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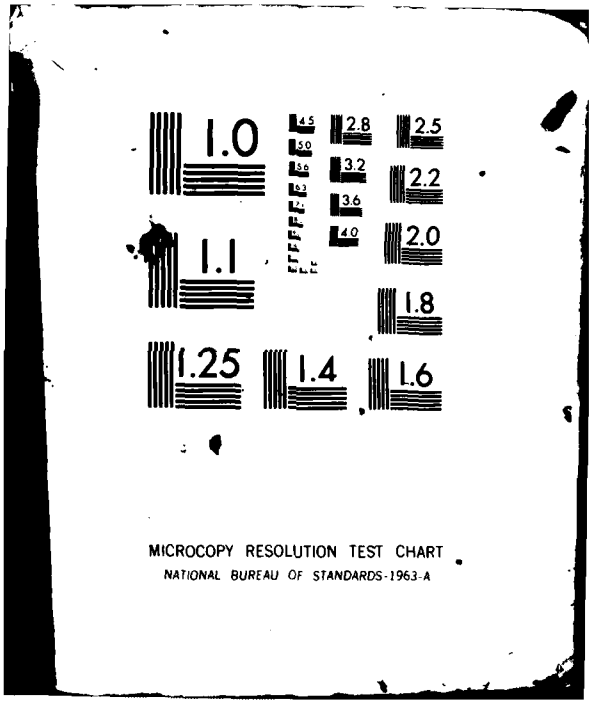
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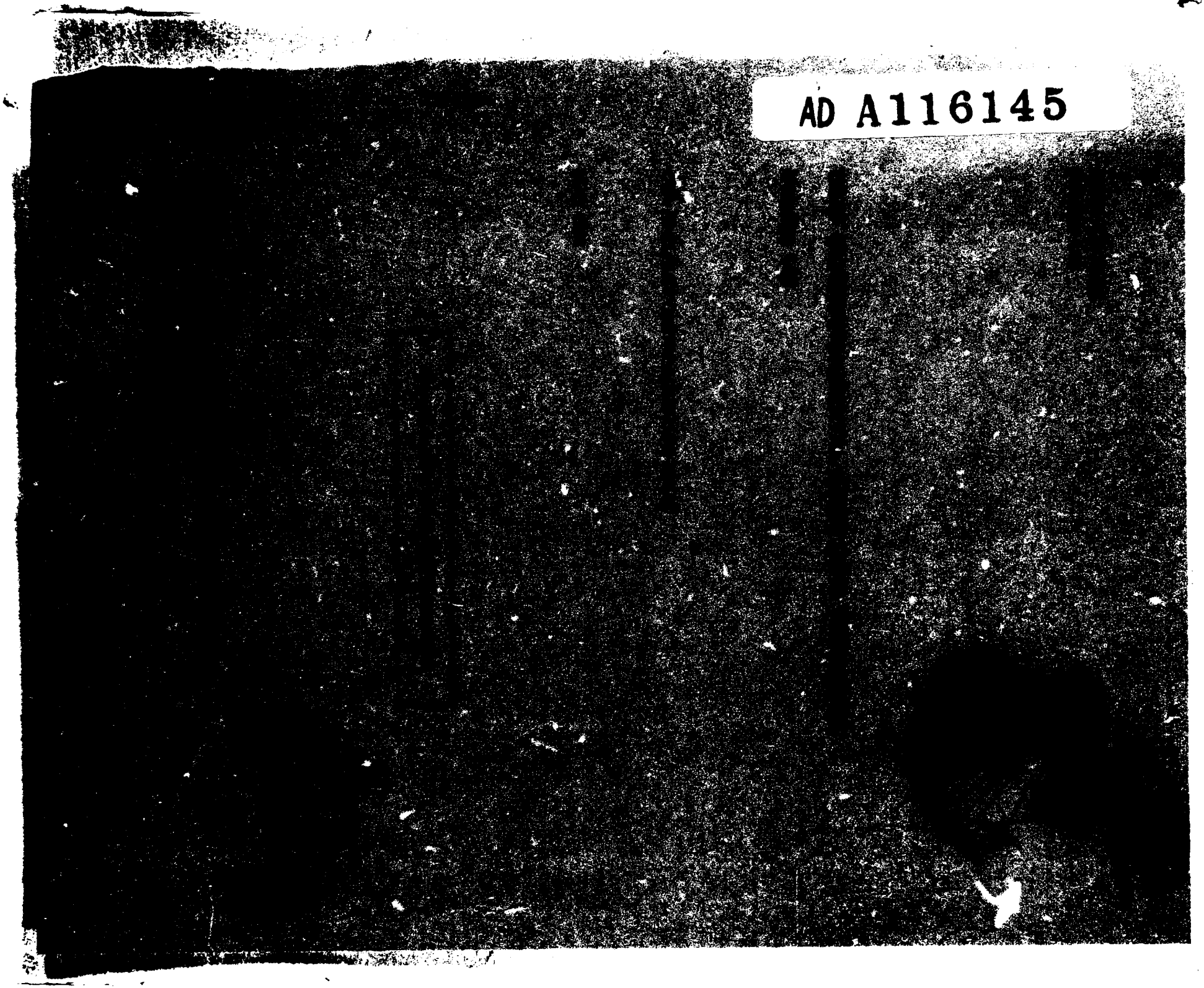

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The C-9A is a McDonnell Douglas DC-9 series 30 commercial transport modified to perform aeromedical evacuation missions. This report provides measured data defining the bioacoustic environments at flight crew/passenger locations inside this aircraft during normal flight operations. Data are reported for 56 locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and

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limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Refer to Volume 1 of this handbook, "USAF Bioenvironmental Noise Data Handbook, Vol. 1: Organization, Content and Application," AMRL-TR-75-50(1) 1975, for discussion of the objective and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc.

PREFACE

This report was prepared by the Biodynamic Environment Branch, Air Force Aerospace Medical Research Laboratory, under Project/Task 723108, Crew Safety In Operational Noise Environments.

The author gratefully acknowledges Mr. John N. Cole who assisted in the preparation of this report, Mr. Henry T. Mohlman and Mr. Fred D. Lampley of the University of Dayton for their assistance in the mechanics of data processing, and Mrs. Norma J. Peachey who typed and prepared the graphics.

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INTRODUCTION

The C-9A aircraft is a McDonnell Douglas DC-9 series 30 commercial transport modified to perform aeromedical evacuation missions. Power is provided by two Pratt and Whitney JT8D-9 turbofan engines rated at 14,500 lbs. thrust.

This volume provides measured data defining the bioacoustic environments produced inside this aircraft. Such data are essential to evaluate ear protection requirements, limiting personnel exposure times, voice communication capabilities, and annoyance problems associated with operations of the C-9A aircraft.

This volume is one of a series published by the Air Force Aerospace Medical Research Laboratory (AFAMRL) under the same report number (AMRL-TR-75-50) as a multi-volume handbook that quantifies the noise environments produced at flight/ground crew locations and in surrounding communities by operations of Air Force aircraft and ground support equipment. The far-field, community-type, noise data in the handbook describe the noise produced during ground operations of aircraft, ground support equipment, and other ground-based equipment or facilities.

Volume 1 of this handbook discusses the objectives and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc. *Refer to Volume 1* (reference 1) for such information because it is not repeated in other handbook volumes.

A cumulative index lists those aerospace systems contained in the handbook, and identifies the specific volumes containing each type of environmental noise data available (i.e., in-flight/flight crew and passenger noise, near-field/ground crew noise, far-field community noise). Volume numbers are assigned sequentially as individual volumes are published. This index is periodically updated as individual volumes are published, and is available upon request from AFAMRL/BBE, Wright-Patterson AFB, OH 45433. Organizations on the distribution list for the handbook will automatically receive a copy of the updated index as it is generated.

Direct any questions concerning the technical data in this report and other handbook volumes to: AFAMRL/BBE, Wright-Patterson AFB, OH 45433; Autovon 78-53675 or 78-53664; Commercial (513) 255-3675 or (513) 255-3664.

1. Cole, John N., *USAF Bioenvironmental Noise Data Handbook, Volume 1: Organization, Content and Application*, AMRL-TR-75-50 (1), Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio, 1975.

IN-FLIGHT NOISE

MEASUREMENTS

All noise measurements were made on-board a standard-configured aircraft during typical speed, altitude, and flight maneuver conditions. These levels describe the standard environments, but may not be representative of those levels encountered if the aircraft has been configured differently (e.g., major equipemnt or structural changes).

Acoustic measurements were made at various flight crew and passenger locations. Table 1 lists the measurement locations and test conditions as numeric/alphabetic designators which are used on the data pages. The designator 1/A means measurement location 1 and test condition A.

The microphone position was at ear level external to headgear in a region 0.2-0.3 meters from the head when an individual was present. At unoccupied locations, measurements were made at ear level throughout a volume where the head would normally be located. In both cases, the microphone was randomly moved throughout a spherical volume where the head would normally be located. In both cases, the microphone was randomly moved throughout a spherical volume approximately 0.3 meter in diameter and the resultant samples analyzed using a 4- or 8-second integration time to obtain a power-averaged level that effectively smooths out short-duration fluctuations and best describes the exposure.

Although the presence of crew member or passenger at a measurement location affects the resultant sound field, the magnitude of such effects is generally small and not significant in determining exposure limits or voice communication capabilities. Consequently, no distinction is made in this report between occupied and unoccupied measurement locations.

RESULTS

The measured data presented in Table 2 define the sound pressure levels (SPL) produced inside the C-9A aircraft at the 56 specified locations. This table includes the overall octave band levels. From these data, C-weighted and A-weighted sound levels, maximum permissible time for one exposure per day (AFR 161-35) with and without standard Air Force ear protectors, preferred speech interference level, and perceived noise level are calculated and presented in Table 3. These variety of measures are widely used to assess the effects of noise on personnel and their performance.

TABLE 1
MEASUREMENT LOCATIONS AND TEST CONDITIONS

C-9A, Travis AFB, 24 Sep 1981
Tail #10877

Location	Position	Height Above Deck
1	Pilot	Seated Head Level
2	Copilot	Seated Head Level
3	Flight Mechanic	Seated Head Level
4	Additional Crewmember	Seated Head Level
5	Flight Nurse	Seated Head Level
6	Medical Crew Director	Seated Head Level
7	Second Medical Technician	Seated Head Level
8	Third Medical Technician	Seated Head Level
9	Charge Medical Technician	Seated Head Level
10	Medical Sink Area	1.5m
11	Aft Pantry Area	1.5m
12	Forward Pantry Area	1.5m
13	Aft Lavatory	Seated Head Level
14	Aft Lavatory	1.5m
15	Row 1 Left Window Seat	Seated Head Level
16	Row 1 Left Aisle Seat	Seated Head Level
17	Row 1 Right Aisle Seat	Seated Head Level
18	Row 1 Right Window Seat	Seated Head Level
19	Row 1 Centerline	1.5m
20	Row 2 Left Window Seat	Seated Head Level
21	Row 2 Left Aisle Seat	Seated Head Level
22	Row 2 Right Aisle Seat	Seated Head Level
23	Row 2 Right Window Seat	Seated Head Level
24	Row 2 Centerline	1.5m
25	Row 3 Left Window Seat	Seated Head Level
26	Row 3 Left Aisle Seat	Seated Head Level
27	Row 3 Right Aisle Seat	Seated Head Level
28	Row 3 Right Window Seat	Seated Head Level
29	Row 3 Centerline	1.5m
30	Row 4 Left Window Seat	Seated Head Level
31	Row 4 Left Aisle Seat	Seated Head Level
32	Row 4 Right Aisle Seat	Seated Head Level
33	Row 4 Right Window Seat	Seated Head Level
34	Row 4 Centerline	1.5m
35	Row 5 Left Window Seat	Seated Head Level
36	Row 5 Left Aisle Seat	Seated Head Level
37	Row 5 Right Aisle Seat	Seated Head Level
38	Row 5 Right Window Seat	Seated Head Level
39	Row 5 Centerline	1.5m

TABLE 1 (Continued)

Location	Position	Height Above Deck
40	Row 6 Left Window Seat	Seated Head Level
41	Row 6 Left Aisle Seat	Seated Head Level
42	Row 6 Centerline	1.5m
43	Row 7 Left Window Seat	Seated Head Level
44	Row 7 Left Aisle Seat	Seated Head Level
45	Row 7 Right Aisle Seat	Seated Head Level
46	Row 7 Right Window Seat	Seated Head Level
47	Row 8 Left Window Seat	Seated Head Level
48	Row 8 Left Aisle Seat	Seated Head Level
49	Row 9 Left Window Seat	Seated Head Level
50	Row 9 Left Aisle Seat	Seated Head Level
51	Aft Right Litter	Supine Head Level (1.2m)
52	Forward Right Litter	Supine Head Level (1.2m)
53	Centerline - Second Medical Technician	1.5m
54	Centerline - Medical Crew Director	1.5m
55	Centerline (Across From Sink)	1.5m
56	Centerline (Across From Forward Lavatory)	1.5m

*Counted from Rear of Aircraft

CONDITION	DESCRIPTION
A	Idle - Both Engines
B	Taxiing
C	Takeoff Roll
D	Climb - Takeoff Power
E	Crusie - 32.0M, .78 Mach, 1.84 EPR, 7.7M Cabin Altitude
F	Descent - 30% Flaps
G	Approach - Full Flaps, Landing Gear Extended
H	Landing Roll - Both Engines Reverse Thrust

TABLE: 2 MEASURED SOUND PRESSURE LEVEL (DB)
1/3 OCTAVE BAND

IDENTIFICATION:
OMEGA 3.2
TEST BP-000-001
RUN 01
25 JAN 82
PAGE F1

NOISE SOURCE/SUBJECT:
C-9A AIRCRAFT
INFLIGHT NOISE LEVELS

OPERATION:

FREQ (HZ)	LOCATION/CONDITION 1/E	2/E	3/E	4/E	5/E	6/E	7/E	8/E	9/B	9/C	9/D	9/E	9/G
25	68	68	66	68	67	68	67	70	80	93	82	73	81
31.5	66	64	66	70	68	67	71	71	79	89	78	73	80
40	65	64	63	65	67	65	70	70	85	87	82	72	81
50	64	64	61	64	71	73	81	82	81	85	80	77	79
63	71	75	71	65	74	77	88	90	76	96	84	82	81
80	63	62	60	60	64	64	73	73	73	85	82	73	79
100	65	65	63	67	63	65	72	77	91	87	87	78	88
125	65	71	63	66	67	65	82	91	94	109	111	91	80
160	61	59	63	61	67	63	75	80	74	96	99	79	83
200	61	60	64	66	67	64	73	80	73	92	92	79	78
250	61	58	65	67	69	68	71	74	72	83	81	76	72
315	63	60	67	68	69	69	72	74	69	80	79	73	73
400	62	61	65	65	69	69	72	72	66	80	81	73	73
500	62	62	64	66	69	70	69	69	67	80	80	74	75
630	62	62	65	68	72	72	72	70	68	79	78	72	70
800	66	66	66	69	73	72	70	70	64	78	76	72	68
1000	66	67	68	71	72	72	70	69	63	76	75	72	68
1250	66	65	68	71	70	69	68	68	63	74	73	70	67
1600	64	63	65	69	68	67	65	65	63	71	71	67	65
2000	63	63	65	69	66	66	63	63	61	70	69	66	64
2500	62	62	64	68	62	62	60	60	59	69	68	67	65
3150	61	62	63	67	60	60	60	59	59	67	66	64	63
4000	59	59	60	63	57	57	58	57	58	68	66	59	63
5000	58	58	58	61	55	55	56	55	57	65	64	59	62
6300	58	60	58	59	53	53	56	55	66	69	66	57	64
8000	59	60	59	60	55	56	61	59	61	67	66	58	73
10000	60	59	59	61	56	58	64	61	59	66	65	60	66
OVERALL	78	80	79	81	82	83	90	94	97	110	112	92	92

LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: 2 MEASURED SOUND PRESSURE LEVEL (DB) 1/3 OCTAVE BAND

IDENTIFICATION:
OMEGA 3.2
TEST BP-000-001
RUN 02
25 JAN 82
PAGE F2

NOISE SOURCE/SUBJECT:
C-9A AIRCRAFT
INFLIGHT NOISE LEVELS

OPERATION:

FREQ (HZ)	LOCATION/CONDITION 9/H	10/E	11/E	12/E	13/E	14/E	15/B	15/C	15/E	15/F	15/G	15/H	16/D
25	88	67	73	69	75	73	76	90	74	86	82	89	78
31.5	90	64	71	69	75	74	73	86	71	82	80	90	76
40	85	65	73	68	78	77	79	87	74	83	84	91	78
50	84	71	76	73	81	81	79	90	82	84	83	91	88
63	91	76	79	78	86	88	82	93	90	86	87	94	87
80	89	62	73	73	75	77	82	87	80	81	89	95	82
100	92	64	81	81	76	80	107	93	89	85	84	93	89
125	97	64	95	95	81	90	106	114	101	97	96	100	111
160	91	61	81	82	81	82	84	101	88	100	99	102	97
200	91	63	82	83	82	82	80	104	90	97	86	97	95
250	93	65	76	78	85	83	78	86	83	82	81	96	83
315	91	66	74	76	75	75	76	82	81	77	77	93	79
400	92	66	74	73	73	74	73	81	77	74	76	94	80
500	92	68	76	76	75	73	68	81	78	77	78	92	79
630	90	70	73	72	71	70	66	76	77	69	75	86	74
800	88	71	73	72	71	71	66	74	75	68	73	93	73
1000	84	71	73	72	69	69	66	71	73	66	74	80	71
1250	80	70	70	70	67	67	69	69	71	53	71	76	69
1500	75	67	68	67	64	64	75	69	68	62	69	73	68
2000	74	65	68	66	62	62	76	67	66	53	66	71	65
2500	71	62	69	66	60	59	68	65	63	62	69	69	64
3150	70	60	64	63	60	58	64	65	60	61	68	66	63
4000	67	57	60	59	54	53	60	65	59	60	72	66	64
5000	66	55	60	58	52	51	57	62	56	55	67	65	60
6300	68	53	58	56	51	50	56	64	55	64	64	69	62
8000	71	55	59	58	52	51	58	64	55	51	59	69	61
10000	68	57	57	59	53	53	59	63	56	56	55	65	61
OVERALL	103	82	96	96	92	94	109	114	102	103	102	107	111

LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: 2 — MEASURED SOUND PRESSURE LEVEL (DB) 1/3 OCTAVE BAND

IDENTIFICATION:
OMEGA 3.2
TEST BP-000-001
RUN 03
25 JAN 82
PAGE F3

NOISE SOURCE/SUBJECT:
C-9A AIRCRAFT
INFLIGHT NOISE LEVELS

OPERATION:

FREQ (HZ)	LOCATION/CONDITION 16/E	16/F	17/B	17/F	17/G	17/H	18/A	18/B	18/C	18/D	18/F	18/G	18/H
25	72	80	74	66	82	88	64	70	84	76	71	76	84
31.5	70	77	71	70	81	88	66	70	82	77	72	76	86
40	72	80	74	72	80	89	81	74	85	79	74	76	88
50	78	89	75	79	80	88	81	78	89	82	61	80	93
63	87	89	77	92	80	93	83	79	91	87	94	82	92
80	77	83	74	79	85	88	85	77	95	84	83	81	90
100	83	85	97	77	85	93	110	89	85	85	80	95	94
125	95	96	94	97	80	91	98	103	108	108	101	84	94
160	82	85	78	93	95	98	90	83	99	99	96	101	97
200	84	82	76	83	82	97	81	76	100	98	87	93	91
250	82	80	73	78	79	94	74	72	84	81	83	75	89
315	80	79	72	77	75	91	73	69	78	74	61	73	88
400	75	75	70	77	75	91	70	68	74	71	81	71	89
500	76	74	68	74	79	88	68	63	73	70	77	69	85
630	74	73	67	74	72	85	66	61	70	67	75	64	84
800	74	70	63	73	71	82	65	61	69	66	75	65	82
1000	73	70	63	71	69	79	64	59	67	66	72	65	77
1250	71	66	61	70	67	75	62	58	64	63	69	62	74
1600	68	63	63	66	68	72	62	57	62	61	67	60	69
2000	65	61	60	64	65	69	61	57	63	62	65	60	67
2500	66	59	58	61	66	65	59	54	60	60	61	62	64
3150	62	57	58	59	62	64	57	57	60	60	59	59	65
4000	63	57	55	56	60	63	58	54	61	61	56	57	61
5000	57	53	55	55	60	62	57	53	59	58	57	58	61
6300	54	52	60	53	63	64	60	56	60	59	54	60	62
8000	55	51	55	54	61	64	60	61	65	63	55	64	65
10000	55	52	55	54	60	62	62	61	63	62	55	60	62
OVERALL	97	98	99	99	97	104	110	103	109	109	103	102	103

LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: 2 MEASURED SOUND PRESSURE LEVEL (DB) 1/3 OCTAVE BAND

IDENTIFICATION:
OMEGA 3.2
TEST BP-000-001
RUN 04
25 JAN 82
PAGE F4

NOISE SOURCE/SUBJECT:
C-9A AIRCRAFT
INFLIGHT NOISE LEVELS

OPERATION:

FREQ (HZ)	LOCATION/CONDITION 19/E	20/E	21/E	22/E	23/E	24/E	25/E	26/E	27/E	28/E	29/E	30/E	31/E
25	65	70	69	65	66	67	70	70	69	70	69	71	71
31.5	71	70	69	68	69	69	71	69	70	71	75	73	72
40	68	69	67	68	69	67	70	67	68	69	68	70	68
50	71	79	74	76	80	69	80	75	78	81	68	78	76
63	77	95	82	83	86	75	85	79	86	89	74	84	81
80	74	76	74	73	75	74	76	74	74	77	75	75	73
100	80	92	80	75	82	80	81	78	78	81	78	78	76
125	92	93	94	86	95	93	91	90	90	94	86	85	76
160	86	79	84	77	80	82	83	78	77	77	76	79	77
200	87	78	84	77	79	82	84	76	78	74	76	80	78
250	80	80	78	77	77	78	77	76	76	76	78	77	75
315	75	77	79	77	77	74	77	77	75	75	75	76	76
400	74	72	74	74	73	73	73	72	73	73	72	73	71
500	74	70	73	73	72	72	71	72	71	71	72	69	71
630	72	70	70	71	71	71	70	70	70	69	71	69	70
800	71	69	69	70	70	70	69	69	70	70	70	69	69
1000	71	68	69	70	69	69	69	69	69	69	69	68	69
1250	67	66	67	67	66	67	65	66	66	66	66	66	66
1600	64	63	64	64	64	64	63	63	64	64	64	64	64
2000	63	61	62	63	62	62	60	62	62	61	62	61	62
2500	62	60	60	61	60	62	60	60	60	59	60	59	60
3150	59	58	59	59	59	59	57	58	58	57	58	58	58
4000	56	55	56	56	54	56	55	56	55	53	55	55	56
5000	55	53	54	54	53	54	52	54	52	51	53	53	53
6300	53	51	52	53	51	52	51	52	52	51	52	53	53
8000	55	54	55	54	53	54	54	56	54	53	55	57	56
10000	56	55	56	56	54	55	56	57	56	55	56	58	58
OVERALL	95	95	95	90	96	94	94	92	92	96	90	90	87

LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: 2 MEASURED SOUND PRESSURE LEVEL (DB) 1/3 OCTAVE BAND

IDENTIFICATION:
OMEGA 3.2
TEST BP-000-001
RUN 05
25 JAN 82
PAGE F5

NOISE SOURCE/SUBJECT:
C-9A AIRCRAFT
INFLIGHT NOISE LEVELS

OPERATION:

FREQ (HZ)	LOCATION/CONDITION 32/E	33/E	34/E	35/E	36/E	37/E	38/E	09/E	40/E	41/E	42/E	43/E	44/E
25	68	69	69	70	71	68	70	68	67	69	67	65	68
31.5	71	72	74	74	75	70	70	74	69	73	70	69	70
40	66	69	69	68	68	68	68	67	68	68	65	70	67
50	75	79	69	78	75	76	79	69	80	77	72	83	79
63	83	86	76	83	80	82	86	76	86	83	79	90	86
80	74	76	75	73	71	70	73	74	72	71	74	73	69
100	76	78	77	78	74	75	78	75	76	74	75	73	73
125	85	87	86	90	84	87	91	79	88	85	87	86	87
160	78	78	78	76	77	78	75	78	77	72	78	73	73
200	79	77	79	75	77	78	74	79	76	71	78	72	72
250	74	76	75	75	74	74	74	74	73	73	73	73	71
315	74	76	73	72	73	73	73	73	73	73	72	73	73
400	73	73	71	72	71	71	72	72	72	70	71	71	72
500	71	71	71	71	69	70	70	71	70	69	70	69	73
630	70	69	71	70	70	69	69	70	69	69	70	70	70
800	69	69	69	70	69	69	69	70	69	68	70	69	70
1000	68	69	68	69	68	69	67	68	68	68	69	67	69
1250	66	66	66	66	66	66	66	67	65	66	67	66	66
1600	64	64	64	64	64	63	63	63	63	63	65	64	65
2000	62	61	62	63	63	62	61	62	62	62	64	64	64
2500	59	58	60	59	60	59	59	59	59	60	60	60	61
3150	58	55	58	58	59	57	56	58	58	57	59	59	59
4000	55	54	55	56	56	54	53	55	56	56	56	57	58
5000	52	51	52	54	54	53	52	53	55	54	55	56	56
6300	52	50	52	53	53	52	51	52	55	54	54	55	56
8000	55	54	55	57	58	56	55	56	59	58	59	60	62
10000	57	56	56	58	60	58	56	58	60	59	62	61	62
OVERALL	89	91	89	92	88	90	93	87	91	89	89	93	90

LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: 2 MEASURED SOUND PRESSURE LEVEL (DB) 1/3 OCTAVE BAND

IDENTIFICATION:
OMEGA 3.2
TEST BP-000-001
RUN 06
25 JAN 82
PAGE F6

NOISE SOURCE/SUBJECT:
C-9A AIRCRAFT
INFLIGHT NOISE LEVELS

OPERATION:

FREQ (HZ)	LOCATION/CONDITION 45/E	46/E	47/E	48/E	49/E	50/E	51/E	52/E	53/E	54/E	55/E	56/E
25	68	68	68	67	68	68	68	66	66	67	65	68
31.5	70	71	71	71	73	70	68	67	70	67	67	70
40	68	68	70	69	69	68	68	68	67	66	63	65
50	78	82	83	79	83	79	76	74	70	71	64	64
63	84	88	90	87	90	85	82	80	74	75	69	71
80	71	73	72	69	71	69	67	67	69	67	63	66
100	73	75	72	68	73	71	67	67	70	68	63	70
125	86	88	83	81	86	82	74	77	76	71	65	67
160	75	75	72	71	71	70	69	72	70	68	65	67
200	75	75	70	70	70	72	70	71	71	69	67	69
250	70	72	70	71	73	71	73	71	71	70	68	69
315	72	71	72	71	74	73	72	72	72	71	69	69
400	70	69	70	71	71	72	71	70	70	71	69	68
500	69	67	68	69	69	69	70	70	70	71	70	67
630	69	70	69	68	71	71	70	70	71	73	74	69
800	69	70	69	69	70	71	70	70	71	73	74	71
1000	68	67	67	68	69	69	69	70	70	72	75	72
1250	66	67	67	67	68	67	67	68	68	70	71	70
1600	65	65	64	65	65	65	65	66	66	68	68	68
2000	64	64	64	64	64	65	64	64	65	67	67	68
2500	60	60	60	60	60	61	60	61	61	63	64	67
3150	59	59	60	60	60	61	60	60	60	61	62	66
4000	57	58	58	58	57	59	58	58	57	57	59	61
5000	57	58	55	56	55	56	57	55	55	54	56	60
6300	57	58	55	55	54	55	56	54	54	53	54	57
8000	63	62	60	60	59	61	63	58	58	57	56	58
10000	68	64	61	62	62	64	65	60	60	59	57	59
OVERALL	89	92	92	89	92	89	86	85	84	83	82	82

LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: 2 — MEASURED SOUND PRESSURE LEVEL (DB) OCTAVE BAND

IDENTIFICATION:
OMEGA 3.2
TEST BP-000-001
RUN 01
25 JAN 82
PAGE J1

NOISE SOURCE/SUBJECT:
C-9A AIRCRAFT
INFLIGHT NOISE LEVELS

OPERATION:

FREQ (HZ)	LOCATION/CONDITION 1/E	2/E	3/E	4/E	5/E	6/E	7/E	8/E	9/B	9/C	9/D	9/E	9/G
31.5	71	70	70	73	72	72	74	75	87	95	8o	78	86
63	72	75	72	68	76	78	89	90	83	90	87	83	84
125	69	72	68	70	71	69	83	92	96	109	111	91	90
250	66	64	70	72	73	72	77	82	76	93	92	81	79
500	67	66	69	71	75	75	76	75	72	85	85	77	78
1000	71	71	72	75	76	76	74	74	68	81	79	76	73
2000	68	67	69	73	70	70	68	68	66	75	74	72	69
4000	64	65	66	69	63	63	63	62	63	71	70	66	67
8000	64	64	63	65	59	61	66	64	67	72	70	63	74
OVERALL	76	80	79	81	82	83	90	94	97	110	112	92	92

TABLE: 2 — MEASURED SOUND PRESSURE LEVEL (DB) OCTAVE BAND

IDENTIFICATION: OMEGA 3.2 / TEST BP-000-001 / RUN 02 / 25 JAN 82 / PAGE J2

NOISE SOURCE/SUBJECT: C-9A AIRCRAFT INFLIGHT NOISE LEVELS

OPERATION:

FREQ (HZ)	LOCATION/CONDITION 9/H	10/E	11/E	12/E	13/E	14/E	15/B	15/C	15/E	15/F	15/G	15/H	16/D
31.5	93	70	77	74	81	79	82	93	78	89	87	95	82
63	94	77	81	80	88	83	86	95	91	92	92	98	91
125	99	66	95	95	84	91	109	114	101	102	101	105	111
250	97	70	83	85	87	86	83	104	91	38	88	100	95
500	96	73	79	79	78	77	75	84	82	79	81	97	83
1000	90	75	77	76	74	74	72	77	78	71	77	85	76
2000	78	70	73	71	67	67	79	72	71	67	73	76	71
4000	73	62	66	65	61	60	66	69	63	67	74	70	67
8000	74	60	63	62	57	56	62	68	60	56	66	73	66
OVERALL	103	82	96	96	92	94	109	114	102	103	102	107	111

TABLE: 2 MEASURED SOUND PRESSURE LEVEL (DB) OCTAVE BAND	IDENTIFICATION: OMEGA 3.2 TEST BP-000-001 RUN 03 25 JAN 82 PAGE J3
NOISE SOURCE/SUBJECT: C-9A AIRCRAFT INFLIGHT NOISE LEVELS	OPERATION:

FREQ (HZ)	LOCATION/CONDITION 16/E	16/F	17/B	17/F	17/G	17/H	18/A	18/B	18/C	18/D	18/F	18/G	18/H
31.5	76	84	78	75	86	93	81	77	89	82	77	81	91
63	87	92	80	92	87	95	88	83	94	90	95	85	97
125	96	96	99	98	96	100	110	103	109	109	102	102	100
250	87	85	79	85	84	99	82	78	100	98	89	93	94
500	80	79	73	80	81	93	73	70	77	75	83	74	91
1000	78	74	67	76	74	84	68	64	72	70	78	69	83
2000	71	66	65	69	71	75	66	61	67	66	70	65	72
4000	66	61	61	61	66	68	62	60	65	64	62	63	68
8000	59	57	62	58	66	68	66	65	68	66	59	67	68
OVERALL	97	98	99	99	97	104	110	103	109	109	103	102	103

TABLE: 2 MEASURED SOUND PRESSURE LEVEL (DB) OCTAVE BAND

IDENTIFICATION:
OMEGA 3.2
TEST BP-000-001
RUN 04
25 JAN 82
PAGE J4

NOISE SOURCE/SUBJECT:
C-9A AIRCRAFT
INFLIGHT NOISE LEVELS

OPERATION:

FREQ (HZ)	LOCATION/CONDITION 19/E	20/E	21/E	22/E	23/E	24/E	25/E	26/E	27/E	28/E	29/E	30/E	31/E
31.5	73	74	73	72	73	72	75	73	74	75	76	76	75
63	79	86	83	84	87	78	87	81	86	90	78	85	82
125	93	93	94	86	95	94	92	90	90	94	89	87	81
250	80	83	86	81	82	84	85	82	81	80	81	82	81
500	78	76	77	77	77	77	76	76	76	76	76	75	75
1000	74	72	73	74	73	74	73	73	73	73	73	72	73
2000	68	66	67	68	67	67	66	67	67	66	67	66	67
4000	62	60	62	61	61	61	60	61	61	59	60	60	61
8000	59	58	59	59	58	59	59	60	59	58	59	61	61
OVERALL	95	95	95	90	96	94	94	92	92	96	90	90	87

TABLE: 2 MEASURED SOUND PRESSURE LEVEL (DB) OCTAVE BAND

IDENTIFICATION:
OMEGA 3.2
TEST BP-000-001
RUN 05
25 JAN 82
PAGE J5

NOISE SOURCE/SUBJECT:
C-9A AIRCRAFT
INFLIGHT NOISE LEVELS

OPERATION:

FREQ (HZ)	LOCATION/CONDITION 32/E	33/E	34/E	35/E	36/E	37/E	38/E	09/E	40/E	41/E	42/E	43/E	44/E
31.5	74	75	76	76	77	73	74	76	73	75	73	73	73
63	84	87	79	84	82	83	87	79	87	94	80	91	87
125	86	88	87	90	85	88	91	82	89	86	88	86	87
250	81	81	81	79	80	80	78	81	79	77	80	77	77
500	76	76	76	76	75	75	75	76	75	74	75	75	76
1000	73	73	73	73	73	72	72	73	72	72	73	72	73
2000	67	66	67	67	67	66	66	66	66	67	68	68	68
4000	60	59	60	61	61	60	59	60	61	61	62	62	63
8000	60	59	59	61	62	61	59	61	63	62	64	64	65
OVERALL	89	91	89	92	88	90	93	87	91	89	89	93	90

TABLE: 2 MEASURED SOUND PRESSURE LEVEL (DB)
OCTAVE BAND

IDENTIFICATION:
OMEGA 3.2
TEST BP-000-001
RUN 06

25 JAN 82

PAGE J6

NOISE SOURCE/SUBJECT:
C-9A AIRCRAFT
INFLIGHT NOISE LEVELS

OPERATION:

FREQ (HZ)	LOCATION/CONDITION 45/E	46/E	47/E	48/E	49/E	50/E	51/E	52/E	53/E	54/E	55/E	56/E
31.5	73	74	74	74	75	73	72	72	73	72	70	73
63	85	89	90	87	91	86	83	81	76	77	71	73
125	86	88	84	81	87	83	76	78	77	74	69	73
250	77	78	75	75	77	77	76	76	76	74	73	74
500	74	73	74	74	75	75	75	75	75	76	76	73
1000	72	73	72	73	73	74	73	74	75	77	78	76
2000	68	68	68	68	68	69	68	69	69	71	71	72
4000	63	63	63	63	62	64	63	63	63	63	64	68
8000	69	66	64	64	64	66	67	63	63	62	60	63
OVERALL	89	92	92	89	92	89	86	85	84	83	82	82

TABLE: 3 MEASURES OF HUMAN NOISE EXPOSURE

IDENTIFICATION:
OMEGA 3.2
TEST BP-000-001
RUN 01
25 JAN 82
PAGE H1

NOISE SOURCE/SUBJECT:
C-9A AIRCRAFT
INFLIGHT NOISE LEVELS

OPERATION:

	LOCATION/CONDITION												
	1/E	2/E	3/E	4/E	5/E	6/E	7/E	8/E	9/B	9/C	9/D	9/E	9/G
HAZARD/PROTECTION													
C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DBC) AT EAR													
A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DBA) AT EAR													
MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)													
NO PROTECTION													
OASLC	76	79	78	81	82	82	90	94	96	109	111	92	92
OASLA	74	74	76	79	79	79	78	80	80	94	96	81	80
T	960	960	960	960	960	960	960	960	960	85	60	807	960
MINIMUM QPL EAR MUFFS													
OASLA*	53	54	53	55	57	57	66	72	75	88	90	70	69
T	960	960	960	960	960	960	960	960	960	240	170	960	960
V-51R EAR PLUGS													
OASLA*	49	49	51	53	55	55	56	59	59	72	74	59	58
T	960	960	960	960	960	960	960	960	960	960	960	960	960
FLENTS EAR PLUGS													
OASLA*	49	49	50	53	55	54	57	60	61	74	76	59	59
T	960	960	960	960	960	960	960	960	960	950	960	960	960
H-157 IN-FLIGHT COMMUNICATION UNIT													
OASLA*	54	55	55	57	59	58	66	71	74	87	90	70	69
T	960	960	960	960	960	960	960	960	960	285	170	960	960
E.A.R.													
OASLA*	41	41	43	46	46	46	48	52	53	67	69	51	50
T	960	960	960	960	960	960	960	960	960	960	960	960	960
COMMUNICATION													
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)													
PSIL	68	68	70	73	74	74	72	72	68	80	79	75	73
ANNOYANCE													
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)													
TONE CORRECTION (C IN DB)													
PNLT	87	89	89	92	90	90	94	99	99	113	115	99	98
C	0	1	0	1	0	0	1	2	2	3	3	2	1

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE: 3 MEASURES OF HUMAN NOISE EXPOSURE

IDENTIFICATION: OMEGA 3.2 TEST BP-000-001 RUN 02 25 JAN 82 PAGE H2

NOISE SOURCE/SUBJECT: C-9A AIRCRAFT INFLIGHT NOISE LEVELS

OPERATION:

	LOCATION/CONDITION												
	9/H	10/E	11/E	12/E	13/E	14/E	15/B	15/C	15/E	15/F	15/G	15/H	16/D
HAZARD/PROTECTION													
C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DBC) AT EAR													
A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DBA) AT EAR													
MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)													
NO PROTECTION													
OASLC	103	81	95	95	91	94	109	114	102	102	101	107	111
OASLA	96	76	83	83	81	81	92	99	88	88	89	97	96
T	60	960	571	571	807	807	120	36	240	240	202	50	60
MINIMUM OPL EAR MUFFS													
OASLA*	80	55	74	74	68	71	88	93	81	81	80	85	90
T	960	960	960	960	960	960	240	101	807	807	960	404	170
V-51R EAR PLUGS													
OASLA*	74	54	61	61	60	60	71	78	66	67	67	76	74
T	960	960	960	960	960	960	960	960	960	960	960	960	960
FLENTS EAR PLUGS													
OASLA*	74	53	62	62	61	61	73	79	68	69	68	76	76
T	960	960	960	960	960	960	960	960	960	960	960	960	960
H-157 IN-FLIGHT COMMUNICATION UNIT													
OASLA*	82	57	74	74	70	72	87	93	80	81	81	86	89
T	679	960	960	960	960	960	285	101	960	807	807	339	202
E.A.R.													
OASLA*	64	45	54	54	51	52	66	72	60	61	60	67	68
T	960	960	960	960	960	960	960	960	960	960	960	960	960
COMMUNICATION													
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)													
PSIL	88	73	76	75	73	73	75	78	77	72	77	86	76
ANNOYANCE													
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)													
TONE CORRECTION (C IN DB)													
PNLT	109	89	102	101	97	98	109	117	106	106	106	111	114
C	1	0	2	2	1	1	2	3	2	2	2	1	3

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE: 3 MEASURES OF HUMAN NOISE EXPOSURE													IDENTIFICATION: OMEGA 3.2 TEST BP-000-001 RUN 03 25 JAN 82 PAGE H3
NOISE SOURCE/SUBJECT: C-9A AIRCRAFT INFLIGHT NOISE LEVELS	OPERATION:												
	LOCATION/CONDITION												
	16/E	16/F	17/B	17/F	17/G	17/H	18/A	18/B	18/C	18/D	18/F	18/G	18/H
HAZARD/PROTECTION													
C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DBC) AT EAR													
A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DBA) AT EAR													
MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)													
NO PROTECTION													
OASLC	97	98	99	99	97	104	110	103	109	109	103	102	103
OASLA	84	83	82	85	85	94	91	87	95	94	89	89	92
T	480	571	679	404	404	85	143	285	71	85	202	202	120
MINIMUM QPL EAR MUFFS													
OASLA*	75	76	78	77	75	81	89	82	88	88	82	81	80
T	960	960	960	960	960	807	202	679	240	240	679	807	960
V-51R EAR PLUGS													
OASLA*	63	62	61	64	63	73	72	65	73	73	68	68	70
T	960	960	960	960	960	960	960	960	960	960	960	960	960
FLENTS EAR PLUGS													
OASLA*	64	64	63	65	64	74	74	67	75	74	69	69	71
T	960	960	960	960	960	960	960	960	960	960	960	960	960
H-157 IN-FLIGHT COMMUNICATION UNIT													
OASLA*	75	75	77	77	76	83	88	81	88	88	82	82	81
T	960	960	960	960	960	571	240	807	240	240	679	679	807
E.A.R.													
OASLA*	55	55	56	57	55	64	67	60	67	67	61	61	62
T	960	960	960	960	960	960	960	960	960	960	960	960	960
COMMUNICATION													
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)													
PSIL	76	73	69	75	75	84	69	65	72	70	77	69	82
ANNOYANCE													
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)													
TONE CORRECTION (C IN DB)													
PNLT	102	102	101	103	103	108	111	105	112	111	106	105	106
C	2	2	2	2	2	1	3	3	3	3	2	2	1

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE: 3 MEASURES OF HUMAN NOISE EXPOSURE

IDENTIFICATION:
OMEGA 3.2
TEST BP-000-001
RUN 04
25 JAN 82
PAGE H4

NOISE SOURCE/SUBJECT:
C-9A AIRCRAFT
INFLIGHT NOISE LEVELS

OPERATION:

	LOCATION/CONDITION												
	19/E	20/E	21/E	22/E	23/E	24/E	25/E	26/E	27/E	28/E	29/E	30/E	31/E
HAZARD/PROTECTION													
C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DBC) AT EAR													
A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DBA) AT EAR													
MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)													
NO PROTECTION													
OASLC	95	94	95	89	96	94	94	91	92	96	90	90	87
OASLA	83	81	82	80	82	81	81	80	80	81	79	79	78
T	571	807	679	960	679	807	807	960	960	807	960	960	960
MINIMUM QPL EAR MUFFS													
OASLA*	73	73	74	67	74	73	72	70	70	74	68	67	63
T	960	960	960	960	960	960	960	960	960	960	960	960	960
V-51R EAR PLUGS													
OASLA*	61	59	61	57	60	59	59	56	56	59	57	57	56
T	960	960	960	960	960	960	960	960	960	950	960	960	960
FLENTS EAR PLUGS													
OASLA*	62	61	62	58	61	61	61	59	59	61	58	58	57
T	960	960	960	960	960	960	960	960	960	960	960	960	960
H-157 IN-FLIGHT COMMUNICATION UNIT													
OASLA*	74	72	74	67	74	73	72	70	70	73	68	68	65
T	960	960	960	960	960	960	960	960	960	950	960	960	960
E.A.R.													
OASLA*	53	52	53	49	53	52	52	50	50	53	49	49	47
T	960	960	960	960	960	960	960	960	960	960	960	960	960
COMMUNICATION													
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)													
PSIL	73	71	73	73	72	73	72	72	72	72	72	71	72
ANNOYANCE													
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)													
TONE CORRECTION (C IN DB)													
PNLT	99	99	100	95	101	99	98	97	97	100	96	95	92
C	2	2	2	2	2	2	2	2	2	3	2	1	0

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE: 3 MEASURES OF HUMAN NOISE EXPOSURE

IDENTIFICATION:
OMEGA 3.2
TEST BP-000-001
RUN 05
25 JAN 82
PAGE H5

NOISE SOURCE/SUBJECT: C-9A AIRCRAFT INFLIGHT NOISE LEVELS

OPERATION:

	LOCATION/CONDITION												
	32/E	33/E	34/E	35/E	36/E	37/E	38/E	09/E	40/E	41/E	42/E	43/E	44/E
HAZARD/PROTECTION													
C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DBC) AT EAR													
A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DBA) AT EAR													
MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)													
NO PROTECTION													
OASLC	89	91	89	91	88	89	93	86	91	88	89	92	90
OASLA	78	79	79	79	78	78	79	78	78	77	79	78	79
T	960	960	960	960	960	960	960	960	960	960	960	960	960
MINIMUM 2PL EAR MUFFS													
OASLA*	66	68	67	70	65	67	71	64	69	66	67	68	67
T	960	960	960	960	960	960	960	960	960	960	960	960	960
V-51R EAR PLUGS													
OASLA*	56	57	56	57	55	56	57	56	56	55	56	57	56
T	960	960	960	960	960	960	960	960	960	960	960	960	960
FLENTS EAR PLUGS													
OASLA*	57	58	57	58	56	57	59	56	57	56	57	58	57
T	960	960	960	960	960	960	960	960	960	960	960	960	960
H-157 IN-FLIGHT COMMUNICATION UNIT													
OASLA*	67	69	67	69	66	68	70	65	68	66	67	68	67
T	960	960	960	960	960	960	960	960	960	960	960	960	960
E.A.R.													
OASLA*	48	49	48	50	47	48	51	47	49	47	48	50	48
T	960	960	960	960	960	960	960	960	960	960	960	960	960
COMMUNICATION													
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)													
PSIL	72	71	72	72	71	71	71	72	71	71	72	72	73
ANNOYANCE													
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)													
TONE CORRECTION (C IN DB)													
PNLT	94	96	95	97	94	95	98	92	96	95	96	96	96
C	1	2	1	2	1	2	2	1	2	2	2	2	2

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE: 3 MEASURES OF HUMAN NOISE EXPOSURE

IDENTIFICATION:
OMEGA 3.2
TEST BP-000-001
RUN 06
25 JAN 82
PAGE H6

NOISE SOURCE/SUBJECT:
C-9A AIRCRAFT
INFLIGHT NOISE LEVELS

OPERATION:

	LOCATION/CONDITION											
	45/E	46/E	47/E	48/E	49/E	50/E	51/E	52/E	53/E	54/E	55/E	56/E
HAZARD/PROTECTION												
C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DBC) AT EAR												
A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DBA) AT EAR												
MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)												
NO PROTECTION												
OASLC	89	92	91	88	92	88	85	84	83	83	82	82
OASLA	78	78	77	77	79	78	78	78	78	80	80	79
T	960	960	960	960	960	960	960	960	960	960	960	960
MINIMUM 2PL EAR MUFFS												
OASLA*	67	69	67	64	68	64	60	60	60	58	57	57
T	960	960	960	960	960	960	960	960	960	960	960	960
V-51R EAR PLUGS												
OASLA*	55	56	56	55	57	55	55	55	55	56	56	54
T	960	960	960	960	960	960	960	960	960	960	960	960
FLENTS EAR PLUGS												
OASLA*	56	57	57	55	58	56	55	55	55	55	56	54
T	960	960	960	960	960	960	960	960	960	960	960	960
H-157 IN-FLIGHT COMMUNICATION UNIT												
OASLA*	66	69	67	64	68	65	62	62	61	60	59	59
T	960	960	960	960	960	960	960	960	960	960	960	960
E.A.R.												
OASLA*	48	50	49	47	50	47	46	46	46	47	47	46
T	960	960	960	960	960	960	960	960	960	960	960	960
COMMUNICATION												
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)												
PSIL	71	71	71	72	72	73	72	73	73	75	75	74
ANNOYANCE												
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)												
TONE CORRECTION (C IN DB)												
PNLT	96	97	95	93	96	94	91	91	91	91	91	92
C	2	2	2	2	2	2	1	1	1	1	0	0

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

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