



U.S. Department
of Transportation
**Federal Aviation
Administration**

Advisory Circular

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800 INDEPENDENCE AVE SW
WASHINGTON, DC 20591

Subject:

Date: 9/6/84
Initiated by: AEE-110

AC No: 36-2B
Change:

Measured or Estimated (Uncertificated)
Airplane Noise Levels

1. **PURPOSE.** This circular provides estimates of noise levels or measured noise levels from airplanes not certificated to FAR Part 36.

2. **CANCELLATION.** Advisory Circular 36-2A, Measured or Estimated (Uncertificated) Airplane Noise Levels, dated February 6, 1978, is cancelled.

3. **BACKGROUND.**

a. Advisory Circular (AC) 36-1C, "Certificated and International Airplane Noise Levels," was published June 6, 1983, and lists the results of significant noise certification actions. To supplement that tabulation this circular provides estimates or measurements of the noise from airplanes not required to meet FAR Part 36 standards.

b. Progress in the control and abatement of airplane noise has been, and will continue to be made. A summary listing of existing airplane noise levels will provide both private and public exposure to this progress, as well as offering a common noise level reference for potential future reductions.

4. **NOISE LEVELS**

a. The noise levels were measured or estimated for each airplane as they might occur during type certification tests conducted under FAR Part 36. However, it should be specifically noted that the estimated levels were not derived from actual tests, and the measured noise levels contained in this circular were obtained from tests which were made for purposes other than type certification. Noise levels are also presented on rotary-wing aircraft which have been estimated or measured and processed according to ICAO Annex 16 standards.

b. Many of these noise levels were obtained from data submitted to the Federal Aviation Administration (FAA) by the manufacturers and from the International Civil Aviation Organization. While the FAA has attempted to verify the reasonableness of these numbers by comparison with those from certified aircraft and (in some instances) by independent measurements, the FAA does not warrant these estimates.

c. Appendix I shows the measured or estimated noise levels for domestic turbojet powered airplanes; Appendix IA shows measured or

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estimated levels for international turbojet powered airplanes. Appendix II shows the measured or estimated levels for large transport category aircraft. These appendices include tabulations of engine type, thrust or equivalent shaft horsepower and gross weight for various aircraft as well as the measured or estimated Effective Perceived Noise Level in decibels (EPNdB) for each aircraft. Appendix III shows the noise levels for propeller driven small airplanes. This appendix includes a tabulation of the engine type, horsepower and gross weight for the various aircraft along with the measured or estimated A-weighted sound level in decibels (dBA) comparably to an FAR Part 36, Appendix F test. Appendix IV contains the levels of civil supersonic airplanes. Appendix V shows the noise levels for rotary-wing aircraft. This appendix includes a tabulation of the engine type, horsepower or equivalent shaft horsepower, rotor size and aircraft weight along with the measured or estimated EPNL for level flyover at 500 feet altitude, takeoff, and sideline. For all information listed, except for some aircraft in Appendix V, standard sea level, 77°F, 70% relative humidity conditions have been assumed.

d. Charts have been included following each appendix so that the appropriate FAR Part 36 noise level limits for takeoff, sideline, and approach can be calculated for each airplane. A chart for calculating the ICAO Annex 16 limits for rotary-wing aircraft has been included for Appendix V.

5. REVISIONS. The airplane noise level listing of this Advisory Circular will be revised and updated periodically.



John E. Wesler
Director of Environment and Energy

APPENDIX I
MEASURED OR ESTIMATED NOISE LEVELS FROM UNCERTIFICATED AIRPLANES
TURBOJET POWERED AIRCRAFT

AIRPLANE	ENGINES			GR. WGT. 1000 LBS.	TAKEOFF	SIDELINE	APPROACH	FLAPS (TO/APP)	NOTES
	MODEL	NO.	THRUST 1000 LBS.		M/EST. EPNDB	M/EST. EPNDB	M/EST. EPNDB		
BOEING									
B-707-100	JT3C-6	4	13.5	258.0	113.0	109.0	111.0		1
B-707-100B	JT3D-1	4	17.0	258.0	108.7	101.3	116.0	20/50	1
B-707-100B	JT3D-3	4	18.0	258.0	107.1	101.7	116.0	20/50	1
B-707-200	JT4A-3	4	16.8	248.0	105.0	111.0	110.0		1
B-707-300	JT4A-11	4	17.5	312.0	109.5	110.0	109.6	30/50	1
B-707-300B/C	JT3D-3B	4	18.0	333.4	113.0	102.1	118.5	14/50	1
B-707-300B/C	JT3D-7	4	19.0	333.6	112.1	102.5	120.4	14/50	1
B-707-400	R.CO. MK 50B	4	17.5	316.0	116.0	112.0	112.0		1
B-720	JT3C-7	4	12.0	230.0	108.0	109.0	108.0		1
B-720B	JT3D-1	4	17.0	234.0	104.7	101.6	115.5	20/50	1
B-720B	JT3D-3	4	18.0	234.0	102.8	102.0	115.5	20/50	1
B-727-100	JT8D-7/7A/7B	3	14.0	169.5	99.2	100.0	110.1	5/40	1
B-727-100	JT8D-1	3	14.0	160.5	97.2	99.2	110.1	5/40	1
B-727-100	JT8D-7	3	14.0	169.5	99.2	100.0	110.1	5/40	1
B-727-100	JT8D-9	3	14.5	169.5	98.3	100.0	108.4	5/40	1
B-727-100C	JT8D-7/7A/7B	3	14.0	169.5	99.2	100.0	110.1	5/40	1
B-727-200	JT8D-7/7A/7B	3	14.0	172.5	102.2	100.4	111.0	15/40	1
B-727-200	JT8D-7	3	14.0	172.5	102.2	100.4	111.0	15/40	1
B-727-200	JT8D-9	3	14.5	172.5	101.2	100.4	109.5	15/40	1
B-737-100	JT8D-7/7A/7B	2	14.0	103.5	93.0	101.6	108.3	1/40	1
B-737-100	JT8D-7/7A/7B	2	14.0	109.0	94.6	101.3	108.3	1/40	1
B-737-100	JT8D-9/9A	2	14.5	110.7	93.7	100.6	111.5	1/40	1
B-737-200	JT8D-7/7A/7B	2	14.0	100.5	92.1	101.7	108.3	1/40	1
B-737-200	JT8D-7/7A/7B	2	14.0	103.5	93.0	101.6	108.5	1/40	1
B-737-200	JT8D-7/7A/7B	2	14.0	109.0	94.7	101.3	108.5	1/40	1
B-737-200	JT8D-9/9A	2	14.5	103.5	91.4	100.9	111.5	1/40	1
B-737-200	JT8D-9/9A	2	14.5	110.7	93.7	100.6	111.6	1/40	1
B-737-200	JT8D-9/9A	2	14.5	114.5	94.9	100.5	111.8	1/40	1
B-737-200ADV.	JT8D-15/15A	2	15.5	115.5	94.4	103.1	111.7	1/40	1
GATES LEARJET									
23	CJ-610-1	2	2.9	12.5	96.1	103.4	96.7		1

APPENDIX I
MEASURED OR ESTIMATED NOISE LEVELS FROM UNCERTIFICATED AIRPLANES
TURBOJET POWERED AIRCRAFT

AC 36-2B
Appendix I

AIRPLANE	ENGINES		TAKEOFF			SIDELINE	APPROACH	FLAPS (TD/APP)	NOTES
	MODEL	NO.	THRUST 1000 LBS.	DR. WGT. 1000 LBS.	M/EST. EPNDB	M/EST. EPNDB	M/EST. EPNDB		
GENERAL DYNAMICS									
CV 880 22	CJ-805-3	4	11.2	184.0	115.0	109.0	106.0		1
CV 880 22M	CJ-805-3B	4	11.7	193.0	117.0	109.0	106.0		1
CV 990A	CJ-805-23	4	16.1	253.0	110.0	111.0	112.0		1
LOCKHEED									
1329 JETSTAR	JT12A-8	4	3.3	42.0	106.6	103.3	107.5		1
MCDONNELL DOUGLAS									
DC-08-20	JT4A-3	4	15.8	276.0	105.0	107.0	112.0		1,2,5
DC-08-30	JT4A-9	4	16.8	315.0	109.0	107.0	112.0		1,2,5
DC-08-40	RCO. 12	4	17.5	315.0	111.0	108.0	115.0		1,2,5
DC-08-50	JT3D-1	4	17.0	300.0	106.0	102.0	114.0		1,2,5
DC-08-50	JT3D-3B	4	18.0	315.0	108.0	103.0	114.0		1,2,5
DC-08-55	JT3D-3B	4	18.0	325.0	109.0	103.0	115.0		1,2,5
DC-08-61	JT3D-3B	4	18.0	328.0	110.0	103.0	115.0		1,2,5
DC-08-62	JT3D-3B	4	18.0	335.0	110.0	103.0	114.0		1,2,5
DC-08-62	JT3D-3B	4	18.0	350.0	111.0	103.0	114.0		1,2,5
DC-08-62	JT3D-7	4	19.0	350.0	111.0	103.0	114.0		1,2,5
DC-08-63	JT3D-3B	4	18.0	350.0	111.0	103.0	114.0		1,2,5
DC-08-63	JT3D-7	4	19.0	355.0	111.0	103.0	114.0		1,2,5
DC-09-10	JT8D-7	2	14.0	90.7	91.3	100.9	105.5		1,2,4,5,6,8
DC-09-20	JT8D-11	2	15.0	98.0	96.2	103.2	103.7		1,2,3,5
DC-09-30	JT8D-9	2	14.5	110.0	99.2	101.4	104.0		1,2,4,5,7
DC-09-30	JT8D-7	2	14.0	105.0	95.4	100.4	105.7		1,2,4,5,7,8
DC-09-30	JT8D-7	2	14.0	108.0	96.2	100.3	105.7		1,2,4,5,7,8
DC-09-30	JT8D-9	2	14.5	108.0	98.4	101.4	103.9		1,2,4,5,7
DC-09-30	JT8D-9	2	14.5	114.0	101.0	101.2	104.1		1,2,4,5,7
DC-09-30	JT8D-7	2	14.0	103.0	94.8	100.5	105.7	0/50	

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APPENDIX I
MEASURED OR ESTIMATED NOISE LEVELS FROM UNCERTIFICATED AIRPLANES
TURBOJET POWERED AIRCRAFT

AIRPLANE	ENGINES		TAKEOFF			SIDELINE	APPROACH	FLAPS (TO/APP)	NOTES
	MODEL	NO.	THRUST 1000 LBS.	GR. WGT. 1000 LBS.	M/EST. EPNDB	M/EST. EPNDB	M/EST. EPNDB		
DC-09-30	JT8D-15	2	15.5	108.0	95.6	102.3	103.7	0/50	1,2,4,5
DC-09-30	JT8D-15	2	15.5	110.0	96.4	102.3	103.7	0/50	1,2,4,5
DC-09-40	JT8D-11	2	15.0	114.0	100.1	102.0	104.1		1,2,4,5
ROCKWELL									
SABRE 40A	JT12A-B	2	3.3	19.6	100.3	100.2	98.5		1

NOTES:

1. THRUST CUTBACK USED
2. NOISE LEVELS DO NOT INCLUDE APPLICATION OF FAR PART 36 AMENDMENTS 8 OR 9
3. ZERO PERCENT OVERSPEED
4. SIX PERCENT OVERSPEED
5. NO ACOUSTIC ENGINE NACELLE TREATMENT
6. ALSO APPLICABLE TO -14/-15/-15F AIRCRAFT
7. ALSO APPLICABLE TO -31/-32/-32F AIRCRAFT
8. ALSO APPLICABLE TO -7A ENGINES

APPENDIX IA
MEASURED OR ESTIMATED NOISE LEVELS FROM UNCERTIFICATED AIRPLANES

TURBOJET POWERED AIRCRAFT

AIRPLANE	ENGINES			TAKEOFF		SIDELINE	APPROACH	NOTES
	MODEL	NO.	THRUST 1000 LBS.	GR. WGT. 1000 LBS.	M/EST. EPNDB	M/EST. EPNDB	M/EST. EPNDB	
BAC								
HS 125-1A	VIPER 521	2	3.1	21.2	95.3	100.9	105.9	1
HS 125-1A-522	VIPER 522	2	3.3	21.2	93.5	102.5	105.4	1
HS 125-1A/S-522	VIPER 522	2	3.3	21.7	94.3	102.5	105.4	1
HS 125-3A	VIPER 522	2	3.3	21.7	94.3	102.5	105.5	1
HS 125-3A/RA	VIPER 522	2	3.3	22.7	95.2	102.5	105.6	1
HS 125-400A	VIPER 522	2	3.3	23.3	95.7	102.5	105.6	1
HS 125-600A	VIPER 601	2	3.7	25.5	97.1	103.6	101.9	1
SUPER VC10	RCO. 43	4	21.8	335.0	110.1	113.5	115.1	
VC10 SRS. 1100	RCO. 42	4	20.4	314.0	110.2	113.2	114.8	
1-11 SRS. 200	SPEY MK506	2	10.4	79.0	96.7	104.7	99.5	1
1-11 SRS. 300/400	SPEY MK511	2	11.4	98.9	94.2	102.4	102.4	
1-11 SRS. 500	SPEY MK512	2	12.6	104.5	101.8	108.0	105.7	
HAWKER SIDDELEY								
	RB162	0	5.3					
COMET 4	RA29 MK524	4	10.5	162.0	103.0	104.0	112.0	1
COMET 4B	RA29 MK525	4	10.5	158.0	102.0	104.0	112.0	1
COMET 4C	RA29 MK525B	4	10.5	162.0	103.0	104.0	112.0	1
HS 125 SERIES 1A	VIPER 521	2	3.0	19.6	88.0	99.0	103.0	1
HS 125 SERIES 3	VIPER 522	2	3.4	21.0	89.0	99.0	104.0	1
HS 125-400	VIPER 522	2	3.4	23.3	90.0	99.0	104.0	1
HS 125-600	VIPER 601-22	2	3.8	25.0	89.0	99.0	105.0	1
TRIDENT 1	RB163 MK505-5	3	10.1	115.0	100.0	100.0	108.0	1
TRIDENT 1E	RB163 MK511-5	3	11.4	130.0	108.0	106.0	109.0	1
TRIDENT 2E	RB163 MK512-5	3	12.0	143.5	108.0	106.0	109.0	1
TRIDENT 3B	RB163 MK512-5	4	11.6	150.0	104.0	105.0	110.0	1,2
IAI								
1121 COMMODORE	CJ610-5	2	3.0	18.5	100.9	104.2	107.0	

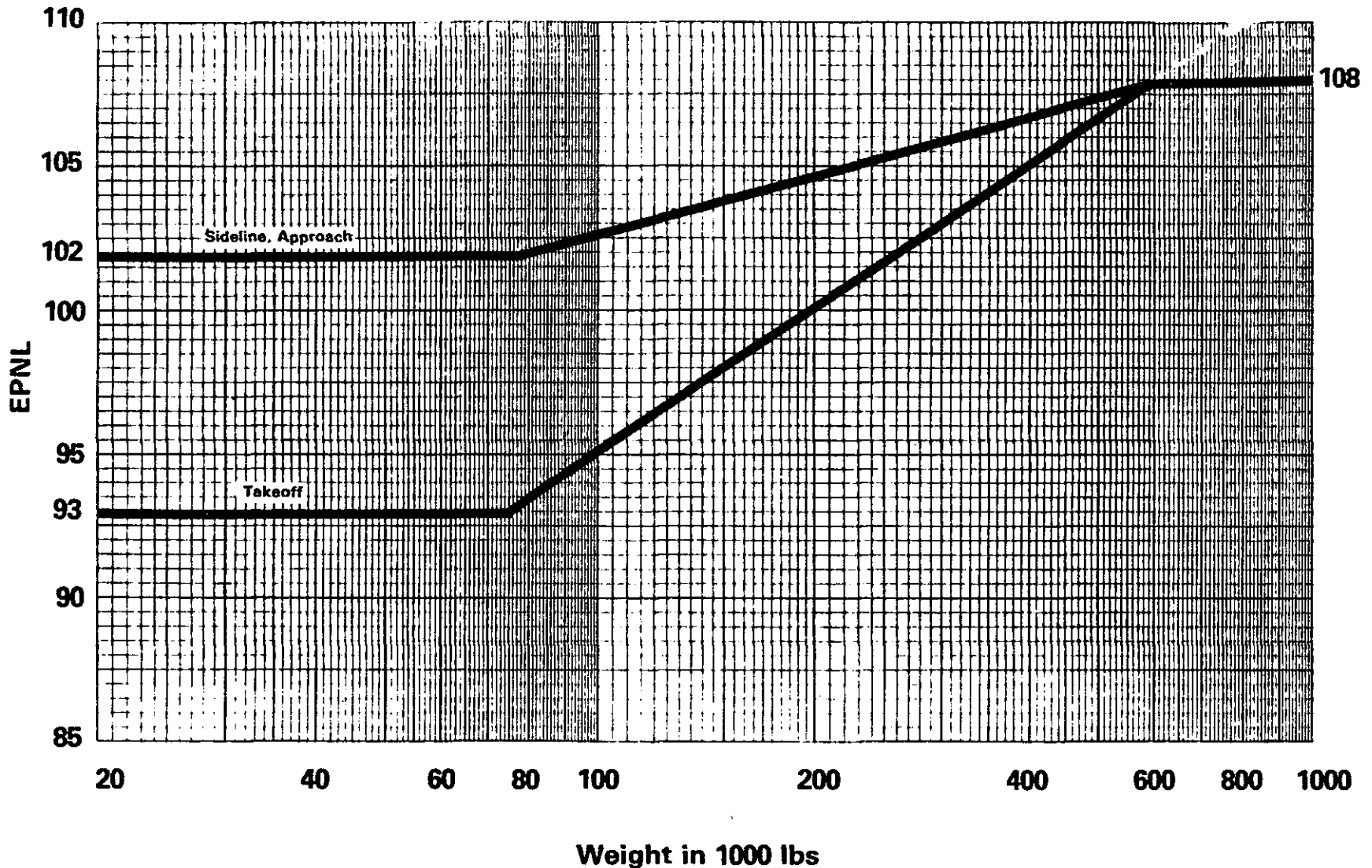
APPENDIX IA
 MEASURED OR ESTIMATED NOISE LEVELS FROM UNCERTIFICATED AIRPLANES
 TURBOJET POWERED AIRCRAFT

AIRPLANE	ENGINES		TAKEDOFF		SIDELINE	APPROACH	NOTES	
	MODEL	NO.	THRUST 1000 LBS.	GR. WGT. 1000 LBS.	M/EST. EPNDB	M/EST. EPNDB		M/EST. EPNDB
1123 WESTWIND	CJ610-9	2	3.1	20.7	100.9	105.0	106.0	
MESSERSCHMITT-BOLKOW-BLOHM								
HFB 320 HANSA	CJ610-5	2	3.0	20.2	100.9	105.0	106.0	
SUD-AVIATION								
CARAVELLE III	RA29 MK527	2	11.4	101.4	104.0	109.0	110.0	1
CARAVELLE VIN	RA29 MK531	2	12.2	105.8	104.0	111.0	106.5	1
CARAVELLE VIR	AVON 533R	2	12.6	110.2	104.0	111.0	107.0	1
CARAVELLE 10R	JT8D-7	2	14.0	114.6	97.0	102.0	107.5	1
VFW-FOKKER								
VFW 614	H45H MK501	2	7.2	44.0	90.5	92.2	97.1	1

APPENDIX II
 MEASURED OR ESTIMATED NOISE LEVELS FROM UNCERTIFICATED AIRPLANES
 LARGE TRANSPORT CATEGORY AIRCRAFT

AIRPLANE	ENGINES			GR. WGT. 1000 LBS.	TAKEOFF	SIDELINE	APPROACH	NOTES
	MODEL	NO.	SHAFT HP.		M/EST. EPNDB	M/EST. EPNDB	M/EST. EPNDB	
AEROSPATIALE								
NORD 262C	BASTAN VIIA	2	1,065	22.9	90.0	92.0	99.0	1
FOKKER								
F-27 MK.200	MK532-7	2	2,050	43.5	90.6	102.0	100.3	1
F-27 MK.400/600	MK532-7R	2	2,140	43.5	89.0	92.5	99.0	1
LOCKHEED								
L-100-50	501-D22A	4	4,200	170.0	99.8	93.5	98.2	1
L-188	501-D13	4	3,750	116.9	95.0	93.0	99.0	1
L-400	501-D22A	2	4,591	84.0	92.7	91.7	97.5	1

Stage 2 Noise Certification Limits: Jet and Transport Aircraft Takeoff, Sideline and Approach



EQUATIONS FOR THE CALCULATION OF
NOISE CERTIFICATION LIMITS
AT TAKEOFF, SIDELINE, AND APPROACH
STAGE 2*

	<u>Takeoff Limits</u> EPNdB	<u>Sideline Limits</u> EPNdB	<u>Approach Limits</u> EPNdB
Up to and including 75,000 lbs	93	102	102
Over 75,000 lbs to 600,000 lbs	$61.86+16.61 \log M$	$89.54+6.64 \log M$	$89.54+6.64 \log M$
Over 600,000 lbs	108	108	108

M = Maximum Takeoff Mass in 1000 lbs

*More stringent noise certification limits exist for aircraft for which application for type certificate was dated on or after November 5, 1976 (Stage 3).

APPENDIX III
 MEASURED OR ESTIMATED NOISE LEVELS FROM UNCERTIFICATED AIRPLANES
 PROPELLER DRIVEN SMALL AIRPLANES

9/6/84

AIRPLANE	ENGINES			PROPELLER	GR. WGT.	FLYDVER
	MODEL	NO.	HP.			M/EST. DBA
BEECH						
A23-24	I0-360-A2B	1	200	MCC.1B235/BFA7762	2,550	78.0
A24R	I0-360-A1B	1	200	MCC.2D34C9-N	2,750	74.0
A60	TIO-541-E1A4	2	380	HC-F3YR-2	6,775	90.0
A60	TIO-541-E1A4	2	323	HC-F3YR-2	6,775	86.0
B24R	I0-360-A1B6	1	200	HC-M2YR-1BF/F7666-2R	2,750	72.0
C 18 S	R-985-AN-1	2	400	HAM.2D-30-237	7,850	86.0
C23	O-320-D2B	1	180	SENS.76EM855-0-60	2,450	70.0
C35	E-225-8	1	185	B-215-107	2,700	74.0
D35	E-225-8	1	185	HC-A2X20-4A1	2,725	70.0
D95A	I0-360-B1B	2	180	HC-92WK-2B	4,200	78.0
E35	E-225-8	1	185	B-215-107	2,725	75.0
F33	I0-470-K	1	225	MCC.2A36C23	3,050	80.0
F33A	I0-520-B	1	285	MCC.2A36C23	3,400	81.0
F35	E-225-8	1	185	B-215-107	2,750	73.0
G35	E-225-8	1	185	B-215-107	2,775	70.0
G50	IGS0-480-A1A6	2	230	HC-93Z20-2C1	7,150	89.0
V35	I0-520-B	1	285	MCC.2A36C23-CP	3,400	80.0
V35	TSIO-520-D	1	285	PHC-A3VF-4	3,400	83.0
V35B	I0-520-BA	1	285	MCC.3A32C76/SB2NB-2	3,400	78.0
V35B	TSIO-520-D	1	285	MCC.2A32C76	3,400	83.0
23	O-320-D2B	1	160	HC-82XL-6F	2,300	70.0
35	E-185-11	1	145	B-215-107	2,550	71.0
35S	I0-520-BA	1	285	MCC.2A36C23	3,300	86.0
35-A33	I0-470-K	1	225	F-12	3,000	81.0
35-B33	I0-470-K	1	225	BHC-92ZF-1D1	3,000	78.0
35-C33	I0-470-K	1	225	MCC.2A36C23-CD	3,050	80.0
35-C33A	I0-520-B	1	285	MCC.2A36C23-CP	3,300	86.0
35-33	I0-470-J	1	225	BHC-92ZF-1D1	2,900	79.0
36	I0-520-B	1	285	MCC.2A36C23-CP	3,600	83.0
56TC	TIO-541-E1B4	2	380	HC-F3YR-2	5,990	82.0
58	I0-520C	2	285	PHC-J3YF-2F/FC7663-2R	5,400	82.0
60	TIO-541-E1A4	2	320	HC-F3YR-2	6,725	87.0

APPENDIX III
MEASURED OR ESTIMATED NOISE LEVELS FROM UNCERTIFICATED AIRPLANES
PROPELLER DRIVEN SMALL AIRPLANES

AC 36-2B
Appendix III

AIRPLANE	ENGINES			PROPELLER	GR. WGT	FLYOVER
	MODEL	NO.	HP.			M/EST. DBA
65	IGSD-480-A1A6	2	320	HC-93Z20-2C1	7,700	70.0
95-A55	IO-470L	2	260	MCC.2AF34C55-D79FF-0	4,980	83.0
95-B55	IO-470L	2	260	BHC-C3YF-2CHR/FC8465-6	5,100	84.0
95-B55	IO-470L	2	260	PHC-3YF-2F/FC-7663-2R	5,100	78.0
95-D55	IO-520C	2	285	MCC.3AF32C75	5,300	83.0
95-E55	IO-520C	2	285	PHC-C3YF-2/FC7663-2R	5,300	81.0
BELLANCA						
7 ECA	0-200-A	1	100	MCC.1A100ACH6948	1,650	69.0
7 GCAA	0-320-A2B	1	150	MCC.1A170/7448	1,650	76.0
7 GCB	0-320-A2B	1	150	MCC.1A170/7448	1,650	70.0
8 GCBC	0-360-A2A	1	180	MCC.1A200FA/7846	2,150	79.0
BELLANCA (CHAMPION)						
7ECA	0-235-K2C	1	115	SEN. 74DM6S8-1-56	1,650	68.8
7GCAA	0-320-A2B/-A2D	1	150	SEN. 74DM6S8-1-56	1,650	68.8
7GCBC	0-320-A2B/-A2D	1	150	SEN. 74DM6S8-1-56	1,650	68.8
7GCBC SEAPLANE	0-320	1	150	MCC. 1A175GMA/8040	1,800	70.3
8GCBC	0-360-C2A/-C2E	1	180	MCC. 1A200/HFA	2,150	72.8
8GCBC	0-360-C1A/-C1E	1	180	HTZ. HC-C2YR-1BF/F7666A	2,150	72.9
8GCBC SEAPLANE	0-360	1	180	MCC. 1A200/HFA	2,150	72.8
8KCA8	AEIO-320-E2B	1	150	SEN. 74DM6S8-0	1,800	69.2
8KCA8	AEIO-320-E1B	1	150	HTZ. HC-C2YL-4(F)/(F)C7663-4	1,800	70.0
8KCA8	AEIO-360-H1A	1	180	HTZ. HC-C2YR-4CF/FC7666A-2	1,800	67.2
BELLANCA (VIKING)						
17-30A	IO-520-K	1	225	MCC. D3A32C90/82NC-4	3,325	77.5
17-30A	IO-520-K	1	225	HTZ. HC-C3YF-1RF/F8468-9R	3,325	77.5
17-30A	IO-520-K	1	225	MCC. D3A34C401/90DFA-12	3,325	77.5

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APPENDIX III
MEASURED OR ESTIMATED NOISE LEVELS FROM UNCERTIFICATED AIRPLANES

PROPELLER DRIVEN SMALL AIRPLANES

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AIRPLANE	ENGINES			PROPELLER	GR. WGT.	FLYOVER
	MODEL	NO.	HP.			M/EST. DBA
17-30A	IO-520-K	1	225	HTZ. HC-C2YF-1BF/F8475-6	3,325	77.5
CESSNA						
A185F	IO-520-D	1	285	MCC.D2A34C58/90AT-9.5	3,350	82.0
A188B	IO-520-D	1	285	MCC.D2A34C58/90AT-8	4,000	85.0
FRA-150L	O-240-A	1	130	MCC.1A135/BRM7150	1,600	73.0
FR172F	IO-360-D	1	210	MCC.D2A34C67L	2,220	81.0
FR172G	IO-360-D	1	210	MCC.D2A34C67L	2,220	77.0
F150J	O-240-A	1	130	MCC.1A135/BRM7150	1,600	72.5
F150L	O-200-A	1	100	MCC.1A101/HCM6948	1,600	69.0
F172L	O-320-E2D	1	150	MCC.1C160/CTM7553	2,300	74.0
F177RG	IO-360-A1B6	1	200	MCC.B2D34C206/78TA	2,800	76.0
TU-206-C	TSIO-520-C	1	285	MCC.D3A32C90/82NC	3,600	77.0
T207	TSIO-520-G	1	285	MCC.D2A34C78-L	3,800	82.0
T210G	TSIO-520-C	1	285	MCC.D3A32C88/82NC-2	3,400	78.0
T210L	TSIO-520-H	1	285	MCC.D3A32C88/82NC-2	3,800	82.0
T310P	TSIO-520-P	2	285	MCC.D2AF34C71L	5,400	82.0
T310P	TSIO-520-B	2	285	MCC.3AF32C87/82NC-4	5,400	74.7
T310Q	TSIO-520-B	2	285	MCC.3AF32C87/82NC-4	5,500	75.2
T310R	TSIO-520-B	2	285	MCC.3AF32C87/82NC-4	5,500	77.7
150D	O-200-A	1	100	MCC.1A101	1,600	67.0
170	C-145-2	1	145	MCC.1A170/DH7656	2,200	73.0
170A	O-340-A1A	1	170	HC-82XL-1D/8433-12	2,200	70.0
170B	C-145-2	1	145	MCC.1A170/DH7656	2,200	75.0
172	O-300-A	1	145	MCC.1A172/EM7653	2,300	72.0
175	6A-350-C2	1	180	MCC.2A31C21/84S-6	2,350	86.0
175A	O-360-A1D	1	180	HC-C2YK-1	2,350	72.0
175B	O-360-A1D	1	180	MCC.2D36C14/78KM-4	2,350	74.0
177	O-360-A1F6	1	180	MCC.2D34C202	2,500	74.0
180	O-470-J	1	225	HC-82XF-1-DB	2,800	76.0
180	O-470-J	1	225	HC-82XF-1C	2,800	75.0
182H	O-470-R	1	230	MCC.2A34C50	2,800	76.0
182P	O-470-R	1	230	MCC.2A34C203	2,950	78.0

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APPENDIX III
MEASURED OR ESTIMATED NOISE LEVELS FROM UNCERTIFICATED AIRPLANES
PROPELLER DRIVEN SMALL AIRPLANES

AIRPLANE	ENGINES			PROPELLER	GR. WGT.	FLYOVER
	MODEL	NO.	HP.			M/EST. DBA
210	ID-470-E	1	260	MCC.D2A36C33	3,800	77.0
310C	ID-470-D	2	260	HC-A2XF-2	4,830	84.0
310F	ID-470-D	2	260	HC-A2XF-2	4,830	81.0
310N	ID-470-V	2	260	MCC.D3AF32C80/82NC-4	5,200	80.0
310Q	ID-470-VQ	2	260	MCC.D3AF32C71/84JF-3	5,300	96.0
310Q	ID-470-VQ	2	260	MCC.3AF32C87/82NC-4	5,300	81.0
320	TSIO-520-B	2	285	3AF32C87/82NC-4	5,200	73.9
320A	TSIO-470-B	2	260	HC-A2XF-2	5,200	82.0
320C	TSIO-470-D	2	260	MCC.D2AF34C54	5,200	93.0
320E	TSIO-520-B	2	285	3AF32C87/82NC-4	5,300	74.2
320F	TSIO-520-B	2	285	3AF32C87/82NC-4	5,300	74.5
337F	ID-360-C	2	210	MCC.D2AF34C	4,630	85.0
340	TSIO-520-K	2	285	MCC.3AF32C87/82NC-4	5,975	83.0
401	TSIO-520-E	2	300	MCC.3AF32C87	6,300	79.0
414	TSIO-520-J	2	310	MCC.3AF32C93	6,350	82.0
421	GTSIO-520-D	2	375	MCC.3AF34C92	7,450	83.0
421B	GTSIO-520-H	2	375	MCC.3AF34C92	7,450	81.0
GRUMMAN AMERICAN						
AA-1A	G-235-C2C	1	108	MCC.1A105SCH7153	1,560	70.0
AA-5	G-320-E2G	1	150	MCC.1C172BTH7359	2,200	72.0
MAULE						
M-4-210C	ID-369-A	1	195	MCC.D2A34C67	2,300	76.0
M-4-220C	6A-350-C1	1	194	MCC.2A31C21	2,300	76.0
MOONEY						
M 20 C	G-360-A1D	1	180	HC-C2YK-1A/7666-2	2,575	75.5
M 20 C	G-360-A1D	1	180	MCC.2D34C53A/74E-0	2,575	75.5

APPENDIX III
 MEASURED OR ESTIMATED NOISE LEVELS FROM UNCERTIFICATED AIRPLANES
 PROPELLER DRIVEN SMALL AIRPLANES

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AIRPLANE	ENGINES			PROPELLER	GR. WGT.	FLYOVER
	MODEL	NO.	HP.			M/EST, DBA
M 20 E	IO-360-A1A	1	200	HC-C2YK-1A/7666-2	2,575	74.3
M 20 F	IO-360-A1A	1	200	HC-C2YK-1A/7666-2	2,740	74.9
M 22	TIO-541-A1A	1	310	HC-C2YK-1B/8475-4	3,680	80.0
PIPER						
PA-18-150	O-320-A2B	1	150	M74DM-56	1,750	70.0
PA-18-150	O-320-A2B	1	150	M74DM-0-50	1,750	72.0
PA-22-135	O-290-D2	1	135	M74DM	1,950	74.0
PA-23-160	O-320-B1A	2	160	HC-82XG-2B	3,800	75.0
PA-23-250	TIO-540-C1A	2	250	HC-E2YR-2RB	5,200	77.0
PA-24-250	O-540-A1D5	1	250	HC-A2XK-1	2,800	76.0
PA-24-260	IO-540-K1A5	1	260	HC-E2YR-1B	2,900	76.0
PA-28-140	O-320-E2A	1	150	M74DM-0-60	2,150	73.0
PA-28-151	O-320-E3D	1	150	74DM6-0-58	2,325	75.0
PA-28-180	O-360-A3A	1	180	M76	2,400	74.0
PA-28-180	O-360-A4A	1	180	76EM855-0-60	2,400	78.0
PA-29-180	IO-360-B1E	1	180	HC-C2YK-1	2,500	73.0
PA-28-200	IO-360-C1C	1	200	HC-C2YK-1	2,600	77.0
PA-28-235	O-540-B4B5	1	235	HC-C2YK-1	2,900	77.0
PA-30	IO-320-C1A	2	160	HC-E2YL-2B	3,600	76.0
PA-31	TIO-540-A2B	2	310	HC-E3YR-2A	6,500	81.0
PA-31	TIO-540-A1A	2	310	HC-E2YR-2B	6,500	86.0
PA-31P	TIO-541-E1A	2	425	HC-C3YN-2L	7,800	85.0
PA-31F-350	TIO/LTIO-540-V2AD	2	350	HC-I3YR-2UF/FC7854/2LUF/FJC/7854K	7,200	80.9
PA-31-350	TIO-540-J2BD/L	2	350	HC-E3YR-2AF/HC-E3YR-2A	7,000	87.0
PA-32-260	O-540-E4D5	1	260	HC-C2YK-1B	3,400	81.0
PA-32-300	IO-540-K1A5	1	300	HC-C2YK-1B	3,400	83.0
PA-34-200	IO-360-C1E6	2	200	HC-C2YK-2	4,200	79.0
PA-34-200T	TSIO-360-E/LTS	2	215	BHC-C2YF-2/FJC8459-8R	4,570	77.0
ROCKWELL INT						
112	IO-360-C1D6	1	200	HC-E2YR-1BF/F7666-A	2,550	72.0

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 Appendix III

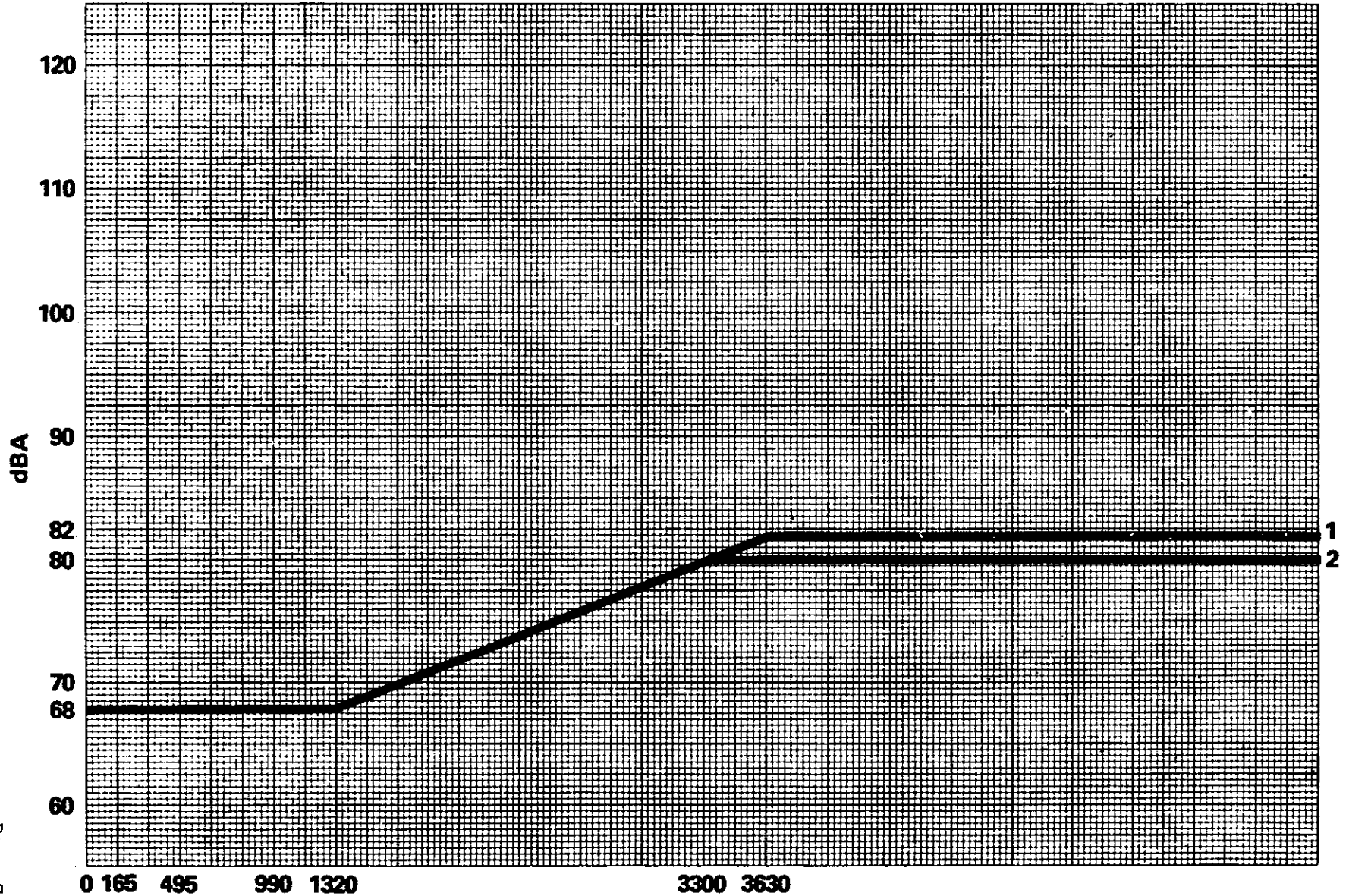
APPENDIX III
 MEASURED OR ESTIMATED NOISE LEVELS FROM UNCERTIFICATED AIRPLANES
 PROPELLER DRIVEN SMALL AIRPLANES

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AIRPLANE	ENGINES			PROPELLER	GR. WGT.	FLYOVER
	MODEL	NO.	HP.			M/EST. DBA
580	G50-480-A1A6	2	320	HC-83X20-2C/9333	6,750	88.0
580FL	IG50-540-B1A	2	360	HC-83Z30-2B/9349-6.5	8,500	79.0
TAYLORCRAFT						
F-19	O-200-A	1	100	MCC. 1A105/SCM6950	1,500	68.4
F-21	O-235-L2C	1	112	SEN. 72CK-0-50	1,500	68.8
F-21A	O235-L2C	1	112	SEN. 72CK-0-50	1,500	68.8
TED SMITH						
AEROSTAR 601	IO-540-F1A5	2	290	HC-C3YR/C9468-BR	5,700	84.0

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Noise Certification Limits for Propeller-Driven Aircraft Under 12,500 lbs



1 Airplane Type Certificate Applied For on or After October 10, 1973

2 Airplane Type Certificate Applied For on or After January 1, 1975

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Appendix III

EQUATIONS FOR THE
CALCULATION OF NOISE CERTIFICATION LIMITS
FOR PROPELLER-DRIVEN AIRCRAFT
UNDER 12,500 LBS

Application for Type Certification on or After October 10, 1973:

	<u>LIMIT</u>
Up to and including 1,320 lbs	- 68 dB(A)
Over 1,320 lbs to 3,630 lbs	- 68 + 1 dB/165 lbs (T/O weight-1320 lbs)
3,630 lbs to 12,500 lbs	- 82 dB(A)

Application for Type Certificate on or After January 1, 1975:

	<u>LIMIT</u>
Up to and including 1,320 lbs	- 68 dB(A)
Over 1,320 lbs to 3,620 lbs	- 68 + 1 dB/165 lbs (T/O weight-1320 lbs)
3.620 lbs to 12,500 lbs	- 80 dB(A)

APPENDIX IV
 MEASURED OR ESTIMATED NOISE LEVELS FROM UNCERTIFICATED AIRPLANES
 CIVIL SUPERSONIC AIRCRAFT

AIRPLANE	ENGINES			GR. WGT. 1000 LBS.	TAKEOFF	SIDELINE	APPROACH
	MODEL	NO.	THRUST 1000 LBS.		M/EST. EPNDB	M/EST. EPNDB	M/EST. EPNDB
TU-144	NK-144	4	38.6	360.0	110.0	114.0	110.0

APPENDIX V
NOISE DATA SHEET FOR ROTARY WING AIRCRAFT

MANUFACTURER AND MODEL	COMMON NAME	MTOW KG LBS	ENGINE MAKE AND MODEL	NUM:PER :ENG:ENG	HF	VY	VH	VNE	KMH MPH	AMH:DIAM. (H)	NUM. BLADES	RPM	FLYOVER: 500FT	T/O :6 DEG	APP REFERENCE
AEROSPATIALE SA 321	SUP:FRÉLON	10995 24243	TURBOMECA TURMO 3C	3 1550				8.60 1.60		6 5	207 990		92.8		A-2
AEROSPATIALE SA 321F	SUP:FRÉLON	11475 25302	TURBOMECA TURMO 3E6	3 1570				8.60 1.60		6 5	207 990		92.0	98.4	WG/R W/P 25
AEROSPATIALE SA 330	PUMA	5540 12215	TURBOMECA TURMO 4C	2 1435				15.00 3.04		4 5			93.6		A-2
AEROSPATIALE SA 330J	PUMA	7042 15527	TURBOMECA TURMO 4C	2 1575		70	260	15.10 3.04	161	4 5	267		91.4	95.4	FAA-EE-79-03
AEROSPATIALE SA 341G	GAZELLE	1800 3988	TURBOMECA TURMO 3A	1 590		65	264	10.50 .70	164	3 13	267		86.1	92.5	FAA-EE-79-03
AEROSPATIALE SA 342	GAZELLE	1896 4180		1									88.2		WG/R W/P 25
AEROSPATIALE SA 342	GAZELLE	1597 3521		1										89.8	WG/R W/P 25
AEROSPATIALE SA 342	GAZELLE	1447 3190	TURBOMECA ASTAZOU 3A	1 970				10.50 .70		3 13			85.5		A-2
AEROSPATIALE SA 350	SOURRELL	1896 4180	LYCOMING LTS 101	1				10.69 1.86					87.2	89.2	WG/R W/P 25
AEROSPATIALE SA 360	DAUPHIN	2994 6601		1										92.4	WG/R W/P 25
AEROSPATIALE SA 360	DAUPHIN	1901 4191	TURBOMECA ASTAZOU 16A	1 1050				11.50 .90		4 13			89.9		A-2
AEROSPATIALE SA 365	DAUPHIN 2	3393 7481		2										89.4	WG/R W/P 25
AEROSPATIALE SA 365N	DAUPHIN-2	8488 18716	TURBOMECA ARIEL 1C	2 710		75	150	11.93 .90	202	4 13	365 4706		98.3	96.5	FAA-EE-84-2 (2)
AGUSTA A109		2599 5730	ALLISON 250-C20B	2 420			0	10.69 2.03	182	4 2	395		91.7	92.9	FAA-EE-81-16 (1)
BELL 206L	LONGRANGER	1814 3999	ALLISON 250-C20F	1 370		52	241	11.28 1.59	150	2 2			85.8	85.9	FAA-EE-79-03
BELL 212	H-1	4742 10500	FRETT + WHITNEY PT61-3	2 1800		55	194	14.64 2.159	115	2 2			94.6	91.7	FAA-EE-79-03

APPENDIX V
NOISE DATA SHEET FOR ROTARY WING AIRCRAFT

MANUFACTURER AND MODEL	COMMON NAME	MTOW KG LBS.	ENGINE MAKE AND MODEL	HF		UY KT	UM KT	VNE MPH	ROTORS MAIN/TAIL		NOISE LEVELS - EPNL						
				NUM: ENG:	PER ENG:				KMH: MPH:	DIAM: (M)	NUM: BLADES:	RPM	FLYOVER: 500FT:	T/O 6 DEG	APP 6 DEG	REFERENCE	
BELL 47G		1237 2727		1								90.3		89.6	FAA-EE-79-03		
BELL HELI BELL 222	TWIN JET	3560 7849	LYCOMING LTS101-650C-3	2	575		65	141	162	12.11 1.98	2	348	1881	87.9	98.2	FAA-EE-84-1 (2)	
BOEING VERTOL 234		20411 45006	LYCOMING T55-L-11C	2	3750					18.29 18.29	1			97.0	97.0	102.1	8-7000-FAA-114
HUGHES 300C		816 1799	LYCOMING H10-360-D1A	1	190					8.18 1.30	3			82.0			A-2
HUGHES 369A		1094 2412	ALLISON T63-A-5A	1	317					8.03 1.30	4			91.1			A-2
HUGHES 500C		1157 2551	ALLISON 250-C18A	1	400		50	244	131	8.03 1.30	4			85.8	85.1	87.7	FAA-EE-79-03
HUGHES 500D		839 1849	ALLISON 250-C20B	1	420					8.05 1.30	5			88.7			A-2
MESSERSCHMITT BOLKOW-BLOHM BO-105		2300 5071	ALLISON 250-C18	2	420		70	241	130	270 167	4			88.4	89.1	91.7	FAA-EE-79-03
MIL MI 2		3518 7757												89.8		96.5	WG/B W/P 25
MIL MI 8		11436 25216												97.6		100.0	WG/B W/P 25
MIL MI-6A		4250 93700												103.7		107.8	WG/B W/P 25
MIL MI-6A		4250 9371	SOL. D-25V/TV-2BM	2	5500					35.00 6.30	5			101.3			A-2
SIKORSKY S-61	H-3	10000 22049	GENERAL ELECTRIC T58-GE-10	2	1400		74	267	144	18.91 3.15	5			92.6	95.9	94.0	FAA-EE-79-03
SIKORSKY S-64		19419 42818		2										97.0		99.0	WG/B W/P 25
SIKORSKY S-64		19459 42907	PRATT WHITNEY JFTD12-5A	2	4800					21.95 4.88	6			96.1			A-2
SIKORSKY S-65	H-53	16775 36988	GENERAL ELECTRIC T64	2	7560		76	196	170	22.02 4.88	6			97.1	95.7	99.9	FAA-EE-79-03

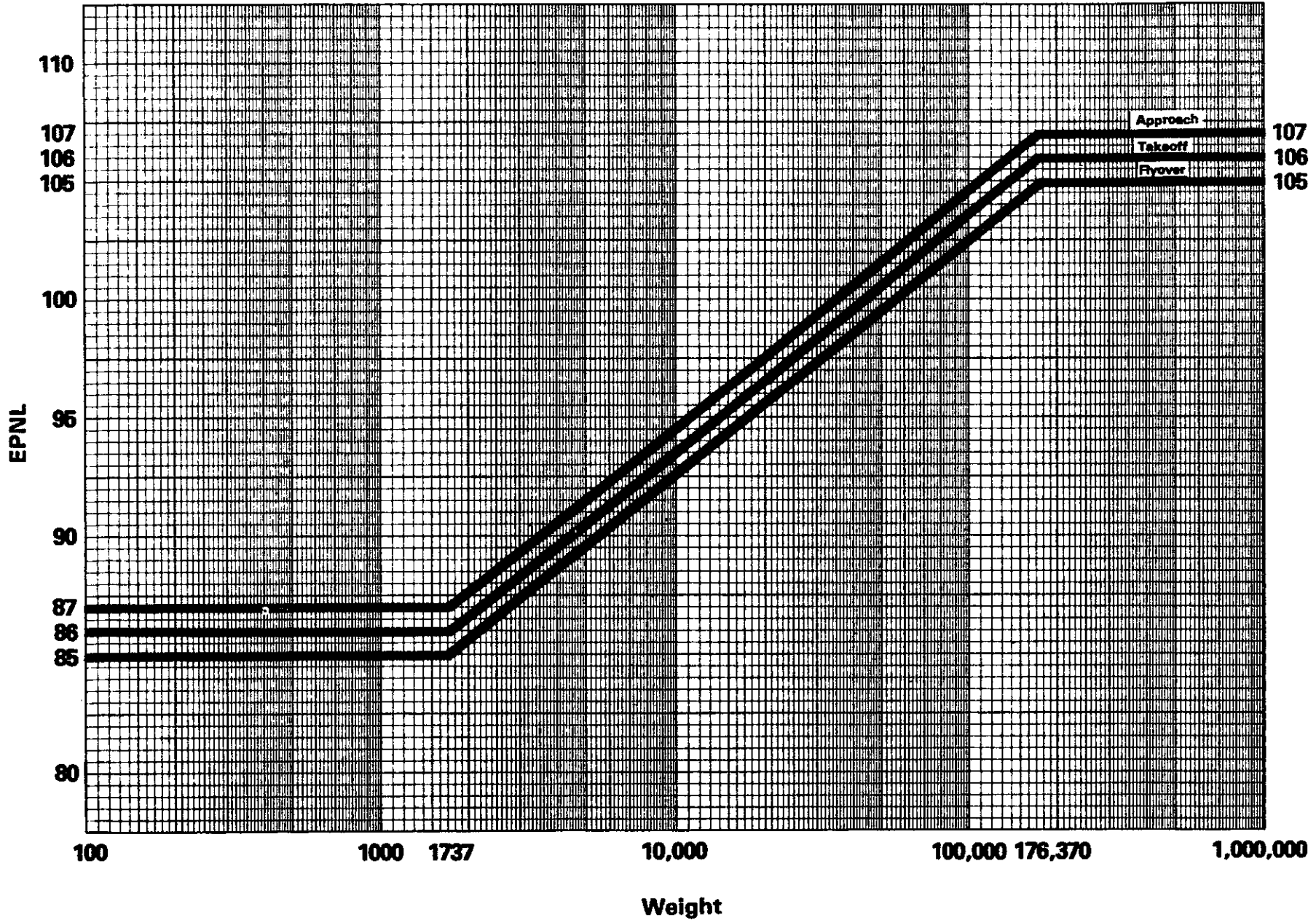
**APPENDIX V
NOISE DATA SHEET FOR ROTARY WING AIRCRAFT**

MANUFACTURER AND MODEL	COMMON NAME	MTOW KG LBS.	ENGINE MAKE AND MODEL	NUM: ENG:	PER: ENG:	VY KT	VH KT	VNE MPH	ROTOR MAIN/TAIL		NOISE LEVELS - EPNL			REFERENCE
									DIAM. (M)	NUM. BLADES	FLYOVER 500FT	T/O 6 DEG	APP	
SIKORSKY S-76	SPIRIT	4545	ALLISON 250-C30	2	650			11.88	4	293	89.1	91.3	95.1	FAA-EE-81-16 (1)
		10021									146	178	2.44	
SIKORSKY UH-60A	BLACKHAWK	9185		1	1543			16.36	4	265	96.9	89.6	96.7	FAA-EE-81-16 (1)
		20252									165	224	3.35	
WESTLAND W-13	W-13	4241		2							97.3	91.6	98.0	WG/B W/P 25
		9351												
WESTLAND 30-100	W-30	5600	ROLLS ROYCE R.R. GEN41-1NK510	2	1120		120	5.24	4	326	93.6	92.8	98.0	MANUFACTURER
		12347									62	120	138	

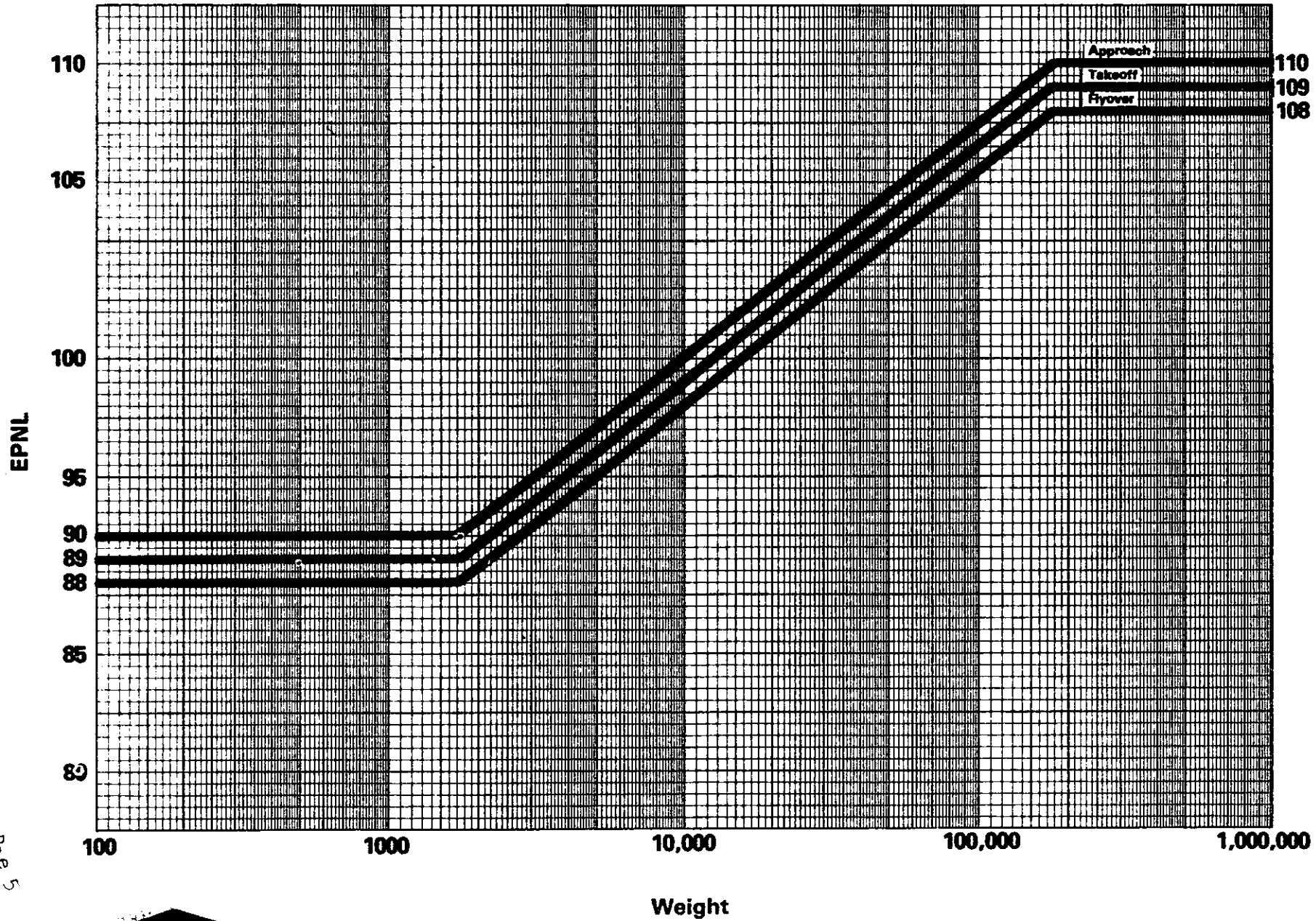
REFERENCES

- (1) Data calculated from this report.
 - (2) Data not corrected to standard reference day nor corrected to reference flight path (as measured data).
- A-2 Advisory Circular 36-2 Dated 2/6/78
WG/B W/P 25 ICAO WorkingGroup 12/14/78

ICAO Noise Certification Limits for Helicopters at Takeoff, Approach and Flyover



Proposed ICAO Noise Certification Limits for Helicopters at Takeoff, Approach and Flyover



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Appendix V

EQUATIONS FOR THE CALCULATION OF
ICAO HELICOPTER NOISE STANDARDS
AT TAKEOFF, APPROACH, AND FLYOVER

	<u>Takeoff Limits</u> EPNdB	<u>Approach Limits</u> EPNdB	<u>Flyover Limits</u> EPNdB
Up to and including 1,737 lbs	86	87	85
Over 1,737 lbs to 176,370 lbs	$83.61+9.97 \log M$	$84.61+9.97 \log M$	$82.61+9.97 \log M$
Over 176,370 lbs	106	107	105

M = Maximum Takeoff Mass in 1000 lbs

PROPOSED EQUATIONS FOR THE CALCULATION
OF ICAO HELICOPTER NOISE STANDARDS
AT TAKEOFF, APPROACH, AND FLYOVER

	<u>Takeoff Limits</u> EPNdB	<u>Approach Limits</u> EPNdB	<u>Flyover Limit</u> EPNdB
Up to and including 1,737 lbs	89	90	88
Over 1,737 lbs to 176,370 lbs	$86.61+9.97 \log M$	$87.61+9.97 \log M$	$85.61+9.97 \log M$
Over 176,370 lbs	109	110	108

M = Maximum Takeoff Mass in 1000 lbs

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