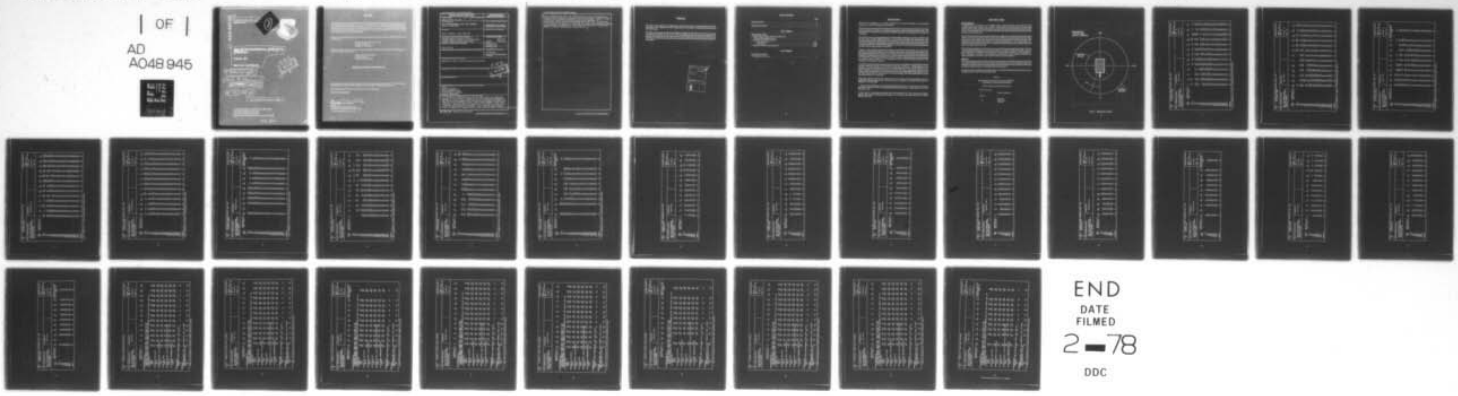
AD-A048 945 AEROSPACE MEDICAL RESEARCH LAB WRIGHT-PATTERSON AFB OHIO F/G 20/1
USAF BIOENVIRONMENTAL NOISE DATA HANDBOOK. VOLUME 107. MA-8 AIR--ETC(U)
DEC 76 N A FARINACCI

UNCLASSIFIED AMRL-TR-75-50-VOL-107 NL

| OF |
AD
A048 945



END
DATE
FILMED
2-78
DDC

(14) AMRL-TR-75-50-VOL-107
Volume 107

(2)

(6)

USAE BIOENVIRONMENTAL NOISE DATA HANDBOOK.

Volume 107.

MA-8 Air Conditioner.

(9) Technical rept.,

(10) Nick A./Farinacci

(11) DEC [redacted] 76 (12) 36p.

(16) 7231 (17) 04

AEROSPACE MEDICAL RESEARCH LABORATORY
AEROSPACE MEDICAL DIVISION
AIR FORCE SYSTEMS COMMAND
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433

NOTICES

When US Government drawings, specifications, or other data are used for any purpose other than a definitely related Government procurement operation, the Government thereby incurs no responsibility nor any obligation whatsoever, and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data, is not to be regarded by implication or otherwise, as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

Please do not request copies of this report from Aerospace Medical Research Laboratory. Additional copies may be purchased from:

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Federal Government agencies and their contractors registered with Defense Documentation Center should direct requests for copies of this report to:

Defense Documentation Center
Cameron Station
Alexandria, Virginia 22314

TECHNICAL REVIEW AND APPROVAL

This report has been reviewed by the Information Office (OI) and is releasable to the National Technical Information Service (NTIS). At NTIS, it will be available to the general public, including foreign nations.

This technical report has been reviewed and is approved for publication.

FOR THE COMMANDER

HENNING E. VON GIERKE
Director
Biodynamics and Bionics Division
Aerospace Medical Research Laboratory

AIR FORCE/56780/19 December 1977 — 500

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER AMRL-TR-75-50, Vol. 107	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) USAF BIOENVIRONMENTAL NOISE DATA HANDBOOK: MA-8 Air Conditioner		5. TYPE OF REPORT & PERIOD COVERED Volume 107 of a series 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Nick A. Farinacci, Capt, USAF, BSC		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Aerospace Medical Research Laboratory Aerospace Medical Division, Air Force Systems Command, Wright-Patterson AFB OH 45433		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 62202F 7231-04-33 7231-04-36
11. CONTROLLING OFFICE NAME AND ADDRESS Same as above		12. REPORT DATE December 1976 13. NUMBER OF PAGES 36
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Noise
Noise Environments
Bioenvironmental Noise
Ground Support Equipment
MA-8 Air Conditioner

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

The MA-8 Air Conditioner is an electric motor driven air conditioner designed to cool electronic equipment on aircraft during ground maintenance. This report provides measured data defining the bioacoustic environments produced by this unit operating inside a large aircraft hangar at normal rated conditions. Near-field data are reported for 37 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

→ over

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

level, perceived noise level, and 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, Aerospace Medical Research Laboratory, under Project/Task 723104, Measurement and Prediction of Noise Environments of Air Force Operations.

The author acknowledges the efforts of Mr. Robert T. England and Mr. Robert G. Powell who conducted the field measurements, and Mr. John N. Cole who established the data analysis requirements and assisted in the preparation of this report. Mr. Henry Mohlman and Mr. David Eilerman of the University of Dayton assisted in the mechanics of data processing, and Mrs. Norma Peachey typed and prepared the graphics.

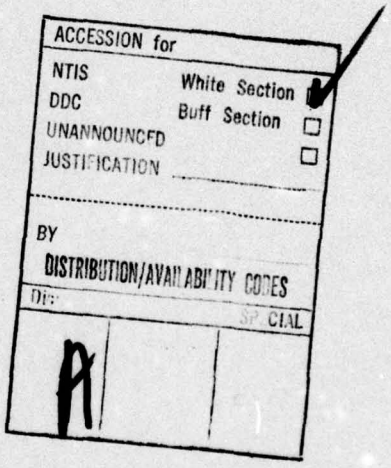


Table of Contents

Page

INTRODUCTION 3

NEAR-FIELD NOISE 4

List of Tables

NEAR-FIELD NOISE

1. Measurement Location and Test Condition for Operator Noise Measurements 4
2. Measured Sound Pressure Level
   - 1/3 Octave Band 6-14
   - Octave Band 15-23
3. Measures of Human Noise Exposure 24-32

List of Figures

NEAR-FIELD NOISE

1. Measurement Locations 5

INTRODUCTION

The MA-8 Air Conditioner is an electric motor-driven air conditioner designed to cool electronic equipment on aircraft during ground maintenance.

This volume provides measured data defining the bioacoustic environments produced by this unit. Such data are essential to evaluate ear protection requirements, limiting personnel exposure times, voice communication capabilities, and annoyance problems associated with operations of the MA-8 air conditioner.

This volume is one of a series published by the Aerospace Medical Research Laboratory (AMRL) 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. Volume 2 provides a method and data for adjusting the handbook's far-field noise data, which are for standard meteorological conditions (15C temperature, 70% rel humidity, 0.760 meters Hg barometric pressure) to derive comparable data for other meteorological conditions. *Refer to Volumes 1 and 2* (references 1 and 2) 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., inflight/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 AMRL/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: AMRL/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.

2. Cole, John N., *USAF Bioenvironmental Noise Data Handbook, Volume 2: Procedure to Evaluate Effects of Non-standard Meteorological Conditions on Far-Field Noise,* AMRL-TR-75-50 (2), AMRL, WPAFB, OH, 1975.

NEAR-FIELD NOISE

MEASUREMENTS

A standard MA-8 Air Conditioner was operated inside, and approximately in the center of a large aircraft hanger (190.5 m long × 95.1 m wide × 18.3 m high) on a concrete floor at normal rated conditions. The hanger walls and ceiling were not acoustically treated. No aircraft were in the vicinity of the unit while being measured. No far-field acoustic data were acquired because of the relatively close proximity of the hanger walls.

Figure 1 identifies 36 noise measurement locations at a height of 1.5 meters above the concrete apron (nominal ear level of ground crew). The 0 degree reference direction passes through the tow bar. These locations are in the acoustic near-field of the source where the sound wave fronts generally do not spherically diverge and the source appears to be spatially distributed (i.e., not a point source). Consequently, these near-field data cannot be extrapolated to longer distances but do properly define the levels at locations close to the unit.

Near-field measurements were also made at ear level at the operator control panel. Table 1 lists the numeric/alphabetic designators used on the data pages in this report to identify the operator measurement location and test conditions. The designator 1/A means operator location 1 and test condition A. Such a descriptor is essential in many handbook volumes that involve multiple combinations of locations/conditions. It is used in this report to maintain format consistency.

RESULTS

The measured data presented in Table 2 define the sound pressure levels (SPL) produced by the MA-8 unit at the 37 specified, near-field locations. This table includes the overall, 1/3 octave band, and octave band levels. From these data one can calculate the variety of measures in Table 3 which are widely used to assess the effects of noise on personnel and their performance.

For data at other intermediate near-field locations (i.e., for radial distances less than 4 meters) you can interpolate between the 36 measured data points.

TABLE 1

MEASUREMENT LOCATION AND TEST CONDITION
FOR OPERATOR NOISE MEASUREMENTS

MA-8 Air Conditioner, Edwards AFB, 22 Sep 1972

Measurement Location	
1	Operator Control Panel
Operation	
A	Vent Cycle
B	Cooling Cycle
C	Heat Cycle

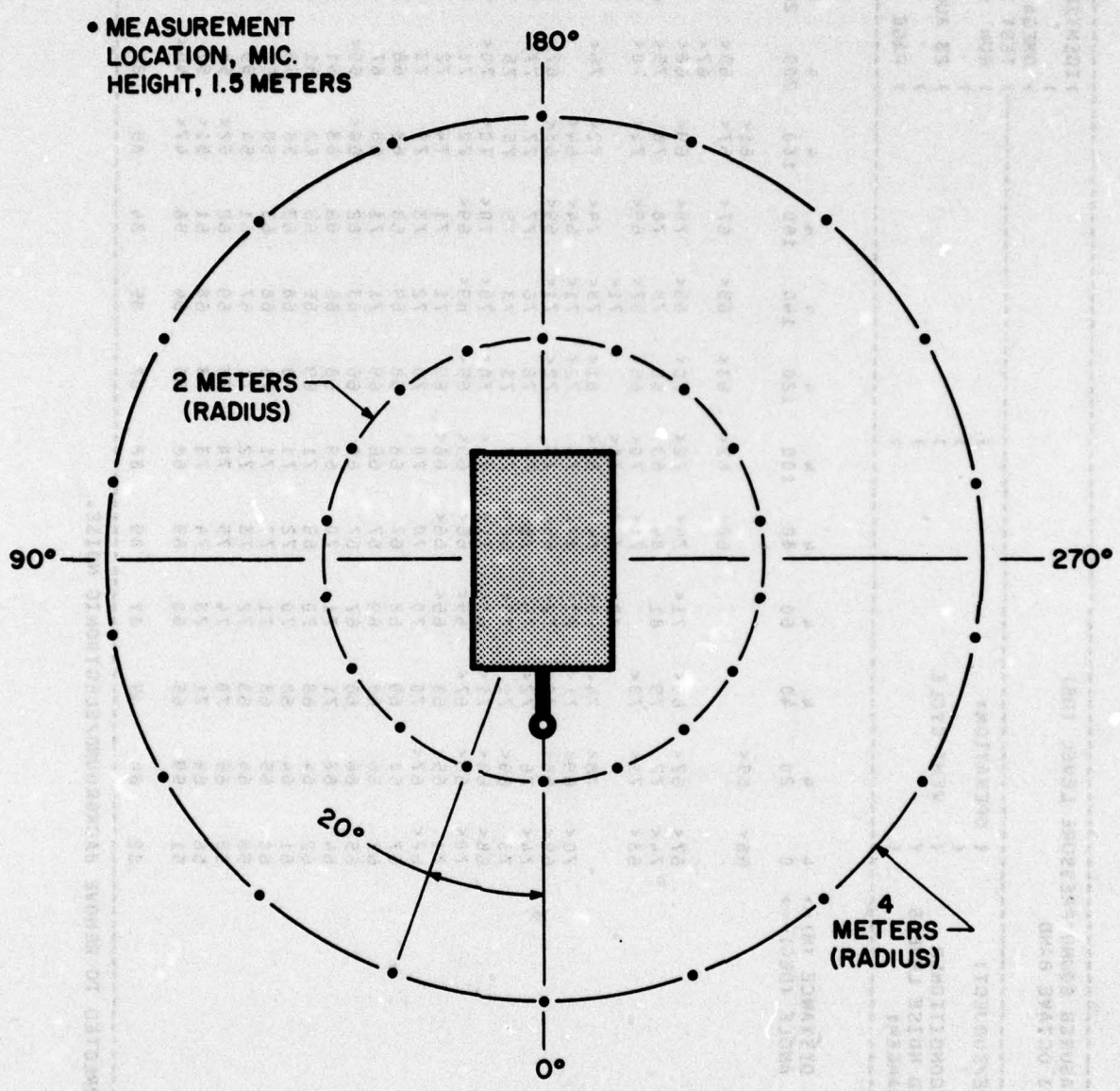


Figure 1. Measurement Locations

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

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-320
RUN 01
23 AUG 74
PAGE F1

NOISE SOURCE/SUBJECT:
MA-8 AIR CONDITIONER
NEAR FIELD NOISE LEVELS
(INSIDE HANGER)

OPERATION:
VENT CYCLE

FREQ (HZ)	DISTANCE (M) -> / ANGLE (DEG) -->	4 / 0	4 / 20	4 / 40	4 / 60	4 / 80	4 / 100	4 / 120	4 / 140	4 / 160	4 / 180	4 / 200	4 / 220	4 / 240
25		66<	65<								61<			
31.5						60<	62<	63<	65<	67<	67<	65<	64<	61<
40												67<		
50		67<	67<	69<	71<	74<	72<	70<	68<	70<	69<	68<		67<
63		74<	77	79	81	84	83	80	78	78	78	75<	67<	76<
80		68<	71<	70<		71<	70<	66<	67<	69<	71<	70<	67<	67<
100					72<	75<	71<		71<					71<
125			78<	74<	80<	84	82<	81<	78<	74<	72<	76<	77<	79<
160		70<	69<	71<	72<	67<	74	72<	71<	64<	64<		71<	77
200		69<	68<	70<	72<	69<	73	72<	71<	69<	68<	67<	70<	75
250		74<	76	72<	76	76	76	76	76	77	77	77	74<	73<
315		73	69<	71	70<	68<	73	73	73	75	75	75	72	67<
400		68<	69<	71<	68<	71<	71<	70<	70<	70<	70<	70<	68<	68<
500		70<	66<	67<	65<	66<	65<	65<	69<	69<	72	71	68<	65<
630		71	65<	68	65<	66<	66<	69	71	71	74	72	71	69
800		68<	67<	70	70	70	70	70	72	73	75	73	70	70
1000		67	68	69	68	67	68	68	69	68	68	68	70	64<
1250		67	66	68	69	67	66	69	71	71	68	67	62<	61<
1600		65	66	66	67	67	66	66	63	62	60<	59<	60<	58<
2000		64	68	71	71	70	69	68	66	66	63	61	60	60
2500		62	64	68	70	69	71	69	65	63	62	61	59	58
3150		61	64	68	70	72	71	70	68	63	58	58	57	56
4000		60	65	68	71	73	71	70	68	63	58	57	58	54<
5000		58	64	68	72	73	72	71	67	61	54	55	55	52<
6300		55	65	70	74	75	74	73	69	62	52<	56	54	53<
8000		56	64	71	73	74	73	73	68	61	51<	52	52	52
10000		51	59	65	68	69	68	68	64	56	47<	46<	50	49
OVERALL		82	84	85	87	89	88	87	85	84	85	84	82	85

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

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

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-320
RUN 02
23 AUG 74
PAGE F2

NOISE SOURCE/SUBJECT:
MA-8 AIR CONDITIONER
NEAR FIELD NOISE LEVELS
(INSIDE HANGER)

OPERATION:
VENT CYCLE

FREQ (HZ)	DISTANCE (M) ->	4	4	4	4	4	2	2	2	2	2	2	2	2
	ANGLE (DEG) -->	260	280	300	320	340	0	20	40	60	80	100	120	140
25									63<	68<	69<	63<		64<
31.5		60<							60<	60<	60<	62<	66<	70<
40														69<
50		68<	70<	72<	71<	66<	72<	73<	76	78	78	77	75<	71<
63		80	82	83	82	76<	83	85	88	89	90	88	85	81
80		71<	67<	72<	69<	67<	68<	71<	70<	70<	71<	71<	67<	71<
100			72<							74<	76<	76<	74<	74<
125		78<	77<	79<			79<	78<	81<	84	86	85	84	83
160		73<	75	75	69<	73<	82	76	74	77	81	82	83	82
200		71<	73	74	69<	72<	80	73	75	79	81	81	82	81
250		69<	72<	73<	71<	70<	73<	77	77	80	77	79	80	77
315		69<	72	65<	69<	70<	75	73	73	75	75	74	73	73
400		69<	67<	67<	66<	70<	76	74	73	75	76	76	75	76
500		64<	62<	63<	63<	66<	72	72	70<	70<	69<	70<	70<	73
630		64<	63<	63<	67	70	72	69	69	69	71	72	72	78
800		64<	63<	63<	68<	69	71	70	72	72	73	75	73	78
1000		62<	62<	62<	64<	67	70	71	74	73	72	72	71	72
1250		60<	60<	63	66	67	70	67	69	73	73	72	71	73
1600		57<	58<	58<	63	65	68	68	71	72	73	73	71	69
2000		57<	58<	61	64	65	70	68	72	77	75	75	70	69
2500		56	57	57	60	62	66	65	69	73	74	75	71	68
3150		56	56	57	61	61	66	65	70	75	78	77	74	70
4000		56	54<	56	60	61	66	65	71	77	79	78	76	70
5000		52<	52<	54	57	58	62	63	71	78	79	79	76	70
6300		51<	51<	52<	54	54	58	63	73	80	81	80	77	71
8000		50<	49<	50<	52	55	60	62	73	81	81	80	77	70
10000		47<	45<	47<	51	53	57	57	67	76	76	75	71	65
OVERALL		84	85	86	84	82	89	88	90	93	94	93	92	90

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

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

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-320
RUN 03
23 AUG 74
PAGE F3

NOISE SOURCE/SUBJECT:
MA-8 AIR CONDITIONER
NEAR FIELD NOISE LEVELS
(INSIDE HANGER)

OPERATION:
VENT CYCLE

FREQ (HZ) / DISTANCE (M) -> / ANGLE (DEG) -->	2 160	2 180	2 200	2 220	2 240	2 260	2 280	2 300	2 320	2 340	OPERATOR LOCATION TEST CONDITION 1/A
25	68<	68<	66<								
31.5	72	73	71	67<	67<	65<	61<			62<	64<
40	72<	73<	74<	66<	66<						
50	74<	75<	71<	67<	68<	71<	72<	74<	72<	70<	68<
63	81	81	79	71<	75<	82	84	85	82	79	76<
80	73<	75<	72<	75<	71<	68<	66<	67<	71<	69<	67<
100	74<	74<						71<	73<	73<	74<
125	83<	81<	80<	78<	78<	76<	76<		77<	81<	81<
160	78	75	76	75	77	80	84	83	79	84	74
200	79	74	76	74	75	78	81	81	78	82	74
250	79	75<	76	72<	72<	72<	74<	74<	77	75<	74<
315	77	76	76	75	70<	77	70<	69<	71	73	74
400	76	78	77	78	70<	71<	69<	69<	70<	76	74
500	76	78	76	74	69<	67<	67<	68<	69<	72	73
630	81	80	82	75	66<	66<	68	67	72	74	69
800	82	81	81	76	67<	64<	67<	66<	71	73	68<
1000	75	74	72	70	66	64<	65<	65<	68	70	69
1250	78	71	67	67	66	64	65	63<	69	72	68
1600	66	63	63	65	63	61<	63	62	65	70	67
2000	69	66	62	64	62	62	63	60	65	70	65
2500	67	67	63	63	61	62	61	60	61	67	65
3150	64	62	60	61	62	61	61	60	61	67	66
4000	65	61	59	62	60	60	60	59	61	67	65
5000	62	57	58	61	60	58	58	57	59	64	62
6300	60	55	57	59	59	57	57	56	56	59	63
8000	59	54	54	57	56	55	56	55	56	59	61
10000	55	51	52	56	52	52	53	50	53	58	59
OVERALL	91	89	89	86	84	87	89	89	87	89	86

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

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

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-320
RUN 04
23 AUG 74
PAGE F4

NOISE SOURCE/SUBJECT:
MA-8 AIR CONDITIONER
NEAR FIELD NOISE LEVELS
(INSIDE HANGER)

OPERATION:
COOLING CYCLE

FREQ (HZ)	DISTANCE (M)-> / ANGLE (DEG)-->	4 / 0	4 / 20	4 / 40	4 / 60	4 / 80	4 / 100	4 / 120	4 / 140	4 / 160	4 / 180	4 / 200	4 / 220	4 / 240
25		61<		62<		62<	69<	70<	68<	62<	66<	65<	63<	63<
31.5		65<	64<	67<	66<	69<	68<	69<	70<	69<	67<	69<	66<	66<
40									69<			71<	68<	66<
50		69<	70<	72<	75<	76	76	74<	72<	68<	68<	78	81	84
63		76<	81	83	87	88	87	84	80	78	74<	82	84	86
80		74<	69<	67<	69<	72<	69<	72<	72<		75<	71<	69<	71<
100		73<	75<	72<	74<		73<	73<	75<	72<		73<	71<	73<
125		77<	82<	81<	78<	74<	78<	80<	78<	75<	74<	74<	73<	74<
160		79	80	79	74	73<	77	77	75	73<	73<	78	81	81
200		80	80	78	75	79	80	77	77	75	73	77	76	76
250		82	80	80	78	76	76	78	77	78	78	83	81	78
315		88	87	85	78	78	77	76	76	75	75	82	80	78
400		86	84	81	75	77	75	74	75	75	75	81	81	79
500		83	81	78	73	73	71	72	74	72	75	83	80	76
630		85	83	81	74	72	72	73	74	73	74	81	84	81
800		86	84	83	78	74	75	73	73	72	72	79	80	76
1000		83	82	80	75	72	72	71	71	72	71	75	77	74
1250		86	83	81	74	73	71	71	72	71	70	74	75	72
1600		81	80	77	72	71	71	70	69	67	68	71	71	70
2000		82	80	77	73	72	70	69	68	67	66	72	70	69
2500		76	76	73	70	70	71	69	67	65	65	69	68	67
3150		75	74	71	70	71	71	70	68	64	63	69	66	65
4000		71	71	70	71	72	72	70	67	62	60	67	65	63
5000		67	69	69	72	73	73	70	67	62	56	64	62	59
6300		60	66	70	74	75	74	73	69	63	53<	60	60	57
8000		60	65	70	72	75	73	72	67	61	52	57	58	55
10000		59	61	65	68	69	67	68	63	56	50	54	55	52
OVERALL		95	94	93	90	91	90	89	88	86	86	91	92	91

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

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

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-320
RUN 05
23 AUG 74
PAGE F5

NOISE SOURCE/SUBJECT:
MA-8 AIR CONDITIONER
NEAR FIELD NOISE LEVELS
(INSIDE HANGER)

OPERATION:
COOLING CYCLE

FREQ (HZ)	DISTANCE (M) ->	4	4	4	4	4	2	2	2	2	2	2	2	2
	ANGLE (DEG) -->	260	280	300	320	340	0	20	40	60	80	100	120	140
25						62<	68<	67<	62<	63<	64<	64<	64<	66<
31.5		65<	65<	61<	63<	64<	71	69<	67<	69<	70<	69<	71	72
40							71<	68<	68<	68<	69<	67<		69<
50		87	88	87	84	82	86	81	76	84	84	80	72<	72<
63		89	90	88	86	83	88	84	79	88	89	87	80	79
80		70<	71<	70<	71<	71<	74<	74<	72<	72<	77	74<	79	75<
100		73<	75<	78<	77<	74<	82<	83	79<	76<	75<	75<	77<	77<
125		75<	76<	78<	77<	75<	86	86	85	81<	79<	79<	84	84
160		78	77	75	77	80	91	90	89	85	88	86	85	81
200		74	74	75	77	80	89	90	88	89	90	89	87	84
250		74<	77	78	81	82	90	89	88	89	87	86	87	81
315		76	79	79	86	87	93	91	86	86	83	83	80	79
400		78	77	79	81	84	90	89	83	82	81	83	82	80
500		74	74	76	79	80	90	88	83	79	79	79	79	77
630		75	73	77	82	83	90	90	83	78	78	79	77	80
800		73	73	79	84	85	91	90	85	80	80	81	78	79
1000		70	71	75	80	82	90	87	84	82	79	78	77	76
1250		69	70	75	80	84	91	88	83	80	81	80	77	75
1600		67	68	72	76	80	88	86	80	81	81	83	77	74
2000		66	67	71	77	81	87	85	79	78	81	82	76	74
2500		63	64	68	73	76	83	82	76	79	80	83	77	72
3150		62	63	66	71	74	82	79	74	77	81	83	78	73
4000		60	60	63	69	72	78	76	73	77	81	81	79	71
5000		57	57	61	66	67	74	73	71	76	79	80	78	71
6300		54	54	57	59	61	67	66	69	75	78	79	76	70
8000		53	53	54	57	60	67	65	67	73	76	77	74	67
10000		49	50	51	56	58	66	64	64	71	73	74	70	63
OVERALL		92	93	93	94	94	101	100	97	97	97	96	94	92

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

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

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-320
RUN 06
23 AUG 74
PAGE F6

NOISE SOURCE/SUBJECT: MA-8 AIR CONDITIONER NEAR FIELD NOISE LEVELS (INSIDE HANGER)

OPERATION: COOLING CYCLE

FREQ (HZ) / DISTANCE (M) -> / ANGLE (DEG) -->	2 160	2 180	2 200	2 220	2 240	2 260	2 280	2 300	2 320	2 340	OPERATOR LOCATION TEST CONDITION 1/8
25	70<		72<	70<	69<	62<				62<	
31.5	74		73	67<	67<	67<	65<	63<	62<	65<	67<
40	73<		71<	69<	67<	67<				66<	
50	74<		75<	75<	83	88	87	86	79	76	77
63	82		83	83	90	91	92	92	88	84	86
80	72<		76<	76<	73<	74<	74<	74<	73<	75<	74<
100	77<		74<	73<	74<	73<	73<	76<	77<	80<	74<
125	84		79<	79<	77<	75<	75<	79<	83	84	81<
160	80		81	81	83	84	80	81	84	87	80
200	83		80	80	81	80	75	81	83	86	79
250	82		80	80	79	77	78	81	83	86	77
315	81		80	80	79	76	80	82	84	87	77
400	83		82	81	81	76	77	77	81	87	77
500	78		79	77	77	77	76	78	84	90	77
630	83		84	80	77	75	74	75	82	88	75
800	80		82	80	76	72	72	74	84	88	75
1000	75		75	75	74	71	71	72	82	87	73
1250	78		75	76	72	69	71	71	81	87	72
1600	71		72	75	71	69	70	70	78	86	71
2000	71		70	72	70	67	67	68	77	84	69
2500	69		68	72	67	65	65	66	72	81	66
3150	67		66	69	65	64	65	66	70	78	65
4000	66		64	71	64	62	63	63	67	76	65
5000	64		62	68	61	59	60	61	64	72	62
6300	61		59	66	60	57	58	58	59	65	61
8000	59		58	65	57	56	57	56	58	64	60
10000	56		55	61	55	51	53	53	56	63	59
OVERALL	92		92	91	93	94	94	94	95	98	90

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

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

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-320
RUN 07
23 AUG 74
PAGE F7

NOISE SOURCE/SUBJECT: MA-8 AIR CONDITIONER, NEAR FIELD NOISE LEVELS (INSIDE HANGER)

OPERATION: HEAT CYCLE

FREQ (HZ) / DISTANCE (M) -> / ANGLE (DEG) -->	4 @ 0	4 @ 20	4 @ 40	4 @ 60	4 @ 80	4 @ 100	4 @ 120	4 @ 140	4 @ 160	4 @ 180	4 @ 200	4 @ 220	4 @ 240
25										67<			
31.5								60<	61<	62<	63<		
40													
50		67<	71<	72<	72<	70<	66<		68<	66<	70<	72<	73<
63		77<	81	82	82	79	73<	71<	76<	75<	78	81	82
80										67<	72<	73<	71<
100		73<				71<		72<					
125	79<	81<	75<		75<	80<	78<	77<					
160	71<	74<	71<	69<	75	74	72<	71<	67<	68<	65<	71<	68<
200	69<	70<	71<	71<	74	74	71<	70<	69<	68<	68<	68<	67<
250	74<	73<	71<	74<	75<	75<	75<	74<	72<	73<	72<	72<	70<
315	71	67<	69<	71	70<	71<	71<	70<	71<	70<	72	72	72
400	67<	67<	67<	69<	69<	68<	68<	69<	67<	70<	67<	69<	68<
500	65<	66<	66<	69<	68<	68<	67<	69<	70<	70<	69<	68<	65<
630	66<	65<	68	67	69	70	71	71	72	71	75	76	74
800	68<	67<	69	69	70	70	70	71	73	72	73	74	72
1000	65<	67	69	68	68	68	68	70	70	67	67	69	66
1250	68	68	69	70	69	68	69	69	69	64	66	68	64
1600	63	66	69	69	70	69	67	64	62	60<	60<	63	64
2000	64	69	71	70	70	70	68	65	63	60	62	62	64
2500	63	66	69	71	71	73	70	66	64	58	60	61	63
3150	61	64	70	71	73	72	70	68	62	56	58	58	60
4000	60	63	67	70	72	72	70	66	61	54<	56	57	59
5000	57	63	68	71	72	72	70	67	60	53<	55	55	57
6300	54	62	68	70	72	72	70	66	60	50<	55	54	56
8000	53	60	66	69	70	70	68	64	56	47<	50<	50<	54
10000	50	55	62	65	66	67	65	62	53	46<	44<	47<	51
OVERALL	83	85	85	86	86	86	84	84	82	82	83	85	84

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

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

NOISE SOURCE/SUBJECT:
MA-8 AIR CONDITIONER
NEAR FIELD NOISE LEVELS
(INSIDE HANGER)

OPERATION:
HEAT CYCLE

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-320
RUN 08
23 AUG 74
PAGE F8

FREQ (HZ) / DISTANCE (M) -> / ANGLE (DEG) -->	4 260	4 280	4 300	4 320	4 340	2 0	2 20	2 40	2 60	2 80	2 100	2 120	2 140
25													68<
31.5												63<	62<
40													
50	72<	72<	72<	69<		68<	72<	78	80	78	74<	69<	69<
63	82	82	81	79	73<	76<	82	87	89	87	84	77<	72<
80	70<	72<	71<	68<		67<	68<	76<	78	80	78	75<	72<
100						80<	77<	72<		73<	76<	76<	76<
125	75<	73<			76<	88	85	80<	75<	81<	84	83	83
160	65<	67<	68<	70<	70<	83	86	81	84	85	84	82	78
200	66<	67<	67<	70<	69<	78	82	80	84	85	85	82	79
250	69<	70<	69<	71<	72<	78	74<	78	79	79	80	81	77
315	71	69<	67<	70<	70<	74	73	74	76	78	77	75	73
400	68<	67<	67<	67<	67<	74	73	72	75	77	78	76	73
500	65<	66<	65<	65<	66<	71	71	72	74	74	76	75	73
630	66<	66<	70	68	69	72	71	72	72	75	75	75	81
800	66<	69	69	68<	68<	74	72	75	74	76	77	76	81
1000	67	67	67	67	68	72	71	76	75	72	73	72	75
1250	68	68	68	69	68	72	71	73	76	77	74	73	75
1600	65	67	66	67	66	69	69	71	74	75	76	72	70
2000	64	65	66	67	65	71	69	75	77	77	77	72	70
2500	64	65	65	65	65	68	67	71	75	77	78	73	69
3150	63	64	64	65	64	67	66	70	76	79	79	76	70
4000	61	62	62	63	62	66	64	70	77	79	78	76	70
5000	59	60	59	60	59	63	62	70	77	78	79	76	70
6300	57	58	58	57	55	58	59	69	77	78	78	74	68
8000	55	56	55	55	55	59	57	67	76	77	76	73	65
10000	52	53	52	52	52	57	55	64	73	74	74	69	62
OVERALL	84	84	84	83	82	91	91	91	93	94	93	91	90

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

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

NOISE SOURCE/SUBJECT: MA-8 AIR CONDITIONER NEAR FIELD NOISE LEVELS (INSIDE HANGER)

OPERATION: HEAT CYCLE

IDENTIFICATION: OMEGA 3.2 TEST 71-020-320 RUN 09 23 AUG 74 PAGE F9

FREQ (HZ) / DISTANCE (M) -> / ANGLE (DEG) -->	2 160	2 180	2 200	2 220	2 240	2 260	2 280	2 300	2 320	2 340	OPERATOR LOCATION TEST CONDITION 1/C
25	71<		69<								
31.5	69<		66<	64<					61<		62<
40	69<		67<								
50	71<		70<	72<	74<	75<	75<	75<	72<	65<	73<
63	77<		78	81	83	84	84	84	81	72<	82
80	75<		73<	71<	69<	69<	72<	71<	70<	69<	69<
100	76<		75<	72<				74<	78<	80<	75<
125	82<		81<	81<	79<	75<	77<	82<	87	87	83
160	76		72<	73<	76	76	78	81	81	77	75
200	77		74	72<	74	74	76	78	78	76	74
250	77		75<	72<	73<	74<	75<	77	76	78	74<
315	76		75	74	72	75	75	73	74	73	75
400	76		74	74	70<	73	74	72<	73	73	74
500	77		74	72	69<	69<	72	71	70<	69<	72
630	84		84	78	71	73	73	72	73	73	72
800	83		82	78	71	72	76	76	75	74	70
1000	76		74	72	69	71	73	71	71	72	71
1250	77		70	71	68	72	74	74	72	73	71
1600	67		67	69	68	72	73	71	71	70	69
2000	69		64	66	67	72	73	71	70	70	68
2500	67		64	65	66	70	73	72	70	68	68
3150	64		61	62	64	68	71	70	68	68	67
4000	63		59	62	62	68	69	68	66	68	67
5000	60		58	61	59	65	68	67	64	63	63
6300	58		55	60	58	64	66	65	62	59	61
8000	55		53	57	56	62	64	63	61	58	61
10000	53		51	52	51	59	61	60	58	57	58
OVERALL	90		89	88	87	88	89	90	90	90	88

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: 2 MEASURED SOUND PRESSURE LEVEL (DB) OCTAVE BAND	IDENTIFICATION:
NOISE SOURCE/SUBJECT: MA-8 AIR CONDITIONER NEAR FIELD NOISE LEVELS (INSIDE HANGER)	OPERATION: VENT CYCLE
	OMEGA 3.2 TEST 71-020-320 RUN 01
	23 AUG 74
	PAGE J1

FREQ (HZ)	DISTANCE (M) --> / ANGLE (DEG) -->	4 / 0	4 / 20	4 / 40	4 / 60	4 / 80	4 / 100	4 / 120	4 / 140	4 / 160	4 / 180	4 / 200	4 / 220	4 / 240
31.5											68	69		
63		76	78	80	82	84	84	81	79	79	79	77	70	77
125			78	76	81	84	83	82	79	74	73		78	82
250		77	77	76	78	77	79	78	79	79	79	79	77	78
500		75	72	74	71	73	73	73	75	75	77	76	74	72
1000		72	72	74	73	73	73	74	75	76	76	75	73	72
2000		69	71	74	74	73	74	72	69	68	66	65	65	63
4000		64	69	73	76	77	76	75	73	67	62	61	61	59
8000		59	68	74	77	78	77	77	72	65	55	58	57	56
OVERALL		82	84	85	87	89	88	87	85	84	85	83	82	85

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

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-320
RUN 02
23 AUG 74
PAGE J2

NOISE SOURCE/SUBJECT:
MA-8 AIR CONDITIONER
NEAR FIELD NOISE LEVELS
(INSIDE HANGER)

OPERATION:
VENT CYCLE

FREQ (HZ)	DISTANCE (M) ->	4	4	4	4	4	2	2	2	2	2	2	2	2
	ANGLE (DEG) -->	260	280	300	320	340	0	20	40	60	80	100	120	140
31.5									64	69	69	65		73
63		80	82	84	83	77	84	85	88	90	90	88	85	82
125		79	80	80			84	80	82	85	87	87	87	86
250		75	77	77	74	75	81	79	80	83	83	83	84	83
500		71	69	70	71	73	78	77	76	77	77	78	77	81
1000		67	66	68	71	72	75	74	77	77	77	78	76	80
2000		62	62	64	67	69	73	72	76	79	79	79	75	73
4000		60	59	60	64	65	70	69	75	81	83	83	80	75
8000		55	54	55	57	59	63	66	76	84	84	83	80	74
OVERALL		84	85	86	84	81	89	88	90	93	94	93	92	90

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

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-320
RUN 03
23 AUG 74
PAGE J3

NOISE SOURCE/SUBJECT:
MA-8 AIR CONDITIONER
NEAR FIELD NOISE LEVELS
(INSIDE HANGER)

OPERATION:
VENT CYCLE

FREQ (HZ)	DISTANCE (M)-> 2	2	2	2	2	2	2	2	2	2	OPERATOR LOCATION
	ANGLE (DEG)--> 160	180	200	220	240	260	280	300	320	340	TEST CONDITION 1/A
31.5	76	76	76	70	70						
63	82	82	80	77	77	83	84	85	83	80	77
125	84	82	81	80	80	81	84	83	82	86	83
250	83	80	81	79	78	81	82	82	81	83	79
500	83	83	83	80	74	74	73	73	75	79	77
1000	84	82	82	77	71	69	70	70	74	76	73
2000	72	70	67	69	67	66	67	65	68	73	70
4000	68	65	64	66	65	65	65	63	65	71	69
8000	63	58	59	62	61	50	60	59	60	63	66
OVERALL	91	89	89	86	84	87	89	89	87	89	86

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

NOISE SOURCE/SUBJECT:
MA-8 AIR CONDITIONER
NEAR FIELD NOISE LEVELS
(INSIDE HANGER)

OPERATION:
COOLING CYCLE

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-320
RUN 04
23 AUG 74
PAGE J4

FREQ (HZ)	DISTANCE (M) -> / ANGLE (DEG) -->	4 / 0	4 / 20	4 / 40	4 / 60	4 / 80	4 / 100	4 / 120	4 / 140	4 / 160	4 / 180	4 / 200	4 / 220	4 / 240
31.5		67		69		70	71	73	74	69	70	74	71	70
63		78	81	84	87	88	87	85	81	78	78	83	86	88
125		82	85	83	81	77	81	82	81	78	77	80	82	82
250		89	89	87	82	83	83	82	81	81	80	86	84	82
500		89	87	85	79	79	78	78	79	78	79	86	87	84
1000		90	88	86	81	78	78	77	77	76	76	81	82	79
2000		85	84	80	76	76	75	74	73	71	71	75	74	74
4000		77	76	75	76	77	77	75	72	67	65	71	70	67
8000		64	69	73	77	78	77	76	72	65	56	62	63	59
OVERALL		95	94	93	90	91	90	89	88	86	86	91	92	91

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

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-320
RUN 05
23 AUG 74
PAGE J5

NOISE SOURCE/SUBJECT:
MA-8 AIR CONDITIONER
NEAR FIELD NOISE LEVELS
(INSIDE HANGER)

OPERATION:
COOLING CYCLE

FREQ (HZ)	DISTANCE (M) -> / ANGLE (DEG) -->	4 260	4 280	4 300	4 320	4 340	2 0	2 20	2 40	2 60	2 80	2 100	2 120	2 140
31.5						66	75	73	71	72	73	72	72	74
63		91	92	91	88	86	90	86	81	90	90	88	83	81
125		80	81	82	82	82	92	92	91	87	88	87	87	86
250		79	82	82	87	89	95	95	92	93	92	91	90	86
500		80	79	82	86	87	94	93	88	85	84	85	84	84
1000		76	76	82	87	89	95	93	89	85	85	84	82	82
2000		71	71	75	80	84	91	89	83	84	85	88	81	78
4000		65	65	69	74	76	83	81	77	81	85	86	83	77
8000		57	57	59	62	64	71	70	72	78	81	81	79	72
OVERALL		92	93	93	94	94	101	100	97	97	97	96	94	92

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

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-320
RUN 06
23 AUG 74
PAGE J6

NOISE SOURCE/SUBJECT:
MA-8 AIR CONDITIONER
NEAR FIELD NOISE LEVELS
(INSIDE HANGER)

OPERATION:
COOLING CYCLE

FREQ (HZ)	DISTANCE (M) -> 2	2	2	2	2	2	2	2	2	2	OPERATOR LOCATION
	ANGLE (DEG) --> 160	180	200	220	240	260	280	300	320	340	TEST CONDITION 1/8
31.5	77		77	74	73	71				69	
63	83		85	84	90	93	93	93	88	85	86
125	86		83	83	84	85	81	84	87	89	84
250	87		85	85	85	83	83	86	88	91	82
500	86		87	84	83	81	81	82	87	93	81
1000	82		83	82	79	76	76	77	87	92	78
2000	75		75	78	74	72	72	73	81	89	74
4000	70		69	74	68	67	68	68	72	81	69
8000	64		62	69	63	60	61	61	62	69	65
OVERALL	92		92	91	93	94	94	94	95	98	90

TABLE: 2 MEASURED SOUND PRESSURE LEVEL (DB) OCTAVE BAND														IDENTIFICATION: OMEGA 3.2 TEST 71-020-320 RUN 07 23 AUG 74 PAGE J7
NOISE SOURCE/SUBJECT: MA-8 AIR CONDITIONER NEAR FIELD NOISE LEVELS (INSIDE HANGER)		OPERATION: HEAT CYCLE												
FREQ (HZ)	DISTANCE (M)-> ANGLE (DEG)-->	4 0	4 20	4 40	4 60	4 80	4 100	4 120	4 140	4 160	4 180	4 200	4 220	4 240
31.5											68			
63			77	81	82	82	79	74		77	76	79	82	83
125		80	82	77		78	81	79	79					
250		77	75	75	77	78	78	77	76	76	76	76	76	75
500		71	71	72	73	73	73	74	75	75	75	76	77	75
1000		72	72	73	74	74	73	74	74	76	74	75	76	73
2000		68	72	74	75	75	76	73	70	68	64	65	67	68
4000		64	68	73	75	77	77	75	72	66	59	61	62	64
8000		57	65	71	73	74	74	73	69	62	53	56	56	59
OVERALL		83	85	85	85	86	86	84	83	82	82	83	85	84

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

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-320
RUN 08
23 AUG 74
PAGE J8

NOISE SOURCE/SUBJECT:
MA-8 AIR CONDITIONER
NEAR FIELD NOISE LEVELS
(INSIDE HANGER)

OPERATION:
HEAT CYCLE

FREQ (HZ)	DISTANCE (M) ->	4	4	4	4	4	2	2	2	2	2	2	2	2
	ANGLE (DEG) -->	260	280	300	320	340	0	20	40	60	80	100	120	140
31.5														69
63		82	83	82	79		77	82	87	90	88	85	79	76
125		75	74			77	90	89	84	84	87	87	86	85
250		74	73	73	75	76	82	83	83	86	87	86	85	82
500		71	71	72	71	72	77	77	76	78	80	81	80	82
1000		72	73	73	73	72	77	76	80	80	80	80	79	82
2000		69	70	70	71	70	74	73	77	80	81	82	77	75
4000		66	67	67	68	66	70	69	75	81	83	83	80	75
8000		60	61	60	60	59	62	62	72	80	81	81	77	71
OVERALL		84	84	84	82	81	91	91	91	93	94	93	91	90

TABLE: 2 MEASURED SOUND PRESSURE LEVEL (DB) OCTAVE BAND											IDENTIFICATION: OMEGA 3.2 TEST 71-020-320 RUN 09 23 AUG 74 PAGE J9
NOISE SOURCE/SUBJECT: MA-8 AIR CONDITIONER NEAR FIELD NOISE LEVELS (INSIDE HANGER)	OPERATION: HEAT CYCLE										
DISTANCE (M) ->	2	2	2	2	2	2	2	2	2	2	OPERATOR LOCATION
FREQ (HZ) / ANGLE (DEG) -->	160	180	200	220	240	260	280	300	320	340	TEST CONDITION 1/C
31.5	74		72								
63	79		80	82	83	84	84	85	82	74	83
125	84		83	82	81	79	80	85	88	88	84
250	82		79	78	78	79	80	81	81	81	79
500	85		85	80	75	77	78	76	77	77	77
1000	84		83	79	74	76	79	79	77	78	75
2000	73		70	72	72	76	78	76	75	74	73
4000	67		64	66	67	72	74	73	71	71	70
8000	60		58	62	61	67	69	68	65	63	65
OVERALL	90		89	88	87	88	89	90	90	90	88

TABLE: MEASURES OF HUMAN NOISE EXPOSURE

3

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-320
RUN 01
23 AUG 74
PAGE H1

NOISE SOURCE/SUBJECT:
MA-8 AIR CONDITIONER
NEAR FIELD NOISE LEVELS
(INSIDE HANGER)

OPERATION:
VENT CYCLE

DISTANCE (M)->	4	4	4	4	4	4	4	4	4	4	4	4	4
ANGLE (DEG)-->	0	20	40	60	80	100	120	140	160	180	200	220	240
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	82	84	84	86	88	88	86	85	84	84	84	82	84
OASLA	77	78	81	82	83	82	82	80	79	79	78	77	76
T	960	960	807	679	571	679	679	960	960	960	960	960	960
MINIMUM QPL EAR MUFFS													
OASLA*	58	60	60	63	65	64	63	62	60	60	60	59	62
T	960	960	960	960	960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS													
OASLA*	54	56	56	59	61	61	59	57	56	56	56	54	58
T	960	960	960	960	960	960	960	960	960	960	960	960	960
V-51R EAR PLUGS													
OASLA*	54	53	55	55	56	56	56	56	56	57	56	54	53
T	960	960	960	960	960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS													
OASLA*	39	40	42	43	45	44	43	42	42	42	41	40	40
T	960	960	960	960	960	960	960	960	960	960	960	960	960
H-133 GROUND COMMUNICATION UNIT													
OASLA*	50	52	54	55	57	56	55	54	52	52	51	50	51
T	960	960	960	960	960	960	960	960	960	960	960	960	960
COMMUNICATION													
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)													
PSIL	72	72	74	73	73	73	73	73	73	73	72	71	69
ANNOYANCE													
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)													
TONE CORRECTION (C IN DB)													
PNLT	90	93	96	98	100	99	98	96	93	91	90	89	90
C	1	1	1	1	2	2	1	1	2	1	1	1	1

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE: MEASURES OF HUMAN NOISE EXPOSURE

3

IDENTIFICATION:

OMEGA 3.2
TEST 71-020-320
RUN 02
23 AUG 74
PAGE H2

NOISE SOURCE/SUBJECT:

MA-8 AIR CONDITIONER
NEAR FIELD NOISE LEVELS
(INSIDE HANGER)

OPERATION:

VENT CYCLE

DISTANCE (M)->	4	4	4	4	4	2	2	2	2	2	2	2	2
ANGLE (DEG)-->	260	280	300	320	340	0	20	40	60	80	100	120	140
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	83	85	86	83	82	89	87	90	92	93	92	91	90
OASLA	73	73	74	75	77	81	80	83	88	88	88	86	84
T	960	960	960	960	960	807	960	571	240	240	240	339	480
MINIMUM QPL EAR MUFFS													
OASLA*	60	62	62	58	58	65	64	66	68	69	69	68	67
T	960	960	960	960	960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS													
OASLA*	57	58	59	56	54	61	60	63	65	66	65	64	62
T	960	960	960	960	960	960	960	960	960	960	960	960	960
V-51R EAR PLUGS													
OASLA*	51	52	52	52	53	58	57	58	60	61	61	60	60
T	960	960	960	960	960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS													
OASLA*	39	40	41	39	39	45	44	46	49	50	49	47	47
T	960	960	960	960	960	960	960	960	960	960	960	960	960
H-133 GROUND COMMUNICATION UNIT													
OASLA*	50	51	52	51	50	56	55	58	61	62	61	59	58
T	960	960	960	960	960	960	960	960	960	960	960	960	960
COMMUNICATION													
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)													
PSIL	67	66	67	70	72	76	74	76	78	78	78	76	78
ANNOYANCE													
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)													
TONE CORRECTION (C IN DB)													
PNLT	88	88	89	88	89	94	94	99	104	105	104	102	99
C	1	1	1	0	0	0	1	1	2	1	1	1	1

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE: 3 MEASURES OF HUMAN NOISE EXPOSURE

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-320
RUN 03
23 AUG 74
PAGE H3

NOISE SOURCE/SUBJECT: MA-8 AIR CONDITIONER NEAR FIELD NOISE LEVELS (INSIDE HANGER)

OPERATION: VENT CYCLE

DISTANCE (M) ->	2	2	2	2	2	2	2	2	2	2	OPERATOR LOCATION
ANGLE (DEG) -->	160	180	200	220	240	260	280	300	320	340	TEST CONDITION 1/A
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	90	89	89	86	84	87	88	88	87	89	86
OASLA	86	85	85	81	77	77	78	77	79	82	79
T	339	404	404	807	960	960	960	960	960	679	960
MINIMUM QPL EAR MUFFS											
OASLA*	67	65	65	63	61	63	65	65	64	66	63
T	960	960	960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS											
OASLA*	62	61	60	58	57	60	62	62	60	62	59
T	960	960	960	960	960	960	960	960	960	960	960
V-51R EAR PLUGS											
OASLA*	63	62	62	58	53	55	56	55	56	58	56
T	960	960	960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS											
OASLA*	49	47	47	44	40	42	43	43	43	45	42
T	960	960	960	960	960	960	960	960	960	960	960
H-133 GROUND COMMUNICATION UNIT											
OASLA*	59	57	56	53	52	53	55	55	54	57	54
T	960	960	960	960	960	960	960	960	960	960	960
COMMUNICATION											
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)											
PSIL	80	79	78	75	71	70	70	69	73	76	73
ANNOYANCE											
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)											
TONE CORRECTION (C IN DB)											
PNLT	100	97	96	94	90	92	93	92	92	96	94
C	2	1	1	1	0	1	1	1	0	1	1

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE: 3 MEASURES OF HUMAN NOISE EXPOSURE														IDENTIFICATION: OMEGA 3.2 TEST 71-820-320 RUN 04 23 AUG 74 PAGE H4
NOISE SOURCE/SUBJECT: MA-8 AIR CONDITIONER NEAR FIELD NOISE LEVELS (INSIDE HANGER)	OPERATION: COOLING CYCLE													
DISTANCE (M)->		4	4	4	4	4	4	4	4	4	4	4	4	4
ANGLE (DEG)-->		0	20	40	60	80	100	120	140	160	180	200	220	240
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	92	90	90	90	89	87	86	85	91	91	91
OASLA		93	91	89	85	84	84	83	82	81	81	87	87	84
T		101	143	202	404	480	480	571	679	807	807	285	285	480
MINIMUM QPL EAR MUFFS														
OASLA*		70	70	68	65	65	66	65	64	62	62	67	67	66
T		960	960	960	960	960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS														
OASLA*		65	65	64	62	63	62	61	60	58	57	63	63	63
T		960	960	960	960	960	960	960	960	960	960	960	960	960
V-51R EAR PLUGS														
OASLA*		69	67	65	61	60	59	58	58	57	58	64	64	61
T		960	960	960	960	960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS														
OASLA*		54	53	51	47	47	46	45	44	43	43	49	50	48
T		960	960	960	960	960	960	960	960	960	960	960	960	960
H-133 GROUND COMMUNICATION UNIT														
OASLA*		65	64	62	59	58	58	57	55	54	53	58	59	58
T		960	960	960	960	960	960	960	960	960	960	960	960	960
COMMUNICATION														
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)														
PSIL		88	86	84	79	77	77	76	76	75	75	81	81	79
ANNOYANCE														
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)														
TONE CORRECTION (C IN DB)														
PNLT		105	104	102	100	100	99	98	96	94	93	99	100	98
C		1	1	1	1	1	1	1	1	1	1	1	1	2

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE: 3 MEASURES OF HUMAN NOISE EXPOSURE

NOISE SOURCE/SUBJECT: MA-8 AIR CONDITIONER NEAR FIELD NOISE LEVELS (INSIDE HANGER)

OPERATION: COOLING CYCLE

IDENTIFICATION: OMEGA 3.2 TEST 71-020-320 RUN 05 23 AUG 74 PAGE H5

DISTANCE (M) ->	4	4	4	4	4	2	2	2	2	2	2	2	2
ANGLE (DEG) -->	260	280	300	320	340	0	20	40	60	80	100	120	140
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	91	92	92	93	94	101	100	97	96	96	96	94	92
OASLA	81	81	85	89	92	99	97	92	91	92	93	90	87
T	807	807	404	202	120	36	50	120	143	120	101	170	285
MINIMUM QPL EAR MUFFS													
OASLA*	66	67	67	68	69	77	76	73	72	72	72	71	69
T	960	960	960	960	960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS													
OASLA*	64	65	64	64	65	72	71	68	68	68	67	66	64
T	960	960	960	960	960	960	960	960	960	960	960	960	960
V-51R EAR PLUGS													
OASLA*	59	59	62	66	68	75	73	69	67	66	67	65	63
T	960	960	960	960	960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS													
OASLA*	47	47	49	52	53	60	59	54	53	53	53	51	49
T	960	960	960	960	960	960	960	960	960	960	960	960	960
H-133 GROUND COMMUNICATION UNIT													
OASLA*	58	59	60	62	64	71	69	65	65	66	66	63	60
T	960	960	960	960	960	960	960	960	960	960	960	960	960
COMMUNICATION													
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)													
PSIL	76	76	80	84	87	94	92	86	85	85	86	83	81
ANNOYANCE													
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)													
TONE CORRECTION (C IN DB)													
PNLT	94	95	98	102	104	111	108	104	105	107	109	104	101
C	0	0	1	1	1	1	0	0	0	0	1	0	1

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE: 3 MEASURES OF HUMAN NOISE EXPOSURE

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-320
RUN 06
23 AUG 74
PAGE H6

NOISE SOURCE/SUBJECT: MA-8 AIR CONDITIONER NEAR FIELD NOISE LEVELS (INSIDE HANGER)

OPERATION: COOLING CYCLE

DISTANCE (M) ->	2	2	2	2	2	2	2	2	2	2	OPERATOR LOCATION
ANGLE (DEG) -->	160	180	200	220	240	260	280	300	320	340	TEST CONDITION
											1/8
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	92	92	91	93	93	93	94	94	98	90	
OASLA	87	87	86	84	82	82	84	90	96	83	
T	285	285	339	480	679	679	480	170	60	571	
MINIMUM QPL EAR MUFFS											
OASLA*	69	68	67	68	69	68	69	70	74	67	
T	960	960	960	960	960	960	960	960	960	960	
AMERICAN OPTICAL 1700 EAR MUFFS											
OASLA*	64	63	63	65	66	66	67	66	69	63	
T	960	960	960	960	960	960	960	960	960	960	
V-51R EAR PLUGS											
OASLA*	64	64	63	62	60	60	62	67	72	60	
T	960	960	960	960	960	960	960	960	960	960	
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS											
OASLA*	50	50	49	49	49	48	49	53	57	47	
T	960	960	960	960	960	960	960	960	960	960	
H-133 GROUND COMMUNICATION UNIT											
OASLA*	60	59	59	59	60	60	60	63	68	57	
T	960	960	960	960	960	960	960	960	960	960	
COMMUNICATION											
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)											
PSIL	81	81	81	79	76	76	77	85	91	78	
ANNOYANCE											
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)											
TONE CORRECTION (C IN DB)											
PNLT	101	100	99	98	97	97	97	101	107	96	
C	2	1	0	1	1	1	0	0	0	1	

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE: 3 MEASURES OF HUMAN NOISE EXPOSURE

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-320
RUN 07
23 AUG 74
PAGE H7

NOISE SOURCE/SUBJECT: MA-8 AIR CONDITIONER NEAR FIELD NOISE LEVELS (INSIDE HANGER)

OPERATION: HEAT CYCLE

DISTANCE (M)->	4	4	4	4	4	4	4	4	4	4	4	4	4
ANGLE (DEG)-->	0	20	40	60	80	100	120	140	160	180	200	220	240
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	83	85	84	85	86	86	84	83	82	81	83	85	84
OASLA	76	78	80	81	82	82	81	79	79	77	78	79	77
T	960	960	960	807	679	679	807	960	960	960	960	960	960
MINIMUM QPL EAR MUFFS													
OASLA*	60	62	60	60	62	63	60	60	57	57	58	60	59
T	960	960	960	960	960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS													
OASLA*	55	58	56	57	58	58	56	55	53	53	54	57	56
T	960	960	960	960	960	960	960	960	960	960	960	960	960
V-51R EAR PLUGS													
OASLA*	53	53	54	55	56	55	55	55	55	54	55	56	54
T	960	960	960	960	960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS													
OASLA*	39	41	41	42	43	43	41	41	41	40	41	42	41
T	960	960	960	960	960	960	960	960	960	960	960	960	960
H-133 GROUND COMMUNICATION UNIT													
OASLA*	51	53	54	55	56	56	54	53	51	49	51	52	52
T	960	960	960	960	960	960	960	960	960	960	960	960	960
COMMUNICATION													
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)													
PSIL	70	72	73	74	74	74	73	73	73	71	72	73	72
ANNOYANCE													
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)													
TONE CORRECTION (C IN DB)													
PNLT	92	93	98	99	100	98	99	94	93	88	90	92	91
C	3	1	3	3	3	1	3	1	3	1	1	2	2

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE: 3 MEASURES OF HUMAN NOISE EXPOSURE	IDENTIFICATION:
NOISE SOURCE/SUBJECT: MA-8 AIR CONDITIONER NEAR FIELD NOISE LEVELS (INSIDE HANGER)	OPERATION: HEAT CYCLE
	OMEGA 3.2 TEST 71-020-320 RUN 08 23 AUG 74 PAGE H8

DISTANCE (M) ->	4	4	4	4	4	2	2	2	2	2	2	2	2
ANGLE (DEG) -->	260	280	300	320	340	0	20	40	60	80	100	120	140
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	84	84	83	82	82	91	91	90	93	93	93	90	89
OASLA	76	77	77	78	77	82	82	84	88	89	89	86	86
T	960	960	960	960	960	679	679	480	240	202	202	339	339
MINIMUM QPL EAR MUFFS													
OASLA*	60	59	58	58	58	69	69	67	68	70	69	68	66
T	960	960	960	960	960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS													
OASLA*	57	57	56	54	54	64	64	63	65	66	65	63	61
T	960	960	960	960	960	960	960	960	960	960	960	960	960
V-51R EAR PLUGS													
OASLA*	52	53	53	53	53	59	58	59	61	62	62	61	62
T	960	960	960	960	960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS													
OASLA*	40	40	40	39	39	47	46	47	49	50	49	47	48
T	960	960	960	960	960	960	960	960	960	960	960	960	960
H-133 GROUND COMMUNICATION UNIT													
OASLA*	52	52	52	51	51	59	58	59	61	62	62	60	58
T	960	960	960	960	960	960	960	960	960	960	960	960	960
COMMUNICATION													
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)													
PSIL	71	71	72	72	72	76	75	78	79	80	81	79	80
ANNOYANCE													
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)													
TONE CORRECTION (C IN DB)													
PNLT	91	91	90	90	93	98	97	100	103	105	105	102	99
C	1	1	0	0	3	1	1	1	1	1	1	1	1

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE: 3 MEASURES OF HUMAN NOISE EXPOSURE

IDENTIFICATION:
OMEGA 3.2
TEST 71-020-320
RUN 09
23 AUG 74
PAGE H9

NOISE SOURCE/SUBJECT: MA-8 AIR CONDITIONER NEAR FIELD NOISE LEVELS (INSIDE HANGER)

OPERATION: HEAT CYCLE

DISTANCE (M) ->	2	2	2	2	2	2	2	2	2	2	OPERATOR LOCATION
ANGLE (DEG) -->	160	180	200	220	240	260	280	300	320	340	TEST CONDITION
											1/C
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	90		89	88	86	87	88	89	90	90	88
OASLA	87		86	83	79	82	84	83	82	82	81
T	285		339	571	960	679	480	571	679	679	807
MINIMUM QPL EAR MUFFS											
OASLA*	66		65	64	63	63	64	66	68	68	65
T	960		960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS											
OASLA*	61		60	60	59	60	60	62	63	63	61
T	960		960	960	960	960	960	960	960	960	960
V-51R EAR PLUGS											
OASLA*	64		63	59	55	57	59	59	58	58	57
T	960		960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS											
OASLA*	50		49	46	43	44	46	46	46	46	44
T	960		960	960	960	960	960	960	960	960	960
H-133 GROUND COMMUNICATION UNIT											
OASLA*	59		57	56	54	56	58	58	58	58	56
T	960		960	960	960	960	960	960	960	960	960
COMMUNICATION											
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)											
PSIL	81		79	77	73	76	78	77	76	76	75
ANNOYANCE											
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)											
TONE CORRECTION (C IN DB)											
PNLT	99		98	96	93	96	99	99	98	98	96
C	2		2	1	1	0	1	2	1	1	1

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

*U.S.Government Printing Office: 1977 — 757-080/255