



GOVERNMENT OF INDIA

OFFICE OF THE DIRECTOR GENERAL OF CIVIL AVIATION

TECHNICAL CENTRE, OPP SAFDURJUNG AIRPORT, NEW DELHI

CIVIL AVIATION REQUIREMENTS

SECTION 2 - AIRWORTHINESS

SERIES 'L', PART XIV

20th JANUARY 1992

EFFECTIVE: FORTHWITH

SUBJECT: ISSUE OF CERTIFICATE OF COMPETENCY

1. INTRODUCTION

Rule 61 of the Aircraft Rules 1937, empowers the Central Government to issue a Certificate of Competency (C of C) to an applicant employed in a firm approved by Director General to perform specialized processes, such as Welding and Non Destructive Testing, which may affect the airworthiness of an aircraft.

This part of the CAR specifies the requirements pertaining to age, knowledge, qualification, skill and medical standards for issue and renewal of Certificate of Competency.

This CAR is issued in accordance with the provisions of rule 133A of the Aircraft Rule 1937.

2. DEFINITIONS

CERTIFICATE OF COMPETENCY - A certificate issued by DGCA to perform specialized processes such as Welding and NDT, which may affect the airworthiness of an aircraft.

NDT - LEVEL I – defines the level of competency required by the applicant to have the skills and knowledge to process parts, any necessary preparation of parts before or after inspection and perform equipment standardization in accordance with written instruction approved by the appropriate level 3.

Note: Level-I qualification does not entitle a person for issue of Certificate of Competency.

NDT - LEVEL II - defines the level of competency required by the applicant for certification of NDT Level II calls for in-depth training, experience, and basic knowledge of aircraft product manufacturing and inspection technology. He will be capable of setting up and calibrate test equipment, make decision and judgment, evaluate, interpret and certify inspection result in technique in which he is qualified.

NDT - LEVEL III - defines the level of competency required by the applicant for certification of NDT Level III should have the skills and knowledge to interpret codes, standards and other contractual documents that control the NDT method(s) as utilized by the employer. He will be capable of selecting, preparing and verifying the adequacy of procedures in the method certified and technique for a specific inspection. He will also be capable of providing or directing training, examination and certification of personnel in the method in which he is certified.

3. APPLICABILITY

No person will carry out specialized processes such as welding (gas, electric, inert gas), Non-Destructive Testing (NDT) of aircraft structures, aircraft parts, engine parts unless issued with Certificate of Competency (C of C) by DGCA.

4. WELDING

4.1. REQUIREMENTS FOR ISSUE OF C OF C IN WELDING

The certificate of competency may be issued in any of the following groups Sheet – Sheet / Tube – Tube / Sheet – Tube for welding either by Oxy acetylene (gas) or Arc Welding (electric) or Tungsten Inert Gas (inert gas) welding process.

| | | |
|-----------|---|-------------------------------------|
| Group I | - | Aluminum Alloys |
| Group II | - | Magnesium Alloys |
| Group III | - | Carbon Steels |
| Group IV | - | Corrosion and heat resistant steels |
| Group V | - | Nickel Alloys/ Inconel / Nimonic |
| Group VI | - | Copper base Alloys |
| Group VII | - | Titanium Alloys |

Note: Application for C of C of welding of materials not covered above shall be referred to local airworthiness Office.

4.2. QUALIFICATION

4.2.1 Age -The applicant shall not be less than 18 years of age.

4.2.2. Knowledge - Minimum educational qualification

The applicant shall have passed Class X examination or its equivalent.

or

The applicant shall have successfully completed a training course on welding from an Industrial Training Institute recognized by the Technical Education Board of the respective state government or any other institute acceptable to DGCA.

4.2.3. Experience - The applicant should have gained at least two years experience in an approved aviation organization under the supervision of a C of C holder of which at least six months must be recent experience. For extension from one group to another, an additional experience of 8 weeks in the new group shall be required.

4.2.4. Skill - The preparation of the welding test pieces (refer Appendix 'A') for issue/ renewal shall be conducted in the presence of an officer from the local Airworthiness Office. The QCM of the organization shall give details of the welder and the proposed weld test on a prescribed form to the Regional Office prior to commencement of the test at least thirty days before expiry of the C of C.

The applicant will not be given more than three chances for the weld test to be performed.

5. ISSUANCE/ RENEWAL OF C OF C IN WELDING

5.1 Issuance

5.1.1 An applicant desirous of obtaining C of C shall apply to the Regional Airworthiness office on a prescribed form given in Appendix 'C'.

5.1.2 C of C will be issued as per the format given in Appendix D to an applicant who meets the requirements of para 4 and is successful in the test, specifying the relevant welding technique (in page 2) and its validity (in page 5-6).

5.1.3 The validity of C of C shall be specified on page 3 and shall not exceed six months.

Note: C of C code allotted for welding shall bear suffix " W " to denote welding.

5.2 Renewal

- 5.2.1 The QCM of the Approved Maintenance Organisation may forward the application for renewal of C of C on the prescribed form (Appendix 'C') to the Regional office.
- 5.2.2 The QCM shall certify that the welder has worked for at least 2 months in the last six months and has not abstained from welding work continuously for more than 60 days during the last validity period.
- 5.2.3. Whenever the C of C holder has abstained from work for more than 60 days even during the currency of C of C, he shall submit weld test pieces pertaining to the groups mentioned in the C of C. He shall exercise the privileges of the C of C provided the test pieces have passed the tests.
- 5.2.4 The welder shall not exercise the privileges of the C of C on the relevant welding technique during the period of unsatisfactory weld test and the result of the next satisfactory weld test.
- 5.2.5 The welder shall not exercise the privileges of the C of C provided the validity (in page 3) is current.
- 5.2.6 The welder shall not exercise the privileges of the C of C on the relevant welding technique unless its welding technique validity (in page 5-6) is current.
- 5.2.5 The C of C shall be renewed for a period of six months from the date of expiry of C of C.

6. NON-DESTRUCTIVE TESTING

6.1 REQUIREMENTS FOR ISSUE OF C OF C

No person will carry out and certify NDT inspection on an aircraft/aircraft engine or its component unless issued with Certificate of Competency for specific NDT techniques by DGCA.

The C of C may be issued in one or more of the following NDT techniques: -

- a) Magnetic Particle Inspection (MPI)
- b) Fluorescent Penetrant Inspection (FPI)
- c) Eddy Current Inspection (ECI)
- d) Ultrasonic Inspection (UI)
- e) Radiography (RI)

Note - NDT technique(s) not covered above shall be referred to DGCA through Regional airworthiness Office.

6.2 QUALIFICATION

The applicant shall have passed at least

- a) Class 10+2 examination with Science and Mathematics;

or

- b) diploma in engineering/any other equivalent qualification acceptable to DGCA;
and
- c) should hold at least Level II competency in each relevant NDT technique,
issued in accordance with NAS 410 or equivalent specifications.

6.3 EXPERIENCE

6.3.1. The applicant shall have minimum of six months experience in aviation industry in relevant NDT technique; of which three months must be recent experience under the supervision of a C of C holder of the respective NDT technique of an approved organization.

6.3.2. For amendment of C of C to cover additional technique the applicant shall have acquired at least 3 months recent experience in respective NDT technique under the supervision of a C of C holder in a an approved organization.

6.4. SKILL

Prior to issue of C of C, the applicant will be subjected to a skill test by a board constituted by the concerned Regional Airworthiness Office to asses his theoretical knowledge and competency to carry out NDT applied for.

The scope and the subjects covered are given in Appendix 'B'.

7. ISSUE OF C OF C IN NDT

An applicant desirous of obtaining C of C shall apply to concerned Regional/ Sub-Regional office on prescribed form at Appendix 'C'.

On being satisfied that the applicant meets the requirements with regard to age, qualification, experience, vision and skill he may be issued with a Certificate of Competency as per the format given in Appendix 'E' covering the relevant NDT technique (in page 2) by the Regional Airworthiness office.

Note: C of C code allotted for NDT shall bear suffix "N" to denote NDT.

7.1. RENEWAL OF C OF C

The Certificate of competency may be renewed for a further period of six months at a time provided the applicant:

- a) Applies to the Regional Airworthiness Office through the Quality Manager on a prescribed proforma given in Appendix 'C' for renewal of C of C, at least 15 days prior to the date of expiry.
- b) Shall have a minimum of two months experience in the last six months.
- c) Has satisfied the vision requirement for renewal of C of C for NDT.
- d) Has undergone a refresher course at least once in 24 months.
- e) Shall have the validity of Level II certificate.
- f) No C of C will be renewed , unless the requirement of refresher course is met with. The guidelines on Refresher Course and the exemptions there from are given in AAC 8 of 2000 .
- g) Whenever the applicant fails to meet the renewal requirements the Regional Airworthiness Office may subject the applicant for additional tests/examination

8. GENERAL

8.1. MEDICAL / VISION STANDARDS FOR C OF C HOLDERS:

- a) Shall not have any physical disabilities, which impairs his normal functions as holder of C of C. The examination must be on a periodic basis, not to exceed one year.
- b) NORMAL VISION – an examination to assure near vision, of at least one eye, either corrected or uncorrected, must be such that the employee can read SNELLEN equivalent of 20/25 (Jaeger #2). Distance vision, of at least one eye either corrected or uncorrected, must be equal to or better than SNELLEN equivalent 20/30 (Jaeger #3). The examination must be on a periodic basis, not to exceed one year.
- c) COLOUR perception requirements:- The applicant shall be required to demonstrate the ability to perceive readily those colors the perception of which is necessary for the safe performance of duties. The applicant shall be tested for the ability to correctly identify a series of pseudoisochromatic plates (tables) in daylight or in artificial light of the same color temperature such as that provided by the Illuminant "C" or

"D" as specified by the International Commission on Illumination (ICI).
The examination must be on a periodic basis, not to exceed five years.

- 8.2. Applicants who have acquired the educational and technical qualification as spelt out above may apply through their organization to Regional Airworthiness Office. The experience claimed by the applicant has to be authenticated by QCM after going through the applicant's logbooks. The application should be submitted in the form given in Appendix - C.
- 8.3. The applicant will be given a date for skill test. The test will evaluate the ability of the applicant to perform the task for which certification is sought.
- 8.4. FEES - For issue/ renewal of C of C the applicable fees as per Rule 62 of the Aircraft Rules, 1937 shall be paid.

Note: No fees shall be charged for renewing the validity of individual welding technique.

- 8.5. On successful completion of the skill test, the Regional Airworthiness Office will issue the Certificate of Competency.

Note -

Persons having undergone training in any organization / institute recognized by responsible authority, professional bodies or examinations conducted by such bodies, i.e. the diploma issued by the industrial training institutes, certificate issued by Society of Non-destructive Engineers or the Society of Welders etc. will automatically be recognized for entering into aviation industry and also will be a substitute for general industrial experience. However, such persons will have to undergo a minimum of aviation experience as detailed in the above paragraphs.

The experience gained in Defence /Space organizations approved by Ministry of Defence / Space will be considered equivalent to the experience gained in DGCA approved organizations.

Persons issued with C of C prior to 1.7.2001, shall acquire level II qualification before 1st January, 2007.

- 8.6. VALIDITY

The Certificate of Competency (C of C) for all types will be valid for a period not exceeding SIX months at a time.

- 8.7. RECORDS :

The employer shall maintain certification records for personnel for as long as their certification is in effect. Such records shall be available for audit by the facilities customers. The records shall include, as a minimum :

- a. Name of the individual certified;
- b. Level, method, and techniques for which individual certified;
- c. The latest written and practical exam, including results; scores for previous exams that the individual has taken;
- d. Date and expiration of current certification(s);
- e. A summary of all previous NDT certifications with current employer;
- f. Training history which identifies source, type of training, dates of training and course hours;
- g. Experience history, including any previous certifications, both with current and previous employers sufficient to justify satisfaction of experience requirements for certification;
- h. Results of the most-recent (i.e. current) visual acuity and color perception examinations;
- i. Extent and documentation of formal education, when used to meet qualification requirements;
- j. The name and signature of the employer's representative authorizing the certification.

9. Privileges of Certificate of Competency holder

- 9.1. To carry out and certify the work in respect of NDT .
- 9.2. To carry out welding as per work order and certify the welding work done on the aircraft parts/components/item of equipments (Certification of the respective welded parts/components/item of equipments in totality will be done by approved inspectors/authorized personnel) .

10. Suspension/Cancellation of C of C

Certificate of Competency may be suspended or cancelled by DGCA in accordance with Rule 61.

(P. K. Chattopadhyay)
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TESTING PROCEDURE FOR WELDING

APPENDIX 'A'

1. For the purpose of this Appendix the following definitions shall apply:

| | | |
|------------------------|---|---|
| Combination | - | Material group, configuration and technique |
| Configuration | - | A sample produced to Figures 1,2,3 |
| Technique | - | The welding method e.g. oxy-acetylene or arc fusion |
| Test Sample (Standard) | - | As detailed in figures 1,2,3 |
| Test Sample (special) | - | As directed by the nature of work being undertaken (e.g. repair or rebuild fan blades etc.) |

- 1.1 Approval when granted to the welder, shall be restricted to the combination for which satisfactory examination reports from an approved Test House are available to the DGCA or the Approved Organisation, in accordance with the procedure under which the welder is to be approved.

Alternatively, special test samples, agreed by the DGCA should be prepared if required for a specific application, and the approval, when granted, will be restricted accordingly.

2. TEST SAMPLES AND SPECIMENS : Standard test samples for oxyacetylene and arc-fusion welding shall be prepared by the welder using the techniques and materials appropriate to the approval sought. The specifications of the material used for test samples must meet the requirements of the material groups defined in paragraph 2 and be representative of materials likely to be encountered by the welder in the course of his normal work. DGCA approved Certificates are not necessary and material of good commercial quality may be appropriate. However, if the material used is not to Standard or other generally recognised aerospace specification a typical aircraft application must be quoted to the DGCA approved Test House as a part of the material specification. The DGCA may decide that special test samples are required appropriate to the work to be undertaken by the welder. The preparation of test samples shall be supervised as defined in 2.1.

- 2.1 Standard Test Samples : The Standard test samples for oxyacetylene and arc-fusion welding shall be prepared to Figures 1,2 and 3 as appropriate.

- 2.1.1 The welds of test samples shall not be hammered or dressed unless specifically required.

- 2.1.2 The test samples shall be submitted complete and suitably identified to DGCA approved Test House.

- 2.1.3 Where appropriate e.g. for light aircraft structural applications, tube wall thickness may be reduced. In certain cases, where the nature of a welder's

activities regularly involve welding thin wall tube, the controlling organisation or authority may require test specimens to be prepared from material of reduced wall thickness.

2.1.4 Cutting Test Specimens : Test specimens shall be cut by the approved Test House.

2.1.5 Test specimens from standard test samples shall be cut in accordance with the tensile, bend and micro specimens shown in figures 1,2 and 3.

2.1.6 Test specimens in magnesium must be sawn from samples and filed to final shape to prevent the possibility of cracking.

3. MECHANICAL TESTING

3.1 Tensile Test Specimens : Tensile test specimens shall be tested to destruction in direct tension. The minimum acceptable tensile strength of the weld test specimen shall be determined by reference to standard specification DEFSTAN 00-932 or by reference to a DGCA recognised Design Authority who can judge the acceptable levels of weld strength required for typical applications of the weld technique in question.

3.2 Sheet to Sheet Butt Weld (Figure 1) : If a tensile specimen prepared in accordance with Figure 1 should break through the weld, it is considered satisfactory only if the ultimate stress is found to be equal to, or greater than the minimum value given in the appropriate specification.

3.3 Tube to Tube Weld : Tensile specimens prepared in accordance with Figure 3 shall be broken in a tensile test machine fitted with suitable shackles and pins, the pins being passed through the top and bottom cross tubes of the specimen so that the end load may be applied without bending.

3.4 Bend Test specimens (Figure 1) : Bend specimens shall be tested in bending so that the weld lies along the centre line of the bend and the base of the weld "V" is on the inner side of the specimen after bending. The specimen must bend without cracking, through 180 (unless otherwise stated) over the radius of bend appropriate to the test.

3.5 To ensure close contact of the specimen to the bar about which it is bent, the side of the specimen remote from the weld face must be dressed by filing or grinding until the weld is level with the parent metal. It may also be necessary to dress the other face to facilitate bending. The edges of the specimen in the vicinity of the weld must be given reasonable radii.

3.6 Bend test specimens of austenitic steel must be given the

"weld decay" picking test prescribed either in the relevant specification or in accordance with British Standard 5903 and must be bent through 90 over a radius equal to three times the nominal thickness of the parent metal.

- 3.7 Magnesium alloy specimens must be bent through 180 over a radius equal to ten times the nominal thickness of parent metal.
- 3.8 Aluminium alloy specimens must be bent through 180 over a radius equal to five times the nominal thickness of the parent metal.
- 3.9 Boron-containing steels must be bent through 180 over a radius equal to three times the nominal thickness of the parent metal.
- 3.10 Titanium alloy specimens must be bent through 180 over a radius equal to five times the nominal thickness of the parent metal.
- 3.11 Specimen of all other materials must be bent through 180 over a radius equal to twice the nominal thickness of the parent metal.
- 3.12 The bend tests may be considered satisfactory if the test specimen withstands the bending without showing cracks which are apparent to normal vision.

NOTE: If interpretation of the bend test results is in doubt, comparison may be made with the bend test performance of a separate sample of the parent material from which the test specimens were fabricated.

4. SPECIMEN EXAMINATION

- 4.1 Final assessment of the weld shall be based on consideration of the sample weld as a whole, including the results obtained by visual, microscopical, and where applicable, mechanical testing. If any doubt exists regarding the quality of the weld, or any defect revealed is thought to be of a local character, further sections may, if available, be examined and final assessment shall be based on all the specimens examined.
- 4.2 The micro specimen shall be examined at suitable magnifications in the unetched and the etched condition.
- 4.3 The presence of intergranular oxide films is considered to be detrimental to the weld due to their embrittling effect, but the extent of these films is very difficult to determine in etched specimens. If the area of intergranular oxide is only very slight and satisfactory results are obtained by mechanical testing, further sections of the weld shall be examined before a decision is reached.

4.4 Where fillet welds are concerned, unless complete fusion is required by the drawing, a certain degree of lack of fusions permissible at the roots:

- a) For fillet welds of 45 or more, the maximum lack of fusion which can normally be accepted is that revealed by a line of oxide extending from the root of the weld for a distance not greater than one-third of that between the root and the toes of the weld. Provided the amount of weld material used has been adequate, this method of assessment should ensure that the effective throat thickness of the weld is not less than the thickness of the sheets or tubes used for the specimens.
- b) For fillet welds at acute angles, full root fusion in tubular sections can be difficult to achieve and there is a danger of collapse of the tube walls if excessive penetration is attempted. The presence of a fairly large cavity, or corresponding lack of fusion, is permissible at the root of such welds but there should be a bridge of weld metal of a reasonable throat depth, showing satisfactory fusion to be basic metal.

4.5 Sheet to sheet butt welds : The section must be free from excess oxidation, burning, cracks, cavitation, porosity, scale and slag. The specimen must show adequate penetration

and with specimens welded from one side only, there should be evidence of adequate penetration when the underside of the weld is examined. If excessive penetration has occurred along the majority of the weld the specimen must be rejected, but isolated excrescences on the underside are permissible, provided the weld itself is free from cavities, oxide films, and other defects.

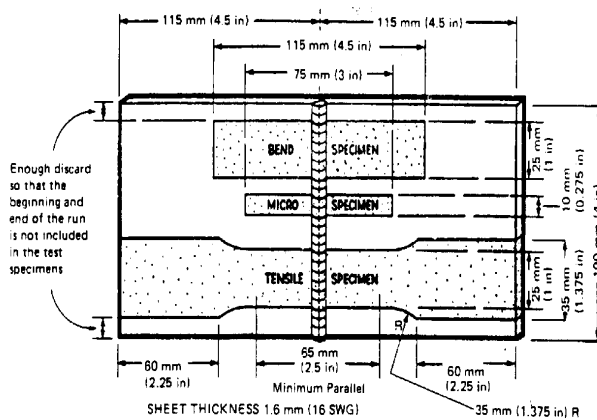
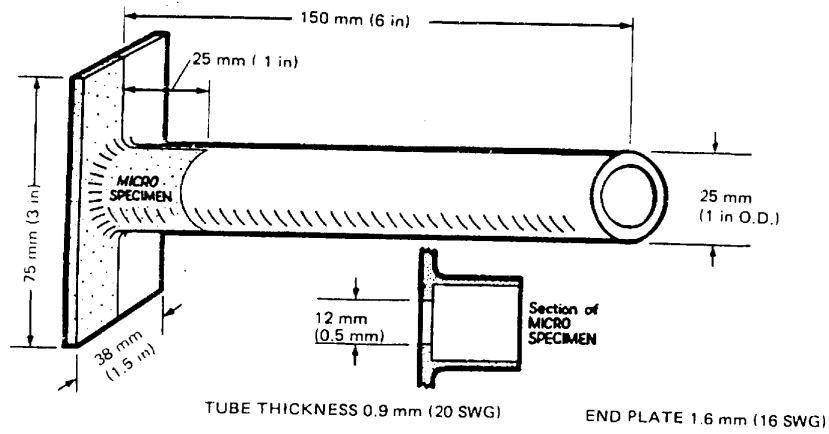


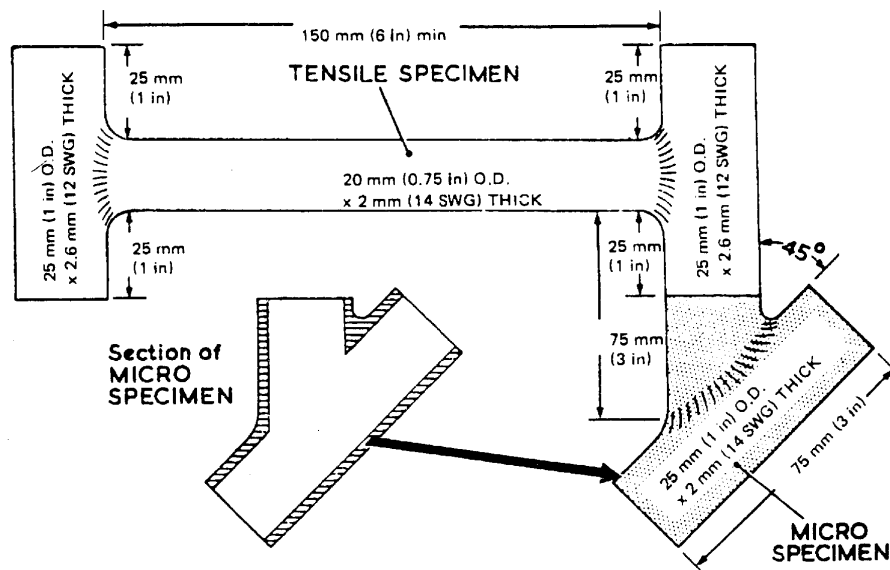
Figure 1 SHEET TO SHEET BUTT WELD

NOTE: Dimensions may be regarded as approximate.



NOTE: If desired, an end plate may be welded to each end of the test specimen to provide additional material for use in assessing borderline cases (see 5.1)

Figure 2 SHEET TO TUBE WELD



NOTE: If desired, small air vent holes may be drilled in the 2.6 mm (12 swg) tubes in the tensile specimen and the 2 mm (14 swg) tube in the micro specimen.

Figure 3 TUBE TO TUBE WELD

APPENDIX - B

1. For the purpose of para 6.4 of this CAR , the knowledge test shall be conducted on the following subjects elements :-

1.1. MAGNETIC PARTICLE INSPECTION (MPI)

- a) Knowledge of the equipment and its various controls
- b) Quality Control check of magnetic ink, its acceptability
- c) Use of various contact heads
- d) Magnetization by coil, its applicability, knowledge of magnetism, electricity, hysteresis
- e) Alternating and direct current
- f) Interpretation of defects and possible causes of misleading interpretation
- g) Demagnetization equipment and its use
- h) Test of residual magnetization
- i) Relation of current with magnetic flux
- j) Current calculation for longitudinal and circular magnetization in relation with the size of component
- k) Process Control checks and calibration.

1.2. FLOURESCENT PENETRATNT INSPECTION (FPI)

- a) Liquid penetrant process
- b) Preparation of parts prior to application of penetrant
- c) Interpretation of defects
- d) Areas and conditions that may lead to misinterpretation
- e) Process Control checks and calibration.

1.3. EDDY CURRENT INSPECTION (ECI)

- a) Knowledge of electricity
- b) Use of eddy current technique
- c) Different application of high frequency and low frequency eddy current.
- d) Knowledge and adjustment of the equipment
- e) The precautions to be taken to obtain the best result
- f) The reasons for erroneous indication
- g) The proper technique and interpretation of defects
- h) Effect on change of impedance on instrumentation properties of eddy current
- i) Types and arrangements of various probes
- j) Factors affecting coil impedance
- k) Selection of test frequency
- l) Relationship of frequency on type of testing
- m) Signal/noise ratio
- n) Phase discrimination
- o) Response speed, skin effect
- p) Permeability changes, saturation

- q) Effect of AC fields strength on eddy current
- r) Read out mechanism

1.4. ULTRASONIC INSPECTION (UI)

- a) Equipment operation and calibration.
- b) Knowledge and modes of ultrasonic propagation in solids and liquids.
- c) Reflection, refraction, absorption and scattering of ultrasonic waves.
- d) Piezo-electric materials
- e) Basic construction and operation of ultrasonic probes
- f) Scope and limitation of flaw detection
- g) Effect and sensitivity of defect size, defect shape, defect disposition, detection of ultrasonic beam
- h) Ultrasonic operating frequency
- i) Surface condition and constructional condition of the material under test
- j) Application of reflection and transmission or shadow method of testing of aluminum alloy and steel work base including welding
- k) False indication and their recognition.
- l) Techniques in ultrasonic.
- m) Variables affecting the test results.
- n) Method of operations (transmission, pulse echo method, immersion testing, resonance testing)

1.5. RADIOGRAPHIC TESTING (RT)

- a) Elementary principles of radiograph theory and how these principles are related to the practical techniques of radiography.
- b) Protections and precautions while operating x-ray equipment;
- c) Photographic aspects of radiography;
- d) Development and recording of radiographic techniques for the inspection of welded components, structures and castings.
- e) Practical application of the techniques and processing the radiograph;
- f) Factors that can lead to misinterpretation
- g) Knowledge of operation of equipment.
- h) Factors affecting image quality.
- i) Process control checks & calibration.

INTERPRETATION TEST: The interpretation test will consist of the following:

- a) The correlation of the radiograph with the report;
- b) Identification of various features in the radiograph.
- c) Defect evaluation using appropriate reference and acceptance standards.

2. LEVELS OF COMPETENCE

Three levels of competence for NDT personnel have been prescribed as per NAS 410. Though for issue of C of C the minimum competency level is " LEVEL-II " , the competency of other levels are given for the sake of comparison.

2.1. NDT - LEVEL I

Individual shall have the skills and knowledge :

- to process parts and perform equipment standardization in accordance with written instructions approved by the appropriate level 3.
- to carry out any necessary preparation of parts before or after inspection in accordance with written instructions approved by the appropriate level 3.
- to be able to follow written instructions in the techniques/methods for which certified.
- to receive guidance or supervision from a Level 2 or Level 3 in that method when necessary.

2.2. NDT - LEVEL II

Individual shall have the skills and knowledge :

- to set up and standardize equipment, conduct tests ,interpret and evaluate for acceptance or rejection , and document.
- be thoroughly familiar with the scope and limitations of the technique / method in which they are certified.
- be capable of providing the necessary guidance and / or supervision to trainees and Level I personnel in the technique / method in which they are certified.
- be familiar with the codes ,standards , and other contractual documents that control the method as utilized by the employer.
- when specified in the written practice ,be capable of developing written instructions from approved general procedures . Such instructions shall require final approval by Level-III.
- have a basic knowledge of product manufacturing and inspection technology

2.3. NDT LEVEL - III

Individual shall have:

- the skills and knowledge to interpret codes , standards, and other contractual documents that control the NDT method(s) as utilized by the employer.
- be capable of assuming technical responsibility for the NDT facility and staff.
- be capable of selecting the method and technique for a specific inspection.
- be capable of preparing and verifying the adequacy of procedures in the method certified.
- approve NDT procedures and other NDT related work instructions for technical adequacy in the method in which they are certified.
- have a general knowledge of other NDT methods and product technologies used by the employer.
- be capable of providing or directing training , examination and certification of personnel in the method in which they are certified.
- conduct NDT for the acceptance of parts only when a demonstration of proficiency in this capability was included in the practical examination.
- when required by the written practice , be capable of auditing outside agencies to ensure requirements of the written practice are met.

3. TRAINING AND EXPERIENCE

The Level-II training shall be conducted at an agency, as per ASNT recommended practice (no SNT-TC-1A) and National Aerospace Standard (NAS 410) or equivalent specifications with necessary accreditation from

NATIONAL CERTIFICATION BOARD,
INDIAN SOCIETY FOR NON-DESTRUCTIVE TESTING,
C/O INDIRA GANDHI CENTRE FOR ATOMIC RESEARCH,
KALPAKKAM- 603102, INDIA.

OR

Any other similar body like American Society for Non-destructive Testing (ASNT) etc.

3.1. TRAINING

Candidates for certification as Level 2 shall complete sufficient organized training to become proficient with the principles and practices of the applicable test method and technique(s). The training shall be conducted in accordance with a detailed course

outlined and shall be approved by a person holding Level 3. The Level 3 certificate holder shall prepare the training and examination program who shall have a thorough knowledge of the written instructions, codes, specifications and standards used by the approved organization. He/she shall also have a thorough knowledge of the materials, components, product technologies, methods and techniques used by the employer.

At a minimum, the training shall cover basic theory, test principles, products, equipment operation and standardization, safety, operating procedures, applicable techniques, the applicable specifications, codes, and written instructions used by the employer, and, if applicable, interpretation of indications. The outline shall include a list of references from which the training material is derived.

3.2. OUTSIDE AGENCIES

When an outside agency is used for training the outside agency shall provide the approved organization with the names, qualifications and, if applicable, the certifications held by the instructors and test administrators employed in the training and examination process. Supporting evidence shall be made available to the approved organization its auditors, or to DGCA upon request.

3.3. TRAINING FACILITIES

Training facilities and classrooms shall permit undisturbed instruction and shall be sufficiently well equipped with training aids, models and samples, etc, to ensure that all aspects of the training course requirements are met. In addition, a sufficient number of representative test samples containing natural or artificial defects shall be available to cover the entire range of testing to be used by the candidate. The samples used for practical examinations shall not be used for training purposes. To ensure the candidate fully benefits from the practical exercises, the training facility shall have equipment sufficiently comparable to that which the candidate will use at the employer.

General, specific and practical training may be obtained with the employer or outside agency and shall always be supplemented by practical on-the-job training with the employer.

3.4. HEALTH AND SAFETY TRAINING

All regulations relating to hazardous substances, accident prevention and safe working practices shall be strictly adhered to. Safety-related training requirements shall be determined by the employer, in accordance with local codes and regulations. As a minimum, all candidates seeking radiography qualification shall have received instruction on the hazards and safety requirements associated with ionizing radiation and be familiar with the applicable regulations and laws prior to certification.

3.5. MINIMUM REQUIRED TRAINING HOURS

All NDT training shall be documented. The minimum training hours for Level-II are given in Table 1 for the specified NDT methods.

When determining training hours for methods not listed in Table 1, the minimum hours shall be based on the requirements for a listed method of similar complexity.

TABLE –1 . MINIMUM FORMAL TRAINING HOURS , LEVELS - I & II

| Method | Level – II (with Level – I experience) | Level – II (without Level – I experience) |
|---------------------------|--|---|
| Liquid Penetrant Testing | 16 | 32 |
| Magnetic Particle Testing | 16 | 32 |
| Eddy Current Testing | 40 | 80 |
| Ultrasonic Testing | 40 | 80 |
| Radiographic Testing | 40 | 80 |

3.6. PREVIOUS TRAINING

Previous training must be documented to be accepted by the employer. For personnel credited with prior training, or those not certified within 12 months of their training, refresher training must be provided. At a minimum, refresher training shall cover products, equipment set-up, operation and standardization, specific operating procedures, applicable techniques, interpretation and evaluation of NDT results, safety, and applicable codes, standards and specifications. The depth of instruction on each subject shall be determined by the responsible Level 3.

3.7. EQUIVALENT TRAINING

For personnel previously certified under NAS410 or other recognized NDT qualification program, the adequacy of their previous training to the requirements of Table 1 will be determined and documented by the responsible Level 3.

4. EXPERIENCE

Candidates for certification at Level 2 shall have sufficient practical experience to assure that they are capable of performing the duties of the level .The minimum experience requirements for Level 2 are provided in Table 2.

TABLE –2. MINIMUM EXPERIENCE REQUIREMENTS FOR LEVELS - I & II

| Method | Experience Time in Hours ** | |
|---------------------------|--|---|
| | Level – II (with Level – I experience) | Level – II (without Level – I experience) |
| Liquid Penetrant Testing | 270 | 400 |
| Magnetic Particle Testing | 400 | 530 |

| | | |
|--|------|------|
| Eddy Current Testing | 1200 | 1600 |
| Ultrasonic Testing | 1200 | 1600 |
| Radiographic Testing | 1200 | 1600 |
| **Experience in multiple methods may be accumulated simultaneously. Experience in method must be at least half this time when remaining time is in other NDT methods when approved by the responsible Level 3. | | |

4.1. PREVIOUS EXPERIENCE

A candidate's documented experience with a previous employer may be accepted by the current employer if approved by a person holding Level-3 certificate.

5. EXAMINATION

5.1. GENERAL

The general examination for all levels shall be a closed book examination consisting of questions that cover the cross-section of the applicable method at the appropriate level. A minimum of 40 questions shall be used for the general examination at Level-2.

5.2. ADMINISTRATION OF EXAMINATIONS

The administration and grading of all examinations shall be the responsibility of the responsible Level-3 person in a training organization .

5.3. CERTIFICATION

Level II certification shall only be issued jointly by the employer and the NDT organization wherein the training ,examination has been conducted by the organization.

5.3.1. LOSS OF CERTIFICATION

Certification may expire be suspended, or be revoked. Certification shall expire when employer is terminated, or when the certification interval has lapsed with no re-certification issued.

5.3.2. RECERTIFICATION FOR LEVEL- I and LEVEL – II

Level - I and Level - II personnel shall be re-certified at intervals not to exceed **FIVE years**. Practical and specific examination equivalent to those required for initial certification shall be administered for Level I and Level II. Certification is considered to expire at the end of corresponding month in which the certification began.

5.3.3. RECERTIFICATION FOR LEVEL – III

Level 3 personnel shall be re-certified at intervals not to exceed **FIVE years**. Re-certification shall be accomplished in accordance with NAS 410, or by specific and practical re-examination equivalent to initial certification.

6. General Requirements

It is recommended that prior to embarking on a training course consultation with the Regional Airworthiness office shall be necessary to ensure that the course will fulfil the requirements .

--- END ---

TEST for ISSUE / RENEWAL

1. C of C No. DAW / ND / CC / Valid up to
 (If Issued)

2. Source of Gas Supply (for welding) _____

3. Details of equipment used for NDT/ Process _____

4. Check for purity of gas / serviceability of equipment: Satisfactory / Unsatisfactory

5. Details of test piece fabricated :

| Test piece marked | Description | Specification of test piece | Remarks |
|-------------------|-------------|-----------------------------|---------|
| | | | |
| | | | |
| | | | |
| | | | |

6. Date of fabrication / NDT Test / Process _____

7. Test piece forwarded to: (applicable to welding test) _____

Vide letter no _____ dtd. _____

(Signature of DGCA representative)

(Signature of Member)

Name : _____

Name: _____

Designation : _____

Designation : _____

Date: _____

Date: _____

MANDATORY ENCLOSURE :

- (i) Copy of respective LEVEL certificate.
- (ii) Copy of MEDICAL certificate
- (iii) Copy of REFRESHER certificate

अनुदेश और पद्धति
INSTRUCTION AND PROCEDURES

- निरीक्षक को केवल उसी कार्य के निरीक्षण और उसे प्रमाणित करने का अधिकार होगा जो पृष्ठ २ पर विनिर्दिष्ट स्वीकृति क्षेत्र के अंदर आता हो।
- An inspector is authorised to only inspect and certify the work falling within the scope of approval specified in page 2.
- इस प्रमाणपत्र में किसी प्रकार की प्रविष्टियां या पृष्ठोंकन नहीं किए जाने चाहिए केवल उन मामलों को छोड़कर जिनमें महानिदेशक नागर विमानन द्वारा इस कार्य के लिए व्यक्तियों को अधिकार दिया गया हो।
- No entries or endorsements should be made in this certificate except by the persons authorised for purpose by Director General of Civil Aviation.
- निरीक्षक उस कार्य के लिए लागू निरीक्षण और परीक्षण अपेक्षाओं की जानकारी प्राप्त करेगा जिसके लिए उसे स्वीकृत किया गया है। सी ए आर अनुभाग-२, श्रंखला एल और विमान नियमावली में निर्धारित की गई स्वीकृत पद्धति का सख्ती से पालन किया जाएगा।
- The inspector shall familiarise himself with the inspection and testing requirements applicable to the work for which he is approved. Approved procedure as laid down in CAR Section 2, Series 'L' and aircraft rules is to be strictly adhered to.
- निरीक्षक प्रत्येक आरेखन, विनिर्देशनों या अन्य शीटों कागजातों के निरूपित वर्तमान अंकों का अनुपालन सुनिश्चित करेंगे।
- Inspectors must ensure compliance with each and every stipulated current issues of drawings, specifications or other governing documents.

4

Name of the Office → Name of the Centre → Number →
DAW / KOL / CC / 000/W

भारत सरकार
GOVERNMENT OF INDIA
महानिदेशक नागर विमानन
DIRECTOR GENERAL OF CIVIL AVIATION



योग्यता प्रमाणपत्र
CERTIFICATE OF COMPETENCY

नाम
NAME :

संख्या
NO. : DAW/KOL/CC/000/W

जारी करने की तारीख
DATE OF ISSUE :

पता
ADDRESS :

राष्ट्रीयता
NATIONALITY :

को एतद्वारा सिविल उड्डयन अपेक्षाएं अनुभाग-२, श्रंखला एल भाग के अनुसार केवल निम्नलिखित कोटियों में विमान कार्य के लिए योग्य व्यक्ति के रूप में स्वीकृत किया जाता है।
is hereby approved as "Competent Person" for aircraft work, in accordance with Civil Aviation Requirements Section 2, Series 'L' Part XIV for those Categories only which are specified below :

| वेल्डिंग तकनीक Welding Technique | स्तर Status | हस्ताक्षर Signature |
|-------------------------------------|----------------|------------------------|
| Gr. I - Aluminium - S to S | | |
| Gr. IV - Stainless Steel - S to S | | |
| Gr. IV - Stainless Steel - T to T | | |
| Gr. V - Nimonic - S to S | | |
| Gr. VII - Titanium - S to S | | |

यह प्रमाणपत्र पृष्ठ ३ पर दिखाई गई अवधि तक वैध है।
This Certificate is valid for period shown on Page 3.

धारक के हस्ताक्षर :
Signature of Holder :

2

निर्गम अधिकारी के हस्ताक्षर
Signature of Issuing Officer

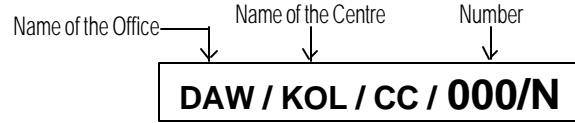
Signature of Issuing Officer

योग्यता प्रमाणपत्र की वैधता / VALIDITY OF COC

| से From | तक To | निर्गम अधिकारी के हस्ताक्षर एवं मोहर Signature & Stamp of Issuing Officer |
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निरीक्षण विफलता :
Inspection Failures :

3



अनुदेश और पद्धति
INSTRUCTION AND PROCEDURES

1. निरीक्षक को केवल उसी कार्य के निरीक्षण और उसे प्रमाणित करने का अधिकार होगा जो पृष्ठ २ पर विनिर्दिष्ट स्वीकृति क्षेत्र के अंदर आता हो।
1. An inspector is authorised to only inspect and certify the work falling within the scope of approval specified in page2.
2. इस प्रमाणपत्र में किसी प्रकार की प्रविष्टियां या पृष्ठान्कन नहीं किए जाने चाहिए केवल उन मामलों को छोड़कर जिनमें महानिदेशक नागर विमानन द्वारा इस कार्य के लिए व्यक्तियों को अधिकार दिया गया हो।
2. No entries or endorsements should be made in this certificate except by the persons authorised for purpose by Director General of Civil Aviation.
3. निरीक्षक उस कार्य के लिए लागू निरीक्षण और परीक्षण अपेक्षाओं की जानकारी प्राप्त करेगा जिसके लिए उसे स्वीकृत किया गया है। सी ए आर अनुभाग-२, श्रंखला एल और विमान नियमावली में निर्धारित की गई स्वीकृत पद्धति का सख्ती से पालन किया जाएगा।
3. The inspector shall familiarise himself with the inspection and testing requirements applicable to the work for which he is approved. Approved procedure as laid down in CARSection 2, Series 'L' and aircraft rules is to be strictly adhered to.
4. निरीक्षक प्रत्येक आरेखन, विनिर्देशनों या अन्य शासी कागजातों के निरूपित वर्तमान अंकों का अनुपालन सुनिश्चित करेंगे।
4. Inspectors must ensure compliance with each and every stipulated current issues of drawings, specifications or other governing documents.

4

नाम

NAME :

संख्या

NO. :

जारी करने की तारीख

DATE OF ISSUE :

पता

ADDRESS :

राष्ट्रीयता

NATIONALITY :

को एतद्वारा सिविल उड्डयन अपेक्षाएं अनुभाग-२, श्रंखला एल भाग के अनुसार केवल निम्नलिखित कोटियों में विमान कार्य के लिए योग्य व्यक्ति के रूप में स्वीकृत किया जाता है।
is hereby approved as "Competent Person" for aircraft work, in accordance with Civil Aviation Requirements Section 2, Series 'L' Part XIV for those Categories only which are specified below :

| अनाशक परीक्षण तकनीक Non-Destructive Testing Technique | लैवल Level | स्तर Status | हस्ताक्षर Signature |
|--|---------------|----------------|------------------------|
| Magnetic Particle Inspection (MPI) | | | |
| Fluorescent Particle Inspection (FPI) | | | |
| Eddy Current Inspection (ECI) | | | |
| Ultrasonic Inspection (UI) | | | |
| Radiographic Inspection (RI) | | | |

यह प्रमाणपत्र पृष्ठ ३ पर दिखाई गई अवधि तक वैध है।

This Certificate is valid for period shown on Page 3.

धारक के हस्ताक्षर :

Signature of Holder :

2

निर्गम अधिकारी के हस्ताक्षर

Signature of Issuing Officer

भारत सरकार

GOVERNMENT OF INDIA

महानिदेशक नागर विमानन

DIRECTOR GENERAL OF CIVIL AVIATION



सत्यमेव जयते

योग्यता प्रमाणपत्र

CERTIFICATE OF COMPETENCY

योग्यता प्रमाणपत्र की वैधता / VALIDITY OF COC

| से From | तक To | निर्गम अधिकारी के हस्ताक्षर एवं मोहर Signature & Stamp of Issuing Officer |
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निरीक्षण विफलता :

Inspection Failures :

3