

## Special Process: Plating System Assessment

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<b>Special Process: Plating System Assessment, 2nd Edition</b>			
Protec Finishing Ltd.			
Address: 1820 Bonhill Road, Mississauga, Ontario L5T 1C4			
Phone Number: (905) 564-5338	<b>Type(s) of Plating Processing at this Facility:</b>		
Fax Number: (905) 564-2206	<b>Process Table A:</b>		
	Barrel Zinc Plating		
Number of Plating Employees at this Facility: 35			
Captive Plater (Y/N): No	<b>Process Table B:</b>		
Commercial Plater (Y/N): Yes	N/A		
Date of Assessment: 12/10/12	<b>Process Table C:</b>		
Date of Previous Assessment: 12/10/2011	Surface Conditioning of Metals for Decorative Plating or Electropolishing: <b>N/A</b>		
	Surface Conditioning of Plastics for Decorative Plating: <b>N/A</b>		
Date of Re-assessment (if necessary):	<b>Process Table E:</b>		
	Decorative Plating for Metal and Plastic: <b>N/A</b>		
	<b>Process Table F:</b>		
	Electropolishing and/or Chrome Flash on Stainless Steel: <b>N/A</b>		
	<b>Process Table G: N/A</b>		
	Hard Chrome Plating <b>N/A</b>		
	<b>Process Table H:</b>		
	Electroless Nickel <b>N/A</b>		
	<b>Process Table I:</b>		
	Hydrogen Embrittlement Relief Bake Process		
	<b>Process Table J :</b>		
	Process Control and Testing Equipment		
Current Quality Certification(s): ISO 9001:2008, ISO 14001:2004			
Personnel Contacted:			
Name:	Title:	Phone:	Email:
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Number of "Not Satisfactory" Findings: None			
Number of "Needs Immediate Action" Findings: None			
Number of "Fail" Findings in the Job Audit(s): None			
Number of Process Table items identified as failed in Comments/Observation column: None			

**Special Process: Plating Process Assessment (General Facility Overview)**

Special Process: Plating Process Assessment (General Facility Overview)							
Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment			
				N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
<b>Section 1 - Management Responsibility and Quality Planning</b>							
1.1	Is there a dedicated and qualified plating person on-site?	To ensure readily available expertise, there shall be a dedicated and qualified plating 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 plating knowledge. The qualifications shall include a minimum of 5 years experience in plating and surface finishing or a combination of formal chemistry/chemical engineering education and plating experience totaling a minimum of 5 years.	Quality Control Supervisor and Plant Manager meet the described requirement for a "qualified coating person" on site. These positions are detailed in the Quality Manual organization chart. The Training database details the required training for these personnel.		<b>Meets specified requirements</b>		
1.2	Does the plater perform advanced quality planning?	The plater shall incorporate a documented advance quality planning procedure. A feasibility study shall be performed and internally approved for each part. Similar parts can be grouped into part families for this effort as defined by the plater. After the part approval process is approved by the customer, no process changes are allowed unless approved by the customer. The plater shall contact the customer when clarification of process changes is required. This clarification of process changes shall be documented.	APQP is done during the Quotation process. During this process the finish requirement, processing specification, and part configuration are evaluated to confirm that we have the capability of producing the part. This evaluation includes the determination as to whether specific tooling is required to produce the part. Should the process not be able to meet the specified requirements either a Deviation Note is add to the quotation detailing the required deviation or the customer is informed that we are unable to meet the specified requirements		<b>Meets specified requirements</b>		

Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment			
				N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
1.3	Are plater FMEA's up to date and reflecting current processing?	<p>The plater 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.</p> <p>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 plating process parameters as defined by the plater.</p> <p>A cross-functional team shall be used in the development of the FMEA. All characteristics, as defined by the plater and its customers, shall be identified, defined, and addressed in the FMEA.</p>	FMEAs are on file and updated as required. PFMEAs are process based and detail all process steps and all key plating process parameters.		Meets specified requirements		
1.4	Are finish process Control Plans up to date and reflecting current processing?	<p>The plater 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 plating process parameters as defined by the plater. 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 plater 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.</p>	Control Plans are in place for each process. Control Plans are up to date and reflect current process		Meets specified requirements		

Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment			
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1.5	Are all plating related and referenced specifications current and available? For example: SAE, AIAG, ASTM, General Motors, Ford, and Chrysler.	To ensure all customer requirements are both understood and satisfied, the plater shall have all related plating 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 Chrysler. The plater 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 plater 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 plating organization, how the current status is established, and how the relevant information is cascaded to the shop floor within the two-week period. The plater shall identify who is responsible for performing these tasks.	<p>All specification are electronically controlled in the System 9000 Specification Database.</p> <p>General Motors, Ford, Chrysler, DIN, ASTM, SAE USCAR, Delphi Volvo specifications are updated and are on automatic review using Lotus Notes System.</p> <p>Honda, Nissan, Toyota and Mazda can only be updated when customer supplies updated specification. There are no web sites for these specifications and these companies will only issue their specifications to their suppliers.</p> <p>All Quotations submitted to customers clearly identify the Issue date of the specification the parts are being quoted to.</p>		<b>Meets specified requirements</b>		
1.6	Is there a written process specification for all active processes?	The plater 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 plater 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.	<p>Process requirements are detailed on Process Control Plans. Requirements are also noted on appropriate documents used to document process parameter verification/analysis. These documents are all found in the System 9000 Released Document database.</p> <p>Completed documents with verification/analysis results can be found in Lab.</p>		<b>Meets specified requirements</b>		

Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment			
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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 plater 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 plater shall define what constitutes a major rebuild. Initial product capability studies shall be conducted for all plating processes per line as defined in scope of work and in accordance with customer requirements. Capability study techniques shall be appropriate for the plating product characteristics, e.g. plate thickness, corrosion resistance, etc.. Any specific customer requirements shall be met. In the absence of customer requirements, the plater 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 capabilities studies are performed once per year. Studies are done on a bar or rack with a minimum Ppk of 1.67. Reviewed studied from all line. All processes show a Ppk greater than 1.67		Meets specified requirements		
1.8	Does the plater 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 plater 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 plater shall determine which parameters to include in such analysis.	There is a regular analysis of defective material. This includes a review of the process data where applicable. This information is documented and reviewed at Plant Specific Management review Meetings.		Meets specified requirements		
1.9	Are records retained and available?	All process control and testing records must be retained for a minimum of one calendar year after the year in which they were created.	All Process Control and Testing documents are maintained for a minimum of one year after the year created. See SOP-0003		Meets specified requirements		
1.10	Does management review and verify bake oven logs for parts requiring hydrogen embrittlement relief every 24 hours?	Management shall review the oven monitoring systems/logs at intervals not to exceed 24 hours or prior to parts being released for shipment. The plater shall have reaction plans for non-conformances to process requirements. This is to contain, at minimum, requirements for quarantining material and notifying customer.	Bake Logs are reviewed and signed off on a daily basis by the Q.C Supervisor. There is a Reaction Plan for nonconforming product including a positive recall process.		Meets specified requirements		

Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment			
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1.11	Are internal assessments being completed on an annual basis, at a minimum, incorporating AIAG PSA?	The plater shall conduct internal assessments on an annual basis, at a minimum, using the AIAG PSA. Concerns shall be addressed in a timely manner.	Internal Audits are performed on a regular basis a minimum of once per year by trained Internal Auditor. Audits cover all areas related to part including the quotation process, the coating process and the inspection process. Internal Audits based on CQI-12 are completed once per year by the Corporate Quality Assurance Manager. Final Product Audits are performed a minimum of once per year as part of the annual CQI Audits. There is a Third Party Audit (ICS) a minimum of once per year at all facilities as part of ISO 9000:2008 Registration. Records of both Internal and Third Party Audits are maintained in System 9000 Automotive Internal Audit database.		Meets specified requirements		
1.12	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 plating 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.	WI-0161 details process for reprocessing parts. This includes identification of personnel authorized to approve rework. As process includes use of acid pickle the coating on the nonconforming parts will be removed and the part returned to the bare metal state. As this is all part of the normal plating cycle a new process control sheet is required. Computer records document the reworked material. Should the rework be material returned from the customer (external rework) a new Shop Order is created for the parts. The exceptions are hardened steel parts. - These parts must be baked as per specified requirements prior to reprocessing. See WI-0012.		Meets specified requirements		

Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment			
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1.13	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.	All Customer Complaints/concerns are documented in the Customer Management database. Customer Complaints are entered and where required an 8D is generated showing the steps taken to resolve the issue. Where internal issues are found (monthly review of rejects corrective actions are implemented and documented.		<b>Meets specified requirements</b>		
1.14	Is there a continual improvement plan applicable to each process defined in the scope of the assessment?	The plater shall define a process for continual improvement for each plating process identified in the scope of the PSA. 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 plater shall show evidence of program effectiveness.	There is a documented process in place for continual improvement. Where appropriate continual improvement projects are documented in the Project Task database, This will include timelines. There are also continual improvements that are made without noting them in the Project Task database, These are usually small projects. these projects will be reported on during the bi monthly Plant Specific Management Review meetings.		<b>Meets specified requirements</b>		
1.15	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.	All material that has been placed in the quarantine area can only be released by a member of the MRB. MRB consists of Plant Manager, Q.C Supervisor, or		<b>Meets specified requirements</b>		



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1.16	Are there procedures or work instructions available to plating personnel that define the plating process?	There shall be procedures and work instructions available to plating personnel covering the plating 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.	There are documented work instructions covering the coating process. These work instructions cover equipment start-up, equipment shutdown, product identification, product traceability, product inspection requirements and criteria, and process monitoring. These work instructions and procedures also include methods of addressing emergency situations. See WI-0225. Work Instructions are maintained in the System 9000 Document Control Database and are reviewed a minimum of once per year. All Procedures, Work Instructions and Forms are maintained as Controlled Documents. Changes to documents go through an Approval Process prior to release of the document for use. Where the employee does not have computer access hard copies of the appropriate procedures and work instructions are maintained.		Meets specified requirements		
1.17	Is management providing employee training for plating?	The plater shall provide employee training for all plating 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.	Formal training program in place. All training documented in Training Database. Training database details training requirements for each job function and shows when training is complete. Training database is reviewed on a monthly basis to ensure that any updated documents are added and to ensure that training is completed on a timely basis.		Meets specified requirements		
1.18	Is there a responsibility matrix to ensure that all key management and supervisory functions are performed by qualified personnel?	The plater 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 plater). This matrix shall be readily available to management at all times.	Training Database shows personnel trained for specific functions. If personnel have been trained for more than one job function this is also noted on the Training Database.		Meets specified requirements		

Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment			
				N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
1.19	Is there a preventive maintenance program? Is maintenance data being utilized to form a predictive maintenance program?	The plater shall have a documented preventive maintenance program for key process equipment (as identified by the plater). 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.	There is a formal Preventive Maintenance program in place. Program is based on both the time and machine usage. Maintenance schedule reviewed a minimum of once per year and updated appropriately based on analysis of maintenance data.. There is system in place to document and follow-up on operator concerns.		Meets specified requirements		
1.20	Has the plater developed a critical spare part list and are the parts available to minimize production disruptions?	The plater shall develop and maintain a critical spare parts list and shall ensure the availability of such parts to minimize production disruptions.	A key spare parts list has been set up for each facility. Each faculty has also been supplied with the Key Spare Parts list of the other facilities.		Meets specified requirements		
<b>Section 2 - Floor and Material Handling Responsibility</b>							
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.	There are documented procedures for receipt of customer product. All product is assigned a Serialized Shop Order that is specific to each container of material received. There are documented procedures in place to resolve receiving		Meets specified requirements		

Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment			
				N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
2.2	Is product clearly identified and staged throughout the plating 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 plating process. Non-plated, in-process, and finished product shall be properly segregated and identified. All material shall be staged in a dedicated and clearly defined area.	Parts are clearly identified with Shop order which identifies part number, Lot Number (if supplied by customer) and processing requirements. There are no dedicated formal staging areas for either raw or finished product. There are general areas but these areas shrink or expand based on material in house. Computer program (LIBRA) control customer part inventory along with part status. There are safeties built into the LIBRA system that will not allow material to be processed on the wrong line or raw material being shipped back to the customer without proper authorization (MRB)		Meets specified requirements		
2.3	Is lot traceability and integrity maintained throughout all processes?	Out-going lot(s) shall be traceable to the incoming lot(s). The discipline 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 through serialized Shop Orders. Each bin has a separate Shop Order which I generated by the LIBRA system. Shop Order is attached to each bin of material when it comes in. This Ship Order is scanned in and out of the line when the parts are processed. This allows for traceability of processing.		Meets specified requirements		
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.	Nonconforming product is controlled. Nonconforming material can only be removed from Quarantine/Hold area with authorization of MRB.		Meets specified requirements		
2.5	Is there a system to identify and inspect trap points in the entire plating process to reduce risk of mixed parts (inappropriate, unfinished, or improperly plated parts)?	There shall be a list of trap points and work instructions detailing inspection frequencies.	There are no trap points in the system as parts are all racked.		Meets specified requirements		

Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment			
				N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
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 plating parts or inappropriate material contaminate the finished lot.	Containers are inspected prior to placing parts back into them after processing to ensure that there is no inappropriate material in the bin. If agreed to under Contract Review a bag liner is placed in the bin to prevent any contamination from oil etc in the bin..		Meets specified requirements		
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.	Part Loading is based on both operator experience and part history. Where there is a specific requirement for clearly defined rack or part orientation due to process concerns the appropriate information is either detailed in a work instruction or noted in the LIBRA system so that when the part is scanned in for processing the computer will notify operator of appropriate loading/racking requirements.		Meets specified requirements		
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.	All appropriate personnel have been trained emergency procedures. WI-0003 Details Action Plan for Unplanned or Emergency downtime.		Meets specified requirements		
2.9	Is the handling, storage and packaging adequate to preserve product quality?	The plater's loading/unloading systems, in process handling and shipping process shall be assessed for risk of part damage or other quality concerns.	Packaging is determined and agreed upon between customer and Acadian Group during Contract Review process..		Meets specified requirements		

Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment			
				N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
2.10	Are plant cleanliness, housekeeping and 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 plater 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.	There is a formal housekeeping program in effect at all facilities including a monthly "Housekeeping Checklist" that is completed and forwarded to Senior Management by the Plant Manager. Housekeeping is also addressed on Start-up and Shut-down checklists.		Meets specified requirements		
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 Parameters are not all monitored at frequencies noted in process tables. Where frequencies differ from noted tables documentation is in on hand to justify change in frequencies. See appropriate Process Table		Meets specified requirements		
2.12	Are out of control/specification parameters reviewed and reacted to?	Are there documented reaction plans to both out of control and out of tolerance process parameters? Is there documented evidence that reaction plans are followed?	Out of control situations are documented and appropriate steps are taken. Documented reacting Plans in place for out of control situations.		Meets specified requirements		
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.	All testing is being done at intervals noted on the PCP		Meets specified requirements		
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.	All test equipment is calibrated at specified intervals. Where applicable all calibrations re done using NIST traceable standards.		Meets specified requirements		
2.15	Are the water rinses controlled and detailed in the process Control Plan to reflect full process parameters?	Identify operating parameters including: - number of rinse tanks between process stages, - tank type (single rinse, counter flowing, stationary rinse, spray rinse) - flow rate, - water requirements (city or deionized water, reverse osmosis), - filtration (if applicable) - control methods.	Rinses are included in Process Control plans and where applicable type is included. Overflowing rinses are verified a minimum of once per shift.		Meets specified requirements		

### Section 3 - Zinc/ Zinc Alloy Plating Equipment

Section 3 - Zinc/ Zinc Alloy Plating Equipment							
Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment			
				N/A	Satisfactory	Not Satisfactory	Needs Immediate Action
3.1	Are process and testing equipment calibrations and/or verification certified, posted, and current?	A system shall be used by the plating facility to track calibration dates of equipment. This system will typically be a computerized tracking system or other notification system. Test equipment shall be verified/calibrated per applicable customer specific standard or consensus standard, e.g., ASTM, SAE, ISO, NIST, etc. Verification/calibration results shall be internally reviewed, approved and documented. Refer to Process Table J, for equipment certification time table.	Calibrations are maintained on System 9000 Calibration database. Calibrations include appropriate measuring equipment, Secondary standards and where applicable analytical chemicals that have an expiry date, Calibration verification time requirements fall within the parameters noted in Process Table J		Meet Specified Requirements		
3.2	Are barrels, racks, and baskets maintained?	Plater shall have preventative maintenance system that is documented and implemented.	There is an ongoing PM on plating barrels. See FCD-0031		Meet Specified Requirements		
3.3	Are rectifiers maintained?	Plater shall have preventative maintenance system that is documented and implemented.	There is a formal PM system in place for rectifiers. Rectifiers are inspected and cleaned once per year.		Meet Specified Requirements		
3.4	Are Contacts and Bussing maintained?	Plater shall have preventative maintenance system that is documented and implemented.					
3.5	Are filters maintained?	Plater shall have preventative maintenance system that is documented and implemented.	Filters are maintained and cleaned as required. Functionality of filters is verified a minimum of once per shift.		Meet Specified Requirements		
3.6	For hydrogen embrittlement relief ovens, are temperature uniformity surveys performed yearly?	Uniformity survey must show that ovens were tested both empty and with a full load. Parts must come up to temperature within one hour of entering oven and meet temperature tolerance specified by customer.					

### Section 3 - Zinc/ Zinc Alloy Plating Equipment

				Assessment		
3.7	For hydrogen embrittlement relief ovens, are thermocouples checked and/or replaced quarterly?	Plater shall have preventative maintenance system that is documented and implemented.	Calibration of thermocouples are verified a minimum of once per quarter using a NIST traceable high temperature thermometer. Records of calibration verification are found in System 9000 calibration database.	<b>Meet Specified Requirements</b>		
3.8	Is there a drying/curing system in place?	Plater shall have a defined drying process to adequately dry parts. Process to include control and verification of temperature and time.	Plating cycle includes a drying process. Parts go through a spin dryer which is heated by forced air. Heating is by natural gas. Temperature may be adjusted if required based on part configuration or load size. Maximum temperature setting 400 F. Time is adjustable by the machine operator. Parts are inspected during the unloading process to ensure that they are dry.	<b>Meet Specified Requirements</b>		

**Section 7 - Job Audit - Finished Product Review**

**Job Identity:** Enterprise Line  
**Customer:** Multitemp  
**Shop Order Number:** 120803040  
**Part Number:** 1720201101  
**Part Description:** Bracket  
**Material:** Steel  
**Plating Requirements:** WSS-M21P17-B3 (Zinc plate plus Trivalent Chromite and Seal)

Question Number	Job Audit Question	Related PSA Question #	Customer or Internal Requirement	Job (Shop) Order or Reference Documentation Requirement	Actual Condition (Objective Evidence)	Pass / Fail / N/A
7.1	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	APQP is done during the Quotation process. During this process the finish requirement, processing specification, and part configuration are evaluated to confirm that we have the capability of producing the part. This evaluation includes the determination as to whether specific tooling is required to produce the part. Should the process not be able to meet the specified requirements either a Deviation Note is add to the quotation detailing the required deviation or the customer is informed that we are unable to meet the specified requirements	APQP is done during the Quotation process. During this process the finish requirement, processing specification, and part configuration are evaluated to confirm that we have the capability of producing the part. This evaluation includes the determination as to whether specific tooling is required to produce the part. Should the process not be able to meet the specified requirements either a Deviation Note is add to the quotation detailing the required deviation or the customer is informed that we are unable to meet the specified requirements	Contact Review Files Quote Number 004972A Dated 10/08/11	Pass



7.2	Does the coater have the proper customer specifications for the part?	1.5	Part Quoted to Ford Specification WSS-M21P17-B3	N/A	Specification on File Dated 05/02/06 Verified on HIS Global Document database specification is latest issue.	Pass
7.3	Is a shop traveler created to meet customer requirements?	1.6 2.1	Shop Order created for each bin of parts received. Shop Order is based on date received and the number of bins received that date. If supplied on Packing Slip Shop Order includes Customer Lot Number	Shop Order with parts. S/N 120803040	Shop Order with parts.	Pass
7.4	Is material identification (part numbers, lot numbers, contract numbers, etc.) maintained throughout the coating process?	2.2 2.3 2.4	Shop Order created for each bin of parts received. Shop Order is based on date received and the number of bins received that date. If supplied on Packing Slip Shop Order includes Customer Lot Number	Shop Order with parts. S/N 120803040	Shop Order with parts.	Pass
7.5	Is there documented evidence of Receiving Inspection?	2.1	Attach Shop Order to Bin of parts to show that parts have passed Incoming Inspection requirements.	Shop Order with parts. S/N 120803040	Shop Order with parts.	Pass
7.6	Are the Loading / Racking requirements identified?	1.6 2.7 2.9	Where required load sizes and appropriate data is entered on Libra System.	Libra System	Libra System	Pass
7.7	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	Ford specification WSS-M21P17-B3	Processing Code noted on Shop Order corresponds to specification requirement. (EBZ032NCV)	Specification on File Dated 05/02/06 Verified on HIS Global Document database specification is latest issue.	Pass
<b>Solution Analysis</b>						
			Soak Cleaner No. 1 1/shift	FCD-0027-A - 1 - 3 % BV	3.5%, 3.3%, 3.2%	Pass
			Soak Cleaner No. 2 1/shift	FCD-0027-A - 1 - 3 % BV	3.7%, 3.5%, 3.3%	Pass
			Electrocleaner - 1/shift	FCD-0027-A - 3 - 5 % BV	5.3 %, 5.1 %, 5.0 %	Pass
			Acid Pickle - 1/shift	FCD-0027-A - 20 - 60 % B.V.	38%, 48%, 44%	Pass

			<b>PLATING BATH</b>			
			Total Chloride	FCD-0027-A - 15 - 21 mls.	20.33, 20.25, 20.7	Pass
			Zinc Metal - 1/week	FCD-0027-A - 3.0 - 5.0 OPG	3.30 OPG	Pass
			Zinc Solution pH - 1/shift	FCD-0027-A - 5.0 - 6.0	5.98, 5.87, 5.85	Pass
			Clear Chromite Concentration - 1/shift	FCD-0027-A - 10 - 15 % B.V.	10.17, 10.7, 10.13	Pass
			Clear Chromite pH - 1/shift	FCD-0027-A - 1.8 - 2.2 .	2.14, 2.45, 3.30	Pass Sample submitted for salt spray. Part met Salt Spray
			Seal Concentration - 1/shift	FCD-0027-A - 3 - 6 % B.V.	3.96, 3.96, 3.96	Pass
			Seal pH - 1/shift	FCD-0027-A - 8.5 - 11	11.03, 11.0, 11.0	Pass
			<b>In process Checks</b>			
			Hot Rinse Temperature - Twice per Shift	FCD-0027-B - 90 F Minimum	N/P, 97, 92, 98, 95, 93	Pass
			Uniseal 2001 Temperature Twice per Shift	FCD-0027-B - 70 - 90 F	N/P, 80, 81, 81, 82, 80	Pass
			High Performance Clear Chromate Temperature Twice per Shift	FCD-0027-B - 85 - 95 F	N/P, 89, 90, 90, 89, 89	Pass
			Soak Cleaner No. 1 Temperature Twice per Shift	FCD-0027-B - 140 - 165 F	N/P, 156, 160, 160, 158, 158	Pass
			Soak Cleaner No. 2 Temperature Twice per Shift	FCD-0027-B - 140 - 165 F	N/P, 154, 160, 160, 159, 158	Pass
			Electrocleaner Temperature Twice per Shift	FCD-0027-B - 140 - 165 F	N/P, 155, 152, 150, 158, 158	Pass
			Zinc Solution Temperature Twice per Shift	FCD-0027-B - 70 - 105 F	76, 92, 90, 93, NP, NP	Pass
7.8	What are the product inspection requirements?	2.13	Each part may have one or more requirements determined by the plating specification. Parts must meet each requirement. List each requirement below and validate.			
7.8.1	Requirement: Plate Thickness					
	Test Method:		Dermitron - Eddy Current			
	Test frequency or quantity:		2 Pieces			
	Selection of samples:		From Bin of parts ready to ship to customer			

	Specification:		WSS-M21P17-B3 Minimum Thickness of 8 Microns (0.00032")	As per Processing Code shown Shop Order	9.4 um 10.1 um	Pass
7.8.2	Requirement: Corrosion Resistance					
	Test Method:		ASTM B117 Rev: 10/01/11			
	Test frequency or quantity:		1 Piece			
	Selection of samples:		From Bin of parts ready to ship to customer			
	Specification:		WSS-M21P17-B3	96 Hours - No white corrosion 384 Hours - No red rust	No evidence white corrosion after 96 Hour exposure. No evidence red rust after 384 hour exposure	Pass
7.8.3	Requirement: Hydrogen Embrittlement Relief (if Applicable)		This includes the transition time from the plating bath to the oven plus heating time. The time to temperature is different for different customers. The most strict (shortest heating time) requirements shall be met.			
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.4	Requirement: Adhesion Test					
	Test Method:		ASTM 571			
	Test frequency or quantity:		1 Part			
	Selection of samples:		From Bin of parts ready to ship to customer			
	Specification:		WSS-M21P17-B3 No loss of adhesion	Heat Quench Test	No loss of adhesion	Pass
7.8.5	Requirement: Substrate Alloy (if Applicable)					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			

7.8.6	Requirement: Torque Tension (if Applicable)					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.7	Requirement: Appearance (Decorative)					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.8	Requirement: Hardness					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.9	Requirement: Smoothness, Rz/Ra					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.10	Requirement: Polishing/Grinding					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.11	Requirement: Stress					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.12	Requirement: Ductility					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			

7.8.13	Requirement: Pore Count/Active Sites					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.14	Requirement: S.T.E.P. (Decorative)					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.15	Sulfur by foil					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.16	Pull Test					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.17	Requirement: Thermal Cycle (Decorative Plastic)					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
<b>Operator or Inspector Responsibilities</b>						
7.9	Were appropriate process steps signed off?	1.4 2.2 2.3 2.11	As per appropriate Log Sheet	FCD-0027-A Rev.8 FCD-0027-B Rev. 7	All process steps completed and documented. Forms verified and signed off by Q.C. Supervisor.	Pass

7.10	Were all inspection steps, as documented in the Control Plan performed?	1.2 1.4	As per appropriate Log Sheet	FCD-0027-D Rev.8 FCD-0027-E Rev. 8	All inspection steps completed and documented. Forms verified and signed off by Q.C. Supervisor. Shop Order signed off with identification of inspector.	Pass
7.11	Were steps/operations performed that were not documented in the Control Plan?	1.2 1.4 1.6			There were no steps performed that were not on the PCP	Pass
7.12	If additional steps were performed, were they authorized?	1.2 1.4 1.6 1.11 1.17				N/A
7.13	If the order was certified, did the certification accurately reflect the process performed?	2.11 2.13			Order was not certified as this is not a requirement from customer. Where certifications are required they reflect the part requirement and are signed off by the Q.C. Supervisor.	Pass
7.14	Was the certification signed by an authorized individual?	1.17				Pass
7.15	Are the parts and containers free of foreign objects or contamination?	2.6			Parts are bulk packed back into customers container. Bins are being checked for foreign objects or contamination prior to use.	

**Packaging Requirements**

7.16	Are packaging requirements identified?	2.9			Packaging requirements are detailed on Shop Order. If parts are decanted Shop Order defines quantity per tote.	Pass
7.17	Are parts packaged to minimize mixed parts (parts packed over height of container)?	2.9			Verified that both bulk pack and decanted parts are packaged to minimize mixed parts. None of the containers checked had parts packed over the height of container.	Pass
<b>Shipping Requirements</b>						
7.18	Were the parts properly identified?	2.3			Verified 20 bins in shipping area. All bins were clearly identified with Shop Order that was signed as OK to Ship. Where applicable Customer labels were on bins.	Pass
7.19	Were the containers properly labeled?	2.3 2.9				Pass

**Section 7 - Job Audit - Finished Product Review**

**Job Identity:** Lake Line  
**Customer:** Warren Industries  
**Shop Order Number:** 120810176  
**Part Number:** 6548  
**Part Description:** Bracket  
**Material:** Steel  
**Plating Requirements:** GMW30448K240/120 (Zinc plate plus Trivalent Chromite and Seal)

Question Number	Job Audit Question	Related PSA Question #	Customer or Internal Requirement	Job (Shop) Order or Reference Documentation Requirement	Actual Condition (Objective Evidence)	Pass / Fail / N/A
7.1	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	APQP is done during the Quotation process. During this process the finish requirement, processing specification, and part configuration are evaluated to confirm that we have the capability of producing the part. This evaluation includes the determination as to whether specific tooling is required to produce the part. Should the process not be able to meet the specified requirements either a Deviation Note is add to the quotation detailing the required deviation or the customer is informed that we are unable to meet the specified requirements	APQP is done during the Quotation process. During this process the finish requirement, processing specification, and part configuration are evaluated to confirm that we have the capability of producing the part. This evaluation includes the determination as to whether specific tooling is required to produce the part. Should the process not be able to meet the specified requirements either a Deviation Note is add to the quotation detailing the required deviation or the customer is informed that we are unable to meet the specified requirements	Contact Review Files Quote Number 0047277 Dated 04/16/09	Pass
7.2	Does the coater have the proper customer specifications for the part?	1.5	Part Quoted to General Motors Specification GMW30448K240/120	N/A	Specification on File Dated February 2012 Verified on HIS Global Document database specification is latest issue.	Pass



7.3	Is a shop traveler created to meet customer requirements?	1.6 2.1	Shop Order created for each bin of parts received. Shop Order is based on date received and the number of bins received that date. If supplied on Packing Slip Shop Order includes Customer Lot Number	Shop Order with parts. S/N 120810176	Shop Order with parts.	Pass
7.4	Is material identification (part numbers, lot numbers, contract numbers, etc.) maintained throughout the coating process?	2.2 2.3 2.4	Shop Order created for each bin of parts received. Shop Order is based on date received and the number of bins received that date. If supplied on Packing Slip Shop Order includes Customer Lot Number	Shop Order with parts. S/N 120810176	Shop Order with parts.	Pass
7.5	Is there documented evidence of Receiving Inspection?	2.1	Attach Shop Order to Bin of parts to show that parts have passed Incoming Inspection requirements.	Shop Order with parts. S/N 120810176	Shop Order with parts.	Pass
7.6	Are the Loading / Racking requirements identified?	1.6 2.7 2.9	Where required load sizes and appropriate data is entered on Libra System.	Libra System	Libra System	Pass
7.7	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	General Motors specification GMW30448K240/120	Processing Code noted on Shop Order corresponds to specification requirement. (EBZ032NCV)	Specification on File Dated February 2012 Verified on HIS Global Document database specification is latest issue.	Pass
			<b>Solution Analysis</b>			
			Soak Cleaner 1/shift	FCD-0027-D - 1 - 3 % BV	2.3% 2.1%, NP	Pass
			Electrocleaner - 1/shift	FCD-0027-D - 3 - 5 % BV	5.0%, 4.8%, NP	Pass
			Acid Pickle - 1/shift	FCD-0027-D - 20 - 60 % B.V.	35%, 42%, NP	Pass
			<b>PLATING BATH</b>			
			Total Chloride	FCD-0027-D - 15 - 21 mls.	20.64, 20.0, NP	Pass
			Zinc Metal - 1/week	FCD-0027-D - 3.0 - 5.0 OPG	4.15	Pass
			Zinc Solution pH - 1/shift	FCD-0027-D - 5.0 - 6.0	5.15, 5.42, NP	Pass
			Clear Chromite Concentration - 1/shift	FCD-0027-D - 10 - 15 % B.V.	12.45, 11.80, NP	Pass
			Clear Chromite pH - 1/shift	FCD-0027-D - 1.8 - 2.2 .	2.20, 2.0, NP	Pass
			Seal Concentration - 1/shift	FCD-0027-D - 3 - 6 % B.V.	2.64, 3.3, NP	Pass Sample submitted for salt spray.

			Seal pH - 1/shift	FCD-0027-D - 7.5 - 10	8.89, 8.9, 8.8	Pass
			<b>In process Checks</b>			
			Hot Rinse Temperature - Twice per Shift	FCD-0027-E - 90 F Minimum	126, 90, 93, 92, NP, NP	Pass
			Uniseal 2001 Temperature Twice per Shift	FCD-0027-E - 70 - 90 F	75, 75, 76, 75, NP, NP	Pass
			High Performance Clear Chromate Temperature Twice per Shift	FCD-0027-E - 85 - 95 F	86, 85, 85, 86, NP, NP	Pass
			Presoak Temperature Twice per Shift	FCD-0027-E - 120 - 165 F	130, 120, 120, 120, NP, NP	Pass
			Soak Cleaner Temperature Twice per Shift	FCD-0027-E - 140 - 165 F	154, 147, 147, 147, NP, NP	Pass
			Electrocleaner Temperature Twice per Shift	FCD-0027-E - 140 - 165 F	146, 143, 145, 144, NP, NP	Pass
			Zinc Solution Temperature Twice per Shift	FCD-0027-E - 70 - 105 F	76, 92, 90, 93, NP, NP	Pass
7.8	What are the product inspection requirements?	2.13	Each part may have one or more requirements determined by the plating specification. Parts must meet each requirement. List each requirement below and validate.			
7.8.1	Requirement: Plate Thickness					
	Test Method:		Dermitron - Eddy Current			
	Test frequency or quantity:		2 Pieces			
	Selection of samples:		From Bin of parts ready to ship to customer			
	Specification:		GMW30448K240/120 Minimum Thickness of 8 Microns (0.00032")	As per Processing Code shown Shop Order	10.3 um 9.8 um	Pass
7.8.2	Requirement: Corrosion Resistance					
	Test Method:		ASTM B117 Rev: 10/01/11			
	Test frequency or quantity:		1 Piece			
	Selection of samples:		From Bin of parts ready to ship to customer			
	Specification:		GMW30448K240/120	120 Hours - No white corrosion 240 Hours - No red rust	No evidence white corrosion after 120 Hour exposure. No evidence red rust after 240 hour exposure	Pass

7.8.3	Requirement: Hydrogen Embrittlement Relief (if Applicable)		This includes the transition time from the plating bath to the oven plus heating time. The time to temperature is different for different customers. The most strict (shortest heating time) requirements shall be met.			
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.4	Requirement: Adhesion Test					
	Test Method:		ASTM 571			
	Test frequency or quantity:		1 Part			
	Selection of samples:		From Bin of parts ready to ship to customer			
	Specification:		GMW30448K240/120 No loss of adhesion	Heat Quench Test	No loss of adhesion	Pass
7.8.5	Requirement: Substrate Alloy (if Applicable)					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.6	Requirement: Torque Tension (if Applicable)					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.7	Requirement: Appearance (Decorative)					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.8	Requirement: Hardness					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.9	Requirement: Smoothness, Rz/Ra					
	Test Method:		N/A			

	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.10	Requirement: Polishing/Grinding					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.11	Requirement: Stress					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.12	Requirement: Ductility					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.13	Requirement: Pore Count/Active Sites					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.14	Requirement: S.T.E.P. (Decorative)					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.15	Sulfur by foil					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.16	Pull Test					
	Test Method:		N/A			
	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
7.8.17	Requirement: Thermal Cycle (Decorative Plastic)					
	Test Method:		N/A			

	Test frequency or quantity:		N/A			
	Selection of samples:		N/A			
	Specification:		N/A			
<b>Operator or Inspector Responsibilities</b>						
7.9	Were appropriate process steps signed off?	1.4 2.2 2.3 2.11	As per appropriate Log Sheet	FCD-0027-D Rev.8 FCD-0027-E Rev. 8	All process steps completed and documented. Forms verified and signed off by Q.C. Supervisor.	Pass
7.10	Were all inspection steps, as documented in the Control Plan performed?	1.2 1.4	As per appropriate Log Sheet	FCD-0027-D Rev.8 FCD-0027-E Rev. 8	All inspection steps completed and documented. Forms verified and signed off by Q.C. Supervisor. Shop Order signed off with identification of inspector.	Pass
7.11	Were steps/operations performed that were not documented in the Control Plan?	1.2 1.4 1.6			There were no steps performed that were not on the PCP	Pass
7.12	If additional steps were performed, were they authorized?	1.2 1.4 1.6 1.11 1.17				N/A
7.13	If the order was certified, did the certification accurately reflect the process performed?	2.11 2.13			Order was not certified as this is not a requirement from customer. Where certifications are required they reflect the part requirement and are signed off by the Q.C. Supervisor.	Pass
7.14	Was the certification signed by an authorized individual?	1.17				Pass

7.15	Are the parts and containers free of foreign objects or contamination?	2.6			Parts are bulk packed back into customers container. Bins are being checked for foreign objects or contamination prior to use. As per customer requirements plastic bin liners are placed in each bin prior to loading parts.	
<b>Packaging Requirements</b>						
7.16	Are packaging requirements identified?	2.9			Packaging requirements are detailed on Shop Order. If parts are decanted Shop Order defines quantity per tote.	Pass
7.17	Are parts packaged to minimize mixed parts (parts packed over height of container)?	2.9			Verified that both bulk pack and decanted parts are packaged to minimize mixed parts. None of the containers checked had parts packed over the height of container.	Pass
<b>Shipping Requirements</b>						
7.18	Were the parts properly identified?	2.3			Verified 20 bins in shipping area. All bins were clearly identified with Shop Order that was signed as OK to Ship. Where applicable Customer labels were on bins.	Pass
7.19	Were the containers properly labeled?	2.3 2.9				Pass

## PROCESS TABLE A - Zinc & Zinc Alloy Plating

All requirements given below are subordinate to applicable customer/OEM specific requirements.

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

\*If minimum requirements are not met, provide supporting records to justify actual conditions. To justify reduced monitoring frequencies, a minimum of 30 consecutive measurements (data points) at stated frequencies must be documented. If any data points at reduced monitoring frequencies are outside of control limits, then revert back to the frequencies stated under the minimum requirements.

For multiple tanks that serve the same purpose copy and paste sections as needed.

Process Line Identification:

Type of Line: Rack or Barrel

ITEM #	Related PSA Question #	Category/Process Steps	Type of Control		Monitoring Frequency		Observation/Comments  (Pass / Fail / N/A)
			Minimum Requirement	Actual Condition	Minimum Requirement	Actual Condition	
<b>1.0</b>		<b>Metal Cleaning</b>					
		Type:					
		Size, volume:					
		Proprietary name:					
		Chemical supplier:					
A1.1	1.4; 2.11; 2.13	Temperature	Automatic	See Job Audit	Continuous monitoring by controller. Manually verify daily.	Automatic Control. Temperature verified every four hours	Pass
A1.2	1.4; 2.11; 2.13	Concentration	Manual	See Job Audit	Once per day	Analysis performed once per day. Records on file	Pass
A1.3	1.4; 2.11; 2.13	Time	Automatic	See Job Audit	After any program changes.	Time controlled by PLC. Time verified after any program change/	Pass
A1.4		Agitation	Automatic	See Job Audit	Per process sheet	Agitation verified minimum once per shift. Documented on Control Log.	Pass
A1.5	1.4; 2.11; 2.13	Amperage or Voltage Control	Automatic	See Job Audit	Once every 8 hours*	Amperage verified minimum once per shift. Documented on Control Log.	Pass
A1.6		Solution Level	Manual	See Job Audit	Once every 8 hours	Solution Levels verified minimum once per shift. Documented on Control Log.	Pass

ITEM #	Related PSA Question #	Category/Process Steps	Type of Control		Monitoring Frequency		Observation/Comments  (Pass / Fail / N/A)
			Minimum Requirement	Actual Condition	Minimum Requirement	Actual Condition	
A1.7	2.15	Flowing Rinse	Automatic	See Job Audit	Once every 8 hours	Rinse overflowing verified minimum once per shift. Documented on Control Log.	Pass
<b>2.0</b>		<b>Acid Pickling</b>					
		<b>Type:</b>		Hydrochloric			
		<b>Size, volume:</b>					
		<b>Proprietary name:</b>		Muriatic Acid			
		<b>Chemical supplier:</b>		UBA			
A2.1	1.4; 2.11; 2.13	Temperature (if applicable)	Automatic		Continuous monitoring by controller. Manually verify daily.	N/A Ambient Temperature	N/A
A2.2	1.4; 2.11; 2.13	Concentration	Manual		Once every 8 hours*	Concentration analysis done once per day. Review of 2012 analysis results show no values out of specified range requirements	Pass
		Metallic impurity concentration. Obtain metallic impurity limits from chemical supplier with required corrective actions.	Manual		Once per month	Enthone to perform analysis and to provide appropriate limits and recommendations.	Pass
A2.3	1.4; 2.11; 2.13	Time (Less than 10 Minutes or Customer Specific)	Automatic	Controlled by PLC.	After any program changes.	Acid time less than 10 minutes. Time controlled by PLC. Time verified	Pass
A2.4		Inhibitor	Manual		Per Control Plan	N/A	N/A
A2.5		Solution Level	Manual	Rinse overflow verified minimum of once per shift.	Once every 8 hours	Solution Levels verified minimum once per shift. Documented on Control Log.	Pass
A2.6	2.15	Flowing Rinse	Automatic	Rinse overflow verified minimum of once per shift. See FCD-0027-B and FCD-0027-E.	Once every 8 hours	Rinse overflowing verified minimum once per shift. Documented on Control Log.	Pass
<b>3.0</b>		<b>Acid Plating Bath</b>					
		<b>Type:</b>					
		<b>Size, volume:</b>					
		<b>Proprietary name:</b>					
		<b>Chemical supplier:</b>					
A3.1	1.4; 2.11; 2.13	Temperature	Automatic	See Job Audit	Continuous monitoring by controller. Manually verify daily.	Automatic Control. Temperature verified every four hours	Pass



ITEM #	Related PSA Question #	Category/Process Steps	Type of Control		Monitoring Frequency		Observation/Comments  (Pass / Fail / N/A)
			Minimum Requirement	Actual Condition	Minimum Requirement	Actual Condition	
A3.2	1.4; 2.11; 2.13	Time	Automatic		After any program changes.	Time controlled by PLC. Time verified after any program change.	Pass
A3.3	1.4; 2.11; 2.13	Current/Voltage	Automatic or Manual		Once every 8 hours	Voltage checked once per shift (8 hours)	Pass
A3.4		Chloride Concentration	Manual	See Job Audit	Once per day	Analysis performed	Pass
A3.5		pH	Manual	See Job Audit	Once every 8 hours	pH checked once per shift (8 hours) rerecords on file	Pass
A3.6		Plating Test Cell (Hull)	Manual	Once per week as per letter from Atotech.	Once per day*	As per Atotech monthly testing exceeds requirements. Records on file.	
A3.7		Plating Metal Concentration(s)	Manual		Once per day*	Zinc Analysis performed	Pass
A3.8		Metallic impurity concentration. Obtain metallic impurity limits from chemical supplier with required corrective actions.	Manual		Once per month	Atotech to perform analysis and to provide appropriate limits and recommendations.	Pass
A3.9		Buffer (Ammonia / Boric Acid per TDS)	Manual	N/A	Once per week*	N/A	
A3.10		Filtration	Continuous		Once every 8 hours	Filters are checked	Pass
A3.11		Agitation (Rack only - others optional)	Continuous	N/A	Once every 8 hours	N/A	N/A
A3.12	2.15	Flowing Rinse	Automatic	Rinse overflow verified minimum of once per shift. See FCD-0027-B and FCD-0027-E.	Once every 8 hours	Rinse overflowing verified minimum once per shift. Documented on Control Log.	Pass

ITEM #	Related PSA Question #	Category/Process Steps	Type of Control		Monitoring Frequency		Observation/Comments  (Pass / Fail / N/A)
			Minimum Requirement	Actual Condition	Minimum Requirement	Actual Condition	
<b>4.0</b>		<b>Alkaline Plating Bath</b>					
		Type:		N/A			
		Size, volume:		N/A			
		Proprietary name:		N/A			
		Chemical supplier:		N/A			
A4.1	1.4; 2.11; 2.13	Temperature	Automatic	N/A	Continuous monitoring by controller. Manually verify daily.		
A4.2	1.4; 2.11; 2.13	Time	Automatic	N/A	After any program changes.		
A4.3	1.4; 2.11; 2.13	Current/Voltage	Automatic or Manual	N/A	Once every 8 hours		
A4.4		Caustic Concentration	Manual	N/A	Once per day		
A4.5		Plating Test Cell (Hull)	Manual	N/A	Once per day		
A4.6		Plating Metal Concentration(s)	Manual	N/A	Once per day		
A4.7		Metallic impurity concentration. Obtain metallic impurity limits from chemical supplier with required corrective actions.	Manual	N/A	Once per month		
A4.8		Filtration	Continuous	N/A	Once every 8 hours		
A4.9	2.15	Flowing Rinse	Automatic	N/A	Once every 8 hours		
<b>5.0</b>		<b>Pre-bake acid treatment if baking is required (i.e., nitric, sulfuric, chromate, etc.)</b>					
A5.1		pH/concentration	Manual	N/A	Once every 8 hours	pH checked once per shift (8 hours) records on file	Pass
A5.2	1.4; 2.11; 2.13	Time	Automatic	N/A	After any program changes.	Time controlled by PLC. Time verified after any program change.	Pass
<b>6.0</b>		<b>Hydrogen Embrittlement Relief</b>					
A6.1		Refer to PT Embrittlement Bake as required					
<b>7.0</b>		<b>Acid Activation (i.e., nitric, sulfuric, etc.)</b>					
A7.1		pH/concentration	Manual	See Job Audit	Once every 8 hours	pH checked once per shift (8 hours) records on file	Pass
A7.2	1.4; 2.11; 2.13	Time	Automatic*	See Job Audit	After any program changes.	Time controlled by PLC. Time verified after any program change.	Pass
<b>8.0</b>		<b>Passivates</b>					
		Type:					
		Size, volume:					
		Proprietary name:					

ITEM #	Related PSA Question #	Category/Process Steps	Type of Control		Monitoring Frequency		Observation/Comments  (Pass / Fail / N/A)	
			Minimum Requirement	Actual Condition	Minimum Requirement	Actual Condition		
		<b>Chemical supplier:</b>						
A8.1		Concentration	Automatic or Manual		Prior to production start-up. If automatic control once per day, once every 8 hours if manual.	Concentration analysis done prior to start up and once per shift (8 hours) . Records on file.	Pass	
A8.2	1.4; 2.11; 2.13	Temperature	Automatic		Continuous monitoring by controller. Manually verify daily.	Temperature is controlled by temperature controller. Temperature is verified minimum of once per shift. Records on file.	Pass	
A8.3	1.4; 2.11; 2.13	Time	Automatic or Manual		Automatic -After any program changes. Manual - every load.*	Time controlled by PLC. Time verified after any program change.	Pass	
A8.4		pH	Automatic*		Prior to production start-up. If automatic control once per day, once every 8 hours if manual.	Automatic additions based on production loads. Ph and concentration analyzed minimum of once per shift (8 hours)	Pass	
A8.5		Agitation	Automatic		Once every 8 hours	Agitation verified minimum once per shift (8 hours). Documented on Control Log.	Pass	
A8.6		Metallic Impurity level(s) (e.g. Fe, Zn)	Manual		Once per week	Iron levels checked once per week. Records on file.	Pass	
A8.7	2.15	Flowing Rinse	Automatic		Once every 8 hours	Rinse overflowing verified minimum once per shift. Documented on Control Log.	Pass	
<b>9.0</b>		<b>Supplemental Treatments - Topcoats, Sealants and Friction Modifiers</b>						
		<b>Type:</b>						
		<b>Size, volume:</b>						
		<b>Proprietary name:</b>						
		<b>Chemical supplier:</b>						
A9.1		Concentration	Manual		Prior to production start-up. If automatic control once per day, once every 8 hours if manual.	Concentration analysis done prior to start up and once per shift (8 hours) . Records on file.	Pass	

ITEM #	Related PSA Question #	Category/Process Steps	Type of Control		Monitoring Frequency		Observation/Comments  (Pass / Fail / N/A)	
			Minimum Requirement	Actual Condition	Minimum Requirement	Actual Condition		
A9.2	1.4; 2.11; 2.13	Temperature (if applicable)	Automatic		Continuous monitoring by controller. Manually verify daily.	Temperature is controlled by temperature controller. Temperature is verified minimum of once per shift. Records on file.	Pass	
A9.3		pH (if applicable)	Automatic or Manual		Prior to production start-up. If automatic control once per day, once every 8 hours if manual.	Automatic additions based on production loads. Ph and concentration analyzed minimum of once per shift (8 hours)	Pass	
A9.4	1.4; 2.11; 2.13	Time	Automatic*		After any program changes if automatic.	Time controlled by PLC. Time verified after any program change.	Pass	
<b>10.0</b>		<b>Drying</b>						
A10.1	3.7	Drying Time	Automatic or Manual		Per Process Sheet and TDS	Temperature is controlled by temperature controller. Temperature is verified minimum of once per shift. Records on file.	Pass	
A10.2	3.7	Drying Temperature	Automatic or Manual		Per Process Sheet and TDS	Dryer Operation is verified a minimum of once per shift (8 hours). Records on file.	Pass	
A10.3		Verify operation of blowers and/or rotation of dryer.	Manual		Once per 8 hours	Rotation of spin dryer verified each shift.	Pass	
A10.4	3.7	There is a procedure to ensure dryness of parts.	Manual		Every container and rack.	Visual inspection of each barrel of parts as they are unloaded	Pass	

Proceed to PT - Embrittlement Bake (If required)

## PROCESS TABLE I - Hydrogen Embrittlement Relief Bake Process

All requirements given below are subordinate to applicable customer/OEM specific requirements.

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

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For multiple tanks that serve the same purpose copy and paste sections as needed.

Process Line Identification:

Type of Oven: Batch or Continuous

ITEM #	Related PSA Question #	Category/Process Steps	Type of Control		Monitoring Frequency		Observation/Comments
			Minimum Requirement	Actual Condition	Minimum Requirement	Actual Condition	
1.0							
I1.1		Process must be in place that limits the acid immersion time in the plating process.	Automatic		No more than ten minutes. If more than ten minutes, parts need to be quarantined, and follow customer reaction plan.	Plating time controlled by PLC. Time is acid is less than 10 minutes	Pass
I1.2		All parts for hydrogen embrittlement relief must reach bake temperature at the center of the load within two hours after plating.	Automatic/Manual		If requirement or procedure is not met, parts need to be quarantined, and follow customer reaction plan.	Temperature probes are placed in the centre of the load. Bake charts are reviewed to verify that parts met temperature within specified time limits. WI-0012 details reaction plan should parts not meet temperature or time requirements.	Pass
I1.3		Oven temperature set point(s) and limits are verified and documented.	Manual		Start of bake cycle and every batch change.	Oven bake set points are verified at the start of each bake load. (batch ovens)	Pass
I1.4		Oven temperature is monitored and recorded.	Automatic		A continuous chart recorder must be used with a temperature control alarm.	Oven is batch type. Continuous chart recorder on oven Alarm on oven to sound if burner shuts off.	Pass

I1.5		For hydrogen embrittlement relief ovens, are temperature uniformity surveys performed yearly?	Manual		Uniformity survey must show that ovens were tested with a full production load. The applicator shall demonstrate that the time from plating to baking temperature can be reached within the time limit set by customer requirements.	Uniformity check completed with a full production load. Oven setting 425 F. Probes placed in parts. All parts reached minimum 400 f within two hours of plating.	Pass
I1.6		For hydrogen embrittlement relief ovens, are thermocouples checked and/or replaced quarterly?	Manual		Plater shall have preventative maintenance system that is documented and implemented.	There is a documented PM program in place for the bake ovens. Records of PMs are on file.	Pass
I1.7		Time and date out of plating line, start of bake cycle, and end of bake cycle, is electronically or mechanically recorded (not hand-written).	Automatic/Manual		Every baking batch.	A time stamp is used when the parts come off the plating line, when they enter the oven and when they are removed from the oven. These records are verified to ensure that bake cycle meets customer's specified requirements.	Pass
I1.8		Air filter (if used) change is scheduled.	Manual		Per oven manufacturer, filter supplier recommendation	Filters are maintained and changed based on supplier	Pass
I1.9		Bake oven logs for each batch are reviewed and verified.	Manual		Before shipment of each batch an independent inspector (other than operator) shall verify that time and date out of plating line, start of bake cycle, temperature and end of bake cycle meet process specification.	All bake Logs and Oven records are reviewed and signed off prior to shipment to the customer.	Pass
I1.10		Hydrogen embrittlement relief must performed per customer requirements before re-work.			Hydrogen embrittlement relief is a time sensitive process. In the case of re-work, the parts must be baked immediately. This shall be reflected in the re-work process control documents.	Rework requirements detailed in WI-0161 and WI-0012 which state <b>"Reprocessing of Nonconforming Material"</b>  All nonconforming material that requires a bake for hydrogen embrittlement MUST be baked as per requirements noted on Shop Order prior to reprocessing parts.	Pass

## PROCESS TABLE J - Process Control and Testing Equipment

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ITEM #	EQUIPMENT TYPE	Zinc/Zinc Alloy	Decorative Plating	Electroless Nickel	Hard Chrome	Electropolish	Chrome flash	Verification Frequency	Calibration / Certification Frequency	Observation/Comments (Pass / Fail / N/A)
1.0	<b>LABORATORY EQUIPMENT</b>									
J1.1	<b>Wet Analysis:</b> Before use, chemicals must be checked for shelf life and/or expiration date	X	X	X	X	X	X	Daily	N/A	All chemicals./standards that have a shelf life are entered into the calibration database. These chemicals/standards are disposed of on or before calibration due date. See Calibration Database. Pass
J1.2	pH / Conductivity Meter	X	X	X		X		Daily	Yearly	pH Meter is calibrated weekly and verified daily Pass
J1.3	pH / Conductivity Probes Solution compatible probes must be used. Dedicated probes must be used for chromates / passivates.	X	X	X		X		Before each use	N/A	
J1.4	Laboratory Balance (Weight Scale) (Optional)	X	X	X	X			Monthly	Yearly	N/A
J1.5	Atomic Absorption (AA)*	X	X	X				Before each use	Yearly	AA unit is calibrated each time it is used. Pass
J1.6	X-Ray Fluorescence (XRF)	Alloy Only						Thickness and alloy verification daily	Yearly	N/A
J1.7	Hardness Tester*		X		X			Daily	Yearly	N/A
J1.8	Profilometer				X			Daily	Yearly	N/A
J1.9	Lab Rectifier	X	X		X			When applicable	Yearly	N/A

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1.0	<b>LABORATORY EQUIPMENT</b>									
2.0	<b>TESTING EQUIPMENT</b>									
J2.1	Salt Spray Cabinet	X			X			Daily	Yearly	Salt Spray Cabinet is operated in accordance with ASTM B11y (Rev. 11 Dated 10/01/11) Readings are taken from Salt Spray Cabinet a minimum of twice per day (weekends excepted) Calibration of all applicable thermometers, Pressure gauges etc. are verified a minimum of once per year. Pass
J2.2	Thickness Tester	X	X	X	X		X	Daily	Yearly	Thickness testers are verified once per shift. They are calibrated once per month Pass
J2.3	Coulometric (STEP) Tester		X					Daily	Yearly	N/A
J2.4	CASS Cabinet		X		X		X	Daily	Yearly	N/A
J2.5	Microscope (Min 100X) with calibrated grid reticle for Pore/Crack Count		X		X			N/A	Yearly	N/A
J2.6	Freezer		X					Daily	Yearly	N/A
J2.7	Lab Oven	X	X				X	Daily	Yearly	Lab oven is verified daily and calibration is verified once per year. Pass



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1.0	<b>LABORATORY EQUIPMENT</b>									
3.0	<b>PROCESSING EQUIPMENT</b>									
J3.1	Rectifier	X	X		X	X	X	Ripple checked every 12 months	N/A	This is performed as part of the annual PM program. Pass
J3.2	Amp Meter/Volt Meter	X	X		X	X	X	Checked every 12 months	N/A	This is performed as part of the annual PM program. Pass
J3.3	Plating Solution Filters	X		X				Daily	N/A	Filters are checked a minimum of once per Shift. Pass
J3.4	Plate filters (bright and semi-bright nickel tanks)		X					Daily	N/A	N/A
J3.5	Oven Temperature recorder							Every 3 months	Yearly	There is a chart recorder used each time parts are processed through the oven for Hydrogen embrittlement relief. Pass
J3.6	Data/Chart recorder for deembrittlement or EN hardness oven	X	X	X				Yearly	N/A	There is a chart recorder used each time parts are processed through the oven for Hydrogen embrittlement relief. Pass
J3.7	Thermocouples	X	X	X				Every 3 months		Thermocouples are verified using a NIST traceable Thermometer a minimum of once every three months. Records are maintained in System 9000 Calibration Database. Pass

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1.0	<b>LABORATORY EQUIPMENT</b>									
J3.8	<b>Controllers:</b> (If Used)	X	X	X	X	X	X	Set points and/or feed rates are verified (if applicable)		
J3.9	Automatic feeders							Daily		Automatic Feeders are checked a minimum of once per day. These feeders are adjusted if necessary based on regular solution analysis. Pass
J3.10	Timers							Daily		
J3.11	Temperature	X	X	X	X	X	X	Daily	Yearly	Temperatures are taken with a Nist traceable thermometer. Calibration of thermometer is verified once per month. Record are in System 9000 Calibration database.
J3.12	Volume							Daily		
J3.13	pH / Conductivity							Daily		
J3.14	<b>Agitation type:</b>	X	X	X		X				
J3.15	Air							Daily		Agitation is verified every Shift
J3.16	Cathode rod							Daily		N/A
J3.17	Eductor							Daily		N/A
J3.18	<b>Water source:</b>	X	X	X	X	X	X			City Water
J3.19	POTW									
J3.20	RO							Daily		
J3.21	Well									
J3.22	Deionized			X				Daily		

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ITEM #	EQUIPMENT TYPE	Zinc/Zinc Alloy	Decorative Plating	Electroless Nickel	Hard Chrome	Electropolish	Chrome flash	Verification Frequency	Calibration / Certification Frequency	Observation/Comments (Pass / Fail / N/A)
1.0	<b>LABORATORY EQUIPMENT</b>									
J3.23	<b>Drying type:</b>	X	X	X	X	X	X			
J3.24	Spin Dryer							Daily		Forced air spin dryer for drying parts. Temperature verified once per shift minimum.
J3.25	Forced Air Drying							Daily		Forced air spin dryer for drying parts. Temperature verified once per shift minimum.
J3.26	Belt Oven							Daily		N/A
J3.27	Box Oven							Daily		N/A