UNITED STATES NAVY/MARINE CORPS

A. Navy/Marine Corps Airframe and Powerplant Certification Program

Navy/Marine Corps Airframe and Powerplant Program

Qualification Training Package (QTP)

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I. INTRODUCTION

Navy and Marine Corps aircraft maintenance technicians are eligible to pursue Federal Aviation Administration (FAA) Airframe & Powerplant (A&P) certification based on documentary evidence of 30 months practical aircraft maintenance experience in airframe and powerplant systems per Title 14, Code of Federal Regulations (CFR), Part 65- *Certification: Airmen Other Than Flight Crew Members*; Subpart D-Mechanics. In 1998, the Department of Defense (DoD) initiated a project to streamline and improve the FAA A&P certification process for the military and provide a certification opportunity for all aircraft maintenance technicians. In result, the DoD chartered the Joint Service Aviation Maintenance Technician Certification Council (JSAMTCC) to standardize the eligibility process for the military and provide direction and resources necessary to ensure technicians meet FAA eligibility requirements.

II. GENERAL INFORMATION

1. Qualification Training Package (QTP).

1.1. The Navy and Marine Corps A&P Certification Program (NMCAPP) QTP is used by Navy and Marine Corps aircraft maintenance technicians, supervisors, trainers and other training elements to plan, conduct and document Naval aircraft maintenance training and practical experience for the purpose of meeting FAA A&P certification eligibility requirements per Title 14, CFR Part 65.77.

1.2. HQ FAA and the JSAMTCC approved this QTP. The QTP provides instructions to successfully complete the NMCAPP and be issued the Armed Forces CG-G-EAE-4 Form, *Certificate of Eligibility*.

1.3. The NMCAPP Certification Program is designed to be flexible, assist technicians in meeting FAA certification eligibility, prepare them for the FAA mechanic exams and successfully complete the FAA certification process.

1.4. Because the NMCAPP Certification Program is a voluntary and individual training program, supervisor and management support is necessary to complete the on-the-job training (OJT) portion of the program.

2. Requesting Information and Changes to the QTP.

2.1. The JSAMTCC and the FAA are responsible for coordinating all recommended program changes and modifying or revising the CG-G-EAE-2 or –3 forms. All recommendations must be forwarded to the Center for Naval Aviation Technical Training (CNATT) at the following address.

Commanding Officer
230 Chevalier Field, Suite C
Pensacola, Fl. 32508
Attn: NMCAPP Committee

Any questions concerning program enrollment, information, or policies, must be directed to the program office: NMCAPP@navy.mil

3. Title 14, CFR Part 65 Rules

3.1. FAA A&P certification may be obtained by one of three methods approved by HQ FAA..

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3.1.1. **Title 14, CFR Part 65.** Eligibility is based on documentary evidence of practical aircraft maintenance experience in aircraft airframe and/or powerplant systems: 18 months for either Airframe or Powerplant rating; 30 months for both Airframe and Powerplant ratings. Applicants schedule an appointment with an FAA Airworthiness Inspector (ASI) at the Flight Standards District Office (FSDO) to complete an FAA Form 8610-2, *Airman Certificate and/or Rating Application* and interview process. Eligibility and FAA approval to test is based on documented evidence of experience provided and the outcome of interview with the ASI. Not all AFSCs will meet FAA eligibility requirements. Technicians must successfully complete all FAA exams to receive FAA A&P certification.

3.1.2. **NMCAPP Certification Program.** HQ FAA approved this program in January 2001. The program is designed to be flexible and provides FAA A&P certification opportunity to all aircraft maintenance NEC/MOSs. The program is a combination of formal aircraft maintenance training, education and practical aircraft maintenance experience in airframe and powerplant systems to fulfill **Title 14, CFR Part 65** eligibility requirements. The accumulation of time towards the 30 months of practical experience begins when the technician arrives at their first duty station. Technicians must complete all program training and experience requirements specified in the QTP and successfully complete all FAA exams to receive FAA A&P certification.

3.1.3. **Title 14, CFR Part 147: Aviation Maintenance Technician School**. This is a civilian FAA-approved technical school that provides A&P education and certification. This is a 2-year program and graduates may receive an Associate in Applied Science degree. There are 150 Part 147 schools in the US and Tuition Assistance may be provided if the school is accredited. The FAA A&P exams are usually accomplished through the school.

3.2. Duration of Certification. Per Title 14, CFR Part 65.15, FAA A&P certification does not expire. It remains effective until it is surrendered, suspended or revoked.

3.2.1. The FAA does not require periodic re-examination or re-certification.

3.2.2. Once the technician obtains the FAA A&P certification, they must maintain recent experience prior to exercising the privileges of the certificate. Refer to Title 14, CFR Part 65.83 for additional information.

4. Forms: The CG-G-EAE-2 Form, *FAA Certification Performance of Job Tasks*, CG-G-EAE-3 Form, *Joint Military Services Airframe and Powerplant Program* and CG-G-EAE-4 Form, *Certificate of Eligibility* are for use by military technicians participating in the JSAMTCC A&P Certification Program. These forms are approved by the FAA as acceptable documentary evidence of practical experience per Title 14, CFR Part 65.77 of eligible military candidates for the FAA mechanic certificate with Airframe and/or Powerplant ratings.

4.1. ****There are severe criminal and civil penalties for knowingly submitting a false, fictitious or fraudulent statement of completed training. The U.S. Criminal Code (Title 18, Section 1001) provides that knowingly falsifying or concealing a material fact is a felony, which may result in fines up to $10,000, and/or 5 years imprisonment, or both. ****

4.2 **The CG-G-EAE-2 Form, *FAA Certification Performance of Job Task* and CG-G-EAE-3 Form, *Joint Military Services Airframe and Powerplant Program.***

4.3 These forms mirror the educational curriculum taught at an FAA-approved Part 147 Aviation Maintenance Technician School.

4.3.1 These forms are required to document the technician's practical aircraft maintenance experience and training while pursuing FAA A&P certification through the NMCAPP A&P Certification program. The forms are part of the QTP and are obtained through USMAP upon program enrollment.

4.4 Technicians may request replacement or updated copies from the USMAP website: www.usmap.cnet.navy.mil.

4.5. **The CG-G-EAE-4 Form, *Certificate of Eligibility.***

4.5.1. The *Certificate of Eligibility* serves the same FAA A&P qualification function as a Certificate of Completion or Graduation from an FAA-approved Part 147 Aircraft Maintenance Technician School.

4.5.2. USMAP issues the CG-G-EAE-4, *Certificate of Eligibility* to technicians who successfully complete the NMCAPP Certification Program and meet FAA certification eligibility per Title 14, CFR Part 65.77.

4.5.3. The Program Director at USMAP is the Navy/Marine Corp's FAA-approved Signature Authority for the CG-G-EAE-4 Form, *Certificate of Eligibility*.

5. FAA A&P Exams.

5.1. The FAA requires applicants for A&P certification to successfully complete 3 computer-based knowledge exams (General, Airframe, and Powerplant) covering the basic principles of aircraft construction, as well as installation and maintenance of aircraft and aircraft systems.

5.1.1. The first step in the FAA testing process is to formally apply for certification. Authorization to test is gained by completion of an FAA Form 8610-2, *Airman Certificate and/or Rating Application*. For more information, refer to Section V., par. 1.10.

5.1.2. The FAA requires a minimum passing score of 70% for each computer-based knowledge exams.

5.1.3. The JSAMTCC has a Memorandum of Agreement between FAA and DANTES, authorizing DANTES to administer the 3 FAA A&P computer-based knowledge exams. These exams may be taken at any base education office approved as an FAA-authorized testing center. This benefit is provided to eligible active duty, guard and reserve members at no cost to the member. Contact your base education office to determine if they are an approved FAA-authorized testing center;

5.1.4. If the base education office is not approved FAA-authorized testing center, technicians should access the Airmen Knowledge Testing Center List http://www.faa.gov/mechanics/testing/) to locate the nearest authorized FAA testing center. The technician is responsible for the FAA exam fees at these locations.

5.2. The FAA also requires applicants for A&P certification to successfully complete an oral and practical exam or Practical Test Standards (PTS) in the form of a Knowledge and Skill test. These exams cover the applicant's basic skill in performing practical projects on the subjects covered by the FAA A&P computer-based knowledge exams.

5.2.1. Applicants must pass all FAA A&P computer-based knowledge exams prior to being administered the oral and practical exams or PTS.

5.2.2. The oral and practical exam or PTS is conducted by an authorized FAA Designated Mechanic Examiner (DME). The applicant is responsible for the costs of the oral and practical exam or PTS.

5.2.3. A link to the FAA DME listing is available on the FAA website (http://av-info.faa.gov/designeesearch.asp) and provides contact information for all authorized DMEs located within each state and local area..

5.3. All FAA A&P exams must be completed within 24 months from the date the first computer-based exam was administered. Applicants who do not complete the certification process within this timeframe must re-accomplish/retake the expired computer-based knowledge exam(s).

5.4. Extensions can be granted to military members who have served outside the United States in support of U.S. Armed Forces operations during the 24-month period. In accordance with Special Federal Aviation Regulation (SFAR) 100-1, U.S. military personnel, who continue to preserve, protect and defend the American public, between 11 September 2001 through 20 June 2010, are permitted an extension of the expiration date of the knowledge exams, up to 6 calendar months after returning to the United States.

5.5. Technicians participating in the Montgomery GI Bill may receive reimbursement for the costs of the 3 computer-based knowledge exams and oral and practical exam or PTS. Visit http://www.gibill.va.gov for more information.

6. Retesting After Failure

6.1. Applicants failing a computer-based knowledge exam may retest 30 days after the date of failure, without the endorsement from a certified mechanic holding the certification being sought.

6.1.1. Applicants may retest before the 30 days have expired, providing the applicant presents a signed statement from a certified mechanic holding the certification being sought, certifying that he/she has been given additional instruction in each of the subject areas failed and considers the applicant ready for retesting.

6.1.2. The original Airman Test Report and signed statement, if applicable, will be presented to the base education office Testing Administrator at the time of retest.

6.2. Applicants failing any section of the oral or practical exam or PTS may retest that section 30 days after the date of failure, without the endorsement from a certified mechanic holding the certification being sought.

6.2.1. Applicants may retest before the 30 days have expired, providing the applicant presents a signed statement from a certified mechanic holding the certification being sought, certifying that at least five hours of additional instruction has been given in each of the subject areas failed and considers the applicant ready for retesting.

6.2.2. The original FAA Form 8610-2, Airman Test Report and signed statement, if applicable, will be presented to the FAA DME at the time of retest.

6.3. The applicant is responsible for any incidental exam fees incurred.

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III. ADMINISTRATIVE INSTRUCTIONS

1. Technician: Program Enrollee

1.1. The NMCAPP is a voluntary program for members of the Navy and Marine Corps. Trainees are expected to complete the program on their own time. However, commands may rotate personnel through maintenance divisions if desired. Members may disaffiliate from the program if they no longer desire A&P certification.

1.1.1. Once enrolled in the program through USMAP, technicians may begin the training and experience process. Use this QTP as a guide to complete required training and document completion on forms CG-G-EAE-2 and CG-G-EAE-3.

1.1.2. To be issued the CG-G-EAE-4, *Certificate of Eligibility* from USMAP, the technician must complete all program training and experience requirements and have a minimum of 4 years time in service.

1.2. It is the technician's responsibility to successfully complete all program requirements. Self-motivation is a must.

2. Trainer/Certifier: Task Certifier

2.1. The trainer/certifier is an individual qualified and authorized to certify practical experience and sign off completed tasks.

2.1.1. The trainer/certifier must be at least the rank of E-6/WG-10; or possess the FAA A&P certification.

2.1.2. The trainer/certifier must be thoroughly familiar with the NMCAPP Certification Program, program policies and procedures and the forms used to document practical experience and training (CG-G-EAE-2 Form and CG-G-EAE-3 Form).

2.2. The trainer/certifier annotates their information in the trainer/certifier blocks on the CG-G-EAE-3 Form, *Joint Military Services Airframe and Powerplant Program.*

2.2.1. Trainers/certifiers possessing the FAA A&P certification must annotate their FAA A&P certificate number in the appropriate block of the CG-G-EAE-3 Form, *Joint Military Services Airframe and Powerplant Program*.

2.3. The trainer/certifier is not required to provide the actual hands-on training. Individuals qualified on the specific task may provide the actual training. However, only the trainer/certifier is authorized to certify the technician possesses the required practical experience and successfully completed required tasks at the specified proficiency training level.

2.4. Upon completion or verification of training, the trainer/certifier places their initials and completion date in the appropriate blocks of the corresponding subject item(s) of the CG-G-EAE-3 Form, *Joint Military Services Airframe and Powerplant Program.* The trainer/certifier's initials certify that training was accomplished to the appropriate proficiency level and the trainee possesses the required practical experience.

2.5. The trainer/certifier may certify and sign off applicable tasks that are directly related to current and previous job qualifications, using the original completion date.

2.6. Tasks that reflect training solely by completing a specific Specialized Course may be signed off once the technician successfully completes the course.

3. Unit-Level Approving Official: Unit Maintenance Officer

3.1. The Unit Aircraft Maintenance Officer is the technician's approving official at the unit level.

3.1.1. The unit-level approving official must be at least the rank of O-3; or may be below the rank of O-3 if they possess the FAA A&P certification.

3.2. The unit-level approving official verifies the technician completed all program training and experience requirements within the QTP by conducting a final unit-level review of completed documents.

3.3. The unit-level approving official is not certifying the technician on any task qualification or proficiency level. The technician's trainer/certifier is responsible for certifying practical experience, completed training and ensuring the technician meets the appropriate task qualification/proficiency level.

3.4. The unit-level approving official annotates their information on the bottom portion of CG-G-EAE-2 Form, *FAA Certification Performance of Job Tasks* and CG-G-EAE-3 Form, *Joint Military Services Airframe and Powerplant Program.*

4. Training Records

4.1. Technicians should retain previous training certificates and other pertinent job qualification and training records, both military and civilian.

IV. WEBSITES AND ADDITIONAL RESOURCES

1. The following list of additional websites provides supplemental information to assist the technician's professional development and increase civilian aviation knowledge.

JSAMTCC Website: https://augateway.maxwell.af.mil/ccaf/index.asp

Navy/Marine Corps. Websites:

Navy Knowledge Online: https://wwwa.nko.navy.mil/portal/splash/index.jsp (A&P Cert page)

Navy/Marine Corp A&P Program: https://usmap.cnet.navy.mil/

Air Force Websites:

Air Force Institute for Advanced Distributive Learning (FIADL): http://www.maxwell.af.mil/au/afiadl/

Federal Aviation Administration Website: http://www.faa.gov/

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FAA Regulatory and Guidance Library:
http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgWebcomponents.nsf/HomeFrame?OpenFrameSet

FAA Mechanics Information: http://www.faa.gov/mechanics/

Additional Resources:

Jeppesen A&P Study Guides: http://www.jeppesen.com/wlcs/index.jsp

ASA A&P Study Guides: http://www.asa2fly.com/

2. It is recommended the following additional FAA-approved publications be used:
   - Federal Aviation Regulations Handbook for Aviation Maintenance Technicians (FAR-AMT)
   - AC-43.13 1B *Acceptable Methods, Techniques, And Practices- Aircraft Inspection And Repair*
   - AC-43.13 2B, *Aircraft Inspection and Repair/Aircraft Alterations*
   - A&P exam study guides – Not required, but useful to prepare for the FAA exams

3. Refer to the JSAMTCC website (https://augateway.maxwell.af.mil/ccaf/index.asp) for further information on these important and useful publications.

V. NMCAPP CERTIFICATION PROGRAM QTP INSTRUCTIONS

It is estimated technicians will require at least 180 days of training and experience with maintenance functions outside their NEC/MOS to fulfill program OJT requirements. The 3 web-based Specialized Courses may be completed at any time after program enrollment. Consult CNATT for further guidance in procedures for program completion.

1. Program Process

1.1 To enroll in the Navy / Marine Corps Airframe & Power Plant Program (NMCAPP) go to the USMAP website (https://usmap.cnet.navy.mil), download and fill out the NMCAPP application. Fax the application to the number provided on the application.

1.2 Download a copy of the QTP from the USMAP website, https://usmap.cnet.navy.mil. Download the CG-G-EAE-2 and CG-G-EAE-3 forms. Completely fill out the Military Job Classification and Military Job Classification Description Title sections on the CG-G-EAE-2 form.

1.3 Obtain a copy of the listed Federal Regulations from the National Archives and Records Administration website, http://www.gpoaccess.gov/nara/index.html/

1.3.1 Obtain a copy of the listed FAA publications from the FAA website, www.faa.gov:
   - Federal Aviation Regulations Handbook for Aviation Maintenance Technicians (FAR-AMT)
   - AC-43.13 1B *Acceptable Methods, Techniques, And Practices- Aircraft Inspection And Repair*
   - AC-43.13 2B, *Aircraft Inspection and Repair/Aircraft Alterations*
   - A&P exam study guides – Not required, but useful to prepare for the FAA exams

1.3 Begin performing all tasks outlined on the CG-G-EAE-3 form. Individuals desiring only one certification shall complete the General Section and the Section corresponding to the desired certification. Trainees desiring A&P certification shall complete the QTP in its entirety. You must complete the listed reading assignments prior to seeking the respective sign off. The certifier will verify that you have

completed the reading assignment and provide training for the specific OJT requirements. The certifier will then sign off their initials and completion date blocks. Once all tasks have been completed have the CG-G-EAE-2 and –3 Forms certified by your Maintenance Officer.

1.3.1 The NMCAPP Certification Program consists of 2 key training and experience elements to assist technicians in meeting FAA certification eligibility requirements and prepare them for the FAA exams. The training includes:

- On-The-Job Training (OJT)
- 3 web-based Specialized Courses (SC)

1.4. **Specialized Courses (SC).** A key component of FAA certification is knowledge and understanding of the FARs and the ability to use civilian aviation technical manuals, publications and procedures. The SCs were developed to fulfill the formal education requirement of the program. They are designed to bridge the gap between military and civilian aircraft maintenance training and education. They also help prepare for the FAA A&P certification exams. Portions of the QTP are fulfilled upon successful course completion;

1.4.1. Upon receipt of this program QTP, complete the three web-based A&P SCs through the Air University Online, a derivative site of the ADLS learning management system;

1.4.2. The Air University Online SCs are: Airframe and Powerplant Mechanic: General (02AF1W); Airframe and Powerplant Mechanic: Airframe (02AF2W); and Airframe and Powerplant Mechanic: Powerplant (02AF3W);

1.4.3. The SCs must be completed sequentially, beginning with General (02AF1W). Each SC must be completed within 13 months, with a minimum passing score of 70% in order to proceed to subsequent SCs (Airframe or Powerplant);

1.4.4. Technicians who possess a single FAA mechanic certificate rating (Airframe or Powerplant), and are participating in this program to pursue an additional rating, are not required to complete General (02AF1W) and the SC applicable to the rating previously awarded. Example: if you possess the FAA Powerplant certification, you are not required to complete General (02AF1W) and Powerplant (02AF3W). The only SC required to complete is Airframe (02AF2W);

1.4.5. Each SC consists of a series of Units and Practice Exams. The Units contain course material and a Unit Review Exercise (URE). The course material is downloadable and can be viewed, printed, or saved to a personal computer. We recommend you print the course material to make notes and answer the Self-Test Questions. We also recommend you save a copy for future reference;

1.4.6. The Air University Online SCs do not require the traditional proctored end-of-course exam administered by local unit supervisors. The UREs are progress exams and test your knowledge of the course material;

1.4.7. A course completion certificate may be printed upon completion of all URE's with a passing score of 70%. The course completion certificate is located at "My Transcript";

1.4.8. Each SC has a set of Practice Exams to help you prepare for the actual FAA A&P certification exams. Access to the Practice Exams is gained upon successful completion of all of the URE's for that course. Upon course completion, go to the "Course List" and search for the appropriate Practice Exam and select "Request Access." This link will send the site administrators a message to grant you access to the Practice Exams. Upon approval, you will receive an E-mail stating you are approved to access;

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1.4.9. **Course Enrollment:** To access the SCs, you must first obtain a username and password for Air University Online at https://au.csd.disa.mil/;

1.4.9.1. After obtaining a username and password, you are able to begin the SCs. To access a course, perform the following steps:

1.4.9.1.1. Enter username and password;

1.4.9.1.2. Click the menu item labeled "Course List". (2nd button left side or 1st button right side);

1.4.9.1.3. Click the "plus sign" next to "Specialized Courses" from the course list provided;

1.4.9.1.4. Click the desired SC to open your enrollment in the course. The SCs are listed alphabetically;

1.4.3. Technicians who successfully completed a Type-65 program, or similar program at a civilian institution, are not required to complete the 3 SCs. For example, completion of Embry-Riddle Aeronautical University's 6 Type-65 courses will fulfill the SC requirement.

1.4.4. If Type-65, or similar, courses have been completed the technician must provide a copy of the transcript from the institution, reflecting course completion.

1.4.5. NMCAPP will inform the technician if the applicable SC(s) are waived.

1.5. Upon completion of the above steps, the technician mails a copy of completed QTP (CG-G-EAE-2 Form, *FAA Certification Performance of Job Tasks* and CG-G-EAE-3 Form, *Joint Military Services Airframe and Powerplant Program*) and Specialized Course completion certificates to:

Commanding Officer
Center for Naval Aviation Technical training
230 Chevalier Field, Suite C
Pensacola, FL 32508
Attn: NMCAPP Committee

1.6. The NMCAPP Committee will verify that all requirements have been met.

1.7. If all requirements are met, USMAP will issue the technician a *Certificate of Eligibility.*

1.8. Once the technician receives the documents from USMAP, schedule an appointment with an ASI at the local FSDO. For information concerning the FSDO within your area, visit the FAA's website at http://www.faa.gov/about/office_org/field_offices/fsdo/.

1.8.1. The technician will provide the C*ertificate of Eligibility,* completed CG-G-EAE-2 Form, and picture military ID to the ASI.

1.8.2. The technician is not required to provide the CG-G-EAE-3 Form, *Joint Military Services Airframe and Powerplant Program.* However, the ASI has the authority to review the CG-G-EAE-3 Form and it is recommended to have the form available.

1.8.3. The ASI will review the documents and endorse the FAA Form 8610-2, authorizing the technician to be administered the FAA A&P exams.

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1.9. The 3 FAA A&P computer-based knowledge exams are administered separately. When the technician is ready to take the subsequent exams (Airframe or Powerplant), contact the base education office to schedule a test date.

1.9.1. If the base education office is an FAA-authorized mechanic knowledge test center, a test date may be scheduled and the computer-based knowledge exams will be administered at no cost to the technician. You may contact the NMCAPP Program Manager at NMCAPP@navy.mil for alternate military service testing locations in your area.

1.9.2. When reporting for testing, present the signed FAA Form 8610-2 and pictured military ID to the test administrator.

1.9.3. If the base education office **is not** an FAA-authorized mechanic knowledge test center, access the Airmen Knowledge Testing Center List (http://afs600.faa.gov/srchFolder.asp?Category=computertesting) to locate the nearest authorized FAA testing center.

1.9.4. The technician is responsible for the FAA computer-based knowledge exam, oral and practical exam fees.

1.9.5. Technicians participating in the Montgomery GI Bill may receive reimbursement for the cost of the exams. Visit http://www.gibill.va.gov/ for more information.

1.9.6. Sailors and Marines of the Active and Reserve components, less Individual Ready Reservist may be eligible for Navy funding of the FAA Airframe & Powerplant examinations via a pre-paid voucher from the Navy Credentials Program Office. If you successfully complete the NMCAPP Certification Program and receive a Certificate of Eligibility from the United States Military Apprenticeship Program you are eligible to participate in the credentialing program. For more information visit https://www.cool.navy.mil/ and do a “Search for Credentials” and review your rating’s summary page.

1.10. After successful completion of the FAA computer-based knowledge exams, contact a Designated Mechanic Examiner (DME) to schedule the oral and practical exams or PTS. A link to the FAA DME listing is available on the FAA website (http://av-info.faa.gov/designeesearch.asp) and provides contact information for all authorized DMEs located within each state and local area.

1.10.1. The technician must present the signed FAA Form 8610-2 and all FAA computer-based exam score sheets, reflecting a passing grade for each section, to the DME.

1.10.2. The technician will be expected to answer a variety of questions and to perform a variety of tasks to ensure they have the required knowledge and skills to competently complete selected tasks. It is up to the discretion of the DME to select the tasks.

1.10.3. Upon successful completion of the oral and practical exams or PTS, the DME will issue a temporary certificate. A permanent certificate will be issued to the technician within 120 days from the FAA Certification Branch in Oklahoma City, Oklahoma.

1.11. Once you receive your permanent certificate, contact your unit education officer for entry into your Service Record and Training Jacket.

2. Subject Tasks and Instructions

2.1. The following provides information concerning the required proficiency/knowledge levels, definitions of key terms, task requirements and practical test standards for each task. The information

provided within each task was derived from the Federal Aviation Administration Flight Standards Service and will assist technicians and trainers/certifiers complete the required OJT tasks.

2.2. Proficiency Level: The proficiency levels assigned to each task indicates the level of knowledge and skill the technician must demonstrate or attain to be considered proficient per the NMCAPP A&P Certification Program and FAA directives. The proficiency levels are:

2.2.1. **LEVEL 1** = Know basic facts and principles; be able to find information and follow directions and written instructions; locate methods, procedures, instructions, and reference material; interpretation of information is not required; no skill demonstration is required.

2.2.2. **LEVEL 2** = Know and understand principles, theories and concepts; be able to find and interpret information and perform basic operations using the appropriate data, tools and equipment; a high level of skill is not required.

2.2.3. **LEVEL 3** = Know, understand and apply facts, principles, theories and concepts; understand how they relate to the total operation and maintenance of aircraft; be able to make independent and accurate airworthiness judgments; perform all skill operations to a return-to-service standard using appropriate data, tools and equipment. Inspections are performed in accordance with acceptable or approved data; a fairly high skill level is required.

2.3. Definitions of key terms:

2.3.1. **Inspect** - to examine by sight and/or touch (With or without inspection enhancing tools/equipment)

2.3.2. **Check** - to verify proper operation

2.3.3. **Troubleshoot** - to analyze and identify malfunctions

2.3.4. **Service** - to perform functions that assure continued operation

2.3.5. **Repair** - to correct a defective condition. Repair of an airframe or powerplant system includes component replacement and adjustment, but not component repair

2.3.6. **Overhaul** – to disassemble, inspect, repair as necessary, and check

2.4. Task requirements: The task requirements, or Curriculum Subjects, specified in the CG-G-EAE-3 Form and described within the following instructions, are used to assist the trainer/certifier and the technician to complete the NMCAPP A&P Certification Program requirements. They also provide task coverage and documentary evidence of practical experience to ensure the technician meets qualification and experience requirements per FAA directives. The trainer/certifier ensures the trainee meets the proficiency level for each task.

2.5. Practical Test Standards: The Aviation Mechanic General, Airframe, and Powerplant Practical Test Standards (PTS) include the subject areas of knowledge and skill for the issuance of an aviation mechanic certificate and/or the addition of a rating. The subject areas are the topics in which aviation mechanic applicants must have knowledge and/or demonstrate skill. The trainer/certifier and the technician should use the PTS provided within the following instructions to ensure technicians meet qualification and experience requirements per FAA directives. They will also help technicians be prepared for the FAA A&P oral and practical exams or PTS. Examples of subjects and projects that may be covered in the exams are provided.

2.6. It is not practical or expected for technicians to complete every item listed within each task. However, the technician is responsible to be prepared to complete any task given by the DME during the oral and practical exams or PTS. The information provided identifies what the technician should **know, understand** and successfully **perform**.

2.7. Due to the advanced technologies involved with Navy/Marine Corps aircraft, some technicians may not have the appropriate resources available to them to complete some of the OJT requirements.

2.7.1. Base Aero Club's and local civilian airports (Fixed-Based Operation (FBO)) with aircraft maintenance facilities may need to be utilized to fulfill some OJT requirements.

3. GENERAL CURRICULUM SUBJECTS

A. Basic Electricity

Task A.1. (Level 1). Complete General Specialized Course (02AF1W).

Task A.2. (Level 1). Complete General Specialized Course (02AF1W).

Task A.3. (Level 3). Complete General Specialized Course (02AF1W) and OJT from Electrical-Environmental, Avionics, Base Aero Club or FBO.

Task A.4. (Level 3). Complete General Specialized Course (02AF1W) and OJT from Electrical-Environmental, Avionics, Base Aero Club or FBO.

Task A.5. (Level 3). Complete General Specialized Course (02AF1W) and OJT from Electrical-Environmental, Avionics, Base Aero Club or FBO.

Task A.6. (Level 3). Complete General Specialized Course (02AF1W) and OJT from Electrical-Environmental, Battery shop, Base Aero Club or FBO.

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. sources and/or effects of capacitance in a circuit.
   b. uses of capacitance in a circuit.
   c. sources and/or effects of inductance in a circuit.
   d. uses of inductance in a circuit.
   e. operation of basic AC and/or DC electrical circuits.
   f. Ohm's law.
   g. Kirchoff's law(s).
   h. procedures used in the measurement of voltage, current, and/or resistance.
   i. determining power used in simple circuits.
   j. troubleshooting, and/or repair or alteration using electrical circuit diagrams.
   k. common types of defects that may occur in an installed battery system.
   l. aircraft battery theory/operation.
   m. servicing aircraft batteries.

2. Must demonstrate the ability to perform the following:
   a. use measuring equipment to measure in a circuit or circuit component(s): voltage, current, resistance and continuity. (Level 3)

b. determine the appropriateness of measurement(s) according to instructions/specifications. (Level 2)

3. Must demonstrate the ability to perform the following:
   a. read and interpret one or more electrical circuit diagrams. (Level 2)
   b. troubleshoot an electrical circuit. (Level 3)
   c. calculate voltage, current, and resistance using Ohm's Law. (Level 2)
   d. inspect a battery and installed battery system. (Level 3)
   e. accomplish a battery state-of-charge (hydrometer) and/or electrical leak (cell imbalance) test. (Level 3)
   f. accomplish removal and/or installation of a battery in an aircraft. (Level 3)
   g. set-up and connect a charger to one or more batteries for constant current and/or constant voltage charging. (Level 3)

B. Aircraft Drawings

Task B.7. (Level 2). Complete General Specialized Course (02AF1W).

Task B.8. (Level 3). Complete General Specialized Course (02AF1W) and OJT from Structures, Base Aero Club or FBO.

Task B.9. (Level 3). Complete General Specialized Course (02AF1W) and OJT from Structures, Base Aero Club or FBO.

Task B.10. (Level 3). Complete General Specialized Course (02AF1W) and OJT from Structures, Base Aero Club or FBO. Know, understand and apply graphs and charts used in aviation maintenance.

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. characteristics and/or uses of any of the various types of drawings/blueprints and/or system schematics.
   b. the meaning of any of the lines and symbols commonly used in aircraft sketches/drawings/blueprints.
   c. using charts or graphs.
   d. troubleshooting an aircraft system or component(s) using drawings/blueprints and/or system schematics.
   e. inspection of an aircraft system or component(s) using drawings/blueprints and/or system schematics.
   f. repair or alteration of an aircraft system or component(s) using drawings/blueprints and/or schematics.
   g. use of drawings/blueprints in component fabrication.
   h. terms used in conjunction with aircraft drawings/blueprints and/or system schematics.

2. Must demonstrate the ability to perform the following:
   a. maintenance and/or inspection using drawings/blueprints and/or system schematics. (Level 3)
   b. preventive maintenance using drawings/blueprints and/or schematics. (Level 3)
   c. troubleshooting using drawings/blueprints and/or schematics. (Level 3)
   d. use a control cable tension chart. (Level 3)
   e. use a servicing, limitation, or calculation chart or graph. (Level 3)
   f. draw a sketch of an alteration or repair. (Level 2)

g. draw a diagram of an electrical circuit or other system, or portion thereof, and explain the drawing. (Level 2)

C. Weight and Balance

Task C.11. (Level 1). Complete General Specialized Course (02AF1W).

Task C.12. (Level 3). Complete General Specialized Course (02AF1W) and OJT from Crew Chiefs, A/R, Base Aero Club or FBO.

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. the purpose(s) of weighing or reweighing.
   b. general preparations for weighing, with emphasis on aircraft preparation and/or weighing area considerations.
   c. the general location of airplane center of gravity (CG) in relation to the center of lift for most fixed main airfoils.
   d. definitions of any of the following: datum, arm, moment (positive or negative), or moment index.
   e. the meaning and/or application of any terms/nomenclature associated with weight and balance other than those mentioned in element "d" above, including but not limited to any of the following: tare, ballast, and residual fuel/oil.
   f. procedures for finding any of the following: datum, arm, moment (positive or negative), or moment index.
   g. purpose and/or application of mean aerodynamic chord (MAC).
   h. adverse loading considerations.

2. Must demonstrate the ability to calculate weight and balance CG and complete aircraft weight and balance documentation. (Level 3)

3. Must demonstrate the ability to perform the following:
   a. weighing equipment preparation and setup according to manufacturer's instructions. (Level 3)
   b. locate procedures for leveling and the leveling points for an aircraft. (Level 2)
   c. locate weigh points, procedures for determining CG, and determine the weigh point arms for an aircraft. (Level 2)
   d. identify tare items for a specific aircraft and weighing procedure. (Level 2)
   e. find the datum for at least two different aircraft. (Level 2)
   f. determine the weight and location of required ballast after an (actual or hypothetical) equipment change. (Level 2)

D. Fluid Lines and Fittings

Task D.13. (Level 3). Complete General Specialized Course (02AF1W) and OJT from Structures (rigid lines) and/or Hydraulic (flexible lines), Base Aero Club or FBO.

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. tubing materials.
   b. tubing materials application.

c. tubing sizes.
d. flexible hose material.
e. flexible hose materials application.
f. flexible hose sizes.
g. flexible hose identification.
h. AN, MS, and/or AC plumbing fittings.
i. rigid line fabrication techniques/practices.
j. rigid line installation techniques/practices.
k. flexible hose fabrication techniques/practices.
l. flexible hose installation techniques/practices.

2. Must demonstrate the ability to perform the following:
   a. rigid line fabrication to include tube fittings, bending, and tube flaring. (Level 3)
   b. flexible line fabrication using replaceable fittings on at least one end. (Level 3)

3. Must demonstrate the ability to perform the following:
   a. inspect for and identify defects in rigid and/or flexible lines. (Level 3)
   b. install and remove a rigid and/or flexible line. (Level 3)
   c. identify correct and/or incorrect rigid line installations. (Level 2)
   d. identify correct and/or incorrect flexible line installations. (Level 2)
   e. form a bead on tubing. (Level 3)
   f. select components and assemble a flareless fitting tube connection. (Level 3)
   g. repair a damaged rigid line. (Level 3)
   h. identify various sizes and types of aircraft fittings. (Level 2)
   i. secure a rigid line with clamps. (Level 3)
   j. identify fluid and/or air lines that may be installed on an aircraft. (Level 2)

E. Material and Processes

Task E.14. (Level 1). Complete General Specialized Course (02AF1W).

Task E.15. (Level 2). Complete General Specialized Course (02AF1W).

Task E.16. (Level 1). Complete General Specialized Course (02AF1W).

Task E.17. (Level 3). Complete General Specialized Course (02AF1W).

Task E.18. (Level 3). Complete General Specialized Course (02AF1W) and OJT from Metals Technology, Crew Chiefs, NDI, Base Aero Club or FBO.

Task E.19. (Level 3). Complete General Specialized Course (02AF1W) and OJT from Structures, Metals Technology, Base Aero Club or FBO. *(Technician must be competent in using micrometers, calipers and other precision measurement devices)*

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. any of the metals commonly used in aircraft and their general application.
   b. composites and other nonmetallic components and their general application.
   c. heat-treated parts precautions, using DD or "icebox" rivets.
   d. typical wood materials and fabric coverings.
   e. visible characteristics of acceptable and/or unacceptable welds.

f. precision measurement and precision measurement tools.
g. using inspection techniques/methods, including any of the following: visual, metallic ring test, dye/fluorescent penetrant, magnetic particle, and/or eddy current.
h. identification, selection, installation, and/or use of aircraft hardware.
i. safetying of components and/or hardware.
j. finding information about material types for specific application(s).

2. Must demonstrate the ability to torque to specification(s), and safety-wire aircraft component(s)/hardware. (Level 3)

3. Must demonstrate the ability to perform the following:
   a. select and install standard aircraft hardware, to include one or more self-locking nuts. (Level 3)
   b. select, install, and secure a clevis bolt and associated hardware. (Level 3)
   c. select and install one or more appropriate screws/bolts, nuts, cotter pins, and washers. (Level 3)
   d. inspect hardware for defects, proper installation. (Level 3)
   e. safety a turnbuckle. (Level 3)
   f. perform a dye or fluorescent penetrant inspection. (Level 3)
   g. find a (not visible) defect using eddy current or ultrasonic inspection equipment. (Level 2)
   h. perform, read, and record a precision measurement using a dial indicator, or micrometer, or vernier caliper. (Level 2)
   i. visually inspect welds and determine acceptability. (Level 3)
   j. identify rivets by physical characteristics. (Level 2)

F. Ground Operation and Servicing

Task F.20. (Level 2). Complete General Specialized Course (02AF1W), and OJT on operating aircraft engines from Crew Chiefs, Base Aero Club or FBO. *(Technician is NOT required to actually run an engine, but must complete all training up to the point of engine start)*

Task F.21. (Level 2). Complete General Specialized Course (02AF1W).

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. general procedures for towing aircraft.
   b. Air Traffic Control (ATC) considerations/requirements for towing aircraft on or across active runways.
   c. general procedures for starting, ground operating, and/or taxiing a reciprocating engine powered aircraft.
   d. general procedures for starting, ground operating, and/or taxiing a turbine engine powered aircraft.
   e. the hazards associated with starting, ground operating, and/or taxiing aircraft and procedures for preventing, minimizing or otherwise managing any of them.
   f. procedures for refueling and/or defueling aircraft.
   g. oxygen system safety practices/precautions.
   h. characteristics of aviation gasoline and/or turbine fuels, including basic types and means of identification.
   i. fuel contamination hazards.
   j. fuel additives commonly used in the field.
   k. use of automobile fuel in aircraft engines.
   l. types/classes of fires, using proper fire extinguishers/methods.

2. Must demonstrate the ability to perform the following:
   a. service an aircraft with compressed air or nitrogen. (Level 3)
   b. set-up an aircraft and cockpit controls for engine start. (Level 2)
   c. start and ground operate an aircraft engine* (taxiing optional), and use or respond to standard hand or light wand signals. (Level 3)
   d. determine the engine oil for a specific engine. (Level 2)
   e. secure an aircraft for outside storage. (Level 3)
   f. fuel and/or defuel an aircraft (may be simulated). (Level 3)
   g. sample fuel and inspect for proper fuel and contaminates. (Level 3)
   h. set-up and connect an aircraft to an external power source. (Level 2)
   i. connect a towbar to an aircraft and prepare for towing. (Level 3)
   j. direct the movement (may be simulated) of aircraft. (Level 3)
   k. locate and clear a liquid lock (actual or simulated) in an aircraft engine. (Level 3)
   l. identify the types/classes of fires that local shop and/or flightline fire extinguishers may be used on. (Level 2)

G. Cleaning and Corrosion Control

Task G.22. (Level 3). Complete General Specialized Course (02AF1W) and OJT from Structures, Crew Chiefs, Base Aero Club or FBO. *(Participate in aircraft wash)*

Task G.23. (Level 3). Complete General Specialized Course (02AF1W) and OJT from Structures, Crew Chiefs, Base Aero Club or FBO. *(Participate in an aircraft wash and treating corrosion)*

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. aircraft preparation for washing, general aircraft cleaning (washing) procedures.
   b. postcleaning (washing) procedures.
   c. corrosion theory.
   d. types/effects of corrosion.
   e. conditions that cause corrosion.
   f. corrosion prone areas in aircraft.
   g. corrosion preventive maintenance procedures.
   h. inspection for and identification of corrosion in any of its various forms.
   i. corrosion removal and treatment procedures.
   j. use of Material Safety Data Sheets (MSDS).

2. Must demonstrate the ability to inspect for and identify two or more of the various forms of corrosion that affect aircraft. (Level 3)

3. Must demonstrate the ability to perform the following:
   a. identify and select materials used to clean interior and/or exterior surfaces according to aircraft manufacturer's instructions. (Level 2)
   b. corrosion removal from any of the metals commonly used in aircraft. (Level 3)
   c. preventive corrosion treatment on any of the metals commonly used in aircraft. (Level 3)
   d. identify and select appropriate corrosion preventive methods and materials for a specific aircraft application. (Level 2)

H. Mathematics

Task H.24. (Level 3). Complete General Specialized Course (02AF1W) or complete a technical/aviation math or college algebra course.

Task H.25. (Level 3). Complete General Specialized Course (02AF1W) or complete a technical/aviation math or college algebra course.

Task H.26. (Level3). Complete General Specialized Course (02AF1W) or complete a technical/aviation math or college algebra course.

Task H.27. (Level 3). Complete General Specialized Course (02AF1W) or complete a technical/aviation math or college algebra course.

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. areas of various geometrical shapes.
   b. volumes of various geometrical shapes.
   c. definitions/descriptions of geometrical terms, including but not limited to any of the following: polygon, pi, diameter, radius, and hypotenuse.
   d. ratio problems, including one or more examples of where or how they may be used in relation to aircraft maintenance or system(s) operation.
   e. proportion problems, including one or more examples of where or how they may be used in relation to aircraft maintenance or system(s) operation.
   f. percentage problems, including one or more examples of where or how they may be used in relation to aircraft maintenance or system(s) operation.
   g. algebraic operations, including one or more examples of where or how they may be used in relation to aircraft maintenance.
   h. conditions or areas where metric conversion may be necessary.

2. Must demonstrate the ability to perform the following, using appropriate formulas:
   a. calculate the area of a polygon and/or circle. (Level 2)
   b. calculate the volume of a sphere, cube, or cylinder. (Level 2)
   c. algebraic operations involving addition, subtraction, multiplication, and/or division of positive and negative numbers. (Level 2)
   d. locate mathematical formulas used to assist in the maintenance, preventive maintenance, or alteration of aircraft. (Level 1)

I. Maintenance Forms and Records

Task I.28. (Level 3). Complete General Specialized Course (02AF1W), and OJT from Crew Chiefs, Base Aero Club or FBO.

Task I.29. (Level 3). Complete General Specialized Course (02AF1W), and OJT from Crew Chiefs, Base Aero Club or FBO. (*Must know how to properly document a FAA Form 337)*

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. writing descriptions of work performed and approval for return to service after minor repairs or minor alterations.

b. the content, form, and disposition of aircraft maintenance records reflecting approval for return to service after a 100-hour inspection.
c. the content, form, and disposition of aircraft maintenance records reflecting disapproval for return to service after a 100-hour inspection.
d. the recording content, form, and disposition requirements for certificated aviation mechanics (without an Inspection Authorization) who perform major repairs and/or major alterations.
e. the inoperative instruments or equipment provisions of 14 CFR part 91.
f. the definition/explanation of any of the terms used in relation to aircraft maintenance, such as overhaul(ed), rebuilt, time in service, maintenance, preventive maintenance, inspection, major alteration, major repair, minor alteration, and minor repair.

2. Must demonstrate the ability to write appropriate entries on FAA Form 337, Major Repair and Major Alteration, indicating performance of a major repair, and make appropriate corresponding aircraft maintenance record entry. (Level 3)

3. Must demonstrate the ability to write entries for the following:
   a. performance of minor repair or minor alteration. (Level 3)
   b. performance of preventive maintenance. (Level 3)
   c. compliance with an airworthiness directive. (Level 3)
   d. performance of a 100-hour inspection with approval for return to service, including a list of some allowable inoperative instruments or equipment in accordance with the provision of 14 CFR part 91. (Level 3)
   e. performance of a 100-hour inspection with disapproval for return to service because of needed maintenance, or noncompliance with applicable specifications or airworthiness directive(s). (Level 3)
   f. FAA Form 337, Major Repair and Major Alteration, for additional equipment installation or an alteration in accordance with a supplemental type certificate (STC) and make appropriate maintenance record entry. (Level 3)
   g. FAA Form 8010-4, Malfunction or Defect Report. (Level 3)

J. Basic Physics

Task J.30. (Level 2). Complete General Specialized Course (02AF1W).

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. any of the simple machines, how they function, and/or how mechanical advantage is applied in one or more specific examples.
   b. sound resonance, how it can be a hazard to aircraft, and how sound may be used to aid in inspecting aircraft.
   c. the relationship between fluid density and specific gravity.
   d. the characteristic of specific gravity of fluids and how it may be applied to aircraft maintenance.
   e. the general effects of pressure and temperature on gases and liquids and how the qualities of compressibility and/or incompressibility of gases and liquids are generally applied to aircraft systems.
   f. density altitude and the effects of temperature, and/or pressure, and/or humidity on aircraft and/or engine performance.
   g. heat, how it is manifested in matter, and how heat transfer is accomplished through conduction, and/or convection, and/or radiation.
   h. coefficient of linear (thermal) expansion as related to aircraft materials.
   i. aircraft structures and theory of flight/physics of lift.

j. the operation of aerodynamic factors in the flight of airplanes and/or helicopters.
k. the relationship between force, area, and pressure.
l. the five forces or stresses affecting aircraft structures.
m. the two forms of energy and how they apply to aircraft and/or aircraft systems.

2. Must demonstrate the ability to perform the following:
   a. identify any parts or systems of an aircraft and/or engine where Bernoulli's principle and/or Newtonian law is applied. (Level 2)
   b. identify parts or systems of an aircraft where Boyle's, Charles', and/or Pascal's Laws apply. (Level 2)
   c. calculate force, area, or pressure in a specific application. (Level 3)
   d. identify one or more methods of heat transfer in aircraft systems and where and how heat damage may occur when performing aircraft maintenance. (Level 2)
   e. identify any of the following and describe how they function aerodynamically: stall strips, wing fences, vortex generators, flaps, slats, spoilers, ailerons, stabilators, elevators, rudders, or trim tabs. (Level 2)
   f. determine which of the five forces/stresses are acting on an aircraft or aircraft parts at specific points under given conditions. (Level 2)
   g. design a simple machine (on paper) that uses one or more methods of mechanical advantage. (Level 2)

K. Maintenance Publications

Task K.31. (Level 3). Complete General Specialized Course (02AF1W). *(Must know ATA 100 specifications)*

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. how a mechanic makes use of Type Certificate Data Sheets (TCDSs) and/or Aircraft Specifications in conducting maintenance or inspections.
   b. aircraft maintenance manuals and associated publications including any of the following types of publications and how they are used: service bulletin, maintenance manual, overhaul manual, structural repair manual, or instructions for continued airworthiness.
   c. the requirements of 14 CFR parts 43.13, 43.15, or 43.16 in the performance of maintenance.
   d. Airworthiness Directives (AD), including purpose and/or AD categories and/or ADs issued to other than aircraft.
   e. in what form individuals may receive FAA published AD summaries and/or how they may be obtained.
   f. the AD identification numbering system.
   g. FAA Advisory Circulars (ACs) including any of the following: significance of the AC numbering system, one or more examples of ACs issued to provide information in designated subject areas, one or more examples of ACs issued to show a method acceptable to the FAA complying with the CFRs.
   h. the intent or function of the Aviation Maintenance Alerts.
   i. the Air Transport Association (ATA) Specification 100.

2. Must demonstrate the ability to perform the following:
   a. read, comprehend, and apply information contained in a manufacturer's maintenance manual or illustrated parts manual. (Level 3)
   b. locate and list all applicable ADs for at least one particular make, model, and serial number of an aircraft, engine, propeller, or appliance. (Level 2)

3. Must demonstrate the ability to read, comprehend, and apply the information contained in the following:
   a. service bulletin. (Level 3)
   b. overhaul manual. (Level 3)
   c. structural repair manual. (Level 3)
   d. instructions for continued airworthiness. (Level 3)
   e. at least one maintenance related section, or appendix, or portion(s) thereof, of 14 CFR. (Level 3)
   f. an AD. (Level 3)
   g. Aircraft Specifications or TCDSs to specific maintenance or inspection operations, or portions thereof. (Level 3)

L. Mechanic Privileges and Limitations

Task L.32. (Level 3). Complete General Specialized Course (02AF1W).

Practical Test Standards:

1. Must demonstrate knowledge of mechanic privileges and limitations and exercise thereof, including the following:
   a. required evidence of eligibility experience satisfactory to the Administrator.
   b. length of experience required for eligibility.
   c. practical experience required for eligibility.
   d. the privileges of a mechanic in relation to 100-hour and annual inspections.
   e. change of address reporting requirements.
   f. minimum age requirements.
   g. recent experience requirements to exercise privileges of a certificate.
   h. who is authorized to perform maintenance/inspection, preventive maintenance, rebuilding, or alteration and/or approve for return to service afterwards.
   i. causes for revocation or suspension.
   j. criteria for determining major and minor repair or alteration.

2. Using Title 14 CFR Part 65, must demonstrate the ability to understand mechanic privileges and limitations by finding and interpreting/explaining essential information containing the following:
   a. Offenses involving alcohol or drugs. (Level 2)
   b. Written tests: Cheating or other unauthorized conduct. (Level 2)
   c. Applications, certificates, logbooks, reports, and records: falsification, reproduction, or alteration. (Level 2)
   d. Refusal to submit to a drug or alcohol test. (Level 2)
   e. General privileges and limitations. (Level 2)
   f. Recent experience requirements. (Level 2)
   g. Airframe rating; additional privileges and/or Powerplant rating; additional privileges. (Level 2)
   h. Display of certificate. (Level 2)

4. AIRFRAME CURRICULUM SUBJECTS

AIRFRAME STRUCTURES

A. Aircraft Finishes

Task A.1. (Level 1). Complete Airframe Specialized Course (02AF2W).

Task A.2. (Level 2). Complete Airframe Specialized Course (02AF2W).

Task A.3. (Level 2). Complete Airframe Specialized Course (02AF2W).

Task A.4. (Level 2). Complete Airframe Specialized Course (02AF2W).

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. protection of airframe structures.
   b. primer materials.
   c. topcoat materials.
   d. surface preparation for a desired finishing material.
   e. effects of ambient conditions on finishing materials.
   f. effects of improper surface preparation on finishing materials.
   g. regulatory requirements for registration markings.
   h. inspection of aircraft finishes.
   i. safety practices/precautions when using finishing materials.
   j. fungicidal, butyrate, and/or nitrate dopes.
   k. finishing materials application techniques and practices.
   l. where necessary, balance considerations after refinishing.

2. Must demonstrate the ability to perform the following:
   a. select appropriate finishing materials for a specific application. (Level 2)
   b. determine preparation necessary for application of finishing materials to a particular surface. (Level 2)
   c. prepare a surface for application of finishing materials. (Level 3)
   d. apply primer and/or topcoat materials. (Level 3)
   e. inspect one or more finished surfaces. (Level 3)
   f. locate appropriate data to use for a specific finishing task. (Level 1)
   g. determine the allowable location and size of registration numbers for a fixed-wing and/or rotorcraft aircraft. (Level 2)

B. Sheet Metal and Non-Metallic Structures

Task B.5. (Level 2). Complete Airframe Specialized Course (02AF2W) and OJT from Structures, Base Aero Club or FBO. *(Performance may be on scrap metal and materials)*

Task B.6. (Level 2). Complete Airframe Specialized Course (02AF2W) and OJT from Structures, Base Aero Club or FBO.

Task B.7. (Level 2). Complete Airframe Specialized Course (02AF2W) and OJT from Crew Chiefs, Structures, Base Aero Club or FBO. *(Technician is required to work as a team member on an aircraft major phase inspection)*

Task B.8. (Level 3). Complete Airframe Specialized Course (02AF2W) and OJT from Crew Chiefs, Structures, Base Aero Club or FBO. *(Must perform a simple repair)*

Task B.9. (Level 3). Complete Airframe Specialized Course (02AF2W) and OJT from Structures, Base Aero Club or FBO. *(Must perform a simple repair)*

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Task B.10. (Level 3). Complete Airframe Specialized Course (02AF2W) and OJT from Structures, Base Aero Club or FBO. *(Must perform a simple repair)*

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. inspection/testing of sheet metal structures.
   b. types of sheet metal defects.
   c. selection of sheet metal.
   d. layout, and/or forming of sheet metal.
   e. selection of rivets.
   f. rivet layout.
   g. rivet installation.
   h. inspection/testing of composite structures.
   i. types of composite structure defects.
   j. composite structure fiber, core, and/or matrix materials.
   k. composite materials storage practices and shelf life.
   l. composite structure repair methods, techniques, and practices.
   m. window inspection/types of defects.
   n. window material storage and handling.
   o. window installation procedures.
   p. care and maintenance of windows.
   q. window temporary and/or permanent repairs.
   r. maintenance safety practices/precautions for sheet metal, and/or composite materials/structures, and/or windows.

2. Must demonstrate the ability to install and remove at least two each, of two or more types of rivets. (Level 3)

3. Must demonstrate the ability to perform the following:
   a. lay out and form sheet metal to given dimensions; include at least one bend. (Level 3)
   b. determine a rivet lay out pattern. (Level 2)
   c. visually inspect an unpainted composite surface. (Level 3)
   d. inspect a composite structure using a non-destructive testing method (in addition to visual). (Level 3)
   e. select materials and clean a transparent surface. (Level 3)
   f. inspect a window or windscreen. (Level 3)
   g. remove one or more minor scratches from a transparent surface. (Level 3)
   h. determine hole size to use in a sheet metal repair. (Level 2)
   i. inspect a sheet metal assembly or repair for airworthiness. (Level 3)
   j. drill and countersink and/or dimple sheet metal. (Level 3)
   k. identify the fiber-reinforcing materials in at least three laminated composite structure samples. (Level 2)
   l. locate data for composite structure damage assessment. (Level 1)

C. Welding

Task C.11. (Level 1). Complete Airframe Specialized Course (02AF2W).

Practical Test Standards:

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1. Must demonstrate knowledge of the following:
   a. flame welding gasses.
   b. storage/handling of welding gasses.
   c. flame welding practices and techniques.
   d. inert-gas welding practices and techniques.
   e. purpose and types of shielding gasses.
   f. characteristics of acceptable welds.
   g. characteristics of unacceptable welds.
   h. types of steel tubing welding repairs.
   i. procedures for weld repairs.
   j. soldering preparation, types of solder, and/or flux usage.
   k. welding and/or soldering safety practices/precautions.

2. Must demonstrate the ability to perform the following:
   a. ignite a torch, set one or more specified flame patterns, and accomplish proper torch shutdown. (Level 2)
   b. solder a joint or connection. (Level 2)
   c. using aircraft quality materials, weld or braze a joint. (Level 2)
   d. determine the appropriate method/material(s) to use for a specific welding, soldering, or brazing task. (Level 2)
   e. determine the appropriate data to use for a specific welding, soldering, or brazing task. (Level 1)

D. Assembly and Rigging

Task D.12. (Level 1). Complete Airframe Specialized Course (02AF2W).

Task D.13. (Level 1). Complete Airframe Specialized Course (02AF2W).

Task D.14. (Level 1). Complete Airframe Specialized Course (02AF2W).

Task D.15. (Level 3). Complete Airframe Specialized Course (02AF2W) and OJT from Crew Chiefs, A/R, Base Aero Club or FBO. (*Technician is required to work as a team member on an aircraft major phase inspection. Technician must work as part of a team removing and replacing a flight control surface.)*

Task D.16. (Level 3). Complete Airframe Specialized Course (02AF2W) and OJT from Crew Chiefs, A/R, Base Aero Club or FBO. *(Technician is required to work as a team member on an aircraft major phase inspection)*

Task D.17. (Level 3). Complete Airframe Specialized Course (02AF2W) and OJT from Crew Chiefs, A/R, Base Aero Club or FBO. *(Technician is required to work as a team member on an aircraft jack)*

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. control cable.
   b. control cable maintenance.
   c. cable connectors.
   d. cable guides.

e. control stops.
f. push pull tubes.
g. torque tubes.
h. bell cranks.
i. flutter and flight control balance.
j. rigging of airplane or rotorcraft flight controls.
k. airplane or rotorcraft flight controls and/or stabilizer systems.
l. types of rotorcraft rotor systems.
m. rotor vibrations.
n. rotor blade tracking.
o. aircraft jacking procedures.
p. jacking safety practices/precautions.

2. Must demonstrate the ability to check and/or set control surface cable tension. (Level 3)

3. Must demonstrate the ability to perform the following:
   a. install a control surface. (Level 3)
   b. check the static balance of a control surface. (Level 3)
   c. locate the procedures for rigging a helicopter. (Level 1)
   d. locate helicopter rotor blade tracking procedures. (Level 1)
   e. identify fixed-wing aircraft rigging adjustment locations. (Level 2)
   f. locate leveling methods and procedures for a specific aircraft. (Level 1)
   g. inspect a flight control system for travel and security. (Level 3)
   h. inspect a primary flight control cable. (Level 3)
   i. install one or more swaged cable terminals and check with appropriate gage. (Level 3)
   j. install one or more Nicopress sleeves and check with appropriate gage. (Level 3)
   k. check and adjust as necessary a push-pull flight control system. (Level 3)
   l. locate jacking points and leveling locations for a specific aircraft. (Level 2)
   m. determine the jacking requirements for a particular aircraft. (Level 2)
   n. jack an aircraft or portion thereof (e.g., as appropriate for tire/wheel change, or gear retraction). (Level 3)

E. Airframe Inspection

Task E.18. (Level 3). Complete Airframe Specialized Course (02AF2W) and OJT from Crew Chiefs, Base Aero Club or FBO. *(Technician is required to work as a team member on an aircraft major phase inspection)*

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. one or more required inspections under 14 CFR part 91.
   b. maintenance requirements under 14 CFR part 43.
   c. inspection requirements under 14 CFR part 43.
   d. requirements for complying with airworthiness directives.
   e. compliance with service letters, instructions for continued airworthiness, and/or bulletins.
   f. maintenance record requirements under 14 CFR part 43.
   g. maintenance record requirements under 14 CFR part 91.

2. Must demonstrate the ability to examine an aircraft maintenance record, and determine if inspection and/or maintenance is due. (Level 3)

3. Must demonstrate the ability to perform the following:
   a. accomplish a 14 CFR part 91 required inspection on an airframe portion or component thereof. (Level 3)
   b. inspect an aircraft or portion thereof after maintenance or preventive maintenance. (Level 3)
   c. determine placarding requirements for a specific aircraft and condition. (Level 2)
   d. determine if all required instruments and equipment for specific operating conditions under 14 CFR part 91 are installed in a particular aircraft. (Level 2)
   e. accomplish a conformity inspection on an airframe portion or component thereof and record results. (Level 3)
   f. generate a checklist for conducting a 100-hour airframe inspection on a specific aircraft. (Level 2)

AIRFRAME SYSTEMS & COMPONENTS

A. Aircraft Landing Gear

Task A.19. (Level 3). Complete Airframe Specialized Course (02AF2W) and OJT from Crew Chiefs, A/R, Base Aero Club or FBO. *(Technician is required to work as a team member on an aircraft major phase inspection)*

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. landing gear strut servicing/lubrication.
   b. landing gear steering systems.
   c. landing gear retraction/extension systems.
   d. landing gear inspection.
   e. brake assembly inspection.
   f. wheel and tire construction
   g. tire mounting.
   h. wheel and tire inspection.
   i. wheel bearing inspection.
   j. tire storage, care, and/or servicing.
   k. landing gear and/or tire and wheel safety practices/precautions.

2. Must demonstrate the ability to perform inspection of an installed brake for serviceability. (Level 3)

3. Must demonstrate the ability to perform the following:
   a. determine the proper lubricant(s) for a landing gear. (Level 1)
   b. inspect a landing gear or landing gear component(s). (Level 3)
   c. service an oleo strut. (Level 3)
   d. install a brake lining or brake assembly. (Level 3)
   e. clean and inspect wheel bearings. (Level 3)
   f. disassemble, clean as necessary, and inspect a wheel. (Level 3)
   g. select lubricant, and lubricate wheel bearings. (Level 3)
   h. remove and replace/install a wheel and tire assembly on a landing gear. (Level 3)
   i. inspect a wheel and tire assembly, check tire pressure, and service as necessary. (Level 3)
   j. service a nosewheel shimmy damper. (Level 3)
   k. accomplish a landing gear retraction/extension check. (Level 3)

B. Hydraulic and Pneumatic Power Systems

Task B.20. (Level 3). Complete Airframe Specialized Course (02AF2W) and OJT from Hydraulics, Crew Chiefs, Base Aero Club or FBO.

Task B.21. (Level 3). Complete Airframe Specialized Course (02AF2W and OJT from Hydraulics, Crew Chiefs, Base Aero Club or FBO. *(Technician is required to work as a team member on an aircraft major phase inspection and perform a basic postflight inspection)*

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. hydraulic and/or pneumatic system, and/or system component(s) function/operation.
   b. servicing, function, and/or operation of accumulators.
   c. types of hydraulic/pneumatic seals and/or fluid/seal compatibility.
   d. hydraulic/pneumatic seal maintenance procedures.
   e. types of hydraulic/pneumatic filters and/or filter operation.
   f. filter maintenance procedures.
   g. pressure regulators and valves.
   h. servicing hydraulic and/or pneumatic systems.
   i. types/identification and/or characteristics of various hydraulics fluids used in aircraft.
   j. hydraulic/pneumatic system safety practices/precautions.

2. Must demonstrate the ability to select and install a hydraulic seal. (Level 3)

3. Must demonstrate the ability to perform the following:
   a. service a pneumatic or hydraulic system filter. (Level 3)
   b. inspect components or portions of a hydraulic or pneumatic system. (Level 3)
   c. locate fluid servicing instructions and identify/select fluid for a particular aircraft. (Level 2)
   d. service a hydraulic reservoir. (Level 3)
   e. troubleshoot a hydraulic or pneumatic system. (Level 3)
   f. repair a hydraulic or pneumatic system defect. (Level 3)
   g. remove and install hydraulic or pneumatic system component(s) and check operation. (Level 3)
   h. service a hydraulic system accumulator. (Level 3)

C. Cabin Atmosphere Control Systems

Task C.22. (Level 2). Complete Airframe Specialized Course (02AF2W).

Task C.23. (Level 2). Complete Airframe Specialized Course (02AF2W).

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. exhaust heat exchanger and/or system component(s) function, operation, and/or inspection procedures.
   b. combustion heater and/or system component(s) function, operation, and/or inspection procedures.
   c. vapor-cycle system and/or system component(s) operation, servicing and/or inspection procedures.
   d. air-cycle system and/or system component(s) operation and/or inspection procedures.
   e. cabin pressurization and/or system component(s) operation and/or inspection procedures.
   f. types of oxygen systems and/or oxygen system component(s) operation.
   g. oxygen system maintenance procedures.

2. Must demonstrate the ability to perform the following:
   a. inspect and/or troubleshoot an exhaust heat exchanger cabin heat system or system component(s). (Level 3)
   b. inspect and/or troubleshoot a combustion air heater system and/or system component(s). (Level 3)
   c. select proper solution and leak test oxygen system component(s). (Level 3)
   d. inspect and/or troubleshoot an oxygen system and/or system component(s). (Level 3)
   e. check the operation of an oxygen system. (Level 3)
   f. service an oxygen system. (Level 3)
   g. purge an oxygen system. (Level 3)

   h. inspect and/or troubleshoot a vapor cycle cooling system and/or system component(s). (Level 3)
   i. inspect and/or troubleshoot a cabin pressurization system and/or system component(s). (Level 3)
   j. inspect and/or troubleshoot an air cycle machine system and/or system component(s). (Level 3)
   k. locate procedures for protecting a vapor-cycle system from contamination during component replacement. (Level 1)
   l. locate procedures for servicing a vapor-cycle cooling system. (Level 1)
   m. locate procedures for inspecting a cabin outflow valve. (Level 1)

D. Aircraft Instrument Systems

Task D.24. (Level 1). Complete Airframe Specialized Course (02AF2W).

Task D.25. (Level 2). Complete Airframe Specialized Course (02AF2W) and OJT from Instrument/Flight Controls, Base Aero Club or FBO. *(Technician is required to perform a pitot-static leak test)*

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. magnetic compass operation.
   b. magnetic compass swinging procedures.
   c. gyroscopic instrument(s) purpose and operation.
   d. vacuum/pressure and/or electrically operated instrument system operation.
   e. vacuum/pressure and/or electricity operated instrument system maintenance procedures.
   f. pitot and/or static instruments purpose and operation.
   g. pitot and/or static system operation.
   h. 14 CFR parts 43 and/or 91 requirements for static system checks.
   i. aircraft instrument range markings.

2. Must demonstrate the ability to perform the following:
   a. remove and install an aircraft instrument. (Level 3)
   b. accomplish a magnetic compass swing. (Level 3)
   c. determine range/limit markings for one or more instruments. (Level 2)
   d. remove, inspect, and install one or more vacuum or pressure system filters. (Level 3)
   e. determine the proper setting of a vacuum and/or pressure system for a particular aircraft. (Level 2)
   f. inspect and/or troubleshoot portions of a vacuum and/or pressure and/or electrically operated instrument power system. (Level 3)
   g. inspect portions of a pitot-static system. (Level 3)
   h. find barometric pressure using an altimeter. (Level 2)

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E. Communication and Navigation Systems

Task E.26. (Level 1). Complete Airframe Specialized Course (02AF2W).

Task E.27. (Level 1). Complete Airframe Specialized Course (02AF2W).

Task E.28. (Level 2). Complete Airframe Specialized Course (02AF2W)

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. 14 CFR part 91 emergency locator transmitter (ELT) maintenance requirements.
   b. 14 CFR part 91 ELT record keeping requirements.
   c. checking/inspecting coaxial cable.
   d. coaxial cable installation and/or routing requirements.
   e. communication and/or navigation systems commonly used.
   f. proper installation of a com/nav radio in an existing radio rack.
   g. means of identification of commonly used communication and/or navigation antennas.
   h. autopilot system basic components and/or sensing elements.
   i. static discharger function and operation.
   j. static discharger maintenance procedures.

2. Must demonstrate the ability to perform the following:
   a. identify and inspect com/nav cable and connectors. (Level 3)
   b. inspect an ELT and/or ELT installation. (Level 3)
   c. determine ELT battery serviceability/status. (Level 2)
   d. inspect one or more antenna installations. (Level 3)
   e. inspect a coaxial cable installation. (Level 3)
   f. inspect a com/nav radio installation. (Level 3)
   g. inspect a shock mount base. (Level 3)
   h. locate and identify various antennas installed on a particular aircraft. (Level 2)
   i. inspect one or more static dischargers for security, resistance. (Level 3)

F. Aircraft Fuel Systems

Task F.29. (Level 1). Complete Airframe Specialized Course (02AF2W).

Task F.30. (Level 1). Complete Airframe Specialized Course (02AF2W).

Task F.31. (Level 1). Complete Airframe Specialized Course (02AF2W).

Task F.32. (Level 2). Complete Airframe Specialized Course (02AF2W).

Task F.33. (Level 2). Complete Airframe Specialized Course (02AF2W).

Task F.34. (Level 3). Complete Airframe Specialized Course (02AF2W) and OJT from Fuel Cell, Base Aero Club or FBO. *(Technician is required to work as a team member on an aircraft major phase inspection)*

Practical Test Standards:

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1. Must demonstrate knowledge of the following:
   a. fuel system strainer servicing.
   b. construction characteristics of one or more types of fuel tanks.
   c. fuel tank maintenance procedures.
   d. fuel line routing/installation requirements.
   e. hazards associated with fuel system maintenance.
   f. types, characteristics, and/or operation of fuel systems and/or components thereof.
   g. characteristics, and/or operation of fuel jettison systems and/or components thereof.

2. Must demonstrate the ability to service a fuel system strainer. (Level 3)

3. Must demonstrate the ability to perform the following:
   a. install a fuel quantity transmitter and/or accomplish an operational check. (Level 3)
   b. install a fuel valve and/or accomplish an operational check. (Level 3)
   c. install a fuel pump and/or accomplish an operational check. (Level 3)
   d. troubleshoot a fuel system. (Level 3)
   e. determine the airworthiness of a specified size fuel system leak/seep. (Level 2)
   f. inspect a fuel system and/or fuel system component(s). (Level 3)
   g. check the operation of one or more fuel system components. (Level 3)
   h. inspect a metal fuel tank. (Level 3)
   i. inspect a bladder fuel tank. (Level 3)
   j. locate fuel system operating instructions. (Level 1)
   k. locate fuel system inspection procedures. (Level 1)

G. Aircraft Electrical Systems

Task G.35. (Level 2). Complete Airframe Specialized Course (02AF2W).

Task G.36. (Level 3). Complete Airframe Specialized Course (02AF2W) and OJT from Electrical-Environmental, Base Aero Club or FBO. (*Technician requires hands-on training on crimping and splicing wires and repairing pins and sockets)*

Task G.37. (Level 3). Complete Airframe Specialized Course (02AF2W) and OJT from Electrical-Environmental, Base Aero Club or FBO. *(Technician is also required to work as a team member on an aircraft major phase inspection)*

Task G.38. (Level 1). Complete Airframe Specialized Course (02AF2W).
Same as Task G37.

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. factors to consider when selecting wire size for an aircraft circuit.
   b. routing and/or installation of electric wire or wire bundles.
   c. wire splicing.
   d. use of derating factors in switch selection.
   e. requirements for circuit protection devices.
   f. voltage regulator—purpose and operating characteristics.
   g. lighting and/or lighting system components.
   h. electric motor operation and/or motor components.
   i. constant speed drive (CSD) and/or integrated drive generator (IDG) systems and/or system components.

j. airframe electrical system components.
k. wiring defects and/or inspection.

2. Must demonstrate the ability to troubleshoot an electrical system or portion thereof, using appropriate tools and/or test equipment. (Level 3)

3. Must demonstrate the ability to perform the following:
   a. select a circuit switch or circuit protection device for a specific aircraft and application. (Level 2)
   b. install a circuit switch or circuit protection device. (Level 3)
   c. select materials and tools and accomplish a wire splice. (Level 3)
   d. adjust one or more voltage regulators. (Level 3)
   e. select and install one or more wires and pins and/or sockets in a connector. (Level 3)
   f. select materials and fabricate a bonding wire. (Level 3)
   g. install a bonding wire and accomplish a resistance check. (Level 3)
   h. check the operation of one or more airframe electrical system circuits and/or system components. (Level 3)
   i. inspect and check a landing light. (Level 3)
   j. inspect and check anti-collision and position lights. (Level 3)
   k. inspect generator brushes and determine serviceability. (Level 3)

H. Position and Warning Systems

Task H.39. (Level 1). Complete Airframe Specialized Course (02AF2W).

Task H.40. (Level 1). Complete Airframe Specialized Course (02AF2W).

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. anti-skid system basic components.
   b. anti-skid system operating characteristics.
   c. takeoff warning system basic components.
   d. takeoff warning system function and operation.
   e. control-surface trim indicating system basic components and/or operating characteristics.
   f. landing gear position indicators.
   g. flap position indicators.
   h. landing gear warning system basic components and/or operating characteristics.
   i. checking and/or repairing a landing gear warning system.
   j. types of stall warning/lift detector systems and/or operating characteristics.
   k. common annunciator system indications.
   l. mach warning system indicator(s) and/or operating characteristics.

2. Must demonstrate the ability to perform the following:
   a. inspect and/or adjust a landing gear position switch. (Level 3)
   b. accomplish an operational check of a landing gear position indicating and/or warning system. (Level 3)
   c. inspect and/or adjust a flap position indicating system. (Level 3)
   d. check the operation of a flap position indicating and/or warning system. (Level 3)
   e. troubleshoot a landing gear warning system. (Level 3)
   f. check the operation of an annunciator system. (Level 3)
   g. check the operation of an anti-skid warning system. (Level 3)

h. identify landing gear position/warning system components. (Level 2)
i. locate troubleshooting procedures for an anti-skid system. (Level 1)
j. locate troubleshooting procedures for a landing gear warning system. (Level 1)

I. Ice and Rain Control Systems

Task I.41. (Level 2). Complete Airframe Specialized Course (02AF2W).

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. aircraft icing causes/effects.
   b. ice detection systems.
   c. anti-ice and/or deice areas.
   d. anti-ice and/or deice methods commonly used.
   e. checking and/or troubleshooting a pitot-static anti-ice system.
   f. anti-icing and/or de-icing system components/operation.
   g. anti-icing and/or de-icing system maintenance.
   h. types of rain removal systems and/or operating characteristics.

2. Must demonstrate the ability to perform the following:
   a. troubleshoot a pitot anti-ice system. (Level 3)
   b. check the operation of a pitot-static anti-ice system. (Level 3)
   c. inspect a deicer boot. (Level 3)
   d. check deicer boot operation. (Level 3)
   e. inspect windshield wiper blade(s) and check blade tension. (Level 3)
   f. adjust a windshield wiper blade tension to specification. (Level 3)
   g. inspect an electrically-heated windshield. (Level 3)
   h. check an electrically-heated windshield operation. (Level 3)
   i. troubleshoot a pneumatic deicer boot system. (Level 3)
   j. service or repair on a pneumatic deicer boot. (Level 3)

J. Fire Protection Systems

Task J.42. (Level 1). Complete Airframe Specialized Course (02AF2W).

Task J.43. (Level 3). Complete Airframe Specialized Course (02AF2W) and OJT from Electrical-Environmental, Crew Chiefs, Base Aero Club or FBO. *(Technician is also required to work as a team member on an aircraft major phase inspection)*

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. fire and/or smoke detection system(s) or system components.
   b. fire extinguishing system(s) and/or system components.
   c. fire and/or smoke detection system operating characteristics.
   d. fire extinguishing system operating characteristics.
   e. determining proper container pressure for an installed fire extinguisher system.
   f. maintenance procedures for fire detection and/or extinguishing system(s) and/or system component(s).
   g. inspecting and/or checking a fire detection/overheat system.
   h. inspecting and/or checking a smoke and/or toxic gas detection system.

i. troubleshooting a fire detection and/or extinguishing system.

2. Must demonstrate the ability to perform the following:
   a. inspect a fire extinguisher container and determine if the pressure is within limits. (Level 3)
   b. determine the hydrostatic test date of a fire extinguisher container. (Level 2)
   c. troubleshoot a fire detection system. (Level 3)
   d. install/replace one or more smoke and/or fire detection and/or extinguishing system components. (Level 3)
   e. inspect a smoke and/or fire detection and/or extinguishing system, or system component(s). (Level 3)
   f. locate inspection procedures for carbon monoxide detectors. (Level 1)
   g. locate procedures for checking a smoke detection system. (Level 1)

5. POWERPLANT CURRICULUM SUBJECTS

POWERPLANT THEORY AND MAINTENANCE

A. Reciprocating Engines

Task A.1. (Level 2). Complete Powerplant Specialized Course (02AF3W).

Task A.2. (Level 2). Complete Powerplant Specialized Course (02AF3W).

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. reciprocating engine theory of operation.
   b. basic radial engine design, components, and/or operation.
   c. firing order of a reciprocating engine.
   d. probable cause and removal of a hydraulic lock.
   e. valve adjustment on a radial engine.
   f. purpose of master and/or articulating rods.
   g. checks necessary to verify proper operation of a reciprocating engine.
   h. induction system leak indications.
   i. reciprocating engine maintenance procedures.
   j. procedures for inspecting various engine components during an overhaul.
   k. correct installation of piston rings and results of incorrectly installed or worn rings.
   l. purpose/function/operation of various reciprocating engine components, including, but not limited to, any of the following: crankshaft dynamic dampers, multiple springs for valves, piston rings, and reduction gearing.

2. Must demonstrate the ability to perform the following:
   a. measure the valve clearance on a reciprocating aircraft engine when the lifters are deflated. (Level 2)
   b. accomplish a compression test, and note all findings. (Level 3)
   c. inspect engine control cables and/ or push-pull tubes for proper rigging. (Level 3)
   d. inspect ring gap, install piston rings on a piston, and install an aircraft engine cylinder. (Level 3)
   e. dimensionally inspect an aircraft engine component. (Level 3)
   f. replace/install one or more aircraft engine components. (Level 3)

B. Turbine Engines

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Task B.3. (Level 3). Complete Powerplant Specialized Course (02AF3W) and OJT from Propulsion, Base Aero Club or FBO. *(Technician is required to work as a team member on an engine overhaul in the jet engine intermediate maintenance shop and work as a team member on an aircraft major phase inspection)*

Task B.4. (Level 3). Complete Powerplant Specialized Course (02AF3W) and OJT from Propulsion, Crew Chiefs, Base Aero Club or FBO. *(Technician is required to work as a team member on an engine removal and replacement on the aircraft)*

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. turbine engine theory of operation.
   b. checks necessary to verify proper operation.
   c. turbine engine troubleshooting procedures.
   d. procedures required after the installation of a turbine engine.
   e. causes for turbine engine performance loss.
   f. purpose/function/operation of various turbine engine components.
   g. turbine engine maintenance procedures.

2. Must demonstrate the ability to perform the following:
   a. repair a turbine engine compressor blade by blending. (Level 3)
   b. remove and/or install a turbine engine component. (Level 3)
   c. determine cycle life remaining between overhaul of a turbine engine life limited component. (Level 2)
   d. check rigging of a turbine engine inlet guide vane system. (Level 3)
   e. measure compressor or turbine blade clearance. (Level 3)
   f. troubleshoot a turbine engine. (Level 3)
   g. locate and identify turbine engine components. (Level 2)
   h. inspect turbine engine components. (Level 3)

C. Engine Inspection

Task C.5. (Level 3). Complete Powerplant Specialized Course (02AF3W), and OJT from Propulsion, Crew Chiefs, Base Aero Club or FBO. *(Technician must be able to review technical orders and engine maintenance records to validate engine removal and replacement actions)*

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. the use of a type certificate data sheet (TCDS) to identify engine accessories.
   b. requirements for the installation or modification in accordance with a supplemental type certificate (STC).
   c. procedures for accomplishing a 100-hour inspection in accordance with the manufacturer's instruction.
   d. compliance with airworthiness directives.
   e. changes to an inspection program due to a change or modification required by airworthiness directive or service bulletin.
   f. determination of life limited parts.
   g. inspection required after a potentially damaging event, including but not limited to any of the following: sudden stoppage, overspeed, or overtemperature.

2. Must demonstrate the ability to perform inspection of a reciprocating and/or turbine engine installation in accordance with the manufacturer's instructions. (Level 3)

3. Must demonstrate the ability to perform the following:
   a. inspect a turbine engine using a bore scope. (Level 3)
   b. determine proper crankshaft flange run-out. (Level 3)
   c. inspect an engine in accordance with applicable airworthiness directive. (Level 2)
   d. inspect a turbine engine compressor section. (Level 3)
   e. inspect a crankcase for cracks. (Level 3)
   f. inspect a crankshaft oil seal for leaks. (Level 3)
   g. engine conformity inspection. (Level 3)
   h. engine airworthiness inspection. (Level 3)

POWERPLANT SYSTEMS AND COMPONENTS

A. Engine Instrument Systems

Task A.6. (Level 2). Complete Powerplant Specialized Course (02AF3W) and OJT from Instrument/Flight Controls, Propulsion, Base Aero Club or FBO.

Task A.7. (Level 3). Complete Powerplant Specialized Course (02AF3W) and OJT from Instrument/Flight Controls, Propulsion, Base Aero Club or FBO. (*Technician is required to work as a team member on an aircraft major phase inspection)*

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. troubleshoot a fuel flow and/or low fuel pressure indicating system.
   b. the operation of a fuel flow indicating system and where it is connected to the engine.
   c. the operation of a temperature indicating system.
   d. the operation of a pressure indicating system.
   e. the operation of an RPM indicating system.
   f. required checks to verify proper operation of a temperature indicating system.
   g. required checks to verify proper operation of a pressure indicating system.
   h. required checks to verify proper operation of an RPM indicating system.
   i. the operation of a manifold pressure gage and where it actually connects to an engine.

2. Must demonstrate the ability to perform inspection of engine electrical and/or mechanical instrument systems, to include the following (Level 3):
   a. temperature.
   b. pressure.
   c. RPM.
   d. rate of flow.

3. Must demonstrate the ability to perform the following:
   a. verify proper operation and marking of an indicating system. (Level 2)
   b. replace a temperature sending unit. (Level 3)
   c. remove, inspect, and install fuel flow transmitter. (Level 3)
   d. troubleshoot an oil pressure indicating system. (Level 3)
   e. locate and inspect fuel flow components on an engine. (Level 2)

f. replace an exhaust gas temperature (EGT) indication probe. (Level 3)
g. troubleshoot a manifold pressure gage that is slow to indicate the correct reading. (Level 2)

B. Engine Fire Protection System

Task B.8. (Level 3). Complete Powerplant Specialized Course (02AF3W) and OJT from Propulsion, Electrical-Environmental, Crew Chiefs, Base Aero Club or FBO. *(Technician is required to work as a team member on an aircraft major phase inspection)*

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. checks to verify proper operation of an engine fire detection and/or extinguishing system.
   b. troubleshoots an engine fire detection and/or extinguishing system.
   c. inspection requirements for an engine fire extinguisher squib and safety practices/precautions. d. components and/or operation of an engine fire detection and/or extinguishing system.
   e. engine fire detection and/or extinguishing system maintenance procedures.

2. Must demonstrate the ability to perform the following:
   a. check an engine fire detection and/or extinguishing system for proper operation. (Level 2)
   b. accomplish weight and pressure inspection of an engine fire bottle, and verify hydrostatic inspection date. (Level 2)
   c. repair an engine fire detector heat sensing loop malfunction. (Level 3)
   d. check operation of firewall shut-off valve after a fire handle is pulled. (Level 2)
   e. troubleshoot an engine fire detection or extinguishing system. (Level 2)
   f. inspect an engine fire detection or extinguishing system. (Level 2)

C. Engine Electrical System

Task C.9. (Level 2). Complete Powerplant Specialized Course (02AF3W) and OJT from Propulsion, Electrical-Environmental, Crew Chiefs, Base Aero Club or FBO.

Task C.10. (Level 3). Complete Powerplant Specialized Course (02AF3W) and OJT from Propulsion, Electrical-Environmental, Crew Chiefs, Base Aero Club or FBO.

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. generator rating and performance data location.
   b. operation of a turbine engine starter-generator.
   c. the procedure for locating the correct electrical cable/wire size needed to fabricate a replacement cable/wire.
   d. installation practices for wires running close to exhaust stacks or heating ducts.
   e. operation of engine electrical system components.
   f. types of and/or components of D.C. motors.
   g. inspection and/or replacement of starter-generator brushes.

2. Must demonstrate the ability to perform the following:
   a. flash a generator field. (Level 3)
   b. install an engine driven generator or alternator. (Level 3)
   c. use of an engine electrical wiring schematic. (Level 2)

d. accomplish the installation of a tach generator. (Level 3)
e. fabricate an electrical system cable. (Level 3)
f. repair a damaged engine electrical system wire. (Level 3)
g. replace and check a current limiter. (Level 3)
h. check/service/adjust one or more engine electrical system components. (Level 3)
i. troubleshoot an engine electrical system component. (Level 3)

D. Engine Lubricating Systems

Task D.11. (Level 2). Complete Powerplant Specialized Course (02AF3W).

Task D.12. (Level 3). Complete Powerplant Specialized Course (02AF3W) and OJT from Propulsion, Crew Chiefs, Base Aero Club or FBO. *(Technician is required to work as a team member on an engine overhaul in the jet engine intermediate maintenance shop or complete an engine intermediate maintenance training course)*

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. differences between straight mineral oil, ashless-dispersant oil, and synthetic oil.
   b. types of oil used for different climates.
   c. functions of an engine oil.
   d. identification and selection of proper lubricants.
   e. servicing of the lubrication system.
   f. the reasons for changing engine lubricating oil at specified intervals.
   g. the purpose and operation of an oil/air separator.
   h. reasons for excessive oil consumption without evidence of oil leaks in a reciprocating and/or turbine aircraft engine.

2. Must demonstrate the ability to perform the following:
   a. inspect an engine lubrication system to ensure continued operation. (Level 3)
   b. inspect oil lines and filter/screen for leaks. (Level 3)
   c. replace a defective oil cooler or oil cooler component. (Level 3)
   d. replace a gasket or seal in the oil system, and accomplish a leak check. (Level 3)
   e. adjust oil pressure. (Level 3)
   f. change engine oil, inspect screen(s) and/or filter, and leak check the engine. (Level 3)
   g. pre-oil an engine. (Level 2)

E. Ignition and Starting Systems

Task E.13. (Level 2). Complete Powerplant Specialized Course (02AF3W), and OJT from Propulsion, Crew Chiefs, Base Aero Club or FBO. *(Hands-on training is waived on reciprocating engines only. Technician is required to work as a team member on an aircraft major phase inspection)*

Task E.14. (Level 3). Complete Powerplant Specialized Course (02AF3W) and OJT from Propulsion, Crew Chiefs, Base Aero Club or FBO.

Task E.15. (Level 1). Complete Powerplant Specialized Course (02AF3W).
Same as Task E14.

Practical Test Standards:

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1. Must demonstrate knowledge of the following:
   a. troubleshooting a reciprocating and/or turbine engine ignition system.
   b. replacement of an exciter box and safety concerns if the box is damaged.
   c. troubleshooting a starter system.
   d. checking a starter system for proper operation.
   e. the operation of a pneumatic starting system.
   f. reasons for the starter dropout function of a starter generator or pneumatic starter.
   g. the purpose of a shear section in a starter output shaft.
   h. purpose of checking a p-lead for proper ground.
   i. inspection and servicing of an igniter and/or spark plug.
   j. magneto systems, components, and operation.
   k. function/operation of a magneto switch and p-lead circuit.
   l. high and low tension ignition systems.

2. Must demonstrate the ability to perform the following (Level 3):
   a. check engine timing.
   b. check a magneto switch for proper operation.
   c. inspect a turbine engine ignition system for proper installation.
   d. inspect a starter/generator for proper installation.
   e. inspect magneto points.

3. Must demonstrate the ability to perform the following:
   a. install a magneto, and set timing on an aircraft engine. (Level 3)
   b. repair an engine ignition and/or starter system. (Level 3)
   c. remove, inspect, and install turbine engine igniter plugs, and perform a functional check of the igniter system. (Level 3)
   d. inspect generator or starter-generator brushes. (Level 3)
   e. install brushes in a starter or starter-generator. (Level 3)
   f. install breaker points in a magneto and internally time the magneto. (Level 3)
   g. repair an engine direct drive electric starter. (Level 3)
   h. inspect and test an ignition harness with a high tension lead tester. (Level 3)
   i. inspect and/or service and install aircraft spark plugs. (Level 3)
   j. bench test an ignition system component. (Level 2)

F. Fuel Metering Systems

Task F.16. (Level 1). Complete Powerplant Specialized Course (02AF3W).

Task F.17. (Level 3). Complete Powerplant Specialized Course (02AF3W), and OJT from Propulsion, Crew Chiefs, Base Aero Club or FBO. *(Hands-on training on reciprocating engines is waived)*

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. troubleshooting an engine that indicates high exhaust gas temperature (EGT) for a particular engine pressure ratio (EPR).
   b. purpose of an acceleration check after a trim check.
   c. reasons an engine would require a trim check.
   d. purpose of the part power stop on some engines when accomplishing engine trim procedure.
   e. procedure required to adjust (trim) a fuel control unit (FCU).
   f. possible reasons for fuel running out of a carburetor throttle body.
   g. indications that would result if the mixture is improperly adjusted.

h. procedure for checking idle mixture on a reciprocating engine.
i. possible causes for poor engine acceleration, engine backfiring or missing when the throttle is advanced.
j. types and operation of various fuel metering systems.
k. fuel metering system components.

2. Must demonstrate the ability to perform the following:
   a. remove and install the accelerating pump in a float-type carburetor. (Level 3)
   b. check and adjust the float level of a float-type carburetor. (Level 3)
   c. check the needle and seat in a float-type carburetor for proper operation. (Level 2)
   d. check a fuel injection nozzle for proper spray pattern, and install a fuel injector nozzle. (Level 2)
   e. check and adjust idle mixture. (Level 3)
   f. install a turbine engine fuel nozzle. (Level 3)
   g. locate and identify various fuel metering system components. (Level 2)
   h. service a carburetor fuel screen. (Level 3)

G. Engine Fuel Systems

Task G.18. (Level 3). Complete Powerplant Specialized Course (02AF3W) and OJT from Propulsion, Crew Chiefs, Base Aero Club or FBO.

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. inspection requirements for an engine fuel system.
   b. checks of fuel systems to verify proper operation.
   c. troubleshooting an engine fuel system.
   d. procedure for inspection of an engine driven fuel pump for leaks and security.
   e. function and/or operation of one or more types of fuel pumps.
   f. function and/or operation of one or more types of fuel valves.
   g. function and/or operation of engine fuel filters.

2. Must demonstrate the ability to perform the following (Level 3):
   a. check a fuel selector valve for proper operation.
   b. inspect an engine fuel filter assembly for leaks.
   c. inspect a repair to an engine fuel system.

3. Must demonstrate the ability to perform the following:
   a. check a fuel boost pump for proper operation. (Level 3)
   b. repair fuel selector valve. (Level 3)
   c. inspect a main fuel filter assembly for leaks. (Level 3)
   d. check the operation of a remotely located fuel valve. (Level 3)
   e. locate and identify a turbine engine fuel heater. (Level 2)
   f. service an engine fuel strainer. (Level 3)
   g. inspect an engine driven fuel pump for leaks and security, and perform an engine fuel pressure check. (Level 3)
   h. repair an engine fuel system or system component. (Level 3)
   i. troubleshoot a fuel pressure system. (Level 3)

H. Induction and Airflow Systems

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Task H.19. (Level 1). Complete Powerplant Specialized Course (02AF3W).

Task H.20. (Level 1). Complete Powerplant Specialized Course (02AF3W).

Task H.21. (Level 1). Complete Powerplant Specialized Course (02AF3W).

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. inspection procedures for engine ice control systems and/or carburetor air intake and induction manifolds.
   b. operation of an alternate air valve, both automatic and manual heat systems.
   c. troubleshooting ice control systems.
   d. explain how a carburetor heat system operates and the procedure to verify proper operation.
   e. effect(s) on an aircraft engine if the carburetor heat control is improperly adjusted.
   f. causes and effects of induction system ice. g. function and operation of one or more types of supercharging systems and components.

2. Must demonstrate the ability to perform inspection of engine induction or airflow system, to include the following (Level 3):
   a. engine ice control system.
   b. induction manifolds.

3. Must demonstrate the ability to perform the following:
   a. repair a defective condition in a carburetor heat box. (Level 3)
   b. check proper operation of an engine anti-ice system. (Level 3)
   c. rig a carburetor heat box. (Level 3)
   d. inspect an induction system. (Level 3)
   e. replace an induction system manifold gasket and/or induction tube. (Level 3)
   f. service an induction system air filter. (Level 3)
   g. trouble shoot an engine malfunction resulting from a defective induction or supercharging system. (Level 3)

I. Engine Cooling System

Task I.22. (Level 1). Complete Powerplant Specialized Course (02AF3W).

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. required inspection on an engine cooling system.
   b. operation of cowl flaps, and how cooling is accomplished.
   c. how turbine engine cooling is accomplished.
   d. cooling of engine bearings and other parts on turbine engines.
   e. the importance of proper engine baffle and seal installation.
   f. the operation of a heat exchanger.
   g. the function and operation of an augmenter cooling system.
   h. rotorcraft engine cooling systems.

2. Must demonstrate the ability to perform the following:
   a. inspect an engine cooling system. (Level 3)
   b. check cowl flap operation and inspect rigging. (Level 3)

c. repair one or more cylinder cooling fins. (Level 3)
d. repair an engine pressure baffle plate. (Level 3)
e. inspect a heat exchanger. (Level 3)
f. troubleshoot an engine cooling system. (Level 3) g. locate and identify rotorcraft cooling system components. (Level 2)

J. Engine Exhaust and Reverser Systems

Task J.23. (Level 3). Complete Powerplant Specialized Course (02AF3W) and OJT from Propulsion, Crew Chiefs, Base Aero Club or FBO.

Task J.24. (Level 1). Complete Powerplant Specialized Course (02AF3W).
Same as Task J23.

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. exhaust leak indications and/or methods of detection.
   b. thrust reverser system operation and components.
   c. differences between a cascade and a mechanical blockage door thrust reverser.
   d. hazards of exhaust system failure.
   e. effects of using improper materials to mark on exhaust system components.
   f. function and operation of various exhaust system components.
2. Must demonstrate the ability to perform inspection of engine exhaust system and/or turbocharger system. (Level 3)

3. Must demonstrate the ability to perform the following:
   a. determine if components of an exhaust system are serviceable. (Level 2)
   b. show the procedures to accomplish a pressurization check of an exhaust system. (Level 2)
   c. repair one or more exhaust system components. (Level 3)
   d. check engine exhaust system for proper operation. (Level 3)
   e. replace one or more exhaust gaskets. (Level 3)
   f. install an engine exhaust system. (Level 3)
   g. check a turbocharger and waste gate system for proper operation. (Level 3)
   h. troubleshoot and/or repair a turbine engine thrust reverser system and/or system component(s). (Level 3)

K. Propellers

Task K.25. (Level 1). Complete Powerplant Specialized Course (02AF3W).

Task K.26. (Level 2). Complete Powerplant Specialized Course (02AF3W).

Task K.27. (Level 1). Complete Powerplant Specialized Course (02AF3W).

Task K.28. (Level 2). Complete Powerplant Specialized Course (02AF3W).

Task K.29. (Level 2). Complete Powerplant Specialized Course (02AF3W).

Task K.30. (Level 3). Complete Powerplant Specialized Course (02AF3W). *(Hands-on training is waived)*

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Task K.31. (Level 2). Complete Powerplant Specialized Course (02AF3W).

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. propeller theory of operation.
   b. checks necessary to verify proper operation of propeller systems.
   c. procedures for proper application of propeller lubricants.
   d. installation or removal of a propeller.
   e. measurement of blade angle with a propeller protractor.
   f. repairs classified as major repairs on an aluminum propeller.
   g. reference data for reducing the diameter of a type certificated propeller.
   h. operation of propeller system component(s).
   i. propeller governor components and operation.
   j. theory and operation of various types of constant speed propellers.
   k. function and operation of propeller synchronizing systems.
   l. function and operation of propeller ice control systems.

2. Must demonstrate the ability to perform the following:
   a. inspection of a propeller installation, and make a minor repair on an aluminum propeller. (Level 3)
   b. determine what minor propeller alterations are acceptable using the appropriate type certificate data sheet. (Level 2)

3. Must demonstrate the ability to perform the following:
   a. service a constant speed propeller with lubricant. (Level 2)
   b. use a propeller protractor to determine correct blade angle. (Level 3)
   c. leak check a constant speed propeller installation. (Level 3)
   d. install a fixed pitch propeller and check the tip tracking. (Level 3)
   e. inspect a spinner/ bulkhead for defects and proper alignment and installation. (Level 3)
   f. dye-penetrant inspection to determine the amount of propeller damage. (Level 2)
   g. inspect and/or adjust a propeller governor. (Level 3)
   h. inspect a wood propeller. (Level 3)
   i. troubleshoot a propeller system. (Level 3)

L. Turbine Powered Auxiliary Power Units

Task L.32. (Level 2). Complete Powerplant Specialized Course (02AF3W).

Practical Test Standards:

1. Must demonstrate knowledge of the following:
   a. inspection to ensure proper operation of turbine driven auxiliary power unit.
   b. replacement procedure for an igniter plug.
   c. servicing an auxiliary power unit.
   d. troubleshooting an auxiliary power unit.
   e. function and operation of auxiliary power unit(s).

6. AVIATION SAFETY CURRICULUM SUBJECTS

Task A.1. thru A.9. (Level 1). Complete General (02AF1W), Airframe (02AF2W) and Powerplant (02AF3W) Specialized Courses.

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