

NAV24 - PLATING

<u>SECTION I - Procedure:</u>		
A 1.	Identify the drawing; specification or document invokes the requirements for plating. Specify:	
A 2	a. Does a written detailed procedure exist and is it utilized for the plating process? Identify procedure number and revision:	___ Yes ___ No ___ N/A
	b. Are procedures readily available?	___ Yes ___ No ___ N/A
A 3	a. Is the procedure approved by the Customer? List Reference Approval Number, if applicable:	___ Yes ___ No ___ N/A
	b. Does the procedure require review/approval by the government?	___ Yes ___ No ___ N/A
A 4.	Are procedures/work instructions adequate for control of:	
	a. (Proper Equipment), etc.	___ Sat ___ Unsat ___ N/A

NAV24 - PLATING

	b. (Proper Materials), etc.	___ Sat ___ Unsat ___ N/A
	c. Temperature monitoring - preheat, spraying temp, cooling, etc	___ Sat ___ Unsat ___ N/A
	d. Methods for masking areas	___ Sat ___ Unsat ___ N/A
	e. Pressure and flow settings	___ Sat ___ Unsat ___ N/A
	f. Preparation of Basis material.	___ Sat ___ Unsat ___ N/A
	g. Rate of application/time and plating bath	___ Sat ___ Unsat ___ N/A
	h. Inspection process	___ Sat ___ Unsat ___ N/A
	i. Test specimens/coupons (when required)	___ Sat ___ Unsat ___ N/A

NAV24 - PLATING

	j. Sample sizes	___ Sat ___ Unsat ___ N/A
	k. Make up and operating ranges of solutions	___ Sat ___ Unsat ___ N/A
	l. Operating temperature of solutions	___ Sat ___ Unsat ___ N/A
	m. Frequency of solution analysis	___ Sat ___ Unsat ___ N/A
	n. Voltage/Amperage ranges (current densities) where applicable.	___ Sat ___ Unsat ___ N/A
	o. Frequency of calibrating temperatures indicators, meters oven, etc. and accuracy required.	___ Sat ___ Unsat ___ N/A
	p. Operational controls for cleaning, plating, baking, etc. (e.g. flowchart, traveler, router)	___ Sat ___ Unsat ___ N/A
	q. Records to be maintained	___ Sat ___ Unsat ___ N/A

NAV24 - PLATING

A 5.	Does procedure include system for identification of inspection status on parts and documentation? (E.g. inspection stamp)	___ Sat ___ Unsat ___ N/A
<u>SECTION II - Record Review</u>		
A 6.	Identify inspection methods used to verify conformance with procedures and standards	___ Sat ___ Unsat ___ N/A
	* Visual _____ * Adhesion Test _____ * Hardness _____ * Thickness _____ * Other (list) _____	Mechanical Test _____ Surface Finish _____ Nondestructive Test _____ Other Destructive Tests _____
A 7.	What inspection documents exist and are they maintained to confirm inspection process was performed?	___ Yes ___ No
	a. Are inspection documents properly completed and maintained?	___ Yes ___ No
	b. Review and record number of samples: _____	___ Yes ___ No
A 8.	Is traceability maintained for material, which has been plated?	___ Yes ___ No
A 9.	Is inspection data reviewed and accepted by qualified personnel?	___ Yes ___ No

NAV24 - PLATING

A 10.	Are all tools, gages, meters, utilized for monitoring and/or inspection a part of the manufacturer's calibration program?	___Yes ___No ___N/A
A 11.	Are certifications for raw materials used in plating process reviewed for acceptance and maintained on file for review?	___Yes ___No ___N/A
A 12.	Verify prohibition of reclaimed material as may be required.	___Yes ___No ___N/A
A 13.	Adequate inspection work records are maintained.	___Yes ___No ___N/A
A 14.	The shop traveler and work records can be traced to the inspection personnel.	___Yes ___No ___N/A
<u>SECTION III - OBSERVATION OF PLATING PROCESS</u> Detailed observation of platers (complete one section for each plater observed). NOTE: if determined to be N/A, provide explanation.		___Sat ___Unsat
A 15.	Identify process observed. Specify class and type and/or grade.	___Sat ___Unsat
	a. Plater identification:(name, badge or clock #, shift)	
	b. Basis material(s) being welded.	

NAV24 - PLATING

	c. Identify plating material.	
	d. Is the plater qualified for observed plating procedure?	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat <input type="checkbox"/> N/A
	e. Is the plater familiar with details of the procedure?	<input type="checkbox"/> Sat <input type="checkbox"/> Unsat <input type="checkbox"/> N/A
	f. Procedure number:	
	g. Is it readily available to the plater and inspector?	<input type="checkbox"/> Yes <input type="checkbox"/> No
A 16.	Are there adequate methods of segregating accepted and rejected materials in use?	<input type="checkbox"/> Yes <input type="checkbox"/> No
A 17.	Tanks are placarded with solutions they contain and the operating parameters.	<input type="checkbox"/> Yes <input type="checkbox"/> No
A 18	. Solution tanks operated at elevated temperatures are equipped with temperature indicating devices.	<input type="checkbox"/> Yes <input type="checkbox"/> No

NAV24 - PLATING

A 19.	Solutions requiring agitation are equipped with acceptable devices to accomplish this requirement.	<input type="checkbox"/> Yes <input type="checkbox"/> No
A 20.	Ammeters, voltmeters, thermometers, are "stickered" to indicate calibration next due date.	<input type="checkbox"/> Yes <input type="checkbox"/> No
A 21.	Clocks and/or timers are available where applicable.	<input type="checkbox"/> Yes <input type="checkbox"/> No
A. 22.	Cleanliness	<input type="checkbox"/> Yes <input type="checkbox"/> No
	a. Are pieces to be plated cleaned prior to process.	<input type="checkbox"/> Yes <input type="checkbox"/> No
	b. List methods and materials used, if applicable.	<input type="checkbox"/> Yes <input type="checkbox"/> No
	c. Is cleanliness maintained prior to plating?	<input type="checkbox"/> Yes <input type="checkbox"/> No
A 23.	Rinse tanks are as follows:	<input type="checkbox"/> Yes <input type="checkbox"/> No

NAV24 - PLATING

	a. Free of contamination detrimental to the process	___Yes ___No
	b. Provide for separate rinses following acid and caustic solutions.	___Yes ___No
A 24.	The supplier has thickness measuring equipment available. Identify:	___Yes ___No
A 25.	The thickness measuring equipment is properly calibrated. a. What frequency? _____ Last calibration date _____	___Yes ___No
A 26.	Verify test coupons are processed with production material as required by the specification and they are properly identified.	___Sat ___Unsat ___N/A
A 27.	Process, general - good practices:	___Sat ___Unsat ___N/A
	a. Parts are visually examined prior to plating for material defects, dimensions (critical surfaces), heat treat condition, dissimilar metals, presence of residual stresses, etc	___Sat ___Unsat ___N/A

NAV24 - PLATING

	b. Parts are visually examined after removal from processing solutions for copper immersion products, non-soluble smuts, pitting, excessively etched surfaces, etc.	___ Sat ___ Unsat ___ N/A
	c. Parts visually examined for a water break free surface before subsequent processing.	___ Sat ___ Unsat ___ N/A
	b. Wiping and cleaning clothes are checked for grease, oil, etc., content.	___ Sat ___ Unsat ___ N/A
A 28.	A certified stress relieve/bake oven is available meeting the following requirements:	___ Sat ___ Unsat ___ N/A
	a. Uniformity survey conducted at specified frequency.	___ Sat ___ Unsat ___ N/A
	b. Accurate at the temperature used to specified tolerances.	___ Sat ___ Unsat ___ N/A
	What range - Min _____ Max _____	
	c. Equipped with a recording chart that meets specified degrees per inch.	___ Sat ___ Unsat ___ N/A

NAV24 - PLATING

	d. Control equipment is periodically calibrated and maintained. What frequency?	___ Sat ___ Unsat ___ N/A
	c. Is the stress relief/baking accomplished within specified time?	___ Sat ___ Unsat ___ N/A
	f. Are the parts held in over for specified time?	___ Sat ___ Unsat ___ N/A
A 29.	Housekeeping - Good Practices	___ Sat ___ Unsat ___ N/A
	a. Finishing tanks, electrical equipment, bus bars, and electrodes are relatively free of corrosion.	___ Sat ___ Unsat ___ N/A
	b. Excessive materials are not allowed in finishing area.	___ Sat ___ Unsat ___ N/A
	c. Chemicals and acids are stored in an area separate from finishing area.	___ Sat ___ Unsat ___ N/A
	d. Safety precautions are in practice, i.e. proper ventilation, personnel and parts.	___ Sat ___ Unsat ___ N/A

NAV24 - PLATING

	e. Tanks, such as anodize, chrome, hot alkaline cleaners, hot deoxidizers, etc., are equipped with exhaust systems.	___ Sat ___ Unsat ___ N/A
A 30.	Adequate cleaning facilities are available and in use.	___ Sat ___ Unsat ___ N/A
A 31.	Equipment is constructed and arranged to permit a uniform and controlled operation.	___ Sat ___ Unsat ___ N/A
	a. Sufficient working area has been allocated.	___ Sat ___ Unsat ___ N/A
	b. Adequate fire protection devices are maintained and readily available for use.	___ Sat ___ Unsat ___ N/A
A 32.	Packaging and Shipping:	
	a. Is adequate protection taken to prevent damage in shipment? (Internal and external)	___ Sat ___ Unsat ___ N/A
	b. Is adequate control provided to assure that packaging, marking and documentation is in accordance with applicable requirements?	___ Sat ___ Unsat ___ N/A

NAV24 - PLATING

General instructions for performing plating process audits:

- A. Determine the types of materials that are plated and the types of plating/coating that are performed at the supplier.
- B. Review a cross section of open and closed orders to measure historical performance. Closed orders should span a two to three year period if possible
- C. Choose a cross section of materials. E.g. type I materials such as 304 or 316 stainless, Type III nickel based alloys with particular attention to X-750 which has special baking requirements, type IV carbon and low alloy steels such as higher strength 4140/4340, type VI materials such as XM-13, 17-4PH, A286. A sample review of each of these materials is appropriate.
- D. Check requirements passed down to the plater in the purchase order from the parts supplier to the plater. Does the purchase order provide specific guidance, such as:
 - 1) Plating, examination and return of coupons
 - 2) Pre-plating stress relief for higher strength materials
 - 3) Post bake performed when required and performed at the right length of time
 - 4) Embrittlement relief testing
 - 5) Review the plater certification versus the format requirements of the specification. Check to ensure that information is completed consistent with expectations (e.g. is a post-bake heat treat is required, is a temperature and bake time documented. Are coupons available (not required to retain but many vendors do as objective evidence.)
 - 6) Perform similar compliance reviews on a sample basis for other types of plating. Read the specification carefully and understand all the requirements and when they should be complied with.

Additional Comments/Concerns: