

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 23

[Docket No. FAA-2022-0217; Notice No. NOA-23-22-01]

Accepted Means of Compliance; Airworthiness Standards: Normal Category Airplanes

AGENCY: Federal Aviation Administration, Department of Transportation (DOT).

ACTION: Issuance of accepted means of compliance.

SUMMARY: This document announces ASTM International (ASTM) consensus standards for use as a means of compliance to the applicable airworthiness standards for normal category airplanes. The FAA accepts ASTM Designation F3264-21 as a means of compliance for applicable airworthiness standards for normal category airplanes, with the changes identified in Table 1 of this document. For ease of use, Table 2 provides a side-by-side view, linking applicable regulations to the associated ASTM sections.

DATES: The FAA accepts the means of compliance effective March 11, 2022.

FOR FURTHER INFORMATION CONTACT: Hieu Nguyen, Federal Aviation Administration, Policy and Innovation Division, Small Airplane Strategic Policy Section, AIR-615, 901 Locust Street, Room 301, Kansas City, Missouri 64106; telephone (316) 946-4123; facsimile: (316) 946-4107; email: hieu.nguyen@faa.gov.

SUPPLEMENTARY INFORMATION:

Background

Under the provisions of the National Technology Transfer and Advancement Act of 1995¹ and Office of Management and Budget (OMB) Circular A-119, “Federal Participation in the Development and Use of Voluntary

Consensus Standards and in Conformity Assessment Activities,” effective January 27, 2016, the FAA participates in the development of consensus standards and uses consensus standards as a means of carrying out its policy objectives where appropriate.

Consistent with the Small Airplane Revitalization Act of 2013,² the FAA has been working with industry and other stakeholders through the ASTM International (ASTM) F44 Committee on General Aviation Aircraft to develop consensus standards as a means of compliance in certifying small airplanes under title 14, Code of Federal Regulations (14 CFR), part 23.

In part 23, amendment 23-64³ (81 FR 96572, published on December 30, 2016), the final rule described the FAA would publish those consensus standards in the **Federal Register**, when the Administrator accepts the consensus standards as an acceptable means of compliance.

Additionally, the FAA published Advisory Circular (AC) 23.2010-1,⁴ dated March 27, 2017, titled “FAA Accepted Means of Compliance Process for 14 CFR part 23”. In paragraph 5.5, the AC also describes that a notice will be published when the Administrator accepts a standard.

The means of compliance accepted by this document is one means, but not the only means of complying with part 23 regulatory requirements.

The FAA reviewed the published ASTM consensus standards developed by ASTM Committee F44 as the basis for means of compliance to 65 sections of part 23, amendment 23-64.

In some cases, the Administrator found sections of the ASTM Standard Designation F3264-21, titled “Standard Specification for Normal Category Aeroplanes Certification,” without changes, accepted as means of compliance with the airworthiness requirements of amendment 23-64, and within the scope and applicability of the consensus standards.

In other cases, the means of compliance, while based on ASTM consensus standards, include additional FAA provisions necessary to comply with the airworthiness requirements of amendment 23-64.

Applicants who desire to use means of compliance reflected by other revisions to ASTM standards not previously accepted, may seek guidance and possible acceptance from the FAA for the use of those means of compliance on a case-by-case basis. Applicants may also propose alternative means of compliance for FAA review and possible acceptance.

Part 23, amendment 23-64, established airworthiness requirements based on the safety requirements outlined in amendment 23-63, except in areas that address loss of control and icing, where the FAA increased the safety level. Depending on the details of a design, the applicant may require use of a different means of compliance beyond those accepted by this document. For example, novel airplane designs, such as unmanned airplanes or vertical takeoff and landing airplanes, may be outside the scope of this document, and applicants may need to propose alternative means of compliance applicable to their designs accepted under § 23.2010.

Means of Compliance Accepted

This document accepts only the revisions of the standards referenced in ASTM International Standard Designation (ASTM) F3264-21, “Standard Specification for Normal Category Aeroplanes Certification.”

Table 1. The FAA accepts ASTM F3264-21 as a means of compliance for part 23, amendment 23-64, with the changes identified.

Table 2. For ease of use, Table 2 provides a side-by-side view, linking the applicable part 23 regulations to the ASTM F3264-21 sections. The ASTM F3264-21 sections must incorporate the changes required for FAA acceptance from Table 1.

TABLE 1—PART 23 ACCEPTED MEANS OF COMPLIANCE BASED ON ASTM CONSENSUS STANDARDS

ASTM designation No.	ASTM document title	Changes required for FAA acceptance ⁵	Additional information ⁶
F2490-20	Standard Guide for Aircraft Electrical Load and Power Source Capacity Analysis.	None.	

¹ Ref Public Law 104-113 as amended by Public Law 107-107.

² Ref Public Law 113-53.

³ See [https://www.federalregister.gov/documents/2016/12/30/2016-30246/revision-of-airworthiness-](https://www.federalregister.gov/documents/2016/12/30/2016-30246/revision-of-airworthiness-standards-for-normal-utility-acrobatic-and-commuter-category-airplanes)

[standards-for-normal-utility-acrobatic-and-commuter-category-airplanes.](https://www.federalregister.gov/documents/2016/12/30/2016-30246/revision-of-airworthiness-standards-for-normal-utility-acrobatic-and-commuter-category-airplanes)

⁴ See <https://drs.faa.gov/browse>.

⁵ The means of compliance are intended for traditional part 23 airplanes, not for novel designs.

Novel designs require evaluation and possible modification of the means of compliance.

⁶ You may find additional information on the FAA Small Airplane Issues List (SAIL) here: https://www.faa.gov/aircraft/air_cert/design_approvals/small_airplanes/small_airplanes_regs/.

TABLE 1—PART 23 ACCEPTED MEANS OF COMPLIANCE BASED ON ASTM CONSENSUS STANDARDS—Continued

ASTM designation No.	ASTM document title	Changes required for FAA acceptance ⁵	Additional information ⁶
F3061/F3061M–20	Standard Specification for Systems and Equipment in Small Aircraft.	<p>Remove: Tables 1, 3, 4, 5, 13 and 14</p> <p>Replace 17.3.1 with the following:</p> <p>(a) Each electrical or electronic system that performs a function, the failure of which would prevent the continued safe flight and landing of the airplane, must be designed and installed such that—</p> <p>(1) The function at the airplane level is not adversely affected during and after the time the airplane is exposed to lightning; and</p> <p>(2) The system recovers normal operation of that function in a timely manner after the airplane is exposed to lightning unless the system’s recovery conflicts with other operational or functional requirements of the system.</p> <p>Replace 17.3.2 with the following:</p> <p>(b) Each electrical and electronic system that performs a function, the failure of which would significantly reduce the capability of the airplane or the ability of the flight crew to respond to an adverse operating condition, must be designed and installed such that the system recovers normal operation of that function in a timely manner after the airplane is exposed to lightning</p> <p>Remove 17.3.3.</p>	<p>Aircraft Type Code compliance matrix tables found in F3061/F3061M–20 are not accepted. Applicability will be determined by the Small Airplane Strategic Policy Section. F3061/F3061M–20 does not contain means for showing compliance to §23.2310 <i>Buoyancy for seaplanes and amphibians</i>. If applying for certification of a seaplane or amphibian, applicants may use the provisions of §§23.751, 23.755, and 23.757 at amendment 23–63 as a means of complying with §23.2310, or may obtain FAA acceptance of a different method of compliance in accordance with §23.2010.</p>
F3062/F3062M–20	Standard Specification for Aircraft Powerplant Installation.	None.	
F3063/F3063M–20	Standard Specification for Aircraft Fuel and Energy Storage and Delivery.	None.	
F3064/F3064M–21	Standard Specification for Aircraft Powerplant Control, Operation, and Indication.	None.	
F3065/F3065M–21a	Standard Specification for Aircraft Propeller System Installation.	None.	
F3066/F3066M–18	Standard Specification for Aircraft Powerplant Installation Hazard Mitigation.	None.	
F3082/F3082M–17	Standard Specification for Weights and Centers of Gravity of Aircraft.	None.	
F3083/F3083M–20a	Standard Specification for Emergency Conditions, Occupant Safety and Accommodations.	None.	
F3093/F3093M–21	Standard Specification for Aeroelasticity Requirements.	None.	
F3114–21	Standard Specification for Structures.	None.	
F3115/F3115M–20	Standard Specification for Structural Durability for Small Aeroplanes.	None	<p>If applicant proposes to use F3115/F3115M–20 section 4.3 or 6.3.3, Policy & Innovation Division will be involved as the standard is applied during projects to review the approach to determining similarity (F3115/F3115M–20 section 4.3) and criteria defining obvious damage (F3115/F3115M–20 section 6.3.3).</p>

TABLE 1—PART 23 ACCEPTED MEANS OF COMPLIANCE BASED ON ASTM CONSENSUS STANDARDS—Continued

ASTM designation No.	ASTM document title	Changes required for FAA acceptance ⁵	Additional information ⁶
F3116/F3116M–18e2 ..	Standard Specification for Design Loads and Conditions.	<p>Replace: Section 4.1.4. With: FAA Section 4.1.4 “Appendix X1 through Appendix X4 provides, within the limitations specified within the appendix, a simplified means of compliance with several of the requirements set forth in Sections 4.2 to 4.26 and 7.1 to 7.9 that can be applied as one (but not the only) means to comply. If the simplified methods in appendix X1 through X3 are used, they must be used together in their entirety.”</p> <p>Replace: Section X1.1.1. With: FAA Section X1.1.1 “The methods provided in this appendix provide one possible means (but not the only possible means) of compliance and can only be applied to level 1 and level 2 low speed airplanes.”</p> <p>Replace: Section X2.1.1. With: FAA Section X2.1.1 “The methods provided in this appendix provide one possible means (but not the only possible means) of compliance and can only be applied to level 1 and level 2 low speed airplanes.”</p> <p>Replace: Section X3.1.1. With: FAA Section X3.1.1 “The methods provided in this appendix provide one possible means (but not the only possible means) of compliance and can only be applied to level 1 and level 2 low speed airplanes.”</p> <p>Replace: Section X4.1.1. With: FAA Section X4.1.1 “The methods provided in this appendix provide one possible means (but not the only possible means) of compliance and can only be applied to level 1 low speed airplanes.”</p>	
F3117/F3117M–20	Standard Specification for Crew Interface in Aircraft.	<p>Add: 4.3 Windshields and Windows. 4.3.1 For Level 4 airplanes, the windshield panels in front of the pilots must be arranged so that, assuming the loss of vision through any one panel, one or more panels remain available for use by a pilot seated at a pilot station to permit continued safe flight and landing. Or For Level 4 Airplanes Add F3117/F3117M–21a Section 4.3.</p>	
F3120/F3120M–20	Standard Specification for Ice Protection for General Aviation.	None.	
F3173/F3173M–21	Standard Specification for Aircraft Handling Characteristics.	None.	
F3174/F3174M–19	Standard Specification for Establishing Operating Limitations and Information for Aeroplanes.	None.	
F3179/F3179M–20	Standard Specification for Performance of Aircraft.	None.	
F3180/F3180M–19	Standard Specification for Low-Speed Flight Characteristics of Aircraft.	FAA does not universally accept F3180/F3180M–19 due to inexperience with Alternative 2 within the standard. FAA previously and continues to accept F3180/F3180M–16.	Applicants are encouraged to consider proposing F3180/F3180M–19, particularly Alternative 2, for development of their method of compliance for low speed handling qualities on a project-by-project basis, or may obtain FAA acceptance of a different method of compliance in accordance with §23.2010.

TABLE 1—PART 23 ACCEPTED MEANS OF COMPLIANCE BASED ON ASTM CONSENSUS STANDARDS—Continued

ASTM designation No.	ASTM document title	Changes required for FAA acceptance ⁵	Additional information ⁶
F3227/F3227M–21	Standard Specification for Environmental Systems in Small Aircraft.	Remove: Tables 1, 2, and 3	Aircraft Type Code compliance matrix tables found in F3227/F3227M–21, are not accepted. Applicability will be determined by the Small Airplane Strategic Policy Section.
F3228–17	Standard Specification for Flight Data and Voice Recording in Small Aircraft.	Remove: Table 1	Aircraft Type Code compliance matrix table found in F3228–17 are not accepted. Applicability will be determined by the Small Airplane Strategic Policy Section.
F3229/F3229M–17	Standard Practice for Static Pressure System Tests in Small Aircraft.	Remove: Table 1	Aircraft Type Code compliance matrix table found in F3229/F3229M–17 are not accepted. Applicability will be determined by the Small Airplane Strategic Policy Section.
F3230–20a	Standard Practice for Safety Assessments of Systems and Equipment in Small Aircraft.	Remove: Table 1	Aircraft Type Code compliance matrix table found in F3230–20a are not accepted. Applicability will be determined by the Small Airplane Strategic Policy Section.
F3231/F3231M–21	Standard Specification for Electrical Systems for Aircraft with Combustion Engine Electrical Power Generation.	Remove: Table 1	Aircraft Type Code compliance matrix table found in F3231/F3231M–21 are not accepted. Applicability will be determined by the Small Airplane Strategic Policy Section.
F3232/F3232M–20	Standard Specification for Flight Controls in Small Aircraft.	Remove: Tables 1 and 2	Aircraft Type Code compliance matrix tables found in F3232/F3232M–20 are not accepted. Applicability will be determined by the Small Airplane Strategic Policy Section.
F3233/F3233M–21	Standard Specification for Instrumentation in Small Aircraft.	Remove: Table 1	Aircraft Type Code compliance matrix table found in F3233/F3233M–21 are not accepted. Applicability will be determined by the Small Airplane Strategic Policy Section.
F3234/F3234M–17	Standard Specification for Exterior Lighting in Small Aircraft.	Remove: Table 1	Aircraft Type Code compliance matrix table found in F3234/F3234M–17 are not accepted. Applicability will be determined by the Small Airplane Strategic Policy Section.
F3235–17a	Standard Specification for Aircraft Storage Batteries.	Remove: Section 4.2 Remove: Table 1.	If applying for certification of an airplane with installed lithium batteries, applicants may use the guidance provided by RTCA DO–311A, or may obtain FAA acceptance of a different method of compliance in accordance with § 23.2010. Aircraft Type Code compliance matrix table found in F3235–17a are not accepted. Applicability will be determined by the Small Airplane Strategic Policy Section.
F3236–17	Standard Specification for High Intensity Radiated Field (HIRF) Protection in Small Aircraft.	Remove: Table 1	Aircraft Type Code compliance matrix table found in F3236–17 are not accepted. Applicability will be determined by the Small Airplane Strategic Policy Section.
F3239–19	Standard Specification for Aircraft Electric Propulsion Systems.	FAA does not universally accept F3239–19 due to inexperience with the standard.	Applicants are encouraged to consider proposing F3239–19 for development of their method of compliance for electric propulsion systems on a project-by-project basis. Any method of compliance proposed must establish a level of safety equivalent to certified reciprocating and turbine propulsion systems and receive acceptance by FAA in accordance with § 23.2010.
F3254–19	Standard Specification for Aircraft Interaction of Systems and Structures.	Figures 2, 3 and 4 Replace: “Remote” With: “10 ^{–5} .” Replace: “Extremely Improbable.” With: “10 ^{–8} ” for Level 1, 2 and 3 airplanes and with “10 ^{–9} ” for Level 4 airplanes”.	Other proposed probabilities will be considered by the FAA on a case by case basis.

TABLE 1—PART 23 ACCEPTED MEANS OF COMPLIANCE BASED ON ASTM CONSENSUS STANDARDS—Continued

ASTM designation No.	ASTM document title	Changes required for FAA acceptance ⁵	Additional information ⁶
F3309/F3309M-21	Standard Practice for Simplified Safety Assessment of Systems and Equipment in Small Aircraft.	None.	
F3316/F3316M-19	Standard Specification for Electrical Systems for Aircraft with Electric or Hybrid-Electric Propulsion.	FAA does not universally accept F3316/F3316M-19 due to inexperience with the standard. Remove: Table 1.	Applicants are encouraged to consider proposing F3316/F3316M-19 for development of their method of compliance for electrical systems installed on airplanes with electric or hybrid-electric propulsion systems on a project-by-project basis. Applicants may obtain FAA acceptance of a different method of compliance in accordance with §23.2010. Aircraft Type Code compliance matrix table found in F3316/F3316M-19 are not accepted. Applicability will be determined by the Small Airplane Strategic Policy Section.
F3331-18	Standard Practice for Aircraft Water Loads.	None.	
F3367-21	Standard Practice for Simplified Methods for Addressing High-Intensity Radiated Fields (HIRF) and Indirect Effects of Lightning on Aircraft.	Replace: paragraph 5.1.1. With: Systems that are part of the Type Certificated Engine must be installed in accordance with the engine manufacturer's requirements. The minimum HIRF and lightning qualification in accordance with Sections 8 and 9 of this ASTM practice should be met at the aircraft level, except for engine control systems in Level 1 and 2 airplanes which should meet the following; <ul style="list-style-type: none"> • HIRF: DO-160, Section 20—R for both radiated and conducted susceptibility. • Lightning: Utilize Guidance in AC 33.28-3 For metallic fuselage DO-160G, Section 22—A3J3L3 (shielded) and A3H3L3 (unshielded). For composite fuselage DO-160G, Section 22—B3K3L3 (shielded) and B3H3L3 (unshielded). Use of lower HIRF and lightning induced voltage & current levels may be acceptable for electronic engine control systems if substantiated at the airplane level (by test in the proposed installation or similar) when exposed to external HIRF environment per AC20-158A and Lightning per AC20-136B; using shielding and grounding of the electronic engine control system and accessories in the given installation.	
F3380-19	Standard Practice for Structural Compliance of Very Light Aeroplanes.	None.	
F3396/F3396M-20	Standard Practice for Aircraft Simplified Loads.	None.	
F3408/F3408M-21	Standard Specification for Aircraft Emergency Parachute Recovery Systems.	None.	
F3432-20a	Standard Practice for Powerplant Instruments.	None.	

TABLE 2—SIDE-BY-SIDE VIEW OF 14 CFR PART 23 REGULATIONS AND ASTM F3264–21 SECTIONS

Part 23 amendment 23–64 regulation(s)	ASTM F3264–21 section(s) ⁷	ASTM F3264–21 subsection(s) ⁸
23.1457	9.12 Installation of Cockpit Recorders	9.12.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 9.12.1.1 F3228—17 Standard Specification for Flight Data and Voice Recording in Small Aircraft.
23.1459	9.13 Installation of Flight Data Recorders	9.13.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 9.13.1.1 F3228—17 Standard Specification for Flight Data and Voice Recording in Small Aircraft.
23.1529	10.6 Instructions for Continued Airworthiness	10.6.1 F3120/F3120M—20 Standard Specification for Ice Protection for General Aviation. 10.6.2 F3117/F3117M—20 Standard Specification for Crew Interface in Aircraft. 10.6.3 F3408/F3408M—21 Standard Specification for Aircraft Emergency Parachute Recovery Systems.
Subpart B—Flight:		
23.2100	5.1 Weight/Mass and Centre of Gravity	5.1.1 F3082/F3082M—17 Standard Specification for Weights and Centers of Gravity of Aircraft. 5.1.2 F3114—21 Standard Specification for Structures.
23.2105	5.2 Performance Data	5.2.1 F3179/F3179M—20 Standard Specification for Performance of Aircraft.
23.2110	5.3 Stall Speed	5.3.1 F3179/F3179M—20 Standard Specification for Performance of Aircraft.
23.2115	5.4 Takeoff Performance	5.4.1 F3179/F3179M—20 Standard Specification for Performance of Aircraft.
23.2120	5.5 Climb Requirements	5.5.1 F3179/F3179M—20 Standard Specification for Performance of Aircraft.
23.2125	5.6 Climb Information	5.6.1 F3179/F3179M—20 Standard Specification for Performance of Aircraft.
23.2130	5.7 Landing	5.7.1 F3179/F3179M—20 Standard Specification for Performance of Aircraft.
23.2135	5.8 Controllability	5.8.1 F3173/F3173M—21 Standard Specification for Aircraft Handling Characteristics.
23.2140	5.9 Trim	5.9.1 F3173/F3173M—21 Standard Specification for Aircraft Handling Characteristics.
23.2145	5.10 Stability	5.10.1 F3173/F3173M—21 Standard Specification for Aircraft Handling Characteristics.
23.2150	5.11 Stall Characteristics, Stall Warning, and Spins.	5.11.1 F3180/F3180M—19 Standard Specification for Low-Speed Flight Characteristics of Aircraft.
23.2155	5.12 Ground and Water Handling Characteristics.	5.12.1 F3173/F3173M—21 Standard Specification for Aircraft Handling Characteristics.
23.2160	5.13 Vibration, Buffeting, and High-Speed Characteristics.	5.13.1 F3173/F3173M—21 Standard Specification for Aircraft Handling Characteristics.
23.2165	5.14 Performance and Flight Characteristics Requirements for Flight in Icing Conditions.	5.14.1 F3120/F3120M—20 Standard Specification for Ice Protection for General Aviation Aircraft.
Subpart C—Structures:		
23.2200	6.1 Structural Design Envelope	6.1.1 F3116/F3116M—18e2 Standard Specification for Design Loads and Conditions. 6.1.1.1 F3396/F3396M—20 Standard Practice for Aircraft Simplified Loads.
23.2205	6.2 Interaction of Systems and Structure	6.2.1 F3254—19 Standard Specification for Aircraft Interaction of Systems and Structures.
23.2210	6.3 Structural Design Loads	6.3.1 F3116/F3116M—18e2 Standard Specification for Design Loads and Conditions. 6.3.1.1 F3396/F3396M—20 Standard Practice for Aircraft Simplified Loads. 6.3.2 F3408/F3408M—21 Standard Specification for Aircraft Emergency Parachute Recovery Systems.
23.2215	6.4 Flight Load Conditions	6.4.1 F3116/F3116M—18e2 Standard Specification for Design Loads and Conditions. 6.4.1.1 F3396/F3396M—20 Standard Practice for Aircraft Simplified Loads.
23.2220	6.5 Ground and Water Load Conditions	6.5.1 F3116/F3116M—18e2 Standard Specification for Design Loads and Conditions. 6.5.1.1 F3331—18 Standard Practice for Aircraft Water Loads.
23.2225	6.6 Component Loading Conditions	6.6.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 6.6.1.1 F3232/F3232M—20 Standard Specification for Flight Controls in Small Aircraft. 6.6.2 F3116/F3116M—18e2 Standard Specification for Design Loads and Conditions.

TABLE 2—SIDE-BY-SIDE VIEW OF 14 CFR PART 23 REGULATIONS AND ASTM F3264–21 SECTIONS—Continued

Part 23 amendment 23–64 regulation(s)	ASTM F3264–21 section(s) ⁷	ASTM F3264–21 subsection(s) ⁸
23.2230	6.7 Limit and Ultimate Loads	6.6.2.1 F3396/F3396M—20 Standard Practice for Aircraft Simplified Loads. 6.7.1 F3114—21 Standard Specification for Structures. 6.7.2 F3408/F3408M—21 Standard Specification for Aircraft Emergency Parachute Recovery Systems.
23.2235	6.8 Structural Strength	6.8.1 F3114—21 Standard Specification for Structures. 6.8.2 F3408/F3408M—21 Standard Specification for Aircraft Emergency Parachute Recovery Systems.
23.2240	6.9 Structural Durability	6.9.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 6.9.2 F3066/F3066M—18 Standard Specification for Aircraft Powerplant Installation Hazard Mitigation. 6.9.3 F3115/F3115M—20 Standard Specification for Structural Durability for Small Aeroplanes. 6.9.3.1 F3380—19 Standard Practice for Structural Compliance of Very Light Aeroplanes.
23.2245	6.10 Aeroelasticity	6.9.4 F3116/F3116M—18e2 Standard Specification for Design Loads and Conditions. 6.10.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 6.10.2 F3093/F3093M—21 Standard Specification for Aeroelasticity Requirements.
23.2250	6.11 Design and Construction Principles	6.11.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 6.11.1.1 F3232/F3232M—20 Standard Specification for Flight Controls in Small Aircraft. 6.11.2 F3114—21 Standard Specification for Structures. 6.11.2.1 F3380—19 Standard Practice for Structural Compliance of Very Light Aeroplanes.
23.2255	6.12 Protection of Structure	6.11.3 F3408/F3408M—21 Standard Specification for Aircraft Emergency Parachute Recovery Systems. 6.12.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 6.12.1.1 F3232/F3232M—20 Standard Specification for Flight Controls in Small Aircraft. 6.12.2 F3114—21 Standard Specification for Structures. 6.12.2.1 F3380—19 Standard Practice for Structural Compliance of Very Light Aeroplanes.
23.2260	6.13 Materials and Processes	6.12.3 F3066/F3066M—18 Standard Specification for Aircraft Powerplant Installation Hazard Mitigation. 6.12.4 F3408/F3408M—21 Standard Specification for Aircraft Emergency Parachute Recovery Systems. 6.13.1 F3114—21 Standard Specification for Structures. 6.13.1.1 F3380—19 Standard Practice for Structural Compliance of Very Light Aeroplanes.
23.2265	6.14 Special Factors of Safety	6.13.2 F3408/F3408M—21 Standard Specification for Aircraft Emergency Parachute Recovery Systems. 6.14.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 6.14.2 F3114—21 Standard Specification for Structures. 6.14.2.1 F3380—19 Standard Practice for Structural Compliance of Very Light Aeroplanes.
23.2270	6.15 Emergency Conditions	6.15.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 6.15.1.1 F3232/F3232M—20 Standard Specification for Flight Controls in Small Aircraft. 6.15.2 F3083/F3083M—20a Standard Specification for Emergency Conditions, Occupant Safety and Accommodations. 6.15.3 F3408/F3408M—21 Standard Specification for Aircraft Emergency Parachute Recovery Systems.
Subpart D—Design and Construction 23.2300	7.1 Flight Control Systems	7.1.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 7.1.1.1 F3232/F3232M—20 Standard Specification for Flight Controls in Small Aircraft. 7.1.2 F3066/F3066M—18 Standard Specification for Aircraft Powerplant Installation Hazard Mitigation. 7.1.3 F3117/F3117M—20 Standard Specification for Crew Interface.

TABLE 2—SIDE-BY-SIDE VIEW OF 14 CFR PART 23 REGULATIONS AND ASTM F3264–21 SECTIONS—Continued

Part 23 amendment 23–64 regulation(s)	ASTM F3264–21 section(s) ⁷	ASTM F3264–21 subsection(s) ⁸
23.2305	7.2 Landing Gear Systems	7.2.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft.
23.2310	7.3 Buoyancy for Seaplanes and Amphibians	7.3.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft.
23.2315	7.4 Means of Egress and Emergency Exits	7.4.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft.
23.2320	7.5 Occupant Physical Environment	7.4.2 F3083/F3083M—20a Standard Specification for Emergency Conditions, Occupant Safety and Accommodations.
23.2325	7.6 Fire Protection	7.5.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft.
23.2330	7.7 Fire Protection in Designated Fire Zones and Adjacent Areas.	7.5.1.1 F3227/F3227M—21 Standard Specification for Environmental Systems in Small Aircraft.
23.2335	7.8 Lightning Protection	7.5.2 F3083/F3083M—20a Standard Specification for Emergency Conditions, Occupant Safety and Accommodations.
Subpart E—Powerplant: 23.2400	8.1 Powerplant Installation	7.5.3 F3114—21 Standard Specification for Structures.
23.2405	8.2 Power or Thrust Control Systems	7.5.4 F3117/F3117M—20 Standard Specification for Crew Interface in Aircraft.
23.2410	8.3 Powerplant Installation Hazard Assessment.	7.6.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft.
		7.6.1.1 F3231/F3231M—21 Standard Specification for Electrical Systems for Aircraft with Combustion Engine Electrical Power Generation.
		7.6.1.2 F3234/F3234M—17 Standard Specification for Exterior Lighting in Small Aircraft.
		7.6.1.3 F3316/F3316M—19 Standard Specification for Electrical Systems for Aircraft with Electric or Hybrid-Electric Propulsion.
		7.6.2 F3066/F3066M—18 Standard Specification for Aircraft Powerplant Installation Hazard Mitigation.
		7.6.3 F3083/F3083M—20a Standard Specification for Emergency Conditions, Occupant Safety and Accommodations.
		7.6.4 F3408/F3408M—21 Standard Specification for Aircraft Emergency Parachute Recovery Systems.
		7.7.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft.
		7.7.1.1 F3231/F3231M—21 Standard Specification for Electrical Systems for Aircraft with Combustion Engine Electrical Power Generation.
		7.7.2 F3066/F3066M—18 Standard Specification for Aircraft Powerplant Installation Hazard Mitigation.
		7.7.3 F3114—21 Standard Specification for Structures.
		7.8.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft.
		8.1.1 F3062/F3062M—20 Standard Specification for Aircraft Powerplant Installation.
		8.1.2 F3063/F3063M—20 Standard Specification for Aircraft Fuel and Energy Storage and Delivery.
		8.1.3 F3064/F3064M—21 Standard Specification for Aircraft Powerplant Control, Operation, and Indication.
		8.1.4 F3065/F3065M—21a Standard Specification for Aircraft Propeller System Installation.
		8.1.5 F3066/F3066M—18 Standard Specification for Aircraft Powerplant Installation Hazard Mitigation.
		8.1.6 F3239—19 Standard Specification for Aircraft Electric Propulsion Systems.
		8.2.1 F3062/F3062M—20 Standard Specification for Aircraft Powerplant Installation.
		8.2.2 F3064/F3064M—21 Standard Specification for Aircraft Powerplant Control, Operation, and Indication.
		8.2.3 F3065/F3065M—21a Standard Specification for Aircraft Propeller System Installation.
		8.2.4 F3117/F3117M—20 Standard Specification for Crew Interface.
		8.3.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft.
		8.3.2 F3062/F3062M—20 Standard Specification for Aircraft Powerplant Installation.
		8.3.3 F3063/F3063M—20 Standard Specification for Aircraft Fuel and Energy Storage and Delivery.
		8.3.4 F3064/F3064M—21 Standard Specification for Aircraft Powerplant Control, Operation, and Indication.

TABLE 2—SIDE-BY-SIDE VIEW OF 14 CFR PART 23 REGULATIONS AND ASTM F3264–21 SECTIONS—Continued

Part 23 amendment 23–64 regulation(s)	ASTM F3264–21 section(s) ⁷	ASTM F3264–21 subsection(s) ⁸
23.2415	8.4 Powerplant Installation Ice Protection	8.3.5 F3065/F3065M—21a Standard Specification for Aircraft Propeller System Installation. 8.3.6 F3066/F3066M—18 Standard Specification for Aircraft Powerplant Installation Hazard Mitigation. 8.3.7 F3117/F3117M—20 Standard Specification for Crew Interface in Aircraft. 8.3.8 F3239—19 Standard Specification for Aircraft Electric Propulsion Systems.
23.2420	8.5 Reversing Systems	8.4.1 F3062/F3062M—20 Standard Specification for Aircraft Powerplant Installation. 8.4.2 F3063/F3063M—20 Standard Specification for Aircraft Fuel and Energy Storage and Delivery. 8.4.3 F3066/F3066M—18 Standard Specification for Aircraft Powerplant Installation Hazard Mitigation. 8.4.4 F3239—19 Standard Specification for Aircraft Electric Propulsion Systems.
23.2425	8.6 Powerplant Operational Characteristics	8.5.1 F3062/F3062M—20 Standard Specification for Aircraft Powerplant Installation. 8.5.2 F3065/F3065M—21a Standard Specification for Aircraft Propeller System Installation. 8.5.3 F3239—19 Standard Specification for Aircraft Electric Propulsion Systems.
23.2430	8.7 Fuel and Energy Storage and Distribution Systems.	8.6.1 F3062/F3062M—20 Standard Specification for Aircraft Powerplant Installation. 8.6.2 F3064/F3064M—21 Standard Specification for Aircraft Powerplant Control, Operation, and Indication. 8.6.3 F3065/F3065M—21a Standard Specification for Aircraft Propeller System Installation. 8.6.4 F3066/F3066M—18 Standard Specification for Aircraft Powerplant Installation Hazard Mitigation. 8.6.5 F3117/F3117M—20 Standard Specification for Crew Interface in Aircraft. 8.6.6 F3239—19 Standard Specification for Aircraft Electric Propulsion Systems.
23.2435	8.8 Powerplant Induction, Exhaust, and Support Systems.	8.7.1 F3062/F3062M—20 Standard Specification for Aircraft Powerplant Installation. 8.7.2 F3063/F3063M—20 Standard Specification for Aircraft Fuel and Energy Storage and Delivery. 8.7.3 F3064/F3064M—21 Standard Specification for Aircraft Powerplant Control, Operation, and Indication. 8.7.4 F3066/F3066M—18 Standard Specification for Aircraft Powerplant Installation Hazard Mitigation. 8.7.5 F3114—21 Standard Specification for Structures. 8.7.6 F3239—19 Standard Specification for Aircraft Electric Propulsion Systems.
23.2440	8.9 Powerplant Installation Fire Protection	8.8.1 F3062/F3062M—20 Standard Specification for Aircraft Powerplant Installation. 8.8.2 F3239—19 Standard Specification for Aircraft Electric Propulsion Systems.
Subpart F—Equipment: 23.2500	9.1 Systems and Equipment Function—Requirements.	8.9.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 8.9.2 F3062/F3062M—20 Standard Specification for Aircraft Powerplant Installation. 8.9.3 F3063/F3063M—20 Standard Specification for Aircraft Fuel and Energy Storage and Delivery. 8.9.4 F3064/F3064M—21 Standard Specification for Aircraft Powerplant Control, Operation, and Indication. 8.9.5 F3066/F3066M—18 Standard Specification for Aircraft Powerplant Installation Hazard Mitigation. 8.9.6 F3239—19 Standard Specification for Aircraft Electric Propulsion Systems.
		9.1.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 9.1.1.1 F3231/F3231M—21 Standard Specification for Electrical Systems for Aircraft with Combustion Engine Electrical Power Generation. 9.1.1.1(a) F3235—17a Standard Specification for Aircraft Storage Batteries.

TABLE 2—SIDE-BY-SIDE VIEW OF 14 CFR PART 23 REGULATIONS AND ASTM F3264–21 SECTIONS—Continued

Part 23 amendment 23–64 regulation(s)	ASTM F3264–21 section(s) ⁷	ASTM F3264–21 subsection(s) ⁸
23.2505	9.2 Equipment Function and Installation Requirements.	9.1.1.2 F3232/F3232M—20 Standard Specification for Flight Controls in Small Aircraft. 9.1.1.3 F3233/F3233M—21 Standard Specification for Instrumentation in Small Aircraft. 9.1.1.3(a) F3229/F3229M—17 Standard Practice for Static Pressure System Tests in Small Aircraft. 9.1.1.4 F3316/F3316M—19 Standard Specification for Electrical Systems for Aircraft with Electric or Hybrid-Electric Propulsion. 9.1.2 F3064/F3064M—21 Standard Specification for Aircraft Powerplant Control, Operation, and Indication. 9.1.3 F3066/F3066M—18 Standard Specification for Aircraft Powerplant Installation Hazard Mitigation. 9.1.4 F3117/F3117M—20 Standard Specification for Crew Interface in Aircraft. 9.1.5 F3120/F3120M—20 Standard Specification for Ice Protection for General Aviation Aircraft. 9.1.6 F3408/F3408M—21 Standard Specification for Aircraft Emergency Parachute Recovery Systems. 9.2.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 9.2.1.1 F3231/F3231M—21 Standard Specification for Electrical Systems for Aircraft with Combustion Engine Electrical Power Generation. 9.2.1.1(a) F3235—17a Standard Specification for Aircraft Storage Batteries. 9.2.1.2 F3232/F3232M—20 Standard Specification for Flight Controls in Small Aircraft. 9.2.1.3 F3233/F3233M—21 Standard Specification for Instrumentation in Small Aircraft. 9.2.1.4 F3316/F3316M—19 Standard Specification for Electrical Systems for Aircraft with Electric or Hybrid-Electric Propulsion. 9.2.2 F3408/F3408M—21 Standard Specification for Aircraft Emergency Parachute Recovery Systems.
23.2510	9.3 Equipment, Systems, and Installation	9.3.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 9.3.1.1 F3230—20a Standard Practice for Safety Assessments of Systems and Equipment in Small Aircraft. 9.3.1.2 F3233/F3233M—21 Standard Specification for Instrumentation in Small Aircraft. 9.3.1.3 F3227/F3227M—21 Standard Specification for Environmental Systems in Small Aircraft. 9.3.1.4 F3309/F3309M—21 Standard Practice for Simplified Safety Assessment of Systems and Equipment in Small Aircraft. 9.3.2 F3408/F3408M—21 Standard Specification for Aircraft Emergency Parachute Recovery Systems.
23.2515	9.4 Electrical and Electronic System Lightning Protection.	9.4.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 9.4.1.1 F3367—21 Standard Practice for Simplified Methods for Addressing High-Intensity Radiated Fields (HIRF) and Indirect Effects of Lightning on Aircraft.
23.2520	9.5 High Intensity Radiated Fields (HIRF) Protection.	9.5.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 9.5.1.1 F3236—17 Standard Specification for High Intensity Radiated Field (HIRF) Protection in Small Aircraft. 9.5.1.2 F3367—21 Standard Practice for Simplified Methods for Addressing High-Intensity Radiated Fields (HIRF) and Indirect Effects of Lightning on Aircraft.
23.2525	9.6 System Power Generation, Storage, and Distribution.	9.6.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 9.6.1.1 F3231/F3231M—21 Standard Specification for Electrical Systems for Aircraft with Combustion Engine Electrical Power Generation. 9.6.1.1(a) F2490—20 Standard Guide for Aircraft Electrical Load and Power Source Capacity Analysis. 9.6.1.2 F3233/F3233M—21 Standard Specification for Instrumentation in Small Aircraft. 9.6.1.3 F3316/F3316M—19 Standard Specification for Electrical Systems for Aircraft with Electric or Hybrid-Electric Propulsion.

TABLE 2—SIDE-BY-SIDE VIEW OF 14 CFR PART 23 REGULATIONS AND ASTM F3264–21 SECTIONS—Continued

Part 23 amendment 23–64 regulation(s)	ASTM F3264–21 section(s) ⁷	ASTM F3264–21 subsection(s) ⁸
23.2530	9.7 External and Cockpit Lighting	9.6.1.3(a) F2490—20 Standard Guide for Aircraft Electrical Load and Power Source Capacity Analysis. 9.6.2 F3117/F3117M—20 Standard Specification for Crew Interface in Aircraft. 9.6.3 F3120/F3120M—20 Standard Specification for Ice Protection for General Aviation Aircraft. 9.7.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 9.7.1.1 F3233/F3233M—21 Standard Specification for Instrumentation in Small Aircraft. 9.7.1.2 F3234/F3234M—17 Standard Specification for Exterior Lighting in Small Aircraft. 9.7.2 F3117/F3117M—20 Standard Specification for Crew Interface in Aircraft. 9.7.3 F3120/F3120M—20 Standard Specification for Ice Protection for General Aviation Aircraft.
23.2535	9.8 Safety Equipment	9.8.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 9.8.2 F3083/F3083M—20a Standard Specification for Emergency Conditions, Occupant Safety and Accommodations. 9.8.3 F3117/F3117M—20 Standard Specification for Crew Interface.
23.2540	9.9 Flight in Icing Conditions	9.9.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 9.9.1.1 F3233/F3233M—21 Standard Specification for Instrumentation in Small Aircraft. 9.9.2 F3120/F3120M—20 Standard Specification for Ice Protection for General Aviation Aircraft.
23.2545	9.10 Pressurized System Elements	9.10.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 9.10.2 F3229/F3229M—17 Standard Practice for Static Pressure System Tests in Small Aircraft.
23.2550	9.11 Equipment Containing High-Energy Rotors.	9.11.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft.
Subpart G—Flight crew Interface and Other Information: 23.2600	10.1 Flight crew Compartment Interface	10.1.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 10.1.1.1 F3232/F3232M—20 Standard Specification for Flight Controls in Small Aircraft. 10.1.2 F3062/F3062M—20 Standard Specification for Aircraft Powerplant Installation. 10.1.3 F3063/F3063M—20 Standard Specification for Aircraft Fuel and Energy Storage and Delivery. 10.1.4 F3064/F3064M—21 Standard Specification for Aircraft Powerplant Control, Operation, and Indication. 10.1.5 F3114—21 Standard Specification for Structures. 10.1.6 F3117/F3117M—20 Standard Specification for Crew Interface in Aircraft. 10.1.7 F3408/F3408M—21 Standard Specification for Aircraft Emergency Parachute Recovery Systems.
23.2605	10.2 Installation and Operation Information	10.2.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 10.2.1.1 F3227/F3227M—21 Standard Specification for Environmental Systems in Small Aircraft. 10.2.1.2 F3231/F3231M—21 Standard Specification for Electrical Systems for Aircraft with Combustion Engine Electrical Power Generation. 10.2.1.3 F3232/F3232M—20 Standard Specification for Flight Controls in Small Aircraft. 10.2.1.4 F3233/F3233M—21 Standard Specification for Instrumentation in Small Aircraft. 10.2.2 F3062/F3062M—20 Standard Specification for Aircraft Powerplant Installation. 10.2.3 F3063/F3063M—20 Standard Specification for Aircraft Fuel and Energy Storage and Delivery. 10.2.4 F3064/F3064M—21 Standard Specification for Aircraft Powerplant Control, Operation, and Indication. 10.2.5 F3117/F3117M—20 Standard Specification for Crew Interface in Aircraft.

TABLE 2—SIDE-BY-SIDE VIEW OF 14 CFR PART 23 REGULATIONS AND ASTM F3264–21 SECTIONS—Continued

Part 23 amendment 23–64 regulation(s)	ASTM F3264–21 section(s) ⁷	ASTM F3264–21 subsection(s) ⁸
23.2610	10.3 Instrument Markings, Control Markings, and Placards:.	10.2.6 F3120/F3120M—20 Standard Specification for Ice Protection for General Aviation Aircraft. 10.2.7 F3408/F3408M—21 Standard Specification for Aircraft Emergency Parachute Recovery Systems. 10.3.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 10.3.2 F3063/F3063M—20 Standard Specification for Aircraft Fuel and Energy Storage and Delivery. 10.3.3 F3117/F3117M—20 Standard Specification for Crew Interface in Aircraft. 10.3.4 F3120/F3120M—20 Standard Specification for Ice Protection for General Aviation Aircraft. 10.3.5 F3408/F3408M—21 Standard Specification for Aircraft Emergency Parachute Recovery Systems.
23.2615	10.4 Flight, Navigation, and Powerplant Instruments.	10.4.1 F3061/F3061M—20 Standard Specification for Systems and Equipment in Small Aircraft. 10.4.2 F3062/F3062M—20 Standard Specification for Aircraft Powerplant Installation. 10.4.3 F3064/F3064M—21 Standard Specification for Aircraft Powerplant Control, Operation, and Indication. 10.4.3.1 F3432—20a Standard Practice for Powerplant Instruments. 10.4.4 F3117/F3117M—20 Standard Specification for Crew Interface in Aircraft.
23.2620	5.15 Operating Limitations 10.5 Airplane Flight Manual	5.15.1 F3174/F3174M—19 Standard Specification for Establishing Operating Limitations and Information for Aeroplanes. 5.15.2 F3408/F3408M—21 Standard Specification for Aircraft Emergency Parachute Recovery Systems. 10.5.1 F3117/F3117M—20 Standard Specification for Crew Interface in Aircraft. 10.5.2 F3174/F3174M—19 Standard Specification for Establishing Operating Limitations and Information for Aeroplanes. 10.5.3 F3120/F3120M—20 Standard Specification for Ice Protection for General Aviation Aircraft. 10.5.4 F3408/F3408M—21 Standard Specification for Aircraft Emergency Parachute Recovery Systems.

Editorial, Reapproval, Revision or Withdrawal

ASTM policy is that a consensus standard should be reviewed in its entirety by the responsible subcommittee and must be balloted for reapproval, revision, or withdrawal, within five years of its last approval date. When an ASTM standard is reapproved, that reapproval is denoted by the year in parentheses (e.g., F2427–05a(2013)).

This date indicates the completion of a review cycle with no technical changes made to the standard. ASTM issues editorial changes denoted by a

⁷ The ASTM F3264–21 Section(s) provides a means of compliance intended to be used on projects for traditional part 23 airplanes, not for novel designs. Novel designs require evaluation and possible modification of the means of compliance.

⁸ The FAA does not accept the Aircraft Type Code compliance matrix tables included in F3061/F3061M–20, F3227/F3227M–21, F3228–17, F3229/F3229M–17, F3230–20a, F3231/F3231M–21, F3232/F3232M–20, F3233/F3233M–21, F3234/F3234M–17, F3235–17a, F3236–17, and F3316/F3316M–19. Applicability will be determined by the Small Airplane Strategic Policy Section.

superscript epsilon in the standard designation (e.g., F3235–17ε1). This indicates information was corrected, and it did not change the meaning or intent of a standard. Any means of compliance accepted by this document, that is based on a standard later reapproved or editorially changed, is also considered accepted and without the need for a notice in the **Federal Register**.

ASTM revises a standard to make changes to its technical content. Revisions to consensus standards serving as the basis for means of compliance accepted by this document, will not be automatically accepted, and will require further FAA acceptance in order for the revisions to be an accepted means of compliance.

Availability

ASTM International Standard Designation F3264–21, “Standard Specification for Normal Category Aeroplanes Certification,” is available for online reading at <https://www.astm.org/READINGLIBRARY/>.

ASTM copyrights these consensus standards, and charges the public a fee for service. Individual downloads or reprints of a standard (single or multiple copies, or special compilations and other related technical information) may be obtained through www.astm.org or contacting ASTM at (610) 832–9585 (phone), (610) 832–9555 (fax), or through service@astm.org (email). To inquire about consensus standard content and/or membership or about ASTM Offices abroad, contact Joe Koury, Staff Manager for Committee F44 on General Aviation Aircraft: (610) 832–9804, jkoury@astm.org.

The FAA maintains a list of accepted means of compliance on the FAA website at https://www.faa.gov/aircraft/air_cert/design_approvals/small_airplanes/small_airplanes_regs/.

Issued in Kansas City, Missouri, on March 2, 2022.

Patrick Mullen,

Manager, Technical Innovation Policy
Branch, Policy and Innovation Division,
Aircraft Certification Service.

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2021-0959; Project Identifier AD-2021-00830-E; Amendment 39-21975; AD 2022-06-09]

RIN 2120-AA64

Airworthiness Directives; Pratt & Whitney Division Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: The FAA is superseding Airworthiness Directive (AD) 2019-03-01 and AD 2021-05-51 for certain Pratt & Whitney Division (PW) PW4074, PW4074D, PW4077, PW4077D, PW4084D, PW4090, and PW4090-3 model turbofan engines. AD 2019-03-01 required performing initial and repetitive thermal acoustic image (TAI) inspections for cracks in certain 1st-stage low-pressure compressor (LPC) blades and removal of those blades that fail inspection. AD 2021-05-51 required performing a one-time TAI inspection for cracks in certain 1st-stage LPC blades and removal of those blades that fail inspection. This AD was prompted by three in-flight failures of a 1st-stage LPC blade, with one failure resulting in an engine fire during flight, and subsequent manufacturer publication of service information specifying improved inspections for three critical locations on the 1st-stage LPC blade. This AD requires initial and repetitive ultrasonic (UT) inspections and TAI inspections for cracks in certain 1st-stage LPC blades and removal of those blades that fail inspection. The FAA is issuing this AD to address the unsafe condition on these products.

DATES: This AD is effective April 15, 2022.

The Director of the Federal Register approved the incorporation by reference of a certain publication listed in this AD as of April 15, 2022.

ADDRESSES: For service information identified in this final rule, contact Pratt & Whitney Division, 400 Main Street, East Hartford, CT 06118; phone: (860) 565-0140; email: help24@prattwhitney.com; website: <https://connect.prattwhitney.com>.

You may view this service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (817) 222-5110. It is also available at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2021-0959.

Examining the AD Docket

You may examine the AD docket at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2021-0959; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this final rule, any comments received, and other information. The address for Docket Operations is U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.

FOR FURTHER INFORMATION CONTACT: Carol Nguyen, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7655; fax: (781) 238-7199; email: carol.nguyen@faa.gov.

SUPPLEMENTARY INFORMATION:

Background

The FAA issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 to supersede AD 2019-03-01, Amendment 39-19553 (84 FR 4320, February 15, 2019) (AD 2019-03-01), and AD 2021-05-51, Amendment 39-21470 (86 FR 13445, March 9, 2021) (AD 2021-05-51). AD 2019-03-01 and AD 2021-05-51 applied to certain PW PW4074, PW4074D, PW4077, PW4077D, PW4084D, PW4090, and PW4090-3 model turbofan engines. The NPRM published in the **Federal Register** on December 28, 2021 (86 FR 73699). The NPRM was prompted by the manufacturer developing an improved UT inspection for the three critical locations on the 1st-stage LPC blade, two at the mid span region of the blade and one at the flow path region of the blade, following three in-flight failures of a 1st-stage LPC blade, with one failure resulting in an engine fire during flight. The manufacturer published Pratt & Whitney Alert Service Bulletin (ASB) PW4G-112-A72-361, dated October 15, 2021, which provides instructions for performing both the improved UT inspection and the TAI inspection. The manufacturer also determined that it was necessary to adjust the initial TAI inspection threshold and lower the

repetitive TAI inspection interval on the 1st-stage LPC blades to address the unsafe condition. In the NPRM, the FAA proposed to require initial and repetitive UT inspections and TAI inspections for cracks in certain 1st-stage LPC blades and removal of those blades that fail inspection.

Discussion of Final Airworthiness Directive

Comments

The FAA received comments from five commenters. The commenters were Air Line Pilots Association, International (ALPA), All Nippon Airways (ANA), The Boeing Company (Boeing), Japan Airlines (JAL), and United Airlines (UAL). The following presents the comments received on the NPRM and the FAA's response to each comment.

Request To Revise Note and Add Additional Note in Required Actions

UAL requested that the FAA revise Note 2 to paragraph (g)(1)(ii) of the NPRM [Note 1 to paragraph (g)(1)(ii) of this AD] to "The FAA-approved TAI inspection method and the vendors that can perform the FAA-approved TAI inspection are specified in the Accomplishment Instructions section and Vendor Services section of PW4G-112-A72-361, respectively." UAL also requested that the FAA add the same note to paragraph (g)(2)(iii) of this AD.

The FAA agrees and revised Note 1 to paragraph (g)(1)(ii) of this AD and added Note 2 to paragraph (g)(2)(iii) to this AD, as requested by UAL.

Request To Change the Initial Compliance Time to Before Revenue Flight

ANA requested that the FAA change the Required Actions, paragraph (g)(1) Initial 1st-stage LPC Blade Inspections, from "before further flight after the effective of this AD" to "before the next revenue flight" to clarify the ferry flight requirement.

Similarly, JAL requested the FAA change the Required Actions, paragraph (g)(1) Initial 1st-stage LPC Blade Inspections, from "before further flight after the effective of this AD" to "before the next revenue flight" or "before further flight except the ferry flight without passenger and cargos."

The FAA disagrees with changing the initial compliance in paragraph (g) of this AD as requested by ANA and JAL. The FAA has determined it is necessary to require certain actions prior to any flight, except as permitted in paragraph (i), Special Flight Permit, of this AD.