Namibia Civil Aviation Authority

AVIATION DIRECTIVE

Reference Number:1/2/1-3

Personnel Licensing

May 2021

Insertion of provisions on the reserved parts of the Technical Standards concerning AME licence Issuance

1. LEGAL AUTHORITY

The AD 1/2/1-3, dated 5th May 2021, issued by the Interim Executive Director in terms of section 38(6), read with sections 67(3) and 68, of the Civil Aviation Act, (Act no. 6 of 2016).

2. EFFECTIVE DATE

This AD shall come into force on the 5th May 2021 and remain in force from the date of issue until it is cancelled and Technical Standards relevant to the provisions addressed by the AD are issued.

3. PURPOSE

The purpose of this AD is to insert provisions in the parts of the Namibian Civil Aviation Technical Standards, NAM-CATS-AMEL "Aircraft Maintenance Engineer Licensing" issued via Government Notice No.54 of 2004, which were reserved at the time of issuance thereof.

4. APPLICABILITY

1. This AD is applicable to all applicants for:

   1.1 Validation of a Licence issued by an appropriate Authority and renewal thereof (NAMCAR 66.01.9);

   1.2 Class II aircraft maintenance Engineer Licence Category W rating (NAMCAR 66.04.);

   1.3 Class I Aircraft Maintenance Engineer Licence Category B rating (NAMCAR 66.05.1);

   1.4 Class I Aircraft Maintenance Engineer Licence Category X rating (NAMCAR 66.07.1);

1.5 Grade One Aircraft Maintenance Instructor Rating (NAMCAR 66.08.1) and,

1.6 Grade Two Aircraft Maintenance Instructor Rating (NAMCAR 66.09.1)

SCHEDULE

5. INSERTED TEXT

The following text is inserted where the technical standard indicates reserved:

5.1 TS 66.01.9 VALIDATION OF LICENCE ISSUED BY APPROPRIATE AUTHORITY

2. Requirements and conditions

Any valid foreign aircraft maintenance engineer licence and rating may be validated by the Executive Director subject to the following conditions –

(1) the applicant must be in possession of a valid foreign AME licence issued by an appropriate authority that meets the ICAO Annex 1 standards and recommended practices;

(2) should the applicant want to use the validation for employment in Namibia, the applicant must submit a letter of employment from a Namibian aircraft maintenance organisation;

(3) the applicant must pass an examination in air law conducted by the Executive Director;

(4) the applicant must submit his/her type course certificates or certified copies thereof; and

(5) the applicant must provide proof that he/she meets the experience requirements for the issue of the relevant AME licence or rating;

4. Renewal of validation

The circumstances and conditions referred to in regulation 66.01.9(5), for the renewal of a validation are the following:

1.1. The applicant shall satisfy the Executive Director that he or she is still employed by an Aircraft Maintenance Organisation.

1.2. The revalidation shall not extend beyond the date of expiry of the original licence or for a period of 12 months, whichever comes first.

1.3. A validation is renewed only once. A second revalidation requires special approval by the Executive Director.

1.4. Should the holder of a revalidated validation wish to continue with exercising the privileges of his or her foreign licence in Namibia, he or she should apply for the issue of a Namibian aircraft maintenance engineer licence before the expiry date of the validation.

5. Requirement and conditions

The requirements and conditions referred to in CAR 66.01.9(6), are the following:

The Executive Director may renew the validation provided that the holder has, for the duration of the validation –

(1) exercised the privileges of the aircraft maintenance engineer licence and rating to which the validation refers, in accordance with the provisions of the Act, the Regulations and this Document;

(2) operated safely and professionally, with a degree of competency appropriate to the privileges granted to the holder of a similar licence; and

(3) Paid a fee of N$ 300.00.

5.2 TS 66.02.3 Theoretical Knowledge Examination

2.14 Category W Avionic Equipment (Installations/Servicing)

1) An applicant accepted for examination in Category W for the certification of the installation, modification, troubleshooting, rectification of defects, repair and system checks in aircraft of all types of Radio Communication Equipment, Radio Navigational Equipment (Pulse and Non-Pulse), and Electronically Operated Systems, i.e. amplifiers, computers, recorders, flight management and entertainment systems, will be required to answer in written examinations, questions to demonstrate his knowledge of the following:

i. Elementary electricity and magnetism, definitions of terms used and their application and the elementary mathematical calculations involved.
ii. Basic theory pertaining to the applicable trade.
iii. Basic semiconductor and digital devices.
iv. Operation and use of electronic test equipment.
v. The regulations made under the Act so far as they affect an aircraft maintenance engineer licensed in Category W.
vi. Methods of inspecting and testing the whole system, including the bonding and earthing system.

vii. Theory of operation, maintenance procedures and testing of the equipment.
viii. The installation of such equipment in aircraft, the procedures to be followed and the precautions to be observed.

2) Where subsequent to the written examination, a supplementary examination is required by the Executive Director, an applicant may be required to answer further questions in respect of the subjects prescribed in subparagraph (a), an applicant may also be required to demonstrate his or her practical knowledge of inspection, the use of measuring instruments and the interpretation of drawings.

Category W: Electrical Equipment (Installations/Servicing)

a) An applicant accepted for examination in Category W for the certification if the installations, modification, troubleshooting, rectification of defects, repair and system checks in aircraft of all types of electrical equipment, will be required to answer in written examinations, questions to demonstrate his knowledge of the following:

i. Elementary electricity and magnetism, definitions of terms used and their application and the elementary mathematical calculations involved.
ii. Basic theory pertaining to the applicable trade.
iii. Basic semiconductor and digital devices.
iv. Operation and use of electronic test equipment.
v. The regulations made under the Act so far as they affect an aircraft maintenance engineer licensed in Category W.
vi. Methods of inspecting and testing the whole system, including the bonding and earthing system.
vii. Theory of operation, maintenance procedures and testing of the equipment.
viii. The installation of such equipment in aircraft, the procedures to be followed and the precautions to be observed.

b) Where, subsequent to the written examination, a supplementary examination is required by the Executive Director, an applicant may be required to answer further questions in respect of the subjects prescribed in subparagraph (a), an applicant may also be required to demonstrate his or her practical knowledge of inspection, the use of measuring instruments and the interpretation of drawings.

Category W: Instrument Equipment Installations/Servicing

(a) An applicant accepted for examination in category W for the certification of the installation, modification, troubleshooting, rectification of defects, repair an system checks in aircraft of all types of

instrument equipment, will be required to answer, in written examinations, questions to demonstrate his knowledge of the following:

i. Elementary electricity and magnetism, definitions of terms used and their application and the elementary mathematical calculations involved.
ii. Basic theory pertaining to the applicable trade.
iii. Basic semiconductor and digital devices.
iv. Operation and use of electronic test equipment.
v. The regulations made under the Act so far as they affect an aircraft maintenance engineer licensed in Category W.
vi. Methods of inspecting and testing the whole system, including the bonding and earthing system.
vii. Theory of operation, maintenance procedures and testing of the equipment.
viii. The installation of such equipment in aircraft, the procedures to be followed and the precautions to be observed.

(b) Where, subsequent to the written examination, a supplementary examination is required by the Executive Director, an applicant may be required to answer further questions in respect of the subjects prescribed in subparagraph (a), an applicant may also be required to demonstrate his or her practical knowledge of inspection, the use of measuring instruments and the interpretation of drawings.

5.3 TS 66.02.4 EXPERIENCE

21. Category X (Aircraft welding): Issue or addition of Category X (aircraft welding)

1. General

(a) An applicant for the issuing of a licence in Category X for aircraft welding and certification of welding on aircraft must have two years' experience after qualifying on relevant trade, of which a minimum of six months in the rating applied for namely –
(i) oxy-acetylene;
(ii) inert gas shielded arc;
(iii) plasma arc;
(iv) atomic hydrogen;
(v) metal arc; and
(vi) carbon welding processes, for the following groups or metallic materials:

(aa) Group 1 – Aluminum alloys
(bb) Group 2 – Magnesium alloys
(cc) Group 3 – Carbon steels
(dd) Group 4 – Corrosion and heat resisting steels
(ee) Group 5 – Nickel base and cobalt base alloys
(ff) Group 6 – Titanium alloys
(gg) Group 7 – Copper base alloys

(b) Welding ratings will be limited to those types of materials or material groups and welding processes on which the applicant has demonstrated his or her welding ability by means of the tests referred to hereunder.

(c) Where a welder is employed by an approved aircraft maintenance organization, the responsibility of maintaining a satisfactory standard of competency of the welder concerned will be entrusted to the organization which must use the procedure for establishing such competency as set out in this technical standard.

2. Welding test for initial ratings

(a) Each welder will be required to make test pieces and at his or her option, prepare test specimens appropriate to the ratings required. Such test pieces and test specimens must conform to the standards shown in Figures 1, 2, 3 and 4. For test pieces shown in Figures 2 and 3, a 25% variation in tube diameter will be permitted; tubular material wall thickness must be within 20% of the range specified.

(b) Applicants must use for their tests piece materials of the same specifications or the nearest equivalent as those they will be welding on aircraft, but – if this provides undue difficulty – similar materials will be acceptable if two control specimens of the parent material conforming to the tensile test specimen of Figure 1 are submitted.

(c) The test pieces required for the various groups of materials are as follows:

(i) For group 1 and 2 materials, the test pieces shown in Figures 1 and 4.

(ii) For group 3 and 4 materials, the test pieces shown in Figure 1, for plasma arc welding process, and Figures 2 and 3 for oxy-acetylene and inert gas shielded arc welding processes.

(iii) For group 5, 6 and 7 materials, the test piece shown in Figure 1.

(iv) Where the applicant desires a welding rating to be limited to certain types of work, e.g. tubular repairs only, such applicable test pieces as shown in Figures 1, 2, 3 or 4.

(v) Figure 3 does not apply in respect of the plasma arc welding process.

(d) The welding of test pieces must be done by each welder in accordance

with the requirements prescribed in paragraph (b) and under the supervision of a person approved for the purpose by the Executive Director. If the welder elects to have the test specimens prepared before these are submitted to the test laboratory for examination, such preparation must also be under the control of the supervisor.

(e) The welds of test pieces and test specimens may not be hammered, dressed or sand blasted.

(f) The supply of welding equipment and test materials is the responsibility of the welder concerned.

(g) Only one set of test pieces and test specimens is permitted at a time for each rating for each welder.

(h) A welder may abandon any test at any stage if he or she is dissatisfied with the results. In such cases, and in the case of failure to pass the initial test, he or she will only be permitted to do further tests after a period of 30 days, during which period he or she must obtain additional welding experience. If a welder fails the second renewal test, all the prescribed tests for that group of metallic material will have to be satisfactorily completed after a further period of 30 days.

(i) A welder only becomes qualified for a material or material group using the appropriate welding process on the date that the approved examiner indicates in writing that the test concerned was satisfactory.

3. Welding tests for renewal

(a) Each welder will annually be required to do a test piece for each rating for which renewal is required and, at his or her option, prepare the necessary test specimens in accordance with Figure 1. For such tests the provisions of paragraphs (2)(a) and (2)(e) to (i) inclusive apply.

(b) A welder may abandon any renewal test at any stage if he or she is dissatisfied with the results.

(c) In cases where the privileges of a rating have lapsed for more than six months, the complete test must be satisfactorily completed before the privileges of the rating concerned are again exercised.

4. Examination of test pieces and test specimens

Examination of test pieces and test specimens must be done in accordance with the following requirements:

(a) General

All welds must be examined for contour, width, reinforcement, penetration, bonding, and porosity, non-metallic inclusions and excessive carburization cracks. Where excessive penetration occurs, the test piece or specimen will be rejected, but isolated excrescencies on the underside of a weld are acceptable provided the weld is free from cavities, oxide films and other defects.

(b) Tensile tests

(i) Tensile test specimens must be tested to destruction in direct tension. The ultimate tensile stress (calculated on the minimum area of cross section of the specimen) and the position of the break must be recorded.

(ii) A breakthrough the weld of a sheet-to-sheet butt welded test specimen will be considered satisfactory only if the ultimate tensile stress at which the break occurs, is to the acceptable value for the type of material concerned.

(iii) Tensile tests on tube to tube specimens must produce end loads without bending. Suitable pins passing through the top and bottom cross tubes and shackles should be used on the tensile test machine for this purpose. Where the specimen fails by the weld metal peeling away from the surface of one of the component parts, the weld will not be considered satisfactory even though the required ultimate tensile stress may have been reached.

(c) Bend tests

(i) Bend test specimens must be bent so that the weld is along the axis of the bend with the base of the weld "V" on the inner side of the bend. To facilitate close contact of the specimen to the bar about which it is bent, the side of the specimen remote from the weld face should be dressed by filing or grinding until any excrescencies are level with the parent metal. The edges of the specimen in the vicinity of the weld should be given a reasonable radius. A backing ingot or slab of lead may be used if desired in accomplishing bends of test specimens. Specimens will be considered satisfactory if they withstand the bend tests without showing cracks visible to the naked eye.

(ii) The angles and radii of bends for the various materials involved must be as shown in the following table:

MATERIAL	ANGLE OF BEND	RADIUS OF BEND
Aluminum alloys	180 °	5 times nominal thickness of test piece
Magnesium alloys	180 °	10 times nominal thickness of test piece
Carbon and low alloy steels	180 °	2 times nominal thickness of test piece
Austenitic steels *	90 °	3 times nominal thickness of test piece
Boron containing steels	180 °	3 times nominal thickness of test piece
Titanium	180 °	5 times nominal thickness of test piece
All other materials	180 °	2 times nominal thickness of test piece

* Austenitic steel bend specimens in the "as welded" condition must be given the "weld decay" pickling test, prescribed by the specification for the parent metal, prior to bending. The formula for the weld decay solution is: 222 grams of copper

sulfate, 106.5 ml of sulfuric acid and add water to make a total of two liters.

(d) Microscopic examinations

(i) Micro specimens must be examined microscopically in the unetched and etched conditions for satisfactory fusion and adequate penetration and for freedom from carburization or decarburisation, cracks, excessive cavitation and harmful inclusions.

(ii) Examination for intergranular oxide films must be done with the specimen in the unetched condition as the presence of such films is difficult to detect in the etched condition. If the area of intergranular oxide is only very slight and satisfactory results are obtained from mechanical testing of the related test specimens, further sections of the weld should be micro examined before a decision is reached.

(iii) For fillet welds of 45 ° or greater, the maximum lack of fusion which will normally be accepted, is that revealed by a line of oxide extending from the root for a distance not greater than one third of the distance between the root and the toe of the weld provided that the amount of weld material used is adequate to give a throat thickness of not less than the thickness of the sheets or tubes used for test pieces.

(iv) For fillet welds at acute angles e.g. 30 ° in Figure 3, complete penetration in the root of the weld may be difficult to achieve without excessive melting of the parent metal. The presence of a fairly large cavity or corresponding lack of fusion will be acceptable at the apex of such welds provided there is a bridge of weld material of a reasonable throat depth showing satisfactory fusion to the parent metal.

(e) Assessment of welded pieces

Final assessment of the weld must be based on consideration of the sample weld as a whole, including the results obtained by visual inspection, microscopical examination, and where applicable, radiographic examination and 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 be examined, and final assessment must be based on all the specimens examined.

5. Methods of preparation of welded test pieces and test specimens

The preparation of welded test pieces for the groups of materials must be as follows:

(a) Figure 1: Sheet to sheet butt weld

(i) Edges of sheets to be welded must be chamfered when 16 I.S.W.G or thicker material is used except for aluminum and aluminum alloys, in which case edge preparation is not necessary for

material thinner than 12 I.S.W.G.

(ii) Welds must be performed by forward welding from one side only using correct flux and filler rod.

(b) Figure 2: Sheet to tube weld

(i) The center of each end plate must be drilled with a 12mm diameter hole prior to welding. The ends of the tube need not be chamfered for material thinner than 16 I.S.W.G.

(ii) End plates may be positioned with tack welds and the first to be welded must be done with the end plate flat on the bench and the tube in the vertical position; this weld must be completed by working around the test piece. The second end plate must be welded to the tube with the tube in the horizontal position and not moved during the process of completing the weld; this weld must be completed by working under and over the test piece.

(iii) The specimen for microscopic examination must be cut from one end of the test piece as indicated in Figure 2. The remainder of the test pieces must be preserved and submitted for any further examination, which may be considered necessary should the results of the macroscopic examination raise any doubt.

(c) Figure 3: Tube to tube weld

(i) After preparation of the tubes for welding these must be assembled in a jig and tack welded.

(ii) The assembly must then be removed from the jig and mounted in a vertical position with the longest tube (365mm) at the lowest point. The assembly may not be moved from this position during the process of completing the welds.

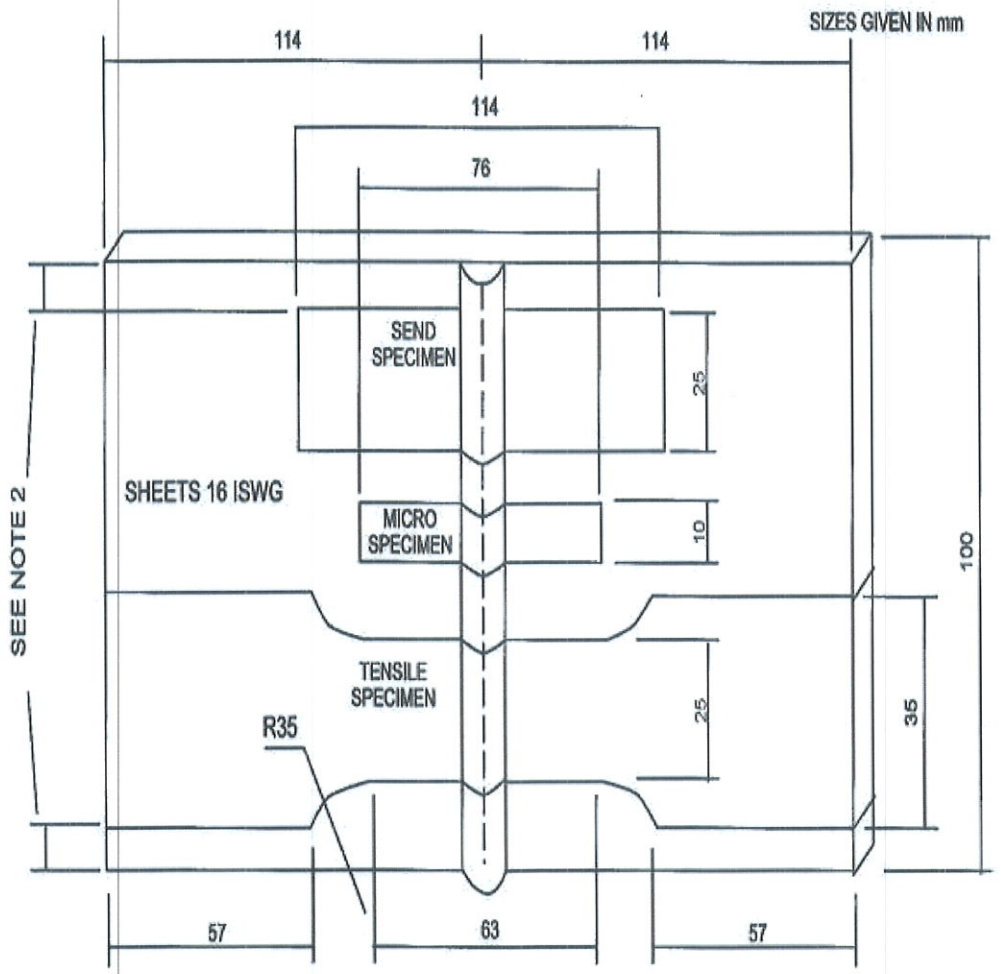
(iii) The uppermost joint formed by the short horizontal, vertical, and diagonal tubes mus be welded by the "overhead" welding technique and the remaining joints completed by working around the test piece.

(d) Figure 4: Block build-up

Do a build-up operation of the U cutout on the machined block, by multiweld runs, to a level slightly above that of block surface.

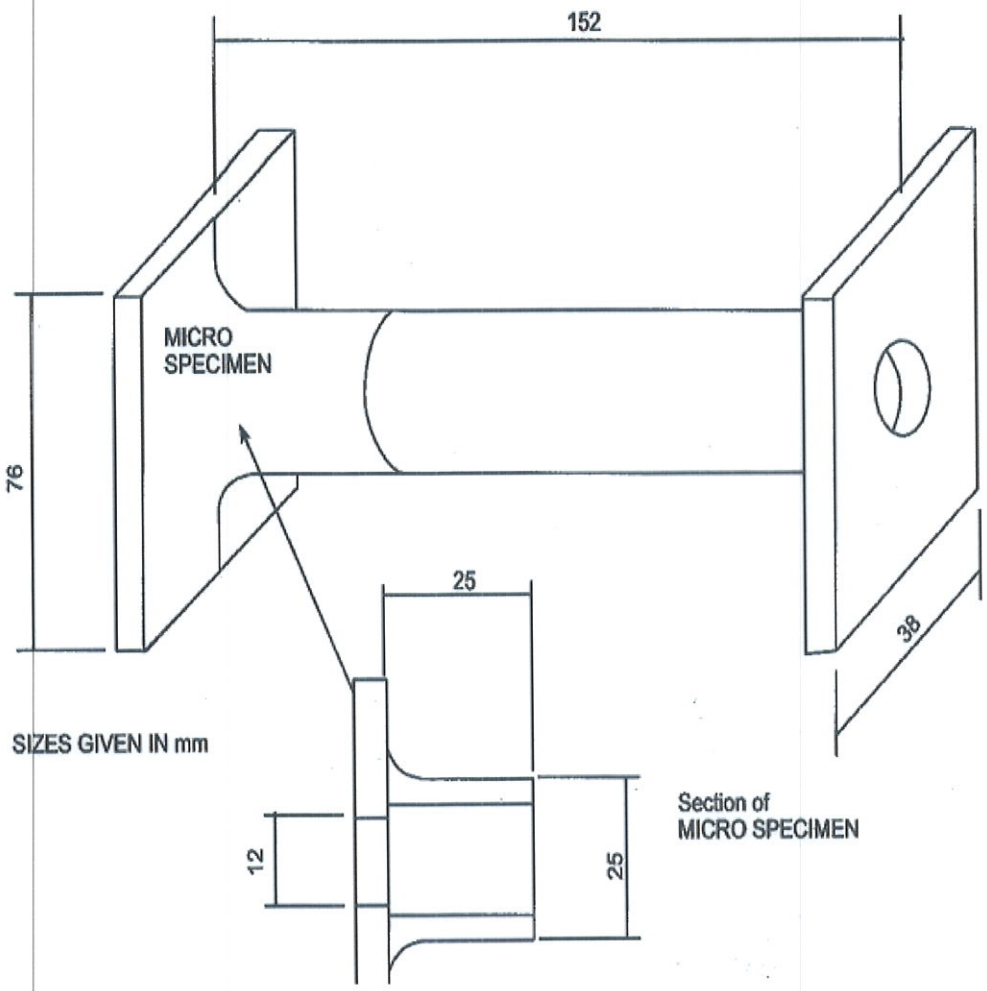
FIGURE 1

SHEET TO SHEET BUTT WELD



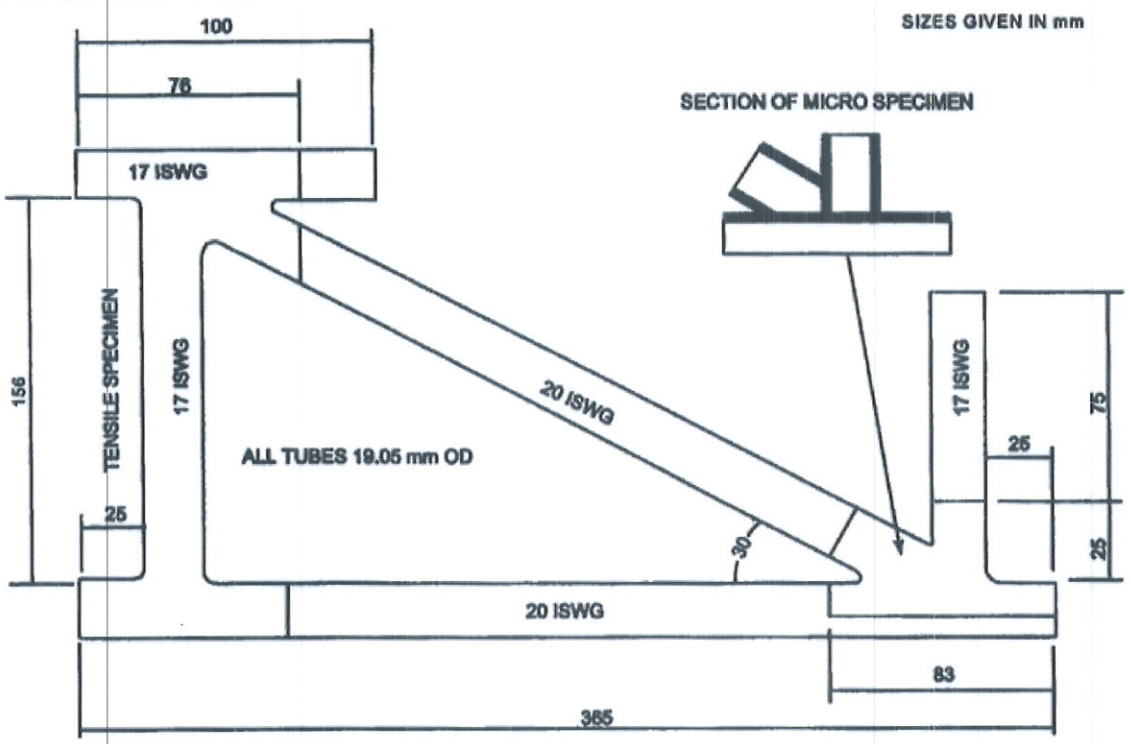
Notes:
ISWG = Imperial or British Standard wire gauge.
Enough discard so that the beginning and end of the run is not included in the test specimen.

FIGURE 2
SHEET TO TUBE WELD



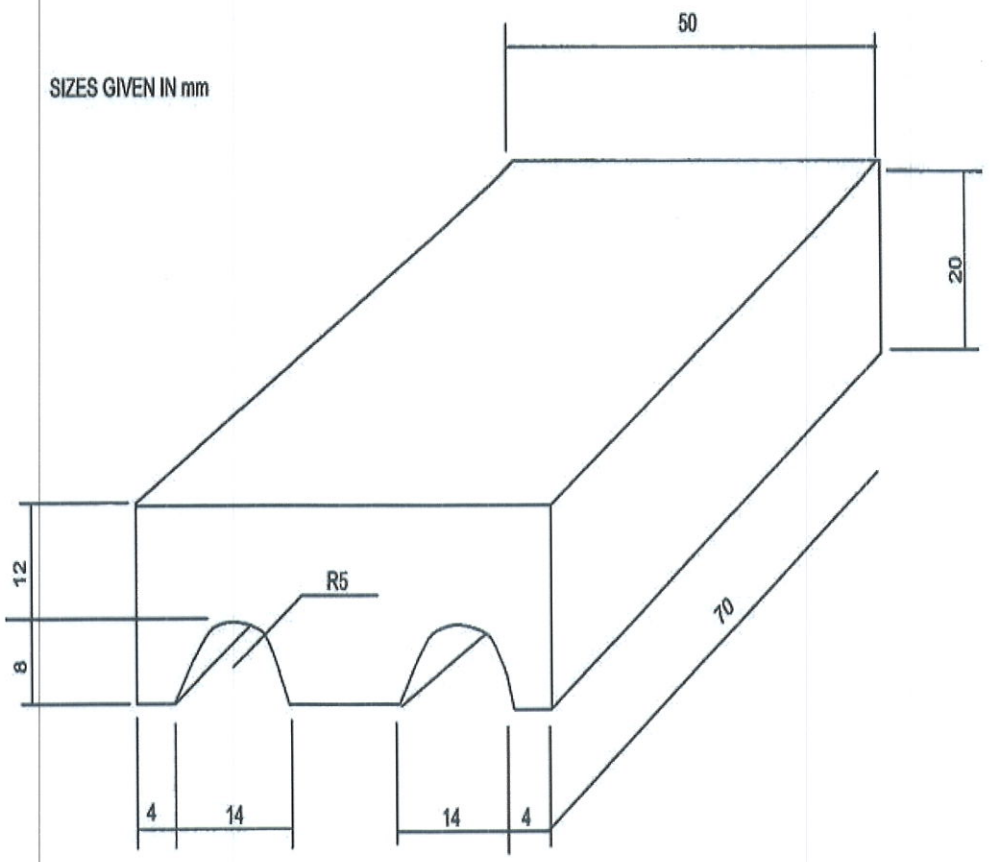
Notes:
A variation of up to 25% in tube diameter will be permitted for tubular material but wall thickness of tubes must be within the dimensions specified.
For Oxy-acetylene welding use tube 20 ISWG (0,889 – 1,016mm) and end plates 16 ISWG (1,626 – 1,676mm).
For ARC welding use tube 16 ISWG (1,626 – 1,676mm) and end plates 16 ISWG (1,626 – 1,676mm).

FIGURE 3
TUBE TO TUBE WELD



Notes:
A variation of up to 25% in tube diameter will be permitted for tubular material but wall thickness of tubes must be within the dimensions specified.
For ARC welding, substitute 14 ISWG (1,829 – 2,108mm) for 17 ISWG (1,422 – 1,473mm) and 16 ISWG (1,626 – 1,676mm) for 20 ISWG (0,899 – 1,016mm).

FIGURE 4
BLOCK BUILD-UP



23. Category W: Issue or addition of Category W

1. Avionic equipment installations/servicing

(a) An applicant for the issuing of a licence in Category W, or for the addition of Category W to an existing licence, for the certification of the installation, modification, troubleshooting, rectification of defects, repair and system checks in aircraft of all types of Radio Communication Equipment, Radio Navigational equipment (Pulse and Non-pulse), and Electronically Operated Systems, i.e. amplifiers, computers, recorders, flight management and entertainment systems, must have two years' electronic engineering experience after qualifying on relevant trade, of which twelve months of recent (within three years) general practical experience in the installation, modification, troubleshooting, rectification of defects, repair and system checks in aircraft of all types of Radio Communication Equipment, Radio Navigational Equipment (Pulse and Non-pulse), and Electronically Operated Systems, i.e. amplifiers,

computers, recorders, flight management and entertainment systems to which the application relates.

(b) For the addition of a "W" to a current licence 6 months recent experience is required.

2. Electrical equipment installations/servicing

(a) An applicant for the issuing of a licence in Category W, or for the addition of Category W to an existing licence, for the certification of the installation, modification, troubleshooting, rectification of defects, repair and system checks in aircraft of all types of electrical equipment, must have two years electronic engineering experience after qualifying on relevant trade, of which twelve months of recent (within three years) general practical experience in the installation, modification, troubleshooting, rectification of defects, repair and system checks in aircraft of all types of electrical equipment to which the application relates.

(b) For the addition of a "W" to a current licence 6 months recent experience is required.

3. Instrument equipment installations/servicing

(a) An applicant for the issuing of a licence in Category W, or for the addition of Category W to an existing licence, for the certification of the installation, modification, troubleshooting, rectification of defects, repair and system checks in aircraft of all types of instrument equipment, must have had at least three years electronic engineering experience after qualifying on relevant trade or has written a trade exam, of which twelve months of recent (within three years) general practical experience in the installation, modification, troubleshooting, rectification of defects, repair and system checks in aircraft of the types of instrument equipment to which the application relates.

(b) For the addition of a "W" to a current licence 6 months recent experience is required.

24. Category W: Extension of Category W

An applicant for the extension of Category W of a licence already valid for the certification of the installation, modification, troubleshooting, rectification of defects, repair and system checks in aircraft of all types of Radio Communication Equipment, Radio Navigational equipment (Pulse and Non-pulse), and Electronically Operated Systems, i.e. amplifiers, computers, recorders, flight management, entertainment systems, electrical equipment and instrument equipment, to include one further type to that for which the licence is already endorsed, must have had at least six months recent practical experience on the

particular type related.

5.4 TS 66.08.2 TRAINING

1. Training standards

2. The training, referred to in regulation 66.08.2, is –

for a Grade I AME Instructor rating applicant, satisfactory completion of a recognized training techniques course (instructor or train the trainer course).

66.08.3 THEORETICAL KNOWLEDGE EXAMINATION

1. Written examination requirements

The requirements of the written examination referred to in regulation 66.03.3(1) are –
(a) the appropriate requirements set out in TS 66.02.3;
(b) the required examination for the instructor training referred to in TS 66.09.2 paragraph 2 (b).

66.08.4 EXPERIENCE

1. Requirements

The experience requirements referred to in regulation 66.09.4 are –
(a) the appropriate experience requirements set out in TS 66.02.4; and
(b) Grade One aircraft maintenance instructor rating, have had experience as a Grade Two instructor for not less than 3 years; or
(c)

5.5 TS 66.09.2 TRAINING

1. Training standards

2. The training, referred to in regulation 66.08.2, is –

for a Grade II AME Instructor rating applicant, satisfactory completion of a recognized training techniques course (instructor, or train the trainer course)

66.09.3 THEORETICAL KNOWLEDGE EXAMINATION

The requirements of the written examination referred to in regulation 66.03.3(1) are –
(a) the appropriate requirements set out in TS 66.02.3;
(b) the required examination for the instructor training referred to in TS 66.09.2

paragraph 2 (b).

66.09.4 EXPERIENCE

1. Requirements

The experience requirements referred to in regulation 66.09.4 are –

(a) the appropriate experience requirements set out in TS 66.02.4; and

(c) for Grade Two aircraft maintenance instructor rating, have had experience as a Licensed Aircraft Maintenance Engineer for not less than two years, on the type applying for.

6. ISSUED BY:

NAMIBIA CIVIL AVIATION AUTHORITY
NCAA
05 MAY 2021
PRIVATE BAG 12003
AUSSPANNPLATZ
WINDHOEK
OFFICE OF THE EXECUTIVE DIRECTOR

Gordon Elliott
INTERIM EXECUTIVE DIRECTOR

5th May 2021.
Date