DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 147

[Docket No. 26331; Notice No. 90-22]

RIN 2120-AD09

Revision of Aviation Maintenance Technician Schools Regulations

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: This notice proposes to update the regulations for certificating aviation maintenance technician schools (AMTS) to accommodate the increasing demand for maintenance technicians with higher levels of skill and knowledge. This proposal, if adopted, would: (1) Modify portions of the current rule that have been open to subjective judgments by the Federal Aviation Administration (FAA) and the AMTS industry, and (2) modify the rule to upgrade the portions that specify the skill and knowledge requirements for an aviation maintenance technician. In addition, the proposal, if adopted, would revise the core curriculum to ensure that a person graduating from an aviation maintenance technician school will be prepared to function in the current technological environment.

DATES: Comments must be received on or before December 11, 1990.

ADDRESSES: Comments on this notice should be mailed, in triplicate, to: Federal Aviation Administration, Office of the Chief Counsel, ATTN: Rules Docket (AGC-10), Docket No. 26331, 800 Independence Avenue SW., Washington, DC 20591. Comments delivered must be marked Docket No. 26331. Comments may be examined in room 915G weekdays between 8:30 a.m. and 5 p.m., except on Federal holidays.

FOR FURTHER INFORMATION CONTACT: Leslie K. Vipond, AFS-302, Aircraft Maintenance Division, Flight Standards Service, Federal Aviation Administration, 800 Independence Avenue SW., Washington, DC 20591, telephone (202) 267-3269.

SUPPLEMENTARY INFORMATION:

Comments Invited

Interested persons are invited to participate in the making of the proposed rule by submitting such written data, views, or arguments as they may desire. Comments relating to the environmental, energy, federalism, or economic impact that might result from adopting the proposals in this notice are also invited. Substantive comments should be accompanied by cost estimates. Comments should identify the regulatory docket or notice number and should be submitted in triplicate to the Rules Docket address specified above. All comments received on or before the closing date for comments will be considered by the Administrator before taking action on this proposed rulemaking. The proposals contained in this notice may be changed in light of comments received. All comments received will be available, both before and after the closing date for comments, in the Rules Docket for examination by interested persons. A report summarizing each substantive public contact with FAA personnel concerned with this proposed rulemaking will be filed in the docket. Commenters wishing the FAA to acknowledge receipt of their comments submitted in response to this notice must include a self-addressed, stamped postcard on which the following statement is made: "Comments to Docket No. 26331." The postcard will be date stamped and mailed to the commenter.

Availability of NPRM's

Any person may obtain a copy of this NPRM by submitting a request to the Federal Aviation Administration, Office of Public Affairs, ATTN: Public Inquiry Center, APA-430, 800 Independence Avenue SW., Washington, DC 20591, or by calling (202) 267-3484. Communications must identify the notice number of this NPRM. Persons interested in being placed on a mailing list for future NPRM's should request a copy of Advisory Circular No. 11-2A, Notice of Proposed Rulemaking Distribution System, which describes the application procedures.

Background

Statement of the Problem

Part 147 of the Federal Aviation Regulations (FAR), Aviation Maintenance Technician Schools (AMTS), specifies requirements for the operation of an AMTS. The regulations specify both the curriculum and operating rules for all certificated AMTS.

The civil aviation environment in which the aviation maintenance technician operates has changed significantly since the regulations now covered by part 147 were first adopted in 1970. Thus, a person could graduate from a part 147-approved AMTS and yet be poorly prepared to function in the current aviation environment. This phenomenon of technology overtaking the current part 147 rules is reflected by the increasing trend of AMTS to offer or require additional supplemental course material beyond the required core curriculum.

History

Part 147 of the FAR, Aviation Maintenance Technician Schools (AMTS), has its origin in Civil Air Regulation (CAR) part 53. When the Civil Air Regulations were recodified in 1962, CAR part 53 become part 147 of the FAR. In April 1970, part 147 was completely revised, the revision increasing the required core curriculum from 1,500 to 1,900 hours and setting forth more definitive subject content and teaching guidelines than before. With the exception of minor changes, part 147 remains essentially the same as it was in 1970. In the late 1970's, the FAA and the Aviation Technician Education Council (ATEC), an association of the majority of aviation maintenance technician schools, held a series of symposia workshops to develop a more objective interpretation of part 147 by both the industry and the FAA.

FAA participation in the symposia was consistent with the FAA practice to solicit comments on current rules and proposed rule changes in order to promote understanding and cooperation between government and industry. Many of the comments and conclusions arising from these workships are preserved in ATEC's historical records and have been considered in the preparation of this notice.

The symposia indicated that most of the AMTS believe that the core curriculum needs to be updated to be consistent with the current practices and requirements of the aviation industry.

The FAA/ATEC part 147 symposia findings indicated that lack of clarity in certain portions of the rule has led to some subjective interpretations by FAA Aviation Safety Inspectors certificating or surveilling some AMTS. The interpretation of the current rules has been the focus of many questions from the AMTS industry concerning uniform application of part 147 by the FAA from region to region.

In keeping with FAA policy to continue to upgrade these regulations, the FAA contacted the airlines, AMTS, repair stations, and mechanic organizations to consider holding joint industry/FAA public meetings to discuss proposed changes. The FAA held a series of three public meetings in 1988 that had significant input from the aviation industry. The first meeting was held in Atlanta, Georgia, on August 29 and 30; the second was held in

Oklahoma City, Oklahoma, on September 8 and 9; and the third was held in San Jose, California, on September 15 and 16. The agenda of the meetings was based on the earlier symposia and more recent questions from the AMTS and airline industry. These public meetings produced an outline of certain proposed changes for the rule. It now appears appropriate to consider modifications of the portions of the rule that govern AMTS curriculum, administration, and operating rule requirements.

Planned Actions

The FAA has completed an in-depth review of part 147 based on the recent public meetings and the previous symposia and proposes to amend portions of the rule as appropriate. To the extent possible, the proposals will establish requirements consistent with current and projected industry technologies. The actions planned take into account complex and newly evolving technologies and their relationship to aviation maintenance requirements in the current and future aviation environment. In addition, the FAA proposes to clarify certain portions of the AMTS operating rules to reduce subjective rule interpretations by both the AMTS and the FAA. This will ensure a more uniform application of the rule in each FAA region.

The need for an updated core curriculum expressed by industry is addressed by the proposed amendments to §§ 147.21 and 147.31 and appendixes A, B, C, and D of part 147. The need to clarify the administrative and operating rules is addressed by the proposed amendment to §§ 147.5, 147.15, 147.17, 147.19, 147.21, 147.23, 147.31, 147.35, 147.36, and 147.38.

General Discussion of the Proposals

The AMTS association and the airline industry have expressed a need for both a revised core curriculum and revised administrative requirements for part 147 schools in order to provide an upgraded education to meet the technological requirements of the aviation environment both today and in the future. This concern can be addressed satisfactorily by the proposed changes to part 147 that would modify portions of the required curriculum by specifying what new subjects are to be taught and at what teaching levels these subjects are to be taught, and would provide new language to clarify certain portions of the regulations. It is anticipated that by modifying §§ 147.21 and 147.31 and portions of appendixes A, B, C, and D of part 147, the technical knowledge requirements for aviation maintenance technicians can be raised to the desired levels. The modification of § 147.21, General Curriculum Requirements, and § 147.31, Attendance And Enrollment, Tests and Credit For Prior Instruction Or Experience, will clarify the AMTS operating criteria. This action should also reduce requirements on FAA certification and surveillance resources. Additionally, the FAA believes that the adoption of this proposed rule will result in an increase in safety because of the higher quality graduates that the AMTS are expected to produce.

Under this proposal, the AMTS curriculum will become more explicit and uniform than is now the case. Sections 147.21 and 147.31 have sometimes been inconsistently applied by both the FAA and the AMTS. As an example, these sections have sometimes been misinterpreted as requiring an AMTS student, when not enrolled in a combined airframe and powerplant curriculum, to repeat the general portion of the AMTS curriculum when seeking more than one rating. The FAA proposes to amend these sections to eliminate the potential for misinterpretation by the AMTS. Specifically, these sections will include additional language to clearly provide that the general portion of an AMTS curriculum need only be taken once, regardless of the type of curriculum in which a student is enrolled.

Section 147.5(a)

The current rule requires applicants for AMTS certificates to provide the FAA with a list of instructors and the subjects to be taught by each. This provision currently restricts schools from using otherwise qualified instructors to teach subjects for which they are not listed without prior notification of the FAA. Under the proposal, this section would be changed to require that an applicant provide the FAA only with a list of all of the FAA-certificated instructors it expects to use. This would permit a more efficient use of instructors and would remove an administrative burden from the AMTS and the FAA. The proposal removes the requirement that applicants submit photographs of the facilities, because historically, photographs have not served any useful purpose in determining whether an applicant met acceptable standards.

Section 147.15

Under the proposal, this section would be amended by removing the requirement for separate classroom and shop space. This change would provide more flexibility for schools to better use existing classroom and laboratory areas. The current language requiring suitable space for engine overhaul also would be deleted to eliminate any inference that schools are required to overhaul engines used for mechanic training to an airworthy condition.

Section 147.17(a)(2)

The proposed amendment to this section would require that the applicant's aircraft be fitted with navigation and communications equipment instead of the current requirement for a two-way radio. This change is intended to assure that the schools are exposing students to the types of navigation and communications equipment which are most prevalent in modern aircraft.

Section 147.19

The proposed amendment to this section would eliminate the reference to tools and instead require the AMTS to supply only special tools that might be needed for such projects as engine calibration. This proposed change serves to clarify the existing interpretation on who is financially responsible to provide common tools, the student or the schools.

Section 147.21

Under the proposal, this section would be amended to permit schools to use a standard 50-minute instruction unit hour to conform with the class time practice in use today at most educational institutions. Another proposed amendment to this section would provide specific language to permit schools to teach material at a teaching level equal to or higher than that shown in appendix A of this rule. An additional amendment proposed to this section would provide schools with more flexibility in the scheduling of tests by requiring only a listing of the proposed tests, thereby allowing schools more flexibility in developing test schedules. A final proposed amendment to this section would give schools greater flexibility in allocating student time between practical and theory-based instruction. Thus, the current rule's requirement that 50 percent of the total curriculum time be spent in shop or laboratory classes would be eliminated.

The FAA recognizes that today's aviation maintenance environment requires mechanics to have a sound understanding of entire aircraft computer-based systems, rather than just physical or hands-on experience. Therefore, some schools may desire to place a greater emphasis on theory-based instruction involving the study of computer-based systems. This

amendment would provide that ability. Fundamental, practical experience acquired through hands-on projects would not be compromised by this proposal. All current level 3 curriculum projects will continue to require that students develop hands-on, "return-to-service," skills.

Section 147.23

Under the proposal, this section would be modified to permit schools to use specialized personnel, who are not certificated mechanics, to teach a wider variety of aviation maintenance-related subjects. Under the current rule, specialized personnel are not permitted to teach core subjects. Essentially, such personnel are restricted to teaching theory-based science, mathematics, and drawing courses. The proposal expands the number and types of courses which may be taught by specialized personnel to include basic electricity, basic hydraulics, and similar core subjects.

The FAA recognizes that a mechanic's certificate is not necessary to effectively teach these subjects. The FAA further recognizes that the majority of AMTS are associated with other school systems, such as community colleges. These school systems often employ technical teaching personnel in such subject areas as electrical, civil, and mechanical engineering, all of which are directly related to basic aviation maintenance core subjects. Thus, under the proposal, the AMTS would be able to benefit from the availability and advanced knowledge of these teachers, even though they might not be certificated mechanics.

This amendment would provide the AMTS with a much larger pool of highly educated teachers from which to draw, which may result in an enhanced quality of education at the AMTS, while not negatively impacting upon the quality of shop and laboratory instruction. This amendment should also result in significant financial savings to the AMTS, since many specialized personnel are already on staff in associated school systems, and the AMTS would not have to expend resources recruiting qualified teachers, who are also certificated mechanics, to teach the core subjects.

Section 147.31

Under the proposal, this section would be modified to provide more educational crediting and testing flexibility to schools, which would relieve some of the administrative burdens for both the AMTS and the FAA. Further, schools would be permitted to administer tests after a student completes a unit of instruction as shown in the school's curriculum. It is further proposed that references to the term "mechanic" in this section should be replaced by the expression "aviation maintenance technician." Another amendment proposed for this section would permit a school to credit students for the general curriculum previously taken at that school when completing one rating and beginning another.

Section 147.35

Under the present rule, this section provides that each school "shall give a transcript of his grades to each student" (graduate or withdrawing student). The proposed amendment adds the words "upon request" to the beginning of paragraph (a) of this section, thereby relieving schools of the burden of issuing transcripts although unrequested and possibly undesired.

Section 147.36

Modifications proposed for this section are parallel to those proposed for § 147.23. Changes to this section, if adopted, would permit the expanded use of instructors who are not certificated mechanics to teach certain subjects in the general curriculum.

Section 147.38

The FAA proposes additional language in this section to provide schools with the flexibility to teach approved subjects above the teaching levels shown in appendix A, subject to FAA approval.

Appendix A

Under the proposal, a new paragraph would be added to facilitate the use of currently accepted educational materials and equipment, such as computers, calculators, and audio-visual equipment.

Appendix B

Under the proposal, new material would be added to this section to require higher teaching levels in some fundamental general subjects, such as mathematics and physics; to require lower teaching levels on some obsolescent subjects, such as heat treatment; and to require additional knowledge and skill levels on advanced subjects, such as solid state electronics. The primary focus of proposed changes in this section would be to increase the students' exposure to the fundamental concepts and newer skill requirements that are more relevant to the needs of today's aviation industry.

Appendix C

This proposal would amend part 147, appendix C, to include a required subject area on composite aircraft structural evaluation and repair. This additional subject area would bring the airframe structures subject requirements into conformity with current industry practices in the area of structural composite materials. As in appendix B, the proposal would delete obsolete and reduce obsolescent material in various subject areas, such as aircraft covering, finishes, and wood structures. The proposal intends to increase curriculum offerings in certain current and newly emerging areas of technology, such as composite materials and cabin atmosphere control systems. Additionally, certain teaching levels would be raised to reflect the increased technical levels required in some subject areas. For example, Item 51 in appendix C would have the teaching level increased from level 1 to level 2; Item 6 in appendix D would have the teaching level increased from level 2 to level 3.

Appendix D

The FAA proposes to add new material to this section to increase the level of technical knowledge and skill requirements in the school powerplant curriculum. This proposal is designed to increase teaching level requirements for turbine powerplant service and repair, as well as for powerplant installation and troubleshooting. Certain curriculum material that has limited application, such as woodworking, would have the required teaching levels reduced, and the requirement to teach powerplant water injection systems would be proposed for deletion. It is further proposed that the subject area of propellers would have the section relating to balancing reduced in teaching level, and new sections would be added to require teaching of the repair of metal propeller blades and the inspection and troubleshooting of unducted fans and auxiliary power units.

Paperwork Reduction Act

Information collection requirements in the proposed amendment to part 147 have previously been approved by the Office of Management and Budget (OMB) under the provisions of the Paperwork Reduction Act of 1980 (Pub. L. 96-511) and have been assigned OMB Control Number 2120-0040.

Regulatory Evaluation Summary

This section summarizes a full regulatory evaluation prepared by the FAA which provides more detailed estimates of the economic consequences of this regulatory action. The full evaluation has been placed in the docket; it quantifies, to the extent

practicable, estimated costs to the private sector, consumers, Federal, state, and local governments, as well as anticipated benefits and impacts.

Executive Order 12291 dated February 17, 1981, directs Federal agencies to promulgate new regulations or modify existing regulations only if the potential benefits to society for the regulatory change outweigh the potential costs. The order also requires the preparation of a draft regulatory impact analysis of all "major" proposals except those responding to emergency situations or other narrowly defined exigencies. A "major" proposal is one that is likely to result in an annual effect on the economy of $100 million or more, a major increase in consumer costs, a significant adverse effect on competition, or is highly controversial.

The FAA has determined that this proposed rule is not "major" as defined in the executive order; therefore, a full regulatory analysis, which includes the identification and evaluation of cost reducing alternatives to the proposal, has not been prepared. Instead, the agency has prepared a more concise document termed a regulatory evaluation, which analyzes only this proposed rule without identifying alternatives. In addition to a summary of the regulatory evaluation, this section also contains an initial regulatory flexibility determination, required by the Regulatory Flexibility Act of 1980, and a trade impact assessment.

The intended rule, as proposed, amends part 147 of the Federal Aviation Regulations by modifying the portions of the rule that have been open to subjective judgments by the FAA and the Aviation Maintenance Technician Schools (AMTS) industry, and by upgrading portions that specify the skill and knowledge requirements for an aviation maintenance technician. In addition, the proposal will establish a core curriculum to ensure that a person graduating from an AMTS will be better prepared to function in a technological environment.

The expected benefits from the proposed rule changes derive mostly from reduction in costs to the AMTS resulting from increased flexibility in conducting their business and decreased administrative burdens. An unquantified benefit will be the higher quality graduates the AMTS are expected to produce due to the regulatory changes. These graduates will be better prepared to participate in the extensive on-the-job training programs for new mechanics at the major airlines or to work immediately at smaller operations. The costs of the proposal, if adopted, would fall on the AMTS due to changes in the curriculum and the increased costs associated with these mandated changes.

The costs and benefits of the proposed regulations are estimated for the 10 year period 1990–1999. All figures are in 1989 dollars. Since the AMTS industry is growing and expected to continue to grow over the next 10 years, this growth is reflected in the projected stream of costs and benefits. Using a 10 percent discount rate, the discounted costs over the 10 year period are estimated to be $2.88 million. The average annual cost is $288 thousand. This cost is associated with one-time capital expenditures for schools to meet the new turbine engine, navigation and communication equipment, and electronic equipment curriculum requirements.

The benefits calculated are in the form of reductions in operating and capital costs. Total discounted benefits over the 10 year period are estimated to be $17.97 million. The average annual benefit is $1.80 million. The major area of benefits is in the expansion of the use of instructors who are not certificated mechanics to teach additional material in the curriculum. Another important benefit is the introduction of more flexibility for schools to utilize better existing classroom and laboratory areas.

From a traditional analysis of costs and benefits, the present value benefits of the proposed regulation exceed the present value costs for the 10-year period 1990–1999 by over 6 to 1. This is due to the fact that incremental costs of the proposal are one-time capital costs, while the benefits are largely savings in operating costs that occur on an ongoing basis through the 10 year period of analysis. First year undiscounted benefits and costs are both $2.33 million; however, in subsequent years, benefits continue to increase while costs significantly decrease from 1990 to 1991, and remain constant thereafter.

International Trade Impact Analysis

This proposed regulation will have little or no impact on trade opportunities for both American firms doing business overseas and foreign firms doing business in the United States. The AMTS regulated by part 147 are in the United States. Their product is a service, education, not a commodity traded between the United States and foreign countries. The AMTS does attract foreign students for study. This is due to the generally accepted lead the United States has in aviation technology. The proposed changes to the curriculum in American AMTS may be emulated in AMTS abroad. These changes in curriculum, however, should have little or no impact on foreign trade. Furthermore, the discounted annual costs and benefits involved, $288 thousand and $1.80 million, respectively, are of little consequence when focusing on international trade issues.

Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (RFA) was enacted by Congress to ensure that small entities are not unnecessarily and disproportionately burdened by Government regulations. The review was conducted in accordance with the requirements of the RFA (Pub. L. 96–354, 94 Stat. 1164 (September 19, 1980); Chapter 6 of the Administrative Procedures Act (5 U.S.C. et seq.). The purpose of this review is to identify rules that have a "significant economic impact on a substantial number of small entities" so that the agency can determine whether such rules should be continued without change or should be amended or rescinded, consistent with the stated objectives of applicable statutes.

Part 147 directly impacts AMTS, students, and the FAA. Small entities subject to the RFA are of three types: Small businesses, small not-for-profit organizations, and small government jurisdictions. The FAA has developed guidelines for identifying small entities and assessing economic impact. This report examines classes of small entities whose activities are potentially impacted by part 147 regulations.

In FAA Order 2100.14, the FAA has identified Standard Industrial Classification (SIC) codes for selected aviation-related entity types and established its own size thresholds for these types. These entity types are typically affected by FAA regulations and include aircraft parts manufacturers, aircraft operators, and airports. For those entity types not specifically identified in FAA Order 2100.14, the Small Business Administration's guidelines in 13 CFR are used for size thresholds, but the cost impact threshold is the lowest value given in FAA Order 2100.14 for any SIC.

The AMTS industry is specifically identified in FAA Order 2100.14A and has four digit SIC Code 8299. The size threshold for the AMTS is 150 employees. A substantial number of small entities is defined as any number exceeding one-third of the total of such entities, but not less than 11.

Economic impact on a small entity is measured by those costs that must be incurred, in excess of normal business expenses, solely to satisfy the regulation. Under FAA Order 2100.14A, the lowest cost threshold for the AMTS

entity is $22,400 in 1983 dollars, or, applying the GNP Price Deflator, $27,143 in 1989 dollars.

Under the above definition, it is immediately apparent that there is no significant impact on small businesses since costs to these businesses will decrease due to the proposed changes in part 147. The primary economic impact of the proposed changes to part 147 is a reduction in costs due to removal of obsolete regulatory burdens. The AMTS will in general have more flexibility in running their programs, thus reducing operating and administrative costs. There are some increases in capital costs due to new requirements, but they will be more than offset by the decrease in operating, administrative, and capital cost items due to other proposed provision changes.

The FAA estimates that first-year cost increases due to the proposed regulation will be $2.33 million. The FAA also estimates that the cost reductions due to the regulatory changes will also be $2.33 million in the first year. In the years to follow, cost savings will be greater than cost increases. The present value (10 percent discount rate) cost for the 10 year period is $288 thousand per year, while the present value cost saving (benefits in the regulatory analysis) is $1.80 million per year. The net effect is a cost decrease of $1.50 million per year over the 10 year period of analysis. If we subtract out the reductions in cost the FAA will experience, there is a net cost decrease to the AMTS industry of $1.47 million per year over the 10 year period in present value terms.

The FAA does not have a size distribution of the AMTS industry. The FAA would welcome from the public any information on this topic. The FAA can, however, estimate an average cost savings per AMTS. Over the 10 year period, 1990–1999, there will be an average of 207 AMTS operating per year. This is based on an additional 10 schools being approved each year over the 1989 base level of 152 AMTS. Dividing the average annual net cost decrease by 207 yields a cost savings of approximately $7,100 per year per AMTS.

The FAA has determined that the requirements imposed by the proposed changes to part 147 relax the regulatory burdens on the AMTS; consequently costs should decrease. Small entities as defined by the RFA are not significantly impacted. Therefore, the FAA in its initial regulatory flexibility determination finds that the proposed regulatory changes do not have a significant economic impact on a substantial number of small entities.

Federalism Implications

The regulations proposed herein would not have substantial direct implications on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that this proposal would not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

Conclusion

For the reasons discussed in the preamble, and based on the findings in the Regulatory Flexibility Determination and the International Trade Impact Analysis, the FAA has determined that this proposed regulation is not major under Executive Order 12291. In addition, the FAA certifies that this proposal, if adopted, will not have a significant economic impact, positive or negative, on a substantial number of small entities identified under the criteria of the Regulatory Flexibility Act. This proposal is considered significant under DOT Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). An initial regulatory evaluation of the proposal, including a Regulatory Flexibility Determination and Trade Impact Analysis, has been placed in the docket. A copy may be obtained by contacting the person identified under "FOR FURTHER INFORMATION CONTACT."

List of Subjects in 14 CFR Part 147

Aviation safety, Aviation maintenance technician schools, Administrative and curriculum requirements.

The Proposed Amendment

In consideration of the foregoing, the Federal Aviation Administration proposes to amend part 147 of the Federal Aviation Regulations (14 CFR part 147) to read as follows:

PART 147—AVIATION MAINTENANCE TECHNICIAN SCHOOLS

1. The authority citation for part 147 is revised to read as follows:

Authority: Secs. 313(a), 314, 601 and 607, 72 Stat. 752; 49 U.S.C. App. 1354(a), 1355, 1421, and 1427.

2. Section 147.5 is amended by revising paragraphs (a)(2) and (a)(3) to read as follows:

§ 147.5 Application and issue.

(a) * * *

(2) A list of the facilities and materials to be used;

(3) A list of its instructors, including the kind of certificate and ratings held and the certificate numbers; and

* * * * *

3. Section 147.15 is amended by revising paragraphs (a), (b), (c), (d), (f) introductory text, (g), and (h) to read as follows:

§ 147.15 Space requirements.

* * * * *

(a) An enclosed classroom suitable for teaching theory classes.

(b) Suitable facilities, either central or located in training areas, arranged to assure proper separation from the working space, for parts, tools, materials, and similar articles.

(c) Suitable area for application of finishing materials, including paint spraying.

(d) Suitable area equipped with washtank and degreasing equipment with air pressure or other adequate cleaning equipment.

* * * * *

(f) Suitable area with adequate equipment, including benches, tables, and test equipment, to disassemble, service, and inspect—

* * * * *

(g) Suitable space with adequate equipment, including tables, benches, stands, and jacks, for disassembling, inspecting, and rigging aircraft.

(h) Suitable space with adequate equipment for disassembling, inspecting, assembling, troubleshooting, and timing engines.

4. Section 147.17 is amended by revising paragraph (a)(2) to read as follows:

§ 147.17 Instructional equipment requirements.

(a) * * *

(2) At least one aircraft of a type currently certificated by FAA for private or commercial operation, with powerplant, propeller, instruments, navigation and communications equipment, landing lights, and other equipment and accessories on which a maintenance technician might be required to work and with which he should be familiar.

* * * * *

5. Section 147.19 is revised to read as follows:

§ 147.19 Materials, special tools, and shop equipment requirements.

An applicant for an aviation maintenance technician school certificate and rating, or for an additional rating, must have an

adequate supply of material, special tools, and such of the shop equipment as are appropriate to the approved curriculum of the school and are used in constructing and maintaining aircraft, to assure that each student will be properly instructed. The special tools and shop equipment must be in satisfactory working condition for the purpose for which they are to be used.

6. Section 147.21 is amended by revising paragraph (b) introductory text, paragraphs (c) and (d)(3), and by removing paragraph (e) to read as follows:

§ 147.21 General curriculum requirements.

* * * * *

(b) The curriculum must offer at least the following number of hours of instruction for the rating shown, and the instruction unit hour shall not be less than 50 minutes in length—

* * * * *

(c) The curriculum must cover the subjects and items prescribed in appendixes B, C, or D, as applicable. Each item must be taught to at least the indicated level of proficiency, as defined in appendix A.

(d) * * *

(3) A list of the minimum required school tests to be given.

7. Section 147.23 is revised to read as follows:

§ 147.23 Instructor requirements.

An applicant for an aviation maintenance technician school certificate and rating, or for an additional rating, must provide the number of instructors holding appropriate mechanic certificates and ratings that the Administrator determines necessary to provide adequate instruction and supervision of the students, including at least one such instructor for each 25 students in each shop class. However, the applicant may provide specialized instructors, who are not certificated mechanics, to teach mathematics, physics, basic electricity, basic hydraulics, drawing, and similar subjects. The applicant is required to maintain a list of names and qualifications of specialized instructors, and upon request, provide a copy of the list to the FAA.

8. Section 147.31 is amended by revising paragraphs (b), (c)(1)(iv), (c)(3), and (e) and adding paragraph (c)(4) to read as follows:

§ 147.31 Attendance and enrollment, tests, and credit for prior instruction or experience.

* * * * *

(b) Each school shall give an appropriate test to each student who completes a unit of instruction as shown in that school's approved curriculum.

(c) * * *

(1) * * *

(iv) A certificated aviation maintenance technician school.

* * * * *

(3) A school may credit a student with previous aviation maintenance experience comparable to required curriculum subjects. It must determine the amount of credit to be allowed by documents verifying that experience, and by giving the student a test equal to the one given to students who complete the comparable required curriculum subject at the school.

(4) A school may credit a student seeking an additional rating with previous satisfactory completion of the general portion of an AMTS curriculum.

* * * * *

(e) A school shall use an approved system for determining final course grades and for recording student attendance. The system must show hours of absence allowed and show how the missed material will be made available to the student.

9. Section 147.35 is amended by revising paragraph (a) to read as follows:

§ 147.35 Transcripts and graduation certificates.

(a) Upon request, each certificated aviation maintenance technician school shall provide a transcript of the student's grades to each student who is graduated from that school or who leaves it before being graduated. An official of the school shall authenticate the transcript. The transcript must state the curriculum in which the student was enrolled, whether the student satisfactorily completed that curriculum, and the final grades the student received.

* * * * *

10. Section 147.36 is revised to read as follows:

§ 147.36 Maintenance of instructor requirements.

Each certificated aviation maintenance technician school shall, after certification or addition of a rating, continue to provide the number of instructors holding appropriate mechanic certificates and ratings that the Administrator determines necessary to provide adequate instruction to the students, including at least one such instructor for each 25 students in each shop or laboratory class. The school may continue to provide specialized instructors who are not certificated mechanics to each mathematics, physics, drawing, basic electricity, basis hydraulics, and similar subjects.

11. Section 147.38 is amended by revising paragraph (a) to read as follows:

§ 147.38 Maintenance of curriculum requirements.

(a) Each certificated aviation maintenance technician school shall adhere to its approved curriculum. With FAA approval, curriculum subjects may be taught at levels exceeding those shown in appendix A of this part.

* * * * *

12. Appendix A is amended by revising paragraph (b) (3) (ii) and by adding a new paragraph (c) to read as follows:

Appendix A to Part 147—Curriculum Requirements

* * * * *

(b) * * *

(3) * * *

(ii) Development of sufficient manipulative skills to simulate return to service.

* * * * *

(c) Teaching materials and equipment.

The curriculum may be presented utilizing currently accepted educational materials and equipment, including, but not limited to: calculators, computers, and audio-visual equipment.

13. Appendix B is amended by revising items, 1, 3, 5, 7, 15, 16, 20, 23, 24, 25, 28, 30, and 31 to read as follows:

Appendix B to Part 147—General Curriculum Subjects

* * * * *

Teaching level	
(2)	1. Calculate and measure capacitance and inductance.
* * * * *	
(3)	3. Measure voltage, current, resistance, and continuity.
* * * * *	
(3)	5. Read and interpret aircraft electrical circuit diagrams, including solid state devices and logic functions.
* * * * *	
(2)	7. Use aircraft drawings, symbols, and system schematics.
* * * * *	
(2)	15. Perform dye penetrant, eddy current, ultrasonic, and magnetic particle inspections.
(1)	16. Perform basic heat-treating processes.
* * * * *	
(2)	20. Start, ground operate, move, service, and secure aircraft and identify typical ground operation hazards.
* * * * *	
(3)	23. Identify, remove, and treat aircraft corrosion and perform aircraft cleaning.
(3)	24. Extract roots and raise numbers to a given power.
(3)	25. Determine areas and volumes of various geometrical shapes.
* * * * *	

Teaching level	
(3)	28. Write descriptions of aircraft discrepancies and corrective actions using typical aircraft maintenance records.
(2)	30. Develop and use the principles of simple machines; sound, fluid, and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight.
(3)	31. Demonstrate ability to read, comprehend, and apply information contained in FAA and manufacturers' aircraft maintenance specifications, data sheets, manuals, publications, and related Federal Aviation Regulations, Airworthiness Directives, and Advisory material.

14. Appendix C is amended by revising items 2, 3, 5, 8, 10, 12, 16, 21, 25, 26, 33, 36, 37, 38, 39, 48, 50, 51, and 52, and the heading for Subject D under I. to read as follows:

Appendix C to Part 147—Airframe Curriculum Subjects

Teaching level	
(1)	2. Identify wood defects.
(1)	3. Inspect wood structures.
(1)	5. Inspect, test, and repair fabric and fiberglass.
(2)	8. Apply finishing materials.
	D. Sheet Metal and Non-Metallic Structures
(2)	10. Select, install, and remove special fasteners for metallic, bonded, and composite structures.
(2)	12. Inspect, test, and repair fiberglass, plastics, honeycomb, composite, and laminated primary and secondary structures.
(3)	16. Form, lay out, and bend sheet metal.
(1)	21. Weld aluminum and stainless steel.
(3)	25. Assemble aircraft components, including flight control surfaces.
(3)	26. Balance, rig, and inspect movable primary and secondary flight control surfaces.
(1)	33. Inspect, check, troubleshoot, service, and repair heating, cooling, air conditioning, pressurization systems, and air cycle machines.
(1)	36. Inspect, check, service, troubleshoot, and repair electronic flight instrument systems and both mechanical and electrical heading, speed, altitude, temperature, pressure, and position indicating systems to include the use of built-in test equipment.
(2)	37. Install instruments and perform a static pressure system leak test.
(1)	38. Inspect, check, and troubleshoot autopilot servos and approach coupling systems.
(1)	39. Inspect, check, and service aircraft electronic communication and navigation systems, including VHF passenger address interphones and static discharge devices, aircraft VOR, ILS, Omega, flight management computers, and GPWS.
(2)	48. Repair and inspect aircraft electrical system components; crimp and splice wiring to manufacturers' specifications; and repair pins and sockets of aircraft connectors.
(3)	50. Inspect, check, troubleshoot, service, and repair alternating current and direct current electrical systems and constant speed and integrated drive generators.
(2)	51. Inspect, check, and service speed and takeoff warning systems, electrical brake controls, and antiskid systems.
(3)	52. Inspect, check, troubleshoot, and service landing gear position indicating and warning systems.

15. Appendix D is amended by revising items 1, 3, 6, 7, 9, 10, 18, 19, 20, 27, 32, and 35; by revising the headings for subjects H and J; under II. by adding a new item 39 under II. heading K; and by adding new subject heading L, consisting of item 40, and heading M, consisting of item 41, to read as follows:

Appendix D to Part 147—Powerplant Curriculum Subjects

Teaching level	
(1)	1. Inspect and repair a radial engine.
(3)	3. Inspect, check, service, and repair reciprocating engines and engine installations.
(3)	6. Inspect, check, service, and repair turbine engines and turbine engine installations.
(3)	7. Install, troubleshoot, and remove turbine engines.
(2)	9. Troubleshoot, service, and repair electrical and mechanical fluid rate-of-flow indicating systems.
(3)	10. Inspect, check, service, troubleshoot, and repair electrical and mechanical engine temperature, pressure, and r.p.m. indicating systems.
(2)	18. Inspect, service, troubleshoot, and repair reciprocating and turbine engine ignition systems and components.
(3)	19. Inspect, service, troubleshoot, and repair turbine engine electrical and pneumatic starting systems.
(1)	20. Troubleshoot and adjust turbine engine fuel metering systems and electronic engine fuel controls.
	H. Induction and Engine Airflow Systems
(1)	27. Inspect, check, service, troubleshoot and repair heat exchangers, superchargers, and turbine engine airflow and temperature control systems.
	J. Engine Exhaust and Reverser Systems
(1)	32. Repair and troubleshoot engine exhaust systems, thrust reverser systems, and related components.
(1)	35. Balance propellers.
(3)	39. Repair aluminum alloy propeller blades.
	L. Unducted Fans
(1)	40. Inspect and troubleshoot unducted fan systems and components.
	M. Auxiliary Power Units
(1)	41. Inspect, check, service, and troubleshoot turbine-driven auxiliary power units.

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