

MIL-S-008806B (USAF)

~~21 September 1971~~

USED IN LIEU OF

MIL-A-8806A

11 July 1966

MILITARY SPECIFICATION

SOUND PRESSURE LEVELS IN AIRCRAFT, GENERAL SPECIFICATION FOR

This limited coordination military specification has been prepared by the Air Force based upon currently available technical information, but it has not been approved for promulgation as a revision of Military Specification MIL-A-8806. It is subject to modification.

However, pending its promulgation as a coordinated military specification, it may be used in procurement.

1. SCOPE

1.1 This specification covers the general requirements for maximum allowable sound pressure levels in aircraft crew and passenger compartments and the testing requirements for determining conformance to these levels.

2. APPLICABLE DOCUMENTS

2.1 The following document, of the issue in effect on date of invitation for bids or request for proposals, forms a part of this specification to the extent specified herein:

Specification

Military

MIL-S-3151 Sound-Level Measuring and Analyzing Equipment

(Copies of documents required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

AMERICAN NATIONAL STANDARDS INSTITUTE, INCORPORATED

S1.1 Acoustical Terminology (Including Mechanical Shock and Vibration)
S1.2 Physical Measurement of Sound, Method for

FSC 15.00

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- 31.4 General-Purpose Sound Level Meters, Specification for
- 31.6 Preferred Frequencies and Band Numbers for Acoustical Measurements
- S1.10 Calibration of Microphones, Method for
- S1.11 Octave, Half-Octave, and Third-Octave Band Filter Sets, Specification for

(Application for copies should be addressed to the American National Standards Institute, Incorporated, 1430 Broadway, New York, New York 10018.)

3. Requirements

3.1 Sound pressure levels and exposure limits. Octave band sound pressure levels and exposure limits for any part of the aircraft occupied by the crew or passengers shall not exceed the values shown on figures 1 and 2 during any one mission. Aircraft design conditions (altitudes, ranges, speeds, et cetera) for each mission shall be as specified in the detail specification. Selection of the appropriate curve will depend upon the duration of exposure and use or nonuse of personnel ear protection. Figures 1 and 3 specify the spectra and duration limits for the unprotected ear. Figure 2 specifies the spectra and duration limits for the ear protected by standard-issue crew-member headgear where communication by electronic means is necessary.

3.1.1 Levels for special mission aircraft. Sound pressure levels other than those shown on figures 1 and 2, such as allowable levels for special mission aircraft and/or gunfire environment, shall be as specified in the detail specification. For example, the NCA-70 db curve shown on figure 3 applies to an airborne command post which requires ambient sound pressure levels that permit intelligible direct speech communication between crew members or passengers for extended periods of time.

3.2 Pure-tone or narrow-band noise. If interior noise environment contains pure-tone or narrow-band components as defined in 6.3.4, the requirements of figures 1 and 2 shall be lowered by 5 db.

4. QUALITY ASSURANCE PROVISIONS

4.1 Test equipment. Measurements shall be made and analyzed with sound-level equipment demonstrated to be in accordance with the performance requirements of MIL-S-3151 or ANSI Standards S1.1, S1.2, S1.4, S1.6, S1.10, and S1.11, as applicable.

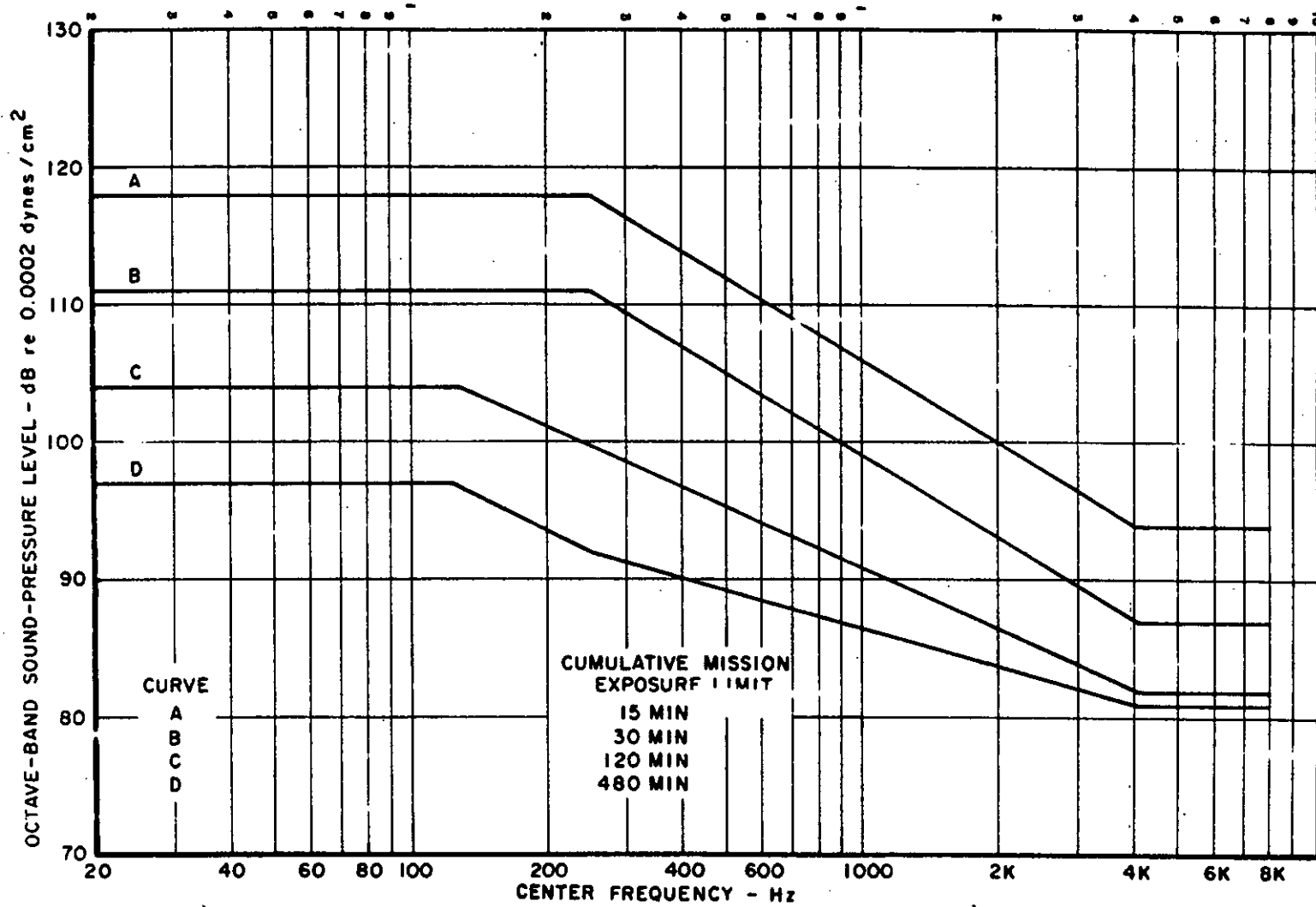


Figure 1. Sound-Pressure Levels at Personnel Locations (No Protection)

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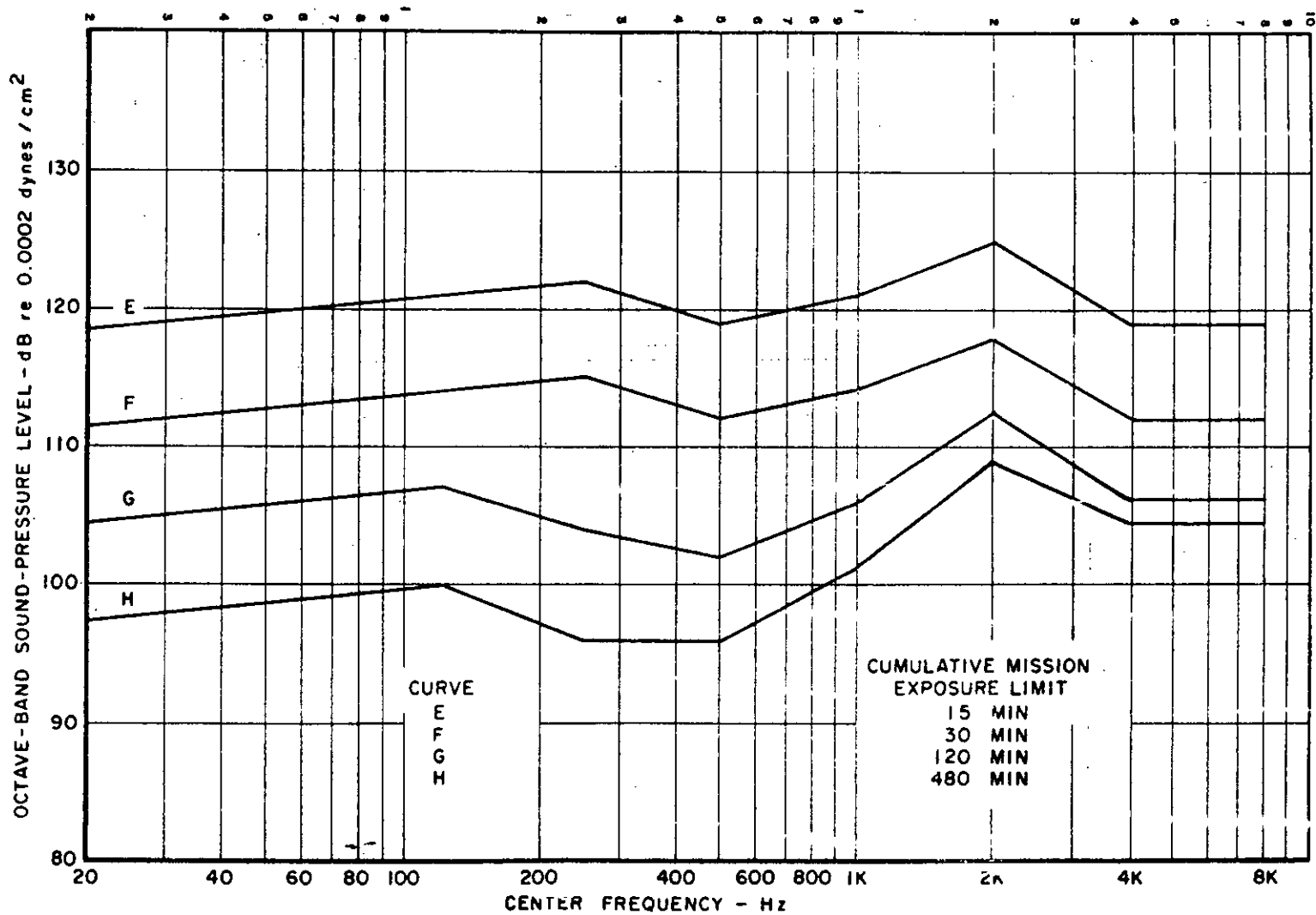


Figure 2. Sound-Pressure Levels at Personnel Locations (Using Standard-Issue Crew-member Headgear)

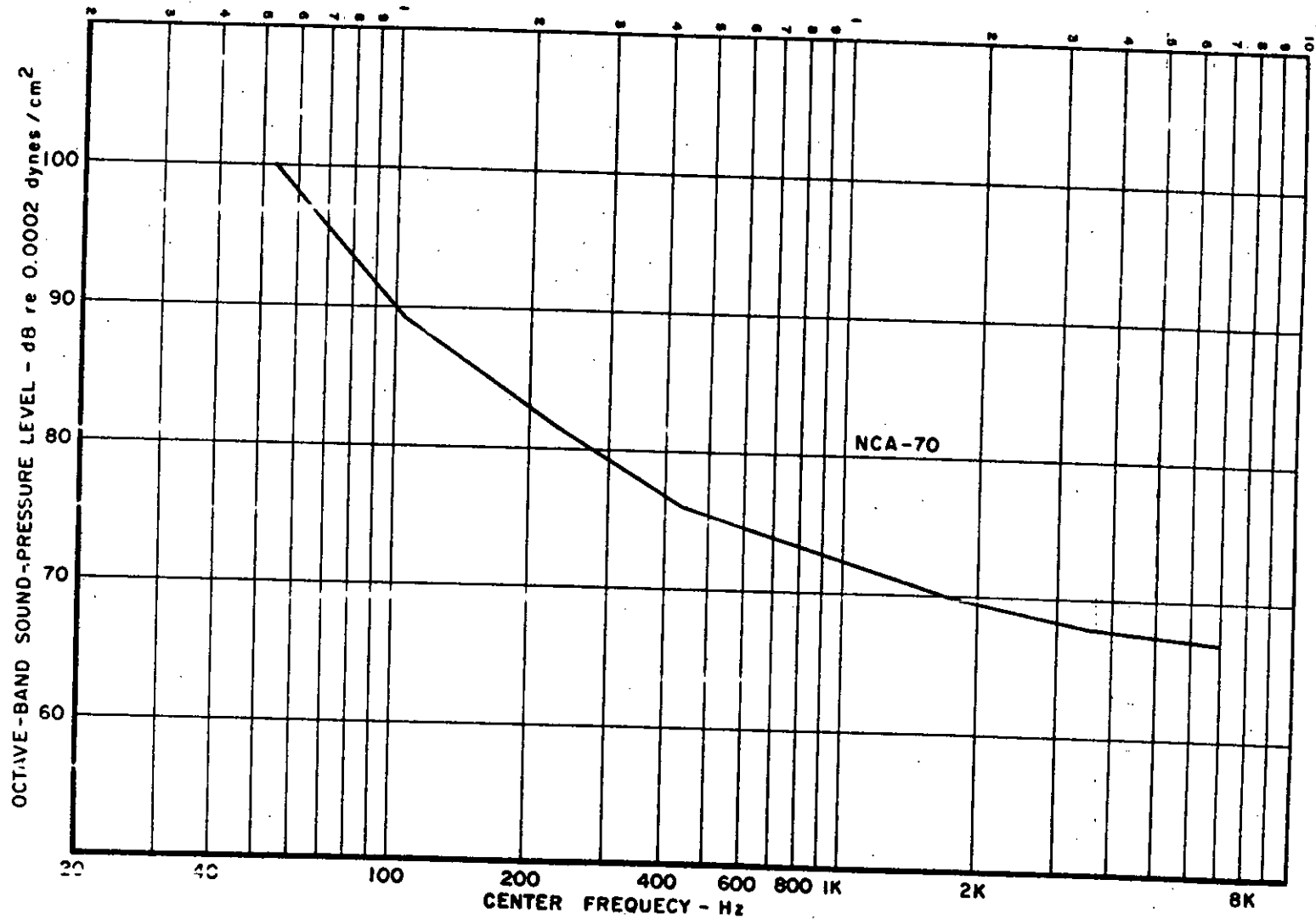


Figure 3. Sound-Pressure Levels at Personnel Locations (No Protection-Special-Mission, Aircraft)

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4.2 Reports. When required (see 6.2), the contractor shall prepare engineering reports which shall include the following:

a. Engineering acoustic analysis

(1) Engineering estimates of the sound pressure levels which may develop inside the aircraft and the basic (pertinent structural data, tests, calculations, et cetera) for such estimates

(2) Estimates of measurements of sound pressure levels generated by auxiliary systems.

b. Acoustic flight-test plan

c. Flight-test sound pressure level report (prepared after completion of tests)

(1) Brief description of the sound-level measuring equipment used including system calibration

(2) Location of microphones

(3) Recorded data in tabular or graphical form and test conditions under which the recordings were made

(4) Brief description of the sound-control measures used in the test aircraft.

4.3 Tests

4.3.1 Sound pressure level measurements. Sound pressure level measurements shall be made on the first completely furnished aircraft. During production, if any acoustically significant modifications to the aircraft configuration are made, additional acoustical measurements shall be made on the first modified aircraft.

4.3.2 Flight conditions. Sound pressure level measurements shall be made with the aircraft at operational conditions specified in the detail specification which shall include takeoff, high-speed cruise, long-range cruise, loiter (if applicable), and any other condition which may be peculiar to a particular aircraft system. All auxiliary systems normally used for each designated operational condition shall be operated.

4.3.3 Measurement locations. Measurements shall be made at the head levels of all crew stations and at a representative number of passenger stations. The stations selected for measurements and microphone location and orientation shall

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be subject to the approval of the procuring activity. The following shall be noted in the measurement report:

- a. Whether any particular measurement station was occupied or vacant and the coordinates of all measurement stations so that they can be located on an inboard profile and/or plan view of the aircraft.
- b. Where an occupant may have freedom of movement in the general area of a particular measurement station, maximum, minimum and average noise levels in the area shall be reported; however contractual compliance shall be based on the arithmetic average levels specified in 6.3.2.
- c. Where time variations in noise level may be significant, for example, beats in a propeller-driven aircraft, data shall be obtained for a period of time sufficient to permit sampling of minimum and maximum levels; however, contractual compliance shall be based on the arithmetic average levels specified in 6.3.2.

5. PREPARATION FOR DELIVERY

5.1 Section 5 is not applicable to this specification.

6. NOTES

6.1 Intended use. This specification is intended for use in defining and substantiating sound pressure levels in crew and passenger compartments of aircraft.

6.2 Reports. When specified on DD form 1423, the data covered in 4.2 will be submitted as identified on a numbered DD form 1664.

6.3 Definitions.

6.3.1 Sound pressure level. The sound pressure level in decibels is defined as $20\log_{10}(p/p_0)$ where p is the measured rms sound pressure and p_0 is the referenced pressure, 0.0002 dyne/cm².

6.3.2 Reported sound pressure level. The sound pressure level to be reported is the arithmetic average of the measured minimum and maximum levels provided the difference between the average and maximum is 3 dB or less. If this difference is greater than 3 dB, the level to be reported shall be obtained by subtracting 3 dB from the maximum level.

6.3.3 Auxiliary systems. An auxiliary system is any mechanism or structure other than the airframe, power plant, or armament which performs a function at some time during the operation of the aircraft for a period exceeding 2 minutes, e.g., heating and ventilation, pressurization, defrost and defog, inverters, pumps, auxiliary power unit (APU), et cetera.

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6.3.4 Pure tone or narrow band. If the sound pressure level of any one-third octave band exceeds the level in the adjacent one-third octave bands by 5 dB or more, that band and associated octave band shall be considered to contain pure tone or narrow band components.

6.3.5 Personnel ear protection. Personnel ear protection consists of standard issue helmet, earplugs, or earmuffs.

6.3.6 Special mission aircraft. Special mission aircraft include Anti-Submarine Warfare (ASW), Aircraft Early Warning (AEW), Airborne Command and Control, Electronic Countermeasures (ECM), et cetera.

6.4 The sound pressure levels in this specification were developed with consideration to hearing damage and speech communications.

Custodian:
Air Force - 11

Preparing activity:
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