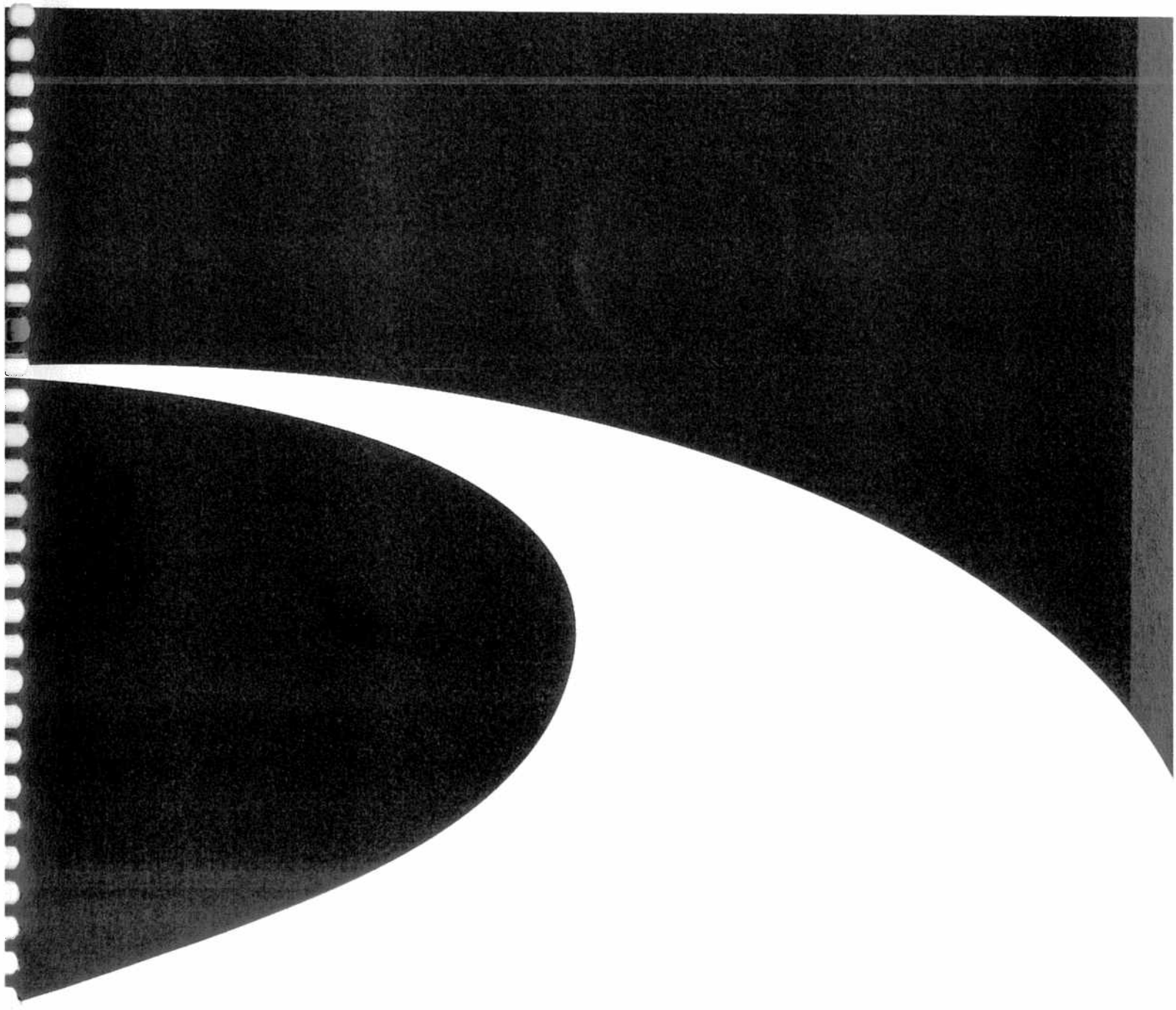


***Special Process: Coating System Assessment***



## **ABOUT AIAG**

### **Purpose Statement**

Founded in 1982, AIAG is a globally recognized organization where OEMs and suppliers unite to address and resolve issues affecting the worldwide automotive supply chain. AIAG's goals are to reduce cost and complexity through collaboration; improve product quality, health, safety and the environment; and optimize speed to market throughout the supply chain.

### **AIAG Organization**

AIAG is made up of a board of directors, an executive director, executives on loan from member companies, associate directors, a full-time staff, and volunteers serving on project teams. Directors, department managers, and program managers plan, direct and coordinate the association's activities under the direction of the executive director.

### **AIAG Projects**

Volunteer committees focus on business processes or supporting technologies and methodologies. They conduct research and develop, publish, and provide training on standards, conventions, standard business practices, white papers, and guidelines in the areas of automatic identification, CAD/CAM, EDI/electronic commerce, continuous quality improvement, health focus, materials and project management, occupational health & safety, returnable containers and packaging systems, transportation/customs and truck & heavy equipment.

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#### **CAUTIONARY NOTICE**

*AIAG publications are subject to periodic review and users are cautioned to obtain the latest editions.*

#### **MAINTENANCE PROCEDURE**

*Recognizing that this AIAG publication may not cover all circumstances, AIAG has established a maintenance procedure. Please refer to the Maintenance Request Form at the back of this document to submit a request.*

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## CQI-12

***Special Process: Coating System Assessment***

Version 1 Issued 8/07



Automotive Industry Action Group

## ***FOREWORD***

Automotive Industry Action Group (AIAG) committees are made up of volunteers from member companies in the automotive industry. The work of preparing process audits is done by AIAG technical committees.

The main task of technical committees is to prepare Automotive Standards and System Requirements. Draft documents adopted by the technical committees are circulated to the Steering Committee for review and consensus approval. Publication of the documents requires approval by the Quality Steering Committee.

The Quality Steering Committee would like to acknowledge and thank the following individuals and their companies who have contributed time and effort to the development of this document.

## **ACKNOWLEDGEMENTS**

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## **INTRODUCTION**

### **General**

The work of preparing CQI-12 Special Process: Coating System Assessment (CSA) was carried out through the AIAG Coating Work Group. These coating requirements are complementary to customer and product standards.

The CSA can be used to assess an organization's ability to meet the requirements in this assessment, as well as customer, regulatory, and the organization's own requirements. The CSA can also be used between an organization and its suppliers.

In the CSA, the word "shall" indicates a requirement for purposes of the self assessment. Failure to meet the requirements results in an assessment that is either "Not Satisfactory" or "Needs Immediate Action". The word "should" indicates a recommendation. Where the term "such as" is used, any suggestions given are for guidance only.

### **Process Approach**

The CSA supports the automotive process approach as described in ISO/TS 16949:2002.

### **Coating System Assessment Goals**

The goal of the CSA is the development of a coating management system that provides for continual improvement, emphasizing defect prevention and the reduction of variation and waste in the supply chain.

The CSA, coupled with an internationally recognized quality management system and applicable customer-specific requirements, defines the fundamental requirements for coating management systems.

The CSA is intended to provide a common approach to a coating management system for automotive production and service part organizations.

### **Assessment Process**

Ongoing assessments shall be conducted annually, unless otherwise specified by the customer, to reexamine the continuing compliance with the CSA. Each assessment shall include a review of the organization's systems using the CSA. Successive Job Audits (Section 3.0 of this document) shall sample parts from different automotive component manufacturers that require compliance to the CSA document.

The assessment shall use the process approach to auditing as identified by the requirements of ISO/TS 16949:2002.

## Assessor Qualifications

Assessor(s) shall have the following specific experience to conduct the COATING SYSTEM ASSESSMENT:

1. Be an experienced quality management system (QMS) internal auditor (for example, ISO/TS 16949:2002, ISO 9001:2000).
2. Assessor shall possess coating knowledge. Evidence shall include a minimum of 5 years experience in coating or a combination of formal chemical education and coating experience totaling a minimum of 5 years.
3. Assessor shall possess knowledge of and be familiar with the application of automotive quality core tools including statistical process control, measurement systems analysis, part approval, failure mode and effects analysis, and advanced quality planning.

Note: If more than one assessor is required to meet the above qualifications, the lead assessor shall be the person meeting the requirements in item #1.
--

## Other Requirements

The organization shall keep records as evidence of compliance to the requirements identified in the CSA, as well as all appropriate action plans to address any unsatisfactory ratings. These records shall be readily available for review by any customer requiring compliance to the requirements within this document.



# 1 SCOPE

## 1.1 General

This document specifies process requirements for an organization or its suppliers performing applicable coating, which need to:

- demonstrate ability to consistently provide product that meets customer and applicable regulatory requirements, and
- enhance customer satisfaction through the effective application of the system, including processes for continual improvement of the system.

The Coating System Assessment is applicable to sites where customer-specified parts for production and/or service are processed throughout the automotive supply chain.

## 1.2 Application

All requirements of the CSA are generic and are intended to be applicable to all organizations performing the coating operations addressed in this document, regardless of type, size, and product.

Ten Process Tables have been developed and the appropriate table(s) is to be referenced during the assessment. The Process Tables are specific to coating processes as noted below:

- Process Table A – Pretreatment – Aqueous Cleaning
- Process Table B – Pretreatment – Mechanical Cleaning
- Process Table C – Pretreatment – Phosphating
- Process Table D – Powder Coating
- Process Table E – Electrocoating
- Process Table F – Liquid (Spray)
- Process Table G – Dip/Spin Coating
- Process Table H – Autophoretic Coating
- Process Table I – Convective Cure
- Process Table J – Equipment

These Process Tables contain requirements for:

1. Process and Test Equipment
2. Process Monitor Frequencies
3. In-Process/Final Test Frequencies
4. Test Frequencies

The Process Tables specify the process parameters and the frequencies for checking process control parameters and parts, as well as periodic maintenance requirements. The Requirements and Guidance in the CSA form will notify the assessor when to refer to the Process Tables.

## **2 THE COATING SYSTEM ASSESSMENT PROCEDURE**

1. Obtain current copy of CQI-12 Special Process: Coating System Assessment from AIAG.
2. Identify all coating processes to which CQI-12 Special Process: Coating System Assessment applies (see CQI-12, 1.2). Record these processes on the CSA.
3. Complete the CSA, determining the level of compliance. A minimum of one job audit (Section 3) shall be performed during each assessment
4. Address each "Not Satisfactory" item and determine corrective action, including root cause analysis and implementation of the corresponding corrective action(s). The corrective action(s) shall be completed within 90 days. Records of the corrective action, including verification, shall be maintained.
5. "Needs Immediate Action" requires immediate containment of suspect product. Address each "Needs Immediate Action" item and determine corrective action(s), including root cause analysis and implementation of the corresponding corrective action(s). The corrective action(s) shall be completed within 90 days. Records of the corrective action, including verification, shall be maintained.
6. Assessments shall be conducted annually unless otherwise specified by the customer.

### **3 SPECIAL PROCESS: COATING ASSESSMENT**

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## **Instructions for completing the Cover Sheet**

1. **Facility Name:** Name of the facility being assessed.  
One form shall be used for each facility. The facility may have several buildings or physical locations in the same general area. If there is a separate management team (Quality Manager and Coating Specialist) or different management system, then these locations shall be considered as separate facilities.
2. **Address:** The street address of the facility being assessed; P.O. Box numbers may be given as additional information.
3. **Phone Number:** The phone number of the facility.  
If there is no common phone number for the facility, the phone number of the Operations Manager or Quality Manager shall be used.
4. **Fax Number:** The fax number of the facility.
5. **Number of Coating Employees at this Facility:** The number of employees, salaried and hourly, associated with the coating operation at this facility.
6. **Captive Coater (Y/N):** Enter "Y" if this facility coats components for their own company. Enter "N" if the company does not coat any components for their own company.
7. **Commercial Coater (Y/N):** Enter "Y" if this facility coats components for companies other than their own company. Enter "N" if this facility does not coat any components for other companies.
8. **Date of Assessment:** Enter the date(s) of the assessment. An alphanumeric format shall be used to avoid confusion with different numeric formats.  
Example: May 3 – 4, 2006
9. **Date of Previous Assessment:** List the date of the previous CQI-12 Special Process: Coating System Assessment of this facility.
10. **Type(s) of Coating at this Facility:** Place a checkmark to designate the coating process(es) performed at this facility. This information determines the appropriate Process Table that shall be used during the assessment. Processes not listed on the cover sheet are not part of the Coating System Assessment.
11. **Current Quality Certification(s):** The coater shall list their current quality certifications, e.g., ISO/TS 16949:2002, ISO 9001:2000. Certifications may be from 3rd party sources or customer quality certifications. If customer quality certification is given, then the year of the last assessment by the customer shall also be given.
12. **Date of Re-assessment (if necessary):** If "Not Satisfactory" findings were observed from the original assessment, then the coater shall address each item and determine correct action, including root cause analysis and implementation of the corresponding corrective action(s). The date of the re-assessment shall be given here, and the appropriate Question(s) from Sections 1 – 3, in the original assessment, shall be modified to reflect that the evidence, relating to the implementation of the corrective action(s), has been observed. Also, the "Number of Not Satisfactory Findings" shall be modified as appropriate.
13. **Personnel Contacted:** List the name(s), title(s), phone number(s), and email address(es), if available, of the principal participants from the coater's organization.

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14. **Auditors/Assessors:** List the name(s), Company(ies), phone number(s) and email address(es), if available, of the auditor/assessor(s).
15. **Number of “Not Satisfactory” Findings:** Enter the number of “Not Satisfactory” findings observed during the assessment.
16. **Number of “Needs Immediate Action” Findings:** Enter the number of “Needs Immediate Action” findings observed during the assessment.
17. **Number of “Fail” Findings in the Job Audit(s):** Enter the number of “Fail” findings observed from the job audit.

<b>Special Process: Coating System Assessment</b>			
Facility Name:			
Address:			
Phone Number:		<b>Type(s) of Coating Processes at this Facility:</b>	
Fax Number:		<b>Process Table A</b>	
		Aqueous Cleaning	
Number of Coating Employees at this Facility:		<b>Process Table B</b>	
		Mechanical Cleaning	
Captive Coater (Y/N):		<b>Process Table C</b>	
Commercial Coater (Y/N):		Phosphating	
		<b>Process Table D</b>	
Date of Assessment:		Powder Coating	
		<b>Process Table E</b>	
Date of Previous Assessment:		Electrocoat	
		<b>Process Table F</b>	
		Spray	
		<b>Process Table G</b>	
		Dip/Spin	
		<b>Process Table H</b>	
		Autophoretic	
		<b>Process Table I</b>	
		Convective Cure	
		<b>Process Table J</b>	
		Equipment	

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

<b>Personnel Contacted:</b>			
Name:	Title:	Phone:	Email:

<b>Auditors/Assesors:</b>			
Name:	Company:	Phone:	Email:

<b>Number of "Not Satisfactory" Findings:</b>
<b>Number of "Needs Immediate Action" Findings:</b>
<b>Number of "Fail" Findings in the Job Audit(s):</b>

**Instructions for completing Sections 1 and 2**

Sections 1 - 2 contain questions and the requirements and guidance for each question. The Sections are:

Section 1 – Management Responsibility & Quality Planning

Section 2 – Floor and Material Handling Responsibility

The assessor shall assess the coater's compliance to Sections 1 and 2 by comparing the evidence presented by the coater to the requirements listed in the "Requirements and Guidance" column.

NOTE 1:	In the "Requirements and Guidance" column, the word "shall" indicates a requirement and the term "such as" indicates that any suggestions given are for guidance only.
NOTE 2:	The "Requirements and Guidance" column will indicate to the assessor when the Process Tables are pertinent to the Questions. When the Process Tables are pertinent to the Question, the assessor shall assess the coater's compliance to the specified section(s) in the Process Tables.
NOTE 3:	If the question is not applicable to the coater, then the assessor shall place a checkmark in the "N/A" Assessment column. If the observed evidence is in compliance to the question, the assessor shall note the evidence in the "Objective Evidence" column and place a check mark in the "Satisfactory" column. If the observed evidence is not in compliance to the question, then the assessor shall note the non-compliance in the "Objective Evidence" column and place a check mark in the "Not Satisfactory" column.
NOTE 4:	Where nonconforming product is identified in the assessment of a given question the assessor shall place a check mark in the "Needs Immediate Action" (NIA) column. NIA requires immediate containment of suspect product.

Special Process: Coating System Assessment (General Facility Overview)						
Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment		
				N/A	Satisfactory	Not Satisfactory
<b>Section 1 - Management Responsibility and Quality Planning</b>						
1.1	Is there a dedicated and qualified coating person on-site?	To ensure readily available expertise, there shall be a dedicated and qualified coating person on the site. This individual shall be a full-time employee and the position shall be reflected in the organization chart. A job description shall exist identifying the qualifications for the position including chemical and coating knowledge. The qualifications shall include a minimum of 5 years experience in coating operation or a combination of a minimum of 5 years of formal chemical education and coating experience.				
1.2	Does the coater perform advanced quality planning?	The organization shall incorporate a documented advanced quality planning procedure. A feasibility study shall be performed and internally approved for each new part or process. Similar parts can be grouped into part families for this effort as defined by the organization. After the part approval process is approved by the customer, no process changes are allowed unless approved by the customer. The coater shall contact the customer when clarification of process changes is required. This clarification of process changes shall be documented.				



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

Special Process: Coating System Assessment (General Facility Overview)						
Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment		
				N/A	Satisfactory	Not Satisfactory
1.5	Are all coating related and referenced specifications current and available? For example, SAE, AIAG, ASTM, General Motors, Ford, and DaimlerChrysler.	To ensure all customer requirements are both understood and satisfied, the organization shall have all related coating and customer referenced standards and specifications available for use and a method to ensure that they are current. Such standards and specifications include, but are not limited to, those relevant documents published by SAE, AIAG, ASTM, General Motors, Ford, and DaimlerChrysler. The organization shall have a process to ensure the timely review, distribution, and implementation of all customer and industry engineering standards and specifications and changes based on customer-required schedule. This process shall be executed as soon as possible and shall not exceed two weeks. The organization shall document this process of review and implementation, and it shall address how customer and industry documents are obtained, how they are maintained within the organization, how the current status is established, and how the relevant information is cascaded to the shop floor within the two-week period. The organization shall identify who is responsible for performing these tasks.				
1.6	Is there a written process specification for all active processes?	The coater shall have written process specifications for all active processes and identify all steps of the process including relevant operating parameters. Examples of operating parameters include process temperatures, cycle times, load rates, recycler settings, etc. Such parameters shall not only be defined, they shall have operating tolerances as defined by the organization in order to maintain process control. All active processes should have a written process specification. These process specifications may take the form of work instructions, job card, computer-based recipes, or other similar documents.				

Special Process: Coating System Assessment (General Facility Overview)						
Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment		
				N/A	Satisfactory	Not Satisfactory
1.7	Has a valid product capability study been performed initially and after process change?	To demonstrate each process is capable of yielding acceptable product, the organization shall perform product capability studies for the initial validation of each process, after relocation of any process equipment, and after a major rebuild of any equipment. The organization shall define what constitutes a major rebuild. Initial product capability studies shall be conducted for all coating processes per line as defined in scope of work and in accordance with customer requirements. Capability study techniques shall be appropriate for the coating product characteristics, e.g., coating thickness, corrosion resistance, etc.. Any specific customer requirements shall be met. In the absence of customer requirements, the organization shall establish acceptable ranges for measures of capability. An action plan shall exist to address the steps to be followed in case capability indices fall outside customer requirements or established ranges.				
1.8	Does the coater collect and analyze data over time, and react to this data?	The analysis of products and processes over time can yield vital information for defect prevention efforts. The organization shall have a system to collect, analyze, and react to product or process data over time. Methods of analysis shall include ongoing trend or historical data analysis of special product or process parameters. The organization shall determine which parameters to include in such analysis.				
1.9	Are internal assessments being completed on an annual basis, at a minimum, incorporating AIAG CSA?	The organization shall conduct internal assessments on an annual basis, at a minimum, using the AIAG CSA. Concerns shall be addressed in a timely manner.				

Special Process: Coating System Assessment (General Facility Overview)						
Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment		
				N/A	Satisfactory	Not Satisfactory
1.10	Is there a system in place to authorize reprocessing and is it documented?	The quality management system shall include a documented process for reprocessing that shall include authorization from a designated individual. The reprocessing procedure shall describe product characteristics for which reprocessing is allowed as well as those characteristics for which reprocessing is not permissible. All reprocessing activity shall require a new processing control sheet issued by qualified technical personnel denoting the necessary coating modifications. Records shall clearly indicate when and how any material has been reprocessed. The Quality Manager or a designee shall authorize the release of reprocessed product.				
1.11	Does the Quality Department review, address, and document customer and internal concerns?	The quality management system shall include a process for documenting, reviewing, and addressing customer concerns and any other concerns internal to the organization. A disciplined problem-solving approach shall be used.				
1.12	Is there a continual improvement plan applicable to each process defined in the scope of the assessment?	The coater shall define a process for continual improvement for each coating process identified in the scope of the CSA. The process shall be designed to bring about continual improvement in quality and productivity. Identified actions shall be prioritized and shall include timing (estimated completion dates). The organization shall show evidence of program effectiveness.				
1.13	Does the Quality Manager or designee authorize the disposition of material from quarantine status?	The Quality Manager or designee is responsible for authorizing and documenting appropriate personnel to disposition quarantine material.				

Special Process: Coating System Assessment (General Facility Overview)						
Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment		
				N/A	Satisfactory	Not Satisfactory
1.14	Are there procedures or work instructions available to coating personnel that define the coating process?	There shall be procedures or work instructions available to coating personnel covering the coating process. These procedures or work instructions shall include methods of addressing potential emergencies (such as power failure), equipment start-up, equipment shut-down, product segregation (See 2.8), product inspection, and general operating procedures. These procedures or work instructions shall be accessible to shop floor personnel.				
1.15	Is management providing employee training for coating?	The organization shall provide employee training for all coating operations. All employees, including backup and temporary employees, shall be trained. Documented evidence shall be maintained showing the employees trained and the evidence shall include an assessment of the effectiveness of the training. Management shall define the qualification requirements for each function, and ongoing or follow-up training shall also be addressed.				
1.16	Is there a responsibility matrix to ensure that all key management and supervisory functions are performed by qualified personnel?	The organization shall maintain a responsibility matrix identifying all key management and supervisory functions and the qualified personnel who may perform such functions. It shall identify both primary and secondary (backup) personnel for the key functions (as defined by the organization). This matrix shall be readily available to management at all times.				

Special Process: Coating System Assessment (General Facility Overview)						
Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment		
				N/A	Satisfactory	Not Satisfactory
1.17	Is there a preventive maintenance program? Is maintenance data being utilized to form a predictive maintenance program?	The organization shall have a documented preventive maintenance program for key process equipment (as identified by the organization). The program shall be a closed-loop process that tracks maintenance efforts from request to completion to assessment of effectiveness. Equipment operators shall have the opportunity to report problems, and problems shall also be handled in a closed-loop manner. Company data, e.g., downtime, quality rejects, first time-through capability, recurring maintenance work orders, and operator-reported problems, shall be used to improve the preventive maintenance program. Maintenance data shall be collected and analyzed as part of a predictive maintenance program.				
1.18	Has the coater developed a critical spare part list, and are the parts available to minimize production disruptions?	The coater shall develop and maintain a critical spare parts list and shall ensure the availability of such parts to minimize production disruptions.				
<b>Section 2 - Floor and Material Handling Responsibility</b>						
2.1	Does the facility ensure that the data entered in the receiving system matches the information on the customer's shipping documents?	Documented processes and evidence of compliance shall exist, e.g., shop travelers, work orders, etc. The facility shall have a detailed process in place to resolve receiving discrepancies.				
2.2	Is product clearly identified and staged throughout the coating process?	Procedures for part and container identification help to avoid incorrect processing or mixing of lots. Appropriate location and staging within the facility also help to ensure that orders are not shipped until all required operations are performed. Customer product shall be clearly identified and staged throughout the coating process. Non-coated, in-process, and finished product shall be properly segregated and identified. All material shall be staged in a dedicated and clearly defined area.				

Special Process: Coating System Assessment (General Facility Overview)						
Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment		
				N/A	Satisfactory	Not Satisfactory
2.3	Is lot traceability and integrity maintained throughout all processes?	Out-going lot(s) shall be traceable to the incoming lot(s). The discipline of precisely identifying lots and linking all pertinent information to them enhances the ability to do root cause analysis and continual improvement.				
2.4	Are procedures adequate to prevent movement of non-conforming product into the production system?	The control of suspect or non-conforming product is necessary to prevent inadvertent shipment or contamination of other lots. Procedures shall be adequate to prevent movement of non-conforming product into the production system. Procedures shall exist addressing proper disposition, product identification and tracking of material flow in and out of hold area. Non-conforming hold area shall be clearly designated to maintain segregation of such material.				
2.5	Is there a system to identify trap points in the entire process to reduce risk of mixed parts (inappropriate, unfinished or improperly coated parts)?	The coater shall have documented procedures to identify and monitor trap points for each process/equipment. Monitoring of potential trap points shall occur for every part changeover.				
2.6	Are containers free of inappropriate material?	Containers handling customer product shall be free of inappropriate material. After emptying and before re-using containers, containers shall be inspected to ensure that all parts and inappropriate material have been removed. The source of inappropriate material shall be identified and addressed. This is to ensure that no nonconforming coated parts or inappropriate material contaminate the finished lot.				
2.7	Is part loading specified, documented and controlled?	Loading parameters shall be specified, documented and controlled. Examples include parts per rack and load size.  Refer to Process Tables for frequency of checks.				

Special Process: Coating System Assessment (General Facility Overview)						
Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment		
				N/A	Satisfactory	Not Satisfactory
2.8	Are operators trained in material handling, containment action and product segregation in the event of an equipment emergency including power failure?	Unplanned or emergency downtime greatly raises the risk of improper processing. Operators shall be trained in material handling, containment action, and product segregation in the event of an equipment emergency including power failure. Training shall be documented. Work instructions specifically addressing potential types of equipment emergencies and failures shall be accessible to and understood by equipment operators. These instructions shall address containment/reaction plans related to all elements of the process. Evidence shall exist showing disposition and traceability of affected product.				
2.9	Is the handling, storage and packaging adequate to preserve product quality?	The coater's loading/unloading systems, in-process handling and shipping process shall be assessed for risk of part damage or other quality concerns.				
2.10	Are plant cleanliness, housekeeping, environmental and working conditions conducive to control and improved quality?	Plant cleanliness, housekeeping, environmental, and working conditions shall be conducive to controlling and improving quality. The coater should evaluate such conditions and their effect on quality. A housekeeping policy shall be clearly defined and executed. The facility shall be reviewed for the following items: loose parts on floor; spillage around tanks; overall plant lighting; fumes etc.				
2.11	Are process control parameters monitored per frequencies specified in Process Tables?	Process control parameters shall be monitored per frequencies specified in Process Tables. Computer monitoring equipment with alarms and alarm logs satisfy the verification requirement. A designated floor person shall verify the process parameters, e.g., by initialing a strip chart or data log.				



Special Process: Coating System Assessment (General Facility Overview)						
Question Number	Question	Requirements and Guidance	Objective Evidence	Assessment		
				N/A	Satisfactory	Not Satisfactory
2.12	Are out of control/specification parameters reviewed and reacted to?	There are documented reaction plans to both out of control and out of tolerance process parameters. There is documented evidence that reaction plans are followed.				Needs Immediate Action
2.13	Are In-Process / Final Test Frequencies performed as specified in Process Tables?	In-Process / Final Test Frequencies shall be performed as specified in Process Tables. Refer to Process Tables				
2.14	Is product test equipment verified?	Test equipment shall be verified/calibrated per applicable customer specific standard or per an applicable consensus standard, e.g., ASTM, SAE, ISO, NIST, etc. Verification/calibration results shall be internally reviewed, approved and documented. Refer to Process Tables for frequency of checks.				

## **Instructions for completing the Job Audit**

The organization is to complete a minimum of one coating part job audit during each assessment. This should be done preferably on a part identified for one of the customers requiring compliance to this document. More part job audits may be done if time permits. Preferably, safety or critical parts should be audited. This may not be easily determined with fasteners, especially if the fastener manufacturer does not identify the end customer (auto manufacturer, tier one, etc.). It is recommended that the job audit be performed at the end of the coating system assessment.

The job audit is not the only or main focus of the CSA. The other two sections on Management Responsibility and Quality Planning and Floor and Material Handling Responsibility are equally if not even more important. The job audit of one part, one coating process, is not sufficient to use as a basis to complete the other sections of the complete CSA.

The job audit is a compliance type audit/review of a specific part and its related paperwork and processing, including coating equipment and processing records for that job from the beginning receipt of a part through processing in the coating operation and inspection to packaging. Parts shall be taken from the shipping area at the dock or the end of the coating operation. If an automotive manufacturer's part is not available or identifiable, then parts from other customers requiring compliance with this document shall be used for the assessment.

The specific coating processing parameters (applies to 3.7 in the Job Audit) that are required in the job audit shall be added to the job audit form. This can be done by reviewing the customer specification(s), the Control Plan, the FMEA, and the floor work/job order. Each processing step shall be reviewed for proper production records/compliance/inspection. These steps can be compared to those in the Coating System Assessment for the actual job/coating process being reviewed for compliance.

## Section 3 - Job Audit - Finished Product Review

Job Identity:  
 Customer: \_\_\_\_\_  
 Shop Order Number: \_\_\_\_\_  
 Part Number: \_\_\_\_\_  
 Part Description: \_\_\_\_\_  
 Coating Requirements: \_\_\_\_\_

Question #	Job Audit Question	Related CSA Question #	Customer or Internal Requirement	Job (Shop) Order or Reference Documentation Requirement	Actual Condition (Objective Evidence)	Pass / Fail / N/A
3.1	Is contract review and advanced quality planning, FMEA, control plans, etc., performed by qualified individuals?	1.1 1.2 1.3 1.4 1.6		N/A		
3.2	Does the Coater have the proper customer specifications for the part?	1.5		N/A		
3.3	Is a shop traveler created to meet customer requirements?	1.6 2.1				
3.4	Is material identification (part numbers, lot numbers, contract numbers, etc.) maintained throughout the coating process?	2.2 2.3 2.4				
3.5	Is there documented evidence of Receiving Inspection?	2.1				
3.6	Are the Loading / Racking requirements identified?	1.6 2.7 2.9				

**Job Identity:**

**Coating Requirements:**

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## Section 3 - Job Audit - Finished Product Review

**Job Identity:** \_\_\_\_\_  
**Customer:** \_\_\_\_\_  
**Shop Order Number:** \_\_\_\_\_  
**Part Number:** \_\_\_\_\_  
**Part Description:** \_\_\_\_\_  
**Coating Requirements:** \_\_\_\_\_

Question #	Job Audit Question	Related CSA Question #	Customer or Internal Requirement	Job (Shop) Order or Reference Documentation Requirement	Actual Condition (Objective Evidence)	Pass / Fail / N/A
3.8	What are the product inspection requirements?	1.5 2.13 2.14	Each part may have one or more requirements determined by the coating specification. Parts must meet each requirement. List each requirement below and validate. (Listed below are some examples)			
3.8.1	<b>Requirement: Coating Thickness</b>					
	Test Method:					
	Test frequency or quantity:					
	Selection of samples:					
	Specification:					
3.8.2	<b>Requirement: Corrosion Resistance (if applicable)</b>					
	Test Method(s):					
	Test frequency or quantity:					
	Selection of samples:					
	Specification:					
3.8.3	<b>Requirement: Hydrogen Embrittlement Relief (if applicable)</b>					
	Test Method:					
	Test frequency or quantity:					
	Selection of samples:					
	Specification:					
3.8.4	<b>Requirement: Adhesion</b>					
	Test Method(s):					
	Test frequency or quantity:					
	Selection of samples:					
	Specification:					

**Section 3 - Job Audit - Finished Product Review**

**Job Identity:**  
Customer: \_\_\_\_\_  
Shop Order Number: \_\_\_\_\_  
Part Number: \_\_\_\_\_  
Part Description: \_\_\_\_\_  
Coating Requirements: \_\_\_\_\_

Question #	Job Audit Question	Related CSA Question #	Customer or Internal Requirement	Job (Shop) Order or Reference Documentation Requirement	Actual Condition (Objective Evidence)	Pass / Fail / N/A
3.8.5	Requirement: Cure					
	Test Method:					
	Test frequency or quantity:					
	Selection of samples:					
	Specification:					
3.8.6	Requirement: Torque Tension (if applicable)					
	Test Method:					
	Test frequency or quantity:					
	Selection of samples:					
	Specification:					

## Section 3 - Job Audit - Finished Product Review

**Job Identity:**  
**Customer:**  
**Shop Order Number:**  
**Part Number:**  
**Part Description:**  
**Coating Requirements:**

Question #	Job Audit Question	Related CSA Question #	Customer or Internal Requirement	Job (Shop) Order or Reference Documentation Requirement	Actual Condition (Objective Evidence)	Pass / Fail / N/A
3.8.7	Requirement: Appearance (Decorative)					
	Test Method:					
	Test frequency or quantity:					
	Selection of samples:					
	Specification:					
3.8.8	Requirement: Dimensional (if applicable)					
	Test Method:					
	Test frequency or quantity:					
	Selection of samples:					
	Specification:					
3.8.9	Requirement: Color and Gloss (Decorative)					
	Test Method:					
	Test frequency or quantity:					
	Selection of samples:					
	Specification:					
3.8.10	Requirement: Customer Specific					
	Test Method(s):					
	Test frequency or quantity:					
	Selection of samples:					
	Specification:					

**Section 3 - Job Audit - Finished Product Review**

**Job Identity:**  
Customer: \_\_\_\_\_  
Shop Order Number: \_\_\_\_\_  
Part Number: \_\_\_\_\_  
Part Description: \_\_\_\_\_  
Coating Requirements: \_\_\_\_\_

Question #	Job Audit Question	Related CSA Question #	Customer or Internal Requirement	Job (Shop) Order or Reference Documentation Requirement	Actual Condition (Objective Evidence)	Pass / Fail / N/A
<b>Operator or Inspector Responsibilities</b>						
3.9	Were appropriate process steps signed off?	1.4 1.6 2.2 2.3 2.11				
3.10	Were all inspection steps, as documented in the control plan performed?	1.2 1.4				
3.11	Were steps/operations performed that were not documented in the control plan?	1.2 1.4 1.6				
3.12	If additional steps were performed, were they authorized?	1.2 1.4 1.6 1.10 1.16				
3.13	Does the governing specification allow reprocessing or rework?	1.5 1.10				
3.14	If the order was certified, did the certification accurately reflect the process performed?	2.11 2.13				
3.15	Was the certification signed by an authorized individual?	1.16				
3.16	Are the parts and containers free of inappropriate objects or contamination?	2.6				



## Section 3 - Job Audit - Finished Product Review

Job Identity:

Customer: \_\_\_\_\_  
 Shop Order Number: \_\_\_\_\_  
 Part Number: \_\_\_\_\_  
 Part Description: \_\_\_\_\_  
 Coating Requirements: \_\_\_\_\_

Question #	Job Audit Question	Related CSA Question #	Customer or Internal Requirement	Job (Shop) Order or Reference Documentation Requirement	Actual Condition (Objective Evidence)	Pass / Fail / N/A
	<b>Packaging Requirements</b>					
3.17	Are packaging requirements identified?	2.6 2.7 2.9				
3.18	Are parts packaged to minimize mixed parts (for example, parts packed over height of container)?	2.6 2.7 2.9				
	<b>Shipping Requirements</b>					
3.19	Were the parts properly identified?	2.3 2.9				
3.20	Were the containers properly labeled?	2.3 2.9				

## **APPENDIX A – PROCESS TABLES**

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**PROCESS TABLE A - Pretreatment (Aqueous)**

All requirements given below are subordinate to customer specific requirements.

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

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

**PROCESS TABLE A - Pretreatment (Aqueous)**

All requirements given below are subordinate to customer specific requirements.

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

Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
<b>3.0</b>		<b>Rinse Bath(s)</b>		
A3.1	2.11	The following checks shall be performed during production:		
A3.2	1.4 2.11 2.12	Pressure/Agitation	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
A3.3	1.4 2.11 2.12	Temperature	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
A3.4	1.4 1.6 2.11 2.12	Time	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
A3.5	1.4 2.11 2.12	Impurity Concentration	Manual	Per Control Plan/Log Sheet (1/shift minimum)
A3.6	1.4 2.11 2.12	Overflow Rate	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
A3.7	2.11	There is a dump schedule for rinses.	Manual	Per Control Plan/Log Sheet
A3.8	1.4 2.11	There is a visual inspection (e.g. water break) after each post cleaning rinse bath where possible. (not applicable for bulk)	Manual	Per Control Plan/Log Sheet (1/shift minimum)
A3.9	1.4 2.11	There is a final rinse. It shall be monitored for presence of bacteria. (for plastic substrate)	Manual	Per Control Plan/Log Sheet (1/shift minimum)
A3.10	1.4 2.11	For Metals -- Corrosion inhibitor concentration is checked. (If applicable)	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)

### PROCESS TABLE B - Pretreatment (Mechanical)

All requirements given below are subordinate to customer specific requirements.

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

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

**PROCESS TABLE C - Pretreatment (Phosphating)**

<p>All requirements given below are subordinate to customer specific requirements.</p> <p>The customer may have additional requirements, e.g., inspection testing, greater frequencies, etc. When performing the job audit, the auditor shall verify coater is conforming to customer requirements.</p>				
Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
<b>1.0</b>		<b>Conversion Coating</b>		
C1.1	1.4	There shall be an incoming part assessment procedure with criteria.	Per Control Plan	Per lot
<b>2.0</b>		<b>Rinse Conditioner (If Applicable)</b>		
C2.1	2.11	The following checks shall be performed during production:		
C2.2	1.4 2.11 2.12	Pressure/Agitation	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C2.3	1.4 1.6 2.11 2.12	Time	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C2.4	1.4 2.11 2.12	Chemical Concentration	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C2.5	2.11	There is a dump schedule for rinse conditioner.	Manual	Per Chemical Manufacturer's Guideline
<b>3.0</b>		<b>Conversion Coating Bath</b>		
C3.1	2.11	The following checks shall be performed during production:		
C3.2	1.4 2.11 2.12	Pressure/Agitation	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C3.3	1.4 2.11 2.12	Temperature	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C3.4	1.4 1.6 2.11 2.12	Time	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C3.5	1.4 2.11 2.12	Chemical Concentration (Free Acid, Total Acid, Iron Content, pH, Accelerator Amount as Applicable)	Automatic/Manual	Per Control Plan/Log Sheet (2/shift minimum)
C3.6	1.4 2.11 2.12	Fluoride Ion Concentration (if aluminum is being coated)	Automatic/Manual	Per Control Plan/Log Sheet (2/shift minimum)
C3.7	1.4 1.6 2.11 2.12	Coating Weight	Manual	Per Control Plan/Log Sheet (1/shift minimum)
C3.8	1.4 2.11 2.12	Crystal Size (If applicable)	Manual	Per customer requirement

**PROCESS TABLE C - Pretreatment (Phosphating)**

All requirements given below are subordinate to customer specific requirements.				
The customer may have additional requirements, e.g., inspection testing, greater frequencies, etc. When performing the job audit, the auditor shall verify coater is conforming to customer requirements.				
Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
<b>4.0</b>		<b>Rinse After Phosphate</b>		
C4.1	2.11	The following checks shall be performed during production:		
C4.2	1.4 2.11 2.12	Impurity Concentration (e.g. Titration, Conductivity)	Manual	Per Control Plan/Log Sheet (1/shift minimum)
C4.3	1.4 2.11 2.12	Pressure/Agitation	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C4.4	1.4 1.6 2.11 2.12	Time	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C4.5	2.11	There is a dump schedule for rinses	Manual	Per Chemical Manufacturer's Guideline
<b>5.0</b>		<b>Seal Rinse</b>		
C5.1	2.11	The following checks shall be performed during production:		
C5.2	1.4 2.11 2.12	Pressure/Agitation	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C5.3	1.4 1.6 2.11 2.12	Time	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C5.4	1.4 2.11 2.12	Chemical Concentration	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C5.5	1.4 2.11 2.12	Temperature (If applicable)	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
C5.6	2.11	There is a dump schedule for seal rinse.	Manual	Per Chemical Manufacturer's Guideline
<b>6.0</b>		<b>Dry-Off (If Applicable)</b>		
C6.1	1.4 2.11 2.12	Air temperature is monitored and controlled.	Automatic	Per Control Plan/Log Sheet (1/shift minimum)
C6.2	1.4 2.11	There is a procedure to ensure dryness of parts prior to subsequent coating.	Visual	Each Lot

### PROCESS TABLE D - Powder

All requirements given below are subordinate to customer specific requirements.

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

Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
<b>1.0</b>		<b>Powder Paint Application</b>		
D1.1	1.4 2.11	Parts are checked exiting dry-off oven for cleanliness and trapped water, prior to entering powder booth.	Manual	Per Control Plan/Log Sheet (1 per hour)
<b>2.0</b>		<b>Powder Booth and Equipment</b>		
D2.1	1.4 2.11 2.12	The temperature of parts entering the coating booth is monitored.	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
D2.2	1.4 1.6 1.17 2.11 2.12	The conveyor is operating at the proper line speed (no abrupt movement or contact between parts).	Automatic	Per Control Plan/Log Sheet (1/shift minimum)
D2.3	1.4 2.11 2.12	The ground is checked using a 500 volt megohm meter (less than 1megohm resistance).	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
D2.4	1.4 1.17 2.11 2.12	The air dryer and filter are on main compressed air line.	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
D2.5	1.4 1.17 2.11 2.12	The booth temperature and humidity are checked.	Manual	Per Control Plan/Log Sheet (1/shift minimum)
D2.6	1.4 2.11 2.12	The air balance in the powder booth is checked.	Manual	Per Control Plan/Log Sheet (1/day minimum)
D2.7	1.4 1.17 2.11 2.12	The rotary seive is clean and operational.	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
D2.8	1.4 2.11 2.12	The powder flow on seive is monitored.	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
D2.9	1.4 2.11 2.12	The vent assist air pressure is checked.	Manual	Per Control Plan/Log Sheet (1/shift minimum)
D2.10	1.4 2.11 2.12	The vent on feed hopper is checked.	Manual	Per Control Plan/Log Sheet (1/shift minimum)
D2.11	1.4 1.17 2.11 2.12	The reclaim seive is operating properly.	Manual	Per Control Plan/Log Sheet (1/shift minimum)



**PROCESS TABLE D - Powder**

All requirements given below are subordinate to customer specific requirements.

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

Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
D2.12	1.4 1.17 2.11 2.12	All guns are operational and in good repair.	Manual	Per Control Plan/Log Sheet (1/shift minimum)
D2.13	1.4 1.17 2.11 2.12	The venturis in the feed pumps and the pick up tubes in the hopper are checked.	Manual	Per PM schedule
D2.14	1.4 2.11 2.12	The feed hoses are checked to ensure that they have no excessive bends and kinks.	Manual	Per Control Plan/Log Sheet (1/day minimum)
D2.15	1.4 2.11 2.12	The virgin/reclaim ratio is checked. (feed pressure)	Manual	Per Control Plan/Log Sheet (1/shift minimum)
D2.16	1.4 1.17 2.11 2.12	The static pressure gauges on primary and final filters are checked.	Manual	Per Control Plan/Log Sheet (1/shift minimum)
D2.17	1.4 1.11 2.12 2.13	Appearance of parts exiting booth is checked.	Manual	Per Control Plan/Log Sheet (1 per hour)
D2.18	1.4 2.11 2.12	The powder supply and atomizing air pressure are checked.	Manual	Per Control Plan/Log Sheet (1/shift minimum)
3.0		Cure (See Convective Cure Process Table I)		

**PROCESS TABLE E - Electrocoat**

All requirements given below are subordinate to customer specific requirements.

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

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

**PROCESS TABLE E - Electrocoat**

All requirements given below are subordinate to customer specific requirements.

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

Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
<b>4.0 Anolyte System</b>				
E4.1	1.4 2.11 2.12	The anolyte solution is being controlled within the required conductivity limits.	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
E4.2	1.4 2.11 2.12	The conductivity reading on the anolyte tank has been confirmed in the laboratory.	Automatic/Manual	Per Control Plan/Log Sheet 1 / week
E4.3	1.4 2.11 2.12	The pH of the anolyte solution has been checked.	Automatic/Manual	Per Control Plan/Log Sheet (1 per shift)
E4.4	1.4 2.11 2.12	Anodes have been inspected.	Manual	Per Control Plan/Log Sheet (1 per six months)
E4.5	1.4 2.11 2.12	The anolyte solution is being circulated to each cell.	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
E4.6	1.4 2.11 2.12	Dump and clean schedule for anolyte being maintained.	Manual	Per Control Plan/Log Sheet
E4.7	1.4 2.11 2.12	Amperage draw has been checked on each anode.	Automatic/Manual	Per Control Plan/Log Sheet
<b>5.0 Rectifier</b>				
E5.1	1.4 1.6 2.11 2.12	The proper voltage is being used for the load size.	Manual	per Equip. Mfg.
E5.2	1.4 2.11 2.12	The ramp up time to full voltage has been verified.	Automatic/Manual	Per Control Plan/Log Sheet (1 per shift)
E5.3	2.10	There is a safety beacon to alert personnel when system is energized.		
E5.4	1.4 1.17 2.11 2.12	The ripple of the rectifier has been checked by an approved electrician.	Automatic/Manual	Per Control Plan / material supplier
<b>6.0 Rinse System</b>				
E6.1	1.4 2.11 2.12	Immersion rinse tanks are operating at the proper levels and tanks are being agitated correctly.	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
E6.2	1.4 2.11 2.12	There is sufficient permeate supplied to the rinse.	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
E6.3	1.4 2.11 2.12	The pH and conductivity of the rinse have been recorded.	Manual	Per Control Plan/Log Sheet (1/shift minimum)
E6.4	1.4 2.11 2.12	There is microbial testing of rinses.	Manual	Per Control Plan / material supplier
E6.5	1.4 2.11 2.12	The ultrafilters are operating at proper pressures and bag filters are being used. What size bags?	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
E6.6	1.4 1.17 2.11 2.12	Rinses have been cleaned per maintenance schedule.	Manual	Per Control Plan / material supplier
<b>7.0 Cure (See Convective Cure Process Table I)</b>				

**PROCESS TABLE F - Spray**

All requirements given below are subordinate to customer specific requirements.

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

Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
<b>1.0</b>		<b>Part Appearance</b>		
F1.1	1.4 2.11	Incoming parts are inspected for cleanliness, trapped water or water spots as well as uniform phosphate coating (when phosphate is used).	Manual	Per Control Plan/Log Sheet (1 per hour)
F1.2	1.14	Inspection criteria are posted.		
F1.3	2.10	Adequate lighting is in place.		
F1.4	1.4 2.9	Mutilation prevention items (i.e. gloves, belt buckle covers, watch covers, etc.) are in place.		
F1.5	1.4 1.17 2.11 2.12	Paint racks are maintained.	Manual	

**PROCESS TABLE F - Spray**

All requirements given below are subordinate to customer specific requirements.

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Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
2.0		<b>Paint Mixing</b>		
F2.1	1.4 2.11 2.12	Paint mixing rooms are controlled (mixing tank grounding, closed container, properly enclosed space, temperature, clean environment).	Automatic/Manual	Per Paint Manufacturer Recommendation
F2.2	1.4 2.11 2.12	FIFO system is being utilized.	Manual	Per Paint Manufacturer Recommendation
F2.3	1.4 1.6 1.17 2.11 2.12	Paint agitation/time and reduction (solvent package) are proper and documented.	Manual	Per Paint Manufacturer Recommendation
F2.4	1.4 1.6 1.17 2.11 2.12	Viscosity and temperature are in operational limits and documented.	Manual	Per Control Plan/Log Sheet/Paint Manufacturer Recommendation
F2.5	1.4 1.6 1.17 2.11 2.12	The proper filter size and type are in place.	Manual	Per Control Plan/Log Sheet/Paint Manufacturer Recommendation
F2.6	1.4 1.6 1.17 2.11 2.12	Pump pressures are set within operational limits.	Manual	Per Control Plan/Log Sheet/Paint Manufacturer Recommendation
F2.7	1.4 2.11 2.12	Circulation (flow meter, pressure gage) is monitored.	Automatic/Manual	Per Control Plan/Log Sheet
F2.8	1.4 2.11 2.12	Bag filter pressures are monitored (bags are changed when psi differential >5-10 PSI).	Automatic/Manual	Per Control Plan/Log Sheet

**PROCESS TABLE F - Spray**

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Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
<b>3.0</b>		<b>Substrate Conditioning (Flame, Plasma, etc) (if applicable)</b>		
F3.1	1.4 2.11	Incoming parts are inspected to ensure that they are free of dirt and contamination.	Manual	
F3.2	1.4 1.17 2.11 2.12	Flame/Plasma is set at operational limits per equipment and material supplier recommendations.	Automatic	Per control plan and equipment and substrate suppliers recommendations
F3.3	1.4 2.11 2.13	Final surface tension is within specifications.	Manual	Per Control Plan
<b>4.0</b>		<b>Primer/Promoter</b>		
F4.1	1.4 2.11	Incoming parts are inspected to ensure that they are free of dirt and contamination.	Manual	Per Control Plan/Log Sheet (1/shift minimum)
F4.2	1.4 1.17 2.11 2.12	Destaticizing air is operational. (Plastic parts only)	Automatic	Per Control Plan/Log Sheet 1 / week
F4.3	1.4 2.11 2.12	Booth balance is monitored.	Manual	Per Control Plan/Log Sheet 1 / week
F4.4	1.4 1.6 1.17 2.11 2.12	Booth temperature and humidity are monitored (or set within operational limits if controlled).	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
F4.5	1.4 2.11 2.12	Film thickness is per customer requirements.	Manual	Per control plan and customer requirements
F4.6	1.4 1.6 1.17 2.11 2.12	Atomizer parameters (fluid flow, air pressures (atomizing fan, shaping), electrostatics and mixing) are set within operational limits.	Automatic/Manual	Per Control Plan/Log Sheet (1 per month minimum)

**PROCESS TABLE F - Spray**

All requirements given below are subordinate to customer specific requirements.

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

Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
<b>5.0</b>		<b>Basecoat (If applicable)</b>		
F5.1	1.4 2.11	Incoming parts are inspected to ensure that they are free of dirt and contamination.	Manual	Per Control Plan / material supplier (once per shift minimum)
F5.2	1.4 1.6 2.11 2.13	Flashtimes between coats are set at suppliers recommended times.	Automatic/Manual	Per Control Plan/material supplier
F5.3	1.4 1.6 1.17 2.11 2.12	Booth temperature and humidity are monitored or set within operational limits if controlled. (Required for waterborne coatings)	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
F5.4	1.4 1.6 1.17 2.11 2.12	Atomizer parameters (fluid flow, air pressures (atomizing fan, shaping), electrostatics and mixing) are set within operational limits.	Automatic/Manual	Per Control Plan/Log Sheet (1 per month minimum)
F5.5	1.4 2.11 2.13	Film builds are per supplier recommendations.	Manual	Per Control Plan and suppliers recommendations
<b>6.0</b>		<b>Basecoat Heated Flash (Waterborne Materials Only)</b>		
F6.1	1.4 1.6 2.11 2.13	Set point is at suppliers recommended time, temperature and energy type (convection/IR/UV/etc.).	Manual	Per Control Plan / material supplier
F6.2	1.4 1.6 2.11 2.13	Percent solids after pre-dry is at the suppliers recommended percentage.	Manual	Per Control Plan/Log Sheet (1/shift minimum)
F6.3	1.4 1.17 2.11 2.12	The pre-dry oven is maintained.	Manual	Per Control Plan / material supplier

### PROCESS TABLE F - Spray

All requirements given below are subordinate to customer specific requirements.

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Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
<b>7.0</b>		<b>Clearcoat</b>		
F7.1	1.4 2.11	Incoming parts are inspected to ensure that they are free of dirt and contamination.	Manual	Per Control Plan / material supplier (once per shift minimum)
F7.2	1.4 1.6 2.11 2.13	Flashtimes between coats are set at suppliers recommended times.	Automatic/Manual	Per Control Plan/material supplier
F7.3	1.4 1.6 1.17 2.11 2.12	Booth temperature and humidity are monitored or set within operational limits if controlled. (Required for waterborne coatings)	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
F7.4	1.4 1.6 1.17 2.11 2.12	Atomizer parameters (fluid flow, air pressures (atomizing fan, shaping), electrostatics and mixing) are set within operational limits.	Automatic/Manual	Per Control Plan/Log Sheet (1 per month minimum)
<b>8.0</b>		<b>Cure (See Convective Cure Process Table I)</b>		
<b>9.0</b>		<b>Final Part Inspection</b>		
F9.1	1.14	Inspection criteria are posted.		
F9.2	2.10	There is adequate lighting in inspection area.		
F9.3	1.4 2.9	Mutilation prevention items are in place.		
F9.4	1.4 1.8 1.12 2.13	Defects are being tracked.	Manual	Per Control Plan
F9.5	1.4 2.13	FTT is being monitored.	Manual	Per Control Plan
F9.6	1.10 1.11 1.12	Scrap and repaints are being tracked.	Manual	Per Control Plan



**PROCESS TABLE G - Dip/Spin**

All requirements given below are subordinate to customer specific requirements.

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Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
<b>1.0</b>		<b>Coating Material Application</b>		
G1.1	1.4 2.11	After pretreatment, parts are inspected for flash rust, wetness, oil or other defects.	Manual	Per Control Plan/Log Sheet (each lot)
G1.2	1.4 2.11	If phosphated, parts are checked for uniformity of phosphate coating.	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
G1.3	2.6 1.17	Skids/bins used to hold parts between coating operations are free of oil, grease or other contaminants.	Manual	Per Control Plan/Log Sheet (each lot)
<b>2.0</b>		<b>Coating Bath</b>		
G2.1	1.4 2.11 2.12	Incoming paint viscosity is checked.	Manual	Each New Lot of Paint
G2.2	1.4 2.11 2.12	Incoming solids checks are performed.	Manual	Each New Lot of Paint
G2.3	1.4 1.17 2.11 2.12	Appropriate mixing equipment is used, capable of dispersing settled solids.	Manual	Ongoing
G2.4	2.9 2.10	Paint is stored properly, away from high humidity and temperature extremes.	Manual	Ongoing
G2.5	2.9 2.10	Paint is kept covered and/or sealed when not in use.	Manual	Ongoing
G2.6	2.9 2.10	Paint storage room is organized so each paint is easily found to prevent contamination.	Manual	Ongoing
G2.7	2.9 2.10	Paint storage room is kept clean.	Manual	Ongoing

**PROCESS TABLE G - Dip/Spin**

<p>All requirements given below are subordinate to customer specific requirements.</p> <p>The customer may have additional requirements, e.g., inspection testing, greater frequencies, etc. When performing the job audit, the auditor shall verify coater is conforming to customer requirements.</p>				
Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
G2.8		The following checks shall be performed during production:		
G2.9	1.4 2.11 2.12	Paint Temperature.	Manual	Per Control Plan/Log Sheet (3/shift minimum)
G2.10	1.4 2.11 2.12	Viscosity.	Manual	Per Control Plan/Log Sheet (3/shift minimum)
G2.11	1.4 2.11 2.12	% Solids (by weight).	Manual	Per Control Plan/Log Sheet (1/Day minimum)
G2.12	1.4 2.11 2.12	Volume (paint depth in coating vat).	Automatic/Manual	Per Control Plan/Log Sheet (3/shift minimum)
G2.13	1.4 2.11 2.12	Vibratory feed tables are cleaned (if used).	Manual	Per Control Plan/Log Sheet (as needed)
G2.14	1.4 1.17 2.11 2.12	Basket condition (basket mesh clean and undamaged).	Manual	Per Control Plan/Log Sheet (as needed)
G2.15	1.4 2.11 2.12	Paint and/or solvent additions are documented.	Manual	Per Control Plan/Log Sheet (each addition)
G2.16	2.10	Viscosity cups are cleaned after each use.	Manual	Per Control Plan/Log Sheet (each check)
G2.17	2.14 1.17	Viscosity cups are verified.	Manual	2/Month minimum
G2.18	2.14 1.17	Thermometers are calibrated/verified.	Manual	Once/Month minimum

**PROCESS TABLE G - Dip/Spin**

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Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
3.0		Application Parameters		
G3.1	1.4 1.6	A system is in place to ensure proper basket weights for specific parts, such as processing manual, traveller, or process recipe.	Automatic/Manual	Per Control Plan/Log Sheet (each lot)
G3.2	1.4 1.6	Baskets are kept less than 2/3 full.	Automatic/Manual	Per Control Plan/Log Sheet (each lot)
G3.3	1.4 1.6	Dip time is controlled.	Automatic/Manual	Per Control Plan/Log Sheet (each lot)
G3.4	1.4 1.6	Spin speed (RPM) is controlled.	Automatic/Manual	Per Control Plan/Log Sheet (each lot)
G3.5	1.4 1.6 1.17	The coating unit has an attached RPM indicator.		
G3.6	1.4 1.6 1.17	RPM's can be adjusted easily.		
G3.7	1.4 1.6	Spin time is controlled.	Automatic/Manual	Per Control Plan/Log Sheet (each lot)
G3.8	1.4 1.6	The number of spins is adjustable (single, double, triple).	Automatic/Manual	

**PROCESS TABLE G - Dip/Spin**

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Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
G3.9	1.4 1.6	Tumble time is in/out of coating controlled (if applicable).	Automatic/Manual	Per Control Plan/Log Sheet (each lot)
G3.10	1.4 1.6 1.17	There is an adequate system to keep parts level going into the oven (raking, vibe table, etc.).	Automatic/Manual	Per Control Plan/Log Sheet (each lot)
G3.11	2.10	Vibratory feed tables are cleaned (if used).	Manual	Per Control Plan/Log Sheet (as needed)
G3.12	2.9	There is evidence of steps taken to assist in soft handling of parts (shallow drops, lined chutes and hoppers, bumper boards, etc.).	Automatic/Manual	Per Control Plan/Log Sheet (each lot)
G3.13	1.4 2.9 2.11	Parts are cool to to touch before each coating step.	Manual	Per Control Plan (each lot)
<b>4.0</b>		<b>Cure (See Convective Cure Process Table I)</b>		

**PROCESS TABLE H - Autophoretic**

All requirements given below are subordinate to customer specific requirements.

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Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
<b>1.0</b>	<b>3.1</b>	<b>Coating Bath</b>		
H1.1	1.4 2.11 2.12	Mixer speed and direction are monitored and adjusted.	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
H1.2	1.4 1.6 2.11 2.12	Time (hoist program) is verified.	Automatic/Manual	Per Control Plan/Log Sheet (1/day minimum)
H1.3	1.4 1.17 2.11 2.12	Conveyor speed is verified (if applicable).	Manual	Annually or after repair
H1.4	1.4 1.6 2.11 2.12	Temperature is monitored and controlled.	Automatic	Per Control Plan/Log Sheet (1/shift minimum)
H1.5	1.4 2.11 2.12	Humidity level is monitored.	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
H1.6	1.4 2.11 2.12	101 (fluoride) and ORP levels are checked.	Automatic/Manual	Per Control Plan/Log Sheet (every 2 hours minimum)
H1.7	1.4 2.11 2.12	Chemical concentration (% solids, starter/iron titration, conductivity) is checked and maintained.	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
H1.8	1.4 1.17 2.11 2.12	Bath transfer is maintained.	Manual	Per PM schedule (1/year minimum)
<b>2.0</b>	<b>1.18</b>	<b>Tap Rinse After Coating</b>		
H2.1	1.4 2.11 2.12	Pump pressure or agitator speed is monitored.	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
H2.2	1.4 2.11 2.12	Impurity concentration (conductivity) is checked.	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)

**PROCESS TABLE H - Autophoretic**

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Item #	Related CSA Question #	Category/Process Steps	Control	Monitoring
<b>3.0</b>	<b>3.2</b>	<b>Reaction Rinse</b>		
H3.1	1.4 2.11 2.12	Chemical concentration (titration, conductivity, pH, Hach Meter Test) is checked and maintained.	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
H3.2	1.4 2.11 2.12	Pump pressure or agitator speed is monitored.	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
H3.3	1.4 2.11 2.12	Temperature is monitored and controlled (if applicable).	Automatic/Manual	Per Control Plan/Log Sheet (1/shift minimum)
H3.4	1.4 1.17 2.11 2.12	There is a dump schedule.	Manual	Per Chemical Manufacturer's Guideline (minimum 3 times per year)
<b>4.0</b>		<b>Cure (See Convective Cure Process Table I)</b>		

**PROCESS TABLE I - Convective Cure**

All requirements given below are subordinate to customer specific requirements.

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

**PROCESS TABLE J - EQUIPMENT**

All requirements given below are subordinate to customer specific requirements.

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

PROCESS EQUIPMENT											
Item #	Related CSA Question #	Pretreatment	Powder Coat	E-Coat	Spray	Dip/Spin	A-Coat	Cure	Verification Frequency	Calibration Frequency	Comment
1.1	2.14	X		X	X	X	X		Daily	Yearly	
1.2	2.14	X	X	X	X	X	X	X	At Start-up	2x/Year	
1.3	2.14		X	X					At Start-up	N/A	
1.4	2.14	X		X	X	X	X		Phosphate - 3hr min. Paint Lines - Before Run E-Coat - 1x/Shift min.	N/A	
1.5	2.14	X							Wet Analysis		
1.6	2.14	X							Atomic Absorption (Optional)		
1.7	2.14	X	X	X	X	X	X	X	Filters	N/A	* As needed based on pressure
1.8	2.14	X		X		X			Balance	Yearly	
1.9	2.14			X					Conductivity Meter	1x/Week Before Use	
1.10	2.14				X	X			Viscosity Measurement	Hourly	
								X	Thermocouple	N/A	
MINIMUM REQUIRED TESTING CAPABILITY											
2.1	2.14		X	X	X	X	X	X	Salt Spray Cabinet		
2.2	2.14		X	X	X		X	X	Water Immersion Tank		
2.3	2.14							X	Environmental Chamber		
2.4	2.14							X	Cure Testing (chemical rubbing)		
2.5	2.14		X	X	X	X	X	X	Adhesion Testing		
2.6	2.14		X	X	X	X	X	X	Thickness Testing		
2.7	2.14	X	X	X	X	X	X	X	Microscope (when applicable)		
2.8	2.14							X	Freezer (plastic substrate)		
2.9	2.14							X	Lab Oven		

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## CQI-12

### ***Special Process: Coating System Assessment***

Version 1 Issued 8/07



## **GLOSSARY**

**Adhesion:** The ability of dry paint to attach to and remain fixed on the surface without blistering, flaking, cracking or being removed by tape.

**Alkaline cleaner:** A solution from a combination of alkali hydroxides and alkaline salts, with high pH value. The cleaning action may be enhanced by the addition of surface-active agents and special solvents.

**Alkaline wash:** A cleaning process that employs alkaline cleaner.

**Atomization:** The formation of tiny liquid droplets during the spraying of coatings.

**Autophoretic (A-coating):** A precipitation reaction of an organic resin that occurs by the action of an acid etching a metallic substrate. The ions of the oxidized metal codeposit with the vinyl emulsion resin in the autophoretic coating process.

**Blast cleaning:** A cleaning method by using loose abrasive materials such as steel grits, or sand that are propelled by compressed air to remove, for example, mill scale, rust or old paint from steel.

**Blistering:** Localized delamination of, for example, a paint film in the form of dome-shaped blisters from the underlying surface.

**Coating:** A finish used to create a protective and/or decorative layer, for example, paint, varnish, lacquer, or other, as well as the process of treating an object with a coating. Generally it is used to refer to paints and coatings applied in an industrial setting as part of the original equipment manufacturer's (OEM) process.

**Corrosion:** A process by which materials are deteriorated by chemical or electrochemical influences.

**CSA:** Coating System Assessment

**Cure:** The process of transforming a liquid or powder coating into a hard film with, for example heat, and developing specified properties in the coating.

**Cure schedule:** The time and temperature relationship required to cure a coating.

**Degreasing:** A form of cleaning which generally uses solvents, for example, chlorinated solvents, to remove organic contaminants on part surface.

**Dip-Spin:** A coating application technique in which small parts are placed in a basket that is lowered into a coating bath, then raised and spun to remove excess coating material. This process is typically utilized as an economical system for coating high volumes of small parts.

**Durability:** The degree to which coatings withstand the destructive effects of the environment to which they are exposed. Durability has two aspects: 1) durability of the coating, 2) the protective properties of the coating to safeguard the substrate from degradation.

**Electrocoating: (E-coat)** A coating application technique in which coating film is formed in a tank containing deionized water and coating particles. Coating particles can be either positively or negatively charged. The parts passing through the tank are oppositely charge and attract the coating particles.

**Electrostatic spray:** A spray coating method in which a coating is charged and deposited on a substrate that is oppositely charged.

**Film thickness:** The thickness of a continuous layer of coating applied to a substrate.

**Filtration:** A means of separating constituents, usually by physical methods.

**Mixing Ratio:** The proportion in which components of coating material must be mixed prior to application.

**Overbake or overcure:** Exposure of the coating to a higher temperature or longer period of time than that recommended for optimal curing, leading to unacceptable appearance and coating properties.

**Overspray:** Sprayed paint that misses the surface to be coated.

**Paint:** A coating including resin, a solvent, additives, pigments and, in some products, a diluent. Paints are generally opaque, and commonly represent the portion of the industry known as "architectural coatings."

**Peeling:** Loss of adhesion resulting in detachment and curling of the coating, particularly paint film, from either previous coatings or the substrate.

**Phosphating:** Surface pretreatment used on typically ferrous parts that provide a very thin crystalline film that enhances both corrosion resistance and adhesion. Aluminum surfaces can also be phosphate treated.

**Pickling:** A treatment for the removal of surface contaminants from steel by immersion in, for example, an acid solution or by electrolysis.

**Pigments:** Powders which give the paint its required anticorrosive or colored properties.

**Pot-Life:** The period of time after the mixing of reactive components of a multi-component coating, for example paint, during which the mixed coating can be used before losing its application properties or ultimate performance.

**Powder coatings:** Finely divided particles of organic polymers, pigments and additives uniformly mixed and applied to a substrate to form a coating.

**Pretreatment:** Processes for cleaning and conditioning a substrate to be coated. Note: Next to the choice of coating, pretreatment may be the most important factor in the use of high-performance coatings.

**Primer:** Paint intended for protection of, for example, metals against corrosion, or for preparing a surface for subsequent topcoats and intended for preparing a surface for a finishing process.

**Post-cure:** A subsequent cure at higher temperature to enhance specific properties such as release and non-wetting.

**Resin:** The constituent of the paint that serves to bind together the various other constituents as well as to provide adhesion to the surface.

**Sealer:** Coating, for example paint, used to seal the substrate or previous coats and prevent interaction between subsequent coats applied.

**Solvent:** Any liquid that can dissolve a material, such as a resin. For example, with paint, this generally refers to the liquid portion that evaporates as the paint dries.

**Surface appearance:** The smoothness, gloss and presence or lack of surface defects in a coating.

**Underbake or undercure:** Exposure of the coating to a lower temperature and/or for a shorter period of time than that recommended for optimal curing. The resulting condition can lead to tackiness, softness, and inferior film durability.

**Viscosity:** The property of a fluid whereby it tends to resist relative motion within itself, for example, resistance to flow.

**Zinc Phosphate:** A phosphate coating that includes zinc with corrosion inhibiting properties.

**MAINTENANCE REQUEST FORM****Name of Submitter:****Date:****Company:****Company Address:****Phone:****Fax:****E-mail:****MAINTENANCE REQUEST****Page Number of Change:****Document Currently Reads:****Recommended Changes/Should Read:****Reason for Change (Use additional sheets if necessary):****Signature of Submitter:****DISPOSITION (AIAG USE ONLY)****Manager's Recommendation:****Final Disposition:****Comments:****Note: Complete form and return to the AIAG Publication Specialist for consideration.**

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