161Thorn Hill Road
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AUDIT CRITERIA

AC7117/2 REV. A

Issued 2006-11

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Superseding AC7117/2

TO BE USED ON AUDITS STARTING ON OR AFTER JANUARY 18, 2015

Nadcap
AUDIT CRITERIA FOR
AUTOMATED PEENING

Editorial Change made to 8.2 on October 15, 2015

1. SCOPE

1.1 This audit criterion is used to survey a facility seeking Nadcap accreditation for the automated shot peening method. This process method checklist shall be used in conjunction with AC7117.

2. GENERAL INSTRUCTIONS

2.1 See AC7117 Section 2.

3. SUBSCRIBER SPECIFIC SUPPLEMENTS — SECTION NA

3.1 Instructions for the Auditors

3.1.1 In completing the prime specific assessment, Auditors are instructed to respond with a “YES” or “NO” to address compliance with each statement or requirement. For any negative responses, the Auditor must clearly indicate if the “NO” reflects noncompliance with respect to existence, adequacy, and/or compliance. Existence relates to documented procedure or policy, and compliance relates to evidence of effective implementation. The “NA” option is used only when the question is not applicable to the Supplier process. Choosing the “NA” option requires an explanation note.

3.1.2 The Auditor shall apply the questions in the supplemental checklist only to the Suppliers who specify the Customer end-users in the audit scope selection herein.

- ☐ U0 – User Unknown
- ☐ U10 – GE Aviation
- ☐ U00 – None
- ☐ U8 – Airbus
- ☐ U11 – The Boeing Company

3.2	U8 – Airbus Supplement *Note: If no automated shot peening is performed for Airbus check the box to collapse the U8 section.*	SECTION NA		
3.2.1	(U8) Where the arc height is outside the required range/tolerance, do procedures describe appropriate actions to identify the cause and take corrective action?	YES	NO	
3.2.2	(U8) Do procedures require re-verification of intensity after a significant change in the process?	YES	NO	
3.2.3	(U8) Is peening equipment either: Fitted with separators and classifiers; Without classifiers but which are fitted with separators which remove fines and it can be demonstrated that there is minimal risk of non-conformance immediately prior to the next scheduled re-assessment and/or shot replacement interval; or Without classifiers and/or separators and with specific written authorization by Airbus?	YES	NO	
3.2.4	(U8) Is new steel shot conditioned before use?	YES	NO	
3.2.5	(U8) Does the Supplier have a procedure for shot additions?	YES	NO	
3.2.6	(U8) Does the Supplier's procedure ensure that coverage does not exceed 500%?	YES	NO	
3.3	U10 – GE Aviation Supplement *Note: If no automated shot peening is performed for GE Aviation check the box to collapse the U10 section.*	SECTION NA		
3.3.1	(U10) Do the Supplier's procedures prevent the use of centrifugal wheel and manual peening for GE Aviation parts?	YES	NO	
3.3.2	(U10) Does the Supplier's equipment, used for P11TF3 peening, include the required hardware interlock or alarm controls that protect against unintended or lack of intended motion?	YES	NO	
3.3.3	(U10) If required, does the Supplier have a coverage map for the part and do the peened parts meet the coverage map?	YES	NO	NA
3.3.4	(U10) Are GE Aviation parts being peened during the automated job audit(s), on a shot peen machine that does not use centrifugal wheel peening?	YES	NO	NA
3.3.5	(U10) Do the Supplier's procedures verify if there is a requirement of coverage maps for GE Aviation?	YES	NO	NA
3.3.6	(U10) Has the Almen saturation curve(s) for GE Aviation parts being peened during the automated job audit(s), been re-run within the previous twelve months?	YES	NO	NA
3.4	U11 – The Boeing Company Supplement *Note: If no automated shot peening is performed for The Boeing*	SECTION NA		

Company check the box to collapse the U11 section.

3.4.1	(U11) Does the Supplier use only automated equipment to shot peen wing skins, chords, stringers and parts with flat contoured surface areas that are greater than 2 square feet, unless otherwise identified in the engineering drawing?	YES	NO	NA
3.4.2	(U11) Does the Supplier use Cast Steel shot that has a hardness of HRC 42-52 when required?	YES	NO	NA
3.4.3	(U11) Are the Supplier's controlled centrifugal force equipment (rotating table type) approved by The Boeing Company prior to use for BAC 5730 PSD 9-7 parts?	YES	NO	NA
3.4.4	(U11) Does the Supplier verify that sharp edges and corners are radiused prior to peening to meet the requirements of applicable The Boeing Company specifications?	YES	NO	
3.4.5	(U11) Does the Supplier verify the peening coverage requirement on a part by visual examination in conjunction with optical examination in accordance with BAC 5730?	YES	NO	
3.4.6	(U11) Does the amount of material removed post shot peening from low alloy parts (200ksi and above) meet the requirements of The Boeing Company specifications when applicable?	YES	NO	NA
3.4.7	(U11) Does the Supplier have evidence of inspection for bulging or rollover condition on parts after peening, as required by BAC 5730?	YES	NO	
3.4.8	(U11) Does the Supplier have and are they following procedure to visually inspect carburized and hardened The Boeing Company Helicopter parts for damage and notify The Boeing Company Helicopter Material Department when damage is detected, prior to any further processing?	YES	NO	NA
3.4.9	(U11) Does the Supplier use distilled water in the wet glass slurry medium?	YES	NO	NA
3.4.10	(U11) Are the Supplier's personnel that are performing or inspecting shot peening operations certified as required in BSS 7630 Table I?	YES	NO	
3.4.11	(U11) Does the certification training for the Supplier's shot peening operators meet the requirements of BSS 7630 Sec.5?	YES	NO	
3.4.12	(U11) Does the re-certification interval meet The Boeing Company requirements of twelve months?	YES	NO	

4. EQUIPMENT

4.1 General

4.1.1	Does peening equipment have the capability of mechanically moving the shot stream and/or the workpiece?	YES	NO	
4.1.2	Does the integral screening equipment classify 100% of the media prior to returning the media to the nozzle?	YES	NO	NA
4.1.3	Is the slurry volume of beads maintained per applicable Customer specifications during wet glass peening?	YES	NO	NA

5. ALMEN

No additional audit criteria.

6. MEDIA

No additional audit criteria.

7. PERSONNEL

No additional audit criteria.

8. GENERAL PROCEDURES

8.1	Records			
8.1.1	Does the Supplier have written procedures to ensure the identity of the specific operator; time, date of start and completion is recorded and retrievable?	YES	NO	
8.2	Software Quality Assurance *For the purpose of this check sheet, "software" is intended to only cover part-specific process control software (e.g. NC Programs).* *This section applies to Suppliers and processes where the approved process controls are based, at least partially, on a stored and retrieved program or program listing. Typically, these programs are loaded and executed on the peening machine.*			SECTION NA
8.2.1	Is there a written procedure for the control of software?	YES	NO	
8.2.2	Is each program uniquely identified?	YES	NO	
8.2.3	Is there a revision history maintained of changes to a program?	YES	NO	
8.2.4	Is the program revision identified in the router or operation sheet/work instruction to allow operator to verify against the control header?	YES	NO	
8.2.5	Is there an approval process for new and modified programs?	YES	NO	
8.2.6	Is new or changed program validation (1st piece) approved by quality and records maintained in accordance with the Suppliers quality system and Customer requirements?	YES	NO	

8.2.7	Are the storage requirements for software programs used to control and monitor the product defined and preserved in a way to prevent loss?	YES	NO
8.2.8	Is there a system in place to prevent unauthorized changes to a program after first piece inspection has been completed and approved?	YES	NO
8.2.9	Is there a system in place to prevent access to obsolete software?	YES	NO

9. JOB AUDIT #1

9.1	Job Information	
9.1.1	A Supplier who has computerized peening equipment may choose to be audited to the automated peening checklist, provided that their Customers do not require computerized peening. Jobs should be chosen according to the NMSE Job Audit Selection Guideline.	
9.1.2	Complete the following and then check the Supplier's information (technique sheets, travelers) against the purchasing requirements.	
9.1.2.1	Job Identity/Number:	_____
9.1.2.2	Technique ID:	_____
9.1.2.3	Generic Part Description:	_____
9.1.2.4	Part Number and Revision level (if applicable):	_____
9.1.2.5	Immediate Customer:	_____
9.1.2.6	End User (Prime) (If known):	_____
9.1.2.7	Purchase Order/Revision Level:	_____
9.1.2.8	Part Quantity:	_____
9.1.2.9	Serial/Lot Numbers (if provided):	_____
9.1.2.10	Start Date of Job:	_____
9.1.2.11	Processing Specification and Revision Level:	_____
9.1.2.12	Special Purchase Order Requirements:	_____
9.1.2.13	Is the job audit part live production, demonstration or previously processed?	_____
9.1.2.14	What Export Control Status did the Supplier identify the part as being?	_____
9.1.2.15	What status did the Auditor(s) identify themselves as being in the opening meeting? (Restricted or Unrestricted)	_____
9.2	Customer Requirements	
9.2.1	Are the engineering requirements provided from the purchase order, or in a variety of other forms, flowed down to the shop?	YES NO

9.2.2	Are media size and type flowed down to the shop floor?	YES	NO	
9.2.3	Are intensity and strip type flowed down to the shop floor?	YES	NO	
9.2.4	Are peening required areas, optional areas, and/or prohibited areas flowed down to the shop floor?	YES	NO	
9.2.5	Is the amount of part coverage flowed down to the shop floor?	YES	NO	NA
9.3	Implementation of Supplier Procedures			
9.3.1	Is the peening operation at this facility performed in the correct sequence as allowed by the traveler?	YES	NO	
9.3.2	Have the required Customer approval(s) been obtained for the current technique sheet?	YES	NO	NA
9.3.3	Are all operations, inspections, and tests performed prior to peening recorded on the traveler or electronic form, stamped, signed, or initialed and including date?	YES	NO	
9.3.4	If there are changes in travelers and/or technique sheets, are they approved and dated by authorized personnel?	YES	NO	NA
9.3.5	Do the personnel who are performing computerized peening operations and final inspections have the required training and qualification?	YES	NO	
9.3.6	Do all gages used to measure parameters in the technique sheet have current calibration identification?	YES	NO	
9.3.7	Are gages that are not calibrated labeled as “reference only” or similarly marked?	YES	NO	NA
9.3.8	Are Almen, part holding, masking, and nozzle fixtures compliant to applicable specifications?	YES	NO	
9.3.9	Is the operator capable of identifying equipment malfunctions?	YES	NO	
9.3.10	Does the operator know how to proceed when there is an equipment malfunction or automatic shut down?	YES	NO	
9.4	Pre-Processing			
9.4.1	Does the Supplier visually inspect the area to be peened for the absence of sharp edges, corrosion, contamination or damage prior to peening and were appropriate actions taken?	YES	NO	
9.4.2	Do the pre-peening cleaning methods used conform to the Customer requirements?	YES	NO	NA
9.4.3	During the job audit, the Auditor shall witness the following pre-processing tasks.			

9.4.3.1	Did the operator and/or appropriate personnel demonstrate proficiency in applying the masking requirements to the parts?	YES	NO	NA
9.4.3.2	Did the operator and/or appropriate personnel demonstrate proficiency in equipment and fixture usage?	YES	NO	
9.4.3.3	Did the operator and/or appropriate personnel demonstrate proficiency in the use of Almen gage and Almen strip?	YES	NO	
9.4.3.4	Did the operator and/or appropriate personnel demonstrate proficiency in the use of Almen strip fixtures?	YES	NO	
9.4.3.5	Did the operator and/or appropriate personnel demonstrate proficiency in calculating the resultant arc height (if pre-bow compensation method is used)?	YES	NO	NA
9.4.3.6	Did the operator and/or appropriate personnel demonstrate proficiency in nozzle/wheel position setup?	YES	NO	
9.4.3.7	Did the operator and/or appropriate personnel demonstrate proficiency in understanding saturation curves?	YES	NO	
9.4.3.8	Did the operator and/or appropriate personnel demonstrate proficiency in media sampling which accurately represents the condition of the shot stream media?	YES	NO	

9.5	Processing			
9.5.1	Did in-process media quality inspection results for this job audit meet the Customer requirements for media type?	YES	NO	NA
9.5.2	Did in-process media quality inspection results for this job audit meet the Customer requirements for screens?	YES	NO	NA
9.5.3	Did in-process media quality inspection meet the Customer requirements for sieve analysis results?	YES	NO	NA
9.5.4	Did in-process media quality inspection results for this job audit meet the Customer requirements for shape sample inspection area?	YES	NO	NA
9.5.5	Did in-process media quality inspection results for this job audit meet the Customer requirements for the actual unacceptable shape?	YES	NO	NA
9.5.6	Did in-process media quality inspection results for this job audit meet the Customer specified requirements?	YES	NO	NA
9.5.7	Are periodic media quality inspections performed at the required intervals?	YES	NO	
9.5.8	Is the slurry volume of beads maintained per applicable specifications during wet glass peening?	YES	NO	NA
9.5.9	Are parts processed in accordance with a technique sheet?	YES	NO	

9.5.10	Does the technique sheet or traveler document all relevant operations performed by the operator?	YES	NO	
9.5.11	Do the Almen fixture locations represent the surfaces to be peened?	YES	NO	NA
9.5.12	Does the Almen fixture being used provide the same number, type, location, and orientation of the Almen strips described in the technique sheet?	YES	NO	
9.5.13	If shaded strips are used, does the Supplier have approval to use them?	YES	NO	NA
9.6	Technique Sheet and Shop Floor Discipline			
9.6.1	Is the job audit part number specified on the technique sheet and correctly followed in production?	YES	NO	
9.6.2	Is the job audit technique sheet revision controlled and correctly followed in production?	YES	NO	
9.6.3	Are job audit part program(s) with revision identified on the technique sheet and being followed in production?	YES	NO	NA
9.6.4	Are approvals from both Supplier and Customer on the job audit technique sheet and does the technique sheet have required approvals?	YES	NO	NA
9.6.5	Are part specific tooling and fixtures identified on the technique sheet and correctly followed in production?	YES	NO	
9.6.6	Are Almen fixtures identified on the technique sheet and correctly followed in production?	YES	NO	
9.6.7	Is part masking identified on the technique sheet and correctly followed in production?	YES	NO	NA
9.6.8	Is the identification of peening equipment listed on the technique sheet and correctly followed in production?	YES	NO	
9.6.9	Is number of nozzles or wheels listed on the technique sheet and correctly followed in production?	YES	NO	NA
9.6.10	Is air pressure or wheel speed listed on the technique sheet and correctly followed in production?	YES	NO	
9.6.11	Is nozzle size listed on the technique sheet and correctly followed in production?	YES	NO	NA
9.6.12	Is air jet size listed on the technique sheet and correctly followed in production?	YES	NO	NA

9.6.13	Is part rotation or translation rate listed on the technique sheet and correctly followed in production?	YES	NO	NA
9.6.14	Are setup sketches or photos listed on the technique sheet and is the observed set up in the job audit accurately described?	YES	NO	
9.6.15	Is nozzle or wheel translation speed listed on the technique sheet and correctly followed in production?	YES	NO	NA
9.6.16	Is travel direction, and travel distance to the part listed on the technique sheet and correctly followed in production?	YES	NO	NA
9.6.17	Is nozzle or wheel position to the part listed on the technique sheet and correctly followed in production?	YES	NO	NA
9.6.18	Is the part orientation setup relative to the machine listed on the technique sheet and correctly followed in production?	YES	NO	NA
9.6.19	Is shot flow control listed on the technique sheet and correctly followed in production?	YES	NO	
9.6.20	Is shot flow value listed on the technique sheet and correctly followed in production?	YES	NO	
9.6.21	Is part peening time (or cycles) listed on the technique sheet and correctly followed in production?	YES	NO	
9.6.22	Is almen strip peening time (or cycles) listed on the technique sheet and correctly followed in production?	YES	NO	
9.6.23	Is media size, hardness, and type listed on the technique sheet and correctly followed in production?	YES	NO	
9.6.24	Is required intensity and test strip type listed on the technique sheet and correctly followed in production?	YES	NO	
9.6.25	Is the amount of coverage listed on the technique sheet and correctly followed in production?	YES	NO	NA
9.7	Process Validation			
9.7.1	Does the Supplier process substantiation data include a saturation curve consisting of a minimum of 4 points (not including “0” point) for each intensity determination location?	YES	NO	
9.7.2	Does the Supplier process substantiation data include intensity verification tests performed at required intervals?	YES	NO	
9.7.3	Does the Supplier process substantiation data include appropriate actions (e.g. accept/reject) based on the job audit Almen strip readings?	YES	NO	

9.7.4	Verify the following values for two Almen locations or if applicable a single location at two times for the job audit part.			
9.7.4.1	Are the observed Almen strip locations used to verify the intensity correctly located?	YES	NO	
9.7.4.2	Is the observed Almen strip type used to verify the intensity correct?	YES	NO	
9.7.4.3	Is the observed intensity value compliant to the Customer intensity requirement?	YES	NO	
9.7.4.4	Is the observed intensity verification range compliant to requirements?	YES	NO	
9.7.4.5	Is the observed initial Almen reading compliant to requirements?	YES	NO	
9.7.4.6	Is the observed final Almen reading compliant to requirements?	YES	NO	NA
9.7.5	For one of the job audits, the Auditor shall witness the generation of saturation curve data and media inspections to verify that the following are correct.			
9.7.5.1	Does the generation of the saturation curve utilize of a minimum of 4 points for each intensity determination location (not including the zero point)?	YES	NO	
9.7.5.2	Are the practices of SAE J443 followed?	YES	NO	
9.7.5.3	Does the media inspection verify shot size by sieve analysis or wet glass verification by bead slurry concentration?	YES	NO	
9.7.5.4	Does the media inspection verify shot fracture counts and shape inspection; or wet glass verification by bead slurry fines concentration?	YES	NO	
9.8	Post Peening Inspection			
9.8.1	Did the operator and/or appropriate personnel demonstrate proficiency during the inspection of fluorescent tracer?	YES	NO	NA
9.8.2	Did the operator and/or appropriate personnel demonstrate proficiency during part inspection for coverage using magnification and other inspection aids?	YES	NO	
9.8.3	Is final inspection for coverage and effectiveness of applicable masking performed?	YES	NO	
9.8.4	Is the coverage inspected visually on all parts (100%) or in accordance with an approved sampling plan?	YES	NO	
9.8.4.1	(INFO) Record the frequency of inspection:	_____		
9.8.5	Are part serial numbers maintained throughout the peening operation?	YES	NO	NA

9.8.6	Do the post-peening cleaning methods used conform to the Customer requirements?	YES	NO	NA
9.8.7	Were parts handled, stored, and transported in a manner to prevent damage?	YES	NO	
9.8.8	Did final inspection result in the proper disposition of the part(s) audited?	YES	NO	
9.8.9	Did an inspection check that the part is free from media debris (internal and external), masking residue, edge rollover, and handling damage and were appropriate actions taken?	YES	NO	
9.8.10	Is the traveler properly completed prior to the part continuing to the next operation or shipment to the Customer?	YES	NO	
9.8.11	When required, does the certification that is returned to the Customer meet the Customer requirements?	YES	NO	NA
9.8.12	(INFO) If YES record the Certification number here:	_____		

10.	JOB AUDIT #2	SECTION NA
10.1	Job Information	
10.1.1	A Supplier who has computerized peening equipment may choose to be audited to the automated peening checklist, provided that their Customers do not require computerized peening. Jobs should be chosen according to the NMSE Job Audit Selection Guideline.	
10.1.2	Complete the following and then check the Supplier's information (technique sheets, travelers) against the purchasing requirements.	
10.1.2.1	Job Identity/Number:	_____
10.1.2.2	Technique ID:	_____
10.1.2.3	Generic Part Description:	_____
10.1.2.4	Part Number and Revision level (if applicable):	_____
10.1.2.5	Immediate Customer:	_____
10.1.2.6	End User (Prime) (If known):	_____
10.1.2.7	Purchase Order/Revision Level:	_____
10.1.2.8	Part Quantity:	_____
10.1.2.9	Serial/Lot Numbers (if provided):	_____
10.1.2.10	Start Date of Job:	_____
10.1.2.11	Processing Specification and Revision Level:	_____
10.1.2.12	Special Purchase Order Requirements:	_____
10.1.2.13	Is the job audit part live production, demonstration or previously processed?	_____
10.1.2.14	What Export Control Status did the Supplier identify the part as being?	_____
10.1.2.15	What status did the Auditor(s) identify themselves as being in the opening meeting? (Restricted or Unrestricted)	_____
10.2	Customer Requirements	
10.2.1	Are the engineering requirements provided from the purchase order, or in a variety of other forms, flowed down to the shop?	YES NO
10.2.2	Are media size and type flowed down to the shop floor?	YES NO

10.2.3	Are intensity and strip type flowed down to the shop floor?	YES	NO	
10.2.4	Are peening required areas, optional areas, and/or prohibited areas flowed down to the shop floor?	YES	NO	
10.2.5	Is the amount of part coverage flowed down to the shop floor?	YES	NO	NA
10.3	Implementation of Supplier Procedures			
10.3.1	Is the peening operation at this facility performed in the correct sequence as allowed by the traveler?	YES	NO	
10.3.2	Have the required Customer approval(s) been obtained for the current technique sheet?	YES	NO	NA
10.3.3	Are all operations, inspections, and tests performed prior to peening recorded on the traveler or electronic form, stamped, signed, or initialed and including date?	YES	NO	
10.3.4	If there are changes in travelers and/or technique sheets, are they approved and dated by authorized personnel?	YES	NO	NA
10.3.5	Do the personnel who are performing computerized peening operations and final inspections have the required training and qualification?	YES	NO	
10.3.6	Do all gages used to measure parameters in the technique sheet have current calibration identification?	YES	NO	
10.3.7	Are gages that are not calibrated labeled as “reference only” or similarly marked?	YES	NO	NA
10.3.8	Are Almen, part holding, masking, and nozzle fixtures compliant to applicable specifications?	YES	NO	
10.3.9	Is the operator capable of identifying equipment malfunctions?	YES	NO	
10.3.10	Does the operator know how to proceed when there is an equipment malfunction or automatic shut down?	YES	NO	
10.4	Pre-Processing			
10.4.1	Does the Supplier visually inspect the area to be peened for the absence of sharp edges, corrosion, contamination or damage prior to peening and were appropriate actions taken?	YES	NO	
10.4.2	Do the pre-peening cleaning methods used conform to the Customer requirements?	YES	NO	NA
10.4.3	During the job audit, the Auditor shall witness the following pre-processing tasks.			
10.4.3.1	Did the operator and/or appropriate personnel demonstrate proficiency in applying the masking requirements to the parts?	YES	NO	NA

10.4.3.2	Did the operator and/or appropriate personnel demonstrate proficiency in equipment and fixture usage?	YES	NO	
10.4.3.3	Did the operator and/or appropriate personnel demonstrate proficiency in the use of Almen gage and Almen strip?	YES	NO	
10.4.3.4	Did the operator and/or appropriate personnel demonstrate proficiency in the use of Almen strip fixtures?	YES	NO	
10.4.3.5	Did the operator and/or appropriate personnel demonstrate proficiency in calculating the resultant arc height (if pre-bow compensation method is used)?	YES	NO	NA
10.4.3.6	Did the operator and/or appropriate personnel demonstrate proficiency in nozzle/wheel position setup?	YES	NO	
10.4.3.7	Did the operator and/or appropriate personnel demonstrate proficiency in understanding saturation curves?	YES	NO	
10.4.3.8	Did the operator and/or appropriate personnel demonstrate proficiency in media sampling which accurately represents the condition of the shot stream media?	YES	NO	

10.5	Processing			
10.5.1	Did in-process media quality inspection results for this job audit meet the Customer requirements for media type?	YES	NO	NA
10.5.2	Did in-process media quality inspection results for this job audit meet the Customer requirements for screens?	YES	NO	NA
10.5.3	Did in-process media quality inspection meet the Customer requirements for sieve analysis results?	YES	NO	NA
10.5.4	Did in-process media quality inspection results for this job audit meet the Customer requirements for shape sample inspection area?	YES	NO	NA
10.5.5	Did in-process media quality inspection results for this job audit meet the Customer requirements for the actual unacceptable shape?	YES	NO	NA
10.5.6	Did in-process media quality inspection results for this job audit meet the Customer specified requirements?	YES	NO	NA
10.5.7	Are periodic media quality inspections performed at the required intervals?	YES	NO	
10.5.8	Is the slurry volume of beads maintained per applicable specifications during wet glass peening?	YES	NO	NA
10.5.9	Are parts processed in accordance with a technique sheet?	YES	NO	
10.5.10	Does the technique sheet or traveler document all relevant operations performed by the operator?	YES	NO	

10.5.11	Do the Almen fixture locations represent the surfaces to be peened?	YES	NO	NA
10.5.12	Does the Almen fixture being used provide the same number, type, location, and orientation of the Almen strips described in the technique sheet?	YES	NO	
10.5.13	If shaded strips are used, does the Supplier have approval to use them?	YES	NO	NA
10.6	Technique Sheet and Shop Floor Discipline			
10.6.1	Is the job audit part number specified on the technique sheet and correctly followed in production?	YES	NO	
10.6.2	Is the job audit technique sheet revision controlled and correctly followed in production?	YES	NO	
10.6.3	Are job audit part program(s) with revision identified on the technique sheet and being followed in production?	YES	NO	NA
10.6.4	Are approvals from both Supplier and Customer on the job audit technique sheet and does the technique sheet have required approvals?	YES	NO	NA
10.6.5	Are part specific tooling and fixtures identified on the technique sheet and correctly followed in production?	YES	NO	
10.6.6	Are Almen fixtures identified on the technique sheet and correctly followed in production?	YES	NO	
10.6.7	Is part masking identified on the technique sheet and correctly followed in production?	YES	NO	NA
10.6.8	Is the identification of peening equipment listed on the technique sheet and correctly followed in production?	YES	NO	
10.6.9	Is number of nozzles or wheels listed on the technique sheet and correctly followed in production?	YES	NO	NA
10.6.10	Is air pressure or wheel speed listed on the technique sheet and correctly followed in production?	YES	NO	
10.6.11	Is nozzle size listed on the technique sheet and correctly followed in production?	YES	NO	NA
10.6.12	Is air jet size listed on the technique sheet and correctly followed in production?	YES	NO	NA
10.6.13	Is part rotation or translation rate listed on the technique sheet and correctly followed in production?	YES	NO	NA

10.6.14	Are setup sketches or photos listed on the technique sheet and is the observed set up in the job audit accurately described?	YES	NO	
10.6.15	Is nozzle or wheel translation speed listed on the technique sheet and correctly followed in production?	YES	NO	NA
10.6.16	Is travel direction, and travel distance to the part listed on the technique sheet and correctly followed in production?	YES	NO	NA
10.6.17	Is nozzle or wheel position to the part listed on the technique sheet and correctly followed in production?	YES	NO	NA
10.6.18	Is the part orientation setup relative to the machine listed on the technique sheet and correctly followed in production?	YES	NO	NA
10.6.19	Is shot flow control listed on the technique sheet and correctly followed in production?	YES	NO	
10.6.20	Is shot flow value listed on the technique sheet and correctly followed in production?	YES	NO	
10.6.21	Is part peening time (or cycles) listed on the technique sheet and correctly followed in production?	YES	NO	
10.6.22	Is almen strip peening time (or cycles) listed on the technique sheet and correctly followed in production?	YES	NO	
10.6.23	Is media size, hardness, and type listed on the technique sheet and correctly followed in production?	YES	NO	
10.6.24	Is required intensity and test strip type listed on the technique sheet and correctly followed in production?	YES	NO	
10.6.25	Is the amount of coverage listed on the technique sheet and correctly followed in production?	YES	NO	NA
10.7	Process Validation			
10.7.1	Does the Supplier process substantiation data include a saturation curve consisting of a minimum of 4 points (not including “0” point) for each intensity determination location?	YES	NO	
10.7.2	Does the Supplier process substantiation data include intensity verification tests performed at required intervals?	YES	NO	
10.7.3	Does the Supplier process substantiation data include appropriate actions (e.g. accept/reject) based on the job audit Almen strip readings?	YES	NO	
10.7.4	Verify the following values for two Almen locations or if applicable a single location at two times for the job audit part.			

10.7.4.1	Are the observed Almen strip locations used to verify the intensity correctly located?	YES	NO	
10.7.4.2	Is the observed Almen strip type used to verify the intensity correct?	YES	NO	
10.7.4.3	Is the observed intensity value compliant to the Customer intensity requirement?	YES	NO	
10.7.4.4	Is the observed intensity verification range compliant to requirements?	YES	NO	
10.7.4.5	Is the observed initial Almen reading compliant to requirements?	YES	NO	
10.7.4.6	Is the observed final Almen reading compliant to requirements?	YES	NO	NA
10.7.5	For one of the job audits, the Auditor shall witness the generation of saturation curve data and media inspections to verify that the following are correct.			
10.7.5.1	Does the generation of the saturation curve utilize of a minimum of 4 points for each intensity determination location (not including the zero point)?	YES	NO	
10.7.5.2	Are the practices of SAE J443 followed?	YES	NO	
10.7.5.3	Does the media inspection verify shot size by sieve analysis or wet glass verification by bead slurry concentration?	YES	NO	
10.7.5.4	Does the media inspection verify shot fracture counts and shape inspection; or wet glass verification by bead slurry fines concentration?	YES	NO	
10.8	Post Peening Inspection			
10.8.1	Did the operator and/or appropriate personnel demonstrate proficiency during the inspection of fluorescent tracer?	YES	NO	NA
10.8.2	Did the operator and/or appropriate personnel demonstrate proficiency during part inspection for coverage using magnification and other inspection aids?	YES	NO	
10.8.3	Is final inspection for coverage and effectiveness of applicable masking performed?	YES	NO	
10.8.4	Is the coverage inspected visually on all parts (100%) or in accordance with an approved sampling plan?	YES	NO	
10.8.4.1	(INFO) Record the frequency of inspection:	_____		
10.8.5	Are part serial numbers maintained throughout the peening operation?	YES	NO	NA
10.8.6	Do the post-peening cleaning methods used conform to the Customer requirements?	YES	NO	NA

10.8.7	Were parts handled, stored, and transported in a manner to prevent damage?	YES	NO	
10.8.8	Did final inspection result in the proper disposition of the part(s) audited?	YES	NO	
10.8.9	Did an inspection check that the part is free from media debris (internal and external), masking residue, edge rollover, and handling damage and were appropriate actions taken?	YES	NO	
10.8.10	Is the traveler properly completed prior to the part continuing to the next operation or shipment to the Customer?	YES	NO	
10.8.11	When required, does the certification that is returned to the Customer meet the Customer requirements?	YES	NO	NA
10.8.12	(INFO) If YES record the Certification number here:	_____		

11.	JOB AUDIT #3	SECTION NA
11.1	Job Information	
11.1.1	A Supplier who has computerized peening equipment may choose to be audited to the automated peening checklist, provided that their Customers do not require computerized peening. Jobs should be chosen according to the NMSE Job Audit Selection Guideline.	
11.1.2	Complete the following and then check the Supplier's information (technique sheets, travelers) against the purchasing requirements.	
11.1.2.1	Job Identity/Number:	_____
11.1.2.2	Technique ID:	_____
11.1.2.3	Generic Part Description:	_____
11.1.2.4	Part Number and Revision level (if applicable):	_____
11.1.2.5	Immediate Customer:	_____
11.1.2.6	End User (Prime) (If known):	_____
11.1.2.7	Purchase Order/Revision Level:	_____
11.1.2.8	Part Quantity:	_____
11.1.2.9	Serial/Lot Numbers (if provided):	_____
11.1.2.10	Start Date of Job:	_____
11.1.2.11	Processing Specification and Revision Level:	_____
11.1.2.12	Special Purchase Order Requirements:	_____
11.1.2.13	Is the job audit part live production, demonstration or previously processed?	_____
11.1.2.14	What Export Control Status did the Supplier identify the part as being?	_____
11.1.2.15	What status did the Auditor(s) identify themselves as being in the opening meeting? (Restricted or Unrestricted)	_____
11.2	Customer Requirements	
11.2.1	Are the engineering requirements provided from the purchase order, or in a variety of other forms, flowed down to the shop?	YES NO
11.2.2	Are media size and type flowed down to the shop floor?	YES NO

11.2.3	Are intensity and strip type flowed down to the shop floor?	YES	NO	
11.2.4	Are peening required areas, optional areas, and/or prohibited areas flowed down to the shop floor?	YES	NO	
11.2.5	Is the amount of part coverage flowed down to the shop floor?	YES	NO	NA
11.3	Implementation of Supplier Procedures			
11.3.1	Is the peening operation at this facility performed in the correct sequence as allowed by the traveler?	YES	NO	
11.3.2	Have the required Customer approval(s) been obtained for the current technique sheet?	YES	NO	NA
11.3.3	Are all operations, inspections, and tests performed prior to peening recorded on the traveler or electronic form, stamped, signed, or initialed and including date?	YES	NO	
11.3.4	If there are changes in travelers and/or technique sheets, are they approved and dated by authorized personnel?	YES	NO	NA
11.3.5	Do the personnel who are performing computerized peening operations and final inspections have the required training and qualification?	YES	NO	
11.3.6	Do all gages used to measure parameters in the technique sheet have current calibration identification?	YES	NO	
11.3.7	Are gages that are not calibrated labeled as “reference only” or similarly marked?	YES	NO	NA
11.3.8	Are Almen, part holding, masking, and nozzle fixtures compliant to applicable specifications?	YES	NO	
11.3.9	Is the operator capable of identifying equipment malfunctions?	YES	NO	
11.3.10	Does the operator know how to proceed when there is an equipment malfunction or automatic shut down?	YES	NO	
11.4	Pre-Processing			
11.4.1	Does the Supplier visually inspect the area to be peened for the absence of sharp edges, corrosion, contamination or damage prior to peening and were appropriate actions taken?	YES	NO	
11.4.2	Do the pre-peening cleaning methods used conform to the Customer requirements?	YES	NO	NA
11.4.3	During the job audit, the Auditor shall witness the following pre-processing tasks.			
11.4.3.1	Did the operator and/or appropriate personnel demonstrate proficiency in applying the masking requirements to the parts?	YES	NO	NA

11.4.3.2	Did the operator and/or appropriate personnel demonstrate proficiency in equipment and fixture usage?	YES	NO	
11.4.3.3	Did the operator and/or appropriate personnel demonstrate proficiency in the use of Almen gage and Almen strip?	YES	NO	
11.4.3.4	Did the operator and/or appropriate personnel demonstrate proficiency in the use of Almen strip fixtures?	YES	NO	
11.4.3.5	Did the operator and/or appropriate personnel demonstrate proficiency in calculating the resultant arc height (if pre-bow compensation method is used)?	YES	NO	NA
11.4.3.6	Did the operator and/or appropriate personnel demonstrate proficiency in nozzle/wheel position setup?	YES	NO	
11.4.3.7	Did the operator and/or appropriate personnel demonstrate proficiency in understanding saturation curves?	YES	NO	
11.4.3.8	Did the operator and/or appropriate personnel demonstrate proficiency in media sampling which accurately represents the condition of the shot stream media?	YES	NO	

11.5	Processing			
11.5.1	Did in-process media quality inspection results for this job audit meet the Customer requirements for media type?	YES	NO	NA
11.5.2	Did in-process media quality inspection results for this job audit meet the Customer requirements for screens?	YES	NO	NA
11.5.3	Did in-process media quality inspection meet the Customer requirements for sieve analysis results?	YES	NO	NA
11.5.4	Did in-process media quality inspection results for this job audit meet the Customer requirements for shape sample inspection area?	YES	NO	NA
11.5.5	Did in-process media quality inspection results for this job audit meet the Customer requirements for the actual unacceptable shape?	YES	NO	NA
11.5.6	Did in-process media quality inspection results for this job audit meet the Customer specified requirements?	YES	NO	NA
11.5.7	Are periodic media quality inspections performed at the required intervals?	YES	NO	
11.5.8	Is the slurry volume of beads maintained per applicable specifications during wet glass peening?	YES	NO	NA
11.5.9	Are parts processed in accordance with a technique sheet?	YES	NO	
11.5.10	Does the technique sheet or traveler document all relevant operations performed by the operator?	YES	NO	

11.5.11	Do the Almen fixture locations represent the surfaces to be peened?	YES	NO	NA
11.5.12	Does the Almen fixture being used provide the same number, type, location, and orientation of the Almen strips described in the technique sheet?	YES	NO	
11.5.13	If shaded strips are used, does the Supplier have approval to use them?	YES	NO	NA
11.6	Technique Sheet and Shop Floor Discipline			
11.6.1	Is the job audit part number specified on the technique sheet and correctly followed in production?	YES	NO	
11.6.2	Is the job audit technique sheet revision controlled and correctly followed in production?	YES	NO	
11.6.3	Are job audit part program(s) with revision identified on the technique sheet and being followed in production?	YES	NO	NA
11.6.4	Are approvals from both Supplier and Customer on the job audit technique sheet and does the technique sheet have required approvals?	YES	NO	NA
11.6.5	Are part specific tooling and fixtures identified on the technique sheet and correctly followed in production?	YES	NO	
11.6.6	Are Almen fixtures identified on the technique sheet and correctly followed in production?	YES	NO	
11.6.7	Is part masking identified on the technique sheet and correctly followed in production?	YES	NO	NA
11.6.8	Is the identification of peening equipment listed on the technique sheet and correctly followed in production?	YES	NO	
11.6.9	Is number of nozzles or wheels listed on the technique sheet and correctly followed in production?	YES	NO	NA
11.6.10	Is air pressure or wheel speed listed on the technique sheet and correctly followed in production?	YES	NO	
11.6.11	Is nozzle size listed on the technique sheet and correctly followed in production?	YES	NO	NA
11.6.12	Is air jet size listed on the technique sheet and correctly followed in production?	YES	NO	NA
11.6.13	Is part rotation or translation rate listed on the technique sheet and correctly followed in production?	YES	NO	NA

11.6.14	Are setup sketches or photos listed on the technique sheet and is the observed set up in the job audit accurately described?	YES	NO	
11.6.15	Is nozzle or wheel translation speed listed on the technique sheet and correctly followed in production?	YES	NO	NA
11.6.16	Is travel direction, and travel distance to the part listed on the technique sheet and correctly followed in production?	YES	NO	NA
11.6.17	Is nozzle or wheel position to the part listed on the technique sheet and correctly followed in production?	YES	NO	NA
11.6.18	Is the part orientation setup relative to the machine listed on the technique sheet and correctly followed in production?	YES	NO	NA
11.6.19	Is shot flow control listed on the technique sheet and correctly followed in production?	YES	NO	
11.6.20	Is shot flow value listed on the technique sheet and correctly followed in production?	YES	NO	
11.6.21	Is part peening time (or cycles) listed on the technique sheet and correctly followed in production?	YES	NO	
11.6.22	Is almen strip peening time (or cycles) listed on the technique sheet and correctly followed in production?	YES	NO	
11.6.23	Is media size, hardness, and type listed on the technique sheet and correctly followed in production?	YES	NO	
11.6.24	Is required intensity and test strip type listed on the technique sheet and correctly followed in production?	YES	NO	
11.6.25	Is the amount of coverage listed on the technique sheet and correctly followed in production?	YES	NO	NA
11.7	Process Validation			
11.7.1	Does the Supplier process substantiation data include a saturation curve consisting of a minimum of 4 points (not including “0” point) for each intensity determination location?	YES	NO	
11.7.2	Does the Supplier process substantiation data include intensity verification tests performed at required intervals?	YES	NO	
11.7.3	Does the Supplier process substantiation data include appropriate actions (e.g. accept/reject) based on the job audit Almen strip readings?	YES	NO	
11.7.4	Verify the following values for two Almen locations or if applicable a single location at two times for the job audit part.			

11.7.4.1	Are the observed Almen strip locations used to verify the intensity correctly located?	YES	NO	
11.7.4.2	Is the observed Almen strip type used to verify the intensity correct?	YES	NO	
11.7.4.3	Is the observed intensity value compliant to the Customer intensity requirement?	YES	NO	
11.7.4.4	Is the observed intensity verification range compliant to requirements?	YES	NO	
11.7.4.5	Is the observed initial Almen reading compliant to requirements?	YES	NO	
11.7.4.6	Is the observed final Almen reading compliant to requirements?	YES	NO	NA
11.7.5	For one of the job audits, the Auditor shall witness the generation of saturation curve data and media inspections to verify that the following are correct.			
11.7.5.1	Does the generation of the saturation curve utilize of a minimum of 4 points for each intensity determination location (not including the zero point)?	YES	NO	
11.7.5.2	Are the practices of SAE J443 followed?	YES	NO	
11.7.5.3	Does the media inspection verify shot size by sieve analysis or wet glass verification by bead slurry concentration?	YES	NO	
11.7.5.4	Does the media inspection verify shot fracture counts and shape inspection; or wet glass verification by bead slurry fines concentration?	YES	NO	
11.8	Post Peening Inspection			
11.8.1	Did the operator and/or appropriate personnel demonstrate proficiency during the inspection of fluorescent tracer?	YES	NO	NA
11.8.2	Did the operator and/or appropriate personnel demonstrate proficiency during part inspection for coverage using magnification and other inspection aids?	YES	NO	
11.8.3	Is final inspection for coverage and effectiveness of applicable masking performed?	YES	NO	
11.8.4	Is the coverage inspected visually on all parts (100%) or in accordance with an approved sampling plan?	YES	NO	
11.8.4.1	(INFO) Record the frequency of inspection:	_____		
11.8.5	Are part serial numbers maintained throughout the peening operation?	YES	NO	NA
11.8.6	Do the post-peening cleaning methods used conform to the Customer requirements?	YES	NO	NA

11.8.7	Were parts handled, stored, and transported in a manner to prevent damage?	YES	NO	
11.8.8	Did final inspection result in the proper disposition of the part(s) audited?	YES	NO	
11.8.9	Did an inspection check that the part is free from media debris (internal and external), masking residue, edge rollover, and handling damage and were appropriate actions taken?	YES	NO	
11.8.10	Is the traveler properly completed prior to the part continuing to the next operation or shipment to the Customer?	YES	NO	
11.8.11	When required, does the certification that is returned to the Customer meet the Customer requirements?	YES	NO	NA
11.8.12	(INFO) If YES record the Certification number here:	_____		