



PROCESS CHECK REPORT

Company:		
Process Title	ELECTRIC RESISTANCE WELDING	
Category(s) of Approval	6k; 6m; 6n; 6p	
Process Check Report Ref. No:		
Date Of Process Audit:		
Auditor (please print name):		
Nadcap Reference (if applicable)		
Invoked Documents:- HBIFSAS/QA/SC1, QAIS Doc Ref Q5B-008H		
QA Element	Yes	No
	✓	X
Calibration Status: All Inspection, Measuring and Test Equipment used in this Process is calibrated, and certified against equipment traceable to National Standards		
Material Usage: All Material used in this Process is in accordance with requirements of the relevant Process Specification/Standard		
BAEP/BS: All work has been processed in accordance with the latest issue of the relevant BAEP(s) and/or National Standards		
Technique Sheets: All applicable Technique Sheets used, including Inspection Plans, are to the latest issue and have been approved by HBQSC		
Training/Qualification: All relevant personnel involved with this Process are appropriately trained, qualified and assessed periodically		
Internal Audit: The Internal Audit for this Process is current, with no outstanding CAs		
If No to any of the above QA Elements - give details below:		
Audit Comments:		
Auditor:	QA Manager:	Approved by (HBQSC):



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Invoked Documents Listing

1. Process Specifications

Reference No.	Title	Issue
BAEP 4523	Electric Resistance Welding	2
BAEP 9050	Etching Of Aluminium Alloys In Almeco 100 BAe and 199	4

2. Quality Assurance Instructions To Suppliers

Reference No.	Title	Issue

3. Other Technical Documents Invoked

Reference No.	Title	Issue

4. General

For any deviations to the applicable BAEP please see the Processor Surveillance Questionnaire Pack



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AUDIT FINDINGS

Details Of Check	Result / Remarks	Action Required
Is BAEP 4523 available and at the correct issue.		
Does an internal procedure exist and what is its reference/issue.		
Is the operation for resistance welding satisfactorily incorporated into the planning.		
Are the history sheets available and fully endorsed.		
Does a maintenance and approval schedule for the operation and maintenance of the specific welding machine exist and is it adjacent to the corresponding machine.		
Are the individual welding machines approved by BAe or Raytheon in conjunction with the company inspection department for the materials, thickness and which process.		
Are the details of the settings covered by Technique Sheets and agreed/approved.		
Has any maintenance been carried out, if so is this recorded.		
Are the materials being welded approved and in accordance with BAEP 4523 section 5.		



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AUDIT FINDINGS

Details Of Check	Result / Remarks	Action Required
Are all parts adequately cleaned of grease, oxide scale or paint prior to welding being carried out.		
Are aluminium parts not anodised and steel parts not plated prior to resistance welding.		
Are the parts welded within 12 hours of cleaning or are they covered with clean polythene sheet if welded after this time limit.		
Do personnel wear clean gloves after cleaning and until the parts have been welded. Note the faces which are to be welded must not be handled.		

For Aluminium Alloys

Are all parts cleaned using sodium flouride (BAEP 9057) or aloclene 100 (BAEP 9050) or local paste etchant. In the case of L59, L61 and L113 are these only cleaned with paste etch or aloclene or sodium flouride pickle to clause 9 of BAEP 4523.		
If aluminium parts have been freshly solutionised have the parts been cleaned only after 12 hours from the heat treatment. Note in special cases longer times are subject to approval via the technique sheets.		



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If using 3 phase machines has wire brushing immediately prior to welding been carried out. (Are 39 swg stainless steel brushes used). Note these brushes should not be used for other materials.		
Are the paste etches in accordance with clause 8 of BAEP 4523.		

For Mild Steel

Are parts degreased in accordance with BAEP 9053 or another approved method.		
Are parts cleaned either by pickling to def stan 03-2 method F, or by grit blasting to BAEP 2003/vapour blasting to BAEP 2004.		
Are the parts immediately welded after cleaning to prevent local rusting.		

For Stainless Steel

Are parts degreased and cleaned as per that of mild steel except that grit blasting should not be carried out.		
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For Titanium

Parts that have been formed, has a stress relief or heat treatment been carried out.		
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Has this been followed by vacu- blasting and pickling to BAEP 9056 prior to welding.		
Has degreasing been carried out to the preferred alkaline method or cold genklene.		
Are the titanium parts welded within 12 hours of cleaning or are they covered with clean polythene sheet if welded after this time limit.		

General

Are the parts to be welded in contact with each other (slight pressure may be used to bring them into contact).		
Are clamps or fixture used to hold parts together.		
Are tack spots used, if so are they positioned away from the main welding run.		
Are the machine settings, electrode tip or track width determined and detailed in the technique sheet.		
Prior to welding have the electrodes been checked for cleanliness, alignment and they are in a good condition.		



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Have the control tests been carried out prior to commencement of the production parts i.e., shear/macro tests and peel/chisel.		
Are the electrodes cleaned regularly during the production run (do the electrodes need changing or re-machining during the run).		
What is used to dress the electrodes (as and when required).		
Are the work pieces only brought into contact with the electrode tips and no other parts of the machine.		
Are all welds located as shown on the drawing and no closer than half the diameter of the electrode track/tip from the edge of the sheet.		
Do the nuggets for stitch/seam welds overlap to form a continuous seam and between 25-40% of the nugget diameter.		
Are the number of spots per inch calculated using the formula within clause 16.6 of BAEP 4523.		



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Have all the test samples been proved satisfactory prior to release of the parts. Note any work carried out by a sub-contractor before clearance of the parts will not be acceptable to BAe Hawker or Raytheon.		
If required are multi thickness samples supplied as per Appendix 1 pages 5A./B of BAEP 4523.		
Are test samples selected so that the full range of combinations joined on each machine has been sampled and recorded against that machine in each one week period.		
Are all test samples produced using the same electrodes/settings as the parts.		
Are all the test samples marked with the date and identity of the machine on which they are welded.		
Is a record of the test samples and results recorded.		
Are the personnel carrying out the testing approved.		



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<p>Are the following adhered to for shear and macro tests:-</p> <p>i) 1 test sample at the beginning and end of each shift.</p> <p>ii) 1 test sample at the beginning and end of each change of material and change of machine setting during the shift.</p> <p>iii) For stitch and seam welding are all the samples taken from one welded sample.</p>		
<p>Are the following adhered to for peel/chisel tests:-</p> <p>i) 1 test sample at the beginning and end of each shift and after an electrode change.</p> <p>ii) 4 test samples per day for each machine in continuous operation and proportionally for intermittent use and a test sample every 2 hours at the same machine setting.</p> <p>iii) A peel test consisting of 100 spots produced weekly for spot welding aluminium alloys or at approved intervals.</p>		
<p>Are the results for strengths and nugget sizes checked against the requirements of BAEP 4523.</p>		
<p>For group 1 parts are they 100% X-Rayed.</p>		
<p>For group 2 parts is a 1st off physically inspected and X-Rayed.</p>		



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Is the extent and frequency of subsequent examinations decided upon and detailed within the approved technique sheet.		
Is a record kept of the following:- i) All work welded on each machine. ii) All test samples produced and accepted on each machine. iii) All results on each machine to determine deterioration if any. iv) Machine maintenance. v) Frequency and results of X-Ray examination for group 1 and 2 parts.		
Are the parts inspected to drawing and checked for freedom of metal splash, electrode pick-up, overheating and cracks.		
Are all personnel given satisfactory training or qualified to carry out the welding operations and inspect the test pieces.		
What is used to determine the shear strength of the spots and is it calibrated.		