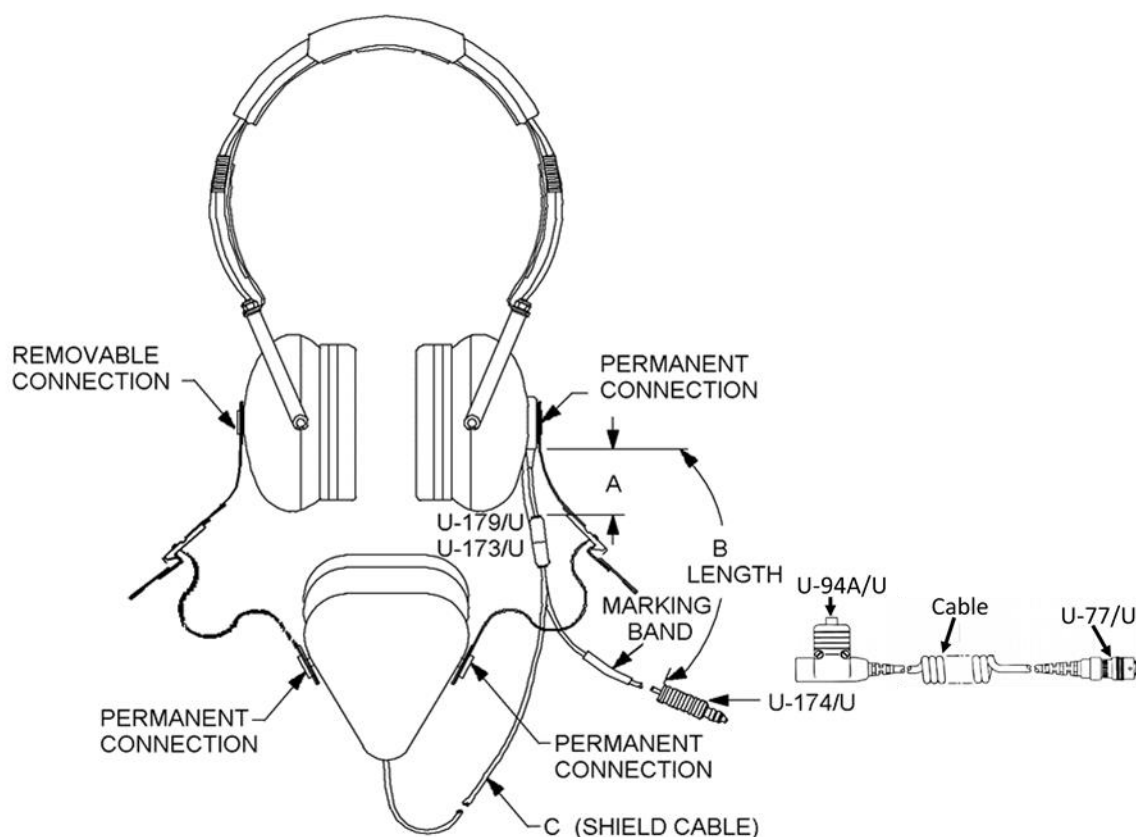


PERFORMANCE SPECIFICATIONS SHEET

HEADSET-MICROPHONE, HEARING PROTECTIVE TYPE HIGH AMBIENT NOISE LEVELS, F-35 FLIGHT DECK M87819/8

This specification is approved for use by all
Departments and Agencies of the Department of Defense.

The requirements for acquiring the product described herein shall consist of this
specification sheet and MIL-PRF-87819.



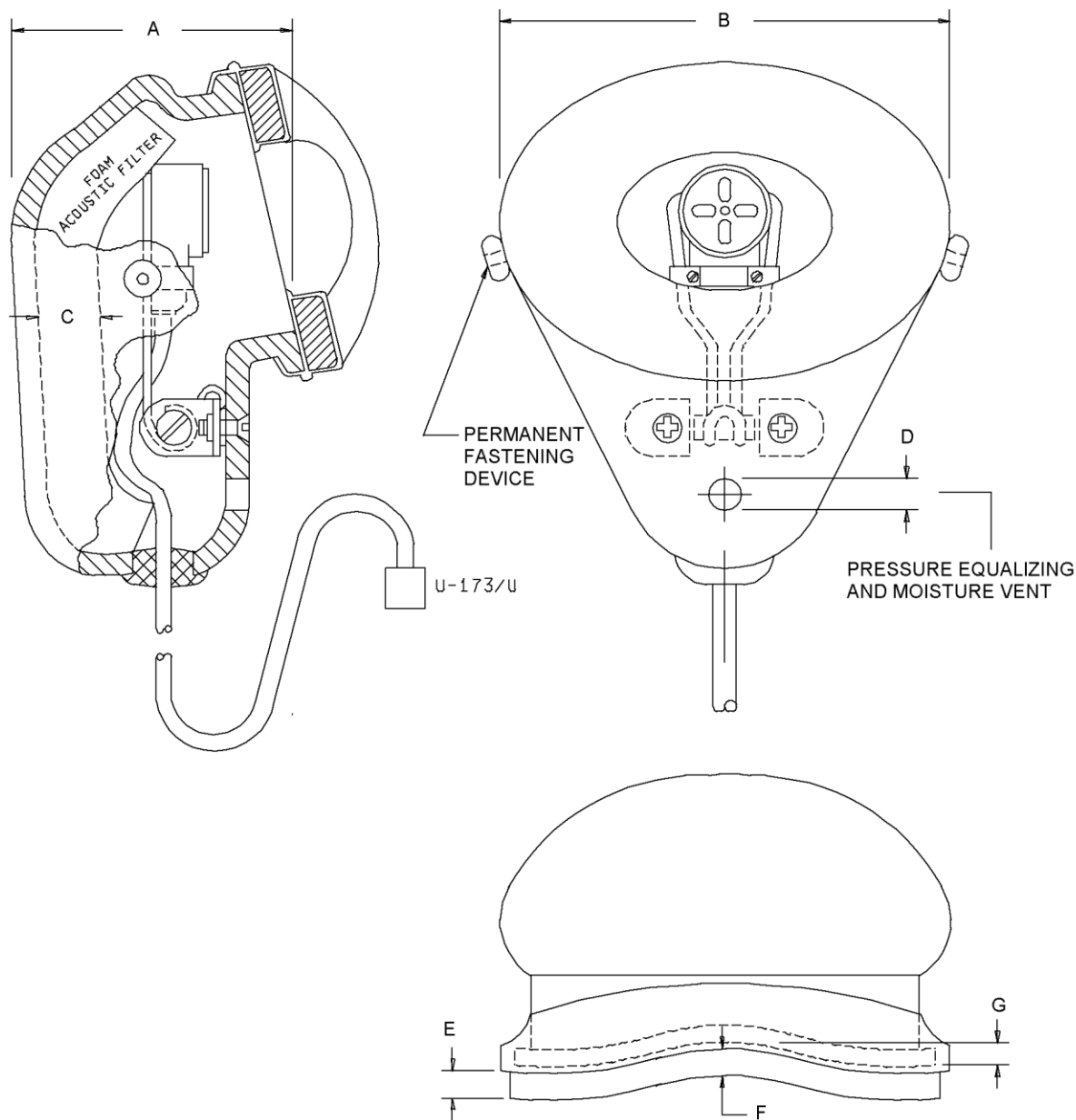
Letter	Inches		mm	
	Design dimension	Tolerances	Design dimension	Tolerances
A	1.50	+0.5 – 0.00	38.1	+12.7 – 0.0
B	28.5	±2.0	732.9	±50.8
C	12.0	±0.5	304.8	±12.7

FIGURE 1. Headset-microphone assembly M87819/8.



NOTES:

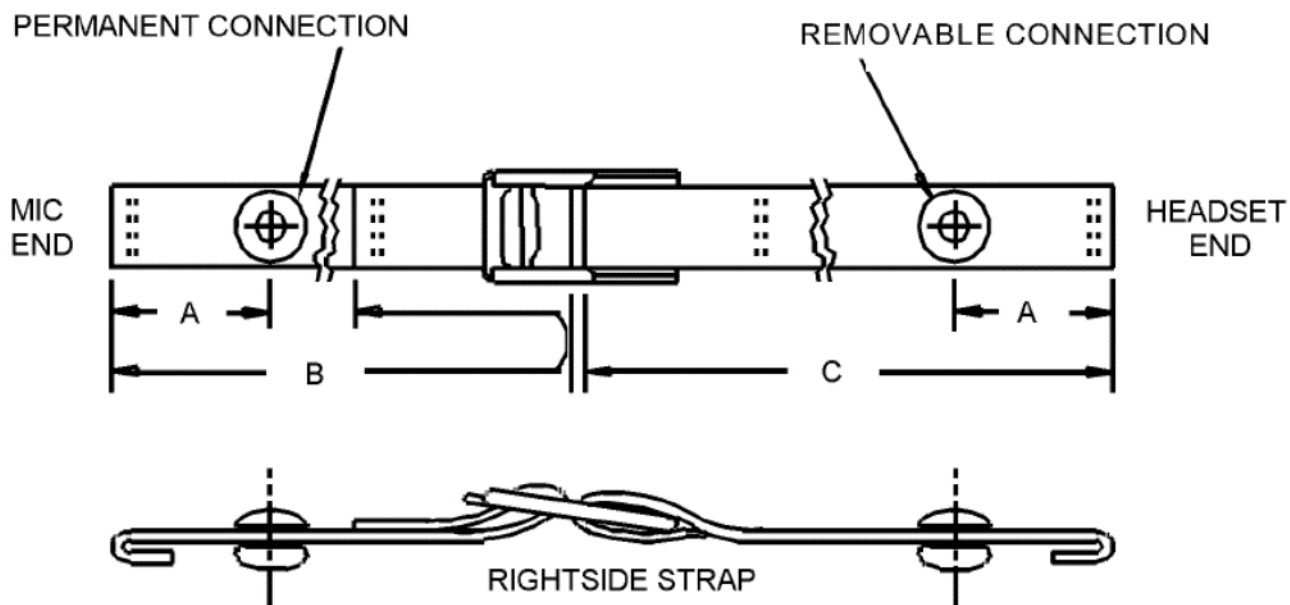
1. The "A" cord, and Part or Identifying Number (PIN) U-179A/U plug shall provide interface to emergency oxygen mask connectors.
2. The "B" cord shall provide walk-around freedom, when used with flight line or shop extender cables.
3. The "C" (shield) cord shall allow the shield to dangle at an accessible, yet unencumbering, position.
4. Dimensions are in inches. Unless otherwise specified, tolerance is ± 0.015 inch. Metric equivalents are given for information only.
5. See Requirements for cable (between PIN U-94A/U and PIN U-77/U) requirements.

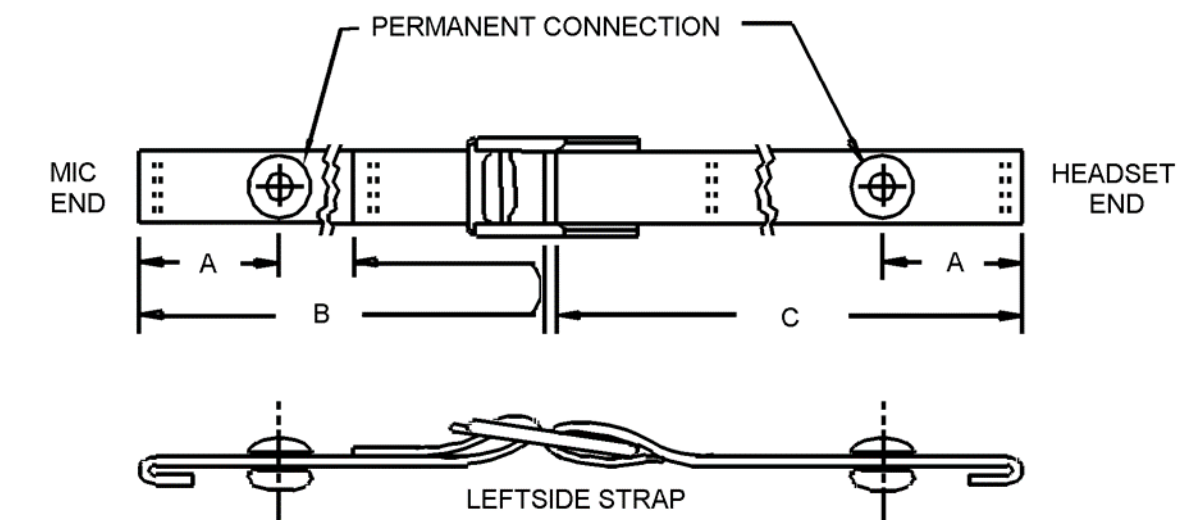
FIGURE 1. Headset-microphone assembly M87819/8 – Continued.FIGURE 2. Microphone protective shield assembly.

Letter	Inches		mm	
	Design dimension	Tolerances	Design dimension	Tolerances
A	2.300	± 0.015	58.42	$+12.7 - 0.0$
B	3.700	± 0.015	93.98	± 0.381
C	0.500	± 0.015	12.7	± 0.381
D	0.250	± 0.015	6.35	± 0.381
E	0.600	± 0.015	15.24	± 0.381

NOTES:

1. Dimensions are in inches. Unless otherwise specified, tolerance is ± 0.015 inch. Metric equivalents are given for information only.
2. All shield and shield-cushion dimensions shall enable the part to provide comfortable wear and acoustic noise-protection under the temperature, work-shift, and noise-conditions encountered, and when used by a user with a standard jaw size (50th percentile, male aviator).
3. Foam acoustic filler shall be provided as specified (see Requirements).
4. Mounting method for microphone shall conform to Requirements, mounting shown. Optional mounting of microphone protective shield on flexible boom not shown.

FIGURE 2. Microphone protective shield assembly – Continued.FIGURE 3. Microphone strap assembly, typical configuration.

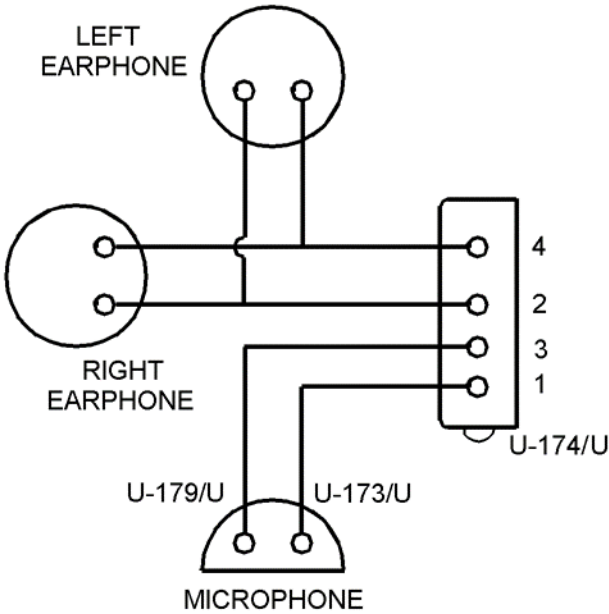
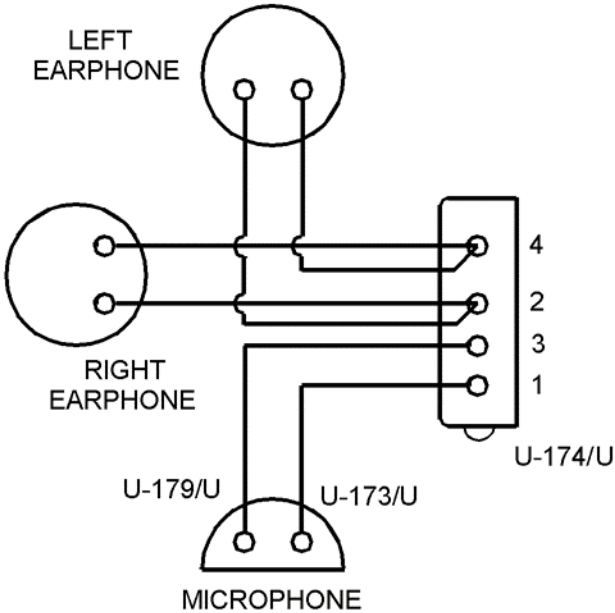


Letter	Inches		mm	
	Design dimension	Tolerances	Design dimension	Tolerances
A	1.0	± 0.125	25.4	± 0.381
B	7.3	± 0.25	185.42	± 12.7
C	3.5	± 0.25	88.9	± 6.35

NOTES:

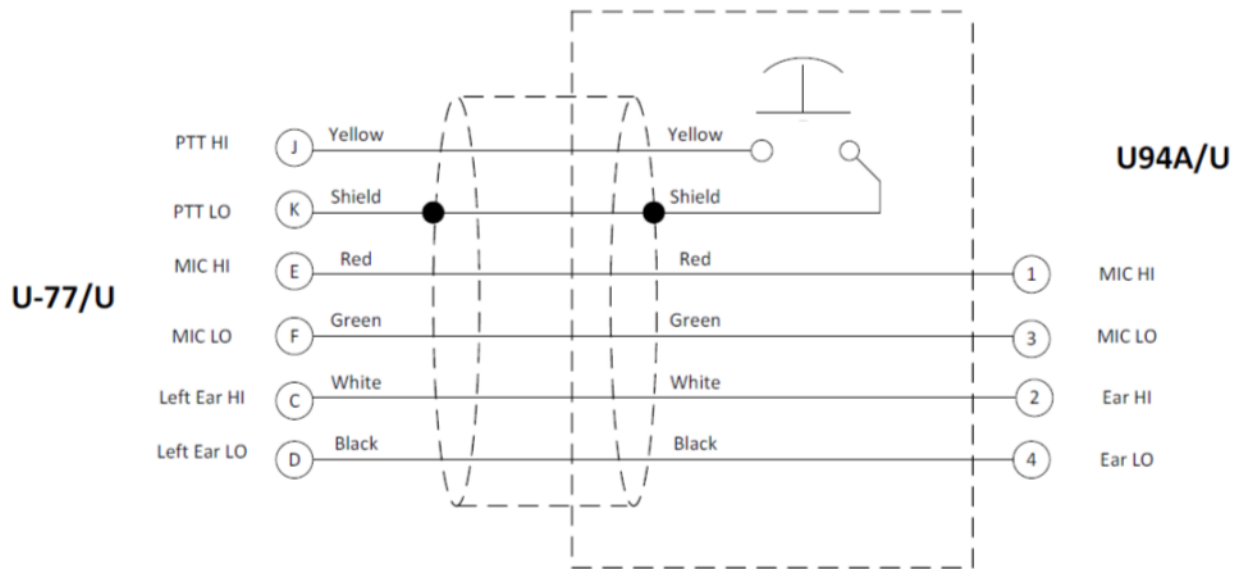
1. Dimensions are in inches. Unless otherwise specified, tolerance is ± 0.125 inch. Metric equivalents are given for information only.
2. Strap dimensions "A". (1.0 inch) shall enable the strap to retain the adjacent connectors under the stress-and-pull conditions encountered, without adding material, which may entangle during use.
3. Major strap dimensions "B" and "C" (7.3 inches, 3.5 inches) shall allow the straps to support the weight of the protective shield when fully extended, while providing sufficient material to allow adjustment of the shield tightly against the standard user head and jaw size when fully tightened.
4. Strap color, material, and connector types shall conform to the requirements of this specification.
5. Optional mounting of microphone protective shield on flexible boom precludes strap requirements.

FIGURE 3. Microphone strap assembly, typical configuration – Continued.



NOTE: Both 4 wire and 6 wire configurations are acceptable provided EMI requirements are met.

FIGURE 4. Wiring diagram.

FIGURE 5. F-35 aircraft to maintainer headset cable wiring diagram.**REQUIREMENTS:**

Design and construction:

Configurations: See figures 1, 2, 3, 4, and 5.

Headband pressure: Headband pressure shall be sufficient to meet the noise attenuation requirements of this specification, without compromising comfort, not to exceed 3.5 pounds.

E3, EMC, and EMI: Testing requirements imposed by MIL-STD-461 for surface ship operation of communications equipment. The test conditions shall not degrade the signal to noise ratio of the signal at the ear or the outgoing microphone signal more than ± 6 dB. The relevant MIL-STD-461 methods for testing of the communication systems identified here include:

Method	Description
CS114	Conducted susceptibility, Bulk cable injection, 10 kHz to 400 MHz, Curve 3 from 10 kHz to 2 MHz and Curve 5 from 2 MHz to 400 MHz
CS115	Conducted susceptibility, Bulk cable injection, Impulse excitation
CS116	Conducted susceptibility, Damped sinusoid transients, 10 kHz to 100 MHz, I _{max} = 10 Amperes
RE102	Radiated emissions, Electric Field, 10 kHz to 18 GHz, Fixed Wing External and Helos Curve (highest internally generated frequency is less than 200 MHz – RE102 maximum test frequency is 2 GHz)
RS103	Radiated Susceptibility, 2 MHz to 18 GHz, at 200V/m
ESD	DO-160 Section 23 - 15 kV Fat Finger Method

For all listed E3, EMC, and EMI testing, the termination of the F-35 Hearing Protection Device (HPD) Headset will be the jet interface cable assembly connected to a load representing the MIP. This will serve to qualify the F-35 HPD Headset connected to typical radio interfaces by similarity. In accordance with MIL-STD-461 Method RE102, the highest frequency tested for RE102 shall be 2 GHz.

The communications input (simulating radio and jet communication signals) will be a 250 Hz continuous signal. The signal will be delivered to the headset. In addition, a sound tube will deliver a 400 Hz signal acoustically to the communication microphone. That signal will be sent on the outgoing communication channel and also to the sidetone delivered to the headset. The headset output will be monitored at the eardrum location through an ear canal simulator using a non-susceptible optical microphone (Optoacoustics FOM Optimic 1140); that signal will contain the incoming communications and the sidetone, a combined 250 Hz and 400 Hz signal. The outgoing communications line will contain the 400 Hz microphone signal and will be separately monitored.

The data acquisition system will continuously monitor the channels associated with each data point with an interference frequency. The absolute amplitude of the 400 Hz signal and the 250 Hz signal will be continuously monitored and recorded throughout the test exposure. If the signals deviate by more than ± 6 dB from the baseline during the test trial, it is an indication of a susceptibility at that frequency that shall require resolution.

Microphone protective shield assembly:

- | | |
|--------------------|---|
| Microphone: | Microphone shall be PIN M-101/AIC, as specified in MIL-PRF-26542/4 (1 required), or a microphone providing equal or superior acoustic, environmental, altitude-capable and noise-canceling performance. The microphone shall be securely attached to the protective shield in a manner which prevents motion during use, as well as removal during routine headset maintenance (see figure 2). |
| Protective shield: | The microphone protective shield shall be provided, as specified on figure 2. Dimensions related to interface with the shield cushion shall be provided as shown (see Cushion). Other dimensions may vary to the extent that they provide superior performance with respect to human interface (hand grasp, 50 th percentile male aviator), shock (drop), noise exclusion, and acoustical compatibility with the microphone element. Cord dimension shall be as shown. |
| Color: | Color of the shield shall be the same as the earcups, for consistency. |
| Filler: | The shield shall be designed to reduce acoustic echoes within the shell. The filler material shall be flame-retardant, and meet or exceed the performance requirements of MIL-PRF-87819. |
| Cushion: | The microphone protective shield cushion shall be in accordance with U.S. Air Force drawing 66B853, for human interface (comfort) under the temperature, work-shift, and noise-conditions encountered in flight-line and shop (engine-test) applications. The color shall be black. |

Microphone strap assembly:

The microphone shield shall be secured to the earcups by two different strap assemblies, as specified on figure 1 and figure 3 or by an optional flexible boom.

Straps: The straps shall conform to the dimensions on figure 3, to enable it to support the dangling microphone shield (when fully extended), as well as enable full adjustment of the microphone shield to the user (when fully tightened). The strap material shall provide high-strength, flame-retardant, fungus-resistant, and slip-resistant performance under the environmental conditions specified. Color shall provide low-contrast with operational clothing and gear.

Buckles: The strap assembly sections shall be joined by a mechanism, which allows the protective shield to be easily adjusted without allowing slippage during use. It shall not damage the strap material. Color shall provide low-contrast with operational clothing and gear. Not required with the optional flexible boom.

Removable connection:

The 1 (one) removable connection shall prevent inadvertent detachment during use. Not required with the optional flexible boom.

Permanent connection:

The 3 (three) permanent connections shall prevent inadvertent detachment of the microphone shield assembly, when not in use. Only one permanent connection is required when using the optional flexible boom.

Earphone element: The earphone element shall be PIN H-143/AIC, as specified in MIL-PRF-25670/2, (2 required), or an electrically compatible part having equivalent or superior noise-canceling, environmental, and voice-band frequency response at ground level and altitude, meeting established United States Air Force hazardous noise exposure standards.

Earcup filler clearance:

Fillers shall allow clearance of at least 0.500 inch from the uncompressed face of the ear cushion.

Wiring diagram: Wiring shall be as specified on figures 4 and 5, for consistency with repair procedures.

Cable and cord assemblies:

The cable between PIN U-77/U and PIN U-94A/U shall be a five conductor WM-53/U cord, as specified in MIL-DTL-5898, with the exception that the conductors can be copper instead of cadmium copper. The four conductor cable and the five conductor cable shall have the same outside diameter. The length shall be as needed.

Connectors: Connectors shall be a PIN U-179A/U type or equivalent as approved by qualifying activity; PIN U-174/U as specified on MIL-DTL-9177/2, and PIN U-173/U as specified on U.S. Air Force drawing (CAGE 97151) 57B12662, or electrically and mechanically compatible parts, as approved by the qualifying activity. See figure 1 and figure 4. PIN U-77/U shall be as specified in MIL-C-10544. PIN U-94A/U shall meet requirements of MIL-DTL-9177/5 (PIN MIL-DTL-9177/5-1) or electrically and mechanically compatible parts. See figure 1 and figure 5.

Weight: The weight shall be sufficient to meet the attenuation requirements of this specification, without compromising comfort, not to exceed 1.75 pounds.

PIN: M87819/8-01

Performance characteristics:
See tables 1-4, and MIL-PRF-87819.

Attenuation: Testing for attenuation shall be in accordance with ANSI S12.6 and ANSI S12.42 as specified in MIL-PRF-87819, with the exception that table I (specified herein) shall be used for attenuation values. Achieving required mean minus two standard deviation attenuation values may require the use of an earplug in a combination hearing protection configuration. If an earplug is required to meet the attenuation requirement, the same configuration shall be used to demonstrate compliance with the speech intelligibility requirement.

TABLE I. Total attenuation values in accordance with MIL-STD-1474.

Octave Band Frequency (Hz)	Noise Attenuation,
	Mean-2SD (dB)
125	27
250	37
500	46
1000	46
2000	37
4000	39
8000	34

Speech intelligibility: Testing for speech intelligibility shall be in accordance with ANSI S3.2 with the noise values as specified in tables II and III. Achieving required speech intelligibility may require the use of communications and/or active noise reduction earplugs in a combination hearing protection configuration. If an earplug is required to meet the speech intelligibility requirement, the same configuration shall be used to demonstrate compliance with the attenuation requirement. Table III augments table II for operating environments that exceed an overall sound pressure level of 115 dB.

TABLE II. Speech intelligibility requirements for operating environments ≤ 115 dB in accordance with MIL-STD-1474.

Overall Sound Pressure Level (dB)	Speech Intelligibility Score, Mean (%)
75	95
95	90
105	85
115	80

TABLE III. Speech intelligibility requirements per operating environment > 115 dB.

Operating Environment	Talker Overall Sound Pressure Level (dB)	Listener Overall Sound Pressure Level (dB)	Speech Intelligibility Score, Mean (%)
Flight Deck	Quiet	120	90 ^{1/}
Flight Deck	Quiet	130	85 ^{1/}
Flight Deck	Quiet	140	70
Flight Deck	120	140	70
Flight Deck	130	140	70

1/ A score of 80% or better would be considered acceptable in accordance with MIL-STD-1474.

Cold-environment shock test:

The microphone protective shield shall resist damage and separation of components, when exposed to typical bumping and dropping in arctic environments. After cooling the headset to -70°F for 30 minutes, it shall be transferred within 2 (two) minutes to an ambient room temperature location and immediately dropped 3 (three) times onto a hard surface (concrete or tile) from a height of 4 (four) feet, striking first on the microphone shield. Measure distance up to the bottom of the microphone shield. This procedure shall be repeated for a total of 2 (two) cooling/dropping cycles. Following the test, the product shall meet the visual and mechanical inspection and acoustic quality requirements of MIL-PRF-87819, as well as the following talk-out test in Subgroup 1 of table IV. Connect the headset to equipment necessary to allow the microphone to transmit through the earphone elements. Verify that voice input to the microphone transmits clearly through the earphone elements, free of degradation due to the dropping.

Supersession data:

Headset-microphone PIN M87819/8-01 supersedes headset-microphone PIN H-133/AIC.

TABLE IV. Performance characteristics.

Inspection ^{1/}	Qualification test	Group A	Group B	Group C
Subgroup 1				
Visual and mechanical	X	X		X
Acoustic quality	X	X		X
Attenuation (Qualification)	X			
Attenuation (Conformance)				X
Speech intelligibility	X			
Headset system sensitivity	X			X
Subgroup 2				
Headband pressure	X		X	
Headband flexing	X			X
Twist and pull	X			X
Shock (drop)	X			X
Fungus	X			
Vibration	X			X
Temperature	X			X
Subgroup 3				
Temperature shock	X			X
Humidity	X			X
Salt fog	X			X
Cold-environment shock ^{2/}	X			X
Subgroup 4				
Cable isolation	X			X

1/ See MIL-PRF-87819, for inspection details.

2/ The Cold-environment shock test appears only in MIL-PRF-87819/1 (see Requirements).

Intended use. Headset-microphone PIN M87819/8 is a high ambient noise level headset-microphone designed for use by F-35 flight deck personnel to provide communication under the extreme noise conditions encountered in close proximity to F-35 and other fighter, transport, and tanker aircraft engines, on the flight deck, for periods of time required by normal duty work-shifts. The noise-attenuation requirements in this document were developed by Lockheed Martin, with review and concurrence from the F-35 Environmental Safety and Occupational Health team and were documented in the F-35 Joint Contract Specification (JCS).

Referenced documents. In addition to MIL-PRF-87819, this document references the following:

MIL-C-10544
MIL-DTL-5898
MIL-DTL-9177/2
MIL-DTL-9177/5
MIL-PRF-25670/2
MIL-PRF-26542/4
MIL-PRF-87819/1
MIL-STD-461
MIL-STD-1474
57B12662
66B853
ANSI/ASA S3.2
ANSI/ASA S12.6
ANSI/ASA S12.42

CONCLUDING MATERIAL

Custodians:
Air Force - 85
DLA – CC

Preparing activity:
DLA – CC

(Project 5965-2020-008)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil>.