

Code of Federal Regulations

▼ Sec. B33.1

Part 33 AIRWORTHINESS STANDARDS: AIRCRAFT ENGINES	
Appendix B--Certification Standard Atmospheric Concentrations of Rain and Hail	

Sec. B33.1

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 Sec. 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 the applicant shows that the substitution does not reduce the severity of the test.

Figure B1- Illustration of
Rain and Hail Threats.

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

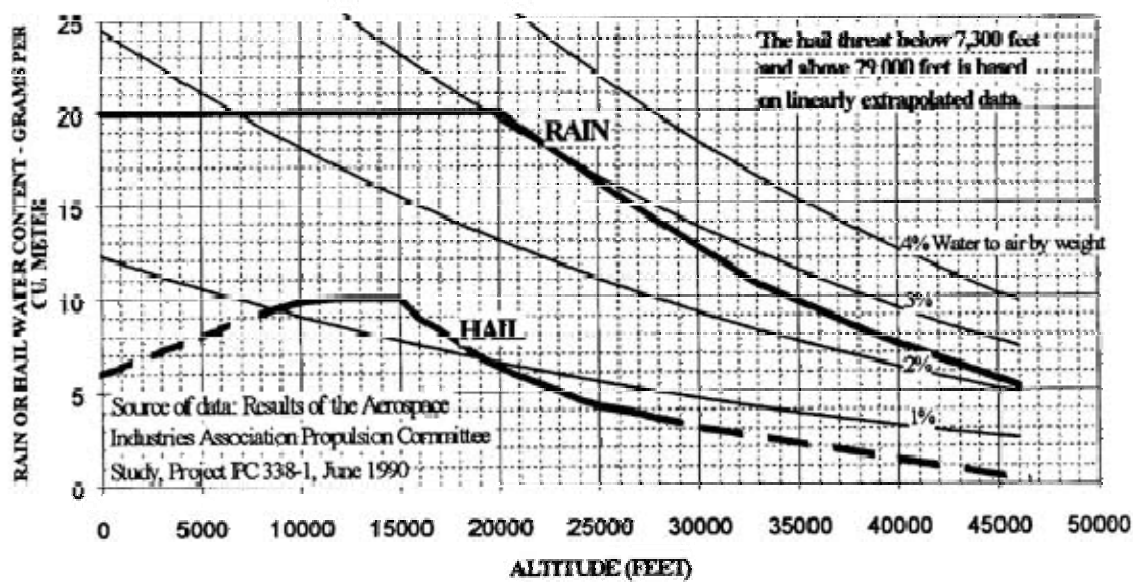


TABLE B1
CERTIFICATION STANDARD ATMOSPHERIC RAIN CONCENTRATIONS

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
-----	8.9
7,300-----	9.4
-----	9.9
8,500-----	10.0

10,000-----	

12,000-----	

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 to 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
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Total-----	100.00

Median diameter of rain droplets is 2.66 m/m

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 (m/m)	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
Total-----	100.00

Median diameter of hail is 16mm

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

▶ Comments

▼ Document History

Notice of Proposed Rulemaking Actions:

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Final Rule Actions:

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