asa

2026 FAR-AMT

FEDERAL AVIATION REGULATIONS FOR AVIATION MAINTENANCE TECHNICIANS

RULES FOR AVIATION MECHANICS, MAINTENANCE OPERATIONS, AND REPAIR SHOPS

U.S. Department of Transportation

From Title 14 of the Code of Federal Regulations

2026 FAR-AMT

FEDERAL AVIATION REGULATIONS FOR AVIATION MAINTENANCE TECHNICIANS

Rules for Aviation Mechanics, Maintenance Operations, and Repair Shops
U.S. Department of Transportation
From Title 14 of the Code of Federal Regulations

AVIATION SUPPLIES & ACADEMICS, INC.
NEWCASTLE, WASHINGTON

SAMPLE

FAR-AMT
Federal Aviation Regulations for Aviation Maintenance Technicians
2026 Edition

Aviation Supplies & Academics, Inc.
7005 132nd Place SE
Newcastle, Washington 98059
asa@asa2fly.com | 425-235-1500 | asa2fly.com

Copyright © 2025 Aviation Supplies & Academics, Inc.
First edition published 1945. 2026 edition published 2025.

This publication contains current regulations as of June 10, 2025.

Visit the FAA's website to review changes to the regulations:
www.faa.gov/regulations_policies/faa_regulations/

Visit **asa2fly.com/farupdate** for regulation changes released after this printing date and to sign up for ASA's free FAR/AIM Update subscription service.

Also visit ASA's website to access this book's Reader Resources containing additional regulatory information pertinent to Aviation Maintenance Technicians:
asa2fly.com/faramt

All rights reserved.

None of the material in this publication supersedes any documents, procedures, or regulations issued by the Federal Aviation Administration or Department of Transportation.

ASA does not claim copyright on any material published herein that was taken from United States government sources.

Front cover photo: iStock.com/Bondariev

ASA-26-FAR-AMT
ISBN 978-1-64425-504-9

Additional formats available:
eBook EPUB ISBN 978-1-64425-505-6
eBook PDF ISBN 978-1-64425-506-3

Printed in the United States of America

2026 2025 9 8 7 6 5 4 3 2 1

03

SAMPLE

Stay informed with ASA online resources.

Website
asa2fly.com

Updates
asa2fly.com/farupdate

Follow, like, share.
instagram.com/asa2fly
facebook.com/asa2fly
youtube.com/asa2fly
linkedin.com/company/asa2fly

2026 FAR-AMT

FEDERAL AVIATION REGULATIONS FOR AVIATION MAINTENANCE TECHNICIANS

Contents

Introduction: ASA 2026 FAR/AIM Series v

Identifying Regulation Changes Since Last Year vi

Summary of Major FAR Changes Since the 2025 Book Was Published vii

FAR Parts Listed in Titles 14 and 49 of the Code of Federal Regulations ix

FAR for Aviation Maintenance Technicians 1

Advisory Circulars 563

FAR-AMT Index 655

SAMPLE

Stay current on all regulation changes that affect this book with ASA's free Update service:
asa2fly.com/farupdate

Regs on the go!
ASA's FAR/AIM app, available for Apple and Android devices, includes the regulations, *AIM*, and advisory circulars from the complete ASA FAR/AIM Series: *FAR/AIM*, *FAR for Flight Crew*, and *FAR for Aviation Maintenance Technicians*!

SAMPLE

Introduction

ASA 2026 FAR/AIM Series
FAR/AIM • FAR for Flight Crew • FAR for AMT

ASA has been supplying the standard reference of the industry, the FAR/AIM series, for 80 years. The 2026 series continues to provide information directly from the Federal Aviation Regulations and the *Aeronautical Information Manual*.

Each regulation Part is preceded by a detailed table of contents. Changes since last year's printing are identified on Page vii and in the table of contents for each regulation Part (in bold and marked with an asterisk), as well as within the text for quick reference (changed text is indicated with a bold line in the margin). In the *AIM*, changes are explained in a list at the beginning and with bold lines in the margins. It is recommended that you familiarize yourself with all the changes to identify those that affect your aviation activities.

Changes affecting the regulations can take place daily; the *AIM* changes every 6 months. ASA tracks all changes and offers you two options for free **Updates** at **asa2fly.com/farupdate**:

- You can download the latest Updates from the ASA website anytime.
- You may sign up for ASA's free service to have Update notices automatically emailed to you.

Visit the Federal Aviation Administration (FAA) website at www.faa.gov to review Advisory Circulars (AC), Notices of Proposed Rulemaking (NPRM), current regulations, FSDO contact details, and FAA Orders and publications. Pilots operating internationally should be familiar with Customs and Border Protection regulations, which can be found at cbp.gov.

Although ASA is not a government agency, and we do not write the regulations or the *AIM*, we do work closely with the FAA. Questions or concerns can be forwarded to our attention, and we will in turn pass the comments on to the responsible office within the agency. The FAA is interested in user feedback and your comments could foster improvements in the regulations that affect the entire industry.

FAR/AIM Comments
Aviation Supplies & Academics, Inc.
7005 132nd Place SE
Newcastle, Washington 98059

Website asa2fly.com
Email asa@asa2fly.com

SAMPLE

Identifying Regulation Changes Since Last Year

Changes since last year's printing of the book are noted in the table of contents of each Part with an asterisk and bold title:

Example:

***61.5 Certificates and ratings issued under this part.**

The updated text within the context of the regulation is indicated by a bold line in the margin:

(a) The following certificates are issued under this part to an applicant who satisfactorily accomplishes the training and certification requirements for the certificate sought:
(1) Pilot certificates—
(i) Student pilot.
(ii) Sport pilot.
(iii) Recreational pilot.
(iv) Private pilot.
(v) Commercial pilot.
(vi) Airline transport pilot.
(2) Flight instructor certificates.
(3) Ground instructor certificates.

How to Identify the Currency of the Regulations

In each Part following the Table of Contents is a Source, with the date of origin for that regulation.

Example:

Docket number within the Federal Registers, where original text can be found

Federal Register volume 74, page 42552

SOURCE: Docket No. FAA–2006–26661, 74 FR 42552, Aug. 21, 2009, unless otherwise noted.

Date regulation was written

If a change has taken place since the original Regulation was written, it is noted at the end of the regulation.

Example:

Docket number within the Federal Registers

Federal Register volume 74, page 42552, where the original text of regulation is

Date original regulation was written

[Docket No. FAA–2006–26661, 74 FR 42552, Aug. 21, 2009; as amended by Amdt. 61–125, 75 FR 5220, Feb. 1, 2010]

Amendment number, the change to the regulation; in the Federal Register

Federal Register volume 75, page 5220, where Amendment can be found

Date change took place

SAMPLE

Summary of Major FAR Changes Since the 2025 Book Was Published

All changes are identified in the table of contents of each Part with bold Section titles and asterisks and in the regulation text with bold lines in the margins.

These regulation changes from the *Federal Register* affect this book as follows:

14 CFR

Parts 1, 43, 91, 135

- Adopts permanent amendments and a Special Federal Aviation Regulation (SFAR) for a period of ten years to facilitate the certification of powered-lift pilots, clarify operating rules applicable to operations involving a powered-lift, and finalize other amendments which are necessary to integrate powered-lift into the National Airspace System (NAS). *(Part 194 containing SFAR No. 120—Powered-Lift: Pilot Certification and Training; Operations Requirements—is accessible online at ecfr.gov and in ASA's FAR/AIM app.)*

Parts 1, 91

- Allows pilots conducting public aircraft operations to credit their flight time toward FAA civil regulatory requirements; amends the operating rules for experimental aircraft to permit certain flight training, testing, and checking in these aircraft without a letter of deviation authority and extends the same relief for limited category, primary category, and experimental light sport aircraft; and revises miscellaneous amendments related to recent flight experience, flight instructor privileges, and flight training in certain aircraft holding special airworthiness certificates.

Parts 1, 91, 135

- Prohibits civil aircraft operations conducted with supplemental restraint systems (SRS) unless operators meet certain requirements for ensuring passenger and crewmember safety during all phases of the operation.

Part 3

- Requires individuals with foreign addresses, and no US physical address of record on file with the FAA, who hold or apply for certain certificates, ratings, or authorizations to designate a US agent for service of FAA documents.

Part 13

- Provides the statutorily prescribed 2025 adjustment to civil penalty amounts that may be imposed for violations of certain DOT regulations.

Part 47

- Amends FAA regulations pertaining to aircraft registration and dealer's registration certificates to facilitate the electronic issuance of these certificates.
- Updates certain procedural regulations relating to civil aircraft registration to provide administrative relief.

Part 65

- Relocates and codifies Special Federal Aviation Regulation (SFAR) No. 100–2, *Relief for U.S. Military and Civilian Personnel who are Assigned Outside the United States in Support of U.S. Armed Forces Operations*, into parts 61, 63, and 65, respectively.
- Removes the expiration date on flight instructor certificates to align with other airman certificates; changes the flight instructor certificate renewal requirements to recent experience requirements; adds two new methods for flight instructors to qualify to train initial applicants; and other provisions.

(continued)

SAMPLE

Part 91

- Amends BasicMed regulations to align aircraft conditions and limitations with the term “covered aircraft” to increase the number of allowable passengers from 5 to 6, increase the number of occupants from 6 to 7, and increase the maximum takeoff weight from 6,000 pounds to 12,500 pounds, while excluding certain transport category rotorcraft.
- Modifies some flight operations in the Kabul Flight Information Region (FIR) (OAKX).
- Extends the prohibition against certain flight operations in the Tehran Flight Information Region (FIR) (OIIX) for an additional three years, from October 31, 2024, to October 31, 2027.
- Extends the prohibition against certain flight operations in the Baghdad Flight Information Region (FIR) (ORBB) for an additional three years, from October 26, 2024, to October 26, 2027.
- Extends the prohibition against certain flight operations in specified areas of the Sanaa Flight Information Region (FIR) (OYSC) for an additional three years, from January 7, 2025, until January 7, 2028.
- Extends the prohibition against certain flight operations in the territory and airspace of Libya for an additional three years, from March 20, 2025, to March 20, 2028.
- Replaces the pilot safety background check required by this section with compliance with 14 CFR Part 111.

Parts 91, 121, 125

- Amends regulations to allow aircraft to operate either with “No Smoking” signs continuously illuminated or with “No Smoking” signs a crewmember can turn on and off.

Parts 91, 135

- Finalizes the substantive relief proposed in the notice of proposed rulemaking entitled *Removal of Check Pilot Medical Certificate Requirement*, amending certain medical certificate requirements to remove inconsistencies applicable to the qualification requirements for check pilots and flight instructors.

Note: Changes affecting the regulations can take place daily. ASA tracks all changes and posts them on the ASA website so you always have the most current information. To view the rules currently in effect and to have Update notices automatically emailed to you, visit **asa2fly.com/farupdate**.

SAMPLE

FAR-AMT Contents

Federal Aviation Regulations (from Title 14 of the Code of Federal Regulations)

Part 1	Definitions and Abbreviations	3
Part 3	General Requirements	13
Part 5	Safety Management Systems	15
Part 13	Investigative and Enforcement Procedures	21
Part 21	Certification Procedures for Products and Articles	49
Part 23	Airworthiness Standards: Normal Category Airplanes	79
Part 26	Continued Airworthiness and Safety Improvements for Transport Category Airplanes	93
Part 27	Airworthiness Standards: Normal Category Rotorcraft	105
Part 33	Airworthiness Standards: Aircraft Engines	161
Part 34	Fuel Venting and Exhaust Emission Requirements for Turbine Engine Powered Airplanes	193
Part 35	Airworthiness Standards: Propellers	205
Part 38	Airplane Fuel Efficiency Certification	211
Part 39	Airworthiness Directives	219
Part 43	Maintenance, Preventive Maintenance, Rebuilding, and Alteration	221
Part 45	Identification and Registration Marking	233
Part 47	Aircraft Registration	237
Part 48	Registration and Marking Requirements for Small Unmanned Aircraft	247
Part 65	Certification: Airmen Other Than Flight Crewmembers	251
Part 91	General Operating and Flight Rules	267
Part 110	General Requirements *(Air Carriers and Operators for Compensation or Hire)*	373
Part 119	Certification: Air Carriers and Commercial Operators	375
Part 121	Operating Requirements: Domestic, Flag, and Supplemental Operations	387
Part 125	Certification and Operations of Large Aircraft	407
Part 135	Operating Requirements: Commuter and On Demand Operations	455
Part 145	Repair Stations	545
Part 147	Aviation Maintenance Technician Schools	555
Part 183	Representatives of the Administrator	557

SAMPLE

PART 33

AIRWORTHINESS STANDARDS: AIRCRAFT ENGINES

Subpart A—General

Sec.
33.1 Applicability.
33.3 General.
33.4 Instructions for Continued Airworthiness.
33.5 Instruction manual for installing and operating the engine.
33.7 Engine ratings and operating limitations.
33.8 Selection of engine power and thrust ratings.

Subpart B—Design and Construction: General

33.11 Applicability.
33.13 [Reserved]
33.15 Materials.
33.17 Fire protection.
33.19 Durability.
33.21 Engine cooling.
33.23 Engine mounting attachments and structure.
33.25 Accessory attachments.
33.27 Turbine, compressor, fan, and turbosupercharger rotor overspeed.
33.28 Engine control systems.
33.29 Instrument connection.

Subpart C—Design and Construction: Reciprocating Aircraft Engines

33.31 Applicability.
33.33 Vibration.
33.34 Turbocharger rotors.
33.35 Fuel and induction system.
33.37 Ignition system.
33.39 Lubrication system.

Subpart D—Block Tests: Reciprocating Aircraft Engines

33.41 Applicability.
33.42 General.
33.43 Vibration test.
33.45 Calibration tests.
33.47 Detonation test.
33.49 Endurance test.
33.51 Operation test.
33.53 Engine system and component tests.
33.55 Teardown inspection.
33.57 General conduct of block tests.

Subpart E—Design and Construction: Turbine Aircraft Engines

33.61 Applicability.
33.62 Stress analysis.
33.63 Vibration.
33.64 Pressurized engine static parts.
33.65 Surge and stall characteristics.
33.66 Bleed air system.
33.67 Fuel system.
33.68 Induction system icing.
33.69 Ignitions system.
33.70 Engine life-limited parts.
33.71 Lubrication system.
33.72 Hydraulic actuating systems.
33.73 Power or thrust response.
33.74 Continued rotation.
33.75 Safety analysis.
33.76 Bird ingestion.
33.77 Foreign object ingestion—ice.
33.78 Rain and hail ingestion.
33.79 Fuel burning thrust augmentor.

Subpart F—Block Tests: Turbine Aircraft Engines

33.81 Applicability.
33.82 General.
33.83 Vibration test.
33.84 Engine overtorque test.
33.85 Calibration tests.
33.87 Endurance test.
33.88 Engine overtemperature test.
33.89 Operation test.
33.90 Initial maintenance inspection test.
33.91 Engine system and component tests.
33.92 Rotor locking tests.
33.93 Teardown inspection.
33.94 Blade containment and rotor unbalance tests.
33.95 Engine-propeller systems tests.
33.96 Engine tests in auxiliary power unit (APU) mode.
33.97 Thrust reversers.
33.99 General conduct of block tests.

Subpart G—Special Requirements: Turbine Aircraft Engines

33.201 Design and test requirements for Early ETOPS eligibility.

APPENDICES TO PART 33

Appendix A to Part 33—Instructions for Continued Airworthiness
Appendix B to Part 33—Certification Standard Atmospheric Concentrations of Rain and Hail
Appendix C to Part 33—[Reserved]
Appendix D to Part 33—Mixed Phase and Ice Crystal Icing Envelope (Deep Convective Cloud)

Authority: 49 U.S.C. 106(g), 40113, 44701, 44702, 44704.

Source: Docket No. 3025, 29 FR 7453, June 10, 1964, unless otherwise noted.

Editorial Note: *For miscellaneous amendments to cross references in this Part 33, see Amdt. 33–2, 31 FR 9211, July 6, 1966.*

SAMPLE

33

Subpart A—General

§33.1 Applicability.

(a) This part prescribes airworthiness standards for the issue of type certificates and changes to those certificates, for aircraft engines.

(b) Each person who applies under part 21 for such a certificate or change must show compliance with the applicable requirements of this part and the applicable requirements of part 34 of this chapter.

[Amdt. 33–7, 41 FR 55474, Dec. 20, 1976, as amended by Amdt. 33–14, 55 FR 32861, Aug. 10, 1990]

§33.3 General.

Each applicant must show that the aircraft engine concerned meets the applicable requirements of this part.

§33.4 Instructions for Continued Airworthiness.

The applicant must prepare Instructions for Continued Airworthiness in accordance with Appendix A to this part that are acceptable to the Administrator. The instructions may be incomplete at type certification if a program exists to ensure their completion prior to delivery of the first aircraft with the engine installed, or upon issuance of a standard certificate of airworthiness for the aircraft with the engine installed, whichever occurs later.

[Amdt. 33–9, 45 FR 60181, Sept. 11, 1980]

§33.5 Instruction manual for installing and operating the engine.

Each applicant must prepare and make available to the Administrator prior to the issuance of the type certificate, and to the owner at the time of delivery of the engine, approved instructions for installing and operating the engine. The instructions must include at least the following:

(a) ***Installation instructions.***

(1) The location of engine mounting attachments, the method of attaching the engine to the aircraft, and the maximum allowable load for the mounting attachments and related structure.

(2) The location and description of engine connections to be attached to accessories, pipes, wires, cables, ducts, and cowling.

(3) An outline drawing of the engine including overall dimensions.

(4) A definition of the physical and functional interfaces with the aircraft and aircraft equipment, including the propeller when applicable.

(5) Where an engine system relies on components that are not part of the engine type design, the interface conditions and reliability requirements for those components upon which engine type certification is based must be specified in the engine installation instructions directly or by reference to appropriate documentation.

(6) A list of the instruments necessary for control of the engine, including the overall limits of accuracy and transient response required of such instruments for control of the operation of the engine, must also be stated so that the suitability of the instruments as installed may be assessed.

(b) ***Operation instructions.***

(1) The operating limitations established by the Administrator.

(2) The power or thrust ratings and procedures for correcting for nonstandard atmosphere.

(3) The recommended procedures, under normal and extreme ambient conditions for—

(i) Starting;

(ii) Operating on the ground; and

(iii) Operating during flight.

(4) For rotorcraft engines having one or more OEI ratings, applicants must provide data on engine performance characteristics and variability to enable the aircraft manufacturer to establish aircraft power assurance procedures.

(5) A description of the primary and all alternate modes, and any back-up system, together with any associated limitations, of the engine control system and its interface with the aircraft systems, including the propeller when applicable.

(c) ***Safety analysis assumptions.*** The assumptions of the safety analysis as described in §33.75(d) with respect to the reliability of safety devices, instrumentation, early warning devices, maintenance checks, and similar equipment or procedures that are outside the control of the engine manufacturer.

[Amdt. 33–6, 39 FR 35463, Oct. 1, 1974, as amended by Amdt. 33–9, 45 FR 60181, Sept. 11, 1980; Amdt. 33–24, 72 FR 50867, Sept. 4, 2007; Amdt. 33–25, 73 FR 48123, Aug. 18, 2008; Amdt. 33–26, 73 FR 48284, Aug. 19, 2008]

§33.7 Engine ratings and operating limitations.

(a) Engine ratings and operating limitations are established by the Administrator and included in the engine certificate data sheet specified in §21.41 of this chapter, including ratings and limitations based on the operating conditions and information specified in this section, as applicable, and any other information found necessary for safe operation of the engine.

(b) For reciprocating engines, ratings and operating limitations are established relating to the following:

(1) Horsepower or torque, r.p.m., manifold pressure, and time at critical pressure altitude and sea level pressure altitude for—

(i) Rated maximum continuous power (relating to unsupercharged operation or to operation in each supercharger mode as applicable); and

(ii) Rated takeoff power (relating to unsupercharged operation or to operation in each supercharger mode as applicable).

(2) Fuel grade or specification.

(3) Oil grade or specification.

(4) Temperature of the—

(i) Cylinder;

(ii) Oil at the oil inlet; and

(iii) Turbosupercharger turbine wheel inlet gas.

(5) Pressure of—

(i) Fuel at the fuel inlet; and

(ii) Oil at the main oil gallery.

(6) Accessory drive torque and overhang moment.

(7) Component life.

(8) Turbosupercharger turbine wheel r.p.m.

(c) For turbine engines, ratings and operating limitations are established relating to the following:

(1) Horsepower, torque, or thrust, r.p.m., gas temperature, and time for—

(i) Rated maximum continuous power or thrust (augmented);

(ii) Rated maximum continuous power or thrust (unaugmented);

(iii) Rated takeoff power or thrust (augmented);

(iv) Rated takeoff power or thrust (unaugmented);

(v) Rated 30–minute OEI power;

(vi) Rated 2-1/2 minute OEI power;

(vii) Rated continuous OEI power; and

(viii) Rated 2-minute OEI power;

SAMPLE

(ix) Rated 30-second OEI power; and
(x) Auxiliary power unit (APU) mode of operation.
(2) Fuel designation or specification.
(3) Oil grade or specification.
(4) Hydraulic fluid specification.
(5) Temperature of—
(i) Oil at a location specified by the applicant;
(ii) Induction air at the inlet face of a supersonic engine, including steady state operation and transient over-temperature and time allowed;
(iii) Hydraulic fluid of a supersonic engine;
(iv) Fuel at a location specified by the applicant; and
(v) External surfaces of the engine, if specified by the applicant.
(6) Pressure of—
(i) Fuel at the fuel inlet;
(ii) Oil at a location specified by the applicant;
(iii) Induction air at the inlet face of a supersonic engine, including steady state operation and transient overpressure and time allowed; and
(iv) Hydraulic fluid.
(7) Accessory drive torque and overhang moment.
(8) Component life.
(9) Fuel filtration.
(10) Oil filtration.
(11) Bleed air.
(12) The number of start-stop stress cycles approved for each rotor disc and spacer.
(13) Inlet air distortion at the engine inlet.
(14) Transient rotor shaft overspeed r.p.m., and number of overspeed occurrences.
(15) Transient gas overtemperature, and number of overtemperature occurrences.
(16) Transient engine overtorque, and number of overtorque occurrences.
(17) Maximum engine overtorque for turbopropeller and turboshaft engines incorporating free power turbines.
(18) For engines to be used in supersonic aircraft, engine rotor windmilling rotational r.p.m.

(d) In determining the engine performance and operating limitations, the overall limits of accuracy of the engine control system and of the necessary instrumentation as defined in §33.5(a)(6) must be taken into account.

[Amdt. 33–6, 39 FR 35463, Oct. 1, 1974, as amended by Amdt. 33–10, 49 FR 6850, Feb. 23, 1984; Amdt. 33–11, 51 FR 10346, Mar. 25, 1986; Amdt. 33–12, 53 FR 34220, Sept. 2, 1988; Amdt. 33–18, 61 FR 31328, June 19, 1996; Amdt. 33–26, 73 FR 48284, Aug. 19, 2008; Amdt. 33–30, 74 FR 45310, Sept. 2, 2009]

§33.8 Selection of engine power and thrust ratings.

(a) Requested engine power and thrust ratings must be selected by the applicant.

(b) Each selected rating must be for the lowest power or thrust that all engines of the same type may be expected to produce under the conditions used to determine that rating.

[Amdt. 33–3, 32 FR 3736, Mar. 4, 1967]

Subpart B—Design and Construction: General

§33.11 Applicability.

This subpart prescribes the general design and construction requirements for reciprocating and turbine aircraft engines.

§33.13 [Reserved]

§33.15 Materials.

The suitability and durability of materials used in the engine must—

(a) Be established on the basis of experience or tests; and

(b) Conform to approved specifications (such as industry or military specifications) that ensure their having the strength and other properties assumed in the design data.

(Secs. 313(a), 601, and 603, 72 Stat. 759, 775, 49 U.S.C. 1354(a), 1421, and 1423; sec. 6(c), 49 U.S.C. 1655(c))

[Amdt. 33–8, 42 FR 15047, Mar. 17, 1977, as amended by Amdt. 33–10, 49 FR 6850, Feb. 23, 1984]

§33.17 Fire protection.

(a) The design and construction of the engine and the materials used must minimize the probability of the occurrence and spread of fire during normal operation and failure conditions, and must minimize the effect of such a fire. In addition, the design and construction of turbine engines must minimize the probability of the occurrence of an internal fire that could result in structural failure or other hazardous effects.

(b) Except as provided in paragraph (c) of this section, each external line, fitting, and other component, which contains or conveys flammable fluid during normal engine operation, must be fire resistant or fireproof, as determined by the Administrator. Components must be shielded or located to safeguard against the ignition of leaking flammable fluid.

(c) A tank, which contains flammable fluids and any associated shut-off means and supports, which are part of and attached to the engine, must be fireproof either by construction or by protection unless damage by fire will not cause leakage or spillage of a hazardous quantity of flammable fluid. For a reciprocating engine having an integral oil sump of less than 23.7 liters capacity, the oil sump need not be fireproof or enclosed by a fireproof shield.

(d) An engine component designed, constructed, and installed to act as a firewall must be:
(1) Fireproof;
(2) Constructed so that no hazardous quantity of air, fluid or flame can pass around or through the firewall; and,
(3) Protected against corrosion;

(e) In addition to the requirements of paragraphs (a) and (b) of this section, engine control system components that are located in a designated fire zone must be fire resistant or fireproof, as determined by the Administrator.

(f) Unintentional accumulation of hazardous quantities of flammable fluid within the engine must be prevented by draining and venting.

(g) Any components, modules, or equipment, which are susceptible to or are potential sources of static discharges or electrical fault currents must be designed and constructed to be properly grounded to the engine reference, to minimize the risk of ignition in external areas where flammable fluids or vapors could be present.

[Docket No. FAA–2007–28503, 74 FR 37930, July 30, 2009]

SAMPLE

§33.19 Durability.

(a) Engine design and construction must minimize the development of an unsafe condition of the engine between overhaul periods. The design of the compressor and turbine rotor cases must provide for the containment of damage from rotor blade failure. Energy levels and trajectories of fragments resulting from rotor blade failure that lie outside the compressor and turbine rotor cases must be defined.

(b) Each component of the propeller blade pitch control system which is a part of the engine type design must meet the requirements of §§35.21, 35.23, 35.42 and 35.43 of this chapter.

[Docket No. 3025, 29 FR 7453, June 10, 1964; as amended by Amdt. 33–9, 45 FR 60181, Sept. 11, 1980; Amdt. 33–10, 49 FR 6851, Feb. 23, 1984; Amdt. 33–28, 73 FR 63346, Oct. 24, 2008]

§33.21 Engine cooling.

Engine design and construction must provide the necessary cooling under conditions in which the airplane is expected to operate.

§33.23 Engine mounting attachments and structure.

(a) The maximum allowable limit and ultimate loads for engine mounting attachments and related engine structure must be specified.

(b) The engine mounting attachments and related engine structure must be able to withstand—

(1) The specified limit loads without permanent deformation; and

(2) The specified ultimate loads without failure, but may exhibit permanent deformation.

[Amdt. 33–10, 49 FR 6851, Feb. 23, 1984]

§33.25 Accessory attachments.

The engine must operate properly with the accessory drive and mounting attachments loaded. Each engine accessory drive and mounting attachment must include provisions for sealing to prevent contamination of, or unacceptable leakage from, the engine interior. A drive and mounting attachment requiring lubrication for external drive splines, or coupling by engine oil, must include provisions for sealing to prevent unacceptable loss of oil and to prevent contamination from sources outside the chamber enclosing the drive connection. The design of the engine must allow for the examination, adjustment, or removal of each accessory required for engine operation.

[Amdt. 33–10, 49 FR 6851, Feb. 23, 1984]

§33.27 Turbine, compressor, fan, and turbosupercharger rotor overspeed.

(a) For each fan, compressor, turbine, and turbosupercharger rotor, the applicant must establish by test, analysis, or a combination of both, that each rotor will not burst when operated in the engine for 5 minutes at whichever of the conditions defined in paragraph (b) of this section is the most critical with respect to the integrity of such a rotor.

(1) Test rotors used to demonstrate compliance with this section that do not have the most adverse combination of material properties and dimensional tolerances must be tested at conditions which have been adjusted to ensure the minimum specification rotor possesses the required overspeed capability. This can be accomplished by increasing test speed, temperature, and/or loads.

(2) When an engine test is being used to demonstrate compliance with the overspeed conditions listed in paragraph (b)(3) or (b)(4) of this section and the failure of a component or system is sudden and transient, it may not be possible to operate the engine for 5 minutes after the failure. Under these circumstances, the actual overspeed duration is acceptable if the required maximum overspeed is achieved.

(b) When determining the maximum overspeed condition applicable to each rotor in order to comply with paragraphs (a) and (c) of this section, the applicant must evaluate the following rotor speeds taking into consideration the part's operating temperatures and temperature gradients throughout the engine's operating envelope:

(1) 120 percent of the maximum permissible rotor speed associated with any of the engine ratings except one-engine-inoperative (OEI) ratings of less than 2-1/2 minutes.

(2) 115 percent of the maximum permissible rotor speed associated with any OEI ratings of less than 2-1/2 minutes.

(3) 105 percent of the highest rotor speed that would result from either:

(i) The failure of the component or system which, in a representative installation of the engine, is the most critical with respect to overspeed when operating at any rating condition except OEI ratings of less than 2-1/2 minutes, or

(ii) The failure of any component or system in a representative installation of the engine, in combination with any other failure of a component or system that would not normally be detected during a routine pre-flight check or during normal flight operation, that is the most critical with respect to overspeed, except as provided by paragraph (c) of this section, when operating at any rating condition except OEI ratings of less than 2-1/2 minutes.

(4) 100 percent of the highest rotor speed that would result from the failure of the component or system which, in a representative installation of the engine, is the most critical with respect to overspeed when operating at any OEI rating of less than 2-1/2 minutes.

(c) The highest overspeed that results from a complete loss of load on a turbine rotor, except as provided by paragraph (f) of this section, must be included in the overspeed conditions considered by paragraphs (b)(3)(i), (b)(3)(ii), and (b)(4) of this section, regardless of whether that overspeed results from a failure within the engine or external to the engine. The overspeed resulting from any other single failure must be considered when selecting the most limiting overspeed conditions applicable to each rotor. Overspeeds resulting from combinations of failures must also be considered unless the applicant can show that the probability of occurrence is not greater than extremely remote (probability range of 10-7 to 10-9 per engine flight hour).

(d) In addition, the applicant must demonstrate that each fan, compressor, turbine, and turbosupercharger rotor complies with paragraphs (d)(1) and (d)(2) of this section for the maximum overspeed achieved when subjected to the conditions specified in paragraphs (b)(3) and (b)(4) of this section. The applicant must use the approach in paragraph (a) of this section which specifies the required test conditions.

(1) Rotor Growth must not cause the engine to:

(i) Catch fire,

(ii) Release high-energy debris through the engine casing or result in a hazardous failure of the engine casing,

(iii) Generate loads greater than those ultimate loads specified in §33.23(a), or

(iv) Lose the capability of being shut down.

(2) Following an overspeed event and after continued operation, the rotor may not exhibit conditions such as cracking or distortion which preclude continued safe operation.

SAMPLE

(e) The design and functioning of engine control systems, instruments, and other methods not covered under §33.28 must ensure that the engine operating limitations that affect turbine, compressor, fan, and turbosupercharger rotor structural integrity will not be exceeded in service.

(f) Failure of a shaft section may be excluded from consideration in determining the highest overspeed that would result from a complete loss of load on a turbine rotor if the applicant:

(1) Identifies the shaft as an engine life-limited-part and complies with §33.70.

(2) Uses material and design features that are well understood and that can be analyzed by well-established and validated stress analysis techniques.

(3) Determines, based on an assessment of the environment surrounding the shaft section, that environmental influences are unlikely to cause a shaft failure. This assessment must include complexity of design, corrosion, wear, vibration, fire, contact with adjacent components or structure, overheating, and secondary effects from other failures or combination of failures.

(4) Identifies and declares, in accordance with §33.5, any assumptions regarding the engine installation in making the assessment described above in paragraph (f)(3) of this section.

(5) Assesses, and considers as appropriate, experience with shaft sections of similar design.

(6) Does not exclude the entire shaft.

(g) If analysis is used to meet the overspeed requirements, then the analytical tool must be validated to prior overspeed test results of a similar rotor. The tool must be validated for each material. The rotor being certified must not exceed the boundaries of the rotors being used to validate the analytical tool in terms of geometric shape, operating stress, and temperature. Validation includes the ability to accurately predict rotor dimensional growth and the burst speed. The predictions must also show that the rotor being certified does not have lower burst and growth margins than rotors used to validate the tool.

[Amdt. 33–10, 49 FR 6851, Feb. 23, 1984; as amended by Amdt. 33–26, 73 FR 48284, Aug. 19, 2008; Amdt. 33–31, 76 FR 42023, July 18, 2011]

§33.28 Engine control systems.

(a) ***Applicability.*** These requirements are applicable to any system or device that is part of engine type design, that controls, limits, or monitors engine operation, and is necessary for the continued airworthiness of the engine.

(b) ***Validation.***

(1) *Functional aspects*. The applicant must substantiate by tests, analysis, or a combination thereof, that the engine control system performs the intended functions in a manner which:

(i) Enables selected values of relevant control parameters to be maintained and the engine kept within the approved operating limits over changing atmospheric conditions in the declared flight envelope;

(ii) Complies with the operability requirements of §§33.51, 33.65 and 33.73, as appropriate, under all likely system inputs and allowable engine power or thrust demands, unless it can be demonstrated that failure of the control function results in a non-dispatchable condition in the intended application;

(iii) Allows modulation of engine power or thrust with adequate sensitivity over the declared range of engine operating conditions; and

(iv) Does not create unacceptable power or thrust oscillations.

(2) *Environmental limits*. The applicant must demonstrate, when complying with §§33.53 or 33.91, that the engine control system functionality will not be adversely affected by declared environmental conditions, including electromagnetic interference (EMI), High Intensity Radiated Fields (HIRF), and lightning. The limits to which the system has been qualified must be documented in the engine installation instructions.

(c) ***Control transitions.***

(1) The applicant must demonstrate that, when fault or failure results in a change from one control mode to another, from one channel to another, or from the primary system to the back-up system, the change occurs so that:

(i) The engine does not exceed any of its operating limitations;

(ii) The engine does not surge, stall, or experience unacceptable thrust or power changes or oscillations or other unacceptable characteristics; and

(iii) There is a means to alert the flight crew if the crew is required to initiate, respond to, or be aware of the control mode change. The means to alert the crew must be described in the engine installation instructions, and the crew action must be described in the engine operating instructions;

(2) The magnitude of any change in thrust or power and the associated transition time must be identified and described in the engine installation instructions and the engine operating instructions.

(d) ***Engine control system failures.*** The applicant must design and construct the engine control system so that:

(1) The rate for Loss of Thrust (or Power) Control (LOTC/LOPC) events, consistent with the safety objective associated with the intended application can be achieved;

(2) In the full-up configuration, the system is single fault tolerant, as determined by the Administrator, for electrical or electronic failures with respect to LOTC/LOPC events;

(3) Single failures of engine control system components do not result in a hazardous engine effect; and

(4) Foreseeable failures or malfunctions leading to local events in the intended aircraft installation, such as fire, overheat, or failures leading to damage to engine control system components, do not result in a hazardous engine effect due to engine control system failures or malfunctions.

(e) ***System safety assessment.*** When complying with this section and §33.75, the applicant must complete a System Safety Assessment for the engine control system. This assessment must identify faults or failures that result in a change in thrust or power, transmission of erroneous data, or an effect on engine operability producing a surge or stall together with the predicted frequency of occurrence of these faults or failures.

(f) ***Protection systems.***

(1) The design and functioning of engine control devices and systems, together with engine instruments and operating and maintenance instructions, must provide reasonable assurance that those engine operating limitations that affect turbine, compressor, fan, and turbosupercharger rotor structural integrity will not be exceeded in service.

(2) When electronic overspeed protection systems are provided, the design must include a means for testing, at least once per engine start/stop cycle, to establish the availability of the protection function. The means must be such that a complete test of the system can be achieved in the minimum number of cycles. If the test is not fully automatic, the requirement for a manual test must be contained in the engine instructions for operation.

(3) When overspeed protection is provided through hydromechanical or mechanical means, the applicant must demonstrate by test or other acceptable means that the overspeed function remains available between inspection and maintenance periods.

(g) ***Software.*** The applicant must design, implement, and verify all associated software to minimize the existence of errors by using a method, approved by the FAA, consistent with the criticality of the performed functions.

SAMPLE

2026 FAR-AMT

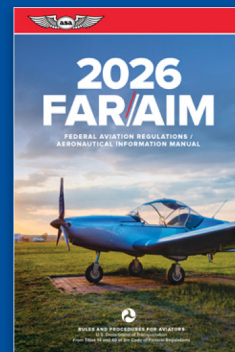
FEDERAL AVIATION REGULATIONS FOR AVIATION MAINTENANCE TECHNICIANS

RULES FOR AVIATION MECHANICS, MAINTENANCE OPERATIONS, AND REPAIR SHOPS

- Title 14 Parts 1, 3, 5, 13, 21, 23, 26, 27, 33, 34, 35, 38, 39, 43, 45, 47, 48, 65, 91, 110, 119, 121 (J, L, Z, AA, DD), 125, 135, 145, 147, and 183.
- Advisory Circulars 20-62E, 20-109B, 21-12C, 39-7D, 43-9C, 43.9-1G.
- Changes and updates since last edition clearly identified.
- Free updates available online and via email subscription for instant access to regulation and procedural changes.
- Comprehensive FAR index.
- Tabs printed in page margins for quick reference.

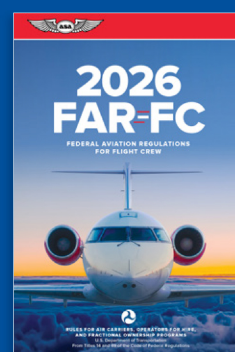
FAR/AIM Series
ON DEMAND
APPS, EBOOKS, UPDATES
asa2fly.com/faraim

OTHER BOOKS AVAILABLE IN ASA'S FAR/AIM SERIES:



FAR/AIM (ASA-26-FR-AM-BK)

Title 14 Parts 1, 5, 43, 48, 61, 67, 68, 71, 73, 89, 91, 97, 103, 105, 107, 110, 119, 136, 137, 141, and 142; Title 49 NTSB 830 and TSA 1552; *Aeronautical Information Manual*; Pilot/Controller Glossary



FAR FOR FLIGHT CREW
(ASA-26-FAR-FC)

Title 14 Parts 1, 5, 63, 65, 91 Subpart K, 110, 111, 117, 119, 120, 121, and 135;
Title 49 Hazmat 175 and TSA 1544

Aviation Supplies & Academics, Inc.
7005 132nd Place SE
Newcastle, Washington 98059 USA
425-235-1500 | asa2fly.com

ASA-26-FAR-AMT

TRANSPORTATION USD $34.95
ISBN 978-1-64425-504-9
53495 >
9 781644 255049