QUALITY ASSURANCE INSTRUCTIONS TO SUPPLIERS

QAIS NO: Q5B-008L

SUBJECT: NON DESTRUCTIVE TESTING

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APPENDIX ‘A’ – CERTIFICATE OF QUALIFICATION/CLASSIFICATION
1 INTRODUCTION

1.1 To ensure the efficiency and validity of non-destructive testing (NDT) operations and meet relevant Airworthiness Authority requirements, all personnel engaged thereon must be suitably qualified.

1.2 Suppliers who seek approval to undertake non-destructive testing on behalf of Raytheon Corporate Jets, Inc., are therefore required to maintain and operate a documented control system which ensures that all relevant personnel are qualified (i.e. nominated, trained, examined) to a level commensurate with their duties and responsibilities.

1.3 This instruction meets the basic requirements of CAA Airworthiness Notice No. 94 and it defines the basic requirements of an acceptance control system.

1.4 A supplier may operate an adequate existing training and qualification scheme which achieves the basic objectives of this instruction but varies in detailed requirements. Such a scheme may be acceptable subject to its approval by or on behalf of, the Quality Manager, RAQSC.

2 APPLICABILITY

2.1 All personnel engaged on NDT of materials, parts and/or assemblies in fulfilment of RAQSC orders, Raytheon Corporate Jets, Inc., (referred to as RAQSC within this document).

2.2 In this context, NDT includes, but is not limited to, the use of the following methods and Specific applications, where applicable.

2.2.1 Radiography

i) Aircraft structures and structural components (other than welds and composites).

ii) Light alloy welded structural components.

iii) Dense metal welded structural components.

iv) Light alloy castings.

v) Dense metal castings.

vi) Composites.
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2.2.2 Ultrasonic Flaw Detection
   i) Raw materials (excluding forgings and stampings).
   ii) Forgings and stamps.
   iii) Aircraft structures and structural components (excluding components).
   iv) Composites.

2.2.3 Eddy Current Flaw Detection

2.2.4 Testing of Adhesive Bonded Structures by
   i) Bond Testers.
   ii) Radiography.
   iii) Ultrasonics.

3 REFERENCED AND ASSOCIATED DOCUMENTS

3.1 CAA Airworthiness Notice No. 94 ‘Qualification of Personnel Concerned with Radiographic, Ultrasonic and Eddy Current Inspection of Aircraft Engines and Components’.

3.2 QAIS Q5B-007A ‘Qualification of Personnel’. Sect7a.pdf

3.3 QAIS Q5B-008F ‘Electrical Conductivity Testing of Heat Treatable Aluminium Alloys’. Sect8f.pdf

3.4 RAIKAS – Raytheon Aircraft Supplies and Services’. RAIFSAS-SC1-Issue 2.pdf

3.5 Relevant RAQSC Processes Specifications.

4 RESPONSIBILITY FOR QUALIFICATION

4.1 It is the responsibility of the supplier to ensure that all personnel engaged on NDT operations in support of RAC orders are suitably qualified in accordance with the requirements of this instruction. However, in cases of difficulty, appropriate RAC Technical Authority may be able to offer advice/assistance in arranging for training and/or certification of technical competence on behalf of the supplier. Reference should be made in the first instance to the Quality Department at RAC.

5 QUALIFICATION LEVELS AND CLASSIFICATIONS
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5.1 Personnel are required to be qualified to one of the three basic levels specified and/or referenced in CAA Airworthiness Notice No. 94, namely ascending order of seniority, NDT Level 1, Level 2 and Level 3, (in one or more of the methods and where applications, defined in paragraph 2.2). The minimum acceptable level of personnel qualification is determined by the nature and complexity of materials, parts and assemblies examined and evaluated by a Supplier in support of RAQSC orders, as defined below.

In any case of doubt regarding the minimum level of personnel qualification appropriate to any order, application for guidance should be made to the Quality Manager at Raytheon Corporate Jets, Inc.

5.1.1 Level 1

Personnel undertaking routine repetitive tests and certifications by the method(s) concerned, who have received sufficient training and experience to correctly perform that task in accordance with relevant RAQSC requirements. Such personnel shall work strictly in accordance with test technique/procedures defined/referenced on relevant drawings or, where specific techniques/procedures are not invoked, undertake the testing and certification of raw materials and simple production parts and assemblies only in accordance with the test parameters defined in relevant referenced RAQSC specifications, standards, etc., (e.g. BAEP 2501 & BAEP 2502).

Level 1 personnel shall NOT undertake the testing and certification of complex production parts and assemblies (unless they are the subject of a specific test technique/procedure) or any part or assembly which is subject to repair and overhaul procedure (unless specifically approved by RAQSC for this purpose) or manufacturing methods employing other than routine planned manufacturing processes. If no personnel qualified to Level 2 or 3 in the appropriate method(s) are available to the supplier, such parts and assemblies shall be referred to the RAQSC site placing the order, for guidance.

5.1.2 Level 2

Personnel who by means of adequate training and experience are capable of undertaking all Level 1 tasks, together with the testing and certification of complex production parts and assemblies, and all parts and assemblies subject to repair and overhaul procedures (in accordance with relevant Maintenance Manual, repair scheme, etc., requirements, where applicable) or manufacturing methods employing other than routine planned manufacturing processes. Level 2 personnel shall additionally be able to set up and calibrate relevant plant and equipment and define suitable procedures to ensure regular and correct maintenance of plant and equipment.

They shall also be capable of formulation, modification and assessment of valid test technique and procedures and interpretation of test results relative to specific requirements and applicable standards and specifications, acceptance standards, etc.
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5.1.3 Level 3

Personnel who by means of adequate training and experience are capable of undertaking all Level 2 tasks. In addition, Level 3 personnel shall possess sufficient knowledge and experience of the method(s) concerned together with relevant associated NDT and/or materials technology to identify and specify the particular test method(s) and/or techniques to be used in given circumstances and assist in establishing viable and suitable acceptance standards, where necessary. Level 3 personnel shall also be capable of assisting in the selection, preparation and administration of training and qualification of personnel to Level 1 and 2.

5.2 Two additional classifications as defined below, may be granted, where applicable. Granting of these classifications is at the discretion of the supplier’s Quality Assurance/Inspection Authority, subject to the availability of personnel qualified to Level 2 or 3 in the appropriate method(s) who shall be responsible for assurance that the requirements outlined in subsequent paragraphs are complied with.

5.2.1 Special Category (SC)
Consisting of a limited and defined approval to undertake the testing and certification of specified materials and/or material forms, parts or assemblies by a specified method and/or technique.

5.2.2 Approved Operator
Relevant to personnel engaged on tasks associated with NDT, but having no direct responsibility for the testing and certification of materials, components, etc., e.g. processing of items through a Penetrant Unit up to, but NOT including, inspection and certification.

6 REQUIREMENTS FOR QUALIFICATION AND CLASSIFICATION

6.1 Qualification to NDT Level 1 and Level 2 shall be dependent upon:-

6.1.1 Optical competence (paragraph 7).

6.1.2 Appropriate training and experience (paragraph 8).

6.1.3 Technical competence established by examination (paragraph 9).

6.2 Qualification of personnel to NDT Level 3 shall be approved by the Supplier’s Quality Assurance/Inspection Authority when he is satisfied that the candidate fulfils the following minimum requirements in addition to the optical competence requirements of paragraph 7.
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6.2.1 Qualification to Level 2 (in accordance with the requirements of paragraph 6.1) in the relevant method(s) and where applicable specific applications, defined in paragraph 2.2.

6.2.2 A minimum of 4 years satisfactory practical experience in the relevant method(s), including a minimum of 12 months since qualification to Level 2 during which time he shall have demonstrated the ability to meet the requirements defined for Level 3 personnel in paragraph 5.1.3.

6.3 Classification of personnel as SC and Approved Operators will be at the discretion of the supplier’s Quality Assurance/Inspection Authority on the written recommendation of a person qualified to Level 2 or 3 in the relevant method(s) that the applicable requirements of paragraphs 7, 8 and 9 have been met.

NOTE: All levels of qualification and classification shall be subject to acceptance by, or on behalf of, the Quality Manager, RAQSC following assessment of supporting evidence of compliance with the above requirements (ref. Paragraph 12).

7 OPTICAL COMPETENCE

7.1 Unless otherwise allowed (ref. Paragraph 10) qualification/classification of personnel as NDT Level 1, Level 2 or Level 3 or SC, shall be conditional upon a successful vision test certified by a qualified practitioner. Minimum requirements are as follows:-

7.1.1 Distant vision equal to 20/30 in at least one eye, either corrected or uncorrected.

7.1.2 Near vision equal to normal vision, as defined by the optical profession, in at least one eye, either corrected or uncorrected.

7.1.3 The ability to distinguish and differentiate between colours used in the process concerned, as determined by a recognised colour vision test.

8 TRAINING AND EXPERIENCE

8.1 Training and experience shall be given in accordance with a training programme(s), prepared by, or on behalf of, the supplier’s Quality Assurance/Inspection Authority, and acceptable to RAQSC. A separate programme shall be available for each method and/or specific application (ref. Paragraph 2.2) for which approval is sought.

Training may be given ‘in house’ or by attendance at a suitable external source acceptable to RAQSC. In the latter case details of the syllabus shall be included or referenced in the relevant training programme with the addition of relevant RAQSC invoked control requirements. Training programmes shall specify the minimum periods of training and experience applicable to each level of qualification/certification and shall meet the following requirements.
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8.1.1 Qualification to NDT Level 1 or Level 2

Based upon or equivalent to the appropriate recommendations of SBAC Tech. Spec. No. 91, and the requirements of relevant RAQSC invoked control documents, e.g. QAIS, etc. Training programmes for qualification to Level 2 shall place appropriate emphasis on the development and assessment of test procedures and techniques.

8.1.2 Classification as SC

Designed to ensure adequate knowledge and proficiency in the basic principles, application and limitations of the relevant method/technique and capability for valid assessment of results, within the parameters of the Special Category concerned.

8.1.3 Classification as Approved Operator

Designed to ensure adequate knowledge and appreciation of requirements and limitations of the process and process equipment and competence in operating in process requirements.

9 EXAMINATION

9.1 Unless otherwise allowed (ref. Paragraph 10), approval of all candidates for qualification or classification shall be subject to successful examination. By agreement with RAQSC, examination may be undertaken ‘in house’ (when the supplier has suitable expertise and facilities available) or at a suitable RAQSC approved external sources. Where examinations are undertaken ‘in house’, sample examination papers and proposed practical tests shall be of a standard acceptable to RAQSC and shall define minimum successful grades. Examination of candidates for qualification as NDT Level 1 or Level 2 shall be based on (or equivalent to ) the appropriate recommendations of SBAC Tech Spec No. 91, and shall include relevant RAQSC invoked requirements.

Examination of prospective Level 2 personnel shall include a satisfactory demonstration of the ability to devise, develop and assess valid test procedures and techniques relative to specific requirements and applicable standards and specifications.

NOTE: Unless otherwise advised by RAQSC, all test procedures and/or techniques relative to Class 1 or 2 items in support of RAC orders (other than those devised by RAC) and utilising methods and/or applications defined in paragraph 2.2 shall be submitted via the RAQSC Quality Manager for approval by the appropriate RAC Technical Authority prior to initial application.

9.2 Candidates for classification as SC and Approved Operators shall be examined by means of an oral and/or written test, against a prepared questionnaire,
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together with a practical test, designated to show conformance with the requirements of paragraphs 8.1.2 or 8.1.3 as applicable.

10 EXEMPTION

10.1 Exemption from the technical aspects of the requirements contained in paragraph 9.1 may be granted to personnel holding or obtaining a relevant recognised national or other qualification, e.g. appropriate Airworthiness Authority Approval, ASNT, CSWIP or PCN Certification, etc. In all cases such personnel shall demonstrate adequate knowledge and familiarity with relevant RAQSC invoked requirements prior to qualification.

10.2 The requirements for Approved Operator may be met by successful completion of a course of instruction by equipment manufacturers, etc.

10.3 Conductivity Testing

The minimum technical and optical requirements for qualification of personnel to undertake verification of the heat treatment and temper condition of aluminium alloys of conductivity testing, are defined in QAIS Q5B-008F. Such personnel shall be classified as ‘SC’ unless the qualification is granted as part of an overall qualification in respect of Materials Evaluation (ref. Paragraph 2.2.8).

10.4 Eddy Current Flaw Detection

The specific optical competence requirements defined in paragraph 7.1 may be waived in the case of personnel qualified in Eddy Current Flaw Detection. However, it is the responsibility of the supplier to ensure annually that the eye sight, corrected as necessary, of nominated personnel is of an adequate standard to ensure the validity of tests undertaken.

11 RE-QUALIFICATION AND RE-CLASSIFICATION

11.1 All levels of qualified and classified personnel shall be subject to re-qualification/re-classification procedures as follows.

11.1.1 Technical Competence.

Technical competence shall be demonstrated at intervals not exceeding 12 months. This may be accomplished during the first and second year after examination by re-examination or by a continuous certified record of satisfactory workmanship. Following any two successive years where a record of satisfactory workmanship has provided the basis for re-approval, competence must be demonstrated by re-examination.

NOTES: I) Where a candidate for re-qualification/re-classification by re-examination has been continuously employed on the appropriate method and/or application.
since last qualified/classified, a restricted examination placing major emphasis on familiarity with recent developments in equipment, techniques, applicable RAC specifications/standards, etc., may be given. In this context the requirement ‘continuously employed’ shall be understood as allowing a maximum break of 3 months from employment on the method/application concerned.

ii) The continued technical competence of Approved Operators may be demonstrated annually by a record of satisfactory workmanship. The requirement for re-examination shall be applied at the discretion of the supplier’s Quality Assurance/Inspection Authority upon introduction of new equipment, etc., or in any situation where the competence of the operator is in question.

11.1.2 Optical Competence

Where applicable, shall be demonstrated at intervals not exceeding 12 months.

11.2 Any qualified/classified person who is not employed on the appropriate method for a continuous period of 12 months or more shall be subject to re-qualification/re-classification by examination before re-employment in that method.

11.3 Any person may be required to undertake the appropriate re-qualification/re-classification procedures at any time at the discretion of the supplier’s Quality Assurance/Inspection Authority.

11.4 Details of all re-qualification/re-classification procedures undertaken shall be recorded by the supplier’s Quality Assurance/Inspection Authority on Part ‘B’ of the relevant RAQSC ‘Certificate of Qualification/Certification In NDT (Suppliers)’ (ref. Paragraph 12).

12 NOMINATION OF QUALIFIED PERSONNEL

12.1 All ‘qualified/classified’ personnel shall be ‘nominated’ to the RAQSC site granting approval together with details of the test method(s) (and applications where appropriate) for which qualification/classification is granted and the relevant level of qualification/classification for each method/application. Acceptance by RAQSC of such qualifications will be notified by issue of RAQSC ‘Certificate of Qualification/Classification In NDT Issue 2/(Suppliers)’ (form ref. Q7B-107 see Appendix A) following a review of evidence of compliance with the relevant requirements of this instruction. Nominated personnel will form an integral part of the suppliers’ approval to undertake testing and/or materials evaluation by the relevant method and any proposed change in nominated personnel shall be notified to the RAQSC approving site immediately.

NOTES:  

I) Where a suppliers’ organisation includes a Level 3 person whose qualification is confirmed in accordance with the Note to paragraph 6.2, the ‘nomination’ will be restricted to that person who will then be responsible for ensuring continued compliance with the requirements of this instruction in respect of all other relevant requirements of this instruction are complied with. Upon
13 ISSUE AND CONTROL OF STAMPS

13.1 The issue of stamps to qualified/classified personnel and their subsequent administration and control is the responsibility of the supplier’s Quality Assurance/Inspection Authority and shall comply with the relevant requirements defined in RAIFSAS, under the heading ‘Indication of Inspection Status’.

13.2 In the event that a stamp holder is not re-qualified/re-classified in accordance with the requirements of paragraph 11, it is the responsibility of the suppliers Quality Assurance/Inspection Authority to ensure withdrawal and quarantine of the stamp(s) associated with the method(s) concerned.

13.3 Stamps held by qualified/classified personnel shall be advised to RAQSC site, of a copy of the relevant ‘Certificate of Qualification/Classification In NDT (Suppliers)’ (ref. Paragraph 12) completed in the appropriate box with a facsimile(s) of the relevant stamp(s) held.

14 RECORDS

14.1 Records shall be maintained as evidence of adequate training and qualification/re-qualification of relevant personnel as required by QAIS Q5B-007A, including relevant RAQSC ‘Certificates of Qualification/Classification In NDT (Suppliers)’ and, as applicable, other relevant certificates of qualification/classification in NDT (Suppliers) and, as applicable, other relevant certificates of qualification/classification and optical competence, examination papers, test reports, external examination reports, monitoring/assessment of performance, etc.

14.2 Such records shall be made available for scrutiny (if so required by appropriate RAQSC representatives).

15 EVALUATION OF PROCEDURES

51.1 The availability, adequacy and application of suitable control procedures in respect of training and qualification of NDT personnel to a suitable level will, where applicable, be amongst aspects considered during evaluation of a supplier’s Quality Control system as part of RAQSC Approval Procedure and during subsequent surveillance visits (ref. RAIFSAS).
APPENDIX A

CERTIFICATE OF QUALIFICATION/CLASSIFICATION IN NDT (SUPPLIERS)
PART A-INITIAL QUALIFICATION

NAME: .......................................................... WORKS NUMBER:
..................................................

EMPLOYED BY: .................................... POSITION HELD: .................................

This is to certify that the above named person, whilst employed by the above named supplier, is qualified to undertake ................................................................. at Level .......... in support of Raytheon Corporate Jets, Inc. Orders placed under that supplier.
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The basis of this certification is:

* a) assessment of satisfactory evidence of compliance with relevant requirements of
* b) examination by Raytheon Corporate Jets, Inc. recognised test

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Any Relevant Qualifications Limitations

* Delete as appropriate

Q7B-107B
PART B-RE-QUALIFICATION

This is to certify that ..................... accordance with the technical re-qualified in accordance with the technical requirements of QAIS Number ...... to undertake


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NOTES:

i) One copy of this certificate completed in the above box with a facsimile of the relevant stamp(s) held by the person named overleaf, is to be returned to the Quality Manager, Raytheon Corporate Jets, Inc., Chester.

ii) Re-qualification procedures as defined in paragraph 11 must be completed ANNUALLY and certified on Part B of this form.

iii) *T - Theory - Theory - If re-qualification is by review of past record.

   *P - Practical (ref. QAIS No. Q5B-007(a),) write REVIEW diagonally across the applicable T and P boxes.

iv) This Certificate remains valid only so long as the person named overleaf is employed by the supplier quoted and the relevant requirements of QAIS No. Q5B-007 are compiled with.