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AIR FORCE SYSTEMS COMMAND
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433

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FOR THE COMMANDER

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

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The USMC AV-8A is a V/STOL light-attack aircraft powered by one F402-RR-401 turbojet engine. This report provides far-field measured and extrapolated data defining both physical and psychoacoustic measures of the bioacoustic environments produced by this aircraft operating on a ground runup pad for two power conditions and in two hover modes (50 and 100 feet above ground level). Far-field data measured at 17 locations are normalized to standard

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meteorological conditions and extrapolated from 75-8000 meters to derive sets of equal-value contours as a function of angle and distance from the source. These contours are measures of: overall and band sound pressure 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. 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.

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INTRODUCTION

The USMC AV-8A is a V/STOL light-attack aircraft powered by one F402-RR-401 turbojet engine. The aircraft was manufactured by Hawker Siddeley and the engine by Rolls-Royce both of which are from the United Kingdom.

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 AV-8A 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, 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 (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.

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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), Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio, 1975.

FAR-FIELD NOISE

MEASUREMENTS

AMRL acquired the far-field data during a 1-hour test periods thus keeping similar meteorological conditions throughout the test. Figure 1 shows the ground runup area (taxiway), ground cover, aircraft orientation and microphone measurement sites on each semicircle. The center of the 75 meter radius semicircles used in surveying the F402-RR-401 engine was on the ground directly below the intersection of the aircraft's centerline and the plane passing through both engines' exhaust-nozzle exit. The runup tests (idle and 55% RPM) were with the aircraft on the ground whereas for the hover tests the aircraft was vertically positioned (50/100 feet) over the same position (Figure 1). The ground runup area did not have a blast deflector; therefore, the engine's exhaust was in a "free-flow" condition.

Table 1 provides cockpit readouts of 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 wave-fronts spherically diverge and the noise source may be regarded as a point source.

A portable microphone/tape-recorder sytem 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.

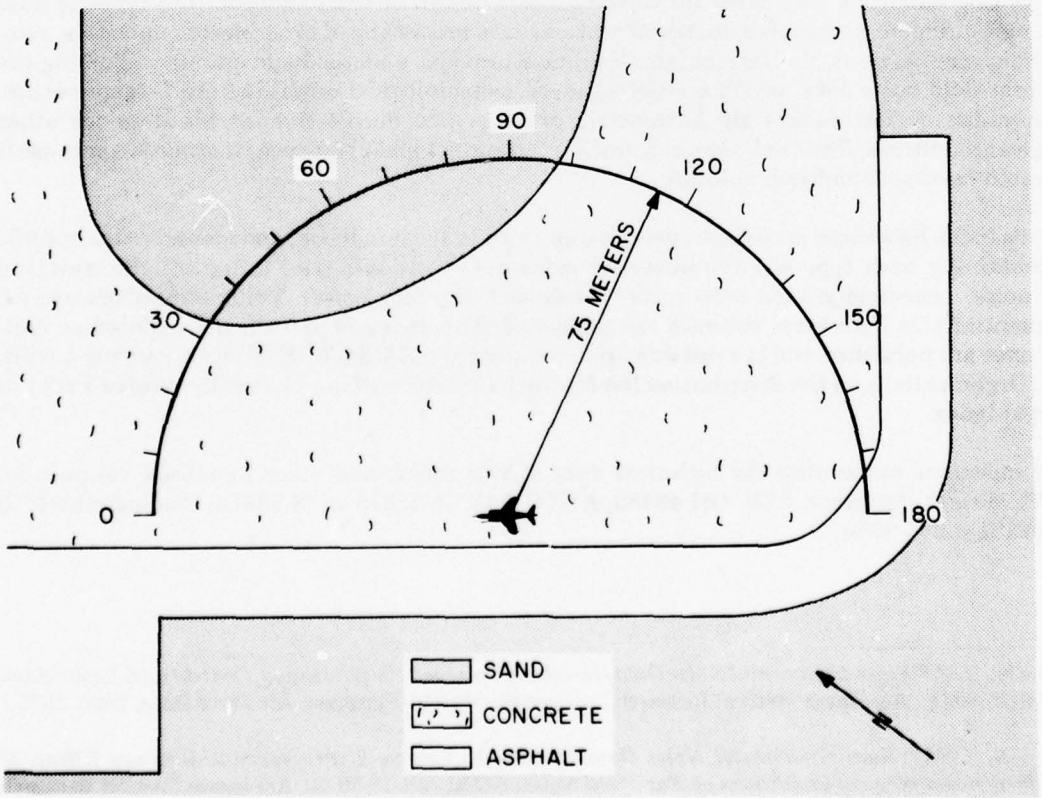


Figure 1. Far-Field Measurement Locations on the Taxiway at ALF, San Clemente Island

TABLE 1

TEST CONDITIONS
FOR FAR-FIELD NOISE MEASUREMENTS

AV-8A Aircraft, Ground Runups, ALF, San Clemente Island
Tail #158706, 15 May 1977

Aircraft Engine Operation

Idle Power	27 % RPM 325 C, Exhaust Gas Temp 1200 LBS/HR, Fuel Flow
55% RPM Runup	55 % RPM 350 C, EGT 2820 LBS/HR, Fuel Flow
50 Foot Hover	98 % RPM 680 C, EGT 12,360 LBS/HR, FF
100 Foot Hover	95 % RPM 650 C, EGT 11,760 LBS/HR, FF

Meteorology

Temperature	18.3 C
Bar Pressure	0.766 M Hg
Rel Humidity	58 %
Wind — Speed	3.6 M/Sec (7 KTS)
— Direction	300 Deg

RESULTS

Table 2 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 2 which provides a compact summary of the far-field noise characteristics of the AV-8A aircraft in a standard format.

Figure 3 and Table 3 present two basic acoustic measures, the acoustic power levels and the directivity index, respectively. The acoustic power level describes the power radiated by the source as a function of the frequency. The directivity index is a standard acoustical engineering measure that 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. No such data are presented for the VTOL maneuvers (50- and 100-foot hover operations) since the noise source is no longer rotationally symmetric about the engine's centerline (see Volume 1, pages 30 and 31). Hovering is achieved through thrust vectoring (the exhaust flow is directed downward), which makes the noise source almost radially symmetric in the ground plane. This symmetry is seen in table 2 and figure 2 for the hover data.

Estimates of ground runup noise levels for intermediate power settings (e.g., 50% RPM) can be determined as explained in Volume 1 of this handbook.

Figures 4 through 10 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, C-weighted sound level, A-weighted sound level, perceived noise level, speech interference level, permissible exposure times for personnel and octave band sound pressure levels. No contours are presented for the hover data. When hovering the noise source is above the ground plane; therefore, the angle between the source and the receiver changes more than 20 degrees as one views it from 75 meters out to 8000 meters for the 100 foot hover operation. Since the noise source is not symmetrical in this vertical plane the extrapolated noise contours are omitted.

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. No data are presented at the 170/180 degree locations for the idle, 55% RPM and 50 foot hovers, nor at the 150/160/170/180 locations for the 100 foot hover power settings because of turbulent air flow behind the aircraft. Typically, the A-weighted levels for these angles are 5 to 20 DBA below the level measured at the preceding microphone location.

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: 2 — MEASURED SOUND PRESSURE LEVEL (OB)
1/3 OCTAVE BAND
DISTANCE = 75 METERS

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
IDLE
27% RPM
FREE FLOW

METEOROLOGY:
TEMP = 18 C
BAR PRESS = .766 M HG
REL HUMID = 58 %

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 01
06 MAY 75
PAGE 2

FREQ (HZ)	ANGLE (DEGREES) 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
25	66<	61<	64<	60<	67<	66<	63<	64<	70<	62<	63<	64<	64<	64<	64<	63<	64<		
31.5	66<	65<	66<	66<	66<	66<	67<	68<	70<	65<	66<	68<	67<	68<	68<	68<	67<		
40	70<	71<	71<	69<	72<	72<	72<	73	73	70<	72<	74	74	74	75	75	73		
50	74	74	74	73	72	74	74	74	74	73	74	74	74	76	78	77	75		
63	77	77	77	77	77	76	76	75	71<	71<	74	76	77	79	81	80	77		
80	73	74	74	75	73	71	69	66<	67	69	70	73	75	77	77	77	71		
100	72	73	73	72	70	70	73	73	74	74	72	70	69	71	73	74	66<		
125	70	70	70	71	70	70	72	71	70	69	71	73	72	72	71	72	60<		
160	70	71	71	72	71	69	69	67	67	66	68	71	72	73	71	70	57<		
200	70	70	71	72	71	67	66	69	69	68	70	72	73	76	73	70	59<		
250	71	72	72	74	70	67	66	66	67	68	71	73	74	76	73	70	57<		
315	72	74	74	75	72	71	72	72	68	68	71	73	74	76	75	69	56<		
400	72	74	74	73	70	70	71	71	69	69	72	72	72	74	75	65	58		
500	72	75	74	72	72	71	71	70	68	69	73	72	71	70	72	66	59		
630	73	75	74	74	72	71	71	69	67	69	72	73	72	70	69	65	59		
800	74	81	79	78	75	75	74	70	70	70	72	73	72	69	68	68	59		
1000	78	77	77	76	74	71	71	70	68	68	70	71	70	67	65	62	54		
1250	94	93	93	94	91	82	77	83	72	77	77	75	82	77	71	71	66		
1600	85	82	82	82	80	76	79	73	73	73	72	71	70	68	68	62	55		
2000	81	80	80	80	78	77	75	73	72	71	72	72	69	69	68	63	54		
2500	83	85	83	84	82	81	79	78	74	74	74	73	73	71	70	65	56		
3150	85	84	84	83	81	82	81	78	75	76	76	74	72	70	70	65	56		
4000	99	97	93	92	88	90	94	91	91	84	84	82	81	78	77	73	65		
5000	92	90	89	92	90	89	90	85	84	82	83	81	79	76	76	71	62		
6300	86	84	85	83	83	81	79	78	77	78	78	78	77	74	73	68	58		
8000	84	83	83	81	81	79	77	76	75	75	76	75	74	70	70	65	55		
10000	80	79	78	78	77	75	74	72	72	70	72	71	70	67	66	61	51		
OVERALL	101	100	98	98	96	94	96	93	93	89	90	89	89	88	88	86	81		

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: 2 MEASURED SOUND PRESSURE LEVEL (DB)
1/3 OCTAVE BAND
DISTANCE = 75 METERS

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 02
06 MAY 75
PAGE 2

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
55% RPM
FREE FLOW

METEOROLOGY:
TEMP = 18 C
BAR PRESS = .766 M HG
REL HUMID = 58 %

FREQ (HZ)	ANGLE (DEGREES) 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
25	72	71	73	67<	74	76	77	76	76	76	75	77	76	78	78	80	81		
31.5	73	73	75	70<	77	78	79	80	79	78	77	80	79	81	81	83	81		
40	77	77	77	73	79	80	82	82	82	80	82	82	82	84	85	86	83		
50	78	79	79	75	80	80	82	82	81	81	82	83	85	85	87	86	82		
63	81	81	81	77	82	82	82	83	83	82	84	85	86	87	88	86	80		
80	82	82	82	77	83	82	81	81	82	83	84	85	87	89	90	87	77		
100	83	83	83	79	83	84	86	87	87	87	87	87	88	90	90	88	74		
125	86	86	86	81	86	86	85	83	83	84	88	89	89	90	90	86	68		
160	86	87	87	83	88	87	85	84	83	83	85	88	89	89	88	84	64<		
200	87	86	87	82	86	85	84	83	83	84	86	87	89	89	87	82	61<		
250	87	87	87	84	85	83	83	82	84	84	88	88	90	89	84	81	60<		
315	86	85	86	82	85	84	84	85	83	84	88	89	90	91	84	80	60		
400	87	87	88	82	85	85	86	85	85	86	89	89	88	89	86	82	61		
500	86	89	88	82	86	85	85	84	85	87	88	88	88	89	87	82	61		
630	87	89	87	82	87	86	85	83	84	85	88	88	88	86	87	82	62		
800	88	89	87	84	86	86	86	85	85	87	89	88	86	86	85	81	61		
1000	89	88	87	82	87	87	86	85	85	87	89	86	83	82	81	81	60		
1250	91	89	87	81	89	86	86	86	86	88	88	87	82	81	81	80	59		
1600	99	96	92	86	101	91	95	89	93	90	88	89	85	81	84	82	60		
2000	92	91	89	83	90	88	87	86	85	86	86	85	82	79	78	77	58		
2500	98	100	95	91	96	93	94	91	89	91	89	88	85	82	81	81	60		
3150	97	97	95	90	92	91	91	90	90	90	89	86	86	84	82	80	61		
4000	96	95	95	91	94	94	93	93	88	91	89	88	85	82	81	77	59		
5000	94	95	93	89	93	93	92	92	90	92	91	89	87	84	82	78	59		
6300	91	92	92	85	90	90	91	89	87	89	89	87	85	83	81	77	57		
8000	89	90	89	83	88	88	87	88	85	87	86	84	81	79	77	73	53		
10000	85	86	85	79	84	84	83	83	81	83	83	80	78	75	74	69	48<		
OVERALL	106	105	103	99	105	102	102	101	100	101	101	101	101	100	100	97	89		

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: 2

MEASURED SOUND PRESSURE LEVEL (DB)
1/3 OCTAVE BAND
DISTANCE = 75 METERS

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
50 FOOT HOVER
98% RPM

METEOROLOGY:
TEMP = 18 C
BAR PRESS = .766 M HG
REL HUMID = 58 %

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 03
06 MAY 75
PAGE 2

FREQ (HZ)	ANGLE (DEGREES) 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
25	83	83	83	91	83	83	82	80	80	83	81	82	82	81	82	81	85		
31.5	87	87	87	93	87	85	84	84	83	86	82	82	84	85	85	84	84		
40	90	91	90	94	90	89	88	89	89	89	88	87	88	87	88	89	89		
50	92	92	91	94	91	91	90	91	90	89	89	88	89	89	90	90	89		
63	95	96	95	95	95	94	91	93	93	93	91	91	92	92	93	91	92		
80	95	98	97	97	96	97	93	95	94	95	95	94	94	95	96	95	95		
100	98	101	100	101	100	101	97	100	100	98	99	98	98	98	99	98	98		
125	99	103	102	103	103	103	99	102	101	102	102	100	100	100	102	100	100		
160	103	105	105	105	106	106	102	102	103	104	104	101	103	101	102	101	101		
200	103	105	106	105	107	108	102	106	106	104	106	103	105	102	104	104	102		
250	105	107	108	108	108	108	104	107	106	102	108	104	107	105	105	105	103		
315	104	107	109	108	107	107	105	108	105	103	108	105	107	106	104	106	104		
400	103	105	109	108	107	106	105	108	105	103	109	107	107	107	106	107	104		
500	102	104	109	108	106	106	104	108	103	104	108	107	105	107	107	107	104		
630	102	105	108	110	106	107	105	108	103	106	108	106	105	108	108	106	104		
800	103	105	109	110	107	108	105	109	105	107	107	106	104	107	107	105	103		
1000	103	106	109	109	107	109	104	109	105	106	108	105	104	106	108	104	103		
1250	103	106	109	108	107	109	103	109	105	106	108	105	104	107	107	103	104		
1600	104	107	109	109	107	109	102	110	106	106	107	104	104	107	106	103	103		
2000	103	106	109	107	106	108	101	108	105	105	107	104	104	107	106	103	103		
2500	103	106	109	107	105	107	101	107	104	105	105	103	103	105	104	103	101		
3150	101	104	106	105	103	105	99	105	103	103	103	102	102	104	103	102	101		
4000	102	105	107	106	105	106	100	105	104	103	104	103	103	105	104	103	102		
5000	103	105	108	106	104	106	100	105	103	102	103	102	102	103	103	102	101		
6300	99	102	105	103	101	103	98	103	100	100	100	99	100	100	100	99	98		
8000	98	100	102	101	100	101	96	101	99	97	98	96	98	99	98	97	95		
10000	95	97	99	98	97	98	93	98	95	94	94	92	94	94	94	93	91		
OVERALL	115	118	120	120	119	120	115	120	117	117	119	117	117	118	118	117	115		

LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: 2

MEASURED SOUND PRESSURE LEVEL (DB)
1/3 OCTAVE BAND
DISTANCE = 75 METERS

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 04
06 MAY 75
PAGE 2

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
100 FOOT HOVER
95% RPM

METEOROLOGY:
TEMP = 18 C
BAR PRESS = .766 M HG
REL HUMID = 58 %

FREQ (HZ)	ANGLE (DEGREES) 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
25	83	84	82	84	82	82	83	83	83	83	81	82	82	81	81				
31.5	88	87	87	87	86	84	85	86	85	85	85	83	84	85	84				
40	92	89	91	89	89	90	90	89	89	89	90	88	90	89	89				
50	91	91	92	91	92	90	91	91	90	90	91	89	90	90	90				
63	96	94	94	94	94	95	94	94	94	94	93	92	93	92	92				
80	94	94	95	95	95	95	94	95	95	94	94	95	96	94	95				
100	98	98	97	99	98	99	99	97	97	98	95	97	98	96	97				
125	97	99	100	101	97	102	99	100	99	99	95	98	98	97	99				
160	99	99	101	102	101	105	102	99	99	100	98	99	98	96	98				
200	99	99	102	102	101	105	103	97	97	101	103	99	103	101	100				
250	101	101	105	104	103	104	105	100	98	100	107	103	107	104	102				
315	101	103	107	106	106	106	106	103	105	102	109	107	109	105	105				
400	101	103	107	106	108	108	106	105	107	105	107	107	109	105	106				
500	101	102	108	106	107	108	106	106	108	106	109	107	110	107	106				
630	102	102	109	107	107	106	105	106	107	103	108	108	110	107	108				
800	102	104	109	107	108	106	106	106	106	103	107	107	110	107	107				
1000	102	104	108	107	107	106	106	107	106	102	108	107	109	106	106				
1250	102	103	109	107	106	106	105	106	105	103	107	107	109	106	105				
1600	103	104	109	107	106	107	106	106	105	103	107	106	108	105	104				
2000	103	104	109	106	105	106	105	104	104	103	106	106	108	105	104				
2500	103	104	108	106	105	106	105	103	103	102	105	105	106	104	103				
3150	100	103	106	104	102	104	102	101	101	100	104	104	106	103	102				
4000	103	104	107	105	103	105	103	101	101	100	104	105	106	103	102				
5000	103	104	107	105	103	104	103	101	101	101	104	104	105	102	102				
6300	100	101	104	102	100	102	100	98	99	97	101	101	102	99	99				
8000	98	99	102	99	98	100	98	97	96	96	99	99	100	97	97				
10000	95	96	98	97	95	97	95	93	93	93	95	95	96	93	93				
OVERALL	114	115	120	118	118	118	117	116	117	115	119	118	120	117	117				

LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

FIGURE: NORMALIZED FARFIELD NOISE LEVELS

2 DISTANCE = 100 METERS

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 01

06 MAY 75

PAGE 6

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
IDLE
27% RPM
FREE FLOW

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

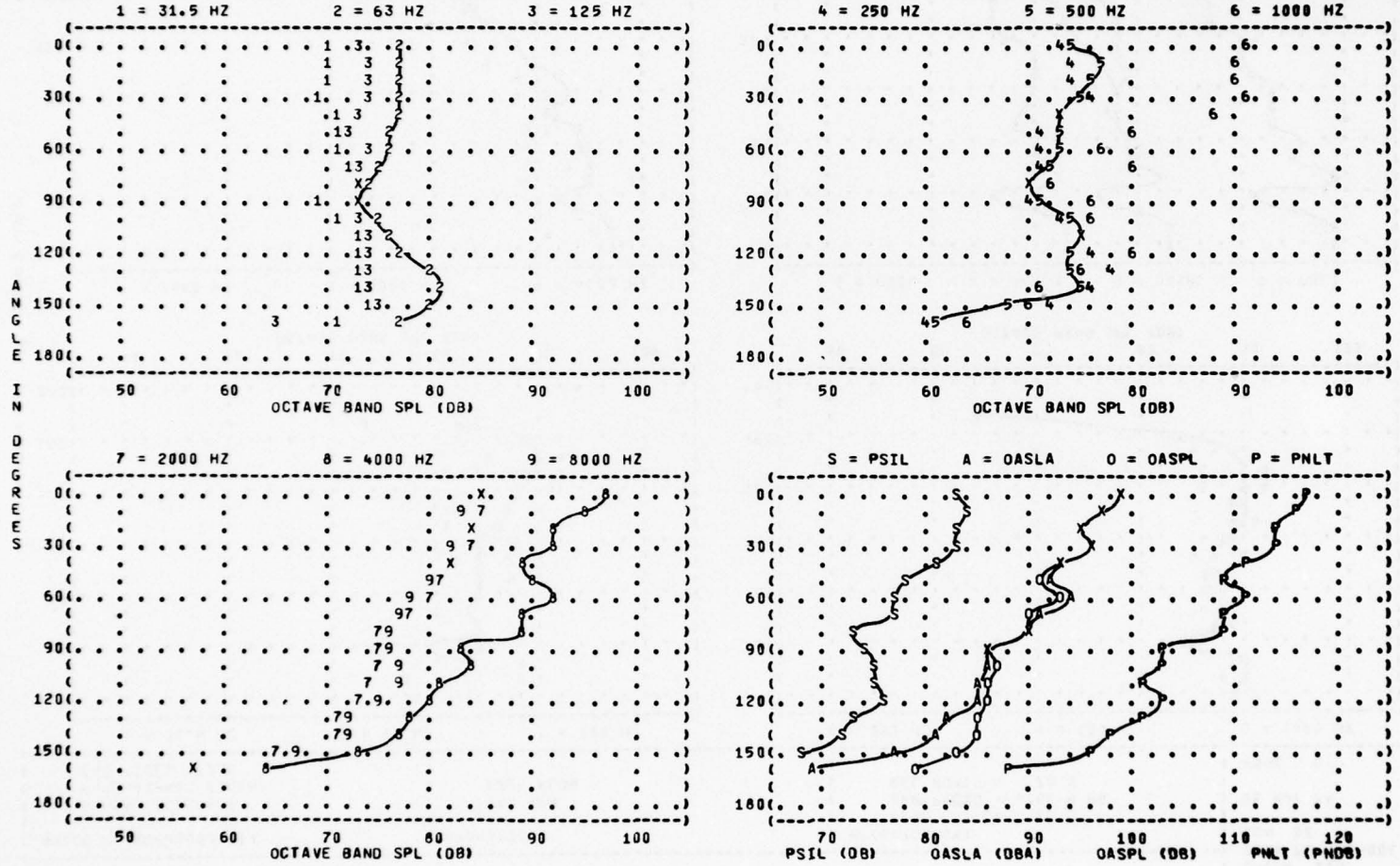


FIGURE: NORMALIZED FARFIELD NOISE LEVELS

2 DISTANCE = 100 METERS

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
55% RPM
FREE FLOW

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 02
06 MAY 75
PAGE 6

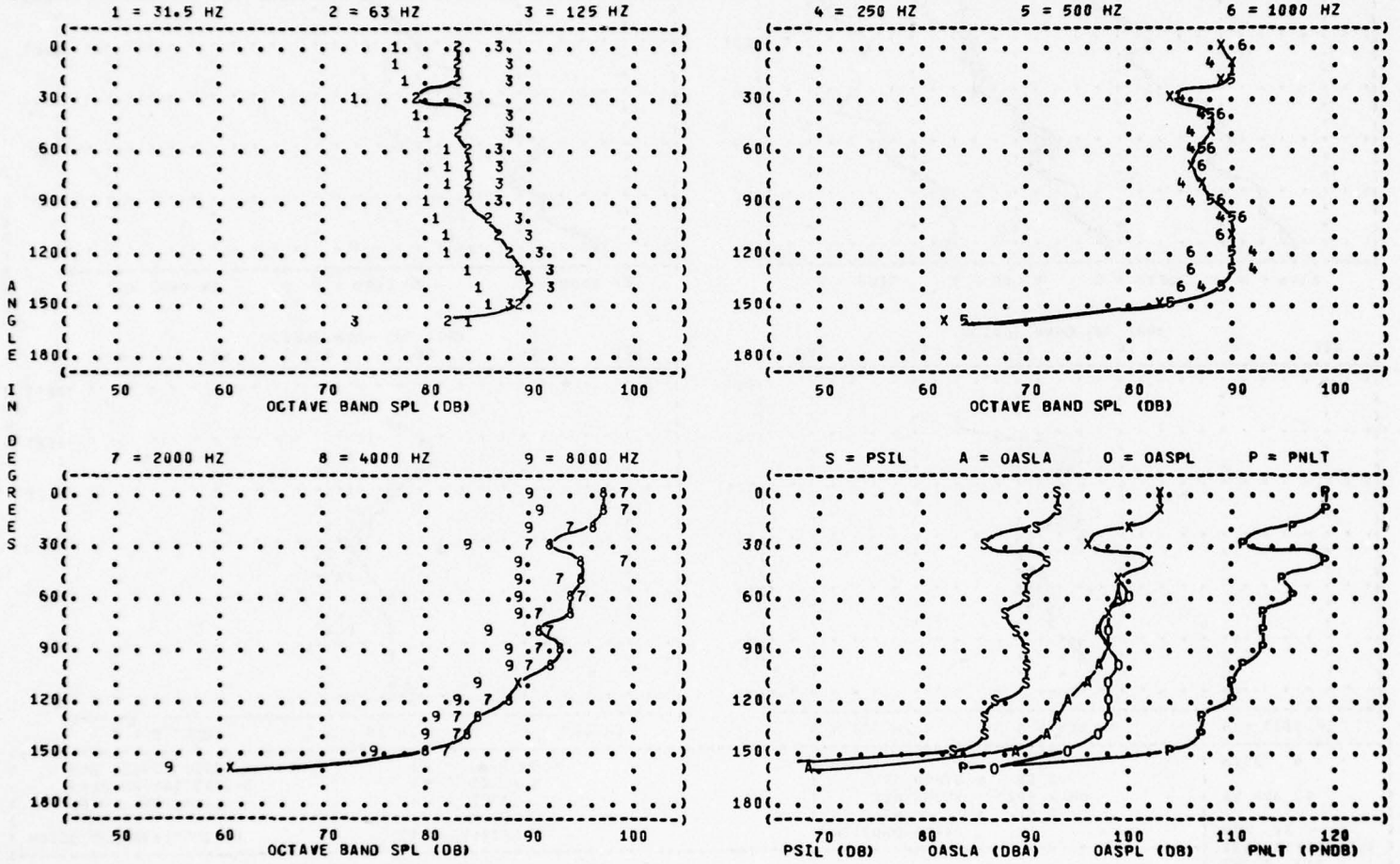


FIGURE: NORMALIZED FARFIELD NOISE LEVELS

2

DISTANCE = 100 METERS

NOISE SOURCE/SUBJECT:

AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:

50 FOOT HOVER
98% RPM

METEOROLOGY:

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

IDENTIFICATION:

OMEGA 1.4
TEST 75-002-006
RUN 03

06 MAY 75

PAGE 6

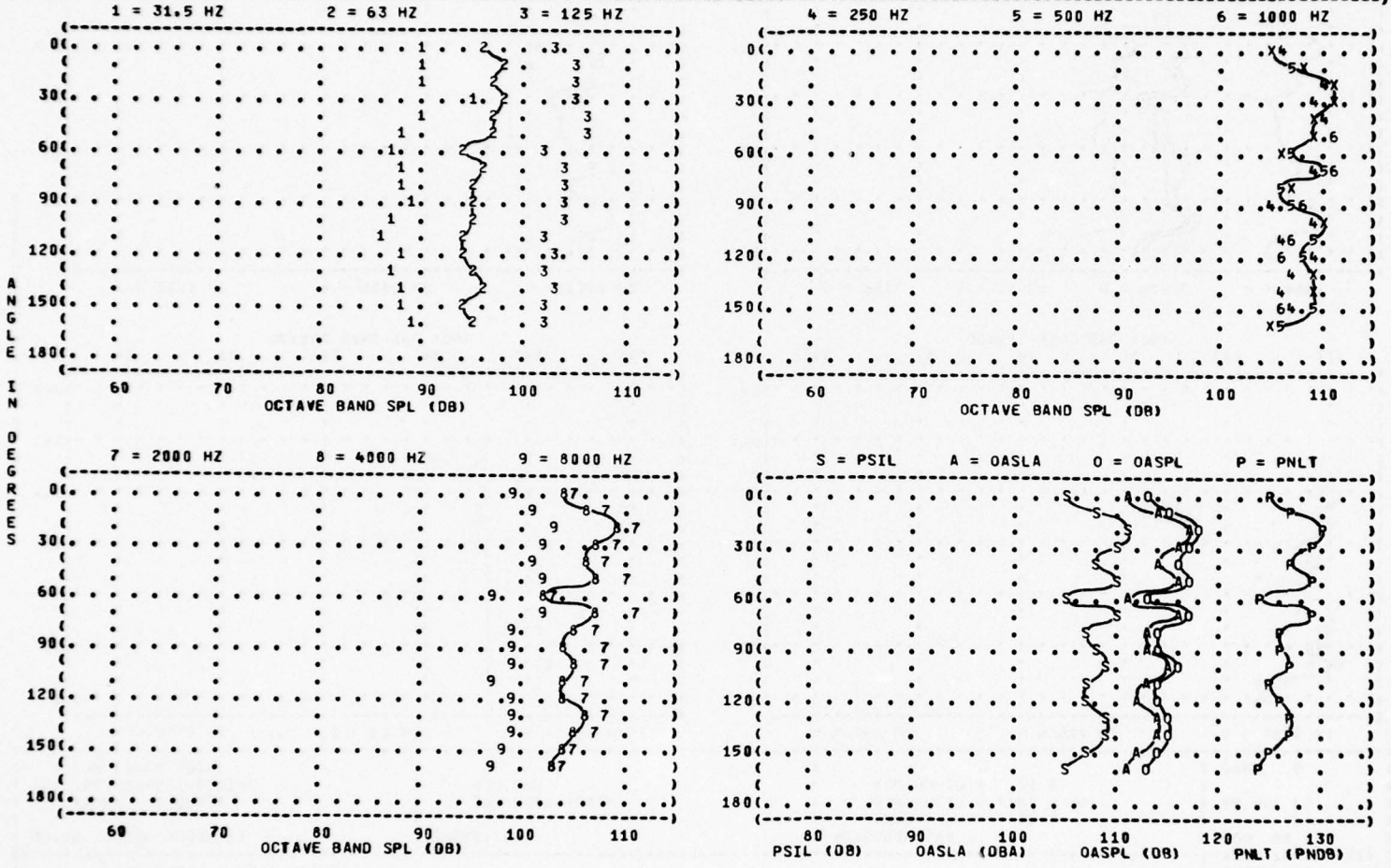


FIGURE: 2 NORMALIZED FARFIELD NOISE LEVELS

DISTANCE = 100 METERS

NOISE SOURCE/SUBJECT:

AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:

100 FOOT HOVER
95% RPM

METEOROLOGY:

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

IDENTIFICATION:

OMEGA 1.4
TEST 75-002-006
RUN 04

06 MAY 75

PAGE 6

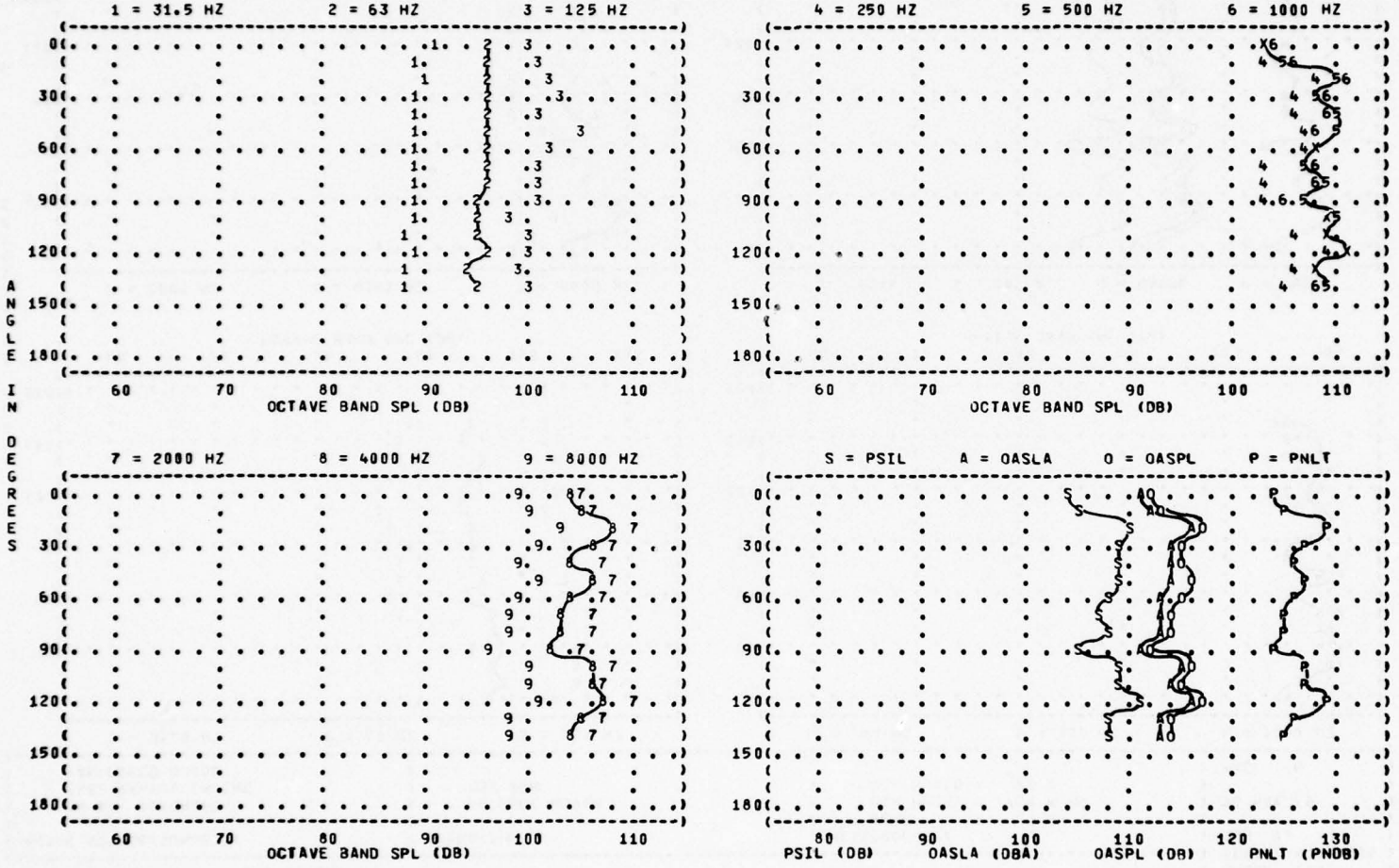
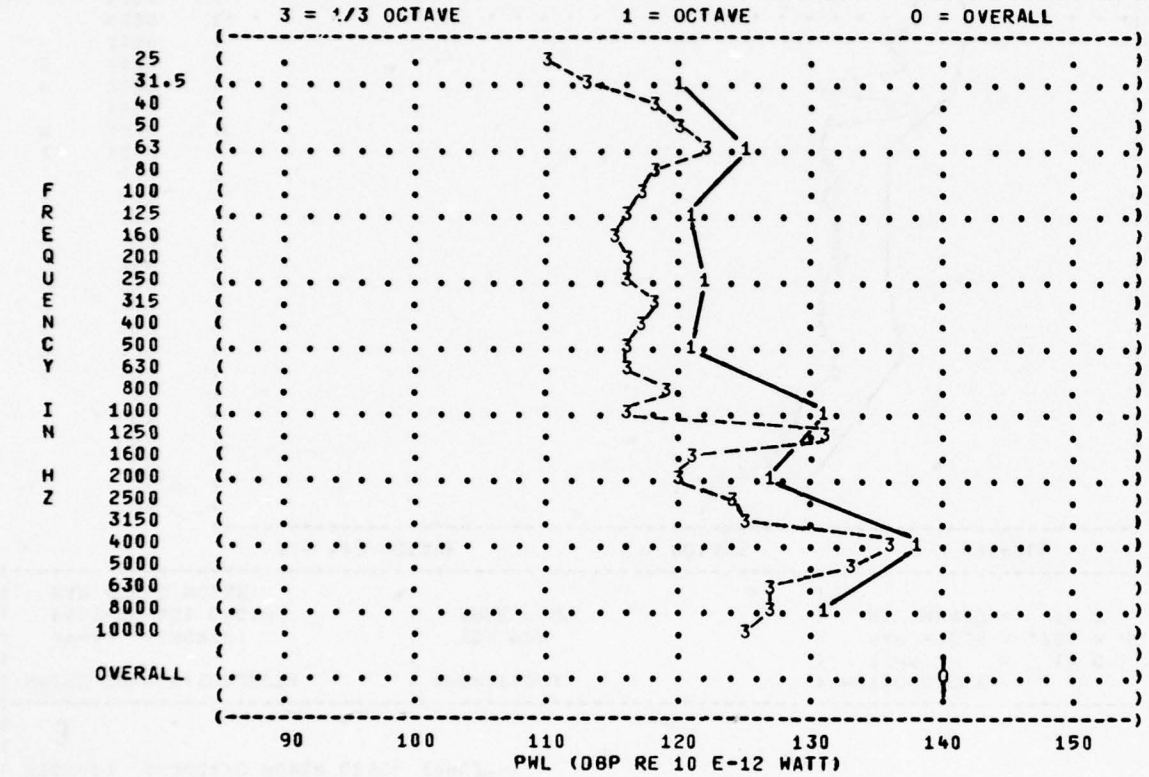


FIGURE: 3 ACOUSTIC POWER LEVEL (PWL)

NOISE SOURCE/SUBJECT:	OPERATION:	METEOROLOGY:	IDENTIFICATION:
AV-8A AIRCRAFT	IDLE	TEMP = 18 C	OMEGA 1.4
F402-RR-401 ENGINE	27% RPM	BAR PRESS = .766 M HG	TEST 75-002-006
FAR FIELD NOISE	FREE FLOW	REL HUMID = 58 %	RUN 01
			06 MAY 75
			PAGE 3



1/3 OCTAVE	PWL OCTAVE
110.3	
112.6	119.6
117.9	
119.5	
121.6	124.7
118.1	
117.4	
116.2	121.1
115.0	
116.1	
116.5	121.5
117.6	
116.8	
116.2	121.2
116.3	
118.7	
116.5	131.1
130.7	
121.4	
120.1	127.0
124.2	
124.8	
136.1	138.2
133.3	
127.5	
126.7	131.3
125.2	
	140.2

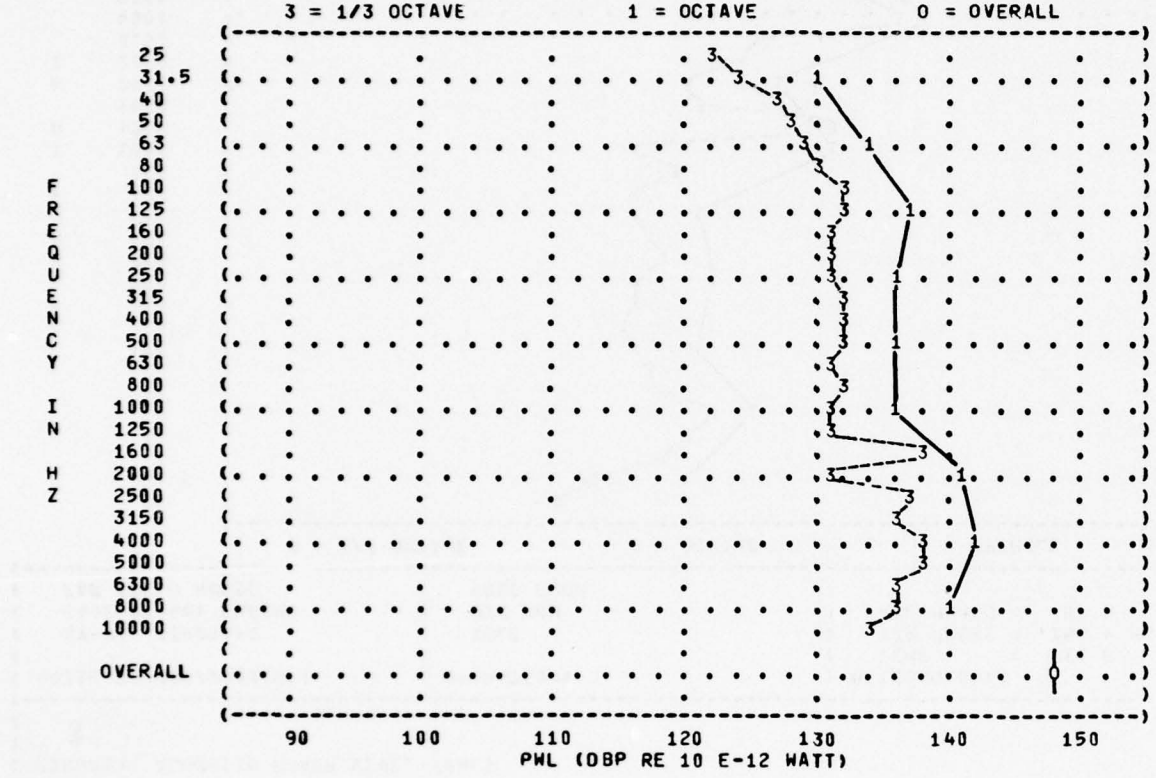
FIGURE: 3 ACOUSTIC POWER LEVEL (PWL)

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
55% RPM
FREE FLOW

METEOROLOGY:
TEMP = 18 C
BAR PRESS = .766 M HG
REL HUMID = 58 %

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 02
06 MAY 75
PAGE 3



	PWL 1/3 OCTAVE	PWL OCTAVE
25	121.6	
31.5	124.2	129.7
40	127.2	
50	127.8	
63	129.2	133.8
80	129.9	
100	131.9	
125	132.0	136.6
160	131.4	
200	130.7	
250	131.1	135.9
315	131.5	
400	131.8	
500	131.7	136.4
630	131.4	
800	131.5	
1000	131.0	136.1
1250	131.4	
1600	137.9	
2000	131.5	141.1
2500	137.3	
3150	136.2	
4000	137.8	142.1
5000	138.0	
6300	136.5	
8000	135.6	140.2
10000	133.7	
OVERALL	147.8	

TABLE: DIRECTIVITY INDEX (DB)

3

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
IDLE
27% RPM
FREE FLOW

METEOROLOGY:
TEMP = 18 C
BAR PRESS = .766 M HG
REL HUMID = 58 %

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 01
06 MAY 75
PAGE 4

FREQ (HZ)	ANGLE (DEGREES) 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
1/3 OCTAVE																			
25	1	-4	-1	-5	2	1	-2	-1	5	-3	-2	-1	-1	-1	-1	-2	-1		
31.5	-1	-2	-2	-1	-1	-1	-1	1	2	-2	-1	1	-1	1	1	1	-1		
40	-2	-2	-2	-3	-1	-1	-1	0	0	-3	-1	1	1	2	2	2	-0		
50	-1	-1	-1	-1	-2	-0	-0	-1	-0	-1	-1	-1	-1	2	3	2	0		
63	0	1	1	0	0	-1	-0	-2	-5	-5	-3	-1	0	3	4	3	1		
80	0	1	1	2	-0	-2	-4	-7	-6	-4	-3	-0	2	4	4	4	-2		
100	0	0	0	-0	-3	-2	1	1	2	2	-0	-2	-3	-1	1	2	-6		
125	-1	-1	-1	-0	-1	-1	1	0	-1	-2	-0	2	1	1	0	1	-11		
160	1	2	2	3	2	-1	-1	-3	-3	-4	-2	1	3	4	1	0	-13		
200	-1	-1	-0	1	-0	-4	-5	-2	-2	-3	-1	1	2	5	2	-1	-12		
250	-0	0	1	2	-1	-4	-5	-5	-4	-4	0	2	3	5	2	-1	-14		
315	-0	2	1	3	-0	-1	-1	-1	-4	-5	-1	1	1	4	2	-3	-16		
400	0	3	2	1	-2	-1	-1	-1	-2	-2	1	1	0	2	4	-6	-13		
500	1	4	3	1	1	1	0	-1	-3	-1	2	2	0	-1	1	-5	-11		
630	2	4	3	3	1	0	-0	-2	-4	-2	1	2	1	-1	-2	-6	-12		
800	1	7	6	5	2	2	1	-3	-4	-3	-1	0	-1	-5	-5	-6	-15		
1000	7	6	6	5	3	0	0	-1	-3	-3	-1	-0	-1	-4	-6	-9	-17		
1250	9	8	8	9	6	-3	-8	-2	-13	-8	-8	-10	-3	-8	-14	-14	-19		
1600	9	7	6	6	4	1	3	-2	-2	-3	-4	-4	-5	-7	-7	-13	-21		
2000	7	6	6	6	4	3	1	-1	-2	-3	-2	-2	-5	-5	-6	-11	-20		
2500	5	7	5	6	4	3	1	0	-4	-4	-4	-5	-5	-7	-8	-13	-22		
3150	6	6	6	4	3	4	3	-0	-3	-2	-2	-5	-6	-8	-9	-13	-22		
4000	10	8	4	3	-1	1	5	2	2	-5	-5	-7	-8	-11	-12	-16	-24		
5000	6	5	4	6	4	3	4	-0	-2	-4	-3	-5	-7	-9	-10	-14	-24		
6300	7	5	6	4	4	2	0	-1	-2	-1	-1	-1	-2	-5	-6	-11	-21		
8000	7	6	6	4	4	2	0	-0	-1	-2	-1	-2	-3	-6	-7	-12	-21		
10000	7	6	5	5	4	2	1	-1	-1	-3	-1	-2	-3	-6	-7	-12	-22		
OCTAVE																			
31.5	-2	-2	-2	-3	-0	-1	-1	0	2	-3	-1	1	1	1	2	2	-0		
63	0	1	0	0	-0	-1	-1	-2	-3	-3	-2	-1	0	3	4	3	0		
125	-0	0	0	1	-1	-1	0	0	0	-0	-1	0	0	1	1	1	-8		
250	-0	1	1	2	-0	-3	-3	-2	-3	-4	-1	1	2	5	2	-2	-14		
500	1	4	3	2	0	-0	-0	-1	-3	-2	1	2	1	0	2	-6	-12		
1000	8	8	8	9	5	-2	-6	-2	-10	-7	-7	-7	-3	-7	-12	-12	-19		
2000	7	7	5	6	4	3	2	-1	-3	-3	-4	-4	-5	-7	-7	-13	-21		
4000	9	7	4	4	1	2	5	1	1	-4	-4	-6	-7	-10	-11	-15	-24		
8000	7	6	6	4	4	2	0	-1	-2	-2	-1	-1	-3	-6	-6	-11	-21		
OVERALL	8	7	5	5	3	1	3	0	-1	-4	-3	-4	-4	-5	-5	-7	-12		

TABLE: DIRECTIVITY INDEX (DB)

3

IDENTIFICATION:

OMEGA 1.4
TEST 75-002-006
RUN 02
06 MAY 75
PAGE 4

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
55% RPM
FREE FLOW

METEOROLOGY:
TEMP = 18 C
BAR PRESS = .766 M HG
REL HUMID = 58 %

FREQ (HZ)	ANGLE (DEGREES) 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
1/3 OCTAVE																			
25	-5	-6	-4	-9	-3	-1	0	-0	-1	-0	-2	1	-0	1	2	4	4		
31.5	-6	-6	-4	-9	-2	-1	-0	1	-0	-1	-2	1	0	2	2	4	2		
40	-5	-5	-5	-9	-3	-2	0	0	-0	-2	0	0	-0	2	3	4	1		
50	-5	-4	-3	-8	-3	-3	-1	-1	-2	-2	-1	0	2	2	4	3	-1		
63	-3	-3	-3	-7	-2	-2	-2	-1	-1	-2	-0	1	2	3	4	2	-4		
80	-3	-3	-3	-7	-2	-3	-4	-3	-3	-1	-0	0	3	4	5	3	-8		
100	-3	-4	-4	-8	-3	-2	-1	-0	-0	1	-0	-0	1	3	4	1	-13		
125	-1	-1	-1	-5	-1	-0	-2	-3	-4	-3	1	2	3	3	4	-1	-18		
160	-0	1	1	-3	2	1	-1	-2	-3	-3	-1	1	3	3	2	-2	-22		
200	1	1	1	-3	0	-1	-2	-2	-2	-1	0	1	3	3	1	-4	-25		
250	1	1	1	-2	-1	-3	-3	-4	-2	-2	2	2	4	3	-1	-4	-26		
315	-1	-1	-1	-5	-2	-2	-2	-1	-3	-2	1	2	4	5	-2	-6	-26		
400	0	1	1	-4	-2	-1	-1	-1	-1	-1	2	2	2	3	-0	-5	-25		
500	-0	2	1	-4	-0	-1	-1	-3	-2	0	2	1	2	2	1	-4	-25		
630	1	3	1	-4	1	0	-1	-3	-2	-1	2	2	2	0	1	-4	-24		
800	2	3	1	-2	0	-0	0	-1	-1	1	3	2	0	0	-1	-5	-25		
1000	3	2	1	-4	1	1	0	-0	-1	2	3	1	-3	-4	-4	-4	-26		
1250	5	3	2	-5	3	1	0	-0	-0	2	2	1	-4	-4	-5	-5	-26		
1600	7	4	-0	-6	9	-1	3	-3	1	-2	-4	-3	-7	-11	-8	-10	-32		
2000	6	5	3	-2	4	3	1	1	-1	1	0	-1	-4	-7	-7	-9	-28		
2500	7	9	4	-0	5	2	3	0	-2	-0	-2	-3	-6	-9	-10	-10	-31		
3150	7	7	5	0	3	2	1	1	1	1	-0	-3	-3	-6	-7	-10	-29		
4000	6	4	4	1	4	4	3	2	-2	0	-1	-3	-6	-8	-9	-13	-32		
5000	3	4	2	-2	3	3	2	2	-0	1	1	-2	-3	-7	-8	-12	-32		
6300	3	4	4	-3	2	2	3	1	-1	1	1	-1	-3	-5	-7	-11	-31		
8000	4	4	3	-3	3	2	2	3	-0	2	1	-2	-4	-7	-8	-12	-32		
10000	4	4	4	-3	3	2	2	2	-1	1	1	-2	-4	-6	-8	-12	-33		
OCTAVE																			
31.5	-5	-5	-4	-9	-3	-2	-0	0	-0	-1	-1	0	-0	2	3	4	2		
63	-3	-3	-3	-7	-2	-3	-2	-2	-2	-2	-0	1	2	3	5	3	-4		
125	-1	-1	-1	-5	-0	-0	-1	-2	-2	-2	0	1	2	3	3	-0	-16		
250	1	0	1	-3	-1	-2	-2	-2	-3	-2	1	2	4	4	-1	-5	-26		
500	0	2	1	-4	-0	-1	-1	-2	-2	-0	2	2	2	2	1	-4	-25		
1000	3	3	1	-4	2	0	0	-0	-1	1	3	1	-2	-2	-3	-5	-26		
2000	7	7	2	-3	7	1	3	-1	0	-1	-3	-3	-6	-10	-9	-10	-31		
4000	6	5	4	-0	3	3	2	2	-1	1	-0	-2	-4	-7	-8	-12	-31		
8000	4	4	3	-3	2	2	2	2	-1	1	1	-1	-3	-6	-7	-12	-32		
OVERALL	4	4	2	-3	4	1	1	-0	-1	-0	0	-0	-1	-1	-2	-4	-12		

FIGURE: 4 OVERALL SOUND PRESSURE LEVEL (OASPL) EQUAL LEVEL CONTOURS (DB)

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 01
06 MAY 75
PAGE 13

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
IDLE
27% RPM
FREE FLOW

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

POINT	DB
A	45
B	50
C	55
D	60
E	65
F	70
G	75
H	80
I	85
J	90
K	95
L	100

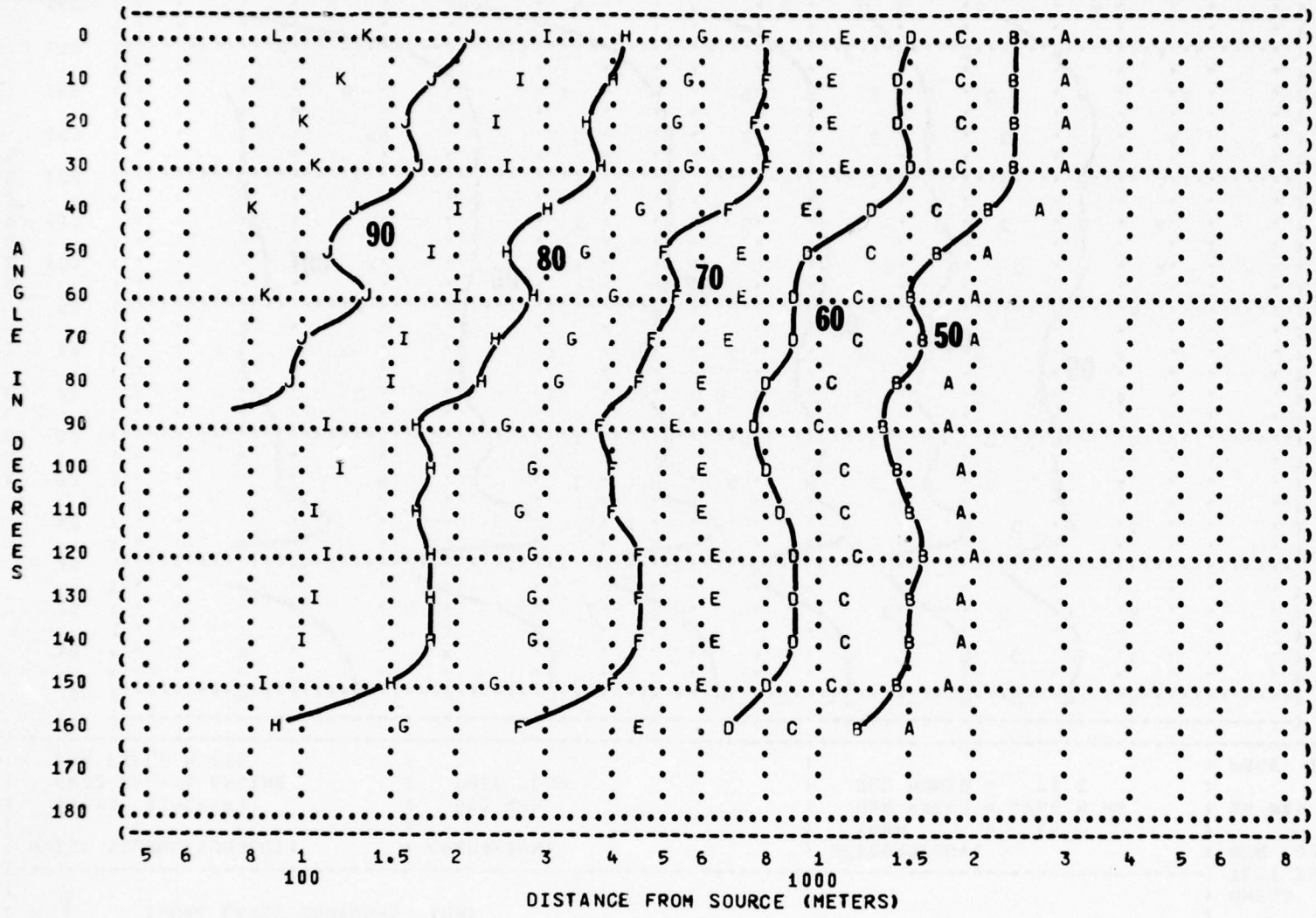


FIGURE: 4 OVERALL SOUND PRESSURE LEVEL (OASPL) EQUAL LEVEL CONTOURS (DB)

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 02
06 MAY 75
PAGE 13

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
55% RPM
FREE FLOW

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

POINT	DB
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

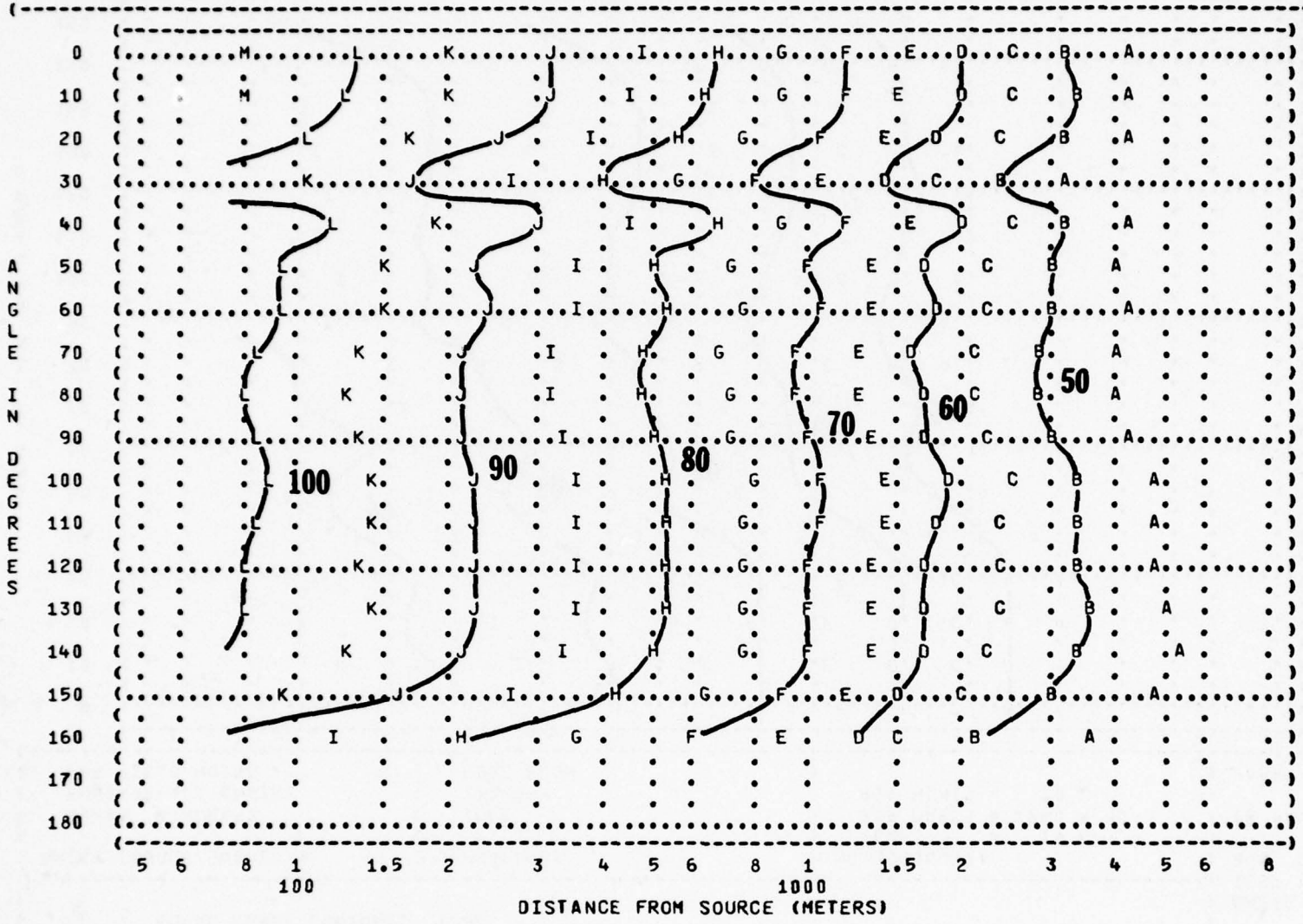


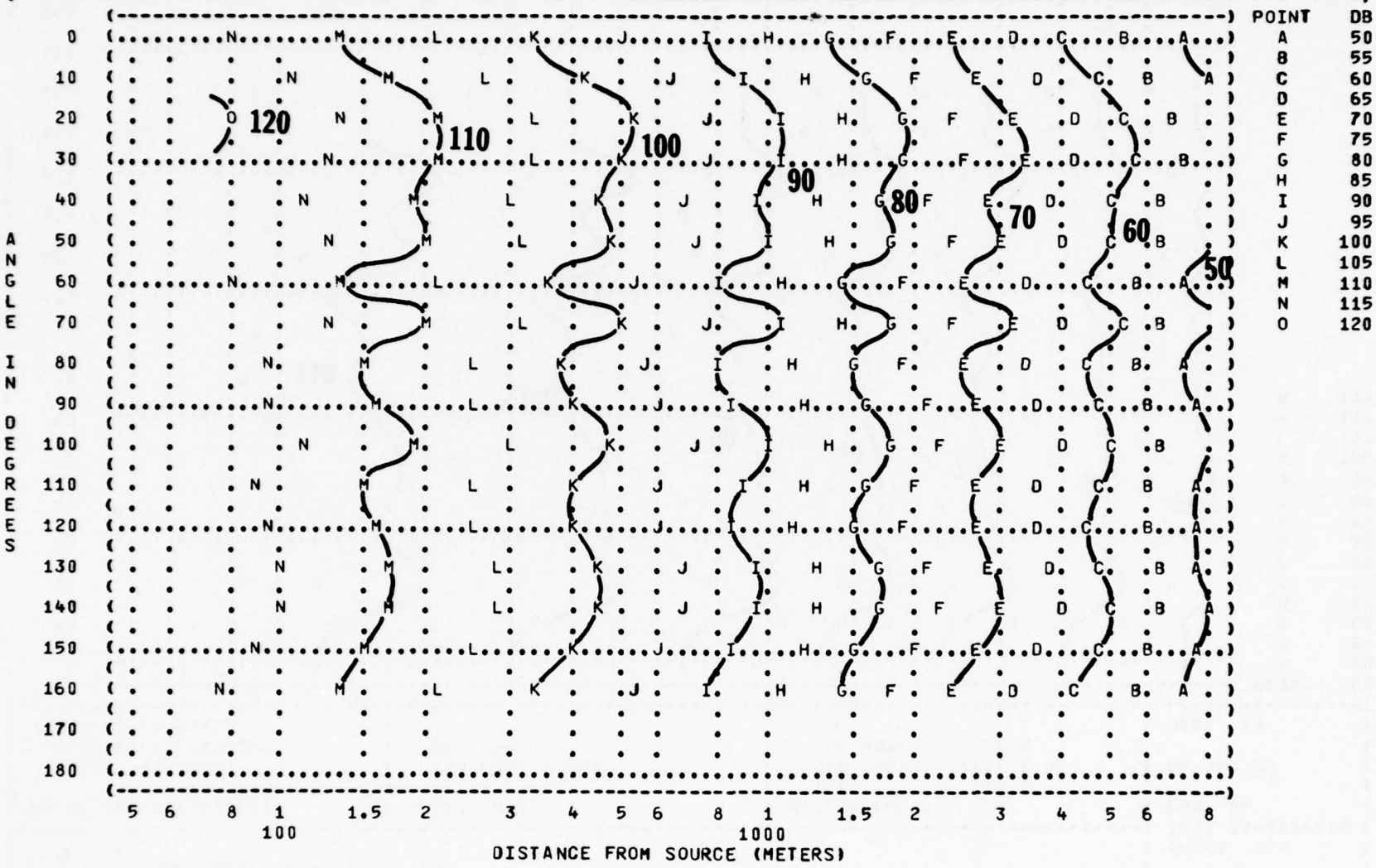
FIGURE: 4 OVERALL SOUND PRESSURE LEVEL (OASPL) EQUAL LEVEL CONTOURS (DB)

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 03
06 MAY 75
PAGE 13

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
50 FOOT HOVER
98% RPM

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



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

FIGURE 4: OVERALL SOUND PRESSURE LEVEL (OASPL) EQUAL LEVEL CONTOURS (DB)

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
100 FOOT HOVER
95% RPM

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 04
06 MAY 75
PAGE 13

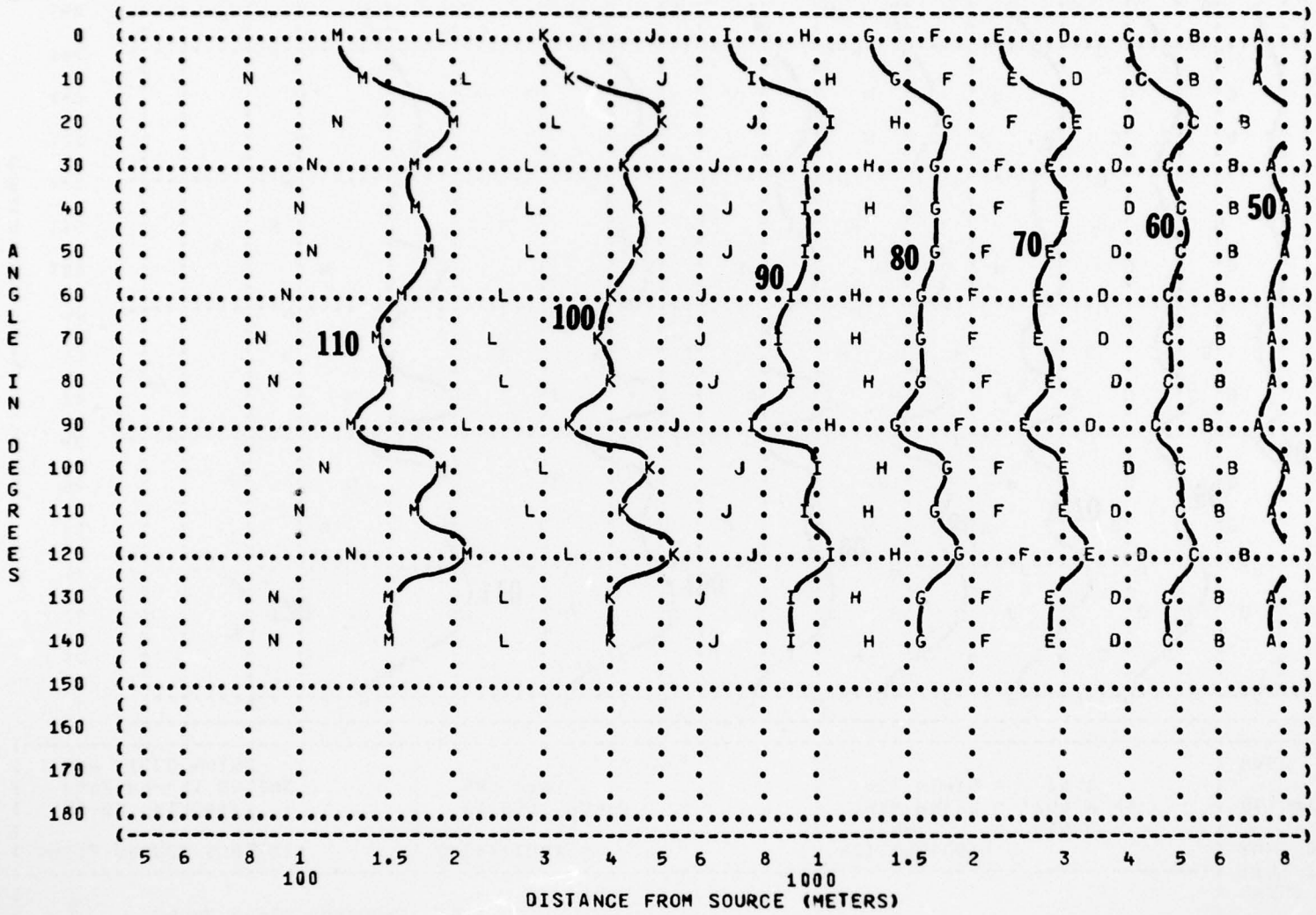


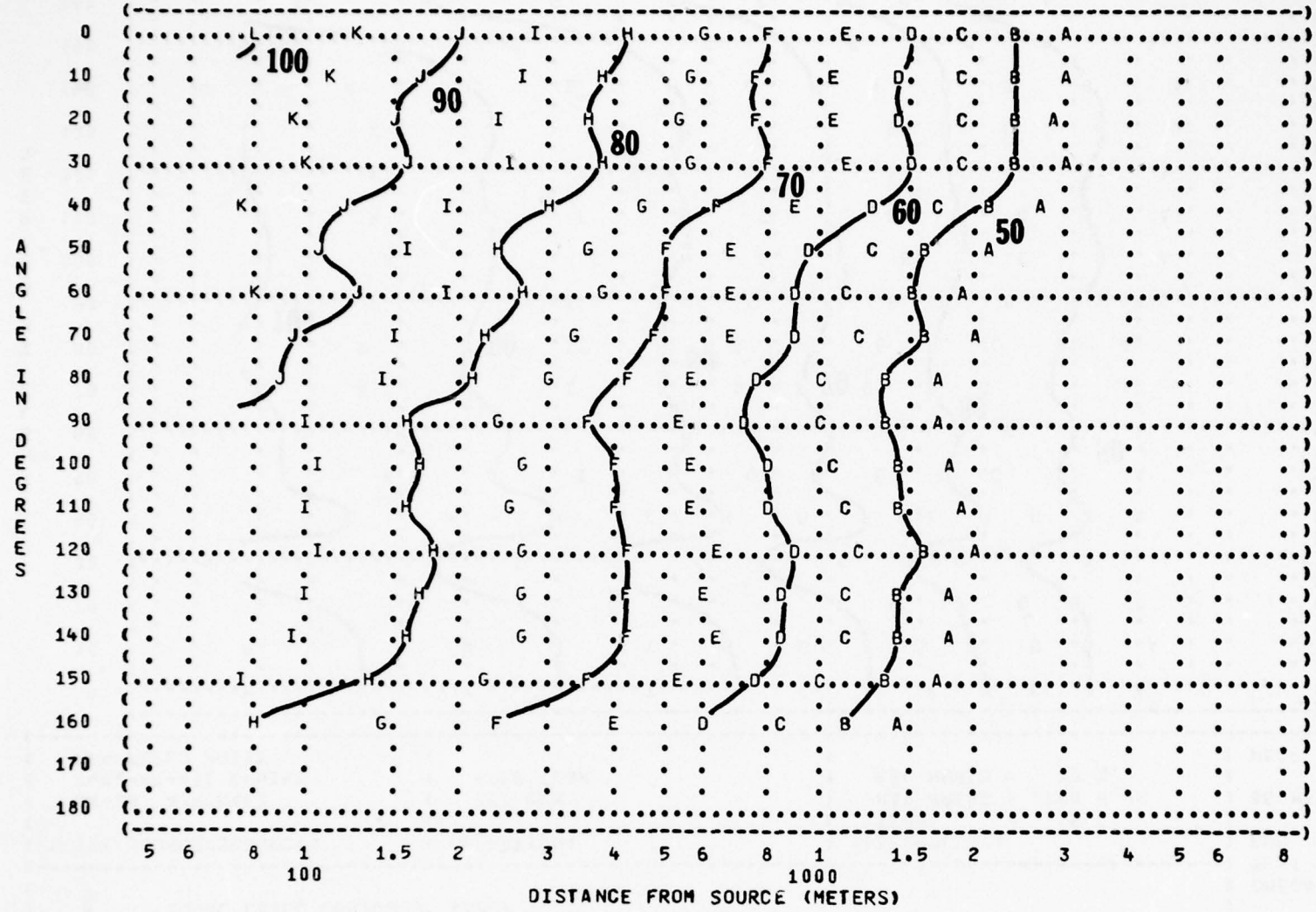
FIGURE: 5 C-WEIGHTED OVERALL SOUND LEVEL (OASLC) EQUAL LEVEL CONTOURS (DBC)

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 01
06 MAY 75
PAGE 14

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
IDLE
27% RPM
FREE FLOW

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



POINT	DBC
A	45
B	50
C	55
D	60
E	65
F	70
G	75
H	80
I	85
J	90
K	95
L	100

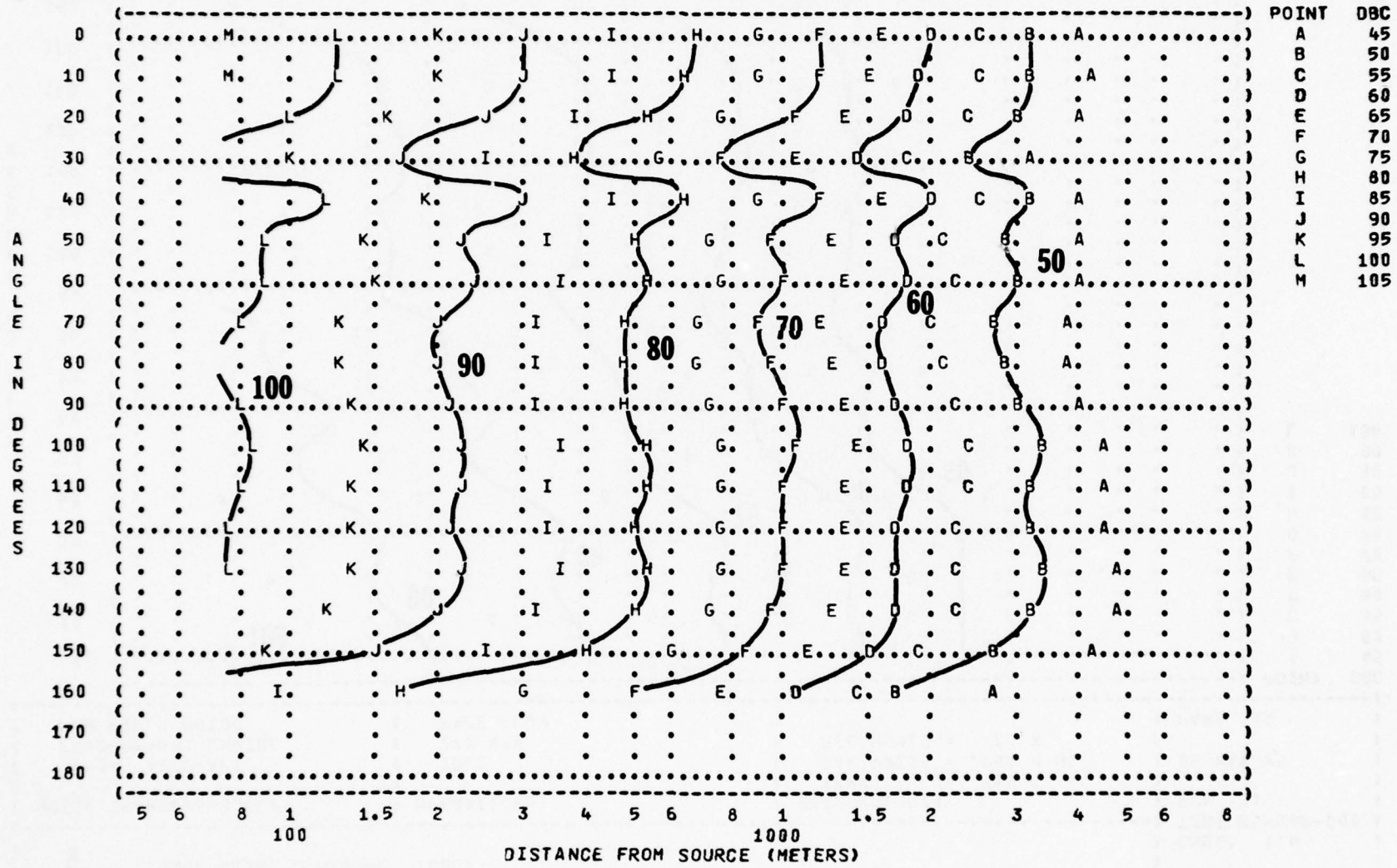
FIGURE 5 C-WEIGHTED OVERALL SOUND LEVEL (OASLC) EQUAL LEVEL CONTOURS (DBC)

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
55% RPM
FREE FLOW

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 02
06 MAY 75
PAGE 14



POINT	DBC
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

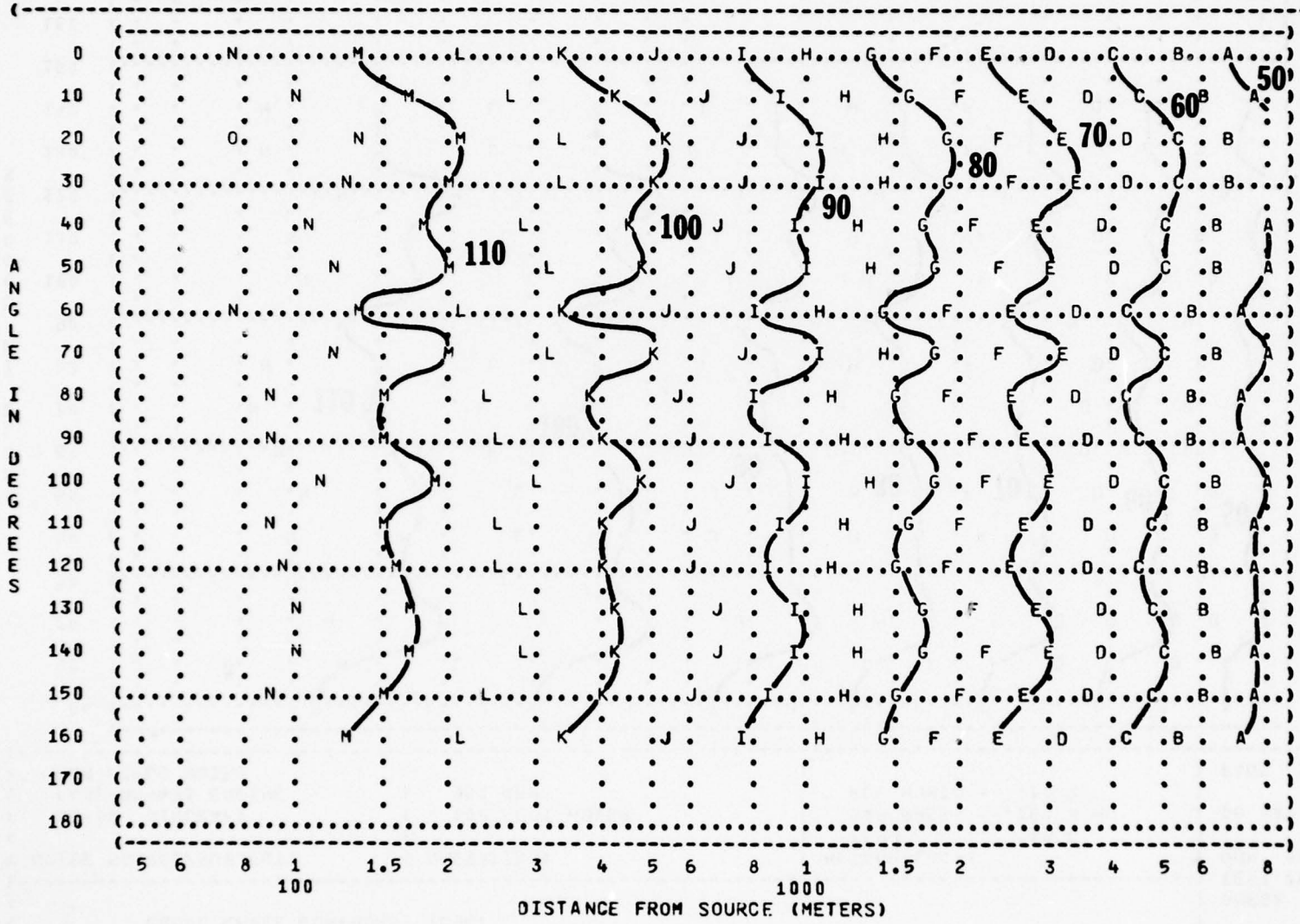
FIGURE 5 C-WEIGHTED OVERALL SOUND LEVEL (OASLC) EQUAL LEVEL CONTOURS (DBC)

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 03
06 MAY 75
PAGE 14

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
50 FOOT HOVER
98% RPM

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



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

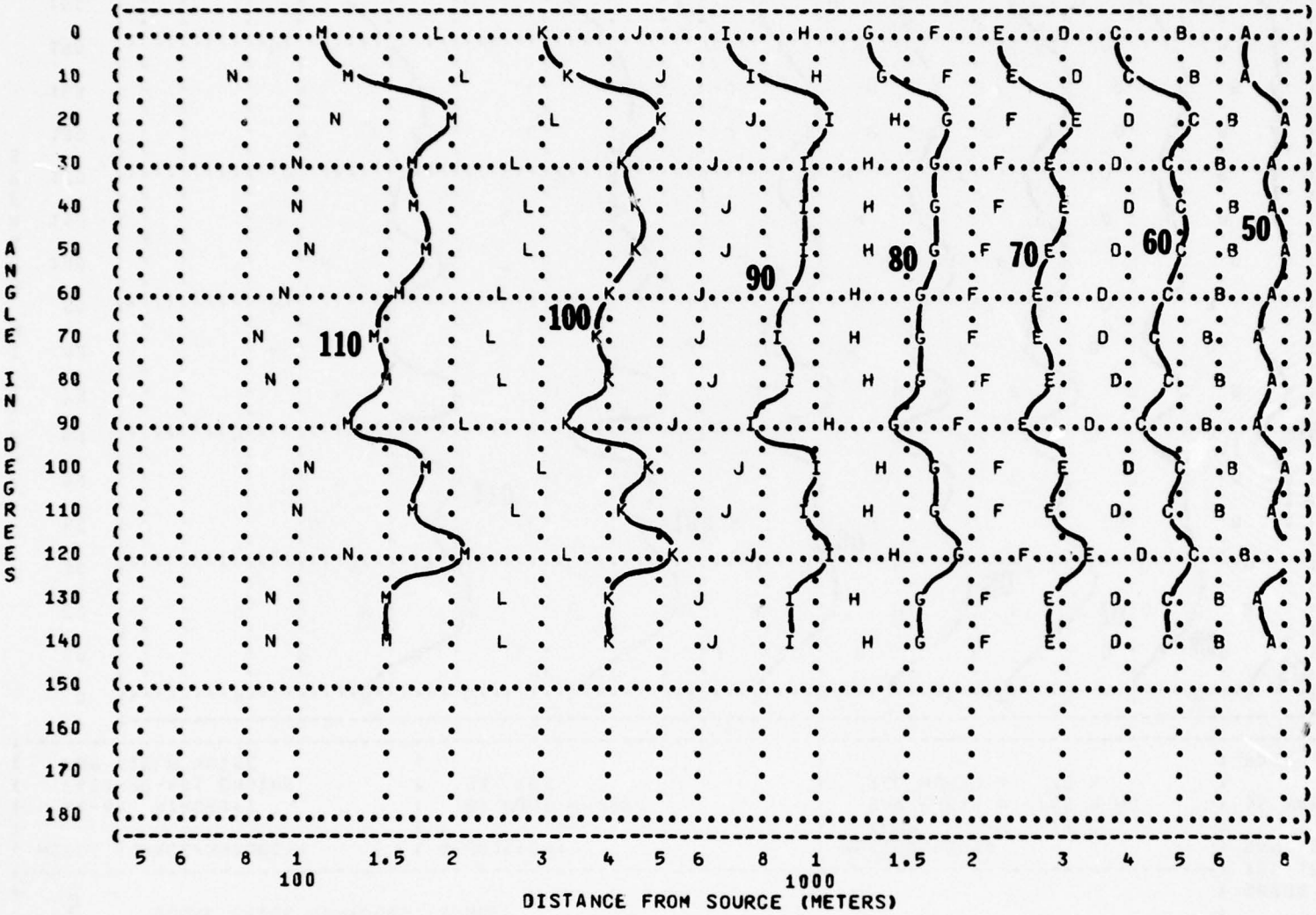
FIGURE 5 C-WEIGHTED OVERALL SOUND LEVEL (OASLC) EQUAL LEVEL CONTOURS (DBC)

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
100 FOOT HOVER
95% RPM

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 04
06 MAY 75
PAGE 14



POINT	DBC
A	50
B	55
C	60
D	65
E	70
F	75
G	80
H	85
I	90
J	95
K	100
L	105
M	110
N	115

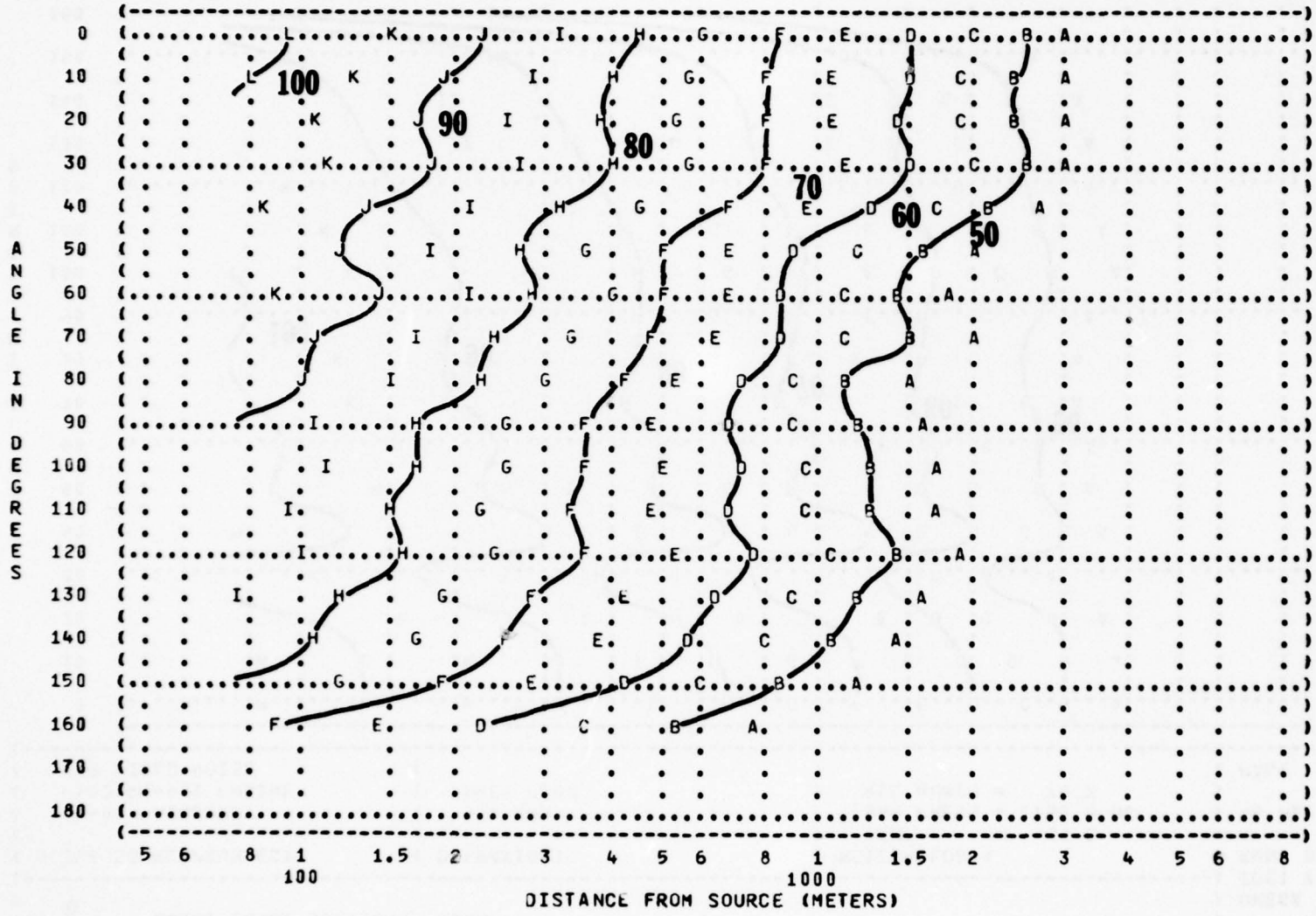
FIGURE 6 A-WEIGHTED OVERALL SOUND LEVEL (OASLA) EQUAL LEVEL CONTOURS (DBA)

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 01
06 MAY 75
PAGE 15

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
IDLE
27% RPM
FREE FLOW

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



POINT	DBA
A	45
B	50
C	55
D	60
E	65
F	70
G	75
H	80
I	85
J	90
K	95
L	100

FIGURE: 6 A-WEIGHTED OVERALL SOUND LEVEL (OASLA) EQUAL LEVEL CONTOURS (DBA)

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 02
06 MAY 75
PAGE 15

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
55% RPM
FREE FLOW

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

POINT	DBA
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

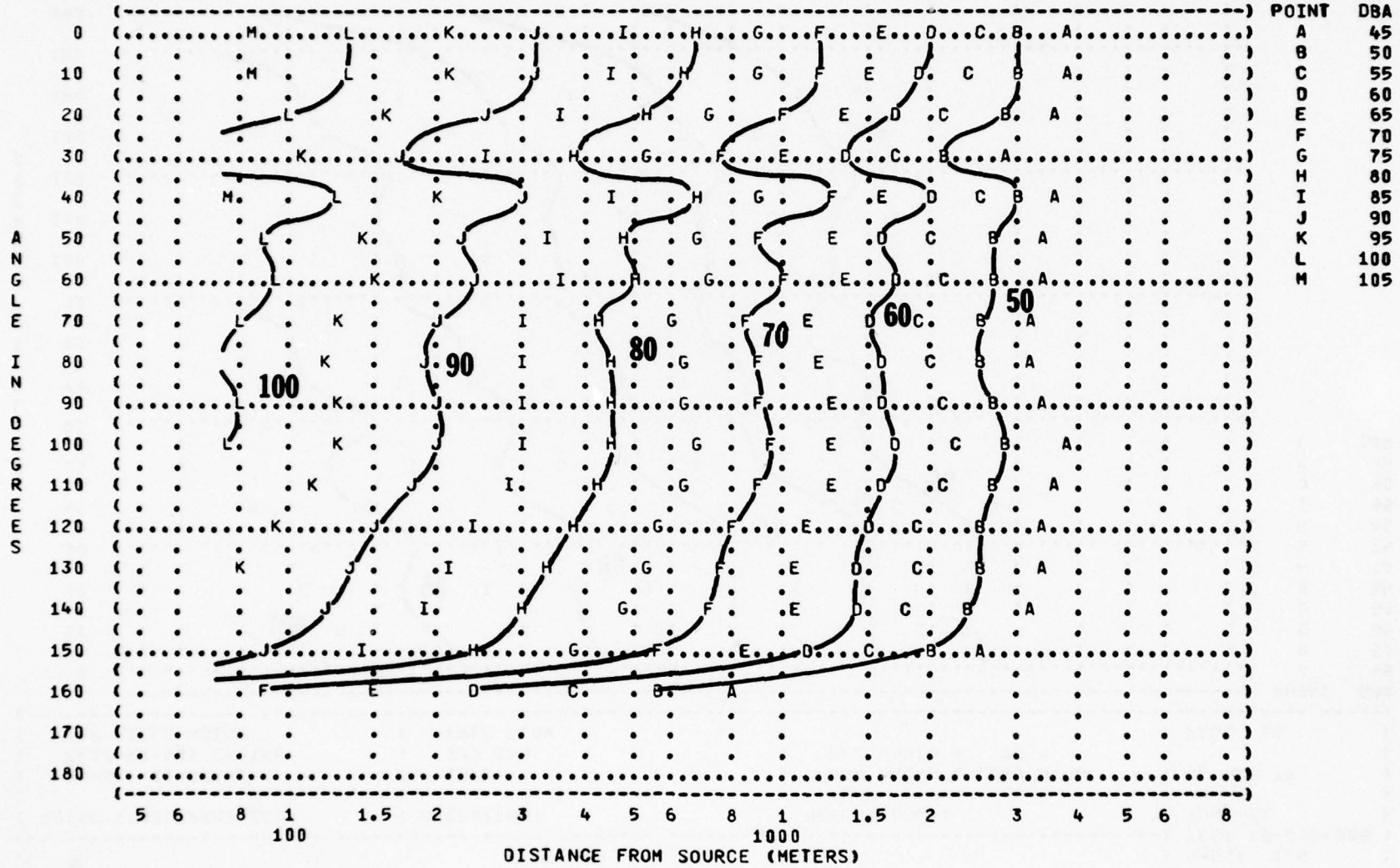


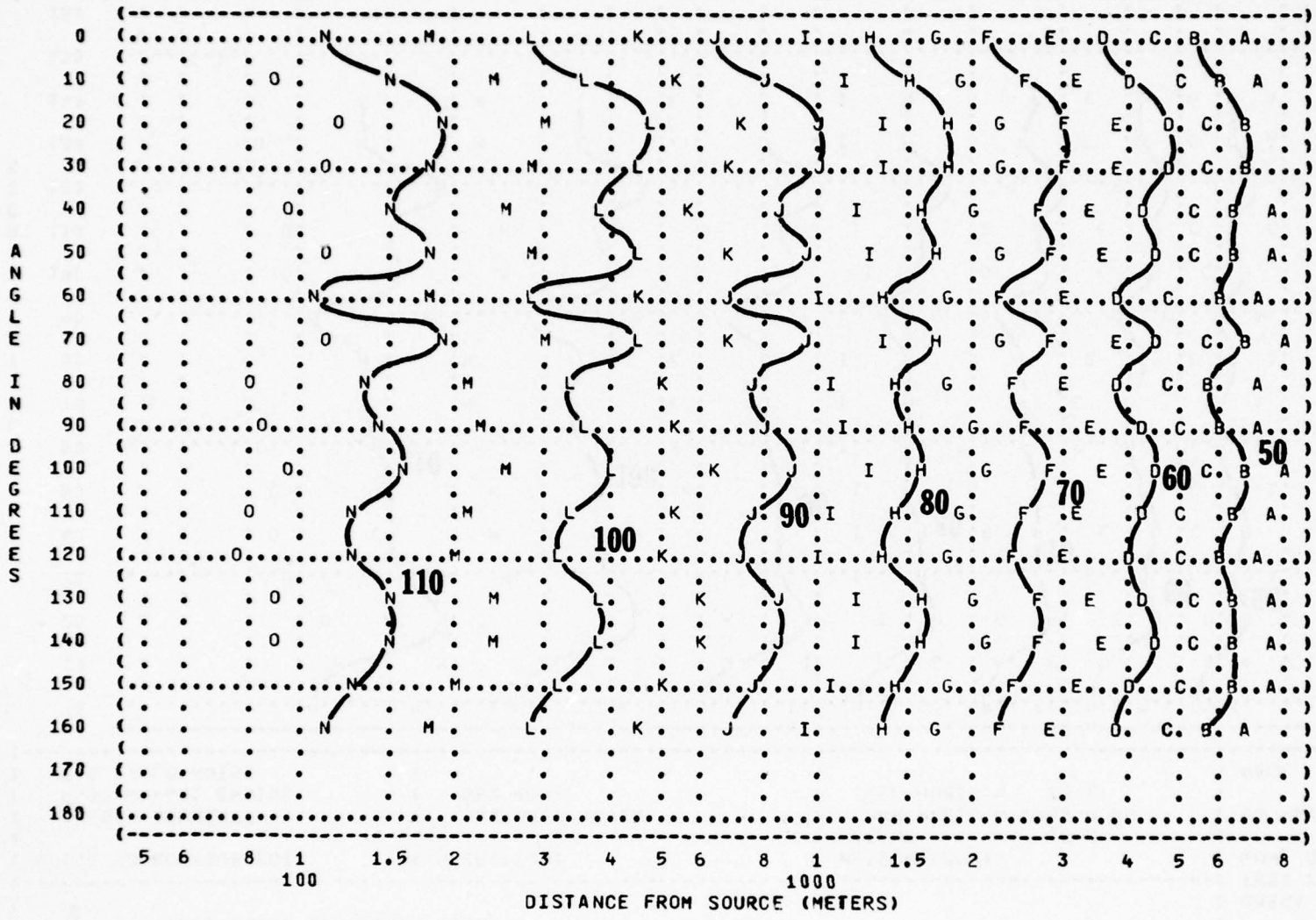
FIGURE: 6 A-WEIGHTED OVERALL SOUND LEVEL (OASLA) EQUAL LEVEL CONTOURS (DBA)

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 03
06 MAY 75
PAGE 15

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
50 FOOT HOVER
98% RPM

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



POINT	DBA
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

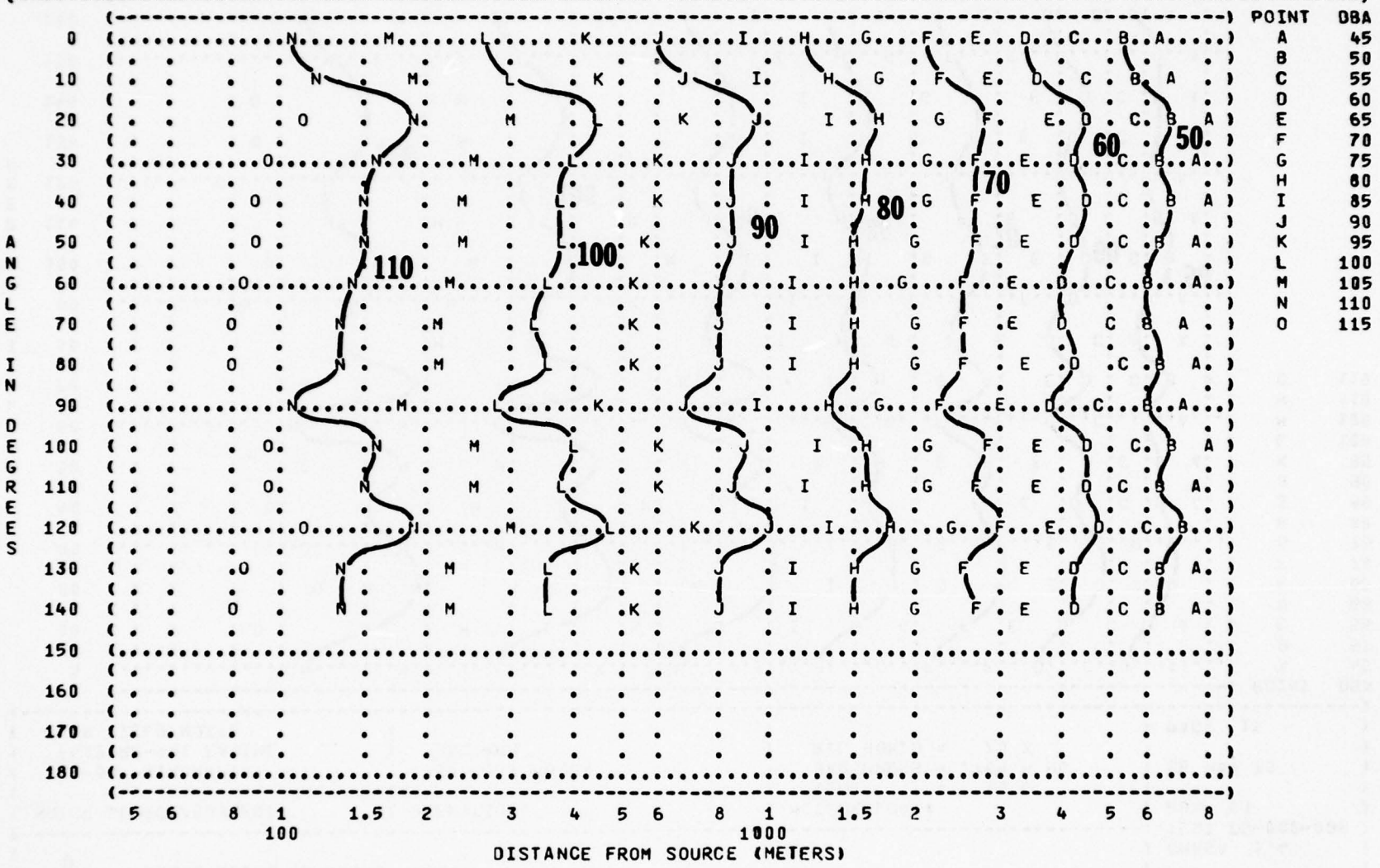
FIGURE 6: A-WEIGHTED OVERALL SOUND LEVEL (OASLA) EQUAL LEVEL CONTOURS (DBA)

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
100 FOOT HOVER
95% RPM

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 04
06 MAY 75
PAGE 15



POINT	DBA
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

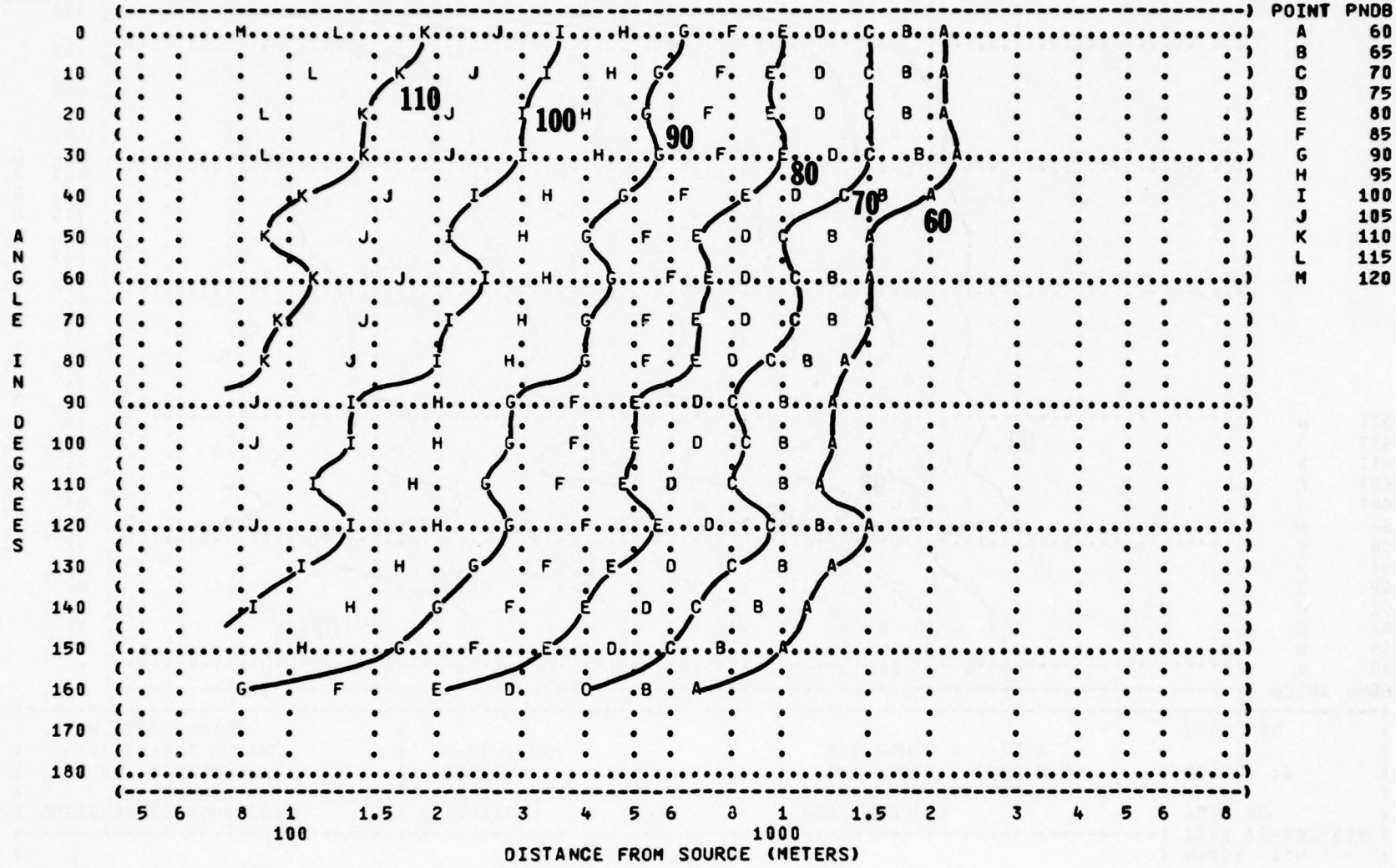
FIGURE 7 PERCEIVED NOISE LEVEL WITH SMOOTH TONE CORRECTION (PNLT) EQUAL LEVEL CONTOURS (PNDB)

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 01
06 MAY 75
PAGE 16

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
IDLE
27% RPM
FREE FLOW

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



POINT	PNDB
A	60
B	65
C	70
D	75
E	80
F	85
G	90
H	95
I	100
J	105
K	110
L	115
M	120

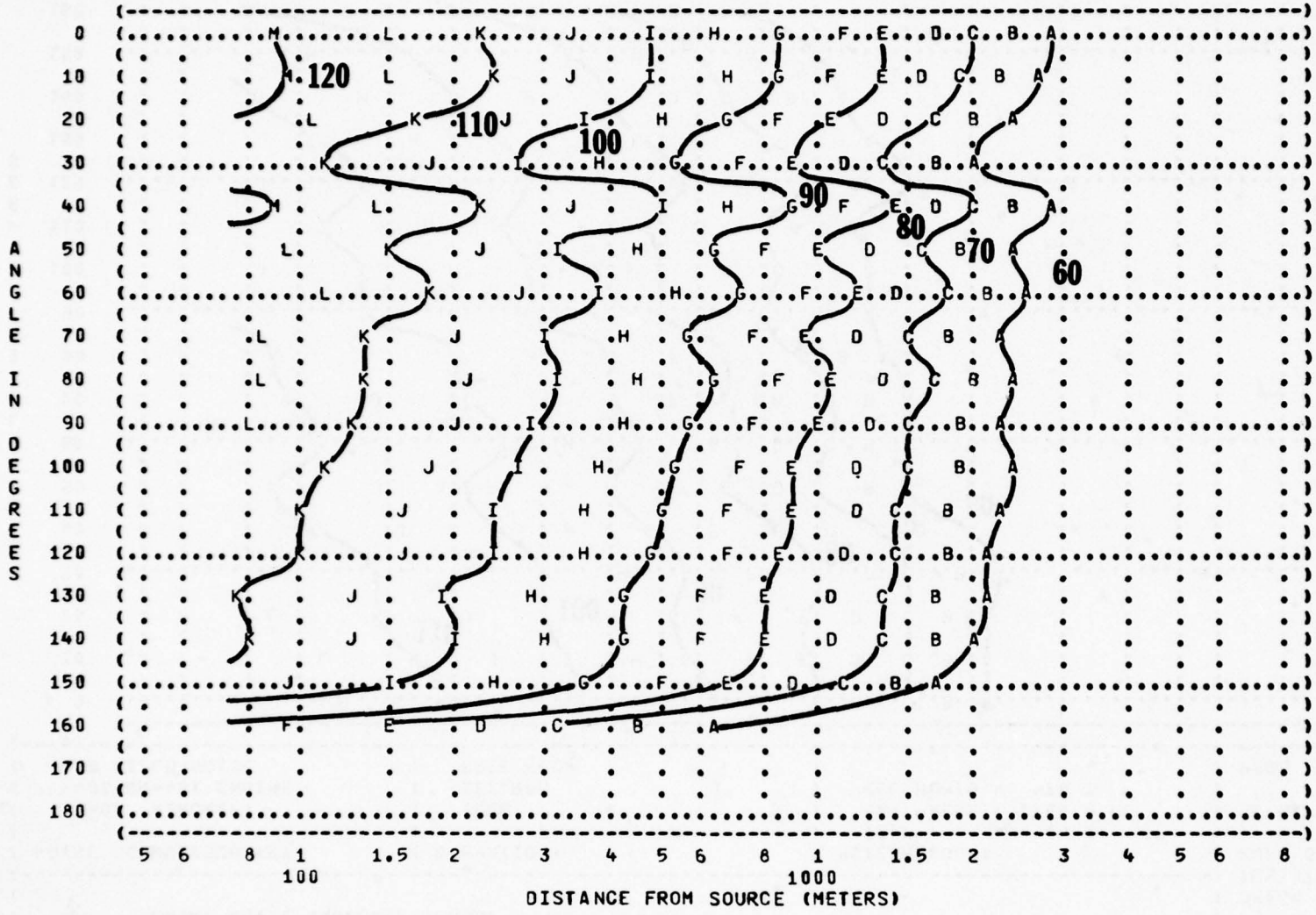
FIGURE 7 PERCEIVED NOISE LEVEL WITH SMOOTH TONE CORRECTION (PNLT) EQUAL LEVEL CONTOURS (PNDB)

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
55% RPM
FREE FLOW

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 02
06 MAY 75
PAGE 16



POINT	PNDB
A	60
B	65
C	70
D	75
E	80
F	85
G	90
H	95
I	100
J	105
K	110
L	115
M	120

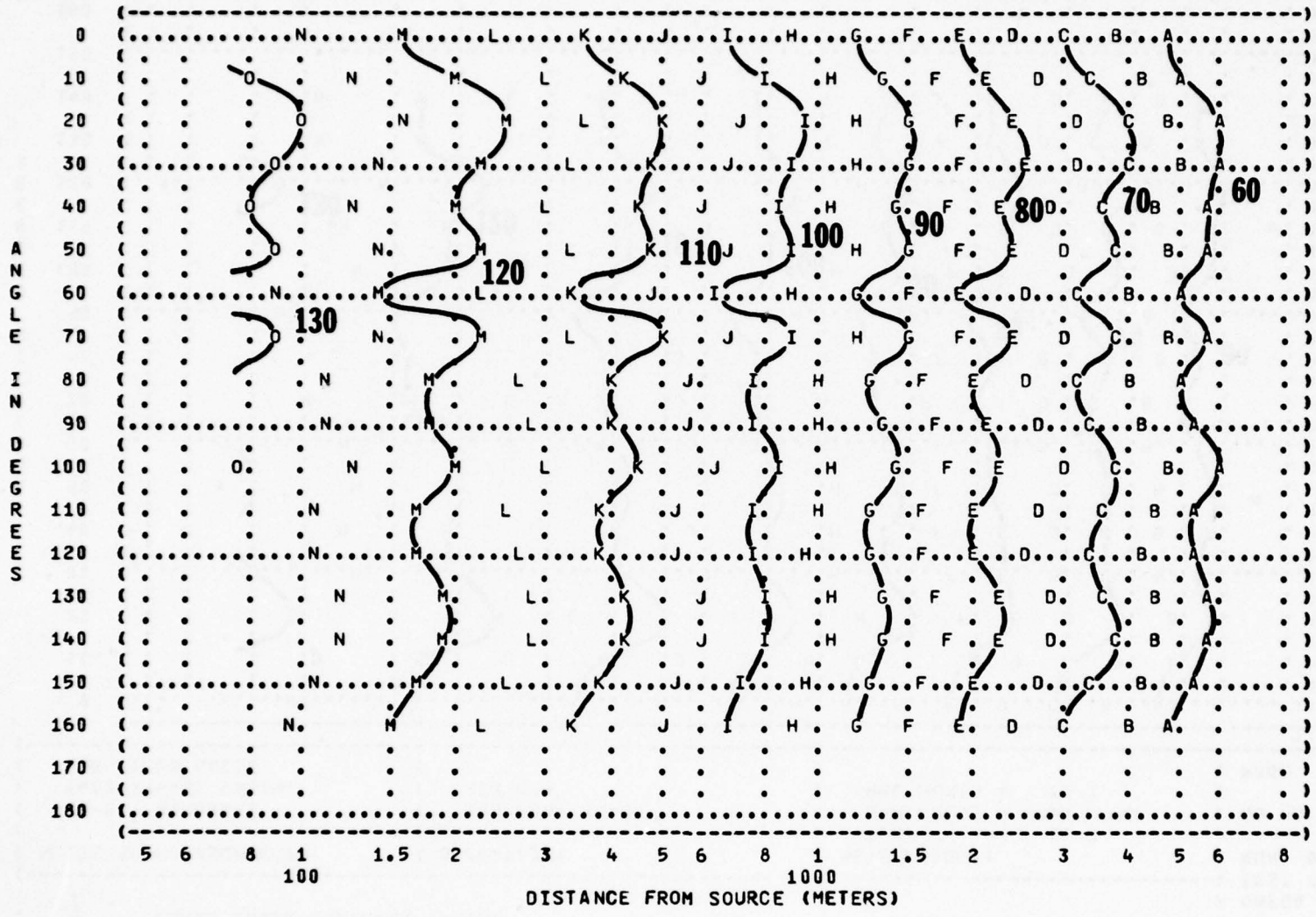
FIGURE 7 PERCEIVED NOISE LEVEL WITH SMOOTH TONE CORRECTION (PNLT) EQUAL LEVEL CONTOURS (PNDB)

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
50 FOOT HOVER
98% RPM

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 03
06 MAY 75
PAGE 16



POINT	PNDB
A	60
B	65
C	70
D	75
E	80
F	85
G	90
H	95
I	100
J	105
K	110
L	115
M	120
N	125
O	130

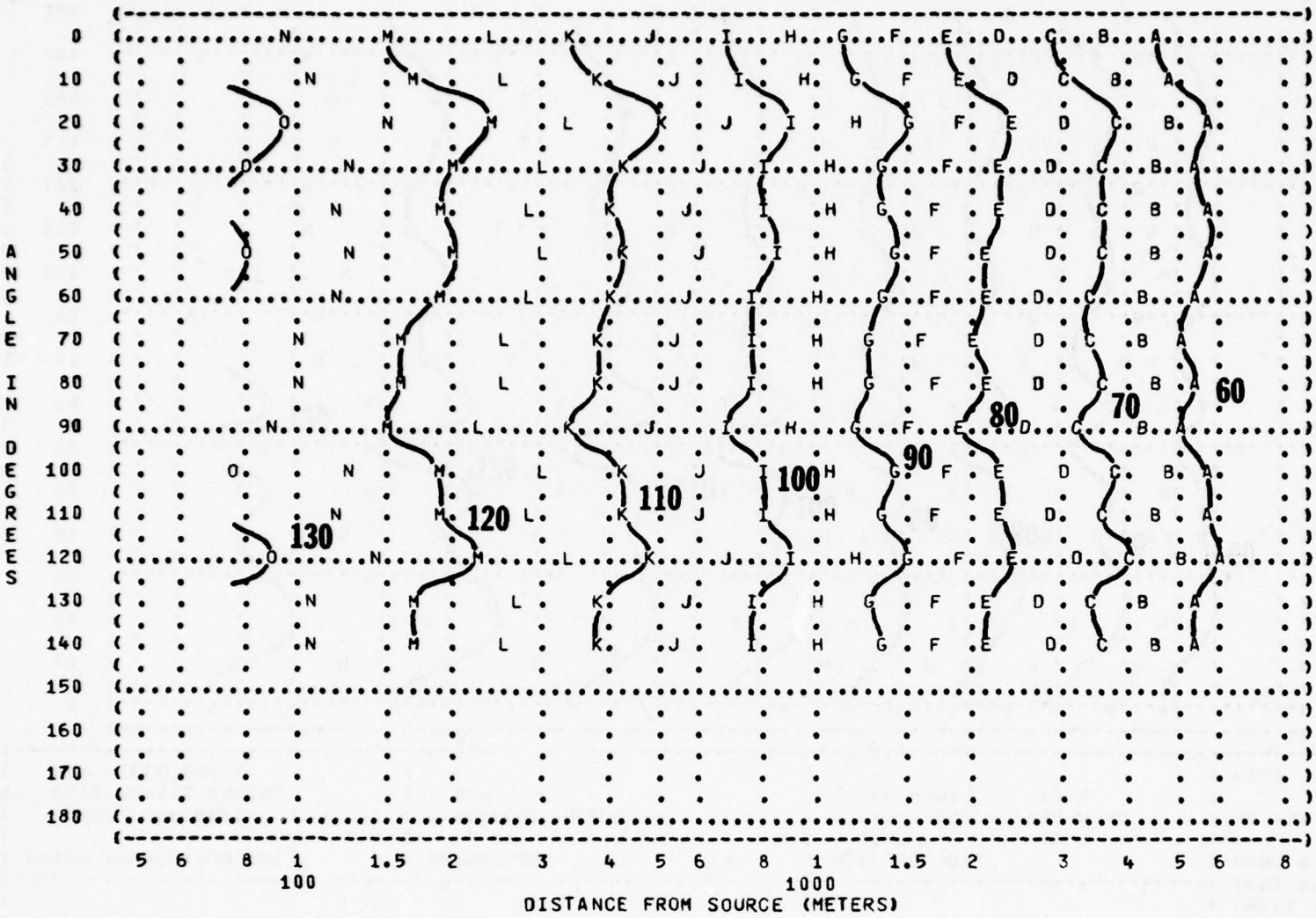
FIGURE 7 PERCEIVED NOISE LEVEL WITH SMOOTH TONE CORRECTION (PNLT) EQUAL LEVEL CONTOURS (PNDB)

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
100 FOOT HOVER
95% RPM

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 04
06 MAY 75
PAGE 16



POINT	PNDB
A	60
B	65
C	70
D	75
E	80
F	85
G	90
H	95
I	100
J	105
K	110
L	115
M	120
N	125
O	130

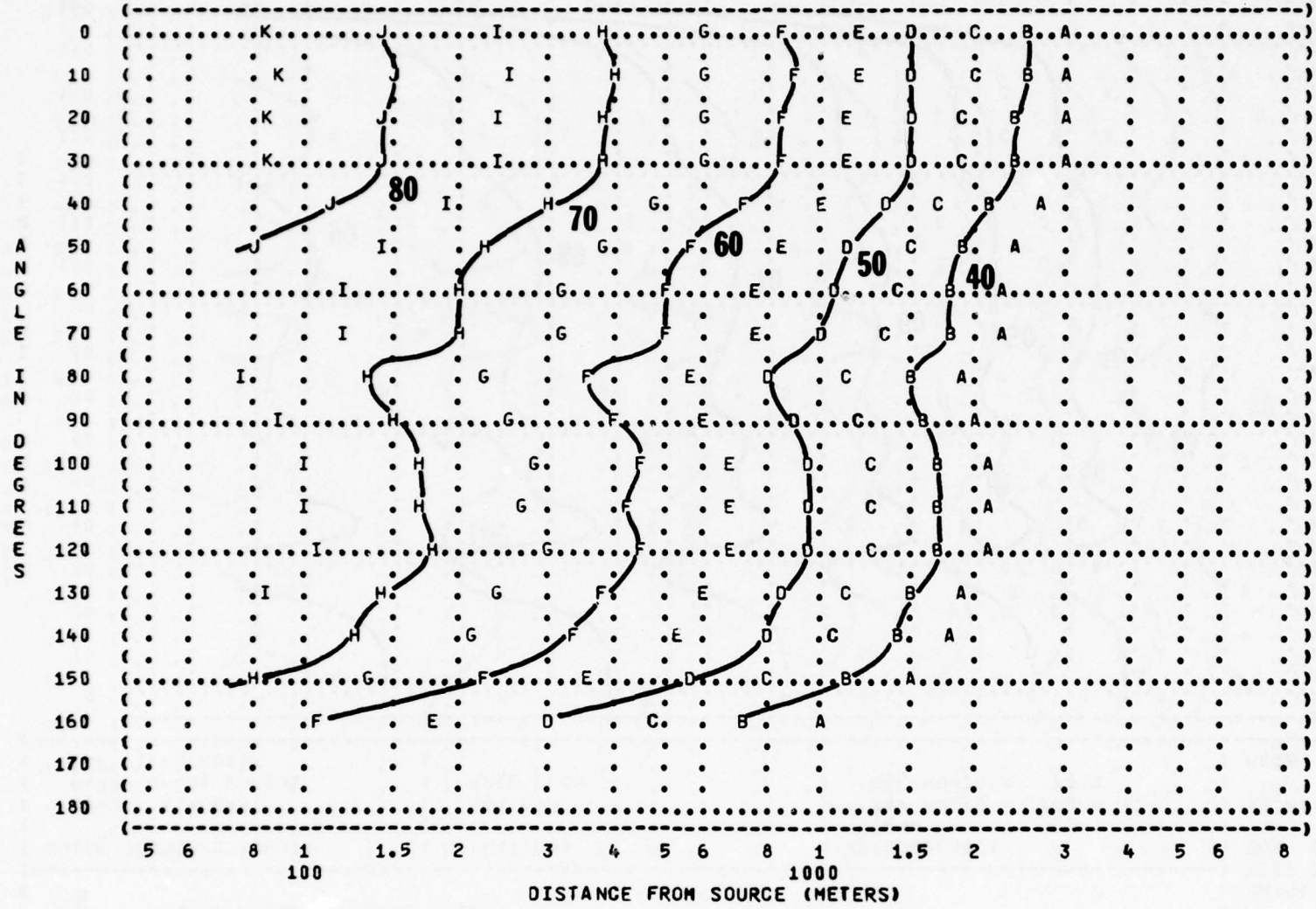
FIGURE 8 PREFERRED SPEECH INTERFERENCE LEVEL (PSIL) EQUAL LEVEL CONTOURS (DB)

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 01
06 MAY 75
PAGE 17

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
IDLE
27% RPM
FREE FLOW

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



POINT	DB
A	35
B	40
C	45
D	50
E	55
F	60
G	65
H	70
I	75
J	80
K	85

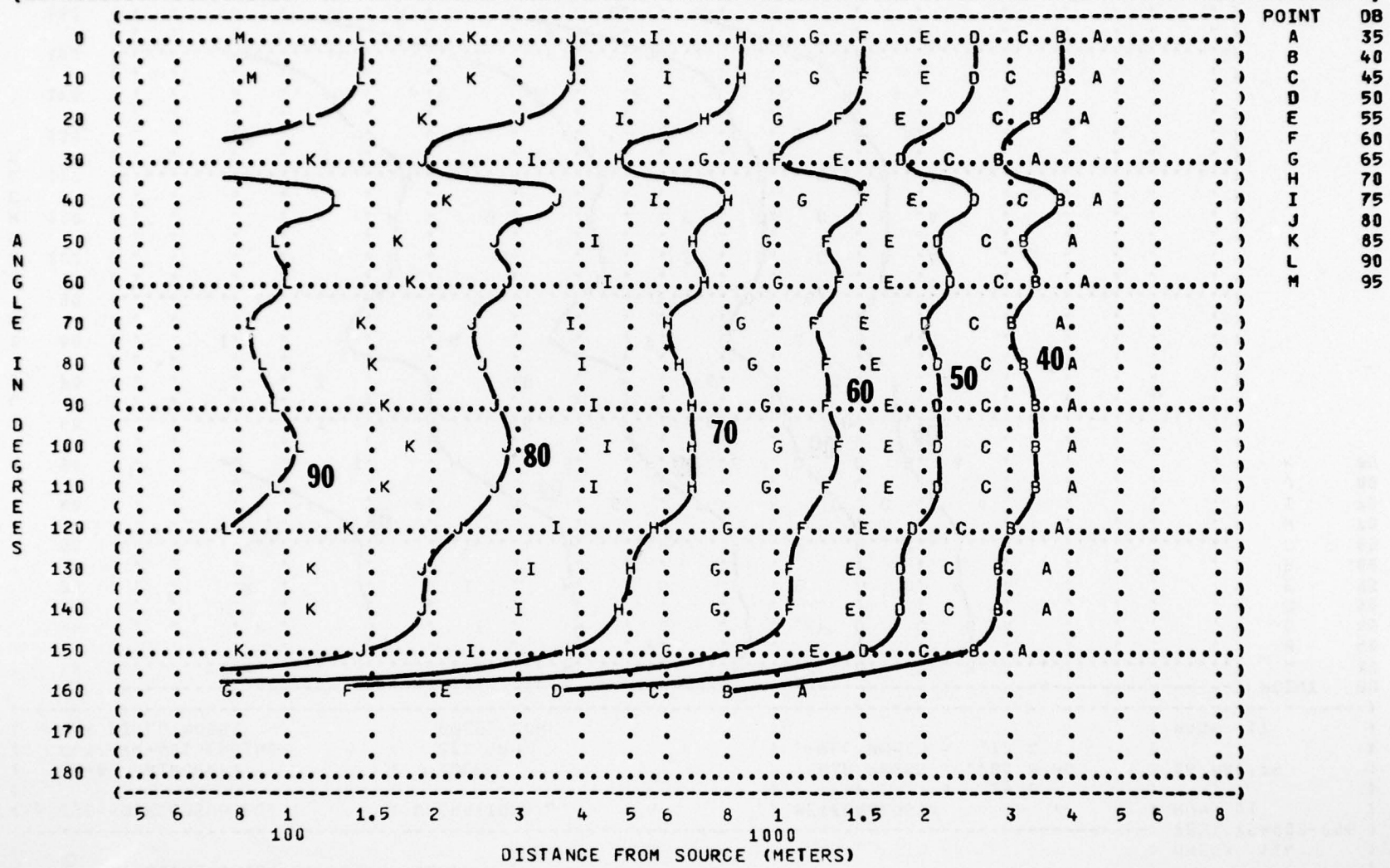
FIGURE 8: PREFERRED SPEECH INTERFERENCE LEVEL (PSIL) EQUAL LEVEL CONTOURS (DB)

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 02
06 MAY 75
PAGE 17

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
55% RPM
FREE FLOW

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



POINT	DB
A	35
B	40
C	45
D	50
E	55
F	60
G	65
H	70
I	75
J	80
K	85
L	90
M	95

FIGURE 8 PREFERRED SPEECH INTERFERENCE LEVEL (PSIL) EQUAL LEVEL CONTOURS (DB)

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 03
06 MAY 75
PAGE 17

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
50 FOOT HOVER
98% RPM

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

POINT	DB
A	35
B	40
C	45
D	50
E	55
F	60
G	65
H	70
I	75
J	80
K	85
L	90
M	95
N	100
O	105
P	110

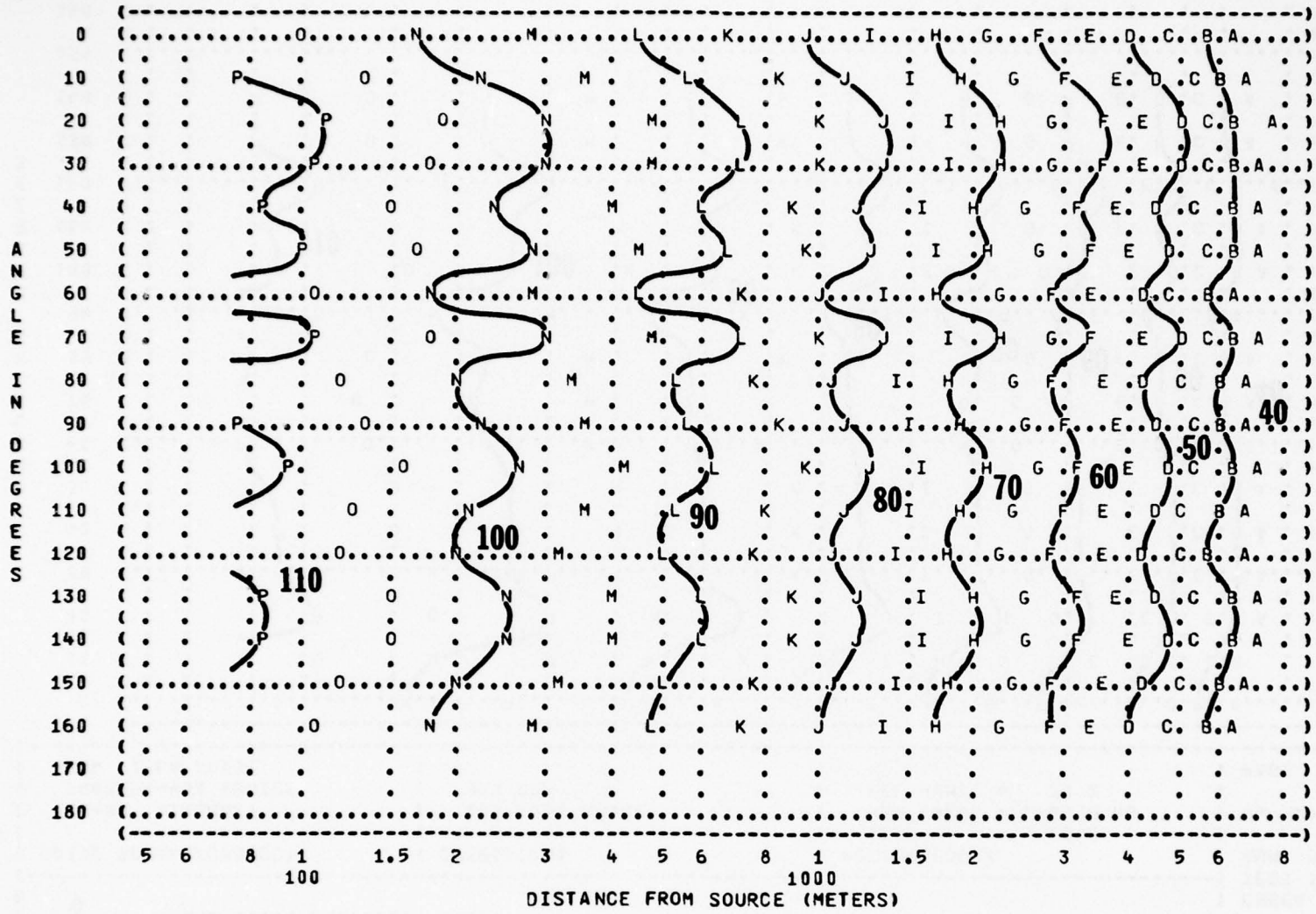


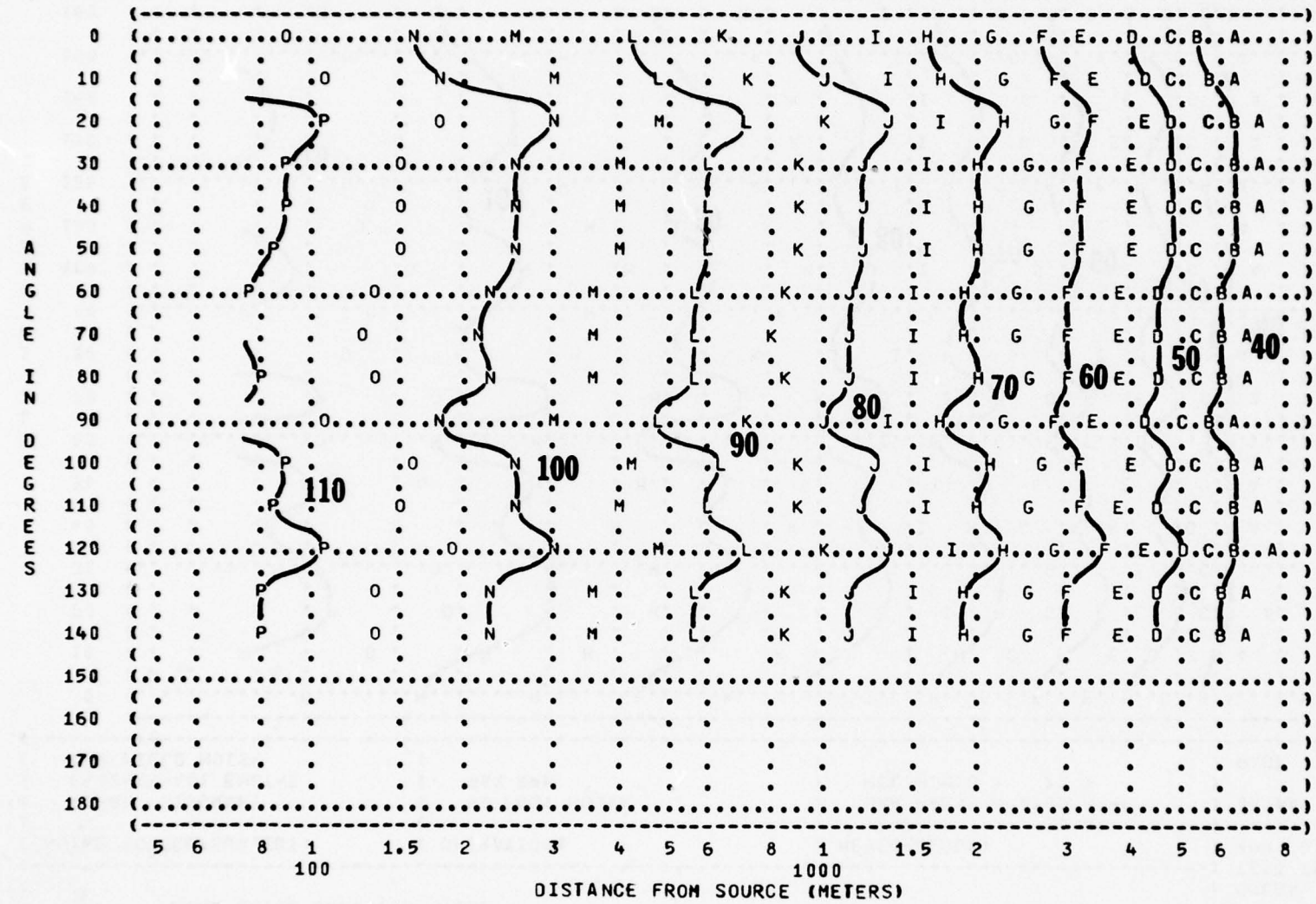
FIGURE 8: PREFERRED SPEECH INTERFERENCE LEVEL (PSIL) EQUAL LEVEL CONTOURS (DB)

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 04
06 MAY 75
PAGE 17

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
100 FOOT HOVER
95% RPM

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



POINT	DB
A	35
B	40
C	45
D	50
E	55
F	60
G	65
H	70
I	75
J	80
K	85
L	90
M	95
N	100
O	105
P	110

FIGURE 9: MAXIMUM PERMISSIBLE TIME (T) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)
EQUAL TIME CONTOURS (MINUTES)
NO PROTECTION

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 01
06 MAY 75
PAGE 7

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
IDLE
27% RPM
FREE FLOW

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

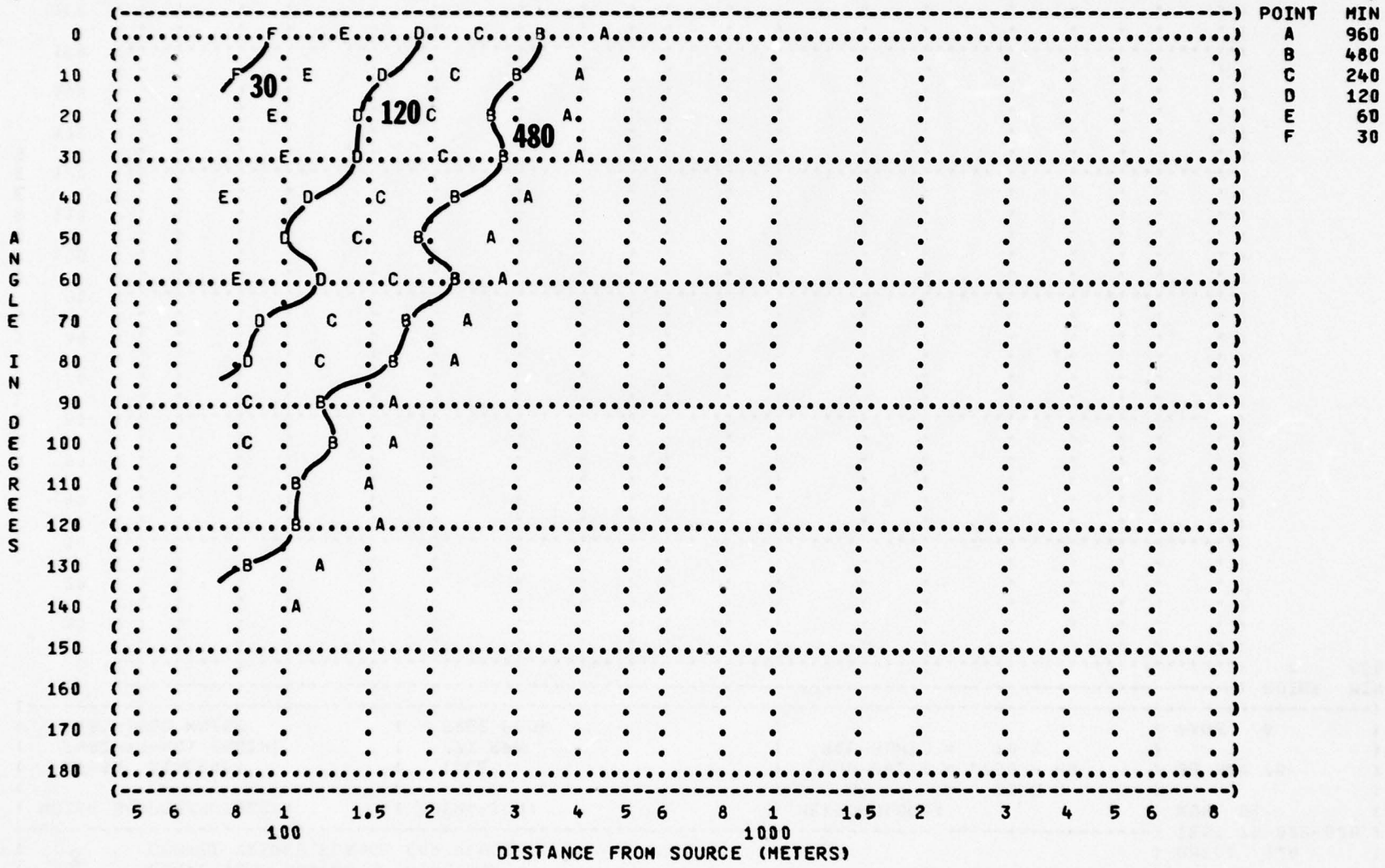


FIGURE 9: MAXIMUM PERMISSIBLE TIME (T) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)
EQUAL TIME CONTOURS (MINUTES)
COMFIT TRIPLE FLANGE EAR PLUGS

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 01
06 MAY 75
PAGE 8

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
IDLE
27% RPM
FREE FLOW

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

POINT MIN
A 960

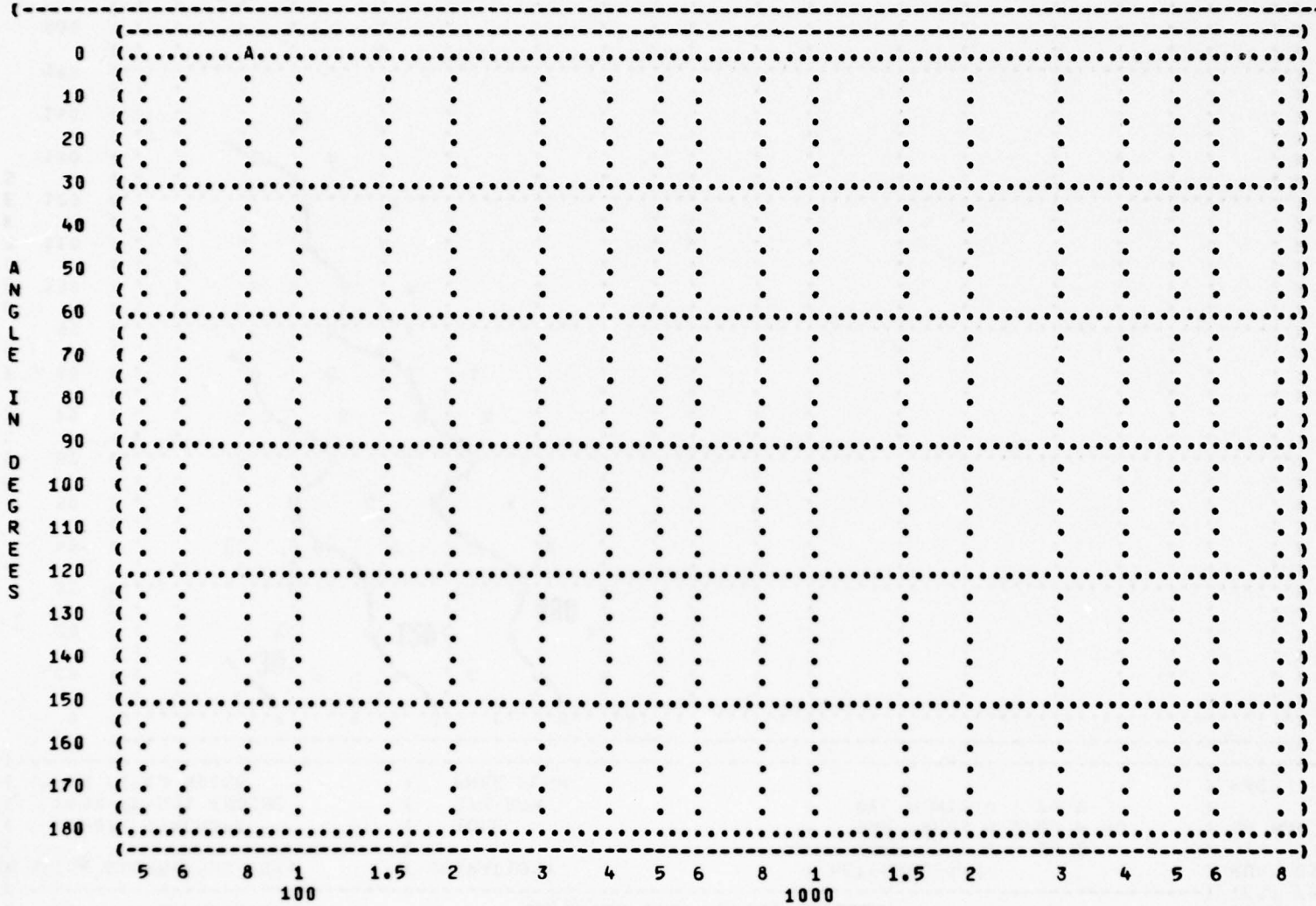


FIGURE 9 MAXIMUM PERMISSIBLE TIME (T) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)
EQUAL TIME CONTOURS (MINUTES)

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 01
06 MAY 75
PAGE 9

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
IDLE
27% RPM
FREE FLOW

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

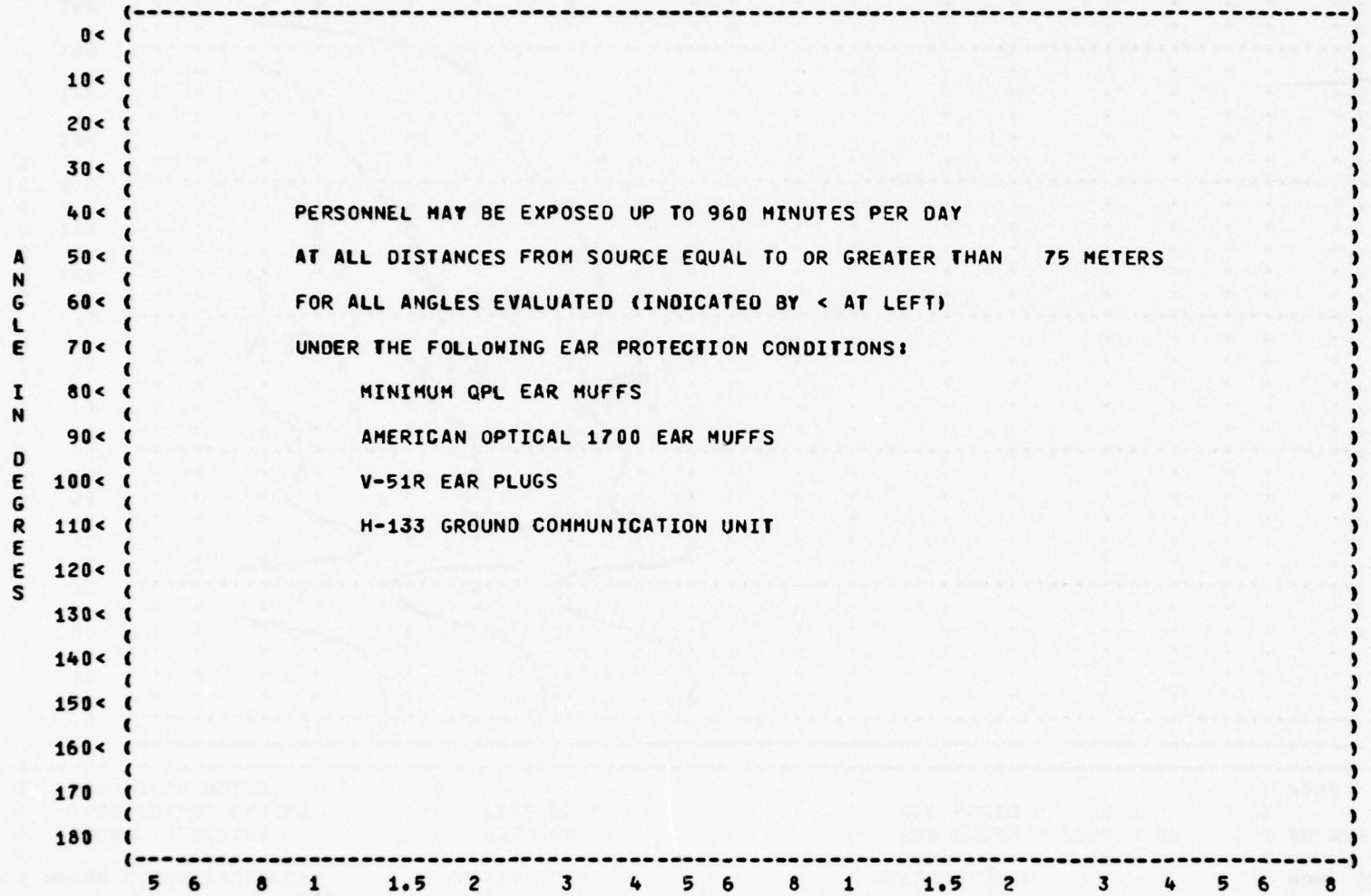


FIGURE 9: MAXIMUM PERMISSIBLE TIME (T) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)
EQUAL TIME CONTOURS (MINUTES)
NO PROTECTION

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 02
06 MAY 75
PAGE 7

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
55% RPM
FREE FLOW

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

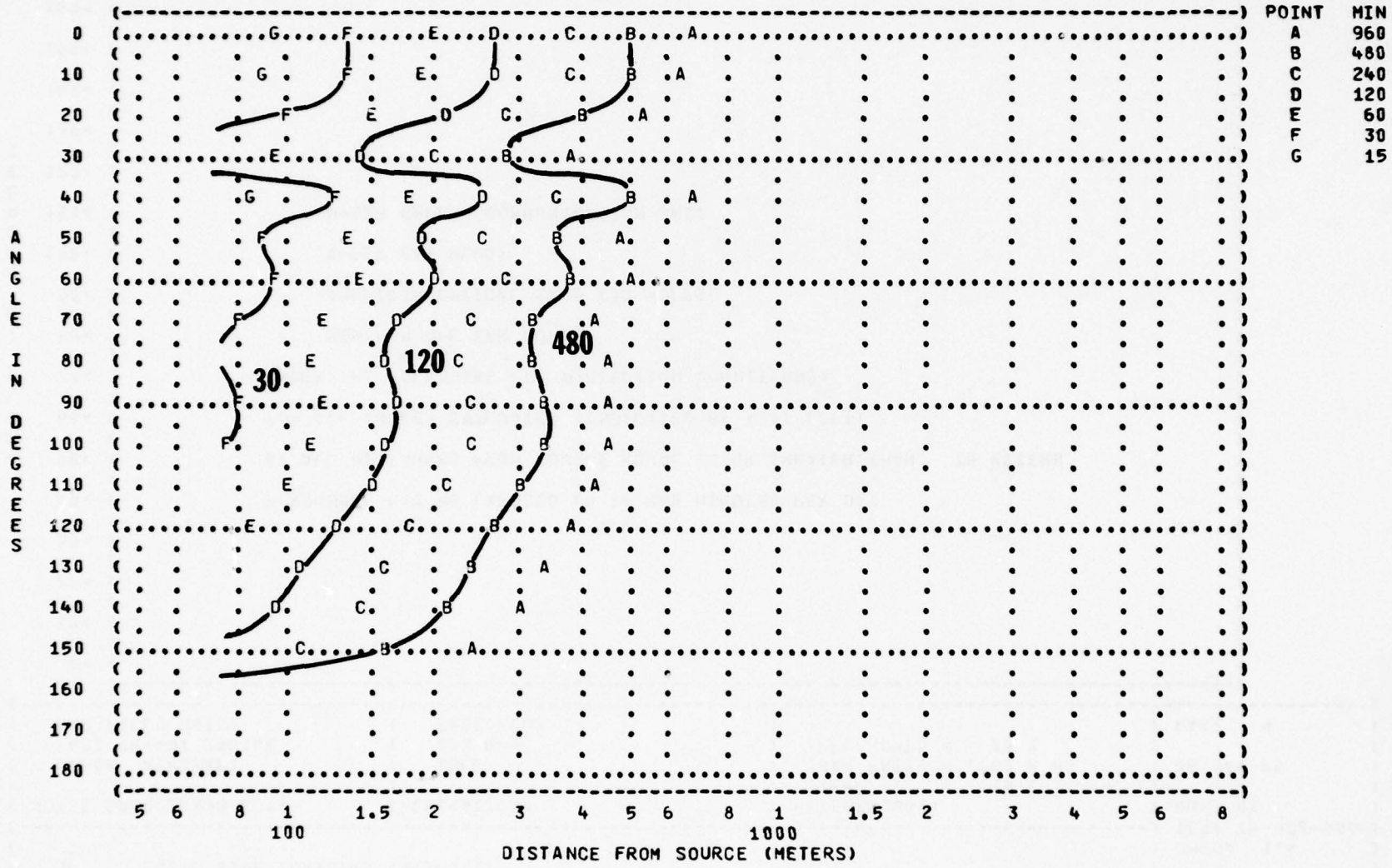


FIGURE 9: MAXIMUM PERMISSIBLE TIME (T) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)
EQUAL TIME CONTOURS (MINUTES)
COMFIT TRIPLE FLANGE EAR PLUGS

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 02
06 MAY 75
PAGE 8

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
55% RPM
FREE FLOW

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

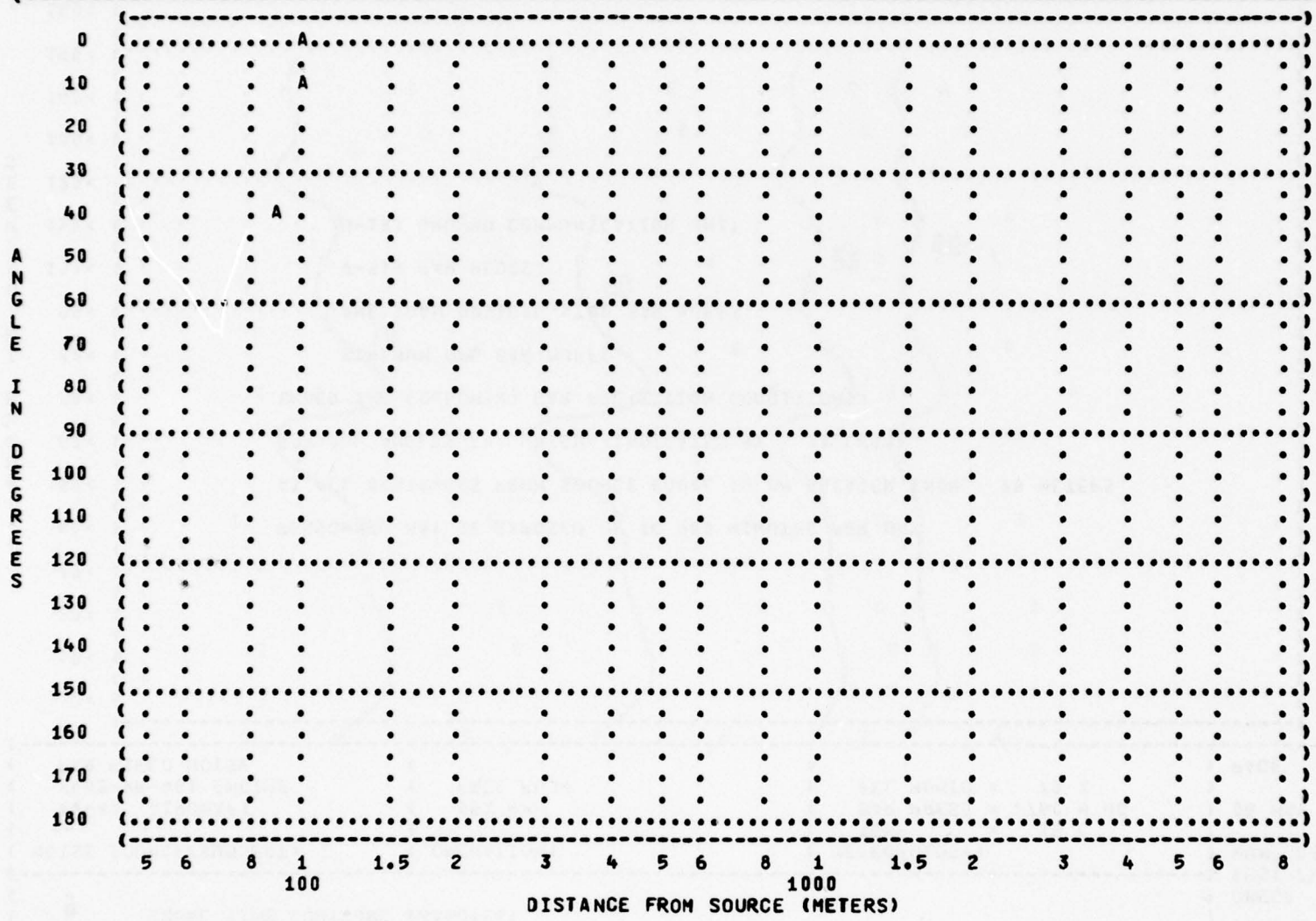


FIGURE 9 MAXIMUM PERMISSIBLE TIME (T) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)
EQUAL TIME CONTOURS (MINUTES)

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 02
06 MAY 75
PAGE 9

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
55% RPM
FREE FLOW

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

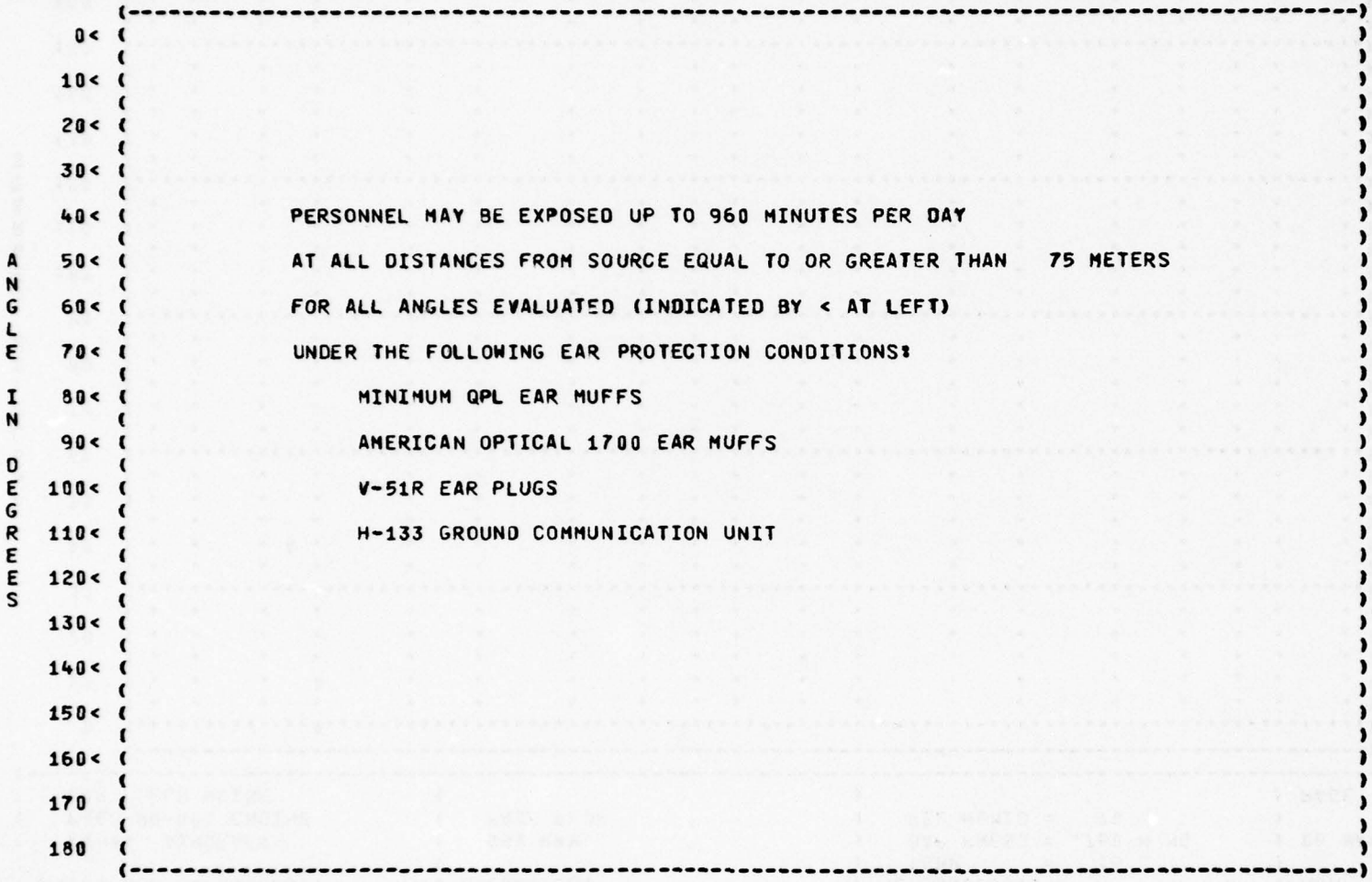


FIGURE: 10 SOUND PRESSURE LEVEL (SPL) EQUAL LEVEL CONTOURS (DB) 31.5 HZ OCTAVE BAND

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 01
06 MAY 75
PAGE 18

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
IDLE
27% RPM
FREE FLOW

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

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

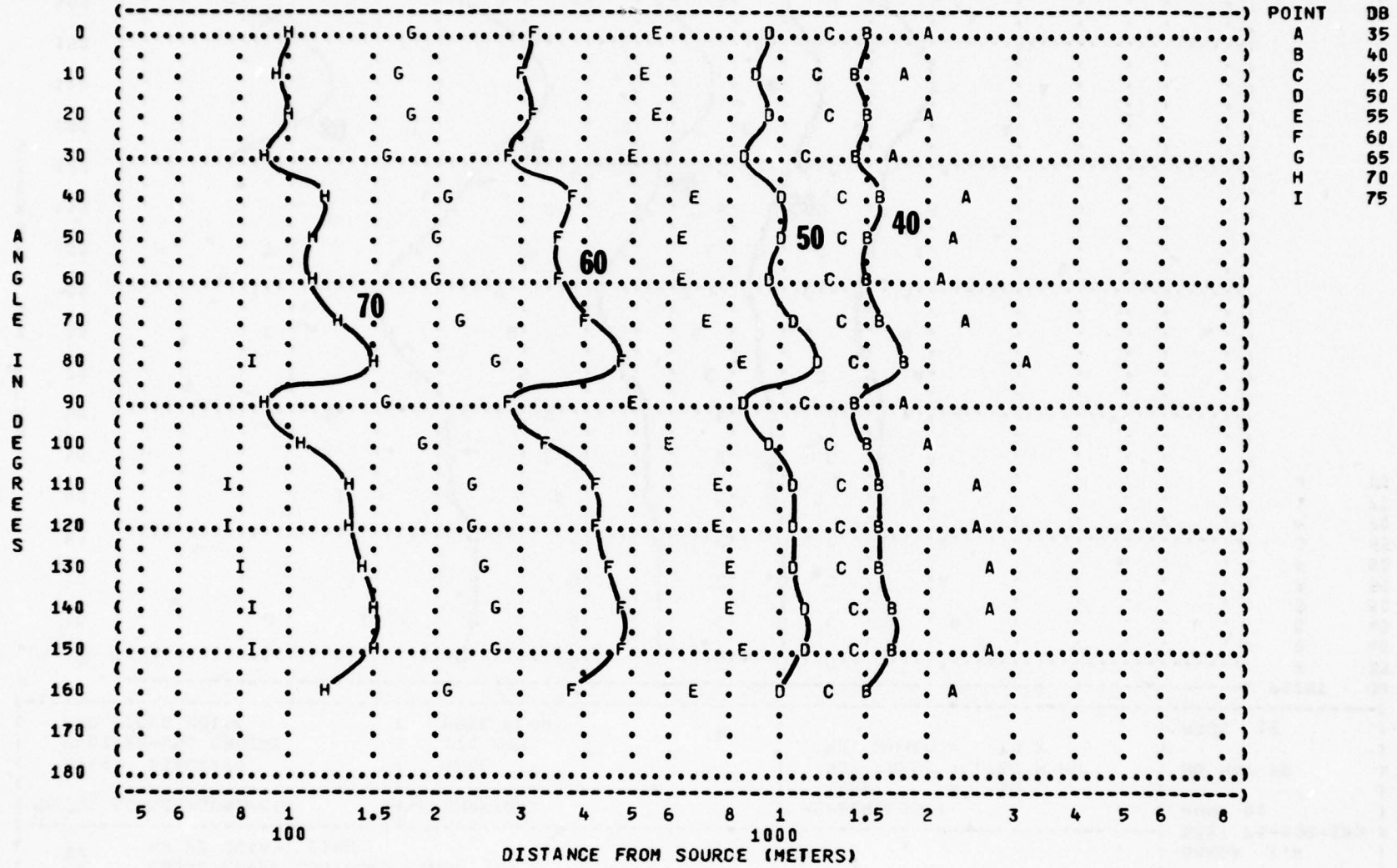


FIGURE: 10

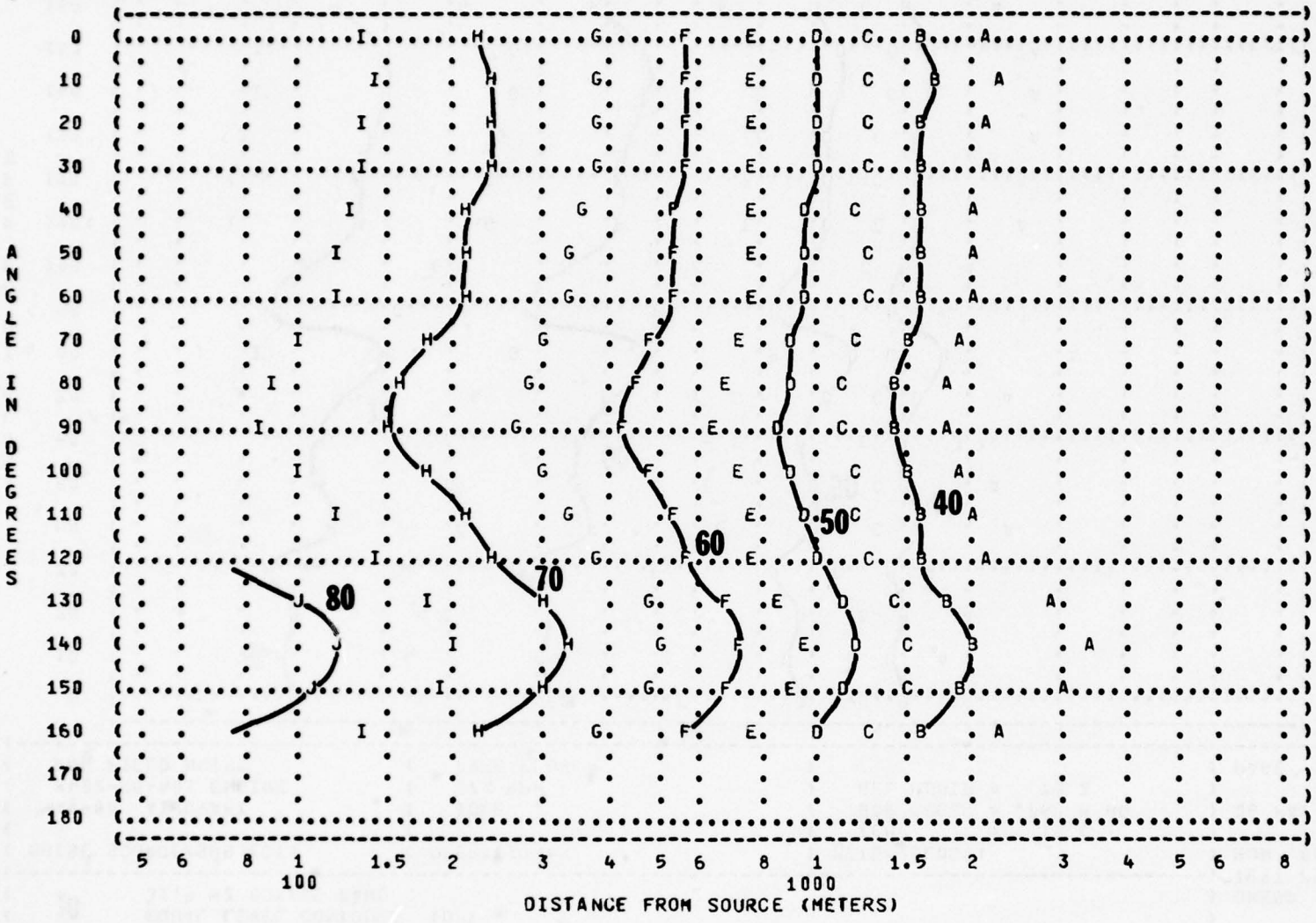
SOUND PRESSURE LEVEL (SPL)
EQUAL LEVEL CONTOURS (DB)
63 HZ OCTAVE BAND

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
IDLE
27% RPM
FREE FLOW

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 01
06 MAY 75
PAGE 19



POINT	DB
A	35
B	40
C	45
D	50
E	55
F	60
G	65
H	70
I	75
J	80

FIGURE: 10

SOUND PRESSURE LEVEL (SPL)
EQUAL LEVEL CONTOURS (DB)
125 HZ OCTAVE BAND

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
IDLE
27% RPM
FREE FLOW

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 01
06 MAY 75
PAGE 20

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

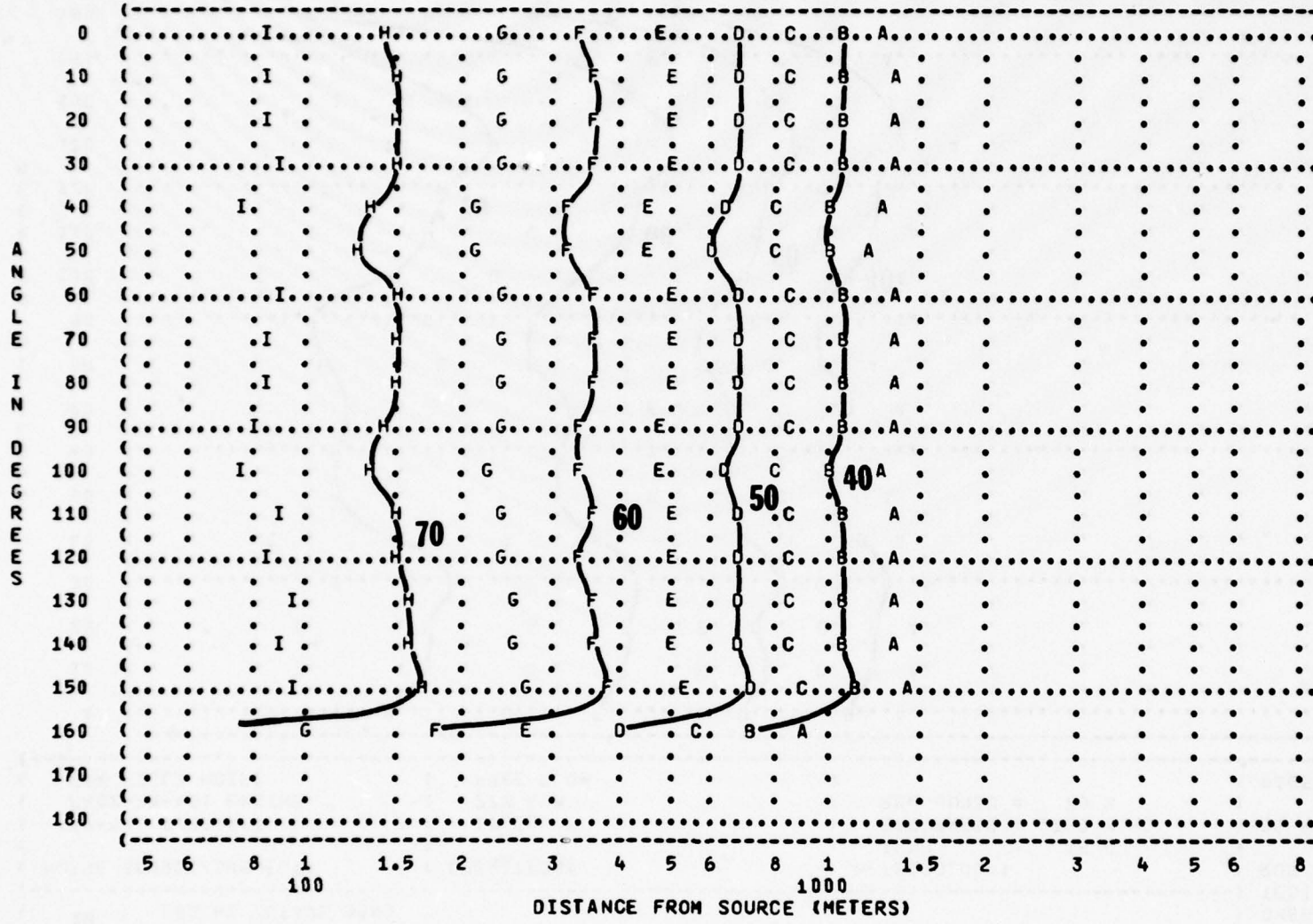


FIGURE: 10

SOUND PRESSURE LEVEL (SPL)
EQUAL LEVEL CONTOURS (DB)
250 HZ OCTAVE BAND

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
IDLE
27% RPM
FREE FLOW

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 01
06 MAY 75
PAGE 21

POINT	DB
A	35
B	40
C	45
D	50
E	55
F	60
G	65
H	70
I	75
J	80

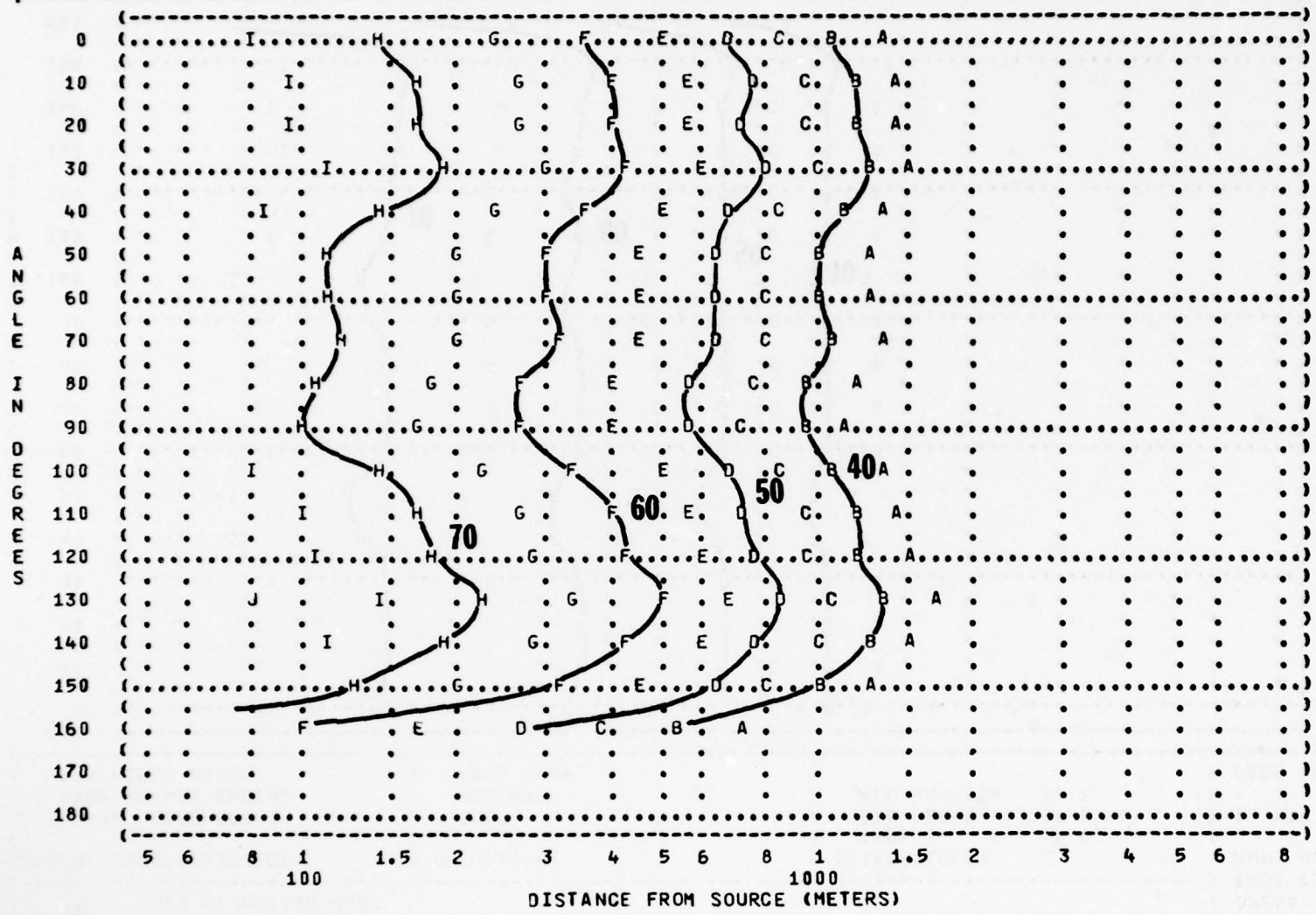


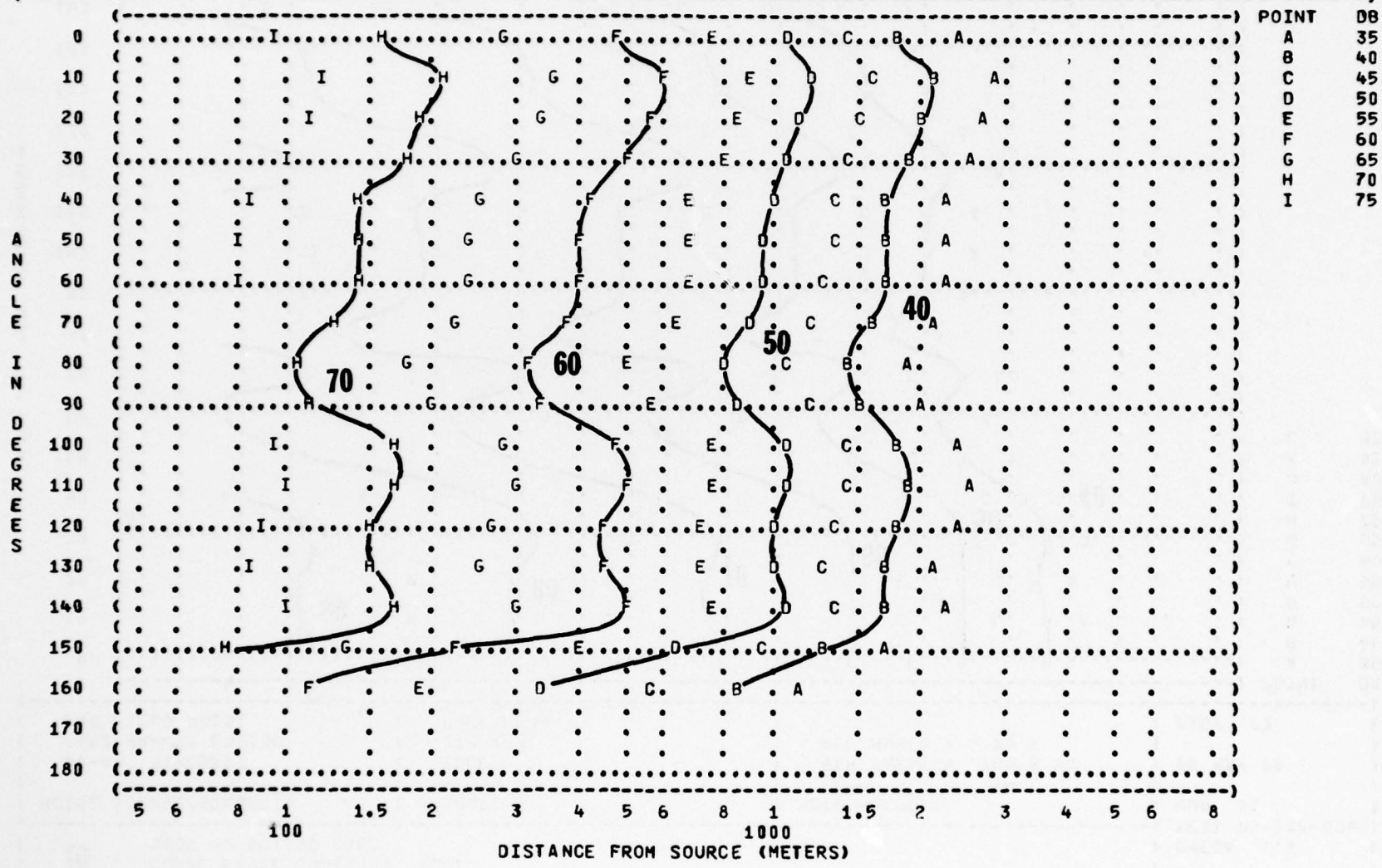
FIGURE: 10 SOUND PRESSURE LEVEL (SPL) EQUAL LEVEL CONTOURS (DB) 500 HZ OCTAVE BAND

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 01
06 MAY 75
PAGE 22

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
IDLE
27% RPM
FREE FLOW

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



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

FIGURE: 10

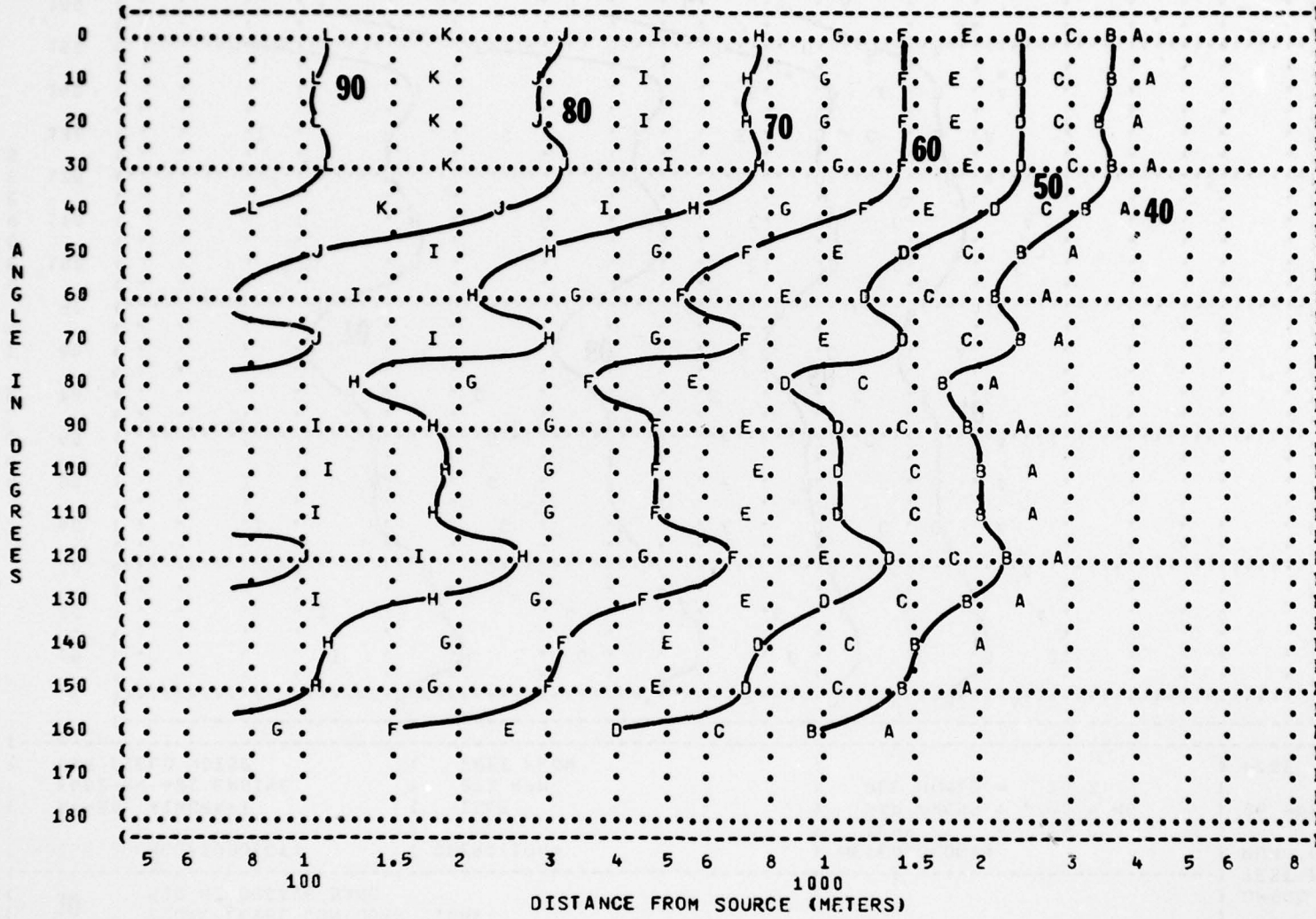
SOUND PRESSURE LEVEL (SPL)
EQUAL LEVEL CONTOURS (DB)
1000 HZ OCTAVE BAND

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
IDLE
27% RPM
FREE FLOW

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 01
06 MAY 75
PAGE 23



POINT	DB
A	35
B	40
C	45
D	50
E	55
F	60
G	65
H	70
I	75
J	80
K	85
L	90

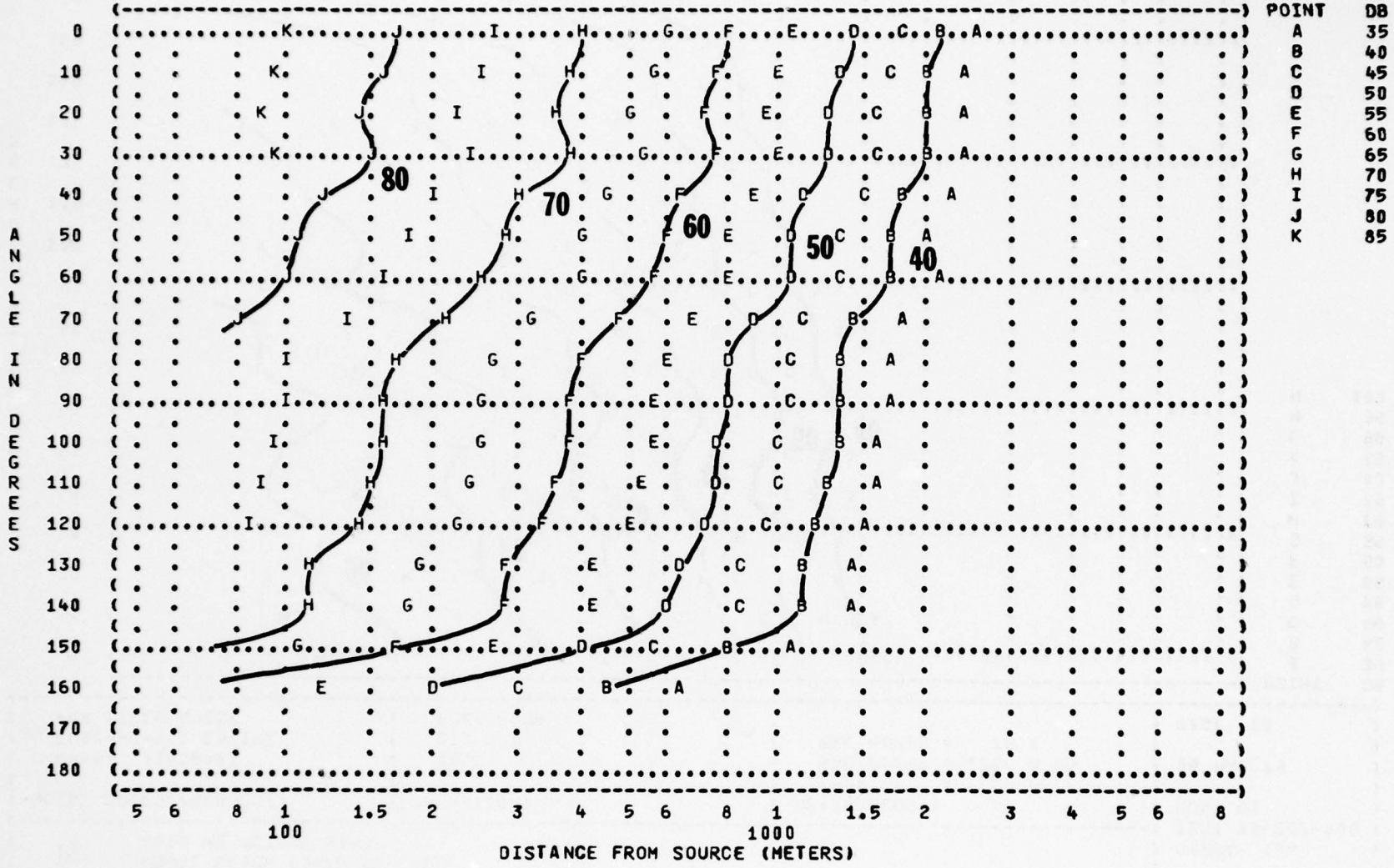
FIGURE 10 SOUND PRESSURE LEVEL (SPL) EQUAL LEVEL CONTOURS (DB) 2000 HZ OCTAVE BAND

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
IDLE
27% RPM
FREE FLOW

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 01
06 MAY 75
PAGE 24



POINT	DB
A	35
B	40
C	45
D	50
E	55
F	60
G	65
H	70
I	75
J	80
K	85

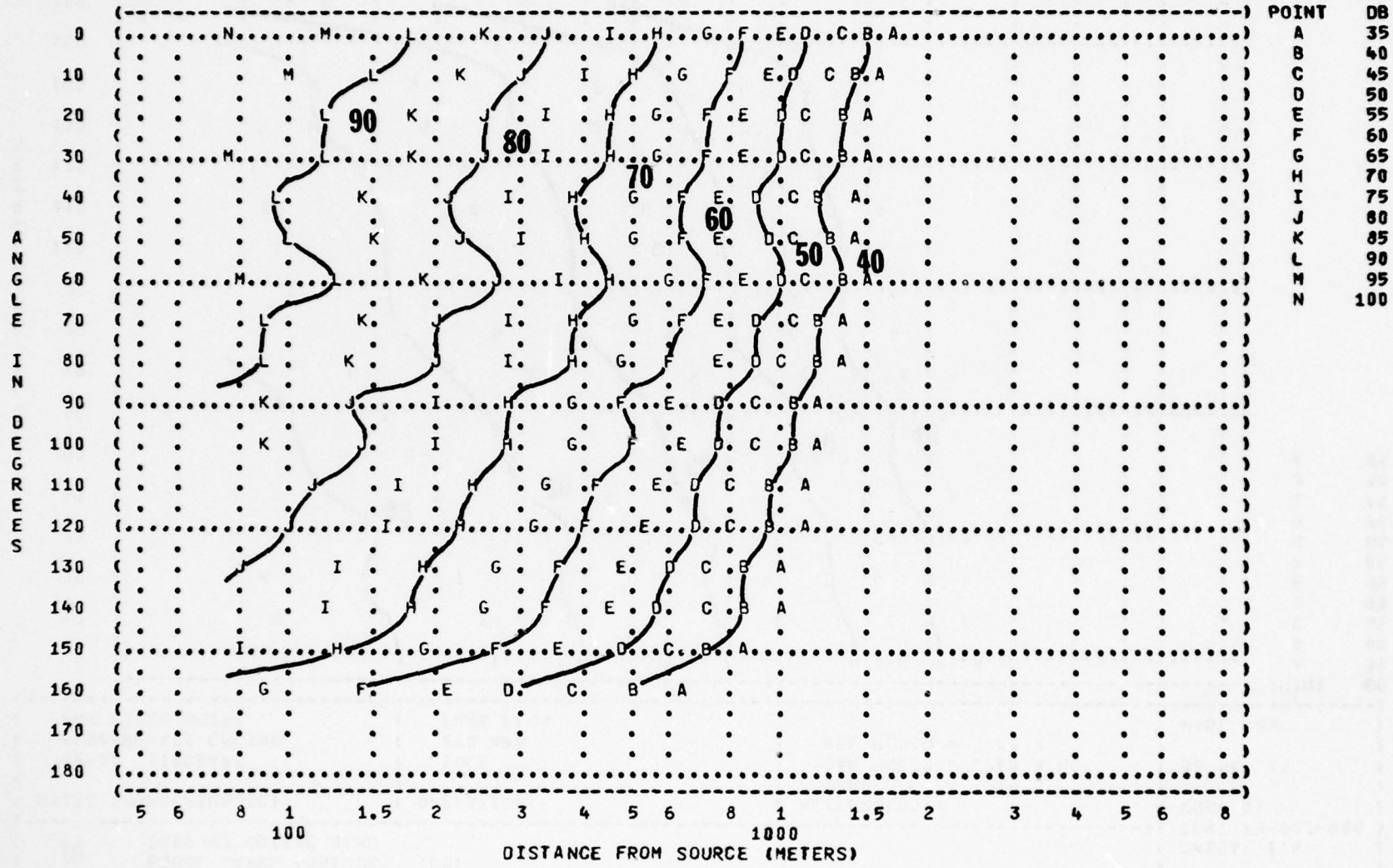
FIGURE: 10 SOUND PRESSURE LEVEL (SPL)
EQUAL LEVEL CONTOURS (DB)
4000 HZ OCTAVE BAND

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
IDLE
27% RPM
FREE FLOW

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 01
06 MAY 75
PAGE 25



POINT	DB
A	35
B	40
C	45
D	50
E	55
F	60
G	65
H	70
I	75
J	80
K	85
L	90
M	95
N	100

FIGURE 10: SOUND PRESSURE LEVEL (SPL) EQUAL LEVEL CONTOURS (DB) 8000 HZ OCTAVE BAND

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
IDLE
27% RPM
FREE FLOW

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 01
06 MAY 75
PAGE 26

POINT	DB
A	35
B	40
C	45
D	50
E	55
F	60
G	65
H	70
I	75
J	80
K	85

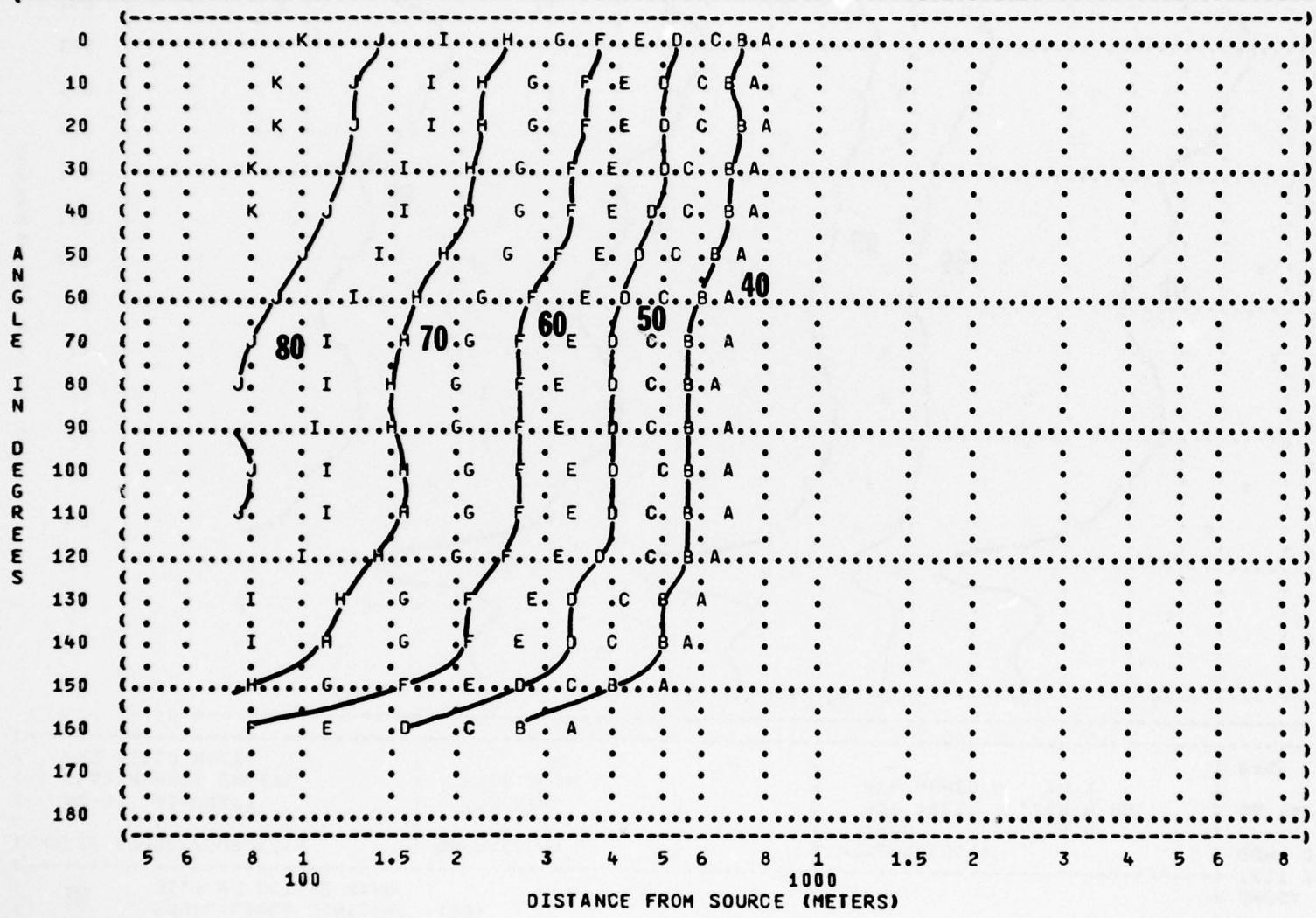


FIGURE 10: SOUND PRESSURE LEVEL (SPL) EQUAL LEVEL CONTOURS (DB) 31.5 HZ OCTAVE BAND

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
55% RPM
FREE FLOW

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 02
06 MAY 75
PAGE 18

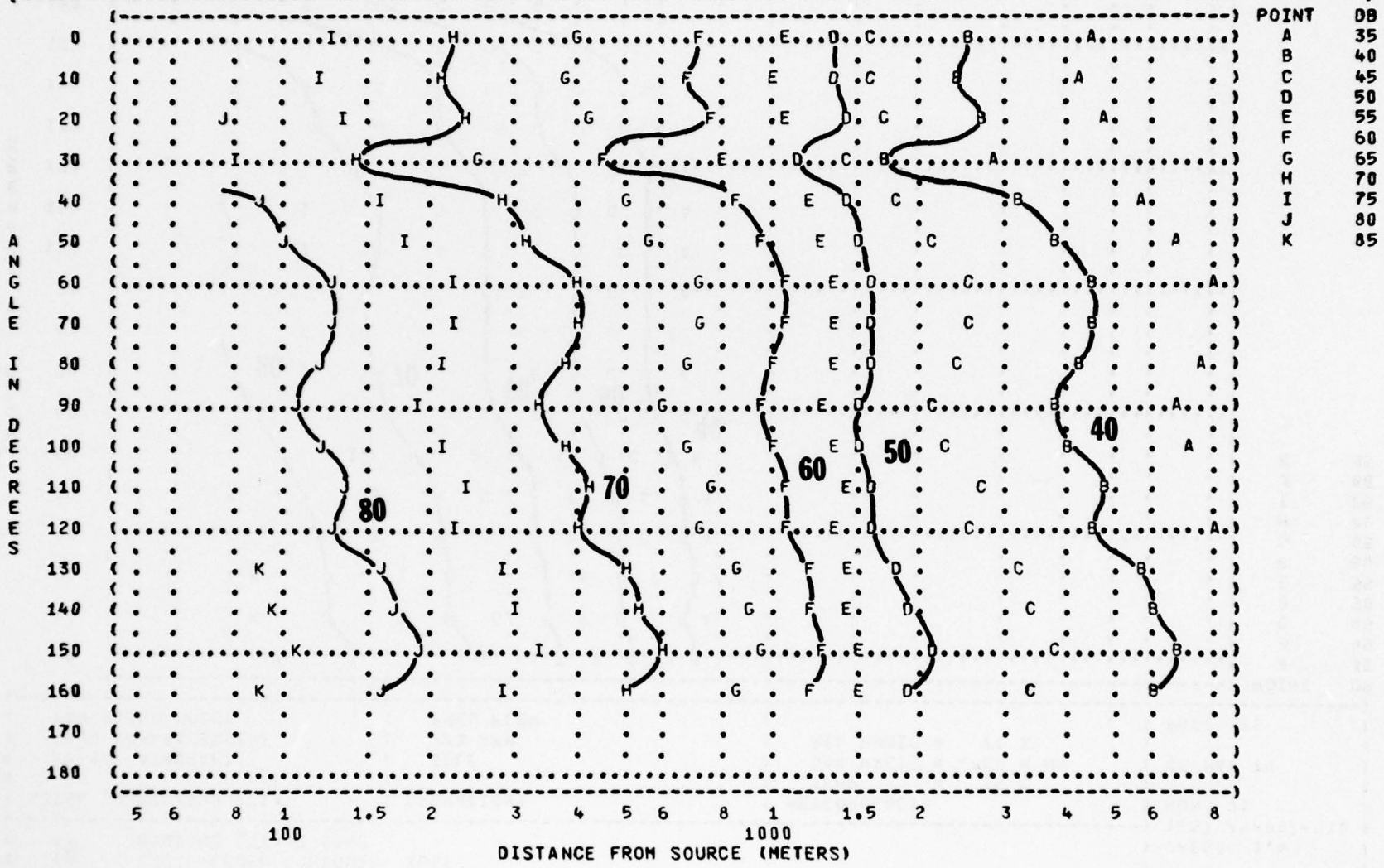


FIGURE: 10

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 02
06 MAY 75
PAGE 19

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
55% RPM
FREE FLOW

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

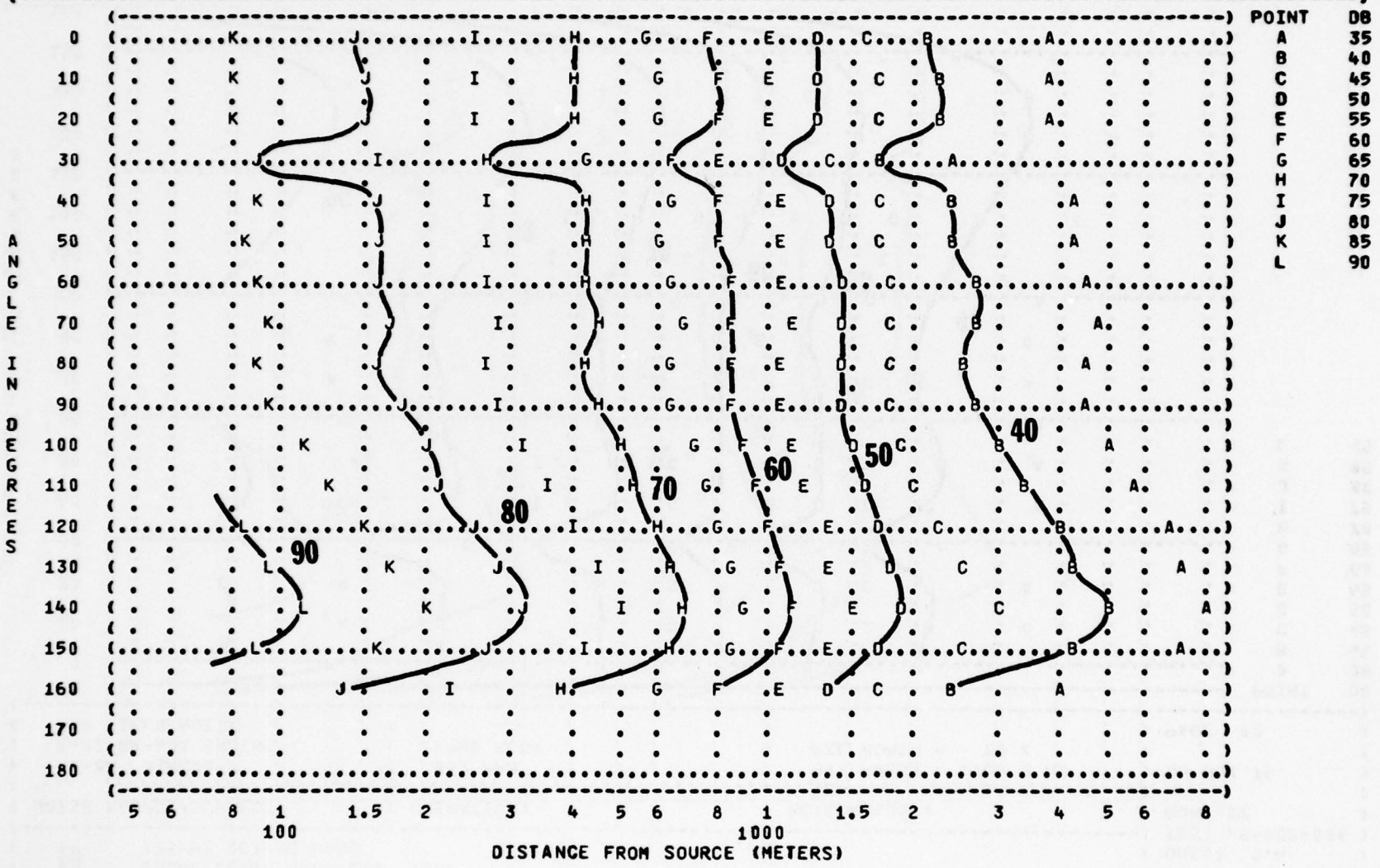


FIGURE 10: SOUND PRESSURE LEVEL (SPL) EQUAL LEVEL CONTOURS (DB) 125 HZ OCTAVE BAND

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 02
06 MAY 75
PAGE 20

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
55% RPM
FREE FLOW

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

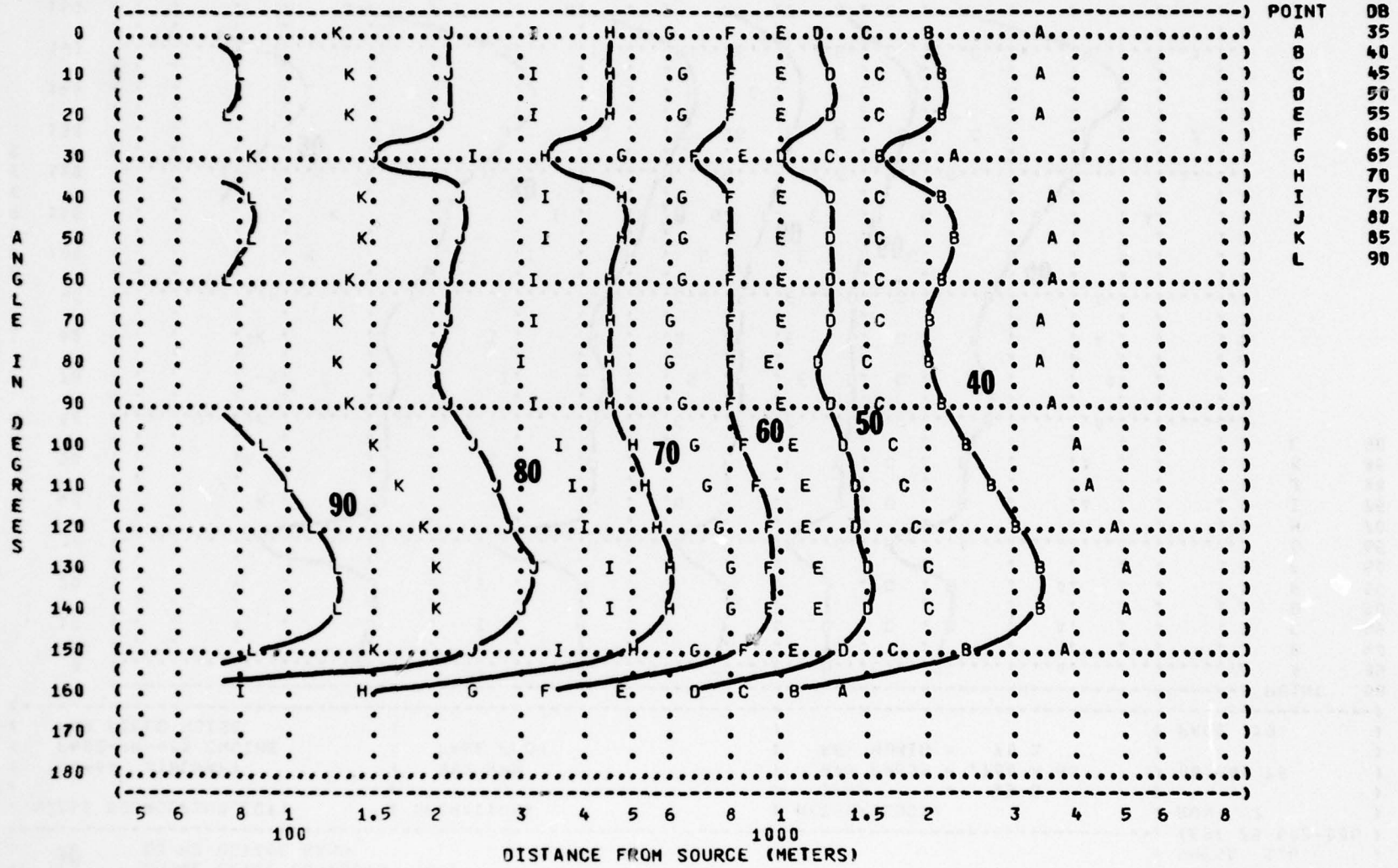


FIGURE: 10

SOUND PRESSURE LEVEL (SPL)
EQUAL LEVEL CONTOURS (DB)
250 HZ OCTAVE BAND

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
55% RPM
FREE FLOW

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 02
06 MAY 75
PAGE 21

POINT	DB
A	35
B	40
C	45
D	50
E	55
F	60
G	65
H	70
I	75
J	80
K	85
L	90

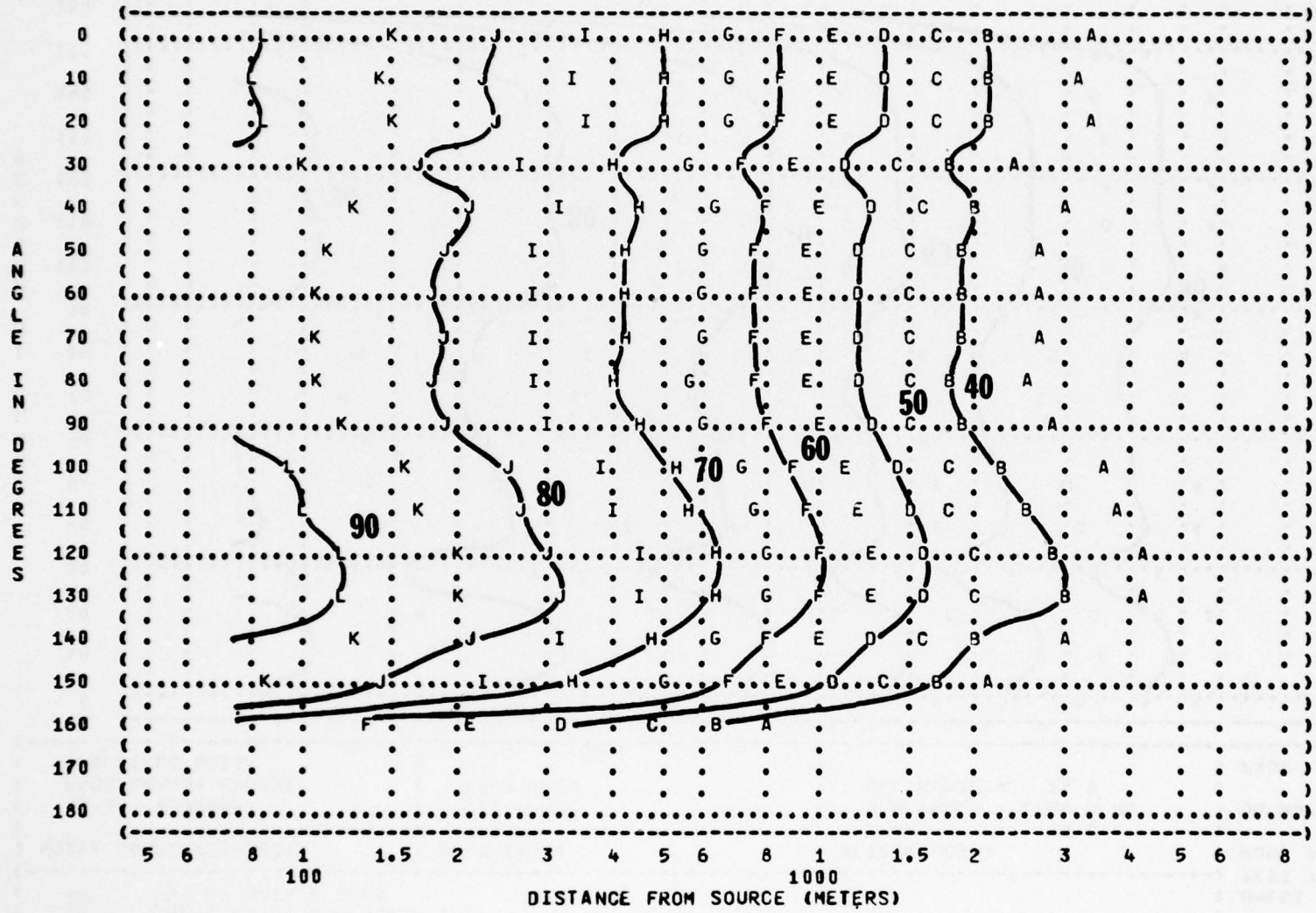


FIGURE: 10

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

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
55% RPM
FREE FLOW

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 02
06 MAY 75
PAGE 22

POINT	DB
A	35
B	40
C	45
D	50
E	55
F	60
G	65
H	70
I	75
J	80
K	85
L	90

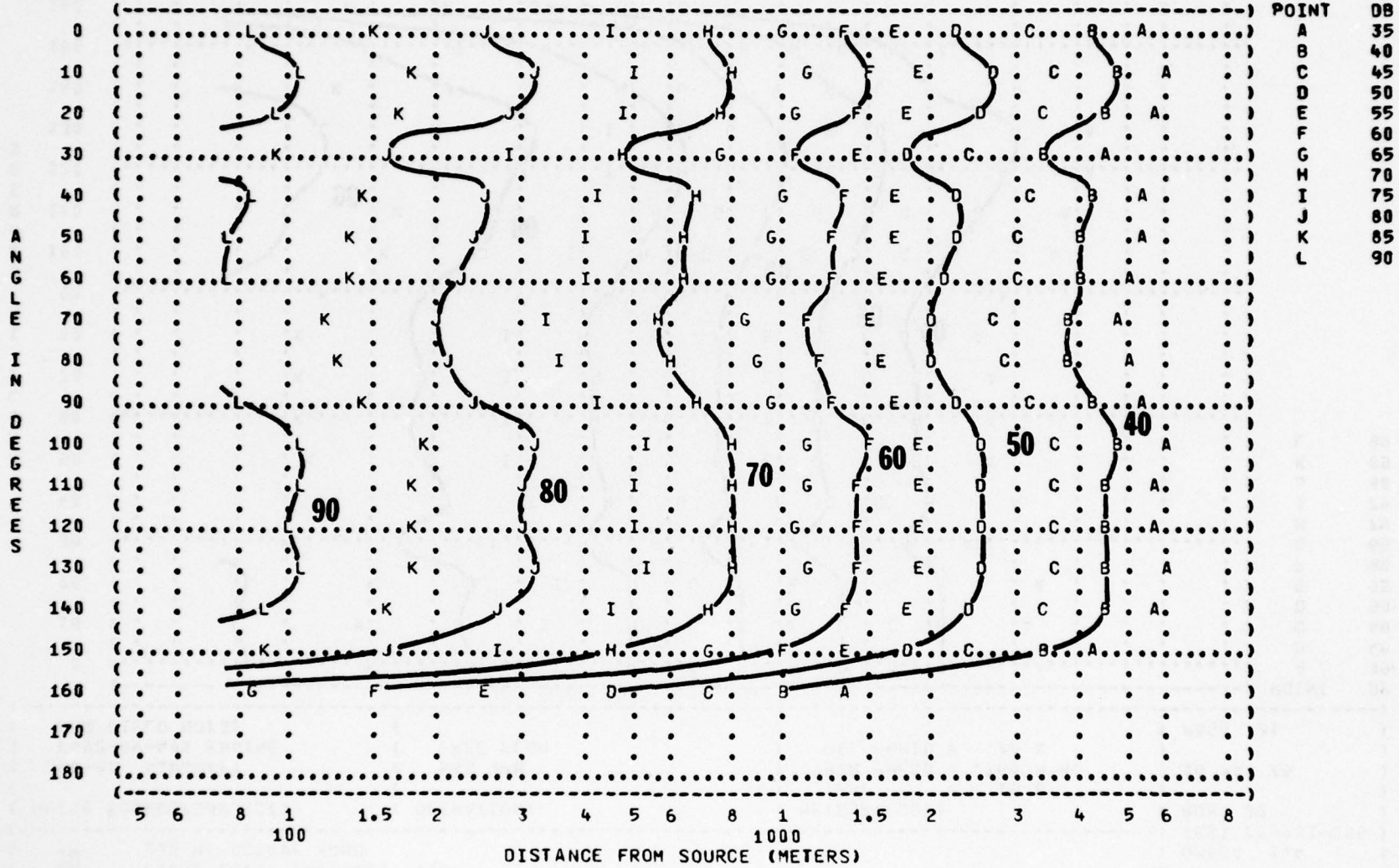


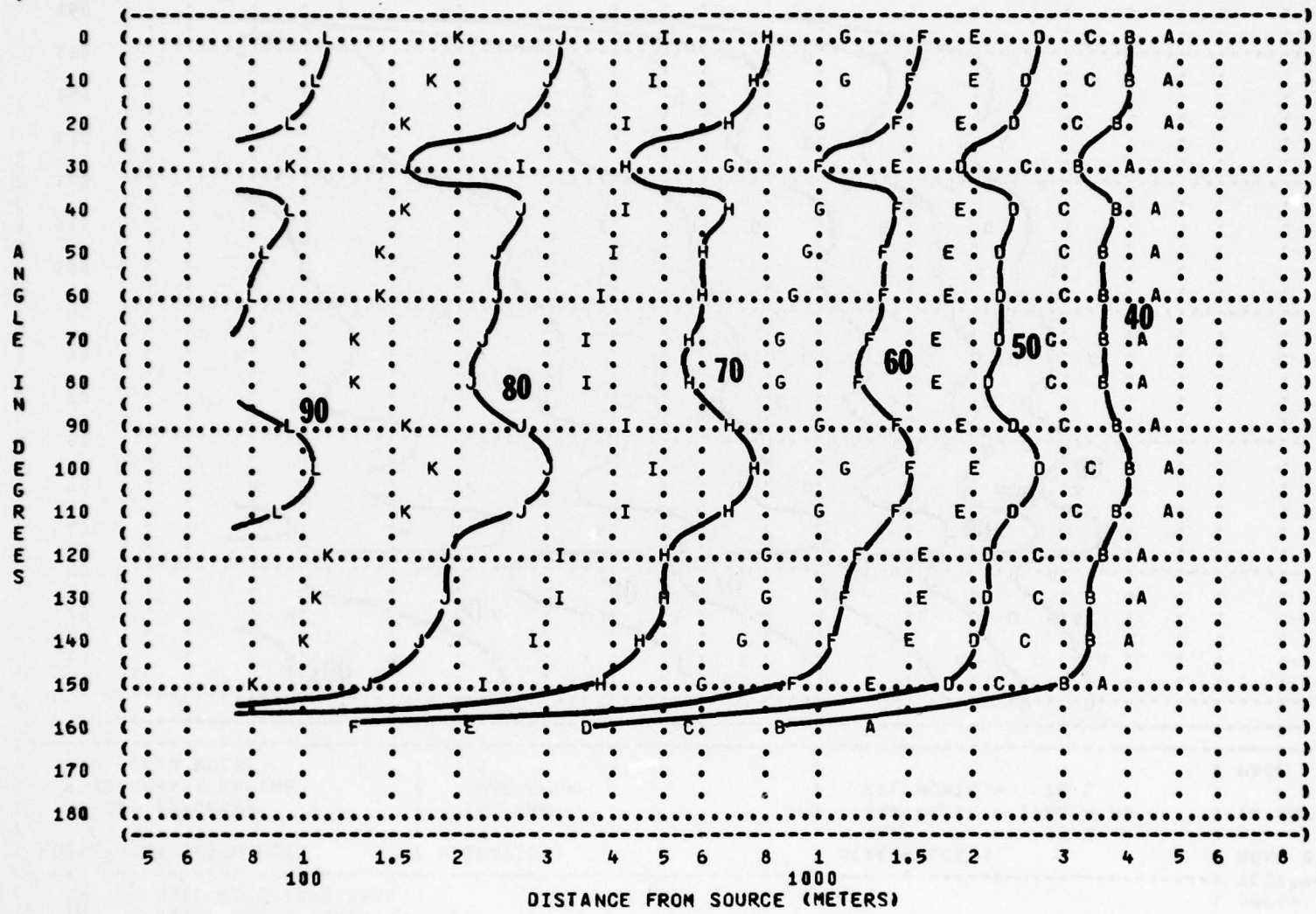
FIGURE 10: SOUND PRESSURE LEVEL (SPL) EQUAL LEVEL CONTOURS (DB) 1000 HZ OCTAVE BAND

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
55% RPM
FREE FLOW

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 02
06 MAY 75
PAGE 23



POINT	DB
A	35
B	40
C	45
D	50
E	55
F	60
G	65
H	70
I	75
J	80
K	85
L	90

FIGURE: 10

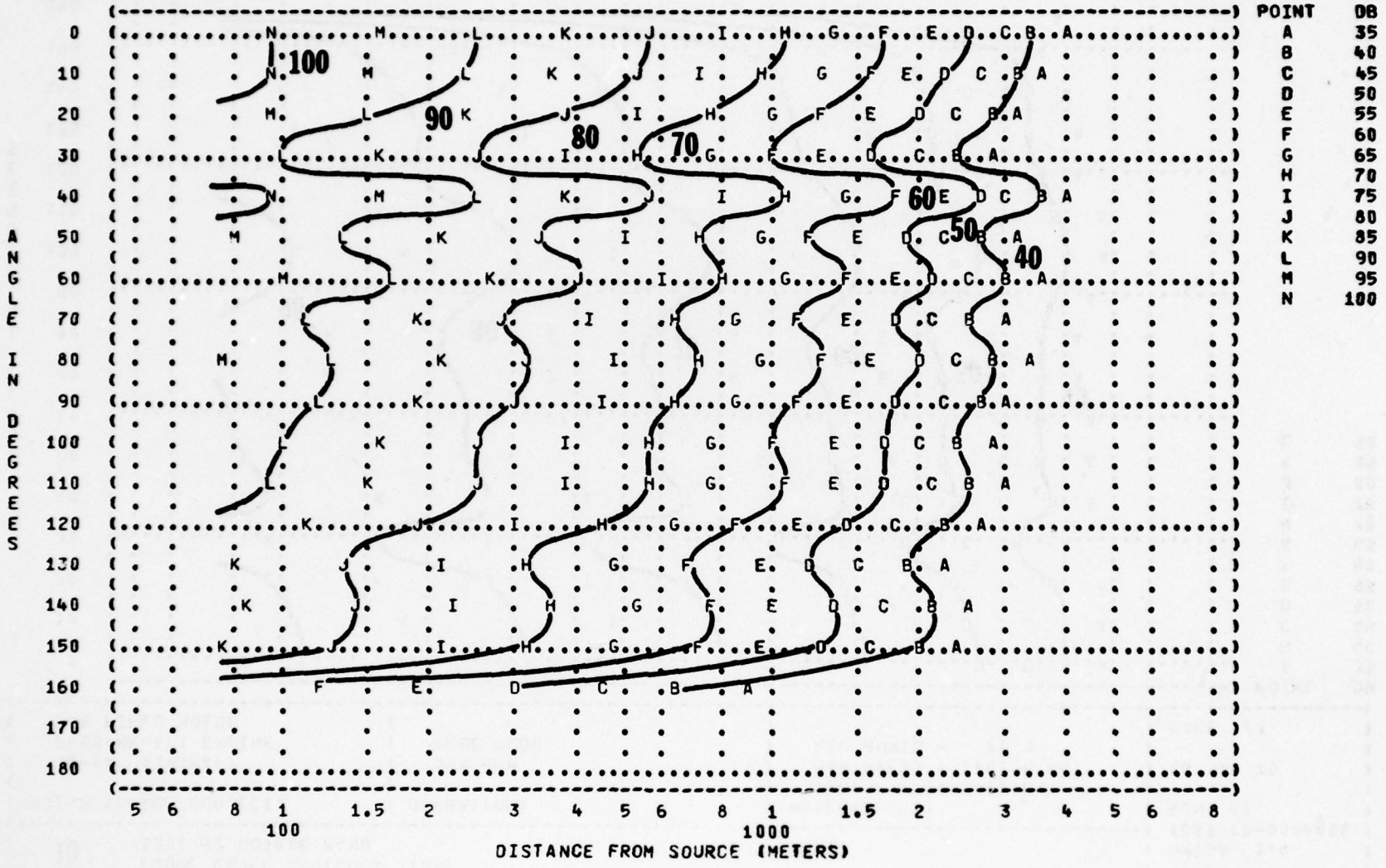
SOUND PRESSURE LEVEL (SPL)
EQUAL LEVEL CONTOURS (DB)
2000 HZ OCTAVE BAND

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
55% RPM
FREE FLOW

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 02
06 MAY 75
PAGE 24



POINT	DB
A	35
B	40
C	45
D	50
E	55
F	60
G	65
H	70
I	75
J	80
K	85
L	90
M	95
N	100

FIGURE: 10

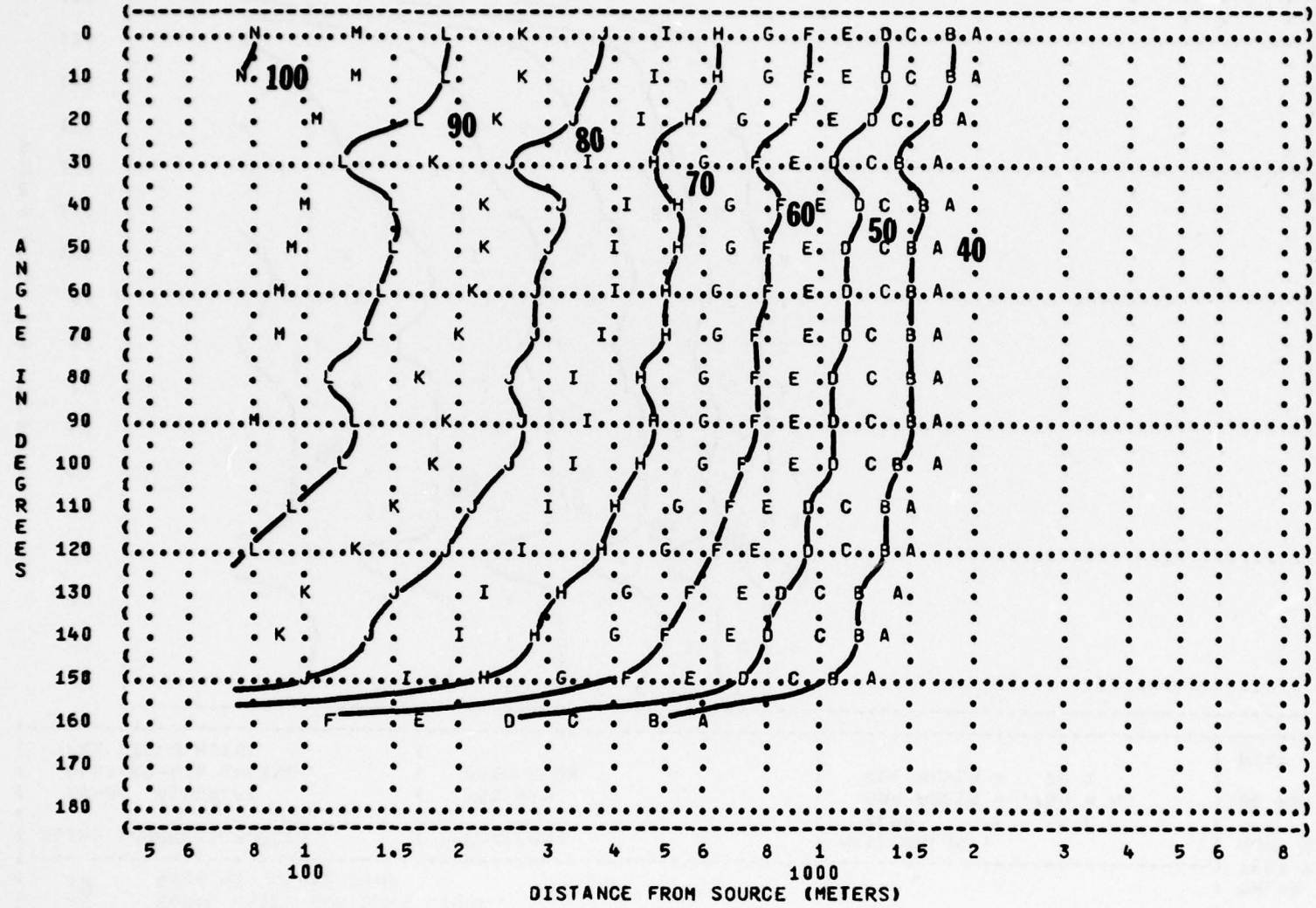
SOUND PRESSURE LEVEL (SPL)
EQUAL LEVEL CONTOURS (DB)
4000 HZ OCTAVE BAND

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
55% RPM
FREE FLOW

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 02
06 MAY 75
PAGE 25



POINT	DB
A	35
B	40
C	45
D	50
E	55
F	60
G	65
H	70
I	75
J	80
K	85
L	90
M	95
N	100

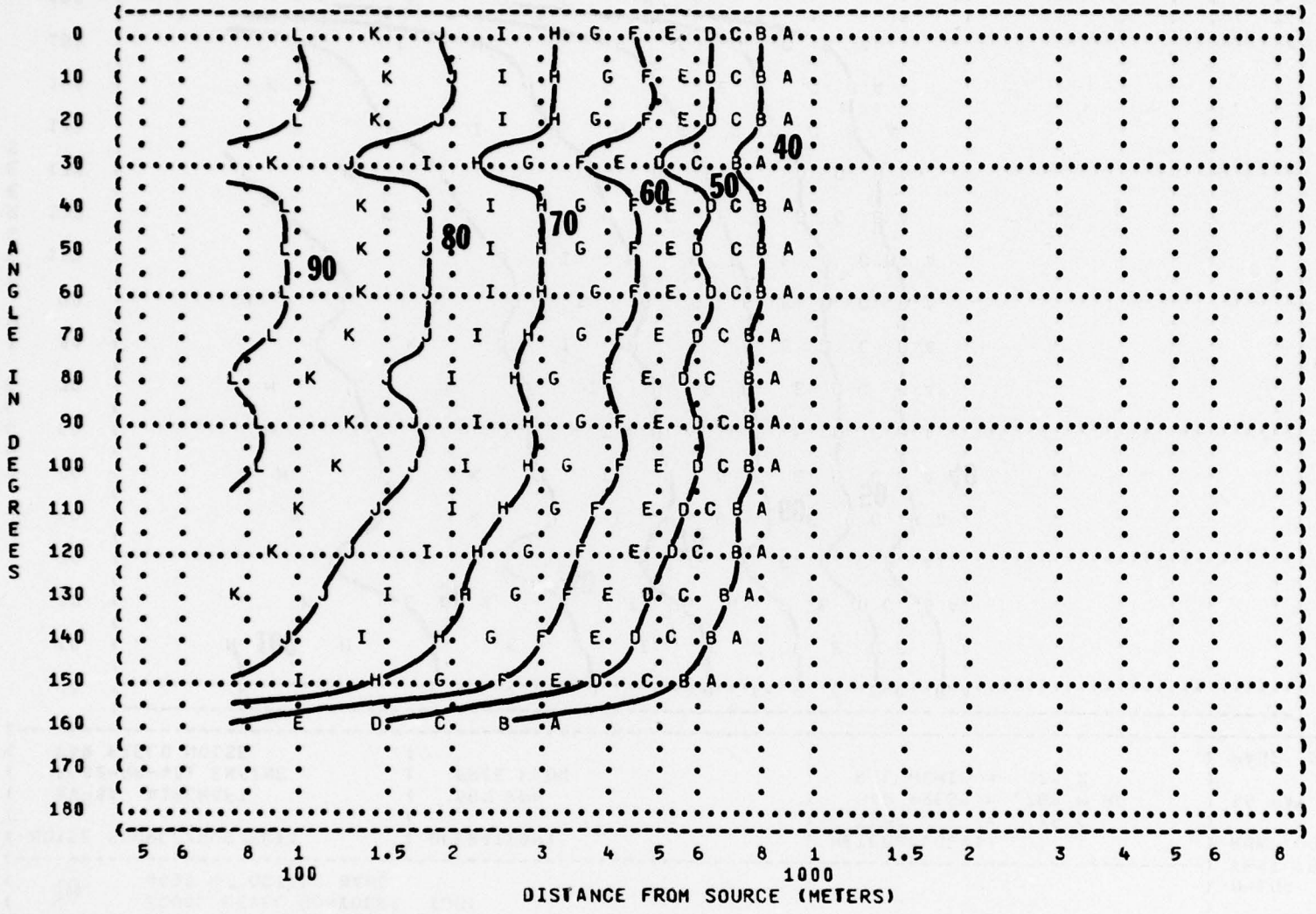
FIGURE 10 SOUND PRESSURE LEVEL (SPL) EQUAL LEVEL CONTOURS (DB) 8000 HZ OCTAVE BAND

NOISE SOURCE/SUBJECT:
AV-8A AIRCRAFT
F402-RR-401 ENGINE
FAR FIELD NOISE

OPERATION:
55% RPM
FREE FLOW

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

IDENTIFICATION:
OMEGA 1.4
TEST 75-002-006
RUN 02
06 MAY 75
PAGE 26



POINT	DB
A	35
B	40
C	45
D	50
E	55
F	60
G	65
H	70
I	75
J	80
K	85
L	90

*U.S.Government Printing Office: 1977 — 757-080/232