



Overview of Part 36 Aircraft Certification “Stages”

The Federal Aviation Administration (FAA) has established limits on allowable levels of aircraft noise emissions, under Title 14 of the Code of Federal Regulations (14 CFR) Part 36, “Noise Standards: Aircraft Type and Airworthiness Certification.” Airplanes must meet the standards to receive new or revised “type” or “airworthiness” certificates, to operate in the U.S.

The standards, measurement locations, and procedures, noise limits, and noise metrics vary according to combinations of aircraft “design” criteria, including, but not limited to:

- Subsonic versus supersonic speed capabilities
- Type of propulsion (e.g. turbojet- or propeller-driven)
- Weight (e.g., “small” aircraft with maximum gross takeoff weights less than 12,500 pounds, and “large” aircraft with maximum takeoff weights of 12,500 pounds or more)
- Helicopter versus fixed-wing aircraft
- Operating category (e.g., “acrobatic,” “agricultural,” “commuter,” “normal,” “restricted,” “transport,” and “utility”) and use (e.g., “fire fighting” or “carrying external loads”)
- Date of initial flight or of application for type certificate
- Engine manufacturer and model

Because the meanings of various “stage classifications” (e.g., “Stage 1” or “Stage 2”) vary with these characteristics, references to a specific stage should be used with care.

This ambiguity largely relates to the manner which Part 36 – and the term stage – evolved and became more complex over time, as summarized in the following timeline:

Initial Rule: 1969 - Establishment of Initial Certification Standards

When first promulgated in 1969, Part 36 only applied to transport-category large and turbojet-powered aircraft. Transport category includes jets with 10 or more seats or greater than 12,500 pound maximum takeoff weights, and propeller-driven airplanes with greater than 19 seats or greater than 19,000 pound maximum takeoff weights. The regulation sets separate measurement requirements and limits for takeoff, sideline, and approach locations, in terms of “Effective Perceived Noise Level” (“EPNL” or “EPNdB”). When promulgated in 1969, the regulation categorized aircraft as “certificated” or “uncertificated”, to reflect whether the aircraft type had passed testing or not. There was no reference to the term stage.

1974 Amendment: Part 36 Application to Propeller-Driven Small Aircraft

The FAA added noise standards for “propeller-driven small aircraft” and “propeller-driven commuter category aircraft” in 1974, prior to the creation of the stage terminology. They continue to be termed certificated or uncertificated, with no reference to stage. The noise standards for these aircraft are in terms of “A-weighted decibel” (“dBA”) limits for level flyovers 1,000’ above ground level.

1977 Amendment: Introduction of Stage Classifications

In 1977, the FAA amended Part 36 to define more stringent noise limits for transport-category large and turbojet-powered aircraft, and introduced the concept of certification “stages,” to provide terminology to differentiate between the original and revised standards. For these aircraft categories, the amendment created three stages:

- “Stage 1” aircraft have never been shown to meet any noise standards, either because they have never been tested, or because they have been tested and failed.
- “Stage 2” aircraft meet original noise limits, set in 1969.
- “Stage 3” aircraft meet more stringent limits, established in 1977.

1978 Amendment: Extension of Part 36 to Civil Supersonic Aircraft

The FAA amended Part 36 to apply the same noise standards to civil supersonic jets as to civil subsonic jets. Concorde with flight time before 1980 were exempted – 16 aircraft in 1978; no new aircraft introduced subsequently.

1988 Amendment: Addition of Certification Standards for Helicopters

The FAA amended Part 36 to incorporate standards for helicopters after the creation of stage terminology. As a result, helicopter noise standards are similar in some aspects to those for propeller-driven small aircraft and in other aspects to those for transport-category large and turbojet-powered aircraft.

Like propeller-driven small aircraft, there are two helicopter certification classes. Unlike propeller-driven small aircraft, but like transport-category large and turbojet-powered aircraft, the two classes are defined in stage terms. Stage 1 helicopters are uncertificated, either because they have not been tested for compliance with noise standards, or because they have been tested and failed to meet the standards. Stage 2 helicopters are certificated, because they have passed the prescribed tests.

The term Stage 2 does not have the same meaning for helicopters as for transport-category large and turbojet-powered aircraft. For helicopters, Stage 2 indicates compliance with the highest applicable noise standards, whereas for transport-category large and turbojet-powered aircraft, it reflects compliance with the lowest of three certificated classes.

Measurement locations and other testing requirements differ significantly for helicopters and propeller-driven small airplanes, compared to each other and to transport-category large and turbojet-powered aircraft. Like transport-category large and turbojet-powered aircraft, helicopter standards are in terms of EPNdB for three measurement locations. However, the measurement locations are a combination of those used for fixed-wing aircraft; they include takeoff and approach, like transport-category large and turbojet aircraft (but not sideline as for those types) and level-flyover, like propeller-driven small airplanes.

2005 Amendment: Addition of Stage 4 Certification Standards

In 2005, FAA amended Part 36 to adopt a Stage 4 classification. The Stage 4 noise limits are a cumulative 10 EPNdB less than those for Stage 3. All subsonic turbojet-powered and transport-category airplanes with maximum gross takeoff weights of 12,500 pounds or more for which application of a new type design is submitted on or after January 1, 2006, must meet new noise certification levels.

It should be noted that the Stage 4 standard applies only to application for type certification on and after January 1, 2006. It does not initiate any FAA process to phase out the production or operation of current aircraft models. Stage 1, 2, and 3 aircraft under 75,000 pounds and Stage 3 aircraft of 75,000 pounds or more may continue to operate in the U.S. However, it also should be noted that most, if not all, civil subsonic turbojet aircraft under 75,000 pounds in production today meet Stage 4 standards.

Other Amendments to Part 36

The preceding timeline focuses only on evolution of noise classifications and use of the term stage. It should be noted that the regulation has been amended numerous other times (22, as of December 13, 1999) to address a broad range of certification-related matters, such as revisions to noise limits, measurement procedures, measurement locations, meteorological reference conditions, data corrections, flight procedures, applicability to specific aircraft, and more.