	Selection of samples:					
	Specification:	GM 6047-M		CMFC SO# 653538		
Operator or Inspector Responsibilities						
3.9	Were appropriate process steps signed off?	1.4 1.6 2.2 2.3 2.11	All process steps to be signed/initialed and dated	CMFC SO# 653538 Process Router	All steps initialed / signed and entered in the computer database to generate shipping documentation	**P**	
3.10	Were all inspection steps, as documented in the control plan performed?	1.2 1.4	Inspections done per Control Plan		Order approved for shipment after inspection by Quality Technicians	**P**	Approved by SAG
3.11	Were steps/operations performed that were not documented in the control plan?	1.2 1.4 1.6	All process steps to be signed/initialed and dated	CMFC SO# 653538 Process Router	Order was processed per Process Router with no undocumented operations conducted	**P**	
3.12	If additional steps were performed, were they authorized?	1.2 1.4 1.6 1.10 1.16	N/A			**NA**	
3.13	Does the governing specification allow reprocessing or rework?	1.5 1.10	Nothing stated in the specification or on the print	GM 6047-M specification	Order was not re-worked	**P**	
3.14	If the order was certified, did the certification accurately reflect the process performed?	2.11 2.13	Certification of Conformance to be the same as the process performed	CMFC SO# 653538 Process Router	Process as stated on the Certification	**P**	Standard E-Coat + Oil
3.15	Was the certification signed by an authorized individual?	1.16	Certification to be signed by authorized individual		Test certs signed by Quality Manager (authorized stamp) and Process Certs signed with electronic signature	**P**	
3.16	Are the parts and containers free of inappropriate objects or contamination?	2.6	Orders to be contamination free	CMFC SO# 653538	Visual examine of the skids did not show any foreign objects	**P**	
	Packaging Requirements						
3.17	Are packaging requirements identified?	2.6 2.7 2.9	Parts to be returned in the same container as received	CMFC SO# 653538	Parts returned in customer containers	**P**	Verified by Chris
3.18	Are parts packaged to minimize mixed parts (for example, parts packed over height of container)?	2.6 2.7 2.9	Tubs are not to be overfilled	CMFC SO# 653538	Parts were well below the tub rim	**P**	
	Shipping Requirements						
3.19	Were the parts properly identified?	2.3 2.9	Parts to be properly identified. A reference example was sealed in a bag and stapled to the Process Router for identification	CMFC SO# 653538	Correct parts were in the skid. Sealed reference sample removed upon final approval	**P**	Verified

3.20	Were the containers properly labeled?	2.3 2.9	Customer tub identifications verified with process routers.	CMFC SO# 653538	Curtis Process router with identifications in each tub	**P**	

Section 3 - Job Audit - Finished Product Review

Job Identity: **Zinc Phosphate and Oil**
Customer: Maclean Fogg
Shop Order Number: **653848**
Part Number: 31247
Part Description: 2PNA NUT
Coating Requirements: **Zinc Phosphate and Oil per ESS-M3P20-A**

Question #	Job Audit Question	Related CSA Question #	Customer or Internal Requirement	Job (Shop) Order or Reference Documentation Requirement	Actual Condition (Objective Evidence)	Pass / Fail / N/A	Comments
3.1	Is contract review and advanced quality planning, FMEA, control plans, etc., performed by qualified individuals?	1.1 1.2 1.3 1.4 1.6		N/A	Estimator doing Contract Review and APQP has 17+ years experience; PFMEA and Control Plans, etc. performed by Quality Manager with 31+ years experience	**P**	
3.2	Does the Coater have the proper customer specifications for the part?	1.5	Specifications match incoming shipper	N/A	Specifications match the incoming paperwork per Customers request	**P**	
3.3	Is a shop traveler created to meet customer requirements?	1.6 2.1	Shop order traveler/ Process Routing Tag created for each lot	CMFC SO# 653848	Process Router/traveler created for this order	**P**	
3.4	Is material identification (part numbers, lot numbers, contract numbers, etc.) maintained throughout the coating process?	2.2 2.3 2.4	Part identification and lot integrity maintained throughout processing	CMFC SO# 653848	Unique shop order number with associated bar code information used to maintain lot integrity	**P**	
3.5	Is there documented evidence of Receiving Inspection?	2.1	Parts looked at upon arrival.	CMFC SO# 653848	Process Router distribution part of incoming inspection. Visual inspection on phosphate line for tramp parts and part incoming condition.	**P**	
3.6	Are the Loading / Racking requirements identified?	1.6 2.7 2.9	Load size to per specified recipe	P/N 31247 part recipe	Bar code lock down of recipe load sizes established for this part	**P**	Locked down recipe followed
3.7	Is the proper procedure or process specification used? Refer to Process Tables for specific parameters. List parameters that were verified in this audit in the spaces provided below.	1.5 1.6 2.1 2.11 2.13	See below				

Process Table A - Pretreatment (Aqueous)	**Item #**				
	1	**AQUEOUS CLEANING PROCESS (Alkaline or Acid)**			
	A1.1	Incoming part assessment procedure with criteria		PSR-P-201 is the incoming inspection procedure for all incoming work.	**P**
	2	**Cleaning Bath(s)**			
	A2.1	The following cleaning checks shall be done during production			
	A2.2	Pressure/Agitation		Air agitation is on constantly to all baths	**P**
	A2.3	Temperature		Temperature checks are done every two hours of production	**P**
	A2.4	Time		Each bath check time is recorded	**P**
	A2.5	Chemical concentration		Each baths chemical concentration is checked and documented **every 2 hours**	**P**

Data recorded for Phosphate line

	A2.6	Impurity content		Visual examination of the cleaner split at the time of each bath testing	**P**	
	A2.7	There is dump schedule for cleaning baths		Dump schedule is on a computer maintenance program	**P**	
	3	**Rinse Bath(s)**				
	A3.1	The following checks shall be done during production				
	A3.2	Pressure/Agitation		Air agitation is on constantly to all baths	**P**	Rinse tank conditions verified
	A3.3	Temperature		Some tanks are kept at ambient and others are live steam injection heated	**P**	
	A3.4	Time		Time is rinse tanks is computer controlled	**P**	
	A3.5	Impurity Concentration		All rinse tanks are on constantly with flow restrictors giving the same flow all the time	**P**	
	A3.6	Overflow Rate		All rinse tanks are on constantly with flow restrictors giving the same flow all the time	**P**	
	A3.7	There is dump schedule for rinse baths		Rinse tanks are constantly purged and cleaned at scheduled intervals	**P**	
	A3.8	Visual exam for water break after each post cleaning rinse		Not applicable to bulk processing	**NA**	
	A3.9	The final rinse shall be monitored for bacteria		Rinse tanks are constantly purged and cleaned at scheduled intervals so no bacteria growth is visible. Rinses are routinely dumped and cleaned.	**P**	
	A3.10	For Metals-Corrosion inhibitor concentration is checked		Not applicable to this processing	**NA**	

Process Table C-Pretreatment (Phosphating)	**Item #**					
	1	**Conversion Coating**				
	C1.1	Incoming part assessment procedure with criteria		PSR-P-201 is the incoming inspection procedure for all incoming work.	**P**	
	2	**Rinse Conditioner (If Applicable)**				
		No Rinse Conditioner is used in the operation - **N/A**				
	3	**Conversion Coating Bath**				
	C3.1	The following checks shall be done during production				
	C3.2	Pressure/Agitation		Air agitation is on constantly to all baths	**P**	
	C3.3	Temperature		Temperature checks are done every two hours of production	**P**	Data documented on process analytical sheets
	C.3.4	Time		Each bath check time is recorded	**P**	
	C3.5	Chemical concentration		Each baths chemical concentration is checked and documented **every 2 hours**	**P**	Data documented on process analytical sheets
	C3.6	Fluoride ion		Not applicable to this process	**NA**	
	C3.7	Coating Weight		Coating weight checked a minimum of once per shift	**P**	34.7 g/m2
	C3.8	Crystal size (if applicable)		Crystal size is periodically verified under the microscope as needed	**P**	
	4	**Rinse After Phosphate**				
	C4.1	The following checks shall be done during production				
	C4.2	Impurity Concentration		Bath is constantly overflowing with flow restrictors regulating the water flow	**P**	Clean rinses verified by Chris

	C4.3	Pressure/Agitation		Air agitation is on constantly to all baths	**P**	Air agitation is on
	C4.4	Time		Each bath check time is recorded	**P**	Computer controlled
	C4.5	There is a dump schedule for rinses		Rinse tanks are constantly purged and cleaned at scheduled intervals	**P**	
	5	**Seal Rinse (Water soluble Oil for these parts)**				
	C5.1	The following checks shall be done during production				
	C5.2	Pressure/Agitation		Air agitation is on constantly to all baths	**P**	Air agitation is on
	C5.3	Time		Each bath check time is recorded	**P**	
	C5.4	Chemical concentration		Each baths chemical concentration is checked and documented **every 2 hours**	**P**	Water soluble oil is applied to these parts
	C5.5	Temperature		Temperature checks are done every two hours of production	**P**	On in-process check sheets
	C5.6	There is a dump schedule for rinses		Sealer tank is dumped and cleaned at scheduled intervals based on production	**P**	
	6	**Dry-Off (If Applicable)**				
	C6.1	Air tempertaure is monitored and maintained		Dry off oven is has digital temperature controls	**P**	Used for dry phosphate work prior to organic coating
	C6.2	There is a procedure to ensure dryness o parts prior to subsequent coating		Each order is insepcted as it comes off the oven belt and insepcted again before the next operation.	**P**	

3.8	What are the product inspection requirements?		Each part may have one or more requirements determined by the coating specification. Parts must meet each requirement. List each requirement below and validate. (Listed below are some examples)			
3.8.1	**Requirement: Coating Thickness**	**Coating thickness measurements are not done on phosphated parts - surrogate Q-Panel Coating weight is done instead**				
	Test Method:	LP-P-134 - Phosphate Coating Thickness Procedure			**P**	Coating panel ran each shift of production
	Test frequency or quantity:	1 standard Q-Panel run every shift of operation				
	Selection of samples:	Standard Q-Panel		3,217 mg/sq.ft		
	Specification:	ESS-M3P20-A				
3.8.2	**Requirement: Corrosion Resistance (if applicable).**	**Dry phosphate does not require a salt spray test. Parts are oiled and tested for oiled process/specs. verification**				
	Test Method(s):	ASTM B117	Curtis internal LSS-P-203 / 204 SST Monitoring Procedure			Samples pulled each run for monitoring
	Test frequency or quantity:		3 random pieces per shift			
	Selection of samples:		3 random pieces per shift			
	Specification:	ESS-M3P20-A	72 hours salt spray	Parts PASS 72 hour corrosion resistance requirement	**P**	
3.8.3	**Requirement: Hydrogen Embrittlement Relief (if applicable)**	**Hydrogen embrittlement avoidance is done by by-passing the acid cleaning step, if needed**				
	Test Method:					
	Test frequency or quantity:					
	Selection of samples:					
	Specification:					
3.8.4	**Requirement: Adhesion**	**N/A**			**NA**	
	Test Method(s):					
	Test frequency or quantity:					
	Selection of samples:					
	Specification:					
3.8.5	**Requirement: Cure**	**N/A**			**NA**	
	Test Method:					
	Test frequency or quantity:					
	Selection of samples:					

	Specification						
3.8.6	**Requirement: Torque Tension (if applicable)**	**Torque Tension testing is not done on dry phosphate: Parts are oiled then tested for process/spec verification**					
	Test Method:	TTP01 (Curtis internal) to meet SAE/USCAR-11	Torque Tension testing of specified surrogate parts per automotive standard				
	Test frequency or quantity:		10 surrogate parts at prescribed interval			**P**	
	Selection of samples:		10 surrogate specified samples run with the parts			**P**	
	Specification:	ESS-M3P20-A	Used as a verification finish/spec		41.5 Nm process avg.	**P**	
3.8.7	**Requirement: Appearance (Decorative)**	**N/A**					
	Test Method:						Not normally applicable for this specification
	Test frequency or quantity:						
	Selection of samples:						
	Specification						
3.8.8	**Requirement: Dimensional (if applicable)**	**N/A**				**NA**	
	Test Method:						
	Test frequency or quantity:						
	Selection of samples:						
	Specification:						
3.8.9	**Requirement: Color and Gloss (Decorative)**	**N/A**				**NA**	
	Test Method:						
	Test frequency or quantity:						
	Selection of samples:						
	Specification:						
3.8.10	**Requirement: Customer Specific**						
	Test Method(s):	No Customer Specific Requirements for this part number and order				**P**	
	Test frequency or quantity:						
	Selection of samples:						
	Specification:	ESS-M3P20-A		CMFC SO# 653848			
Operator or Inspector Responsibilities							
3.9	Were appropriate process steps signed off?	1.4 1.6 2.2 2.3 2.11	All process steps to be signed/initialed and dated	CMFC SO# 653848 Process Router	All steps initialed/ signed and entered in the computer database to generate shipping documentation	**P**	All process steps completed
3.10	Were all inspection steps, as documented in the control plan performed?	1.2 1.4	Inspections done per Control Plan		Order approved for shipment after inspection by Quality Technicians	**P**	Approved by SAG
3.11	Were steps/operations performed that were not documented in the control plan?	1.2 1.4 1.6	All process steps to be signed/initialed and dated	CMFC SO# 653848 Process Router	Order was processed per Process Router with no undocumented operations conducted	**P**	Processed per Router
3.12	If additional steps were performed, were they authorized?	1.2 1.4 1.6 1.10 1.16	N/A			**NA**	No additional steps performed
3.13	Does the governing specification allow reprocessing or rework?	1.5 1.10	Nothing stated in the specification or on the print	ESS-M3P20-A specification	Order was not re-worked	**P**	Order was not reworked
3.14	If the order was certified, did the certification accurately reflect the process performed?	2.11 2.13	Certification of Conformance to be the same as the process performed	CMFC SO# 653848 Process Router	Process as stated on the Certification	**P**	
3.15	Was the certification signed by an authorized individual?	1.16	Certification to be signed by authorized individual		Test certs signed by Quality Manager (authorized stamp) and Process Certs signed with electronic signature	**P**	

3.16	Are the parts and containers free of inappropriate objects or contamination?	2.6	Orders to be contamination free	CMFC SO# 653848	Visual examination of the tubs did not show any foreign objects	**P**	Verified by SAG during final inspection
	Packaging Requirements						
3.17	Are packaging requirements identified?	2.6 2.7 2.9	Parts to be returned in the same container as received	CMFC SO# 653848	Parts returned in customer containers	**P**	Verified by Chris
3.18	Are parts packaged to minimize mixed parts (for example, parts packed over height of container)?	2.6 2.7 2.9	Tubs are not to be overfilled	CMFC SO# 653848	Parts were well below the tub rim	**P**	
	Shipping Requirements						
3.19	Were the parts properly identified?	2.3 2.9	Parts to be properly identified. A reference example was sealed in a bag and stapled to the Process Router for identification	CMFC SO# 653848	Correct parts were in the skid. Sealed reference sample removed upon final approval	**P**	Verified by Chris
3.20	Were the containers properly labeled?	2.3 2.9	Customer tub identifications verified with process routers.	CMFC SO# 653848	Curtis Process router with identifications in each tub	**P**	

PROCESS TABLE A - Pretreatment (Aqueous)

All requirements given below are subordinate to customer specific requirements.

The customer may have additional requirements, e.g., inspection testing, greater frequencies, etc. When performing the job audit, the auditor shall verify coater is conforming to customer requirements.

Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
1.0		**AQUEOUS CLEANING PROCESS (Alkaline or Acid)**		
A1.1	1.4	There shall be an incoming part assessment procedure with criteria.	Per Control Plan	Per lot
2.0		**Cleaning Bath(s)**		
A2.1	2.11	The following checks shall be performed during production:		
A2.2	1.4 2.11 2.12	Pressure/Agitation	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
A2.3	1.4 2.11 2.12	Temperature	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
A2.4	1.4 1.6 2.11 2.12	Time	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
A2.5	1.4 1.6 2.11 2.12	Chemical Concentration	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
A2.6	1.4 2.11 2.12	Impurity Content (e.g. acid split)	Manual	Per Control Plan/Log Sheet (1/shift minimum)
A2.7	2.11	There is a dump schedule for cleaning baths.	Manual	Per Control Plan/Log Sheet
3.0		**Rinse Bath(s)**		
A3.1	2.11	The following checks shall be performed during production:		
A3.2	1.4 2.11 2.12	Pressure/Agitation	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
A3.3	1.4 2.11 2.12	Temperature	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
A3.4	1.4 1.6 2.11 2.12	Time	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
A3.5	1.4 2.11 2.12	Impurity Concentration	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
A3.6	1.4 2.11 2.12	Overflow Rate	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
A3.7	2.11	There is a dump schedule for rinses.	Manual	Per Control Plan/Log Sheet

PROCESS TABLE A - Pretreatment (Aqueous)

All requirements given below are subordinate to customer specific requirements.

The customer may have additional requirements, e.g., inspection testing, greater frequencies, etc. When performing the job audit, the auditor shall verify coater is conforming to customer requirements.

Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
A3.8	1.4 2.11	There is a visual inspection (e.g. water break) after each post cleaning rinse bath where possible. (not applicable for bulk)	Manual	Per Control Plan/Log Sheet (1/shift minimum)
A3.9	1.4 2.11	There is a final rinse. It shall be monitored for presence of bacteria. (for plastic substrate)	Manual	Per Control Plan/Log Sheet (1/shift minimum)
A3.10	1.4 2.11	For Metals -- Corrosion inhibitor concentration is checked. (If applicable)	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)

PROCESS TABLE B - Pretreatment (Mechanical)

All requirements given below are subordinate to customer specific requirements.

The customer may have additional requirements, e.g., inspection testing, greater frequencies, etc. When performing the job audit, the auditor shall verify coater is conforming to customer requirements.

Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
1.0		**ABRASIVE BLAST PROCESS**		
B1.1	1.4	There shall be an incoming part assessment procedure with criteria.	Per Control Plan	Per lot
B1.2	2.11	The following checks shall be performed during production:		
B1.3	1.4 1.6 2.11 2.12	Abrasive media flow	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
B1.4	1.4 1.6 2.11 2.12	Nozzle air pressure	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
B1.5	1.4 1.6 2.11 2.12	Dwell time	Automatic	Per Control Plan/Log Sheet (1/shift minimum)
B1.6	1.4 2.11 2.12	Dust collector efficiency/air flow	Automatic	Per Control Plan/Log Sheet (2/shift minimum)
B1.7	1.4 2.11 2.12	Working mix	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
B1.8	1.4 2.11	Surface cleanliness is checked after process.	Manual	Per Control Plan/Log Sheet (1/shift minimum)
B1.9	1.4 2.11 2.13	Surface profile is checked after process (if applicable).	Manual	Per lot

PROCESS TABLE C - Pretreatment (Phosphating)

All requirements given below are subordinate to customer specific requirements.

The customer may have additional requirements, e.g., inspection testing, greater frequencies, etc. When performing the job audit, the auditor shall verify coater is conforming to customer requirements.

Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
1.0		**Conversion Coating**		
C1.1	1.4	There shall be an incoming part assessment procedure with criteria.	Per Control Plan	Per lot
2.0		**Rinse Conditioner (If Applicable)**		
C2.1	2.11	The following checks shall be performed during production:		
C2.2	1.4 2.11 2.12	Pressure/Agitation	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C2.3	1.4 1.6 2.11 2.12	Time	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C2.4	1.4 2.11 2.12	Chemical Concentration	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C2.5	2.11	There is a dump schedule for rinse conditioner.	Manual	Per Chemical Manufacturer's Guideline
3.0		**Conversion Coating Bath**		
C3.1	2.11	The following checks shall be performed during production:		
C3.2	1.4 2.11 2.12	Pressure/Agitation	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C3.3	1.4 2.11 2.12	Temperature	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C3.4	1.4 1.6 2.11 2.12	Time	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C3.5	1.4 2.11 2.12	Chemical Concentration (Free Acid, Total Acid, Iron Content, pH, Accelerator Amount as Applicable)	Automatic/Manual	Per Control Plan/Log Sheet (2/shift minimum)
C3.6	1.4 2.11 2.12	Fluoride Ion Concentration (if aluminum is being coated)	Automatic/Manual	Per Control Plan/Log Sheet (2/shift minimum)
C3.7	1.4 1.6 2.11 2.12	Coating Weight	Manual	Per Control Plan/Log Sheet (1/shift minimum)
C3.8	1.4 2.11 2.12	Crystal Size (If applicable)	Manual	Per customer requirement
4.0		**Rinse After Phosphate**		
C4.1	2.11	The following checks shall be performed during production:		
C4.2	1.4 2.11 2.12	Impurity Concentration (e.g. Titration, Conductivity)	Manual	Per Control Plan/Log Sheet (1/shift minimum)

PROCESS TABLE C - Pretreatment (Phosphating)

All requirements given below are subordinate to customer specific requirements.

The customer may have additional requirements, e.g., inspection testing, greater frequencies, etc. When performing the job audit, the auditor shall verify coater is conforming to customer requirements.

Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
C4.3	1.4 2.11 2.12	Pressure/Agitation	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C4.4	1.4 1.6 2.11 2.12	Time	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C4.5	2.11	There is a dump schedule for rinses	Manual	Per Chemical Manufacturer's Guideline
5.0		**Seal Rinse**		
C5.1	2.11	The following checks shall be performed during production:		
C5.2	1.4 2.11 2.12	Pressure/Agitation	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C5.3	1.4 1.6 2.11 2.12	Time	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C5.4	1.4 2.11 2.12	Chemical Concentration	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C5.5	1.4 2.11 2.12	Temperature (If applicable)	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C5.6	2.11	There is a dump schedule for seal rinse.	Manual	Per Chemical Manufacturer's Guideline
6.0		**Dry-Off (If Applicable)**		
C6.1	1.4 2.11 2.12	Air temperature is monitored and controlled.	Automatic	Per Control Plan/Log Sheet (1/shift minimum)
C6.2	1.4 2.11	There is a procedure to ensure dryness of parts prior to susequent coating.	Visual	Each Lot

PROCESS TABLE E - Electrocoat

All requirements given below are subordinate to customer specific requirements.

The customer may have additional requirements, e.g., inspection testing, greater frequencies, etc. When performing the job audit, the auditor shall verify coater is conforming to customer requirements.

Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
1.0		**Pre-Electrocoat Paint Application Part Appearance**		
E1.1	1.4 2.11	Incoming parts are inspected for cleanliness and/or uniform phosphate coating (when phosphate is used).	Manual	Per Control Plan/Log Sheet (1 per hour)
2.0		**Electrocoat Laboratory**		
E2.1	2.14	Laboratory equipment is calibrated and in good working order.	N/A	
E2.2	2.14	Laboratory standards and reagents are properly stored, labeled, and not expired.	N/A	
E2.3	2.14	Laboratory records, internal and external, are filed and accessible for review.	Manual	Per Control Plan/Log Sheet (1/shift minimum)
3.0		**Electrocoat Tank**		
E3.1	1.4 2.11 2.12	Bath parameters (pH, conductivity, solid content, temperature, voltage) are checked and adjusted.	Automatic/Manual	Per Control Plan/Log Sheet
E3.2	1.4 1.6 2.11 2.12	Line speed setup is checked.	Automatic/Manual	Per Control Plan/Log Sheet
E3.3	1.4 2.11 2.12	Line speed is verified.	Manual	Once/week minimum
E3.4	1.4 2.11 2.12	There is circulation and it is monitored. (flow meter, pressure gage)	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
E3.5	1.4 2.11 2.12	Bag filter pressures are monitored. Bags changed when psi differential. >5-10 PSI.	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
E3.6	1.4 2.11 2.12	Flow direction is checked (for monorail system).	Manual	Per Control Plan/Log Sheet (1/shift minimum)
E3.7	1.4 2.11 2.12	Flow over the weir is checked.	Manual	Per Control Plan (1/shift minimum)
E3.8	1.4 2.11 2.12	Bath is checked for microbial contamination.	Manual	Per Control Plan/Log Sheet (1/ per week minimum)
E3.9	1.4 2.11 2.12	Incoming DI / RO water is checked for cleanliness. (conductivity)	Manual	Per Control Plan/Log Sheet (1/shift minimum)
E3.10	1.4 1.17 2.11 2.12	Paint racks are being maintained.	Automatic/Manual	As needed
E3.11	1.4 1.17 2.11 2.12	There is a paint rack maintenance schedule.	Manual	Required
E3.12	1.4 1.17 2.11 2.12	There is a tank clean up schedule.	Manual	Required (1/year minimum)
4.0		**Anolyte System**		
E4.1	1.4 2.11 2.12	The anolyte solution is being controlled within the required conductivity limits.	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
E4.2	1.4 2.11 2.12	The conductivity reading on the anolyte tank has been confirmed in the laboratory.	Automatic/Manual	Per Control Plan/Log Sheet 1 / week

PROCESS TABLE E - Electrocoat

All requirements given below are subordinate to customer specific requirements.

The customer may have additional requirements, e.g., inspection testing, greater frequencies, etc. When performing the job audit, the auditor shall verify coater is conforming to customer requirements.

Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
E4.3	1.4 2.11 2.12	The pH of the anolyte solution has been checked.	Automatic/Manual	Per Control Plan/Log Sheet (1 per shift)
E4.4	1.4 2.11 2.12	Anodes have been inspected.	Manual	Per Control Plan/Log Sheet (1 per six months)
E4.5	1.4 2.11 2.12	The anolyte solution is being circulated to each cell.	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
E4.6	1.4 2.11 2.12	Dump and clean schedule for anolyte being maintained.	Manual	Per Control Plan/Log Sheet
E4.7	1.4 2.11 2.12	Amperage draw has been checked on each anode.	Automatic/Manual	Per Control Plan/Log Sheet
5.0		**Rectifier**		
E5.1	1.4 1.6 2.11 2.12	The proper voltage is being used for the load size.	Manual	per Equip. Mfg.
E5.2	1.4 2.11 2.12	The ramp up time to full voltage has been verified.	Automatic/Manual	Per Control Plan/Log Sheet (1 per shift)
E5.3	2.10	There is a safety beacon to alert personnel when system is energized.		
E5.4	1.4 1.17 2.11 2.12	The ripple of the rectifier has been checked by an approved electrician.	Automatic/Manual	Per Control Plan / material supplier
6.0		**Rinse System**		
E6.1	1.4 2.11 2.12	Immersion rinse tanks are operating at the proper levels and tanks are being agitated correctly.	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
E6.2	1.4 2.11 2.12	There is sufficient permeate supplied to the rinse.	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
E6.3	1.4 2.11 2.12	The pH and conductivity of the rinse have been recorded.	Manual	Per Control Plan/Log Sheet (1/shift minimum)
E6.4	1.4 2.11 2.12	There is microbial testing of rinses.	Manual	Per Control Plan / material supplier
E6.5	1.4 2.11 2.12	The ultrafilters are operating at proper pressures and bag filters are being used. What size bags?	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
E6.6	1.4 1.17 2.11 2.12	Rinses have been cleaned per maintenance schedule.	Manual	Per Control Plan / material supplier
7.0		**Cure (See Convective Cure Process Table I)**		

PROCESS TABLE G - Dip/Spin

All requirements given below are subordinate to customer specific requirements.

The customer may have additional requirements, e.g., inspection testing, greater frequencies, etc. When performing the job audit, the auditor shall verify coater is conforming to customer requirements.

Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
1.0		**Coating Material Application**		
G1.1	1.4 2.11	After pretreatment, parts are inspected for flash rust, wetness, oil or other defects.	Manual	Per Control Plan/Log Sheet (each lot)
G1.2	1.4 2.11	If phosphated, parts are checked for uniformity of phosphate coating.	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
G1.3	2.6 1.17	Skids/bins used to hold parts between coating operations are free of oil, grease or other contaminants.	Manual	Per Control Plan/Log Sheet (each lot)
2.0		**Coating Bath**		
G2.1	1.4 2.11 2.12	Incoming paint viscosity is checked.	Manual	Each New Lot of Paint
G2.2	1.4 2.11 2.12	Incoming solids checks are performed.	Manual	Each New Lot of Paint
G2.3	1.4 1.17 2.11 2.12	Appropriate mixing equipment is used, capable of dispersing settled solids.	Manual	Ongoing
G2.4	2.9 2.10	Paint is stored properly, away from high humidity and temperature extremes.	Manual	Ongoing
G2.5	2.9 2.10	Paint is kept covered and/or sealed when not in use.	Manual	Ongoing
G2.6	2.9 2.10	Paint storage room is organized so each paint is easily found to prevent contamination.	Manual	Ongoing
G2.7	2.9 2.10	Paint storage room is kept clean.	Manual	Ongoing
G2.8		**The following checks shall be performed during production:**		
G2.9	1.4 2.11 2.12	Paint Temperature.	Manual	Per Control Plan/Log Sheet (3/shift minimum)
G2.10	1.4 2.11 2.12	Viscosity.	Manual	Per Control Plan/Log Sheet (3/shift minimum)
G2.11	1.4 2.11 2.12	% Solids (by weight).	Manual	Per Control Plan/Log Sheet (1/Day minimum)
G2.12	1.4 2.11 2.12	Volume (paint depth in coating vat).	Automatic/Manual	Per Control Plan/Log Sheet (3/shift minimum)
G2.13	1.4 2.11 2.12	Vibratory feed tables are cleaned (if used).	Manual	Per Control Plan/Log Sheet (as needed)
G2.14	1.4 1.17 2.11 2.12	Basket condition (basket mesh clean and undamaged).	Manual	Per Control Plan/Log Sheet (as needed)
G2.15	1.4 2.11 2.12	Paint and/or solvent additions are documented.	Manual	Per Control Plan/Log Sheet (each addition)
G2.16	2.10	Viscosity cups are cleaned after each use.	Manual	Per Control Plan/Log Sheet (each check)

PROCESS TABLE G - Dip/Spin

All requirements given below are subordinate to customer specific requirements.

The customer may have additional requirements, e.g., inspection testing, greater frequencies, etc. When performing the job audit, the auditor shall verify coater is conforming to customer requirements.

Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
G2.17	2.14 1.17	Viscosity cups are verified.	Manual	2/Month minimum
G2.18	2.14 1.17	Thermometers are calibrated/verified.	Manual	Once/Month minimum
3.0		**Application Parameters**		
G3.1	1.4 1.6	A system is in place to ensure proper basket weights for specific parts, such as processing manual, traveller, or process recipe.	Automatic/Manual	Per Control Plan/Log Sheet (each lot)
G3.2	1.4 1.6	Baskets are kept less than 2/3 full.	Automatic/Manual	Per Control Plan/Log Sheet (each lot)
G3.3	1.4 1.6	Dip time is controlled.	Automatic/Manual	Per Control Plan/Log Sheet (each lot)
G3.4	1.4 1.6	Spin speed (RPM) is controlled.	Automatic/Manual	Per Control Plan/Log Sheet (each lot)
G3.5	1.4 1.6 1.17	The coating unit has an attached RPM indicator.	Automatic/Manual	Per Control Plan/Log Sheet (each lot)
G3.6	1.4 1.6 1.17	RPM's can be adjusted easily.	Automatic/Manual	Per Control Plan/Log Sheet (each lot)
G3.7	1.4 1.6	Spin time is controlled.	Automatic/Manual	Per Control Plan/Log Sheet (each lot)
G3.8	1.4 1.6	The number of spins is adjustable (single, double, triple).	Automatic/Manual	
G3.9	1.4 1.6	Tumble time is in/out of coating controlled (if applicable).	Automatic/Manual	Per Control Plan/Log Sheet (each lot)
G3.10	1.4 1.6 1.17	There is an adequate system to keep parts level going into the oven (raking, vibe table, etc.).	Automatic/Manual	Per Control Plan/Log Sheet (each lot)
G3.11	2.10	Vibratory feed tables are cleaned (if used).	Manual	Per Control Plan/Log Sheet (as needed)
G3.12	2.9	There is evidence of steps taken to assist in soft handling of parts (shallow drops, lined chutes and hoppers, bumper boards, etc.).	Automatic/Manual	Per Control Plan/Log Sheet (each lot)
G3.13	1.4 2.9 2.11	Parts are cool to to touch before each coating step.	Manual	Per Control Plan (each lot)
4.0		**Cure (See Convective Cure Process Table I)**		

PROCESS TABLE I - Convective Cure

All requirements given below are subordinate to customer specific requirements.

The customer may have additional requirements, e.g., inspection testing, greater frequencies, etc. When performing the job audit, the auditor shall verify coater is conforming to customer requirements.

Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
1.0				
I1.1	1.4 1.6 2.11 2.12	Oven temperature set point and limits are checked and documented.	Automatic	1/shift minimum or at every material change. Per coating supplier recommendation
I1.2	1.17	Part temperature profile is monitored.	Manual	1/month minimum
I1.3	1.4 1.6 2.11 2.12	Proper cure time is maintained (if applicable).	Automatic/Manual	Per coating supplier recommendation
I1.4	1.4 1.6 1.17 2.11 2.12	Conveyor speed is maintained (if applicable).	Automatic	1/month minimum (after PM)
I1.5	1.4 2.11 2.12	Airflow is measured (if required by coating supplier).		Per coating supplier recommendation
I1.6	1.17	Air filter change is scheduled.	Manual	Per oven manufacturer, filter supplier recommendation
I1.7	1.17	Thermocouple for oven control is calibrated.	Manual	Based on oven thermo profile
I1.8	2.13	Cure testing is conducted by laboratory.	Manual	Per coating supplier recommendation
I1.9	2.13	Final color is monitored.	Manual	Per Control Plan/Log Sheet (1/shift or color change minimum)
I1.10	2.13	Film thickness/coating weight is monitored.	Manual	Per Control Plan/Log Sheet (1/shift or color change minimum)
I1.11	2.13	Gaugeability is checked (if applicable).	Manual	Per customer requirements
I1.12	2.13	Paint adhesion is monitored.	Manual	Per Control Plan/Log Sheet (1/shift or color change minimum)

PROCESS TABLE J - EQUIPMENT

Curtis Metal Finishing Company - Machesney Park, Illinois

All requirements given below are subordinate to customer specific requirements.

The customer may have additional requirements, e.g., inspection testing, greater frequencies, etc. When performing the job audit, the auditor shall verify coater is conforming to customer requirements.

PROCESS EQUIPMENT												
Item #	**Related CSA Question #**	**Pretreatment**	**Powder Coat**	**E-Coat**	**Spray**	**Dip/Spin**	**A-Coat**	**Cure**		**Verification Frequency**	**Calibration Frequency**	**Comment**
1.1	2.14	**X**		**X**	X	**X**	X		pH Meter/Probe	Daily	Yearly	Done as prescribed
1.2	2.14	**X**	X	**X**	X	**X**	X	**X**	Temperature Controller	At Start-up	2x/Year	Done as prescribed
1.3	2.14		X	**X**					Rectifier	At Start-up	N/A	Done as prescribed
1.4	2.14	**X**	X	**X**	X	**X**	X		Wet Analysis	Phosphate - 3hr min. Paint Lines - Before Run E-Coat - 1x/Shift min.	N/A	Completed as prescribed
1.5	2.14								Atomic Absorption (Optional)		N/A	
1.6	2.14	X	X	**X**	X	**X**	X	**X**	Filters	*	N/A	* As needed based on pressure.
1.7	2.14	**X**		**X**		**X**			Balance	1x/Week	Yearly	Completed as prescribed
1.8	2.14	X		**X**					Conductivity Meter	Before Use	Yearly	Done as prescribed
1.9	2.14				X	**X**			Viscosity Measurement	Hourly	Monthly	Done as prescribed
1.10	2.14							**X**	Thermocouple	N/A	2x/Year	Done 2x year
MINIMUM REQUIRED TESTING CAPABILITY												
2.1	2.14		X	**X**	X	**X**	X	**X**	Salt Spray Cabinet		Yearly	5 salt spray cabinets
2.2	2.14		X	**X**	X		X	X	Water Immersion Tank			(#) Not required for specification testing
2.3	2.14							X	Environmental Chamber			(#) Not required for specification testing
2.4	2.14							**X**	Cure Testing (chemical rubbing)			Done with various solvents
2.5	2.14		X	**X**	X	**X**	X	**X**	Adhesion Testing			Done with 3M tape
2.6	2.14		X	**X**	X	**X**	X	**X**	Thickness Testing		Yearly	CMI Eddy Mag 2000 electroinc tester
2.7	2.14	**X**	X	**X**	X	**X**	X		Microscope (when applicable)			Digital microscopes used for analysis-sent to Sterling Heights for analysis
2.8	2.14							X	Freezer (plastic substrate)			(#) Not required for specification testing
2.9	2.14							**X**	Lab Oven		2x/Year	Used for solids determination

(#) Not required for the automotive specifications that Curtis processes to