U.S. Department of Transportation
Federal Aviation Administration

# Advisory Circular

**Subject:** Powered-Lift Operations | **Date:** 10/7/24 | **AC No:** 194-1
**Initiated by:** AFS-800 | **Change:**

This advisory circular (AC) describes how powered-lift will comply with specific regulations in Title 14 of the Code of Federal Regulations (14 CFR) parts 43, 91, 91 subpart K (part 91K), 97, 135, and 136. This AC does not provide compliance options for every regulation addressed in 14 CFR Part 194, Special Federal Aviation Regulation No. 120—Powered-Lift: Pilot Certification and Training; Operations Requirements, as several regulations do not require additional information. Instead, this AC provides clarification for specified regulations within Special Federal Aviation Regulation (SFAR) 120, Powered-Lift: Pilot Certification and Training; Operations Requirements, to ensure powered-lift operate safely. This AC can be used to help in understanding some of the part 194 regulations and will remain in effect until permanent rules for powered-lift are developed.

The contents of this document do not have the force and effect of law and are not meant to bind the public in any way, and the document is intended only to provide information to the public regarding existing requirements under the law or agency policies.

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# CHAPTER 1. INTRODUCTION

## 1.1 Purpose of This Advisory Circular (AC).

**1.1.1** Powered-Lift and Title 14 of the Code of Federal Regulations (14 CFR). This AC describes how powered-lift will comply with specific regulations in 14 CFR parts 43, 91, 91 subpart K (part 91K), 97, 135, and 136. This AC does not provide compliance options for every regulation addressed in 14 CFR part 194, as several do not require additional information. Instead, this AC provides clarification for specified regulations within Special Federal Aviation Regulation (SFAR) 120, Powered-Lift: Pilot Certification and Training; Operations Requirements, to ensure powered-lift operate safely. This AC can be used to help in understanding some of the part 194 regulations and will remain in effect until permanent rules for powered-lift are developed.

**1.1.2** Powered-Lift and Applicable Aircraft Rules. Parts 43, 91, 91K, 97, 135, and 136 contain some provisions that are applicable to all aircraft and some provisions that specify applicability to a particular kind of aircraft (e.g., airplane or rotorcraft). Powered-lift are aircraft as defined in 14 CFR part 1, § 1.1 and, as explained in part 194, § 194.301, must comply with regulations that are applicable to aircraft. In addition, the SFAR requires powered-lift to comply with regulations that specify applicability to a particular kind of aircraft. This AC describes how powered-lift comply with specific airplane, rotorcraft, and helicopter rules contained in parts 43, 91, 91K, 97, 135, and 136. Because this AC discusses the applicability of existing rules to powered-lift operations, it contains numerous references to other ACs, orders, and guidance material. These documents can be found on the Dynamic Regulatory System (DRS) located at https://drs.faa.gov.

**1.1.3** Effects of Guidance. This AC is intended to support powered-lift operations during the term of the SFAR. It is not mandatory and does not constitute a regulation. The contents of this document do not have the force and effect of law and are not meant to bind the public in any way, and the document is intended only to provide information to the public regarding existing requirements under the law or agency policies.

**1.1.4** Regulatory Requirements. The content of this AC does not change or create any additional regulatory requirements, nor does it authorize changes in, or permit deviations from, existing regulatory requirements.

**1.2 Audience.** The primary audience for this AC includes pilots and operators intending to operate powered-lift in accordance with parts 43, 91, 91K, 97, 135, and/or 136.

**1.3 Where You Can Find This AC.** You can find this AC on the Federal Aviation Administration's (FAA) website at https://www.faa.gov/regulations_policies/advisory_circulars and DRS at https://drs.faa.gov.

## 1.4 Background.

**1.4.1** Concurrently with publication of this AC, the FAA has published a final rule establishing the requirements for pilot certification and operation of powered-lift through the publication of the SFAR. Powered-lift are defined in part 1 as heavier-than-air aircraft

capable of vertical takeoff, vertical landing, and low-speed flight that depend principally on engine-driven lift devices or engine thrust for lift during these flight regimes and on nonrotating airfoil(s) for lift during horizontal flight. Powered-lift may be capable of vertical takeoff and landing (VTOL) operations or conventional takeoffs and landings, while being able to fly like an airplane during cruise flight. The powered-lift SFAR will establish a regulatory structure that leverages the existing rules, removes operational barriers, and mitigates safety risks for powered-lift.

**1.4.2** The FAA conducted a review of ACs that may be relevant to powered-lift. These are listed in Appendix B, Related Reading Material.

**1.5 Powered-Lift Flight Modes.** Powered-lift are hybrid aircraft capable of operating in a manner similar to airplanes (wing-borne flight mode) and rotorcraft (vertical-lift flight mode). The FAA refers to these modes as wing-borne flight mode and vertical-lift flight mode.

**1.5.1** Vertical-Lift Flight Mode. Vertical-lift flight mode means a mode of flight where a powered-lift:

- Is in a configuration that allows vertical takeoff, vertical landing, and low-speed flight; and
- Depends principally on engine-driven lift devices or engine thrust for lift.

**1.5.2** Wing-Borne Flight Mode. Wing-borne flight mode means a mode of flight where a powered-lift is not operating in the vertical-lift flight mode as defined and depends exclusively or partially on nonrotating airfoil(s) for lift during takeoff, landing, or horizontal flight.

**1.5.3** Autorotation. Autorotation means a rotorcraft or powered-lift flight condition in which the lifting rotor is driven entirely by action of the air when the rotorcraft or powered-lift is in motion.

**1.6 AC Feedback Form.** For your convenience, the AC Feedback Form is the last page of this AC. Note any deficiencies found, clarifications needed, or suggested improvements regarding the contents of this AC on the Feedback Form.

# CHAPTER 2. PART 43 MAINTENANCE

**2.1 Applicability of Part 43 to Powered-Lift.** Powered-lift meet the definition of an aircraft as defined in § 1.1 and must comply with all part 43 maintenance requirements that are applicable to aircraft in accordance with § 43.1(a)(1), unless otherwise specified in the Special Federal Aviation Regulation (SFAR) 120, Powered-Lift: Pilot Certification and Training; Operations Requirements.

**2.2 Maintenance and Inspection Provisions Applicable to Powered-Lift.** The following maintenance provisions under part 43 that pertain to rotorcraft also apply to powered-lift:

1. Section 43.3(h) applies to certificate holders (CH) operating powered-lift under part 135 in a remote area; and
2. In lieu of complying with § 43.15(b), each person performing an inspection required by part 91 on a powered-lift shall inspect critical parts in accordance with the maintenance manual or instructions for continued airworthiness (ICA), or as otherwise approved by the Administrator. "Critical part" under the SFAR has the same meaning as provided in 14 CFR part 27, § 27.602 and part 29, § 29.602.

**2.3 Powered-Lift Operations in Remote Areas Under Part 135.** Under part 135, § 135.429(d), the Administrator may approve a CH to authorize a pilot in remote areas when no other qualified person is available to have a required inspection performed on a rotorcraft by that pilot that meets the criteria addressed in § 135.429(d). Powered-lift CHs will be allowed under the SFAR to use the same process to receive this approval from the FAA currently in place for rotorcraft and will contact their responsible Certificate Management Team (CMT). Section 194.402(a) requires CHs operating powered-lift in remote areas under part 135 to comply with the preventive maintenance protocols prescribed in § 43.3(h). Section 194.306(lll) requires pilots performing the specific preventive maintenance functions to be properly trained and qualified in accordance with § 135.429(d).

**2.4 Inspection of Critical Parts.** Section 194.402(b) applies the definition of a "critical part" in §§ 27.602 and 29.602 to powered-lift subject to the inspection outlined in § 43.15(b), as specified in the aircraft manufacturer's maintenance manual. The intent for critical part inspections will be the same as currently written in § 43.15 for rotorcraft, but may have different nomenclature for powered-lift critical parts as specified in the maintenance manual or ICAs. In lieu of complying with § 43.15(b), each person performing an inspection required by part 91 on a powered-lift shall inspect critical parts in accordance with the maintenance manual or ICA, or as otherwise approved by the Administrator.

# CHAPTER 3. PART 91 OPERATIONS

**3.1 Operations of Powered-Lift.** Persons operating powered-lift must continue to comply with rules applicable to all aircraft in part 91. In § 194.302, Table 1 to § 194.302 outlines the airplane, helicopter, and rotorcraft provisions that are applicable to powered-lift. Moreover, any provisions in part 91 that are specific to a category of aircraft such as airplane or helicopter, and that are not outlined in Table 1 to § 194.302, do not apply to powered-lift.

**3.2 Part 91 Subpart A, General.** Powered-lift must comply with the provisions in part 91 subpart A that are applicable to aircraft. Paragraphs 3.2.1 and 3.2.2 below detail how the regulations in part 91 subpart A that contain airplane- or helicopter-specific provisions apply to powered-lift. The FAA also amended a small number of regulations to accommodate powered-lift, discussed herein.

**3.2.1** Section 91.1, Applicability. The provisions in part 91 subpart A are applicable to all aircraft operating in the National Airspace System (NAS) unless specifically excepted, such as for aircraft governed by 14 CFR part 103 or 107. The FAA changed the term "airplane" to "aircraft" in § 91.1(d) to include powered-lift, because the FAA intends for powered-lift to comply with the provisions in part 91 subpart A.

**3.2.2** Section 91.9, Civil Aircraft Flight Manual, Marking, and Placard Requirements. Section 91.9(a) and (b) contains references to "Airplane or Rotorcraft Flight Manual." The FAA intends for powered-lift operators to comply with the manual requirements and any additional requirements in § 91.9. The FAA will evaluate the aircraft flight manual during type certification for acceptability. Thus, § 194.302(a) requires powered-lift to comply with § 91.9. Although the Powered-Lift's Aircraft Flight Manual (PLAFM) will not refer to an airplane or rotorcraft as specified in § 91.9, the FAA is applying the requirements set forth in § 91.9 to powered-lift with an aircraft flight manual.

**3.3 Part 91 Subpart B, Flight Rules.** Powered-lift must comply with the provisions in part 91 subpart B that are applicable to aircraft. Paragraphs 3.3.1 through 3.3.14 below detail how the regulations in part 91 subpart B that contain airplane- or helicopter-specific provisions apply to powered-lift.

**3.3.1** Section 91.103, Preflight Action (refer to § 194.302(b)). Section 91.103 contains the requirement for a pilot in command (PIC) to be familiar with all available information concerning a flight, including takeoff and landing distance data as specified in the approved Airplane or Rotorcraft Flight Manual. Due to the hybrid capabilities of powered-lift, a PIC must be familiar with takeoff and landing distances for all applicable flight modes. Section 194.302(b) requires powered-lift with an aircraft flight manual approved through the certification process to comply with the provisions in § 91.103.

**3.3.2** Section 91.107, Use of Safety Belts, Shoulder Harnesses, and Child Restraint Systems (refer to § 194.302(c)). Section 194.302(c) makes § 91.107(a)(3) applicable to all powered-lift. In § 91.107(a)(3) for seaplane and float-equipped rotorcraft operations during movement on the surface, persons pushing off a seaplane or float-equipped

rotorcraft from the dock or persons mooring a seaplane or rotorcraft at a dock are excepted from the seating and safety belt requirements. The exceptions also apply to powered-lift in § 194.302(c). For further information about how to comply with § 194.302(c), powered-lift operators should apply the information contained in the current edition of AC 91-69, Seaplane Safety for 14 CFR Part 91 Operators.

**3.3.3** Section 91.109, Flight Instruction; Simulated Instrument Flight and Certain Flight Tests. Section 91.109 requires the use of fully functional dual controls for aircraft used in flight instruction with exceptions for free manned balloon and instrument instruction in airplanes with a single functioning throwover control wheel. However, the powered-lift final rule adopted provisions to facilitate pilot certification in powered-lift with a single functioning flight control and single pilot station.

**Note:** Further discussion of powered-lift and fully functioning dual controls for flight instruction is contained in AC 194-2, Pilot Training and Certification for Powered-Lift Operations.

**3.3.4** Section 91.113, Right-of-Way Rules: Except Water Operations.

**3.3.4.1** Section 91.113 requires all powered-lift to comply with § 91.113(d)(2) and (d)(3). Under the rule in § 91.113, when aircraft of the same category are converging at approximately the same altitude (except head-on, or nearly so), the aircraft to the other's right has the right-of-way. When the aircraft are of different categories, § 91.113(d)(1) through (d)(3) establishes a hierarchy giving priority to balloons, then gliders, followed by airships, and then to airplanes and rotorcraft. An aircraft that is towing or refueling other aircraft has right-of-way over all other engine-driven aircraft. Under the revised § 91.113, powered-lift, airplanes, and rotorcraft are grouped in the same right-of-way category. Thus, if a powered-lift is converging with an airplane, the aircraft to the right has the right-of-way.

**3.3.4.2** To comply with this rule, powered-lift should refer to the current editions of AC 90-48, Pilots' Role in Collision Avoidance, and AC 90-66, Non-Towered Airport Flight Operations. When referring to AC 90-66, powered-lift operators should note that the term "powered-lift" should be considered equivalent to the terms "airplane" or "rotorcraft." For example: A glider has the right-of-way over an airship, powered parachute, weight-shift-control aircraft, airplane, rotorcraft, or powered-lift. Also, an airship has the right-of-way over a powered parachute, weight-shift-control aircraft, airplane, rotorcraft, or powered-lift.

**3.3.5** Section 91.119, Minimum Safe Altitudes: General. Section 91.119 prescribes the minimum safe altitude (MSA) for aircraft operations. Section 91.119(d) contains an exception for helicopters, powered parachutes, and weight-shift-control aircraft, allowing them to operate below the minimum altitudes prescribed in § 91.119(b) and (c) when certain conditions are met. Powered-lift operating in the vertical-lift flight mode that have demonstrated the capability to autorotate or conduct an approved equivalent maneuver

are allowed the same MSAs as those afforded to helicopters in § 91.119(d), as outlined in § 194.302(d). With regard to powered-lift utilizing helicopter routes, the FAA notes that some helicopter routes may be lower than a minimum altitude published in the aircraft flight manual for a given powered-lift configuration (e.g., an altitude which enables a transition from wing-borne flight mode to vertical-lift flight mode at an altitude sufficient to conduct a safe autorotation, or an approved equivalent maneuver, to a landing). Regardless of any clearance or helicopter route prescribed altitude, no powered-lift may operate lower than any limitation specified in the aircraft flight manual or any other limitation. The Administrator reiterates that a clearance by air traffic does not grant exemption from any rule. Section 91.9 requires compliance with all aircraft flight manual limitations at all times.

**3.3.6** Section 91.126, Operating On or In the Vicinity of an Airport in Class G Airspace (refer to § 194.302(e) and (f)).

**3.3.6.1** When entering the traffic pattern to land, powered-lift may transition between wing-borne flight mode and vertical-lift flight mode. Wing-borne flight mode (forward flight) is similar to an airplane, and vertical-lift flight mode (vertical flight) is similar to a helicopter.

**3.3.6.2** If the powered-lift intends to land in wing-borne flight mode, § 194.302(e) requires the pilot to comply with § 91.126(b)(1) and make all turns of the powered-lift to the left, unless the airport displays approved light signals or visual markings indicating that turns should be made to the right, in which case the pilot must make all turns to the right. If the powered-lift is operating in vertical-lift flight mode, § 194.302(f) requires the pilot to comply with § 91.126(b)(2) and avoid the flow of fixed-wing aircraft.

**3.3.6.3** To comply with this rule, powered-lift operators should refer to AC 90-66. Powered-lift pilots must consider their mode of flight in accordance with § 194.302(e) and (f). For example, AC 90-66, paragraph 12.1.1 states "[i]n the case of a helicopter approaching to land other than on the runway in use, the pilot should avoid the flow of fixed-wing aircraft and land on a marked helipad or suitable clear area." Therefore, powered-lift operating in vertical-lift flight mode would comply with the helicopter provision, avoid the flow of fixed-wing aircraft, and land on a marked helipad or suitable clear area.

**3.3.7** Section 91.129, Operations in Class D Airspace (refer to § 194.302(g) through (j)). The provisions of § 91.129(a) through (d), (g)(1), and (i) refer to aircraft and are applicable to powered-lift.

**3.3.7.1** **Section 91.129(e) and (g) Minimum Altitudes When Operating To an Airport in Class D Airspace.** Section 91.129(e) and (g) specifies minimum altitudes for landing, approaches and departures at an airport in Class D Airspace. Section 91.129(h) prescribes noise abatement requirements for large or turbine-powered airplanes. The provisions of these rules are necessary for

noise abatement and to ensure adequate terrain clearance for large or turbine-powered airplanes. Section 194.302(g) requires large or turbine-powered powered-lift to comply with the provisions in § 91.129(e)(1), (e)(2), (g)(2), and (h). Furthermore, operators must note these provisions apply to all large or turbine-powered powered-lift *regardless of the flight mode* they may be operating in.

**3.3.7.2 Section 91.129(e)(3) Approaching to Land on a Runway Served by a Visual Approach Slope Indicator (VASI) (refer to § 194.302(h)).**

**3.3.7.2.1** Section 194.302(h) requires a powered-lift pilot intending to land in wing-borne flight mode and approaching a runway served by a VASI to comply with § 91.129(e)(3). The pilot must operate the powered-lift at an altitude at or above the glidepath until a lower altitude is necessary for a safe landing. The requirement for powered-lift to remain at or above the glidepath ensures adequate obstacle clearance is maintained during the approach.

**3.3.7.2.2** Powered-lift pilots intending to land in vertical-lift flight mode are anticipated to be flying more slowly than powered-lift pilots landing in wing-borne flight mode. Thus, the slower speed and the ability to maneuver like a helicopter make it unnecessary to comply with § 194.302(g)(1).

**3.3.7.3 Section 91.129(f)(1) Class D Airspace Landing Approach Procedures (refer to § 194.302(i)).**

**3.3.7.3.1** Section 194.302(i) requires powered-lift pilots intending to land in wing-borne flight mode to comply with the airplane rule in § 91.129(f)(1). The pilot must circle the airport to the left unless the powered-lift is conducting a circling approach under part 97 or if the pilot is otherwise directed by air traffic control (ATC).

**3.3.7.3.2** Section 194.302(j) requires powered-lift pilots intending to land in vertical-lift flight mode to comply with the helicopter rule in § 91.129(f)(2) and avoid the flow of fixed-wing traffic unless the powered-lift is conducting a circling approach under part 97 or if the pilot is otherwise directed by ATC.

**Note:** In § 194.302(i)(2) and (j)(2), the requirements of § 91.129(f) do not apply to powered-lift conducting a circling approach under part 97 because a circling approach may have specific procedures established, or turns may be requested by ATC to ensure safety in the traffic pattern.

**3.3.7.4 Section 91.129(h) Runway Usage Requirements (refer to § 194.302(g)).** Section 194.302(g) requires large or turbine-powered powered-lift to comply with § 91.129(h). Under the Special Federal Aviation Regulation (SFAR) 120, where a formal runway use program has been established by the FAA, each pilot of a large or turbine-powered powered-lift must use the noise abatement runway assigned by ATC. However, the PIC remains the final authority

concerning the safe operation of the aircraft, as prescribed in § 91.3(a), and may request that ATC assign a different runway in the interest of safety.

**3.3.8** Section 91.131, Operations in Class B Airspace (refer to § 194.302(k)). The current provisions of § 91.131(a)(2) are applicable to large turbine-engine-powered airplanes. However, the FAA anticipates that certain powerplants, such as electric motors, may have equal or better performance in comparison to internal combustion engines; therefore, operators of powered-lift must note that under the SFAR, all large powered-lift, regardless of powerplant type, must comply with § 194.302(k). This requires a person operating a powered-lift to or from a primary airport for which Class B Airspace is designated to operate at or above the designated floors of the Class B Airspace area while within the lateral limits of that area. This is to ensure that large powered-lift remain deconflicted from smaller aircraft that may be operating under Class B Airspace and not receiving air traffic services.

**3.3.9** Section 91.151(a) and (b), Fuel Requirements for Flight in VFR Conditions (refer to § 194.302(l)).

**3.3.9.1** Except in accordance with § 194.302(l), all powered-lift must comply with the airplane fuel requirements prescribed in § 91.151(a). In accordance with § 194.302(l), powered-lift with the performance capability (as outlined in the aircraft flight manual) to conduct a landing in the vertical-lift flight mode along the entire route of flight may use the visual flight rules (VFR) fuel requirements outlined in § 91.151(b). However, if the powered-lift cannot be assured of a safe landing in vertical-lift flight mode along the entire route of flight, then compliance with § 91.151(a) would be required.

**3.3.9.2** Indications that a powered-lift may not be assured of a safe landing in vertical-lift flight mode along the entire route of flight may include a limitation or requirement in the aircraft flight manual that would preclude such a landing. Likewise, the powered-lift may not be capable of transitioning from wing-borne to vertical-lift flight mode quickly enough to comply. This provision will not prevent a powered-lift from operating in wing-borne flight mode. Rather, it will require the powered-lift to have the performance capability (as detailed in the aircraft flight manual) to conduct a landing in vertical-lift flight mode along the entire route of flight in order to take advantage of the rotorcraft VFR fuel requirements.

**Note:** The term “fuel” includes any form of energy used by an engine or powerplant installation, such as provided by carbon-based fuels or electrical potential. The term “fuel systems” includes a means of storage for the electrical energy provided (e.g., batteries that provide energy to an electric motor) or devices that generate energy for propulsion (e.g., solar panels or fuel cells).

**3.3.10** Section 91.155, Basic VFR Weather Minimums (refer to § 194.302(m), (n), and (o)). Section 91.155 permits helicopters to operate under lower visibility and cloud clearance

minimums than airplanes in Class G Airspace. The FAA recognizes that helicopters operate at lower speeds and are capable of greater maneuverability than other aircraft. This allows pilots to see and avoid other air traffic or obstructions in time to prevent a collision. Powered-lift may have equivalent maneuvering capabilities to helicopters when operating in vertical-lift flight mode and therefore may comply with the helicopter provisions in certain circumstances. To comply with these provisions, powered-lift must be operated at a speed that allows the pilot enough time to see and avoid any other air traffic, or any obstructions in time to avoid a collision. A powered-lift that cannot be operated at a speed that allows the pilot enough time to see and avoid any other air traffic or any obstructions to avoid a collision, regardless of the mode of flight, must comply with the airplane visibility minimums prescribed in § 91.155(a) and (b)(2).

**3.3.11** Section 91.157, Special VFR Weather Minimums (refer to § 194.302(p)). Section 91.157 permits helicopters to operate under lower visibility and cloud clearance minimums than airplanes. For the same reasons stated in paragraph 3.3.10 above, powered-lift may comply with the helicopter exceptions of § 91.157(b)(3), (b)(4), and (c), provided powered-lift are operated at a speed that allows the pilot enough time to see and avoid any other air traffic or any obstructions in time to avoid a collision. As such, § 194.302(p) stipulates that the helicopter exceptions outlined in § 91.157(b)(3), (b)(4), and (c) apply to powered-lift operating in vertical-lift flight mode when those aircraft are operated at a speed that allows the pilot to see any other traffic or obstructions in time to avoid a collision.

**3.3.12** Section 91.167, Fuel Requirements for Flight in IFR Conditions (refer to § 194.302(q)).

**3.3.12.1** Section 91.167(a)(1) through (3) specifies no person may operate a civil aircraft in instrument flight rules (IFR) conditions unless it carries enough fuel (considering weather reports and forecasts and weather conditions) to:

1. Complete the flight to the first airport of intended landing;
2. If necessary, and except as provided in § 91.167(b), to fly from that airport to the alternate airport; and
3. To fly after that for 45 minutes at normal cruising speed or, for helicopters, fly after that for 30 minutes at normal cruising speed.

**3.3.12.2** Because a powered-lift can operate similarly to a helicopter, powered-lift are required to only carry the fuel reserves of a helicopter in certain circumstances. As such, powered-lift authorized to conduct Copter Procedures and that have the performance capability, as provided in the aircraft flight manual, for the entire flight to conduct a landing in the vertical-lift flight mode may comply with the IFR fuel requirements established for helicopters.

**3.3.12.3** Furthermore, during aircraft certification, the FAA will assess the aircraft's stability, system, and equipage for IFR operations. A powered-lift that does not possess these characteristics may still be certificated for IFR but will be prohibited from performing Copter Procedures and have a limitation in the

aircraft flight manual to that effect. Powered-lift with such a limitation would not be authorized to use this option and would be required to use the IFR alternate airport minimums specified for airplanes.

**3.3.12.4** Section 194.302(q) stipulates that:

1. A powered-lift authorized to conduct Copter Procedures, and that has the performance capability for the entire flight to conduct a landing in the vertical-lift flight mode as outlined in the aircraft flight manual, may use the 30-minute fuel requirement established for helicopters under § 91.167(a)(3);
2. A powered-lift authorized to conduct Copter Procedures, and that has the performance capability for the entire flight to conduct a landing in the vertical-lift flight mode as outlined in the aircraft flight manual, may use the helicopter provision under § 91.167(b)(2)(ii); and
3. A powered-lift that is unable to meet the requirements outlined in § 194.302(q)(1) and (2) must use the 45-minute fuel requirement outlined in § 91.167(a)(3) and the aircraft requirement outlined in § 91.167(b)(2)(i).

**3.3.13** Section 91.169, IFR Flight Plan: Information Required (refer to § 194.302(r)).

**3.3.13.1** Section 91.169(b)(2)(ii) stipulates that § 91.169(a)(2) does not apply if appropriate weather reports or weather forecasts, or a combination of them, indicate, for helicopters, at the estimated time of arrival (ETA) and for 1 hour after the ETA, the ceiling will be at least 1,000 feet above the airport elevation, or at least 400 feet above the lowest applicable approach minimums, whichever is higher, and the visibility will be at least 2 statute miles (sm).

**3.3.13.2** Likewise, § 91.169(c)(1)(ii) stipulates that unless otherwise authorized by the Administrator, no person may include an alternate airport in an IFR flight plan unless appropriate weather reports or weather forecasts, or a combination of them, indicate that, at the ETA at the alternate airport, the ceiling and visibility at that airport will be at or above the following weather minimums:

**3.3.13.2.1** If an instrument approach procedure (IAP) has been published in part 97, or a special IAP has been issued by the Administrator to the operator, the minimums for that airport will be:

1. Per § 91.169(c)(1)(i), for powered-lift operating in the wing-borne flight mode and/or with a flight manual limitation that prohibits

Copter Procedures, the alternate airport minimums specified in that procedure, or if none are specified, the following approach minimums:

a. For a precision approach procedure, a ceiling of 600 feet and visibility of 2 sm.

b. For a non-precision approach procedure, a ceiling of 800 feet and visibility of 2 sm.

2. Per § 91.169(c)(1)(ii), for powered-lift operating in the vertical-lift mode, a ceiling of 200 feet above the minimum for the approach to be flown, and visibility of at least 1 sm but never less than the minimum visibility for the approach to be flown.

**3.3.13.3** Because powered-lift can operate similarly to helicopters, powered-lift may utilize the requirements for helicopter IFR flight plan required information in certain circumstances. As such, § 194.302(r) stipulates:

1. Powered-lift authorized to conduct Copter Procedures and that have the performance capability to land in the vertical-lift flight mode, as outlined in the aircraft flight manual, may use the helicopter provisions specified in § 91.169(b)(2)(ii) and (c)(1)(ii); and
2. Powered-lift that are unable to meet the requirements outlined in § 194.302(r)(1) must use the requirements for aircraft other than helicopters under § 91.169(b)(2)(i) and (c)(1)(i).

**3.3.14** Section 91.175, Takeoff and Landing Under IFR (refer to § 194.302(s) and (t)).

**3.3.14.1** Section 91.175(f) provides civil airport takeoff minimums for persons operating an aircraft under 14 CFR part 121, 125, 129, or 135; however, part 194 only addresses part 135 operations. Section 91.175(f)(2) provides takeoff visibility minimums if the takeoff visibility minimums are not otherwise provided under part 97 for a particular airport. In this case, a powered-lift with two or less engines must have a minimum visibility of 1 sm for takeoff. For more than two engines, a minimum visibility of ½ sm is required for takeoff.

**3.3.14.2** Section 194.302(s) stipulates that a powered-lift with two engines or less that conducts their takeoff vertically and are authorized to use Copter Procedures may use the helicopter minimums of ½ sm as provided in § 91.175(f)(2)(iii).

**3.3.14.3** Section 91.175(f)(4)(i) requires a pilot under part 135 operations to use a takeoff obstacle clearance or avoidance procedure that ensures compliance with the applicable airplane performance operating limitations under part 135 subpart I for takeoff at that airport. Section 194.302(t) requires powered-lift operators under part 135 to comply with the performance requirements of § 91.175(f)(4)(i). Section 194.306(bbb) requires powered-lift operators to comply with the requirements of part 135 subpart I based upon the size and certification basis of the aircraft.

**3.3.14.4** The operator should review their aircraft's performance operating limitations to determine which aircraft performance limitation requirements of part 135 subpart I apply. They will use this information to ensure that they are using the appropriate takeoff obstacle clearance or avoidance procedure.

**3.4 Part 91 Subpart C, Equipment, Instrument, and Certificate Requirements, and Part 91 Subpart D, Special Flight Operations.** Powered-lift must comply with the provisions in part 91 subpart C and part 91 subpart D that are applicable to aircraft. Paragraphs 3.4.1 through 3.4.7 below detail how the regulations in part 91 subparts C and D that contain airplane- or helicopter-specific provisions apply to powered-lift.

**3.4.1** Section 91.205, Powered Civil Aircraft with Standard Category U.S. Airworthiness Certificates: Instrument and Equipment Requirements (refer to § 194.302(u) and (v)).

**3.4.1.1** Section 194.302(u) requires all small powered-lift to comply with § 91.205(b)(11) and (b)(14). Section 91.205(b)(11) requires airplanes to be equipped with a position and anticollision light system that meets the requirements set forth in 14 CFR part 23, § 23.2530(b). Under § 194.302(u), powered-lift must be equipped with position and anticollision lights that meet the requirements set forth in § 23.2530(b). In the event of failure of any light of the anticollision light system, operation of the aircraft may continue to a location where repairs or replacement can be made.

**3.4.1.2** Powered-lift are also required under § 194.302(u) to comply with § 91.205(b)(14) and have an approved shoulder harness or restraint system installed for all seats. To comply with this rule, powered-lift operators should refer to the current edition of AC 21-34, Shoulder Harness-Safety Belt Installations, for acceptable means of compliance and basic principles regarding design and installation of combined shoulder harness and safety belt restraint systems that meet the applicable requirements.

**3.4.1.3** Section 194.302(v) requires powered-lift certified for IFR operations to comply with the airplane provisions in § 91.205(d)(3)(i). Under § 194.302(v), powered-lift must be equipped with either a gyroscopic rate-of-turn indicator or a third attitude instrument system usable through flight attitudes of 360 degrees of pitch and roll installed.

**3.4.2** Section 91.207, Emergency Locator Transmitters (refer to § 194.302(w)). Section 194.302(w) requires all powered-lift to comply with § 91.207 and be equipped with an emergency locator transmitter (ELT). To comply with this rule, powered-lift operators should refer to the current edition of AC 91-44, Installation and Inspection Procedures for Emergency Locator Transmitters and Receivers. AC 91-44 describes installation and inspection procedures for ELT systems and is intended to be used in conjunction with or as a supplement to the installation, maintenance, and inspection requirements found in the maintenance manuals and other information related to the installation, usage, inspection, and maintenance of ELTs.

**3.4.3** Section 91.213, Inoperative Instruments and Equipment. Section 91.213 prescribes the circumstances in which an aircraft may be operated with inoperative instruments and equipment. Powered-lift operators must have an approved minimum equipment list (MEL) as required by § 91.213(a) through (c) in order to take off an aircraft with inoperative instruments or equipment installed. Powered-lift operators should review the FAA's Policy Letter PL-34, MMEL and MEL Preamble, for information on the policy and purpose of the MEL.

**Note:** Section 91.213(d) allows an aircraft without an approved MEL to continue to be operated with inoperative instruments and equipment when certain conditions are met. Section 91.213(d) does not apply to powered-lift and is not included in the SFAR. Powered-lift without an approved MEL must comply with § 91.213(a) through (c) and may not take off with inoperative instruments and equipment installed.

**3.4.4** Section 91.215, ATC Transponder and Altitude Reporting Equipment and Use (refer to § 194.304). Section 91.215(b) states that no person may operate an aircraft in the airspace described in § 91.215(b)(1) through (b)(5) unless the aircraft is equipped with an operable coded radar beacon transponder. This regulation is applicable to aircraft, and therefore, applicable to powered-lift. All powered-lift are required under § 91.215(b)(1) to be equipped with an operable coded radar beacon transponder.

**Note:** Section 91.215(b)(3) and (b)(5) provide an exception to the requirement for an aircraft to be equipped with an operable coded radar beacon transponder if the aircraft was not originally certificated with an engine-driven electrical system or has not subsequently been certified with an engine-driven electrical system. Under § 194.304, the exceptions outlined in § 91.215(b)(3) and (b)(5) for aircraft not certificated with an engine-driven electrical system do not apply to powered-lift. All powered-lift are required under § 91.215(b)(1) to be equipped with an operable coded radar beacon transponder.

**3.4.5** Section 91.219, Altitude Alerting System or Device (refer to § 194.302(x)). Section 91.219 prohibits the operation of a turbojet-powered U.S.-registered civil airplane unless that airplane is equipped with an approved altitude alerting system or device. Section 194.302(x) requires all powered-lift to comply with the altitude alerting requirements under § 91.219, regardless of powerplant type. To comply with this rule, powered-lift operators should refer to the current edition of AC 25.1322-1, Flightcrew Alerting, for acceptable means of compliance with the 14 CFR part 25 requirements for the design approval of flightcrew-alerting functions. AC 25.1322-1 contains information on the type of alert function elements that should be considered (including visual, aural, and tactile or haptic elements), alert management, the interface or integration of alerts with other systems, and color standardization.

**3.4.6** Section 91.223, Terrain Awareness and Warning System (refer to § 194.302(y)).

**3.4.6.1 Section 194.302(y) Requirements.** Section 194.302(y) requires powered-lift to comply with § 91.223(a) and (c). Section 91.223 requires powered-lift

configured with six or more passenger seats, excluding any pilot seat, to be equipped with a Helicopter Terrain Awareness and Warning System (HTAWS) that meets the requirements in Technical Standard Order (TSO)-C194, Helicopter Terrain Awareness and Warning System (HTAWS), and RTCA DO-309, Minimum Operational Performance Standards (MOPS) for Helicopter Terrain Awareness and Warning System (HTAWS) Airborne Equipment, section 2, or an FAA-approved Class A Terrain Awareness and Warning System (TAWS A)/HTAWS hybrid system. Powered-lift operators may meet the requirement by having either a traditional HTAWS or a hybrid TAWS A/HTAWS that has been approved by the FAA. The aircraft flight manual must also contain appropriate procedures for the use of the TAWS and proper flightcrew reaction in response to the TAWS audio and visual warnings.

**3.4.6.2 HTAWS and Hybrid TAWS A/HTAWS Approvals.**

**3.4.6.2.1** FAA Aircraft Certification Service (AIR) certification branches are responsible for assessing HTAWS or hybrid equipment prior to installation and use on the aircraft. Field approvals are not authorized for these systems. The assessment may occur at initial certification or when a supplemental or amended type certification is requested.

**3.4.6.2.2** HTAWS that meet the TSO-C194 standard must be approved as part of the type certificate (TC) approval process under 14 CFR part 21, § 21.17(b).

**3.4.6.2.3** HTAWS or hybrid TAWS A/HTAWS equipment that does not meet the TSO-C194 standard must be assessed and approved by the FAA prior to its installation and use under the TC process set forth in § 21.17(b).

**3.4.6.2.4** Modifiers and Original Equipment Manufacturers (OEM) should submit requests to the responsible AIR certification branch. A list of AIR certification branches can be found at https://www.faa.gov/about/office_org/field_offices/certification_branches.

**3.4.7** Section 91.313, Restricted Category Civil Aircraft: Operating Limitations (refer to § 194.302(z)). Section 194.302(z) requires restricted category small powered-lift to comply with § 91.313(g) and be equipped with a shoulder harness or restraint system for each front seat.

**Note:** Section 91.313(a) through (e) applies to aircraft and therefore applies to powered-lift. Section 91.313(f) is not applicable to powered-lift because this rulemaking does not enable powered-lift to conduct operations under 14 CFR part 133.

**3.5 Part 91 Subpart E, Maintenance, Preventive Maintenance, and Alterations.** Powered-lift must comply with the provisions in part 91 subpart E that are applicable to aircraft. Paragraphs 3.5.1 and 3.5.2 below detail how the regulations in part 91 subpart E that contain airplane- or helicopter-specific provisions apply to powered-lift.

**3.5.1** Section 91.409, Inspections (refer to § 194.302(aa)).

**3.5.1.1** Section 194.302(aa) requires technically advanced powered-lift (TAPL) to comply with § 91.409(e) through (h). TAPL are powered-lift equipped with an electronically advanced system in which the pilot interfaces with a multi-computer system with increasing levels of automation in order to aviate, navigate, or communicate. Section 91.409(e) through (h) sets forth strict and specific inspection requirements for complex aircraft systems to ensure the airworthiness of the aircraft. Powered-lift that are not considered technically advanced as defined in the SFAR must continue to comply with § 91.409(a), (b), and (d) because those provisions apply to all "aircraft."

**3.5.1.2** To be considered a TAPL for purposes of the SFAR as described in § 194.302(aa)(1), the powered-lift must be equipped with an electronically advanced multi-computer system that includes one or more of the following installed components:

1. An electronic primary flight display (PFD) that includes, at a minimum, an airspeed indicator, turn coordinator, attitude indicator, heading indicator, altimeter, and vertical speed indicator (VSI);
2. An electronic multifunction display (MFD) that includes, at a minimum, a moving map using Global Positioning System (GPS) navigation with the aircraft position displayed;
3. A multi-axis autopilot integrated with the navigation and heading guidance system; and
4. An advanced fly-by-wire-flight control system that utilizes electronically operated controls with no direct mechanical link from the pilot to the control surfaces.

**3.5.1.3** The display elements described in paragraph 3.5.1.2, items 1 and 2 above must be continuously visible to ensure that the essential aircraft information is displayed and available to the pilot during all phases of flight.

**3.5.1.4** The PFD is a display that provides increased situational awareness to the pilot by replacing the traditional six instruments used for instrument flight with an easy-to-scan single display that provides the horizon, airspeed, altitude, vertical speed, trend, trim, and rate-of-turn, among other key relevant indicators. In addition, the PFD is designed specific to controlling the TAPL attitude and altitude relative to the horizon and the surface of the earth, especially when outside visibility is poor or unavailable.

**3.5.1.5** The MFD is a display that provides information to the pilot in numerous configurable methods. Often, an MFD will be used in concert with a PFD. The MFD has a different priority; its function is secondary to the PFD. The MFD will have an integrated multi-axis autopilot, navigation, and position

awareness information, even though it may include some PFD features for redundancy.

**3.5.1.6** Determining whether a display is considered a PFD or an MFD will be based on certain minimum display elements specified by the FAA. Using specific characteristics to define TAPL allows the FAA to distinguish between highly complex and less complex powered-lift and to determine which inspection program is required. The FAA and the operator/applicant will determine whether the powered-lift meets the requirements of a TAPL and document the status of the display in the operator's inspection program documents.

**3.5.1.7** The rule determines whether a powered-lift constitutes a TAPL because it outlines the required criteria. As part of the operator's certification process, the FAA will communicate with the operator for any specific data (e.g., instructions for continued airworthiness (ICA) and aircraft manufacturer's maintenance manuals) to substantiate the applicant's inspection program.

**3.5.1.8** AC 91-90, Part 91 Approved Inspection Programs, and AC 135-10, Approved Aircraft Inspection Program, prescribe the procedures to develop and submit a powered-lift or a TAPL inspection program in accordance with an inspection program selected under §§ 91.409(f)(4) and 135.419 for review and approval by the FAA. In addition, as explained in AC 91-90, to distinguish between part 91 and part 135 inspection programs, the FAA generally refers to an inspection program approved under part 91 as an approved inspection program (AIP) and refers to an inspection program approved under § 135.419 as an Approved Aircraft Inspection Program (AAIP). Therefore, the term "AIP" should be used when referring to a program approved under § 91.409(f)(4), and the term "AAIP" should be used when referring to an inspection program approved under § 135.419. Note that, as explained in AC 91-90, under part 135, operators of aircraft certificated for a passenger seating configuration (excluding any pilot seat) of nine seats or less are not required to have an AAIP but may elect to use one of the inspection programs under § 91.409, depending on their operation and aircraft fleet size.

**3.5.2** Section 91.411, Altimeter System and Altitude Reporting Equipment Tests and Inspections (refer to § 194.302(bb)). Section 194.302(bb) requires all powered-lift to comply with § 91.411. Section 91.411 prescribes altimeter system and altitude reporting equipment tests and inspections. To comply with this rule, powered-lift operators should refer to the current edition of AC 43-6, Altitude Reporting Equipment and Transponder System Maintenance and Inspection Practices. AC 43-6 provides acceptable methods for testing altimeters, static systems, altitude encoders, and ATC transponder systems (ATCTS).

**3.6 Part 91 Subpart F, Large and Turbine-Powered Multiengine Airplanes and Fractional Ownership Program Aircraft.** Powered-lift must comply with the provisions in part 91 subpart F that are applicable to aircraft. Paragraphs 3.6.1

through 3.6.16 below detail how regulations in part 91 subpart F that contain airplane- or helicopter-specific provisions apply to powered-lift.

**3.6.1** Section 91.501, Applicability (refer to § 194.302(cc)). Section 91.501 prescribes operating rules for large airplanes of U.S. registry, turbojet-powered multiengine civil airplanes of U.S. registry, and fractional ownership program aircraft of U.S. registry that are operating under part 91 subpart K (part 91K) and not involved in common carriage. This section is applicable to all large powered-lift in accordance with § 194.302(cc), regardless of powerplant type, system of aircraft ownership, or ownership interest. It also applies to any powered-lift used in a fractional ownership program operating under part 91K. The higher level of airworthiness and operational standards in part 91 subpart F are necessary to enhance the safety of powered-lift operations. The FAA notes that any sections or paragraphs within part 91 subpart F that refer to a specific category of aircraft, such as airplane or helicopter, and that are not referred to in the SFAR tables to § 194.302 or § 194.306, do not apply to powered-lift.

**Note:** All civil powered-lift coming to market are multiengine aircraft, and it is not anticipated that civil single-engine powered-lift will be developed during the term of the SFAR. Therefore, although many regulations in part 91 subpart F and parts 135 and 136 refer to multiengine airplanes and aircraft, the FAA does not use the term "multiengine powered-lift" in the SFAR to avoid redundancy and overly inclusive regulatory application.

**3.6.2** Section 91.503, Flying Equipment and Operating Information (refer to § 194.302(dd)). Section 91.503 prescribes flying equipment and operating information. This section applies to all powered-lift subject to the requirements of part 91subpart F in accordance with § 194.302(dd). Powered-lift operators subject to the requirements of part 91 subpart F may comply with § 91.503(a)(5) notwithstanding one engine inoperative by having the engine or multiple engines inoperative climb performance data available at the pilot station. The engine-out performance data required may differ depending on the aircraft configuration because some powered-lift have six or more engines, and may be able to continue flight after failure of one or more engines. In some cases, the engine-out performance data will not be limited to only one engine inoperative and may include data for continued operations with multiple engines inoperative, if the aircraft is capable and certified for continued flight with more than one engine inoperative. The engine(s) inoperative climb performance data must include different modes of flight (e.g., wing-borne flight or vertical-lift flight mode) as determined under the certification process of § 21.17(b). In addition, as part of the § 21.17(b) certification process, appropriate engine climb performance data must be provided for the phases of flight (e.g., takeoff or landing) for which the applicant is seeking approval.

**3.6.3** Section 91.505, Familiarity with Operating Limitations and Emergency Equipment (refer to § 194.302(ee)). Section 91.505 requires the PIC and crew to be familiar with the operating limitations and emergency equipment on the aircraft prior to the flight. This section is applicable to all powered-lift subject to the requirements of part 91 subpart F in § 194.302(ee).

**3.6.4** Section 91.507, Equipment Requirements: Over-the-Top or Night VFR Operations (refer to § 194.302(ff)). Section 91.507 states that no person may operate an airplane over the top or at night under VFR unless that airplane is equipped with the instruments and equipment required for IFR operations under § 91.205(d) and one electric landing light for night operations. Each required instrument and item of equipment must be in operable condition. In § 194.302(ff), all powered-lift subject to the requirements of part 91 subpart F and conducting over-the-top and night VFR operations must comply with the equipment requirements in § 91.507.

**3.6.5** Section 91.509, Survival Equipment for Overwater Operations (refer to § 194.302(gg)).

**3.6.5.1** Section 194.302(gg) requires all powered-lift subject to the requirements of part 91 subpart F to comply with § 91.509. Section 91.509(a) prescribes the survival equipment requirements for overwater operations in airplanes. Powered-lift operating over water may use either the nearest shore or the nearest offshore heliport structure in accordance with § 194.302(gg)(1). The 50 nautical mile (NM) limit in § 91.509(a) and the 100 NM limit in § 91.509(b) apply to the nearest shore and to the nearest offshore heliport structure. This allows operators to maximize the vertical landing capability of powered-lift and to use heliport structures in a manner that is consistent with the definition of extended overwater operations in § 194.103, as well as in an emergency.

**3.6.5.2** Section 91.509(b)(5) requires a lifeline to be stored in accordance with part 25, § 25.1411(g). Section 194.302(gg)(1) requires all powered-lift subject to the requirements of part 91 subpart F to comply with § 91.509(b)(5), which would include § 25.1411(g) or such airworthiness requirements that provide an equivalent level of safety to existing airworthiness standards. The lifeline storage requirements will be based on the aircraft configuration, but must be in an obvious location, directly accessible, and protected from inadvertent damage in accordance with § 25.1411(b) or an airworthiness standard providing an equivalent level of safety in accordance with § 21.17(b).

**3.6.6** Section 91.511, Communication and Navigation Equipment for Overwater Operations (refer to § 194.302(hh)). Section 91.511 describes requirements for communication and navigation equipment for overwater operations. This section applies to all powered-lift subject to the requirements of part 91 subpart F in accordance with § 194.302(hh). Section 91.511(a) states that no person may take off an airplane for a flight over water more than 30 minutes flying time or 100 NM from the nearest shore unless it has at least the operable radio communication and electronic navigation equipment described in the rule. Under § 194.302(hh), the 100 NM limit for powered-lift operating over water under § 91.511(a) includes the nearest shore or the nearest offshore heliport structure.

**3.6.7** Section 91.513, Emergency Equipment (refer to § 194.302(ii)). Section 91.513 describes requirements for emergency equipment for airplanes, such as fire extinguishers, first aid kits, and megaphones. This rule is applicable to all powered-lift subject to the requirements of part 91 subpart F in accordance with § 194.302(ii).

**3.6.8** Section 91.515, Flight Altitude Rules (refer to § 194.302(jj)). Section 91.515 prescribes flight altitudes for airplanes in part 91 subpart F. The flight altitudes are designed to ensure adequate terrain clearance from any mountain, hill, or other obstruction to flight for day and night operations. This rule is applicable to all powered-lift subject to the requirements of part 91 subpart F in accordance with § 194.302(jj).

**3.6.9** Section 91.517, Passenger Information (refer to § 194.302(kk)). Section 91.517 prescribes requirements for passenger information and signage displaying the use of seatbelts and non-smoking requirements. This rule is applicable to powered-lift under § 194.302(kk). AC 121-24, Passenger Safety Information Briefing and Briefing Cards, may have some useful information which may be applied to powered-lift that carry flight attendants (F/A).

**3.6.10** Section 91.519, Passenger Briefing (refer to § 194.302(ll)). Section 91.519 prescribes requirements for passenger briefings for the use of seatbelts and non-smoking requirements. This rule is applicable to powered-lift under § 194.302(ll). The oral briefing required by § 91.519(a) must be given by the PIC or a member of the crew but need not be given when the PIC determines that the passengers are familiar with the contents of the briefing.

**3.6.11** Section 91.521, Shoulder Harness (refer to § 194.302(mm)). Section 194.302(mm) requires that large powered-lift subject to the requirements of part 91 subpart F comply with § 91.521 and have a combined safety belt and shoulder harness installed at each seat at a flight deck station. In § 194.302(mm), the safety belt and shoulder harness must meet the applicable requirements of § 25.785 or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b).

**3.6.12** Section 91.523, Carry-On Baggage (refer to § 194.302(nn)). Section 194.302(nn) requires powered-lift subject to the requirements of part 91 subpart F with a seating capacity of more than 19 passengers to comply with the requirements in § 91.523 for carry-on baggage. In § 194.302(nn), carry-on baggage must be stowed such that it can withstand the inertia forces described in § 25.561(b)(3) or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b).

**3.6.13** Section 91.525, Carriage of Cargo (refer to § 194.302(oo)). Section 91.525 prescribes requirements for carriage of cargo in airplanes. This rule is applicable to all powered-lift subject to the requirements of part 91 subpart F under § 194.302(oo).

**3.6.14** Section 91.527, Operating in Icing Conditions (refer to § 194.302(pp) and (qq)).

**3.6.14.1** Section 194.302(pp) requires all powered-lift subject to the requirements of part 91 subpart F to comply with § 91.527(a). Under § 91.527(a), pilots are prohibited from taking off in an airplane that has frost, ice, or snow adhering to any propeller, windshield, stabilizing or control surface; to a powerplant installation; or to an airspeed, altimeter, rate of climb, or flight attitude instrument system or wing, except that takeoffs may be made with frost under the wing in the area of the fuel tanks if authorized by the FAA.

**3.6.14.2** Powered-lift may rely on lifting devices such as rotors during vertical-lift flight mode, and on traditional airplane surfaces such as wings during wing-borne flight mode. In addition to wings and control surfaces, powered-lift may also have other surfaces that are negatively impacted by frost, ice, or snow adhering to those surfaces, such as rotor blades. Under § 194.302(pp)(1) and (pp)(2), these other surfaces are considered "critical surfaces," which the manufacturer will identify during certification and which will be outlined in the aircraft flight manual for that aircraft. Any frost, ice, or snow adhering to a critical surface could have an adverse impact on the aircraft's ability to operate safely. To ensure safe operation of powered-lift, all the items listed in § 91.527(a), as well as other critical surfaces as determined by the manufacturer, must be clear from any contamination adhering to their surfaces, including the vertical-lift flight mode lifting devices. Pilots are also encouraged to refer to the current edition of AC 91-74, Pilot Guide: Flight in Icing Conditions, to assist with the safe operation of powered-lift in icing conditions.

**3.6.14.3** Section 91.527(b)(2) and (b)(3) states that no pilot may fly under IFR into known or forecast light or moderate icing conditions or under VFR into known light or moderate icing conditions unless it has been type certificated and appropriately equipped for operations in icing conditions. To operate powered-lift under IFR into known or forecast light or moderate icing conditions or under VFR into known light or moderate icing conditions, the powered-lift pilot must comply with § 194.302(qq), which directs the operator to comply with § 194.306(xx) (pertaining to § 135.227(d)). Section 91.527 requires the powered-lift to be type certificated and appropriately equipped for operations in certain icing conditions. Procedures on the use of ice protection equipment are contained in the aircraft flight manual. For additional information on aircraft ice protection, powered-lift operators should also refer to the current edition of AC 20-73, Aircraft Ice Protection.

**3.6.14.4** Section 91.527(c) prescribes the requirements for operations into known or forecast severe icing conditions. Under § 194.302(rr), powered-lift are not permitted to conduct operations into known or forecast severe icing conditions. In addition, the exception outlined under § 91.527(c) applying to airplanes with ice protection provisions and transport category airplanes does not apply to powered-lift.

**3.6.15** Section 91.531, Second in Command Requirements (refer to § 194.302(rr)). Section 91.531 prescribes when a second in command (SIC) is required or not required. It also specifies that no person may designate a pilot to serve as SIC, nor may any pilot serve as SIC, of an airplane required under part 91 to have two pilots unless that pilot meets the qualifications for SIC prescribed in 14 CFR part 61, § 61.55. Refer to SFAR 120 and AC 194-2, Pilot Training and Certification for Powered-Lift Operations, for further information.

**3.6.16** Section 91.533, Flight Attendant Requirements (refer to § 194.302(ss)). Section 91.533 prescribes F/A requirements for airplanes with more than 19 passengers. There are

currently no powered-lift undergoing type certification with more than 19 seats. However, if such powered-lift are developed, they will be required to comply with § 91.533 in accordance with § 194.302(ss).

**3.7 Part 91 Subpart G, Additional Equipment and Operating Requirements for Large and Transport Category Aircraft.** Powered-lift must comply with the provisions in part 91 subpart G that are applicable to aircraft. Paragraphs 3.7.1 through 3.7.4 below detail how the regulations in part 91 subpart G that contain airplane- or helicopter-specific provisions apply to powered-lift.

**3.7.1** Section 91.603, Aural Speed Warning Device (refer to § 194.302(tt)). Section 194.302(tt) requires large powered-lift to comply with the § 91.603 requirements for an aural speed warning device in transport category airplanes. The requirement for an aural speed warning device will be determined during the aircraft certification process. The aural speed warning device must comply with § 25.1303(c)(1) or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b).

**3.7.2** Section 91.605, Transport Category Civil Airplane Weight Limitations (refer to § 194.302(uu), (vv), and (ww)).

**3.7.2.1** Section 194.302(uu) requires large powered-lift to comply with § 91.605(b)(1). Section 91.605(b)(1) requires the Airplane Flight Manual to contain the takeoff weight performance information, and § 91.605(b)(2) requires the Airplane Flight Manual to contain landing weight performance information. Under the SFAR, powered-lift must provide takeoff and landing weight performance information in the aircraft flight manual in accordance with § 194.302(uu) and (vv).

**3.7.2.2** Section 194.302(ww) requires large powered-lift that execute takeoff operations using wing-borne lift and that have takeoff performance information contained in the aircraft flight manual to comply with § 91.605(b)(3), (b)(4)(ii), and (c).

**3.7.3** Section 91.609, Flight Data Recorders and Cockpit Voice Recorders (refer to § 194.302(xx)).

**3.7.3.1** Section 91.609 prescribes requirements for flight data recorders (FDR) and cockpit voice recorders. Powered-lift are required to comply with § 91.609(c), (d), (e), (i), and (j) in accordance with § 194.302(xx).

**3.7.3.2** To comply with § 91.609(c)(1), and in accordance with § 194.302(xx)(1), powered-lift having a passenger seating configuration, excluding any pilot seat, of 10 seats or more must comply with § 194.310 or 194.311 in lieu of part 91 appendix E and part 91 appendix F, which are referenced in § 91.609(c)(1).

**3.7.3.3** To comply with § 91.609(c)(3), (e)(1), and (i), powered-lift must comply with the certification provisions specified during the § 21.17(b) approval process, or with the certification provisions specified in the relevant part 91 regulation

as prescribed in § 194.302(xx)(2). For example, an operator required by § 194.302(xx)(2) to comply with § 91.609(c)(3) must comply with such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) or with the 14 CFR Chapter I, Subchapter C certification provisions listed in § 91.609(c)(3), specifically § 23.1459, § 25.1459, § 27.1459, or § 29.1459.

**3.7.3.4** Similarly, an operator required by § 194.302(xx)(2) to comply with § 91.609(e)(1) must comply with such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b) or with the 14 CFR Chapter I, Subchapter C certification provisions specified in § 91.609(e)(1).

**3.7.3.5** To comply with § 91.609(d), the flight recorder must operate continuously from the earlier time of when the powered-lift begins the takeoff roll or begins lift-off until the later time of when the powered-lift completes the landing roll or lands at its destination in accordance with § 194.302(xx)(3).

**3.7.3.6** Powered-lift operators should refer to the current editions of AC 20-141, Airworthiness and Operational Approval of Digital Flight Data Recorder Systems, and AC 20-186, Airworthiness and Operational Approval of Cockpit Voice Recorder Systems, for information about acceptable means of compliance with this rule.

**3.7.4** Section 91.613, Materials for Compartment Interiors (refer to § 194.302(yy)). Powered-lift type certificated using transport category certification standards are required by § 194.302(yy) to comply with § 91.613(b)(2). Powered-lift compartment interiors must comply with § 25.856, or such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b). To comply with this rule, powered-lift operators should refer to the current edition of AC 25.856-1, Thermal/Acoustic Insulation Flame Propagation Test Method Details.

**3.8 Part 91 Subpart K, Fractional Ownership Operations.** Powered-lift must comply with the provisions in part 91K that are applicable to aircraft and to powered-lift. Paragraphs 3.8.1 through 3.8.3 below detail how the regulations in part 91K that contain airplane- or helicopter-specific provisions apply to powered-lift. To comply with these regulations, powered-lift operators should refer to the current edition of AC 91-84, Fractional Ownership Programs.

**3.8.1** Section 91.1037, Large Transport Category Airplanes: Turbine Engine Powered; Limitations; Destination and Alternate Airports (refer to § 194.302(zz)). Section 91.1037 prescribes requirements for large transport category airplanes. Under § 194.302(zz), large powered-lift operating under part 91K certificated to conduct landing operations in wing-borne flight mode as indicated in the aircraft flight manual are required to comply with § 91.1037. Under § 194.302(zz), powered-lift operators required to comply with § 91.1037 must also comply with § 91.1025(o)(7).

**Note:** Section 91.1025(o)(7) requires a Destination Airport Analysis for aircraft that meet the threshold set forth in § 91.1037 (i.e., large transport category turbine-engine-powered airplanes). Section 91.1037 is applicable to powered-lift that operate under part 91K, but § 91.1025(o)(7) is only applicable to airplanes. Under § 194.302(zz), large powered-lift are required to comply with all of the requirements of § 91.1025(o), including § 91.1025(o)(7).

**3.8.2** Section 91.1041, Aircraft Proving and Validation Tests (refer to § 194.302(aaa)). Section 91.1041 prescribes requirements for aircraft proving and validation tests. Section 194.302(aaa) requires all powered-lift subject to the requirements of part 91K to comply with § 91.1041(b) and (d). Specific information on proving and validation test requirements for program aircraft can be found in AC 91-84.

**3.8.3** Section 91.1045, Additional Equipment Requirements (refer to § 194.302(bbb) and (ccc)).

**3.8.3.1** Section 194.302(bbb) requires powered-lift operating under part 91K with a passenger seat configuration of more than 30 seats or a payload capacity of more than 7,500 pounds to comply with § 91.1045(a).

**3.8.3.2** Section 194.302(bbb) requires powered-lift to comply with § 91.1045(a)(3) and be equipped with either an HTAWS that meets the requirements in TSO-C194 and RTCA DO-309 section 2, or an FAA-approved TAWS A/HTAWS hybrid system.

**3.8.3.3** Section 194.302(ccc) requires powered-lift operating under part 91K with a passenger-seat configuration of 30 seats or fewer, excluding each crewmember, and a payload capacity of 7,500 pounds or less to comply with § 91.1045(b). Compliance with § 91.1045(b)(3) requires an HTAWS that complies with § 194.306(s). Section 194.306(s), like § 194.302(bbb), requires either an HTAWS that meets the requirements in TSO-C194 and RTCA DO-309 section 2, or an FAA-approved TAWS A/HTAWS hybrid system.

**Note:** See paragraph 3.4.6 above for details on TAWS A/HTAWS requirements and approval processes.

## 3.9 Other Part 91 Considerations.

**3.9.1** Waivers and Exemptions. Powered-lift operators that are unable to comply with the SFAR requirements may apply for a waiver from the regulations listed in § 91.905 or as modified by part 194 in accordance with waiver provisions in § 91.903. If the regulation is not subject to waiver, the operator may seek an exemption in accordance with 14 CFR part 11.

**3.9.2** Operations Over the High Seas. U.S. powered-lift operators conducting operations over the high seas must do so in accordance with § 91.703 and the standards outlined in International Civil Aviation Organization (ICAO) Annex 2, Rules of the Air.

# CHAPTER 4. PART 97 OPERATIONS FOR POWERED-LIFT

**4.1 Applicability of Copter Procedures Under Part 97 to Powered-Lift.** Under § 194.305, persons operating powered-lift may use Copter Procedures as defined in part 97, § 97.3 if the aircraft is certified for instrument flight rules (IFR) operations and does not contain a limitation prohibiting use of such procedures in its aircraft flight manual.

**4.2 Part 97, Standard Instrument Procedures.** Part 97 prescribes Standard Instrument Approach Procedures (SIAP), Obstacle Departure Procedures (ODP), and weather minimums that apply to IFR takeoffs and landings at civil airports in the United States. Copter instrument procedures provide an instrument procedure along a predetermined course to safely allow helicopters to transition from visual meteorological conditions (VMC) to instrument meteorological conditions (IMC) for departures and from IMC to VMC for approaches. The criteria for Copter Procedure approaches or departures are defined in the current edition of FAA Order 8260.3, United States Standard for Terminal Instrument Procedures (TERPS), and presume a certain level of vehicle performance and stability.

**4.3 Instrument Approach Procedures (IAP).** Powered-lift pilots should become familiar with the Aeronautical Information Manual (AIM), Chapter 10, Helicopter Operations, Section 1, Helicopter IFR Operations. Copter IAPs are designed presuming nominal descent rates and gradients over a range of given airspeeds. Copter instrument approaches also presume the maximum and minimum descent glideslope and gradient that may be encountered while maintaining vertical navigation accuracy. In addition, the design of the IAPs allows for the aircraft to descend to the minimum descent altitude (MDA) or decision altitude (DA) prior to or upon arriving at the missed approach point (MAP). At the MAP, the powered-lift pilot assesses whether the flight can safely and legally proceed to the destination in the meteorological conditions present. Continuation of the flight beyond the MAP must be accomplished via a visual transition segment in accordance with the design of the IAP as prescribed in § 91.175(c). The MAP is located such that the aircraft can execute the missed approach procedure or visually transition to a safe landing by using a nominal deceleration rate. Both the missed approach procedures and departure procedures are designed with the underlying minimum assumption of aircraft performance as defined in the Order 8260.3 TERPS criteria.

**4.4 Powered-Lift Seeking IFR and Copter Procedure Approval.** The FAA will assess powered-lift operators seeking to fly IFR and use Copter Procedures. The FAA will consider the aircraft's stability, system, and equipage for IFR operations as compared to helicopters. This assessment will occur during the type certification process as set forth in § 21.17(b). A powered-lift design that meets these standards can be certificated for IFR flight and authorized to conduct Copter Procedures. A powered-lift that does not possess these characteristics may still be certificated for IFR but have a limitation from conducting Copter Procedures listed in the aircraft flight manual to that effect. Powered-lift operators should review the performance and limitations section of their aircraft flight manual prior to utilizing Copter Instrument Flight Procedures (IFP).

# CHAPTER 5. PART 135 OPERATIONS

**5.1 Organization of Topics.** This chapter is organized to promote a logical sequence of topics for the reader to easily navigate. The chapter is broken down into two distinct parts: part 135 regulations as they pertain to Special Federal Aviation Regulation (SFAR) 120, Powered-Lift: Pilot Certification and Training; Operations Requirements; and the ACs that are impacted by the powered-lift SFAR. The FAA reviewed the regulations contained in the powered-lift SFAR and determined that the majority of the powered-lift SFAR regulations as they pertain to part 135 do not require any further explanation to assist operator compliance with the requirements of the SFAR.

**5.1.1** In order to provide operators with additional information, the following part 135 regulations are discussed under paragraph 5.2 below:

- Section 135.93, Minimum Altitudes for Use of Autopilot (refer to § 194.306(c)).
- Section 135.152, Flight Data Recorders (refer to § 194.306(p) through (r)).
- Section 135.154, Terrain Awareness and Warning System, and § 135.605, Helicopter Terrain Awareness and Warning System (HTAWS) (refer to § 194.306(s) and (ooo)).
- Section 135.203, VFR: Minimum Altitudes (refer to § 194.306(mm) through (nn)).
- Section 135.209, VFR: Fuel Supply (refer to § 194.306(rr) through (ss)).
- Section 135.221, IFR: Alternate Airport Weather Minimums (refer to § 194.306(tt)).
- Section 135.223, IFR: Alternate Airport Requirements (refer to § 194.306(uu)).
- Section 135.227, Icing Conditions: Operating Limitations (refer to § 194.306(ww) through (xx)).

**5.1.2** Much of the information contained in current ACs that are relevant to part 135 operations can be applied to powered-lift operations without any further explanation. The following ACs, which are addressed in paragraph 5.11 below, contain information the FAA believes would be valuable in assisting operators utilizing powered-lift in applying the requirements of the SFAR:

- AC 120-27, Aircraft Weight and Balance Control.
- AC 120-49, Parts 121 and 135 Certification.
- AC 120-96, Operations Control Center (OCC) for Helicopter Air Ambulance (HAA) Operations.
- AC 135-14, Helicopter Air Ambulance Operations.

**5.2 Applicability of SFAR 120 to Powered-Lift Part 135 Operations.**

**5.2.1** Section 194.306 contains the provisions under part 135 that are applicable to powered-lift (other than the part 135 “aircraft” provisions that already apply to powered-lift). Section 194.306 states that no person may operate a powered-lift under part 135 unless

that person complies with the regulations listed in Table 1 to § 194.306 despite their applicability to airplanes, rotorcraft, or helicopters, and requires a person operating powered-lift to comply with the requirements of those sections. Additionally, the provisions contained in the second column of Table 1 of § 194.306, and any additional requirements specified in the third column of Table 1 of § 194.306 are also applicable.

**5.2.2** The FAA also notes that some part 135 regulations refer to airworthiness standards in part 23, 25, 27, or 29. When an airworthiness standard is referenced in a particular operating rule, those specific standards listed may or may not be used in their entirety due to some of the designs unique to each particular aircraft. When a particular airworthiness certification standard is referenced, but it is not practical to use that standard in its entirety, the FAA, as part of the § 21.17(b) process, could instead apply such airworthiness criteria as the FAA may find provide an equivalent level of safety in accordance with § 21.17(b).

**5.3 Section 135.93, Minimum Altitudes for Use of Autopilot.** Section 135.93 details minimum altitudes for use of an autopilot. Section 135.93 is applicable to all aircraft but contains many references to an Airplane Flight Manual in multiple paragraphs and, in § 135.93(g), excepts rotorcraft operations. Section 194.306(c) specifies that § 135.93(a) through (f) are applicable to powered-lift. It additionally specifies that the requirements referencing the Airplane Flight Manual in § 135.93(b) are applicable to a Powered-Lift's Aircraft Flight Manual (PLAFM). Other requirements that reference the Airplane Flight Manual in § 135.93(a) through (f) are also applicable to a PLAFM. Section 135.93(c) stipulates requirements for the use of an autopilot for en route operations, including climbs and descents. Powered-lift that have a published minimum engagement altitude for en route operations contained in their aircraft flight manual may use the autopilot for en route operations at that minimum engagement altitude. If no minimum engagement altitude is specified in the aircraft flight manual, then a powered-lift could not use the autopilot during en route operations below 500 feet or at an altitude that is no lower than twice the altitude loss specified in the aircraft flight manual for an autopilot malfunction in cruise conditions, whichever is greater. The FAA also retained the provision in § 135.93(c)(3) that permits the use of the autopilot en route at an altitude specified by the Administrator, which is applicable to all powered-lift regardless of whether they have an aircraft flight manual minimum engagement altitude or not.

**5.4 Section 135.152, Flight Data Recorders (refer to § 194.306(p) through (r)).**

**5.4.1** Under § 194.306(p) through (r), § 135.152 applies to powered-lift depending on the passenger seating configuration. Under § 194.306(r), § 135.152(c), (d), (f), and (j) apply to powered-lift with a passenger seating configuration (excluding crewmember seats) of 10 to 30 seats. Under § 194.306(p), § 135.152(a) applies to powered-lift with a passenger seating configuration of 10 to 19 seats. And under § 194.306(q), § 135.152(b) and (b)(3) apply to powered-lift with a passenger seating configuration of 20 to 30 seats. As mentioned in paragraph 5.2.2 above, the FAA will either apply the airworthiness standards referred to throughout §§ 135.151 and 135.152 or the equivalent standards developed during the § 21.17(b) process.

**5.4.2** To comply with § 135.152(a), and in accordance with § 194.306(p), powered-lift having a passenger seating configuration of 10 to 19 seats must comply with the flight recorder specifications found within § 194.312 or § 194.313 in lieu of part 135 appendix B and part 135 appendix C, which are referenced in § 135.152(a). Under § 194.312 (vertical-lift flight mode) and § 194.313 (wing-borne flight mode), the FAA applied the flight data recorder (FDR) requirements from the airplane and helicopter appendices to powered-lift, dependent on which operational flight mode is in use. The FAA replaced helicopter-specific nomenclature for flight controls to accommodate powered-lift by changing the terminology used for primary controls. Despite the slight nomenclature changes within the tables to accommodate powered-lift, the FAA did not change the other information and parameters listed within the original part 135 appendices B and C.

**5.5 Section 135.154, Terrain Awareness and Warning System, and § 135.605, Helicopter Terrain Awareness and Warning System (HTAWS) (refer to § 194.306(s) and (ooo)).** Section 135.154 requires a Terrain Awareness and Warning System (TAWS) to be installed on airplanes and § 135.605 requires an HTAWS system be installed on helicopters used in air ambulance operations. Section 194.306(s) requires powered-lift configured with six or more passenger seats, excluding any pilot seat, to be equipped with HTAWS that meets the requirements in Technical Standard Order (TSO)-C194, Helicopter Terrain Awareness and Warning System (HTAWS), and RTCA DO-309, Minimum Operational Performance Standards (MOPS) for Helicopter Terrain Awareness and Warning System (HTAWS) Airborne Equipment, section 2, or an FAA-approved Class A TAWS (TAWS A)/HTAWS hybrid system. Section 194.306(ooo) requires powered-lift conducting air ambulance operations to be equipped with an HTAWS that meets the requirements in TSO-C194 and RTCA DO-309 section 2 or an FAA-approved TAWS A/HTAWS hybrid system.

**5.5.1** HTAWS Requirement. Powered-lift operators may meet the requirement by having either an HTAWS or a hybrid TAWS A/HTAWS that has been approved by the FAA. The aircraft flight manual must contain appropriate procedures for the use of the TAWS and proper flightcrew reaction in response to the TAWS audio and visual warnings.

**5.5.2** HTAWS and Hybrid TAWS A/HTAWS Approvals.

**5.5.2.1** FAA Aircraft Certification Service (AIR) certification branches (are responsible for assessing HTAWS or a hybrid TAWS A/HTAWS prior to installation and its use on the aircraft. Field approvals are not authorized for these systems. The assessment of these systems may occur at initial certification or when a supplemental or amended type certification is requested.

**5.5.2.2** HTAWS that meet the TSO-C194 standard must be approved as part of the type certificate (TC) approval process under § 21.17(b).

**5.5.2.3** HTAWS or hybrid TAWS A/HTAWS equipment that does not meet the TSO-C194 standard must be assessed and approved by the FAA prior to installation and its use under the TC approval process under § 21.17(b).

**5.5.2.4** Modifiers and Original Equipment Manufacturers (OEM) should submit requests to the responsible AIR certification branch. A list of AIR certification branches can be found at https://www.faa.gov/about/office_org/field_offices/certification_branches.

## 5.6 Section 135.203, VFR: Minimum Altitudes.

**5.6.1** Section 135.203 provides the visual flight rules (VFR) minimum altitude requirements for airplanes and helicopters. The FAA has determined that powered-lift that are able to autorotate or conduct an approved equivalent maneuver should be allowed to use the same VFR minimum altitudes as provided to helicopters. The two scenarios where this would be applicable to powered-lift operations are when a powered-lift is being operated in the vertical-lift flight mode or, when operating in the wing-borne flight mode, the powered-lift is able to transition from wing-borne flight to the vertical-lift flight mode and then conduct a safe autorotation or approved equivalent maneuver that permits a controlled descent to a landing.

**5.6.2** Section 135.203(b) applies when a powered-lift is operating in the vertical-lift flight mode, however; the powered-lift must be certificated and be able to conduct an autorotation or an approved equivalent maneuver to a landing. If a powered-lift is not certificated or able to conduct an autorotation or an approved equivalent maneuver to a landing, then the minimums specified in § 135.203(a) would apply.

**5.6.3** To utilize a lower VFR minimum altitude than specified in § 135.203(a) when operating in the wing-borne flight mode, an operator must be authorized to use a lower altitude by operations specifications (OpSpecs). The OpSpecs will specify the VFR minimum altitude for each type of powered-lift. To receive this authorization, the PLAFM must have a minimum altitude specified that enables a transition from wing-borne flight mode to the vertical-lift flight mode, and then conduct a safe autorotation or approved equivalent maneuver that permits a controlled descent to a landing. This authorization will be granted to each specific type of powered-lift since each type could have a different minimum altitude specified in the respective aircraft flight manual. If the aircraft flight manual limitation is greater than 300 feet, that altitude becomes the required minimum altitude. However, when operating in the wing-borne flight mode a powered-lift in no case would be allowed to go below 300 feet above the surface. Powered-lift that do not have a minimum altitude specified in the aircraft flight manual that enables a transition from wing-borne flight mode to the vertical-lift flight mode as discussed above must use the airplane criteria found in § 135.203(a) for day and night operations when they are operating in the wing-borne flight mode.

### 5.7 Section 135.209, VFR: Fuel Supply.

**5.7.1** Section 135.209(a) requires airplanes to have enough fuel supply under VFR, considering wind and forecast weather conditions, to reach the first point of intended landing at normal cruise fuel consumption and then fly after that point for 30 minutes. At night, this requirement increases to 45 minutes past the first point of intended landing.
Section 135.209(b) states that helicopters must have enough fuel to fly to the first point of intended landing, considering wind and forecast weather conditions, and to fly after that for at least 20 minutes regardless of day or nighttime.

**5.7.2** Section 194.306(ss) allows a powered-lift to use the VFR helicopter fuel minimums when they are able to conduct a landing in the vertical-lift flight mode. This provision would not prevent a powered-lift from operating in the wing-borne flight mode but will require the powered-lift to have the performance capability, as detailed in the aircraft flight manual, to conduct a landing in the vertical-lift flight mode along the entire route of flight. When using this provision, a person must consider any landing performance data that enables a landing in the vertical-lift flight mode, including taking into consideration the energy requirements to successfully complete a descent and landing in the vertical-lift flight mode from the altitude they plan to use. There may be performance requirements or limitations contained in the aircraft flight manual that could prevent a powered-lift from conducting a landing in the vertical-lift flight mode, such as a landing weight limitation, thereby requiring the use of the airplane fuel supply requirements of § 135.209(a).

**5.7.3** Section 194.306(rr) and (ss) contain the flexibility to apply for a deviation for a fuel supply other than the airplane or helicopter VFR fuel supply requirements prescribed in § 135.209(a) and (b). This deviation will be available only to those powered-lift operating over specific routes that have predetermined suitable landing areas available. A suitable landing area under § 194.306(rr) and (ss) is an area that provides the operator reasonable capability to land without causing undue hazard to persons or property. These suitable landing areas must be site-specific, designated by the operator, and accepted by the FAA. This will ensure that any operation conducted with less than the prescriptive VFR fuel supply requirements will be conducted under a controlled environment. The controlled environment will incorporate predetermined suitable landing areas that are known by the pilot in advance and be based upon the specific route being flown. The FAA will evaluate each certificate holder's (CH) deviation request to determine if the proposed operation will maintain an equivalent level of safety as currently provided in the prescriptive rule. The authorization to use this deviation would be granted to the CH via OpSpecs.

### 5.8 Section 135.221, IFR: Alternate Airport Weather Minimums.

**5.8.1** Section 135.221 provides the requirements for alternate airport weather minimums. Per § 135.221(a), no person operating an aircraft other than rotorcraft may designate an alternate airport unless the weather reports or forecasts indicate the weather conditions will be at or above authorized alternate airport landing minimums for that airport at the estimated time of arrival (ETA).

**5.8.2** Section 135.221(b) provides alternate airport weather minimums for rotorcraft. Powered-lift that are authorized to conduct Copter Procedures and can land in the vertical-lift flight mode, as provided in the aircraft flight manual, can use the provisions stipulated in § 135.221(b).

### 5.9 Section 135.223, IFR: Alternate Airport Requirements.

**5.9.1** Section 135.223(a) requires aircraft other than helicopters to carry a 45-minute fuel reserve. Section 135.223(a)(3) limits the fuel reserve for helicopters to 30 minutes.

**5.9.2** Powered-lift that are authorized to conduct Copter Procedures and can land in the vertical-lift flight mode as provided in the aircraft flight manual will have the option to use the helicopter fuel requirements specified in § 135.223(a)(3).

**5.9.3** A powered-lift will only be authorized to utilize Copter Procedures if they are able to fly at the slower airspeeds necessary to conduct those procedures. Powered-lift that are unable to meet the requirements for Copter Procedures will be required to use standard approach procedures, and therefore use the fuel requirement specified for aircraft in § 135.223(a)(3). During aircraft certification, the FAA will assess the aircraft's stability, system, and equipage for instrument flight rules (IFR) operations. A powered-lift that does not possess these characteristics may still be certificated for IFR but will be prohibited from performing Copter Procedures and have a limitation in the aircraft flight manual to that effect. Those powered-lift with a limitation in the aircraft flight manual prohibiting Copter Procedures would not be authorized to use the 30-minute fuel reserve option and would be required to use the 45-minute fuel reserves specified for aircraft.

**5.9.4** When taking into consideration the performance capability to conduct a landing in the vertical-lift flight mode, a person must consider the energy required to successfully complete a descent from the altitude they plan to use, any required instrument or visual procedure, and land in the vertical-lift flight mode. There may be performance requirements or limitations contained in the aircraft flight manual, or in any approved minimum equipment list (MEL) that would prevent a powered-lift from conducting a landing in the vertical-lift flight mode, such as a landing weight limitation or a deferred maintenance item, thereby requiring a person to use the 45 minutes of reserve fuel.

### 5.10 Section 135.227, Icing Conditions: Operating Limitations (refer to § 194.306(ww) and (xx)).

**5.10.1** Section 135.227(b) specifies airplanes, and allows an operator to take off in conditions where frost, ice, or snow may reasonably be expected to adhere to the airplane provided the pilot has completed all the applicable training required by § 135.341 and one of the conditions in § 135.227(b)(1) through (3) is met. Section 194.306(ww) allows powered-lift to utilize the same provisions extended to airplanes as provided in § 135.227(b). However, § 194.306(ww) has some different requirements than those contained in § 135.227(b) for airplanes, and are explained below.

**5.10.2** In addition to wings and control surfaces, powered-lift may have other surfaces that are negatively impacted by frost, ice, or snow adhering to those surfaces, such as rotor

blades. These other surfaces are considered "critical surfaces," which the manufacturer will identify during certification and will be outlined in the aircraft flight manual for that aircraft. Any frost, ice, or snow adhering to a critical surface could have an adverse impact on the aircraft's ability to operate safely.

**5.10.3** Section 194.306(ww)(1) requires that the powered-lift critical surfaces, as outlined in the aircraft flight manual for that aircraft, must be determined to be free of frost, ice, or snow. Additionally, § 194.306(ww)(2) stipulates that powered-lift critical surfaces are determined by the manufacturer.

**5.10.4** Further discussion of ground deicing/anti-icing programs can be found in the current editions of AC 120-60, Ground Deicing and Anti-Icing Program, and AC 120-107, Use of Remote On-Ground Ice Detection System.

**5.10.5** Section 135.227(c) includes the regulatory requirements for flight into icing conditions, and it specifies that no pilot may fly under IFR into known or forecast light or moderate icing conditions or under VFR into known light or moderate icing conditions unless certain conditions are met. Section 135.227(c)(1) requires the "aircraft" to have functioning deicing or anti-icing equipment protecting each rotor blade, propeller, windshield, wing, stabilizing or control surface, and each airspeed, altimeter, rate of climb, or flight attitude instrument system. The requirement applies to all aircraft; accordingly, any powered-lift that intends to fly into the icing conditions specified must have functioning deicing or anti-icing equipment.

**5.10.6** Section 135.227(c)(2) and (c)(3) are airplane-specific. The FAA will not apply this section to powered-lift because they are applying the provisions provided by § 135.227(d) through the issuance of § 194.306(xx) as described in paragraph 5.10.7 below.

**5.10.7** Section 135.227(d) addresses in-flight icing conditions and prohibits any pilot from flying a helicopter under IFR into known or forecast icing conditions or under VFR into known icing conditions unless it has been type certificated and appropriately equipped for operations in icing conditions. Section 194.306(xx) prohibits any pilot from flying a powered-lift under IFR into known or forecast icing conditions or under VFR into known icing conditions unless it has been type certificated and appropriately equipped for operations in icing conditions.

**5.11 ACs Requiring Further Explanation for the Integration of Powered-Lift.** To comply with § 194.306, as well as other regulations not contained in the powered-lift SFAR but relevant to powered-lift operations, some information from existing ACs was extracted to provide additional information to assist an operator in applying the requirements of the powered-lift SFAR. This additional information is listed below.

**5.11.1** AC 120-27, Aircraft Weight and Balance Control. AC 120-27 was written for both airplanes and helicopters, and the majority of its content applies to powered-lift without the need for additional explanation. However, the information regarding standard average

weights warrants additional explanation because it will also apply to powered-lift authorized to conduct air ambulance operations.

**5.11.1.1 Standard Average Weights.** Use of standard average weights is limited to operators of multiengine turbine-powered aircraft that have a passenger seat configuration of five or more passenger seats who hold OpSpecs, management specifications (MSpecs), or Letters of Authorization (LOA), as applicable, and the following:

1. For aircraft other than powered-lift certificated under part 23 (normal category), part 25, or part 29;
2. A large powered-lift certificated under § 21.17(b); or
3. The operator and manufacturer are able to prove that the aircraft can meet the performance requirements prescribed by part 23 normal category aircraft.

**Note:** Piston-powered powered-lift authorized to conduct air ambulance operations may not use standard average weights.

**5.11.2** AC 120-96, Operations Control Center (OCC) for Helicopter Air Ambulance Operations (HAA), and AC 135-14, Helicopter Air Ambulance Operations. AC 120-96 and AC 135-14 are helicopter-specific and are not slated to be revised to incorporate powered-lift until the SFAR expires and a permanent rule is adopted. Although most of the information contained in AC 120-96 and AC 135-14 can be applied to powered-lift without any further explanation, the information below will aid the part 135 CH conducting air ambulance operations in complying with the powered-lift SFAR.

**5.11.3** AC 120-96, Operations Control Center (OCC) for Helicopter Air Ambulance (HAA) Operations.

**5.11.3.1 OCC Requirement.** Part 135 subpart L will be applicable to any operator conducting air ambulance operations with a powered-lift as required by § 194.306. AC 120-96 provides information on OCC requirements for HAA operations and was written to specifically address helicopters. The information contained in AC 120-96 also applies to powered-lift conducting air ambulance operations because all powered-lift air ambulance operations are required under the SFAR to comply with part 135 subpart L. The information in AC 120-96 read in conjunction with this AC will assist part 135 CHs conducting air ambulance operations in powered-lift in complying with the SFAR. Section 135.619 requires operators conducting HAA operations with 10 or more helicopters to establish an OCC that is staffed with appropriately trained Operations Control Specialists (OCS) that provide the services required by § 135.619. Under § 194.306(www), powered-lift operators conducting air ambulance operations utilizing 10 or more air ambulance aircraft must establish an OCC, whether the air ambulance aircraft are helicopters, powered-lift, or any combination thereof.

**5.11.3.2 Terms and Requirements.** AC 120-96 contains the terms "helicopter" and "HAA," as well as a 10-helicopter requirement for an operator to establish an OCC. These helicopter-specific terms and requirements are noted below.

**5.11.3.2.1** When the term "helicopter" is used, the topic being addressed in AC 120-96 will be applicable to powered-lift unless otherwise noted.

**5.11.3.2.2** When the term "HAA" is used, it will also apply to operators using powered-lift for air ambulance operations under § 194.306(mmm).

**5.11.3.2.3** The FAA reiterates that the requirement for an OCC under the SFAR is based on whether the operator has 10 or more aircraft conducting air ambulance operations, whether they are helicopters, powered-lift, or any combination thereof.

**5.11.3.3 Definitions and Abbreviations.** AC 120-96 contains a list of definitions and abbreviations. Selected definitions from AC 120-96 are discussed below to provide greater clarity for those areas where the SFAR contains differences that relate to powered-lift.

**5.11.3.3.1** Overwater Flight. AC 120-96 refers to overwater flight for rotorcraft. Overwater flight for powered-lift is the operation of a powered-lift beyond the autorotational or gliding distance from the shoreline. Determining whether the powered-lift is conducting overwater flight depends on the powered-lift's ability to autorotate or glide to reach the shoreline. If the powered-lift is operating overwater beyond either the gliding, or autorotational distance of the shoreline, then it meets the definition of overwater flight.

**5.11.3.3.2** Suitable Offshore Heliport Structure. A suitable offshore heliport structure is defined as a heliport structure that can support the size and weight of the rotorcraft being operated where a safe landing can be made. Powered-lift that are able to conduct vertical takeoff and landings can use any suitable heliport or vertiport, and this includes suitable offshore heliport structures. Additionally, in order to use a heliport, a powered-lift must be capable of meeting the performance requirements for that specific heliport, and the powered-lift cannot exceed the size and weight limitations established for that heliport.

**Note:** To determine if a powered-lift can use a vertiport, refer to Engineering Brief No. 105, Vertiport Design, at the Airport Engineering Briefs web page at https://www.faa.gov/airports/engineering/engineering_briefs.

**5.11.4** AC 135-14, Helicopter Air Ambulance Operations.

**5.11.4.1 Air Ambulance Operations.** AC 135-14 provides information on HAA operations and was written to specifically address helicopters. Some of the information contained in AC 135-14 also applies to powered-lift conducting

air ambulance operations because all powered-lift air ambulance operations are required by § 194.306(mmm) to comply with part 135 subpart L. The information in AC 135-14 reads in conjunction with the information contained within this AC to assist part 135 CHs conducting air ambulance operations in powered-lift in complying with the SFAR.

**5.11.4.2 Terms and Requirements.** AC 135-14 contains the terms "helicopter" and "HAA," as well as a 10-helicopter requirement for an operator to establish an OCC. These helicopter-specific terms and requirements are noted below:

**5.11.4.2.1** When the term "helicopter" is used, the topic being addressed in AC 135-14 will be applicable to powered-lift unless otherwise noted.

**5.11.4.2.2** When the term "HAA" is used, it will also apply to operators using powered-lift for air ambulance operations under § 194.306(mmm).

**5.11.4.2.3** The FAA notes that the requirement for an OCC under the SFAR is based on whether the operator has 10 or more aircraft conducting air ambulance operations, whether they are helicopters, powered-lift, or any combination thereof.

**5.11.4.3 Definitions and Abbreviations.**

**5.11.4.3.1** Autorotational Distance. Autorotational distance is the distance a powered-lift or rotorcraft can travel in autorotation as described by its manufacturer in the approved aircraft flight manual. (Refer to §§ 135.168 and 194.306(z).)

**5.11.4.3.2** Overwater Flight. AC 135-14 refers to overwater flight for rotorcraft. Overwater flight for powered-lift is the operation of a powered-lift beyond the autorotational or gliding distance from the shoreline. Determining whether the powered-lift is conducting overwater flight depends on the powered-lift's ability to autorotate or glide to reach the shoreline. If the powered-lift is operating over water beyond either the gliding or autorotational distance of the shoreline, then it meets the definition of overwater flight.

**5.11.4.3.3** Shoreline. Shoreline is land adjacent to the water of an ocean, sea, lake, pond, river, or tidal basin that is above the high-water mark where a powered-lift could be landed safely. This does not include land areas unsuitable for landing, such as vertical cliffs or land intermittently under water. (Refer to §§ 135.168 and 194.306(z).)

**5.11.4.3.4** Suitable Offshore Heliport Structure. Suitable offshore heliport structure is a heliport structure that can support the size and weight of the rotorcraft being operated where a safe landing can be made. Powered-lift that are able to conduct vertical takeoff and landings can use any suitable heliport or vertiport, and this includes suitable offshore heliport structures. Additionally, in order to use a heliport, a powered-lift must be capable of meeting the performance

requirements for that specific heliport, and the powered-lift cannot exceed the size and weight limitations established for that heliport.

**Note:** To determine if a powered-lift can use a vertiport, refer to Engineering Brief No. 105, Vertiport Design, at the Airport Engineering Briefs web page at https://www.faa.gov/airports/engineering/engineering_briefs.

**5.11.5** Certification and HAA-Specific Considerations. HAA operations are authorized through the issuance of OpSpec A021, Helicopter and/or Powered-Lift Air Ambulance Operations. Powered-lift conducting air ambulance operations will experience the same organizational and operational challenges that current HAA operators face. Therefore, the FAA will authorize powered-lift operators wanting to conduct air ambulance operations by issuing OpSpecs. In addition, powered-lift air ambulance operators are required by § 194.306(mmm) to comply with part 135 subpart L.

**5.11.6** Regulatory Operational Considerations. HAA operators and persons utilizing powered-lift for air ambulance operations are subject to regulatory operational requirements contained in part 135, including part 135 subpart L, and part 194. Section 194.306(a) and (mmm) require powered-lift air ambulance operators to comply with part 135 subpart L.

**5.11.7** Pilot Qualifications. Refer to AC 194-2, Pilot Training and Certification for Powered-Lift Operations, for detailed information on pilot training and certification and guidance for pilots, examiners, and instructors on the pilot training and certification process in a powered-lift.

**5.11.8** VFR Ceiling and Visibility Requirements for Class G Airspace. Section 135.609 specifies the minimum ceiling and visibility requirements for conducting VFR HAA operations in Class G Airspace. Operators conducting air ambulance operations with powered-lift must comply with § 135.609 as well as the powered-lift specific ceiling and visibility contained in § 194.306(qqq). Those requirements are broken down into day or night, vertical-lift or wing-borne flight mode, mountainous or non-mountainous, and local or non-local flying areas. The provisions in § 194.306(qqq) specify VFR weather minimums specific to powered-lift conducting air ambulance operations in Class G Airspace. Those minimums are detailed in Table 5-1 below:

**Table 5-1. Revised VFR Air Ambulance Minimums in Class G Airspace**

| Location | Day Vertical-Lift Wing-Borne Flight Mode | | Night Vertical-Lift Flight Mode | | Night Wing-Borne Flight Mode | |
|---|---|---|---|---|---|---|
| | Ceiling | Visibility | Ceiling | Visibility | Ceiling | Visibility |
| Non-Mountainous Local Flying Areas | 800 ft | 2 sm | 800 ft | 3 sm | 1,500 ft | 3 sm |
| Non-Mountainous Non-Local Flying Areas | 800 ft | 3 sm | 1,000 ft | 3 sm | 1,500 ft | 3 sm |
| Mountainous Local Flying Areas | 800 ft | 3 sm | 1,000 ft | 3 sm | 2,500 ft | 3 sm |
| Mountainous Non-Local Flying Areas | 1,000 ft | 3 sm | 1,000 ft | 5 sm | 2,500 ft | 5 sm |

**5.11.9** VFR Flight Planning Documentation.

**5.11.9.1** Operators conducting air ambulance operations with powered-lift must comply with § 135.615, including the powered-lift specific requirements contained in § 194.306(uuu). Section 135.615 requires VFR flight planning and includes the evaluation and documentation requirements for part 135 CHs conducting HAA operations. Section 194.306(uuu) contains different altitude clearance requirements for powered-lift that will be operated en route in the wing-borne flight mode than those currently listed for helicopters. Therefore, § 194.306(uuu) requires the pilot in command (PIC) of a powered-lift that will be operating in the wing-borne flight mode to use the higher minimum altitudes specified for airplanes in § 135.203(a)(1) and (a)(2) while conducting VFR operations en route. Therefore, to comply with the requirements of § 194.306(uuu), the PIC of a powered-lift being operated in the wing-borne flight mode must ensure that all terrain and obstacles along the route of flight are cleared vertically and horizontally by no less than 500 feet during the day. At night, that requirement is no less than 1,000 feet above the highest obstacle within a horizontal distance (HD) of 5 miles from the course intended to be flown, while the requirement in designated mountainous terrain is no less than 2,000 feet above the highest obstacle within an HD of 5 miles from the course intended to be flown.

**5.11.9.2** When a powered-lift will be operated en route in the vertical-lift flight mode the altitude clearance requirements of § 135.615(b), those stipulated for helicopters, can be used. The PIC must ensure that all terrain and obstacles

along the route of flight are cleared vertically by no less than 300 feet for day operations and 500 feet for night operations.

**5.11.10** Use of Minimum Safe Cruise Altitudes. Section 194.306(uuu) requires that prior to conducting VFR operations, the PIC of a powered-lift, when conducting their preflight analysis, must use the minimum safe cruise altitudes specified in § 194.306(uuu)(1) and (uuu)(2) as explained in paragraph 5.11.9 above.

**5.11.11** VFR/IFR Flight Planning and Weather Minimums.

**5.11.11.1 Flight Planning (refer to §§ 135.613, 135.615, and 194.306(sss) and (uuu)).** Under § 194.306(uuu), powered-lift air ambulance VFR flight planning must consider factors including the determination of highest obstacles and minimum cruising altitudes along planned routes as well as contingencies such as deviations due to medical necessity, dynamic weather, and changes to the planned flight. The procedures defining these planning methods must be documented. (Refer to § 194.306(uuu).)

**5.11.11.2 Departure Procedures Minimums (refer to §§ 135.609, 135.613, and 194.306(qqq) and (ttt)).** Powered-lift conducting air ambulance operations may depart on an IFR clearance from the surface, at heliports or vertiports that are not served by weather reporting, providing the heliport or vertiport is served by a departure procedure (Standard Instrument Departure (SID) or Obstacle Departure Procedure (ODP)) containing ODP and takeoff minimums. The flight may depart and proceed visually in accordance with the instructions contained in the departure procedure. If the departure involves a VFR to IFR transition and does not meet the requirements of § 194.306(ttt), and there is no departure procedure, and/or the initial departure fix (IDF) is more than 3 nautical miles (NM) from the point of lift-off, the VFR weather minimums required by the class of airspace apply. If the flight is within Class G Airspace, the minimums in § 194.306(qqq) apply.

**5.11.11.3 Approach Procedures Minimums (refer to §§ 135.609, 135.611, 135.613, and 194.306(sss)).**

**5.11.11.3.1** When a powered-lift is properly equipped and authorized to perform point in space (PinS) Copter approaches that include a “Proceed VFR” segment between the missed approach point (MAP) and a served heliport or vertiport which are 1 NM or less from the MAP, flights must be conducted in accordance with the ceiling and visibility limitations published in § 194.306(sss). Therefore, powered-lift will use the VFR weather minimums as described in § 135.613(a)(1), which requires a flight visibility of at least 1 statute mile (sm) and the ceiling that is published on the approach chart.

**5.11.11.3.2** When accessing a heliport or vertiport near an airport served by an instrument approach procedure (IAP), the pilot of a powered-lift may execute a published IAP to an airport which is not the intended landing site, and then

break off that published approach after visually acquiring the airport served by the approach and then proceed to a landing area that is 3 NM or less from the airport to which the approach was conducted. When conducting these operations, the powered-lift pilot may accomplish this only under VFR weather minimums in accordance with § 194.306(sss), which is dependent on whether the powered-lift is being operated in the wing-borne or vertical-lift flight mode. Wing-borne flight mode day operations require a ceiling of no less than 1,000 feet and 2 sm visibility, and for night operations no less than a 1,500-foot ceiling and 3 sm visibility. Vertical-lift flight mode day operations require no less than a 600-foot ceiling and 2 sm flight visibility, and for night operations no less than a 600-foot ceiling and 3 sm flight visibility.

**Note:** For all instrument approaches, including PinS, if the distance from the MAP to the landing area is greater than 3 NM, the VFR weather minimums required by the class of airspace are applicable. The airspace between the protected area surrounding the approach to the airport and the intended landing area located nearby may not be surveyed and obstructions may exist between the airspace protected for the airport served by the IAP and the intended landing site.

**5.11.11.4 Weather Minimums for Class G Airspace.** Section 135.609 specifies HAA minimums for Class G Airspace. HAA operations use higher ceiling and visibility minimums in uncontrolled airspace than is required for other part 135 operations. Section 194.306(qqq) contains the weather minimums that powered-lift air ambulance operators must use when operating in Class G Airspace. (See Table 5-1, Revised VFR Air Ambulance Minimums in Class G Airspace, for powered-lift ceiling and visibility requirements in Class G Airspace.)

**5.11.11.5 Flight into Locations Without Weather Reporting.** The requirement in § 135.611 for the PIC to assess the weather at a departure point where weather reporting is not provided applies to powered-lift pilots under § 135.611 as listed in § 194.306(rrr). Therefore, the PIC of a powered-lift must use the weather minimums provided in § 194.306(qqq), or those established for Class B, D, or E Airspace overlying the departure point, as applicable.

**5.11.12** Hazards to Operations: Identification and Mitigation.

**5.11.12.1 Flight Controls.** Leaving the flight controls of a powered-lift while rotors or powerplants are running is a potentially hazardous situation that may be encountered in air ambulance operations. While current regulations do not prohibit the pilot from leaving the controls while the powered-lift is operating, air ambulance operators are encouraged to include procedures for accomplishing this safely in their documented operational procedures and training.

**5.11.12.2 Heliports/Landing Zones (LZ).** When part 135 HAA operations are conducted from established heliports, those heliports should meet the criteria established in the current edition of AC 150/5390-2, Heliport Design, to the maximum extent possible. Powered-lift that are able to conduct vertical takeoff and landings can use any suitable heliport or vertiport. Additionally, in order to use a heliport, a powered-lift must be capable of meeting the performance requirements for that specific heliport, and the powered-lift cannot exceed the size and weight limitations established for that heliport.

**Note:** Refer to Engineering Brief No. 105, Vertiport Design, at https://www.faa.gov/airports/engineering/engineering_briefs.

**5.11.13** Operations Under Special Conditions.

**5.11.13.1 Flat Light, Whiteout, and Brownout.** In accordance with § 135.293(a)(9), all powered-lift pilots must be tested on procedures for aircraft handling in flat-light, whiteout, and brownout conditions, including methods for recognizing and avoiding those conditions. Air ambulance operators are susceptible to all of these conditions due to the nature of off-airport landings and operating in remote environments. The following descriptions are not intended to be scientific explanations but serve as operational definitions suitable for use by air ambulance operators. These terms should not be used interchangeably.

**5.11.13.2 Flat Light.** Flat light is an optical condition, also known as sector or partial whiteout. It is not as severe as whiteout, but this condition causes pilots to lose depth-of-field and vertical orientation. Flat-light conditions are usually the result of overcast skies over snow or ice fields, inhibiting visual reference. Such conditions can occur anywhere in the world, primarily in snow-covered areas but they can also occur in dust, sand, mud flats, or on glassy water. Flat light can completely obscure features of the terrain, creating an inability to distinguish distances and closure rates. As a result of this reflected light, it can give pilots the illusion of ascending or descending when actually flying level. However, with good judgment and proper training and planning, it is possible to safely operate aircraft in flat-light conditions.

**5.11.13.3 Whiteout/Brownout.** This effect typically occurs when a powered-lift takes off or lands on a dusty or snow-covered area. The rotor or vertical-lift device downwash picks up particles and recirculates them. The effect can vary in intensity depending upon the amount of light on the surface. This phenomenon can happen on the sunniest, brightest day with good contrast everywhere. However, when it happens, there can be a complete loss of visual cues. If the pilot has not prepared for this immediate loss of visibility, the results can be disastrous.

**5.11.14** Equipment Required by Regulation for HAA Operations.

**5.11.14.1 Radio Altimeter (RA).** RAs are required to be installed on rotorcraft under § 135.160. Section 194.306(v) requires powered-lift operators to comply with § 135.160. The FAA may authorize deviations for certain powered-lift and helicopters that have a maximum gross takeoff weight no greater than 2,950 pounds and are unable to incorporate an RA.

**5.11.14.2 HTAWS.** Section 194.306(ooo) requires all air ambulance operators utilizing powered-lift have an HTAWS or an FAA-approved TAWS A/HTAWS hybrid system installed and operational. For more information on HTAWS and TAWS A/HTAWS hybrid systems, see paragraph 5.5.

**5.11.14.3 Additional Equipment Required for HAA Overwater Operations.** Except for takeoff and landing, or unless the OpSpecs allow otherwise, overwater operations beyond the autorotational or gliding distance from the shoreline require the following special equipment to be aboard a powered-lift air ambulance. Requirements can be found in § 194.306(z) and (jj).

1. Approved life preservers, equipped with an approved survivor locator light, must be carried aboard all powered-lift operating under part 135 (including air ambulances) for each occupant. In accordance with § 194.306(z), each occupant must wear a life preserver when the flight operates beyond the autorotational or gliding distance from the shoreline. The exception to this requirement is when wearing a life preserver would be inadvisable for medical reasons as determined by medical personnel. Additionally, for powered-lift, the life preserver required by § 135.168(b)(1) need not be worn, but must be readily available for its intended use and easily accessible to each occupant when the powered-lift is a multiengine aircraft operated at a weight that will allow it to climb, with the critical engine inoperative or experiencing a critical change of thrust, at least 50 feet a minute, at an altitude of 1,000 feet above the surface. The powered-lift SFAR defines “critical change of thrust” as a failure that would most adversely affect the performance or handling qualities of an aircraft. Refer to § 194.306(z), (ii), (jj), and (kk).
2. Under § 194.306(z), a 406 megahertz (MHz) emergency locator transmitter (ELT), with a 121.5 MHz homing capability and approved batteries must be installed in the powered-lift air ambulance, in accordance with § 135.168(b). Section 194.306(z) requires this ELT meet the TSO and RTCA standards as listed in § 135.168(d).

**5.11.14.4 Electrical Power.** All wiring, electrical components, and installation procedures should conform to the requirements of part 23, 25, 27, or 29, as applicable. The specific requirements will be determined during the certification basis of the powered-lift as established according to § 21.17(b). The proposed certification basis will be published in the Federal Register (FR) for public comment. An electrical load analysis (ELA) should be performed to preclude overload of the aircraft's generating system. The system should provide the pilot with a means of rapidly shedding electrical loads in an emergency.

# CHAPTER 6. PART 136 COMMERCIAL AIR TOURS AND NATIONAL PARKS AIR TOUR MANAGEMENT

**6.1 Part 136 Applicability.** This chapter clarifies how and when part 136 will apply to commercial air tour operations using powered-lift.

**6.2 Part 136 Subpart A, National Air Tour Safety Standards.** Part 136 subpart A provides special operating rules for commercial air tour operators and each person intending to operate an air tour in an airplane or helicopter. The Special Federal Aviation Regulation (SFAR) 120, Powered-Lift: Pilot Certification and Training; Operations Requirements, will add regulatory requirements established for air tour operators utilizing powered-lift.

**6.2.1** Applicability and Definitions. Section 194.308(a) states that persons operating powered-lift in commercial air tours must continue to comply with rules applicable to all aircraft in part 136. Part 136 subpart A provides special operating rules for commercial air tour operators and each person intending to operate an air tour in an airplane, powered-lift, or rotorcraft. The following definitions and sections from part 136 subpart A are applicable to powered-lift in § 194.308.

**6.2.1.1 Suitable Landing Area.** Section 136.1(d) defines "suitable landing area for rotorcraft." As stated in the definition, suitable landing areas must be site-specific, designated by the operator, and accepted by the FAA. The purpose of this definition is to provide the pilot with suitable areas to land should an emergency occur. The operator designates potential landing areas in advance of the air tour operation, and as a result, the pilot is aware of these suitable landing areas, thereby helping reduce the risk of a major accident. The landing areas can be used in an aircraft emergency, which could be more than just an engine failure. Knowing in advance where these site-specific suitable landing areas are located is intended to prevent a major accident, and if used, would not cause serious injury to persons irrespective of aircraft damage. Section 194.308(b) includes powered-lift in this definition and will use the same rationale to reduce the risk of a major accident should an in-flight aircraft emergency occur.

**6.2.1.2 Critical Change of Thrust.** The powered-lift SFAR defines "critical change of thrust" as a failure that would most adversely affect the performance or handling qualities of an aircraft. Refer to § 194.308(c).

**6.2.2** Life Preserver Requirements (refer to § 136.9). The life preserver requirement in § 194.308(d)(1) applies to powered-lift in the final rule. Therefore, § 136.9(b) applies to powered-lift, excepting them from the requirement for each occupant to wear a life preserver as long as a life preserver is readily available for its intended use and easily accessible when one of the following conditions is met:

1. The powered-lift is operating in wing-borne flight mode within power-off gliding distance to the shoreline for the duration of the time that flight is over water. This

exception will not be allowed when the powered-lift is operating in the vertical-lift flight mode (refer to § 194.308(d)(1)(i)).

2. The multiengine powered-lift can be operated with the critical engine inoperative or a critical change in thrust, at a weight that will allow it to climb at least 50 feet per minute at an altitude of 1,000 feet above the surface, as provided in the aircraft flight manual. The FAA has written into § 194.308(d)(1)(ii)) that the reference to "Airplane Flight Manual" applies to powered-lift to the extent that they have an aircraft flight manual approved through the certification process. This will clarify the FAA's intent for powered-lift operators to comply with the manual requirements.
3. The exception contained in § 136.9(b)(1) allows floats in lieu of wearing the life preservers which includes all aircraft, so this exception would be available to powered-lift as written.
4. As stated in § 136.9(c), no life preserver is required if the overwater operation is necessary only for takeoff or landing.

**6.2.3** Floats Over Water (refer to § 136.11).

**6.2.3.1** Section 194.308(d)(2)(i) specifies that § 136.11(a)(1) is applicable to single-engine powered-lift while conducting commercial air tours over water beyond the shoreline.

**6.2.3.2** Section 194.308(d)(2)(ii) specifies that § 136.11(a)(2) applies to multiengine powered-lift while conducting commercial air tours over water beyond the shoreline when it cannot be operated with the critical engine inoperative or while experiencing a critical change of thrust, at a weight that will allow it to climb, at least 50 feet a minute, at an altitude of 1,000 feet above the surface, as provided in the approved aircraft flight manual for that aircraft.

**6.2.3.3** Section 194.308(d)(2) addresses § 136.11(b) and (c). Section 136.11(b) applies to powered-lift while conducting commercial air tours over water that are required to be equipped with an inflatable flotation. These inflatable flotation systems must have an activation switch for the flotation system on one of the primary flight controls; and it must be armed when the powered-lift is over water beyond the shoreline and is flying at a speed that does not exceed the maximum speed prescribed in the approved aircraft flight manual for flying with the flotation system armed.

**6.2.3.4** As mentioned above, § 194.308(d)(2) also addresses § 136.11(c). Section 136.11(c)(1) applies to powered-lift and provides relief from installing either a fixed or inflatable flotation system if the powered-lift is over water only during the takeoff or landing portion of the flight.

**6.2.3.5** Under § 194.308(d)(2), § 136.11(c)(2) applies to powered-lift and provides relief from installing either a fixed or inflatable flotation system when the powered-lift is operated within the power-off gliding distance to the shoreline

for the duration of the flight and each occupant is wearing a life preserver from before takeoff until the aircraft is no longer over water.

**6.2.4** Performance Plans (refer to § 136.13).

**6.2.4.1** Section 136.13 applies to powered-lift in accordance with § 194.308(d)(3). This section requires each operator of a powered-lift to complete a performance plan before the commercial air tour flight occurs. These performance plans are a key component of mitigating the risk of commercial air tour operations flown in powered-lift, as they require the pilot in command (PIC) to be prepared to respond to unforeseen events. A height/velocity (H/V) diagram or any other avoidance areas such as the transition to and from vertical-lift flight mode to wing-borne flight mode, are an important component of the performance plan. Those powered-lift that have H/V or any other avoidance areas contained within their aircraft flight manuals must use that information when completing a performance plan as prescribed in § 136.13(a) and required by § 194.308(d)(3). This rule also requires the PIC of the powered-lift to review the plan for accuracy and comply with the performance plan on the day the flight is flown. The performance plan will be based on the information in the appropriate Powered-Lift's Aircraft Flight Manual (PLAFM) and must take into consideration the maximum density altitude for the planned operation in accordance with § 136.13(a) as required by § 194.308(d)(3). The performance plan will determine the following information:

- Maximum gross weight and center of gravity (CG) limitations for hovering in ground effect;
- Maximum gross weight and CG limitations for hovering out of ground effect; and
- Maximum combination of weight, altitude, and temperature for which H/V or any other avoidance area information as contained in the PLAFM is valid.

**6.2.4.2** Under § 136.13(b) and (c) as required by § 194.308(d)(3), the PIC must make a reasonable plan to operate the aircraft outside of any caution/warning/avoid areas contained within the aircraft flight manual.

**6.3 Special Operating Rules for Air Tour Operators in the State of Hawaii.** There are special operating rules for air tour operators in the State of Hawaii that apply to both airplanes and helicopters. Powered-lift are required to comply with these regulations under § 136.71. Many air tours within the State of Hawaii occur over large bodies of water and in water conditions that are rough with rugged terrain, which are unlike any other conditions in other parts of the country where air tours occur. Accordingly, the helicopter requirements are equally important for powered-lift conducting commercial air tours in Hawaii to ensure an equivalent level of safety.

**6.3.1** Flotation Equipment. Applying the flotation equipment requirements to single-engine powered-lift increases the likelihood of survival in the event of a water landing. Therefore, any air tour operation conducted in a single-engine powered-lift that is beyond the shore of any island, and regardless of whether the single-engine powered-lift is within gliding or autorotational distance of the shore, must ensure each person on board is wearing approved flotation gear as required in §§ 136.75(a) and 194.308(d)(4). The only relief provided for each occupant from wearing approved flotation gear is when the single-engine powered-lift is amphibious or equipped with floats adequate to accomplish a safe emergency ditching. Those aircraft that are either amphibious or equipped with floats must also have approved flotation gear easily accessible for each occupant in accordance with § 136.75(a) as required by § 194.308(d)(4).

**6.3.2** Performance Plan. The requirement for powered-lift to have a performance plan is an important safety requirement for these operators in the State of Hawaii. The FAA placed this performance requirement into the regulation based on the need for operators to conduct preflight planning and have operational knowledge that is essential to aircraft being flown in commercial passenger carrying operations. Under § 136.75(b) and as required by § 194.308(d)(5), the H/V diagram and any other avoidance areas such as the transition to and from vertical-lift flight mode to wing-borne flight mode are important components of the performance plan and will apply to commercial air tours conducted in powered-lift that have H/V or any other avoidance area information contained within their aircraft flight manuals. The PIC of the powered-lift must comply with the performance plan prescribed in § 136.75(b) as required by § 194.308(d)(5).

**6.3.3** Operating Limitations. The requirement for the powered-lift PIC to operate with the aircraft limitations is equally important. Therefore, under § 136.75(c) as required by § 194.308(d)(6), except for approach to and transition from a hover and for the purpose of takeoff and landing, the PIC must operate the powered-lift at a combination of height and forward speed (including hover) that would permit a safe landing in the event of engine power loss or critical change of thrust. The PIC must also ensure that the aircraft is operated in accordance with the height-speed envelope or any other avoidance areas such as the transition to and from vertical-lift flight mode to wing-borne flight mode as published in the aircraft's flight manual for that powered-lift. When making these determinations, the PIC must also use the aircraft's current weight and altitude.

# APPENDIX A. LIST OF ACRONYMS

| Acronym | Definition |
|---|---|
| 14 CFR | Title 14 of the Code of Federal Regulations |
| AAIP | Approved Aircraft Inspection Program |
| AC | Advisory Circular |
| AIM | Aeronautical Information Manual |
| AIP | Approved Inspection Program |
| ATC | Air Traffic Control |
| ATCTS | ATC Transponder System |
| CG | Center of Gravity |
| CH | Certificate Holder |
| CMT | Certificate Management Team |
| DA | Decision Altitude |
| DRS | Dynamic Regulatory System |
| ELA | Electrical Load Analysis |
| ELT | Emergency Locator Transmitter |
| ETA | Estimated Time of Arrival |
| F/A | Flight Attendant |
| FAA | Federal Aviation Administration |
| FDR | Flight Data Recorder |
| FR | Federal Register |
| GPS | Global Positioning System |
| GS | Glideslope |
| HAA | Helicopter Air Ambulance |
| HTAWS | Helicopter Terrain Awareness and Warning System |
| H/V | Height/Velocity |
| IAP | Instrument Approach Procedure |
| ICA | Instructions for Continued Airworthiness |
| ICAO | International Civil Aviation Organization |
| IDF | Initial Departure Fix |

| Acronym | Definition |
|---|---|
| IFP | Instrument Flight Procedure |
| IFR | Instrument Flight Rules |
| IMC | Instrument Meteorological Conditions |
| LOA | Letter of Authorization |
| LZ | Landing Zone |
| MAP | Missed Approach Point |
| MDA | Minimum Descent Altitude |
| MEL | Minimum Equipment List |
| MFD | Multifunction Display |
| MHz | Megahertz |
| MSA | Minimum Safe Altitude |
| MSpec | Management Specification |
| NAS | National Airspace System |
| NM | Nautical Mile |
| OCC | Operations Control Center |
| OCS | Operations Control Specialist |
| ODP | Obstacle Departure Procedure |
| OEM | Original Equipment Manufacturer |
| OpSpec | Operations Specification |
| part 91K | Part 91 Subpart K |
| PFD | Primary Flight Display |
| PIC | Pilot in Command |
| PinS | Point in Space |
| PLAFM | Powered-Lift’s Aircraft Flight Manual |
| RA | Radio Altimeter |
| SFAR | Special Federal Aviation Regulation |
| SIAP | Standard Instrument Approach Procedure |
| SIC | Second in Command |
| SID | Standard Instrument Departure |

| Acronym | Definition |
|---|---|
| sm | Statute Mile |
| TAPL | Technically Advanced Powered-Lift |
| TAWS | Terrain Awareness and Warning System |
| TAWS A | Class A TAWS |
| TC | Type Certificate |
| TERPS | Terminal Instrument Procedures |
| TSO | Technical Standard Order |
| VASI | Visual Approach Slope Indicator |
| VFR | Visual Flight Rules |
| VMC | Visual Meteorological Conditions |
| VSI | Vertical Speed Indicator |
| VTOL | Vertical Takeoff and Landing |

# APPENDIX B. RELATED READING MATERIAL

**B.1** The FAA publishes many ACs that address a wide range of topics and audiences. Some of these ACs are applicable to certain kinds of aircraft, while others are not aircraft-specific and do not include aircraft in the subject matter. These ACs may be relevant to powered-lift, even though the term "powered-lift" is not found within each AC. The FAA encourages persons to review the available ACs to determine the information that may be relevant to their intended operations. All ACs can be found on the FAA website at https://www.faa.gov/regulations_policies/advisory_circulars.

**B.2** ACs that are applicable to all aircraft are applicable to powered-lift per the § 1.1 definition of "aircraft."

**B.3** The list below contains ACs that the FAA has determined could apply to powered-lift as written with no further explanation required. The FAA acknowledges that the list is not exhaustive but is included here as a guide to assist the reader in identifying potentially relevant ACs.

**B.3.1** General:

- AC 00-1.1, Public Aircraft Operations—Manned and Unmanned.
- AC 00-46, Aviation Safety Reporting Program.
- AC 00-58, Voluntary Disclosure Reporting Program.
- AC 00-59, Integrating Helicopter and Tiltrotor Assets Into Disaster Relief Planning.
- AC 00-60, North American Free Trade Agreement and Specialty Air Services Operations.
- AC 00-61, Event Planning Guide.
- AC 00-63, Use of Flight Deck Displays of Digital Weather and Aeronautical Information.
- AC 00-64, Air Medical Resource Management.
- AC 00-65, Towbar and Towbarless Movement of Aircraft.
- AC 00-70, Flightcrew Member Certificate Verification Plan.

**Note:** Also refer to FAA-H-8083-28, Aviation Weather Handbook.

**B.3.2** Maintenance. AC 43.13-2, Acceptable Methods, Techniques, and Practices – Aircraft Alterations.

**B.3.3** Airman. AC 61-134, General Aviation Controlled Flight Into Terrain Awareness.

**B.3.4** Air Traffic and General Operating Rules:

- AC 90-23, Aircraft Wake Turbulence.
- AC 90-67, Light Gun Signals from the Control Tower for Ground Vehicles, Equipment, and Personnel.
- AC 90-96, Approval of U.S. Operators and Aircraft to Operate Under Instrument Flight Rules (IFR) in European Airspace Designated for Basic Area Navigation (B-RNAV)/RNAV 5 and Precision Area Navigation (P-RNAV).
- AC 90-100, U.S. Terminal and En Route Area Navigation (RNAV) Operations.
- AC 90-101, Approval Guidance for RNP Procedures with AR.
- AC 90-102, Airspace Flow Program.
- AC 90-105, Approval Guidance for RNP Operations and Barometric Vertical Navigation in the U.S. National Airspace System and in Oceanic and Remote Continental Airspace.
- AC 90-106, Enhanced Flight Vision System Operations.
- AC 90-107, Guidance for Localizer Performance with Vertical Guidance and Localizer Performance without Vertical Guidance Approach Operations in the U.S. National Airspace System.
- AC 90-108, Use of Suitable Area Navigation (RNAV) Systems on Conventional Routes and Procedures.
- AC 90-113, Instrument Flight Procedure Validation (IFPV) of Performance Based Navigation (PBN) Instrument Flight Procedures (IFP).
- AC 90-114, Automatic Dependent Surveillance-Broadcast Operations.
- AC 90-115, Collaborative Trajectory Options Program (CTOP).
- AC 90-117, Data Link Communications.
- AC 91-32, Safety In and Around Helicopters.
- AC 91-36, Visual Flight Rules (VFR) Flight Near Noise-Sensitive Areas.
- AC 91-37, Truth in Leasing.
- AC 91-58, Use of Pyrotechnic Visual Distress Signaling Devices in Aviation.
- AC 91-63, Temporary Flight Restrictions (TFR) and Flight Limitations.
- AC 91-79, Aircraft Landing Performance and Runway Excursion Mitigation.
- AC 91-88, Electronic News Gathering Operations.
- AC 91-90, Part 91 Approved Inspection Programs.

- AC 91-92, Pilot's Guide to a Preflight Briefing.
- AC 91.21-1, Use of Portable Electronic Devices Aboard Aircraft.

**Note:** Also refer to FAA Order JO 7610.4, Sensitive Procedures and Requirements for Special Operations, the Aeronautical Information Manual (AIM), and the Aeronautical Information Publication (AIP).

**B.3.5** Air Carriers, Air Travel Clubs, and Operations for Compensation or Hire Certification and Operations:

- AC 120-48, Communication and Coordination Between Flightcrew Members and Flight Attendants.
- AC 120-64, Operational Use and Modification of Electronic Checklists.
- AC 120-71, Standard Operating Procedures and Pilot Monitoring Duties for Flight Deck Crewmembers.
- AC 120-83, Flight Deck Observer Seat and Associated Equipment.
- AC 120-87, Use of Child Restraint Systems on Aircraft.
- AC 120-88, Preventing Injuries Caused by Turbulence.
- AC 120-95, Portable Oxygen Concentrators.
- AC 121-24, Passenger Safety Information Briefing and Briefing Cards.
- AC 135-10, Approved Aircraft Inspection Program.
- AC 135-42, Extended Operations (ETOPS) and Operations in the North Polar Area.

**Advisory Circular Feedback Form**

If you find an error in this AC, have recommendations for improving it, or have suggestions for new items/subjects to be added, you may let us know by contacting the General Aviation and Commercial Division at 9-AFS-800-Correspondence@faa.gov or the Flight Standards Directives Management Officer at 9-AWA-AFB-120-Directives@faa.gov.

Subject: AC 194-1, Powered-Lift Operations

Date: _____

*Please check all appropriate line items:*

☐ An error (procedural or typographical) has been noted in paragraph _____ on page _____.

☐ Recommend paragraph _____ on page _____ be changed as follows:

_____

_____

☐ In a future change to this AC, please cover the following subject:
*(Briefly describe what you want added.)*

_____

_____

☐ Other comments:

_____

_____

☐ I would like to discuss the above. Please contact me.

Submitted by: _____ Date: _____