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NASA/GE QUIET ENGINE "C" ACOUSTIC TEST RESULTS

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16. Abstract

The Quiet Engine "C", low noise technology demonstrator was constructed under the NASA/GE Experimental Quiet Engine Program in order to acquire directly applicable experimental data on noise reduction features that might be utilized for future engine systems. This 22,000-pound (97,900 newton) thrust class, high-bypass turbofan engine was based on a new, supersonic tip speed (1550 ft/sec, 472 m/sec), 1.6 pressure ratio, single-stage fan. Three approaches to noise reduction were incorporated in the design of Engine "C": thermodynamic cycle selection, the design of features that reduce source noise, and the suppression of the generated noise.

Thirteen configurations were examined to determine the effect of design/treatment variations on the engine's noise characteristics. The maximum baseline perceived noise levels (PNL's) along the 200-foot (61 m) sideline occurred in the front quadrant. The levels for this configuration with fan frame treatment were 107.5 PNdB at the approach power setting and 121.6 PNdB at the takeoff power setting. The maximum levels in the front quadrant were reduced to 96.4 PNdB and 106.5 PNdB for approach and takeoff by the addition of a four-ring inlet splitter system, a splitter in the fan exhaust duct, and extended fan duct wall treatment. The maximum perceived noise levels for this fully suppressed configuration occurred in the aft quadrant and were 101.5 PNdB at approach and 110.7 PNdB at takeoff.

Although Engine "C" was not designed for actual flight application the ground static results were projected to in-flight conditions to indicate potential reductions of landing approach and takeoff noise levels. When applied to representative aircraft, the projected airport community noise levels were considerably below those resulting from operation with currently available engines.

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I. SUMMARY

In order to acquire directly applicable experimental data on noise reduction features that might be utilized for low noise engine systems, the General Electric Company constructed the Quiet Engine "C" demonstrator for the Experimental Quiet Engine Program, under contract to the National Aeronautics and Space Administration. This 22,000-pound (97,900 newton) thrust class turbofan engine was based on a new, supersonic tip speed, single-stage fan. This fan was designed at the altitude cruise condition for a corrected tip speed of 1550 ft/sec (472 m/sec), at a bypass pressure ratio of 1.6 and with a corrected fan flow of 915 lbs/sec (415 kg/sec).

The design of the new fan was based on low noise criteria to reduce fan source noise. Further, the thermodynamic cycle for this engine was selected to produce low exhaust velocities, thus reducing jet noise. In addition, sound suppression materials were incorporated in the fan inlet and the exhaust ducts.

Thirteen configurations were examined to determine the effect of design/treatment variations on the engine system's noise characteristics. In particular the following features were investigated: fan speed, operating lines, fan duct wall treatment, inlet splitters, a low Mach number exhaust splitter, core exhaust treatment, and a coplanar nozzle. Farfield acoustic data were recorded at six speed points, with repeats, for the 13 Engine "C" configurations.

All of the static engine test data recorded at General Electric were extrapolated to the 200-foot (61 m) sideline. The Engine "C" front and aft quadrant maximum perceived noise levels are summarized in Table I for the approach and takeoff power settings.

Although Engine "C" was not designed for actual flight application, an indication of the potential reduction available from the application of technology evolving from this program to actual flight hardware can be obtained by projecting ground static results to in-flight conditions. Effective perceived noise levels (EPNL's) were projected both for level flight and for landing approach and takeoff flight profiles of a representative four engine aircraft of the current civil fleet. The projected EPNL's for three basic Engine "C" configurations are compared to current DC8 levels and to the FAR-36 limits as shown in Table II.

Table I. Quiet Engine "C" Configurations, Summary of 200-ft (61 m) Sideline Front and Aft Maximum PNL.

NASA/GE Quiet Engine "C" Configurations	APPROACH				TAKEOFF			
	Front		Aft		Front		Aft	
	PNL	Angle	PNL	Angle	PNL	Angle	PNL	Angle
Fan Frame Treated	107.5	60°	106.3	120°	121.6	50°	118.8	110°
Totally Suppressed Inlet, Hard Fan Exhaust	99.9*	70°	107.3	120°	111.9*	70°	118.8	120°
Contoured Inlet	103.0	50°	102.6	120°	115.5	70°	113.6	110°
Long Inlet	102.9	50°	101.6	120°	115.2	70°	112.8	110°
One Splitter Inlet	99.9	50°	102.1	120°	112.3	70°	111.2	110°
Two Splitter Inlet	99.8	50°	102.9	120°	110.6	70°	112.0	110°
Three Splitter Inlet	99.6	70°	102.5	120°	110.3	70°	112.1	110°
Four Splitter Inlet	97.5	70°	102.0	120°	108.8	70°	110.4	110° & 120°
Long Inlet with 24" MPT Treatment	101.0	60°	101.6	120°	112.5	60°	110.7	120°
Long Inlet with 36" MPT Treatment	100.3	50°	102.0	120°	111.1	70°	111.2	110°
Fully Suppressed with Hard Core Exhaust	99.1	70°	105.7	120°	108.6	70°	113.2	110°
Fully Suppressed	96.4	70°	101.5	120°	106.5*	70°	110.7	110°
Coplanar Nozzle	97.2	70°	102.5	120°	107.0	70°	111.1	120°

* PNL's steadily decrease from the maximum in the aft quadrant. The 70° level is representative of the front quadrant noise.

Table II. Noise Levels at FAR-36[1] Reference Points

DC8-Type Aircraft Configuration

Four Engines

	Landing Approach, 1 N. Mile From Runway	Full Power Takeoff, 3.5 N. Mile From Brake Release
JT3D Engine[2]	118 EPNdB	117 EPNdB
FAR-36 Limits	106.3 EPNdB	103.5 EPNdB
Quiet Engine "C" with Fan Frame Treatment (Baseline)*	104.5 EPNdB	105.9 EPNdB
Quiet Engine "C" with Extended Fan Duct Treatment and Aft Splitter*	97.4 EPNdB	94.6 EPNdB
Quiet Engine "C" Fully Suppressed*	93.6 EPNdB	87.0 EPNdB

*Based on projected flight profiles.[3]

1. "Noise Standards: Aircraft Type Certification," Vol. III, Part 36, Federal Aviation Regulations, December 1, 1969.

2. Bishop, D.E. and Simpson, M.A., "Noise Exposure Forecast Contours for 1967, 1970 and 1975 Operations at Selected Airports," FAA Report No. 70-8, 1970.

3. Pendley, R.E., "The Integration of Quiet Engines with Subsonic Transport Aircraft," Douglas Aircraft Company Report DAC-68510A (NASA CR-72548) August 1969.

The projected Engine "C" flight noise levels for this class of aircraft were considerably below the levels of currently available engines which power the DC8. The "C" baseline effective perceived noise levels were 13.5 and 11.1 EPNdB less than the JT3D levels for the approach and takeoff power settings, respectively. The four-engine DC8 aircraft, FAR-36 requirements were nearly achieved with the fan frame treatment alone. The approach level was 1.8 EPNdB less than the FAR-36 limit while the takeoff level exceeded the limit by 2.4 EPNdB.

The predicted performance presented in Table II indicates that a DC8 aircraft powered by four Engines "C" with fan duct wall treatment would produce noise reductions of more than 20 EPNdB relative to current DC8's and 8 EPNdB relative to FAA noise regulation. Further, the projected noise levels of the DC8 aircraft with four fully suppressed Engines "C" were more than 24 EPNdB below those of the existing DC8 and more than 12 below FAR-36. (Note that there is an economic penalty associated with the maximum feasible noise reduction which can be significant.)[1]

II. INTRODUCTION

The General Electric Company, under contract to the National Aeronautics and Space Administration, constructed two low noise propulsion technology demonstrators in the 22,000-pound (97,900 newton) thrust class under the Experimental Quiet Engine Program. Both demonstrator engines were based on new, single-stage fans - a subsonic tip speed fan designated as Fan "A" and a supersonic tip speed fan designated as Fan "C". The Engine "A" demonstrator was tested at General Electric during the summer and fall of 1971. The acoustic results of these tests have previously been published.[2] The Engine "C" demonstrator underwent an extensive test program at General Electric between April and November 1972. This report describes the acoustic investigation and evaluation of the "C" propulsion demonstrator by the General Electric Company for the NASA Lewis Research Center.

The major objectives of the Quiet Engine Program were:

1. To determine the noise levels produced by turbofan bypass engines designed for low noise output and to confirm that predicted noise reductions can be achieved;

2. To demonstrate the technology and innovations which will reduce the production and radiation of noise in turbofan engines;

3. To acquire experimental acoustic and aerodynamic data for high bypass turbofan engines from which acoustic theory and experience can be correlated to provide a better understanding of the noise production mechanisms.

The engine test program was utilized to provide information pertinent to achieving those objectives. The goals for the Quiet Engine Program called for an engine 15-20 PNdB quieter than currently available engines in the same thrust class. The results of the Quiet Engine "C" testing provided directly applicable experimental data on noise reduction features that might be applied to future engine systems.

In general, there are three approaches to noise reduction applicable to engine technology. These are: thermodynamic cycle selection, design features that reduce source noise, and suppression of the generated noise. These three approaches were taken concurrently in the design of Quiet Engine "C".

A high bypass ratio thermodynamic cycle was selected to permit thrust generation by means of a low specific thrust, that is, a high mass flow with a low fan exhaust velocity. Further, the exhaust velocity of the core was reduced by a high extraction of turbine energy and by the use of an "open" core nozzle. In both cases, the lower exhaust velocities resulted in a reduction of jet noise. Reduction of fan source noise involved the judicious selection of design parameters, such as spacing of rotating and stationary parts, blade/vane ratios, and elimination of inlet guide vanes. Sound suppression materials were also added in the fan inlet and exhaust ducts.

III. TEST VEHICLE

A. ENGINE DESCRIPTION

Engine "C" was a low noise technology turbofan demonstrator which was designed, built, and acoustically evaluated under the NASA/GE Experimental Quiet Engine Program. The 22,000-pound (97,900 newton) thrust class turbofan consisted of a newly developed, high tip speed, single-stage fan coupled with the basic TF39/CF6 core.

The QEP Fan "C", which represented an all new design, was a supersonic tip speed, single-stage fan. It was designed, at the altitude cruise condition, for a corrected tip speed of 1550 ft/sec (472 m/sec), at a bypass pressure ratio of 1.6, and with a corrected fan flow of 915 lbs/sec (415 kg/sec) (see Table III). The fan had 26 unshrouded rotor blades (Figure 1) and 60 outlet guide vanes.

With the exception of the low pressure turbine, the core components in Engine "C" were adapted with little modification from the CF6-6 engine. The number of low pressure turbine stages required for the design thrust was reduced by the high tip speed fan. A two-stage low pressure turbine was developed to replace the five-stage CF6-6 turbine, thus decreasing engine weight, cost, and complexity. In that the basic core consisted of proven components, extensive engine development testing was not required.

The quiet engine cutaway, Figure 2, indicates the low noise design features that were incorporated in Engine "C". Since a thermodynamic cycle with a high bypass ratio was selected for the engine, the core and fan exhaust jet velocities (see Table IV) were relatively low, reducing jet noise substantially. In addition, an "open" core nozzle [850 sq in. (0.54 m) instead of 678 sq in. (0.42 m)] was also utilized to further reduce the velocity of the core jet to ensure that core jet noise would be lower than fan noise. Design features also were selected to reduce fan source noise. The fan inlet guide vanes were eliminated to reduce wake interaction noise. The axial spacing between the fan rotor blades and the downstream outlet guide vanes was selected as two aerodynamic chord lengths to minimize rotor wake interaction noise. The ratio of the number of vanes to the number of blades, which was 60 to 26 or 2.3, was chosen to reduce the noise radiated from the fan. A careful design balance was made between fan rotational speed and blade aerodynamic loading to reduce fan noise. Further, an acoustic absorptive treatment was placed on the inside and outside walls of the airflow passage through the fan to reduce noise propagation. Additional acoustic treatment was also used to line the core inlet and turbine exhaust ducts to reduce compressor and turbine noise.

Table III. Quiet Engine "C" Demonstrator Characteristics, NASA/GE Experimental Quiet Engine Program.

- Turbofan Engine in 22,000-Pound (97,900 Newton) Thrust Class
- Single-Stage Fan
- Supersonic Fan Tip Speed
- High Bypass Ratio
- Two-Stage Low Pressure Turbine

Designed at the altitude cruise condition for:

Corrected Fan Tip Speed	1550 ft/sec (472 m/sec)
Bypass Pressure Ratio	1.6
Corrected Fan Flow	915 lbs/sec (415 Kg/sec)
Bypass Flow Ratio	5.0

B. ENGINE PERFORMANCE

Engine "C" performance characteristics were determined by aerodynamic testing at the General Electric outdoor test facility located in Peebles, Ohio. (The aero-mechanical performance capabilities as well as distortion tolerances of Fan "C" had been demonstrated previously during the fan evaluation at General Electric's Full Scale Fan Test Facility located in Lynn, Massachusetts.)[3] The engine was fully instrumented during the outdoor testing to measure thrust, fuel consumption, airflow, and other performance characteristics. Fan performance was determined from the measurement of total temperatures and total pressures at the fan inlet and fan discharge. (Four radial rakes were used in the inlet while seven circumferential rakes were used in the fan discharge bypass duct.) These parameters were measured for a full range of power settings to determine the engine performance for the different operating conditions.

Three fan nozzles were investigated during the performance testing. These were designated as "small", 1385 square inches (0.89 m^2); "nominal", 1539 square inches (0.99 m^2); and "large", 1695 square inches (1.09 m^2).

The fan map presented in Figure 3 shows the three operating lines and the six constant speed lines along which acoustic data were recorded. The corrected fan weight flow is shown in Figure 4 as a function of percent corrected fan speed for the three nozzles. The corrected total engine thrust for the three nozzles is shown in Figure 5 again as a function of percent corrected fan speed. Pertinent engine characteristics are presented in tabular form for the approach and takeoff power settings in Table IV.

C. TEST CONFIGURATIONS

Thirteen configurations of Engine "C" were investigated during the test program. The effects of fan duct treatment were examined as were the effects of inlet splitters, a low Mach number exhaust splitter, core exhaust treatment, a coplanar nozzle, and different operating lines (controlled by the fan nozzle area).

The basic engine configuration incorporated a bellmouth inlet, fan frame treatment, compressor inlet treatment, and core exhaust treatment. A sketch of the "frame-treated" engine configuration which indicates the location and the length of acoustic wall treatment is presented in Figure 6. The treatment in the fan frame was a multiple-degree-of-freedom (MDOF) resonator design while the treatment in the core exhaust consisted of single-degree-of-freedom (SDOF) panels. This configuration is shown mounted on the engine test stand in Figure 7.

In order to suppress fan noise, substantial inlet and fan duct treatment was added to the basic engine configuration. The length and location of acoustic treatment for this "fully suppressed" configuration is indicated by the sketch, Figure 8. A contoured inlet with a four-ring splitter system was installed in place of the standard bellmouth inlet. This contoured inlet incorporated 37.3 inches (94.7 cm) of wall treatment. A mixture of 1.0 inch

Table IV. Quiet Engine "C", Performance and Physical Characterisitics.

Physical Characteristics

100% Corrected Fan Speed	5200 rpm	
Fan Diameter	68.3 inches	174.4 cm
Hub/Tip Ratio at Rotor LE	.36	
Number of Rotor Blades	26	
Number of Outlet Guide Vanes	60	
Core Nozzle Area	850 sq. inches	.54 m^2
Nominal Fan Nozzle Area	1539 sq. inches	.99 m^2

Performance Characteristics

Takeoff (Sea Level Static)

% Corrected Fan Speed	90.5%	
Gross Engine Thrust	22,000 lbs	97,900 Newtons
Fan Tip Speed	1403 ft/sec	427 m/sec
Fan Bypass Pressure Ratio	1.502	
Fan Jet Velocity	876 ft/sec	267 m/sec
Core Jet Velocity	864 ft/sec	263 m/sec
Bypass Ratio	4.99	
Bypass Flow	674.3 lbs/sec	306.2 kg/sec

Approach (Sea Level Static)

% Corrected Fan Speed	60%	
Gross Engine Thrust	7997 lbs	35,587 Newtons
Fan Tip Speed	930 ft/sec	283 m/sec
Fan Bypass Pressure Ratio	1.174	
Fan Jet Velocity	535 ft/sec	163 m/sec
Core Jet Velocity	445 ft/sec	136 m/sec
Bypass Ratio	5.16	
Bypass Flow	414.7 lbs/sec	188.3 kg/sec

(2.5 cm) and 0.3 inch (0.75 cm) thick SDOF resonator material was used for both wall and splitter treatment. Two casings with 2.8 inch (7.1 cm) deep SDOF treatment for multiple pure tone (MPT) suppression, totaling 36 inches (91.4 cm), were also added forward of the fan frame. Further, the fan duct was replaced with a long duct which incorporated a low Mach number exhaust splitter and 89.4 inches (227.1 cm) of extended wall treatment. The treatment for both the splitter and the wall consisted of one inch (2.5 cm) thick "Scottfelt". In addition, to prevent casing radiation the engine was wrapped with polyurethane foam ("Scottfoam") and lead vinyl from the forward edge of the MPT casing to aft outer cowl (approximately the leading edge of the exhaust splitter). Photographs of this fully suppressed configuration are presented in Figure 9.

In order to determine the effectiveness of each additional portion of this acoustic treatment, a number of configurations were tested which differed from a preceding configuration by only one piece of treatment. A summary of the engine configurations is presented in Table V. The table lists the type of inlet, the number of inlet splitters, the inlet wall treatment including length, the fan exhaust treatment, and the core exhaust treatment.

The contribution of the fan exhaust duct treatment was investigated by testing the engine with the inlet totally suppressed and the fan exhaust untreated. Aft views of the two fan exhaust configurations are presented in Figure 10. Note the difference in length of the two ducts. The effects of further extending the duct to the plane of the core exhaust were also examined. The "coplanar nozzle" configuration is shown in Figure 11.

Similarly, the amount of core noise suppression achieved with the core exhaust wall treatment was investigated. The core treatment panels were replaced with hardwall pieces. The test was run while the fan was fully suppressed so that the differences in core noise would be readily observable.

Further, the effect of the inlet splitter system on front quadrant noise propagation was examined. The four-ring inlet splitter system was designed so that the individual splitters could be removed, starting with the innermost splitter. Figure 12 is a photograph of the four splitter inlet. Noise levels were measured with one, two, three, and four splitters as well as with no splitters. These configurations differed from fully suppressed by the number of splitters and by the replacement of the 36 inches (91.4 cm) of MPT treatment with a 24-inch (61.0 cm) hardwall spool.

Variations of inlet wall treatment were also investigated. The configurations examined had, in addition to the baseline frame and core treatment, the contoured inlet and the fan exhaust duct treatment. Four configurations were tested: (1) with 36 inches (91.4 cm) of MPT treatment, (2) with 24 inches (61.0 cm) of MPT treatment, (3) with the 24-inch (61.0 cm) hardwall spool in place of the MPT treatment, and (4) without any MPT section.

Table V. Quiet Engine "C", Acoustic Treatment for Engine Configurations.

Configuration	Inlet Type	Inlet Splitters	Inlet Wall Treatment	Total SDOF Inlet Treatment in.	Total SDOF Inlet Treatment cm	Frame Treatment	Fan Exhaust Treatment	Core Exhaust Treatment
Fan Frame Treated	Standard	None	None	None		X	None	X
Fully Suppressed	Contour	Four	A, B, & C	73.3	186.2	X	E	X
Totally Suppressed Inlet, Hard Fan Exhaust	Contour	Four	A, B, & C	73.3	186.2	X	None	X
Coplanar Nozzle	Contour	Four	A, B, & C	73.3	186.2	X	E & F	X
Fully Suppressed Fan with Hard Core Exhaust	Contour	Four	A, B, & C	73.3	186.2	X	E	None
Four Splitter Inlet	Contour	Four	A & D	37.3	94.7	X	E	X
Three Splitter Inlet	Contour	Three	A & D	37.3	94.7	X	E	X
Two Splitter Inlet	Contour	Two	A & D	37.3	94.7	X	E	X
One Splitter Inlet	Contour	One	A & D	37.3	94.7	X	E	X
Long Inlet	Contour	None	A & D	37.3	94.7	X	E	X
Contoured Inlet	Contour	None	A	37.3	94.7	X	E	X
Long Inlet with 24" MPT Treatment	Contour	None	A & B	61.3	155.7	X	E	X
Long Inlet with 36" MPT Treatment	Contour	None	A, B, & C	73.3	186.2	X	E	X

A - 37.3" (94.7 cm) of mixed SDOF wall treatment, incorporated in the contoured inlet

B - 24" (61.0 cm) casing with thick SDOF treatment for MPT suppression

C - 12" (30.5 cm) casing with thick SDOF treatment for MPT suppression

D - 24" (61.0 cm) hardwall spool

E - Long duct incorporating a low Mach number exhaust splitter and 89.4" (227.1 cm) of Scottfelt wall treatment

F - Coplanar nozzle

IV. TEST PROGRAM

A. SOUND FIELD DESCRIPTION

Engine "C" testing was performed at the Peebles Test Operation, General Electric's outdoor test site shown in Figure 13. This test facility permits full-scale engine measurements of acoustic and aerodynamic performance charactersitics. Two views of Engine "C" mounted on the full-scale engine test stand are presented in Figure 14.

Acoustic data were recorded using 16 calibrated microphones located on a 150-foot (45.7 m) arc. The microphones were positioned at 10 degree intervals from 10° to 160° as measured from the engine centerline at the axial position of the rotor leading edge. These microphones were attached to towers at a height of 40 feet (12.2 m) above the level sound field surface of gravel, in order to simulate ground reflections typical of flyover conditions. In that the engine centerline height was 13 feet (4.0 m), the actual distance from the center of the sound field at the fan rotor to each individual microphone was about 152-1/2 feet (46.5 m). The microphones used were B&K 4133 1/2-inch (1.3 cm) diameter microphones, each of which was pointed at the engine.

B. FARFIELD DATA ACQUISITION

At least two sets of farfield acoustic data were recorded at six engine power settings for each configuration. The data were recorded on FM with a Sangamo 28-channel recorder, Model 4700. A tape speed of 30 ips (0.75 m/sec) was used to provide a flat frequency response through the 10 KHz 1/3-octave band. Data were recorded for a minimum of 60 seconds, with all angles being recorded simultaneously.

Each microphone system consisted of the following equipment:

Component	Manufacturer	Model
Microphone	B&K	4133 1/2 inch (1.3 cm)
Cathode Follower	B&K	2615
Power supply	B&K	2801

Prior to testing, the frequency response of the system was determined by removing the microphone head and inputting a constant voltage at various frequencies throughout the range of interest. For a range of 50 Hz to 25 KHz, this was performed at frequencies of 50, 250, 1000, 5K, 8K, 10K, 12.5K, 16K, 20K, and 25 KHz. The voltage input was chosen at 10 millivolts, approximately the equivalent to 94 dB for a 1/2-inch (1.3 cm) microphone and an approximation of the levels encountered during an actual test.

The loss through each system was measured by removing the microphone head and inputting one volt RMS at the microphone preamplifier at a frequency of 250 Hz, which corresponds to the pistonphone frequency. If the system loss was not within a specified limit, based on the specifications of the components, then the system was checked and/or changed before continuing.

With the 124 dB pistonphone on the microphone, the voltage output was compared with the calculated output based on the system losses and the microphone sensitivity. If the actual voltage output agreed within 1/2 dB (approximately 5%) of the calculated output, the microphone was functioning properly. Microphone cartridges falling outside this limit were set aside for repair and/or recalibration prior to reuse.

The amplifiers, tape recorder, and data reduction facilities were checked by recording a pink noise electrical signal of known amplitude. Reduction of this signal provided a measure of the frequency response of these components.

In addition to these system checks, a pre- and posttest calibration was recorded on each channel using the 124-dB pistonphone (B&K model 4220).

C. ACOUSTIC DATA REDUCTION

The acoustic data reduction system, schematically illustrated in Figure 15, was designed specifically to perform time-averaged spectral analysis with a General Radio 1/3-octave bandwidth parallel filter system using a 30 second averaging time. Data were recorded on FM analog magnetic tape and was played back through an amplifier/attenuator to provide the optimum signal input level to utilize the 50 dB dynamic range of the 1/3-octave filter system. The output of each filter was directly connected to a detector/integrator circuit which had built-in "hold" capabilities. The hold capability enabled the system to accumulate average signal amplitudes for each of the 1/3-octave bands and to hold them until they were processed through the analog-to-digital converter. The digital signal was then input to the DDP-116 Computer which provided a digital magnetic tape used for further computations and an on-line "quick-look" printout of sound pressure level spectra (temperature and humidity corrected to Standard Day). The "quick-look" information was used as a quality check prior to additional data reduction.

"Standard data reduction" of these 1/3-octave results provided in addition: perceived noise levels, overall sound pressure levels, sound power levels, overall sound power levels, and directivity indices, as well as extrapolations to various sideline distances. These 1/3-octave engine test results for the 150-foot (45.7 m) arc are presented in the Appendix.

Noise differences among configurations are shown in this report by comparisons of PNL directivities and SPL spectra. Since the test results generally demonstrated very good repeatability, the 1/3-octave arc data for each power setting of each configuration were arithmetically averaged. These 150-foot (45.7 m) arc sound pressure levels had been corrected to standard day conditions of 59° F (15° C) temperature and 70% relative humidity according to the SAE method described in ARP 866.[4] These corrected spectral results were extrapolated to the 200-foot (61 m) sideline, with extra ground attenuation (EGA) effects applied from the 150-foot (45.7 m) measuring arc to the sideline. [These EGA effects were calculated according to the SAE report AIR 923,[5] using a downwind velocity of 10 mph (16.1 k/hr) and an elevation angle of 0°]. Perceived noise levels for a single engine were calculated from these extrapolated spectra according to SAE procedures in ARP 865A.[6] These extrapolated, average results are presented in this report.

D. TESTING SCHEDULE

Farfield acoustic data were recorded at six speed points, with repeats, for the Engine "C" configurations. Physical speeds were set to correspond to the following corrected speeds based on ambient temperature: 2600 rpm, 3120 rpm, 3640 rpm, 4160 rpm, 4680 rpm, and 4940 rpm. These speeds correspond to 10% increments of corrected fan speed from 50% to 90%, plus 95% corrected fan speed.

Acoustic noise levels were measured for 13 engine configurations between April and November 1972 (there was a planned break in testing between late May and mid August while additional hardware was built). In all, 144 hours of acoustic and aerodynamic testing were completed at the Peebles site with Engine"C".

All noise measurements were obtained while complying with the following restrictions which were imposed on acoustic testing:

1. Acoustic data were not taken with steady winds greater than 7 mph. (11.27 km/hr) or gusts greater than 3 mph (4.83 km/hr);

2. Water or snow accumulation on the sound field prohibited testing;

3. Rain, snow, or fog at the test site prohibited testing;

4. Testing was restricted to conditions where the relative humidity was greater than 30% and lower than 90%;

5. No acoustic data were taken while aerodynamic instrumentation was installed.

V. DATA ANALYSIS

A. FAN FRAME ACOUSTIC TREATMENT

The basic Engine "C" configuration investigated during the Peebles test program contained acoustic treatment in the fan frame, in the compressor inlet, and in the core exhaust. Details of the acoustic wall treatment for this "frame-treated configuration are shown in Figure 6. The other Engine "C" configurations which were tested during the program each contain additional acoustic treatment.

The noise characteristics of the frame-treated configuration are examined in this section. These baseline noise measurements have been averaged for each speed point and then extrapolated to the 200-foot (61 m) sideline for presentation. These results have been corrected to standard day conditions of 59° F (15° C) temperature and 70% relative humidity.

1. Variation With Fan Speed

The baseline perceived noise directivities were examined at four speed settings in order to determine the effect of fan speed on the engine's noise characteristics. Results for the 60%, 70%, 80%, and 90% corrected fan speeds are shown for the nominal operating line in Figure 16. The perceived noise at each angle generally increased with successively higher fan speeds, although the front quadrant noise levels at 80% were very similar to those at 90% fan speed. Further, the directivity patterns for the 60%, 70%, and 90% fan speed were similar. At each speed the maximum perceived noise occurred in the front quadrant at either 50° or 60°.

The comparison of maximum perceived noise in the front quadrant and in the aft quadrant, Figure 17, likewise indicated that the noise levels were higher in the front quadrant. These sideline perceived noise levels are shown as a function of corrected engine thrust, with the approach and takeoff power settings designated. While the aft maximum levels increased smoothly between the approach and takeoff power settings, the maximum levels in the front increased sharply between 12,500-pounds (55,656 newtons) thrust and 16,300-pounds (72,535 newtons) thrust. At these data points the engine thrust levels correspond to 70% and 80% fan speeds, respectively. Onset of the supersonic phenomenon of multiple pure tones (MPT's) or buzz-saw noise occurred between these points. These MPT's characteristically make a major contribution at frequencies below the blade passing frequency (at multiples of the fan rotor shaft revolutions) when the fan rotor tip relative Mach number exceeds unity. As observed in the previous figure, the front quadrant noise levels for 80% and 90% fan speeds (power settings at which MPT activity existed) were very similar.

The sound pressure level spectra for the approach (60% speed) and takeoff (90% speed) power settings are presented for angles 60°, 90°, and 120° in Figures 18 through 20. At the higher tip speed, multiple pure tones were produced, and in addition, the broadband and BPF related noise increased.

The differences in terms of perceived noise were larger in the front quadrant due to multiple pure tones occurring at the takeoff speed. These MPT's were most prominent within the 400-Hz and 500-Hz 1/3-octave bands.

At 60°, MPT's largely controlled the takeoff spectrum. The levels of the 400-Hz and 500-Hz bands were 6 dB and 3 dB higher, respectively, than the level of the takeoff fundamental. Further, the 400-Hz and 500-Hz bands at takeoff which contained MPT's, were 33 dB and 30 dB higher than the corresponding bands at approach. While the fundamental and second harmonic were very prominent in the approach spectrum at this angle, the takeoff fundamental was, nevertheless, 12 dB higher. (Note that the BPF occurred within different bands - 1250 Hz for approach and 2000 Hz for takeoff.)

At 90°, the most prominent spectral characteristics were likewise the MPT's at takeoff and the BPF at approach. The sound pressure levels at this angle were lower, however, than those levels at 60° from 400 Hz to 10 KHz at the takeoff power setting and from the BPF to 10 KHz at the approach power setting. The SPL deltas between the approach and takeoff spectra were approximately the same for 1/3-octave bands of 2000 Hz and above. Similarly the difference between the BPF levels was about 12 dB at this angle, as it was at 60°.

At 120°, the spectrum characteristics changed relative to the spectra examined at the other two angles. Although some MPT content was observed in the aft takeoff spectrum, it was substantially less than in the front quadrant spectra. At this aft angle, the BPF was the most prominent takeoff characteristic. On the other hand, while the fundamental and second harmonic can be observed in the approach spectrum, the perceived noise for this power setting was largely controlled by broadband noise. The level of the takeoff BPF was again 12 dB higher than the approach fundamental. The tone level measured at both of these fan speeds falls between the corresponding fundamental levels measured at 60° and 90°.

Test results also indicated the presence of an unexplained, low frequency tone which occurred within the 125-Hz band at the approach power setting and within the 160-Hz band at the takeoff power setting. This tone is particularly evident in the 60° results, Figure 18. An investigation into the origin of this sharp tone seemed to rule out facility noise as well as the data acquisition and reduction system. The tone was apparently related to the core shaft speed. However, the source of this core related, 1/rev tone has not been determined. This tone was evident throughout the Engine "C" test results, particularly in results of the suppressed configurations.

2. Variation With Fan Exhaust Nozzle

Engine "C" was tested with two additional fan exhaust nozzles to investigate the effect of the variation of the engine operating line on the engine's performance and acoustic characteristics (see Section III-B for performance details). The design area of the fan exhaust nozzle was 1539 square inches (0.99 m^2). The other nozzles were 10% smaller and 10% larger in area. Thus the "small" nozzle was 1385 square inches (0.89 m^2) while the "large" nozzle was 1695 square inches (1.09 m^2).

The frame-treated configuration was tested with each of the three nozzles. Variation of noise characteristics are shown relative to the nominal nozzle results which were presented in the previous section.

Changes in noise directivities with the two nozzles are shown in Figure 21 for the 60%, 70%, 80%, and 90% corrected fan speeds. Only small changes in the engine's acoustic characteristics due to the exhaust nozzle changes are indicated by these four curves. Generally, the delta noise reduction was less than zero, indicating that the perceived noise increased slightly relative to the baseline results when the small and large nozzles were installed.

The delta spectral reductions for a forward and an aft angle are shown in Figure 22 for 60% speed and in Figure 23 for 90% speed. The spectral deviations were generally less than 3 dB different from the baseline spectra. The results for the large nozzle indicate decreases of noise within some 1/3-octave bands below the BPF. However, at frequencies above the BPF, the noise levels for both the small and large nozzles were slightly higher than with the nominal nozzle, baseline results.

3. Comparison of Engines "A" and "C" Frame-Treated Configurations

The acoustic characteristics of Engine "C" with the basic fan treatment were compared to the corresponding acoustic results measured for Engine "A". Both of these low noise technology demonstrators were 22,000-pound (97,900 Newton) thrust class turbofan engines. Both were based on new, single-stage fans. Fan "C" was designed for a supersonic tip speed of 1550 ft/sec (472 m/sec) and a pressure ratio of 1.6 while Fan "A" was designed for a subsonic tip speed of 1160 ft/sec (354 m/sec) and a 1.5 pressure ratio. Further, "C" had 26 unshrouded rotor blades compared to "A" which had 40 tip shrouded rotor blades.

The noise comparisons of the two engines are presented in Figures 24 through 30 for the frame-treated configurations. The acoustic treatment for "A" closely corresponded to "C" in terms of treatment lengths, placement, and suppression material. For additional details of the QEP Engine "A", refer to the report, "NASA/GE Engine 'A' Acoustic Test Results."[2]

The perceived noise directivities for the approach power setting are presented in Figure 24. The noise characteristics at this power setting were very similar for the two engines especially in the aft quadrant. It can be observed that the maximum perceived noise for "C" occured at 60° while the noise level for "A" was slightly higher at 120° than at 50°. A 2 PNdB difference occurred at 60° and 70°.

Spectral comparisons for this power setting are presented for the front and aft maximum angles (60° and 120°) in Figures 25 and 26, respectively. The fundamental and the second harmonic tones for Engine "C" were very prominent in the front quadrant, especially compared to Engine "A". (Note that while the Engine "C" BPF fell within the 1250 Hz band, the "A" fundamental fell within the 1600 Hz band.) Although the levels of these tones differed by 6 dB to 7 dB at 60°, the difference in perceived noise between the two engines at this angle was 2 PNdB. At 120°, the fundamentals for Engines "A" and "C" again differed by 6 dB, however, the second harmonics for both were the same level. At this aft angle the perceived noise levels were the same for the two engines.

Comparisons of the 60° and 120° spectra for the two engines are also presented in the form of 20-Hz bandwidth filter, narrowband overlays (see Figures 27 and 28). These data, measured on the 150-foot (46 m) arc, clearly show the predominance of the Engine "C" BPF and harmonics.

At the takeoff power setting, the noise characteristics of the subsonic and supersonic tip speed vehicle diverged substantially. The perceived noise directivities for "A" and "C", which are compared in Figure 29, indicated that the "C" levels were more that 5 PNdB higher than the "A" levels throughout the front quadrant. This difference was due to multiple pure tones associated with the supersonic tip speed fan. At the forward angle of maximum perceived noise, 60°, the noise levels differed by 7.5 PNdB, while at 120° they were within one PNdB.

The takeoff spectral comparison for 60° clearly differentiates the subsonic and supersonic fans. This comparison, shown in Figure 30, indicates that there was a difference of more than 10 dB between the two engine spectra from the 315-Hz bands to the 1600-Hz bands due to MPT's. The largest spectral difference occurred at 400 Hz, the band containing the strongest multiple pure tone. Within this band the "C" SPL was 23-1/2 dB higher than the "A" level. Multiple pure tones were also evident within the "C" spectrum at frequencies above 1600 Hz. Thus the 7 dB difference observed within the 2000-Hz band was not only the difference between the two engine fundamentals occurring within this band but also reflected "C" multiple pure tones as well. The differences at higher frequencies were also due in part to these MPT contributions. The 60° spectral differences between the two engines at the takeoff power settings are clearly shown in the narrowband overlay, Figure 31. These 150-foot (46 m) arc spectra indicate that the most prominent characteristics of "A" were the BPF and harmonics of the fan while the "C" spectrum was controlled by multiple pure tones extending in frequency well past the BPF.

Differences between the engine spectra at 120° further reflect the Engine "C" MPT's. At this aft angle (see Figure 32), the "C" spectrum was 5 to 7 dB higher than the "A" levels from 400 Hz to 1600 Hz due to multiple pure tones. In addition, the results for the 2000-Hz band indicated that the "C" BPF was 6-1/2 dB higher than the "A" fundamental. This "A" spectrum was dominated by the second harmonic in the aft quadrant. From the 4000-Hz band through 10 KHz, the "A" levels were higher than "C". The spectral comparison at this aft angle is also presented in the narrowband overlay, Figure 33, of the 150-foot (46 m) arc results of the two engines.

The comparison of maximum perceived noise as a function of corrected engine thrust, presented in Figure 34, showed that the "C" levels were higher than those for "A" throughout the thrust range. These maximum levels occured in the front quadrant for Engine "C" and in the aft quadrant for Engine "A". While the "A" levels increased smoothly between the approach and takeoff power settings, the forward maximum levels for "C" increased sharply upon the onset of MPT's. The largest difference between the engine maximum levels, which was

9 dB, occurred at 80% speed. The variations of aft maximum perceived noise with thrust were similar for the two engines although the Engine "C" aft levels, which are presented in Figure 17, were higher than the corresponding "A" levels.

B. FULL ACOUSTIC ENGINE TREATMENT

Substantial acoustic treatment was added to the basic engine configuration in order to suppress fan noise. The goal of the acoustic treatment design was to achieve noise levels which were similar in magnitude to those recorded for the fully suppressed Engine "A". A contoured inlet which incorporated SDOF wall treatment replaced the basic fan inlet. This contoured inlet included a four-ring splitter system. Two casings with thick treatment for MPT suppression were also added forward of the fan frame. In addition the fan duct was replaced with a long exhaust duct which incorporated an exhaust splitter and extended SDOF acoustic wall treatment. This exhaust duct was designed for low Mach number flow in order to increase the effectiveness of the acoustic treatment. The engine was also wrapped with lead vinyl and polyurethane foam to prevent casing radiation. Further details of the acoustic treatment of this fully suppressed configuration are presented in Figure 8.

Aerodynamic performance of the fully suppressed configuration was much as predicted. At takeoff, the measured total pressure recovery at the fan face was 0.983 as compared to a design value of 0.985. Operation with the four-ring inlet splitter system and fan bypass duct splitter resulted in a 4% reduction in engine thrust relative to the baseline configuration. However, wall Mach number calculations for this speed indicated an inlet flow redistribution resulting in higher airflow levels in the outer section of the inlet.

The 200-foot (61 m) sideline noise characteristics of the fully suppressed configuration are compared to the "C" baseline results and to the Engine "A" fully suppressed characteristics in this section.

1. Comparison of the Fully Suppressed and Frame-Treated Configurations

The perceived noise directivities of the fully suppressed configuration were examined at four speed settings in order to determine the effectiveness of the total engine suppression relative to the baseline noise levels. Comparisons were made for the 60%, 70%, 80%, and 90% corrected fan speeds and are presented in Figures 35 through 38. Large reductions of perceived noise were achieved at each speed. In particular, the greatest reductions of frame-treated noise levels were attained in the front quadrant. The angles of maximum perceived noise shifted from 50° to 60° for the baseline to 110° to 120° for the fully treated configuration.

At the approach power setting (60% fan speed), significant reductions of the baseline noise levels were achieved in both the front quadrant, from 7.5 to 12.6 PNdB, and in the rear quadrant, from 4.5 to 7.3 PNdB. As shown in Figure 35, the maximum perceived noise, which occurred at 60°, was suppressed 12.1 PNdB by the addition of the full acoustic treatment. In that less reduction was attained at the adjacent angles, the forward "maximum" angle for the fully suppressed configuration shifted to 70°. At the angle of aft maximum PNL, the frame-treated level was reduced 4.8 PNdB.

The spectral comparison at 60°, presented in Figure 39, indicates that the baseline levels for the fan fundamental and harmonics decreased with the fully suppressed configuration. The bands containing the BPF and the second harmonic were reduced 19.7 and 19.0 dB, respectively, relative to the frame-treated levels. The other 1/3-octave bands from 500 Hz to 8 KHz were reduced from 5.3 to 14.8 dB. Examination of the 60° narrowband overlay, Figure 40, shows that the only tones evident for the fully suppressed configuration were beyond the second fan harmonic.

In the aft quadrant at 120°, the fan BPF and harmonics were eliminated from the fully suppressed spectrum. Figure 41 shows that the 1250-Hz band with the BPF was reduced 8.2 dB, and the band containing the second harmonic was decreased 5.6 dB. The 1/3-octave bands between the BPF and 5000 Hz were all reduced from 4.5 to 9.2 dB. Nevertheless, little SPL reduction was attained in the 6.3, 8, and 10 KHz bands.

At this 120° angle, the approach perceived noise for the fully suppressed configuration was controlled by the 2.5, 3.15 KHz, 6.3 KHz, and 8.0 KHz 1/3-octave bands. [Figure 42 is a narrowband (20 Hz filter bandwidth) overlay of the two configurations which shows this 120° spectrum.] Acoustic traversing probe and Kulite wall-mounted transducer measurements indicated that both fan tones and broadband noise within these bands were suppressed by the acoustic treatment in the bypass exhaust duct. These controlling farfield noise characteristics were apparently core related, although the core exhaust duct was also treated in these configurations. The turbine first- and second-stage BPF's were observed within the 6.3 KHz 1/3-octave band farfield results (also see Figure 42). The 2.5 - 3.15 KHz 1/3-octave levels were held up by a rolling characteristic or hump, which according to the narrowband overlay occurred between 2 and 4 KHz. As can be observed in both Figure 41 and 42, the broadband levels within the 8 KHz band did not drop off, and in addition, an as yet unexplained, sharp tone occurred at approximately 8000 Hz.

These apparent core levels produced a noise floor which limited the perceived noise reduction that might have been attained with fan acoustic treatment. If either the 2.5 - 3.15 KHz bands or the 6.3 - 8.0 KHz bands were reduced to levels similar to adjacent 1/3-octave bands, the perceived noise would be reduced 1/2 PNdB. If, however, both of these pairs were reduced, the noise level would decrease 2 PNdB.

The takeoff perceived noise results are presented in Figure 38 for the two "C" configurations. Large noise reductions were achieved at all angles with the fully suppressed configuration. The greatest reductions were attained in the front quadrant; 14 PNdB suppression or more is shown for each angle from 10° to 70°. The maximum suppression, 17.2 PNdB, occurred at 50°. The amount of reduction demonstrated for each angle decreased from this 50° angle to 150° where the frame-treated level was suppressed by 4.6 PNdB. At 110°, the baseline aft maximum PNL was reduced 8.1 PNdB to 110.7 PNdB, the maximum takeoff PNL for the fully suppressed configuration. The perceived noise levels decreased at each succeeding angle on either side of 110°. As such, there was no "maximum" PNL in the front quadrant. The perceived noise levels in the front quadrant were controlled by noise radiated from the aft quadrant. (Data measured with a directional broadside microphone array [7] support this conclusion.)

The takeoff spectral comparisons of the two configurations are presented in Figures 43 and 44 for the 60° and 110° angles, respectively. At the front angle, the baseline noise levels were suppressed from 250 Hz to 10 KHz by the full engine acoustic treatment. The MPT content as well as the BPF and harmonic tones were virtually eliminated from the fully suppressed spectrum. The sound pressure levels of the 1/3-octave bands from 400 Hz to 2000 Hz (excepting the 800 Hz and 1600 Hz bands) were reduced by 21 to 22-1/2 dB relative to the baseline. Less suppression was achieved at the aft angle than in the front, although the full acoustic treatment reduced the baseline levels throughout the spectrum at 110°. The MPT, BPF, and harmonic tones were eliminated from the aft spectrum by the additional treatment. The 2000-Hz band which contained the BPF and the 4000 Hz band with the second harmonic were reduced 13.4 and 9.4 dB, respectively. At this angle as well as in the front, broadband noise controlled the fully suppressed 1/3-octave spectra. Narrowbands of the spectra for the 60° and 110° angles are presented in Figures 45 and 46, respectively. (An unexplained tone at 5800 Hz was very prominent in the fully suppressed takeoff spectra, expecially at 60°. This tone apparently occurred whenever the low Mach number exhaust duct was installed.)

A comparison of the maximum sideline PNL's versus engine thrust is presented in Figure 47. The frame-treated levels which are from the front quadrant clearly show the onset of multiple pure tones. The fully suppressed levels which are from the aft quadrant increased steadily with increasing thrust. Both the approach and takeoff power settings, which have been discussed in detail, are indicated for this comparison.

In summary, large reductions of the baseline noise levels were achieved with the full acoustic treatment for Engine "C". The greatest amounts of suppression were achieved in the front quadrant. The MPT's, fundamentals, and fan harmonics characteristic of the frame-treated configuration were virtually eliminated from the fully suppressed results. However, turbine/core related noise appear to have held the overall engine levels up at the approach power setting.

2. Comparison of Engines "A" and "C" Fully Suppressed Configurations

The design goal of the fully treated Engine "C" was to achieve noise levels of magnitude similar to those of the fully suppressed Engine "A". The basic design of these two engines was discussed in Section V-A3. A comparison of the total acoustic treatment applied to each is presented in Figure 48. Both engines had fan frame acoustic treatment and core exhaust treatment. The acoustic wall treatment for each engine is shown in Table VI.

Table VI. Engines "A" and "C" Wall Treatment.

Inlet			Bypass Duct		
Length	Type	Depth	Length	Type	Depth
Engine "C"					
19.55"(45.1cm)	SDOF	0.3"(.75cm)	89.4"(227.1cm)	Scottfelt	1.0"(2.5cm)
17.75"(45.1cm)	SDOF	1.0"(2.5cm)	26.6"(67.6cm)	Scottfelt	1.0"(2.5cm)
36.0"(91.4cm)	SDOF	2.8"(7.1cm)			
15.2"(38.0cm)	MDOF	1.0"(2.5cm)			
Engine "A"					
58.0"(147.3cm)	SDOF	0.88"(2.2cm)	37.0"(94.0cm)	MDOF	1.0"(2.5cm)
20.0"(50.8cm)	MDOF	1.0"(2.5cm)	37.0"(94.0cm)	MDOF	1.0"(2.5cm)
15.5"(38.8cm)	MDOF	1.0"(2.5cm)			

In addition, Engine "C" had four inlet splitters while Engine "A" had three. Both engines had a single bypass duct splitter. It should be pointed out that the splitters incorporated in Engine "A" were not specifically designed for the aerodynamic nor acoustic environment of the "A" inlet and exhaust ducts. As such, greater thrust losses were introduced and broadband noise was probably increased.

The cores of the two engines were basically the same with the exception of the new two-stage, low pressure turbine for "C" which replaced the four-stage LPT of "A". (Note that the sketch indicates that Engine "C" was shorter than "A". This was due to the differences between the low pressure turbines.) The core exhaust nozzle of Engine "C" was 25% larger in area than the "A" nozzle which resulted in lower core exhaust velocities - 864 ft/sec (263 m/sec) for "C" as compared to 1177 ft/sec (359 m/sec) for "A" at the takeoff power settings. The difference in core exhaust velocities resulted in correspondingly lower core jet noise for "C".

The perceived noise directivities for the approach power setting are presented in Figure 49 for the two fully suppressed engines. The "C" levels were generally lower than the suppressed "A" levels with the exception of the angles of maximum PNL, 110° to 120°. At 120°, the "C" level was about 2 PNdB higher than "A".

Spectral comparisons are presented for this power setting at the front and aft maximum angles of 70° and 120° in Figures 50 and 51, respectively. The 70° spectra were very similar for the two suppressed engines from the 1000-Hz to the 4000-Hz 1/3-octave bands. The "C" levels were lower than the corresponding "A" levels below this range; while the "C" SPL's were higher from 5 KHz through 10 KHz. At the aft angle the low frequency "C" levels, up to 800 Hz, were lower than "A" due to reduced core exhaust velocities, and thus reduced core jet noise for "C". However, above 800 Hz the "C" SPL's were generally higher than "A", resulting in the 2 PNdB difference observed in Figure 49. The 1/3-octave bands producing this difference (2.5 - 3.15 KHz and 6.3 - 8.0 KHz) were the same bands which seemed to be controlled by "C" core noise. While the low pressure turbine BPF's could be identified within the 6.3 KHz band for Engine "C", the "A" first stage turbine tone (also occurring within the 6.3 KHz band) was buried under the "haystack" which can be observed in the "A" spectrum.[2]

The comparison of perceived noise at the takeoff power setting are presented in Figure 52. The noise levels of the two suppressed engines were very similar in the front quadrant. In the aft quadrant, the Engine "C" levels were surpressed below the perceived noise of the fully suppressed Engine "A".

The takeoff spectral comparisons for 70° and 110° are presented in Figures 53 and 54. Although very large differences existed between the subsonic and supersonic baseline fan characteristics, the "C" inlet treatment produced the suppression required to achieve the suppressed "A" levels. The spectra of the two engines were very similar from 500 Hz through 1600 Hz. The "C" levels were lower than "A" within the 2000 Hz and 2500 Hz bands and higher than "A" in the bands from 3.15 KHz through 10 KHz. The spectra at 110° were very similar for the two engines with the exception of jet noise at low frequencies and broadband noise in the 8- and 10-KHz bands.

A comparison of maximum perceived noise as a function of corrected engine thrust is presented in Figure 55. The "C" levels were higher than "A" at the lower thrusts but are lower than "A" in the vicinity of the takeoff power setting.

C. FAN EXHAUST TREATMENT

In order to investigate the contributions of individual noise suppression features to the total engine suppression, portions of acoustic treatment for the fully suppressed configuration were removed and the resultant farfield noise was measured. Similarly, to determine the additional benefit of a specific modification to the fully suppressed configuration, the change was incorporated and the resultant farfield noise was likewise measured. These farfield results were compared to the fully suppressed noise measurements and the differences were thus a measure of the effectiveness of that specific noise reduction feature.

1. Effect of Low Mach Number Splitter and Extended Duct Treatment

The fan exhaust duct of the fully suppressed engine was a low noise reduction feature of particular interest. The conventional bypass duct had been completely replaced by an exhaust duct and splitter assembly which was specifically designed for low Mach number flow over the acoustically treated walls and splitter. The details of the exhaust duct acoustic treatment are contained in Section III-C.

The contribution of the low Mach number exhaust duct design was investigated by testing an engine configuration with the conventional, untreated bypass duct while the inlet was totally suppressed. When these results were compared to the fully suppressed data, the differences indicated the amount of fan exhaust noise suppression that was attained with this noise reduction feature. Cross sections of these two configurations, shown in Figure 56, point out the differences in acoustic treatment. Aft views of these two bypass ducts are presented in Figure 10.

The 200-foot (61 m) perceived noise directivities of the totally suppressed inlet, hard fan exhaust configuration (referred to as the suppressed inlet) were compared to the noise characteristics of the fully suppressed configuration in order to evaluate the effectiveness of the new bypass duct design. Comparisons at 60%, 70%, 80%, and 90% corrected fan speed are presented in Figures 57 through 60. These results demonstrate that the suppression of fan exhaust noise by the splitter and extended wall treatment occurred at each angle along the sideline. In other words, significant amounts of fan exhaust noise were radiating into the front quadrant. Substantial aft quadrant noise level reductions were achieved as well as reductions of this forward radiating exhaust noise. These reductions were evident at all of the speeds examined.

At the approach power setting (60%), the addition of the splitter and extended treatment resulted in suppressions of 2 to 4 PNdB in the front quadrant and 5 to 8 PNdB in the aft quadrant. At 70°, a difference of 3-1/2 PNdB was observed between the configurations. The spectral comparison at this angle, Figure 61, indicates that the suppressed inlet levels were higher than the fully suppressed SPL's at all frequencies. At this speed, the amount of noise radiated forward was generally the same across the spectrum. (This figure demonstrates the prominance of the core 1/rev at 125 Hz in a suppressed 60% speed spectrum as discussed on page 15. The difference in the level of this low frequency tone for these two configurations is unexplained, however, it is not believed to be related to noise radiating from the fan exhaust.) At 120°, a 5-1/2 PNdB reduction was attained with the splitter and extended wall treatment. The noise reduction was across the spectrum as indicated in Figure 62. The fan exhaust noise appears to have been reduced to the point where perceived noise was apparently controlled by a core noise floor. Noise suppression of 5 dB or more was achieved from 1250 Hz to 5000 Hz, with 10 dB attained in the 4000-Hz band and 7-1/2 dB in the 5000-Hz band.

The comparison at the takeoff power setting, 90% speed, indicates that the installation of the low Mach number splitter and extended wall treatment yielded 3-1/2 to 5-1/2 PNdB reductions in the front quadrant and 7-1/2 to 9 PNdB reductions at the aft angles of 90° to 130°. Without the bypass duct treatment, the fan fundamental and harmonic tones as well as broadband noise were radiated from the fan exhaust, as shown in the spectral comparisons presented in Figures 63 and 64. Both the BPF tone and higher broadband levels were radiated to the forward angle (70°) for the suppressed inlet configuration. At the aft angle, 110° from the inlet, the fundamental and second harmonic were very prominent. The BPF was about 14 dB higher than the fully suppressed level, while the second harmonic was 11 dB higher without the exhaust duct suppression. The high frequency broadband noise was also significantly higher for the suppressed inlet configuration.

Comparison of the maximum perceived noise levels, presented in Figure 65 demonstrates that a reduction of 4 to 9 PNdB was achieved by the addition of the low Mach number splitter and treated bypass duct assembly. The suppression shown is the reduction of fan exhaust noise attained in the aft quadrant with the full engine treatment.

2. Effect of Coplanar, Coannular Nozzles

The fully suppressed configuration was also modified to determine the acoustic effects of coplanar jet exhausts. The bypass duct was extended 53 inches (134.6 cm) without any additional acoustic treatment as shown in Figure 66. The fan discharge nozzle area was designed to be approximately the same as that of the fully suppressed engine. In all other aspects the fully suppressed configuration was unchanged. Descriptions of the acoustic treatment are contained in Section III-C and additional photographs of the "Coplanar" configuration are presented in Figure 11.

Comparison of the 200-foot (61 m) sideline directivities for the coplanar and noncoplanar, fully suppressed engine configurations indicated very small differences at approach. As shown in Figure 67, the perceived noise measured for the coplanar configuration was about a half to one PNdB higher at 70° and 120°. Examination of the 70° spectra (Figure 68) shows that the major difference was at 2000 Hz, although the broadband noise with the coplanar nozzle was slightly higher. The 5 dB difference observed at 2000 Hz was due to an unexplained, sharp tone which was measured for several Engine "C" configurations. (Kulite wall transducers indicated that the source of this tone was in the vicinity of the inlet throat. It could be speculated that a probe hole was not blanked off properly during farfield testing.) The spectral comparison at 120° was generally the same as shown in Figure 69. The same spectra were compared at 150 feet (45.7 m) in an overlay of 20 Hz bandwidth filter narrowbands of the two configurations, Figure 70. Several tones were very prominent within these spectra, primarily the BPF's of the low pressure turbine, first and second stages which are designated. (The difference in frequency was due to different physical speeds required to produce the same corrected speeds.) Note that the unexplained tone at 8 KHz did not occur in the coplanar results. In addition, the differences in the 2 and 10 KHz bands can be seen to have been related to broadband noise.

A very interesting observation can be made concerning the turbine tones of these two configurations. The second-stage tone was much sharper and 7 dB higher for the configuration with the coplanar nozzle. Likewise the first-stage tone was at least 5 dB higher than the fully suppressed tone which occurred at 6150 Hz. However, the turbine treatment in the core exhaust duct was exactly the same for these two configurations. The shape of the second-stage tone for the noncoplanr configuration suggests that it may have been modulated, dispersing the noise energy associated with this tone over a band of frequencies. It may further be speculated that such modulation took place within the mixing region of the two jets and that the characteristics of this turbine noise radiation were altered when the mixing characteristics were changed by the extended fan duct.

The 200-foot (61 m) sideline directivities were also very similar at the takeoff power setting. As indicated in Figure 71, the perceived noise of the coplanar nozzle configuration was slightly higher at several of the mid and aft angles. The small difference at 70° appeared to result from the higher broadband levels of the coplanar configuration between 630 Hz and 3150 Hz, shown in Figure 72. Virtually no perceived noise differences could be observed at 110° for this speed, although some differences of the broadband noise did exist (Figure 73).

As indicated by the directivity comparisons, only slight differences of the maximum perceived noise existed at approach and takeoff thrusts for the coplanar and noncoplanar configurations. This trend continued at all intermediate thrust levels as well, as shown in Figure 74.

D. CORE EXHAUST TREATMENT

The farfield results for the fully suppressed configuration indicated that an apparent core noise floor held up the approach aft quadrant noise levels, despite the inclusion of core exhaust treatment in the engine. To determine the effectiveness of this acoustic treatment in the core exhaust duct, these panels were replaced by hardwall pieces for one set of tests. Both of the configurations incorporated a contoured inlet with a four-ring splitter system, thick inlet wall treatment for MPT suppression, fan frame treatment, and a low Mach number splitter and extended wall treatment in the bypass duct. In this fashion, fan noise was totally suppressed so that core noise suppression could be observed.

The core exhaust treatment, which was incorporated in all but one of the Engine "C" configurations, is shown in Figure 75. This noise reduction design consisted of SDOF treatment which was applied to both walls of the duct passage over a nominal length of 36 inches (91.4 cm). The 200-foot (61 m) sideline farfield results with and without this portion of the engine treatment are compared in Figures 76 through 85. Detailed investigations, utilizing acoustic probes, a broadside directional array, and a nearfield microphone array are presented in the report, "Turbine Noise Suppression".[7]

The perceived noise results for the suppressed fan, hard core and fully suppressed configurations are presented in Figures 76 through 79 for the four fan speeds. These comparisons indicated that the engine noise levels at each of these speeds were reduced from 2 to 4-1/2 PNdB at angles of 80° through 130° by the installation of the SDOF wall treatment in the core exhaust duct. The maximum reduction of perceived noise occurred at 90° for each speed.

At the angle of the forward maximum PNL (70°), the approach perceived noise of the fully suppressed engine was 2-1/2 PNdB lower that that of the "hard core", configuration. Addition of core treatment reduced the engine noise from 2.5 KHz to 10 KHz at this angle, as shown in Figure 80. The difference at 2 KHz, due to the unexplained tone discussed in the previous section, contributed to the perceived noise difference between the two configurations. The amount of noise reduction at this angle suggests core noise radiated from the aft to the front quadrant.

The spectral comparison at 120°, the angle of maximum PNL, is presented in Figure 81. The addition of core exhaust treatment to the totally suppressed fan configuration produced significant reduction of the engine noise levels (4-1/2 PNdB). The suppressed fan, levels were reduced from 2 KHz to 10 KHz by the treatment. The comparison of 150-foot (45.7 m), 20-Hz bandwidth filter narrowband results is presented in Figure 82. It can be observed that the noise characteristics of the fully suppressed configuration which have been described as core related were all higher without the core exhaust treatment. The turbine tones were suppressed approximately 6 to 7 dB by the core treatment. The rolling characteristic or hump between 2 and 3 KHz was reduced about 2 to 3 dB as was the broadband noise in the 10 KHz band. In addition, the noise levels within the 4 and 5 KHz bands were substantially reduced. The unexplained high frequency tone was the same level for the two configurations, however, the frequency of the tone changed. It was thus apparent that the maximum level at approach was controlled by noise radiated through the core exhaust duct and not by fan noise.

Generally a half to one PNdB less reduction was attained at the takeoff power setting than at approach. The spectra for the front and aft angles of maximum perceived noise are presented in Figures 83 and 84. At 70°, the suppressed fan spectrum was reduced from 2 to 4-1/2 dB for 1/3-octave bands above 1600 Hz by the addition of the core duct treatment. At 110°, the hard core duct noise levels were reduced from 3 dB to 7 dB, the amount of suppression increasing from 3.15 to 10 KHz. Both configurations produced the same noise levels at the lower frequencies for 70° and 110°.

The reduction of the maximum aft quadrant noise levels due to the addition of the core exhaust treatment is shown in Figure 85. Reductions of from 2 to 4 PNdB were indicated, decreasing with increasing power setting. This trend reflects the relative contribution of core noise to the overall engine noise levels.

E. EFFECT OF INLET SPLITTERS

Part of the systematic approach to determine the individual contributions of the engine acoustic treatment, was to investigate the characteristics of the noise suppression achieved with the inlet splitters. The four-ring inlet splitter system (pictured in Figure 12) was designed so that the splitters could be individually removed, starting with the innermost splitter. In this fashion it was possible to examine the noise characteristics for three, two, and one splitters as well as for no splitter.

Details of the splitter system are presented in Figure 86. The splitter and inlet wall treatment consisted of two SDOF designs which utilized different treatment thicknesses for maximum suppression at different frequencies. These two designs were mixed such that opposing passage surfaces had similar treatment. Note that the inlet with four splitters differed from the fully suppressed configuration, in that a hardwall spool replaced the deep treatment for MPT suppression. In this manner it was possible to determine the amount of MPT suppression attained with the splitters.

In an attempt to present the 200-foot (61 m) sideline results clearly, the directivity and spectral comparisons for the inlet variations are presented as delta suppression as well as absolute noise levels. The suppression differences were computed relative to the "no splitter" results.

The perceived noise directivities for the various splitter configurations are presented in Figures 87 through 90 for 60%, 70%, 80%, and 90% corrected fan speeds. It can be observed that without splitters the noise levels were forward dominant. With the addition of one or more inlet splitters, however, the maximum PNL generally shifted to an aft angle.

The greatest suppression attained by the addition of a single splitter was from no splitters to one splitter. Significant reductions were attained from 30° to 90° with the outermost splitter. The addition of the second and third splitters produced far less additional suppression at the approach and takeoff power settings, although gains at the 70% and 80% speeds were noteworthy. The addition of the fourth splitter yielded a definite improvement at each forward angle for all speeds.

The single splitter produced no noise reduction at the extreme forward angles (10° and 20°). Addition of the second and third splitter produced successively more suppression at these angles. However, the largest additional suppression due to the fourth splitter was attained at these angles. These results suggest that the perceived noise at these forward angles were primarily controlled by noise propagating through the center of the duct. In contrast, treatment in the outer portion of the flow path (single splitter) had the greatest effect on the engine noise levels measured from 40° to 80°.

The perceived noise levels were quite similar in the aft quadrant as would be expected. A trend was evident, however, that the noise measurements for the configurations with one, two, and three splitters were slightly higher than with no splitters or with four splitters. (Aerodynamic measurements indicated a flow redistribution for the off design configurations. As a splitter was removed for this noise investigation, no attempt was made to reposition the remaining splitters to optimize either aerodynamic or acoustic performance.) Thus, it appears from the observed trend that the source noise might have been increased by the off design splitter configurations.

The spectral comparisons of the splitter configurations are presented in Figures 91 and 92 for the approach power setting. At 50°, the comparison shows the progressive spectral suppression with increasing number of splitters for the 1000-Hz band and above. In particular, large reductions of the fundamental and second harmonic were achieved with three splitters as well as with four splitters. The comparison further indicates, that nearly a constant noise reduction was attained with the single splitter for bands from 1000 Hz to 5000 Hz. Note that the unexplained 2000 Hz tone from the inlet throat was prominent in the spectra of the configurations with three and four splitters. This tone also occurred in each of the other spectra, however, it was not as prominent in that the levels of the adjacent 1/3-octave bands for the other configurations were similar to the level of this tone. The spectra at 120° were generally slightly higher than the "no splitter" configuration at this angle. This was especially true at the higher frequencies for the configurations with two and three splitters.

At the takeoff power setting, the spectra in both the front and aft quadrants were dominated by the 400-Hz MPT as shown in Figures 93 and 94. Large amounts of suppression were achieved at 70° by the addition of splitters. The amount of suppression generally followed the same hierarchy as observed at the approach power setting. The frequency range of the suppression broadened at takeoff and the amount of suppression attained with the outermost splitters increased at this front quadrant angle. The suppression of the 400-Hz MPT was best at 110° with these two outer splitters (separately or together). From this MPT to 4000 Hz, the addition of splitters generally reduced the noise levels of the no splitter configuration slightly, while the levels increased from 5000 Hz to 10,000 Hz (the levels for the two and three splitter configurations were usually higher than the others).

The maximum perceived noise levels versus corrected engine thrust for the front quadrant are presented for these configurations in Figure 95. This comparison indicates that the greatest suppression achieved by the addition of a single splitter was from no splitters to one splitter. The maximum front noise levels decreased as splitters were added at the approach and takeoff engine thrusts. At intermediate thrusts, the one and two splitter configurations resulted in similar front maximum levels as did the three and four splitter configurations.

Without splitters the maximum PNL had occurred in the front, however, addition of splitters reduced the front quadrant noise sufficiently to shift this maximum to the aft quadrant. At the lower thrusts settings, the maximum front and maximum aft levels were very similar; thus, the addition of splitters indicated no change of the system maximum PNL. At the higher power settings the maximum aft levels (similar for all of these configurations) had been 3 to 6 PNdB lower than the maximum forward levels; thus, suppression of forward radiated noise resulted in the shifting of the engine maximum perceived noise levels to the aft quadrant.

F. EFFECT OF INLET TREATMENT/LENGTH

The fully suppressed inlet incorporated 73.3 inches (186.2 cm) more inlet wall treatment than the baseline inlet. To determine the effectiveness of this additional wall treatment and length, the engine was tested with segments of this treatment removed. Four variations of wall treatment were examined.

The entire wall treatment used for the total engine suppression is shown in Figure 96. This included, in addition to the MDOF frame treatment: 36 inches (91.5 cm) of deep treatment for MPT suppression which consisted of a 24-inch (61 cm) section and a 12-inch (30.5 cm) section; and a 37.3-inch (94.7 cm) contoured section of mixed thickness treatment.

The following combinations were tested (see Table V): the contoured section by itself, the contoured section plus a 24-inch (61 cm) hardwall spool to increase the inlet length, the contoured section plus the 24-inch (61 cm) treated section, and the contoured section plus both the 24-inch (61 cm) and the 12-inch (30.5 cm) sections with thick treatment. The directivity and spectral test results are compared in terms of absolute noise levels for a 200-foot (61 m) sideline and delta suppression relative to the contoured inlet results.

The comparisons of the perceived noise directivities for these inlet configurations are presented in Figures 97 through 100 for the 60%, 70%, 80%, and 90% corrected fan speeds. Very little effect of the additional 24 inches (61 cm) of length could be observed for the "long inlet" configuration compared to the results for the "contoured inlet" with the exception of the 80% speed. The inlet with 24 inches (61 cm) of thick treatment for FPT suppression provided the largest increment of suppression and did so over a wide range of angles. The effect of the additional 12 inches (30.5 cm) of thick treatment was most evident in the front angles of 10° to 60°, although at 70% speed sizeable reductions were attained to 90° with added treatment. Generally 3 to 6 PNdB suppression of the front quadrant noise levels were attained with the full wall treatment relative to the contour inlet levels.

At the front and aft angles of maximum PNL the reductions attained with the 24-inch (61 cm) MPT treatment were most prominent at both approach and takeoff. The approach spectra at 50°, Figure 101, indicated that the fundamental, although reduced about 3 dB, continued to control perceived noise. However, the broadband noise and the bands containing the fan harmonics were reduced from 3 to 4 dB by both configurations with MPT treatment. At 120°, Figure 102, the contoured inlet spectrum was reduced a small amount by each of the other configurations.

At the takeoff power setting, a significant reduction of MPT noise was achieved with the thick wall treatment as shown in Figures 103 and 104. The MPT's at 400 Hz and 500 Hz were reduced approximately 12.5 dB at 50° and 9 dB at 110°. The suppression due to the thick treatment extended over a wide range of frequencies - from 315 Hz to 10 KHz. At 50°, the additional 12 inches (30.5 cm) of treatment produced an extra 2 to 4 dB suppression over most of this range; however, the noise levels measured at 110° for the longer inlet were slightly lower than those for the inlet with 24 inches (61 cm) of MPT treatment.

The variation of front quadrant maximum perceived noise with engine thrust is presented in Figure 105 for the different inlet configurations. The contoured inlet and the long inlet configurations produced almost the same maximum levels. The configuration with 24 inches (61 cm) of MPT treatment reduced the forward maximum levels by 3 - 4 PNdB at thrusts above the approach power setting. A further reduction of up to 1-1/2 to 2 PNdB was realized due to the additional 12 inches (30.5 cm) of treatment for the 36-inch (91.5 cm) configuration.

G. FLYOVER NOISE PROJECTIONS

One of the goals of the NASA/GE Quiet Engine Program was to demonstrate through extrapolation of ground static data, the noise levels that could be anticipated on landing approach and takeoff by an existing aircraft equipped with quiet engines. Although Engine "C" was not designed for actual flight application, an indication of the potential reduction available from the application of technology evolving from this program to actual flight hardware can be obtained by examining the projected effective perceived noise levels at the FAA (FAR 36)[8] reference points.

The effective perceived noise levels for Engine "C" were computed from the static engine test data measured at Peebles using estimated flight paths for a DC8 aircraft powered by four Quiet Engines "C" in the approach and takeoff mode. The Douglas Aircraft Company compiled a study[9] on the DC8-61 aircraft in which new course information was generated for such an aircraft to reflect the more powerful engines. The new approach and takeoff flight profiles are presented by Figure 106 based on an aircraft takeoff gross weight of 325,000 pounds (147,550 kg) and a landing weight of 240,000 pounds (108,960 kg).

In addition, EPNdB values were also projected for level flight of a four-engine aircraft with a flight speed of 279 feet per second (85.0 m/sec), flight Mach number 0.25. These EPNL's were compiled for flight directly over the measuring point at 370 feet (112.8 m) altitude for the approach flight engine net thrust, 4900 pounds (21,805 newtons) and at 1000 feet (305 m) altitude for the takeoff net thrust, 15,950 pounds (71,334 newtons). (Refer to the Appendix, "Flight Noise Prediction," for a description of the EPNL calculation procedure used to project both level and DC8 course flight noise.)

A summary of the projected in-flight EPNL's for the 13 Engine "C" configurations investigated during the program is presented in Table VII. The four-engine, effective perceived noise levels are shown for both the level flyover and the DC8-61 revised flight paths. It should be noted that both noise levels for the approach power setting were based on the same aircraft altitude over the measuring point, 370 feet (112.8 m), and that the largest resulting difference between the "level" and "course" EPNL's for the same configuration was 0.4 EPNdB. On the other hand, the DC8-61 takeoff altitude over the measuring point was 1450 feet (442 m) or 450 feet (137 m) above the level flight altitude. The DC8 course noise levels were thus consistently lower than the level flight EPNdB values for takeoff.

The projected flight noise levels of the DC8 aircraft powered by four Engines "C" were considerably below the flight levels of currently available engines which power the DC8. The "C" baseline EPNL's were 13.5 and 11.1 less than the JT3D levels of 118 EPNdB at approach and 117 EPNdB at takeoff. This engine with a supersonic tip speed fan nearly achieved the FAR-36 requirements for a four-engine DC8 aircraft with the fan frame treatment alone. These regulations specify that the EPNL values for a 325,000-pound (147,550 kg) takeoff gross weight aircraft certified after December 1, 1969 may not exceed: 103.5 EPNdB for takeoff, measured at 3-1/2 nautical miles (6486 m) from the brake release and 106.3 EPNdB for approach, measured at 1 nautical mile (1853 m) from the threshold.[10]

Table VII. Quiet Engine "C" Configurations, Summary of Projected In-Flight Effective Perceived Noise.

	Projected Effective Perceived Noise Levels for Four Engine Aircraft*			
	Level Flyover **		DC8-61 Course ***	
	Approach	Takeoff	Approach	Takeoff
Configuration	Altitude = 370 ft (112.8m)	Altitude = 1000 ft (305m)	1 N. Mile from Touchdown	3.5 N. Mile from Brake Release
Fan Frame Treated	104.2	109.8	104.5	105.9
Totally Suppressed Inlet Hard Fan Exhaust	100.1	105.8	100.5	102.3
Contoured Inlet	99.8	103.8	99.9	100.4
Long Inlet	99.2	103.7	99.4	100.3
One Splitter Inlet	97.3	100.8	97.2	97.1
Two Splitter Inlet	96.9	99.2	97.0	95.4
Three Splitter Inlet	96.0	98.5	96.2	95.0
Four Splitter Inlet	94.4	98.2	94.7	95.0
Long Inlet with 24" MPT Treatment	97.8	99.9	98.1	95.1
Long Inlet with 36" MPT Treatment	97.2	99.4	97.4	94.6
Fully Suppressed with Hard Core Exhaust	97.2	94.9	97.6	90.0
Fully Suppressed	93.2	92.9	93.6	87.0
Coplanar Nozzle	94.4	93.5	94.4	87.6

* Derived from static engine test data.
** Aircraft flight speed of 279 ft/sec (85.0 m/sec), flight Mach number 0.25.
*** Based on flight profiles documented in Reference 2.

The predicted effective perceived noise level for the fan frame-treated configuration was 1.8 EPNdB less than the FAR-36 limit at approach while the takeoff level exceeded the limit by 2.4 EPNdB. Large reductions of the baseline EPNL were realized by the addition of acoustic treatment in the fan duct, especially at the takeoff power setting. Extrapolations of the frame-treated and fully suppressed farfield results are presented in Figures 107 and 108 for the approach and takeoff power settings, respectively. These ground level, static comparisons were made at sideline distances corresponding to the altitudes of the level flight comparisons - 370 feet (113 m) for approach and 1000 feet (305 m) for takeoff.

The projected PNLT - time histories for the configurations which were previously examined statically, are presented in Figures 109 through 115. Level flight noise levels are shown for both the approach and takeoff power settings. The EPNL's listed for each configuration are based on both the level of the maximum tone corrected perceived noise and the length of time these four engine noise levels exceeded the PNLT - 10 value. The zero point on the delta time scale indicates the point at which the aircraft was directly over the measuring point. Thus, the comparisons indicate that the maximum PNLT occurred before the aircraft passed overhead when the inlet incorporated one or no splitters and just after the passover with more than one splitter.

VI. CONCLUSIONS

Based on these Quiet Engine "C" results, it can be concluded:

1. Technology to produce low noise, supersonic tip speed turbofans has been demonstrated, although additional work to flight qualify these low noise features is needed. Projected flight noise levels of a DC8 aircraft powered by four Engines "C" are substantially below the flight levels of currently available engines which power the DC8.

2. Noise levels similar to those attained with suppressed, subsonic tip speed fans can be achieved with suppressed, supersonic tip speed fans.

3. MPT related noise can be effectively suppressed (although not necessarily completely eliminated) with either a single splitter or thick wall inlet treatment.

4. For this engine, fan exhaust noise was suppressed to the extent that turbine/core related noise controlled the aft noise levels in the vicinity of the approach power settings.

5. The relative position of the fan and core jet exhaust planes can significantly influence the characteristics of the low pressure turbine BPF tones which are radiated to the farfield.

VII. NOMENCLATURE

B&K	B&K Instruments, Inc. - Bruel & Kjaer Precision Instruments
BPF	Blade Passing Frequency
Comp.	Compressor
EPNL	Effective Perceived Noise Levels
F_n/δ	Net engine thrust, corrected to standard day conditions
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
Freq.	1/3-octave band center frequencies
LPT	Low Pressure Turbine
M	Aircraft Mach Number
MDOF	Multiple degree of freedom
N_f $(N_f/\sqrt{\theta})$	Fan rotational speed, corrected to standard day conditions
OAPWL	Overall sound power level calculated by summation of power level spectra from 50 Hz to 20 KHz.
OASPL	Overall sound pressure level calculated by summation of sound pressure levels at each 1/3 octave from 50 Hz to 20 KHz.
$P_{T_{23}}/P_{T_2}$	Ratio of fan bypass exit total pressure to fan inlet total pressure
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
RMS	Root mean square
SDOF	Single degree of freedom
SFC	Specific Fuel Consumption

SPL	Sound pressure level, Re 0.0002 dynes/cm^2
Standard Day	59° F (15° C) temperature and 70% relative humidity
$W_2\sqrt{\theta}/\delta$	Fan air flow, corrected to standard day conditions
dB	Decibel
EPNdB	Effective perceived noise decibel
Hz	Hertz (cycles per second)
ips	Inches per second
PNdB	Perceived noise decibel

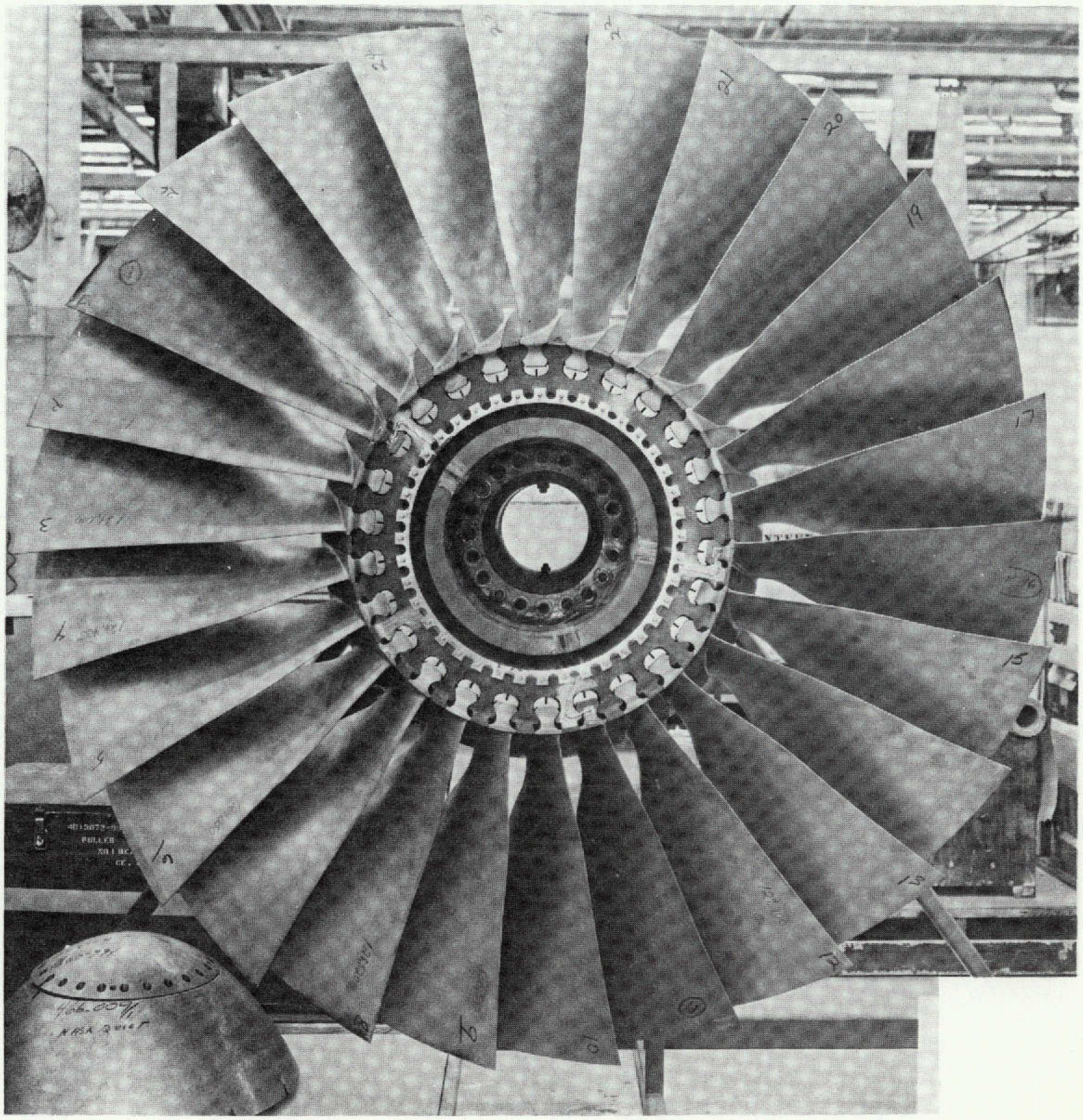


Figure 1. Fan "C" Rotor.

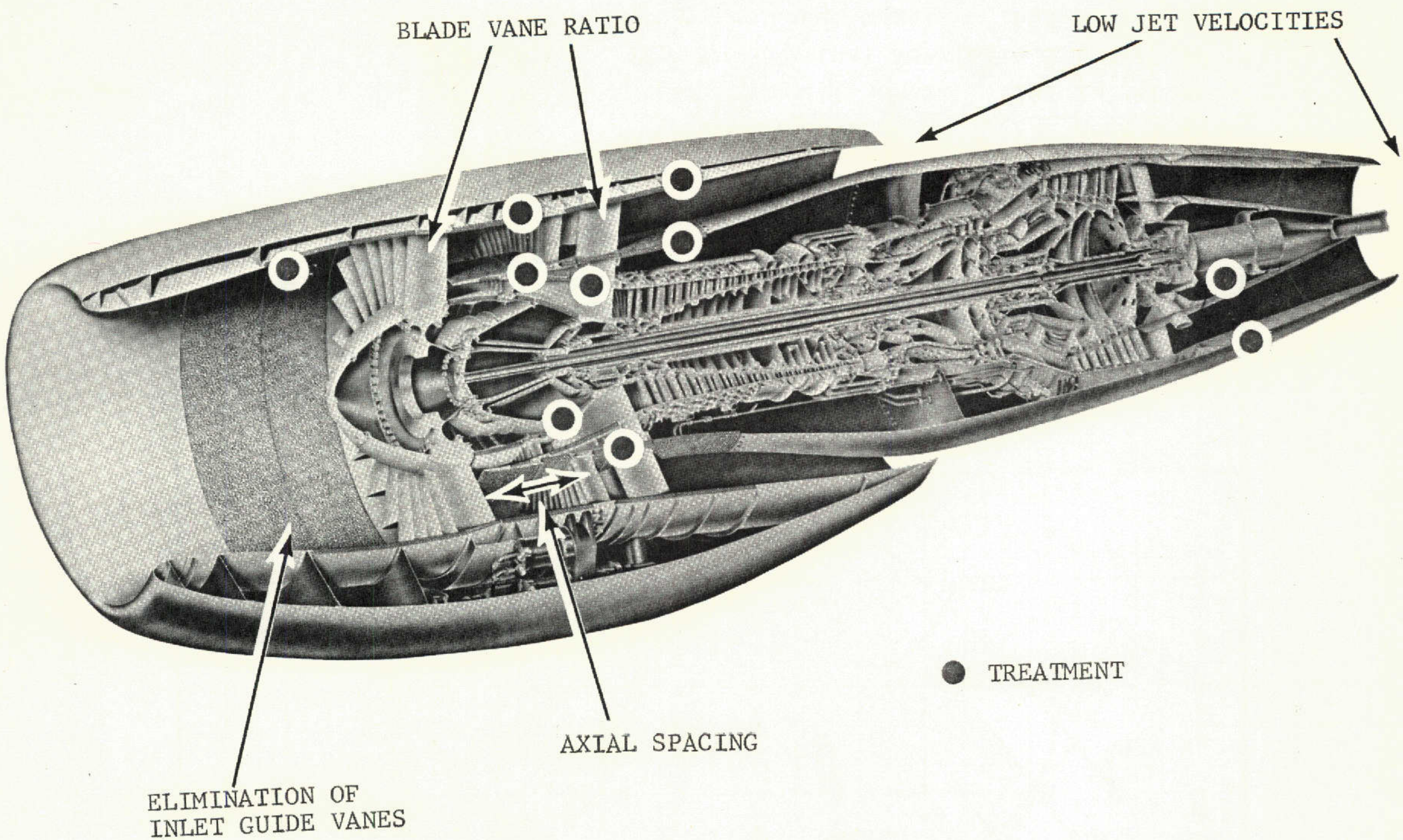


Figure 2. Cutaway Drawing of a Quiet Engine.

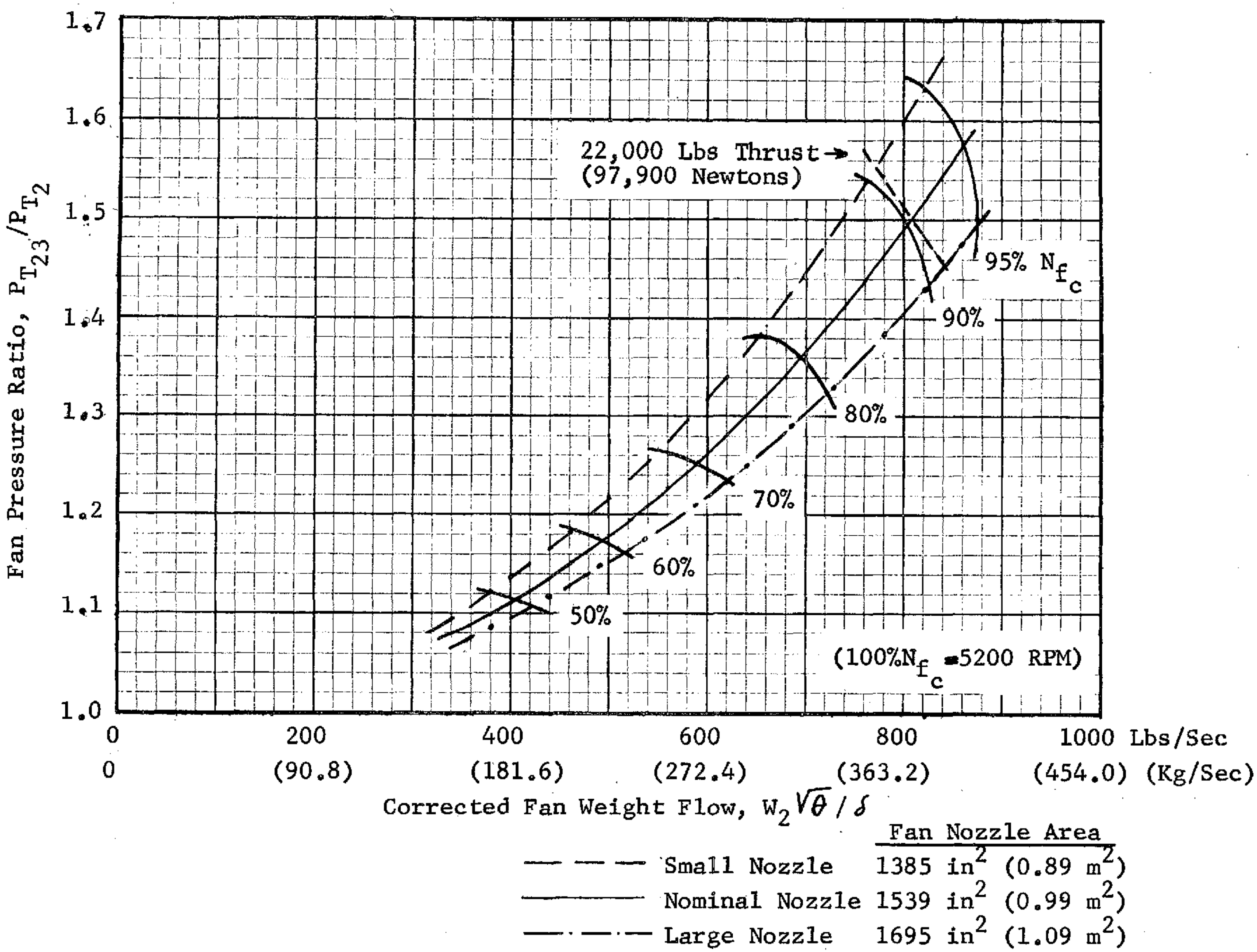


Figure 3. Quiet Engine "C" Performance, Fan Map.

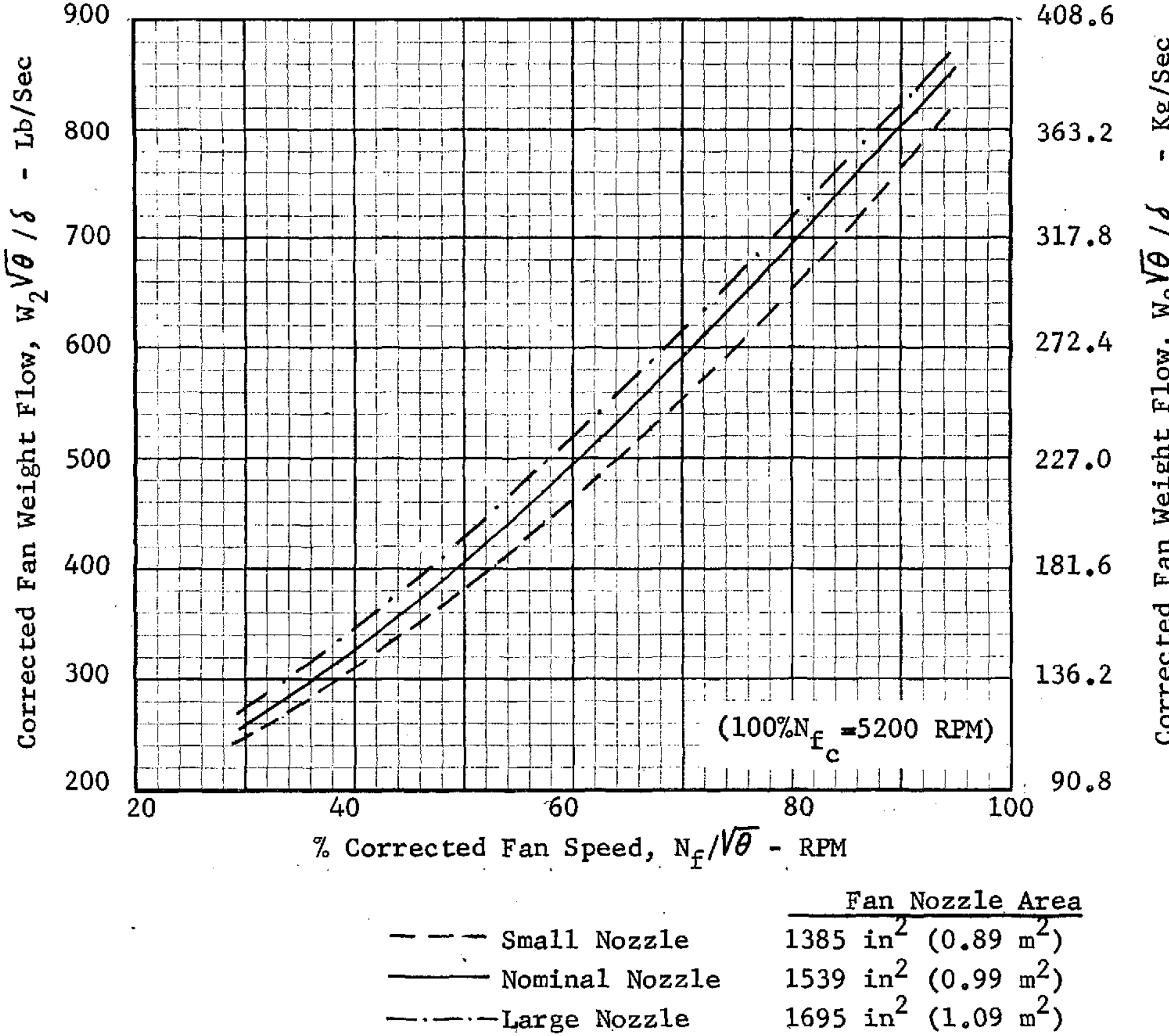


Figure 4. Quiet Engine "C" Performance, Corrected Weight Flow Vs. Corrected Fan Speed.

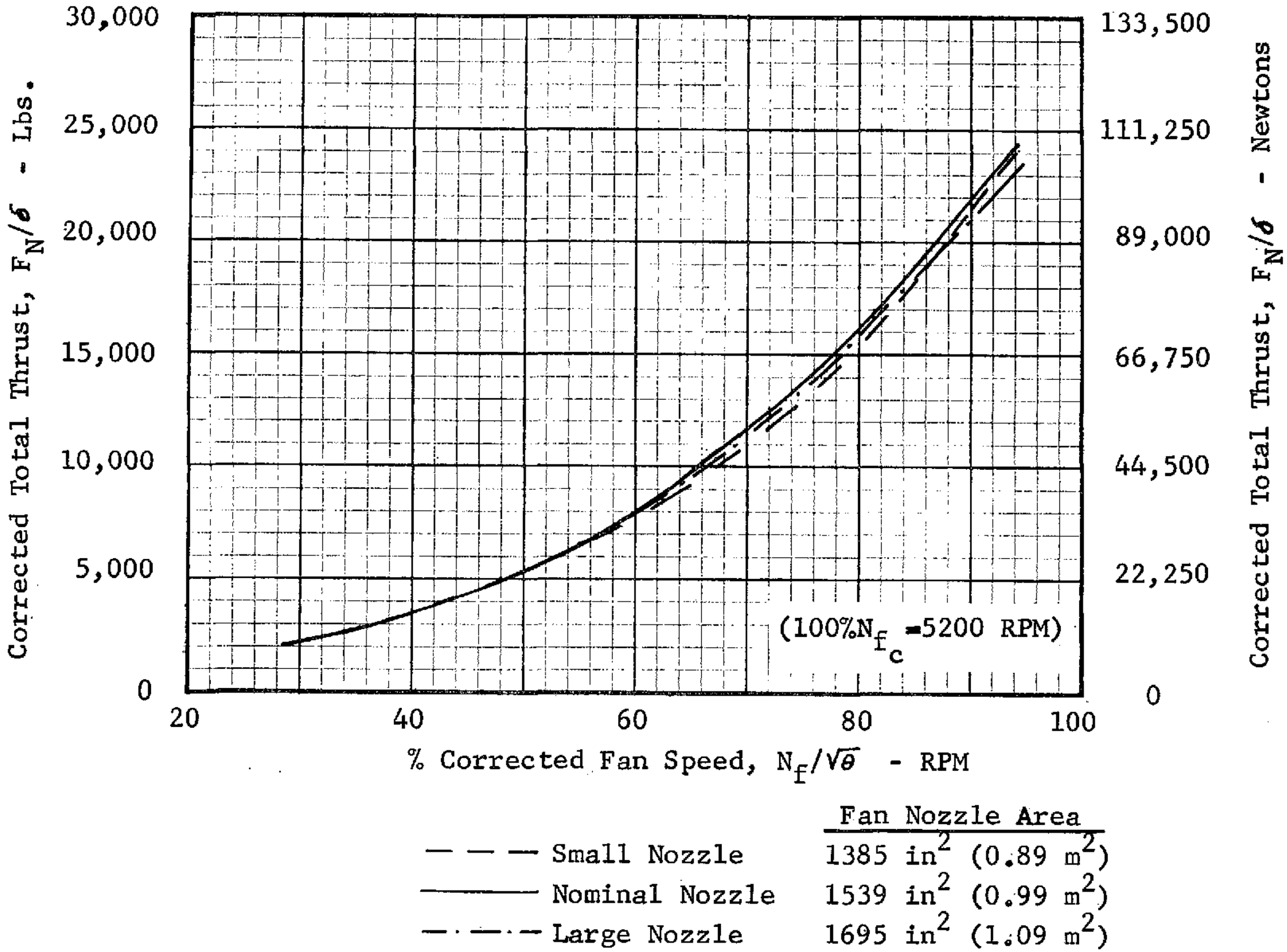
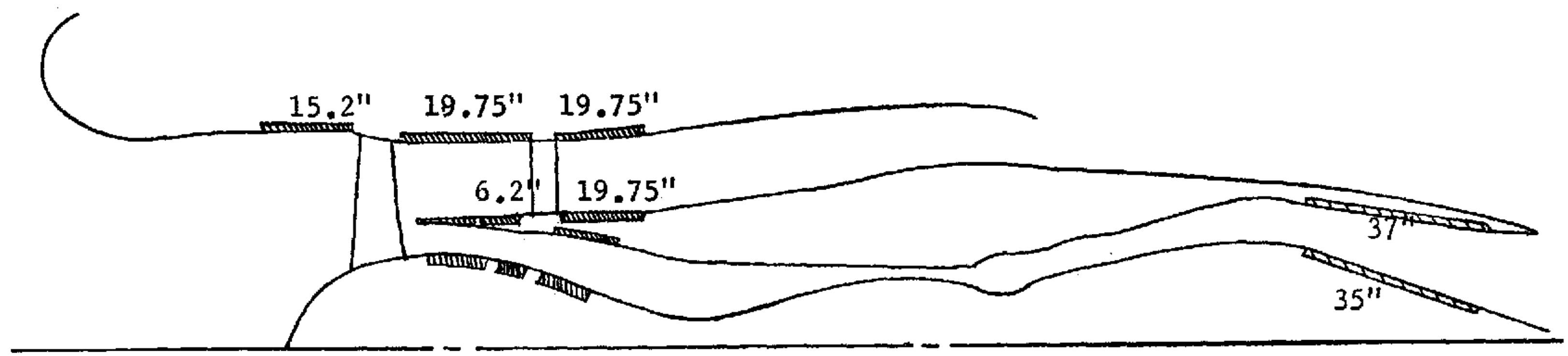


Figure 5. Quiet Engine "C" Performance, Corrected Total Thrust Vs. Corrected Fan Speed.



- Bellmouth Inlet
- Fan Frame Treatment (1)
- Core Exhaust Treatment (2)

Treatment Details

1.0" thick MDOF 10% Porosity (1)

0.25" thick SDOF 7% Porosity (2)

Figure 6. Quiet Engine "C", Cross Section of Frame-Treated Configuration.

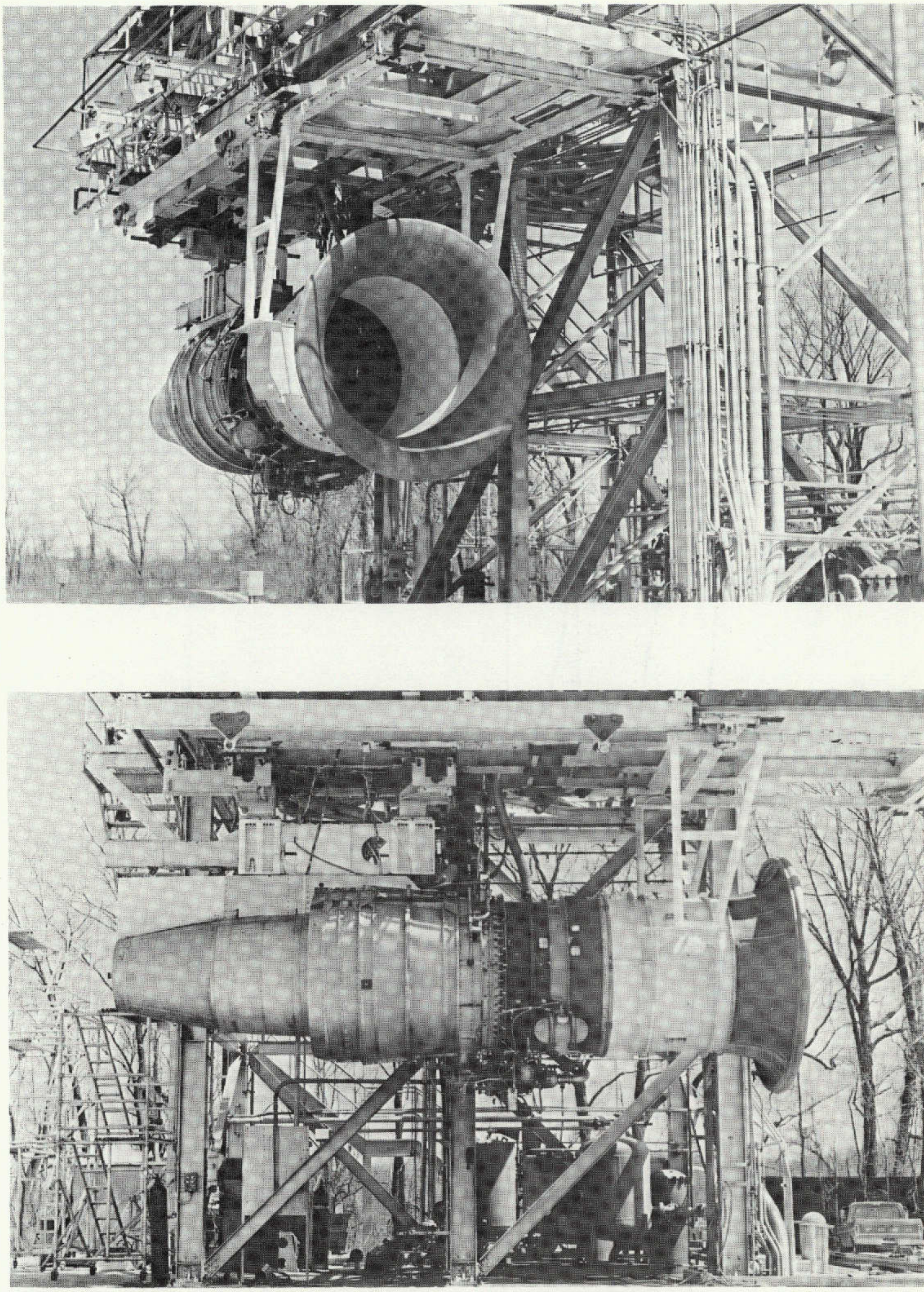
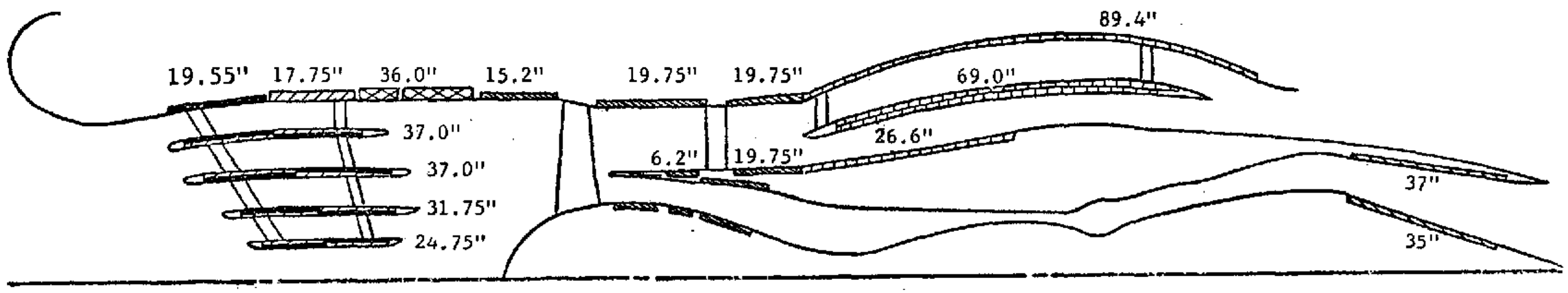


Figure 7. Quiet Engine "C", Frame-Treated Configuration.



- Contoured Inlet Treatment (1)
- Four Ring Splitter System (2)
- MPT Treatment (3)
- Fan Frame Treatment (4)
- Fan Exhaust Duct Treatment (5)
- Low Mach Number Exhaust Splitter (6)
- Core Exhaust Treatment (7)

  (Wrapped from the forward edge of the MPT casing to the aft outer cowl.)

Treatment Details

1.0" thick MDOF (4) 10% Porosity

0.25" thick SDOF (7) 7% Porosity

0.30" thick SDOF (1,2) 7% Porosity

1.0" thick SDOF (1,2) 10% Porosity

2.8" thick SDOF (3) 2.5% Porosity

1.0" thick Scottfelt (5,6)

Figure 8. Quiet Engine "C", Cross Section of Fully Suppressed Configuration.

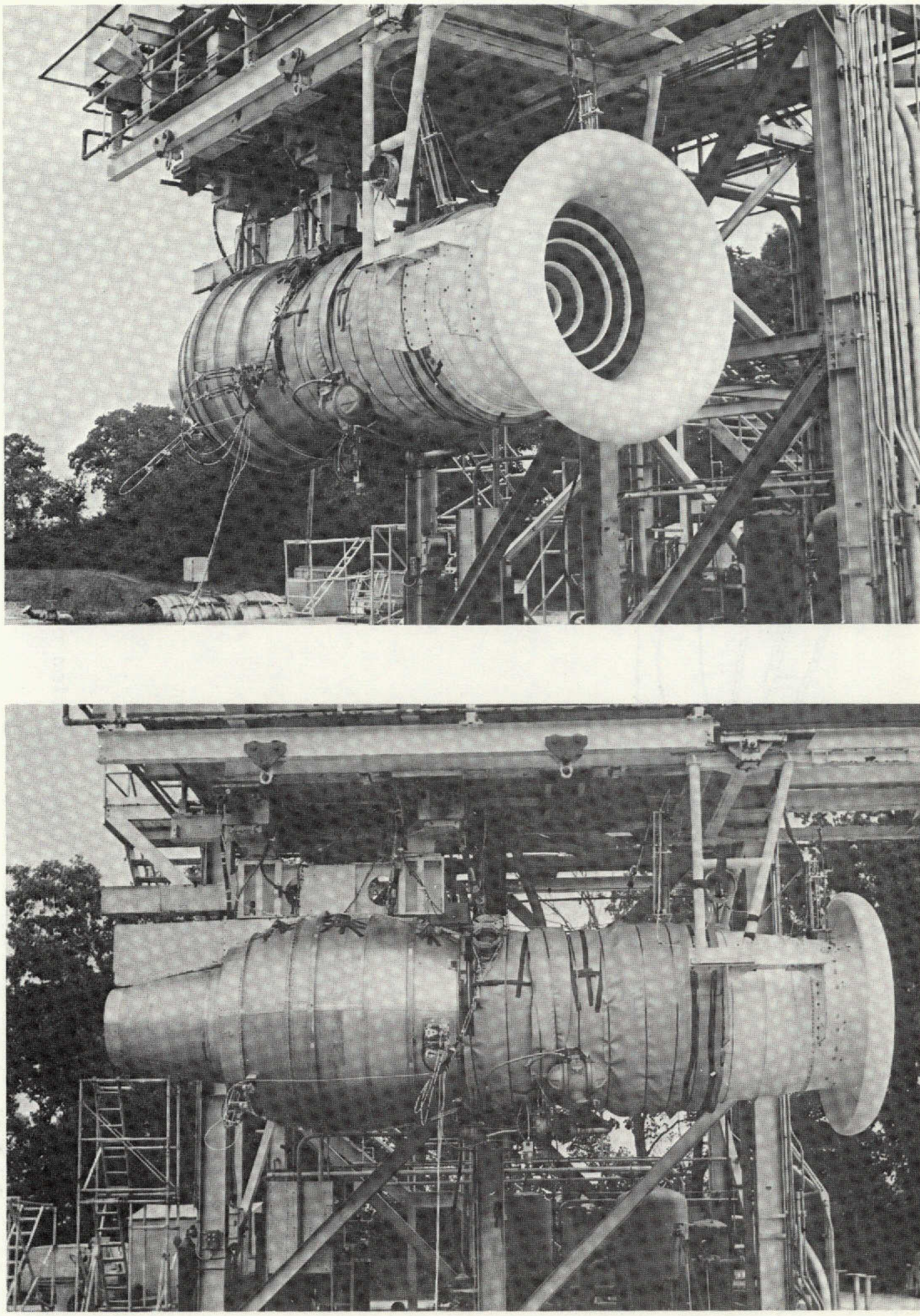


Figure 9. Quiet Engine "C", Fully Suppressed Configuration.

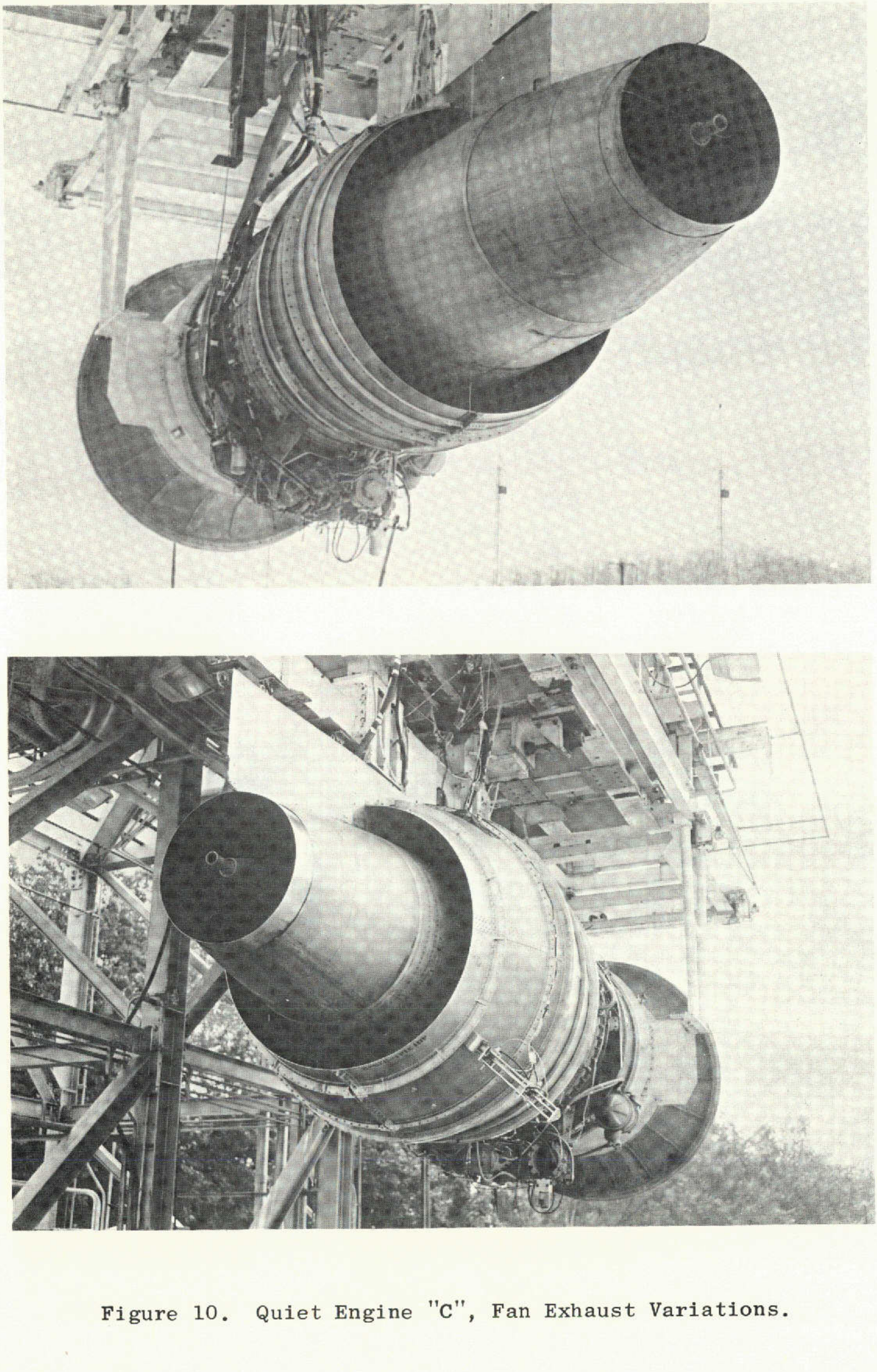


Figure 10. Quiet Engine "C", Fan Exhaust Variations.

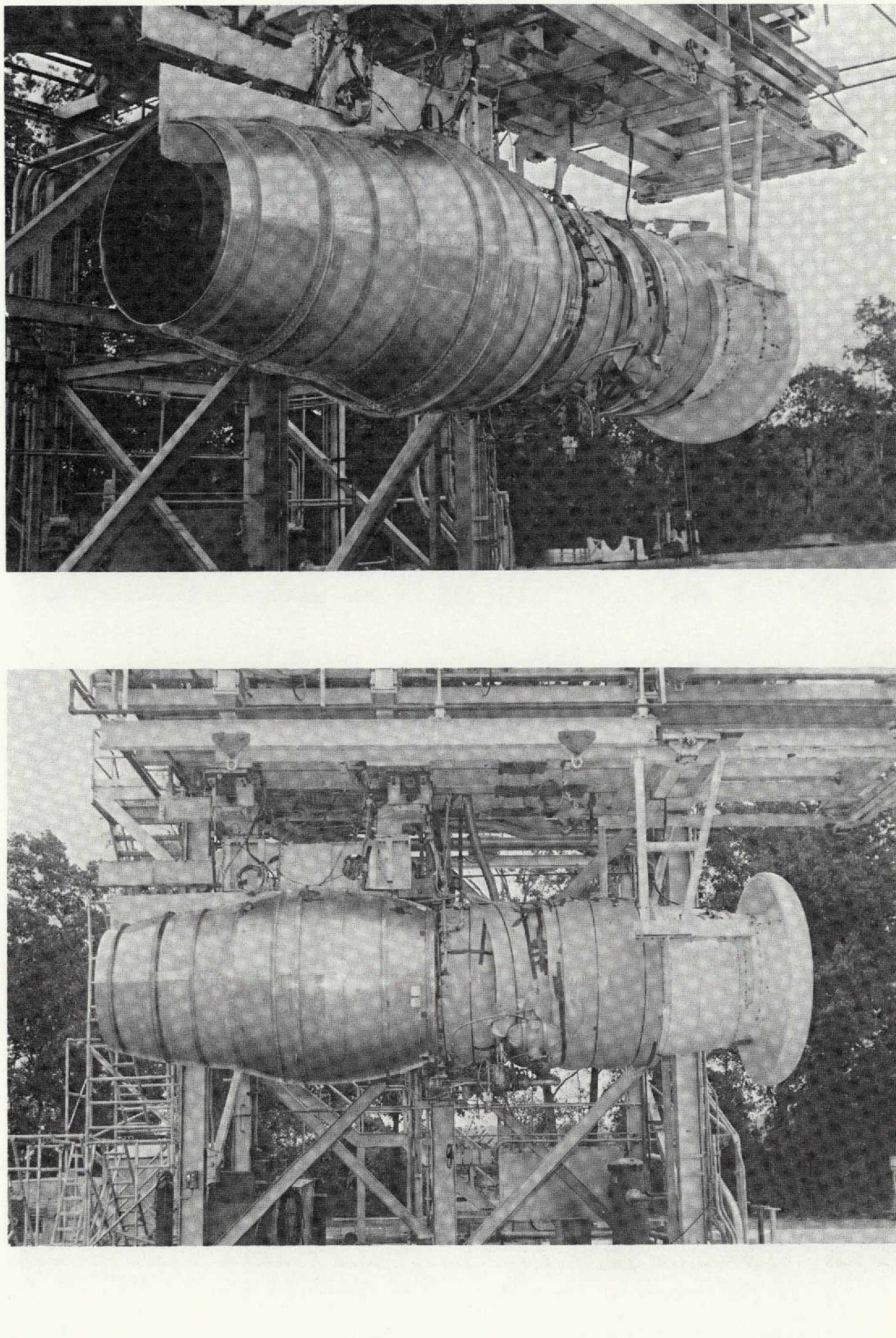


Figure 11. Quiet Engine "C", Coplanar Nozzle Configuration.

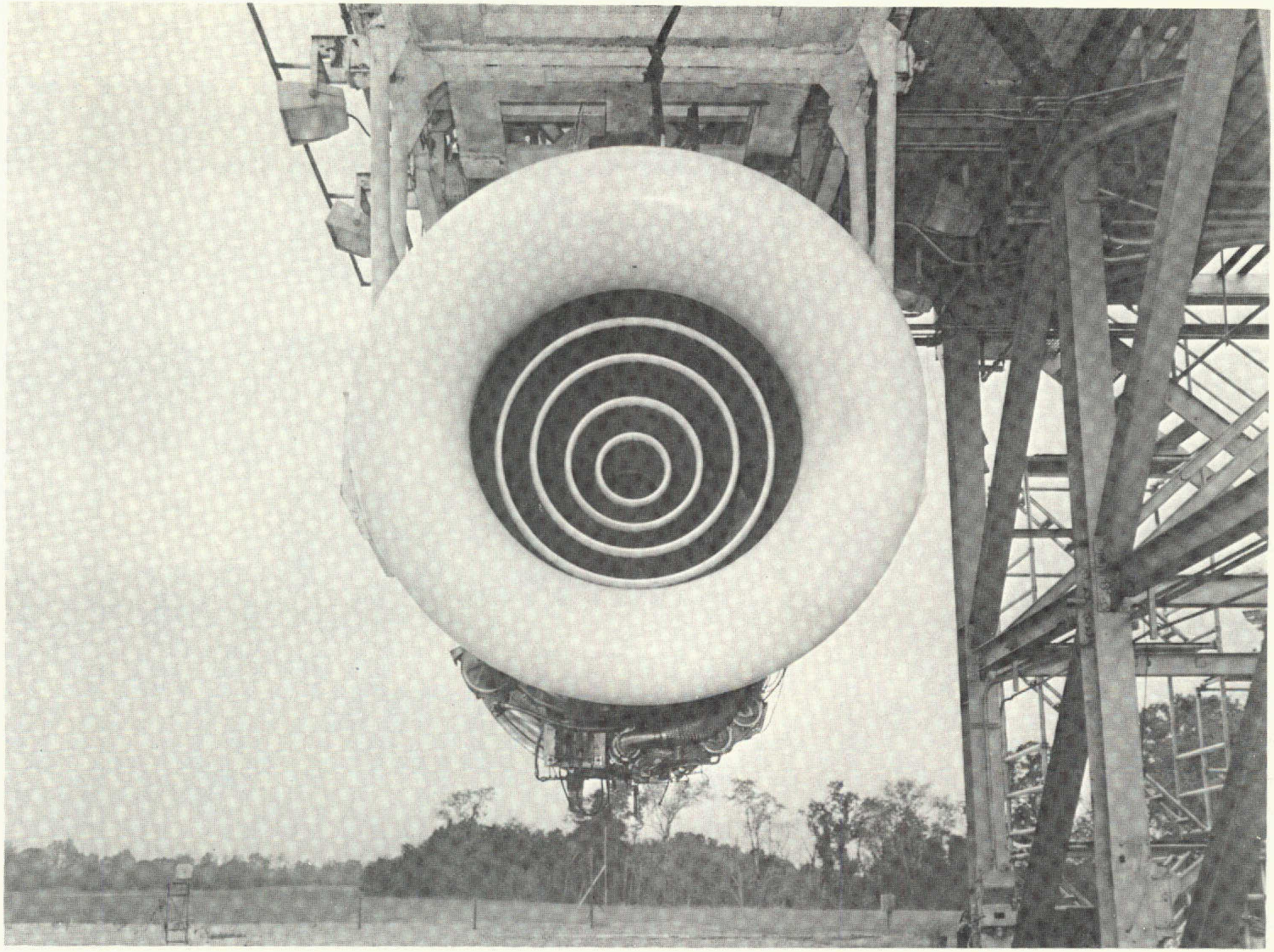


Figure 12. Quiet Engine "C", Four-Splitter Inlet.

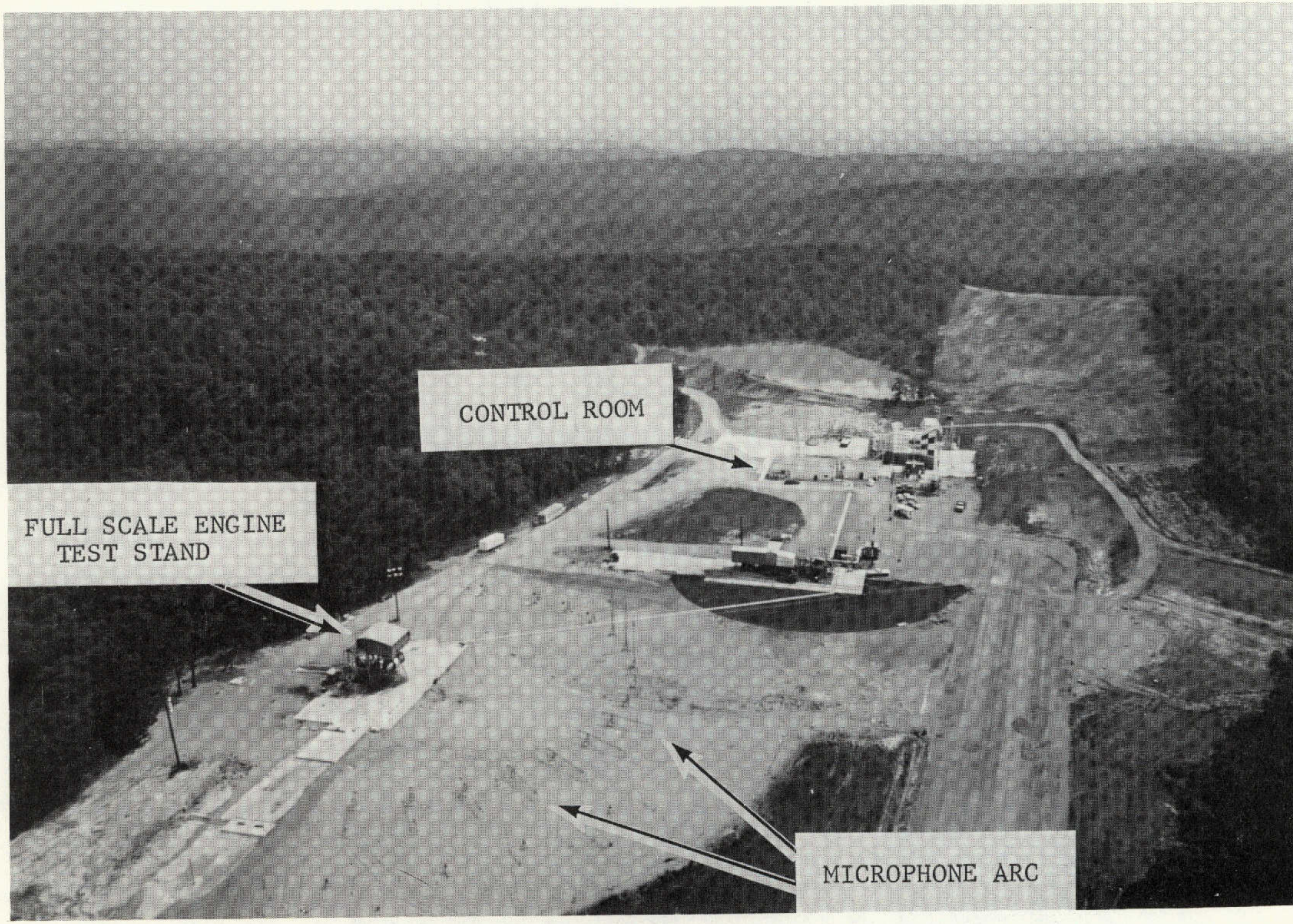
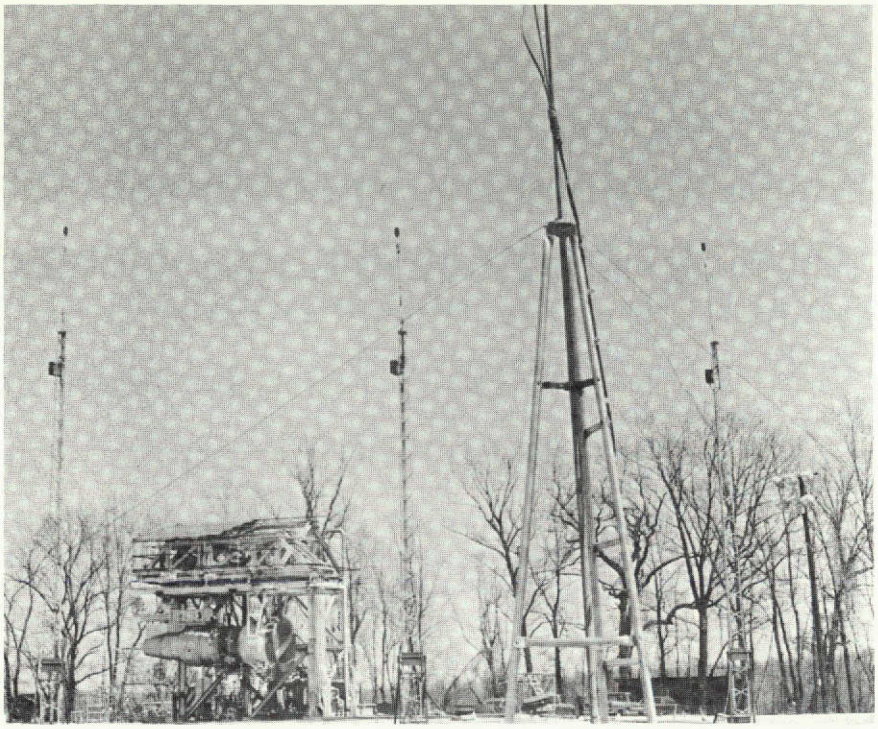


Figure 13. Aerial View of GE Peebles Sound Field.



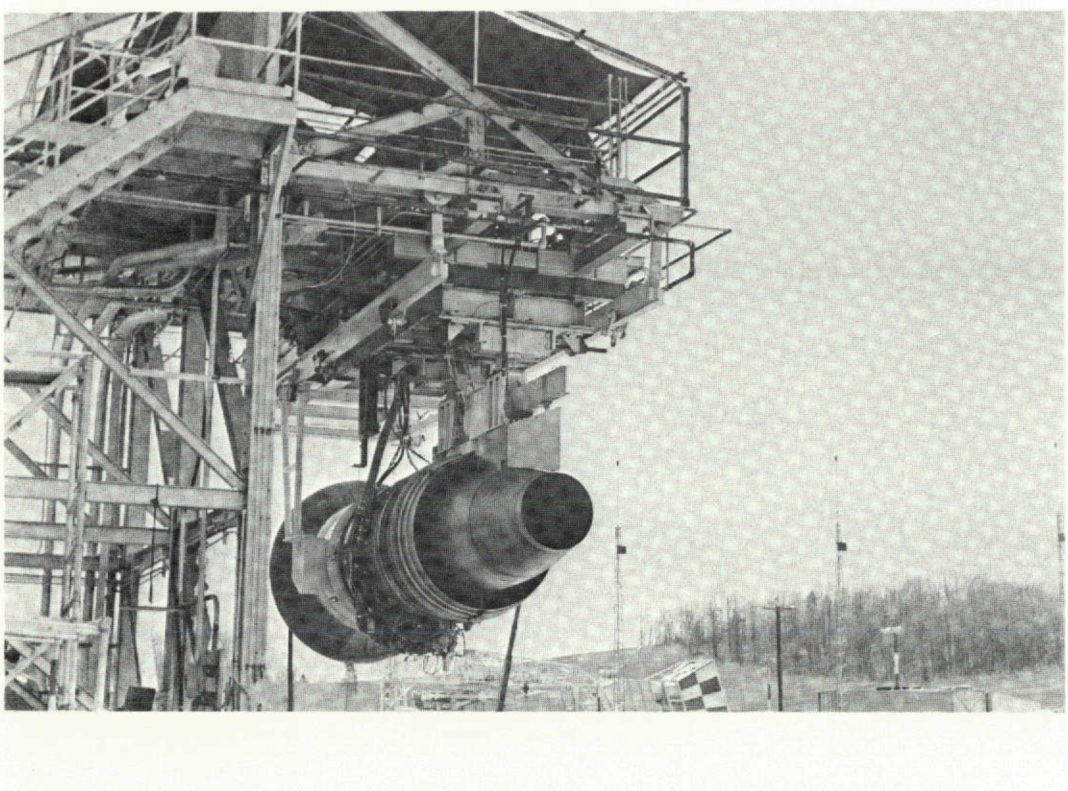


Figure 14. Quiet Engine "C" Mounted on Engine Test Stand.

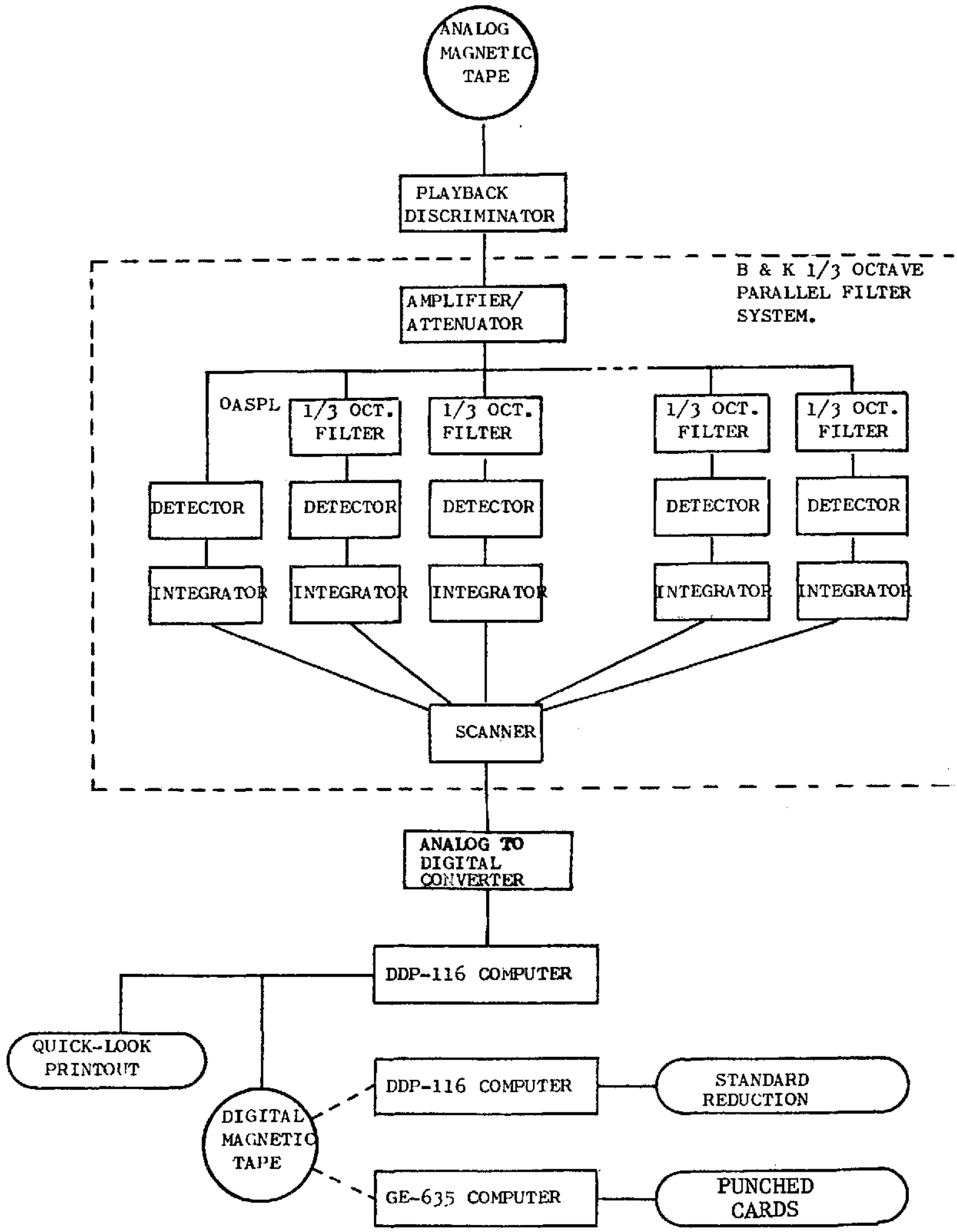


Figure 15. Acoustic Data Reduction System.

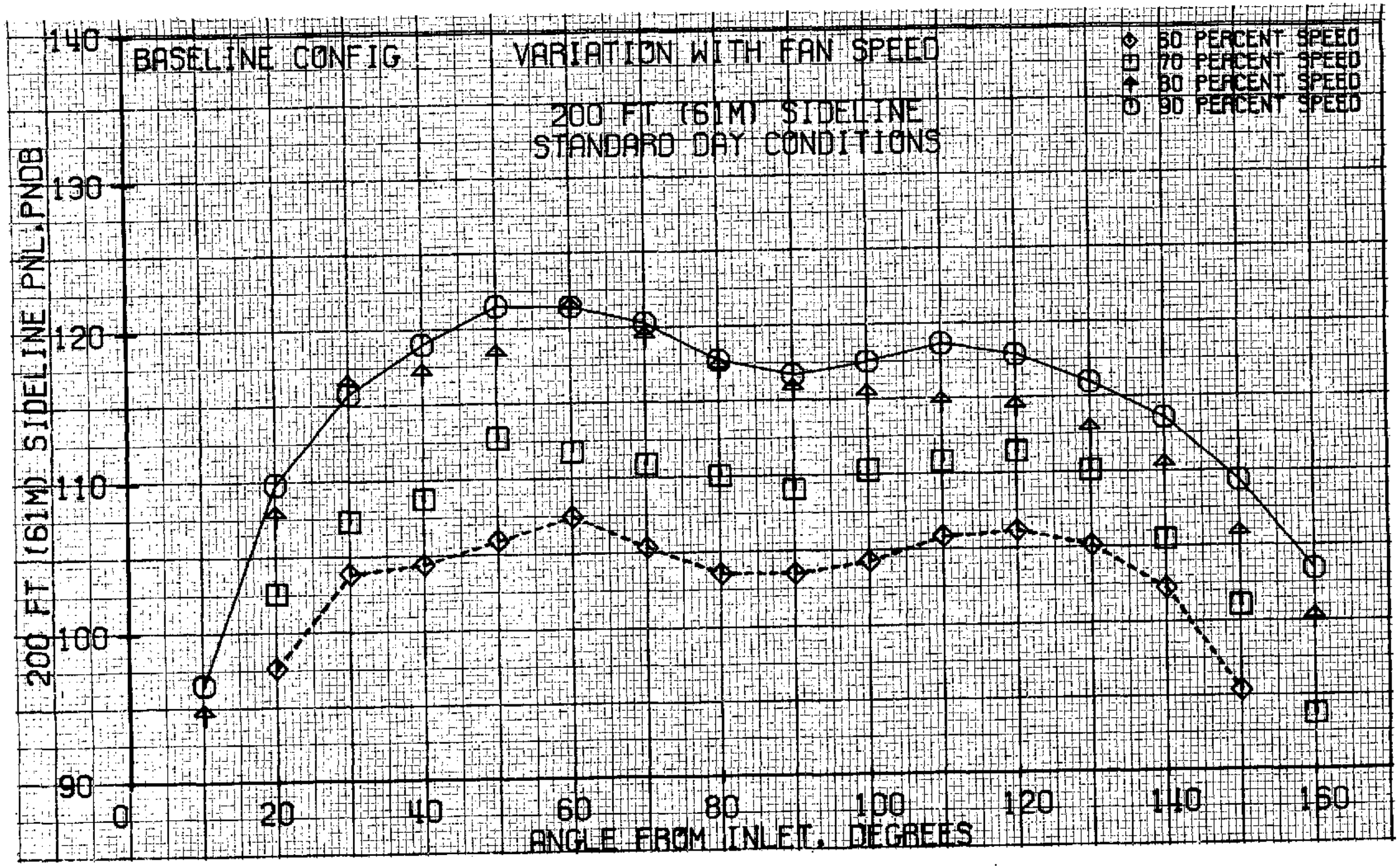


Figure 16. Frame-Treated Configuration, Variation of PNL Directivities with Fan Speed.

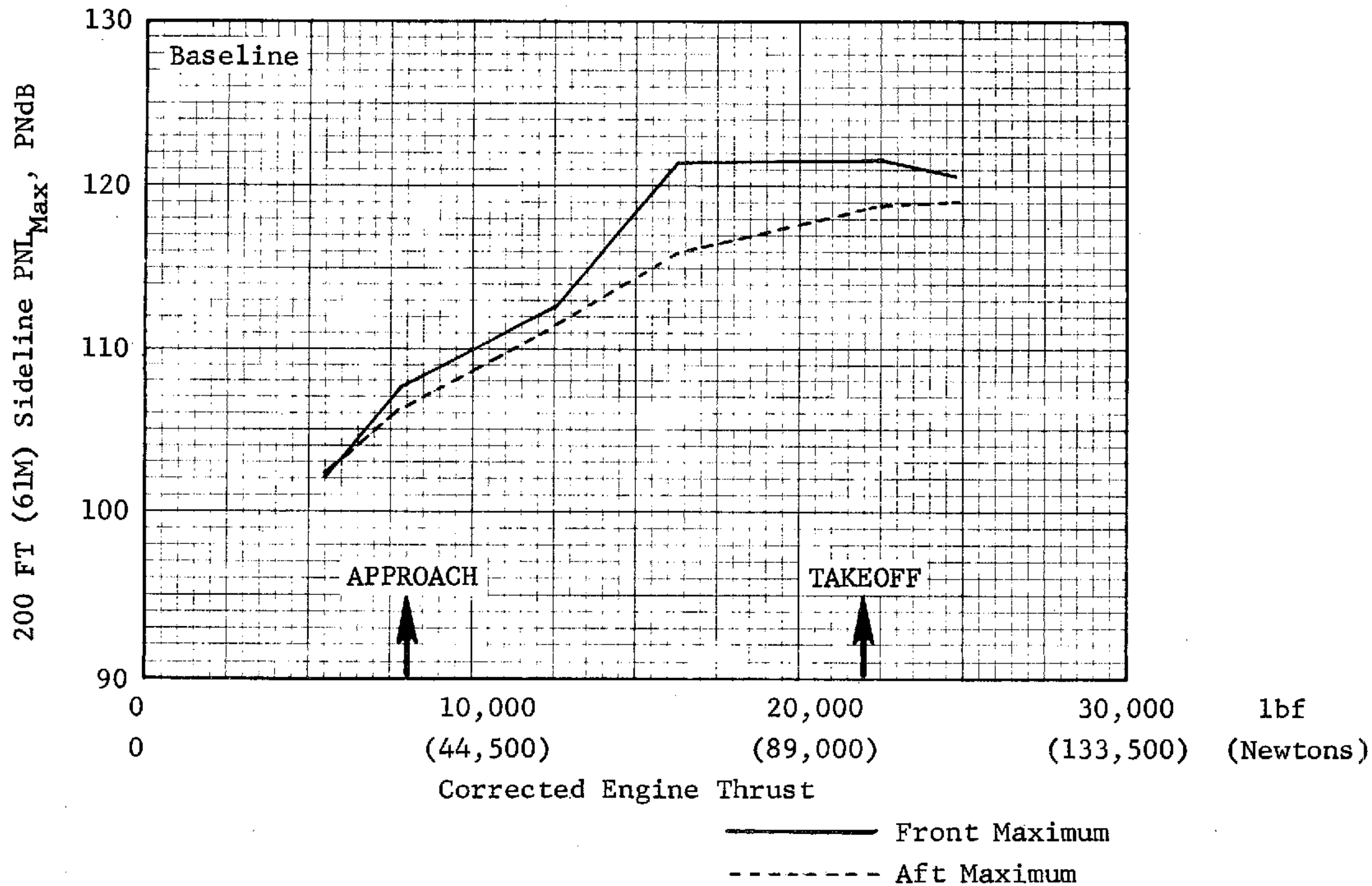


Figure 17. Frame-Treated Configuration, Front and Aft Maximum PNL Variation with Engine Thrust.

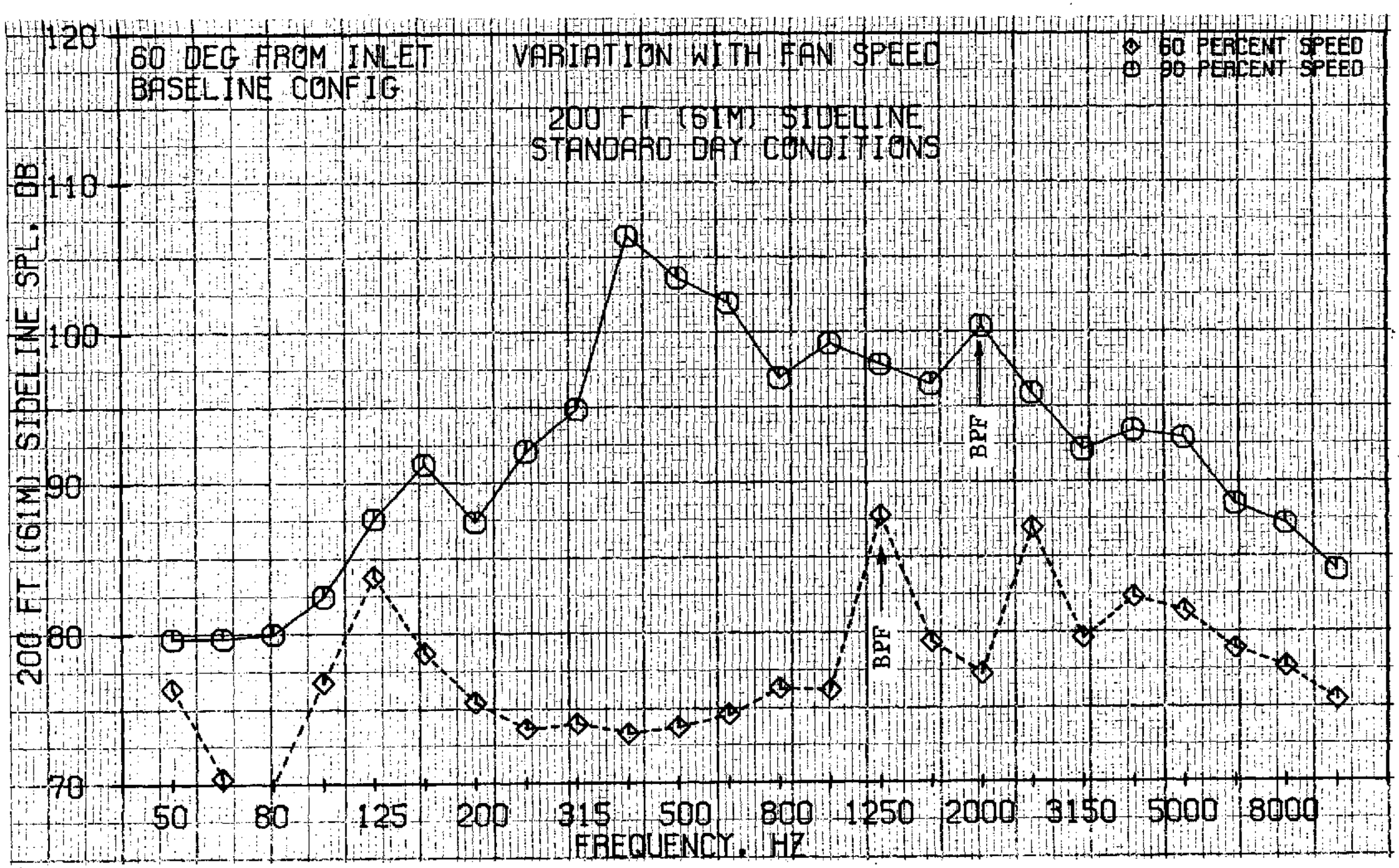


Figure 18. Frame-Treated Configuration, Variation of SPL Spectra with Fan Speed at 60°.

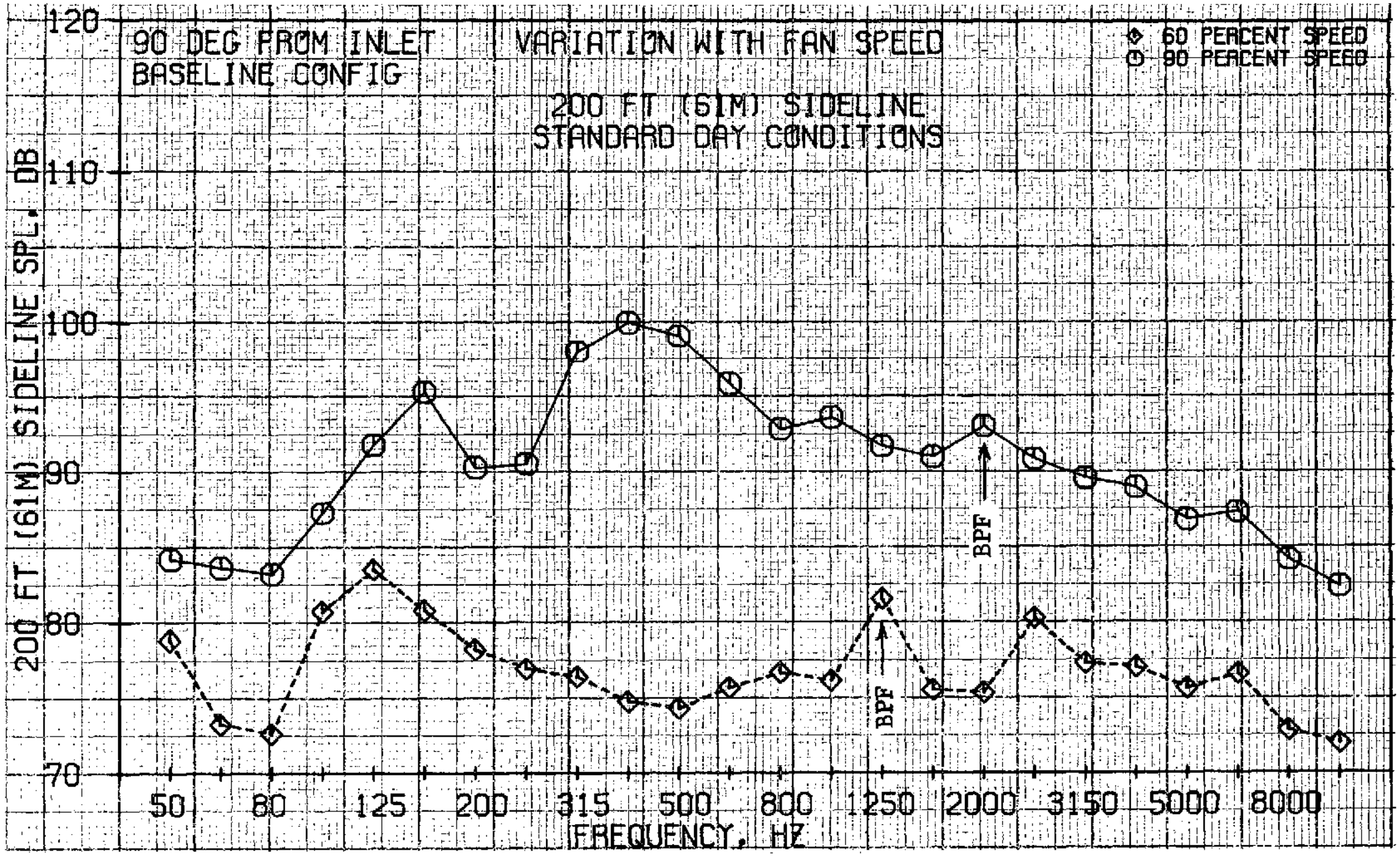


Figure 19. Frame-Treated Configuration, Variation of SPL Spectra with Fan Speed at 90°.

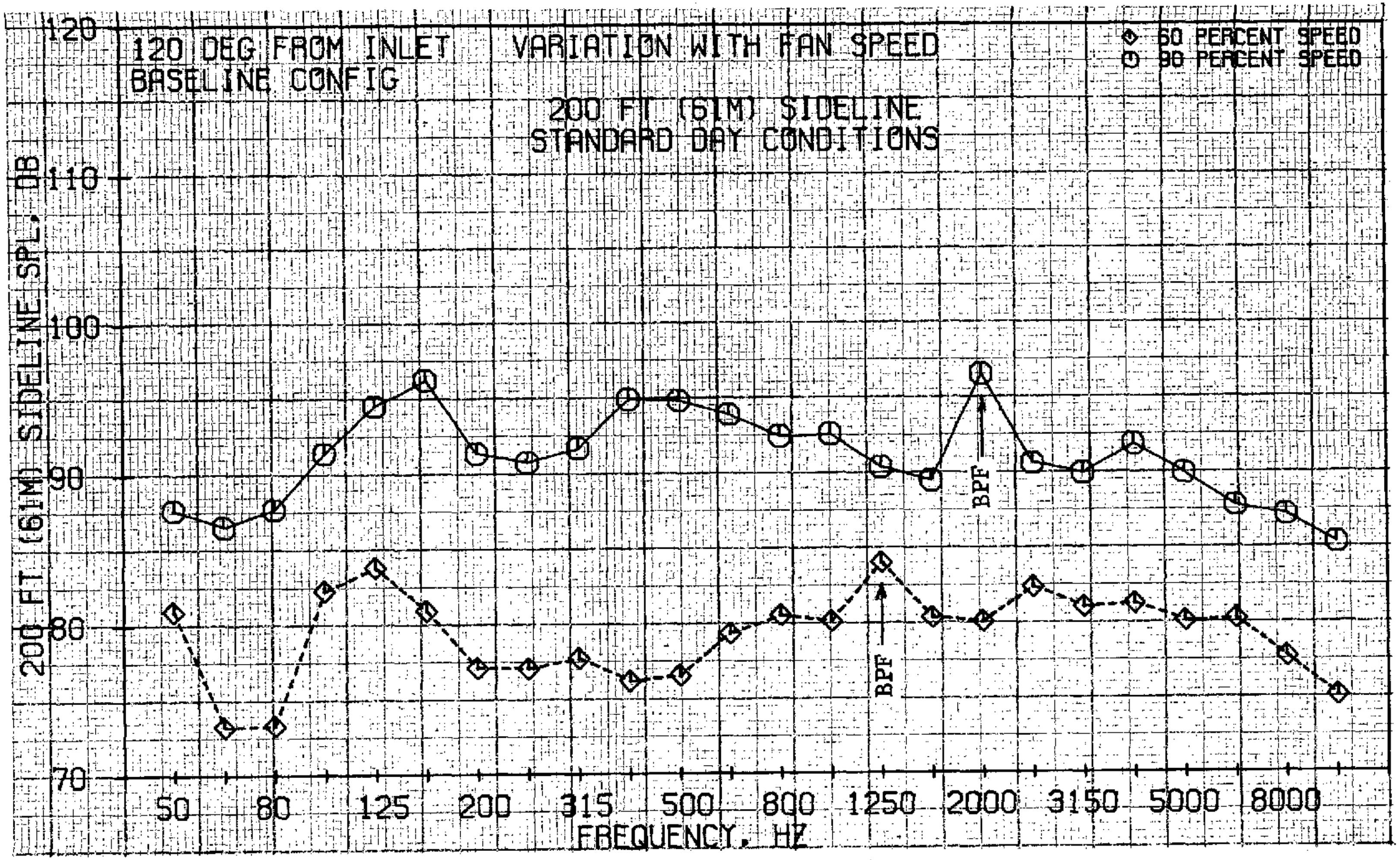


Figure 20. Frame-Treated Configuration, Variation of SPL Spectra with Fan Speed at 120°.

Re: Nominal Nozzle

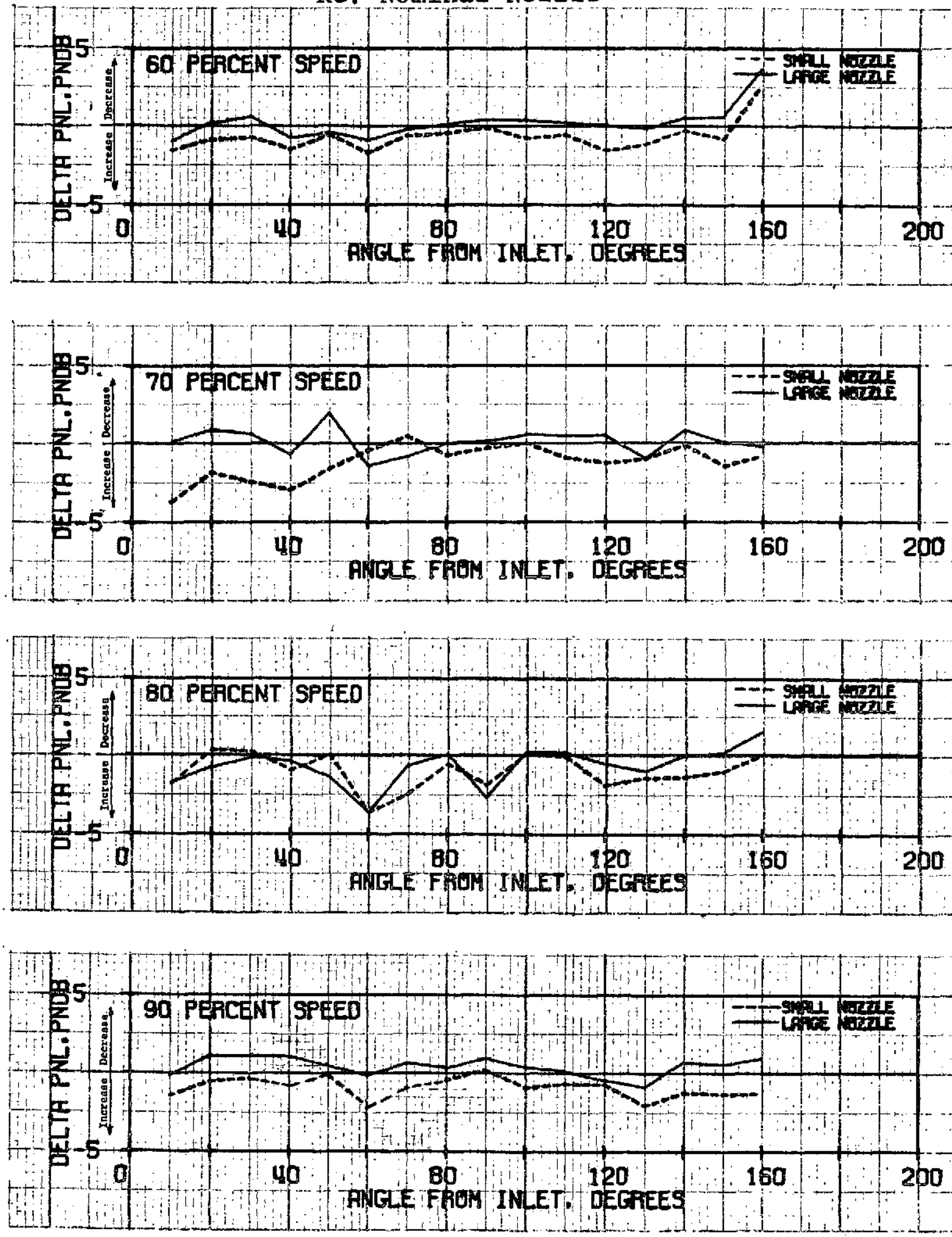


Figure 21. Frame-Treated Configuration, Variation of PNL Directivities with Fan Exhaust Nozzle for Four Fan Speeds.

Re: Nominal Nozzle

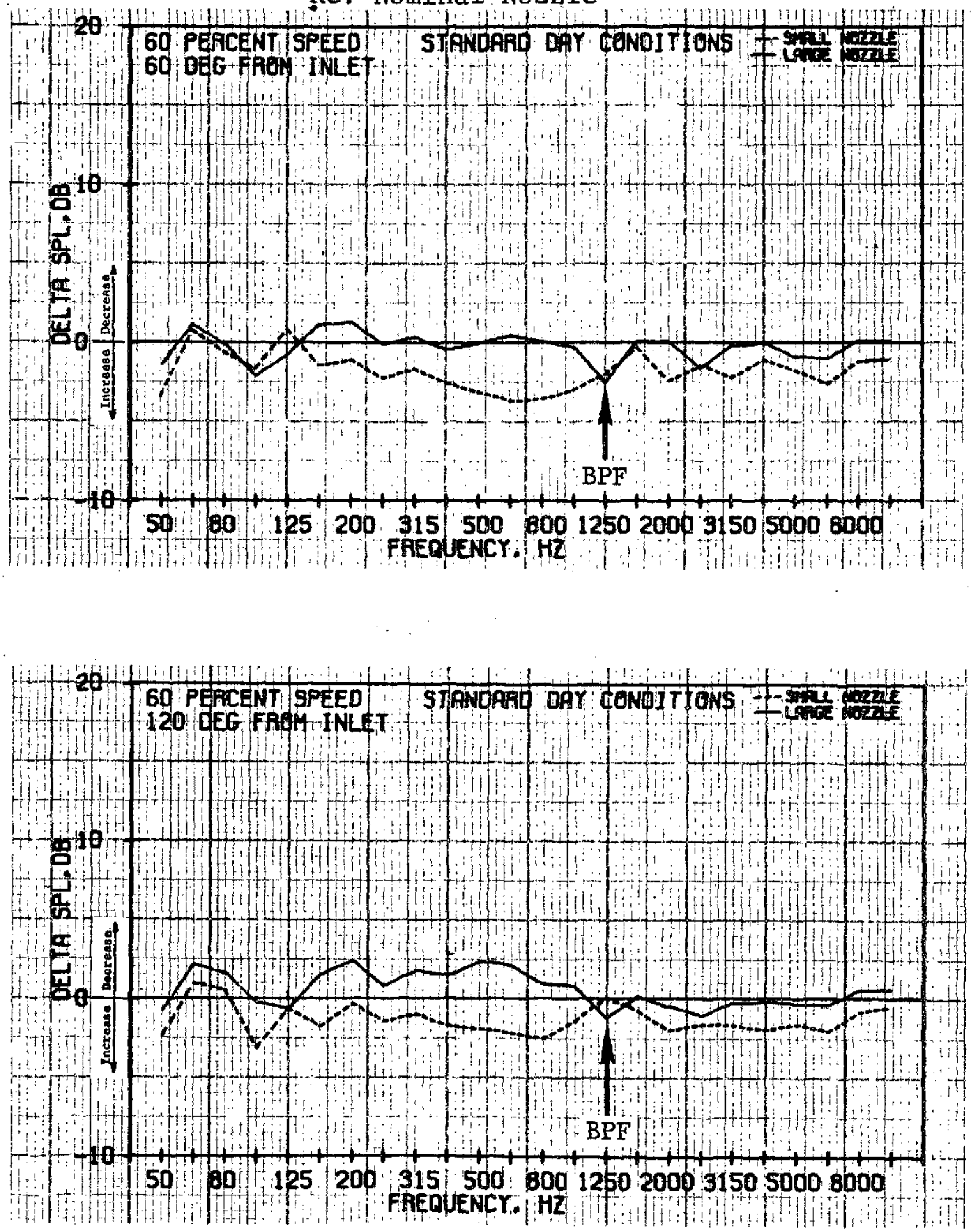
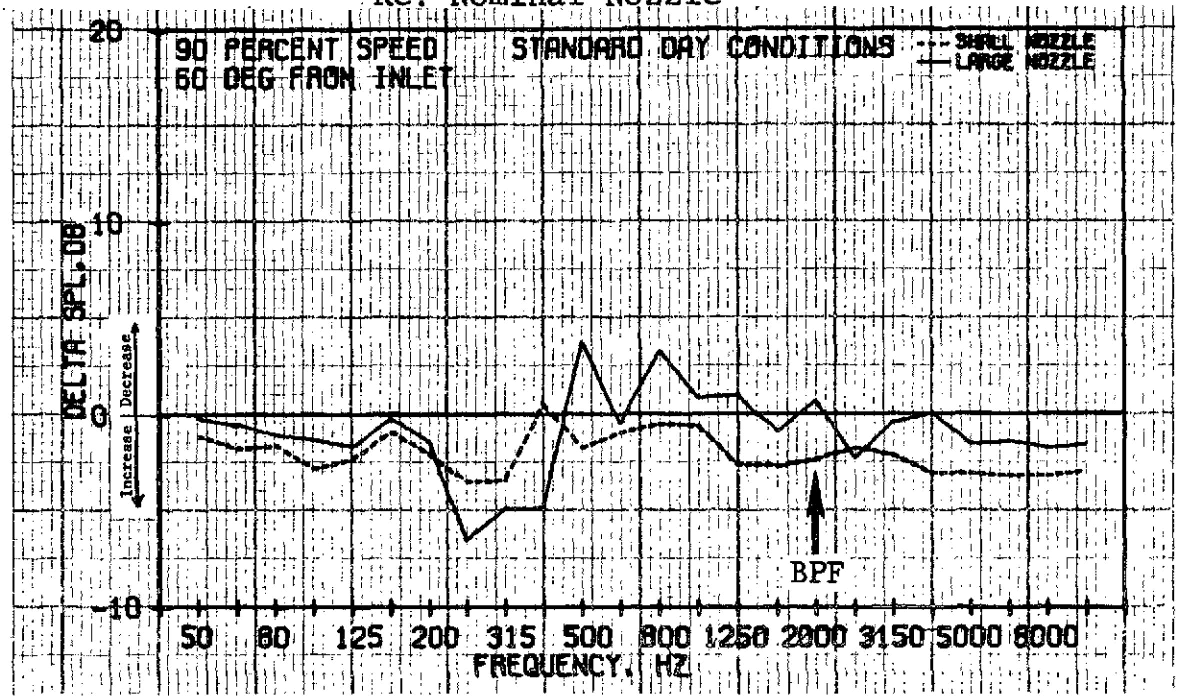


Figure 22. Frame-Treated Configuration, Variation of SPL Spectra with Fan Exhaust Nozze for Approach at 60° and 120°.

Re: Nominal Nozzle



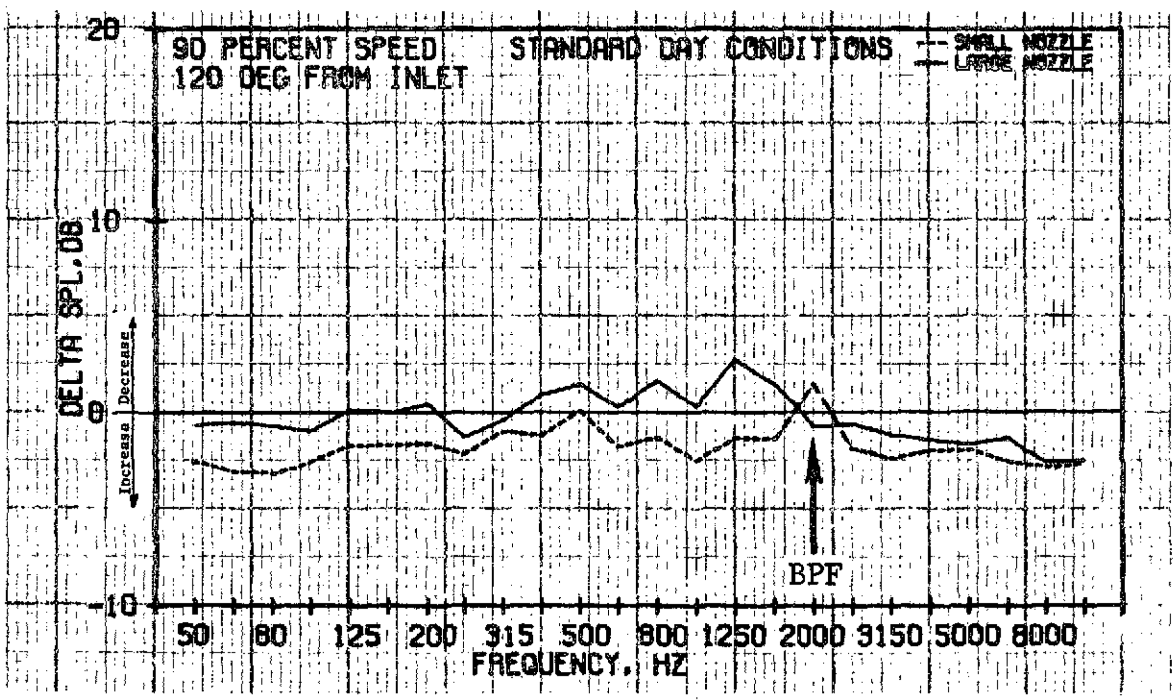


Figure 23. Frame-Treated Configuration, Variation of SPL Spectra with Fan Exhaust Nozzle for Takeoff at 60° and 120°.

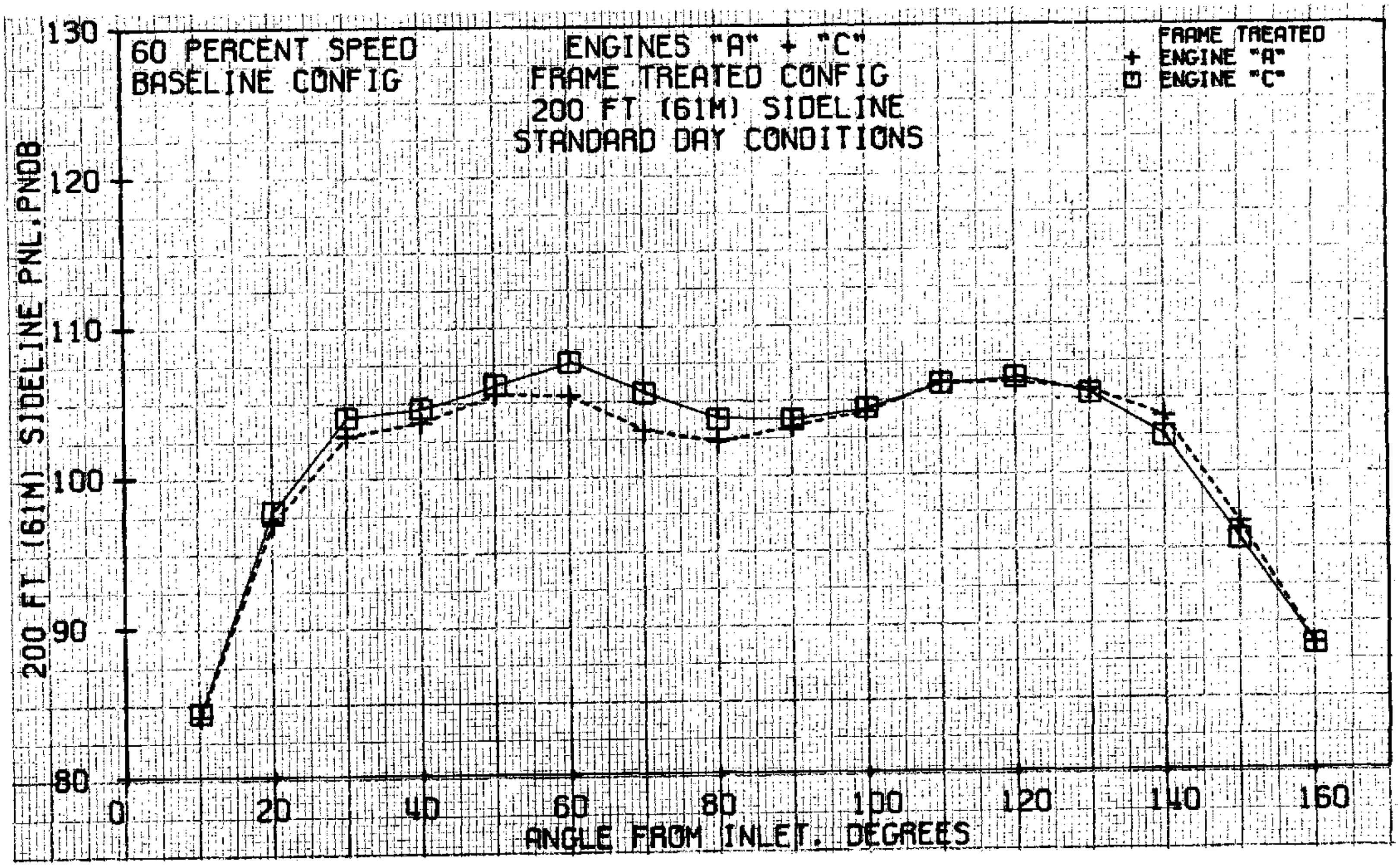


Figure 24. Comparison of Engines "A" and "C" Frame-Treated Configurations, PNL Directivities for Approach.

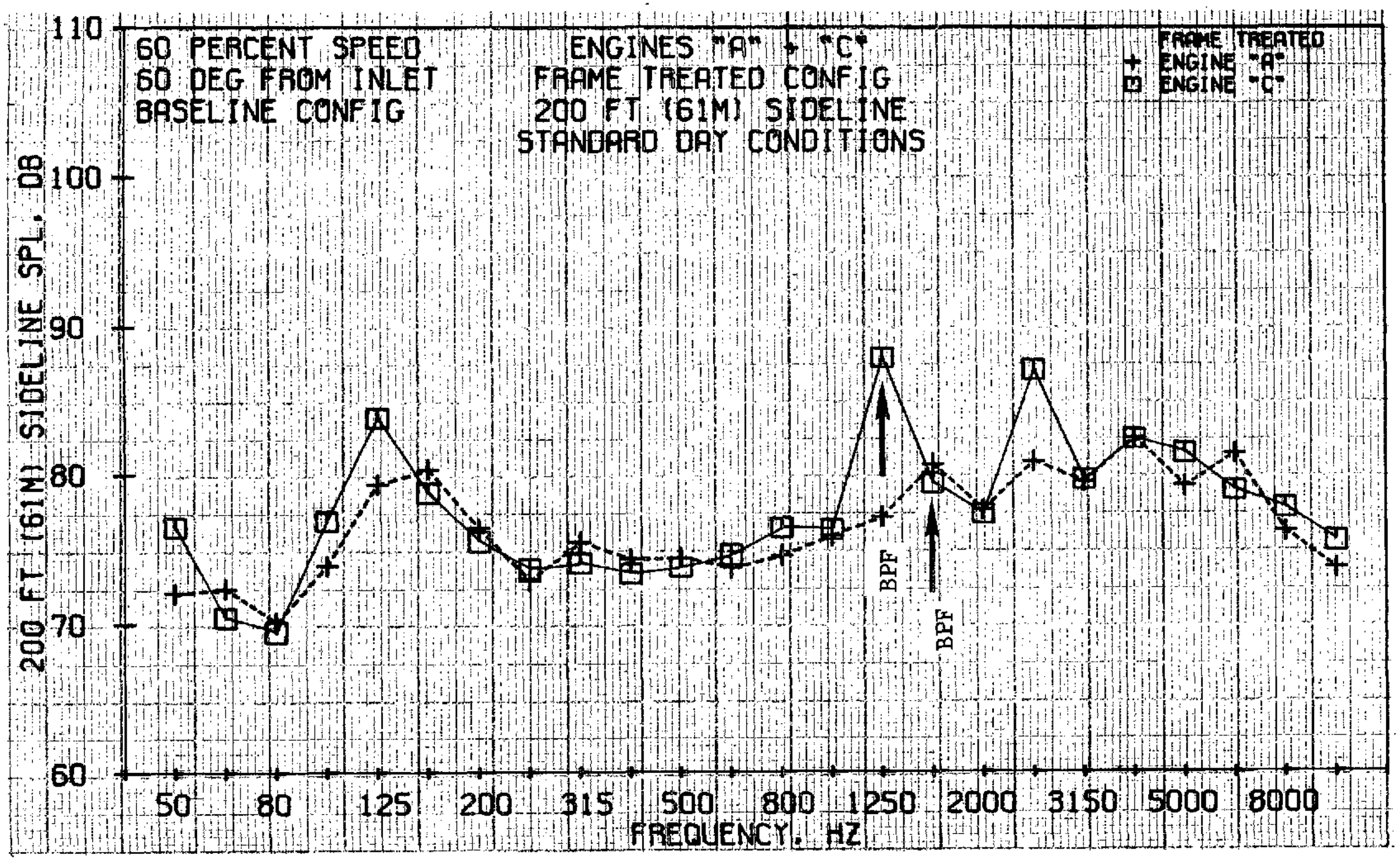


Figure 25. Comparison of Engines "A" and "C" Frame-Treated Configurations, SPL Spectra for Approach at 60°.

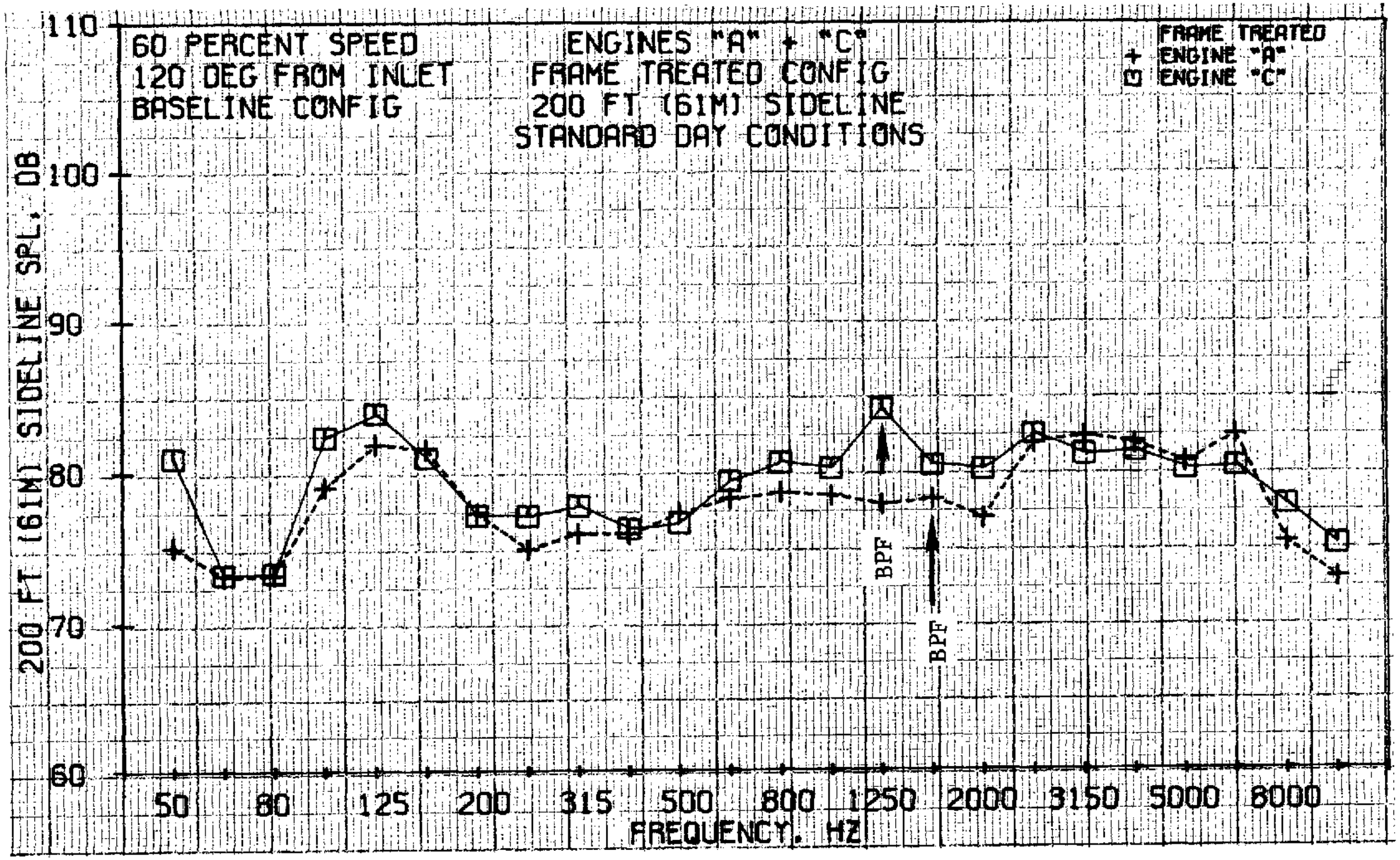


Figure 26. Comparison of Engines "A" and "C" Frame-Treated Configurations, SPL Spectra for Approach at 120° .

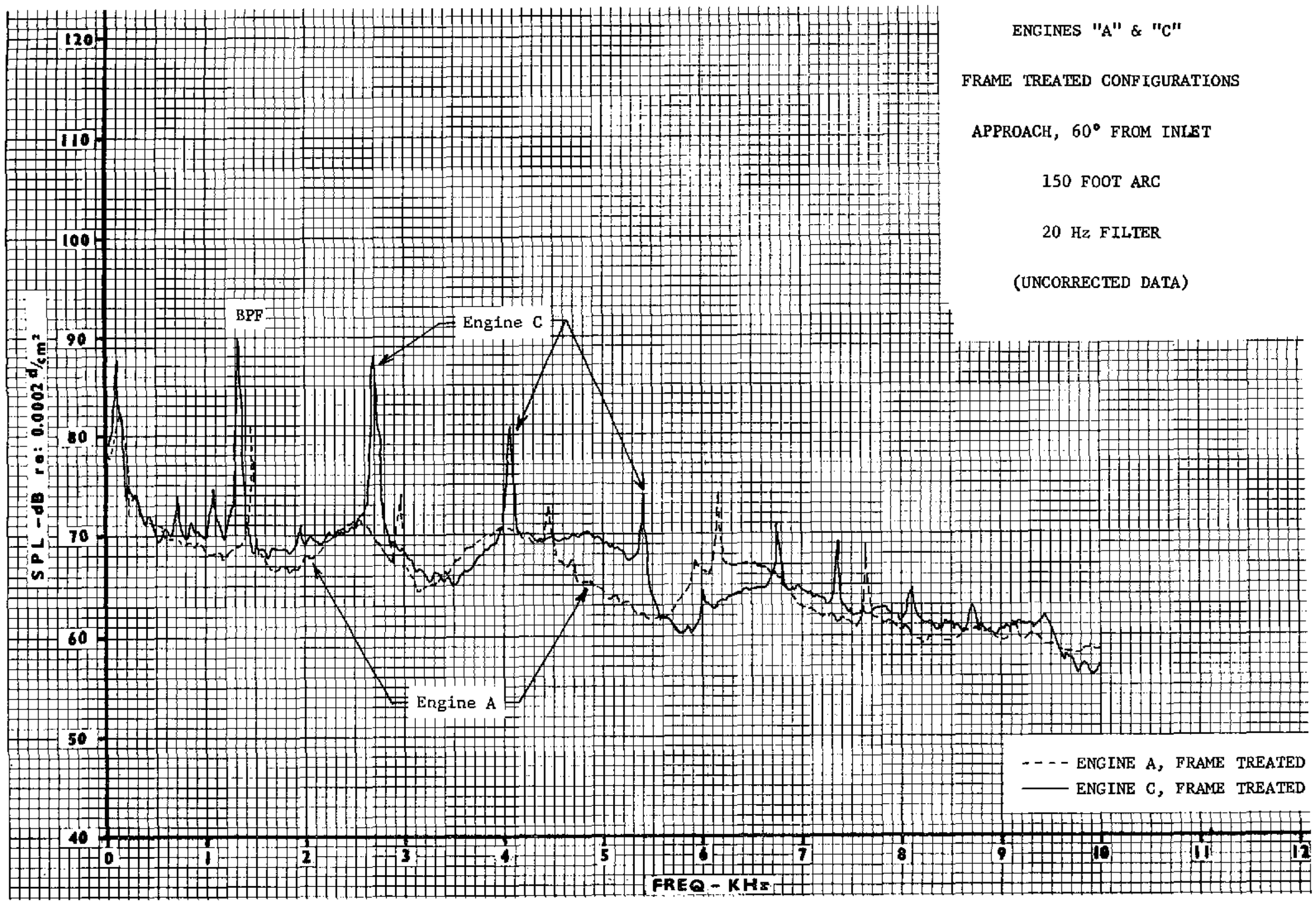


Figure 27. Comparison of Engines "A" and "C" Frame-Treated Configurations, Narrowband Overlay for Approach at 60°.

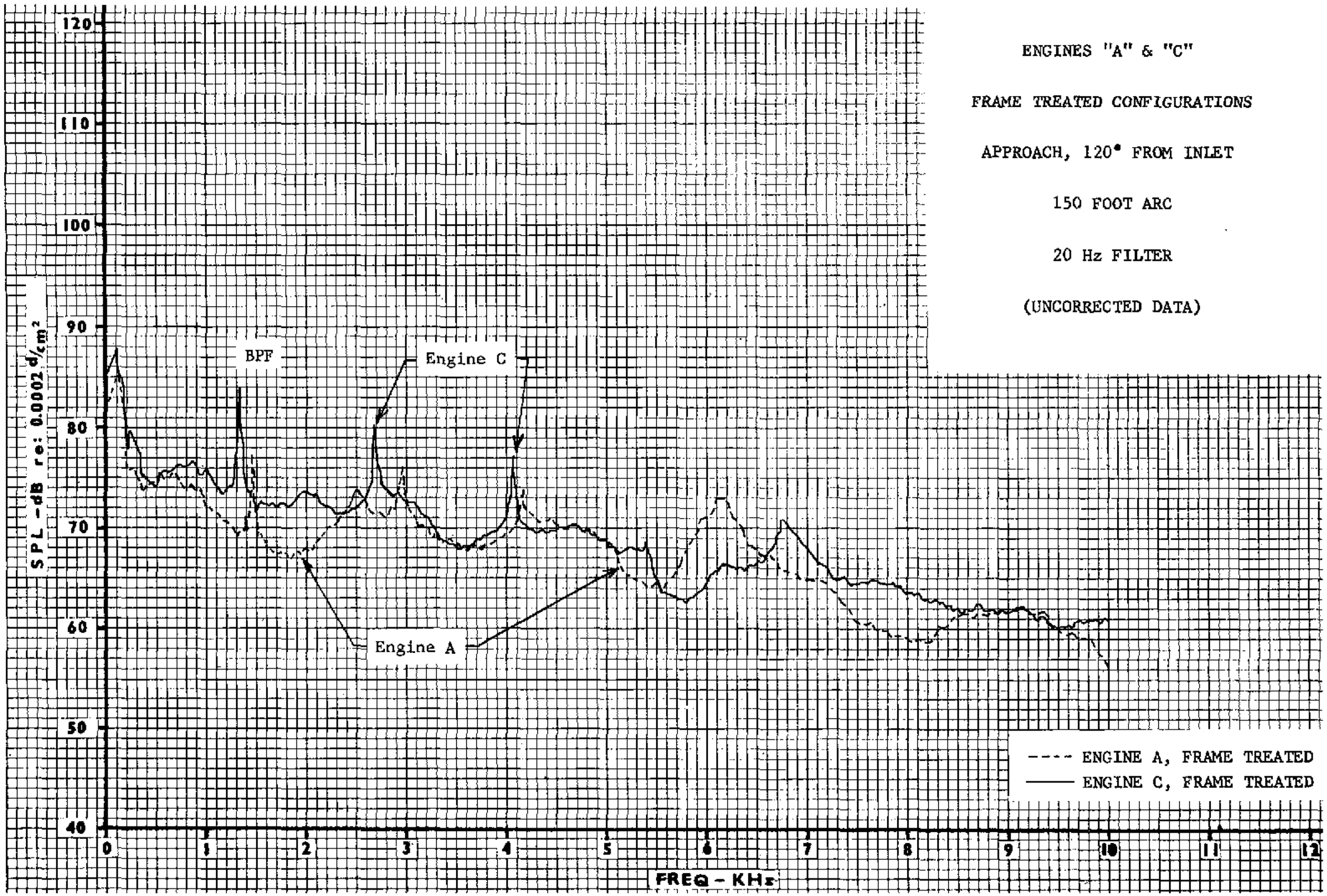


Figure 28. Comparison of Engines "A" and "C" Frame-Treated Configurations, Narrowband Overlay for Approach at 120°.

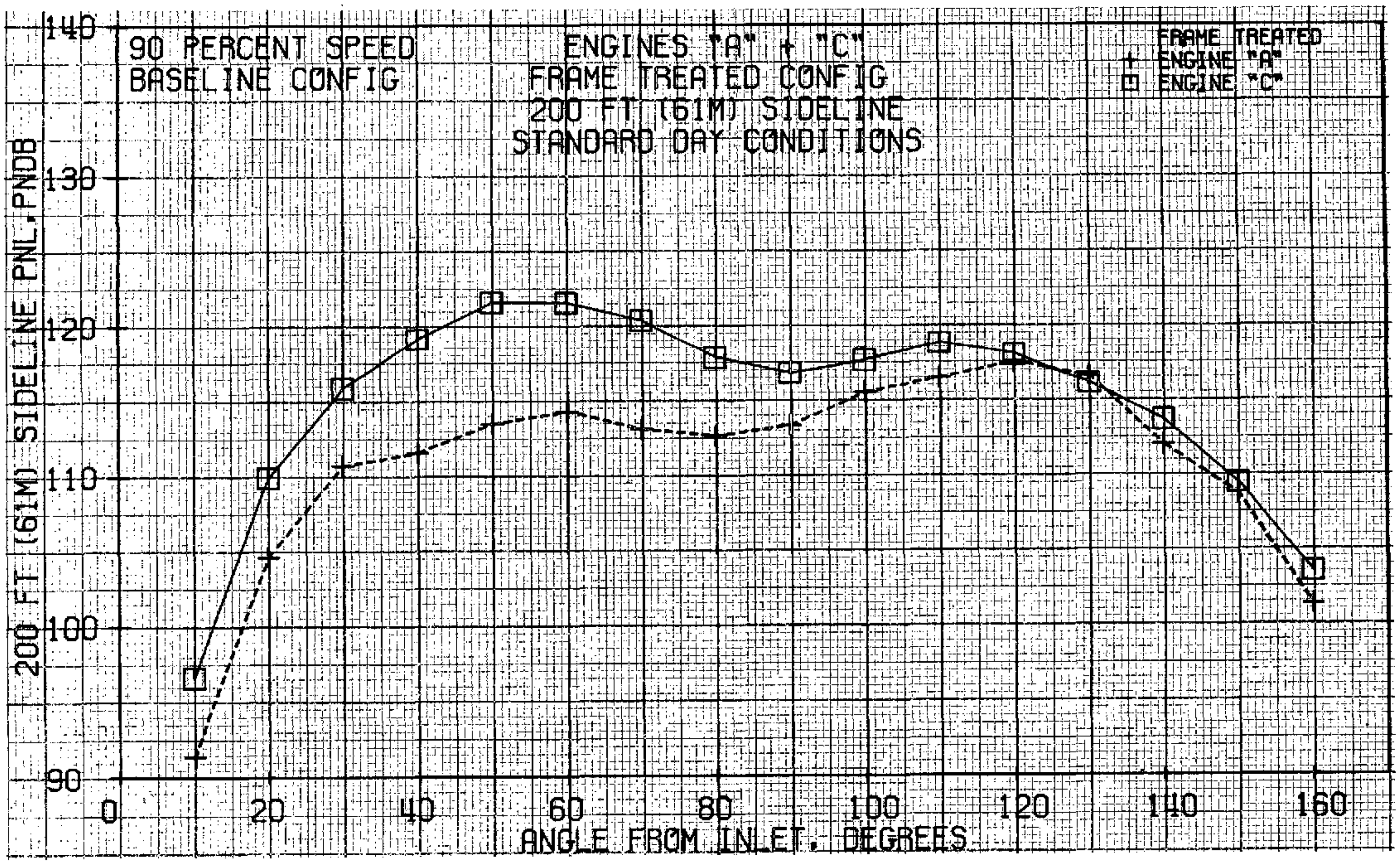


Figure 29. Comparison of Engines "A" and "C" Frame-Treated Configurations, PNL Directivities for Takeoff.

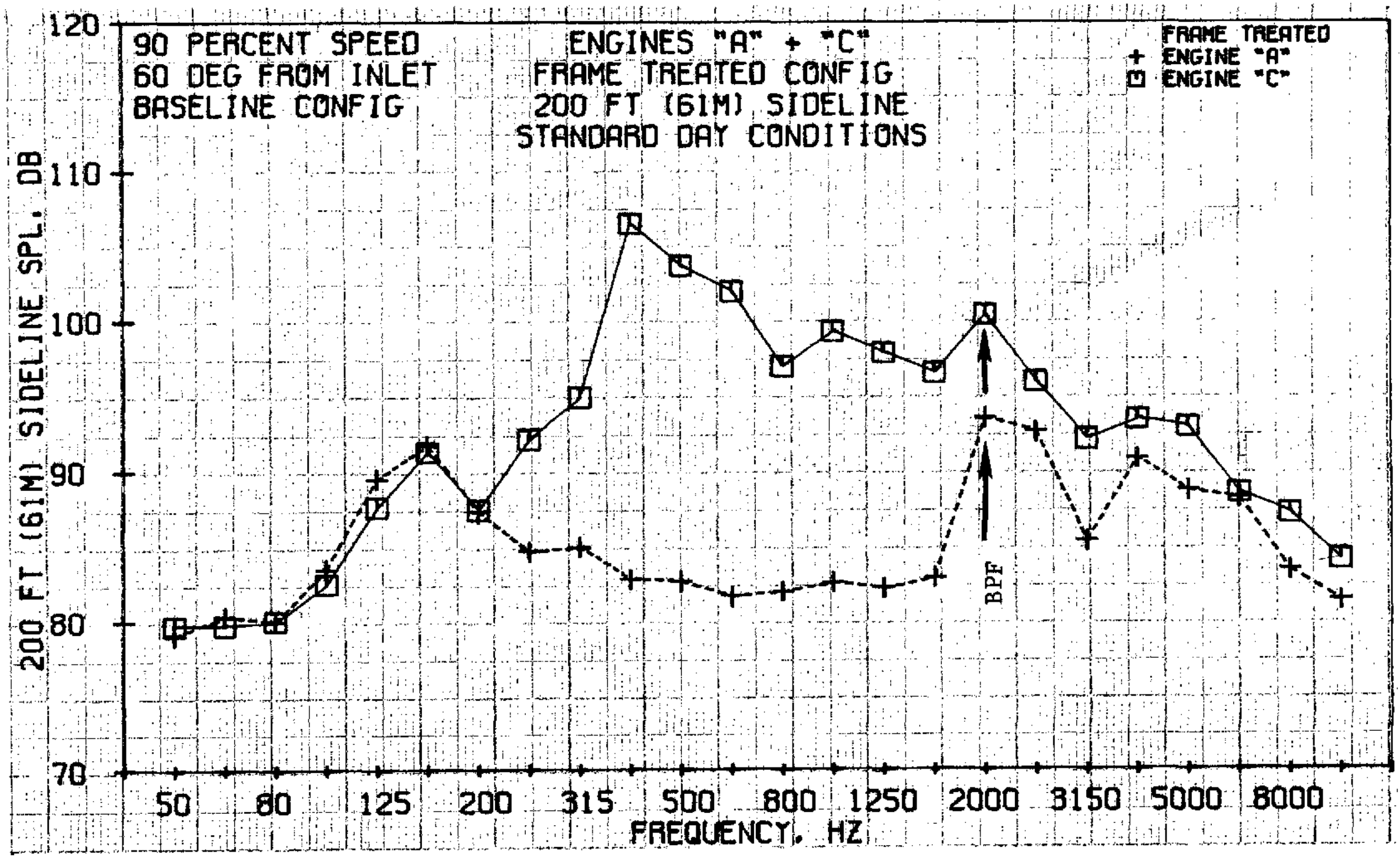


Figure 30. Comparison of Engines "A" and "C" Frame-Treated Configurations, SPL Spectra for Takeoff at 60°.

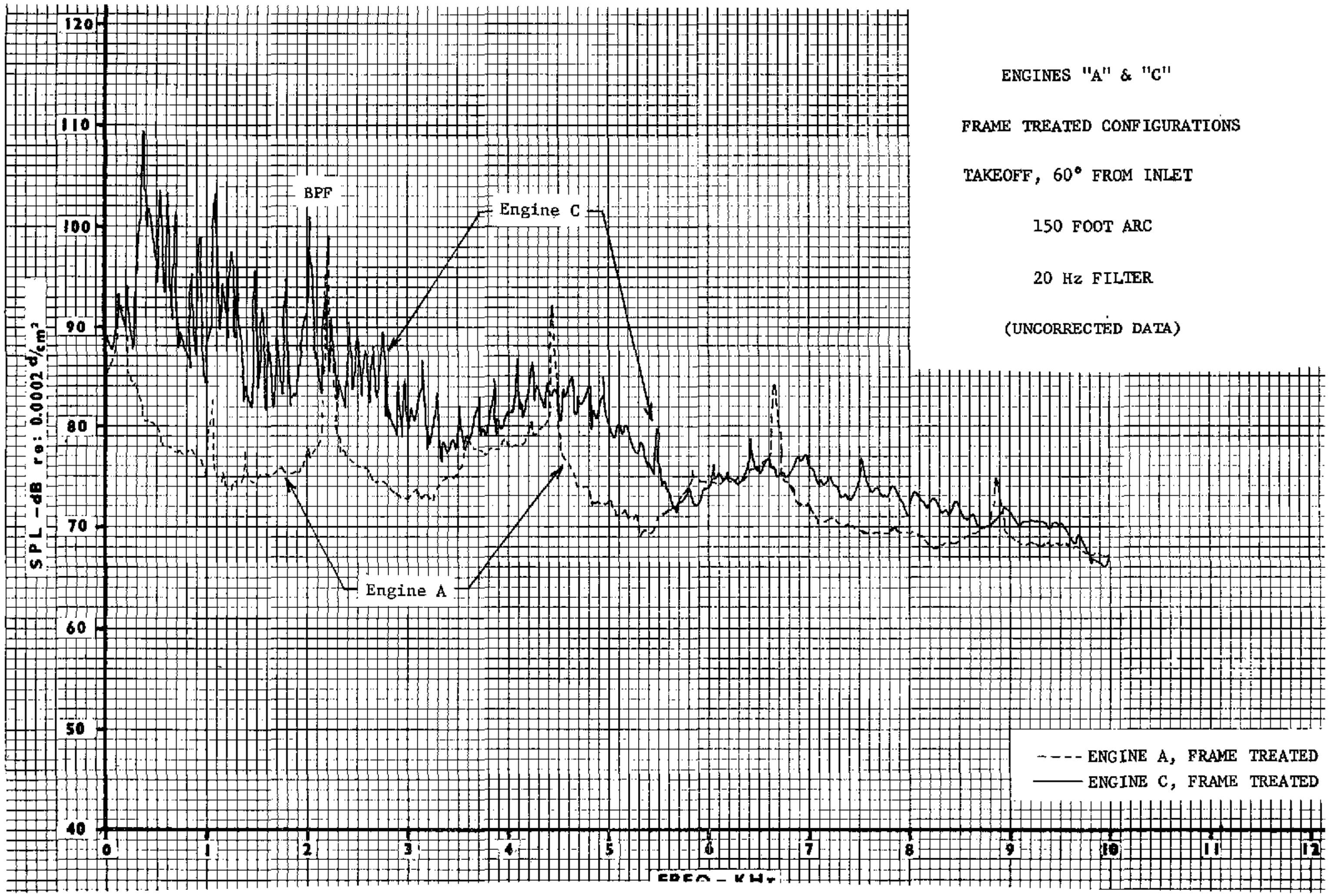


Figure 31. Comparison of Engines "A" and "C" Frame-Treated Configurations, Narrowband Overlay for Takeoff at 60°.

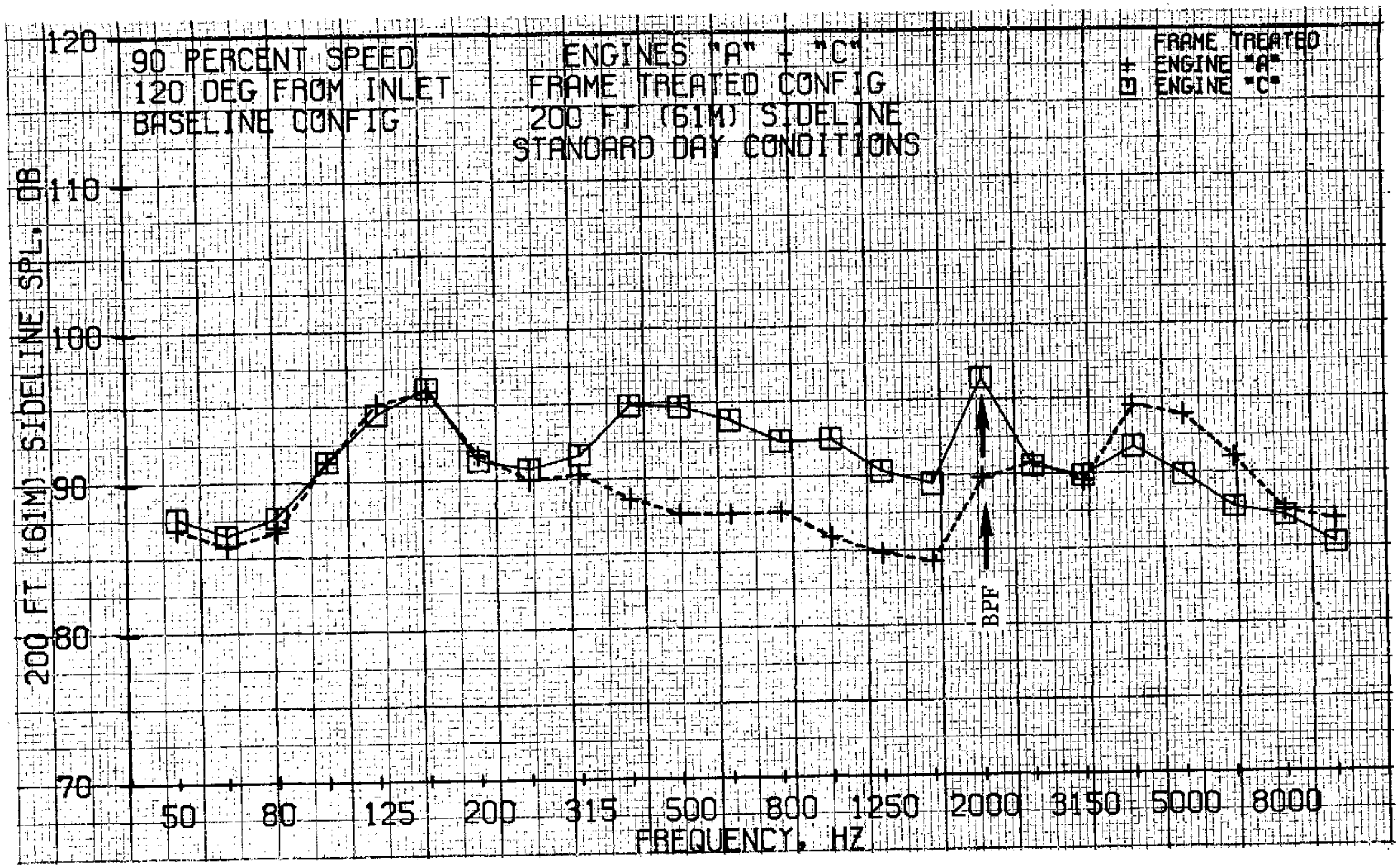


Figure 32. Comparison of Engines "A" and "C" Frame-Treated Configurations, SPL Spectra for Takeoff at 120°.

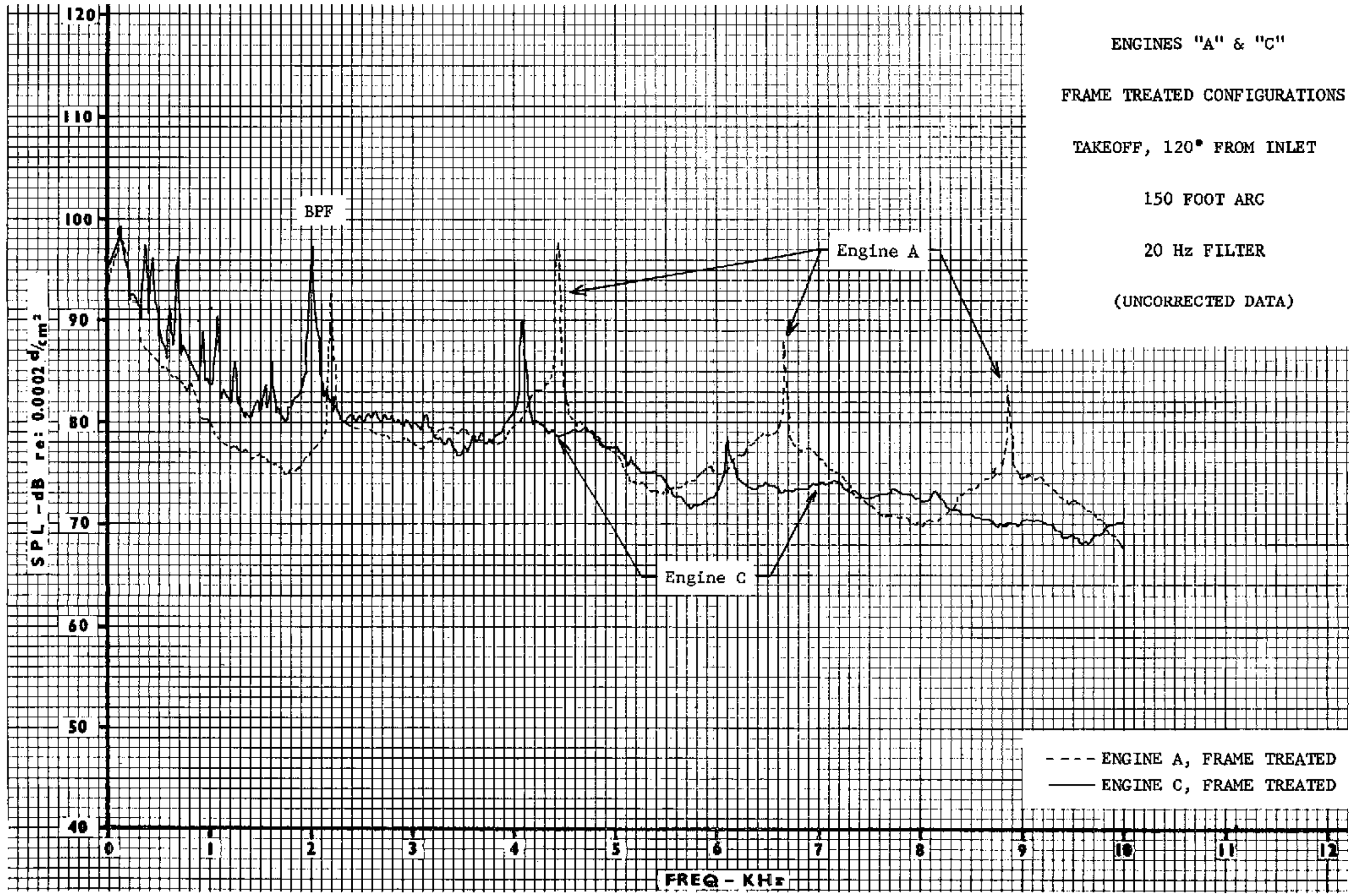


Figure 33. Comparison of Engines "A" and "C" Frame-Treated Configurations, Narrowband Overlay for Takeoff at 120°.

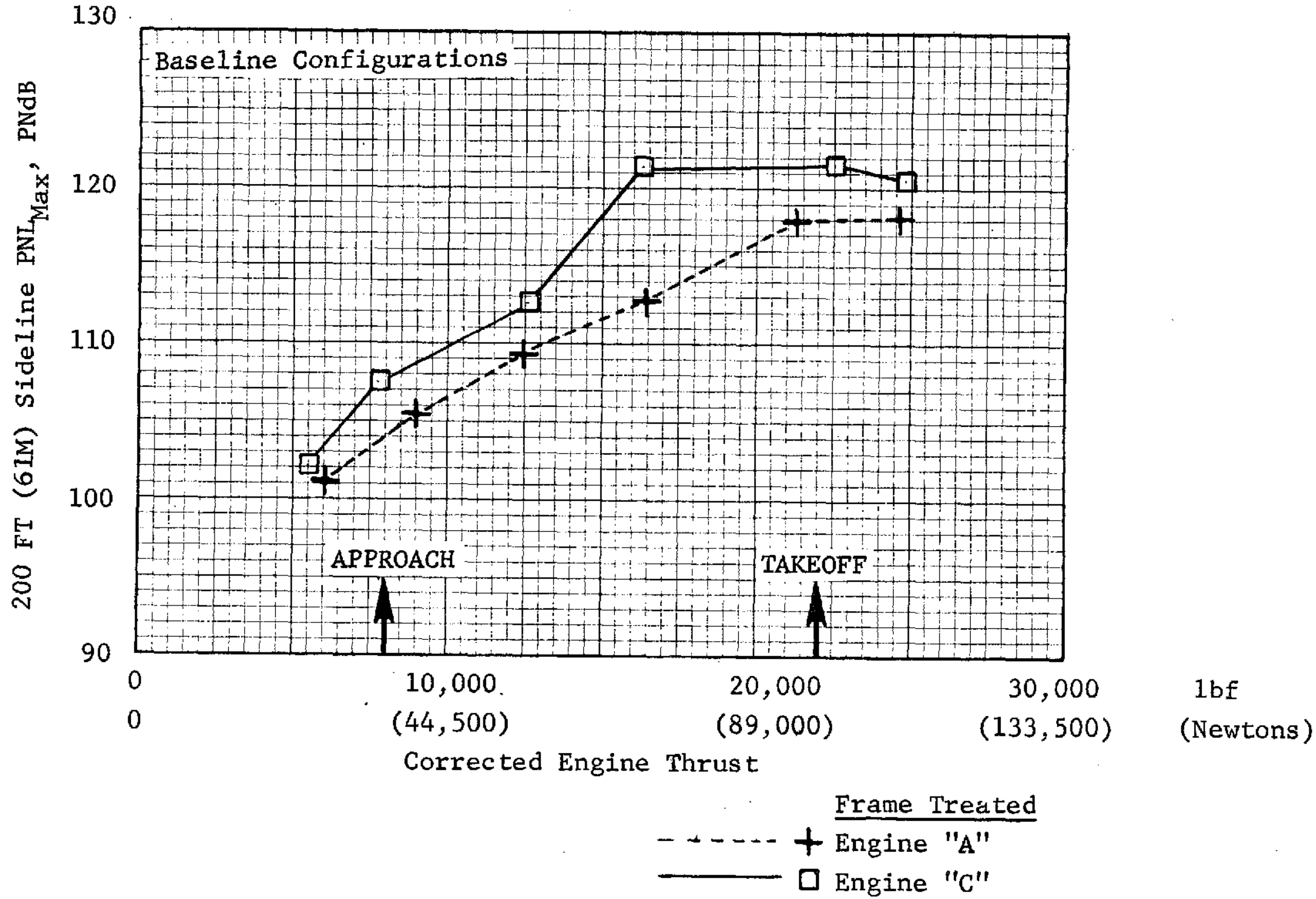


Figure 34. Comparison of Engines "A" and "C" Frame-Treated Configurations, Maximum PNL Variation with Engine Thrust.

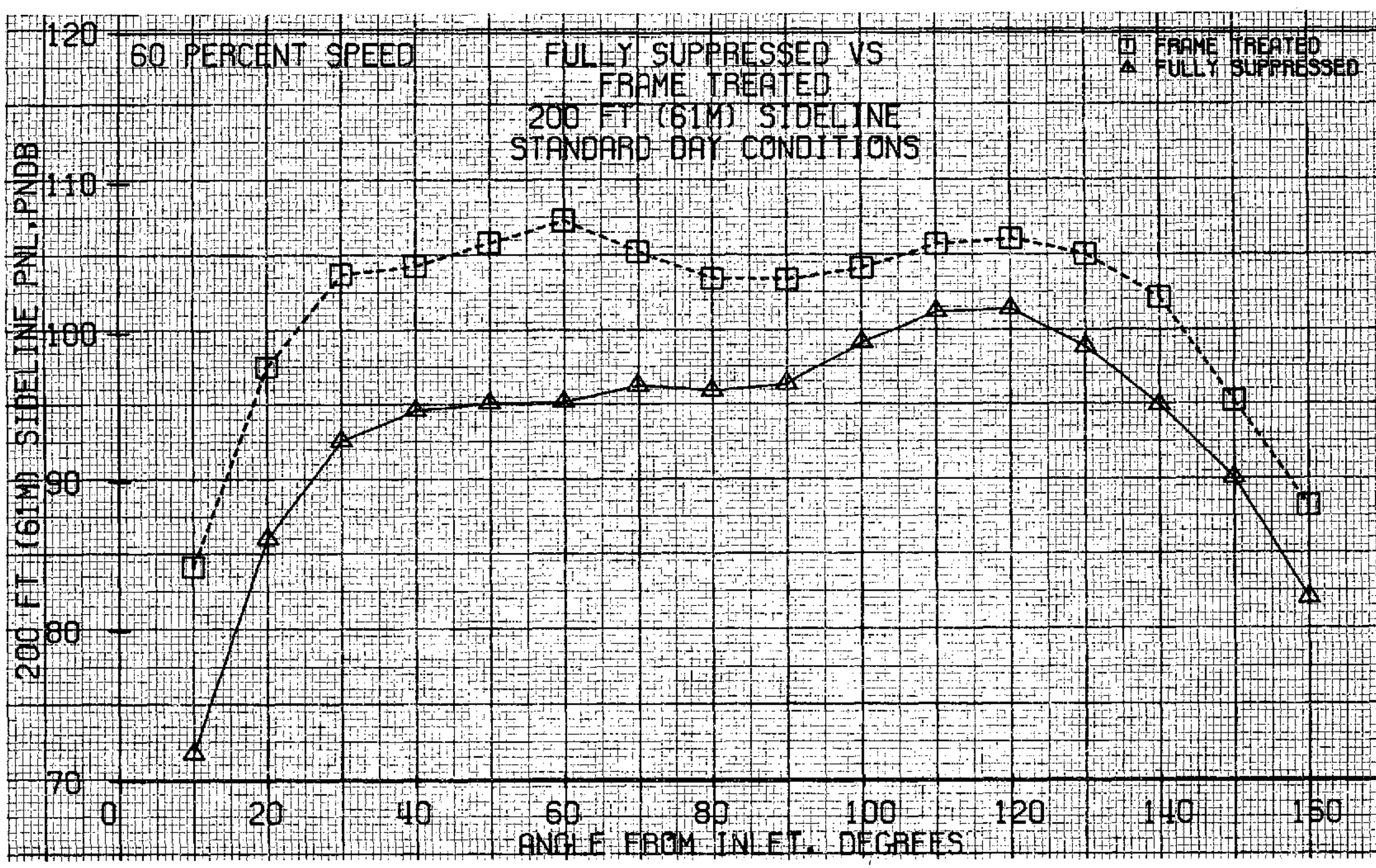


Figure 35. Comparison of Fully Suppressed and Frame-Treated Configurations, PNL Directivities at 60% Fan Speed.

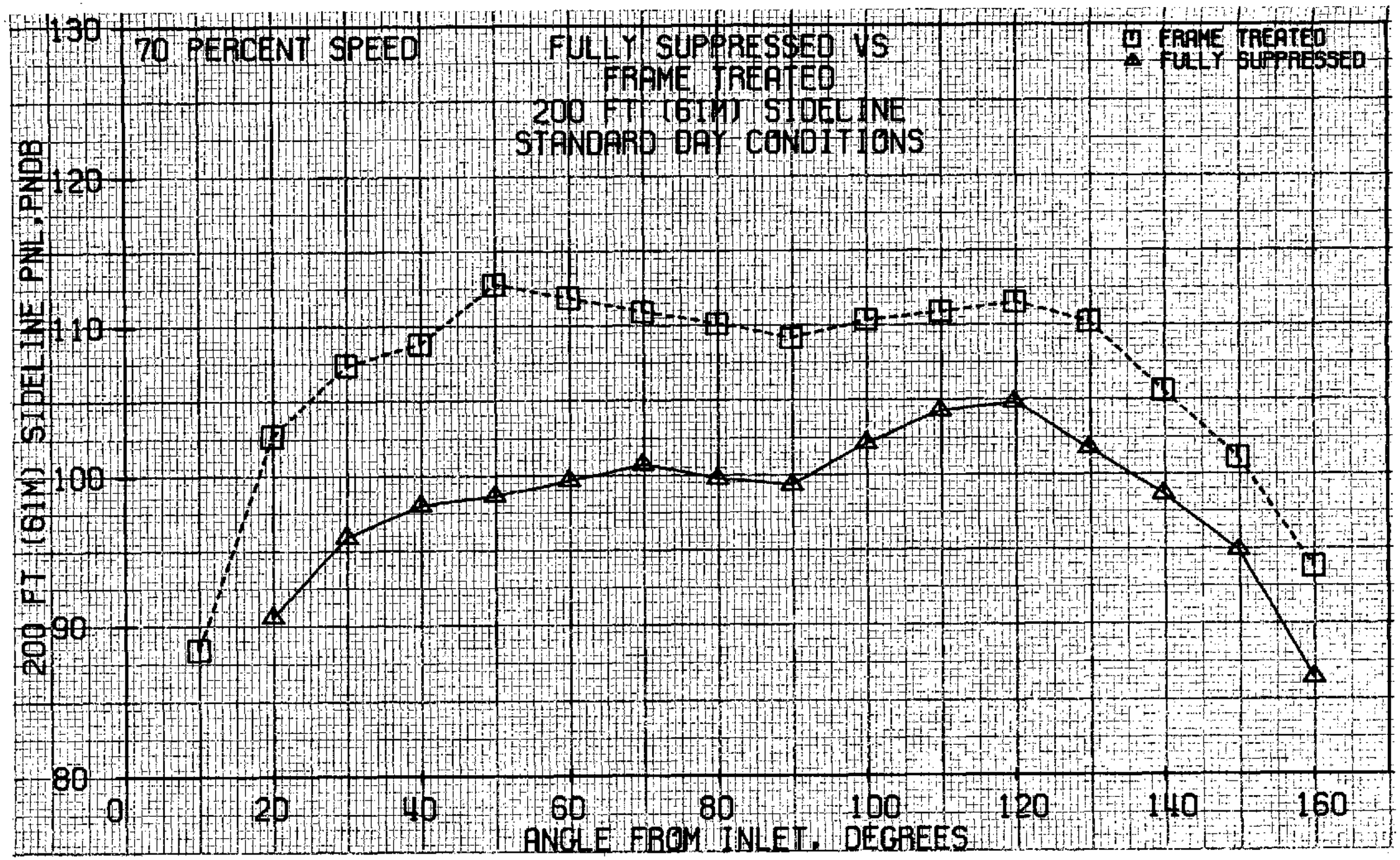


Figure 36. Comparison of Fully Suppressed and Frame-Treated Configurations, PNL Directivities at 70% Fan Speed.

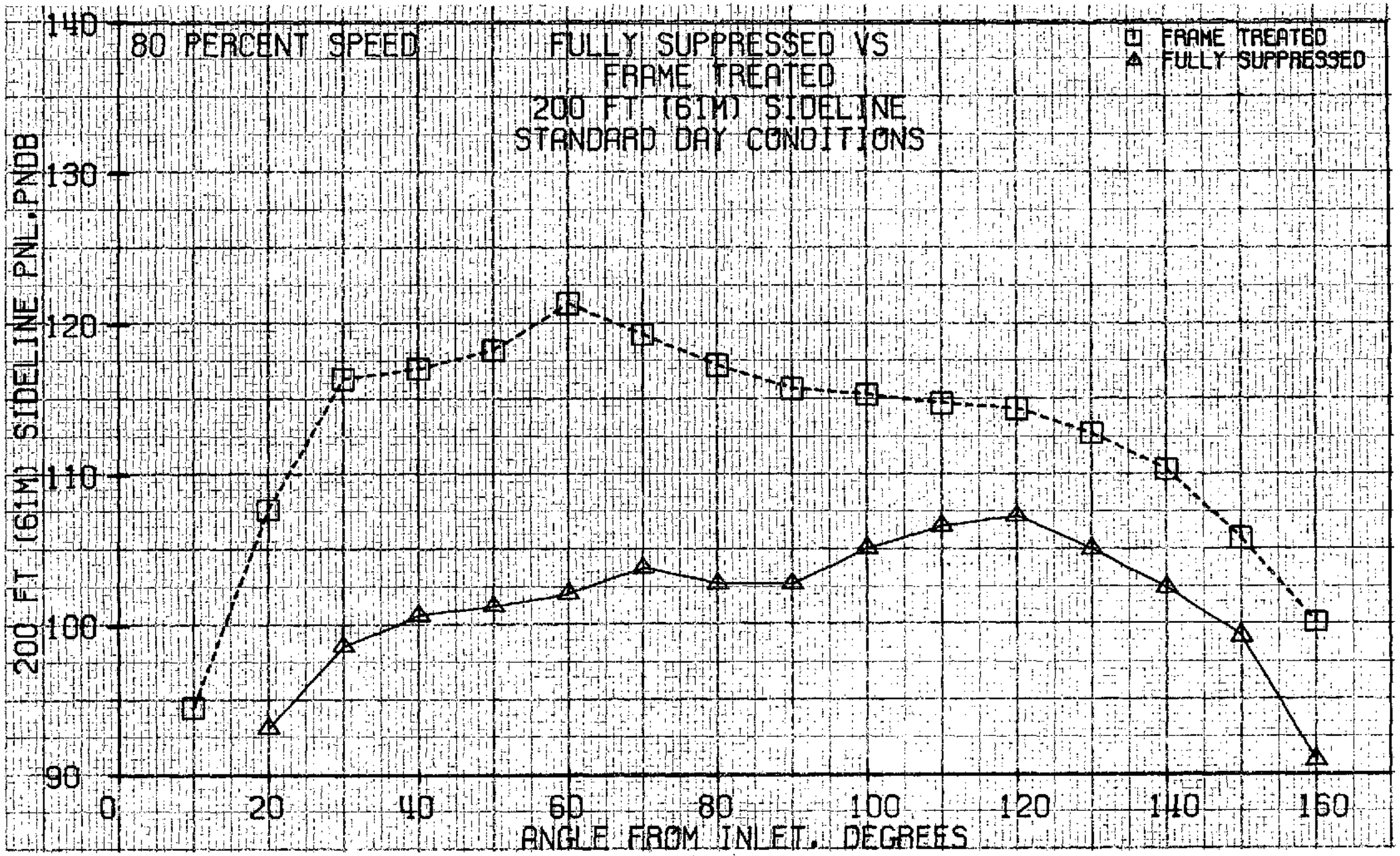


Figure 37. Comparison of Fully Suppressed and Frame-Treated Configurations, PNL Directivities at 80% Fan Speed.

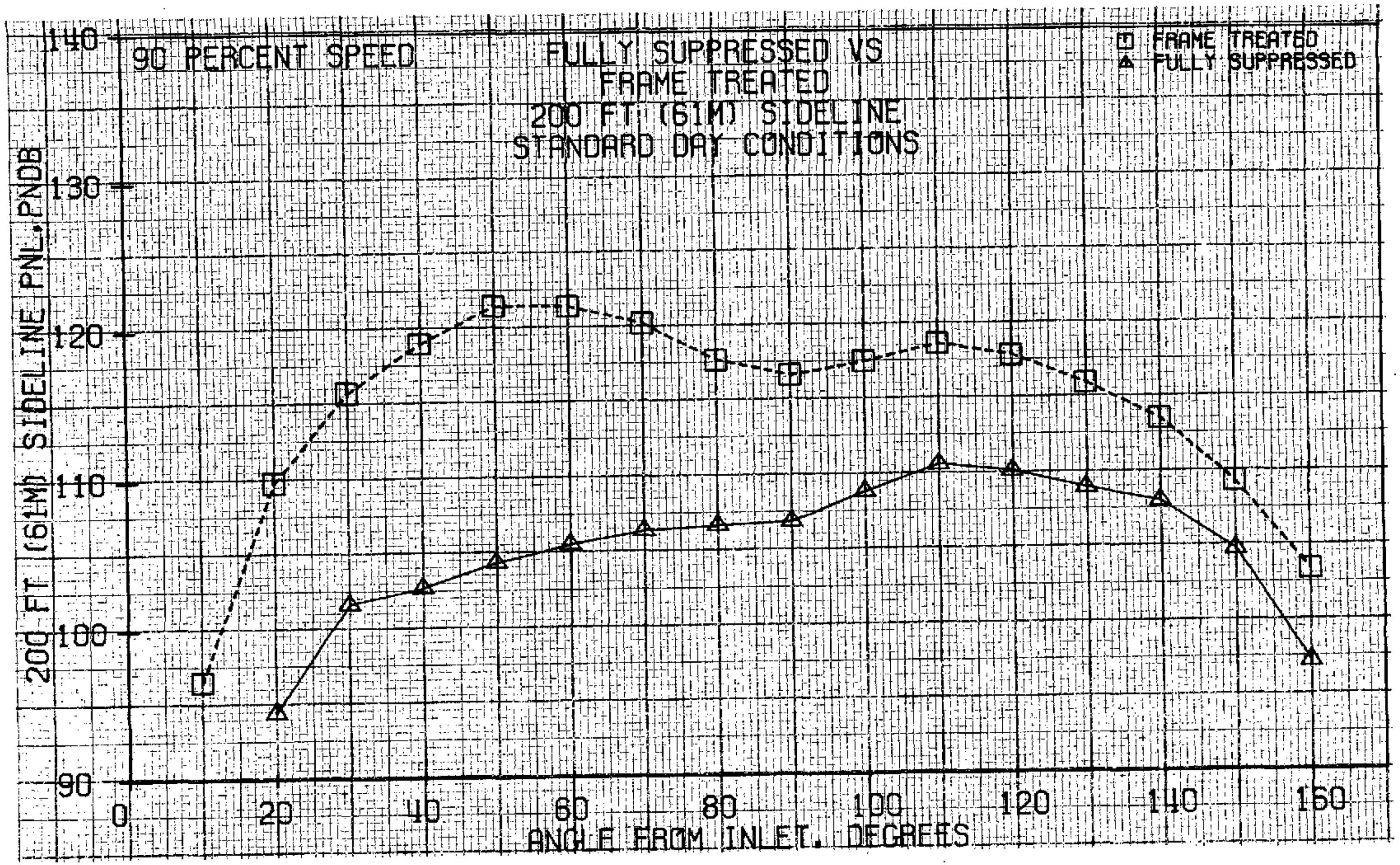


Figure 38. Comparison of Fully Suppressed and Frame-Treated Configurations, PNL Directivities at 90% Fan Speed.

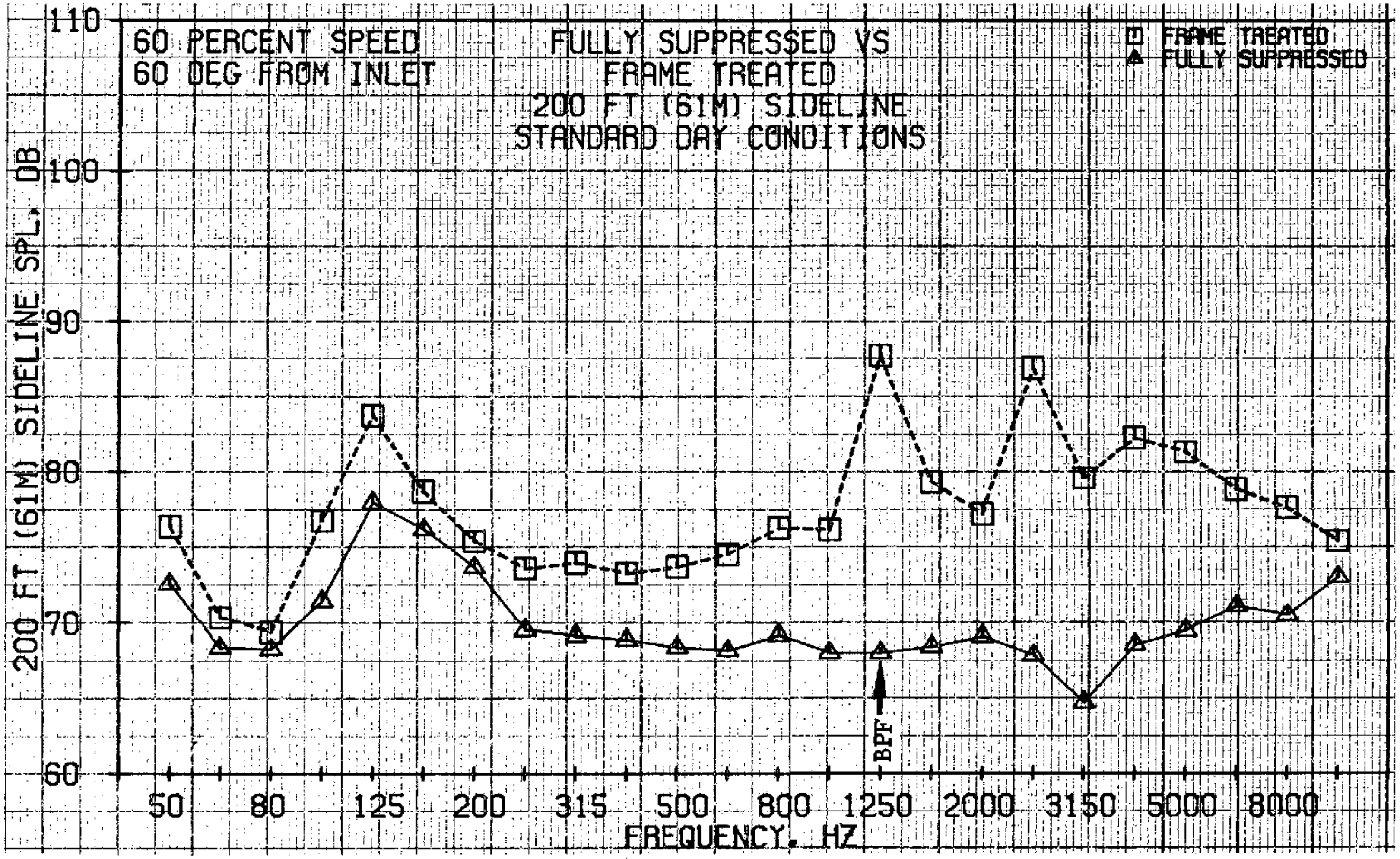


Figure 39. Comparison of Fully Suppressed and Frame-Treated Configurations, SPL Spectra at 60°.

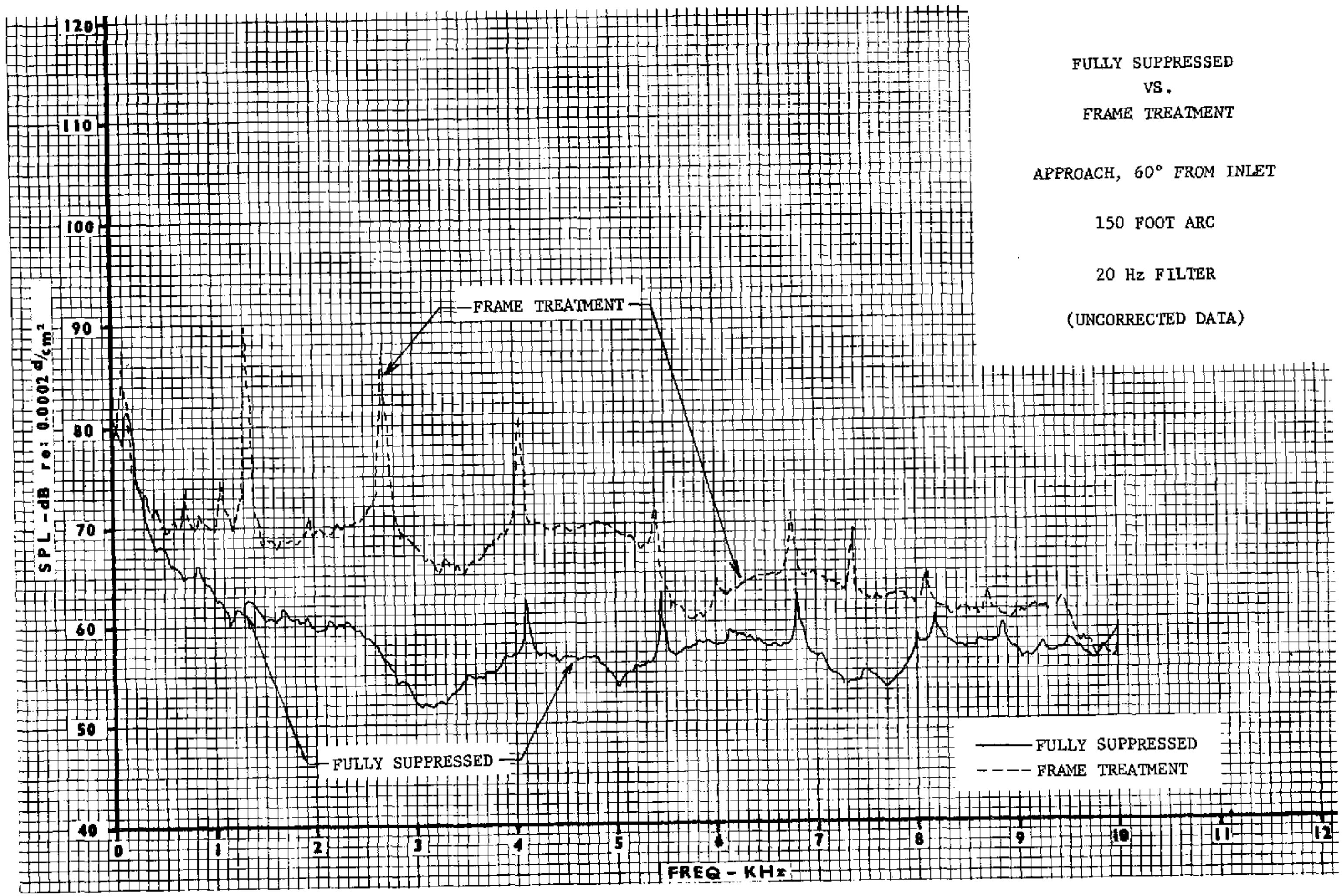


Figure 40. Comparison of Fully Suppressed and Frame-Treated Configurations, Narrowband Overlay for Approach at 60°.

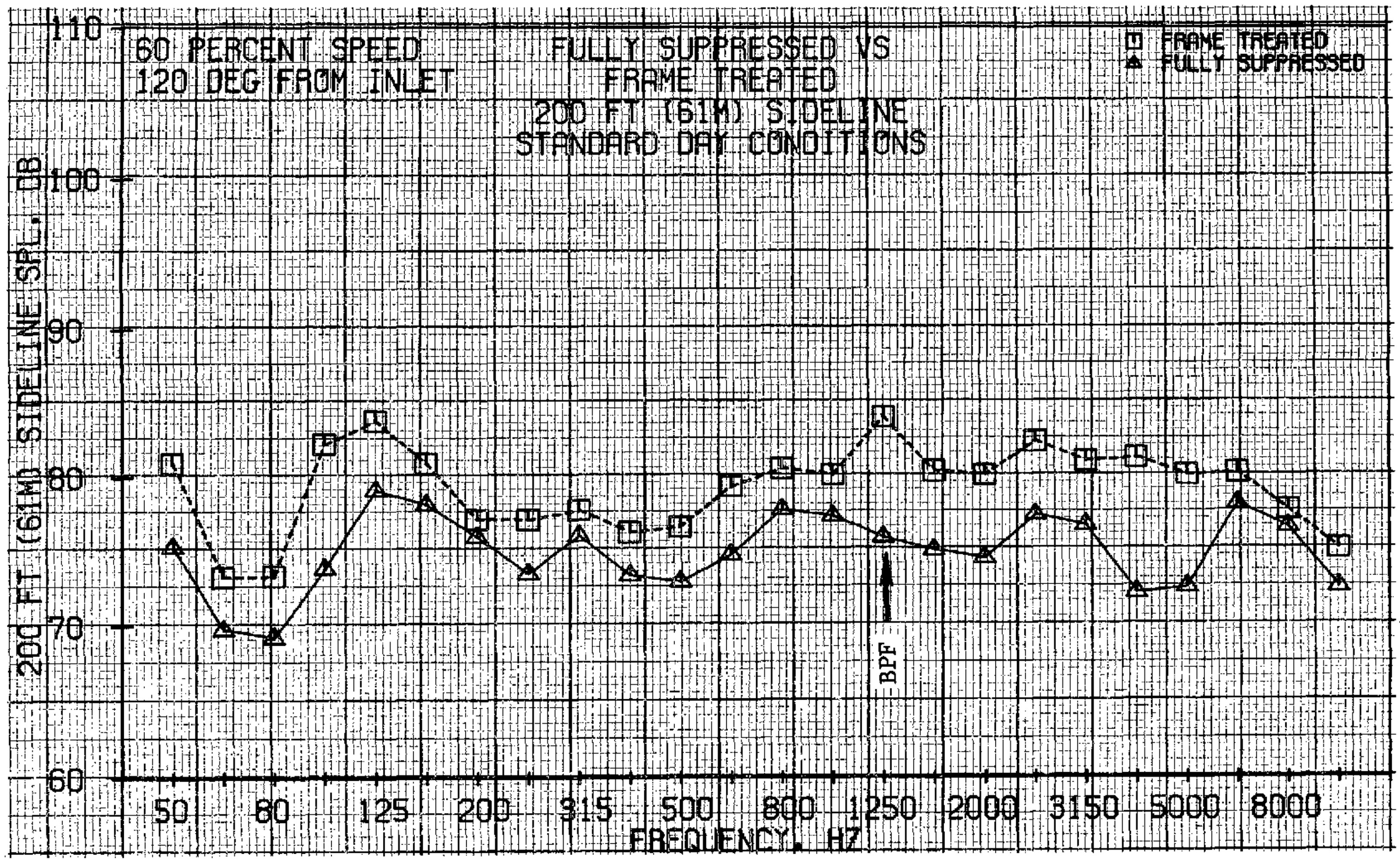


Figure 41. Comparison of Fully Suppressed and Frame-Treated Configurations, SPL Spectra for Approach at 120°.

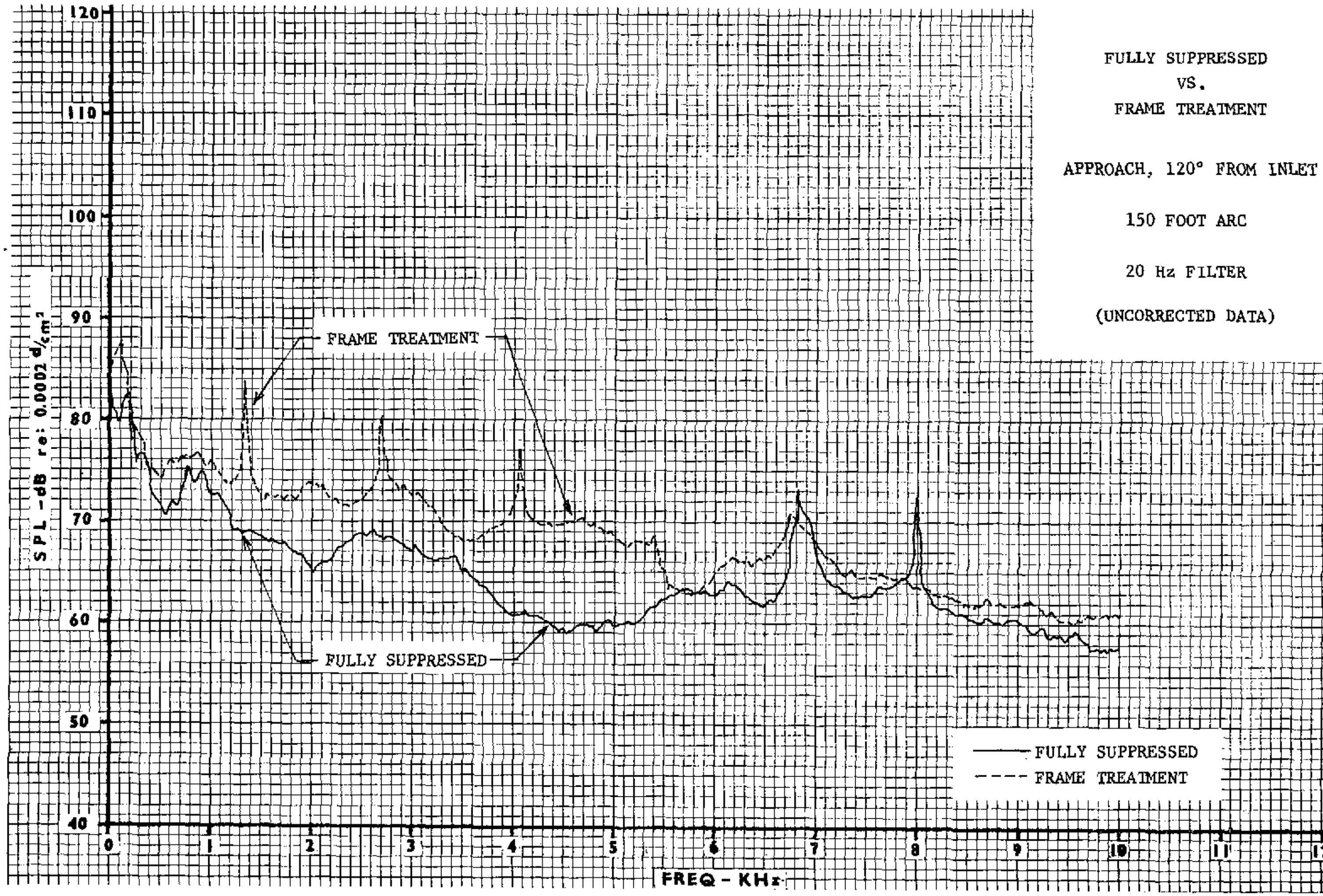


Figure 42. Comparison of Fully Suppressed and Frame-Treated Configurations, Narrowband Overlay for Approach at 120°.

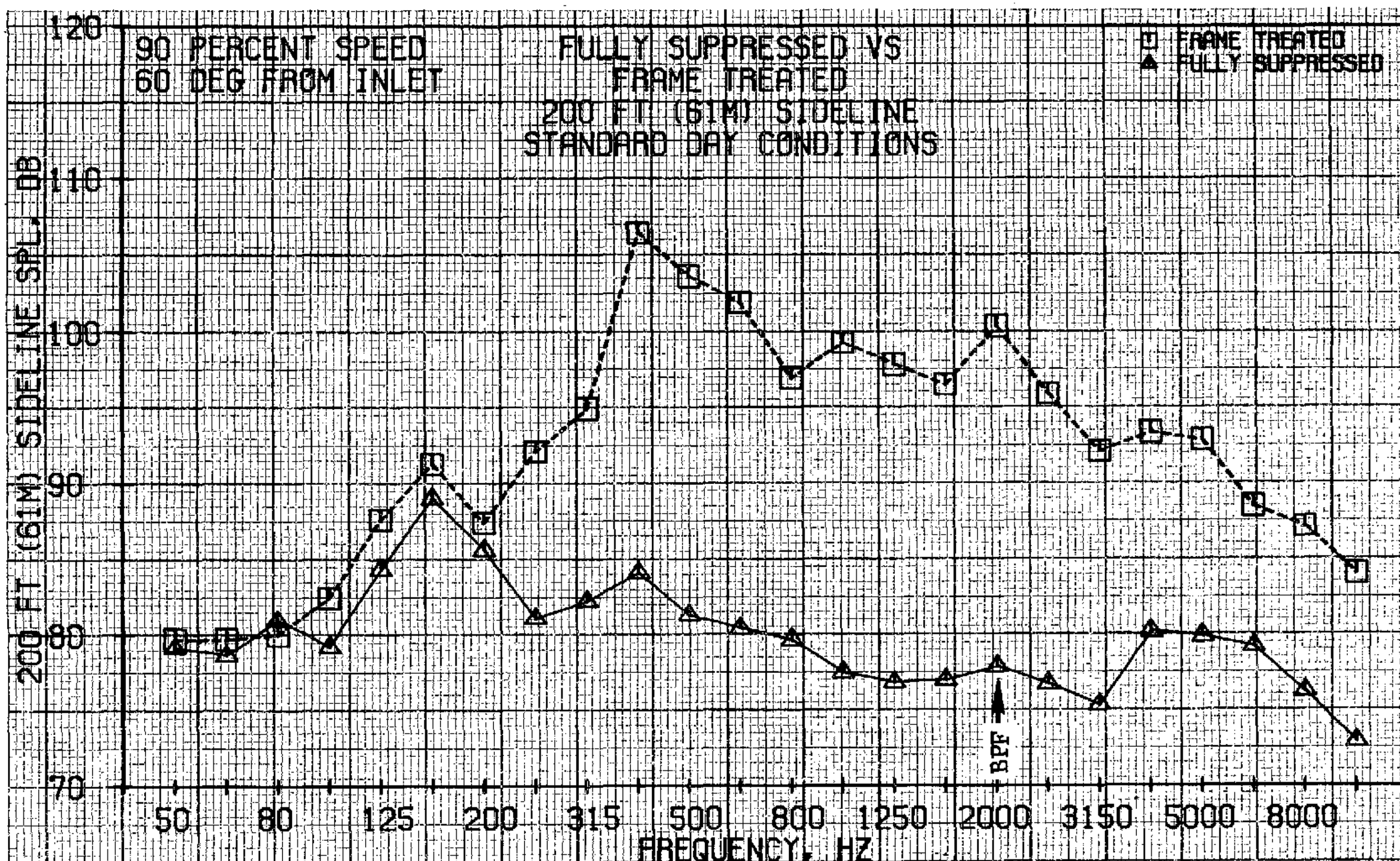


Figure 43. Comparison of Fully Suppressed and Frame-Treated Configurations, SPL Spectra for Takeoff at 60°.

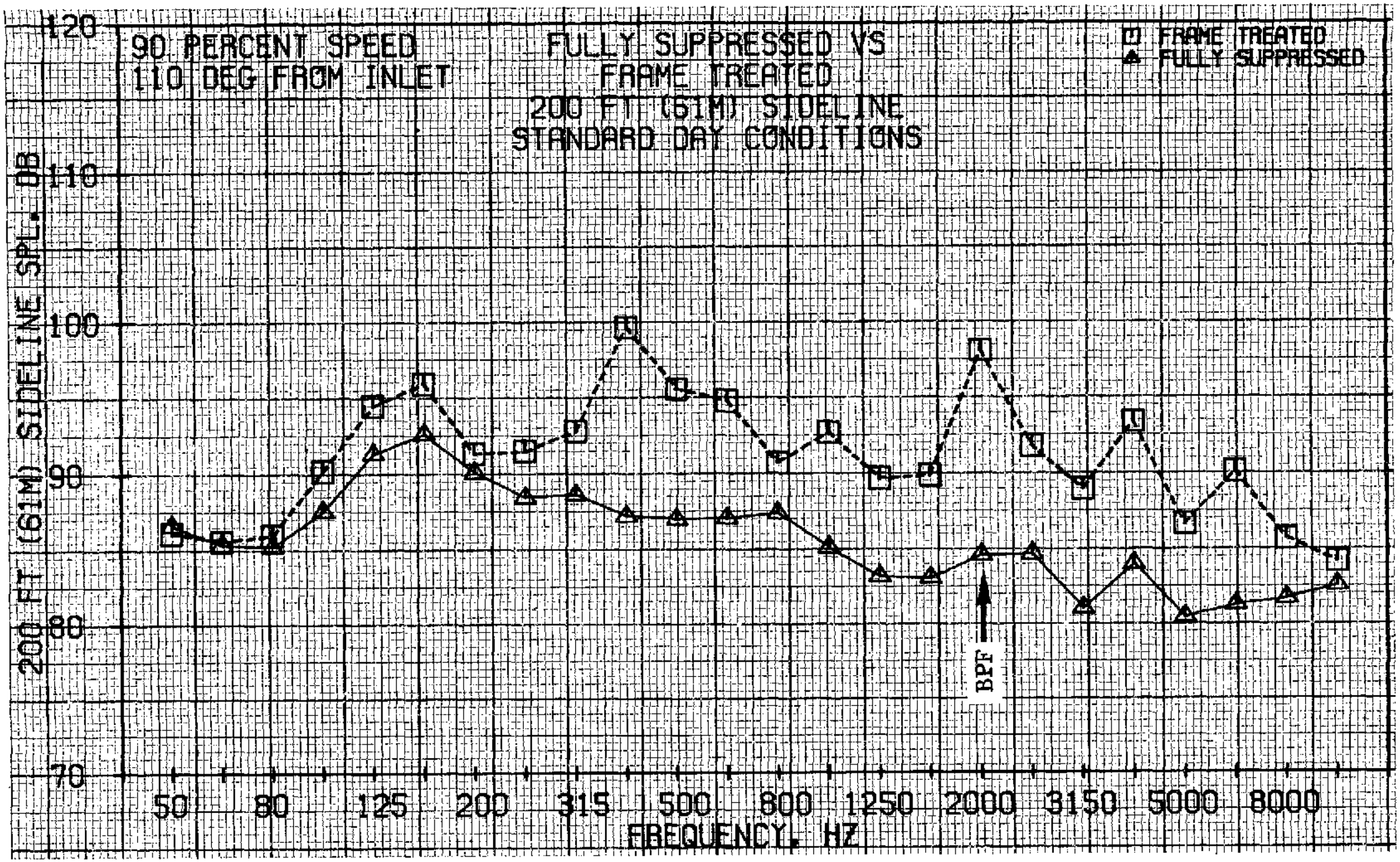


Figure 44. Comparison of Fully Suppressed and Frame-Treated Configurations, SPL Spectra for Takeoff at 110°.

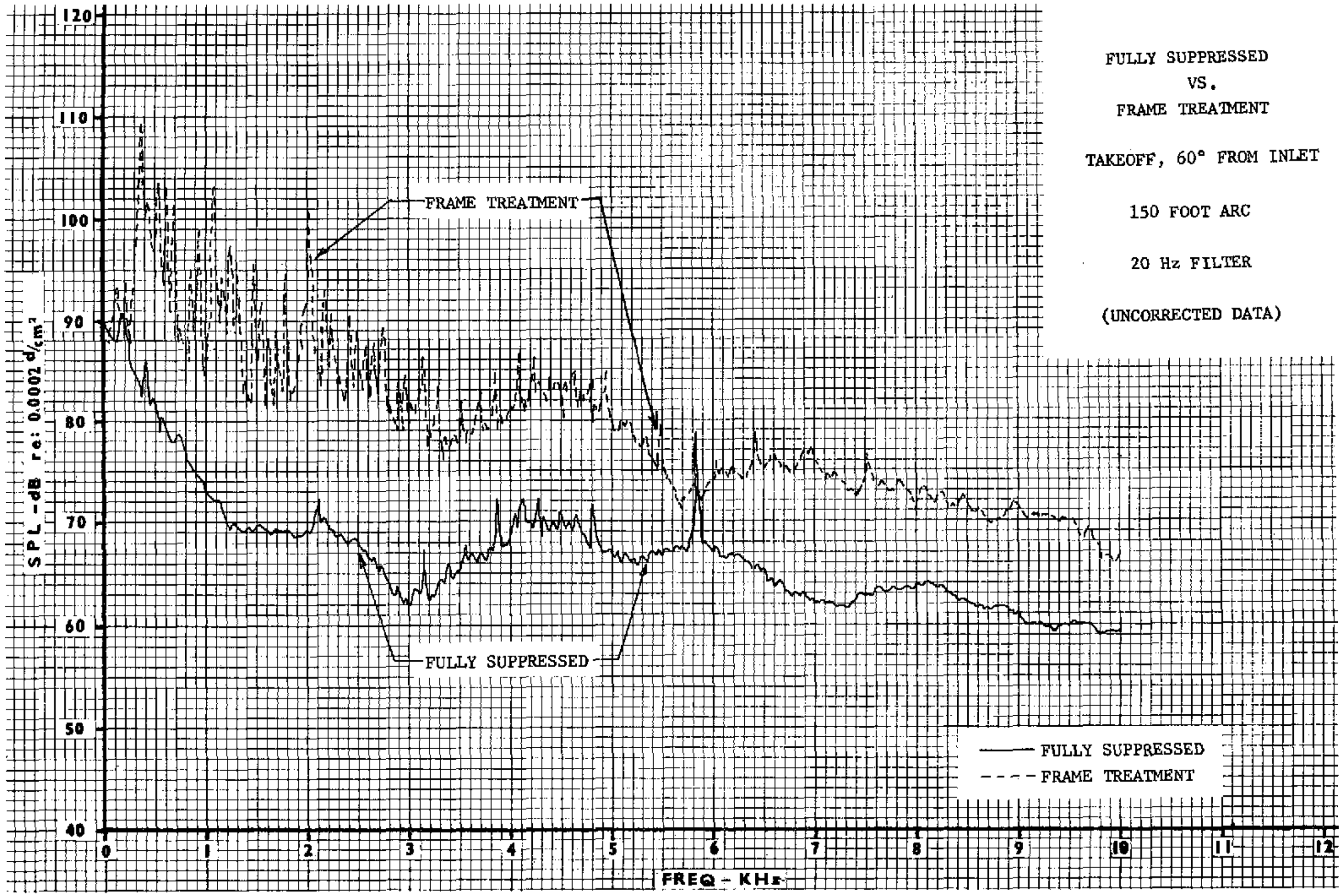


Figure 45. Comparison of Fully Suppressed and Frame-Treated Configurations, Narrowband Overlay for Takeoff at 60°.

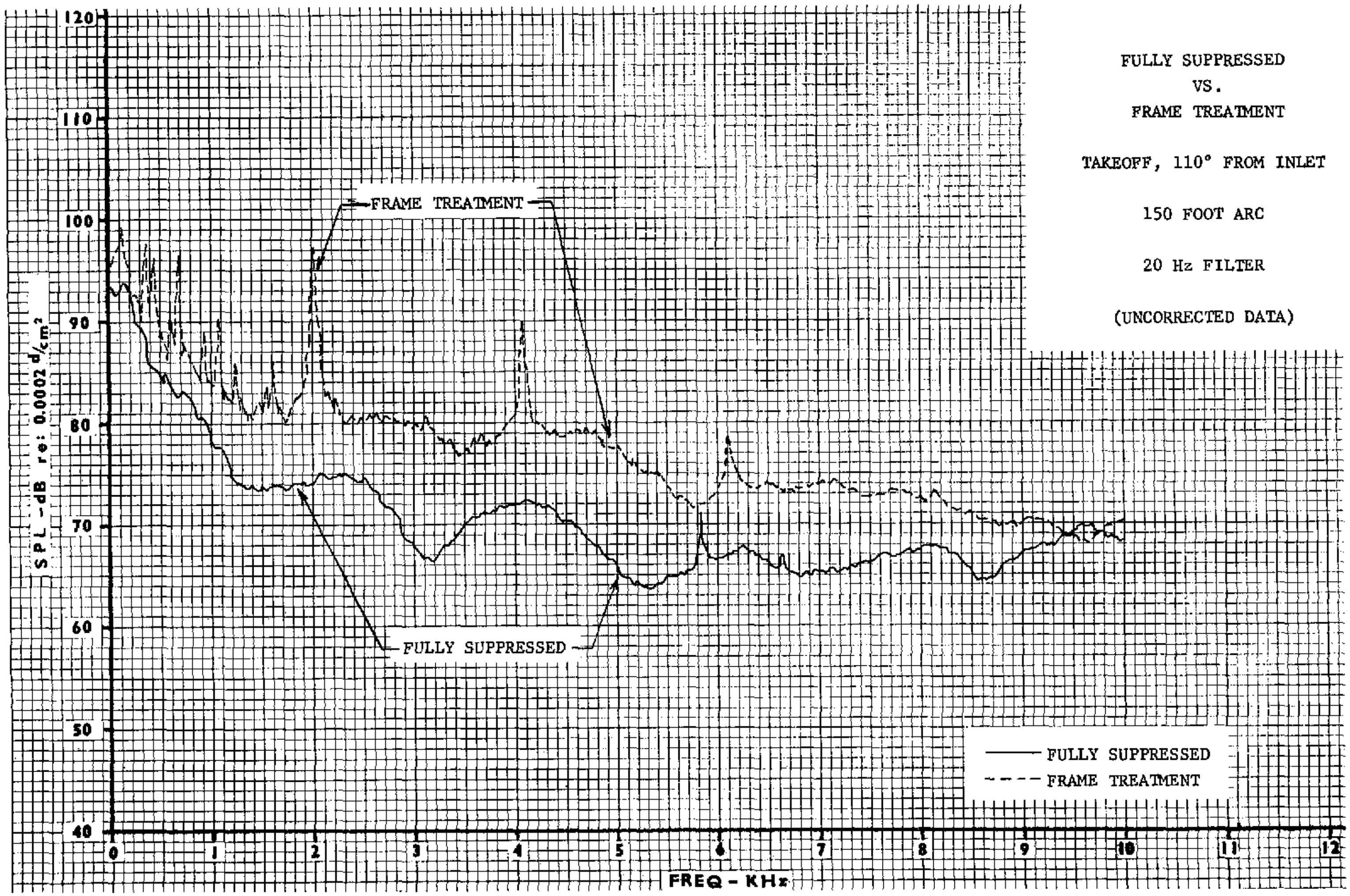


Figure 46. Comparison of Fully Suppressed and Frame-Treated Configurations, Narrowband Overlay for Takeoff at 110°.

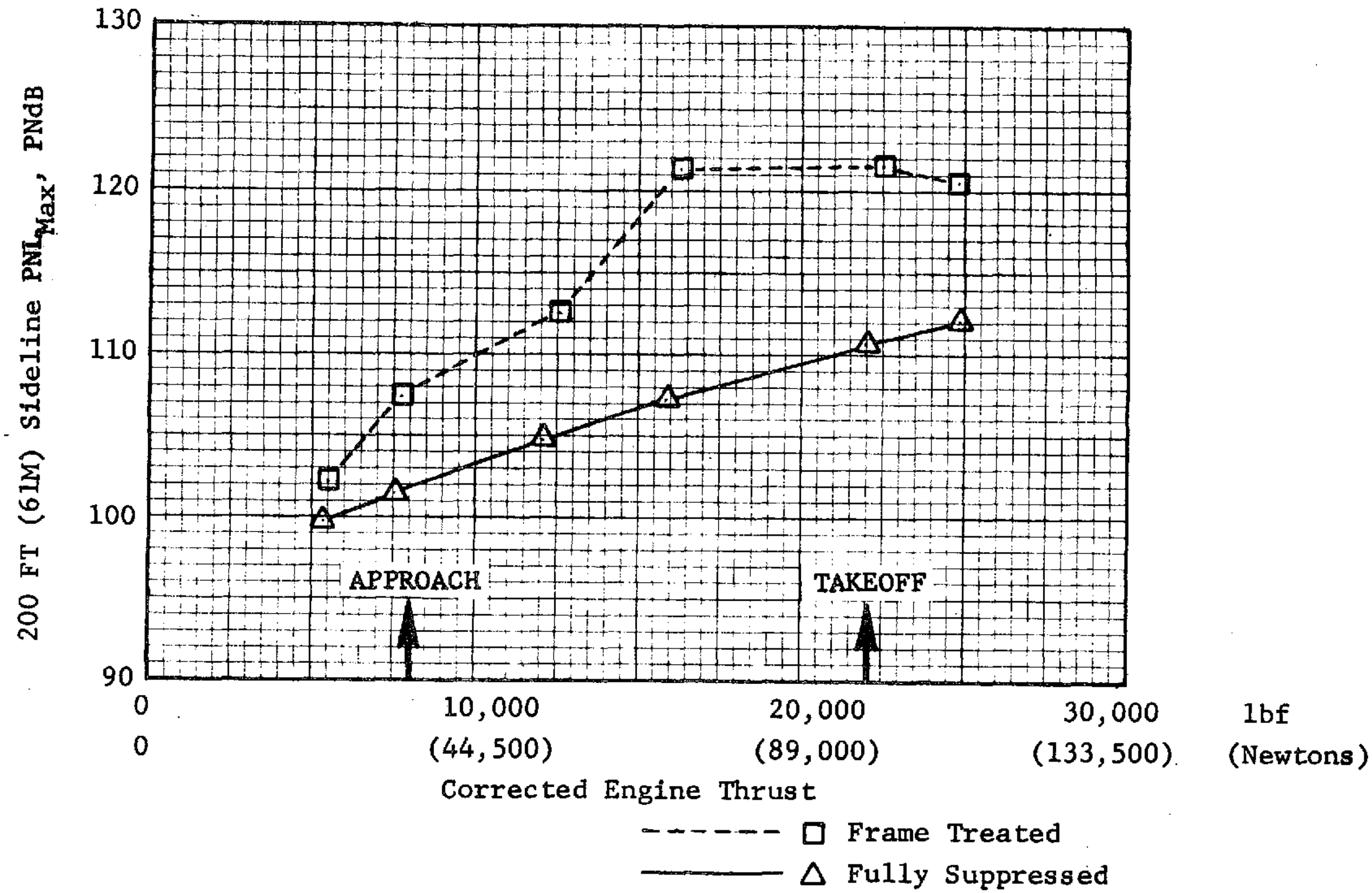
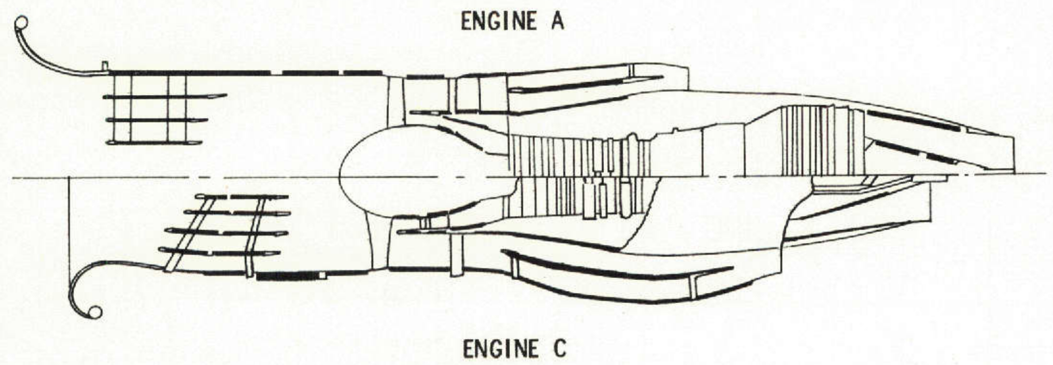
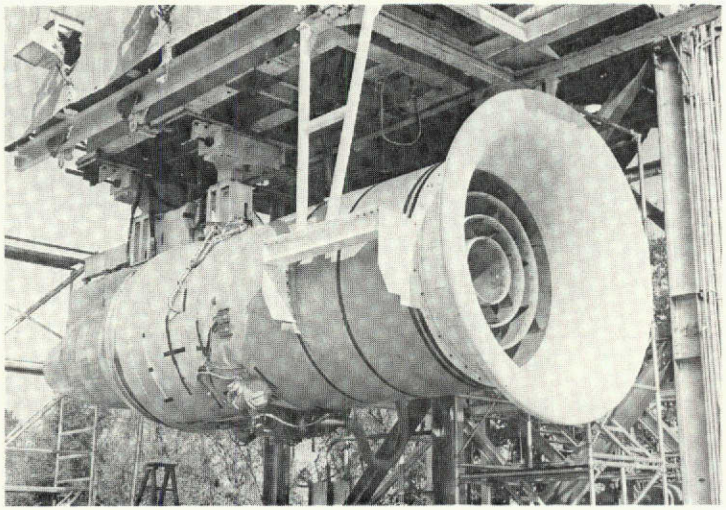
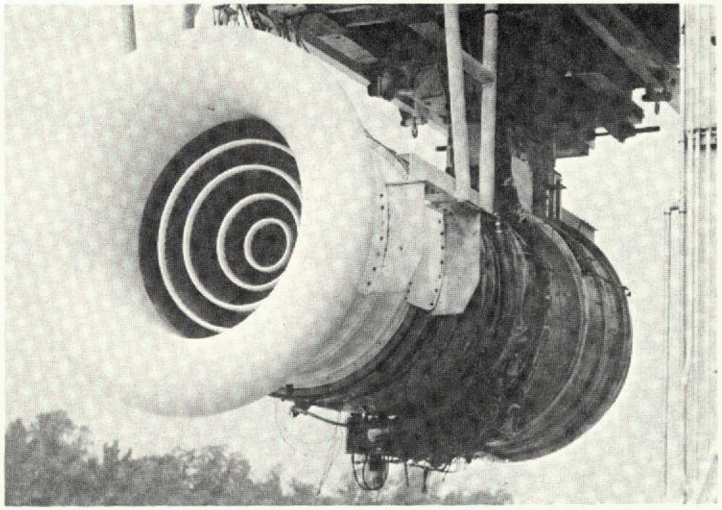


Figure 47. Comparison of Fully Suppressed and Frame-Treated Configurations, Maximum PNL Variation with Engine Thrust.





QUIET ENGINE "A"



QUIET ENGINE "C"

Figure 48. Fully Suppressed Quiet Engines.

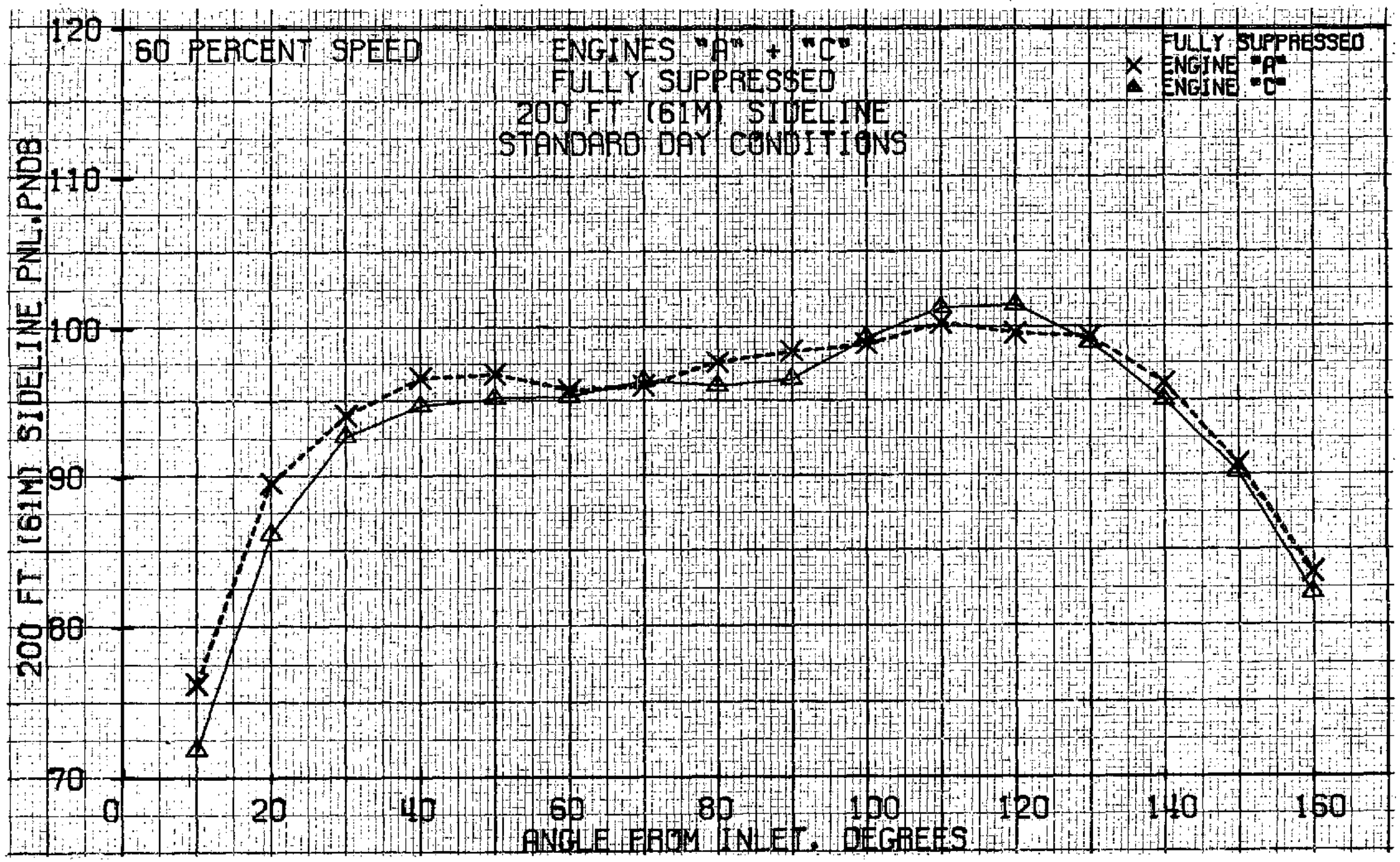


Figure 49. Comparison of Engines "A" and "C" Fully Suppressed Configurations, PNL Directivities for Approach.

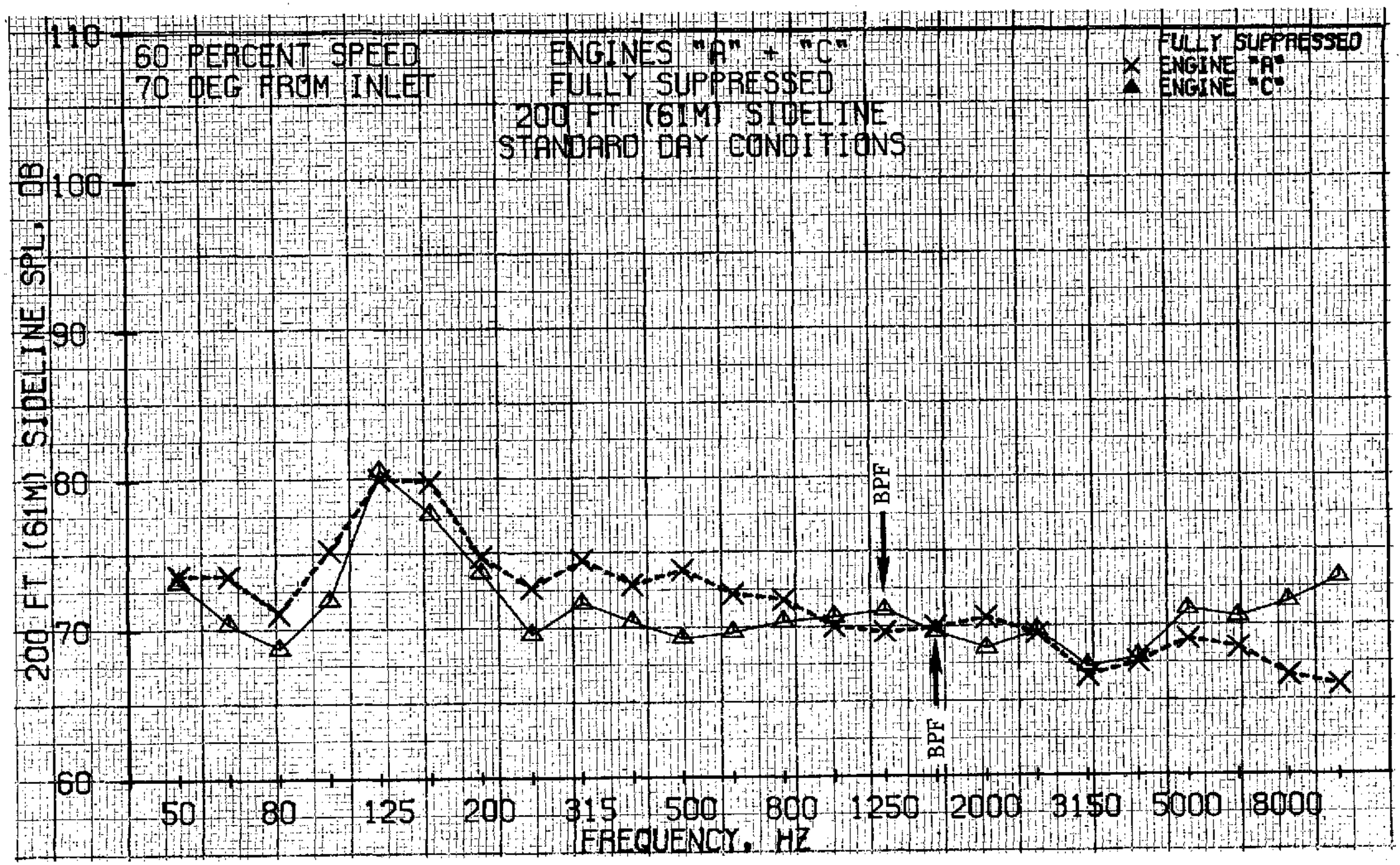


Figure 50. Comparison of Engines "A" and "C" Fully Suppressed Configurations, SPL Spectra for Approach at 70°.

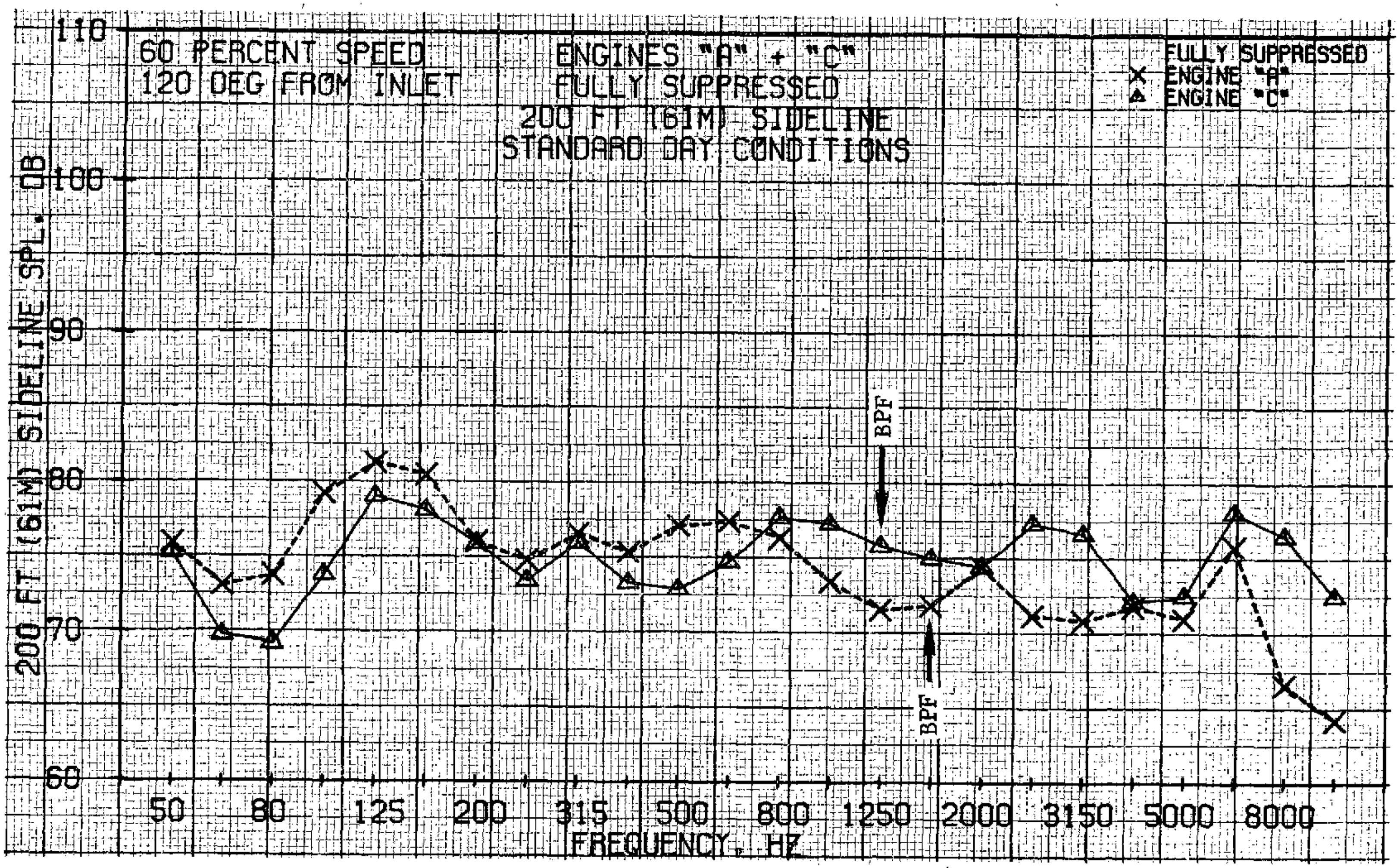


Figure 51. Comparison of Engines "A" and "C" Fully Suppressed Configurations, SPL Spectra for Approach at 120°.

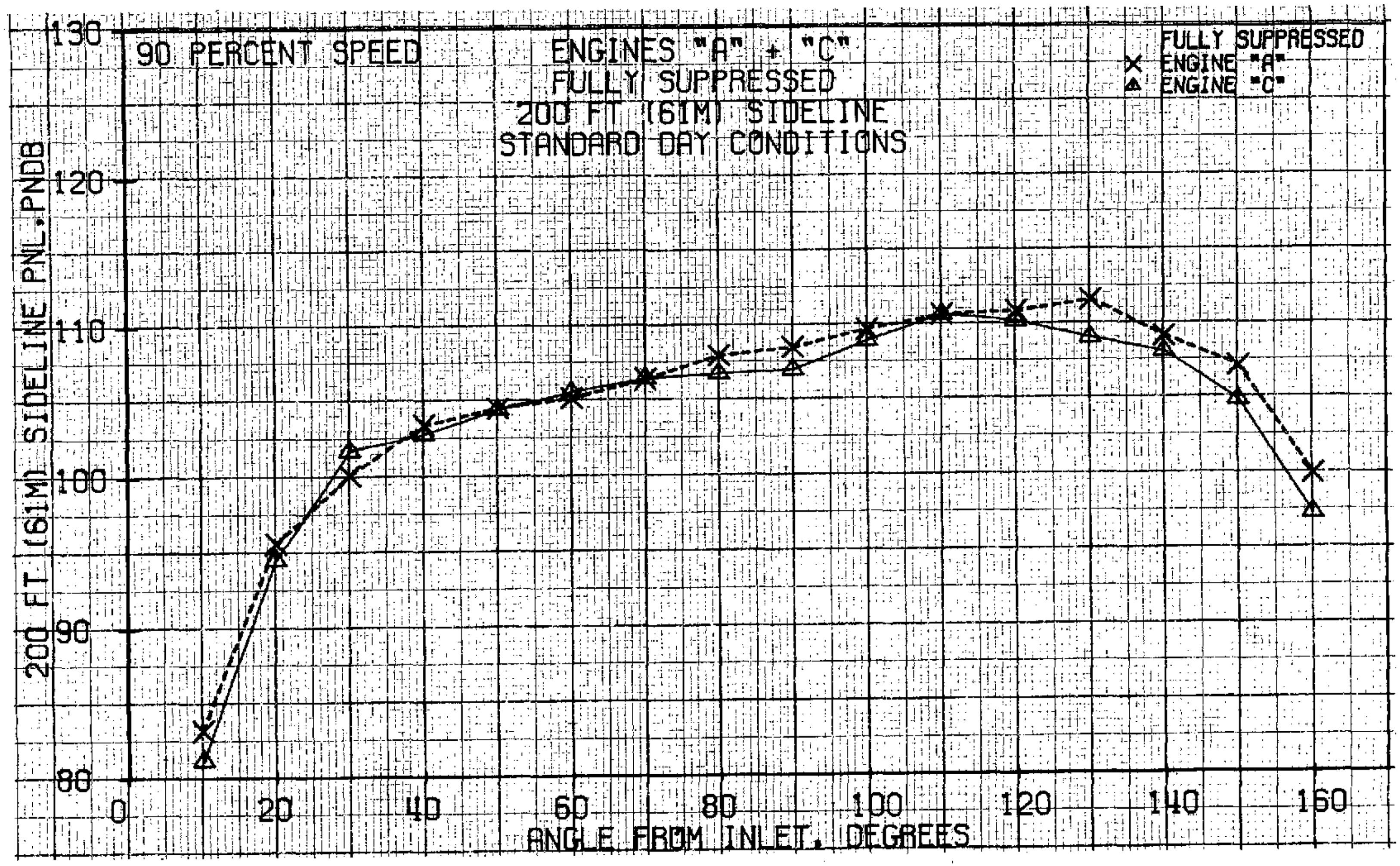


Figure 52. Comparison of Engines "A" and "C" Fully Suppressed Configurations, PNL Directivities for Takeoff.

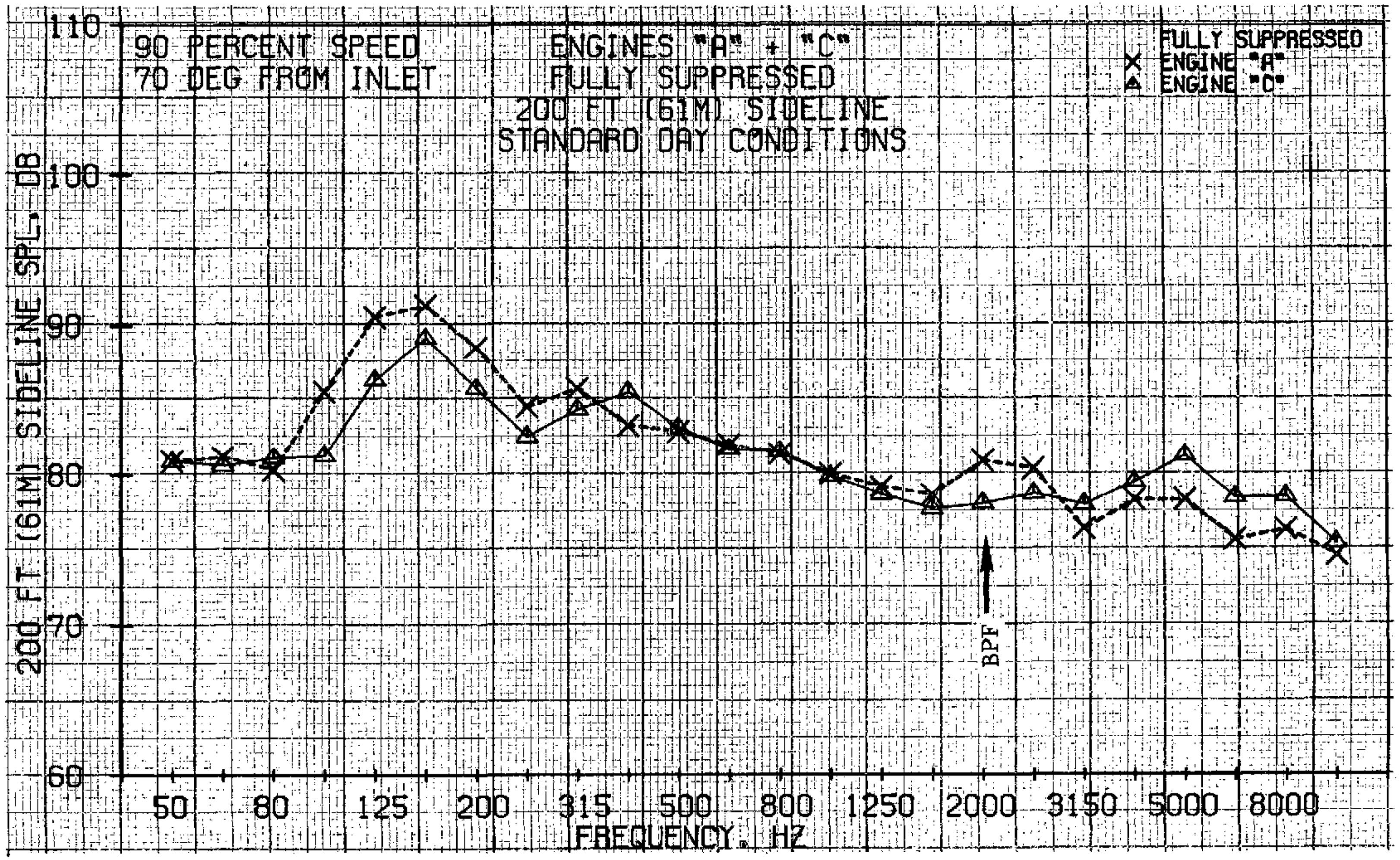


Figure 53. Comparison of Engines "A" and "C" Fully Suppressed Configurations, SPL Spectra for Takeoff at 70°.

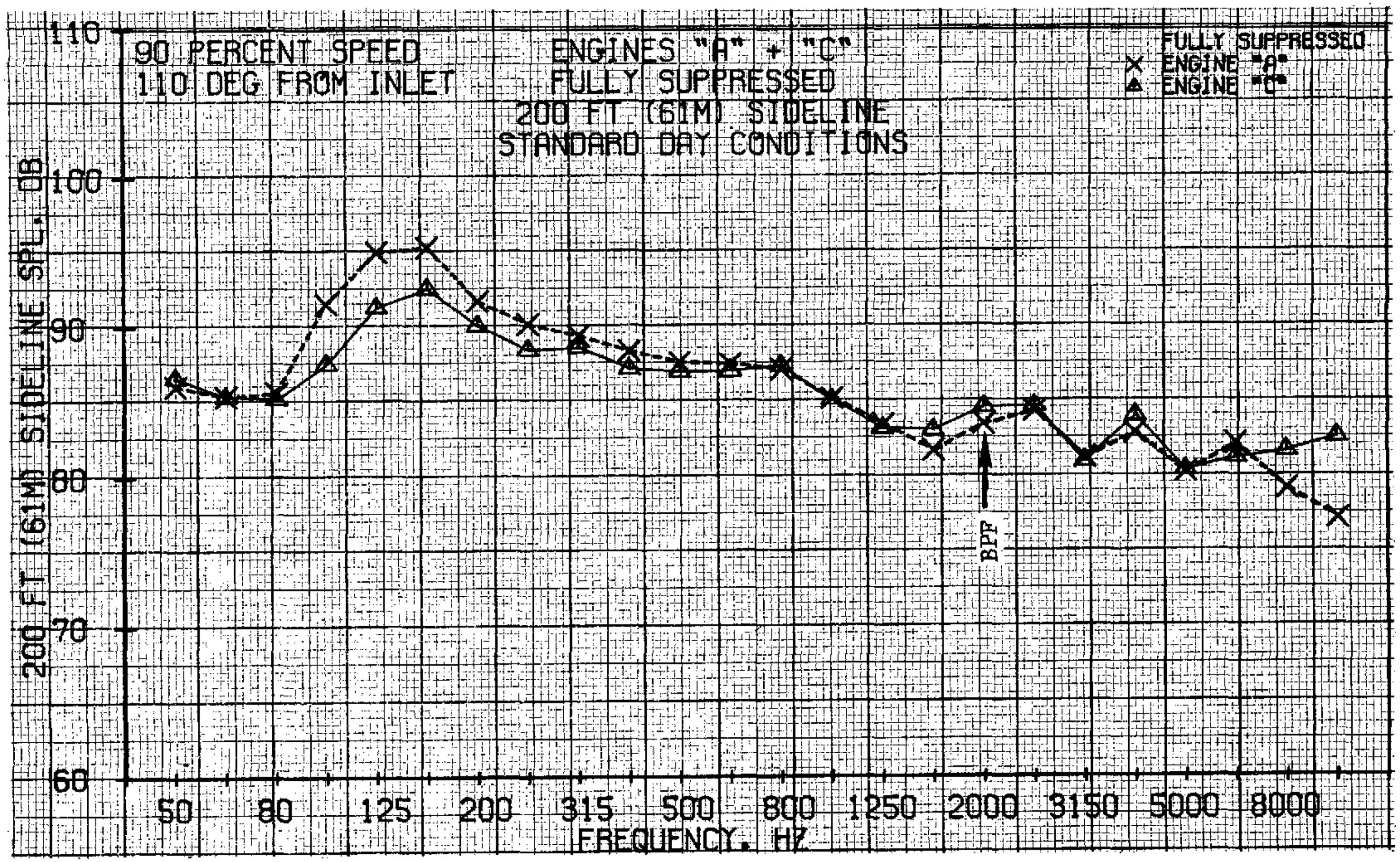


Figure 54. Comparison of Engines "A" and "C" Fully Suppressed Configurations, SPL Spectra for Takeoff at 110°.

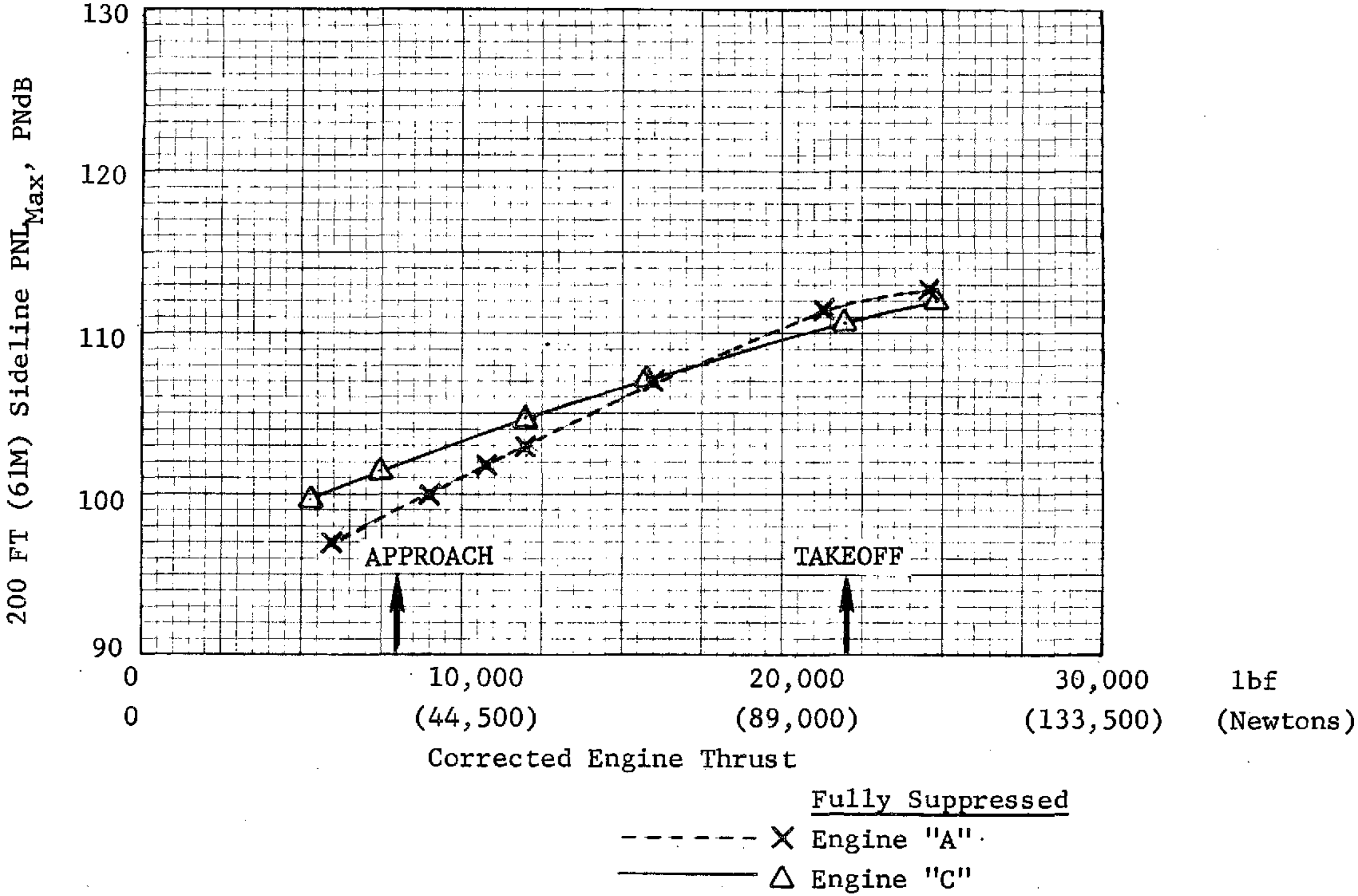


Figure 55. Comparison of Engines "A" and "C" Fully Suppressed Configurations, Maximum PNL Variation with Engine Thrust.

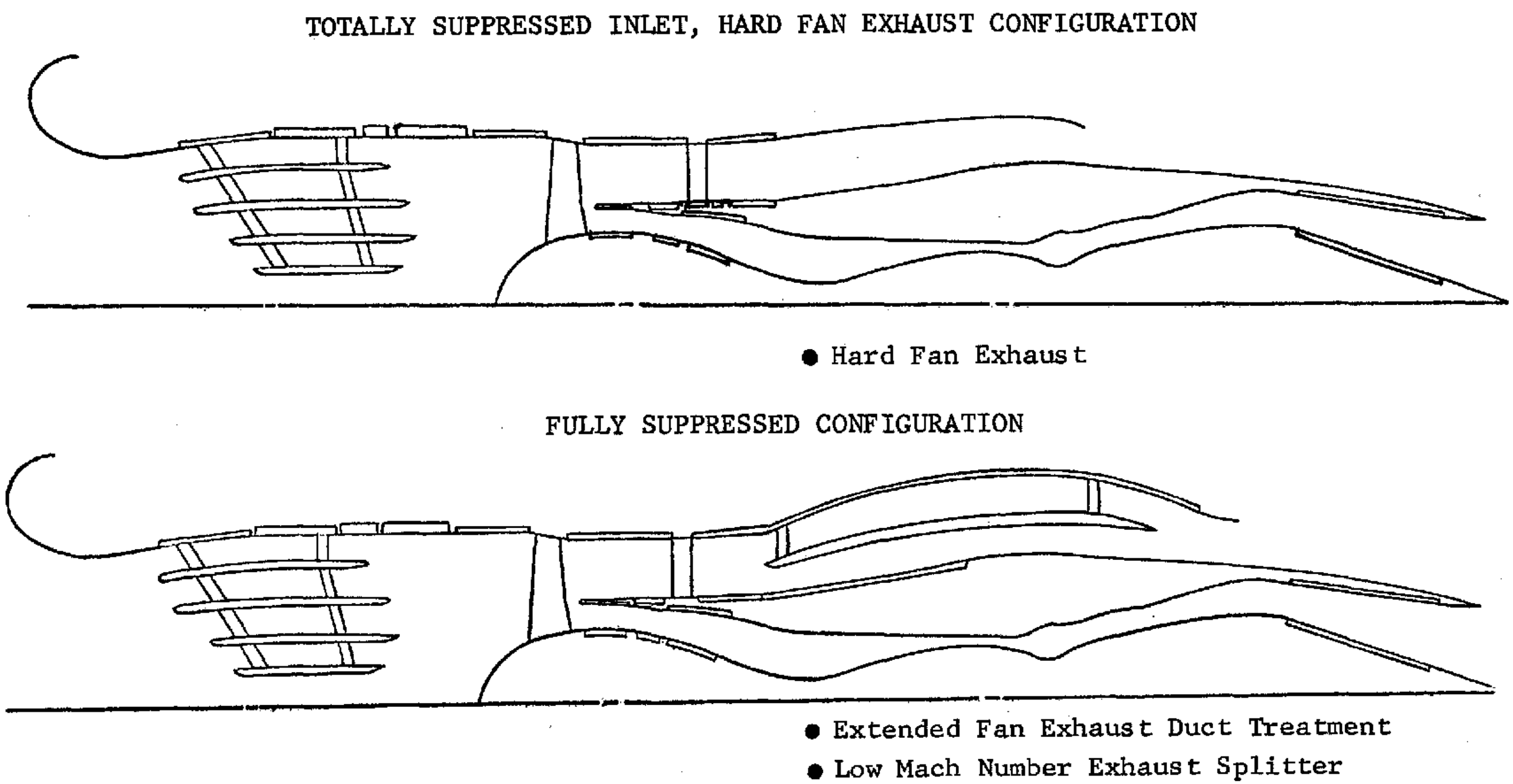


Figure 56. Cross Sections Showing the Installation of Fan Exhaust Duct Wall Treatment and a Low Mach Number Splitter.

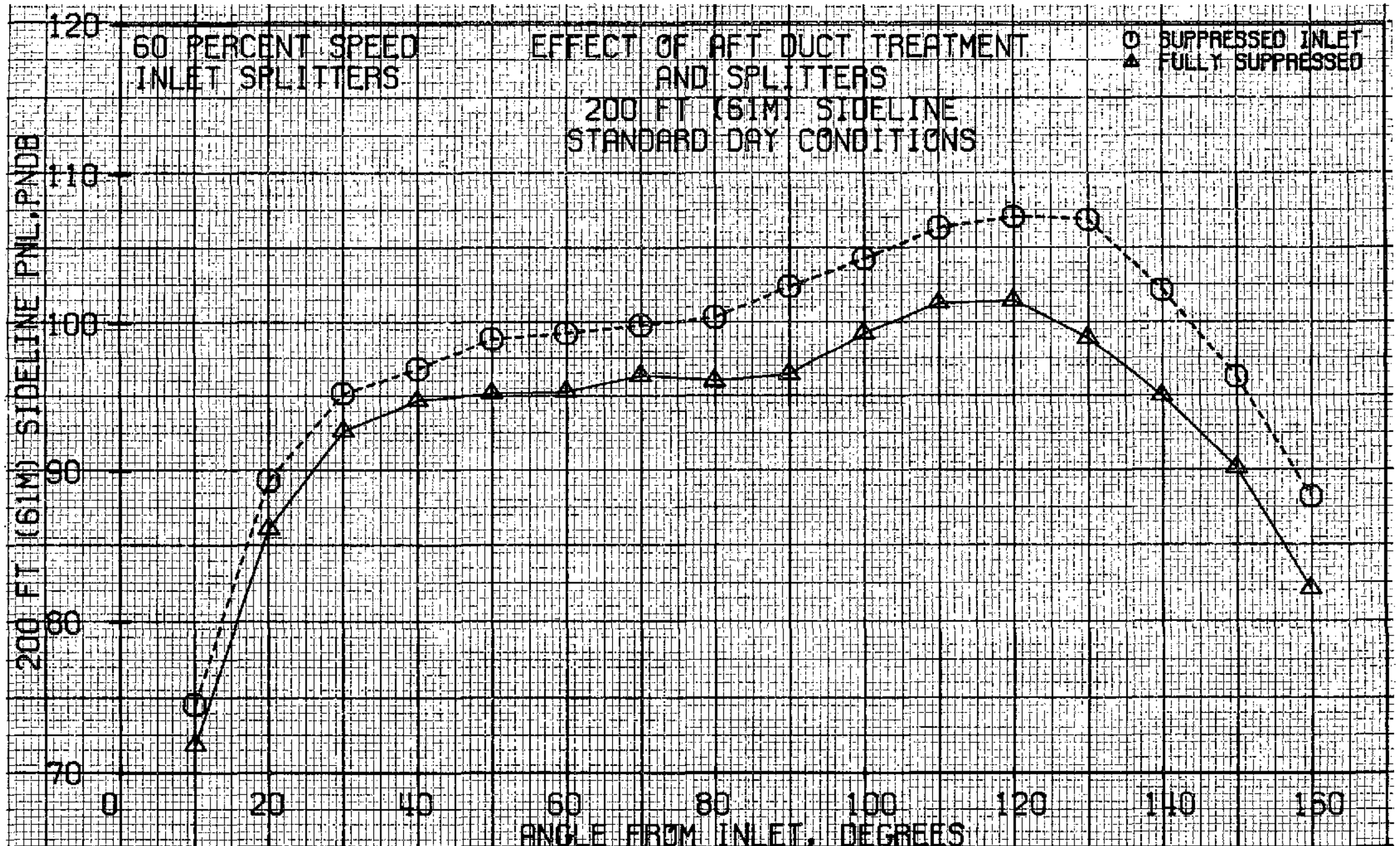


Figure 57. Effect of Fan Exhaust Duct Treatment and Splitter, PNL Directivities at 60% Fan Speed.

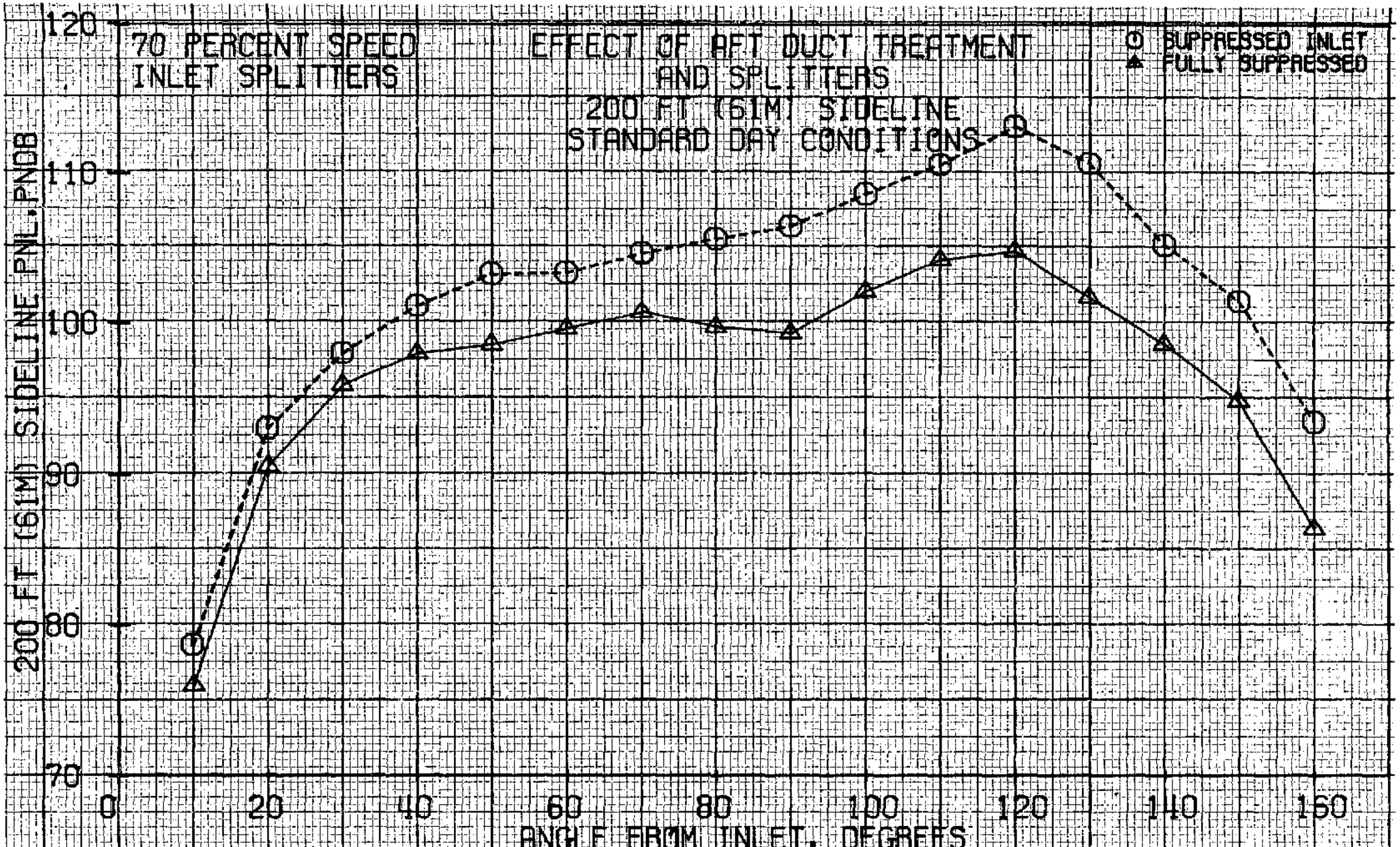


Figure 58. Effect of Fan Exhaust Duct Treatment and Splitter, PNL Directivities at 70% Fan Speed.

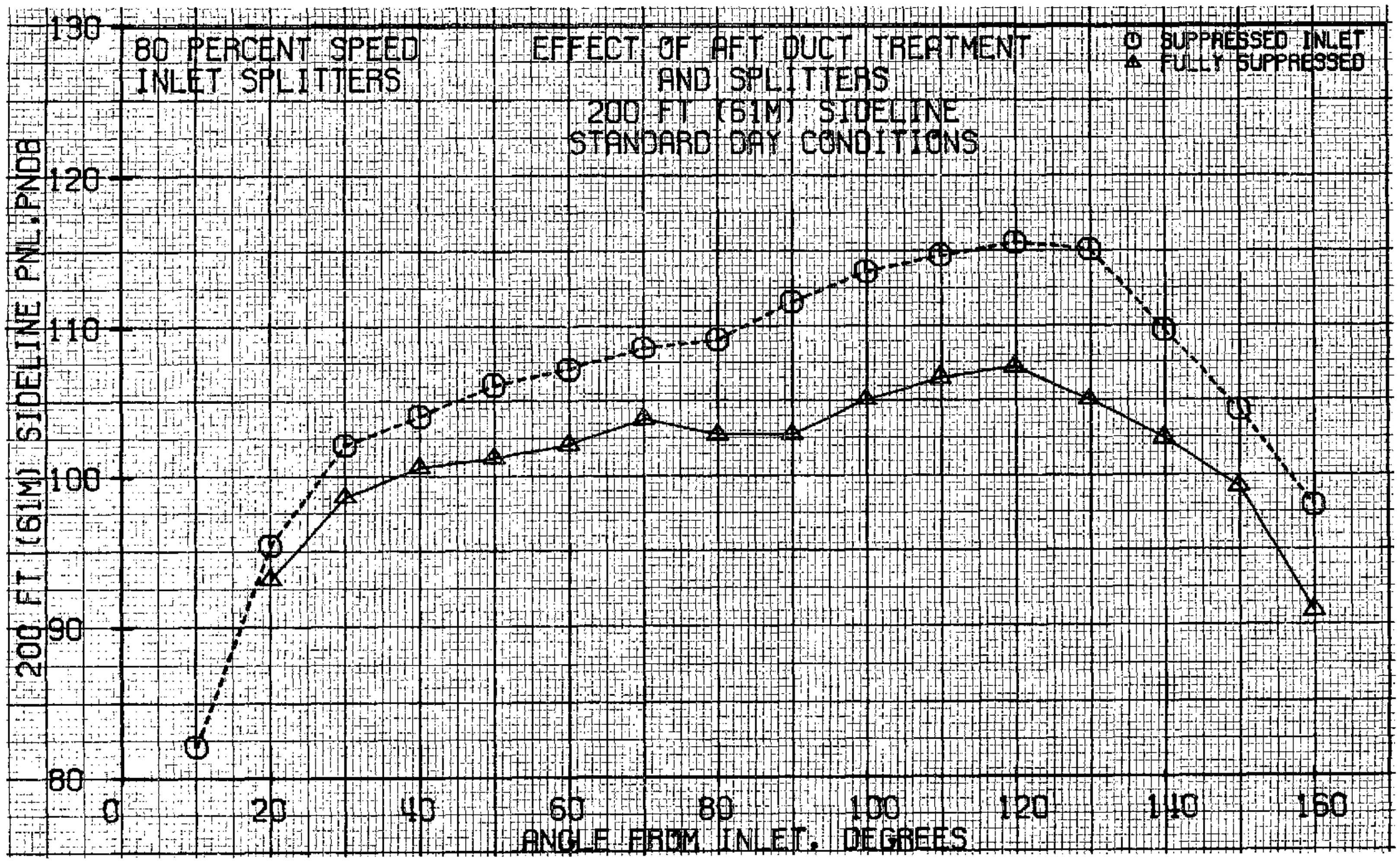


Figure 59. Effect of Fan Exhaust Duct Treatment and Splitter, PNL Directivities at 80% Fan Speed.

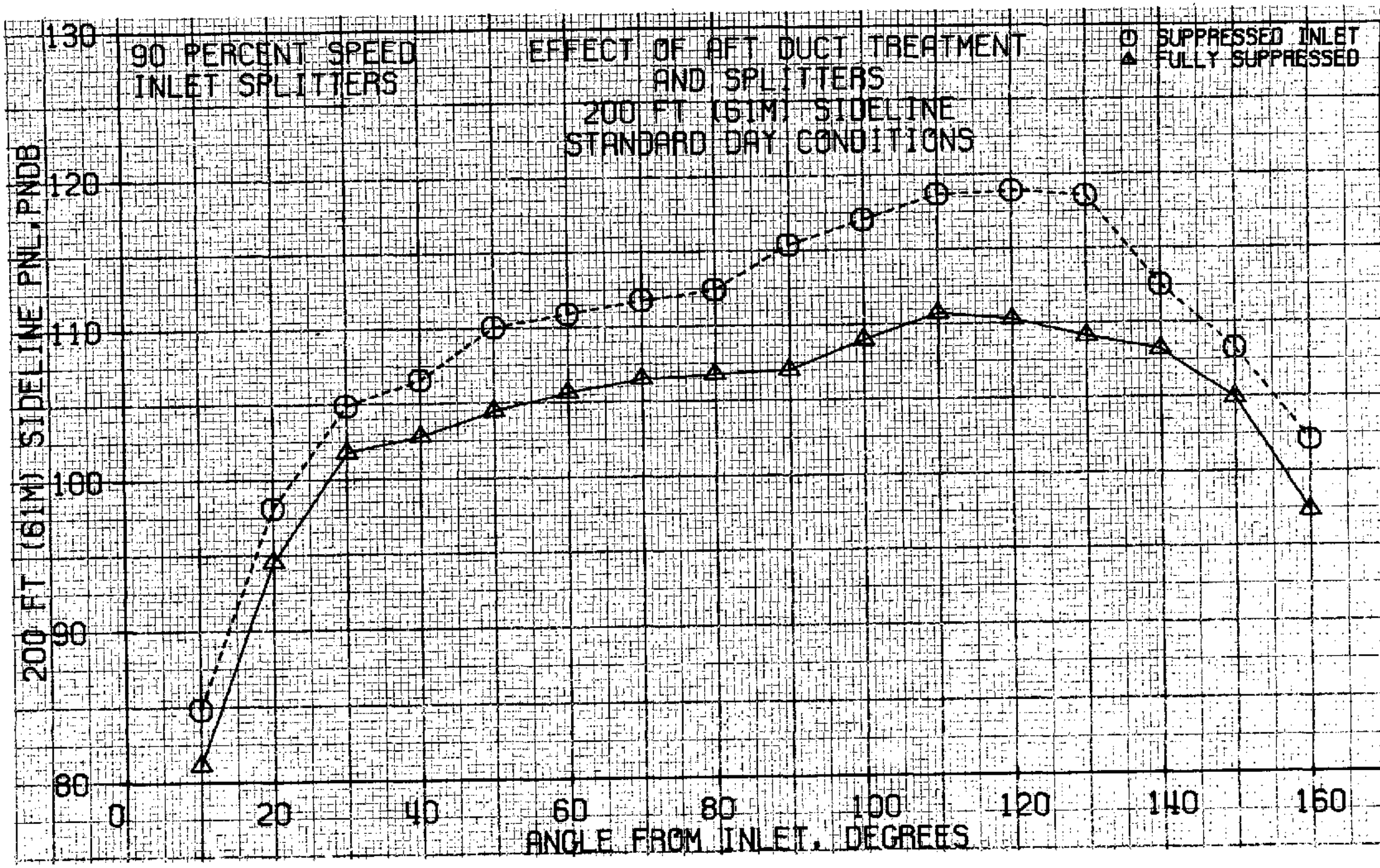


Figure 60. Effect of Fan Exhaust Duct Treatment and Splitter, PNL Directivities at 90% Fan Speed.

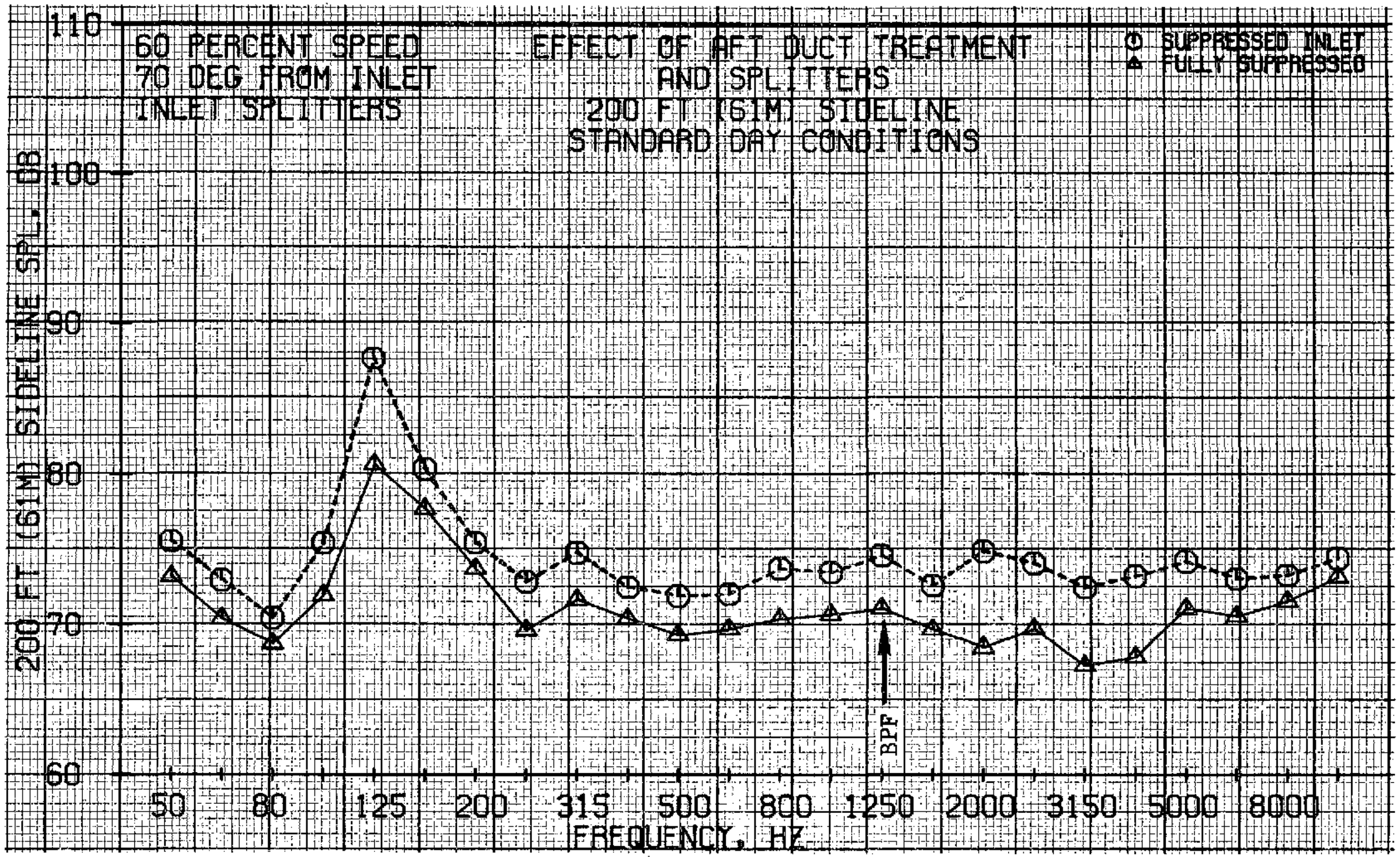


Figure 61. Effect of Fan Exhaust Duct Treatment and Splitter, SPL Spectra for Approach at 70°.

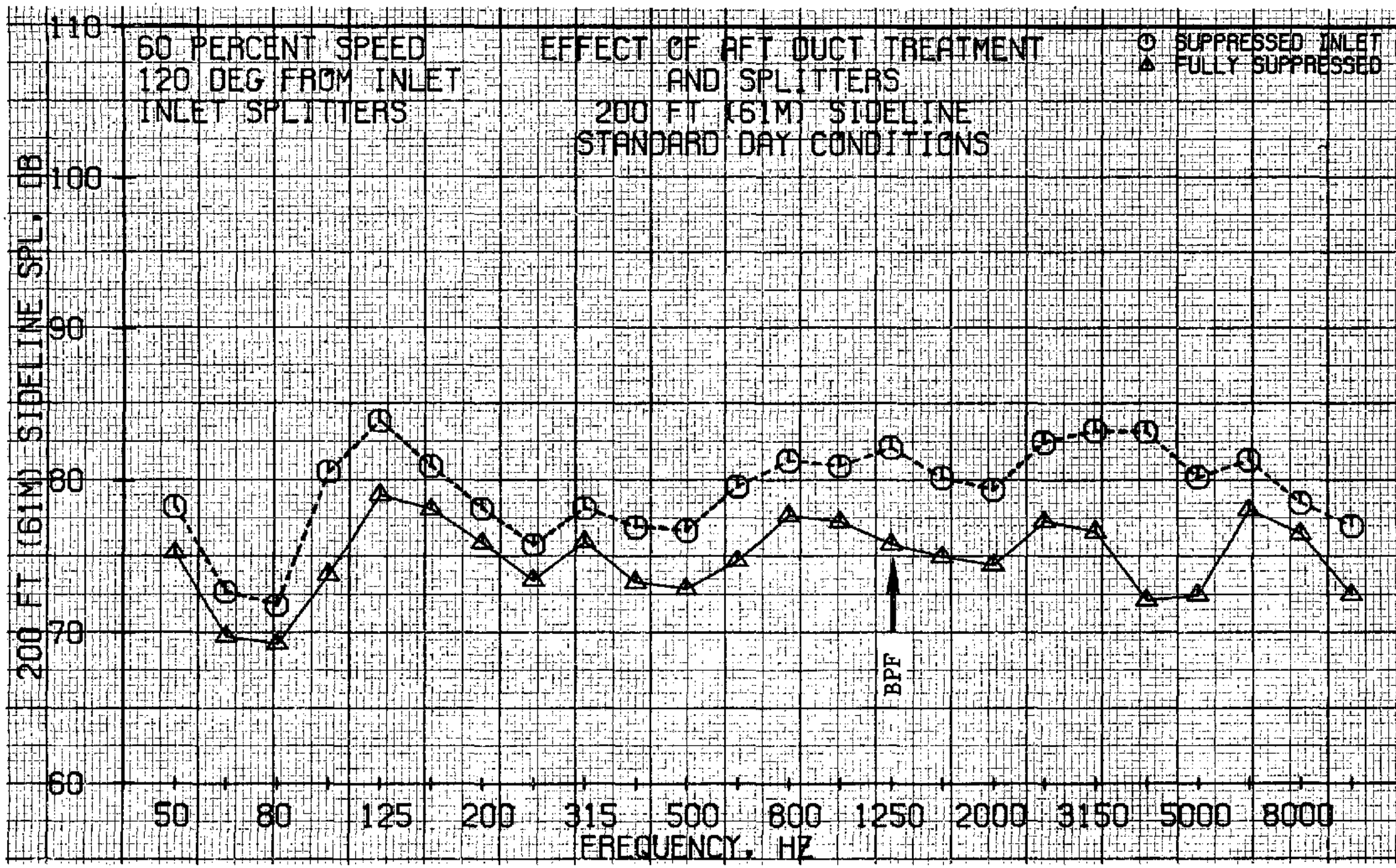


Figure 62. Effect of Fan Exhaust Duct Treatment and Splitter, SPL Spectra for Approach at 120°.

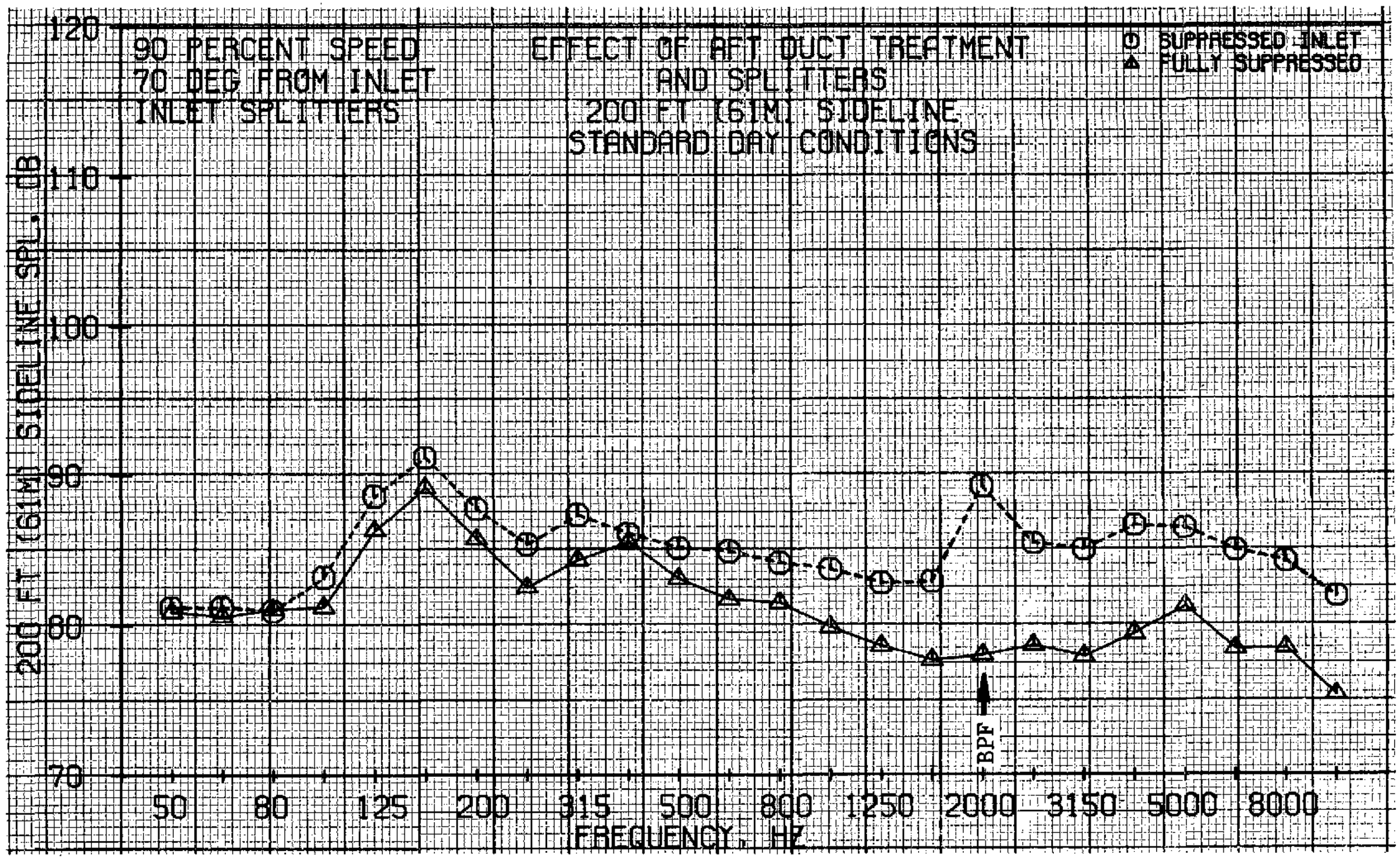


Figure 63. Effect of Fan Exhaust Duct Treatment and Splitter, SPL Spectra for Takeoff at 70°.

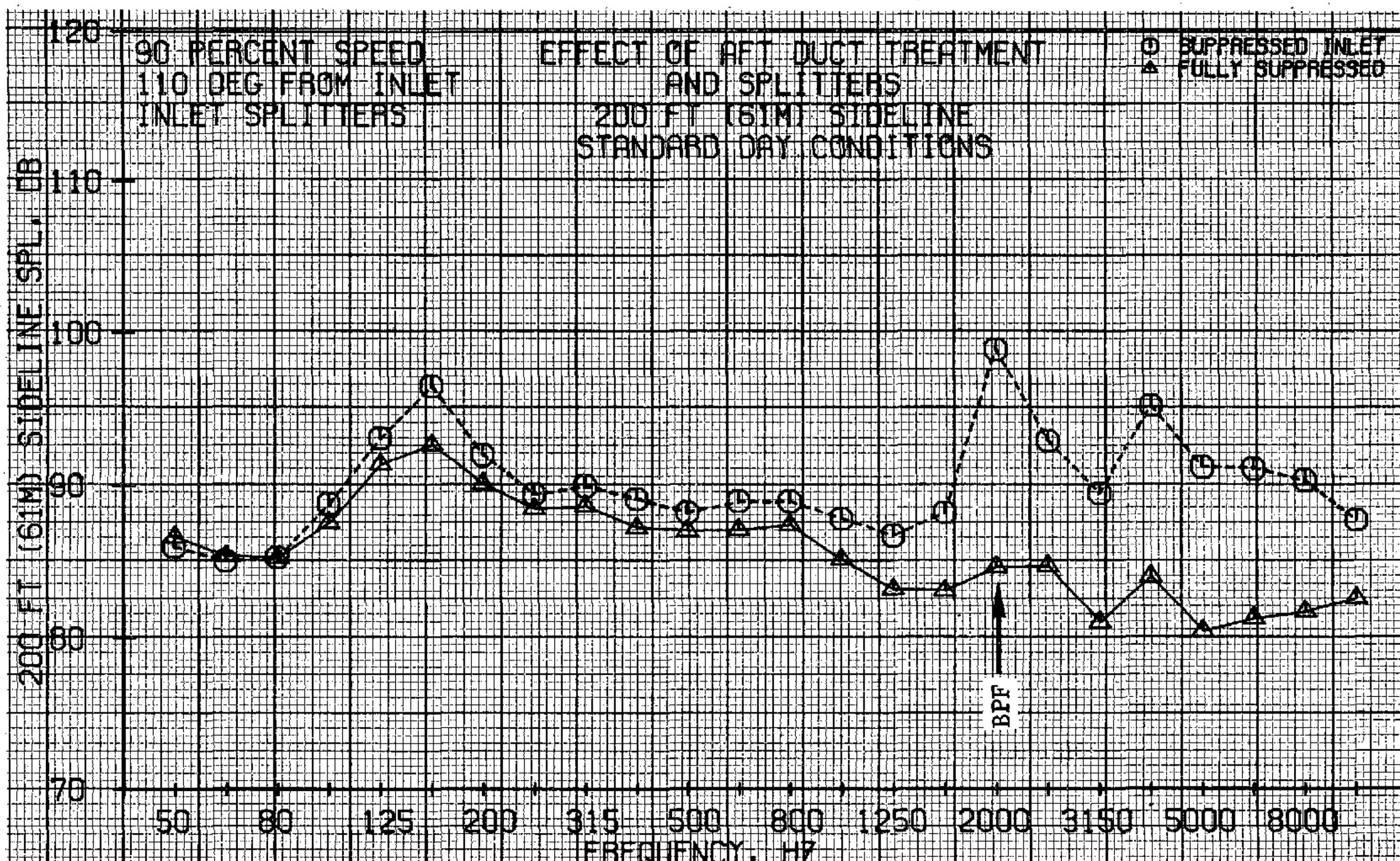


Figure 64. Effect of Fan Exhaust Duct Treatment and Splitter, SPL Spectra for Takeoff at 110°.

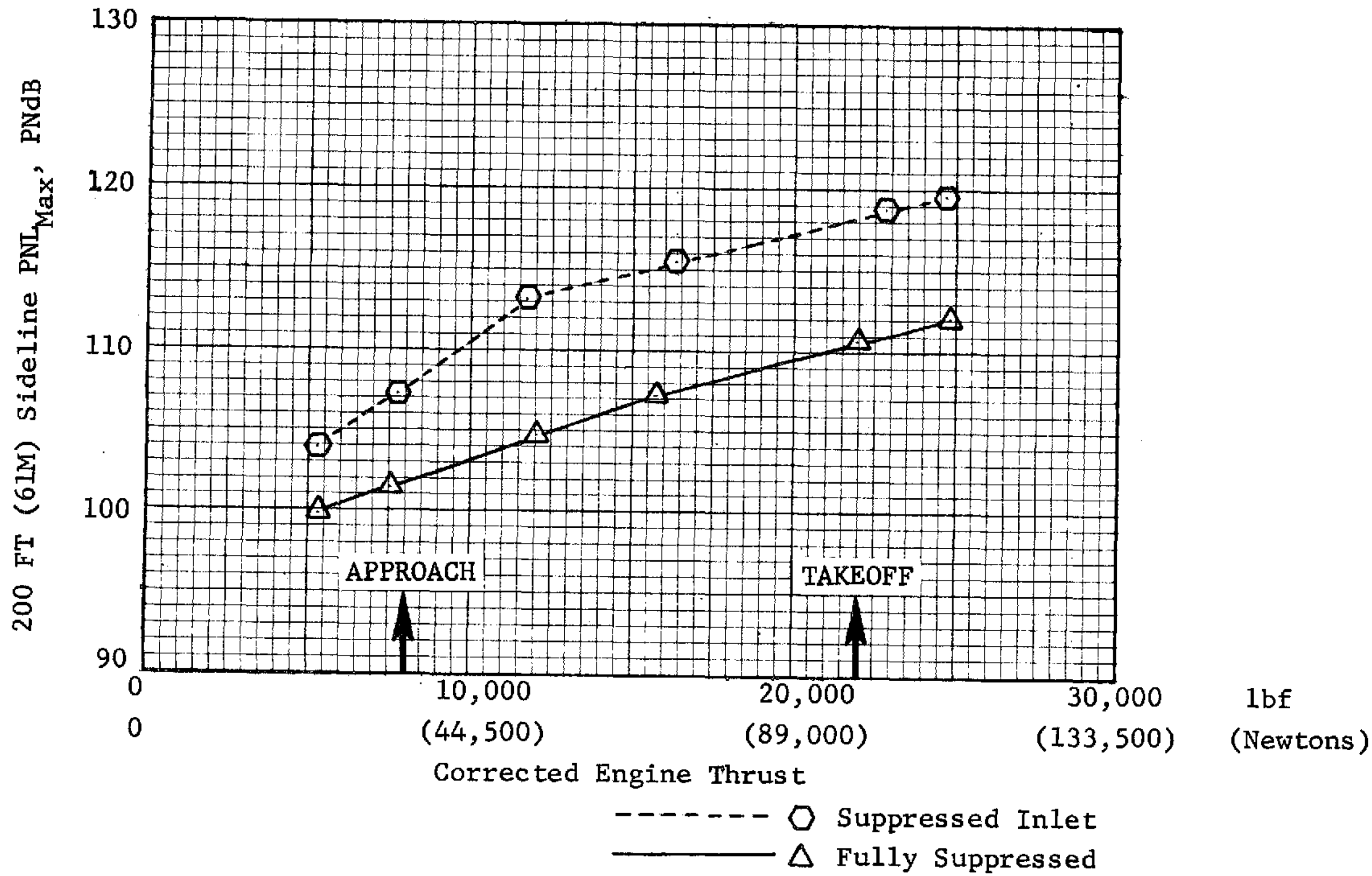
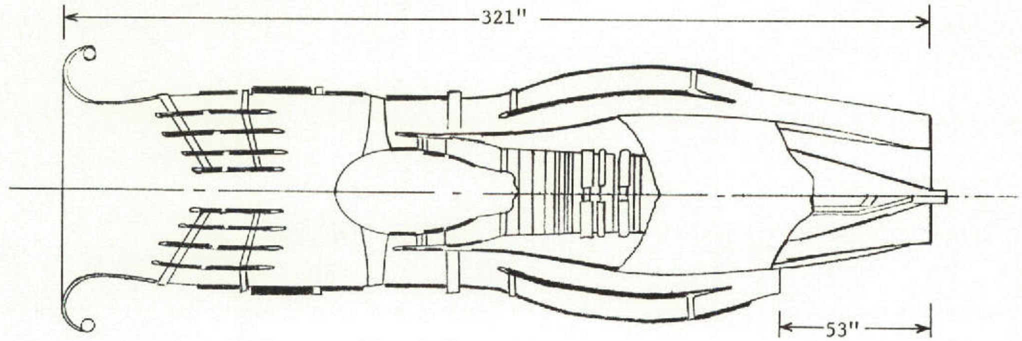
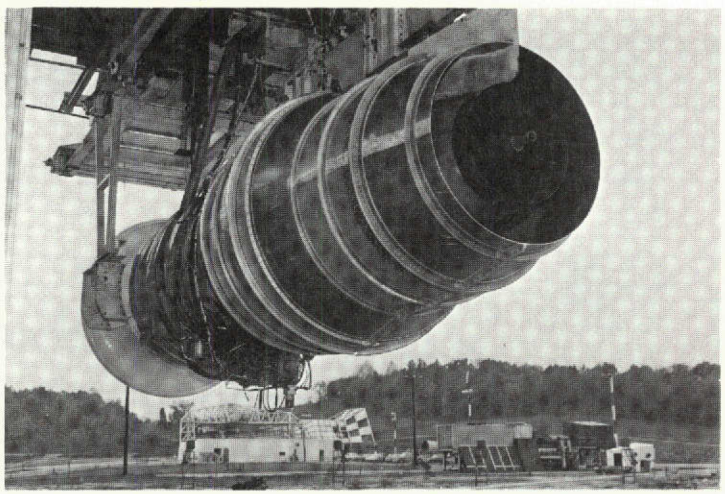


Figure 65. Effect of Fan Exhaust Duct Treatment and Splitter, Maximum PNL Variation with Engine Thrust.

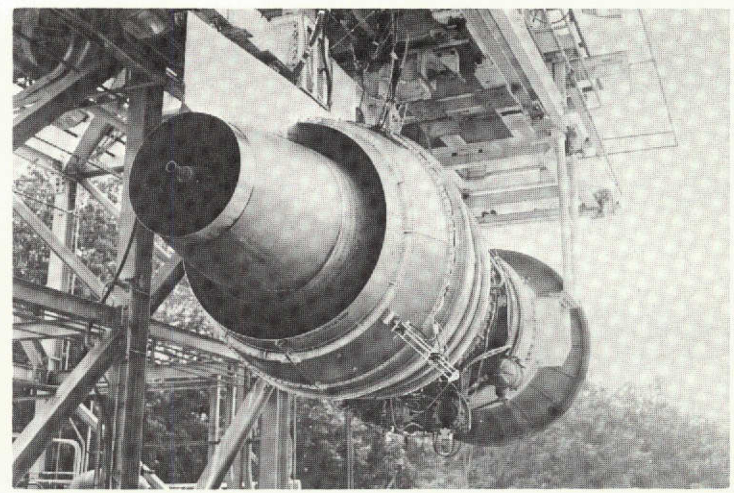
COPLANAR JET EXHAUSTS



COANNULAR, NON-COPLANAR JET EXHAUSTS



COPLANAR JET EXHAUSTS



COANNULAR, NON-COPLANAR JET EXHAUSTS

Figure 66. Quiet Engine "C" Fan Exhaust Configurations.

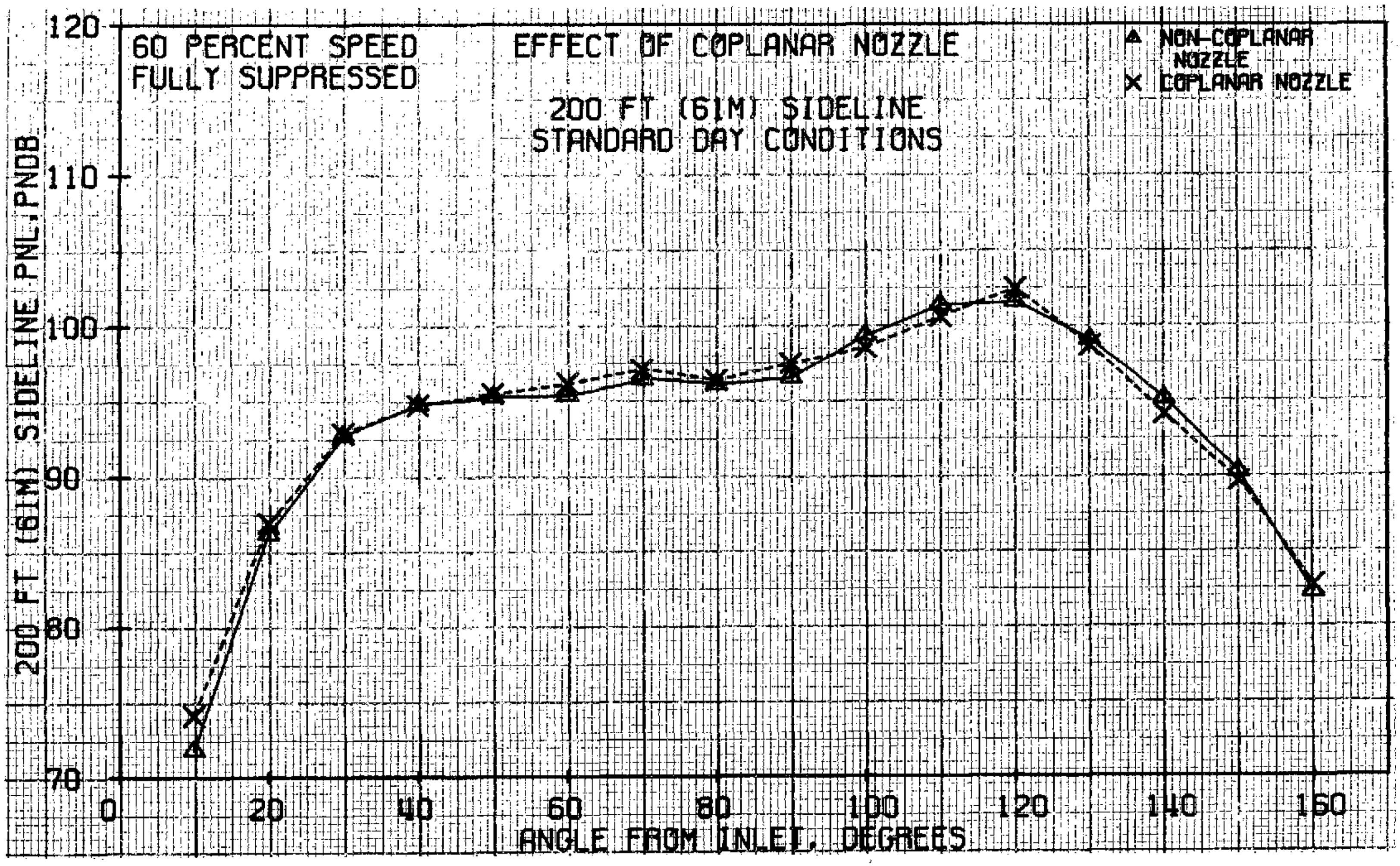


Figure 67. Effect of a Coplanar Nozzle, PNL Directivities for Approach.

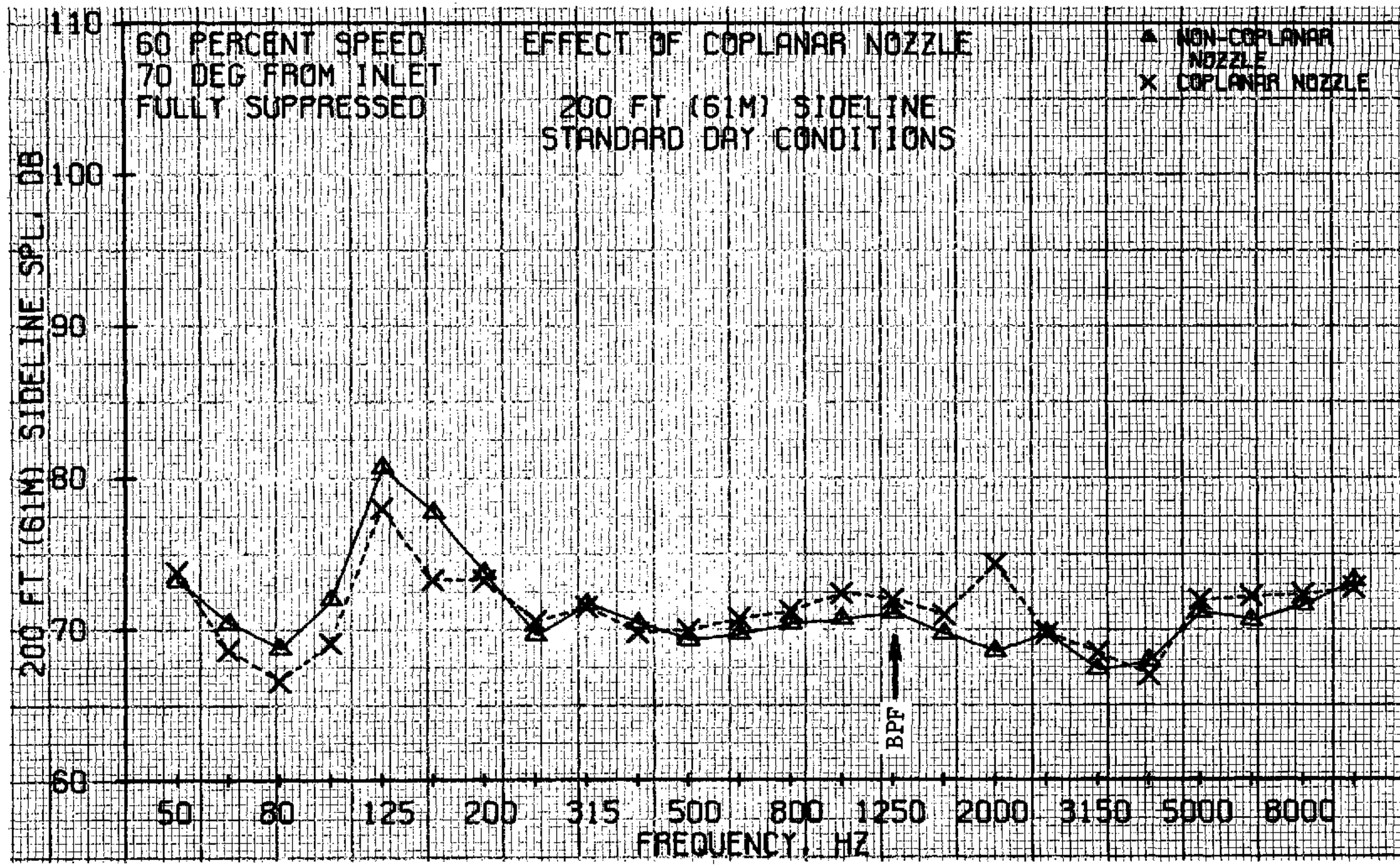


Figure 68. Effect of a Coplanar Nozzle, SPL Spectra for Approach at 70°.

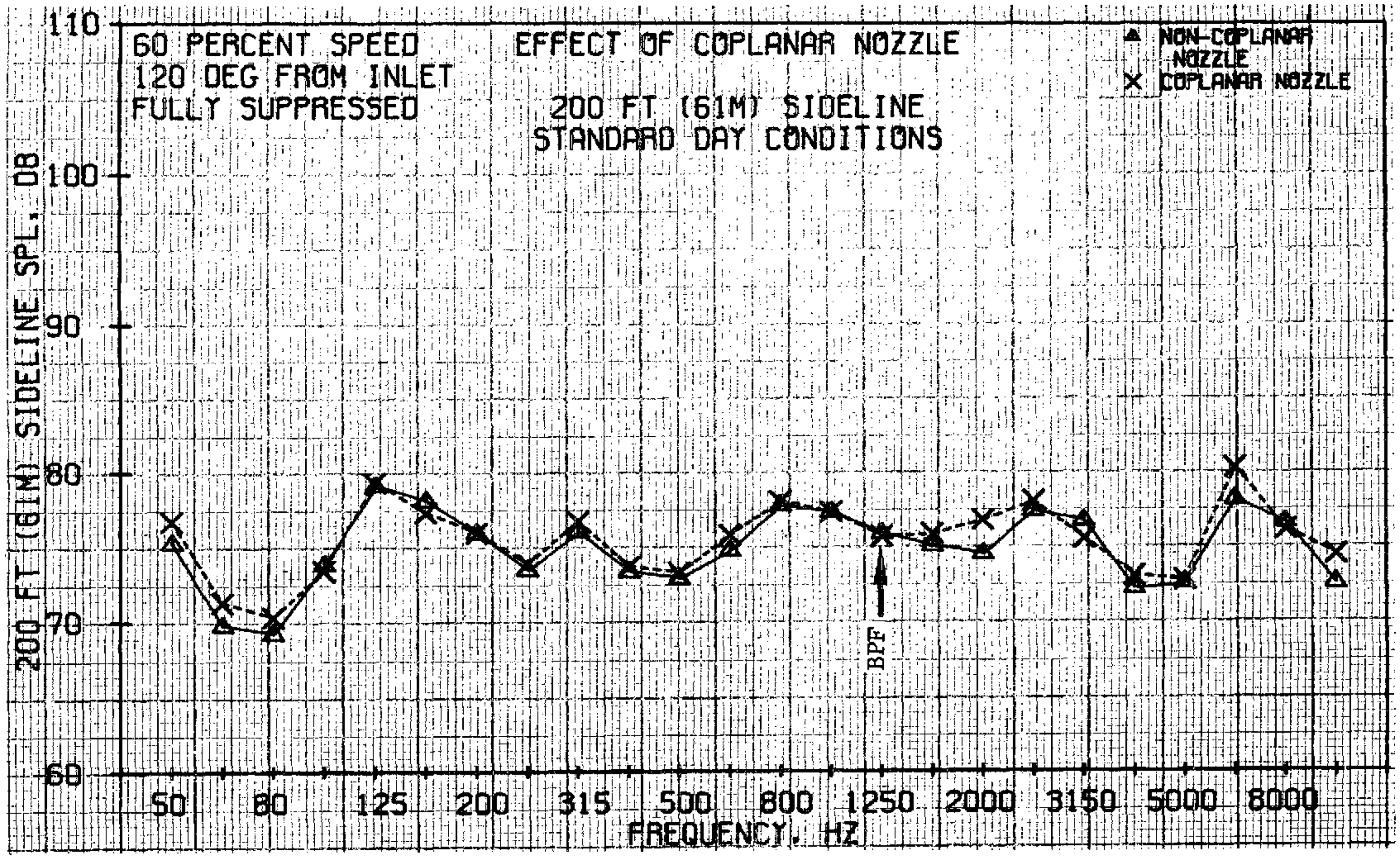


Figure 69. Effect of a Coplanar Nozzle, SPL Spectra for Approach at 120°.

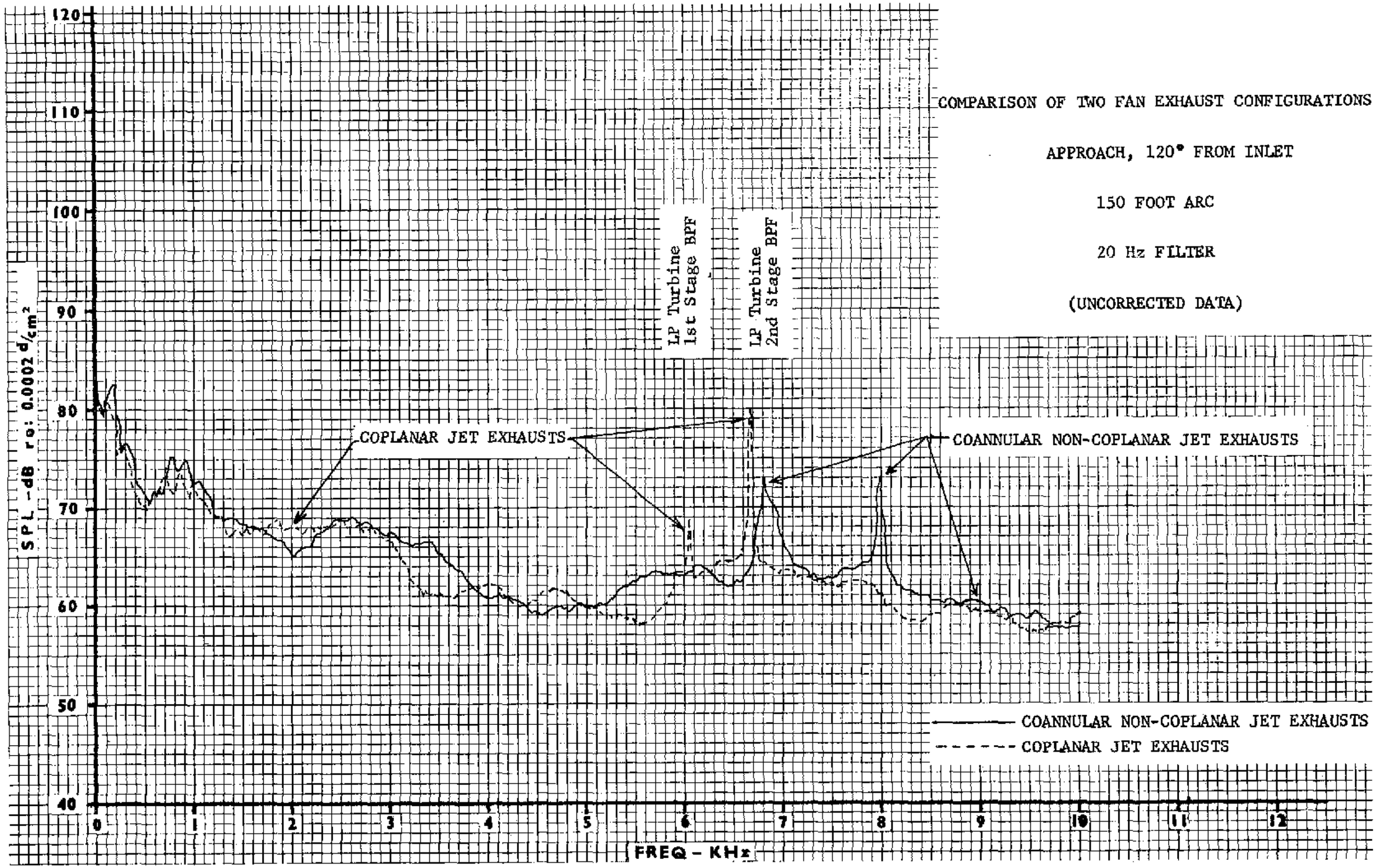


Figure 70. Effect of a Coplanar Nozzle, Narrowband Overlay for Approach at 120°.

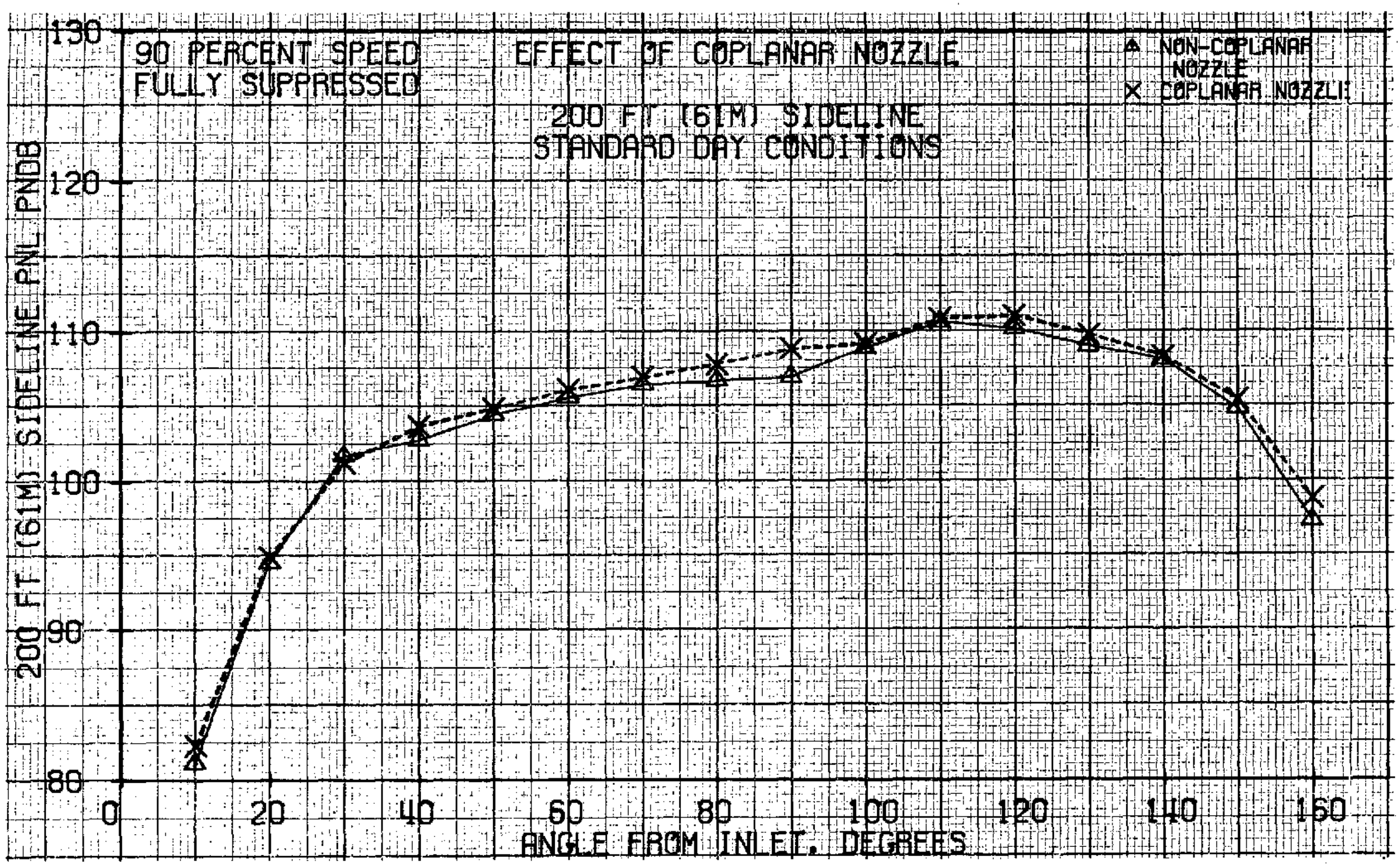


Figure 71. Effect of a Coplanar Nozzle, PNL Directivities for Takeoff.

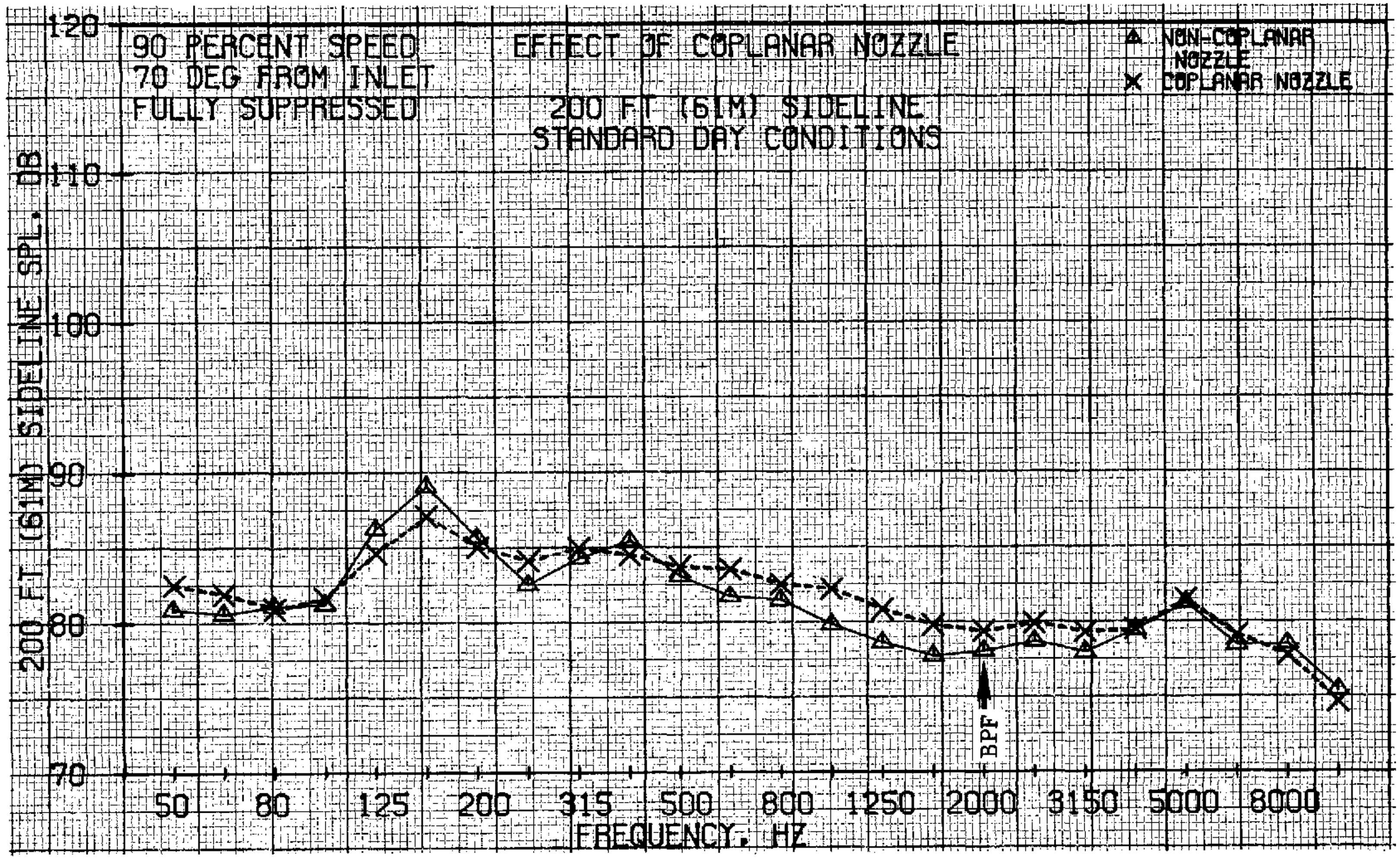


Figure 72. Effect of a Coplanar Nozzle, SPL Spectra for Takeoff at 70°.

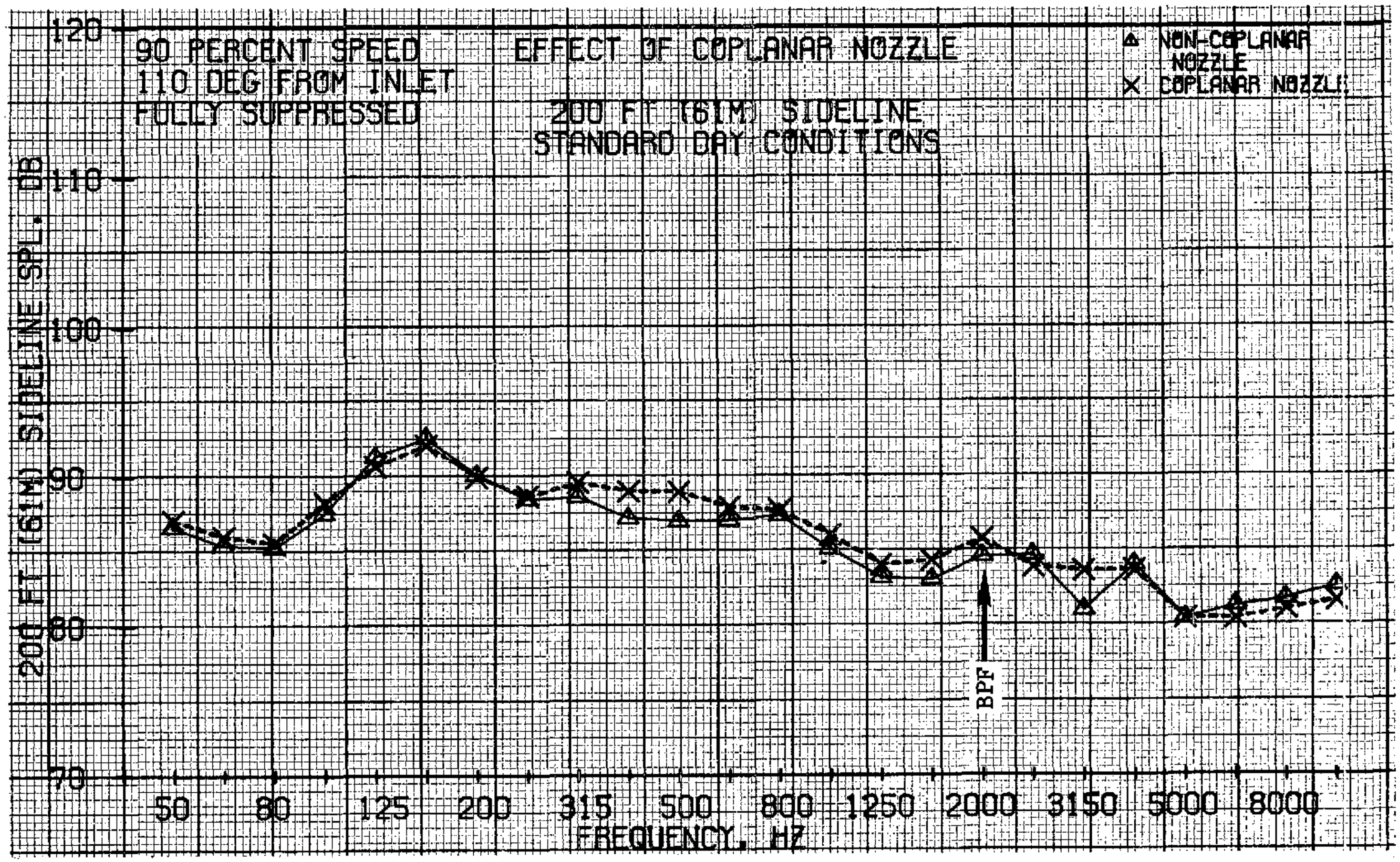


Figure 73. Effect of a Coplanar Nozzle, SPL Spectra for Takeoff at 110°.

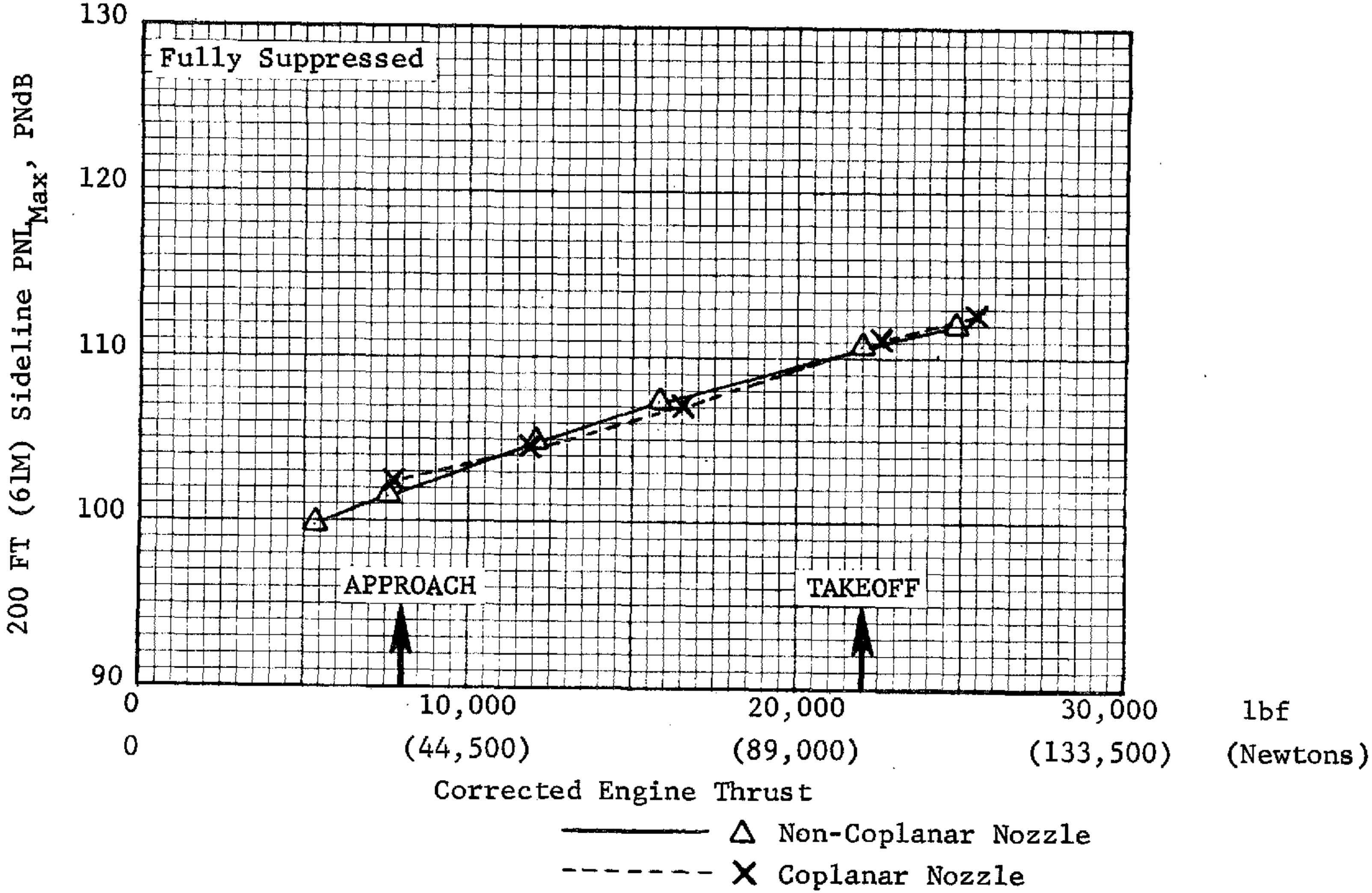
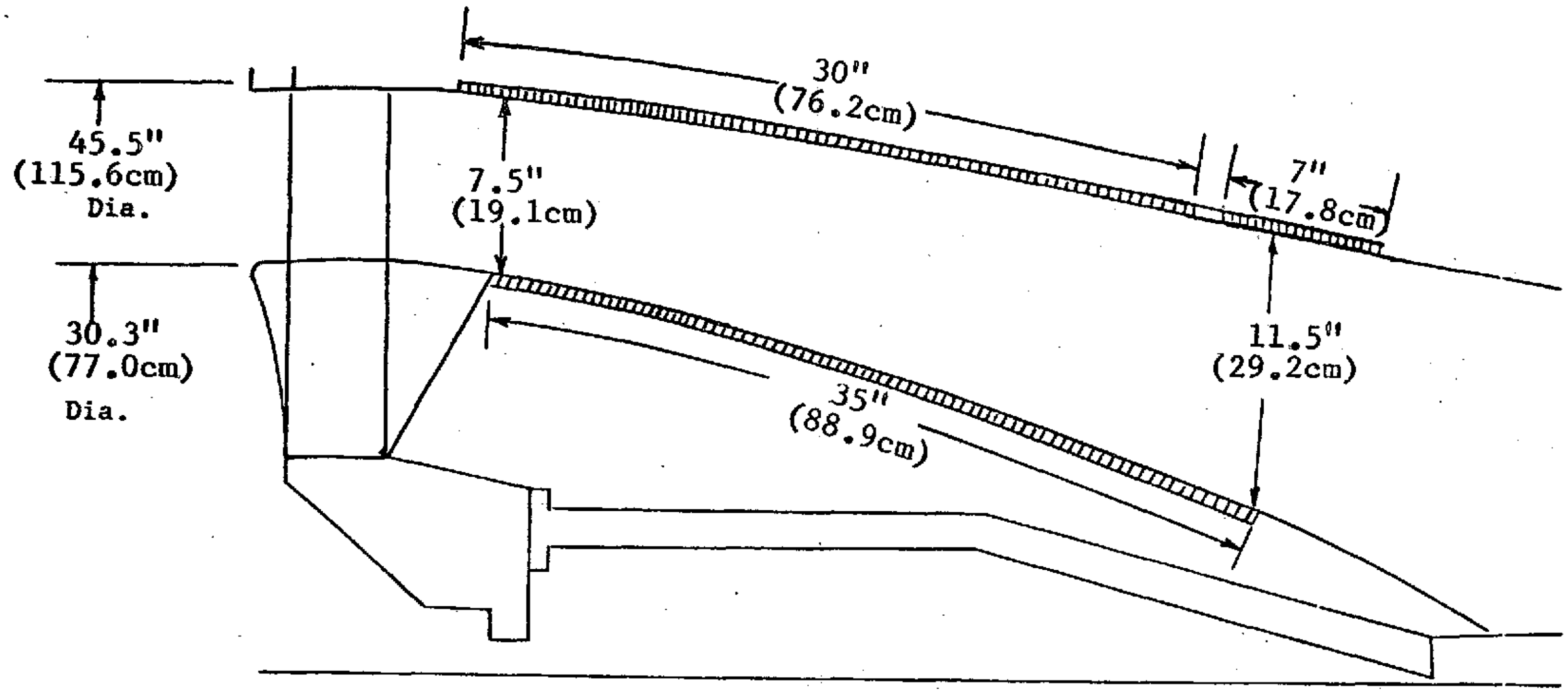


Figure 74. Effect of a Coplanar Nozzle Maximum PNL Variation with Engine Thrust.



Treatment Details

0.25" (.64cm) thick SDOF

7% Porosity

Approximate L/H = 3.7

Figure 75. Cross Section of Acoustically Treated Core Exhaust Duct.

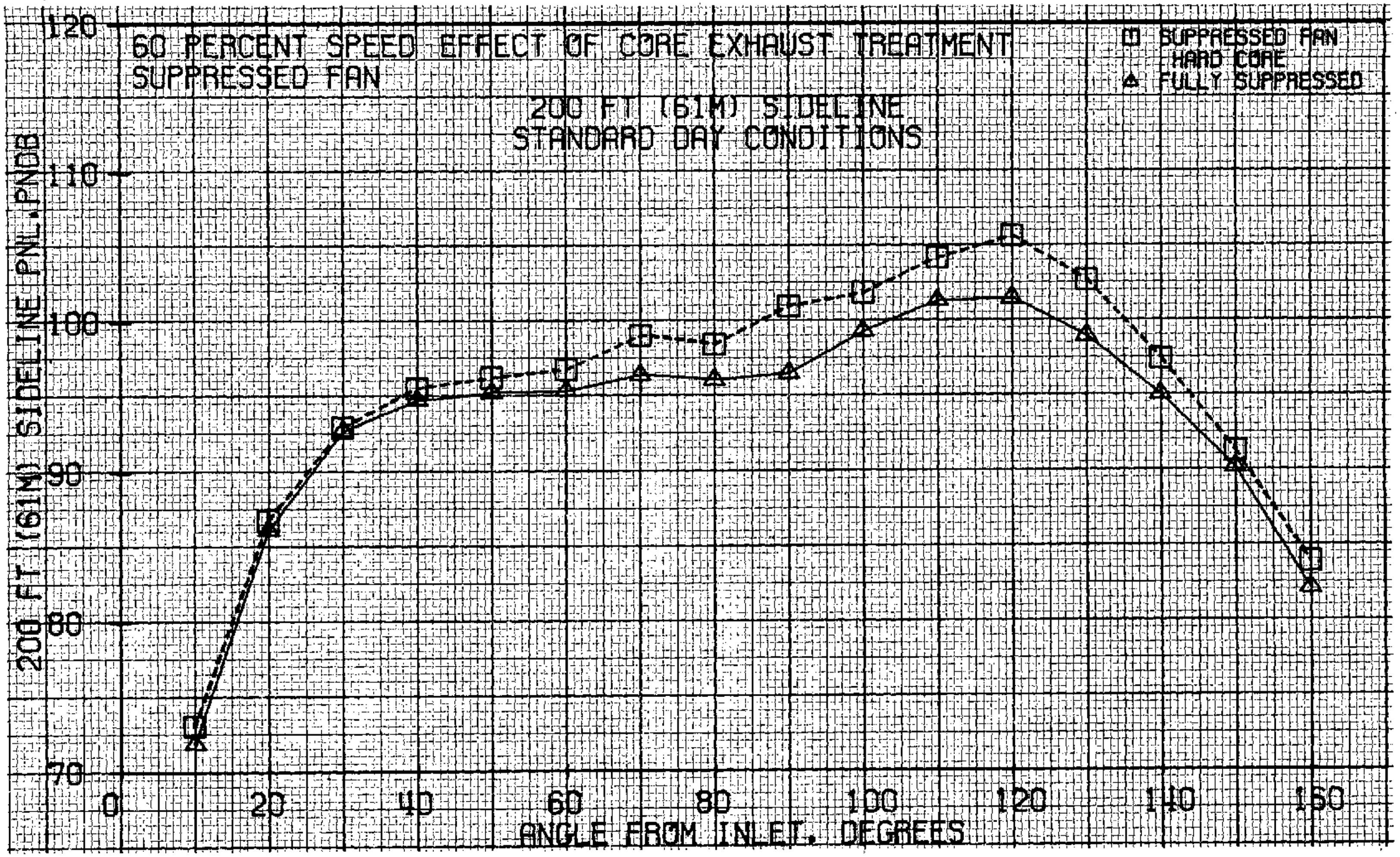


Figure 76. Effect of Core Exhaust Treatment, PNL Directivities at 60% Fan Speed.

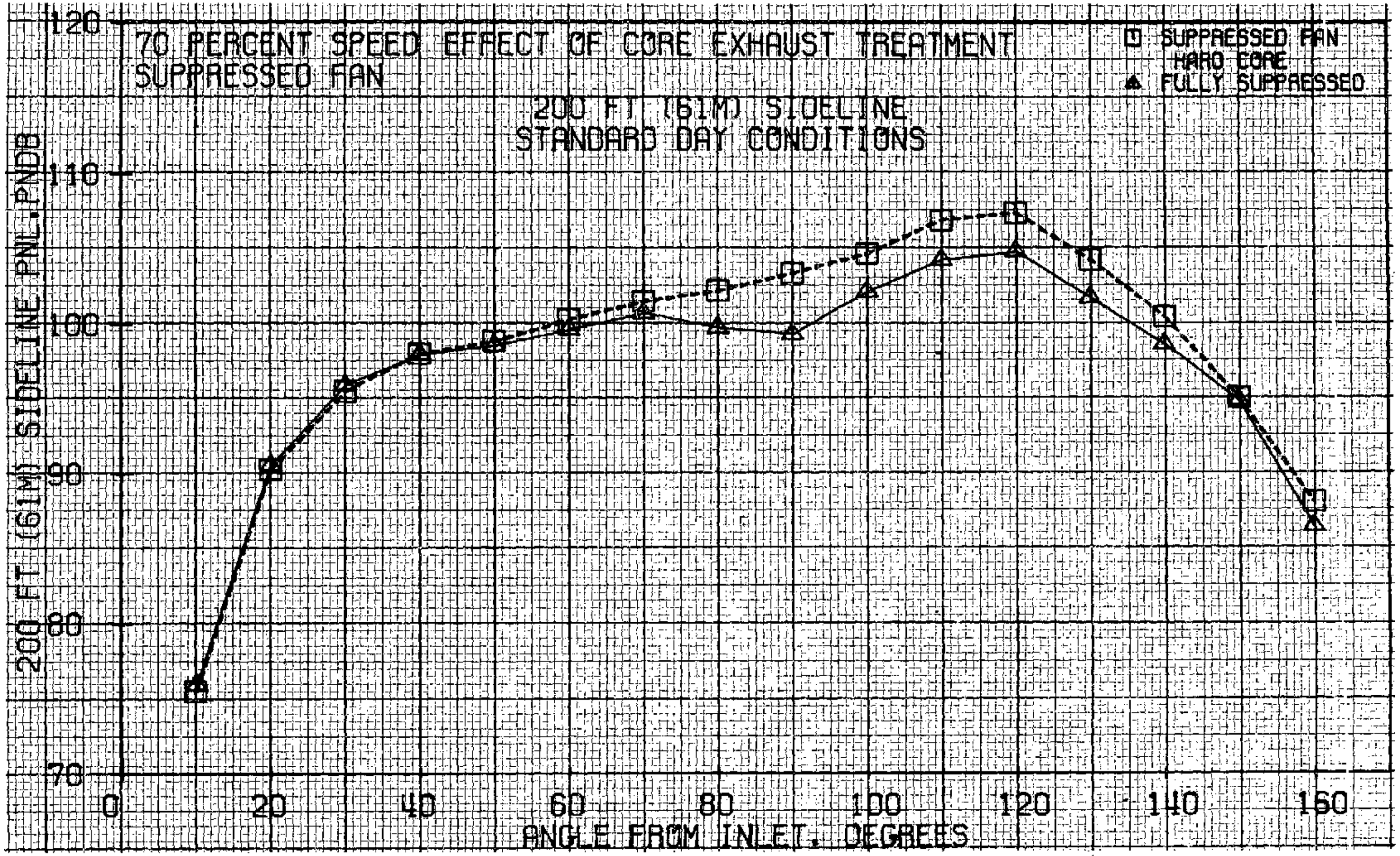


Figure 77. Effect of Core Exhaust Treatment, PNL Directivities at 70% Fan Speed.

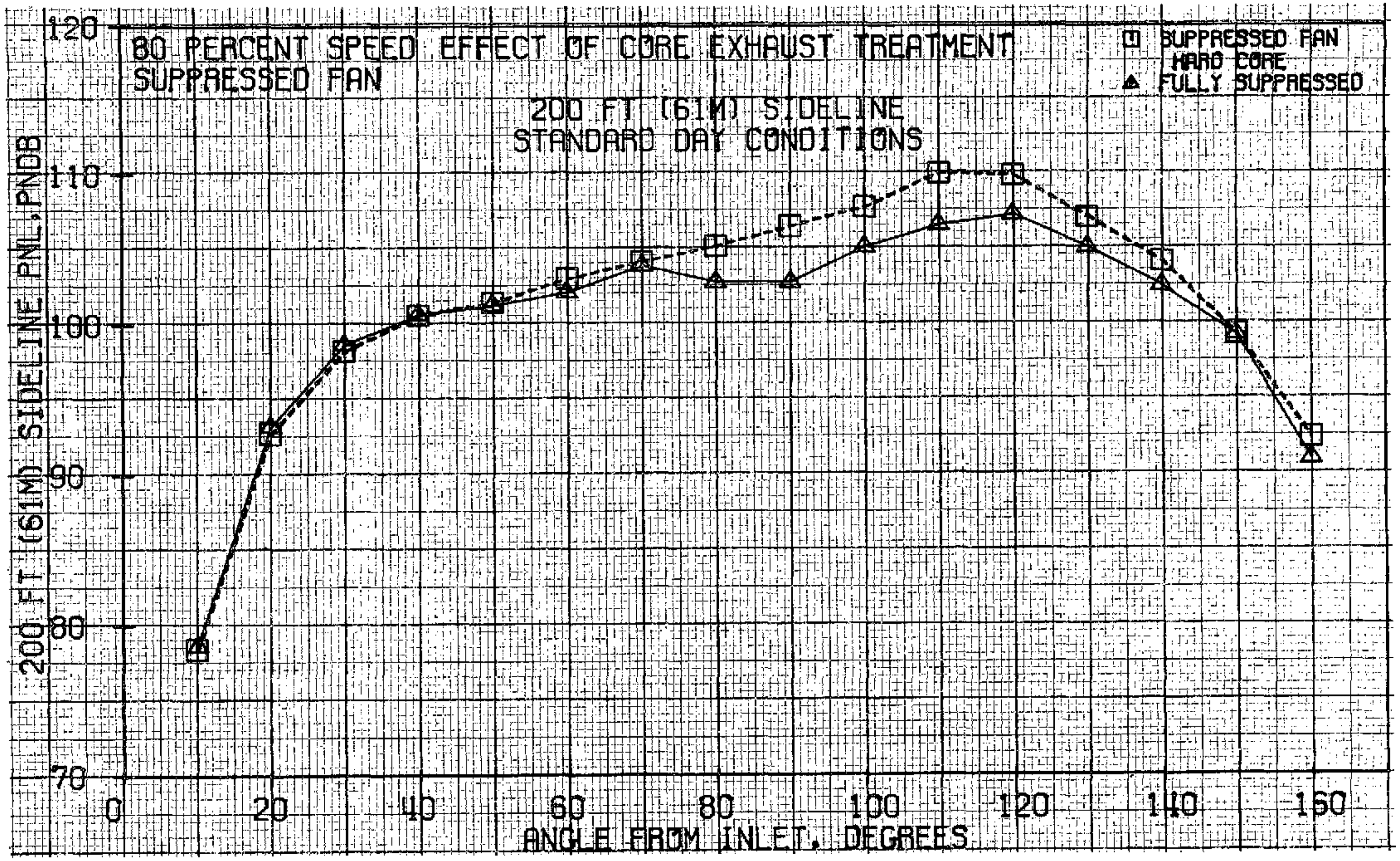


Figure 78. Effect of Core Exhaust Treatment, PNL Directivities at 80% Fan Speed.

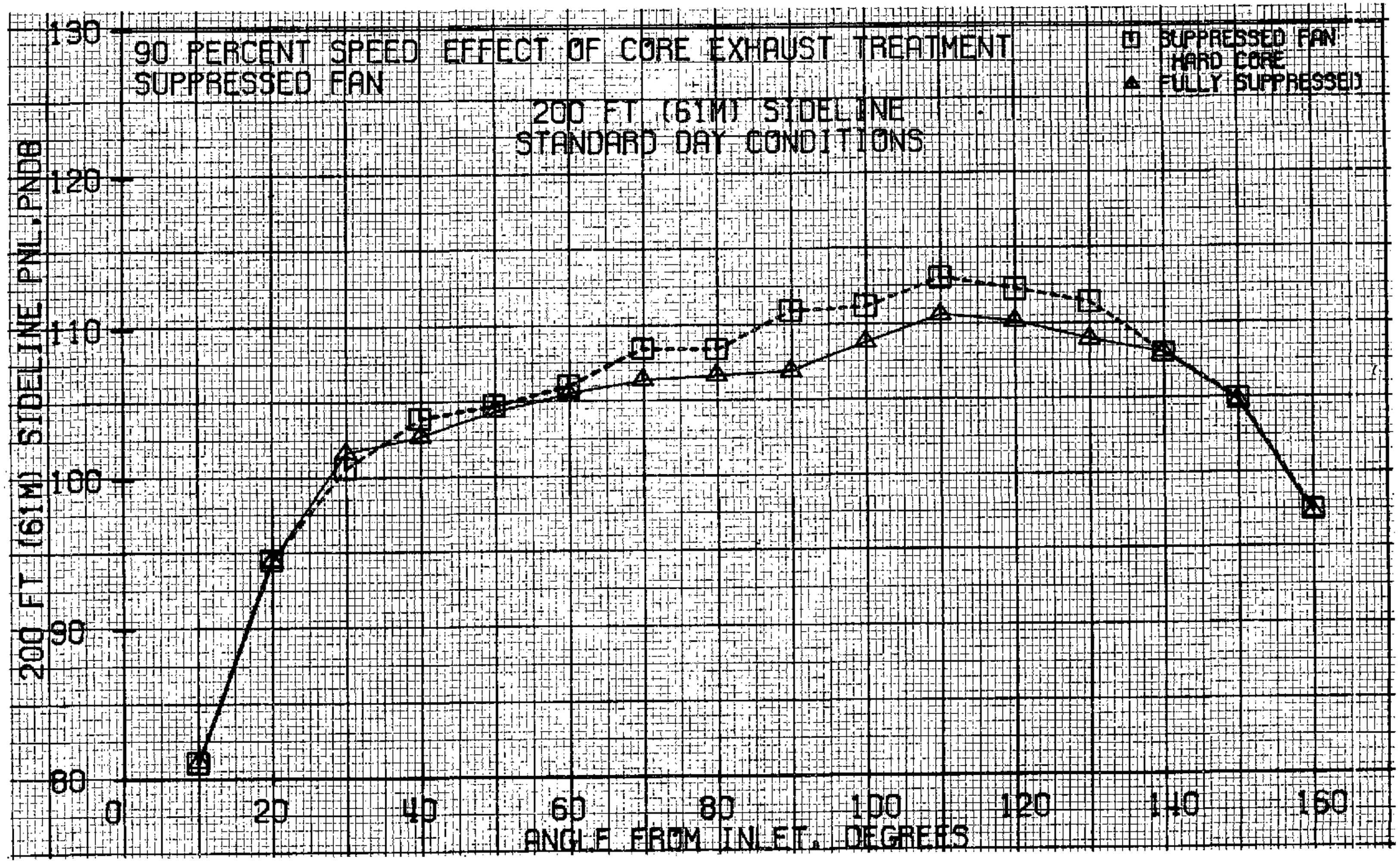


Figure 79. Effect of Core Exhaust Treatment, PNL Directivities at 90% Fan Speed.

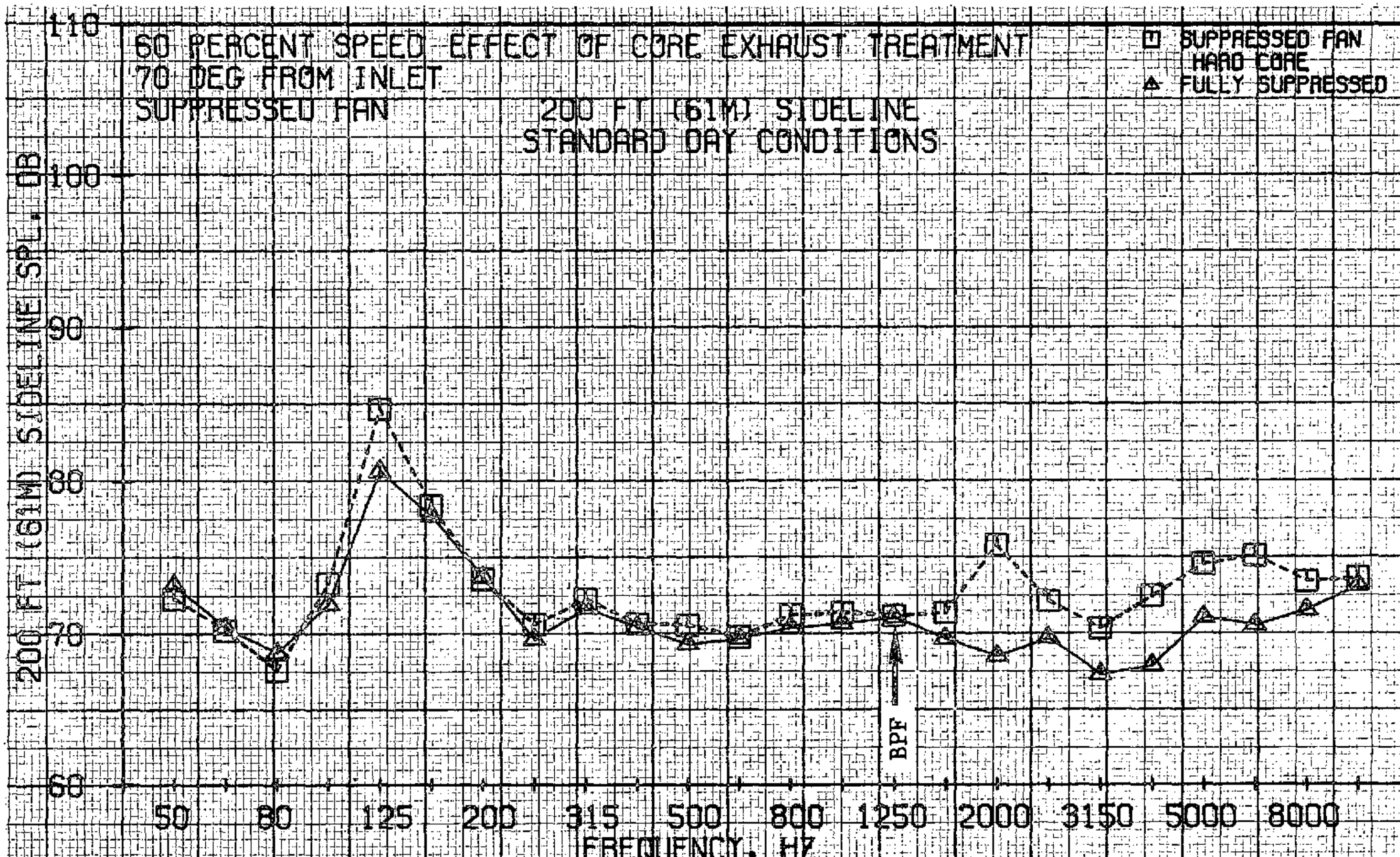


Figure 80. Effect of Core Exhaust Treatment, SPL Spectra for Approach at 70°.

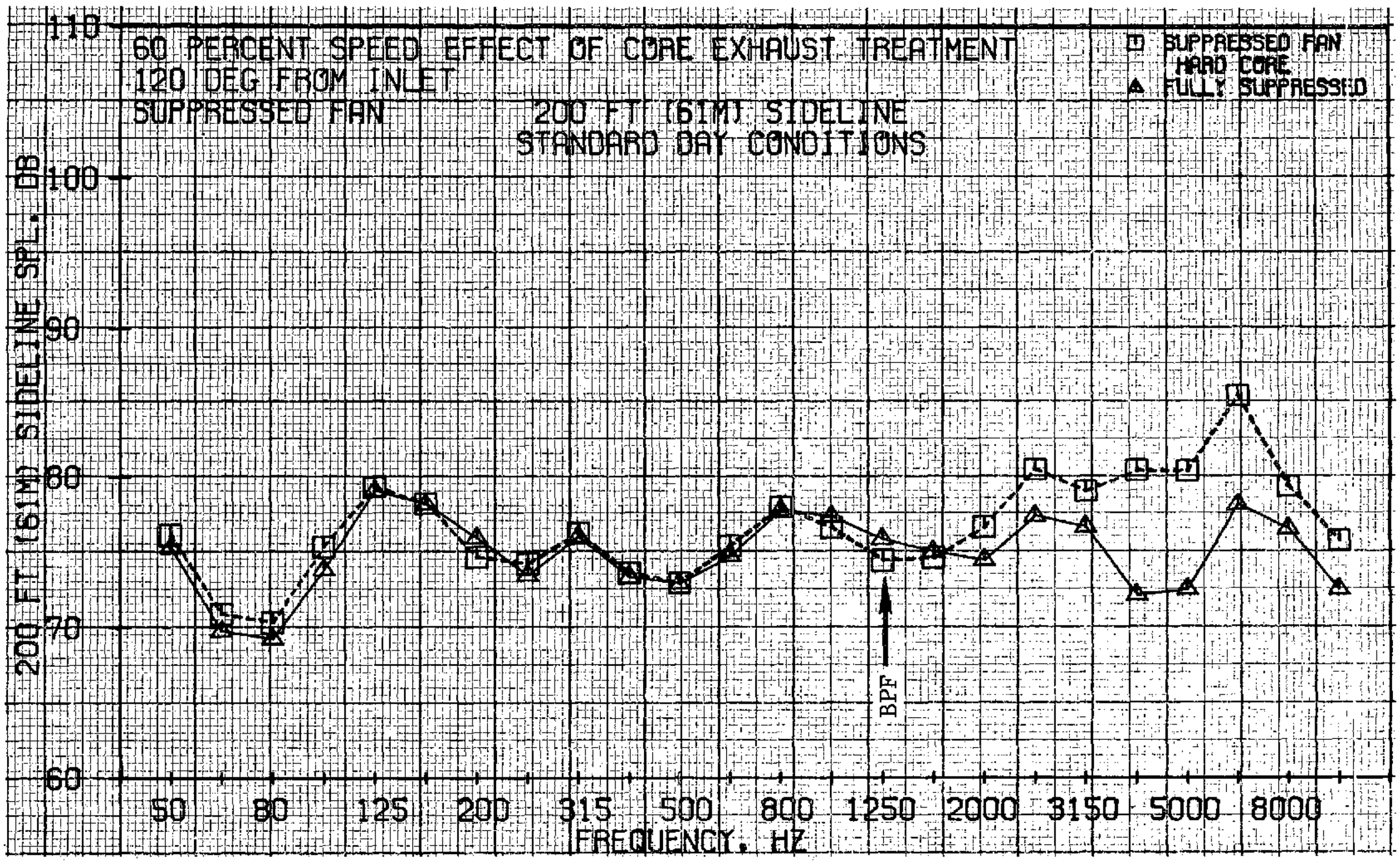


Figure 81. Effect of Core Exhaust Treatment, SPL Spectra for Approach at 120°.

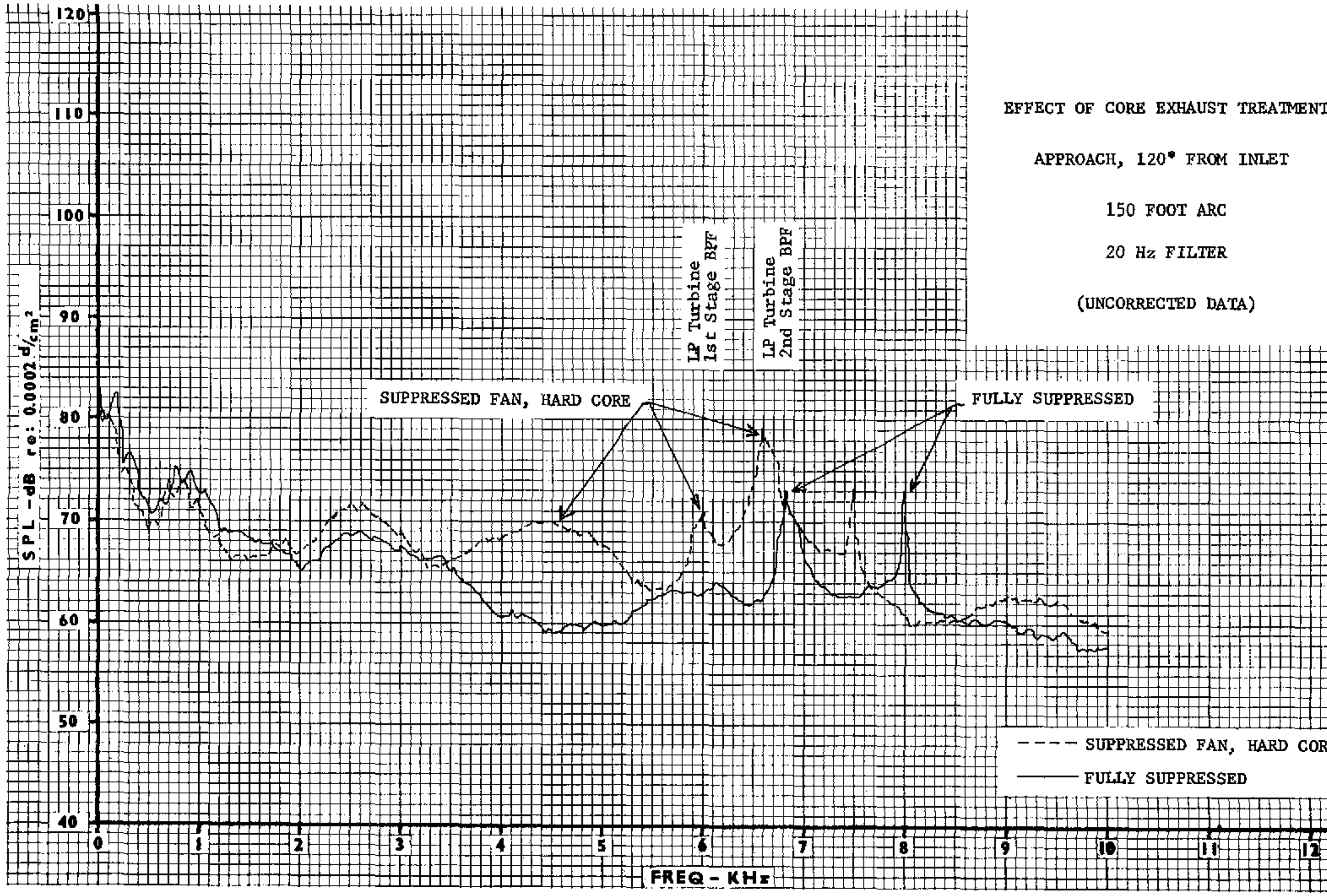


Figure 82. Effect of Core Exhaust Treatment, Narrowband Overlay for Approach at 120°.

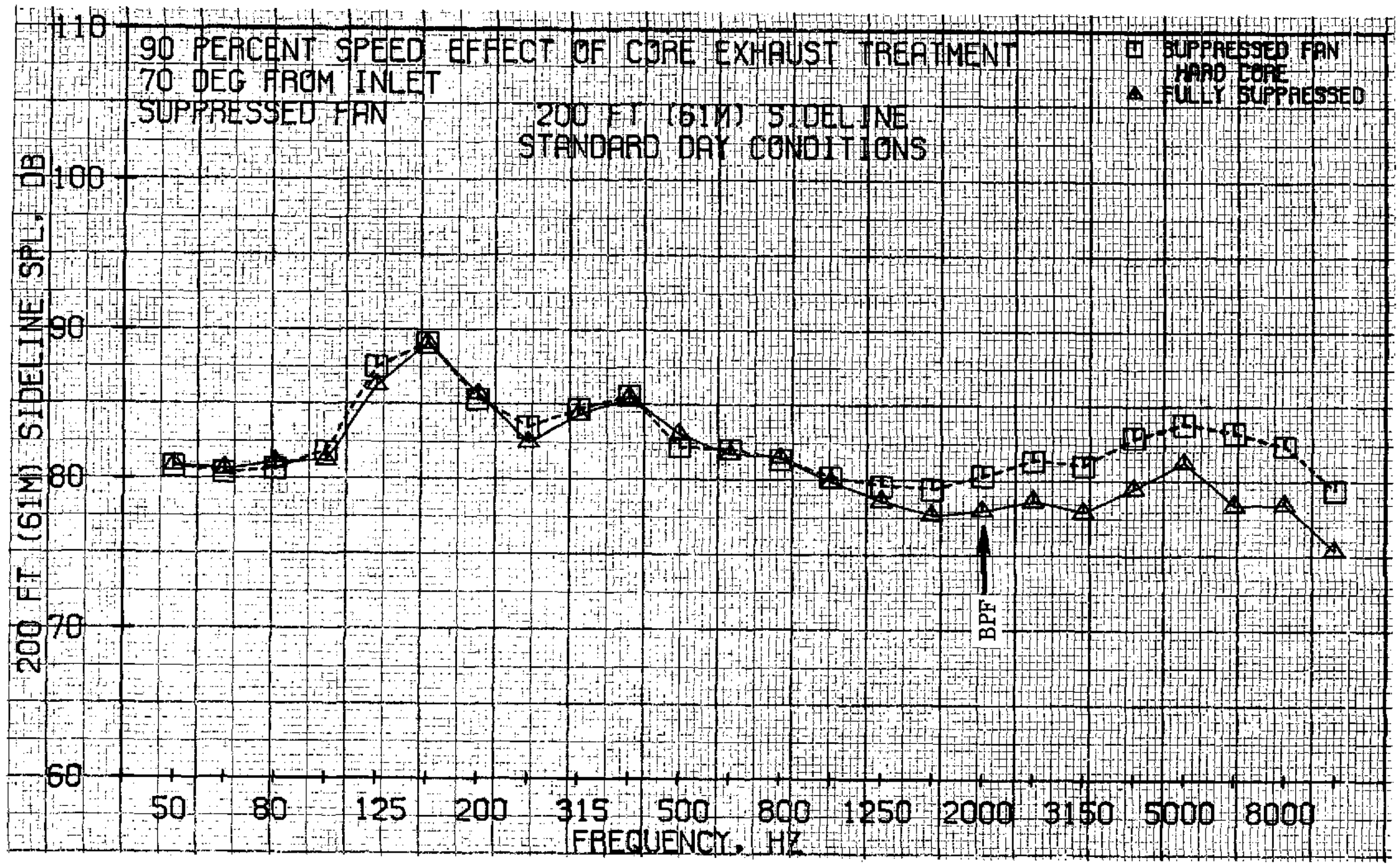


Figure 83. Effect of Core Exhaust Treatment, SPL Spectra for Takeoff at 70°.

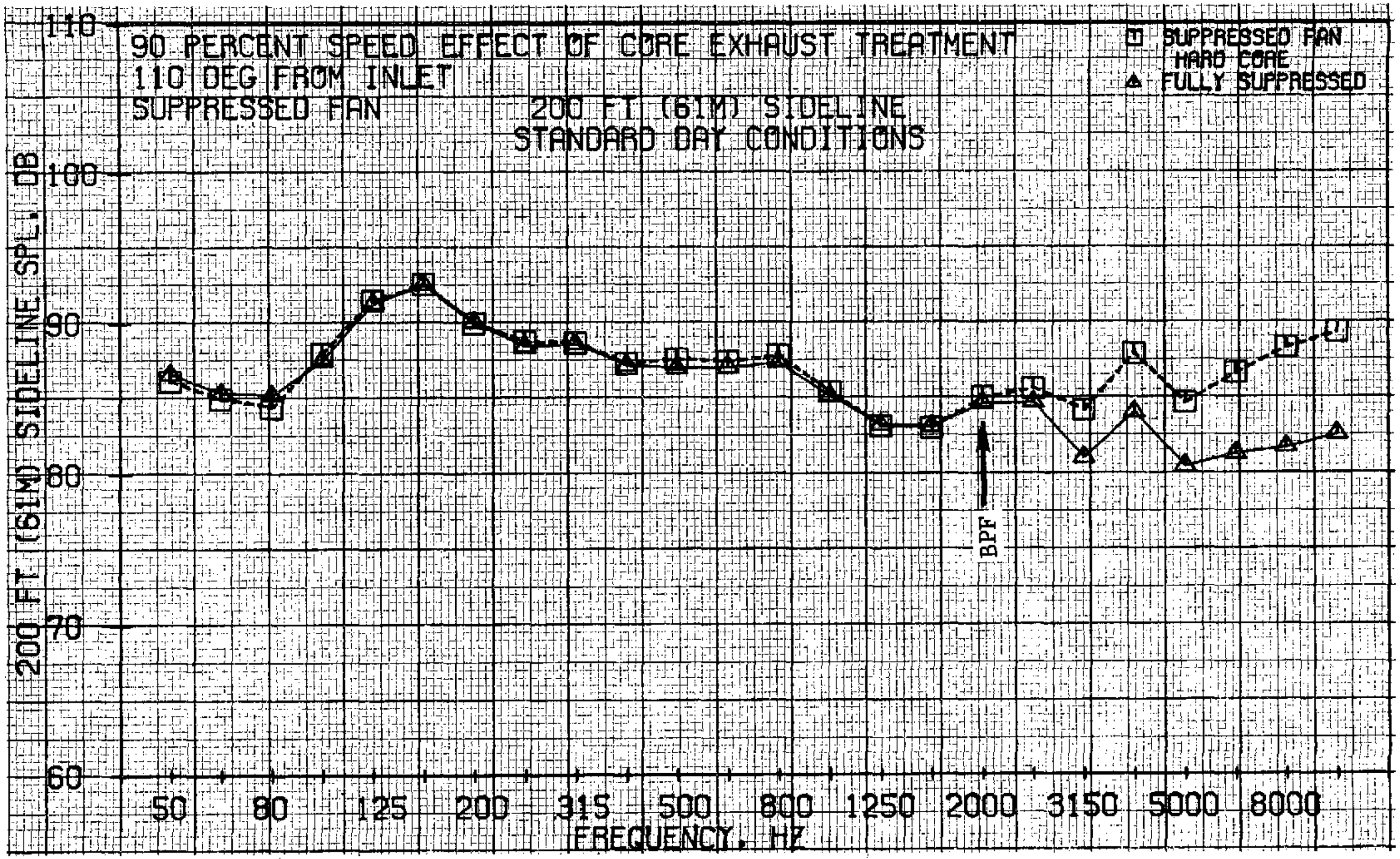


Figure 84. Effect of Core Exhaust Treatment, SPL Spectra for Takeoff at 110°.

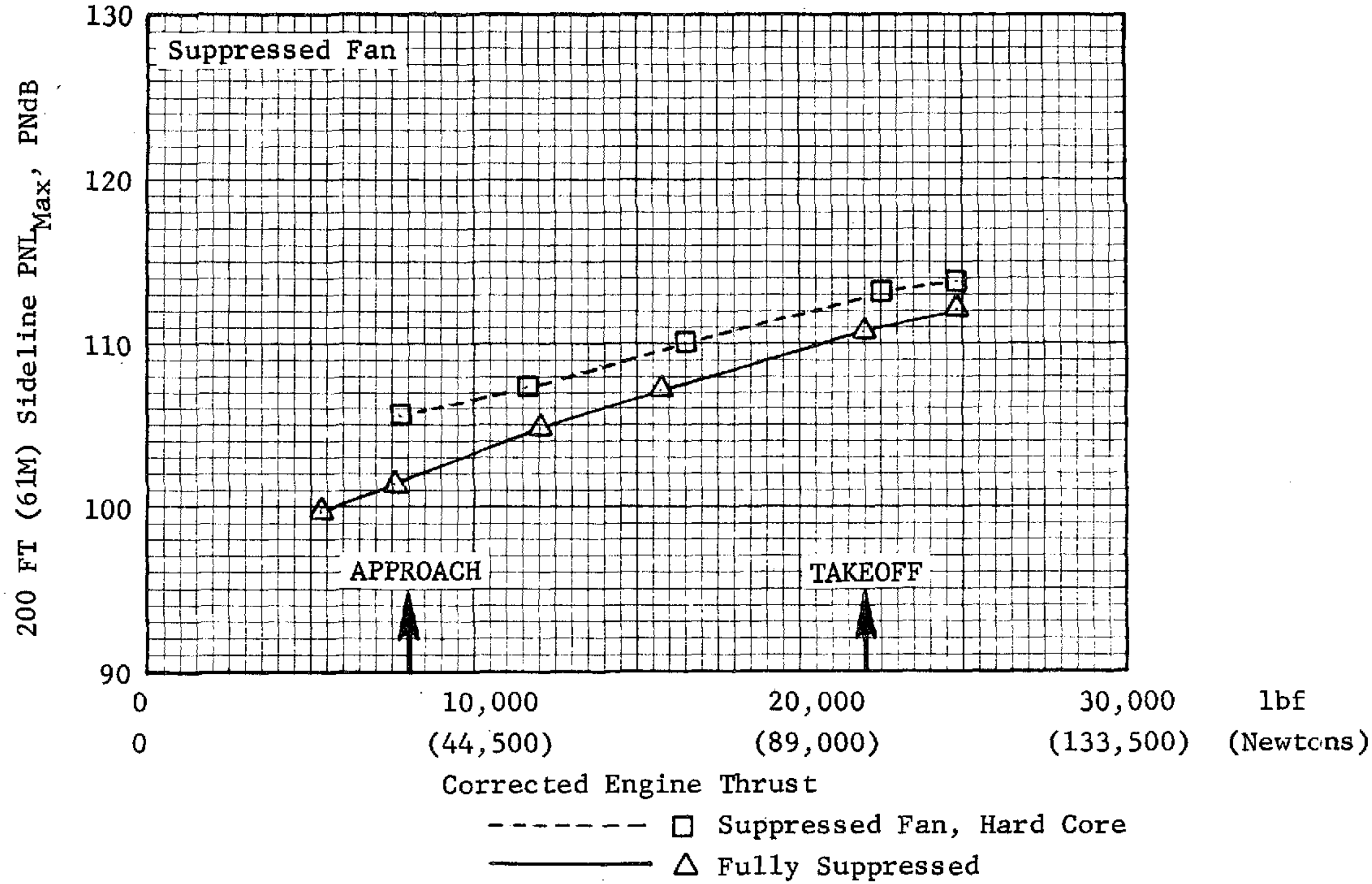


Figure 85. Effect of Core Exhaust Treatment, Maximum PNL Variation with Engine Thrust.

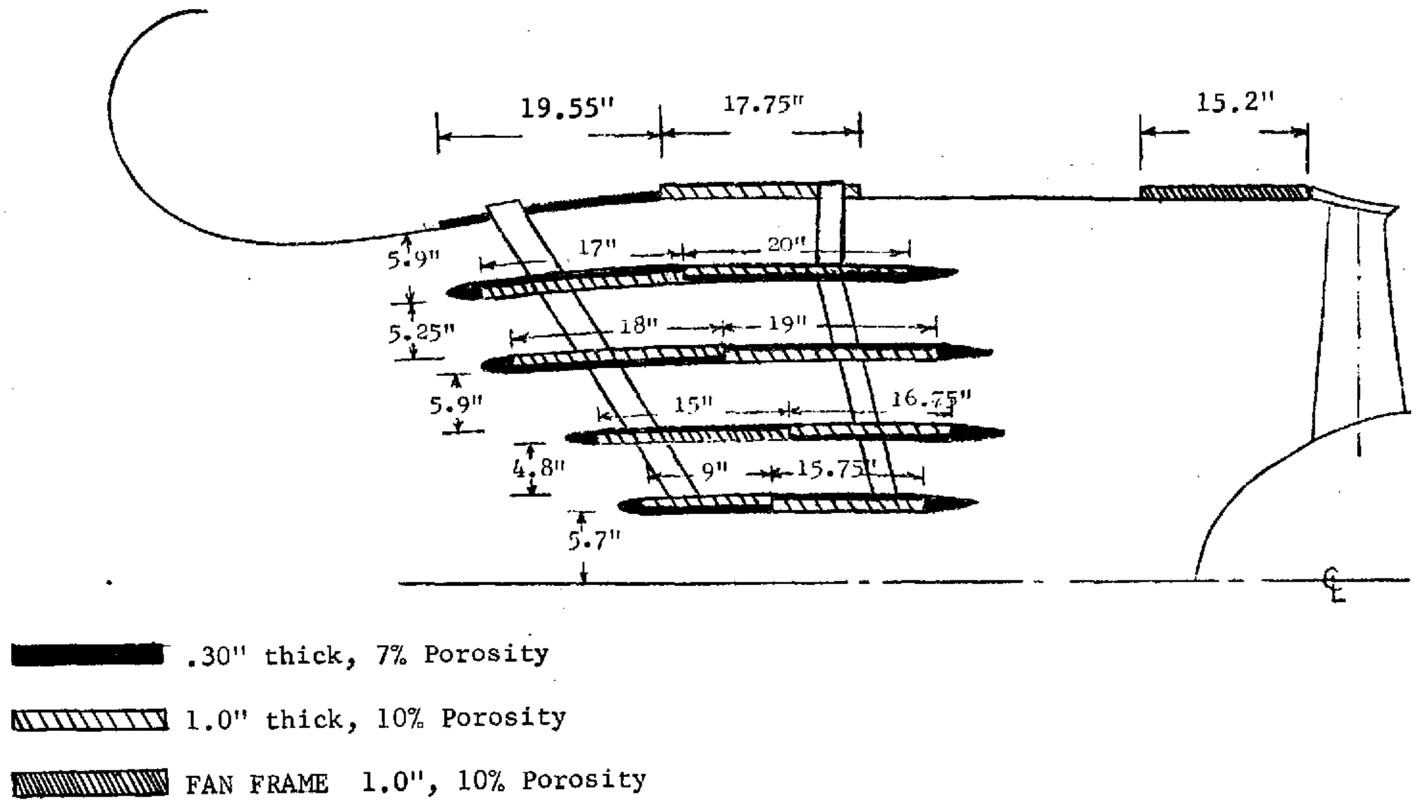


Figure 86. Cross Section of the Four-Ring Inlet Splitter System.

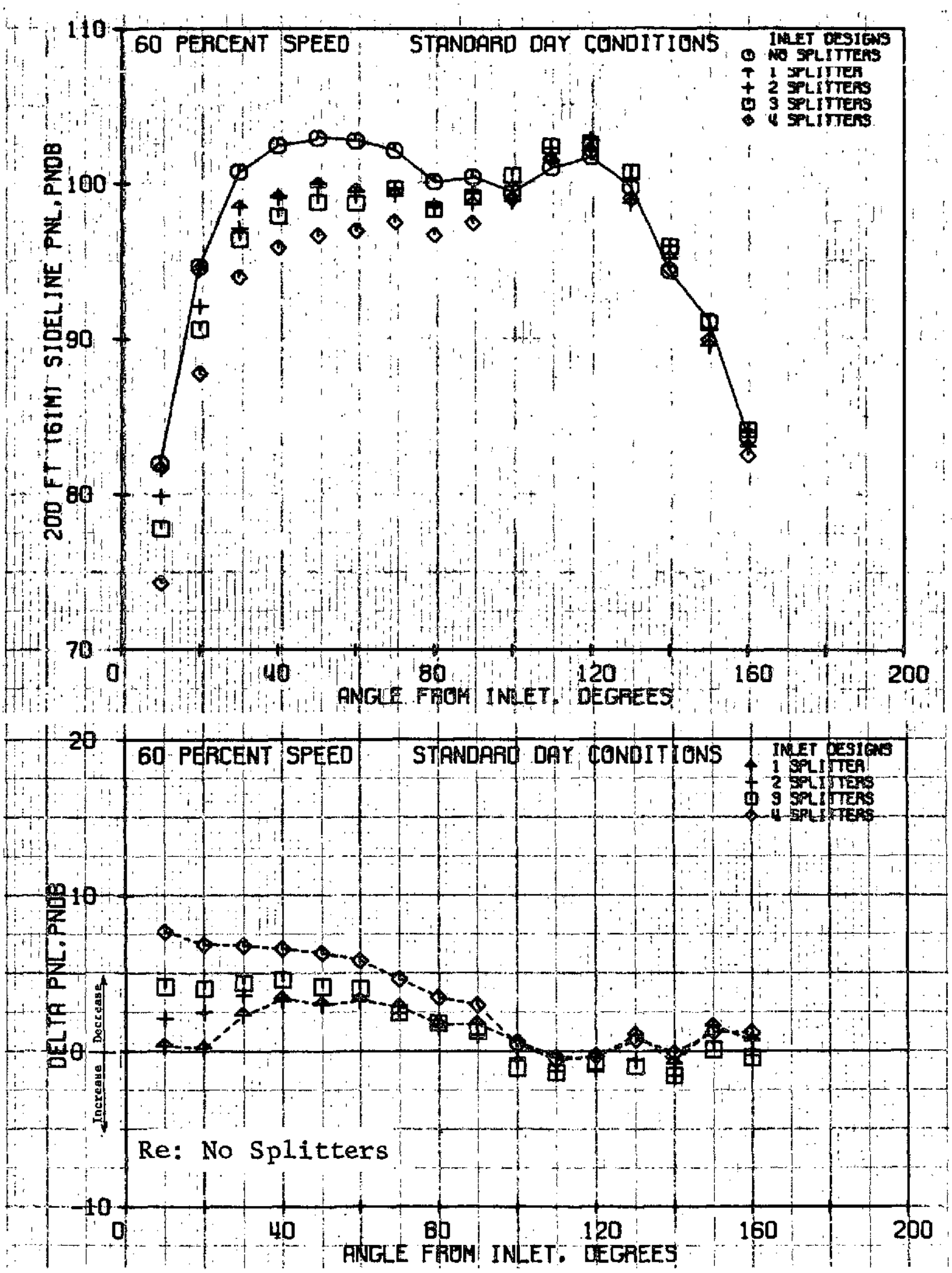


Figure 87. Effect of Inlet Splitters, PNL Directivities at 60% Fan Speed.

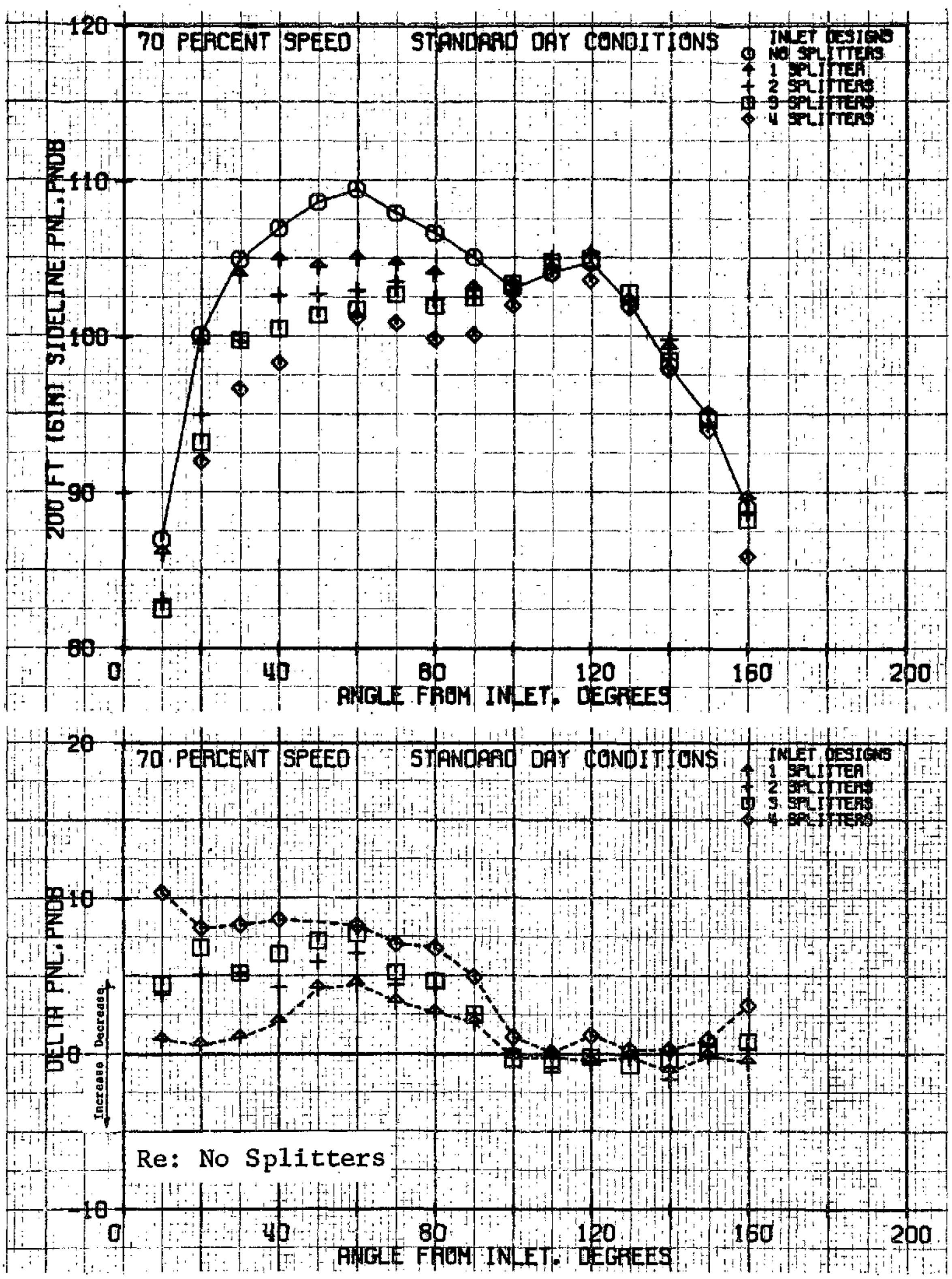


Figure 88. Effect of Inlet Splitters, PNL Directivities at 70% Fan Speed.

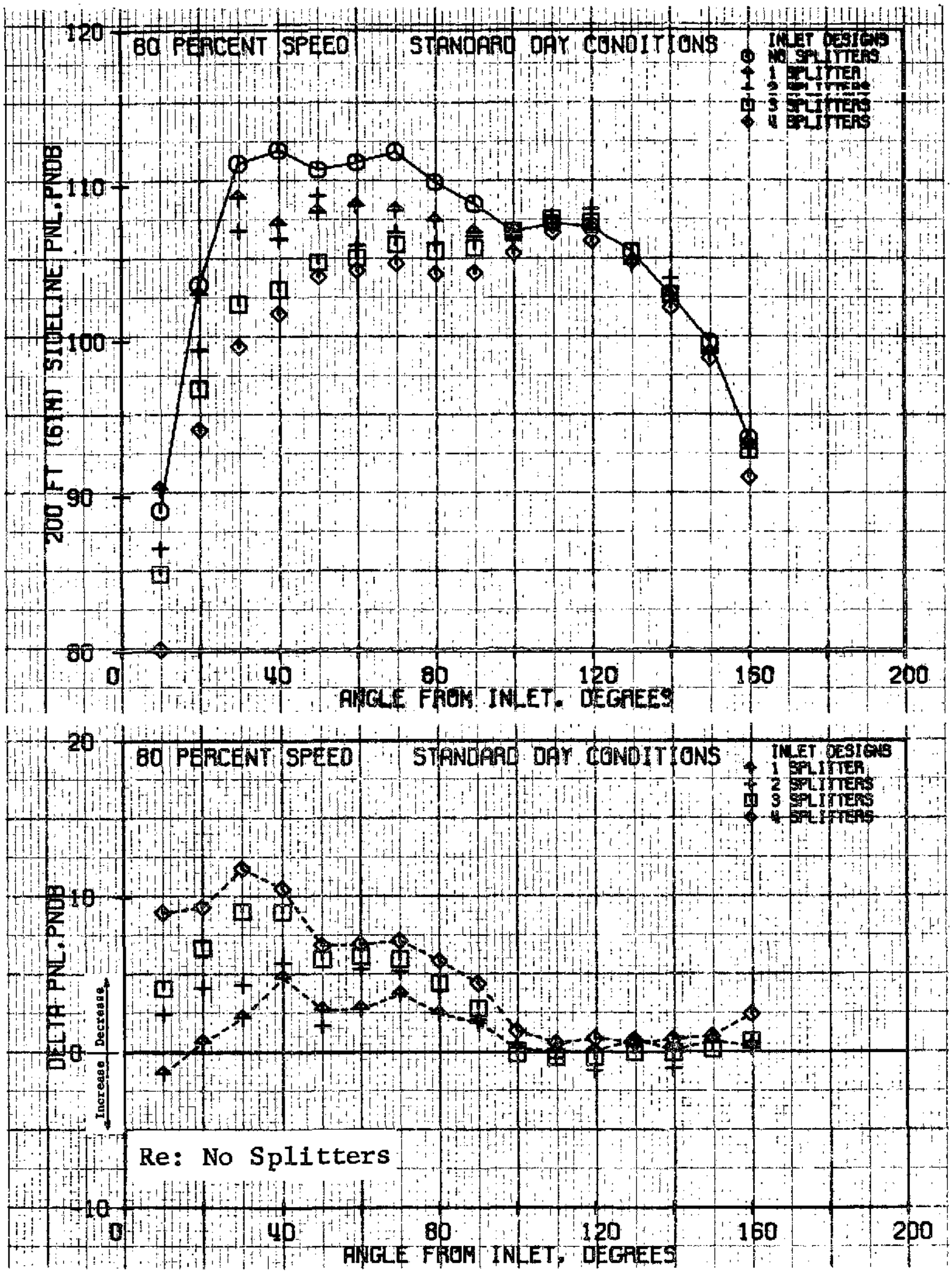


Figure 89. Effect of Inlet Splitters, PNL Directivities at 80% Fan Speed.

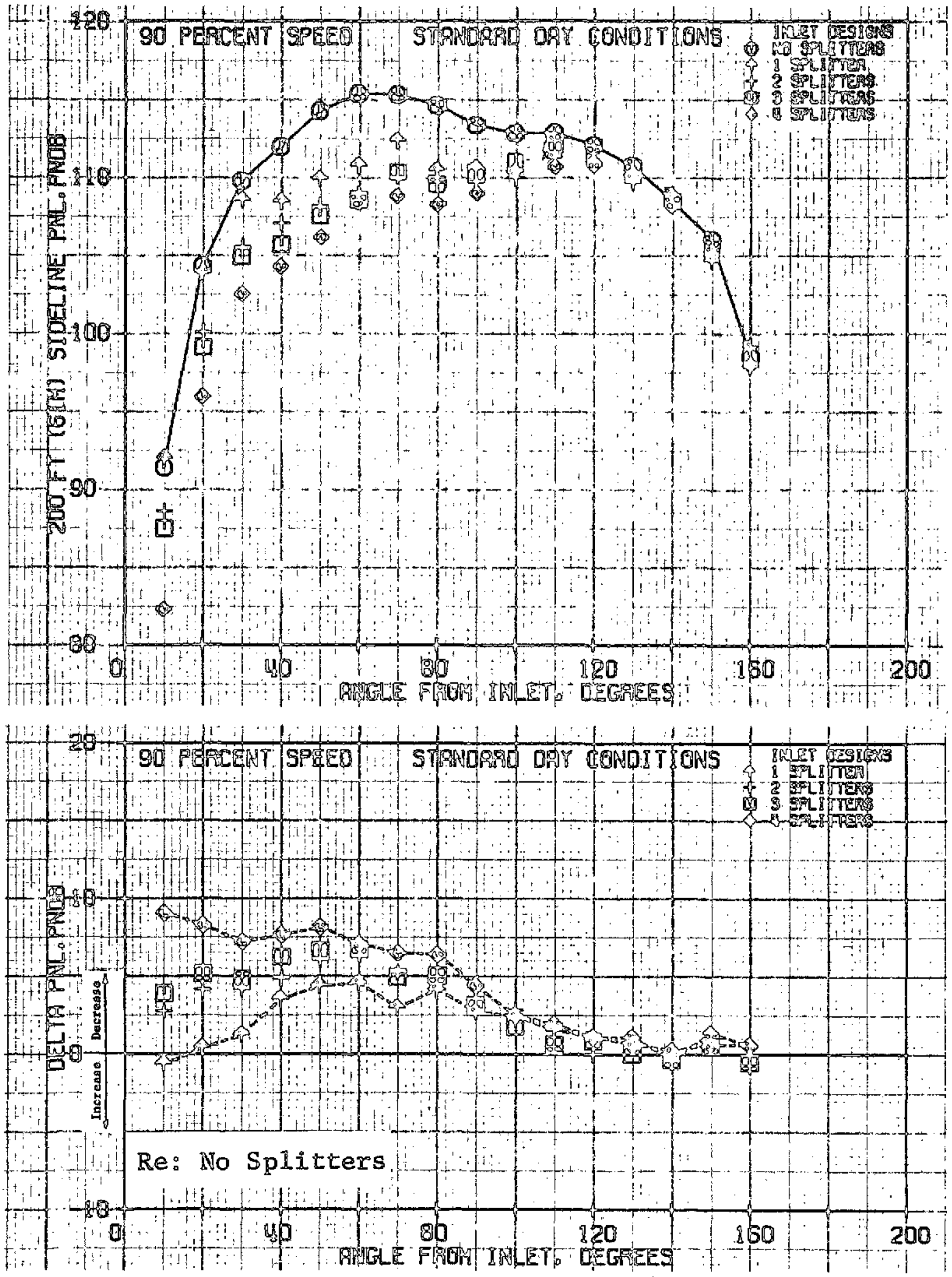


Figure 90. Effect of Inlet Splitters, PNL Directivities at 90% Fan Speed.

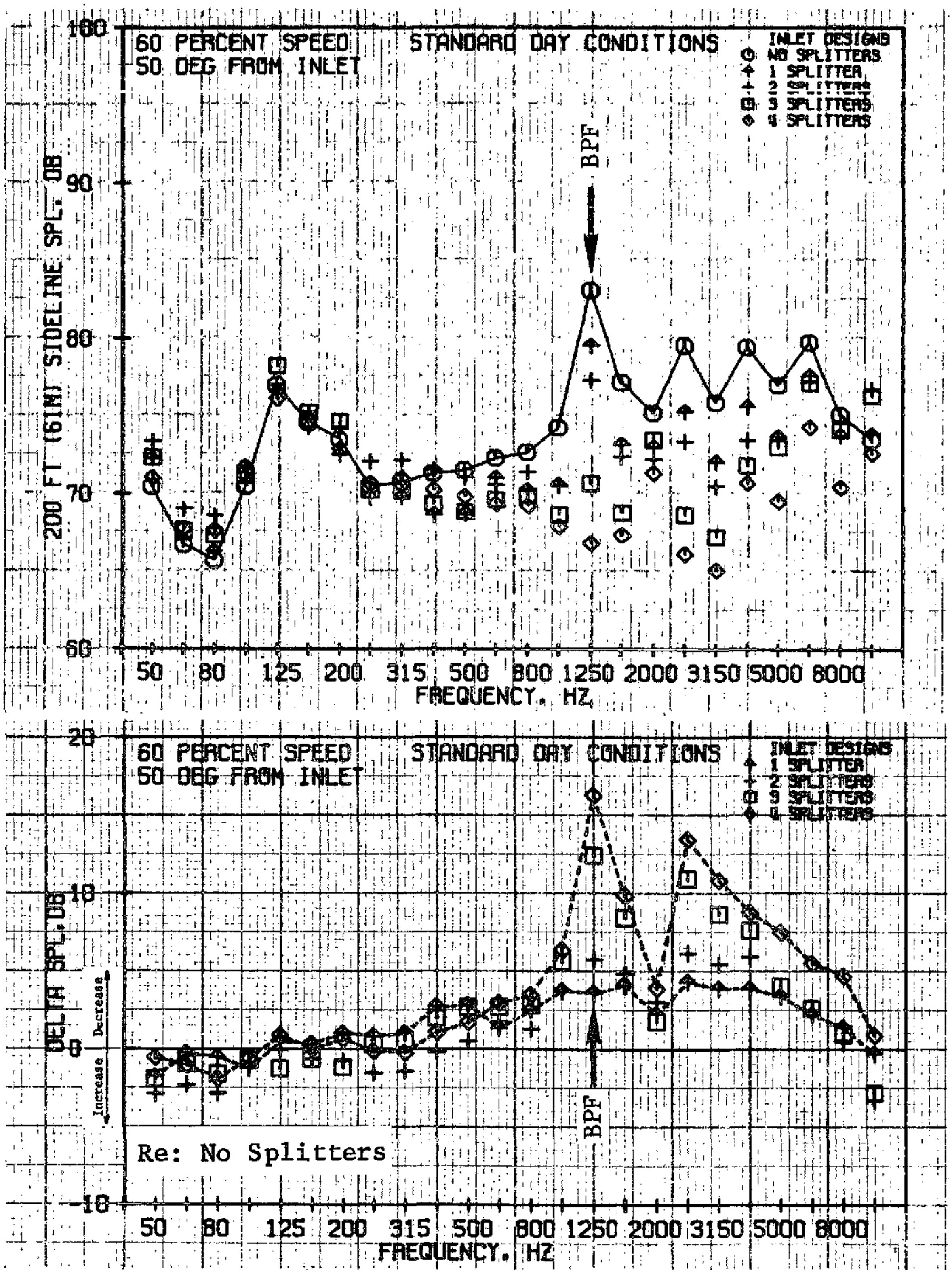


Figure 91. Effect of Inlet Splitters, SPL Spectra for Approach at 50°.

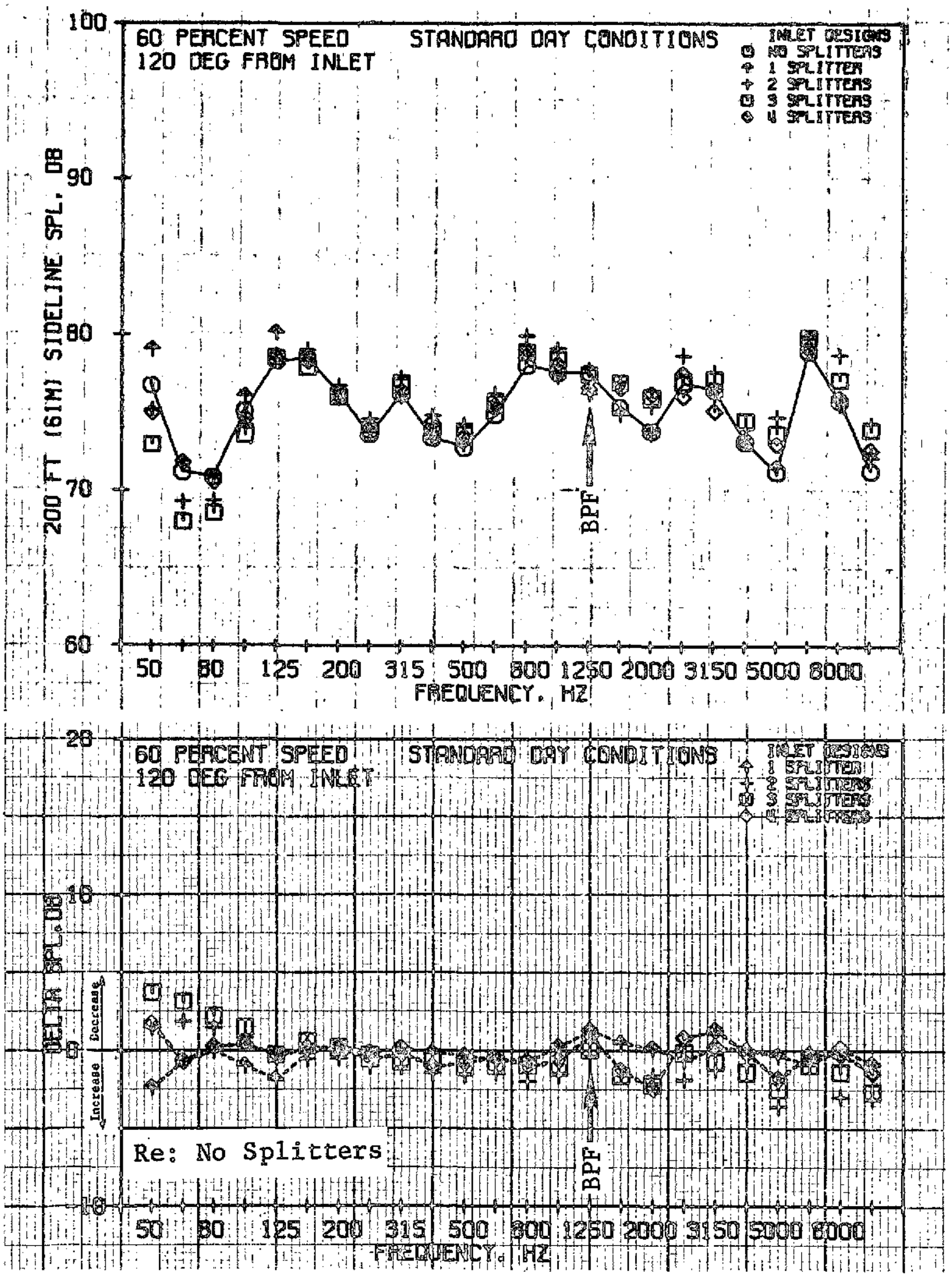


Figure 92. Effect of Inlet Splitters, SPL Spectra for Approach at 120°.

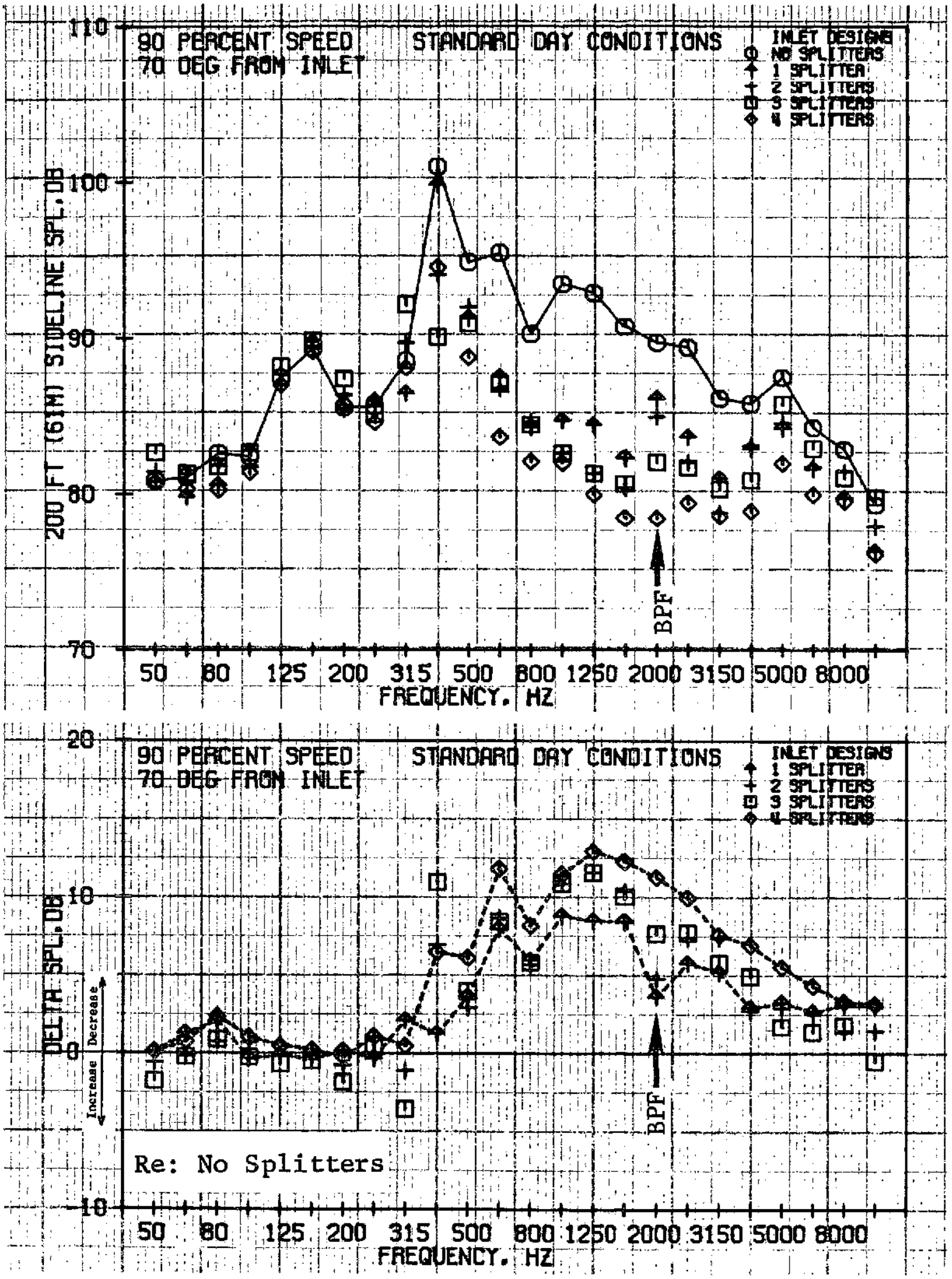


Figure 93. Effect of Inlet Splitters, SPL Spectra for Takeoff at 70°.

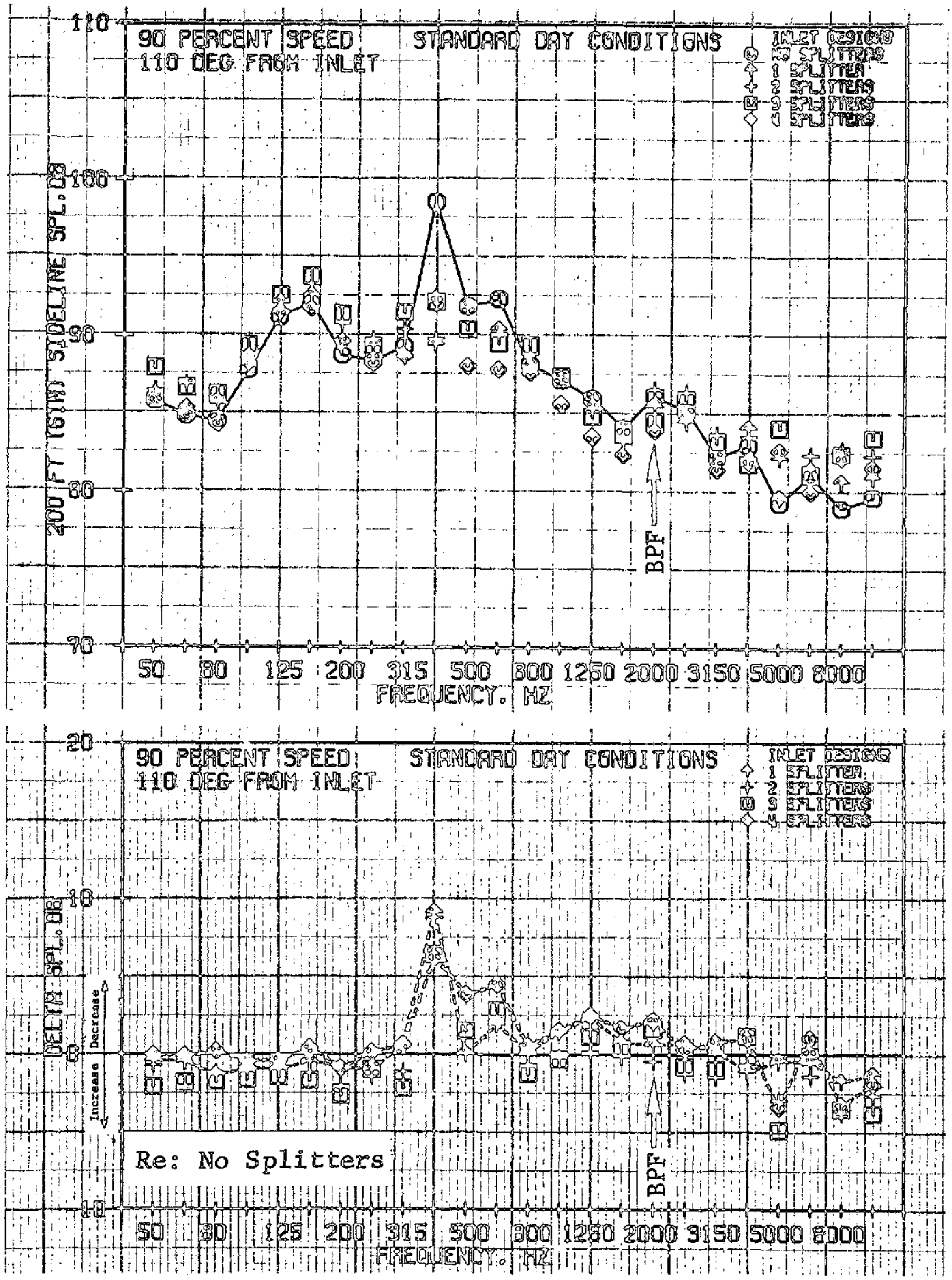


Figure 94. Effect of Inlet Splitters, SPL Spectra for Takeoff at 110°.

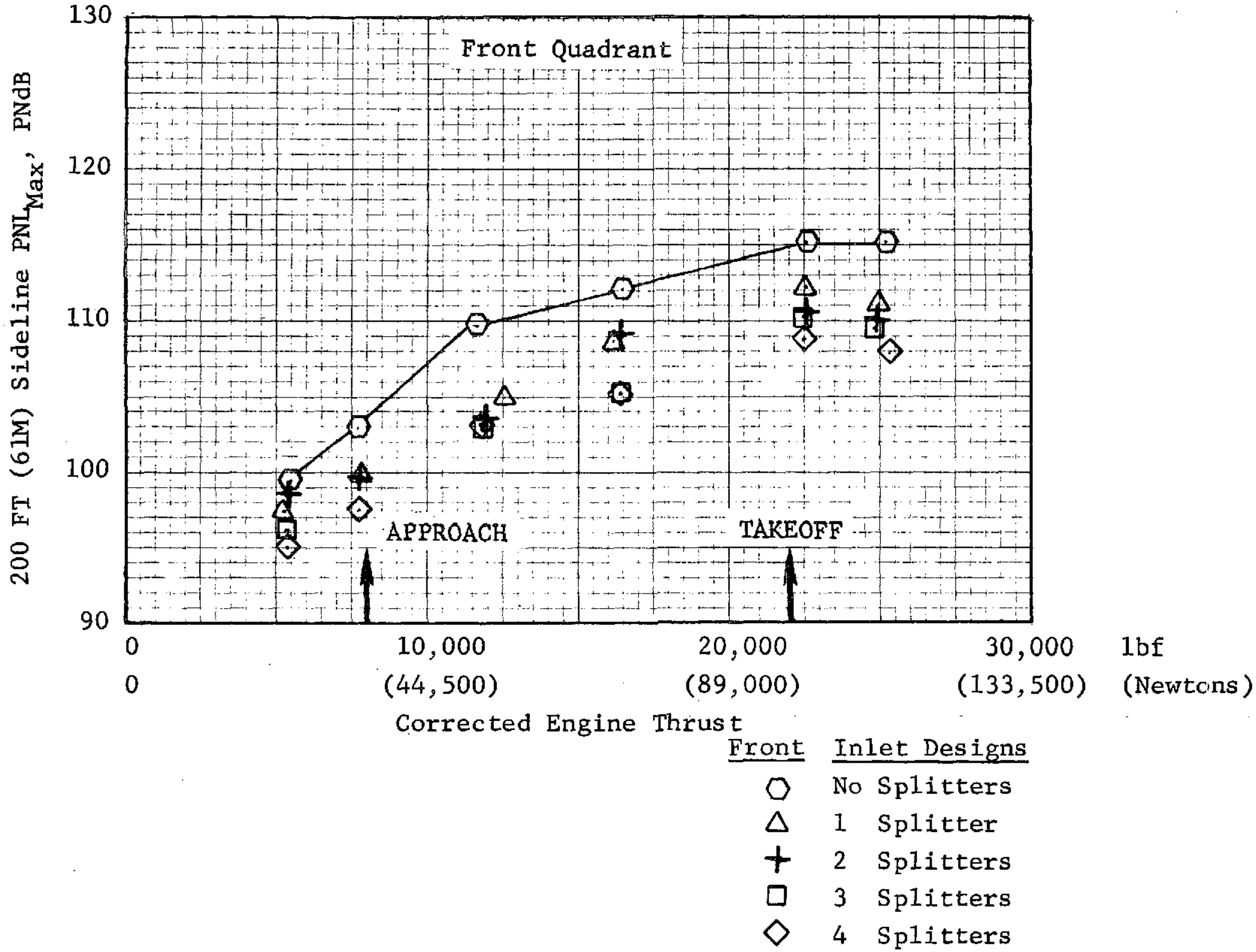


Figure 95. Effect of Inlet Splitters, Maximum Front Quadrant PNL Variation with Engine Thrust.

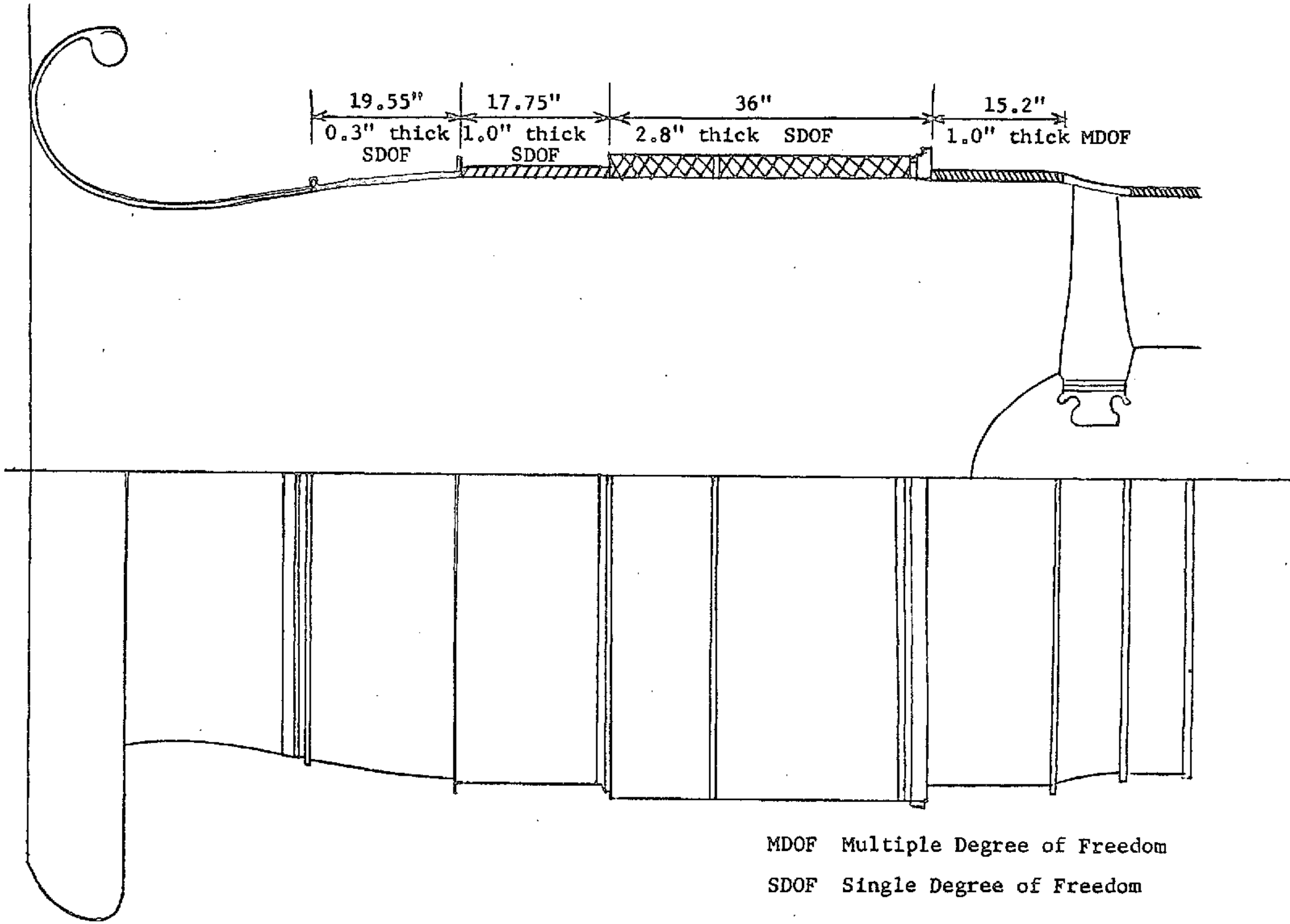


Figure 96. Cross Section Showing the Inlet Wall Treatment.

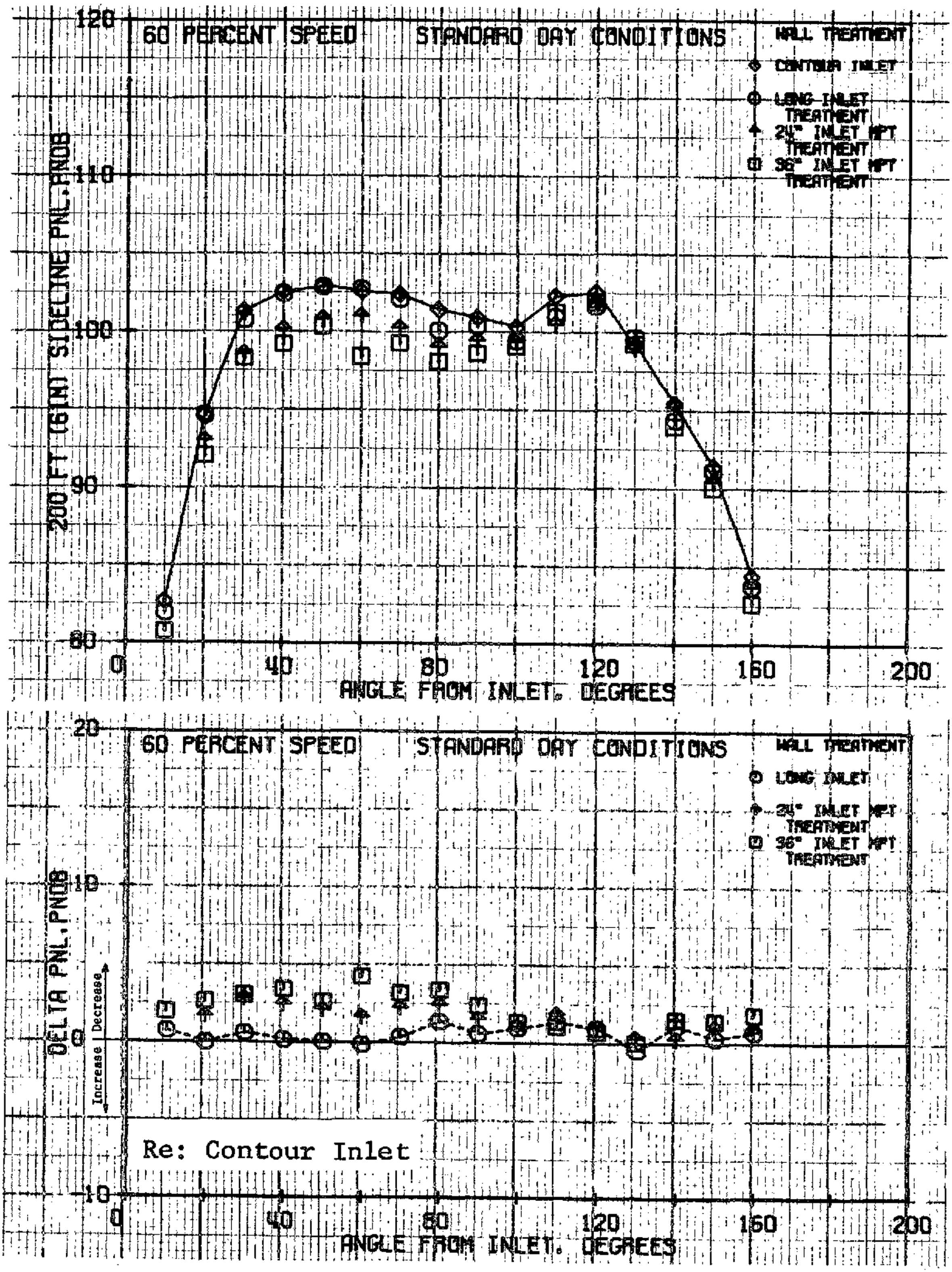


Figure 97. Effect of Inlet Treatment/Length, PNL Directivities at 60% Fan Speed.

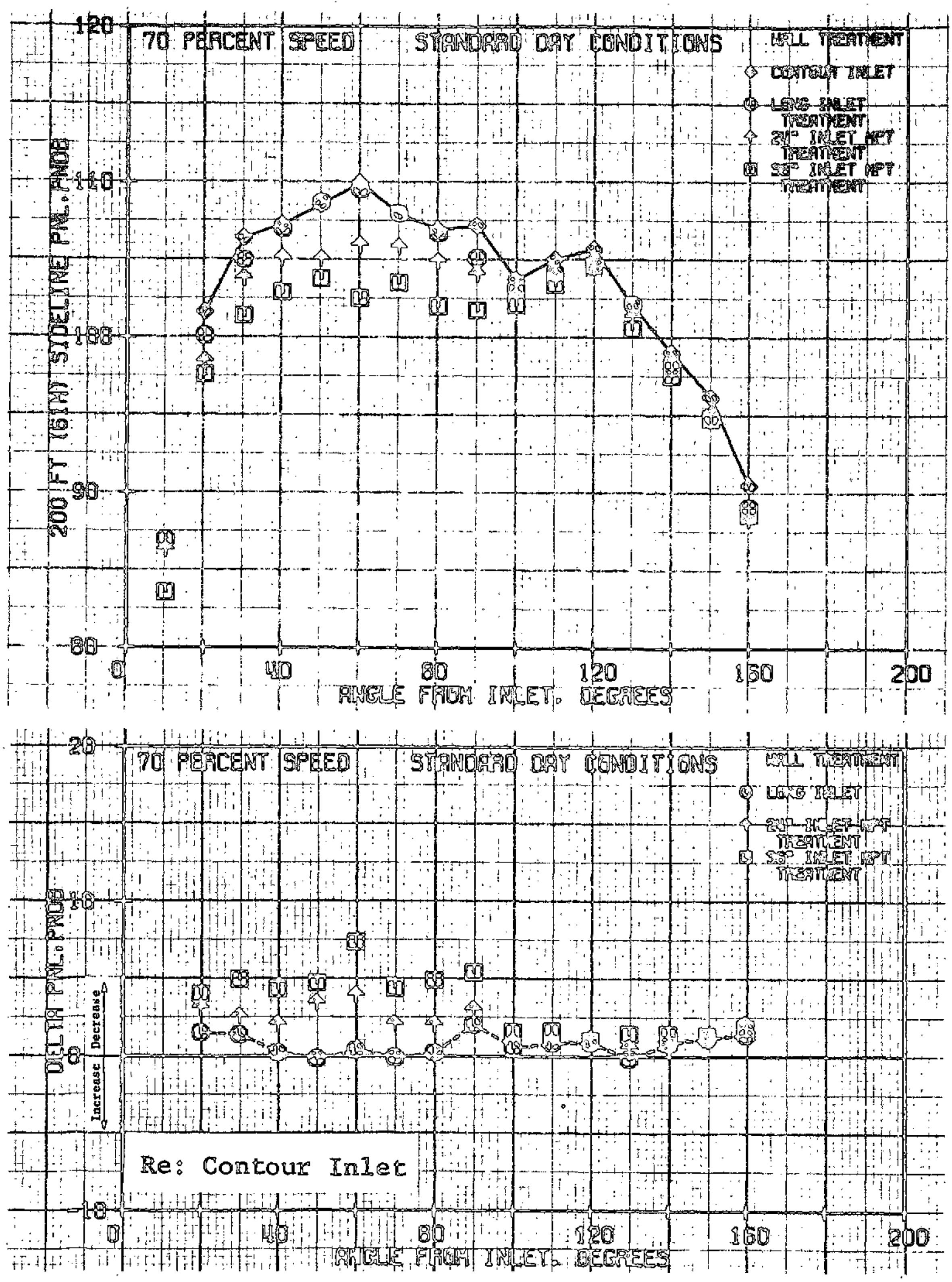


Figure 98. Effect of Inlet Treatment/Length, PNL Directivities at 70% Fan Speed.

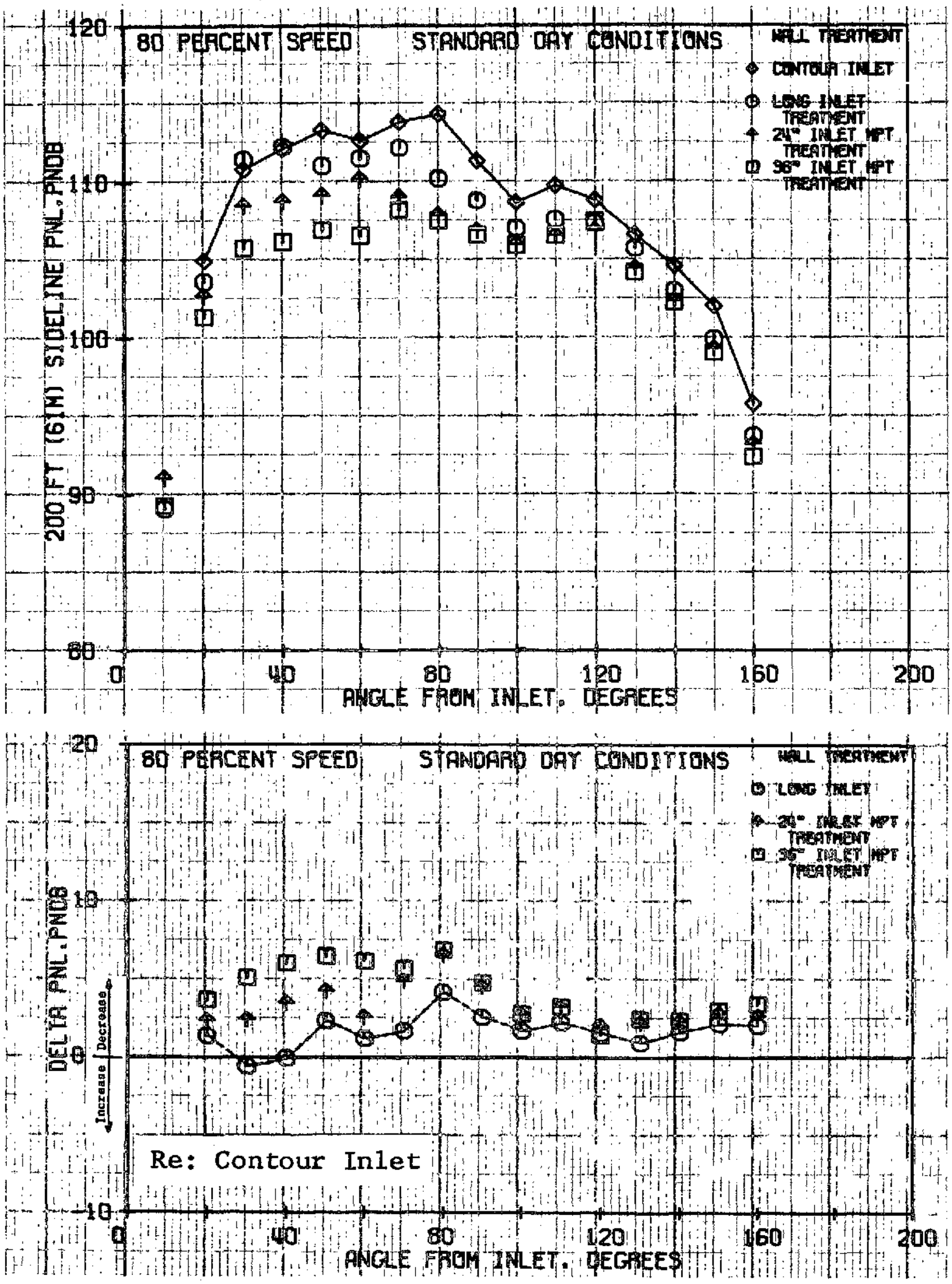


Figure 99. Effect of Inlet Treatment/Length, PNL Directivities at 80% Fan Speed.

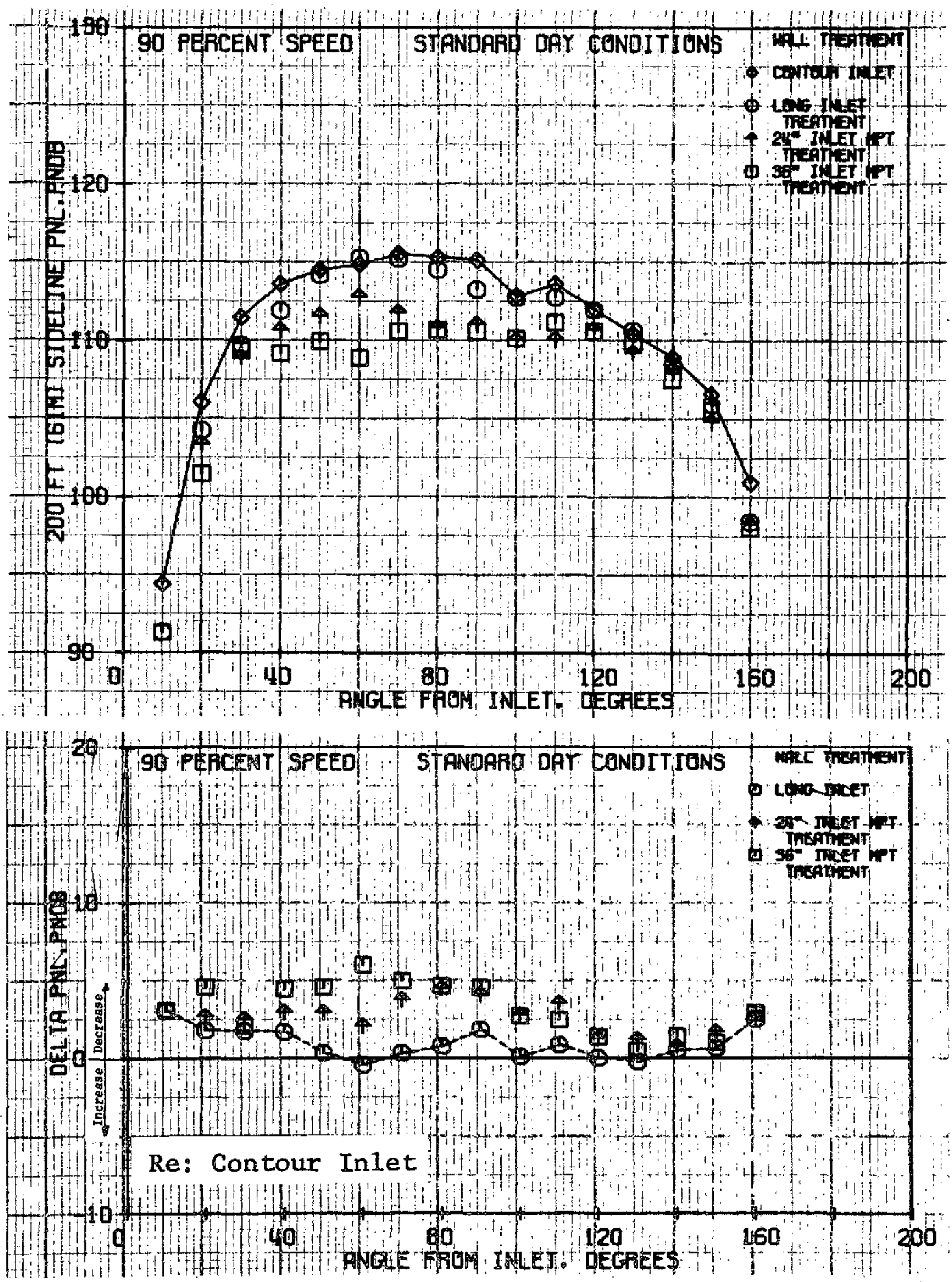


Figure 100. Effect of Inlet Treatment/Length, PNL Directivities at 90% Fan Speed.

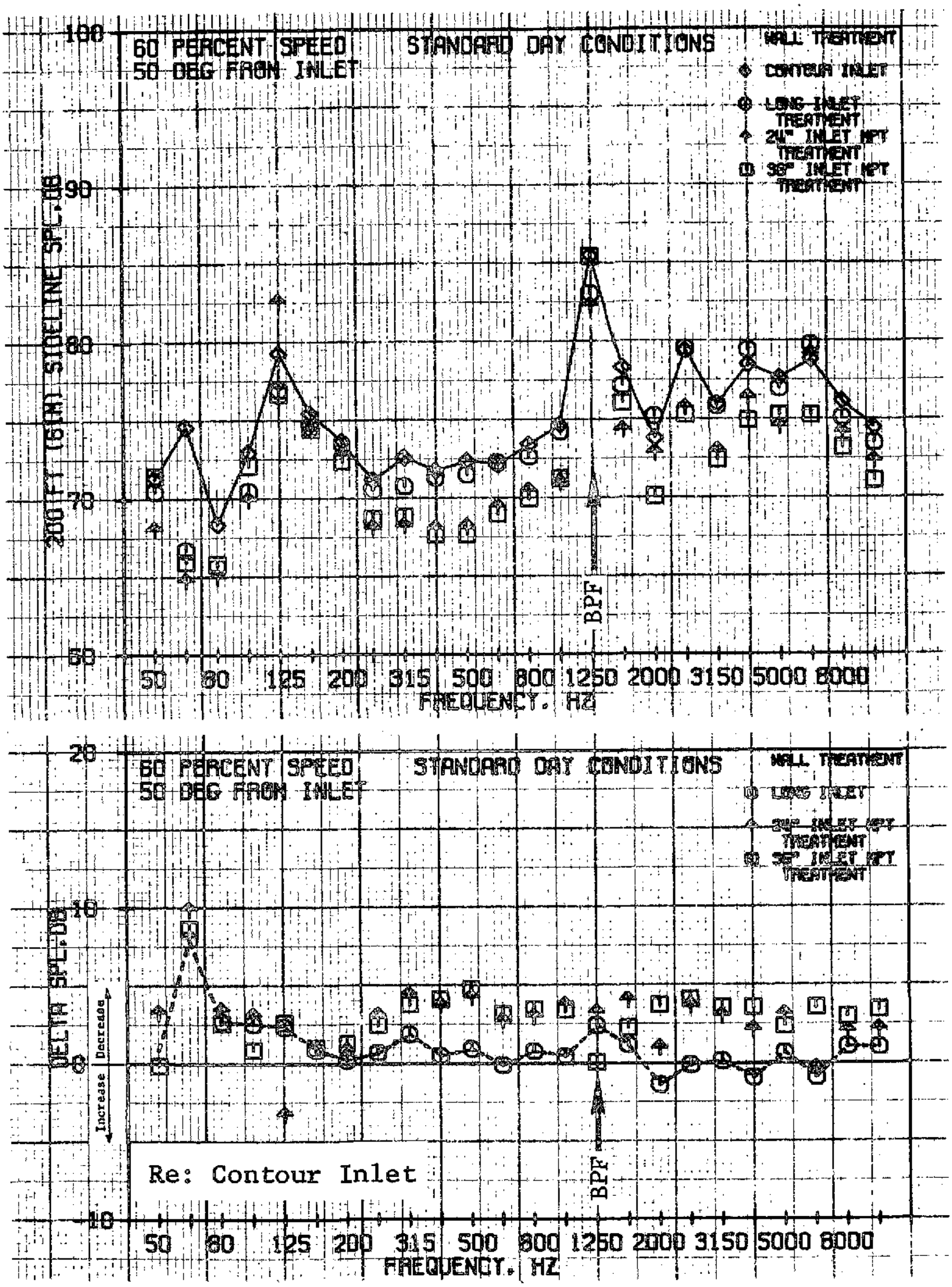


Figure 101. Effect of Inlet Treatment/Length, SPL Spectra for Approach at 50°.

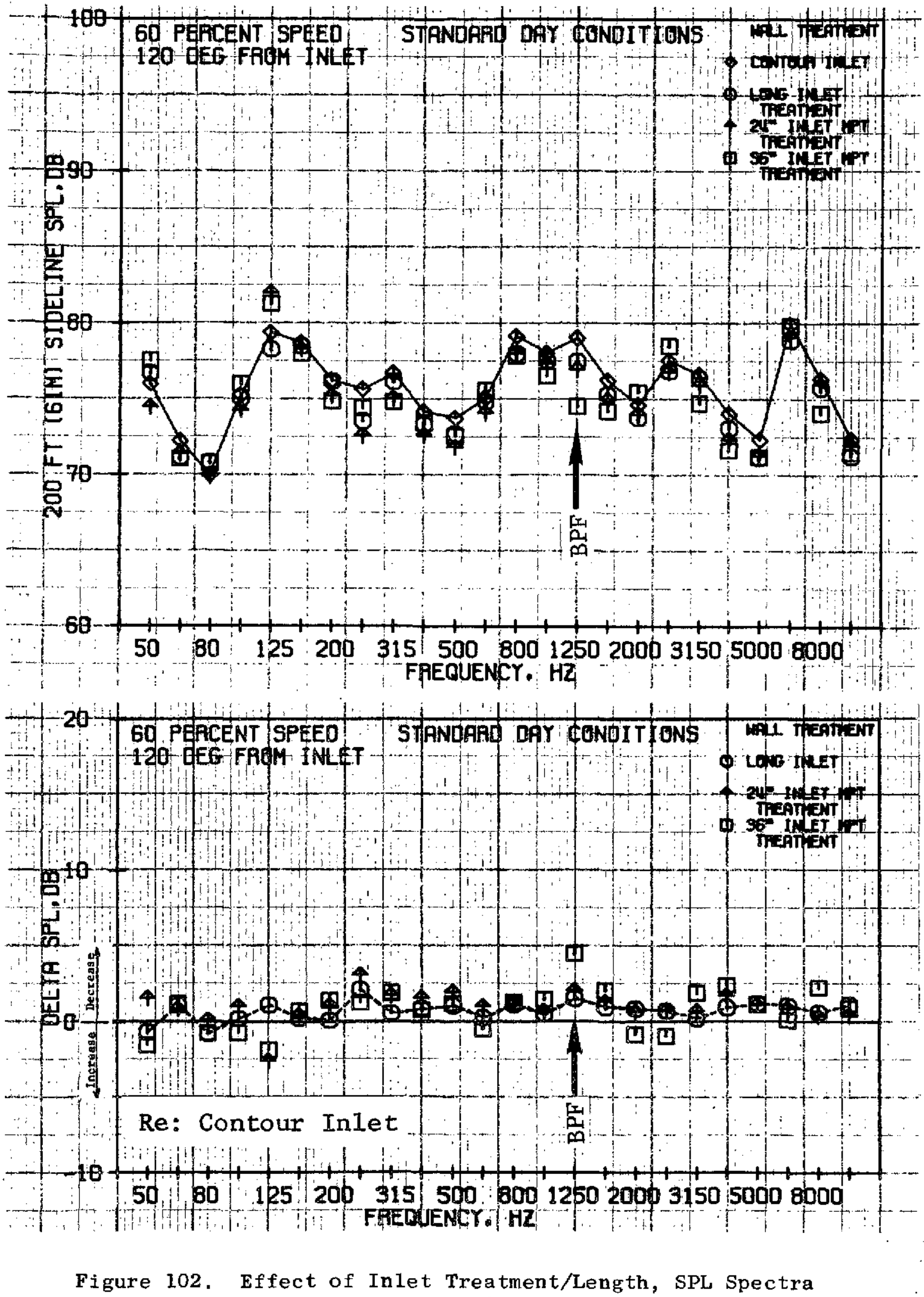


Figure 102. Effect of Inlet Treatment/Length, SPL Spectra for Approach at 120°.

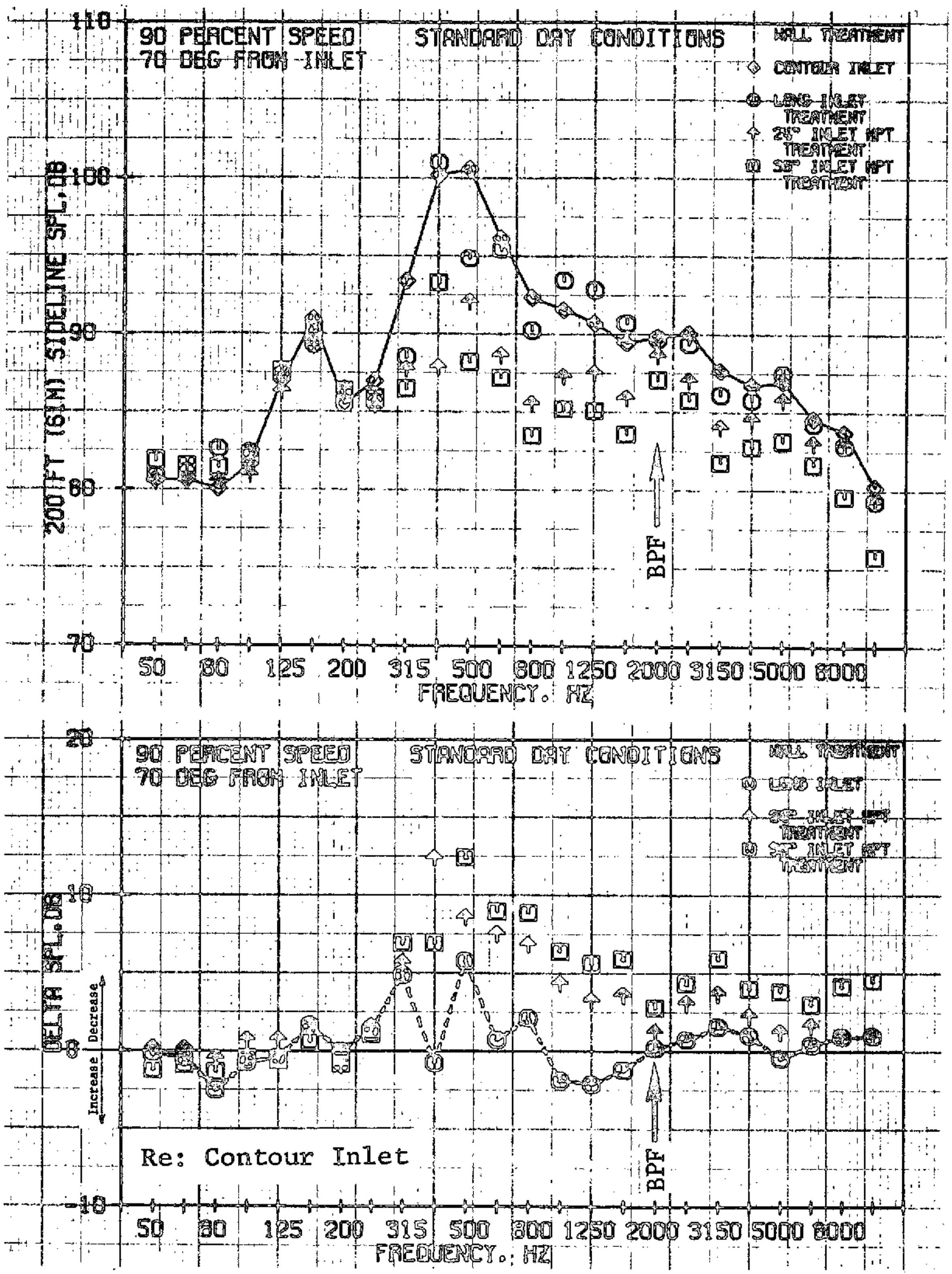


Figure 103. Effect of Inlet Treatment/Length, SPL Spectra for Takeoff at 70°.

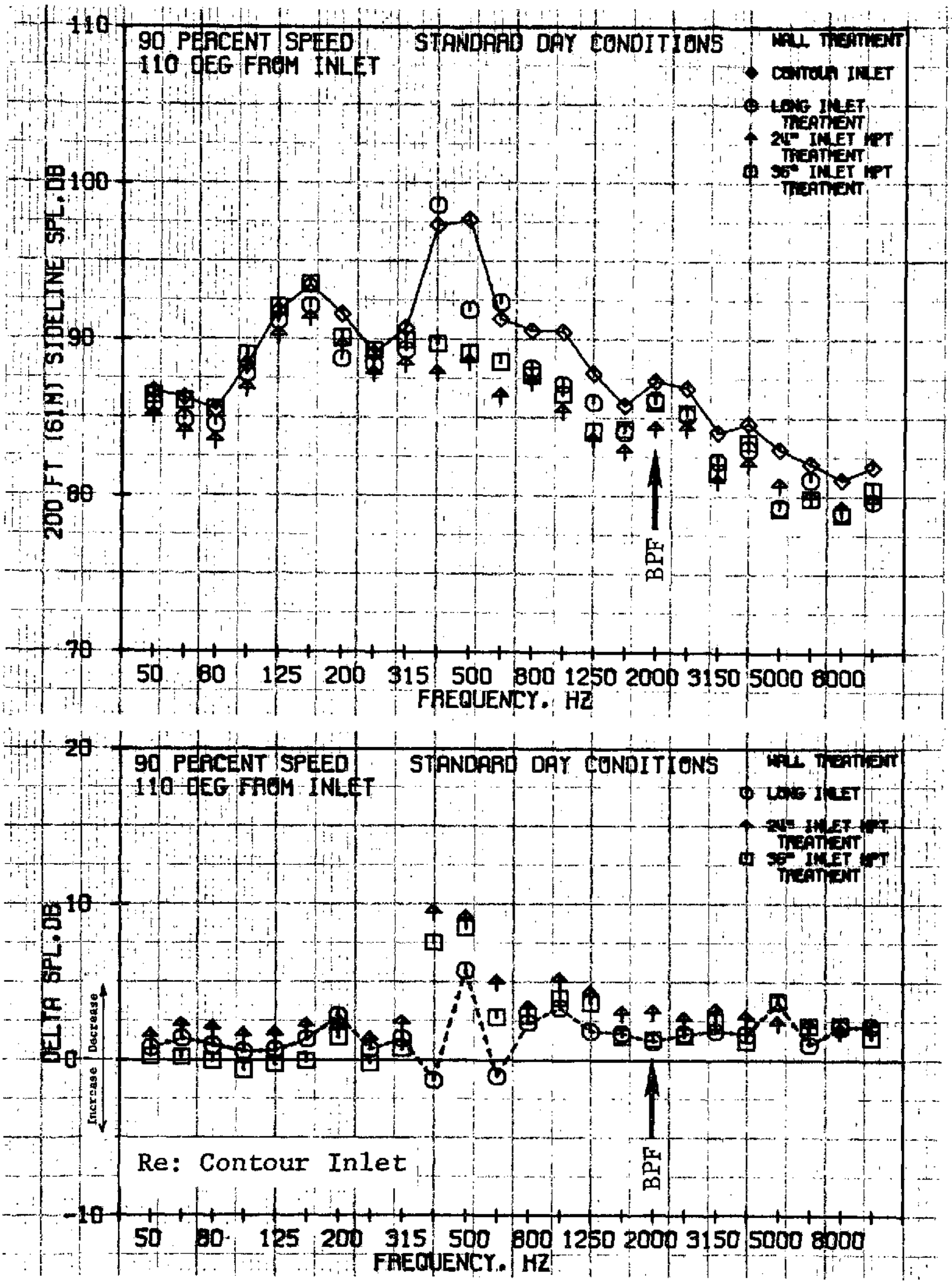


Figure 104. Effect of Inlet Treatment/Length, SPL Spectra for Takeoff at 110°.

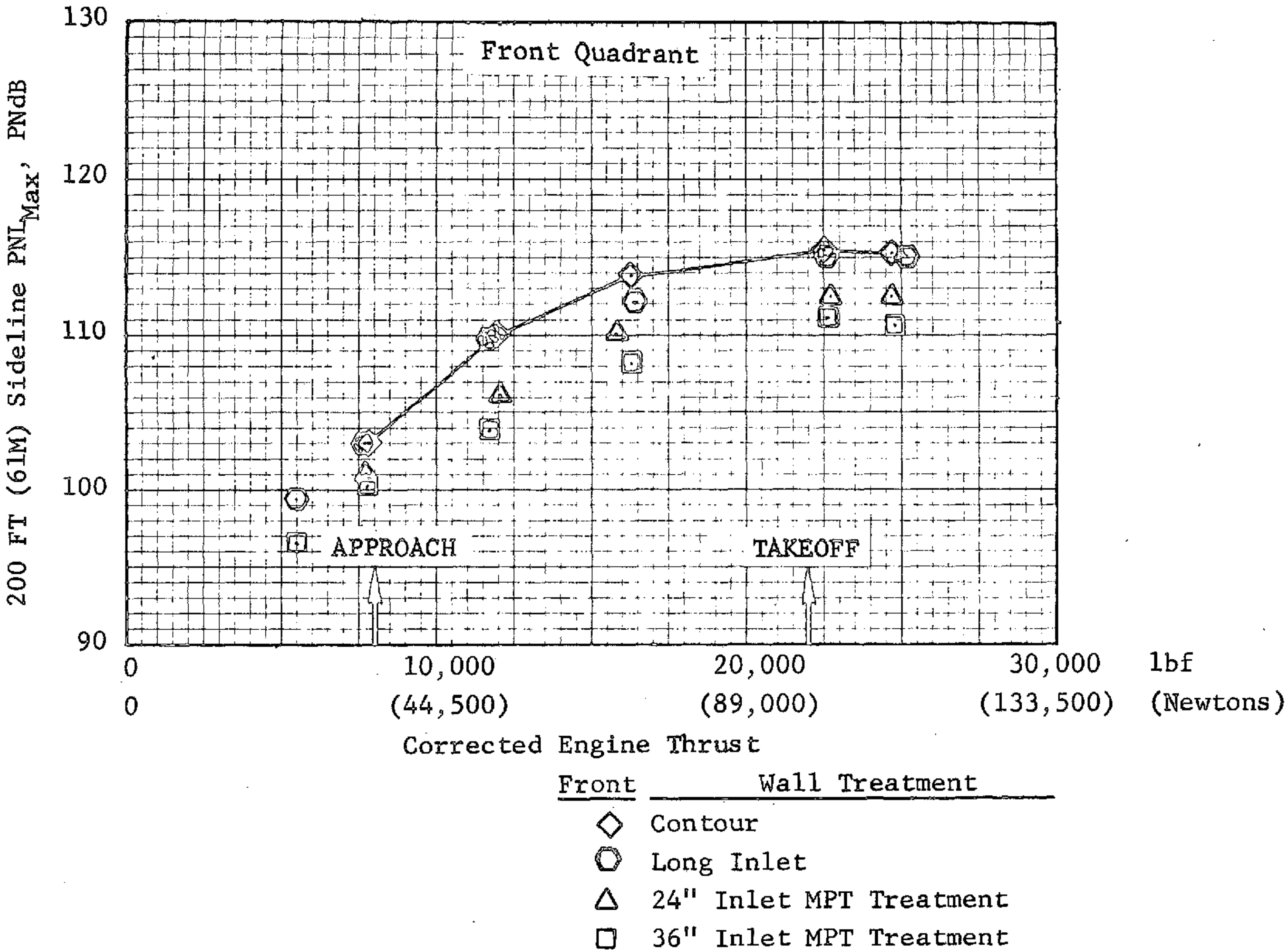


Figure 105. Effect of Inlet Treatment/Length, Maximum Front Quadrant PNL Variation with Engine Thrust.

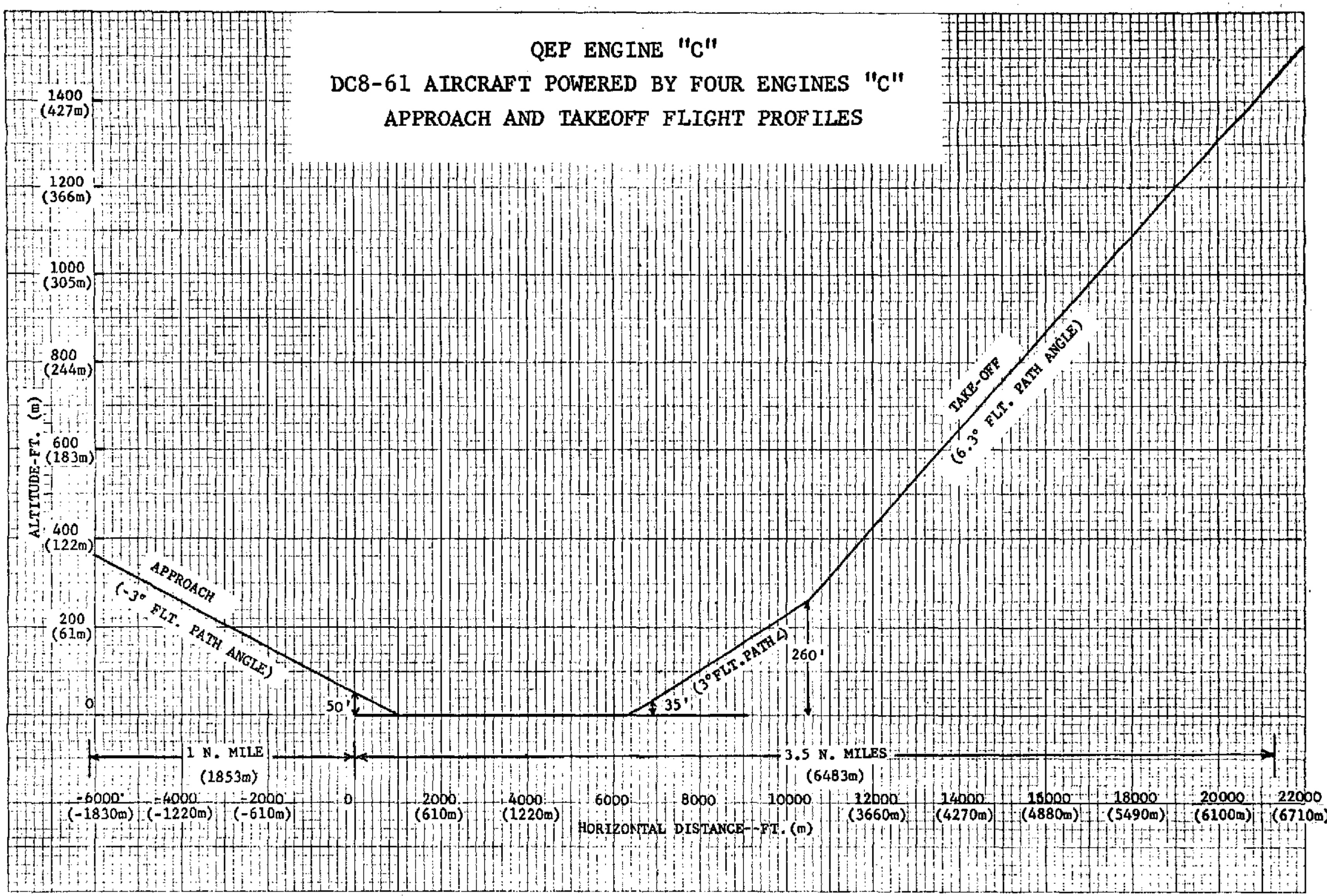


Figure 106. Approach and Takeoff Flight Profiles for a DC8-61 Aircraft Powered by Four Engines "C".

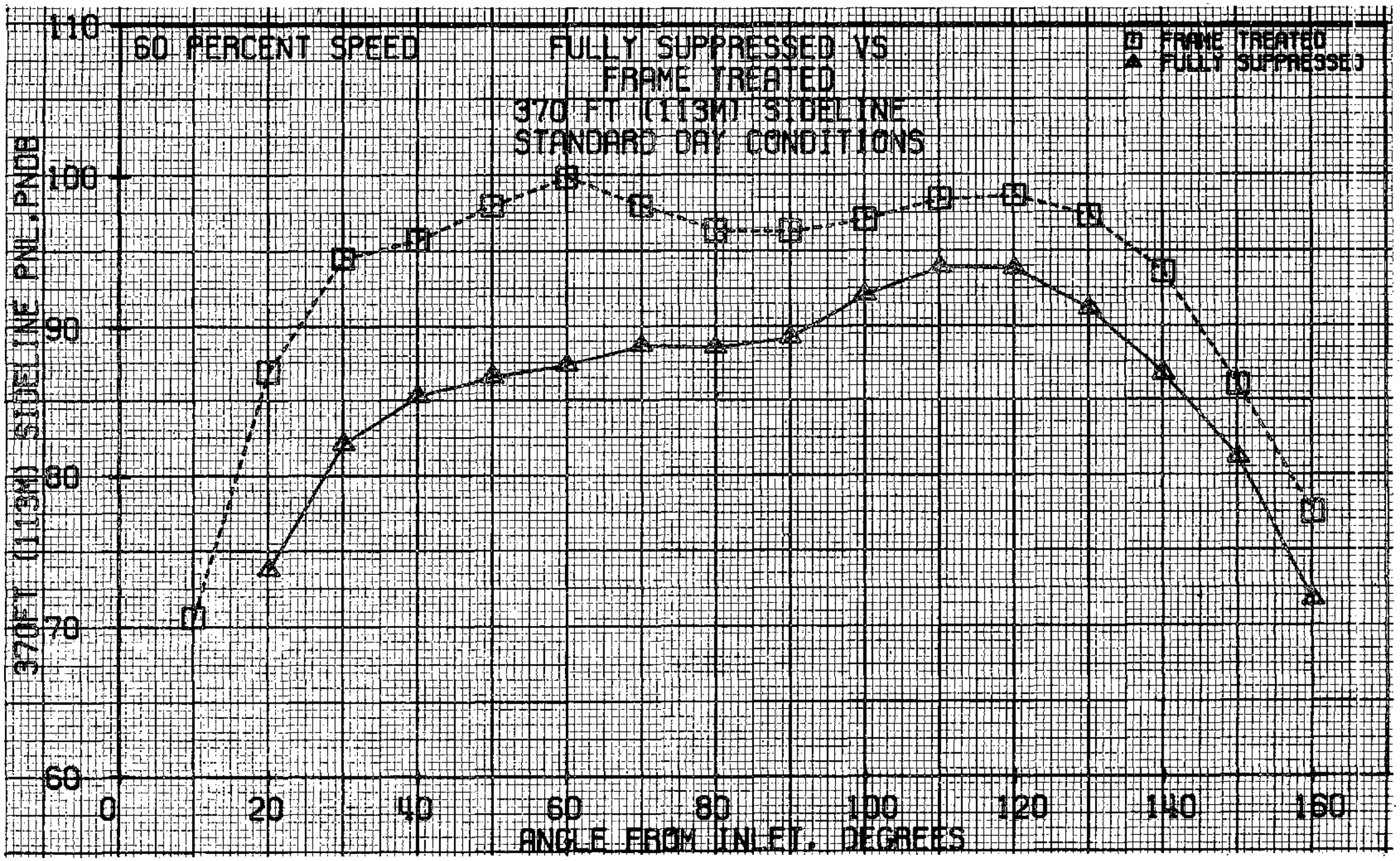


Figure 107. Comparison of Fully Suppressed and Frame-Treated Configurations, 370-ft (113 m) Sideline PNL Directivities for Approach.

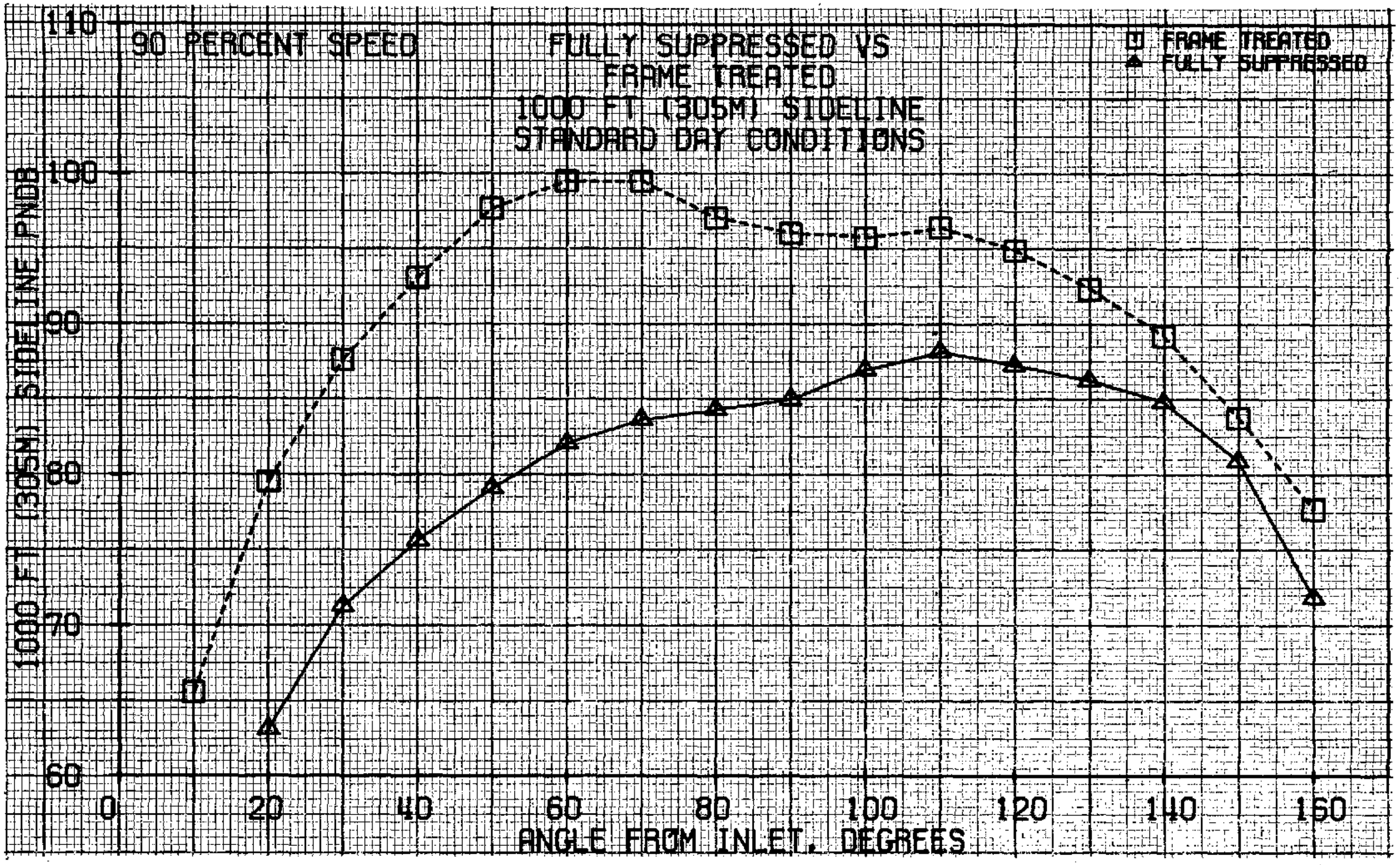
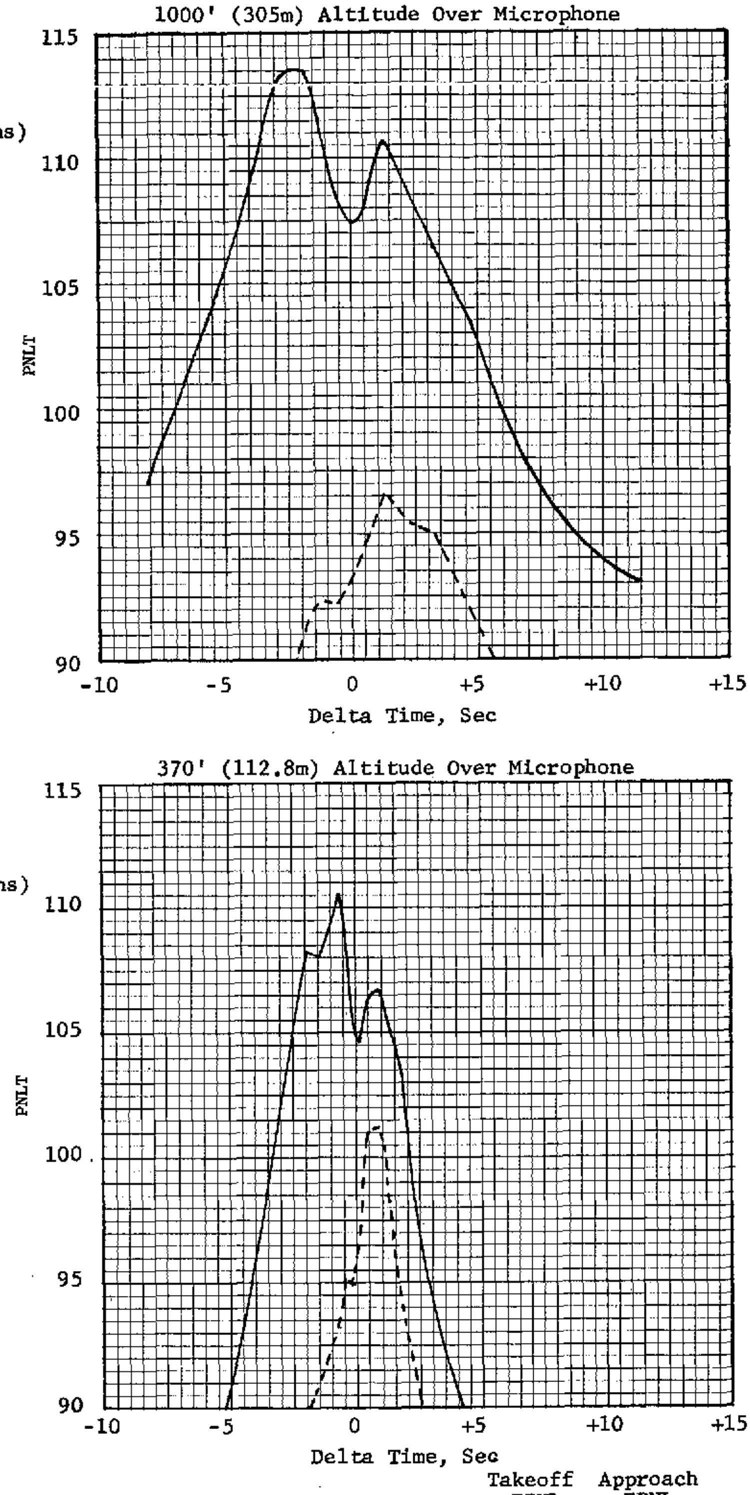


Figure 108. Comparison of Fully Suppressed and Frame-Treated Configurations, 1000-ft (305 m) Sideline PNL Directivities for Takeoff.

Takeoff
M= 0.25
Engine Thrust=15,950 Lbs
(70,978 Newtons)

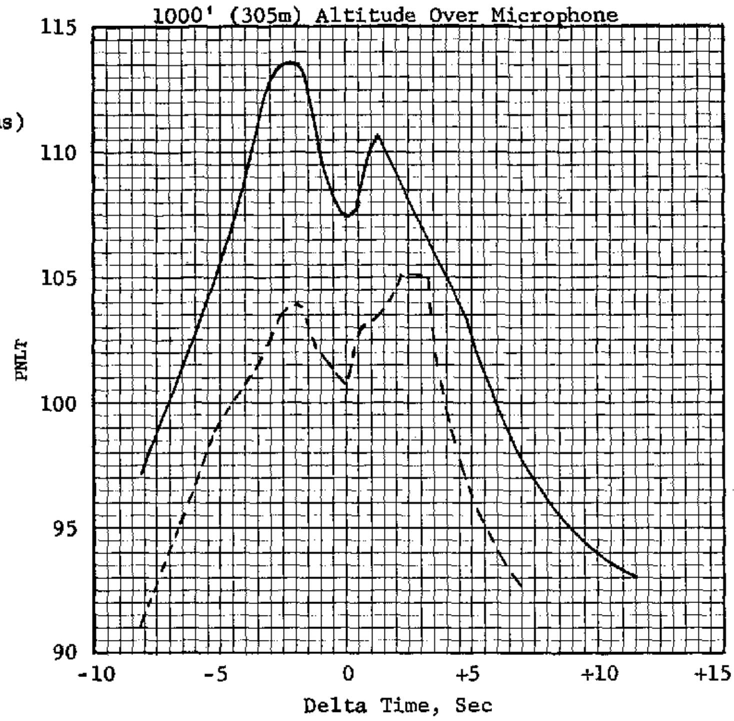
Approach
M= 0.25
Engine Thrust= 4,900 Lbs
(21,805 Newtons)



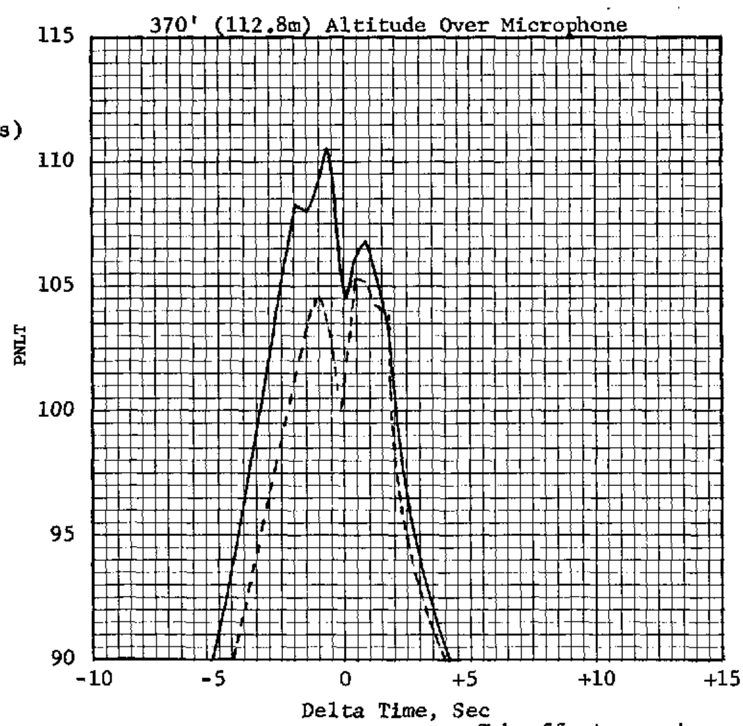
	Takeoff EPNL	Approach EPNL
——— Frame Treated	109.7	104.2
- - - - - - Fully Suppressed	92.9	93.2

Figure 109. Comparison of Fully Suppressed and Frame-Treated Configurations, Level Flyover of an Aircraft Powered by Four Engines "C".

Takeoff
M= 0.25
Engine Thrust=15,950 Lbs
(70,978 Newtons)



Approach
M= 0.25
Engine Thrust= 4,900 Lbs
(21,805 Newtons)

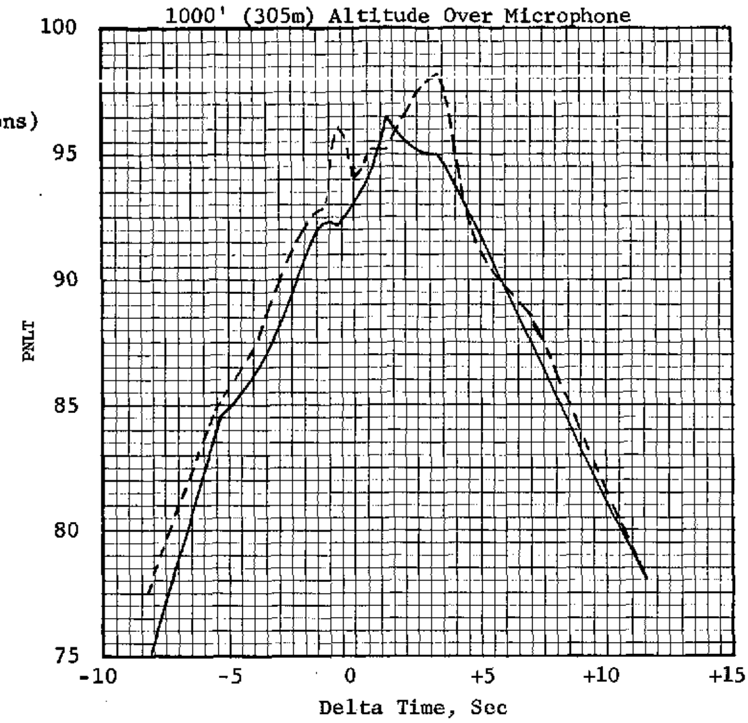


Note: Fan Frame Treatment, Baseline

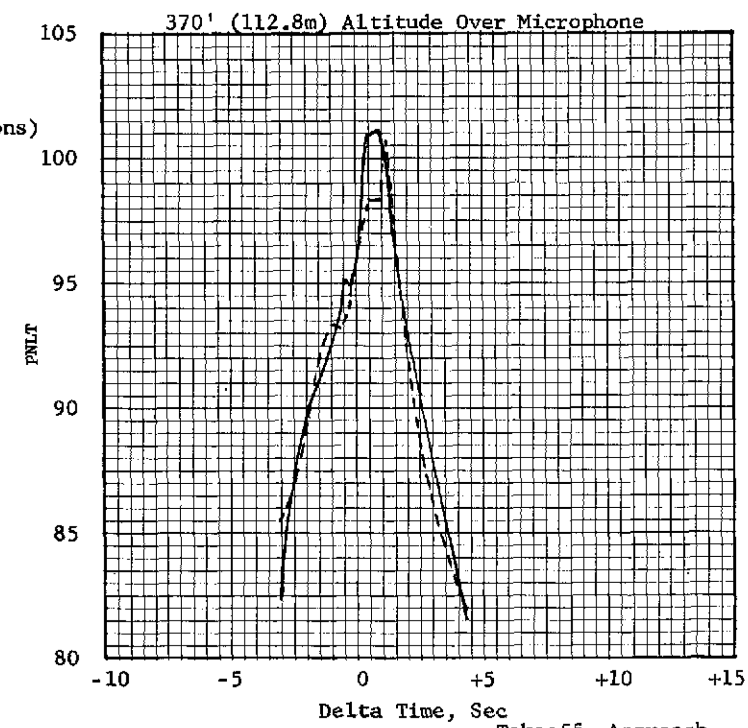
	Takeoff EPNL	Approach EPNL
———— Engine "C"	109.7	104.2
- - - - - - - Engine "A"	103.0	100.3

Figure 110. Comparison of Engines "A" and "C" Frame-Treated Configuration, Level Flyover of an Aircraft Powered by Four Engines "C".

Takeoff
M= 0.25
Engine Thrust=15,950 Lbs
(70,978 Newtons)



Approach
M= 0.25
Engine Thrust= 4,900 Lbs
(21,805 Newtons)

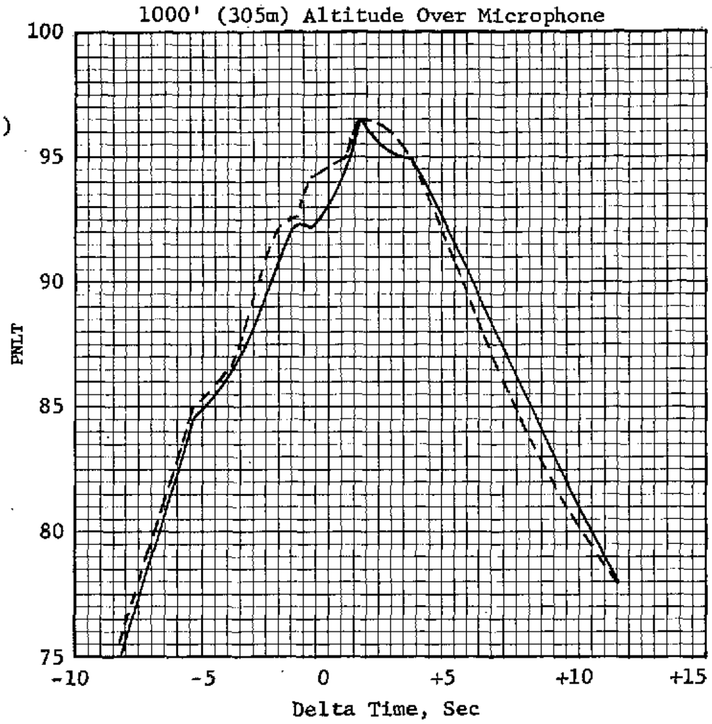


Note: Fully Suppressed

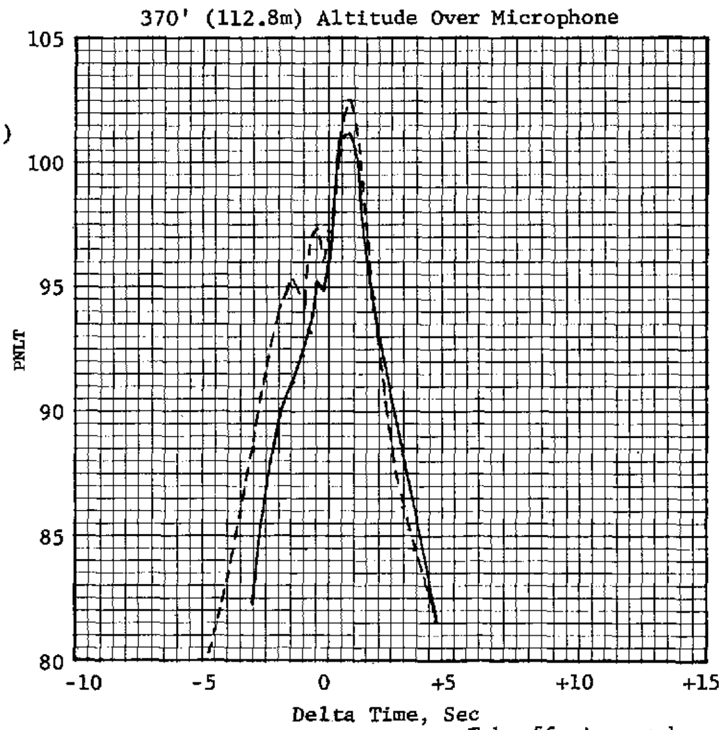
	Takeoff EPNL	Approach EPNL
———— Engine "C"	92.9	93.2
------- Engine "A"	94.3	92.4

Figure 111. Comparison of Engines "A" and "C" Fully Suppressed Configuration, Level Flyover of an Aircraft Powered by Four Engines "C".

Takeoff
M= 0.25
Engine Thrust=15,950 Lbs
(70,978 Newtons)



Approach
M= 0.25
Engine Thrust= 4,900 Lbs
(21,805 Newtons)

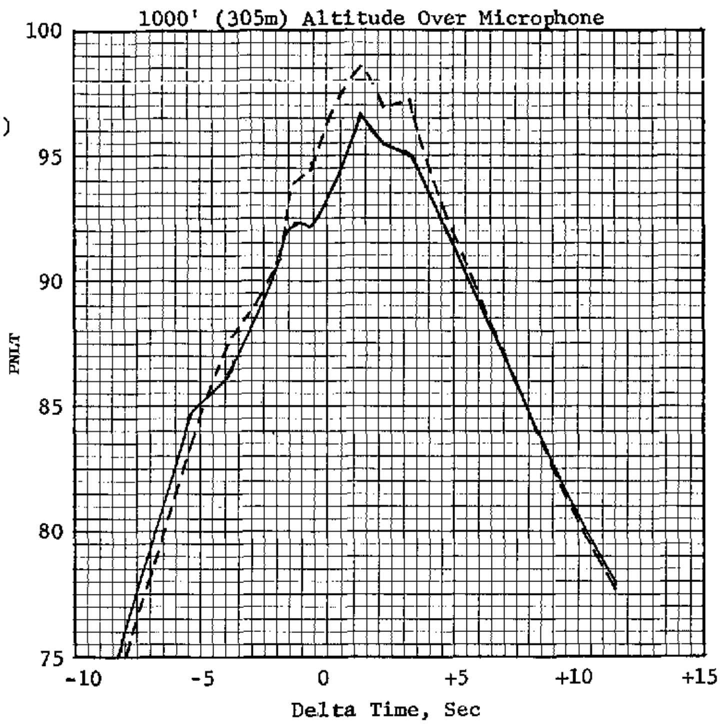


Note: Fully Suppressed

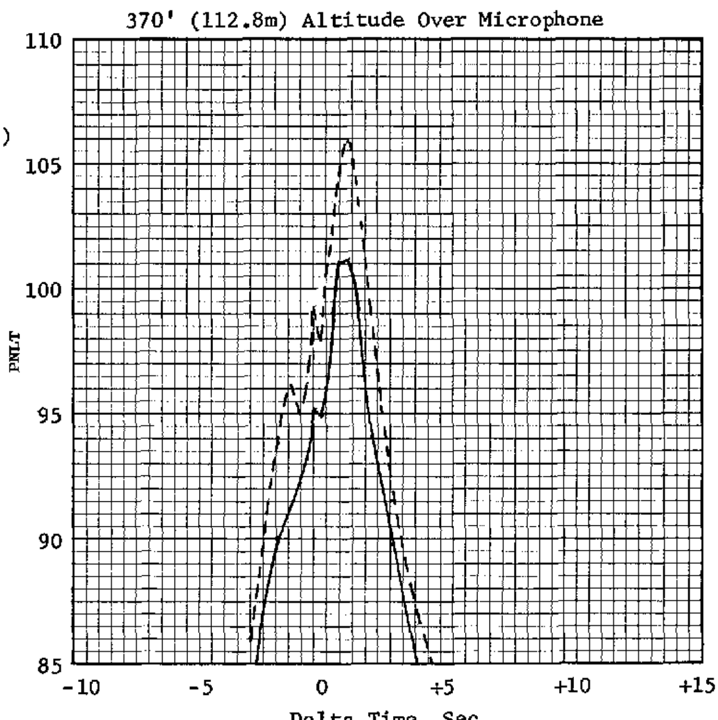
	Takeoff EPNL	Approach EPNL
———— Non-Coplanar Nozzle	92.9	93.2
------ Coplanar Nozzle	93.5	94.4

Figure 112. Effect of Coplanar Nozzle, Level Flyover of an Aircraft Powered by Four Engines "C".

Takeoff
M= 0.25
Engine Thrust=15,950 Lbs
(70,978 Newtons)



Approach
M= 0.25
Engine Thrust= 4,900 Lbs
(21,805 Newtons)



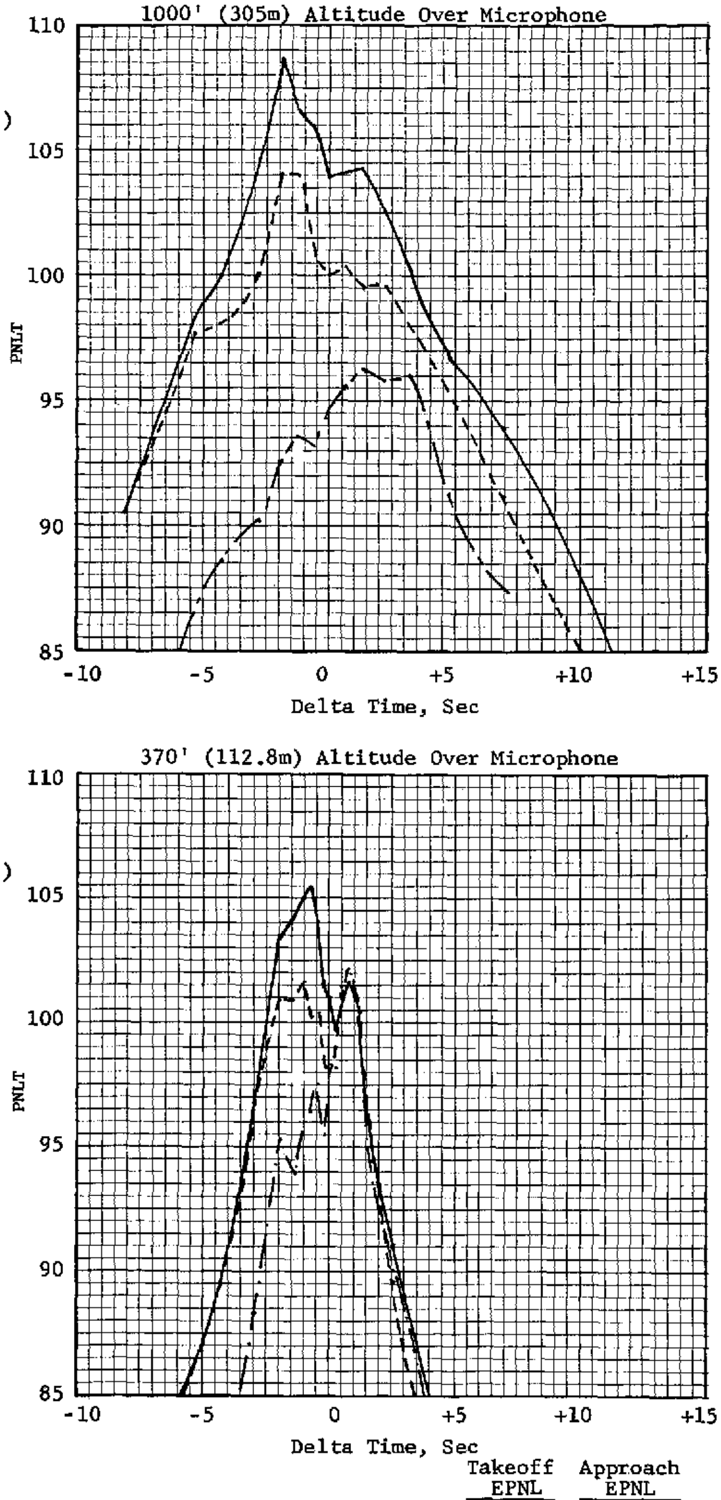
Note: Suppressed Fan

	Takeoff EPNL	Approach EPNL
——— Fully Suppressed	92.9	93.2
------ Suppressed Fan, Hard Core	94.9	97.2

Figure 113. Effect of Core Exhaust Treatment, Level Flyover of an Aircraft Powered by Four Engines "C".

Takeoff
M= 0.25
Engine Thrust=15,950 Lbs
(70,978 Newtons)

Approach
M= 0.25
Engine Thrust= 4,900 Lbs
(21,805 Newtons)

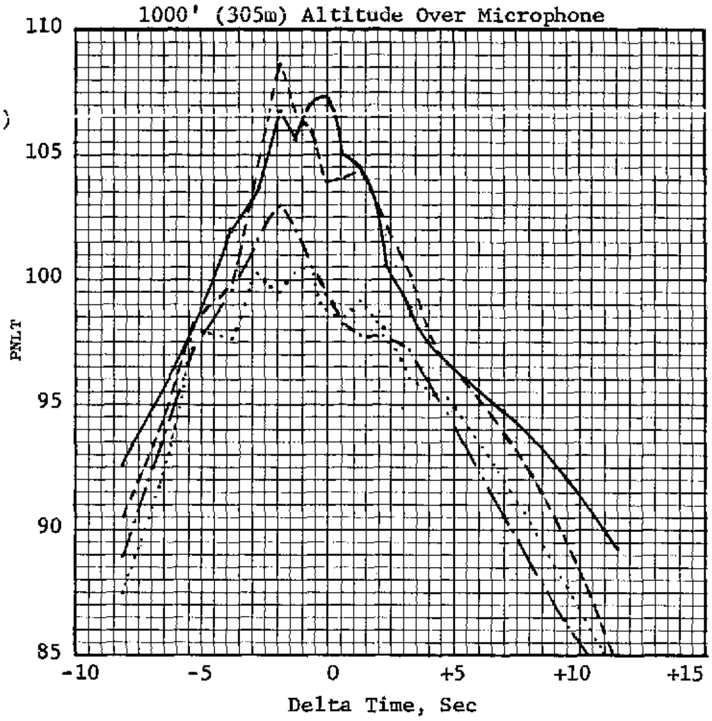


Note: Suppressed Fan Exhaust

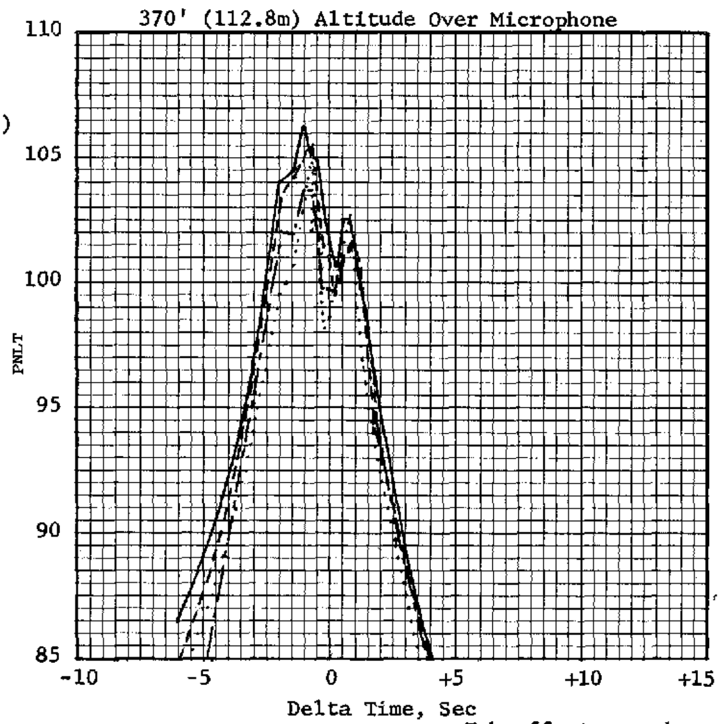
	Takeoff EPNL	Approach EPNL
———— No Splitter	103.7	98.9
- - - - - - - One Splitter	100.6	97.3
—— • —— Four Splitters	93.0	94.4

Figure 114. Effect of Inlet Splitters, Level Flyover of an Aircraft Powered by Four Engines "C".

Takeoff
M= 0.25
Engine Thrust=15,950 Lbs
(70,978 Newtons)



Approach
M= 0.25
Engine Thrust= 4,900 Lbs
(21,805 Newtons)



Note: Suppressed Fan Exhaust

	Takeoff EPNL	Approach EPNL
———— Contoured Inlet	103.8	99.8
------ Long Inlet Treatment	103.7	98.9
—·— 24" Inlet MPT Treatment	99.9	97.8
········ 36" Inlet MPT Treatment	99.4	97.5

Figure 115. Effect of Inlet Treatment/Length, Level Flyover of an Aircraft Powered by Four Engines "C".

APPENDIX

A. FLIGHT NOISE PREDICTION

Flight noise levels were projected for an aircraft powered by four Quiet Engines "C". These projections were based on flight directly over microphones at the FAR-36[7] specified measuring locations for the DC8-61 approach and takeoff flight profiles as well as for level flight at a specific altitude. The flight noise projections were computed with the General Electric "Fly Over Noise Program".

This fly over program predicts noise levels of a point noise source moving through three dimensional space, as would be recorded at a stationary point on the ground. The program requires the input of the 1/3-octave static engine spectra at multiples of 10° angles as well as the number of engines on the aircraft. Further, the aircraft flight path, velocity and angle of attack must be detailed as a function of time. With these inputs, the program projects the time varying, aircraft flight spectra that have been adjusted for the number of aircraft engines, for the Doppler effect, for the range from the plane to the microphone, and for ground and atmospheric attenuation.

A further adjustment must be made to these flight spectra. The jet noise portion of these spectra, which is produced by the interaction of the engine jet exhaust with the surrounding air is based on static test conditions. However, during flight the free stream air is moving (relative to the engines) at the velocity of the aircraft. In that the jet noise levels are based on relative velocity differences, the low frequency portions of static spectra are too high to be representative of flight. Thus, corrections for relative velocity effects must be applied in order to simulate flight conditions.

The "Fly Over Noise Program" permits such relative velocity corrections. The SAE method described in AIR 876[11] is used to predict the total static and flight, maximum angle, jet spectra from cycle data for the fan and the core jets (See Table IV for approach and takeoff cycle data.) These dynamic and static spectra are arithmetically subtracted from one another. The maximum angle spectral difference is then arithmetically subtracted from the static test results for those angles and over those portions of the test spectra determined to be jet noise. The jet noise portion of the spectra was determined by examining comparisons of the test data and the predicted static jet spectra on an individual basis. When the delta (difference between measured and predicted jet) was greater than 3 dB, the spectra were no longer considered to be jet noise controlled.

Perceived noise levels are calculated from these adjusted spectra to yield a PNL-time relationship. By applying the pure tone corrections to the perceived noise, PNLT is determined as a function of time. Integrating this PNLT flyover time history from the time at which the maximum value of PNLT-10 first occurs until the time at which it last occurs, using 1/2 second time intervals as specified by FAR-36, produces the effective perceive noise of the flyover (note that a 90 PNdB floor was utilized for this calculation, as specified by FAR-36).

B. ONE-THIRD-OCTAVE TEST DATA

Representative 1/3-octave results from NASA/GE Engine "C" testing at the Peebles Test Site are presented in Figures 116 through 167. Data recorded at four speeds (60%, 70%, 80% and 90%) are included for each configuration investigated. These data have been corrected to standard day conditions of 59° F (15° C) temperature and 70% relative humidity according to the SAE method described in ARP 866.[12] The sound pressure levels are otherwise as measured at the 16 microphone locations on the 150-foot (45.7 m) arc. Each table consists of 24 bands of data at angles from 10° to 160° in 10° increments. The "standard data reduction" (See Section IV-C) of these 1/3-octave results provide, in addition: perceived noise levels and overall sound pressure levels for each angle; sound power levels for each frequency, and the overall sound power level for each speed point.

The results for the 13 sets of speed points are presented as follows:

Figure Number	Configurations
Figures 116 to 119	Fan Frame Treated
Figures 120 to 123	Fully Suppressed
Figures 124 to 127	Total Suppressed Inlet, Hard Fan Exhaust
Figures 128 to 131	Coplanar Nozzle
Figures 132 to 135	Fully Suppressed Inlet With Hard Core Exhaust
Figures 136 to 139	Long Inlet
Figures 140 to 143	One Splitter Inlet
Figures 144 to 147	Two Splitter Inlet
Figures 148 to 151	Three Splitter Inlet
Figures 152 to 155	Four Splitter Inlet
Figures 156 to 159	Contoured Inlet
Figures 160 to 163	Long Inlet With 24" MPT Treatment
Figures 164 to 167	Long Inlet With 36" MPT Treatment

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 60% N_{f_c}

FAN FRAME TREATED CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	77.2	76.5	77.9	81.7	80.8	81.6	80.6	80.1	83.6	85.6	85.6	85.6	86.4	85.5	88.0	87.6	0.	0.	137.3
63.	0.	74.5	72.8	72.3	73.1	73.3	74.2	74.7	75.0	76.2	76.7	76.3	77.0	77.5	77.8	79.2	80.3	0.	0.	129.4
80.	0.	71.5	71.6	71.4	71.3	73.1	73.0	73.3	74.1	75.5	75.6	76.4	76.1	77.6	78.1	79.8	79.1	0.	0.	128.9
100.	0.	71.1	71.6	77.7	78.3	81.3	80.2	80.2	81.5	83.2	84.2	85.2	86.2	85.8	85.4	84.4	81.7	0.	0.	136.6
125.	0.	78.5	78.8	79.1	82.5	87.5	85.7	84.3	85.5	84.4	85.5	87.5	85.7	87.3	85.8	85.1	82.5	0.	0.	138.8
160.	0.	76.8	78.7	80.6	81.1	82.0	82.4	82.1	82.5	83.4	85.0	84.6	84.5	84.8	84.9	82.3	81.2	0.	0.	136.7
200.	0.	78.6	80.8	80.4	79.7	80.1	79.3	79.0	82.1	81.3	80.6	81.5	81.3	80.6	81.1	78.2	80.5	0.	0.	134.2
250.	0.	78.1	79.6	77.8	76.9	78.1	77.2	79.3	79.8	78.7	79.0	81.5	80.1	79.8	80.0	77.9	78.6	0.	0.	132.8
315.	0.	78.3	81.5	79.9	77.8	76.8	78.0	77.7	78.8	78.9	79.8	80.5	82.1	81.3	80.0	79.2	78.8	0.	0.	133.3
400.	0.	79.2	80.7	80.1	78.7	77.5	76.9	76.9	76.6	77.1	77.9	79.2	80.2	80.5	80.9	78.6	76.8	0.	0.	132.4
500.	0.	79.9	81.0	82.2	76.6	78.9	77.3	76.7	77.0	76.7	78.1	79.1	80.4	80.9	82.0	78.2	76.5	0.	0.	132.9
630.	0.	82.0	81.3	83.1	79.9	79.5	78.7	78.0	77.9	78.1	79.8	81.0	82.8	84.8	83.7	79.4	77.3	0.	0.	134.8
800.	0.	84.0	83.8	83.6	81.0	80.8	81.0	79.6	78.2	79.5	80.4	82.8	84.5	85.6	83.0	78.7	77.4	0.	0.	135.9
1000.	0.	84.2	85.1	84.6	81.8	80.5	80.0	78.5	77.9	78.6	80.1	82.0	84.2	84.3	82.7	78.6	75.8	0.	0.	135.7
1250.	0.	93.4	96.0	97.9	92.8	92.1	92.5	89.7	85.8	83.7	84.3	84.8	88.1	87.1	87.8	82.9	83.5	0.	0.	144.6
1600.	0.	86.7	88.0	88.8	85.2	83.5	83.4	80.7	79.0	78.1	79.5	81.7	84.7	83.7	83.7	78.6	77.6	0.	0.	137.6
2000.	0.	87.6	86.9	87.2	85.1	82.9	81.2	78.3	79.4	78.5	80.1	83.4	84.4	84.7	84.9	79.7	77.9	0.	0.	137.5
2500.	0.	91.3	92.6	93.2	89.9	90.4	91.3	87.3	83.6	83.1	83.0	85.1	86.7	87.7	85.5	81.5	78.9	0.	0.	142.7
3150.	0.	86.6	88.3	88.4	87.5	84.9	83.8	80.5	78.2	80.3	79.3	81.8	85.8	86.1	84.0	78.7	78.6	0.	0.	138.9
4000.	0.	90.6	89.4	92.1	89.8	89.8	87.0	83.2	81.1	80.3	82.1	84.8	86.1	84.1	86.4	82.4	80.5	0.	0.	141.6
5000.	0.	88.7	90.8	89.1	88.9	85.7	86.2	82.9	78.6	78.9	78.7	80.2	85.0	86.0	81.9	78.1	76.1	0.	0.	140.1
6300.	0.	88.4	88.3	90.6	88.0	86.2	84.4	81.2	77.8	80.0	80.5	83.7	85.5	83.5	81.9	77.5	76.5	0.	0.	140.4
8000.	0.	88.7	89.9	87.7	87.2	84.6	87.6	80.4	77.2	76.7	76.0	79.4	83.6	82.9	81.6	76.7	73.8	0.	0.	140.0
10000.	0.	86.5	87.3	86.8	86.4	82.5	81.9	78.3	74.6	76.4	76.1	79.2	81.5	80.5	79.4	74.3	73.6	0.	0.	139.5
OVERALL	13.8	100.0	101.3	102.2	99.4	96.7	98.3	95.7	94.2	94.3	95.2	96.6	98.1	98.1	97.4	94.9	93.9	13.8	13.8	152.2
PNL	0.	113.4	114.3	114.9	112.8	112.1	111.9	108.9	106.5	106.4	106.9	109.1	110.8	110.9	110.3	106.5	105.1	0.	0.	
PNLT	0.	116.0	117.5	118.6	115.9	115.5	115.5	112.2	108.9	108.2	108.4	110.3	112.0	112.0	111.8	108.0	107.3	0.	0.	

Figure 116.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 70% N_{f_c}

FAN FRAME TREATED CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	74.5	75.0	75.9	75.8	76.0	76.8	79.0	79.0	81.2	81.7	81.7	75.5	83.0	84.7	88.0	89.0	0.	0.	134.9
63.	0.	78.5	76.0	77.9	76.0	77.0	77.0	79.7	79.2	80.1	81.0	83.1	77.8	82.2	84.0	86.6	87.2	0.	0.	134.5
80.	0.	76.1	76.6	75.5	74.6	75.3	74.6	77.3	77.6	78.0	79.3	80.6	76.3	81.8	83.5	86.2	84.7	0.	0.	133.1
100.	0.	76.3	75.8	77.1	77.9	81.6	80.6	82.5	84.1	85.0	85.8	86.6	83.6	87.8	88.6	89.8	87.0	0.	0.	138.4
125.	0.	85.8	86.9	85.1	88.0	90.1	90.3	88.2	94.5	92.5	94.0	92.1	91.0	94.2	94.2	93.9	90.2	0.	0.	145.5
160.	0.	90.4	83.8	86.0	84.7	86.9	86.7	87.6	89.2	89.5	90.7	90.7	88.7	91.0	89.9	86.6	87.2	0.	0.	142.3
200.	0.	83.5	85.7	86.1	84.8	84.7	82.9	83.7	87.2	88.6	87.0	85.7	87.6	89.3	90.8	86.7	85.2	0.	0.	140.5
250.	0.	91.7	83.6	82.2	79.8	80.7	79.8	83.0	83.2	84.4	85.0	84.7	83.5	85.9	85.0	83.9	85.2	0.	0.	137.3
315.	0.	79.7	82.9	81.9	79.8	82.0	81.0	82.8	83.2	84.1	84.7	85.9	85.4	85.2	83.7	83.9	82.9	0.	0.	137.4
400.	0.	83.4	83.8	82.8	81.7	81.9	83.9	81.8	86.1	84.0	82.9	84.9	83.3	86.1	84.8	84.5	82.8	0.	0.	137.7
500.	0.	90.3	83.4	85.0	80.8	80.7	79.8	81.4	82.0	82.0	82.5	83.5	84.5	84.0	85.8	83.7	82.0	0.	0.	136.7
630.	0.	85.0	85.2	85.1	82.0	80.1	79.0	80.2	81.4	82.7	85.2	85.2	85.7	86.5	85.1	82.8	81.2	0.	0.	137.6
800.	0.	85.6	86.9	84.1	81.8	82.0	80.8	80.7	81.2	82.2	83.0	85.7	86.5	87.0	84.0	82.7	80.2	0.	0.	137.8
1000.	0.	86.9	86.2	86.4	84.0	84.9	83.2	83.0	82.2	83.5	85.0	85.9	87.9	87.2	85.2	85.1	80.2	0.	0.	139.2
1250.	0.	87.7	89.1	89.1	86.1	87.9	85.1	83.0	84.1	83.5	84.7	86.0	86.5	87.2	84.0	83.6	81.0	0.	0.	140.0
1600.	0.	100.8	105.1	98.3	101.2	105.1	102.3	95.3	96.6	95.6	95.1	92.1	95.1	92.3	92.1	90.0	87.6	0.	0.	153.3
2000.	0.	88.1	90.6	88.5	86.2	87.2	85.5	82.2	83.7	82.7	84.3	86.2	87.2	85.7	83.3	82.2	79.6	0.	0.	140.1
2500.	0.	89.0	88.4	89.7	87.1	86.1	83.1	82.1	80.6	83.6	85.1	87.4	88.0	89.4	85.3	84.0	80.5	0.	0.	140.7
3150.	0.	95.5	94.0	98.0	94.8	95.0	92.8	92.0	88.2	88.1	87.9	90.8	92.5	94.0	90.0	87.7	88.2	0.	0.	147.3
4000.	0.	88.8	91.0	90.4	87.2	86.8	84.9	82.8	82.1	83.4	86.0	87.9	87.6	88.4	87.1	84.0	80.3	0.	0.	141.8
5000.	0.	92.3	92.3	93.7	88.4	90.5	87.5	84.7	81.7	83.1	86.4	87.6	89.3	89.8	86.4	84.6	82.9	0.	0.	143.6
6300.	0.	88.3	90.5	90.5	87.3	88.4	83.4	83.4	81.7	84.9	86.4	87.4	86.2	86.6	82.4	81.1	78.7	0.	0.	142.1
8000.	0.	84.7	87.2	87.1	85.0	84.2	82.2	80.2	79.5	81.4	84.2	86.2	89.0	87.4	86.0	83.1	80.2	0.	0.	141.8
10000.	0.	85.0	85.9	86.2	84.3	84.2	80.2	79.0	77.2	79.6	81.0	82.3	82.7	85.2	82.0	80.9	77.2	0.	0.	140.5
OVERALL	13.8	103.8	106.6	103.8	103.5	106.3	103.8	99.7	101.8	100.6	101.2	101.1	101.7	102.5	101.3	100.4	98.7	13.8	13.8	157.0
PNL	0.	116.9	119.5	118.4	116.4	118.8	116.4	113.1	113.9	112.9	113.4	114.3	115.2	116.2	113.6	111.9	110.8	0.	0.	
PNLT	0.	121.2	124.6	121.5	121.5	124.7	122.0	117.3	118.8	117.1	116.9	116.3	117.9	118.4	116.4	114.3	113.5	0.	0.	

Figure 117.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 80% N_{f_c}

FAN FRAME TREATED CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	78.3	78.0	78.0	78.8	79.0	78.7	80.2	81.3	82.3	83.0	84.2	86.0	87.7	89.4	92.6	94.5	0.	0.	139.0
63.	0.	81.5	79.2	78.6	79.8	81.8	80.1	82.0	81.5	82.0	83.3	85.0	86.4	87.5	89.4	91.4	92.3	0.	0.	138.7
80.	0.	79.3	78.1	78.5	78.4	80.4	79.6	80.0	80.1	81.3	82.9	84.6	86.0	87.5	89.5	91.0	90.6	0.	0.	138.2
100.	0.	78.4	78.4	80.3	82.7	83.9	84.1	85.1	86.1	86.8	89.1	90.0	90.9	92.4	93.7	94.5	91.7	0.	0.	142.6
125.	0.	80.9	85.9	89.1	89.2	90.7	91.1	91.6	91.3	92.5	95.7	96.2	97.2	96.4	96.7	96.0	93.1	0.	0.	147.5
160.	0.	84.1	87.6	90.0	90.3	90.4	91.1	91.3	91.3	92.2	94.2	95.0	95.7	95.0	94.7	93.2	91.2	0.	0.	146.5
200.	0.	86.2	88.7	87.0	88.2	87.7	85.9	86.4	87.9	88.7	89.3	89.8	90.6	90.8	91.2	90.3	90.1	0.	0.	142.6
250.	0.	85.4	87.9	89.1	84.7	88.2	86.2	86.2	85.7	86.6	89.5	90.1	89.5	90.8	90.7	88.9	89.2	0.	0.	142.1
315.	0.	84.0	85.7	86.5	85.0	86.2	85.6	86.5	86.9	87.1	88.5	90.1	90.5	90.1	90.2	88.3	88.5	0.	0.	141.8
400.	0.	83.6	85.4	87.8	87.6	85.8	84.8	87.6	87.4	88.5	87.9	88.7	89.0	90.0	89.5	89.7	88.1	0.	0.	141.8
500.	0.	92.5	93.9	97.3	98.6	89.5	91.7	92.7	86.2	93.0	92.5	89.4	90.9	90.3	93.1	93.6	87.7	0.	0.	146.7
630.	0.	93.9	100.4	94.0	96.4	97.0	97.2	93.6	87.6	91.5	90.0	92.7	90.7	92.2	96.2	90.5	89.4	0.	0.	148.1
800.	0.	95.4	101.7	100.7	103.3	103.8	103.2	102.2	99.8	94.5	95.3	95.5	95.5	96.0	94.3	94.3	95.7	0.	0.	153.8
1000.	0.	110.2	100.7	99.6	99.6	100.3	103.1	99.7	102.1	98.4	96.8	94.2	93.7	99.4	99.4	94.2	91.6	0.	0.	153.5
1250.	0.	98.5	100.5	101.2	97.5	98.6	101.1	102.0	100.1	96.3	94.7	92.2	92.6	97.4	97.3	92.1	90.0	0.	0.	152.5
1600.	0.	110.7	101.4	107.3	102.3	104.5	104.6	102.2	98.0	98.8	96.0	95.7	96.4	95.3	95.3	93.0	93.2	0.	0.	155.2
2000.	0.	113.6	103.3	109.7	104.3	106.1	105.7	103.0	98.1	101.3	97.6	97.8	98.0	96.1	96.8	95.0	95.5	0.	0.	157.1
2500.	0.	99.6	101.6	102.8	97.3	100.2	100.3	99.3	95.7	93.8	92.1	93.9	93.6	93.6	91.0	89.4	88.8	0.	0.	151.9
3150.	0.	97.4	99.2	100.9	101.3	98.8	98.0	97.2	91.5	92.8	90.4	92.5	94.5	94.1	90.8	87.6	88.5	0.	0.	151.1
4000.	0.	110.5	98.5	101.7	102.7	101.5	98.0	96.4	93.0	90.5	90.8	93.5	93.3	91.3	93.3	90.1	89.5	0.	0.	152.2
5000.	0.	97.1	98.9	98.5	93.4	95.9	97.9	96.9	90.3	88.8	87.8	89.5	94.0	93.4	89.0	86.1	84.8	0.	0.	150.0
6300.	0.	94.6	94.8	97.2	95.9	96.0	93.3	93.1	88.4	87.8	87.9	90.0	90.7	88.1	87.7	84.1	84.6	0.	0.	148.1
8000.	0.	93.6	95.2	94.1	95.1	93.1	93.2	92.7	87.4	85.3	85.1	87.6	91.2	88.5	87.3	83.0	82.4	0.	0.	147.8
10000.	0.	90.1	91.6	92.0	92.4	90.1	90.5	89.5	84.1	83.1	83.1	85.1	88.3	87.1	86.0	81.6	81.3	0.	0.	146.3
OVERALL	13.8	110.0	111.3	114.1	111.8	112.2	112.2	110.6	108.1	107.2	106.0	106.3	106.9	107.3	107.4	105.5	104.8	13.8	13.8	164.0
PNL	0.	123.0	123.9	127.4	125.1	125.0	124.8	123.1	119.2	120.2	118.3	118.9	119.5	119.2	118.9	116.8	116.5	0.	0.	
PNLT	0.	124.3	123.9	129.5	127.3	127.2	126.5	124.9	120.8	121.8	119.4	120.4	120.6	120.4	120.1	118.0	118.2	0.	0.	

Figure 118.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 90% N_{f_c}

FAN FRAME TREATED CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	82.0	82.1	81.1	82.3	82.5	83.0	84.5	85.3	86.5	88.0	89.1	91.3	93.0	96.0	100.2	102.3	0.	0.	145.5
63.	0.	84.0	82.3	82.7	81.8	82.5	83.1	84.5	85.2	86.3	87.5	88.8	90.1	92.0	94.5	97.5	98.4	0.	0.	143.5
80.	0.	84.1	81.9	82.0	82.2	82.9	83.8	84.6	84.7	85.9	87.4	89.4	92.1	93.9	95.8	97.7	96.0	0.	0.	143.9
100.	0.	83.4	82.2	84.5	84.9	86.9	86.6	87.9	89.2	90.5	92.1	93.7	95.4	97.2	99.2	100.8	96.8	0.	0.	147.3
125.	0.	83.7	85.2	89.1	90.2	91.4	91.4	92.7	93.8	94.4	96.7	97.8	98.5	100.0	102.0	102.2	98.2	0.	0.	150.8
160.	0.	87.4	92.1	96.2	94.8	95.3	94.8	94.6	94.9	97.6	99.0	99.0	99.7	99.7	100.6	100.5	97.3	0.	0.	151.2
200.	0.	88.5	91.2	90.3	90.7	90.7	90.9	91.2	92.5	92.4	94.0	94.4	95.2	95.7	98.0	96.4	95.6	0.	0.	147.3
250.	0.	89.2	92.2	93.3	92.5	93.8	95.4	92.7	94.3	93.4	94.5	94.8	95.0	96.4	97.0	95.5	93.5	0.	0.	148.1
315.	0.	94.5	99.1	95.6	93.4	99.3	99.4	98.3	93.0	100.5	99.9	95.9	95.7	96.7	97.8	95.2	96.4	0.	0.	151.4
400.	0.	91.8	93.6	101.6	105.2	110.2	110.6	109.9	105.2	103.4	96.6	102.8	99.3	101.9	101.9	98.3	101.4	0.	0.	159.4
500.	0.	96.7	104.6	105.5	102.5	104.8	108.0	105.4	103.1	101.5	98.4	99.1	99.4	98.6	99.1	100.1	99.9	0.	0.	156.9
630.	0.	94.9	101.8	105.1	104.2	106.5	105.9	101.9	102.5	98.4	96.4	98.3	99.2	102.0	99.8	98.0	98.4	0.	0.	156.1
800.	0.	99.3	100.1	100.4	103.3	102.5	101.0	98.8	97.5	94.9	94.7	93.9	97.2	98.1	95.6	95.0	95.4	0.	0.	152.7
1000.	0.	107.2	104.4	106.3	105.0	105.2	103.7	103.0	100.3	95.9	99.7	95.5	97.4	96.4	98.7	95.2	94.0	0.	0.	155.8
1250.	0.	100.8	103.6	104.1	103.6	102.3	102.5	99.9	95.5	94.5	95.7	93.2	95.0	93.7	95.2	93.4	93.4	0.	0.	153.5
1600.	0.	100.3	101.5	102.1	101.5	100.3	100.9	97.8	94.8	93.7	93.6	93.4	94.2	92.9	93.4	92.2	91.3	0.	0.	151.9
2000.	0.	104.9	106.2	106.2	108.6	108.3	105.3	100.1	98.0	97.3	98.9	101.8	101.6	99.6	98.6	96.7	95.4	0.	0.	157.8
2500.	0.	101.4	102.2	103.9	100.9	101.6	100.3	97.6	95.3	94.0	94.1	95.6	95.3	95.0	93.2	92.1	90.5	0.	0.	152.8
3150.	0.	97.7	99.7	100.4	101.1	98.3	96.5	94.9	91.3	92.7	91.5	92.9	95.0	93.0	91.7	88.7	89.4	0.	0.	150.6
4000.	0.	100.1	99.1	101.7	99.5	99.6	98.0	94.6	94.0	92.2	94.2	97.1	97.2	93.7	94.9	92.8	90.9	0.	0.	152.0
5000.	0.	97.8	99.3	98.7	98.1	95.6	97.7	95.1	90.6	89.9	90.2	90.6	95.2	94.4	90.8	88.4	86.6	0.	0.	150.1
6300.	0.	95.6	95.3	97.7	96.6	96.7	93.5	91.6	89.3	90.6	91.1	94.3	93.6	90.9	90.1	87.9	88.3	0.	0.	149.4
8000.	0.	94.3	95.8	94.5	94.8	93.2	92.5	91.3	88.8	88.1	88.6	90.1	93.5	89.8	89.0	86.3	85.5	0.	0.	148.4
10000.	0.	90.6	91.6	92.0	92.9	90.9	90.5	87.9	86.5	86.6	87.2	89.2	92.1	89.2	87.7	84.5	83.4	0.	0.	147.6
OVERALL	13.8	112.4	113.6	114.8	114.8	115.9	115.7	113.7	111.0	109.8	109.2	110.2	110.5	110.8	111.2	110.7	110.1	13.8	13.8	166.8
PNL	0.	124.8	126.2	126.9	127.6	127.6	126.2	123.6	120.8	120.2	120.7	122.4	122.9	121.9	121.5	120.0	119.1	0.	0.	
PNLT	0.	127.5	128.5	128.3	130.1	130.1	127.7	125.0	122.1	121.3	122.4	124.9	125.2	123.8	123.3	121.5	120.6	0.	0.	

Figure 119.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 60% N_{f_c}

FULLY SUPPRESSED CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	74.6	73.8	73.5	76.4	75.5	76.0	76.7	75.5	76.0	77.9	79.1	78.9	81.9	82.8	82.4	83.6	0.	0.	132.0
63.	0.	72.8	72.2	73.0	72.7	72.0	72.6	74.7	73.8	74.2	74.2	74.3	74.0	76.0	76.6	77.7	78.7	0.	0.	127.9
80.	0.	71.7	72.2	70.9	71.6	71.9	73.1	73.8	72.7	73.1	72.9	74.1	73.2	75.2	76.6	78.6	77.6	0.	0.	127.4
100.	0.	71.8	70.9	71.9	73.7	74.7	76.1	76.6	76.8	77.3	78.1	79.1	77.9	79.2	80.7	81.6	78.7	0.	0.	131.1
125.	0.	72.0	72.4	76.2	81.0	79.1	79.8	82.2	81.2	82.5	85.3	84.3	83.3	82.3	82.9	83.9	80.9	0.	0.	135.7
160.	0.	71.7	74.1	76.9	78.5	79.0	80.2	81.1	79.7	80.2	82.0	82.2	82.2	82.3	82.7	80.5	79.7	0.	0.	134.3
200.	0.	73.8	75.2	75.7	76.8	77.9	77.6	77.1	76.6	77.3	79.4	79.1	79.1	80.1	80.0	77.9	77.0	0.	0.	131.7
250.	0.	74.0	74.3	74.6	72.5	75.0	73.4	72.7	73.6	74.3	76.3	77.0	77.0	78.2	78.0	76.9	76.7	0.	0.	129.3
315.	0.	75.0	74.0	73.7	73.5	74.7	73.4	74.9	75.9	76.1	78.1	78.1	79.4	79.4	78.7	77.7	76.8	0.	0.	130.6
400.	0.	72.7	72.9	72.6	71.3	74.9	73.3	73.6	74.4	74.1	75.9	76.9	76.9	78.3	78.9	78.8	75.5	0.	0.	129.5
500.	0.	71.6	72.1	72.8	71.3	72.8	72.2	72.4	72.4	72.8	74.8	76.8	77.1	78.0	78.8	77.7	74.5	0.	0.	128.9
630.	0.	72.3	73.2	74.9	72.7	74.9	72.6	73.1	72.8	72.4	76.5	77.2	78.6	80.3	78.2	75.7	72.8	0.	0.	129.8
800.	0.	72.8	73.0	74.7	71.8	72.7	73.2	73.9	72.9	74.2	77.4	80.2	81.4	82.2	76.9	75.6	72.6	0.	0.	131.2
1000.	0.	72.0	72.3	73.2	73.0	72.2	72.4	74.1	74.0	73.4	76.5	78.3	81.6	80.1	76.1	75.0	71.8	0.	0.	130.5
1250.	0.	71.0	71.3	73.7	71.5	72.0	72.2	74.0	74.6	73.2	76.0	77.0	80.2	78.0	75.9	73.6	71.9	0.	0.	129.7
1600.	0.	68.2	69.4	72.5	70.5	72.1	73.3	73.8	74.7	73.1	76.1	77.1	79.3	77.6	74.8	73.7	72.0	0.	0.	129.5
2000.	0.	70.1	70.6	74.0	71.6	72.4	73.8	72.2	73.9	72.3	75.6	80.4	78.5	80.7	76.9	74.1	72.9	0.	0.	130.6
2500.	0.	72.7	73.9	73.6	72.5	71.7	73.1	72.9	72.6	74.9	78.1	81.3	82.1	80.4	78.0	75.5	71.6	0.	0.	132.0
3150.	0.	73.0	72.4	73.2	70.7	72.0	69.4	70.9	71.8	71.2	74.1	76.5	81.4	76.1	75.9	73.0	71.1	0.	0.	129.7
4000.	0.	79.7	79.0	80.0	76.4	74.6	74.4	71.9	72.8	69.9	73.2	78.0	76.9	78.1	73.8	73.5	71.6	0.	0.	130.9
5000.	0.	81.3	82.2	81.0	77.8	76.1	74.7	74.9	70.8	72.4	74.1	76.2	77.5	74.5	75.8	71.0	69.0	0.	0.	131.6
6300.	0.	85.0	85.2	85.0	83.0	80.0	76.5	75.1	74.0	72.1	75.4	81.3	83.5	80.3	78.2	74.8	72.1	0.	0.	136.0
8000.	0.	83.1	83.3	82.7	80.6	77.8	76.5	75.9	72.8	72.2	75.0	81.3	82.0	80.1	76.6	73.7	70.8	0.	0.	135.6
10000.	0.	84.9	85.8	85.8	84.4	81.9	79.4	78.6	73.6	71.0	72.0	77.1	78.9	77.0	75.7	72.6	69.4	0.	0.	137.8
OVERALL	13.8	91.5	91.9	92.0	90.9	89.8	89.2	89.7	88.9	89.2	91.5	93.0	93.7	93.3	92.5	91.6	90.2	13.8	13.8	146.1
PNL	0.	104.5	104.8	105.1	103.3	101.9	100.3	100.2	99.5	99.6	102.3	105.1	106.2	105.0	103.2	101.2	98.9	0.	0.	
PNLT	0.	104.5	104.8	106.0	104.4	103.0	100.3	100.8	99.5	100.6	103.4	105.7	106.8	105.5	103.2	101.2	98.9	0.	0.	

Figure 120.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 70% N_{f_c}

FULLY SUPPRESSED CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	73.7	73.6	72.5	74.0	73.6	74.2	76.4	75.5	76.9	78.0	79.6	79.5	83.7	85.0	88.1	88.6	0.	0.	134.1
63.	0.	75.2	73.8	73.6	74.9	75.2	76.7	78.5	76.0	75.7	78.2	79.3	78.6	82.6	84.9	86.2	86.4	0.	0.	133.4
80.	0.	74.0	73.9	72.8	72.8	73.8	74.3	75.3	74.6	74.9	76.7	78.0	79.8	81.9	84.1	85.8	83.6	0.	0.	132.4
100.	0.	74.1	73.7	72.6	75.2	76.9	77.7	79.4	80.0	79.8	81.1	82.2	83.9	85.9	86.9	88.3	84.7	0.	0.	135.8
125.	0.	74.0	76.9	80.0	81.4	83.4	90.6	90.0	89.0	86.3	86.4	88.4	89.2	88.8	90.1	91.2	86.0	0.	0.	141.6
160.	0.	74.1	79.0	81.7	83.4	83.2	87.7	88.7	86.8	85.0	85.9	88.2	88.9	88.6	89.1	88.3	84.4	0.	0.	140.5
200.	0.	78.0	80.1	80.8	82.1	82.2	82.5	82.5	81.8	81.1	83.0	84.3	85.7	85.9	86.2	84.2	82.7	0.	0.	137.0
250.	0.	77.2	80.1	80.0	78.4	79.1	79.7	80.5	79.1	78.8	80.9	82.0	82.9	83.9	83.9	82.9	81.5	0.	0.	134.0
315.	0.	77.0	79.8	79.2	78.1	79.0	79.4	80.6	81.2	80.8	83.0	84.0	86.0	85.9	84.2	83.0	79.7	0.	0.	136.2
400.	0.	77.1	77.8	77.7	76.9	76.9	78.4	79.4	79.8	78.7	81.8	82.1	83.6	83.6	83.8	82.9	80.4	0.	0.	134.7
500.	0.	75.8	76.5	77.6	75.8	76.8	77.3	78.5	77.7	77.7	80.0	81.1	82.5	82.7	83.7	82.8	79.3	0.	0.	133.9
630.	0.	76.1	77.4	78.2	77.2	77.3	77.0	77.7	78.3	78.4	80.1	82.4	83.9	84.3	83.1	82.2	78.7	0.	0.	134.5
800.	0.	75.3	76.8	77.8	76.4	75.9	77.8	77.8	77.8	78.1	81.3	83.0	86.0	84.9	82.2	81.2	77.8	0.	0.	135.1
1000.	0.	72.0	74.9	75.1	75.2	75.4	75.6	77.7	76.9	76.3	80.2	81.1	85.2	81.9	80.4	79.4	75.7	0.	0.	133.6
1250.	0.	71.9	73.7	73.7	73.3	74.2	74.4	76.6	76.6	75.9	78.2	80.1	83.1	79.8	79.2	79.2	75.1	0.	0.	132.3
1600.	0.	73.3	76.1	77.1	75.3	75.1	76.7	75.8	76.8	75.2	78.4	80.2	82.1	80.1	79.1	79.1	76.9	0.	0.	132.5
2000.	0.	71.4	73.2	75.1	74.2	73.4	75.9	74.8	76.2	74.3	78.4	82.5	81.0	80.9	79.4	79.2	76.0	0.	0.	132.7
2500.	0.	75.1	76.1	74.9	75.0	73.1	74.4	75.6	74.7	76.9	80.8	83.9	83.6	80.9	80.9	78.9	74.7	0.	0.	134.0
3150.	0.	80.3	80.1	78.2	74.2	74.4	71.9	73.6	75.1	75.2	77.4	79.4	84.2	79.1	78.3	78.2	75.0	0.	0.	133.0
4000.	0.	83.9	83.8	82.9	80.3	77.9	77.7	75.7	75.9	72.6	76.9	81.8	80.9	81.5	76.7	78.1	74.7	0.	0.	134.5
5000.	0.	86.1	88.3	84.2	84.3	79.4	79.7	79.7	75.1	75.8	77.1	78.1	80.1	78.0	79.3	76.1	72.9	0.	0.	135.8
6300.	0.	88.2	88.3	88.2	86.6	83.5	81.7	79.9	78.3	73.9	77.1	82.2	81.9	79.1	77.4	76.4	74.0	0.	0.	138.3
9000.	0.	84.9	87.8	85.0	84.4	81.0	79.7	80.4	76.6	75.0	78.9	84.9	86.9	83.6	79.9	78.2	74.5	0.	0.	139.4
10000.	0.	85.9	87.8	86.5	86.1	83.0	81.4	80.5	76.4	73.7	75.5	78.5	80.7	79.4	78.8	77.6	73.2	0.	0.	139.5
OVERALL	13.8	94.3	95.8	94.8	94.2	92.9	95.1	95.2	94.1	92.8	94.8	96.7	98.1	97.6	97.7	97.9	95.4	13.8	13.8	150.1
PNL	0.	107.7	109.0	108.1	107.0	105.0	104.8	104.7	103.3	102.5	105.5	108.2	109.6	107.9	107.0	106.2	103.0	0.	0.	
PNLT	0.	107.7	109.0	108.7	107.0	105.6	106.1	105.6	104.2	103.1	105.5	109.3	110.5	108.7	107.0	106.2	103.0	0.	0.	

Figure 121.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 80% N_{f_c}

FULLY SUPPRESSED CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	77.0	76.2	76.8	78.5	79.7	79.2	80.1	79.8	80.8	81.9	83.7	83.7	87.7	89.8	93.8	94.6	0.	0.	139.1
63.	0.	78.9	77.7	77.7	78.0	79.9	78.4	79.3	79.7	80.0	82.1	83.1	83.9	86.6	89.0	91.3	91.8	0.	0.	137.7
80.	0.	79.0	77.9	77.9	77.6	79.8	79.3	79.1	78.6	79.6	82.0	83.0	84.5	87.4	88.7	90.9	89.5	0.	0.	137.4
100.	0.	78.9	77.6	77.9	79.0	81.1	80.6	82.1	81.9	81.9	84.8	86.1	87.6	89.8	91.7	93.0	89.6	0.	0.	139.8
125.	0.	78.3	79.9	83.5	83.9	87.5	85.9	88.7	87.2	87.3	89.2	90.1	91.1	93.7	94.2	95.4	90.8	0.	0.	143.5
160.	0.	78.9	83.7	86.7	87.9	89.0	89.5	90.6	88.0	88.1	89.9	91.0	92.6	93.7	93.7	93.0	89.6	0.	0.	144.0
200.	0.	80.9	84.0	85.7	85.0	86.2	85.4	85.4	84.7	85.0	87.0	88.0	89.7	90.5	90.1	89.0	87.6	0.	0.	140.9
250.	0.	80.9	82.8	82.7	81.0	85.2	82.4	82.2	81.7	82.0	86.1	86.1	87.6	88.5	88.1	88.0	86.8	0.	0.	139.0
315.	0.	79.9	82.0	83.0	80.8	83.2	82.7	84.1	83.9	84.0	87.2	86.8	86.7	88.8	88.0	88.1	85.5	0.	0.	139.5
400.	0.	80.1	81.5	81.6	79.9	83.1	81.4	82.1	82.6	82.6	85.0	86.0	87.5	87.7	87.9	88.2	84.4	0.	0.	138.6
500.	0.	80.0	80.6	80.7	80.8	81.0	81.3	82.2	81.5	81.8	84.7	84.6	86.6	87.3	87.6	86.9	83.5	0.	0.	138.0
630.	0.	79.1	82.2	81.1	81.3	80.4	81.7	81.7	81.9	82.2	84.3	85.3	86.3	88.7	87.2	86.1	82.7	0.	0.	138.3
800.	0.	80.9	81.8	81.8	80.8	81.0	81.5	82.2	80.9	81.7	84.8	86.1	89.7	87.8	86.7	85.2	82.8	0.	0.	138.7
1000.	0.	78.4	81.3	78.9	79.2	78.2	79.7	80.4	80.2	80.2	83.1	84.3	87.8	84.9	85.1	84.4	80.9	0.	0.	137.0
1250.	0.	76.9	77.0	78.0	77.1	79.9	78.5	79.5	79.7	78.8	80.9	82.1	84.9	82.5	83.7	82.9	79.7	0.	0.	135.3
1600.	0.	79.0	75.9	78.2	77.9	77.9	77.9	78.5	78.8	78.1	80.2	82.2	84.6	82.8	83.1	81.3	79.9	0.	0.	134.9
2000.	0.	77.2	79.2	81.2	78.0	78.4	79.7	78.7	79.2	78.0	81.1	84.1	83.1	83.9	83.2	82.2	80.0	0.	0.	135.7
2500.	0.	79.9	79.9	78.9	78.9	77.1	77.7	78.4	77.7	79.9	82.8	84.8	84.5	83.3	83.6	83.1	78.7	0.	0.	136.2
3150.	0.	82.3	82.0	82.0	78.3	78.1	75.9	77.4	77.9	77.9	80.4	82.1	85.8	80.9	81.2	81.4	78.0	0.	0.	135.6
4000.	0.	85.8	85.9	86.6	83.9	82.1	81.4	79.3	79.6	76.7	80.8	84.0	83.5	85.3	79.6	82.1	79.4	0.	0.	137.7
5000.	0.	86.3	89.3	86.1	86.2	82.1	82.6	83.6	79.8	78.9	80.2	80.2	82.8	80.9	82.1	80.3	76.7	0.	0.	138.2
6300.	0.	89.5	90.1	89.0	88.3	84.3	81.7	81.6	80.1	77.2	79.3	82.1	83.0	80.6	80.1	80.4	77.7	0.	0.	139.6
8000.	0.	85.8	88.8	85.9	84.9	81.9	81.4	82.3	78.6	77.7	80.8	85.0	85.5	82.4	79.6	79.1	75.1	0.	0.	139.8
10000.	0.	85.9	88.5	86.4	85.7	83.8	80.2	80.9	77.6	75.5	77.5	82.6	85.3	84.1	83.6	80.9	75.2	0.	0.	141.0
OVERALL	13.8	96.2	97.8	97.2	96.6	96.7	96.1	96.9	95.7	95.8	98.2	99.4	101.0	101.6	101.9	102.6	100.6	13.8	13.8	153.0
PNL	0.	109.9	111.0	110.3	109.4	107.7	107.1	107.7	106.2	105.7	108.4	110.2	111.8	111.4	110.4	110.2	107.4	0.	0.	
PNLT	0.	110.5	111.0	110.8	110.0	107.7	107.7	108.8	106.2	105.7	108.4	110.8	111.8	112.9	110.4	110.2	107.4	0.	0.	

Figure 122.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 90% N_{f_c}

FULLY SUPPRESSED CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	81.8	80.9	79.8	81.5	82.5	83.0	83.7	84.4	85.3	86.8	90.2	88.0	92.8	96.8	100.8	102.7	0.	0.	145.8
63.	0.	82.8	81.1	80.7	81.5	82.7	82.2	83.6	83.7	84.4	87.0	88.2	88.0	92.2	94.7	96.9	98.9	0.	0.	143.2
80.	0.	83.7	81.0	81.6	81.4	83.6	85.0	84.5	83.8	84.3	86.9	88.1	89.2	92.0	94.7	97.8	96.4	0.	0.	143.2
100.	0.	83.0	81.1	80.9	81.7	83.5	83.1	84.6	85.8	86.4	89.1	90.6	92.2	95.0	97.7	99.7	97.8	0.	0.	145.4
125.	0.	82.0	81.6	84.9	84.9	88.2	88.8	89.0	89.9	90.8	93.4	94.6	95.2	97.3	99.2	101.9	96.9	0.	0.	147.8
160.	0.	82.9	86.3	89.8	91.4	90.6	92.5	92.6	91.9	92.2	94.0	96.3	96.9	97.9	99.9	99.6	96.9	0.	0.	148.6
200.	0.	85.0	87.3	88.1	88.8	89.8	89.3	88.0	88.9	89.6	92.1	93.5	93.3	95.3	96.8	95.9	93.8	0.	0.	145.8
250.	0.	83.7	84.3	84.7	84.4	85.9	85.2	85.9	86.6	87.4	90.2	91.7	92.3	94.1	95.0	93.8	92.8	0.	0.	144.0
315.	0.	82.8	85.4	84.9	85.7	87.0	85.4	87.8	87.7	88.4	91.1	91.5	93.3	93.1	94.6	93.8	91.8	0.	0.	144.2
400.	0.	83.9	84.3	83.9	83.6	86.9	86.3	88.7	87.5	87.5	89.1	90.4	91.9	92.0	93.9	93.5	90.5	0.	0.	143.5
500.	0.	82.5	84.0	86.5	83.3	84.7	85.3	86.6	86.6	87.1	89.0	90.2	91.1	91.1	93.6	92.8	89.6	0.	0.	142.9
630.	0.	81.2	82.6	84.9	84.0	84.9	84.7	85.1	85.8	86.8	88.3	90.6	91.2	91.5	93.1	92.0	88.0	0.	0.	142.6
800.	0.	80.0	82.2	83.7	83.6	83.9	84.3	84.9	83.8	86.4	88.2	90.7	92.1	91.3	92.0	90.6	86.6	0.	0.	142.3
1000.	0.	79.0	81.4	82.0	80.7	81.1	81.6	83.1	83.0	84.4	87.3	88.8	90.3	88.6	90.0	89.8	85.8	0.	0.	140.6
1250.	0.	77.8	79.4	80.8	80.8	80.7	81.2	81.7	82.6	82.4	85.0	86.7	88.3	87.3	89.0	88.6	85.9	0.	0.	139.3
1600.	0.	77.2	78.6	81.1	79.9	81.1	81.6	80.8	82.0	81.6	84.1	86.4	87.0	87.2	88.9	87.0	85.0	0.	0.	138.8
2000.	0.	83.3	82.7	84.3	81.8	81.2	82.5	81.0	82.1	82.5	84.6	87.8	85.5	88.4	89.1	87.9	85.1	0.	0.	139.6
2500.	0.	83.0	83.4	83.0	81.7	79.8	81.4	82.6	81.5	84.4	86.3	88.6	86.9	87.1	88.8	87.6	83.8	0.	0.	140.0
3150.	0.	86.0	85.4	86.2	82.0	82.1	79.6	81.2	81.8	81.6	83.2	84.7	88.3	84.2	86.1	85.1	82.8	0.	0.	138.9
4000.	0.	87.8	87.4	90.0	86.4	85.5	85.2	82.8	83.7	81.1	83.9	87.5	85.1	88.0	84.6	86.5	83.8	0.	0.	140.9
5000.	0.	88.0	89.5	88.0	86.6	83.8	84.4	84.8	82.0	83.4	83.4	84.7	85.3	84.2	86.9	83.8	81.0	0.	0.	140.4
6300.	0.	89.3	89.7	90.3	86.9	85.8	84.6	82.8	82.8	80.4	82.4	85.7	84.3	84.2	84.8	85.0	82.8	0.	0.	141.1
8000.	0.	85.7	87.4	86.6	84.5	82.6	82.1	82.8	81.5	82.1	83.1	86.5	84.9	83.1	81.6	82.8	79.8	0.	0.	140.6
10000.	0.	84.6	85.9	85.8	84.3	81.7	79.2	80.5	79.4	79.2	82.0	87.0	88.1	86.2	84.5	84.4	80.4	0.	0.	142.1
OVERALL	13.8	98.0	98.7	99.6	98.6	99.0	99.3	99.5	99.5	100.1	102.3	104.1	104.7	105.9	107.8	108.9	107.6	13.8	13.8	157.3
PNL	0.	111.3	112.0	113.0	110.8	110.4	110.3	110.0	109.9	110.1	112.1	114.3	114.7	114.9	115.8	115.4	112.8	0.	0.	
PNLT	0.	112.4	112.0	113.6	111.5	110.4	111.4	110.7	109.9	110.1	112.1	114.3	114.7	116.2	116.8	115.4	112.8	0.	0.	

Figure 123.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 60% N_{f_c}

TOTALLY SUPPRESSED INLET, HARD FAN EXHAUST CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	78.9	78.9	79.4	81.8	79.8	81.8	79.0	79.0	83.8	84.1	85.1	83.0	86.9	86.4	87.7	88.0	0.	0.	137.0
63.	0.	74.8	73.8	73.4	73.9	74.6	74.8	76.1	76.1	77.7	77.1	77.4	76.8	79.0	78.6	80.8	81.2	0.	0.	130.4
80.	0.	72.5	73.7	72.1	71.8	75.3	73.8	73.5	74.4	74.3	73.8	76.0	75.5	78.0	77.4	79.6	79.9	0.	0.	128.9
100.	0.	71.9	72.9	74.4	76.0	78.8	81.0	77.9	79.1	79.7	81.9	83.4	82.9	84.2	83.5	83.8	81.2	0.	0.	134.6
125.	0.	75.2	81.3	80.8	83.4	84.2	83.2	90.3	88.2	82.9	87.4	91.8	87.4	86.4	86.8	88.3	85.4	0.	0.	140.7
160.	0.	74.7	77.8	80.5	80.9	81.9	82.3	82.8	83.1	83.6	84.1	85.4	84.8	85.2	84.8	83.1	81.8	0.	0.	136.9
200.	0.	78.1	79.9	80.4	81.3	80.0	79.1	78.2	79.2	81.7	81.2	81.5	82.2	83.0	83.6	78.9	80.2	0.	0.	134.5
250.	0.	77.2	80.0	78.6	75.2	76.0	75.0	75.9	78.0	78.0	77.0	79.3	80.3	82.2	81.0	78.2	78.3	0.	0.	132.2
315.	0.	77.0	80.0	77.3	76.2	75.8	77.1	78.0	78.1	79.1	80.1	80.6	82.1	82.1	80.0	79.0	78.1	0.	0.	133.1
400.	0.	74.8	77.0	76.2	74.1	74.6	74.9	75.8	76.1	76.9	78.0	79.5	80.9	81.0	80.8	80.2	78.2	0.	0.	131.9
500.	0.	72.6	74.6	77.1	74.0	74.7	74.8	75.7	75.8	77.6	77.9	79.2	80.8	81.9	80.8	79.0	77.0	0.	0.	131.0
630.	0.	74.2	76.2	76.5	75.3	75.8	75.2	75.3	76.3	78.0	79.5	81.5	84.1	85.2	84.1	80.3	77.0	0.	0.	134.2
800.	0.	75.1	76.8	77.3	76.4	75.8	76.4	77.1	76.9	79.0	80.1	83.3	85.0	86.3	83.7	80.9	76.9	0.	0.	139.1
1000.	0.	73.2	77.0	77.4	75.3	74.1	76.6	76.3	76.3	78.0	79.2	82.8	85.2	85.5	84.1	80.1	77.1	0.	0.	134.0
1250.	0.	73.9	79.1	78.6	78.0	77.8	79.0	78.0	81.0	79.8	83.0	83.3	86.9	88.3	90.6	84.9	81.0	0.	0.	138.1
1600.	0.	72.2	74.9	76.4	74.1	75.9	76.5	76.0	78.2	77.0	80.2	81.4	84.1	85.3	86.1	81.0	78.5	0.	0.	135.1
2000.	0.	80.2	80.2	81.9	79.5	81.1	78.4	78.3	77.4	78.0	81.5	83.6	84.2	86.6	84.2	78.2	78.3	0.	0.	136.2
2500.	0.	74.8	77.9	78.6	79.0	76.7	79.3	78.2	76.8	81.7	83.3	86.5	86.9	89.3	85.6	81.8	79.2	0.	0.	138.1
3150.	0.	75.0	76.9	76.7	76.1	75.8	76.3	76.0	77.3	78.2	78.2	82.7	88.4	85.5	84.1	82.3	79.4	0.	0.	136.6
4000.	0.	81.1	79.1	82.6	78.0	79.8	74.0	77.2	77.1	81.0	83.0	86.3	87.9	90.3	84.6	83.1	80.2	0.	0.	139.1
5000.	0.	82.0	85.1	81.8	81.4	77.0	78.3	78.1	78.3	78.1	79.4	83.4	85.1	85.2	84.0	80.3	77.0	0.	0.	137.1
6300.	0.	85.0	85.0	86.7	81.4	82.2	79.1	77.1	76.2	79.1	79.2	84.4	86.1	85.4	81.8	79.2	77.2	0.	0.	138.4
8000.	0.	83.6	85.6	84.1	83.0	79.6	77.1	77.7	75.6	76.5	78.0	82.1	83.7	83.8	79.4	78.6	74.8	0.	0.	137.7
10000.	0.	85.5	87.5	87.8	85.3	83.2	80.7	79.6	75.2	76.2	76.4	81.0	83.3	82.7	78.3	76.3	74.5	0.	0.	140.0
OVERALL	13.8	92.8	94.5	94.7	93.3	92.8	92.4	93.9	93.2	93.5	95.0	97.8	98.4	99.3	98.0	96.0	94.3	13.8	13.8	150.3
PNL	0.	105.7	107.3	107.7	105.1	104.8	103.8	103.6	103.6	105.6	107.2	110.2	111.9	113.1	109.9	107.6	105.2	0.	0.	
PNLT	0.	108.0	108.5	109.1	106.2	106.4	104.7	105.2	104.8	106.8	108.6	111.4	112.5	114.7	111.7	109.1	106.3	0.	0.	

Figure 124.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 70% N_{f_c}

TOTALLY SUPPRESSED INLET, HARD FAN EXHAUST CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	75.7	74.3	72.9	74.7	80.4	75.8	77.6	77.6	80.0	80.3	80.8	80.4	83.7	85.8	87.9	88.7	0.	0.	134.9
63.	0.	79.2	75.4	74.8	75.2	80.8	78.8	80.7	80.7	80.2	81.8	83.2	82.6	86.9	87.0	89.1	89.8	0.	0.	136.7
80.	0.	76.8	76.1	74.4	74.5	81.4	75.3	77.3	76.1	77.5	78.2	79.5	80.2	82.8	83.9	85.3	86.4	0.	0.	133.6
100.	0.	76.0	74.3	75.0	77.8	82.7	80.0	80.6	81.4	83.8	84.7	84.8	85.7	87.1	87.2	88.8	86.7	0.	0.	137.6
125.	0.	79.4	82.4	85.1	87.5	87.7	89.0	88.8	89.0	91.2	93.1	93.2	93.8	94.2	93.3	92.3	88.0	0.	0.	144.7
160.	0.	79.9	82.2	85.1	86.0	86.5	86.7	86.4	85.6	89.0	90.8	90.2	90.6	91.2	90.3	88.8	86.4	0.	0.	142.1
200.	0.	82.0	84.5	85.2	85.1	84.8	82.8	82.5	83.7	87.0	86.8	86.2	87.8	89.1	89.4	86.9	85.8	0.	0.	139.8
250.	0.	82.2	82.3	82.0	80.1	82.5	78.8	81.5	82.5	82.9	83.6	83.0	84.8	84.9	85.0	84.0	84.5	0.	0.	136.7
315.	0.	79.3	83.3	81.3	80.1	81.8	81.1	82.7	82.8	84.2	84.8	85.9	86.6	87.1	85.0	84.7	83.7	0.	0.	137.9
400.	0.	78.8	79.2	79.8	77.9	81.7	79.6	81.6	80.3	81.8	83.4	83.0	84.4	85.0	83.9	84.8	81.6	0.	0.	136.2
500.	0.	76.0	78.1	79.0	77.9	81.3	78.7	79.5	79.5	81.8	83.3	82.8	84.6	86.0	84.8	83.5	81.2	0.	0.	136.1
630.	0.	77.0	77.7	79.2	78.3	82.0	79.1	79.9	79.9	82.2	83.7	84.4	87.7	88.5	86.2	83.9	80.9	0.	0.	137.6
800.	0.	79.0	78.6	80.0	80.1	81.6	79.8	81.5	79.7	83.9	86.6	85.9	90.0	89.1	87.1	85.0	80.4	0.	0.	139.1
1000.	0.	77.4	78.5	79.2	79.5	81.1	79.1	80.8	79.9	83.1	84.8	86.4	90.2	88.3	85.3	84.2	79.9	0.	0.	138.7
1250.	0.	75.9	77.3	78.0	78.2	79.9	78.9	80.8	80.5	81.2	82.7	84.4	88.1	88.3	86.3	83.0	79.8	0.	0.	137.7
1600.	0.	82.3	81.7	82.3	82.1	84.6	84.1	84.8	84.5	86.3	88.0	92.1	94.0	93.4	91.2	90.0	87.9	0.	0.	143.5
2000.	0.	78.3	77.6	80.3	78.6	82.8	80.0	79.7	81.8	83.2	85.8	87.2	88.1	90.3	85.3	83.0	81.7	0.	0.	139.3
2500.	0.	78.0	79.6	81.0	82.0	82.5	81.8	81.7	81.7	85.3	87.6	90.3	89.9	93.0	85.2	83.7	80.4	0.	0.	141.5
3150.	0.	83.5	83.5	83.2	83.5	84.0	83.1	83.7	83.7	85.2	85.8	88.3	96.1	92.5	89.6	90.1	85.7	0.	0.	143.7
4000.	0.	86.9	82.2	85.2	82.3	85.5	78.1	82.4	81.6	85.2	87.7	90.3	91.9	93.0	86.3	85.0	82.7	0.	0.	142.7
5000.	0.	87.1	89.4	85.2	87.5	85.7	83.0	84.9	83.6	84.3	87.0	90.5	91.1	92.2	89.3	85.2	81.9	0.	0.	143.2
6300.	0.	89.4	87.5	89.2	85.2	87.7	84.2	82.9	80.9	84.2	84.9	88.2	90.9	90.5	84.5	82.9	81.9	0.	0.	142.8
8000.	0.	87.8	88.1	86.0	86.9	86.3	80.9	83.3	80.5	83.7	83.6	87.9	89.8	89.1	84.1	82.8	79.3	0.	0.	142.7
10000.	0.	88.3	87.9	87.3	87.4	87.1	83.1	83.8	79.0	81.3	81.1	84.5	87.1	86.4	82.6	80.3	77.8	0.	0.	142.8
OVERALL	13.8	96.8	96.9	96.9	96.8	97.9	96.0	96.7	96.2	98.5	100.1	101.5	103.7	103.7	101.3	100.5	98.5	13.8	13.8	154.5
PNL	0.	110.1	110.5	110.2	109.7	110.5	107.9	108.9	108.4	110.4	112.2	114.4	117.9	117.0	113.7	113.1	109.9	0.	0.	
PNLT	0.	111.8	112.0	111.3	111.0	111.6	109.5	110.4	109.5	111.8	113.5	116.5	119.9	118.3	115.5	115.4	112.3	0.	0.	

Figure 125.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 80% N_{f_c}

TOTALLY SUPPRESSED INLET, HARD FAN EXHAUST CONFIGURATION.

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	77.7	77.0	79.1	77.8	78.7	79.9	80.3	80.5	84.0	84.4	84.8	83.4	89.0	91.0	93.8	95.4	0.	0.	139.9
63.	0.	81.3	78.4	80.4	79.0	79.9	80.3	81.5	80.7	83.1	83.5	84.3	84.8	89.3	90.4	91.8	92.8	0.	0.	139.1
80.	0.	80.9	78.9	79.9	77.8	80.3	79.0	80.0	79.4	81.7	83.1	83.6	85.1	88.6	89.8	91.6	91.3	0.	0.	138.4
100.	0.	79.2	78.3	81.0	80.0	83.5	83.0	83.4	83.7	86.3	87.4	87.9	88.5	92.1	92.4	94.7	91.6	0.	0.	141.6
125.	0.	80.2	82.5	87.2	88.5	90.1	89.3	91.7	90.1	92.4	94.8	95.3	96.0	97.4	96.3	96.2	93.0	0.	0.	147.0
160.	0.	82.9	86.5	89.9	91.0	91.8	91.3	92.4	90.8	94.2	95.5	96.0	96.5	97.9	96.4	94.7	92.5	0.	0.	147.8
200.	0.	97.0	88.4	88.3	88.3	86.6	86.1	86.7	87.7	91.3	89.7	90.1	90.9	93.0	93.2	91.0	89.9	0.	0.	143.4
250.	0.	95.3	86.6	87.3	84.1	83.9	84.1	83.5	84.5	86.4	88.6	88.2	86.9	91.0	90.2	88.8	87.9	0.	0.	141.0
315.	0.	82.0	84.4	86.0	84.4	83.6	85.2	85.7	85.5	88.5	89.7	89.1	90.9	91.0	90.2	89.0	87.9	0.	0.	141.8
400.	0.	81.0	81.4	83.9	82.2	82.5	82.9	84.5	83.6	87.4	88.5	88.2	88.7	88.9	89.1	88.6	86.7	0.	0.	140.4
500.	0.	78.9	83.2	83.1	81.9	83.7	84.2	85.2	85.6	89.1	91.4	87.9	89.4	89.9	90.3	88.6	86.3	0.	0.	141.7
630.	0.	80.2	82.8	84.2	82.2	82.8	83.1	83.9	83.7	86.6	88.0	88.3	90.0	91.5	90.4	88.2	86.0	0.	0.	141.1
800.	0.	80.9	82.3	83.4	83.1	82.6	84.3	85.7	83.8	87.5	88.7	89.4	91.7	92.0	89.3	88.8	85.3	0.	0.	141.9
1000.	0.	81.7	82.6	83.3	82.3	80.9	83.3	83.9	84.0	86.6	88.1	89.6	91.9	91.2	88.7	89.3	83.7	0.	0.	141.6
1250.	0.	78.1	80.7	83.3	81.1	81.0	82.4	82.8	83.8	85.4	86.6	87.3	90.7	91.0	89.3	87.9	83.5	0.	0.	140.8
1600.	0.	83.1	82.7	85.3	83.4	85.7	85.2	84.7	86.6	87.4	90.0	91.5	92.7	95.3	91.3	87.9	86.7	0.	0.	143.9
2000.	0.	88.6	87.6	89.6	87.3	91.1	89.6	88.8	92.1	91.8	94.9	95.4	96.8	100.5	96.7	92.0	91.9	0.	0.	148.8
2500.	0.	81.9	83.3	86.2	85.0	83.9	86.1	84.6	84.5	89.3	90.9	93.1	92.8	95.0	89.2	87.0	84.7	0.	0.	144.3
3150.	0.	86.2	85.8	87.3	84.3	84.9	85.3	85.7	85.7	87.7	88.9	91.3	96.8	94.2	90.5	89.3	87.0	0.	0.	145.1
4000.	0.	89.9	86.2	89.9	86.2	88.6	85.3	86.6	86.5	90.5	92.8	95.3	96.8	98.0	91.5	90.9	89.6	0.	0.	147.6
5000.	0.	88.2	91.4	89.2	89.3	85.8	88.3	88.0	87.0	87.5	88.8	91.6	93.0	93.2	90.7	87.2	85.0	0.	0.	145.1
6300.	0.	90.4	88.4	91.2	87.2	87.8	87.3	85.9	84.0	87.5	87.8	90.3	93.0	92.1	88.4	86.1	85.9	0.	0.	144.9
8000.	0.	88.1	89.1	89.8	88.1	84.7	84.2	86.5	84.6	86.2	87.5	91.2	91.7	91.1	86.2	85.5	82.6	0.	0.	145.0
10000.	0.	88.4	88.6	89.6	87.4	85.2	84.4	85.0	82.1	84.7	83.8	87.5	90.2	90.3	85.7	83.2	82.1	0.	0.	144.8
OVERALL	13.8	99.0	99.4	100.8	99.4	99.8	99.6	100.2	100.0	102.4	104.0	105.0	106.5	107.8	105.5	104.6	103.2	13.8	13.8	158.0
PNL	0.	112.7	113.1	113.9	112.2	112.4	112.0	112.2	112.8	114.9	116.6	118.4	120.0	121.1	117.7	115.8	114.1	0.	0.	
PNLT	0.	115.3	114.6	115.2	113.2	114.5	113.4	113.5	114.9	116.0	118.1	119.8	121.4	122.9	119.9	117.3	116.2	0.	0.	

Figure 126.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 90% N_{f_c}

TOTALLY SUPPRESSED INLET, HARD FAN EXHAUST CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	80.8	81.6	80.0	81.9	82.8	83.0	84.0	85.5	87.5	88.0	88.8	88.6	94.2	96.6	100.9	103.7	0.	0.	146.3
63.	0.	83.0	82.1	81.2	82.1	82.9	82.9	83.9	84.7	86.6	86.9	88.2	88.8	93.2	94.8	98.1	101.0	0.	0.	144.3
80.	0.	83.5	82.7	82.9	83.6	84.4	84.6	83.8	83.3	85.5	86.5	88.9	89.7	93.1	93.5	97.8	97.5	0.	0.	143.4
100.	0.	82.7	82.6	81.9	83.9	85.6	85.9	86.1	87.6	88.7	91.0	91.8	93.9	97.1	97.5	100.7	97.8	0.	0.	146.9
125.	0.	93.2	84.9	88.3	89.2	90.9	91.6	91.2	92.0	93.9	95.2	96.2	98.1	100.7	101.1	102.3	99.2	0.	0.	149.9
160.	0.	94.7	91.7	94.9	96.3	93.7	95.0	93.9	95.8	98.5	98.9	100.0	100.1	101.5	101.6	101.9	98.1	0.	0.	151.9
200.	0.	87.9	91.8	91.1	91.1	89.9	90.1	90.1	91.8	93.9	93.2	94.9	96.2	97.6	98.7	96.9	96.0	0.	0.	147.8
250.	0.	86.1	87.9	88.2	86.8	88.9	88.4	88.4	89.2	90.7	92.1	93.0	94.3	96.4	95.7	95.8	93.9	0.	0.	145.9
315.	0.	84.1	87.1	86.3	86.3	89.9	89.4	90.1	90.2	92.0	93.1	93.0	96.0	96.5	95.9	94.1	94.2	0.	0.	146.4
400.	0.	83.8	88.1	86.9	85.1	89.0	89.1	90.1	89.9	90.0	92.0	92.9	93.9	94.1	93.5	94.7	93.1	0.	0.	145.3
500.	0.	82.6	85.7	86.8	85.8	86.6	88.3	87.2	89.0	89.9	90.9	91.8	94.1	94.5	94.4	94.6	92.0	0.	0.	145.0
630.	0.	83.0	86.0	87.4	85.3	86.9	88.4	88.2	89.3	90.2	92.2	92.4	95.4	95.7	93.8	93.2	91.3	0.	0.	145.5
800.	0.	83.1	85.9	87.3	87.0	86.0	86.4	87.3	87.1	90.0	91.0	92.3	95.0	96.3	92.7	93.1	90.1	0.	0.	145.2
1000.	0.	82.0	86.4	85.4	86.4	85.0	86.6	87.3	88.1	89.0	90.2	91.1	95.2	94.4	92.8	93.2	89.1	0.	0.	144.7
1250.	0.	81.1	85.1	86.0	84.9	84.9	86.4	85.9	86.8	88.7	89.3	90.2	95.3	95.5	92.7	92.0	88.9	0.	0.	144.6
1600.	0.	82.0	84.0	85.4	85.1	85.9	86.4	86.1	87.0	88.2	90.5	92.2	94.4	95.7	92.0	91.0	89.3	0.	0.	144.8
2000.	0.	91.2	90.5	94.6	92.6	95.4	95.4	92.3	94.2	97.0	99.6	102.6	103.6	104.7	97.2	94.3	95.4	0.	0.	153.6
2500.	0.	85.7	87.9	89.1	88.3	88.1	90.5	89.1	88.2	92.7	94.3	97.0	97.0	98.6	92.8	91.8	89.9	0.	0.	148.2
3150.	0.	87.1	89.4	89.3	87.1	86.9	88.6	88.5	89.1	91.1	90.2	93.2	98.2	94.4	91.0	92.0	89.3	0.	0.	146.8
4000.	0.	90.8	90.2	93.3	89.0	91.8	87.1	90.0	90.8	94.0	96.3	99.1	100.0	99.6	93.6	93.1	91.9	0.	0.	150.6
5000.	0.	89.0	94.1	90.2	92.2	88.2	89.5	90.6	90.1	90.8	92.1	95.0	96.4	95.4	92.0	90.9	88.0	0.	0.	147.9
6300.	0.	90.0	91.3	92.5	89.4	89.9	90.0	89.2	88.0	91.1	91.1	95.0	98.3	95.6	90.9	89.1	89.0	0.	0.	148.6
8000.	0.	87.8	90.9	89.1	89.8	86.4	86.8	88.8	88.7	88.7	91.0	94.9	95.7	93.2	89.3	88.5	86.9	0.	0.	148.0
10000.	0.	86.3	88.5	87.7	86.6	86.1	85.6	86.7	65.2	88.3	88.4	93.3	95.6	92.8	89.0	88.4	85.3	0.	0.	148.1
OVERALL	13.8	100.0	102.4	103.2	102.7	102.8	103.2	102.8	103.6	105.8	107.0	109.1	110.7	111.3	109.4	110.3	109.5	13.8	13.0	161.7
PNL	0.	113.8	116.1	116.5	115.2	115.8	116.0	115.2	115.9	118.2	119.9	122.4	124.0	124.5	120.0	119.5	118.2	0.	0.	
PNLT	0.	116.2	117.6	118.9	117.1	118.6	118.3	116.8	118.1	120.4	122.3	125.1	126.7	127.0	121.6	119.5	120.1	0.	0.	

Figure 127.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 60% N_{f_c}

COPLANAR NOZZLE CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	75.9	74.3	74.5	77.7	73.7	77.2	76.5	75.7	78.0	77.5	78.1	80.1	81.4	79.7	82.0	83.6	0.	0.	131.7
63.	0.	71.3	68.9	68.9	69.4	69.6	70.4	71.6	71.6	72.5	71.9	73.2	74.9	75.6	76.2	78.4	79.8	0.	0.	126.9
80.	0.	69.0	67.1	66.8	67.8	67.8	68.9	69.1	68.9	70.4	70.9	72.3	74.1	75.0	76.9	79.1	78.9	0.	0.	126.2
100.	0.	69.3	68.9	70.5	69.3	68.9	69.8	72.4	72.9	73.6	74.3	75.9	77.4	78.9	80.3	81.9	80.8	0.	0.	129.4
125.	0.	71.6	72.9	74.6	75.8	74.4	77.0	81.6	77.9	79.4	83.2	85.5	82.3	81.3	81.8	82.7	81.8	0.	0.	134.5
160.	0.	71.5	71.7	72.4	73.3	73.6	75.4	75.9	75.3	77.4	78.9	80.3	81.2	81.9	82.5	80.7	80.8	0.	0.	132.2
200.	0.	72.2	73.3	71.9	73.7	74.9	77.0	76.5	76.9	77.4	77.2	78.6	80.1	80.1	79.9	78.5	78.9	0.	0.	131.2
250.	0.	72.2	72.3	71.2	71.4	70.9	72.8	74.5	74.0	75.2	75.6	77.1	78.0	78.6	77.6	77.4	76.8	0.	0.	129.2
315.	0.	72.9	73.0	72.5	71.6	71.7	73.5	74.7	75.3	76.4	77.7	79.1	80.6	80.6	78.1	76.9	76.0	0.	0.	130.7
400.	0.	72.8	73.6	72.1	71.5	71.3	72.2	72.9	73.1	74.6	75.3	77.0	77.6	78.0	77.4	76.5	74.6	0.	0.	128.9
500.	0.	72.2	73.0	73.5	72.2	71.5	72.3	73.0	73.3	74.5	74.9	76.9	77.1	77.5	77.2	76.6	74.1	0.	0.	128.8
630.	0.	73.6	73.4	73.6	72.9	72.4	72.7	74.9	76.5	75.7	76.8	79.0	80.0	80.3	77.2	76.6	73.7	0.	0.	130.6
800.	0.	73.6	73.0	73.7	72.4	72.4	74.3	74.4	73.7	75.5	76.9	80.3	82.1	82.0	76.6	75.4	72.8	0.	0.	131.6
1000.	0.	72.1	72.4	71.6	71.6	71.9	73.0	75.7	74.8	75.5	76.6	78.8	81.3	80.0	76.3	74.5	72.2	0.	0.	130.7
1250.	0.	70.3	70.7	71.4	71.6	72.2	73.7	75.7	73.9	74.5	75.6	77.6	80.1	77.9	74.8	73.4	72.2	0.	0.	129.8
1600.	0.	71.8	73.4	74.3	73.4	72.7	73.7	74.1	73.9	74.0	75.0	78.5	80.2	77.5	74.6	73.4	72.1	0.	0.	130.0
2000.	0.	81.0	82.1	83.0	80.3	75.7	78.1	76.5	75.4	75.5	76.4	80.4	81.1	79.8	74.7	73.1	73.5	0.	0.	133.1
2500.	0.	73.2	72.5	73.2	72.9	71.4	72.5	73.3	73.5	75.4	77.7	79.6	82.3	79.3	75.7	74.6	71.7	0.	0.	131.4
3150.	0.	73.0	72.8	72.2	73.5	71.0	70.6	72.1	69.8	71.8	73.5	77.4	79.9	76.0	75.3	73.2	71.8	0.	0.	129.4
4000.	0.	81.8	79.3	80.0	77.7	76.4	74.5	70.7	73.2	73.7	73.4	77.1	77.7	77.2	73.7	71.3	71.2	0.	0.	131.2
5000.	0.	82.3	83.5	79.7	80.4	76.0	73.1	75.6	71.6	71.3	72.9	76.6	77.3	74.8	73.1	73.0	68.6	0.	0.	131.8
6300.	0.	85.9	84.6	85.2	-82.3	80.8	78.2	76.2	73.2	75.7	75.6	79.6	86.0	81.3	77.6	73.3	73.0	0.	0.	136.6
8000.	0.	83.4	85.3	83.0	82.0	78.5	76.3	76.9	74.0	73.3	72.4	76.7	81.8	78.2	76.0	72.8	69.5	0.	0.	135.5
10000.	0.	86.6	87.0	85.4	85.7	82.2	80.3	77.6	73.5	73.1	73.1	76.6	80.7	76.5	74.3	71.7	69.7	0.	0.	138.4
OVERALL	13.8	92.6	92.8	92.0	91.2	88.9	88.8	89.3	88.1	89.1	90.3	92.6	94.3	93.0	91.5	91.3	90.9	13.8	13.8	146.1
PNL	0.	105.6	105.1	105.1	103.5	101.8	100.9	100.6	99.4	100.4	101.7	104.3	107.4	104.7	102.1	100.6	99.2	0.	0.	
PNLT	0.	108.4	108.2	108.2	105.9	103.0	102.5	101.8	100.4	101.0	102.8	105.5	108.5	105.5	102.6	100.6	99.9	0.	0.	

Figure 128.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 70% N_{f_c}

COPLANAR NOZZLE CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	74.2	73.3	72.2	74.3	73.9	75.6	76.3	76.2	77.9	78.6	80.5	81.6	83.0	84.2	87.4	89.9	0.	0.	134.3
63.	0.	76.2	73.6	72.9	74.6	75.9	77.7	78.1	75.9	76.9	78.4	79.6	80.7	81.4	82.8	85.5	87.2	0.	0.	133.2
80.	0.	74.2	71.5	71.2	71.8	72.5	73.4	74.5	74.1	75.6	76.8	78.5	80.6	81.9	83.4	86.2	86.3	0.	0.	132.7
100.	0.	73.5	71.8	71.8	72.8	72.6	73.9	75.3	75.9	78.4	79.1	80.8	82.7	84.6	86.5	89.3	87.6	0.	0.	135.1
125.	0.	76.8	73.4	74.8	79.2	80.0	88.3	87.7	87.5	87.1	84.2	86.8	88.0	87.2	89.0	90.4	88.3	0.	0.	140.2
160.	0.	73.7	74.5	76.6	77.8	78.4	81.3	81.9	82.0	83.3	83.4	85.0	86.5	87.4	88.4	86.7	87.4	0.	0.	137.7
200.	0.	74.6	76.7	75.9	77.4	78.5	78.4	79.3	79.8	81.0	82.4	83.9	84.7	85.5	85.0	84.8	84.7	0.	0.	135.8
250.	0.	76.6	77.8	76.4	76.1	75.9	77.0	79.8	77.9	80.1	80.8	82.9	83.0	84.5	83.8	83.7	82.7	0.	0.	134.7
315.	0.	77.3	78.1	77.4	77.2	77.0	78.9	79.6	81.1	81.6	82.5	84.1	85.8	85.3	83.7	83.4	82.7	0.	0.	135.9
400.	0.	77.2	77.9	77.3	76.6	76.6	76.9	78.2	79.0	80.4	80.7	82.7	83.4	82.9	83.0	83.0	81.9	0.	0.	134.5
500.	0.	76.2	77.6	78.3	76.0	75.7	76.8	76.9	77.7	79.6	80.3	81.9	82.4	82.3	83.1	82.4	80.3	0.	0.	133.9
630.	0.	75.8	76.6	77.6	76.1	75.8	76.4	77.4	77.4	79.2	81.5	82.8	83.2	83.4	82.8	81.3	79.0	0.	0.	134.3
800.	0.	75.1	76.9	76.9	75.6	75.9	77.0	77.7	77.5	78.4	81.0	83.8	85.5	84.0	81.7	80.8	78.0	0.	0.	134.8
1000.	0.	72.3	74.6	74.5	74.4	74.0	74.7	77.6	76.6	77.4	80.2	81.8	84.5	81.5	80.5	79.8	76.0	0.	0.	133.9
1250.	0.	71.3	72.9	73.7	73.2	73.6	75.0	77.4	76.4	76.7	78.2	80.3	83.0	79.7	79.1	78.6	75.8	0.	0.	132.3
1600.	0.	71.2	75.4	74.1	76.5	75.0	76.9	78.2	76.3	77.0	78.6	81.8	82.1	79.4	78.7	77.5	76.9	0.	0.	132.8
2000.	0.	73.1	72.2	74.6	75.1	74.6	75.5	75.2	76.9	77.4	78.5	82.6	82.8	80.5	78.3	76.9	75.5	0.	0.	133.0
2500.	0.	74.3	74.1	74.9	73.9	73.3	74.2	75.7	75.9	78.0	80.0	82.3	83.3	81.3	79.0	78.0	74.1	0.	0.	133.5
3150.	0.	79.5	79.4	76.5	76.2	74.2	73.1	74.8	73.2	75.1	76.7	80.7	82.4	78.6	78.5	76.2	75.1	0.	0.	132.5
4000.	0.	85.9	83.0	83.7	80.2	78.7	78.1	73.5	75.6	76.9	76.6	80.4	80.3	80.3	77.8	75.2	74.8	0.	0.	134.4
5000.	0.	85.8	87.9	84.7	84.1	78.8	77.2	78.7	75.0	74.3	74.8	77.9	79.7	78.3	76.9	75.7	72.6	0.	0.	135.3
6300.	0.	88.5	86.7	88.2	85.5	83.7	81.9	79.5	76.7	78.7	77.9	80.8	83.6	78.6	77.2	74.1	74.7	0.	0.	138.1
8000.	0.	85.5	87.4	84.7	84.5	81.5	79.4	78.9	76.9	76.5	76.6	82.1	89.2	82.7	79.8	77.1	74.5	0.	0.	139.5
10000.	0.	86.4	87.6	86.4	86.2	83.4	81.2	79.9	76.7	76.1	75.5	79.0	81.7	76.5	76.8	74.0	73.9	0.	0.	139.5
OVERALL	13.8	94.7	95.0	94.2	93.3	91.7	93.1	93.1	92.7	93.4	93.8	96.1	97.9	96.8	96.9	97.5	97.1	13.8	13.8	149.5
PNL	0.	108.0	108.3	107.7	106.2	104.7	104.2	103.7	102.6	103.7	104.9	107.5	109.6	107.2	106.1	105.2	103.8	0.	0.	
PNLT	0.	109.0	109.3	108.7	106.9	105.4	106.0	105.2	104.0	104.8	104.9	108.2	110.7	107.9	106.1	105.7	103.8	0.	0.	

Figure 129.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 80% N_{f_c}

COPLANAR NOZZLE CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PNL
50.	0.	78.5	77.2	77.0	78.7	78.3	80.1	80.7	81.3	82.7	83.3	84.7	87.3	88.8	90.1	94.4	96.6	0.	0.	140.3
63.	0.	79.9	77.4	77.1	77.8	78.7	80.1	80.8	80.4	81.5	81.9	83.8	86.1	87.1	88.8	91.7	93.3	0.	0.	138.4
80.	0.	79.5	76.3	75.5	76.4	77.0	78.8	79.5	79.3	80.6	81.4	84.0	86.1	87.8	90.0	92.8	92.5	0.	0.	138.7
100.	0.	77.9	75.8	76.3	77.7	78.2	79.3	80.1	80.6	82.7	83.9	86.4	87.6	90.4	92.3	94.9	93.5	0.	0.	140.6
125.	0.	80.6	78.2	80.5	80.4	81.4	85.1	83.3	85.4	86.0	86.7	89.2	90.8	92.5	94.0	96.1	93.7	0.	0.	142.7
160.	0.	79.3	78.9	81.5	81.9	82.4	85.3	84.5	85.9	87.0	88.4	90.0	91.0	92.7	93.7	93.1	92.2	0.	0.	142.5
200.	0.	78.9	81.3	80.6	82.0	81.7	82.9	83.6	84.5	86.1	86.3	88.8	89.7	90.8	91.1	90.8	90.8	0.	0.	140.9
250.	0.	80.0	81.3	80.6	80.6	80.0	82.1	82.4	83.0	84.1	84.8	87.1	88.5	89.2	89.9	89.8	88.5	0.	0.	139.5
315.	0.	81.0	82.3	82.0	81.6	81.0	82.9	84.1	84.5	85.6	86.8	88.6	89.9	89.3	89.1	89.3	88.1	0.	0.	140.8
400.	0.	79.6	81.4	81.7	81.2	80.8	82.0	83.3	84.1	86.3	85.6	87.0	89.0	88.4	89.3	89.2	87.1	0.	0.	139.8
500.	0.	79.5	80.6	82.1	81.1	80.0	81.6	82.9	82.8	85.4	85.3	86.5	87.8	88.4	89.1	88.8	85.4	0.	0.	139.3
630.	0.	80.4	81.0	81.8	82.0	80.9	81.6	82.5	82.9	84.1	85.4	87.0	87.7	88.8	88.8	87.9	84.4	0.	0.	139.3
800.	0.	79.4	79.8	83.5	81.1	80.7	81.4	82.1	82.3	83.5	84.8	87.3	89.1	88.0	87.3	86.6	83.5	0.	0.	139.1
1000.	0.	76.2	81.0	79.5	79.7	78.2	79.8	81.1	80.7	82.3	83.4	85.7	87.9	85.8	86.3	85.3	81.6	0.	0.	137.7
1250.	0.	74.0	75.9	77.7	77.2	77.5	78.6	80.1	79.7	80.8	81.7	83.2	85.9	83.8	84.7	83.5	80.9	0.	0.	136.0
1600.	0.	74.7	75.0	78.0	77.8	77.4	79.2	79.2	79.9	80.4	81.1	83.8	85.0	83.7	83.5	82.5	80.3	0.	0.	135.8
2000.	0.	78.2	77.4	79.7	80.0	78.0	80.1	78.6	80.8	81.4	82.0	85.7	85.2	84.7	82.9	81.9	80.8	0.	0.	136.7
2500.	0.	79.9	77.8	78.7	76.9	75.6	77.3	79.3	79.3	81.1	82.5	83.9	84.9	84.3	83.4	82.4	78.5	0.	0.	136.2
3150.	0.	82.5	82.1	80.8	80.4	77.8	77.3	78.0	76.5	78.6	79.9	83.5	84.6	81.0	82.3	80.4	78.9	0.	0.	135.6
4000.	0.	87.9	85.1	86.0	83.5	83.2	81.9	78.3	80.5	81.6	81.1	83.7	84.3	83.4	81.7	79.6	79.0	0.	0.	137.9
5000.	0.	86.8	88.9	85.9	86.6	83.0	81.5	82.5	78.5	78.4	78.6	80.3	82.9	81.5	80.6	80.2	75.9	0.	0.	137.9
6300.	0.	89.4	88.0	89.2	86.5	84.7	83.8	81.6	79.7	80.8	79.5	82.2	83.0	80.1	80.0	76.9	77.1	0.	0.	139.4
8000.	0.	85.9	87.5	85.0	85.2	81.8	80.4	80.6	78.9	79.5	79.3	84.9	86.2	81.9	80.3	77.9	76.0	0.	0.	139.5
10000.	0.	86.6	87.4	86.4	86.3	82.6	81.0	79.4	77.2	77.9	76.7	81.1	86.8	83.3	81.6	78.0	76.7	0.	0.	140.8
OVERALL	13.8	96.5	96.6	96.4	95.8	94.4	95.3	95.4	95.7	97.0	97.7	99.8	101.3	101.7	102.4	103.5	102.9	13.8	13.8	153.2
PNL	0.	110.1	110.1	109.9	109.0	107.2	107.1	107.0	106.6	107.8	108.1	110.6	111.9	111.0	110.8	110.2	108.3	0.	0.	
PNLT	0.	111.2	111.2	110.9	109.0	107.2	107.1	107.0	107.6	108.9	108.1	111.2	111.9	111.0	110.8	110.2	108.3	0.	0.	

Figure 130.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 90% N_{f_c}

COPLANAR NOZZLE CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PNL
50.	0.	83.0	82.0	81.2	83.3	83.0	84.6	85.6	86.3	87.6	88.8	90.1	92.1	93.8	96.0	100.8	103.9	0.	0.	146.5
63.	0.	84.5	81.6	81.4	81.9	82.3	84.1	85.2	85.3	86.4	86.9	89.2	91.0	92.4	94.4	97.8	100.0	0.	0.	144.1
80.	0.	84.0	81.5	81.0	81.8	82.0	82.7	83.9	84.3	85.6	87.1	88.4	90.6	93.1	95.8	99.6	98.7	0.	0.	144.5
100.	0.	82.8	81.1	81.4	82.6	82.6	83.7	84.7	85.6	87.4	89.2	91.4	93.9	96.6	99.2	102.6	100.0	0.	0.	147.2
125.	0.	82.1	81.1	83.4	84.4	85.6	85.7	87.9	88.8	90.8	91.7	93.9	96.0	98.7	100.5	102.7	99.3	0.	0.	148.9
160.	0.	82.6	82.8	85.6	86.5	87.9	88.7	90.1	90.0	92.3	94.0	95.2	96.9	98.2	100.2	99.7	97.7	0.	0.	148.2
200.	0.	82.4	84.9	85.1	85.7	86.7	87.3	88.2	89.1	90.9	91.5	93.0	95.0	95.6	97.3	96.9	96.7	0.	0.	146.1
250.	0.	84.1	85.4	85.4	85.2	84.3	87.0	87.3	87.0	88.5	89.8	91.8	93.8	95.1	96.8	96.1	94.2	0.	0.	145.1
315.	0.	84.6	86.8	87.2	86.7	85.8	87.0	88.4	88.8	90.4	91.8	92.9	95.0	94.6	95.5	95.4	93.2	0.	0.	145.5
400.	0.	85.3	86.0	85.5	86.1	87.1	89.3	88.0	89.2	90.1	90.0	92.2	92.9	93.6	95.3	94.7	92.4	0.	0.	144.8
500.	0.	83.9	83.7	86.4	85.7	85.4	87.1	86.8	87.2	88.3	89.1	92.3	92.1	93.0	94.7	94.4	91.0	0.	0.	144.1
630.	0.	82.3	83.1	86.1	85.3	85.6	86.5	87.2	86.9	88.2	89.5	91.4	92.3	93.1	94.4	93.1	89.9	0.	0.	143.9
800.	0.	81.6	82.9	84.8	84.7	83.6	85.3	85.7	85.7	87.7	89.3	90.7	92.6	92.7	92.9	91.9	88.3	0.	0.	143.2
1000.	0.	81.8	82.1	83.1	82.1	82.3	82.7	85.7	83.9	86.1	87.7	89.5	91.5	90.3	91.4	90.5	86.9	0.	0.	141.8
1250.	0.	78.1	79.9	81.6	81.4	81.6	82.5	84.2	83.5	84.2	85.4	87.3	89.5	89.4	90.2	88.6	85.5	0.	0.	140.4
1600.	0.	78.0	78.6	81.0	82.0	81.5	82.2	83.1	83.6	84.1	85.2	87.9	88.6	88.5	89.1	87.7	85.7	0.	0.	140.0
2000.	0.	86.1	82.4	84.5	83.5	82.4	84.0	83.0	85.2	86.0	86.1	89.5	88.7	89.7	88.4	86.9	84.5	0.	0.	141.0
2500.	0.	83.1	83.2	83.4	82.5	80.3	81.2	83.8	83.2	85.0	86.2	87.3	88.2	88.7	88.2	87.1	82.7	0.	0.	140.2
3150.	0.	85.2	85.5	84.7	85.1	82.2	81.6	82.9	81.0	82.8	83.0	87.4	87.5	84.8	87.3	85.0	82.8	0.	0.	139.5
4000.	0.	89.7	88.2	89.8	87.7	87.2	86.2	83.0	84.9	85.7	85.2	87.3	88.2	88.2	86.7	84.4	83.5	0.	0.	141.9
5000.	0.	88.3	90.9	87.5	88.0	83.7	83.1	85.6	82.8	82.3	83.3	84.3	86.3	85.8	85.8	85.0	81.1	0.	0.	140.7
6300.	0.	90.0	88.9	89.7	87.7	85.6	83.8	83.7	81.7	84.4	83.2	84.7	85.5	84.2	84.3	81.8	81.7	0.	0.	141.1
8000.	0.	86.3	88.4	85.4	86.6	82.1	81.0	82.5	81.4	82.5	82.7	85.4	86.1	83.9	83.3	81.9	80.1	0.	0.	140.8
10000.	0.	85.2	86.5	85.0	86.0	81.2	80.1	80.1	79.4	81.6	82.5	87.1	90.1	86.3	84.7	81.7	80.8	0.	0.	142.8
OVERALL	13.8	98.7	99.0	99.1	99.0	98.2	99.0	99.7	99.9	101.4	102.4	104.3	105.9	106.9	108.6	110.0	109.2	13.8	13.8	158.0
PNL	0.	112.5	112.7	112.8	111.9	110.9	110.8	110.8	110.8	112.0	112.4	114.6	115.7	115.8	116.1	115.5	113.4	0.	0.	
PNLT	0.	114.3	112.7	114.0	111.9	112.3	112.1	110.8	111.8	113.0	112.4	114.6	115.7	115.8	116.1	115.5	113.4	0.	0.	

Figure 131.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 60% N_{f_c}

FULLY SUPPRESSED WITH HARD CORE EXHAUST CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	74.8	74.3	73.7	76.2	74.4	75.1	75.2	76.2	78.9	79.6	80.4	80.2	81.9	80.8	83.5	84.1	0.	0.	132.4
63.	0.	72.2	70.7	69.7	70.4	70.7	71.1	72.9	71.9	72.6	72.5	70.9	74.9	75.2	75.8	77.7	78.9	0.	0.	127.8
80.	0.	69.8	69.9	68.3	68.4	69.4	70.1	70.3	70.5	71.6	71.9	72.8	74.1	74.5	75.2	76.9	76.6	0.	0.	125.9
100.	0.	70.2	69.6	71.3	72.8	74.6	75.2	76.1	77.0	77.9	78.8	79.5	79.3	80.5	80.3	80.7	78.8	0.	0.	131.8
125.	0.	72.7	74.1	76.1	78.9	79.5	82.4	86.5	82.8	83.4	83.0	83.0	81.4	83.8	83.9	82.5	80.7	0.	0.	136.1
160.	0.	73.4	74.8	76.5	78.4	78.7	79.9	81.2	80.2	80.5	81.0	81.2	81.5	82.2	81.8	79.7	79.2	0.	0.	133.9
200.	0.	75.2	76.2	75.6	76.6	76.7	76.5	77.2	75.9	77.3	77.4	78.1	78.2	79.0	79.0	77.2	78.4	0.	0.	130.9
250.	0.	75.0	74.9	74.4	72.9	73.5	74.1	73.7	75.2	76.5	75.9	76.8	78.2	78.7	77.2	76.7	76.6	0.	0.	129.6
315.	0.	75.3	75.2	74.5	74.3	74.0	74.5	75.4	76.7	77.6	77.8	78.9	80.1	80.2	78.2	78.6	76.5	0.	0.	131.1
400.	0.	73.7	74.5	73.8	72.3	73.1	72.7	73.8	74.3	74.9	76.4	77.2	77.5	78.6	78.8	78.9	76.5	0.	0.	129.8
500.	0.	71.6	73.0	74.2	73.2	72.5	72.9	74.0	73.7	74.6	74.7	76.5	76.7	78.3	79.0	77.4	74.7	0.	0.	129.8
630.	0.	73.2	73.1	74.3	73.1	72.9	72.8	72.9	73.3	74.5	75.7	78.0	79.2	80.6	77.9	75.1	73.6	0.	0.	130.0
800.	0.	73.3	73.4	73.9	72.9	73.4	73.8	74.6	74.7	75.8	76.9	80.2	81.7	81.8	76.3	75.9	72.9	0.	0.	131.4
1000.	0.	71.4	72.1	72.6	72.8	73.4	73.2	74.9	74.9	76.0	76.3	78.7	80.7	80.0	75.7	74.3	71.3	0.	0.	130.5
1250.	0.	69.8	70.4	73.4	71.4	72.1	73.6	74.5	74.2	75.5	75.2	77.0	78.6	78.2	74.1	73.4	72.4	0.	0.	129.4
1600.	0.	70.5	71.5	74.5	75.0	72.9	73.4	74.7	74.3	74.4	75.8	78.0	79.0	78.3	74.7	72.7	72.2	0.	0.	129.9
2000.	0.	78.3	77.1	81.7	82.8	78.1	76.9	78.1	76.8	75.7	77.9	81.3	81.0	82.0	77.1	74.5	74.1	0.	0.	133.7
2500.	0.	72.2	72.6	73.8	74.6	73.4	74.5	75.1	75.2	77.6	79.5	82.4	84.9	82.8	77.8	75.8	72.8	0.	0.	133.8
3150.	0.	74.1	73.6	75.3	73.1	71.3	70.7	72.0	72.7	75.9	77.1	80.4	83.4	81.2	77.8	74.3	74.4	0.	0.	132.4
4000.	0.	80.6	78.8	79.2	78.4	76.4	74.6	74.6	76.4	77.0	80.8	84.5	85.3	85.3	81.7	77.2	74.9	0.	0.	136.1
5000.	0.	80.9	83.3	80.3	78.7	77.2	75.4	76.7	75.7	76.8	78.0	81.6	85.1	81.7	79.5	76.5	73.5	0.	0.	135.2
6300.	0.	85.1	83.8	84.5	83.3	79.8	78.3	77.4	76.9	81.1	83.6	87.8	90.3	86.4	84.7	80.3	77.4	0.	0.	140.8
8000.	0.	82.9	84.6	83.1	82.1	78.0	77.1	76.2	75.7	76.1	76.5	81.7	84.6	82.4	80.4	77.5	73.0	0.	0.	137.2
10000.	0.	85.1	86.4	84.9	85.7	82.3	80.6	77.6	74.4	75.2	74.2	78.2	81.5	79.4	77.6	73.4	71.4	0.	0.	136.6
OVERALL	13.8	91.8	92.3	92.0	92.0	90.0	90.0	91.2	90.1	91.2	92.1	94.5	96.2	95.2	93.3	91.9	90.8	13.8	13.8	147.6
PNL	0.	105.0	104.8	105.1	104.5	102.2	101.4	101.7	101.7	103.4	105.1	108.2	110.3	108.6	106.1	103.2	101.1	0.	0.	
PNLT	0.	107.3	106.5	107.6	107.6	103.8	102.3	103.0	102.4	104.2	106.1	109.3	111.2	109.9	107.1	103.7	101.7	0.	0.	

Figure 132.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 70% N_{f_c}

FULLY SUPPRESSED WITH HARD CORE EXHAUST CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	SWL
50.	0.	73.0	72.7	72.3	73.5	72.9	74.4	75.5	76.0	77.6	77.8	79.7	81.5	82.7	83.0	86.6	88.2	0.	0.	133.5
63.	0.	75.4	73.2	74.7	75.7	75.7	76.6	76.9	76.2	77.4	79.3	79.9	81.0	81.2	82.4	84.9	86.4	0.	0.	133.8
80.	0.	73.6	73.0	71.5	71.4	72.7	73.9	74.5	74.7	75.7	76.7	78.2	80.2	81.2	82.5	84.6	84.2	0.	0.	131.9
100.	0.	73.3	73.3	74.1	76.0	77.8	78.9	79.7	80.9	81.6	82.1	83.6	84.2	85.3	86.6	87.4	85.6	0.	0.	136.0
125.	0.	75.9	82.2	84.5	82.2	85.5	92.5	95.1	93.9	91.1	86.7	90.2	89.9	88.6	89.4	90.7	87.9	0.	0.	144.1
160.	0.	74.5	79.4	81.7	82.3	83.7	86.8	88.1	87.1	85.9	85.7	87.2	87.6	87.7	88.0	86.8	85.6	0.	0.	139.9
200.	0.	77.8	79.7	80.1	80.7	80.8	80.9	80.3	81.1	81.2	81.7	82.9	83.9	84.1	84.2	82.9	83.9	0.	0.	135.5
250.	0.	78.1	79.2	78.4	77.6	79.0	79.7	80.0	79.8	79.8	81.3	82.6	82.9	83.4	83.7	82.7	81.7	0.	0.	134.8
315.	0.	76.9	78.9	77.9	77.6	78.0	79.0	80.5	81.2	81.4	82.5	83.1	85.1	83.8	83.8	82.3	80.9	0.	0.	135.9
400.	0.	75.8	77.2	77.2	75.4	76.5	77.1	78.9	78.7	79.4	80.9	80.9	82.2	82.7	82.7	82.5	80.8	0.	0.	133.9
500.	0.	74.7	76.4	76.7	75.4	76.0	77.1	77.5	78.5	78.9	79.3	81.3	81.9	82.9	82.9	81.9	79.7	0.	0.	133.6
630.	0.	75.1	76.1	77.4	75.4	75.8	76.2	77.1	77.6	78.8	80.0	82.1	83.6	84.1	82.9	80.8	78.3	0.	0.	134.1
800.	0.	74.4	76.4	76.9	76.2	76.1	77.1	77.2	77.7	78.6	80.5	83.4	85.9	83.9	80.9	80.8	77.9	0.	0.	134.7
1000.	0.	72.4	74.4	75.4	74.9	75.1	75.5	76.9	76.6	77.9	79.5	81.6	84.4	81.4	79.9	78.6	76.1	0.	0.	133.3
1250.	0.	71.0	72.4	73.7	73.9	74.3	75.3	76.1	76.3	77.4	77.9	79.9	82.4	79.6	78.7	77.1	76.2	0.	0.	132.0
1600.	0.	71.3	74.5	75.0	74.5	74.7	76.1	76.5	77.1	76.1	78.3	80.2	81.5	79.0	78.5	77.4	76.8	0.	0.	132.1
2000.	0.	72.6	72.9	75.6	75.8	73.6	76.2	75.5	77.6	76.8	79.5	82.8	82.8	81.6	79.4	77.0	76.7	0.	0.	133.3
2500.	0.	73.8	74.5	75.3	75.8	75.7	76.7	77.0	77.5	80.4	82.4	84.5	86.3	82.5	80.1	78.7	75.9	0.	0.	135.6
3150.	0.	77.9	78.0	78.4	75.3	74.8	73.8	75.1	76.0	78.6	80.2	83.4	85.9	82.1	80.1	77.8	77.6	0.	0.	135.0
4000.	0.	84.5	82.5	83.3	81.7	79.7	78.4	77.4	79.5	80.4	83.7	87.5	88.1	87.0	84.1	79.9	77.9	0.	0.	138.9
5000.	0.	84.4	87.8	83.8	83.5	81.8	80.3	80.3	78.9	79.4	80.3	83.5	86.7	83.2	81.5	79.2	76.0	0.	0.	137.9
6300.	0.	87.8	86.1	87.5	86.0	83.5	81.2	80.8	80.8	83.5	84.8	87.3	88.4	84.6	83.8	79.1	78.0	0.	0.	140.7
8000.	0.	85.1	86.6	85.5	84.2	81.3	81.0	80.3	81.8	81.9	83.2	88.6	91.0	88.8	86.7	82.4	79.2	0.	0.	142.9
10000.	0.	85.3	87.4	86.5	86.2	83.0	81.6	79.4	77.6	79.1	77.8	82.1	84.7	82.3	81.9	77.8	75.7	0.	0.	140.5
OVERALL	13.8	93.9	95.0	94.8	93.9	93.3	95.7	97.3	96.6	95.7	95.5	98.2	99.5	98.1	97.8	97.2	96.1	13.8	13.8	[illegible]
PNL	0.	107.2	108.3	107.8	106.7	105.3	104.9	105.1	105.4	106.5	108.0	111.0	112.3	110.7	109.0	106.5	104.9	0.	0.	
PNLT	0.	108.4	109.4	108.9	106.7	106.1	106.5	107.0	107.0	107.7	109.1	112.4	113.0	112.1	110.1	107.2	104.9	0.	0.	

Figure 133.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 80% N_{f_c}

FULLY SUPPRESSED WITH HARD CORE EXHAUST CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	76.5	76.2	75.5	77.0	76.4	77.6	79.0	80.3	81.1	81.7	83.7	85.3	86.7	88.8	93.0	94.9	0.	0.	138.7
63.	0.	79.3	76.4	76.2	76.4	77.1	77.6	78.9	79.3	81.3	81.4	83.1	84.7	85.8	87.4	90.2	92.2	0.	0.	137.2
80.	0.	77.2	76.2	75.2	75.6	76.4	77.3	77.7	78.9	80.2	80.7	82.5	84.8	86.4	88.3	90.8	89.7	0.	0.	137.0
100.	0.	76.6	76.3	77.0	79.0	80.9	81.5	82.7	83.8	84.6	85.5	87.1	88.6	89.8	91.2	93.1	90.3	0.	0.	140.2
125.	0.	78.8	80.0	85.2	85.4	87.9	88.3	89.3	89.1	88.5	90.2	91.4	91.8	92.9	93.5	94.4	91.4	0.	0.	143.8
160.	0.	78.5	82.5	85.7	86.4	87.1	88.8	88.5	88.1	88.5	89.4	91.4	91.5	92.1	92.4	92.4	89.5	0.	0.	143.2
200.	0.	80.9	83.3	83.1	83.5	83.4	83.7	83.5	84.2	84.6	86.1	87.8	88.8	88.6	89.5	88.7	88.1	0.	0.	139.9
250.	0.	80.1	83.0	81.6	81.8	82.2	82.5	82.3	83.0	84.1	86.1	87.0	87.2	88.3	88.5	87.1	86.8	0.	0.	139.0
315.	0.	79.5	81.5	81.0	80.7	81.7	82.7	83.4	84.2	85.7	85.8	87.2	88.9	88.1	87.7	87.0	85.7	0.	0.	139.3
400.	0.	80.0	81.2	81.2	79.6	80.1	81.6	82.6	82.8	83.9	84.4	86.1	86.8	87.2	87.4	87.2	84.8	0.	0.	138.8
500.	0.	78.6	79.8	81.9	80.5	80.0	81.0	81.9	82.3	83.1	84.0	86.0	86.7	86.4	87.9	87.5	84.3	0.	0.	138.1
630.	0.	79.0	81.0	81.2	81.4	80.9	81.9	81.2	82.7	83.7	84.3	86.4	87.6	87.5	87.5	85.6	84.2	0.	0.	138.5
800.	0.	76.9	79.0	81.3	80.0	80.0	80.9	81.0	81.5	83.8	84.4	87.0	89.0	86.6	85.9	85.2	82.8	0.	0.	138.4
1000.	0.	74.9	79.8	78.9	78.9	78.4	79.1	80.0	80.2	82.0	82.9	84.9	86.9	84.8	84.6	83.7	80.4	0.	0.	136.8
1250.	0.	73.9	75.4	77.1	76.6	77.3	77.5	79.0	79.5	80.5	81.1	82.7	84.5	82.7	83.4	82.9	80.4	0.	0.	135.2
1600.	0.	75.3	76.5	79.2	76.7	77.7	78.4	78.7	78.9	80.0	80.7	83.0	83.6	83.0	82.9	81.7	81.0	0.	0.	135.1
2000.	0.	77.6	78.4	81.2	79.1	78.4	79.5	79.2	80.4	80.7	83.2	85.1	84.4	83.8	83.4	82.4	81.4	0.	0.	136.5
2500.	0.	78.0	79.2	78.1	78.5	77.8	79.0	79.7	79.9	82.4	84.5	86.9	87.6	84.3	82.8	82.6	78.9	0.	0.	137.7
3150.	0.	82.7	82.8	82.5	79.1	77.5	76.3	77.1	79.3	81.7	83.4	86.2	87.1	83.1	82.9	80.8	80.1	0.	0.	137.4
4000.	0.	86.3	85.5	86.0	85.2	82.9	82.0	81.3	83.1	84.0	86.6	90.2	89.4	88.7	86.4	82.9	81.1	0.	0.	141.4
5000.	0.	85.9	89.1	86.1	85.3	84.3	83.5	84.3	82.1	82.6	82.5	85.4	89.1	85.0	83.5	82.7	79.5	0.	0.	140.3
6300.	0.	89.1	87.8	88.8	87.2	84.3	83.0	82.6	82.6	85.5	85.7	88.0	88.7	84.9	84.0	81.0	80.0	0.	0.	141.7
8000.	0.	85.6	88.4	86.6	85.5	82.8	82.5	82.6	83.5	84.8	85.4	89.0	90.6	87.4	85.2	82.4	79.8	0.	0.	143.0
10000.	0.	85.5	87.5	85.7	85.9	82.9	81.2	80.0	79.5	82.2	81.8	86.1	90.1	87.2	86.9	82.6	79.7	0.	0.	143.1
OVERALL	13.8	95.7	97.0	96.9	96.3	95.8	96.2	96.5	96.8	97.8	98.8	100.9	102.0	101.4	101.7	102.1	101.0	13.8	13.8	153.7
PNL	0.	109.3	110.5	110.0	108.9	107.7	107.6	108.0	108.2	109.5	111.0	113.8	114.3	113.1	112.1	110.5	108.7	0.	0.	
PNLT	0.	109.9	110.5	110.7	109.9	108.4	108.1	108.6	108.8	109.5	112.2	115.3	114.3	114.6	113.2	110.5	108.7	0.	0.	

Figure 134.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 90% N_{f_c}

FULLY SUPPRESSED WITH HARD CORE EXHAUST CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	81.0	80.7	80.0	81.7	81.9	82.5	84.0	84.5	85.8	86.5	88.8	90.8	93.2	94.4	99.6	102.6	0.	0.	145.2
63.	0.	82.5	81.0	80.2	80.7	81.2	82.2	83.4	83.9	85.0	85.7	88.1	89.4	91.8	93.2	96.7	98.2	0.	0.	142.8
80.	0.	82.5	81.4	81.6	81.7	83.7	84.7	83.9	83.1	84.3	84.9	87.5	89.6	92.1	93.8	97.1	96.2	0.	0.	142.7
100.	0.	82.4	80.6	80.6	82.1	83.1	83.3	84.8	86.3	88.2	89.5	91.2	93.4	95.2	97.5	100.4	96.8	0.	0.	145.7
125.	0.	81.2	81.6	84.6	86.6	87.9	88.4	90.5	90.2	92.3	93.0	94.5	96.2	97.5	99.2	101.0	97.1	0.	0.	147.9
160.	0.	83.2	86.6	88.6	91.2	91.2	92.7	92.4	91.7	92.8	94.0	95.7	96.5	97.7	98.4	98.9	95.3	0.	0.	148.1
200.	0.	84.2	86.9	87.7	88.6	89.0	88.7	88.4	89.5	90.1	91.7	93.1	94.0	95.1	95.6	94.9	93.7	0.	0.	145.5
250.	0.	83.3	84.6	85.4	84.7	85.1	85.7	86.7	86.4	88.8	90.4	91.8	92.5	94.3	94.3	93.7	92.2	0.	0.	144.0
315.	0.	81.9	84.0	84.0	85.3	85.1	86.0	87.7	88.5	89.6	90.9	92.1	93.9	93.4	93.1	93.5	91.0	0.	0.	144.2
400.	0.	83.1	83.6	83.6	83.3	86.3	88.8	88.5	86.8	89.4	89.7	90.7	91.4	92.3	93.0	93.3	90.5	0.	0.	143.5
500.	0.	82.6	83.5	86.9	84.5	85.4	85.7	85.7	85.8	87.5	88.9	91.3	91.3	92.2	92.9	92.5	89.5	0.	0.	143.0
630.	0.	81.2	82.4	85.1	83.9	83.9	84.7	85.6	85.6	87.2	88.2	91.0	91.7	92.2	92.1	90.6	88.9	0.	0.	142.6
800.	0.	80.0	81.8	83.5	83.4	83.4	83.9	84.7	85.2	87.3	88.0	91.3	92.0	91.3	90.3	90.2	86.9	0.	0.	142.3
1000.	0.	79.2	81.6	81.9	81.4	81.8	82.3	83.4	83.3	86.0	86.9	89.0	90.7	88.9	88.8	89.6	85.4	0.	0.	140.8
1250.	0.	77.0	79.1	80.7	81.4	81.1	81.2	82.9	82.9	84.8	84.7	86.7	87.9	87.7	87.8	87.9	85.7	0.	0.	139.3
1600.	0.	77.1	78.0	81.0	80.5	80.7	81.0	82.7	82.5	85.1	84.5	86.3	86.5	88.1	87.7	87.8	85.3	0.	0.	139.1
2000.	0.	87.4	81.6	84.1	83.1	82.1	82.8	83.8	83.8	86.2	86.1	88.8	87.1	89.3	88.0	87.8	85.6	0.	0.	140.6
2500.	0.	81.6	82.6	82.5	83.0	81.9	82.8	85.0	83.6	88.7	87.4	89.7	89.2	89.7	87.2	88.4	83.9	0.	0.	141.9
3150.	0.	84.9	85.0	85.8	83.6	80.8	80.4	84.3	81.8	88.4	84.6	88.5	88.1	88.8	86.0	87.1	84.1	0.	0.	140.8
4000.	0.	88.1	87.3	89.1	88.6	86.4	85.0	86.4	86.6	89.8	89.3	92.0	90.8	92.6	88.7	87.9	85.0	0.	0.	144.3
5000.	0.	86.9	90.3	87.2	87.5	86.2	86.0	87.7	84.7	89.6	86.0	89.8	90.8	92.7	86.0	88.6	82.5	0.	0.	143.9
6300.	0.	89.4	87.7	89.4	88.6	85.6	86.0	87.2	85.2	90.9	88.2	92.0	89.9	94.3	87.4	88.2	84.5	0.	0.	145.3
8000.	0.	85.5	88.2	86.2	86.9	84.0	85.3	86.4	87.7	90.8	90.4	93.6	91.8	95.8	86.6	90.2	83.5	0.	0.	147.1
10000.	0.	84.4	85.6	84.6	86.3	82.3	82.4	84.4	83.1	90.0	88.6	95.0	96.2	97.8	91.8	92.9	84.9	0.	0.	149.7
OVERALL	13.8	97.8	98.5	99.1	99.4	98.9	99.6	100.4	100.2	102.7	102.9	105.3	106.0	107.4	107.0	108.6	107.3	13.8	13.8	158.4
PNL	0.	111.3	112.1	112.4	112.2	110.9	110.7	112.1	111.7	115.0	114.5	117.2	117.0	118.5	116.0	116.4	113.4	0.	0.	
PNLT	0.	114.0	112.1	112.4	113.2	111.5	111.7	112.1	112.8	115.0	115.8	117.2	117.0	118.5	117.0	116.4	113.4	0.	0.	

Figure 135.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 60% N_{f_c}

LONG INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	69.9	72.3	70.5	0.	74.9	74.8	73.0	73.1	73.8	75.6	77.7	79.9	81.7	79.4	82.6	81.9	0.	0.	130.6
63.	0.	71.8	71.3	69.7	0.	71.3	71.1	73.0	73.1	73.2	71.8	72.8	74.9	75.9	74.4	78.0	78.7	0.	0.	126.8
80.	0.	70.7	70.2	68.6	0.	70.7	70.7	70.9	70.7	71.9	71.4	72.7	74.5	75.2	75.4	78.3	76.3	0.	0.	126.2
100.	0.	70.8	70.2	70.9	0.	75.0	76.2	76.1	78.0	79.1	77.7	78.1	78.8	80.9	79.8	82.0	78.6	0.	0.	131.3
125.	0.	73.1	73.6	75.9	0.	82.5	82.3	82.4	83.5	85.5	82.1	82.1	82.2	83.9	83.8	84.0	81.0	0.	0.	136.0
160.	0.	73.0	74.5	77.9	0.	80.4	81.4	81.1	81.5	81.2	81.0	81.8	81.9	83.6	81.5	80.8	79.7	0.	0.	134.4
200.	0.	75.0	76.6	76.9	0.	78.1	77.1	77.0	77.1	78.0	77.8	79.0	80.1	80.7	79.7	77.7	77.7	0.	0.	131.6
250.	0.	75.9	75.3	77.1	0.	75.4	74.1	74.3	74.4	77.2	75.6	76.2	76.9	78.7	76.9	77.0	77.0	0.	0.	129.6
315.	0.	76.8	77.3	76.9	0.	76.1	75.0	76.0	77.1	77.9	77.0	78.2	80.2	80.7	77.6	77.7	75.7	0.	0.	131.2
400.	0.	78.1	79.4	78.9	0.	76.0	76.2	74.9	76.0	76.0	75.9	76.9	77.0	79.9	78.6	78.8	75.8	0.	0.	130.7
500.	0.	78.0	79.2	81.0	0.	75.9	75.1	74.8	75.2	75.8	74.9	76.8	76.7	78.6	77.5	77.5	74.5	0.	0.	130.5
630.	0.	82.4	80.6	82.3	0.	77.3	75.4	75.1	74.5	75.4	75.9	77.3	79.0	80.9	77.1	75.9	74.2	0.	0.	131.4
800.	0.	81.0	81.5	80.8	0.	78.1	77.3	76.0	75.4	76.0	76.7	79.0	82.2	82.0	76.7	75.7	73.8	0.	0.	132.4
1000.	0.	83.4	82.9	81.2	0.	79.4	78.6	77.4	76.3	76.4	76.2	78.4	81.4	79.9	75.0	75.1	73.1	0.	0.	132.5
1250.	0.	92.2	91.5	92.9	0.	87.2	88.2	84.4	82.3	81.4	79.3	79.3	81.3	79.8	76.9	76.7	77.8	0.	0.	139.4
1600.	0.	86.0	85.6	86.2	0.	81.6	81.3	78.4	78.3	76.3	76.1	78.1	79.3	78.7	74.6	74.1	73.9	0.	0.	134.1
2000.	0.	84.2	84.7	86.1	0.	80.7	79.4	78.2	78.6	76.5	77.0	79.4	78.1	81.0	76.9	75.1	74.2	0.	0.	134.1
2500.	0.	89.0	89.5	88.8	0.	85.1	84.0	82.2	77.9	78.7	78.7	80.7	81.0	80.5	76.7	76.4	72.8	0.	0.	137.2
3150.	0.	84.3	85.8	87.2	0.	81.5	80.6	78.1	75.5	76.1	74.2	77.0	81.1	78.7	74.9	73.8	73.9	0.	0.	134.6
4000.	0.	88.2	86.6	89.8	0.	85.3	77.3	80.3	77.1	75.2	74.7	77.2	77.8	78.6	75.5	74.6	71.9	0.	0.	136.3
5000.	0.	87.2	88.7	87.1	0.	83.5	83.6	82.4	76.2	75.4	73.0	75.3	76.1	75.1	73.7	72.9	71.9	0.	0.	136.2
6300.	0.	85.3	87.1	89.5	0.	86.7	83.6	80.6	78.5	77.6	77.4	80.6	83.7	81.1	78.0	76.2	73.1	0.	0.	138.5
8000.	0.	85.5	87.8	86.2	0.	83.0	79.7	79.5	75.4	75.5	73.1	78.3	81.5	79.2	77.0	74.0	71.2	0.	0.	137.1
10000.	0.	82.3	84.2	84.3	0.	81.6	78.7	78.5	73.6	74.3	71.3	75.1	77.2	75.9	74.0	72.0	69.0	0.	0.	136.0
OVERALL	13.8	98.0	98.3	99.0	13.8	95.3	94.3	92.8	91.5	91.8	90.7	92.2	93.7	94.0	91.7	91.9	90.3	13.8	13.8	148.8
PNL	0.	111.1	111.5	112.4	0.	108.7	106.8	105.6	103.0	103.1	102.5	104.5	106.2	105.5	102.5	101.9	100.3	0.	0.	
PNLT	0.	113.6	113.9	115.5	0.	110.9	109.6	107.7	104.6	104.8	103.5	105.2	107.0	106.1	103.0	101.9	101.7	0.	0.	

Figure 137.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 70% N_{f_c}

LONG INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	75.6	75.0	75.2	76.5	74.6	74.5	75.0	75.5	76.7	76.7	79.1	80.1	82.3	83.2	86.2	88.5	0.	0.	133.5
63.	0.	79.2	74.2	76.9	76.0	76.0	75.0	75.9	75.7	76.6	77.4	79.3	80.1	82.0	82.1	83.8	85.7	0.	0.	132.5
80.	0.	77.6	76.3	75.3	74.8	74.8	74.3	74.3	75.1	75.7	76.2	78.4	79.7	80.8	82.0	83.9	84.3	0.	0.	131.8
100.	0.	76.7	75.6	77.6	78.9	79.1	78.9	79.1	80.9	81.4	82.2	83.7	84.3	84.9	86.0	87.5	85.4	0.	0.	136.0
125.	0.	79.2	81.8	83.9	83.6	87.8	92.0	92.2	91.6	87.9	87.7	91.7	90.4	88.9	88.7	90.9	87.9	0.	0.	143.2
160.	0.	77.1	81.3	82.3	84.1	84.6	86.8	87.4	87.4	85.9	86.4	88.2	87.8	87.8	87.4	86.7	85.8	0.	0.	140.1
200.	0.	78.9	80.8	81.6	81.9	82.7	81.9	82.0	80.8	81.4	82.2	83.7	83.9	84.9	84.8	83.0	83.6	0.	0.	136.5
250.	0.	78.5	80.4	81.2	80.9	81.5	79.4	79.8	80.3	80.5	80.8	82.3	82.5	84.0	83.3	82.1	81.7	0.	0.	135.1
315.	0.	78.5	79.4	81.2	81.2	81.2	80.4	81.0	82.1	81.7	82.8	84.0	84.9	85.0	83.6	82.1	81.2	0.	0.	136.2
400.	0.	79.6	81.3	81.3	81.6	82.6	82.3	80.0	81.0	80.6	80.7	82.7	82.1	82.9	82.5	82.3	81.1	0.	0.	135.9
500.	0.	80.5	81.2	85.4	81.5	82.6	79.2	79.1	79.6	79.4	80.1	81.8	81.8	82.8	82.9	81.8	80.2	0.	0.	135.2
630.	0.	80.9	81.4	85.7	81.7	80.4	78.2	77.7	78.7	78.9	80.0	81.7	82.7	83.9	82.6	80.5	79.5	0.	0.	135.1
800.	0.	87.2	87.5	83.9	85.7	84.4	80.2	79.3	78.5	80.3	80.6	83.2	85.7	84.0	81.7	80.1	78.2	0.	0.	136.9
1000.	0.	85.1	86.4	84.0	83.6	82.2	80.1	78.7	78.4	79.0	80.0	81.7	84.4	81.2	79.6	79.5	76.9	0.	0.	135.0
1250.	0.	86.8	87.5	89.0	84.7	85.0	83.7	81.9	80.1	78.4	78.8	80.3	82.7	80.0	78.7	78.1	77.5	0.	0.	137.0
1600.	0.	96.4	98.3	94.9	97.2	96.4	98.9	93.2	88.7	86.1	82.7	84.3	85.8	82.8	81.8	81.2	82.3	0.	0.	147.8
2000.	0.	86.9	87.9	88.6	86.4	84.2	83.9	81.3	80.1	77.8	79.3	82.2	79.9	81.4	79.3	77.6	77.9	0.	0.	137.4
2500.	0.	90.7	90.2	90.2	88.6	85.9	83.6	82.3	78.9	80.4	81.2	82.9	83.1	81.0	79.3	78.3	76.1	0.	0.	139.8
3150.	0.	90.5	94.4	93.7	91.0	87.9	88.5	84.2	83.2	83.2	80.2	80.9	84.1	81.2	78.6	78.0	79.5	0.	0.	141.8
4000.	0.	92.0	90.4	92.2	90.7	87.1	80.9	82.7	81.6	78.0	78.7	80.7	80.9	81.2	79.5	78.1	75.9	0.	0.	140.3
5000.	0.	91.9	93.7	90.5	91.7	89.3	88.3	87.1	82.3	81.0	77.2	78.6	79.3	77.3	77.9	76.6	76.2	0.	0.	141.8
6300.	0.	89.2	89.4	91.9	91.7	89.2	87.3	84.8	84.4	81.4	80.1	81.9	82.6	79.6	78.4	77.4	76.1	0.	0.	142.0
8000.	0.	87.5	90.3	89.0	88.7	84.7	83.5	83.6	80.8	79.6	76.4	81.5	85.4	81.8	79.4	76.6	75.2	0.	0.	140.9
10000.	0.	84.4	86.6	86.9	87.4	83.5	82.9	80.8	79.2	77.4	74.9	77.5	80.4	77.9	76.9	74.9	72.5	0.	0.	139.8
OVERALL	13.8	101.5	103.0	102.0	101.9	100.5	101.5	98.7	97.0	95.4	95.1	97.4	97.9	97.2	96.6	96.9	96.3	13.8	13.8	153.9
PNL	0.	114.7	116.4	116.0	115.0	113.7	114.2	110.9	108.3	107.5	106.1	108.0	109.4	107.7	106.5	105.6	105.5	0.	0.	
PNLT	0.	117.9	119.9	118.1	118.9	117.6	119.2	114.8	111.2	110.1	107.3	109.0	110.9	108.4	106.5	106.7	107.0	0.	0.	

Figure 136.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 80% N_{f_c}

LONG INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	77.0	76.7	78.0	78.5	78.7	78.8	79.8	80.6	81.7	82.2	83.9	85.1	86.7	88.3	92.5	94.9	0.	0.	138.7
63.	0.	79.2	79.2	79.7	78.7	79.5	79.2	80.0	79.7	81.2	81.9	83.6	85.3	85.6	86.9	90.4	92.1	0.	0.	137.5
80.	0.	78.3	77.3	79.0	77.1	78.1	78.0	79.1	78.6	80.5	81.4	83.5	84.9	85.9	87.4	90.6	89.9	0.	0.	137.0
100.	0.	78.1	76.1	79.3	79.6	81.6	81.1	81.4	83.6	84.5	85.4	86.8	87.9	90.4	91.0	92.8	91.0	0.	0.	140.1
125.	0.	80.1	78.6	83.9	85.4	88.2	87.1	89.5	88.5	88.1	90.0	91.2	91.9	92.7	93.0	94.6	92.1	0.	0.	143.6
160.	0.	80.6	81.3	85.8	87.1	88.8	88.7	89.5	88.1	88.8	89.9	91.4	91.6	92.4	92.2	92.8	90.5	0.	0.	143.5
200.	0.	81.4	83.4	83.9	85.3	85.1	85.3	84.1	84.9	85.6	86.6	88.2	88.5	89.2	89.2	88.9	89.0	0.	0.	140.4
250.	0.	81.2	82.8	82.9	82.8	83.7	84.7	84.4	84.3	83.6	85.7	87.3	86.8	88.1	88.3	87.3	88.0	0.	0.	139.3
315.	0.	81.7	82.4	82.7	84.5	83.0	83.9	85.5	85.0	86.2	87.2	87.7	88.6	87.9	87.3	86.8	86.0	0.	0.	139.9
400.	0.	84.9	83.3	81.8	82.6	83.4	82.1	83.1	83.4	85.1	85.1	86.2	87.2	87.2	87.2	86.7	84.9	0.	0.	138.8
500.	0.	92.2	85.2	85.7	89.2	89.9	86.2	86.8	87.3	85.9	93.6	85.8	87.6	88.8	87.6	87.5	84.5	0.	0.	141.3
630.	0.	96.1	92.8	93.4	90.5	89.8	85.6	84.2	83.9	84.1	85.1	86.9	86.8	86.3	88.0	87.1	84.2	0.	0.	141.6
800.	0.	95.1	95.8	94.6	91.1	95.1	93.3	94.1	90.6	86.1	85.4	92.2	91.2	87.1	89.3	85.8	86.2	0.	0.	145.7
1000.	0.	94.2	93.0	92.0	88.4	91.0	88.7	92.3	88.2	87.4	87.4	88.5	88.5	85.8	85.1	84.7	83.0	0.	0.	143.3
1250.	0.	90.6	93.5	96.1	91.6	87.5	87.2	86.5	86.7	85.7	83.2	85.4	85.3	83.7	83.7	83.1	82.2	0.	0.	142.4
1600.	0.	94.4	95.2	100.9	97.4	92.7	91.9	92.7	89.7	85.8	83.3	85.7	85.4	84.0	84.3	83.2	82.8	0.	0.	146.5
2000.	0.	97.3	99.3	105.0	102.0	96.5	95.8	97.7	94.0	89.9	85.1	88.5	86.0	86.6	86.4	84.8	85.1	0.	0.	150.8
2500.	0.	94.7	93.9	95.4	94.0	91.0	90.3	88.8	84.9	85.3	84.6	85.6	84.8	84.3	83.3	83.0	81.3	0.	0.	143.8
3150.	0.	93.2	95.2	94.4	92.0	88.1	89.5	85.9	84.9	84.6	82.3	83.0	85.3	82.3	81.9	80.5	81.1	0.	0.	142.9
4000.	0.	95.8	93.7	95.7	94.5	91.8	86.6	86.6	86.4	83.5	83.4	84.0	84.3	83.8	83.1	82.5	80.3	0.	0.	144.2
5000.	0.	94.3	96.5	93.0	93.8	89.8	90.3	89.0	84.7	84.6	80.7	81.1	81.8	80.6	81.3	79.8	79.6	0.	0.	144.0
6300.	0.	91.9	92.7	94.2	94.0	91.2	89.9	87.8	87.1	85.0	82.0	83.2	82.7	81.5	80.6	80.5	78.8	0.	0.	144.4
8000.	0.	91.1	93.5	91.0	91.9	87.7	85.7	86.4	84.5	83.7	81.2	83.4	84.3	81.7	80.7	78.6	77.7	0.	0.	143.4
10000.	0.	87.0	88.4	87.6	90.1	85.4	84.4	83.5	82.0	81.2	77.9	80.4	83.8	82.4	81.5	78.0	76.3	0.	0.	142.2
OVERALL	13.8	105.0	106.1	108.6	106.4	103.6	102.4	103.0	100.7	99.3	99.2	100.9	101.1	101.1	101.3	102.1	101.6	13.8	13.8	157.3
PNL	0.	118.5	119.3	122.3	120.3	116.7	115.7	116.4	113.9	111.7	110.0	111.7	111.8	110.9	110.8	110.2	109.5	0.	0.	
PNLT	0.	120.1	121.1	124.6	122.4	118.9	117.9	119.6	116.1	113.2	111.2	113.2	113.0	110.9	110.8	110.2	110.5	0.	0.	

Figure 138.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 90% N_{f_c}

LONG INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	80.6	80.3	79.7	0.	82.7	83.1	83.8	85.7	86.9	86.6	88.8	90.8	93.6	94.2	100.5	102.5	0.	0.	145.4
63.	0.	81.7	80.5	80.0	0.	83.2	82.1	84.3	84.1	86.4	85.7	88.0	90.2	93.1	93.4	97.7	99.8	0.	0.	143.7
80.	0.	82.7	81.1	82.3	0.	83.8	85.7	85.6	84.5	85.7	85.7	87.6	90.7	93.4	93.0	97.3	96.3	0.	0.	143.1
100.	0.	81.9	79.4	80.6	0.	83.8	84.3	85.2	86.8	88.3	88.7	91.1	92.9	95.6	97.4	101.1	96.5	0.	0.	145.9
125.	0.	82.2	81.7	85.2	0.	88.2	89.4	90.6	91.2	92.7	93.4	94.4	96.5	99.2	98.8	102.2	97.1	0.	0.	148.4
160.	0.	82.7	86.4	90.0	0.	91.0	93.1	93.0	92.9	93.2	94.1	95.9	96.9	98.7	98.5	99.7	95.5	0.	0.	148.5
200.	0.	83.8	86.5	87.7	0.	90.1	89.5	89.3	89.1	91.5	91.2	92.1	94.0	95.8	95.7	95.9	93.7	0.	0.	145.6
250.	0.	85.8	89.6	86.5	0.	90.1	92.2	88.3	88.3	90.2	91.0	91.3	94.0	96.8	94.5	95.7	93.9	0.	0.	145.7
315.	0.	86.7	89.6	85.7	0.	87.2	89.2	91.2	92.0	92.5	94.2	92.0	94.2	95.0	94.8	94.0	91.9	0.	0.	145.9
400.	0.	94.8	91.2	94.7	0.	99.1	105.4	105.3	104.2	99.5	102.1	102.9	100.2	96.7	97.5	95.9	92.9	0.	0.	155.2
500.	0.	98.7	94.4	91.9	0.	99.9	101.3	97.2	98.0	97.1	96.0	94.8	94.1	95.9	97.6	95.5	95.4	0.	0.	150.9
630.	0.	91.3	91.8	97.3	0.	100.5	100.7	99.3	98.2	97.5	94.1	96.2	93.2	96.9	94.9	93.1	91.1	0.	0.	151.0
800.	0.	94.1	95.5	94.2	0.	96.4	97.2	93.1	92.0	91.5	89.9	92.3	94.0	94.2	92.6	91.7	88.7	0.	0.	147.4
1000.	0.	96.2	95.5	97.0	0.	97.5	97.4	96.6	91.4	92.4	91.1	90.1	92.3	90.9	90.7	90.9	88.8	0.	0.	147.9
1250.	0.	94.9	95.6	96.9	0.	97.1	97.6	96.5	91.3	90.5	90.2	89.1	91.1	90.1	88.8	89.7	86.9	0.	0.	147.6
1600.	0.	93.1	94.5	97.1	0.	95.1	95.5	94.4	90.3	88.5	88.1	87.2	89.0	90.1	88.8	89.1	86.8	0.	0.	146.2
2000.	0.	97.1	100.8	100.3	0.	96.5	93.4	93.3	93.5	89.4	89.2	89.2	86.9	90.2	88.7	89.2	88.2	0.	0.	147.9
2500.	0.	97.9	97.1	97.8	0.	93.9	93.3	93.2	90.0	91.1	88.7	89.1	87.7	88.5	88.2	88.8	85.5	0.	0.	146.5
3150.	0.	94.2	95.6	96.2	0.	92.5	92.6	90.5	89.0	90.5	85.2	86.1	88.0	86.7	85.8	85.8	86.1	0.	0.	145.1
4000.	0.	96.0	94.3	97.8	0.	94.0	89.2	90.1	89.9	87.1	86.0	87.0	87.1	88.6	87.7	87.9	83.9	0.	0.	145.6
5000.	0.	94.1	95.5	94.0	0.	93.3	92.4	91.6	87.3	87.6	83.3	83.3	85.2	84.2	85.7	84.9	83.1	0.	0.	144.8
6300.	0.	92.2	91.8	94.5	0.	93.5	91.6	88.6	87.5	86.6	84.6	85.5	86.3	87.0	85.1	86.3	83.1	0.	0.	144.9
8000.	0.	90.2	92.6	91.1	0.	89.6	89.5	87.3	85.2	86.7	82.4	83.1	85.3	83.2	83.0	83.2	80.2	0.	0.	143.6
10000.	0.	86.3	87.8	88.2	0.	88.2	89.7	84.6	82.4	83.6	82.3	84.4	87.4	85.2	83.8	83.2	80.0	0.	0.	143.6
OVERALL	13.8	106.9	107.3	108.1	13.9	108.5	110.0	108.9	107.7	106.1	106.2	106.9	106.8	107.9	107.7	109.5	108.0	13.8	13.8	161.6
PNL	0.	120.1	120.7	121.3	0.	119.7	120.0	119.2	117.8	116.5	116.0	116.6	116.3	116.5	116.0	116.4	114.3	0.	0.	
PNLT	0.	123.1	122.4	122.7	0.	120.7	121.7	121.0	119.3	117.6	117.1	118.2	117.3	117.6	116.0	116.4	115.5	0.	0.	

Figure 139.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 60% N_{f_c}

ONE SPLITTER INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PNL
50.	0.	72.9	75.4	75.9	76.0	76.9	75.8	73.9	73.7	76.6	77.5	79.9	82.8	82.8	83.7	83.8	84.9	0.	0.	132.9
63.	0.	74.1	74.6	74.2	71.5	71.1	71.8	72.1	73.1	73.1	73.0	75.2	76.1	75.3	77.0	79.0	79.9	0.	0.	128.0
80.	0.	71.4	72.5	72.5	70.1	70.5	70.6	71.7	71.4	72.5	73.3	74.3	74.5	75.8	77.5	77.6	77.4	0.	0.	127.1
100.	0.	71.7	72.5	72.7	72.3	76.7	76.9	76.7	78.0	79.0	78.8	80.0	79.8	79.9	81.1	80.9	79.7	0.	0.	131.9
125.	0.	72.3	74.9	78.1	79.6	81.4	85.0	89.4	89.2	86.2	81.1	86.3	83.5	84.2	84.3	83.4	81.1	0.	0.	138.7
160.	0.	73.0	75.5	77.1	78.2	79.1	80.1	81.9	81.8	81.1	80.8	82.8	82.8	82.9	83.8	81.1	79.9	0.	0.	134.8
200.	0.	75.1	76.6	76.1	77.2	76.8	77.2	77.2	76.9	77.8	78.9	79.9	80.2	79.3	79.9	77.2	77.9	0.	0.	131.8
250.	0.	75.9	74.9	74.3	73.5	74.8	74.8	74.1	73.9	75.8	75.8	77.9	78.3	78.0	78.9	77.0	75.8	0.	0.	129.8
315.	0.	76.1	76.6	75.1	74.2	74.8	73.8	75.8	76.9	77.8	77.8	79.1	80.2	79.0	78.9	77.0	75.8	0.	0.	131.1
400.	0.	75.0	76.5	76.1	73.2	74.0	72.7	74.7	75.0	75.1	75.7	77.8	78.0	78.3	79.1	78.0	76.0	0.	0.	130.0
500.	0.	75.7	77.4	78.0	74.3	73.6	72.9	74.7	74.6	74.7	74.5	76.7	77.0	77.9	78.9	76.9	75.6	0.	0.	129.8
630.	0.	80.1	79.9	79.2	76.7	77.0	74.2	73.2	74.0	75.3	75.2	78.3	79.2	80.2	78.3	75.3	74.0	0.	0.	131.0
800.	0.	80.0	81.7	81.1	77.2	75.0	74.8	74.8	74.1	75.2	77.0	80.8	83.2	81.3	76.9	74.9	72.8	0.	0.	132.5
1000.	0.	82.5	82.9	80.4	76.3	76.0	75.9	74.0	75.0	76.0	76.2	79.8	81.4	79.2	75.9	74.0	72.0	0.	0.	131.9
1250.	0.	91.2	90.8	89.3	84.6	85.2	81.9	81.0	78.2	77.0	77.0	79.2	80.3	78.3	77.2	75.1	74.6	0.	0.	137.1
1600.	0.	85.3	84.8	84.1	79.4	79.1	77.0	75.9	75.2	75.0	74.8	78.2	79.3	78.1	75.1	72.9	72.9	0.	0.	132.9
2000.	0.	84.4	83.9	83.2	80.5	78.2	76.0	77.3	77.0	76.0	76.2	80.4	78.3	80.5	76.3	73.3	73.3	0.	0.	133.4
2500.	0.	89.0	89.7	86.8	84.1	81.7	78.7	78.7	74.6	76.6	77.8	80.9	81.7	78.8	76.6	73.9	71.5	0.	0.	136.1
3150.	0.	85.1	86.1	84.1	79.6	78.0	76.1	73.2	73.9	74.0	73.8	77.0	80.1	77.3	74.9	72.0	72.9	0.	0.	133.2
4000.	0.	86.9	85.9	87.2	82.5	81.9	75.0	76.8	73.9	72.8	73.6	78.0	78.0	78.0	77.1	73.2	70.6	0.	0.	134.9
5000.	0.	88.4	88.9	85.5	84.6	80.2	80.1	78.0	74.4	73.9	72.2	75.8	76.0	73.1	73.9	71.1	70.2	0.	0.	135.5
6300.	0.	86.6	87.1	88.4	85.9	84.3	82.5	79.6	78.3	77.2	77.1	81.6	84.3	80.6	78.5	75.3	72.4	0.	0.	138.4
8000.	0.	86.3	89.0	85.4	83.9	81.3	77.5	78.5	76.4	75.2	73.0	78.2	81.3	78.5	78.1	73.4	71.0	0.	0.	137.4
10000.	0.	84.3	86.1	84.6	83.6	82.2	80.3	78.1	76.2	73.4	72.3	75.4	78.1	76.4	75.4	71.2	69.4	0.	0.	137.5
OVERALL	13.8	97.8	98.3	97.0	94.3	93.3	92.1	93.1	92.5	91.4	90.5	93.6	94.3	93.4	93.0	91.5	90.9	13.8	13.8	140.2
PNL	0.	111.0	111.6	110.4	107.5	106.2	104.4	103.3	102.1	101.7	102.0	105.2	106.6	104.6	103.4	100.6	99.6	0.	0.	
PNLT	0.	113.4	113.9	112.7	109.7	108.7	106.2	105.3	103.6	102.8	102.7	106.0	107.6	105.4	103.4	101.1	99.6	0.	0.	

Figure 140.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 70% N_{f_c}

ONE SPLITTER INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	74.5	74.3	74.5	75.6	74.2	76.0	75.7	77.0	77.2	78.2	79.5	82.2	83.5	84.1	87.5	89.6	0.	0.	134.4
63.	0.	77.7	75.0	74.1	75.2	75.4	76.7	77.1	77.2	77.1	78.8	81.4	82.6	82.3	83.5	85.7	87.4	0.	0.	153.8
80.	0.	75.6	74.1	74.0	73.8	74.0	74.8	75.0	76.0	76.0	77.5	79.1	80.7	82.2	83.9	85.5	85.1	0.	0.	152.8
100.	0.	76.3	75.4	76.1	77.4	78.6	79.6	80.4	81.7	82.2	83.2	84.1	84.7	86.7	87.4	88.7	86.9	0.	0.	137.0
125.	0.	77.2	81.9	82.6	82.9	86.0	93.2	95.7	94.1	89.8	87.7	91.4	91.5	90.4	90.7	92.2	89.7	0.	0.	144.7
160.	0.	76.8	80.1	83.1	83.9	84.2	88.4	89.7	88.4	86.7	86.9	88.3	88.7	88.9	88.9	88.1	87.4	0.	0.	141.1
200.	0.	79.3	82.1	81.3	82.6	82.3	81.6	83.7	83.5	82.5	84.0	84.4	85.8	85.9	86.5	84.4	85.0	0.	0.	137.5
250.	0.	79.2	80.9	80.2	80.4	79.0	79.2	79.5	80.3	80.5	82.8	83.5	83.6	85.0	84.5	82.7	83.3	0.	0.	135.7
315.	0.	78.7	80.7	80.2	80.4	80.1	80.2	81.4	82.0	82.3	84.3	84.4	85.9	86.1	84.0	83.2	81.7	0.	0.	136.8
400.	0.	79.3	81.3	82.1	81.3	80.0	80.6	81.0	81.0	81.2	82.2	82.6	83.8	84.2	83.9	83.4	81.7	0.	0.	135.9
500.	0.	80.5	81.2	82.2	79.5	79.6	80.0	80.1	80.6	79.8	81.4	82.5	82.6	83.6	84.1	82.8	80.6	0.	0.	135.4
630.	0.	81.6	83.1	82.9	81.1	81.1	80.0	80.5	80.3	79.5	81.5	82.9	83.8	84.7	83.3	82.1	80.2	0.	0.	135.9
800.	0.	86.9	84.4	84.6	84.2	83.3	82.2	79.3	79.6	81.1	81.6	83.7	86.6	84.5	82.0	80.8	79.3	0.	0.	137.0
1000.	0.	87.1	87.8	83.8	82.1	80.5	81.8	79.7	78.9	78.4	80.2	82.1	85.3	81.5	80.1	79.7	77.6	0.	0.	136.0
1250.	0.	87.8	86.2	86.9	82.9	80.6	80.4	79.3	78.6	77.9	79.0	80.2	83.2	79.5	79.3	78.5	78.0	0.	0.	135.6
1600.	0.	94.6	99.6	95.9	92.2	90.8	90.1	88.9	86.8	82.4	83.6	83.3	86.9	86.1	83.6	80.6	83.3	0.	0.	144.5
2000.	0.	87.1	88.2	87.1	83.6	81.6	79.6	79.2	78.5	77.4	79.7	81.9	80.3	81.5	80.0	78.2	78.2	0.	0.	136.2
2500.	0.	90.4	89.4	88.7	86.5	82.8	80.8	79.4	77.7	79.4	80.7	82.1	83.3	80.7	79.4	78.3	75.3	0.	0.	137.7
3150.	0.	92.4	93.2	90.9	89.2	85.0	84.5	81.4	82.7	80.7	80.2	80.6	84.1	80.7	78.7	77.9	79.2	0.	0.	140.0
4000.	0.	91.0	89.2	90.4	87.9	85.8	79.6	80.5	78.2	77.1	78.1	80.6	81.0	81.5	79.7	78.4	75.3	0.	0.	138.7
5000.	0.	94.8	93.7	90.5	91.3	85.8	84.6	84.5	79.8	78.6	77.1	77.9	79.6	77.1	78.0	75.9	75.8	0.	0.	140.9
6300.	0.	90.4	90.4	91.2	91.1	89.1	87.1	83.9	82.4	80.7	80.4	81.6	83.0	79.9	78.4	76.8	75.0	0.	0.	141.7
8000.	0.	89.3	91.4	87.7	89.4	84.7	81.7	82.1	79.6	79.1	77.7	82.0	86.9	83.2	81.3	77.3	75.7	0.	0.	141.2
10000.	0.	87.8	88.4	87.3	89.0	84.6	83.2	81.9	79.1	78.0	75.2	77.3	80.7	79.1	78.2	75.2	72.5	0.	0.	140.8
OVERALL	13.8	101.9	103.4	101.3	100.0	97.7	98.3	99.0	97.7	95.5	95.8	97.5	98.8	98.2	97.9	98.1	97.5	13.8	13.8	153.0
PNL	0.	115.8	116.5	114.3	113.4	110.8	109.5	108.8	107.6	106.3	106.5	107.8	109.9	108.4	107.2	106.1	105.8	0.	0.	
PNLT	0.	118.2	120.6	117.3	116.4	114.0	112.9	112.0	110.4	107.8	107.9	108.7	111.6	110.2	108.5	106.8	107.5	0.	0.	

Figure 141.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 80% N_{f_c}

ONE SPLITTER INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	77.7	76.9	77.7	77.5	77.3	78.0	79.4	80.6	82.6	81.7	83.8	84.7	87.0	89.1	93.0	95.1	0.	0.	158.9
63.	0.	78.9	77.2	77.7	78.0	77.6	78.3	79.9	79.9	81.0	82.0	83.1	83.9	86.0	87.2	90.0	91.6	0.	0.	157.1
80.	0.	79.5	77.0	77.3	76.6	77.4	77.5	79.3	78.5	80.5	81.6	83.7	84.5	85.8	87.8	89.7	89.9	0.	0.	136.8
100.	0.	78.5	76.8	78.9	79.7	80.7	81.1	82.6	83.8	85.1	85.1	87.8	88.6	90.2	91.1	92.9	91.5	0.	0.	140.4
125.	0.	79.8	79.3	84.1	84.9	88.1	88.3	90.0	89.2	88.4	90.5	91.4	92.1	93.3	93.6	94.2	92.8	0.	0.	143.9
160.	0.	78.7	82.1	85.6	87.6	88.5	89.4	88.9	88.9	89.1	90.0	91.8	91.7	92.0	93.0	91.9	90.5	0.	0.	143.6
200.	0.	81.7	82.9	83.7	84.6	84.8	84.9	84.6	84.8	86.2	86.9	88.0	87.7	89.1	89.2	89.0	88.5	0.	0.	140.3
250.	0.	80.9	83.1	83.7	81.6	82.6	82.2	82.9	83.1	84.9	86.2	87.3	87.7	88.4	89.2	88.0	87.2	0.	0.	139.4
315.	0.	80.9	83.1	84.7	81.9	83.8	83.2	86.9	85.1	86.9	86.9	88.0	87.7	88.3	88.2	87.9	86.1	0.	0.	140.1
400.	0.	83.6	82.8	83.8	82.6	84.7	81.9	86.8	83.7	85.8	85.1	86.0	85.9	86.9	88.3	86.9	85.3	0.	0.	139.2
500.	0.	88.6	88.8	85.7	89.8	82.6	83.0	86.7	83.7	85.0	89.9	87.1	86.7	86.8	87.2	88.8	84.2	0.	0.	140.7
630.	0.	90.0	94.5	90.0	86.9	84.5	82.4	82.1	83.3	85.4	86.1	87.4	87.1	86.5	88.4	86.3	83.6	0.	0.	140.8
800.	0.	94.8	91.3	86.8	89.0	92.9	88.0	91.8	91.9	92.0	91.3	89.0	89.5	87.0	86.2	85.2	85.4	0.	0.	144.8
1000.	0.	96.9	93.2	90.2	90.3	88.9	86.4	85.8	83.3	85.1	84.4	86.0	87.1	84.4	85.2	84.3	83.4	0.	0.	141.6
1250.	0.	92.7	90.2	91.1	85.6	85.8	84.0	83.7	83.1	81.9	82.2	83.9	84.7	83.2	84.0	82.9	82.2	0.	0.	139.5
1600.	0.	96.7	98.3	99.7	91.1	91.9	88.3	86.9	84.8	83.9	83.0	86.1	84.9	83.0	83.3	82.9	83.3	0.	0.	144.9
2000.	0.	98.1	100.1	102.9	93.1	94.8	90.5	88.9	86.3	85.3	85.4	88.3	85.0	85.1	85.1	83.0	84.3	0.	0.	147.5
2500.	0.	94.7	94.0	93.6	89.6	87.5	85.0	84.7	81.9	83.7	83.7	84.9	84.4	82.0	82.9	82.0	79.2	0.	0.	141.6
3150.	0.	92.9	93.3	91.9	89.2	86.0	85.4	81.8	82.3	83.1	81.1	83.0	85.1	82.1	81.4	80.1	81.3	0.	0.	140.8
4000.	0.	94.7	93.2	94.7	90.7	89.9	83.8	84.6	83.9	82.0	82.2	84.0	83.9	83.9	83.2	80.9	80.1	0.	0.	142.9
5000.	0.	94.9	95.4	91.2	92.0	87.0	88.2	87.1	84.0	83.1	80.1	81.3	80.8	80.1	80.4	79.1	79.6	0.	0.	142.5
6300.	0.	92.1	92.2	93.1	92.2	90.3	89.4	86.2	86.4	84.5	81.6	83.2	83.2	81.5	80.6	79.5	78.4	0.	0.	143.5
8000.	0.	90.2	92.2	90.0	90.5	86.1	83.4	84.1	83.1	83.4	80.5	84.0	84.2	82.3	80.3	77.4	77.6	0.	0.	142.3
10000.	0.	88.0	89.2	89.3	90.3	85.0	84.4	83.1	81.3	81.1	78.2	81.3	84.2	83.3	81.5	78.4	76.4	0.	0.	142.6
OVERALL	13.8	105.8	106.1	106.7	102.4	101.8	99.6	99.9	99.0	99.3	99.7	100.6	100.7	100.9	101.5	101.9	101.5	13.8	13.8	156.0
PNL	0.	118.6	119.4	120.5	115.4	114.9	112.1	111.6	110.3	110.1	109.7	111.5	111.4	110.7	110.6	109.5	109.1	0.	0.	
PNLT	0.	119.6	121.9	123.9	117.1	117.5	114.1	114.3	113.2	112.3	111.7	111.5	111.4	110.7	110.6	109.5	110.1	0.	0.	

Figure 142.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 90% N_{f_c}

ONE SPLITTER INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	81.9	81.6	80.6	81.3	81.6	82.8	83.6	84.9	85.9	86.5	89.6	90.6	93.1	94.8	99.8	102.8	0.	0.	145.4
63.	0.	83.2	82.5	81.1	80.2	81.7	81.8	82.8	83.9	84.9	86.0	89.0	90.1	92.1	94.1	97.1	99.3	0.	0.	143.4
80.	0.	83.8	81.4	80.7	80.1	83.5	84.5	83.7	83.5	85.5	85.6	89.4	90.5	92.0	94.6	96.3	96.7	0.	0.	143.0
100.	0.	83.1	81.7	81.8	82.1	83.8	83.7	85.8	86.7	89.0	89.9	91.7	93.0	95.3	97.8	100.2	97.1	0.	0.	145.8
125.	0.	83.1	82.8	85.4	85.7	88.2	89.1	90.1	91.2	92.5	92.2	95.3	96.3	97.1	100.4	101.6	97.6	0.	0.	148.3
160.	0.	84.1	88.6	90.1	90.3	90.9	93.1	92.8	92.1	92.9	93.9	95.6	97.0	98.1	99.8	99.9	96.1	0.	0.	148.7
200.	0.	85.1	88.7	88.2	89.3	90.0	88.9	88.9	90.0	90.4	91.8	92.8	93.9	95.3	96.9	95.9	94.1	0.	0.	145.9
250.	0.	85.9	88.8	86.9	88.6	88.2	89.3	89.2	89.3	90.0	91.0	92.1	93.9	94.2	95.8	93.9	93.0	0.	0.	145.2
315.	0.	84.1	88.8	85.8	88.3	90.2	89.1	89.2	89.3	91.2	90.7	91.8	93.9	93.4	94.8	93.9	92.0	0.	0.	145.1
400.	0.	90.0	93.6	96.1	86.4	92.2	101.0	103.1	96.9	95.9	96.6	92.7	96.8	95.3	96.9	93.0	93.9	0.	0.	151.1
500.	0.	93.8	96.7	90.8	96.1	97.8	89.7	94.0	93.8	93.1	95.5	94.6	91.9	94.2	96.9	94.0	93.0	0.	0.	148.5
630.	0.	91.2	90.9	90.4	88.5	89.1	90.3	90.1	92.2	91.1	90.1	93.3	93.1	93.3	94.1	92.1	89.3	0.	0.	145.5
800.	0.	94.3	93.0	91.3	89.6	88.0	90.9	88.1	86.2	88.9	89.7	91.0	92.9	91.3	91.8	90.9	87.9	0.	0.	144.6
1000.	0.	98.2	96.9	92.5	90.8	90.4	90.1	87.9	88.2	87.2	89.1	89.2	92.0	89.5	91.0	89.3	87.1	0.	0.	144.7
1250.	0.	96.0	96.7	95.3	92.3	89.0	89.9	87.8	87.9	86.1	85.8	87.1	89.9	88.4	90.0	88.2	86.6	0.	0.	144.3
1600.	0.	94.1	94.6	93.5	90.2	87.2	87.9	85.8	86.3	85.2	84.8	86.9	88.2	88.2	88.9	87.0	86.3	0.	0.	142.9
2000.	0.	100.4	100.2	100.1	93.5	91.4	89.1	90.1	89.4	87.2	87.2	89.2	87.3	88.6	89.9	88.1	87.1	0.	0.	146.9
2500.	0.	96.8	95.7	95.7	92.1	90.0	86.9	87.8	85.9	87.9	87.5	88.5	87.9	87.9	88.7	87.6	84.7	0.	0.	144.5
3150.	0.	93.1	93.8	92.3	89.6	87.2	87.0	85.1	86.2	85.9	84.8	85.8	87.9	86.4	86.1	85.3	85.3	0.	0.	142.6
4000.	0.	95.1	92.6	94.1	91.5	91.2	83.9	86.7	86.1	84.8	84.9	88.0	87.1	88.3	88.7	86.1	83.9	0.	0.	143.9
5000.	0.	95.2	95.2	92.2	92.7	88.2	87.3	88.0	85.3	85.1	82.9	84.2	85.4	84.3	85.9	83.4	83.4	0.	0.	143.5
6300.	0.	91.4	91.4	93.6	91.7	91.6	89.3	86.1	87.2	85.3	84.4	86.1	85.5	86.4	85.4	85.5	82.5	0.	0.	144.3
8000.	0.	89.6	92.3	89.3	89.9	87.1	83.3	84.1	85.1	85.1	83.0	85.3	85.2	83.4	83.0	81.5	80.2	0.	0.	142.8
10000.	0.	87.2	88.2	87.2	87.8	85.4	82.2	81.4	83.5	83.1	82.1	86.1	88.2	85.4	84.4	81.5	79.5	0.	0.	143.1
OVERALL	13.8	107.0	107.2	106.2	104.0	103.8	104.5	105.6	103.3	103.3	103.9	104.8	106.0	106.4	108.3	108.7	107.9	13.8	13.8	159.6
PNL	0.	120.2	120.4	119.8	116.7	115.9	115.0	115.8	113.5	113.6	113.5	114.9	115.5	115.6	116.5	115.3	113.7	0.	0.	
PNLT	0.	121.9	122.0	121.6	119.6	118.3	116.9	117.7	114.6	114.2	114.0	115.9	116.1	115.6	116.5	115.8	113.7	0.	0.	

Figure 143.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 60% N_{f_c}

TWO SPLITTER INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PNL
50.	0.	74.4	72.5	72.9	77.5	78.7	78.4	76.7	75.7	76.7	79.7	82.4	78.6	84.9	82.7	85.6	85.4	0.	0.	133.8
63.	0.	73.6	71.3	71.6	71.6	73.9	71.4	72.9	73.6	72.8	73.7	75.6	72.5	76.8	76.8	78.5	79.5	0.	0.	127.8
80.	0.	71.9	71.3	70.3	70.5	73.5	71.3	71.2	71.5	72.3	72.3	74.3	72.2	75.6	75.5	78.2	78.1	0.	0.	126.9
100.	0.	72.6	71.3	70.6	72.6	76.1	75.6	75.6	77.6	77.8	77.9	79.5	77.8	80.8	79.9	81.8	79.8	0.	0.	131.3
125.	0.	72.7	72.8	75.8	80.0	82.2	81.8	84.2	85.0	83.9	83.0	84.0	82.2	84.4	83.1	82.8	80.8	0.	0.	136.4
160.	0.	73.5	74.5	77.5	78.7	79.9	80.5	81.7	81.9	81.7	82.0	82.7	82.6	83.7	82.8	80.7	80.5	0.	0.	135.0
200.	0.	75.6	75.4	76.4	76.9	79.0	77.9	77.9	77.6	76.8	78.8	80.8	79.7	80.8	80.0	77.8	78.8	0.	0.	132.2
250.	0.	75.3	75.3	74.6	73.9	76.9	75.5	74.6	75.0	75.6	76.9	77.6	77.8	78.9	77.9	76.7	77.4	0.	0.	130.1
315.	0.	77.6	77.4	75.6	74.7	76.9	75.7	76.9	77.9	77.6	78.8	79.8	80.9	81.2	78.9	77.8	76.7	0.	0.	132.0
400.	0.	76.5	77.3	76.5	74.6	77.0	74.6	75.5	75.8	75.5	76.6	77.7	78.5	79.8	78.9	78.5	77.3	0.	0.	130.8
500.	0.	75.4	77.2	77.4	74.5	75.9	74.2	74.6	74.7	74.4	75.7	77.4	78.6	79.0	78.8	77.6	75.4	0.	0.	130.4
630.	0.	79.7	78.7	78.8	74.9	75.0	74.6	75.1	74.8	75.1	76.9	78.8	79.9	81.4	78.1	75.7	74.6	0.	0.	131.3
800.	0.	78.7	78.8	77.4	75.9	76.1	75.5	75.9	75.6	75.9	77.7	80.6	83.9	84.1	78.2	75.7	73.6	0.	0.	133.1
1000.	0.	78.7	79.0	77.6	76.1	76.3	75.7	77.1	76.8	75.8	78.3	79.8	83.0	82.1	76.2	74.7	73.6	0.	0.	132.6
1250.	0.	87.8	87.6	89.8	83.9	83.1	83.9	79.8	79.8	78.0	77.8	79.7	81.8	80.0	76.1	75.5	74.5	0.	0.	136.6
1600.	0.	82.6	80.9	82.9	77.8	77.3	76.8	76.0	77.0	75.0	76.8	78.7	81.1	79.0	75.9	73.5	72.8	0.	0.	132.5
2000.	0.	84.0	82.8	83.8	80.0	79.2	77.0	79.3	76.1	76.1	77.2	80.9	80.2	81.2	77.2	74.7	74.6	0.	0.	133.9
2500.	0.	86.4	85.8	84.5	81.8	79.0	77.8	77.7	74.6	77.9	78.8	82.5	82.9	81.8	78.1	75.5	73.4	0.	0.	135.2
3150.	0.	82.7	82.9	82.0	77.1	76.3	73.6	73.8	75.0	73.8	75.8	76.6	81.9	79.0	75.2	73.6	72.8	0.	0.	132.5
4000.	0.	87.3	84.6	84.6	81.7	79.9	77.7	76.7	73.7	73.7	74.7	78.7	78.5	78.7	76.8	74.3	73.5	0.	0.	134.8
5000.	0.	84.8	86.8	84.5	81.1	80.0	76.5	79.1	73.9	73.6	73.7	76.5	79.8	77.9	75.9	72.5	70.7	0.	0.	134.5
6300.	0.	87.8	87.9	87.9	86.8	84.4	81.7	80.0	76.7	77.8	77.9	81.9	83.8	82.2	79.1	76.6	74.8	0.	0.	138.7
8000.	0.	86.2	87.5	85.3	84.8	81.8	79.6	80.6	76.6	75.6	74.7	80.6	83.8	81.8	79.7	74.2	73.2	0.	0.	138.3
10000.	0.	87.9	89.1	86.9	87.1	85.4	82.0	81.3	76.3	75.3	74.3	78.2	80.4	78.5	76.3	73.1	71.8	0.	0.	140.2
OVERALL	13.8	96.7	96.8	96.4	94.4	93.5	92.1	92.1	91.4	91.0	91.6	93.8	94.7	95.0	92.7	92.2	91.4	13.8	13.8	148.3
PNL	0.	110.1	109.6	109.3	107.5	106.2	104.2	103.7	101.8	102.2	103.1	106.1	107.1	106.6	103.6	101.6	100.5	0.	0.	
PNLT	0.	112.5	112.1	112.5	109.8	108.3	106.7	104.8	102.7	102.9	103.7	107.3	107.1	106.6	103.6	102.1	100.5	0.	0.	

Figure 144.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 70% N_{f_c}

TWO SPLITTER INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	73.7	73.4	72.3	74.4	78.5	75.5	76.2	76.1	77.3	77.4	80.5	77.9	82.8	84.1	87.5	88.7	0.	0.	133.9
63.	0.	77.9	73.9	73.6	75.8	80.0	77.9	78.5	77.6	77.3	80.1	82.8	80.4	83.7	83.6	85.6	86.9	0.	0.	134.2
80.	0.	74.5	72.4	71.9	73.1	79.6	74.5	74.3	75.2	75.9	76.3	79.0	78.7	82.3	83.0	84.4	84.5	0.	0.	132.8
100.	0.	74.5	73.4	73.1	76.4	81.7	78.7	79.7	80.3	82.3	82.9	83.3	83.3	85.8	86.5	87.7	85.7	0.	0.	136.2
125.	0.	76.8	77.0	81.9	81.9	85.9	91.8	93.5	91.8	90.5	84.9	89.8	88.7	89.2	89.7	91.0	87.8	0.	0.	143.2
160.	0.	75.7	79.1	82.3	83.8	85.6	87.6	89.3	87.5	87.3	86.5	88.4	87.3	88.9	89.4	87.9	85.5	0.	0.	140.8
200.	0.	78.7	80.7	81.5	82.7	84.0	83.0	82.5	82.7	82.4	83.7	84.4	85.2	85.6	86.3	83.6	83.8	0.	0.	137.8
250.	0.	77.8	79.9	79.8	79.7	80.8	80.8	78.6	79.4	81.4	82.0	83.4	83.2	84.9	84.3	82.6	82.6	0.	0.	135.9
315.	0.	78.8	80.0	79.8	79.7	82.1	80.9	81.6	81.5	82.5	83.8	84.7	86.2	85.7	84.4	82.7	81.6	0.	0.	136.8
400.	0.	77.8	79.6	80.4	78.5	80.7	78.7	80.6	80.6	80.4	81.7	83.3	84.1	83.8	84.3	82.8	81.5	0.	0.	135.9
500.	0.	77.5	80.8	84.5	77.7	79.6	78.9	79.4	78.2	80.3	80.6	82.3	83.3	83.8	83.1	83.4	81.4	0.	0.	135.2
630.	0.	79.2	80.2	82.5	78.9	79.0	78.3	77.7	78.6	79.6	81.3	82.9	84.6	83.9	83.9	81.1	79.0	0.	0.	135.2
800.	0.	82.1	80.8	79.8	78.7	78.8	78.1	79.6	78.6	80.7	81.8	84.7	87.3	84.9	82.6	80.6	78.5	0.	0.	136.2
1000.	0.	83.3	81.0	80.0	78.8	77.9	76.9	77.7	78.6	79.8	81.0	82.7	86.4	82.9	80.5	79.8	76.7	0.	0.	135.2
1250.	0.	83.7	81.8	81.5	78.8	79.1	77.8	78.8	78.6	79.3	79.8	81.7	84.4	80.9	79.3	77.9	76.8	0.	0.	134.6
1600.	0.	92.7	88.9	88.6	87.8	85.9	84.2	82.9	80.6	79.5	80.2	82.6	84.4	80.8	80.5	78.9	78.7	0.	0.	138.6
2000.	0.	85.0	82.3	82.7	81.0	78.2	78.1	77.0	76.8	77.8	79.3	81.9	81.4	81.1	79.3	77.8	76.8	0.	0.	134.6
2500.	0.	87.6	85.7	84.7	82.9	80.0	78.8	78.5	76.5	80.6	81.7	84.4	84.4	81.9	80.3	78.7	76.7	0.	0.	136.8
3150.	0.	88.2	88.9	87.0	84.3	81.1	80.1	78.9	78.9	78.9	79.4	80.8	84.5	80.2	78.6	76.5	76.8	0.	0.	137.0
4000.	0.	91.6	87.8	87.3	86.6	82.8	81.9	78.7	77.2	78.1	77.5	81.5	81.2	80.5	80.2	77.7	76.6	0.	0.	137.7
5000.	0.	91.0	91.9	87.8	87.8	86.2	84.2	83.9	78.5	78.4	77.0	79.8	81.3	80.7	79.7	75.9	74.6	0.	0.	139.8
6300.	0.	91.6	90.9	90.5	91.0	87.1	85.8	82.9	81.6	81.7	80.9	82.7	83.6	79.9	79.4	77.7	76.8	0.	0.	141.4
8000.	0.	89.5	90.4	88.2	87.7	84.6	82.6	83.6	79.5	79.3	78.5	83.4	89.0	84.4	83.1	77.6	76.3	0.	0.	141.6
10000.	0.	89.1	90.2	89.1	89.1	86.2	83.5	84.3	79.9	79.9	77.3	80.8	82.9	80.3	80.0	78.0	74.9	0.	0.	142.2
OVERALL	13.8	100.2	99.5	98.5	98.0	96.7	96.8	97.5	96.0	95.9	95.2	97.6	98.5	97.9	97.8	97.5	96.4	13.8	13.8	151.9
PNL	0.	113.9	113.2	111.9	111.5	109.3	108.2	107.7	105.6	106.1	106.4	109.0	110.2	108.2	107.5	105.7	104.6	0.	0.	
PNLT	0.	116.6	115.5	114.0	114.1	111.7	110.2	109.3	106.9	107.0	107.0	110.0	111.2	108.9	108.0	106.2	104.6	0.	0.	

Figure 145.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 80% N_{f_c}

TWO SPLITTER INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	78.6	77.3	77.3	79.5	83.7	79.4	80.4	81.1	83.1	82.7	85.2	82.2	88.6	89.6	93.6	95.5	0.	0.	139.6
63.	0.	80.8	77.5	77.2	78.7	82.8	78.6	79.7	80.3	82.5	81.8	84.4	82.2	86.6	88.5	91.1	92.8	0.	0.	138.0
80.	0.	79.4	77.0	77.1	77.3	84.5	78.4	79.2	80.1	80.8	81.2	84.3	84.0	87.3	89.2	91.7	90.4	0.	0.	138.0
100.	0.	79.4	76.6	78.1	79.6	84.4	81.4	82.3	83.1	84.3	85.4	87.5	87.3	90.7	92.3	93.6	91.6	0.	0.	140.7
125.	0.	80.0	78.7	82.4	85.9	88.9	87.1	89.0	88.7	88.5	90.0	90.8	91.5	93.2	94.7	94.9	92.0	0.	0.	143.9
160.	0.	80.6	82.7	86.2	88.4	89.8	89.7	90.5	89.3	89.4	90.9	92.5	92.5	93.9	94.6	93.6	90.9	0.	0.	144.7
200.	0.	82.8	83.9	84.3	85.4	88.7	85.7	85.4	85.2	86.5	87.6	89.6	90.6	90.0	91.5	89.0	89.7	0.	0.	141.7
250.	0.	82.6	82.8	84.3	83.5	87.6	82.9	82.7	83.6	84.3	86.9	88.8	89.2	88.8	89.8	88.0	87.6	0.	0.	140.5
315.	0.	80.9	83.9	84.4	82.8	85.6	82.9	85.7	85.3	87.3	87.7	88.6	90.7	89.1	88.8	87.8	85.9	0.	0.	140.8
400.	0.	82.5	82.8	83.5	81.4	87.6	82.6	85.4	84.3	85.4	86.6	87.8	88.4	87.7	88.7	87.7	85.5	0.	0.	140.0
500.	0.	82.4	84.7	85.0	86.6	85.7	82.5	85.3	84.2	84.1	88.8	87.7	88.3	88.6	89.4	88.6	85.7	0.	0.	140.6
630.	0.	84.4	83.8	86.8	89.0	87.9	88.0	84.9	82.5	84.5	86.1	88.1	88.7	89.1	88.8	86.9	85.1	0.	0.	141.0
800.	0.	92.8	91.8	89.7	93.0	91.8	89.1	88.6	91.9	89.3	92.8	89.7	92.4	88.8	88.6	86.7	84.6	0.	0.	144.7
1000.	0.	90.2	89.2	84.8	85.8	87.1	84.2	83.7	83.8	83.4	87.1	86.9	90.6	85.9	86.9	84.8	82.1	0.	0.	140.5
1250.	0.	85.6	85.8	84.4	82.7	82.6	80.6	81.7	82.5	82.2	82.6	84.7	87.2	83.9	85.4	83.7	82.8	0.	0.	138.0
1600.	0.	91.9	90.9	94.9	89.8	89.9	83.8	83.6	82.4	82.3	82.0	84.6	86.3	83.8	84.8	83.1	81.7	0.	0.	141.4
2000.	0.	95.9	95.3	101.8	93.2	95.3	88.1	86.7	84.8	84.5	83.9	86.9	85.7	84.2	85.7	83.9	84.1	0.	0.	146.2
2500.	0.	90.8	89.6	87.5	85.7	83.7	81.9	82.4	80.4	83.4	84.0	86.5	86.1	84.6	84.6	82.6	80.5	0.	0.	139.4
3150.	0.	90.1	90.0	88.6	85.1	83.9	81.2	79.7	81.6	83.5	82.1	83.0	86.5	82.0	83.0	80.9	80.1	0.	0.	139.0
4000.	0.	94.9	91.8	91.3	90.5	87.7	85.7	83.3	82.4	84.3	81.7	85.5	85.1	84.7	84.5	81.7	80.4	0.	0.	141.8
5000.	0.	91.0	93.1	90.6	90.0	88.0	86.1	86.6	83.7	84.2	80.7	81.8	84.3	83.7	82.8	80.7	78.7	0.	0.	141.7
6300.	0.	93.1	93.0	92.6	93.0	89.8	88.9	85.0	85.4	86.3	82.7	83.5	84.1	82.8	82.5	80.7	80.9	0.	0.	143.7
8000.	0.	90.8	91.8	89.5	89.4	87.6	85.4	85.4	83.1	84.3	81.6	85.5	89.0	84.7	82.2	79.6	78.3	0.	0.	143.2
10000.	0.	90.2	91.2	88.9	90.3	87.1	84.1	84.9	81.7	83.7	80.0	82.8	86.6	85.1	83.1	80.0	78.3	0.	0.	143.7
OVERALL	13.8	103.3	102.9	104.7	102.0	102.1	99.1	99.1	98.8	99.1	100.2	101.2	102.2	102.0	102.8	102.8	101.9	13.8	13.8	155.8
PNL	0.	117.2	116.0	118.8	114.9	115.3	111.4	110.8	109.7	110.5	110.1	112.0	113.1	111.8	112.0	110.3	109.2	0.	0.	
PNLT	0.	119.4	118.4	123.9	117.7	119.2	113.6	112.3	112.6	112.3	112.2	113.0	113.7	111.8	112.0	110.3	109.2	0.	0.	

Figure 146.

C-3

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 90% N_{f_c}

TWO SPLITTER INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	82.4	80.6	80.1	82.3	83.4	82.8	84.3	85.4	87.3	86.7	89.5	87.2	93.5	95.2	99.6	103.0	0.	0.	145.4
63.	0.	83.7	80.8	80.6	81.7	83.9	82.7	84.5	84.6	85.2	85.9	89.4	88.2	92.7	94.6	97.7	99.9	0.	0.	143.8
80.	0.	84.3	81.4	82.2	83.4	85.1	85.2	85.1	83.9	86.1	85.2	88.0	88.0	92.5	94.3	96.5	97.6	0.	0.	143.0
100.	0.	82.4	80.4	80.3	82.6	83.7	84.5	84.6	85.8	88.3	89.5	91.5	92.3	95.8	98.4	99.9	97.9	0.	0.	145.9
125.	0.	82.8	82.0	84.5	86.7	87.8	89.2	90.0	90.9	92.6	92.2	94.6	95.6	98.0	99.8	101.9	97.9	0.	0.	148.2
160.	0.	84.4	87.5	89.3	92.8	91.9	93.6	92.4	92.4	92.5	94.9	96.3	97.1	98.9	99.8	99.9	95.8	0.	0.	149.0
200.	0.	85.6	87.8	88.6	89.6	89.7	89.8	89.8	89.4	91.5	91.8	93.3	94.5	94.9	96.6	95.6	94.6	0.	0.	146.0
250.	0.	85.6	86.6	88.4	87.8	90.0	88.1	88.8	88.6	90.4	91.0	92.4	94.5	94.7	95.7	93.6	93.7	0.	0.	145.3
315.	0.	86.7	85.9	86.4	90.0	90.8	90.9	92.6	92.6	94.6	93.0	93.4	95.3	93.9	94.7	92.9	93.7	0.	0.	146.6
400.	0.	84.5	97.6	95.4	86.7	95.6	98.7	97.5	96.7	92.5	92.7	92.6	96.1	92.9	94.6	93.8	92.9	0.	0.	149.0
500.	0.	88.9	94.5	91.6	90.7	89.8	92.7	97.4	92.4	91.4	95.8	95.6	94.3	92.7	97.4	93.5	92.8	0.	0.	148.0
630.	0.	86.9	90.2	91.8	91.2	93.2	89.3	90.0	86.8	90.6	89.0	91.9	93.7	93.8	94.6	91.8	90.2	0.	0.	145.4
800.	0.	87.9	87.9	87.4	86.6	87.7	86.7	87.7	86.4	88.5	88.8	91.5	93.5	91.7	92.7	89.9	88.7	0.	0.	143.7
1000.	0.	93.0	87.9	86.8	87.1	87.9	86.2	85.7	87.6	88.5	88.1	90.6	92.7	89.8	89.9	89.8	87.1	0.	0.	143.1
1250.	0.	90.8	86.9	89.8	86.8	84.5	84.7	84.4	85.3	85.5	84.9	88.6	90.2	88.9	89.6	88.6	85.9	0.	0.	141.6
1600.	0.	88.9	87.7	88.5	84.9	83.0	84.0	83.8	85.0	84.4	85.0	87.5	89.3	87.7	88.7	87.0	85.7	0.	0.	140.8
2000.	0.	98.0	94.3	95.7	89.9	89.0	88.1	88.8	88.6	87.7	85.9	88.6	87.6	89.1	89.6	87.8	86.1	0.	0.	144.4
2500.	0.	93.7	91.7	90.4	88.5	86.6	84.9	85.6	84.3	86.1	86.6	88.6	88.3	88.4	88.5	87.8	84.7	0.	0.	142.3
3150.	0.	90.3	91.1	89.8	87.1	84.1	83.2	82.0	84.6	83.7	84.9	84.8	88.7	85.1	86.6	84.8	84.0	0.	0.	140.9
4000.	0.	95.6	91.6	92.6	90.5	88.8	86.5	87.2	86.2	86.1	86.5	87.2	87.9	87.5	88.4	86.7	85.4	0.	0.	143.6
5000.	0.	91.9	93.1	90.6	90.8	89.1	86.8	89.0	85.4	84.6	84.7	84.7	88.3	86.9	87.5	84.9	82.5	0.	0.	143.2
6300.	0.	93.2	93.0	92.6	93.0	89.9	88.9	85.8	85.7	87.3	85.0	85.7	87.2	84.9	86.7	85.6	83.6	0.	0.	144.4
8000.	0.	90.6	91.8	89.5	89.5	86.4	84.4	86.5	84.1	85.9	84.6	86.3	89.2	85.3	85.3	82.4	81.4	0.	0.	143.7
10000.	0.	88.5	90.2	87.8	89.1	86.3	83.0	83.8	82.7	84.9	84.3	87.0	90.8	88.3	86.8	84.9	82.1	0.	0.	144.8
OVERALL	13.8	104.4	104.5	103.9	102.7	102.9	103.4	103.9	102.8	103.1	103.6	105.0	106.3	106.7	108.2	108.7	108.3	13.8	13.8	159.1
PNL	0.	118.2	116.9	116.9	115.5	114.4	113.6	114.0	112.9	113.3	113.5	114.9	116.3	115.5	116.6	115.4	114.1	0.	0.	
PNLT	0.	120.5	118.4	118.9	117.0	115.8	114.9	115.4	114.3	113.8	115.1	116.0	116.3	115.5	116.6	116.4	114.1	0.	0.	

Figure 147.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 60% N_{f_c}

THREE SPLITTER INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	73.5	72.2	73.3	81.7	76.7	77.8	74.8	74.5	76.6	78.7	80.7	76.3	83.9	82.7	84.7	84.6	0.	0.	133.0
63.	0.	73.4	71.6	70.5	80.8	71.5	71.6	73.7	73.3	73.6	75.9	75.7	71.4	76.6	75.9	77.5	80.0	0.	0.	128.6
80.	0.	72.1	70.9	69.3	79.3	72.1	71.4	72.2	71.1	71.2	72.4	73.9	71.7	75.4	76.2	77.1	77.5	0.	0.	127.3
100.	0.	71.5	69.3	70.7	80.0	75.5	75.9	75.9	77.6	77.7	80.0	79.8	77.4	80.0	80.0	81.6	80.7	0.	0.	131.8
125.	0.	71.9	71.6	78.1	86.3	83.3	82.1	83.1	83.8	86.3	88.2	84.1	82.9	86.3	88.0	86.8	84.0	0.	0.	138.5
160.	0.	73.6	74.5	76.7	79.7	79.9	82.0	81.7	81.7	81.8	82.9	82.7	81.3	83.9	82.9	80.8	81.0	0.	0.	135.1
200.	0.	75.3	75.3	76.5	80.7	78.7	78.8	78.0	77.6	78.7	79.8	80.6	79.6	80.8	80.8	77.8	79.0	0.	0.	132.8
250.	0.	75.6	75.4	74.7	79.8	74.9	74.7	74.7	74.7	76.0	76.9	77.9	77.5	78.8	77.8	76.5	76.7	0.	0.	130.3
315.	0.	77.5	76.7	75.6	78.0	74.9	75.8	77.1	76.7	77.8	78.9	79.7	80.5	81.8	78.9	76.6	77.0	0.	0.	132.0
400.	0.	75.6	76.6	76.8	75.8	74.6	73.7	75.9	75.4	75.6	76.9	77.6	77.5	79.0	78.8	77.9	76.9	0.	0.	130.5
500.	0.	75.5	77.5	77.7	75.5	73.5	73.8	74.6	74.3	75.6	76.8	77.5	77.4	78.0	78.6	77.8	75.8	0.	0.	130.2
630.	0.	77.9	76.9	77.9	76.2	75.1	74.0	75.0	74.7	75.3	77.2	79.1	79.7	81.1	79.3	76.8	74.2	0.	0.	131.3
800.	0.	76.8	77.6	76.9	75.7	75.7	76.1	77.1	75.7	75.8	78.9	80.7	82.8	83.9	78.8	76.6	74.7	0.	0.	133.0
1000.	0.	75.6	75.6	75.8	74.0	74.2	75.0	76.3	76.6	76.0	79.1	80.2	82.7	82.3	77.0	74.8	74.2	0.	0.	132.4
1250.	0.	86.8	82.6	83.8	76.8	75.7	75.8	77.9	77.5	75.1	78.0	79.7	81.8	79.8	76.1	74.5	73.8	0.	0.	133.3
1600.	0.	80.0	76.9	77.0	73.9	73.9	73.9	74.9	75.9	73.9	76.9	79.1	80.8	79.3	76.2	73.9	73.9	0.	0.	131.2
2000.	0.	83.9	82.9	83.1	76.2	77.2	80.4	78.3	78.0	76.0	77.0	80.0	80.0	81.4	78.1	74.8	75.0	0.	0.	133.7
2500.	0.	82.8	81.9	80.0	75.6	74.6	74.7	75.8	73.4	76.8	79.2	81.8	81.4	82.1	78.1	76.6	72.9	0.	0.	133.4
3150.	0.	78.8	78.0	77.1	73.1	72.8	72.2	73.0	73.9	73.2	76.2	79.1	81.7	78.3	76.2	73.7	72.9	0.	0.	131.4
4000.	0.	84.4	81.5	83.0	77.9	77.6	72.7	73.0	73.3	74.0	73.9	75.7	79.4	79.0	75.9	74.4	72.6	0.	0.	132.5
5000.	0.	86.1	86.7	83.0	80.3	79.0	79.1	79.4	74.9	73.0	75.9	78.9	78.7	77.2	74.9	72.8	71.8	0.	0.	134.5
6300.	0.	86.7	86.1	87.9	85.0	84.0	79.3	78.3	76.7	78.3	76.9	81.8	84.6	82.0	80.1	77.0	75.2	0.	0.	138.1
8000.	0.	86.6	88.3	85.5	83.6	81.8	79.9	78.7	75.3	75.6	77.5	80.4	82.5	81.6	77.9	75.3	72.7	0.	0.	138.0
10000.	0.	88.1	88.9	88.2	86.4	84.5	82.3	82.3	77.0	76.4	75.3	78.2	79.8	78.2	77.2	74.2	72.4	0.	0.	140.3
OVERALL	13.8	95.8	95.5	95.1	94.4	92.3	91.5	91.6	90.8	91.6	93.2	93.7	94.3	95.0	93.7	92.7	91.8	13.8	13.8	148.1
PNL	0.	108.6	108.4	108.3	106.2	104.9	103.0	103.3	101.5	102.1	103.7	105.8	107.1	106.6	104.1	102.1	100.6	0.	0.	
PNLT	0.	111.6	110.5	110.8	107.3	105.8	105.1	104.5	102.6	103.1	104.9	105.8	107.7	107.3	105.2	103.0	101.2	0.	0.	

Figure 148.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 70% N_{f_c}

THREEE SPLITTER INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	73.7	75.3	73.7	75.6	74.0	75.8	77.3	77.8	78.8	80.2	80.2	78.1	82.8	83.0	86.3	88.6	0.	0.	153.8
63.	0.	76.7	74.7	74.8	76.7	75.7	77.6	78.3	77.0	78.2	81.0	80.4	78.3	82.7	83.1	85.0	86.4	0.	0.	153.5
80.	0.	74.3	73.5	72.7	73.1	74.1	74.3	75.9	75.6	77.0	78.0	78.3	77.7	81.3	81.5	83.8	84.0	0.	0.	151.7
100.	0.	73.8	73.6	72.9	75.1	76.6	77.4	78.4	79.4	80.9	82.0	82.6	82.6	84.4	85.2	86.6	85.7	0.	0.	155.1
125.	0.	76.4	78.4	81.3	81.9	84.3	91.7	93.6	92.0	89.6	86.4	90.3	88.3	89.1	88.5	90.8	88.2	0.	0.	143.0
160.	0.	75.1	79.1	81.7	83.1	84.2	88.5	89.7	88.1	87.7	87.4	89.4	88.4	88.8	88.0	87.5	86.3	0.	0.	141.1
200.	0.	77.2	80.9	81.6	82.5	82.4	82.1	83.0	82.0	82.4	84.7	84.9	85.5	87.3	85.2	83.7	84.1	0.	0.	137.4
250.	0.	78.2	78.9	79.5	78.7	78.7	79.6	77.5	79.0	79.7	81.9	81.7	82.8	83.5	82.6	81.8	81.4	0.	0.	134.4
315.	0.	78.2	79.7	80.1	79.8	79.4	79.2	81.1	81.2	82.0	83.9	84.4	85.6	85.8	83.2	82.0	80.7	0.	0.	136.3
400.	0.	77.9	78.6	78.5	76.6	77.9	77.4	79.7	79.4	80.4	81.3	82.1	83.2	83.6	82.0	81.9	80.8	0.	0.	134.5
500.	0.	76.3	78.5	78.2	76.8	77.0	77.5	78.6	78.1	79.6	80.7	81.3	81.9	82.5	82.0	81.8	80.0	0.	0.	133.8
630.	0.	76.4	78.0	78.6	77.2	76.7	76.9	77.8	78.2	79.0	80.9	81.7	83.0	83.7	82.3	80.7	78.9	0.	0.	134.1
800.	0.	78.2	78.3	78.1	77.8	77.5	78.0	78.4	78.2	79.1	82.0	83.2	85.8	84.8	81.5	80.0	78.0	0.	0.	135.2
1000.	0.	76.9	78.0	76.1	76.7	75.4	76.5	77.8	78.0	78.2	80.9	82.4	86.3	84.0	78.9	79.2	76.1	0.	0.	134.7
1250.	0.	79.5	78.5	77.7	76.0	75.0	75.8	77.2	77.8	77.6	80.2	80.8	84.2	81.9	78.7	77.7	76.5	0.	0.	133.6
1600.	0.	92.2	88.5	91.4	85.6	82.8	77.1	81.4	81.2	78.7	80.3	80.9	84.0	80.4	78.6	79.4	77.3	0.	0.	138.0
2000.	0.	80.5	78.5	79.1	77.5	75.5	74.7	76.0	76.3	77.3	78.8	80.2	82.1	81.0	78.7	77.6	76.9	0.	0.	133.1
2500.	0.	81.4	80.7	79.3	78.5	75.4	76.4	76.8	75.3	78.8	81.2	83.4	82.2	83.0	78.6	78.3	75.1	0.	0.	134.5
3150.	0.	83.0	84.1	81.3	79.2	76.2	75.2	74.8	76.3	76.1	79.2	80.9	83.8	79.5	77.9	76.3	76.2	0.	0.	134.2
4000.	0.	86.9	84.2	84.2	83.2	79.4	76.4	75.0	75.5	77.5	77.0	78.2	82.0	82.7	78.6	77.8	75.9	0.	0.	135.8
5000.	0.	88.2	88.4	84.4	85.1	80.6	81.6	80.4	76.6	76.1	77.3	79.0	79.2	82.1	75.8	74.5	73.1	0.	0.	136.9
6300.	0.	88.3	88.4	89.7	88.8	85.6	81.4	81.0	80.7	81.0	79.1	81.2	83.5	80.4	78.4	77.7	76.4	0.	0.	139.7
8000.	0.	87.6	89.6	85.9	86.8	83.2	81.8	80.9	78.9	78.6	81.3	82.3	88.1	86.7	80.3	78.6	76.0	0.	0.	140.8
10000.	0.	87.4	89.2	87.7	89.2	84.3	82.0	82.2	79.4	79.4	79.1	79.6	83.4	87.2	78.5	76.1	74.5	0.	0.	141.9
OVERALL	13.8	97.6	97.4	97.2	96.3	94.2	95.8	97.0	95.9	95.3	95.7	97.2	98.1	98.3	96.4	96.9	96.2	13.8	13.8	151.1
PNL	0.	110.3	110.4	110.2	109.3	106.8	105.5	105.5	104.9	105.2	106.4	108.0	109.6	109.2	105.9	105.4	104.0	0.	0.	
PNLT	0.	114.4	113.7	114.5	112.3	109.3	106.9	107.1	106.2	106.1	106.4	108.7	110.6	109.2	105.9	106.1	104.0	0.	0.	

Figure 149.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 80% N_{f_c}

THREE SPLITTER INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	77.3	77.3	76.4	78.0	78.3	79.2	79.6	80.8	82.3	83.8	85.0	81.1	88.1	88.8	93.7	95.5	0.	0.	139.3
63.	0.	78.9	77.7	76.6	77.7	78.5	79.0	78.8	79.7	81.6	83.2	84.1	82.3	86.9	88.2	90.8	92.5	0.	0.	137.7
80.	0.	78.9	77.6	75.7	76.1	77.5	78.0	78.1	78.6	80.6	82.7	83.5	82.7	86.6	87.6	90.0	90.1	0.	0.	136.9
100.	0.	77.5	76.8	76.6	78.3	79.3	79.6	80.6	82.1	83.4	85.3	85.9	86.1	89.4	90.3	93.0	91.1	0.	0.	139.5
125.	0.	79.2	76.7	82.0	84.2	86.6	87.0	88.3	87.2	87.8	90.5	90.5	90.4	92.8	93.2	94.8	92.2	0.	0.	143.3
160.	0.	80.1	82.4	85.2	87.6	89.7	89.9	90.2	89.5	89.6	91.8	91.7	92.1	93.8	93.2	93.8	91.2	0.	0.	144.5
200.	0.	81.0	83.7	83.8	85.2	86.4	86.3	85.9	85.7	86.5	89.1	89.6	90.2	90.3	90.5	89.3	89.3	0.	0.	141.6
250.	0.	80.4	82.7	82.0	81.4	81.9	81.4	81.0	82.5	84.0	86.6	87.0	87.5	88.6	88.2	87.8	87.5	0.	0.	139.0
315.	0.	79.5	83.0	82.1	81.2	81.9	81.7	84.5	85.5	86.5	88.1	88.8	89.9	89.4	88.0	87.9	86.4	0.	0.	140.4
400.	0.	80.4	81.9	81.5	80.6	80.8	81.1	84.1	83.4	85.4	85.8	85.8	87.5	87.9	87.2	87.0	85.5	0.	0.	138.6
500.	0.	82.3	81.5	82.9	87.0	81.5	82.2	82.5	82.8	84.1	88.1	86.4	87.9	87.3	87.6	88.7	84.7	0.	0.	139.5
630.	0.	81.7	82.2	85.5	86.7	84.1	83.4	82.7	82.5	83.7	85.9	85.4	87.0	87.8	87.7	87.8	84.6	0.	0.	139.3
800.	0.	90.7	90.9	89.7	82.9	83.4	84.4	84.3	84.0	88.9	90.8	88.3	90.0	89.4	89.7	89.2	85.6	0.	0.	142.2
1000.	0.	83.7	84.7	82.8	80.4	84.6	81.7	81.7	83.5	82.5	86.2	87.0	89.9	86.0	85.9	86.3	83.1	0.	0.	139.3
1250.	0.	82.0	81.2	80.6	79.3	78.7	78.7	79.8	81.0	80.1	82.7	84.2	85.8	83.7	83.4	83.3	81.2	0.	0.	136.4
1600.	0.	86.4	86.4	85.5	81.3	79.4	79.8	79.4	81.4	80.2	82.4	83.3	85.2	82.6	82.8	82.2	80.6	0.	0.	136.9
2000.	0.	92.1	92.3	92.2	86.2	82.1	83.0	80.8	84.3	81.8	82.5	84.0	84.9	84.0	82.9	82.3	81.9	0.	0.	139.9
2500.	0.	86.7	84.2	83.1	80.7	79.2	79.9	80.2	78.7	81.7	83.9	85.7	84.0	84.2	82.9	83.0	79.2	0.	0.	137.3
3150.	0.	86.0	86.7	83.6	81.2	79.7	78.1	78.0	79.5	78.8	82.5	83.4	86.0	81.2	81.4	80.2	79.6	0.	0.	136.8
4000.	0.	90.6	89.3	88.6	86.9	85.6	81.2	80.1	80.6	81.7	81.4	81.4	85.0	84.9	82.3	81.8	80.1	0.	0.	139.3
5000.	0.	90.0	90.6	87.1	86.9	84.0	85.9	84.9	80.9	79.6	80.8	82.5	81.7	81.5	79.5	78.9	77.5	0.	0.	139.4
6300.	0.	90.3	90.5	92.1	90.8	89.8	85.8	84.9	83.7	83.5	81.9	81.9	84.0	81.4	80.9	80.0	79.4	0.	0.	142.2
8000.	0.	89.4	90.9	87.7	88.9	85.8	84.5	83.5	82.6	82.4	83.7	85.0	87.1	84.0	80.5	80.1	78.0	0.	0.	142.1
10000.	0.	88.7	89.7	88.3	89.7	85.1	82.8	82.8	81.4	81.7	80.6	83.0	86.9	84.8	82.2	80.4	77.5	0.	0.	142.9
OVERALL	13.8	100.2	100.6	99.9	98.9	97.9	97.3	97.4	97.3	98.1	100.1	100.3	101.2	101.7	101.5	102.7	101.7	13.8	13.8	154.1
INL	0.	113.7	113.5	113.2	112.0	110.8	109.3	108.8	108.2	108.5	110.1	111.0	112.2	111.5	110.3	110.3	108.6	0.	0.	
INLT	0.	116.4	116.5	116.5	113.7	112.0	110.3	109.8	109.6	110.5	111.6	111.0	112.2	112.7	110.3	110.3	108.6	0.	0.	

Figure 150.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 90% N_{f_c}

THREE SPLITTER INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PNL
50.	0.	82.5	81.2	81.4	82.7	83.5	83.9	85.8	86.3	87.5	88.8	90.5	86.0	94.7	96.6	100.6	103.4	0.	0.	146.2
63.	0.	84.4	81.4	81.8	80.8	82.9	83.0	83.9	85.4	85.8	87.9	89.9	86.5	92.8	95.1	97.4	100.9	0.	0.	144.2
80.	0.	84.9	81.9	83.0	81.4	84.4	85.2	84.5	83.9	84.5	87.2	89.4	87.0	93.3	94.6	97.0	97.3	0.	0.	143.5
100.	0.	83.4	81.3	82.7	82.5	85.5	84.6	85.6	85.6	87.7	89.7	92.5	91.6	96.0	97.7	100.5	97.9	0.	0.	146.0
125.	0.	82.7	82.9	85.8	85.7	87.9	89.1	91.2	91.1	92.2	94.0	95.8	95.7	98.9	99.9	101.6	98.2	0.	0.	148.6
160.	0.	84.4	87.6	90.8	92.7	92.0	94.0	93.0	93.7	93.0	95.6	96.7	96.5	99.5	99.8	99.5	97.6	0.	0.	149.3
200.	0.	85.3	87.4	89.9	90.0	91.8	90.8	90.1	90.8	91.9	94.0	94.5	94.6	96.7	97.7	96.4	95.0	0.	0.	147.1
250.	0.	84.4	87.4	89.7	86.7	89.8	86.7	87.8	89.4	89.9	91.1	92.6	92.7	94.8	96.1	94.8	94.0	0.	0.	145.8
315.	0.	85.8	87.7	86.9	86.7	88.8	90.0	94.9	94.6	94.9	95.8	94.7	94.7	95.1	95.8	94.6	92.8	0.	0.	147.9
400.	0.	85.6	93.5	90.7	86.6	93.7	96.7	91.9	95.5	91.1	92.0	95.5	94.3	94.8	94.8	95.4	92.2	0.	0.	147.6
500.	0.	90.4	90.7	93.6	90.9	88.7	92.7	94.8	92.7	92.0	92.9	93.7	92.3	94.7	95.6	94.4	93.6	0.	0.	147.0
630.	0.	86.7	87.7	88.9	89.0	90.3	91.2	89.4	87.9	91.4	91.1	92.9	92.7	94.3	94.1	93.0	90.3	0.	0.	145.4
800.	0.	89.0	88.9	87.9	89.1	88.1	86.9	87.9	88.8	87.9	90.1	92.8	92.8	93.1	93.8	90.7	89.2	0.	0.	144.5
1000.	0.	89.1	88.8	88.2	86.9	85.9	86.0	86.3	87.0	86.0	89.1	90.9	92.7	91.4	90.4	90.1	86.2	0.	0.	143.9
1250.	0.	87.6	86.5	87.0	84.0	83.0	83.6	84.8	84.8	85.1	87.0	88.0	90.5	89.2	90.0	88.9	87.0	0.	0.	141.3
1600.	0.	85.6	85.6	86.0	82.1	83.1	83.0	84.2	84.9	84.2	85.9	86.7	88.4	88.3	89.0	87.7	86.1	0.	0.	140.4
2000.	0.	93.9	93.1	93.0	87.2	86.2	84.3	85.3	84.5	85.1	86.2	88.2	87.6	89.4	89.1	87.8	87.0	0.	0.	142.5
2500.	0.	90.6	89.6	88.9	85.6	83.7	84.0	85.0	83.4	85.7	87.7	89.7	86.5	89.1	89.1	88.6	84.9	0.	0.	141.8
3150.	0.	87.9	89.1	88.9	84.8	85.1	83.9	84.0	84.6	84.2	85.1	87.0	88.8	85.9	86.9	84.6	84.9	0.	0.	140.9
4000.	0.	92.5	90.5	92.0	88.8	87.9	84.7	84.9	85.6	86.0	84.8	85.7	88.2	88.8	88.0	87.5	84.6	0.	0.	142.7
5000.	0.	93.0	94.0	91.0	89.4	87.1	88.4	90.1	85.6	85.0	86.1	88.1	86.8	88.1	86.2	84.9	81.9	0.	0.	143.6
6300.	0.	90.9	90.9	93.0	91.1	89.3	87.0	87.3	85.9	87.3	84.1	84.9	86.5	86.0	85.9	84.9	84.1	0.	0.	143.7
8000.	0.	90.7	91.4	88.7	87.5	85.7	84.8	85.8	84.5	85.5	85.7	86.5	87.1	85.8	84.5	82.4	80.6	0.	0.	143.1
10000.	0.	88.2	89.2	88.0	87.2	85.0	83.1	85.5	83.1	85.4	85.0	88.2	90.0	88.2	86.1	83.0	81.3	0.	0.	144.6
OVERALL	13.8	102.5	103.1	103.2	101.5	102.0	102.8	103.0	103.1	103.0	104.3	105.7	105.5	107.6	108.4	109.1	108.7	13.8	13.8	159.0
PNL	0.	116.1	116.5	116.2	113.8	113.4	113.1	114.1	112.8	113.1	114.0	115.7	115.7	116.5	116.5	115.9	114.1	0.	0.	
PNLT	0.	118.1	118.4	118.1	114.9	114.2	114.1	115.5	112.8	113.8	114.7	115.7	115.7	116.5	116.5	115.9	114.1	0.	0.	

Figure 151.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 60% N_{f_c}

FOUR SPLITTER INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PNL
50.	0.	74.5	71.6	69.5	72.9	72.9	73.0	74.9	74.0	75.9	76.0	79.0	78.8	81.4	81.7	82.9	83.9	0.	0.	131.2
63.	0.	73.0	70.5	69.5	70.0	70.9	70.4	72.1	72.2	72.1	73.1	75.1	75.9	76.5	75.8	77.1	79.0	0.	0.	127.2
80.	0.	71.6	70.2	68.1	70.6	70.7	69.7	70.7	71.5	71.7	71.8	73.7	74.3	75.1	75.6	78.0	77.4	0.	0.	126.5
100.	0.	69.9	69.5	69.4	73.3	75.8	76.3	76.0	77.8	78.4	79.2	80.1	78.8	80.5	80.0	81.3	78.7	0.	0.	131.6
125.	0.	72.0	70.8	75.7	81.7	80.2	80.7	82.7	84.3	85.6	85.2	85.2	82.3	82.6	84.3	84.3	80.3	0.	0.	136.7
160.	0.	71.9	73.5	75.6	79.1	79.1	80.1	81.1	81.2	81.2	80.9	81.8	81.9	83.3	81.8	80.3	79.8	0.	0.	134.5
200.	0.	74.0	75.6	74.5	77.3	77.0	77.5	77.2	76.2	77.5	78.0	79.2	80.0	79.8	78.9	77.4	77.1	0.	0.	131.5
250.	0.	74.0	74.6	73.7	74.1	74.9	74.4	74.1	73.9	74.4	75.2	78.0	77.7	78.6	77.1	76.4	76.8	0.	0.	129.5
315.	0.	75.7	75.6	74.8	74.3	75.8	74.2	75.4	76.9	77.5	77.0	79.0	81.1	80.6	77.9	77.4	75.7	0.	0.	131.3
400.	0.	75.0	75.6	75.7	74.3	74.0	73.3	75.0	74.1	74.3	75.1	77.1	78.8	79.6	77.9	78.1	75.7	0.	0.	130.8
500.	0.	74.7	76.8	76.7	74.2	74.0	73.3	74.2	74.0	75.0	74.8	76.7	77.8	78.3	78.0	77.0	75.5	0.	0.	129.7
630.	0.	77.3	75.8	76.8	75.2	74.0	72.6	73.5	73.4	75.3	75.4	78.2	79.2	80.5	77.1	75.2	74.1	0.	0.	130.5
800.	0.	75.0	75.9	75.5	75.3	74.1	75.4	75.4	74.9	75.4	77.0	80.0	83.7	82.4	76.9	75.3	73.9	0.	0.	132.2
1000.	0.	73.2	73.9	73.4	74.2	73.2	73.6	75.3	76.4	76.4	76.2	80.2	83.0	80.3	76.2	75.2	72.9	0.	0.	131.6
1250.	0.	74.6	74.8	73.6	73.2	72.7	73.3	75.0	75.8	75.0	75.1	78.1	81.0	78.3	74.9	72.9	72.6	0.	0.	130.5
1600.	0.	71.1	71.7	72.6	72.4	73.0	72.5	74.2	74.3	73.4	75.0	78.2	81.2	77.9	73.8	73.3	71.8	0.	0.	130.0
2000.	0.	79.3	79.9	82.0	78.4	76.0	77.7	76.3	74.3	75.5	75.4	79.2	81.0	80.8	75.2	74.5	72.8	0.	0.	132.5
2500.	0.	72.9	73.5	73.6	74.0	71.8	74.1	74.0	73.1	75.0	76.9	81.9	81.0	80.3	76.6	74.0	72.6	0.	0.	131.8
3150.	0.	73.3	72.8	72.8	71.3	70.4	69.4	71.3	71.2	71.5	73.4	77.5	80.1	76.7	75.3	72.3	70.1	0.	0.	129.4
4000.	0.	79.0	77.9	80.7	77.5	77.1	73.2	71.4	71.0	73.2	72.3	76.3	77.8	78.5	72.1	73.2	71.0	0.	0.	130.9
5000.	0.	83.5	83.2	80.0	78.9	75.6	75.9	76.5	73.4	70.6	72.6	78.4	77.4	73.7	75.2	69.8	69.1	0.	0.	132.1
6300.	0.	81.8	82.6	84.3	83.2	79.9	75.8	75.0	72.5	75.7	73.8	80.9	83.8	80.3	74.6	73.9	70.3	0.	0.	135.5
8000.	0.	82.3	83.7	81.0	80.1	76.5	74.8	75.0	72.8	71.8	73.5	78.9	80.7	79.1	75.7	72.7	70.4	0.	0.	134.5
10000.	0.	81.9	83.6	82.4	84.3	79.8	77.1	76.2	71.0	70.0	70.0	75.0	77.8	75.1	72.6	69.9	66.8	0.	0.	135.9
OVERALL	13.8	91.2	91.7	91.5	91.5	89.7	89.3	89.9	90.0	90.7	90.8	93.2	94.2	93.6	91.8	91.4	90.3	13.8	13.8	146.0
PNL	0.	104.7	104.8	104.9	104.2	102.0	100.6	101.0	99.6	100.4	101.3	105.4	106.6	105.1	102.8	100.4	98.8	0.	0.	
PNLT	0.	107.2	107.2	107.8	105.9	103.4	102.1	102.1	100.4	101.4	102.2	106.6	107.4	106.2	102.6	101.0	98.8	0.	0.	

Figure 152.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 70% N_{f_c}

FOUR SPLITTER INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	80.2	88.1	83.0	78.9	0.	75.5	75.5	76.8	76.9	78.6	78.9	76.7	82.1	82.7	85.3	86.9	0.	0.	133.9
63.	0.	80.1	88.2	82.1	80.0	0.	77.7	75.6	76.1	75.9	77.8	79.0	78.6	82.0	82.8	84.3	85.0	0.	0.	133.7
80.	0.	78.6	86.6	80.6	76.8	0.	75.2	73.5	75.4	74.8	75.5	77.5	77.5	80.6	81.6	84.6	82.6	0.	0.	132.8
100.	0.	77.1	85.9	80.2	76.0	0.	77.9	77.6	79.1	80.2	81.9	81.9	82.7	84.8	85.9	87.1	84.3	0.	0.	135.4
125.	0.	77.5	84.3	82.3	82.3	0.	90.1	91.0	90.2	88.5	87.3	90.2	89.0	88.2	88.3	90.5	86.3	0.	0.	141.9
160.	0.	76.0	82.9	82.2	82.9	0.	86.6	86.7	85.9	85.0	85.7	87.2	86.9	88.2	87.7	86.2	84.3	0.	0.	139.8
200.	0.	77.1	83.0	81.1	81.1	0.	83.0	82.1	80.3	81.1	83.1	83.0	83.7	85.3	84.1	83.3	82.1	0.	0.	136.0
250.	0.	77.3	81.1	80.1	78.3	0.	79.0	77.8	78.2	79.1	80.7	81.0	82.0	84.0	83.0	81.3	81.0	0.	0.	134.0
315.	0.	78.3	81.3	78.3	78.2	0.	79.0	79.7	81.0	81.3	82.8	82.9	83.9	84.9	84.1	81.9	79.1	0.	0.	135.8
400.	0.	76.9	79.1	78.9	75.8	0.	77.6	78.6	79.1	79.0	80.6	81.1	81.7	82.9	81.9	81.8	80.2	0.	0.	133.7
500.	0.	74.7	79.9	78.8	74.9	0.	77.5	76.8	78.0	78.1	79.6	81.0	80.8	82.9	82.5	81.8	78.9	0.	0.	133.8
630.	0.	77.5	78.4	78.5	76.4	0.	77.2	77.0	77.3	78.3	80.2	81.5	82.2	84.2	81.9	80.3	78.3	0.	0.	133.7
800.	0.	76.1	79.3	77.1	76.0	0.	77.8	77.8	77.2	78.1	81.0	83.8	85.2	84.4	80.8	80.3	77.4	0.	0.	134.6
1000.	0.	73.1	76.3	75.4	74.3	0.	76.9	75.9	77.1	77.2	79.9	82.4	85.2	81.4	79.0	78.2	75.4	0.	0.	133.5
1250.	0.	71.1	74.3	74.2	72.9	0.	74.9	75.9	76.9	76.3	78.8	80.4	83.1	79.4	78.1	77.1	75.3	0.	0.	132.1
1600.	0.	74.2	74.2	79.1	74.2	0.	75.9	74.7	76.9	76.3	78.8	79.3	82.8	80.1	78.1	77.1	75.3	0.	0.	132.3
2000.	0.	71.5	72.1	74.4	74.1	0.	73.9	74.1	75.4	76.5	78.3	81.2	81.2	81.5	78.0	77.5	75.2	0.	0.	132.1
2500.	0.	73.9	75.0	74.9	73.8	0.	74.8	75.6	74.8	77.2	80.6	83.9	80.9	81.2	78.6	78.0	73.9	0.	0.	133.8
3150.	0.	78.2	80.4	77.1	74.1	0.	75.0	73.1	74.1	74.1	77.2	80.2	82.0	80.2	77.9	76.1	72.4	0.	0.	132.3
4000.	0.	85.2	82.9	84.3	81.2	0.	74.6	73.8	74.1	76.0	75.8	79.0	79.9	81.9	75.5	77.2	74.3	0.	0.	133.9
5000.	0.	87.6	89.2	85.5	84.2	0.	83.2	80.2	77.1	74.4	77.2	81.3	78.9	76.4	78.9	74.1	72.5	0.	0.	136.5
6300.	0.	86.4	87.4	89.4	86.3	0.	81.0	80.1	78.3	78.5	78.3	81.4	82.1	80.4	76.1	76.5	72.6	0.	0.	138.0
8000.	0.	84.3	87.2	84.6	83.2	0.	80.2	80.3	77.3	75.2	78.2	82.2	85.2	82.2	80.0	77.4	74.2	0.	0.	138.2
10000.	0.	84.6	87.4	86.2	85.2	0.	81.1	80.1	76.0	76.2	75.8	78.4	79.9	79.4	76.8	74.0	71.1	0.	0.	138.5
OVERALL	13.8	94.5	98.0	96.0	94.1	13.8	94.9	94.9	94.3	93.7	94.7	96.5	97.0	97.1	96.2	96.5	94.6	13.8	13.8	149.6
PNL	0.	108.0	110.3	109.2	106.8	0.	105.7	104.3	103.2	103.3	105.4	107.9	108.1	107.9	105.5	104.8	102.3	0.	0.	
PNLT	0.	108.0	111.6	110.8	107.6	0.	107.5	105.8	104.5	104.3	106.0	109.0	108.8	109.1	106.5	105.5	102.3	0.	0.	

Figure 153.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 80% N_{f_c}

FOUR SPLITTER INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	78.1	79.7	77.9	78.8	79.0	79.5	79.5	80.7	81.8	82.8	83.7	82.8	88.1	89.7	93.1	95.0	0.	0.	139.1
63.	0.	80.2	79.8	78.2	77.9	79.9	79.6	79.6	79.9	81.2	82.9	84.0	82.9	86.9	87.7	90.0	91.0	0.	0.	137.8
80.	0.	79.5	78.7	76.5	75.8	78.7	78.5	78.5	79.5	79.8	82.2	82.6	84.2	87.6	89.3	90.9	89.9	0.	0.	137.5
100.	0.	80.2	78.0	77.9	78.9	80.7	80.8	80.5	82.0	82.7	85.5	85.9	87.8	91.1	91.9	94.3	90.2	0.	0.	140.4
125.	0.	80.5	80.4	83.2	84.2	88.5	89.2	88.0	88.5	88.3	90.3	90.3	91.0	94.2	94.3	96.2	91.2	0.	0.	144.1
160.	0.	80.9	83.1	86.1	86.9	89.3	89.7	88.7	89.3	89.3	90.9	91.1	91.8	93.2	92.7	93.0	89.0	0.	0.	143.9
200.	0.	83.0	84.2	84.0	84.2	86.2	85.5	84.7	84.9	86.4	88.1	87.9	88.8	89.0	90.2	90.1	88.1	0.	0.	140.8
250.	0.	82.0	83.1	82.0	81.9	83.0	81.6	80.9	82.9	83.2	86.8	86.1	86.9	89.2	89.0	88.3	85.9	0.	0.	139.1
315.	0.	79.9	84.0	82.2	80.9	84.1	82.6	84.6	84.8	86.0	88.0	87.0	89.7	89.2	88.0	88.0	84.9	0.	0.	140.1
400.	0.	81.8	83.0	81.8	81.1	82.8	82.7	83.5	83.7	84.8	86.6	85.9	87.7	88.1	87.7	87.9	85.1	0.	0.	139.2
500.	0.	80.0	83.9	84.7	89.1	85.6	84.7	86.5	83.6	84.0	85.7	85.7	86.6	87.8	88.5	88.8	84.0	0.	0.	140.0
630.	0.	83.1	84.3	86.1	86.4	84.3	83.8	81.8	83.1	85.2	88.0	86.0	86.8	88.2	89.0	86.4	84.4	0.	0.	139.9
800.	0.	86.0	86.9	84.9	82.2	86.2	82.7	80.9	83.9	83.2	87.0	86.8	89.8	88.3	86.7	85.2	84.0	0.	0.	139.9
1000.	0.	79.1	81.1	83.4	79.4	82.3	82.8	80.0	81.3	82.1	83.8	85.1	87.8	84.3	84.8	85.1	81.1	0.	0.	137.7
1250.	0.	79.0	77.2	78.1	78.2	82.0	79.6	79.6	80.3	80.0	82.7	82.8	85.9	83.9	83.7	82.9	81.0	0.	0.	136.2
1600.	0.	78.3	77.0	78.3	77.0	79.9	77.7	78.0	79.9	79.0	81.0	81.8	84.9	82.9	82.7	82.0	80.3	0.	0.	135.2
2000.	0.	80.2	77.4	80.2	79.1	79.2	78.2	77.9	80.1	80.4	81.9	84.2	84.1	84.4	83.8	83.2	81.6	0.	0.	136.2
2500.	0.	79.9	79.8	79.0	78.8	77.8	78.5	78.5	77.8	81.1	83.5	85.9	82.5	83.1	82.8	81.8	78.9	0.	0.	136.2
3150.	0.	82.2	83.1	82.4	80.4	79.4	78.8	76.9	78.1	78.4	81.2	82.3	84.1	82.4	80.9	80.4	77.4	0.	0.	135.7
4000.	0.	89.0	88.2	88.3	86.2	86.1	80.6	79.9	78.9	80.0	80.9	83.0	83.7	85.1	80.6	81.9	78.9	0.	0.	138.8
5000.	0.	88.4	91.3	87.3	86.2	84.4	88.0	87.3	83.2	79.2	81.2	83.3	82.2	81.5	83.2	78.6	77.3	0.	0.	140.2
6300.	0.	88.8	89.5	91.5	89.4	88.5	85.4	86.1	83.6	82.4	81.1	82.6	83.1	81.4	80.1	80.6	76.5	0.	0.	141.5
8000.	0.	87.5	89.4	86.6	85.7	84.5	83.0	84.3	81.3	79.6	81.4	86.4	86.0	82.3	81.1	78.6	76.4	0.	0.	140.9
10000.	0.	86.4	88.7	87.4	87.4	84.3	82.1	82.3	79.6	77.7	78.4	82.3	86.1	84.6	82.4	79.6	75.4	0.	0.	141.7
OVERALL	13.8	97.6	98.8	98.4	97.9	98.2	97.6	97.2	97.0	97.3	99.3	99.7	100.8	101.8	101.9	102.8	100.8	13.8	13.8	153.7
PNL	0.	111.4	112.4	111.9	110.6	110.4	109.9	109.5	107.9	107.4	109.4	110.8	111.2	111.5	110.4	110.2	107.5	0.	0.	
PNLT	0.	113.0	113.8	113.0	112.4	111.8	111.6	110.9	107.9	107.4	109.4	111.5	111.2	112.6	110.4	110.2	107.5	0.	0.	

Figure 154.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 90% N_{f_c}

FOUR SPLITTER INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	82.2	83.1	82.8	82.5	81.9	83.7	84.8	84.8	86.9	89.0	89.9	89.9	94.3	96.8	101.9	104.0	0.	0.	146.8
63.	0.	84.0	82.2	82.1	81.6	81.7	82.8	83.9	84.9	85.9	88.1	89.0	90.0	92.3	95.6	98.7	99.3	0.	0.	144.2
80.	0.	84.6	83.5	82.5	82.2	84.2	85.2	84.2	83.2	84.8	87.7	88.4	90.5	93.7	96.2	98.6	96.5	0.	0.	144.1
100.	0.	83.2	80.8	81.9	82.8	82.7	84.5	85.5	86.8	87.9	90.7	91.7	93.9	96.0	99.5	101.9	98.2	0.	0.	146.9
125.	0.	83.3	82.5	86.1	88.0	88.3	90.2	91.0	92.0	92.3	94.3	95.0	98.0	99.3	101.3	103.3	97.6	0.	0.	149.5
160.	0.	84.0	87.0	90.1	93.7	91.8	93.9	92.7	92.7	93.2	95.7	95.7	97.7	99.0	99.9	100.9	97.2	0.	0.	149.4
200.	0.	86.1	88.1	88.2	89.1	89.1	90.0	89.1	89.9	91.0	93.1	93.8	95.1	95.4	96.7	96.8	95.3	0.	0.	146.4
250.	0.	85.0	87.1	89.2	85.6	86.8	87.7	88.8	89.0	89.3	92.0	92.0	94.1	95.4	95.7	94.6	92.9	0.	0.	145.3
315.	0.	85.0	87.3	86.0	85.9	88.8	91.9	91.7	90.8	91.2	92.8	93.0	95.2	94.3	94.6	94.6	92.2	0.	0.	146.0
400.	0.	87.0	89.0	93.8	87.7	96.9	98.4	99.8	92.9	96.1	95.9	95.6	95.9	95.2	94.8	95.5	92.8	0.	0.	149.7
500.	0.	86.9	89.9	94.7	88.5	90.6	91.7	89.6	89.6	90.8	92.9	91.8	94.6	93.3	95.4	94.4	93.7	0.	0.	146.2
630.	0.	85.5	86.2	89.4	87.1	87.0	88.2	87.0	88.0	89.3	91.3	92.0	93.4	93.6	94.1	92.8	90.2	0.	0.	144.6
800.	0.	83.3	84.2	87.1	86.7	84.7	87.0	86.0	87.8	88.1	90.8	91.8	93.8	92.2	92.9	91.9	89.0	0.	0.	144.0
1000.	0.	83.5	84.1	84.2	83.1	84.1	85.9	87.0	85.1	86.5	89.0	90.0	92.3	89.3	91.8	89.8	86.4	0.	0.	142.4
1250.	0.	81.1	81.3	83.1	82.0	82.0	82.9	84.0	84.7	85.0	87.1	87.8	90.9	88.2	90.9	88.7	87.0	0.	0.	141.0
1600.	0.	79.1	79.3	82.9	81.0	81.1	82.7	82.0	83.7	83.2	85.8	86.7	89.1	88.2	88.8	88.0	86.1	0.	0.	139.9
2000.	0.	81.3	82.5	85.0	82.7	82.2	83.8	82.2	84.1	85.4	86.0	88.0	87.9	89.4	88.9	88.9	86.5	0.	0.	140.7
2500.	0.	84.0	84.1	84.0	83.6	81.9	83.8	83.6	82.6	86.0	87.8	89.0	86.9	88.4	88.9	87.9	84.9	0.	0.	140.9
3150.	0.	86.5	86.2	86.3	83.9	83.2	81.8	82.9	83.0	83.1	85.0	86.2	88.0	86.4	87.9	85.9	83.2	0.	0.	140.0
4000.	0.	87.2	87.3	90.2	87.8	87.1	84.7	83.0	83.0	85.0	85.7	87.0	88.0	89.4	85.7	87.0	85.0	0.	0.	141.8
5000.	0.	89.8	89.4	87.4	87.3	84.2	86.1	86.0	84.3	82.3	84.3	87.3	86.3	84.4	88.2	84.0	82.3	0.	0.	141.8
6300.	0.	86.6	87.6	89.5	88.3	87.3	84.4	84.4	83.2	84.7	83.5	84.4	86.5	85.5	85.4	86.2	82.5	0.	0.	141.7
8000.	0.	86.5	87.6	86.6	84.4	82.2	82.1	84.2	83.3	82.4	84.2	87.4	86.2	82.7	84.4	84.4	80.7	0.	0.	141.4
10000.	0.	82.6	84.5	84.3	84.2	81.2	80.1	81.5	79.5	81.5	83.5	87.2	89.6	85.8	85.3	86.5	79.8	0.	0.	142.7
OVERALL	13.8	98.9	99.9	101.9	100.4	101.6	103.0	103.3	101.5	102.7	104.5	105.0	106.7	107.2	108.7	110.2	108.6	13.8	13.8	158.9
PNL	0.	112.2	112.6	114.1	112.3	112.1	112.7	113.2	111.1	112.4	114.0	115.1	116.0	116.2	116.5	116.2	113.9	0.	0.	
PNLT	0.	112.2	112.6	116.3	113.2	113.3	114.1	114.7	111.1	113.2	114.5	115.6	116.0	117.5	116.5	116.2	113.9	0.	0.	

Figure 155.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 60% N_{f_c}

CONTOURED INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	71.7	71.0	70.5	72.7	73.8	72.7	72.6	74.0	77.0	74.6	76.7	78.7	79.9	81.1	82.9	82.8	0.	0.	130.5
63.	0.	72.0	70.2	69.7	69.9	82.1	70.9	72.6	73.3	76.2	75.0	74.8	76.0	76.2	75.9	78.7	78.6	0.	0.	129.2
80.	0.	70.6	69.8	68.6	68.8	71.3	70.5	69.5	71.9	72.5	72.3	74.3	73.8	74.8	75.8	78.5	78.2	0.	0.	126.7
100.	0.	71.6	69.8	70.6	72.8	75.9	74.6	74.7	77.2	79.8	78.6	79.6	79.1	79.9	80.0	80.7	78.8	0.	0.	131.3
125.	0.	73.2	75.1	78.9	83.5	85.3	81.9	81.8	81.4	85.5	83.0	83.2	84.3	88.2	84.3	84.0	84.2	0.	0.	137.3
160.	0.	74.6	74.8	76.8	79.1	80.0	80.0	80.8	81.0	82.1	81.0	82.4	82.2	83.4	82.2	81.7	80.7	0.	0.	134.7
200.	0.	75.7	77.2	76.6	78.3	77.7	78.0	76.8	78.0	81.2	78.8	81.0	80.1	80.1	80.1	79.0	79.0	0.	0.	132.7
250.	0.	79.1	75.9	77.7	75.9	75.0	75.7	77.8	79.0	79.9	78.0	79.8	80.1	79.3	79.3	77.7	77.6	0.	0.	132.0
315.	0.	76.7	78.2	75.9	76.9	78.0	76.0	75.8	78.0	78.9	78.9	79.8	81.1	80.3	78.0	77.9	76.6	0.	0.	132.1
400.	0.	76.5	78.0	77.5	75.8	75.4	74.7	75.4	77.8	78.7	76.6	78.6	78.8	79.1	79.2	80.6	77.4	0.	0.	131.5
500.	0.	77.5	78.9	80.5	76.8	76.8	75.8	76.7	76.1	79.0	76.8	77.6	78.0	78.8	78.9	78.6	75.7	0.	0.	131.6
630.	0.	82.3	81.3	82.0	78.1	77.2	76.2	75.0	76.2	77.4	77.2	79.0	79.4	80.3	78.3	76.3	74.8	0.	0.	132.2
800.	0.	83.2	81.4	80.8	80.1	78.9	76.7	76.9	76.1	76.9	77.8	81.1	83.2	82.1	78.1	76.7	73.7	0.	0.	133.5
1000.	0.	82.3	82.3	82.0	80.3	80.1	78.0	77.1	77.2	78.1	77.2	80.0	82.3	80.1	76.1	75.1	72.1	0.	0.	133.4
1250.	0.	92.8	91.3	93.8	89.0	91.1	89.8	85.9	84.1	83.1	80.1	81.0	83.4	79.1	79.1	79.9	77.9	0.	0.	141.3
1600.	0.	85.3	84.4	87.0	83.2	83.2	82.1	78.6	78.4	77.0	77.1	78.9	80.2	78.3	76.0	75.0	75.0	0.	0.	135.1
2000.	0.	85.3	84.4	85.2	83.3	80.3	79.2	78.9	78.4	75.1	77.2	80.2	79.1	80.5	76.1	75.1	75.0	0.	0.	134.6
2500.	0.	90.0	89.2	90.9	89.2	86.0	80.7	82.6	80.3	79.1	80.0	82.7	82.0	80.2	77.9	77.5	74.6	0.	0.	138.8
3150.	0.	85.3	86.4	87.2	83.2	82.0	78.2	77.7	75.4	77.0	77.2	77.9	81.2	78.1	76.1	75.1	74.1	0.	0.	135.3
4000.	0.	88.9	86.9	89.6	87.9	84.7	83.9	80.6	80.2	76.8	76.6	78.6	78.8	78.9	77.1	76.8	74.5	0.	0.	138.0
5000.	0.	86.9	89.4	87.9	86.4	84.2	83.0	83.8	78.1	77.0	73.9	77.1	77.3	75.3	76.3	73.8	73.1	0.	0.	137.6
6300.	0.	88.2	88.2	89.9	88.2	86.2	81.9	81.8	81.3	78.1	79.0	81.8	85.2	81.2	78.5	76.8	75.0	0.	0.	139.8
8000.	0.	86.0	89.0	88.0	85.9	83.8	82.9	81.6	78.9	79.1	74.9	80.6	82.0	80.2	78.0	74.5	72.6	0.	0.	139.3
10000.	0.	85.5	86.6	86.5	86.1	82.5	79.5	80.4	78.7	75.6	73.5	77.4	78.7	76.6	74.9	72.6	70.4	0.	0.	138.8
OVERALL	13.8	98.8	98.6	99.8	97.5	96.7	94.7	93.5	92.6	93.1	91.8	93.7	94.7	94.5	92.7	92.5	91.5	13.8	13.8	149.8
PNL	0.	111.9	111.7	112.8	111.0	109.1	107.3	106.5	105.0	104.2	103.8	106.2	107.4	105.4	103.6	103.0	101.2	0.	0.	
PNLT	0.	114.9	114.3	115.9	113.4	112.2	110.6	109.2	107.1	106.0	104.6	107.4	108.3	106.5	104.6	104.6	102.7	0.	0.	

Figure 156.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 70% N_{f_c}

CONTOURED INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PNL
50.	0.	0.	72.0	74.6	74.0	77.5	74.8	75.7	77.1	78.0	77.5	79.6	81.0	82.0	83.8	86.7	87.7	0.	0.	153.5
63.	0.	0.	73.9	75.0	73.2	78.0	74.0	75.6	77.3	78.2	78.9	80.8	81.2	82.0	82.2	84.7	84.9	0.	0.	132.9
80.	0.	0.	72.5	76.6	72.8	77.4	74.3	75.2	74.6	75.6	76.3	78.6	78.8	80.6	81.9	84.3	83.5	0.	0.	151.7
100.	0.	0.	74.1	75.8	75.9	79.4	77.6	78.5	80.1	81.1	80.8	81.8	83.2	83.9	84.8	86.6	84.6	0.	0.	154.9
125.	0.	0.	78.3	82.1	83.4	84.9	92.0	91.7	90.5	90.4	84.9	90.9	88.2	88.4	87.5	90.0	86.1	0.	0.	142.5
160.	0.	0.	78.8	81.8	83.9	83.9	86.6	87.7	87.2	86.8	85.5	87.8	88.1	87.8	87.9	86.8	84.5	0.	0.	140.0
200.	0.	0.	79.9	81.0	81.2	82.0	81.7	82.6	82.2	82.2	82.9	84.8	85.2	84.9	85.2	83.9	83.7	0.	0.	136.7
250.	0.	0.	80.2	81.0	78.9	81.7	78.0	78.9	78.9	80.2	81.9	81.9	81.2	82.2	82.0	81.7	81.7	0.	0.	134.4
315.	0.	0.	81.1	80.0	79.2	83.0	79.7	80.6	82.9	82.1	82.9	83.8	84.2	84.9	84.2	81.9	80.7	0.	0.	136.2
400.	0.	0.	83.0	82.6	79.0	83.8	83.8	80.6	80.1	81.7	80.5	82.4	84.1	82.8	82.8	82.8	81.8	0.	0.	136.0
500.	0.	0.	82.8	85.7	80.0	82.8	79.5	79.6	80.0	81.7	81.5	82.7	82.0	83.0	82.7	82.7	79.7	0.	0.	135.7
630.	0.	0.	83.4	84.2	82.1	83.2	79.2	80.8	80.2	80.4	80.9	82.8	82.4	84.0	82.4	80.9	79.2	0.	0.	135.7
800.	0.	0.	86.9	90.9	85.3	86.0	83.7	84.6	81.2	82.2	83.7	83.6	86.0	84.0	82.2	80.9	80.1	0.	0.	138.6
1000.	0.	0.	87.1	85.9	83.4	85.9	82.0	81.8	80.2	81.4	79.9	82.0	85.4	81.4	79.4	79.9	76.9	0.	0.	136.8
1250.	0.	0.	87.9	88.7	85.2	85.7	84.7	81.8	80.3	81.2	78.7	80.9	83.4	79.3	79.2	79.7	77.9	0.	0.	137.3
1600.	0.	0.	103.9	98.3	98.4	95.2	99.0	93.0	90.2	93.1	85.9	87.8	90.5	85.0	85.0	83.8	85.7	0.	0.	149.0
2000.	0.	0.	88.0	87.2	87.1	85.8	83.1	80.8	81.4	79.1	80.1	81.8	80.2	81.1	79.3	79.1	77.8	0.	0.	137.3
2500.	0.	0.	90.1	90.7	88.1	86.9	80.8	81.5	82.1	80.8	80.8	82.7	83.5	80.9	80.1	79.7	75.8	0.	0.	138.8
3150.	0.	0.	94.4	95.2	90.2	91.0	88.2	86.7	83.4	84.3	81.0	81.8	84.4	81.1	80.0	79.8	79.8	0.	0.	142.5
4000.	0.	0.	90.9	90.9	90.1	88.7	85.3	82.5	82.8	80.0	79.5	80.5	82.1	81.8	79.8	78.8	77.8	0.	0.	140.2
5000.	0.	0.	95.1	93.2	92.4	91.9	87.1	87.7	86.0	82.0	78.8	80.7	81.1	79.1	80.0	77.7	76.8	0.	0.	143.0
6300.	0.	0.	90.1	93.0	92.2	92.0	86.1	86.0	87.1	82.3	80.0	82.8	83.4	79.4	78.4	79.1	78.0	0.	0.	143.0
8000.	0.	0.	90.9	89.8	80.2	88.8	85.9	85.5	82.9	81.8	77.9	82.8	86.2	81.9	80.9	77.6	75.6	0.	0.	142.1
10000.	0.	0.	88.7	87.7	88.6	89.8	82.4	84.3	81.9	80.6	76.4	78.5	81.0	78.7	76.7	76.3	73.6	0.	0.	142.0
OVERALL	13.8	13.8	105.9	103.5	102.3	101.5	101.6	99.1	97.8	98.0	95.3	97.6	98.4	97.1	96.7	97.1	96.0	13.8	13.8	154.3
PNL	0.	0.	118.9	117.2	115.4	114.6	114.4	111.3	109.8	110.4	106.8	108.7	110.3	108.0	107.0	106.7	106.1	0.	0.	
PNLT	0.	0.	124.2	121.0	119.5	117.8	119.4	115.2	112.9	114.8	109.0	110.8	113.2	109.6	108.9	108.2	108.7	0.	0.	

Figure 157.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 80% N_{f_c}

CONTOURED INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	78.5	77.0	76.5	77.8	83.5	78.5	79.4	81.0	83.0	82.7	84.8	85.8	88.0	89.9	94.6	95.5	0.	0.	139.9
63.	0.	79.7	77.9	77.7	78.2	83.8	78.9	79.6	80.9	82.9	82.7	83.6	86.0	86.9	88.3	91.8	93.0	0.	0.	138.5
80.	0.	80.3	77.8	77.6	76.6	84.4	78.6	78.4	79.8	81.8	82.3	83.5	84.6	86.7	87.9	90.6	90.6	0.	0.	137.6
100.	0.	79.6	76.9	77.6	79.1	85.6	80.8	81.5	83.1	85.0	85.6	86.5	87.8	88.1	91.2	93.6	90.7	0.	0.	140.1
125.	0.	80.2	81.2	85.1	83.4	89.1	90.3	88.9	89.2	89.1	90.0	90.9	91.5	93.2	93.5	95.0	91.0	0.	0.	144.0
160.	0.	81.8	83.1	87.6	87.1	90.8	92.0	90.9	91.2	89.8	90.7	92.5	92.2	93.3	94.0	93.7	90.7	0.	0.	144.9
200.	0.	82.9	84.9	84.7	86.1	88.9	86.7	85.6	85.9	87.1	87.8	89.7	90.3	91.3	91.0	90.0	88.8	0.	0.	142.0
250.	0.	83.1	82.9	83.7	85.0	88.9	83.7	82.7	83.0	85.0	85.9	88.0	86.8	87.9	89.1	87.9	86.9	0.	0.	139.9
315.	0.	84.7	84.2	83.7	86.2	90.9	87.8	85.6	88.2	88.1	87.7	90.7	90.3	89.1	88.1	89.0	86.7	0.	0.	142.2
400.	0.	86.8	84.7	85.5	89.0	93.0	88.7	89.5	91.2	88.0	88.7	91.6	91.1	90.1	88.1	88.9	86.8	0.	0.	143.6
500.	0.	87.5	87.7	92.6	91.8	89.9	85.8	85.4	91.9	87.9	86.5	89.7	89.0	88.0	89.9	90.6	88.6	0.	0.	143.2
630.	0.	91.0	98.2	95.0	90.6	92.2	90.1	87.1	89.5	88.4	85.9	88.2	89.2	88.4	92.5	90.0	86.9	0.	0.	144.6
800.	0.	96.8	97.4	98.1	96.2	97.9	92.8	96.0	88.3	91.1	88.0	90.2	92.4	90.3	89.1	91.1	88.8	0.	0.	147.6
1000.	0.	95.0	93.2	95.0	91.2	94.4	91.0	90.9	88.4	91.5	90.0	92.0	90.3	89.3	90.6	87.2	84.8	0.	0.	145.4
1250.	0.	92.8	93.0	93.8	92.1	92.0	92.1	90.0	88.4	90.2	86.7	87.7	88.2	85.2	86.0	85.7	84.6	0.	0.	144.1
1600.	0.	98.9	98.4	98.9	95.4	93.3	92.9	93.8	93.2	88.1	85.8	86.7	87.3	86.0	85.3	86.0	84.7	0.	0.	146.9
2000.	0.	104.2	103.2	103.9	100.2	98.3	97.0	97.9	99.5	92.2	89.2	90.9	90.6	89.2	88.2	89.2	89.2	0.	0.	151.8
2500.	0.	95.8	97.0	97.0	96.2	94.8	89.8	91.7	91.2	88.1	86.9	88.7	85.9	85.1	85.1	84.8	82.8	0.	0.	146.2
3150.	0.	93.9	95.2	96.2	92.2	91.1	88.0	89.1	86.4	87.0	83.9	85.1	86.3	83.1	81.4	82.9	81.9	0.	0.	144.0
4000.	0.	97.9	95.2	96.9	96.2	92.7	91.9	90.6	90.9	86.9	84.7	85.7	86.0	85.8	83.8	83.5	83.6	0.	0.	146.5
5000.	0.	95.2	96.4	94.9	94.1	92.4	90.9	92.1	90.2	88.0	83.0	83.9	83.3	82.0	83.0	81.8	80.0	0.	0.	145.6
6300.	0.	94.9	93.2	95.2	95.4	92.3	90.0	90.9	91.5	88.1	84.1	84.7	84.1	82.1	81.4	82.1	81.0	0.	0.	146.1
8000.	0.	92.0	93.9	92.8	92.9	90.8	89.5	90.9	88.2	86.8	82.6	85.5	85.9	83.1	81.1	79.9	78.6	0.	0.	145.6
10000.	0.	89.5	90.0	89.7	91.0	88.6	84.6	87.3	84.9	83.6	79.4	82.3	84.7	84.6	80.9	80.4	77.6	0.	0.	144.1
OVERALL	13.8	108.4	108.3	108.7	106.6	106.2	103.9	104.5	104.3	102.0	100.6	102.4	102.5	102.3	102.8	103.7	102.3	13.8	13.8	158.9
PNL	0.	122.1	121.8	122.4	120.1	119.2	117.2	117.8	118.2	114.3	112.0	113.7	113.7	112.6	112.3	112.8	111.7	0.	0.	
PNLT	0.	125.3	124.3	125.1	121.9	120.9	119.0	120.1	120.6	115.7	112.0	114.8	115.0	113.8	113.3	114.0	113.5	0.	0.	

Figure 158.

QEP ENGINE "C"

1/3 OCATVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 90% N_{f_c}

CONTOURED INLET CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PNL
50.	0.	83.5	82.0	81.7	82.7	85.8	82.5	83.7	85.8	86.8	86.7	89.6	90.9	92.8	95.0	101.7	103.5	0.	0.	146.8
63.	0.	83.7	82.0	80.7	81.2	86.7	82.8	83.6	85.2	87.0	86.7	89.7	91.4	92.2	93.9	98.0	99.8	0.	0.	144.8
80.	0.	84.5	83.8	84.3	82.6	87.3	84.6	83.2	84.6	85.5	85.5	88.6	90.9	91.9	93.6	96.6	96.3	0.	0.	143.0
100.	0.	84.6	83.1	83.6	83.1	87.9	82.9	84.8	86.8	87.8	89.7	91.6	93.3	94.9	97.1	100.0	96.8	0.	0.	145.6
125.	0.	85.1	85.2	86.9	86.1	91.0	88.3	90.2	91.5	92.3	93.3	94.9	96.6	98.2	99.5	102.0	97.1	0.	0.	148.5
160.	0.	86.9	88.1	91.9	92.0	93.0	92.0	93.6	92.2	94.0	93.7	96.7	97.1	99.0	99.0	100.8	96.8	0.	0.	149.1
200.	0.	86.6	87.9	88.9	90.3	92.1	90.1	88.7	90.3	92.3	93.0	95.0	95.1	95.9	97.1	97.0	94.7	0.	0.	146.9
250.	0.	90.1	87.3	86.6	86.2	90.1	88.8	90.7	90.1	91.1	91.1	93.0	93.2	94.9	95.2	95.0	93.7	0.	0.	145.5
315.	0.	88.8	92.5	90.8	91.3	94.9	93.8	96.7	99.1	97.3	93.1	94.0	95.1	94.0	94.9	95.0	92.9	0.	0.	148.9
400.	0.	91.9	92.2	97.6	98.9	100.9	104.7	103.5	100.8	95.9	96.7	100.5	97.2	93.9	97.9	96.9	99.8	0.	0.	153.7
500.	0.	97.8	99.2	98.6	99.9	103.6	100.7	103.5	101.8	102.8	100.9	100.5	94.2	95.8	95.0	98.7	95.7	0.	0.	154.5
630.	0.	96.0	97.3	100.0	98.5	99.1	98.1	99.1	96.5	96.5	91.1	95.2	92.6	93.4	94.1	95.0	91.1	0.	0.	150.9
800.	0.	97.0	96.4	96.8	93.0	95.0	97.1	95.8	93.1	96.1	93.3	94.1	94.5	94.1	92.9	92.0	90.7	0.	0.	148.8
1000.	0.	98.1	101.3	97.0	97.5	98.3	96.0	94.9	96.3	95.5	92.1	93.9	94.6	91.2	92.2	93.2	91.1	0.	0.	149.7
1250.	0.	99.0	98.1	97.8	95.3	96.1	98.8	93.7	93.3	94.1	90.1	91.0	91.4	89.0	92.2	91.8	88.7	0.	0.	148.7
1600.	0.	97.9	96.2	97.9	94.4	94.0	97.0	93.0	92.2	92.1	89.0	89.1	89.4	89.1	90.2	89.9	87.7	0.	0.	147.5
2000.	0.	101.9	101.3	100.2	98.2	96.0	95.2	93.8	94.2	90.3	89.0	90.9	88.5	90.3	89.4	90.1	88.8	0.	0.	149.2
2500.	0.	100.6	99.3	99.9	98.9	95.8	92.5	93.9	93.2	91.2	90.0	90.6	88.0	88.9	89.1	89.9	86.5	0.	0.	148.8
3150.	0.	96.2	97.3	98.1	95.2	94.3	90.3	91.1	90.2	90.3	87.1	87.9	89.4	86.4	87.1	87.2	85.8	0.	0.	146.7
4000.	0.	98.7	96.0	96.9	96.9	93.7	92.6	90.7	91.9	88.0	87.6	88.6	88.1	88.8	87.8	87.8	85.8	0.	0.	147.3
5000.	0.	96.1	97.5	94.9	94.4	93.2	90.0	90.9	90.4	88.1	84.1	86.9	86.1	85.3	87.3	85.1	82.8	0.	0.	146.1
6300.	0.	95.2	94.3	95.2	95.5	92.0	88.2	88.9	89.1	87.3	85.8	86.9	86.2	86.2	85.7	86.8	84.1	0.	0.	146.0
8000.	0.	92.0	94.1	92.7	93.9	89.6	88.0	87.6	87.1	87.1	83.9	85.6	85.3	85.2	84.9	82.9	81.6	0.	0.	145.4
10000.	0.	89.7	90.1	89.9	91.8	89.5	83.7	85.3	83.9	84.9	82.7	87.7	88.7	86.7	84.9	83.7	80.6	0.	0.	145.2
OVERALL	13.8	109.5	109.6	109.6	108.9	109.5	109.4	109.3	108.2	107.8	106.0	107.6	106.7	107.1	108.1	110.0	109.0	13.8	13.8	162.9
PNL	0.	122.8	122.3	122.6	121.7	120.5	119.4	118.9	118.4	117.9	115.9	117.0	116.5	116.3	116.5	117.3	115.9	0.	0.	
PNLT	0.	124.1	123.8	123.3	122.9	121.7	120.7	119.6	119.5	120.1	118.3	117.6	116.5	116.3	116.5	117.3	116.9	0.	0.	

Figure 159.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 60% N_{f_c}

LONG INLET WITH 24" MPT TREATMENT CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	0.	69.6	69.2	73.8	72.2	74.6	71.8	71.6	73.8	74.4	76.2	77.7	79.2	79.4	81.5	82.4	0.	0.	129.5
63.	0.	0.	70.9	69.8	70.2	69.6	71.6	73.2	71.9	72.1	71.9	72.7	75.1	75.5	75.9	78.0	79.6	0.	0.	126.9
80.	0.	0.	69.6	68.4	70.6	70.2	70.4	70.5	70.8	70.8	70.3	72.0	73.7	74.9	75.5	77.6	77.5	0.	0.	125.9
100.	0.	0.	69.2	69.8	73.2	74.9	75.7	75.2	78.1	78.1	77.7	77.5	78.0	79.3	79.8	80.9	78.7	0.	0.	130.8
125.	0.	0.	78.1	80.2	86.3	87.9	81.1	83.5	83.3	87.1	86.0	85.0	87.4	87.7	89.0	89.1	85.2	0.	0.	139.5
160.	0.	0.	74.1	76.5	79.1	79.9	80.7	81.0	80.2	80.9	81.0	80.5	82.3	82.6	83.0	81.7	79.9	0.	0.	134.8
200.	0.	0.	75.2	75.6	77.2	77.8	78.2	76.9	76.9	77.2	77.7	78.6	79.3	79.7	79.8	76.8	77.9	0.	0.	131.4
250.	0.	0.	74.2	73.8	73.9	72.6	74.0	74.0	74.0	74.9	75.7	75.8	76.1	77.6	76.7	76.0	76.6	0.	0.	128.8
315.	0.	0.	74.2	74.8	74.0	72.9	74.8	75.0	75.9	76.9	77.0	77.8	79.1	80.5	78.0	75.7	75.0	0.	0.	130.4
400.	0.	0.	74.2	73.7	72.8	72.8	73.7	74.2	74.1	74.8	74.9	75.5	76.2	78.2	77.9	76.9	75.8	0.	0.	129.0
500.	0.	0.	75.8	75.4	73.8	73.5	73.6	73.8	74.0	74.6	73.8	75.4	76.0	77.2	77.6	76.8	74.7	0.	0.	128.9
630.	0.	0.	76.3	77.9	77.0	74.7	74.1	74.1	74.1	74.2	74.8	76.7	78.1	78.7	77.2	75.1	74.0	0.	0.	129.9
800.	0.	0.	78.2	77.6	76.9	75.9	76.1	75.9	75.0	76.2	76.0	78.9	82.2	81.8	77.8	76.0	73.9	0.	0.	131.9
1000.	0.	0.	79.6	77.8	77.2	75.8	75.3	77.4	76.2	76.3	76.9	78.7	81.6	80.7	75.9	75.0	72.9	0.	0.	131.8
1250.	0.	0.	91.1	90.8	86.1	87.7	86.9	84.1	80.1	80.2	78.8	78.6	81.4	78.6	77.0	76.1	76.7	0.	0.	138.5
1600.	0.	0.	83.4	82.8	80.2	80.1	79.3	77.1	76.3	76.0	75.8	76.7	79.5	78.4	75.1	74.1	74.1	0.	0.	132.7
2000.	0.	0.	86.3	85.9	80.6	79.2	82.2	76.4	76.2	75.4	76.2	78.7	78.3	80.7	77.0	75.2	75.2	0.	0.	134.2
2500.	0.	0.	87.9	85.9	85.2	81.9	81.9	79.2	77.1	77.6	78.8	80.7	81.4	80.4	77.9	75.9	73.9	0.	0.	135.9
3150.	0.	0.	83.2	83.8	80.4	79.2	75.2	74.4	73.4	75.4	74.1	75.8	80.6	77.5	75.2	73.2	72.9	0.	0.	132.7
4000.	0.	0.	86.9	86.8	84.9	82.8	81.1	78.9	77.1	75.1	74.6	76.5	77.2	79.6	75.8	74.9	73.8	0.	0.	135.7
5000.	0.	0.	86.4	85.8	85.4	81.1	81.0	80.5	75.4	75.1	73.9	76.0	76.2	74.7	75.9	71.9	70.8	0.	0.	135.8
6300.	0.	0.	88.1	87.9	87.2	86.9	82.1	79.6	77.5	77.4	76.9	80.8	84.4	79.9	78.3	76.2	74.1	0.	0.	138.7
8000.	0.	0.	86.0	85.9	85.0	81.7	81.1	80.3	75.9	75.8	73.9	77.8	81.4	79.7	78.0	73.7	71.6	0.	0.	137.4
10000.	0.	0.	85.9	84.5	84.1	80.8	79.8	77.8	74.1	76.0	71.8	74.6	77.9	76.4	74.7	71.9	69.5	0.	0.	137.1
OVERALL	13.8	13.8	97.5	97.0	95.7	94.9	93.4	92.1	90.6	91.8	91.3	92.2	94.3	94.0	93.4	92.9	91.3	13.8	13.8	148.2
PNL	0.	0.	110.2	110.0	108.6	107.6	105.7	104.2	102.3	102.4	102.5	104.3	106.5	105.2	103.3	101.6	100.5	0.	0.	
PNLT	0.	0.	113.4	113.5	111.1	110.8	108.9	106.5	103.6	103.8	103.7	105.4	107.7	106.4	104.5	102.9	101.6	0.	0.	

Figure 160.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 70% N_{f_c}

LONG INLET WITH 24" MPT TREATMENT CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PNL
50.	0.	72.8	71.7	72.9	74.9	73.8	75.7	77.1	76.8	77.4	76.6	78.8	81.1	81.7	82.8	86.5	88.0	0.	0.	133.3
63.	0.	77.8	72.6	73.2	75.2	74.3	76.0	77.1	76.0	78.0	78.1	79.1	80.0	80.9	82.3	84.8	86.3	0.	0.	132.7
80.	0.	74.6	72.4	71.8	72.7	73.6	74.8	74.9	75.6	75.4	76.4	77.9	78.7	80.7	81.9	84.6	83.7	0.	0.	131.6
100.	0.	75.8	72.9	73.8	76.0	77.9	78.8	78.9	80.9	80.7	80.9	82.1	83.8	84.0	84.8	87.6	85.1	0.	0.	135.8
125.	0.	76.9	78.9	83.3	82.1	87.2	93.2	94.4	93.6	88.1	87.0	90.6	90.3	87.4	88.4	92.4	88.2	0.	0.	143.9
160.	0.	76.9	77.9	81.8	82.8	84.3	88.2	89.1	88.2	85.6	85.6	88.1	87.9	87.8	87.3	87.6	84.9	0.	0.	140.4
200.	0.	77.5	79.8	80.7	81.7	81.8	83.0	83.1	81.1	82.5	81.8	83.1	83.9	83.7	85.1	83.6	83.1	0.	0.	136.3
250.	0.	77.7	78.7	78.8	79.2	79.9	79.1	79.2	80.0	80.8	80.7	81.9	82.0	83.1	83.0	81.9	82.0	0.	0.	134.5
315.	0.	78.0	79.0	79.1	79.1	79.2	80.9	81.2	82.0	81.6	83.0	83.2	85.0	84.9	83.0	82.0	80.0	0.	0.	135.9
400.	0.	79.5	77.9	79.1	78.1	78.2	79.8	78.8	80.2	80.5	80.7	81.9	82.2	83.1	81.9	82.0	79.9	0.	0.	134.4
500.	0.	78.5	78.6	80.0	77.8	77.8	80.0	79.9	79.8	79.7	79.6	81.1	81.1	81.7	82.1	81.6	79.1	0.	0.	134.0
630.	0.	79.9	80.2	80.2	79.4	77.9	79.4	78.6	79.2	78.8	80.0	81.3	82.4	82.4	81.5	81.0	78.4	0.	0.	134.2
800.	0.	85.7	84.8	82.9	81.2	81.0	81.0	79.1	79.3	79.9	80.1	83.3	85.0	83.2	81.3	81.1	77.3	0.	0.	135.8
1000.	0.	85.1	84.8	81.4	81.3	79.4	79.1	79.2	79.5	79.1	79.9	82.1	84.4	81.3	79.4	79.9	76.2	0.	0.	135.1
1250.	0.	86.0	85.0	85.9	81.9	81.0	81.2	80.3	78.3	78.7	78.8	80.3	82.3	79.2	78.0	79.1	76.3	0.	0.	135.2
1600.	0.	96.1	97.2	97.1	94.3	92.3	93.1	90.3	87.1	85.0	81.9	85.1	84.4	82.3	81.4	82.0	81.3	0.	0.	144.9
2000.	0.	87.2	86.9	87.4	84.4	82.2	82.4	80.3	80.2	77.9	79.0	81.3	80.5	81.4	79.4	79.0	76.5	0.	0.	136.5
2500.	0.	89.7	90.0	87.8	86.8	83.9	84.1	82.0	80.2	79.5	80.7	83.2	82.9	80.1	79.9	79.0	75.9	0.	0.	138.2
3150.	0.	93.2	92.0	93.4	89.3	87.1	82.3	83.5	81.4	82.0	79.2	80.2	83.2	80.3	78.4	78.9	77.4	0.	0.	140.5
4000.	0.	89.9	90.9	90.1	88.7	85.8	83.7	82.1	80.8	78.5	78.9	79.9	81.1	80.7	79.1	78.6	76.9	0.	0.	139.8
5000.	0.	94.1	92.2	91.0	92.1	86.2	86.9	86.3	83.0	80.7	78.1	79.3	79.2	77.9	78.2	76.9	75.1	0.	0.	141.4
6300.	0.	89.2	93.2	92.1	91.4	90.1	87.3	85.1	85.4	83.0	80.2	81.5	83.4	80.0	78.1	78.9	76.4	0.	0.	142.7
8000.	0.	88.7	88.7	89.9	89.0	85.1	84.8	83.9	81.9	80.8	78.0	82.1	86.1	81.8	80.9	77.9	75.2	0.	0.	141.4
10000.	0.	85.6	87.6	87.8	87.3	84.6	82.6	81.7	80.6	79.3	76.7	77.9	80.9	78.6	77.6	76.7	72.9	0.	0.	140.6
OVERALL	13.8	101.7	102.1	102.0	100.4	98.4	99.2	98.8	97.7	95.4	94.8	97.0	97.7	96.5	96.3	97.7	95.9	13.8	13.8	152.0
PNL	0.	115.2	115.0	115.4	113.7	111.3	111.2	109.7	108.3	107.1	105.9	107.9	109.0	107.3	106.3	106.3	104.4	0.	0.	
PNLT	0.	118.4	118.7	119.3	117.4	114.9	115.0	113.0	111.0	109.3	106.9	109.4	110.0	107.3	106.8	107.1	106.1	0.	0.	

Figure 161.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 80% N_{f_c}

LONG INLET WITH 24" MPT TREATMENT CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	76.5	76.5	77.7	77.7	76.8	78.7	78.8	80.0	81.4	81.5	83.0	85.0	86.8	88.8	92.7	94.0	0.	0.	138.4
63.	0.	78.7	77.3	78.0	77.2	77.2	78.9	80.3	80.2	80.6	81.0	82.3	84.0	85.1	87.2	90.7	92.0	0.	0.	137.1
80.	0.	78.3	76.7	78.6	76.4	76.9	77.8	78.9	78.9	79.5	80.7	81.9	83.6	85.4	86.8	90.3	89.6	0.	0.	136.4
100.	0.	78.9	75.9	78.8	79.0	80.1	80.8	81.2	83.0	83.4	83.9	85.8	87.8	88.7	90.9	92.8	90.1	0.	0.	139.5
125.	0.	79.0	79.0	83.3	84.2	88.2	87.4	90.6	88.2	88.0	89.1	90.3	91.3	92.4	93.6	95.2	91.2	0.	0.	143.5
160.	0.	78.6	82.0	85.9	87.1	87.9	89.2	90.1	89.1	88.8	89.8	90.2	91.3	91.9	93.0	92.9	89.1	0.	0.	143.4
200.	0.	80.8	82.9	84.8	84.8	86.1	85.7	85.1	85.8	85.5	86.8	88.2	89.0	89.0	88.9	88.8	88.1	0.	0.	140.5
250.	0.	80.7	81.7	82.8	83.2	81.9	83.1	83.2	82.9	83.5	85.0	86.3	86.2	87.8	88.0	87.3	86.9	0.	0.	138.6
315.	0.	79.9	81.9	82.1	82.9	81.2	83.1	84.3	84.9	84.8	86.0	86.9	88.2	88.1	87.0	87.0	86.0	0.	0.	139.2
400.	0.	82.1	81.7	82.8	81.8	82.1	81.9	83.0	82.9	83.5	84.9	84.9	85.8	86.0	87.0	86.8	84.9	0.	0.	138.1
500.	0.	84.6	82.8	88.0	85.0	84.8	84.7	83.9	83.0	83.4	83.9	84.8	84.9	86.7	87.1	87.8	84.1	0.	0.	138.9
630.	0.	89.1	90.1	93.5	90.5	88.2	86.1	84.3	84.4	84.9	83.2	85.5	85.5	86.0	86.5	87.0	83.5	0.	0.	141.0
800.	0.	91.8	93.9	88.9	87.1	85.0	87.2	87.3	86.2	85.9	84.8	87.4	88.2	86.1	85.3	85.8	83.9	0.	0.	141.3
1000.	0.	91.3	95.3	90.2	88.3	88.4	86.1	85.4	85.1	85.1	83.9	85.4	88.1	84.0	84.1	84.9	82.2	0.	0.	141.3
1250.	0.	90.9	89.0	91.3	89.2	85.3	85.2	85.3	82.2	82.9	82.0	84.0	85.3	82.9	83.2	83.0	81.0	0.	0.	139.7
1600.	0.	97.0	96.0	96.1	93.2	91.5	90.2	89.3	87.1	85.0	84.0	84.4	85.1	83.2	83.5	83.8	82.1	0.	0.	144.0
2000.	0.	101.0	100.1	99.5	97.5	94.3	94.3	91.7	90.3	86.3	87.3	87.3	86.5	85.3	84.4	85.0	85.5	0.	0.	147.6
2500.	0.	94.7	93.8	93.2	92.0	90.3	91.0	88.0	86.1	83.8	84.0	86.1	84.9	82.8	83.1	83.7	80.9	0.	0.	143.1
3150.	0.	94.3	93.3	94.1	89.1	88.1	84.1	84.5	82.3	84.1	81.9	82.2	85.4	81.2	80.3	81.2	80.1	0.	0.	141.6
4000.	0.	93.6	94.7	95.8	93.1	91.2	89.1	87.1	85.8	82.7	82.6	83.0	83.8	84.7	82.8	82.6	81.0	0.	0.	143.9
5000.	0.	96.1	93.1	93.3	93.1	89.4	89.3	89.2	85.3	83.7	80.8	81.0	82.0	80.2	82.2	80.8	79.3	0.	0.	143.4
6300.	0.	92.2	95.3	94.4	93.4	92.2	89.1	87.2	86.3	84.6	81.8	82.4	83.3	80.9	80.3	81.1	80.2	0.	0.	144.6
8000.	0.	91.9	91.1	91.9	92.0	87.7	87.7	87.2	84.1	83.7	80.7	83.2	84.9	81.6	80.9	79.9	78.2	0.	0.	143.6
10000.	0.	87.4	89.6	88.5	90.7	86.9	84.8	84.0	81.8	82.3	78.7	79.7	83.9	83.5	80.6	79.4	77.9	0.	0.	142.9
OVERALL	13.8	106.0	105.8	105.6	103.9	101.9	101.2	100.5	99.1	98.4	98.4	99.5	100.5	100.5	101.1	102.3	100.9	13.8	13.8	156.0
PNL	0.	119.6	119.2	119.1	117.4	115.1	114.6	113.2	111.7	110.1	109.8	110.8	111.6	110.7	110.2	110.5	109.3	0.	0.	
PNLT	0.	122.1	121.9	120.8	119.1	117.0	116.3	114.2	113.6	110.1	110.9	110.8	111.6	112.1	110.2	110.5	110.6	0.	0.	

Figure 162.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 90% N_{f_c}

LONG INLET WITH 24" MPT TREATMENT CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	0.	79.8	79.5	81.9	80.5	82.7	83.5	84.5	87.0	86.5	88.2	90.8	92.9	95.6	100.6	103.4	0.	0.	145.8
63.	0.	0.	81.4	79.6	81.2	81.8	83.1	84.1	84.9	86.3	85.7	87.8	90.0	92.2	94.0	96.9	99.9	0.	0.	143.9
80.	0.	0.	83.8	83.2	82.8	84.6	86.7	83.8	83.2	84.7	85.3	87.1	89.6	91.9	94.6	96.5	96.5	0.	0.	142.8
100.	0.	0.	80.4	80.5	82.0	82.7	84.0	84.2	85.9	88.1	88.6	90.5	93.1	95.2	98.0	100.7	96.9	0.	0.	145.8
125.	0.	0.	81.6	83.8	86.2	86.9	89.1	89.5	91.2	91.4	93.0	93.8	95.4	97.6	100.2	102.0	96.9	0.	0.	148.1
160.	0.	0.	86.1	89.8	91.2	89.9	93.0	92.9	91.8	93.4	93.7	94.7	97.1	98.1	99.7	99.7	95.8	0.	0.	148.5
200.	0.	0.	87.6	87.8	90.1	90.0	90.2	90.0	89.8	91.3	92.1	92.8	94.4	95.5	97.0	95.9	94.7	0.	0.	146.2
250.	0.	0.	85.1	84.8	87.2	87.6	89.2	89.3	88.7	89.4	89.8	91.6	93.4	94.2	95.0	93.7	93.9	0.	0.	144.7
315.	0.	0.	87.5	88.6	89.0	86.9	89.0	92.0	91.1	90.4	92.1	91.8	94.1	93.5	94.1	93.7	92.6	0.	0.	145.8
400.	0.	0.	89.4	89.6	86.8	94.9	96.0	92.2	96.0	89.0	92.9	91.7	93.3	93.4	95.7	94.5	91.6	0.	0.	147.1
500.	0.	0.	88.0	90.7	89.9	92.5	95.7	98.0	91.9	93.1	92.6	93.4	92.9	92.3	94.6	93.5	91.7	0.	0.	147.4
630.	0.	0.	88.6	91.8	88.3	91.9	94.1	91.9	90.9	90.2	89.9	89.6	92.5	92.7	92.9	92.8	89.7	0.	0.	145.4
800.	0.	0.	92.4	90.7	89.1	86.7	91.2	87.9	89.0	89.1	89.1	90.6	92.6	91.5	91.8	90.7	89.0	0.	0.	144.2
1000.	0.	0.	96.8	94.2	93.3	93.2	93.1	92.2	90.3	89.4	88.2	88.9	91.6	88.6	90.3	90.1	87.9	0.	0.	145.6
1250.	0.	0.	96.4	95.8	91.2	91.9	92.2	93.0	88.7	90.1	85.9	87.6	90.2	87.1	89.9	89.0	87.0	0.	0.	145.1
1600.	0.	0.	94.3	93.7	90.5	89.9	90.1	90.9	86.8	88.0	86.1	86.9	88.1	87.5	88.2	87.8	87.0	0.	0.	143.6
2000.	0.	0.	99.6	100.1	97.3	96.1	96.1	92.3	91.0	89.7	87.9	88.1	86.5	89.5	90.1	89.2	88.2	0.	0.	148.1
2500.	0.	0.	97.6	95.9	95.3	92.7	93.1	91.2	89.7	89.3	88.0	88.5	88.0	88.0	88.8	88.6	85.9	0.	0.	146.0
3150.	0.	0.	94.7	94.7	92.3	90.9	86.3	88.1	85.2	88.3	84.9	84.9	88.5	85.3	86.1	85.9	84.9	0.	0.	143.7
4000.	0.	0.	96.5	95.8	95.0	92.6	90.1	89.1	86.8	86.2	85.8	86.5	87.2	88.1	88.0	86.6	85.9	0.	0.	145.4
5000.	0.	0.	94.8	93.8	95.2	90.9	90.3	89.4	86.1	87.2	84.1	84.8	85.5	84.2	86.8	84.9	83.1	0.	0.	144.7
6300.	0.	0.	95.8	93.9	94.5	93.0	89.1	87.1	86.2	87.5	84.0	84.7	85.5	84.4	84.8	85.9	84.0	0.	0.	145.3
8000.	0.	0.	92.3	91.7	92.3	88.9	87.0	86.9	84.9	87.0	82.7	84.3	85.3	83.3	83.6	82.8	80.6	0.	0.	144.0
10000.	0.	0.	90.2	88.7	90.2	87.5	83.7	84.0	81.7	85.2	82.8	85.4	88.2	85.2	83.6	82.5	80.5	0.	0.	144.0
OVERALL	13.8	13.8	107.0	106.5	105.4	104.7	105.2	104.6	103.2	103.2	103.1	103.8	105.6	106.2	108.0	109.1	108.2	13.8	13.8	159.5
PNL	0.	0.	120.2	120.1	118.8	117.5	117.4	116.0	114.4	114.6	113.5	114.2	115.5	115.2	116.1	115.9	114.3	0.	0.	
PNLT	0.	0.	121.4	121.9	120.3	119.1	118.9	118.0	115.2	115.8	113.5	114.2	115.5	116.4	116.1	115.9	114.3	0.	0.	

Figure 163.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 60% N_{f_c}

LONG INLET WITH 36" MPT TREATMENT CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	73.0	71.7	73.7	77.4	75.9	73.7	74.7	74.6	76.9	78.4	80.6	81.9	83.5	81.6	83.5	83.0	0.	0.	132.5
63.	0.	73.0	69.9	71.7	69.9	70.8	69.9	72.9	72.8	73.1	72.7	73.5	74.7	76.9	76.0	77.6	78.1	0.	0.	127.1
80.	0.	70.6	69.5	71.3	68.3	70.7	69.4	70.8	72.4	73.7	73.3	74.3	74.4	76.2	75.6	78.2	77.7	0.	0.	127.0
100.	0.	70.3	69.9	72.7	73.6	77.1	75.1	77.1	77.7	78.8	79.7	79.8	79.7	81.0	81.0	82.6	80.1	0.	0.	132.1
125.	0.	71.5	75.2	79.2	78.8	82.2	82.4	85.4	84.3	82.2	83.9	88.7	85.0	85.0	82.2	84.1	82.1	0.	0.	137.9
160.	0.	73.0	74.5	77.7	77.6	79.0	80.0	81.2	80.1	80.9	81.0	82.5	81.9	82.8	81.7	80.9	80.1	0.	0.	134.2
200.	0.	74.3	75.0	76.7	75.9	77.8	74.9	76.1	76.0	76.9	77.6	78.8	78.8	78.7	78.8	76.9	77.1	0.	0.	130.9
250.	0.	74.0	73.8	76.9	73.9	73.8	72.9	73.9	75.0	77.1	76.7	77.8	78.0	78.9	78.0	77.5	76.8	0.	0.	130.1
315.	0.	76.0	75.0	77.0	73.9	74.2	72.9	75.2	76.0	78.2	77.7	78.7	78.8	80.1	77.1	77.6	76.1	0.	0.	130.8
400.	0.	74.2	72.6	77.8	72.8	72.8	71.9	73.9	75.0	76.8	75.6	77.5	77.0	78.9	78.8	78.7	76.0	0.	0.	130.0
500.	0.	74.1	73.8	77.9	73.5	73.0	71.7	74.0	73.8	75.7	75.7	77.4	76.6	78.8	78.9	77.4	74.6	0.	0.	129.8
630.	0.	75.5	74.9	80.1	75.9	74.4	72.4	73.4	74.2	75.2	76.1	78.8	79.3	81.3	77.1	75.1	73.3	0.	0.	130.8
800.	0.	79.1	77.7	79.1	76.8	75.8	73.8	75.1	75.0	76.1	77.9	80.5	82.1	82.8	77.0	75.5	72.7	0.	0.	132.3
1000.	0.	81.6	80.3	78.9	77.0	77.3	74.1	75.1	74.9	75.3	77.8	78.8	81.4	80.8	75.0	74.7	72.2	0.	0.	131.9
1250.	0.	92.1	90.0	89.1	88.0	92.0	87.3	82.9	79.9	78.1	77.7	78.9	78.8	80.1	74.7	75.8	74.8	0.	0.	139.5
1600.	0.	84.2	83.0	83.0	80.2	82.4	78.2	76.3	75.2	74.0	76.1	78.0	78.9	77.9	74.1	74.0	72.2	0.	0.	133.0
2000.	0.	83.7	81.5	83.5	79.3	76.3	75.6	75.3	75.4	75.5	76.3	80.4	79.5	80.3	76.1	75.0	73.5	0.	0.	132.9
2500.	0.	88.4	86.3	86.3	84.5	81.8	79.5	78.3	75.5	76.6	78.3	81.0	83.4	80.3	76.1	75.2	72.1	0.	0.	135.9
3150.	0.	82.8	84.5	83.5	79.3	78.6	72.8	73.8	73.6	72.8	74.3	76.3	79.4	76.3	73.3	73.2	71.5	0.	0.	132.4
4000.	0.	85.9	83.9	87.7	84.4	81.7	78.7	77.9	75.7	74.8	73.4	77.3	76.5	77.6	75.6	73.5	71.5	0.	0.	135.2
5000.	0.	87.5	87.3	85.0	84.3	82.4	78.1	78.3	72.9	73.3	73.8	74.8	76.1	75.8	73.1	70.7	68.9	0.	0.	135.1
6300.	0.	85.1	85.6	87.8	84.8	82.7	79.0	78.6	75.7	76.6	75.6	80.3	84.6	79.7	76.7	74.5	71.8	0.	0.	137.3
8000.	0.	84.4	86.4	84.1	84.1	81.4	77.4	77.4	74.1	74.1	73.9	77.7	80.4	79.2	75.9	72.8	69.3	0.	0.	136.4
10000.	0.	82.1	83.9	83.8	82.8	80.1	75.1	75.9	72.7	73.1	71.9	75.7	77.8	76.7	74.7	70.8	68.0	0.	0.	136.0
OVERALL	13.8	97.2	96.3	96.7	94.7	95.3	92.0	91.7	90.5	90.6	91.2	93.9	94.1	94.0	91.7	91.9	90.4	13.8	13.8	137.9
PNL	0.	110.0	109.3	110.4	107.7	106.9	103.3	103.1	101.4	101.6	102.4	105.0	106.6	105.2	102.1	101.1	99.0	0.	0.	
PNLT	0.	113.1	112.1	113.1	110.9	110.9	107.0	105.5	103.0	102.8	103.4	106.3	107.9	105.7	102.1	101.1	99.0	0.	0.	

Figure 164.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 70% N_{f_c}

LONG INLET WITH 36" MPT TREATMENT CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	73.8	72.7	72.4	72.9	72.6	72.9	75.4	76.7	77.5	77.6	78.9	80.6	81.8	82.7	86.6	88.1	0.	0.	133.2
63.	0.	77.9	73.1	73.6	73.5	73.7	74.0	75.6	76.6	79.0	78.9	79.1	80.6	81.0	81.2	84.6	85.3	0.	0.	132.5
80.	0.	74.8	72.4	72.4	71.1	74.2	72.7	73.5	75.3	76.4	76.4	77.7	80.4	80.8	82.5	84.5	84.6	0.	0.	131.8
100.	0.	75.8	73.8	74.7	75.4	78.5	76.7	78.8	80.7	81.8	81.6	83.0	84.6	85.0	86.0	88.5	85.8	0.	0.	136.0
125.	0.	77.4	81.2	82.1	81.5	86.2	91.1	92.9	92.2	89.1	86.9	91.3	90.9	87.4	89.1	91.2	88.2	0.	0.	143.2
160.	0.	75.9	79.0	81.7	82.5	83.7	85.8	86.7	86.9	86.1	85.7	87.3	87.9	87.2	86.9	86.6	85.9	0.	0.	139.6
200.	0.	78.0	80.1	79.7	80.4	81.1	80.9	81.9	82.1	82.2	81.8	82.4	84.8	84.3	84.2	83.7	84.0	0.	0.	136.0
250.	0.	78.0	78.2	78.8	77.3	78.8	76.9	77.9	80.8	79.8	82.0	82.4	83.1	84.0	83.2	84.6	82.3	0.	0.	134.9
315.	0.	78.0	79.3	78.9	77.5	78.8	78.0	80.0	81.8	82.2	83.0	84.1	85.0	84.3	84.3	82.7	84.0	0.	0.	136.0
400.	0.	76.8	76.8	77.7	76.3	77.7	78.0	77.8	79.6	81.0	80.7	81.2	82.6	82.2	82.0	82.5	82.9	0.	0.	134.2
500.	0.	79.1	76.7	82.8	76.2	76.6	76.9	77.4	78.4	79.6	79.5	80.8	81.5	82.0	82.0	82.4	82.0	0.	0.	133.8
630.	0.	80.2	80.2	80.9	77.6	76.0	75.3	76.8	78.0	80.0	80.9	82.2	84.2	83.4	81.4	82.0	82.5	0.	0.	134.6
800.	0.	87.3	82.3	83.0	79.5	79.0	77.2	77.7	77.9	79.8	81.0	83.5	86.0	83.0	80.9	81.6	79.0	0.	0.	135.6
1000.	0.	83.3	84.3	82.2	78.4	79.0	76.1	77.2	77.1	79.0	79.0	81.3	84.2	80.5	79.2	81.1	77.5	0.	0.	134.3
1250.	0.	84.1	84.3	84.1	80.4	80.8	77.0	77.7	76.9	78.1	79.1	79.4	82.2	79.3	78.2	79.0	78.0	0.	0.	134.2
1600.	0.	92.5	93.2	90.8	91.4	91.9	87.1	86.9	86.2	82.1	80.9	82.3	83.9	80.2	79.2	81.0	81.2	0.	0.	141.5
2000.	0.	86.4	84.6	86.0	81.7	80.1	79.3	78.0	78.3	78.1	77.9	81.6	82.1	80.6	78.5	79.3	78.6	0.	0.	135.8
2500.	0.	90.3	88.5	86.9	84.8	81.0	80.2	80.0	77.9	79.3	80.2	82.5	85.2	80.5	78.4	77.8	77.5	0.	0.	137.2
3150.	0.	89.8	94.7	89.6	85.3	85.7	79.6	80.4	77.6	77.4	78.3	79.0	82.6	77.8	76.5	77.3	76.9	0.	0.	138.9
4000.	0.	90.1	88.0	90.7	87.2	83.8	81.0	80.5	78.4	77.5	77.6	79.9	80.3	78.9	78.9	77.6	75.9	0.	0.	138.2
5000.	0.	92.3	91.2	89.0	90.7	84.9	83.3	84.2	77.1	76.2	77.8	76.2	78.8	77.1	76.3	75.1	73.1	0.	0.	139.5
6300.	0.	88.1	88.1	90.5	88.1	84.8	82.7	83.6	79.7	79.5	77.6	80.8	83.5	77.6	76.9	76.5	74.8	0.	0.	139.6
8000.	0.	86.4	88.5	86.3	86.6	84.3	80.5	81.3	76.3	77.1	76.9	80.4	84.3	82.3	79.4	77.0	73.5	0.	0.	139.2
10000.	0.	84.1	85.1	84.7	85.4	82.8	78.1	79.7	76.0	76.0	74.9	77.0	79.9	77.2	75.9	74.7	72.9	0.	0.	138.2
OVERALL	13.8	100.0	100.5	99.3	98.0	96.9	95.8	96.8	96.1	95.0	94.7	96.8	98.1	96.4	96.3	97.5	96.6	13.8	13.8	151.4
PNL	0.	113.7	115.2	113.2	111.8	109.9	106.9	107.6	106.0	105.1	105.4	107.3	109.5	106.5	105.8	105.7	104.8	0.	0.	
PNLT	0.	116.1	118.1	115.1	115.2	113.7	109.9	110.6	108.9	106.4	105.9	108.3	110.3	107.3	106.3	106.3	104.8	0.	0.	

Figure 165.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 80% N_{f_c}

LONG INLET WITH 36" MPT TREATMENT CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	77.9	76.7	77.3	77.0	77.4	76.5	79.6	80.8	81.9	81.6	83.0	86.7	86.9	88.7	92.8	95.0	0.	0.	138.9
63.	0.	79.2	76.2	77.8	76.5	77.6	76.7	79.7	80.7	81.9	81.7	82.9	85.6	86.1	87.9	91.0	91.9	0.	0.	137.6
80.	0.	78.4	76.8	78.4	74.9	76.4	76.3	78.2	79.2	80.6	81.3	82.6	85.5	86.4	88.6	91.6	89.8	0.	0.	137.4
100.	0.	77.8	76.8	79.4	78.4	79.9	78.7	81.6	82.6	84.8	84.9	86.1	89.5	90.1	92.1	94.9	91.1	0.	0.	140.7
125.	0.	80.1	79.1	84.7	85.5	87.2	87.0	88.9	89.0	88.4	89.8	91.3	92.0	93.0	93.4	95.2	92.5	0.	0.	143.8
160.	0.	79.1	82.2	85.5	87.3	87.7	87.8	89.9	88.7	88.9	89.8	91.0	92.8	92.0	92.9	92.7	90.9	0.	0.	143.6
200.	0.	81.0	83.3	84.6	84.7	86.1	84.9	85.8	85.8	86.2	86.8	88.1	89.7	89.3	89.1	89.1	89.1	0.	0.	140.8
250.	0.	81.0	82.2	83.6	80.7	82.1	80.2	82.0	83.1	84.9	86.1	87.4	88.7	89.1	89.0	87.9	87.2	0.	0.	139.5
315.	0.	79.9	82.0	82.8	80.4	82.8	82.1	84.8	85.8	85.9	86.8	87.4	89.7	88.2	88.0	88.8	85.8	0.	0.	140.0
400.	0.	81.7	81.8	82.3	79.5	81.9	80.7	82.8	82.9	85.0	84.8	86.2	87.8	87.1	87.8	87.5	84.7	0.	0.	138.7
500.	0.	84.7	84.7	86.3	83.3	84.8	80.9	83.5	83.6	84.7	84.5	85.8	86.7	85.9	88.0	87.4	84.6	0.	0.	139.0
630.	0.	90.4	86.3	90.0	86.7	84.2	81.3	84.9	83.9	84.3	84.9	86.3	88.1	87.4	88.1	86.8	83.3	0.	0.	140.1
800.	0.	96.9	93.2	89.9	88.3	89.0	86.9	86.9	86.7	84.9	85.8	87.1	89.7	87.2	86.1	85.9	83.1	0.	0.	142.1
1000.	0.	94.2	91.5	89.9	86.6	85.3	82.1	82.9	82.3	84.3	84.3	84.5	87.9	85.1	84.1	84.9	81.3	0.	0.	140.0
1250.	0.	90.3	92.5	90.7	85.4	85.9	83.9	83.2	81.9	82.2	82.1	83.0	85.0	83.0	83.1	83.0	81.1	0.	0.	139.4
1600.	0.	95.3	96.4	94.8	89.6	89.9	87.3	87.8	88.1	84.5	83.2	84.1	84.1	83.1	83.0	82.9	82.2	0.	0.	142.9
2000.	0.	97.5	98.3	97.0	91.9	92.1	91.1	91.2	90.3	87.3	84.3	86.4	85.3	84.5	84.4	84.3	83.2	0.	0.	145.8
2500.	0.	93.4	92.5	92.9	90.9	88.2	87.3	86.2	85.0	84.4	84.0	84.5	86.3	84.4	83.3	83.1	80.1	0.	0.	142.0
3150.	0.	92.0	92.0	91.3	87.3	86.7	81.5	81.7	81.5	81.6	81.4	81.9	84.6	80.9	80.5	80.3	79.8	0.	0.	139.8
4000.	0.	92.8	91.8	93.4	90.4	88.5	84.7	85.5	84.7	83.7	81.5	83.7	83.5	82.7	83.6	81.7	79.9	0.	0.	141.9
5000.	0.	94.5	94.2	91.0	91.8	88.2	86.3	86.2	82.2	80.2	80.0	79.2	81.9	82.0	80.0	79.1	77.0	0.	0.	141.9
6300.	0.	91.0	91.0	92.4	90.1	87.6	84.6	85.5	84.6	83.7	78.7	81.0	83.5	78.9	79.6	79.7	77.9	0.	0.	141.8
8000.	0.	88.4	91.4	88.1	88.9	85.3	82.4	83.1	81.0	80.3	80.2	82.6	85.0	81.5	79.2	78.2	75.3	0.	0.	141.1
10000.	0.	86.2	87.2	86.8	87.4	83.8	80.6	81.8	79.6	79.1	76.7	80.0	85.0	82.2	81.1	78.7	76.1	0.	0.	140.8
OVERALL	13.8	104.9	104.6	103.8	101.2	100.3	98.4	99.3	98.8	98.4	98.5	99.7	101.6	100.9	101.5	102.7	101.4	13.8	13.8	155.0
PNL	0.	117.7	117.9	117.2	114.5	113.3	111.5	112.1	111.3	109.9	109.1	110.2	112.0	110.5	110.6	110.2	108.3	0.	0.	
PNLT	0.	119.4	119.3	118.3	114.5	114.7	113.2	113.5	113.4	110.5	109.1	111.3	112.0	110.5	111.7	110.2	108.3	0.	0.	

Figure 166.

QEP ENGINE "C"

1/3 OCTAVE DATA CORRECTED TO STANDARD DAY

150' (45.7M) ARC; 90% N_{f_c}

LONG INLET WITH 36" MPT TREATMENT CONFIGURATION

FREQ	0.	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	PWL
50.	0.	81.8	80.3	81.8	82.7	82.9	81.9	85.0	84.8	86.9	86.8	89.5	90.7	93.7	95.8	100.4	102.6	0.	0.	145.7
63.	0.	84.3	80.5	82.9	81.9	82.9	81.8	84.9	84.8	85.9	87.0	89.5	89.8	92.9	93.8	97.5	98.8	0.	0.	143.6
80.	0.	83.6	82.2	83.5	81.3	84.5	83.4	84.5	84.4	85.8	86.3	89.1	90.5	93.7	94.4	98.1	97.4	0.	0.	143.8
100.	0.	83.2	80.7	84.0	82.9	83.8	82.0	85.2	86.8	88.8	89.9	92.5	94.1	96.8	97.9	101.6	96.9	0.	0.	146.6
125.	0.	82.4	81.7	86.0	86.1	88.0	87.4	91.1	91.4	93.2	94.1	95.7	96.3	99.0	99.2	101.9	97.3	0.	0.	148.6
160.	0.	84.2	87.5	91.8	91.0	92.8	91.7	93.9	93.1	94.0	95.1	96.7	96.9	98.8	98.8	99.9	96.0	0.	0.	149.0
200.	0.	85.2	87.8	88.9	89.8	90.2	89.0	90.0	89.9	91.3	91.9	93.8	94.1	96.1	95.8	95.7	93.8	0.	0.	146.1
250.	0.	84.3	85.5	88.0	85.9	87.1	85.8	89.0	89.9	89.9	90.9	92.5	92.9	96.1	95.1	94.7	92.8	0.	0.	145.2
315.	0.	85.3	84.6	85.7	86.0	86.1	87.0	90.1	90.0	91.1	92.2	92.8	93.2	93.9	93.8	94.5	92.1	0.	0.	145.0
400.	0.	91.1	86.7	88.0	86.8	96.1	94.8	96.0	93.8	93.3	91.9	92.5	92.9	93.7	94.0	95.4	91.0	0.	0.	147.5
500.	0.	92.9	87.6	92.7	87.8	91.0	90.0	92.1	90.7	91.1	92.7	92.6	91.8	93.0	93.7	94.4	91.6	0.	0.	145.7
630.	0.	91.6	89.1	93.1	90.2	91.2	88.2	90.5	89.0	90.2	90.1	91.8	92.2	93.4	93.0	92.0	89.3	0.	0.	145.0
800.	0.	91.1	90.8	90.1	89.0	88.1	85.6	86.9	87.0	87.9	89.9	91.5	91.9	92.1	91.1	91.5	88.1	0.	0.	143.8
1000.	0.	95.3	93.2	93.3	92.0	91.4	87.2	89.2	86.9	87.1	88.4	90.0	91.3	90.3	90.0	90.0	87.0	0.	0.	144.2
1250.	0.	93.1	91.9	92.1	90.1	90.2	87.0	87.9	86.8	86.2	86.0	87.5	87.8	88.7	88.9	88.8	86.8	0.	0.	142.8
1600.	0.	91.6	90.8	93.0	88.8	89.2	87.3	87.1	87.2	86.1	84.9	87.9	86.9	88.4	88.0	87.7	86.2	0.	0.	142.5
2000.	0.	100.8	97.2	101.3	95.2	92.7	91.3	90.7	91.6	89.6	87.1	90.3	88.2	89.1	89.5	89.0	87.3	0.	0.	147.5
2500.	0.	96.8	95.0	96.3	93.5	91.4	89.4	89.4	87.3	86.4	88.1	89.0	89.2	89.2	88.5	88.0	84.5	0.	0.	145.2
3150.	0.	92.0	93.2	93.8	90.4	89.8	84.7	85.5	85.8	84.8	84.4	85.4	86.7	85.4	85.4	85.2	84.5	0.	0.	142.6
4000.	0.	94.2	92.3	96.8	93.5	90.6	86.7	86.8	86.7	86.7	84.4	87.5	86.4	87.4	87.5	86.5	84.5	0.	0.	144.6
5000.	0.	95.3	94.7	93.2	93.9	90.4	86.9	87.0	83.9	83.3	84.1	82.8	84.9	86.1	84.1	83.7	81.2	0.	0.	143.8
6300.	0.	91.1	91.3	93.6	91.7	87.8	84.6	85.9	85.6	84.9	82.4	84.1	84.5	83.7	83.7	85.3	82.5	0.	0.	143.0
8000.	0.	89.3	91.1	89.2	91.1	87.0	83.1	84.2	82.3	83.5	82.9	83.9	84.2	84.0	81.9	81.8	81.1	0.	0.	142.5
10000.	0.	86.2	86.7	86.7	90.6	84.8	79.9	80.9	81.0	82.9	81.7	85.4	87.0	85.7	83.7	82.8	81.8	0.	0.	142.9
OVERALL	13.8	106.2	104.6	106.7	104.1	103.8	101.8	103.2	102.5	103.0	103.4	105.0	105.4	107.2	107.4	109.4	107.7	13.8	13.8	159.1
PNL	0.	119.9	117.9	120.5	117.5	115.9	113.5	114.3	113.9	113.6	113.4	114.8	115.1	115.8	115.4	115.8	113.5	0.	0.	
PNLT	0.	122.1	119.3	122.7	118.8	117.2	114.5	115.2	115.3	113.6	113.4	116.0	115.1	115.8	115.4	115.8	113.5	0.	0.	

Figure 167.

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