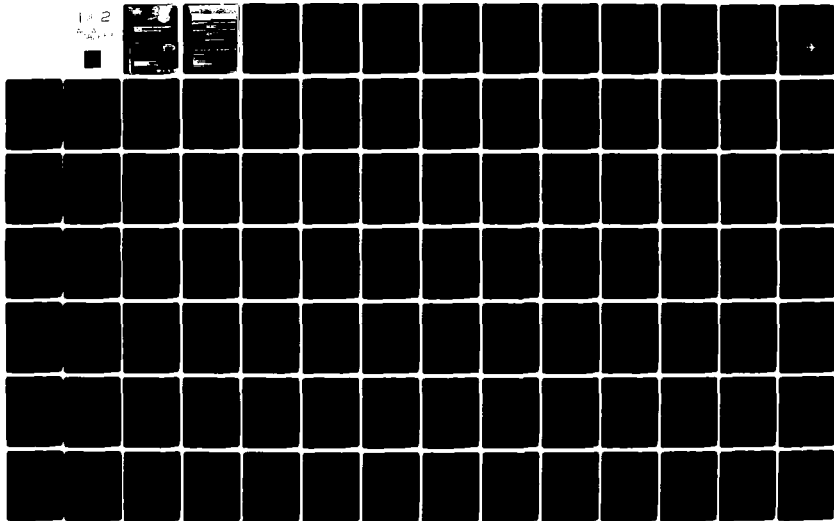
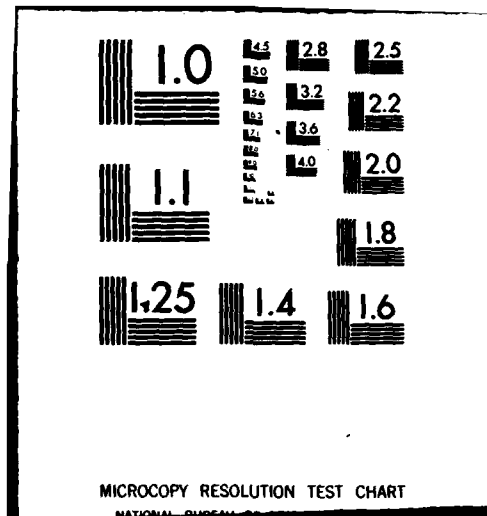


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AEROSPACE MEDICAL RESEARCH LAB WRIGHT-PATTERSON AFB OH F/G 1/2
USAF BIOENVIRONMENTAL NOISE DATA HANDBOOK. VOLUME 139. E-3A AIR-ETC(U)
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UNCLASSIFIED AMRL-TR-75-50-VOL-139 NL

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levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Far-field data measured at 19 locations are normalized to standard meteorological conditions and extrapolated from 75-8000 meters to derive sets of equal-value contours for these same seven acoustic measures as functions of angle and distance from the source. 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. A

PREFACE

This report was prepared by the Biodynamic Environment Branch, Aerospace Medical Research Laboratory, under Project/Task 723107, Technology to Define and Assess Environmental Quality of Noise from AF Operations and 72310807 Crew Safety in Operational Noise Environments.

The author gratefully acknowledges Mr. John Cole for his assistance in preparing this report, Mr. Robert Lee and Mr. Jerry Speakman for their assistance in acquiring the raw data, Mr. Henry Mohlman, Mr. Keith Kettler and Mr. Fred Lampley of the University of Dayton for assistance in the mechanics of data processing and preparation of the graphics and Mrs. Peggy Massie for assistance in typing and report preparation.

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INTRODUCTION

The USAF E-3A is an airborne warning and control system aircraft powered by four TF33-P-100A turbofan engines. The aircraft was manufactured by the Boeing Company and the engines by United Aircraft, Pratt and Whitney Division. The commercial version of the aircraft is the Boeing 707.

This volume provides measured and extrapolated data defining bioacoustic environments produced by this aircraft during ground runup operations. Such data are essential to evaluate ear protection requirements, limiting personnel exposure times, voice communication capabilities, and annoyance problems associated with ground runups of the E-3A aircraft.

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, 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 (15 C 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 each updated index.

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

AMRL acquired near-field noise data on the E-3A aircraft during ground runup operations of its turbofan engines. For these tests, the aircraft was located on a concrete taxiway at Wright-Patterson AFB with no significant reflecting surfaces in the vicinity except the ground plane. Table 1 gives the surface meteorological conditions and the engine power conditions. The ground-crew chief selected power conditions and near-field locations generally used during routine maintenance or engine runup for preflight checks.

At each near-field location a test engineer randomly moved a hand-held microphone in and around each location, probing all areas where a crew member's head would normally be located. He recorded all of the noise samples on magnetic tape. During analysis of each sample, he determined the root-mean square sound pressure using a 4- or 8-second integration time to derive a power-averaged level for each location.

Figure 1 shows the nine numbered near-field locations where ground crews are usually located for maintenance and/or preflight checkout operations. Estimates of noise levels at other locations in the near-field are difficult since the noise source is spatially distributed, i.e., not a point source. The noise levels at near-field locations can vary widely depending upon relative distances from each noise source (intake noise, exhaust noise, panel resonances, internal engine noise through the engine wall, etc.).

Table 1 lists the numeric/alphabetic designators used on the data pages in this report to identify the measurement locations and test conditions. For example, the designator 1/A means ground crew location 1 and test conditions A.

RESULTS

The measured data presented in Table 2 define the sound pressure levels (SPL) produced by the E-3A aircraft at the nine ground crew locations. This table includes the overall, 1/3 octave band, and octave band levels. From these data one can calculate the variety of measures given in Table 3 which are widely used to assess the effects of noise on personnel and their performance.

All near-field data are for the meteorological conditions at the time of test but are valid for all typical airbase meteorology because of the short sound propagation distances involved.

TABLE 1
MEASUREMENT LOCATIONS AND TEST CONDITIONS
FOR NEAR-FIELD NOISE MEASUREMENT

E-3A Aircraft, Ground Runup, Wright-Patterson AFB, OH
 29 June 1978
 Tail # 61604

Ground Crew Location

1	Engine Start
2	Engine Start
3	Engine Start
4	Engine Start
5	Air Hose Removal
6	Electric Disconnect
7	Wheel Chock Pull
8	Wing Marshall
9	Trim Adjustment

Aircraft Engine Operation

A	Engine #4 Idle
B	Engine #3 and 4 Idle
C	Engine #2, 3 and 4 Idle
D	All Engines Idle
E	All Engines 85% RPM

Meteorology

Temperature	31 C
Bar Pressure	0.742 m Hg
Rel Humidity	53 %
Wind — Speed	4.1 m/sec (8 kts)
— Direction	350 Deg

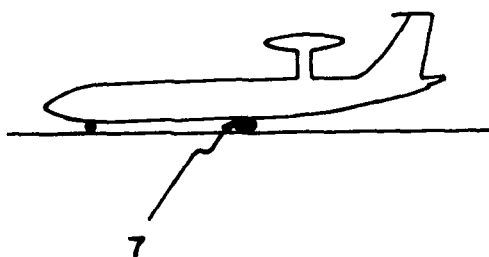
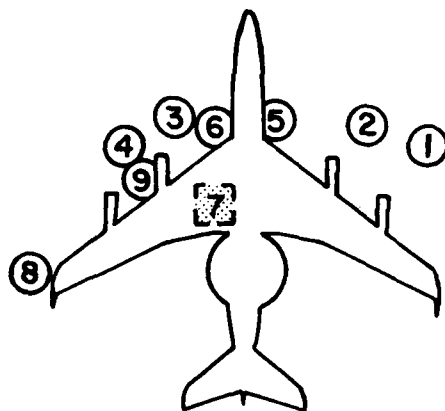


**Figure 1. Near-Field Measurement Locations on
Taxiway 16 at Wright-Patterson AFB OH**

FAR-FIELD NOISE

MEASUREMENTS

AMRL acquired near and far-field data during a one hour test period, thus keeping similar meteorological conditions throughout the test. Figure 2 shows the ground runup pad, ground cover, aircraft orientation and the 19 microphone measurement sites on a semicircle. The center of the 75 meter radius semicircle used in surveying the TF33-P-100A engines was on the ground directly below the intersection of the aircraft's centerline and the plane passing through the inboard engines' exhaust-nozzle exits. The ground runup area did not have a blast deflector; therefore, the engines' exhausts were in a "free-flow" condition.

Table 4 provides cockpit readouts of some engine characteristics (% RPM, fuel flow, etc.) for each power setting used in the far-field tests. Also listed in this table are the surface meteorological conditions during data acquisition.

All microphone measurement sites are in the acoustic far-field of the source where the sound wavefronts spherically diverge and the noise source may be regarded as a point source.

A portable microphone/tape-recorder system was used to sequentially record the noise at each far-field location. The microphone was attached to a hand-held pole, pointed at the source (0° angle of incidence) and vertically scanned from 0.5 to 3 meters for a period of 5-10 seconds during data acquisition at each microphone location. These samples were then time-integrated to derive a root-mean-square sound pressure level. Vertical scanning and time-integrating together reduce anomalies frequently present in data acquired by a fixed height microphone.

RESULTS

Table 5 lists the overall and 1/3 octave band SPL measured at the far-field locations under meteorological conditions at the time of the test. Data in all other figures and tables are based on these levels. These data were normalized to 100 meters distance and standard meteorological conditions (15 C temperature, 70% relative humidity, 0.760 meter Hg barometric pressure) and used to derive the graphic data in Figure 3 which provides a compact summary of the far-field noise characteristics of the E-3A aircraft in a standard format.

Figure 4 and Table 6 present two basic acoustic measures, the acoustic power level and the directivity index, respectively. The acoustic power level describes the power radiated by the source as a function of frequency. The directivity index is a standard acoustical engineering measure which describes the geometric way in which the source radiates this power as a function of both frequency and angle from source. These basic source measures are primarily of interest for acoustical engineers and noise generation/control specialists.

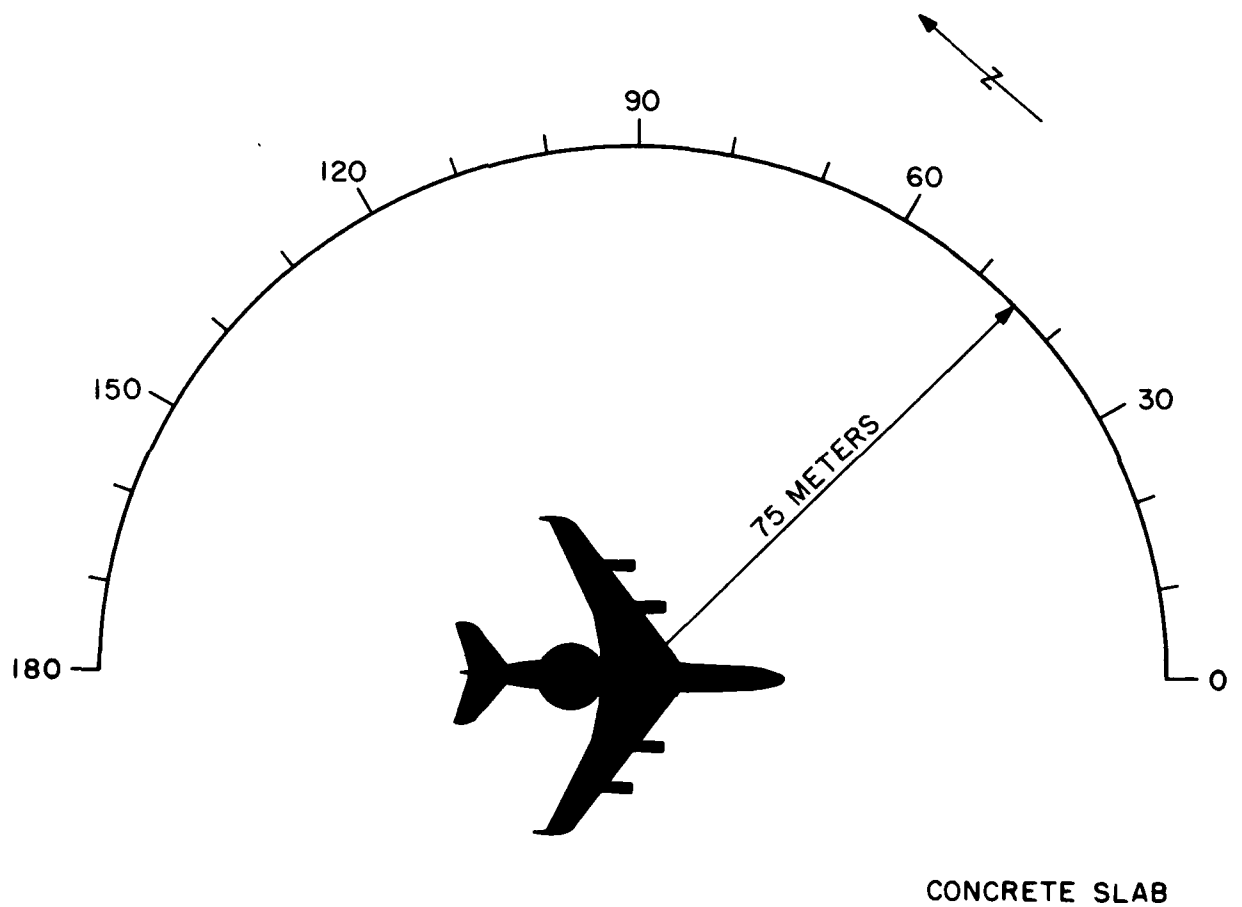


**Figure 2. Far-Field Measurement Locations at
Wright-Patterson AFB OH**

Estimates of noise characteristics for intermediate power settings (e.g., 88% engine) and/or different number of engines operating (e.g., single engine) can be determined as explained in Volume 1 of this handbook.

Figures 5 through 11 are sets of equal noise contours describing seven different measures of noise as a function of angle and distance from the source for standard day meteorology. They are respectively, overall sound pressure level, A-weighted sound level, perceived noise level, speech interference level, permissible exposure times for personnel and octave band sound pressure levels.

No data are presented from 150 through 180 degree locations for the 70% RPM nor from 160 through 180 degree locations for the 85% RPM and take off-rated thrust engine setting because of turbulent air flow behind the aircraft. Typical A-weighted levels for these angles are 10 to 20 dBA below the last measurement location.

Test personnel performed noise surveys during quiet periods when the background noise was minimal, e.g., early in the morning when no other aircraft or engine test stands were operating. Data eliminated because they were near the background/electronic noise were generally not significant because the levels were so low (e.g., Table 5 at idle power).

Volume 2 of the handbook describes the influence of meteorology on far-field noise environments, and provides, if required, the factors necessary to adjust the handbook's standard meteorological day data.

TABLE: MEASURED SOUND PRESSURE LEVEL (DB)									
1/3 OCTAVE BAND									
2									
NOISE SOURCE/SUBJECT: (OPERATION:)									
E-3A AIRCRAFT ()									
GROUND CREW ()									
NEAR FIELD NOISE LEVELS ()									
LOCATION/CONDITION									
FREQ (HZ)	1/A	2/B	3/C	4/D	5/D	6/D	7/D	8/D	9/D
25	74	78	76	78	68	88	93	81	89
31.5	76	78	80	81	89	87	93	84	94
40	77	81	80	81	90	89	93	86	91
50	80	84	84	83	89	90	94	87	93
63	85	87	87	88	92	92	95	90	95
80	81	85	84	87	89	91	93	88	93
100	80	83	86	87	90	92	96	88	92
125	82	85	81	86	84	85	92	81	90
160	80	85	82	86	86	85	89	84	90
200	83	84	84	85	87	86	94	87	93
250	84	84	84	86	89	87	94	90	94
315	87	87	86	91	90	89	96	88	95
400	91	90	89	97	92	91	96	88	99
500	99	98	98	102	97	96	98	90	102
630	98	102	95	99	98	95	99	93	103
800	98	100	98	100	97	97	101	93	107
1000	100	102	100	104	99	97	103	95	111
1250	100	103	99	101	99	98	102	95	108
1600	100	102	100	104	99	98	106	98	109
2000	103	105	103	106	106	104	112	107	115
2500	100	103	99	101	103	99	102	94	107
3150	101	102	99	102	99	97	102	96	107
4000	98	100	96	100	98	97	102	96	108
5000	98	99	96	98	96	96	100	94	106
6300	95	96	93	96	97	96	100	94	104
8000	94	96	93	95	95	95	99	95	104
10000	92	94	90	92	93	92	96	92	102
OVERALL	111	113	110	113	111	110	116	110	120

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: MEASURED SOUND PRESSURE LEVEL (DB)									
2									
NOISE SOURCE/SUBJECT: (OPERATION:)									
E-3A AIRCRAFT ()									
GROUND CREW ()									
NEAR FIELD NOISE LEVELS ()									
LOCATION/CONDITION									
1/A 2/B 3/C 4/D 5/D 6/D 7/D 8/D 8/E 9/D									
FREQ (HZ)									
31.5	80	84	84	85	94	93	98	89	96
63	87	90	90	91	95	96	99	93	98
125	85	89	88	91	92	94	98	90	95
250	90	90	90	93	93	92	100	93	99
500	102	104	100	104	101	99	102	96	106
1000	104	107	104	107	103	102	107	99	114
2000	106	108	106	109	108	106	113	107	121
4000	104	105	102	105	102	102	106	100	112
8000	99	100	97	100	100	99	103	98	108
OVERALL	111	113	110	113	111	110	116	110	120

TABLE: MEASURES OF HUMAN NOISE EXPOSURE											IDENTIFICATION:			
3														
NOISE SOURCE/SUBJECTS (OPERATIONS:											OMEGA 3.2		TEST 78-008-001	
E-3A AIRCRAFT ((													RUN 01	
GROUND CREW ((													18 JAN 79	
NEAR FIELD NOISE LEVELS ((													PAGE M1	

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.
P ADDITIONAL EAR PROTECTION REQUIRED.

TABLE 4
TEST CONDITIONS
FOR FAR-FIELD NOISE MEASUREMENTS

E-3A Aircraft, Ground Runups, Wright-Patterson AFB, OH
29 June 1978
Tail # 61604

Aircraft Engine Operation

Idle	Engines No. 2 and 3 28 % RPM (Fan Speed) 320 C EGT (Exhaust Gas Temperature) 1.05 EPR (Engine Pressure Ratio) 1050 LBS/HR FF (Fuel Flow)
70% RPM	Engine No. 3, Engine 2 Idle 70 % RPM 350 C EGT 1.225 EPR 4100 LBS/HR FF
85% RPM	Engine No. 3, Engine 2 Idle 95 % RPM 405 C EGT 1.47 EPR 6750 LBS/HR FF
95% RPM	Engine No. 3 Engine No. 2 85% RPM, Others Idle 85 % RPM 500 C EGT 1.84 EPR 10,000 LBS/HR FF

Meteorology

Temperature	31 C
Bar Pressure	0.742 m Hg
Rel Humidity	53 %
Wind — Speed	4.1 m/sec (8 kts)
— Direction	

TABLE: MEASURED SOUND PRESSURE LEVEL (DB)																
1/3 OCTAVE BAND																
DISTANCE = 75 METERS																
NOISE SOURCE/SUBJECT: (OPERATION:) METEOROLOGY:) IDENTIFICATION:																
E-3A AIRCRAFT (70% RPM ENGINE NO.2) TEMP = 31 C) OMEGA 1.4																
TF33-P-100A ENGINE (IDLE, ENGINE NO.3) BAR PRESS = .742 M HG) TEST 78-008-001																
FAR FIELD NOISE (FREE FLOW) REL HUMID = 53 %) RUN 02																
FREQ (HZ) 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180																
25	74<	75<	74<	73<	72<	74<	76	78	79	78	79	82	85	86		
31.5	75	76	75	75	75	78	79	79	80	82	82	85	89	90		
40	77	77	75	78	81	80	82	81	83	84	86	88	92	92		
50	79	78	77	80	83	82	83	83	85	85	86	88	91	93		
63	79	79	82	82	84	84	85	85	86	88	89	90	93	96		
80	80	80	82	83	85	85	86	87	89	89	91	93	95	97		
100	81	82	82	84	85	86	86	86	88	89	90	92	95	97		
125	80	82	83	84	85	85	85	87	88	88	90	91	93	97		
160	82	83	84	85	86	85	86	86	88	89	91	91	93	96		
200	84	84	86	85	85	85	86	86	87	88	89	90	93	94		
250	85	87	86	85	86	86	87	86	86	86	88	89	91	93		
315	84	85	84	83	85	85	85	85	87	88	88	89	91	93		
400	83	83	84	85	86	86	85	85	86	86	87	87	89	90		
500	84	83	84	85	86	86	85	85	86	86	87	87	89	89		
630	84	84	86	85	86	86	85	85	85	86	86	86	87	87		
800	86	85	87	86	87	86	86	86	86	86	86	86	85	85		
1000	86	86	88	87	88	88	87	87	85	86	86	85	85	83		
1250	87	89	93	92	92	91	89	88	86	87	88	87	85	83		
1600	90	91	96	94	94	93	92	91	89	88	89	88	84	82		
2000	91	93	94	92	93	93	93	91	89	89	90	88	83	81		
2500	96	98	98	103	102	99	102	104	103	103	101	102	98	91		
3150	93	94	96	97	97	95	97	98	96	96	96	94	89	85		
4000	91	92	94	93	94	93	95	91	91	90	92	91	88	84		
5000	92	94	94	96	96	96	98	95	96	96	99	97	95	88		
6300	89	90	92	93	93	93	94	92	93	92	93	93	91	86		
8000	89	90	92	92	93	93	94	94	96	94	96	96	92	87		
10000	85	85	87	88	89	88	90	90	92	90	92	92	86	82		
OVERALL	102	104	105	106	106	105	106	107	106	107	107	106	106	106	105	

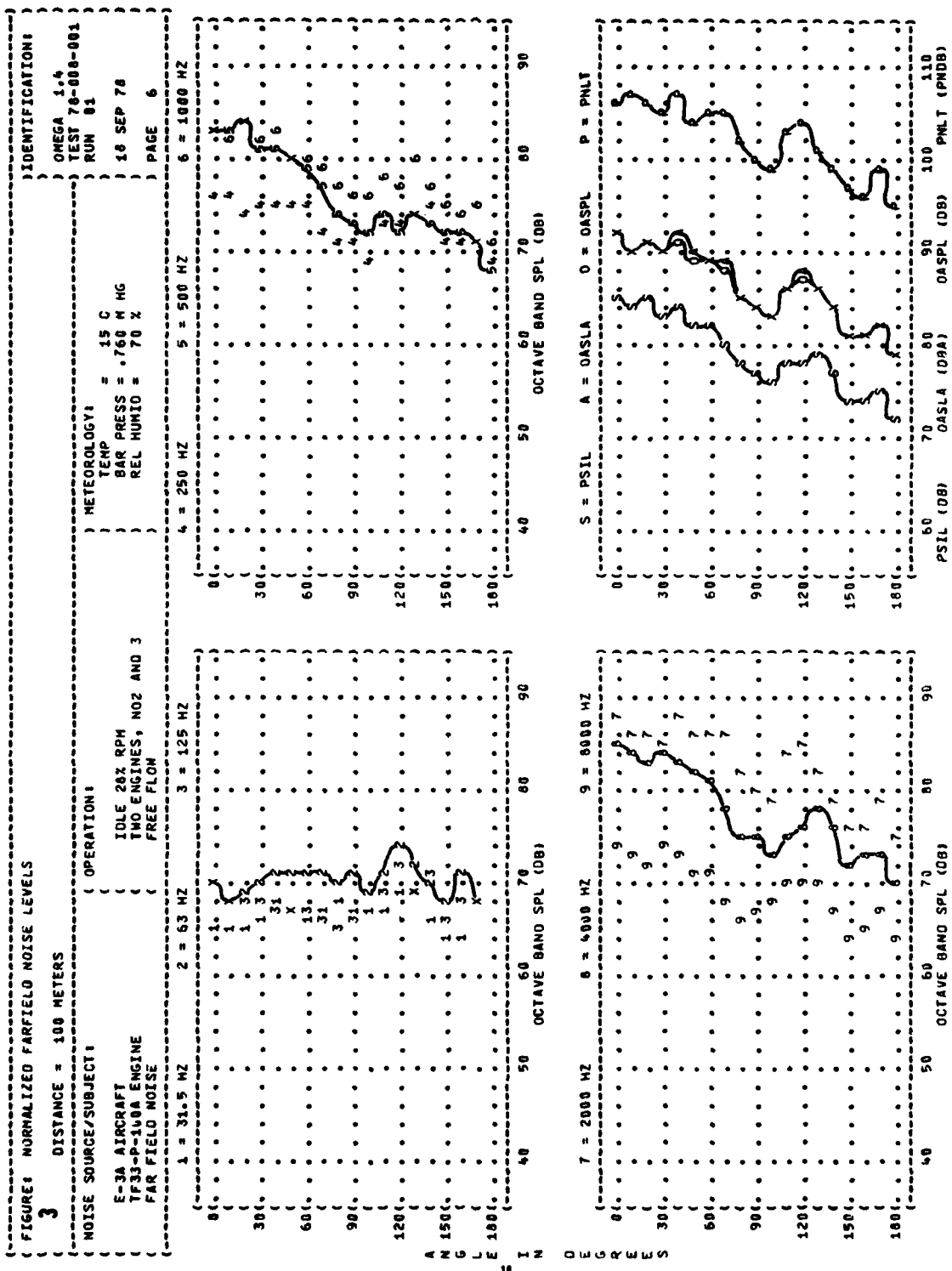
< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: MEASURED SOUND PRESSURE LEVEL (DB)		IDENTIFICATION:																	
5		OMEGA 1.4																	
1/3 OCTAVE BAND		TEST 78-008-001																	
DISTANCE = 75 METERS		RUN 03																	
NOISE SOURCE/SUBJECT:		METEOROLOGY:																	
(		TEMP = 31 C																	
(		BAR PRESS = .742 M HG																	
(		REL HUMID = 53 %																	
(		PAGE 2																	
E-3A AIRCRAFT																			
TF33-P-100A ENGINE																			
FAR FIELD NOISE																			
FREQ (HZ)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
25	77	80	80	79	78	83	84	82	82	83	83	85	88	92	94	92			
31.5	80	82	79	81	81	84	83	83	84	87	89	89	92	97	100	96			
40	80	82	80	82	84	84	84	85	89	90	91	93	94	100	101	99			
50	82	83	83	86	87	86	86	87	90	91	93	95	99	100	102	98			
63	84	83	85	86	86	87	88	90	90	92	94	97	101	106	105	99			
80	85	85	88	89	90	88	89	92	93	94	96	100	104	108	106	97			
100	87	86	88	92	91	91	92	92	94	95	97	101	106	109	107	96			
125	87	88	88	89	90	90	91	92	94	95	98	102	107	109	107	95			
160	88	88	90	91	92	90	92	93	96	96	98	102	107	108	107	92			
200	89	90	92	92	92	91	92	93	94	95	97	101	105	106	104	89			
250	91	93	92	92	92	92	92	93	93	94	96	100	105	104	103	86			
315	89	90	89	90	92	92	91	91	93	94	96	100	104	102	100	85			
400	88	88	89	92	93	92	93	92	94	93	96	99	102	99	97	82			
500	86	87	88	91	93	91	90	91	93	93	95	98	101	98	95	81			
630	86	87	88	90	91	92	90	92	93	94	96	97	98	97	94	80			
800	86	86	88	90	91	90	91	90	93	93	95	97	98	97	93	79			
1000	87	85	88	90	90	90	91	92	92	91	93	97	96	95	92	78			
1250	88	87	89	94	93	93	91	94	97	93	94	96	95	93	91	78			
1600	97	91	101	99	97	95	94	95	96	96	93	96	94	92	90	78			
2000	95	94	95	97	94	94	93	94	93	92	92	94	93	91	89	77			
2500	96	94	97	97	96	99	98	101	98	99	98	101	94	91	89	78			
3150	101	100	105	105	106	105	106	109	108	107	107	109	100	95	93	84			
4000	93	93	94	95	95	95	93	95	96	95	95	97	93	90	87	76			
5000	92	91	93	94	94	94	92	94	95	94	93	95	91	87	85	74			
6300	92	92	95	95	97	97	96	98	100	99	97	100	94	89	87	77			
8000	89	90	91	92	93	93	92	94	96	97	95	97	93	89	87	77			
10000	86	86	89	90	90	92	91	93	95	96	93	97	91	87	85	73			
OVERALL	106	105	100	109	109	109	109	111	111	111	111	114	115	117	115	106			
LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.																			

LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: MEASURED SOUND PRESSURE LEVEL (DB)																			IDENTIFICATION:	
1/3 OCTAVE BAND																				
DISTANCE = 75 METERS																			OMEGA 1.4	
NOISE SOURCE/SUBJECT:																			TEST 78-000-001	
(OPERATION:																			RUN 04	
(TRT ENGINE NO.2																			18 SEP 78	
(85% RPM ENGINE NO.3																				
(FREE FLOW																			PAGE 2	
METEOROLOGY:																				
TEMP = 31 C																				
BAR PRESS = .742 M HG																				
REL HUMID = 53 %																				
ANGLE (DEGREES)																				
FREQ	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	
(HZ)																				
25	82	83	82	82	83	85	86	86	87	88	87	90	96	99	100	100				
31.5	84	86	84	84	85	88	88	88	91	91	91	94	97	103	106	105				
40	87	86	85	87	86	89	88	91	94	94	94	95	98	101	107	107	108			
50	88	87	87	90	90	89	91	93	95	97	98	100	106	109	110	106				
63	92	88	90	90	90	91	93	93	95	98	100	101	106	112	111	108				
80	93	91	93	93	92	93	94	95	98	99	100	105	110	115	114	108				
100	94	94	94	95	95	95	98	99	100	101	103	106	113	117	115	108				
125	93	94	95	95	95	96	96	99	100	102	104	108	115	119	116	108				
160	95	96	98	99	98	97	97	99	100	102	105	108	116	119	116	110				
200	97	96	98	97	97	97	97	99	101	102	105	108	114	117	115	108				
250	97	99	97	98	98	99	98	98	100	102	106	108	112	115	115	109				
315	95	96	95	97	97	98	98	99	100	102	106	108	113	114	113	107				
400	93	94	95	97	97	98	98	98	100	100	104	107	111	111	111	104				
500	92	93	94	96	97	96	97	98	99	100	103	106	109	110	109	100				
630	93	92	94	95	96	96	96	98	99	100	103	106	107	107	107	98				
800	94	92	94	95	96	96	96	98	99	100	103	106	107	107	106	97				
1000	93	92	94	94	95	95	95	96	97	98	102	104	105	105	103	95				
1250	93	92	95	94	95	97	98	97	97	98	101	104	103	103	101	94				
1600	100	99	101	97	99	101	100	99	100	98	102	103	102	102	100	94				
2000	99	96	98	98	99	99	98	97	98	97	100	102	101	100	98	91				
2500	100	99	98	96	97	97	99	98	98	96	99	100	99	99	96	91				
3150	106	104	107	100	102	104	106	106	105	101	105	105	99	99	96	91				
4000	99	96	98	97	100	103	102	103	107	104	108	102	97	97	94	89				
5030	95	94	95	92	94	95	96	97	97	95	98	98	96	96	92	88				
6300	97	95	96	93	94	95	96	100	100	96	100	98	95	94	92	87				
8000	94	93	93	90	93	94	95	99	100	96	101	98	95	94	92	88				
10000	91	90	90	88	89	91	92	96	96	93	97	95	92	92	89	85				
OVERALL	111	110	111	109	110	111	112	113	114	114	117	119	123	126	125	119				
LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.																				

LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.



(FIGURE: NORMALIZED FARFIELD NOISE LEVELS
 (3 DISTANCE = 100 METERS
 (NOISE SOURCE/SUBJECT: (IDENTIFICATION:
 (E-1A AIRCRAFT (OMEGA 1.4
 (TF33-P-100A ENGINE (TEST 78-000-001
 (FAR FIELD NOISE (RUN 02
 ((METEOROLOGY: (TEMPERATURE = 15 C
 ((BAR PRESS = 760 MM HG
 ((REL HUMID = 70 %
 ((PAGE 6

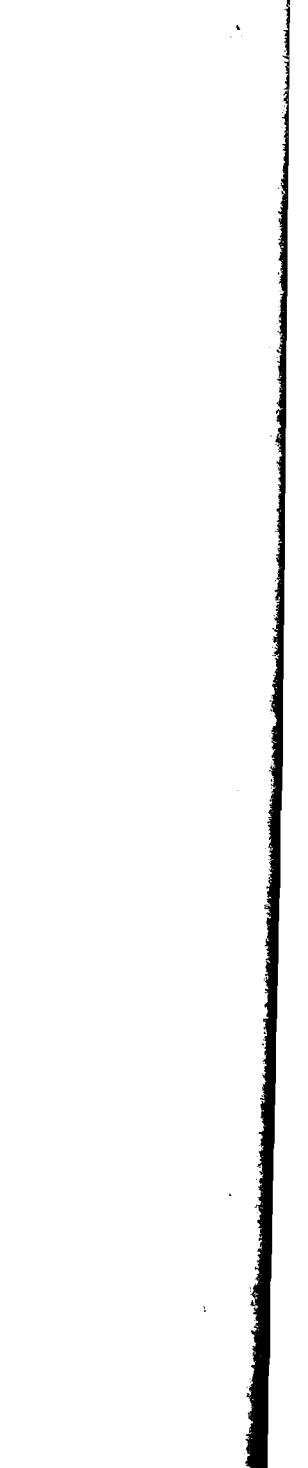
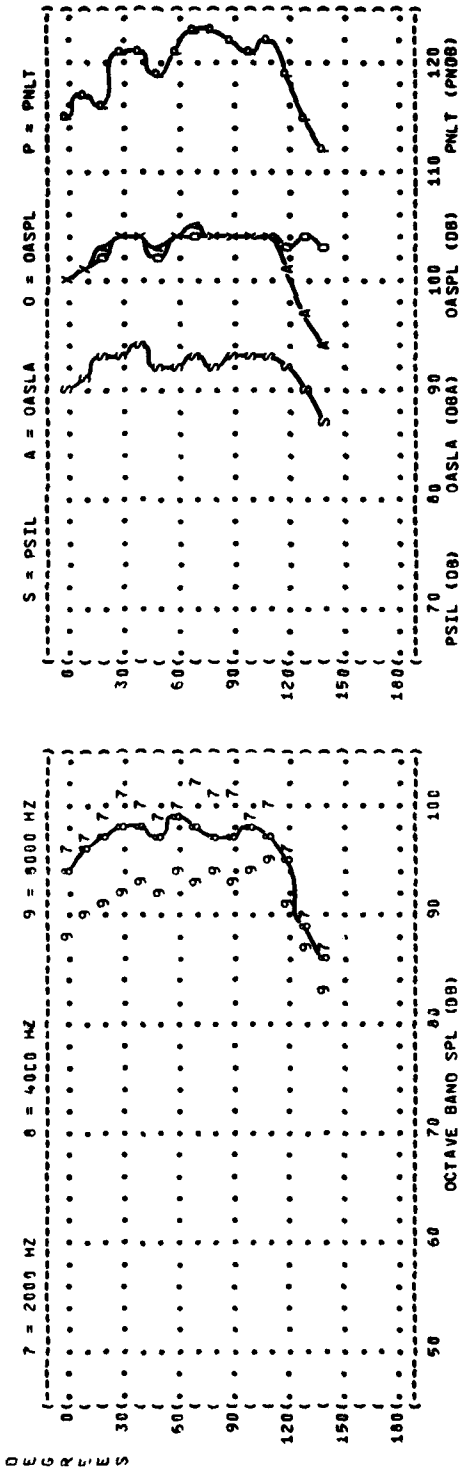
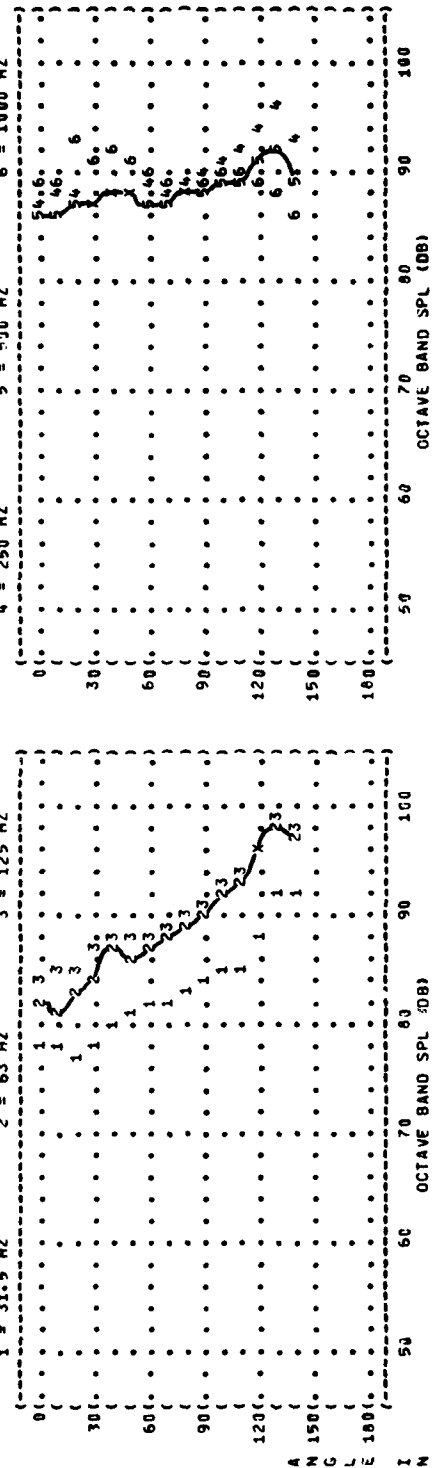


FIGURE: NORMALIZED FARFIELD NOISE LEVELS

3 DISTANCE = 100 METERS

NOISE SOURCE/SUBJECTS

OPERATION:

85% RPM ENGINE NO.2

IDLE, ENGINE NO.3

FREE FLOW

E-3A AIRCRAFT

TF33-P-100A ENGINE

FAR FIELD NOISE

IDENTIFICATION:

OMEGA 1.4

TEST 78-008-001

RUN 03

16 SEP 78

PAGE 6

METEOROLOGY:

TEMP = 15 C

BAR PRESS = .760 M HG

REL HUMID = 70 %

4 = 250 HZ 5 = 500 HZ 6 = 1000 HZ

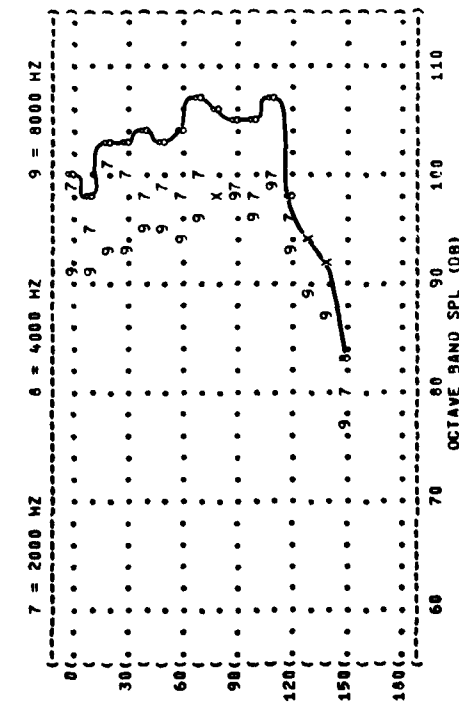
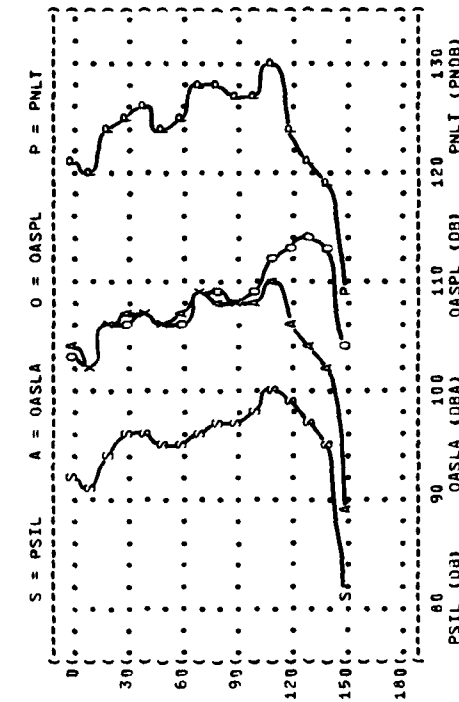
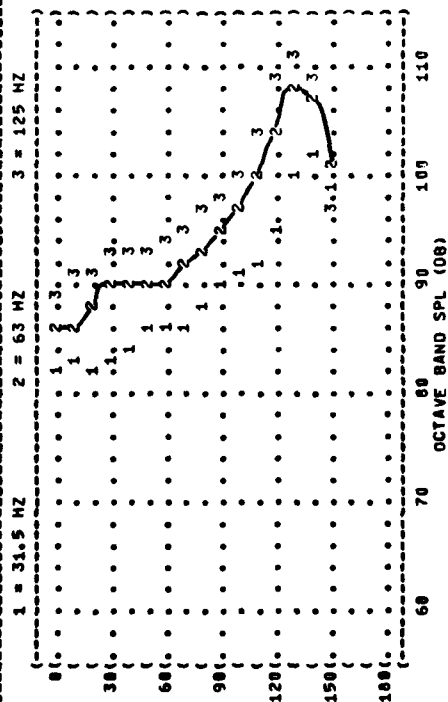
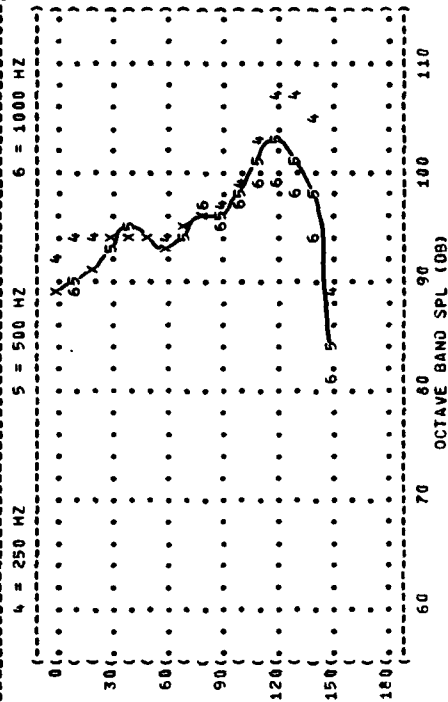


FIGURE: ACOUSTIC POWER LEVEL (PNL)
 4
 NOISE SOURCE/SUBJECT: () OPERATION: () METEOROLOGY: ()
 E-3A AIRCRAFT () IDLE 28% RPM () TEMP = 31 C
 TF33-P-100A ENGINE () TWO ENGINES, NO2 AND 3 () BAR PRESS = .742 M HG
 FAR FIELD NOISE () FREE FLOW () REL HUMID = 53 %
 IDENTIFICATION: ()
 ()
 () OMEGA 1.4
 TEST 78-008-001
 RUN 01
 18 SEP 78
 PAGE 3

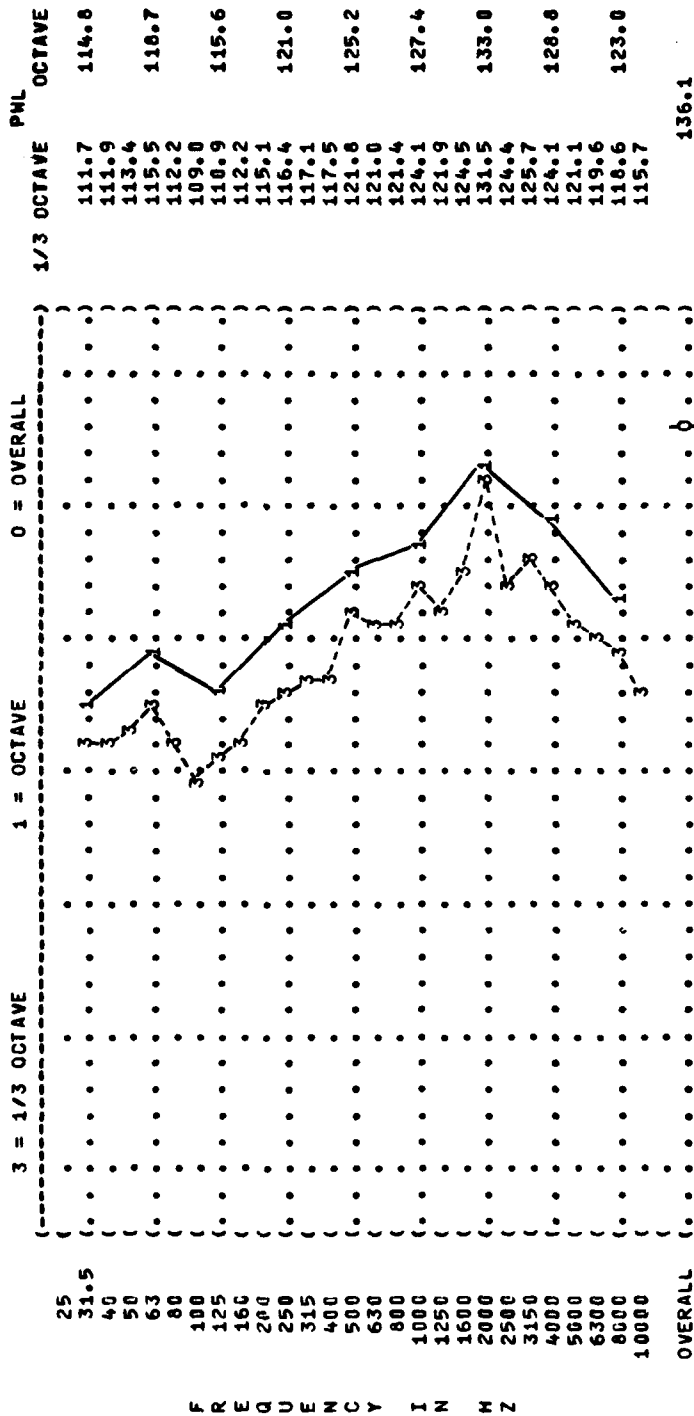


FIGURE: ACOUSTIC POWER LEVEL (PNL)
 4
 NOISE SOURCE/SUBJECT: (OPERATION:) METEOROLOGY:)
 ((70X RPM ENGINE NO.2) TEMP = 31 C)
 ((IDLE, ENGINE NO.3) BAR PRESS = .742 M HG)
 ((FREE FLOW) REL HUMID = 53 %)
 E-3A AIRCRAFT
 TF33-P-130A ENGINE
 FAR FIELD NOISE
 IDENTIFICATION:)
) OMEGA 1.4
) TEST 78-008-001
) RUN 02
) 10 SEP 78
) PAGE 3
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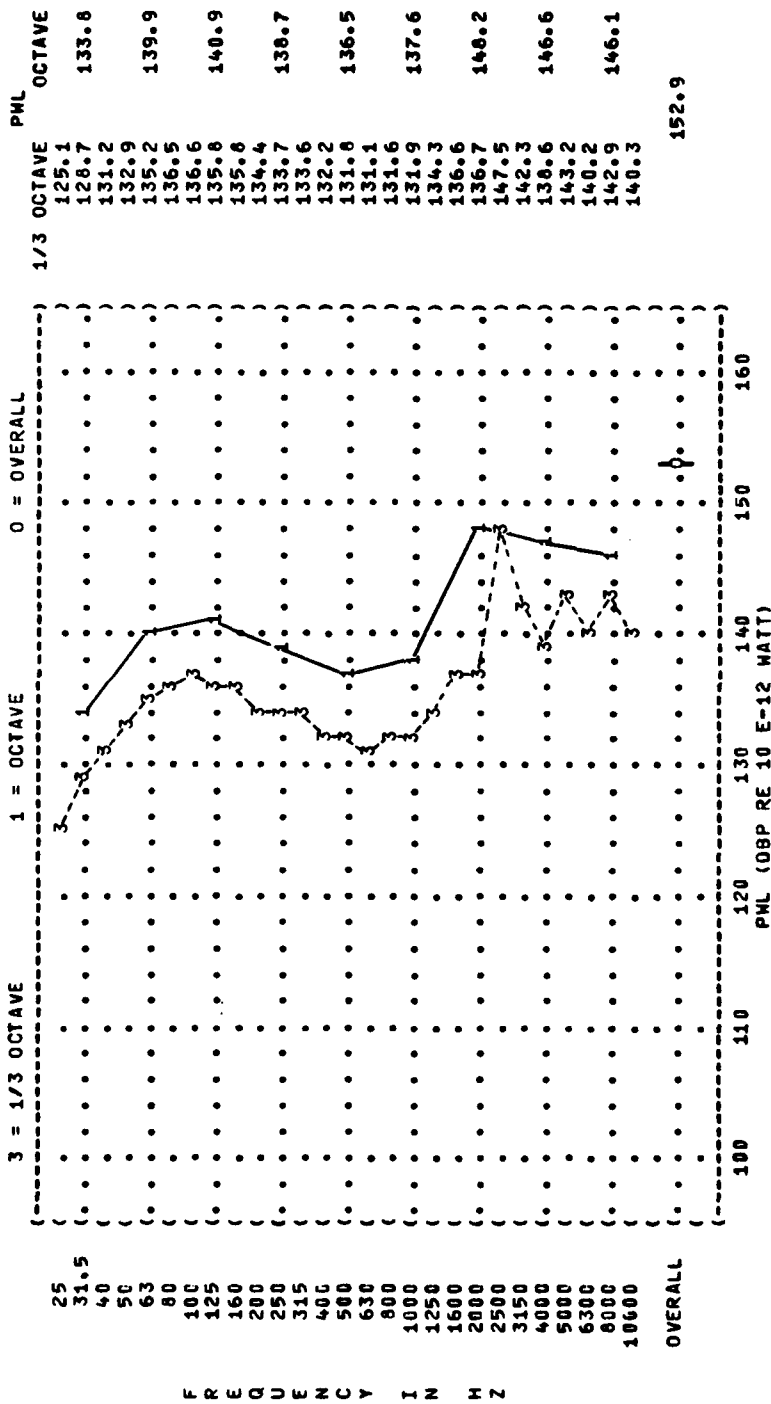


FIGURE: ACOUSTIC POWER LEVEL (PWL)

4

IDENTIFICATION: OMEGA 1.4
TEST 70-008-001
RUN 03

NOISE SOURCE/SUBJECT: E-3A AIRCRAFT
85% RPM ENGINE NO.2
IDLE, ENGINE NO.3
FREE FLOW

METEOROLOGY: TEMP = 31 C
BAR PRESS = .742 M HG
REL HUMID = 53 %

18 SEP 78
PAGE 3

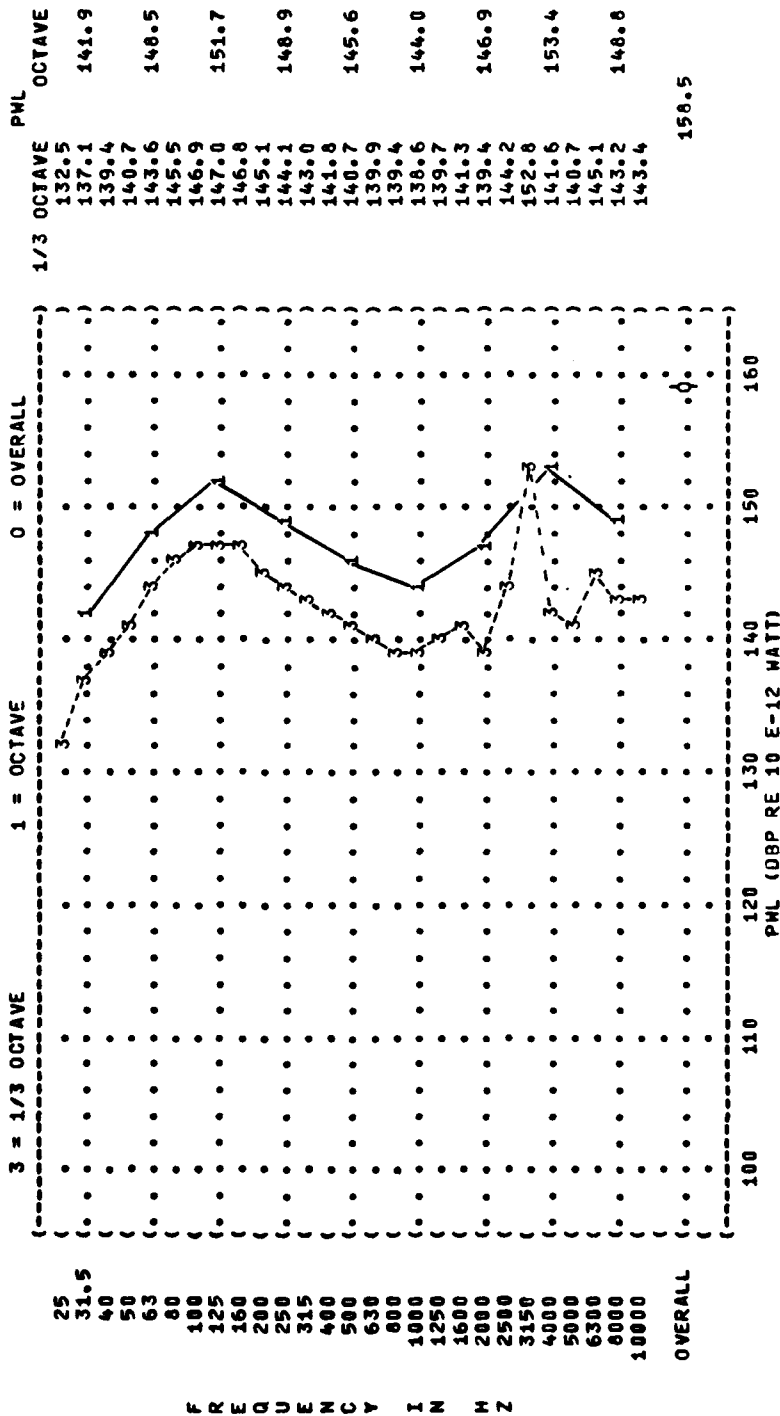


TABLE: DIRECTIVITY INDEX (DB)																	IDENTIFICATION:	
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																	TEST 70-000-001	
NOISE SOURCE/SUBJECT:																	RUN 01	
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TABLE: DIRECTIVITY INDEX (DB)										IDENTIFICATION:									
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NOISE SOURCE/SUBJECT:										TEST 78-008-001									
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TABLE: DIRECTIVITY INDEX (DB)																
IDENTIFICATION:																
6																
NOISE SOURCE/SUBJECT:																
E-3A AIRCRAFT																
TF33-P-100A ENGINE																
FAR FIELD NOISE																
OPERATION:																
85% RPM ENGINE NO.2																
IDLE, ENGINE NO.3																
FREE FLOW																
METEOROLOGY:																
TEMP = 31 C																
BAR PRESS = .742 M HG																
REL HUMID = 53 %																
PAGE 4																
ANGLE (DEGREES)																
FREQ	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
(HZ)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
1/3 OCTAVE																
25	-10	-7	-7	-8	-9	-4	-3	-5	-5	-4	-4	-2	1	5	7	5
31.5	-12	-10	-13	-11	-10	-8	-9	-9	-8	-4	-3	-3	1	5	8	5
40	-14	-12	-14	-12	-10	-10	-10	-9	-5	-4	-3	-1	0	6	7	5
50	-13	-12	-12	-9	-9	-9	-8	-8	-6	-4	-3	0	4	5	7	3
63	-15	-15	-13	-12	-12	-11	-10	-9	-8	-6	-4	-1	2	7	7	1
80	-15	-15	-12	-11	-10	-12	-11	-8	-7	-6	-4	0	4	8	6	-3
100	-15	-14	-14	-10	-11	-11	-10	-10	-8	-6	-4	-1	5	7	6	-6
125	-15	-13	-14	-13	-11	-12	-11	-9	-8	-7	-4	0	5	8	5	-7
160	-14	-13	-12	-11	-10	-11	-10	-9	-5	-6	-3	0	5	7	5	-10
200	-10	-9	-8	-8	-8	-9	-8	-7	-5	-5	-2	2	5	7	5	-11
250	-8	-6	-7	-7	-7	-6	-6	-6	-4	-3	-1	3	7	5	3	-13
315	-9	-8	-8	-7	-6	-6	-6	-7	-4	-3	0	3	6	3	1	-14
400	-9	-8	-7	-5	-4	-4	-4	-4	-2	-3	0	3	6	3	0	-14
500	-9	-8	-7	-4	-2	-2	-4	-5	-2	-2	0	3	6	3	0	-14
630	-8	-8	-6	-5	-3	-2	-4	-2	-1	0	2	4	4	3	0	-14
800	-8	-8	-6	-3	-3	-3	-3	-3	-1	-1	2	4	4	3	-1	-14
1000	-6	-7	-4	-3	-3	-3	-2	-1	-1	-1	1	4	4	2	-1	-15
1250	-5	-7	-5	0	-1	-1	-2	-1	4	0	1	3	1	0	-2	-15
1600	2	-4	6	4	2	0	-2	0	1	1	-2	0	-1	-3	-5	-18
2000	2	1	2	4	1	1	0	1	0	-1	-1	1	0	-2	-4	-16
2500	-2	-4	-1	-1	-1	2	0	4	0	1	1	3	-4	-7	-8	-20
3150	-5	-6	-1	0	0	-1	0	4	2	1	1	3	-6	-11	-13	-22
4000	-1	-2	0	1	1	0	-1	1	2	1	1	3	-1	-4	-7	-18
5000	-1	-2	0	1	1	1	-1	1	2	1	0	2	-2	-6	-8	-19
6300	-4	-4	-2	0	0	0	-1	2	3	2	1	3	-3	-8	-9	-19
8000	-5	-4	-3	-2	-1	-1	-2	0	3	3	1	4	0	-5	-7	-17
10000	-6	-6	-4	-3	-2	-1	-2	0	2	4	0	4	-2	-6	-8	-19
OCTAVE																
31.5	-12	-11	-12	-11	-10	-8	-8	-8	-6	-4	-3	-2	1	6	8	5
63	-15	-14	-12	-11	-10	-11	-10	-9	-7	-5	-4	-3	-1	3	7	6
125	-14	-13	-13	-11	-11	-11	-10	-9	-7	-6	-4	0	5	7	6	-7
250	-9	-7	-7	-7	-7	-7	-7	-6	-5	-4	-2	2	6	6	4	-12
500	-9	-8	-7	-5	-3	-4	-4	-4	-2	-2	1	3	6	3	1	-14
1000	-6	-7	-5	-2	-2	-2	-2	-1	1	1	1	3	3	2	-1	-15
2000	1	-3	3	2	0	1	0	2	0	0	2	2	-2	-4	-6	-18
4000	-4	-5	-1	0	0	-1	0	3	2	1	1	3	-5	-10	-12	-21
8000	-5	-5	-2	-2	-1	0	-1	1	3	3	1	3	-2	-6	-8	-19
OVERALL	-6	-7	-4	-3	-3	-3	-3	-1	-1	-1	-1	2	3	5	3	-6

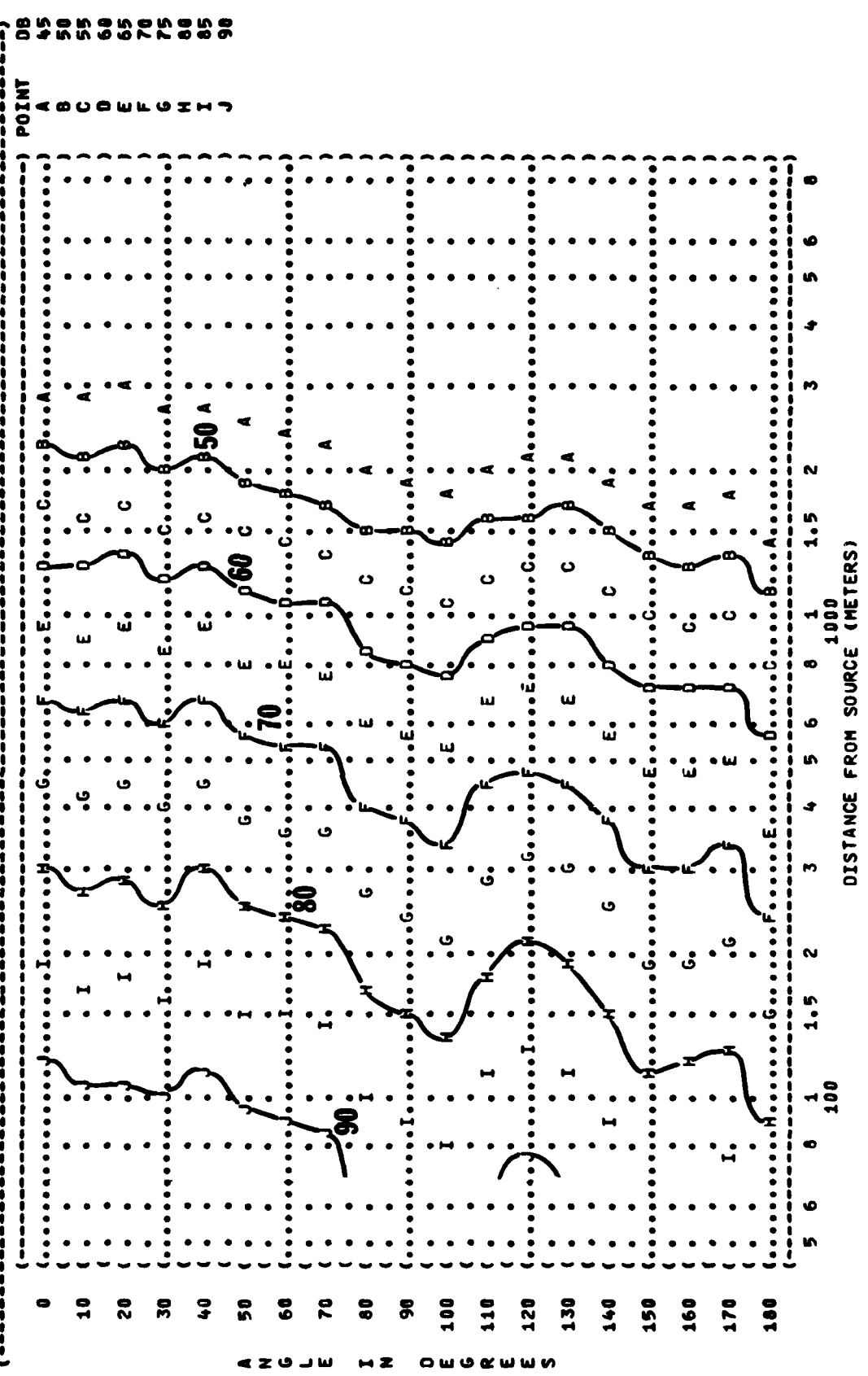
TABLE: DIRECTIVITY INDEX (DB)																
IDENTIFICATION:																
6																
NOISE SOURCE/SUBJECT:																
E-3A AIRCRAFT																
TF33-P-100A ENGINE																
FAR FIELD NOISE																
OPERATION:																
TRI ENGINE NO.2																
85% RPM ENGINE NO.3																
FREE FLOW																
METEOROLOGY:																
TEMP = 31 C																
BAR PRESS = .742 M HG																
REL HUMID = 53 %																
PAGE 4																
FREQ																
(HZ)																
ANGLE (DEGREES)																
1/3 OCTAVE																
25	-11	-10	-11	-11	-10	-8	-7	-7	-6	-5	-6	-3	2	6	6	7
31.5	-14	-12	-14	-14	-13	-10	-10	-10	-9	-7	-6	-4	0	5	8	7
40	-14	-15	-15	-14	-14	-11	-12	-9	-7	-6	-6	-2	0	6	6	8
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63	-13	-16	-14	-14	-14	-13	-12	-11	-9	-7	-4	-3	2	6	7	3
80	-14	-16	-14	-14	-15	-14	-13	-12	-9	-8	-7	-2	3	8	7	1
100	-15	-15	-14	-13	-14	-14	-11	-10	-9	-8	-6	-3	4	8	6	-1
125	-17	-16	-16	-15	-15	-15	-14	-11	-11	-8	-7	-3	4	8	6	-2
160	-16	-15	-13	-12	-13	-14	-14	-11	-11	-9	-6	-3	5	8	5	-1
200	-13	-13	-12	-12	-12	-12	-12	-10	-8	-5	-1	-1	4	8	6	-1
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400	-13	-12	-11	-8	-8	-8	-7	-7	-5	-5	-1	1	5	6	5	-2
500	-12	-11	-10	-9	-8	-7	-7	-6	-5	-4	-1	1	5	6	5	-4
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10000	-2	-4	-3	-5	-4	-2	-1	3	3	0	4	2	-1	-2	-5	-9
OCTAVE																
31.5	-13	-13	-14	-14	-13	-10	-11	-9	-6	-6	-6	-3	1	6	7	7
63	-14	-16	-14	-14	-14	-14	-12	-11	-9	-7	-5	-3	3	8	7	2
125	-16	-15	-14	-13	-14	-14	-13	-11	-10	-8	-6	-3	5	8	6	-2
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4000	0	-1	1	-4	-2	0	1	2	3	0	4	1	-4	-5	-7	-12
8000	-1	-3	-2	-5	-4	-2	-1	3	3	0	4	1	-2	-2	-5	-9
OVERALL	-8	-9	-8	-10	-9	-8	-7	-6	-5	-6	-2	0	4	7	5	-1

FIGURE: OVERALL SOUND PRESSURE LEVEL (OASPL)
 5
 EQUAL LEVEL CONTOURS (DB)

NOISE SOURCE/SUBJECT: (OPERATION:)
 ((IDLE 28% RPM)
 ((TWO ENGINES, NO2 AND 3)
 ((FREE FLOW)

METEOROLOGY:
 (TEMP = 15 C)
 (BAR PRESS = .760 M HG)
 (REL HUMID = 70 %)

IDENTIFICATIONS:
 (OMEGA 1.4)
 (TEST 78-008-001)
 (RUN 01)
 (18 SEP 78)
 (PAGE 13)



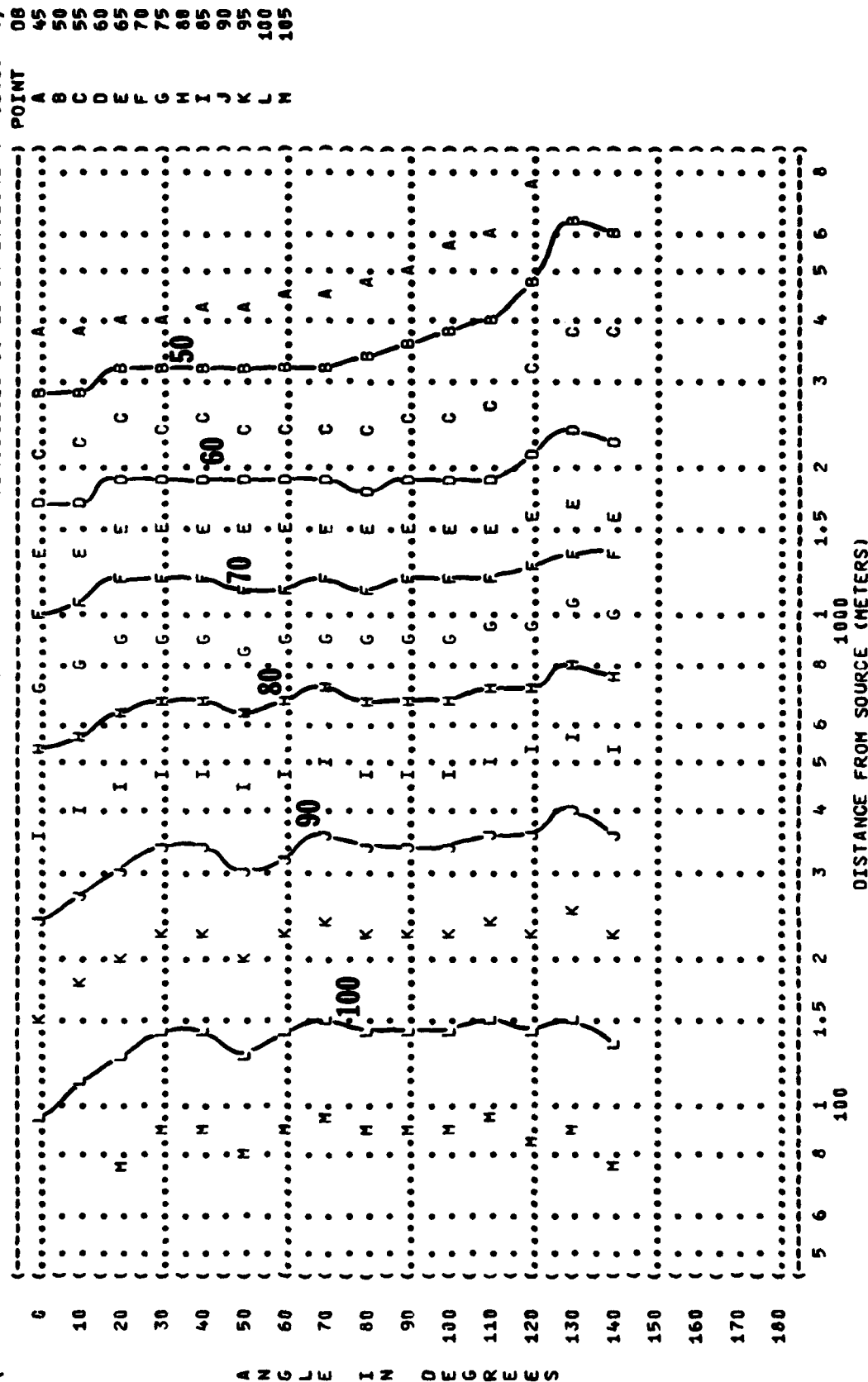
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IDENTIFICATION:
OMEGA 1.4
TEST 76-008-00;
RUN 02

METEOROLOGY:
TEMP = 15 C
BAR PRESS = .760 M HG
REL HUMID = 70 %

OPERATION:
70% RPM 2
IDLE, ENC
FREE FLOW

NOISE SOURCE/SUBJECT:
E-3A AIRCRAFT
TF33-P-100A ENGINE
FAR FIELD NOISE



POINT

DISTANCE FROM SOURCE (METERS)

**FIGURE: OVERALL SOUND PRESSURE LEVEL {OASPL}
EQUAL LEVEL CONTOURS (DB)**

```

IDENTIFICATION:
OMEGA 1.4
TEST 76-008-00
RUN 03
18 SEP 78
PAGE 13

```

METEOROLOG Y:

TEMP = 15 C
BAR PRESS = .760 MM
REL HUMID = 70 %

E-3A AIRCRAFT	(	85% RPM ENGINE NO.2
TF33-P-100A ENGINE	(	IDLE, ENGINE NO.3
FAR FIELD NOISE	(	FREE FLOW

OPERATION:

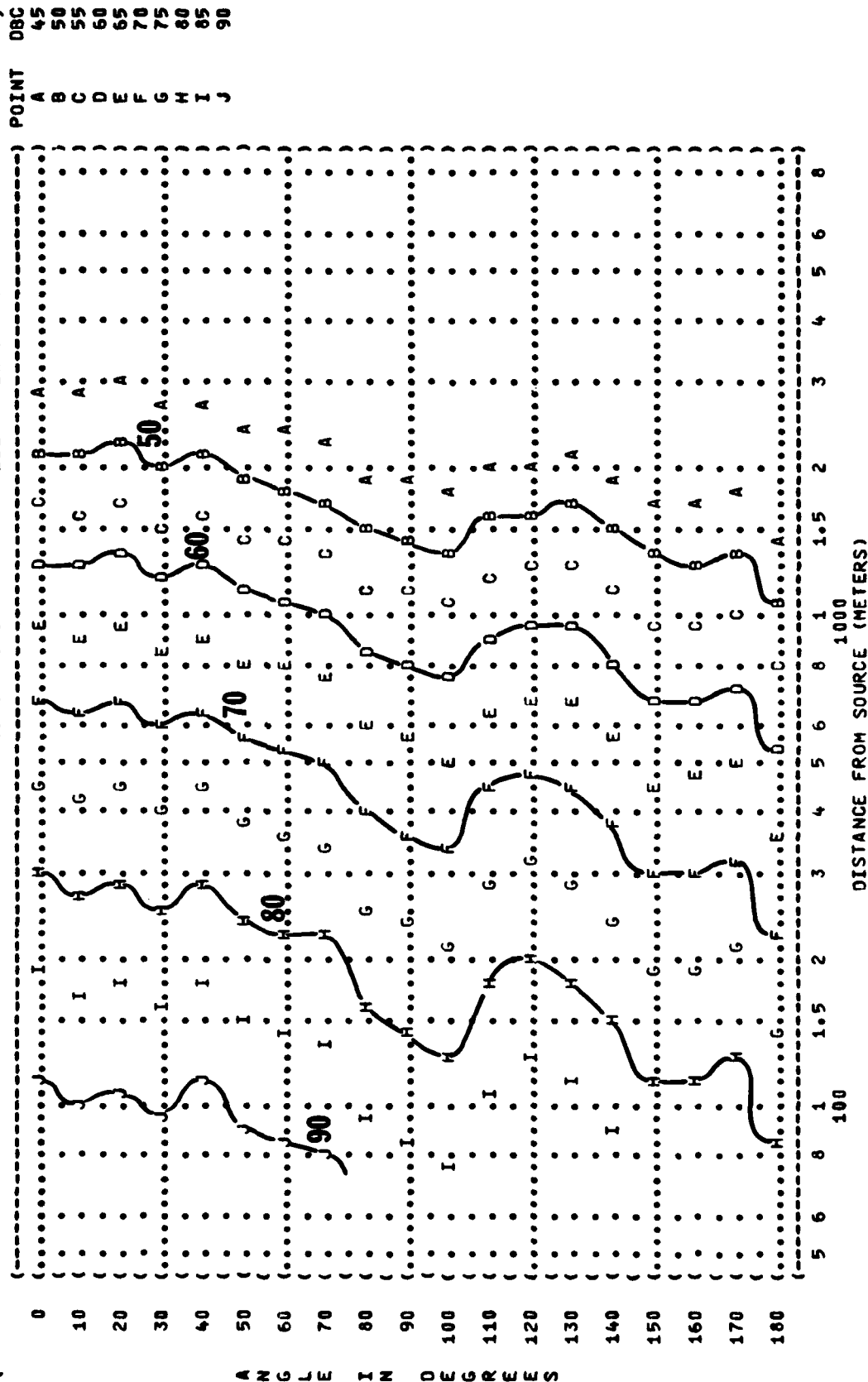
85% RPM ENGINE NO.2
IDLE, ENGINE NO.3
FREE FLOW

NOISE SOURCE/SUBJECT:

E-3A AIRCRAFT
TF33-P-100A ENGINE
FAR FIELD NOISE



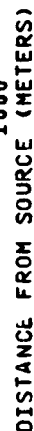
IDENTIFICATION:)
) OMEGA 1.4
 TEST 78-008-001)
 RUN 01)
 18 SEP 78)
 PAGE 14)
 METEOROLOGY:)
 TEMP = 15 C)
 BAR PRESS = .760 M HG)
 REL HUMID = 70 %)
 OPERATION:)
 IDLE 282 RPM)
 TWO ENGINES, NO2 AND 3)
 FREE FLOW)
 NOISE SOURCE/SUBJECT:)
 E-3A AIRCRAFT)
 TF33-P-100A ENGINE)
 FAR FIELD NOISE)



```

( ( FIGURE: C-WEIGHTED OVERALL SOUND LEVEL {OASLC}
( ( EQUAL LEVEL CONTOURS (DBC)
( (
( ( 6
( (
( ( NOISE SOURCE/SUBJECT: ( OPERATION: ( METEOROLOGY: ( IDENTIFICATION:
( ( ( ( ( (
( ( E-3A AIRCRAFT ( 76% RPM ENGINE NO.2 ( TEMP = 15 C ( )
( ( TF33-P-130A ENGINE ( IDLE, ENGINE NO.3 ( BAR PRESS = .760 M HG ( )
( ( FAR FIELD NOISE ( FREE FLOW ( REL HUMID = 70 % ( )
( ( ( ( ( ( ) PAGE 14 ( )

```



PAGE 14

18 SEP 78

4

36

DISTANCE FROM SOURCE (METERS)

IDENTIFICATION:))

-

) METEOROLOGY:

18 SEP 78
PAGE 14

BAR PRESS = .760 M HG

REL HUMID = 70 %

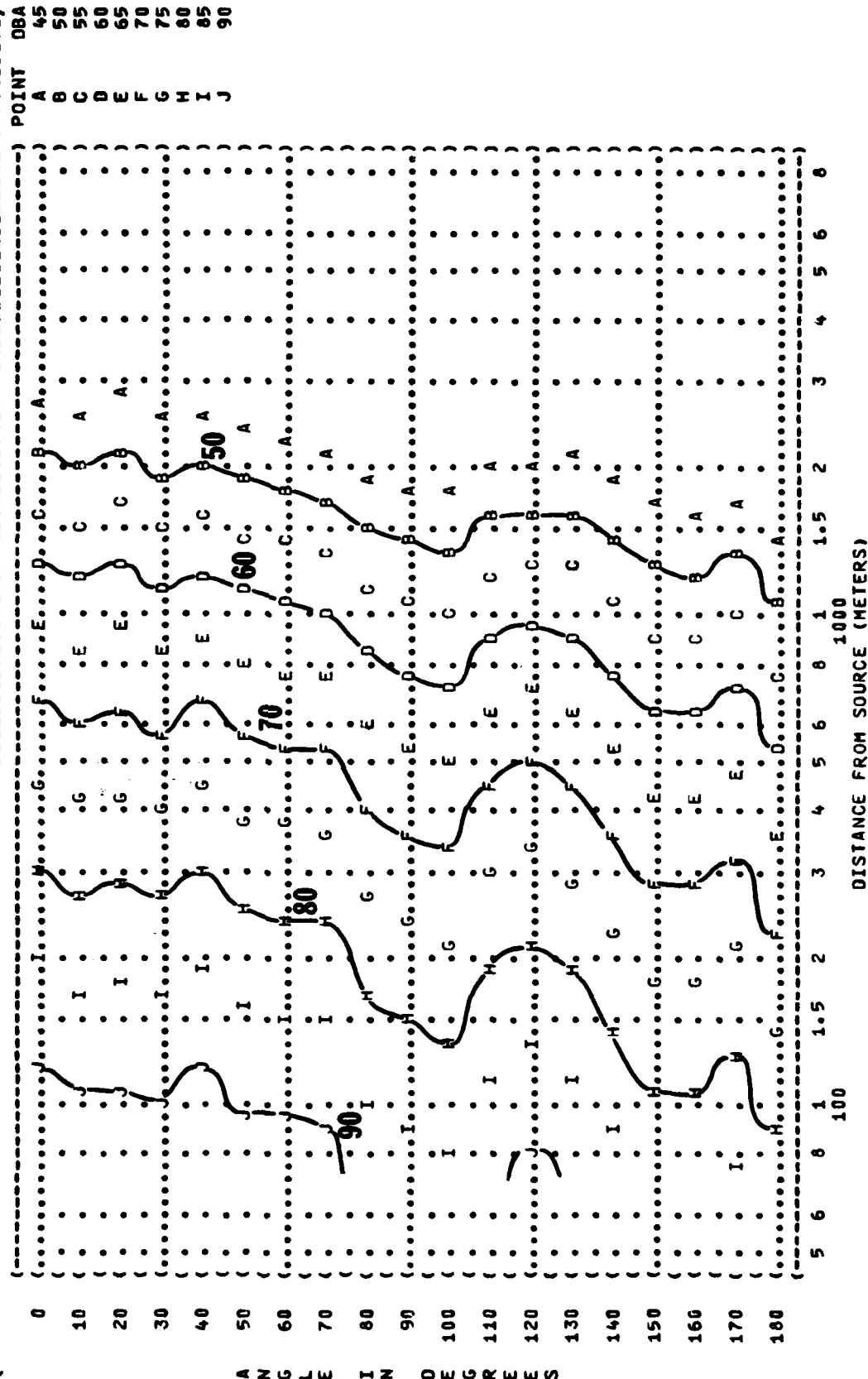
PAGE 14

POINT	OBC
A	45
B	50
C	55
D	60
E	65
F	70
G	75
H	80
I	85
J	90
K	95
L	100
M	105
N	110
O	115
P	120
Q	125

420 JW HZ OWORWWS

DISTANCE FROM SOURCE (METERS)

(FIGURE: A-WEIGHTED OVERALL SOUND LEVEL (OASLA)
 (7
 (EQUAL LEVEL CONTOURS (DBA)
 () IDENTIFICATION:)
 () OMEGA 1.4
 () TEST 78-008-001
 () RUN 01
 () NOISE SOURCE/SUBJECT:)
 () OPERATION:)
 () IDLE 28% RPM
 () TWO ENGINES, NO2 AND 3
 () FREE FLOW
 () METEOROLOGY:)
 () TEMP = 15 C
 () BAR PRESS = .760 M HG
 () REL HUMID = 70 %
 () 18 SEP 78
 () PAGE 15
 ()



(FIGURE: A-WEIGHTED OVERALL SOUND LEVEL (OASLA)
 (7
 (EQUAL LEVEL CONTOURS (DSA)
 () IDENTIFICATION:)
 () OMEGA 1.4
 () TEST 78-008-001
 () RUN 02
 ()
 (NOISE SOURCE/SUBJECT: (OPERATION:) METEOROLOGY:)
 () TEMP = 15 C
 () 70% RPM ENGINE NO.2 BAR PRESS = .760 M HG
 () TF33-P-100A ENGINE (IDLE, ENGINE NO.3) REL HUMID = 70 %
 () FAR FIELD NOISE (FREE FLOW)) PAGE 15
 ()

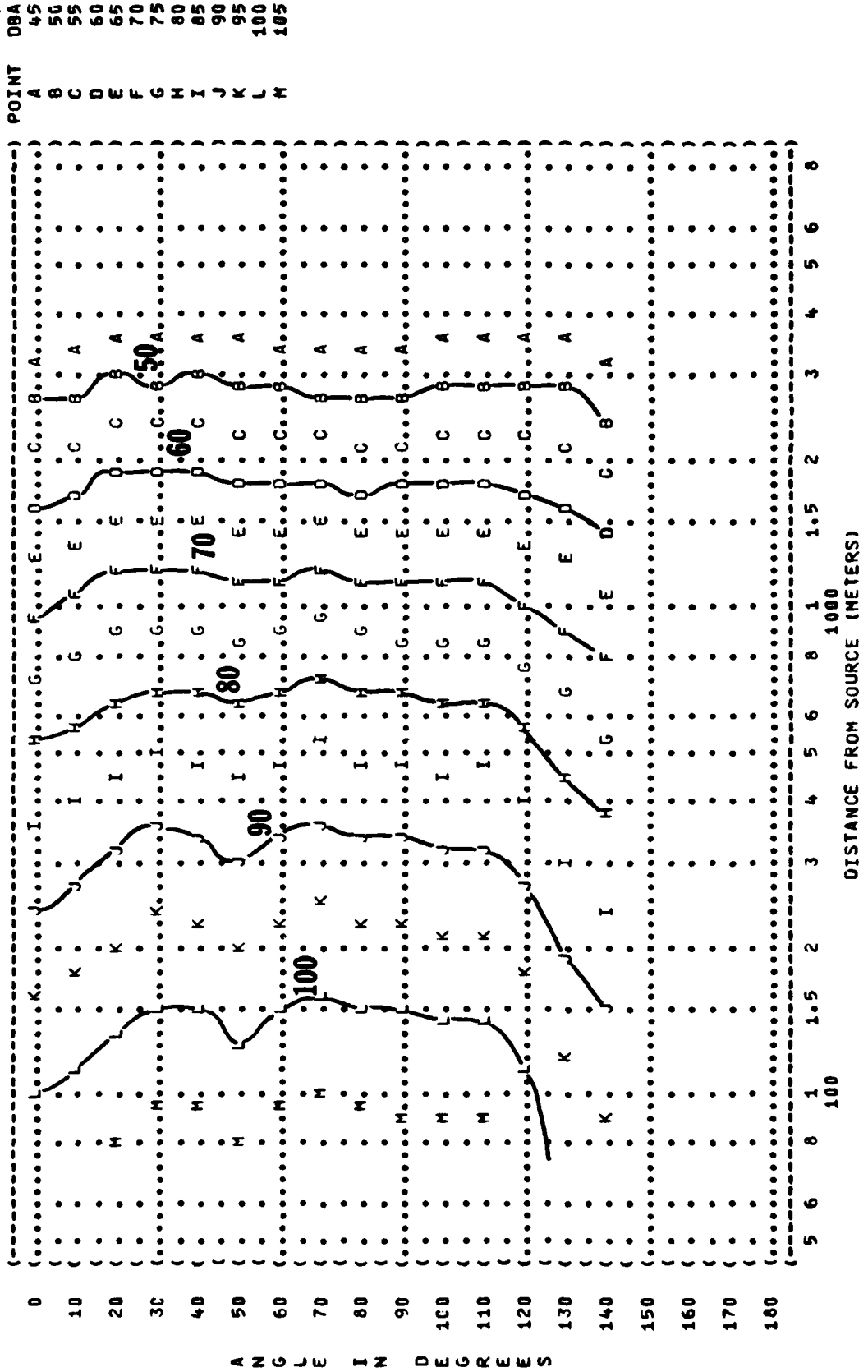


FIGURE: A-WEIGHTED OVERALL SOUND LEVEL (OASLA)
EQUAL LEVEL CONTOURS (DBA)

7

IDENTIFICATION:
OMEGA 1.4
TEST 78-008-001
RUN 04
METEOROLOGY:
TEMP = 15 C
BAR PRESS = .760 M HG
REL HUMID = 70 %
OPERATION:
TRT ENGINE NO.2
85% RPM ENGINE NO.3
FREE FLOW
NOISE SOURCE/SUBJECT:
E-3A AIRCRAFT
TF33-P-100A ENGINE
FAR FIELD NOISE

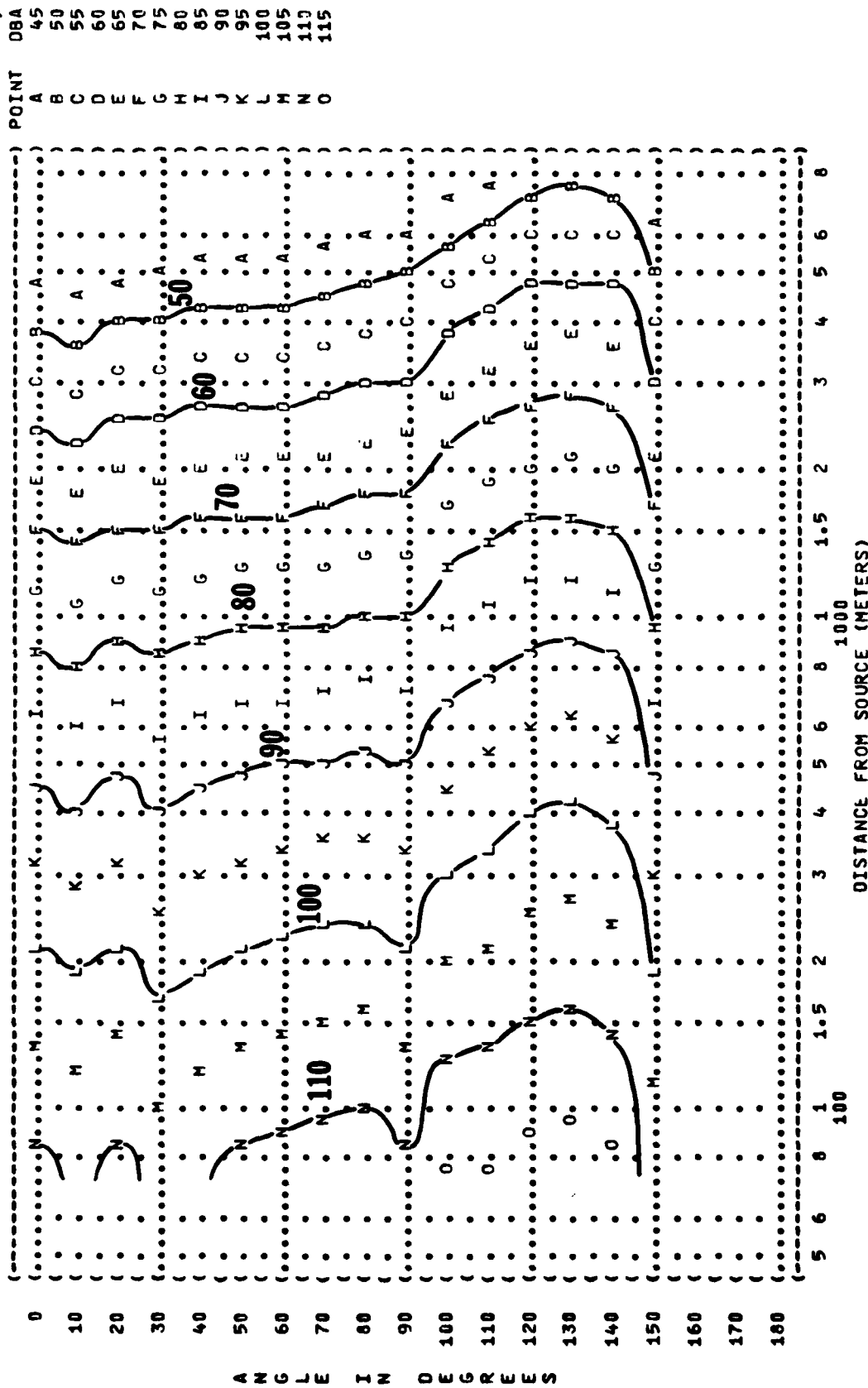


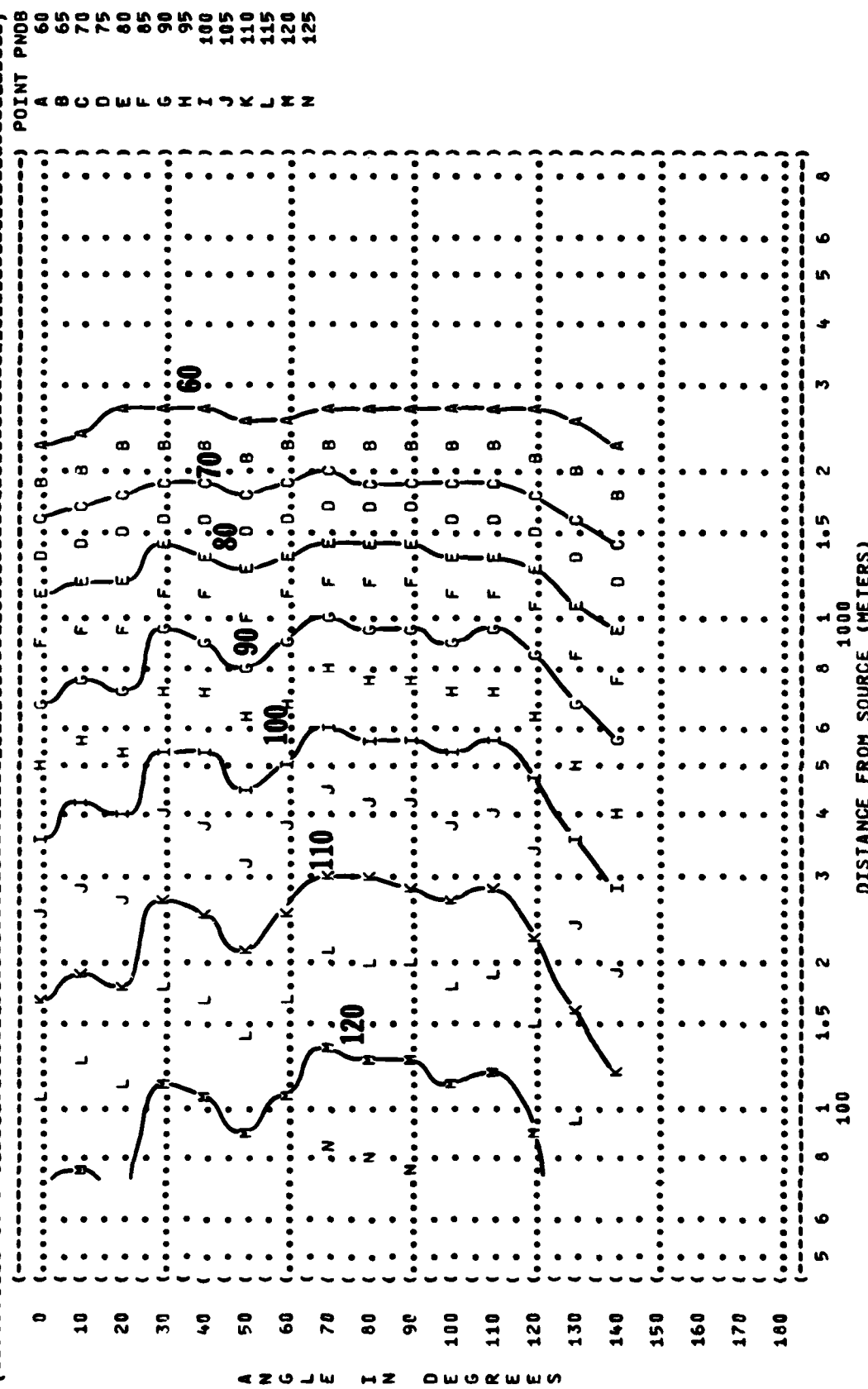
FIGURE 8 PERCEIVED NOISE LEVEL WITH SMOOTH TONE CORRECTION (PNLT)
EQUAL LEVEL CONTOURS (PNDB)

NOISE SOURCE/SUBJECT:
(E-3A AIRCRAFT
(TF33-P-100A ENGINE
(FAR FIELD NOISE

OPERATION:
(70% RPM ENGINE NO.2
(IDLE, ENGINE NO.3
(FREE FLOW

METEOROLOGY:
(TEMP = 15 C
(BAR PRESS = .760 M HG
(REL HUMID = 70 %

IDENTIFICATION:
(OMEGA 1.4
(TEST 78-008-001
(RUN 02
(10 SEP 78
(PAGE 16



A N G L E I N D E G R E E S

FIGURE 8: PERCEIVED NOISE LEVEL WITH SMOOTH TONE CORRECTION {PNLT} EQUAL LEVEL CONTOURS (PNDB)

IDENTIFICATION:

OMEGA 1.4

TEST 78-008-001

NOISE SOURCE/SUBJECT: (OPERATION:

METEOROLOGY:

TEMP = 15 C

BAR PRESS = .760 H HG

REL HUMID = 70 %

PAGE 16

00000000

«ZUJW HZ BWGKWWV

DISTANCE FROM SOURCE (METERS)

IDENTIFICATION:

OMEGA 1.4

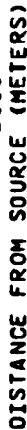
1) METEOROLOGY:

04
RUN

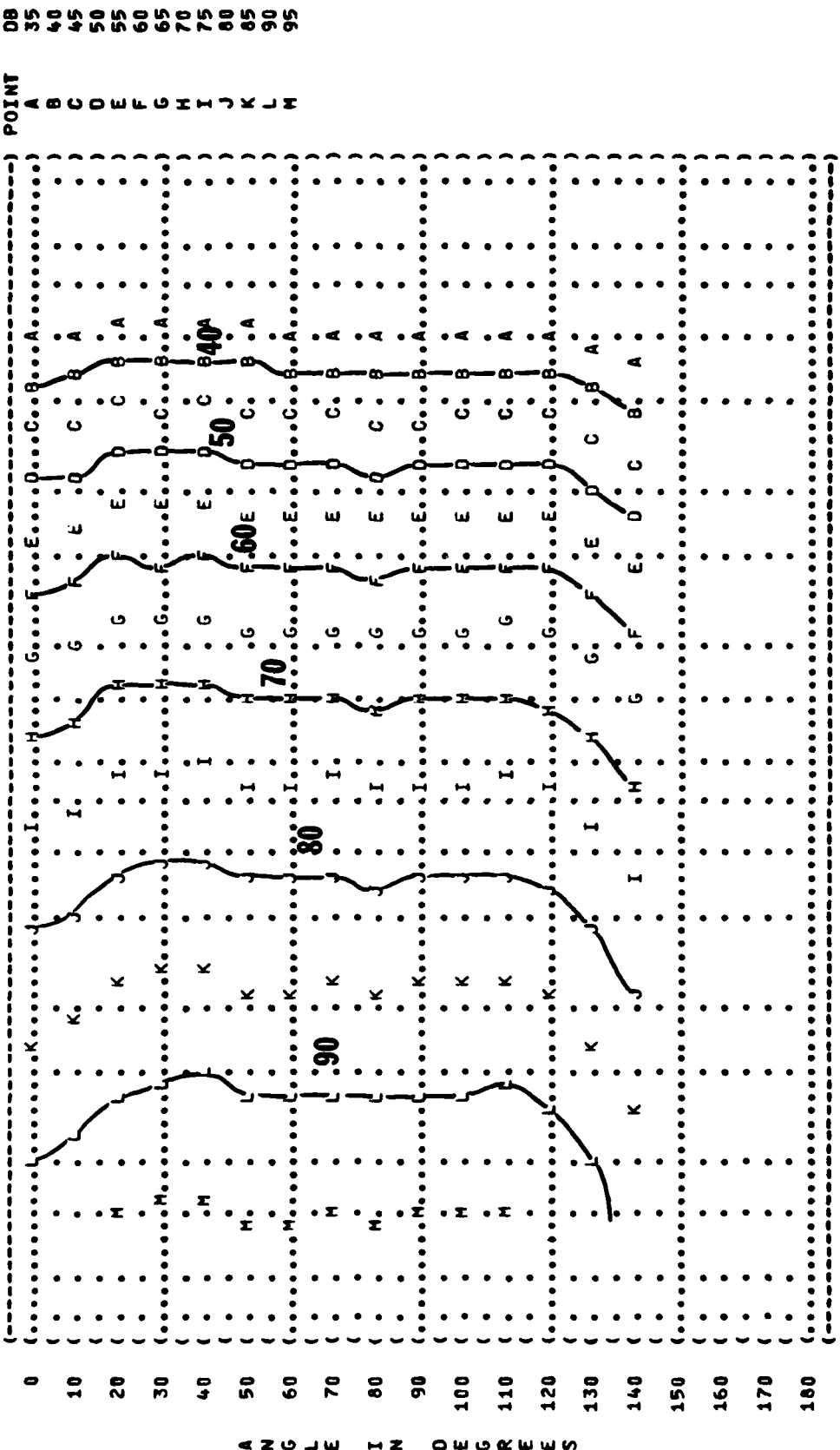
press = .760

HUMID = 70 %

1



IDENTIFICATION: OMEGA 1.4
 TEST 78-008-001
 RUN 02
 18 SEP 78
 PAGE 17
 METEOROLOGY: TEMP = 15 C
 BAR PRESS = .760 M HG
 REL HUMID = 70 %
 OPERATION: 70% RPM ENGINE NO.2
 IDLE, ENGINE NO.3
 FREE FLOW
 NOISE SOURCE/SUBJECT: E-3A AIRCRAFT
 TF33-P-100A ENGINE
 FAR FIELD NOISE

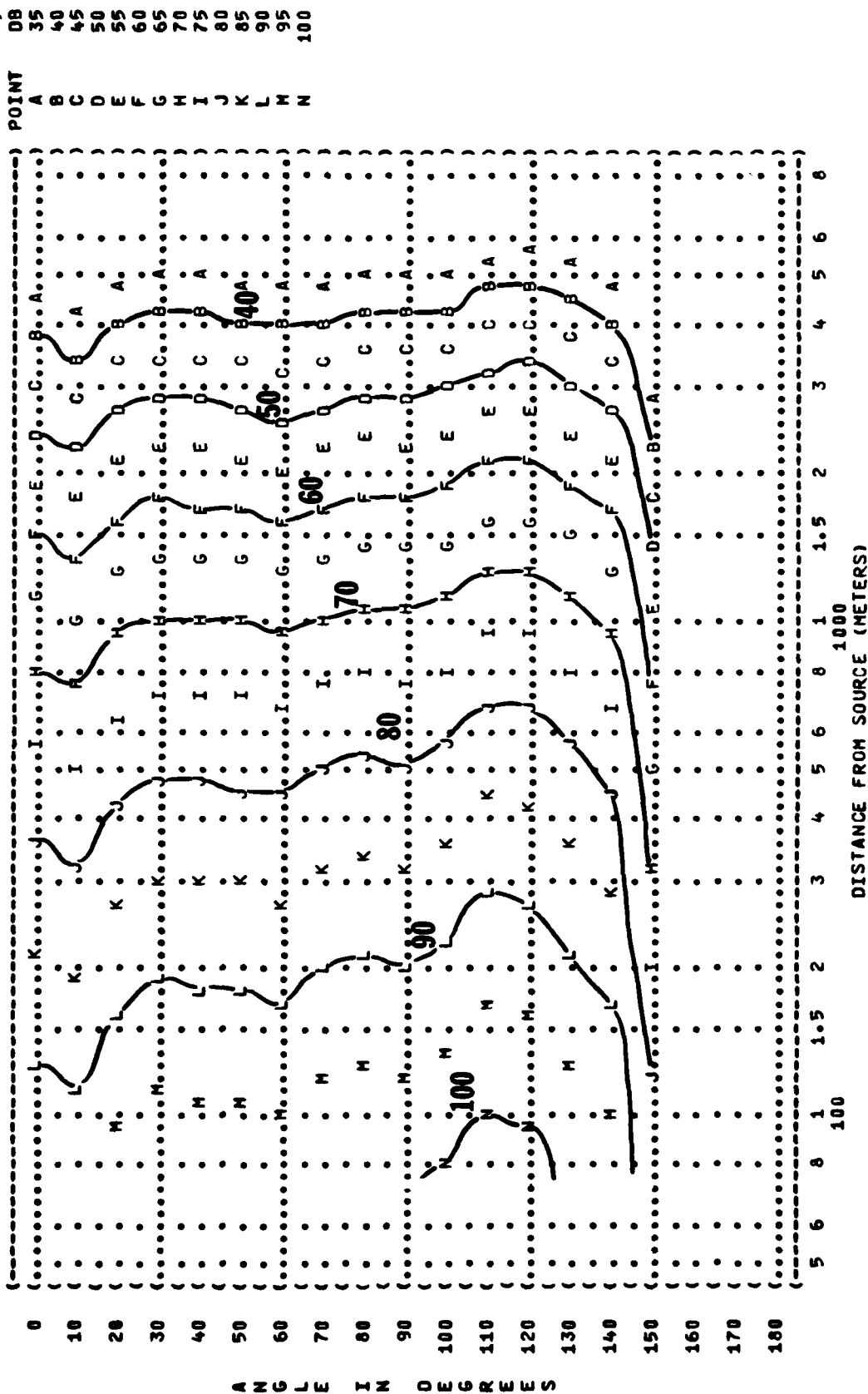


DISTANCE FROM SOURCE (METERS)
 0 100 1000
 5 6 8 1 1.5 2 3 4 5 6 8

FIGURE: PREFERRED SPEECH INTERFERENCE LEVEL (PSIL)
 9
 EQUAL LEVEL CONTOURS (DB)

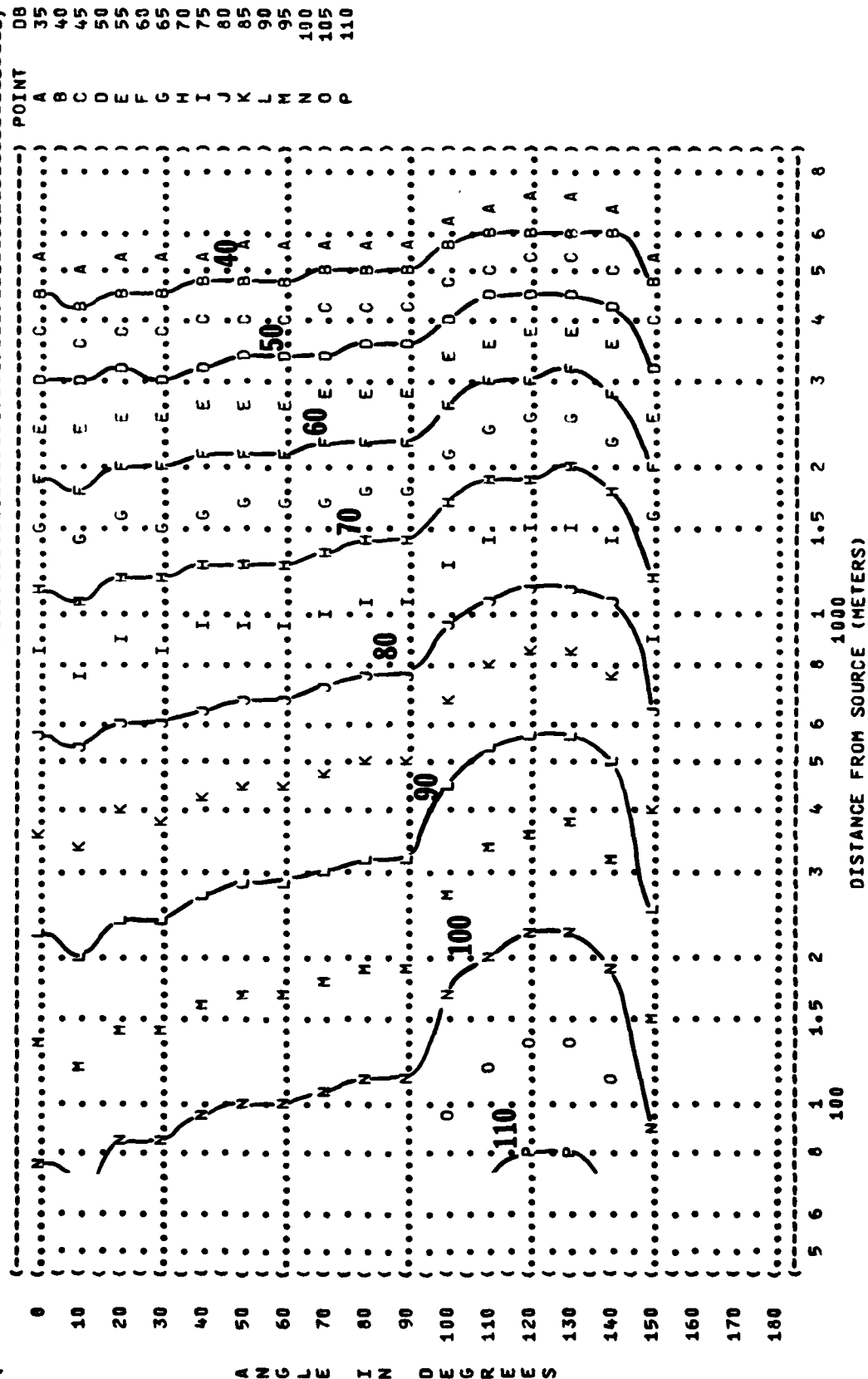
IDENTIFICATION: OMEGA 1.4
 TEST 78-008-001
 RUN 03
 18 SEP 78
 PAGE 17

NOISE SOURCE/SUBJECT: OPERATION: METEOROLOGY:
 E-3A AIRCRAFT 85% RPM ENGINE NO.2 TEMP = 15 C
 TF33-P-100A ENGINE IDLE, ENGINE NO.3 BAR PRESS = .760 M HG
 FAR FIELD NOISE FREE FLOW REL HUMID = 70 %



A N G L E I N D E G R E E S

() FIGURE: PREFERRED SPEECH INTERFERENCE LEVEL (PSIL)
 () 9
 () IDENTIFICATION:
 ()
 () OMEGA 1.4
 () TEST 78-008-001
 () NOISE SOURCE/SUBJECT: () OPERATION: () METEOROLOGY: () RUN 04
 () E-3A AIRCRAFT () TRT ENGINE NO.2 () TEMP = 15 C ()
 () TF33-P-100A ENGINE () 85% RPM ENGINE NO.3 () BAR PRESS = .760 M HG () 18 SEP 78
 () FAR FIELD NOISE () FREE FLOW () REL HUMID = 70 % ()
 () PAGE 17



A N G L E I N D E G R E E S

FIGURE	MAXIMUM PERMISSIBLE TIME (T) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)	IDENTIFICATION
EQUAL TIME CONTOURS (MINUTES)		
10		OMEGA 1.4
		TEST 78-000-001
		RUN 01
NOISE SOURCE/SUBJECT	OPERATION	METEOROLOGY
E-3A AIRCRAFT	IDLE 28% RPM	TEMP = 15 C
TF33-P-100A ENGINE	TWO ENGINES, NO2 AND 3	BAR PRESS = .760 M HG
FAR FIELD NOISE	FREE FLOW	REL HUMID = 70 %
		PAGE 8

PERSONNEL MAY BE EXPOSED UP TO 960 MINUTES PER DAY
AT ALL DISTANCES FROM SOURCE EQUAL TO OR GREATER THAN 75 METERS
FOR ALL ANGLES EVALUATED (INDICATED BY $\angle$ AT LEFT)
UNDER THE FOLLOWING EAR PROTECTION CONDITIONS:

MINIMUM QPL EAR MUFFS
AMERICAN OPTICAL 1700 EAR MUFFS
V-51R EAR PLUGS
COMFIT TRIPLE FLANGE EAR PLUGS
H-133 GROUND COMMUNICATION UNIT

(-----)

5	6	8	1	1.5	2	3	4	5	6	8	1000	1	1.5	2	3	4	5	6	8
										DISTANCE FROM SOURCE (METERS)									


```

(-----)
( FIGURE: MAXIMUM PERMISSIBLE TIME (T) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73) ) IDENTIFICATION: )
( EQUAL TIME CONTOURS (MINUTES) ) )
( 10 ) )
( COMFIT TRIPLE FLANGE EAR PLUGS ) )
(-----)
( NOISE SOURCE/SUBJECT: ) OPERATION: ) METEOROLOGY: )
( ) ) )
( ) ) )
( E-3A AIRCRAFT ) 70% RPM ENGINE NO.2 ) TEMP = 15 C )
( TF33-P-100A ENGINE ) IDLE, ENGINE NO.3 ) BAR PRESS = .760 M HG )
( ) ) )
( FAR FIELD NOISE ) FREE FLOW ) REL HUMID = 70 % )
( ) ) )
(-----)
( PAGE 9 )
(-----)

```

[illegible]

**1000
DISTANCE FROM SOURCE (METERS)**

```
(-----)
( FIGURE: MAXIMUM PERMISSIBLE TIME {T} FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73) ) IDENTIFICATION:
( EQUAL TIME CONTOURS (MINUTES) ) )
(      10      H-133 GROUND COMMUNICATION UNIT ) OMEGA 1.4
( NOISE SOURCE/SUBJECT: ) METEOROLOGY: ) TEST 78-008-001
(   )   ) TEMP = 15 C ) RUN 02
( E-3A AIRCRAFT ) 70% RPM ENGINE NO.2 ) BAR PRESS = .760 M HG ) 18 SEP 78
( TF33-P-100A ENGINE ) IDLE, ENGINE NO.3 ) REL HUMID = 70 % )
( FAR FIELD NOISE ) FREE FLOW ) PAGE 10
(-----)
```

POINT A	MIN 960
0	
10	
20	
30	
40	
50	
60	
70	
80	
90	
100	
110	
120	
130	
140	
150	
160	
170	
180	

DISTANCE FROM SOURCE (METERS)

```
(-----)
( FIGURE: MAXIMUM PERMISSIBLE TIME (T) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73) ) IDENTIFICATION:
( ( EQUAL TIME CONTOURS (MINUTES) ) )
( 10 ) OMEGA 1.4
(-----)
( NOISE SOURCE/SUBJECT: ) OPERATION: ) METEOROLOGY:
( ( ) TEMP = 15 C )
( E-3A AIRCRAFT ) 70% RPM ENGINE NO.2 ) BAR PRESS = .760 M HG )
( TF33-P-100A ENGINE ) IDLE, ENGINE NO.3 ) REL HUMID = 70 % )
( FAR FIELD NOISE ) FREE FLOW ) PAGE 11
(-----)
```

[illegible]

PERSONNEL MAY BE EXPOSED UP TO 960 MINUTES PER DAY
AT ALL DISTANCES FROM SOURCE EQUAL TO OR GREATER THAN 75 METERS
FOR ALL ANGLES EVALUATED (INDICATED BY $\angle$ AT LEFT)

UNDER THE FOLLOWING EAR PROTECTION CONDITIONS:

AMERICAN OPTICAL 1700 EAR MUFFS

V-51R EAR PLUGS

5 6 0 1 1.5 2 3 4 5 6 8 1000 100

DISTANCE FROM SOURCE (METERS)

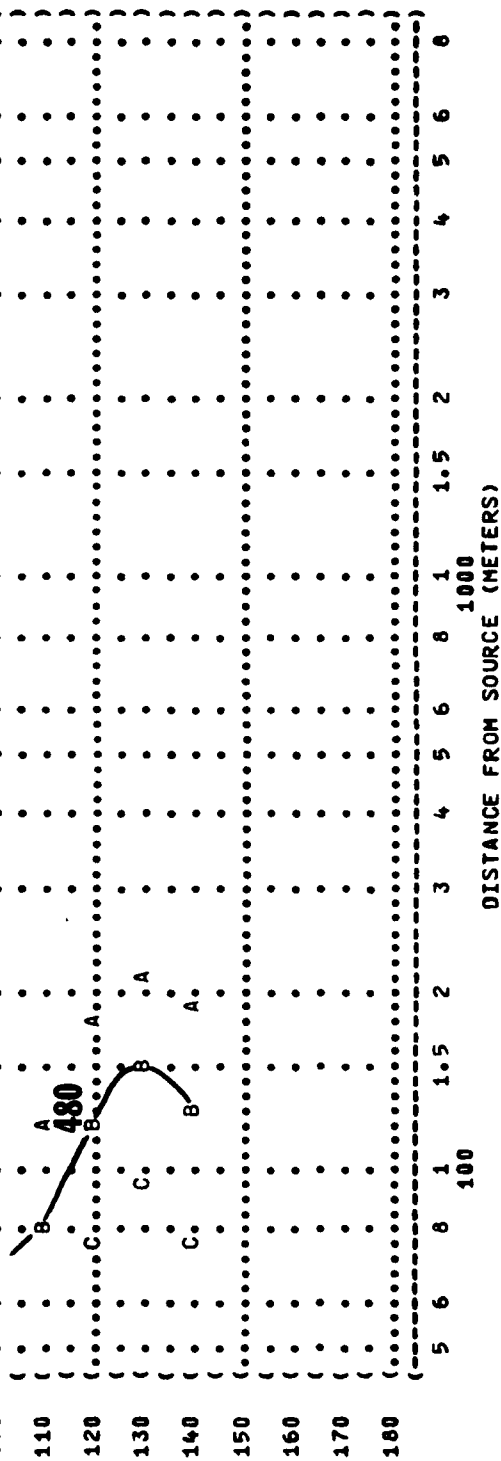

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(-----)
( FIGURE: MAXIMUM PERMISSIBLE TIME {T} FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73) ) IDENTIFICATION:
( 10 EQUAL TIME CONTOURS (MINUTES) ) )
( AMERICAN OPTICAL 1700 EAR MUFFS ) ) OMEGA 1.4
( ) ) TEST 78-008-001
( NOISE SOURCE/SUBJECT: ) OPERATION: ) METEOROLOGY: ) RUN 03
( ) ) TEMP = 15 C )
( E-3A AIRCRAFT ) 85% RPM ENGINE NO.2 ) BAR PRESS = .760 M HG ) 18 SEP 78
( TF33-P-100A ENGINE ) IDLE, ENGINE NO.3 ) ) )
( FAR FIELD NOISE ) FREE FLOW ) ) ) PAGE 9
(-----)

```

	(-----)	MIN	POINT
0	(.....)	960	A
10	(.....)	480	B
	(.....)	240	C

ANGLE IN DEGREES



) PAGE 11



1000
DISTANCE FROM SOURCE (METERS)

POINT	MIN
A	960
B	480
C	240

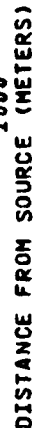


FIGURE:	MAXIMUM PERMISSIBLE TIME (T) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)	IDENTIFICATION:
10	EQUAL TIME CONTOURS (MINUTES)	
	AMERICAN OPTICAL 1700 EAR MUFFS	OMEGA 1.4
		TEST 78-008-001
NOISE SOURCE/SUBJECT:	OPERATION:	RUN 04
		METEOROLOGY:
		TEMP = 15 C
E-3A AIRCRAFT	TRT ENGINE NO.2	BAR PRESS = .760 M HG
TF33-P-100A ENGINE	85% RPM ENGINE NO.3	REL HUMID = 70 %
FAR FIELD NOISE	FREE FLOW	PAGE 9

ANGLE IN DEGREES

POINT

A B C D E

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180

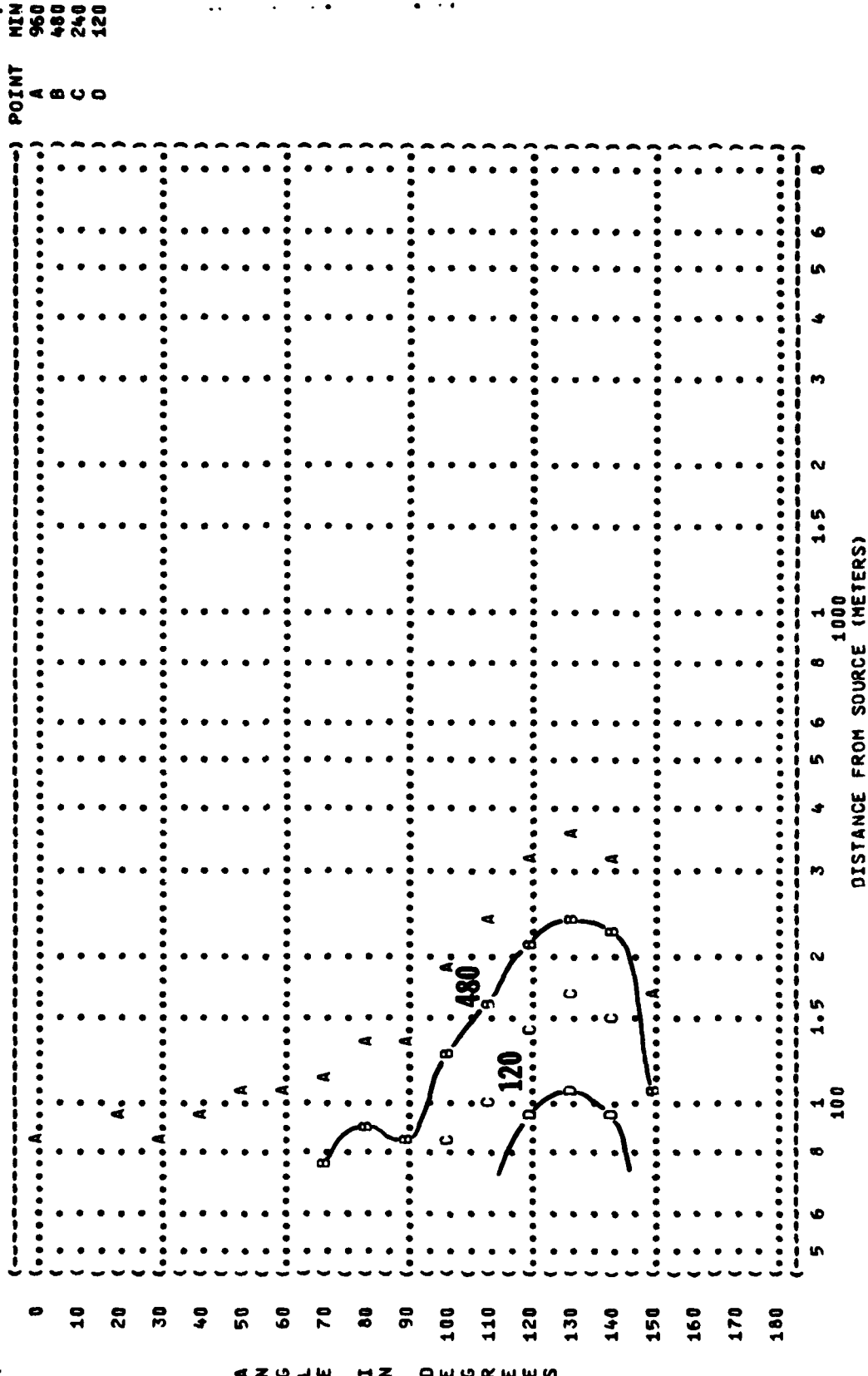
480

120

DISTANCE FROM SOURCE (METERS)

((FIGURE: MAXIMUM PERMISSIBLE TIME {T} FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)
((10 EQUAL TIME CONTOURS (MINUTES)
((10 V-51R EAR PLUGS
((IDENTIFICATION:)
(()
(() OMEGA 1.4)

(	NOISE SOURCE/SUBJECT:	(	OPERATION:	(	METEOROLOGY:	(	RUN 04
(		(		(	TEMP = 15 C	(	
(	E-3A AIRCRAFT	(	TRT ENGINE NO.2	(	BAR PRESS = .760 H HG	(	18 SEP 78
(	TF33-P-100A ENGINE	(	85% RPM ENGINE NO.3	(	REL HUMID = 70 %	(	
(	FAR FIELD NOISE	(	FREE FLOW	(		(	PAGE 10



POINT	MIN
A	960
B	480
C	240
D	120
E	60



FIGURE: SOUND PRESSURE LEVEL (SPL)
EQUAL LEVEL CONTOURS (DB)
11 63 HZ OCTAVE BAND

IDENTIFICATION:
OMEGA 1.4
TEST 78-008-001

NOISE SOURCE/SUBJECT:

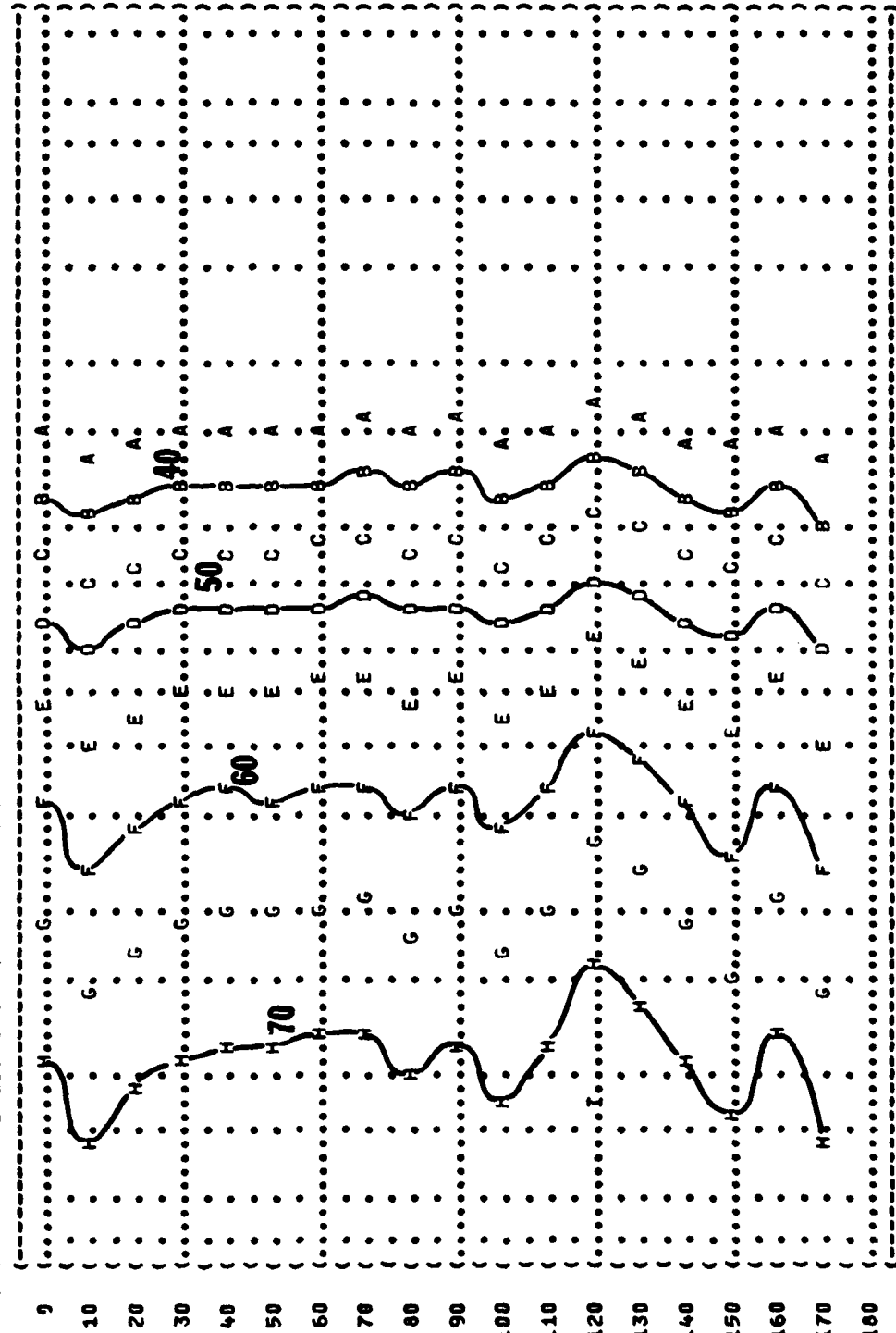
OPERATION:

METEOROLOGY:

E-3A AIRCRAFT
TF33-P-100A ENGINE
FAR FIELD NOISE
IDLE 28X RPM
TWO ENGINES, NO2 AND 3
FREE FLOW
TEMP = 15 C
BAR PRESS = .769 M HG
REL HUMID = 70 %
18 SEP 78
PAGE 19

POINT
A B C D E F G H I
DB
35
40
45
50
55
60
65
70
75

A N G L E I N D E G R E E S



DISTANCE FROM SOURCE (METERS)

(FIGURE: SOUND PRESSURE LEVEL (SPL)
 (11 EQUAL LEVEL CONTOURS (DB)
 (125 HZ OCTAVE BAND
 (NOISE SOURCE/SUBJECT: (OPERATION:
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 (TF33-P-100A ENGINE (TWO ENGINES, NO2 AND 3
 (FAR FIELD NOISE (FREE FLOW
 (METEOROLOGY:
 (TEMP = 15 C
 (BAR PRESS = .760 M HG
 (REL HUMID = 70 %
 (IDENTIFICATION:
 (OMEGA 1.4
 (TEST 78-008-001
 (RUN 01
 (18 SEP 78
 (PAGE 20

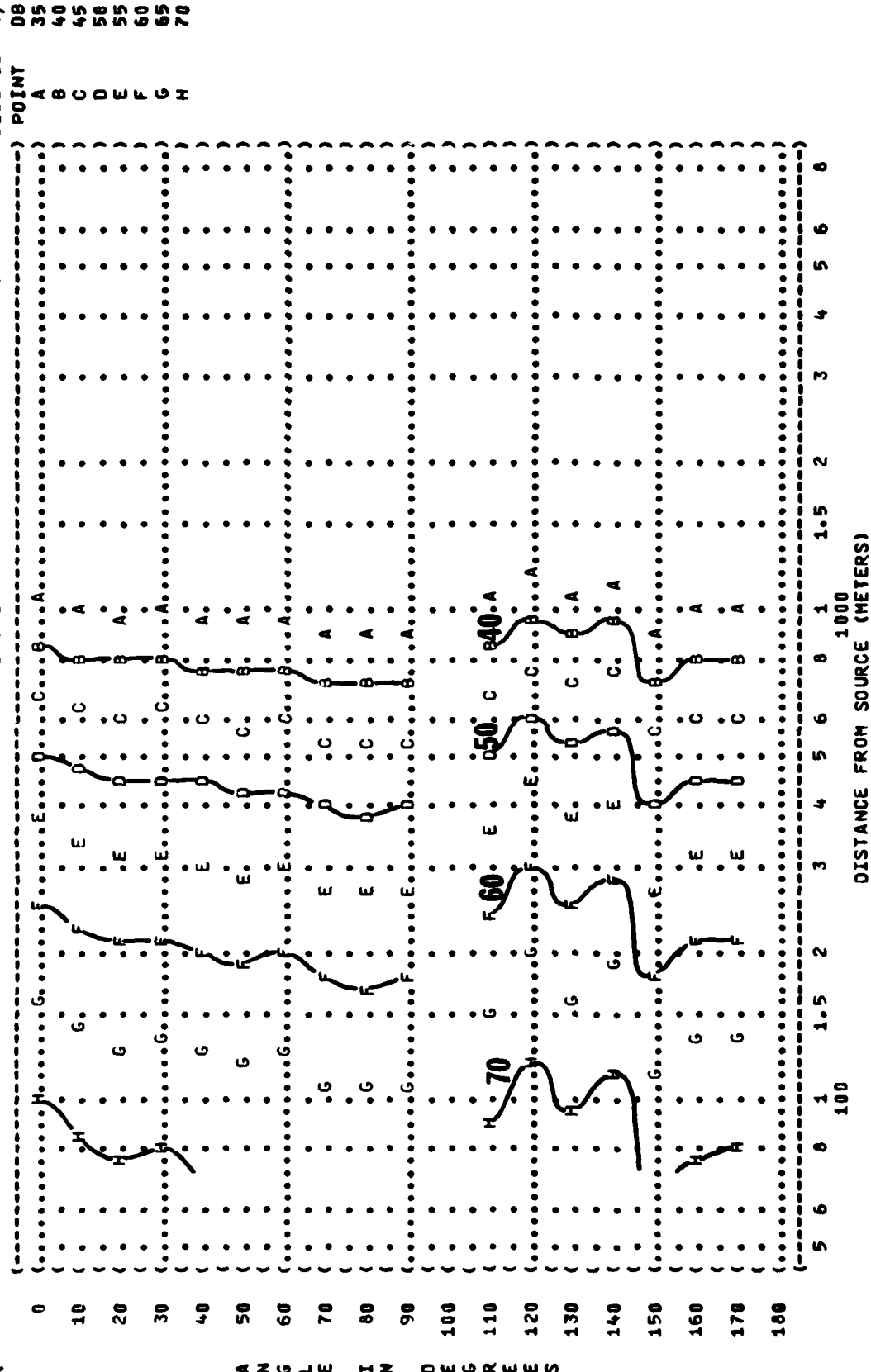


FIGURE 11
SOUND PRESSURE LEVEL {SPL}
EQUAL LEVEL CONTOURS (DB)
250 HZ OCTAVE BAND

NOISE SOURCE/SUBJECT: (OPERATION:

E-3A AIRCRAFT	(	IDLE 28% RPM
TF33-P-100A ENGINE	(	TWO ENGINES,
FAR FIELD NOISE	(	FREE FLOW

) METEOROLOGY:

) TEMP = 15 C
) BAR PRESS = .760 M HG
) REL HUMID = 70 %

(OPERATIONS

(IOLE 28% RPH
(TWO ENGINES, NO2 AND 3
(FREE FLOW

) RUN 01

)
) 18 SEP 78
)
) PAGE 21

POINT

0	(.....)	H.....	G.....	F.....	E.....	D.....	C.....	B.....	A.....	
10	(.....)	I.....	G.....	F.....	E.....	D.....	C.....	B.....	A.....	
20	(.....)	I.....	G.....	F.....	E.....	D.....	C.....	B.....	A.....	
30	(.....)	I.....	G.....	F.....	E.....	D.....	C.....	B.....	A.....	
40	(.....)	I.....	G.....	F.....	E.....	D.....	C.....	B.....	A.....	

ANGLE IN DEGREES

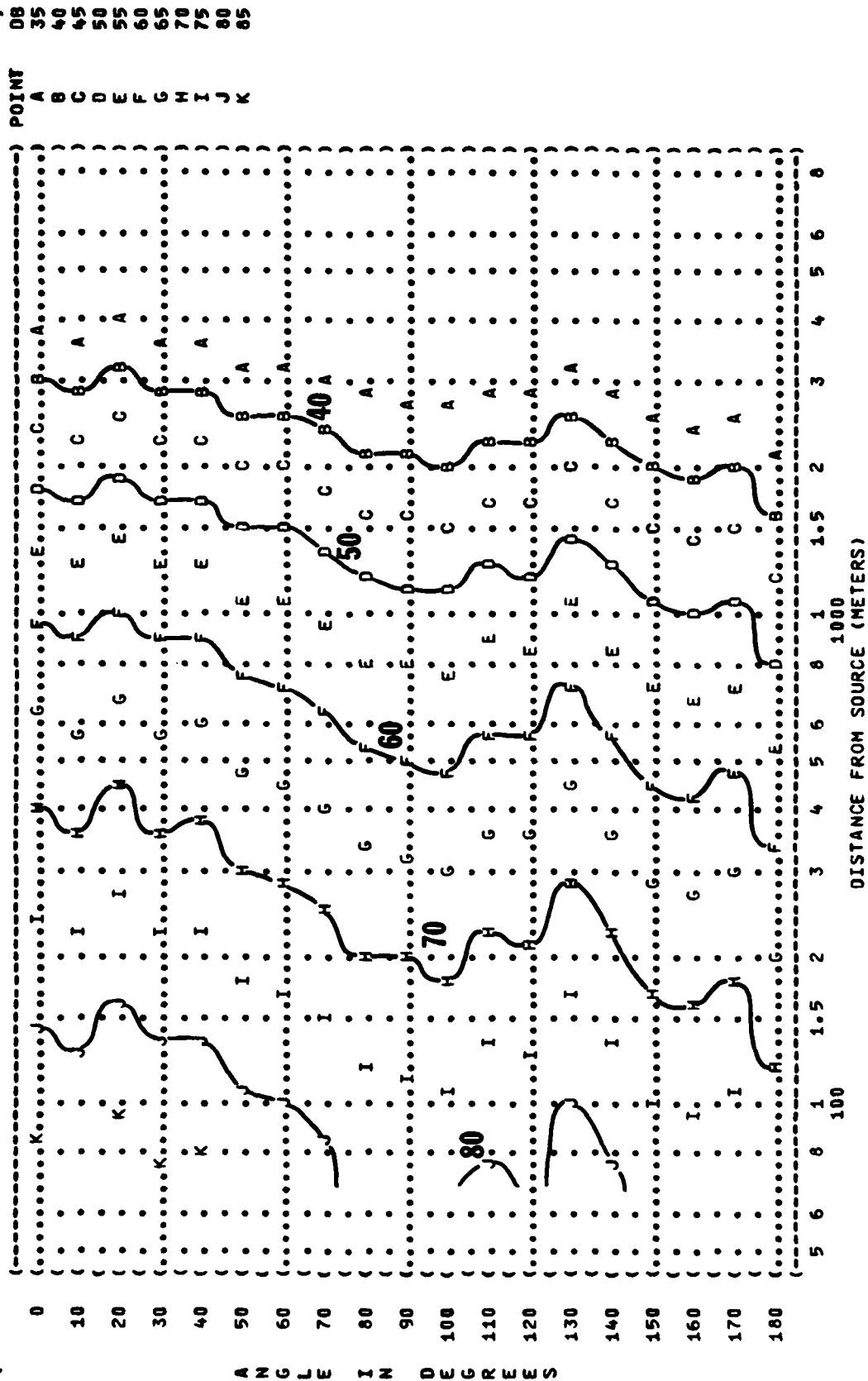
DISTANCE FROM SOURCE (METERS)

((FIGURE: SOUND PRESSURE LEVEL {SPL}
((EQUAL LEVEL CONTOURS (DB)
((**11**
((500 HZ OCTAVE BAND
((-----
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((TF33-P-100A ENGINE (TWO ENGINES, NO2 AND 3
((FAR FIELD NOISE (FREE FLOW
((METEOROLOGY: TEMP = 15 C
((BAR PRESS = .760 M HG
((REL HUMID = 70 %
((IDENTIFICATION:) OMEGA 1.4
((TEST 79-008-001
((RUN 01
((PAGE 22

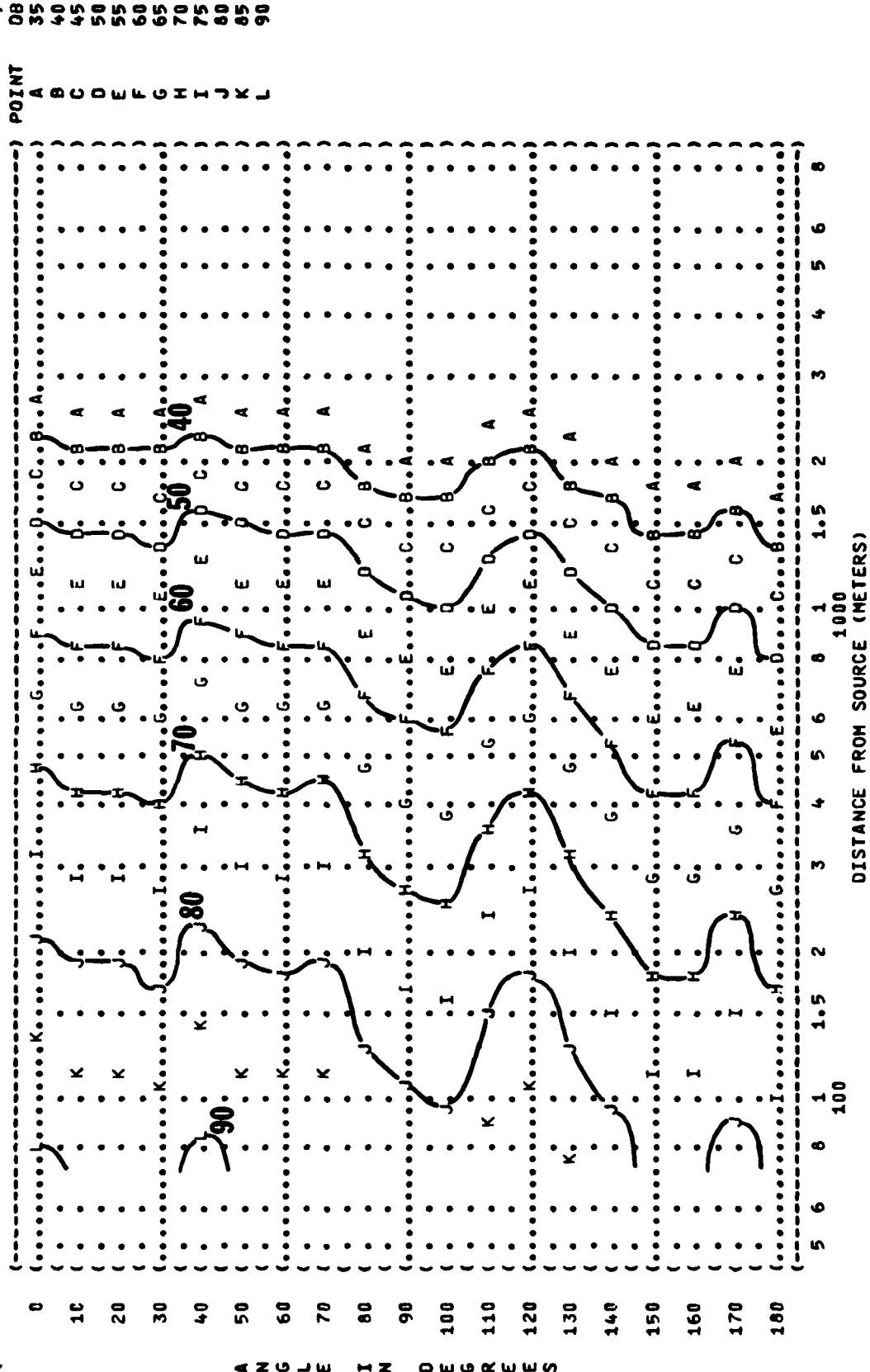
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(		(		(		(				(	
(	E-3A AIRCRAFT	(	IDLE 28% RPM	(		(	BAR PRESS	=	.760 M HG	(	18 SEP 78
(	TF33-P-100A ENGINE	(	TWO ENGINES, NO2 AND 3	(		(	REL HUMID	=	70 %	(	
(	FAR FIELD NOISE	(	FREE FLOW	(		(				(	PAGE 22

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1000	5	6	8	1	1.5	2	3	4	5	6	8

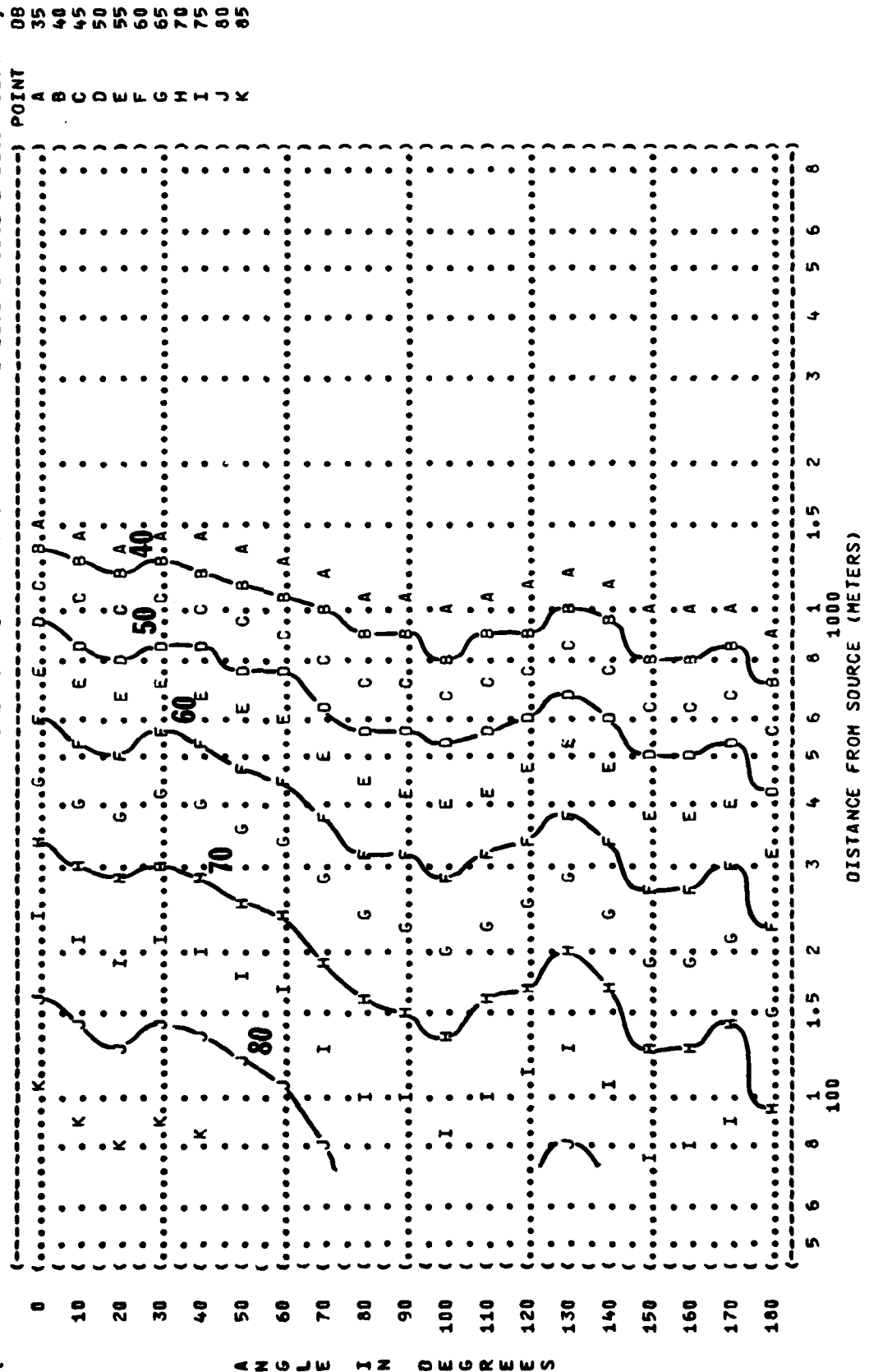
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 (11 EQUAL LEVEL CONTOURS (DB)
 (1000 HZ OCTAVE BAND
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 (TF33-P-100A ENGINE (TWO ENGINES, NO2 AND 3
 (FAR FIELD NOISE (FREE FLOW
 (METEOROLOGY:
 (TEMP = 15 C
 (BAR PRESS = .760 M HG
 (REL HUMID = 70 %
 (IDENTIFICATION:
 (OMEGA 1.4
 (TEST 78-008-001
 (RUN 01
 (18 SEP 78
 (PAGE 23



(FIGURE: SOUND PRESSURE LEVEL (SPL)
 (11 EQUAL LEVEL CONTOURS (DB)
 (2000 HZ OCTAVE BAND
 (NOISE SOURCE/SUBJECT: (OPERATION:
 (E-3A AIRCRAFT (IDLE 28X RPM
 (TF33-P-100A ENGINE (TWO ENGINES, NO2 AND 3
 (FAR FIELD NOISE (FREE FLOW
 (METEOROLOGY:
 (TEMP = 15 C
 (BAR PRESS = .760 M HG
 (REL HUMID = 70 %
 (IDENTIFICATION:
 (OMEGA 1.4
 (TEST 78-008-001
 (RUN 01
 (10 SEP 78
 (PAGE 24



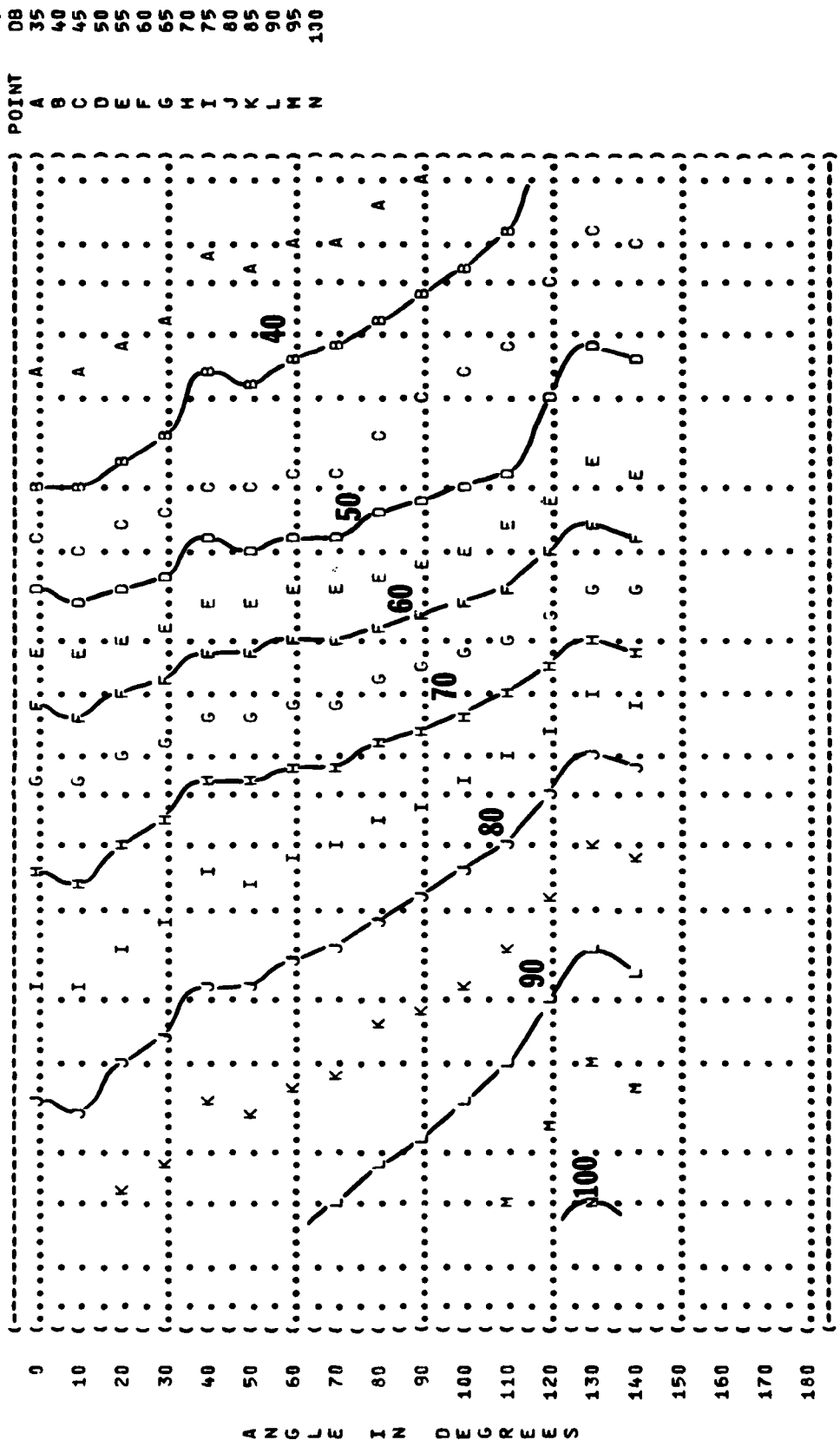
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 (4000 HZ OCTAVE BAND
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 (METEOROLOGY: (TEMP = 15 C
 (BAR PRESS = .760 M HG
 (REL HUMID = 70 %
 (IDENTIFICATION: (OMEGA 1.4
 (TEST 78-008-001
 (RUN 01
 (18 SEP 78
 (PAGE 25



DISTANCE FROM SOURCE (METERS)

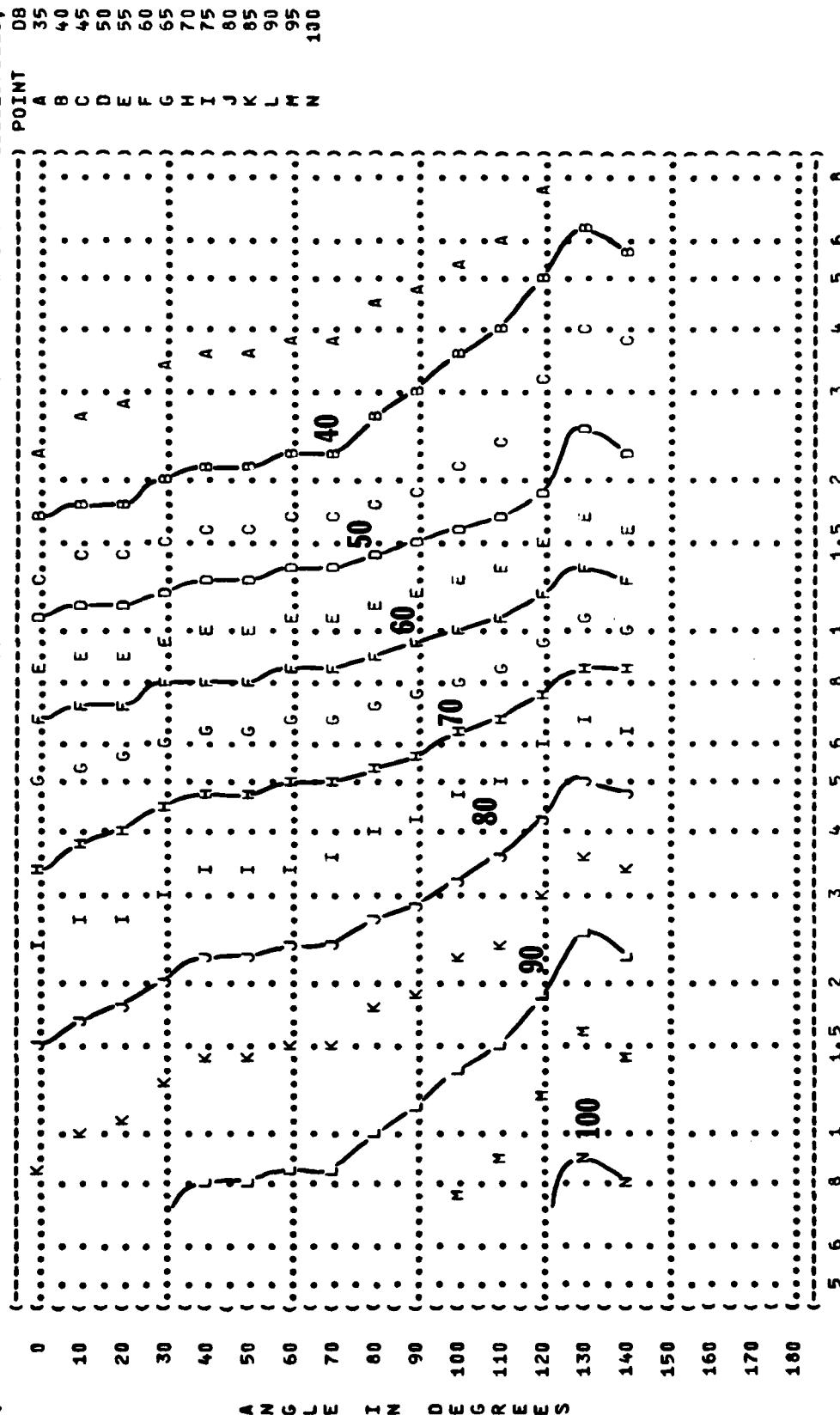
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FIGURE 1 SOUND PRESSURE LEVEL (SPL)
 EQUAL LEVEL CONTOURS (DB)
 63 HZ OCTAVE BAND
 NOISE SOURCE/SUBJECT: (OPERATION:) METEOROLOGY:)
 ((70% RPM ENGINE NO.2) TEMP = 15 C)
 ((1F33-P-130A ENGINE) BAR PRESS = .760 M HG)
 ((FAR FIELD NOISE) (IDLE, ENGINE NO.3) REL HUMID = 70 %)
 ((FREE FLOW))
 IDENTIFICATION:)
)
) OMEGA 1.4
) TEST 78-008-001
) RUN 02
) 18 SEP 78
) PAGE 19

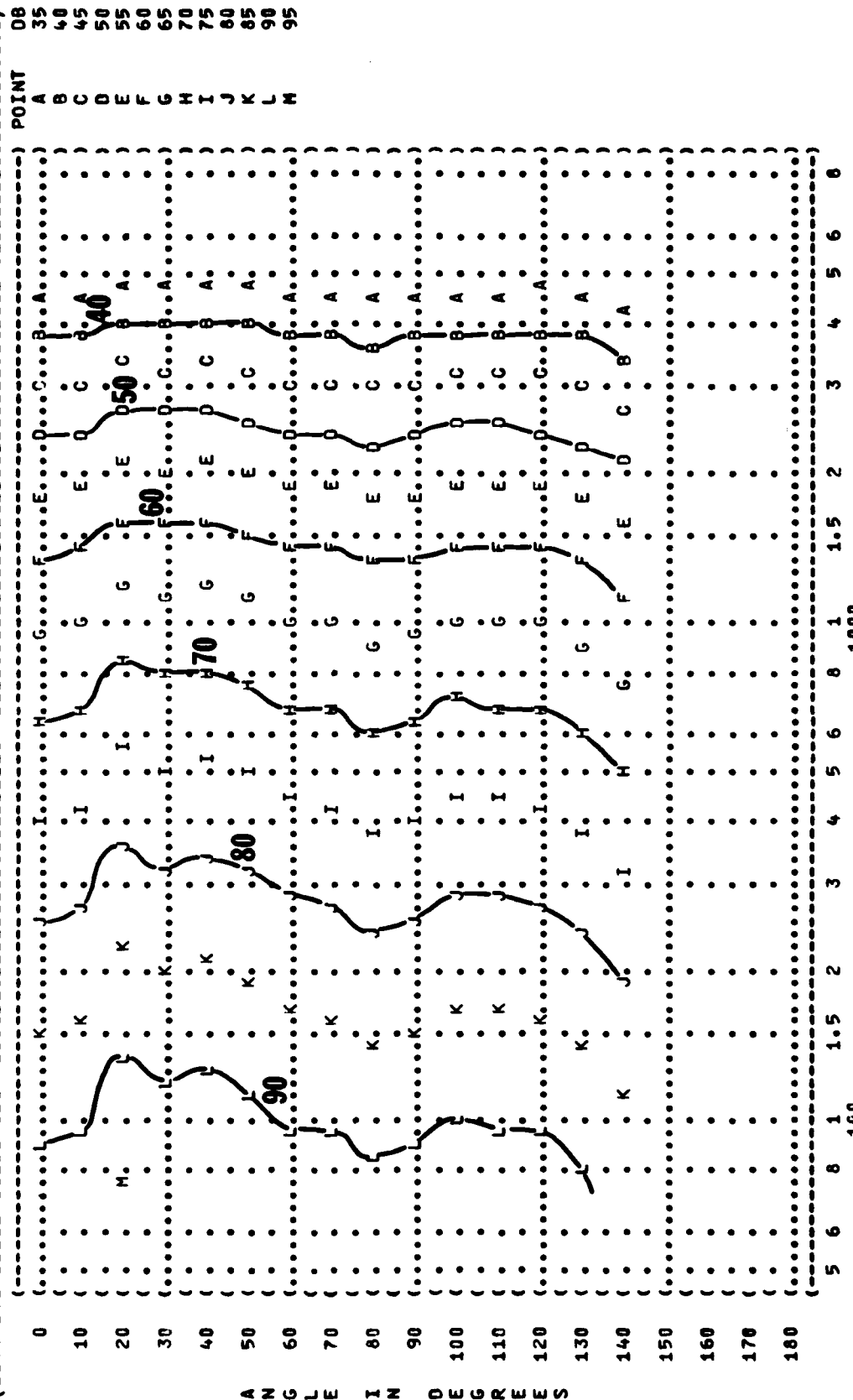


DISTANCE FROM SOURCE (METERS)

(FIGURE: SOUND PRESSURE LEVEL (SPL)
 (11 EQUAL LEVEL CONTOURS (DB)
 (125 HZ OCTAVE BAND
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 (TF33-P-100A ENGINE (IDLE, ENGINE NO.3
 (FAR FIELD NOISE (FREE FLOW
 (METEOROLOGY: (TEMP = 15 C
 (BAR PRESS = .760 M HG
 (REL HUMID = 70 %
 (RUN 02
 (18 SEP 78
 (PAGE 20
 (IDENTIFICATION:)
 (OMEGA 1.4
 (TEST 78-008-001
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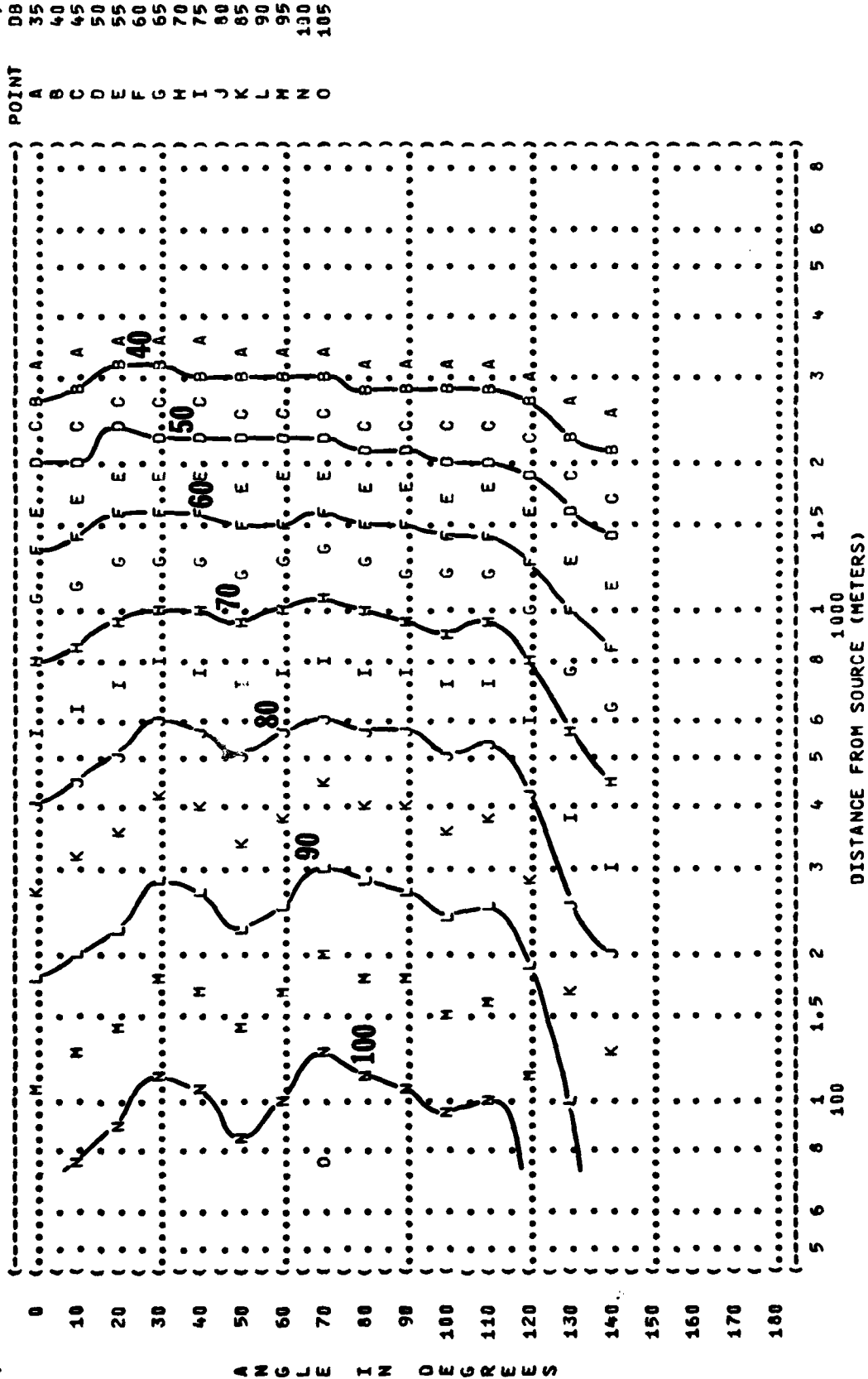


(FIGURE: SOUND PRESSURE LEVEL (SPL))
 (11 EQUAL LEVEL CONTOURS (DB))
 (1000 HZ OCTAVE BAND)
 (NOISE SOURCE/SUBJECT:)
 ((OPERATION:)
 ((70% PPM ENGINE NO.2)
 ((TF33-P-100A ENGINE)
 ((FAR FIELD NOISE)
 ((METEOROLOGY:)
 ((TEMP = 15 C)
 ((BAR PRESS = .760 M HG)
 ((REL HUMID = 70 %)
 ((RUN 02)
 ((OMEGA 1.4)
 ((TEST 78-008-001)
 ((PAGE 23)

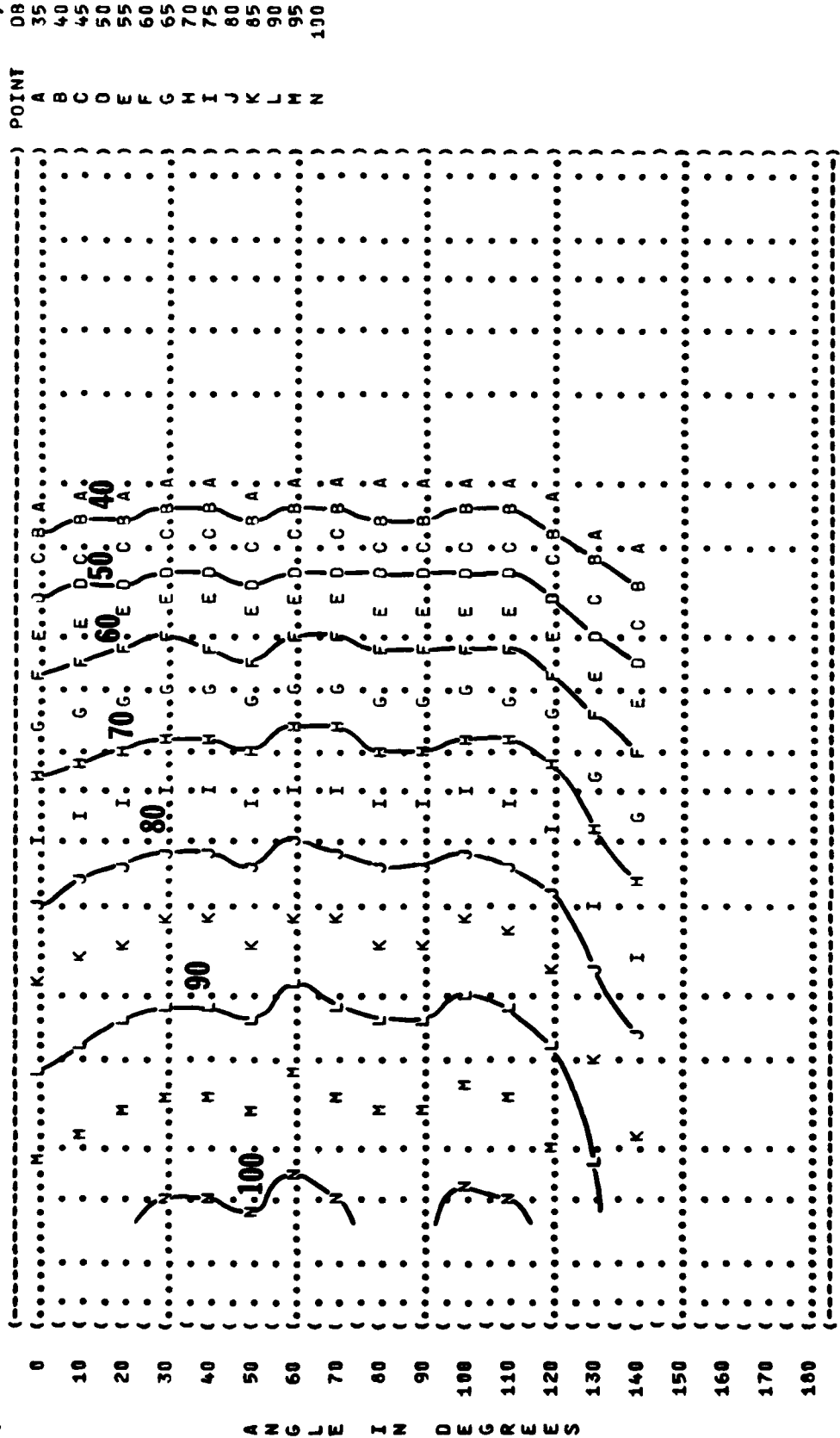


DISTANCE FROM SOURCE (METERS)

(FIGURE: SOUND PRESSURE LEVEL (SPL)
 (EQUAL LEVEL CONTOURS (DB)
 (11 2000 HZ OCTAVE BAND
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 (((IDLE, ENGINE NO.3
 (((FAR FIELD NOISE
 (METEOROLOGY: (TEMP = 15 C
 (BAR PRESS = .760 M HG
 (REL HUMID = 70 %
 (RUN 02
 (TEST 78-008-001
 (OMEGA 1.4
 (IDENTIFICATION: (



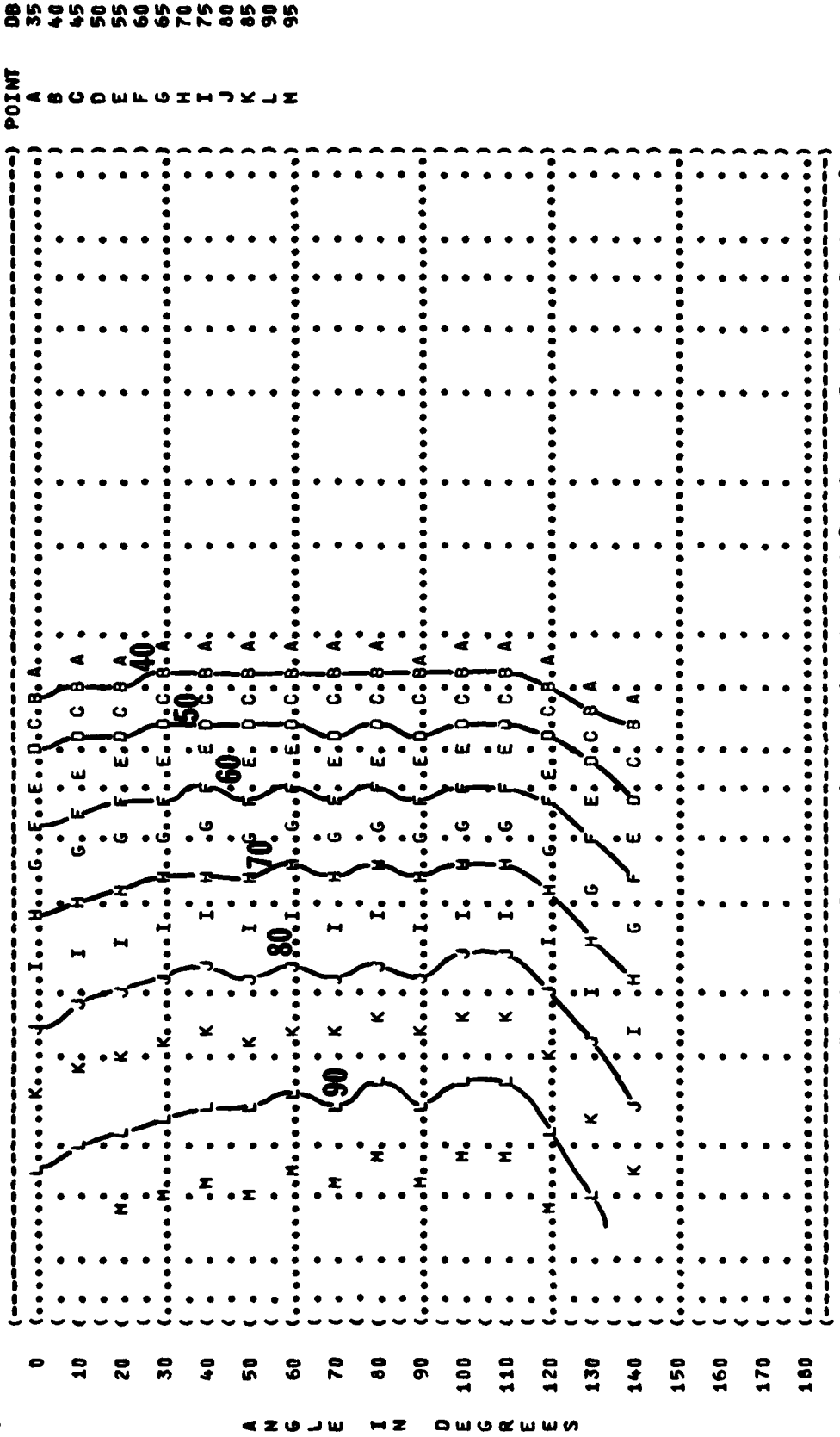
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 (TF33-P-100A ENGINE (IDLE, ENGINE NO.3
 (FAR FIELD NOISE (FREE FLOW
 (METEOROLOGY: (TEMP = 15 C
 (BAR PRESS = .760 M HG
 (REL HUMID = 70 %
 (RUN 02
 (18 SEP 78
 (PAGE 25
 (IDENTIFICATION:)
 (OMEGA 1.4
 (TEST 78-008-001
 ()



A N G L E I N D E G R E E S

DISTANCE FROM SOURCE (METERS)

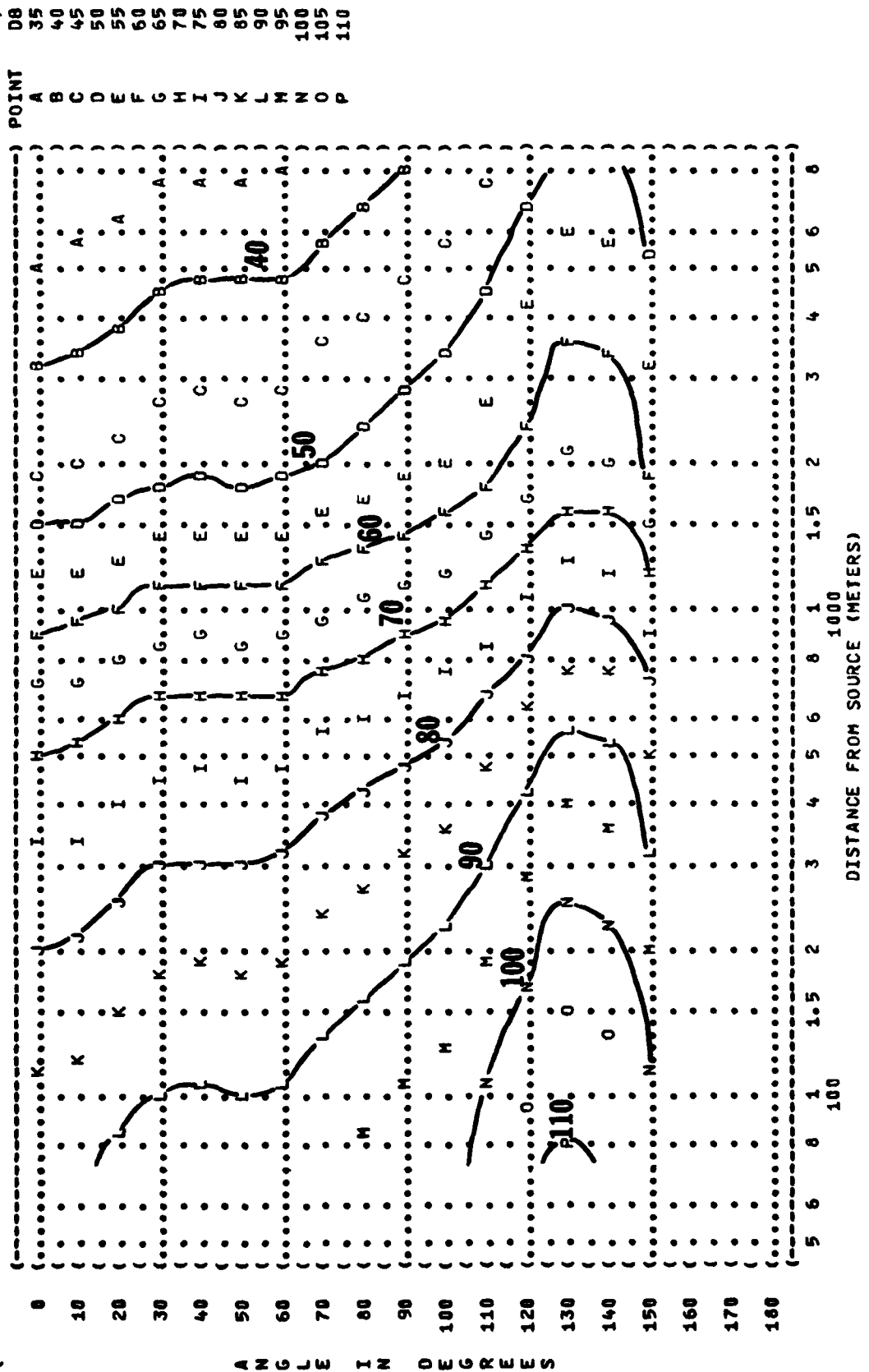
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 (TF33-P-100A ENGINE (IDLE, ENGINE NO.3
 (FAR FIELD NOISE (FREE FLOW
 (METEOROLOGY:
 (TEMP = 15 C
 (BAR PRESS = .760 M HG
 (REL HUMID = 70 %
 (IDENTIFICATION:
 (OMEGA 1.4
 (TEST 78-000-001
 (RUN 02
 (18 SEP 78
 (PAGE 26



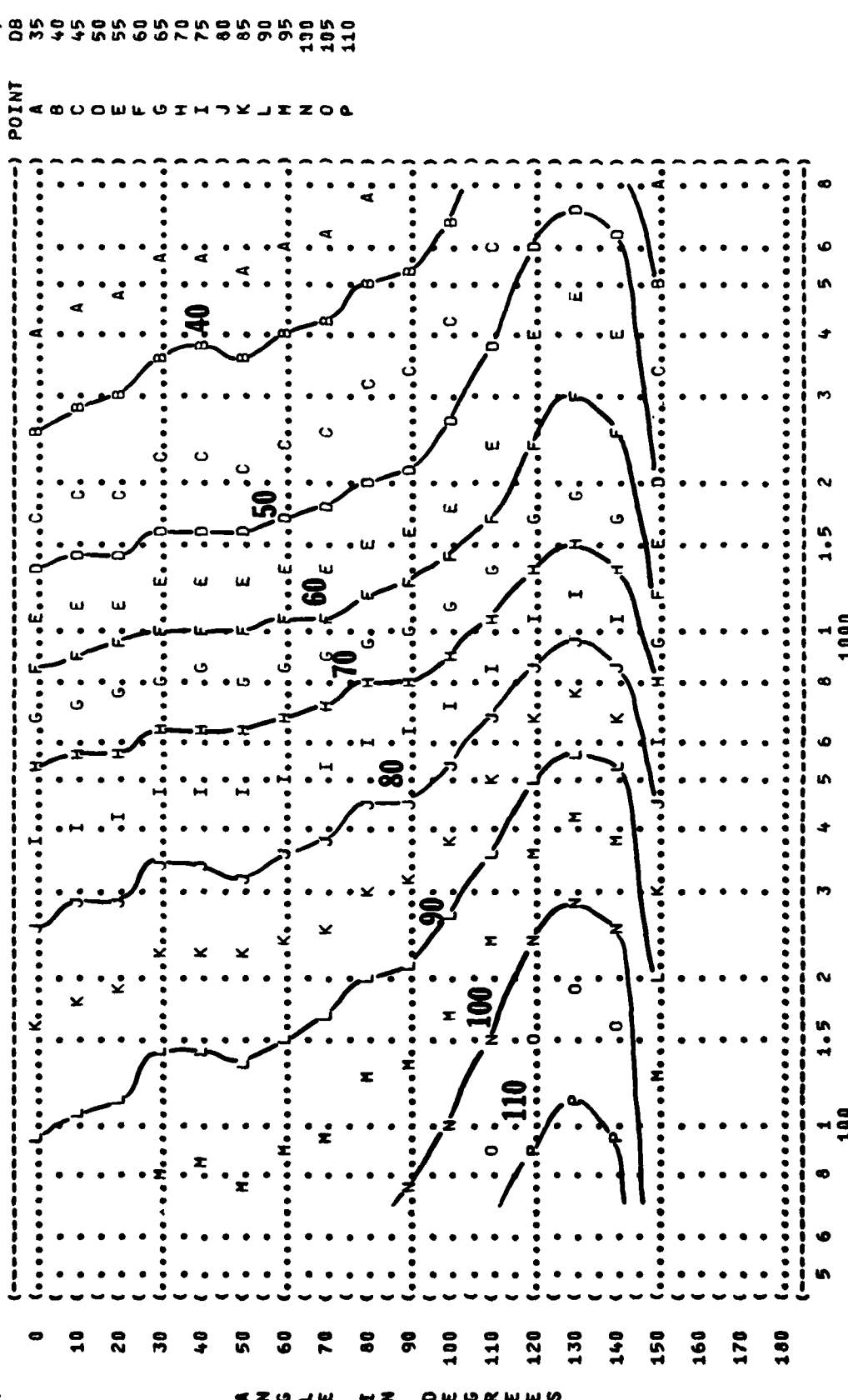
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(FIGURE: SOUND PRESSURE LEVEL (SPL)
 (EQUAL LEVEL CONTOURS (DB)
 (11 63 HZ OCTAVE BAND
 (NOISE SOURCE/SUBJECT: (OPERATION:
 (E-3A AIRCRAFT (65% RPM ENGINE NO.2
 (TF33-P-100A ENGINE (IDLE, ENGINE NO.3
 (FAR FIELD NOISE (FREE FLOW
 (METEOROLOGY:
 (TEMP = 15 C
 (BAR PRESS = .760 M HG
 (REL HUMID = 70 %
 (RUN 03
 (PAGE 19
 (IDENTIFICATION:
 (OMEGA 1.4
 (TEST 76-008-001



(FIGURE: SOUND PRESSURE LEVEL (SPL)
 (11 EQUAL LEVEL CONTOURS (DB)
 (125 HZ OCTAVE BAND
 (NOISE SOURCE/SUBJECT: (OPERATION: (METEOROLOGY: (POINT DB
 (E-3A AIRCRAFT (85% RPM ENGINE NO.2 (TEMP = 15 C (A 35
 (TF33-P-100A ENGINE (IDLE, ENGINE NO.3 (BAR PRESS = .760 M HG (B 40
 (FAR FIELD NOISE (FREE FLOW (REL HUMID = 70 % (C 45
 (((((RUN 03 (D 50
 (((((18 SEP 78 (E 55
 (((((PAGE 20 (F 60
 (((((G 65
 (((((H 70
 (((((I 75
 (((((J 80
 (((((K 85
 (((((L 90
 (((((M 95
 (((((N 100
 (((((O 105
 (((((P 110



(FIGURE: SOUND PRESSURE LEVEL (SPL)
 (11 EQUAL LEVEL CONTOURS (DB)
 (250 HZ OCTAVE BAND
 (NOISE SOURCE/SUBJECT: (OPERATION:
 (E-3A AIRCRAFT (85% RPM ENGINE NO.2
 (TF33-P-100A ENGINE (IDLE, ENGINE NO.3
 (FAR FIELD NOISE (FREE FLOW
 (METEOROLOGY: (TEMP = 15 C
 (BAR PRESS = .760 M HG
 (REL HUMID = 70 %
 (IDENTIFICATION: (OMEGA 1.4
 (TEST 76-008-001
 (RUN 03
 (16 SEP 78
 (PAGE 21

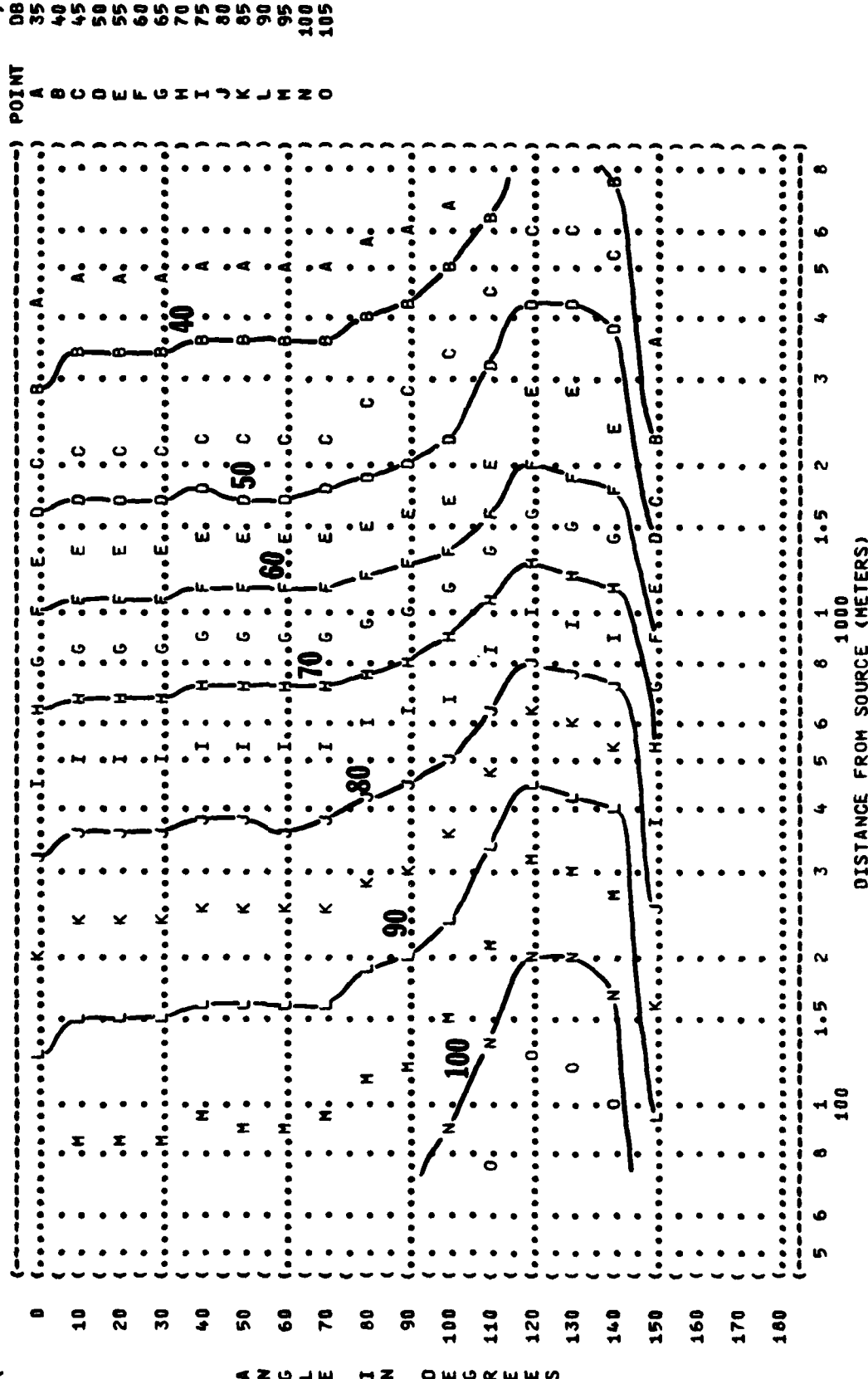


FIGURE: SOUND PRESSURE LEVEL (SPL)
EQUAL LEVEL CONTOURS (DB)
500 HZ OCTAVE BAND

11

IDENTIFICATION:

OMEGA 1.4

TEST 78-008-001

NOISE SOURCE/SUBJECT:

OPERATION:

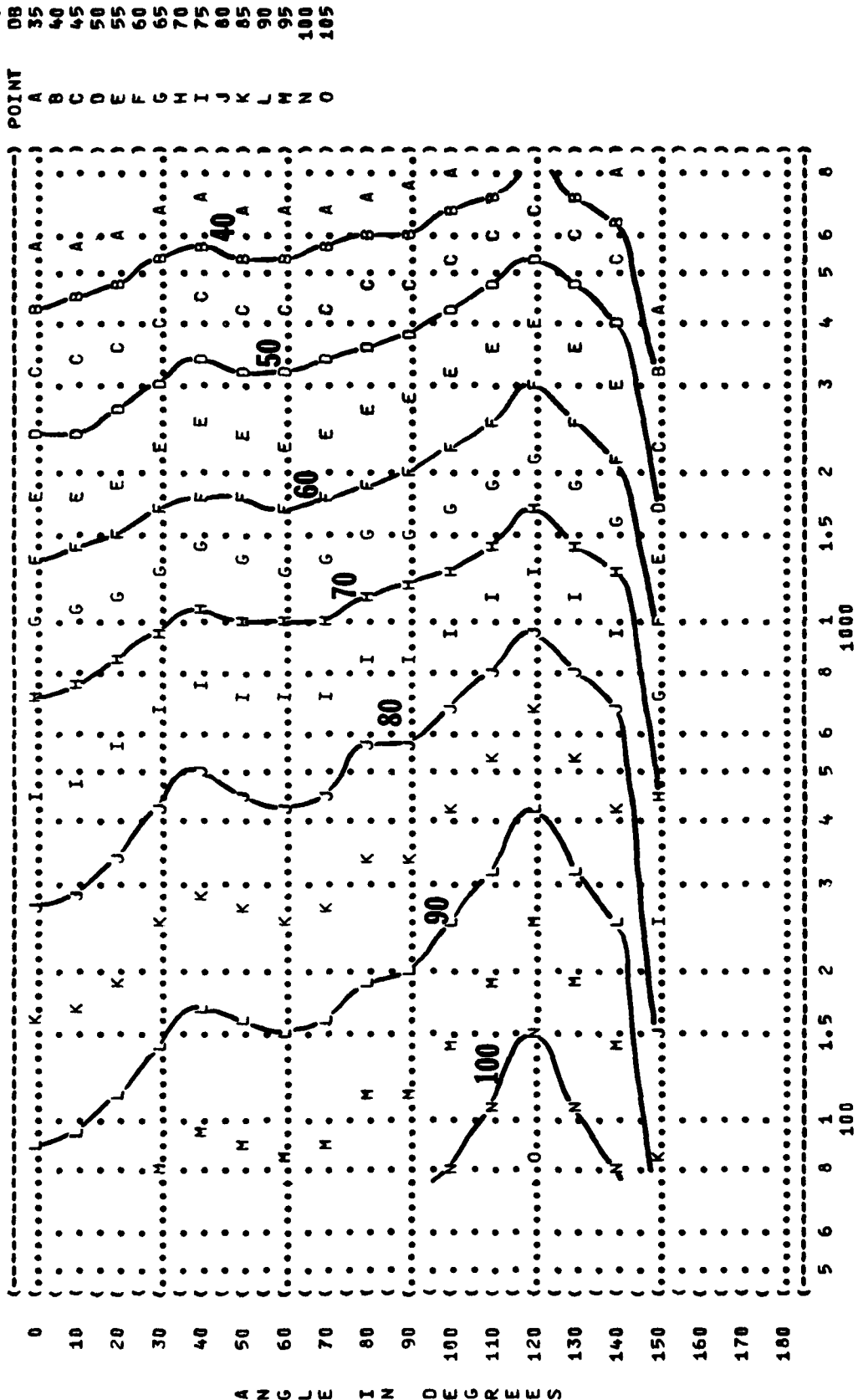
METEOROLOGY:

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TF33-P-138A ENGINE
FAR FIELD NOISE

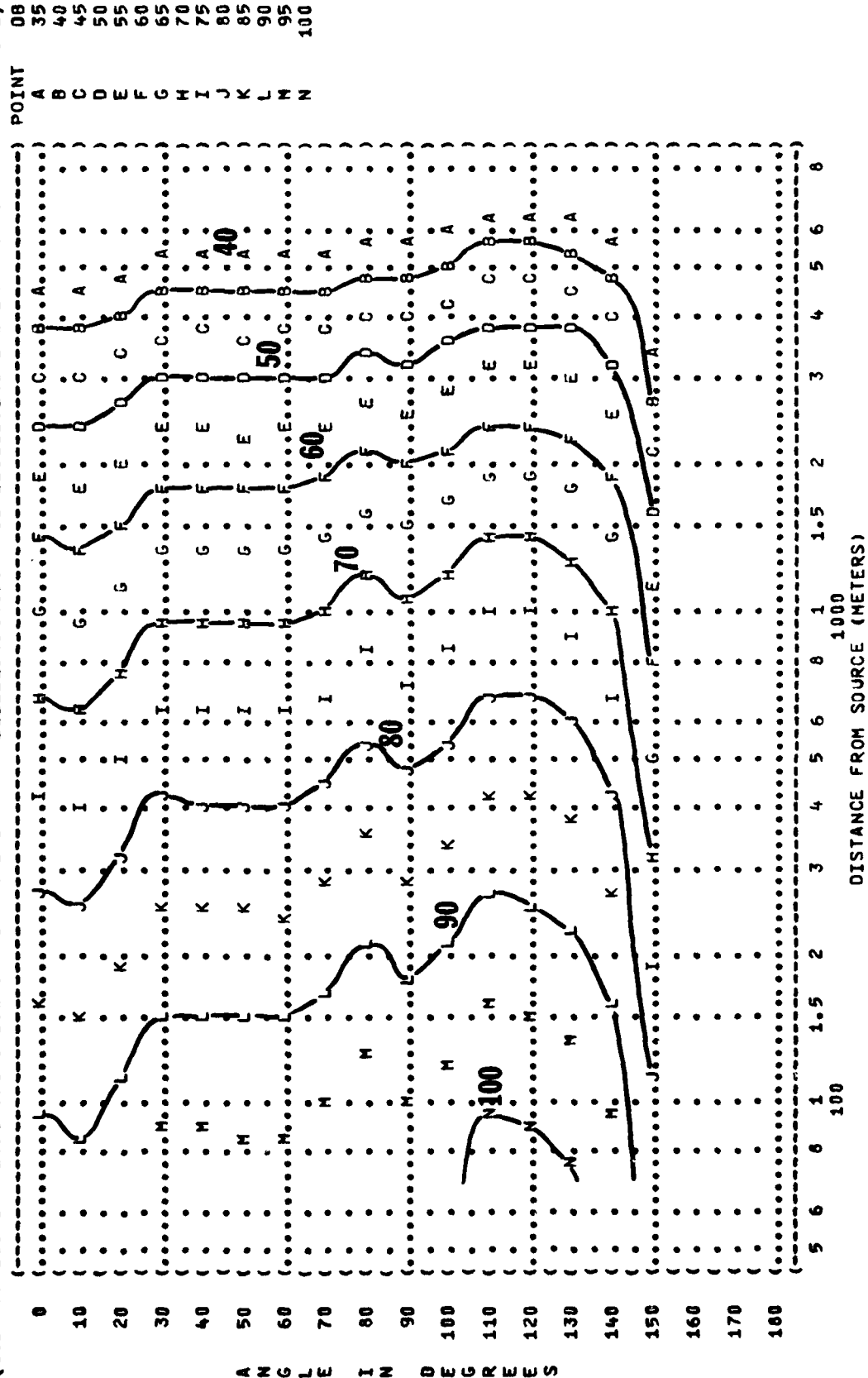
85% RPM ENGINE NO.2
IDLE, ENGINE NO.3
FREE FLOW

TEMP = 15 C
BAR PRESS = .760 M HG
REL HUMID = 70 %

24 JAN 79
PAGE 22



(FIGURE: SOUND PRESSURE LEVEL (SPL)
 (11 EQUAL LEVEL CONTOURS (DB)
 (1000 HZ OCTAVE BAND
 (NOISE SOURCE/SUBJECT: (OPERATION:
 (((((METEOROLOGY:
 (E-3A AIRCRAFT (85% RPM ENGINE NO.2 (TEMP = 15 C
 (TF33-P-100A ENGINE (IDLE, ENGINE NO.3 (BAR PRESS = .760 M HG
 (FAR FIELD NOISE (FREE FLOW (REL HUMID = 70 %
 (((((PAGE 23
 (IDENTIFICATION:
 (OMEGA 1.4
 (TEST 78-008-001
 (RUN 03
 (18 SEP 78
 (



AD-A062 653

AEROSPACE MEDICAL RESEARCH LAB WRIGHT-PATTERSON AFB OH F/G 1/2
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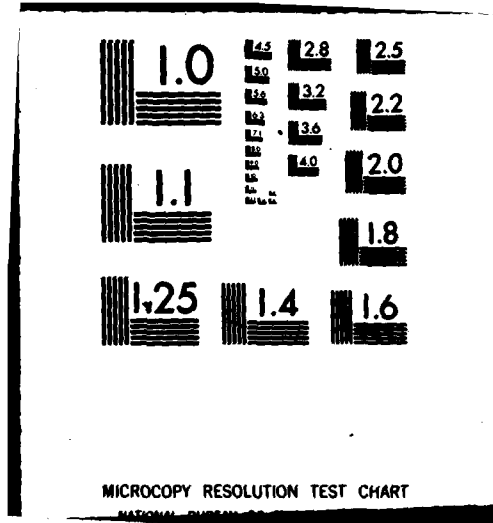
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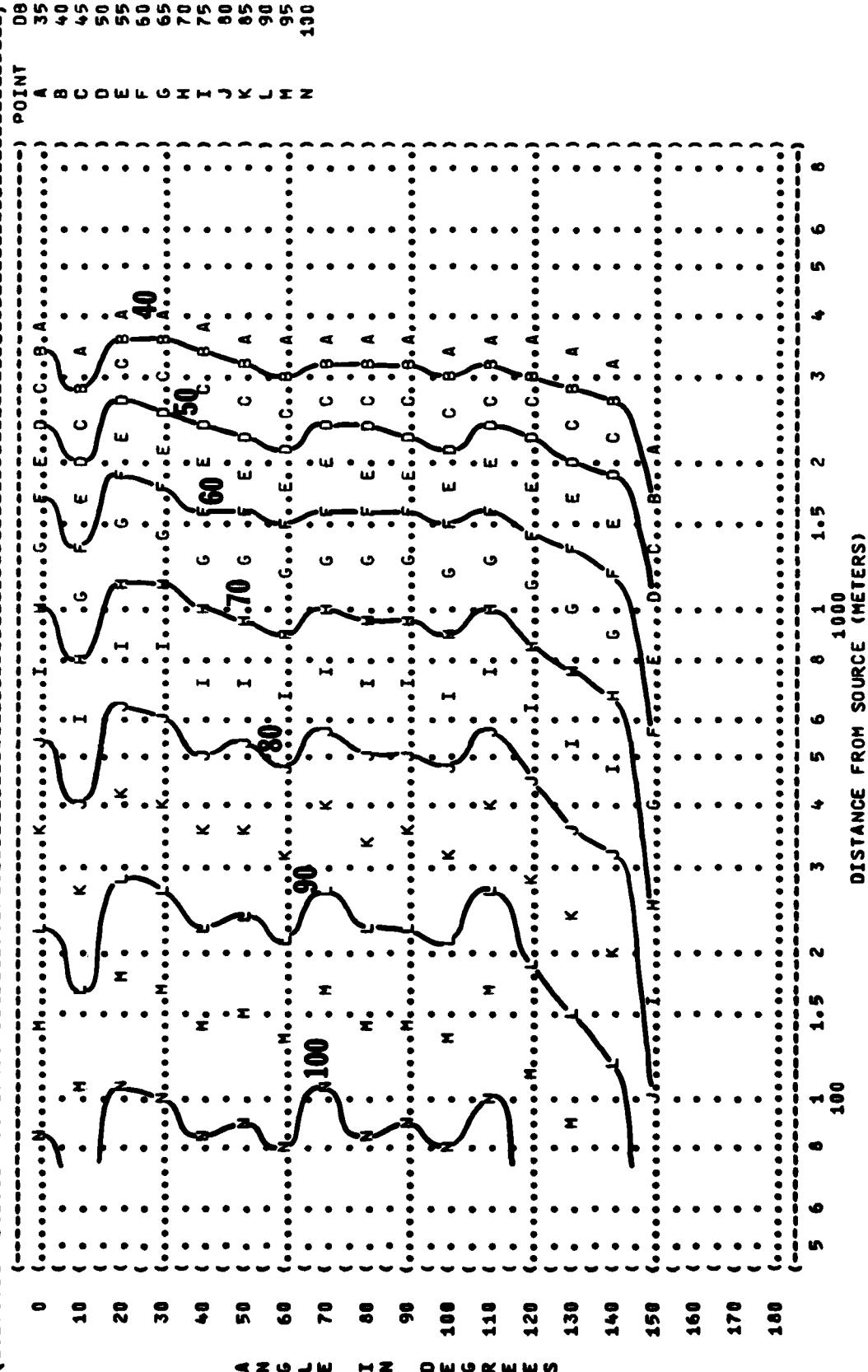
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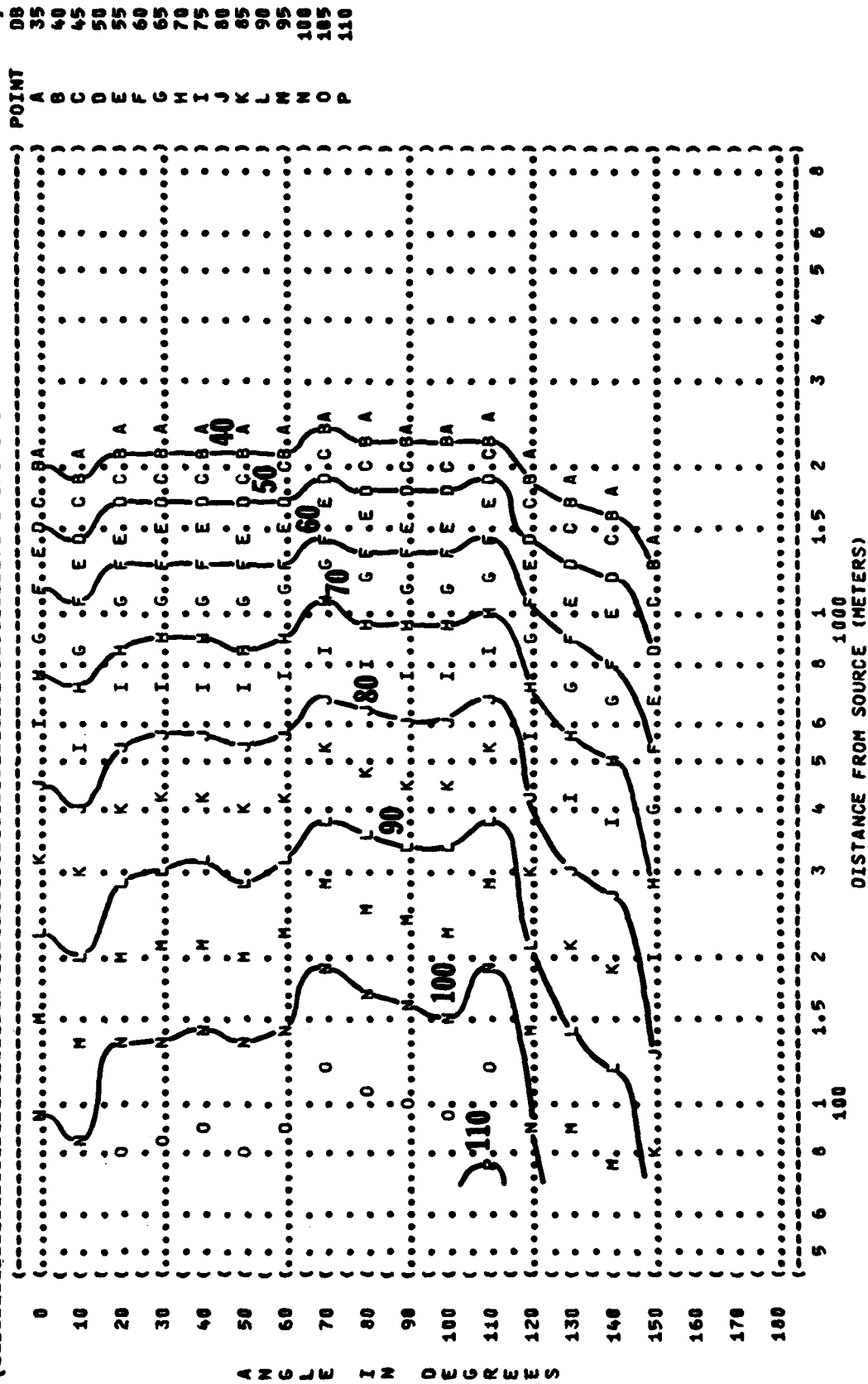
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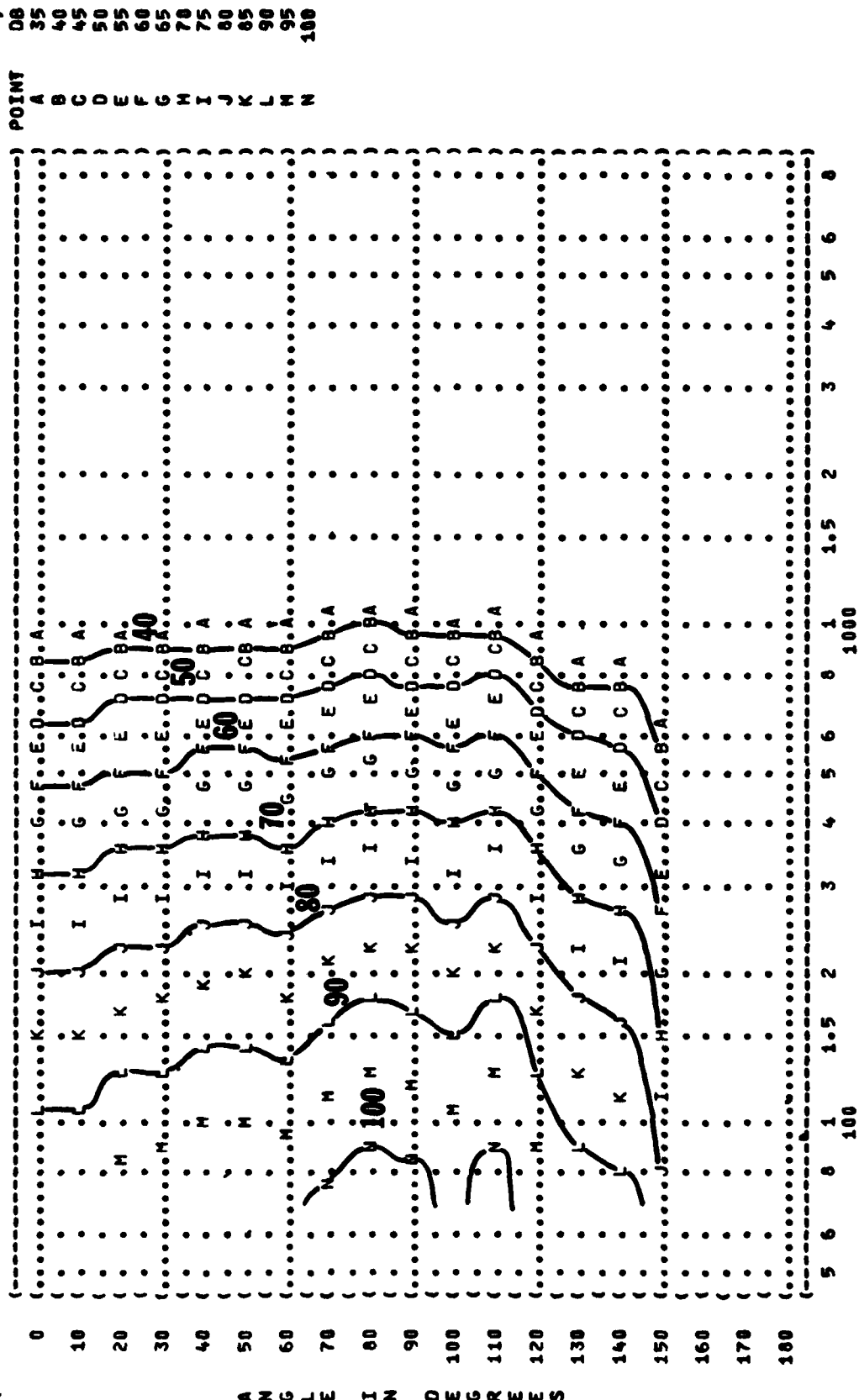
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 (EQUAL LEVEL CONTOURS (DB)
 (11 2000 HZ OCTAVE BAND
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 (TF33-P-100A ENGINE (IDLE, ENGINE NO.3
 (FAR FIELD NOISE (FREE FLOW
 (METEOROLOGY:
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 (REL HUMID = 70 %
 (18 SEP 78
 (OMEGA 1.4
 (TEST 78-008-001
 (RUN 03
 (PAGE 24



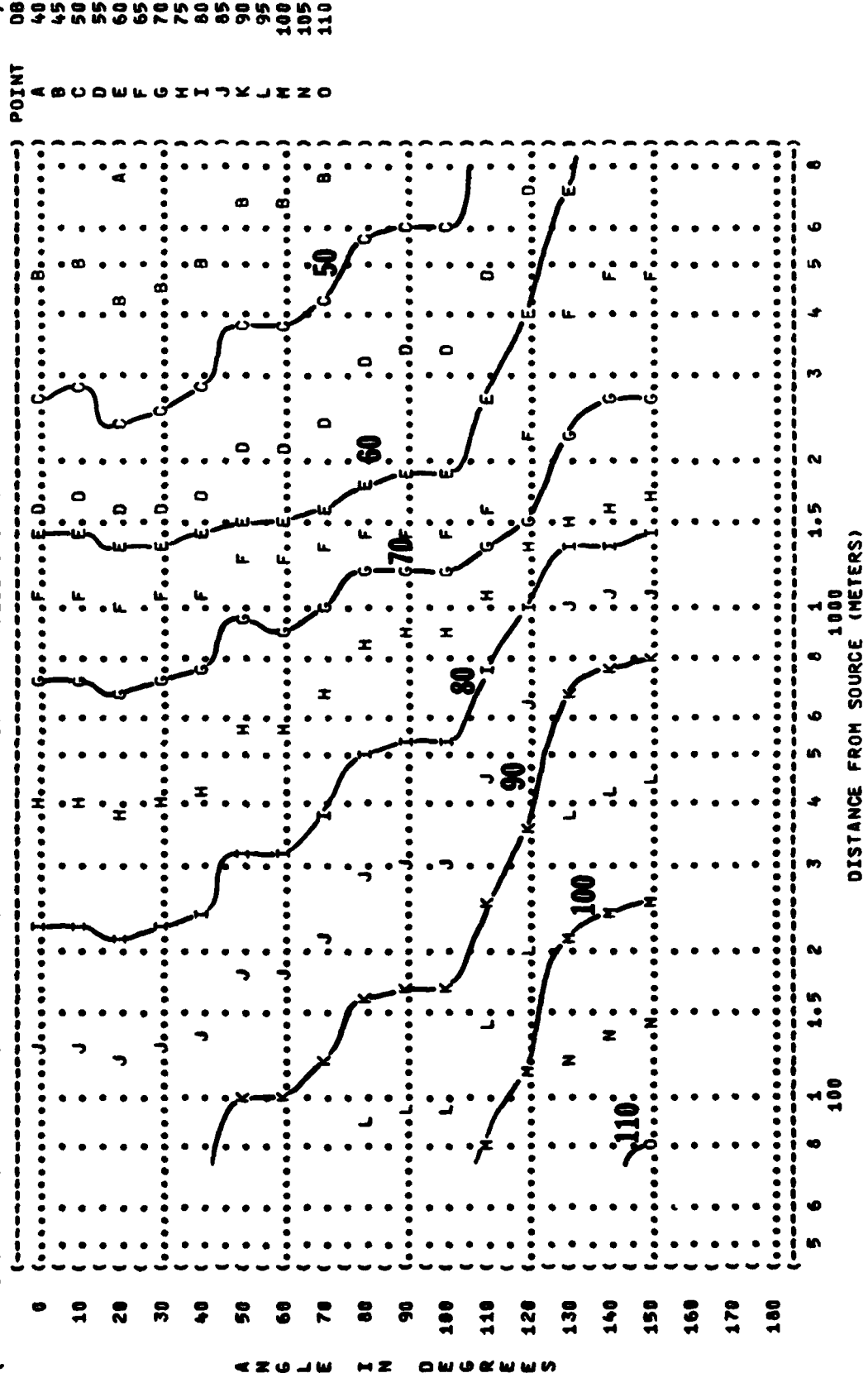
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( 11 EQUAL LEVEL CONTOURS (DB) ) )
( 4000 HZ OCTAVE BAND ) OMEGA 1.4 )
( ) TEST 78-000-001 )
( NOISE SOURCE/SUBJECT: ) METEOROLOGY: ) RUN 03 )
( ) TEMP = 15 C ) )
( E-3A AIRCRAFT ) BAR PRESS = .760 M HG ) 10 SEP 78 )
( TF33-P-100A ENGINE ) IDLE, ENGINE NO.3 ) )
( FAR FIELD NOISE ) FREE FLOW ) PAGE 25 )
(-----)
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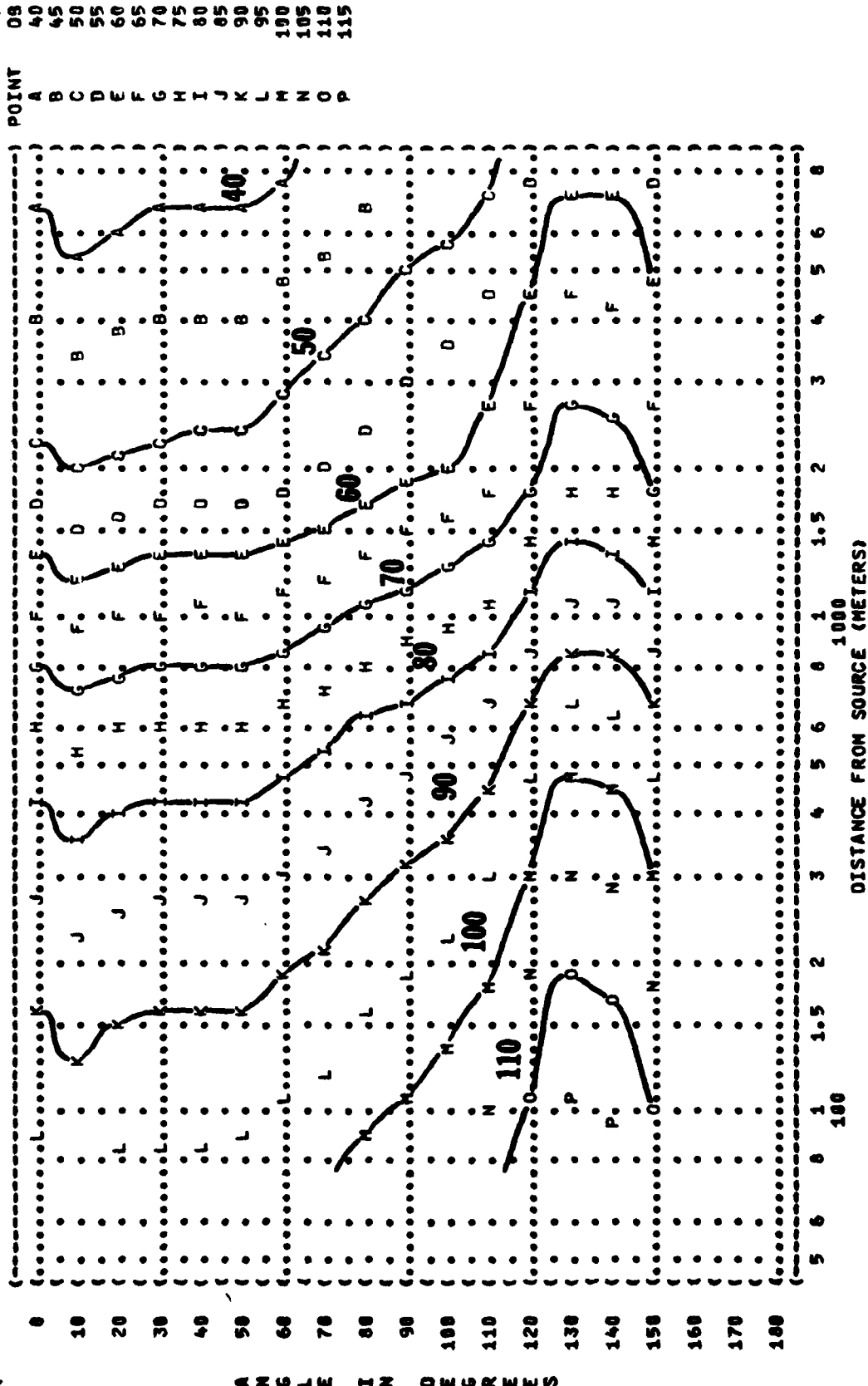
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 (8000 HZ OCTAVE BAND)
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 (TF33-P-100A ENGINE)
 (FAR FIELD NOISE)
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 (BAR PRESS = .760 M HG)
 (REL HUMID = 70 %)
 (IDENTIFICATION:)
 (OMEGA 1.4)
 (TEST 78-0008-001)
 (RUN 03)
 (10 SEP 78)
 (PAGE 26)



(FIGURE: SOUND PRESSURE LEVEL (SPL)
 (11 EQUAL LEVEL CONTOURS (DB)
 (31.5 HZ OCTAVE BAND
 (NOISE SOURCE/SUBJECT: (OPERATION:
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 (METEOROLOGY:
 (TEMP = 15 C
 (BAR PRESS = .760 M HG
 (REL HUMID = 70 %
 (IDENTIFICATION:
 (OMEGA 1.4
 (TEST 78-008-001
 (RUN 04
 (16 SEP 78
 (PAGE 18



(FIGURE: SOUND PRESSURE LEVEL (SPL))
 (11 EQUAL LEVEL CONTOURS (DB))
 (63 HZ OCTAVE BAND)
 (NOISE SOURCE/SUBJECT:)
 (OPERATION:)
 (E-3A AIRCRAFT)
 (TF33-P-108A ENGINE)
 (FAR FIELD NOISE)
 (METEOROLOGY:)
 (TEMP = 15 C)
 (BAR PRESS = .760 M HG)
 (REL HUMID = 70 %)
 (IDENTIFICATION:)
 (OMEGA 1.4)
 (TEST 78-008-001)
 (RUN 04)
 (24 JAN 79)
 (PAGE 19)



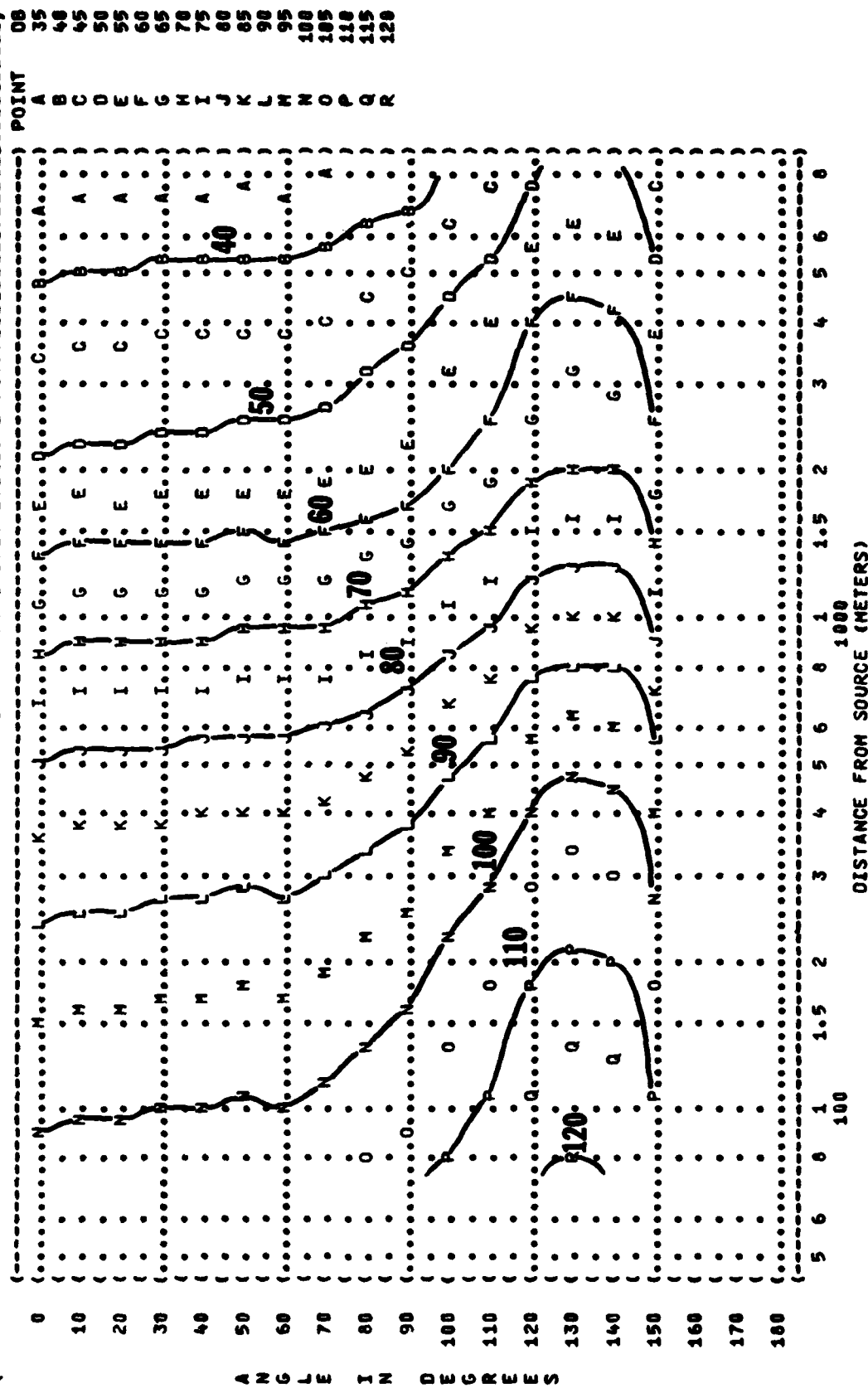
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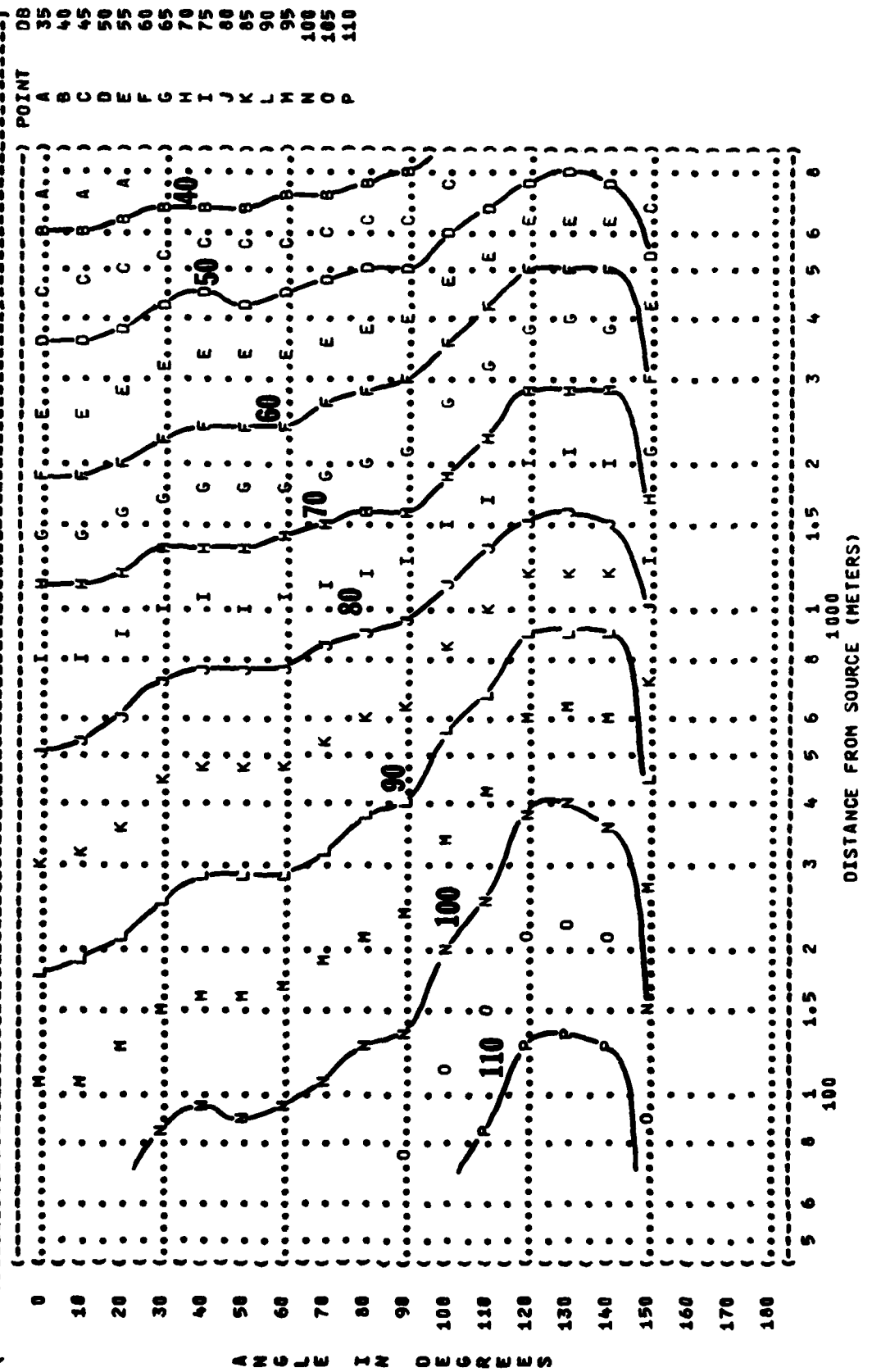
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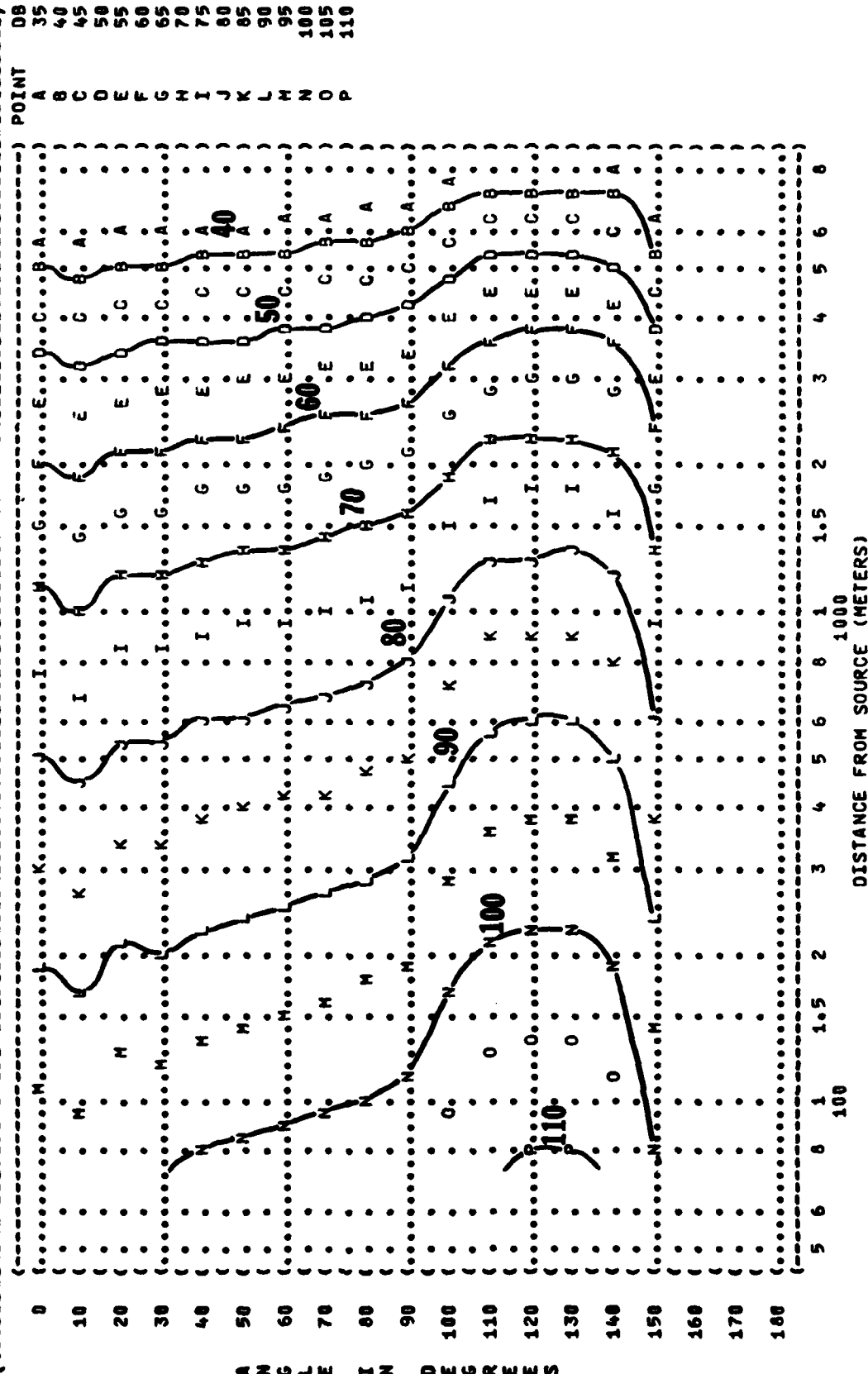
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(FIGURE: SOUND PRESSURE LEVEL (SPL)
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 (250 HZ OCTAVE BAND
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 (METEOROLOGY:
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 (BAR PRESS = .760 M HG
 (REL HUMID = 70 %
 (IDENTIFICATION:
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 (TEST 78-000-001
 (RUN 04
 (18 SEP 78
 (PAGE 21

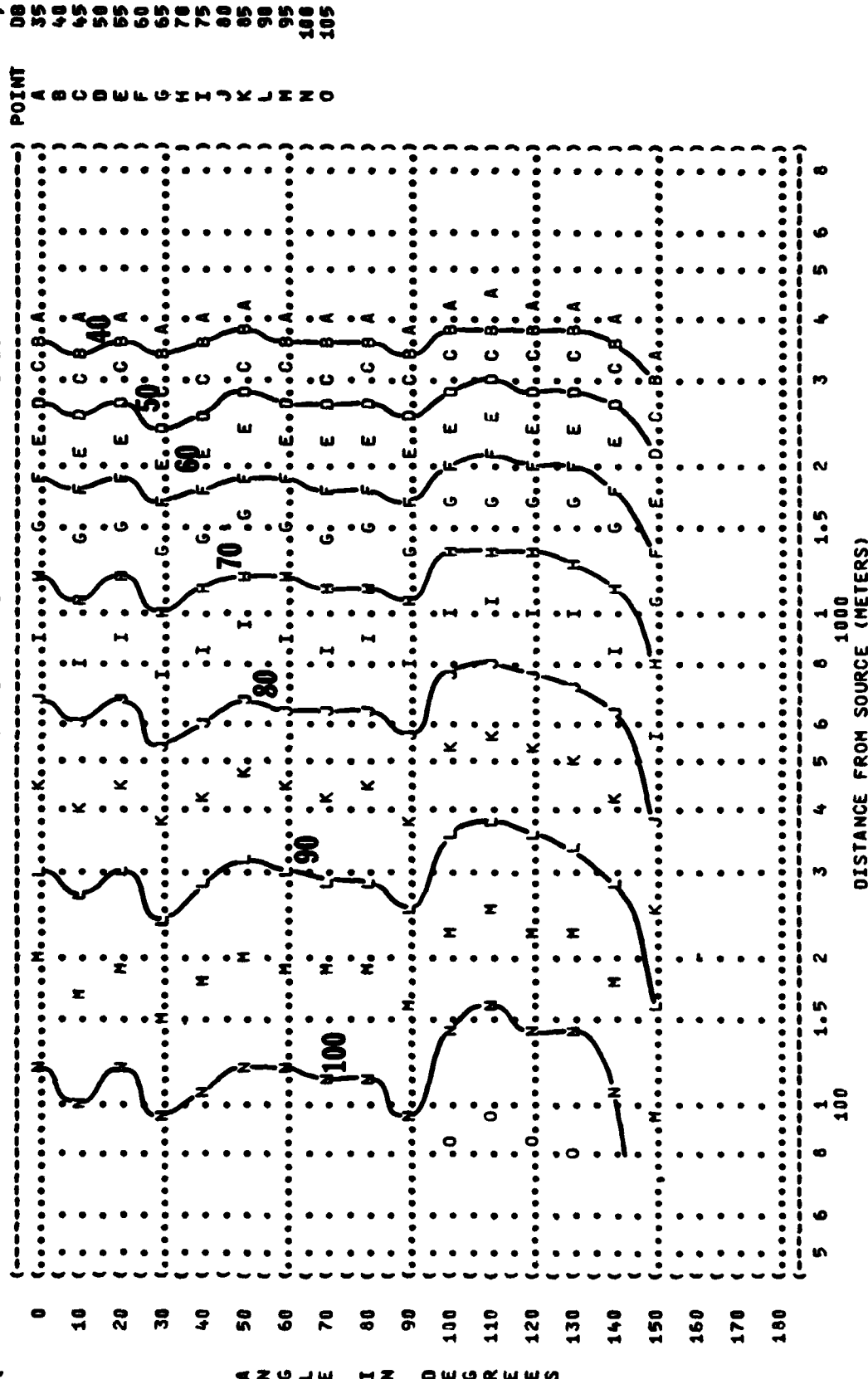


(FIGURE: SOUND PRESSURE LEVEL (SPL)
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 (500 HZ OCTAVE BAND
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 (TF33-P-100A ENGINE (85% RPM ENGINE NO.3
 (FAR FIELD NOISE (FREE FLOW
 (METEOROLOGY:
 (TEMP = 15 C
 (BAR PRESS = .760 M HG
 (REL HUMID = 70 %
 (IDENTIFICATION:
 (OMEGA 1.4
 (TEST 78-0008-001
 (RUN 04
 (18 SEP 78
 (PAGE 22





(FIGURE: SOUND PRESSURE LEVEL (SPL)
 (11 EQUAL LEVEL CONTOURS (DB)
 (2000 HZ OCTAVE BAND
 (NOISE SOURCE/SUBJECT: (OPERATION:
 (E-3A AIRCRAFT (TRT ENGINE NO.2
 (TF33-P-100A ENGINE (85% RPM ENGINE NO.3
 (FAR FIELD NOISE (FREE FLOW
 (METEOROLOGY: (TEMP = 15 C
 (BAR PRESS = .760 M HG
 (REL HUMID = 70 %
 (RUN 84
 (18 SEP 78
 (PAGE 24
 (IDENTIFICATION:)
 (OMEGA 1.4
 (TEST 78-000-001
 ()



A N G L E
 I M
 O E G R E E S

(FIGURE: SOUND PRESSURE LEVEL (SPL)
 (11 EQUAL LEVEL CONTOURS (DB)
 (8000 HZ OCTAVE BAND
 (NOISE SOURCE/SUBJECT: (OPERATION:
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 (FAR FIELD NOISE (FREE FLOW
 (METEOROLOGY:
 (TEMP = 15 C
 (BAR PRESS = .760 M HG
 (REL HUMID = 70 %
 (IDENTIFICATION:
 (OMEGA 1.4
 (TEST 70-008-001
 (RUN 04
 (18 SEP 78
 (PAGE 26

