NAM-CATS 66: Aircraft Maintenance Engineer Licensing

CONTENTS

1. INTRODUCTORY NOTES

1.1 Section 227 of the Civil Aviation Act, 2016 empowers the Executive Director of Civil Aviation to issue technical standards for civil aviation. Section 227 of the Civil Aviation Act, 2016 further empowers the Executive Director of Civil Aviation to incorporate into a technical standard any international aviation standard or any amendment without publishing the text of such standard or any amendment by mere reference to the title, number and year of issue of such standard or amendment or to any other particulars by which such standard or amendment is sufficiently identified.

1.2 The Executive Director of Civil Aviation has, pursuant to the empowerment mentioned above, issued technical standards relating to Regulation Part 66 (Standards Relating to Aircraft Maintenance Engineer Licensing) to be known as Document NAM-CATS-66.

1.3 Document NAM-CATS-65 comprises the standards, rules, requirements, methods, specifications, characteristics and procedures which are applicable in respect of the licensing of Aircraft Maintenance Engineers.

1.4 Each reference to a technical standard in this document, is a reference to the corresponding regulation in the Namibian Civil Aviation Regulations.

1.5 Where there is any perceived disparity of meaning or inconsistency between these technical standards and the regulations, the provisions of the regulations will take precedence.

1.6 Where there is a difference between a standard or procedure prescribed in ICAO documents and the Civil Aviation Technical Standards (CATS), the CATS standard will prevail.

1.7 The abbreviation "CAR" is used throughout this document when referring to any civil aviation regulation.

1.8 The abbreviations "TS" or "CATS" are used throughout this document when referring to any technical standard.

1.9 In this document the words "Executive Director" refers to the chief executive officer of the Authority appointed pursuant to section 34 of the Civil Aviation Act 2016 being the Executive Director of Civil Aviation.

2. AMENDMENTS TO THE TECHNICAL STANDARDS

2.1 The NCAA Personnel Licensing Division has responsibility for the technical content of this technical standard.

2.2 This technical standard is issued, and may only be amended, under the authority of the Executive Director of Civil Aviation.

2.3 Requests for changes to the content of this technical standard must be forwarded to the Executive Director and may come from:

(a) technical areas within NCAA; or
(b) aviation industry service providers or operators; or
(c) pilots, engineers and maintenance organization staff.

2.4 The need to change the content of this technical standard may arise for any of the following reasons:

(a) to ensure safety;

(b) to ensure standardisation;

(c) to respond to changed NCAA regulations or standards;

(d) to respond to changes initiated by ICAO;

(e) to accommodate proposed initiatives or new technologies.

2.5 The NCAA may approve trials of new procedures or technologies to develop appropriate standards.

66.01.4 GROUPS OF AIRFRAMES AND ENGINES

1. Introduction

Definitions used for the purpose of this technical standard:

"Series" means a series of aircraft designated with the same ICAO designator.

"Family" means a collection of aircraft with similar characteristics.

"Flagship model" means the aircraft model that is considered representative of a defined family of aircraft.

"Group" means an aircraft group as defined in regulation 66.01.4.

2. Principles

2.1 Principles applicable to the issue of series, family and group licences for aircraft in groups 1 to 5, rotorcraft in groups 7 and 9, engines in groups 01 to 04 and propellers are as follows:

2.1.1 Use of ICAO designator

For aircraft and rotorcraft in these groups the ICAO designator will be used as the primary element for the granting of an AME licence and not the individual model within the designator.

As example: *A Cessna 182 licence will be issued as Cessna 182 series, and not at individual model level*.

The interpretation of the CATS 66 in this regard will be as follows:

2.1.1.1 CATS 66.02.4 1.1 – Issue or addition of different types of category 'A'

"*An applicant for the issuing of a licence in Category A, or for the addition of Category A to an existing licence, must have two years aeronautical engineering experience after qualifying on relevant trade, including 6 months experience to the type for which application is made*".

In terms of the Cessna 182 example: The six months experience to be on any combination of Cessna 182 aircraft, not necessarily one specific model of 182.

2.1.1.2 CATS 66.02.4 1.2 – Extension of category A (all types within the same data specification)

> "*An applicant for the extension of Category A of his or her licence must have had a total amount of six months experience of practical maintenance and inspection of airframes on type or six months within the same type data specification of which a minimum of thirty days spent solely on the type for which the extension is desired*".

2.1.1.3 When applying for an additional series within the same type certificate the 'additional' experience on type required will be thirty days and not six months.

Example: The holder of the C182 series desiring to obtain the R182 series (code C82R) needs only 30 days experience.

2.1.2 Families of aircraft

In addition to the series, associated with a single type designator, various families of aircraft may be defined for the purpose of granting a family licence. (The basic principle is similarity of the aircraft and their systems).

Examples: Cessna 100 family

Cessna 200 family

Beech Debonair/Bonanza/Baron family

The definition of a family is not necessarily limited to the same manufacturer. The families that have been defined are listed in this document with the group definitions. Typically, a flagship model has been selected for each of the defined series. The candidate will target the flagship model to attain an AME licence on that model. Provision has been made for the candidate who is not in a position to gain six months experience on the flagship model by allowing the granting of a series of the lesser models based on the seniority of the licence held by the candidate.

When upgrading from a lesser model to a more senior model in the series two months experience on the senior model will be considered acceptable.

2.1.3 Groups of aircraft

A group licence may be granted to an applicant who holds 60% of the aircraft (by ICAO code) in the qualifying group.

Examples: Aircraft in group 4

Rotorcraft in group 7

The Executive Director reserves the right to exclude any particular aircraft from a defined series or group on the grounds of dissimilarity from the other aircraft in the group. Any such identified exclusion will be published.

A person shall hold a group licence from issuance and it shall be applicable to all aircraft within a group, as per the latest revision of aircraft within a group published.

The Director shall not list individual aircraft within a group on a licence, once a group licence has been issued. Only those aircraft listed individually prior to issuance of a group licence may be considered for separate listing on an AME licence.

2.1.4 Experience requirement

A family licence may only be granted to an applicant who has five year uninterrupted experience as licensed AME since the first rating was issued in the family. The experience need not be limited to aircraft in the series or group for which the licence is sought.

[Sub-para. (iv) substituted by SA-CATS 1/2018 w.e.f. 1 March 2018.]

2.1.5 Theoretical requirement

Recognition of the theoretical knowledge for the lesser aircraft models in a series or family is automatically granted to an applicant who has training course prescribed in Part 141, or an approved manufacturer's course, or an appropriate written examination as prescribed in Document SA-CATS 66.

[Sub-para. (v) added by SA-CATS SA-CATS 1/2018 w.e.f. 1 March 2018.]

3. Airframes

3.1 Classification of groups

For the purposes of licensing AMEs, airframes are classified into the following groups:

3.1.1 **GROUP 1** – AEROPLANES OF WOODEN CONSTRUCTION, WITH A MAXIMUM CERTIFICATED MASS OF 5700KG OR LESS.

3.1.1.1 When reference is made in a licence to this group, the privileges of the licence may be exercised in respect of the following airframes:

MANUFACTURER	MODEL	ICAO CODE
DE HAVILLAND	DH-87 Hornet Moth	DH87
DE HAVILLAND	DH-89 Dragon Rapide	DH89

3.1.1.2 *Eligibility for a group licence*

The holder of any rating in group 1 who has more than 5 years uninterrupted experience as AME, since the first AME licence with a Cat A rating was granted to the holder, is eligible to apply for the issue of a group 1 licence.

3.1.2 **GROUP 2** – AEROPLANES CONSTRUCTED OF COMPOSITES, WITH A MAXIMUM CERTIFICATED MASS OF 5700KG OR LESS.

3.1.2.1 When reference is made in a licence to this group, the privileges of the licence may be exercised in respect of the following airframes:

MANUFACTURER	MODEL	ICAO CODE
CIRRUS	SR20/SR22	SR20/SR22
DIAMOND	DA-20 Katana	DV20
DIAMOND	DA-40	DA40
DIAMOND	DA-42	DA42
EXTRA	300, 350	E300
EXTREMEAIR	XA42	XA42
GROB	G-103C Twin 3SL	G103
GROB	G-109, Ranger (Vigilant)	G104
STEMME	S-10	S10S

3.1.2.2 *Eligibility for a group licence*

The holder of a rating in group 2 who has more than 5 years uninterrupted experience as AME, since the first AME licence with a cat A rating was granted to the holder, and who holds 60% of the aircraft (ICAO designator) in group 2, at the date of application, is eligible to apply for the issue of a group 2 licence.

3.1.3 **GROUP 3** – AEROPLANES OF FABRIC COVERED TUBULAR METAL CONSTRUCTION, WITH A MAXIMUM CERTIFICATED MASS OF 5700KG OR LESS.

3.1.3.1 When reference is made in a licence to this group, the privileges of the licence may be exercised in respect of the following airframes:

MANUFACTURER	MODEL	ICAO CODE
AERONCA 15	Sedan	AR15
ANTONOV	AN-2	AN2
AUSTER	J-5 Adventurer	ADVE
AUSTER	Auster AOP6 (K, 6A)	AUS6
BEECH	17 Staggerwing (UC-43 Traveler)	BE17
BELLANCA	7 Champ, Citabria	AR7
BELLANCA	8 Decathlon, Scout	BL8
BELLANCA	17 Viking, Super Viking, Turbo Viking	B L17
BOEING	75 Kaydet (PT-13, PT-17, PT-18, PT-27, N2S)	ST75
CHRISTEN	A-1 Husky	HUSK
DE HAVILLAND	DH-82 Tiger Moth	DH82
FAIRCHILD	F-24 (UC-61, JK, Forwarder, Argus)	FA24
MAULE	M-4 Bee Dee, Jetasen, Rocket, Astro Rocket, Strata Rocket	M4
MAULE	M-5, Strata Rocket, Lunar Rocket, Patroller	M5
MAULE	M-6 Super Rocket	M6
MAULE	M-7-235, MT-7, MX-7-160/180/235, MXT-7-160/180 Super Rocket, Star Rocket	M7
PIPER	J-3 Cub	J3
PIPER	PA-12 Super Cruiser	PQ12
PIPER	PA-14 Family Cruiser	PA14

PIPER	PA-17 Vagabond	PA17
PIPER	PA-18 Super Cub variants	PA18
PIPER	PA-20 Pacer	PA20
PIPER	PA-22 Tri-Pacer, Caribbean, Colt	PA22
PIPER	PA-25 Pawnee	PA25
PITTS	S-2 Special	PTS2
STINSON	108 Voyager, Station Wagon	S108
TAYLORCRAFT	BC, BF, BL, Ace, Sportsman, Traveller	TAYB
TAYLORCRAFT	Plus C/D (Auster 1)	PLUS

3.1.3.2 In group 3, as a build-up to a complete group 3 licence, a candidate may qualify for the issue of a licence for a 'family' of aircraft of similar construction.

3.1.3.3 The holder of a rating in group 3 who has more than 5 years uninterrupted as AME, since the first AME licence with a cat A rating was granted to the holder, is eligible to apply for the issue of a 'family' licence for any of the defined 'families' as follows:

3.1.3.3.1 The Maule family in group 3 if the candidate holds a rating for the Maule M7.

3.1.3.3.2 The Piper family aircraft in group 3 if he or she holds a rating for either of the PA-18, 20, 22 or 25.

3.1.3.4 *Description of the Piper family in group 3*

3.1.3.4.1 The numbering of the Pipers represents the order in timeline of manufacture.

3.1.3.4.2 All these aircraft show the horse power of the engine by the dash number, after the model type. For example, J3C-65 means it is a J3, the C is for continental engine and the 65 is the horse power. There are others like J3L (L for Lycoming) and J3F (F for Franklin). According to type certificates most of Piper aircraft in group 3 have Lycoming engines only.

3.1.3.4.3 In this Piper family (fabric covered aircraft), the J3 is lowest form with no electrics, no flaps, two seats and engines from 40 hp. to 90 hp. (not listed above is the PA 11 which is a J3 with larger engine electrics and full engine cowling) (Type certificate still owned by Piper).

3.1.3.4.4 PA 12 is larger with electrics, flaps optional, 3 seats and engines from 108 hp. to 125 hp. (most are STC'd to 150 hp.).

3.1.3.4.5 PA 14 is a slightly wider body version of the PA 12 with flaps, 4 seats, full electrics and same engines as PA 12 (also most STC'd to 150 hp.).

NOTE: *both PA 12 and 14 type certificates do not belong to Piper.*

3.1.3.4.6 PA 17 is listed above, but is not owned by Piper, and most are now NTCA.

3.1.3.4.7 PA 18 is a slightly larger version of the J3, still with 2 seats, but has full electrics, flaps and engines from 125 hp. to 150 hp.

3.1.3.4.8 The PA 18 series also has an agricultural version, called a PA 18A. (TC owned by Piper and supported).

3.1.3.4.9 The PA 20 is essentially a shorter version of the PA 12/14, shorter fuselage and wings, 4 seats, full electrics, pretty much the same as PA 12/14, including the engines.

*(**NOTE** all above aircraft are tail wheel types)*

3.1.3.4.10 The PA 22-135/150/160 aircraft are identical to the PA 20, except they were converted to tricycle gear and engine options up to 160 hp.

3.1.3.4.11 PA 22-108 is a downgraded version of the above aircraft, with only 2 seats and 108 hp. engine, no flaps.

NOTE: *PA 20 and 22 are still owned by Piper but not really supported in terms of updated publications.*

3.1.3.4.12 PA 25 is a crop sprayer and not owned by Piper any longer. The PA 25 would be considered the flagship of the group 3 Piper, as it has the largest engine in the group up to 260 hp.

3.1.3.4.13 **Summary:** The PA 22 would be the flagship for the J3 through PA 18. The PA 25 would be the overall flagship for the group.

3.1.3.5 The Aeronca, Auster, Bellanca 7/8, Stinson and Taylor Craft are so similar to the PA-12, 14, 18, 20 or 22 that they can be combined with the Pipers into a series of similar monoplane aircraft.

3.1.3.6 The holder of the Piper series and any of the Aeronca, Auster, Bellanca 7/8, Stinson or Taylor Craft ratings qualifies to apply for a group 3 monoplane family rating.

3.1.3.7 The Boeing Stearman is the top of the range in this Biplane group and the holder of this licence may be granted the Pitts series and the DH82.

3.1.3.8 The Boeing Stearman, Pitts series and DH82 are biplanes that require much rigging experience.

3.1.3.9 An applicant who holds 60% of the aircraft in group 3, at the date of application, is eligible to apply for the issue of a group 3 licence.

3.1.4 **GROUP 4** – UNPRESSURISED AEROPLANES OF ALL-METAL CONSTRUCTION, WITH A MAXIMUM CERTIFICATED MASS OF 5700KG OR LESS.

3.1.4.1 When reference is made in a licence to this group, the privileges of the licence may be exercised in respect of the following airframes:

MANUFACTURER	MODEL	ICAO CODE
AERO	45	AE45
AERO COMMANDER	100 Commander 100	VO10
AERO COMMANDER	500 Commander 500	AC50
AERO COMMANDER	680F, Commander 680F	AC68
AERO COMMANDER	S-2 Ag Commander	SS2P
AEROSTAR	600, 601	AEST
AIR TRACTOR	AT-301/401	AR3P
AIR TRACTOR	AT-302/400/402	AT3T
AIR TRACTOR	AT-502/503	AT5T
AIR TRACTOR	AT-602	AT6T
AIR TRACTOR	AT-802	AT8T
ALLISON	36 Turbine Bonanza	B36T
AMERICAN	AG-5 Tiger	AA5
ALPHA AVIATION	R2160i (Robin)	R200
AYRES	S-2R-600/R1340/R1820/R3S Thrush, Bull Thrush	SS2P
AYRES	S-2R-T11/T15/T34/T65/G6/G10 Turbo Thrush, V-1 Vigilante	SS2T
BEAGLE	B-121 Pup	PUP
BEECH	18 (C-45, RC-45, TC-45, UC-45, AT-7, AT-11 Kansan, SNB, JRB, Expeditor, Navigator)	BE18
BEECH	19 Musketeer Sport, Sport	BE19
BEECH	23 Musketeer, Sundowner	BE13

BEECH	24 Musketeer Super, Sierra	BE24
BEECH	33 Debonair, Bonanza (E-24)	BE33
BEECH	35 Bonanza	BE35
BEECH	36 Bonanza	BE36
BEECH	55 Baron (T-42 Cochise, C-55, E-20)	BE55
BEECH	56 Baron	BE56
BEECH	58 Baron	BE58
BEECH	65 Queen Air (U-8F Seminole)	BE65
BEECH	76 Duchess B	BE76
BEECH	95 Travel Air The Travel Air is considered as a subset of the B55 and may be awarded to the holder of a B55	BE95
BRITTEN-NORMAN	BN-2, BN-2A/B Islander, Defender, Maritime Defender	BN2P
BRITTEN-NORMAN	BN-2T	BN-2T
CESSNA	120	C120
CESSNA	140	C140
CESSNA	150, A150, Commuter, Aerobat	C150
CESSNA	152, A152, Aerobat	C152
CESSNA	170	C170
CESSNA	172, P172, R172, Skyhawk, Hawk XP, Cutlass (T-41, Mescalero)	C172
CESSNA	172RG Cutlass RG	C72R
CESSNA	175, Skylark	C175
CESSNA	177, Cardinal	C177
CESSNA	177RG Cardinal RG	C77R
CESSNA	180, Skywagon 180 (U-17C)	C180
CESSNA	182, Skylane	C182
CESSNA	R182, TR182 (Turbo) Skylane RG	C82R
CESSNA	185, A185 Skywagon, Skywagon 185, AgCarryall (U-17A/B)	C185
CESSNA	188, A188, T188 AgWagon, AgPickup, AgTruck, AgHusky	C188
CESSNA	195 (LC-126)	C195
CESSNA	206, P206, TP206, U206, TU206, (Turbo) Super Skywagon, (Turbo) Super Skylane, (Turbo) Skywagon 206, (Turbo) Stationair, (Turbo) Stationair 6	C206
CESSNA	207 (Turbo) Skywagon 207, (Turbo) Stationair 7/8	C207
CESSNA	208 Caravan 1, (Super) Cargomaster, Grand Caravan (U-27)	C208
CESSNA	210, T210, (Turbo) Centurion	C210
CESSNA	310, T310 (U-3, L-27)	C310
CESSNA	320 (Executive) Skyknight	C320
CESSNA	335	C335
CESSNA	336	C336
CESSNA	337, M337, MC337, T337B/C/D/E/F/H (Turbo) Super	C337

	Skymaster (O-2)	
CESSNA	401, 402, Utililiner, Businessliner	C402
CESSNA	404 Titan F406 Caravan 2	C404
CESSNA	T303 Crusader	C303
DE HAVILLAND	DHC-1 Chipmunk	DHC1
DE HAVILLAND CANADA	DHC-2 Mk1 Beaver (U-6, L-20)	DHC2
DE HAVILLAND CANADA	DHC-6 Twin Otter (UV-18, CC-138)	DHC6
DORNIER	DO-27 (Fpl53)	DO27
DORNIER	228-100/200	D228
EMBRAER	110	E110
ERCO	415 Ercoupe	ERCO
FUJI	FA200-180	SUBA
GIPPSLAND	GA8	GA8
GIPPSLAND	GA200	GA20
GLOBE	GC-1 Swift	GC1
GRUMMAN	G-164 Ag-Cat, Super Ag-Cat	G164
GRUMMAN AMERICAN	AA-1 Trainer, Tr2, T-Cat, Lynx	AA1
GRUMMAN AMERICAN	AA-5 Traveler, Cheetah, Tiger	AA5
GRUMMAN AMERICAN	G-164 Ag-Cat, Super Ag-Cat	G164
GRUMMAN AMERICAN	G-164 Turbo Ag-Cat	G64T
HELIO	H-391/392/395/250/295/700/800, HT-295 Courier, Strato-Courier, Super Courier (U-10)	COUR
MOONEY	M-20, 201, 205, 231, 252, ATS, MSE, PFM, TLS, Mark 21, Super 21, Ranger, Master, Chaparral, Executive, Statesman, Ovation	M20
MOONEY	M22, Mustang	M22
MORANE-SAULNIER	MS-880 to 893 Rallye, Rallye Club, Super Rallye, Rallye Commodore	RALL
PAKISTAN	Mushshak	MF17
PACIFIC AEROSPACE	750XL	P750
NAVION	Rangemaster	RANG
PARTENAVIA	P-64/66 Oscar, Charlie OSCR	OSCR
PARTENAVIA	P-68, Victor, Observer P68	P68
PARTENAVIA	AP-68TP-600 Viator VTOR	VTOR
PIAGGIO	P-166, P-166A/B/C/DL2/M/S, Portofino, Albatross	P66P
PILATUS	PC-6A/B/C Turbo-Porter (UV-20 Chiricahua)	PC6T
PIPER	PA-23-150/160 Apache	PA23
PIPER	PA-23-235/250 Aztec, Turbo Aztec (U-11, E-19, UC-26)	PA27
PIPER	PA-24 Comanche	PA24
PIPER	PA-28-140/150/151/160/161/180/181 Cherokee, Archer, Cadet, Dakota, Turbo Dakota, Warrior, Cherokee Archer/Challenger/Charger/Chief/	PA28

	Cruiser/Flite Liner/Pathfinder/Warrior	
PIPER	PA-28R-180/200/201 Cherokee Arrow, Arrow 2/3, Turbo Arrow 3	P28R
PIPER	PA-28RT-201/201T Arrow 4, Turbo Arrow 4 P28T	P28T
PIPER	PA-30/39 Twin Comanche, Twin Comanche CR, Turbo Twin Comanche	PA30
PIPER	PA-31 Navajo, Piper, Chieftain	PA31
PIPER	PA-32 Cherokee Six, Six, Saratoga, Turbo Saratoga	PA32
PIPER	PA-32R Cherokee Lance, Lance, Saratoga SP, Turbo Saratoga SP	P32R
PIPER	PA-32RT Lance 2, Turbo Lance 2	P32T
PIPER	PA-34 Seneca	PA34
PIPER	PA-36 Pawnee Brave	PA36
PIPER	PA-38 Tomahawk	PA38
PIPER	PA-44 Seminole, Turbo Seminole	PA44
PIPER	PA-60, Aerostar	AEST
PZL-MIELEC	M-18 Dromader	M18
PZL-OKECIE	PZL-106AT/BT Turbo Kruk	PZ6T
PZL-OKECIE	PZL-104 Wilga	PZ04
REIMS	F172, FP172, FR172, Skyhawk, Reims Rocket, Hawk XP	C172
REIMS	F182	C182
REIMS	F406 Caravan II	F406
ROCKWELL	112, 114 Commander 112/114, Alpine Commander, Gran Turismo Commander	CM11
SCHWEIZER	G-164 Ag-Cat, Super Ag-Cat	G164
SCHWEIZER	G-164 Turbo Ag-Cat, Ag-Cat Turbine	G64T
SIAI-MARCHETTI	S-205-18F/20F	S05F
SIAI-MARCHETTI	S-205-18R/20R/22R	S05R
SIAI-MARCHETTI	S-208	S208
SIAI-MARCHETTI	SF-260A/B/C/D/M/W, Warrior	F260
SHORTS	SC-7 Skyvan	SC7
SOCATA	MS-880 to 894, Rallye, Rallye Club/Minerva/ Commodore, Gabier, Gaillard, Galérien, Galopin, Garnement, Gaucho, Guerrier	RALL
SOCATA	TB-10/20 Tobago, GT	TOBA
SOCATA	TB-20/21 Trinidad, GT, Pashosh	TRIN
TECNAM	P2002-JF	SIRA
TRANSAVIA	PL-12 Airtruk, Skyfarmer	PL12
ROBIN	HR-100 Royal, Safari, Tiara, President	HR10
ROBIN	HR-200, R-200, Acrobin	HR20
ROBIN	DR-400 Cadet, Chevalier, Dauphin 4/80/2+2, Earl, Major, Major 80, Petit Prince, Regent, Remo 180/200/212, Remorqueur, 2+2	DR40

ZLIN	Z-42/142/242	Z42
ZLIN	Z-50	Z50

3.1.4.2 In group 4, as a build-up to a complete group 4 licence, a candidate may qualify for the issue of a licence for a 'family' of aircraft of similar construction.

3.1.4.3 The holder of a rating in group 4, who has more than 5 years uninterrupted experience as AME, since the first AME licence with a cat A rating was granted to the holder, is eligible to apply for the issuance of a 'family' licence for any of the defined 'families' as follows:

3.1.4.3.1 *Ayres/Rockwell/Aerocommander/Air Tractor/Piper PA 36 Agricultural aircraft*

3.1.4.3.1.1 Although these are produced by different manufacturers they have been designed by the same person using the same principles and can be dealt with as a family of Agricultural aircraft.

3.1.4.3.1.2 The holder of the Ayres S-2R (piston) rating qualifies to apply for the Rockwell commander, the Air Tractor AT 301/401 AT 302/400/402, the Aero Commander S-2 as well as the PA 60.

3.1.4.3.1.3 The holder of the Ayres S-2R-T (turbine) rating qualifies to apply for the Air Tractor AT 502/503 and AT 602 ratings. The new AT 801 will become the senior in this family.

3.1.4.3.2 *Beech Aircraft*

3.1.4.3.2.1 <u>The Beech 19, 23, 24 and 76 </u>represent a family of aircraft

<u>The Beech 24 </u>is a retractable version of the 23 while the 76 is a twin engine version of the 24.

The holder of the Beech 76 (the flagship) qualifies to apply for the 19, 23, 24 and 76 as a family.

3.1.4.3.2.2 <u>The Beech 33/35/95/36/55/58/58P family</u>

<u>The B58 </u>is the flagship in group 4, while the 58P (in group 5) is the overall senior aircraft for this family.

The holder of the B58 or the B58P qualifies to apply for the issue of the above family of Beech aircraft in group 4.

The holder of any of the other aircraft in this family qualifies to apply for the issue of the ratings of the lesser aircraft in this family.

3.1.4.3.2.3 A description follows of the aircraft in this group:

<u>B35 under type cert A-77 </u>are the very early versions of the Bonanza beginning 1947 through 1955. They are the entire 'V' tail configuration and all use the same control systems, pedals, control column and bell cranks. They all use the same electro mechanical undercarriage and flap system. Variations are engine related, beginning with Continental E-185 series through to Continental E-225 series. It is considered that as this aircraft is virtually obsolete, including the engines, it is unlikely that any person would actually apply to write an examination on this aircraft. However this series should be included with the successful completion of examination or approved technical course mentioned on type certificate 3A15.

<u>B33 </u>covers the Bonanza/Debonair series from 1956-2005 under type cert 3A15 and is follow on from TCA-777. This includes the 35-33 series. The holder of any of the E, F or G33 should be granted all the B33 aircraft series.

<u>B35 </u>is also under Type cert 3A15. The holder of any of the V35 models should be granted the entire B35 and B33 series.

B36 series is also under the type cert 3A15. The holder of any of the A or B36TC series should be granted the entire B36/B35/B33 series licences.

B95 Travel Air series

This series begins with the model 95 through B95/B95A/D95A/E95, known as the Travel Air, beginning 1957 through to 1960. This is a smaller version of what became the Baron and the engines are Lycoming O-360 series. The Travel Air uses essentially the same fuselage as the early 35 Debonair series. They are basically the same aircraft using Conventional control surfaces and stabilisers.

It is considered that as this aircraft is virtually obsolete, it is unlikely that any person would actually apply to write an examination on this aircraft.

B55 series

From 1960 on, the Travel Air became known as the Baron with designation 95-55. At the D55 the 95-designation was discontinued, and these models are now commonly known as the 55 Baron. The 55 series uses essentially the same fuselage as the 33 Bonanza series. The main variation from the Travel Air series is the size of fuselage, and the engines changed to Continentals (with the exception of the 56TC and A56TC).

The B55 and B95 should be seen as one series and the holder of an E55 licence should be granted the entire B55/B95/B35/B33 series.

B56 series aircraft are turbocharged version of the B55 and appear on the same type certification.

The holder of a B56 licence should be granted the B55 and aircraft below.

B58 series is a larger version of the 55 and is on the same type certification. This is the senior model in the B58/B55/B95/B35/B33 series. Although the B58TC is on a different type certificate (A23CE) it is still in the Baron series and should be included in the B58 series.

3.1.4.3.3 *Cessna Aircraft*

3.1.4.3.3.1 Cessna 100 family

This family includes 120, 140, 150, 152, 170, 172, 175, 177, 180, 182, 185, 190, 195.

Retractable versions are the Cessna 172RG and 182RG (virtually same undercarriage and hydraulic system as Cessna 210N and 210R).

The holder of any licence in this family qualifies to apply for the lesser aircraft in the family (with the exception of the retractable undercarriage versions unless an RG version is held). The 180, 182 or 185 are seen as the senior models in the family.

The 190 and 195 are radial engine versions and may be granted to the holder of the appropriate radial engine licences.

When upgrading from a lesser model to a more senior model in the family, 2 months experience on the senior model will be considered acceptable.

Cessna 120, 140 have some fabric covered surfaces; Cessna 190, 195 have radial engines.

3.1.4.3.3.2 Cessna 200 family

The 210 is the highest order in the 200 family. Any person holding the Cessna 210, qualifies to apply for the remainder of the 200 family, i.e. Cessna 207, 206 and 205.

This is based on the 210 being the first design in the 200 series followed by the 205, 206 and 207. All Cessna 210 series are retractable undercarriage types. A fixed gear version was designated 210-5 and 210-5A which became the Cessna 205 and later Cessna 206, with Cessna 207 being a stretched version of the same aircraft. Cessna 210/210A through to 210J shared essentially same fuselage as the 205 and 206 series.

From 210K onwards, the fuselage was shortened. The only significant variation would be turbo charging.

Cessna 210 series up to T210J had more complicated undercarriage and hydraulic system and should possibly be seen as a series within a series. With successful passing of exam on Cessna T210J, the candidate should be granted the entire 210 series from 210, 210A through to T210R. This is based on the more complicated undercarriage and hydraulic system incorporated on these aircraft. The candidate should also be granted 205, 206 and 207 series aircraft. Therefore, the above aircraft are actually of the highest order within the range as they are more complicated than the aircraft described below.

From the 210K through to 210L and 210M, the undercarriage and hydraulic system is simplified but still more complicated than the 210N and 210R. Successful candidate for 210M exam should be given 210K and 210L but not necessarily the series 210/A through 210J. However, Cessna 205, 206 and 207 should be granted.

Cessna 210N and 210R have even more simplified hydraulic system.

The holder of any 210 licence should be granted the remainder of the 200 series as well as the 100 series.

The Cessna 208 is a very large fixed gear turbine version of the Cessna 206/207 and has many similarities to the 200 series. However, turbine and piston engine aircraft will be considered separately.

3.1.4.3.3.3 Cessna 300 Family

The 337 is the highest order in the 300 family.

Any person holding the Cessna 337 qualifies to apply for the remainder of the 300 family.

The holder of any other rating in the 300 family qualifies to apply for the ratings of the lesser aircraft in the family.

The holder of the Cessna 337 rating also qualifies to apply for the Cessna 100 and 200 families.

Common types are Cessna 303, 310, 320, 335, 340, 336 and 337. All are retractable twin-engine except fixed gear 336. Cessna 310, 320 and 335 are almost identical and should be put together under one series licence (electro-mechanical undercarriage system).

Cessna 340 is pressurised version of 335.

Cessna 303 is the simplest version in the 300 series (hydraulic system similar to Cessna 210N and 210R) and should be a separate examination with consideration for granting of 100 series.

Cessna 336 and 337 are almost identical apart from 337 being retractable. Successful passing of examination on 335, candidate should be granted 320 and 310 and 303.

Successful Cessna 337 candidate should be granted 336. Consideration should be given here for granting of Cessna 200 and 100 Series with passing of 337 as this aircraft is of the highest order in the 300 series (non-pressurised).

3.1.4.3.3.4 Cessna 400 series (non-pressurised)

Cessna 401, 402A and 402B are almost identical. Successful candidate for 402B qualifies to apply for the 402A and 401 as well as Cessna 310, 320, 335.

Cessna 402C candidate should be granted the above aircraft.

The rest of the 400 series are mainly pressurised and treated under group 5.

3.1.4.3.4 *Mooney family*

The holder of the M22 qualifies to apply for the mooney family in group 4.

Mooney M20 series Type Certificate 2A3 (includes M20A, B, C, etc. through S and TN).

M20A through M20G are virtually identical with mechanically operated undercarriage system and hydraulic flap actuation. M20J and on have electrically actuated undercarriage and flap system. Successful candidate for M20G should be granted all models below. Successful candidate for M20S and TN should be granted entire series.

3.1.4.3.5 *Piper family aircraft*

The holder of any fixed gear rating in the Piper family qualifies to apply for the lesser fixed gear aircraft in the family.

The progression of fixed gear aircraft in this family is, from lesser aircraft to flagship: PA 38, 28, 32, 36.

The holder of any retractable rating in the above family qualifies to apply for the lesser fixed and retractable aircraft in the family.

The progression of retractable gear aircraft in this family is, from lesser aircraft to flagship: PA 28R, 32R, 24, 46.

The holder of any retractable rating in the above family qualifies to apply for the equivalent fixed gear aircraft in the family.

The holder of any twin rating in the above family qualifies to apply for the lesser fixed and retractable aircraft in the family.

The progression of twin-engined aircraft in this family is, from lesser aircraft to flagship: PA 44, 30/39, 34, 23, 31, 31T.

The holder of any twin rating in the above family qualifies to apply for the single engine versions based on the same design

Description of the Piper aircraft in group 4

PA 23 is an obsolete aircraft in terms of spares and support. It is a twin engine, 4-6 seater with engine variations from 180 hp. – 260 hp., hydraulic retractable undercarriage.

PA 24 is also virtually obsolete in terms of spares and support. It has electrically operated retractable undercarriage, it is a 4 seater with engines from 180 hp. – 400 hp.

PA 28 series is a far simpler aircraft to the PA 24 in terms of structures and systems, 2-4 seats with engines from 150 hp. – 235 hp. (Has normally aspirated and turbo charged versions).

PA 28R series is the retractable version of the PA 28, virtually identical structure and systems, with engines from 180 hp. – 200 hp. (Has normally aspirated and turbo charged versions).

PA 30/39 this is a twin engine version of the PA 24, identical in structure except for the twin engines. The PA 39 is simply a turbo charged version of the normally aspirated PA 30. Engines are 180 hp. only.

PA 31 commonly known Navajo/Chieftain, this is a 6-8 seater with horse power from 300-350. It is the largest of the twin piston engine Pipers.

PA 31T and P series, these are pressurised versions of the same aircraft. The PA 31P is still piston powered. The PA 31T turbo propeller. (different type certificate).

PA 32 is essentially a large version of the PA 28 series, with virtually identical structures on a larger scale. They are 6 seaters, with fixed gear and retractable versions. With horse power from 260-300 in turbo charged and normally aspirated versions.

PA 34 is a twin engine version of the PA 32, virtually identical in structure, only comes in retractable version. With horse power from 200-220.

PA 36 is a crop sprayer and much larger version of the PA 25. With 400 hp. engine. And all metal construction.

PA 38 this is the smallest of the group 4 Piper, it is a training aircraft, with 2 seats and 115 hp. only. It is probably the most simple of the group, except that it has a T tail configuration.

PA 44 is essentially a twin engine retractable version of the PA 28 series.

PA 60 is actually not a Piper, although listed in AICs as a Piper. The type had a brief history with Piper but is actually an Aerostar. This aircraft bears no structural similarity to the other Pipers and has more in common with AeroCommander as they were both designed by Ted Smith.

An applicant who holds 60% of the aircraft in group 4, at the date of application, is eligible to apply for the issue of a group 4 licence.

3.1.5 **GROUP 5** – PRESSURISED AEROPLANES OF ALL-METAL CONSTRUCTION, WITH A MAXIMUM CERTIFICATED MASS OF 5700KG OR LESS.

3.1.5.1 When reference is made in a licence to this group, the privileges of the licence may be exercised in respect of the following airframes:

MANUFACTURER	MODEL	ICAO CODE
AERO COMMANDER	680F, 680FP Commander 680F/680FP	AC68
AERO COMMANDER	680FL Grand Commander	AC6L
AEROSTAR	601P	AEST
BEECH	58P Baron (Pressurised)	BE58
BEECH	60 Duke	BE60
BEECH	90, A90 to E90 King Air (T-44, VC-6)	BE9L
BEECH	F90 King Air	BE9T
BEECH	100 King Air (U-21F Ute)	BE10
BEECH	200, 300, Super King Air, Commuter (C-12A to F, C-12L, UC-12, RC-12, Tp101, Huron)	BE20/B30
CESSNA	P210 Pressurised Centurion	P210
CESSNA	340	C340
CESSNA	414, Chancellor	C414
CESSNA	421, Golden Eagle, Executive Commuter	C421
CESSNA	425 Corsair, Conquest 1	C425
CESSNA	441 Conquest, Conquest 2	C441
CESSNA	500, 501 Citation, Citation 1/1SP	C500
CESSNA	510 Mustang	C510
CESSNA	525 CitationJet, Citation CJ	C525
CESSNA	525A Citation CJ2	C25A
EMBRAER	500 (Phenom 100)	E50P
FAIRCHILD-SWEARINGENS	SA226 Merlin	SW4
GULFSTREAM – AEROSPACE	690, 695 Jetprop Commander 840/900/980/1000	AC90/95
LEAR JET	23	LJ23
MITSUBISHI	MU-2, Marquise, Solitaire (LR-1)	MU2
PILATUS	PC-12 PC12	PC12
PIPER	PA-31P Navajo, Pressurised Navajo, Mojave, T-1020 (E-18)	PA31
PIPER	PA-31T Cheyenne, Cheyenne 1/2, T-1040 (E-18B)	P31T
PIPER	PA-42 Cheyenne 3/400/1000	PA42
PIPER	PA-46 Malibu, Malibu Mirage	PA46
PIPER	PA-60, Aerostar (Pressurised)	AEST
RAYTHEON	390 Premier 1	PRM1
ROCKWELL	690, 695 Turbo Commander, Jetprop Commander 840/980/1000	AC690/95
SOCATA	TBM 700/850	TBM7

3.1.6 **GROUP 6** – UNPRESSURISED AEROPLANES OF ALL-METAL CONSTRUCTION, WITH A MAXIMUM CERTIFICATED MASS EXCEEDING 5700KG.

3.1.6.1 Certification of these aircraft is subject to valid company certification held, and will be granted on individual aircraft types only.

MANUFACTURER	MODEL	ICAO CODE
BASLER	Turbo 67	DC3T
CASA	352L, C-212, CN-235 JU52/	C212/CN35
DORNIER	228-201/202	D228
DOUGLAS	DC-3, DST (C-47, C-47A to J, AC-47, EC-47, HC-47, LC-47, RC-47, TC-47, VC-47 Skytrain, C-53 Skytrooper, C-117A/B/C, R4D-1 to 7, Dakota)	DC3
DOUGLAS	DC-4 (C-54, EC-54, HC-54, TC-54, VC-54, R5D Skymaster)	DC4
LET	L-410/420 Turbolet	L410
SCHAFER	DC-3-65TP	DC3T
SHORTS	SD3-60	SH36

3.1.7 **GROUP 7** – ROTORCRAFT POWERED BY RECIPROCATING ENGINES, NOT EXCEEDING 3175KG.

3.1.7.1 When reference is made in a licence to this group, the privileges of the licence may be exercised in respect of the following airframes:

MANUFACTURER	MODEL	ICAO CODE
BELL	47D, G, H Trooper, OH-13, Sioux, TH-13T, UH-13H, HE-7	B47G
BELL	47J, Ranger, HH-13, TH-13N, UH-13J/P/R	B47J
ENSTROM	F-28, 280 series, Shark, Falcon, Sentinel	EN28
FAIRCHILD HILLER/HILLER	UH-12B/C/E/L, E4, L3, L4, SL3, SL4, H-23, OH-23, Raven, THE, Hauler	UH12
HUGHES/ SCHWEIZER	200, 269 A/B/C, 280, 300, TH-55/300, Sky Knight, Osage, HE-20, Hkp5	H269
ROBINSON	R-22, Beta, Beta II, Mariner	R22
ROBINSON	R-44 Astro, Clipper, Raven, Raven II	R44

3.1.7.2 In group 7, as a build-up to a complete group 7 licence, a candidate may qualify for the issue of a licence for a 'family' of aircraft of similar construction.

3.1.7.3 The holder of a rating in group 7 who has more than 5 years uninterrupted experience as AME, since the first AME licence with a cat A rating was granted to the holder, is eligible to apply for the issue of a 'family' licence for any of the defined 'families' as follows:

3.1.7.3.1 Robinson Helicopters

Any persons holding a Robinson R22 or R44 qualifies for the application for the Robinson R22 and 44 family due to large similarities in construction and design philosophy.

3.1.7.3.2 Bell Helicopters

Any person holding the Bell 47G qualifies for the application for ICAO B47G and B47J ICAO codes, as this is the most common type, with other models being earlier versions of type with the exception of the 47H and 47G whish are based on the 47G airframe.

3.1.7.3.3 Enstrom Helicopters

The 280F is the most advanced version of the Enstrom piston range with the addition of a throttle correlator. The 280FX differences to the F28F are that of a cosmetic and aerodynamic nature.

Any persons holding a F28F and/or 280FX to be granted qualifies for the application for Enstrom F28F and 280 family.

An applicant who holds 60% of the aircraft in group 7, at the date of application, is eligible to apply for the issue of a group 7 licence.

3.1.8 **GROUP 8** – PRESSURISED AEROPLANES OF ALL-METAL CONSTRUCTION, WITH A MAXIMUM CERTIFICATED MASS EXCEEDING 5700KG.

3.1.8.1 Certification of these aircraft is subject to valid company certification held, and will be granted on individual aircraft types only.

MANUFACTURER	MODEL	ICAO CODE
AIRBUS	A-300 – 600	A300
AIRBUS	A-319/320/321	A319
AIRBUS	A-320	A320
AIRBUS	A-330	
AIRBUS	A-340-200	A342
AIRBUS	A-340-300	A343
AIRBUS	A-340-600	A346
ATR	ATR-42/72	ATR
ANTONOV	AN-32B	AN32
BAC	111 One-Eleven	BA11
BAE	3100 Jetstream 31	JS31
BAE	4100 Jetstream 41	JS41
BEECH	300 Super King Air	BE30
BEECH	B300 Super King Air 350	B350
BEECH	400 Beechjet (T-1 Jayhawk)	BE40
BEECH	1900 (C-12J) series	B190
BOEING	707-100/300	B701/B703
BOEING	727 (C-22)	B727
BOEING	737-100/200, Surveiller (CT-43, VC-96)	B732
BOEING	737-300	B733

BOEING	737-400	B734
BOEING	737-600	B737
BOEING	737-800	B738
BOEING	747-100/200/300 (E-4, VC-25)	B742
BOEING	747-400	B744
BOEING	747SP	B74S
BOEING	767	B767
BRITISH AEROSPACE	BAe-125-700/800 (C-29)/750/850XP/800XP/900XP/1000	H25B
BRITISH AEROSPACE	BAE-146-200/300	B462/B463
BOMBARDIER	BD-100 Challenger 300	CL30
BOMBARDIER	BD-700 Global Express	GLEX
CASA	CN-235	CN35
CANADAIR	CL-600/601/604 Challenger (CC-144, CE-144) RJ100/700	CL60
CESSNA	550, S550, 551, 552 Citation 2/S2/2SP/Bravo (T-47, OT-47, U-20)	C550
CESSNA	560 Citation 5	C560
CESSNA	680 Citation Sovereign	C680
CESSNA	750 Citation 10	C750
CONVAIR	CV-240/340/440/580 Convairliner, Metropolitan (C-131, HC-131, RC-131, TC-131, VC-131F/G, T-29, VT-29, ET-29, VT-29, Samaritan)	CVLP
DASSAULT	Falcon 10, Mystere 10	FA10
DASSAULT	Falcon 50, Mystere 50	FA50
DASSAULT	Falcon 20/200, Mystere 20/200	FA20
DASSAULT	Falcon 900, Mystere 900	FA900
DASSAULT	Falcon 2000, 2000 EX	F2TH
DE HAVILLAND CANADA	DHC-8 Dash 8 (E-9, CT-142, CC-142) series	DHC8
DORNIER	328-100/300	D328
DOUGLAS	DC-8	DC85/6/7
DOUGLAS	DC-9	DC9
DOUGLAS	DC-10	
EMBRAER	120	E120
EMBRAER	135/145	E135
EMBRAER	505 (Phenom 300)	E55P
FOKKER	F-27 Friendship, Troopship, Maritime (C-31, D-2)	F27
FOKKER	F-28 Fellowship	F28
FOKKER	F-28-070/100	F28
FAIRCHILD – SWEARINGEN	SA227 Metro	SW4
GATES LEARJET	24	LJ24

GATES	25	LJ25
LEARJET		
GATES LEARJET	31	LJ31
GATES LEARJET	35, 36 (C-21, RC-35, RC-36, U-36)	LJ35
GRUMMAN	G-159 Gulfstream 1 (TC-4 Academe, VC-4)	G159
GRUMMAN	G-1159 Gulfstream 2	GULF
GULFSTREAM Aerospace	G-1159 Gulfstream 3/4/5 (C-20, S102, Tp102) 550	GULF
GULFSTREAM – AEROSPACE	200	GALX
HAWKER SIDDELEY	HS-748 (Andover, C-91)	A748
HAWKER SIDDELEY	HS-125-1/2/3/400/600 (Dominie, EC-93, EU-93, VC-93, VU-93)	H25A
HAWKER	4000	HA4T
IAI 1125	Astra, Gulfstream 100	ASTR
LEARJET	24	LJ24
LEARJET	25	LJ25
LEARJET	31	LJ31
LEARJET	35 (C-35, R-35, VU-35)	LJ35
LEARJET	45	LJ45
LEARJET	60	LJ60
LOCKHEED	C-130, AC-130, CC-130, DC-130, EC-130, HC-130, JC-130, KC-130, LC-130, MC-130, NC-130, RC-130, TC-130, VC-130, WC-130, T-10, TK-10, TL-10, Tp84 Hercules, Spectre, Aya, Karnaf, Sapeer (L-100/182/282/382)	C130
LOCKHEED	L-1329	L29A/B
SAAB	340	SF34

3.1.9 **GROUP 9** – ROTORCRAFT POWERED BY TURBINE ENGINES, WITH A MAXIMUM CERTIFICATED MASS OF 3175KG OR LESS.

3.1.9.1 When reference is made in a licence to this group, the privileges of the licence may be exercised in respect of the following airframes:

MANUFACTURER	MODEL	ICAO CODE
AEROSPATIALE/AIRBUS	AS-350 Ecureuil, Astar, SuperStar	AS50
AEROSPATIALE/AIRBUS	AS-355 Ecureuil 2, TwinStar, TwinSquirrel	AS55
AEROSPATIALE/AIRBUS	SA-341/342 Gazelle	GAZL
AEROSPATIALE/AIRBUS	SA-315 Lama	LAM1
AEROSPATIALE/AIRBUS	SA-316/319, Alouette 3	ALO3
AEROSPATIALE/AIRBUS	SA-318, Alouette 2	ALO2
AGUSTA WESTLAND	A-109 Series, AW-109SP, AW109 Grand Nexus Power	A109
AGUSTA WESTLAND	A-119 (koala), AW119MKII	A119

BELL	206A/B/L, 406, JetRanger, LongRanger	B06
BELL	407	B407
BELL	427	B427
BELL	429, Global Ranger	B429
ENSTROM	480, TH-28	EN48
EUROCOPTER/AIRBUS	EC-120, Colobri	EC20
EUROCOPTER/AIRBUS	EC-130	EC30
EUROCOPTER/AIRBUS	EC-135	EC35
FAIRCHILD HILLER	FH-1100	FH11
HUGHES/ MCDONNELL DOUGLAS	369, 500 series/530F	H500
MCDONNELL DOUGLAS	520N	MD52
MCDONNELL DOUGLAS	600N	MD60
MESSERSCHMITT – BOLKOW/AIRBUS	BO-105, Twin Jet, Super Five	B105
SCHWEIZER/SIKORSKY	330, 333, 269D	S330

3.1.9.2 Robinson R66 is excluded from group 9 and the holder of a rating in group 9 who has more than 5 years uninterrupted experience since the first AME licence with a category A rating was granted to the holder, is eligible to apply for issuance of the R66 provided he or she holds an R22 or R44 rating and has passed the differences course on the R66.

3.1.9.3 In group 9, as a build-up to a complete group 9 licence, a candidate may qualify for the issue of a licence for a 'family' of aircraft of similar construction.

3.1.9.4 The holder of a rating in group 9 who has more than 5 years uninterrupted experience since the first AME licence with a cat A rating was granted to the holder, is eligible to apply for the issuance of a 'family' licence for any of the defined 'families' as follows:

3.1.9.4.1 Augusta Helicopters

Person holding an A109 licence qualifies to apply for the A119, as the A119 is derived from the A109.

Due to the fact that the AS109 is a single engine version of the AS119, a person holding an AS109 series with 30 days experience on AS119 and difference course qualifies to apply for the AS109/119 family.

3.1.9.4.2 Eurocopter/Airbus family

The AS350 and EC130 are an evolution of the same basic design philosophy over a period of time with the primary difference being engine type fitted and avionics.

Any person holding an AS350B3 licence qualifies to apply for the AS350 series.

Any person who has an AS350 licence and has completed the EC130 difference course qualifies to apply for the EC130 series.

Due to the fact that the AS355 is a twin engine version of the AS350, A person holding an AS350 series with 30 days experience on AS355 and difference course qualifies to apply for the AS350/355 family.

3.1.9.4.3 Bell Helicopters

Any person with a 206L qualifies to apply for the 206 family as it is the latest version of the 206 series of helicopters mainly evolved using variations on the RR 250 engine.

The 407 is a derivative of the 206L.

Any person who has a 407 licence qualifies to apply for the 206/407 series.

Due to the fact that the 427 is a twin engine version of the 407, a person holding a 407 series with 30 days experience on 427 and difference course qualifies to apply for the 427/407 series.

An applicant who holds 60% of the aircraft in group 9, at the date of application, is eligible to apply for the issue of a group 9 licence.

3.1.10 **GROUP 10** – ROTORCRAFT POWERED BY TURBINE ENGINES, WITH A MAXIMUM CERTIFICATED MASS EXCEEDING 3175KG.

3.1.10.1 Certification of these aircraft is subject to valid company certification held, and will be granted on individual aircraft types only.

MANUFACTURER	MODEL	ICAO CODE
AEROSPATIALE/AIRBUS	SA-330 Puma (CH-33, HT-19)	PUMA
AEROSPATIALE/AIRBUS	AS-332 C/L/L1/L2 SUPERPUMA	AS32
AEROSPATIALE/AIRBUS	SA-365C, Dauphin 2	S65C
AEROSPATIALE/AIRBUS	SA-360/361 Dauphin	
AEROSPATIALE/AIRBUS	SA-365F/N	AS65
AUGUSTAWESTLAND	AW-101	EH10
AGUSTA WESTLAND	AB/AW-139	A139
BELL	212, Twin Two-Twelve, Griffon (UH-1N, VH-1, CUH-1N, CH-135/146, Twin Huey) 222, 230, 430	B212
BELL	214, B/C, Biglifter	B214
BELL	222	B222
BELL	230	B230
BELL	412 Arapaho, Sentinel, Griffon	B412
BELL	430	B430
EUROCOPTER/AIRBUS	EC-145	EC45
EUROCOPTER/AIRBUS	EC-155	EC55
MBB	BK-117, B/C-1	BK17
MD HELICOPTER	MF-902, EXPLORER	EXPL
MIL	Mi-8/9/17/19/171/172	MI8
SIKORSKY	S-62 (HH-52 Seaguard)	S62
SIKORSKY	SS-76, H-76, AUH-76, Spirit, Eagle (HE-24)	S76
SIKORSKY	S-61A/B/D/L/N (SH-3, UH-3, VH-3, HSS-2, CH-124, HS-9, Sea	S61

	King, Nuri)	
SIKORSKY	S-92, Helibus, Superhawk	S92

2.1.10.1.2 Augusta Westland

Person holding an AW109 licence qualifies to apply for the AW119, as the AW119 is derived from the AW109.

Due to the fact that AW119 is a single engine version of the AW109, a person holding an AW109 series within 30 days experience on AW119 and difference course qualifies to apply for the AW109/119 family.

4. Engines

4.1 Introduction

4.1.1 For the purpose of CAR 66.02.4 'Type' will in this context be interpreted as engines of similar construction but not necessarily on the same type certificate.

4.1.2 Group 01 and 02 licences may be granted for Lycoming and Continental engines on the basis of the similar characteristics of the engines in those groups, subject to the rules below.

4.1.3 For each of the above groups a representative engine has been selected. A candidate applying for an engine group (as defined above) licence who has passed the course for this engine and has acquired six months experience on this engine, may be granted an engine Group 01 rating. Provision is made for persons holding another licence as the "representative" to obtain the group as follows: The holder of a more senior licence qualifies for the group. The holder of a lesser licence must have passed a course relating to the group or the representative engine and have thirty days experience on the representative engine.

4.1.4 Due to the fact that vintage engines occur only in small numbers and fly limited hours in a year, it is impractical to consider a requirement of six months experience before the issue of a licence. It is therefore recommended that in these cases, where the AMO does not have the rating for a particular vintage engine, the AMO should apply for a once off approval to perform the required maintenance. When such maintenance has been successfully completed, the experience gained will be considered sufficient for the granting of the licence.

4.2 Classification of groups

4.2.1 66.01.4(2): For the purposes of licensing of AME's, engines are classified into the following groups.

4.2.2 **GROUP 01**: ALL CERTIFIED HORIZONTAL OPPOSED NORMALLY ASPIRATED PISTON ENGINES:

4.2.2.1 *Continental Motors*:

A and C series, O and GO-300 series, E, O- and IO-360, -470, -520, 550 and 6-285 series.

The IO-520 has been selected as the representative engine in this group of engines. The candidate must therefore pass the theoretical examination for the IO-520.

Experience on the IO-520 and/or the IO-550 will qualify for the issue or addition of the rating 'Continental engines in group 01'.

4.2.2.2 *Franklin*:

6A-335, 6A-350, 6A4-150, and 6A8-215 series.

The theoretical examination on any of the engines in this group will be considered as representative of the group. An exam paper is available at the CAA on the 6A4-150 Six months experience on any combination of the engines in this group qualifies for the issue or addition of the group rating.

For the holder of a group 01 Continental and a group 01 Lycoming rating, one month's experience on the Franklin engines will be acceptable.

4.2.2.3 *Lycoming*:

O-145, O-235 and O-290 series. O-, IO-, AEIO-, VO-, IVO-, HO- and HIO-320, -360, -480, -540 and -720 series.

The IO-540 has been selected as the representative engine in this group of engines. The candidate must therefore pass the theoretical examination for the IO-540.

Experience on the IO-540 will qualify for the issue or addition of the rating 'Lycoming engines in group 01'.

4.2.2.4 *Rotax 912S2*:

This engine is in its own group, and requires a theoretical examination and six months experience on the type.

4.2.3 **GROUP 02:** ALL CERTIFICATED HORIZONTALLY OPPOSED TURBO NORMALISED, TURBOCHARGED AND SUPERCHARGED PISTON ENGINES:

4.2.3.1 *Continental Motors*:

TIO-, TSIO-, LTSIO-, GTSIO-360, -470, -520 and -550 series.

The TSIO-520 has been selected as the representative engine in this group of engines. The candidate must therefore pass the theoretical examination for the TSIO-520.

Experience on the TSIO-520 and/or the TSIO-550 will qualify for the issue or addition of the rating 'Continental engines in group 02'.

4.2.3.2 *Lycoming*:

TSO-, TSIO-, TGSIO-, and IGSO-360, -480, -540, and -541 series engines.

The TSIO-540 has been selected as the representative engine in this group of engines. The candidate must therefore pass the theoretical examination for the TSIO-540.

Experience on the TIO-540 will qualify for the issue or addition of the rating 'Lycoming engines in group 02'.

4.2.3.3 *SMA SR305-230*:

This engine is in its own group, and requires a theoretical examination and six months experience on the type.

4.2.4 **GROUP 03:** ALL INLINE PISTON ENGINES:

Blackburn Cirrus minor and major series. DH Gipsy major, Gipsy six and Gipsy Queen. Walter 337A, M137, M601Z, minor series 4/111, minor 6-111 and mikron 111AE, Ranger 6-440 series.

These engines are considered vintage engines. The opportunity to work on these engines is scarce. The rule of six months experience is not practical.

If the candidate does not hold the rating, application for a special approval (through the AMO) should be made. Completion of the MPI (C rating) or the overhaul/shock load or major repair (D rating) will be considered acceptable training and experience for the issue of the rating (C or D as applicable).

(Rating is issued per individual type certificate).

4.2.5 **GROUP 04:** RADIAL ENGINES.

Lycoming R-680 series. Pratt and Whitney R985, R1340, R1830, R2000, R2800 and Double Wasp series. Pezetel AF2-620R. Warner Super Scarab 165. Curtiss Wright R1820 – C9CC Series. PZL-Kalisz 1 AS2-621-M18. Jacobs R-755 series. PZL A1-14 RA, Continental W670.

These engines are considered vintage engines. The opportunity to work on these engines is scarce. The rule of six months experience is not practical.

If the candidate does not hold the rating, application for a special approval (through the AMO) should be made. Completion of the MPI (C rating) or the overhaul/shockload or major repair (D rating) will be considered acceptable training and experience for the issue of the rating (C or D as applicable).

(Rating is issued per individual type certificate).

4.3 **GROUP 05:** TURBINE ENGINES:

Rating is issued per individual type certificate.

MANUFACTURER	**MODEL**
ALLIED SIGNAL/GE	CFE 738
ALLISON/ROLLS ROYCE	250-C, 250-817C, 250-C20, 250-C20B, 250-C20J, 250-C20R, 250-C28B, 250-C30 series, 250-c47 series, 501-013 and 501D22A series
CFM INTERNATIONAL	CFM-56 series
GENERAL ELECTRIC	CF34-series, CF6-50, CF6-80, CF700, CJ610-4, CJ610-6, CJ610-8, CT58-110-1 and CT58-140-1 series; CT7 series
GARRETT AIRE	TPE331-3UW, TPE3318-5-251K, TPE331-6-251M, TPE331-8/9, TFE731, TPE331-5-252D, TPE 331-14, TPE 331-10/11 and ATF3 series
HONEYWELL	AS907-1-1A
INTERNATIONAL AEROSPACE	IAE V2500 series engines
ROLLS ROYCE	Dart 532-2L, 532-7, 500, 515, 529-8X and RB211-524 series Spey 500, 511-14 and 555-15P series

	TAY 611-8 and Viper 522 series. TAY 620-15; TAY 650-15 TREND 500 series
ROLLS ROYCE/ALLISON	AE3007A/C
ROLLS ROYCE	BR700-710-AI-10, BR700-710 A2-20
WILLIAMS-ROLLS	FJ44 series
PRATT AND WHITNEY CANADA	PT6A-20-27-28, -28/34, -41/42, -60, -65, -67 series. PW206, PW207 Series, PT6B Series, PT6C Series, PT6T-3 and -6 series. PW305, PW306 A/C, PW308 series, PW530, PW545, PW535 series, PW118A, PW 120, 121, 123, 124B, 127. JT15D series. PW615F-A/E
PRATT AND WHITNEY	JT-3D, JT4A, JT-8D-series, JT9D series and 4000 series
UAC	JT14D
LYCOMING	ALF502; 502R-3 and 507 series, LTS101-750-C1
TURBOMECA	Artouste, Aztazau 2A and 3 series. Bastian V10, Arriel series, Arrius series
VEMAENYEN	M148

5. Propellers

The training required for the overhaul of propellers is skill related rather than design-related. (Note that this approach has also been followed with the ratings X1 to X3) Propellers will therefore be grouped as follows:

(i) Variable pitch propellers of metal construction, fitted to piston engine powered aircraft.
(ii) Variable pitch propellers of composite construction, fitted to piston engine powered aircraft.
(iii) Variable pitch propellers of metal construction, fitted to turbine powered aircraft.
(iv) Variable pitch propellers of composite construction, fitted to turbine powered aircraft.

66.01.9 VALIDATION OF LICENCE ISSUED BY APPROPRIATE AUTHORITY

1. Application for validation of AME licence and rating issued by an appropriate authority

The application form FSS PEL 66-04 must be completed for the issuing of the validation of an aircraft maintenance engineer licence.

2. Requirements and conditions

Any valid foreign aircraft maintenance engineer licence and rating may be validated by the 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 in addition be in possession of a work permit and submit a letter of employment from a Namibian aircraft maintenance organisation;

(3) the applicant must pass an examination in air law conducted by the Director or by an approved maintenance training organisation issued in terms of Part 141, and approved for this purpose and undergo a competency assessment with a designated examiner;

(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;

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

3. Issuing of a validation

(1) Once all requirements have been met, a validation of an aircraft maintenance engineer licence and rating shall be issued by the Director.

4. Renewal of validation

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

(a) The applicant shall satisfy the Director that he or she is in possession of a work permit. The revalidation shall not extend beyond the date of expiry of the original licence or for a period of 12 months, whichever comes first.

(b) A validation is normally renewed only once. A second revalidation requires special approval by the Director.

(c) Should the holder of a revalidated validation wishes 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.

The 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; and

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

5. Compliance

The requirements and conditions, referred to in CAR 66.01.9(6), are that the holder of the validation at all times shall comply with the privileges and limitations of the validation granted by the Director as prescribed in regulation 66.02.10 for the applicable categories and ratings.

66.01.11 DESIGNATION OF EXAMINERS

1. Conditions, rules, requirements, procedures or standards for designation of examiners

1.1. Purpose

This technical standard deals with the selection and designation of Examiners (DE) and identifies the specific functions which, when authorized by the Director, may be performed by DE's.

1.2 Qualification criteria

(a) General qualifications

To qualify for a designation as a DE, the applicant must possess the general qualifications listed hereunder, in addition to having the specialised experience appropriate to the particular function for which designation is sought –

(i) current and thorough knowledge of the Civil Aviation Regulations and relevant Aeronautical Information Circulars, and Civil Aviation Technical Standards, etc.;

(ii) current technical knowledge and experience commensurate with that required for the particular function;

(iii) unquestionable integrity, co-operative attitude, and ability to exercise sound judgment;

(iv) the ability to maintain the highest degree of objectivity while performing authorized functions on behalf of the Director in compliance with the CAR and safety goals, notwithstanding any coercion by any person to the contrary;

(v) hold an AME licence with rating with at least five years of satisfactory experience in the field of work covered by the designation.

(b) Specialised experience

In addition to the general qualifications, specified in sub-paragraph (a), an applicant for designation as examiner shall have the following specialised experience, and demonstrated ability in respect of each particular function for which DE designation is sought –

(i) At least two years experience as a Grade I instructor at an approved aviation training organisation (ATO), aircraft maintenance organization (AMO) or an aircraft manufacturer's training school that has been involved with either –

(a) the issuing of course material, or

(b) the management of programs, leading to the issuing of course certificates, or

(c) the development of training standards and material for aircraft technicians and AMEs,

in either case for aircraft, engines, propellers, avionics, instruments, electrical and component parts of similar type and complexity to those for which DE designation is sought.

(ii) Must hold a current valid instructor's certification with an appropriate rating and must demonstrate the ability to carry out instruction and examination to determine the status of aircraft, engines, propellers, avionics, instruments, electrical and component parts of a similar type and complexity for which DE designation is sought.

(iii) must be able to assess the skill demonstration of prospective aircraft maintenance engineer licence and rating applicants to determine if they have achieved the required level competency for the issuance of the licence and rating, or the addition of a rating and to carry out the functions safely.

1.3. Application procedure

(a) Any suitably qualified person may apply for designation as a DE using form FSS PEL 66-05 available from the DCA website.

(b) Applications submitted by individual applicants must be accompanied by –

(i) a letter from the applicant's employer, attesting to the applicant's integrity and qualifications to perform instruction and examination on products of similar type and complexity, to those for which designation is sought;

(ii) supporting documents, to substantiate that he or she meets all the relevant qualifications specified in paragraph 1.2; and

(iii) the appropriate fee as prescribed in Part 187.

1.4. Procedure followed with regard to selection and appointment

(a) Receipt of an application is acknowledged by the Director.

(b) The Director evaluates the applicant's qualifications and peruses the personal references submitted.

(c) On determination that the applicant meets all the relevant requirements, the Director issues a document that identifies him or her as a Designated Examiner in the particular category.

66.01.13 LOGBOOKS

1. Completion of logbooks

1.1 Category A/B &C/D

All Logbooks must be properly filled in including the designation of all aircraft types and engine types. Experience to be filled in, in either days, weeks or months. Logbooks should be signed and stamped in the appropriate place by a Supervising Inspector, a Quality Manager or Accountable Manager.

Below is an example of how the experience should be indicated in the logbook:

Period		Employer	Type of aircraft,- engine or equipment	Inspection or any other work carried out	Aircraft category IN DAYS	Engine category IN DAYS			Supervising inspectors signature and stamp
From	To				A	B	C	D	
01/01/01			Boeing 737-800	MPI and Snags ext	5		5		
	20/01/01	Com Air	CMF 56-5	MPI			5	5	
01/02/01			Cessna 208	MPI and Snags ext	14				
	28/02/01	Com Air	PT6A-114	MPI			14		
01/03/01			Boeing 737-800	MPI and Snags ext	20				
	30/03/01	Com Air	CMF 56-5	MPI			10		
01/04/01			Cessna 208	MPI and Snags ext	15				
	30/04/01	Com Air	PT6A-114	MPI			15		
01/05/01			Boeing 737-800	MPI and Snags ext	5	10			
	30/05/01	Com Air	CMF 56-5	MPI			5	10	
01/06/01			Cessna 208	MPI and Snags ext	10	10			Signature & Stamp
	30/06/01	Com Air	PT6A-114	MPI			10		
01/07/01			Boeing 737-800	MPI and Snags ext	10	5			
	30/07/01	Com Air	CMF 56-5	MPI			10	5	
01/08/01			Cessna 208	MPI and Snags ext	20				
	30/08/01	Com Air	PT6A-114	MPI			10		
01/09/01			Boeing 737-800	MPI and Snags ext	5				
	30/09/01	Com Air	CMF 56-5	MPI			25		
01/10/01			Cessna 208	MPI and Snags ext	15				
	30/10/01	Com Air	PT6A-114	MPI			15		
01/11/01			Boeing 737-800	MPI and Snags ext	20				
	30/11/01	Com Air	CMF 56-5	MPI			10		
01/12/01			Cessna 208	MPI and Snags ext	25				
	30/12/01	Com Air	PT6A-114	MPI			5		
	SUMMARY OF EXPERIENCE FROM 1 JAN 2001 TO 31 DEC 2001								
	BOEING 737-800			65 DAYS					
	CFM 56-7			65 DAYS					
	CESSNA 208			99 DAYS					
	PTA-114			69 DAYS					
	ACCOUNTABLE MANAGER SIGN & STAMP								
	LICENCE NR								

1.2 Category X and W

All Logbooks must be properly filled in including the designation of all aircraft component types and engine component types. Experience must be filled in, in either days, weeks or months. Logbooks should be signed and stamped in the appropriate place by a Supervising Inspector, a Quality Manager or Accountable Manager.

Below is an example of how the experience should be indicated in the logbook:

Period		*Employer*	*Type of aircraft,- engine or equipment*	*Inspection or any other work carried out*	*Electrical category*	***Aut om atic***	***Co mp ass es***	***Instrument s Category***	*Supervising inspectors signature and stamp*
From	To								
01/01/01			Boeing 737-800	MPI and Snags ext	5		5		
	20/01/01	Com Air	CMF 56-5	MPI			5	5	
01/02/01			Cessna 208	MPI and Snags ext	14				
	28/02/01	Com Air	PT6A-114	MPI			14		
01/03/01			Boeing 737-800	MPI and Snags ext	20				
	30/03/01	Com Air	CMF 56-5	MPI			10		
01/04/01			Cessna 208	MPI and Snags ext	15				
	30/04/01	Com Air	PT6A-114	MPI			15		
01/05/01			Boeing 737-800	MPI and Snags ext	5	10			
	30/05/01	Com Air	CMF 56-5	MPI			5	10	
01/06/01			Cessna 208	MPI and Snags ext	10	10			
	30/06/01	Com Air	PT6A-114	MPI			10		
01/07/01			Boeing 737-800	MPI and Snags ext	10	5			
	30/07/01	Com Air	CMF 56-5	MPI			10	5	
01/08/01			Cessna 208	MPI and Snags ext	20				
	30/08/01	Com Air	PT6A-114	MPI			10		
01/09/01			Boeing 737-800	MPI and Snags ext	5				
	30/09/01	Com Air	CMF 56-5	MPI			25		
01/10/01			Cessna 208	MPI and Snags ext	15				
	30/10/01	Com Air	PT6A-114	MPI			15		
01/11/01			Boeing 737-800	MPI and Snags ext	20				
	30/11/01	Com Air	CMF 56-5	MPI			10		
01/12/01			Cessna 208	MPI and Snags ext	25				
	30/12/01	Com Air	PT6A-114	MPI			5		
	SUMMARY OF EXPERIENCE FROM 1 JAN 2001 TO 31 DEC 2001								
	BOEING 737-800			65 DAYS					
	CFM 56-7			65 DAYS					
	CESSNA 208			99 DAYS					
	PTA-114			69 DAYS					
	ACCOUNTABLE MANAGER SIGN & STAMP								
	LICENCE NR								

Signature & Stamp

66.01.15 CREDIT FOR MILITARY SERVICE

1. Recognition of Prior Learning and Experience by NAF aircraft maintenance engineers

Namibian Air Force aircraft maintenance engineers may be exempted from all or some of the requirements to attend a theoretical training course for an AME licence and rating but are required to write at least the examinations reflected below.

(i) This exemption is applicable to all applicants who held an AME qualification in the NAF within the 60 months preceding the date of application.

(ii) Applicants are to include in their exemption request a *Curriculum Vitae* describing his/her Namibian Air Force Career and details of his/her AME experience. Include the following documents:

(a) Letter from Officer Commanding from the squadron or unit where the applicant has served/serving confirming employment or date that applicant left the Air Force and position held. This is necessary to confirm if the applicant complies with the 60 month requirement;

(b) Confirmation of types of aircraft and engines worked on in the NAF. This requirement will determine if the applicant is eligible for an exemption;

(c) certified copy of logbook indicating the types of aircraft and engines worked on;

(c) Certified copy of ID document or DCA licence, if applicable;

(iii) *Exemption allowed*:

Depending on the applicant's prior experience in the NAF, the applicant may be exempted from some or all technical examinations except Air Law. The applicant must attend a bridging course with an approved Part 141 aviation training organisation prior to entry for the examination.

66.01.16 CHANGE OF NAME OR ADDRESS

The notification of change of Name or Address shall be made on form FSS PEL-G01.

66.01.17 DUPLICATE AIRCRAFT MAINTENANCE ENGINEER LICENCE

The application for a duplicate licence shall be made on the respective licence application form for the initial issue of the licence.

66.02.2 TRAINING

1. Basic training syllabus for the trade: Aircraft Mechanic Category A, B, C, D, X (variable-pitch propeller)

1.1 Introduction

(1) Competency Based Modular Training (CBMT)

1.2 Safety

(1) Occupational Health and Safety Act

(2) Acceptable first-aid course (Approved by appropriate body)

(3) Acceptable fire-fighting course (Approved by appropriate body)

(4) Incident reporting

1.3 Engineering practices

(1) Identify, care and use of hand tools

(2) Use of torque wrenches and deadweight testing (Acro torque)

(3) Standard torque's and charts

(4) Ferrous and non-ferrous metals

(5) Heat treatment of materials (hardening, case hardening, tempering, normalising, hardness test)

(6) Identification and control of corrosion

(7) Reading of engineering drawings and performing layout

(8) Reading and use of measuring instruments (verniers, micrometers, vernier height gauges, dial test indicators and combination sets)

(9) Use of calipers and dividers

(10) Use of precision gauges (cylinder bore-, radius- hole-, telescopic-, drill point-, snap-, ring-, slip-, sine- and weighting scale)

(11) Reading and use of steel rule and tape

(12) Care and use of hand files

(13) Care and use of hacksaws

(14) Care and use of band saws

(15) Identification and safe use of a pedestal drill

(16) Identification and safe use of a bench grinder

(17) Replacing and dressing a grinding wheel

(18) Grinding of drill bits, punches and chisels

(19) Drilling, tapping and reaming of holes

(20) External and internal threading

(21) Identification of screw threads

(22) Repair of heli-coils

(23) Stud removal

(24) Manufacturing of projects

1.4 Standard practices

(1) Selection and use of information-, procedures-, overhaul-, maintenance-, illustrated parts catalogue manuals, Air Transport Association (ATA) chapters, and Civil Aviation Regulations

(2) Aircraft hardware and locking procedures

(3) Jacking and leveling of aircraft

(4) Determining the mass of an aircraft

(5) Marshalling signals

(6) Aircraft towing

(7) Aircraft refueling

(8) Aircraft labels

(9) Aircraft fluids (contamination, fuels, hydraulic fluids, oils, greases and inhibiting)

(10) Cleaning solvents and compounds

(11) Performing liquid penetrate and fluorescent dye inspection

(12) Identifying solid and flexible tubing

(13) Flaring, bending and cutting of solid tubing

(14) Solid and flexible end fittings

(15) Testing of tubing

(16) Maintenance of plain-, shell-, ball-, roller- and taper bearings

(17) Common bearing faults

1.4.1 Piston engines

(1) Identifying different types of engines

(2) Principles of operation

(3) Identifying major sections

(4) Disassembling and assembling of engines

(5) Changing components

(6) Cleaning methods

(7) Performing visual and dimensional inspections (cylinder, piston accessories, nips, crankshaft, reduction gear assembly, alignment checks and final inspections)

(8) Carburetors, fuel injection systems, pumps and systems

(9) Magneto stripping, replacement of points, condensers, distributors, internal timing, engine timing

(10) Valve timing

(11) Grinding of valves and valve seats

(12) Replacement of valve guides and testing of valve springs

(13) Repair or replacement of valve rocker assemblies, testing of hydraulic tappet assemblies, repair and adjustment of push rod assemblies

(14) Inspection, repair and replacement of exhaust systems, exhaust shrouds for carburetor and cabin heating systems

(15) Inspection, repair and replacement of turbochargers and related component parts; setting and adjusting turbocharger systems

(16) Supercharger and related components, induction system; setting and adjusting supercharger

(17) Radiators, oil coolers, governors, constant speed units, oil pumps, oil filters and related oil systems

(18) Engine cooling systems, radiators, baffles, cowl flaps and related systems

(19) Engine mounts, shock mounts, bonding, protection and related parts

(20) Reduction gears, drive belts, pulleys gearboxes and related components and parts

(21) Sparkplug cleaning and testing

(22) High tension ignition harness system repair, replacement and testing

(23) Compression and blow-by check

(24) Engine overhaul

(25) Engine inhibiting

(26) Engine and related system testing

1.4.2 Propellers

(1) Construction, description and operation

(2) Replacement

(3) Overhaul

(4) Half-life inspection

(5) Blade repair and straightening

(6) Blade dimensional measuring

(7) Hub and actuation mechanism repairs

(8) Anodising

(9) Plating

(10) De-icer boot replacement

(11) Static balancing

(12) Dynamic balancing

1.4.3 Gas turbines

(1) Identify different types and major sections identified as modules

(2) Construction, description and operation

(3) Airflow and pressure probes

(4) Gas flow, temperature probes and tail cone

(5) Fuel flow nozzles and fuel manifold system

(6) Fuel control units, pumps and related component parts

(7) Combustion chambers and vanes

(8) Fan and by-pass system

(9) Low pressure compressor and turbine assembly

(10) High pressure compressor and turbine assembly

(11) Gearbox and related component parts

(12) Thrust reverse system

(13) Lubrication system

(14) Construction diagram of a basic module system

(15) Engine overhaul

(16) Replacement of engine modules

(17) Overhaul and repair of engine modules

(18) Rebuild an engine to a QEC (Quick Engine Change) status

(19) Engine servicing

(20) System servicing

(21) Change components

(22) Overhaul components

(23) Test components

(24) Overhaul procedures (visual, dimensional and cleaning)

(25) Hot section inspection

(26) Boroscope inspection

(27) Remove, inspect, repair and replace compressor and turbine blades

(28) Dynamic and static balancing

(29) Engine testing and inhibiting

1.4.4 Pneumatics

(1) Identifying different types and major sections

(2) Construction, description and operation of units and components that deliver large volumes of compressed air from a power source to connecting points for such other systems as air- conditioning, pressurisation, de-icing, and other systems

(3) Identifying components such as; ducts, valves, actuators, heat exchangers, controls, temperature and pressure indicators

(4) Maintenance of and removal of components and parts for inspection, repair, overhaul and testing.

1.4.5 Vacuum

(1) Identifying different types and major sections

(2) Units and components used to generate, deliver and regulate negative air pressure to using systems.

(3) Identifying components such as lines, pumps, regulators, temperature- and vacuum-indicating systems

(4) Maintenance of and removal of components and parts for inspection, repair, overhaul and testing.

1.4.6 Hydraulics

(1) Identify components, such as –

(a) hydraulic fluid to use in the system

(b) tanks

(c) accumulators

(d) valves

(e) pumps

(f) actuators

(g) jacks

(h) selectors

(i) connectors

(j) gauges

(2) Hydraulic operation principles

(3) Hydraulic fluid identification

(4) Hydraulic pipe and hose identification

(5) Operational check

(6) Principles of operation of an aircraft's secondary systems.

(7) Maintain components

(8) Overhaul and repair components

(9) Bench test components

1.4.7 Flight controls

(1) Mechanics of flight (low and high speed)

(2) Terms and definitions

(3) Axis of an aircraft

(4) Flight controls (low and high speed)

(5) Basic components

(6) Terms and definitions

(7) Major stresses

(8) Major components

(9) Wing forms and components

(10) Fuselage types and components

(11) Control rigging

(12) Primary and secondary systems

(13) Types of tensionometers

(14) Temperature and tension charts

(15) Setting cable tension

(16) Control surface travels, utilising inclinometers

(17) Setting surface travel

(18) Carryout rigging checks

(19) Balancing of flight controls

(20) Duel inspection of flight controls

1.4.8 Fuel systems

(1) Identify components such as –

(a) fuel tanks, metal, bladder, tip, slung, integral, reserve and other

(b) fuel pumps engine-driven, electrical, boost and other

(c) fuel-dumping components

(d) valves and shuttles

(e) selectors and cocks

(f) gauges, indicators, transmitters and sender units

(g) fuel caps

(h) pressure-fueling systems

(i) drain cocks and de-fueling

(j) fuel transfer

(2) Fuel system operating principles

(3) Fuel identification and placarding

(4) Fuel pipe and hose identification

(5) Fuel flow checks

(6) Fueling and de-fueling precautions

(7) Overhaul and repair components

(8) Bench test components

1.4.9 Safety equipment

(1) Those items of equipment required for use in emergency procedure, to be removed during periodic inspections for condition, repair, replenishment or TBO –

(a) portable fire extinguishers

(b) cockpit smoke/oxygen masks, extinguishers, harnesses gloves and axe

(c) first-aid kits

(d) loud hailers, torches

(e) lavatory smoke warning, automatic fire extinguishers and fire proof bins

(f) life jackets, rafts and floatation cushions

(g) life rafts

(h) indicator lights and lighted signs

(i) slides or inflatable slides/slide rafts

(j) incubators

(k) portable oxygen bottles

(l) passenger service units

(m) medical stretchers

(n) signal strips

(o) signal flares

(p) evacuation signs and pamphlets

1.4.10 Landing gear and brakes

(1) Identify components such as –

(a) steering system on ground or on water

(b) main gear assemble

(c) nose gear assembly

(d) tail gear assembly

(e) wheel assembly

(f) bearings

(g) de-boosters

(h) swivel glands

(i) brake assembly

(j) anti-skid devices

(l) skids

(m) floats

(n) doors

(o) shock struts

(p) tyres

(q) valves

(r) linkages

(s) actuators

(t) locks

(u) latches

(v) position indicating

(w) warning systems

(2) Landing gear servicing

(3) Landing gear indicator lights, warning system and emergency systems

(4) Landing gear components and parts overhaul and NDT

(5) Landing gear rigging and alignment

(6) Service, inspect, repair a wheel assembly

(7) Replace and balance tyres

(8) Service, inspect, repair and overhaul an oleo leg

(9) Service, inspect, repair and overhaul a brake assembly

(10) Service, inspect, repair and overhaul a brake system

(11) Overhaul procedures hydraulic components and parts (visual dimensional and cleaning)

(12) Inspect, repair and replace components

(13) Measure tyre creep

(14) Retraction tests

(15) Wheel balancing

1.4.11 Inspections

(1) Inspection techniques

(2) Pre-flight inspections

(3) Between flight inspections

(4) After flight inspections

(5) Weekly inspections

(6) Periodic Inspections

(7) Special inspections after an occurrence, incident or accident per SA-CATS 43

1.4.12 Rotorcraft

(1) Rotorcraft theory

(2) Major transmission components

(3) Inspect, remove, repair and replace components

(4) Strip, inspect repair, overhaul and assemble main rotor head

(5) Strip, inspect, repair, overhaul and assemble tail rotor head

(6) Strip, inspect, repair, overhaul and assemble tail and main rotor gearbox

(7) Strip, inspect, repair, overhaul and assemble incline shaft, brake, clutch unit, free-wheel unit and drive belts

(8) Rotorcraft mass and balance

(9) Static balancing of rotor assemblies

(10) Dynamic balancing of rotor assemblies

(11) Rotor blade inspection, maintenance, repair and replacement

(12) Undercarriage, skids, wheels and brakes

(13) Undercarriage retraction system

(14) Ground engine running and precautions

(15) Ground handling and precautions

1.4.13 Structures, composites, fabrics and plastics

(1) Theory of structures, composites, fabrics and plastics

(2) Aging aircraft and corrosion prevention control programs

(3) Methods of carrying out repair to steel, aluminum, composites, fabrics and plastics

(4) Edge dimensions, spacing and installing aircraft rivets and fasteners

(5) Mark-off projects

(6) Cut out projects

(7) Drill materials

(8) Bend materials

(9) Roll and form materials

(10) Heat treatment of materials

(11) Assemble materials

(12) Inspection of fabric covered materials

(13) Repair of and replacement fabric covered materials

(14) Inspection and repair of composites and plastics

1.4.14 Batteries

(1) Theory lead-acid batteries

(2) Theory Nickel cadmium ni-cad batteries

(3) Servicing and charging of batteries

(4) Inspection, repair and overhaul of batteries

(5) Corrosion prevention and control

(6) Venting procedures

(7) Storage procedures

1.4.15 Avionic mechanical

(1) Electron theory

(2) Properties of conductors and insulators

(3) Theory of electric charges

(4) Current flow and potential

(5) Methods of generating electricity

(6) Fundamentals of magnetism

(7) Operation of an electromagnet

(8) Measure volts, amperes and resistance

(9) Amp meter and voltmeter range conversions

(10) Amp meters and voltmeters connected in circuits

(11) Factors controlling resistance

(12) Resistance value and power rating

(13) Identify components in a simple circuit

(14) Theory and operation of a step up, step down and auto transformers

(15) Design and construct a step up and step down transformer

(16) Aircraft instrumentation principles

(17) Navigation radio communication principles

(18) Calculate resistance of a series resistive network

(19) Calculate resistance of a parallel resistive network

(20) Kirchhoff's voltage and current laws

(21) Construct series and parallel circuits

(22) Theory of alternating current

(23) Various alternating current meters

(24) Ohm's law to determine amps, volts, resistance and power consumed in a pure resistive alternating current circuit

(25) Characteristics of inductance in alternating and direct current circuits

(26) Calculate inductances in series and parallel, inductive time constant and inductive circuits

(27) Apparent power and true power in an alternating current circuit

(28) Theory of capacitance

(29) Construction of different capacitors

(30) Characteristics of capacitance in direct and alternating currents

(31) Calculate capacitive time constant and reactance

2. Basic training syllabus for the trade: Aircraft Structures Worker Category B

2.1 Introduction

(1) Competency Based Modular Training (CBMT)

2.2 Safety

(1) Occupational Health and Safety Act

(2) Acceptable first-aid course (Approved by appropriate body)

(3) Acceptable fire-fighting course (Approved by appropriate body)

(4) Incident reporting

2.3 Engineering practices

(1) Apply sealants

(2) Bend and roll material (bending allowances)

(3) Correct use of pneumatic hand drills

(4) Countersinking of holes

(5) Deburr of holes

(6) Identification, care and use of hand tools

(7) Identification, safe use of bench grinders, pedestal drill (replace and dress of grinding wheels)

(8) Identify sealants and joints

(9) Identify corrosion and treatments

(10) Install temporary fasteners

(11) Identification of rivets and defects (countersink and universal)

(12) Installation of various types of fasteners

(13) Identify profiles, abbreviations, extrusions, joints and radii

(14) Identify various aircraft materials

(15) Interpretation of manufacturer’s manuals

(16) Installation of universal and countersink rivets and obtaining the correct bucktails

(17) Manufacturing of various projects

(18) Manufacturing and repairing of various aircraft components (stress skin repairs, etc.)

(19) Manufacturing and repairing aircraft flex and solid tubing

(20) Oxygen acetylene gas welding – heat treatment

(21) Polishing of aircraft materials

(22) Protective coatings

(23) Read and use of measuring instruments (verniers, micrometers, rulers [metric and imperial] height gauges)

(24) Removing of rivets and fasteners

(25) Reaming of holes for various fasteners

(26) Read and identify more complex aircraft drawings

(27) Stretch, crimp and form aircraft materials

(28) Safety precautions and use of guillotine

(29) Workout of bending allowances

(30) Iron and steel production, weigth, strength, melting points, heat treatment, anodic treatment, plating, applications and limitations

(31) Testing of ferrous and non-ferrous materials for hardness, tensile strength, fatigue strength and impact resistance

(32) Characteristics and Electrical/magnetic properties of the material

(33) Wood: types, specifications, plywoods, damage/failure mode, environmental contamination, disease, joining, cutting, grain, protection, sealing, application and uses

(34) Identification of composite materials commonly used in non-structural aircraft applications: glass, carbon, and kevlar fibres

(35) Standard weaves used in fibre mats and properties of fibre elements

(36) Resin matrixes and their properties

(37) Defects in non-structural composite material; its detection and rectification

(38) Repair of laminates and fibre reinforced plastics, tools, testing, and vacuum processes

(39) Methods for non-destructive testing, castings, forgings, extrusions, welds aircraft and engine components, including equipment used

(40) Understanding and applying airworthiness requirements for structural strength

(41) Understanding wing construction methods

(42) Inspection methodology, including inspection of structures, symmetry, fasteners

(43) Repair processes, including sheet metal repair, tubular structure repair, window and windshield repair

(44) Pressurized structures

(45) Surface protection and paint

3. Basic training syllabus for the trade: Aircraft Instrument Mechanic Category X

3.1 Introduction

(1) Competency Based Modular Training (CBMT)

3.2 Safety

(1) Occupational Health and Safety Act

(2) Acceptable first-aid course (Approved by appropriate body)

(3) Acceptable fire-fighting course (Approved by appropriate body)

(4) Incident reporting

3.3 Engineering practices

3.3.1 Soldering

(1) Soldering and soldering process

(2) Soldering to turret terminals

(3) Soldering to cup terminals

(4) Soldering to bifurcated terminals

(5) Soldering hook, pierced and lug terminals

(6) Axial lead components

(7) Soldering IC

(8) TO-5 type IC package and other multi lead devices

3.3.2 Electricity

(1) AC/DC voltage with AVO meter

(2) AC/DC current with AVO meter

(3) Resistance with AVO meter

(4) AC/DC voltages with digital multimeter

(5) AC/DC current with digital multimeter

(6) Resistance with digital multimeter

(7) Values and tolerances of resistors

(8) Values and tolerances of potentiometers

(9) Resistance of series/parallel combination of resistors

(10) Kirchhoff’s voltage and current laws

(11) OHM’s law determine current, voltage and resistance in basic circuit

(12) Power in DC load and maximum power transfer

(13) Trouble shoot series and/or parallel circuits

(14) Block diagram of power supply

(15) Power supply with voltage and current specifications

(16) AC voltages, current and measuring peak RMS values

(17) AC/DC voltages with oscilloscope

(18) Block diagram of function generator

(19) Generates sine waves with function generator

(20) Generate square waves with function generator

(21) Time duration with oscilloscope

(22) Frequency and phase difference with oscilloscope

(23) Testing of inductors

(24) Measure inductance, reactance and resistance of coil

(25) Frequency and phase relationships of coil

(26) Effect on DC on inductance of iron core choke

(27) Impedance of RL circuit

(28) Relationship that exists in RL circuit

(29) Identify values of capacitors

(30) Capacitance of capacitors in series and parallel

(31) Capacitive reactance of capacitor

(32) Voltage across capacitors and capacitor voltage dividers

(33) Charging and discharging of capacitor

(34) Phase angle between voltage, current in capacitive circuit.

3.3.3 Electronics

(1) Atomic and semiconductor theory

(2) Diode applications

(3) Construct a transformer fed full and half wave rectifier circuit

(4) Testing of zener diodes

(5) Valves of OPTO electronic devices

(6) Operation of active filters

(7) Testing of bridge rectifiers

(8) Test a transistor

(9) Construct a common base amplifier

(10) Construct a common emitter amplifier

(11) Construct a common collector amplifier

(12) Field effect transistors

(13) Metal oxide field effect transistors

(14) Test a uni-junction transistor

(15) Test a thyristor

(16) Construction and operation of switches

(17) Voltage multipliers

(18) Voltage regulation

(19) Construct a monostable circuit

(20) Construct a astable circuit

(21) Construct a bistable circuit

(22) Introduction to operational amplifiers

(23) Operational amplifiers in DC circuit

(24) Operational amplifiers in AC circuit

(25) Typical applications

(26) Block diagram and operation of an oscilloscope

3.3.4 Digitals

(1) Digital techniques in electronics

(2) Binary number system

(3) Binary coded octal system

(4) Binary coded hexa-decimal system

(5) Decimal to binary, vice versa

(6) Binary to octal, vice versa

(7) Binary to hexa-decimal, vice versa

(8) Basic logic functions

(9) Truth tables for: AND, OR, NOR, NAND

(10) Re-design circuit by using NAND or OR gates

(11) Boolean equations for logic functions

(12) Simplify by Boolean algebra and karnaugh maps

(13) Propagation delay

(14) Power dissipation

(15) Noise shielding

(16) Fan out/in

(17) Logic levels

(18) TTL logic

(19) MOS logic

(20) Scottky TTL

(21) Three-state devices

(22) Data busses

(23) Identify different packages

(24) Flip-flops

(25) Counters

(26) Arithmetic CCT

(27) Combine logic CCT

(28) Processor language

(29) Introduction to microprocessors

(30) Internal organization of microprocessors

(31) Computer memory

3.3.5 Theory of flight

(1) Terms and definitions

(2) Aircraft controls

(3) Facts of aircraft stability

(4) Lift and drag ratios

(5) Power-to-weight ratios

3.3.6 Hand tools and hand skills

(1) Hand tools

(2) Linear measuring tools

(3) Use steel rule and tape

(4) Set caliper and divider using rule

(5) Vernier inside, outside and depth

(6) Vernier height gauge

(7) Use of micrometers

(8) Use of a hacksaw

(9) Manufacture a work piece

(10) Layout using scriber, vernier height gauge, steel ruler or tape

(11) Bench grinder

(12) Grinding wheels

(13) Grind drill bit

(14) Drill press

(15) File to layout

(16) Drill and ream holes

(17) Internal thread by using hand taps

(18) External thread by using hand dies

(19) Locking devices

(20) Use of screwdrivers and spanners

3.3.7 Pitot and static units

(1) Basic principles of pitot static

(2) Vacuum chamber

(3) Barometer

(4) Altimeters

(5) Mach indicator

(6) Outflow valve and pressure switches

(7) VSI

(8) Airspeed indicator

(9) Capsule principles

3.3.8 Mechanical watches

(1) Watches

3.3.9 Pressure switches and transmitters

(1) Principles of pressure switches

(2) Altitude switch

(3) Oil pressure switch

(4) Bourden Tubes

(5) Pressure TX

3.3.10 Basic compass

(1) Aircraft magnetism

(2) Magnetic properties

(3) Identify components

(4) Direction of magnetic field

(5) Standby compass

3.3.11 Oxygen

(1) Properties of Oxygen

(2) General life support

(3) Testing

(4) Precautions

3.3.12 Moving coil meters

(1) Moving coils

3.3.13 Fuel quantity and flow systems

(1) Indicator and TX

(2) Resistive type fuel system

(3) Capacitive type fuel system

3.3.14 Methods of temperature

(1) Temperature measurement

(2) Thermocouples

(3) Resistive probes

3.3.15 Engine instruments

(1) RPM test bench

(2) RPM indicators

(3) Tacho generators

(4) Oil pressure theory

(5) Oil pressure indicators

(6) RPM system

(7) Vibration system

(8) Fuel pressure

(9) Temperature indicators

(a) JTP

(b) EGT

(c) TIT

(d) CHT

3.3.16 Display equipment

(1) Construction of CRT

(2) CRT deflection

(3) Colour CRT

3.3.17 Synchro system

(1) Synchro theory

(2) Control synchro theory

(3) Differential synchro theory

(4) Dessyn system

(5) Synchro TX theory

(6) Synchro indicator theory

3.3.18 Gyroscopic instrument

(1) Principles of operation

(2) Artificial horizon

(3) Turn-and-bank indicator

(4) Directional indicator

3.3.19 Navigation systems

(1) Navigation indicators

(a) RMI

(b) HIS

(c) ADI

3.3.20 Autopilots and Recorders

(1) Theory

(2) Flight recorders

(3) Voice recorders

4. Basic training syllabus for the trade: Aircraft Radiotrician Category X

4.1 Introduction

(1) Competency Based Modular Training (CBMT)

4.2 Safety

(1) Occupational Health and Safety Act

(2) Acceptable first-aid course (Approved by appropriate body)

(3) Acceptable fire-fighting course (Approved by appropriate body)

(4) Incident reporting

4.3 Engineering practices

4.3.1 Soldering

(1) Soldering and soldering process

(2) Soldering to turret terminals

(3) Soldering to cup terminals

(4) Soldering to bifurcated terminals

(5) Soldering hook, pierced and lug terminals

(6) Axial lead components

(7) Soldering IC

(8) TO-5 type IC package and other multi lead devices

(9) The flat pack

(10) De-soldering

4.3.2 Electricity

(1) Principles of electrostatics

(2) Principles of conductors and insulators

(3) Which active components operates with magnetism

(4) Relays

(5) Magnetic field about wire carrying current

(6) Voltage will be induced in coil when moving through magnetic field

(7) Magnetic field about bar and horse shoe magnets

(8) Block diagram and operation of a VOM

(9) Use of ECG manual

(10) Block diagram and operation of digital multimeter

(11) AC/DC voltages with AVO meter

(12) AC/DC current with AVO meter

(13) Resistance with AVO meter

(14) AC/DC voltages with digital multimeter

(15) AC/DC current with digital multimeter

(16) Resistance with digital multimeter

(17) Values and tolerances of resistors

(18) Values and tolerances of potentiometers

(19) Resistance of series/parallel combination of resistors

(20) Kirchoff's voltage and current laws

(21) OHM's law determine current, voltage and resistance in basic circuit

(22) Power in DC load and maximum power transfer

(23) Trouble shoot series and/or parallel circuits

(24) Block diagram of power supply

(25) Power supply with voltage and current specifications

(26) AC voltages, current and measuring peak RMS values

(27) AC/DC voltages with oscilloscope

(28) Block diagram of function generator

(29) Generates sine waves with function generator

(30) Generate square waves with function generator

(31) Time duration with oscilloscope

(32) Frequency and phase difference with oscilloscope

(33) Testing of inductors

(34) Measure inductance, reactance and resistance of coil

(35) Frequency and phase relationships of coil

(36) DC effect on inductance of iron core choke

(37) Impedance of RL circuit

(38) Relationship that exists in RL circuit

(39) Identify values of capacitors

(40) Capacitors in series and parallel

(41) Capacitive reactance of capacitor

(42) Voltage across capacitors and capacitor voltage dividers

(43) Charging and discharging of capacitor

(44) Phase angle between voltage and current in pure capacitive circuit

(45) Frequency change and connection in RL and RC circuits

(46) Impedance of RC circuit

(47) Relationship that exists in RC circuit

(48) Effect of frequency on impedance on RLC circuit

(49) Apparent power, true power and power factor in AC circuit

(50) Resonant frequency of series LC circuit

(51) Impedance of parallel RC and RLC circuit

(52) Impedance in RLC circuit

(53) Turns ratio and primary load current of insulation transformers

(54) Parallel resonance

(55) Types of batteries

(56) Battery maintenance and storage

(57) Battery internal resistance

(58) Identify, test, apply fuses

(59) Bandwidth of series resonance

(60) Battery voltages in series and parallel

(61) Series RC phase shift

4.3.3 Electronics

(1) Atomic theory for semiconductors

(2) Diodes and test

(3) Transistor and test

(4) Zener diode and test

(5) Transformer full and half wave rectifier

(6) Function generator

(7) Sine waves

(8) Common base amplifier

(9) Common emitter amplifier

(10) Common collector

(11) Class A amplifier

(12) Class B amplifier

(13) Cascading (transformer)

(14) Cascading (RC)

(15) Cascading (direct)

(16) Amplifier principle

(17) Fault Finding 2 stage amplifier

(18) Active filters

(19) Differential amplifier

(20) Complementary symmetry amplifier

(21) Clipping and clamping

(22) Fault find push pull amplifier

(23) Operational amplifier

(24) Regulated PSU

(25) Voltage doubling and tripling

(26) Audio amplifier construction

(27) Test, trace and repair amplifier

(28) FET

(29) UJT

(30) Plugs and sockets

(31) Class C amplifier

(32) RF amplifier cascading

(33) RF amplifier test, trace and repair

(34) Astable multivibrator

(35) Bistable multivibrator

(36) Schmidt trigger

(37) Diagnostic testing on TV

(38) TRIACS

(39) SCR's

(40) Bandwidth of common emitter amplifier

(41) Bridge rectification

(42) OPTO electronics

(43) DIACS

(44) AM signals with function generator

(45) FM signals with function generator

(46) RF generator

(47) RF generator and AM modulation

(48) RF generator and FM modulation

(49) Carrier signals

(50) Hartley oscillator

(51) Colpitts oscillator

(52) Phase shift oscillator

(53) Crystal oscillator

(54) Phase lock loop

4.3.4 Digitals

(1) Basic logic function

(2) TTL and MOS voltage levels

(3) IC packaging

(4) Practical reasons and uses

(5) Binary number system

(6) Positive and negative logic

(7) Series/parallel data

(8) RTL logic characteristics

(9) TTL logic characteristics

(10) DTL logic characteristics

(11) Identify and explain logic levels

(12) Identify and explain TTL logic levels

(13) Introduction to microprocessors

(14) Internal organization of microprocessors

(15) Computer memory

(16) Processor language

4.3.5 Theory of flight

(1) Terms and definitions

(2) Aircraft controls

(3) Facts of aircraft stability

(4) Lift and Drag ratios

(5) Power to Weight ratios

4.3.6 Hand tools and hand skills

(1) Hand tools

(2) Linear measuring tools

(3) Set caliper and divider using rule

(4) Use a vernier

(5) Vernier height gauge

(6) Use steel rule and tape

(7) Use of micrometer

(8) Hacksaw cut to layout

(9) Manufacture a work piece

(10) Layout using scriber, vernier height gauge, steel ruler or tape

(11) Bench grinder

(12) Grinding wheel

(13) Grind drill bit

(14) Drill press

(15) File to layout

(16) Drill and ream holes

(17) Internal thread by using hand taps

(18) External thread by using hand dies

(19) Use steel rule and tape

(20) Use of screwdrivers and spanners

4.3.7 Synchro's and servo

(1) Synchro and servo

(2) Dessyu systems

4.3.8 Basic communication and antennas

(1) Telephony

(2) Volume and radio signals

(3) Propagation and paths

(4) Transmission lines

(5) Antenna principles

(6) Dipoles and vertical antenna's

(7) UHF and antenna arrays

(8) Practical demonstrator

(9) Practical construction and SWR

(10) Magnetic recording

(11) Practical applications

(12) Introduction to radar

(13) TX block diagram-AM

(14) RX block diagram-AM

(15) RX block diagram-SSB

(16) TX block diagram-SSB

(17) TX block diagram-FM

(18) RX block diagram-FM

4.3.9 Basic TX

(1) Operator power amplifier – AM output

(2) Master oscillator – A

(3) Phase Lock loop – AM

(4) Balanced modulator SSB

(5) FM TX construction

(6) Preliminary TX fault finding

(7) TX fault finding (symptoms)

(8) TX fault finding (visual inspection)

(9) TX fault finding (main DC checks)

(10) TX fault finding (signal tracing)

(11) TX fault finding (stage identification)

(12) TX fault finding (stage DC checks)

(13) TX fault finding (component identification)

(14) TX fault finding resistance confirm

(15) Practical TX fault finding

(16) SSB TX fault diagnostics

4.3.10 Basic RX

(1) Mixers, oscillators and detectors

(2) RX auxiliary CCT

(3) RX practical AM detector

(4) RX fault finding preliminary check

(5) RX fault finding symptoms checks

(6) RX fault finding visual inspect

(7) RX fault finding main DC checks

(8) RF probe and oscillator

(9) RX fault finding signal injection

(10) RX fault finding stage identification

(11) RX fault finding stage DC checks

(12) RX fault finding component identification

(13) RX fault finding resistance confirmation

(14) Practical RX fault finding

(15) SSB RX fault diagnostics

4.3.11 Display equipment

(1) Radar displays

(2) Glass Cockpit and Display

(3) Diagnostic testing

(4) Display equipment

4.3.12 Navigation systems

(1) ADF

(2) VOR

(3) ILS

(4) DME

(5) Radio altimeters

(6) ATC transponder

(7) Weather radar

(8) Aircraft controls, locations and safety

(9) GPS

(10) ACAS

4.3.13 Aircraft communication

(1) Aircraft intercom system

(2) Principle of operation, HF, UHF, VHF

5. Basic training syllabus for the trade: Aircraft Electrician Category X

5.1 Introduction

(1) Competency Based Modular Training (CBMT)

5.2 Safety

(1) Occupational Health and Safety Act

(2) Acceptable first-aid course (Approved by appropriate body)

(3) Acceptable fire-fighting course (Approved by appropriate body)

(4) Incident reporting

5.3 Engineering Practices

5.3.1 Soldering

(1) Soldiering and soldiering process

(2) Soldiering to turret terminals

(3) Soldiering to cup terminals

(4) Soldiering bifurcated terminals

(5) Soldiering hook, pierced and lug terminals

(6) Axial lead components

(7) Soldering Integrated Circuit

(8) TO-5 type Integrated Circuit package and other multi lead devices

(9) The flat pack

(10) De-soldering

5.3.2 Electricity

(1) Principles of electrostatics

(2) Principles of conductors and insulators

(3) Principles of magnetism

(4) Which active components operates with magnetism

(5) Magnetic field about wire carrying current

(6) Voltage will be induced in coil when moving through magnetic field

(7) Magnetic field about bar and horse shoe magnets

(8) Block diagram and operation of a VOM

(9) Use of ECG manual

(10) Block diagram and operation of digital multimeter

(11) AC/DC voltages with AVO meter

(12) AC/DC current with AVO meter

(13) Resistance with AVO meter

(14) AC/DC voltages with digital multimeter

(15) AC/DC current with digital multimeter

(16) Resistance with digital multimeter

(17) Values and tolerances of resistors

(18) Values and tolerances of potentiometers

(19) Resistance of series/parallel combination of resistors

(20) Kirchoff's voltage and current laws

(21) OHM's law determine current, voltage and resistance in basic circuit

(22) Power in DC load and maximum power transfer

(23) Measure inductance, reactance and resistance of coil

(24) Frequency and phase relationships of coil

(25) DC effect on inductance of iron core choke

(26) Impedance of RL circuit

(27) Relationship that exists in RL circuit

(28) Identify values of capacitors

(29) Capacitors in series and parallel

(30) Capacitive reactance of capacitor

(31) Voltage across capacitors and capacitor voltage dividers

(32) Charging and discharging of capacitor

(33) Phase angle between voltage and current in pure capacitive circuit

5.3.3 Electronics

(1) Construction and operation of switches

(2) Test a thyristor

(3) Voltage multipliers

(4) Voltage regulation

(5) Construct mono-stable

(6) Construct a a-stable circuit

(7) Construct bi-stable

(8) Introduction to operational amplifiers

(9) Operational amplifiers in DC circuit

(10) Operational amplifiers in AC circuit

(11) Typical applications

(12) Block diagram and operation of an oscilloscope

5.3.4 Digitals

(1) Digital techniques in electronics

(2) Binary of system

(3) Binary coded octal system

(4) Binary coded hexa-decimal system

(5) Decimal to binary vice versa

(6) Binary to octal vice versa

(7) Binary to hexa-decimal vice versa

(8) Basic logic functions

(9) Truth tables for: AND, OR, NAND and NOR gates

(10) Re-design circuit by using NAND or OR gates

(11) Boolean equations for logic functions

(12) Simplify by boolean algebra and karnaugh maps

(13) Propagation delay

(14) Power dissipation

(15) Noise shielding

(16) Fan out/in

(17) Logic levels

(18) TTI logic

(19) MOS logic

(20) Scottky TTL

(21) Three-stage devices

(22) Data busses

(23) Identify different packages

(24) Flip-flops

(25) Counters

(26) Arithmetic circuit

(27) Combine logic circuit

(28) Processor language

(29) Introduction to microprocessors

(30) Internal organization of microprocessors

(31) Computer memory

5.3.5 Theory of flight

(1) Terms and definitions

(2) Aircraft controls

(3) Facts of aircraft stability

(4) Lift and drag ratios

(5) Power to weight ratios

5.3.6 Hand tools and hand skills

(1) Hand tools

(2) Linear measuring tools

(3) Use steel rule and tape

(4) Set caliper and divider using rule

(5) Vernier, inside, outside and depth

(6) Vernier height gauge layout for inspection

(7) Use of micrometer

(8) Hacksaw cut to layout

(9) Manufacture a work piece

(10) Layout using scriber, vernier height gauge, steel ruler or tape

(11) Bench grinder

(12) Dress a grinding wheel

(13) Grind drill bit

(14) Drill press

(15) File to layout

(16) Drill and ream holes

(17) Internal thread by using hand taps

(18) External thread by using hand dies

(19) Locking devices

(20) Use of screwdrivers and spanners

5.3.7 Servicing of aircraft wiring

(1) Wire marking

(2) Cable loom

(3) Fault find and test of cable loom

(4) Wire stripper and crimping tool

(5) Plugs and sockets

(6) Crimping of various terminals

(7) Continuity tester

(8) Meggar

(9) Crimping of various splices

(10) Electronic symbols, CCT diagrams

(11) Busbars

(12) CCT diagrams of AC/DC electrical systems

5.3.8 Operation, maintenance and servicing of DC machines

(1) DC machines

(2) Armature and commentator servicing

(3) Field coil and measure its resistance

(4) Brushes used in DC machines

(5) Install brushes

(6) Lubricants

(7) Types of bearings

(8) Lubrication and installation of bearings

(9) Gears, clutches, brakes and switches

(10) Inspection of gears, clutches, brakes and switches

(11) O-rings and seals

(12) Inspection of O-rings and seals

(13) Lapping of steel and carbon seals

(14) Fault finding on DC machines

(15) Repair, service, overhaul and testing of DC generators

(16) Repair, service, overhaul and testing of DC motors

(17) Synchro and servos

5.3.9 Operation of aircraft batteries

(1) Batteries

(2) Voltage of battery in series and parallel

(3) Internal resistance of dry cell

(4) Safety precautions secondary cells

(5) Use of hydrometer

(6) Gravity readings of cells

(7) Inspection of aircraft batteries

(8) Test of aircraft batteries

(9) Maintenance of aircraft batteries

(10) Applications of voltage regulator

(11) Fuses

(12) Circuit breakers

(13) Testing of DC control equipment

(14) Testing of relays

(15) Testing of DC control equipment

5.3.10 Operation, servicing and maintenance of AC machines

(1) Operation of AC machines

(2) Repair and testing of AC machines

(3) Operation of an AC induction motor

(4) Overhaul and test induction motor

(5) Operation of split phase induction motor

(6) Overhaul and test capacitor start induction motor

(7) Operation of a capacitor start induction motor

(8) Operation of a capacitor start capacitor run motor

(9) Shaded pole motor

(10) Universal motor

(11) Overhaul and test of universal motor

(12) Synchronous motors

(13) Contactors

(14) Cut-out protection single-phase motors

(15) Start and switch single-phase motors

5.3.11 Electromechanical devises

(1) Rotary actuators

(2) Linear actuators

5.3.12 Operation, servicing and maintenance of aircraft control equipment

(1) Voltage regulation

(2) Magnetic amplifiers

(3) Brake control equipment

(4) Environmental control

5.3.13 Operation, servicing and maintenance of APU and TRU

(1) Auxiliary Power unit (APU)

(2) Applications of transformer rectifier Units

(3) Applications of inverters

(4) AC ignition exciter

(5) DC ignition exciter

(6) Ignitor plug

(7) Magnetos

5.3.14 Operation, servicing and maintenance of aircraft lighting

(1) Application of aircraft lighting equipment

(2) Fault find of aircraft lighting equipment

(3) Fault find of aircraft lighting panel

(4) Explain aircraft lighting system

5.3.15 Operation of fire protection pneumatic and air conditioning systems

(1) Fire protection

(2) Pneumatics and air conditioning system

6. Basic training syllabus for the trade: Aircraft Welding Category X

6.1 Introduction

(1) Competency Based Modular Training (CBMT)

6.2 Safety

(1) Occupational Health and Safety Act

(2) Acceptable first-aid course (Approved by appropriate body)

(3) Acceptable fire-fighting course (Approved by appropriate body)

(4) Incident reporting

6.3 Engineering Practices

(1) Identify, care and use of hand tools

(2) Identification, safe use of bench grinders, pedestal drill (replace and dress of grinding wheels)

(3) Ferrous and non-ferrous metals

(4) Heat treatment of materials (hardening, case hardening, tempering, normalising, hardness, etc.)

(5) Manufacturing of various projects

(6) Read engineering drawings and perform layout

(7) Read and use measuring instruments (verniers, micrometers, vernier height gauges, dial test indicators and combination sets)

(8) Use of calipers and dividers – identify various aircraft materials

(9) Manufacturing and preparing of various aircraft components (Stress skin repairs)

(10) Read and use of steel rule and tape

(11) Care and use of hand files

(12) Care and use of hacksaws

(13) Care and use of band saws

(14) Identification and safe use of a pedestal drill

(15) Identification and safe use of a bench grinder

(16) Replace and dress a grinding wheel

(17) Grinding of drill bits, punches and chisels

(18) Drilling, tapping and reaming of holes

(19) External and internal threading

(20) Identification of screw treads

(21) Interpretation of manufacturer's manuals

(22) Safety precautions and use of guillotine

(23) Workout of bending allowances

6.4 Experience in the following welding processing

(1) Oxy-acetylene welding (basic)

(2) Oxy-acetylene welding (advance)

(3) Oxy-acetylene brazing

(4) Oxy-acetylene silver brazing

(5) Welding inspection

(6) Oxy-acetylene aluminum welding

(7) Oxy-acetylene cutting (free hand)

(8) Shielded metal arc welding (basic)

(9) Gas metal arc welding (basic)

(10) Gas metal arc welding (advance)

(11) Gas tungsten arc welding (basic)

(12) Gas tungsten arc welding (advance)

(13) Plasma arc welding

6.5 Resistance Welding

(1) Oxy-acetylene welding experience

(2) Shield metal arc welding experience

(3) Gas metal arc welding experience

6.6 Gas Tungsten Arc Welding

6.7 Knowledge of the following

(1) Welding inspection

(2) Heat treatment

(3) Sheet metal

(4) Metal spray

7. Type training

7.1 In addition to the basic training for the trade, the aircraft maintenance engineer shall either complete a type training course with an approved aviation training organization in terms of part 141 or with the manufacturer for each type of airframe

or engine that the aircraft maintenance engineer are required to work on or obtain sufficient experience through an on-the-job training programme carried out under the supervision of a licenced AME, at an approved aircraft maintenance organisation.

7.2 On completion of the type training course or the on-the-job training, the aircraft maintenance engineer is required to successfully demonstrate his/her skill and ability to perform the functions required with respect to the licence and rating held, to a designated examiner or an authorized inspector.

7.3 Upon successful completion of the skills demonstration by the aircraft maintenance engineer, the designated examiner or authorized inspector shall issue the certificate of competency as contained in form FSS PEL 66-01.

8. Human factors training

All Aircraft Maintenance Engineers must attend and successfully complete a Human Factors course that covers at least the following content:

(1) The history of Human Factors

(2) Relevance of Human Factors to Aircraft Maintenance

(3) Human Factor Errors in Aircraft Maintenance

(4) Managing Human Factors in Aircraft Maintenance

(5) Reporting, Analysis and Decision Making

(6) Human Factors Training

(7) ICAO requirements for Human Factors

(8) Implementation of Human Factor Programmes

(9) Operation of Human Factor Programmes

66.02.3 THEORETICAL KNOWLEDGE EXAMINATION

1. Entry requirements and procedures for theoretical knowledge examinations for Aircraft Maintenance Engineer licence (Categories A, C, W, B, D and X)

1.1 General

(1) Candidates who intend to sit for a theoretical knowledge examination must complete the application form timeously to be considered for the examination concerned.

(2) Applications must be accompanied by certified true copies of the necessary supporting documents. It is of utmost importance that the experience claimed is verified by the accountable manager or responsible person of the AMO where the candidate is employed. Particular attention should be paid to Part III of the application.

(3) After evaluation of the application the successful candidates will be advised of the topics to be written as well as of the costs involved.

(4) All applications must reach the examination section of the DCA or the aviation training organization, as the case may be, before the first closing date as specified in an aeronautical information circular, to be published from time to time by the Director.

(5) All fees must be paid on or before the second closing date as specified in an aeronautical information circular, to be published from time to time by the Director. Failure to pay such fees timeously will disqualify the candidate from being entered for the examination concerned.

(6) Applications or fees, which are received after the respective closing dates, will not be accepted, regardless of the date on which such applications were completed.

(7) A candidate accepted for a theoretical knowledge examination will be required to answer in a written examination, questions to demonstrate his or her knowledge of the appropriate topics, which are prescribed in section 2 below.

1.2 Procedures for examinations

(1) Written examination instructions to candidates will be attached to the letter of acceptance from the Director or aviation training organization concerned. The letter of acceptance will serve as admittance to the examination room. Candidates, unable to produce this letter of acceptance, will be denied access to the examination room.

(2) Candidates must –

(a) report at the examination room at least 20 minutes before the scheduled time of commencement;

(b) provide an identity document in the form of either an identity book, AME licence with a photo or in the case of non-citizens, a passport;

(c) sign the attendance register;

(d) provide their own writing and ancillary equipment;

(e) check that their examination number and necessary information are correct on all the documents;

(f) remain silent during the course of the examination;

(g) stop writing at the instruction of the invigilator;

(h) hand in examination script when so instructed by the invigilator;

(i) hand in all question papers, scrap paper and related documents;

(j) if there is any lack of clarity regarding a question, write his/her complaints to the examiner on the scrap paper and hand this in with his/her answer paper; and

(k) comply with all examination instructions during the course of the examination.

(3) Candidates may not –

(a) retain any notes of whatever nature during the examination;

(b) communicate with another candidate;

(c) pass any object to another candidate;

(d) look at the work of another candidate;

(e) enter the examination room if more than 30 minutes late;

(f) leave the examination room within the first hour of the examination;

(g) leave the examination room without the invigilators permission;

(h) write on the answer sheet of multiple choice examinations apart from the mark to indicate the answer selected;

(i) make any notes or marks on the manuals and question papers

(j) direct any question regarding the questionnaire to the invigilator;

(k) use or retain in their possession, while in the examination room, a programmable computer/calculator;

(l) smoke in the examination room;

(m) behave in an unsatisfactory manner; or

(n) disobey the instructions of the invigilator.

(4) The following types of programmable computers have been identified as such and may not be taken into the examination room –

(a) any calculator with an alphanumerical keyboard;

(b) position organizer/Navmaster;

(c) any Hewlett Packards;

(d) if doubt exists whether a computer may be used or not, candidates may request the DCA or the aviation training organization concerned at least 30 days before the examination to approve such computer.

1.3 Special examinations

(1) Special examinations will only be considered if –

(a) written application is submitted in accordance with paragraph 1.1;

(b) motivation is acceptable; and

(c) the fees concerned are paid.

1.4 Examination Results

(1) The candidate is to be notified of his/her examination(s) results giving percentage(s) obtained. No examination result will be given telephonically.

(2) A candidate for an examination success will be valid for twelve months from the date of the examination. A candidate who applies to use that credit after that period is to be re-examined.

1.5 Re-testing after failure

An applicant who fails the written examination referred to in sub-regulation (1), may apply for retesting after the appropriate period specified below:

(1) The pass mark for any written technical examination is 75%.

(2) A candidate who fails with a mark –

(a) of between 71% and 74%, both inclusive, may apply in writing for a re-mark within 30 days from the date of receiving the examination results, on payment of the appropriately fee. If the remark is successful, the fee will be refunded;

(b) of more than 68% may apply to be entered for the following exam sitting;

(c) of between 60% and 68%, both inclusive, has to wait 6 months before applying to enter again;

(d) of less than 60%, will have to wait for 12 months before applying to enter again.

(3) A candidate who is unsuccessful with his or her second attempt, and shows no improvement on previous attempts, will have to wait 18 months before he or she will be allowed to enter for the same examination.

1.6 Persons found guilty of misconduct

Persons found guilty of misconduct by DCA inspectors and have been requested to attend penalty examinations at DCA will follow the process as per technical standard 66.02.3, paragraph 1. Note that the first attempt will be at no cost but should the applicant fail his/her first attempt the second attempt will be charged as per Part 187.

2 Knowledge requirements

2.1 Aircraft Maintenance Engineer licence (Category A rating)

(1) Category A (aeroplanes)

(a) An applicant accepted for examination in Category A to cover aeroplanes will be required to answer, in a written examination, questions to demonstrate his or her knowledge of the following subjects, according to the construction of the type for which accepted:

(i) British Civil Airworthiness Requirements, British Civil Aircraft Inspection Procedures and the FAA Advisory Circular 43.13-2B, so far as they affect an aircraft maintenance engineer licensed in Category A.

(ii) Practical arithmetical calculations, involving vulgar and decimal fractions, percentage mensuration.

(iii) The various terms used in aeroplane construction and aerodynamics, the functioning of each component of an aeroplane, and the elementary principles of theory of flight.

(iv) The preparation of a brief report, illustrated by sketches if necessary, describing the replacements required in the event of damage, defect or wear.

(v) The inspection and checks for alignment after assembly of aeroplane structural components.

(vi) The inspection during and after adjustment of flying controls.

(vii) The correction of faults experienced in flight, with particular reference to rigging and control settings.

(viii) General maintenance of the airframe (including equipment but excluding the engine) and minor repairs.

(ix) Defect and deterioration of metallic materials, treatments and methods used against corrosion.

(x) Defects and deterioration of wooden structures, including treatments and methods used in this connection, where applicable.

(xi) Defects and deterioration of materials – other than wood or metal – such as fabric, dopes, rubber, etc. Treatments and methods used in rectifying defects encountered, where applicable.

(xii) The inspection of control mechanisms for defects and deterioration.

(xiii) The inspection and scope of investigation following heavy landings.

(xiv) The methods of checking flying instruments for correct functioning, the inspection of instruments and instrument installations in aeroplanes and methods of making check calibrations.

(xv) The inspection of electrical installations in aeroplanes and testing for correct functioning and condition.

(xvi) The inspection of under-carriage shock-absorbing systems, brakes, wheels and tyres.

(xvii) The principles of operation of retracting undercarriage and flap operating systems and inspection of these systems installed in aeroplanes, where applicable.

(xviii) The method of determining the mass and the position of the center of gravity of an aeroplane and the preparation of a mass and balance schedule.

(xix) Where applicable, general principles of operation of the particular type of automatic pilot installed in the aeroplane.

(xx) Where applicable, methods of coupling the automatic pilot system to the aircraft flying controls. Tests to ensure that the automatic pilot can be immediately disengaged or over-controlled in any emergency.

(xxi) Where applicable, the daily maintenance and periodical inspections necessary to ensure correct operation and functioning of automatic pilot installations. Such minor replacements and adjustments to the automatic pilot on the aeroplane as specified in the maintenance manual as being within the scope of an aircraft maintenance engineer licensed in Category A.

(xxii) The regulations made under the Act in so far as they affect an aircraft maintenance engineer licensed in Category A.

(xxiii) Detailed knowledge of the construction of the airframe and the principles of operation of the components.

(b) Where, subsequent to the written examination, a supplementary examination is required by the Director, an applicant may be required to answer further questions in respect of the subjects prescribed in sub-paragraph (1). 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.

(2) Categories A (rotorcraft)

(a) An applicant accepted for examination in Categories A for the certification before flight of rotorcraft, excluding engines, will be required to answer, in a written examination, questions to demonstrate his or her knowledge of the following subjects, according to the construction of the type for which accepted:

(i) British Civil Airworthiness Requirements, British Civil Aircraft Inspection Procedures and the FAA Advisory Circular 43.13-2B, so far as they affect an aircraft maintenance engineer licensed in Categories A.

(ii) Practical arithmetical calculations, involving vulgar and decimal fractions, percentages and mensuration.

(iii) The maintenance, including minor repairs, of the rotorcraft, airframe, and its equipment.

(iv) The various terms used in rotorcraft construction and aerodynamics and the functioning of each component of a rotorcraft.

(v) The assembly of rotorcraft structures, with particular reference to the assembly and functioning of the rotors, including transmission.

(vi) The adjustment of the rotors for the purpose of rectifying faults experienced in flight as a result of a defect or maladjustment.

(vii) The inspection of electrical installations in rotorcraft and testing for correct functioning and condition.

(viii) Defects and deterioration in covered surfaces, in timber and metal structures, as applicable and methods of rectification.

(ix) The principles and functioning of shock-absorbing devices and retracting devices of landing gear, where applicable.

(x) The methods of effecting minor repairs and replacements.

(xi) The methods of checking flying and engine instruments for correct functioning, methods of making check-calibrations, and inspection of instruments and installations in rotorcraft.

(xii) The preparation of a brief report, illustrated by sketches if necessary, describing the replacements of repairs required in the case of damage.

(xiii) Detailed knowledge of the construction of the rotorcraft.

(xv) The principles of operation of the transmission and the inspection and rectification of faults in the system.

(xvi) The composition, properties, uses, defects and protection against corrosion and deterioration of the principal materials used in the construction of the rotorcraft.

(xvii) The method of determining the mass and the center of gravity of a rotorcraft and the preparation of a mass and balance schedule.

(xviii) The regulations made under the Act in so far as they affect an aircraft Maintenance Engineer licensed in Categories A.

(b) Where, subsequent to the written examination, a supplementary examination is required by the Director, an applicant may be required to answer further questions in respect of the subjects prescribed in subparagraph (1). 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.

2.2 Aircraft Maintenance Engineer licence (Category C rating)

(1) Category C (engines: piston and gas turbine jet)

(a) An applicant accepted for examination in Category C to cover aircraft engines will be required to answer, in a written examination, questions to demonstrate his or her knowledge of the following subjects, according to the construction of the type for which accepted:

(i) British Civil Airworthiness Requirements, British Civil Aircraft Inspection Procedures and the FAA Advisory Circular 43.13-1B, so far as they affect an aircraft maintenance engineer licensed in Category C.

(ii) Practical arithmetical calculations involving vulgar and decimal fractions, percentages and mensuration.

(iii) The principles of operation of the engine and its parts and accessories. The preparation of a brief report, illustrated by sketches if necessary. Describing the replacements required in the event of damage, defect or wear.

(iv) Methods of inspection for defects during rectification, clearances and allowances for wear and distortion.

(v) Methods of rectification of defects, inspection during and after re-assembly.

(vi) Inspection and checks on complete installation and systems, as required during engine installation.

(vii) The methods of checking engine instruments for correct functioning, the inspection of engine instruments and instrument installations in aeroplanes and methods of making check calibrations.

(viii) Testing and tuning during ground running in accordance with the manufacturer’s recommended procedure, including diagnosis of all types of running faults.

(ix) Preparing engines for initial installation and inhibiting of engines.

(x) General maintenance of the engine and its installation, including minor repairs.

(xi) Where applicable, the assembly of variable-pitch propellers dismantled for ease of transport, provided the propeller hub is not dismantled or split, assembly of propeller to engine, inspection of damage to propellers, permissible limits and methods of rectification.

(xii) Where applicable, the principles of variable-pitch propellers and controlling devices, beta and reverse mode inspection of correct assembly and functioning, de-icing ground testing and rectification of defects.

(xiii) Detailed knowledge of the construction of the type of engine for which accepted.

(xiv) Dismantling of modules of turbo propeller and gas turbine jet engines for repairs for overhaul and testing.

(xv) Constructional details of parts, the rectification of which may be certified by the holder of a licence in Category C.

(xvi) Typical faults and defects calling for partial overhaul or other rectification that may be certified by the holder of a licence in Category C, provided the crankcase halves of a piston engine are not dismantled.

(xvii) The inspection of the complete fuel, oil, pneumatic and, where applicable, coolant systems and tests for functioning and defects and methods of rectification.

(xviii) Inspection of ignition systems and high tension harnesses for correct installation, condition, timing and functioning, and test for defects and methods of rectification.

(xix) The principles of operation of carburetors and/or injectors, inspection of carburetors or injectors and induction systems, fuel control units, fuel manifolds, nozzles and combustion chambers, test for functioning and defects.

(xx) Where applicable, the inspection of fixed-pitch propellers, fans, compressors, turbines, inspection, repairs and replacement of rotors and blades and checks during assembly to engine.

(xxi) Where applicable, the principles of supercharging turbo charging and the operation of boost controls, inspection for correct assembly adjustment and functioning.

(xxii) Where applicable the principles of gas turbine engines, air and gas flows, engine pressure ratios, rotor speeds, temperatures, torques, thrust and thrust reversing.

(xxiii) The composition, properties, uses, defects and protection against corrosion and deterioration of the principal materials used in the construction of the engine, its parts, accessories and installation.

(xxiv) The regulations made under the Act in so far as they affect an aircraft maintenance engineer licensed in Category C.

(b) Where, subsequent to the written examination, a supplementary examination is required by the Director, an applicant may be required to answer further questions in respect of the subjects prescribed in subparagraph (1). 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.

2.3 Aircraft Maintenance Engineer licence (Category W rating)

(1) Category W: Avionic Equipment (Installations/Servicing)

(a) 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) British Civil Airworthiness Requirements, British Civil Aircraft Inspection Procedures and the American Advisory Circular 43.13-1A & B so far as they affect an aircraft maintenance engineer's licence in Category W.

(ii) Elementary electricity and magnetism, definitions of terms used and their application and the elementary mathematical calculations involved.

(iii) Basic theory pertaining to the applicable trade.

(iv) Basic semiconductor and digital devices.

(v) Operation and use of electronic test equipment.

(vi) The regulations made under the Act so far as they affect an aircraft maintenance engineer licensed in Category W.

(vii) Methods of inspecting and testing the whole system, including the bonding and earthing system.

(viii) Theory of operation, maintenance procedures and testing of the equipment.

(ix) 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 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.

(2) 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) British Civil Airworthiness Requirements, British Civil Aircraft Inspection Procedures and the American Advisory Circular 43.13-1A & B so far as they affect an aircraft maintenance engineer licensed in Category W.

(ii) Elementary electricity and magnetism, definitions of terms used and their application and the elementary mathematical calculations involved.

(iii) Basic theory pertaining to the applicable trade.

(iv) Basic semiconductor and digital devices.

(v) Operation and use of electronic test equipment.

(vi) The regulations made under the Act so far as they affect an aircraft maintenance engineer licensed in Category W.

(vii) Methods of inspecting and testing the whole system, including the bonding and earthing system.

(viii) Theory of operation, maintenance procedures and testing of the equipment.

(ix) 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 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.

(3) 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) British Civil Airworthiness Requirements, British Civil Aircraft Inspection Procedures and the American Advisory Circular 43.13-1A & B so far as they affect an aircraft maintenance engineer licensed in Category W.

(ii) Elementary electricity and magnetism, definitions of terms used and their application and the elementary mathematical calculations involved.

(iii) Basic theory pertaining to the applicable trade.

(iv) Basic semiconductor and digital devices.

(v) Operation and use of electronic test equipment.

(vi) The regulations made under the Act so far as they affect an aircraft maintenance engineer licensed in Category W.

(vii) Methods of inspecting and testing the whole system, including the bonding and earthing system.

(viii) Theory of operation, maintenance procedures and testing of the equipment.

(ix) 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 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.

2.4 Aircraft Maintenance Engineer licence (Category B rating)

(1) Category B (aircraft)

(a) An applicant accepted for examination in Category B for the certification of the repair and overhaul of aircraft, incorporating the use and replacement of approved parts and components only, will be required to answer, in a written examination, questions to demonstrate his or her knowledge of the following subjects, according to the construction of the type for which accepted:

(i) British Civil Airworthiness Requirements, British Civil Aircraft Inspection Procedures and the FAA Advisory Circular 43.13-1B, so far as they affect an aircraft maintenance engineer licensed in Category B.

(ii) Practical arithmetical calculations, involving vulgar and decimal fractions, percentages and mensuration.

(iii) The various terms used in aeroplane construction and aerodynamics, the functioning of each component of an aircraft and the elementary principles of theory of flight.

(iv) The preparation of an inspection report on the condition of an aircraft that is about to be overhauled.

(v) The method of systematically carrying out the required overhaul.

(vi) The procedure for compiling an inspection report of work done in the overhaul of the components.

(vii) The approved repair scheme applicable to the complete rectification and overhaul of the components, including fixed-pitch wooden propellers or rotors.

(viii) The inspection of the repair, overhaul and assembly of components and the workshop processes involved, such as gluing, doping, welding, brazing and soldering, so far as they affect the incorporation of previously approved replacement members and parts, including the appropriate protective and heat treatments, where applicable.

(ix) The inspection and methods of checking for alignment and symmetry of components such as fuselages, hulls, floats, wings and fixed-pitch wooden propellers and rotors, where applicable.

(x) The inspection of the repair, overhaul and functional testing of tanks, radiators and coolers.

(xi) The inspection of the repair, overhaul and functional testing of shock-absorbing devices of landing gear.

(xii) The inspection of the engine installations, including controls and fuel, oil and coolant systems.

(xiii) The inspection of the complete aircraft, including controls and trimming devices, for correct assembly and functioning.

(xiv) The general principles of electricity and magnetism and, as far as it is practicable on the ground, the inspection of the installation and functioning of instruments, automatic pilots and electrical equipment. Methods of making check calibrations.

(xv) The method of determining the mass and the position of the center of gravity of an aircraft and the preparation of the mass and balance schedule.

(xvi) The preparation of a sketch from which a finished drawing can be made.

(xvii) The inspection of the assembly and functioning of retracting devices of landing gear, where applicable.

(xviii) The regulations made under the Act in so far as they affect an aircraft maintenance engineer licensed in Category B.

(xix) Detailed knowledge of the construction of the airframe and its components.

(xx) The composition, properties, uses, defects and protection against corrosion and deterioration of the principal materials used in the construction of the airframe and its components.

(xxi) The identification, selection, inspection and physical testing of the various timbers used in the construction of the aircraft, where applicable.

(xxii) The methods of examination and physical testing of all the non-metallic materials (other than timbers) used in the construction of the aircraft to ensure compliance with specification requirements.

(xxiii) The inspection during manufacture of non-metallic materials into aircraft parts and components, of the workshop processes involved in gluing, stitching, doping and protective measures against corrosion and deterioration, where applicable.

(xxiv) The methods of examination and physical testing of both ferrous and non-ferrous metallic materials used in the construction of the aircraft to ensure compliance with specification requirements.

(xxv) The inspection during manufacture of metallic materials into aircraft parts and components, and of the workshop processes involved. Heat treatment, including temperature control, welding, soldering, brazing, electro-plating and other protective treatments against corrosion and deterioration.

(xxvi) The inspection during construction of components such as fuselages, wings, fixed-pitch wooden propellers, rotors, tanks, radiators and coolers.

(b) Where, subsequent to the written examination, a supplementary examination is required by the 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 his or her interpretation of drawings.

(2) Category B (Structure Worker)

(a) An applicant accepted for the examination in Category X (aircraft structures) will be required to answer in a written examination, questions to demonstrate his or her knowledge of the subjects prescribed in items (iii) to (xii):

(i) British Civil Airworthiness Requirements, British Civil Aircraft Inspection Procedures and the FAA Advisory Circular 43.13-1B, in so far as these affect an aircraft maintenance engineer licensed in Category X (aircraft structures).

(ii) Standard Practices

(aa) Safety practices

(bb) Gas laws and fluid mechanics – Theory and application

(cc) Properties of the atmosphere – Pressure, humidity, density characteristics

(dd) Properties of solids and liquids – Theory and application

(ee) Velocity, acceleration, mass and force – Theory and calculation

(ff) Heat, temperature, heat transfer and measurement – Calculation

(gg) Work, energy and power – Theory and calculation

(hh) Aircraft electrical wiring – Types, characteristics, wire sizes

(ii) Aircraft grounding and bonding – Theory and calculation

(jj) Instrument panel layout and instrument mounting – Theory and application

(ll) Flight control systems – Theory and application

(mm) Propulsion systems – Theory and application

(nn) Hydraulic systems – Theory and application

(oo) Pneumatic systems – Theory and application

(pp) Landing gear systems – Theory and application

(qq) Environmental systems – Theory and application

(rr) Fire protection systems – Theory and application

(ss) Safety wiring (lockwiring) procedures

(tt) Welding techniques – Theory and application

(uu) ATA Specification 100 – Chapters relevant to maintenance aviation maintenance

(iii) Aerodynamics

(aa) Aircraft structures and theory of flight – Fixed wing aircraft

(bb) Aircraft structures and theory of flight – Rotary wing aircraft

(iv) Mathematics/Physics

(aa) Shop mathematics, graphs and charts – Theory and application

(bb) Measurement systems and conversion – Calculation and application

(cc) Chemical and physical nature of matter – Theory and application

(dd) Stress and strain – Theory and application

(v) Aircraft Hardware

(aa) Specifications and standards – Basic theory and application

(bb) Rivets – Identification and use

(cc) Threaded fasteners – Identification and use

(dd) Special fasteners – Theory and application

(ee) Control cables, terminals and turnbuckles – Identification and use

(ff) Rigid lines, flexible lines and fittings – characteristics, fabrication, material and size designation

(gg) Sealant – Theory and application

(vi) Aircraft Drawing

(aa) Types of drawings – Application

(bb) Interpretation of drawings, diagrams and charts – Theory and application

(cc) Station diagrams – Theory and application

(vii) Weight and Balance

(aa) C of G design limits and range – knowledge and application

(bb) Weighing procedures and calculations – knowledge and application

(viii) Metallurgy and Corrosion Prevention

(aa) Types of corrosion – Identification

(bb) Inspection processes – Theory and application

(cc) Removal and treatment of corrosion – Theory and application

(dd) Heat treatment, annealing and temper designation – Theory and application

(ee) Ferrous and non ferrous metals – Types and properties

(ix) Non-destructive Testing

(aa) Inspection techniques – Theory, types and application

(x) General Handling and Servicing

(aa) Shop safety – Theory and application

(bb) Fire protection – Types, prevention and extinguishing

(cc) Safety on the flight line – FOD and hazardous areas

(dd) Ground servicing equipment – Theory and application

(xi) Tools and Measuring Devices

(aa) Hand tools – Identification and use

(bb) Power tools – Identification and use

(cc) Measuring devices – Identification and use

(dd) Test equipment – Identification and application

(xii) Aircraft Sheet Metal, Tubular, Wood and Composite Structures

(aa) Repairs and fabrication

(bb) Assessment methods, techniques and practices – Theory, application and inspection

(cc) Repair materials – identification and application

(xiii) Thermoplastics

(aa) Material – Inspection and installation

(bb) Storage and surface protection – Theory and application

(xiv) Maintenance Procedures

(aa) Inspection and maintenance requirements – Theory and application

(bb) Inspections (periodic, annual, progressive, approved maintenance schedules)

(cc) Jacking, hoisting and leveling – Theory and application

(dd) Basic welding – Theory and application

(ee) Rivet layout pattern designs and installation – Theory and application

2.5 Aircraft Maintenance Engineer licence (Category D rating)

(1) Category D (engines)

(a) An applicant accepted for examination in Category D for the certification of the overhaul and repair of engines, incorporating the use and replacement of approved parts and components only, will be required to answer, in a written examination, questions to demonstrate his or her knowledge of the following subjects, according to the construction of the type for which accepted –

(i) British Civil Airworthiness Requirements, British Civil Aircraft Inspection Procedures and the FAA Advisory Circular 43.13-1B, so far as they affect an aircraft maintenance engineer licensed in Category D.

(ii) Practical arithmetical calculations, involving vulgar and decimal fractions, percentages and mensuration.

(iii) The principles of operation of the engine and its components and accessories.

(iv) The preparation of an inspection report on the condition of an engine stripped down for complete overhaul for parts accessories and installation.

(v) The method of systematically carrying out the complete overhaul and repair of the engine, its parts and accessories, not incorporating electric principles but including the replacement of the mechanical parts of a magneto.

(vi) The procedure for completing the inspection report on work done in the overhaul of the parts.

(vii) The methods of inspection during overhaul of the parts of an engine for wear, misalignment, distortion and damage. The defects likely to be encountered and their rectification, the permissible allowances for wear and distortion and the balancing of parts.

(viii) The inspection during rectification of parts and the re-assembly of the engine and of the workshop processes involved, so far as they affect the incorporation and fitting of previously approved replacement parts, including the appropriate protective treatments applicable.

(ix) The methods of inspection and checking the correct functioning of the ignition, fuel control, carburetion or injection, bonding and, where applicable, coolant systems.

(x) The inspection of the complete engine, including controls for correct assembly and functioning.

(xi) The principles, functioning, operation, adjustment and control of the equipment used for testing engines.

(xii) The inspection, adjustment and testing of an engine and all its accessories after overhaul, including the measurement of the power developed and of the fuel and oil consumption.

(xiii) The preparation of a sketch from which a finished drawing can be made.

(xiv) The methods of inspecting and checking of the correct functioning of propeller control systems, where applicable.

(xv) The principles of supercharging and the operation and testing of superchargers and boost control systems, where applicable.

(xvi) Detailed knowledge of the construction of the engine, its parts and accessories.

(xvii) The composition, properties, uses, defects and protection against corrosion and deterioration of the principal materials used in the construction of the engine, its parts, accessories and installation.

(xviii) The regulations made under the Act in so as they affect an aircraft maintenance engineer licensed in Category D.

(xix) The methods of examination and physical testing of both ferrous and non-ferrous metallic materials used in the construction of the engine to ensure compliance with specification requirements.

(xx) The methods of examination and physical testing of metal forgings, castings and pressings used in the construction of the engine, for the detection of characteristic defects which may render them unsuitable and to ensure compliance with both specification and drawing requirements.

(xxi) The inspection of metallic materials during the manufacture of metal forgings, castings and pressings into engine parts, the repair of parts and of the workshop processes involved, heat treatments, including temperature control of hardening, tempering, case hardening and normalising procedures, and of welding, white metalling, soldering, brazing, electroplating and other protective treatments against corrosion and deterioration.

(xxii) The inspection and methods of checking the finished parts prior to and during assembly into the complete engine for correct alignment, mass and balance.

(b) Where, subsequent to the written examination, a supplementary examination is required by the 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.

2.6 Aircraft Maintenance Engineer licence (Category X rating)

(1) Category X (automatic pilots)

An applicant accepted for examination in Category X for the certification of the repair and overhaul of automatic pilots will be required to answer, in a written examination, questions to demonstrate his or her knowledge of the subjects prescribed in items (a) to (d) and, in addition, according to the class of automatic pilot for which accepted, questions to demonstrate his or her knowledge of the subjects prescribed in sub-paragraphs (b) to (d) –

(a) General

(i) British Civil Airworthiness Requirements, British Civil Aircraft Inspection Procedures and the FAA Advisory Circular 43.13-1B, so far as they affect an aircraft maintenance engineer licensed in Category X.

(ii) Elementary physics and the elementary practical mathematical calculations involved.

(iii) The fundamental principles employed in the construction and operation and their application to the particular automatic pilot for which the application is accepted.

(iv) The regulations made under the Act in so far as they affect an aircraft maintenance engineer licensed in Category X (automatic pilots).

(b) Automatic pilots employing hydraulic operation

(i) General principles of construction and operation of the control units, subassemblies, hydraulic and air systems.

(ii) The necessary inspection prior to installation in the aircraft of the automatic pilot and its subassemblies, including oil pumps, regulators and accessories.

(iii) The inspection, during and after installation in the aircraft, including procedure for bleeding the hydraulic system. Tests to be carried out to ensure that the automatic pilot can be disengaged quickly and/or manually over-controlled in emergency in flight and that it is correctly installed.

(iv) The types of faults, which may develop in operation and methods, adopted to trace the causes. The adjustment and rectification of minor defects and measures taken to prevent their recurrence.

(v) The inspection of parts of the control units and subassemblies during overhaul, repair or modification and the correction of physical and mechanical faults peculiar to such parts. The effect of variation and adjustment.

(vi) The methods and procedure for lapping, polishing, testing and inspecting ball-races, cones and pivots to the gyro systems, gimbal systems and attachments.

(vii) The conventional method of tuning, balancing, calibrating, adjusting and testing during and after overhaul, repair or modification of the subassemblies and the complete automatic pilot in the workshop so far as is permitted by the manufacturer's approved overhaul and repair manual.

(viii) The principles employed and methods adopted in construction, operation, calibration and testing of the substandard test apparatus normally used in automatic pilot repair workshops. The use for this purpose of reference standards.

(c) Automatic pilots employing pneumatic operation

(i) The general principles of operation and construction of the control unit or units and subassemblies, including the monitoring system and air system.

(ii) The necessary inspection prior to installation in the aircraft of the automatic pilot and its subassemblies including the compressors, separators and dryers.

(iii) The inspection during and after installation in the aircraft. Tests to be carried out to ensure that the automatic pilot can be disengaged quickly and/or manually over-controlled in emergency in flight and that it is correctly installed.

(iv) The type of faults, which may develop in operation, methods, adopted to trace the causes. The adjustment and rectification of minor defects and measures to be taken to prevent their recurrence.

(v) The inspection of parts of the control units and subassemblies during overhaul, repair or modification and the correction of physical and mechanical faults peculiar to such parts. The effect of variation and adjustment.

(vi) The methods and procedures for lapping, polishing, testing and inspecting ball-races, cups, cones and pivots of the gyro systems, gimbal systems and attachments.

(vii) The conventional method of tuning, balancing, calibrating, adjusting and testing during and after overhaul, repair or modification of the subassemblies and the complete automatic pilot in the workshop so far as is permitted by the manufacturer's approved overhaul and repair manual.

(viii) The principles employed and the methods adopted in the construction, operation, calibration and testing of the substandard test apparatus normally used in automatic pilot repair workshops. The use for this purpose of reference standards.

(d) Automatic pilots employing electrical operation (including those with electronic amplifiers)

(i) Electricity and magnetism, definitions of terms used and their application and the elementary practical mathematical calculations involved. Basic electronic principles, the operation of electronic components, electronic circuit analysis and basic calculations involved with such circuits.

(ii) General principles of operation and construction of the control unit or units and subassemblies, including the electrical, hydraulic and/or air systems and monitoring systems, where applicable.

(iii) The necessary inspection prior to installation in the aircraft of the automatic pilot and its subassemblies.

(iv) The inspection during and after installation in the aircraft of the automatic pilot and its subassemblies.

(v) The types of electrical and mechanical faults, which may develop in operation and the methods, adopted to trace the causes. The adjustments and rectification of minor defects and measures taken to prevent their recurrence.

(vi) The inspection of components of the control units and subassemblies during overhaul, repair or modification and the correction of physical, electrical and mechanical faults peculiar to such components. The effect of variation and adjustment.

(vii) The conventional method of calibrating, adjusting and testing during and after overhaul, repair or modification of the sub-assemblies and the complete automatic pilot in the workshop so far as is permitted by the manufacturer's approved overhaul and repair manual.

(viii) The principles employed and methods adopted in the construction, operation, calibration and testing of the substandard test apparatus normally used in automatic pilot repair workshops. The use for this purpose of reference standards.

(e) Supplementary examination

Where, subsequent to the written examination, a supplementary examination is required by the Director, an applicant may be required to answer further questions in respect of the subjects prescribed in subparagraphs (a) to (d) according to the class of automatic pilot for which application is accepted. 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.

(2) Category X (Compasses)

(a) An applicant accepted for examination in Category X for the certification of the installation and compensation of direct-reading compasses will be required to answer, in a written examination, questions to demonstrate his or her knowledge of the subjects prescribed in items (i) to (x). An applicant for examination in remote-reading compasses will be required in addition to answer, in a written examination, questions to demonstrate his or her knowledge of the subjects prescribed in items (xi) to (xiii) according to the form of construction applicable to the type of remote-reading compass for which the application is accepted:

(i) British Civil Airworthiness Requirements, British Civil Aircraft Inspection Procedures and the FAA Advisory Circular 43.13-1B, so far as they affect an aircraft maintenance engineer licensed in Category X.

(ii) The general principles of magnetism, magnetic materials and permanent magnets, polarity and strength of bar magnets, the earth as a magnet, the magnetic meridian and its relationship to the geographic meridian.

(iii) The general principles of construction of typical aircraft compasses, including magnet systems, damping liquid, verge ring and markings, lubber line, grid wires, shock-absorbing suspension and corrector box, the inspection necessary for the detection of common defects that may arise in use.

(iv) Minor external repairs to the compass and de-aerating the compass liquid.

(v) The installation of compasses in aircraft, points to be observed and the procedure adopted before adjustments are made.

(vi) The precautions to be observed in the choice of a site for and the preparation of a "swinging base" and checking the base by means of a landing compass.

(vii) The compensation of compasses in aircraft, including the observation of deviations, the calculations and adjustments necessary for corrections of co-efficients A, B and C, the procedure to be followed after the corrections are made and the preparation of deviation cards and graphs.

(viii) The use of a landing compass for the checking of compasses in aircraft.

(ix) The compensation of the compass in a marine aircraft afloat by means of a bearing plate, on the aircraft, or by the use of a landing compass ashore.

(x) The regulations made under the Act in so far as they affect an aircraft maintenance engineer licensed in Category X (compasses).

(xi) The general principles of construction of remote-reading aircraft compasses, the principles of operation and functioning of the particular type for which the application is made and inspection of the parts necessary, prior to installation in the aircraft.

(xii) The installation and correct positioning of the remote-reading compass in the aircraft, including the components and accessories, points to be observed and the procedure adopted before adjustments are made.

(xiii) The methods and procedure adopted for the compensation of remote-reading compass in the aircraft, the adjustments to be made to the master compass, the master indicator and the repeater units in order to ensure correct functioning.

(b) Supplementary examination

Where, subsequent to the written examination, a supplementary examination is required by the 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 knowledge, in a practical form, of the subjects prescribed above.

(3) Category X (Electrical Equipment)

(a) An applicant accepted for examination in Category X for the certification of the overhaul, repair and modification of aircraft electrical equipment, including installations in aircraft with main power supply systems, the nominal tension of which does not exceed 30 volts, will be required to answer, in a written examination, questions to demonstrate his or her knowledge of the following subjects –

(i) British Civil Airworthiness Requirements, Procedures and the FAA Advisory Circular 43.13-1B, so far as they affect an aircraft maintenance engineer licensed in Category X.

(ii) Elementary electricity and magnetism, definitions of the terms used and their application, and the elementary practical mathematical calculations involved.

(iii) The construction and functioning of all types of electro-magnetic induction machines used on aircraft.

(iv) The method of carrying out overhauls and repairs to electro-magnetic induction machines used on aircraft, the inspection necessary to detect defects, mechanical, electrical and magnetic, as a result of wear and deterioration, and the permissible allowances in each case.

(v) The inspection of parts of aircraft electrical generators, motors, automatic control and switch gear.

(vi) The schedule of tests, the equipment required for such tests, and the methods employed in carrying out functional tests to prove the satisfactory condition of electrical generators and motors after overhaul and repair.

(vii) The general principles of construction and functioning of all types of automatic control and switch gear, the method of carrying out overhauls, repairs and tests.

(viii) The installation, functioning and testing of all types of electrical batteries.

(ix) The selection and inspection of materials used in the construction, repair and overhaul of aircraft electrical equipment.

(x) The types, sizes and capacities of cables, fuses and switch gear used in aircraft electrical installation.

(xi) The specified light-angles of navigation lamps, the installation, inspection, overhaul and testing of navigation, signaling and landing-light equipment.

(xii) Methods of inspecting and testing the whole of the electrical system installed in aircraft, including the bonding and earthing system.

(xiii) The preparation of a circuit diagram illustrating the symbols used to denote the various items of equipment.

(xiv) The regulations made under the Act in so far as they affect an aircraft maintenance engineer licensed in Category X (electrical equipment).

(b) Supplementary examination

Where, subsequent to the written examination, a supplementary examination is required by the 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.

(4) Category X (Ignition Equipment)

(a) An applicant accepted for examination in Category X for the certification of the repair and overhaul of aircraft engine ignition equipment will be required to answer, in a written examination, questions to demonstrate his or her knowledge of the following subjects –

(i) British Civil Airworthiness Requirements, British Civil Aircraft Inspection Procedures and the FAA Advisory Circular 43.13-1, so far as they affect an aircraft maintenance engineer licensed in Category X.

(ii) Elementary electricity and magnetism, definitions of the terms used and their application and the elementary practical mathematical calculations involved.

(iii) The construction and functioning of all types of engine ignition apparatus, including screened types fitted to aircraft engines.

(iv) The method of carrying out overhauls and repairs, the inspection necessary to detect defects, mechanical, electrical and magnetic, as a result of wear and deterioration and the permissible allowances in each case.

(v) The inspection and testing of parts and assemblies, and the equipment required for such tests.

(vi) The schedule of tests, the equipment for such tests, and the methods employed in carrying out functional tests to prove the satisfactory condition of apparatus after overhaul and repair.

(vii) The construction and functioning of impulse starters, the method of carrying out overhauls, repairs and tests.

(viii) The construction and functioning of automatic timing devices, the method of carrying out overhauls, repairs and tests.

(ix) The construction, inspection and testing of ignition cables, screened harness and fittings, the defects and deterioration likely to be encountered, and the effect on engine ignition apparatus and spark plugs, of metal braiding on cables.

(x) The overhaul and testing of spark plugs.

(xi) The preparation of a wiring diagram from which a finished drawing could be made of the internal and external connections of a typical ignition system.

(xii) The regulations made under the Act in so far as they affect an aircraft maintenance engineer licensed in Category X (engine ignition equipment).

(b) Supplementary examination

Where, subsequent to the written examination, a supplementary examination is required by the 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) Category X (Instruments)

(a) An applicant accepted for examination in Category X for the certification of the overhaul, repair and modification of aircraft and engine instruments, excluding electrically operated instruments, will be required to answer, in a written examination, questions to demonstrate his or her knowledge of the subjects prescribed in items (i) to (x). An applicant accepted for examination in Category X for the certification of the overhaul, repair or modification of aircraft and engine instruments, including electrically operated instruments, will be required in

addition to answer, in a written examination, questions to demonstrate his or her knowledge of the subjects prescribed in items (xi) and (xii) –

(i) British Civil Airworthiness Requirements, British Civil Aircraft Inspection Procedures and the FAA Advisory Circular 43.13-1B, so far as they affect an aircraft maintenance engineer licensed in Category X.

(ii) Elementary physics and the elementary practical mathematical calculations involved.

(iii) The general principles of construction, operation, overhaul and repair of all types of mechanically operated aircraft and engine instruments.

(iv) The types of fault, which may develop in operation, methods, adopted to trace the causes and measures taken to prevent their recurrence, the effect of variation and adjustment on instrument mechanisms.

(v) The inspection of parts of the various instruments during overhaul and repair, the correction of mechanical faults peculiar to such instruments.

(vi) The conventional methods of calibration, adjusting and testing aircraft and engine instruments, high and low pressure tests, temperature and vibration tests, and luminosity tests on luminous fluorescent dial markings.

(vii) The principles employed, and method adopted, in the construction and operation of the substandard test apparatus normally used in instrument repair shops for calibration purposes.

(viii) Methods of testing and checking the accuracy of the substandard test apparatus, and the use for this purpose of reference standards.

(ix) The preparation of a sketch from which a finished drawing could be made of a part of a typical instrument mechanism.

(x) The regulations made under the Act in so far as they affect an aircraft maintenance engineer licensed in Category X (instruments).

(xi) Elementary electricity and magnetism, definitions of the terms used and their application, and the elementary practical mathematical calculations involved.

(xii) The general principles of construction, operation, overhaul and repair of all electrically-operated instruments used in aircraft, methods of adjustment, detection and rectification of faults peculiar to specific instruments and equipment, and the tests necessary to prove correct functioning.

(b) Supplementary examination

Where, subsequent to the written examination, a supplementary examination is required by the 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.

(6) Category X (Variable-Pitch Propellers)

(a) An applicant accepted for examination in Category X for the certification of the overhaul, repair or modification of variable-pitch propellers, will be required to answer, in a written examination, questions to

demonstrate his or her knowledge of the subjects prescribed in items (i) to (x), according to the form of construction applicable to the type of propeller for which application is accepted. An applicant accepted for examination in Category X for the certification of the overhaul, repair or modification of oil and electrically operated variable-pitch propellers will be required in addition to answer, in a written examination, questions to demonstrate his or her knowledge of the subjects prescribed in item (xii) –

(i) British Civil Airworthiness Requirements, British Civil Aircraft Inspection Procedures and the FAA Advisory Circular 43.13-1B so far as they affect an aircraft maintenance engineer licensed in Category X.

(ii) Practical arithmetical calculations, involving vulgar and decimal fractions, percentages and mensuration.

(iii) The principles and functioning of the operating systems of current types of variable-pitch propellers.

(iv) The preparation of an inspection report on the condition of the propeller dismantled for complete overhaul.

(v) The method of systematically carrying out the required overhaul.

(vi) The procedure for completing the inspection record on work done in the overhaul of the parts.

(vii) The approved repair scheme applicable to the rectification and overhaul of the parts.

(viii) The methods of inspection during the overhaul of the parts of a propeller for wear, mal-alignment, distortion and damage. The defects likely to be encountered and their rectification, the permissible clearances and allowances for wear and distortion, and the balancing of parts.

(ix) The inspection during rectification of parts and components and the reassembly of the propeller, the workshop processes involved, so far as they affect the incorporation and fitness of previously approved replacement parts, including the appropriate protective treatments applicable.

(x) The inspection during rectification of spinners, fans and all parts normally attached to, and rotating with, propellers.

(xi) The construction and functioning of auxiliary oil pumps, motors, constant-speed governors, controlling means and de-icing equipment and the methods of carrying out overhauls, repairs and tests.

(xii) The inspection of a complete propeller for correct assembly, adjustment, mass and balance, methods employed for correcting balance and checking torque loading of blades.

(xiii) Assembly of a propeller to an engine, check testing and adjustment for performance and correction of faults.

(xiv) Static and dynamic balancing of the propeller.

(xv) The preparation of a sketch from which a finished drawing could be made of a part of the operating mechanism of a variable, controllable and fixed pitch propeller.

(xvi) The regulations made under the Act in so far as they affect an aircraft maintenance engineer licensed in Category X (variable, controllable and fixed pitch propellers).

(xvii) Elementary electricity and magnetism, definitions of the terms used and their application and the elementary practical mathematical calculations involved.

(b) Where, subsequent to the written examination, a supplementary examination is required by the Director, an applicant may be required to answer further questions in respect of the subjects, as applicable, 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.

(7) Category X (Avionic Equipment)

(a) An applicant accepted for examination in Category X for the certification of the overhaul, repair, modification and installation of avionic equipment in aircraft will be required to answer in a written examination, questions to demonstrate his or her knowledge of the subjects prescribed in items (i) to (vi), and in addition, according to the rating for which he has been accepted, questions to demonstrate his or her knowledge of the subjects prescribed in items (vii) to (x) or (xi) to (xx) –

(i) British Civil Airworthiness Requirements, British Civil Aircraft Inspection Procedures and the FAA Advisory Circular 43.13-1B so far as they affect an aircraft maintenance engineer licensed in Category X.

(ii) Elementary electricity and magnetism, definitions of terms used and their application and the elementary mathematical calculations involved.

(iii) Basic theory pertaining to radio and electronic principles.

(iv) Basic semi-conductor and digital devices theory and its application.

(v) Operation and use of electronic test equipment and the limitations on the use of such equipment.

(vi) The regulations made under the Act in so far as they affect an aircraft maintenance engineer licensed in Category X (Avionic Equipment).

(vii) Avionic equipment excluding equipment employing pulse techniques

(viii) Methods of inspecting and testing the whole of the avionic system, excluding equipment employing pulse techniques, installed in aircraft, including the bonding and earthing system.

(ix) Theory of operation, maintenance procedures, alignment and testing of all types of avionic equipment excluding equipment employing pulse techniques.

(x) The installation of all such equipment in aircraft, the procedures to be followed and the precautions to be observed.

(xi) Theory of operation, installation, inspection and testing of appropriate avionic equipment, antenna and transmission lines.

(xii) Avionic equipment employing pulse techniques

(xiii) Base theory and principles of pulse techniques.

(xix) Methods of inspecting and testing the whole of the avionic system employing pulse techniques installed in aircraft, including the bonding and earthling system.

(xx) Theory of operation, maintenance procedures, alignment and testing of all types of avionic equipment employing pulse techniques.

(xxi) The installation of all such equipment in aircraft, the procedures to be followed and the precautions to be observed.

(xxii) Theory of operation, installation, inspection and testing of appropriate avionic equipment antenna and transmission lines.

(b) Supplementary examination

Where, subsequent to the written examination, a supplementary examination is required by the Director, an applicant may be required to answer further questions in respect of the subjects, as applicable, 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.

(8) Category X (aircraft welding)

(a) An applicant accepted for the examination in Category X (aircraft welding) will be required to answer in a written examination, questions to demonstrate his or her knowledge of the subjects prescribed in items (i) to (vi) and, in addition, shall pass practical tests to demonstrate his or her knowledge of the subjects prescribed in item (vii) –

(i) British Civil Airworthiness Requirements, British Civil Aircraft Inspection Procedures and the FAA Advisory Circular 43.13-1B, in so far as these affect an aircraft maintenance engineer licensed in Category X (aircraft welding).

(ii) Elementary welding procedures and their application, definitions and terms used, and the elementary mathematical calculations involved in aircraft welding.

(iii) Basic theory pertaining to welding principles.

(iv) Basic strength of material and heat treatment theory and its application.

(v) Operating and use of test equipment and the limitations on the use of such equipment.

(vi) The regulations made under the Act in so far as they affect an aircraft maintenance engineer licensed in Category X (aircraft welding).

(vii) The welding requirements as prescribed in Schedule 1 in this document.

(b) Supplementary examination

Where, subsequent to the written examination, a supplementary examination is required by the Director, an applicant may be required to answer further questions in respect of the subjects, as applicable, 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.

66.02.4 EXPERIENCE

1. Aircraft Maintenance Engineer licence (Category A)

1.1 Category A (Aeroplanes): Issue or addition of different types of Category 'A'

(1) An applicant for the issuing of a licence in Category A, or for the addition of Category A to an existing licence, must have two years aeronautical engineering experience after qualifying on relevant trade including 6 months experience on the type for which application is made, shown in the following table:

TABLE 1

1 Applications relating to airframe will be accepted for the following:	2 Total aeronautical engineering experience after passing the appropriate trade test or trade exam		3 Experience in column 2 must include periods of general practical maintenance and inspection solely of airframes prior to flight on the type to which the application is made
	Without training	With training	With approved training
All or any one of the types classified under group 1	3 years	2 years	6 months
All or any one of the types classified under group 2	3 years	2 years	6 months
All or any one of the types classified under group 3	3 years	2 years	6 months
All or any one of the types classified under group 4	3 years	2 years	6 months
All or any one of the types classified under group 5	3 years	2 years	6 months
One of the types classified under group 6	3 years	2 years	6 months
All or any one of the types classified under group 7	3 years	2 years	6 months
One of the types classified under group 8	3 years	2 years	6 months
All or any one of the types classified under group 9	3 years	2 years	6 months

One of the types classified under group 10	3 years	2 years	6 months
One of the types classified under group 11	3 years	2 years	6 months
One of the types classified under group 12	3 years	2 years	6 months

NOTE

An "approved course" refers to a course approved for the purpose by the Director which includes practical training in the maintenance and inspection of Airframes or Engines or Electrical or Instruments or Avionics before flight as per CAR Part 141.

1.2. Category A (Aeroplanes): Extension of Category A (all types within same type data specification)

An applicant for the extension of Category A of his or her licence must have had a total amount of six months experience of practical maintenance and inspection of airframes on type or six months within the same type data specification of which a minimum of thirty days spent solely on the type for which the extension is desired.

1.3. Categories A (Rotorcraft): Issue or addition of Categories A

An applicant for the issuing of a licence in Categories A, or for the addition of Categories A to an existing licence, for the certification of rotorcraft with a maximum certificated mass of 3175kg or less, must have had two years' aeronautical engineering experience after passing trade test, including a minimum of one year of general practical experience of the maintenance and inspection solely of rotorcraft of which six months must have been on the practical maintenance and inspection of the type for which application is made including engines.

1.4. Categories A (Rotorcraft): Extension of Categories A

An applicant for the extension of Categories A of a licence already valid for the certification before flight of rotorcraft, to include a further type or types of rotorcraft, must have had a total six months' experience on the practical maintenance and inspection of rotorcraft on type or six months within the same type data specification of which a minimum of thirty days spent solely on the type for which the extension is desired including engines.

2. Aircraft Maintenance Engineer licence (Category C)

2.1. Category C (engines): Issue or addition of different types of Category C

(1) An applicant for the issuing of a licence in Category C, or the addition of Category C to an existing licence, must have two years aeronautical engineering experience after qualifying on relevant trade including 6 months experience, appropriate to the type for which application is made, shown in the following table:

TABLE 3

1 Applications relating to engines will be accepted for the following	2 Total aeronautical engineering experience after passing the appropriate trade test or trade exam		3 Experience in column 2 must include periods of general practical maintenance and inspection solely of aircraft engines prior to flight, on the type to which the application is made
	Without training	With training	With approved training
All or any one of the types classified under group 01	3 years	2 years	6 months
All or any one of the types classified under group 02	3 years	2 years	6 months
One of the types classified under group 03	3 years	2 years	6 months
One of the types classified under group 04	3 years	2 years	6 months
One of the of the types classified under group 05	3 tears	2 years	6 months
All or any of the of the types classified under group 06	3 years	2 years	6 months

(2) Where a licence is already valid under Category D for an engine classified under groups 01, 02, 03, 04 and 05, the experience requirements for the addition of Category C to include the same engine will be half of those stated above in column 3.

2.2. Category C (engines): Extension of Category C (all types within same type data specification)

An applicant for the extension of Category C of his or her licence must have had a total of six months' experience on the practical maintenance and inspection of engines prior to flight on type or six months within the same type data specification of which a minimum of thirty days spent solely on the type for which the extension is desired.

3. Aircraft Maintenance Engineer licence (Category W)

3.1. Category W: Issue or addition of different types 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.

3.2. 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.

4. Aircraft Maintenance Engineer licence (Category B)

4.1. Category B: Issue or addition of different types of Category B

An applicant for the issuing of a licence in Category B, or the addition of Category B to an existing licence for the certification of the repair and overhaul of airframes, must have two years aeronautical engineering experience after qualifying on relevant trade including 6 months experience, appropriate to the type for which application is made, shown in the following table:

TABLE 2

1 Applications relating to airframes will be accepted for the following	2 Total aeronautical engineering experience after passing the appropriate trade test or trade exam		3 Experience in column 2 must include periods of the practical repair and overhaul of airframes on the type to which the application is made
	Without training	With training	With approved training
All or any one of the types classified under group 1	3 years	2 years	6 months
All or any one of the types classified under group 2	3 years	2 years	6 months
All or any one of the types classified under group 3	3 years	2 years	6 months
All or any one of the types classified under group 4	3 years	2 years	6 months
All or any one of the types classified under group 5	3 years	2 years	6 months
One of the types classified under group 6	3 years	2 years	6 months
All or any one of the types classified under group 7	3 years	2 years	6 months
One of the types classified under group 8	3 years	2 years	6 months
All or any one of the types classified under group 9	3 years	2 years	6 months
One of the types classified under group 6	3 years	2 years	6 months
One of the types classified under group 11	3 years	2 years	6 months
One of the types classified under group 12	3 years	2 years	6 months

NOTE:

An approved course is a course approved for the purpose by the Director which includes practical training in the maintenance and inspection of Airframes or Engines or Electrical or Instruments or Avionics before flight.

4.2. Category B: Extension of Category B (all types within same type data specification)

An applicant for the extension of Category B of his or her licence must have had a total of six months' experience of the practical repair and overhaul of airframes types or six months within the same type data specification of which a minimum of thirty days spent solely on the type for which the extension is desired.

4.3. Category B (Aircraft Structure Worker): Issue of Category B (Aircraft Structure Worker)

An applicant for the issuing of a licence in Category B, for the certification of the repair and overhaul of airframes, must have two years aeronautical engineering experience after qualifying on relevant trade including 12 months experience, appropriate to the type of work for which application is made, shown in the following table:

TABLE 2

1	2		3
Applications relating to airframes will be accepted for the following	Total aeronautical engineering experience after passing the appropriate trade test or trade exam		Experience in column 2 must include periods of the practical repair and overhaul of airframes on the type to which the application is made.
	Without training	With training	With approved training
All or any one of the types classified under group 1	3 years	2 years	12 months
All or any one of the types classified under group 2	3 years	2 years	12 months
All or any one of the types classified under group 3	3 years	2 years	12 months
All or any one of the types classified under group 4	3 years	2 years	12 months
All or any one of the types classified under group 5	3 years	2 years	12 months
One of the types classified under group 6	3 years	2 years	12 months
All or any one of the types classified under group 7	3 years	2 years	12 months
One of the types classified under group 8	3 years	2 years	12 months
All or any one of the types classified under group 9	3 years	2 years	12 months

One of the types classified under group 6	3 years	2 years	12 months
One of the types classified under group 11	3 years	2 years	12 months
One of the types classified under group 12	3 years	2 years	12 months

NOTE

An approved course is a course approved for the purpose by the Director which includes practical training in the maintenance and inspection of Airframes or Engines or Electrical or Instruments or Avionics before flight.

5. Aircraft Maintenance Engineer licence (Category D)

5.1. Category D (Engines): Issue or addition of different types of Category D

An applicant for the issuing of a licence in Category D or for the addition of Category D to an existing licence, for the certification of the repair and overhaul of engines must have two years aeronautical engineering experience after qualifying on relevant trade including the experience, appropriate to the type for which application is made, shown in the following table:

TABLE 4

1 Applications relating to engines will be accepted for the following	2 Total aeronautical engineering experience after passing the appropriate trade test or trade exam		3 Experience in column 2 must include periods of practical repair and overhaul of engines on the type to which the application is made.
	Without training	With training	With approved training
All or any one of the types classified under group 01	3 years	2 years	6 months
All or any one of the types classified under group 02	3 years	2 years	6 months
All or any one of the types classified under group 03	3 years	2 years	12 months
All or any one of the types classified under group 04	3 years	2 years	12 months
All or any one of the types classified under group 05	3 years	2 years	12 months

All or any one of the types classified under group 06	3 years	2 years	6 months

5.2. Category D (Engines): Extension of Category D (all types within same type data specification)

An applicant for the extension of Category D of his or her licence must have had a total of six months' experience in the practical repair and overhaul of engines type or six months within the same type data specification of which a minimum of thirty days spent solely on the type for which the extension is desired.

6. Aircraft Maintenance Engineer licence (Category X)

6.1. Category X (Automatic pilots): Issue or addition of Category X (Automatic pilots)

(1) An applicant for the issuing of a licence in Category X for the certification of the overhaul, repair, modification, calibration and installation in aircraft of automatic pilots which do not operate on electronic principles, must have two years' instrument engineering experience after qualifying on relevant trade, of which a minimum of nine months on gyroscopic instruments, and three months general practical experience of the repair, modification, calibration, installation and testing of aircraft automatic pilots, must be recent (within three years) experience concentrated on the particular type of automatic pilot to which the application relates.

(2) An applicant for the issuing of a licence in Category X for the certification of the installation and in flight adjustment of electronic automatic pilots, must have two years' electronic experience after qualifying on relevant trade, of which twelve months' general practical experience of the repair, modification, calibration, installation and testing of electronic automatic pilots, must be recent (within three years) experience concentrated on the particular type of automatic pilot to which the application relates.

6.2. Category X (Automatic pilots): Extension of Category X (Automatic pilots)

An applicant for the extension of Category X of a licence already valid for the certification of the repair and overhaul of automatic pilots, to include one further type of automatic pilot similar to that for which the licence is already endorsed, must have four months recent (within the last three years) practical experience of the particular type, and in addition, a satisfactory course, except that where the type of automatic pilot to which the application relates includes electronic principles, the applicant must have had at least nine months' practical experience of the particular types.

6.3. Category X (Compasses): Issue of Category X (Compasses)

An applicant for the issuing of a licence in Category X for the certification of the installation and compensation of direct-reading or remote-reading magnetic compasses in aircraft must have had the appropriate experience referred to in CAR 43.02.18, in the installation and compensation of direct-reading magnetic compasses in aircraft.

6.4. Category X (Compasses): Extension of Category X (Compasses)

An applicant for the extension of a licence already valid for the certification of the installation and compensation of compasses to include direct-reading magnetic compasses or one further type of remote-reading compass, must have had the appropriate experience referred to in CAR 43.02.18, of the type for which the extension is required.

6.5. Category X (Electrical equipment): Issue or addition of Category X (Electrical equipment)

(A) An applicant for the issuing of a licence in Category X for the certification of the overhaul, repair or modification of aircraft electrical equipment, including installations in aircraft with main power supply systems, the nominal tension of which does not exceed 30 volts, must have two years' electrical engineering experience after qualifying on relevant trade, of which a minimum of twelve months of recent (within the last three years) general practical experience in the overhaul, repair and testing of aircraft electrical equipment, including recent experience of the inspection and testing of electrical installations in aircraft: Provided that three months' recent (within the last three years) general practical experience in the overhaul, repair or modification of aircraft electrical equipment for engines classified in groups 01, 02 and 03 will be acceptable for the issuing of a licence in Category X –

(a) if the applicant is the holder of an existing licence in Category X (ignition equipment); or

(b) if the applicant is the holder of an existing licence in Category D for any or all of the engines classified in groups 01, 02 and 03: Provided that the privileges of any Category X licence issued or added to an existing licence in accordance herewith shall be restricted to the certification of the overhaul, repair or modification of electrical equipment fitted to the engine type ratings entered under Category D of the existing licence.

(B) An applicant for the extension of Category X of a licence already valid for the certification of the repair and overhaul of electrical equipment, must have four months recent (within the last three years) practical experience of the particular type.

6.6. Category X (Ignition equipment): Issue or addition of Category X (Ignition equipment)

(A) An applicant for the issuing of a licence in Category X for the certification of the overhaul, repair or modification of aircraft engine ignition equipment, must have two years' electrical engineering experience after qualifying on relevant trade, of which a minimum of twelve months of recent (within the last three years) general practical experience in the overhaul, repair and testing of all types of aircraft engine ignition equipment: Provided that three months' recent (within the last three years) general practical experience in the overhaul, repair and modification and testing of ignition equipment for engines classified in groups 01, 02 and 03 will be acceptable for the issuing of a licence in Category X –

(a) if the applicant is the holder of an existing licence in Category X (electrical equipment); or

(b) if the applicant is the holder of an existing licence in Category D for any or all of the engines classified in groups 01, 02 and 03: Provided that the privileges of any Category X licence issued or added to an existing licence in accordance herewith will be restricted to the certification of the overhaul, repair, modification and testing of ignition equipment fitted to the engine type ratings entered under Category D of the existing licence.

(B) An applicant for the extension of Category X of a licence already valid for the certification of the repair and overhaul of ignition equipment, must have four months recent (within the last three years) practical experience of the particular type.

6.7. Category X (Instruments): Issue or addition of Category X (Instruments)

(1) An application for the issuing of a licence in Category X for the certification of the overhaul, repair or modification of aircraft and engine instruments, excluding electrically operated instruments, must have two years'

instrument engineering experience after qualifying on relevant trade, of which a minimum of twelve months of recent (within the last three years) general practical experience in the overhaul, repair, calibration and installation in aircraft of all types of physically and mechanically operated aircraft and engine instruments.

(2) An applicant for the issuing of a licence in Category X for the certification of the overhaul, repair or modification of aircraft and engine instruments, including electrically operated instruments, must have had at least twelve months of recent (within the last three years) general practical experience in the overhaul, repair or modification of electrically operated aircraft and engine instruments.

(B) An applicant for the extension of Category X of a licence already valid for the certification of the repair and overhaul of instruments, must have four months recent (within the last three years) practical experience of the particular type.

6.8. Category X (Variable-pitch propellers): Issue or addition of Category X (Variable-pitch propellers)

An applicant for the issuing of a licence in Category X, or for the addition of Category X to an existing licence, for the certification of the overhaul, repair or modification of variable-pitch propellers, must have had a minimum of twelve months of recent (within the last three years) general practical experience in the overhaul and repair of variable-pitch propellers, of which at least six months must have been spent on the overhaul or repair of the type of propeller to which the application relates: Provided that the Director may agree to lesser periods of experience on specified types of propellers of comparatively simple construction: Provided further that six months' experience in the overhaul and repair of the type of propeller to which the application relates will be acceptable if the applicant, being the holder of an existing aircraft maintenance engineers' licence in Category B or D, applies for the addition of Category X to such licence.

6.9. Category X (Avionic equipment): Issue or addition of Category X (Avionic equipment)

An applicant for the issuing of a licence in Category X for the certification of the overhaul, repair, modification and installation of avionic equipment or of avionic equipment employing pulse techniques, must have two years' electronic engineering experience after qualifying on relevant trade, of which a minimum of twelve months of recent (within the last three years) general practical experience in the overhaul, repair, calibration and installation in aircraft of all types of avionic equipment to which the application relates.

6.10. Category X: (Avionic Equipment): Extension of Category X (Avionic equipment)

An applicant for the extension of Category X of a licence already valid for the certification of the overhaul, repair modification and installation of avionic equipment or of avionic equipment employing pulse techniques to include the type of avionics equipment to which the application relates, must in addition to the experience detailed in paragraph 9 above, have had at least one year of recent (within the last three years) general practical experience in the overhaul, repair or modification of avionic equipment of the type concerned.

6.11. 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 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 carburisation 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 break through 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 litres.

(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 carburisation 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 centre 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.

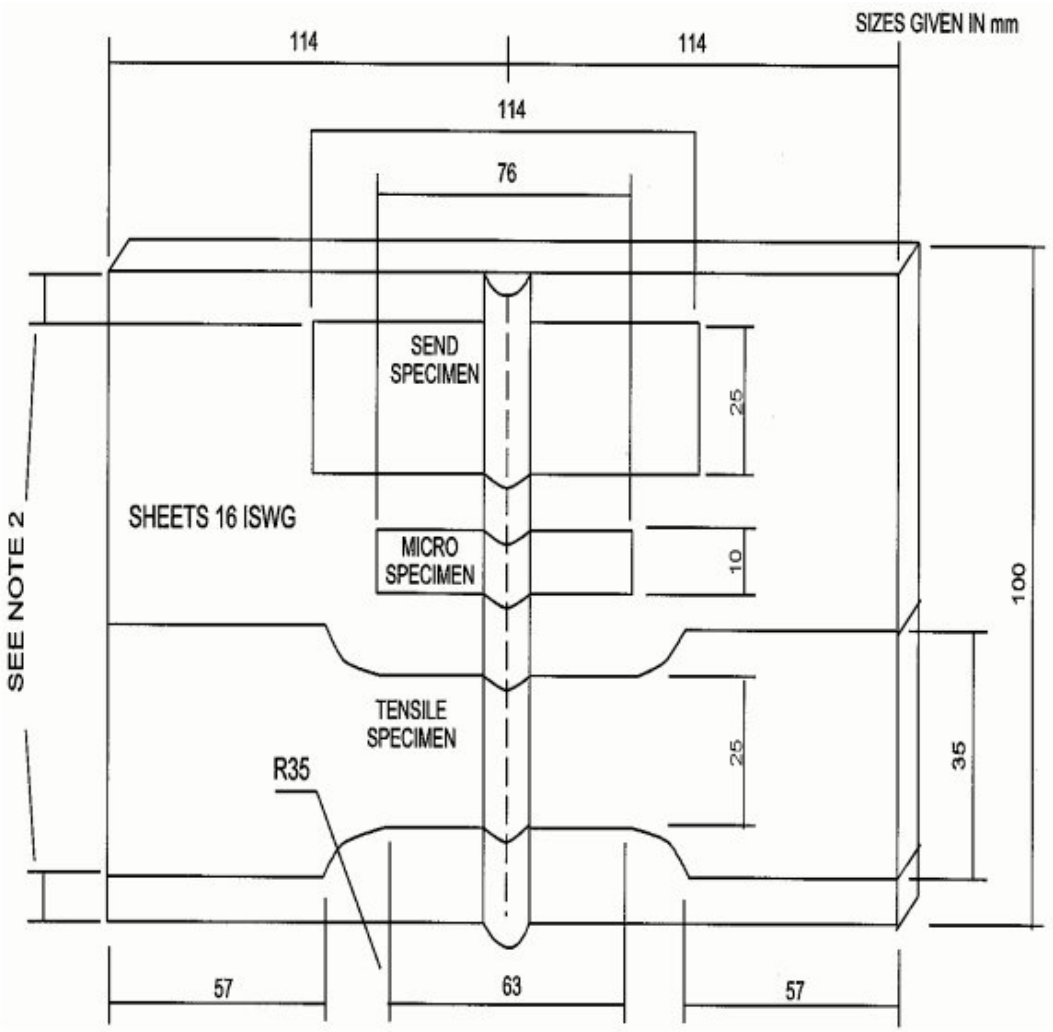
(iii) The uppermost joint formed by the short horizontal, vertical and diagonal tubes must be welded by the “overhead” welding technique and the remaining joints completed by working around the test piece.

(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



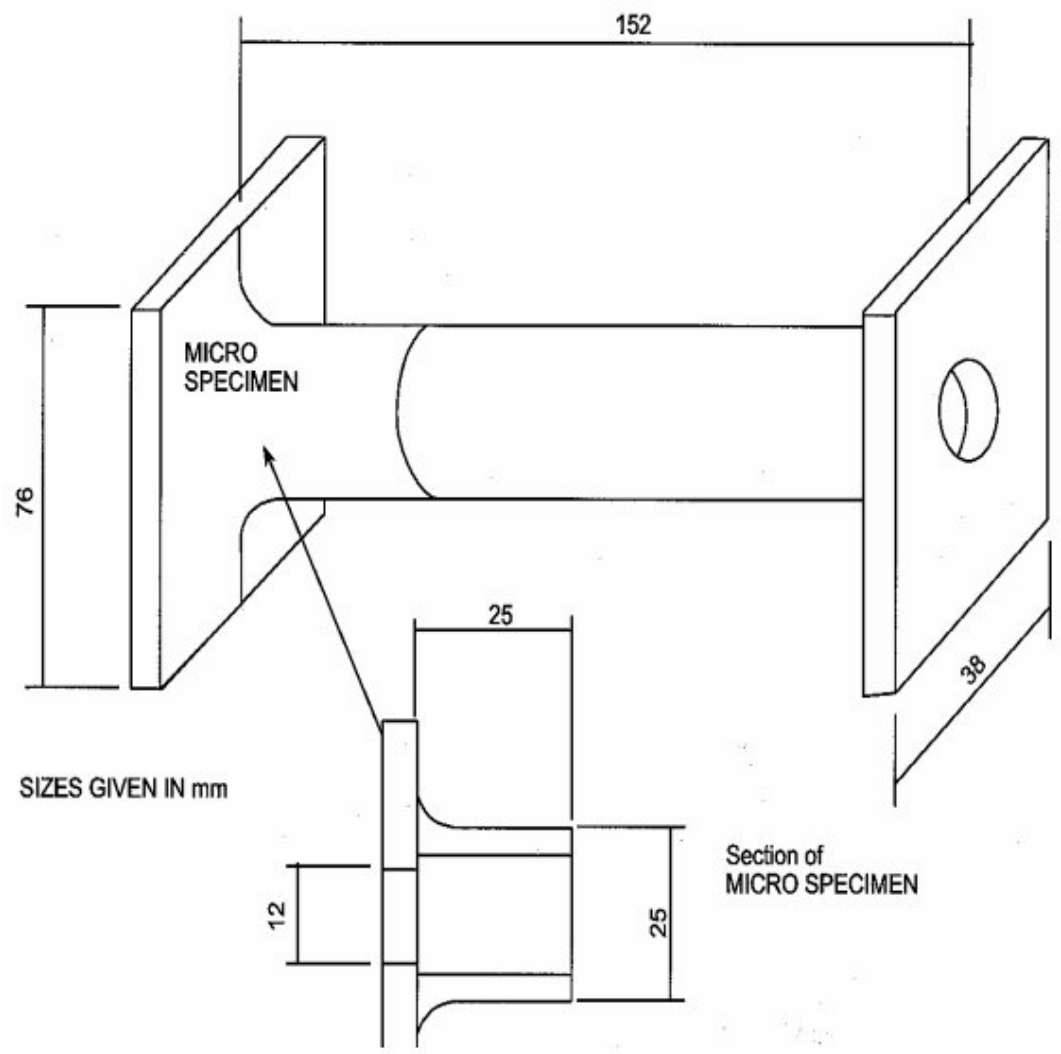
Notes:

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:

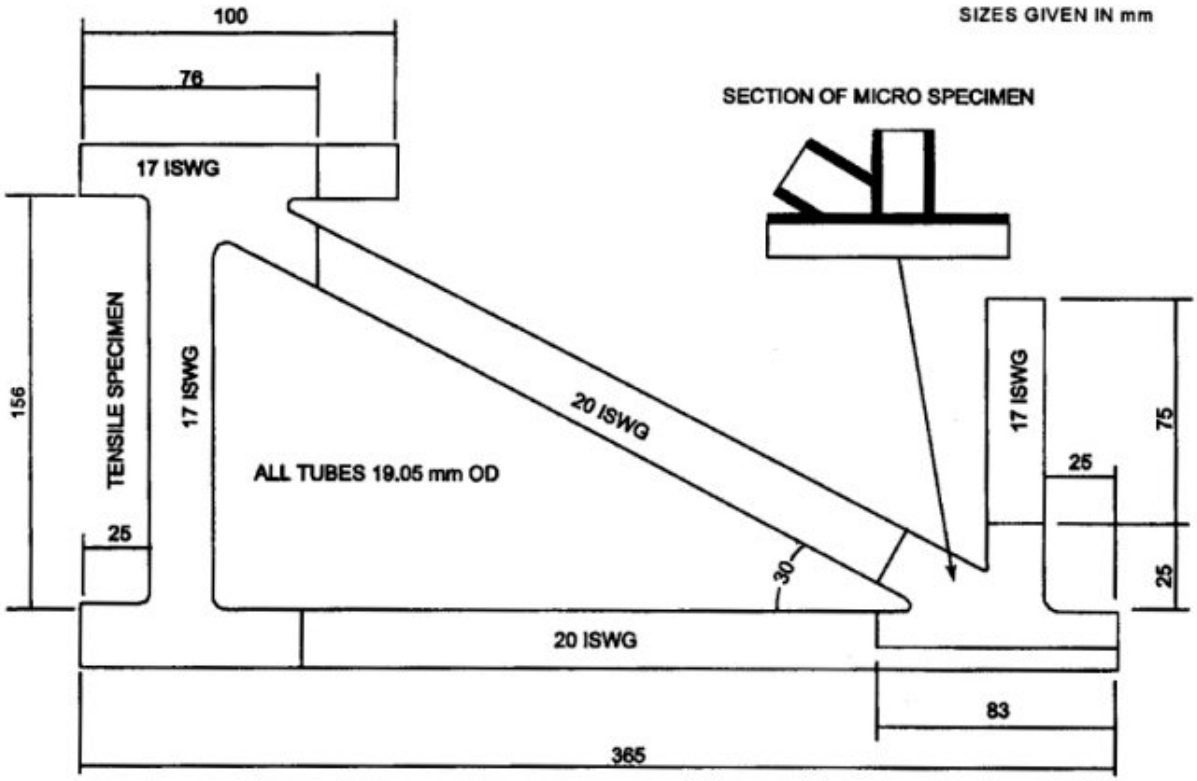
A variation of up to 25% in tube diameter will be permitted for tubular material but wall thickness of tubes must be within the dimensions specified.

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



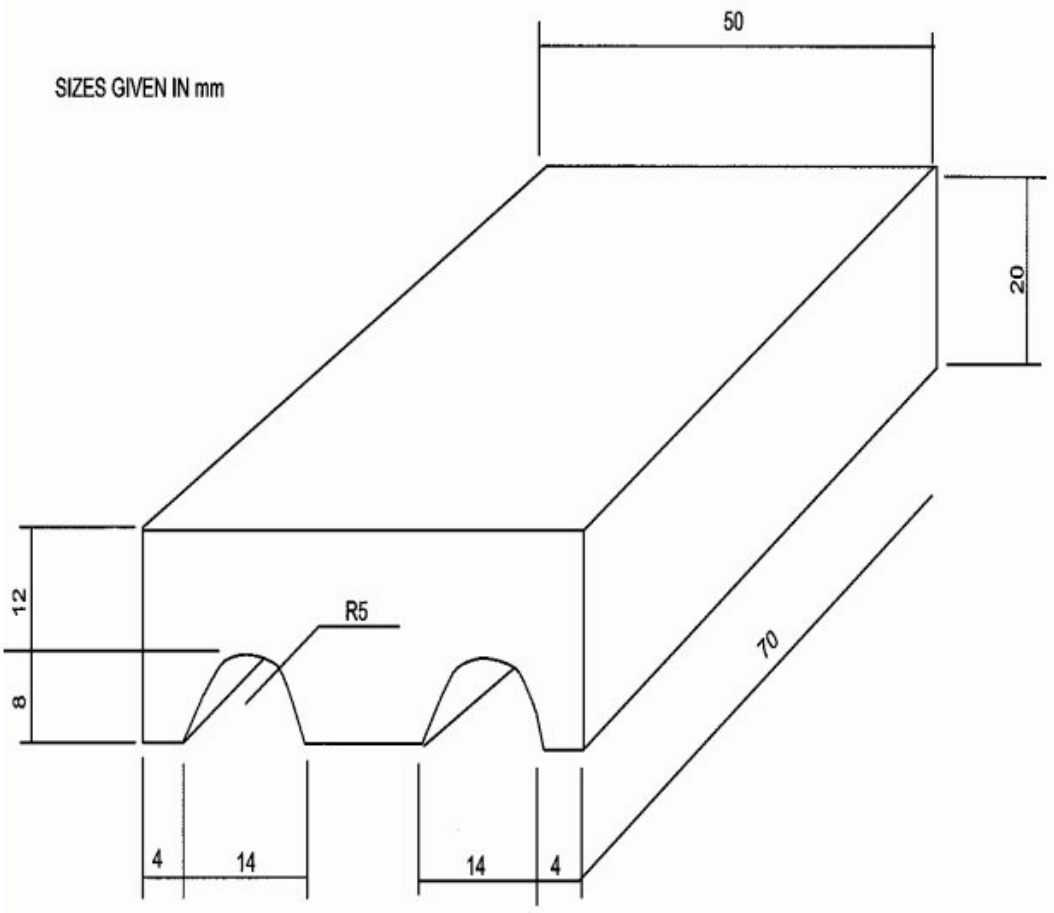
Notes:

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



66.03.2 TRAINING

1. Training standards

(1) The training, referred to in regulation 66.03.2, is –

(a) the appropriate training set out in TS 66.02.2; and

(b) for a Grade II AME Instructor rating applicant, satisfactory completion of a recognized training techniques course (train the trainer, or assessor and moderator).

(2) The prospective AME instructor (Grade I and II) shall practically demonstrate their ability to instruct on the types to be instructor rated on to a designated examiner, who must issue the competency certificate contained in form FSS PEL 66-03 once satisfied with the prospective instructor's ability.

66.03.3 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; and

(b) the required examination/proficiency test for the training standard referred to in TS 66.03.2(1)(b).

2. Re-testing after failure

An applicant who fails the written examination referred to in paragraph 1, may apply for retesting after the appropriate period specified below:

(a) The pass mark for any written technical examination is 75%.

(b) A candidate who fails with a mark –

(i) of between 71% and 74%, both inclusive, may apply in writing for a re-mark within 30 days from the date of receiving the examination results, on payment of the appropriately fee. If the remark is successful, the fee will be refunded;

(ii) of more than 68% may apply to be entered for the following exam sitting;

(iii) of between 60% and 68%, both inclusive, has to wait 6 months before applying to enter again;

(iv) of less than 60%, will have to wait for 12 months before applying to enter again.

(c) A candidate who is unsuccessful with his or her second attempt, and shows no improvement on previous attempts, will have to wait 18 months before he or she will be allowed to enter for the same examination.

66.03.4 EXPERIENCE

1. Requirements

The experience requirements referred to in regulation 66.03.4 are –

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

(b) in the case of a Grade One aircraft maintenance instructor rating, have had experience as a Grade Two instructor for not less than 3 years; or

(c) in the case of a 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.

66.04.4 CATEGORIES AND CLASSES OF RATINGS

1. Airframe classification

Airframes may be classified as follows –

(a) aeroplanes and gliders of fabric- or composite-covered wooden construction;

(b) aeroplanes and gliders of composite construction;

(c) aeroplanes and gliders of fabric-covered tubular-metal, aluminium and wooden construction;

(d) unpressurised aeroplanes and gliders of all-metal construction;

(e) rotorcraft;

(f) balloons and airships.

2. Engine classification

Engines may be classified as follows –

(a) certified aircraft engines;

(b) non-certified aircraft engines;

(c) automobile engines;

(d) turbine engines.

66.04.9 THEORETICAL KNOWLEDGE EXAMINATION

1. Written examination

An applicant for the issuing of an approved person certificate shall have successfully passed a written examination in the following subjects:

Air law and airworthiness requirements
a) Relevant regulations of Parts 1, 11, 24, 44, 66, 91 and 149 and applicable airworthiness requirements governing certification to release to service, authority to fly, and continuing airworthiness of aircraft and procedures;

Natural science and aircraft general knowledge
b) basic mathematics; units of measurement; fundamental principles and theory of physics and chemistry applicable to aircraft maintenance;

Aircraft engineering
c) characteristics and applications of the materials of aircraft construction including principles of construction and functioning of aircraft structures, fastening techniques; engines and their associated systems; mechanical, fluid, electrical and electronic power sources; aircraft instrument and display systems; aircraft control systems; and airborne navigation and communication systems;

Aircraft maintenance
d) tasks required to ensure the continuing airworthiness of the aircraft including methods and procedures for the overhaul, repair, inspection, replacement, modification or defect rectification of aircraft structures, components and systems in accordance with the methods prescribed in the relevant Maintenance Manuals and the applicable Standards of airworthiness, as applicable; and

Human performance
e) human performance, including principles of threat and error management, relevant to aircraft maintenance.

2. Application for examination

An application to write the examination for the issue or amendment of an Approved Person Certificate shall be made on the appropriate form as prescribed by the Director..

66.04.14 RENEWAL OF APPROVED PERSON CERTIFICATE

The application for the renewal of the Approved person certificate shall be the same as for the issue of the certificate. (form FSS PEL 66-05)