Special Process: Coating System Assessment Cover Sheet

Facility Name: Elm Plating Co.	
Address: 1319 S. Elm Ave & 533 Hupp st.	
Jackson MI. 49203	
Phone Number: 517-782-8161	
Current Quality Certification(s):	
Number of Coating Employees at this Facility:	
Captive Coater (Y/N): N	
Commercial Coater (Y/N): Y	
Date of Assessment: 10/13/20	
Date of Previous Assessment: 10/14/19	
Date of Re-assessment (if necessary):	
Type(s) of Coating Processing at this Facility:	
Process Table A: YES	**Process Table G: Yes**
Pretreatment (Aqueous)	Dip-Spin & Zinc Flake
Process Table B: YES	**Process Table H: Not applicable**
Pretreatment (Mechanical)	Autodeposition
Process Table C: Not applicable	**Process Table I: Yes**
Conversion Coatings	Cure
Process Table D: Not applicable	**Process Table J: Not applicable**
Powder Coating	Anodizing and Hard Coat Anodizing
Process Table E: Not applicable	**Process Table K: Yes**
Spray Coating	Equipment
Process Table F: Not applicable	
Electrocoat	
Personnel Contacted:	
Name: Sam Bitonti	Phone: 517-782-8161
Mike Clemet	517-782-8161
Cole Giffin	517-782-8161
Auditors/Assessors:	
Name: Bill Dunn	Phone: 517-782-8161
Number of Nonconforming Findings from Section 1 and Section 2:	
0	
Number of Nonconforming Findings in the Job Audit(s):	
0	
Number of Nonconforming Findings in the Process Table(s):	
0	

	Section 1 - Management Responsibility & Quality Planning
1.1	There shall be a dedicated and qualified surface finishing person on site.

• To ensure readily available expertise, there shall be a dedicated and qualified surface finishing person on 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 coating and surface finishing knowledge.
• The qualifications shall include a minimum of 5 years experience in surface finishing operation or a combination of a minimum of 5 years of relevant formal education and surface finishing experience.

Guidance	Objective Evidence	Conforming Nonconforming NA
What is this person's title?	Production Manager & director of technical engineering	**conforming**
Is this position reflected in the organizational chart?	Org Chart dated 6/28/20 Verified	**conforming**
Is there a documented job description listing all the required qualifications and responsibilities of this position?	See job description HRJD-0056 and HRJD-0040	**conforming**
Describe in detail this person's educational background and practical experience.	Bachelor's degree in technical field (or a minimum of 8 years experience) and a minimum of 5 years experience in a related field	**conforming**
How many years of process experience at a coating facility does this person have?	Management team has over 20 years of combined experience	**conforming**
Is this individual a full-time employee at the location being audited?	Production manager Full time and at location	**conforming**
Comments:		

	Section 1 - Management Responsibility & Quality Planning
1.2	The facility shall perform advanced quality planning.

• The organization shall incorporate a documented advanced product quality planning process.
• 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 organization shall contact the customer when clarification of process changes is required. This clarification of process changes shall be documented.

Guidance	Objective Evidence	Conforming Nonconforming NA
Does the facility use a documented advanced quality planning process?	Procedure # PR-200 for advanced quality planning including process changes. Planning documented on QCT4-0007	**conforming**
Does the facility perform a documented internal feasibility study for each part before processing? If no, does the facility perform a documented internal feasibility study for similar part types or family of parts before processing?	Documented on form # QCT4-0007 and recipe matrix data/ feasibility	**conforming**
What is the procedure for changing the process after PPAP?	Procedure # PR-200	**conforming**
Comments:		

	Section 1 - Management Responsibility & Quality Planning
1.3	The facilities FMEAs shall be up to date and shall reflect the current process.

• The organization shall incorporate the use of a documented Failure Mode and Effects Analysis (FMEA) 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.
• FMEAs shall address every process step from part receipt to part shipment.
• 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.

Guidance	Objective Evidence	Conforming Nonconforming NA
Does the facility have a documented Failure Mode and Effects Analysis (FMEA) in use?	Yes - see PFMEA dated 03/10/20	**conforming**
Identify the names and job function of the team members used in the development of the FMEA.	VP / Production manager / Quality Manager / Engineering	**conforming**
Identify if the FMEA is written for each part, part family or process specific.	Process Specific PFMEA , Control plan & PF	**conforming**
Are all FMEAs consistent with all associated documentation such as control plans, work instructions and shop travelers?	Yes	**conforming**
Do all FMEAs include every process step from part receipt to part shipment?	Yes	**conforming**
Are special characteristics, as defined by the organization and its customers, identified, defined, and addressed in the FMEAs?	PFMEA - states see job routers / on job routers (shop travelers)	**conforming**
Provide evidence that the FMEA has been updated in response to quality issues.	Yes - see PFMEA dated 3/20/20 - updated 3/20/20 from quality issue	**conforming**

Comments:

	Section 1 - Management Responsibility & Quality Planning
1.4	The process control plans shall be up to date and shall reflect the current process.

• The organization shall incorporate the use of a documented control plan 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.
• The control plans shall address all process steps from part receipt to part shipment and identify all equipment used and all key surface finishing process parameters as defined by the organization.
• A cross-functional team 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.
• The control plan shall detail the product and process characteristics, and controls including testing frequency and sample size.

Guidance	Objective Evidence	Conforming Nonconforming NA
Does the facility have a documented control plan in use?	Yes - see Control plan dated 03/10/20	**conforming**
Identify if the control plan is written for each part, part family or process specific.	Process Specific Control plan	**conforming**
Do all control plans include every process step from part receipt to part shipment?	Yes	**conforming**
Does the control plan identify all key surface finishing process parameters?	Yes	**conforming**
Identify the names and job function of the team members used in the development of the control plan.	VP / Production manager / Quality Manager / Engineering	**conforming**
Are the control plans consistent with all associated documentation such as work instructions, shop travelers, specifications and FMEAs?	Yes	**conforming**
Provide evidence that sample sizes and frequencies for evaluation of process and product characteristics are addressed and consistent with the minimum requirements.	Yes - sample size 10 pieces minimum.	**conforming**

Are special characteristics, as defined by the organization and its customers, identified, defined, and addressed in the control plans?	control plan states see job routers / on job routers (shop travelers)	**conforming**
Provide evidence that the control plan has been updated in response to quality issues, customer requirements and process changes.	Yes - see control plan dated 3/20/20 - updated 3/20/20 from quality issue	**conforming**
Comments:		

	Section 1 - Management Responsibility & Quality Planning
1.5	All surface finishing related and referenced specifications shall be up to date and available. For example: SAE, AIAG, ASTM, General Motors, Ford, FCA, Toyota, Volvo Truck.

• A document control system is pertinent for the handling and internal distribution of received customer specifications and to keep up to date with national or global standards related to surface finishing processes. To ensure all customer requirements are understood and satisfied, the organization shall have all related surface finishing and customer referenced standards and specifications available for use and a process to ensure that they are current.
• 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.

Guidance	**Objective Evidence**	**Conforming Nonconforming NA**
Does the organization have all related surface finishing and customer referenced standards and specifications available for use?	Yes see specification library on server	**conforming**
How are standards and specifications obtained?	Ihs account / customer portals or thru customer	**conforming**
Describe the system and timing used to maintain the standards and specifications to ensure that they are up to date.	Procedure # PR-200 or automatic subscription on IHS account	**conforming**
Define that process used to review and communicate within the two week period updated standards and specifications throughout the organization. Include the names and job functions of the responsible personnel.	See procedure # PR-200 & PR-301 section 2.5	**conforming**
Comments:		

	Section 1 - Management Responsibility & Quality Planning
1.6	There shall be documented process instructions.

• The organization shall have written process instructions for all active parts or family of parts, including relevant part specific requirements. Examples of part specific requirements include process line, coating type, load size, and rectifier settings.
• These process instructions may take the form of work instructions, job card, computer-based recipes, or other similar documents.

Guidance	**Objective Evidence**	**Conforming Nonconforming NA**
Does the organization have written process instructions for all active parts or family of parts and include all relevant operating parameters?	Yes, Per job router requirements	**conforming**
What form of process specification is used? (These may be in the form of work instructions, job card, computer-based recipes, or other similar documents.)	Work instruction, job routers and computor-based recipes	**conforming**
Comments:		

	Section 1 - Management Responsibility & Quality Planning
1.7	A valid product capability study shall be performed.

• 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 change of any process or equipment. The organization shall define what constitutes a major change.
• Initial product capability studies shall be conducted for all surface finishing processes per line as defined in scope of work and in accordance with customer requirements. Capability study techniques shall be appropriate for the surface finishing product characteristics (e.g., surface finishing thickness, corrosion resistance).
• An action plan shall exist to address the steps to be followed in case capability indices fall outside customer requirements or established ranges.

Guidance	Objective Evidence	Conforming Nonconforming NA
Has an initial product capability study been performed?	Yes, and on new part family's	**conforming**
Are studies conducted for each surface finishing process for each line in the facility?	Yes per line	**conforming**
Has a new study been completed after relocation of any process equipment, major rebuild of any equipment, or any significant change in process chemistry?	See procedure # PR-200 - Sales and APQP team designate requirements by customer.	**conforming**
How does the organization define what constitutes a major change?	Procedure # PR-300 Equipment maintenance	**conforming**
What steps are followed when capability indices fall outside specified requirements?	Follow Procedure # PR-200	**conforming**
Comments:		

	Section 1 - Management Responsibility & Quality Planning
1.8	The organization shall collect, analyze, and react to product and process data over time.

• The analysis of product characteristics and processes parameters over time can yield vital information for defect prevention efforts.
• Methods of analysis shall include ongoing trend or historical data analysis of special product and process parameters.
• The organization shall determine which parameters to include in such analysis.

Guidance	Objective Evidence	Conforming Nonconforming NA
What product characteristics and process parameters are used?	Product = thickness & salt spray / Process = Solids & viscosity	**conforming**
How is the ongoing trend or historical data reviewed and analyzed?	Reviewed weekly for trends	**conforming**
How does the organization use this data to prevent future failures and improve the quality system?	Reaction limits established or adjusted for improvement	**conforming**
Comments:		

	Section 1 - Management Responsibility & Quality Planning
1.9	All process control and testing records must be retained for a minimum of one calendar year after the year in which they were created.

Guidance	Objective Evidence	Conforming Nonconforming NA
What is the process to retain these records?	Procedure # PR-301	**conforming**
What is the process for retention of customer specific documents with longer retention times?	Procedure # PR-301 and customer specific requirements	**conforming**
Comments:		

	Section 1 - Management Responsibility & Quality Planning
1.10	There shall be a process in place to review the monitoring systems/logs at specified intervals.

• Management or management designee shall review the monitoring systems/logs at specified intervals.
• The organization shall have reaction plans for nonconformances to process requirements.

Guidance	Objective Evidence	Conforming Nonconforming NA
Define the process in place to gather and review this information.	Daily dashboard / weekly quality meeting	**conforming**
Identify the manager or management designee reviewing the process records from the monitoring systems/logs.	Quality manager & supervisors	**conforming**
Describe reaction plans for nonconformances to the written process requirements.	See work instruction # PRQC-0002, PRQC-0009 & PRP3-041	**conforming**

Comments:

	Section 1 - Management Responsibility & Quality Planning
1.11	Internal assessments shall be completed at a minimum once every 12 months using the latest revision of the AIAG CQI-12 Coating System Assessment.

Guidance	Objective Evidence	Conforming Nonconforming NA
What is the date of the last AIAG CQI-12 Coating System Assessment?	Last assessment completed 10/14/19	**conforming**

Comments:

	Section 1 - Management Responsibility & Quality Planning
1.12	There shall be an internal system in place to authorize reprocessing and it shall be documented.

• The quality management system shall include a documented process for reprocessing that shall include authorization from the quality manager or 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 separate rework specific process control sheet or other identification method issued by qualified technical personnel denoting the necessary surface finishing modifications.
• Records shall clearly indicate when and how any material has been reprocessed.
• The rework of material shall comply with the customer's specifications and/or requirements.

Guidance	Objective Evidence	Conforming Nonconforming NA
Describe the procedure for authorizing reprocessing of nonconforming material.	See work instruction # P3QC-0014 for reprocessing with customer specific requirements	**conforming**
Does the reprocessing procedure describe product characteristics that allow or not allow reprocessing?	Yes work instruction # P3QC-0014 for reprocessing with customer specific requirements	**conforming**
Did the quality manager or manager's designee authorize the rework and determine the reprocessing procedure?	Yes per work instruction # P3QC-0014 for reprocessing with customer specific requirements/notification	**conforming**
How do you identify that material has been reprocessed?	Yes per work instruction # P3QC-0014 for reprocessing with customer specific requirements/notification	**conforming**
Do the records clearly indicate when and how any material has been reprocessed including the quality manager's authorization of release?	Yes in internal isolation log and requires QC manager approval.	**conforming**
Provide evidence that the rework complies with your customer's specifications and/or requirements.	Yes per work instruction # P3QC-0014 for reprocessing - see customer specific requirements/notification listed in W.I.	**conforming**

Comments:

	Section 1 - Management Responsibility & Quality Planning		
1.13	The Quality Department shall 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.			
Guidance		**Objective Evidence**	**Conforming Nonconforming NA**
Describe the procedure for reviewing and addressing external customer and internal concerns.		See procedure # PR-102	**conforming**
Describe the problem solving approach that is used.		See procedure # PR-102	**conforming**
Describe the communication process used to respond to the originator.		See procedure # PR-102	**conforming**
Provide a recent example of this procedure in use.		See 8D # DS20-006	**conforming**
Comments:			

	Section 1 - Management Responsibility & Quality Planning		
1.14	The organization shall have a continual improvement process.		
• The continual improvement process shall be designed to achieve improvements in quality and productivity. • Identified actions shall be prioritized and shall include timing (estimated completion dates). • The organization shall show evidence of program effectiveness.			
Guidance		**Objective Evidence**	**Conforming Nonconforming NA**
Describe the continual improvement process used to achieve improvements in quality and productivity.		Elm Plating's' KPI's are presented daily to management. Those indicators include internal and external rejects, on time delivery, downtime, productivity. Monthly management reviews of KPIs include the preceding and comparison of actual KPIs achieved to established goals. Daily and monthly meetings are vehicle through which continual improvement opportunities are identified, and subsequently pursued. Presidential focus.	**conforming**
Provide a recent example of how actions are identified, prioritized and completion dates assigned.		During Weekly Quality and Maintenance Meetings completion dates will be assigned based on the needs available to complete.	**conforming**
Describe how the organization measures the effectiveness.		Based on SOP metrics, Verifying effectiveness of actions taken.	**conforming**
Comments:			

	Section 1 - Management Responsibility & Quality Planning		
1.15	There shall be predefined personnel responsible for management of materials in quarantine area.		
Only the quality manager or designee may authorize the disposition of material from quarantine status.			
Guidance		**Objective Evidence**	**Conforming Nonconforming NA**

Define the process for release of material from quarantine.	The Quality Supervisor documents quarantined material disposition on an RRF form. An RRF log is maintained on the Elm Plating Business system for traceability and trend analysis of reprocessing. Quarantined product review and disposition responsibilities are identified on EPC plating Facility Responsibility Matrix. Quarantined product information is reviewed daily with managers.	**Conforming**
List the authorized personnel with job titles.	Bill Dunn - Quality Manager Larry Schulze - Quality Engineer	**Conforming**
Review evidence that only these persons are releasing materials from the quarantine area.	See W.I. # QCT3-0041 / Rework Routers are only made by Quality Team.	**Conforming**
Comments:		

	Section 1 - Management Responsibility & Quality Planning
1.16	There shall be documented procedures and/or work instructions for all processes and they shall be available to all of the organization's personnel.

• There shall be procedures or work instructions available to personnel covering their responsibilities.
• These documents shall include instructions for addressing potential emergencies (such as power failure), equipment start-up, equipment shut-down, product segregation (See 2.3, 2.8), product inspection, and general operating procedures.

Guidance	Objective Evidence	Conforming Nonconforming NA
Review the procedure/work instruction for process start-up and shut-down.	Elm Plating Co. utilizes process flow work instructions and schematics for start up and shut down. Check Sheets and calibration verification instructions in place for all other equipment. Procedures and Work Instructions are available on the production	**Conforming**
Review the procedure/work instruction for process control during operation.	Work Instructions are written for each process and are available at the process. Work Instructions, and/or Procedures encompass the entire process.	**Conforming**
What is the procedure in place to address potential emergencies? (Such as power outage and/or equipment failure).	Yes per P3QC-0009	**Conforming**
Review the procedures for inspection of the product, in process or after completion.	Yes per P3QC-0009	**Conforming**
Verify that these procedures/work instructions are accessible to personnel performing the job at all times.	Yes hardcopy and electronic instruction available	**Conforming**
Comments:		

	Section 1 - Management Responsibility & Quality Planning
1.17	The organization and management shall provide employee training.

• The organization shall provide employee training for all 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 employee assessment.
• Management shall define the qualification requirements for each function, and ongoing or follow-up training shall also be addressed.

Guidance	Objective Evidence	Conforming Nonconforming NA
Review the process for initial training of all employees, including backup and temporary.	See training forms: New hire form # HRD4-0003 and training matrix	**Conforming**
Review the process for ongoing and/or follow-up training.	Ongoing training documented on form # HRD4-0019	**Conforming**

Provide a recent copy of the training matrix.	Training matrix reviewed and verified	**Conforming**
Provide documented evidence that shows how the organization verifies effectiveness of training.	Effectivness is verified on skill test and performance reviews	**Conforming**
Comments:		

	Section 1 - Management Responsibility & Quality Planning
1.18	Essential management and supervisory functions shall be performed by qualified personnel at all times and a matrix of these essential responsibilities shall be available for review.

• The organization shall maintain a responsibility matrix identifying all essential management and supervisory functions and list the qualified personnel who may perform such functions.
• It shall identify both primary and secondary (backup) personnel for the essential functions (as defined by the organization).
• This matrix shall be readily available to management at all times.

Guidance	**Objective Evidence**	**Conforming Nonconforming NA**
Review and provide an example of the most recent matrix.	See responsibilty matrix in BMS manual - page 7	**Conforming**
Confirm that the matrix includes both primary and secondary persons.	Yes - See responsibilty matrix in BMS manual - page 7	**Conforming**
Describe how and where this information is made available.	In BMS manual - page 7 and avaiable to all personnel	**Conforming**
Comments:		

	Section 1 - Management Responsibility & Quality Planning
1.19	There shall be a preventive maintenance program and maintenance data shall be utilized to form a predictive/preventive maintenance program.

• The organization shall have a documented preventive maintenance program for essential 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 preventive maintenance program.

Guidance	**Objective Evidence**	**Conforming Nonconforming NA**
Show evidence that a documented preventive maintenance program exists.	Elm Plating's preventive maintenance program requirements are identified in Maintenance Work Instruction MNT3-0049,50,&51 PM'S for Maintenance. Predictive methods are developed with support from suppliers, equipment OEM's, and the fully staffed Maintenance Department personnel. Any processing equipment downtime is reported for review in weekly management meetings.	**Conforming**
Describe the process for reporting problems.	Elm Plating has a formal maintenance work order system supported by work instruction MNT3-0010, Maintenance Work Order Form for scheduled PM. Maintenance work instructions for critical PM activities are used to ensure PM thoroughness and accuracy.	**Conforming**
Provide a recent example showing that the person reporting the problem received feedback after the problem was resolved.	Maintenance work orders may be requested via the Maintenance Work Order Request, MNT3-0010. Work Order Requests are closed loop, tracked via this log.	**Conforming**
Give a recent example of how the program was used to prevent/predict potential equipment failure.	Maintenance requests are reported in daily management meetings, and during scheduled Management Reviews. During these meeting if it is found to be an ongoing failure mode an adjustment will be made on the current PM.	**Conforming**

How is the data being generated reviewed with management to improve the quality system?	Data is review during our Weekly Operations meetings.	**Conforming**
Comments:		

	Section 1 - Management Responsibility & Quality Planning
1.20	The organization shall develop a critical spare part list and the parts must be available to minimize production disruptions.
• Spare part suppliers, minimum quantity and lead times shall be documented.	

Guidance	**Objective Evidence**	**Conforming Nonconforming NA**
Provide the critical spare parts list.	See MNT4-0019	**Conforming**
Does the critical spare parts list include inventory, lead time and suppliers?	See MNT4-0019 and live form for current inventory and open orders.	**Conforming**
Describe how and when the organization updates the list.	Maintenance manager updated daily from usage and orders - verified monthly for accuracy	**Conforming**
What criteria are used to determine whether critical spare parts are kept at the facility or sourced off site?	All spare parts that have long lead times.	**Conforming**
Describe the process used to maintain minimum quantities.	MNT4-0019 has minimum and maximum quantities listed on form.	**Conforming**
Comments:		

	Section 2 - Floor and Material Handling Responsibility
2.1	The organization shall ensure that customer data entered into the receiving system matches the customer's shipping documents.

It is critical that all customer requirements and lot identification be correctly transferred to internal documents.
• The facility shall ensure that the data entered in the receiving system match the information on the customer's shipping documents.
• Documented processes and evidence of compliance shall exist (e.g., shop travelers, work orders).
• Sometimes the material received does not precisely correspond to customer shipping documents. The facility shall have a detailed procedure in place to resolve receiving discrepancies.
• The requirements stated above apply to captive, in-house, commercial and all involved departments.

Guidance	Objective Evidence	Conforming Nonconforming NA
Describe the receiving process including listing the documentation used.	Receiving inspection matches customer paperwork to orders to generate routers for production. Receiving inspection signs off on router to start the process once the customer paperwork is verified. Procedures are in place to record & reply back to customers for Shipping / Receiving discrepancies such as weight, damaged parts, damaged containers, incorrect paperwork, mixed parts, etc... SHP3-0001 staging and receiving	**Conforming**
Describe the process to identify the coating requirements.	Coating requirements are based on customer Part number in our MRP system.	**Conforming**
Describe the reaction process when material received does not correspond to the customer's documents.	Notify Customer Place in MRB Hold Area for their disposition.	**Conforming**

Comments:

	Section 2 - Floor and Material Handling Responsibility
2.2	Is product clearly identified and stored throughout the surface finishing process and is lot traceability and integrity maintained?

Procedures are required for part and container identification to avoid incorrect processing or mixing of lots.
• As received, in-process, and finished product or material shall be properly segregated, identified, and stored in a dedicated and clearly defined area.
• 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.

Guidance	Objective Evidence	Conforming Nonconforming NA
Describe the method that ensures the parts and lot numbers are correctly identified and maintained throughout the process.	Each customer's tub of parts contains a router with a sleeve that includes customer travelers for product identification through out the coating process. The job router identifies all customer supplied information, customer, part number, part description, order and tub quantity, container serial number, lot number, etc. It also shows all of the processes that will be done to this part. The Final Inspectors are required to verify that the correct parts are in the tub by matching the picture on the router to the part.	**Conforming**
Verify that received, in-process, and finished product or material is properly segregated, identified, and stored in a dedicated and clearly defined area.	Raw and Finished goods are staged in clearly identified staging areas.	**Conforming**

Comments:

	Section 2 - Floor and Material Handling Responsibility
2.3	Procedures shall be adequate to prevent movement of nonconforming product into and out of the production system.

The control of suspect or nonconforming product is necessary to prevent inadvertent shipment or contamination of other lots.
• Procedures shall be adequate to prevent movement of nonconforming product into the production system.
• Procedures shall exist addressing authorized personnel, appropriate disposition, product identification and tracking of material flow in and out of hold area.
• Nonconforming hold area shall be clearly designated to ensure segregation of such material.

Guidance	Objective Evidence	Conforming Nonconforming NA
Where is the nonconforming holding area, and how is it identified?	Hold area is located away from staging areas and all other product.	Conforming
Describe the procedure to prevent the unauthorized movement of nonconforming products.	Quarantined per work instruction and identified with hold tag error proof system is in place that if the QI has not tracked out shipping will be unable to complete a shipper	Conforming
Provide evidence that material movement in and out of this area is documented.	Yes per our Isolation log. Procedures and work instruction exist for rejected material and proper handling (P3QC3-0002 & P3QC-0007)	Conforming

Comments:

	Section 2 - Floor and Material Handling Responsibility
2.4	For bulk processing there shall be a procedure to identify trap points throughout the entire process to reduce risk of unfinished, improperly coated and mixed parts.

• The organization shall have documented procedures to identify and monitor all trap points for each process/equipment.
• Monitoring of potential trap points shall occur at minimum every part changeover.
• Trap points may include baskets, barrels, bins, part containers, loading and unloading equipment, oven belts, load hoppers and transfer belts.

Guidance	Objective Evidence	Conforming Nonconforming NA
Describe the procedure to identify and monitor all trap points for each process and/or equipment.	Completed weekly per work instruction # P3QC-0010 and documented on form # P3QC-F006	Conforming
Provide the list of trap points.	Both work instruction # P3QC-0010 and form # P3QC-F006 have visual aids and diagrams of areas to check.	Conforming

Comments:

	Section 2 - Floor and Material Handling Responsibility
2.5	The handling, storage and packaging shall be adequate to ensure product quality is maintained throughout the entire process.

• Handling, storage, and packaging shall be adequate to ensure product quality.
• Part cleanliness shall be maintained throughout the process.
• All parts shall be stored in a controlled environment.

Guidance	Objective Evidence	Conforming Nonconforming NA
Which process steps have dedicated in-process containers?	All pretreatment steps have dedicated skids or baskets. All paint types have separate paint pots and baskets	Conforming
How are containers maintained to preserve part cleanliness?	Work Instruction detail how the operator is to clean and inspect containers.	Conforming
Describe how the containers are inspected to ensure they are free of foreign material.	Work Instruction detail how the operator is to clean and inspect container and inspection tickets used to identify.	Conforming
What is used for liner material of customer containers before packing finished goods for shipment? (Materials like newspapers, used cardboard and bags should be avoided).	See job router for customer specific req. Plastic liners used unless specified.	Conforming

Provide a list of dedicated storage areas that avoid exposure to contamination and corrosion. (Storage outdoors, near media blasting and corrosive processes such as acid tanks should be avoided).	Marked staging areas	**Conforming**
Comments:		

	Section 2 - Floor and Material Handling Responsibility
2.6	Each process step shall be documented and traceable.

How does the operator verify that all process steps have been completed in specified order and in within specified time limits?

Guidance	**Objective Evidence**	**Conforming Nonconforming NA**
Do you have a document (e.g., shop travelers, job sheet) that specifies all the processes for each part number/part family?	Job router for each order/ lot.	**Conforming**
Define the procedure that ensures that all processes have been completed in the specified order.	error proof bar code tracking for each step.	**Conforming**
Describe how time sensitive processes are completed in the specified time limits (e.g., wet part transfer).	Barcode tracking with monitoring.	**Conforming**
Provide documentation that this process has been followed.	See completed job router - job audit	**Conforming**
Comments:		

	Section 2 - Floor and Material Handling Responsibility
2.7	Part loading shall be specified, documented and controlled.

• Loading parameters shall be specified, documented and controlled.
• Examples include parts per rack, part position and orientation, weight per barrel/basket or masking.

Guidance	**Objective Evidence**	**Conforming Nonconforming NA**
Describe how the loading parameters are communicated to the operator.	Per job router requirments and computor based recipes by part number,	**Conforming**
Identify how the loading weight or rack quantity is recorded for each load or rack.	Each basket filled and at each process step	**Conforming**
Comments:		

	Section 2 - Floor and Material Handling Responsibility
2.8	There shall be a procedure for material handling, containment action and product segregation in the event of an unplanned process interruption.

Unplanned downtime greatly increases the risk of improper processing.
• Work instructions specifically addressing potential types of unplanned process interruptions shall be accessible to operators.
• Specific instructions shall address containment/reaction plans for each step of the process. Where processes are time critical, immediate actions are required. Examples include process steps exposing parts to acidic solutions, current, bake or curing processes.
• Evidence shall exist showing disposition and traceability of affected product.

Guidance	**Objective Evidence**	**Conforming Nonconforming NA**
What procedure is used to address each step of the process?	Control Plans and Job routers.	**Conforming**
Provide all work instructions that address unplanned process interruptions.	Control Plans and Specified work instructions	**Conforming**
How is the affected product traced, dispositioned and documented?	Per procedure #PR-205	**Conforming**

Comments:			
	Section 2 - Floor and Material Handling Responsibility		
2.9	Plant cleanliness, environment, and working conditions shall be conducive to ensure product quality.		
• Plant cleanliness, housekeeping, environmental, and working conditions shall be adequate to preserve product quality. • A housekeeping policy shall be clearly defined and executed.			
Guidance		**Objective Evidence**	**Conforming Nonconforming NA**
Provide a copy of the housekeeping procedure.		See P3PN-F010 for housekeeping tasks.	**Conforming**
Provide a copy of the procedure used to handle dropped or spilled parts.		See procedure # PR-205	**Conforming**
Describe what is done with loose parts found on the floor of the plant.		Scrapped per procedure #PR-205	**Conforming**
Define the process used to review the facility for conditions that are detrimental to quality processing such as chemical spills and inadequate ventilation.		PR-113 Monitoring and measuring	**Conforming**
Comments:			

	Section 2 - Floor and Material Handling Responsibility		
2.10	Plant lighting shall be adequate in all inspection areas.		
Lighting in the part and/or process inspection areas must be adequate for the intended operation.			
Guidance		**Objective Evidence**	**Conforming Nonconforming NA**
How do you ensure the lighting in the part and/or process inspection areas, including loading and unloading areas, is adequate for the intended operation?		All areas of process have well light areas.	**Conforming**
For part inspection, how do you arrange the lighting to avoid spot lighting, glare, shadows and distracting reflections?		All areas of process have well light areas and no testing that would be affected by spot lighting, glare, shadows and distracting reflections	**Conforming**
Comments:			

Section 3 - Pyrometry

Questions can be found in the Process Tables and shall be answered per these requirements.

P3.1 Thermocouples

P3.1.1 **Calibration of Thermocouples:** Thermocouples shall be calibrated traceable to the National Institute of Standards and Technology (NIST) or other national standards laboratory prior to first use and in the temperature range in which they will be employed. The calibration temperature test points shall be no further than 150ºC or 250ºF apart.

P3.1.1.1 Thermocouple calibration certificates shall include the following detail: the actual test temperature reading, the nominal test temperature, the corresponding correction factor (or error/deviation value) for each calibration temperature test point, the provider of the calibration data and their accreditation symbol (or equivalent) if not performed in-house, and the calibration method used.

P3.1.1.2 External sources providing calibrations shall be accredited to ISO/IEC 17025 or other national equivalent. Internal sources providing calibrations shall do so in accordance with the intent of ISO/IEC 17025 or other national equivalent.

P3.1.1.3 All thermocouples shall comply with Tables P3.1.1, P3.1.2 and P3.1.3 requirements. The time interval for the replacement of thermocouples shall commence with the date thermocouple is placed in service.

P3.1.2 **Reuse of Thermocouples:** The date that any thermocouple is placed in service shall be documented. The tracking of uses for non-expendable control, monitoring and recording thermocouples is not required. See Tables P3.1.1, P3.1.2 and P3.1.3 for replacement and recalibration requirements.

P3.1.2.1 Damaged thermocouples shall not be used. Examples of a damaged thermocouple would include but are not limited to; insulation not intact, hot junction broken, evidence of corrosion, crimping, termination fitting or plug has become loose or sheath material has been scratched exposing mineral insulating material.

Table P3.1.1 – Calibration and Replacement Requirements for Thermocouples Used for Control, Monitoring and Recording

THERMOCOUPLE TYPE (1)	SYSTEM TYPE	CALIBRATION / REPLACEMENT INTERVAL	CALIBRATED AGAINST	INITIAL CALIBRATION ACCURACY REQUIRED
Base Metal Types (K, J, N, T)	Oven systems with a process temperature control tolerance of 20°C (30°F) or less.	Calibrate before first use. Replace every two years **(2,3)**	Primary or Secondary Standard	± 1.1ºC (± 2.0ºF) or ± 0.4% whichever is greater
Base Metal Types (K, J, N, T)	Other Ovens	Calibrate before first use. Replace every four years **(2,3)**	Primary or Secondary Standard	± 1.1ºC (± 2.0ºF) or ± 0.4% whichever is greater
Base Metal Types (K, J, N, T)	Process Tanks	Calibrate before first use. Replace every two years **(2,3)**	Primary or Secondary Standard	± 1.1ºC (± 2.0ºF) or ± 0.4% whichever is greater
Noble Metal Types (B,R,S, Platinum RTD)	All Ovens and Process Tanks	Calibrate before first use. Replace or recalibrate every four years **(2)**	Primary or Secondary Standard	± 1.1ºC (± 2.0ºF) or ± 0.4% whichever is greater

1. Non-Expendable

2. Thermocouples shall be replaced whenever needed (e.g., failed SAT or damaged thermocouple); however, thermocouples shall be replaced minimally as stated above. Thermocouples may either be purchased calibrated or calibrated internally and shall meet requirements of P3.1.

3. Base metal thermocouples shall not be recalibrated.

Table P3.1.2 – Calibration and Replacement Requirements for Test Thermocouples Used for Temperature Uniformity Surveys (TUS) and System Accuracy Tests (SAT)

THERMOCOUPLE	THERMOCOUPLE TYPE	USE	CALIBRATION / REPLACEMENT INTERVAL	CALIBRATED AGAINST	CALIBRATION ACCURACY REQUIRED
Test Thermocouples	Base Metal Types (K, J, N, T)	TUS SAT	As per Table P3.1.3 Recalibration prohibited **(1)**	Primary or Secondary Standard	± 1.1ºC (± 2.0ºF) or ± 0.4% whichever is greater

1. Base metal thermocouples shall not be recalibrated.

Table P3.1.3 – Allowable Number of Uses for Thermocouples in Specific Applications

THERMOCOUPLE TYPE	USE (1)	OPERATING TEMPERATURE	MAXIMUM PERMITTED USES
Expendable Base Metal (K, J, N, T)	Temperature Uniformity Surveys (TUS) / System Accuracy Test (SAT)	≤ 430ºC (800ºF)	15 **(2)**
Expendable Base Metal (K, J, N, T)	Control	≤ 430ºC (800ºF)	1 **(2)**
Expendable Base Metal (K, J, N, T)	Monitor/Record/Load Sensing	≤ 430ºC (800ºF)	30 **(2)**
Non-expendable Base Metal (K, J, N, T)	Temperature Uniformity Surveys (TUS) / System Accuracy Test (SAT)	≤ 430ºC (800ºF)	2yrs maximum
Non-expendable Base Metal (K, J, N, T)	Load Sensing (part temperature)	≤ 430ºC (800ºF)	6 months

1. Thermocouples shall be dedicated to a specific, unalterable purpose (TUS, SAT, Load Sensing, Control, Monitoring, or Recording). Thermocouples that have achieved their maximum permitted number of uses for this assigned application shall not be repurposed for other CQI-12 compliance requirements.

2. Under no circumstance shall any expendable base metal thermocouple be used beyond six months from date of first use.

P3.2 Instrumentation

P3.2.1 **General Instrumentation Requirements:** Instrumentation shall be calibrated traceable to the National Institute of Standards and Technology (NIST) or other national standards laboratory.

P3.2.1.1 External sources providing calibrations shall be accredited to ISO/IEC 17025 or other national equivalent. Internal sources providing calibrations shall do so in accordance with the intent of ISO/IEC 17025 or other national equivalent.

P3.2.1.2 Calibration frequencies and accuracies are specified in Instrumentation Table P3.2.1.

P3.2.1.3 The temperature for each oven control zone shall be recorded by a recording instrument. Recorder shall be operating during the entire time that product is in the oven. Process record shall be legible.

P3.2.1.4 Analog instrumentation shall not be allowed following three (3) years from release date of this document.

P3.2.2 **Offsets:** Although the use of offsets is generally discouraged, they are allowed to specifically correct for calibration errors, SAT errors or to center a TUS result.

Offset values applied are limited and shall not exceed 5°C or 10°F for the correction of instrument calibration error. An additional offset of 5°C or 10°F is allowed for the correction of an SAT error and another 5°C or 10°F of offset for the purpose of centering a TUS result.

When offsets are used a documented procedure shall exist which at a minimum describes each of the following:

- When the use of offset is permitted
- How manual (external) and electronic (internal) offsets are performed
- How the basis (calibration, SAT or TUS) for the offset is documented
- How offset is accounted for when performing calibrations
- How offset is considered when performing an SAT
- How to reintroduce any intentional offsets
- Who has the authority to approve the use of offsets
- How is this approval documented

P3.2.3 **Calibration:** Calibration of control, monitoring, and recording instruments shall be performed to the manufacturer's instructions or as described in P3.2.3.1.

P3.2.3.1 It is acceptable to perform calibrations on either a single point (measure) or multi-point (source) basis. The following requirements shall be met:

P3.2.3.1.1 For the calibration of control, monitoring and recording instruments on oven systems and processing tanks that are in operation and running at typical operating temperatures, a single point calibration is acceptable.

P3.2.3.1.2 Calibration of control, monitoring and recording instruments may be performed on a multi-point basis by sourcing a signal to the instrument representing the low, mid, and high points of the range of the instrument.

P3.2.3.1.3 Field Test Instruments used for the calibration of control, monitoring and recording instruments shall at a minimum meet the requirements as specified in Table P3.2.1. Field Test Instrument calibration reports shall indicate correction factor or error data for each test point.

P3.2.3.2 For multi-channel instruments, a calibration shall be required for each channel in use.

P3.2.4 **Calibration Records:** Calibration status and results shall be reported as follows:

P3.2.4.1 A calibration label shall be affixed to the instrumentation device, or in the case of panel mounted control, monitoring or recording instrumentation, on the device or as near as practical to the device(s) to indicate the most recent successful calibration. The label(s) at a minimum shall include:

- Date the calibration was performed
- Due date of the next calibration
- Technician who performed the calibration (initials are acceptable)
- Serial number of instrument

P3.2.4.2 Instrumentation calibration results shall be documented. The instrument calibration report or certificate shall include the following information:

- Oven or unit identification number
- Make, model and serial number of instrument calibrated. PLC devices/modules not serialized require unique identification. Each channel/input calibrated shall be identified
- Standard or test instrument used during calibration
- Method of calibration
- Ambient temperature and humidity
- Required accuracy (+/-2°C; +/-4°F)
- As-Found/As-Left temperature values at each calibration point (if no adjustment is made then the final value will equal the As-Found value)
- As-Found/As-Left offset/bias values (if no adjustment is made then the corrected offset/bias value will equal the As-Found value)
- Basis for offset/bias values indicated and clearly defined (Calibration, SAT, or TUS)
- Pass/Fail status
- Any limitations or restrictions of the calibration
- Date the calibration was performed
- Due date of next calibration
- Technician who performed the calibration
- Signature of the technician who performed the calibration
- Calibration company if not performed in-house
- Accreditation symbol (or equivalent) if not performed in-house
- Sign-off by coating organization to include the name and title of person reviewing and approving report

P3.2.4.3 In the event of a failed calibration or out of tolerance condition, appropriate corrective actions shall be taken and documented.

Table P3.2.1 – Instrument Calibration Requirements

INSTRUMENT	INSTRUMENT TYPE	MAXIMUM CALIBRATION PERIOD (MONTHS)	CALIBRATED AGAINST	CALIBRATION ACCURACY REQUIRED	USE
Field Test Instrument	Portable potentiometer or digital instrument, electronic data recorder, or data acquisition system.	12	Primary or Secondary standard	± 0.6ºC (± 1.0ºF) or ± 0.1% of reading, whichever is greater	Limited to controlling, monitoring, or recording instrument calibration, performance of system accuracy tests and temperature uniformity surveys.
Control, Monitoring, or Recording Instruments	Digital, Mechanical (analog), Electro-mechanical, or Thermal element.	12	Field Test Instrument (single-point or multi-point calibration)	± 2.0ºC (± 4.0ºF)	Limited to measuring, recording, and controlling the temperature of thermal processing equipment.

P3.3 System Accuracy Test (SAT)

P3.3.1 Oven and Dryer control, monitoring and recording temperature systems (instrument, leadwire, and thermocouple/RTD) are verified by performing an SAT. This requirement includes load sensing thermocouples. The SAT shall be performed in accordance with Section P3.3.

P3.3.1.1 The oven SAT frequency shall be every six months.

P3.3.1.2 Process tank control temperature systems (instrument, leadwire, and thermocouple/RTD) are verified by performing a temperature check as per the applicable process table. Process tank temperature checks satisfies the SAT requirement. For maximum allowed temperature check difference values, reference the applicable process table.

P3.3.1.3 The process tank temperature check frequency shall be daily (or as otherwise prescribed).

P3.3.2 Oven SAT's and Process Tank daily temperature checks shall be performed using a test thermocouple conforming to the requirements of Thermocouple Table P3.1.2 coupled with a test instrument meeting the requirements of Instrumentation Table P3.2.1.

P3.3.3 A new oven SAT or process tank daily temperature check shall be performed after any maintenance that could affect the SAT or temperature check accuracy (e.g., replacement of the lead wire or control thermocouple, replacement of the control instrument).

P3.3.4 For oven systems the SAT shall be performed while the oven is operating at a typical operating temperature using Probe Method A as detailed in Section P3.3.4.1.

P3.3.4.1 Probe Method A:

P3.3.4.1.1 Probe Method A is a check between the uncorrected reading of the oven control, monitoring and recording temperature system (instrument, leadwire, and thermocouple/RTD) and the corrected reading of a test temperature system (test instrument and test thermocouple). See Illustration P3.3.1.

P3.3.4.1.2 The tip (measuring junction) of the test thermocouple shall be no further than 50 mm (2 inches) from the tip (measuring junction) of the oven control, monitoring and recording thermocouple/RTD.

P3.3.4.1.3 The difference between the temperature indication of the oven control, monitoring and recording instrument connected to its respective thermocouple/RTD and the corrected temperature indication of the test thermocouple on a test instrument shall be within the following tolerances:

System	Maximum SAT Difference Allowed
Ovens (all)	± 5.0ºC (± 10.0ºF)

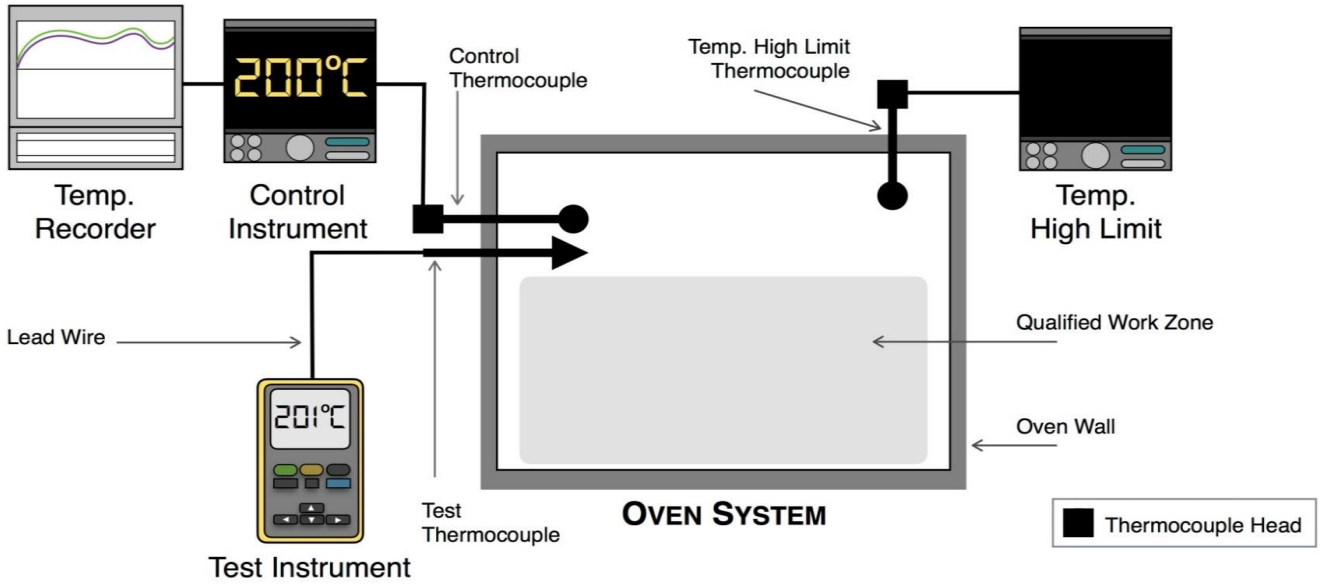
After insertion of the test thermocouple, allow sufficient time to achieve equilibrium between the test thermocouple and the oven control, monitoring and recording instrument thermocouple/RTD.

P3.3.4.1.4 If the calculated SAT difference exceeds the values stated above, the appropriate corrective action shall be taken before commencing with additional processing. Oven control, monitoring or recording thermocouples/RTD's failing to meet the requirements shall be replaced.

A new SAT shall be conducted on the replacement thermocouple/RTD. Actions taken shall be documented.

Note: When using Probe Method A, any electronic offset value introduced into the control instrument for the purpose of centering a TUS result shall be mathematically removed when calculating the SAT difference. See Illustration P3.3.1.

EXAMPLE of Probe Method "A"



EXAMPLE of System Accuracy Test (SAT) Calculations - Probe Method A

CONTROL INSTRUMENT TEMPERATURE (A)	CONTROLLER TUS OFFSET (B)	ADJ. CONTROL INSTRUMENT TEMPERATURE (C)=(A)-(B)	TEST INSTRUMENT TEMPERATURE (D)	TEST THERMOCOUPLE CORRECTION FACTOR (E)	TEST INSTRUMENT CORRECTION FACTOR (F)	TRUE TEST TEMPERATURE (G)=(D)+(E)+(F)	CALCULATED SAT DIFFERENCE (C) – (G)
200°C (392°F)	0°C (0°F)	200°C (392°F)	201°C (394°F)	+ 0.3°C (+ 0.5°F)	+ 0.1°C (+ 0.2°F)	201.4°C (394.7°F)	- 1.4°C (- 2.7°F)

Illustration P3.3.1

P3.3.5 **SAT Report:** Oven System Accuracy Test records shall include the following:

- Identification of the control, monitoring or recording thermocouple being tested
- Identification of the SAT test thermocouple
- Identification of the SAT test instrument
- Date and time of day of the test
- Observed control, monitoring or recording instrument reading
- Observed test instrument reading
- SAT test thermocouple and SAT test instrument correction factors
- Corrected SAT test instrument reading
- Calculated system accuracy test difference
- Pass/Fail status
- Identification of technician performing the test
- External calibration company, if applicable
- Accreditation symbol (or equivalent) if not performed in-house
- Sign-off by coating organization to include the name and title of person reviewing and approving report

P3.4 Temperature Uniformity Surveys (TUS)

P3.4.1 **General TUS Requirements:** Temperature uniformity characteristics, qualified work zones, and operating temperature ranges of curing ovens and drying ovens are verified by performing an annual TUS in accordance with the requirements of this section.

P3.4.1.1 TUS's shall be performed using independent test instrumentation meeting the requirements of Table P3.2.1 – Instrument Calibration Requirements and independent test thermocouples meeting the requirements of Table P3.1.2 – Thermocouples.

P3.4.1.2 Compensation for known deviations in the test instrumentation shall be made by electronic or mathematical corrections.

P3.4.1.3 Any oven modification or repair that could alter the temperature uniformity characteristics of the oven shall result in a temperature uniformity survey being performed prior to the oven system being used for processing.

P3.4.1.4 Oven modifications are actions taken that change the oven from its original documented state. The following are examples of oven modifications that could alter the temperature uniformity characteristics of the oven and shall require an additional TUS:

- Increase in the maximum qualified operating temperature
- Decrease in the minimum qualified operating temperature
- Change in burner size, number, type or location
- Change in heating element number, type or location
- Changes to airflow (baffle positions, fan speed, fan quantity, etc.)
- Change of control sensor location
- Change of combustion pressure settings from original settings
- Temperature control scheme changes (proportional vs. high-low/on-off)
- Changes in temperature control tuning constants (PID)
- Work zone volume increase covering area not previously tested
- Work zone location change covering area not previously tested

P3.4.1.5 Oven repairs are maintenance actions that restore the oven to its original documented condition. If repairs are not expected to impact the temperature uniformity characteristics of the oven, an additional TUS shall not be required. The following are examples of oven repairs that would not require an additional TUS:

- Replacing a burner with an identical burner
- Replacing a heating element with an identical heating element
- Replacing a control thermocouple without changing its documented location
- Replacing heating system components (gas regulator, valve, metering device, etc.) with identical components and settings
- Restoring original documented combustion pressure settings
- Restoring original documented control tuning constants (PID)
- Replacing a controller with an identical controller with the same tuning constants
- System accuracy test failures
- Repair of oven door seals

P3.4.1.6 All oven modifications or repairs shall be documented and include the determination made by the responsible authority within the organization as to whether these modifications or repairs could alter the temperature uniformity characteristics of the oven.

P3.4.2 **TUS Test Temperatures:**

If the operating temperature range of the oven's qualified work zone is equal to or less than 170°C (305°F), then only the maximum operating temperature of the oven is required to be tested.

If the operating temperature range of the oven's qualified work zone is greater than 170°C (305°F), the minimum and maximum operating temperatures of the oven shall be tested.

P3.4.3 **TUS Oven Parameters:** When performing the temperature uniformity survey, the oven system parameters during the test shall replicate the oven system parameters during normal production. The preheating of the oven system is permissible if the oven is preheated in normal production.

The TUS shall be performed with a dense, full production load or simulated production load which shall represent the maximum permissible load rate for the oven during normal production. Part time-to-temperature shall meet the most stringent applicable Customer or process specification.

P3.4.4 **Continuous and Semi-Continuous Ovens**

P3.4.4.1 **TUS Methods:** Continuous and semi-continuous ovens shall be surveyed so that the volume defined as the qualified work zone is tested. TUS test sensors shall be arranged either three dimensionally (Volumetric Method) or in a plane (Plane Method).

P3.4.4.2 **Number and Location of TUS Thermocouples:**

P3.4.4.2.1 Volumetric Method: Shall be used with semi-continuous or pusher type ovens. Shall also be used for continuous ovens where product is not oriented in a single plane. See Table P3.4.1 for number of TUS thermocouples. See Figure P3.4.1 to determine appropriate location of the TUS thermocouples.

P3.4.4.2.2 Plane Method: Shall be used for continuous ovens where the product is continuously moving through the oven (e.g., belt/conveyor type ovens). See Table P3.4.2 for number required TUS thermocouples. See Figure P3.4.2 and Figure P3.4.3 to determine the appropriate location of the TUS thermocouples.

P3.4.4.3 **TUS Data Collection:**

P3.4.4.3.1 TUS test thermocouples shall be traversed through the entire oven at the maximum line speed used in production and representing all required test locations.

P3.4.4.3.2 Data collection shall begin when the TUS thermocouples are loaded into the oven.

P3.4.4.3.3 All temperature data generated by the TUS test thermocouples and all temperature data recorded on the process record for oven zone temperature shall be recorded automatically at least every thirty seconds for the duration of the survey.

P3.4.4.3.4 The process record for oven zone temperature shall be compared to the TUS data to ensure compliance to TUS requirements. Manual data collection is not allowed.

P3.4.4.3.5 TUS data collected shall clearly show the time elapsed between parts entering the oven and achieving target part temperature. All TUS data collected shall clearly show the time at set temperature.

P3.4.5 **Batch Ovens**

P3.4.5.1 **TUS Methods:** Batch ovens shall be surveyed so that the volume defined as the qualified work zone is tested. TUS test thermocouples shall be arranged three dimensionally (Volumetric Method) and as required in Table P3.4.1 and Figure P3.4.1.

P3.4.5.1.1 Batch ovens shall be loaded in a single, uninterrupted and continuous process. Incremental loading, and the subsequent need to open and close batch oven doors to accommodate this loading process, is not allowed.

P3.4.5.2 **Number and Location of TUS Thermocouples:**

P3.4.5.2.1 Volumetric Method: Shall be used with batch ovens. See Table P3.4.1 for number of TUS thermocouples. See Figure P3.4.1 for the location and placement of the TUS thermocouples.

For oven work zone volumes greater than 8.5m³ (300ft³), the thermocouple locations shall be similar to the example in Figure P3.4.1 and the additional thermocouples shall be located to best represent the qualified work zone.

P3.4.5.3 **TUS Data Collection:**

P3.4.5.3.1 Data collection shall begin when the TUS thermocouples are loaded into the oven.

P3.4.5.3.2 All temperature data generated by the TUS test thermocouples and all temperature data recorded on the process record for oven zone temperature shall be recorded automatically at least every thirty seconds for the duration of the survey.

P3.4.5.3.3 The process record for oven zone temperature shall be compared to the TUS data to ensure compliance to TUS requirements. Manual data collection is not allowed.

P3.4.5.3.4 When the oven temperature control achieves set point temperature, displaying a normal control cycling around set point; the TUS test thermocouples have stabilized and the part time-to-temperature requirement, if applicable, has been achieved, then the TUS data collection shall continue for an additional thirty minutes minimum, or time required per product technical data sheet when time at temperature is less than thirty minutes.

P3.4.6 **Permissible TUS Test Thermocouple Failures:** A temporary condition such as a short or loose connection or other identifiable cause where normal temperature readout is restored shall not be considered a failed TUS test thermocouple.

P3.4.7 **TUS Pass/Fail Requirements:**

P3.4.7.1 A temperature uniformity survey shall be acceptable if all previous requirements are met including the following:

- Readings of all TUS thermocouples and control thermocouples are within ±10°C (±20°F) of the temperature controller set-point value or other more stringent customer specification, process sheet or technical data sheet
- The time required to achieve target part temperature did not exceed the time limit specified in customer specification, process sheet, or technical data sheet
- The required time at temperature was achieved (for continuous/semi-continuous ovens only)
- The upper temperature tolerance was not exceeded at any time by any TUS thermocouple or temperature controller thermocouple
- The lower temperature tolerance was continuously maintained after reaching the beginning of the soak period

P3.4.8 **Reaction to TUS Failures:** If the temperature uniformity results are not within the established limits, the cause of the deviation shall be determined and documented. The equipment shall not be used for additional processing until the cause has been corrected and the TUS has been performed successfully or a deviation/exception from the Customer and chemical supplier has been obtained.

P3.4.8.1 If the Qualified Operating Temperature Range exceeds 170ºC (305ºF) then the minimum and maximum temperatures of the operating temperature range shall be resurveyed.

P3.4.9 **TUS Report:** The items listed below shall be included in the temperature uniformity survey report:

- Oven identification name or number
- Method of TUS (whether volumetric or plane)
- Survey test temperature (temperature controller set-point and required TUS tolerance indicated)
- TUS thermocouple quantity and location identification including a detailed diagram in three dimensional space, or detailed description of any load, rack or set-up
- Photograph showing placement of thermocouples into the load
- TUS thermocouple calibration report to include correction factors
- Survey test instrument identification number
- Survey test instrument calibration report to include calibration data and correction factors for each adjustable channel or input
- Testing company identification, if not performed in-house
- Accreditation symbol (or equivalent), if not performed in-house
- Name & Signature of the technician performing the TUS
- Survey start / stop time and start / stop date
- Corrected readings of all TUS thermocouples at each survey temperature
- Identify time-to-temperature for the test load
- Process time parameters (e.g., conveyor/belt speed, index time)
- The data collection period or soak period
- Soak time required vs. soak time achieved
- Control instrument tuning parameters (e.g., PID values)
- Time and temperature profile data for all TUS thermocouples and temperature control thermocouples for all zones tested. Control thermocouple data shall be generated by the associated process recorder or process data acquisition system
- Pass/Fail status (to include indication of the applicable standard or specification)
- Summary of final plus and minus readings at each test temperature
- Sign-off by coating organization to include the name and title of person reviewing and approving report

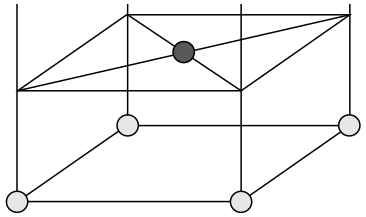
Table P3.4.1 - TUS Test Thermocouple
(VOLUMETRIC METHOD)

Qualified Work Zone Volume (1)	**< 0.1 m³ (< 3 ft³)**	**0.1 to 8.5 m³ (3 ft³ to 300 ft³)**
Number of Thermocouples (2)	5 (3)	9

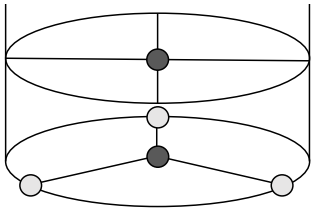
Note 1. For oven volumes greater than 8.5 m³ (300 ft³), add at a minimum one thermocouple for each additional 3 m³ (105 ft³). For example, for an oven with a qualified work zone volume of 17.50 m³ (620 ft³), twelve (12) TUS thermocouples shall be used at a minimum.

Note 2. TUS thermocouples shall be attached to the part or buried in the load to best represent the locations illustrated in Figure P3.4.1.

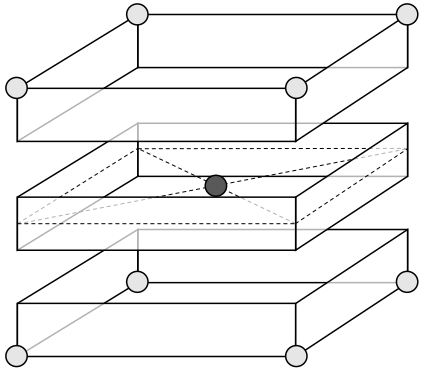
Note 3. When (5) TUS thermocouples are required they shall be placed to represent the four corner positions and the center of a rectangular qualified work zone volume or 90° apart along the periphery and the center of a cylindrical qualified work zone volume.



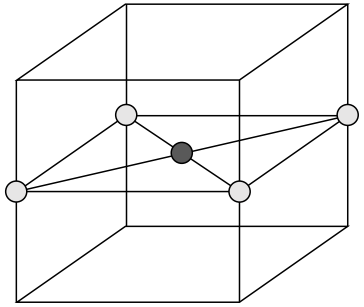
RECTANGULAR WORK ZONE



CYLINDRICAL WORK ZONE



MULTIPLE RECTANGULAR BASKETS



SMALL RECTANGULAR WORK ZONE
[QUALIFIED WORK ZONE < 0.1 m³ (3 ft³)]

○	Represents thermocouple locations
●	Represents a center thermocouple location

Figure P3.4.1 - TUS Test Thermocouple Locations

Table P3.4.2 - Number and Location of the TUS Thermocouples (PLANE METHOD)

	HORIZONTAL ORIENTATION	
	Qualified work zone height	
Qualified work zone width	**≤ 300 mm (1 ft)** see Notes 1,4	**> 300 mm (1 ft)** see Notes 2,4
< 2.4 m (8 ft)	3	8
> 2.4 m (8 ft)	See Note 3	

	VERTICAL ORIENTATION
	Qualified work zone width

Qualified work zone height	≤ 300 mm (1 ft) see Notes 1,4	> 300 mm (1 ft) see Notes 2,4
< 2.4 m (8 ft)	3	8
> 2.4 m (8 ft)	See Note 3	

Note 1. Two TUS thermocouple locations shall be within 50 mm (2 inches) of the work zone edges. One TUS thermocouple location shall be at the center. Additional TUS thermocouples shall be uniformly distributed throughout a plane perpendicular to the conveyance direction.

Note 2. Four TUS thermocouple locations shall be within 50 mm (2 inches) of the work zone corners and the remainder shall be at the center and symmetrically distributed about the center of a plane perpendicular to the conveyance direction.

Note 3. Add one additional thermocouple for each 0.6 m (2 ft.) of additional height and/or width. Additional TUS thermocouples shall be uniformly distributed throughout a plane perpendicular to the conveyance direction.

Note 4. TUS thermocouples shall be attached to the part or buried in the load.

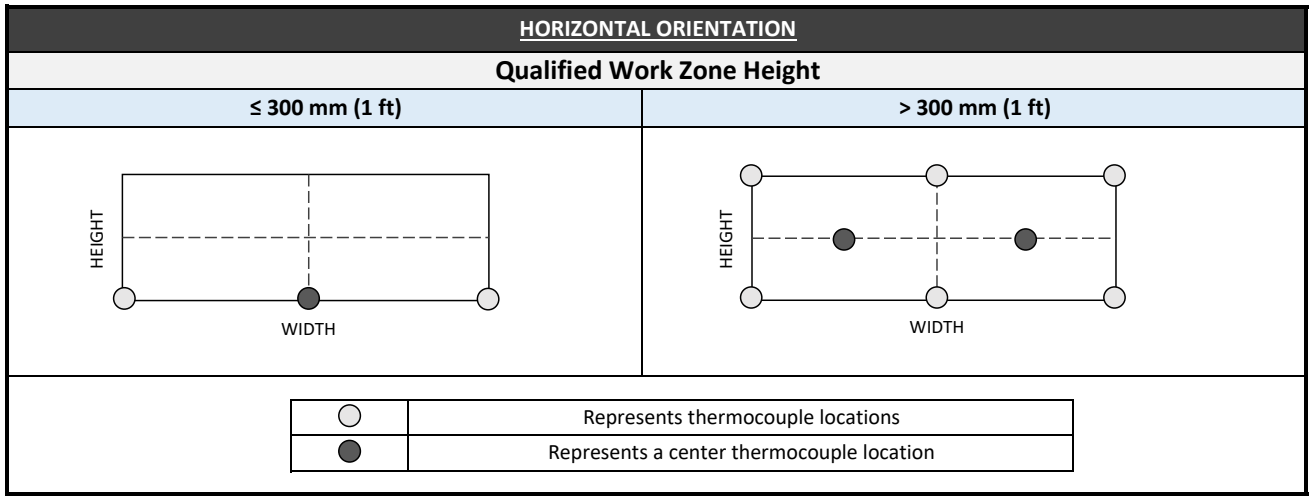


Figure P3.4.2 – Horizontally Oriented Plane Method TUS Test Thermocouple Locations

VERTICAL ORIENTATION	
Qualified Work Zone Width	
≤ 300 mm (1 ft)	> 300 mm (1 ft)

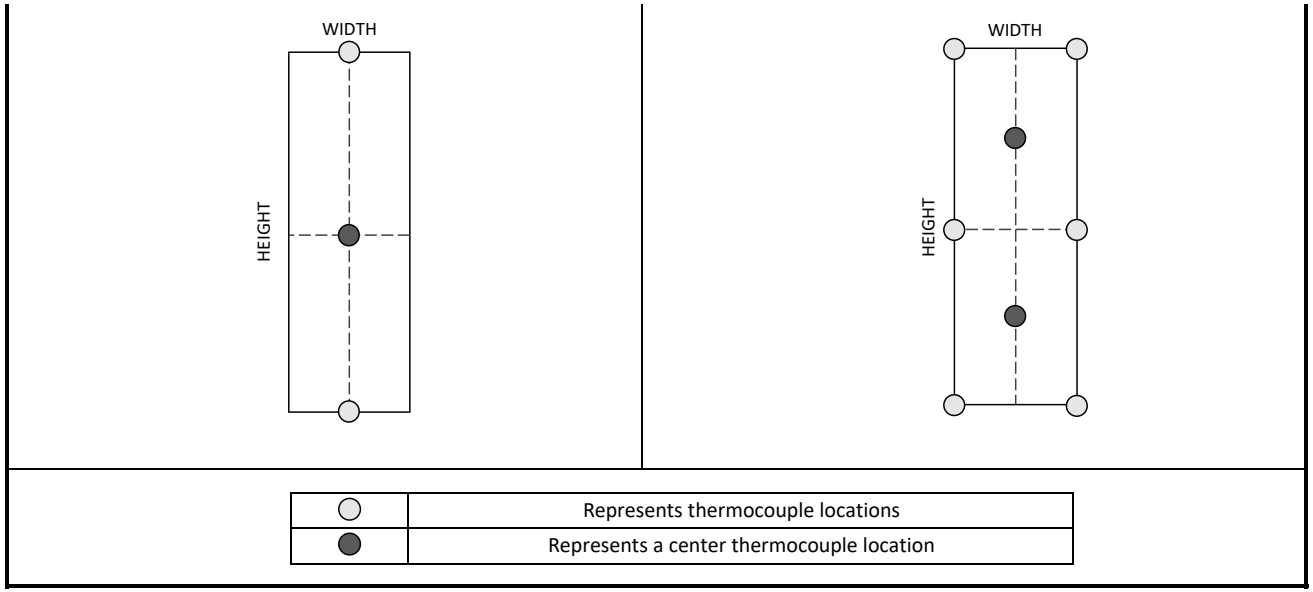


Figure P3.4.3 – Vertically Oriented Plane Method TUS Test Thermocouple Locations

Section 4 - Coating System Assessment Job Audit - Finished Product Review

	Job Identity: 729668	
	Customer: Shannon Precision Fasteners	
	Shop Order Number: 729668	
	Part Number: W712318-S442	
	Part Description: M14-2.0 X 155 Hex flange bolt	
	Material Substrate: Steel	
	Coating Requirements: (S442) WSS-M21P42-A3	
	Specification Number and Revision: WSS-M21P42-A3 Revision 3/22/19	

Question Number	Inspection Element	Identify Relevant Documents & Actual Condition (Provide Data or Values & Embed or Attach Documents)	Conforming Nonconforming NA
4.1	Attach evidence that the documentation for the specific part conforms to the requirements including: • Advanced quality planning process • FMEA • Process Control Plan	Verified APQP dated 1/16/12 PFMEA dated 3/10/20 Control plan dated 3/10/20	**Conforming**
4.2	What customer specifications or requirements are used for this part? • List the specification(s) and revision(s)	Ford - WSS-M21P42-A3 / REV 3/22/19	**Conforming**
4.3	Provide evidence of receiving inspection.	See Job router 729668 - first process step	**Conforming**
4.4	Provide the job traveler or attach a copy of this traveler showing: • Customer name • Lot number • Weight/quantity • Process instructions • Inspection requirements	See Job router 729668	**Conforming**
4.5	If the lot is divided, how is the traceability maintained throughout the process?	Lot / order not divided Job router # 729668 used to identify records and traceability	**Conforming**
4.6	Describe the method used to document each operation as being completed. Is there a sign-off with time stamp, bar code or scan, etc., after each operation?	Sign off and bar code scanning/tracking	**Conforming**
4.7	Attach work instructions applicable to this part indicating proper barrel/basket mesh size or perforation (hole size), load size, appropriate rack configuration, appropriate part orientation on rack, etc.	computor based recipe by part number with target basket weight.	**Conforming**
4.8	Identify each process table pertaining to this job audit. Populate the applicable process tables with the actual process results/conditions at the time this part was processed (Columns H and I in Process Tables A through H).	Process table A,B,G,I & K	**Conforming**
4.9	Were appropriate process steps on the job router/traveler signed off? For electronic systems, a screen print is acceptable.	Yes - See Job router 729668	**Conforming**
4.10	Were all inspection steps, as documented in the control plan, performed?	Yes - See Job router 729668 and inspection data / certification	**Conforming**

4.11	Were steps/operations performed that were not documented in the control plan?	No additional steps - followed control pland and job router.	**Conforming**
4.12	If additional steps were performed, were they authorized?	N/A	**Conforming**
4.13	If the order was certified, did the certification accurately reflect the process performed?	Yes - see certification # 729668	**Conforming**
4.14	Was the certification signed by an authorized individual?	Yes - inspector Rufus Goodin	**Conforming**
4.15	Are the parts and containers free of foreign objects or contamination?	Yes all 3 containers inspected and were free of objects and/or contamination.	**Conforming**
4.16	Are packaging requirements identified?	Plastic liners used for all 3 contaniners	**Conforming**
4.17	Are parts packaged to prevent mixing or damage to parts (parts packed over height of container)?	All 3 containers lined with plastic liner and no over filled containers	**Conforming**
4.18	Are storage conditions sufficient to maintain part quality? (e.g., parts are stored indoors in a clean, dry environment)	Marked finished parts area - claen and dry	**Conforming**
4.19	Were the parts properly identified and/or labeled before shipping?	Yes Job router number and customer container tag.	**Conforming**
4.20	For the finished part, list each test and inspection requirement per customer specification.	Each part may have one or more requirements determined by the coating specification. Parts must meet each requirement. Add additional sections as needed.	
	Below is an <u>example</u> of how to fill out sections in 4.20.x	**Inspection Requirement**	**Conforming Nonconforming NA**
Example only	**Test Description:**	Corrosion Resistance	
	Test Method:	ASTM B117	
	Test frequency or quantity:	daily, 2 parts	**Conforming**
	Test Requirement:	240 hrs. no white / 1000 hours no red	
	Result: Attach evidence:	White corrosion at 168 hours, no red LAB Report 12	**Nonconforming**
	Insert audit data below this line. Add additional sections as needed.		
4.20.1	**Test Description:**	Coating thckness	**Conforming**
	Test Method:	Magnetic induction method / W.I.# P3QC-0005	**Conforming**
	Test frequency or quantity:	10 pieces per order	**Conforming**
	Test Requirement:	10-20 Ums	**Conforming**
	Result: Attach evidence:	See certification # 729668 10.2-12.2 Ums.	**Conforming**
4.20.2	**Test Description:**	Adhesion	**Conforming**
	Test Method:	WSS-M21P42-A3 section 3.3	**Conforming**
	Test frequency or quantity:	2 pieces per container	**Conforming**

	Test Requirement:	No peeling or flaking of coating	**Conforming**
	Result: Attach evidence:	See certification # 729668 Passed	**Conforming**

PROCESS TABLE A - Pretreatment (Aqueous)

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

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.

For sections that are not applicable mark NA in the Comments column.

Instruction for creating the table with the form builder:

Using the Populate Forms list to the right, select the box that represents the first step of the process flow.
Then select the Populate Forms banner and that section of the process table will be added below.
For each additional step of the process flow, continue adding sections to the form by selecting the applicable step from the list to the right, followed by selecting the Populate Forms banner.
Rinses between process steps are to be included.
If using multiple counter flowed rinses only insert one Rinse section, document only the condition of the last rinse tank in the series.

Process Line Identification:

Type of Line: Rack or Barrel

	Category/Process Steps	Type of Control		Monitoring Frequency		Observation/ Comments	Job Audit Measurements	
ITEM #		Minimum Requirement	Actual Condition	Minimum Requirement	Actual Condition	Conforming Nonconforming NA	Range	Actual Measurements supporting time of Job Audit

PROCESS TABLE A - Pretreatment (Aqueous)

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

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
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If any data points at reduced monitoring frequencies are outside of control limits, then revert back to the frequencies stated under the minimum requirements.

Process Line Identification:

Type of Line: Rack or Barrel

	Category/Process Steps	Type of Control		Monitoring Frequency		Observation/ Comments	Job Audit Measurements	
ITEM #		**Minimum Requirement**	**Actual Condition**	**Minimum Requirement**	**Actual Condition**	**Conforming Nonconforming NA**	**Range**	**Actual Measurements supporting time of Job Audit**
1.0	**Aqueous Cleaning Process (Alkaline or Acid)**							
A1.1	There shall be an incoming part assessment procedure with criteria.	Per Control Plan	Per control plan	Once per lot and per part change.	Per order	**Conforming**	pass /fail	Pass
A1.2	Time	Automatic / Manual	Automatic	Automatic Line: Confirm set-up at the start of production and every process change. Manually verify every 3 months or after programming change or equipment maintenance. Manual Line: Continuously monitor time in each stage of process.	Per recipe time / verified	**Conforming**	Cycle time monitored daliy	Pass
2.0	**Cleaning / Descaling Solution**							
A2.1	Pressure for spray rinse. Agitation for immersion tanks.	Automatic / Manual	Automatic	Once every 8 hours.	agitiation	**Conforming**	verified agitation	Pass
A2.2	Solution Temperature is monitored and controlled if required by chemical supplier's technical data sheet.	Automatic	Continuous monitored by controller	Continuous monitoring by controller. Manually verify daily.	Continuous monitored by controller	**Conforming**	Continuous monitored by controller	Pass
A2.3	Temperature (Thermocouple)	Automatic Max SAT difference allowed +/- 5°C (10°F)	Continuous monitored by controller	Continuous monitoring by controller. Manually verify daily.	Continuous monitored by controller	**Conforming**	Continuous monitored by controller	Pass
A2.4	Chemical Concentration (Alkaline Cleaner) (If used) Per chemical supplier recommendation such as: - free alkalinity - total alkalinity - pH - conductivity - percentage of cleaner (weight/volume or volume/volume)	Automatic / Manual	Automatic	Once every 8 hours.	automatic conductivity probe	**Conforming**	1-3%	3%
A2.5	Chemical Concentration (Acid Cleaner) (If used) Per chemical supplier recommendation such as: - free acidity or concentration - metal contamination	Automatic / Manual	No acid used	Once every 8 hours.	No acid cleaner	**n/a**	n/a	n/a
A2.6	Impurity Content Per chemical supplier recommendation such as: - acid split (oil contamination) - alkalinity ratio - iron content	Manual	Alkalinity ratio	Once every 8 hours.*	Alkalinity ratio checked every shift	**Conforming**	2.6 max.	1.89
A2.7	Solution Level	Manual	Automatic level control	Once every 8 hours.	Automatic level control	**Conforming**	Full	Pass

PROCESS TABLE A - Pretreatment (Aqueous)

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Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

A2.8	Solution and tank clean out schedule is documented and followed - Desludging, coalescer, new make-up frequency, etc.	Manual	Per PM schedule	Per preventative maintenance program.	semi-annual or as needed	**Conforming**	Last completed 9/21/20	Pass
3.0	**Rinse**							
A3.1	Rinse Type - Identify in comment section e.g., Flowing, Counter Flowing, Spray, Stagnant, Drag-in/out.	Automatic	Counter flowing	Once every 8 hours.	counter flowing	**Conforming**	counter flowing	Pass
A3.2	Water Type - Identify in comment section e.g., Municipal, Deionized (DI), Reverse Osmosis (RO).	NA	Municipal	NA	Municipal water controled automatically	**Conforming**	Municipal water controled automatically	Pass
A3.3	Agitation type - Identify in comment section, if applicable. e.g., Mechanical (Describe), Air, Ultrasonic.	Automatic	Automatic	NA	automatic	**Conforming**	automatic	Pass
A3.4	Solution Temperature is monitored and controlled if required by chemical supplier's technical data sheet.	Automatic	Continuous monitored by controller	Continuous monitoring by controller. Manually verify daily.	Continuous monitored by controller	**Conforming**	130F Min.	135F
A3.5	Temperature (Thermocouple), if applicable.	Automatic Max SAT difference allowed +/- 5°C (10°F)	Continuous monitored by controller	Continuous monitoring by controller. Manually verify daily.	Continuous monitored by controller/alarm	**Conforming**	130F Min.	134F
A3.6	pH, if applicable.	Manual	not applicable	Once every 8 hours.*	n/a	**n/a**	n/a	n/a
A3.7	Conductivity, if applicable.	Manual	automatic	Once every 8 hours.*	Continuous monitored with alarm	**Conforming**	automatic	Pass
A3.8	Concentration, if applicable.	Manual	Controoled by conductivety probe	Once every 8 hours.*	Continuous monitored by conductivity /alarm	**Conforming**	automatic	Pass
A3.9	Flow rate, if applicable.	Manual	not applicable	Once every 8 hours.	n/a	**n/a**	n/a	n/a
A3.10	Spray nozzle condition, if applicable.	Manual	not applicable	Once every 8 hours.	n/a	**n/a**	n/a	n/a
A3.11	Verify position of incoming water feed is near the bottom (if immersion tank)	Manual	In 3rd rinse- near bottom	Per preventative maintenance program.	counter flowing to 1st and 2nd rinse tanks	**Conforming**	counter flowing	Pass
A3.12	Tank maintenance schedule documented and followed.	Manual	manual	Per preventative maintenance program.	semi-annual or as needed	**Last completed 9/21/20**	per PM schedile	Pass
4.0	**Acid / Neutral Pickling**							
A4.1	Concentration	Manual	No acid used	Once every 8 hours.	No acid used	**n/a**		
A4.2	Concentration of Fe, per chemical supplier.	Manual	No acid used	Once per day.	No acid used	**n/a**		
A4.3	Solution Temperature is monitored and controlled if required by chemical supplier's technical data sheet.	Automatic	No acid used	Continuous monitoring by controller. Manually verify daily.	No acid used	**n/a**		
A4.4	Temperature (Thermocouple), if applicable.	Automatic Max SAT difference allowed +/- 5°C (10°F)	No acid used	Continuous monitoring by controller. Manually verify daily.	No acid used	**n/a**		
A4.5	Inhibitor (if used)	Manual	N/A	Per supplier data sheet.	N/A	**n/a**		
A4.6	Solution Level	Manual	No acid used	Once every 8 hours.	No acid used	**n/a**		

PROCESS TABLE A - Pretreatment (Aqueous)

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

A4.7	Solution and tank clean out schedule is documented and followed - Desludging, coalescer, new make-up frequency, etc.	Manual	No acid used	Per preventative maintenance program.	No acid used	**n/a**		
A4.8	Rinse - See Section 3.0.							

PROCESS TABLE A - Pretreatment (Aqueous)

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

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

5.0	**Aluminum Etching**							
A5.1	Concentration	Manual	**n/a**	Once every 8 hours.		**n/a**		
A5.2	Concentrations of Al, per chemical supplier.	Manual	**n/a**	Once per day.		**n/a**		
A5.3	Solution Temperature is monitored and controlled if required by chemical supplier's technical data sheet.	Automatic	**n/a**	Continuous monitoring by controller. Manually verify daily.		**n/a**		
A5.4	Temperature (Thermocouple)	Automatic Max SAT difference allowed +/- 5°C (10°F)	**n/a**	Continuous monitoring by controller. Manually verify daily.		**n/a**		
A5.5	Solution and tank clean out schedule is documented and followed - Desludging, coalescer, new make-up frequency, etc.	Manual	**n/a**	Per preventative maintenance program.		**n/a**		
A5.6	Rinse - See Section 3.0.							
6.0	**Aluminum Deoxidizing**							
A6.1	Concentration	Manual	**n/a**	Once every 8 hours.		**n/a**		
A6.2	Concentrations of Al, per chemical supplier.	Manual	**n/a**	Once per day.		**n/a**		
A6.3	Solution Temperature is monitored and controlled if required by chemical supplier's technical data sheet.	Automatic	**n/a**	Continuous monitoring by controller. Manually verify daily.		**n/a**		
A6.4	Temperature (Thermocouple)	Automatic Max SAT difference allowed +/- 5°C (10°F)	**n/a**	Continuous monitoring by controller. Manually verify daily.		**n/a**		
A6.5	Solution and tank clean out schedule is documented and followed - Desludging, coalescer, new make-up frequency, etc.	Manual	**n/a**	Per preventative maintenance program.		**n/a**		
A6.6	Rinse - See Section 3.0.							
7.0	**Sealing Rinse (if applicable)**							
A7.1	Solution Temperature is monitored and controlled if required by chemical supplier's technical data sheet.	Automatic	**n/a**	Continuous monitoring by controller. Manually verify daily.		**n/a**		
A7.2	Temperature (Thermocouple)	Automatic Max SAT difference allowed +/- 5°C (10°F)	**n/a**	Continuous monitoring by controller. Manually verify daily.		**n/a**		
A7.3	Concentration	Manual	**n/a**	Once every 8 hours.		**n/a**		
A7.4	pH, if applicable.	Automatic / Manual	**n/a**	Once every 8 hours.		**n/a**		
A7.5	Solution Level	Manual	**n/a**	Once every 8 hours.		**n/a**		
A7.6	Solution and tank clean out schedule is documented and followed - Desludging, coalescer, new make-up frequency, etc.	Manual	**n/a**	Per preventative maintenance program.		**n/a**		

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Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

A7.7	Rinse - See Section 3.0.							

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

8.0	**Oil / Wax (if applicable)**							
A8.1	Pressure/Agitation	Automatic	**n/a**	Once every 8 hours.		**n/a**		
A8.2	Chemical Analysis: Per chemical supplier recommendation such as: - Concentration - pH - Emulsion Stability - Viscosity - Total Dissolved Solids (TDS)	Manual	**n/a**	If not used at 100% concentration, every 8 hours. If used at 100% concentration, every lot change.		**n/a**		
A8.3	Solution Temperature is monitored and controlled if required by chemical supplier's technical data sheet.	Automatic	**n/a**	Continuous monitoring by controller. Manually verify daily.		**n/a**		
A8.4	Temperature (Thermocouple)	Automatic Max SAT difference allowed +/- 5°C (10°F)	**n/a**	Continuous monitoring by controller. Manually verify daily.		**n/a**		
A8.5	Solution and tank clean out schedule is documented and followed - Desludging, new make-up frequency, etc.	Manual	**n/a**	Per preventative maintenance program.		**n/a**		
9.0	**Dry-Off (If Applicable)**							
A9.1	Air temperature is monitored and controlled.	Automatic	Continuous monitored by controller	Once every 8 hours.	Continuous monitored by controller	**Conforming**	Continuous monitored by controller	Pass
A9.2	There is a procedure to ensure dryness of parts prior to subsequent coating.	Visual	visual	Every change of lot number and each container.	visual / adhesion tested	**Conforming**	adhesion tested on evey skid	Pass
10.0	**Process Equipment**							
A10.1	Process equipment shall be verified and calibrated per Process Table K. Calibrations shall be certified, posted and up to date. A system shall be used to track calibration dates of equipment. Complete the audit for these identified elements in Process Table K.							

Guidance	**Objective Evidence / Comments**	**Conforming Nonconforming NA**
What internal system is used for conducting and managing calibration of all relevant equipment identified in Process Table K?	Internal calibration database with tracking indicators	**conforming**
Provide the document that lists all relevant equipment identified in Process Table K.	see calibration records	**conforming**
How do you ensure calibrations are up to date?	calibration database	**conforming**
How do you ensure new equipment has been added to the calibration list and inactive equipment has been removed?	Procedure # PR-113	**conforming**
Are calibration labels present and up to date for listed equipment?	Yes - all test equipement found with calibration stickers and current	**conforming**
What is the reaction plan to any failed verification?	Take out of service until corrected/repaired	**conforming**

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Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

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A10.2	Barrels, baskets, process tanks, belts/conveyors, racks, fixtures and drive mechanisms shall be maintained.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
How do you inspect for the integrity of the barrels, baskets, process tanks, racks, contact points, belts/conveyors and drive mechanisms? (e.g., wear, perforations, trap points, plugged holes, door gaps, other damage) Where are the inspection results documented?	Inspected per W.I. #PRP3-022 and documented on form # P3PN-F014	**conforming**
What is your preventative maintenance program for barrels, baskets, racks, contact points, process tanks and drive mechanism?	Automatic basket rotation or when paint type is changed	**conforming**
What is the maintenance program for mechanical/chemical cleaning of barrels, baskets, racks, contact points and process tanks?	per W.I. #PRP3-022 and documented on form # P3PN-F014	**conforming**
How is each basket, barrel, or rack uniquely identified for tracking purposes?	All baskets have id numbers	**conforming**

A10.3	All filtration equipment shall be maintained. The organization shall have a preventative maintenance system that is documented and implemented.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
What is the preventative maintenance program for filters?		**n/a**
How is the filter type identified during use?		**n/a**
If reusable filters are used, do they meet the supplier's recommendations?		**n/a**
If disposable filters are used, do they meet the supplier's recommendations?	disposable filters used for paint filtering per supplier recommendations	**Conforming**
What are your criteria for filter replacement and/or cleaning?	n/a	**n/a**
What information is used to determine the required mesh size?	200um per supplier recommendations	**Conforming**
How is compatibility with the process determined?		**n/a**
Describe the preventive maintenance program for all solution filters to include plate, filter bag and cartridge.		**n/a**
Describe the preventive maintenance program for all air filters used on ovens, dryers, chillers, blowers and fans etc.		**n/a**

A10.4	All process and equipment alarms shall be tested on a quarterly basis at a minimum. The organization shall have a preventative maintenance system that is documented and implemented.

PROCESS TABLE A - Pretreatment (Aqueous)

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

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
What is the preventative maintenance program where alarms are used for solution temperature, level control, environmental control, faults, etc.?	Verified during PM	**Conforming**
What are the alarms that are tested and their test frequency?	see PM schedule	**Conforming**

A10.5	Processing equipment is designed/optimized for "soft handling" of parts.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
Are chutes lined to prevent part damage?	All chutes lined and all conveyors are rubber belts	**Conforming**
What technique(s) are used to minimize drop heights?	All height at minimum and some tilt during loading and unloading	**Conforming**

A10.6	Part transfer equipment is maintained.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
What is your program to assure cleanliness of belts, conveyors, chutes, vibratory tables, etc.?	Cleaned every shift or durning changeovers.	**Conforming**
What is your maintenance program for belts, conveyors, chutes, vibratory tables, etc.?	Every week	**Conforming**

A10.7	In-process and customer containers are managed and maintained.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
How do you identify and segregate in-process containers for different processes?	No customer containers used for in process product - internal containers	**Conforming**
What is your maintenance program for keeping in-process containers clean and in good condition?	Cleaned after every use.	**Conforming**
How do you ensure that the customer containers do not degrade the quality of the coated parts? (e.g., customer container may arrive damaged, oily, dirty)	Plastic liners used on all customer containers or other material required by customer	**Conforming**

A10.8	Electrical system shall be maintained. Coater shall have a preventative maintenance system that is documented and implemented.	verified annually

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
Describe the preventative maintenance program for rectifiers (e.g., voltage and amperage)		**n/a**
All anodes/cathodes, contacts and bussing shall be maintained. Coater shall have a preventative maintenance system that is documented and implemented.		**N/A**
Describe the preventative maintenance program including cleanliness, electrical resistance and electrical shorts.		**N/A**

PROCESS TABLE A - Pretreatment (Aqueous)

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

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

11.0	**Test Equipment (Process Control and Finished Part Quality)**		
A11.1	Test Equipment shall be verified and calibrated per Process Table K. Calibrations shall be certified, posted and up to date. A system shall be used to track calibration dates of equipment. Complete the audit for these identified elements in Process Table K.		
Guidance		**Objective Evidence / Comments**	**Conforming Nonconforming NA**
Wet Analysis: Before use, chemicals must be checked for shelf life and/or expiration date		All chemicals checked before use and in envirometal controlled storage	**Conforming**
pH Meter			**N/A**
pH Probes (must be solution compatible)			**N/A**
Laboratory Balance (Weight Scale)		Calibration verifed and calibration completed annually	**Conforming**
Rectifier			**n/a**
Hand Held Thermometer		annually	**Conforming**
Temperature Controller		annually	**Conforming**
Thermocouple		annually	**Conforming**
Solution Mixer		verified before use	**Conforming**
Amp Meter/Volt Meter		checked weekly	**Conforming**
Filters		per PM schedule	**Conforming**
Conductivity Meter		checked daily	**Conforming**
Conductivity Probes (must be solution compatible)		checked daily	**Conforming**
Ultrasonic Cleaner, if applicable.			**n/a**

Proceed to PT B , PT C or PT H

PROCESS TABLE B - Pretreatment (Mechanical)

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

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

Item #	Category/Process Steps	Type of Control		Monitoring Frequency		Observation/ Comments	Job Audit Measurements	
		Minimum Requirement	Actual Condition	Minimum Requirement	Actual Condition	Conforming Nonconforming NA	Range	Actual Measurements supporting time of Job Audit
1.0	**Abravise Blast Process**							
B1.2	Parts shall be clean and free of oil and grease.	Manual	Automatic	For batch operations per load. For integrated operations once every 8 hours.	Every basket	**Conforming**	Every basket	Passed
B1.3	Load Weight is verified.	Manual / Automatic	Automatic	Per load.	Per load	**Conforming**	Every basket	Passed
B1.4	Media Size / type is appropriate for the part being processed.	Manual	Automatic	Per part number.	Media size S3	**Conforming**	Only one type of media used	passed
B1.5	Dwell time is clearly defined.	Manual / Automatic	Automatic	Per load.	Per recipe	**Conforming**	4 mins,	Passed
B1.6	Verify blasting force/energy is set and maintained within control limits, e.g., Amperage Draw, PSI.	Manual / Automatic	Automatic	Per load.	Continuous with alarm	**Conforming**	Amp meter monitoring with alarm	Passed
B1.7	Verify abrasive media volume is sufficient.	Manual	Automatic	Once every 8 hours.	Continuous with alarm	**Conforming**	Automatic level control	Passed
B1.8	Verify dust collector efficiency/air flow is within limits.	Manual	Automatic	Once every 8 hours.	Continuous with alarm	**Conforming**	monitoring with alarm	Passed
B1.9	Media size / life: Media size is being checked on a regular schedule to determine effective cleaning and life for product mix.	Manual / Automatic	Manual	Once per week.	sieve testing once per week	**Conforming**	sieve testing once per week	Passed
B1.10	Part cleanliness is checked after process. Surface cleanliness check must be conducted using a chemical, e.g., copper sulfate, surface tension ink or other qualitative method.	Manual	Manual	Once every 4 hours.	1 piece every 3 hours	**Conforming**	visual - copper sulfate test	Passed
B1.11	If additional blasting is required, management approval is needed.	Manual / Automatic	Manual	Per load.	1 piece every 3 hours	**Conforming**	Pass	Passed
B1.12	Surface profile is checked after process, if applicable.	Manual	Not applicable	Per load.	Not applicable	**n/a**		
2.0	**Process Equipment**							
B2.1	Process equipment shall be verified and calibrated per Process Table K. Calibrations shall be certified, posted and up to date. A system shall be used to track calibration dates of equipment. Complete the audit for these identified elements in Process Table K.							

PROCESS TABLE B - Pretreatment (Mechanical)

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

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
What internal system is used for conducting and managing calibration of all relevant equipment identified in Process Table K?	Internal calibration database with tracking indicators	**conforming**
Provide the document that lists all relevant equipment identified in Process Table K.	see calibration records	**conforming**
How do you ensure calibrations are up to date?	calibration database	**conforming**
How do you ensure new equipment has been added to the calibration list and inactive equipment has been removed?	Procedure # PR-113	**conforming**
Are calibration labels present and up to date for listed equipment?	Yes - all test equipement found with calibration stickers and current	**conforming**
What is the reaction plan to any failed verification?	Take out of service until corrected/repaired	**conforming**

B2.2	Barrels, belts/conveyors, racks, fixtures and drive mechanisms shall be maintained.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
How do you inspect for the integrity of the barrels, racks, belts/conveyors and drive mechanisms? (e.g., wear, perforations, trap points, plugged holes, door gaps, other damage)	Inspected per W.I. #PRP3-022 and documented on form # P3PN-F014	**conforming**
What is the maintenance program for barrels, belts/conveyors, racks, fixtures and drive mechanisms?	Automatic basket rotation or when paint type is changed	**conforming**
How is each barrel or rack uniquely identified for tracking purposes?	All baskets have id numbers	**conforming**

B2.3	All filtration equipment shall be maintained. The organization shall have a preventative maintenance system that is documented and implemented.

PROCESS TABLE B - Pretreatment (Mechanical)

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

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
What is the preventative maintenance program for filters?		**n/a**
How is the filter type identified during use?		**n/a**
If reusable filters are used, do they meet the supplier's recommendations?		**n/a**
If disposable filters are used, do they meet the supplier's recommendations?	disposable filters used for paint filtering per supplier recommendations	**Conforming**
What are your criteria for filter replacement and/or cleaning?	n/a	**n/a**
What information is used to determine the required mesh size?	200um per supplier recommendations	**Conforming**
How is compatibility with the process determined?		**n/a**
Describe the preventive maintenance program for all solution filters to include plate, filter bag and cartridge.		**n/a**
Describe the preventive maintenance program for all air filters used on ovens, dryers, chillers, blowers and fans, etc.		**n/a**
How is the dust collection system maintained? (e.g., pressure differential gages/sensors)	Pressure differental and sensors - automatic alarm	**Conforming**

B2.4	All process and equipment alarms shall be tested on a quarterly basis at a minimum. The organization shall have a preventative maintenance system that is documented and implemented.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
What is the preventative maintenance program where alarms are used for environmental control, faults, etc.?	Verified during PM	**Conforming**
What alarms are tested and define the test frequency?	see PM schedule	**Conforming**

PROCESS TABLE B - Pretreatment (Mechanical)

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

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

B2.5	Processing equipment is designed/optimized for "soft handling" of parts.		
Guidance		**Objective Evidence / Comments**	**Conforming Nonconforming NA**
Are chutes lined to prevent part damage?		All chutes lined and all conveyors are rubber belts	**Conforming**
What technique(s) are used to minimize drop heights/damage?		All height at minimum and some tilt during loading and unloading	**Conforming**

B2.6	Part transfer equipment is maintained.		
Guidance		**Objective Evidence / Comments**	**Conforming Nonconforming NA**
What is your program to assure cleanliness of belts, conveyors, chutes, vibratory tables, etc.?		Cleaned every shift or durning changeovers.	**Conforming**
What is your maintenance program for belts, conveyors, chutes, vibratory tables, etc.?		Every week	**Conforming**

B2.7	In-process and customer containers are managed and maintained.		
Guidance		**Objective Evidence / Comments**	**Conforming Nonconforming NA**
How do you identify and segregate in-process containers for different processes?		No customer containers used for in process product - internal containers	**Conforming**
What is your maintenance program for keeping in-process containers clean and in good condition?		Cleaned after every use.	**Conforming**
How do you ensure that the customer containers do not degrade the quality of the coated parts? (e.g., customer container may arrive damaged, oily, dirty)		Plastic liners used on all customer containers or other material required by customer	**Conforming**

B2.8	The blasting force/energy supply system shall be maintained. (e.g., Amperage Draw, PSI.)		
Guidance		**Objective Evidence / Comments**	**Conforming Nonconforming NA**
Describe the preventative maintenance program for drive motors (e.g., voltage and amperage)		verified annually	**Conforming**

PROCESS TABLE B - Pretreatment (Mechanical)

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

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

3.0	**Test Equipment (Process Control and Finished Part Quality)**
B3.1	Test Equipment shall be verified and calibrated per Process Table K. Calibrations shall be certified, posted and up to date. A system shall be used to track calibration dates of equipment. Complete the audit for these identified elements in Process Table K.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
Wet Analysis: Before use, chemicals must be checked for shelf life and/or expiration date	All chemicals checked before use and in envirometal controlled storage	**Conforming**
Media flow rate - amp meter	verified weekly	**Comforming**
Part dust residue test capability	visual every lot and dust control additive used	**Conforming**
Surface profile assessment capability, if applicable		**n/a**
Media fine removal capability	Sieve testing	**Conforming**
Media size distribution capability - sieves/lab balance, laser	Sieve testing	**Conforming**
Media pattern assessment capability	Verified on start up / automacally	**Conforming**
Part dryness ceramic test media (e.g., Zirblast), if applicable	n/a	**n/a**
Part cleanliness assessment - Copper sulfate solution for Hogaboom test, surface tension ink, if applicable	Copper sulfate test done	**Conforming**
Phenolpthalein solution for alkaline contamination check, if applicable		**n/a**
Laboratory Balance (Weight Scale)	Calibration verifed and calibration completed annually	**Conforming**

Proceed to PT A, PT C or PT G

PROCESS TABLE G - Dip-Spin & All Zinc-Flake Application Methods

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

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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 Table G applies to every Dip-Spin coating and all Zinc-Flake coating processes, including spray and dip-drain.

Item #	Category/Process Steps	Type of Control		Monitoring Frequency		Observation/ Comments	Job Audit Measurements	
		Minimum Requirement	Actual Condition	Minimum Requirement	Actual Condition	Conforming Nonconforming NA	Range	Actual Measurements supporting time of Job Audit
1.0	**Coating Material Application**							
G1.1	Pretreatment, coating, and post treatment shall be completed in the same building.	All described processes in the same building.	aqueous & mechanical pretreatment	Ongoing.	aqueous & mechanical pretreatment	**conforming**	mechanical used on 729668	Pass
G1.2	After pretreatment, and immediately before each coating, parts are inspected for flash rust, wetness, cleanliness, phosphate coating uniformity (when applicable), oil or other defects.	Visual inspection.	per lot inspection	Ongoing.	parts dry and passed copper sulfate test	**conforming**	Passed	pass
G1.3	Containers used to hold parts between coating operations are free of blast media, oil, grease or other contaminants.	Visual inspection.	No containers used	Each container.	No containers used - 3 coat processing line	**conforming**	Passed	Pass
G1.4	Parts shall be stored indoors in a staging area that does not affect the cleanliness and quality of parts. The staging area shall not be adjacent to open doorways or windows exposing parts to water, dirt, fumes, blast media or other contaminations.	Designated staging area.	marked staging areas	Ongoing.	marked staging areas	**conforming**	All staging areas in clean areas	Pass
G1.5	After pretreatment, parts shall be coated within the time limit specified by the customer specification and/or chemical supplier application manual.	Per application manual/customer specification.	within 24 hours of pretreatment	Ongoing.	automated line coated withing 1 hour	**conforming**	24 hours max.	Pass
2.0	**Coating Material**							
G2.1	Incoming coating material viscosity and percent solids are checked per chemical supplier application manual.	Manual measurement and compare to certification.	certification with each lot	Each new lot of coating material.	verified before use.	**conforming**	51-55% solids / 20-40 seconds vicosity	53.47% solids / vicosity 24 seconds
G2.2	Appropriate mixing equipment shall be used and capable of dispersing settled solids. The blade type, shaft length, and power rating shall be consistent with chemical supplier's recommendations. Hand mixers are not allowed.	Chemical supplier approved equipment.	air powered mixers used	Ongoing.	air powered mixers used for paint pots	**conforming**	Passed	Pass
G2.3	Coating material shall be stored per chemical supplier requirements.	Per chemical supplier requirements.	stored in climate controlled rooms	Ongoing.	climate controlled rooms	**conforming**	35-90F	72F
G2.4	When not in use, coating material is kept covered and/or sealed per chemical supplier requirements.	Per chemical supplier requirements.	Paint pots stored in climet controlled room with covers	Ongoing.	all found covered and sealed in climate control room	**conforming**	35-90F	72F
G2.5	Coating material storage area is clean and organized so each coating material is easily found and to prevent contamination.	Manual	clean and organized	Ongoing.	clean and organized	**conforming**	verified all labeld , clean and organized	Pass

PROCESS TABLE G - Dip-Spin & All Zinc-Flake Application Methods

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

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

3.0	**Coating Process and Bath**							
G3.1	Verify that the coating bath is uniformly mixed (e.g., no settling or agglomeration checked by viscosity cup and depth gage).	Manual	mixed and checked before use	Prior to start of production and before any additions.	mixed and checked before use	**conforming**	Passed	passed
G3.2	Secondary and feed tanks are verified for settling, agglomeration and viscosity.	Manual	paint pots are rotated out and added to and re-mixed	Prior to start of production and every shift.	secondary paint pots prepared and tested before use	**conforming**	51-55% solids / 20-40 seconds viscosity	53.56% solids / viscosity 23 seconds
G3.3	Coating material filtration as required by chemical supplier guidelines/manual.	Manual	per supplier guidelines and internal instructions	Per preventative maintenance schedule.	per supplier guidelines and internal instructions	**conforming**	filtered per internal W.I. and paint pot tagged when completed	passed
G3.4	Coating material temperature.	Automatic / Manual	checked at time of viscosity test	Prior to start of production and once every 2 hours.*		**conforming**	35-90F	72F
G3.5	Temperature (Thermocouple)	Automatic Max SAT difference allowed +/- 5°C (10°F)	35-96F	Continuous monitoring by controller. Manually verify daily.	Climate controlled paint boths	**conforming**	both controlled by HVAC / no SAT	Pass
G3.6	Viscosity as required by chemical supplier guidelines/manual.	Manual	20-40 seconds	Prior to start of production and once every 2 hours.*	20-40 seconds	**conforming**	23 seconds	pass
G3.7	Percent (%) solids by chemical supplier guidelines/manual.	Manual	51-55%	Prior to start of production and before every process change.	51-55%	**conforming**	51-55% solids	53.56% solids
G3.8	Volume (coating material depth in process tank).	Automatic / Manual	automatic low level alarm	Prior to start of production and once every 2 hours.*	automatic low level alarm	**conforming**	20-40 seconds viscosity	viscosity 23 seconds
G3.9	Equipment surfaces in contact with wet coating (e.g., vibratory feed tables) are free of loose debris and excess coating build-up.	Manual	checked every shift	Once every 8 hours and before every process change.	checked every shift	**conforming**	passed	passed
G3.10	Basket shall be undamaged and free from coating buildup. Damaged or dirty baskets shall be removed from service immediately.	Manual	basket cleaning schedule and inspection	Prior to start of production, every process change, and every 4 hours.	basket cleaning schedule and inspection	**conforming**	passed	passed
G3.11	Coating material and/or viscosity reducing agent additions are verified before production continues.	Manual	checked after each addition	Each addition.	checked after each addition	**conforming**	passed	passed
G3.12	Viscosity cups are cleaned after each use. The cups shall be stored in a designated location and protected against contamination and damage.	Manual	cleaned after each use	After each use.	cleaned after each use	**conforming**	cleaned after each use and stored in cabinet/paint	Passed
4.0	**Application Parameters Dip-Spin**							
G4.1	Loading weight shall be defined for each part and documented in the processing manual, traveler, or process recipe.	Automatic / Manual	computor based part recipe with target weight	Every lot.	computor based part recipe with target weight	**conforming**	passed	passed
G4.2	Baskets are kept less than 70% full by volume.	Automatic / Manual	computor based part recipe with target weight	Every lot.	computor based part recipe with target weight	**conforming**	paint baskets at 50-60% volume	passed
G4.3	Coating parameters are controlled and verified via external display (dip time, spin speed, spin time, spin cycle, spin direction and basket tilting).	Automatic / Manual	computor based part recipe with target weight	Every lot.	computor based part recipe with target weight	**conforming**	passed	passed
G4.4	There is a system (raking, vibe table, etc.) to uniformly distribute parts prior to curing to ensure proper cure and prevent parts from sticking and minimize touch marks.	Automatic / Manual	automated leveling	Every coating load.	automated leveling	**conforming**	passed	passed
G4.5	Equipment and fixtures that are in contact with parts (baskets, loading tables, chutes, conveyor belts, etc.) are kept clean.	Manual	checked and cleaned per shift or process change	Inspect prior to start of production, every process change, and every 4 hours.	checked and cleaned per shift or process change	**conforming**	passed	passed
G4.6	There shall be soft handling of parts (shallow drops, lined chutes and hoppers, bumper boards, etc.).	Automatic / Manual	soft handling on all areas	Ongoing.	soft handling on all areas	**conforming**	passed	passed
G4.7	Parts are within recommended temperature range per chemical supplier recommendation or application manual before each coating step.	Manual	automated cool down stations	Ongoing.	automated cool down stations	**conforming**	passed	passed

PROCESS TABLE G - Dip-Spin & All Zinc-Flake Application Methods

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

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

5.0	**Application Parameters Spray**							
G5.1	Parts shall be properly racked or fixtured to minimize touch marks. Racks and fixtures shall be defined for each part and documented in the process manual, traveler, or process recipe.	Manual		Every lot.	N/A	N/A	N/A	N/A
G5.2	Parts shall be completely within the spray pattern.	Manual		Every lot.	N/A	N/A	N/A	N/A
G5.3	Coating parameters shall be controlled, verified and documented (e.g., air pressure, voltage, electrostatics, material flow).	Automatic / Manual		Every lot.	N/A	N/A	N/A	N/A
G5.4	Equipment, racks and fixtures that are in contact with parts are kept clean.	Manual		Inspect prior to start of production, every process change, and every 4 hours.	N/A	N/A	N/A	N/A
G5.5	Parts are within recommended temperature range per chemical supplier recommendation or application manual before each coating step.	Manual		Ongoing.	N/A	N/A	N/A	N/A
G5.6	Booth temperature and humidity are monitored and documented, if applicable.	Automatic / Manual		Prior to start of production and once every 4 hours. With a control alarm, frequency may be reduced to once every 8 hours.	N/A	N/A	N/A	N/A
G5.7	Conveyer speed is verified and documented.	Automatic		Start of production and every process change.	N/A	N/A	N/A	N/A
6.0	**Process Equipment**							
G6.1	Process equipment shall be verified and calibrated per Process Table K. Calibrations shall be certified, posted and up to date. A system shall be used to track calibration dates of equipment. Complete the audit for these identified elements in Process Table K.							

Guidance	**Objective Evidence / Comments**	**Conforming Nonconforming NA**
What internal system is used for conducting and managing calibration of all relevant equipment identified in Process Table K?	Internal calibration database with tracking indicators	**conforming**
Provide the document that lists all relevant equipment identified in Process Table K.	see calibration records	**conforming**
How do you ensure calibrations are up to date?	calibration database	**conforming**
How do you ensure new equipment has been added to the calibration list and inactive equipment has been removed?	Procedure # PR-113	**conforming**
Are calibration labels present and up to date for listed equipment?	Yes - all test equipement found with calibration stickers and current	**conforming**
What is the reaction plan to any failed verification?	Take out of service until corrected/repaired	**conforming**

G6.2	Baskets, coating tank, belts/conveyors, racks, fixtures and drive mechanisms shall be maintained.

Guidance	**Objective Evidence / Comments**	**Conforming Nonconforming NA**
How do you inspect for the integrity of the baskets, coating tank, belts/conveyors and drive mechanisms? (e.g., wear, perforations, trap points, warpage, plugged holes, door gaps, other damage) Where are the inspection results documented?	Inspected per W.I. #PRP3-022 and documented on form # P3PN-F014	**conforming**
What is your preventative maintenance program for baskets, coating tank and drive mechanism?	Automatic basket rotation or when paint type is changed	**conforming**
What is the maintenance program for mechanical/chemical cleaning of baskets and coating tanks?	Inspected per W.I. #PRP3-022 and documented on form # P3PN-F014	**conforming**
How is each basket and coating tank uniquely identified for tracking purposes?	All baskets have id numbers and automated change out	**conforming**

PROCESS TABLE G - Dip-Spin & All Zinc-Flake Application Methods

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

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

G6.3	Racks and fixtures shall be maintained. Organization shall have preventative maintenance system that is documented and implemented.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
How do you inspect for the integrity of the racks and fixtures? (e.g.,: broken electrical contacts, coating build up and other damage) Where are the inspection results documented?	No racks or fixtures	**n/a**
What is your preventative maintenance program for racks and fixtures?	No racks or fixtures	**n/a**
How is each rack or fixture identified for tracking purposes?	No racks or fixtures	**n/a**

G6.4	All filtration equipment shall be maintained. The organization shall have a preventative maintenance system that is documented and implemented.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
What is the preventative maintenance program for filters?		**n/a**
How is the filter type identified during use?		**n/a**
If reusable filters are used, do they meet the supplier's recommendations?		**n/a**
If disposable filters are used, do they meet the supplier's recommendations?	disposable filters used for paint filtering per supplier recommendations	**Conforming**
What are your criteria for filter replacement and/or cleaning?	n/a	**n/a**
What information is used to determine the required mesh size?	200um per supplier recommendations	**conforming**
How is compatibility with the process determined?	Per APQP procedure # PR-200	**conforming**
Describe the preventive maintenance program for all solution filters to include plate, filter bag and cartridge.	disposable filters used for paint filtering per supplier recommendations	**conforming**
Describe the preventive maintenance program for all air filters used on ovens, dryers, chillers, blowers and fans, etc.	per preventative maintenance schedule.	**conforming**

PROCESS TABLE G - Dip-Spin & All Zinc-Flake Application Methods

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

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

G6.5	Magnets may be used to remove metal fines. If used, the organization shall have a preventative maintenance system that is documented and implemented.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
What is your preventative maintenance program for magnets?	No magnets	**N/A**

G6.6	All process and equipment alarms shall be tested on a quarterly basis at a minimum. The organization shall have a preventative maintenance system that is documented and implemented.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
What is the preventative maintenance program where alarms are used for solution temperature, level control, environmental control, faults, etc.?	Per PM Schedule	**conforming**
What are the alarms that are tested and their test frequency?	Per PM schedule	**conforming**

G6.7	Processing equipment is designed/optimized for "soft handling" of parts.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
Are chutes lined to prevent part damage?	All chutes are lined for sft handling	**conforming**
What technique(s) are used to minimize drop heights?	minimal drop heights in line design	**conforming**

G6.8	Part transfer equipment is maintained.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
What is your program to assure cleanliness of belts, conveyors, chutes, vibratory tables, etc.?	Cleaned every shift or durning changeovers.	**Conforming**
What is your maintenance program for belts, conveyors, chutes, vibratory tables, etc.?	Every week	**Conforming**

PROCESS TABLE G - Dip-Spin & All Zinc-Flake Application Methods

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

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

G6.9	In-process and customer containers are managed and maintained.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
How do you identify and segregate in-process containers for different processes?	No customer containers used for in process product - internal containers	**Conforming**
What is your maintenance program for keeping in-process containers clean and in good condition?	Cleaned after every use.	**Conforming**
How do you ensure that the customer containers do not degrade the quality of the coated parts? (e.g., customer container may arrive damaged, oily, dirty)	Plastic liners used on all customer containers or other material required by customer	**Conforming**

7.0	**Test Equipment (Process Control and Finished Part Quality)**
G7.1	Test Equipment shall be verified and calibrated per Process Table K. Calibrations shall be certified, posted and up to date. A system shall be used to track calibration dates of equipment. Complete the audit for these identified elements in Process Table K.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
Wet Analysis: Before use, chemicals must be checked for shelf life and/or expiration date	All chemicals checked before use and in envirometal controlled storage	**Conforming**
pH Meter		**N/A**
pH Probes (must be solution compatible)		**N/A**
% Solids Testing - Moisture Analyzer or Lab Oven/Lab Balance	lab oven/ lab balance verifed and calibration completed annually	**Conforming**
Laboratory Balance (Weight Scale)	lab balance verifed and calibration completed annually	**n/a**
Viscosity Cup or equivalent	verified with calibration viscosity oil / cleaned after use	**Conforming**
Hand Held Thermometer	annually	**Conforming**
Paint/Solution Mixer	checked daliy	**Conforming**
Temperature Controller	annually	**Conforming**
Amp Meter/Volt Meter	annually	**Conforming**
Filters	n/a	**n/a**
Conductivity Meter	checked daily	**Conforming**

PROCESS TABLE G - Dip-Spin & All Zinc-Flake Application Methods

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

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

Conductivity Probes (must be solution compatible)	checked daily	**Conforming**
Lab Oven Controller	annual calibration	**Conforming**
Thickness measurement device - Magnetic Induction/Eddy Current Gauge or X-Ray Fluorescence (XRF) or Microscope for cross sectional thickness measurement	calibration verified on each part type tested / verified with foils .	**Conforming**
Salt Spray Cabinet	annual calibration	**Conforming**
Ultrasonic Cleaner, if applicable	n/a	**n/a**
Coefficient of Friction/Torque Tension (required for fasteners)	annual calibration with verification before use.	**Conforming**
Scribe and Tape for Adhesion Test	visually inspected daily	**Conforming**
Coating Weight Capability (as alternative to film thickness measurement)	n/a	**n/a**
Part dryness ceramic test media (e.g., Zirblast)	n/a	**n/a**
Blacklight (for UV tracer identification)	checked beofre use	**Conforming**
Booth Temperature/Humidity Controller	annually	**Conforming**
Circulation Flow Meter/Pressure Gauge	checked per PM schedule	**Conforming**
Process Air Cleanliness Control	checked per PM schedule	**Conforming**
Process Air Control - Shaping, Atomization, Fluids	HVAC Controlled system	**Conforming**
Cure Test - solvent rub or pencil hardness, if applicable	pencil hardness checked before use	**Conforming**

Proceed to PT I

PROCESS TABLE I - Cure

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

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

Item #	Category/Process Steps	Type of Control		Monitoring Frequency		Observation/ Comments	Job Audit Measurements	
		Minimum Requirement	Actual Condition	Minimum Requirement	Actual Condition	Conforming Nonconforming NA	Range	Actual Measurements supporting time of Job Audit
1.0	**Curing Process**							
I1.1	Oven control temperature is monitored and recorded continuously by a recording instrument.	Automatic	Continuous recording with alarm	With alarm system set per limits (of I1.3): Continuous recording. No alarm system: Review and approve data every process change and every 2 hours.	Continuous recording with alarm	**Conforming**	440F - 460F	441.8-444.6F
I1.2	Part temperatures shall be sufficiently cool before next operations (coating, unloading, packing, etc.).	Automatic / Manual	Automatic	Each batch.	Parts cool down in automatic cool down section	**Conforming**	96F max	87F
I1.3	Temperature control limits shall be defined to ensure the part temperature is within the chemical supplier recommendation.	Automatic	Automatic	Each process change.	Verified Monthly by chemical supplier(TUS)	**Conforming**	See TDS chart	Pass
I1.4	Temperature (Thermocouple).	Automatic Max SAT difference allowed +/- 5°C (10°F)	Automatic	For batch oven/spray processes, prior to start of production and every part change. For automated processes, at oven start-up, once every 8 hours, and every process change.	Continuous monitoring with alarm	**Conforming**	440-460F	PASS - 449F
I1.5	Process time parameters shall be verified against the control plan (conveyor/belt speed set point, batch timer set point, index time).	Manual	Set point and index time verified daliy	For batch oven/continuous processes, prior to start of production and every part family change. For automated processes, at oven start-up, once every 8 hours, and every process change.	Verified Monthly by chemical supplier(TUS)	**Conforming**	14-16 cycles per hour	15 cycles
I1.6	Air filter (if used) change is scheduled.	Manual	Per PM schedule	Per oven manufacturer, filter supplier recommendation.	per PM schedule	**Conforming**	semi-annual	Pass
I1.7	Cure testing is performed per part specification on a production part, if applicable.	Manual	not applicable	At oven start-up, every process or part change and once every 8 hours.	n/a	**n/a**	n/a	n/a
I1.8	Coating adhesion test is performed per part specification on a production part.	Manual	1 piece every skid	At oven start-up, every process change and once every 8 hours.	3 pieces tested - passed	**Conforming**	pass	pass
I1.9	Appearance requirements checks (color, gloss, defects, etc.) are performed per part specification.	Manual	not applicable	At oven start-up, every process change and once every 8 hours.	n/a	**n/a**	N/A	N/A
I1.10	TUS data shall be evaluated to verify the oven is capable of meeting the minimum curing time and temperature requirements.	Manual	Completed monthly by chemical supplier	After each TUS.	Completed	**Conforming**	pass	pass

PROCESS TABLE I - Cure

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

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

2.0	**Process Equipment**
I2.1	Thermocouples shall be checked and replaced per Section P3.1 and Process Table requirements.

Guidance	**Objective Evidence / Comments**	**Conforming Nonconforming NA**
Are thermocouples calibrated before first use and within the temperature range in which they will be used?	RTD's used on curing ovens - recalibrate or replace every 4 years per pyrometry table 3.1.1	**Conforming**
Do thermocouples meet the accuracy requirements of the Section P3.1 Tables?	RTD's used on curing ovens	**Conforming**
Is thermocouple usage properly documented as applicable per Section P3.1.2 (e.g., date placed in service, uses)?	RTD's used on curing ovens / date in service 12/2/19	**Conforming**
Are thermocouples replaced in accordance with Tables P3.1.1, P3.1.2 and P3.1.3?	RTD's used on curing ovens - recalibrate or replace every 4 years per pyrometry table 3.1.1	**Conforming**
Do thermocouples calibration certificates conform with Section P3.1.1.1?	RTD's used on curing ovens / date in service 12/2/19	**Conforming**

I2.2	Calibration of instrumentation shall conform to the requirements defined in Section P3.2 and the Process Tables.

Guidance	**Objective Evidence / Comments**	**Conforming Nonconforming NA**
Are instrument calibrations performed at the intervals specified in Table P3.2.1?	Yes - annually	**Conforming**
How do you ensure instrument calibrations are up to date?	calibration database	**Conforming**
Do instruments meet the accuracy requirements specified in Table P3.2.1 as applicable?	Yes - see calibration certifications	**Conforming**
Are offset values within the acceptable limits defined in Section P3.2.2?	Yes - all test equipement found within calibration and no offsets used.	**Conforming**
Is there a documented offset procedure as defined in Section P3.2.2?	Yes	**Conforming**
Does the documented offset procedure indicate who has the authority to approve the use of offsets?	Yes - Quality manager	**Conforming**
How is approval of offset documented?	On calibration certification	**Conforming**
Do calibration labels conform with the requirements established in Section P3.2.4.1?	yes	**Conforming**
Do calibration reports conform with the requirements established in Section P3.2.4.2?	yes	**Conforming**

PROCESS TABLE I - Cure

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

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

I2.3	System Accuracy Test (SAT) for all control, monitoring, and recording temperature systems (instrument, leadwire, and thermocouple/RTD) shall conform to Section P3.3.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
Are system accuracy tests performed on all oven/dryer control, monitoring, and recording temperature systems?	Yes -annually	Conforming
Are system accuracy tests performed at the intervals specified in Section P3.3.1.1?	Yes annually	Conforming
Are system accuracy tests performed after maintenance per Section P3.3.3?	Yes when required	Conforming
How do you ensure the measuring junctions of the test and oven control, monitoring, or recording thermocouple/RTD are within 50 mm (2 inches) of each other as specified in Section P3.3.4.1.2?	No RTD's within 2 inches of each other.	Conforming
Do system accuracy tests meet the tolerance requirements specified in Section P3.3.4.1.3?	Yes	Conforming
Do System Accuracy Test records conform with the requirements established in Section P3.3.5?	Yes	Conforming

I2.4	Temperature Uniformity Surveys (TUS) of all ovens shall conform to Section P3.4.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
Are temperature uniformity surveys performed annually as specified in Section P3.4.1?	Monthly by chemical supplier	Conforming
Are temperature uniformity surveys performed after oven modification or repair per Section P3.4.1.2?	yes	Conforming
How are oven modifications or repairs documented per section P3.4.1.3?	Any major repair	Conforming
How do you determine whether oven modifications or repairs have altered the temperature uniformity characteristics of the oven?	New TUS survey	Conforming
If the oven operating temperature range of the qualified work zone is greater than 170°C/305°F, then were the minimum and maximum temperatures tested per P3.4.2.	Yes	Conforming
Are readings of all TUS thermocouples and control thermocouples within ±10ºC (±20ºF) of the temperature controller set-point value or other more stringent customer specification, process sheet or technical data sheet?	Yes - except pre cure(Flash off) section	Conforming
Was the time required to achieve target part temperature within the time limit specified in customer specification, process sheet or technical data sheet?	Yes - per chemical requirements	Conforming

PROCESS TABLE I - Cure

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

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

Was the required time at temperature achieved (for continuous/semi-continuous ovens only)?	Yes	**Conforming**
Was the upper temperature tolerance exceeded at any time by any TUS thermocouple or temperature controller thermocouple?	No	**Conforming**
Was the lower temperature tolerance continuously maintained after reaching the beginning of the soak period?	No	**Conforming**
How does the organization internally define suitable time at temperature for determining pass/fail status of TUS?	Per	**Conforming**
Does TUS reporting conform with the requirements established in Section P3.4.7?	Yes - see CSI report	**Conforming**

I2.5	Baskets, belts/conveyors, racks, fixtures and drive mechanisms shall be maintained.

Guidance	**Objective Evidence / Comments**	**Conforming Nonconforming NA**
How do you inspect for the integrity of the baskets, racks, belts/conveyors and drive mechanisms? (e.g., wear, perforations, trap points, plugged holes, door gaps, other damage)	Inspected per W.I. #PRP3-022 and documented on form # P3PN-F014	**Conforming**
What is your preventative maintenance program for baskets, racks, belts/conveyors and drive mechanisms?	Automatic basket rotation or when paint type is changed	**Conforming**
What is the maintenance program for mechanical/chemical cleaning of baskets, racks, belts/conveyors and drive mechanisms?	Inspected per W.I. #PRP3-022 and documented on form # P3PN-F014	**Conforming**
How is each basket or rack uniquely identified for tracking purposes?	All baskets have id numbers	**Conforming**

I2.6	All air filters shall be maintained. The organization shall have a preventative maintenance system that is documented and implemented.

Guidance	**Objective Evidence / Comments**	**Conforming Nonconforming NA**
What is your preventative maintenance program for air filters?	See PM schedule for change/ clean frequency	**Conforming**
How do you verify that the replacement filter is appropriate?	Replaced with same part/filter	**Conforming**

I2.7	All process and equipment alarms shall be tested on a quarterly basis at a minimum. The organization shall have a preventative maintenance system that is documented and implemented.

Guidance	**Objective Evidence / Comments**	**Conforming Nonconforming NA**
What is the preventative maintenance program where alarms are used for temperature, environmental control, faults, etc.?	See PM schedule	**Conforming**
What are the alarms that are tested and their test frequency?	See PM schedule	**Conforming**

PROCESS TABLE I - Cure

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

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

Columns H and I are used for the Job Audit (Section 4).
Regularly scheduled measurements (e.g., temperature, concentrations, pH) are to be entered in the appropriate row.
For sections that are not applicable mark NA in the Comments column.

***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.

I2.8	Processing equipment is designed/optimized for "soft handling" of parts.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
Are chutes lined to prevent part damage?	Lined with rubber of plastic	**Conforming**
What technique(s) are used to minimize drop heights/part damage?	Line designed with minimal drop heights and rubber conveyor belts	**Conforming**

I2.9	Part transfer equipment is maintained.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
What is your program to assure cleanliness of belts, conveyors, chutes, vibratory tables, etc.?	Cleaned every shift or durning changeovers.	**Conforming**
What is your maintenance program for belts, conveyors, chutes, vibratory tables, etc.?	Every week	**Conforming**

I2.10	In-process and customer containers are managed and maintained.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
How do you identify and segregate in-process containers for different processes?	No customer containers used for in process product - internal containers	**Conforming**
What is your maintenance program for keeping in-process containers clean and in good condition?	Cleaned after every use.	**Conforming**
How do you ensure that the customer containers do not degrade the quality of the coated parts? (e.g., customer container may arrive damaged, oily, dirty)	Plastic liners used on all customer containers or other material required by customer	**Conforming**

3.0	**Test Equipment (Process Control and Finished Part Quality)**
I3.1	Test Equipment shall be verified and calibrated per Process Table K. Calibrations shall be certified, posted and up to date. A system shall be used to track calibration dates of equipment. Complete the audit for these identified elements in Process Table K.

Guidance	Objective Evidence / Comments	Conforming Nonconforming NA
Hand Held Thermometer	n/a	**n/a**
Lab Oven	annual calibration	**conforming**
Traveling Temperature Recorder (e.g., Datapaq or equivalent)	n/a	**n/a**

PROCESS TABLE K - Process Control and Testing Equipment Verification and Calibration

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

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

ITEM #	EQUIPMENT TYPE	Verification Frequency	Conforming Nonconforming NA	Calibration / Certification Frequency	Conforming Nonconforming NA	Observation / Comments	Job Audit Measurements	
1.0							**Range**	**Actual Measurements supporting time of Job Audit**
K1.1	Control chemicals (e.g., Hogeboom solution, buffers, titrants, indicators, surface tension ink, viscosity oil)	Daily	**Conforming**	Before use - must be checked for shelf life / expiration date, contamination	**conforming**	viscosity oil used for verification	63-82 seconds	**66 seconds @ 71F**
K1.2	Thermocouple	Per Section 3 Pyrometry.	**Conforming**	Per Section 3 Pyrometry.	**conforming**	New RTDs on M3 line	440-460f	**444.2F**
K1.3	Booth Temperature/Humidity Controller	Once every 4 hours	**Conforming**	Every 6 months	**conforming**	Continuous monitored/controlled by HVAC system	68-96F	**74F**
K1.4	Circulation/Flow Meter/Pressure Gauge	At the beginning of production and at every material change.	**n/a**	Annually	**n/a**	n/a	n/a	**n/a**
K1.5	Process Air Cleanliness Control	Per equipment manufacturer's specifications.	**n/a**	Annually	**n/a**	n/a	n/a	**n/a**
K1.6	Amp Meter/Volt Meter	At the beginning of production and at every material change.	**Conforming**	Annually	**conforming**	pass	pass	**pass**
K1.7	pH Meter	Per equipment manufacturer's specifications.	**N/A**	Annually	**N/A**	n/a	n/a	**N/A**
K1.8	pH Probe	Once every 4 hours, using a minimum of 2 buffer solutions near the min and max of the chemical control range.	**N/A**	NA	**N/A**	n/a	n/a	**N/A**
K1.9	Conductivity Meter	Per equipment manufacturer's specifications.	**n/a**	Annually	**n/a**	n/a	n/a	**n/a**
K1.10	Conductivity Probe	Once every 4 hours, using a minimum of 2 reference solutions near the min and max of the chemical control range.	**Conforming**	NA	**n/a**	n/a	n/a	**n/a**
K1.11	Ion Selective (ISE) Probe	Once every 4 hours, using a minimum of 2 reference solutions near the min and max of the chemical control range.	**N/A**	NA	**N/A**	n/a	n/a	**N/A**
K1.12	Laboratory Balance	Monthly using a minimum of 2 reference mass standards.	**Annually**	Annually	**conforming**	1 & 3 gram weights used	1 & 3 gram	**PASS**
K1.13	Atomic Absorption (AA)	Before each use.	**n/a**	Annually	**N/A**	N/A	N/A	**N/A**

PROCESS TABLE K - Process Control and Testing Equipment Verification and Calibration

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

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

ITEM #	EQUIPMENT TYPE	Verification Frequency	Conforming Nonconforming NA	Calibration / Certification Frequency	Conforming Nonconforming NA	Observation / Comments	Job Audit Measurements	
K1.14	Inductively Coupled Plasma (ICP)	Before each use.	**n/a**	Annually	**N/A**	N/A	N/A	**N/A**
K1.15	Ion Chromatography (IC)	Before each use.	**n/a**	Annually	**N/A**	N/A	N/A	**N/A**
K1.16	X-Ray Fluorescence (XRF)	Daily. Thickness and alloy for each combination of coating and substrate.	**Annually**	Annually	**conforming**	Calibrated		
K1.17	Hardness Tester	Daily	**n/a**	Annually	**N/A**	N/A	N/A	**N/A**
K1.18	Profilometer	Daily	**n/a**	Annually	**N/A**	N/A	N/A	**N/A**
K1.19	Lab Rectifier	NA	**n/a**	Annually	**N/A**	N/A	N/A	**N/A**
K1.20	Ultrasonic Cleaner	Monthly (e.g., foil test)	**n/a**	Annually	**N/A**	N/A	N/A	**N/A**
K1.21	Hand Held Digital Thermometer	NA	**Conforming**	Annually	**conforming**	passed	n/a	**n/a**
K1.22	Glass Thermometer	Visual inspection before each use.	**n/a**	Annually	**N/A**	n/a	n/a	**N/A**
K1.23	Pipettes - must be checked for broken tips	Before each use.	**before each use**	NA	**n/a**	n/a	n/a	**n/a**
K1.24	Salt Spray Cabinet	Daily	**Conforming**	Annually	**Conforming**	Calibrated 9/21/20	Passed	**Passed**
K1.25	Water Immersion Bath	Per Section 3 Pyrometry.	**Conforming**	Per Section 3 Pyrometry.	**Conforming**	passed	passed	**131F**
K1.26	Freezer	Per Section 3 Pyrometry.	**n/a**	Per Section 3 Pyrometry.	**N/A**	N/A	N/A	**N/A**
K1.27	Thickness Tester	Every 8 hours.	**Conforming**	Annually	**Conforming**	calibrated 6/22/20	Annually	**Passed**
K1.28	CASS Cabinet	Daily	**N/A**	Annually	**N/A**	n/a	n/a	**N/A**
K1.29	Microscope 100x for surface profile 500x for crystal morphology	Visual inspection before each use.	**n/a**	NA	**N/A**	n/a	n/a	**N/A**
K1.30	Lab Oven	Per Section 3 Pyrometry.	**Conforming**	Annually	**Conforming**	Calibrated	**Annually**	**ok**
K1.31	Muffle Furnace	Per Section 3 Pyrometry.	**N/A**	Per Section 3 Pyrometry.	**N/A**	N/A	**N/A**	**N/A**

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***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.

ITEM #	EQUIPMENT TYPE	Verification Frequency	Conforming Nonconforming NA	Calibration / Certification Frequency	Conforming Nonconforming NA	Observation / Comments	Job Audit Measurements	
K1.32	Coefficient of Friction/Torque Tension Testing (required for fasteners)	NA	**Conforming**	Annually	**Conforming**	verified before use	**Annually**	**pass**
K1.33	Refractometer	Monthly	**N/A**	NA	**N/A**	n/a	n/a	**N/A**
K1.34	Spectrophotometer	Monthly	**N/A**	Annually	**N/A**	n/a	n/a	**N/A**
K1.35	Color Meter	Daily	**N/A**	Annually	**N/A**	n/a	n/a	**N/A**
K1.36	Gloss Meter	Monthly	**N/A**	Annually	**N/A**	n/a	n/a	**N/A**
K1.37	Digital Temperature Recorder (e.g., DataPaq)	NA	**Conforming**	Annually	**Conforming**	verified	**Annually**	**ok**
K1.38	Moisture Analyzer	NA	**N/A**	Annually	**N/A**	n/a	**N/A**	**N/A**
K1.39	Filters/Sieves - blast media distribution, impurity removal	Visual Inspection Lab - before each use Production - each time media is added	**Conforming**	NA	**Conforming**	verified	**visual inspection before use**	**ok - all sieve in good condition**
K1.40	Lineguard® 101 Meter	Visual Inspection.	**N/A**	Every 3 months	**N/A**	n/a	**N/A**	**N/A**
K1.41	ORP Meter (in process)	When difference is greater than 30 mV when compared to lab meter.	**N/A**	Annually	**N/A**	n/a	**N/A**	**N/A**
K1.42	ORP Meter (Laboratory)	NA	**N/A**	Every 30 days	**N/A**	n/a	**N/A**	**N/A**
K1.43	Line viscosity cup or equivalent	Every 14 days.	**Conforming**	NA	**Conforming**	verified weekly	**weekly**	**Completed 10/12/20**
K1.44	Master viscosity cup or equivalent	Every 30 days.	**Conforming**	Upon receipt	**Conforming**	verified weekly	**weekly**	**Completed 10/12/20**
K1.45	Weight per Gallon Cup/Hydrometer	Before each use.	**N/A**	NA	**N/A**	n/a	**N/A**	**N/A**
K1.46	Tape (adhesion testing/dust residue check)	Before each use.	**Conforming**	NA	**Conforming**	checked daily	**before each use**	**completed and results attached to job router.**
K1.47	Scribe Tool	Before each use.	**Conforming**	NA	**Conforming**	checked before use	**before each use**	**ok**
K1.48	Blacklight for UV tracer identification	Before each use.	**Conforming**	NA	**Conforming**	checked before use	**before each use**	**ok**
K1.49	Timer/Stopwatch	Before each use.	**Conforming**	Upon receipt	**Conforming**	checked before use	**before each use**	**ok**