requiring specialized maintenance techniques, test equipment, or expertise. The recommended overhaul periods and necessary cross references to the Airworthiness Limitations section of the manual must also be included. In addition, the applicant must include an inspection program that includes the frequency and extent of the inspections necessary to provide for the continued airworthiness of the engine.

(7) Troubleshooting information describing probable malfunctions, how to recognize those malfunctions, and the remedial action for those malfunctions.

(8) Information describing the order and method of removing the engine and its parts and replacing parts, with any necessary precautions to be taken. Instructions for proper ground handling, crating, and shipping must also be included.

(9) A list of the tools and equipment necessary for maintenance and directions as to their method of use.

(b) *Engine Overhaul Manual or Section.* (1) Disassembly information including the order and method of disassembly for overhaul.

(2) Cleaning and inspection instructions that cover the materials and apparatus to be used and methods and precautions to be taken during overhaul. Methods of overhaul inspection must also be included.

(3) Details of all fits and clearances relevant to overhaul.

(4) Details of repair methods for worn or otherwise substandard parts and components along with the information necessary to determine when replacement is necessary.

(5) The order and method of assembly at overhaul.

(6) Instructions for testing after overhaul.

(7) Instructions for storage preparation, including any storage limits.

(8) A list of tools needed for overhaul.

(c) *ETOPS Requirements.* For an applicant seeking eligibility for an engine to be installed on an airplane approved for ETOPS, the Instructions for Continued Airworthiness must include procedures for engine condition monitoring. The engine condition monitoring procedures must be able to determine prior to flight, whether an engine is capable of providing, within approved engine operating limits, maximum continuous power or thrust, bleed air, and power extraction required for a relevant engine inoperative diversion. For an engine to be installed on a two-engine airplane approved for ETOPS, the engine condition monitoring procedures must be validated before ETOPS eligibility is granted.

A33.4 airworthiness limitations section

The Instructions for Continued Airworthiness must contain a section titled Airworthiness Limitations that is segregated and clearly distinguishable from the rest of the manual.

(a) For all engines:

(1) The Airworthiness Limitations section must set forth each mandatory replacement time, inspection interval, and related procedure required for type certification. If the Instructions for Continued Airworthiness consist of multiple documents, the section required under this paragraph must be included in the principal manual.

(2) This section must contain a legible statement in a prominent location that reads: ''The Airworthiness Limitations section is FAA approved and specifies maintenance required under §§43.16 and 91.403 of Title 14 of the Code of Federal Regulations unless an alternative program has been FAA approved.''

(b) For rotorcraft engines having 30-second OEI and 2-minute OEI ratings:

(1) The Airworthiness Limitations section must also prescribe the mandatory post-flight inspections and maintenance actions associated with any use of either 30-second OEI or 2-minute OEI ratings.

(2) The applicant must validate the adequacy of the inspections and maintenance actions required under paragraph (b)(1) of this section A33.4.

(3) The applicant must establish an in-service engine evaluation program to ensure the continued adequacy of the instructions for mandatory post-flight inspections and maintenance actions prescribed under paragraph (b)(1) of this section A33.4 and of the data for §33.5(b)(4) pertaining to power availability. The program must include service engine tests or equivalent service engine test experience on engines of similar design and evaluations of service usage of the 30-second OEI or 2-minute OEI ratings.

[Amdt. 33–9, 45 FR 60181, Sept. 11, 1980, as amended by Amdt. 33–13, 54 FR 34330, Aug. 18, 1989; Amdt. 33–21, 72 FR 1878, Jan. 16, 2007; Amdt. 33–25, 73 FR 48124, Aug. 18, 2008]

APPENDIX B TO PART 33—CERTIFICATION STANDARD ATMOSPHERIC CONCENTRATIONS OF RAIN AND HAIL

Figure B1, Table B1, Table B2, Table B3, and Table B4 specify the atmospheric concentrations and size distributions of rain and hail for establishing certification, in accordance with the requirements of §33.78(a)(2). In conducting tests, normally by spraying liquid water to simulate rain conditions and by delivering hail fabricated from ice to simulate hail conditions, the use of water droplets and hail having shapes, sizes and distributions of sizes other than those defined in this appendix B, or the use of a single size or shape for each water droplet or hail, can be accepted, provided that applicant shows that the substitution does not reduce the severity of the test.

FIGURE B1 - Illustration of Rain and Hail Threats. Certification concentrations are obtained using Tables B1 and B2.

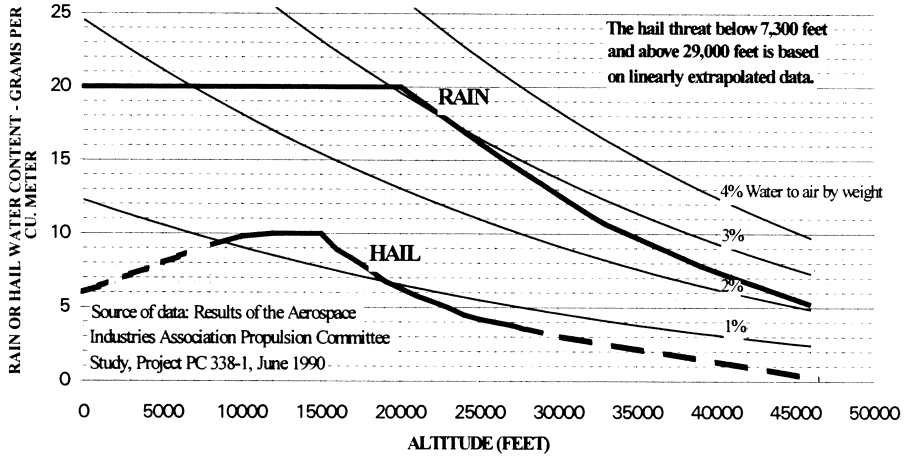

TABLE B1—CERTIFICATION STANDARD ATMOSPHERIC RAIN CONCENTRATIONS

Altitude (feet)	Rain water content (RWC) (grams water/meter^3 air)
0	20.0
20,000	20.0
26,300	15.2
32,700	10.8
39,300	7.7
46,000	5.2

RWC values at other altitudes may be determined by linear interpolation.

NOTE: Source of data—Results of the Aerospace Industries Association (AIA) Propulsion Committee Study, Project PC 338–1, June 1990.

TABLE B2—CERTIFICATION STANDARD ATMOSPHERIC HAIL CONCENTRATIONS

Altitude (feet)	Hail water content (HWC) (grams water/meter^3 air)
0	6.0
7,300	8.9
8,500	9.4
10,000	9.9
12,000	10.0
15,000	10.0
16,000	8.9
17,700	7.8
19,300	6.6
21,500	5.6
24,300	4.4
29,000	3.3
46,000	0.2

HWC values at other altitudes may be determined by linear interpolation. The hail threat below 7,300 feet and above 29,000 feet is based on linearly extrapolated data.

NOTE: Source of data—Results of the Aerospace Industries Association (AIA Propulsion Committee (PC) Study, Project PC 338–1, June 1990.

TABLE B3—CERTIFICATION STANDARD ATMOSPHERIC RAIN DROPLET SIZE DISTRIBUTION

Rain droplet diameter (mm)	Contribution total RWC (%)
0–0.49	0
0.50–0.99	2.25
1.00–1.49	8.75
1.50–1.99	16.25
2.00–2.49	19.00
2.50–2.99	17.75
3.00–3.49	13.50
3.50–3.99	9.50
4.00–4.49	6.00
4.50–4.99	3.00
5.00–5.49	2.00
5.50–5.99	1.25
6.00–6.49	0.50
6.50–7.00	0.25
Total	100.00

Median diameter of rain droplets in 2.66 mm

NOTE: Source of data—Results of the Aerospace Industries Association (AIA Propulsion Committee (PC) Study, Project PC 338–1, June 1990.

TABLE B4—CERTIFICATION STANDARD ATMOSPHERIC HAIL SIZE DISTRIBUTION

Hail diameter (mm)	Contribution total HWC (%)
0–4.9	0
5.0–9.9	17.00
10.0–14.9	25.00
15.0–19.9	22.50
20.0–24.9	16.00
25.0–29.9	9.75
30.0–34.9	4.75
35.0–39.9	2.50
40.0–44.9	1.50
45.0–49.9	0.75
50.0–55.0	0.25

TABLE B4—CERTIFICATION STANDARD ATMOSPHERIC HAIL SIZE DISTRIBUTION—Continued

Hail diameter (mm)	Contribution total HWC (%)
Total	100.00

Median diameter of hail is 16 mm

NOTE: Source of data—Results of the Aerospace Industries Association (AIA Propulsion Committee (PC) Study, Project PC 338–1, June 1990.

[Doc. No. 28652, 63 FR 14799, Mar. 26, 1998]

PART 34—FUEL VENTING AND EXHAUST EMISSION REQUIREMENTS FOR TURBINE ENGINE POWERED AIRPLANES

Subpart A—General Provisions

Sec.

Subpart B—Engine Fuel Venting Emissions (New and In-Use Aircraft Gas Turbine Engines)

Subpart C—Exhaust Emissions (New Aircraft Gas Turbine Engines)

Subpart D—Exhaust Emissions (In-Use Aircraft Gas Turbine Engines)

Subparts E–F [Reserved]

Subpart G—Test Procedures for Engine Exhaust Gaseous Emissions (Aircraft and Aircraft Gas Turbine Engines)

Subpart H—Test Procedures for Engine Smoke Emissions (Aircraft Gas Turbine Engines)

AUTHORITY: 42 U.S.C. 4321 *et seq.*, 7572; 49 U.S.C. 106(g), 40113, 44701–44702, 44704, 44714.

SOURCE: Docket No. 25613, 55 FR 32861, Aug. 10, 1990, unless otherwise noted.

Subpart A—General Provisions

§ 34.1 Definitions.

As used in this part, all terms not defined herein shall have the meaning given them in the Clean Air Act, as amended (42 U.S.C. 7401 et. seq.):

Act means the Clean Air Act, as amended (42 U.S.C. 7401 et. seq.).

Administrator means the Administrator of the Federal Aviation Administration or any person to whom he has delegated his authority in the matter concerned.

Administrator of the EPA means the Administrator of the Environmental Protection Agency and any other officer or employee of the Environmental Protection Agency to whom the authority involved may be delegated.

Aircraft as used in this part means any airplane as defined in 14 CFR part 1 for which a U.S. standard airworthiness certificate or equivalent foreign airworthiness certificate is issued.

Aircraft engine means a propulsion engine which is installed in, or which is manufactured for installation in, an aircraft.

Aircraft gas turbine engine means a turboprop, turbofan, or turbojet aircraft engine.

Class TP means all aircraft turboprop engines.

Class TF means all turbofan or turbojet aircraft engines or aircraft engines designed for applications that otherwise would have been fulfilled by turbojet and turbofan engines except engines of class T3, T8, and TSS.