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AUDIT CRITERIA

AC 7108 REV. D

Issued 1995-01

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Superseding AC7108 Rev C

TO BE USED ON AUDITS AFTER OCTOBER 4, 2009

Nadcap
AUDIT CRITERIA FOR
CHEMICAL PROCESSING

1. QUALITY SYSTEM APPROVAL AND OTHER GENERAL REQUIREMENTS

1.1 Companies seeking accreditation for processing to AC7108 and its related slash sheets (AC7108/x) must be accredited to an acceptable quality system by an acceptable registration body - see Nadcap operating procedure NOP-002.

1.2 Companies carrying out analysis and testing in support of processes to AC7108 must be accredited to AC7108 for the scope of analysis and testing carried out. Should a processor use a sub-contract laboratory for some or all of the analysis and testing in support of their AC7108 accreditation as of (1 year issue of AC7108 Rev C) that subcontract laboratory must be Nadcap accredited for AC 7101 (MTL), accredited by a registration body recognized by MTL, accredited by CP to AC7108/4 or AC7108 for the scope of analysis and testing performed, or approved by Prime customer(s) for laboratory analysis (see AC7108 para 3.5.2).

2. INSTRUCTIONS TO SUPPLIER TO BE AUDITED

2.1 Prior to the Audit

2.1.1 Self-Audit
The supplier must complete a self-audit to AC 7108 and related slash sheets, AC 7004, AS9003, AS/EN/JISQ 9100 or AS/EN/JISQ 9110 (as applicable) in preparation for this audit. Performing a thorough, objective self-audit against each question in the checklist is the critical first step in the Nadcap accreditation process. This can significantly reduce the number of findings issued by the auditor and the time required to achieve accreditation. All non-conformances should be corrected prior to the actual audit. Non-conformances of a technical nature found during the actual audit will, at the Task Group's discretion, require a follow-up audit at the supplier's expense. **NOTE: The location and identification of all applicable documentation must be indicated on the self-audit form. This will greatly expedite the audit and avoid the expense of additional audit days.**

2.1.2 Auditor Review
Retain a copy of the self-audit on site for review by the Nadcap auditor when requested.

2.1.3 Required Audit Information:
The information in questions 2.1.3.1 through 2.1.3.5 must be provided to the auditor, in English unless another language is acceptable to the auditor, at least 30 days prior to the scheduled audit:
NOTE: No ITAR/EAR restricted materials are to be submitted.

2.1.3.1 Original Self-Audit
The self-audit complete with procedure titles/procedure numbers for all documentation.

2.1.3.2 Travelers/Route Cards.
One sample traveler/route card for a process performed.

2.1.3.3 List of Prime Customers and prime processing specifications in the scope of the audit.

2.1.3.4 List of Supplier's Procedures
List of supplier's procedures (index/table of contents only) for processing, testing, inspection, etc.

2.1.3.5 Organization Chart
Organization Chart

2.1.4 List of items that need to be presented to the auditor on arrival:

- Quality Control Manual.
- List of purchased services
- Schedule of calibrations, TUS, SAT, solution analysis etc.
- List of Quality personnel by process.
- List of trained personnel by process.
- Continuous Process Improvement implementation plan.
- Test Matrix

2.2 During the Audit

2.2.1 In-briefing
The supplier should provide for an in-briefing for the auditor and arrangements for a brief plant tour prior to the start of the audit. Key members of the applicant's staff should attend the in-briefing so the audit purpose, methods and assessment processes can be discussed.

2.2.2 Working Space
Working space for the auditor with desks or tables, chairs, telephone, etc. Clerical, typing and reproduction services are to be provided as required. This is not a full time assignment.

2.2.3 Out-Briefing
A final out-briefing will be conducted at the completion of the audit. Each nonconformance report (NCR) will be reviewed and the supplier will be given the opportunity to discuss proposed corrective action or to provide any additional information. A copy of the NCR(s) will be provided to the supplier. NCR's deemed a finding (e.g., a nonconformance to a requirement) are numbered. NCR's that are judged by the auditor to be a nonconformance to recommended practice are observations and are lettered. NOTE: The Chemical Processing Task Group may, upon review, change the auditor's determination of finding or observation.

2.2.4 Submittal of Corrective Actions/Objective Evidence
The supplier shall have **21 calendar days** to submit corrective actions, effectivity dates for each NCR along with objective evidence of implementation. The response must address the root cause of the nonconformance from a systems management approach and the actions taken to preclude recurrence.

2.2.5 Delinquency of Corrective Actions
Delinquency of corrective actions and/or responses may result in failure of the audit, see NOP-011.

2.3 Review of the Audit Report

2.3.1 Responsibility

Responsibility for meeting submittal deadlines rests with the supplier. Failure to comply with specified dates will result in significant delays in your accreditation and a reduction in the term of your accreditation.

A supplier representative should be available for questions during the final Task Group review to clarify issues (either on site or by telephone).

PRI Staff or the Task Group may, after review of your audit report, require additional information or may elect to issue additional findings. NOTE: Final authority over the audit report, acceptability of corrective actions, and accreditation recommendation rests with the Task Group.

2.4 Definition of Terms (See ISO2080 for general terms and definitions associated with chemical processing)

AMBIENT TEMPERATURE FOR PROCESS TANKS: Unless otherwise specified by customer, specification or technical data sheet, ambient is the natural uncontrolled temperature at the location of the tank and need not be monitored or controlled

AUTOMATIC PROCESS LINE: A fully automatic process line is one in which all the variables of a chemical process sequence are maintained, controlled and recorded by an automated, e.g. computer, system. Variables include (but are not limited to) solution immersion times, solution temperatures, step sequencing, and current/voltage settings. An automated process line does not require operator intervention to validate or monitor any part of the processing operation. The operator may be required to initiate, sequence or queue the specified, pre-established and programmed handling equipment or process, but does not alter or adjust the process variables, with the exception of halting a sequence that is in failure mode (in response to an alarm, warning, etc).

BATCH: A quantity of parts of the same part number that are processed on the same route card/traveler.

CHEMICAL ETCHING FOR CLEANING: The chemical removal of metal with the intent of removing surface contamination and oxide. AC7108/2 is not required for this.

CHEMICAL ETCHING FOR NDT: The process of controlled chemical removal with the intent of removing a small amount of material to open up surface cracks or to reveal a grain structure.

CHEMICAL MILLING: The process of controlled chemical removal of metal to achieve a final dimension.

CONCESSION REQUESTS: A request to the prime contractor that allows for the material to be outside engineering requirements.

CONTROL LIMITS: Calculated operating limits resulting from statistical process control programs.

CONTROL PLAN: A formalized written plan that intends to control the product characteristics and the associated processing variables. The control plan assures that the good improvements established by your project will not deteriorate once the project is returned to manufacturing.

CORROSION PIT: For salt spray testing on aluminum panels, the most common type of corrosive attack is pitting -- a highly localized reaction to the salt spray environment resulting in cavities of variable size, shapes and depths. Corrosion pits commonly occur at surface scratches, breaks in protective coatings, and variations in surface compositions (for example, grain boundaries or nonmetallic inclusions) or finishes. After exposure, salt spray test panels should be rinsed and dried cautiously so that any corrosion by-products are not disturbed. Evaluation for corrosion pitting should be conducted as soon as possible after salt spray exposure because continued corrosion activity may occur within observed pits. Typical characteristics of a corrosion pit are, a rounded, elongated or irregular appearance when viewed normal to the test panel surface, a "comet tail" or line or "halo" (i.e., surface discoloration) that emanates from the pit cavity, some quantity of corrosion by-product inside or immediately around the pit (on aluminum test panels the by-product may be granular, powdery or amorphous, and white, grayish or black in color). To be considered a corrosion pit, an observed surface cavity must exhibit at least two of the above

characteristics. Surface cavities that exhibit only one of these characteristics may require additional analysis before being classified as a corrosion pit. Visual inspection with 10X magnification is typical practice when corrosion by-products are not visible with the unaided eye. For example MIL-A-8625 also defines a corrosion pit as having depth greater than its width. Measurement of pit dimensions can be difficult since the extent of a pit is usually not fully revealed from the surface. For example some typical corrosion pit measurement methods are described in ASTM G 46.

DEIONIZED WATER: 50,000 ohm•cm resistivity minimum or <20 µS/cm. Examples could be water produced by reverse osmosis or resin transfer columns.

DEIONIZED WATER FOR ANALYSIS PURPOSES (Lab Water): 500,000 ohm•cm resistivity minimum or <2 µS/cm.

ENGINEERING REQUIREMENTS: Technical requirements identified in the purchase order, specifications or drawing.

FIRST PIECE: First time processing a specific part number.

FROZEN PROCESS: The shop paper/traveler/work instruction that is pre-approved by the main contractor and cannot be changed without re-approval or repair/MRB authority.

IN PROCESS: Parts have been accepted for processing and released to manufacturing but not yet accepted at final inspection or scrapped. (In process inspections are typically "visual" (water break, uniformity, coverage, etc.) "checks" to determine if parts should proceed to the next processing step.)

INVALID TEST: A test where it can be shown that the test piece was of an incorrect material, or it was processed incorrectly, or it was tested incorrectly.

JOB: All of the hardware processed to a single order control document as a lot or multiple lots with a unique control number.

LOT: Unless otherwise specified, shall be all parts of the same part number, material, size and shape, processed at the same time, using the same processing materials, under the same conditions in not more than 8 hours and presented for inspection at one time.

MATERIAL CONDITION: This can include the heat treatment condition, the hardness and the surface finish, e.g. shot peened. Depending on the substrate material and process being carried out some or all of these conditions may be required to be known.

MATERIAL REVIEW BOARD (MRB): Is authority granted by the prime contractor to allow sub-contractors to reprocess material under their authority that does not meet drawing requirements, using out of manufacturing sequence steps, to return the material back to drawing requirements. MRB authority may allow material to exceed drawing requirements.

POLICY: A written company philosophy on how something should be done in very broad generic terms. The existence of a procedure shall satisfy the requirements for a policy.

PROCEDURE: A detailed “how to”, step-by-step revision controlled document used to enforce or implement company policy.

PROCESS PARAMETER: A process parameter is any variable that can influence the process and as such may vary depending on the process in question. For process solutions, examples are: solution temperature, contact/immersion time, concentration of constituents. For painting, examples are: mixing time, induction time, pot life, drying time, oven cure time, humidity and temperature. For electrolytic processes examples are: current density/amperage, voltage and ramp rate. See Appendix D for a list of process parameters that must be recorded either by an automatic system or by the operator.

REPAIR - Using approved processing to return material to a usable condition, even though it does not meet drawing requirements. Requires MRB/Customer approval.

REPLACEMENT TEST: A repeat test where the original test can be shown to be an invalid test. A replacement test may be done once without customer permission.

RETEST: A repeat test where the original test result is believed to be wrong but cannot be invalidated. A retest can only be done if permitted by specification or customer. Does not apply to solution analysis

REWORK: Using standard approved processing to return material to drawing requirements before the next processing step.

SHOP PAPER/ TRAVELER: The paperwork that controls and records the manufacturing process.

SHOP TARGET LIMIT - A processor defined operating limit that defines an action point to prevent the solution constituent from exceeding the Technical Bulletin Limits/Specification Limits prior to the next analysis.

SYSTEM ACCURACY TEST: See definition in AMS2750

TECHNICAL BULLETIN LIMITS: The specification or manufacturer-set-limits beyond which the process must be shut down.

TECHNOLOGY: For the purpose of AC7108 technologies are defined as;
- Anodizing
- Conversion Coating.
- Chemical Milling
- Etching
- Electroplating
- Electropolishing
- Electroless Plating.
- Painting & Dry Film Lubricant.
- Surface preparation for metal bond.
- Vacuum Cadmium and Ion-Vapor Deposition of Aluminum.
- Cleaning and Descaling as stand alone processes.
- Passivation

TEMPERATURE UNIFORMITY SURVEY (TUS): See definition in AMS2750.

TEST MATRIX: **A revision controlled document / electronic file arranged in a logical sequence; containing all the elements of the Appendix C example identifying all lot and periodic test**

requirements for all specifications in the scope of the Nadcap Chemical Process accreditation..

TEST PIECE: A specific piece of material, or sample of parts, that is processed and assessed/tested to determine the performance or a characteristic of a process. Test pieces are not typically included in the delivered batch.

TREND ANALYSIS: The concept of collecting information/data and attempting to spot a pattern or trend, in the information. A negative trend is when trend analysis predicts a diminishing effect to a process or parameter such as a specification limit being exceeded prior to the next test being conducted. This does not mean that the specification limit is exceeded, it means that it will be exceeded if no action is taken

VALIDATED TESTING FAILURE: Either the original test failed, the test could not be invalidated and a retest was not permitted or the retest, if permitted, or replacement test also failed.

2.5 Audit Scope

[ ] FULL SCOPE (all questions completed)

[ ] VCA or Follow-Up Audit

[ ] MODIFIED SCOPE AUDIT

2.6 Processes to be approved/Plant Layout:
Processes to be approved and plant layout.

Is a revision controlled document (drawing or detailed list) available which defines the specific location of each process line for which Nadcap Accreditation is sought? (e.g. Chrome Plating Line located in North End of Building 10).	YES NO

***Auditor, please attach an uncontrolled copy of the above drawing/list. ***

COMPANY INFORMATION

Company Name:_____ Survey Date:_____

Division:_____ Facility:_____

Address:_____ Phone_____

City/State/Zip:_____ Fax:_____

e-mail:_____

Nature of Business:_____

[ ] In-House Products Only: [ ] Accepts Outside Work:

Total #of Employees:_____ No. of QA Personnel:_____

Square Feet of Work Area:_____ No. of Shifts Worked_____

Contacts: Position:

_____ _____

_____ _____

SCOPE OF SURVEY:

Comments:_____

_____

LIST OF PRIME CUSTOMERS:

Prime Customers:_____

_____

REASON FOR VISIT:

[ ] Initial Audit [ ] Reaccreditation Audit [ ] VCA Audit [ ] Follow Up Audit

Corrective Action Verified: [ ] Yes (C/A from previous audit must be verified.)
[ ] NA (Initial Audit)

Recurring findings from previous audit? [ ] Yes (List the findings that are recurring: _____)
[ ] No
[ ] NA

Surveyor's Signature: _____ Date: _____

3. GENERAL QUALITY SYSTEM

3.0.1 Please attach a copy of t-frm-91 for all AC7004 Quality System approvals or a copy of the QS certificate if not AC7004. Also attach a copy of the auditor letter.

3.0.2 Has the supplier performed an effective self audit per para. 2.1.1? YES NO

3.1 Process Integrity

3.1.1 Continuous Process Improvement
The company shall maintain a Process Improvement system that meets the requirements of Appendix A

3.1.1.1 If this is the supplier's initial audit do they have an implementation plan that ensures sections A.01,Foundation, and A.02, Procedures, of Appendix A, Process Improvement, are implemented prior to the first reaccreditation audit YES NO NA

- *Compliance Assessment Guidance: NA only applies if this is not an initial audit.*

3.1.1.2 Does the implementation date support implementation of A.1 and A.2 one month prior to the next audit? YES NO NA

Date by which implementation plan, with milestones will be complete:

_____

- *Compliance Assessment Guidance: NA only applies if this is not an initial audit.*

3.1.1.3 If the supplier has been accredited to AC 7108 for a period of one (1) year or greater, is the supplier compliant with sections A.1 and A.2 of Appendix A? YES NO NA

- *Compliance Assessment Guidance: NA only applies if this is not the first reaccreditation audit.*

3.1.1.4 If the supplier has been accredited for two (2) or more years are they fully compliant with all the requirements of Appendix A? YES NO NA

- *Compliance Assessment Guidance: NA only applies for the initial audit and first reaccreditation audit. With the second re-accreditation audit and subsequent audits a new project is required to be completed.*

3.1.2 Sampling Plans

3.1.2.1 Are inspection and test personnel trained in procedures and techniques for using sampling plans? YES NO NA

- *Compliance Assessment Guidance: NA applies if sampling plans are not used.*

3.1.2.2 If used, are supplier-developed sampling plans available for review and approved by the customer when required by contract? YES NO NA

- *Compliance Assessment Guidance: NA applies if supplier developed sampling plans are not used.*

3.2	**Training, Qualification, and Evaluation of Processing, Inspection, and Testing Personnel** • *Compliance Assessment Guidance: Section NA applies if a modified scope audit.*	**Section NA**
3.2.1	Do procedures require periodic evaluations at defined frequencies to ensure that approved personnel maintain proficiency in their assigned tasks?	YES NO
3.2.2	Do records indicate that evaluations are conducted and the results reviewed with employees?	YES NO
3.2.3	Do procedures define requirements to address weaknesses and concerns identified by the evaluations?	YES NO
3.2.4	Do records indicate that training, identified in 3.2.3, is scheduled and attended in accordance with the procedure?	YES NO
3.2.5	Are those personnel functions that require training and qualification defined, including:	
	a. Processing Personnel?	YES NO
	b. Testing/inspection personnel? • *Compliance Assessment Guidance: These are personnel who do inspection, thickness measurements, etc. It will also include people who carry out lot/batch testing, periodic testing and solution analysis.*	YES NO
	c. Data review personnel?	YES NO
	d. Laboratory specimen preparation personnel (e.g. micros, corrosion, abrasion, coating weight, IGA, etc.)? • *Compliance Assessment Guidance: NA applies when laboratory specimen preparation is not performed on site.*	YES NO NA
	e. Planning personnel?	YES NO
3.2.6	Are testing and data review personnel qualified through at least one of the following (check all applicable)? • *Compliance Assessment Guidance: Defined requirement for training personnel, e.g. 5 years of experience, degree, manufacturer rep.* [ ] Training by personnel with technical degree and/or related experience [ ] Initial and periodic technical examination	YES NO
3.2.7	Are laboratory specimen preparation personnel qualified through at least one of the following (check all applicable)? • *Compliance Assessment Guidance: NA applies if no laboratory specimen preparation is performed at the supplier.* [ ] Training by personnel with technical degree and/or related experience	YES NO NA

- *Compliance Assessment Guidance: Define requirement for training personnel, e.g. 5 years of experience, degree, manufacturer rep.*

[ ] Periodic review of work

3.3 Job Documentation **Section NA**

- *Compliance Assessment Guidance: Section NA applies if a modified scope audit.*

3.3.1 Does shop paper/traveler, which accompanies each lot, contain as a minimum the following information:

a. Evidence of frozen process approval as required by the customer? YES NO NA
   - *Compliance Assessment Guidance: NA applies if frozen processes are not performed.*

b. Evidence of customer approval of any changes to the frozen process? YES NO NA
   - *Compliance Assessment Guidance: NA applies if frozen processes are not performed.*
   - *Non-technical changes are permitted without customer approval.*

c. Relevant purchase order number, purchase order requirements OR identification which is traceable to engineering requirements? YES NO
   - *Compliance Assessment Guidance: The shop paper does not have to reference the PO or contract number, but must have traceability to it.*

d. Part identification, number of parts (ensuring traceability), and when required material and/or material condition? YES NO
   - *Compliance Assessment Guidance: The material and/or material condition are required on the traveler unless one of the following applies: it does not influence the process steps/sequence; when the customer specifies the process steps, e.g. repair manual sequence or processing to defined steps on customer traveler; if it is readily available to the operator in some other manner, e.g. drawing; part is an assembly/kit.*

e. A description of the number, composition and dimensions of test specimens to be processed with the parts when use of test specimens is permitted/required by the applicable specification? YES NO NA
   - *Compliance Assessment Guidance: NA only applies if processing does not require/permit the use of test specimens.*
   - *Reference to a defined test specimen, e.g. test specimen drawing, is acceptable.*

f. A step for each process performed with applicable internal process/or inspection procedure numbers including as applicable:

   1) Incoming inspection YES NO NA
      - *Compliance Assessment Guidance: NA applies for transfer of work between facilities or departments.*

2) Pre-process cleaning method(s) YES NO NA
- *Compliance Assessment Guidance: NA applies if this step is not required for the process.*
- *Pre process cleaning is cleaning of incoming parts prior to the primary process i.e. prior to masking/racking, e.g. sandblast, solvent clean.*

3) Pre-process thermal treatment YES NO NA
- *Compliance Assessment Guidance: NA applies if this step is not required for the process.*

4) Masking YES NO NA
- *Compliance Assessment Guidance: NA applies if this step is not required for the process.*

5) Fixturing, racking YES NO NA
- *Compliance Assessment Guidance: NA applies if this step is not required for the process.*
- *Shop paper to reference internal racking instruction, a general instruction for routine racking or specific details for unique racking requirements as required.*

6) In process cleaning, water break free check? YES NO NA
- *Compliance Assessment Guidance: NA applies if this step is not required for the process or for barrel plating and automated line*

7) Etch YES NO NA
- *Compliance Assessment Guidance: NA applies if this step is not required for the process.*

8) Strike/activation YES NO NA
- *Compliance Assessment Guidance: NA applies if this step is not required for the process.*

9) Chemical finishing e.g. Plate, anodizing, conversion coating, passivation? YES NO NA
- *Compliance Assessment Guidance: NA applies if this step is not required for the process.*

10) Primer YES NO NA
- *Compliance Assessment Guidance: NA applies if this step is not required for the process.*

11) Paint/film YES NO NA
- *Compliance Assessment Guidance: NA applies if this step is not required for the process.*

12) Post-process cleaning methods YES NO NA
- *Compliance Assessment Guidance: NA applies if this step is not*

required for the process.

13) Post-finishing thermal treatment YES NO NA
- *Compliance Assessment Guidance: NA applies if this step is not required for the process.*

14) In-process and final tests and inspections, including disposition YES NO
- *Compliance Assessment Guidance: Any inspection requires a discrete callout for the inspection, i.e. visual, thickness, adhesion, with inclusion of, or reference to the inspection requirements.*

15) Packaging and handling YES NO

16) Shipping YES NO NA
- *Compliance Assessment Guidance: NA applies if the part is moved within the same plant.*

g. Documentation of rework that is traceable to the shop paper / traveler and all processing performed on the parts? YES NO NA
- *Compliance Assessment Guidance: NA applies if no rework observed during the audit.*

h. Each step, or logical group of steps in the process flow, is signed off and dated by the operator as completed? YES NO
- *Compliance Assessment Guidance: See Appendix E for the definition of logical grouping.*

i. Unless otherwise authorized by the cognizant engineering organization, specified process parameters which are controlled by the operator are recorded for each lot of parts processed, including: Section NA
- *Compliance Assessment Guidance: Section NA applies if the cognizant engineering authority has specifically stated that the process parameters need not be recorded.*
- *If the quantity of parts on the traveler are not processed simultaneously, operator controlled variable data shall be captured for each simultaneously processed quantity, (e.g. sub-lots).*

1) Masking material used YES NO NA
- Compliance Assessment Guidance: NA applies is if no masking material is required.

2) Estimated surface area of part YES NO NA
- *Compliance Assessment Guidance: NA applies if process is not controlled by current density.*

3) Temperature, time, current (as applicable) for strike/activation, plating, anodize, conversion coat, chemical milling, etching, passivation, etc. YES NO NA
- *Compliance Assessment Guidance: See Appendix D for the list*

of required process parameters.

4) Pre/post thermal treatments, racking, and fixturing YES NO NA
   - *Compliance Assessment Guidance: NA only if pre/post thermal treatments are not required.*
   - *Times, temperatures and specific racking for thermal treatments to be recorded.*

j. Unless otherwise authorized by the cognizant engineering organization, for automated process lines, specified process parameters which are controlled by the automated system are recorded (electronically or physically) and retrievable. YES NO NA
   - *Compliance Assessment Guidance: NA applies if the cognizant engineering authority has specifically stated that the process parameters need not be recorded.*
   - *If the quantity of parts on the traveler are not processed simultaneously, operator controlled variable data shall be captured for each simultaneously processed quantity, (e.g. sub-lots).*

3.3.2 Are shop papers (travelers, work instructions etc) understood by the operators using them? YES NO
- *Compliance Assessment Guidance: Observe that the operator correctly follows the instructions and records required information.*

3.4 Process and Quality Planning **Section NA**
- *Compliance Assessment Guidance: Section NA applies if a modified scope audit.*

3.4.1 Does a procedure define a system/requirements for process and quality planning which effectively ensures compliance with customer and/or specification requirements? YES NO

3.4.2 Are there instructions for actions to be taken by the operator, inspector, or any other personnel, when a discrepancy is detected? YES NO

3.4.3 Is there a procedure that defines the review of repeat orders for changes in requirements? YES NO

3.4.4 Are there procedures for each process that defines the required method for processing including all processing steps with a definition of the controls to perform the process? YES NO

3.4.5 Does the quality planning address removal of defective or nonconforming platings and coatings and their reapplication (rework) to preclude part life degradation or nonconforming part dimensions? YES NO NA
- *Compliance Assessment Guidance: NA only applies when plating and coating is not performed.*

3.5 Purchasing-Source Selection **Section NA**
- *Compliance Assessment Guidance: Section NA applies if a modified scope*

audit.

3.5.1	Are all subtier suppliers that provide any consumable material, or service used in the process taken from an approved supplier list?	YES NO
3.5.2	Are all solution analysis and process control testing sources approved in accordance with an internal supplier procedure meeting all contractual requirements? • *Compliance Assessment Guidance: NA applies if no subcontract analysis or testing is done.* • *For jobs audited, outside laboratory testing is performed by a laboratory that is approved to prime customer requirements. If no prime requirement then one of the following must be met:* *a) Any Prime customer laboratory approval (scope does not need to match).* *b) MTL accreditation or any MTL recognized approval (scope does not need to match).* *c) AC 7108/4 or AC 7108 accreditation (scope does need to match).*	YES NO NA
3.6	**Receiving Procedure** • *Compliance Assessment Guidance: Section NA applies if a modified scope audit.*	**Section NA**
3.6.1	Does the processor obtain through customer-provided information: part identification, material type and any other part specific information required for subsequent processing? • *Compliance Assessment Guidance: NA applies only if the traveler states that this is the next operation and the work being performed is being bought off in the same traveler* • *A yes answer would be a work instruction or a place on their traveler looking for information that is critical for their processing, e.g. hardness for steel materials, shot peened surfaces, alloy composition.*	YES NO NA
3.6.2	Does the system provide for holding and segregation of hardware pending receipt of proper material documentation or if nonconformance is detected?	YES NO
3.6.3	Does the supplier have incoming inspection procedures identifying characteristics to be checked and methods to be used, including sampling plan as defined in the quality manual?	YES NO
3.6.3.1	Does the supplier verify dimensional requirements in as-received condition for jobs having post-processing dimensional requirements? • *Compliance Assessment Guidance: NA applies only if post-processing dimensional requirements are not contractually required.*	YES NO NA
3.6.4	Does incoming material quality planning provide for shelf-life monitoring and control for materials that so require? • *Compliance Assessment Guidance: NA applies if no materials requiring shelf-life control are used.*	YES NO NA

3.7	**Housekeeping** • *Compliance Assessment Guidance: Section NA applies if a modified scope audit.*	**Section NA**
3.7.1	Are the company's facilities clean, uncluttered, and well lighted?	YES NO
3.7.2	Are incompatible materials such as acids/alkalis or oxidizers/organics segregated in storage?	YES NO
3.7.3	Are all containers legibly and indelibly labeled and are unlabeled containers not used? • *Compliance Assessment Guidance: Not applicable to containers used for transfer, or non-production materials.*	YES NO
3.7.4	Are process materials stored to preclude damage or degradation from heat, cold, water, atmospheric moisture or other environmental considerations?	YES NO
3.7.5	Are process materials, that are transferred from original manufacturer's containers controlled, to maintain identity and to prevent contamination or degradation? • *Compliance Assessment Guidance: NA applies when the material is transferred to a container for immediate use.*	YES NO NA
3.7.6	Does training or a procedure address cleaning of pumps and other transfer equipment after use to preclude material contamination and for operator safety?	YES NO
3.8	**Control of Non-Conforming Parts**	
3.8.1	Is there a policy to ensure that customers are informed of discrepancies affecting hardware? (i.e. out of tolerance conditions)	YES NO NA
3.8.2	Is rework approved by the customer when required?	YES NO NA
3.8.3	Is there a rework procedure that requires planning/shop paper to be issued defining all processing performed on the part, including stripping, inspection following stripping and reprocessing? • *Compliance Assessment Guidance: NA applies if the supplier does not carry out rework.*	YES NO NA
3.8.4	Is repair/MRB always approved by the customer? • *Compliance Assessment Guidance: NA applies only if the supplier has MRB authority.*	YES NO NA
3.9	**Product Packaging & Delivery** • *Compliance Assessment Guidance: Section NA applies if a modified scope audit.*	**Section NA.**
3.9.1	Is there a procedure to provide for the protection of parts after final inspection and during shipment that includes customer requirements?	YES NO

3.9.2 Do shipping documents conform to purchase order requirements or contracts? YES NO

3.10 Calibration of Process and Testing Equipment **Section NA**

- *Compliance Assessment Guidance: Section NA applies if a modified scope audit.*

3.10.1 Is there evidence of current calibration on:

a. All shop equipment used to set, control or monitor the control of a process? YES NO

b. All test and inspection equipment used to accept product or control a process? YES NO

3.11 Internal Quality Audits

3.11.1 Are internal audits proceduralized and include; YES NO

- Scope?
- Audit criteria?
- Frequency?
- Method?
- Responsibility?
- All chemical processes in the scope of this audit?
- Support processes such as contract review and planning?

3.11.2 Are internal audits carried out; YES NO

- As planned?
- By personnel knowledgeable of the process?
- By personnel not directly responsible for the process?

3.11.3 Are these internal audits results reviewed by management on a periodic basis? YES NO

3.11.4 Do records indicate corrective action is taken for all audit findings including Nadcap audit findings? YES NO NA

- *Compliance Assessment Guidance: NA applies if there have been no findings from any previous audits.*

4. PERIODIC, LOT TESTING & SOLUTION ANALYSIS

4.1 Specification Compliance

4.1.1 Does a test matrix consistent with the content of Appendix C define all periodic testing and lot acceptance testing requirements for each process? YES NO

- *Compliance Assessment Guidance: The test matrix shall be a revision controlled document / electronic file; arranged in a logical sequence; containing all the elements of the Appendix C example.*

Auditor Note: Attach a copy of the job tracker here. For specifications that are EC-LR in their own right only the spec number shall be added to the tracker in the "Other Specification" category.
Do NOT attach a copy of the supplier's test matrix to this audit as it may be

EC-LR controlled.

4.1.2	Is periodic and lot acceptance testing as shown in the test matrix in compliance with customer and/or specification requirements, including Nadcap Table 1? • *Compliance Assessment Guidance: Nadcap Table 1 is a flowdown requirement from ALL Nadcap Primes to suppliers.*	YES NO
4.1.3	Auditor is to select a minimum of 8 tests (not solution analysis) consisting of, where possible, four internal tests and four external tests from the supplier's Test Matrix and evaluate them utilizing the corresponding sections of Appendix B. These tests to be selected in addition to test records reviewed in job audits and to include both periodic and acceptance tests?	YES NO NA
	(A)	YES NO NA
	(B)	YES NO NA
	(C)	YES NO NA
	(D)	YES NO NA
	(E)	YES NO NA
	(F)	YES NO NA
	(G)	YES NO NA
	(H) • *Compliance Assessment Guidance: NA applies if no testing is required by specifications.*	YES NO NA
4.1.4	Are written purchase orders available, providing definition of requirements for testing performed externally? Do these comply with customer and specification requirements? • *Compliance Assessment Guidance: NA applies if no external testing is performed.*	YES NO NA
4.2	**Periodic Test Documentation** • *Compliance Assessment Guidance: Section NA applies if no periodic testing is required*.	**Section NA**
4.2.1	Are testing records maintained such that they are traceable to both shop travelers and certification/test report and would they enable the processing supplier to reconstruct the test samples or testing conditions and identify any incorrectly tested material?	YES NO
4.2.1.1	Are testing records maintained and organized in a manner in which they are readily available for review?	YES NO
4.2.2	Is there a procedure that requires the review of test data for conformance to	YES NO

specification whether generated by captive or independent laboratory?

4.2.2.1 Does the procedure require that the review also include an examination for historical trends in the testing data and that negative or questionable trends be acted upon? YES NO

4.2.2.2 Is the responsibility for this review identified in the procedure? YES NO

4.2.2.3 Is the person identified to conduct this review, someone other than the person responsible for conducting the tests? YES NO
- *Compliance Assessment Guidance: For small process houses it is acceptable for a suitably qualified person to do both the test and the review of results.*

4.2.2.4 Does the procedure require the identified person(s) to stamp or sign-off and date the test results as proof of review? YES NO

4.2.3 Are errors in the internally generated test data corrected by either of the following: (check one) YES NO

[ ] Line out, write correction, initial and date.
[ ] Void the data, make corrections, and retype/reprint or electronically record correction.
- *Compliance Assessment Guidance: When data is voided then the old file/paper/data should still exist giving traceability. The new file/paper/data can have the corrections made and then can be saved or reprinted/retyped if required.*

4.2.4 Is there a procedure which requires the following in the event that an error is identified in the certificate of test, test data or testing procedure? (check all that apply) YES NO

[ ] Identification of error cause
[ ] Implementation of corrective actions
[ ] Notification of affected customers as required
[ ] Retesting or replacement testing if required and correction of certification/test data

4.3 Test Piece Control **Section NA**
- *Compliance Assessment Guidance: Section NA applies of no test pieces are required for specifications within the scope of the audit.*

4.3.1 Are material certifications, manufacturer's labels, or the materials themselves verified against the process suppliers purchase orders in order to ensure receipt of correct material? YES NO

4.3.2 Are test pieces traceable to material from which they are made? YES NO
- *Compliance Assessment Guidance: Traceability to the CofC or the lab report for the material being used satisfies this requirement.*

4.3.3 Are test pieces positively identified during all stages of processing and testing YES NO

until disposed of (tags, bags, etc)?

- *Compliance Assessment Guidance: Coupons can be identified by Job #, S/N, or any form of identification that can be traced back to the router/traveler.*

4.3.4	Are all test pieces provided for testing (internal/external lab) accounted for (e.g., tested to completion/failure, or replaced?)	YES NO
4.3.5	Is there documentation which provides for tracking and accountability of all test pieces currently in work (processing and testing)? • *Compliance Assessment Guidance: A router should be with every test piece describing the process and all of the variables to make sure that it is representative of the part.*	YES NO
4.3.6	Is there specific shop paperwork (router, etc.) which is traceable to the test pieces which specifies how they are to be processed and which tank they are processed in?	YES NO
4.3.7	Are all operator controlled parameters associated with the processing of the test pieces recorded on the shop paper and traceable to the specific samples. (For automated process lines, are all process variables controlled, recorded and retrievable)? • *Compliance Assessment Guidance: If test pieces are not processed with hardware, ensure that the process steps represent the production process. If specification requires test pieces to be processed with hardware, ensure that this is being performed.*	YES NO
4.4	**Test Failure, Replacement Testing and Retesting of Periodic Test Pieces.** • *Compliance Assessment Guidance: Section NA applies if periodic testing is not required.*	**Section NA**
4.4.1	Is there a procedure which establishes specific criteria for replacement and retesting, including specific responsibilities for authorization?	YES NO
4.4.1.1	Does the procedure define "Invalid Test", “Replacement Test” and “Retest”?	YES NO
4.4.1.2	Are replacement tests performed only when original failed test has been shown to be invalid and are retests performed only when permitted by customer and/or specification?	YES NO
4.4.2	Are original test failures, replacement tests, nonconforming tests, and retests logged and cross indexed, including explanations with entries signed off by authorized personnel? (i.e., Replacement / Retests traceable to the original tests) • *Compliance Assessment Guidance: NA applies only if no test failures are observed.*	YES NO NA
4.4.3	Is there a procedure which addresses the following in the event of a validated testing failure	

a. Immediate notification of all affected customers? YES NO

b. Identification of all affected hardware shipped to the customer? YES NO

c. Isolation of all affected in-house hardware? YES NO

d. Immediate shutdown of the affected process/process line pending resolution? YES NO

e. Investigation of failure cause and implementation of corrective action? YES NO

f. After the process has been corrected is it tested to show compliance to requirements before production is resumed? YES NO
- *Compliance Assessment Guidance: Limited processing may be re-started after correction prior to test results being obtained if the customer agrees to "at risk" release or parts are held at supplier pending test results.*

4.4.4 Is the test failure log reviewed, with evidence of review, at least quarterly for trends which might indicate deterioration of test procedures, methodologies and/or processing/test equipment? YES NO

4.4.5 If negative trends are apparent from the test failure log have corrective actions been applied? YES NO NA
- *Compliance Assessment Guidance: An NA applies if there is no evidence of negative trends or no test failures.*

4.5 Process Control Laboratory Procedures (Solution Analysis) Section NA
- *Compliance Assessment Guidance: Section NA applies if solution analysis is not required.*

4.5.1 Are there assigned responsibilities for review and approval of analysis results, authorization of re-analysis, calculation of process solution additions and corrections, and the preparation and approval of analysis procedures as required? YES NO

4.5.2 Are these responsibilities performed by a qualified individual (Ref. paragraphs 3.2.1- 3.2.7) and are their job responsibilities, job specification and qualifications documented? YES NO
- *Compliance Assessment Guidance: If there is no on-site technical expertise in simple chemical analysis techniques, witness a typical titration or other test to confirm minimal skill levels in using a pipette, reading a burette, standardizing a pH meter, etc.*

4.5.3 Does the supplier have a solution matrix that identifies the parameters for each tank, meeting the content of Appendix F? YES NO
- *Compliance Assessment Guidance: The supplier may use other methods or formats provided the content of Appendix F is covered and the information is readily available.*

4.5.4 Are there solution control logs which contain the following information for each

tank monitored:

a. Tank Identification? YES NO

b. Tank Contents? YES NO

c. Tank size (working volume) and level? YES NO
- *Compliance Assessment Guidance: The working volume shall be defined in the log but the level may be marked, or automatically controlled, in the tank.*

d. Analysis frequency? YES NO

e. Constituents to be analyzed? YES NO

f. Operating tolerances (temperature, shop target limits, specification limits / technical bulletin limits, pH, etc)? YES NO

g. Date sampled and analyzed? YES NO

h. Analysis result and calculated constituent values? YES NO

i. Additions and corrections? YES NO
- *Compliance Assessment Guidance: Corrections are removal of solutions for the maintenance of controls, for example- electroless nickel*

j. Tank dumps? YES NO

k. Reanalysis after addition when out of shop target limits? YES NO

l. Identity of individual conducting analyses, additions, reanalysis and dumps? YES NO

4.5.5 Does the solution control log show that corrections and/or additions are made when shop target limits are exceeded? YES NO

4.5.6 Are solution analyses conducted on frequencies based on specification requirements and solution stability? YES NO

4.5.6.1 Do procedures require and records show that the frequency of analysis is increased for tanks which are found to be out of shop target limits after two (2) consecutive analysis or three (3) out of the last ten, whichever occurs first? (Reference ARP 4992 for guidance.) YES NO

4.5.7 Do procedures require, and documents show, the cessation of processing when any chemical constituent and/or operating parameter (i.e., temperature) does not comply with the applicable process specification or chemical supplier's technical bulletin until the process is brought into compliance? YES NO

4.5.8 Do detailed internal procedures exist for the following?

a. Solution analysis conforming to a laboratory standard or chemical compound manufacturer's procedures? YES NO NA
   - *Compliance Assessment Guidance: NA Applies when solution analysis is outsourced.*
   - *The use of test kits supplied for testing proprietary compounds is acceptable.*

b. Sample collection which assures that the sample is representative of the bath solution and operating condition and precludes sample contamination? YES NO
   - *Compliance Assessment Guidance: Bath should be at correct level, agitated and at correct temperature prior to sampling.*

c. Initial tank make-up and addition calculations? YES NO

d. Increase or decrease of analysis frequencies based on historical analysis test data in addition to meeting minimum frequency requirements when defined by specification? YES NO

4.5.9 Chemicals used as reagents during analysis shall be General Laboratory Reagent Grade or better according to customers/ National requirements? YES NO NA
- *Compliance Assessment Guidance: NA applies if solution analysis is performed by external laboratory.*

4.5.10 Are laboratory chemicals labeled and stored properly? YES NO NA
- *Compliance Assessment Guidance: NA applies if solution analysis is performed by external laboratory.*

4.5.11 Is water of at least 500,000 ohm•cm (2µS/cm maximum) used for analysis purposes and do records support it, e.g. certificate of analysis, test log? YES NO NA
- *Compliance Assessment Guidance: NA applies if solution analysis is performed by external laboratory.*

4.5.12 Are certified, commercial-grade or better buffer solutions within shelf-life expiration date and covering the range of testing acceptance used to standardize the pH meter to a procedure before use? YES NO NA
- *Compliance Assessment Guidance: NA applies if solution analysis is performed by external laboratory.*

4.5.13 Are standards with a limited shelf life properly labeled to preclude usage after expiration date? YES NO NA
- *Compliance Assessment Guidance: NA applies if solution analysis is performed by external laboratory.*

4.5.13.1 Are shelf-life disciplines documented and maintained for standards susceptible to deterioration (e.g., evaporation of liquid standards, reaction with glass storage containers, photochemical reactions)? YES NO NA
- *Compliance Assessment Guidance: NA applies if solution analysis is performed by external laboratory.*

4.5.14	Are titration solutions standardized against appropriate documented, certified reference standards, and are they monitored for stability and protected against degradation? • *Compliance Assessment Guidance: NA applies if solution analysis is performed by external laboratory.*	YES NO NA

5. PROCESS EQUIPMENT CONTROL AND MAINTENANCE

5.1	**General** • *Compliance Assessment Guidance: Section NA applies if a modified scope audit.*	**Section NA**
5.1.1	Are current operating manuals or instructions available to operators, maintenance personnel, and other personnel requiring the information?	YES NO
5.1.2	Are tanks labeled to include identification number, contents, and temperature ranges? • *Compliance Assessment Guidance: NA applies if processes do not use tanks. Examples include painting lines and brush plating.*	YES NO NA
5.1.2.1	Are tank labels consistent with procedures, shop paper and logs? • *Compliance Assessment Guidance: NA applies if processes do not use tanks. Examples include painting lines and brush plating.*	YES NO NA
5.1.3	Is the location of each process line/area for which Nadcap Accreditation is sought summarized/defined in a revision controlled drawing or other document, and is that equipment line being properly maintained and listed in Table 1 (see section 2.6)? • *Compliance Assessment Guidance: The purpose of this document is to define the boundaries of the area subject to the audit and to ensure that all areas defined in the scope of the audit are verified by the auditor*	YES NO
5.1.4	Does the compressed air supply used for production include particulate, moisture, and oil filters with scheduled maintenance and point of use inspection? • *Compliance Assessment Guidance: NA applies for processes that do not require compressed air (e.g. brush plating)* • *This does not mean that every point of use must be inspected, but inspection point should be as close to the point of use as practical.*	YES NO NA
5.2	**Maintenance Procedures** • *Compliance Assessment Guidance: Section NA applies if a modified scope audit.*	**Section NA**
5.2.1	Are maintenance procedures prepared with preventative maintenance as a goal and based on prior maintenance records? • *Compliance Assessment Guidance: The goal of the maintenance program is to minimize downtime due to equipment failure. The facility maintenance program should include scheduled equipment review and/ or actions based*	YES NO

on equipment manufacturer's recommendations and equipment breakdown and repair histories. The procedure and records need to show periodic reviews of maintenance history and preventative actions taken based on those reviews.

5.2.2 Do records indicate that maintenance has been performed in accordance with a defined schedule? YES NO

5.2.3 Is contamination removed from process solutions as required, by a process such as filtration, chemical treatment etc.? YES NO NA
- *Compliance Assessment Guidance: NA applies if there are no tanks.*

5.3 Process Line Equipment Section NA
- *Compliance Assessment Guidance: Section NA applies if a modified scope audit.*

5.3.1 Are tanks and/or work surfaces maintained free of corrosion and chemical spillage detrimental to the process? YES NO

5.3.2 Are spray and immersion rinse tanks Section NA
- *Compliance Assessment Guidance: NA applies for processes that do not utilize spray rinses or tanks.*

a. Clean, clear, free-running or monitored for contamination levels YES NO
   - *Compliance Assessment Guidance: Does not apply to drag-out tanks if adequate rinsing is provided afterward.*

b. Situated in a sequence to prevent cross contamination of process tanks YES NO

c. Assuring adequate neutralization and/or removal of process chemicals? YES NO
   - *Compliance Assessment Guidance: Particular attention must be given to parts such as small diameter tubes. Processor should have or make provision for auxiliary rinsing.*

5.3.3 Are process and rinse tanks situated such that hardware can be maintained wet, from final cleaning and activation through the process to the final rinse, without interruption? YES NO NA

5.3.4 Are tanks with defined temperature ranges operating within the posted range? YES NO NA
- *Compliance Assessment Guidance: NA applies where none of the tanks have a defined temperature range.*

5.3.5 Are heated and cooled tanks equipped with automatic thermostatic controls? YES NO NA
- *Compliance Assessment Guidance: NA applies for processes that do not utilize heated or cooled tanks.*
- *Manual control is not acceptable.*

5.3.6 Are tanks of sufficient volume and dimensions to contain hardware during processing and assure sufficient coverage of parts? YES NO NA
- *Compliance Assessment Guidance: NA applies for processes that do not*

utilize tanks.
- *For parts requiring processing of selective areas, entire area to be processed must be immersed.*
- *Other situations such as double dipping require specification or customer approval.*

5.3.7 Are tanks that require uniformity of temperature and solution concentration agitated? YES NO NA
- *Compliance Assessment Guidance: NA applies for processes that do not utilize tanks or where stratification does not occur.*
- *Agitation may be turned off when not in use and turned on prior to using with a suitable amount of time for adequate temperature stabilization and solution mixing.*

5.3.8 Are fixtures, workbars, electrical connections, and hard masking free of corrosion and physical damage detrimental to the process while in use? YES NO NA
- *Compliance Assessment Guidance: NA applies for processes that do not use these devices*

5.3.9 Are fixtures and masking designed as such so they do not entrap air or processing solutions on parts? YES NO NA
- *Compliance Assessment Guidance: NA applies for processes that do not use these devices*

5.3.10 Is fixturing and racking design adequate so that, when hardware is positioned for rinsing, there is adequate process solution neutralization and removal and does it minimize process solution and rinse water drag-out and cross-contamination of process tanks? YES NO NA
- *Compliance Assessment Guidance: NA applies to processes that do not involve rinsing (e.g. painting) or if no fixturing or racking is used.*

5.3.11 Is fixturing and rack design, and the arrangement of workbars and anodes/cathodes, such that electrical contacts are solid but preclude potential pressure damage or electrical arcing? YES NO NA
- *Compliance Assessment Guidance: NA applies to non-electrolytic processes*

5.3.12 Are tanks for application of electrolytic coatings equipped for processing hardware with variable geometric configuration or for variable lot sizes to promote uniform deposition rates as necessary/required by specification and/or part/customer requirements? YES NO NA
- *Compliance Assessment Guidance: NA applies to non-electrolytic processes and for processes that do not utilize tanks.*
- *Equipment for uniform deposition shall include reconfigurable/ conforming cathodes/ anodes, thieves and/or robbers as required.*

5.3.13 Are hoists and other lifting equipment labeled as to capacity? YES NO NA
- *Compliance Assessment Guidance: NA applies if no hoists or lifting equipment is used.*

5.3.14 Are hoists and other lifting equipment electrically insulated from work? YES NO NA
- *Compliance Assessment Guidance: NA applies if no hoists or lifting equipment is used.*
- *Disconnection of hoist from work is sufficient.*

5.3.15 Does supplier's de-ionized water system deliver water meeting 50,000 ohm-cm resistivity minimum (20 µS/cm conductivity maximum) as demonstrated using a calibrated inline sensor or periodic analysis? YES NO NA
- *Compliance Assessment Guidance: NA applies if no deionized water is required.*
- *50,000 ohm-cm = 20 micro-mhos/cm (approx10 ppm or mg/L TDS). Any combination of water purification methods may be used to meet the resistivity requirement. In-house deionizer units need either a calibrated red/green light of the correct resistivity value, a calibrated meter capable of read-out of actual resistivity, or the water confirmed by periodic chemical analysis or use of a total Dissolved Solids (TDS) meter, calibrated with known standards.*

5.3.16 Is de-ionized water used for anodize sealant bath make-up? YES NO NA
- *Compliance Assessment Guidance: NA applies if anodize sealing is not performed.*

5.3.17 Is de-ionized water used for make-up and additions for anodizing, electroless nickel and precious metal plating solutions, and other process solutions as required by customer specifications, unless there is objective evidence that the water available in the facility is acceptable for use? YES NO NA
- *Compliance Assessment Guidance: NA applies for processes that do not use water and for process solutions that do not require deionized water (i.e., other than anodizing, electroless nickel and precious metal plating).*
- *Objective evidence would include periodic analysis of facility water and tests meeting relevant specification requirements.*

5.4 Certified Ovens for Thermal Treatments at a set point above 250ºF (121ºC). **Section NA**
- *Compliance Assessment Guidance: NA applies if processing does not require thermal treatments above 250°F (121°C).*
- *The only pyrometry requirements to be verified are those required to answer the following questions.*

5.4.1 For all ovens used to perform thermal treatments (within the scope of the audit), conducted at temperatures above 250°F (121°C), is pyrometry certified in accordance with AMS 2750? YES NO
- *Compliance Assessment Guidance: AMS 2750 is the Baseline requirement. Where customer specifications define higher requirements they shall be met.*
- *It is not required to fully assess the pyrometry to AMS2750 and/or customer specification it is only required to ensure the report/certification confirms compliance to them.*

5.4.2 Thermal Processing Equipment

5.4.2.1	Do certified ovens meet temperature uniformity requirements of AMS 2750 for Furnace Class 5 (±25°F [±14°C]) unless more stringent requirements are specified? • *Compliance Assessment Guidance: Furnace Classes specify the minimum requirements for temperature uniformity. Ovens meeting Furnace Class 1 through 4 are also acceptable.*	YES NO
5.4.2.2	Do instruments conform to the requirements of AMS 2750 for Instrumentation Type D or better having: • At least one control sensor in each control zone, attached to a control instrument that displays and controls temperature? • A recording instrument that records the displayed temperature for each control zone? • Over-temperature protection in each control zone? • *Compliance Assessment Guidance: Instrumentation Type D is the minimum acceptable. Instrumentation Types A, B, and C require more sensors and recorders, and are also acceptable.*	YES NO
5.4.3	Controlling, Monitoring and Recording Instrument Calibration. • *Compliance Assessment Guidance: Controlling, monitoring and recording instruments must be calibrated. Over temperature instruments used solely for oven over temperature protection do not need to be calibrated.*	
5.4.3.1	Is calibration accuracy ±2°F (±1.1°C) and is sensitivity at least 3°F (2°C) unless a different accuracy or sensitivity is specified by AMS 2750 or customer requirements? • *Compliance Assessment Guidance: AMS 2750 defines different accuracy requirements for different oven classes and instrumentation types which differ from this requirement. For those ovens that are used for heat treat processes and are included in Nadcap accreditation to AC 7102, no further evaluation is required.*	YES NO
5.4.3.2	Is calibration frequency at least semi-annually for digital instruments or quarterly for analog (electromechanical) instruments unless a more stringent requirement is specified?	YES NO
5.4.3.3	Are chart recorder (circular and strip) speed(s) calibrated/ verified at least annually and accurate to within ± 3 minutes per hour? • *Compliance Assessment Guidance: NA applies if temperature recorder is electronic/ digital data collection type.*	YES NO NA
5.4.4	System Accuracy Tests (SAT) • *Compliance Assessment Guidance: Also called a Probe Check.*	
5.4.4.1	Is a SAT performed after any maintenance that could affect the SAT result? • *Compliance Assessment Guidance: Examples include replacement of thermocouple(s) and re-calibration of the instrument when any adjustment has been made.*	YES NO

5.4.4.2 Are SATs performed upon installation and are periodic tests performed Biweekly (every two weeks) thereafter unless a different interval is specified by AMS 2750 or customer requirements? YES NO

- *Compliance assessment Guidance: SAT frequency is based upon equipment class and instrumentation type. AMS 2750 requires that the SATs be performed Biweekly for Furnace Class 5, Instrumentation Type D. in accordance with the requirements of AMS 2750, Table 6, including any applicable frequency reductions and customer requirements?*
- *AMS 2750 may allow less frequent SATs based oven class and instrumentation types. For those ovens that are used for heat treat processes and are included in Nadcap accreditation to AC 7102, no further evaluation is required.*

5.4.4.3 Do system accuracy tests demonstrate conformance to the requirements for Furnace Class 5 (±5°F [±2.8°C]) of AMS 2750 unless a more stringent requirement is specified by the customer? YES NO

- *Compliance Assessment Guidance: AMS 2750 requires that the system accuracy of the temperature control and recording systems be within ±5°F (±2.8°C) of the test instrument for Furnace Class 5. Other requirements apply for other Furnace Classes. There are specific requirements for test sensor placement and resident SAT thermocouples.*

5.4.5 Temperature Uniformity Surveys (TUS)

5.4.5.1 Do the initial uniformity test temperatures include the highest and lowest temperatures for which the equipment will be used (qualified operating range), and are additional surveys conducted at sufficient intermediate temperatures to ensure that no two adjacent survey temperatures are greater than 600°F (335°C) apart? YES NO

- *Compliance Assessment Guidance: The initial uniformity test establishes the qualified operating range. It is acceptable to have more than one qualified operating range.*

5.4.5.2 If the highest and lowest test temperatures are more than 600°F (or 335°C) apart, are periodic tests performed at a temperature within each range as defined during the initial survey? YES NO NA

- *Compliance Assessment Guidance: NA applies if the qualified operating range is not more than 600°F (or 335°C).*

5.4.5.3 At least annually, are periodic surveys performed at the minimum and maximum temperatures of the qualified operating range? YES NO

5.4.5.4 Are periodic uniformity surveys performed at least quarterly unless a reduced frequency is allowed by AMS 2750 or more frequent surveys are required by customer specification? YES NO

- *Compliance Assessment Guidance: AMS 2750 defines different TUS frequencies based on oven class and instrumentation types. For those ovens that are used for heat treat processes and are included in Nadcap accreditation to AC 7102, no further evaluation is required. For existing ovens having 4 or more successive, acceptable uniformity surveys, initiation of quarterly surveys is not required.*

5.4.5.5 Do temperature uniformity survey results conform to the uniformity requirements (except frequency) for Furnace Class 5 of AMS 2750 (±25°F [±14°C]) unless a more stringent requirement is specified by the customer? YES NO

- *Compliance Assessment Guidance: Uniformity requirements are based on Furnace Class. Furnace Class 5 requires ±25°F (±14°C)*

5.4.6 Is there a procedure for pyrometry (calibration, temperature uniformity surveys and system accuracy tests) whether performed internally or by an outside source? YES NO

- *Compliance Assessment Guidance: The processor must have an internal procedure that defines the calibration, temperature uniformity surveys and system accuracy tests required for each certified oven within the scope of the audit.*

5.4.7 Does the procedure specify the following as a minimum:

a. Test Frequency? YES NO

b. Survey temperature(s) and qualified operating temperature range(s)? YES NO

c. Does this range cover all applicable thermal treatments? YES NO

d. Number and location of sensors? YES NO

e. Temperature data recording frequency and period of monitoring after temperature stabilization (for temperature uniformity surveys)? YES NO

f. The test parameters that must be included on the purchase order, if pyrometry is performed by a subcontract source? YES NO NA

- *Compliance Assessment Guidance: NA applies if a subcontract source is not used for pyrometry.*

5.5 Miscellaneous Equipment for Thermal Treatments at or below 250ºF (121ºC) Section NA Section NA

- *Compliance Assessment Guidance: NA applies if no thermal treatments at or below 250°F (121°C) are performed within the scope of the audit or if these treatments are performed in a certified oven. Equipment that is not fully enclosed but provides this type of thermal treatment shall be considered as an oven for the purpose of the audit.*

5.5.1 Are temperature controllers on miscellaneous thermal treatment equipment calibrated? YES NO NA

- *Compliance Assessment Guidance: NA applies if the thermal treatment equipment is engineered to provide the required temperature without the use of a temperature controller.*

5.5.2 Do procedures require and records show a periodic check is performed to ensure the minimum (if specified) and maximum temperatures within the working zone meet requirements? YES NO

5.6	**Cleaning Procedures: General** *Compliance Assessment Guidance: Section NA applies if a modified scope audit.*	**Section NA**
5.6.1	Are cleaning procedures compatible (and selected in accordance with customer requirements if required) with part alloys and heat treat conditions (as applicable to the process), dissimilar components of assemblies, previously deposited coatings, and braze/solder joint material?	YES NO
5.6.2	Are test pieces, if permitted/required by the applicable specifications, processed as required through the cleaning solutions with the hardware they represent? • *Compliance Assessment Guidance: NA applies if test pieces aren't required, e.g. testing may be performed on hardware.*	YES NO NA
5.6.3	When required by customer or specification, is hardware that is susceptible to hydrogen embrittlement mechanically descaled; or if chemically descaled with materials generating hydrogen, is it baked directly after chemically descaling? • *Compliance Assessment Guidance: NA applies if not performing chemical descaling on material that is susceptible to hydrogen embrittlement.*	YES NO NA
5.6.4	Are parts suitably protected against recontamination prior to subsequent processing?	YES NO
5.6.5	Are surface contaminants (including oils, adhesive products and their residues, and part marking inks) removed prior to acid etching and acid descaling? • *Compliance Assessment Guidance: NA applies if acid etching or acid descaling is not required.*	YES NO NA
5.7	**Mechanical Cleaning** • *Compliance Assessment Guidance: Section NA applies if processor does not perform mechanical cleaning in support of chemical processing.* • *Compliance Assessment Guidance: Section NA applies if a modified scope audit.*	Section NA
5.7.1	Are procedures and controls in place:	
5.7.1.1	To assure proper grit size and media type are used?	YES NO
5.7.1.2	To assure proper particle size distribution is maintained within requirements? • *Compliance Assessment Guidance: NA applies if mechanical cleaning other than abrasive blasting is performed.*	YES NO NA
5.7.1.3	To minimize cross contamination of alloys during mechanical cleaning (e.g., aluminum and iron based alloys)? • *Compliance Assessment Guidance: This can be accomplished through media changeout, dedicated blast equipment, etc.*	YES NO
5.7.2	When abrasive blast techniques are used, are off-set distances, pressures, and media recorded?	YES NO NA

- *Compliance Assessment Guidance: NA applies if mechanical cleaning other than abrasive blasting is performed.*
- *If these parameters are not defined by customer specification, appropriate parameters may be derived from test results or references such as MIL-STD-1504, that will provide this information for various alloy types and media types. For manual blasting, recording offset as a range is acceptable.*

5.7.3 Are standards used to evaluate surface finish as required by customer or specification? YES NO NA

- *Compliance Assessment Guidance: NA applies if no surface finish requirements are imposed.*
- *Visual comparison standards are acceptable, as well as profilometer measurements.*

5.7.4 Has hardware been visually checked and documented to verify corrosion, oxides, scale, and abrasive media have been removed? YES NO

- *Compliance Assessment Guidance: Visual in-process inspection must be performed prior to the next operation.*

5.8 **Chemical Cleaning Prior to Chemical Processing** **Section NA**

- *Compliance Assessment Guidance: Section NA applies if chemical cleaning is not required.*
- *Compliance Assessment Guidance: Section NA applies if a modified scope audit.*

5.8.1 Is cathodic cleaning prohibited with high strength steels of 180 ksi and greater (unless otherwise approved by the customer)? YES NO NA

- *Compliance Assessment Guidance: NA applies if high strength steels are not processed or if supplier does not possess cathodic cleaning capability.*

5.8.2 Is chemical cleaning and rinsing carried out immediately prior to follow-on chemical processing unless otherwise approved by customer or specification? YES NO NA

- *Compliance Assessment Guidance: NA applies for chemical milling.*

5.8.3 Is all hardware maintained wet and is a water break free surface observed after the cleaning cycle? YES NO NA

- *Compliance Assessment Guidance: NA applies as follows:*
- *- Barrel plating processing is exempt from water break free surface observance.*
- *- Automated processing lines are exempt from water break free surface observance, unless otherwise directed by cognizant engineering organization, provided the following controls are in place:*
- *- - All processing solutions are chemically analyzed (see matrix) and maintained within the prescribed solution control limits?*
- *- - All process tanks and staging areas are guarded against direct leakage from overhead equipment?*
- *- - There is a scheduled inspection and maintenance of the overhead equipment to eliminate sources for leakage?*
- *- - There is a history of acceptable process control and lot test results that*

indicate surface cleanliness conditions, based on test requirements of relevant specifications? (e.g. - salt spray, coating adhesion, wedge crack)

5.8.4 Is there a procedure that specifies a minimum water-break free interval? YES NO NA
- *Compliance Assessment Guidance: NA applies only for barrel and/or automated lines.*
- *Minimum water-break free interval should be sufficient to ensure adequate cleaning, but should also ensure that hardware does not dry. Time will be dependent on process, part material, size, geometry and customer specification.*

5.8.5 Is the water break free acceptance step documented? YES NO NA
- *Compliance Assessment Guidance: NA applies only for barrel and/ or automated lines.*

5.8.6 Are activation chemical baths situated so as to permit processing immediately prior to plating and conversion operations? YES NO NA
- *Compliance Assessment Guidance: NA applies if activation baths are not required.*

5.9 Masking **Section NA**
- *Compliance Assessment Guidance: Section NA applies if masking is not required within the scope of the audit.*
- *Compliance Assessment Guidance: Section NA applies if a modified scope audit.*

5.9.1 Are procedures in place for masking prior to cleaning, for visual inspection of adequate masking before and after cleaning, and for remasking when damaged during mechanical cleaning? YES NO NA
- *Compliance Assessment Guidance: NA applies if masking prior to cleaning is not required.*

5.9.2 Does shop paper or the traveler clearly show the areas to be masked and specify the masking material to be used? YES NO
- *Compliance Assessment Guidance: Best practice is to have work instructions as part of the traveler that show specifically where to mask and what materials to use. It is acceptable to have a generic work instruction and customer's engineering drawing and/ or customer's process sheets if this provides sufficient information, and the actual masking and maskants are documented in traceable shop records.*

5.9.3 Is masking material compatible with hardware and process conditions? YES NO

5.9.4 Are fixtures and masking designed to assure part area to be processed is exposed and all other areas precluded as required by the customer? YES NO
- *Compliance Assessment Guidance: Particular attention should be given to threaded holes, fayed surfaces and joints of assemblies prior to welding or brazing, and assemblies such as bearing raceways.*

5.9.5 Are adhesives, masking material, markings and residual chemicals removed YES NO NA

after processing and before further thermal processing or shipment?

- *Compliance Assessment Guidance: NA applies when maskants that are compatible with thermal operations, as per Section 5.9.3, are removed after thermal processing.*

5.10 Power Supplies **Section NA**

- *Compliance Assessment Guidance: Section NA applies if power supplies are not used within the scope of the audit.*
- *Compliance Assessment Guidance: Section NA applies if a modified scope audit.*

5.10.1 Are power supplies equipped with calibrated ammeters, voltmeters and ramp rate controls (if equipped with ramp rate control)? YES NO

- *Compliance Assessment Guidance: For those tanks equipped with digital or paper chart recorders documenting voltage/ amperage, and time, calibration of the ramp rate control is not required provided the ramp rate can be verified from the recorded data.*

5.10.2 Does each tank have dedicated meters that are capable of reflecting actual power at the tank? YES NO

5.10.3 Is the resolution of the power meters sufficient for the voltage and amperage range specified in the shop paper traveler? YES NO

- *Compliance Assessment Guidance: Resolution of ammeter/ voltmeter needs to be sufficient to properly control processing. For example, an ammeter with a scale of 0-3000 amps in 100 amp increments would not provide sufficient resolution to verify that 64 amps are being applied.*

5.10.4 Are rectifiers identified to the tank which they service, or if not, does each tank have individual rheostat? YES NO

- *Compliance Assessment Guidance: If multiple rectifiers per tank or portable rectifiers are used, the rectifier must be traceable to individual hardware.*

5.10.5 When required by specification, is ripple periodically verified for electrochemical rectifiers as part of calibration? YES NO NA

- *Compliance Assessment Guidance: NA applies if ripple checks not required by specification. Ripple measurements are to be taken at the tank.*

5.10.6 If a power failure occurs, is there a mechanism that requires the operator to physically restart the power supply to plating and anodizing tanks? YES NO

5.11 Timers **Section NA**

- *Compliance Assessment Guidance: Section NA applies if timers are not required for processing.*
- *Compliance Assessment Guidance: Section NA applies if a modified scope audit.*

5.11.1 Are timers available, suitable to the purpose, calibrated and visible or audible YES NO

from the tanks?

- *Compliance Assessment Guidance: Timers used for process control must be calibrated. Timers include wall clocks and watches if the operators use them for timing process parameters.*

5.12 Etch Inspection Processes (Pre-Penetrant, Local, Macrostructure, Blue Etch Anodize, Nital, Temper Etch)

If Pre-Penetrant, Local, Macrostructure, Blue Etch Anodize, Nital or Temper Etching is performed, compliance with AC7108/2 "Nadcap Audit Criteria for Etch Processes" is required.

5.13 Etching, Chemical Milling **Section NA**

- *Compliance Assessment Guidance: Section NA applies if chemical milling is not performed, or audit is conducted using the chemical milling checklist AC7108/5 or etching is not for controlled metal removal.*
- *This section does not apply to processes such as pickling or preparation for follow-on chemical processing.*
- *Compliance Assessment Guidance: Section NA applies if a modified scope audit.*

5.13.1 Are stock removal rates determined to assure correct processing? YES NO

5.13.2 Are stock removal panels of the same alloy and in the same processed condition as the hardware and controlled for maximum number of uses? YES NO

5.13.3 Is stock loss determined by weight or dimensional change? YES NO

5.13.4 If masking is used, is the integrity checked prior to milling? YES NO NA

- *Compliance Assessment Guidance: NA applies if masking is not required.*

5.13.5 Are there procedures in place to ensure that the part is not introduced, moved, or removed from the etching process when current is applied (power on)? YES NO NA

- *Compliance Assessment Guidance: NA applies if process is non-electrolytic.*

5.14 Stripping **Section NA**

- *Compliance Assessment Guidance: Section NA applies if stripping is not performed within the scope of the audit.*
- *Compliance Assessment Guidance: Section NA applies if a modified scope audit.*

5.14.1 Are chemical stripping baths inhibited when required by specification and/or customer requirement? YES NO NA

- *Compliance Assessment Guidance: NA applies when inhibiting is not required by specification or customer.*

5.14.2 Does the hardware receive an embrittlement relief bake after chemical stripping as required by specification and/or customer requirement? YES NO NA

- *Compliance Assessment Guidance: NA applies when embrittlement relief*

baking is not required or when chemical stripping is not performed.

5.14.3	Are masking, insulators, or similar methods being used to prevent Galvanic Coupling of dissimilar metals? • *Compliance Assessment Guidance: NA applies if not performing chemical stripping or there are no dissimilar metal couples.*	YES NO NA
5.14.4	If required by the customer, has the stripping of parts and the process been approved? • *Compliance Assessment Guidance: NA applies if customer approval is not required.*	YES NO NA
5.14.5	For each strip cycle, are all stripping operations appropriately planned, processing documented, and traceable to the hardware?	YES NO
5.14.6	When stripping is not part of the standard process, has the reason for each strip been recorded on the individual part/lot documentation and the rework properly authorized (by appropriate authorities) and the need for corrective action considered? • *Compliance Assessment Guidance: This question applies if stripping is required due to nonconformance after plating/ coating.* • *NA applies if stripping is the expectation of the customer as defined in the purchase order or drawing. .*	YES NO NA
5.14.7	Is there a procedure for mechanical stripping that defines process controls when it is performed? • *Compliance assessment Guidance: NA applies if no mechanical stripping is performed.*	YES NO NA
5.14.8	Do strip procedures include an inspection of the stripped component following the strip operation? • *Compliance Assessment Guidance: Inspection may include dimensional, surface finish, complete removal of coating, etching and damage.*	YES NO
5.15	**Brush Plating** • *Compliance Assessment Guidance: Section NA applies if brush plating is not within the scope of the audit.* • *Compliance Assessment Guidance: Section NA applies if a modified scope audit.*	**Section NA**
5.15.1	Are operators trained or certified as required by the customer or specification? • *Compliance Assessment Guidance: Certification of operators may be required; otherwise, internal training and approval is acceptable.*	YES NO
5.15.2	Are anodes controlled and specific to each process solution to avoid cross contamination?	YES NO
5.15.3	Is masking adequate to protect part from corrosion and unwanted coverage?	YES NO
5.15.4	Are equipment and solution in compliance with applicable customer	YES NO

requirements?

5.16 Nickel and Copper Electroforming **Section NA**

- *Compliance Assessment Guidance: Section NA applies if electroforming is not performed.*
- *Compliance Assessment Guidance: Section NA applies if a modified scope audit.*

5.16.1 Are reusable mandrels and fixtures controlled for identification and condition? YES NO NA

- *Compliance Assessment Guidance: NA applies if mandrels are not re-used*

5.16.2 Is stress measurement performed on deposited coating when required? YES NO NA

- *Compliance Assessment Guidance: NA applies if stress measurement is not required.*

5.16.3 Is the composition of deposited material controlled in accordance with customer requirements? YES NO

5.16.4 Do mandrel removal procedures preclude part damage? YES NO

5.17 Titanium Cleaning, Etching and Handling **Section NA**

- *Compliance Assessment Guidance: Section NA applies if titanium is not processed within the scope of the audit.*

5.17.1 Is there a procedure for the cleaning of titanium that includes cleaning methods within the scope of the audit, including alkaline cleaning by itself, alkaline cleaning with scale removal, and acid etching to remove alpha-case (stable oxide) layer, as applicable? YES NO

5.17.2 Is anodic alkaline cleaning prohibited with titanium alloys, unless otherwise permitted by the customer or specification? YES NO

- *Compliance Assessment Guidance: Anodic alkaline cleaning may develop an anodic coating on the part.*

5.17.3 Do procedures for cleaning titanium surfaces prohibit using methanol or halogenated substances unless permitted by customer or specification? YES NO

- *Compliance Assessment Guidance: If the procedures list specific materials to be used and do not include prohibited solvents, this requirement is satisfied.*

5.17.4 Are parts immersion alkaline cleaned and thoroughly rinsed (including complex configurations) prior to processing through acid etches unless customer and/or specification allows other methods of cleaning? YES NO

5.17.5 Is water used for final rinse, including spray rinses, de-ionized or monitored for halogen content when required by specification? YES NO NA

- *Compliance Assessment Guidance: NA applies if de-ionized water or halogen content monitoring is not required.*

5.17.6 Do procedures require that parts be handled with clean fabric gloves after YES NO

	cleaning and drying? (Chemical resistant rubber gloves may be used during the wet processing steps.)? • *Compliance Assessment Guidance: Gloves that contain stearates or powders to keep them from sticking together are disallowed.*	
5.17.7	Is water used to make additions to processing tanks and in-process rinsing limited to 200 ppm chlorine/ chloride level or as required by customer or specification?	YES NO
5.17.8	Are Intergranular Attack (IGA), selective/ preferential attack, end grain pitting, and hydrogen pickup, as applicable, determined periodically in accordance with the internal procedure or customer requirement? • *Compliance Assessment Guidance: NA applies if only alkaline cleaning is performed.*	YES NO NA
5.17.9	Controlled metal removal (e.g. Alpha Case Removal) • *Compliance Assessment Guidance: Section NA applies if a controlled metal removal requirement is not imposed.*	Section NA
5.17.9.1	Have etch rate test coupons / panels been supplied or approved by customer for testing or (if supplier determined), are test coupon(s) of the same alloy and heat treat condition?	YES NO
5.17.9.2	Are stock removal (etching) rates determined daily prior to processing hardware or if not determined prior to processing, is the frequency based upon historical test data when allowed by specification?	YES NO
5.17.9.3	For the method used to determine etch rate, is the resolution of the measurement instrument 10x more precise than the amount of material removed by the etch rate test. • *Compliance Assessment Guidance: If 0.007 is removed on the etch rate test panel then the resolution of the instrument must be better than 0.0007 regardless of method used.*	YES NO
5.17.9.4	Are stock removal (etching) rates posted or logged in a manner readily accessible by the operator? • *Compliance Assessment Guidance: Some primes require this data to be posted.*	YES NO
5.17.9.5	Does the etch rate determination meet minimum requirements called out in the processing procedure or customer requirement?	YES NO
5.17.9.6	Is the total thickness of alpha-case (oxide layer) either provided in advance by the customer, or determined in advance of etching, to ensure required alpha-case removal without excessive stock loss?	YES NO
5.18	**Electropolishing** • *Compliance Assessment Guidance: Section NA applies if electropolishing is not in the scope of the audit.*	**Section NA**
5.18.1	Are stock removal rates determined to assure correct processing?	YES NO

5.18.2	Is the required surface finish defined or approved by the purchaser?	YES NO
5.18.3	Is the location of electrical contacts defined or approved by the purchaser when required by specification? • *Compliance Assessment Guidance: NA applies if not required by specification.*	YES NO NA
5.18.4	Is the dissolved metal in the electropolishing solution being monitored and controlled?	YES NO
5.18.5	Are processing parameters including voltage/ current density, solution temperature and processing time defined in the work instructions?	YES NO
5.18.6	For electropolishing of corrosion resistant steel (CRES) to be used as passivation, is one or more of the following methods being used for evaluation? -Water immersion test -Humidity test -Salt spray testing -Copper sulfate test -Modified “ferroxyl” test • *Compliance Assessment Guidance: NA applies if passivation effectiveness is not required or corrosion resistant steel (CRES) is not electropolished*	YES NO NA
5.19	**Inspection** • *Compliance Assessment Guidance: Section NA applies if a modified scope audit.*	**Section NA**
5.19.1	Does the supplier utilize “first piece”/”lot” and “in process” inspection to verify process?	YES NO

6. COMPLIANCE

Auditor is to perform 4 complete job audits as a minimum (unless otherwise directed in writing by the staff engineer in accordance with operating procedures). One minimum job for each sub-discipline (plating, anodize/conversion coating, painting/dry film and strip/etch.)

6.1 Job 1 **Section NA**

- *Compliance Assessment Guidance: Section NA applies if this job audit is not required.*

Note: If the part being audited is EC–LR (e.g. ITAR) the questions marked with an (EC) cannot be answered as they are technical information which cannot be displayed in eAuditNet. Auditor to answer EC questions with "EC/LR".

6.1.1 (EC) **Job Identity – Job Audit Of**_____

6.1.1.1 Part Description_____
(If EC only include a general description, e.g. "turbine blade", "bracket")

6.1.1.2 Part Number_____

6.1.1.3 Customer_____

6.1.1.4 Prime Contractor_____

6.1.1.5 Purchase Order/Revision Level_____

6.1.1.6 Part Quantity_____

6.1.1.7 Serial/Lot Numbers_____

6.1.1.8 Date of Job/Job Number_____

6.1.1.9 (EC) Alloy/Heat Treat Condition/Hardness_____

6.1.1.10 Processing Specifications_____
(If EC only include specification number, e.g. "AMS2411")

6.1.1.11 (EC) Other Purchase Order Requirements_____

6.1.2 Paperwork Review: Compare purchase order, shipping documents, referenced blueprints, specifications, shop travelers, process instructions, and inspection records.

6.1.2.1 Are part numbers, specifications, and revision levels flowed down correctly? YES NO

6.1.2.1.1	Are the frozen processes identified and if so, has customer approval been obtained? • *Compliance Assessment Guidance: NA applies if no frozen processes.*	YES NO NA
6.1.2.1.2	If a follow-on order, have purchase order requirements been reviewed for change?	YES NO
6.1.2.2	Are processing and inspection test requirements flowed down correctly?	YES NO
6.1.2.3	Does the shop paper provide the following:	
6.1.2.3.1	Traceable part identification?	YES NO
6.1.2.3.2	All processing steps identified including procedure numbers as applicable?	YES NO
6.1.2.3.3	All inspection and test requirements identified?	YES NO
6.1.2.3.4	All relevant variable data from process parameters controlled by operator recorded on shop paper or traceable to job in shop records?	YES NO
6.1.2.3.5	All inspection and test results recorded on shop paper or traceable in shop records?	YES NO
6.1.2.3.6	All operations, inspections, and tests done in sequence recorded or traceable to specific process lines/workstations, operator/inspector/technician and date done?	YES NO
6.1.2.3.7	If rework is done are all operations documented? • *Compliance Assessment Guidance: NA applies if no rework is required for this job.*	YES NO NA
6.1.2.3.8	All test coupons identified and traceable to specific pieces/lots? Coupons processed through all processing steps on pieces/lots they represent; including pre- and post-process chemical and/or mechanical cleaning and thermal cycles? • *Compliance Assessment Guidance: NA applies if test coupons are not required to be processed with this job.*	YES NO NA
6.1.2.3.9	All process, test, and inspection equipment calibrated and traceable to part shop documents?	YES NO

6.1.3 Process Observations

6.1.3.1 Receiving, paperwork generation, requirement review and receiving inspection:

_____

_____

6.1.3.2 (EC) Pre-process cleaning (Record pre-cleaning method done, e.g. vapor degrease or none required)

6.1.3.3 (EC) Pre-process thermal operations (Record actual time and temperature or none required)

6.1.3.4 (EC) Masking (Record masking type, e.g. tape, wax, tool# or none required)

6.1.3.5 (EC) Fixturing/Racking (Record basket, hook, wire, tool#)

6.1.3.6 (EC) Processing (The continuous part after masking and racking. Record steps e.g. degrease, deox, anodize. Parameters need only be recorded if they are non-compliant)

6.1.3.7 (EC) Post-processing cleaning (Record method, e.g. solvent wipe, or none required)

6.1.3.8 (EC) Post-processing thermal operations (Record time and temperature, time delay since processing, none required)

6.1.3.9 Final Inspection

6.1.3.10 Packing and shipping (e.g. per customer requirement, interop)

6.1.3.11 (EC) Solution and/or material testing (e.g. reviewed and acceptable, if material testing (paint) what was done)

6.1.3.12 (EC) Periodic and/or lot testing (Record testing done, e.g. Lot - Visual, Thickness. Monthly - Salt Spray, Coating Weight)

6.1.3.13 Was required periodic testing performed and documented? (See Table 1) YES NO NA
- *Compliance Assessment Guidance: NA applies if no periodic testing required.*

6.1.4 Lot Acceptance Testing/Inspection

6.1.4.1 Does the definition of “lot” as established by the supplier conform to the definition outlined by the specification? YES NO

6.1.4.2 If parts were shipped before completion of lot acceptance testing, was this authorized in writing by the customer? YES NO NA
- *Compliance Assessment Guidance: NA applies if parts were not shipped before completion of lot testing.*

6.1.4.3 Did the sampling plan meet specification and/or customer requirements? YES NO

6.1.4.4 Was hardware held pending resolution of nonconformances noted during testing? YES NO NA
- *Compliance Assessment Guidance: NA applies if no non-conformances.*

6.1.4.5 Was lot testing required? YES NO NA
- *Compliance Assessment Guidance: NA applies if no lot testing.*

6.1.4.6 Was lot testing performed and documented? YES NO NA
- *Compliance Assessment Guidance: NA applies if no lot testing.*

6.1.4.7 Was lot testing in conformance with specification and/or customer requirements? YES NO NA
- *Compliance Assessment Guidance: NA applies if no lot testing.*

6.1.5 Operator Control and Job Acceptance

6.1.5.1 List operator(s) who performed processing operations:

_____

_____

6.1.5.2 Are the operators trained and approved? YES NO

6.1.5.3 Are all operations, inspections and tests properly stamped off or signed off and dated, as required, by the correct operator or department? YES NO

Describe: _____

_____

6.1.5.4 Does all processing, testing, and inspection conform to requirements? YES NO

6.1.6 Certification and Reports or Test Reports

6.1.6.1 Does certification show compliance to all requirements and reflect actual data as required? YES NO

6.1.6.2 Did this job comply with all requirements? YES NO

6.1.6.3 Certificate or test report number: _____ NA
- *Compliance Assessment Guidance: NA applies if certificate not raised before audit completed.*

6.1.6.4 Certification or test report date: _____ N/A
- *Compliance Assessment Guidance: NA applies if certificate not raised before audit completed.*

Document Change Table

Date	Rev	Changes to Document
June 2009	D	4.1.1 and Test Matrix definition.

5.4 and 5.5 Temperature applicability.

Section NA

Compliance Assessment Guidance: NA for Initial Audits only but the implementation plan must be reviewed to ensure all items in A1 and A2 have all been identified. If a supplier claims to have an improvement process then they should have done a gap analysis to ensure all of A1 and A2 are captured.

APPENDIX A
CONTINUOUS PROCESS IMPROVEMENT

Appendix A establishes requirements for a continuous process improvement program using process improvement tools. Compliance with Sections A1 and A2 of Appendix A is mandatory within one year of Nadcap Accreditation to AC7108 (i.e., the first reaccreditation audit).

The intent of AC7108 Appendix A is to add value to the supplier and their customers by reducing and controlling variation and waste in the supplier's processes. This is done by ensuring that Nadcap Chemical Processing Accredited suppliers establish a culture of continuous improvement routinely applied to appropriate processes as identified by management analysis of data (such as Pareto analysis). This analysis must include, but is not limited to, all Nadcap Accredited Chemical Process areas and must be performed on a periodic basis not to exceed one year.

The Task Group stresses that supplier management use this data to choose where the improvement tools are applied. This is not limited to the “traditional processes” but also applies to system elements (contract review / flowdown, planning, calibration, etc.). Management does, however, need to identify (in writing based on the above data) the reason for selection of the particular process(es)."

A1.	**FOUNDATION**	
A1.1	Is there a policy to support top-down management commitment to a Continuous Process Improvement Program?	YES NO
A1.2	Has a steering committee (or central focal person) been assigned to give direction and oversee activities?	YES NO
A1.3	Are the functions/titles and responsibilities of those individuals responsible for the continuous improvement program documented?	YES NO
A1.4	Is there a documented training program for all levels of employees as applicable to their responsibilities covering principles and usage of, process improvement tools, statistical techniques and applicable internal procedures?	YES NO
A2	**PROCEDURES**	
A2.1	Are there documented internal procedures for:	
A2.1.1	Ongoing collection and analysis of performance data related to chemical processing e.g. internal reprocessing and rework, repair, internal rejects, customer rejects and customer complaints, costs turnaround times, waste streams, scrap etc. Does this procedure identify:	YES NO
A2.1.2	Methods & responsibilities for data collection on a job by job basis?	YES NO

A2.1.3	Methods, frequencies (at least annually) & responsibilities for data compilation and assessment?	YES NO
A2.1.4	Criteria (e.g. cost, customer satisfaction, frequency, delivery) for determining which process shall take priority for improvement based on the above assessment?	YES NO
A2.1.5	At least annual management review of data and selection of process for improvement based on data and criteria?	YES NO
A2.1.6	How teams are selected and their responsibilities and timescales for applying the process improvement methods. Does the procedure also identify their reporting requirements (frequency, to whom)?	YES NO
A2.1.7	Process improvement methods, e.g. Pareto Analysis, FMEA, Process Maps, Run Charts, Control Charts, as applicable, identifying how they are constructed, used and the data assessed?	YES NO
A2.1.8	When applicable, processes parameters and product key characteristics to be identified and monitored for a period of time before and after any process changes (e.g. changes to process operating parameter ranges) to demonstrate an improvement in product conformance?	YES NO
A2.1.9	Development and incorporation of a control plan based on the process improvement studies that include response to out of control conditions?	YES NO
A2.1.10	Documentation of data, analyses, reports, decisions, etc. for all the above within a single summary document associated with that improvement?	YES NO
A3.	**APPLICATION** • *Compliance Assessment Guidance: NA applies for the first re-accreditation audit.*	**Section NA**
A3.1	Is performance data collected and analyzed in accordance with procedures?	YES NO
A3.2	Has a new process been selected at least annually for improvement based on the criteria identified in procedures?	YES NO
A3.3	Were teams created and did they operate in accordance with procedures?	YES NO NA
A3.4	Were the personnel trained as required for the activities carried out?	YES NO
A3.5	Does data demonstrate reduction in process variation, improvement in product conformance or reduction of cost as applicable? • *Compliance Assessment Guidance: These activities are undertaken on a best effort basis; ultimate yields may be limited to a heightened understanding and control of the process without specific or measurable benefits.*	YES NO NA
A3.6	Has a control plan been constructed and has it been incorporated into the relevant process procedure?	YES NO

A3.7	Does present data show that the control plan is being maintained?	YES NO
A3.8	When applicable, have Cpk values been calculated to identify the level of process control and assess if further process improvement is required? • *Compliance Assessment Guidance: NA for process improvements that would not require a run chart or control chart.*	YES NO NA
A3.9	Are materials (e.g. computers, charts, reference books) used for process improvements readily available to those who require them?	YES NO
A3.10	Are process improvement charts and data displayed for all applicable personnel to see? • *Compliance Assessment Guidance: Applicable personnel to include all people involved in the project.*	YES NO
A3.11	Are process improvement activities and resultant data included as part of management review?	YES NO

APPENDIX B
REQUIREMENTS TESTING

B1.	**HYDROGEN EMBRITTLEMENT TEST SPECIMEN PREPARATION** • *Compliance Assessment Guidance: NA applies if hydrogen embrittlement testing is not required.*	Section NA
B1.1	Are specimens manufactured and certified to the applicable specification, or other customer requirement?	YES NO
B2.	**HYDROGEN EMBRITTLEMENT TESTING** • *Compliance Assessment Guidance: NA applies if hydrogen embrittlement testing is not required.*	Section NA
B2.1	Is there an internal procedure covering this test method that identifies the specs to which it is compliant. • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory*	YES NO NA
B2.2	Is the person doing the testing identified as trained/competent to do the test? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B2.3	Is the test carried out at the required frequency?	YES NO
B2.4	Is the testing performed in accordance with applicable specification?	YES NO
B2.5	Is the test device constructed and maintained so as to minimize bending stresses imparted to the specimen including lever arms properly balanced, fulcrums clean and free from excessive wear, and load train self-aligning and hanging freely from suspension point? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B2.6	Does test procedure include, at a minimum, a visual inspection prior to testing to verify instrument operation in accordance with B2.5? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B2.7	Do test records include the results of visual inspection of the notch for cracks after testing? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B2.8	Does the test procedure describe calculations to determine loading? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA

B2.9	Do test reports/certs show evidence of review, compliance to specification or correct retesting/ replacement testing or customer notification?	YES NO
B2.10	Does the review also include trend analysis and action if negative trends are identified?	YES NO
B2.11	If testing is sub-contracted is the Laboratory listed on the supplier's Approved Supplier List and is it approved by the customer if required? • *Compliance Assessment Guidance: NA applies if testing is performed in-house*	YES NO NA
B3.	**METALLOGRAPHY** • *Compliance Assessment Guidance: NA applies if metallography testing is not required*	Section NA
B3.1	Is there an internal procedure covering the test method that identifies the specifications to which it is compliant? • *Compliance Assessment Guidance: NA applies if the test is performed by external laboratory.*	YES NO NA
B3.2	Is the person doing the testing identified as trained/competent to do the test? • *Compliance Assessment Guidance: NA applies if the test is performed by external laboratory.*	YES NO NA
B3.3	Is testing performed in accordance with applicable specifications?	YES NO
B3.4	Is the test carried out at the required frequency?	YES NO
B3.5	Are precautions taken to prevent cutting or grinding induced specimen damage? • *Compliance Assessment Guidance: NA applies if the test is performed by external laboratory.*	YES NO NA
B3.6	Do metallographic mounts display good edge retention with minimal edge rounding and with no gap between specimen and mount media? • *Compliance Assessment Guidance: NA applies if the test is performed by external laboratory.*	YES NO NA
B3.7	Does the preparation method produce section perpendicularity adequate for measurement of surface dimensions in accordance with applicable specification? • *Compliance Assessment Guidance: NA applies if the test is performed by external laboratory.*	YES NO NA
B3.8	Does the test procedure specify the magnification to be used for thickness measurement? • *Compliance Assessment Guidance: NA applies if the test is performed by external laboratory.*	YES NO NA
B3.9	Are the filar eye-pieces used for thickness measurement calibrated using stage	YES NO NA

micrometers?
- *Compliance Assessment Guidance: NA applies if the test is performed by external laboratory.*

B3.10	Do test reports/ certs show evidence of review, compliance to specification or correct retesting/ replacement testing or customer notification?	YES NO
B3.11	Does the review also include trend analysis and action if negative trends are identified?	YES NO
B3.12	If testing is sub-contracted is the Laboratory listed on the supplier's Approved Supplier List and is it approved by customer if required. • *Compliance Assessment Guidance: NA applies if the test is performed in-house*	YES NO NA
B4.	**MICROHARDNESS** • *Compliance Assessment Guidance: NA applies if micro-hardness testing is not required.*	Section NA
B4.1	Is there an internal procedure covering the test method that identifies the specifications to which it is compliant? • *Compliance Assessment Guidance: NA applies if the test is performed by external laboratory.*	YES NO NA
B4.2	Is the person doing the testing identified as trained/competent to do the test? • *Compliance Assessment Guidance: NA applies if the test is performed by external laboratory.*	YES NO NA
B4.3	Is testing performed in accordance with applicable specifications?	YES NO
B4.4	Is the test carried out at the required frequency?	YES NO
B4.5	Is testing performed in accordance with applicable specification?	YES NO
B4.6	Does the test procedure specify the default sampling location (i.e., tested on cross section or directly on surface)? • *Compliance Assessment Guidance: NA applies if the test is performed by external laboratory.*	YES NO NA
B4.7	Is testing performed in an area free from vibration? • *Compliance Assessment Guidance: NA applies if the test is performed by external laboratory.*	YES NO NA
B4.8	Is the specimen surface finish adequate that the perimeter of the indentation is clearly defined in the field of the microscope? • *Compliance Assessment Guidance: NA applies if the test is performed by external laboratory.*	YES NO NA
B4.9	Are specimen flatness (lack of edge rounding) and alignment adequate to assure that:	Section NA

- *Compliance Assessment Guidance: NA applies if the test is performed by external laboratory.*

B4.9.1	Indentations closest to the edge are clearly defined in the field of focus?	YES NO
B4.9.2	(Knoop) One leg of long diagonal is no more that 20% greater than the other?	YES NO
B4.9.3	(Vickers) Both legs of same diagonals are not noticeably different?	YES NO
B4.10	Are indentations, located closer to the edge of the specimen than the length of the indentation diagonal when measured perpendicular to the edge, disregarded? • *Compliance Assessment Guidance: NA applies if the test is performed by external laboratory.*	YES NO NA
B4.11	Are hardness test machines verified to applicable specification? • *Compliance Assessment Guidance: NA applies if the test is performed by external laboratory.*	YES NO Section NA
B4.11.1	Do written procedures establish periodicity of verification (to be “daily” when machine is used)?	YES NO
B4.11.2	Does repeatability conform to applicable specification?	YES NO
B4.11.3	Does maximum error conform to applicable specification?	YES NO
B4.11.4	Are hardness blocks certified to applicable specification?	YES NO
B4.11.5	If microhardness values are converted to other hardness scales, is the conversion table that was used recorded? List table(s) used _____ _____	YES NO
B4.12	Do test reports/ certs show evidence of review, compliance to specification or correct retesting/ replacement testing or customer notification?	YES NO
B4.13	Does the review also include trend analysis and action if negative trends are identified?	YES NO
B4.14	If testing is sub-contracted is the Laboratory listed on the supplier's Approved Supplier List and is it approved by customer if required. • *Compliance Assessment Guidance: NA applies if the test is performed in-house*	YES NO NA
B5.	**CORROSION/SALT SPRAY TESTING** • *Compliance Assessment Guidance: NA applies if corrosion testing is not required.*	**Section NA**
B5.1	Is there an internal procedure covering the test method that identifies the	YES NO NA

	specifications to which it is compliant? • *Compliance Assessment Guidance: NA applies if the test is performed by external laboratory.*	
B5.2	Is the person doing the testing identified as trained/competent to do the test? • *Compliance Assessment Guidance: NA applies if the test is performed by external laboratory.*	YES NO NA
B5.3	Is testing performed in accordance with applicable specifications?	YES NO
B5.4	Is the test carried out at the required frequency?	YES NO
B5.5	Are specimens suitably masked or protected so as to prevent corrosion of cut or otherwise uncoated edges? • *Compliance Assessment Guidance: NA applies if the test is performed by external laboratory.*	YES NO NA
B5.6	Are specimens prepared and handled so as to preclude the introduction of foreign materials to the test surface?	YES NO
B5.7	Are the following items recorded? • *Compliance Assessment Guidance: NA applies if the test is performed by external laboratory.*	Section NA
B5.7.1	The type of salt and water used in preparing the salt solution?	YES NO
B5.7.2	The chamber temperature?	YES NO
B5.7.3	The collection rate?	YES NO
B5.7.4	The specific gravity or concentration of the condensate?	YES NO
B5.7.5	The pH of the condensate?	YES NO
B5.7.6	The method of cleaning specimens before and after testing?	YES NO
B5.7.7	The method of supporting or suspending the specimen in the chamber?	YES NO
B5.7.8	The masking or protection used?	YES NO
B5.7.9	The exposure period?	YES NO
B5.7.10	Interruption in exposure?	YES NO
B5.7.11	The angle at which the specimen is positioned?	YES NO
B5.8	Does the test procedure specify the referee magnification to be used in visual examination of test specimens to allow for determination of suspect indications? • *Compliance Assessment Guidance: NA applies if the test is performed by external laboratory.*	YES NO NA
B5.9	Does the salt used for the solution make-up fully conform to that required by the latest issue of the test specification? • *Compliance Assessment Guidance: NA applies if the test is performed by external laboratory.*	YES NO NA
B5.10	Does the water used for solution make-up conform to the applicable specification? • *Compliance Assessment Guidance: NA applies if the test is performed by*	YES NO NA

external laboratory.

B5.11	Do test reports/ certs show evidence of review, compliance to specification or correct retesting/ replacement testing or customer notification?	YES NO
B5.12	Does the review also include trend analysis and action if negative trends are identified?	YES NO
B5.13	If testing is sub-contracted is the Laboratory listed on the supplier's Approved Supplier List and is it approved by customer if required. • *Compliance Assessment Guidance: NA applies if the test is performed in-house*	YES NO NA
B6	**WATER IMMERSION/HUMIDITY TESTING** • *Compliance Assessment Guidance: NA applies if immersion/humidity testing is not required.*	Section NA
B6.1	Is there an internal procedure covering this test method that identifies the specs to which it is compliant. • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory*	YES NO NA
B6.2	Is the person doing the testing identified as trained/competent to do the test? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B6.3	Is the test carried out at the required frequency?	YES NO
B6.4	Is testing performed in accordance with specification requirements?	YES NO
B6.5	Does the test procedure specify the control of test water and is there evidence that the correct water is used? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B6.6	Does the test procedure specify the referee magnification to be used in visual examination of test specimens after exposure to allow for determination of suspect indications? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B6.7	Do test reports/ certs show evidence of review, compliance to specification or correct retesting/ replacement testing or customer notification?	YES NO
B6.8	Does the review also include trend analysis and action if negative trends are identified?	YES NO
B6.9	If testing is sub-contracted is the Laboratory listed on the supplier's Approved Supplier List and is it approved by customer if required. • *Compliance Assessment Guidance: NA applies if the test is performed in-*	YES NO NA

house

B7.	**HEAT RESISTANCE TESTING** • *Compliance Assessment Guidance: NA applies if heat resistance testing is not required.*	Section NA
B7.1	Is there an internal procedure covering this test method that identifies the specs to which it is compliant? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory*	YES NO NA
B7.2	Is the person doing the testing identified as trained/competent to do the test? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B7.3	Is the test carried out at the required frequency?	YES NO
B7.4	Is testing performed in accordance with the applicable specification?	YES NO
B7.5	Does the test procedure specify the referee magnification to be used in visual examination of test specimens after exposure to allow for determination of suspect indications? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B7.6	Do test reports/ certs show evidence of review, compliance to specification or correct retesting/ replacement testing or customer notification?	YES NO
B7.7	Does the review also include trend analysis and action if negative trends are identified?	YES NO
B7.8	If testing is sub-contracted is the Laboratory listed on the supplier's Approved Supplier List and is it approved by customer if required? • *Compliance Assessment Guidance: NA applies if the test is performed in-house*	YES NO NA
B8.	**ADHESION-WEAR TESTING** • *Compliance Assessment Guidance: NA applies if adhesion-wear testing is not required.*	Section NA
B8.1	Is there an internal procedure covering this test method that identifies the specs to which it is compliant? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory*	YES NO NA
B8.2	Is the person doing the testing identified as trained/competent to do the test? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B8.3	Is the test carried out at the required frequency?	YES NO

B8.4	Is testing performed in accordance with the applicable specification?	YES NO
B8.5	Does the test procedure specify a referee magnification to be used in visual examination of test specimens to allow for determination of suspect indications? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B8.6	Do test reports/ certs show evidence of review, compliance to specification or correct retesting/ replacement testing or customer notification?	YES NO
B8.7	Does the review also include trend analysis and action if negative trends are identified?	YES NO
B8.8	If testing is sub-contracted is the Laboratory listed on the supplier's Approved Supplier List and is it approved by customer if required? • *Compliance Assessment Guidance: NA applies if the test is performed in-house*	YES NO NA
B9.	**TABER WEAR TESTING** • *Compliance Assessment Guidance: NA applies if taber wear testing is not required.*	Section NA
B9.1	Is there an internal procedure covering this test method that identifies the specs to which it is compliant. • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory*	YES NO NA
B9.2	Is the person doing the testing identified as trained/competent to do the test.? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B9.3	Is the test carried out at the required frequency?	YES NO
B9.4	Is testing performed in accordance with applicable specification?	YES NO
B9.5	Are abrasive wheels resurfaced prior to each test? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B9.6	Are abrasive wheels updated in accordance with their life limit date? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B9.7	Are test devices standardized in accordance with applicable specification prior to each test? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA

B9.8	Are specimens conditioned in accordance with the specification and tested in the conditioning environment or immediately upon removal from the conditioning environment? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B9.9	Unless determined by weight change does the test procedure specify the referee magnification to be used in visual examination of test specimens after abrasion to allow for determination of suspect indications? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B9.10	Do test reports/ certs show evidence of review, compliance to specification or correct retesting/ replacement testing or customer notification?	YES NO
B9.11	Does the review also include trend analysis and action if negative trends are identified?	YES NO
B9.12	If testing is sub-contracted is the Laboratory listed on the supplier's Approved Supplier List and is it approved by customer if required? • *Compliance Assessment Guidance: NA applies if the test is performed in-house*	YES NO NA
B10.	**ADHESION TAPE TESTING** • *Compliance Assessment Guidance: NA applies if adhesion tape testing is not required.*	Section NA
B10.1	Is there an internal procedure covering this test method that identifies the specs to which it is compliant? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory*	YES NO NA
B10.2	Is the person doing the testing identified as trained/competent to do the test? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B10.3	Is the test carried out at the required frequency?	YES NO
B10.4	Is testing performed in accordance with applicable specification?	YES NO
B10.5	Does the test procedure specify conditioning environment and duration and the allowable time between removal from the conditioning environment and testing? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B10.6	Does the test procedure specify tape characteristics and roller mass and hardness? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA

B10.7	Does the test procedure specify a referee magnification to be used in visual examination of test specimens to allow for determination of suspect indications? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B10.8	Do test reports/ certs show evidence of review, compliance to specification or correct retesting/ replacement testing or customer notification?	YES NO
B10.9	Does the review also include trend analysis and action if negative trends are identified?	YES NO
B10.10	If testing is sub-contracted is the Laboratory listed on the supplier's Approved Supplier List and is it approved by customer if required? • *Compliance Assessment Guidance: NA applies if the test is performed in-house*	YES NO NA
B11.	**ADHESION SCRATCH AND CHISEL TESTING** • *Compliance Assessment Guidance: NA applies if scratch and chisel testing is not required.*	Section NA
B11.1	Is there an internal procedure covering this test method that identifies the specs to which it is compliant? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B11.2	Is the person doing the testing identified as trained/competent to do the test? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B11.3	Is the test carried out at the required frequency?	YES NO
B11.4	Is scratch and chisel testing performed in accordance with the applicable specification?	YES NO
B11.5	Does the test procedure specify a referee magnification to be used in visual examination of test specimens to allow for determination of suspect indications? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B11.6	Do test reports/ certs show evidence of review, compliance to specification or correct retesting/ replacement testing or customer notification?	YES NO
B11.7	Does the review also include trend analysis and action if negative trends are identified?	YES NO
B11.8	If testing is sub-contracted is the Laboratory listed on the supplier's Approved Supplier List and is it approved by customer if required?	YES NO NA

- *Compliance Assessment Guidance: NA applies if the test is performed in-house*

B12.	**ADHESION BEND TESTING (METALLIC COATINGS)** • *Compliance Assessment Guidance: NA applies if adhesion bend testing is not required.*	Section NA
B12.1	Is there an internal procedure covering this test method that identifies the specs to which it is compliant? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B12.2	Is the person doing the testing identified as trained/competent to do the test? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B12.3	Is the test carried out at the required frequency?	YES NO
B12.4	Is the testing performed in accordance with applicable specification?	YES NO
B12.5	Is the bend mandrel diameter in accordance with the test specification? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B12.6	Does the test procedure specify the referee magnification to be used in visual examination of test specimens after bending to allow for determination of suspect indications? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B12.7	Do test reports/ certs show evidence of review, compliance to specification or correct retesting/ replacement testing or customer notification?	YES NO
B12.8	Does the review also include trend analysis and action if negative trends are identified?	YES NO
B12.9	If testing is sub-contracted is the Laboratory listed on the supplier's Approved Supplier List and is it approved by customer if required? • *Compliance Assessment Guidance: NA applies if the test is performed in-house*	YES NO NA
B13.	**COATING WEIGHT TESTING** • *Compliance Assessment Guidance: NA applies if coating weight testing is not required.*	**Section NA**
B13.1	Is there an internal procedure covering this test method that identifies the specs to which it is compliant? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA

B13.2	Is the person doing the testing identified as trained/competent to do the test? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B13.3	Is the test carried out at the required frequency?	YES NO
B13.4	Is testing performed in accordance with the applicable specification?	YES NO
B13.5	Does the test record include the initial and final weight and surface area of the specimen determined as necessary to satisfy the level of precision specified by the specification? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B13.6	Does the test procedure describe the calculations to determine coating weight? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B13.7	Are test specimens simple in geometry so as to minimize measurement induced inaccuracies? (A thin panel with parallel sides is recommended)	YES NO
B13.8	Are stripping solutions such that they do not chemically attack the basis material. Is solution selection qualified by trial immersion of uncoated specimens of the same basis material as the test specimens or is solution specified by the specification being used? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B13.9	Do test reports/ certs show evidence of review, compliance to specification or correct retesting/ replacement testing or customer notification?	YES NO
B13.10	Does the review also include trend analysis and action if negative trends are identified?	YES NO
B13.11	If testing is sub-contracted is the Laboratory listed on the supplier's Approved Supplier List and is it approved by customer if required? • *Compliance Assessment Guidance: NA applies if the test is performed in-house*	YES NO NA
B14.	**CONDUCTIVITY TESTING (%IACs)** • *Compliance Assessment Guidance: NA applies if conductivity testing (%IACS) is not required.*	**Section NA**
B14.1	Is there an internal procedure covering this test method that identifies the specs to which it is compliant?	YES NO
B14.2	Is the person doing the testing identified as trained/competent to do the test?	YES NO
B14.3	Is the test carried out at the required frequency?	YES NO
B14.4	Is testing performed in accordance with applicable specification?	YES NO

B14.5	Are the test specimen and reference standard the same temperature as the surrounding medium?	YES NO
B14.6	Is the test specimen sufficiently flat as to allow for complete contact with probe?	YES NO
B14.7	Is certified conductivity based on more than one measurement per specimen?	YES NO
B15.	**RESISTIVITY TESTING** • *Compliance Assessment Guidance: NA applies if resistivity testing is not required*	**Section NA**
B15.1	Is there an internal procedure covering this test method that identifies the specs to which it is compliant? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B15.2	Is the person doing the testing identified as trained/competent to do the test? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B15.3	Is the test carried out at the required frequency?	YES NO
B15.4	Is testing performed in accordance with applicable specification?	YES NO
B15.5	Are test specimens and reference standard the same temperature as the surrounding medium? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B15.6	Is certified resistivity based on more than one measurement per specimen?	YES NO NA
B15.7	If testing is sub-contracted is the Laboratory listed on the supplier's Approved Supplier List and is it approved by customer if required? • *Compliance Assessment Guidance: NA applies if the test is performed in-house*	
B16.	**THICKNESS VERIFICATION OF MAGNETIC, EDDY CURRENT AND XRF MACHINES** • *Compliance Assessment Guidance: NA applies if thickness measurement is not required.*	**Section NA**
B16.1	Is there an internal procedure covering this test method that identifies the specs to which it is compliant?	YES NO
B16.2	Is the person doing the testing identified as trained/competent to do the test?	YES NO
B16.3	Is thickness measurement performed in accordance with the applicable specification?	YES NO

B16.4	Are thickness standards controlled, available to operators, appropriate for the range required, and traceable to National Standards?	YES NO
B16.5	Is the verification carried out prior to each production batch thickness measurement: For single channel machines prior to each production lot? For multi-channel machines at a frequency to ensure correct set-up for the parts being measured?	YES NO
B16.6	Is there a record of verification maintained, and are values within tolerance?	YES NO
B16.7	Are specific locations for thickness measurement defined for processed parts?	YES NO
B16.8	Do thickness measurement methods and locations take into account error associated with edge effect, curvature, and coating/base material properties as applicable?	YES NO
B17.	**SOLDERABILITY** • *Compliance Assessment Guidance: NA applies if solderability testing is not required*	**Section NA**
B17.1	Is there an internal procedure covering this test method that identifies the specs to which it is compliant? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B17.2	Is the person doing the testing identified as trained/competent to do the test? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B17.3	Is the test carried out at the required frequency?	YES NO
B17.4	Is testing performed in accordance with the applicable specification?	YES NO
B17.5	Is testing performed on “as-coated” specimens without surface cleaning beyond that specified in the coating procedure? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B17.6	Are specimen immersion and removal rates, as well as time in solder pot, tightly controlled in accordance with the applicable specifications? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B17.7	Does the test procedure specify the referee magnification to be used in visual examination of test specimens to allow for determination of suspect indications? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B17.8	Do test reports/ certs show evidence of review, compliance to specification or	YES NO

	correct retesting/ replacement testing or customer notification?	
B17.9	Does the review also include trend analysis and action if negative trends are identified?	YES NO
B17.10	If testing is sub-contracted is the Laboratory listed on the supplier's Approved Supplier List and is it approved by customer if required? • *Compliance Assessment Guidance: NA applies if the test is performed in-house*	YES NO NA
B18.	**ADHESION TESTING HEAT & QUENCH** • *Compliance Assessment Guidance: NA applies if heat & quench testing is not required*	Section NA
B18.1	Is there an internal procedure covering this test method that identifies the specs to which it is compliant? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B18.2	Is the person doing the testing identified as trained/competent to do the test? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B18.3	Is the test carried out at the required frequency?	YES NO
B18.4	Is testing performed in accordance with the applicable specification?	YES NO
B18.5	Do test reports/ certs show evidence of review, compliance to specification or correct retesting/ replacement testing or customer notification?	YES NO
B18.6	Does the review also include trend analysis and action if negative trends are identified?	YES NO
B18.7	If testing is sub-contracted is the Laboratory listed on the supplier's Approved Supplier List and is it approved by customer if required? • *Compliance Assessment Guidance: NA applies if the test is performed in-house*	YES NO NA
B19.	**CLIMBING DRUM PEEL TESTING** • *Compliance Assessment Guidance: NA applies if climbing drum peel testing is not required*	**Section NA**
B19.1	Is there an internal procedure covering this test method that identifies the specs to which it is compliant? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B19.2	Is the person doing the testing identified as trained/competent to do the test? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA

B19.3	Is the test carried out at the required frequency?	YES NO
B19.4	Is testing performed in accordance with applicable specification?	YES NO
B19.5	Is there a shop document that records and provides traceability for the test piece manufacturer, including material certs?	YES NO
B19.6	Is the test machine calibrated (load cell), serviced and in good condition? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B19.7	Does the test method show that the load is applied at the correct speed? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B19.8	Is the formula for determining the peel strength correct? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B19.9	Does the review also include trend analysis and action if negative trends are identified?	YES NO
B19.10	If testing is sub-contracted is the Laboratory listed on the supplier's Approved Supplier List and is it approved by customer if required? • *Compliance Assessment Guidance: NA applies if the test is performed in-house*	YES NO NA
B20.	**POROSITY TESTING** • *Compliance Assessment Guidance: NA applies if porosity testing is not required.*	Section NA
B20.1	Is there an internal procedure covering this test method that identifies the specs to which it is compliant? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B20.2	Is the person doing the testing identified as trained/competent to do the test? • *Compliance Assessment Guidance: NA applies if testing is performed by external laboratory.*	YES NO NA
B20.3	Is the test carried out at the required frequency?	YES NO
B20.4	Is testing performed in accordance with the applicable specification?	YES NO
B20.5	Is the test solution made fresh each day or tested for effectiveness prior to use?	YES NO
B20.6	Is the component, or test piece where permitted, being kept wet/submersed for the required time?	YES NO

B21. OTHER TEST METHOD Section NA

- Compliance Assessment Guidance: Section NA applies if no other testing is done or audited.

B21.1 Is testing performed in accordance with the applicable specification? YES NO NA

(Free text box for describing test and audit results)

AC7108 APPENDIX C – EXAMPLE TEST MATRIX

Internal Procedure Process	Specification	Lot Testing				Periodic Testing				
		Method	Number of Test Pieces	Test Piece Dimensions	Test Piece Material	Method	Frequency	Number of Test Pieces	Test Piece Dimensions	Test Piece Material
XXX.10.12 Chromic Acid Anodize	AMS-A-8625 Type 1 Class 1	Visual	MIL-STD-105 XXX.10.12	Parts	Parts	Coating Weight ASTM B 137 XXX.03.05	Monthly	3	3x8x0.032	2024 T3
		Thickness	MIL-STD-105 XXX.10.12	Parts	Parts	Corrosion Resistance ASTM B 117 XXX.03.01	Monthly	5	3x10x0.032	2024-T3
XXX.10.15 Conversion Coat	AMS-C-5541	Visual	MIL-STD-105 XXX.10.15	Parts	Parts	Corrosion Resistance ASTM B 117 XXX.03.01	Monthly	5	3x10x0.032	2024-T3
						Wet Tape FED-STD-141 Method 6301 XXX.03002	Monthly	2	3x10x0.032	2024-T3
	RPS436	Visual	100%	Parts	Parts	None Required				

AC7108 APPENDIX D – PROCESS PARAMETERS TO BE RECORDED

Note: Operator controlled variables (OCV) are process parameters that are directly under the control of the operator.

Note: Temperature is typically controlled and recorded on a periodic basis, e.g. daily, weekly. If the operator is required to change the temperature of a bath for different specifications, e.g. sulfuric tank for type II or type III anodize then the temperature must be recorded on the route card or on a log traceable to the route card.

Pre-Cleaning

None so long as method is non-etching. Process sheet must specify the maximum time.
Immersion/Contact Time if etching.

Cleaning

None so long as method is non-etching. Process sheet must specify the maximum time.
Immersion/Contact Time if etching.

Rinsing

None.

De-Oxidize/Pickle

Immersion Time.

Electrolytic Clean

Immersion time
Voltage or Amperage - as required by specification.
Surface area if current density (amperage) controlled.
Anodic/Cathodic/Reversing unless it is fixed.

Acid Desmut

None for dilute acid solutions used for alkaline etch desmut or neutralizing. Process sheet specify maximum immersion time.

Conversion Coating

Immersion Time

Electroless Plating

Immersion Time

Chromic Acid Anodize

Voltage or Amperage - as required by specification.
Surface area if current density (amperage) controlled.
Anodize Time

Sulfuric Acid Anodize

Voltage or Amperage - as required by specification.
Surface area if current density (amperage) controlled.
Anodize Time

Hard Anodize (e.g. AMS-A8625 Type III)

Amperage unless specification requires voltage.
Surface area if current density (amperage) controlled.
Anodize Time

Sealing/Dying

Immersion Time

Barrel Plating

Voltage or Amperage - as required by specification
Surface area if current density (amperage) controlled.
Time

Brush Plating

Surface Area
Solution Type
Voltage
Ampere Hours

Strike

Voltage or Amperage - as required by specification
Surface area if current density (amperage) controlled.
Time

Electroplating

Cadmium (not LHE)

Voltage or Amperage - as required by specification
Surface area if current density (amperage) controlled.
Time
(Periodic verification of current density required.)

Zinc

Voltage or Amperage - as required by specification
Surface area if current density (amperage) controlled.
Time

(Periodic verification of current density required.)

Other Electroplate

Current

Surface area.

Time

Ramp Rates

Time current is initially applied

Time the required voltage/amperage is reached.

Abrasive Blasting

Grit type

Pressure

Stand off

Painting

Primer

Mixing Information

Base Batch#

Mix Start Time

Viscosity

Spraying information

Coat 1 Start

Coat 2 Start

Cure Start

Temperature

Top Coat

Mixing Information

Base Batch#

Mix Start Time

Viscosity

Spraying information

Coat 1 Start

Coat 2 Start

Cure Start

Temperature

AC7108 APPENDIX E – MINIMUM BUY-OFF STEPS.

Incoming inspection
Pre-process cleaning method(s)
Pre-coat thermal treatment
Masking
Fixturing, racking
Strike/activation
Process: Electroplating / Painting / Etching etc.
Post-process cleaning methods
Post-coating thermal treatment
In-process and final tests and inspections, including disposition
Packaging and handling
Shipping
Note: All water break free inspections need a separate/positive buy-off

AC7108 APPENDIX F - EXAMPLE SOLUTION ANALYSIS MATRIX

Tank ID	Name	Constituent	Spec Low	Target low	Target	Target High	Spec High	Unit	Freq.	Method	Control Specs
#1	**Aluminum Soap**	**XX Degreaser**	**38**	**40**	**50**	**55**	**60**	**g/l**	**weekly**	**LP2**	
			5				8	oz/gal			BAC XXX
		Temperature	**160**				**190**	**F**	**lot**		
			160				190	F			BAC XXXX
#2	**Etch**										
		Sodium Hydroxide	**100**	**110**	**180**	**200**	**210**	**g/l**	**weekly**	**LP98**	
		Aluminum					**200**	**g/l**	**weekly**	**LP19**	
#3	**Deox**										
		Deoxidizer	**25**	**30**	**40**	**42**	**43**	**g/l**	**weekly**	**LP23**	
			25				43	g/l			BAC XXX
		Copper					**0.4**	**g/l**	**weekly**	**LP78**	
							0.4	g/l			BAC XXXX
#4	**Sulfuric Acid Anodize**										
		Sulfuric Acid	**175**	**180**	**190**	**210**	**220**	**g/l**	**weekly**	**LP45**	
			15				20	%bw			AMS 2471F
			15				20	%bw			AMS 2472E
			10				14	floz/gal			PNXXXX
		Aluminum	**1**				**2.4**	**g/l**	**weekly**	**LP34**	
							2.4	g/l			PHXXXX
		Temperature	**64**	**70**	**72**	**74**	**75**	**F**	**lot**		
			64				75	F			AMS 2471F
			64				85	F			AMS 2472E