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ACOUSTIC AND AERODYNAMIC TESTING OF SCALE MODEL VARIABLE PITCH FAN

by

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TABLE OF CONTENTS

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LIST OF ILLUSTRATIONS

LIST OF ILLUSTRATIONS (Continued)

LIST OF ILLUSTRATIONS (Continued)

LIST OF ILLUSTRATIONS (Continued)

LIST OF ILLUSTRATIONS (Concluded)

I. SUMMARY

The scale model variable pitch fan was designed to determine the aerodynamic and acoustic characteristics of a fan with a variable pitch rotor blade. Changing the blade pitch at speed has the effect of improving the incidence match relative to the minimum loss incidence. The single-stage fan was designed for a corrected tip speed of 1160 ft/sec (353.568 m/sec) at a bypass pressure ratio of 1.5. There are 26 rotor blades and 60 vanes with 2.45 rotor chord spacing between them.

The fan was tested with "standard" frame treatment which consisted of 1/2-inch (1.3 cm) thick Scottfelt covered with a plate of 22-1/2% open area ratio. Three operating lines were investigated using three fan exhaust nozzles: nominal, large (16% oversized), and small (6% undersized).

With each nozzle, the 200-ft (60.96 m) sideline maximum PNL was reduced by increasing the stagger, that is, closing the blade at 44% to 75% of takeoff thrust. At takeoff thrust the noise was essentially the same for the two stagger positions investigated with the nominal nozzle. The large nozzle showed a decrease in noise at takeoff thrust when the blade was opened. The small nozzle data was insufficient to determine a stagger for minimum noise at takeoff.

The lowest aft maximum PNL was obtained with the nominal nozzle and with variable pitch rotor capabilities. The small nozzle showed the highest fan efficiency at the minimum noise stagger position for each thrust. The small nozzle had about 1.0% higher efficiency than the nominal nozzle, while the nominal nozzle had about 1.0 PNdB lower noise.

II. INTRODUCTION

It has long been known that if the blade pitch or stagger angle of fan rotor blades could be adjusted at speeds less than design, improved performance could be obtained. The restaggering would have the effect of improving the incidence match relative to the blade's minimum loss incidence. However, it was recognized that the restaggering would result in reduced flow and pressure rise necessitating an increase in fan speed in order to maintain thrust.

This latter point leaves somewhat in doubt the question of whether or not an associated acoustic gain can be had as well. If it is hypothesized that fan noise generation is independent of fan tip speed, but is in fact more generally a direct function of blade aerodynamic loading, then a noise reduction might be obtained.

Fan noise generation can be grouped in two categories:

1. Interaction (viscous wake and potential field)
2. Turbulence (direct and indirect radiation)

The first has long been recognized as a source of blade passing frequency and harmonic noise. The restaggering process should have an effect on the width of the viscous wake and possibly its velocity decrement (loss of velocity at the wake's center).

The second generation process can come in two ways. One is from direct radiation from the turbulent wake. As in the case with the gross wake characteristics, it is assumed that the turbulence level will change with the restaggering. The second half of this category is related to the impact of inlet turbulence on the rotor blades. As these eddies strike the blade's pressure field, they cause a fluctuation which in turn manifests itself in terms of a low-amplitude pressure wave (sound wave) which moves away from the blade. It may be postulated that if the pressure field surrounding the blade is stabilized, the resulting pressure fluctuations due to turbulence impingement will be dampened. Since the turbulence strength, eddy size, and eddy concentration are random, this generating mechanism is usually associated with broadband or "haystack" (broadband-type noise with concentrations at given frequencies) noise.

The test program described in this report leads to a quantative answer to the noise reduction question when a given thrust is required.

III. VEHICLE DESCRIPTION

The fan rotor has 26 cantilevered blades and 60 outlet guide vanes (OGV's). The rotor blade pitch was designed to be variable, see Figure 2. The variable blade pitch was controlled by a hydraulic actuator assembled to the disc and supplied through the vehicle shaft from the aft end. The pitch of the fan blades were varied from -1.6° open to 21.4° closed (directions as shown in Figure 2) from the nominal stagger angle. There is an axial spacing between the blade rows of 2.45 rotor tip chords. The single-stage fan is designed to produce a pressure ratio of 1.5 at a corrected tip speed of 1160 feet per second (353.568 m/sec). The fan was modelled after Fan B in the Quiet Engine Program.[1] There are significant differences between Fan B scale model and the variable pitch fan. These include: the addition of 2.5 inches (6.35 cm) to the rotor - OGV spacing which represents a large percentage increase. In fact, the spacing-to-chord-ratio was increased from 2.0 to 2.45. The rotor tip clearance has been increased to allow for the rotor stagger changes, and the hub radius was increased to clear the pitch actuator mechanism and to allow for stagger changes. These design changes make it difficult to compare directly the variable pitch fan acoustic data with the Fan B scale model data. The inlet configuration was standard bellmouth with "standard" frame treatment as shown in Figures 1 and 3. The amount of acoustic treatment at each location is summarized in Table I.

Acoustic absorbing panels were placed on the fan "frame" walls. This material consists of 1/2-inch (1.3 cm) polyurethane foam (Scottfelt 3-900) backed by a solid plate and covered with a perforated face plate with 1/16-inch (0.2 cm) diameter holes and an open area ratio of 22-1/2%.

Three fixed-area nozzles were used for acoustic and aeromechanical testing. The small, nominal, and large nozzles had areas of 372 in.^{2} (2399.4 cm^2), 396 in.^{2} (2554.2 cm^2), and 460 in.^{2} (2967 cm^2), respectively.

Aerodynamic data were taken with arc rakes ahead of the rotor and behind the stator. These rakes and other aerodynamic probes were removable so that they would not interfere with acoustic testing.

Table I. Variable Pitch Fan Scale Model Acoustic Treatment Areas.

Location	Area, in.^{2} (cm^2)
Inlet	812 (5237.4)
Rotor - OGV's	
Inner Wall	315 (2031.75)
Outer Wall	1007 (6495.15)
Aft of OGV's	
Inner Wall	417 (2689.65)
Outer Wall	668 (4308.6)
Total	3219 (20762.55)

IV. TEST PROGRAM AND DATA ANALYSIS

The test program was conducted at General Electric's Peebles Test Site. The vehicle was located on Site IV B on the scale model Fan Component Test Stand, (see Reference 1 for location photo). The vehicle was driven by a front drive shaft powered through a gearbox by a General Electric LM1500 gas turbine engine. The gearbox and the LM1500 are contained within acoustically absorbing housings.

Acoustic data were taken by microphones placed on a 100-foot (30.48 m) arc centered at the fan inlet centerline at a height of 15 feet (4.572 m). The microphones were placed at 10 degree intervals from 20 degrees from the inlet axis around to 160 degrees from the inlet axis. The field between the microphones and the vehicle is covered with asphalt.

The acoustic data were recorded on a 28-channel Sangamo recorder with appropriate amplifiers for simultaneously recording 26 channels of acoustic data on FM with flat response through 20 kHz at a tape speed of 60 in./sec (152.4 cm/sec).

Acoustic testing was restricted to winds of 5 mph steady and gusts of no more than 2 mph above the maximum steady wind from any direction. In addition, data were not taken when the field was wet or snow covered, relative humidity was less than 30% or in excess of 90%, or temperatures less than 20° F. Also, all instrumentation protruding into the flowpath was removed prior to acoustic testing.

Data were taken on 14 microphones for five constant thrust lines at various stagger angles. The speed range was from 60% to 90% of design speed. For each data point a repeat point was also taken. The repeat point helps to establish the scatter which is an integral part of all testing that relies on the average of a time unsteady signal.

The effect of varying the fan operating line was investigated with the scale model by testing three nozzle sizes. Each nozzle was run at five constant thrust lines with various stagger angles to determine their effects on aerodynamic and acoustic performance.

The acoustic data were analyzed in two ways. Most of the analysis was in 1/3-octave bands. These were obtained using a General Radio parallel filter set with a 32-second averaging time. All data were corrected to a standard day of 59° F and 70% relative humidity. The other method of analysis was through narrowband filtering in 40 Hz bandwidths. For these analyses a UA-6A Federal Scientific Ubiquitious Spectrum Analyzer and a high resolution digital averager were used with a 12.8-second averaging time. This method of analysis provides a more detailed look at the spectrum than does 1/3-octave analysis, particularly when pure tone content is under investigation.

Aerodynamic data were recorded for a broader range of operating parameters than that employed in acoustic testing. Ample data were acquired to determine the flow, pressure ratio, and efficiency of the fan for the three operating lines at various stagger angles.

Together the acoustic and aerodynamic data establish the performance tradeoffs for a given noise decrease. That is, the maximum efficiency and minimum noise stagger can be determined for a given thrust level and operating line.

Acoustic tests were conducted at five constant thrust lines, with three nozzle sizes, for various blade stagger angles. Table II summarizes the configurations for which data were obtained.

Table II. Test Data on Variable Pitch Fan
Standard Frame Treatment with Stagger
and Nozzle Variations.

% Thrust	Blade Angle	Speed and Reading No.					
		Physical Speed	Nom. Nozzle	Physical Speed	Small Nozzle	Physical Speed	Large Nozzle
44	-1.6	4246	467/480	4307	544/556	4173	508/519
(Approach)	1.4	4372	469/482	4421	546/558	4316	510/521
	6.4	4651	474/487	4703	551/563	4676	514/525
	11.4	5071	477/490	5090	553/565	5263	516/527
	16.4	5840	479/492	5830	555/567	6699	518/529
55	-1.6	4766	493/500	4960	568/575	4624	530/537
	1.4	4885	470/483	5051	547/559	4843	511/522
	6.4	5229	496/503	5271	570/577	5310	533/540
	11.4	5730	497/504	5700	572/579	6128	535/542
	15.0	6702	499/506	6701	573/580		
65	-1.6	5165	468/481	5450	545/557	5013	509/520
	1.4	5291	471/484	5467	548/560	5277	512/523
	6.4	5682	475/488	5714	552/564	5839	515/526
	11.4	6290	478/507	6242	554/566	6702	517/528
75	-1.6	5563	494/501	5845	569/576	5392	531/538
	1.4	5662	[illegible]	5851	549/561	[illegible]	513/524
	6.4	6103	476/489	6128	571/578	6412	534/541
	10.4	6703	498/505	6704	574/581		
100	-1.6	6332	495/502			6284	532/539
(Takeoff)	3.4	6705	473/486	6690	550/562	6702	536/543

Small Nozzle = 372 in.^{2} (2399.4 cm^2)

Nominal Nozzle = 396 in.^{2} (2554.2 cm^2)

Large Nozzle = 460 in.^{2} (2967 cm^2)

Test Date 1-12, 13-73

V. TECHNICAL DISCUSSION

A. DATA PRESENTATION

1. Noise Scaling

The data presented have been scaled to reflect a full-scale fan design. The scale factor was 0.484. This results in a full-scale fan which is 73.35 inches (186.309 cm) in diameter. The effect of the scaling is to lower the frequency spectrum, since for a given tip speed a larger fan turns at a lower rotational speed than a smaller fan. For the case being considered, the scaling requires a downward shift of three 1/3-octave bands or one octave. In addition to the frequency shift, the noise levels were scaled by adding to the scale model 1/3-octave band noise levels a factor 10 times the logarithm of the ratio of the full scale to the scale model weight flow.

The scaling process gives a more realistic evaluation of the extrapolation of the noise data to distances far from the fan. This is true because of the difference in attenuation of various frequency noises in air. With the spectral components of noise in their proper bands, this attenuation is applied in a more realistic manner.

2. Core Jet Noise Addition

The scale model variable pitch fan (VPF) used here does not contain the core jet which is a major noise source in an actual engine. In many instances, this noise has a dampening effect on the overall engine noise reduction brought about by a fan noise reduction. For this reason, some of the data presented in this report contain an addition for the core jet noise of a full-scale engine.

The jet noise levels were predicted from a correlation of jet noise data based on the weight flow, area, and velocity of the jet.[2] For the take-off fan speed these parameters were

Weight Flow	-	135 lbm/sec (61.29 kg/sec)
Area	-	3.9 ft^2 (0.3624 m^2)
Velocity	-	1158 ft/sec (352.9584 m/sec)

and for the approach fan speed:

Weight Flow	-	75 lbm/sec (34.05 kg/sec)
Area	-	3.9 ft^2 (0.3624 m^2)
Velocity	-	566 ft/sec (172.5168 m/sec)

3. Flight Velocity Effects

There are two direct effects of aircraft flight velocity which alter the noise spectra. First the velocity results in Doppler shifting of the spectrum. In the case being considered here, a flight velocity of 279 ft/sec (85.0392 m/sec) ((M_o = 0.25) was used. Where applicable Doppler shifting was included for level flyovers of the fan and core jet noise.

The second effect acts to reduce the jet noise. This is due to a reduction in the relative velocity between the jet and the surrounding air (ambient air). The test data are, of course, taken statically; thus, a correction is required. This correction is computed by using the procedure recommended in the SAE's AIR 876 "Jet Noise Prediction". The static and flight spectra are predicted by the fan jet as suggested by AIR 876.

The parameters used for the fan at takeoff speed were:

Weight	-	692 lbm/sec (314.168 kg/sec)
Area	-	11.8 ft^2 (1.0966 m^2)
Velocity	-	795 ft/sec (242.316 m/sec)

and for the approach fan speed:

Weight Flow	-	434 lbm/sec (197.036 kg/sec)
Area	-	11.8 ft^2 (1.0966 m^2)
Velocity	-	496 ft/sec (151.1808 m/sec)

The differences between these predicted spectra are then subtracted from the test data.

In addition, the frequency range over which the relative velocity correction is applied is important. That is, the relative velocity correction can only be applied over the frequency range in which jet noise is dominant. The determination of this point is largely done by examining the test spectra and designating the frequency by noting the dip in noise level which generally denotes the jet region (usually below 400 Hz) and the fan dominant region (usually above 400 Hz). The resulting spectra is then smoothed between the two regions of the spectra which are dominated by fan and jet noise.

Together the alterations made to the basic data cited above provide a means for evaluation of the test results under more meaningful conditions than would be provided for by the static scale model fan data alone.

B. EFFECTS OF STAGGER VARIATION ON NOISE

The data presented in this section are for the nominal nozzle (396 $in.^2$, 2554.2 cm^2) 200-foot (60.96 m) sideline maximum perceived noise level (PNL) variations with stagger angle on a full-scale fan basis. The fan has "standard" frame treatment as previously described.

Figure 4 shows the aft maximum 200-foot (60.96 m) sideline PNL for constant thrust at various delta stagger angles (Referenced to the original design stagger angle). At 44% of takeoff thrust (approach) the minimun noise delta stagger is approximately 8° closed from nominal stagger, (the design stagger angle), and indicates 1.8 PNdB lower noise than the nominal stagger PNL. At 100% thrust (takeoff), little data were obtained due to physical speed limitations of the scale model vehicle. For the range of delta stagger from 1.5 degrees open to 3.5 degrees closed, essentially no change in PNL was observed at 100% thrust. For the intermediate constant thrust lines of 55%, 65%, and 75% thrust, the PNL follows the same trends as the 44% thrust line. The delta PNL between nominal stagger and minimum noise stagger decreases with increasing thrust. The minimum noise stagger angle also decreases; that is, approaches nominal stagger, with increasing thrust. For the nominal nozzle (396 $in.^2$, 2554.2 cm^2), the front maximum PNL distribution with variable stagger and for constant thrust is shown in Figure 5. The front maximum PNL distribution follows about the same trend as the aft maximum PNL distribution. The delta PNL between the aft and front is about 4 PNdB, with the front being lower, at nominal and minimum noise stagger positions.

Figures 6 and 7 show the maximum PNL variation with percent corrected thrust for nominal stagger and variable stagger minimum PNL. The data is shown for the nominal nozzle configuration. These figures reemphasize the variable stagger minimum noise characteristics relative to the nominal stagger noise for various percent corrected thrusts. The greatest noise reduction in the aft quadrant was obtained at the approach thrust condition (44% F_n). The 200-ft (60.96 m) sideline maximum PNL reduction for this condition is about 1.8 PNdB. Variable stagger minimum PNL reduction decreased with increasing thrust and approached the nominal stagger noise level at 100% thrust (takeoff). The maximum forward noise reduction also occurs at the approach condition with a decrease of about 2.2 PNdB. The trend in noise reduction with increasing thrust for the forward quadrant is similar to the aft quadrant.

Figures 8 through 12 show the 200-ft (60.96 m) sideline perceived noise level for the nominal nozzle at nominal stagger and variable stagger minimum noise condition as a function of the angle from the inlet for a range of thrust from 44 to 100%. These data indicate that by varying the stagger angle of the rotor blade the noise reduction is obtained over a wide angular range. As thrust is increased from 44%, the delta PNL between nominal stagger and minimum noise stagger decreases to almost zero at 100% thrust (Figure 12) for the whole angular range.

A 1/3-octave special comparison at 50 degrees from the inlet axis, Figure 13, at 44% thrust shows that the broadband noise of the variable stagger minimum noise condition is generally lower than that for the nominal stagger case throughout the frequency range with the exception of the 315 Hz band where the minimum noise stagger is about 3 dB higher than the nominal stagger level. Presently, no explanation can be given for the 315 Hz frequency band change.

The blade passing frequency (BPF) and the second harmonic nominal and minimum noise stagger SPL levels are seen to be approximately equal. Figure 14 shows the spectral distribution for the aft maximum PNL angle. The blade passing frequency SPL is seen to be higher at the minimum noise stagger condition, but the second harmonic SPL is slightly lower along with the majority of the rest of the frequency spectrum.

Figures 15 through 20 illustrate the 1/3-octave spectral comparison at the maximum forward and aft noise angles for 55%, 65%, and 75% thrust. The SPL reduction in other frequency bands more than compensates for the increase in BPF SPL at constant thrust resulting in a variable stagger minimum PNL.

Figures 21 and 22 show the 100% (takeoff) thrust 1/3-octave spectral distribution. Stagger variations from 1.5 degrees open to 3.5 degrees closed seem to have little effect on the 200-ft (60.96 m) sideline PNL distribution (see Figure 12). The BPF levels increased for the minimum noise stagger while the higher frequencies have lower SPL levels.

Typical narrowband data are presented in Figures 23 through 26. These narrowbands are for the front and aft maximum PNL angles at 44% and 65% thrust with the nominal fan nozzle configuration. A 40 Hz bandpass filter was used in each case. The data are uncorrected (i.e., not adjusted to standard day atmospheric conditions) narrowbands on the 100-foot (30.48 m) measuring arc for the scale model size fan. The two curves presented on each plot are 1.5 degrees open (closest to nominal) and minimum noise (closest to minimum) stagger. At the 50° angle, both the 44% and 65% thrust conditions show a considerable decrease in broadband noise, although the BPF and its harmonics have increased for the minimum noise stagger. The end result, on a scaled up basis, was a decrease in PNL as shown in Figures 8 and 10. The upward shift in frequency for the minimum noise stagger is due to an increase in speed necessary to maintain constant thrust when varying the stagger. At 130° the trends are similar to the front quadrant except the levels are higher.

Summarizing the narrowband data it appears that at each thrust level for which a minimum noise level is obtained due to a stagger change the broadband noise goes down and the BPF and its harmonics increase. Assuming the noise generating mechanisms noted in Section III-A are acting, it may be concluded that the decrease in broadband noise can be attributed to dampened pressure fluctuations; that is, the pressure field surrounding the blade at the minimum noise stagger position is more stabilized, and random inflow turbulence therefore has less effect on the pressure field. The increase in tone noise can be attributed to increased wake momentum loss associated with the higher blade relative velocity required to maintain constant thrust.

C. LEVEL FLYOVER SCALED DATA

The data presented in this section has been not only scaled to full size but a core jet noise source has been incorporated in the data, and flight effects on the noise signature have been included. As previously stated, the jet noise levels were predicted from a correlation of jet noise data based on the weight flow, jet nozzle area, (2) and jet velocity. Also included were flight velocity effects such as Doppler shifting of the spectra, and jet noise reduction due to a decrease in the relative velocity between the jet and the surrounding air.

Figure 27 shows the perceived noise level (PNL) for a 1000-foot (304.8 m) level flyover of the scaled fan noise at takeoff with a prediction of the core jet noise added. This configuration has standard frame treatment and a 396 in.^{2} (2554.2 cm^2) (nominal) fan nozzle area. These data indicate little difference between the nominal stagger and variable stagger minimum noise PNL distributions much like the nonflyover PNL data presented previously. A calculation of the EPNL from these data indicates that the noise levels are approximately equal, 96.6 EPNdB for nominal stagger and 97.1 EPNdB for minimum noise stagger. The tone corrected PNLT distribution, Figure 28, shows the maximum aft has shifted from 130 to 120 degrees and the minimum noise stagger is 2 PNdB higher than nominal stagger. This increase is attributed to the BPF tone correction and speed increase required to maintain constant thrust.

The 1/3-octave spectral comparison for the front and aft maximum PNL at 1000-foot (304.8 m) level flyovers are shown in Figures 29 and 30. The linear variation of SPL with frequency in Figures 29 and 30 below 400 Hz is indirectly a result of the relative velocity correction. When the jet noise is adjusted downward to account for the relative velocity, the fan spectrum must then be smoothed into the jet noise. This is done by decreasing the fan noise 2 dB per 1/3 octave until the jet noise is encountered. If, however, the jet noise has been adjusted so low as to not make an intersection possible, then the linear level variation results. Figure 31 shows an extrapolation to 2000 feet (609.6 m) for the front maximum PNL. The nominal stagger and variable stagger minimum PNL at takeoff are seen to be nearly coincident.

From the data presented above, it appears that variable stagger cannot serve as an effective means to reduce noise at the takeoff thrust condition.

Continuing with the level flyover scaled data, Figures 32 through 35 show data for the approach (44% of takeoff) thrust condition at 370-foot (112.776 m) level flyover. The PNL distributions for nominal stagger and variable stagger minimum noise are shown in Figure 32. The minimum noise stagger indicates a decrease of approximately 2.5 - 3.0 PNdB around the arc. The tone corrected PNL distribution over the arc is shown in Figure 33. The delta PNLT between the nominal and minimum noise stagger has decreased. The forward maximum angle has a delta PNdB of about 0.5, and the aft maximum angle has coincident points. The EPNL for 44% of takeoff thrust are 95.9 EPNdB for nominal stagger and 94.8 EPNL for minimum noise stagger. A spectral comparison at 50 degrees, Figure 34, shows the effect of doppler shifting of the spectrum due to the forward motion of the engine. The BPF at this speed is 915 Hz (1000 Hz band), while the spectrum shows one 1/3 octave shift to the 1250 Hz band for the front angle (the plane flying towards an observer). The spectrum at 130° shows a downward shift in BPF to the 800 Hz, 1/3-octave band (the plane flying away from an observer). This phenomenon did not occur at takeoff because the maximum angles were 70 degrees and 120 degrees. At these angles the range to the ground does not change fast enough to cause a Doppler shift significant enough to result in a 1/3-octave displacement.

The linear ramp due to the extrapolation of the fan noise data over the reduced jet noise is also evident. The difference between the two curves in the linear range is probably not meaningful since the slope is at best approximate.

In summary, the flyover data for the nominal nozzle show a reduction in noise when closing the blade at thrust levels below 100%. At approach (44%) thrust, the minimum noise stagger was about 1.0 EPNdB quieter than the nominal stagger position. At takeoff, there was no gain on an EPNL basis.

D. FAN NOZZLE VARIATIONS

All of the data presented previously were with a nominal area (396 in.^{2}, 2554.2 cm^2) fan exhaust nozzle. That is, a nozzle which results in a 1.415 pressure ratio at 91% speed with a nominal (design) stagger position. In addition to this nozzle two other nozzles were tested at various stagger angles for five constant thrust lines. The smaller nozzle was 6% under nominal and the larger was 16% over nominal. Complete sets of data were taken for each nozzle.

First let us examine the 200-foot (60.96 m) sideline aft maximum PNL variations at different stagger angles for constant thrust lines with the small and large nozzles. Figure 36 shows that the minimum PNL stagger for the small nozzle occurs at a more closed position than the nominal nozzle (Figure 4); and the large nozzle, Figure 37; minimum noise stagger occurs at a more open position. The minimum noise is lower for the large nozzle than the small nozzle except at the 55% thrust line where the minimum noise level is slightly higher with the large nozzle.

At nominal stagger the PNL for the large nozzle is lower than nominal nozzle at all thrust levels, but at their respective minimum noise stagger positions the nominal nozzle configuration has lower noise.

The aft maximum delta PNL's between nominal stagger and variable stagger minimum noise are shown in Figures 38 and 39. For the small nozzle, considerable difference (approximately 2.5 PNdB) exists between nominal stagger and minimum noise stagger, while the large nozzle shows very little change. Apparently, the higher flow associated with the larger exhaust nozzle has brought the incidence angle back toward the minimum loss position thus reducing that which can be gained by adjusting the stagger angle.

Figures 40 through 44 show the 200-foot (60.96 m) sideline PNL directivity with the small nozzle for constant thrusts. The variable stagger minimum noise is considerably lower than nominal stagger at all thrust levels. Speed limitations at 100% thrust made it impossible to obtain acoustic data at stagger angles beyond nominal for the small nozzle. Closing the blade at constant thrust was speed limited while opening the blade was limited by the blade stall line.

Figures 45 through 54 show 1/3-octave frequency spectra for the front and aft maximum PNL at various thrust levels. The narrowbands for 44% and 65%

thrusts, Figures 55 - 58, show the predominance of BPF and the harmonics. The curves shown are for staggers closest to nominal and minimum noise stagger. The frequency shift on the narrowbands at different stagger angles is due to a speed change required to maintain constant thrust.

For the large nozzle, the scaled data show little difference on a PNL basis between nominal stagger and minimum noise stagger, see Figures 59 through 63. The directivity pattern is similar to the nominal and small nozzle; that is, rear noise dominant. Large nozzle spectral comparisons at constant thrust for nominal and minimum noise stagger are shown in Figures 64 through 73. Except for 100% thrust, the SPL levels at BPF for the minimum noise stagger are equal to or greater than the nominal stagger SPL levels. As previously mentioned, this increase in level is due to an increase in speed.

To summarize the effects of nozzle variations on a variable stagger minimum noise, Figure 74 is provided. This figure shows the 200-foot (60.96 m) sideline aft maximum PNL vs. percent corrected thrust for the three fan exhaust nozzles. The data has been scaled to full size. The plot shows the large nozzle to be approximately 0.4 PNdB higher than the nominal nozzle at all thrust levels. The small nozzle is consistantly higher at all thrust levels. The nominal nozzle proves to be the lowest minimum noise configuration. Figure 75 shows the minimum noise variations with thrust for a fixed pitch and nozzle, a fixed pitch and variable nozzle, and a variable pitch and nozzle. With the variable pitch and nozzle, a reduction of about 1.0 to 1.5 PNdB was obtained from 44% to 75% of takeoff thrust. As it turns out, the nominal fixed nozzle was minimum noise with a variable pitch rotor for this particular fan.

E. AERODYNAMIC PERFORMANCE DATA

Figures 76 through 78 show the variations in corrected fan speed with stagger for constant thrust. The negative delta stagger indicates open from nominal and positive is closed from nominal stagger. It can be seen on these plots that the speed increases considerably when closing the rotor blade to maintain a constant thrust.

The aerodynamic performance maps are shown for nominal, small, and large nozzles in Figures 79, 80, and 81, respectively. The three operating lines on the performance maps were determined by using a set of fixed nozzles of different areas. The performance maps include stagger variation for a given percent corrected speed. For ease of correlation lines of constant thrust are superimposed on the maps. The difference between acoustic data points and constant thrust lines on the performance maps occur since acoustic data were not taken at exactly the same point as aero data. Efficiency trends for variable stagger at constant thrust are illustrated for each nozzle in Figures 82 through 84. Peak efficiency varies as follows; with the small nozzle (Figure 80) the peak efficiency for constant thrust occurs at a more closed stagger angle than the nominal nozzle, and the large nozzle has its peak efficiency at a more open stagger angle. It is interesting to note that for the large nozzle, the 44% thrust condition is more efficient than any other thrust for every delta stagger angle considered. The nominal nozzle shows a peak efficiency at about 8° delta stagger for the approach thrust (44%) condition. For takeoff (100%) thrust, the peak is at approximately 3 degrees closed from nominal stagger. This does not however, mean that the blade was improperly staggered in the "nominal" stagger position since the criteria used was to produce optimum efficiency at the altitude cruise point (100% fan speed).

F. AERO/ACOUSTIC NOISE TRADEOFF

In this section, aerodynamic and acoustic data are examined in a manner so as to obtain a fan vehicle with the best possible aero and acoustic characteristics. Acoustically, the best combination is with a variable pitch rotor and a nominal nozzle for the thrust range of interest (see Figure 75). At 200-foot (60.96 m) sideline, the aft maximum PNL for the nominal nozzle (Figure 4) was a minimum at 8° closed from nominal stagger for 44% thrust. The efficiency for that condition was 87%, the maximum on that thrust line (Figure 82). At 75% thrust the minimum noise and maximum efficiency were both at the same stagger angle. The trends were similar for all three nozzles, that is, the minimum noise is coincident with maximum efficiency.

The following table summarizes the minimum noise, the delta stagger, and the efficiency for each nozzle at 44% thrust and 100% thrust.

200-Foot (60.96 m) Sideline PNL_{max} - Scaled.

	100% Thrust			44% Thrust		
Nozzle	η %	PNL PNdB	Δ Stagger Degrees	η % P	PNL PNdB	Δ Stagger Degrees
Small*	8.12	118.2	1.5	87.6	105.7	10.0
Nominal	85.5	116.5	2.6	86.8	104.7	8.0
Large	82.0	117.3	-1.5	85.0	105.3	3.0

For the approach thrust condition, the best configuration from an acoustic viewpoint would be the nominal nozzle with a variable pitch rotor (Figure 75); while from an aerodynamic viewpoint, the small nozzle with a variable pitch rotor would be prefered since that configuration produces the best efficiency.

*Only one stagger angle taken at the takeoff thrust.

VI. CONCLUSIONS

1. A variable (or reverse pitch) fan can be scheduled so as to reduce noise and increase efficiency at off design thrust levels.

2. In general, the PNL reduction is obtained through broadband noise reduction. Blade passing frequency and harmonic noise tends to increase at constant thrust.

VII. REFERENCES

1. Kazin, S.B., Minzner, W.R., and Paas, J.E., "Acoustic Testing of a 1.5 Pressure Ratio, Low Tip Speed Fan (QEP Fan B Scale Model)," General Electric Company, NASA CR-120789, August, 1971.

2. "Jet Noise Predictions," AIR 876, SAE, Issued July 10, 1965.

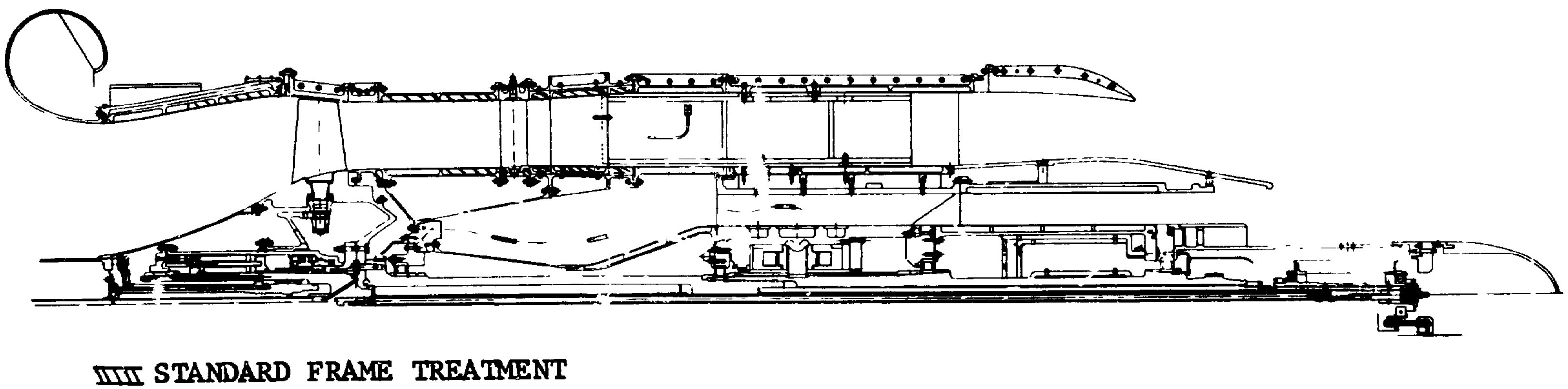

Figure 1. Variable Pitch Fan, Scale Model.

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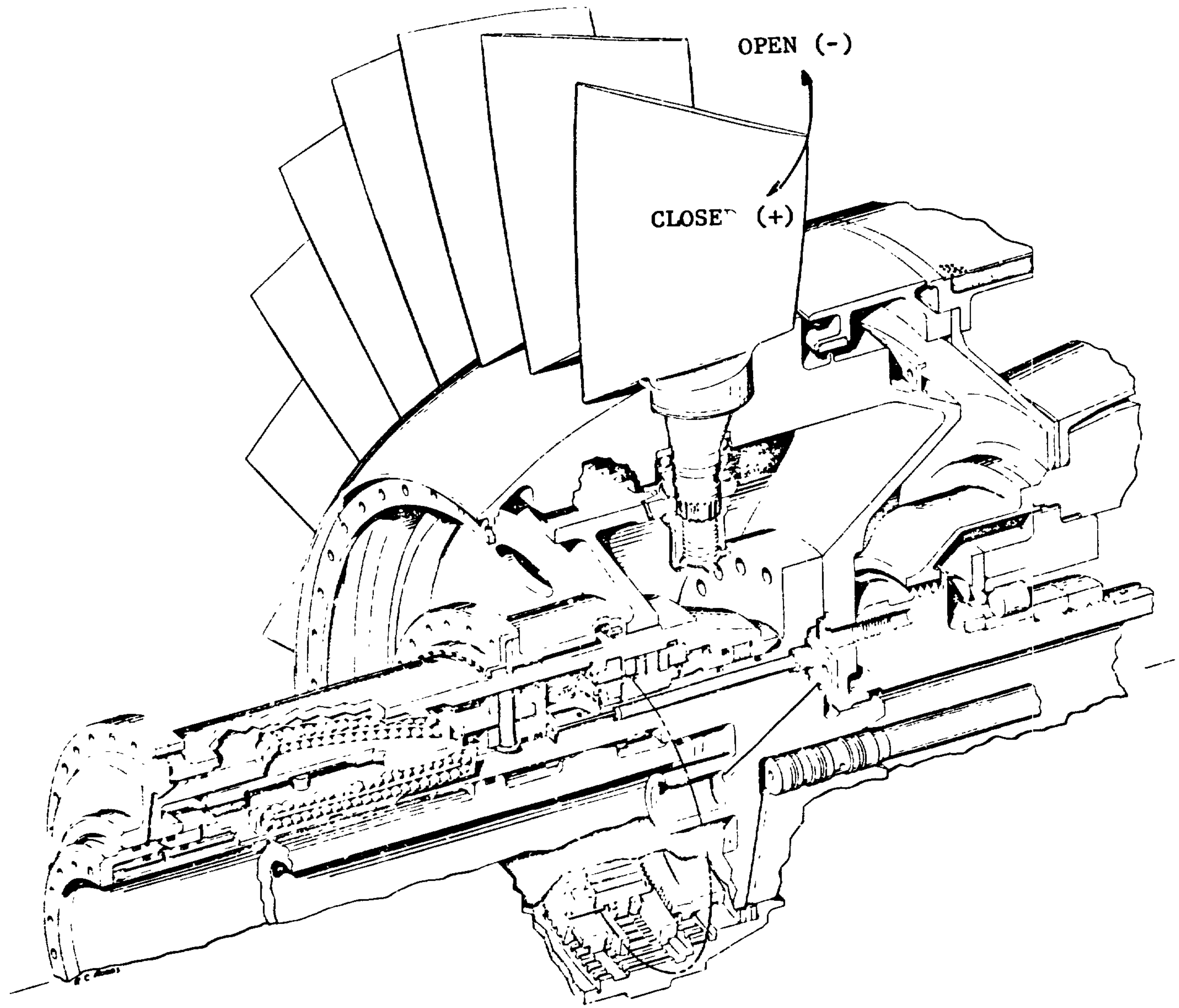
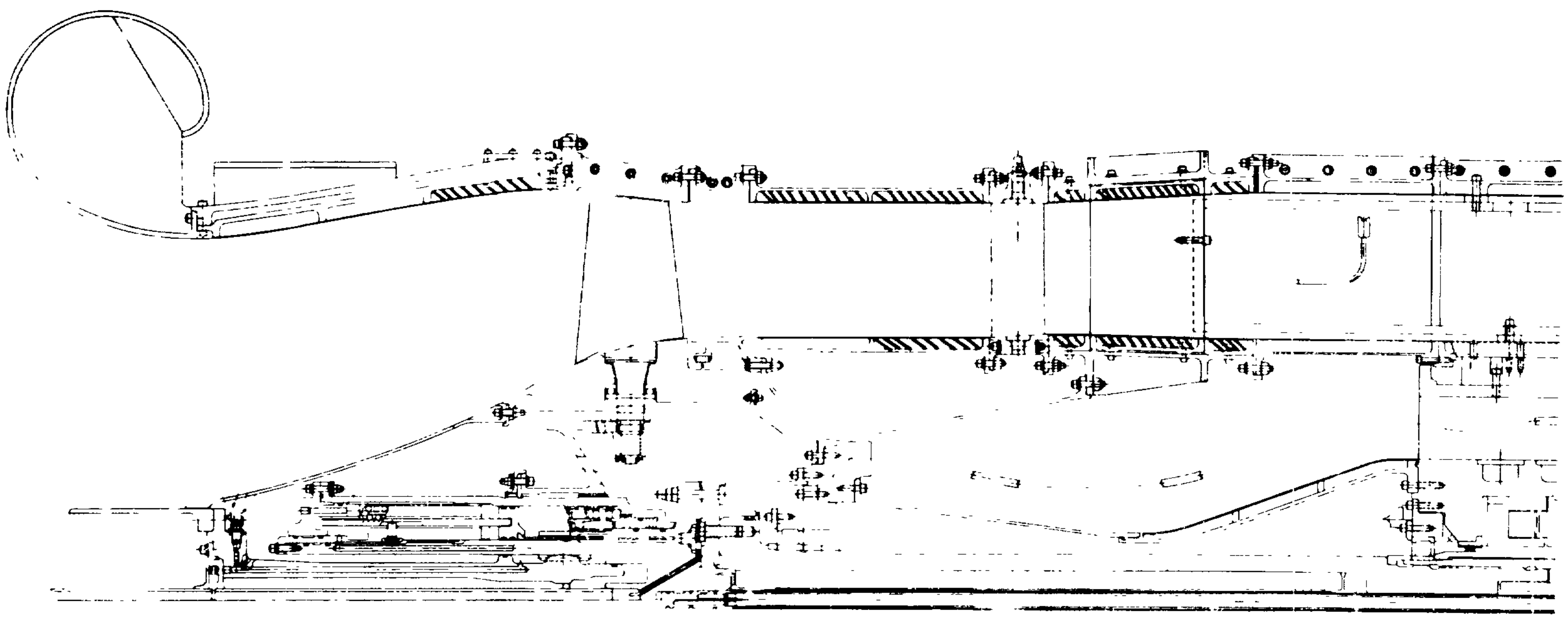


Figure 2. Variable Pitch Fan, Actuating Mechanism.



STANDARD FRAME TREATMENT

Figure 3. Variable Pitch Fan, Scale Model.

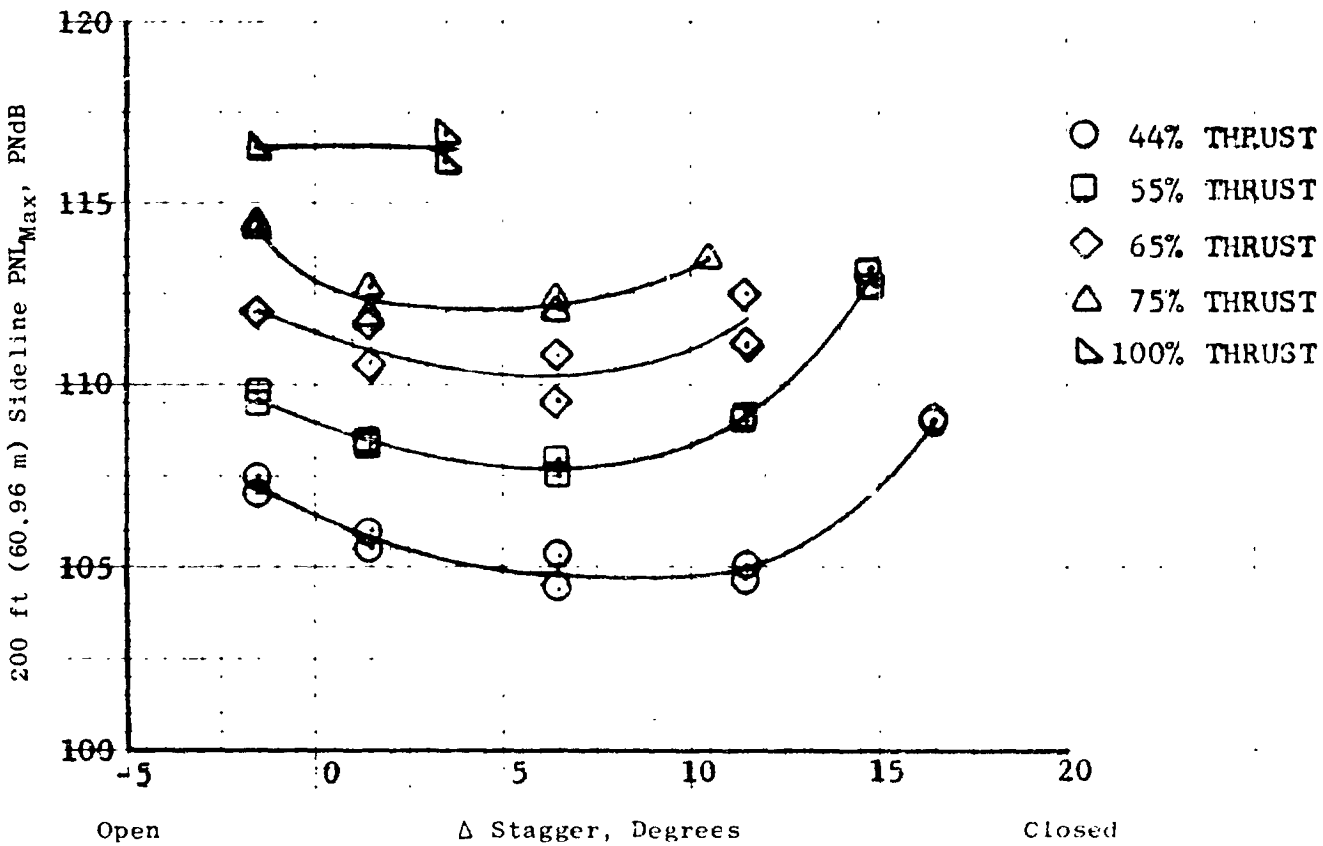


Figure 4. Aft Maximum 200-ft (60.96 m) Sideline PNL for Constnat Thrust at Var ous Delta Stagger Angles, Nominal Nozzle.

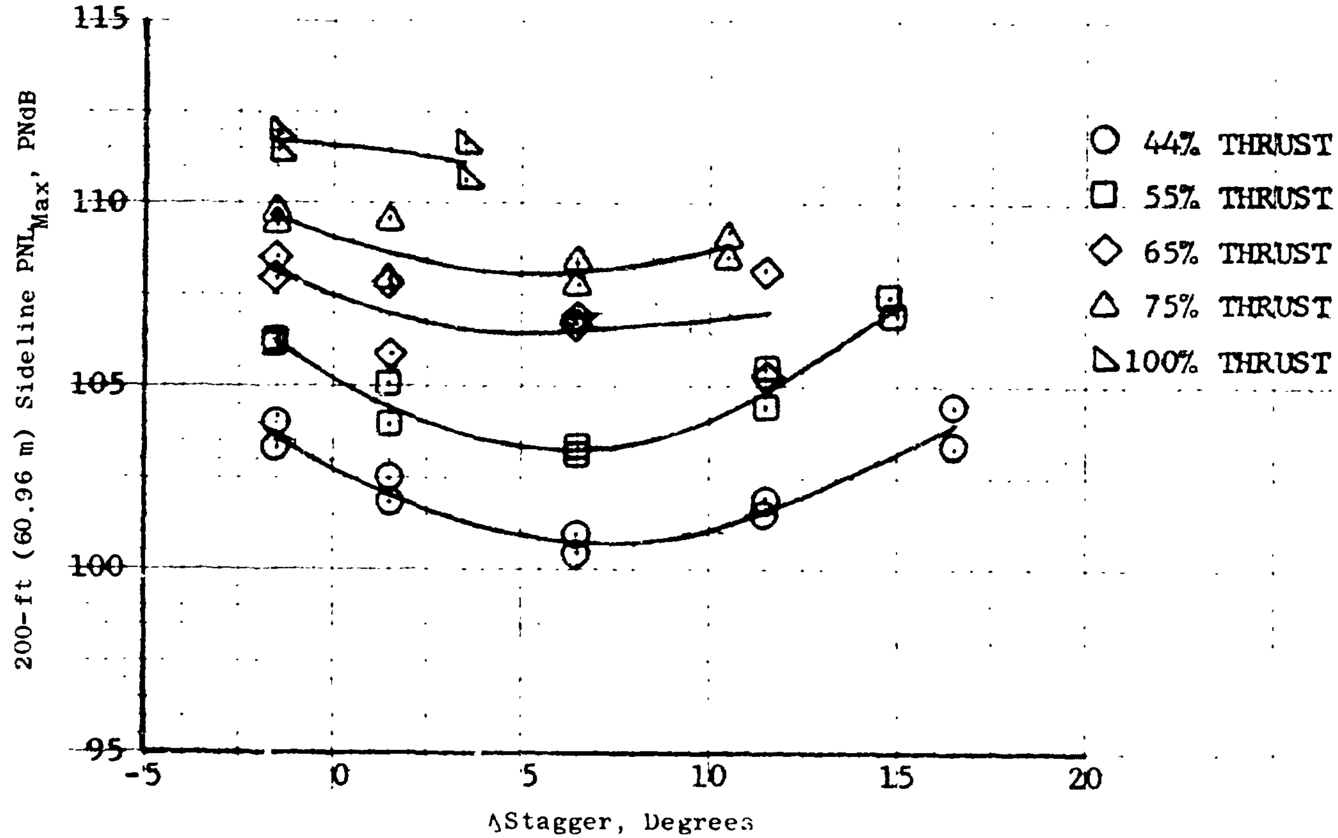


Figure 5. Front Maximum 200-ft (60.96 m) Sideline PNL for Constant Thrust at Various Delta Stagger Angles, Nominal Nozzle.

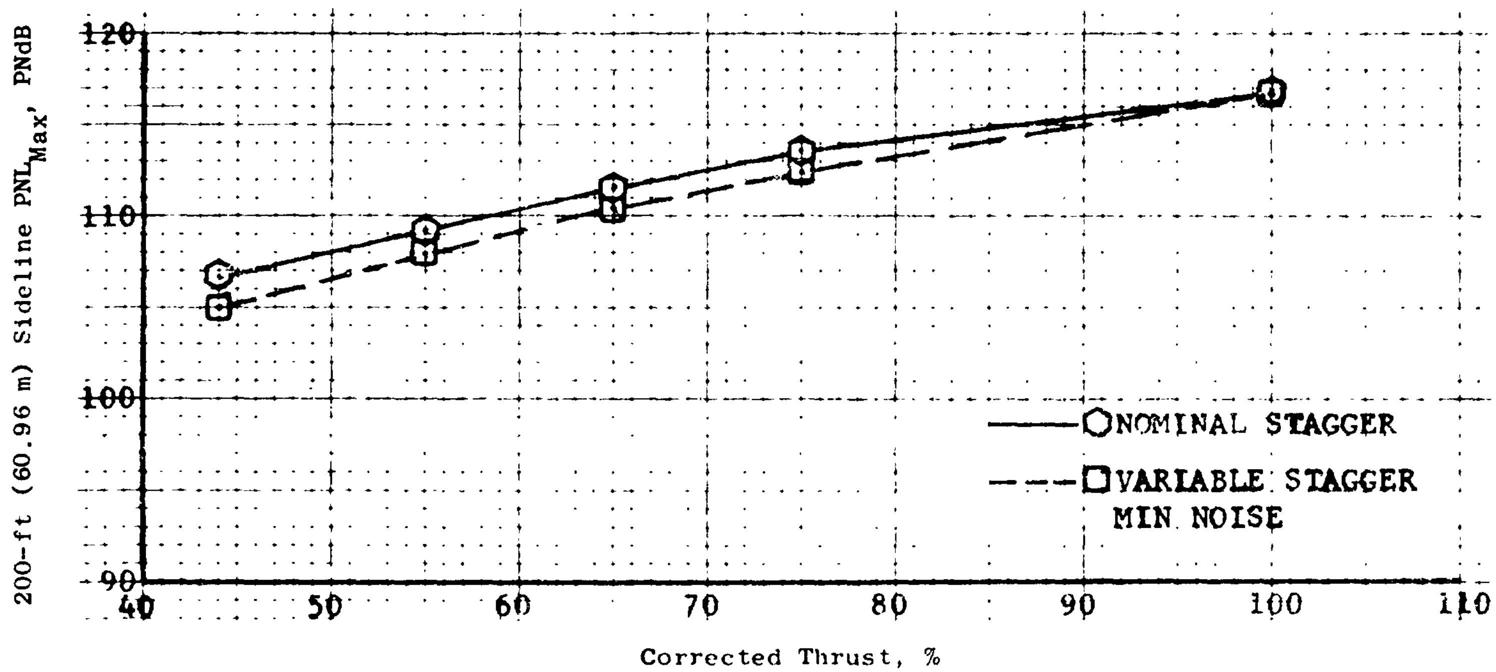


Figure 6. 200-ft (60.96 m) Sideline Maximum PNL Variation with Corrected Thrust, Aft Maximum PNL, Nominal Nozzle.

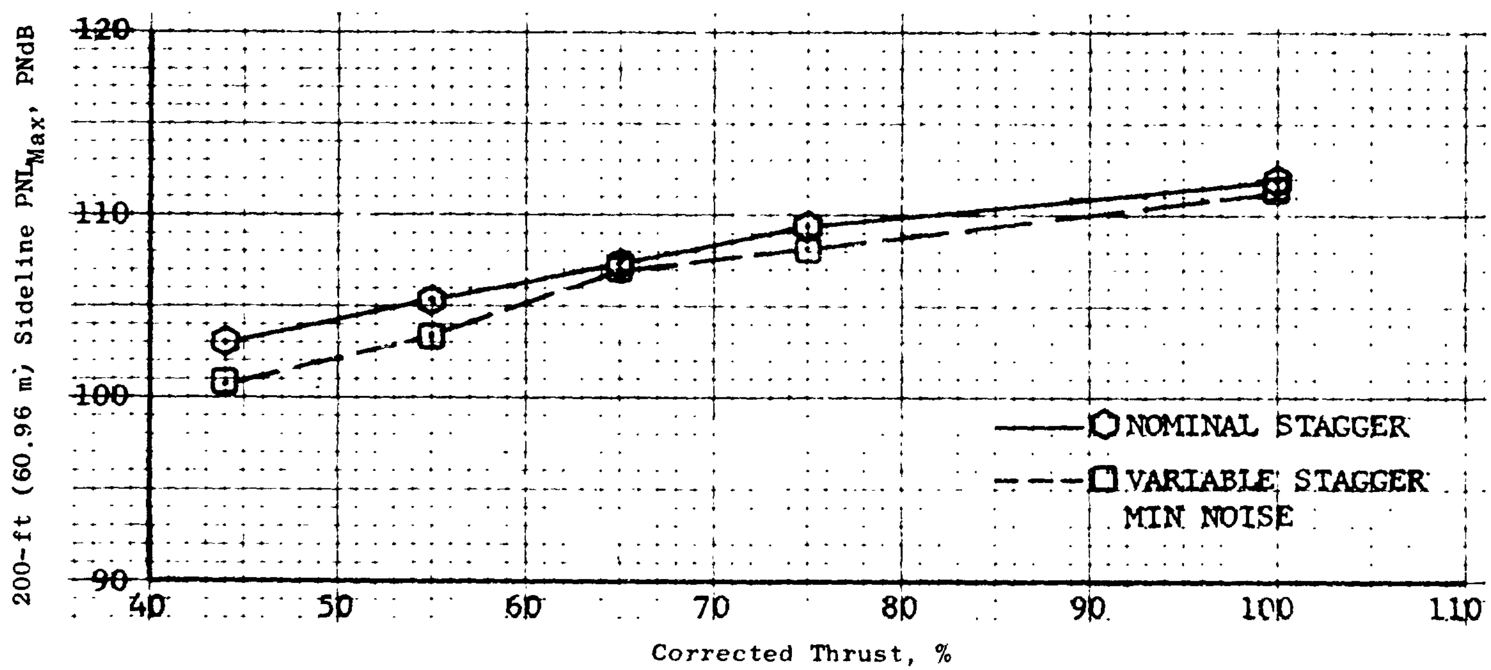


Figure 7. 200-ft (60.96 m) Sideline Maximum PNL Variation with Corrected Thrust, Front Maximum PNL, Nominal Nozzle.

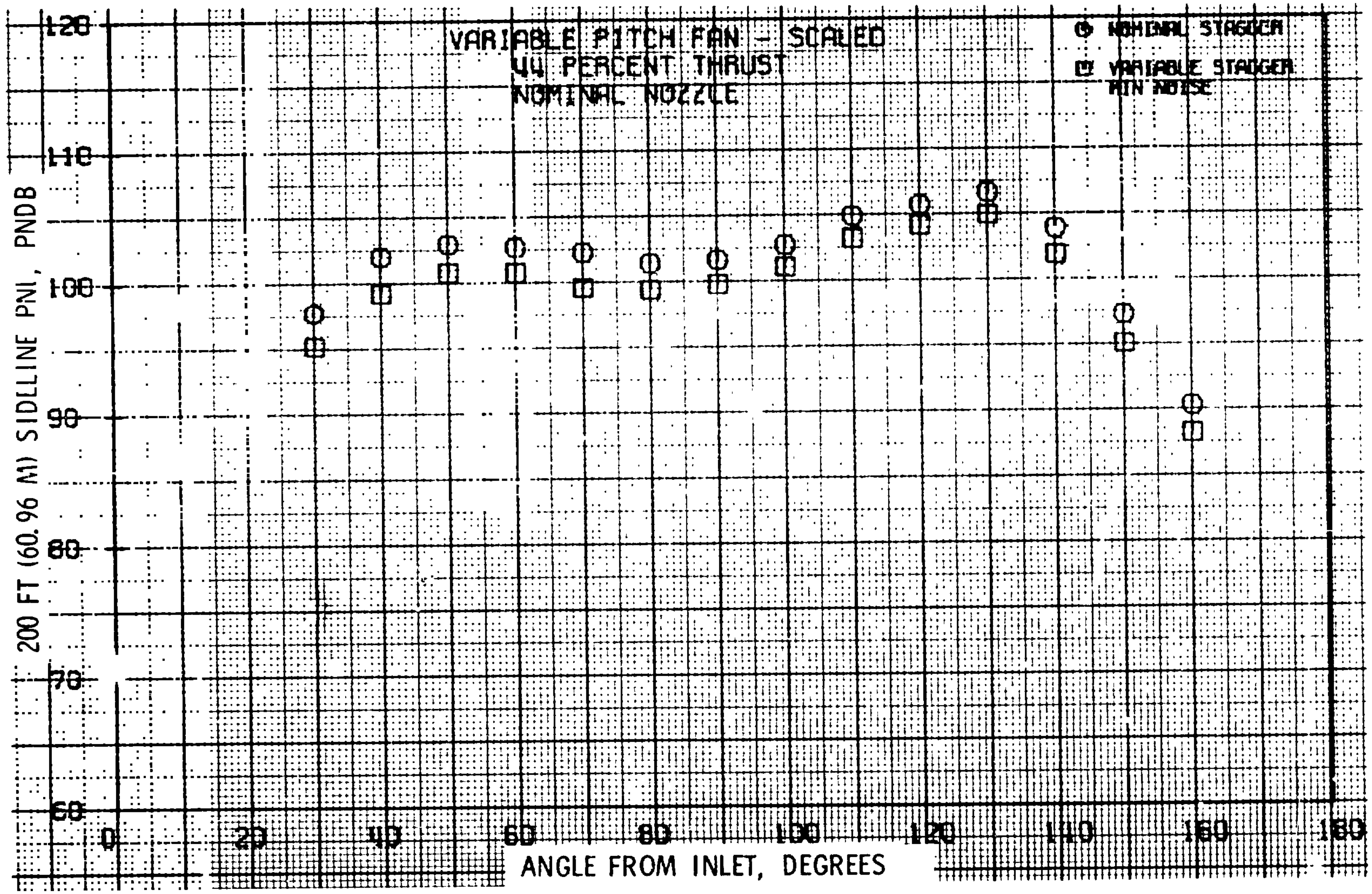


Figure 8. 200-ft (60.96 m) Sideline Perceived Noise Level, Nominal Nozzle, 44% Thrust.

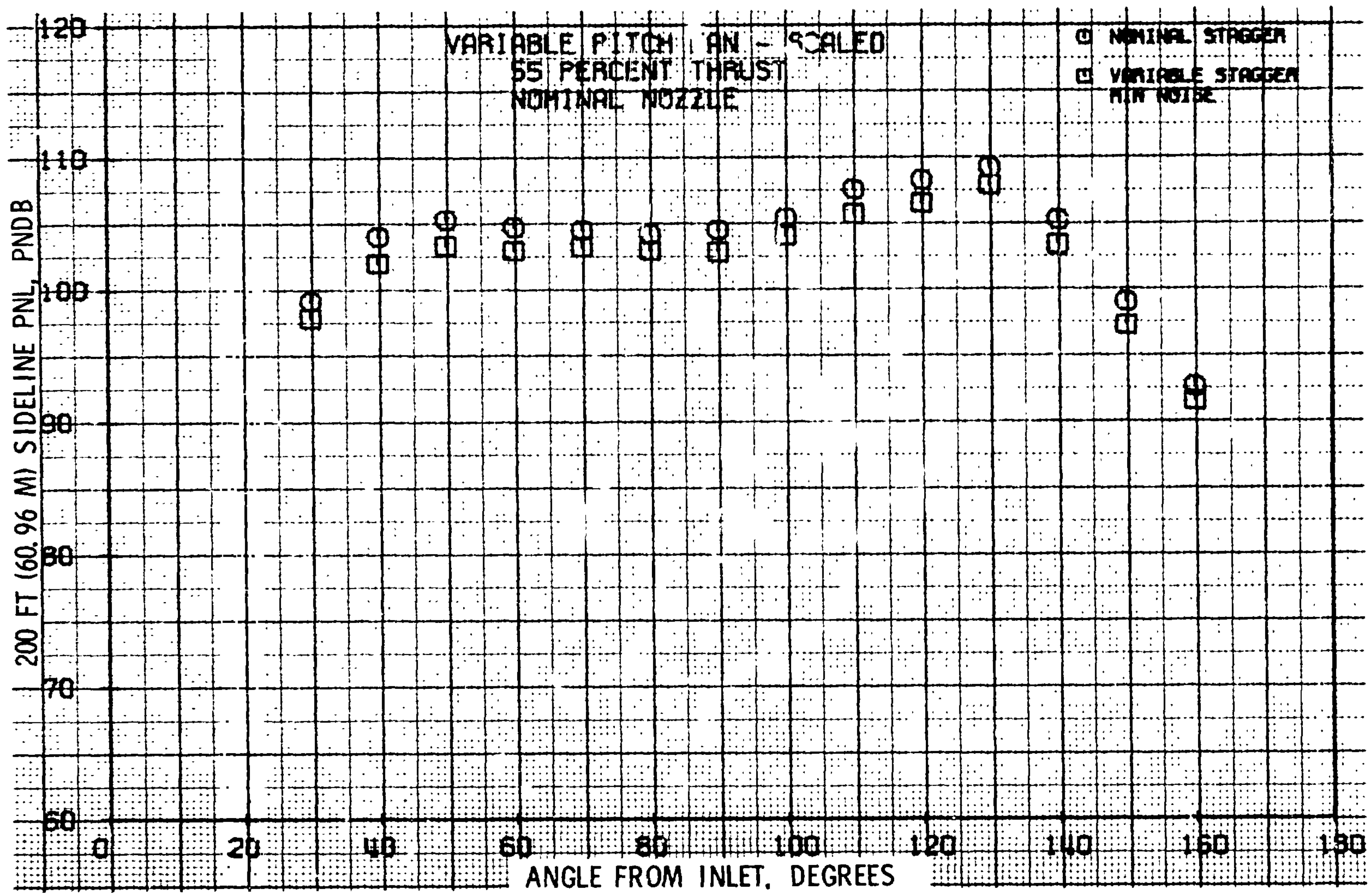


Figure 9. 200-ft (60.96 m) Sideline Perceived Noise Level, Nominal Nozzle, 55% Thrust.

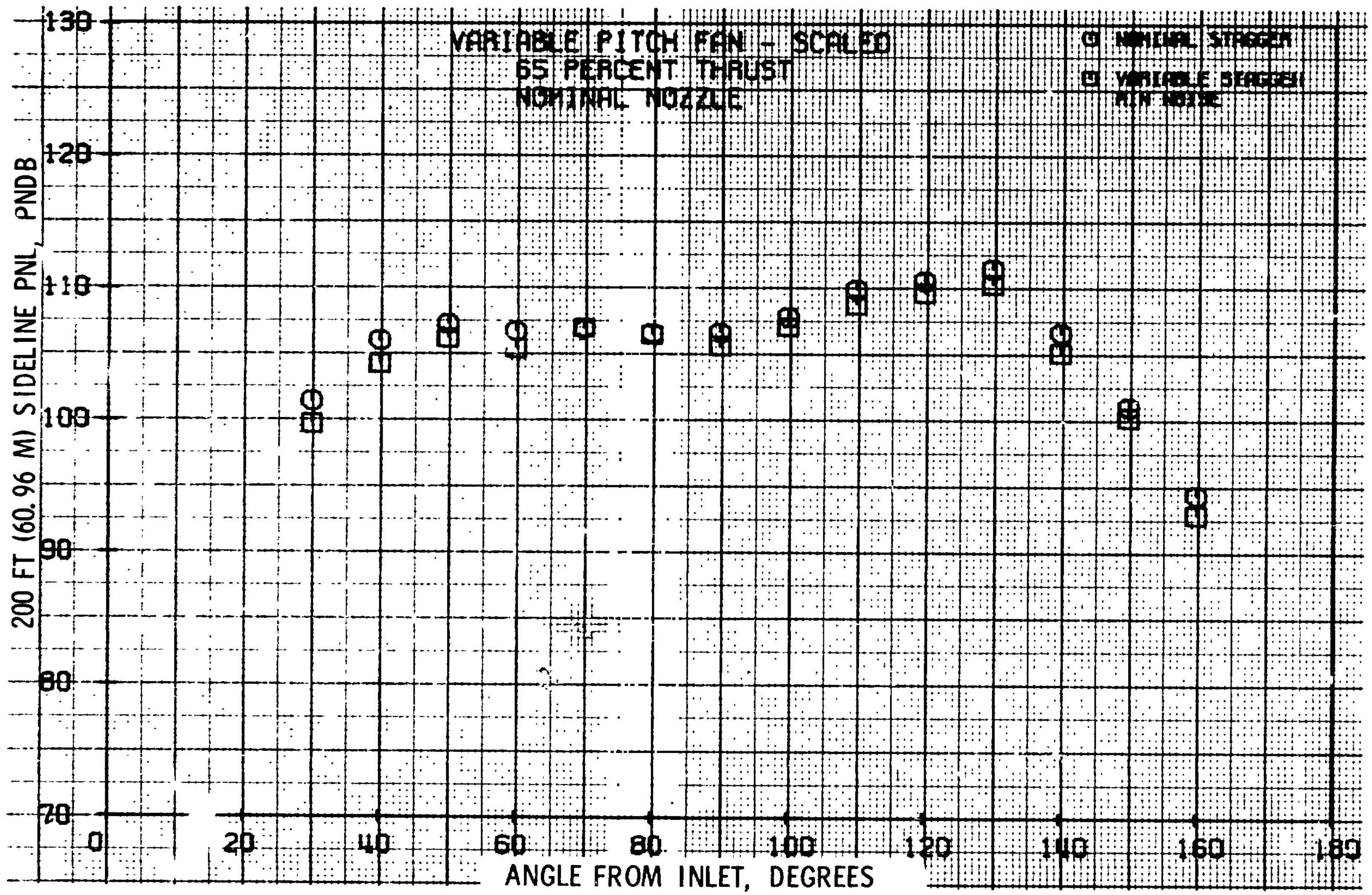


Figure 10. 200-ft (60.96 m) Sideline Perceived Noise Level, Nominal Nozzle, 65% Thrust.

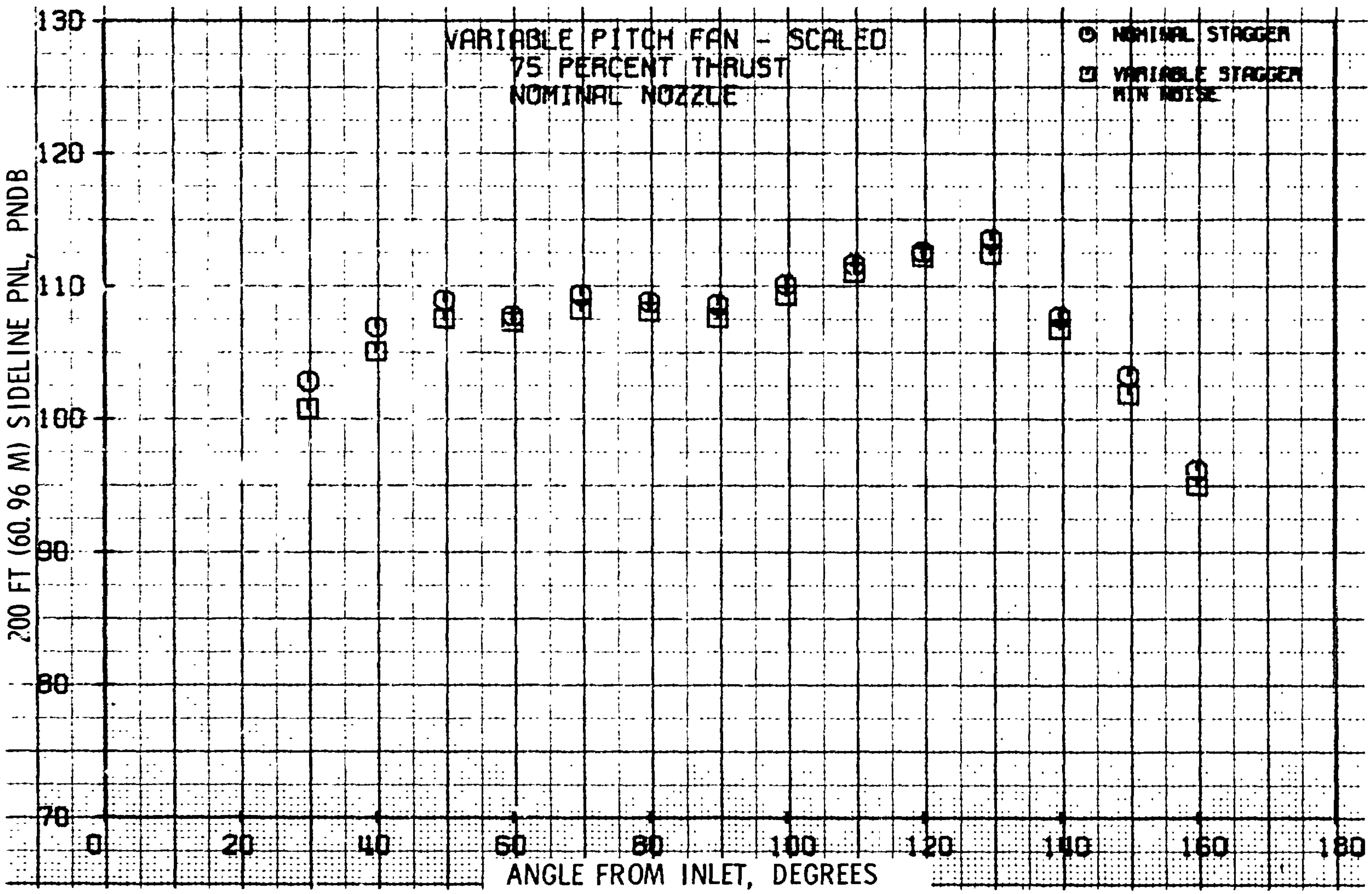


Figure 11. 200-ft (60.96 m) Sideline Perceived Noise Level, Nominal Nozzle, 75% Thrust.

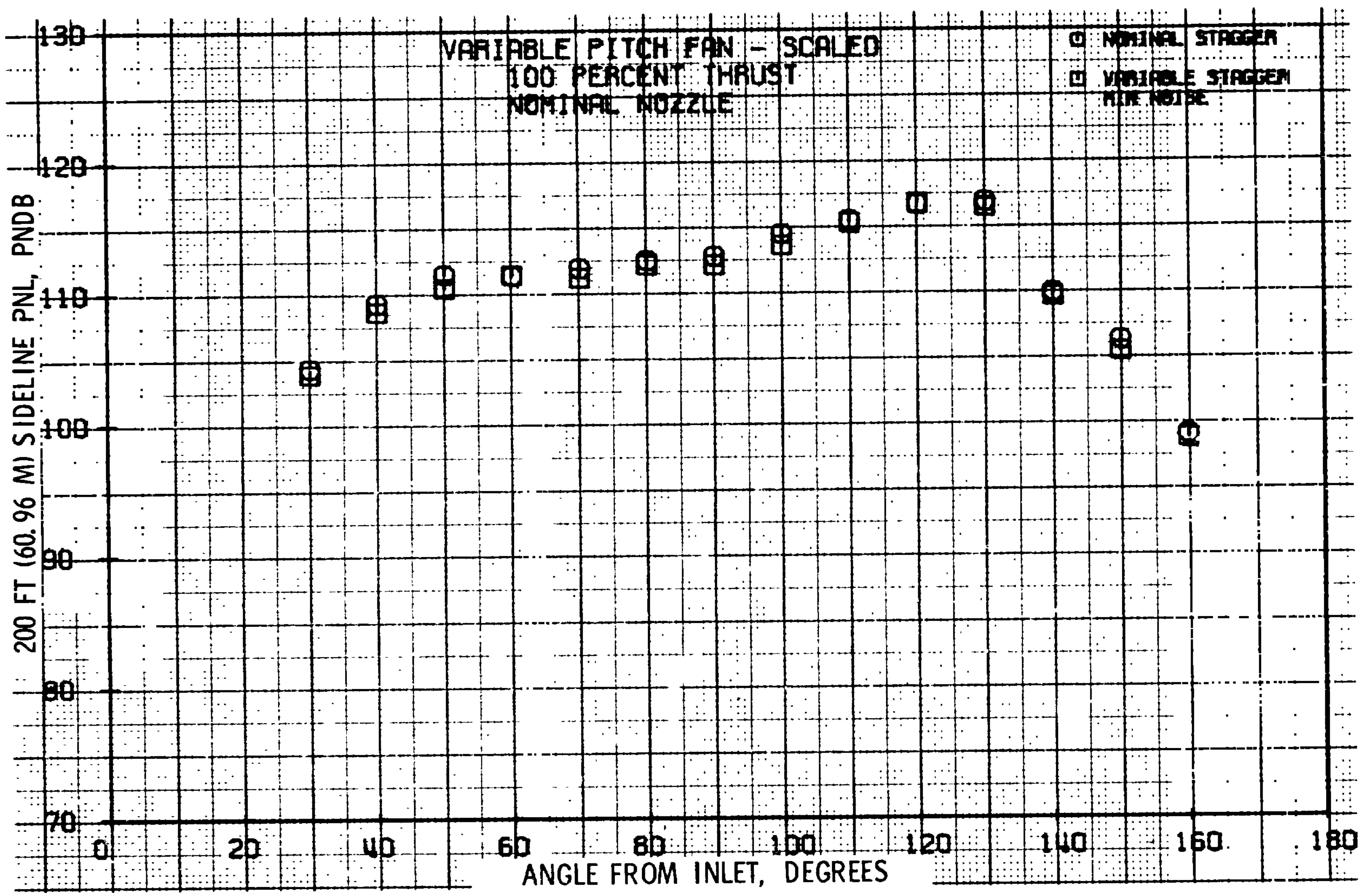


Figure 12. 200-ft (60.96 m) Sideline Perceived Noise Level, Nominal Nozzle, 100% Thrust.

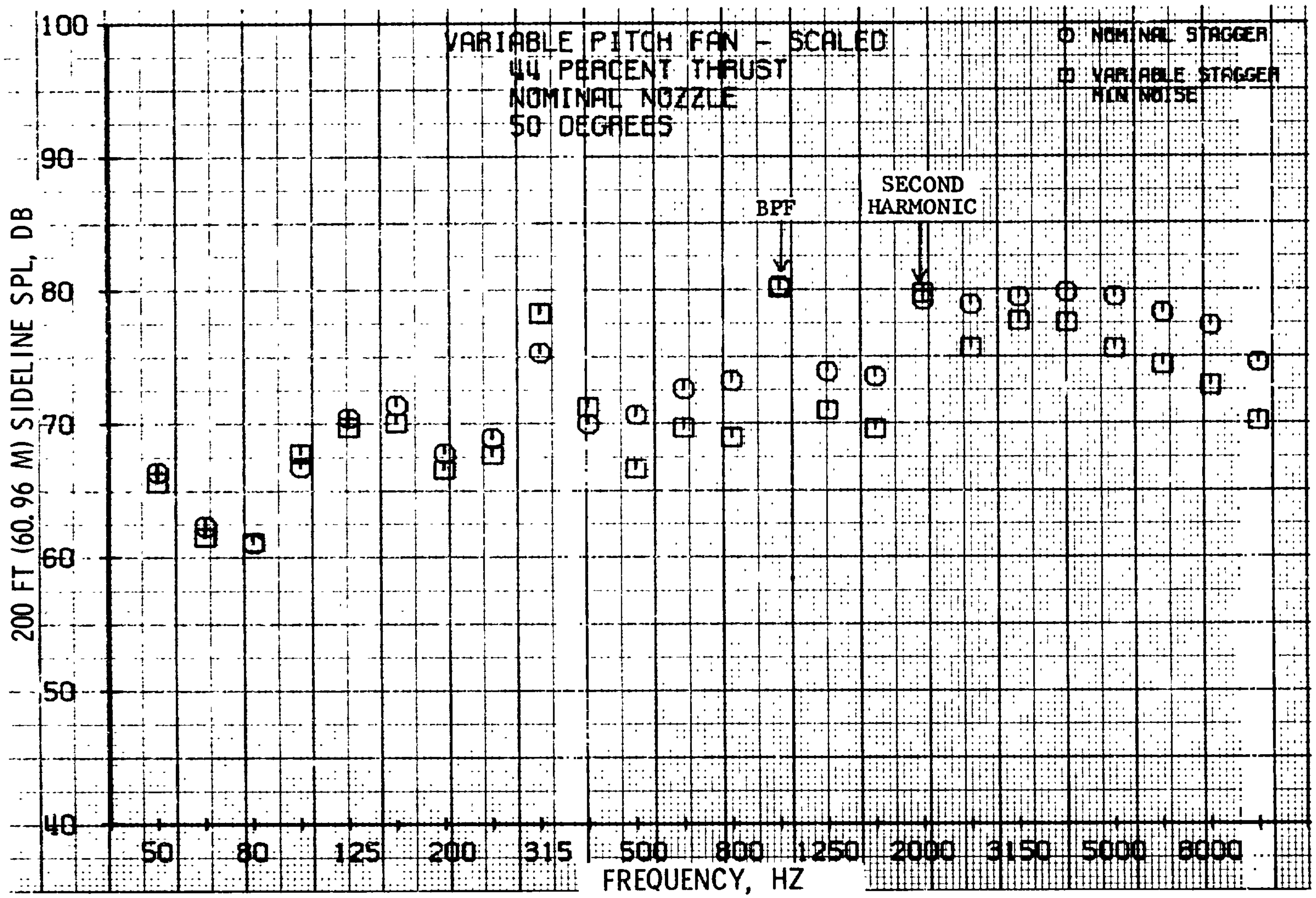


Figure 13. 1/3-Octave Spectral Comparison, Nominal Nozzle, 44% Thrust, 50°.

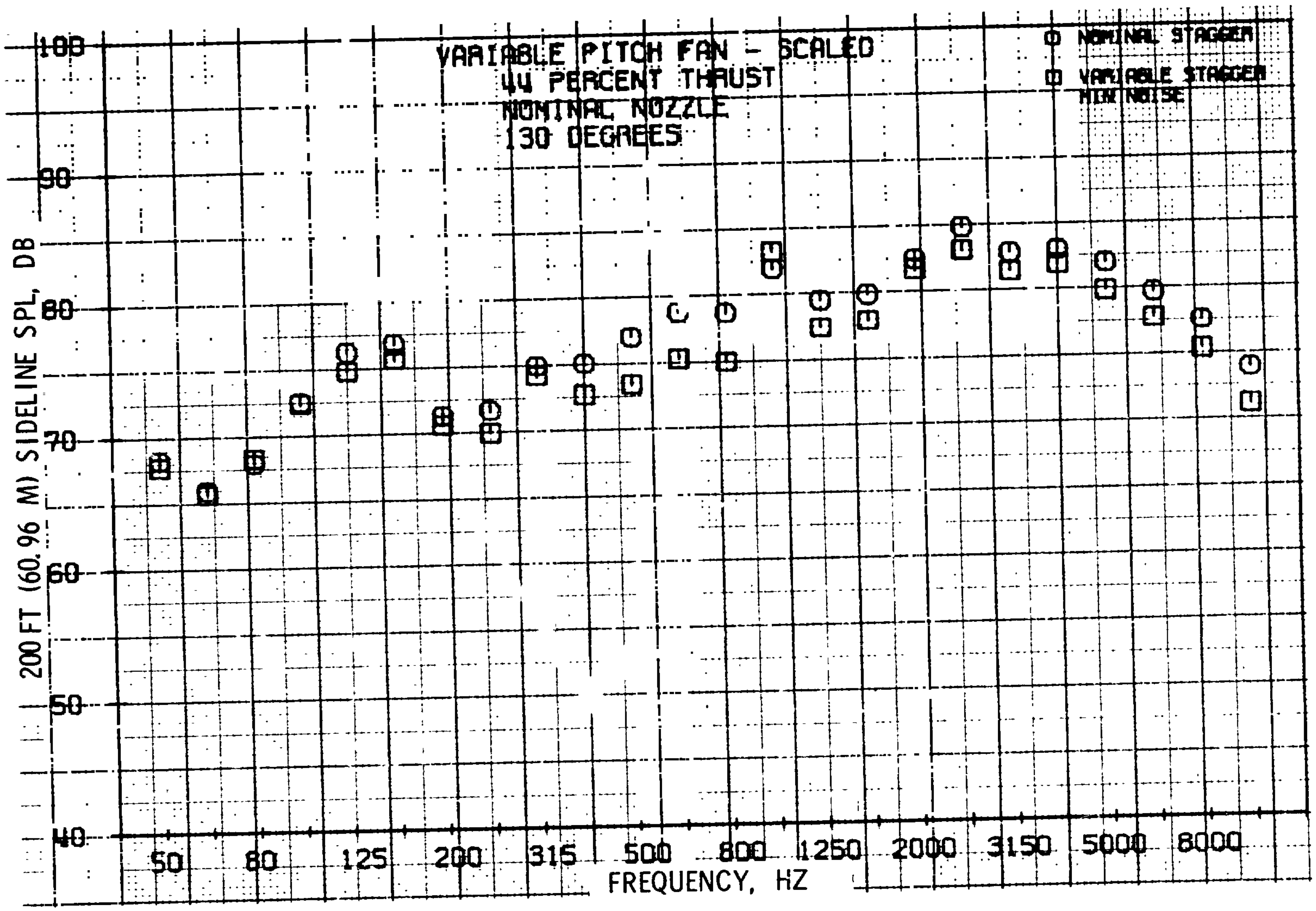


Figure 14. 1/3-Octave Spectral Comparison, Nominal Nozzle, 44% Thrust, 130°.

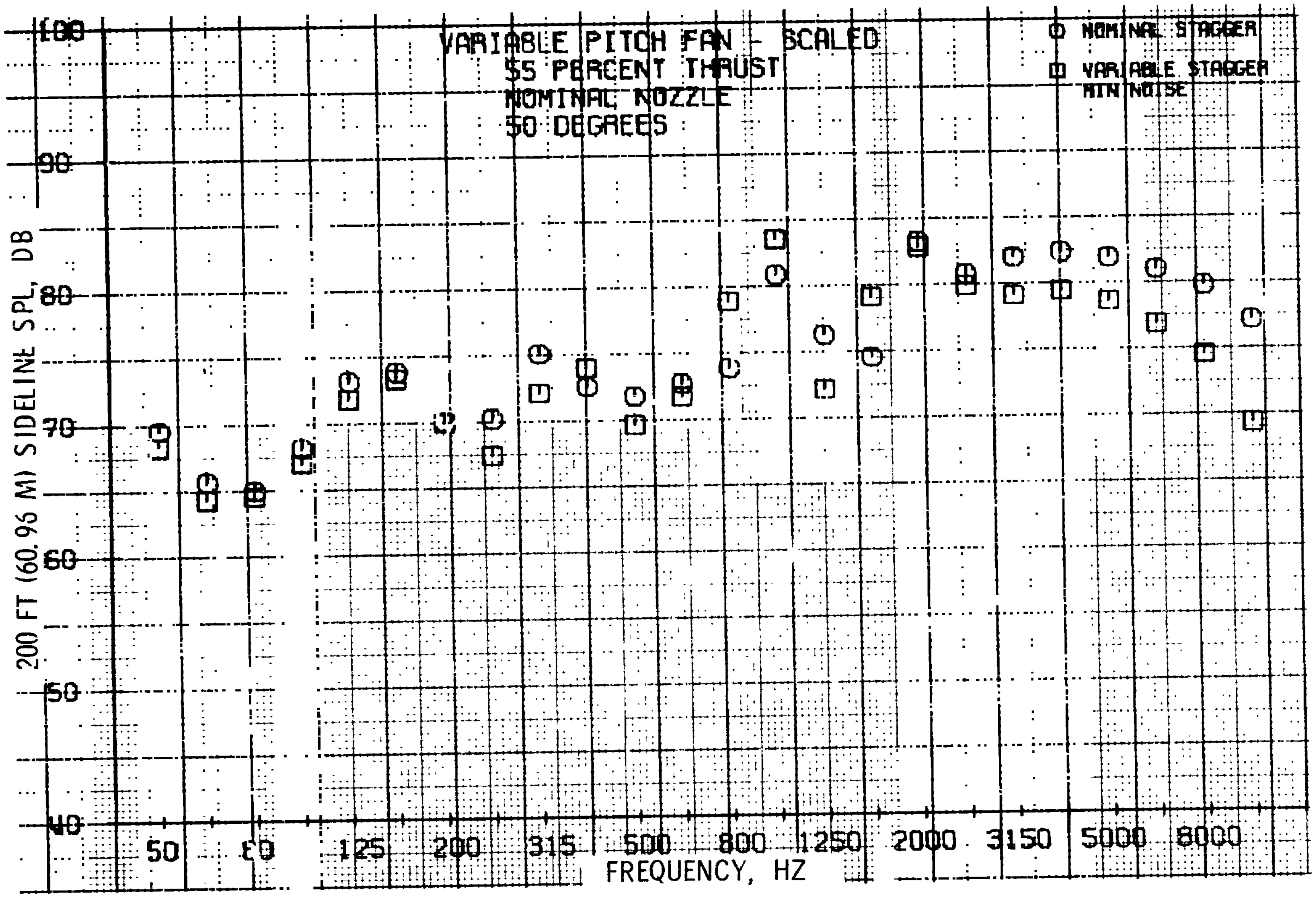


Figure 15. 1/3-Octave Spectral Comparison, Nominal Nozzle, 55% Thrust, 50°.

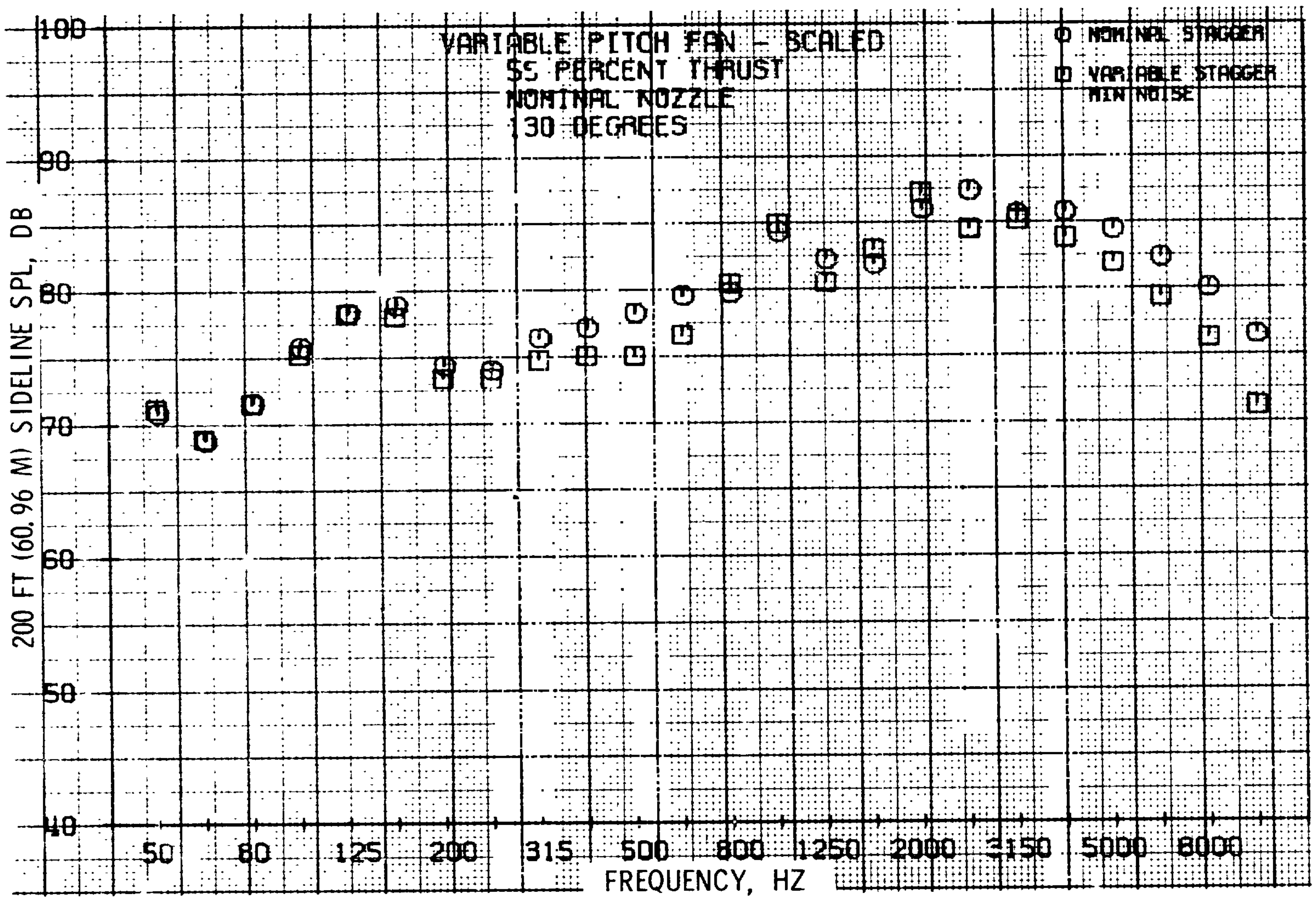


Figure 16. 1/3-Octave Spectral Comparison, Nominal Nozzle, 55% Thrust, 130°.

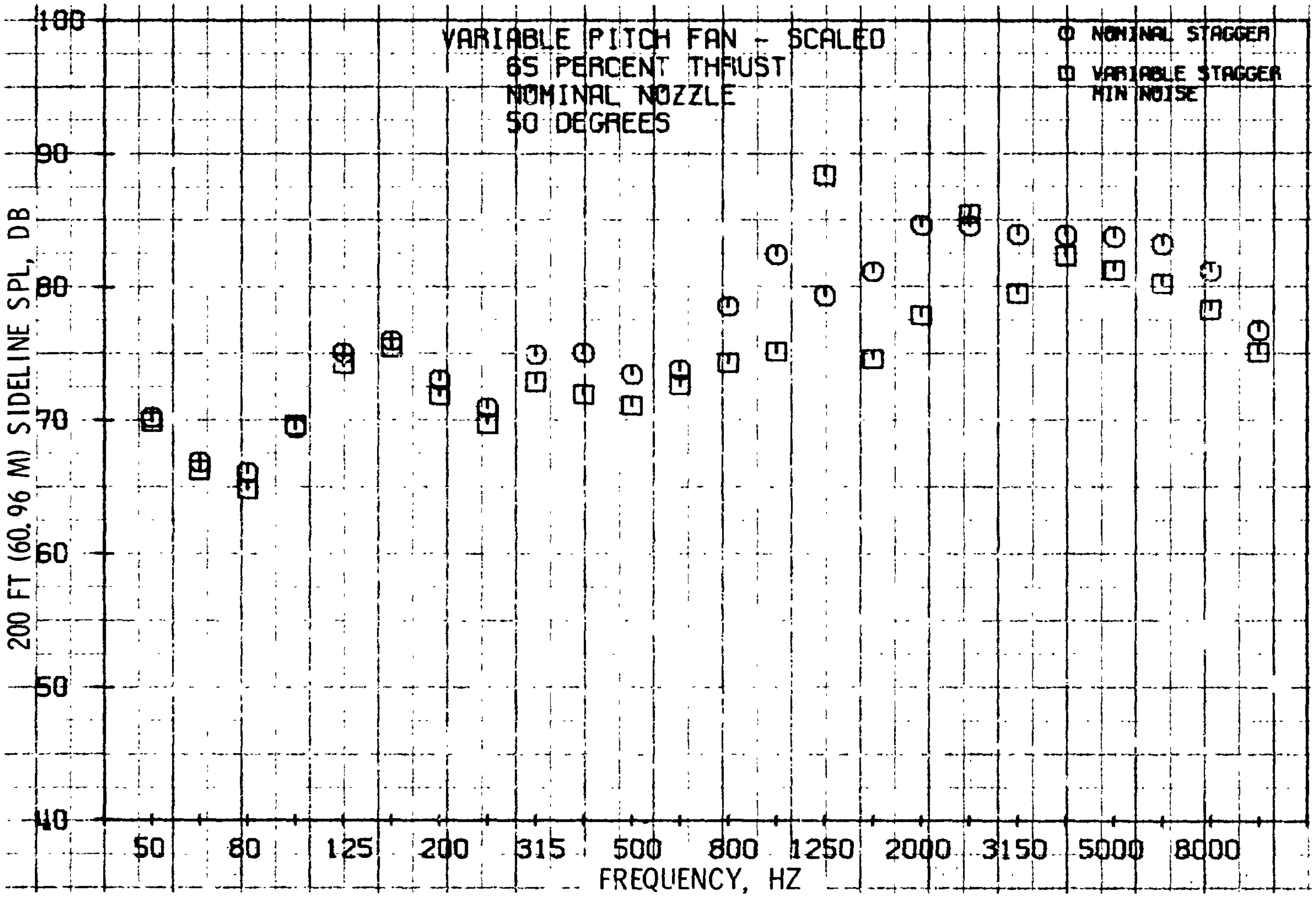


Figure 17. 1/3-Octave Spectral Comparison, Nominal Nozzle, 65% Thrust, 50°.

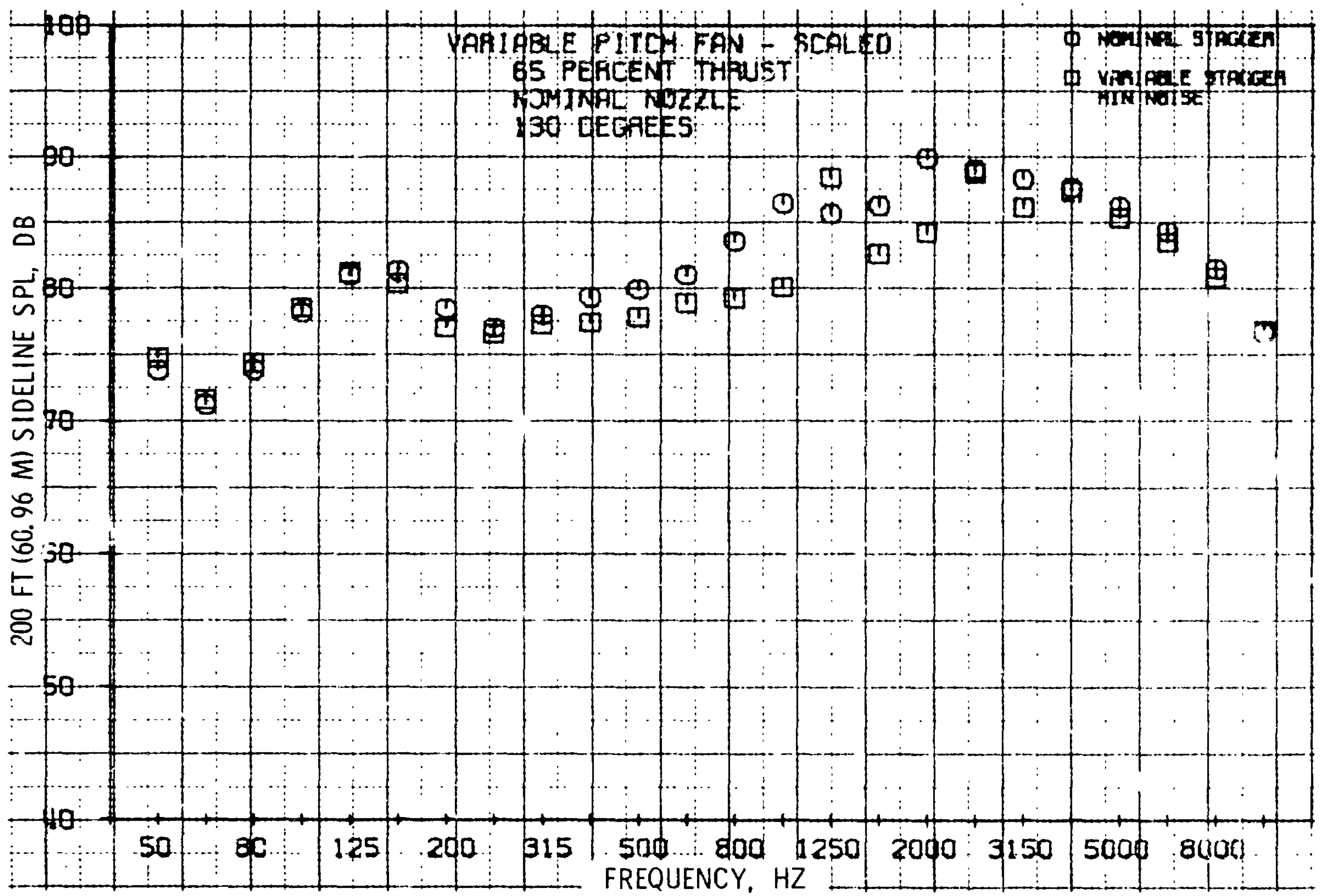


Figure 18. 1/3-Octave Spectral Comparison, Nominal Nozzle, 65% Thrust, 130°.

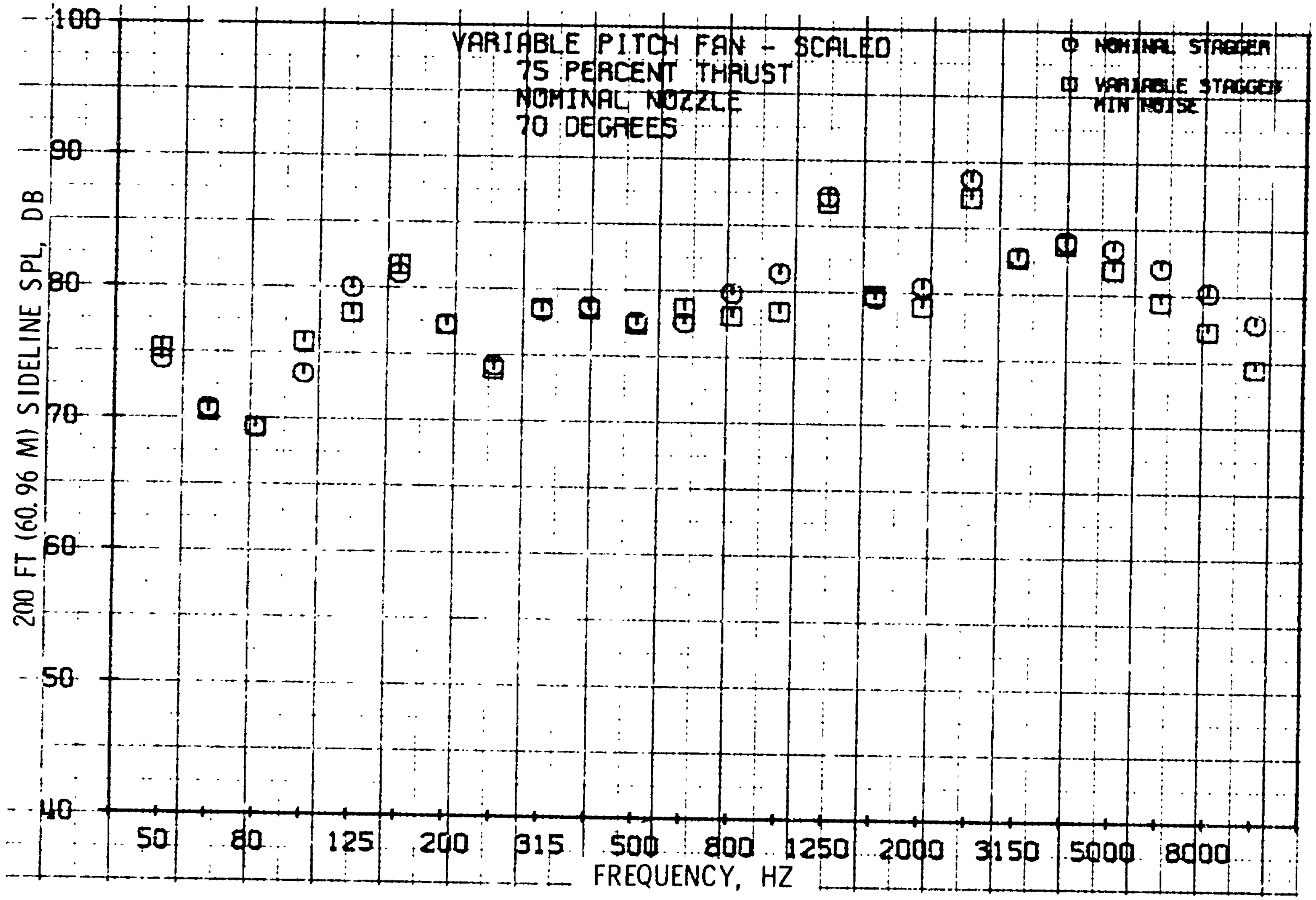


Figure 19. 1/3-Octave Spectral Comparison, Nominal Nozzle, 75% Thrust, 70°.

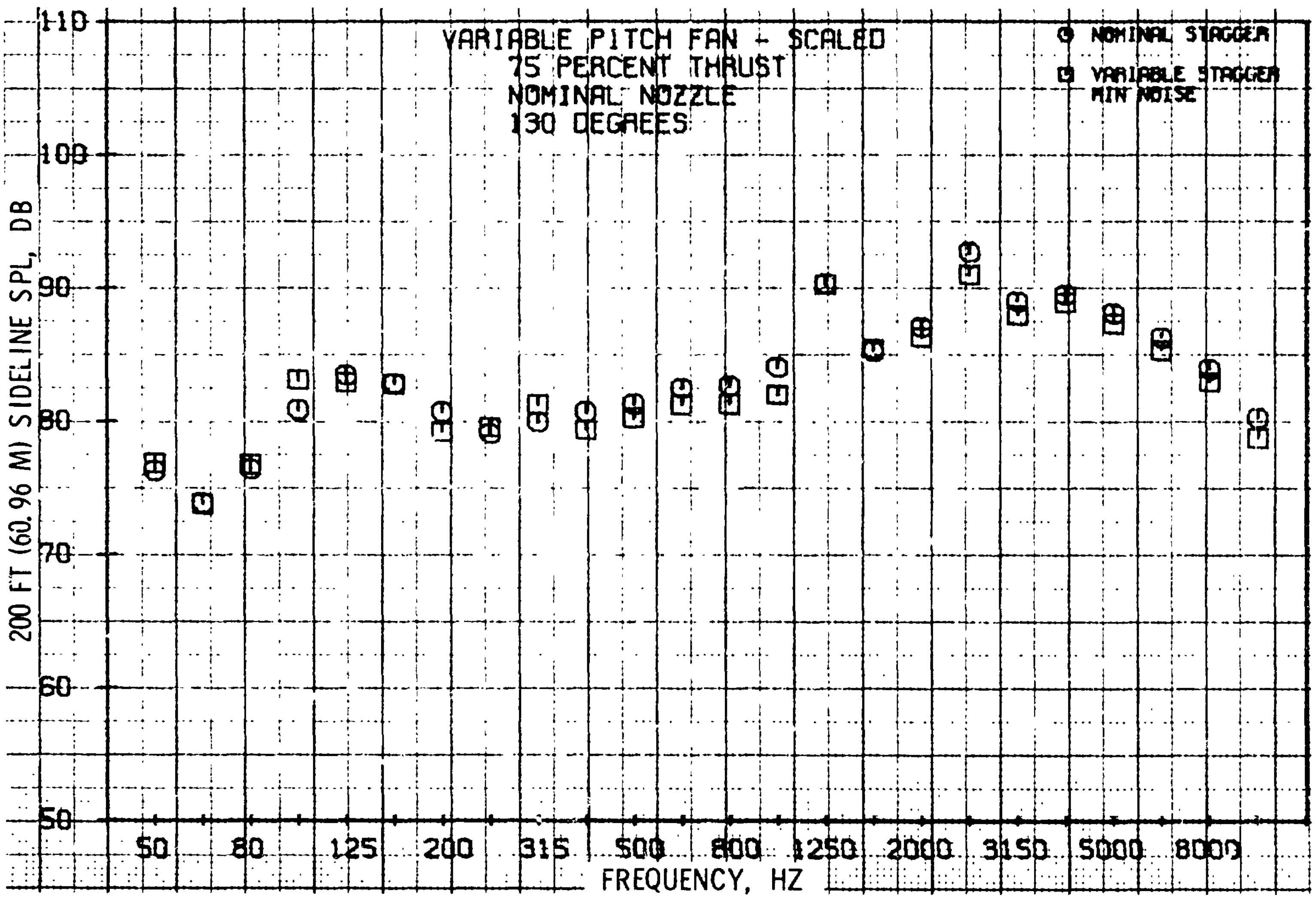


Figure 20. 1/3-Octave Spectral Comparison, Nominal Nozzle, 75% Thrust, 130°.

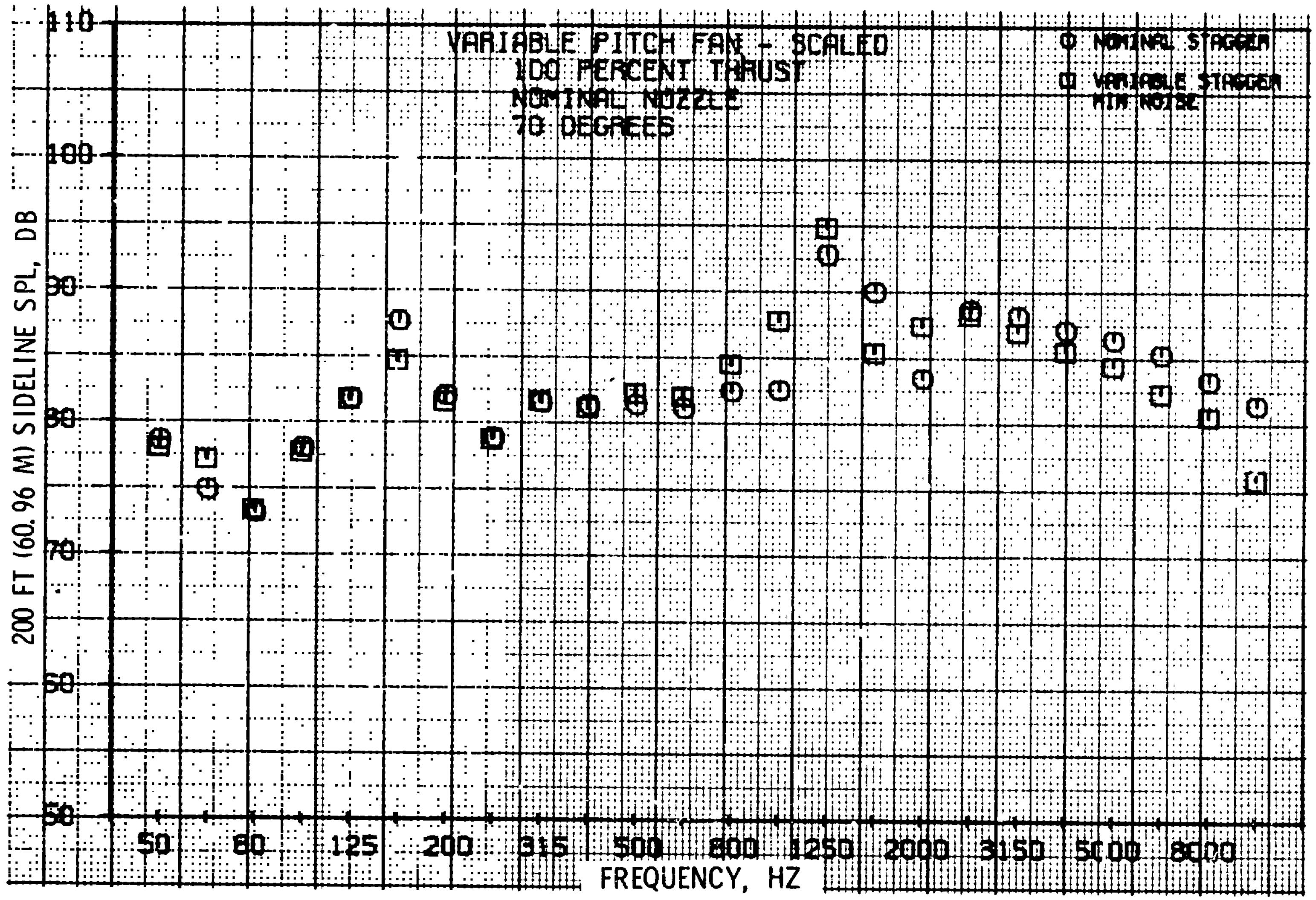


Figure 21. 1/3-Octave Spectral Comparison, Nominal Nozzle, 100% Thrust, 70°.

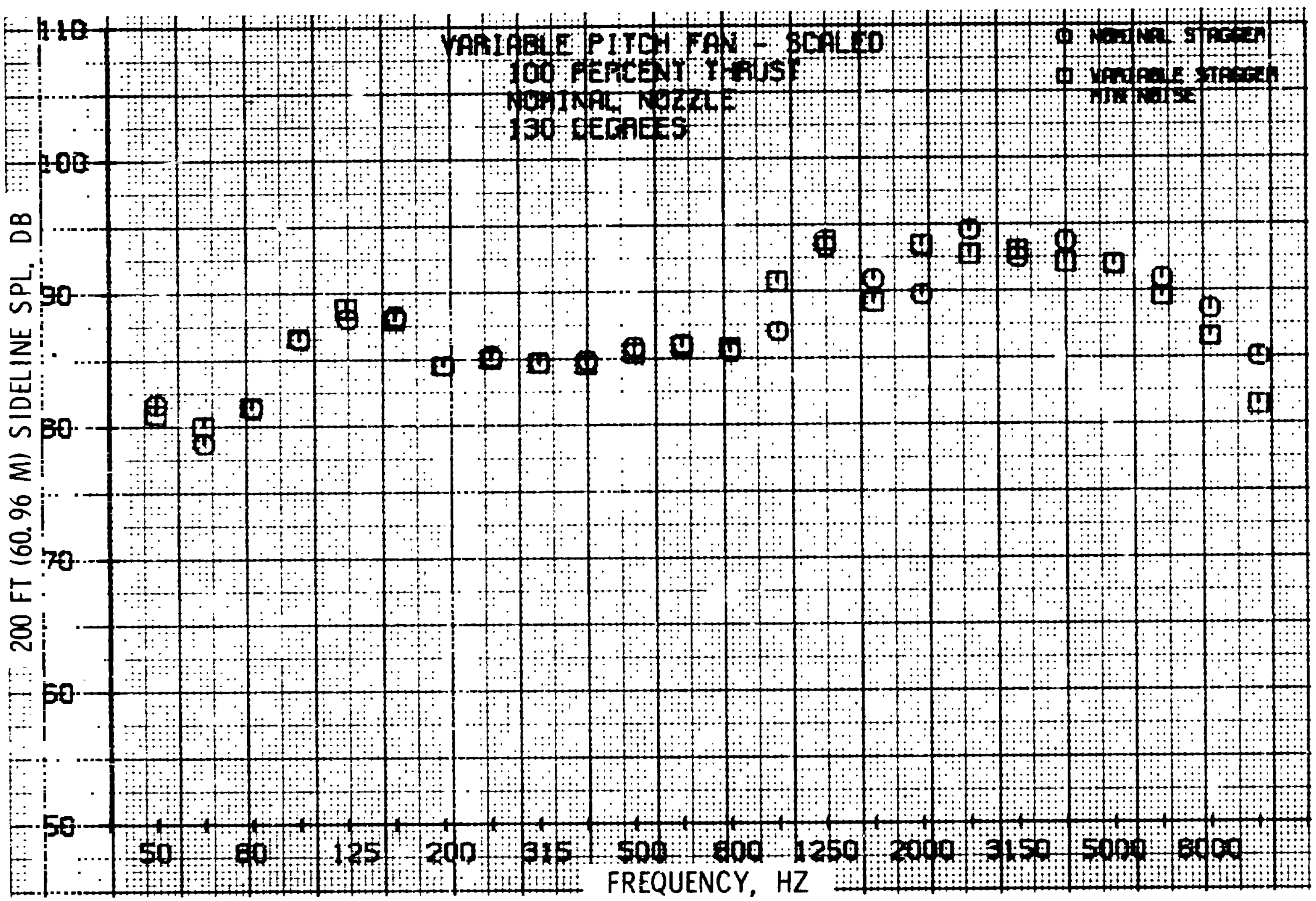


Figure 22. 1/3-Octave Spectral Comparison, Nominal Nozzle, 100% Thrust, 130°.

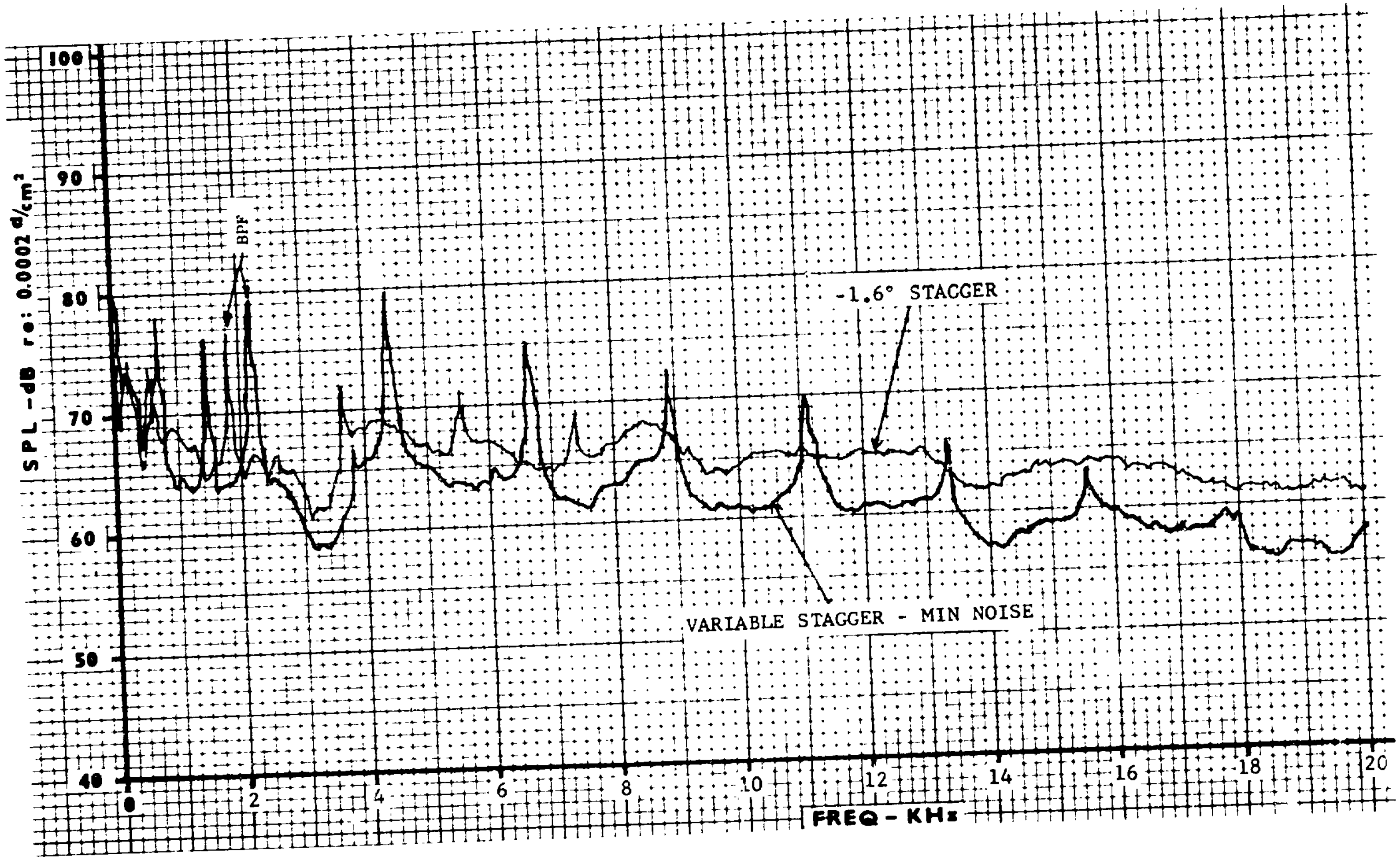


Figure 23. Narrowband Data, Nominal Nozzle, 44% Thrust, 50°.

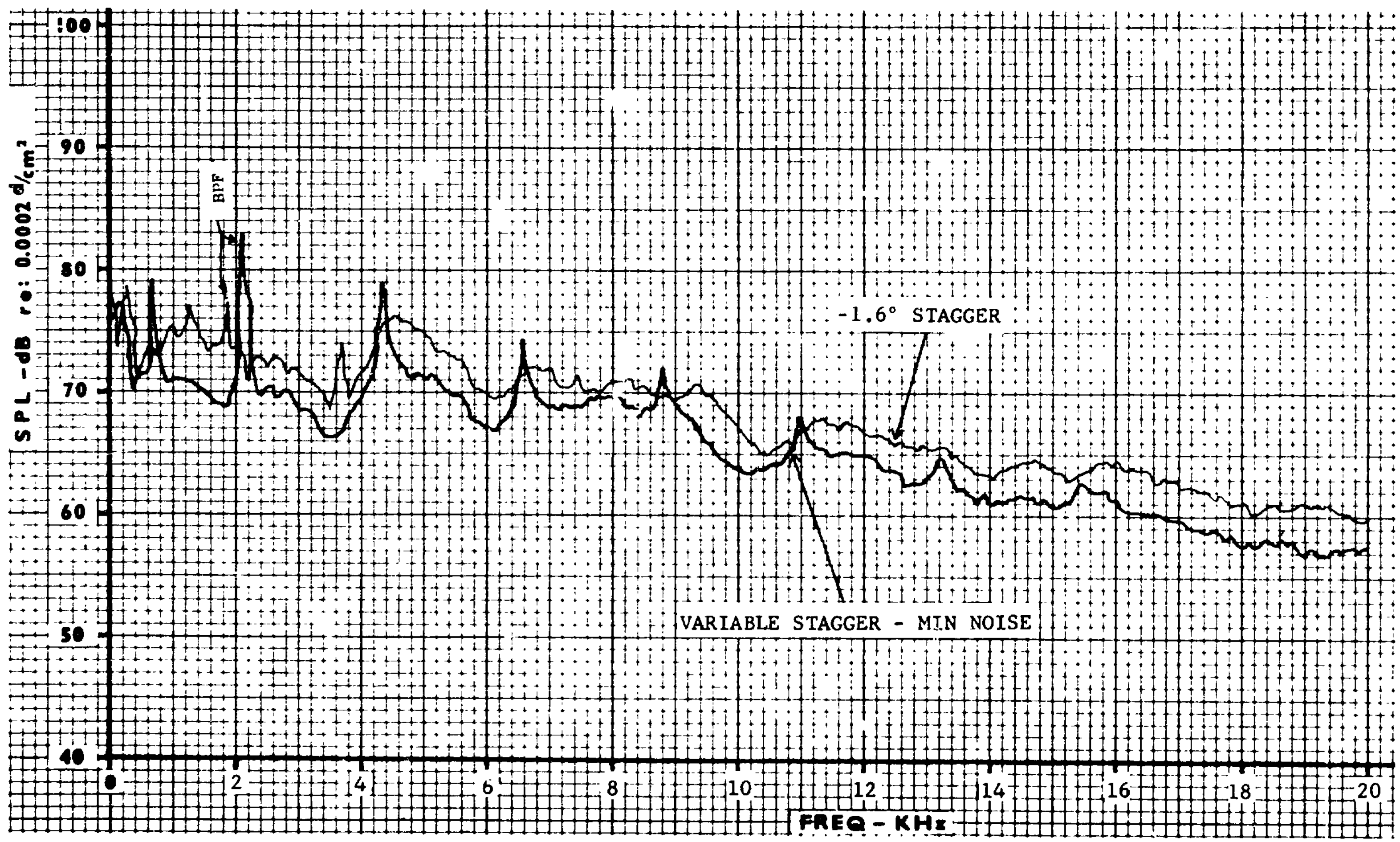


Figure 24. Narrowband Data, Nominal Nozzle, 44% Thrust, 130°.

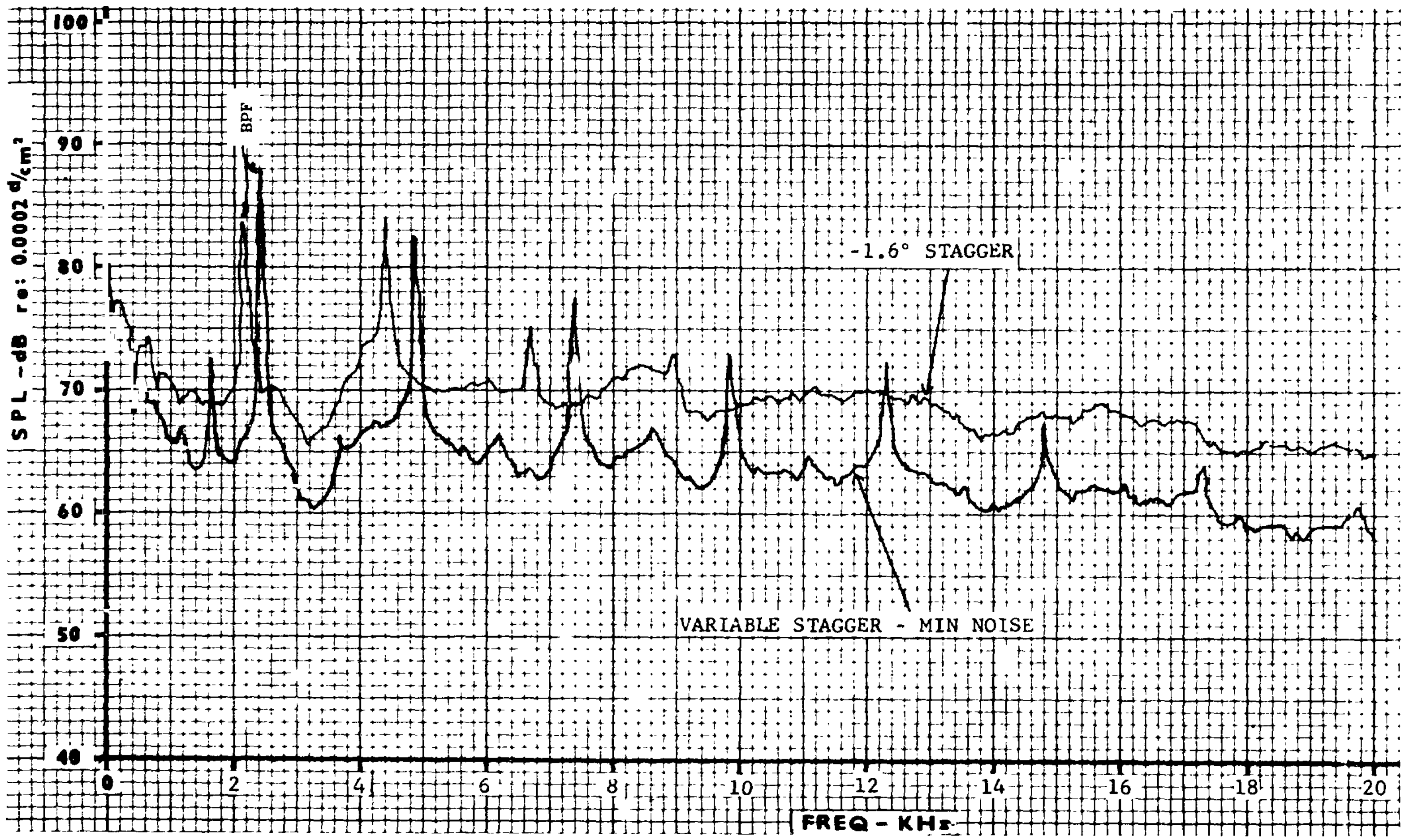


Figure 25. Narrowband Data, Nominal Nozzle, 65% Thrust, 50°.

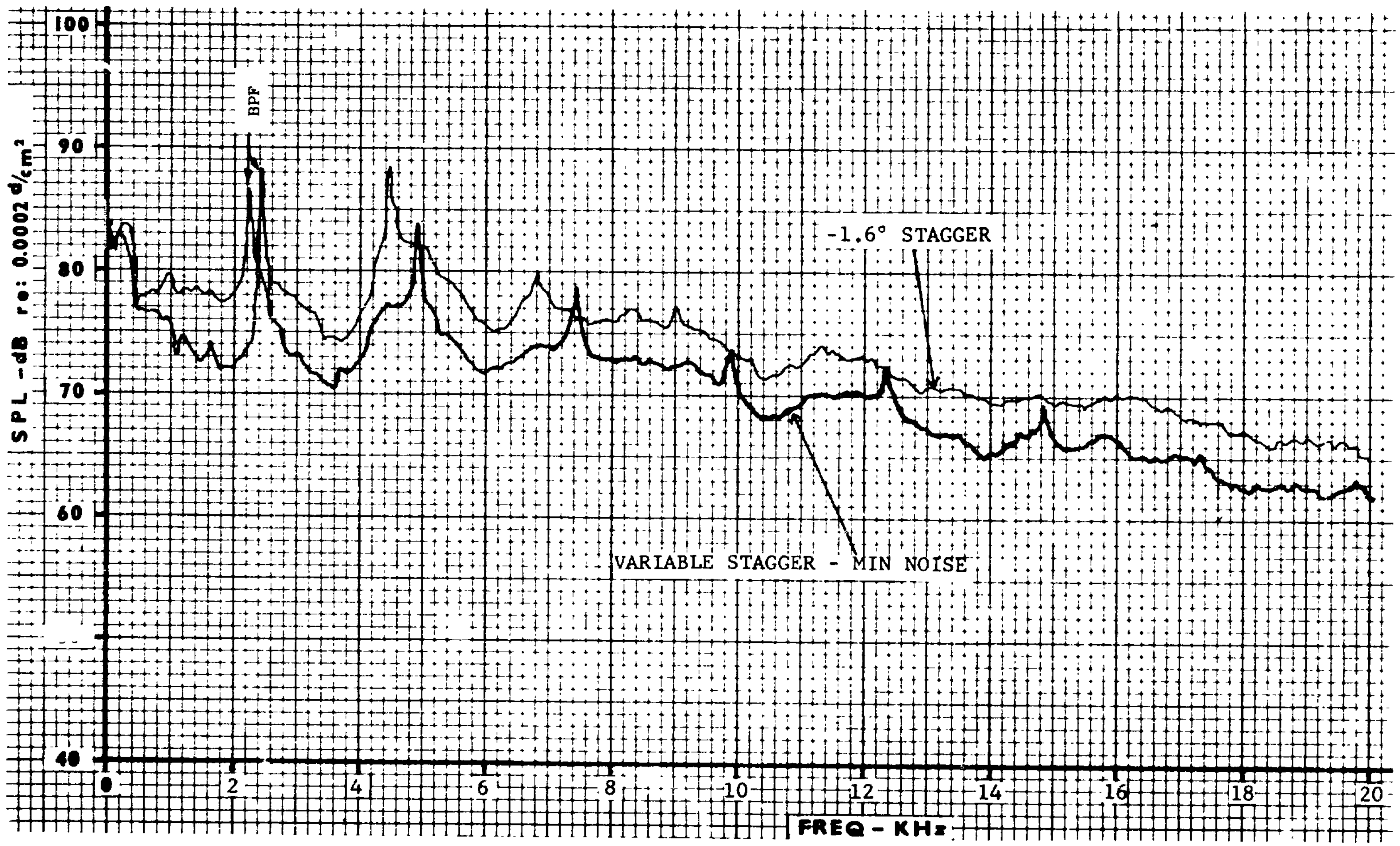


Figure 26. Narrowband Data, Nominal Nozzle, 65% Thrust, 130°.

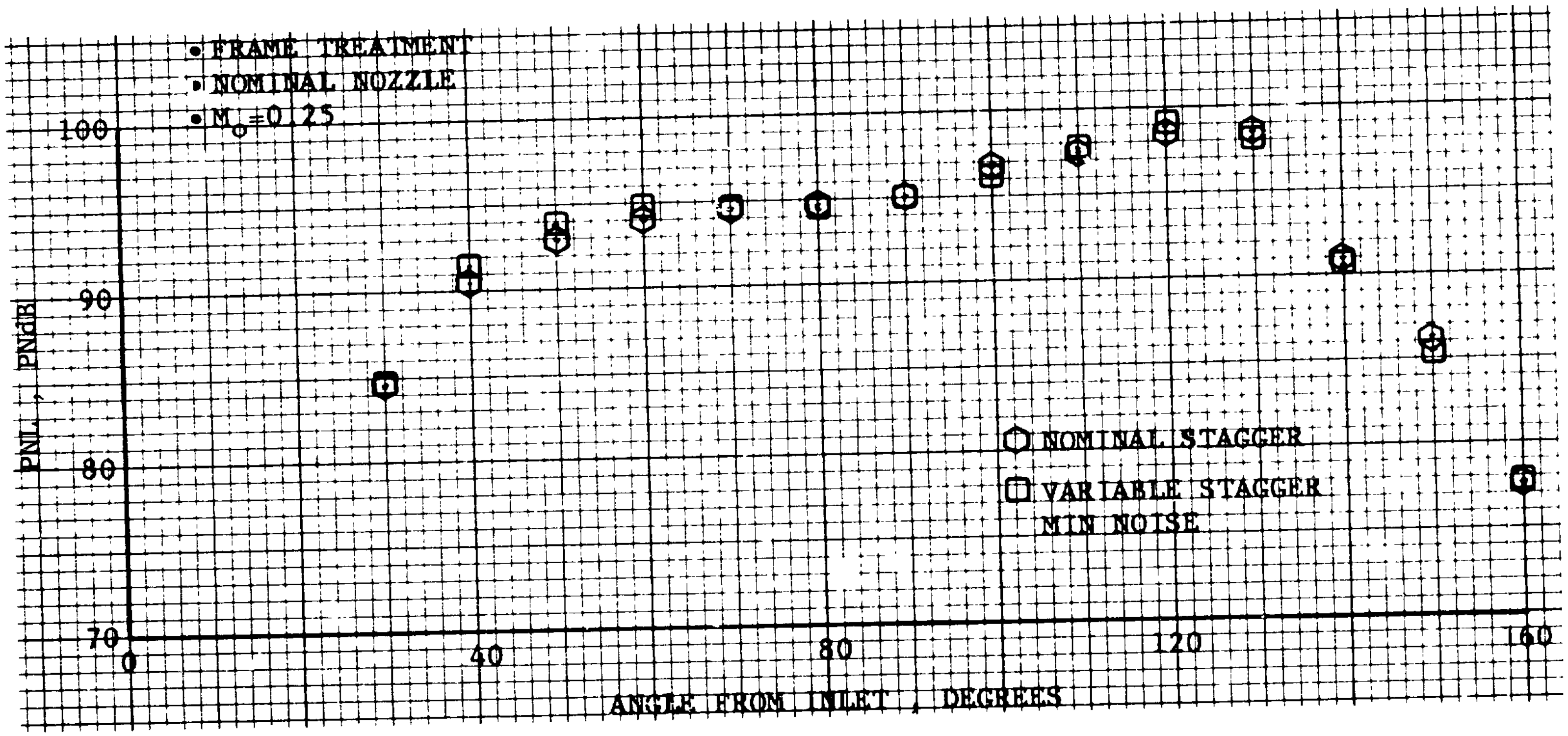


Figure 27. PNL for 1000-ft (304.8 m) Level Flyover, Fan + Jet Noise, Takeoff.

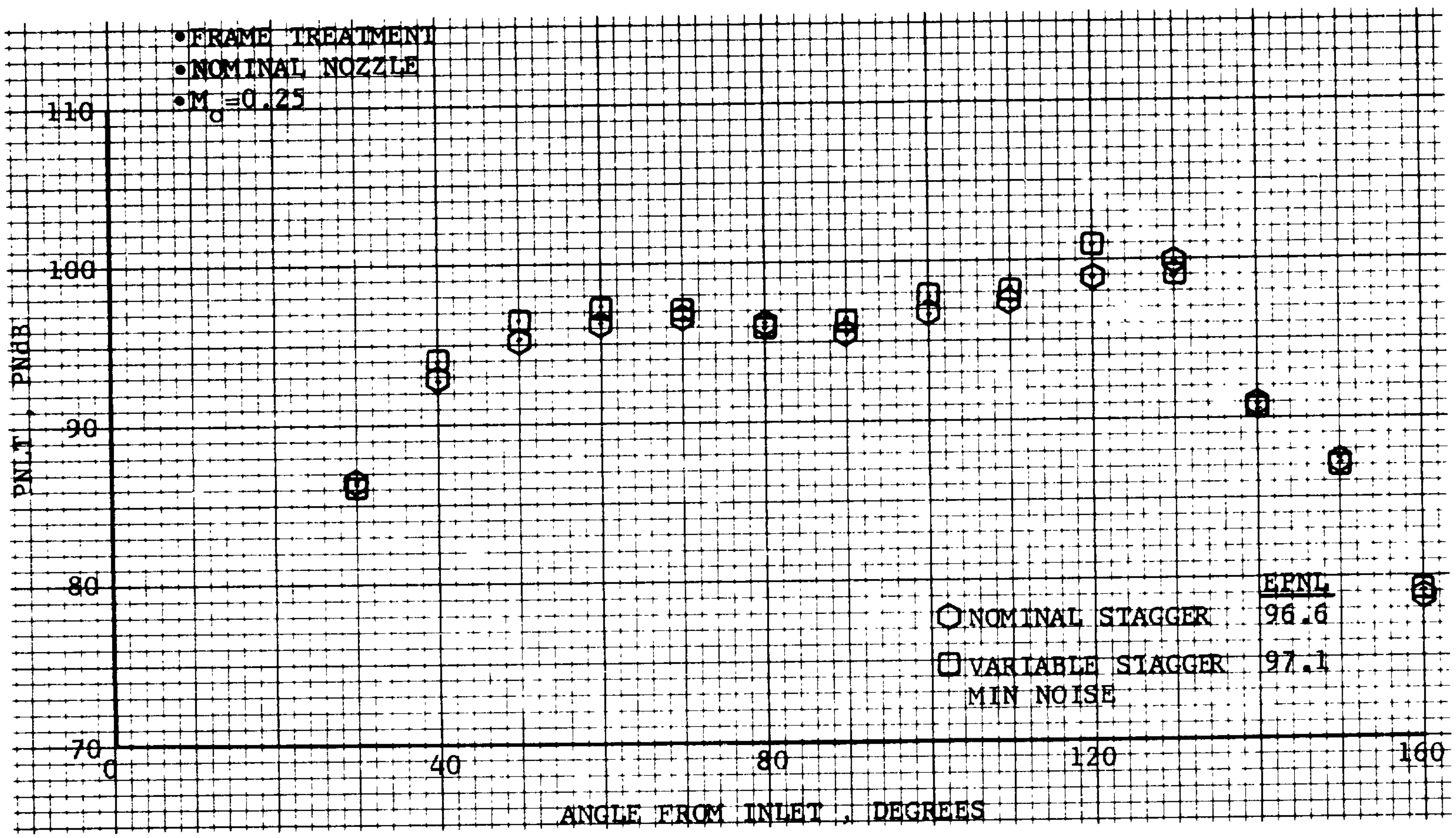


Figure 28. PNLT for 1000-ft (304.8 m) Level Flyover, Fan + Jet Noise, Takeoff.

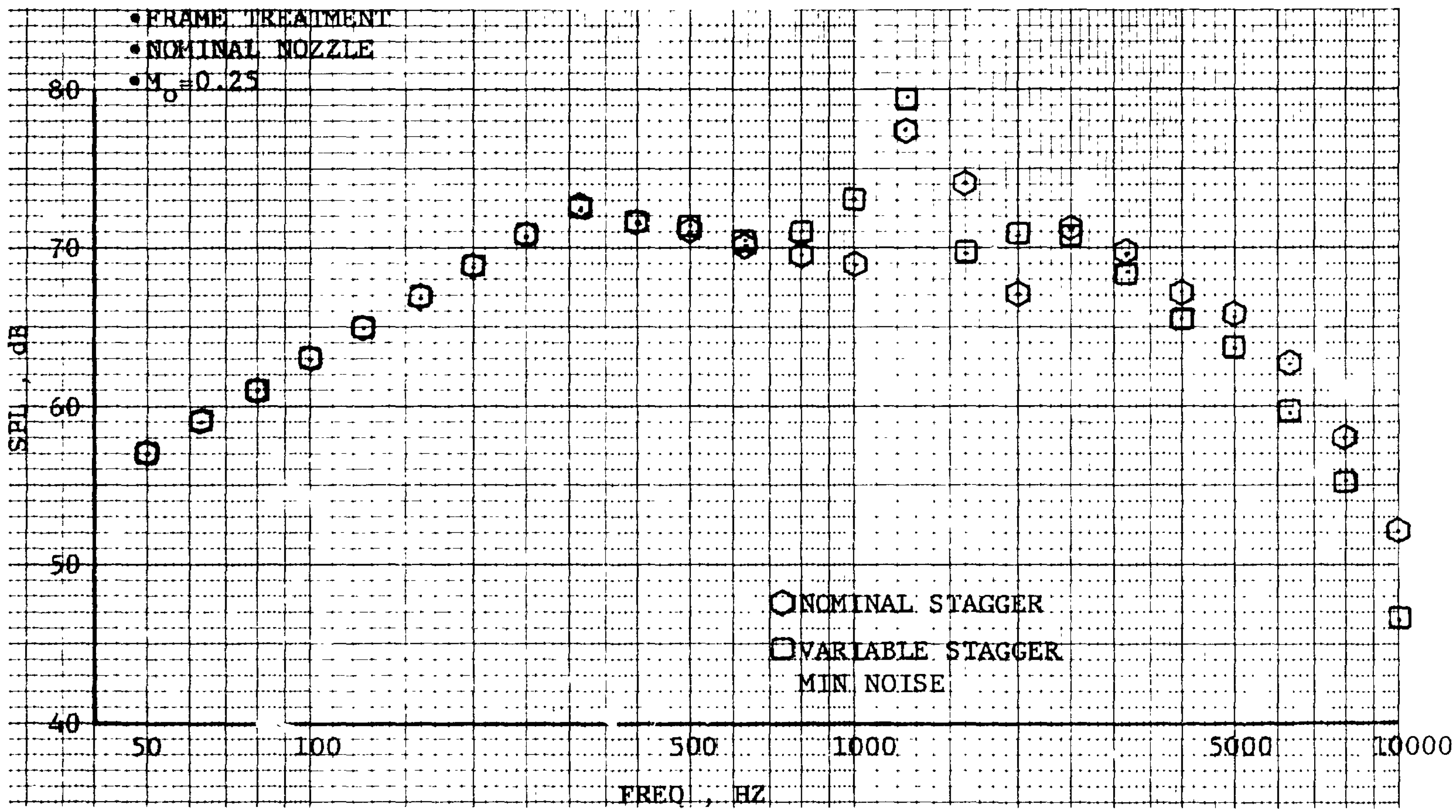


Figure 29. 1/3-Octave Spectral Comparison at 1000-ft (304.8 m) Level Flyover, Fan + Jet Noise, Takeoff, 70°.

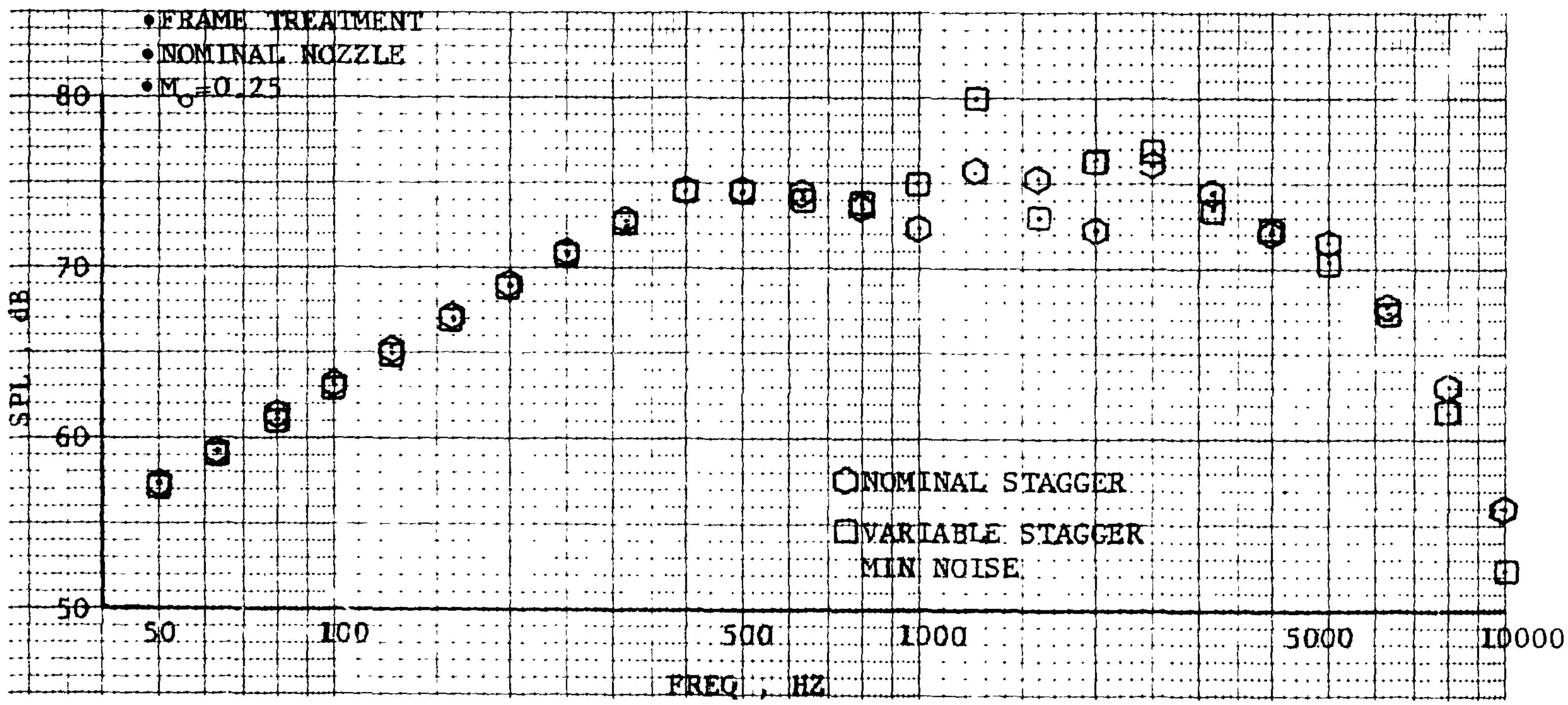


Figure 30. 1/3-Octave Spectral Comparison at 1000-ft (304.8 m) Level Flyover, Fan + Jet Noise, Takeoff, 120°.

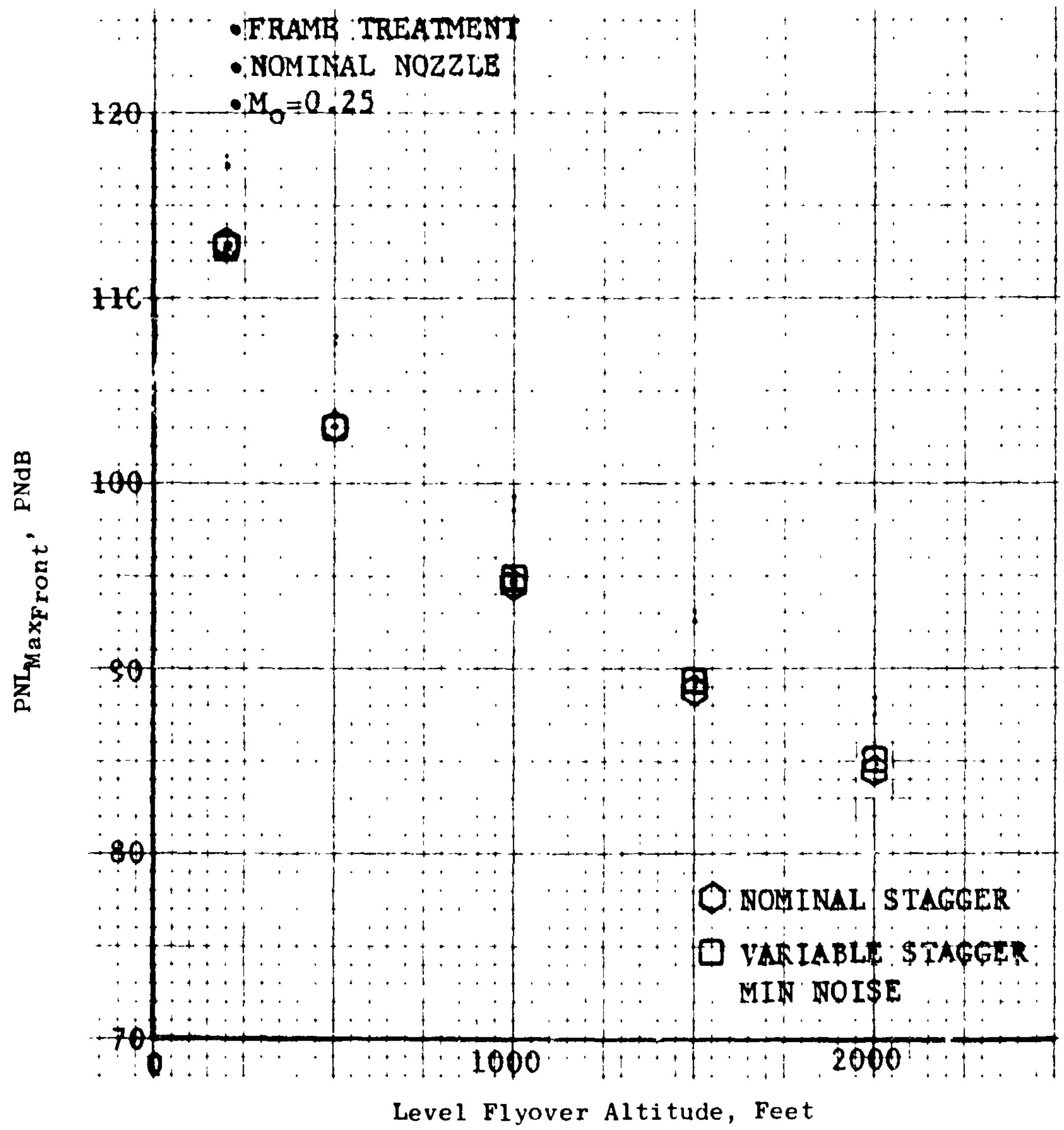


Figure 31. Front Maximum PNL at Takeoff, Fan + Jet Noise.

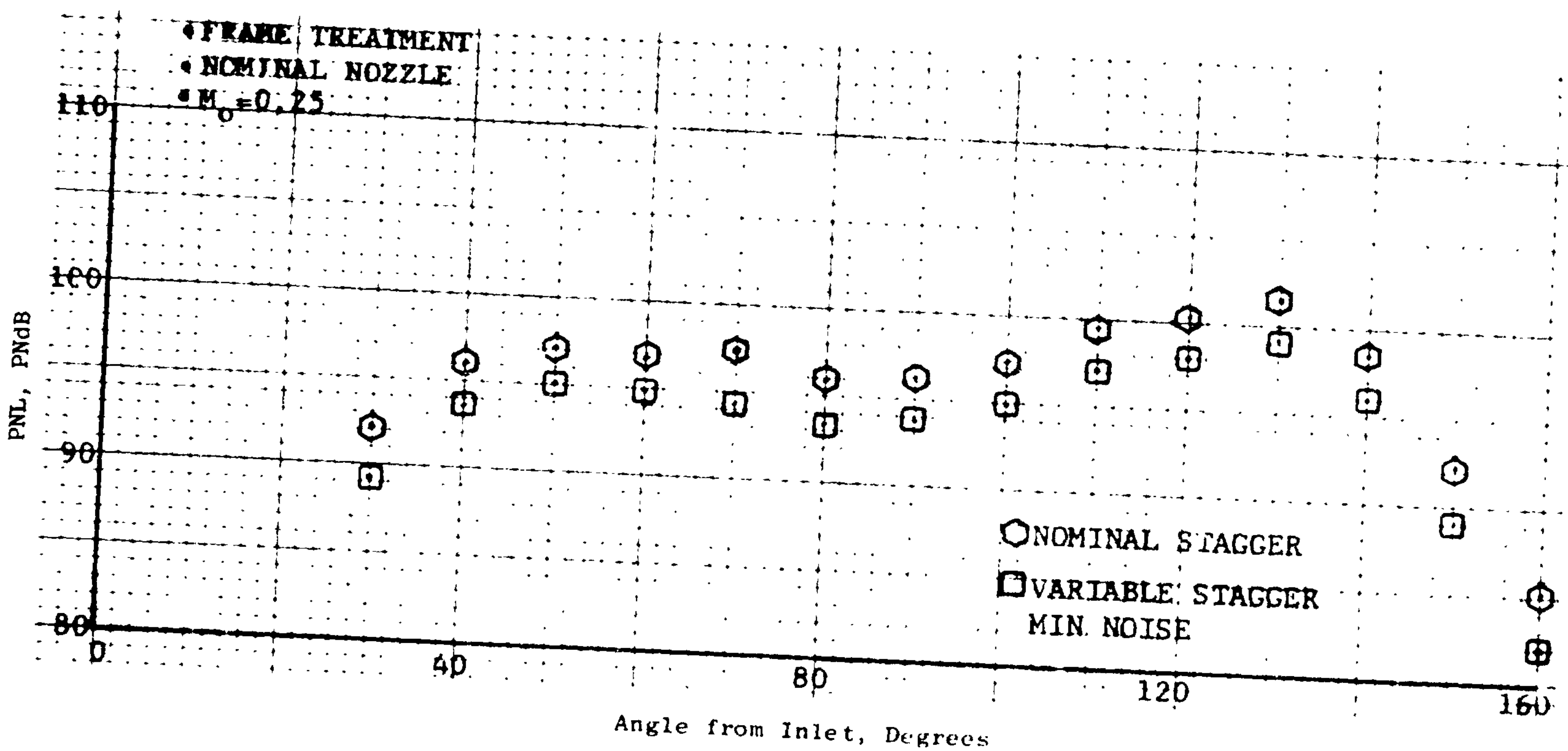


Figure 32. PNL Distributions for 370-ft (112.8 m) Level Flyover, Fan + Jet Noise, Approach.

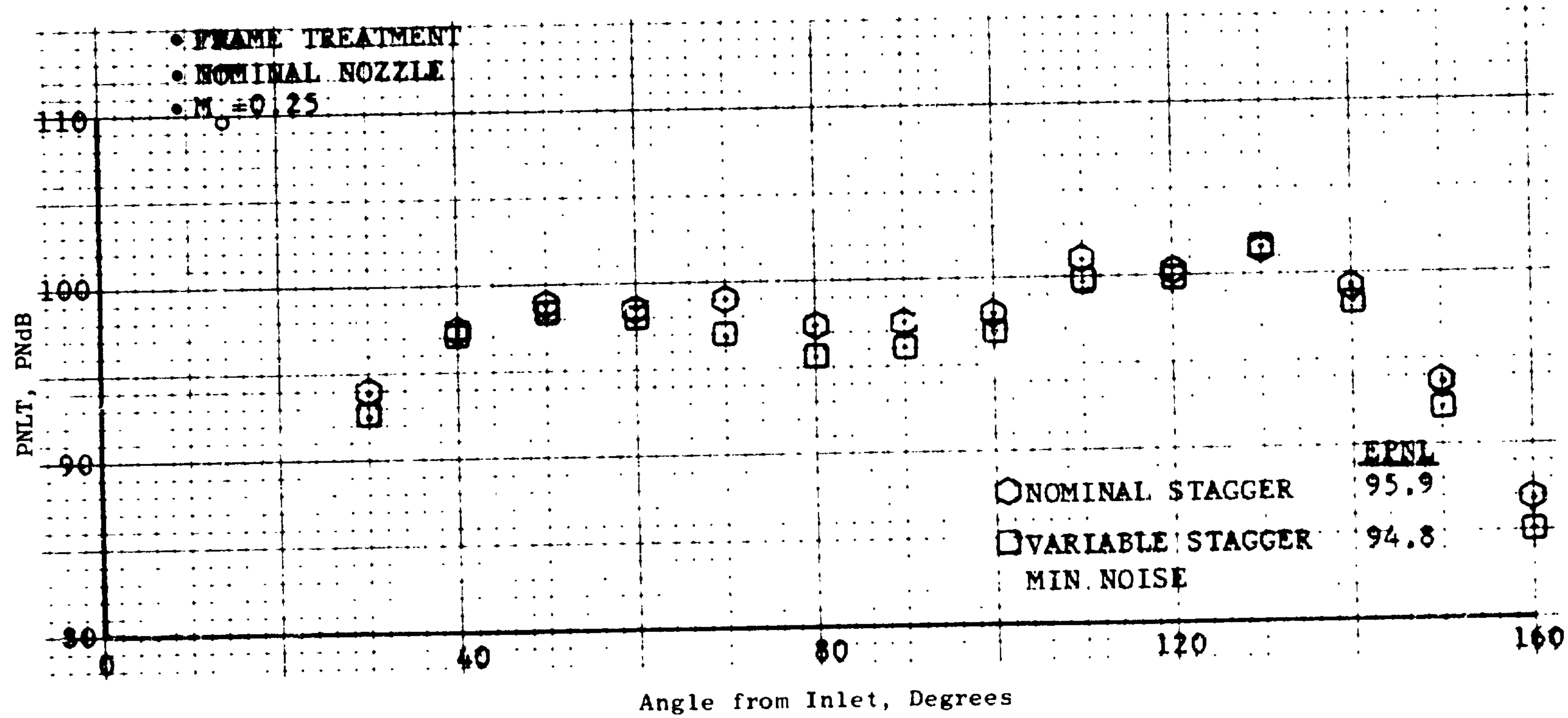


Figure 33. Tone Corrected PNL for 370-ft (112.8 m) Level Flyover, Fan + Jet Noise, Approach.

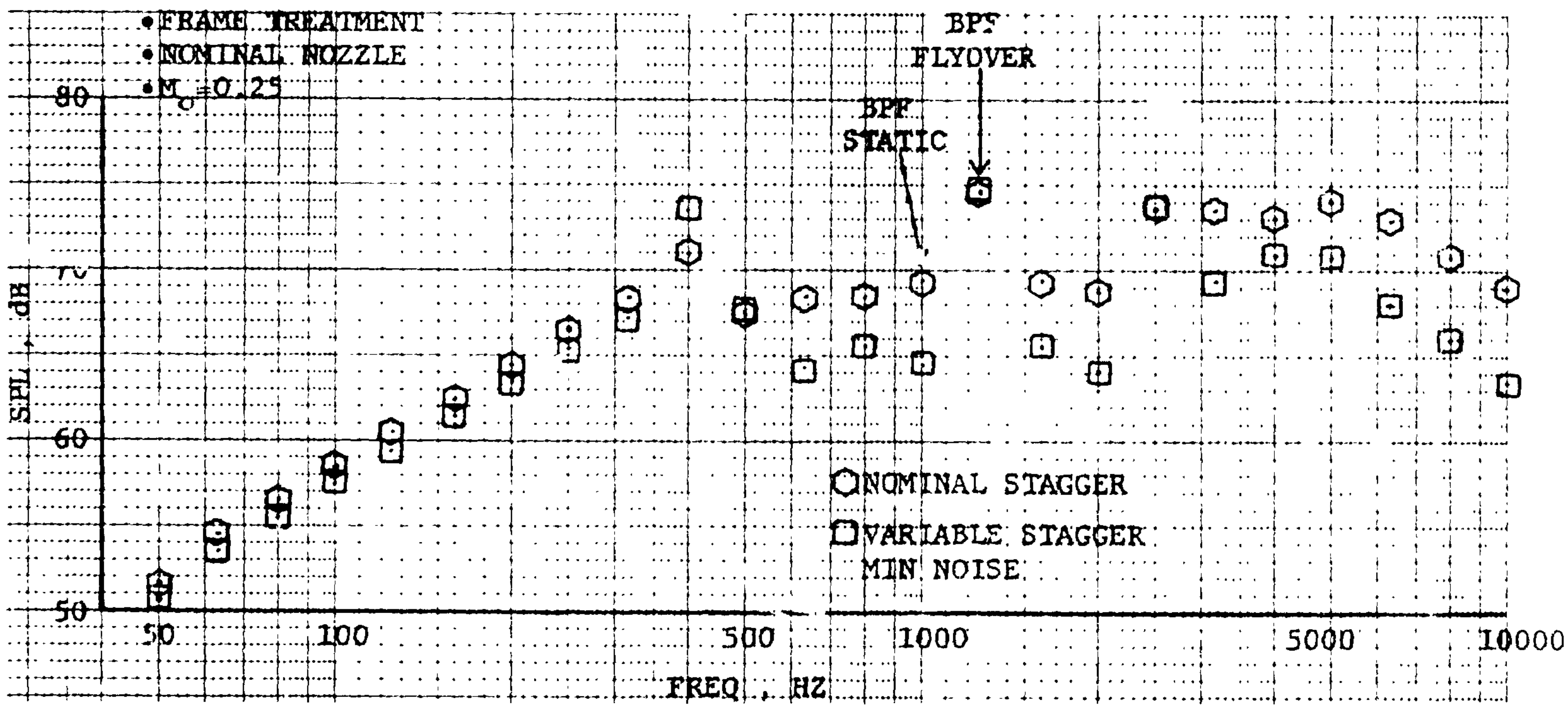


Figure 34. 1/3-Octave Spectral Comparison at 370-ft (112.8 m) Level Flyover, Fan + Jet Noise, Approach, 50°.

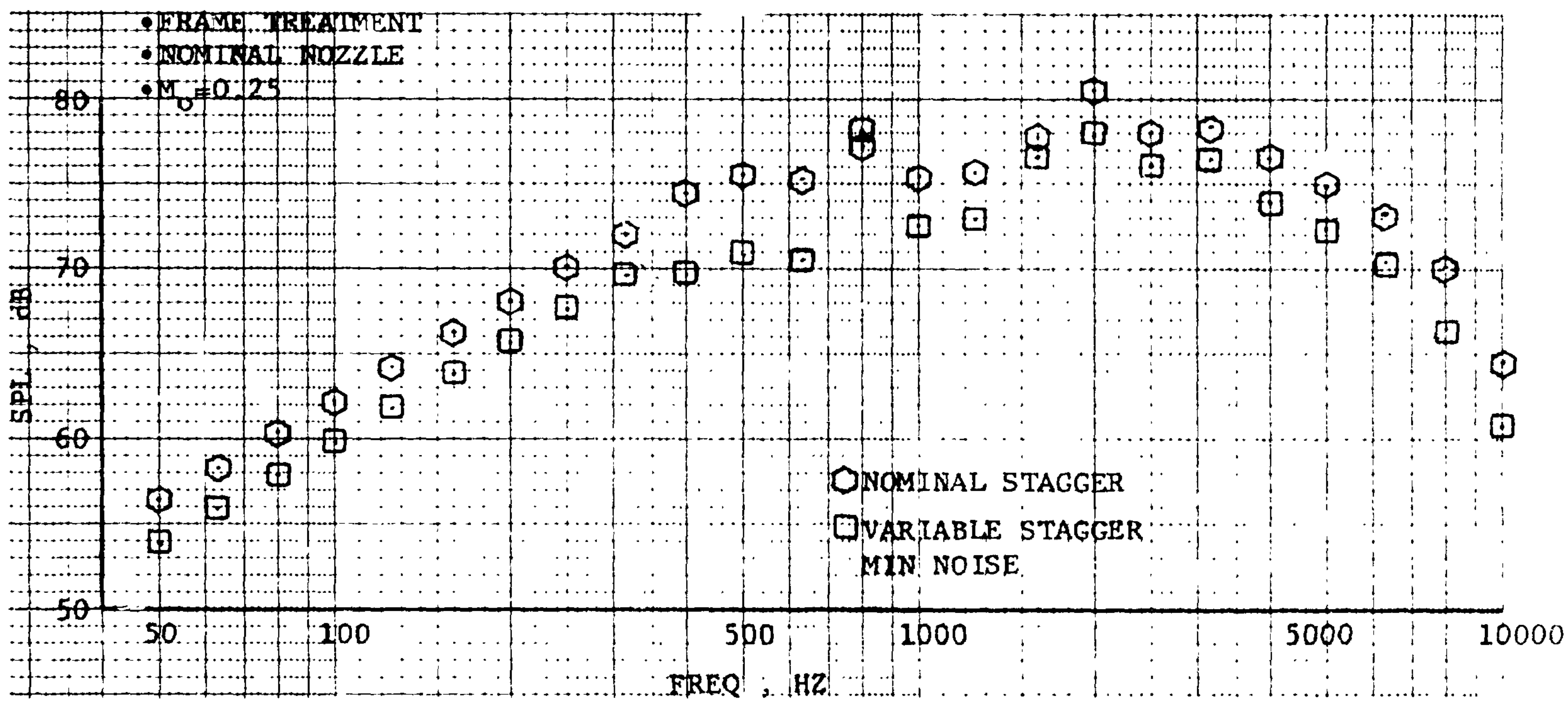


Figure 35. 1/3-Octave Spectral Comparison at 370-ft (112.8 m) Level Flyover, Fan + Jet Noise, Approach, 130°.

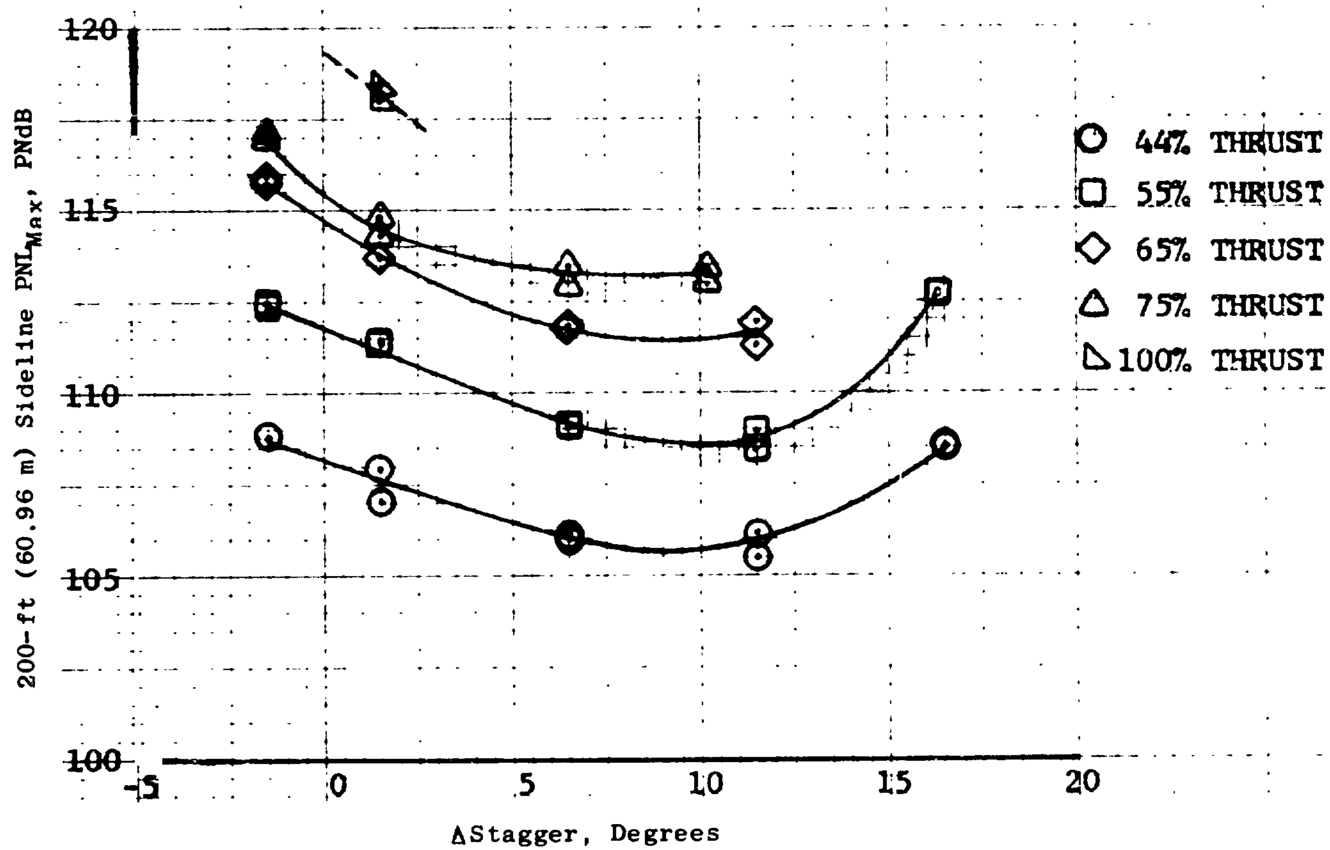


Figure 36. Aft Maximum 200-ft (60.96 m) Sideline PNL Variations at Different Stagger Angles, Small Nozzle.

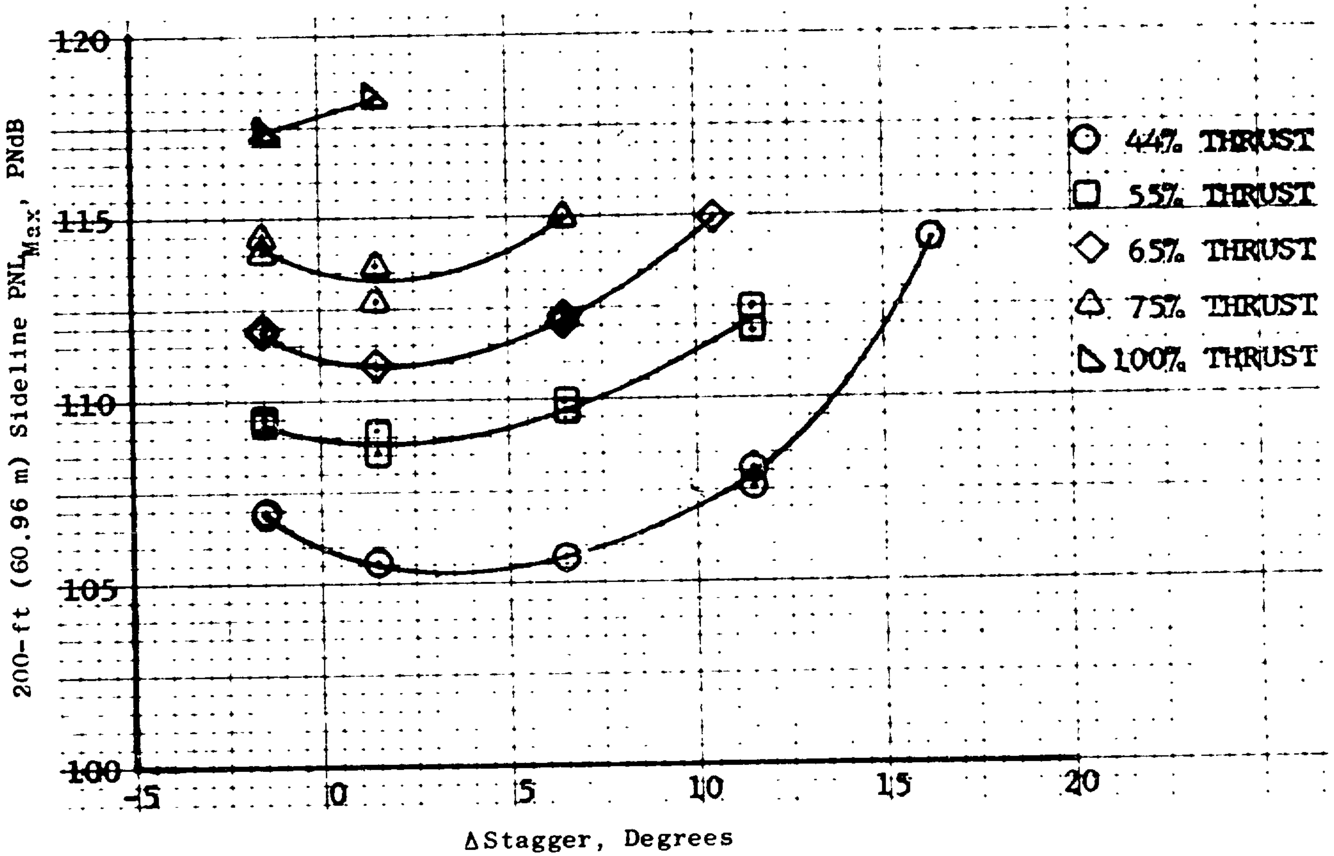


Figure 37. Aft Maximum 200-ft (60.96 m) Sideline PNL Variations at Different Stagger Angles, Large Nozzle.

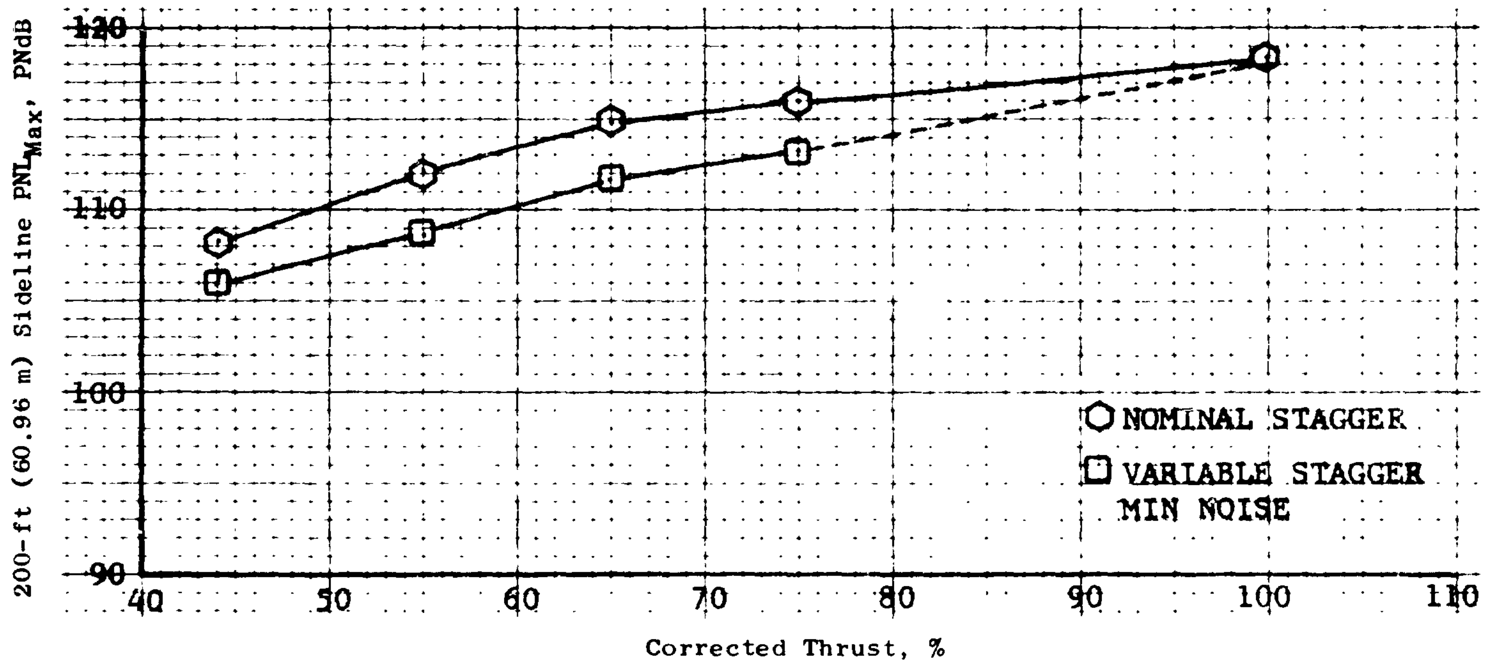


Figure 38. 200-ft (60.96 m) Sideline Maximum PNL Variation with Corrected Thrust, Aft Maximum PNL, Small Nozzle.

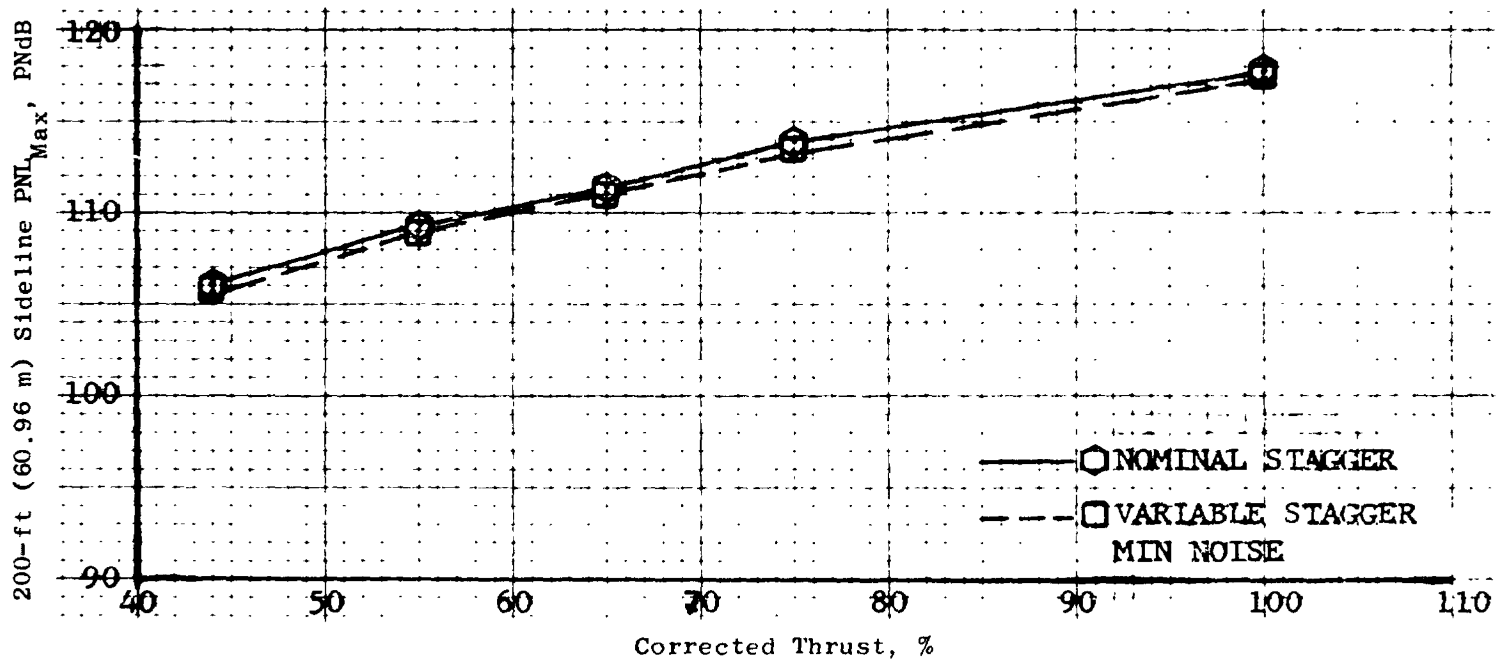


Figure 39. 200-ft (60.96 m) Sideline Maximum PNL Variation with Corrected Thrust, Aft Maximum PNL, Large Nozzle.

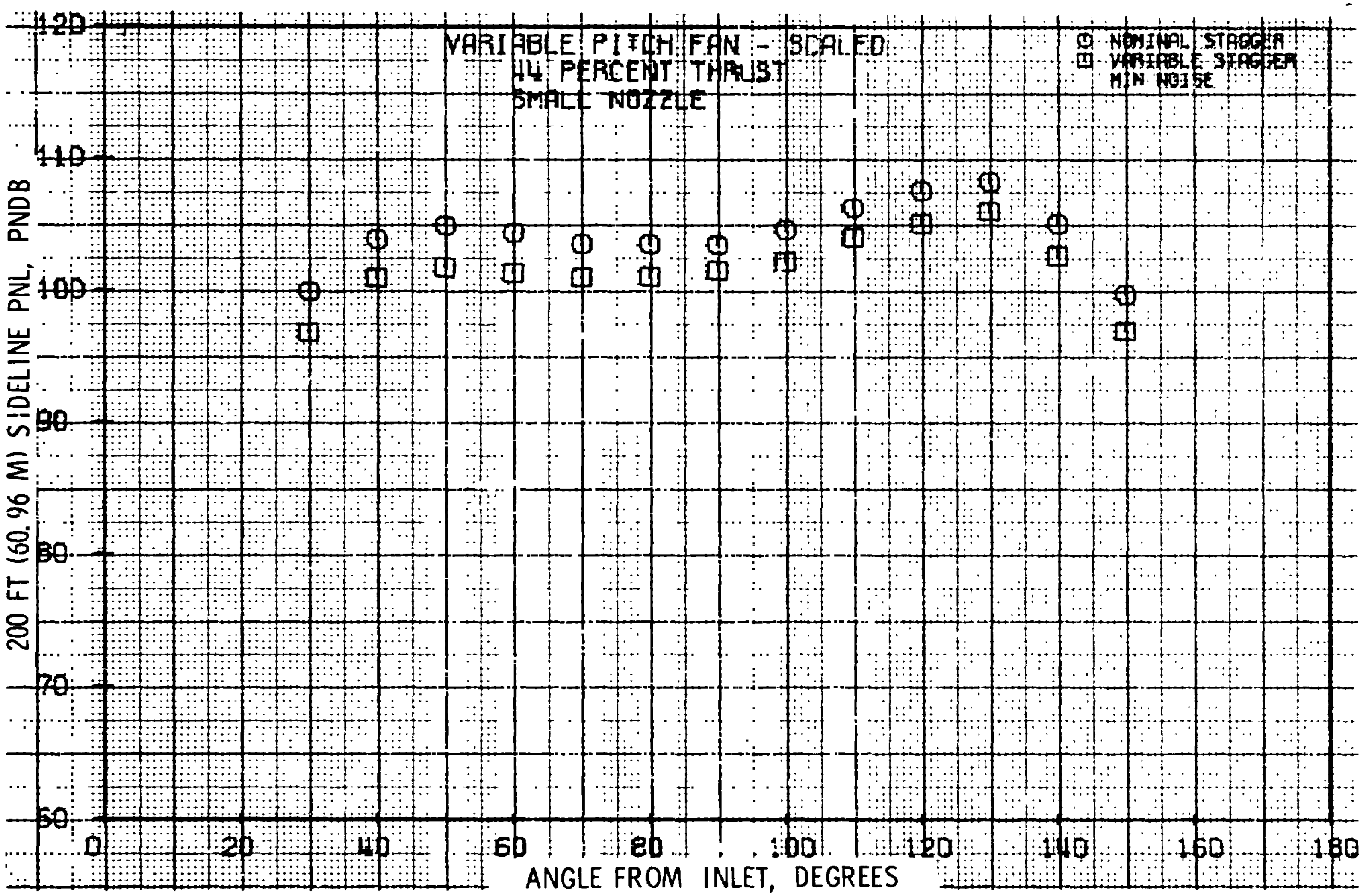


Figure 40. 200-ft (60.96 m) Sideline PNL, Small Nozzle, 44% Thrust.

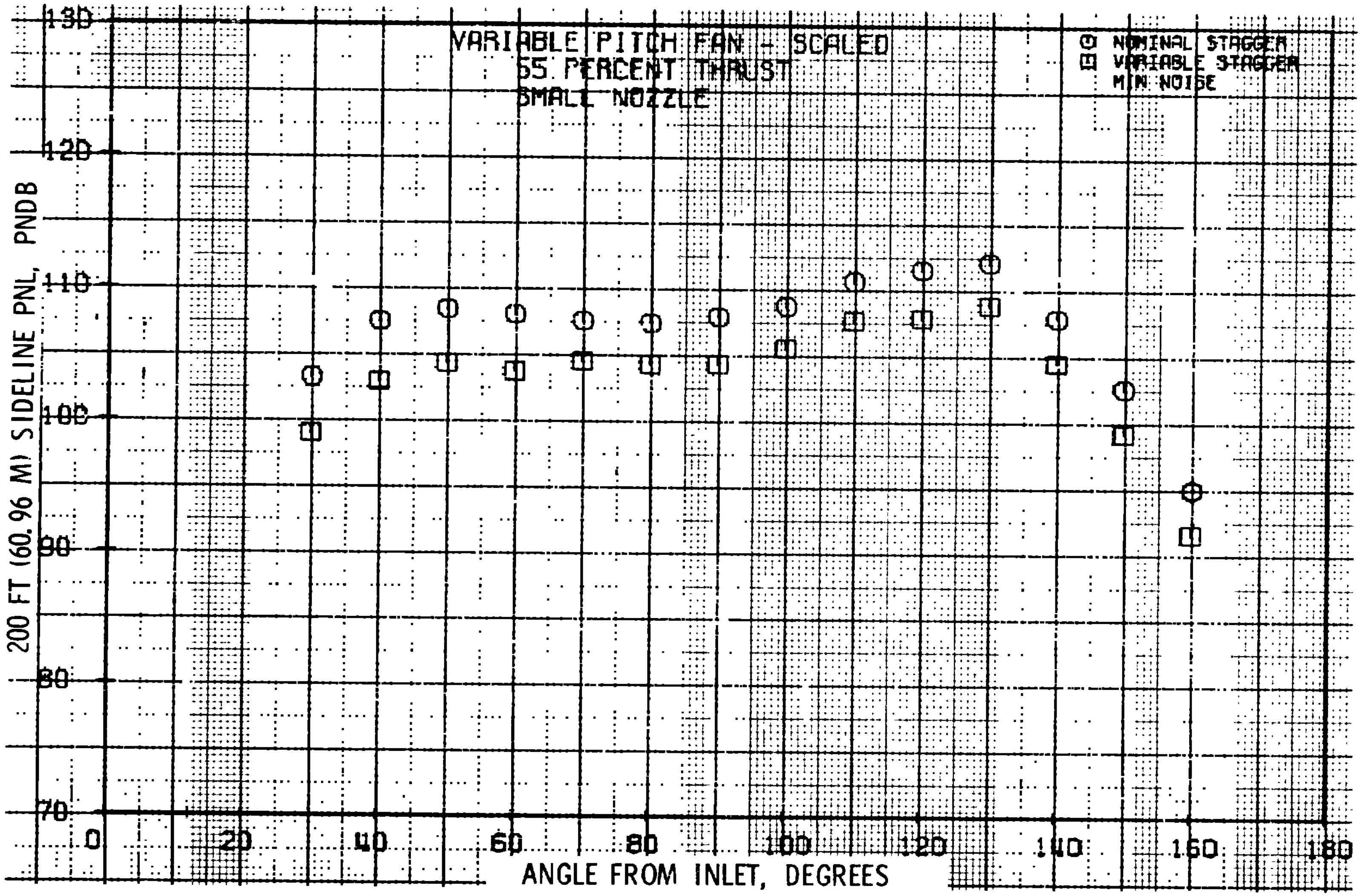


Figure 41. 200-ft (60.96 m) Sideline PNL, Small Nozzle, 55% Thrust.

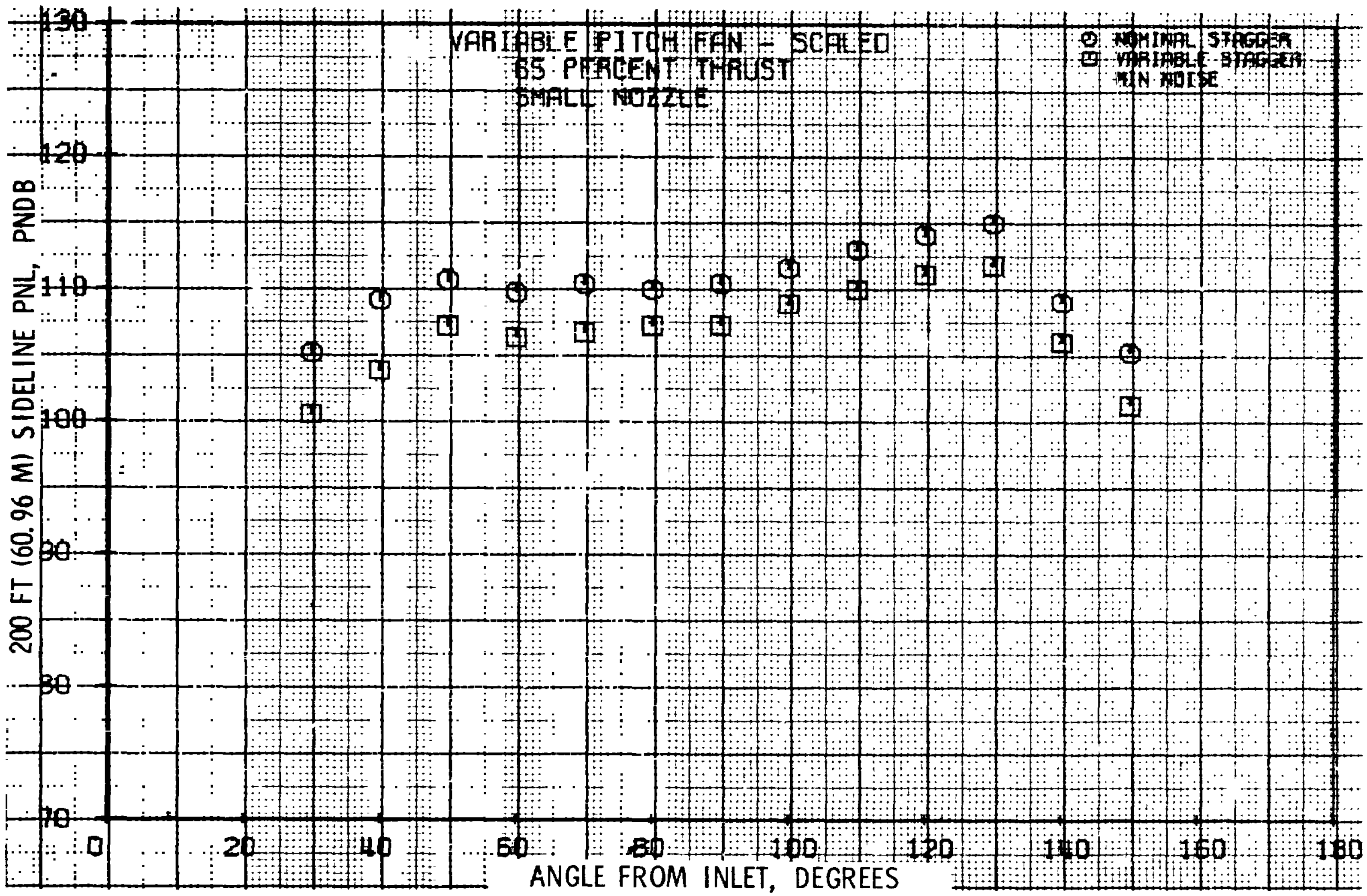


Figure 42. 200-ft (60.96 m) Sideline PNL, Small Nozzle, 65% Thrust.

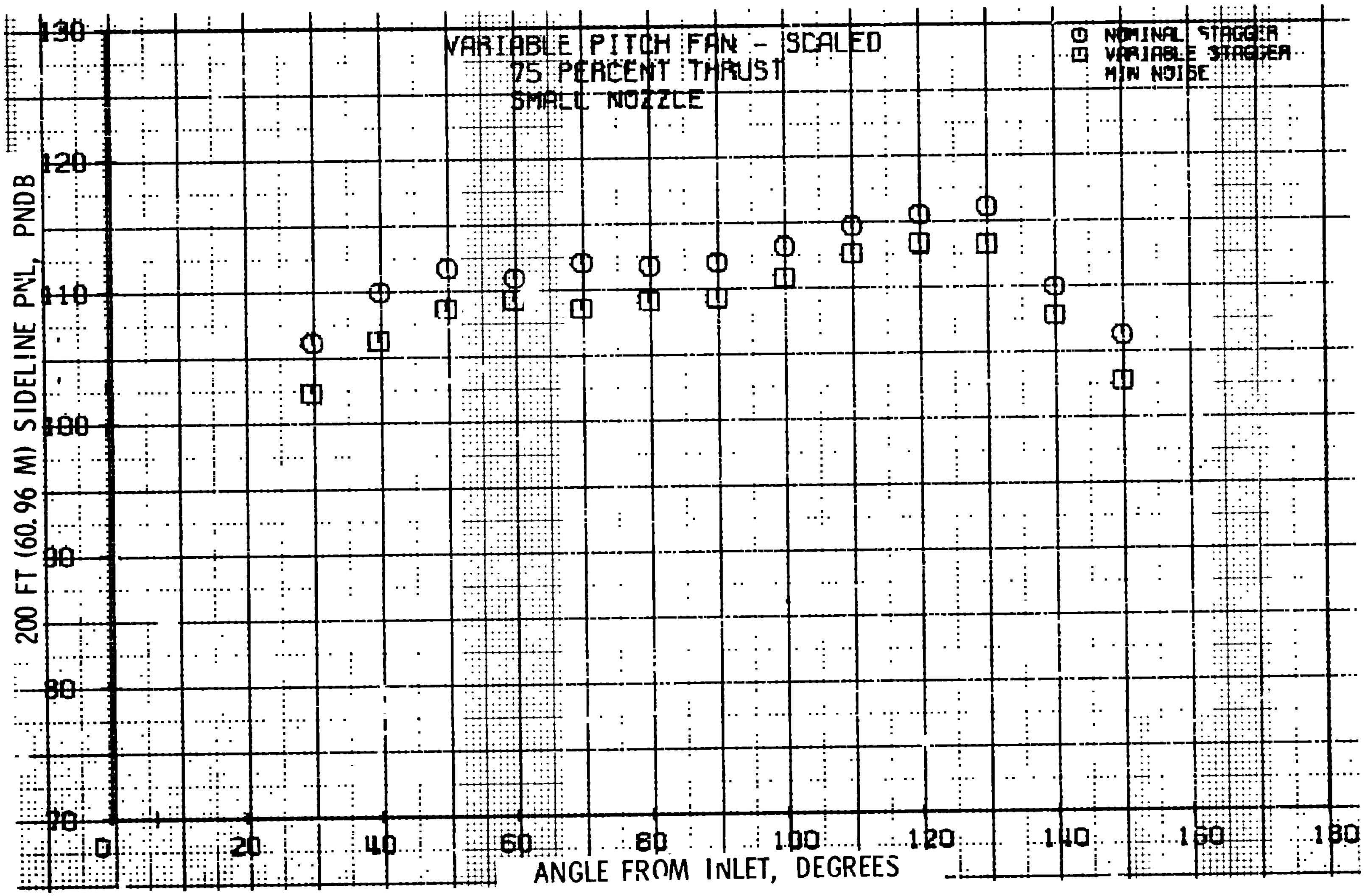


Figure 43. 200-ft (60.96 m) Sideline PNL, Small Nozzle, 75% Thrust.

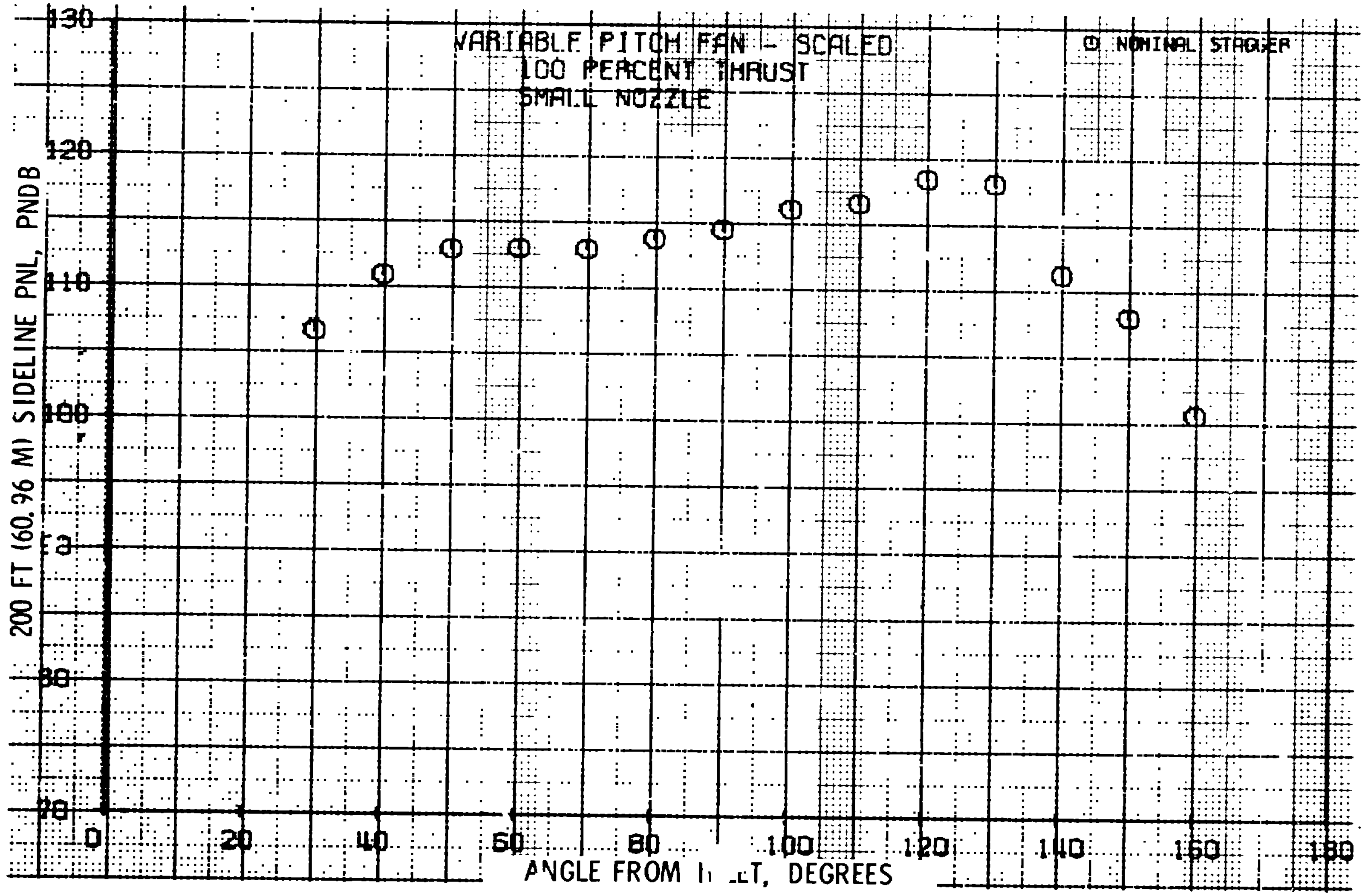


Figure 44. 200-ft (60.96 m) Sideline PNL, Small Nozzle, 100% Thrust.

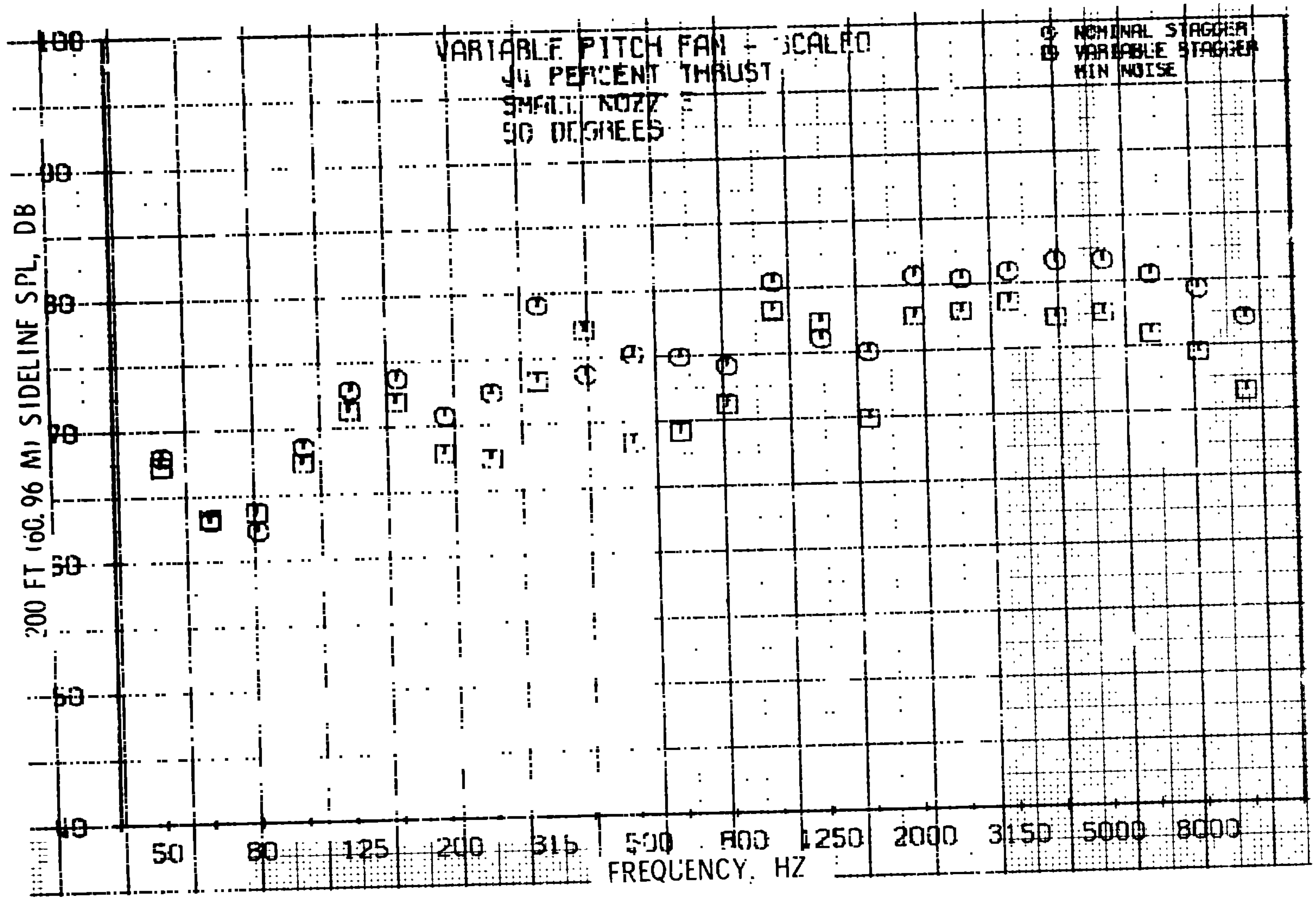


Figure 45. 1/3-Octave Spectral Comparison, Small Nozzle, 44% Thrust, 50°.

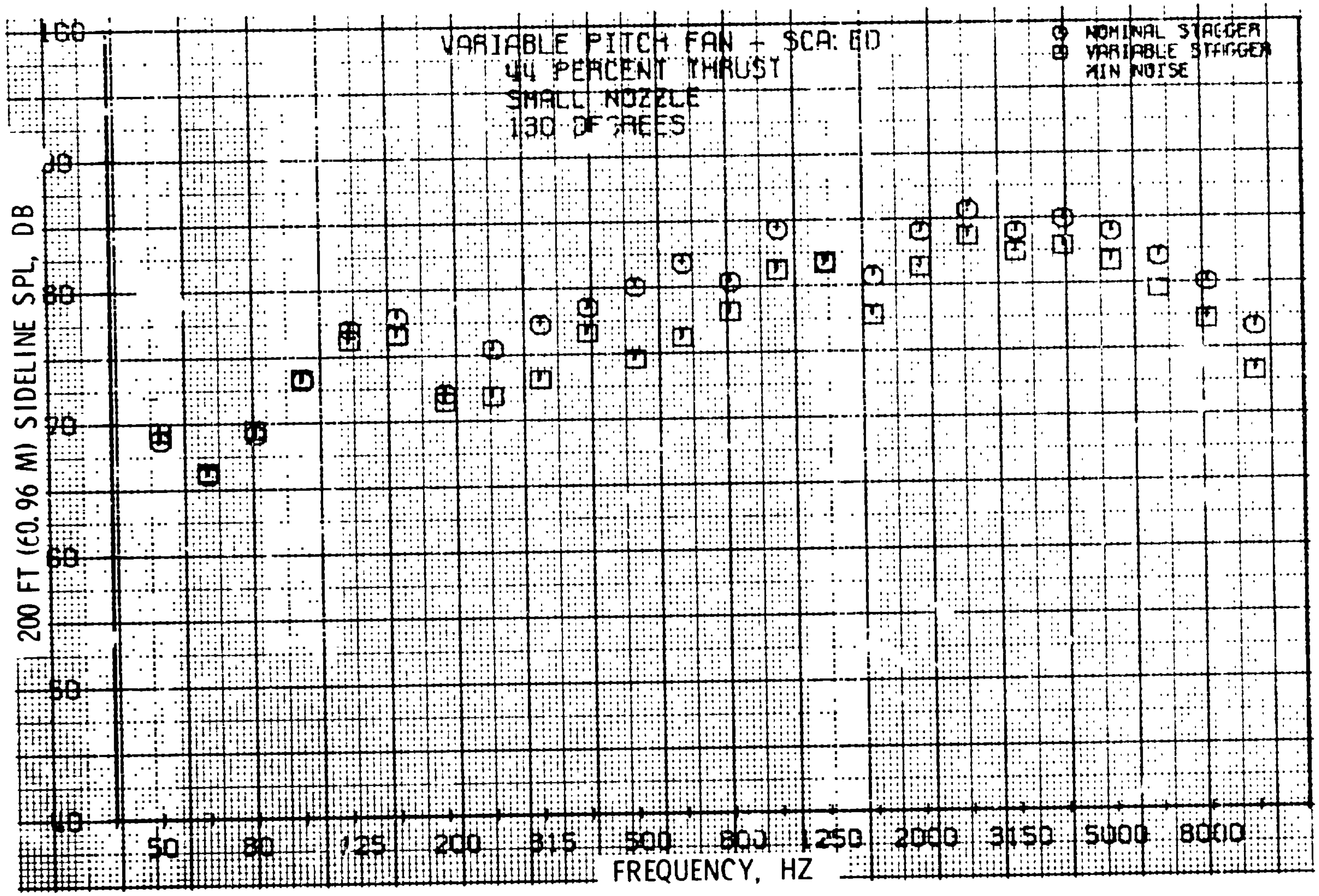


Figure 46. 1/3-Octave Spectral Comparison, Small Nozzle, 44% Thrust, 130°.

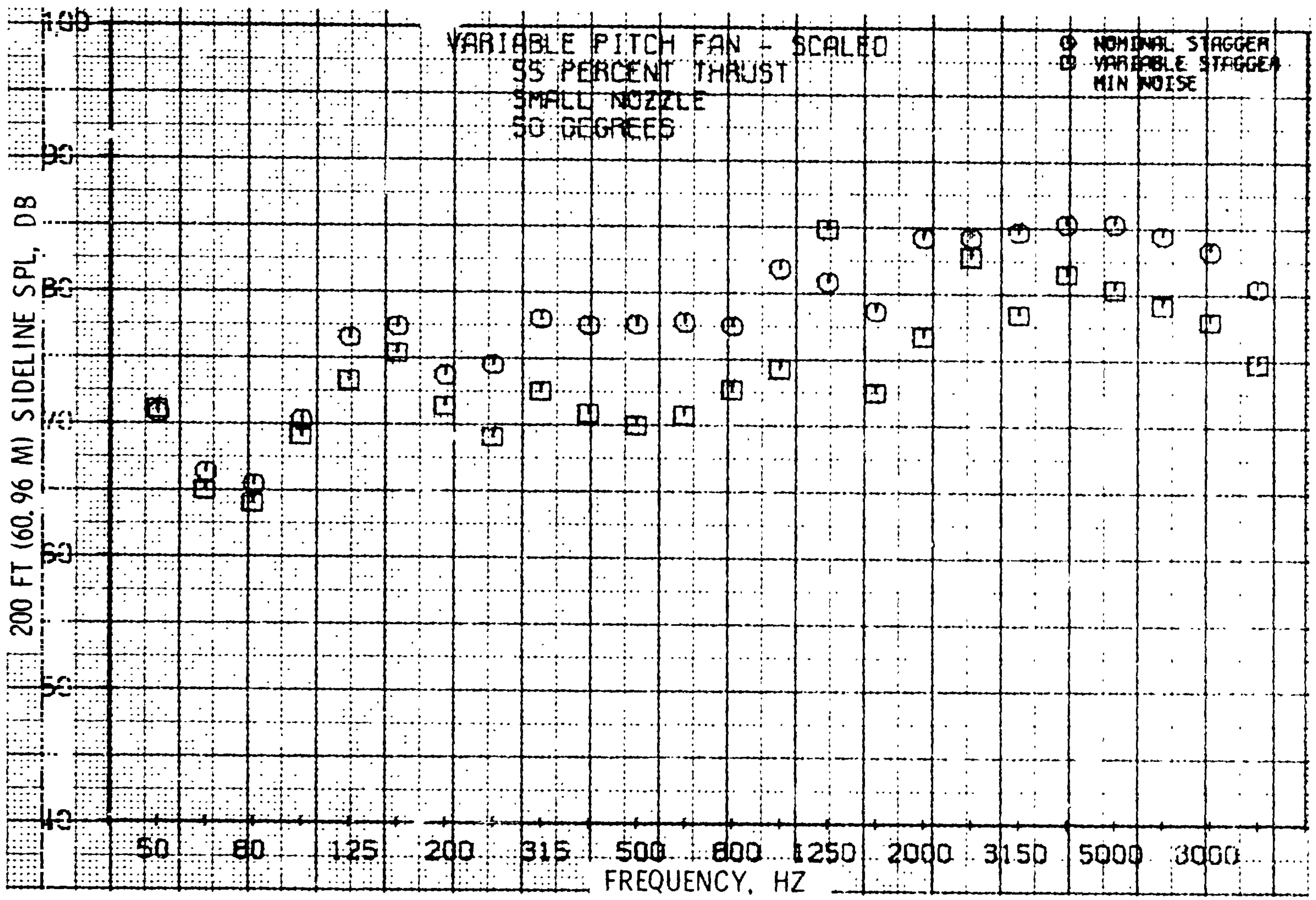


Figure 47 1/3-Octave Spectral Comparison, Small Nozzle, 55% Thr st, 50°.

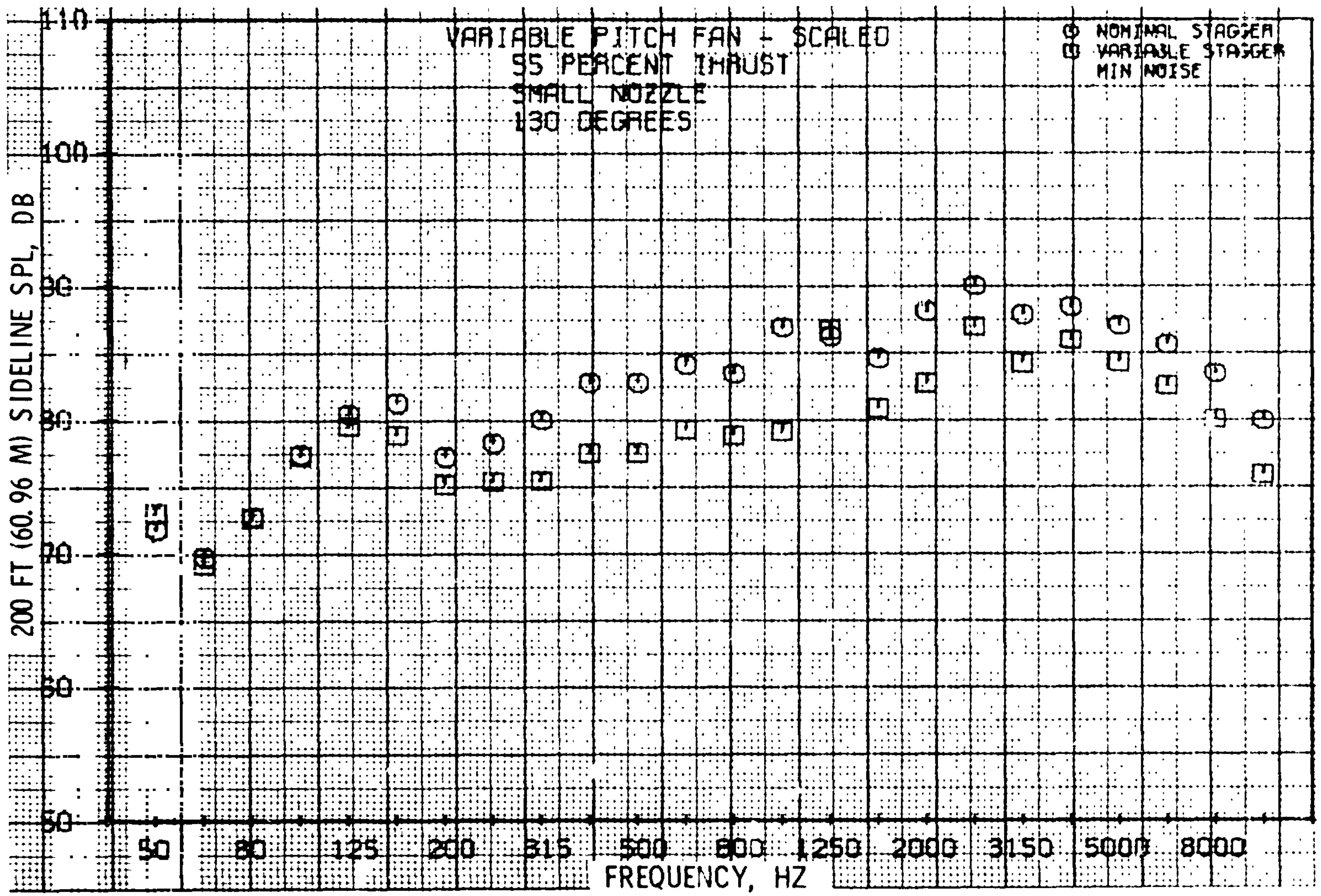


Figure 48. 1/3-Octave Spectral Comparison, Small Nozzle, 55% Thrust, 130°.

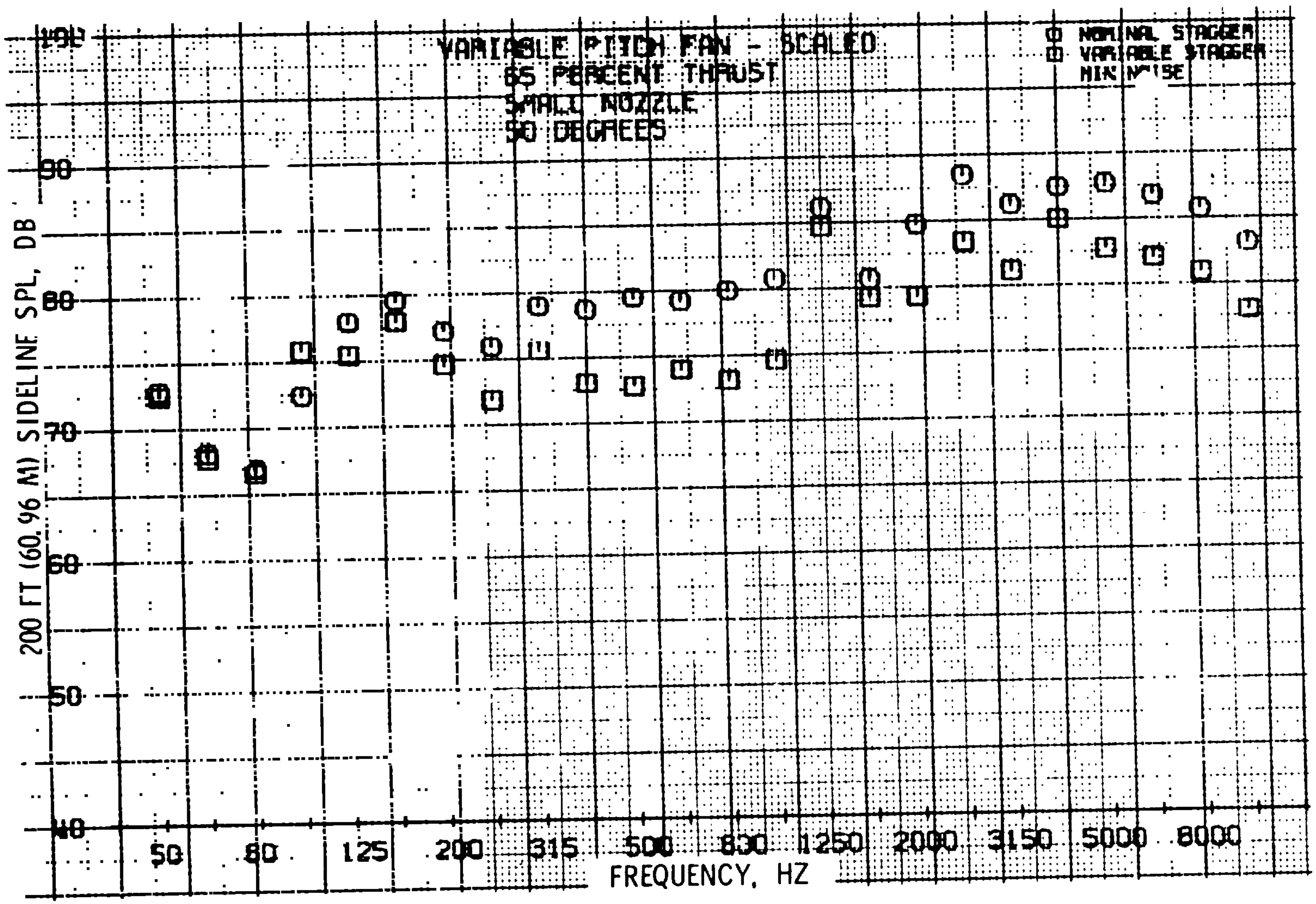


Figure 49. 1/3-Octave Spectral Comparison, Small Nozzle, 65% Thrust, 50°.

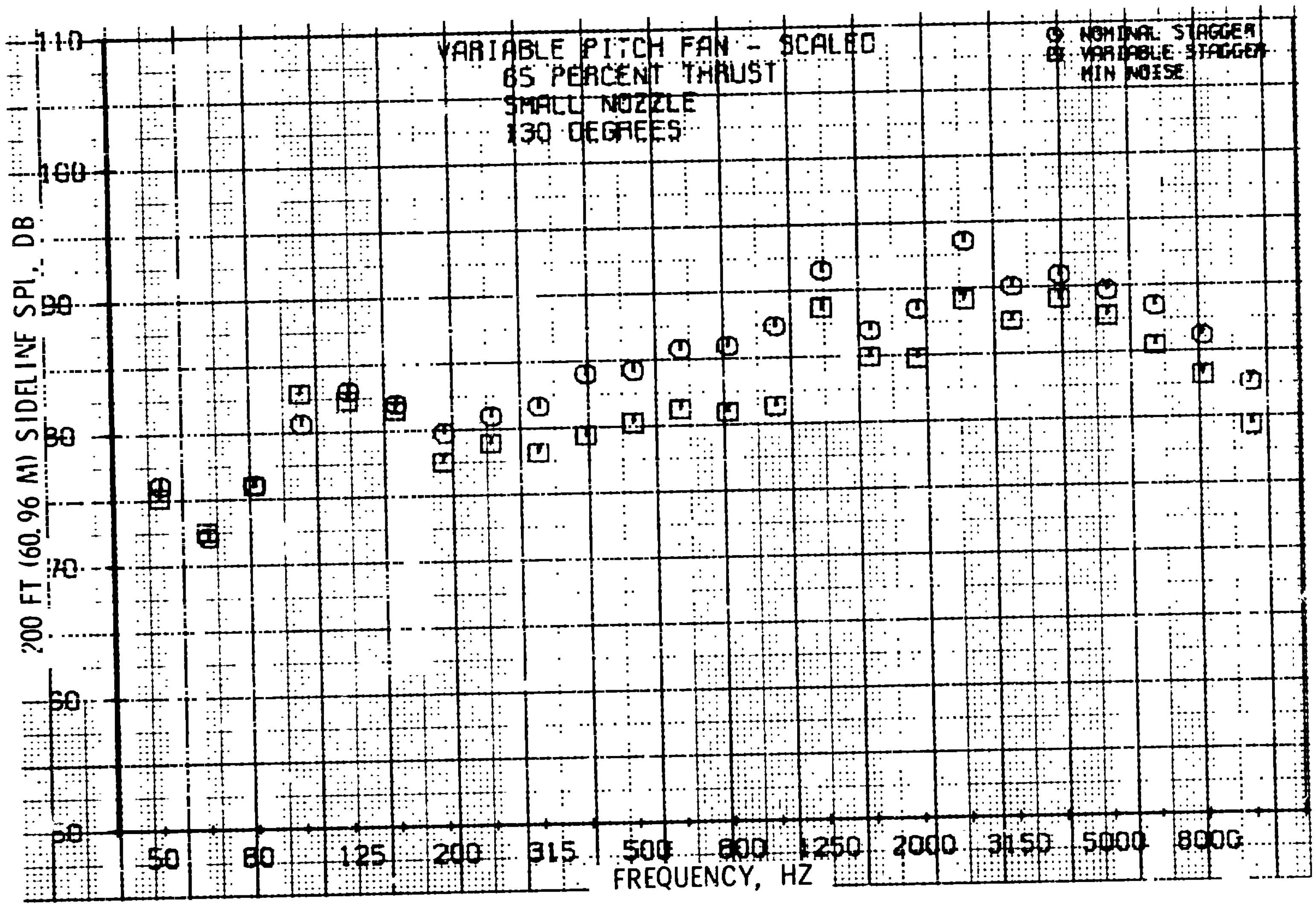


Figure 50. 1/3-Octave Spectral Comparison, Small Nozzle, 65% Thrust, 130°.

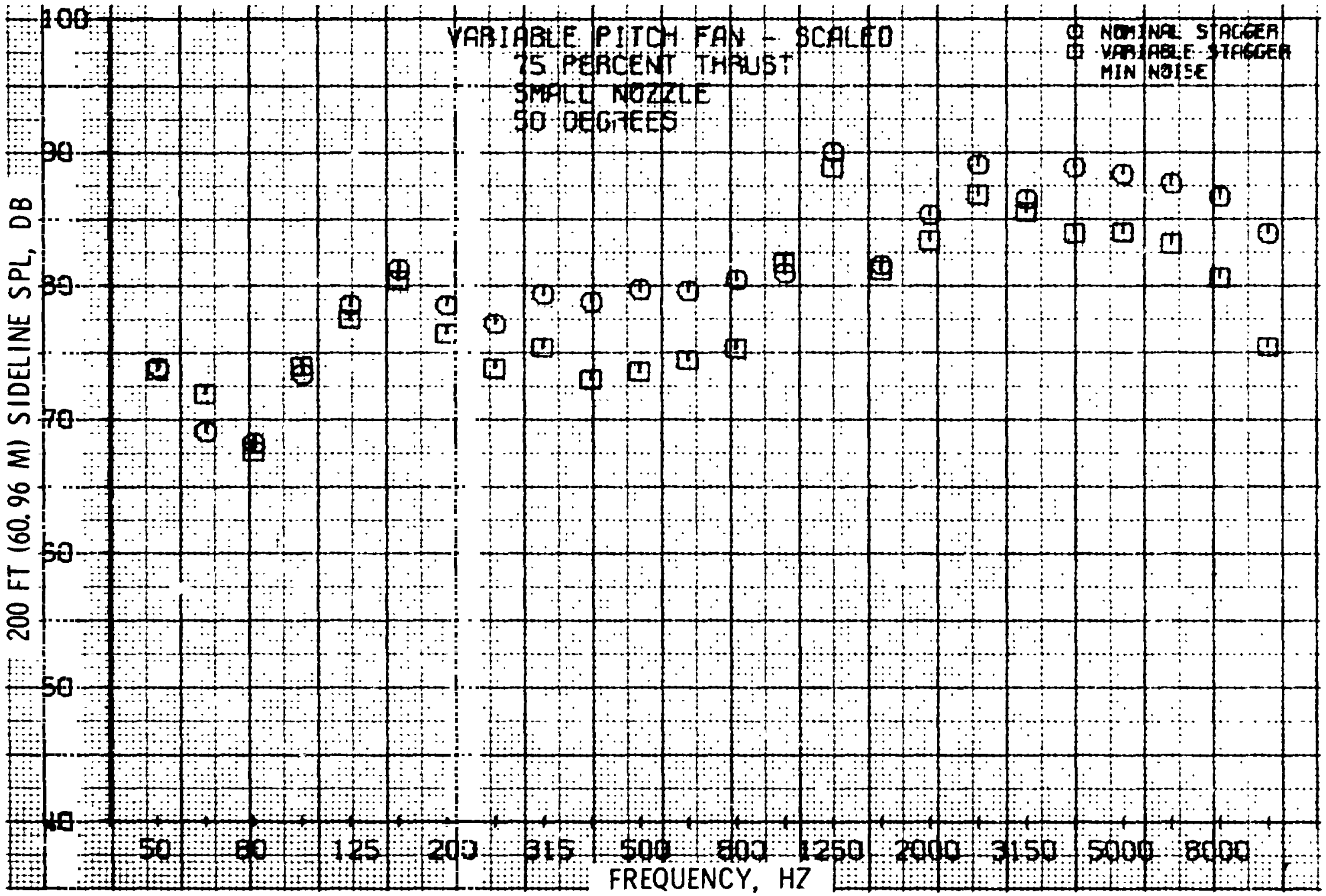


Figure 51. 1/3-Octave Spectral Comparison, Small Nozzle, 75% Thrust, 50°.

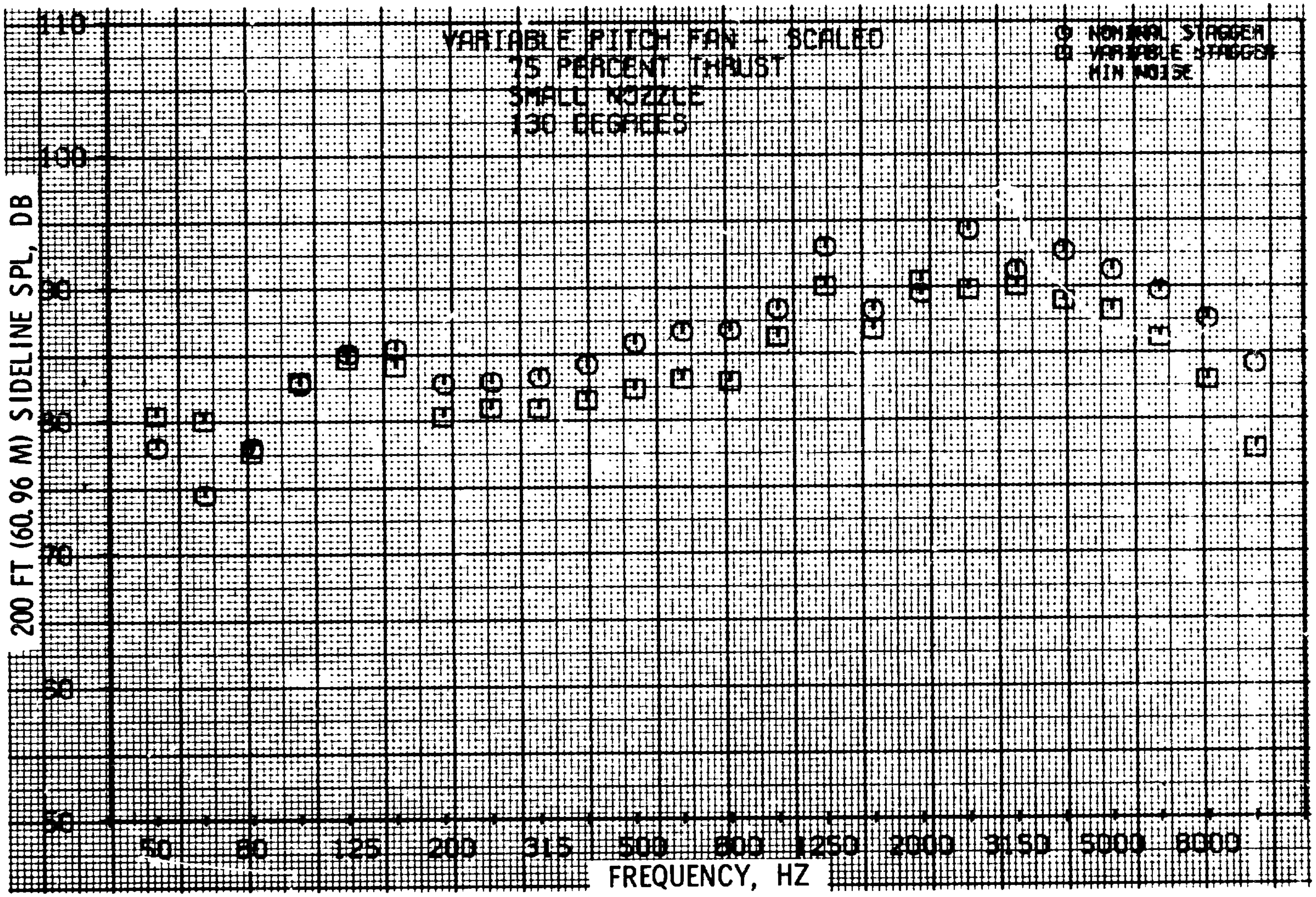


Figure 52. 1/3-Octave Spectral Comparison, Small Nozzle, 75% Thrust, 130°.

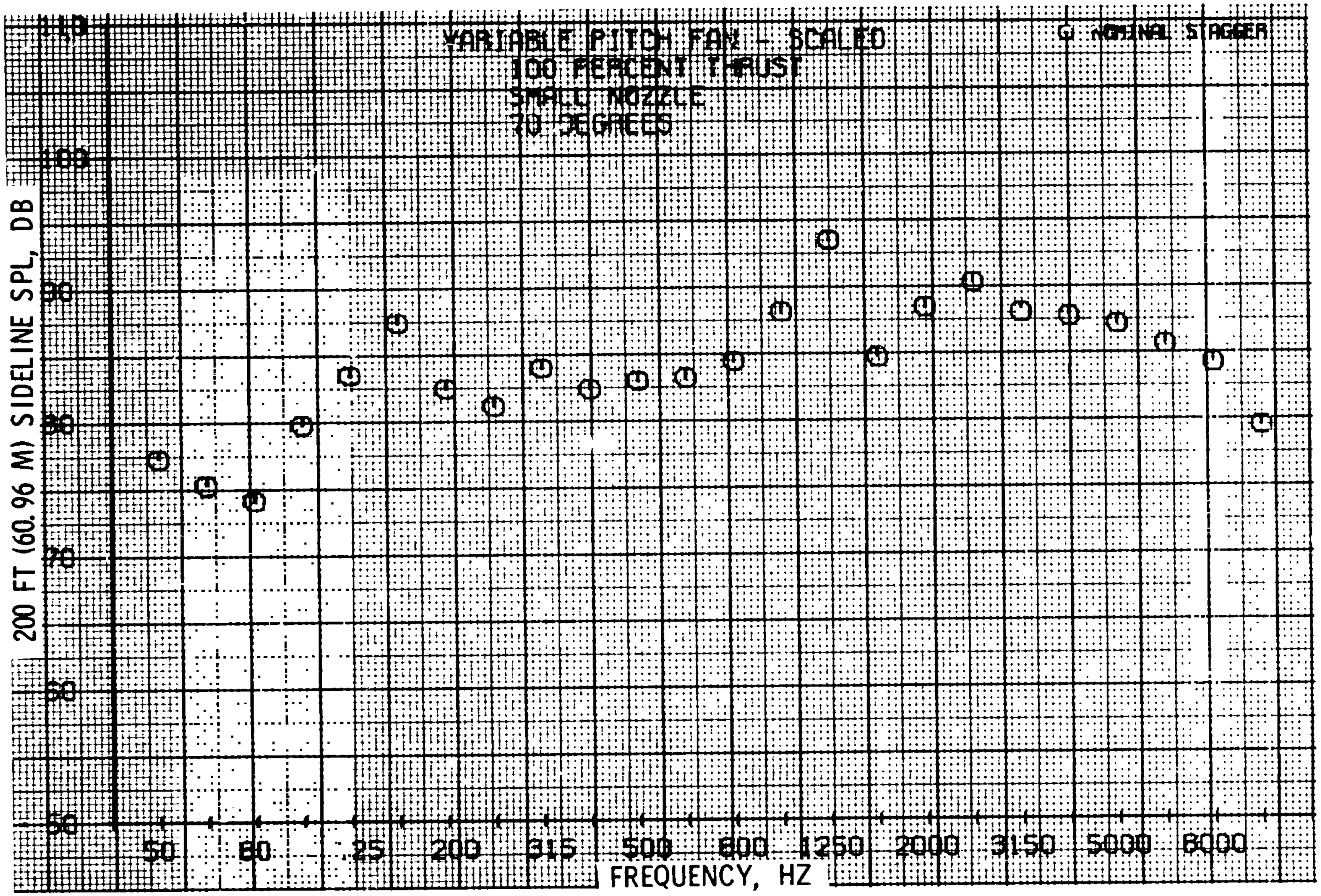


Figure 53. 1/3-Octave Spectral Comparison, Small Nozzle, 100% Thrust, 70°.

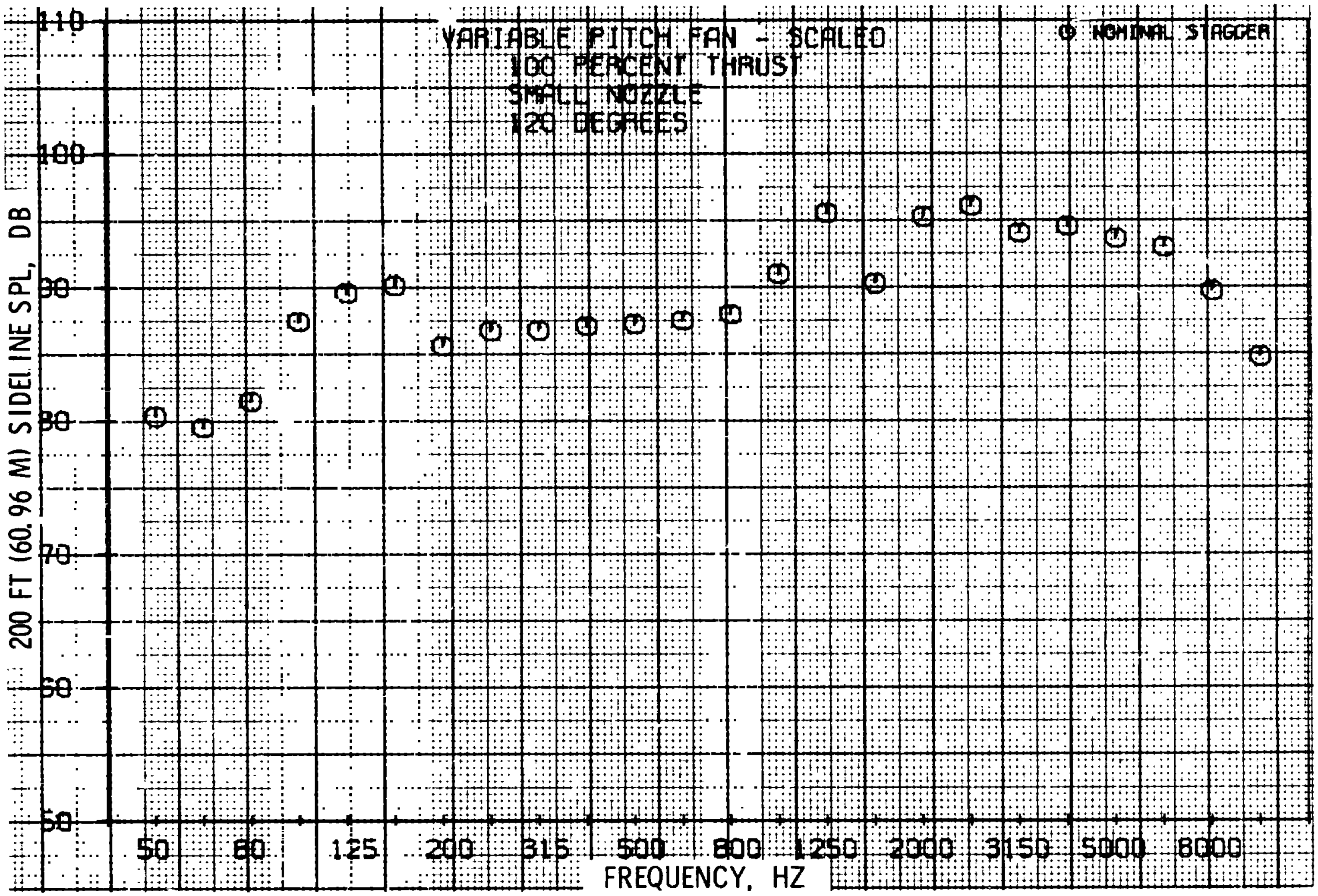


Figure 54. 1/3-Octave Spectral Comparison, Small Nozzle, 100% Thrust, 120°.

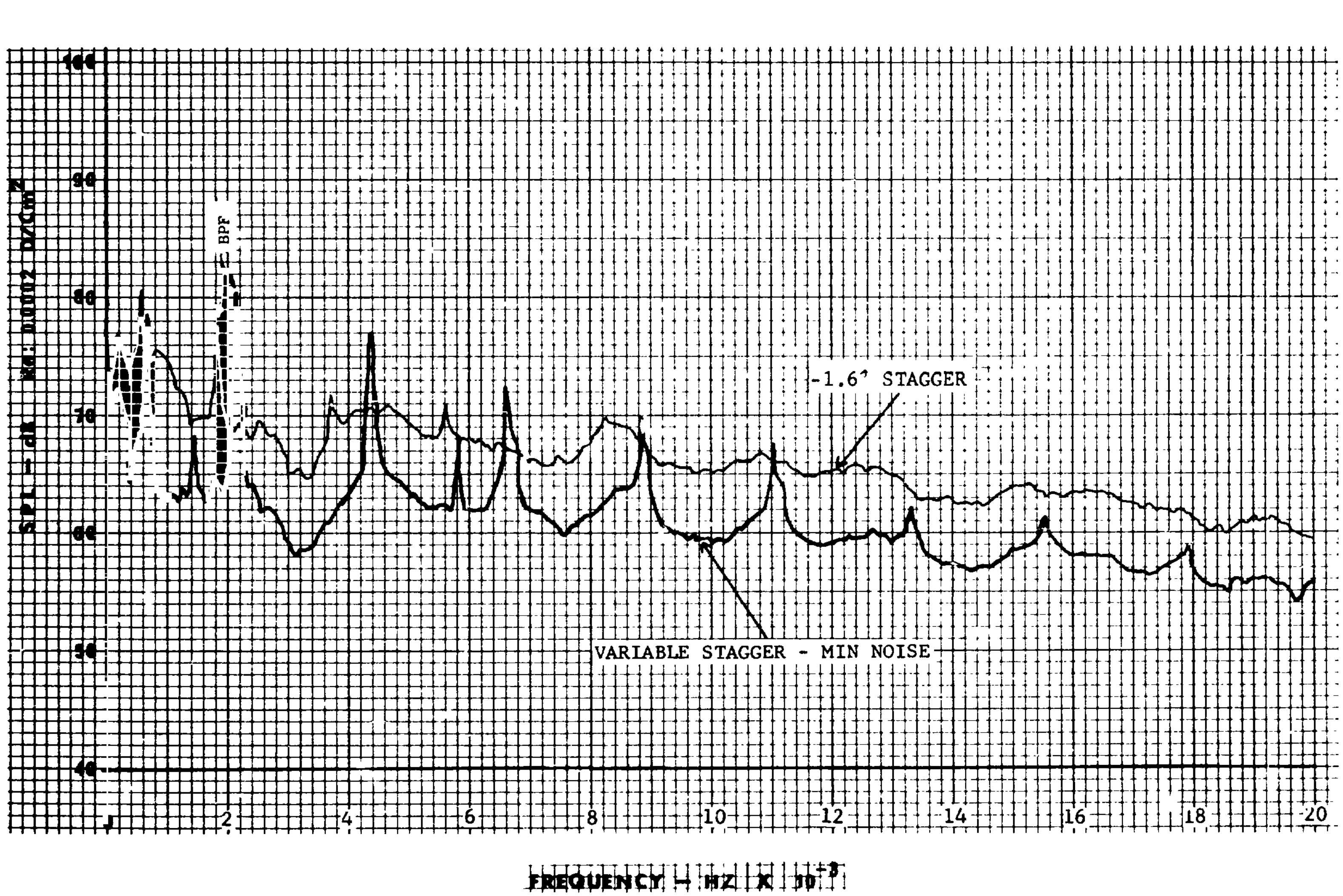


Figure 55. Narrowband Data, Small Nozzle, 44% Thrust, 50°.

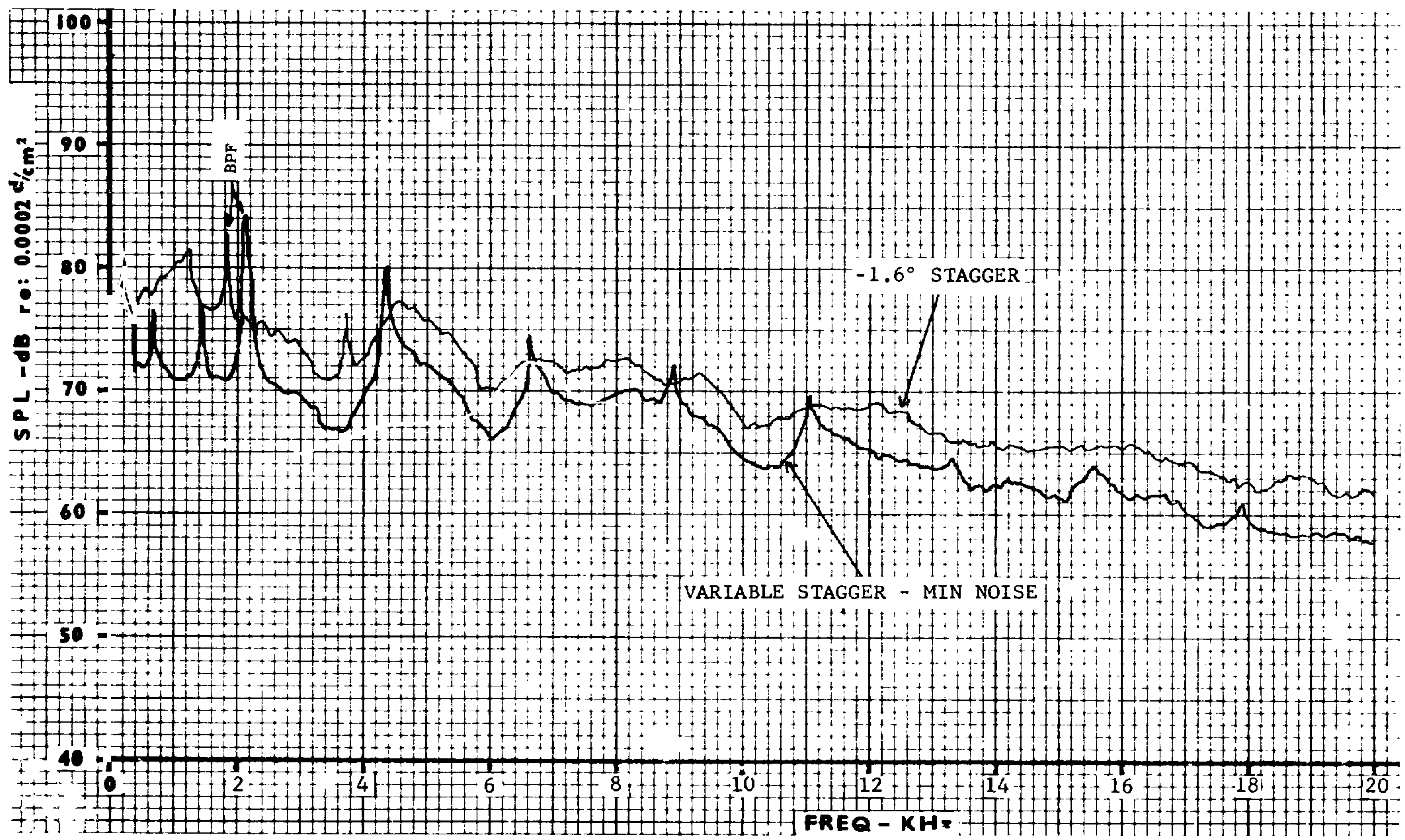


Figure 56. Narrowband Data, Small Nozzle, 44% Thrust, 130°.

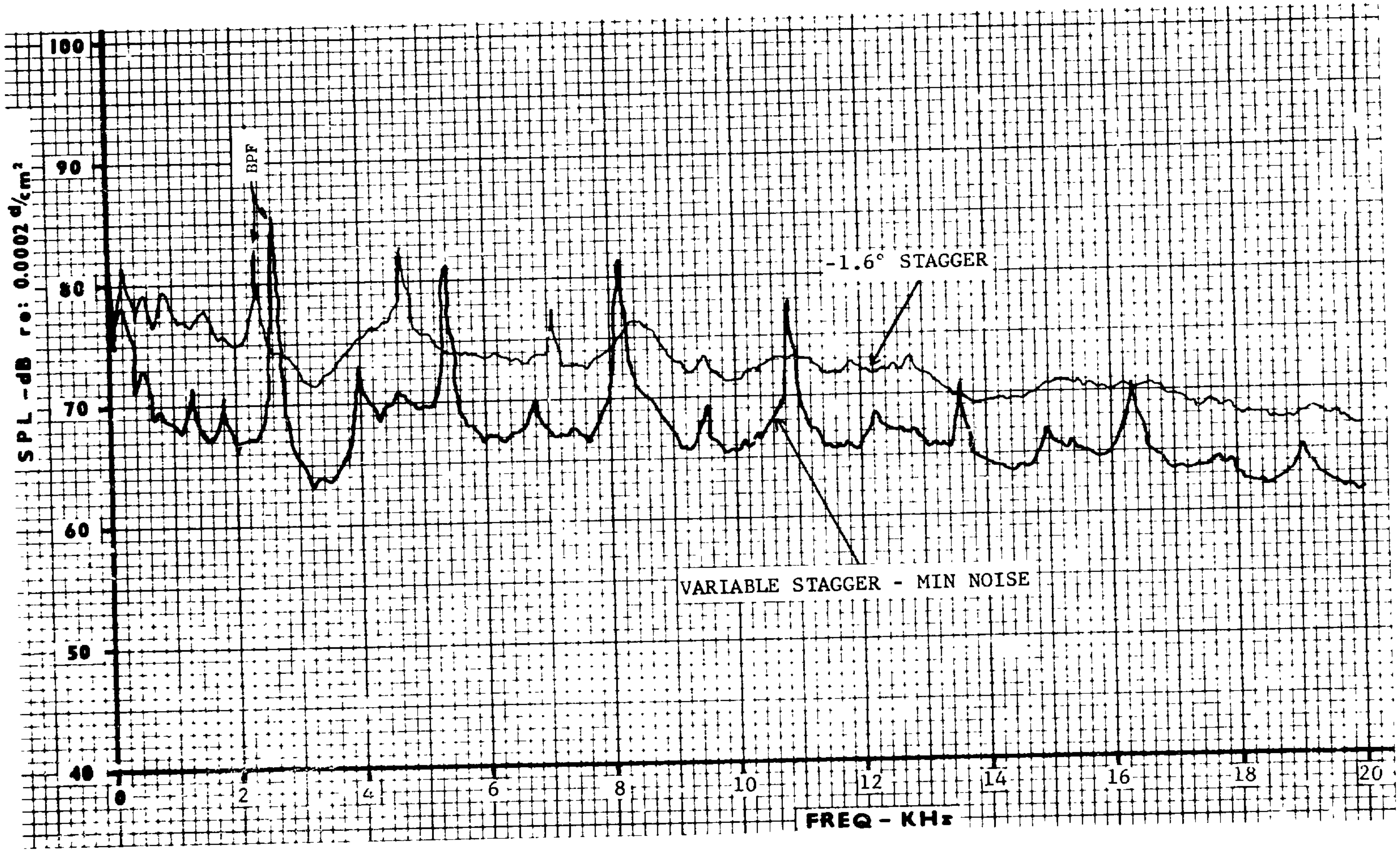


Figure 57. Narrowband Data, Small Nozzle, 65% Thrust, 50°.

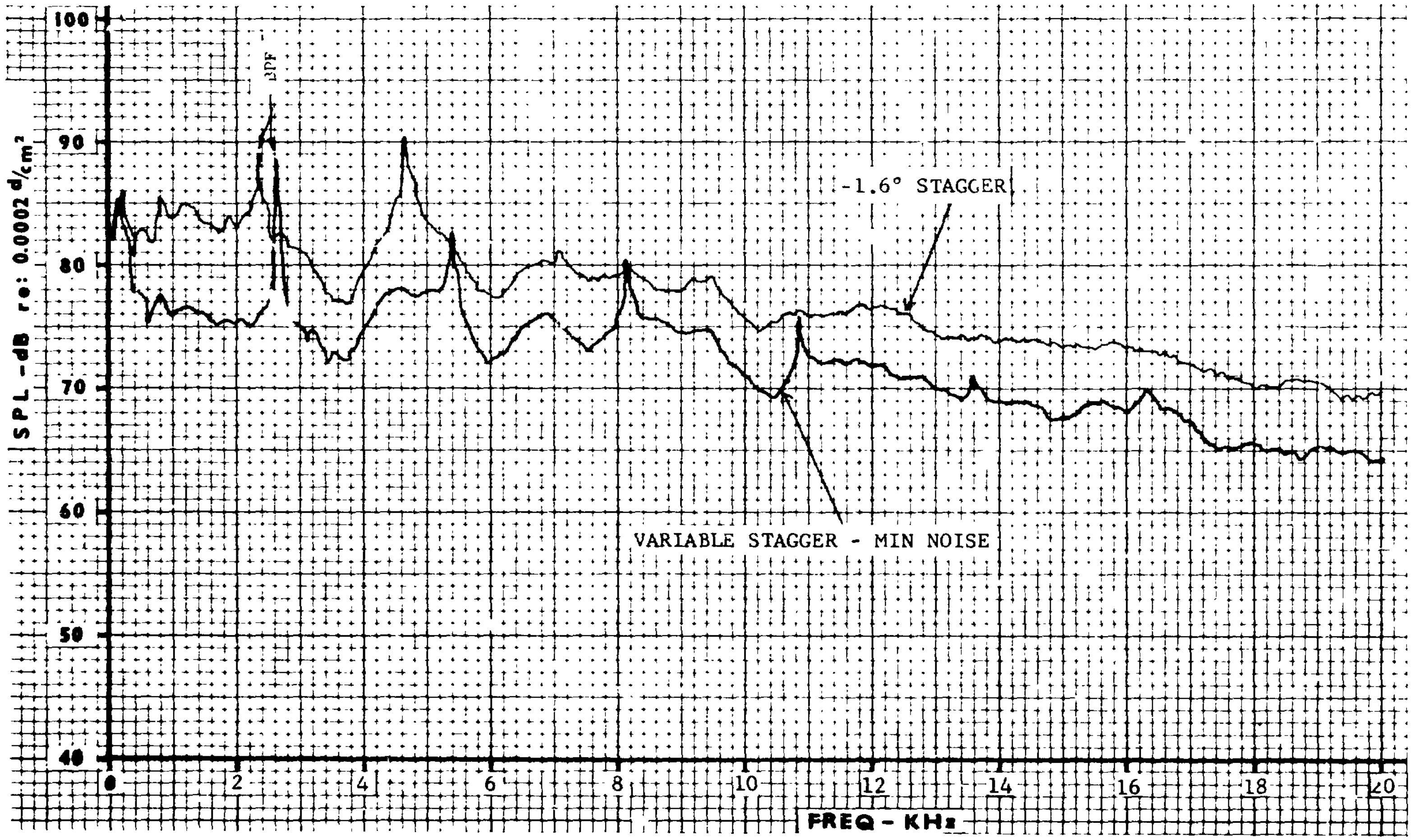


Figure 58. Narrowband Data, Small Nozzle, 65% Thrust, 130°.

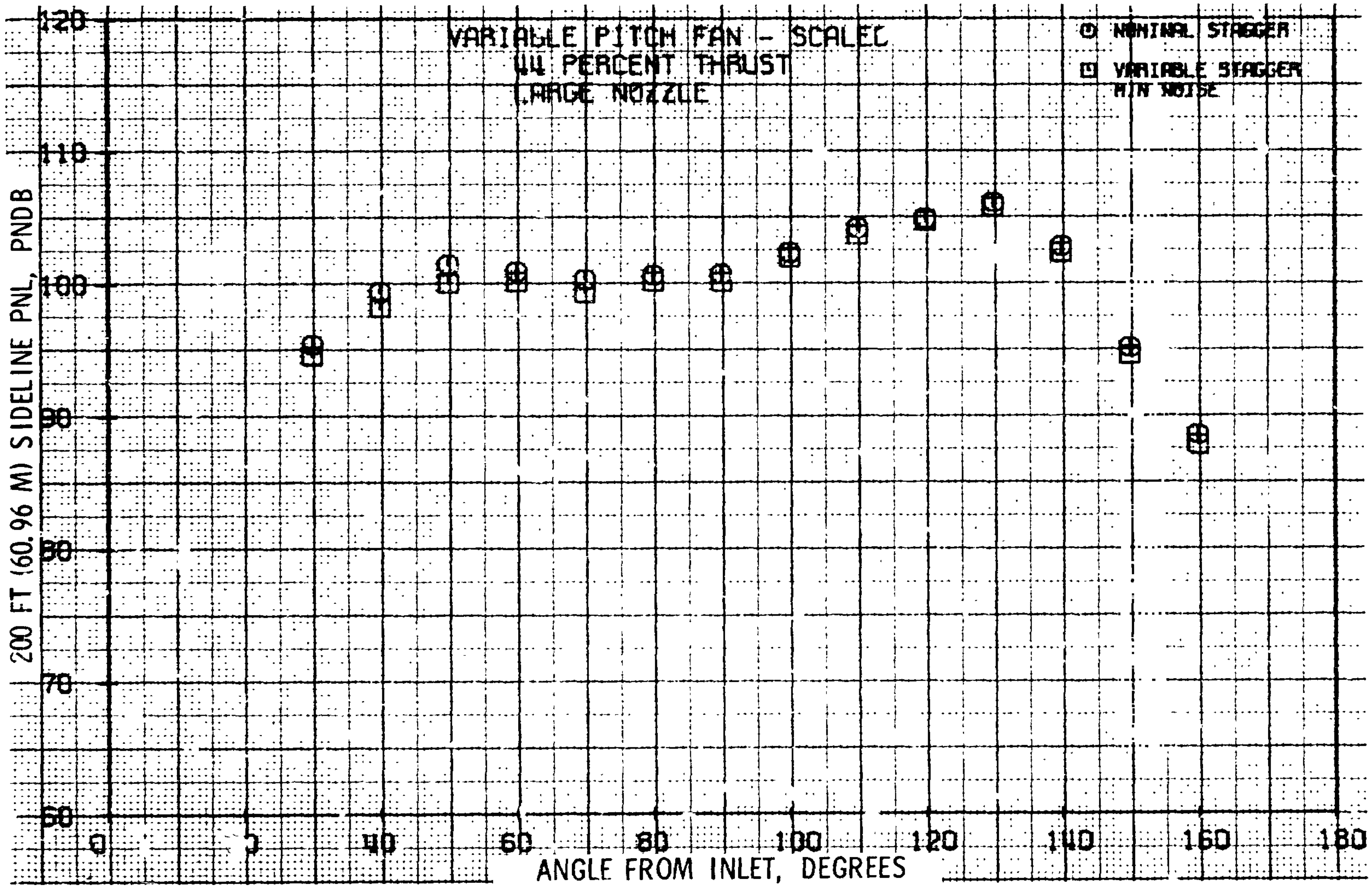


Figure 59. 200-ft (60.96 m) Sideline PNL, Large Nozzle, 44% Thrust.

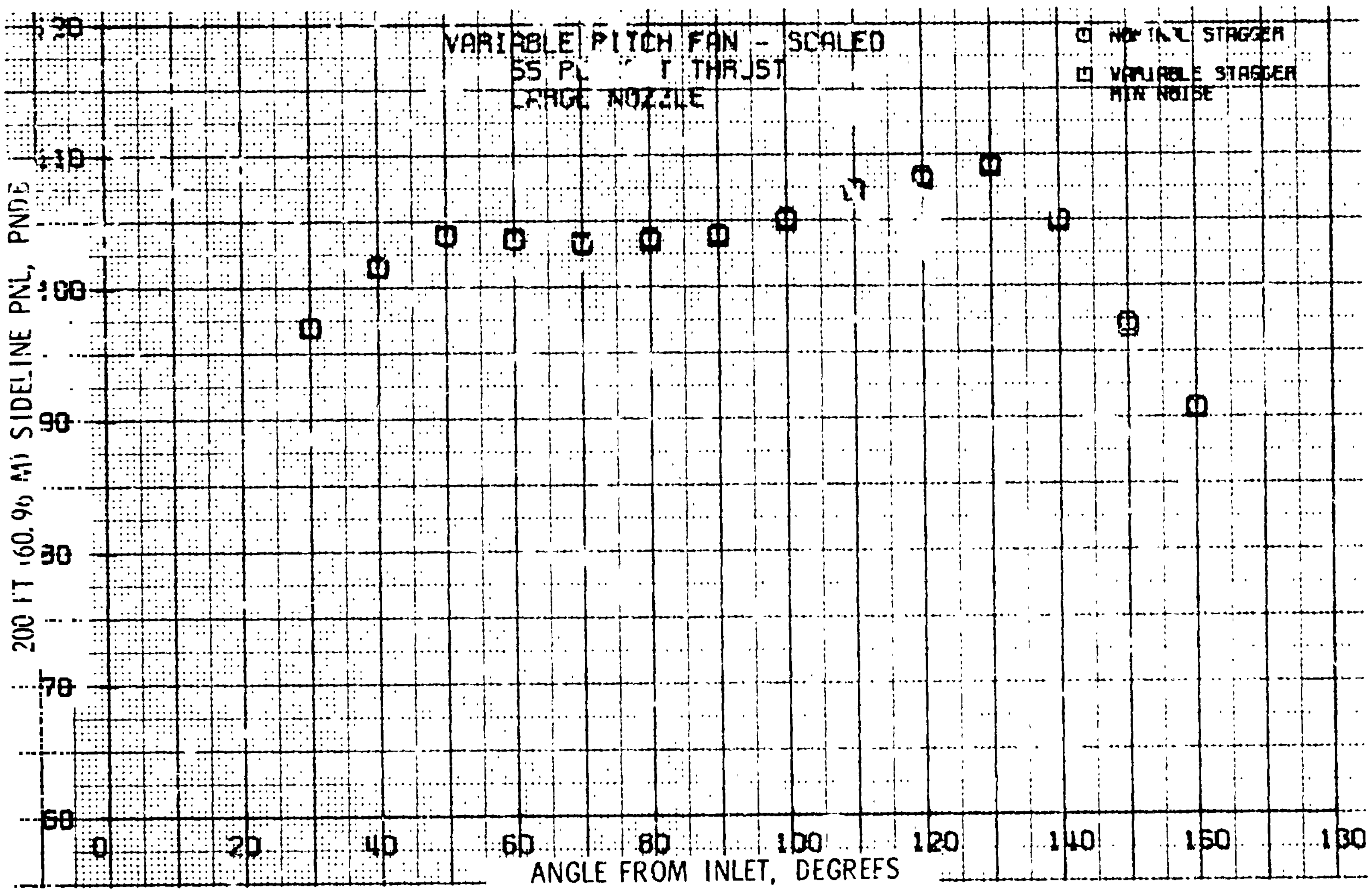


Figure 60. 200-ft (60.96 m) Sideline PNL, Large Nozzle, 55% Thrust.

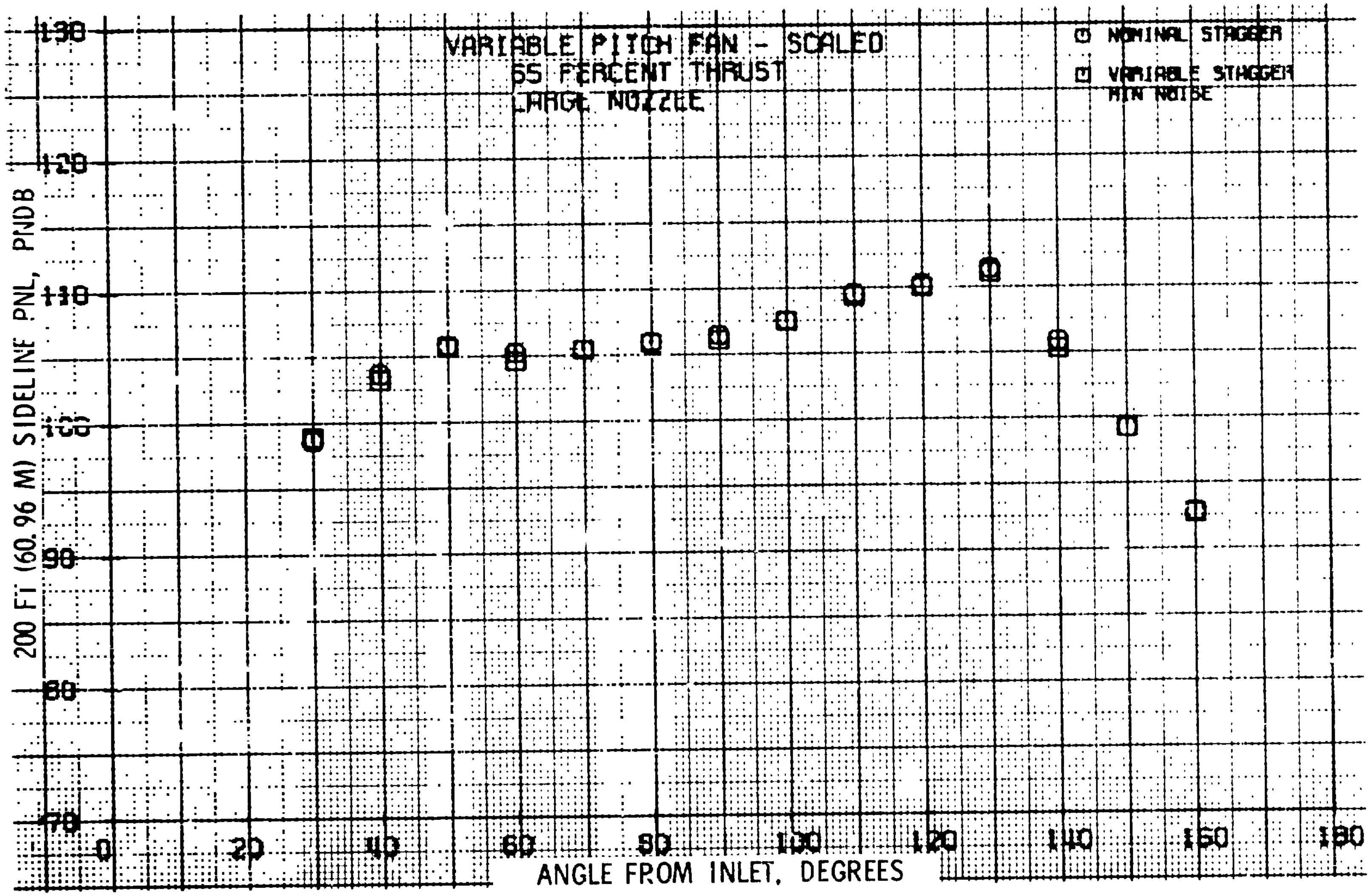


Figure 61. 200-ft (60.96 m) Sideline PNL, Large Nozzle, 65% Thrust.

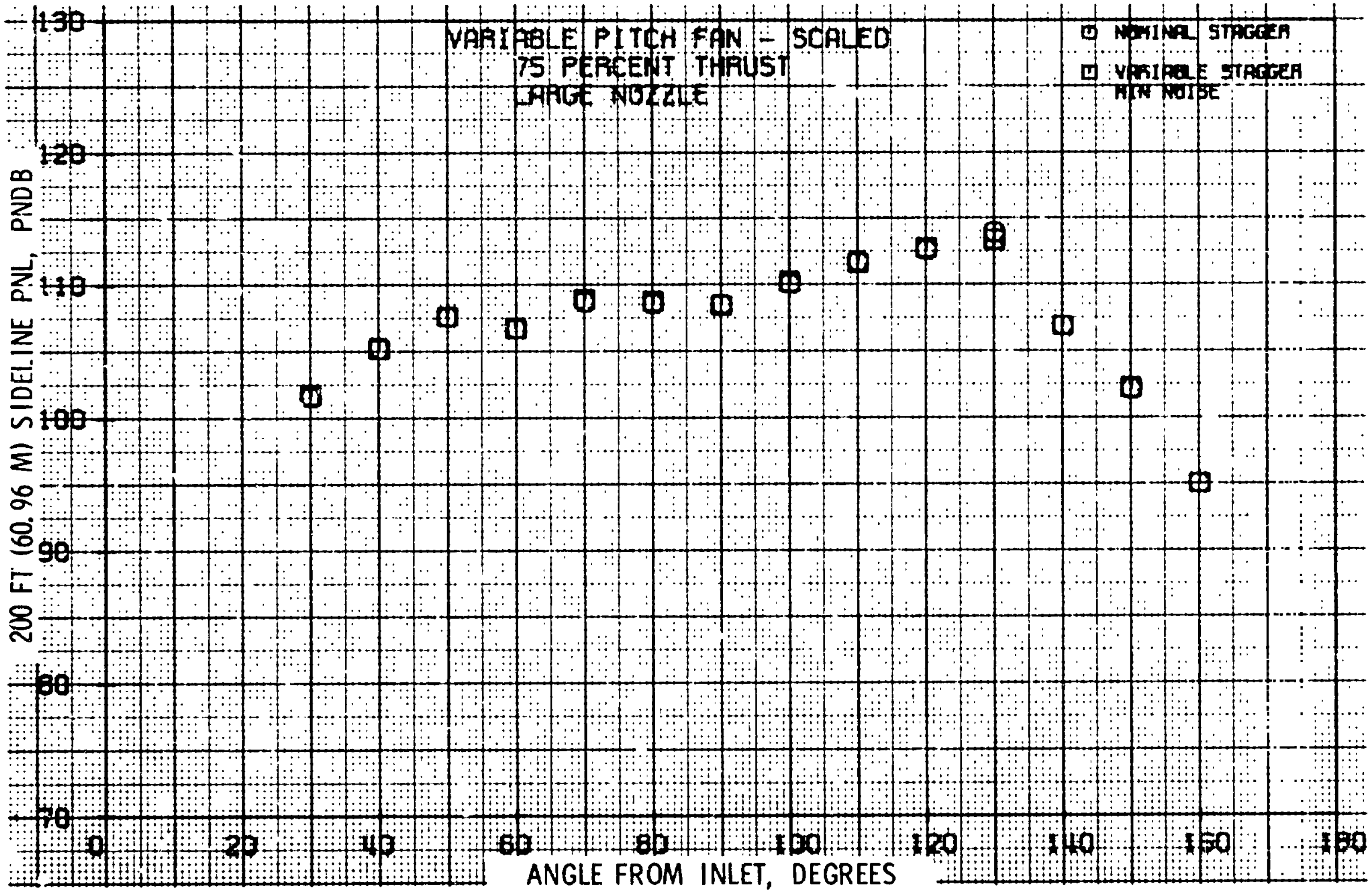


Figure 62. 200-ft (60.96 m) Sideline PNL, Large Nozzle, 75% Thrust.

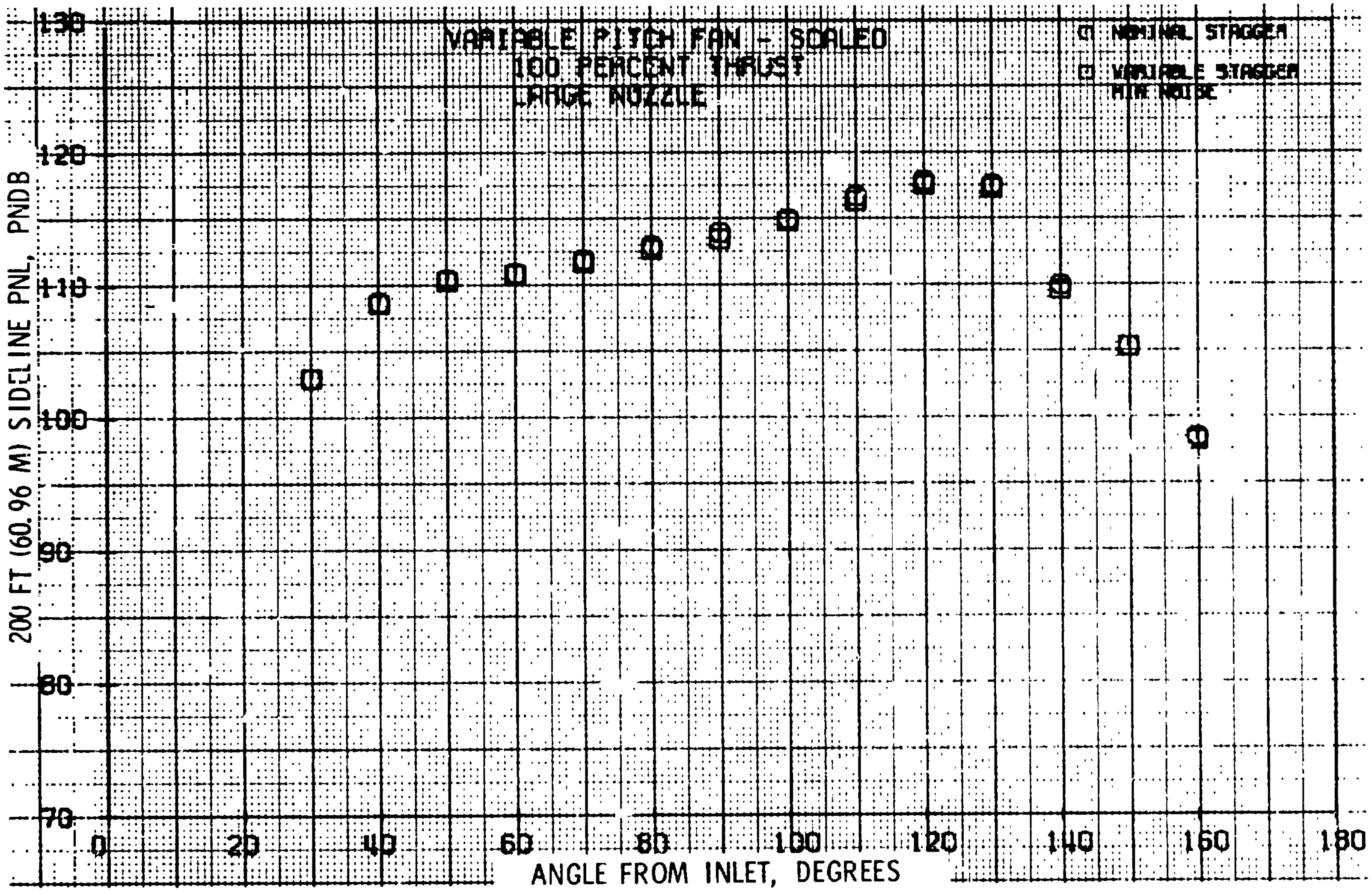


Figure 63. 200-ft (60.96 m) Sideline PNL, Large Nozzle, 100% Thrust.

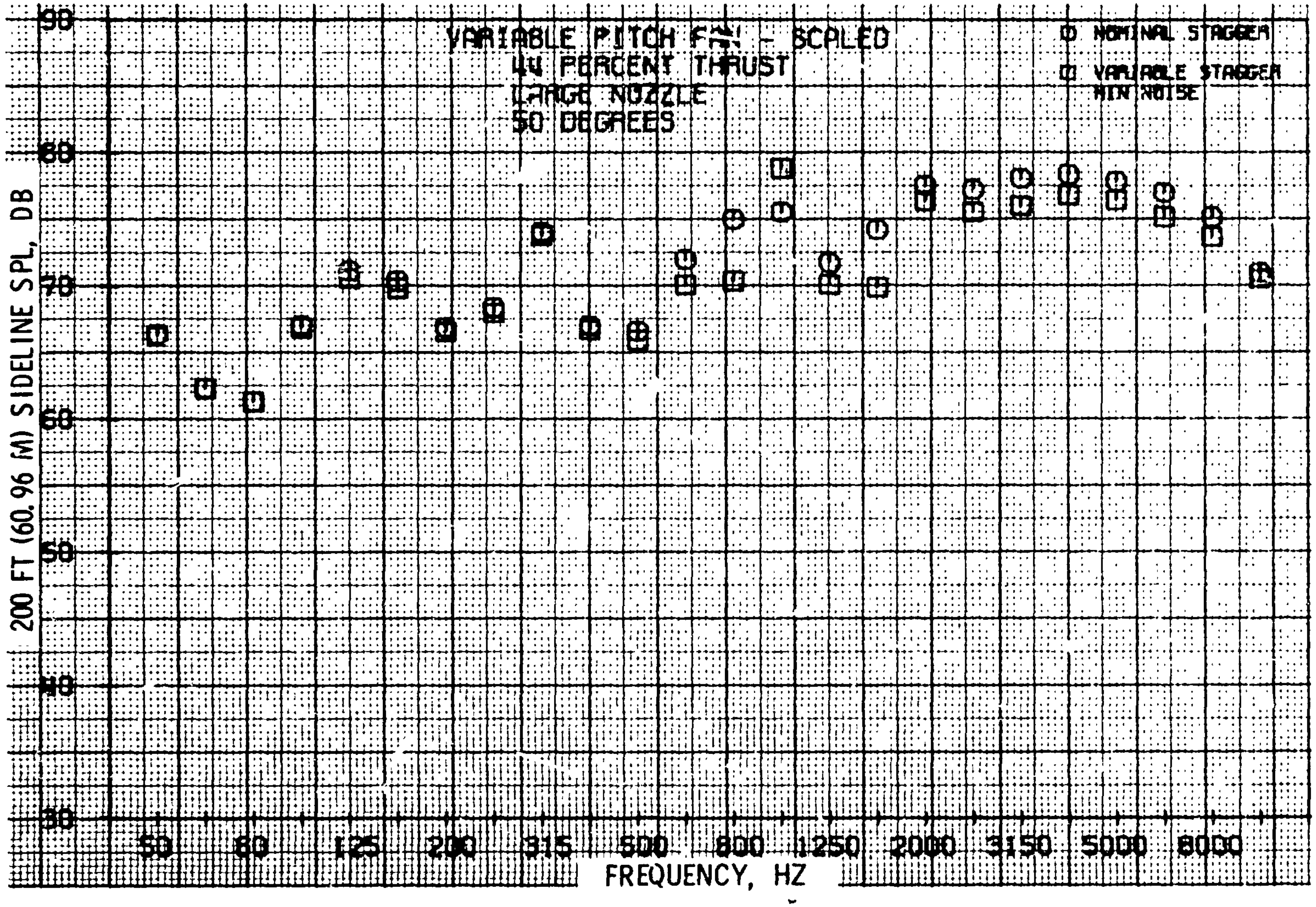


Figure 64. 1/3-Octave Spectral Comparison, Large Nozzle, 44% Thrust, 50°.

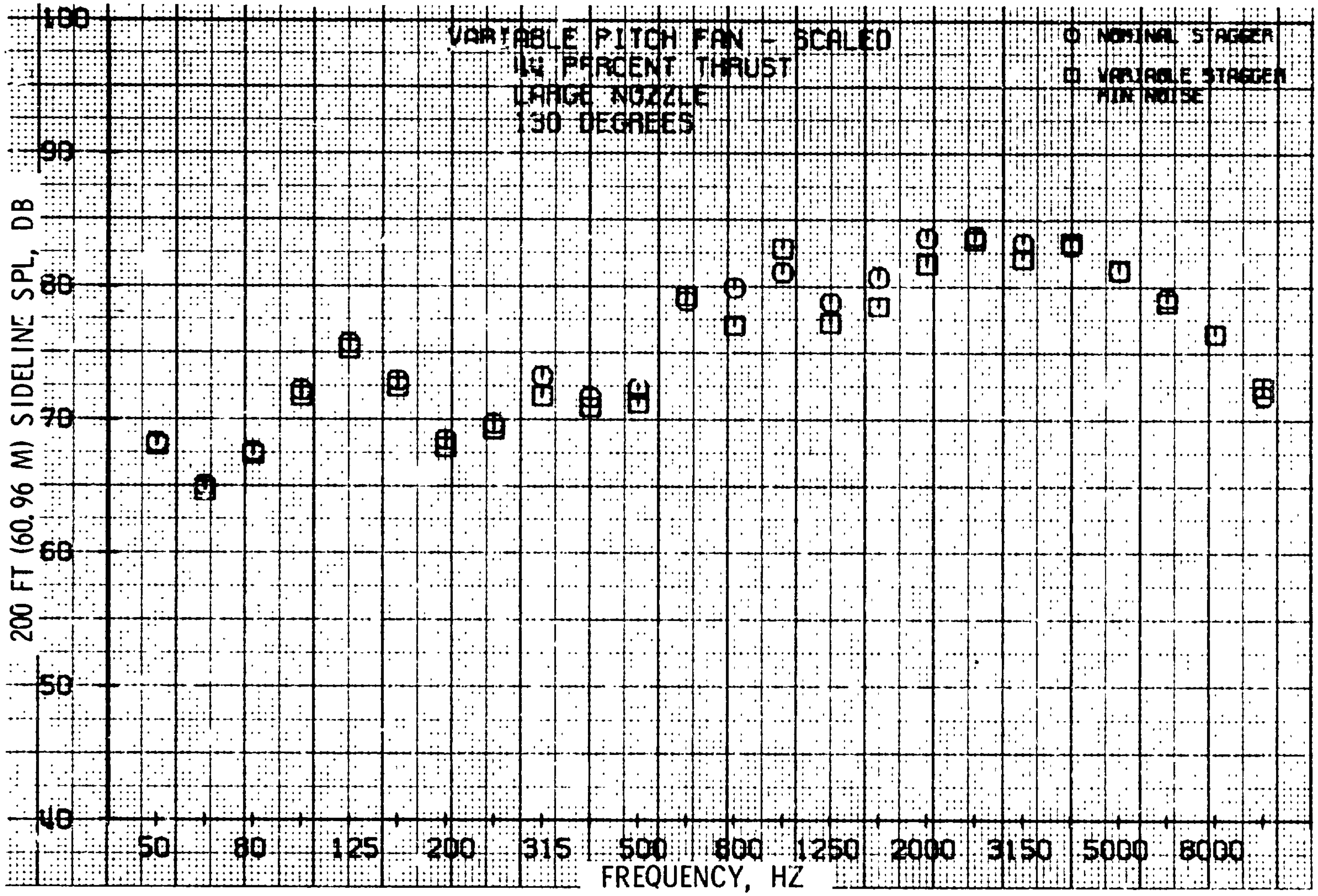


Figure 65. 1/3-Octave Spectral Comparison, Large Nozzle, 44% Thrust, 130°.

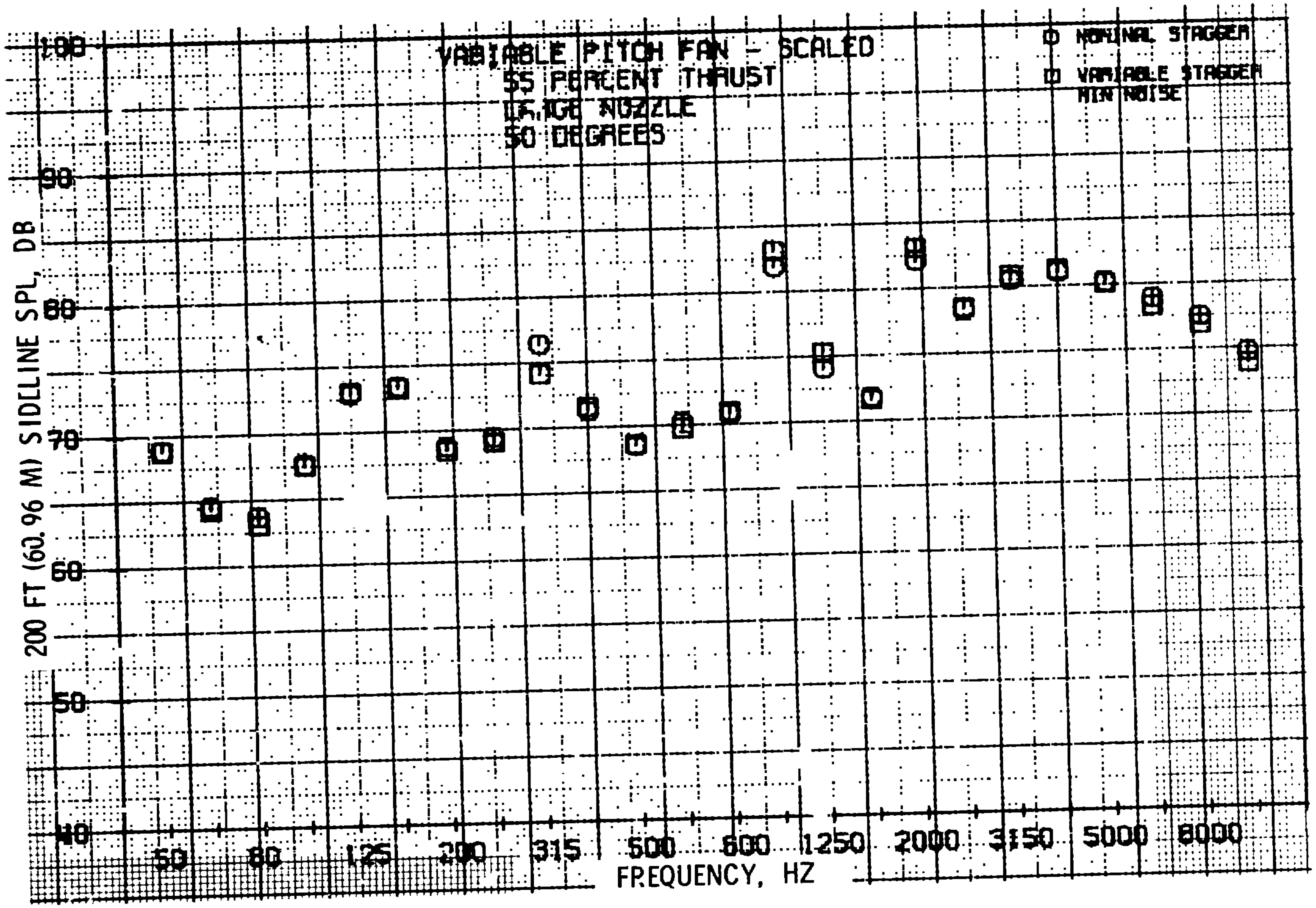


Figure 66. 1/3-Octave Spectral Comparison, Large Nozzle, 55% Thrust, 50°.

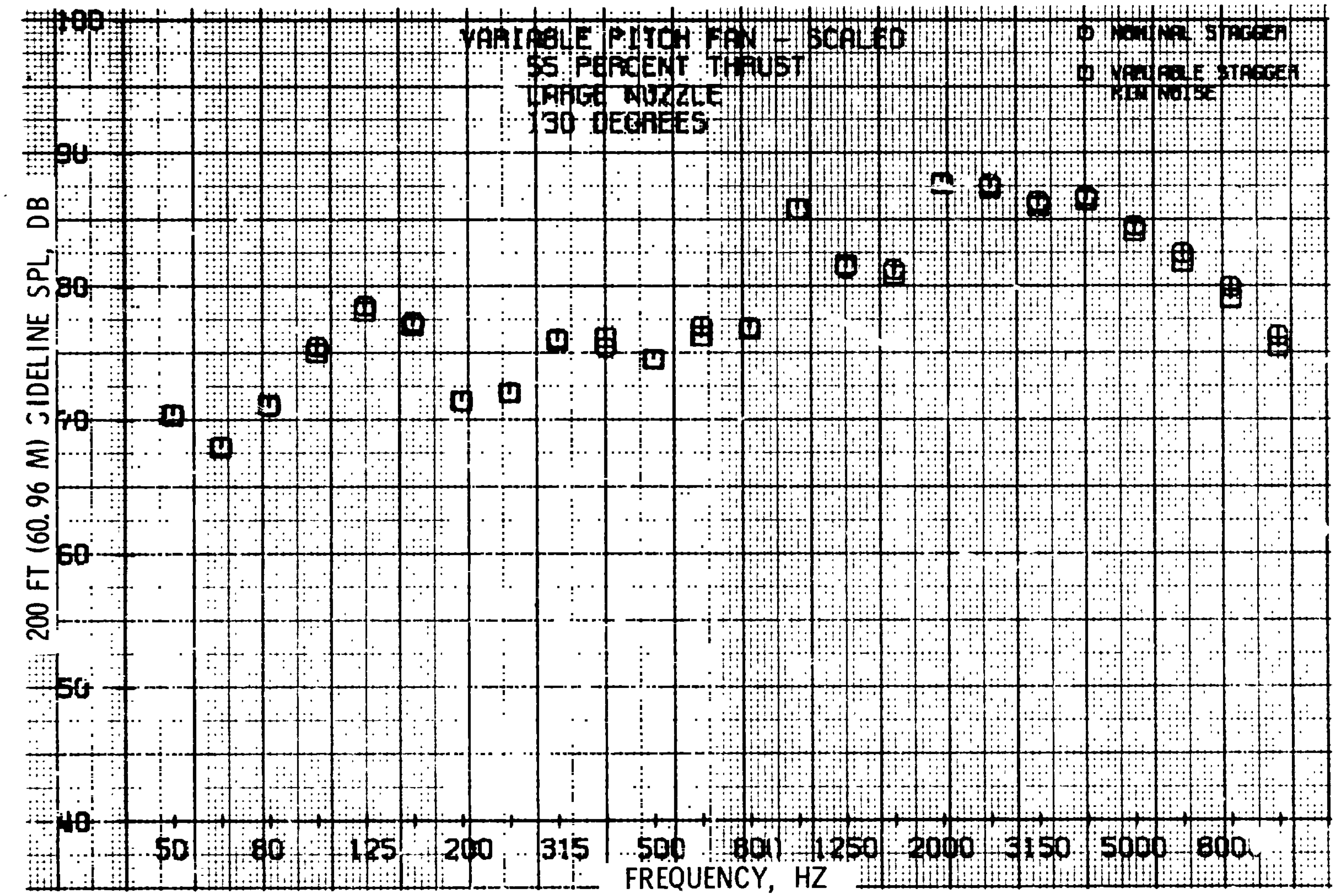


Figure 67. 1/3-Octave Spectral Comparison, Large Nozzle, 55% Thrust, 130°.

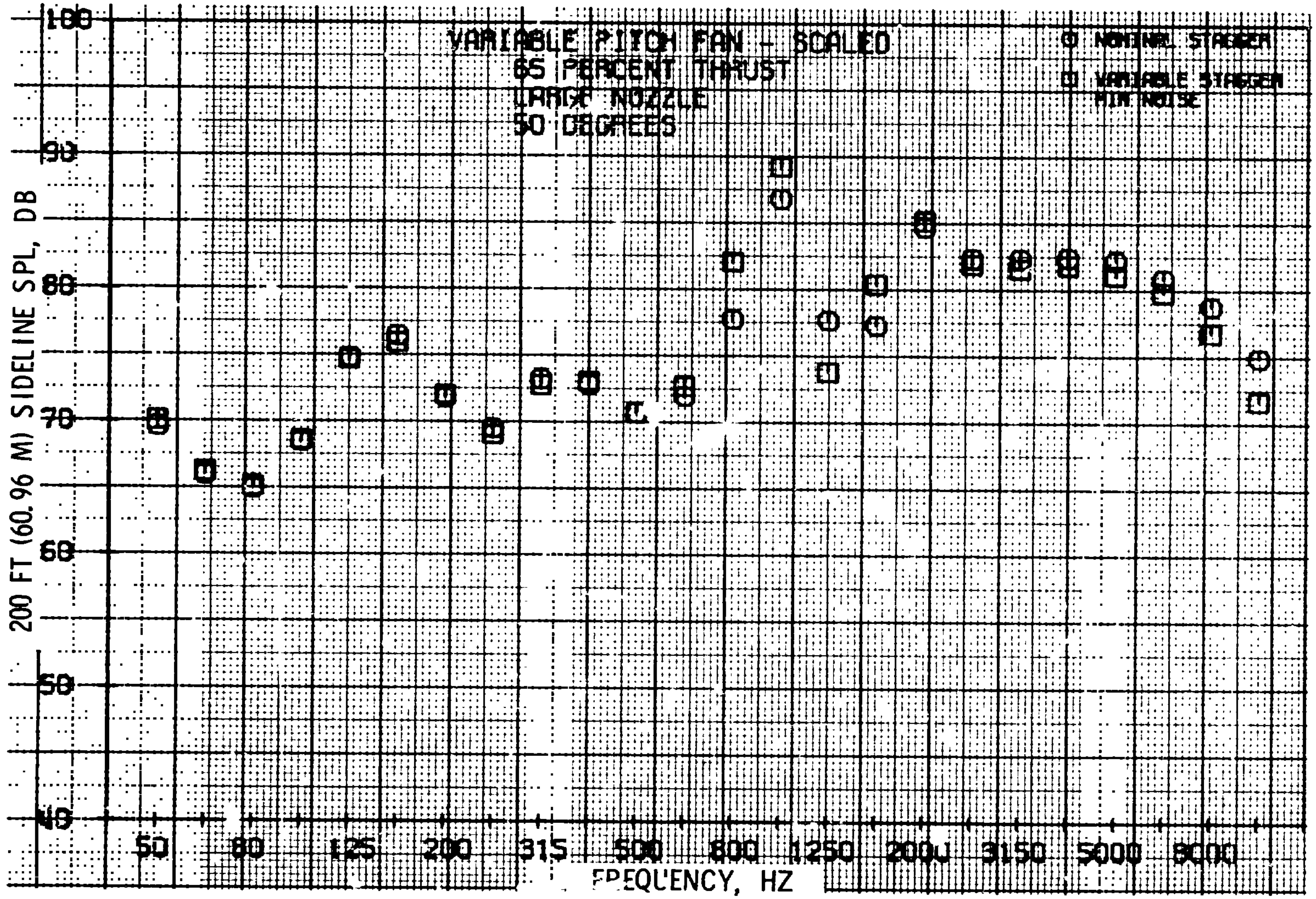


Figure 68. 1/3-Octave Spectral Comparison, Large Nozzle, 65% Thrust, 50°.

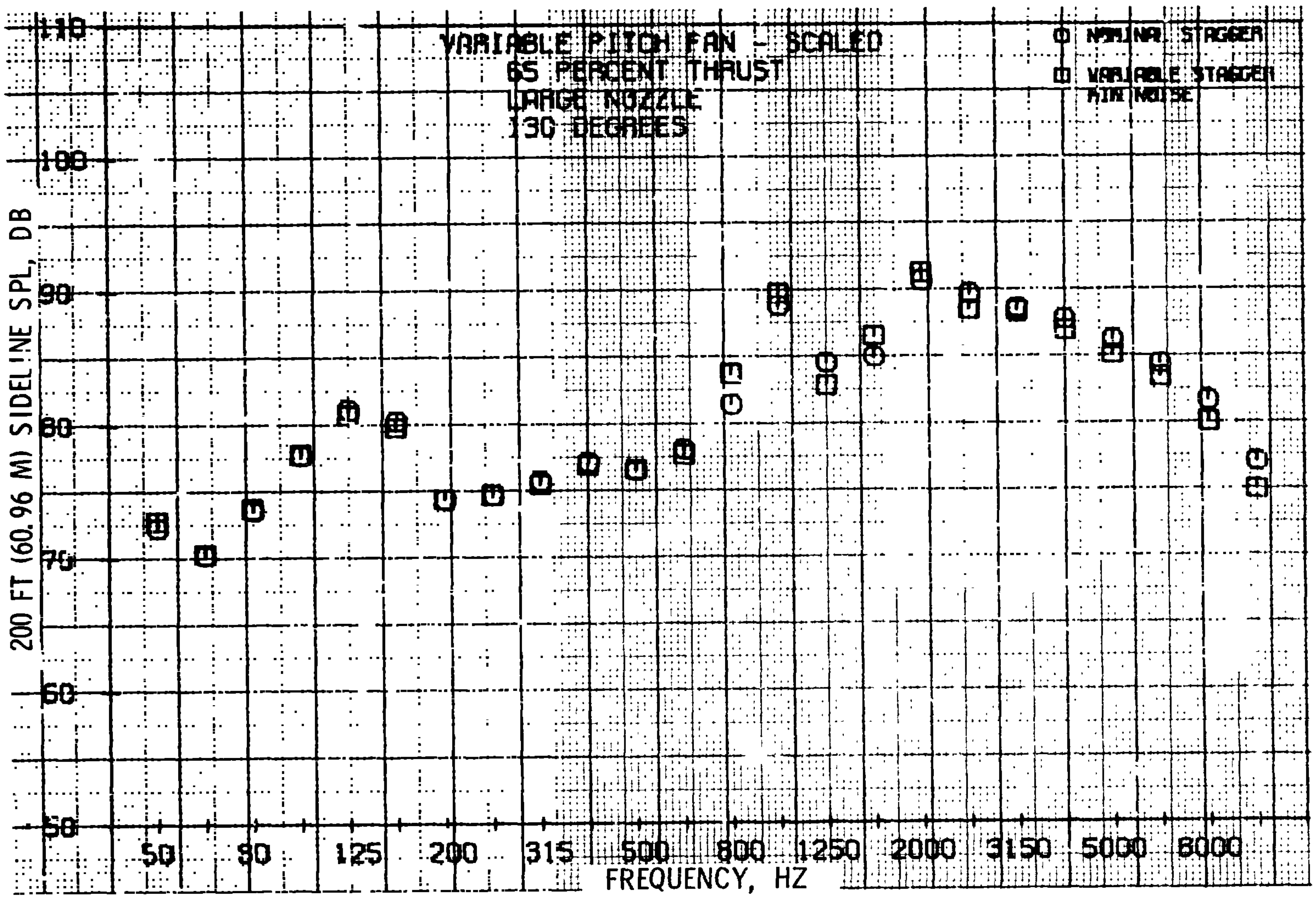


Figure 69. 1/3-Octave Spectral Comparison, Large Nozzle, 65% Thrust, 130°.

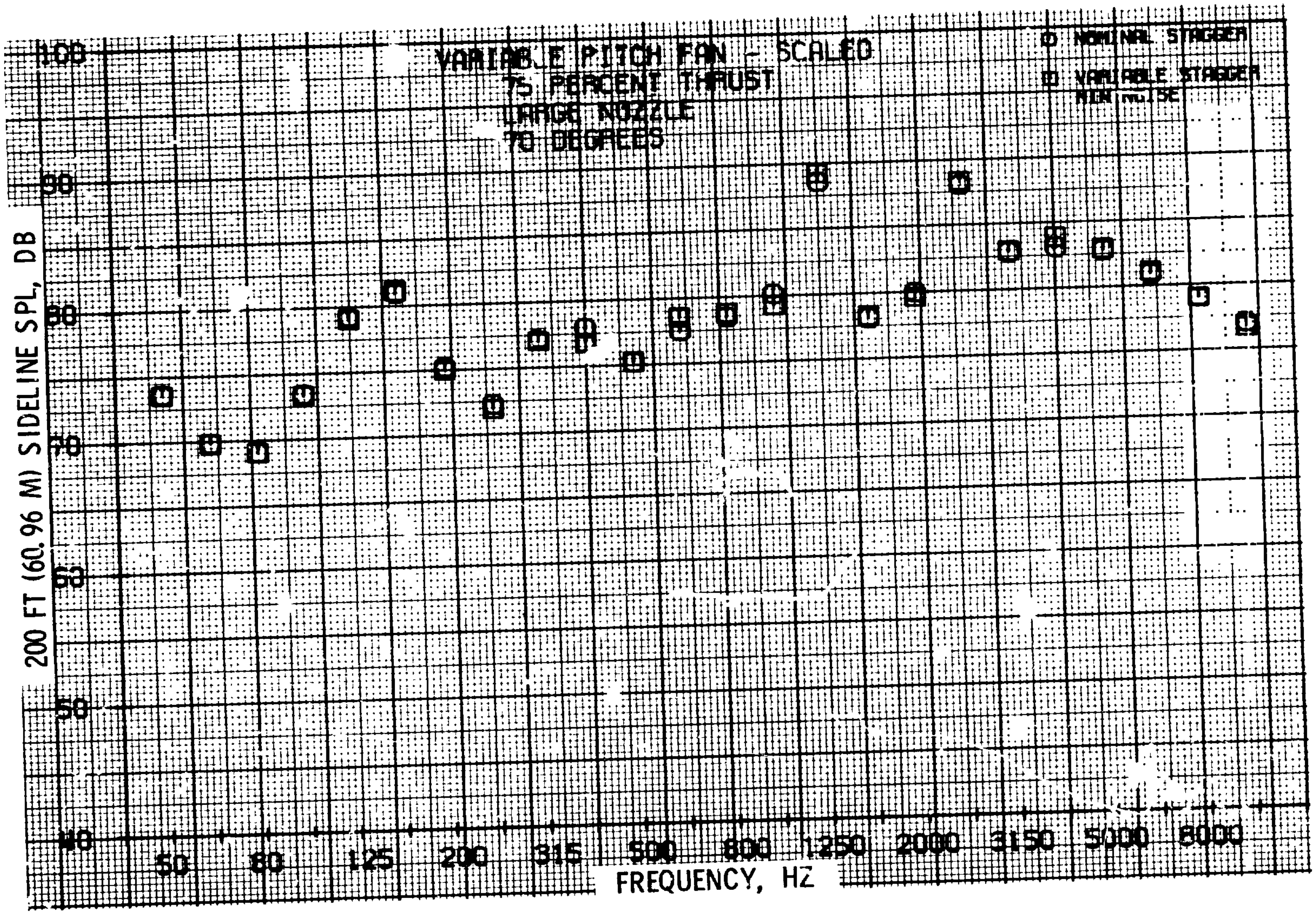


Figure 70. 1/3-Octave Spectral Comparison, Large Nozzle, 75% Thrust, 70°.

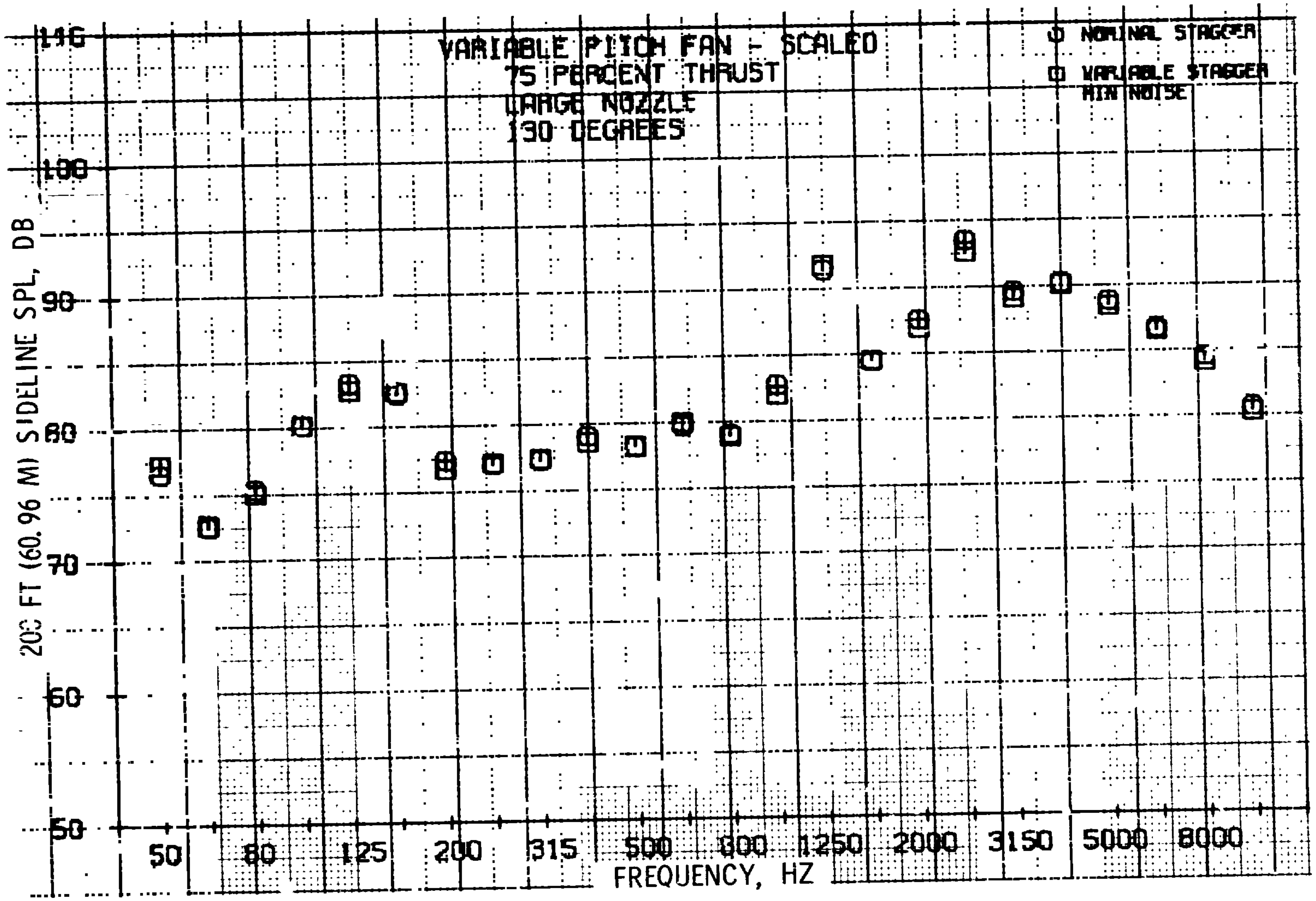


Figure 71. 1/3-Octave Spectral Comparison, Large Nozzle, 75% Thrust, 130°.

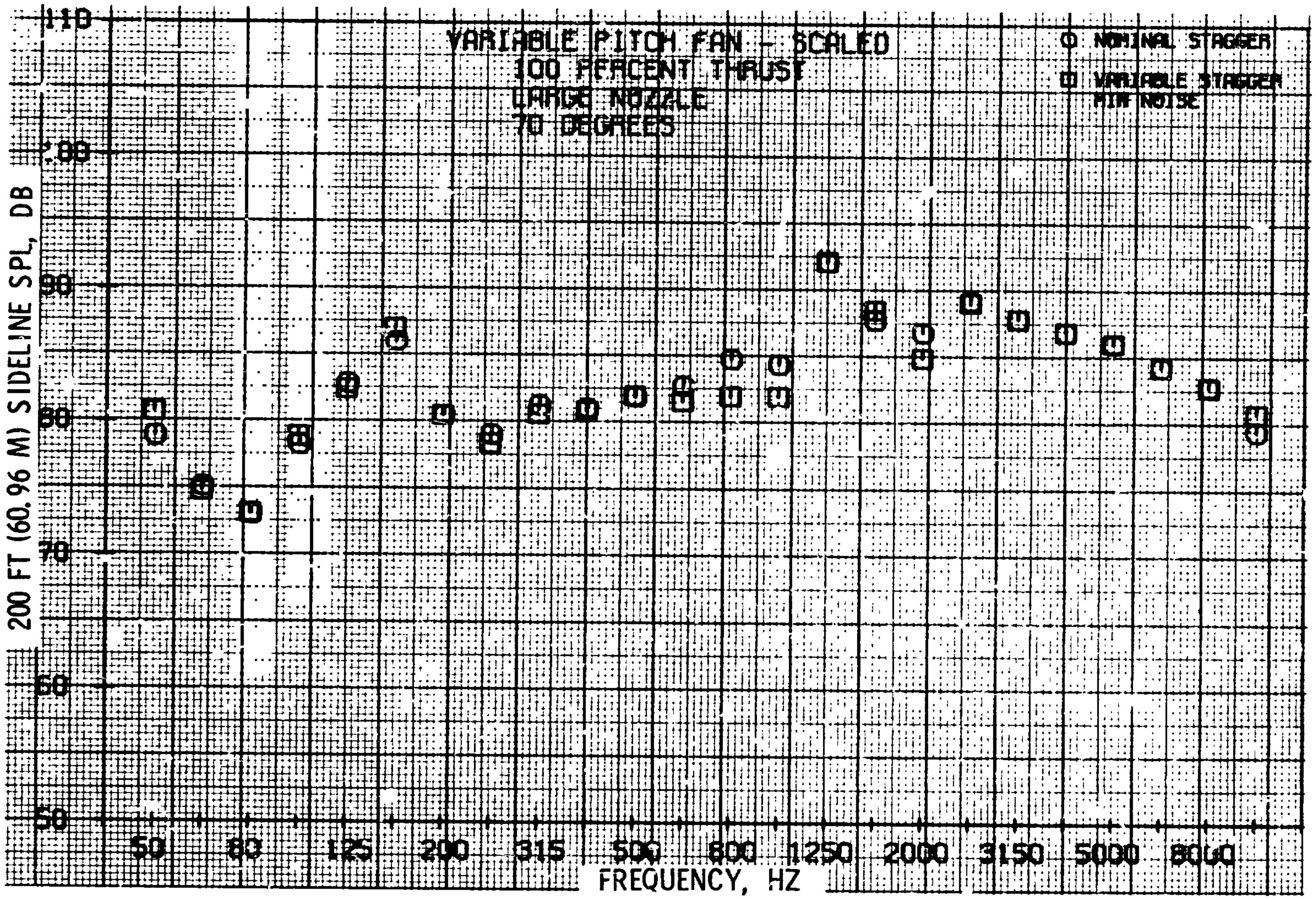


Figure 72. 1/3-Octave Spectral Comparison, Large Nozzle, 100% Thrust, 70°.

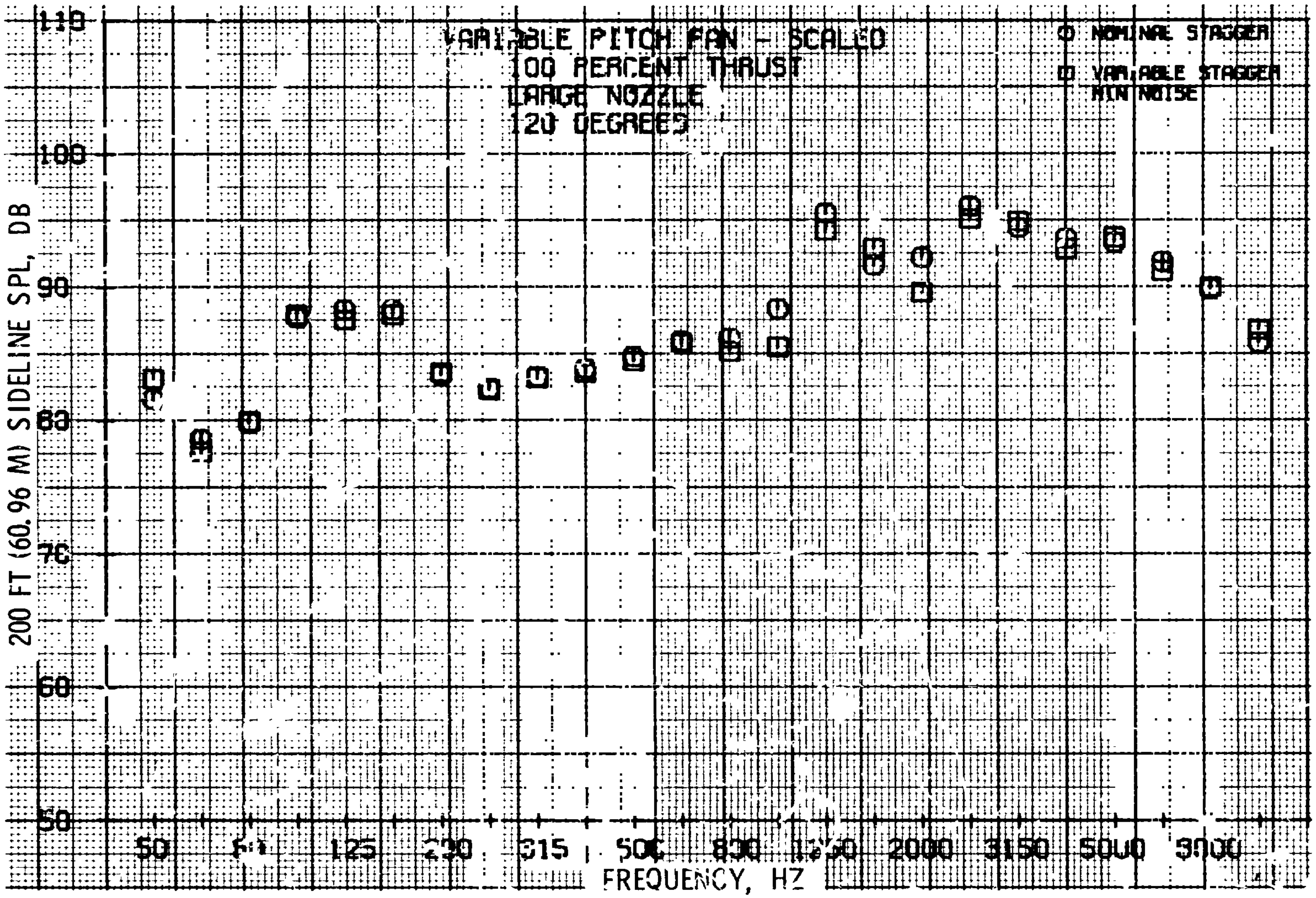


Figure 73. 1/3-Octave Spectral Comparison, Large Nozzle, 100% Thrust, 120°.

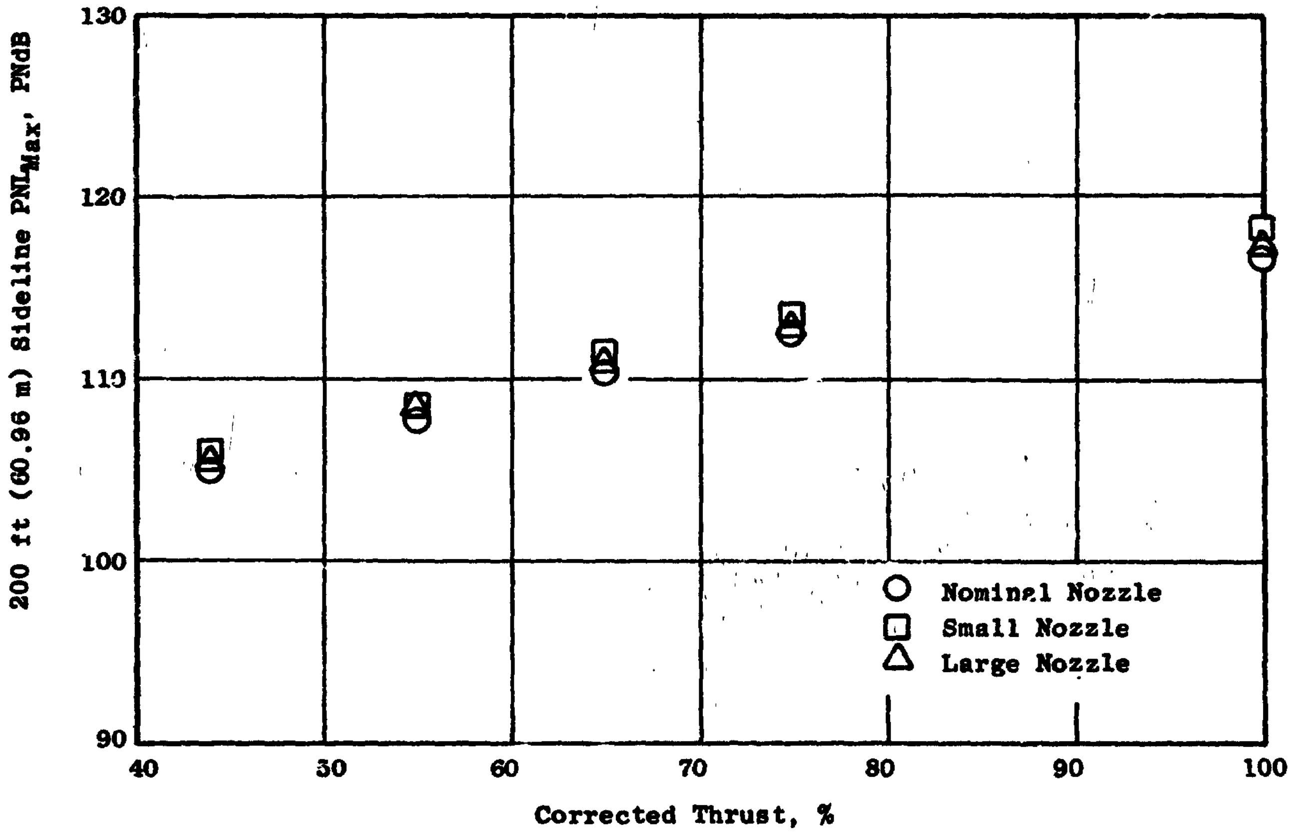


Figure 74. Effects of Nozzle Variations on Variable Stagger Minimum Noise, Aft Maximum 200-ft (60.96 m) Sideline PNL Vs. Corrected Thrust.

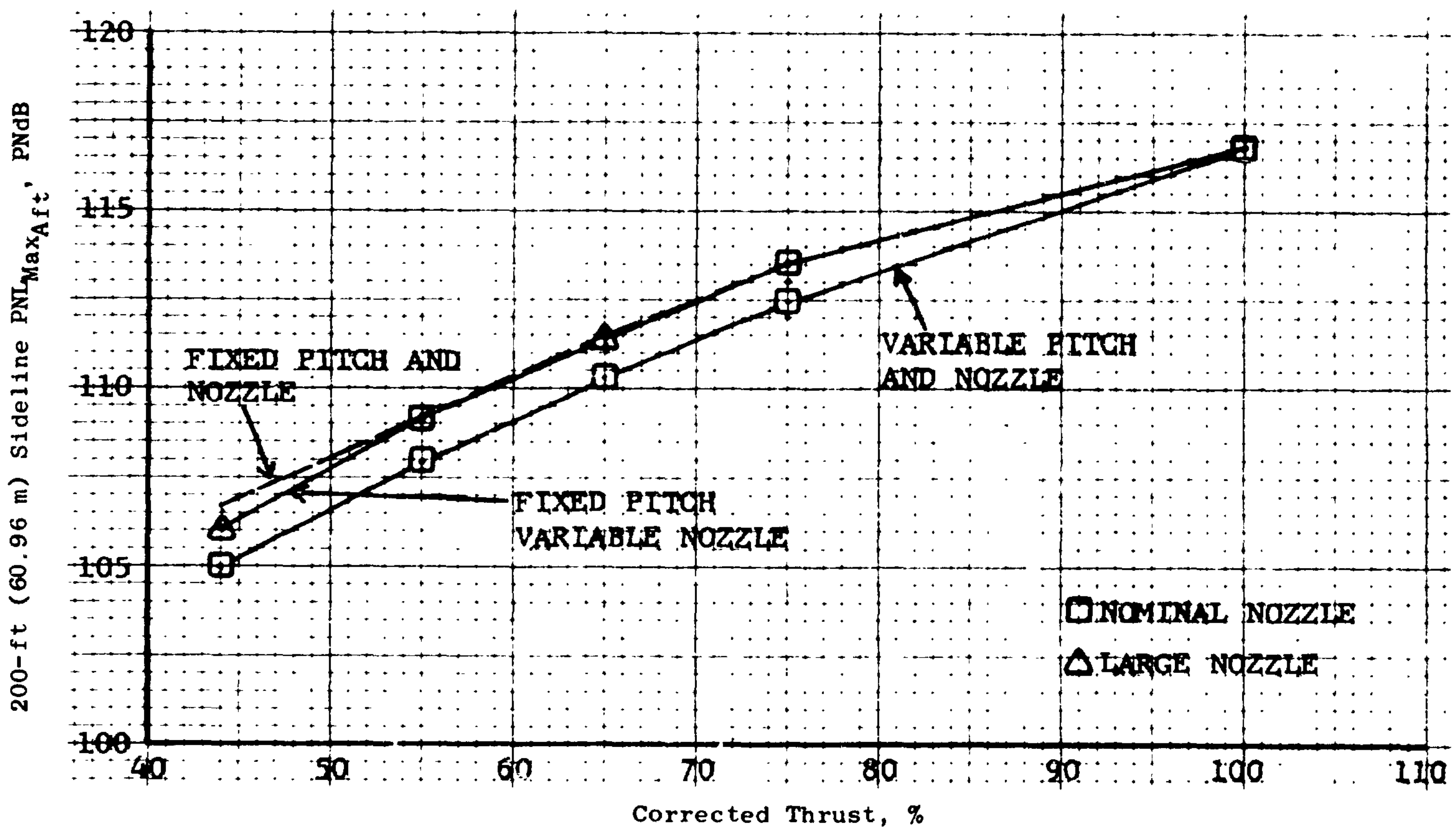


Figure 75. Minimum Noise Variations with Thrust for Fixed Pitch and Nozzle, Fixed Pitch and Variable Nozzle, and Variable Pitch and Nozzle; Aft Maximum 200-ft (60.96 m) Sideline PNL.

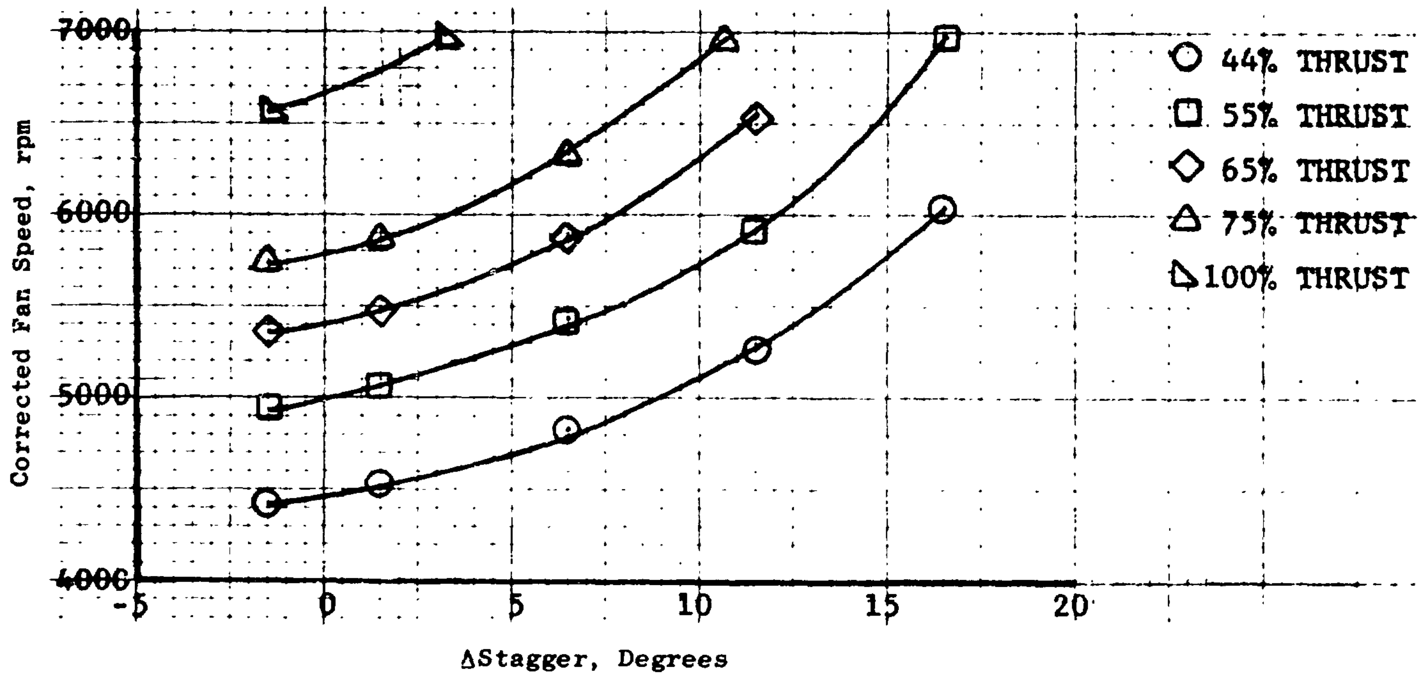


Figure 76. Variations in Corrected Fan Speed with Stagger for Constant Thrust, Nominal Nozzle.

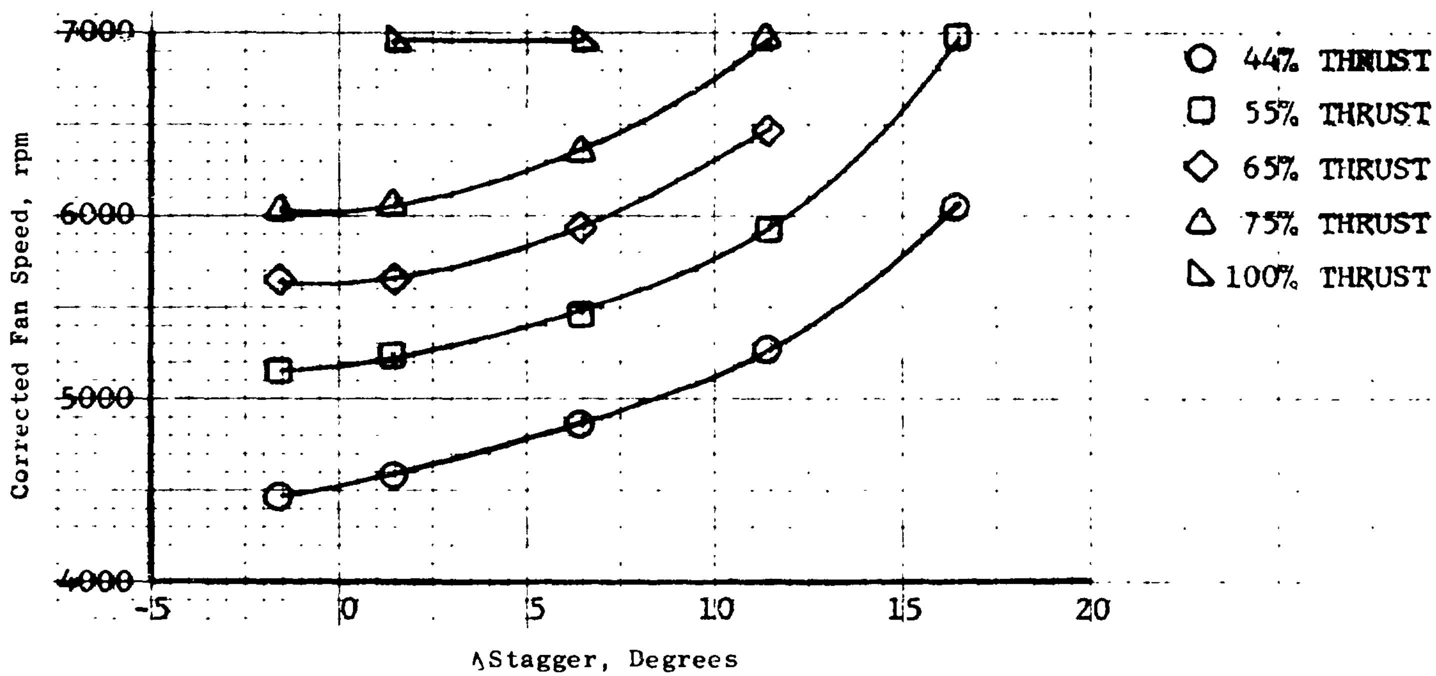


Figure 77. Variations in Corrected Fan Speed with Stagger for Constant Thrust, Small Nozzle.

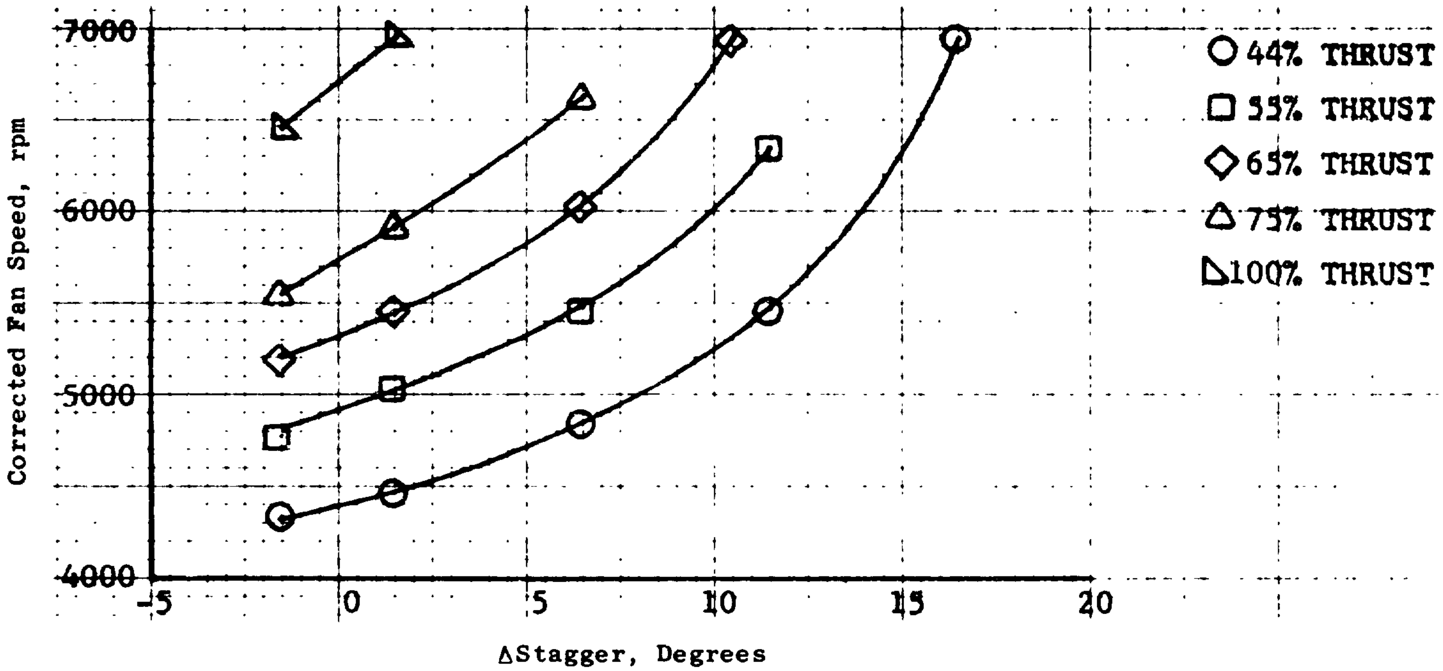


Figure 78. Variations in Corrected Fan Speed with Stagger for Constant Thrust, Large Nozzle.

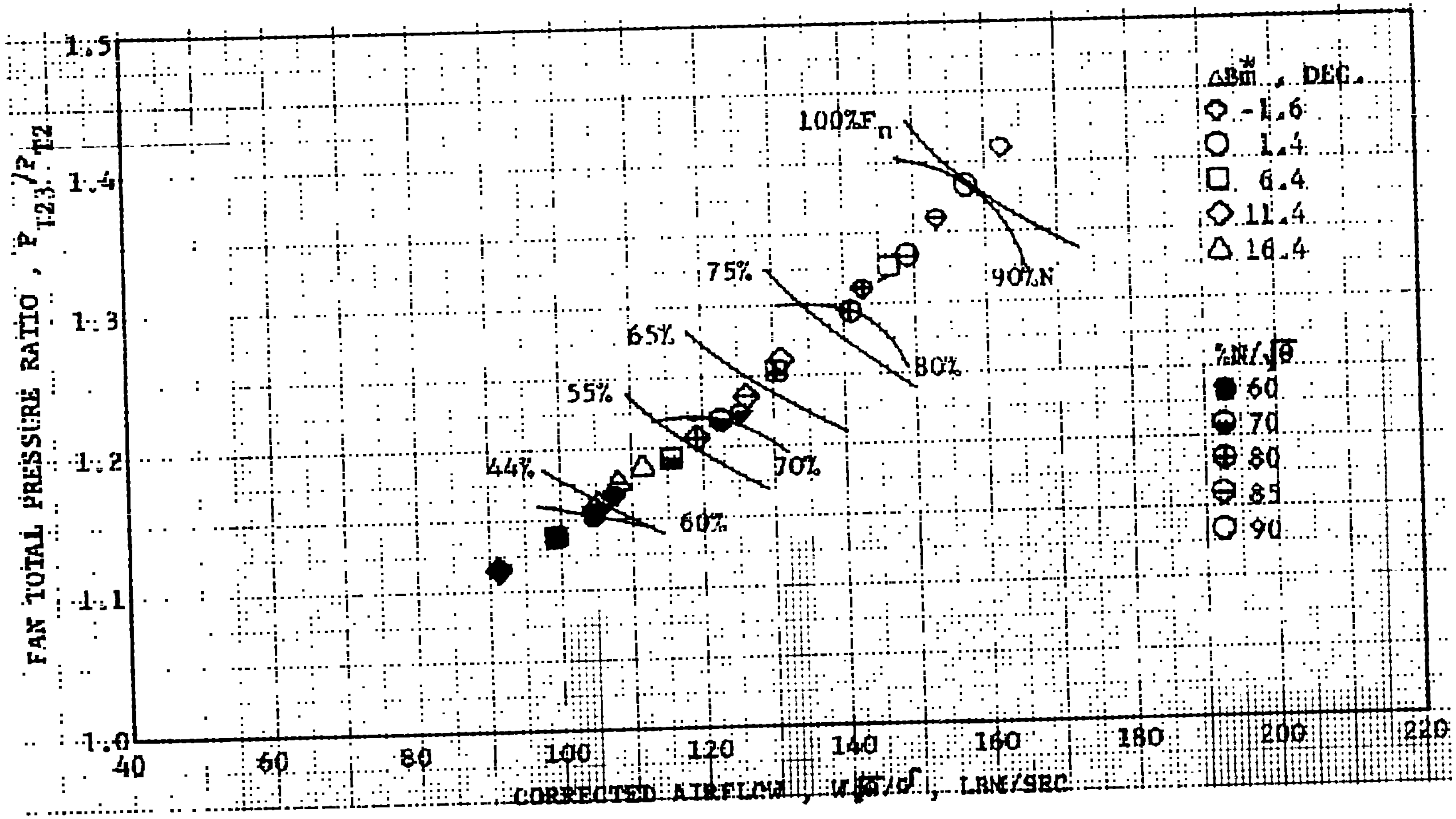


Figure 79. Aerodynamic Performance Map, Nominal Nozzle.

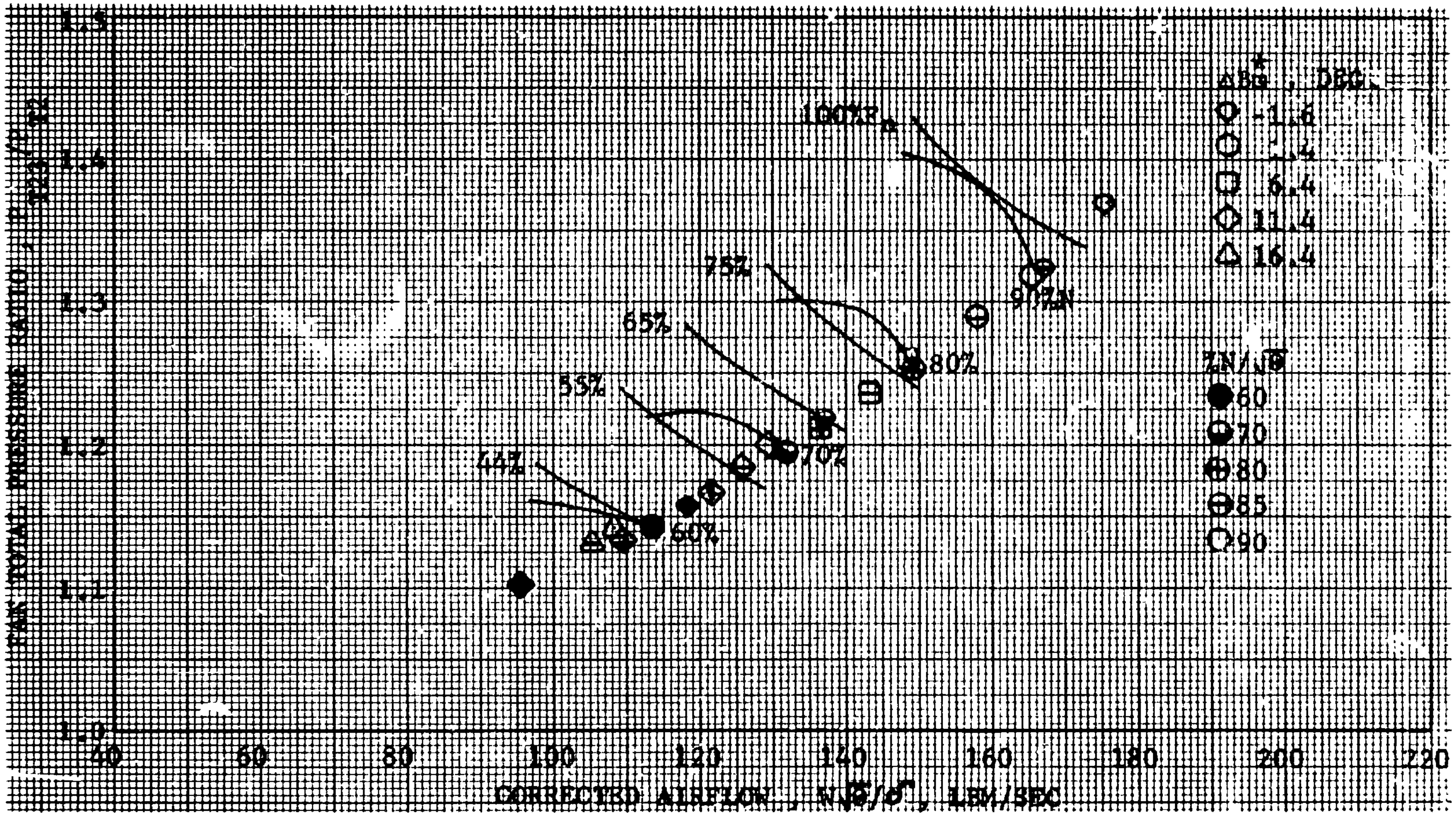


Figure 80. Aerodynamic Performance Map, Large Nozzle.

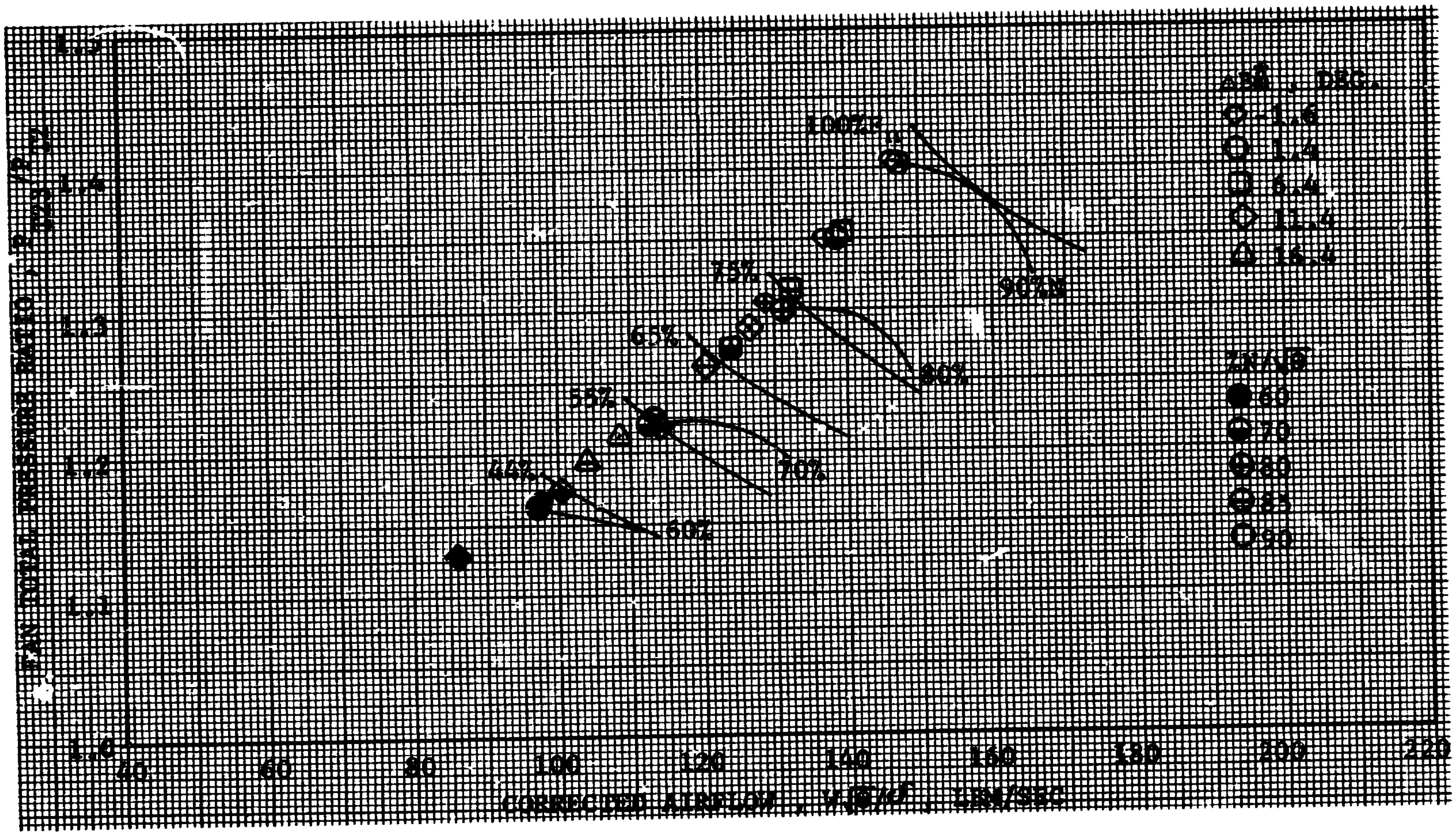


Figure 81. Aerodynamic Performance Map, Small Nozzle.

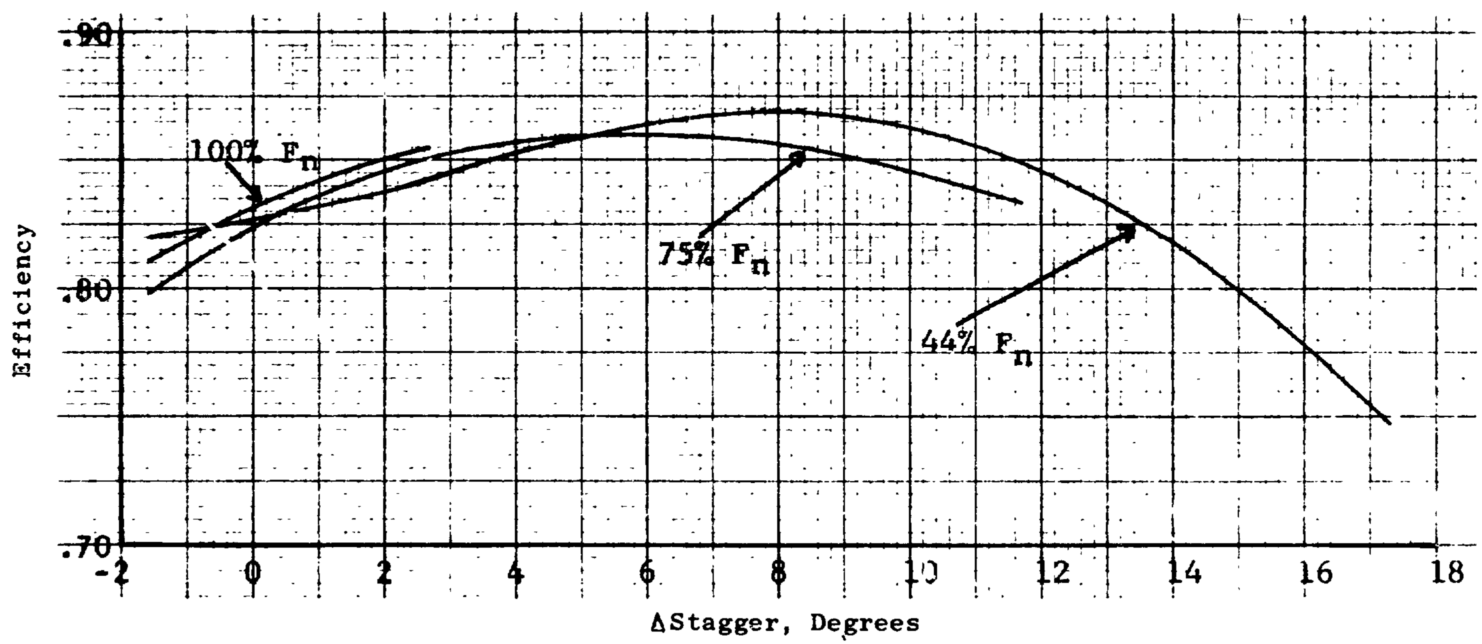


Figure 82. Efficiency Vs. Stagger at Constant Thrust, Nominal Nozzle.

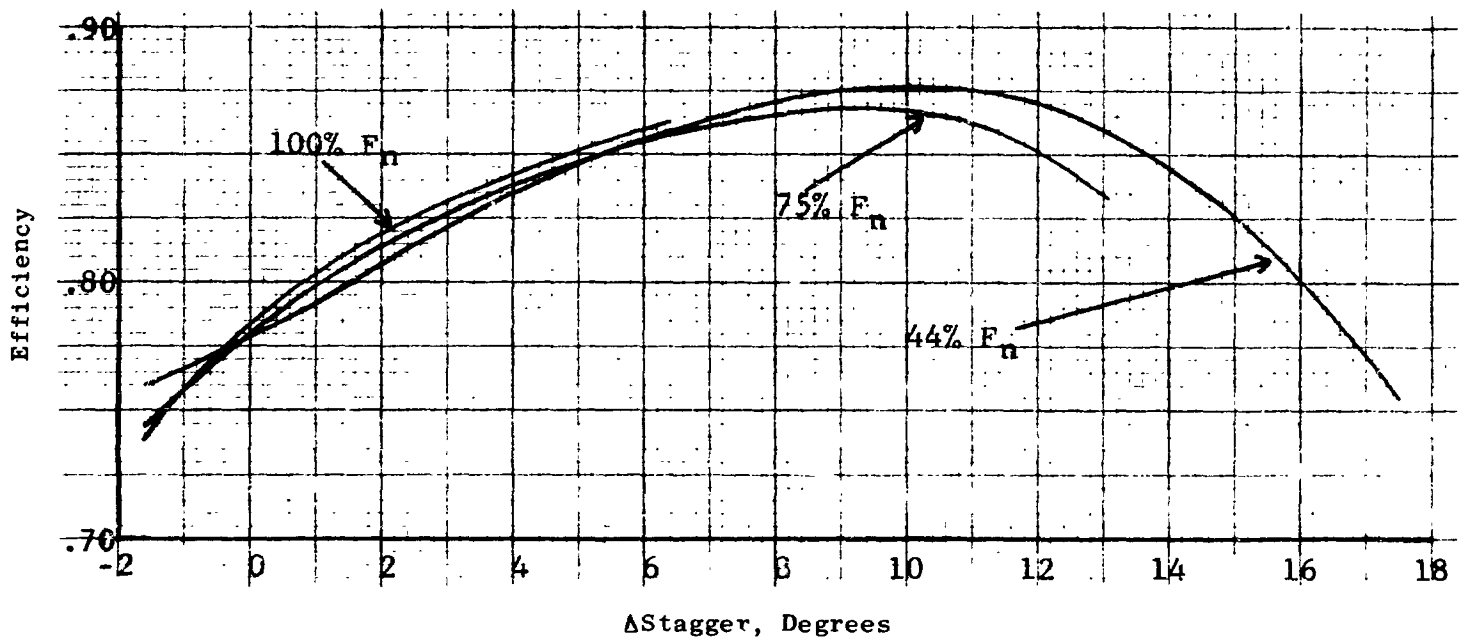


Figure 83. Efficiency Vs. Stagger at Constant Thrust, Small Nozzle.

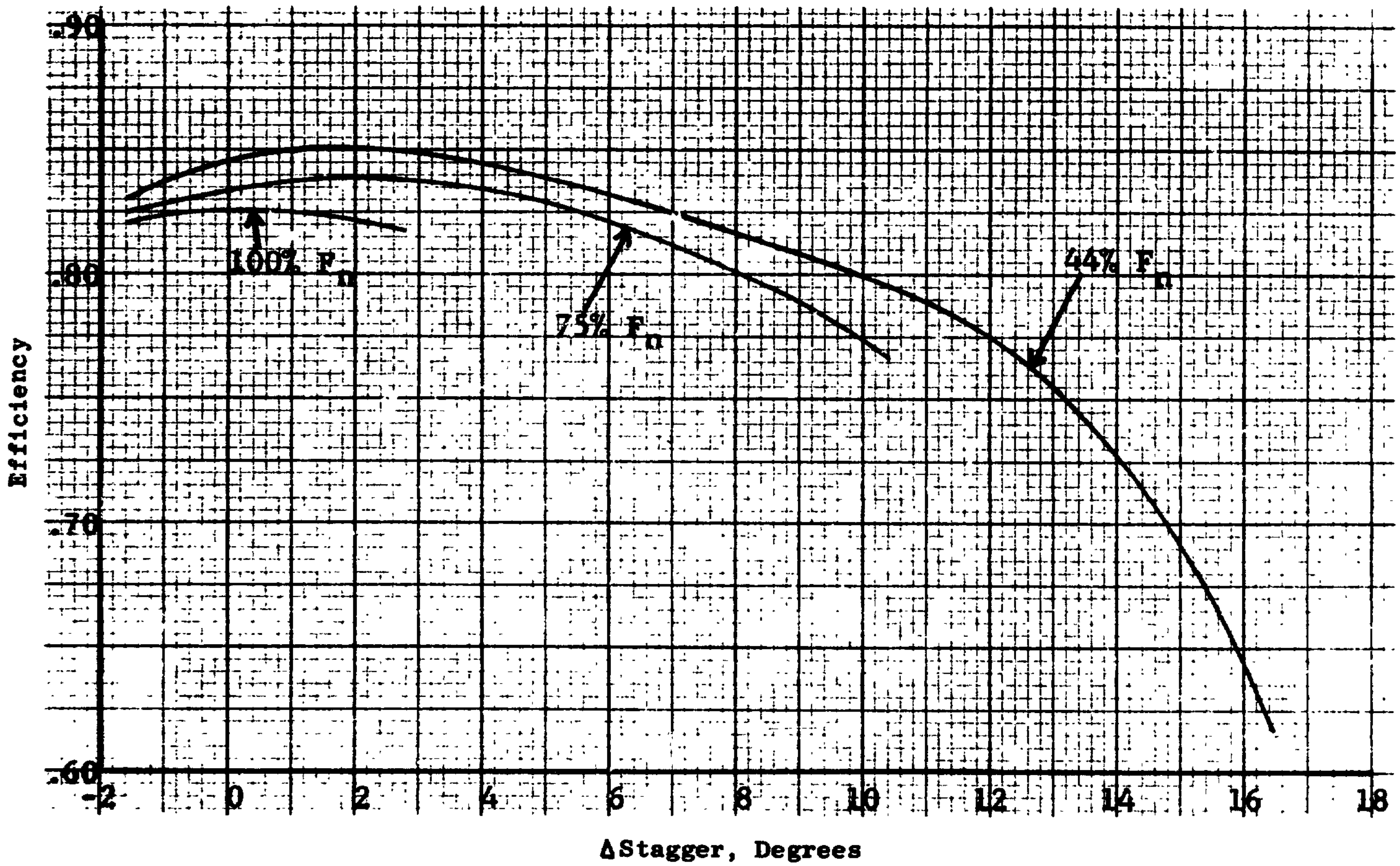


Figure 84. Efficiency Vs. Stagger at Constant Thrust, Large Nozzle.

VIII. APPENDIX - ONE-THIRD OCTAVE BAND DATA

This appendix contains 100-foot (30.48 in) arc scale model 1/3-octave data corrected to 70% relative humidity on a 59° F day and 200-foot (60.96 in.) sideline data scaled to full size. Each table consists of 24 bands of data at angles from 20 degrees to 150 degrees in 10 degree increments referenced to the inlet centerline.

The data included is for various constant thrust lines with nominal, small, and large nozzles at delta stagger angles closest to nominal and minimum noise delta stagger. All data presented are with "standard" frame treatment.

Table A-1.
Va·iable Pitch Fan
44% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Nominal Stagger (-1.6°)
Nominal Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F. 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	( )	( )	( )	PNL
50	71.2	69.6	69.3	68.1	67.6	68.9	68.0	71.3	70.6	75.4	74.0	73.5	77.3	79.4				121.9
63	70.5	69.8	69.2	67.8	67.8	69.7	68.7	70.5	70.2	75.6	73.5	73.4	76.8	79.3				121.8
80	68.8	67.4	68.8	67.7	68.4	69.5	69.1	70.1	70.0	73.5	72.5	72.8	75.4	77.6				120.8
100	69.5	67.5	69.1	68.4	67.9	68.0	68.4	69.1	69.4	71.5	70.5	71.6	73.7	75.8				119.7
125	66.6	65.5	65.2	65.4	64.9	65.1	65.4	65.6	66.8	69.1	68.6	69.7	71.5	72.7				117.1
160	65.8	64.7	64.1	64.0	62.9	65.8	65.4	66.7	68.1	69.7	70.6	71.0	73.4	73.6				117.9
200	67.7	67.8	69.8	68.5	68.0	69.7	70.7	72.0	73.0	73.9	74.9	75.9	76.5	76.0				122.1
250	69.7	71.1	73.7	74.6	73.7	74.8	76.4	77.4	78.3	78.7	79.0	79.3	78.5	76.7				126.4
315	72.5	73.6	74.4	76.7	75.5	76.3	77.0	77.4	79.1	78.7	79.3	79.5	78.1	76.3				127.1
400	71.1	71.8	71.4	71.3	71.2	71.3	71.4	72.5	73.6	74.1	74.4	74.6	74.6	74.4				122.6
500	71.6	72.0	72.9	71.3	70.9	71.0	71.1	71.9	72.7	73.5	75.0	75.5	74.7	75.4				122.0
630	77.5	78.1	77.3	76.5	77.9	79.3	77.3	77.7	77.3	78.3	78.4	79.0	80.8	78.2				128.1
800	74.0	74.7	73.6	74.2	75.3	74.9	75.3	75.9	76.6	78.1	78.7	78.4	78.4	77.8				126.3
1000	74.5	75.4	75.3	76.0	76.4	74.7	75.8	78.0	78.2	80.7	82.0	80.2	78.7	78.0				128.1
1250	75.0	78.5	76.1	77.0	76.5	75.2	76.8	78.8	79.4	83.6	83.1	82.9	80.3	79.7				129.7
1600	77.5	79.0	77.8	77.0	77.9	76.2	76.3	78.5	79.9	83.1	83.1	82.9	81.2	79.2				130.0
2000	84.2	84.3	84.2	82.5	82.9	80.8	80.5	81.1	84.4	85.1	86.0	86.7	85.5	83.7				134.1
2500	79.5	80.7	78.2	76.4	76.5	74.8	74.9	77.1	79.1	81.3	83.3	83.3	79.6	77.5				129.7
3150	79.0	81.7	78.2	78.4	77.0	74.5	76.1	78.7	80.5	82.7	83.8	82.5	80.3	77.				130.0
4000	82.4	83.8	83.2	82.3	79.0	78.0	78.3	79.3	84.5	82.9	86.5	86.4	81.5	80.5				133.5
5000	84.1	82.9	83.6	78.7	81.1	79.0	77.4	81.0	80.6	84.7	89.0	85.8	83.7	80.4				134.1
6300	83.0	84.9	83.2	82.4	79.2	77.6	78.9	79.3	83.1	85.5	86.6	87.2	82.4	80.4				134.4
8000	84.3	84.5	84.4	80.5	79.7	78.4	78.0	80.2	81.9	83.1	86.9	86.3	82.5	80.4				134.7
10000	83.3	84.7	83.9	80.2	79.4	77.2	77.2	76.4	81.1	83.8	85.6	84.2	82.2	79.4				134.7
12500	83.1	82.8	81.7	79.3	77.1	75.2	74.6	76.1	78.7	79.9	83.0	80.9	80.6	78.0				133.7
16000	81.3	81.3	80.7	77.2	74.8	72.9	72.0	73.3	76.8	78.3	80.7	77.8	78.6	77.4				133.9
20000	78.2	78.3	77.4	74.8	72.1	69.7	68.0	70.1	73.8	74.7	76.7	77.3	75.9	74.[illegible]				133.2
OVERALL MEASURED	93.5	93.6	92.6	91.2	90.3	89.4	89.3	91.4	92.5	94.7	96.0	97.2	95.1	93.3				
OVERALL CALCULATED	93.5	94.2	93.5	91.6	90.9	89.7	89.7	91.2	93.2	95.0	96.8	96.2	94.2	92.8				144.9
PNDB	105.7	106.0	105.9	104.7	103.5	102.1	102.3	103.9	106.7	107.6	11[illegible]2	109.3	106.7	10[illegible].1				

Table A-2.
Variable Pitch Fan
44% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Nominal Stagger (-1.6°)
Nominal Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F, 70 PERCENT REL. HUM. DAY)

50	63.8	64.0	67.2	67.5	67.8	68.3	68.8	69.4	69.2	70.7	68.6	68.1	67.9	66.6
63	60.8	61.9	63.2	64.5	64.7	65.3	65.8	65.9	66.7	68.2	66.6	66.1	65.7	63.2
80	59.6	61.1	62.0	63.0	62.7	65.9	65.7	66.9	67.9	68.8	68.5	67.4	67.4	61.9
100	61.6	64.1	67.7	67.5	67.7	69.8	71.0	72.2	72.7	72.9	72.8	72.1	70.4	66.1
125	63.5	57.3	71.5	73.5	73.4	74.9	76.6	77.5	78.0	77.7	76.9	75.4	72.3	66.7
160	66.2	69.7	72.2	75.6	75.1	76.4	77.2	77.5	78.7	77.6	77.1	75.6	71.7	66.0
200	64.7	67.8	69.1	70.2	70.8	71.4	71.6	72.5	73.2	73.0	72.1	70.6	68.1	64.0
250	65.0	67.9	70.5	70.1	70.5	71.0	71.3	71.9	72.3	72.3	72.9	71.5	68.1	64.7
315	70.8	74.0	75.3	75.3	77.4	79.2	77.4	77.7	76.8	77.1	75.9	74.9	74.1	67.3
400	67.1	70.5	71.1	72.9	74.8	74.9	75.4	75.8	76.1	76.8	76.2	74.1	71.6	66.6
500	67.5	71.1	72.7	74.6	75.8	74.6	75.9	77.9	77.6	79.3	79.4	75.9	71.7	66.7
630	67.9	74.0	73.4	75.6	75.9	75.0	76.8	78.6	78.8	82.1	80.5	78.5	73.1	68.1
800	70.2	74.5	75.1	75.6	77.2	76.0	76.3	78.3	79.2	81.6	80.4	78.4	73.9	67.3
1000	76.7	79.6	81.4	81.0	82.2	80.6	80.4	80.9	83.7	83.6	83.2	82.0	78.0	71.6
1250	71.9	75.9	75.3	74.8	75.8	74.6	74.8	76.9	78.3	79.7	80.4	78.5	71.9	65.0
1600	71.1	76.8	75.2	76.7	76.2	74.2	76.0	78.4	79.7	81.1	80.8	77.6	72.4	64.8
2000	74.4	78.8	80.2	80.6	78.2	77.7	78.2	79.0	83.7	81.2	83.5	81.4	73.5	67.2
2500	75.8	77.8	80.5	76.9	80.3	78.6	77.2	80.6	79.7	83.0	85.9	80.6	75.4	66.7
3150	74.5	79.7	80.0	80.7	78.5	77.4	78.8	79.1	82.3	83.8	83.4	82.0	73.9	66.2
4000	75.5	79.1	81.2	78.9	79.1	78.3	78.1	80.1	81.2	81.4	83.8	81.0	73.6	65.5
5000	74.7	79.7	81.2	79.1	79.3	77.6	77.8	78.8	81.0	82.7	82.9	79.2	73.7	[illegible]
6300	74.2	77.9	79.3	78.5	77.4	76.1	75.6	76.9	79.0	79.1	80.5	76.0	71.7	62.1
8000	72.0	76.5	78.6	77.0	75.8	74.5	73.9	74.9	77.7	78.1	78.6	75.0	69.3	60.0
10000	68.2	73.5	75.8	75.3	73.9	72.3	70.8	72.6	75.6	75.2	75.1	71.5	65.9	54.7
OVERALL CALCULATED	85.3	89.3	90.7	90.2	90.3	89.6	89.8	91.0	92.7	93.4	94.0	91.3	86.3	79.9
PNDB	98.6	102.7	104.1	103.7	103.2	102.3	102.6	104.0	105.8	106.8	107.6	104.8	98.7	91.2

Table A-3.
Variable Pitch Fan
44% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Δ Stagger = 1.4°
Nominal Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F, 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	PNL
50	71.4	70.6	70.6	71.8	70.9	71.1	71.1	72.3	73.4	74.2	73.7	76.5	80.1	87.6	125.4
63	69.6	69.7	69.7	70.4	74.2	70.5	71.4	71.5	71.7	73.2	73.2	78.0	79.1	84.9	124.1
80	69.4	68.2	69.9	71.1	70.7	72.0	72.6	72.5	72.8	73.5	73.0	74.6	77.1	84.9	123.8
100	69.7	68.0	69.7	69.6	68.3	69.0	69.5	69.1	69.8	70.1	71.0	72.4	75.6	83.4	122.0
125	66.2	66.3	66.0	68.0	66.1	66.3	66.2	66.8	66.9	68.1	68.3	71.1	73.9	81.7	120.0
160	65.9	65.0	64.0	65.4	64.8	66.5	65.7	67.5	68.5	70.2	70.0	71.8	74.1	80.4	119.7
200	65.7	66.3	68.1	69.2	68.6	69.5	70.5	72.2	74.1	74.4	74.8	76.9	76.9	79.7	122.8
250	68.3	70.6	71.9	73.2	72.9	73.6	74.6	76.4	77.2	77.5	78.0	78.5	78.2	79.6	125.5
315	71.3	73.1	73.2	75.5	74.9	75.6	75.7	77.1	78.0	78.0	79.0	78.5	78.0	78.0	126.4
400	69.9	70.7	69.5	70.7	73.0	70.2	69.7	71.4	72.7	73.2	73.7	73.3	73.2	75.5	121.8
500	69.4	70.4	69.9	70.4	69.2	68.7	69.6	71.1	71.5	72.8	73.4	74.4	73.3	74.5	121.4
630	74.3	76.8	78.2	74.5	78.5	79.4	77.0	75.4	77.4	79.1	76.2	78.2	80.1	79.1	127.6
800	70.9	72.9	71.2	72.1	72.7	73.4	72.4	73.3	74.8	76.3	76.7	76.0	76.3	75.5	124.1
1000	70.9	[illegible]	71.7	72.4	72.7	72.8	73.7	74.5	75.3	77.2	78.4	78.8	75.3	75.8	124.8
1250	72.8	75.8	76.1	75.0	77.4	76.9	74.3	75.2	77.0	79.5	80.3	80.8	77.9	78.5	127.5
1600	75.5	77.0	75.3	75.3	75.9	74.3	74.1	75.7	77.7	80.6	80.8	80.8	78.7	76.9	127.7
2000	85.1	86.4	84.2	84.1	83.8	80.5	80.9	81.5	83.8	84.3	85.5	87.6	86.7	85.0	134.6
2500	76.9	78.4	75.9	74.7	74.5	73.5	72.7	75.1	77.3	78.9	82.0	81.4	77.6	76.5	127.8
3150	[illegible]	80.6	75.6	76.1	74.5	73.2	74.9	76.8	79.6	81.1	82.6	80.9	78.8	76.2	129.0
4000	82.2	83.7	81.7	81.9	77.5	77.6	77.9	77.6	83.8	81.3	85.5	86.3	80.1	79.3	132.7
5000	81.6	88.8	81.4	76.9	78.3	76.5	75.4	79.0	79.6	[illegible]	87.1	84.2	81.8	75.3	132.2
6300	81.4	94.2	82.3	81.2	81.0	76.1	78.1	78.3	82.1	84.0	85.8	85.6	80.5	78.5	133.4
8000	82.2	83.0	82.0	79.2	76.8	77.1	[illegible]	78.6	81.1	82.3	85.8	85.3	80.9	78.1	133.3
10000	81.7	83.3	81.3	79.7	75.4	75.7	75.8	76.5	79.9	82.1	84.5	82.9	80.0	78.0	133.1
12500	81.3	81.3	79.8	78.0	73.8	73.9	72.9	74.8	77.0	78.4	81.6	79.7	78.3	76.2	132.0
16000	80.2	79.6	78.9	76.2	70.7	72.0	69.9	71.7	74.9	76.5	78.8	77.8	76.5	74.4	132.1
20000	76.5	77.5	75.4	73.6	69.2	69.7	66.9	68.8	72.2	72.7	74.7	74.5	73.8	72.0	131.6
OVERALL MEASURED	93.1	92.6	92.1	91.6	91.1	89.7	89.5	90.2	92.3	93.8	94.8	96.2	95.1	98.0	
OVERALL CALCULATED	92.3	93.4	91.9	90.9	90.1	88.9	88.8	89.8	92.3	93.5	95.5	95.3	93.4	94.9	143.7
PNDB	104.5	105.9	104.3	103.9	103.2	101.4	101.5	102.5	105.9	106.3	108.7	108.7	106.4	105.8	

Table A-4.
Variable Pitch Fan
44% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Δ Stagger = 1.4°
Nominal Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F, 70 PERCENT REL. HUM. DAY)

50	63.9	64.5	67.8	68.8	68.2	69.3	69.9	69.3	69.7	69.2	69.1	68.9	69.9	74.2
63	60.4	62.8	64.0	67.1	65.9	66.6	66.6	67.1	66.7	67.2	66.3	67.6	68.1	72.2
80	59.9	61.3	61.9	64.4	64.6	66.7	66.1	67.7	68.3	69.3	67.9	68.2	68.1	70.7
100	59.6	62.5	65.9	68.2	68.3	69.7	70.8	72.4	73.8	73.4	72.7	73.2	70.8	69.8
125	62.1	[illegible]	69.7	72.2	72.6	73.7	74.8	76.5	76.9	76.5	75.8	74.7	72.0	69.5
160	64.9	69.2	70.9	74.4	74.5	75.7	76.0	77.2	77.7	76.9	76.7	74.5	71.6	67.7
200	63.4	66.7	67.2	69.5	72.6	70.2	69.8	71.4	72.3	72.1	70.9	69.3	66.7	65.1
250	62.8	66.3	67.5	69.2	68.8	69.7	69.8	71.1	71.1	71.0	71.1	70.3	66.8	63.8
315	67.5	72.7	75.8	73.3	78.0	79.4	77.2	75.4	76.9	77.8	73.7	74.0	73.4	68.2
400	64.0	68.7	68.7	70.8	72.1	73.3	72.5	73.2	74.2	75.0	74.2	71.7	69.4	64.4
500	63.9	68.6	69.1	71.0	72.2	72.7	73.2	74.4	74.7	75.9	75.8	72.5	68.3	63.7
630	65.6	71.4	73.4	73.6	76.8	76.7	74.3	75.0	76.3	78.1	77.6	76.4	70.8	66.9
800	68.2	72.5	72.6	73.8	75.2	74.6	74.1	75.5	77.0	79.1	78.0	78.2	71.4	65.0
1000	77.7	81.7	81.4	82.6	83.1	80.3	80.9	81.3	83.1	82.8	82.7	82.9	79.2	72.8
1250	69.2	73.6	73.0	73.1	73.7	73.2	72.6	74.8	76.8	77.3	79.2	78.6	69.9	64.0
1600	69.0	75.7	72.7	74.4	73.7	72.9	74.8	76.5	78.8	79.4	79.6	76.0	70.9	63.2
2000	74.1	78.7	78.7	80.2	76.7	77.3	77.7	77.3	83.0	79.6	82.5	81.3	72.0	66.0
2500	73.2	75.6	78.2	75.2	77.5	76.1	75.2	78.6	78.8	81.9	84.0	79.0	73.4	64.6
3150	72.8	79.0	79.1	79.4	80.2	75.8	78.0	78.1	81.3	82.3	82.7	80.3	72.0	64.3
4000	73.8	77.6	78.8	77.5	76.2	77.0	76.6	78.4	80.4	80.7	82.6	80.0	72.0	64.1
5000	73.1	78.4	78.6	78.6	75.3	76.1	76.4	76.9	79.7	81.0	81.9	77.9	71.5	63.1
6300	72.4	76.3	77.3	77.2	74.0	74.8	73.9	75.6	77.3	77.6	79.2	74.7	69.5	60.3
8000	71.0	74.8	76.9	76.0	71.7	73.6	71.7	73.4	75.9	76.3	76.8	72.9	67.2	57.0
10000	66.5	72.8	73.8	74.1	71.0	72.3	69.7	71.4	74.0	73.2	73.2	69.7	63.8	58.4
OVERALL CALCULATED	84.1	88.5	89.1	89.4	89.3	88.8	88.6	89.6	91.6	91.9	92.6	90.4	85.4	81.6
PNDB	96.9	101.7	102.2	102.5	102.5	101.2	101.4	102.4	104.7	105.3	106.8	103.4	97.0	90.3

Table A-5.
Variable Pitch Fan
44% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Δ Stagger = 6.4°
Nominal Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F, 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	( )	( )	( )	PNL
50	67.7	65.7	66.9	68.3	67.2	68.9	67.6	69.7	71.5	71.5	71.7	72.7	75.5	76.9				120.2
63	71.9	66.5	65.7	66.6	67.5	68.5	67.1	68.6	69.7	71.8	71.5	72.8	75.2	75.9				119.0
80	63.2	63.5	66.2	67.4	67.0	67.0	67.6	71.3	72.8	71.6	71.3	72.5	74.3	74.4				119.8
100	64.5	64.0	66.9	66.5	65.4	67.3	67.7	67.6	68.0	69.5	69.6	71.5	72.8	74.3				118.3
125	62.8	63.8	63.1	65.0	63.6	64.8	64.7	65.3	65.9	67.6	68.2	69.1	70.2	70.8				116.0
160	66.2	64.6	62.7	63.4	62.5	65.7	64.9	66.1	67.3	69.0	70.3	70.8	72.0	72.7				117.3
200	66.8	65.3	68.5	70.7	69.4	70.3	70.3	72.1	73.2	73.8	74.4	75.3	75.5	75.6				121.9
250	67.8	69.1	71.6	73.3	71.4	73.3	74.3	75.2	76.5	76.4	76.4	77.7	77.5	76.4				124.5
315	70.3	71.1	71.5	74.7	73.4	74.1	74.3	75.5	77.0	76.7	77.7	77.2	76.7	75.1				125.0
400	71.2	69.7	68.0	69.3	69.0	69.8	69.7	70.9	71.9	72.6	73.1	73.0	72.6	72.8				120.9
500	67.5	68.0	69.7	68.1	67.9	68.8	68.2	70.1	71.0	70.6	72.1	73.0	72.6	71.5				120.0
630	74.1	74.9	81.2	73.9	78.3	74.9	78.7	76.8	79.8	77.2	76.9	76.6	82.4	79.0				128.1
800	76.4	70.2	73.6	70.1	74.7	72.2	73.0	73.0	75.3	74.3	75.0	74.5	73.1	74.0				123.7
1000	67.7	69.4	68.2	70.1	70.2	69.7	70.2	72.1	72.6	74.3	75.3	74.5	73.3	71.6				122.0
1250	70.0	71.8	71.8	71.0	75.6	74.7	72.6	75.0	74.7	81.3	77.4	76.1	76.4	75.1				125.8
1600	78.5	72.5	71.0	71.0	73.4	71.9	71.3	73.2	74.4	79.1	77.3	76.3	75.0	73.4				124.6
2000	82.9	86.4	82.2	80.4	80.2	79.0	77.9	78.6	82.8	84.1	85.3	85.2	84.6	82.7				133.0
2500	73.9	76.4	73.2	72.4	72.4	71.6	70.5	72.8	75.1	77.1	79.7	79.3	74.9	73.8				125.6
3150	72.7	75.4	71.9	72.9	71.5	70.0	71.5	74.7	75.8	78.9	80.4	77.6	74.9	72.6				125.9
4000	81.6	84.5	82.8	80.5	76.0	75.7	75.7	75.8	81.7	79.9	83.8	83.6	77.6	77.5				131.4
5000	78.6	78.1	78.3	74.6	75.8	73.9	73.3	76.2	76.4	81.1	85.8	82.1	78.2	76.1				130.0
6300	81.3	82.6	80.7	79.9	75.5	74.3	75.5	75.6	80.0	82.2	84.2	83.9	77.5	77.0				131.5
8000	80.0	79.4	80.2	76.6	74.3	74.6	74.2	76.3	76.5	80.2	84.4	83.9	78.1	76.8				131.2
10000	77.5	80.4	77.7	75.9	72.6	72.9	73.0	74.6	77.6	80.5	82.0	81.9	76.4	75.1				130.6
12500	76.8	77.8	76.2	74.4	70.4	71.1	70.0	71.9	74.6	76.4	79.8	77.3	74.2	72.9				129.1
16000	76.3	75.8	74.0	72.5	67.7	68.8	67.0	69.2	71.9	74.2	74.8	76.1	71.9	72.4				129.0
20000	74.6	72.6	71.1	69.3	64.6	66.4	63.6	66.0	69.5	70.9	72.2	72.2	69.2	71.4				128.5
OVERALL MEASURED	90.7	90.9	90.7	89.1	88.2	88.0	87.1	88.5	90.8	91.8	93.1	92.7	93.3	90.7				
OVERALL CALCULATED	90.0	91.7	90.4	88.4	87.5	86.8	86.9	88.0	90.6	92.1	93.9	93.2	91.2	90.0				141.6
PNDB	102.9	105.0	103.7	102.0	100.3	99.5	99.4	100.3	103.9	104.8	107.1	106.3	104.1	102.7				

Table A-6.
Variable Pitch Fan
44% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Δ Stagger = 6.4°
Nominal Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F, 70 PERCENT REL. HUM. DAY)

50	56.7	60.5	65.0	65.7	65.2	67.5	68.1	67.9	67.9	68.7	67.7	68.0	67.0	65.0
63	56.1	60.2	61.1	64.1	63.4	65.1	65.1	65.6	65.8	66.7	66.2	65.5	64.3	61.3
80	60.2	61.0	60.7	62.4	62.3	65.9	65.2	66.3	67.1	68.0	68.2	67.1	66.1	63.1
100	60.7	61.6	66.4	69.7	69.1	70.5	70.6	72.3	72.9	72.8	72.2	71.6	69.5	65.7
125	61.6	65.2	69.4	72.2	71.1	73.5	74.6	75.3	76.2	75.4	74.3	73.8	71.3	66.3
160	63.9	67.1	69.3	73.6	73.0	74.2	74.5	75.6	76.6	75.5	75.5	73.2	70.3	64.8
200	64.8	65.7	65.7	68.2	68.6	69.8	69.9	70.9	71.5	71.4	70.8	69.0	66.1	62.4
250	60.9	63.9	67.3	66.9	67.4	68.8	68.4	70.1	70.6	69.6	69.8	69.0	66.0	60.8
315	67.4	70.7	78.8	72.7	77.8	74.9	78.8	76.8	79.3	75.9	74.5	74.5	75.7	68.1
400	63.6	65.9	71.1	68.8	74.2	72.2	73.0	72.9	74.7	73.0	72.5	70.0	70.2	62.9
500	68.7	65.1	65.6	68.7	69.7	69.6	70.3	71.9	72.0	72.9	72.7	70.2	66.3	60.4
630	62.9	67.3	69.2	69.6	75.0	74.5	72.6	74.8	74.1	79.9	74.8	71.7	69.3	63.5
800	63.2	68.0	68.3	69.5	72.8	72.4	71.3	73.0	73.7	77.8	74.6	71.8	67.7	61.5
1000	75.4	81.8	79.4	78.9	79.6	78.8	77.8	78.3	82.1	82.6	82.5	80.5	77.1	70.6
1250	66.2	71.7	70.4	70.8	71.6	71.3	70.4	72.5	74.3	75.5	76.8	74.5	67.2	61.3
1600	64.8	70.5	69.0	71.2	70.7	69.7	71.4	74.4	75.0	77.2	77.4	72.7	67.0	59.7
2000	73.5	79.4	79.8	78.8	75.2	75.5	75.5	75.5	80.9	78.3	80.8	78.6	69.5	64.2
2500	70.2	72.9	75.2	72.7	75.0	73.6	73.1	75.9	75.6	79.3	82.6	77.0	69.9	62.4
3150	72.8	77.3	77.6	78.2	74.7	74.1	75.4	75.3	79.2	80.5	81.0	78.7	69.0	62.8
4000	71.2	74.0	77.1	74.9	73.6	74.4	74.3	76.2	77.9	78.6	81.3	78.6	69.2	61.8
5000	68.9	75.4	75.0	74.8	72.4	73.3	73.6	75.1	77.5	79.4	79.4	77.0	67.8	60.2
6300	67.9	72.9	73.8	73.6	70.6	71.9	71.1	72.8	74.8	75.6	77.3	72.4	65.3	57.0
8000	67.0	71.0	72.0	72.3	68.6	70.5	68.8	70.8	72.9	74.0	74.9	71.3	62.7	55.0
10000	64.6	67.8	69.5	69.8	66.4	68.9	66.3	68.5	71.3	71.4	70.6	67.4	59.3	51.8
OVERALL CALCULATED	81.9	86.9	87.5	86.9	86.8	86.6	86.9	87.7	89.9	90.5	91.0	88.3	83.6	77.6
PNDB	95.8	99.5	100.4	100.4	98.9	98.8	99.2	100.3	102.6	103.7	104.4	101.5	94.3	87.8

Table A-7.
Variable Pitch Fan
55% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Nominal Stagger (-1.6°)
Nominal Nozzle

MODEL SOUND PRESSURE LEVELS (59, DEG, F, 70 PERCENT REL, HUM, DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	( )	( )	PWL
50	70.9	67.9	69.9	71.0	72.0	71.2	72.9	73.6	73.6	73.6	74.6	75.8	79.4	81.6			123.6
63	67.8	68.1	68.5	69.1	69.5	70.3	71.8	71.8	71.5	72.0	73.3	75.3	78.4	81.1			122.5
80	65.7	66.8	70.0	68.6	70.2	70.7	71.7	72.7	73.0	73.9	74.2	75.4	77.5	79.0			122.5
100	66.5	66.5	71.2	70.3	70.2	70.0	70.7	71.2	70.9	71.1	72.2	74.1	75.8	76.9			121.2
125	65.1	65.4	66.3	67.6	67.3	67.0	68.3	68.3	68.8	69.7	70.5	71.5	73.3	74.2			118.6
160	65.8	66.1	65.8	65.8	65.5	68.3	68.8	69.2	69.7	71.5	73.3	74.7	76.0	76.4			120.4
200	[illegible]	68.7	71.7	72.4	71.9	72.6	73.2	74.8	75.6	76.3	78.0	79.2	80.0	80.0			125.1
250	[illegible]	73.2	75.6	76.0	74.6	77.4	77.6	78.7	79.7	79.9	80.2	81.5	81.3	80.4			126.2
315	74.3	75.1	76.1	77.3	77.3	77.7	78.1	79.0	81.5	81.2	81.2	81.0	80.5	79.1			128.9
400	72.8	73.1	72.3	72.4	72.5	73.0	73.1	74.3	75.5	75.9	77.0	77.0	76.8	76.8			124.5
500	71.5	72.5	74.0	71.7	72.2	71.7	72.2	73.3	73.9	74.6	76.4	76.6	76.4	75.3			123.[illegible]
630	78.6	80.2	78.4	74.9	80.6	76.9	78.2	79.7	79.0	78.9	79.0	79.9	82.5	78.8			129.1
800	75.7	77.8	75.5	74.5	78.8	76.0	77.2	77.8	77.8	78.8	79.6	79.0	81.3	78.7			127.9
1000	74.0	75.5	75.7	75.3	75.9	75.4	76.5	77.8	78.9	80.3	82.1	80.3	78.2	78.4			128.1
1250	74.9	77.4	76.6	75.7	78.2	77.1	76.9	79.5	79.5	83.7	83.5	82.5	79.2	79.4			129.9
1600	76.1	77.9	76.8	75.4	79.5	77.4	77.1	79.2	80.2	83.5	83.2	82.2	79.2	78.8			130.0
2000	82.7	84.8	84.0	81.6	82.9	80.8	81.0	82.5	84.8	85.0	88.0	85.7	85.2	84.9			134.4
2500	78.9	81.0	79.1	77.4	78.0	77.1	76.8	78.4	80.7	82.4	85.7	83.9	80.2	79.5			131.0
3150	78.3	82.0	78.9	78.5	78.1	76.1	77.4	80.8	81.8	83.7	85.5	82.7	79.6	79.1			131.5
4000	85.3	86.5	86.5	84.0	80.9	30.7	81.0	81.9	87.0	84.1	89.0	87.9	81.7	82.6			135.7
5000	84.6	84.1	84.6	79.6	82.3	81.1	80.1	82.8	82.7	87.2	90.9	86.0	84.6	82.3			135.7
6300	85.2	87.8	86.4	84.3	81.6	80.5	82.0	81.7	85.7	87.3	89.2	88.4	83.2	83.3			136.7
8000	85.9	86.2	86.7	82.2	81.7	81.4	80.9	82.6	84.4	85.4	89.2	87.6	84.0	83.0			136.6
10000	85.5	87.1	85.8	82.5	80.7	79.8	80.2	81.0	83.5	86.2	88.0	85.7	83.8	83.1			137.0
12500	85.1	84.8	84.8	81.8	79.6	78.8	77.2	78.8	81.3	83.0	85.8	83.3	82.4	81.4			136.3
16000	83.5	83.8	82.8	80.2	76.7	76.7	74.7	76.7	79.0	80.8	82.7	81.5	80.8	80.7			136.3
20000	80.7	81.3	80.2	77.2	74.8	73.8	71.4	73.6	76.4	77.4	79.2	78.4	78.3	78.4			136.0
OVERALL MEASURED	94.7	95.5	94.7	93.2	92.9	91.7	92.3	93.2	94.5	95.9	97.5	96.2	95.8	94.8			
OVERALL CALCULATED	94.8	96.0	95.4	92.8	92.5	91.5	91.6	93.0	95.1	96.4	98.8	97.1	95.2	94.8			146.7
PNDB	107.8	108.4	106.0	105.8	105.0	104.2	104.5	105.8	108.7	109.3	112.0	110.4	107.6	106.9			

Table A-8.
Variable Pitch Fan
55% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Nominal Stagger (-1.6°)
Nominal Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F, 70 PERCENT REL. HUM. DAY)

50	60.7	63.0	69.3	69.4	70.0	70.2	71.1	71.5	70.8	70.3	70.3	70.6	70.0	67.6
63	59.3	61.8	64.3	66.7	67.1	67.3	68.7	68.5	68.6	68.8	68.5	67.9	67.5	64.7
80	59.8	62.4	63.7	64.9	65.3	68.4	69.1	69.4	69.5	70.5	71.2	71.0	70.1	66.7
100	62.5	65.0	69.5	71.4	71.6	72.8	73.5	75.0	75.3	75.3	75.9	75.4	73.9	70.1
125	64.9	69.4	73.4	75.0	74.3	77.5	77.9	78.8	79.4	78.9	78.1	77.7	75.1	70.3
160	67.9	71.2	73.8	76.2	76.9	77.8	78.3	79.0	81.2	80.1	79.0	77.1	74.1	68.8
200	66.3	69.1	70.0	71.3	72.1	73.1	73.2	74.3	75.1	74.8	74.7	73.0	70.3	66.4
250	64.9	68.4	71.6	70.4	71.7	71.7	72.3	73.3	73.5	73.4	74.1	72.5	69.8	64.6
315	71.9	76.1	75.9	73.6	80.2	76.8	78.3	79.7	78.5	77.7	76.5	75.7	75.8	67.9
400	68.9	73.5	73.0	73.2	78.2	75.9	77.3	77.7	77.3	77.5	77.1	74.8	74.5	67.6
500	67.0	71.2	73.1	73.9	75.3	75.3	76.5	77.7	78.3	78.9	79.5	75.9	71.3	67.1
630	67.7	73.0	74.0	74.3	77.6	77.0	76.9	79.3	78.9	82.3	80.6	78.0	72.0	67.8
800	68.8	73.4	74.1	74.0	78.8	77.2	77.1	79.0	79.6	82.0	80.5	77.7	71.8	66.9
1000	75.2	80.1	81.2	80.0	82.2	80.6	80.9	82.3	84.1	83.4	85.2	81.1	77.7	77.7
1250	71.2	76.2	76.2	75.9	77.2	76.8	76.7	78.1	80.0	80.8	82.8	79.1	72.5	67.0
1600	70.4	77.1	75.9	76.8	77.3	75.7	77.2	80.4	81.0	82.0	82.5	77.7	71.7	66.1
2000	77.2	81.5	83.5	82.3	80.1	80.4	80.9	81.7	86.2	82.5	86.0	82.9	73.7	69.3
2500	76.3	79.0	81.5	77.9	81.4	80.7	79.9	82.4	81.8	85.5	87.7	80.8	76.3	68.6
3150	76.6	82.5	83.3	82.5	80.9	80.2	81.9	81.4	84.9	85.6	86.1	84.1	74.7	69.1
4000	77.1	80.9	83.6	80.6	81.0	81.3	81.0	82.5	83.8	83.8	86.1	82.2	75.1	68.1
5000	77.0	82.1	83.1	81.4	80.5	80.2	80.8	81.4	83.4	85.1	85.3	80.7	75.2	68.3
6300	76.2	79.9	82.4	81.0	79.8	79.6	78.2	79.6	81.6	82.7	83.4	78.3	73.5	65.5
8000	74.3	79.0	80.7	80.0	77.6	78.3	76.5	78.3	80.0	80.6	80.7	76.7	71.5	63.3
10000	70.7	76.5	78.6	77.7	76.6	76.3	74.2	76.1	78.3	77.9	77.6	73.6	68.3	58.8
OVERALL CALCULATED	86.5	91.0	92.6	91.4	91.9	91.4	91.7	92.9	94.5	94.9	95.9	92.2	87.3	81.7
PNDB	99.9	104.8	106.2	105.1	104.9	104.8	105.1	106.2	108.0	108.6	109.5	105.9	99.7	93.6

Table A-9.
Variable Pitch Fan
55% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Δ Stagger = 1.4°
Nominal Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F. 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	( )	( )	( )	PNL
50	69.4	67.9	69.1	70.8	71.6	71.1	70.4	72.7	73.2	73.7	74.7	74.0	79.1	80.6				123.1
63	66.4	66.2	67.6	69.6	74.3	70.3	69.9	71.3	72.0	72.7	73.6	75.6	78.5	80.4				122.7
80	65.2	66.7	68.9	69.3	68.7	70.3	70.6	73.3	74.5	75.4	74.7	76.0	77.2	79.1				122.8
100	65.7	65.3	69.5	70.9	68.3	70.3	69.7	70.8	71.3	71.5	72.6	73.8	75.5	76.0				120.9
125	64.8	65.6	65.5	68.7	66.6	68.6	66.7	68.3	68.6	69.6	70.6	71.9	73.4	73.5				118.7
160	65.0	65.3	65.9	66.9	65.5	69.0	66.9	69.8	70.0	71.5	73.7	75.3	75.8	76.7				120.6
200	66.3	67.3	69.0	70.2	69.8	72.3	72.6	74.1	75.1	76.3	77.7	78.7	79.6	79.5				124.5
250	70.4	73.0	74.3	75.8	74.1	76.4	77.5	78.7	80.1	80.0	80.8	81.1	81.4	80.2				128.0
315	74.3	75.2	76.0	77.4	76.6	77.1	78.2	78.6	81.3	80.5	81.3	80.6	80.6	79.3				128.6
400	72.5	73.5	71.9	73.1	74.2	73.5	73.5	74.6	75.5	75.7	76.0	76.1	75.8	76.3				124.4
500	70.7	71.0	71.2	70.6	69.7	71.5	71.1	72.0	73.5	74.2	76.3	76.6	76.3	75.0				123.0
630	75.8	79.1	77.1	75.0	75.9	76.6	77.1	76.8	78.8	78.7	78.3	79.0	78.2	79.3				127.5
800	75.9	81.2	75.7	73.8	76.7	76.2	76.4	77.2	80.2	78.4	79.6	78.6	78.6	77.6				127.9
1000	71.2	72.8	72.7	73.1	73.5	74.0	74.2	75.1	76.3	78.2	79.0	77.3	75.8	75.8				125.6
1250	72.9	74.4	73.6	73.2	76.1	74.6	73.9	75.7	77.4	80.1	80.8	79.8	77.2	76.7				127.0
1600	75.1	74.6	76.8	73.9	79.7	74.9	74.8	77.0	77.9	81.0	81.1	79.5	78.2	76.9				128.1
2000	84.2	84.3	81.7	80.4	81.8	80.3	79.4	79.8	83.0	84.6	80.7	86.3	84.8	83.5				133.5
2500	78.1	79.7	77.4	75.9	76.0	75.8	74.5	76.1	79.0	81.0	84.4	82.8	78.9	78.4				129.8
3150	76.1	79.2	75.4	76.1	75.2	74.0	75.1	77.9	79.9	81.9	83.8	80.6	76.0	77.0				129.4
4000	85.0	86.2	84.5	82.2	79.5	79.8	78.9	79.7	84.4	82.8	89.3	86.1	80.6	80.9				134.6
5000	82.4	82.0	82.3	78.3	80.1	78.9	77.7	80.8	81.0	85.2	89.9	85.0	82.2	80.4				134.0
6300	82.0	85.2	83.0	82.4	82.6	78.6	80.0	79.4	84.6	86.1	88.1	86.3	81.6	81.1				135.0
8000	83.0	84.1	82.9	79.6	78.4	79.5	78.5	80.1	82.3	84.0	88.0	84.8	81.3	80.5				134.5
10000	82.0	83.8	82.0	79.9	77.7	77.9	78.1	78.6	81.9	84.1	86.1	83.1	81.1	79.3				134.4
12500	81.6	82.4	81.3	78.7	74.9	76.7	75.1	76.0	79.1	80.4	83.3	80.6	79.0	77.2				133.4
16000	80.3	80.6	79.5	77.4	72.1	74.4	72.1	73.5	76.8	79.4	81.0	78.3	77.0	75.5				133.5
20000	77.1	78.4	76.4	74.4	70.5	71.1	68.4	70.5	74.0	75.0	77.1	75.3	74.3	72.7				132.9
OVERALL MEASURED	93.0	94.1	92.9	91.6	90.7	90.7	90.2	91.3	93.6	94.6	97.1	95.1	94.3	93.5				
OVERALL CALCULATED	92.8	94.2	92.6	91.0	90.8	90.1	89.9	91.0	93.6	94.9	97.7	95.5	93.6	93.1				144.8
PNDB	106.0	107.3	105.8	104.2	103.7	103.0	102.6	103.7	106.9	107.7	111.2	108.9	106.0	105.3				

Table A-10.
Variable Pitch Fan
55% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Δ Stagger = 1.4°
Nominal Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F. 70 PERCENT REL. HUM. DAY)

50	60.8	61.8	67.5	70.1	68.1	70.5	70.1	71.1	71.1	70.7	70.6	70.4	69.8	66.7
63	58.9	62.0	63.5	67.8	66.4	68.8	67.1	68.5	68.5	68.7	68.6	68.3	67.6	64.1
80	59.0	61.7	63.8	65.9	65.2	69.2	67.2	70.0	69.8	70.5	71.7	71.6	69.8	67.1
100	60.2	63.6	66.9	69.2	69.5	72.5	72.9	74.3	74.8	75.3	75.6	74.9	73.5	69.6
125	64.1	69.2	72.1	74.7	73.8	76.5	77.8	78.8	79.8	79.0	78.6	77.3	75.2	70.2
160	68.0	71.3	73.8	76.3	76.2	77.2	78.4	78.7	80.9	79.4	79.0	76.7	74.2	69.0
200	66.0	69.5	69.6	72.0	73.8	73.5	73.6	74.6	75.1	74.6	73.7	72.1	69.4	65.8
250	64.1	66.9	68.8	69.4	69.3	71.5	71.3	72.0	73.1	73.0	73.9	72.5	69.7	64.3
315	69.1	74.9	74.6	73.8	75.4	76.6	77.2	76.8	78.3	77.5	75.8	74.8	71.5	68.4
400	69.0	77.0	73.1	72.5	76.2	76.2	76.5	77.1	79.7	77.1	77.1	74.3	71.7	66.5
500	64.2	68.5	70.1	71.7	72.9	73.9	74.2	75.0	75.8	76.8	77.1	73.0	68.8	64.4
630	65.7	70.0	70.9	71.8	75.4	74.5	73.9	75.5	76.8	78.7	78.2	75.4	70.1	65.1
800	67.8	70.1	74.1	72.5	79.1	74.7	74.7	76.9	77.2	79.6	78.4	75.0	70.9	65.0
1000	76.7	79.6	78.9	78.9	81.1	80.0	79.4	79.6	82.3	83.1	83.9	81.7	77.3	71.3
1250	70.4	74.9	74.6	74.3	75.3	75.5	74.3	75.8	78.2	79.4	81.5	78.0	71.2	65.9
1600	68.2	74.3	72.4	74.4	74.4	73.7	75.0	77.6	79.1	80.3	80.9	75.7	70.1	64.1
2000	76.9	81.2	81.4	80.5	78.8	79.5	78.8	79.4	83.6	81.1	86.3	81.1	72.6	67.6
2500	74.1	76.8	79.2	76.5	79.3	78.5	77.5	80.4	80.1	83.4	86.8	79.8	73.9	66.7
3150	73.5	80.0	79.9	80.7	81.8	78.4	79.9	79.1	83.8	84.4	84.9	81.1	73.1	66.9
4000	74.1	78.7	79.8	78.0	77.7	79.4	78.6	79.9	81.6	82.4	84.9	79.4	72.5	65.6
5000	73.4	78.8	79.3	78.8	77.5	78.4	78.7	79.0	81.7	83.0	83.4	78.1	72.6	64.4
6300	72.7	77.5	78.8	77.9	75.2	77.5	76.1	76.8	79.4	79.6	80.9	75.7	70.2	61.3
8000	71.0	75.8	77.5	77.2	73.1	76.0	73.9	75.1	77.7	79.2	78.9	73.5	67.8	58.1
10000	67.1	73.6	74.8	74.9	72.3	73.7	71.1	73.0	75.8	75.5	75.5	70.5	64.3	53.1
OVERALL CALCULATED	84.7	89.3	89.8	89.6	90.1	90.0	89.9	90.8	93.0	93.4	94.8	90.7	85.8	80.5
PNDB	97.5	102.7	103.1	103.3	103.9	103.1	103.2	103.8	106.6	107.1	108.4	104.0	97.7	91.5

Table A-11.
Variable Pitch Fan
55% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Δ Stagger = 6.4°
Nominal Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F, 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	( )	( )	( )	PNL
50	69.9	67.7	69.9	70.2	70.7	71.4	70.9	72.2	73.1	73.9	74.6	76.2	79.1	81.4				123.2
63	67.6	68.6	68.3	68.4	68.8	70.5	69.8	70.8	71.5	72.6	73.3	75.4	77.8	80.3				122.0
80	65.8	66.8	68.5	69.5	69.0	70.5	71.0	71.0	72.0	73.7	74.4	75.3	77.2	78.9				122.1
100	67.2	67.3	70.5	70.3	69.4	70.5	70.2	70.7	70.9	71.7	72.4	73.8	75.0	76.0				121.0
125	64.6	65.6	66.3	67.3	67.0	67.3	66.0	67.8	68.5	69.3	70.6	72.1	73.3	73.6				118.6
160	65.8	65.6	66.7	65.8	66.2	68.2	68.0	69.0	69.9	72.2	74.0	75.1	77.0	77.7				120.9
200	66.4	67.1	69.4	68.9	69.9	71.7	72.6	74.4	75.0	76.4	77.7	79.1	80.7	80.9				124.9
250	70.6	71.9	74.1	74.[illegible]	74.7	76.4	77.1	78.7	79.5	80.0	80.8	81.6	81.8	80.9				128.1
315	73.4	74.4	76.1	77.3	76.3	76.6	77.1	78.5	79.5	79.5	80.2	79.6	80.0	79.1				127.9
400	72.9	72.9	72.5	72.5	72.7	73.0	73.1	74.2	74.5	75.5	75.7	75.8	76.3	76.1				124.0
500	70.1	69.8	70.2	69.5	69.4	70.4	70.7	72.6	73.4	74.2	76.4	76.2	76.9	75.0				122.9
630	74.6	74.4	74.8	73.4	75.6	76.8	76.6	76.1	78.2	77.1	77.1	77.6	79.4	77.7				126.5
800	73.9	74.3	76.4	73.7	74.9	75.4	75.5	77.3	76.7	79.3	78.0	77.2	78.5	77.5				126.6
1000	71.5	72.6	72.4	72.7	73.0	73.1	73.7	74.2	74.6	76.7	77.7	76.3	75.5	74.8				124.6
1250	71.7	73.2	74.1	73.4	73.6	74.1	73.4	75.1	76.2	79.0	79.5	77.7	76.1	75.7				125.9
1600	76.9	75.9	76.8	74.4	76.9	78.3	75.9	78.0	79.2	80.5	80.7	80.0	81.0	81.1				128.7
2000	82.5	83.6	81.2	81.0	80.5	77.9	77.6	79.0	80.5	81.3	83.0	82.6	80.6	80.1				131.3
2500	87.4	88.7	86.4	85.7	84.2	81.4	81.5	83.2	84.2	84.7	87.7	86.5	84.4	85.0				135.7
3150	74.4	77.7	75.1	75.2	74.8	73.6	75.8	78.2	79.4	81.7	83.7	79.4	77.1	76.4				129.0
4000	80.7	81.3	81.6	79.5	77.8	77.8	77.6	79.0	83.1	81.7	85.9	83.6	78.3	78.7				132.0
5000	84.8	84.8	85.3	81.6	82.8	80.5	79.7	81.9	81.3	85.8	90.3	86.1	83.6	81.7				135.3
6300	81.2	84.8	82.4	81.7	80.0	79.1	79.6	79.2	83.3	85.7	87.4	85.0	80.3	81.0				134.2
8000	80.2	82.2	82.0	78.4	78.3	78.8	78.5	80.7	82.1	83.7	87.9	84.7	80.4	79.7				134.1
10000	81.0	83.1	81.7	79.5	78.3	78.1	77.8	79.0	81.8	84.2	86.5	83.1	80.1	78.5				134.4
12500	78.9	80.1	80.1	77.3	75.4	75.6	75.0	76.7	79.1	80.6	83.5	80.0	77.7	76.3				132.8
16000	76.7	78.3	78.2	75.4	73.1	73.2	71.6	73.2	75.9	78.8	80.3	77.7	75.7	76.0				132.3
20000	73.3	74.9	74.3	71.9	70.3	70.4	67.6	70.6	73.[illegible]	75.0	75.8	73.9	72.1	75.2				131.5
OVERALL MEASURED	93.5	93.8	93.5	92.0	91.3	91.2	90.7	92.8	93.7	94.5	96.7	95.3	95.3	93.8				
OVERALL CALCULATED	92.8	94.1	93.2	91.6	91.0	90.3	90.1	91.6	93.2	94.7	97.3	95.1	93.8	93.5				144.6
PNDB	106.7	107.9	106.6	105.6	104.8	103.5	103.4	105.0	106.3	107.8	110.9	108.3	106.6	106.6				

Table A-12.
Variable Pitch Fan
55% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Λ Stagger 6.4°
Nominal Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F, 70 PERCENT REL. HUM. DAY)

50	61.4	63.8	68.5	69.4	69.3	70.7	70.6	70.9	70.8	78.8	70.5	70.3	69.2	66.7
63	58.7	62.1	64.3	66.4	66.8	67.5	67.2	68.0	68.3	68.4	68.6	68.5	67.5	64.2
80	59.8	61.9	64.7	64.8	66.0	68.4	68.3	69.2	69.7	71.2	71.9	71.4	71.8	68.0
100	60.3	63.4	67.2	67.8	69.6	71.9	72.9	74.5	74.8	75.4	75.6	75.3	74.6	71.0
125	64.4	68.1	72.0	73.8	74.4	76.5	77.4	78.8	79.2	78.9	78.6	77.8	75.6	70.8
160	67.1	70.5	73.8	76.1	75.9	76.7	77.3	78.6	79.1	78.3	77.9	75.7	73.6	68.8
200	66.4	68.9	70.2	71.3	72.4	73.1	73.2	74.3	74.1	74.3	73.4	71.8	69.8	65.7
250	63.5	65.7	67.8	68.3	69.0	70.4	70.8	72.6	72.9	73.0	74.1	72.2	70.3	64.3
315	67.9	70.2	72.3	72.1	75.1	76.8	76.7	76.0	77.7	75.9	74.7	73.5	72.7	66.8
400	67.1	70.0	73.9	72.4	74.4	75.3	75.5	77.2	76.2	78.0	75.5	72.9	71.6	66.4
500	64.5	68.3	69.8	71.4	72.4	73.0	73.7	74.1	74.1	75.4	75.1	71.9	68.5	63.4
630	64.5	68.8	71.5	72.0	73.0	74.0	73.4	75.0	75.6	77.6	76.9	73.3	69.0	64.1
800	75.3	79.1	78.6	79.6	79.9	78.1	77.7	78.9	79.9	79.9	80.4	78.2	73.7	69.2
1000	80.0	84.2	83.7	84.3	83.6	81.3	81.5	83.0	83.6	83.3	85.0	81.9	77.1	72.9
1250	66.9	73.0	72.4	73.7	74.2	73.8	75.8	78.1	78.8	80.3	81.0	74.8	69.6	64.4
1600	73.1	76.6	78.9	78.1	77.2	77.8	77.7	78.9	82.6	80.3	83.1	78.9	70.7	66.0
2000	76.9	79.9	82.4	80.1	82.2	80.4	79.7	81.8	80.7	84.3	87.4	81.2	75.6	68.5
2500	73.3	80.0	79.7	80.4	79.5	79.1	79.8	79.2	82.9	84.3	84.7	80.2	72.4	67.7
3150	72.2	77.6	79.4	77.3	78.1	79.1	79.0	81.0	82.0	82.6	85.3	80.1	72.4	66.1
4000	73.0	78.5	79.4	78.7	78.5	78.8	78.7	79.7	81.9	83.4	84.2	78.5	72.1	64.4
5000	71.5	76.3	78.6	77.4	76.5	77.3	76.8	78.3	80.1	80.6	82.1	76.3	70.3	62.6
6300	69.0	75.3	77.7	76.6	75.4	76.0	74.6	76.0	78.1	79.9	79.8	74.8	68.8	62.0
8000	66.7	72.7	74.9	74.3	73.9	74.6	72.0	74.8	77.1	77.4	76.4	71.7	65.4	60.4
10000	60.4	67.1	69.7	69.4	69.2	69.9	67.4	70.1	72.4	72.5	71.2	66.1	59.1	52.6
OVERALL CALCULATED	85.2	89.6	90.6	90.4	90.5	90.2	90.2	91.5	92.7	93.4	94.6	90.4	85.9	81.0
PNDB	97.1	101.9	103.1	102.8	102.9	103.0	102.9	104.5	105.7	106.7	107.9	103.3	97.3	91.6

Table A-13.
Variable Pitch Fan
65% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Nominal Stagger (-1.4°)
Nominal Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F, 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	PNL
50	78.5	78.4	77.6	75.1	74.9	76.5	74.[illegible]	76.2	77.2	78.3	77.8	79.0	82.1	84.3	127.4
63	77.2	78.0	76.1	73.9	76.2	76.1	73.9	74.7	75.5	78.0	76.7	79.1	81.4	83.3	126.7
80	74.9	75.7	75.1	74.3	73.8	76.4	76.1	76.9	77.8	78.9	77.3	78.3	80.6	81.8	126.7
100	73.7	75.0	74.5	73.8	73.2	74.7	73.9	75.1	75.6	77.8	76.0	77.3	78.9	79.4	125.3
125	72.2	72.8	71.7	71.9	70.8	72.0	70.5	71.7	72.4	76.1	73.4	75.1	76.7	77.4	122.9
160	70.4	70.2	69.9	69.9	70.0	71.2	70.6	71.8	73.4	76.7	76.0	77.8	79.4	80.2	123.9
200	69.7	70.8	71.8	71.5	71.8	73.8	74.3	76.2	78.2	79.5	80.5	81.5	83.3	83.5	127.4
250	73.3	75.8	76.8	77.4	76.6	79.0	80.2	81.5	82.6	83.0	83.3	84.3	84.7	84.3	130.9
315	77.8	78.4	78.6	80.1	78.8	80.5	80.2	81.7	82.8	84.0	84.3	84.0	83.3	82.0	131.4
400	75.9	77.1	75.7	76.8	76.8	77.0	76.4	78.7	79.9	80.7	80.9	81.3	80.2	79.7	128.5
500	73.4	74.1	73.6	73.3	73.3	73.4	73.9	75.6	77.0	77.9	79.6	80.3	80.2	78.6	128.4
630	77.9	79.2	78.4	77.6	78.5	79.0	78.4	80.3	80.8	81.6	81.5	83.1	82.1	80.3	130.0
800	76.9	77.7	77.5	77.8	79.1	80.1	78.3	80.1	80.4	82.9	82.4	81.2	81.2	80.9	130.1
1000	78.4	77.9	77.7	78.0	78.2	77.5	78.5	79.7	81.0	82.9	84.4	83.2	80.9	79.9	130.4
1250	76.6	79.2	77.2	77.6	78.5	77.8	78.4	80.8	82.1	84.8	85.5	83.8	81.3	8[illegible].3	131.3
1600	78.4	81.4	78.1	79.8	80.8	80.3	79.7	81.5	83.0	86.2	86.2	84.5	82.1	80.5	132.6
2000	84.4	83.7	83.7	83.4	83.0	81.5	81.5	83.3	85.9	88.2	88.2	88.8	84.3	83.[illegible]	135.0
2500	87.3	86.3	85.6	85.5	83.4	82.2	81.8	84.2	86.5	88.6	89.9	88.9	85.6	85.4	136.5
3150	88.4	84.2	80.3	80.2	79.5	78.9	80.3	82.1	84.4	86.3	87.8	84.9	82.2	80.6	133.7
4000	86.4	88.2	86.7	83.7	82.3	82.5	82.2	82.8	88.1	85.8	90.7	88.6	82.2	83.0	136.9
5000	89.1	89.1	88.3	84.4	85.3	83.9	83.4	84.6	84.9	90.5	94.6	88.7	86.7	84.4	139.2
6300	87.[illegible]	90.0	87.0	86.2	84.6	82.8	84.2	84.0	88.8	90.1	91.8	89.4	84.7	83.8	138.8
8000	87.[illegible]	88.3	87.5	84.3	82.1	83.2	82.2	84.5	86.6	87.3	91.5	88.1	85.0	83.5	138.4
10000	86.9	89.3	86.8	85.0	81.4	82.3	82.8	82.8	86.6	88.6	90.4	86.6	84.4	83.4	138.9
12500	84.8	87.8	85.8	83.6	78.8	80.6	79.2	81.1	83.9	84.7	87.8	84.1	82.9	81.4	137.8
16000	85.8	85.1	84.3	82.0	75.5	76.6	76.4	77.9	81.9	83.2	85.1	82.6	80.9	80.1	137.8
20000	81.8	82.8	80.7	78.9	72.2	75.3	72.9	74.9	78.9	79.8	81.1	79.6	78.7	77.1	137.3
OVERALL MEASURED	98.8	98.2	97.7	95.7	93.8	95.5	93.5	95.6	97.3	98.8	100.5	98.6	97.6	96.8	
OVERALL CALCULATED	97.2	98.5	96.8	95.3	94.8	93.9	93.7	95.2	97.7	99.0	101.4	99.0	97.8	96.4	148.0
PNDB	109.8	110.9	109.5	107.9	107.2	106.7	106.5	108.2	110.9	112.3	115.1	112.1	109.7	108.7	

Table A-14.
Variable Pitch Fan
65% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Nominal Stagger (-1.6°)
Nominal Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F, 70 PERCENT REL. HUM. DAY)

50	68.0	71.5	72.5	73.0	73.1	75.0	74.3	75.3	75.4	77.0	74.0	73.8	73.1	70.1
63	66.3	69.2	69.7	71.0	70.6	72.3	70.8	71.9	72.8	75.2	71.4	71.5	70.8	67.9
80	64.4	66.5	67.8	68.9	69.7	71.4	70.9	72.0	73.1	75.8	74.0	74.1	73.5	70.5
100	63.6	67.8	69.6	70.5	71.6	74.0	74.5	76.4	78.0	78.5	78.4	77.8	77.2	73.6
125	67.0	72.0	74.6	76.3	76.3	79.1	80.5	81.6	82.2	82.0	81.1	80.5	78.4	74.3
160	70.7	74.5	76.4	79.0	78.4	80.6	80.4	81.8	82.4	82.9	82.0	80.1	77.0	71.7
200	69.5	73.2	73.3	75.6	76.4	77.1	76.6	78.7	79.6	79.5	78.6	77.3	73.7	69.3
250	66.8	70.0	71.2	72.1	72.8	73.4	74.0	75.6	76.6	76.7	77.3	76.2	73.6	67.9
315	71.2	75.0	76.8	76.3	78.0	78.9	78.5	80.2	80.4	80.3	79.1	78.9	75.4	69.4
400	70.1	73.4	75.0	76.4	78.6	80.0	78.3	80.0	79.9	81.6	79.9	76.9	74.3	69.8
500	69.4	73.5	75.1	76.7	77.6	77.4	78.6	79.6	80.4	81.5	81.8	78.9	73.9	68.6
630	69.4	74.7	74.5	76.2	77.9	77.6	78.4	80.7	81.5	83.4	82.9	79.3	74.2	68.7
800	77.2	81.2	81.1	82.0	82.5	81.4	81.6	83.2	85.3	84.8	85.6	82.4	77.1	71.8
1000	79.9	83.7	82.9	84.1	82.8	82.0	81.9	84.0	85.9	85.2	87.2	84.4	78.2	73.3
1250	73.3	79.6	77.5	78.8	78.9	78.7	80.3	82.0	83.8	84.9	85.0	80.2	74.7	68.2
1600	78.7	83.5	84.0	83.3	81.8	82.5	82.3	82.7	87.5	84.4	88.0	83.9	74.5	78.3
2000	81.1	84.2	85.4	83.1	84.6	83.8	83.4	85.5	85.8	88.9	91.8	83.8	78.8	71.3
2500	79.2	85.2	84.3	84.8	84.1	82.8	84.4	84.1	88.1	88.7	89.0	84.6	76.7	78.5
3150	79.5	83.6	84.9	83.2	81.9	83.5	82.7	84.9	86.4	86.2	89.0	83.4	77.1	69.9
4000	79.9	84.7	84.5	84.2	81.5	83.0	83.6	83.5	86.8	87.8	88.1	82.0	76.3	69.3
5000	78.7	83.3	84.3	83.6	79.9	82.2	81.0	82.8	84.9	84.7	86.4	80.4	75.5	67.7
6300	78.1	82.1	83.8	83.1	77.7	81.4	79.4	80.7	84.1	84.4	84.6	79.6	74.0	66.2
8000	75.1	80.6	81.3	81.3	75.8	79.5	77.3	79.1	82.5	82.2	81.7	77.4	72.0	62.3
10000	68.8	75.0	76.2	76.4	71.0	74.9	72.7	74.4	77.7	77.3	76.5	71.8	65.7	54.5
OVERALL CALCULATED	89.5	94.0	94.5	94.3	93.3	93.9	93.8	95.2	97.3	97.7	98.8	94.3	89.3	84.0
PNDB	102.6	107.4	107.9	107.6	106.4	107.2	107.1	108.4	110.6	111.0	112.0	107.3	101.6	95.0

Table A-15.
Variable Pitch Fan
65% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Δ Stagger = 1.4°
Nominal Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F, 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	( )	( )	PWL
50	70.3	68.1	69.8	70.6	71.3	72.4	72.2	74.2	74.4	75.1	76.4	76.5	82.5	83.8			125.2
63	68.7	69.6	70.2	70.3	70.5	72.5	72.4	73.7	74.7	74.8	76.4	78.7	81.9	83.8			125.1
80	68.1	67.9	70.3	69.9	71.1	71.8	72.8	73.5	74.7	76.0	77.2	78.3	81.0	82.1			124.8
100	69.8	68.7	71.8	72.5	71.7	72.3	73.1	73.8	75.3	75.5	76.3	77.0	79.2	79.7			124.2
125	66.6	67.2	68.1	69.7	69.7	68.8	69.[illegible]	70.2	71.1	72.2	72.6	74.4	76.4	76.1			121.1
160	67.4	66.7	67.3	67.7	67.4	69.2	69.3	70.6	72.1	74.0	76.0	77.4	80.0	79.7			123.0
200	68.7	69.8	71.4	70.8	71.5	72.5	74.1	75.7	76.9	78.7	80.0	81.8	83.6	82.5			127.0
250	73.9	75.2	77.4	76.9	76.7	78.2	80.3	81.3	81.7	82.2	82.7	84.0	84.9	82.8			130.5
315	76.7	77.2	78.2	79.4	78.6	79.2	80.1	80.5	82.0	81.9	83.5	85.5	83.4	81.3			130.6
400	75.4	76.3	75.2	75.5	75.4	75.9	76.7	78.1	79.2	79.9	81.3	80.5	79.9	78.8			128.0
500	72.9	72.5	73.4	73.0	72.4	72.3	72.9	74.3	75.5	77.1	79.2	79.7	80.3	75.6			125.6
630	76.2	76.9	76.5	76.8	77.3	77.5	77.6	78.1	79.1	80.1	79.6	81.1	81.2	78.4			128.4
800	75.3	75.6	78.6	76.6	77.4	76.7	75.8	77.4	77.9	82.6	81.7	81.7	80.5	79.7			128.9
1000	74.3	74.4	75.3	75.7	75.3	75.4	75.8	77.4	78.7	80.4	81.4	79.7	78.7	77.7			127.8
1250	74.8	75.8	75.7	75.2	75.5	75.7	76.0	77.9	78.9	81.6	82.3	81.2	79.1	78.6			128.6
1600	76.5	77.6	76.7	77.3	79.2	78.0	77.0	78.9	80.4	83.0	83.5	81.4	81.2	79.9			130.1
2000	82.9	83.7	82.4	80.5	82.0	79.1	79.4	80.5	82.8	83.6	86.4	84.9	82.7	82.1			132.9
2500	90.8	90.9	89.8	86.7	87.1	83.7	84.1	84.8	87.[illegible]	86.0	92.8	91.1	88.3	88.7			138.9
3150	78.2	80.7	78.7	78.2	78.2	76.1	78.7	81.3	83.0	85.3	86.3	83.1	80.2	78.8			132.1
4000	83.7	84.1	84.2	81.8	80.5	81.1	81.0	81.5	86.5	84.6	88.5	86.5	81.1	80.5			134.8
5000	88.8	88.5	90.4	84.8	86.7	85.1	83.9	85.6	89.8	90.0	93.8	88.4	87.2	85.1			139.2
6300	84.2	87.5	85.9	84.6	82.3	82.1	83.6	82.9	87.4	89.1	90.5	88.2	83.6	83.0			137.5
8000	84.6	86.0	86.6	82.5	81.9	82.8	82.2	83.6	86.2	87.0	.1	87.6	84.2	82.5			137.6
10000	84.6	86.0	86.1	83.3	82.0	81.2	81.9	82.1	84.9	88.0	.6	86.1	83.8	81.9			137.8
12500	84.1	84.2	84.7	81.9	80.3	80.0	79.0	80.6	83.3	85.0	87.0	83.6	82.1	80.5			137.0
16000	82.4	82.1	83.5	80.4	77.2	77.7	75.9	77.6	81.3	82.5	84.5	81.6	79.9	78.5			136.8
20000	79.6	79.7	80.6	77.8	75.3	74.1	72.3	73.8	78.1	79.1	80.1	78.4	76.9	76.1			136.2
OVERALL MEASURED	95.3	95.8	95.9	93.1	93.0	92.6	92.3	93.8	95.2	96.[illegible]	99.4	97.6	96.6	95.8			
OVERALL CALCULATED	96.2	96.8	96.9	94.1	94.0	93.1	93.2	94.2	96.5	98.1	100.7	98.4	96.9	96.0			148.0
PNDB	109.8	110.3	110.0	107.4	107.6	108.3	106.2	107.4	109.5	111.4	114.3	112.1	110.0	109.3			

Table A-16.
Variable Pitch Fan
65% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Δ Stagger = 1.4°
Nominal Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F, 70 PERCENT REL. HUM. DAY)

50	64.1	65.2	69.8	71.6	71.5	72.5	73.5	74.1	75.1	74.6	74.3	73.5	73.4	70.4
63	60.8	63.7	66.1	68.8	69.5	69.0	70.2	70.4	70.9	71.3	70.6	70.9	70.6	66.7
80	61.4	63.0	65.3	66.8	67.2	69.4	69.6	70.8	71.8	73.0	73.9	73.7	74.0	70.1
100	62.6	66.0	69.3	69.8	71.2	72.6	74.4	75.9	76.6	77.7	77.9	78.1	77.5	72.4
125	67.7	71.4	75.2	75.9	76.4	78.[illegible]	80.6	81.4	81.4	81.1	80.6	80.2	78.7	72.7
160	70.3	73.2	75.9	78.3	78.2	79.[illegible]	80.3	80.6	81.6	80.8	81.3	79.6	77.1	71.1
200	68.9	72.3	72.9	74.4	75.0	75.9	76.9	78.1	78.8	78.8	79.0	76.5	73.4	68.3
250	66.3	68.4	71.0	71.8	72.0	72.3	73.0	74.3	75.1	75.9	76.8	75.0	73.7	65.9
315	69.5	72.7	74.1	75.5	76.8	77.4	77.7	78.1	78.6	78.8	77.2	77.0	74.5	67.5
400	68.4	71.4	76.1	75.2	76.9	76.6	75.9	77.3	77.4	81.3	79.2	77.4	73.6	68.6
500	67.3	70.1	72.7	74.3	74.8	75.3	75.8	77.3	78.1	79.0	78.9	75.4	71.7	66.3
630	67.6	71.4	73.1	73.7	74.9	75.5	76.0	77.7	78.2	80.4	79.7	76.7	71.9	67.0
800	69.2	73.1	74.0	75.8	78.5	77.8	77.[illegible]	78.7	79.7	81.6	80.8	76.9	73.9	65.0
1000	75.4	79.0	79.6	79.0	81.3	78.9	79.3	80.2	82.2	82.0	83.6	80.3	75.3	70.0
1250	83.1	86.1	86.9	85.1	86.3	83.4	83.9	84.5	86.2	86.4	89.9	80.3	80.7	75.7
1600	70.3	75.7	75.7	76.5	77.4	75.8	78.6	81.0	82.2	83.6	83.3	78.2	72.3	65.9
2000	75.6	79.1	81.2	80.2	79.7	80.9	80.9	81.2	85.7	83.0	85.5	81.5	73.0	67.2
2500	80.5	83.3	87.2	83.1	85.8	84.7	83.7	85.2	85.0	88.3	90.7	83.2	78.9	71.4
3150	75.6	82.3	82.7	82.9	81.5	81.8	83.5	82.6	86.6	87.4	87.5	82.9	75.1	65.8
4000	75.7	80.6	83.4	80.8	81.3	82.7	82.2	83.5	85.5	85.4	87.9	82.3	75.4	67.5
5000	76.1	81.0	83.4	82.2	81.8	81.6	82.5	82.5	84.8	86.9	87.0	81.2	75.2	67.1
6300	75.2	79.2	82.3	81.1	80.6	80.8	80.0	81.5	83.6	84.2	84.6	78.6	73.3	64.6
8000	73.1	77.3	81.5	80.2	78.2	79.3	77.7	79.2	82.3	82.3	82.5	76.0	70.6	61.4
10000	69.7	74.9	79.0	78.3	77.1	76.7	75.1	76.3	79.9	79.6	78.[illegible]	73.[illegible]	66.9	56.5
OVERALL CALCULATED	88.1	91.9	94.1	92.7	93.4	93.0	93.2	94.1	95.9	96.7	97.9	93.5	89.0	83.2
PNDB	101.3	104.9	107.6	106.0	107.0	106.6	106.6	107.5	109.5	110.3	111.7	106.4	101.3	94.4

Table A-17.
Variable Pitch Fan
65% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Δ Stagger = 6.4°
Nominal Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F, 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	PWL
50	72.1	70.2	72.3	75.6	73.2	72.4	73.3	74.4	76.0	76.7	77.2	79.8	82.2	84.0	123.1
63	73.1	69.7	71.4	73.6	72.2	71.5	72.1	73.8	75.0	76.7	77.3	78.8	81.9	84.1	125.6
80	66.4	67.9	70.4	72.1	70.8	71.2	71.6	73.3	75.0	76.5	77.0	79.1	80.9	82.1	124.8
100	70.9	69.7	71.7	73.1	72.3	73.0	73.7	76.9	76.3	76.3	77.0	78.9	79.1	79.6	125.4
125	66.0	67.5	67.8	70.7	69.4	68.8	69.5	70.2	72.1	72.8	73.6	75.4	76.6	77.0	121.5
160	67.2	66.4	66.4	68.4	67.8	69.7	69.1	70.3	72.8	74.3	75.4	77.5	79.2	79.4	122.6
200	69.5	70.3	71.0	70.7	70.8	72.3	73.7	76.5	78.3	79.0	80.0	81.5	82.8	82.4	127.0
250	72.8	74.9	76.1	76.4	76.2	77.5	77.8	79.8	81.3	81.6	82.7	83.8	83.8	83.5	127.8
315	76.3	77.1	76.8	79.2	78.5	78.7	79.2	80.3	81.6	81.8	82.5	83.0	82.9	81.2	130.1
400	76.1	76.0	73.6	74.9	74.5	75.5	75.4	77.4	79.0	79.	79.4	80.1	79.7	78.9	127.3
500	71.2	71.7	71.4	72.3	71.5	72.0	72.4	74.1	75.3	76.2	76.4	79.1	79.5	77.0	125.0
630	74.3	75.1	74.8	75.2	75.4	76.9	76.6	77.3	79.6	79.3	79.5	80.8	80.4	78.3	127.7
800	73.4	74.4	74.1	75.6	77.0	78.6	78.4	78.9	79.4	81.6	79.9	82.2	79.7	78.6	128.4
1000	72.4	72.9	73.2	74.4	74.8	75.0	75.7	78.9	77.8	79.1	80.4	79.1	78.1	76.3	126.9
1250	74.6	76.8	74.8	75.6	75.3	74.9	75.0	76.8	77.7	80.3	81.1	79.8	78.5	77.2	127.6
1600	73.7	75.8	76.8	75.1	77.1	75.8	76.3	77.6	78.8	81.5	81.6	79.8	78.5	77.4	128.4
2000	78.1	82.2	78.1	79.9	80.5	77.1	77.1	78.1	81.1	81.9	82.1	81.1	78.8	77.2	130.2
2500	89.6	93.1	91.6	89.0	87.2	83.9	82.6	84.0	85.8	87.4	90.5	89.7	87.7	85.6	138.8
3150	76.9	80.1	77.4	77.6	70.5	75.0	77.4	80.2	81.7	84.1	85.2	81.2	78.9	77.5	130.9
4000	80.2	82.1	81.1	80.0	77.7	79.4	79.3	80.2	84.9	83.4	86.4	83.6	78.9	79.1	132.8
5000	86.8	88.7	89.1	83.9	88.0	85.5	81.7	85.1	85.0	89.2	91.2	86.5	86.1	83.0	138.0
6300	82.8	84.3	82.3	82.5	79.9	80.4	80.8	81.2	85.2	87.4	88.7	85.8	80.6	80.4	135.3
8000	83.8	86.8	85.3	83.5	82.2	83.1	81.6	83.2	85.7	86.6	90.1	85.9	82.6	81.2	137.0
10000	82.1	85.9	83.6	82.3	80.0	80.4	80.4	81.0	84.2	86.7	87.1	84.7	81.0	79.5	136.2
12500	81.2	82.7	82.2	80.7	77.1	78.7	77.3	79.3	82.3	83.5	85.3	82.3	79.2	77.1	135.2
16000	79.7	80.7	79.7	78.7	73.1	76.3	74.3	76.3	79.0	81.6	82.5	80.3	76.7	75.7	134.7
20000	76.6	77.1	76.2	75.1	68.9	71.8	70.1	72.2	75.7	77.3	77.8	76.1	73.2	72.9	133.4
OVERALL MEASURED	93.7	96.0	95.1	94.4	93.0	92.5	91.2	92.8	95.0	96.5	97.9	96.5	96.4	94.7	
OVERALL CALCULATED	94.4	97.0	95.9	94.1	93.5	92.6	91.8	93.4	95.5	97.2	98.9	97.0	95.7	94.8	146.8
PNDB	108.3	111.1	109.8	108.2	107.5	106.2	104.8	106.7	108.4	110.5	112.2	110.6	108.9	107.4	

Table A-18.
Variable Pitch Fan
65% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Δ Stagger = 6.4°
Nominal Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F, 70 PERCENT REL. HUM. DAY)

50	65.2	66.2	69.8	72.3	72.1	73.2	74.0	77.2	78.1	75.4	75.0	75.4	73.3	70.3
63	60.1	63.9	65.8	69.8	69.2	69.0	69.8	70.4	71.9	71.9	71.6	71.0	70.8	67.6
80	61.2	62.8	64.4	67.4	67.5	69.9	69.4	70.5	72.6	73.3	73.4	73.9	73.2	69.7
100	63.4	66.6	68.9	69.7	70.5	72.5	74.0	76.7	78.0	78.0	77.9	77.6	76.7	72.6
125	66.6	71.0	73.9	75.4	75.9	77.6	78.0	79.9	81.0	80.5	80.5	80.0	77.6	73.5
160	69.9	73.2	74.5	78.0	76.2	78.8	79.4	80.4	81.2	80.7	80.2	79.1	76.5	71.0
200	69.7	72.0	71.3	73.7	74.1	75.5	75.5	77.5	78.6	78.5	77.1	76.1	73.3	68.4
250	64.6	67.7	69.0	71.1	71.1	72.0	72.5	74.1	74.8	75.0	76.0	75.0	72.9	66.3
315	67.6	70.9	72.4	74.0	74.9	76.6	76.9	77.3	79.1	78.0	77.1	76.7	73.7	67.4
400	66.5	70.1	71.6	74.3	76.5	78.5	76.5	76.8	78.9	80.3	77.4	77.9	72.9	67.5
500	65.4	65.6	70.6	73.1	74.2	74.9	75.7	76.8	77.2	77.7	77.6	74.7	71.1	64.9
630	67.4	72.4	72.2	74.1	74.7	74.7	75.0	76.7	77.1	78.9	78.4	75.4	71.4	65.6
800	66.4	71.2	74.1	73.6	76.5	75.6	76.2	77.4	78.1	80.1	76.9	75.3	71.2	65.5
1000	70.6	77.5	75.3	78.4	79.9	76.9	77.0	77.9	80.4	80.1	79.3	76.4	71.3	65.0
1250	81.9	88.3	88.7	87.4	86.4	83.6	82.5	83.7	85.0	85.8	87.6	84.9	80.0	73.1
1600	69.0	75.1	74.4	76.1	75.7	74.7	77.3	79.9	80.9	82.5	82.2	76.2	71.0	64.6
2000	72.2	77.1	78.0	78.4	76.9	79.1	79.2	79.9	84.1	81.7	83.4	78.6	70.8	65.8
2500	78.5	83.5	86.0	82.1	87.1	85.2	81.5	84.7	84.2	87.5	88.1	81.3	77.8	69.3
3150	74.3	79.1	79.2	80.8	79.1	80.1	80.7	81.0	84.4	85.7	85.5	80.4	72.1	66.2
4000	74.9	81.5	82.1	81.8	81.5	82.9	81.6	83.0	85.0	85.0	87.0	80.5	73.8	66.3
5000	73.6	80.9	80.9	81.2	79.8	80.8	81.0	81.4	84.1	85.6	84.5	79.6	72.5	64.6
6300	72.3	77.7	79.7	79.9	77.4	79.6	78.3	80.1	82.6	82.7	82.8	77.3	70.3	61.2
8000	70.4	75.9	77.7	78.5	74.1	78.0	76.1	77.9	80.0	81.4	80.4	75.5	67.4	58.3
10000	66.7	72.4	74.6	75.6	70.7	74.4	72.9	74.7	77.5	77.8	76.2	71.3	63.2	53.3
OVERALL CALCULATED	86.4	92.1	93.0	92.5	92.8	92.5	91.8	93.2	94.9	95.7	95.9	92.1	87.8	82.1
PNDB	99.3	104.5	106.1	105.2	106.7	106.3	105.0	106.7	108.3	109.3	109.6	104.6	99.8	92.5

Table A-19.
Variable Pitch Fan
75% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Nominal Stagger (-1.6°)
Nominal Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F. 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	( )	( )	( )	PWL
50	71.9	70.2	71.4	72.2	72.7	73.8	73.7	75.4	76.1	76.8	77.7	80.4	83.8	86.9				127.1
63	69.1	69.8	71.3	71.6	71.7	72.9	73.3	74.5	75.2	76.5	77.8	80.3	83.8	86.5				126.8
80	68.3	69.0	71.2	71.0	71.9	73.2	73.8	74.9	75.4	76.9	78.3	80.2	83.4	84.9				126.5
100	70.2	70.5	72.4	75.2	74.6	75.8	77.5	78.0	76.9	77.2	77.5	78.8	81.1	82.2				126.6
125	67.8	69.3	70.0	70.8	70.7	71.2	71.0	72.0	72.5	73.7	75.6	76.6	78.8	79.5				123.2
160	68.7	68.3	68.5	68.8	69.4	70.9	71.2	72.1	74.2	75.9	78.1	80.0	81.9	82.7				125.2
200	71.1	71.9	72.5	72.4	74.0	75.0	76.1	78.2	80.2	80.5	82.7	84.6	85.8	85.9				129.6
250	75.1	77.1	79.0	79.3	80.1	80.9	82.0	84.2	83.8	84.5	85.9	86.4	87.3	86.4				133.0
315	78.7	79.2	80.5	81.5	81.4	81.8	82.0	83.7	83.9	84.5	85.1	85.4	86.3	84.4				132.9
400	78.8	79.1	78.8	78.4	77.8	78.3	79.2	82.1	82.6	84.4	83.1	82.7	82.7	82.5				131.0
500	75.7	76.2	75.7	75.2	74.8	75.1	75.4	76.8	78.0	79.8	81.4	82.7	82.4	81.2				128.3
630	78.7	79.8	79.2	79.3	79.1	79.9	79.7	80.4	81.2	82.0	82.6	83.6	83.3	81.6				130.8
800	80.6	80.4	80.3	79.8	80.3	81.7	80.6	81.2	83.5	82.8	83.5	82.8	82.6	82.4				131.8
1000	77.2	77.5	79.3	78.9	79.3	79.0	80.0	81.3	81.8	83.8	84.5	82.8	81.6	81.5				131.2
1250	76.4	79.0	79.0	78.3	79.0	78.7	79.8	81.5	82.1	85.4	86.1	84.2	82.3	81.4				132.0
1600	77.9	80.0	79.7	79.0	81.5	80.8	81.0	81.9	85.2	86.6	86.9	84.4	82.3	80.9				133.0
2000	79.8	82.6	81.5	80.3	82.2	80.9	81.3	82.5	84.8	86.0	87.9	85.4	82.3	81.1				133.8
2500	89.2	91.2	88.7	86.1	86.3	84.6	84.2	85.6	88.4	89.4	93.2	89.3	87.2	86.3				138.8
3150	81.0	84.5	81.5	81.5	81.7	79.4	81.5	84.2	85.5	87.9	89.5	84.9	83.3	81.8				135.0
4000	84.7	86.5	86.3	84.5	82.7	83.6	84.0	84.2	88.9	86.9	91.0	88.4	82.8	83.6				137.1
5000	90.3	90.6	91.3	85.1	89.8	86.5	85.5	88.0	87.8	92.3	96.6	88.7	88.9	86.9				141.2
6300	86.9	89.6	88.2	86.9	84.9	84.1	85.7	86.2	90.1	92.4	93.5	89.6	85.2	85.8				140.1
8000	88.9	90.2	89.9	86.2	85.4	85.6	85.2	86.9	88.9	89.6	93.2	89.3	86.7	86.3				140.5
10000	87.5	89.9	89.7	86.3	85.2	84.1	84.5	85.5	87.7	90.5	92.0	87.9	87.0	85.6				140.7
12500	87.6	88.6	88.2	85.6	83.2	82.7	81.6	83.8	85.8	87.8	89.6	85.5	85.3	83.6				140.0
16000	86.5	86.5	86.3	83.3	81.5	81.2	79.1	81.0	83.7	86.2	87.4	84.4	83.1	82.6				140.1
20000	83.0	84.7	83.4	80.7	78.9	77.9	75.1	78.2	80.9	82.7	83.3	81.6	80.5	80.3				139.7
OVERALL MEASURED	97.7	98.5	98.2	96.2	96.0	95.1	95.5	96.2	97.7	99.7	102.0	99.1	99.1	98.8				
OVERALL CALCULATED	97.8	99.3	98.8	96.2	96.3	95.4	95.5	97.0	98.9	100.7	103.1	99.7	98.7	98.4				150.5
PNDB	110.4	111.7	111.5	108.4	110.0	108.4	108.3	110.1	111.9	113.8	116.8	112.3	111.3	110.3				

Table A-20.
Variable Pitch Fan
75% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
(Nominal Stagger (-1.6°)
Nominal Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F, 70 PERCENT REL. HUM, DAY)

50	64.5	67.0	70.5	74.4	74.5	76.1	77.8	78.3	76.8	76.4	75.5	75.3	75.3	72.9
63	62.0	65.8	68.0	69.9	70.5	71.4	71.4	72.2	72.3	72.8	73.6	73.1	73.0	70.0
80	62.8	64.6	66.4	67.8	69.2	71.1	71.6	72.3	74.0	75.0	76.0	76.3	75.9	73.0
100	65.8	68.1	70.8	71.4	73.7	75.2	76.4	78.4	80.0	79.5	80.6	80.9	79.7	76.0
125	68.9	73.3	76.8	78.2	79.8	81.0	82.3	84.3	83.4	83.4	83.8	82.6	81.0	76.3
160	72.3	75.3	78.2	80.4	81.1	81.9	82.2	83.8	83.6	83.4	82.9	81.5	79.9	74.1
200	72.4	75.1	76.5	77.2	77.4	78.4	79.3	82.2	82.2	83.2	80.7	78.7	76.2	72.0
250	69.1	72.1	73.3	74.0	74.4	75.1	75.6	76.8	77.6	78.6	79.1	78.6	75.8	70.5
315	72.8	75.6	76.8	78.0	78.6	79.9	79.8	80.4	80.7	80.7	80.2	79.5	76.6	70.7
400	73.8	76.1	77.8	78.5	79.7	81.6	80.7	81.2	83.0	81.5	81.0	78.5	75.7	71.3
500	70.2	73.1	76.8	77.5	78.7	78.8	80.8	81.2	81.3	82.5	81.9	78.4	74.6	70.1
630	69.3	74.6	76.4	76.9	78.4	78.6	79.8	81.3	81.5	84.0	83.5	79.7	75.2	69.8
800	70.6	75.4	77.0	77.6	80.8	80.6	81.0	81.7	82.4	85.2	84.2	79.9	75.0	69.0
1000	72.3	77.9	78.7	78.8	81.5	80.7	81.2	82.3	84.1	84.4	85.2	80.7	74.8	69.0
1250	81.5	86.4	85.8	84.6	85.6	84.3	84.0	85.4	87.7	87.8	90.3	84.5	79.5	73.8
1600	73.1	79.6	78.5	79.8	80.9	79.1	81.4	83.9	84.7	86.3	86.5	80.0	75.4	68.9
2000	76.6	81.5	83.2	82.8	81.9	83.3	83.9	84.0	88.1	85.3	88.0	83.3	74.7	70.3
2500	82.8	85.4	88.2	83.3	85.9	86.1	85.3	87.7	87.0	90.5	93.5	83.5	80.6	73.2
3150	78.4	84.4	85.0	85.2	84.1	83.8	85.6	85.9	89.3	90.7	90.4	84.3	76.7	71.6
4000	80.1	84.8	86.8	84.5	84.7	85.4	85.3	86.7	88.2	88.0	90.1	84.0	77.9	71.4
5000	78.9	85.0	87.1	85.1	85.8	84.5	85.1	85.9	87.6	89.4	89.4	83.0	78.5	70.7
6300	78.7	83.6	85.8	84.8	83.5	83.6	82.6	84.6	84.1	87.0	87.1	80.5	76.4	67.7
8000	77.2	81.7	84.3	83.1	82.5	82.8	80.9	82.6	84.7	86.0	85.4	79.6	73.8	65.2
10000	73.8	79.9	81.9	81.2	80.7	80.4	77.9	80.7	82.7	83.2	81.8	76.8	70.5	60.7
OVERALL CALCULATED	89.6	94.4	96.8	94.8	95.8	95.4	95.6	97.0	98.4	99.3	100.2	94.6	93.9	85.6
PNDB	103.2	107.7	109.6	108.3	109.8	108.8	109.8	110.3	112.2	113.2	114.3	108.9	103.4	96.8

Table A-21.
Variable Pitch Fan
75% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Δ Stagger = 1.4°
Nominal Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F, 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	( )	( )	PWL
50	72.8	70.6	71.8	73.6	73.7	74.1	73.9	75.7	77.5	77.2	79.8	81.8	84.1	87.5			127.9
63	73.7	71.8	70.9	73.0	73.3	73.7	74.2	75.5	76.7	76.9	78.8	81.6	84.6	87.6			127.8
80	69.1	70.2	71.4	71.9	72.2	73.7	73.9	75.3	76.2	77.3	78.8	80.8	83.3	84.8			126.7
100	71.9	71.4	73.5	74.7	73.6	75.2	76.3	78.1	79.7	77.5	78.6	80.4	81.2	82.2			127.1
125	68.5	69.7	70.8	71.6	70.8	71.3	71.2	71.8	73.4	74.6	75.6	77.6	79.1	79.4			123.5
160	68.9	68.2	68.7	69.1	69.7	71.4	71.1	72.7	75.0	76.5	78.6	80.7	82.9	83.1			125.8
200	71.6	72.0	72.8	73.1	73.3	75.2	77.0	78.7	80.5	82.0	83.2	85.0	86.5	88.5			130.1
250	74.5	76.6	78.5	80.5	79.8	79.9	81.9	83.0	83.5	84.6	85.8	87.1	87.3	85.8			132.8
315	78.4	79.3	79.9	82.8	81.3	81.2	82.4	83.0	84.0	84.3	84.8	86.1	85.8	84.1			132.9
400	76.8	79.3	77.0	78.4	78.4	78.0	78.3	81.4	84.2	83.9	82.4	83.7	83.0	81.6			131.0
500	74.9	74.9	74.4	75.4	74.2	74.9	75.7	77.4	79.4	79.9	81.3	82.7	82.2	80.4			128.3
630	77.8	78.0	77.3	78.5	79.3	79.7	80.2	80.5	81.8	82.2	81.7	83.1	82.6	81.3			130.5
800	76.2	76.7	76.4	78.3	77.2	82.8	78.3	78.4	81.2	[illegible]	82.6	83.1	81.4	81.6			130.8
1000	75.2	75.7	75.9	77.5	77.5	77.8	78.2	78.4	80.7	82.4	83.1	81.9	80.2	79.9			129.7
1250	75.8	79.2	76.8	77.5	77.4	77.1	77.8	80.0	81.1	83.3	84.3	82.6	80.8	79.8			130.3
1600	75.5	78.5	77.8	78.2	80.0	78.4	78.3	80.0	81.6	84.2	83.8	82.6	80.6	79.8			130.8
2000	80.2	83.0	80.7	80.8	81.7	79.4	79.2	81.6	83.5	84.2	86.2	83.6	81.6	80.0			132.6
2500	81.2	84.3	83.6	80.9	89.9	86.0	85.1	86.5	89.0	89.7	93.6	92.3	89.5	88.4			141.1
3150	80.0	82.3	79.5	79.2	78.8	77.4	80.0	82.6	84.6	86.8	87.1	83.7	81.9	80.4			133.3
4000	82.9	84.0	82.7	82.5	79.7	82.0	81.9	83.1	87.9	86.1	89.3	86.9	81.9	81.4			135.4
5000	90.3	87.6	90.3	84.7	88.4	86.8	85.1	87.9	87.5	92.0	95.2	88.9	89.1	86.2			140.5
6300	84.2	87.3	84.7	84.8	81.8	83.0	84.2	84.6	88.4	90.7	91.0	88.8	84.6	83.1			138.2
8000	87.4	88.7	86.9	84.8	83.3	85.2	84.4	86.0	88.6	89.3	91.7	89.0	85.3	84.5			139.3
10000	86.8	88.2	86.3	84.8	81.3	83.3	83.7	83.6	86.9	89.8	89.8	86.6	84.8	83.0			138.9
12500	85.1	85.6	85.0	83.6	79.3	82.1	80.8	82.9	85.2	86.8	87.8	83.9	82.7	80.8			138.1
16000	83.2	83.7	83.2	81.8	75.6	80.3	78.2	79.1	82.9	84.9	84.9	82.4	80.6	79.4			137.9
20000	79.9	88.7	79.9	78.5	71.5	76.3	74.3	75.6	79.9	81.1	80.1	78.9	77.7	76.3			136.9
OVERALL MEASURED	97.6	98.0	97.1	95.8	94.8	94.9	94.1	95.6	98.0	98.7	100.8	98.9	98.3	98.0			
OVERALL CALCULATED	97.8	98.8	97.9	96.1	95.3	95.0	94.7	96.2	98.4	100.0	101.7	99.6	98.5	97.9			149.4
PNDB	111.5	112.7	111.8	110.1	109.4	108.1	107.5	109.5	111.3	113.3	115.4	113.3	111.3	110.3			

Table A-22.
Variable Pitch Fan
75% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Δ Stagger = 1.4°
Nominal Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F, 70 PERCENT REL. HUM. DAY)

50	66.2	67.9	71.5	73.0	73.4	73.4	76.7	78.4	79.5	76.7	76.7	76.9	75.4	72.9
63	62.6	66.2	68.0	70.7	70.6	71.5	71.6	72.1	73.2	73.7	73.6	74.1	73.3	69.9
80	63.0	64.5	66.6	68.2	69.5	71.6	71.4	72.9	74.7	75.6	76.5	77.0	77.0	73.4
100	64.9	68.3	70.6	72.0	73.0	75.4	77.3	78.9	80.2	81.0	81.1	81.3	80.4	75.6
125	68.3	72.8	76.3	79.4	79.5	80.0	82.2	83.1	83.2	83.6	83.6	83.3	81.0	75.7
160	72.1	75.4	77.7	81.7	80.9	81.2	82.6	83.1	83.6	83.2	82.6	82.2	79.4	73.8
200	72.3	75.3	74.6	77.2	78.0	78.1	78.5	81.4	83.8	82.8	80.1	79.7	76.5	71.2
250	68.3	70.9	72.1	74.2	73.8	74.9	75.8	77.4	79.0	78.7	79.0	78.6	75.6	69.7
315	70.3	73.8	74.9	77.2	78.8	79.7	80.3	80.5	81.4	81.0	79.3	78.9	75.9	70.4
400	69.3	72.4	73.9	77.0	76.7	82.7	79.4	79.4	80.7	82.8	80.1	78.9	74.6	70.8
500	68.2	71.3	73.3	76.2	77.0	77.7	78.2	79.3	80.1	81.0	80.6	77.6	73.2	68.5
630	68.7	74.7	74.2	76.1	76.8	76.9	77.8	79.9	80.5	81.8	81.6	78.1	73.7	68.2
800	68.2	74.0	75.1	76.7	79.3	78.2	78.2	79.9	80.9	82.8	81.8	78.0	73.2	67.9
1000	72.7	78.3	77.9	79.2	81.0	79.2	79.1	80.4	82.8	82.7	83.5	78.9	74.1	67.8
1250	85.5	89.5	90.7	89.3	89.1	85.7	85.0	86.2	88.2	88.1	90.8	87.5	81.8	75.9
1600	72.1	77.4	76.6	77.5	78.0	77.1	79.9	82.3	83.9	85.2	84.1	78.7	74.0	67.5
2000	74.9	79.0	79.7	80.9	78.9	81.7	81.7	82.8	87.1	84.4	86.3	81.8	73.8	68.1
2500	82.8	84.4	87.2	82.9	87.5	86.4	84.9	87.6	86.7	90.3	92.0	83.7	80.8	72.5
3150	77.7	82.0	81.5	83.1	81.0	82.8	84.1	84.3	87.6	89.0	87.9	83.5	76.1	68.9
4000	78.6	83.3	83.8	83.1	82.6	85.1	84.5	85.9	87.9	87.7	88.6	83.6	76.5	69.6
5000	77.4	83.3	83.6	83.7	81.2	83.7	84.3	84.1	86.7	88.7	87.2	81.6	76.2	68.2
6300	76.2	80.6	82.6	82.8	79.6	82.9	81.8	83.7	85.4	85.8	85.4	78.9	73.8	64.9
8000	74.0	78.9	81.2	81.6	76.5	81.9	80.1	80.7	83.8	84.7	82.8	77.6	71.4	62.0
10000	70.0	75.9	78.4	79.0	73.3	78.8	77.1	78.2	81.7	81.6	78.5	74.1	67.7	56.7
OVERALL CALCULATED	89.7	93.8	95.1	94.7	94.6	95.0	94.8	96.1	97.8	98.5	98.8	94.8	90.6	85.0
PNDB	102.6	106.2	108.8	107.1	108.0	108.4	108.0	109.6	111.3	112.2	112.7	107.4	102.9	95.7

Table A-23.
Variable Pitch Fan
75% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Δ Stagger = 6.4°
Nominal Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F, 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	( )	( )	( )	PWL
50	72.8	71.8	73.5	74.0	74.5	74.1	74.5	77.5	77.0	78.0	78.6	81.3	84.6	90.8				129.1
63	74.4	72.4	72.3	73.5	73.7	74.0	74.2	76.5	76.2	77.0	77.9	81.1	84.8	90.6				128.9
80	68.9	70.7	71.8	72.3	73.0	73.5	74.1	76.3	76.0	77.0	78.6	80.3	83.5	87.6				127.4
100	74.1	73.3	75.1	78.2	76.0	75.5	74.7	76.1	78.3	78.3	78.3	81.6	81.7	86.9				128.1
125	69.0	78.3	70.4	71.7	70.8	71.8	71.2	72.4	73.6	74.5	75.6	77.9	80.0	86.7				125.4
160	68.9	68.7	68.6	69.9	69.5	71.4	70.9	73.1	74.5	76.7	78.5	80.9	83.0	86.6				126.6
200	73.7	74.8	76.7	78.1	75.9	79.4	78.1	80.5	81.5	82.7	84.6	86.4	87.8	88.5				131.8
250	74.6	77.1	77.2	78.7	78.3	79.5	80.1	81.8	83.3	84.1	85.0	86.8	87.3	87.1				132.4
315	78.9	80.1	80.3	81.9	82.0	82.2	80.8	82.1	83.7	84.5	84.7	85.6	85.9	85.6				132.8
400	78.8	80.1	76.8	78.5	77.0	78.6	78.2	79.7	81.6	81.6	81.3	82.5	81.8	83.7				130.0
500	74.4	75.1	75.2	76.5	74.3	75.2	75.6	77.7	79.6	80.9	81.8	82.9	82.4	82.1				128.7
630	78.9	79.0	80.0	83.1	79.2	79.4	80.9	84.1	84.7	85.0	84.0	85.6	84.1	82.8				132.7
800	74.6	75.6	75.3	77.2	79.4	78.6	78.5	78.7	80.9	81.2	81.8	81.9	81.0	81.2				129.7
1000	74.8	75.4	75.8	78.0	77.5	78.1	78.8	79.4	80.8	81.9	82.8	82.4	80.4	79.7				129.7
1250	77.9	81.5	78.6	78.4	79.3	79.0	78.4	80.1	81.3	83.8	83.7	82.8	81.3	81.0				131.0
1600	74.8	77.3	76.3	77.2	78.8	77.9	78.0	79.6	81.0	84.2	84.2	81.9	80.4	78.8				130.5
2000	77.1	78.6	77.3	77.9	79.0	78.5	78.3	80.6	82.5	83.3	84.8	82.8	80.1	79.1				131.1
2500	[illegible]	95.3	90.9	90.5	88.7	87.3	84.8	86.2	87.9	90.0	94.1	90.2	88.0	87.2				140.7
3150	82.5	85.5	81.4	82.0	80.9	79.6	81.0	83.5	84.5	87.4	88.6	84.4	82.8	81.7				134.6
4000	83.5	84.0	83.1	83.5	79.4	82.1	81.8	82.9	88.1	85.9	89.1	86.4	81.5	82.0				135.5
5000	87.8	88.0	89.2	85.4	88.7	85.9	83.3	87.6	87.5	[illegible]	94.2	87.8	87.3	84.3				139.8
6300	85.5	86.5	84.9	85.5	83.4	83.1	84.0	84.2	86.3	90.9	91.3	87.7	83.8	83.0				138.2
8000	87.0	87.0	88.3	86.0	84.6	85.3	84.0	86.1	88.1	89.6	92.3	88.2	85.7	83.7				139.4
10000	85.1	87.1	85.3	84.3	82.0	83.4	82.9	83.2	86.9	89.4	89.9	86.5	83.8	83.2				138.6
12500	83.6	84.8	83.5	82.6	79.0	81.4	80.6	82.0	85.0	86.5	88.0	83.8	82.1	80.3				137.7
16000	82.8	82.4	81.8	80.6	75.4	79.2	77.3	78.8	82.0	84.7	85.5	82.1	79.9	79.0				137.4
20000	79.4	79.5	77.8	77.4	71.4	75.5	73.3	75.7	78.5	80.5	80.7	78.6	76.5	76.3				136.2
OVERALL MEASURED	96.1	97.6	96.3	96.1	94.8	94.4	94.2	95.8	97.8	98.9	100.8	98.5	99.1	101.0				
OVERALL CALCULATED	96.7	98.7	96.9	96.3	95.4	95.1	94.3	96.1	98.1	100.1	101.7	99.1	98.8	99.5				149.2
PNDB	110.5	113.1	110.4	110.3	109.1	108.5	107.2	109.4	111.2	113.5	115.1	112.3	110.6	110.4				

Table A-24.
Variable Pitch Fan
75% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Δ Stagger = 6.4°
Nominal Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F. 70 PERCENT REL. HUM. DAY)

50	68.4	69.8	73.2	77.3	75.8	75.7	75.1	76.3	78.1	77.4	76.3	78.2	76.0	77.6
63	63.1	66.7	68.4	70.8	70.6	72.0	71.6	72.6	73.4	73.6	73.6	74.3	74.2	77.2
80	62.9	65.0	66.6	68.9	69.3	71.6	71.2	73.2	74.3	75.6	76.5	77.2	77.0	77.0
100	67.6	71.0	74.5	77.1	75.6	79.6	78.4	80.6	81.2	81.7	82.5	82.7	81.7	78.7
125	68.3	73.3	75.1	77.6	78.0	79.6	80.4	81.9	83.0	83.0	82.8	83.0	81.1	77.0
160	72.6	[illegible]	78.1	80.8	81.6	82.2	81.0	82.2	83.4	83.4	82.5	81.7	79.5	75.3
200	72.3	76.1	74.5	77.4	76.6	78.6	78.4	79.8	81.2	80.5	79.0	78.5	75.3	73.2
250	67.8	71.1	72.9	75.3	73.8	75.2	75.8	77.7	79.2	79.7	79.4	78.8	75.9	71.5
315	72.1	74.8	77.6	81.9	78.8	79.4	81.0	84.0	84.2	83.8	81.6	81.4	77.4	71.9
400	67.8	71.4	72.8	75.9	78.9	79.5	78.6	79.6	80.4	79.8	79.3	77.6	74.1	70.1
500	67.6	71.1	73.2	76.6	76.9	78.0	78.8	79.3	80.3	80.6	80.3	78.1	73.4	68.3
630	70.7	77.0	75.9	77.0	78.7	78.8	78.4	80.0	80.7	82.4	81.1	78.4	74.2	69.4
800	67.5	72.8	73.6	75.7	78.1	77.8	78.0	79.4	80.4	82.8	81.5	77.4	73.0	66.9
1000	69.6	73.9	74.5	76.4	78.4	78.3	78.2	80.4	81.8	81.8	82.0	78.2	72.6	66.9
1250	83.9	90.5	88.0	88.9	88.0	87.0	84.7	85.9	87.2	89.1	91.3	85.5	80.3	74.7
1600	74.6	80.6	78.5	80.3	80.2	79.3	80.8	83.1	83.7	85.7	85.6	79.5	74.9	68.8
2000	75.4	79.0	80.1	81.9	78.6	81.8	81.6	82.6	87.3	84.2	86.1	81.4	73.4	68.7
2500	79.5	82.8	86.1	83.6	87.9	85.6	81.2	87.2	86.6	90.7	91.0	82.6	79.0	70.6
3150	77.0	81.3	81.7	83.8	82.6	82.9	[illegible]	83.9	87.5	89.2	88.2	82.4	75.2	68.8
4000	78.2	81.6	85.2	84.3	83.9	85.2	84.0	86.0	87.5	88.0	89.2	82.8	76.9	68.8
5000	76.5	82.1	82.6	83.2	81.8	83.8	83.5	83.6	86.7	88.3	87.3	81.5	75.3	67.4
6300	74.7	79.9	81.0	81.8	79.3	82.2	81.7	82.8	85.3	85.6	85.5	78.8	73.2	64.4
8000	73.3	77.6	79.7	80.4	76.4	80.8	79.1	80.4	83.0	84.5	83.4	77.2	70.6	61.6
10000	69.4	74.7	76.3	77.9	73.2	78.0	76.1	78.2	80.3	81.0	79.1	73.8	66.5	56.7
OVERALL CALCULATED	88.7	93.9	94.0	94.9	94.7	95.0	94.5	96.0	97.6	98.7	98.8	94.3	90.5	86.9
PNDB	101.3	105.4	107.3	107.7	108.4	108.3	107.6	109.4	111.0	112.4	112.4	106.9	102.0	95.4

Table A-25.
Variable Pitch Fan
100% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Nominal Stagger (-1.6°)
Nominal Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	( )	( )	( )	PWL
50	74.6	72.6	74.4	75.7	76.3	77.4	77.4	79.5	79.9	81.1	82.1	85.2	89.2	92.0				131.8
63	72.6	73.3	74.9	75.6	75.5	76.8	77.0	78.9	79.4	81.1	81.9	85.9	89.6	92.5				132.0
80	72.6	72.7	75.7	75.3	76.0	77.2	77.7	78.6	79.6	81.2	83.0	85.0	88.9	90.8				131.4
100	74.5	73.2	76.2	77.7	79.3	78.5	77.7	81.1	80.8	80.5	83.3	84.7	87.3	88.6				131.1
125	72.8	73.0	74.3	74.6	75.2	75.3	75.0	76.4	77.3	78.8	80.8	82.6	85.2	85.2				128.4
160	72.5	71.7	72.8	72.8	73.5	75.7	75.3	76.9	78.8	81.0	83.3	85.0	88.3	88.4				130.5
200	79.2	77.3	79.8	77.1	78.3	80.2	81.0	84.7	87.4	88.0	88.5	90.7	92.2	91.5				135.9
250	79.8	81.0	82.5	82.0	82.2	83.8	84.3	86.2	87.2	88.5	90.2	92.1	93.2	92.0				137.2
315	86.7	85.7	54.7	86.8	87.9	84.4	88.5	87.2	89.2	90.7	90.4	91.1	92.2	90.4				138.4
400	83.9	82.8	82.9	82.5	83.1	82.6	82.9	84.4	86.5	86.5	87.0	87.6	88.4	87.1				134.9
500	79.3	78.8	79.3	79.4	79.3	79.8	80.3	82.6	83.3	84.3	87.2	88.2	87.8	85.8				133.3
630	80.3	81.0	81.0	81.8	82.5	82.9	83.7	85.5	85.7	86.6	87.1	88.6	88.0	6.3				134.9
800	79.9	79.8	80.1	81.1	82.3	82.5	83.1	83.1	85.0	86.0	87.4	87.0	86.9	5.4				134.1
1000	79.4	79.0	81.1	81.6	81.8	82.3	83.9	85.1	85.0	86.9	88.3	86.8	86.1	4.6				134.6
1250	79.0	82.0	81.5	81.0	82.0	82.0	83.0	84.5	84.7	87.8	88.5	86.7	85.3	84.1				134.7
1600	78.6	81.1	81.0	80.8	83.2	82.4	83.0	84.2	84.7	88.0	87.9	85.7	84.5	83.2				134.5
2000	80.1	81.5	81.8	81.3	83.5	83.0	83.3	84.8	87.0	87.4	89.8	85.7	84.5	83.0				135.3
2500	90.9	94.4	93.7	93.8	93.2	90.2	88.9	90.1	89.4	92.2	96.1	90.4	89.7	89.2				142.6
3150	88.2	91.4	91.0	91.0	90.7	87.5	87.4	89.2	89.7	92.7	93.9	88.4	88.2	87.5				140.9
4000	85.5	87.0	87.5	85.3	84.4	86.9	86.7	88.0	92.9	90.2	92.7	89.1	85.5	85.8				139.6
5000	90.1	89.6	90.9	86.8	89.5	88.8	58.1	91.5	91.1	95.6	97.7	89.0	90.6	87.3				142.7
6300	88.5	91.7	91.0	89.5	89.2	88.9	39.2	90.0	92.6	94.9	95.4	90.1	88.5	87.2				142.7
8000	89.2	89.9	91.7	88.0	88.1	88.9	88.9	91.1	92.4	93.9	96.9	90.3	89.5	87.7				143.3
10000	88.0	90.0	89.8	87.0	86.8	88.0	88.7	90.7	91.7	93.9	94.9	88.9	88.3	86.6				143.2
12500	87.6	88.1	88.6	86.4	85.4	86.8	86.3	89.3	90.6	91.8	93.8	87.5	86.8	84.9				143.0
16000	35.8	86.2	86.5	84.6	82.8	84.8	82.7	84.8	88.3	89.5	91.0	86.0	84.8	83.3				142.5
20000	82.7	84.5	84.0	81.6	80.3	81.2	79.5	82.0	84.7	86.4	86.9	82.9	81.5	80.8				141.8
OVERALL MEASURED	99.0	99.7	100.2	99.0	99.1	98.5	98.7	100.3	101.7	103.4	104.9	102.2	102.8	102.2				
OVERALL CALCULATED	99.2	100.8	100.9	99.7	99.8	99.2	99.3	101.0	102.4	104.2	105.9	102.4	102.9	102.4				153.4
PNDB	112.0	114.2	114.1	113.5	113.6	112.2	111.9	113.8	115.5	117.2	119.1	114.5	114.5	113.4				

Table A-26.
Variable Pitch Fan
100% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Nominal Stagger (-1.6°)
Nominal Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F, 70 PERCENT REL. HUM. DAY)

50	68.7	69.7	74.3	76.8	79.1	78.8	78.1	81.3	80.7	79.6	81.3	81.2	81.6	79.3
63	66.9	69.5	72.3	73.7	75.0	75.5	75.4	76.6	77.1	77.9	78.8	79.0	79.3	75.7
80	66.5	68.1	70.7	71.8	73.2	75.9	75.6	77.0	78.6	80.1	81.2	81.4	82.4	78.8
100	73.1	73.6	77.6	76.1	78.0	80.4	81.3	84.8	87.2	87.0	86.4	87.0	86.1	81.4
125	73.6	77.2	80.4	81.0	81.9	83.9	84.5	86.3	86.9	87.4	88.0	88.3	8[illegible].0	82.0
160	80.3	81.8	82.5	85.7	87.6	84.5	88.7	87.3	88.8	89.6	88.1	87.2	85.9	80.2
200	77.4	78.9	80.6	81.3	82.7	82.6	83.1	84.4	86.2	89.3	84.7	83.6	82.0	76.7
250	72.7	74.8	77.0	78.2	78.8	79.8	80.4	82.6	82.8	83.1	84.8	84.1	81.3	75.2
315	73.6	76.8	78.6	80.6	82.0	82.9	83.8	85.4	85.2	85.4	84.7	84.5	81.3	75.4
400	73.0	75.5	77.6	79.8	81.7	82.4	83.1	83.0	84.5	84.7	84.9	82.7	80.0	74.2
500	72.4	74.7	78.6	80.3	81.3	82.2	83.9	85.0	84.5	85.6	85.7	82.4	79.1	73.3
630	71.8	77.6	78.9	79.6	81.4	81.8	83.0	84.4	84.1	86.4	85.8	82.3	78.2	72.4
800	71.2	76.5	78.3	79.3	82.6	82.2	[illegible]	84.1	84.1	86.5	85.2	81.1	77.2	71.4
1000	72.6	76.9	79.0	79.8	82.8	82.8	83.2	84.6	86.3	85.9	87.0	81.1	77.0	70.9
1250	83.3	89.6	90.8	92.2	92.4	89.9	88.8	89.8	88.7	90.6	93.3	85.6	82.0	75.7
1600	80.3	86.5	88.0	87.4	89.9	87.2	87.3	88.9	88.9	91.1	91.0	83.5	80.4	74.6
2000	77.5	82.0	84.5	83.6	83.6	86.7	86.6	87.7	92.1	88.5	89.7	84.1	77.4	72.5
2500	81.8	84.4	87.7	85.1	88.7	88.5	87.9	91.2	90.2	93.8	94.6	83.8	82.3	73.6
3150	79.9	86.5	87.9	87.8	88.4	88.6	89.1	89.7	91.8	93.2	92.3	84.9	80.0	73.0
4000	80.4	84.5	88.6	86.4	87.5	88.8	89.0	91.0	91.7	92.3	93.8	84.9	80.7	72.8
5000	79.5	85.1	87.1	85.9	86.6	88.5	89.3	91.1	91.6	92.8	92.3	84.0	79.8	71.7
6300	78.7	83.1	86.1	85.6	85.6	87.6	87.3	90.1	90.8	91.0	91.3	82.6	78.0	69.0
8000	76.5	81.4	84.5	84.4	83.7	86.4	8[illegible].6	86.4	89.2	89.3	89.0	81.2	75.5	66.0
10000	72.8	79.[illegible]	82.4	82.1	82.1	83.7	[illegible].2	84.5	86.5	86.9	85.3	78.1	71.5	61.2
OVERALL CALCULATED	91.2	95.[illegible]	98.1	98.3	99.2	99.1	99.4	101.0	101.9	102.8	103.1	97.7	95.3	89.9
PNDB	104.1	109.1	111.4	111.0	112.0	112.5	112.7	114.4	115.3	116.3	116.7	109.7	106.2	99.1

Table A-27.
Variable Pitch Fan
100% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Δ Stagger = 3.4°
Nominal Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG, F, 70 PERCENT REL, HUM, DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	( )	( )	PWL ( )
50	74.8	73.6	74.3	76.3	76.7	77.3	77.6	79.4	80.1	81.4	82.9	84.1	89.8	93.1			132.4
63	75.6	74.7	74.8	76.1	75.7	77.4	78.2	80.2	80.9	81.7	83.3	88.6	89.6	92.9			132.6
80	72.6	73.9	75.1	75.4	76.0	76.9	77.9	79.4	80.9	82.2	83.5	85.4	88.2	90.9			131.5
100	73.4	74.2	76.4	77.8	78.9	78.8	78.2	80.2	80.7	80.8	82.8	84.4	86.7	87.9			130.7
125	73.0	74.2	74.5	77.3	78.2	77.6	75.9	79.0	79.2	80.3	82.1	83.1	84.5	85.2			129.3
160	72.7	71.9	71.9	73.6	73.5	75.1	75.4	77.1	79.4	81.3	84.1	86.2	88.3	88.9			131.0
200	76.0	77.2	77.5	77.9	78.2	81.3	81.9	84.0	85.9	87.7	89.2	91.0	92.5	91.0			135.8
250	79.7	81.7	82.2	82.4	82.0	83.9	85.0	86.9	88.6	89.8	91.3	92.8	93.1	91.3			137.8
315	85.1	85.0	85.6	85.8	85.2	86.6	85.4	86.6	88.6	88.8	90.0	91.5	91.3	89.8			137.6
400	83.2	83.3	81.3	82.3	82.1	82.8	82.8	83.9	85.2	85.8	87.0	87.4	87.4	86.6			134.4
500	79.8	80.1	79.0	80.5	79.4	80.3	81.5	83.0	83.9	85.0	87.8	88.4	87.9	85.9			133.8
630	79.7	81.0	80.5	82.7	82.2	83.5	84.7	85.3	86.6	87.1	87.4	88.6	87.8	86.0			135.1
800	79.5	80.6	79.8	81.0	82.6	82.8	82.6	83.7	84.7	86.2	87.5	87.2	86.2	84.5			134.1
1000	80.5	82.5	82.5	84.0	83.1	83.3	83.6	84.4	85.9	87.0	88.4	86.7	85.7	85.2			135.0
1250	80.6	82.8	81.4	82.6	82.5	82.4	82.4	84.6	85.8	88.3	89.0	87.0	85.1	85.1			135.1
1600	83.9	86.7	83.4	83.4	85.2	84.5	83.4	85.0	86.8	88.8	89.2	37.6	85.9	86.8			136.3
2000	82.1	83.7	82.2	82.9	83.7	83.2	82.9	84.8	87.6	88.3	90.3	86.1	84.3	83.8			135.8
2500	87.7	91.1	89.3	88.1	88.7	86.1	85.6	87.6	89.0	91.9	94.4	88.7	87.9	86.3			139.8
3150	93.9	98.5	96.0	94.7	95.8	92.0	91.5	93.6	94.4	97.8	98.1	92.2	93.6	91.9			145.8
4000	86.9	88.4	89.2	88.4	86.8	87.8	87.2	87.7	92.6	90.8	92.3	89.1	85.6	85.9			140.0
5000	88.0	88.4	88.8	86.5	88.2	87.8	86.9	90.2	91.0	95.2	96.4	88.4	88.5	86.5			141.7
6300	89.4	91.6	90.7	91.4	89.1	88.5	89.4	90.8	93.8	96.3	96.0	91.1	88.6	87.3			143.4
8000	88.6	88.9	89.4	87.1	87.8	88.5	87.9	89.5	92.0	93.5	95.8	90.0	87.9	86.6			142.4
10000	87.5	88.7	88.4	86.7	85.6	86.8	87.5	87.9	91.3	93.3	94.8	88.9	86.7	85.1			142.3
12500	86.2	86.5	87.0	85.5	83.1	85.6	85.3	88.1	90.4	91.4	93.8	87.6	85.2	83.6			142.3
16000	84.4	85.0	85.0	83.2	79.4	82.8	82.2	83.8	87.3	89.6	89.8	86.0	83.1	81.3			141.4
20000	81.2	81.7	81.7	80.2	75.8	79.5	78.3	80.4	83.8	85.0	85.8	82.9	79.7	78.1			140.3
OVERALL MEASURED	99.4	101.0	99.9	99.2	99.0	98.7	98.4	100.2	101.9	104.2	105.0	102.4	102.9	102.8			
OVERALL CALCULATED	99.5	102.C	100.8	100.0	100.1	99.3	99.1	100.8	102.9	104.9	106.0	102.8	102.8	102.5			153.4
PNDB	113.9	117.1	115.5	114.7	115.3	113.4	113.1	115.0	116.5	118.9	119.8	115.7	115.9	114.7			

Table A-28.
Variable Pitch Fan
100% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Δ Stagger = 3.4°
Nominal Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F, 70 PERCENT REL. HUM. DAY)

50	67.7	70.7	74.4	76.9	78.7	79.1	78.6	80.5	80.5	79.9	80.9	80.9	81.0	78.6
63	67.1	70.7	72.5	76.4	78.0	77.8	76.3	79.2	79.0	79.4	80.1	79.5	78.6	75.7
80	66.7	68.2	69.8	72.6	73.2	75.3	75.7	77.3	79.2	80.4	82.0	82.5	82.3	79.3
100	69.9	73.5	75.4	76.9	77.9	81.5	82.2	84.1	85.7	86.7	87.1	87.3	86.4	81.1
125	73.5	77.9	80.0	81.4	81.7	84.0	85.2	87.0	88.3	88.8	89.1	89.0	86.9	81.3
160	78.8	81.1	83.4	84.7	84.8	86.7	85.6	86.7	88.2	87.6	87.8	87.6	84.9	79.5
200	76.8	79.3	79.0	81.1	81.7	82.8	82.9	84.0	84.8	84.7	84.7	83.4	81.0	76.2
250	73.2	76.0	76.7	79.3	79.0	80.3	81.7	83.0	83.5	83.7	85.4	84.3	81.4	75.2
315	72.9	76.8	78.0	81.4	81.7	83.4	84.8	85.3	86.1	85.9	84.9	84.5	81.1	75.2
400	72.6	76.3	77.3	79.7	82.0	82.7	82.7	83.6	84.1	84.9	85.0	82.9	79.3	73.4
500	73.5	78.2	79.9	82.6	82.5	83.2	83.6	84.3	85.4	85.6	85.8	82.4	78.7	73.8
630	73.4	78.3	78.7	81.2	81.9	82.3	82.4	84.4	85.2	86.9	86.4	82.6	78.0	73.4
800	76.5	82.1	80.7	81.9	84.6	84.3	83.4	84.8	86.1	87.3	86.5	83.0	78.6	74.9
1000	80.4	86.5	86.6	86.6	88.1	86.0	85.6	87.5	88.4	90.5	91.7	84.1	80.5	74.2
1250	86.4	93.9	93.2	93.2	95.2	91.9	91.5	93.5	93.8	96.4	95.4	87.5	86.1	79.5
1600	79.2	83.7	86.5	87.0	86.2	87.7	87.3	87.6	92.0	89.4	89.6	84.4	78.0	73.2
2000	80.1	83.5	85.9	85.0	87.5	87.7	86.9	90.0	90.4	93.7	93.6	83.5	80.5	73.3
2500	81.5	86.8	87.9	90.0	88.6	88.6	89.6	90.9	93.4	95.0	93.3	86.3	80.7	74.0
3150	80.7	84.2	86.8	86.0	87.6	88.8	88.4	89.9	91.8	92.4	93.2	85.4	80.0	73.0
4000	79.4	84.1	86.1	85.8	85.7	87.5	88.3	88.6	91.5	92.5	92.5	84.3	78.6	71.0
5000	78.8	82.8	85.5	85.5	84.1	87.2	87.1	89.7	91.5	91.5	92.4	83.9	77.9	70.0
6300	77.5	82.0	84.5	84.4	81.6	85.6	85.2	86.6	89.6	90.0	89.4	83.0	76.2	67.4
8000	74.6	79.5	82.3	82.6	79.4	83.7	82.7	84.6	87.4	87.4	86.4	80.7	73.0	63.4
10000	68.3	74.0	77.2	77.7	74.6	79.1	78.0	79.9	82.6	82.5	81.3	75.1	66.7	55.6
OVERALL CALCULATED	91.9	97.5	98.3	98.8	99.5	99.4	99.4	100.9	102.6	103.7	103.4	98.3	95.3	89.9
PNDB	104.3	109.1	110.5	111.7	111.3	112.4	112.3	113.8	115.8	116.9	116.6	110.2	105.5	99.0

Table A-29.
Variable Pitch Fan
44% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Nominal Stagger (-1.6°)
Small Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F, 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	( )	( )	( )	PWL
50	70.4	68.0	67.3	69.2	68.3	67.7	69.2	70.3	71.8	72.0	73.1	74.8	78.3				120.9
63	67.4	68.2	69.0	69.2	68.3	70.4	70.4	70.2	70.2	71.0	71.5	72.9	77.3				120.3
80	65.8	65.5	69.8	70.3	70.4	71.8	72.5	71.6	70.9	71.1	71.3	72.1	75.9				120.7
100	66.1	64.6	70.1	69.3	67.7	68.6	68.6	68.9	69.4	69.4	70.7	71.4	74.2				119.0
125	63.9	64.9	65.0	66.4	65.5	64.3	65.5	65.4	67.0	68.3	68.2	70.0	73.8				116.8
160	64.8	64.1	64.7	65.3	65.9	67.4	67.1	67.7	70.2	71.1	71.1	71.9	75.2				118.7
200	67.9	69.0	71.5	71.4	[illegible]	71.9	73.2	73.5	74.5	75.2	75.5	76.7	77.4				123.1
250	71.1	72.5	75.7	77.0	75.5	76.9	78.4	79.4	79.6	79.9	79.6	79.4	79.3				127.6
315	75.1	76.7	77.0	78.0	77.0	77.8	78.4	79.2	79.6	81.1	81.1	80.8	80.1				128.6
400	73.5	75.1	74.2	74.1	72.4	72.6	72.9	73.4	73.6	75.1	75.1	75.9	76.7				123.9
500	74.7	75.2	76.3	75.5	75.0	74.2	74.2	75.5	76.8	78.2	79.2	79.5	77.4				126.2
630	77.9	81.8	83.3	79.0	82.6	80.6	80.8	79.8	80.6	81.7	81.8	82.7	82.4				131.2
800	78.0	80.1	78.3	78.9	78.7	78.3	78.9	79.9	80.2	82.7	82.9	82.5	81.7				130.2
1000	79.9	80.9	80.4	80.6	80.7	79.6	79.4	81.1	81.7	84.5	84.7	83.5	82.0				131.7
1250	78.9	81.0	78.7	78.5	78.3	78.9	79.8	81.0	82.0	85.1	86.3	85.3	82.2				132.0
1600	77.5	78.5	77.9	77.2	78.5	76.8	77.4	78.8	80.0	83.0	84.0	83.5	81.4				130.2
2000	82.8	83.6	83.0	81.9	81.5	79.2	78.8	80.7	83.0	84.2	87.0	86.0	85.3				133.3
2500	80.7	81.8	79.6	77.8	77.5	75.4	75.7	77.6	79.6	82.4	85.4	84.6	82.2				131.0
3150	80.3	82.9	78.6	78.6	77.1	74.5	76.7	79.1	80.7	83.2	84.5	83.7	82.3				131.2
4000	84.1	83.9	83.9	82.7	78.9	78.0	78.5	80.0	84.7	82.9	8[illegible].2	87.0	83.1				133.9
5000	85.8	83.6	84.1	79.9	81.4	79.3	77.5	81.6	80.9	85.4	89.1	85.4	85.5				134.5
6300	85.3	86.3	84.4	83.4	79.[illegible]	78.7	80.[illegible]	80.2	83.7	8[illegible].4	87.5	87.5	83.5				133.3
8000	86.5	85.6	85.1	82.4	80.[illegible]	80.1	79.2	80.9	82.9	84.1	88.5	87.0	84.5				135.8
10000	86.3	86.1	84.9	82.3	79.6	78.7	79.0	79.4	82.0	85.4	87.2	85.2	8[illegible].3				136.2
12500	85.1	84.4	83.7	80.5	77.9	77.0	76.3	77.3	80.3	82.2	85.3	82.8	82.6				135.5
16000	84.2	82.9	82.0	78.9	76.1	75.7	73.8	75.6	77.9	80.7	83.0	81.5	81.7				135.8
20000	80.8	80.7	79.2	76.1	73.1	72.5	70.2	72.1	75.3	76.8	79.0	78.1	78.4				135.2
OVERALL MEASURED	95.5	95.0	95.1	93.3	92.3	91.8	91.5	92.6	94.4	95.5	97.6	96.6	96.8				
OVERALL CALCULATED	95.4	95.5	94.8	93.0	92.0	91.1	91.2	92.5	94.1	96.2	98.2	97.2	95.8				146.1
PNDB	107.4	107.6	107.0	105.7	104.3	103.0	103.2	104.9	107.4	108.5	111.1	110.2	108.4				

Table A-30.
Variable Pitch Fan
44% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Nominal Stagger (-1.6°)
Small Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F, 70 PERCENT REL. HUM. DAY)

50	60.3	61.1	68.2	68.5	67.6	68.9	69.0	69.2	69.3	68.5	68.7	67.9	68.5
63	58.0	61.4	63.0	65.5	65.3	64.5	65.8	65.7	66.8	67.4	66.2	66.4	67.9
80	58.8	60.5	62.6	64.4	65.7	67.6	67.4	67.9	70.0	70.1	69.1	68.3	69.2
100	61.8	65.3	69.4	70.4	70.0	72.1	73.5	73.6	74.2	74.2	73.3	73.0	71.3
125	64.9	68.7	73.6	76.0	75.2	77.0	78.7	79.5	79.3	78.8	77.4	75.6	73.1
160	68.7	72.8	74.7	76.9	76.6	77.9	78.6	79.2	79.2	80.0	78.9	76.9	73.8
200	67.1	71.1	71.8	72.9	72.0	72.7	73.1	73.4	73.3	73.9	72.8	72.0	70.2
250	68.1	71.1	73.9	74.3	74.6	74.2	74.4	75.5	76.4	77.0	76.8	75.4	70.8
315	73.2	77.6	80.9	77.6	82.1	80.5	80.9	79.8	80.1	80.4	79.4	78.5	75.7
400	71.2	75.9	75.8	77.6	78.2	78.2	78.9	79.9	79.7	81.4	80.4	78.2	74.9
500	72.9	76.6	77.9	79.3	80.2	79.5	79.4	81.0	81.2	83.1	82.1	79.1	75.0
630	71.7	76.6	76.0	77.1	77.7	78.8	79.8	81.6	81.4	83.7	83.6	80.9	75.0
800	70.2	74.4	75.2	75.7	77.9	76.7	77.6	79.5	79.4	81.5	81.5	79.0	74.0
1000	75.4	79.0	80.2	80.4	80.9	79.0	78.7	80.5	82.3	82.7	84.2	81.4	77.8
1250	73.0	77.0	76.7	76.2	76.8	75.2	75.6	77.3	78.8	80.8	82.5	79.8	74.5
1600	72.4	77.9	75.6	76.9	76.3	74.2	76.6	78.8	79.9	81.5	81.5	78.8	74.4
2000	76.1	78.9	80.9	81.0	78.2	77.8	78.4	79.7	83.9	81.3	84.2	82.0	75.0
2500	77.5	78.4	81.0	78.1	80.6	79.0	77.3	81.3	80.1	83.7	86.0	80.2	77.2
3150	76.8	81.1	81.3	81.7	79.1	78.5	80.1	79.9	82.9	84.7	84.3	82.2	75.0
4000	77.7	80.2	82.0	80.7	80.0	80.0	79.2	80.7	82.2	82.5	85.4	81.6	75.7
5000	77.7	81.1	82.3	81.5	79.7	79.2	79.6	79.9	81.9	84.3	84.5	80.2	75.8
6300	76.2	79.5	81.3	79.7	78.2	78.4	77.3	78.2	80.5	81.4	82.8	77.9	73.7
8000	74.9	78.1	80.0	78.7	77.1	77.3	75.6	77.2	78.8	80.5	80.9	76.7	72.5
10000	70.8	75.9	77.6	76.6	74.9	75.0	73.0	74.6	77.1	77.3	77.4	73.3	68.5
OVERALL CALCULATED	87.2	90.7	92.0	91.6	91.5	91.0	91.3	92.4	93.6	94.8	95.4	92.7	87.9
PNDB	100.7	104.2	105.4	105.0	104.2	103.9	104.1	105.1	106.7	108.1	108.8	105.6	100.5

Table A-31.
Variable Pitch Fan
44% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Δ Stagger = 11.4°
Small Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F, 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	PWL
50	71.6	69.1	68.7	70.9	70.0	69.7	70.2	71.2	71.7	72.6	73.0	74.3	77.5	87.3	124.5
63	67.0	68.0	67.2	68.1	67.7	69.2	68.8	70.1	70.2	70.7	71.2	73.5	77.0	86.3	123.5
80	65.4	66.8	67.1	68.9	68.6	70.2	71.7	71.3	72.6	74.5	73.1	72.9	75.7	85.1	123.4
100	65.7	66.1	69.1	69.5	67.8	68.3	69.0	68.8	69.6	70.6	71.4	72.2	74.4	84.8	122.0
125	63.3	65.7	65.2	66.1	65.3	64.4	65.4	65.4	65.8	67.7	68.2	69.5	72.5	83.3	120.2
160	65.2	65.4	65.6	66.0	66.8	68.9	68.6	68.3	69.1	71.3	71.9	73.2	74.9	83.2	121.6
200	65.8	66.7	69.5	69.3	69.9	71.4	72.7	73.4	73.9	75.2	75.7	76.8	78.1	82.3	123.9
250	68.5	70.7	73.5	73.8	74.5	75.7	76.1	77.3	78.0	78.9	78.6	79.0	79.2	81.1	126.6
315	72.0	73.2	74.2	76.4	75.2	75.4	75.6	76.8	77.8	77.8	78.6	78.1	77.4	79.1	126.3
400	70.7	71.9	70.6	70.3	70.3	69.8	70.3	70.8	71.8	72.5	73.4	72.5	73.4	76.3	121.5
500	68.4	69.0	69.8	69.6	68.8	69.2	70.4	71.5	72.6	73.3	74.5	75.1	74.3	76.0	121.8
630	73.1	75.4	75.9	73.6	76.6	75.9	74.8	75.7	76.4	76.9	75.2	76.3	76.8	79.8	125.9
800	72.6	76.0	80.4	81.2	77.0	76.7	74.6	76.9	74.5	76.6	79.1	78.9	78.6	77.3	127.7
1000	70.4	71.0	70.8	71.5	71.8	71.8	72.2	73.0	73.3	76.3	76.8	75.7	74.6	74.0	123.5
1250	71.7	72.6	71.9	72.3	72.9	72.6	72.6	73.8	74.3	77.4	79.0	77.8	75.5	75.1	124.9
1600	74.6	75.0	73.6	74.4	77.8	75.5	73.0	74.3	75.6	78.4	81.2	78.7	78.9	78.9	127.1
2000	82.3	82.2	81.5	78.1	79.2	77.0	76.0	77.6	80.5	81.0	84.2	85.1	83.0	81.7	131.3
2500	81.9	81.6	80.6	77.2	78.2	76.4	75.6	77.3	79.8	80.4	85.1	84.7	82.4	80.8	131.0
3150	73.3	75.5	73.0	72.9	72.5	71.4	72.9	76.0	76.7	79.1	80.9	78.9	76.4	73.6	126.7
4000	81.5	80.9	80.8	77.9	76.5	76.8	76.2	76.3	80.2	79.8	84.5	82.9	80.4	78.0	130.7
5000	83.0	81.6	81.6	77.1	78.5	76.7	76.1	79.1	77.7	82.6	87.1	83.5	82.6	79.6	132.2
6300	81.4	84.5	82.1	79.5	77.7	77.7	78.7	77.7	81.6	83.7	85.6	85.0	80.8	78.3	133.0
8000	80.4	80.6	81.1	76.4	76.2	76.7	76.9	78.6	80.1	82.4	86.4	83.7	80.1	76.9	132.6
10000	81.0	81.4	81.1	76.7	76.0	75.9	76.7	76.8	79.3	83.0	84.9	82.0	79.5	76.2	132.8
12500	79.2	79.3	78.8	75.0	73.6	74.3	74.0	75.3	77.0	79.1	82.3	78.7	77.8	74.6	131.5
16000	77.4	77.6	77.0	73.7	71.8	72.3	71.0	71.8	74.5	77.3	79.7	77.4	75.6	73.3	131.4
20000	72.6	73.7	73.8	73.7	68.7	68.2	66.9	68.7	71.6	73.3	75.3	73.4	72.3	71.5	130.3
OVERALL MEASURED	93.4	92.3	92.9	91.7	90.5	90.5	89.6	91.5	92.0	93.3	95.4	94.5	95.1	98.0	
OVERALL CALCULATED	91.4	91.9	91.5	89.3	89.0	88.5	88.3	89.4	91.0	92.8	95.6	94.2	92.7	95.3	143.0
PNDB	104.1	104.7	103.9	101.6	101.5	100.9	100.8	102.1	103.7	105.4	108.7	107.1	105.5	105.2	

Table A-32.
Variable Pitch Fan
44% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Δ Stagger = 11.4°
Small Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F. 70 PERCENT REL. HUM. DAY)

50	60.0	62.6	67.2	68.6	67.7	68.6	69.4	69.1	69.5	69.8	69.4	68.7	68.7	74.9
63	57.9	62.2	63.2	65.2	65.1	64.6	65.8	65.6	65.6	66.8	66.2	66.0	66.6	73.8
80	59.2	61.7	63.6	65.0	66.6	69.1	68.9	68.5	68.9	70.4	69.8	69.5	68.9	73.6
100	59.7	62.9	67.3	68.3	69.6	71.6	73.0	73.5	73.7	74.2	73.6	73.0	72.0	72.4
125	62.3	66.9	71.3	72.8	74.2	75.8	76.3	77.4	77.7	77.8	76.4	75.2	73.0	71.0
160	65.7	69.3	72.0	75.3	74.8	75.5	75.8	76.8	77.5	76.7	76.3	74.2	71.1	68.8
200	64.2	67.9	68.3	69.1	69.9	69.8	70.4	70.8	71.4	71.4	71.1	68.5	66.9	65.9
250	61.8	64.9	67.4	68.4	68.4	69.2	70.5	71.5	72.1	72.1	72.2	71.0	67.7	65.3
315	66.3	71.3	73.5	72.3	76.2	75.9	74.9	75.6	75.9	75.6	72.8	72.1	70.0	68.9
400	65.8	71.7	77.8	79.9	76.5	76.6	74.7	76.8	74.0	75.3	76.6	74.6	71.7	66.2
500	63.4	66.7	68.2	70.1	71.2	71.6	72.2	72.9	72.8	75.0	74.2	71.3	67.6	62.7
630	64.5	68.2	69.2	70.8	72.3	72.4	72.6	73.7	73.7	76.0	76.4	73.3	68.3	63.5
800	67.3	70.5	70.9	73.0	77.2	75.3	73.0	74.1	74.9	77.0	78.5	74.1	71.6	66.6
1000	74.8	77.5	78.7	76.6	78.5	76.8	75.9	77.4	79.8	79.5	81.4	80.4	75.5	69.5
1250	74.2	76.8	77.7	75.6	77.4	76.1	75.5	77.1	79.0	78.8	82.2	79.9	74.7	68.3
1600	65.4	70.5	70.0	71.3	71.7	71.1	72.0	75.7	75.9	77.5	77.9	74.0	68.5	60.6
2000	73.4	75.9	77.8	76.2	75.8	76.5	76.1	76.0	79.4	78.1	81.5	77.9	72.3	64.7
2500	74.7	76.4	78.5	75.4	77.6	76.3	75.9	78.8	76.9	80.9	84.0	78.4	74.3	65.9
3150	72.9	79.3	79.0	77.8	76.9	77.4	78.6	77.5	80.8	82.0	82.5	79.7	72.3	64.1
4000	71.6	75.2	78.0	74.8	75.5	76.6	77.0	78.4	79.4	80.8	83.3	78.4	71.2	62.0
5000	72.4	76.4	78.5	75.5	75.8	74.3	77.3	77.2	79.1	81.8	82.3	77.1	71.0	61.4
6300	70.3	74.4	76.4	74.2	73.9	75.2	75.1	76.1	77.3	78.3	79.8	73.7	68.9	58.7
8000	68.1	72.7	75.0	73.5	72.7	73.9	72.8	73.4	75.4	77.1	77.6	72.6	66.4	55.9
10000	62.7	69.0	72.2	71.2	70.5	70.8	69.7	71.3	73.4	73.7	73.7	68.6	62.4	51.9
OVERALL CALCULATED	83.3	86.9	88.7	87.8	88.3	88.3	88.2	89.2	90.3	91.3	92.7	89.3	84.8	82.4
PNDB	96.4	100.9	102.0	100.9	100.9	101.3	101.7	102.2	103.8	103.0	106.2	102.8	97.2	90.4

Table A-33.
Variable Pitch Fan
55% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Nominal Stagger (-1.6°)
Small Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F, 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	PWL
50	71.4	69.7	73.2	73.7	73.0	73.5	72.9	73.8	74.7	74.4	74.8	76.7	80.3	88.1	125.4
63	68.4	69.7	72.7	72.4	71.9	77.5	72.2	71.7	73.0	73.5	73.8	75.9	79.5	85.0	124.4
80	66.8	69.1	72.3	72.1	71.8	73.6	74.0	75.1	76.9	77.0	75.7	76.3	78.4	84.2	125.2
100	68.0	68.8	73.1	73.6	71.8	71.8	71.8	72.4	72.6	72.6	73.8	75.3	74.1	82.9	123.5
125	66.1	67.8	70.1	70.1	69.4	69.1	69.1	68.2	69.9	70.9	71.3	73.3	74.7	81.3	121.3
160	67.8	67.5	68.8	69.6	69.8	70.8	70.3	70.9	72.8	74.0	74.7	76.3	78.1	81.7	123.0
200	69.4	71.4	73.7	73.9	73.2	74.4	76.1	76.6	78.3	79.3	79.8	81.0	81.9	82.8	127.3
250	74.4	76.7	79.5	80.5	79.0	80.6	82.3	81.6	83.0	82.8	82.7	83.8	83.8	83.6	131.3
315	79.8	79.4	79.8	81.3	81.3	81.1	81.8	83.1	83.8	84.3	84.7	83.0	83.1	82.3	132.2
400	77.8	77.8	76.1	75.8	74.8	75.6	75.8	77.0	78.9	79.8	80.4	80.7	80.3	80.5	127.9
500	77.8	78.9	79.1	79.4	77.4	77.4	77.7	79.0	80.1	81.7	82.9	82.7	81.4	81.6	129.8
630	82.5	83.7	81.8	79.6	82.1	81.8	82.6	82.4	82.9	83.8	84.0	84.5	84.1	84.9	132.8
800	82.6	83.6	81.4	82.1	82.1	81.1	82.1	83.2	84.9	85.9	86.2	85.6	84.1	84.9	133.7
1000	82.1	84.1	82.6	82.1	82.4	81.4	82.2	83.2	84.1	86.7	87.3	86.2	84.2	83.9	134.1
1250	82.8	85.8	82.8	81.5	82.5	82.5	84.3	85.6	86.4	88.8	88.5	88.3	84.8	85.0	135.6
1600	81.8	82.7	81.3	81.8	82.8	81.5	82.3	83.3	84.5	87.3	87.1	86.7	84.8	82.5	134.2
2000	83.5	87.0	85.0	84.0	84.7	82.5	83.2	84.1	88.7	87.8	90.6	89.0	88.6	84.5	13[illegible]
2500	84.9	86.1	83.7	81.9	82.2	80.4	81.1	82.2	88.6	86.8	89.8	87.9	89.8	82.9	135.2
3150	83.9	86.7	82.5	82.7	81.2	79.2	81.7	83.2	85.2	87.5	88.4	86.9	84.3	82.3	135.1
4000	88.6	88.6	87.4	85.4	82.7	82.9	83.7	83.8	87.9	86.2	91.4	90.7	89.7	84.7	137.8
5000	89.3	88.0	87.6	83.3	85.6	83.8	83.1	86.1	85.1	90.3	93.2	88.6	88.4	84.8	138.7
6300	89.1	90.4	88.2	87.2	83.7	83.2	85.2	84.5	88.4	90.4	91.3	90.7	87.0	84.5	139.3
8000	90.1	89.8	88.9	85.1	84.1	84.1	84.1	85.4	87.3	88.9	92.2	89.9	87.6	85.1	139.7
10000	89.6	90.3	88.3	85.6	83.6	82.9	83.8	83.4	86.3	89.4	90.0	88.1	87.4	84.6	139.8
12500	89.1	89.0	87.2	84.5	81.8	81.0	81.2	81.8	84.8	86.1	88.7	86.1	85.5	83.6	139.4
16000	87.3	87.0	85.6	82.8	79.8	79.9	78.4	79.2	83.3	84.6	86.0	84.4	84.3	82.1	139.5
20000	83.9	84.0	81.9	79.7	76.9	76.2	74.8	76.5	80.2	81.5	82.2	81.2	81.3	78.8	138.8
OVERALL MEASURED	99.2	98.5	98.1	96.5	95.3	95.6	95.3	96.1	98.0	99.0	100.4	99.9	98.6	98.7	
OVERALL CALCULATED	99.8	99.5	98.0	96.1	95.4	94.7	95.4	96.2	98.2	100.8	101.7	100.3	98.5	98.0	149.9
PNDB	111.8	111.6	110.3	108.7	108.1	107.1	107.9	108.9	111.1	112.7	114.8	113.6	111.2	109.8	

Table A-34.
Variable Pitch Fan
55% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Nominal Stagger (-1.6°)
Small Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F, 70 PERCENT REL. HUM. DAY)

50	62.3	65.3	71.2	72.7	71.7	72.1	72.2	72.7	72.4	71.8	71.9	71.8	70.4	73.6
63	60.2	64.0	68.1	69.2	69.2	69.4	69.5	68.4	69.7	70.0	69.3	69.8	68.8	72.8
80	61.0	63.8	66.8	68.6	69.5	71.0	70.7	71.1	72.6	73.1	72.8	72.6	72.1	72.0
100	63.5	67.7	71.6	72.9	72.9	74.6	76.4	76.8	78.0	78.3	77.6	77.3	75.8	72.9
125	68.2	72.9	77.3	79.5	78.7	80.7	82.6	81.7	82.7	81.7	80.5	80.0	77.6	73.5
160	72.7	75.5	77.6	80.2	80.9	81.2	82.0	83.2	83.5	83.2	82.8	79.7	76.8	72.1
200	70.6	73.8	73.8	74.7	74.4	75.7	76.0	77.1	78.6	78.6	78.1	76.7	73.8	70.8
250	70.4	74.8	76.8	78.2	76.9	77.4	77.9	79.0	79.7	80.5	80.1	78.8	74.8	70.9
315	75.8	79.6	79.4	78.3	81.6	81.7	82.7	82.4	82.4	82.5	81.5	80.4	77.4	74.8
400	75.7	79.3	78.9	80.8	81.5	81.1	82.2	83.1	84.4	84.3	83.7	81.4	77.3	73.8
500	75.1	79.7	80.1	80.8	81.8	81.3	82.2	83.1	83.6	85.3	84.7	81.8	77.2	72.5
630	75.6	80.5	80.2	80.1	81.9	82.4	84.3	85.4	85.8	87.4	85.8	83.8	77.6	73.4
800	73.7	78.3	78.6	79.5	82.1	81.3	82.2	83.3	83.8	85.0	84.4	82.2	76.7	71.0
1000	78.0	82.3	82.2	82.5	84.0	82.3	83.2	83.9	86.0	86.3	87.8	84.3	77.1	72.3
1250	77.2	81.3	80.8	80.3	81.4	80.1	81.0	81.9	83.9	85.2	86.4	83.1	77.3	70.4
1600	76.0	81.7	79.5	81.1	80.4	78.9	81.5	82.9	84.4	85.8	85.4	82.0	76.4	69.3
2000	80.6	85.6	84.4	83.7	81.9	82.7	83.6	83.5	87.1	84.6	88.4	85.6	77.8	71.4
2500	81.0	87.8	84.5	81.6	84.8	83.5	82.9	85.8	84.2	88.6	90.1	83.6	80.0	71.1
3150	80.6	85.2	85.1	85.5	82.9	82.9	85.1	84.2	87.6	88.7	88.2	85.4	78.4	70.3
4000	81.2	84.4	85.7	83.5	83.4	83.9	84.2	85.3	86.7	87.2	89.1	84.5	78.8	70.2
5000	81.8	85.4	85.7	84.4	83.5	83.3	84.4	83.8	86.2	88.3	87.4	83.1	78.8	69.7
6300	80.2	84.0	84.8	83.7	82.1	82.6	82.3	82.7	85.0	85.3	86.2	81.1	78.6	67.7
8000	78.0	82.2	83.6	82.6	80.8	81.5	80.3	80.8	84.3	84.4	84.0	79.9	75.1	66.7
10000	73.9	79.2	80.4	80.2	78.8	78.8	77.6	79.1	82.0	82.0	80.6	76.9	71.3	59.2
OVERALL CALCULATED	90.7	94.6	95.2	94.8	94.8	94.7	95.5	96.2	97.7	98.6	98.9	95.9	90.6	89.3
PNDB	104.3	108.2	108.8	108.5	107.8	107.8	108.7	109.2	111.1	112.0	112.3	106.8	103.4	96.1

Table A-35.
Variable Pitch Fan
55% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Δ Stagger = 11.4°
Small Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F, 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	( )	( )	PNL
50	71.1	70.0	70.5	71.7	71.4	72.5	72.7	74.8	74.6	75.2	74.9	77.9	80.3	82.0			124.5
63	68.1	68.9	68.9	69.4	69.2	71.2	71.4	72.8	72.9	73.7	74.2	77.1	79.4	82.2			123.4
80	66.5	67.0	69.1	69.3	69.3	70.5	71.0	71.9	72.8	73.6	73.8	75.7	77.7	79.9			122.4
100	70.5	69.4	73.1	71.8	70.4	70.8	72.3	74.6	[illegible]	73.9	74.8	76.0	78.3	78.4			123.5
125	65.8	67.1	66.6	68.1	67.4	67.6	67.8	67.9	69.6	70.1	71.1	73.1	74.0	76.3			119.6
160	65.0	66.1	65.9	67.3	67.0	68.3	68.6	69.9	71.3	72.9	74.5	75.0	78.2	77.2			121.8
200	66.9	68.2	70.9	71.9	72.7	72.5	73.6	75.5	78.0	79.3	79.1	81.8	81.7	81.5			126.6
250	71.4	73.2	75.2	76.2	75.4	76.7	78.2	79.2	80.0	80.9	81.6	82.3	82.8	81.5			128.0
315	75.3	76.7	77.4	79.3	77.7	77.2	78.4	79.7	80.5	80.6	80.8	81.3	80.5	79.3			129.0
400	75.0	75.0	73.4	74.4	73.8	73.8	74.4	75.4	76.6	77.1	77.1	77.1	77.0	76.0			125.3
500	70.9	71.8	71.8	71.3	70.5	71.0	72.2	73.3	75.0	76.1	77.5	78.0	77.4	75.8			124.0
630	74.3	74.2	74.7	74.4	75.4	75.4	74.4	76.3	77.6	78.3	77.7	78.4	79.1	79.1			126.6
800	72.7	75.2	73.0	76.4	76.7	79.6	77.5	77.5	77.7	79.9	79.6	80.8	77.8	78.1			128.0
1000	71.5	72.5	72.3	74.6	74.2	75.2	75.2	76.5	77.0	78.9	79.8	79.0	76.0	76.3			126.3
1250	71.9	73.9	72.9	73.4	74.1	74.0	74.9	76.8	77.6	80.6	81.5	80.2	77.9	76.7			127.3
1600	73.6	74.8	75.1	74.9	77.3	75.6	75.6	77.1	78.1	81.8	81.2	79.7	78.3	77.1			128.1
2000	77.0	78.6	76.7	77.9	77.9	75.9	75.8	76.5	79.6	80.6	81.8	81.4	78.0	77.4			128.5
2500	87.5	88.8	87.3	83.9	83.6	80.9	81.1	81.5	84.0	85.7	89.1	88.8	85.9	84.4			136.0
3150	75.8	77.3	75.1	75.8	75.3	73.8	76.3	79.8	80.7	83.2	83.7	81.4	78.0	75.8			129.8
4000	79.4	79.7	79.4	78.7	75.8	77.9	78.1	78.5	84.1	82.0	85.5	83.5	78.8	77.6			131.6
5000	87.0	85.1	85.6	79.1	83.4	81.4	79.5	82.9	82.8	84.6	89.8	88.3	86.0	81.4			133.7
6300	88.9	82.5	81.2	80.7	78.6	78.4	79.5	80.1	83.9	85.7	87.0	85.0	88.1	78.1			133.8
8000	85.1	85.1	84.3	81.4	80.9	81.0	81.2	82.2	85.4	85.9	88.9	86.2	82.1	80.2			136.1
10000	82.2	84.0	82.7	81.2	79.3	78.6	79.6	80.1	83.2	85.7	86.7	84.7	81.4	78.6			135.4
12500	81.9	81.7	81.0	79.2	77.1	77.6	77.1	78.5	81.4	82.5	84.7	81.7	77.6	76.3			134.5
16000	79.7	79.7	79.8	77.5	74.9	75.2	73.7	75.0	78.5	80.8	81.0	80.0	77.3	74.1			134.2
20000	75.5	76.6	75.8	73.8	71.9	71.6	69.6	71.4	74.5	76.6	77.2	75.8	73.8	70.9			132.8
OVERALL MEASURED	94.5	94.3	93.8	92.0	91.3	91.8	91.2	93.1	94.2	95.6	96.8	96.4	95.4	94.3			
OVERALL CALCULATED	93.7	94.3	93.5	91.6	91.3	90.8	90.8	92.2	94.4	95.9	97.7	96.2	94.5	93.0			145.4
PNDB	106.9	107.9	106.9	104.8	104.6	103.6	103.3	105.2	107.3	108.8	110.9	109.8	107.6	106.2			

Table A-36.
Variable Pitch Fan
55% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Δ Stagger = 11.4°
Small Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F. 70 PERCENT REL. HUM. DAY)

50	64.8	65.9	71.1	71.0	70.2	71.1	72.7	74.9	74.1	73.1	72.9	73.1	70.9	69.1
63	59.9	63.5	64.6	67.2	67.2	67.9	68.2	68.1	69.4	69.2	69.1	69.0	69.0	66.9
80	59.9	62.4	63.8	66.3	66.9	68.5	68.9	70.1	71.0	71.9	72.4	72.1	72.2	69.5
100	68.8	64.5	68.8	70.9	72.4	72.6	73.9	75.7	77.8	78.3	77.0	77.3	75.6	71.7
125	65.1	69.4	73.0	75.2	75.1	76.9	78.4	79.3	79.7	79.0	79.4	78.5	76.0	71.5
160	69.0	72.8	75.2	78.2	77.3	77.3	78.7	79.7	80.2	79.5	78.6	77.4	74.1	69.0
200	68.5	71.1	71.1	73.2	73.4	73.9	74.5	75.5	76.2	76.0	74.8	73.1	70.6	66.4
250	64.4	66.9	68.6	70.1	70.0	71.0	72.4	73.3	74.5	74.0	74.9	73.9	70.0	65.1
315	67.6	70.0	72.3	73.2	74.9	75.4	76.5	76.2	77.2	77.1	75.2	74.2	72.4	68.2
400	65.8	70.9	70.5	75.1	76.2	79.6	77.6	77.4	77.2	78.6	77.1	76.0	72.9	67.0
500	64.5	68.1	69.7	72.6	73.7	75.1	75.3	76.4	76.4	77.6	76.8	74.7	69.9	64.9
630	64.7	69.4	70.3	72.8	73.5	73.9	74.9	76.7	77.0	79.2	78.9	73.8	70.0	65.0
800	66.3	70.3	72.4	73.4	76.7	75.4	75.6	76.9	77.4	80.3	78.0	75.2	71.0	69.2
1000	70.3	73.9	73.9	76.0	77.2	75.6	75.8	76.2	78.9	79.0	79.0	76.0	70.6	65.2
1250	79.8	84.0	84.4	82.3	82.0	80.6	80.0	81.2	84.1	84.1	86.2	84.0	77.0	71.9
1600	67.9	72.3	72.1	74.2	74.5	73.5	76.1	79.5	79.9	81.5	80.7	76.5	70.1	62.9
2000	71.3	74.7	76.4	77.1	75.0	77.6	78.0	78.2	83.3	80.4	82.4	78.5	70.7	64.3
2500	78.7	80.9	82.4	77.3	82.5	81.0	77.3	82.6	82.0	84.9	86.7	80.1	77.7	67.7
3150	72.4	77.2	78.1	79.0	77.8	78.1	79.4	79.8	83.1	84.0	83.0	79.7	71.6	63.9
4000	76.2	79.8	81.2	79.8	80.2	80.9	81.3	82.1	84.7	84.3	85.0	80.8	73.3	68.3
5000	73.5	79.0	80.1	80.1	79.2	79.8	80.2	80.5	83.1	84.6	84.1	79.8	72.9	63.7
6300	73.6	76.7	78.5	78.3	77.4	78.4	78.1	79.4	81.7	81.7	82.2	76.7	70.7	60.4
8000	70.4	74.9	77.7	77.3	75.8	76.8	75.5	76.6	77.4	80.6	79.0	75.2	68.1	56.8
10000	65.5	71.8	74.2	74.3	73.7	74.1	72.3	73.9	76.3	77.1	75.6	71.0	63.0	51.3
OVERALL CALCULATED	85.6	87.4	90.6	90.2	90.7	90.7	90.9	92.0	93.9	94.4	94.0	91.3	86.7	81.0
PNDB	99.1	102.4	103.8	103.2	104.1	104.1	104.3	105.4	107.5	107.8	108.4	104.3	99.4	91.2

Table A-37.
Variable Pitch Fan
65% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Nominal Stagger (-1.6°)
Small Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F, 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	( )	( )	( )	PWL
50	72.1	70.5	72.1	72.1	74.7	73.5	73.7	74.4	74.9	75.8	76.2	79.2	83.6	86.1				126.4
63	69.3	70.5	71.4	71.4	71.7	72.4	73.1	73.8	74.6	75.2	76.2	79.1	82.8	85.5				125.9
80	68.9	69.7	72.3	72.1	72.5	73.3	73.9	75.0	74.7	76.7	77.3	79.0	81.6	82.8				125.5
100	72.1	72.1	74.8	75.0	75.3	76.5	77.1	78.4	78.6	78.2	78.6	79.0	80.3	80.5				127.0
125	69.0	69.9	70.4	70.8	71.2	70.6	71.0	70.9	71.4	73.5	74.4	76.4	78.4	79.2				122.8
160	68.9	69.1	69.4	69.9	70.6	72.3	73.0	73.7	75.0	76.9	78.4	80.2	83.0	82.9				125.9
200	72.0	72.7	73.7	75.2	75.4	76.6	78.1	79.3	80.8	82.6	82.7	84.8	86.3	84.9				130.3
250	77.0	79.3	82.1	81.8	81.1	82.0	83.1	84.0	84.3	85.1	85.5	87.0	87.5	85.5				133.6
315	81.6	82.5	83.3	83.8	83.5	83.0	83.9	84.0	84.8	84.9	85.0	86.1	85.3	83.8				133.9
400	81.6	82.2	80.9	79.8	79.2	80.0	79.3	82.2	83.0	83.8	83.4	83.2	82.7	82.4				131.6
500	79.2	80.4	80.3	80.5	79.6	79.1	79.9	81.1	82.4	83.7	85.1	85.2	84.6	83.5				131.9
630	84.4	85.1	83.8	82.3	83.0	83.7	84.4	85.5	85.8	86.4	86.7	87.5	86.6	85.7				133.1
800	83.2	84.6	82.9	84.2	83.4	83.3	84.5	85.8	86.1	87.5	88.1	86.9	86.0	85.8				135.4
1000	84.8	85.9	85.4	84.9	84.7	83.9	84.0	85.6	86.1	89.5	89.8	87.4	85.9	86.4				136.4
1250	84.6	86.7	85.0	83.8	84.8	84.7	85.7	87.3	88.5	91.1	90.9	89.8	86.5	86.4				137.6
1600	83.8	85.8	85.0	84.0	85.8	84.4	84.8	86.2	87.5	89.8	90.9	88.5	86.5	84.9				137.1
2000	84.3	86.7	85.4	84.2	86.0	84.2	84.5	85.3	88.2	90.0	91.6	88.4	85.7	84.4				137.4
2500	89.5	91.1	89.0	87.2	88.3	86.8	86.0	87.1	89.6	91.2	94.3	91.6	90.1	88.1				140.1
3150	85.0	88.7	85.4	85.2	84.4	82.4	84.5	86.7	88.6	90.8	91.1	88.4	86.9	84.6				137.9
4000	88.6	90.0	89.2	87.8	85.0	85.7	85.2	86.4	91.0	89.1	92.4	90.7	86.5	86.8				139.5
5000	92.8	91.1	91.9	96.1	89.6	87.8	86.7	90.3	88.5	93.7	97.8	91.6	91.4	88.1				142.4
6300	90.2	92.2	90.1	88.9	86.6	86.4	88.0	87.8	91.4	93.7	94.1	91.4	88.9	86.9				141.7
8000	91.4	91.9	91.1	88.1	87.4	87.3	87.0	88.3	90.1	91.7	95.0	91.0	89.7	88.8				142.2
10000	98.9	92.3	91.1	87.8	86.6	86.0	87.0	86.8	89.3	92.4	93.2	90.1	90.0	87.5				142.5
12500	90.4	90.4	90.0	87.1	85.1	85.5	84.7	85.3	88.1	89.9	91.9	87.8	88.6	85.8				142.8
16000	89.8	89.3	88.2	85.8	82.9	83.2	82.4	83.5	86.0	88.3	89.2	86.5	86.8	84.8				142.8
20000	86.3	86.7	85.4	82.7	80.7	80.2	78.4	80.2	83.2	84.5	85.1	83.4	84.0	81.6				141.8
OVERALL MEASURED	100.2	101.1	99.5	98.1	97.6	97.4	97.7	98.5	100.3	101.9	103.4	101.0	100.5	99.5				
OVERALL CALCULATED	100.7	101.6	100.7	98.6	98.3	97.7	98.8	99.2	101.8	103.0	104.7	102.0	101.0	99.9				152.5
PNDB	113.0	113.5	113.2	111.1	111.4	110.4	110.5	112.3	114.0	115.8	118.3	114.7	113.8	111.9				

Table A-38.
Variable Pitch Fan
65% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Nominal Stagger (-1.6°)
Small Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F. 70 PERCENT REL. HUM. DAY)

50	66.4	68.6	72.9	75.0	75.2	76.8	77.5	78.6	78.5	77.3	76.6	75.6	74.6	71.2
63	63.1	66.3	68.4	69.8	71.0	70.8	71.4	71.1	71.3	72.6	72.4	72.8	72.6	69.8
80	62.9	65.5	67.3	69.0	70.4	72.5	73.3	73.9	74.8	75.9	76.4	76.5	77.0	73.2
100	65.9	69.0	73.6	74.2	75.2	76.8	78.3	79.4	80.5	81.6	80.6	81.0	80.2	75.0
125	71.4	75.5	79.9	80.8	80.8	82.1	83.4	84.1	84.0	84.1	83.3	83.2	81.3	75.4
160	75.3	78.6	81.0	82.7	83.2	83.1	84.1	84.1	84.5	83.8	82.8	82.2	78.9	73.5
200	75.1	78.2	78.6	78.6	78.8	80.0	79.5	82.2	82.6	82.6	81.0	79.2	76.3	71.9
250	72.6	76.4	78.0	79.3	79.2	79.1	80.1	81.1	82.0	82.5	82.7	81.1	78.0	72.9
315	77.7	80.9	81.3	81.1	82.6	83.7	84.5	85.5	85.3	85.1	84.3	83.3	79.9	74.8
400	76.3	80.4	80.4	82.9	82.9	83.3	84.6	85.8	85.6	86.2	85.6	82.6	79.1	74.7
500	77.8	81.6	82.9	83.5	84.1	83.8	84.0	85.5	85.6	88.1	87.0	83.1	78.9	75.8
630	77.5	82.3	82.3	82.4	84.2	84.6	85.7	87.1	87.9	89.7	88.2	85.3	79.3	74.8
800	76.5	81.2	82.3	82.6	85.1	84.2	84.8	86.0	86.8	88.4	88.2	83.9	79.2	73.0
1000	76.8	82.1	82.7	82.7	85.3	83.9	84.5	85.1	87.5	88.5	88.8	83.6	78.2	72.2
1250	81.8	86.3	86.1	85.6	87.6	86.5	85.9	86.8	88.9	89.6	91.4	86.8	82.4	75.5
1600	77.1	81.8	82.4	83.5	83.6	82.1	84.4	86.3	87.8	89.1	88.1	83.5	79.0	71.7
2000	80.5	85.0	86.2	86.1	84.2	85.4	86.1	86.2	90.2	87.4	89.4	85.7	78.4	72.7
2500	83.6	86.0	88.8	84.4	88.8	87.5	86.6	89.9	87.7	91.9	94.6	86.4	83.0	74.4
3150	81.7	86.9	87.0	87.2	85.9	86.1	87.9	87.5	90.6	92.0	90.9	86.1	80.3	72.7
4000	82.6	86.5	88.0	86.5	86.7	87.2	87.0	88.2	89.4	90.0	91.8	85.7	80.8	73.1
5000	82.4	87.4	88.4	86.7	86.4	86.4	87.6	87.2	89.2	91.3	90.6	85.1	81.5	72.6
6300	81.5	85.4	87.6	86.3	85.3	86.4	85.7	86.2	88.3	89.1	89.5	82.9	79.8	69.9
8000	80.6	84.4	86.2	85.6	83.8	84.8	84.2	85.1	86.9	88.1	87.2	81.6	77.5	66.8
10000	76.3	81.9	83.9	83.2	82.5	82.7	81.1	82.7	85.0	85.0	83.5	78.7	74.0	62.0
OVERALL CALCULATED	92.4	96.7	97.9	97.3	97.8	97.8	98.2	99.2	100.5	101.6	101.9	97.2	93.2	87.0
PNDB	105.9	113.2	111.4	110.7	111.2	111.8	111.5	112.5	114.8	115.1	115.9	110.2	106.1	98.5

Table A-39.
Variable Pitch Fan
65% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Δ Stagger = 11.4°
Small Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F, 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	PNL
50	71.9	71.1	72.3	72.9	73.6	73.5	73.5	74.7	75.8	75.8	77.0	79.5	83.2	125.3
63	69.6	70.8	71.3	72.0	72.0	72.7	73.2	74.0	74.5	75.3	76.7	79.2	82.9	124.7
80	68.8	68.9	71.4	71.5	71.9	72.4	72.5	73.3	74.1	75.3	76.6	78.6	81.5	124.1
100	73.8	71.9	74.4	73.6	78.3	79.5	76.8	76.4	79.3	79.3	76.1	78.2	79.7	126.9
125	69.1	69.3	69.7	70.4	70.2	70.7	70.2	70.7	72.0	73.5	74.2	76.0	78.3	121.9
160	68.7	68.1	69.1	69.6	69.4	70.9	71.4	72.9	73.9	75.9	78.0	80.0	82.3	124.5
200	72.9	75.5	78.2	76.6	77.8	75.9	80.5	82.8	80.9	82.3	85.4	85.5	85.6	131.0
250	73.8	75.2	78.2	79.1	78.8	80.1	81.3	82.3	82.6	83.3	84.6	85.6	86.4	131.6
315	78.5	78.8	79.9	80.7	80.3	80.6	80.5	81.8	81.9	82.3	83.1	84.1	83.9	131.1
400	78.9	79.2	76.6	76.9	76.4	75.4	76.3	77.7	78.3	79.0	79.3	80.3	80.3	127.7
500	73.9	74.3	74.5	75.3	74.5	74.0	75.5	77.4	78.7	79.8	81.4	81.9	81.7	127.7
630	75.9	76.4	77.7	76.5	78.0	79.0	80.0	79.3	80.1	80.8	80.6	81.6	81.6	129.2
800	74.7	76.1	75.3	77.4	77.5	77.0	77.5	79.2	80.0	81.5	82.2	81.2	81.0	128.9
1000	74.7	74.6	75.6	77.2	77.9	77.0	77.6	78.9	80.0	82.0	83.0	80.9	79.9	129.1
1250	76.3	77.7	76.6	77.3	77.2	77.4	78.4	79.8	80.3	83.3	83.8	82.1	80.3	129.9
1600	74.6	75.6	76.1	76.9	78.5	77.1	77.5	79.0	80.5	83.2	83.8	81.8	80.3	129.8
2000	76.8	77.9	77.8	77.9	78.7	77.8	77.9	79.2	82.3	83.2	84.5	82.0	79.9	130.6
2500	87.9	89.9	87.6	85.7	85.6	82.1	81.9	83.8	84.5	88.9	92.2	88.9	87.1	137.5
3150	82.6	84.4	82.5	80.9	81.2	78.6	80.4	82.9	83.9	86.9	87.9	84.9	83.0	134.1
4000	81.4	82.1	82.6	81.7	78.9	80.2	81.0	81.7	86.7	84.8	87.8	85.0	81.0	134.1
5000	85.8	84.6	86.7	81.6	84.9	82.9	81.8	85.9	85.7	89.9	92.1	85.7	86.4	137.4
6300	83.1	84.9	84.4	83.4	82.2	81.4	83.4	83.9	87.2	89.7	90.9	87.2	83.5	137.1
8000	87.1	85.6	88.4	84.4	84.4	84.5	83.6	85.9	87.4	88.9	92.6	86.9	85.8	139.0
10000	85.8	85.9	85.7	83.6	81.9	82.9	83.1	83.7	86.7	89.6	90.7	85.4	84.5	138.6
12500	84.4	85.3	84.8	81.9	81.0	81.3	81.4	82.7	85.0	86.0	88.3	83.6	82.8	137.9
16000	83.3	83.7	83.2	80.4	78.6	78.9	77.8	79.2	82.5	84.7	85.7	82.2	80.9	137.8
20000	80.1	80.5	79.9	77.9	70.1	75.5	74.0	75.7	78.9	80.7	81.2	78.7	77.9	136.8
OVERALL MEASURED	95.7	95.6	96.1	94.6	93.8	93.8	93.3	95.3	96.4	97.8	99.6	97.6	97.6	
OVERALL CALCULATED	95.4	96.1	96.0	94.1	94.1	93.5	93.8	95.4	97.0	99.0	101.0	97.9	97.3	148.2
PNDB	108.3	109.5	108.6	107.2	107.2	105.8	105.9	108.2	109.8	111.9	113.8	111.0	109.8	

Table A-40.
Variable Pitch Fan
65% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Δ Stagger = 11.4°
Small Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG, F, 70 PERCENT REL, HUM, DAY)

50	68.0	68.4	72.4	72.7	78.2	79.8	77.2	76.6	79.1	78.5	74.2	74.7	73.9
63	63.3	65.7	67.7	69.5	70.0	70.9	70.5	70.9	71.8	72.6	72.2	72.4	72.4
80	62.8	64.5	67.1	68.6	69.2	71.1	71.7	73.0	73.7	74.9	76.0	76.3	[illegible]
100	66.8	71.7	76.1	75.5	77.5	76.1	80.8	83.0	80.6	81.3	83.2	81.8	79.5
125	67.6	71.4	76.0	78.1	78.5	80.2	81.6	82.4	82.3	82.3	82.4	81.8	80.2
160	72.1	74.9	77.6	79.6	80.0	80.7	80.8	81.9	81.5	81.2	80.8	80.2	77.6
200	72.4	75.3	74.3	75.8	76.0	75.4	76.5	77.8	77.9	77.8	76.9	76.3	73.9
250	67.3	70.2	72.1	74.1	74.1	74.0	75.7	77.4	78.2	78.5	79.1	77.9	75.1
315	69.1	72.2	75.3	75.3	77.5	79.0	80.2	79.3	79.7	79.6	78.2	77.4	74.9
400	67.8	71.8	72.8	76.1	77.0	76.9	77.5	79.1	79.5	80.2	79.7	76.9	74.1
500	67.7	70.3	73.0	75.8	77.3	76.9	77.6	78.8	79.4	80.6	80.4	76.6	72.9
630	69.1	73.2	74.0	75.8	76.6	77.3	78.3	79.6	79.7	81.8	81.1	77.6	73.2
800	67.3	71.1	73.4	75.4	77.8	76.9	77.5	78.8	79.9	81.8	81.1	77.2	73.8
1000	69.3	73.2	75.1	76.4	78.0	77.6	77.8	79.0	81.6	81.7	81.7	77.4	72.4
1250	80.3	85.1	84.7	84.2	84.8	81.8	81.7	83.6	83.8	87.3	89.3	84.1	79.4
1600	74.7	79.5	79.5	79.2	80.4	78.3	80.2	82.6	83.1	85.3	85.0	79.9	75.1
2000	73.4	77.1	79.6	80.0	78.1	79.9	80.8	81.4	86.0	83.1	84.8	80.0	73.0
2500	77.5	79.4	83.6	79.9	84.0	82.5	81.6	83.6	84.8	88.2	89.0	80.5	78.1
3150	74.5	79.7	81.3	81.7	81.4	81.1	83.3	83.6	86.4	88.0	87.8	81.9	74.9
4000	78.2	80.3	85.3	82.7	83.7	84.3	83.7	85.7	86.7	87.3	89.5	81.6	76.9
5000	77.0	81.0	83.0	82.5	81.8	83.3	83.7	84.1	86.6	88.5	88.1	80.5	76.0
6300	75.5	80.3	82.3	81.1	81.2	82.1	82.5	83.5	85.3	85.2	85.8	78.7	73.9
8000	74.0	78.9	81.2	80.2	79.5	80.5	79.6	80.8	83.4	84.5	83.7	77.4	71.7
10000	70.1	75.7	78.3	78.4	77.9	78.0	76.8	78.2	80.7	81.2	79.6	73.9	67.9
OVERALL CALCULATED	87.3	91.2	93.2	92.7	93.5	93.5	93.9	95.3	96.5	97.6	98.1	93.1	89.5
PNDB	100.7	103.9	107.2	106.1	106.9	107.2	107.2	108.8	110.1	111.2	111.9	105.9	101.4

Table A-41.
Variable Pitch Fan
75% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Nominal Stagger (-1.6°)
Small Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F, 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	PWL
50	73.9	72.2	73.0	74.2	74.2	74.8	75.5	77.1	77.5	78.8	79.9	81.9	85.5	88.3	128.7
63	70.7	72.7	72.2	73.2	72.9	74.2	75.4	76.2	76.9	78.2	79.1	81.6	85.0	88.5	128.4
80	70.2	71.3	73.3	73.6	73.4	74.6	75.6	75.9	76.8	78.4	79.3	81.5	83.8	85.7	127.5
100	73.4	75.1	75.9	77.1	76.8	78.9	80.6	80.4	80.9	79.4	79.8	81.8	82.1	83.1	129.1
125	70.6	71.4	71.4	72.8	72.4	72.6	72.9	73.2	74.4	76.2	77.3	79.3	80.9	81.4	125.1
160	71.0	70.7	70.6	71.8	71.8	73.9	74.5	74.9	76.8	79.1	80.5	82.2	84.9	85.0	127.8
200	73.9	75.4	76.5	78.1	79.9	78.5	79.4	81.8	83.9	84.5	85.6	87.6	88.7	87.8	132.8
250	77.6	79.7	82.0	82.4	81.4	82.2	83.9	84.8	85.4	87.0	87.7	88.8	89.2	87.8	134.9
315	83.1	83.7	84.7	86.2	85.2	84.4	85.9	85.3	86.4	86.7	88.0	87.8	87.5	85.9	135.7
400	83.5	84.1	81.6	82.1	82.4	81.8	83.6	84.4	85.1	85.9	85.8	85.0	84.9	83.5	133.8
500	80.4	82.0	81.0	81.5	80.7	80.0	81.0	82.6	84.0	84.8	87.0	86.9	85.8	84.5	133.3
630	84.0	85.9	83.7	84.1	84.4	85.0	85.2	86.3	84.9	88.1	87.6	87.6	87.7	86.7	136.0
800	82.7	83.9	83.0	83.4	83.6	83.5	85.0	85.5	86.3	88.4	88.8	86.9	85.6	86.0	135.6
1000	83.9	85.4	85.3	84.2	85.3	84.5	85.2	86.5	87.0	90.0	91.1	87.7	86.1	85.4	136.9
1250	84.8	86.4	84.9	84.6	85.1	85.1	85.9	87.6	89.0	91.9	91.5	89.9	86.7	86.4	138.0
1600	84.8	87.1	85.9	85.6	87.6	85.6	85.6	87.1	88.5	91.5	91.7	89.0	87.1	85.3	138.2
2000	84.7	87.4	85.6	85.6	87.6	85.6	88.1	87.1	89.7	92.1	93.4	89.0	88.4	84.6	138.8
2500	92.0	93.6	92.4	91.3	90.9	87.8	88.3	86.2	91.1	93.4	96.8	92.2	88.7	89.1	142.3
3150	86.0	89.3	85.8	86.6	85.8	83.8	86.3	87.7	89.9	92.3	92.7	88.5	87.6	85.8	139.1
4000	88.9	90.4	90.0	89.7	86.6	86.8	87.3	86.9	92.4	90.7	93.6	90.7	87.1	86.6	140.5
5000	92.5	92.1	92.4	87.8	91.6	90.1	88.4	91.2	91.3	96.0	98.5	91.2	92.6	89.1	143.7
6300	91.1	93.0	91.0	90.5	88.6	87.8	89.6	88.5	92.4	95.2	95.4	91.6	89.9	87.8	142.9
8000	93.3	93.1	92.8	89.8	89.5	89.6	89.4	90.2	92.7	94.1	96.8	92.3	90.8	88.7	144.1
10000	91.6	93.3	92.1	90.1	88.7	88.2	89.5	88.2	91.9	94.4	94.5	91.0	90.3	88.5	144.0
12500	91.5	91.8	91.0	89.8	87.4	87.7	86.6	86.7	90.3	91.4	92.8	88.3	89.2	86.4	143.6
16000	89.8	90.0	89.6	87.3	85.0	[illegible]	84.0	84.0	88.6	90.2	90.8	87.6	87.8	85.2	143.8
20000	86.6	87.9	86.3	84.3	82.1	81.8	80.5	81.6	84.9	86.5	86.9	84.0	84.1	82.5	143.1
OVERALL MEASURED	100.7	101.8	101.3	100.8	99.5	98.4	99.3	99.6	102.1	103.6	105.0	102.2	101.8	101.8	
OVERALL CALCULATED	101.6	102.7	101.8	100.4	100.1	99.3	99.7	100.3	102.7	104.8	106.2	102.7	102.1	100.9	153.9
PNDB	113.7	115.0	114.0	113.1	113.2	112.1	112.0	113.4	115.6	117.6	119.6	115.4	115.0	113.0	

Table A-42.
Variable Pitch Fan
75% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Nominal Stagger (-1.6°)
Small Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F, 70 PERCENT REL. HUM. DAY)

50	67.8	71.6	74.0	76.2	76.7	79.1	81.0	80.7	[illegible]	78.6	77.8	78.3	76.4	73.8
63	64.7	67.8	69.4	71.9	72.2	72.9	73.2	73.5	74.2	75.3	75.3	75.6	75.0	71.9
80	65.0	67.1	68.5	70.9	71.6	74.0	74.8	75.1	76.6	78.2	78.4	78.5	79.0	75.3
100	67.8	71.7	74.4	77.1	79.6	78.6	79.7	81.9	83.6	83.5	83.5	83.9	82.6	78.0
125	71.4	75.9	79.8	81.4	81.1	82.3	84.2	84.9	85.1	85.9	85.6	85.0	83.0	77.7
160	76.8	79.8	82.5	85.1	84.8	84.5	86.1	85.3	86.1	85.6	85.8	83.9	81.1	75.7
200	77.0	80.1	79.3	80.9	82.0	81.9	83.8	84.5	84.7	84.7	83.5	81.0	78.5	73.1
250	73.8	77.9	78.6	80.3	80.3	80.0	81.1	82.6	83.6	83.6	84.6	82.8	79.2	73.8
315	77.2	81.7	81.3	82.8	83.9	85.0	85.3	86.3	86.4	86.8	85.2	83.4	81.0	75.8
400	75.8	79.7	80.5	82.1	83.1	83.4	85.1	85.5	85.7	87.1	86.3	82.6	78.8	74.9
500	76.9	81.1	82.7	82.9	84.7	84.4	85.3	86.4	86.4	88.6	88.5	83.3	79.1	74.1
630	76.9	81.9	82.3	83.2	84.5	84.9	85.9	87.4	88.4	90.4	88.9	85.5	79.5	74.8
800	77.4	82.5	83.2	84.1	87.0	85.4	85.5	86.9	87.8	90.1	89.0	84.5	79.8	73.4
1000	77.3	82.7	82.9	84.1	86.9	85.4	86.0	86.8	89.0	90.5	90.6	84.4	78.9	72.4
1250	84.4	88.8	89.6	89.8	90.2	87.5	88.1	87.9	90.4	91.8	94.0	87.4	83.0	76.6
1600	78.1	84.4	82.9	84.9	85.0	83.5	86.1	87.4	89.1	90.6	89.7	85.6	79.7	72.9
2000	80.8	85.4	87.0	88.1	85.8	86.5	87.1	86.6	91.7	89.1	90.6	85.6	79.0	73.3
2500	84.2	86.9	89.2	86.1	90.7	89.7	88.2	90.8	90.4	94.3	95.4	86.1	84.3	75.4
3150	82.6	87.7	87.8	88.7	87.8	87.5	89.5	88.3	91.7	93.5	92.2	86.4	81.3	73.6
4000	84.4	87.7	89.7	88.2	88.8	89.5	89.5	90.1	92.0	92.5	93.7	86.9	81.9	73.8
5000	83.0	88.4	89.5	89.0	88.6	88.6	90.1	88.6	91.8	93.3	91.9	86.1	81.8	73.6
6300	82.6	86.2	88.6	88.2	87.7	88.5	87.7	87.6	90.6	90.6	90.3	83.4	80.3	70.5
8000	80.5	85.2	87.6	87.1	86.0	87.0	85.8	85.6	89.6	90.0	88.8	82.8	78.5	67.8
10000	76.7	83.1	84.8	84.8	85.9	84.4	83.3	84.2	86.7	87.0	85.4	79.2	74.1	63.0
OVERALL CALCULATED	93.4	97.8	99.0	99.1	99.6	99.3	99.9	100.3	102.2	103.3	103.3	97.9	94.2	88.1
PNDB	107.1	111.1	112.6	112.3	113.0	112.9	113.2	113.7	115.6	116.8	117.0	110.9	107.1	99.5

Table A-43.
Variable Pitch Fan
75% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Δ Stagger = 10.4°
Small Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F, 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	PNL
50	72.6	71.2	72.2	73.4	73.5	74.5	74.5	77.1	77.7	78.9	78.8	81.6	84.9	87.5	128.1
63	70.9	71.9	71.8	72.7	72.4	73.7	74.2	76.0	76.4	77.7	78.7	81.3	84.6	87.8	127.8
80	69.3	70.0	72.4	72.3	72.3	73.8	74.6	75.4	76.8	78.5	78.8	81.2	83.7	85.6	127.2
100	72.8	75.3	75.3	77.7	74.6	74.6	74.5	75.2	76.6	79.0	82.1	81.4	83.0	82.7	127.7
125	70.3	75.1	73.7	76.7	73.1	72.4	72.6	72.6	74.5	78.5	81.9	80.2	81.0	81.0	126.6
160	69.3	69.1	69.6	70.1	70.2	71.3	72.3	73.6	75.5	77.6	79.3	81.4	83.9	84.2	126.6
200	71.1	73.2	76.4	77.6	75.7	76.9	79.3	80.6	83.0	83.9	84.7	86.5	87.4	87.0	131.8
250	75.9	77.7	79.8	80.5	79.8	81.1	82.3	83.6	85.1	86.0	86.7	88.0	88.1	87.3	133.8
315	80.3	81.6	82.3	85.3	81.3	82.3	83.8	83.0	85.3	84.6	86.7	87.5	86.9	85.[illegible]	134.2
400	80.4	80.2	78.3	79.5	78.5	79.2	79.8	81.0	82.4	82.7	82.8	83.4	84.0	83.[illegible]	131.0
500	76.0	76.2	76.3	76.6	76.0	77.9	77.5	78.7	80.4	81.4	83.0	84.6	84.2	82.4	129.9
630	77.6	77.6	77.9	78.6	80.6	80.1	81.1	82.1	83.2	84.1	82.9	84.5	84.3	82.2	131.7
800	76.2	76.2	75.0	78.1	78.6	79.0	80.1	80.1	81.4	82.9	83.7	83.1	82.7	81.1	130.5
1000	75.7	75.2	76.0	78.7	79.2	79.1	80.4	80.9	82.1	84.4	84.6	83.9	82.3	80.4	131.3
1250	74.3	76.4	76.7	78.6	78.5	79.0	80.0	81.3	82.2	85.5	85.6	84.5	82.3	81.1	131.7
1600	76.8	75.3	77.7	79.[illegible]	80.5	79.4	80.0	81.3	83.0	85.8	85.3	84.0	82.1	80.8	132.1
2000	76.6	77.6	77.4	78.2	79.7	80.0	80.0	81.5	84.2	85.0	85.3	84.2	81.8	80.3	132.1
2500	82.3	85.8	83.6	83.1	82.9	81.2	81.1	83.0	84.9	86.1	88.8	86.2	82.7	81.4	134.8
3150	89.4	93.6	90.9	90.4	88.9	86.5	86.4	88.2	88.1	91.2	91.9	89.4	87.2	85.1	140.2
4000	82.4	83.6	83.5	82.4	81.0	82.3	83.2	83.6	88.7	86.5	89.2	87.0	81.3	82.0	135.8
5000	85.8	84.8	85.9	83.1	84.6	83.4	83.4	86.7	86.1	90.9	93.1	86.8	85.6	83.1	138.0
6300	87.6	89.2	89.5	89.2	86.2	84.2	86.2	86.5	90.0	92.0	92.0	88.7	86.3	83.7	140.0
8000	87.6	87.2	87.9	83.9	84.1	85.0	85.1	86.7	89.1	90.5	92.4	88.2	86.4	83.9	139.6
10000	85.6	85.9	86.0	83.7	83.0	83.7	84.7	85.0	89.2	91.3	90.9	87.7	85.3	83.2	139.8
12500	85.4	84.4	85.0	83.5	81.5	83.0	82.7	85.0	87.6	88.7	89.4	85.9	83.8	81.5	139.6
16000	83.8	83.5	83.3	82.1	79.1	80.6	80.0	81.1	85.0	87.1	86.4	84.5	81.8	79.5	139.2
20000	79.2	80.9	79.7	78.7	76.1	[illegible]7.0	75.6	77.6	81.7	82.7	82.1	80.7	78.1	75.6	138.0
OVERALL MEASURED	96.2	97.0	97.1	96.1	95.0	94.8	95.6	97.3	98.5	100.3	101.0	99.2	99.0	98.5	
OVERALL CALCULATED	96.4	98.2	97.3	93.[illegible]	95.5	95.2	95.8	97.0	99.2	100.9	101.8	99.8	98.8	98.1	149.9
PNDB	109.9	112.6	111.2	110.6	109.8	108.7	109.1	110.5	111.9	113.9	114.9	112.8	111.1	109.6	

Table A-44.
Variable Pitch Fan
75% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Δ Stagger = 10.4°
Small Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F, 70 PERCENT REL. HUM. DAY)

50	66.3	71.8	73.4	76.8	74.5	74.9	74.9	75.4	76.4	78.1	80.1	77.9	77.3	73.4
63	64.4	71.5	71.7	75.8	72.9	72.6	73.0	72.9	74.3	77.6	79.9	76.6	75.2	71.5
80	63.3	65.4	67.6	69.1	70.0	72.0	72.6	73.8	75.3	76.7	77.2	77.7	77.9	74.5
100	65.0	69.4	74.3	76.6	75.4	77.1	79.6	80.7	82.8	82.9	82.5	82.8	81.3	77.1
125	69.7	73.9	77.6	79.5	79.5	81.2	82.6	83.7	84.7	85.0	84.5	84.2	81.9	77.2
160	73.9	77.7	80.1	84.2	81.0	82.4	84.0	83.7	84.9	83.5	84.4	83.6	80.6	75.2
200	73.9	76.2	76.0	78.3	78.1	79.3	80.0	81.0	82.0	81.6	80.5	79.4	77.5	72.7
250	69.4	72.2	73.9	75.4	75.6	77.9	77.7	78.7	79.9	80.2	80.7	80.5	77.6	71.7
315	70.9	73.5	75.5	77.3	80.1	80.0	81.2	82.1	82.8	82.8	80.5	80.4	77.8	71.4
400	69.3	71.9	72.5	75.8	78.1	78.9	80.2	80.1	80.9	81.6	81.2	78.9	75.8	70.0
500	68.7	70.9	73.5	77.3	78.6	79.0	80.4	80.8	81.6	83.1	82.2	79.5	75.3	69.0
630	67.2	71.9	74.0	77.2	77.9	78.9	80.0	81.1	81.6	84.1	83.0	80.0	75.2	69.4
800	69.5	73.8	74.9	77.5	79.9	79.2	80.0	81.1	82.3	84.3	82.6	79.4	74.7	68.9
1000	74.9	81.2	80.9	81.7	82.3	81.0	81.2	82.8	84.3	84.7	86.2	81.6	75.3	69.3
1250	81.9	89.0	88.2	88.9	88.3	86.4	86.5	88.1	87.5	89.7	89.2	84.8	79.7	72.8
1600	74.7	78.9	80.7	81.0	80.4	82.2	83.3	83.5	88.1	85.1	86.4	82.3	73.6	69.3
2000	77.8	79.9	83.0	81.6	83.9	83.2	83.4	86.5	85.4	89.4	90.2	81.9	77.7	70.0
2500	79.7	84.4	86.7	87.9	85.8	84.3	86.4	86.6	89.5	90.6	89.3	83.9	78.3	70.4
3150	79.7	82.5	85.4	82.8	84.0	85.3	85.6	87.1	88.9	89.3	89.9	83.5	78.5	70.3
4000	77.6	82.4	83.7	82.9	83.2	84.4	85.5	85.7	89.3	90.4	88.6	83.2	77.3	69.1
5000	78.0	82.7	83.5	83.5	82.6	84.6	84.5	86.6	88.7	88.8	87.9	82.1	76.4	67.8
6300	76.9	80.5	82.8	83.2	81.3	83.4	83.0	83.9	87.2	88.2	85.9	81.5	74.9	65.6
8000	72.5	78.7	80.3	81.1	79.6	81.2	80.0	81.8	85.2	85.1	82.6	78.5	71.4	60.8
10000	66.2	73.2	75.1	76.2	74.9	76.5	75.3	77.1	80.5	80.2	77.5	72.9	65.2	53.0
OVERALL CALCULATED	88.9	93.8	95.0	95.6	95.2	95.4	96.1	97.2	99.0	99.6	99.3	95.3	91.3	85.7
PNdB	102.2	106.3	108.2	109.1	108.1	108.8	109.3	110.5	112.5	113.4	112.8	107.8	102.9	95.6

Table A-45.
Variable Pitch Fan
100% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Δ Stagger = 1.4°
Small Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F, 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	( )	( )	( ) PNL
50	75.8	73.4	75.5	76.2	77.0	77.2	77.1	79.2	80.5	81.5	82.9	85.9	90.0	94.0			132.8
63	73.8	74.2	75.4	75.9	78.7	76.9	77.8	79.2	79.9	81.7	83.0	85.9	90.2	93.5			132.6
80	72.9	73.8	76.0	75.5	78.3	77.5	77.9	78.8	80.1	81.5	82.8	85.3	89.3	93.1			132.3
100	74.7	77.6	78.8	78.6	77.6	77.5	78.3	79.3	79.8	81.3	83.4	84.8	87.8	90.1			131.3
125	74.5	77.4	77.2	77.5	75.4	75.6	76.1	77.1	78.7	80.9	83.2	83.9	86.4	89.8			130.4
160	72.4	72.1	73.4	73.9	74.3	76.0	77.0	79.1	80.6	82.9	85.3	87.7	90.9	91.9			133.0
200	75.8	77.4	79.3	80.7	78.7	81.7	84.2	86.2	88.7	88.8	90.5	92.8	94.6	93.8			137.4
250	80.7	82.5	80.6	84.2	83.8	84.8	86.8	86.6	89.3	90.8	91.8	94.1	94.6	92.9			139.0
315	88.4	86.8	88.3	87.5	87.8	88.0	88.7	88.8	89.8	91.1	91.8	92.1	92.3	91.8			139.4
400	85.1	84.5	82.9	82.9	83.0	82.7	84.6	85.1	84.8	86.3	86.9	88.1	88.6	87.6			135.1
500	81.5	81.6	81.6	82.8	81.1	81.1	83.3	85.5	86.0	88.1	89.4	90.6	89.9	87.8			135.8
630	82.1	82.6	82.6	83.5	84.3	84.8	86.5	86.8	86.7	87.7	87.7	89.2	89.4	87.4			136.2
800	81.3	81.9	81.9	83.1	83.1	83.6	83.8	85.7	86.3	88.7	89.6	89.4	88.6	86.5			136.0
1000	81.8	81.2	82.4	82.8	83.7	83.6	84.8	85.3	85.5	88.4	89.2	87.8	86.8	86.2			135.6
1250	81.1	82.4	82.3	82.7	83.8	83.2	84.9	85.9	85.9	88.7	90.0	88.2	86.8	85.6			136.0
1600	81.3	83.5	82.8	83.2	83.0	84.8	88.2	85.8	86.3	89.3	90.0	87.1	86.6	85.6			136.3
2000	81.4	83.6	83.0	82.7	85.0	84.4	84.9	86.4	87.6	[illegible]	91.8	86.8	85.7	83.8			136.8
2500	88.7	92.6	92.5	88.8	88.9	87.0	87.0	88.6	88.4	92.1	95.1	88.7	88.8	87.4			140.7
3150	94.3	99.4	99.7	94.8	94.2	91.2	91.1	93.4	91.7	97.0	98.2	91.9	91.2	92.6			146.0
4000	87.8	87.7	87.7	86.6	85.8	87.7	88.4	88.9	92.7	91.5	93.9	89.1	86.8	86.8			140.3
5000	98.2	89.1	89.1	86.5	88.1	88.3	89.8	92.3	90.9	96.4	97.3	89.7	91.0	87.4			142.8
6300	92.7	93.1	93.1	92.7	91.1	90.1	90.8	92.3	93.8	97.1	96.8	91.8	91.2	88.4			144.6
8000	90.6	91.1	92.0	88.2	88.3	89.8	90.4	92.2	92.0	95.3	97.8	90.6	90.4	88.1			144.1
10000	89.5	91.2	91.0	88.6	88.0	89.2	88.8	90.4	91.8	95.2	96.2	90.3	89.6	87.8			144.1
12500	89.0	90.2	89.4	87.9	86.5	88.2	89.1	91.5	91.3	93.4	95.4	89.1	88.2	85.9			144.5
16000	87.6	88.0	88.0	85.7	83.6	85.5	85.9	86.8	88.3	91.8	92.0	87.0	86.6	83.6			143.8
20000	84.1	85.2	85.0	82.6	81.0	82.4	81.9	82.8	84.3	87.4	88.0	83.8	83.4	80.5			142.7
OVERALL MEASURED	100.2	102.1	102.8	99.7	98.5	99.8	100.2	101.7	102.0	104.5	105.5	103.5	104.3	103.8			
OVERALL CALCULATED	101.1	103.2	103.4	100.8	100.4	100.8	101.6	102.4	102.8	105.6	107.1	103.7	104.4	103.9			154.7
PNDB	114.8	118.0	118.2	115.1	114.8	113.5	114.0	115.7	115.7	119.1	120.4	116.0	117.1	115.9			

Table A-46.
Variable Pitch Fan
100% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Δ Stagger = 1.4°
Small Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59, DEG, F, 70 PERCENT REL, HUM, DAY)

50	68.9	74.1	76.6	77.7	77.4	77.8	78.7	79.6	79.7	80.5	81.4	81.4	81.3	80.8
63	68.6	73.8	75.2	76.6	75.2	75.8	78.5	77.3	78.5	80.8	81.2	80.4	80.3	79.5
80	66.4	68.4	71.3	72.8	74.1	76.2	77.3	79.2	80.3	81.9	83.2	84.1	84.9	82.8
100	68.9	73.7	77.2	79.7	79.4	81.9	84.5	86.3	86.4	87.8	88.4	88.8	88.5	83.1
125	74.5	78.7	81.4	83.1	83.5	84.9	87.1	88.7	89.0	89.8	89.6	90.2	88.4	82.9
160	82.1	82.9	86.8	86.4	87.4	88.1	89.9	88.9	89.4	90.0	89.3	88.2	86.0	80.9
200	78.8	80.5	80.8	81.7	82.6	82.7	84.8	85.1	84.4	85.2	84.6	84.1	82.1	77.8
250	74.9	77.0	79.3	80.8	80.7	81.1	83.4	85.5	85.6	86.9	87.0	86.5	83.3	77.8
315	75.4	78.4	80.1	82.8	83.8	84.7	86.6	86.7	86.8	86.4	85.3	85.0	82.6	76.8
400	74.4	77.7	79.3	81.8	82.6	83.5	85.9	85.7	85.7	87.4	87.1	85.1	81.7	75.8
500	74.0	76.9	79.9	81.5	83.1	83.5	84.8	85.4	84.9	87.0	86.6	83.5	79.8	74.9
630	74.8	77.9	79.6	81.3	83.1	83.1	84.9	85.7	85.3	87.3	87.3	83.7	79.7	74.8
800	74.8	78.9	80.1	81.8	83.3	84.8	85.2	85.7	85.7	87.8	87.3	82.5	79.2	73.4
1000	81.3	88.1	89.8	87.4	88.3	86.9	87.8	88.5	87.8	90.7	92.4	84.2	81.4	75.8
1250	86.8	94.8	97.0	93.4	93.6	91.0	91.1	93.3	91.1	95.5	95.5	87.3	86.7	80.8
1600	79.4	83.0	84.9	85.2	88.2	87.6	88.4	88.8	92.1	90.0	91.2	84.4	79.1	73.6
2000	82.3	84.2	86.7	88.8	88.5	89.2	89.8	92.1	90.2	94.8	94.5	84.8	83.0	74.3
2500	84.8	88.3	90.3	91.4	90.7	90.1	91.8	92.3	93.3	95.8	94.1	87.0	83.3	75.1
3150	82.5	86.4	89.5	87.1	88.1	90.1	90.9	92.6	91.9	94.1	95.2	85.9	82.5	74.5
4000	81.5	86.7	88.7	87.8	88.1	88.8	90.7	91.1	91.3	94.4	93.9	85.8	81.6	72.9
5000	81.7	86.5	88.8	88.8	87.6	89.8	90.5	93.1	92.3	93.5	94.0	85.3	80.8	72.8
6300	80.7	85.1	87.6	86.9	85.8	88.3	88.9	89.6	90.8	93.0	91.6	84.1	79.7	69.9
8000	77.4	83.0	85.5	85.0	86.5	86.6	86.3	87.0	87.9	89.8	88.5	81.6	76.7	65.7
10000	71.1	77.4	80.4	80.1	79.8	81.9	81.6	82.3	83.1	84.9	83.4	76.1	70.4	57.9
OVERALL CALCULATED	93.6	98.8	100.9	99.7	100.1	100.8	101.4	102.7	102.8	104.7	104.8	99.2	97.8	91.8
PNDB	108.6	110.6	113.8	112.9	113.8	113.7	114.6	115.9	115.9	118.1	118.1	111.8	107.8	100.9

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR.

Table A-47.
Variable Pitch Fan
44% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Nominal Stagger (-1.6°)
Large Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F, 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	PWL
50	69.2	67.0	68.3	67.3	67.4	68.5	67.8	68.6	70.9	70.7	71.8	72.7	73.1	77.8	120.3
63	67.0	67.5	68.0	67.5	66.9	70.3	69.0	69.8	69.0	70.6	71.8	72.2	74.0	78.5	120.1
80	63.4	65.6	66.4	65.8	66.8	67.4	67.5	68.8	68.4	69.8	70.8	70.5	72.3	78.1	118.8
100	68.5	66.7	67.0	68.7	67.8	69.6	67.6	68.3	68.9	69.6	70.3	70.1	70.4	73.8	118.9
125	63.8	64.2	64.0	65.5	66.2	64.4	67.4	65.9	67.4	67.9	66.1	68.1	69.8	74.6	118.6
160	65.8	63.9	63.1	63.9	64.3	66.0	66.0	66.5	68.1	67.8	70.8	69.8	71.1	74.5	117.6
200	69.3	67.8	70.0	71.8	70.1	70.0	70.9	74.1	75.8	74.9	75.1	76.1	75.1	79.6	122.8
250	69.6	72.8	73.3	73.7	74.1	75.2	75.2	76.5	77.2	77.6	78.3	78.4	77.7	78.6	125.7
315	70.3	71.7	72.8	74.4	73.8	73.8	73.8	73.4	74.9	74.9	75.7	75.6	75.1	73.9	123.8
400	70.9	71.5	69.8	68.4	68.8	69.8	67.8	69.3	69.7	70.3	71.1	72.6	72.7	70.8	119.5
500	78.1	69.9	70.8	69.3	68.7	68.6	69.5	69.8	71.1	70.9	72.8	72.8	72.6	71.8	120.4
630	74.8	79.8	76.5	75.8	75.7	75.5	77.7	74.7	77.8	76.7	77.2	76.9	79.8	79.3	126.5
800	73.4	75.9	73.2	69.9	71.9	71.1	71.1	72.3	73.6	74.1	75.8	73.9	74.2	72.8	122.4
1000	68.9	72.0	69.9	70.4	70.1	70.4	71.6	72.1	73.1	75.0	74.8	74.3	72.6	71.8	122.4
1250	71.5	74.7	72.2	74.3	71.8	71.7	72.9	74.4	74.2	73.3	78.9	78.8	74.8	74.1	125.4
1600	75.9	77.4	76.4	75.5	76.8	74.7	75.4	75.4	77.8	74.8	81.9	81.8	78.8	76.6	128.0
2000	81.2	83.0	82.2	80.9	80.8	78.9	78.5	78.8	81.7	83.1	85.8	86.6	84.2	81.8	132.6
2500	74.4	76.4	79.4	73.1	73.0	72.4	72.1	73.8	79.8	78.6	82.2	80.7	79.7	74.1	127.0
3150	75.2	81.9	80.7	75.9	74.6	72.9	74.8	77.5	83.3	81.3	85.2	85.2	77.8	78.8	129.0
4000	79.8	81.6	81.5	80.1	76.9	77.3	77.8	78.7	83.8	82.6	85.8	85.2	78.7	78.8	132.1
5000	81.2	79.9	81.7	76.9	78.7	77.8	76.2	80.3	80.0	84.6	86.6	84.6	81.9	79.1	133.1
6300	83.1	82.3	81.7	80.2	77.8	76.8	77.5	78.7	82.8	84.7	86.8	86.4	79.6	77.8	133.4
8000	81.7	82.2	82.7	77.1	77.2	77.2	76.7	77.1	81.8	82.6	87.1	85.8	77.6	78.8	133.5
10000	80.5	82.0	82.8	79.0	77.8	76.3	75.6	77.3	80.4	82.1	85.1	82.6	79.8	77.7	133.3
12500	80.1	80.1	80.5	77.3	74.8	74.4	72.6	75.1	77.2	79.2	82.8	79.3	77.2	75.8	132.1
16000	78.4	76.6	79.3	75.4	72.6	72.9	70.8	72.8	74.9	77.4	79.6	77.8	75.6	74.5	132.2
20000	75.7	76.2	75.7	72.4	70.6	69.9	66.6	69.1	71.9	73.8	75.6	74.1	73.2	72.8	131.6
OVERALL MEASURED	91.4	91.8	91.8	90.1	89.8	89.9	88.5	89.7	91.3	92.8	95.2	94.3	92.6	92.0	
OVERALL CALCULATED	90.7	91.7	91.7	89.7	88.6	89.1	88.8	89.4	91.8	93.4	96.8	95.8	91.6	91.1	143.3
PNDB	102.9	104.2	104.0	102.6	101.8	100.8	100.7	102.5	103.4	106.4	109.8	107.8	105.3	105.0	

Table A-48.
Variable Pitch Fan
44% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Nominal Stagger (-1.6°)
Large Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59, DEG, F, 70 PERCENT REL, HUM, DAY)

50	62.8	63.2	65.0	67.8	67.7	69.9	68.0	68.6	68.0	68.7	68.5	66.6	63.7	60.5
63	57.9	60.7	62.0	64.6	65.9	64.7	65.8	66.1	67.2	66.5	64.7	64.5	63.6	55.2
80	59.8	61.3	61.1	62.9	64.1	67.0	66.4	66.7	67.9	66.6	68.0	66.1	65.2	64.8
100	63.2	64.0	67.9	70.0	69.7	70.1	71.8	74.3	74.9	73.9	73.0	72.4	69.0	65.7
125	63.4	68.2	71.1	72.7	73.9	79.3	75.4	76.6	76.9	76.5	76.1	74.6	71.8	66.9
160	63.9	67.8	70.5	73.3	73.9	73.5	73.4	73.8	74.1	73.8	73.6	71.7	68.7	63.6
200	63.5	66.5	66.7	67.3	68.4	69.1	68.0	69.4	69.3	69.2	68.8	66.6	64.2	60.4
250	63.5	65.8	68.5	68.1	68.3	68.6	67.6	69.5	70.6	69.3	70.4	68.7	66.0	61.1
315	68.1	70.9	74.1	73.7	75.2	75.4	77.8	74.7	76.8	75.8	74.8	72.7	72.5	68.4
400	63.5	66.6	67.7	68.6	71.9	71.0	71.1	72.2	73.1	72.8	72.5	69.3	67.3	61.4
500	61.9	65.7	67.4	69.0	69.5	70.3	71.6	72.0	72.6	73.7	73.5	70.0	65.7	60.4
630	68.4	73.1	73.9	74.1	76.1	74.6	74.5	75.3	76.9	78.4	79.0	77.4	71.7	65.1
800	74.6	78.5	79.5	79.5	80.3	78.8	79.5	78.7	81.1	81.7	82.7	82.1	76.9	70.0
1000	67.6	71.8	72.7	71.7	72.9	72.3	72.1	73.7	75.3	77.2	79.5	76.1	68.3	62.0
1250	68.2	74.3	74.0	74.5	74.0	72.6	74.7	77.4	78.7	79.8	80.4	76.6	69.6	63.2
1600	72.2	76.9	78.8	78.6	75.7	77.2	77.1	78.6	82.9	80.6	83.0	80.5	71.0	65.6
2000	73.3	75.0	78.8	75.3	78.1	77.6	76.2	80.1	79.8	83.1	85.7	79.7	74.0	65.5
2500	72.1	77.5	79.0	78.9	76.3	76.8	77.7	78.7	82.3	83.3	84.1	81.6	71.7	64.5
3150	73.7	77.8	80.1	78.0	77.0	77.5	77.2	79.4	81.3	81.5	84.5	80.3	71.6	64.6
4000	72.5	77.4	79.9	78.1	77.1	77.0	76.8	78.0	80.5	82.1	82.8	78.1	71.4	63.6
5000	72.8	76.3	79.1	77.3	75.9	76.0	74.4	76.7	78.3	79.3	81.0	75.6	69.8	62.1
6300	71.9	75.6	78.8	76.5	74.8	75.7	73.0	75.6	76.6	78.6	79.4	74.8	68.7	60.6
8000	69.1	74.0	76.3	74.8	74.2	74.1	71.0	73.3	75.4	76.2	76.1	71.9	66.6	58.0
10000	62.8	68.4	71.1	69.9	69.4	69.5	66.4	68.7	70.7	71.3	71.0	66.3	60.3	58.2
OVERALL CALCULATED	83.2	87.3	89.5	88.6	88.3	88.3	88.1	89.5	91.4	92.1	93.8	90.1	84.0	78.4
PNDB	96.6	100.5	102.9	101.6	101.1	101.3	100.9	102.7	104.5	105.4	106.9	103.2	96.0	87.3

Table A-49.
Variable Pitch Fan
44% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Δ Stagger = 1.4°
Large Nozzle

MODEL SOUND PRESSURE LEVELS (PP, DB, F, 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	( )	( )	( )	PWL
50	66.8	67.8	66.8	69.8	67.8	69.8	67.7	69.1	70.7	70.5	71.2	71.9	72.3	69.6				120.6
63	67.3	66.5	67.5	68.7	67.8	70.1	65.9	68.4	69.5	70.1	70.2	71.6	72.5	77.6				120.2
80	63.6	69.1	67.3	68.6	68.2	70.8	70.7	70.2	67.8	70.5	71.2	70.2	72.1	70.4				120.0
100	63.7	67.2	66.2	70.4	69.9	67.8	67.1	67.5	68.1	68.9	70.8	70.9	71.2	70.8				118.7
125	64.6	64.8	64.8	68.7	68.9	68.9	69.9	68.8	68.6	68.3	68.8	67.9	69.8	72.9				118.8
160	63.9	65.8	63.5	68.6	68.8	68.6	68.8	68.8	69.3	68.7	69.8	69.6	71.8	71.0				117.5
200	65.6	69.5	69.2	69.7	69.2	70.8	70.8	71.9	72.7	73.2	74.0	74.7	74.0	70.3				121.5
250	67.8	70.2	72.5	73.2	73.2	74.5	75.1	76.8	76.8	77.1	77.0	77.2	76.8	70.7				124.9
315	69.9	70.8	72.8	73.4	73.5	72.9	72.5	73.5	76.8	74.1	74.4	74.7	74.2	74.1				123.1
400	68.7	67.6	69.1	69.4	69.7	68.4	68.7	68.3	69.2	70.1	70.8	70.6	70.9	71.1				119.3
500	69.1	68.8	72.1	68.3	69.8	69.5	68.5	69.5	70.3	70.8	71.7	72.3	71.8	72.6				120.1
630	74.2	79.5	75.5	74.2	78.3	79.1	77.5	79.1	78.8	76.7	74.1	74.7	72.6	72.3				126.3
800	68.9	68.9	68.8	68.8	70.8	71.1	72.8	71.8	71.8	73.0	73.8	75.3	77.2	72.1				121.3
1000	68.2	68.6	68.6	69.1	69.8	69.6	69.3	70.3	73.1	73.1	74.0	72.5	70.9	70.3				120.7
1250	72.8	75.2	72.5	75.5	72.9	72.7	71.9	74.9	77.8	82.0	81.8	75.9	75.8	75.9				127.1
1600	74.8	74.2	73.3	72.7	73.9	72.8	72.4	73.6	74.9	76.9	78.1	78.4	79.7	74.4				123.2
2000	71.4	75.8	71.9	71.4	71.3	71.1	73.5	81.3	82.6	81.3	85.8	80.8	81.1	81.6				133.1
2500	73.2	73.8	72.9	71.2	71.3	70.8	73.6	73.8	74.3	77.1	81.8	80.6	75.4	72.8				125.2
3150	73.7	75.4	72.9	73.4	72.2	70.9	73.1	75.8	77.7	79.7	81.7	79.3	75.7	73.6				127.1
4000	79.4	81.8	79.5	79.8	75.3	76.6	76.6	77.2	82.8	80.7	84.6	80.4	77.9	77.6				131.2
5000	71.3	77.8	78.6	74.8	76.7	75.8	74.7	79.8	79.1	83.1	86.8	83.1	77.8	77.4				131.2
6300	71.9	77.5	78.9	76.2	75.3	75.3	75.8	77.2	81.9	83.4	85.1	85.1	76.1	76.6				131.8
8000	79.9	79.5	79.3	76.8	75.2	76.8	79.7	78.1	80.4	81.8	86.8	84.8	78.3	76.9				132.3
10000	78.8	79.6	78.6	75.8	74.9	74.9	74.8	75.7	79.9	81.6	83.8	81.9	77.8	75.8				131.6
12500	77.4	76.3	74.9	74.6	72.3	72.8	72.1	73.5	76.4	77.3	81.9	78.1	78.2	77.6				130.8
16000	75.9	75.3	74.9	73.1	70.3	70.8	68.8	70.8	73.8	76.1	78.2	77.3	73.2	72.4				130.8
20000	71.9	72.4	71.2	69.8	67.8	68.1	65.4	67.8	79.7	92.1	73.8	72.9	70.2	70.9				129.1
OVERALL MEASURED	90.8	91.1	90.3	89.8	88.9	88.9	87.9	89.2	90.9	92.3	94.8	93.9	91.3	92.8				
OVERALL CALCULATED	89.7	91.2	89.3	88.8	87.8	87.8	87.2	88.6	90.9	92.5	94.8	93.9	92.4	92.9				142.0
PNDB	102.3	102.8	102.8	101.7	100.9	100.3	100.8	101.4	104.2	105.2	107.8	107.2	105.6	102.4				

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

Table A-50.
Variable Pitch Fan
44% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Δ Stagger = 1.4°
Large Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F, 70 PERCENT REL. HUM. DAY)

50	58.3	63.7	64.3	69.2	63.7	67.9	67.8	67.8	68.9	68.0	68.8	67.4	68.4	66.5
63	56.7	63.7	62.2	64.7	64.7	64.2	64.3	64.1	65.2	65.4	64.6	64.3	63.4	64.4
80	58.8	61.8	61.3	63.6	64.6	66.0	66.1	67.0	68.9	67.6	67.4	66.2	65.2	64.4
100	59.5	61.7	67.1	68.7	68.9	70.1	71.1	72.0	72.4	72.2	71.9	71.2	68.4	65.3
125	61.6	66.4	70.3	72.2	72.9	74.9	74.4	76.1	76.1	76.1	75.3	73.4	70.3	65.6
160	62.7	66.1	69.7	72.3	72.8	73.0	72.7	73.6	73.6	73.0	72.1	70.8	67.9	63.9
200	62.8	65.6	66.8	68.2	69.3	68.4	69.1	68.3	68.8	68.9	68.2	66.5	64.0	60.6
250	62.3	64.8	67.8	67.1	68.6	69.0	68.9	69.5	69.9	69.6	69.5	68.2	65.2	61.9
315	67.5	71.3	73.1	72.9	77.8	79.8	77.6	75.1	74.0	75.4	71.7	70.5	67.9	67.4
400	62.6	64.6	66.7	67.8	70.2	71.0	72.6	71.7	71.1	71.7	71.8	68.0	66.3	61.0
500	61.2	64.3	66.1	67.7	68.3	69.5	69.1	70.0	70.8	71.7	71.5	68.2	63.9	59.0
630	64.6	73.0	69.8	74.1	72.3	72.6	71.9	74.7	77.2	80.6	79.1	70.9	66.5	63.3
800	66.7	71.6	70.5	71.9	73.3	72.6	72.4	73.4	75.1	78.4	77.0	73.9	68.4	62.5
1000	75.8	78.9	79.1	79.9	80.6	79.9	79.4	80.1	81.9	81.8	83.0	82.1	76.6	69.4
1250	65.5	68.9	70.8	69.6	70.6	70.6	70.9	72.7	73.6	75.5	77.2	73.5	66.6	59.9
1600	69.8	70.5	70.0	71.8	71.4	70.6	73.0	75.4	74.9	78.1	78.7	74.4	67.5	60.7
2000	71.3	75.8	76.4	78.1	74.6	76.3	76.5	76.9	81.3	79.1	81.6	80.4	69.9	64.6
2500	70.9	72.3	75.5	73.8	75.9	70.4	74.7	75.9	78.3	81.3	83.4	77.9	71.5	63.7
3150	74.4	75.2	75.8	76.5	74.9	75.1	75.7	77.0	80.7	81.7	82.0	79.9	69.6	62.4
4000	71.1	74.1	76.2	74.8	74.9	75.8	79.8	77.9	79.7	80.2	83.4	79.2	69.4	62.0
5000	70.3	74.6	76.8	74.7	74.4	74.5	79.4	78.1	79.3	80.5	80.9	76.9	69.8	60.7
6300	68.5	71.4	74.4	73.8	72.8	73.5	73.1	74.4	76.6	76.5	78.5	73.1	66.3	57.7
8000	66.6	71.5	72.9	72.9	71.3	72.4	71.7	72.4	74.8	75.9	76.1	71.5	63.9	55.0
10000	62.8	67.4	69.7	70.3	69.4	70.7	68.1	70.3	72.0	72.6	72.2	68.1	60.2	51.3
OVERALL CALCULATED	81.6	85.4	86.5	87.0	87.2	87.6	87.2	88.5	90.3	91.1	92.0	89.0	85.6	77.4
PNDB	94.3	96.2	99.5	99.8	99.2	99.9	99.8	101.4	103.6	104.5	105.6	102.6	96.5	87.7

Table A-51.
Variable Pitch Fan
55% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Nominal Stagger (-1.6°)
Large Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F, 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	( )	( )	( )	PWL
50	69.3	67.5	68.4	68.6	69.2	69.9	70.0	71.4	72.2	72.4	73.2	75.0	77.5	79.6				121.9
63	67.7	66.2	68.5	67.6	67.7	70.2	68.9	70.1	71.2	71.5	72.2	74.0	76.2	78.2				120.9
80	65.3	66.3	69.5	70.4	70.7	71.7	71.8	72.9	73.3	72.1	73.3	74.3	75.0	76.5				121.8
100	65.9	68.6	70.6	69.8	68.8	69.4	69.9	70.3	70.6	70.9	72.0	72.4	73.4	74.1				120.2
125	64.9	66.1	66.3	67.7	67.1	68.6	66.3	67.0	67.8	68.7	69.5	70.9	71.6	72.4				117.8
160	66.4	65.7	65.6	66.0	65.8	69.1	67.9	69.0	70.6	72.2	72.6	74.3	75.3	75.8				120.3
200	67.0	67.5	69.7	69.6	70.2	71.9	73.5	75.1	75.4	77.3	77.6	78.2	78.4	78.3				124.5
250	70.7	72.2	75.2	76.2	75.6	77.8	77.9	79.7	80.0	81.2	81.3	81.0	80.5	79.3				128.5
315	72.7	74.2	75.4	76.9	76.9	76.4	75.4	76.7	78.1	78.9	79.5	79.3	78.9	78.9				127.0
400	72.1	72.1	70.9	70.3	70.5	71.0	71.0	72.5	72.9	73.4	73.3	73.9	73.3	73.3				122.0
500	71.2	70.5	72.5	70.5	70.0	71.0	70.2	71.3	72.3	73.1	74.2	75.3	73.7	73.3				122.0
630	78.8	74.9	81.6	74.6	78.2	78.3	76.6	79.6	80.6	76.8	78.3	77.4	80.5	81.1				128.6
800	72.8	72.6	73.8	73.2	74.8	73.6	73.0	73.2	75.5	75.9	76.9	75.6	76.0	72.7				124.7
1000	70.5	71.5	71.0	71.2	71.8	72.8	71.8	73.2	74.0	76.2	77.0	75.1	74.1	74.0				123.6
1250	72.4	74.2	73.5	73.5	73.9	77.2	74.4	75.1	76.4	80.4	80.5	78.0	74.9	74.4				126.7
1600	72.6	73.7	73.4	72.3	74.6	75.1	73.9	75.0	76.2	79.6	80.0	78.4	75.4	74.1				126.3
2000	84.5	85.0	84.0	82.9	83.1	81.3	80.0	82.2	85.5	85.7	88.7	88.3	85.9	85.1				135.1
2500	76.0	77.1	76.0	73.7	74.5	74.5	73.8	76.0	78.1	80.6	84.2	81.5	78.8	75.3				128.6
3150	75.8	77.7	75.2	75.5	75.2	73.6	76.0	78.9	80.2	82.6	84.5	81.2	77.1	76.3				129.7
4000	82.9	83.9	84.5	82.3	79.7	80.2	80.4	80.9	85.8	84.9	90.7	89.2	81.0	80.8				135.5
5000	81.4	80.6	81.6	76.9	80.4	79.9	79.0	82.7	82.4	87.2	90.7	85.9	82.6	79.9				134.8
6300	82.7	84.0	83.8	82.4	79.3	80.0	80.7	81.7	86.0	86.1	89.9	88.3	81.5	80.3				136.1
8000	83.3	83.0	84.3	79.9	79.3	80.7	79.6	82.2	83.9	85.6	90.0	87.0	82.0	80.3				135.9
10000	81.9	83.8	83.6	80.0	78.7	79.6	79.5	80.6	83.1	86.0	87.4	84.8	81.4	79.6				135.6
12500	81.8	81.8	82.3	78.7	77.1	77.9	76.4	78.3	80.6	82.2	85.8	81.6	79.6	77.4				134.7
16000	81.2	80.4	80.4	76.8	74.7	75.5	73.3	75.7	78.7	80.3	82.9	80.2	77.8	76.0				134.6
20000	77.9	77.7	77.8	74.0	72.6	72.3	70.1	72.0	75.4	76.7	78.5	76.1	75.1	73.9				133.9
OVERALL MEASURED	93.6	93.0	93.8	91.6	90.7	91.8	90.5	92.2	93.8	95.2	98.0	95.8	94.7	93.1				
OVERALL CALCULATED	92.6	93.1	93.4	91.8	90.6	90.8	90.2	92.1	94.4	96.0	98.8	96.7	93.4	92.6				145.6
PNDB	104.8	105.6	106.8	104.1	103.2	103.4	103.3	104.9	107.6	109.8	112.1	110.4	106.8	105.1				

Table A-52.
Variable Pitch Fan
55% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Nominal Stagger (-1.6°)
Large Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F. 70 PERCENT REL. HUM. DAY)

50	68.1	65.1	68.7	69.0	68.7	69.6	70.3	70.8	70.4	70.1	70.1	68.9	67.6	64.8
63	59.0	62.6	64.2	66.8	66.9	66.8	66.7	67.3	67.7	67.8	67.5	67.3	65.7	62.9
80	60.4	62.0	63.6	65.0	65.6	69.3	68.2	69.2	70.4	71.3	70.8	70.6	69.3	66.2
100	60.9	63.7	67.6	68.6	69.9	72.1	73.8	75.3	75.1	76.3	75.5	74.5	72.3	68.5
125	64.4	68.4	73.0	75.1	75.3	77.9	78.1	79.8	79.7	80.1	79.1	77.2	74.3	69.2
160	66.3	70.3	73.1	75.8	76.6	76.5	75.6	76.8	77.7	77.8	77.3	75.4	72.5	66.7
200	65.6	68.2	68.6	69.1	70.1	71.1	71.2	72.6	72.5	72.3	71.0	69.9	66.9	62.8
250	64.6	66.4	70.1	69.3	69.6	71.0	70.3	71.3	71.8	71.9	71.8	71.2	67.2	62.6
315	72.0	70.7	79.1	73.3	77.8	78.3	76.7	79.5	80.1	75.6	75.8	73.3	73.8	70.2
400	66.8	68.3	71.3	71.9	74.0	73.5	73.1	75.1	75.0	74.6	74.4	71.3	69.1	64.5
500	63.5	67.2	68.5	69.9	71.2	72.7	71.8	73.1	73.4	74.8	74.5	70.8	67.1	62.7
630	65.3	69.8	70.8	72.1	73.3	77.0	74.4	75.0	75.8	79.0	77.9	73.5	67.8	62.8
800	65.3	69.1	70.7	70.8	73.9	74.9	73.8	74.9	75.5	78.1	77.3	73.8	68.0	62.2
1000	77.0	80.4	81.2	81.4	[illegible]	81.1	79.9	[illegible]	84.8	84.2	86.0	83.6	78.5	72.9
1250	68.3	72.3	73.2	72.1	73.8	74.3	73.7	75.7	77.3	79.0	81.3	76.7	69.1	62.8
1600	67.9	72.7	72.2	73.8	74.4	73.3	75.9	78.6	79.4	81.0	81.5	76.3	69.2	63.4
2000	74.9	78.9	81.5	80.7	78.9	79.9	80.3	80.7	85.0	83.2	87.7	84.2	72.9	67.5
2500	73.1	75.4	78.5	75.1	79.5	79.5	78.8	82.4	81.6	85.5	87.6	80.7	74.3	66.2
3150	74.2	78.7	80.6	80.6	78.6	79.8	80.6	81.4	85.2	86.4	86.7	83.0	73.0	66.1
4000	74.4	77.6	81.1	78.2	78.7	80.6	79.6	82.0	83.3	84.0	86.9	81.6	73.1	65.3
5000	73.3	78.9	81.0	78.9	78.6	80.0	80.1	81.0	83.0	84.9	84.8	79.9	72.8	64.8
6300	72.9	76.9	79.9	77.9	77.4	78.8	77.4	79.1	80.8	81.4	83.4	76.6	70.8	61.5
8000	71.9	75.6	78.4	76.6	75.7	77.1	75.1	77.3	79.6	80.1	80.9	75.4	68.5	58.7
10000	67.9	72.9	76.2	74.5	74.4	74.9	72.7	74.6	77.2	77.2	77.0	71.3	65.1	54.3
OVERALL CALCULATED	84.4	88.1	90.7	89.6	90.0	90.8	90.3	92.0	93.8	94.5	95.9	91.7	85.5	79.9
PNDB	97.5	101.4	103.9	103.1	102.7	104.0	103.7	105.3	107.5	106.4	109.3	105.2	97.5	90.6

Table A-53.
Variable Pitch Fan
55% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Δ Stagger = 1.4°
Large Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F. 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	( )	( )	( )	PNL
50	72.1	71.0	70.6	70.0	69.7	70.2	69.5	71.2	71.8	72.7	73.9	75.2	77.7	81.8				122.7
63	68.1	68.7	68.5	68.2	68.1	70.2	69.2	70.4	70.8	71.9	72.9	73.9	76.5	79.5				121.3
80	65.8	67.1	68.6	69.8	68.5	70.2	71.0	72.5	75.1	74.7	74.0	74.7	75.1	79.6				122.4
100	68.5	65.2	70.7	69.8	68.8	70.3	69.1	70.6	70.4	71.0	72.3	72.8	73.9	77.6				120.7
125	65.6	66.0	66.5	67.7	66.8	66.6	66.9	67.1	67.5	69.4	69.9	70.9	72.2	79.1				119.1
160	66.4	65.4	65.2	65.8	65.8	68.3	67.8	68.8	70.2	71.5	73.3	74.1	75.3	77.4				120.3
200	66.0	67.0	69.0	68.9	69.7	71.4	72.6	74.1	75.5	76.4	77.1	77.6	78.5	79.6				124.1
250	70.5	72.7	75.3	75.9	76.1	76.9	77.6	79.0	79.6	80.2	80.3	81.0	80.4	79.3				128.0
315	72.8	74.0	75.5	77.3	76.9	76.7	76.4	76.8	78.1	78.5	79.0	79.3	78.2	77.5				127.0
400	72.8	72.7	70.7	71.4	71.3	71.6	70.8	71.8	72.7	73.5	73.4	73.6	74.0	74.3				122.2
500	70.9	70.3	70.9	70.3	69.5	69.8	70.5	71.5	71.8	73.2	74.7	75.0	73.9	73.9				121.9
630	75.8	76.2	75.8	74.2	77.7	75.8	76.7	75.7	75.8	76.9	79.0	76.7	77.2	79.3				126.6
800	76.4	75.0	74.1	74.8	78.9	76.3	78.5	75.0	78.0	75.8	79.4	75.5	77.1	78.9				126.8
1000	71.0	72.1	71.6	71.6	71.8	72.1	71.9	73.3	74.4	76.8	77.3	75.3	73.6	73.6				123.8
1250	71.6	73.0	72.5	73.4	77.6	74.7	73.4	74.7	75.0	78.8	79.5	77.6	74.5	73.9				125.9
1600	73.1	74.0	73.8	75.1	81.0	76.2	75.3	75.1	76.5	79.5	80.5	78.4	75.2	78.4				127.5
2000	88.2	88.1	86.2	83.8	84.0	81.6	81.1	82.0	85.2	86.6	88.8	90.1	86.1	85.3				136.2
2500	79.6	80.2	78.8	76.6	76.5	75.5	74.6	76.9	78.8	81.5	84.7	83.0	78.1	77.6				129.9
3150	75.5	77.1	74.7	75.1	74.6	73.6	75.9	78.7	80.3	82.7	83.9	80.2	76.8	75.4				129.4
4000	84.1	84.5	86.6	83.7	80.4	81.0	80.7	80.7	85.3	84.5	91.3	87.9	80.8	81.3				135.8
5000	81.2	80.2	81.7	77.5	80.1	79.4	78.2	82.1	81.7	86.6	90.9	85.0	82.2	79.6				134.6
6300	82.3	84.4	84.0	82.7	80.4	79.9	80.7	80.4	85.2	87.6	89.4	87.7	80.8	79.9				135.7
8000	82.0	81.1	84.7	80.4	80.1	80.1	78.9	81.8	83.3	85.0	89.8	86.0	81.2	79.3				135.5
10000	80.8	81.7	83.0	80.2	76.5	78.8	78.8	79.9	82.7	85.9	87.1	84.2	79.4	78.5				135.1
12500	79.6	79.5	80.8	78.5	76.0	76.3	75.3	77.6	79.8	82.0	84.7	80.4	77.4	76.1				133.6
16000	78.1	76.9	79.1	76.2	73.6	74.6	72.6	74.8	76.9	79.7	81.2	78.3	75.1	74.4				133.0
20000	74.0	74.4	75.7	73.1	70.5	70.7	68.6	71.1	75.7	75.7	77.5	74.6	72.4	72.3				132.1
OVERALL MEASURED	93.9	92.8	93.6	91.8	91.5	91.5	90.5	91.2	93.3	95.5	98.0	96.0	93.8	93.8				
OVERALL CALCULATED	93.1	93.3	93.8	91.6	91.4	90.5	90.3	91.5	93.8	95.7	98.8	96.5	92.9	93.1				145.3
PNDB	106.1	106.4	107.1	105.6	104.1	103.7	103.4	104.4	107.3	108.5	112.3	109.7	105.9	105.6				

Table A-54.
Variable Pitch Fan
55% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Δ Stagger = 1.4°
Large Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59, DEG, F, 70 PERCENT REL, HUM, DAY)

50	62.7	64.7	68.8	69.0	68.7	70.6	69.5	70.8	70.3	70.2	70.3	69.3	68.1	68.3
63	59.7	62.4	64.5	66.8	66.6	66.9	67.3	67.3	67.3	68.5	67.9	67.3	66.4	69.7
80	60.5	61.8	63.1	64.9	65.5	65.5	68.1	69.0	69.9	70.6	71.2	70.4	69.3	67.7
100	59.9	63.2	66.9	67.9	69.4	71.6	72.9	74.2	75.3	75.4	75.0	73.9	72.4	69.7
125	64.3	68.9	73.1	74.9	75.8	77.0	77.9	79.1	79.3	79.1	78.1	77.2	74.2	69.2
160	66.5	70.1	73.2	76.1	76.5	76.7	76.7	76.9	77.8	77.4	76.7	75.4	71.9	67.3
200	66.3	68.7	68.4	70.2	70.9	71.7	71.0	71.9	72.3	72.4	71.1	69.6	67.5	63.9
250	64.3	66.3	68.5	69.1	69.1	69.8	70.6	71.5	71.4	72.0	72.4	71.0	67.3	63.2
315	69.1	72.0	73.4	72.9	77.2	75.8	76.8	75.7	75.3	75.7	76.6	72.5	70.5	68.4
400	69.6	71.8	71.6	73.5	78.4	76.2	76.6	75.0	77.5	74.5	76.9	71.3	70.2	67.6
500	64.0	67.7	69.1	70.2	71.2	72.0	71.9	73.1	73.9	75.5	74.7	70.9	66.6	62.2
630	64.4	68.5	69.9	72.0	77.0	74.5	73.4	74.5	74.4	77.4	76.9	73.1	67.3	62.3
800	65.8	69.4	71.1	73.7	80.4	76.0	75.3	75.0	75.8	78.0	77.8	73.9	67.9	62.5
1000	80.7	83.4	83.4	82.3	83.3	81.4	81.0	81.8	84.5	85.0	86.1	85.4	78.6	73.1
1250	71.9	75.4	75.9	75.0	75.8	75.3	74.5	76.7	78.0	79.9	81.8	78.2	70.5	65.1
1600	67.6	72.2	71.8	73.4	73.8	73.3	75.8	78.4	79.5	81.0	81.0	75.3	68.9	62.4
2000	76.0	79.5	83.6	82.0	79.7	80.7	80.6	80.4	84.6	82.8	88.3	82.9	72.7	68.0
2500	72.9	75.0	78.6	75.8	79.2	79.0	78.0	81.7	80.9	84.8	87.7	79.9	73.9	65.9
3150	73.8	79.2	80.9	81.0	79.7	79.7	80.6	80.2	84.4	85.9	86.3	82.4	72.3	65.7
4000	73.2	75.7	81.6	78.7	79.4	80.0	79.0	81.7	82.7	83.4	86.7	80.7	72.3	64.4
5000	72.2	76.7	80.4	79.1	78.4	79.2	79.4	80.3	82.6	84.8	84.5	79.2	70.8	63.7
6300	70.7	74.6	78.4	77.7	76.3	77.2	76.3	78.5	80.0	81.2	82.2	75.5	68.5	60.1
8000	68.8	72.0	77.1	76.0	74.5	76.2	74.4	76.4	77.9	79.5	79.2	73.5	65.8	57.0
10000	64.1	69.6	74.2	73.6	72.3	73.2	71.4	73.6	75.5	76.2	75.9	69.8	62.5	52.8
OVERALL CALCULATED	85.1	88.5	90.9	90.1	90.8	90.4	90.3	91.4	93.2	94.2	95.8	91.6	85.1	80.6
PNDB	97.1	101.3	104.0	103.5	103.4	103.5	103.6	104.8	106.8	108.1	109.2	104.6	96.9	90.7

Table A-55.
Variable Pitch Fan
65% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Nominal Stagger (-1.6°)
Large Nozzle

MODEL SOUND PRESSURE LEVELS (59, DEG, F, 70 PERCENT REL, HUM, DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	PNL
50	71.6	78.0	70.0	70.4	70.9	72.2	71.1	72.6	73.8	74.7	75.2	76.9	80.1	82.3	124.0
63	67.8	69.0	69.2	69.2	69.4	71.2	70.4	71.7	72.5	73.7	74.7	78.4	79.2	81.6	123.1
80	66.6	68.8	70.3	70.0	70.2	72.8	73.4	74.2	75.5	77.5	75.8	76.2	78.1	79.4	124.0
100	69.3	67.2	71.1	72.1	70.8	71.5	71.0	71.6	71.9	72.5	73.7	75.4	76.1	76.6	122.0
125	67.0	67.5	67.8	68.9	68.1	68.4	68.3	68.8	69.5	70.8	72.0	73.4	74.8	75.1	119.9
160	68.2	66.9	67.1	67.6	67.3	70.3	69.7	70.3	72.1	74.0	75.8	78.3	78.0	78.9	122.4
200	67.8	65.7	70.5	70.9	71.6	73.7	74.6	76.5	77.2	78.7	79.8	80.5	81.6	81.3	125.5
250	72.1	74.4	77.5	78.0	77.4	79.2	79.9	82.3	83.3	83.4	83.6	84.2	83.9	81.8	131.0
315	76.1	77.3	79.1	79.8	79.5	79.3	79.2	79.5	81.4	81.7	82.8	81.8	81.4	79.8	130.0
400	74.7	74.9	73.9	73.6	73.8	73.6	73.5	74.3	75.3	75.8	76.7	76.5	76.7	76.6	129.8
500	72.4	71.8	72.1	71.8	71.2	71.8	72.0	73.5	74.6	75.7	77.1	77.7	76.6	75.0	124.0
630	75.8	76.0	75.8	76.2	77.7	78.1	77.4	78.3	77.3	79.0	78.6	79.3	79.3	78.8	127.7
800	74.4	75.6	75.3	75.3	80.2	80.2	77.9	77.9	78.5	78.1	80.0	79.1	78.9	78.2	125.3
1000	72.2	73.6	73.6	73.8	73.8	74.3	74.4	75.5	76.6	78.9	79.0	77.5	76.1	75.8	125.9
1250	72.3	74.7	74.2	73.9	75.6	74.1	74.8	76.2	77.8	80.7	81.4	79.3	76.5	76.2	127.3
1600	74.2	75.4	76.1	77.3	81.0	76.9	79.9	77.5	80.8	82.2	81.8	79.8	78.9	78.3	127.6
2000	87.2	88.6	87.3	84.4	85.5	83.0	81.5	83.7	84.9	87.2	90.8	88.9	86.4	84.8	135.4
2500	84.1	85.5	84.7	81.7	82.6	80.2	79.4	81.6	82.5	85.4	89.2	86.2	83.3	81.7	134.5
3150	76.8	80.1	77.4	78.3	77.4	75.3	78.5	81.7	82.6	85.2	86.2	82.2	79.0	77.9	131.8
4000	84.6	87.8	87.5	85.5	83.1	83.2	82.4	82.7	86.8	86.2	93.0	89.0	82.6	83.2	137.4
5000	84.5	84.7	86.2	82.3	84.1	83.1	81.8	85.1	85.4	90.1	93.9	88.1	85.7	83.0	138.0
6300	83.1	87.5	86.4	85.4	82.9	82.7	84.3	84.1	88.4	90.7	91.9	89.3	83.7	82.9	138.5
8000	83.5	84.6	86.1	83.1	82.0	82.4	82.0	84.0	86.1	88.0	91.3	87.3	83.4	81.8	137.6
10000	82.7	85.7	85.6	83.7	81.6	81.6	81.8	83.1	85.4	88.4	89.4	84.8	83.0	81.4	137.7
12500	82.2	83.5	84.0	82.5	80.2	80.2	78.5	80.4	83.6	85.2	87.5	82.3	80.8	79.7	136.9
16000	80.6	82.3	82.9	80.7	77.9	78.1	75.7	77.9	80.8	83.1	85.0	80.9	79.5	78.4	135.8
20000	77.1	79.9	79.8	77.8	75.1	74.8	71.8	74.7	77.8	79.0	80.2	78.0	76.2	75.7	135.9
OVERALL MEASURED	94.9	95.6	96.0	94.3	93.5	93.2	92.3	94.5	95.8	97.4	100.2	97.5	96.3	95.3	
OVERALL CALCULATED	94.2	95.9	96.0	94.2	93.7	93.1	92.8	94.3	96.3	98.4	101.1	97.9	95.4	94.6	147.0
PNDB	106.8	108.2	108.9	107.3	106.4	106.0	105.7	107.2	109.3	111.4	114.4	111.2	108.1	107.1	

Table A-56.
Variable Pitch Fan
65% Thrust
200 ft (60.96 m) Sidel ne
(Scale Model - Scaled ata)
Nominal Stagger (-1.6°)
Large Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59, DEG, F. 70 PERCENT REL, HUM, DAY)

50	63.5	65.7	69.2	71.2	70.6	71.8	71.4	71.8	71.8	71.7	71.8	71.9	70.4	67.3
63	61.2	64.0	65.8	68.0	67.9	68.6	68.6	69.1	69.3	69.9	70.0	69.8	68.9	65.7
80	62.2	63.2	65.0	56.6	67.1	70.5	70.0	70.5	71.9	73.0	73.8	72.6	72.0	69.3
100	61.7	65.0	68.3	69.9	71.3	73.8	74.9	76.6	76.9	77.7	77.7	76.7	75.5	71.5
125	65.8	70.6	75.3	77.0	77.1	79.4	80.2	82.4	83.0	82.3	81.4	80.4	77.6	71.8
160	69.7	73.4	76.8	78.7	79.1	79.3	79.4	79.6	81.0	80.6	80.5	77.9	75.0	69.6
200	68.2	70.9	71.6	72.5	73.4	73.6	73.7	74.4	74.9	74.6	74.4	72.6	70.2	66.1
250	65.8	67.8	69.7	70.6	70.8	71.8	72.1	73.5	74.1	74.5	74.7	73.7	70.0	64.3
315	69.1	71.8	73.3	75.0	77.2	78.0	77.5	78.3	76.8	77.8	76.2	75.1	72.6	68.0
400	67.5	71.4	72.3	74.0	79.7	80.1	78.0	77.8	77.9	76.8	77.5	74.9	72.0	67.1
500	65.2	69.3	71.0	72.5	73.3	74.2	74.5	75.4	76.1	77.5	76.4	73.2	69.1	64.4
630	65.2	70.3	71.6	72.5	75.0	74.0	74.3	76.1	77.2	79.3	78.7	74.8	69.3	64.6
800	66.9	70.9	73.4	75.8	80.3	76.7	79.9	77.3	80.2	80.7	79.1	75.2	71.6	66.4
1000	79.8	83.9	84.5	82.8	84.8	82.8	81.4	83.5	84.2	85.7	88.0	84.3	78.9	72.6
1250	76.5	80.8	81.9	80.1	81.9	79.9	79.2	81.4	81.7	83.8	86.3	81.4	75.6	69.2
1600	68.9	75.1	74.4	76.6	76.6	75.0	78.4	81.4	81.8	83.5	83.2	77.3	71.1	64.9
2000	76.8	80.8	84.5	83.9	82.4	82.9	82.3	82.4	86.0	84.5	90.0	84.0	74.5	69.9
2500	76.2	79.5	83.0	80.5	83.2	82.8	81.6	84.8	84.6	88.3	90.8	82.9	77.3	69.3
3150	74.8	82.2	83.3	83.7	82.1	82.4	84.2	83.9	87.6	89.0	88.8	84.1	75.2	68.7
4000	74.6	79.2	83.0	81.4	81.4	82.3	82.0	83.9	85.4	86.4	88.2	81.9	74.5	66.9
5000	74.2	81.0	83.0	82.6	81.5	82.1	82.4	83.6	85.3	87.2	86.7	79.9	74.4	66.6
6300	73.3	78.5	81.5	81.7	80.4	81.0	79.6	81.3	83.8	84.4	85.0	77.3	71.9	63.8
8000	71.3	77.5	80.8	80.5	78.9	79.8	77.5	79.5	81.7	82.9	82.9	76.1	70.3	61.0
10000	67.2	75.1	78.2	78.3	76.9	77.4	74.6	77.2	79.6	79.5	78.7	73.2	66.2	58.1
OVERALL CALCULATED	86.2	91.0	93.2	92.8	93.2	93.1	92.9	94.2	95.8	96.9	98.2	93.0	87.6	81.8
PNDB	98.6	104.4	106.3	106.3	106.8	106.1	106.7	107.4	109.8	110.9	111.8	106.4	100.0	93.2

Table A-57.
Variable Pitch Fan
65% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Δ Stagger – 1.4°
Large Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F, 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	PNL
50	71.3	69.3	70.2	71.0	70.7	72.2	71.5	73.2	74.3	75.1	76.3	77.9	80.7	83.3	124.6
63	68.6	69.3	69.5	69.2	69.5	71.2	71.0	72.8	72.8	73.9	75.3	76.9	79.5	82.6	123.8
80	67.7	65.6	69.8	70.3	70.8	72.8	72.2	72.7	73.6	75.4	75.9	76.5	78.6	80.0	123.6
100	70.5	69.2	72.4	73.3	72.0	72.9	72.9	73.5	73.4	74.7	75.3	75.8	76.4	78.4	123.4
125	67.9	67.5	66.0	69.4	68.4	68.7	68.4	68.6	69.7	71.3	72.4	73.4	75.5	76.9	120.4
160	68.2	67.5	67.1	67.0	67.5	70.3	69.8	70.5	71.9	74.3	76.0	77.0	79.3	79.7	122.9
200	68.5	69.0	70.7	70.9	71.6	73.9	75.2	76.8	77.6	79.5	80.0	81.3	81.9	81.5	126.9
250	72.1	74.4	77.2	78.8	78.5	79.5	80.0	81.7	82.1	82.4	82.9	84.2	84.4	82.0	130.7
315	75.1	77.0	78.6	79.4	79.3	79.3	79.1	79.8	80.9	81.7	82.5	81.5	80.9	79.8	127.8
400	75.[illegible]	75.4	74.4	73.6	73.9	73.8	73.8	75.3	75.7	77.2	77.3	77.1	77.5	76.3	125.3
500	73.2	72.4	72.1	71.0	71.6	72.1	72.1	74.5	75.3	75.4	77.4	77.8	76.6	74.7	124.3
630	74.8	75.0	75.0	75.5	75.9	76.7	77.0	77.3	78.4	78.3	78.3	79.0	79.7	77.6	127.1
800	73.3	73.6	75.0	78.5	75.8	75.3	76.1	81.1	78.0	79.1	78.9	77.8	78.2	78.7	127.7
1000	72.5	74.1	73.2	73.3	73.8	74.3	78.4	75.8	75.6	78.4	79.6	77.0	75.9	75.6	125.8
1250	74.3	76.7	75.5	74.5	75.2	75.4	74.7	76.8	76.7	80.3	80.6	79.3	76.5	76.7	127.2
1600	78.8	80.6	76.5	77.6	79.3	78.6	76.4	81.7	78.6	82.2	81.5	80.2	81.1	80.0	130.0
2000	82.9	85.7	86.1	80.6	81.6	79.1	78.5	80.8	83.2	83.7	87.2	83.3	80.9	79.8	133.4
2500	89.6	93.0	93.3	86.9	86.9	83.9	84.0	85.8	87.8	88.9	93.1	89.1	86.8	85.7	139.6
3150	76.5	79.0	77.2	77.2	77.3	75.9	78.4	81.4	82.6	84.2	85.7	81.7	78.0	77.4	131.3
4000	82.4	82.8	83.8	81.0	80.7	81.3	81.0	81.7	85.8	85.2	89.4	85.4	79.7	80.0	134.7
5000	87.5	87.9	88.9	84.1	86.8	85.1	83.6	86.0	88.2	90.0	[illegible]	88.4	88.5	84.6	139.0
6300	83.6	86.5	85.7	83.9	81.9	82.8	85.5	83.6	87.7	89.3	91.3	87.1	82.0	81.4	137.5
8000	82.7	84.2	84.9	81.4	81.1	82.1	82.1	84.0	85.9	87.0	90.7	86.3	82.3	81.6	136.9
10000	82.5	84.5	85.2	82.6	81.7	81.1	81.9	82.6	85.0	88.0	89.0	84.4	82.0	80.1	137.2
12500	80.9	81.6	83.3	80.5	7[illegible]	79.7	79.2	80.9	83.3	84.1	86.6	81.7	79.4	77.6	135.9
16000	78.8	79.7	81.0	78.2	76.1	77.3	75.3	77.4	80.0	82.1	84.1	80.4	76.9	75.8	135.4
20000	74.5	76.2	77.0	75.0	72.6	73.1	71.4	73.3	76.6	78.4	79.4	76.1	73.4	72.6	134.1
OVERALL MEASURED	95.1	96.1	96.9	94.0	93.5	93.3	92.6	94.8	95.7	97.4	99.9	97.3	95.9	95.5	
OVERALL CALCULATED	94.8	95.9	97.4	93.6	93.7	93.0	92.9	94.6	96.3	98.0	100.7	97.0	95.2	94.6	147.5
PNDB	108.7	111.2	111.4	107.2	107.3	106.3	105.9	107.8	109.3	11[illegible]	114.2	110.4	108.4	107.5	

Table A-58.
Variable Pitch Fan
65% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Δ Stagger = 1.4°
Large Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F. 70 PERCENT REL. HUM. DAY)

50	64.7	65.7	70.7	72.5	71.8	73.1	73.3	73.8	73.3	73.9	73.3	72.3	70.7	69.1
63	61.2	63.9	66.0	68.5	68.2	68.9	68.8	68.8	69.5	70.4	70.4	69.8	69.6	67.4
80	62.2	63.9	65.0	66.1	67.3	70.4	70.2	70.7	71.7	73.3	73.9	73.4	73.3	70.0
100	62.4	65.2	68.6	69.9	71.4	74.0	75.5	76.9	77.2	78.5	77.9	77.5	75.8	71.6
125	65.9	70.6	75.0	77.8	78.2	79.6	80.3	81.8	81.8	81.4	80.7	80.4	78.2	71.9
160	69.5	73.1	76.3	78.3	78.9	79.3	79.3	79.8	80.5	80.6	80.7	77.6	74.5	69.5
200	69.3	71.4	72.1	72.5	73.5	73.9	74.1	75.4	75.3	76.0	75.0	73.1	71.0	65.9
250	66.6	68.3	69.7	69.8	71.1	72.1	72.3	74.5	74.9	74.2	75.1	73.7	70.0	64.1
315	67.3	70.9	72.6	74.2	75.4	76.7	77.1	77.2	77.9	77.1	75.8	74.8	72.9	66.7
400	66.5	69.3	73.4	77.2	75.2	75.2	76.1	81.0	77.5	77.8	76.4	73.5	71.4	67.5
500	65.5	69.8	70.6	72.0	73.3	74.2	74.4	75.7	75.0	77.0	77.0	72.7	68.9	64.4
630	67.1	72.3	72.8	73.0	74.6	75.2	74.7	76.6	76.1	78.8	78.0	74.8	69.4	65.0
800	75.7	81.3	83.5	79.2	81.0	79.0	78.5	81.5	82.6	82.4	84.6	78.9	73.8	68.1
1000	82.2	88.5	90.6	85.5	86.3	83.8	84.0	85.7	87.2	87.5	90.4	84.6	79.4	73.6
1250	69.0	74.4	74.5	75.7	76.7	75.8	78.4	81.3	82.0	82.7	82.9	77.1	70.4	65.0
1600	74.7	78.1	81.1	79.6	79.6	81.2	81.1	81.8	85.2	83.8	86.7	80.7	72.0	67.3
2000	79.6	83.0	86.1	82.6	86.2	85.0	83.6	85.9	85.6	88.5	91.2	83.5	78.5	71.5
2500	75.7	81.7	83.0	82.6	81.5	82.8	83.7	83.7	87.3	87.9	88.6	82.4	74.1	68.1
3150	74.8	79.5	82.3	80.2	80.9	82.4	82.6	84.4	85.7	85.9	88.2	81.6	74.4	68.0
4000	74.5	79.9	82.9	81.8	81.8	81.8	82.8	83.3	85.1	87.2	86.7	79.8	73.9	66.0
5000	73.5	77.8	81.9	80.6	79.6	81.3	81.0	82.5	84.3	84.2	85.2	78.0	72.1	63.9
6300	71.9	76.8	80.6	79.4	78.3	80.2	78.3	80.2	82.2	83.3	83.6	77.4	70.0	61.6
8000	67.8	73.9	77.6	77.4	76.2	77.3	75.8	77.5	80.2	80.8	80.0	73.9	66.8	57.8
10000	61.5	68.4	72.5	72.5	71.4	72.6	71.1	72.9	75.4	75.9	74.9	68.3	60.5	50.0
OVERALL CALCULATED	87.2	92.3	94.8	92.5	93.2	93.1	93.1	94.7	96.8	96.7	98.1	92.4	87.5	82.0
PNDB	99.3	103.8	106.4	105.2	106.8	106.1	106.2	107.7	109.2	110.0	110.9	105.1	99.3	92.7

Table A-59.
Variable Pitch Fan
75% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Nominal Stagger (-1.6°)
Large Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F, 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	PNL
50	72.1	69.7	71.1	72.4	72.4	73.2	72.9	75.0	75.7	77.0	77.9	79.2	82.6	83.1	126.2
63	70.1	70.5	70.4	71.4	70.7	73.2	73.2	74.4	74.7	75.2	76.4	78.2	81.3	84.0	123.2
80	68.2	69.1	71.7	71.4	72.2	73.2	73.5	74.5	74.7	76.4	77.3	78.5	80.6	82.1	125.1
100	70.9	72.0	74.3	74.5	73.8	74.8	74.6	76.3	75.8	77.2	77.6	78.4	78.9	78.7	125.5
125	68.3	69.6	69.8	70.0	69.8	69.8	78.1	70.8	71.8	73.0	74.0	75.0	76.8	77.9	122.0
160	69.5	68.9	[illegible]	69.0	69.3	71.6	71.6	73.3	74.0	75.9	77.6	78.8	81.2	81.0	124.6
200	78.1	71.0	72.9	72.6	73.7	75.9	77.2	78.8	79.8	81.2	82.3	83.3	84.3	84.0	129.0
250	73.4	76.1	79.2	80.7	80.0	81.1	82.1	84.2	84.3	85.4	86.0	86.8	86.1	87.5	133.0
315	78.5	80.0	80.7	82.1	81.8	81.5	81.5	82.5	83.0	84.1	84.5	84.1	83.8	81.5	137.3
400	77.6	78.5	76.8	76.4	75.5	75.3	75.6	78.0	78.4	80.2	80.2	80.4	80.4	78.9	128.0
500	74.2	74.0	73.7	72.9	73.1	73.5	74.8	76.1	77.0	78.0	79.1	80.1	79.1	77.6	126.2
630	74.6	75.4	76.6	76.9	77.9	78.0	77.9	79.3	79.5	79.6	79.2	80.3	80.1	79.1	128.4
800	75.7	77.1	77.5	77.3	79.1	76.8	76.5	79.7	79.6	80.5	82.2	81.3	79.0	79.4	129.1
1000	74.2	74.4	75.0	74.9	75.7	78.3	78.2	77.5	77.9	80.3	80.7	79.5	77.3	77.3	127.5
1250	75.4	78.0	77.0	76.1	77.2	76.4	76.1	78.2	78.8	81.9	82.2	80.8	78.2	78.4	128.8
1600	74.5	76.9	75.8	76.3	78.5	77.6	77.3	79.3	80.2	81.6	81.8	81.5	77.9	78.0	129.2
2000	82.0	84.8	82.0	77.9	81.8	79.5	78.6	80.1	82.5	83.9	84.3	82.5	80.8	77.8	132.5
2500	91.4	94.4	91.4	88.1	88.8	86.3	85.2	86.4	88.4	91.0	93.9	90.9	87.9	87.6	140.5
3150	79.2	80.8	78.0	78.6	78.6	77.6	80.2	82.9	83.7	86.6	87.2	82.5	80.1	78.7	132.9
4000	83.9	83.7	83.5	81.6	81.0	82.7	82.5	84.0	87.9	86.9	90.9	86.2	81.5	81.0	136.1
5000	89.6	88.7	89.8	85.3	88.8	86.8	85.6	88.1	88.1	92.4	97.3	89.6	88.4	86.1	141.2
6300	85.0	87.8	85.7	84.6	83.8	84.2	85.2	85.7	90.0	91.6	92.9	88.5	83.3	82.8	139.2
8000	85.9	86.5	85.7	83.1	82.8	84.4	84.4	86.4	87.9	89.1	93.2	88.3	84.5	83.3	139.1
10000	84.8	86.9	85.6	83.6	82.8	83.1	83.6	84.8	87.6	90.2	91.6	86.3	84.7	82.	139.3
12500	83.5	84.0	84.0	82.3	80.5	82.0	80.5	83.3	85.3	86.8	88.7	84.1	82.0	79.8	138.0
16000	81.6	82.4	81.9	80.1	78.6	79.9	78.4	80.1	82.6	85.1	86.6	82.9	79.9	78.2	137.9
20000	78.5	79.3	78.5	76.6	75.6	75.8	73.6	77.0	79.5	81.4	82.1	79.3	76.4	74.6	136.8
OVERALL MEASURED	96.7	97.6	97.0	94.7	94.7	94.7	94.5	95.8	97.8	99.1	101.3	98.3	97.6	96.1	
OVERALL CALCULATED	96.6	98.3	96.9	94.8	95.3	94.8	96.7	96.3	98.1	100.1	102.8	98.7	96.9	96.2	149.3
PNDB	110.3	112.5	110.5	108.3	109.8	108.8	107.8	109.5	110.9	113.3	116.6	112.1	109.9	109.1	

Table A-60.
Variable Pitch Fan
75% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Nominal Stagger (-1.6°)
Large Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F, 70 PERCENT REL. HUM. DAY)

50	65.1	68.5	72.4	73.6	73.7	75.8	79.0	76.6	75.6	76.4	75.6	74.9	73.1	69.4
63	62.4	66.1	67.8	69.1	69.6	70.0	70.4	71.0	71.6	72.1	72.0	72.0	70.9	68.5
80	63.6	65.2	66.3	68.1	69.1	71.9	71.9	73.9	73.8	75.0	75.9	75.1	75.3	71.3
100	64.0	67.2	70.8	71.6	73.4	76.1	77.5	79.0	79.5	80.2	80.2	79.6	78.2	74.1
125	67.2	72.3	77.1	79.1	79.7	81.2	82.4	84.3	83.9	84.3	83.8	83.0	79.8	74.5
160	72.1	76.1	78.5	81.6	81.4	81.6	81.7	82.6	82.6	83.0	82.3	80.1	77.8	71.2
200	71.1	74.5	74.5	75.2	75.1	75.3	75.7	78.0	78.0	79.0	77.9	76.4	74.0	68.5
250	67.6	70.0	71.4	71.7	72.6	73.5	74.1	76.1	76.5	76.8	76.7	76.0	72.5	68.9
315	67.9	71.3	74.2	75.7	77.4	78.0	78.0	79.3	79.0	78.3	76.8	78.1	73.4	68.2
400	68.9	72.8	75.0	76.0	78.6	76.7	76.6	79.8	79.1	79.2	79.7	77.0	73.1	68.3
500	67.2	70.0	72.4	73.6	75.2	76.2	76.3	77.4	77.3	79.0	76.1	75.1	70.3	65.9
630	68.2	73.5	74.3	74.7	76.5	76.2	76.1	78.1	78.2	80.5	79.6	76.3	71.0	68.8
800	67.2	72.4	73.1	74.8	77.8	77.4	77.3	79.1	79.6	80.2	79.0	76.9	70.6	68.1
1000	74.5	80.2	79.2	78.4	81.1	79.2	78.6	79.9	81.8	82.4	83.5	77.9	73.3	67.6
1250	83.7	89.6	88.5	86.5	87.9	86.1	86.1	86.1	87.6	89.4	91.0	86.1	80.2	75.1
1600	71.3	73.8	75.0	77.0	77.8	77.3	80.1	82.6	82.9	84.9	84.2	77.6	72.2	65.8
2000	75.8	78.7	80.4	80.6	80.2	82.4	82.4	83.7	87.1	85.2	87.9	81.2	73.4	67.7
2500	81.3	83.6	86.7	83.6	88.0	86.5	85.4	87.8	87.3	90.7	94.2	84.4	80.1	77.4
3150	78.4	82.5	82.5	82.9	83.0	84.0	85.1	85.5	89.2	89.9	89.8	83.2	74.8	68.6
4000	77.1	81.2	82.6	81.5	82.1	84.3	84.5	86.3	87.3	87.4	90.0	82.9	78.7	68.3
5000	76.3	81.9	82.9	82.4	82.7	83.5	84.2	85.3	87.5	89.1	88.9	81.4	76.1	67.5
6300	74.6	79.1	81.6	81.5	80.8	82.9	81.5	84.1	85.5	86.0	86.3	79.1	73.2	63.9
8000	72.4	77.6	79.9	79.9	79.6	81.5	80.2	81.8	83.6	84.9	84.6	78.1	70.7	60.8
10000	68.5	74.5	76.9	77.1	77.4	78.4	76.4	79.5	81.3	81.9	80.5	74.5	66.4	55.0
OVERALL CALCULATED	88.6	93.4	94.1	93.4	94.7	94.8	94.8	96.3	97.6	98.6	99.9	93.8	89.1	83.5
PNDB	101.8	105.4	107.4	106.3	108.5	108.2	108.1	109.8	111.5	112.3	114.1	106.8	101.7	94.6

Table A-61.
Variable Pitch Fan
75% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Δ Stagger = 1.4°
Large Nozzle

MODEL SOUND PRESSURE LEVELS (59. DEG. F. 70 PERCENT REL. HUM. DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.2)	140. (2.44)	150. (2.62)	160. (2.79)	PNL
50	72.3	70.8	71.3	72.3	73.8	73.5	73.8	74.9	75.2	76.4	77.4	80.1	83.8	85.3	128.3
63	69.8	70.6	71.3	71.7	70.9	73.2	72.6	73.4	74.8	75.6	77.1	79.2	82.4	85.3	125.8
80	68.4	69.1	71.6	71.3	71.3	73.3	72.8	73.9	74.8	76.2	77.8	79.0	81.2	82.6	125.2
100	73.7	73.9	74.9	75.6	74.6	76.1	76.1	78.4	79.8	77.5	79.4	79.6	78.7	79.5	126.9
125	68.7	69.5	69.7	70.7	70.2	69.9	70.2	70.6	71.7	73.6	74.6	75.9	77.7	78.5	122.4
160	69.4	67.9	68.1	69.6	69.1	71.1	71.3	72.0	73.6	75.8	77.2	79.4	81.3	81.4	124.6
200	71.8	71.5	73.0	75.4	73.9	75.1	77.6	78.7	79.6	81.4	82.4	83.7	85.1	83.8	129.3
250	73.7	79.7	78.0	79.3	79.3	80.8	81.5	82.5	83.3	84.0	85.2	85.3	85.3	83.7	132.0
315	78.4	80.4	80.1	82.3	81.8	81.3	81.9	81.7	83.1	83.5	85.8	84.0	83.6	82.5	132.1
400	77.8	77.7	75.4	76.2	75.1	75.6	76.3	77.9	78.3	79.2	78.9	80.2	80.6	79.5	127.6
500	74.9	73.6	73.6	73.3	72.2	73.5	74.2	75.8	77.4	78.3	79.8	80.1	79.7	78.1	126.4
630	76.3	76.2	76.0	76.8	77.4	78.6	78.8	78.8	79.6	79.8	80.0	80.5	80.6	79.8	128.7
800	77.7	76.6	75.6	78.2	77.2	80.4	80.7	75.8	78.2	81.6	81.3	81.7	77.8	81.8	129.7
1000	75.4	75.3	75.3	76.1	76.0	77.3	77.1	77.8	78.5	80.4	80.8	79.9	78.6	77.8	128.0
1250	77.5	80.9	79.5	79.0	80.7	77.4	77.6	79.5	79.8	83.5	83.1	81.3	79.6	80.8	130.5
1600	74.4	77.2	77.9	77.2	78.9	77.6	77.3	79.5	79.5	82.4	81.9	80.4	79.2	78.4	129.5
2000	79.1	81.1	80.8	78.5	80.8	78.9	77.8	78.2	82.1	83.0	83.2	82.0	78.7	78.7	131.2
2500	92.2	95.2	95.2	91.7	90.8	88.7	88.8	88.8	89.5	91.4	95.3	93.1	87.7	88.6	14[illegible].1
3150	79.3	81.9	79.4	79.5	79.7	78.3	80.7	83.4	84.5	86.9	87.6	83.5	81.0	79.4	133.5
4000	82.9	84.6	83.8	82.3	80.9	82.6	82.5	83.7	88.0	86.5	90.2	86.0	82.2	82.0	135.9
5000	90.8	89.0	90.2	84.8	89.9	87.9	85.4	88.8	88.5	93.2	96.3	89.4	89.7	86.1	141.2
6300	83.9	86.7	85.6	85.4	[illegible]	83.8	85.0	85.8	89.6	91.5	92.7	87.5	83.9	82.8	137.0
8000	87.2	88.5	88.2	[illegible]	85.1	86.2	84.8	87.1	89.2	90.4	94.0	88.8	86.0	84.6	140.3
10000	84.5	87.5	86.4	[illegible]	84.0	84.1	84.6	85.3	87.7	91.1	91.8	88.3	84.7	83.1	139.8
12500	83.7	84.8	[illegible]	[illegible]	82.1	82.8	81.6	83.8	86.2	87.3	89.8	84.1	83.8	80.3	138.8
16000	81.9	81.6	[illegible]	80.1	79.0	80.5	79.0	80.7	83.8	86.0	86.9	83.3	80.6	78.4	136.6
20000	78.8	79.8	79.2	77.5	74.0	77.2	74.5	77.4	80.3	81.8	82.3	79.6	77.1	75.7	137.4
OVERALL MEASURED	96.6	97.4	97.6	95.3	95.8	95.1	96.5	95.7	97.6	99.5	101.7	98.5	97.6	96.8	
OVERALL CALCULATED	97.8	98.8	98.7	96.1	96.4	95.7	95.1	96.5	98.5	100.[illegible]	102.8	99.1	97.4	96.9	149.9
PNDB	110.7	113.0	112.8	110.3	110.2	109.1	108.2	109.8	111.2	113.7	116.1	113.1	110.7	110.0	

Table A-62.
Variable Pitch Fan
75% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Δ Stagger = 1.4°
Large Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F. 70 PERCENT REL. HUM. DAY)

50	68.8	77.5	73.0	74.7	74.2	75.4	76.5	78.7	79.8	76.7	77.4	76.1	72.9	78.2
63	62.9	65.9	67.7	69.8	70.0	70.2	70.5	70.8	71.5	72.7	72.6	72.3	71.9	69.0
80	63.5	64.2	36.0	68.6	68.8	71.3	71.6	72.2	73.4	74.8	75.2	75.8	75.3	71.7
100	65.7	66.7	70.9	74.4	73.6	75.3	77.9	78.8	79.3	80.2	80.3	80.0	79.0	73.9
125	67.9	71.9	75.8	78.2	78.9	80.9	81.8	82.7	83.0	82.9	83.0	81.5	79.1	73.7
160	72.8	76.5	77.8	81.2	81.4	81.4	81.7	81.8	82.7	82.4	82.7	80.1	77.2	72.2
200	71.3	73.7	73.1	75.1	74.7	75.6	76.5	78.0	77.9	78.0	76.6	76.2	74.1	69.0
250	68.3	69.5	71.2	72.1	71.8	73.5	74.4	75.8	77.0	77.1	77.5	76.0	73.1	67.4
315	69.5	72.1	73.5	75.6	76.9	78.5	78.9	78.8	79.1	78.5	77.5	76.4	73.9	68.9
400	70.9	72.4	73.3	76.9	76.7	80.4	80.7	79.6	78.7	80.3	78.8	77.4	72.9	70.7
500	68.4	71.0	72.7	74.7	79.4	77.2	77.1	77.7	77.9	79.0	78.3	75.5	71.6	66.5
630	70.3	76.4	76.9	77.6	80.1	77.2	77.6	79.3	79.2	82.1	80.5	76.8	72.4	69.1
800	67.1	72.7	75.2	75.8	78.3	77.4	77.3	79.4	78.9	81.0	79.2	75.9	71.9	66.5
1000	71.6	76.5	78.0	77.0	79.3	78.6	77.8	79.0	81.4	81.5	82.4	77.4	71.2	66.5
1250	84.5	90.4	92.3	90.1	90.1	88.4	86.7	86.6	88.8	89.8	92.4	88.3	80.0	76.4
1600	71.4	76.9	76.4	77.8	78.9	78.0	80.5	83.1	83.7	85.2	84.6	78.5	73.1	66.5
2000	74.8	79.6	80.8	80.6	80.2	82.3	82.4	83.5	87.2	84.9	87.2	81.0	74.1	68.7
2500	81.7	83.8	87.1	82.2	89.1	87.5	85.2	88.4	87.6	91.4	93.2	84.2	81.4	72.4
3150	75.4	81.4	82.5	83.7	83.3	83.6	84.9	85.2	89.1	89.8	89.5	82.3	75.4	68.6
4000	78.4	83.1	85.0	83.0	84.4	86.1	84.8	86.9	88.9	88.7	90.9	83.4	77.1	69.6
5000	75.9	82.5	83.8	83.5	83.8	84.5	85.2	85.8	87.6	90.0	89.2	81.4	76.2	68.3
6300	74.8	79.5	82.2	82.1	82.4	83.5	82.7	84.7	86.5	86.5	87.4	79.2	74.1	64.4
8000	72.6	77.8	81.2	80.6	79.9	82.1	80.8	82.3	84.8	85.8	84.9	78.5	71.3	61.1
10000	68.8	75.0	77.6	78.0	77.8	79.7	77.3	79.9	82.1	82.3	80.7	74.8	67.1	56.2
OVERALL CALCULATED	88.9	93.9	95.8	94.7	95.8	95.7	95.2	96.5	98.0	99.1	99.9	94.2	87.5	84.0
PNDB	102.8	105.8	108.1	107.1	109.4	109.1	108.4	110.1	111.7	112.8	113.7	106.9	102.6	95.2

Table A-63.
Variable Pitch Fan
100% Thrust
100 ft (30.32 m) Arc (Scale Model Data)
Δ Stagger = -1.6°
Large Nozzle

MODEL SOUND PRESSURE LEVELS (59, DEG, F, 70 PERCENT REL, HUM, DAY) - ANGLES FROM INLET IN DEGREES (AND RADIANS)

FREQ.	30. (0.52)	40. (0.70)	50. (0.87)	60. (1.05)	70. (1.22)	80. (1.40)	90. (1.57)	100. (1.75)	110. (1.92)	120. (2.09)	130. (2.27)	140. (2.44)	150. (2.62)	160. (2.79)	PNL
50	74.2	72.5	74.2	75.0	77.7	76.7	76.4	78.3	79.9	80.0	82.2	84.6	88.0	91.0	131.0
63	72.4	73.3	74.2	74.3	74.2	76.1	75.4	78.9	79.7	80.3	82.2	84.1	87.6	90.0	130.7
80	72.0	72.6	75.0	73.0	74.7	76.3	76.2	77.8	78.8	80.2	82.1	83.7	86.1	88.1	129.6
100	75.0	74.4	76.4	78.3	80.0	81.4	77.3	81.2	82.1	83.0	83.9	84.2	84.7	89.0	131.1
125	72.0	73.1	73.9	74.4	74.6	74.8	74.8	75.1	76.6	78.2	79.6	81.2	83.7	83.4	127.1
160	72.6	71.9	71.8	72.6	73.1	75.1	75.5	76.7	79.3	80.7	82.9	84.7	87.4	87.4	130.0
200	79.2	80.7	78.2	77.1	79.0	79.8	[illegible]	83.3	86.5	88.6	90.1	90.3	91.8	89.7	133.8
250	78.5	83.6	82.1	82.3	83.3	84.3	84.7	86.2	87.1	88.6	89.8	90.5	91.3	89.8	136.5
315	84.2	85.6	86.6	86.4	87.3	86.3	85.8	87.5	89.3	88.9	91.0	91.3	91.0	89.2	138.1
400	82.6	82.5	80.7	80.8	80.5	80.7	81.2	82.9	83.6	84.7	85.0	86.0	85.8	85.0	133.0
500	79.3	78.9	78.3	78.0	78.6	79.5	79.3	82.1	82.5	83.3	86.5	86.4	85.7	83.9	132.2
630	78.2	79.1	80.0	80.4	81.3	82.0	82.5	83.8	83.9	84.5	84.6	85.0	89.8	84.5	133.0
800	[illegible]	[illegible]	[illegible]	80.7	81.2	81.4	82.2	83.1	83.3	[illegible]	85.7	85.2	84.2	83.2	132.0
1000	79.2	80.8	80.9	81.2	82.9	81.2	81.7	83.1	83.5	85.9	86.0	85.0	83.7	82.9	133.3
1250	83.5	85.9	83.3	83.4	82.3	82.8	82.3	83.5	84.2	87.3	88.9	88.9	83.8	82.8	134.8
1600	79.9	81.8	81.2	81.1	82.7	82.0	82.2	83.4	84.1	86.5	86.8	84.3	83.1	82.3	133.7
2000	80.0	81.3	82.6	80.0	82.7	83.3	81.0	84.2	88.1	87.0	88.5	84.0	83.1	81.3	134.7
2500	91.9	94.3	94.6	92.9	93.9	90.8	89.7	92.1	91.7	96.2	96.6	91.0	90.9	90.4	144.1
3150	87.4	89.3	90.0	87.5	89.5	86.7	87.4	90.1	90.2	94.6	94.7	88.2	88.1	87.0	140.9
4000	86.2	88.0	89.0	87.6	85.8	87.4	87.5	88.4	92.8	91.4	94.0	88.2	89.2	85.0	140.2
5000	89.1	88.2	88.7	85.7	80.1	88.3	88.8	92.0	92.7	97.0	98.9	88.7	87.8	87.1	143.4
6300	87.2	88.3	89.7	89.1	86.7	88.7	89.5	90.9	94.2	96.4	98.9	89.5	87.5	86.4	143.2
8000	88.2	88.1	90.2	86.3	87.7	89.0	89.0	91.6	93.3	94.3	97.0	89.9	88.5	86.5	143.3
10000	86.1	88.1	88.9	85.5	86.3	87.3	86.6	89.3	91.9	94.9	94.7	88.9	86.6	85.4	142.9
12500	84.8	84.1	87.3	84.4	83.8	85.8	85.8	88.2	90.3	92.2	92.8	88.0	84.0	82.8	142.1
16000	83.1	83.0	85.2	82.2	81.9	83.8	83.0	85.4	88.4	90.0	90.7	88.0	83.2	81.2	142.0
20000	79.7	81.8	82.0	79.0	78.8	79.5	79.3	81.8	85.1	86.4	86.2	83.8	80.0	78.0	140.9
OVERALL MEASURED	98.0	99.1	99.9	97.3	99.3	98.2	98.2	100.2	101.0	104.1	105.2	101.9	101.9	101.0	
OVERALL CALCULATED	98.5	100.0	100.7	98.7	99.7	99.1	99.1	101.2	102.8	105.1	106.9	101.8	101.6	101.0	153.3
PNdB	112.1	113.9	114.6	112.7	113.8	112.4	112.0	114.4	115.6	118.2	119.7	114.2	113.8	113.0	

Table A-64.
Variable Pitch Fan
100% Thrust
200 ft (60.96 m) Sideline
(Scale Model - Scaled Data)
Δ Stagger = -1.6°
Large Nozzle

FULL SIZE SOUND PRESSURE LEVELS SCALED FROM MODEL DATA (59. DEG. F, 70 PERCENT REL. HUM. DAY)

50	69.2	78.9	74.4	77.4	80.7	81.7	77.7	81.9	81.9	82.9	81.9	80.7	78.9	79.7
63	66.9	69.6	71.9	73.5	74.4	75.1	74.4	75.3	76.4	77.3	77.6	77.6	76.9	74.0
80	66.6	68.3	69.8	71.7	72.9	75.2	75.8	76.9	79.1	79.7	80.8	81.1	81.4	77.8
100	73.1	77.0	78.0	76.1	78.8	80.8	83.5	83.4	86.2	87.6	88.0	86.6	85.7	79.9
125	72.3	76.8	79.9	81.3	83.0	84.4	85.0	86.3	84.8	87.6	87.6	86.7	85.1	79.7
160	77.9	81.7	84.4	85.2	86.9	86.3	86.2	87.6	88.9	87.8	89.3	87.4	84.7	78.9
200	76.1	78.5	78.4	79.6	80.1	80.7	81.3	82.9	83.2	83.5	82.7	82.0	79.3	74.5
250	72.8	74.9	76.0	76.8	78.1	79.5	79.5	82.1	82.0	82.1	84.1	82.3	79.1	73.2
315	71.5	74.9	77.6	79.1	80.8	82.0	82.6	83.7	83.4	83.3	82.2	81.6	79.1	73.6
400	72.5	76.5	78.4	79.4	80.7	81.3	82.2	83.1	82.8	83.3	83.2	80.9	77.3	72.0
500	72.2	75.6	78.3	79.9	80.3	81.0	81.7	83.0	83.0	84.6	84.2	80.6	76.7	71.5
630	76.4	81.4	80.6	82.0	81.7	82.6	82.3	83.4	83.6	85.9	85.9	81.4	76.6	71.1
800	72.6	77.3	78.5	79.6	82.1	81.8	82.2	83.3	83.4	85.0	84.1	79.7	75.8	70.3
1000	72.5	76.7	79.8	79.3	82.0	82.1	81.9	84.0	85.4	85.5	86.7	79.4	75.6	69.1
1250	84.2	89.5	92.0	91.1	93.2	90.6	89.5	91.8	90.9	94.6	95.8	86.2	83.3	77.9
1600	79.5	84.4	87.1	85.9	88.7	86.4	87.3	89.8	89.5	92.9	91.8	83.3	80.2	74.0
2000	78.2	83.0	86.0	85.9	85.0	87.1	87.3	88.1	92.0	89.7	90.9	83.2	77.2	71.7
2500	80.8	85.0	87.5	84.0	89.3	89.0	88.6	92.5	91.9	95.2	95.0	83.5	81.5	73.4
3150	78.7	85.0	86.6	87.3	87.9	88.4	89.4	90.4	93.4	94.7	93.6	85.2	79.0	72.2
4000	79.4	82.7	87.1	84.7	87.0	88.8	89.0	91.5	92.6	92.7	93.8	84.6	79.7	71.6
5000	77.5	83.2	86.2	84.3	86.2	87.7	89.2	89.7	91.7	93.8	92.0	83.9	78.0	70.5
6300	76.1	81.2	84.9	83.6	84.1	86.6	88.8	89.1	90.6	91.4	90.4	81.6	75.9	66.9
8000	73.8	79.2	83.2	82.0	82.9	85.2	84.8	87.0	89.4	89.8	88.7	81.2	73.9	63.8
10000	69.8	76.1	80.5	79.5	80.6	82.1	82.0	84.3	86.9	86.9	84.6	78.2	70.1	58.4
OVERALL CALCULATED	90.5	95.1	97.9	97.2	99.1	99.1	99.3	101.2	102.3	103.7	103.6	97.1	94.0	88.4
PNDB	103.2	108.0	110.5	110.3	111.7	112.3	112.7	114.6	116.1	117.3	117.1	109.4	105.1	98.0

XI. NOMENCLATURE

BPF	Blade Passing Frequency
dB	Decibel
EPNL	Effective Perceived Noise Level
F_n	Engine Net Corrected Thrust
H_z	Hertz (Cycles per Second)
M_o	Aircraft Mach Number
Max	Maximum
Min	Minimum
$N/\sqrt{\theta}$	Fan Rotational Speed, Corrected to Standard Day
OGV	Outlet Guide Vane
P_{T23}/P_{T2}	Ratio of Fan Bypass Exit Total Pressure to Fan Inlet Total Pressure
PNdB	Perceived Noise Decibel
PNL	Perceived Noise Level; a Calculated Annoyance Weighted Sound Level
PNLT	Tone Corrected Perceived Noise Level
PWL	Sound Power Level, Re 10^{-13} Watts
QEP	Quiet Engine Program
SLS	Sea Level Static
SPL	Sound Pressure Level, Re 0.0002 Dynes/cm^2
VPF	Variable Pitch Fan
$W\sqrt{\theta}/\delta$	Bypass Airflow, Corrected to Standard Day, lbm/sec (Kg/sec)
ΔBm*	Delta Stagger
η	Efficiency

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