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NOISE DATA FROM TESTS OF A 1.83-METER- (6-FT-) DIAMETER VARIABLE-PITCH 1.2-PRESSURE-RATIO FAN (QF-9)

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16. Abstract

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SUMMARY

In this report acoustic and some aerodynamic data for a 1.83-meter (6-ft) diameter fan suitable for a quiet engine for short-takeoff-and-landing (STOL) aircraft are documented. The 1.2 pressure ratio fan stage, designated QF-9, was designed and built under contract for Lewis by the Hamilton Standard Division of the United Aircraft Corporation. The QF-9 rotor blades had an adjustable pitch feature which allowed testing at several rotor blade setting angles including one for reverse thrust.

The fan stage incorporated features for low noise. Far-field noise around the fan was measured without acoustic suppression over a range of operating conditions for six different rotor blade setting angles in the forward thrust configuration and one in the reverse configuration. Complete results of one-third-octave band analysis of the data are presented in tabular form. Included also are power spectra, data referred to the source, and sideline perceived noise levels. Some one-third-octave band data are presented graphically. Narrow-band sound pressure level spectra are also presented for selected data.

INTRODUCTION

Since short-takeoff-and-landing (STOL) aircraft are being considered for operation near highly populated areas, they must satisfy low noise requirements. The reduction of engine noise is therefore an important consideration and will greatly affect engine design.

A large effort within the STOL program was devoted to conducting research on a number of fan stages for possible STOL application. This report presents the acoustic and aerodynamic performance of a candidate fan for a low-noise STOL engine. A 1.83-meter (6-ft) diameter fan, designated QF-9, was designed and built under contract for

Lewis by the Hamilton Standard Division of the United Aircraft Corporation. The fan stage incorporated features for low noise including the elimination of inlet guide vanes, low rotor blade tip speed, long axial spacing between the rotor and stator blade rows, and low number of rotor blades. The low number of rotor blades was expected to yield a noise benefit in reducing the frequency of the blade passage tone, which would be reflected in a lower calculated perceived noise level, thus tending to make the noise less objectional to human hearing. In addition, the QF-9 featured adjustable-pitch rotor blades which provided a means for testing at several forward thrust rotor blade setting angles as well as one for reverse thrust. The fan stage was designed for a pressure ratio of 1.20 and a rotor tip speed of 213.3 meters per second (700 ft/sec).

QF-9 was run without acoustic suppression in the flow passages. The configurations tested included the takeoff nozzle (design), nozzles with 95 and 92 percent of takeoff nozzle area, and with the nozzle removed, which resulted in an exit area 105 percent that of the takeoff nozzle.

This report documents the more significant acoustic data obtained in the program. To expedite distribution of the data, no attempt is made herein at interpretation or analysis. Emphasis is placed on completeness and convenience of the format for potential users. Reference 1 reported a comparison of limited scope between the results of QF-9 and QF-6 which were both 1.2 pressure ratio fans.

APPARATUS

Fan Assembly

The QF-9 fan was designed by the contractor. A brief description of the more important features of the design is given here, as well as some details of the acoustical test setup. In tables I and II, selected design configuration parameters are given for QF-9. The QF-9 fan is characterized generally as being a low-speed, low-aspect-ratio, low-solidity fan.

The fan stage was designed for a pressure ratio of 1.20 and a rotor tip speed of 213.3 meters per second (700 ft/sec). The QF-9 incorporated features for low noise including the elimination of inlet guide vanes, low rotor blade tip speed, long axial spacing between the rotor and stator blade rows, and low number of rotor and stator blades.

Figure 1 shows the QF-9 rotor and stator blading. Figure 1(a) is a partial view of the 15-blade rotor assembly. The rotor chord increases from hub to tip, with a maximum value of 24.3 centimeters (13.5 in.) at the tip. These blades also have an adjustable-pitch feature that provided a means for testing at several rotor blade setting angles including a setting (through feather) for thrust reversal. The partial view of the 11-blade (constant chord) stator assembly of figure 1(b) clearly shows the very-low-

solidity, large-chord blading. The stators were designed to turn the airflow back to the axial direction.

Figure 2 presents the relative positions of the QF-9 blading as viewed looking toward the fan axis from the blade tips. To reduce rotor-stator wake interaction, a major noise-generating mechanism, it is desirable to increase the axial spacing between these blade rows. The large-chord blades limited the practical spacing for QF-9 to two rotor-chord lengths at the mean radius. The large camber of the QF-9 blades resulted primarily from the lower solidity levels for that design (table II).

Figure 3, a cutaway sketch of QF-9 fan installation as tested at the Lewis quiet fan facility, is a representation showing the drive shaft in the fan inlet, relative positions of rotor and stator blades, and the support pylon. In all testing the fan flow passage had no acoustic suppression treatment.

Facility

The QF-9 fan was tested at the Lewis quiet fan facility and is shown in figure 4(a) for the takeoff configuration and figure 4(b) for the reverse thrust configuration. The fan was located on a concrete pedestal 37 meters (121 ft) from the face of the drive motor building. The drive motors were used to drive the fan through a gearbox and drive shaft. Figure 5 is a sketch of the test site. The entire test site surface was asphalt. The acoustic data were taken with an array of microphones located at the fan centerline elevation on a 30.5-meter (100-ft) radius from the fan in 10° increments from 10° to 160° from the fan inlet centerline. Data were not taken at 0° because of the drive shaft, nor above 160° because of the high-velocity fan exhaust. In figure 4(a) the microphones are shown covered with plastic bags to protect them from the weather. The bags are removed during operation. Additional details on design of the quiet fan facility are given in reference 2. Foam treatment is shown on the portion of the drive motor building wall that was considered likely to cause a sound reflection problem at the microphone locations.

TEST CONFIGURATIONS

A tabulation of the configurations for which aerodynamic and acoustic data are reported is given in table III. Each configuration was run at various speeds. For every test far-field noise was measured. Four exhaust nozzle configurations were used. These were referred to as takeoff (design), 95 and 92 percent of takeoff, and 105 percent of takeoff with the nozzle removed. The takeoff (design) nozzle had an exit area of 2.02 square meters (21.75 ft^2).

The adjustable-pitch rotor was tested at six forward and one reverse thrust rotor blade setting angle configurations. These angles, listed in table IV, are measured from the tangential direction (consistent with manufacturing specifications) at the 75 percent radius measured from the rotor blade hub. The minus direction opened the blades to pass more airflow. The plus direction closed the blades and, therefore, passed less airflow. In the reverse-thrust configuration the incoming air stream entered through the exhaust nozzle which was flared open to form a contracting flow path. The exit air flow left the fan through the bellmouth, was discharged over the drive shaft and deflected from drive motor building by a blast shield (see fig. 4(b)). Results are given with and without this shield (table III). In this reverse mode the airflow over the stators generated wakes on entering the rotor.

INSTRUMENTATION AND PROCEDURE

Aerodynamic

QF-9 fan aerodynamic performance was measured at several measuring stations. Figure 6 shows the axial locations of these stations, and figure 7(a) shows the details of fan aerodynamic instrumentation. The inlet corrected weight flow was calculated from the inlet static-pressure taps. Stage total-pressure ratio was determined from total-pressure rakes located downstream of the stator blade row (fig. 7(b)). The corrected thrust was determined from total- and static-pressure rakes located at nozzle discharge (fig. 7(c)). No aerodynamic rakes were used for reverse thrust tests. All rakes were removed for acoustic tests. The aerodynamic data were recorded through a pressure multiplexing valve, a pressure transducer, and data acquisition network. This system recorded nine samples in about 90 seconds. These raw data samples were averaged and used to compute the desired flow parameters.

Acoustic

Acoustic measurements were made outdoors in the horizontal plane containing the centerline of the fan (5.9 m (19.3 ft) above ground; fig. 4(a)). The test site surface was hard asphalt. The 16 far-field microphones were located on a 30.5-meter (100-ft) radius (fig. 5) except for the 120° and 160° microphone distances which were actually at 31.4 and 31.9 meters, respectively, because of the presence of a walkway through the microphone field. Data from the microphones were corrected to a 30.5-meter radius. The microphone angular positions were measured from the fan inlet axis.

Figure 8 presents a block diagram of the acoustic data system. Before the set of tests for each configuration, a pistonphone signal was impressed on each far-field microphone for absolute calibration.

Three 100-second samples for each speed point were recorded from the microphone data on magnetic tape for later analysis. Simultaneously with the magnetic tape recording, an on-line one-third-octave-band analyzer was used for 4 seconds on each microphone sample, and the results were recorded on digital tape. These one-third-octave digital data were further adjusted for atmospheric absorption to obtain results corrected to standard-day conditions of 15° C and 70 percent relative humidity. The data were not adjusted for ground reflection. From these standard-day, sound-pressure-level data, the sound-power-level and perceived-noise values were calculated. For the perceived-noise level determinations, the data were adjusted to a 152.4-meter (500-ft) sideline, which has become standard practice for STOL noise evaluations, and, in addition, for a 304.8-meter (1000 ft) sideline. A more detailed discussion of the acoustic data analysis for the quiet fan tests is given in reference 3.

AERODYNAMIC PERFORMANCE

The quiet fan facility was primarily designed for acoustic testing of full-scale candidate engine fans. The facility incorporated limited aerodynamic instrumentation, as previously described, to give an indication of the fan aerodynamic performance at the test points. Consequently, the aerodynamic results for QF-9 are not as complete nor as precise as might have been obtained from a purely aerodynamic test facility.

Figures 9 to 11 present selected aerodynamic results for QF-9. In general, the aerodynamic results are presented as a function of the percent of fan design speed to facilitate a correlation of these results with the acoustic results. Figure 9 shows the stage pressure ratios for various configurations and speeds. Figure 10 shows corrected inlet weight flow for the same configurations and speeds, and figure 11 presents plots of corrected thrust for various configurations and speeds.

ACOUSTIC PERFORMANCE

Tabulations

All standard-day one-third-octave band data on a 30.5-meter arc which were obtained from the acoustical test program are presented in tabular form. Table III lists the data presented. The actual data appear in tables V to XX, inclusive. Each table is

identified by rotor setting angle, nozzle area, and speed. Each table also contains descriptive information about the configuration.

The principal table entries are standard-day sound pressure levels (SPL referred to 0.00002 Pa) in each one-third-octave band for each angle on the 30.5-meter radius. Overall sound pressure levels which were computed from the one-third-octave band data are also given.

Using the data referred to the source, calculations of PWL (power level) were made by multiplying the sound intensity at each angle by its respective incremental area on the surface of a hemisphere and summing the increments of power so obtained. Radiation was neglected for area increments at the fan axis for which no data were obtained. Such small contributions are insignificant. Power levels are presented in the tables referred to 0.1 picowatt (pW).

Each power level has associated with it a simple source SPL (sound pressure level) which is the sound pressure level produced by a source emitting the same acoustic power but radiating uniformly in all directions.

For all cases projections were made to a sideline 152.4 and 304.8 meters parallel to the fan axis, and perceived noise levels in PNdB were computed in accordance with the method of reference 4. These perceived noise levels, also given in the tables, permit a practical comparison among all the noise data of the relative noise generated.

Graphical Data

One-third-octave band data. - For many configurations, the one-third-octave band data are qualitatively similar. For this reason data from only selected configurations are presented graphically to illustrate general features. Detailed comparisons may be made using the tabulated data. Configurations for takeoff rotor blade setting with takeoff nozzle area are presented in figures 12 to 17 as typical. The configuration for reverse thrust is significantly different, and the data from this are presented in figures 18 to 22. Graphical data presented consist of standard-day, one-third-octave band sound pressure levels at a 30.5-meter (100-ft) radius for all angles and speeds. Power levels and overall sound pressure levels are presented, as are perceived noise on a 152.5 meters (500 ft) and 304.8 meters (1000 ft) sideline.

Narrow-band data. - Only representative samples of narrow-band spectra are presented to illustrate their general character. Spectra at or near the peak noise angles front and rear at 100 and 120 percent speeds have been selected. These are presented for takeoff configurations in figures 23 and 24, respectively. Also presented are those for reverse thrust in figure 25.

CONCLUDING REMARKS

In this report acoustic and some aerodynamic data for a 1.83-meter (6-ft) diameter fan suitable for a quiet engine for short-takeoff-and-landing (STOL) aircraft are documented. The 1.2 pressure ratio fan stage, designated QF-9, was designed for low speed with a low number of rotor and stator blades. The low number of rotor blades allows the QF-9 rotor to have an adjustable pitch feature which can be used for thrust reversal. The reduced number of rotor blades lowers the blade-passage tone to lower frequencies where it is less objectionable to the human ear.

Acoustical tests were conducted over a range of aerodynamic operating conditions with no suppressive liners. Complete far-field noise results obtained in the tests are presented without interpretation. The data are presented in tabular and graphical form in a format intended to be useful to the majority of interested users. These results, and the results from other full-scale fans in the program, should contribute to a better understanding of fan noise generation.

Lewis Research Center,
National Aeronautics and Space Administration,
Cleveland, Ohio, November 7, 1974,
505-03.

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3. Montegani, Francis J.: Noise Generated by Quiet Engine Fans I - Fan B. NASA TM X-2528, 1972.
4. Noise Standards: Aircraft Type and Airworthiness Certification. Federal Aviation Regulations, Pt. 36, 1973.

TABLE I. - AERODYNAMIC DESIGN PARAMETERS

Overall total pressure ratio	1.20
Corrected rotor tip speed, m/sec (ft/sec)	213.3 (700)
Predicted overall efficiency, percent	90.2
Corrected inlet weight flow, kg/sec (lb/sec)	403 (889)
Corrected inlet specific weight flow, kg/sec-m^2 (lb/sec-ft^2)	194.8 (39.9)
Stage thrust, N (lb)	71 705 (16 120)
Work coefficient	0.369
Rotor head-rise coefficient	0.348
Stage head rise coefficient	0.334
Rotor tip diameter, m (ft)	1.829 (6.0)

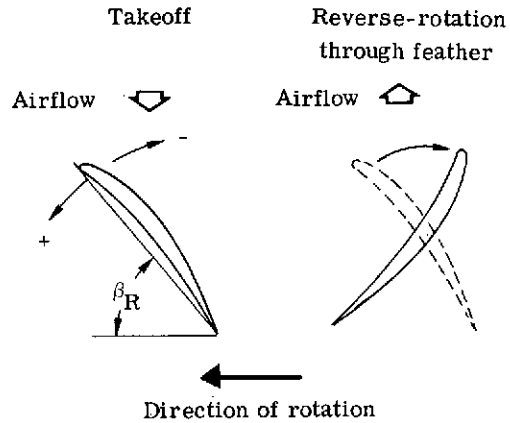
TABLE II. - BLADE DESIGN PARAMETERS

	Rotor	Stator
Number of blades	15	11
Chord, cm (in.)		
Hub	21.5 (8.46)	38.1 (15.0)
Tip	34.3 (13.5)	38.1 (15.0)
Solidity		
Hub	1.219	1.406
Tip	0.893	0.714
D-factor		
Hub	0.530	0.512
Maximum	0.530	0.512
Tip	0.431	0.363
Camber angle, deg		
Hub	44.89	52.50
Tip	18.40	56.40
Chord angle, deg, relative to fan axis		
Hub	5.61	16.30
Tip	41.14	11.32
Mean aspect ratio	1.70	1.23
Rotor inlet hub-tip radius ratio	0.460	-----
Tip relative inlet Mach number	0.865	-----
Material	Plastic and titanium	Aluminum
Corrected speed, rpm	2227.0	-----
Blade passage frequency, Hz	557	-----
Mean rotor-stator separation, rotor chords	2	-----

TABLE III. - TEST CONFIGURATIONS

Purpose of test	Configuration description		Data table
	Rotor setting angle and condition	Nozzle area, percent of takeoff	
Far-field noise	Takeoff (design)	100	V
	↓	95	VI
		92	VII
		105	VIII
Far-field noise	Approach	100	IX
	↓	95	X
		92	XI
		105	XII
Far-field noise	Takeoff plus 7°	100	XIII
	Takeoff minus 5°	100	XIV
	Approach plus 5°	100	XV
Far-field noise, overspeed	Takeoff plus 5°	100	XVI
	Takeoff	100	XVII
	Takeoff	92	XVIII
Far-field noise, with blast deflector	Reverse	105	XIX
Far-field noise, without blast deflector	Reverse	105	XX

TABLE IV. - ROTOR BLADE SETTING ANGLES



Rotor setting angle,[a] deg β_R	Condition	Rotor setting angle,[a] deg β_R	Condition
64	Takeoff (design)	69	Takeoff minus 5°
50	Approach	45	Approach plus 5°
57	Takeoff plus 7°	148	Reverse
59	Takeoff plus 5°		

[a]At 75 percent radius from hub.

TABLE V. - FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) 60 Percent speed; fan physical speed, 1331 rpm; fundamental blade passage frequency, 332 hertz

(a-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	96.9	94.9	95.7	97.5	97.9	97.9	98.7	97.9	96.0	96.5	96.9	96.0	97.2	96.7	96.9	98.1	97.2	114.9
63	92.7	93.7	94.0	94.7	94.7	95.2	93.0	93.4	92.7	93.5	94.9	95.0	95.5	96.2	96.5	97.6	94.5	112.2
80	96.9	96.0	96.4	96.7	95.7	98.7	97.2	94.4	95.5	95.7	95.2	95.6	96.9	98.7	98.0	98.3	96.6	114.3
100	99.0	99.5	100.2	99.9	97.2	98.2	97.7	97.2	98.2	100.4	99.2	96.8	99.0	101.7	98.5	98.4	98.9	116.6
125	103.4	105.5	104.9	102.9	103.2	101.3	100.5	101.3	100.7	103.0	103.9	101.0	102.5	102.7	101.4	99.9	102.4	120.1
160	102.2	104.4	103.9	101.9	101.2	100.1	99.2	99.9	99.9	100.2	101.9	101.1	101.6	102.1	99.6	98.8	101.1	118.8
200	105.2	106.1	103.9	101.2	99.4	98.2	97.9	99.0	98.4	97.9	98.9	97.5	100.2	100.2	99.1	99.0	100.1	117.8
250	111.9	111.6	109.9	106.6	104.7	103.6	101.4	101.4	102.1	103.6	104.9	104.7	107.4	107.7	105.6	101.4	105.6	123.3
315	122.1	120.1	120.4	120.9	119.8	116.8	114.9	113.3	116.3	116.1	118.8	118.5	117.8	117.6	117.3	114.7	117.9	135.6
400	114.1	114.4	114.3	112.6	111.3	109.1	106.8	106.0	108.3	109.4	110.9	110.5	111.6	110.9	108.4	105.5	110.5	128.2
500	112.0	112.7	112.1	110.5	109.0	106.3	104.7	104.7	105.3	107.0	108.7	107.3	109.8	111.2	108.2	104.6	108.5	126.2
630	114.5	115.5	115.5	115.5	112.8	110.1	109.5	109.8	111.6	111.8	113.0	112.0	115.6	115.8	112.8	108.8	113.0	130.7
800	112.1	113.0	113.5	112.3	110.1	107.3	105.5	106.0	106.8	108.5	110.6	110.2	113.1	113.8	109.5	105.0	110.3	128.0
1000	113.8	114.3	113.2	112.3	110.5	108.0	105.8	106.5	107.3	109.5	111.8	111.8	115.3	115.5	110.5	106.2	111.4	129.1
1250	112.1	112.6	112.1	111.2	110.1	106.9	104.2	104.4	105.2	107.7	109.7	109.3	112.9	113.6	108.7	104.3	109.6	127.3
1600	110.4	111.7	111.2	110.4	108.9	106.1	102.6	102.1	103.6	105.7	108.2	107.5	112.4	112.7	107.9	101.8	108.5	126.2
2000	107.4	110.6	110.4	109.9	107.6	104.6	100.4	100.2	102.1	103.9	106.9	106.2	110.9	110.7	106.1	100.3	107.1	124.8
2500	104.1	109.1	108.3	107.8	105.9	102.9	99.6	98.1	100.4	102.8	105.3	104.5	109.1	108.3	104.9	98.7	105.3	123.0
3150	102.9	108.8	108.1	107.3	105.1	102.6	98.9	97.3	99.8	102.3	104.9	103.9	107.6	108.1	104.1	98.2	104.7	122.4
4000	102.6	108.3	108.0	108.0	105.6	101.6	97.6	96.5	98.6	100.8	103.5	102.8	107.8	107.6	103.8	98.1	104.4	122.1
5000	106.9	106.7	106.7	107.8	104.3	100.3	95.8	94.5	97.0	99.7	102.7	100.8	106.5	105.3	104.2	95.9	103.2	120.9
6300	106.5	108.2	106.3	107.0	103.8	101.3	97.3	93.8	98.5	101.0	104.0	103.0	106.2	107.2	104.2	96.8	103.7	121.4
8000	104.0	108.0	107.4	108.0	104.9	100.7	95.6	94.0	98.0	100.7	103.5	102.2	107.7	106.9	103.0	97.0	104.0	121.7
10000	104.3	106.6	105.8	106.9	103.1	99.8	95.1	92.6	97.3	98.8	102.4	101.0	106.4	105.6	102.6	95.3	102.7	120.4
12500	105.5	106.0	104.8	106.8	103.1	99.0	93.8	91.1	96.1	98.5	102.0	100.7	106.3	104.6	101.6	94.2	102.2	119.9
16000	104.1	105.1	103.9	104.4	101.1	97.2	91.9	89.2	93.5	96.9	100.1	99.7	104.2	103.6	101.3	93.8	100.6	118.3
20000	103.7	103.8	102.7	103.2	99.1	94.8	90.1	88.7	92.0	96.0	98.5	98.0	103.2	102.3	100.3	92.1	99.3	117.0
OVERALL	125.9	125.6	125.2	125.0	123.3	120.5	118.5	117.9	119.8	120.6	122.8	122.3	124.5	124.6	121.9	118.2	122.5	140.2

TABLE V. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) Concluded. 60 Percent speed; fan physical speed, 1331 rpm; fundamental blade passage frequency, 332 hertz

(a-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	65.2	65.2	66.0	67.0	68.2	68.2	69.0	68.2	66.3	66.8	67.2	66.3	67.5	67.0	67.2	68.4
63	63.0	64.0	64.3	65.0	65.0	63.5	63.3	63.7	63.0	63.8	65.2	65.3	65.8	66.5	66.8	67.9
80	65.2	66.3	66.7	67.0	66.0	69.0	67.5	64.7	65.8	66.0	65.5	65.9	67.2	65.0	68.3	68.6
100	65.3	65.8	70.5	70.2	67.5	68.5	68.0	67.5	68.5	70.7	69.5	67.1	65.3	72.0	68.8	68.7
125	73.7	75.8	75.2	73.2	73.5	71.3	70.8	71.3	71.0	73.3	74.2	71.3	72.8	73.0	71.7	70.2
160	72.5	74.7	74.2	72.2	71.5	70.4	69.5	70.2	70.2	70.5	72.2	71.4	71.9	72.4	69.9	69.1
200	75.5	76.4	74.2	71.5	69.7	68.5	68.2	70.2	68.7	68.2	69.2	67.8	70.5	70.5	69.4	69.3
250	82.2	81.9	79.2	76.9	75.0	73.9	71.7	71.7	72.4	73.9	75.2	75.0	77.7	78.0	75.9	71.7
315	92.4	90.4	90.7	91.1	90.1	87.1	85.2	83.6	86.6	86.4	89.1	88.8	88.1	87.9	87.6	85.0
400	84.3	84.6	84.5	82.8	81.5	79.3	77.0	77.0	78.5	79.6	81.1	80.7	81.8	81.1	78.6	75.7
500	82.2	82.9	82.2	80.7	79.2	76.5	74.9	74.9	75.5	77.2	78.9	77.5	80.0	81.4	78.4	74.8
630	84.8	85.7	85.7	85.7	83.0	80.3	79.7	80.0	81.8	82.0	83.2	82.2	85.8	86.0	83.0	79.0
800	82.3	83.5	83.7	82.5	80.3	77.5	75.7	76.2	77.0	78.7	80.8	80.4	83.3	84.0	79.7	75.2
1000	84.0	84.5	83.4	83.0	80.7	78.2	76.0	76.7	77.5	79.7	82.0	82.0	85.5	85.7	80.7	76.4
1250	82.2	82.7	82.2	81.3	80.2	77.0	74.3	74.5	75.3	77.8	79.8	79.4	83.0	83.7	78.8	74.4
1600	80.5	81.8	81.3	80.5	79.0	76.2	72.7	72.2	73.7	75.8	78.3	77.6	82.5	82.8	78.0	71.9
2000	79.4	80.6	80.4	79.9	77.6	74.6	70.4	70.2	72.1	73.9	76.9	76.2	80.9	80.7	76.1	70.3
2500	78.0	79.0	78.2	77.7	75.8	72.8	69.5	68.0	70.3	72.7	75.2	74.4	79.0	78.2	74.8	68.6
3150	77.5	78.5	77.8	77.0	74.8	72.3	68.6	67.0	69.5	72.0	74.6	73.6	77.3	77.8	73.8	67.9
4000	77.1	77.3	77.5	77.5	75.1	71.1	67.1	66.0	68.1	70.3	73.0	72.3	77.3	77.1	73.3	67.6
5000	76.0	75.9	75.9	77.0	73.5	69.5	65.0	63.7	66.2	68.9	71.9	70.0	75.7	74.5	73.4	65.1
6300	75.2	76.9	75.0	75.7	72.5	70.5	66.0	62.5	67.2	69.7	72.7	71.7	74.9	75.9	72.9	65.5
8000	76.1	76.1	75.5	76.1	73.0	68.8	64.6	62.1	66.1	68.8	71.6	70.3	75.7	75.0	71.1	65.1
10000	73.4	73.7	72.9	74.0	70.2	66.9	62.2	59.7	64.4	65.9	69.5	68.1	73.5	72.7	69.7	62.4
12500	71.2	71.7	70.5	72.5	68.8	64.7	59.6	56.9	61.9	64.2	67.7	66.4	72.0	70.3	67.3	59.9
16000	67.9	68.9	67.7	68.3	65.0	61.1	55.7	53.0	57.4	60.7	63.9	63.5	68.0	67.4	65.1	57.6
20000	64.8	64.9	63.8	64.3	60.2	56.0	51.2	49.8	53.1	57.1	59.6	59.1	64.3	63.4	61.4	53.2
OVERALL	99.8	99.5	99.3	99.0	93.4	90.6	88.7	88.1	90.0	90.8	92.9	92.4	94.9	94.6	91.9	88.4
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	69.8	77.6	81.7	84.2	84.5	82.9	81.4	80.9	83.3	84.1	86.0	84.6	85.5	83.7	78.2	70.2
304.8 M	63.4	69.3	73.6	76.3	76.8	75.4	74.0	73.6	75.9	76.7	78.5	77.0	77.4	75.4	70.1	61.7

TABLE V. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) 70 Percent speed; fan physical speed, 1553 rpm; fundamental blade passage frequency, 388 hertz

(b-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	105.9	99.1	97.4	99.9	101.4	100.3	101.3	97.4	98.4	98.9	97.9	97.9	100.8	100.8	100.3	105.0	100.1	117.8
63	94.6	97.5	97.0	95.5	99.6	96.6	95.3	95.3	95.3	97.3	96.1	96.7	99.8	102.0	101.0	105.5	98.4	116.1
80	96.8	98.3	97.6	96.4	99.3	96.6	95.4	95.6	95.9	96.9	98.1	97.0	100.4	101.9	102.1	106.0	98.8	116.5
100	103.6	104.1	103.1	102.5	101.1	103.1	100.3	98.5	100.8	101.6	101.8	101.2	104.0	104.1	104.5	106.3	102.4	120.1
125	105.2	106.4	105.4	105.7	105.7	102.9	103.7	103.1	104.2	104.9	105.6	104.0	105.1	105.7	105.7	107.0	104.9	122.6
160	106.0	106.6	106.3	104.7	104.3	102.8	102.3	102.7	103.7	104.2	105.0	104.7	105.7	105.3	103.2	105.4	104.4	122.1
200	107.2	106.9	105.4	102.9	102.4	100.6	99.7	99.6	99.9	100.6	101.6	101.3	103.7	103.2	103.1	104.8	102.4	120.1
250	111.1	110.2	108.9	108.1	106.8	105.1	102.9	102.9	104.3	105.9	107.4	107.3	109.6	108.8	106.4	106.3	107.0	124.7
315	118.0	117.2	115.2	112.7	113.2	111.7	109.0	107.3	107.8	109.3	111.3	111.4	112.0	112.2	108.3	108.7	111.7	129.4
400	126.1	126.5	123.6	124.5	127.6	126.3	123.0	117.8	117.0	120.3	123.8	125.2	123.8	125.0	119.1	119.2	124.2	141.9
500	115.1	114.8	115.1	113.8	112.6	110.3	108.9	108.3	109.8	111.9	112.6	112.0	113.6	113.6	110.1	109.8	112.1	129.8
630	115.9	115.0	115.3	113.5	111.8	109.2	107.3	107.5	109.7	111.5	112.5	112.3	115.5	115.7	110.0	109.4	112.3	130.0
800	119.1	119.4	119.9	118.7	117.2	115.4	114.2	114.9	116.9	117.1	118.6	119.2	120.6	121.9	116.7	115.8	118.1	135.8
1000	115.3	115.9	115.0	114.3	112.9	110.8	108.8	108.8	110.4	112.6	114.6	114.2	116.6	115.4	110.3	110.5	113.3	131.0
1250	116.1	117.1	117.3	115.3	114.8	111.4	109.6	109.8	110.9	112.9	114.8	116.4	118.3	117.3	112.1	111.7	114.6	132.3
1600	116.8	115.3	115.8	115.1	113.9	110.9	107.3	107.1	109.3	111.4	113.3	113.2	117.6	116.8	110.9	109.0	113.3	131.0
2000	113.6	114.1	114.7	113.9	112.7	109.9	105.9	105.1	107.1	109.7	111.6	111.2	115.7	114.7	109.4	107.3	111.7	129.4
2500	111.9	112.5	112.7	112.4	111.2	108.5	104.5	103.2	105.4	108.2	110.5	110.0	113.5	112.9	107.9	106.3	110.0	127.7
3150	111.4	111.4	111.9	111.4	110.1	107.9	104.4	102.1	104.8	107.4	109.8	108.9	112.1	111.9	106.6	105.5	109.1	126.8
4000	111.4	111.7	112.0	112.4	110.5	107.2	102.7	101.5	103.9	106.2	108.2	108.1	111.9	110.7	105.9	104.9	108.7	126.4
5000	110.0	109.6	110.2	111.5	109.0	105.5	101.0	99.0	101.8	104.5	107.5	106.1	111.0	108.5	106.2	102.6	107.3	125.0
6300	110.0	111.0	109.9	110.8	108.3	107.4	102.4	98.8	103.9	106.0	108.4	107.7	110.2	110.4	106.3	103.8	107.7	125.4
8000	111.0	111.2	110.7	111.2	108.9	106.2	101.2	99.0	103.4	105.5	107.7	106.7	111.5	110.0	105.7	103.7	107.8	125.5
10000	109.5	109.2	109.0	110.4	107.2	105.3	99.5	97.7	102.3	104.0	107.0	105.7	110.4	108.8	105.5	102.4	106.6	124.3
12500	109.1	108.6	107.7	109.5	106.9	104.2	98.5	96.7	101.2	103.6	106.2	105.8	110.4	107.9	104.9	101.3	106.0	123.7
16000	107.4	107.5	106.7	107.4	104.9	102.0	95.6	94.2	99.2	101.9	104.4	103.7	108.1	106.9	104.8	100.8	104.3	122.0
20000	106.7	105.8	105.3	106.1	103.1	99.6	95.0	93.5	97.5	100.8	102.6	102.5	107.2	105.3	103.7	99.1	102.9	120.6
OVERALL	120.4	120.7	120.6	120.3	120.3	117.7	114.7	111.6	112.8	114.8	117.2	118.0	118.5	119.2	114.1	113.8	117.3	135.0

TABLE V. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) Concluded. 70 Percent speed; fan physical speed, 1553 rpm; fundamental blade passage frequency, 388 hertz

(b-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	71.2	69.4	67.6	70.2	71.7	70.6	71.6	67.7	68.7	69.2	68.2	68.2	71.1	71.1	70.6	75.3
63	66.9	67.3	67.5	65.1	65.9	66.3	65.6	65.6	65.6	67.6	66.4	67.0	70.1	72.3	71.3	75.8
80	67.1	68.6	67.9	66.7	65.6	66.9	65.7	65.9	66.2	67.2	68.4	67.3	70.7	72.2	72.4	76.3
100	73.9	74.1	73.4	72.8	71.4	73.4	70.6	68.8	71.1	71.9	72.1	71.5	74.3	74.4	74.8	76.6
125	75.5	76.7	75.7	76.0	76.0	73.2	74.9	73.4	74.5	75.2	75.9	74.3	75.4	76.0	76.0	77.3
160	76.3	76.3	76.5	75.2	74.6	73.1	72.6	73.0	74.0	74.5	75.3	75.0	76.2	75.6	73.5	75.7
200	77.5	77.2	75.7	73.2	72.7	70.9	70.0	69.0	70.2	70.9	71.9	71.6	74.0	73.5	73.4	75.1
250	81.4	81.1	79.2	78.4	77.1	75.4	73.2	73.2	74.6	76.2	77.7	77.6	79.5	79.1	76.7	76.6
315	88.3	87.5	85.5	83.6	83.5	82.3	79.3	77.6	78.1	79.6	81.6	81.7	82.3	82.5	78.6	79.0
400	93.3	96.7	93.8	94.7	97.8	96.5	93.2	88.0	87.2	90.5	94.0	95.4	94.0	95.2	89.3	89.4
500	89.3	86.0	85.3	94.6	82.9	81.3	79.1	78.5	80.0	82.1	82.8	82.2	83.8	82.8	80.3	80.0
630	85.2	85.2	85.5	83.7	82.3	79.4	77.5	77.7	79.9	81.7	82.7	82.5	85.7	85.9	80.2	79.6
800	89.5	85.6	90.1	88.9	87.4	85.6	84.4	85.1	87.1	87.3	88.8	85.4	90.8	92.1	86.9	86.3
1000	85.5	86.1	85.8	84.5	83.1	81.3	79.0	79.0	80.6	82.8	84.4	84.4	86.8	85.6	80.5	80.7
1250	86.2	87.2	87.4	85.9	84.9	81.5	79.7	79.9	81.0	83.0	84.9	86.5	88.4	87.4	82.2	81.8
1600	84.9	85.4	85.9	85.2	84.0	81.3	77.4	77.2	79.4	81.5	83.4	83.3	87.7	86.9	81.0	79.1
2000	83.6	84.1	84.7	83.9	82.7	79.9	75.9	75.1	77.1	79.7	81.6	81.2	85.7	84.7	79.4	77.3
2500	81.8	82.4	82.1	82.3	81.1	78.4	74.4	73.1	75.3	78.1	80.4	79.9	83.4	82.8	77.8	76.2
3150	81.1	81.1	81.6	81.1	79.8	77.6	74.1	71.8	74.5	77.1	79.5	78.6	81.8	81.6	76.3	75.2
4000	80.9	81.2	81.5	81.9	80.0	76.7	72.2	71.0	73.4	75.7	77.7	77.6	81.4	80.2	75.4	74.4
5000	79.2	79.0	79.4	80.7	78.2	74.7	70.2	68.2	71.0	73.7	76.7	75.3	80.2	77.7	75.4	71.8
6300	78.7	79.7	79.6	79.2	77.0	76.1	71.1	67.5	72.6	74.7	77.1	76.4	78.5	79.1	75.0	72.5
8000	79.1	79.3	78.2	79.3	77.0	74.3	69.3	67.1	71.5	73.6	75.8	74.8	79.5	78.1	73.8	71.8
10000	76.6	76.3	76.1	77.5	74.3	72.4	66.6	64.8	69.4	71.1	74.1	72.8	77.5	75.9	72.6	69.5
12500	74.3	74.3	73.4	75.2	72.6	70.3	64.2	62.5	66.9	69.3	71.9	71.5	76.1	72.6	70.6	67.0
16000	71.2	71.7	70.5	71.2	68.8	65.9	60.4	58.1	63.1	65.7	68.2	67.5	71.9	70.7	68.6	64.6
20000	67.8	68.9	65.4	67.2	64.2	60.8	55.1	54.6	58.6	61.9	63.7	63.6	68.3	66.4	64.8	60.2
OVERALL	95.5	95.3	100.9	98.3	95.5	97.9	94.9	92.0	92.9	94.9	97.3	96.1	98.9	99.3	94.1	93.9
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	76.1	82.6	87.9	88.2	90.9	90.5	88.0	85.6	86.6	89.0	91.0	90.7	90.5	88.9	81.0	76.5
304.8 M	74.8	74.3	80.5	80.4	83.4	83.0	80.8	78.3	79.2	81.6	83.6	83.3	82.8	81.1	72.9	68.1

TABLE V. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO; QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) 86 Percent speed; fan physical speed, 1902 rpm; fundamental blade passage frequency, 475 hertz

(c-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) IN 1.0 METER RADIUS																
50	101.6	97.5	99.8	100.0	101.5	101.8	102.6	103.1	103.0	104.3	105.1	102.7	104.8	105.8	107.1	107.8	103.7	121.4
63	104.2	102.8	100.3	99.6	100.8	103.1	105.1	102.3	103.6	103.8	104.8	101.1	105.6	106.3	107.5	109.2	104.4	122.1
80	100.6	100.2	99.2	98.4	99.7	100.4	100.7	100.9	100.6	102.7	104.4	102.8	105.9	107.4	108.9	109.8	103.7	121.4
100	106.3	106.3	105.4	104.8	103.3	104.6	104.8	104.9	105.6	107.8	108.4	106.7	108.8	108.8	110.1	109.8	106.9	124.6
125	111.2	112.3	112.3	109.7	107.7	106.8	105.7	108.9	108.7	110.3	111.8	109.6	111.5	110.5	110.7	109.4	109.9	127.6
160	109.2	109.5	109.5	106.7	106.8	107.0	106.2	107.7	107.8	109.0	109.5	109.8	109.8	109.0	108.8	107.7	108.5	126.2
200	116.8	111.3	110.5	109.6	107.0	106.1	104.3	105.3	105.3	105.8	107.6	106.2	108.3	107.8	108.5	107.5	107.4	125.1
250	114.7	116.4	113.4	112.0	111.0	109.2	107.7	109.5	110.2	111.5	113.2	111.6	113.5	112.9	110.5	108.6	111.7	129.4
315	118.5	117.6	116.0	114.5	111.6	109.5	109.5	110.0	110.8	112.0	113.8	112.2	114.0	113.8	111.0	110.0	112.8	130.5
400	124.3	122.7	123.0	121.8	120.3	116.2	115.5	114.7	116.0	118.3	119.7	118.1	121.2	120.0	115.5	113.6	119.2	136.9
500	125.5	131.0	130.5	131.2	130.4	126.5	123.7	121.2	125.0	127.4	127.5	124.6	130.5	129.5	124.5	122.6	128.4	146.1
630	119.0	119.5	119.5	118.4	116.5	113.0	112.2	113.0	115.0	117.5	118.7	117.3	119.9	118.5	113.2	111.3	117.0	134.7
800	119.4	119.7	120.2	119.9	117.2	115.2	114.4	115.1	116.4	118.6	119.9	118.7	121.6	121.1	114.7	112.3	118.3	136.0
1000	121.1	123.1	123.1	123.1	121.9	120.9	117.1	118.1	120.1	121.3	122.9	122.7	125.8	123.9	118.1	116.5	121.9	139.6
1250	118.7	119.9	120.3	119.1	117.1	114.6	113.3	114.1	115.8	117.6	119.8	118.7	121.4	118.6	113.9	111.3	117.8	135.5
1600	119.7	120.4	121.2	120.5	118.5	116.4	115.7	114.2	115.7	117.5	119.5	118.6	123.4	120.0	114.2	111.2	118.6	136.3
2000	116.4	119.0	120.4	119.5	118.0	115.4	112.5	112.7	114.5	116.2	118.4	118.1	121.7	119.2	113.4	110.4	117.6	135.3
2500	117.6	117.3	118.6	118.8	116.6	114.6	111.8	111.1	112.8	115.1	117.1	116.1	119.6	117.1	112.0	108.7	116.0	133.7
3150	116.4	117.4	117.9	118.2	116.2	114.9	112.0	110.4	112.0	114.7	116.5	115.8	117.9	116.9	111.0	108.1	115.4	133.1
4000	117.4	117.4	117.7	118.0	115.7	113.4	110.2	109.2	111.2	113.0	114.7	114.3	117.5	115.2	110.0	106.9	114.5	132.2
5000	116.2	115.9	116.4	117.9	113.9	111.4	108.2	107.0	108.9	110.9	113.5	112.2	116.2	113.2	110.2	104.6	113.0	130.7
6300	114.9	116.2	114.9	116.2	113.2	112.9	109.2	106.2	110.6	112.0	114.5	113.4	115.5	114.4	109.4	105.8	113.1	130.8
8000	115.8	116.0	115.7	116.8	113.4	111.4	107.7	106.6	110.2	111.2	113.5	112.7	116.6	114.4	109.1	105.2	113.0	130.7
10000	113.5	114.0	113.5	115.2	111.3	109.6	105.5	105.1	109.0	109.8	113.2	111.8	115.3	112.8	109.0	103.7	111.6	129.3
12500	112.4	113.1	112.2	114.4	110.0	108.9	104.4	103.9	107.9	109.4	112.6	111.5	115.3	112.1	108.8	103.0	111.0	128.7
16000	110.5	112.1	110.8	111.5	108.4	106.1	101.9	101.8	105.8	107.8	110.8	109.9	113.6	111.7	108.8	102.8	109.3	127.0
20000	110.2	110.6	109.3	110.1	106.5	103.6	99.6	100.3	104.3	106.5	109.6	108.7	112.5	110.3	109.0	101.1	107.8	125.5
OVERALL	137.8	134.2	135.6	134.2	132.8	129.4	127.3	126.5	128.9	131.0	132.1	130.6	134.6	133.1	128.3	126.3	131.8	149.5

TABLE V. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) Concluded. 86 Percent speed; fan physical speed, 1902 rpm; fundamental blade passage frequency, 475 hertz

(c-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 20.5 METER RADIUS															
50	71.8	67.8	70.1	70.3	71.8	72.1	72.9	73.4	73.3	74.6	75.4	73.0	75.1	76.1	77.4	78.1
63	75.1	73.1	70.6	69.9	71.1	73.4	76.4	72.3	73.9	74.1	75.1	71.4	75.9	76.6	77.8	79.5
80	70.9	70.5	69.5	68.7	70.0	70.7	71.0	71.2	70.9	73.0	74.7	73.1	76.2	77.7	79.2	80.1
100	77.4	76.6	75.7	75.1	73.6	74.9	75.1	75.2	75.9	78.1	78.7	77.0	79.1	79.1	80.4	80.1
125	81.9	82.6	82.6	80.0	78.0	77.1	77.0	79.1	79.0	80.6	82.1	79.9	81.8	80.8	81.0	79.7
160	79.5	79.8	79.8	79.0	77.1	77.3	76.5	78.0	78.1	79.3	79.8	79.9	80.1	79.3	79.1	78.0
200	81.1	82.1	80.9	79.3	77.3	76.4	74.6	75.6	75.6	76.1	77.9	76.5	78.6	78.1	78.8	77.8
250	85.0	86.7	83.7	82.3	81.3	79.5	78.0	79.8	80.5	81.8	83.5	81.9	83.8	83.2	80.8	78.9
315	88.7	87.5	86.3	84.6	81.9	79.3	79.8	80.3	81.1	82.3	84.1	82.5	84.3	84.1	81.3	80.3
400	90.0	92.9	93.2	92.0	90.5	86.4	85.7	84.9	86.2	88.5	89.9	88.3	91.4	90.2	85.7	83.8
500	103.7	101.2	103.7	101.4	100.3	95.7	93.9	91.4	95.2	97.6	97.7	94.8	100.7	99.7	94.7	92.8
630	90.1	89.7	89.7	88.6	86.7	83.2	82.4	83.2	85.2	87.7	88.9	87.5	90.1	88.7	83.4	81.5
800	89.6	89.9	93.4	89.1	87.4	85.4	84.6	85.3	86.6	88.8	90.1	88.9	91.8	91.3	84.9	82.5
1000	91.9	92.3	94.3	93.3	92.1	91.1	87.3	88.3	90.3	91.5	93.1	92.9	96.0	94.1	88.3	86.7
1250	88.7	89.9	90.4	89.2	87.2	84.7	83.4	84.2	85.9	87.7	89.9	88.8	91.9	88.7	84.0	81.4
1600	91.8	90.5	91.3	90.6	88.6	86.5	83.8	84.3	85.8	87.6	89.6	88.7	93.5	90.1	84.3	81.3
2000	88.4	89.3	90.4	89.9	88.0	85.4	82.5	82.7	84.5	86.2	88.4	88.1	91.7	89.2	83.4	80.4
2500	84.9	87.7	89.5	88.4	86.5	84.5	81.7	81.0	82.7	85.0	87.0	86.0	89.9	87.3	81.9	78.6
3150	86.1	87.1	87.6	87.9	85.9	84.6	81.7	80.1	81.7	84.4	86.2	85.5	87.6	86.6	80.7	77.8
4000	85.5	86.9	87.2	87.5	85.2	82.9	79.7	78.7	80.7	82.5	84.2	83.8	87.0	84.7	79.5	76.4
5000	84.4	84.7	85.7	86.7	83.1	80.5	77.4	76.2	78.1	80.1	82.7	81.4	85.4	82.4	79.4	73.8
6300	83.6	84.9	83.6	84.9	81.9	81.6	77.9	74.9	79.3	80.7	83.2	82.1	84.2	83.1	78.1	74.5
8000	83.7	84.1	83.8	84.7	81.5	79.5	75.8	74.7	78.3	79.3	81.6	80.8	84.7	82.5	77.2	73.3
10000	80.6	81.1	80.6	82.3	77.4	76.7	72.6	72.2	76.1	76.9	80.2	78.9	82.4	79.9	76.1	70.8
12500	76.2	78.8	77.9	80.2	76.6	74.7	70.2	69.7	73.7	75.1	78.3	77.2	81.6	77.8	74.5	68.7
16000	74.3	75.5	74.6	75.5	72.3	70.0	65.8	65.7	69.7	71.6	74.7	73.7	77.4	75.5	72.6	66.6
20000	71.5	71.1	70.4	71.2	67.6	64.8	60.8	61.4	65.4	67.6	69.7	69.8	73.6	71.4	69.1	62.2
OVERALL	107.0	104.3	105.7	104.2	102.9	99.4	97.4	96.6	99.0	101.0	102.1	100.6	104.6	103.1	98.2	96.4
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	81.3	87.7	92.8	94.1	94.6	92.6	91.4	90.8	93.5	95.4	96.1	93.5	96.4	93.0	85.6	79.2
304.8 M	77.0	75.7	85.8	86.3	87.0	84.9	83.9	83.3	86.1	88.0	88.5	85.8	88.7	85.2	77.5	70.7

TABLE V. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) 93 Percent speed; fan physical speed, 2063 rpm; fundamental blade passage frequency, 515 hertz

(d-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																
50	103.9	101.0	102.4	102.3	103.0	102.3	102.0	103.4	103.2	104.8	104.4	104.2	107.0	107.8	108.9	111.3	105.0	122.7
63	102.2	104.9	102.8	101.9	101.9	104.0	103.3	101.7	102.9	104.4	103.2	104.4	107.3	108.5	109.7	111.6	105.2	122.9
80	103.2	104.3	101.9	100.2	101.1	102.0	101.6	101.5	101.7	104.2	105.2	105.4	108.6	109.6	111.1	112.4	105.7	123.4
100	110.3	109.1	107.7	109.0	109.1	107.9	105.7	106.9	107.8	109.4	110.8	109.7	111.6	112.8	113.3	112.8	109.8	127.5
125	111.2	112.7	112.9	111.2	109.4	109.6	109.1	110.1	111.1	111.7	112.7	111.7	113.9	113.1	112.8	112.1	111.6	129.3
160	112.0	112.3	111.7	110.9	109.4	109.7	108.5	109.9	110.9	111.5	112.5	112.4	113.0	111.5	111.0	110.8	111.2	128.9
200	114.2	113.7	111.4	108.7	108.0	107.3	105.9	106.5	107.0	108.2	109.2	108.8	111.2	111.2	110.3	109.9	109.2	126.9
250	115.4	116.2	115.0	113.6	112.7	112.0	110.0	110.0	111.6	113.0	113.6	113.6	116.0	114.8	112.1	110.7	113.2	130.9
315	117.8	117.7	116.9	114.7	113.4	112.7	111.7	113.1	113.7	115.6	116.1	115.9	117.1	114.6	111.8	110.6	114.8	132.5
400	120.4	121.4	121.5	118.1	116.4	115.3	114.0	114.8	115.9	117.4	118.1	117.9	120.0	117.9	113.5	112.8	117.5	135.2
500	124.3	124.7	123.4	123.2	122.9	120.7	120.7	121.0	121.0	121.6	121.1	120.4	121.1	120.2	118.4	116.5	120.0	137.8
630	121.9	120.4	121.4	120.5	118.8	117.1	116.1	117.1	118.8	120.8	120.8	120.7	123.8	121.6	116.1	114.7	120.1	137.8
800	119.5	120.9	121.1	119.2	118.5	116.8	116.8	117.7	120.0	121.5	121.8	121.5	124.5	121.5	115.3	113.6	120.3	138.0
1000	124.3	124.8	124.8	123.9	124.3	121.3	120.4	121.1	122.1	123.3	125.4	127.3	127.0	123.3	118.4	116.5	124.0	141.7
1250	119.7	121.0	121.7	120.7	119.1	117.1	115.7	117.0	118.9	120.1	121.4	121.5	123.2	119.7	115.1	113.2	119.8	137.5
1600	121.2	122.2	123.2	123.1	121.6	120.2	117.2	118.6	119.4	120.6	121.9	122.4	126.9	121.6	116.4	113.4	121.6	139.3
2000	120.1	121.4	121.4	121.6	120.5	118.7	115.7	115.7	117.4	118.9	120.1	120.5	124.4	120.2	115.0	112.0	119.8	137.5
2500	118.8	119.5	120.2	120.6	119.2	117.6	115.0	114.1	116.0	117.5	119.3	119.1	122.3	118.8	113.6	110.7	118.4	136.1
3150	118.3	119.1	119.6	119.9	118.3	117.1	114.9	113.5	115.6	117.4	118.9	118.3	120.8	117.9	112.6	109.9	117.7	135.4
4000	117.1	118.9	119.2	120.1	118.2	116.0	113.2	112.7	114.6	116.1	117.5	117.3	120.9	117.5	112.1	109.0	117.1	134.8
5000	116.7	116.9	117.4	118.7	116.0	113.7	111.0	110.4	112.1	113.7	116.0	114.8	119.4	115.0	112.1	106.7	115.2	132.9
6300	116.1	117.6	116.6	117.7	114.7	115.0	111.4	109.5	113.5	114.9	116.6	116.1	118.4	116.4	111.7	107.8	115.3	133.0
8000	116.6	117.7	117.1	117.8	115.0	113.4	109.7	109.5	113.1	114.1	116.1	115.0	119.4	116.0	111.1	107.4	115.1	132.8
10000	115.1	115.5	114.9	116.4	113.4	111.9	107.8	108.1	112.2	112.9	115.3	113.5	118.3	114.6	111.0	106.1	113.8	131.5
12500	114.9	114.4	113.9	115.7	112.3	111.2	105.8	107.2	111.3	112.6	114.8	113.7	118.4	114.2	110.6	105.1	113.3	131.0
16000	111.5	112.0	112.1	112.6	109.7	108.3	104.1	104.6	109.0	111.1	113.1	112.2	116.2	113.5	110.7	104.5	111.4	129.1
20000	110.7	110.5	110.3	110.9	107.5	105.2	102.0	103.5	107.3	109.6	111.1	111.1	114.8	112.4	110.1	103.2	109.8	127.5
OVERALL	124.4	125.7	125.0	123.7	123.0	121.1	120.0	120.4	121.4	122.5	123.3	123.9	126.6	124.9	129.4	128.0	123.1	150.8

TABLE V. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) Concluded. 93 Percent speed; fan physical speed, 2063 rpm; fundamental blade passage frequency, 515 hertz

(d-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	73.8	71.3	72.7	72.6	73.3	72.6	72.3	73.7	73.5	75.1	74.7	74.5	77.2	76.1	79.2	81.6
63	72.5	74.5	73.1	72.2	72.2	74.3	73.6	72.0	73.2	74.7	73.5	74.7	77.6	78.8	80.0	81.9
80	73.5	74.3	72.2	70.5	71.4	72.3	71.9	71.8	72.0	74.5	75.5	75.7	78.9	79.9	81.4	82.7
100	80.6	79.4	79.0	79.6	79.4	78.2	76.0	77.2	78.1	79.7	81.1	80.0	81.9	83.1	83.6	83.1
125	80.5	83.0	83.2	81.5	79.7	79.9	79.4	80.4	81.4	82.0	83.0	82.0	84.2	83.4	83.1	82.4
160	82.3	82.6	82.0	81.2	79.7	80.0	78.8	80.2	81.2	81.8	82.8	82.7	83.3	81.8	81.3	81.1
200	83.5	84.0	81.7	79.0	78.3	77.6	76.2	76.8	77.3	78.5	79.5	79.1	81.5	81.5	80.6	80.2
250	86.1	86.5	85.3	83.9	83.0	82.3	80.3	80.3	81.9	83.3	83.9	83.9	86.3	85.1	82.4	81.0
315	89.1	88.0	87.2	85.0	83.7	83.0	82.0	83.4	84.0	85.9	86.4	86.2	87.4	84.9	82.1	80.9
400	90.6	91.6	91.7	88.2	86.6	85.5	84.2	85.0	86.1	87.6	88.3	88.1	90.2	88.1	83.7	83.0
500	101.1	102.9	100.6	98.4	99.1	96.9	95.9	97.2	97.2	97.8	97.3	95.6	101.8	102.3	95.4	94.6
630	92.1	93.6	91.8	90.7	89.0	87.3	86.3	87.3	89.0	91.0	91.0	90.9	94.0	91.8	86.3	84.9
800	90.8	91.0	91.3	89.5	88.5	87.0	87.0	87.9	90.2	91.7	92.0	91.7	94.7	91.7	85.5	83.8
1000	94.5	95.0	97.0	94.0	94.5	91.5	90.6	91.3	92.3	93.5	95.6	97.5	97.2	93.5	88.6	86.7
1250	89.8	91.1	91.8	90.3	89.2	87.2	85.8	87.1	89.0	90.2	91.5	91.6	93.3	89.8	85.2	83.3
1600	91.3	92.3	93.2	93.2	91.7	90.3	87.3	88.7	89.5	90.7	92.0	92.5	97.0	91.7	86.5	83.5
2000	90.1	91.4	91.6	91.6	90.5	88.7	85.7	85.7	87.4	88.9	90.1	90.5	94.4	90.2	85.0	82.0
2500	88.4	89.4	90.1	90.5	89.1	87.5	84.9	84.0	85.9	87.4	89.2	89.0	92.2	88.7	83.5	80.6
3150	88.0	88.9	89.3	89.6	88.2	86.8	84.6	83.2	85.3	87.1	88.6	88.0	90.5	87.6	82.3	79.6
4000	87.6	88.4	88.7	89.6	87.7	85.5	82.7	82.2	84.1	85.6	87.0	86.8	90.4	87.0	81.6	78.5
5000	85.9	86.1	86.6	87.9	85.2	82.9	80.2	79.6	81.3	82.9	85.2	84.0	88.6	84.2	81.3	75.9
6300	84.8	86.3	85.3	86.4	83.4	83.7	80.1	78.2	82.2	83.6	85.3	84.8	87.1	85.1	80.4	76.5
8000	84.7	85.8	85.2	85.9	83.1	81.4	77.8	77.6	81.2	82.2	84.2	83.1	87.5	84.1	79.2	75.5
10000	82.2	82.6	82.0	83.5	80.2	79.0	74.9	75.2	79.3	80.0	82.4	81.0	85.4	81.7	78.1	73.2
12500	79.7	80.1	79.6	81.5	78.1	77.0	72.6	73.0	77.0	78.3	80.5	79.4	84.1	79.9	76.3	70.8
16000	76.3	76.7	75.9	76.5	73.6	72.2	68.0	68.5	72.9	74.9	76.9	76.0	80.1	77.3	74.5	68.3
20000	71.9	71.7	71.4	72.0	68.6	66.4	63.1	64.6	68.4	70.7	72.2	72.2	75.5	73.5	71.2	64.3
OVERALL	104.4	105.8	105.0	103.6	103.1	101.1	100.1	100.5	101.4	102.5	103.3	103.9	106.5	104.9	99.4	98.1
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	79.0	88.7	92.1	93.6	95.0	94.5	94.1	94.9	96.0	97.0	97.2	96.7	98.4	95.0	86.7	81.0
304.8 M	69.4	80.2	83.9	85.5	87.2	86.8	86.7	87.5	88.5	89.5	89.5	89.1	90.6	87.2	78.6	72.6

TABLE V. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(e) 100 Percent speed; fan physical speed, 2218 rpm; fundamental blade passage frequency, 554 hertz

(e-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
	106.7	101.7	100.0	104.0	105.3	105.0	104.4	105.3	106.5	106.8	106.4	108.5	108.5	110.5	111.8	112.8	107.3	125.0
	102.9	104.0	102.0	103.1	104.6	102.5	103.4	103.4	104.0	104.9	105.4	106.8	109.4	110.6	111.8	113.4	106.8	124.5
	107.5	109.9	103.9	103.7	106.7	105.7	104.7	103.2	106.2	106.9	108.2	109.8	111.4	113.7	113.7	115.6	109.1	126.8
	111.7	109.5	109.7	109.5	107.7	108.7	106.6	107.2	109.6	111.0	112.2	112.6	114.0	114.5	114.8	115.2	111.3	129.0
	113.4	115.3	114.4	112.4	111.9	111.9	109.9	112.3	112.9	113.9	115.1	115.5	115.9	115.6	115.5	114.5	113.9	131.6
	116.7	115.9	113.5	113.6	113.4	113.5	111.5	112.7	115.2	116.4	115.1	117.3	115.9	116.1	115.6	114.7	115.1	132.8
	114.2	114.7	111.7	111.3	110.3	112.3	109.2	110.3	110.6	111.1	111.3	111.7	113.6	113.2	112.7	112.0	111.9	129.6
	117.2	115.6	114.3	115.4	114.3	113.1	113.6	111.6	113.2	114.5	116.2	117.2	118.3	117.3	114.3	112.9	115.2	132.9
	119.5	119.7	118.9	119.7	117.2	116.1	114.6	116.7	117.3	119.5	120.9	119.9	120.1	118.4	114.1	112.6	118.2	135.9
	122.7	123.7	121.3	119.3	118.2	119.9	119.7	116.7	117.6	119.3	120.7	120.2	121.4	119.3	114.5	114.0	118.9	136.6
	127.7	125.5	124.2	123.7	123.2	127.5	128.2	126.9	126.7	126.6	128.2	128.1	127.1	124.6	122.1	120.9	127.2	144.9
	127.3	126.2	124.7	127.6	121.3	124.8	125.9	124.3	125.0	125.9	127.3	126.8	126.5	124.3	121.3	119.3	125.6	143.3
	117.6	124.6	121.6	120.3	119.8	117.4	119.2	119.9	121.7	123.6	124.1	124.2	126.7	123.1	117.4	115.3	122.1	139.8
	125.7	124.3	123.1	124.5	121.9	120.6	121.6	121.7	123.2	124.1	125.7	127.7	127.7	124.4	118.9	117.2	124.2	141.9
	123.9	122.7	124.3	124.9	121.5	120.1	120.5	121.5	122.9	123.4	125.2	127.3	127.1	123.5	119.2	116.4	123.7	141.4
	121.6	122.2	124.1	123.7	122.1	121.2	119.4	120.5	122.4	123.1	124.7	125.5	128.9	122.7	118.1	115.3	123.5	141.2
	120.3	121.5	122.7	121.7	120.2	118.9	117.0	117.6	119.6	121.3	123.1	122.4	126.2	120.7	116.2	113.7	121.3	139.0
	119.7	120.5	121.1	121.0	119.5	117.6	116.1	116.1	118.3	120.3	121.8	122.2	124.3	120.0	115.3	112.6	120.1	137.8
	118.5	119.1	120.7	120.4	118.3	117.6	116.1	115.7	118.0	120.0	121.7	121.7	122.8	119.5	114.5	111.9	119.5	137.2
	118.0	119.0	120.2	120.3	118.0	116.5	113.9	115.0	116.9	118.7	120.0	120.4	122.5	118.8	113.5	110.9	118.6	136.3
	117.7	117.2	118.4	119.5	115.0	114.6	112.0	112.6	114.5	116.7	118.9	118.0	121.4	118.4	113.6	108.7	116.9	134.6
	115.8	117.7	116.9	117.5	114.3	115.4	112.4	111.3	115.9	117.4	119.4	119.5	120.4	117.9	113.4	109.4	117.0	134.7
	116.9	117.6	117.4	117.5	114.6	114.1	111.2	111.9	115.2	116.7	118.6	118.4	121.3	118.0	112.6	109.3	116.7	134.4
	115.2	115.3	114.9	117.3	112.5	112.3	109.3	110.4	114.3	115.6	117.7	117.2	120.2	116.5	112.6	108.1	115.4	133.1
	114.1	114.3	113.6	115.9	111.4	111.8	108.6	109.5	113.5	115.0	117.3	117.2	120.3	116.0	112.3	106.9	115.0	132.7
	111.9	112.1	111.9	113.1	109.1	108.8	106.1	107.0	111.3	113.3	115.3	115.5	117.9	115.4	112.3	106.5	113.0	130.7
	106.3	105.1	104.9	110.1	106.1	105.7	103.5	106.7	109.5	111.7	113.4	114.1	116.8	114.0	111.7	104.7	111.4	129.1
	134.7	134.9	135.2	135.9	131.9	132.4	132.6	132.3	133.3	134.3	135.8	136.3	137.4	134.0	130.3	128.6	134.3	152.0

TABLE V. - Concluded. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(e) Concluded. 100 Percent speed; fan physical speed, 2218 rpm; fundamental blade passage frequency, 554 hertz

(e-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	75.2	72.1	74.3	74.6	76.1	75.3	74.7	75.6	75.8	76.6	76.7	78.8	78.8	80.3	82.1	83.1
63	72.3	74.3	72.9	73.4	74.9	73.8	73.7	73.7	74.3	75.2	75.7	77.1	79.7	80.9	82.1	83.7
80	78.2	79.2	75.2	73.9	77.0	76.0	75.0	73.5	76.5	77.2	78.5	80.1	81.7	84.0	84.0	85.9
100	80.9	79.3	79.5	79.3	78.0	79.0	76.9	77.5	79.9	81.3	82.5	82.9	84.3	84.8	85.1	85.6
125	83.9	85.3	84.7	82.7	82.2	82.2	80.2	82.3	83.2	84.2	85.4	85.8	86.2	85.9	85.8	84.8
160	86.0	86.2	87.8	83.9	83.7	83.8	81.8	83.0	85.5	86.7	85.4	87.3	86.2	86.4	85.9	85.0
200	84.6	85.5	84.9	81.6	80.5	82.3	79.5	80.3	80.9	81.4	81.6	82.0	83.9	83.5	83.0	82.3
250	87.5	88.7	85.9	85.7	84.3	83.4	80.9	81.9	83.5	84.8	86.5	87.5	88.3	87.3	84.3	83.2
315	85.8	90.0	89.2	87.0	87.5	86.4	84.9	87.0	87.3	89.8	91.2	90.2	90.4	88.7	84.4	82.9
400	90.9	91.9	91.2	89.4	88.4	86.1	85.9	86.9	87.8	89.2	90.9	90.5	91.6	89.2	84.7	84.2
500	97.9	98.7	99.4	100.1	93.4	97.2	98.4	97.1	96.9	96.8	98.4	98.3	97.3	94.8	92.3	91.1
630	96.3	96.5	96.8	98.6	92.0	95.0	96.1	95.0	95.2	96.1	97.2	97.0	97.1	94.5	91.5	89.5
800	89.8	90.8	91.8	90.5	89.0	87.5	88.4	90.1	91.9	93.8	94.3	94.4	96.9	93.3	87.6	85.5
1000	92.9	94.6	95.0	94.8	92.1	90.8	91.8	91.9	93.4	94.3	95.9	97.9	97.9	94.6	89.1	87.4
1250	92.0	93.8	94.3	94.5	91.6	90.2	90.7	91.6	93.0	93.5	95.3	97.4	97.2	93.6	89.3	86.5
1600	91.7	92.3	94.1	93.8	92.2	91.3	89.5	90.6	92.5	93.2	94.8	95.6	95.0	92.8	88.2	85.4
2000	90.0	91.3	92.2	91.7	90.2	88.6	87.0	87.6	89.6	91.3	93.1	93.4	96.2	90.7	86.2	83.7
2500	88.6	90.5	91.0	90.9	89.4	87.3	85.0	86.0	88.2	90.2	91.7	92.1	94.2	89.9	85.2	82.5
3150	88.2	89.9	90.3	90.1	88.0	87.3	85.8	85.4	87.7	89.7	91.4	91.4	92.5	89.2	84.2	81.6
4000	87.7	88.5	89.7	90.0	87.5	85.3	83.4	84.5	86.4	88.2	89.5	89.9	92.0	88.3	83.0	80.4
5000	85.9	86.4	87.4	88.7	84.8	83.8	81.2	81.8	83.7	85.9	88.1	87.2	90.6	85.6	82.8	77.9
6300	84.5	86.4	85.6	86.7	83.0	84.1	81.1	80.2	84.6	86.1	88.1	88.2	89.1	86.6	82.1	78.1
8000	89.0	85.7	85.5	85.6	82.7	82.2	79.3	80.0	83.3	84.8	86.7	86.5	89.4	86.1	80.7	77.4
10000	82.3	82.4	82.1	83.4	79.6	79.4	76.4	77.4	81.4	82.7	84.8	84.3	87.3	83.6	79.7	75.2
12500	79.9	80.1	79.4	81.6	77.5	77.5	74.3	75.2	79.2	80.7	83.0	82.9	86.0	81.7	78.0	72.6
16000	79.4	76.0	75.6	76.0	73.0	72.7	70.0	70.9	75.2	77.1	79.2	79.3	81.8	79.2	76.1	70.3
20000	76.9	70.3	70.9	71.4	67.3	66.9	64.7	66.8	70.6	72.8	74.5	75.2	77.9	75.1	72.8	65.8
OVERALL	103.9	104.9	105.3	105.5	101.9	102.4	102.7	102.4	103.3	104.3	105.7	106.2	107.3	103.9	100.3	98.7
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	78.9	87.5	92.3	95.2	94.5	95.5	96.1	96.4	97.8	98.9	99.9	99.4	100.1	93.9	87.0	80.8
304.8 M	69.2	78.3	84.1	87.2	86.2	87.8	88.7	88.9	90.1	91.0	91.9	91.5	92.0	85.5	78.6	72.2

TABLE VI. - FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 95 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) 60 Percent speed; fan physical speed, 1336 rpm; fundamental blade passage frequency, 334 hertz

(a-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	101.5	96.1	95.5	97.5	96.8	96.5	98.1	96.1	94.6	97.0	98.3	97.1	99.1	96.6	98.3	98.3	97.3	115.0
63	95.9	98.3	96.9	96.9	97.6	95.4	95.4	96.8	98.8	98.8	98.4	99.4	98.8	98.6	100.4	99.2	98.1	115.8
80	93.8	94.6	94.5	92.5	92.3	92.8	93.0	92.3	92.6	94.6	94.8	97.1	98.0	97.3	98.3	98.5	95.1	112.8
100	98.7	97.6	98.6	98.2	96.2	95.7	95.9	95.2	95.7	97.7	97.6	97.7	99.9	98.9	98.9	98.3	97.5	115.2
125	102.8	103.8	103.4	103.3	104.1	101.1	100.3	101.3	101.8	102.4	103.9	102.5	102.6	102.8	102.3	100.5	102.5	120.2
160	102.0	103.6	103.0	101.1	100.3	99.0	99.0	99.6	101.8	102.5	103.1	102.4	101.5	101.3	100.5	99.4	101.4	119.1
200	105.5	105.3	104.5	101.3	98.8	97.2	97.3	99.3	99.2	99.3	100.8	100.4	100.5	100.3	100.7	98.7	100.5	118.2
250	110.2	110.0	109.5	106.7	104.2	103.3	103.8	100.5	101.5	104.0	105.2	104.9	105.7	105.3	105.0	101.1	105.0	122.7
315	122.1	120.6	123.6	122.3	122.0	117.8	115.0	116.0	116.3	116.3	116.1	116.4	117.0	117.3	114.8	115.4	118.5	136.2
400	114.3	114.3	115.0	112.8	111.7	108.7	106.7	106.7	107.8	109.3	110.0	110.3	110.3	110.3	107.7	106.4	110.3	128.0
500	112.7	112.3	111.3	109.8	108.0	105.8	104.5	104.2	104.7	106.7	107.8	108.4	109.3	111.2	108.8	104.9	108.2	125.9
630	115.2	116.4	115.9	113.9	112.9	109.5	108.0	108.5	110.0	112.2	111.2	113.5	116.2	115.7	113.7	109.4	112.9	130.6
800	112.1	113.4	113.1	111.2	109.9	106.6	105.4	105.4	106.6	108.7	109.9	111.2	112.6	113.2	109.6	105.6	110.0	127.7
1000	113.9	114.6	113.0	111.9	110.6	107.7	105.7	106.2	107.2	110.0	111.9	113.8	115.1	115.6	111.7	106.9	111.6	129.3
1250	111.8	112.9	111.6	110.6	109.9	106.9	104.3	103.9	104.9	107.3	109.3	110.2	111.8	113.1	109.3	104.2	109.3	127.0
1600	110.7	111.8	111.2	109.8	108.5	105.8	102.3	101.8	103.5	105.8	107.5	109.1	111.8	112.5	109.0	102.2	108.4	126.1
2000	109.5	110.4	109.7	109.1	107.9	104.0	100.5	99.7	102.0	104.0	105.9	107.0	110.0	110.7	106.0	100.9	106.8	124.5
2500	107.9	108.9	108.1	107.4	106.3	102.6	99.6	98.1	100.1	102.9	104.6	106.0	108.1	108.4	104.6	99.2	105.2	122.9
3150	107.2	108.4	107.6	106.9	105.4	102.4	98.7	97.1	99.1	102.4	104.1	104.8	106.6	106.9	103.9	98.3	104.3	122.0
4000	107.8	108.3	108.4	107.4	105.9	102.1	97.8	95.9	98.6	100.4	102.9	103.9	106.3	106.4	103.8	97.8	104.1	121.8
5000	107.2	106.8	107.8	107.5	105.0	100.5	95.3	94.5	97.5	99.2	102.0	102.1	105.5	104.3	102.6	96.1	103.0	120.7
6300	107.3	108.3	107.1	106.7	104.2	102.9	97.8	93.6	96.8	100.8	103.1	104.2	105.1	106.1	101.8	97.4	103.5	121.2
8000	108.4	108.4	108.3	107.8	104.9	102.6	97.1	94.8	98.8	100.2	102.6	103.4	106.6	106.1	103.3	97.9	104.0	121.7
10000	107.9	107.7	106.9	107.2	103.7	101.7	95.7	93.2	97.5	99.2	102.4	102.7	106.1	105.2	102.7	96.9	103.2	120.9
12500	107.7	107.7	106.7	107.7	104.5	101.5	95.5	92.3	97.5	99.2	102.2	103.2	106.2	104.8	103.3	96.5	103.3	121.0
16000	105.7	106.2	105.2	104.8	102.9	98.7	92.7	89.8	94.7	97.2	100.3	101.3	103.7	103.4	100.0	95.1	101.2	118.9
20000	103.8	103.6	101.0	102.3	99.6	96.0	89.6	87.7	92.7	95.2	97.5	99.1	101.5	101.0	98.5	92.5	98.8	116.5
OVERALL	125.9	125.7	126.6	125.3	124.5	120.9	118.3	118.7	119.6	120.8	121.5	122.5	124.0	124.3	121.5	118.8	122.6	140.3

TABLE VI. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) Concluded. 60 Percent speed; fan physical speed, 1336 rpm; fundamental blade passage frequency, 334 hertz

(a-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	71.8	66.4	65.8	67.8	67.1	66.9	68.4	66.4	64.9	67.3	68.6	67.4	69.4	66.9	68.6	68.6
63	66.2	68.6	67.2	67.2	67.9	65.7	66.7	67.1	69.1	69.1	68.7	69.7	69.1	68.9	70.7	69.5
80	64.1	64.9	64.8	62.8	62.6	63.1	63.3	62.6	62.9	64.9	65.1	67.4	68.3	67.6	68.6	68.8
100	69.0	67.9	68.9	68.5	66.5	66.0	66.2	65.5	66.0	68.0	67.9	68.0	70.2	69.2	69.2	68.6
125	73.1	74.1	73.7	73.6	74.4	71.4	70.6	71.6	72.1	72.7	74.2	72.8	72.9	73.1	72.6	70.8
160	72.3	73.9	73.3	71.4	70.6	69.3	69.3	69.9	72.1	72.8	73.4	72.7	71.8	71.6	70.8	69.7
200	75.8	75.6	74.8	71.6	69.1	67.5	67.6	69.6	69.5	69.6	71.1	70.7	70.8	70.6	71.0	69.0
250	80.5	80.3	79.8	77.0	74.5	73.6	71.1	70.8	71.8	74.3	75.5	75.2	76.0	75.6	75.3	71.4
315	92.4	90.9	93.9	92.6	92.3	88.1	85.3	86.3	86.6	86.6	86.4	86.7	87.3	87.6	85.1	85.7
400	84.5	84.2	85.2	83.0	81.9	78.9	76.9	76.9	78.0	79.5	80.2	80.5	80.5	80.5	77.9	76.6
500	82.9	82.5	81.5	80.0	78.2	76.0	74.7	74.4	74.9	76.9	78.0	78.6	79.5	81.4	79.0	75.1
630	85.4	86.6	86.1	84.1	83.1	79.7	78.2	78.7	80.2	82.4	81.4	83.7	86.4	85.9	83.9	79.6
800	82.3	83.6	83.3	81.4	80.1	76.8	75.6	75.6	76.8	78.9	80.1	81.4	82.8	83.4	79.8	75.8
1000	84.1	84.8	83.2	82.1	80.8	77.9	75.9	76.4	77.4	80.2	82.1	84.0	85.3	85.8	81.9	77.1
1250	81.9	83.0	81.7	80.7	80.0	77.0	74.4	74.0	75.0	77.4	79.4	80.3	81.9	83.2	79.4	74.3
1600	80.8	81.9	81.3	79.9	78.6	75.9	72.4	71.9	73.6	75.9	77.6	79.2	81.5	82.6	79.1	72.3
2000	79.5	80.4	79.7	79.1	77.9	74.0	70.5	69.7	72.0	74.0	75.9	77.0	80.0	80.7	76.0	70.9
2500	77.8	78.8	78.0	77.3	76.2	72.5	69.5	68.0	70.0	72.8	74.5	75.9	78.0	78.3	74.5	69.1
3150	76.9	78.1	77.3	76.6	75.1	72.1	68.4	66.8	68.8	72.1	73.8	74.5	76.3	76.6	73.6	68.0
4000	77.3	77.8	77.9	76.9	75.4	71.6	67.3	65.4	68.1	69.9	72.4	73.4	75.8	75.9	73.3	67.3
5000	76.4	76.0	76.2	76.7	74.2	69.7	65.5	63.7	66.7	68.4	71.2	71.3	74.7	73.5	71.8	65.3
6300	76.0	77.0	75.8	75.4	72.9	71.6	66.5	62.3	65.5	69.5	71.8	72.9	73.8	74.8	70.5	66.1
8000	76.4	76.5	76.4	75.8	73.0	70.7	65.2	62.9	66.8	68.3	70.7	71.5	74.6	74.2	71.3	66.0
10000	75.0	74.8	74.0	74.3	70.8	68.8	62.8	60.3	64.6	66.3	69.5	69.8	73.2	72.3	69.8	64.0
12500	73.4	73.4	72.4	73.4	70.2	67.2	61.2	58.1	63.2	64.9	68.0	68.9	71.9	70.5	69.0	62.2
16000	69.6	70.0	69.0	68.7	66.8	62.6	55.6	53.7	58.6	61.1	64.2	65.2	67.6	67.2	63.9	58.9
20000	64.9	64.8	64.1	63.5	60.8	57.2	50.8	48.8	53.8	56.3	58.7	60.2	62.6	62.2	59.6	53.7
OVERALL	99.9	95.7	96.7	95.3	94.6	90.9	88.5	89.0	89.7	90.9	91.6	92.5	94.0	94.3	91.5	89.0
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	69.8	77.7	83.1	84.6	85.5	83.2	81.3	81.9	83.1	84.3	84.6	84.5	84.8	83.3	77.4	70.7
304.8 M	60.4	69.2	75.1	76.7	77.9	75.7	73.9	74.6	75.8	76.8	77.1	76.9	76.8	75.0	69.2	62.3

TABLE VI. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 95 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) 70 Percent speed; fan physical speed, 1559 rpm; fundamental blade passage frequency, 389 hertz

(b-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	107.6	97.6	96.8	100.8	97.8	102.9	99.1	97.6	96.3	100.4	100.4	101.5	102.9	100.3	101.4	102.3	100.6	118.3
63	96.6	96.1	95.8	95.1	95.3	95.4	94.8	96.1	95.3	98.8	97.6	98.5	99.1	100.3	101.1	102.2	97.7	115.4
80	96.6	96.8	96.1	94.3	94.6	94.1	94.3	95.6	95.6	98.4	98.4	99.2	100.1	101.1	102.1	102.3	98.0	115.7
100	102.4	100.8	100.8	100.4	98.6	100.9	100.4	98.1	100.1	101.9	102.1	102.0	103.6	103.8	103.8	102.5	101.5	119.2
125	105.1	105.6	104.6	104.9	105.8	102.3	103.4	103.1	101.9	105.1	105.4	105.5	105.4	104.9	104.8	103.6	104.5	122.2
160	105.1	106.1	105.5	103.6	103.5	102.5	101.8	102.3	103.0	103.8	104.1	105.2	104.3	104.8	103.3	103.0	103.8	121.5
200	106.7	107.6	105.6	102.1	101.7	100.2	99.9	99.9	99.7	101.1	102.2	102.3	103.1	103.1	102.7	101.8	102.3	120.0
250	111.0	110.5	108.8	107.3	106.0	105.0	102.5	103.1	103.6	105.1	106.6	108.2	107.6	107.8	105.6	103.0	106.4	124.1
315	118.3	118.0	116.7	113.2	112.5	112.3	108.8	108.5	108.7	110.2	109.3	111.1	110.5	110.7	108.0	106.2	111.8	129.5
400	129.8	127.3	132.0	126.5	128.0	127.3	123.3	122.1	122.1	124.6	121.1	123.7	122.8	121.8	118.3	119.4	125.3	143.0
500	115.3	115.1	115.9	113.6	112.8	110.5	108.6	108.3	109.8	111.5	111.5	112.6	112.8	112.6	110.6	107.5	112.0	129.7
630	114.1	115.6	114.5	113.8	111.5	109.0	107.6	107.6	109.1	111.1	111.6	112.7	114.0	114.5	110.3	106.4	111.8	129.5
800	119.2	119.6	120.4	118.4	116.9	114.9	114.1	113.9	116.2	116.6	117.2	120.2	120.1	121.6	117.9	114.0	117.9	135.6
1000	114.9	115.9	114.9	114.1	112.4	109.7	108.2	108.6	109.9	111.7	113.6	115.0	115.7	115.1	110.4	107.4	112.8	130.5
1250	116.1	118.1	116.1	115.6	114.3	111.5	109.8	110.5	111.1	113.8	114.3	116.1	117.5	117.0	112.3	109.0	114.4	132.1
1600	114.5	115.8	115.5	114.8	113.8	110.5	107.7	106.8	109.8	111.0	112.7	114.3	116.7	116.5	111.8	106.2	113.1	130.8
2000	113.6	114.3	114.1	113.9	112.6	109.6	105.9	105.1	107.1	109.3	110.8	112.0	114.9	114.3	109.6	104.7	111.4	129.1
2500	112.0	113.1	112.0	112.5	111.0	107.8	105.0	103.3	105.6	107.8	109.5	110.6	113.0	112.5	108.3	103.5	109.8	127.5
3150	111.2	112.2	111.7	111.9	110.1	107.7	104.1	102.1	104.1	107.1	108.6	109.7	110.9	111.2	106.4	102.5	108.8	126.5
4000	111.5	112.6	112.3	112.5	110.8	107.5	102.8	101.3	103.8	105.6	107.5	108.6	110.5	110.5	106.3	101.7	108.6	126.3
5000	110.9	110.9	111.2	112.0	109.7	106.0	101.2	99.7	102.4	104.0	106.7	106.8	109.7	107.9	105.4	99.8	107.4	125.1
6300	110.8	112.0	110.7	111.5	108.7	108.0	102.8	98.3	101.7	105.3	107.3	108.0	109.0	109.3	104.8	100.4	107.6	125.3
8000	112.1	112.7	112.1	112.4	109.6	107.7	102.4	99.2	103.2	104.7	107.2	108.0	110.6	109.9	106.2	100.9	108.3	126.0
10000	111.1	111.4	110.4	111.6	108.1	107.1	100.8	98.1	101.6	104.1	106.9	107.1	109.9	108.6	105.6	99.8	107.3	125.0
12500	110.9	110.9	109.9	111.4	108.4	106.6	100.4	97.6	101.9	103.9	106.7	107.1	109.7	108.1	106.4	99.6	107.1	124.8
16000	109.2	110.0	108.7	109.0	106.7	103.8	98.0	95.2	99.2	101.7	104.2	105.3	107.2	106.9	103.3	98.5	105.1	122.8
20000	107.3	107.3	106.4	106.4	103.4	100.6	95.1	93.5	97.1	99.6	101.4	103.1	105.5	104.6	102.1	95.6	102.7	120.4
OVERALL	131.6	130.4	133.2	129.3	129.6	128.5	124.9	124.0	124.7	126.8	125.6	127.7	128.0	127.9	124.2	122.4	127.8	145.5

TABLE VI. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) Concluded. 70 Percent speed; fan physical speed, 1559 rpm; fundamental blade passage frequency, 389 hertz

(b-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	77.9	67.9	67.1	71.1	68.1	73.2	69.4	67.9	66.6	70.7	70.7	71.8	73.2	70.6	71.7	72.6
63	66.9	66.4	66.1	65.4	65.6	65.7	65.1	66.4	65.6	69.1	67.9	68.8	69.4	70.6	71.4	72.5
80	66.9	67.1	66.4	64.6	64.9	64.4	64.6	65.9	65.9	68.7	68.7	69.5	70.4	71.4	72.4	72.6
100	72.7	71.1	71.1	70.7	68.9	71.2	70.7	68.4	70.4	72.2	72.4	72.3	73.5	74.1	74.1	72.8
125	75.4	75.9	74.9	75.2	76.1	72.6	73.7	73.4	72.2	75.4	75.7	75.8	75.7	75.2	75.1	73.9
160	75.4	76.4	75.3	73.9	73.8	72.8	72.1	72.6	73.3	74.1	74.4	75.5	74.6	75.1	73.6	73.3
200	77.0	77.9	75.9	72.4	72.0	70.5	70.2	70.2	70.0	71.4	72.5	72.6	72.4	73.4	73.0	72.1
250	81.3	80.8	79.1	77.6	76.3	75.3	72.8	73.4	73.9	75.4	76.9	78.5	77.9	78.1	75.9	73.3
315	83.6	88.3	87.0	83.5	82.8	82.6	79.1	78.8	79.0	80.5	79.6	81.4	80.8	81.0	78.3	76.5
400	100.0	97.5	102.2	96.7	98.2	97.5	93.5	92.3	92.3	94.8	91.3	93.9	93.0	92.0	88.5	89.6
500	85.5	85.3	86.0	83.8	83.0	80.7	78.8	78.5	80.0	81.7	81.7	82.8	83.0	83.8	80.8	77.7
630	84.3	85.8	84.7	84.0	81.7	79.2	77.8	77.3	79.3	81.3	81.8	82.9	84.2	84.7	80.5	76.6
800	89.4	89.8	90.6	88.6	87.1	85.1	84.3	84.1	86.4	86.8	87.4	90.4	90.3	91.8	88.1	84.2
1000	85.1	86.1	85.1	84.3	82.6	79.9	79.4	78.8	80.1	81.9	83.8	85.2	85.9	85.3	80.6	77.6
1250	86.2	88.2	86.2	85.7	84.4	81.6	79.9	80.6	81.2	83.9	84.4	86.2	87.6	87.1	82.4	79.1
1600	84.6	85.9	85.6	84.9	83.9	80.6	77.8	76.9	79.9	81.1	82.8	84.4	86.8	86.6	81.9	76.3
2000	83.6	84.3	84.1	83.9	82.6	79.6	75.9	75.1	77.1	79.3	80.8	82.0	84.9	84.3	79.6	74.7
2500	81.9	83.0	81.9	82.4	80.9	77.7	74.9	73.2	75.5	77.7	79.4	80.5	82.9	82.4	78.2	73.4
3150	80.9	81.9	81.4	81.6	79.8	77.4	73.8	71.8	73.8	76.8	78.3	79.4	80.6	80.9	76.1	72.2
4000	81.0	82.1	81.8	82.0	80.3	77.0	72.3	70.8	73.3	75.1	77.0	78.1	80.0	80.0	75.8	71.2
5000	80.1	80.1	80.4	81.2	78.9	75.2	70.4	68.9	71.6	73.2	75.9	76.0	78.9	77.1	74.6	69.0
6300	79.5	80.7	79.4	80.2	77.4	76.7	71.5	67.0	70.4	74.0	76.0	76.7	77.7	76.0	73.5	69.1
8000	80.1	80.8	80.2	80.4	77.7	75.8	70.5	67.3	71.3	72.8	75.3	76.1	78.6	78.0	74.2	69.0
10000	78.2	78.5	77.5	78.7	75.2	74.2	67.9	65.2	68.7	71.2	74.0	74.2	77.0	75.7	72.7	66.9
12500	76.6	76.6	75.6	77.1	74.1	72.3	66.1	63.3	67.6	69.6	72.4	72.8	75.4	73.8	72.1	65.3
16000	73.0	73.8	72.5	72.9	70.6	67.7	61.9	59.1	63.1	65.6	68.1	69.2	71.1	70.7	67.2	62.3
20000	69.4	68.5	67.6	67.6	64.6	61.8	56.3	54.6	58.2	60.7	62.6	64.2	66.6	65.8	63.2	56.8
OVERALL	101.7	100.4	103.3	99.3	99.7	98.6	95.1	94.2	94.8	96.9	95.6	97.7	98.0	97.9	94.2	92.5
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	76.2	82.2	89.7	89.2	91.0	90.8	86.2	87.6	88.7	90.8	89.4	90.4	89.5	87.2	80.8	75.0
304.8 M	67.2	74.9	82.0	81.4	83.5	83.5	81.0	80.5	81.5	83.5	81.9	82.9	81.8	79.3	72.7	66.7

TABLE VI. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 95 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) 86 Percent speed; fan physical speed, 1909 rpm; fundamental blade passage frequency, 477 hertz

(c-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	101.9	98.8	98.9	98.6	100.3	101.1	101.4	102.9	99.3	101.9	102.8	103.4	104.8	105.4	107.6	109.3	103.1	120.8
63	111.2	100.4	98.9	98.0	99.2	101.2	102.9	101.9	102.2	100.5	104.9	102.9	105.2	106.0	107.9	109.4	103.8	121.5
80	100.2	99.6	98.9	97.1	97.9	99.1	98.7	100.6	98.2	101.2	102.9	104.0	106.6	107.4	109.1	110.0	103.4	121.1
100	105.6	105.6	105.7	102.9	103.9	103.6	103.1	103.7	103.9	105.7	106.7	107.5	108.7	109.9	110.2	110.1	106.4	124.1
125	109.1	109.4	109.7	109.6	108.4	106.9	107.2	107.6	107.9	109.4	110.1	110.5	110.7	111.6	111.7	110.6	109.4	127.1
160	108.7	110.6	109.2	107.7	106.4	107.1	106.1	106.9	107.2	108.1	108.2	110.3	109.1	108.9	108.7	108.8	108.2	125.9
200	110.4	111.7	112.6	109.4	107.6	106.6	105.1	105.7	105.7	105.6	106.7	107.5	108.6	109.1	108.4	108.1	107.9	125.6
250	113.6	115.5	113.3	111.1	109.5	109.3	108.5	108.1	109.3	110.8	111.5	113.0	112.6	112.1	110.5	107.8	111.1	128.8
315	117.6	117.1	115.0	112.1	110.8	109.1	109.0	109.1	109.5	111.1	111.6	112.9	113.0	113.0	110.6	109.8	111.9	129.6
400	124.2	123.4	123.6	120.8	119.1	117.4	115.6	114.9	116.6	118.4	118.3	120.5	119.9	119.1	114.4	113.7	119.1	136.8
500	134.3	132.5	134.1	130.3	130.5	127.6	125.1	125.1	126.8	128.8	127.5	129.7	130.1	129.1	122.8	122.7	129.1	146.8
630	119.1	119.6	118.6	117.6	115.6	113.6	112.6	113.3	114.0	116.8	117.1	118.2	119.1	118.0	113.1	111.4	116.5	134.2
800	119.0	120.0	120.0	118.7	117.7	115.4	114.5	115.0	116.9	118.4	119.4	119.8	121.0	119.7	114.0	111.9	118.1	135.8
1000	122.9	124.0	123.5	124.5	125.2	122.7	118.7	118.4	119.4	121.2	123.0	123.5	125.5	122.5	117.0	116.6	122.5	140.2
1250	118.4	119.7	119.6	118.7	117.1	115.4	113.4	114.1	115.4	117.1	118.7	120.2	120.9	118.1	113.2	111.5	117.6	135.3
1600	119.3	120.6	120.8	120.3	119.1	117.0	114.0	114.1	115.6	117.3	119.1	120.6	123.5	120.0	114.0	111.2	118.8	136.5
2000	118.4	119.9	120.4	119.5	118.7	116.5	113.0	112.5	113.9	115.9	117.7	119.6	122.0	119.2	113.7	110.8	117.8	135.5
2500	116.5	118.1	118.1	118.1	117.1	114.8	112.0	111.1	112.3	114.1	116.3	117.2	119.6	117.1	111.3	108.7	115.9	133.6
3150	115.9	117.8	117.6	117.6	116.4	114.6	111.9	110.1	110.9	114.1	115.4	116.7	117.6	115.9	110.8	108.3	115.1	132.8
4000	116.5	117.7	117.5	117.7	116.5	114.2	110.5	109.2	110.7	112.2	114.2	115.5	116.9	114.9	110.4	107.1	114.5	132.2
5000	115.7	116.0	116.5	117.5	115.5	112.0	108.7	107.3	109.2	110.7	113.0	113.6	115.8	112.3	109.0	105.2	113.2	130.9
6300	115.1	117.5	116.0	116.3	114.0	113.8	110.0	106.3	107.8	111.3	113.3	114.3	114.6	113.6	108.5	105.4	113.1	130.8
8000	116.4	117.5	116.7	116.7	114.4	112.9	109.0	107.1	109.7	110.9	113.2	113.9	116.1	113.9	110.2	106.0	113.4	131.1
10000	115.3	116.3	115.3	115.8	112.6	111.9	107.3	105.9	108.4	109.9	112.3	113.3	115.1	112.8	109.3	104.8	112.3	130.0
12500	114.4	115.6	114.2	115.7	112.6	111.2	106.7	105.2	108.7	109.6	112.1	113.1	115.7	112.4	110.1	104.5	112.1	129.8
16000	112.3	114.2	112.7	112.8	110.5	108.1	104.0	102.7	105.7	107.7	110.2	111.3	112.8	111.4	108.0	103.1	109.9	127.6
20000	110.3	110.9	110.4	109.9	106.6	104.7	100.9	100.8	104.0	105.6	107.4	109.1	111.0	109.1	106.1	100.5	107.4	125.1
OVERALL	136.0	135.2	136.0	133.7	133.3	130.9	128.7	128.0	129.5	131.5	131.6	133.2	134.3	132.6	127.4	126.4	132.1	149.9

TABLE VI. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 95 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) Concluded. 86 Percent speed; fan physical speed, 1909 rpm; fundamental blade passage frequency, 477 hertz

(c-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	72.2	69.1	69.2	68.9	70.6	71.4	71.7	73.2	69.6	72.2	73.1	73.7	75.1	75.7	77.9	79.6
63	81.5	73.7	69.2	68.3	69.5	71.5	73.2	72.2	72.5	70.8	75.2	73.2	75.5	76.3	78.2	79.7
80	73.5	69.9	69.2	67.4	68.2	69.4	69.0	70.9	68.5	71.5	73.2	74.3	76.9	77.7	79.4	80.3
100	75.9	75.9	76.0	73.2	74.2	73.9	73.4	74.0	74.2	76.0	77.0	77.8	79.0	80.2	80.5	80.4
125	79.4	79.7	79.0	79.9	78.7	77.2	77.5	77.9	78.2	79.7	80.4	80.8	81.0	81.9	82.0	80.9
160	79.0	80.9	79.5	78.3	76.7	77.4	76.4	77.2	77.5	78.4	78.5	80.6	79.4	79.2	79.0	79.1
200	80.7	82.0	82.9	79.7	77.9	76.9	75.4	76.0	76.0	75.9	77.0	77.8	78.9	79.4	78.7	78.4
250	83.9	85.8	83.6	81.4	79.8	79.6	79.8	78.4	79.6	81.1	81.8	83.3	82.9	82.4	80.8	78.1
315	87.9	87.4	85.3	82.4	81.1	79.4	79.3	79.4	79.8	81.4	81.9	83.2	83.3	83.3	80.9	80.1
400	94.5	93.6	93.8	91.0	89.3	87.6	85.8	85.1	86.8	88.6	88.5	90.7	90.1	89.3	84.6	83.9
500	104.5	102.7	104.3	100.5	100.7	97.8	96.3	95.3	97.0	99.0	97.7	99.9	100.3	99.3	93.0	92.9
630	89.3	89.8	88.8	87.8	85.8	83.8	82.8	83.5	84.2	87.0	87.3	86.4	89.3	88.2	83.3	81.6
800	89.2	90.2	90.2	88.9	87.9	85.6	84.7	85.2	86.1	88.6	89.6	90.0	91.2	89.9	84.2	82.1
1000	93.1	94.2	93.7	94.7	95.4	92.9	88.9	88.6	89.6	91.4	93.2	93.7	95.7	92.7	87.2	86.8
1250	88.5	89.8	89.7	88.8	87.2	85.5	83.5	84.2	85.5	87.2	88.8	90.3	91.0	88.2	83.3	81.6
1600	89.4	90.7	90.9	90.4	89.2	87.1	84.1	84.2	85.7	87.4	89.2	90.7	93.6	90.1	84.1	81.3
2000	88.4	89.9	90.4	89.5	88.7	86.5	83.0	82.5	83.9	85.9	87.7	89.6	92.0	89.2	83.7	80.8
2500	86.4	88.0	88.0	88.0	87.0	84.7	81.9	81.0	82.2	84.0	86.2	87.1	89.5	87.0	81.2	78.6
3150	85.6	87.5	87.3	87.3	86.1	84.3	81.6	79.8	80.6	83.8	85.1	86.4	87.3	85.6	80.5	78.0
4000	86.0	87.2	87.0	87.2	86.0	83.7	80.0	78.7	80.2	81.7	83.7	85.0	86.4	84.4	79.9	76.6
5000	84.9	85.2	85.7	86.7	84.7	81.2	77.9	76.5	78.4	79.9	82.2	82.8	85.0	81.5	78.2	74.4
6300	83.8	86.2	84.7	85.0	82.7	82.5	78.7	75.0	76.5	80.0	82.0	83.0	83.3	82.3	77.2	74.1
8000	84.4	85.6	84.8	84.8	82.5	81.0	77.1	75.2	77.7	79.0	81.3	82.0	84.1	82.0	78.2	74.1
10000	82.4	83.4	82.4	82.9	79.7	79.0	74.4	73.0	75.5	77.0	79.4	80.4	82.2	79.9	76.4	71.9
12500	80.1	81.3	79.9	81.4	78.3	77.0	72.4	70.9	74.4	75.3	77.8	78.8	81.4	78.1	75.8	70.2
16000	76.2	78.1	76.5	76.7	74.4	72.0	67.9	66.6	69.6	71.6	74.1	75.2	76.7	75.2	71.9	66.9
20000	71.4	72.1	71.6	71.1	67.8	65.9	62.1	61.9	65.1	66.7	68.6	70.2	72.1	70.3	67.2	61.7
OVERALL	106.1	105.2	106.1	103.7	103.4	100.9	98.8	98.2	99.6	101.6	101.6	103.2	104.3	102.6	97.4	96.6
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	80.5	88.0	93.0	93.5	94.9	93.8	92.6	92.4	93.9	95.7	95.5	96.3	96.0	92.6	84.7	79.3
304.8 M	71.1	79.6	85.0	85.6	87.2	86.2	85.2	85.0	86.6	88.4	88.0	88.8	88.3	84.8	76.5	70.9

TABLE VI. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 95 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) 93 Percent speed; fan physical speed, 2071 rpm; fundamental blade passage frequency, 517 hertz

(d-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	104.0	101.3	102.3	101.7	101.3	102.5	103.3	103.8	102.5	105.0	105.7	107.2	107.7	108.7	110.3	111.4	105.7	123.4
63	101.1	103.5	101.5	101.3	100.5	103.8	105.3	103.5	102.8	105.0	105.1	106.1	107.6	109.0	110.1	112.2	105.8	123.5
80	102.3	103.0	101.3	99.8	99.3	101.1	102.3	101.8	101.8	104.3	105.0	107.2	109.0	110.6	112.0	113.0	106.2	123.9
100	110.3	110.1	109.8	107.3	106.5	106.6	108.0	105.5	106.5	108.3	108.8	110.6	112.0	112.8	113.3	113.0	109.5	127.2
125	109.4	111.0	111.7	109.9	109.2	109.0	109.0	109.4	109.4	111.4	112.4	113.3	113.4	113.7	113.7	112.7	111.4	129.1
160	111.2	111.7	111.3	109.5	108.5	109.3	108.3	109.8	109.8	111.3	112.0	113.1	112.0	112.3	111.2	111.4	110.9	128.6
200	113.3	113.5	111.5	108.1	107.3	106.5	105.8	106.5	106.6	108.3	109.0	109.9	111.0	111.6	110.5	110.2	109.2	126.9
250	115.7	115.0	114.0	112.2	111.7	110.5	108.9	109.5	110.4	112.7	113.5	115.1	115.9	115.0	112.4	110.6	112.9	130.6
315	117.7	117.7	115.6	114.4	112.9	111.6	110.9	112.4	112.4	114.6	114.6	115.2	115.6	114.7	112.6	110.5	114.0	131.7
400	120.4	121.2	120.5	118.0	116.4	114.2	113.9	114.0	114.9	116.7	118.0	119.0	119.4	118.0	115.2	114.6	117.3	135.0
500	132.9	131.9	130.6	130.6	130.1	125.7	128.1	124.6	127.4	128.6	126.6	129.0	130.9	131.1	126.2	122.9	128.8	146.5
630	122.6	123.1	121.7	120.9	120.1	116.4	116.4	116.1	118.6	120.7	120.6	121.0	122.2	121.2	116.7	114.3	119.9	137.6
800	120.1	120.9	121.1	119.4	118.2	116.2	115.9	116.9	118.7	120.7	121.2	121.5	122.5	121.2	115.7	113.3	119.7	137.4
1000	125.1	126.8	127.9	126.8	125.4	120.9	120.3	120.9	121.8	124.6	125.6	128.7	126.3	124.4	118.6	117.3	124.8	142.5
1250	119.7	121.7	121.8	120.8	119.0	116.8	115.8	116.3	118.0	120.0	121.2	122.6	122.2	119.7	115.3	113.5	119.7	137.4
1600	121.7	123.5	124.2	123.2	122.2	119.9	117.2	117.4	120.0	120.9	121.9	123.5	126.2	122.2	117.2	113.8	121.8	139.5
2000	120.3	121.6	122.4	122.3	121.1	118.8	115.8	115.1	116.6	118.9	120.1	121.2	124.1	120.6	115.4	112.5	120.0	137.7
2500	118.9	120.7	120.7	120.9	119.5	117.2	114.9	113.9	115.0	117.7	118.9	120.0	121.5	118.9	113.4	111.1	118.4	136.1
3150	118.1	120.0	120.3	119.8	118.5	116.8	114.8	112.8	114.3	117.1	117.8	119.1	119.8	117.8	113.0	110.2	117.5	135.2
4000	118.7	119.9	120.2	120.2	118.7	116.7	113.2	112.4	114.0	116.2	116.9	118.5	119.7	117.2	112.7	109.6	117.2	134.9
5000	117.4	118.1	118.3	119.6	116.6	113.9	111.4	110.1	112.3	113.0	115.4	116.1	118.3	114.6	111.4	107.5	115.4	133.1
6300	116.9	119.0	117.8	118.3	114.9	115.6	111.9	109.3	111.4	114.8	116.1	117.1	116.5	115.5	110.4	107.6	115.3	133.0
8000	117.8	119.1	113.8	118.8	115.5	114.1	111.3	109.1	112.6	113.8	115.6	116.3	118.7	115.8	111.8	107.9	115.5	133.2
10000	116.7	117.5	117.2	117.8	113.5	113.2	109.0	108.3	110.7	112.8	114.5	115.2	117.5	114.5	111.0	106.5	114.2	131.9
12500	116.3	116.8	116.2	117.8	113.5	112.7	108.7	107.5	110.9	112.7	114.2	115.2	117.4	114.4	112.4	106.1	114.0	131.7
16000	113.4	115.1	114.4	114.9	111.2	109.0	105.7	104.9	108.4	110.7	112.4	113.0	114.9	112.9	109.7	105.2	111.7	129.4
20000	111.5	112.1	111.6	111.8	107.3	105.8	102.6	103.2	106.2	108.3	109.5	110.8	112.7	110.8	108.2	102.4	109.1	126.8
OVERALL	125.6	135.8	135.5	135.0	133.8	130.7	130.7	129.1	131.2	132.9	133.0	134.8	135.8	134.5	130.0	127.7	133.2	150.9

TABLE VI. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 95 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) Concluded. 93 Percent speed; fan physical speed, 2071 rpm; fundamental blade passage frequency, 517 hertz

(d-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	74.3	71.6	72.6	72.0	71.6	72.8	73.6	74.1	72.8	75.3	76.0	77.5	78.0	79.0	80.6	81.7
63	71.4	73.8	71.8	71.6	70.8	74.1	75.6	73.8	73.1	75.3	75.4	76.4	77.9	79.3	80.4	82.5
80	72.6	73.3	71.6	70.1	69.6	71.4	72.6	72.1	72.1	74.6	75.3	77.5	79.3	80.9	82.3	83.3
100	80.6	80.4	80.1	77.6	76.8	76.9	78.3	75.8	76.8	78.6	79.1	80.9	82.3	83.1	83.6	83.3
125	79.7	81.3	82.0	80.2	79.5	79.3	79.3	79.7	79.7	81.7	82.7	83.6	83.7	84.0	84.0	83.0
160	81.6	82.0	81.6	79.8	78.8	79.6	78.6	80.1	80.1	81.6	82.3	83.4	82.3	82.6	81.5	81.7
200	83.6	83.8	81.8	78.4	77.6	76.8	76.1	76.8	76.9	78.6	79.3	80.2	81.2	81.9	80.8	80.5
250	86.0	85.3	84.3	82.5	82.0	80.8	79.2	79.8	80.7	83.0	83.8	85.4	86.2	85.3	82.7	80.9
315	88.0	88.0	85.9	84.7	83.2	81.9	81.2	82.7	82.7	84.9	84.9	85.5	85.9	85.0	82.9	80.8
400	90.6	91.4	90.7	88.2	86.6	84.4	84.1	84.2	85.1	86.9	88.2	89.2	89.6	88.2	85.4	84.8
500	103.1	102.1	100.8	100.8	100.3	95.9	98.3	94.8	97.6	98.8	96.8	99.2	101.1	101.3	96.4	93.1
630	92.8	93.3	91.9	91.1	90.3	86.6	86.6	86.3	88.8	90.9	90.8	91.2	92.4	91.4	86.9	84.5
800	90.3	91.1	91.3	89.6	88.4	86.4	86.1	87.1	88.9	90.9	91.4	91.7	93.1	91.4	85.9	83.5
1000	95.3	97.0	98.1	97.0	95.6	91.1	90.5	91.1	92.0	94.8	95.8	98.9	96.5	94.6	88.8	87.5
1250	89.8	91.8	91.9	90.9	89.1	86.9	85.9	86.4	88.1	90.1	91.3	92.7	92.3	89.8	85.4	83.6
1600	91.8	93.6	94.3	93.3	92.3	90.0	87.3	87.5	90.1	91.0	92.0	93.6	96.2	92.3	87.3	83.9
2000	90.3	91.6	92.4	92.3	91.1	88.8	85.8	85.1	86.6	88.9	90.1	91.2	94.1	90.6	85.4	82.5
2500	88.8	90.6	90.6	90.8	89.4	87.1	84.8	83.8	84.9	87.6	88.8	89.9	91.4	88.8	83.3	81.0
3150	87.8	89.7	90.0	89.5	88.2	86.5	84.5	82.5	84.0	86.8	87.5	88.8	89.5	87.5	82.7	79.9
4000	88.2	89.4	89.7	89.7	88.2	86.2	82.7	81.9	83.5	85.7	86.4	88.0	89.2	86.7	82.2	79.1
5000	86.6	87.3	87.5	88.8	85.8	83.1	80.6	79.3	81.5	83.0	84.6	85.3	87.5	83.8	80.6	76.7
6300	85.6	87.7	86.5	87.0	83.6	84.3	80.6	78.0	80.1	83.5	84.8	85.8	85.6	84.2	79.1	76.3
8000	85.9	87.2	86.9	86.9	83.6	82.2	79.4	77.2	80.7	81.9	83.7	84.4	86.7	83.9	79.8	76.0
10000	83.8	84.6	84.3	84.9	80.6	80.3	76.1	75.4	77.8	79.9	81.6	82.3	84.6	81.6	78.1	73.6
12500	82.0	82.5	81.5	83.5	79.2	78.5	74.4	73.3	76.6	78.4	79.5	80.9	83.1	80.1	78.1	71.8
16000	77.2	79.0	78.3	78.8	75.1	72.9	69.6	68.8	72.3	74.6	76.3	76.9	78.8	76.7	73.6	69.0
20000	72.6	73.3	72.8	73.0	68.5	67.0	63.8	64.3	67.3	69.5	70.7	71.9	73.8	71.9	69.3	63.6
OVERALL	105.7	105.8	105.4	104.9	103.9	100.6	100.8	99.2	101.2	103.0	103.0	104.8	105.7	104.5	100.1	97.8
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	80.2	88.6	92.4	94.8	95.6	93.9	94.8	93.5	95.7	97.3	96.8	97.5	97.6	94.6	87.4	80.5
304.8 M	76.6	80.0	84.2	86.8	87.9	86.2	87.3	86.1	88.3	89.9	89.1	89.9	89.8	86.8	79.4	72.0

TABLE VI. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 95 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(e) 100 Percent speed; fan physical speed, 2227 rpm; fundamental blade passage frequency, 556 hertz

(e-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) CN 1.0 METER RADIUS																	
50	105.6	102.9	103.1	103.3	104.1	104.8	105.3	105.6	103.9	107.3	106.9	108.4	109.3	111.1	112.8	113.3	107.6	125.3
63	102.0	104.1	103.0	102.3	103.5	102.8	103.5	103.6	102.6	105.5	105.5	107.6	109.8	111.8	113.1	114.7	107.4	125.1
80	109.6	109.6	106.6	103.8	106.3	105.8	105.1	104.1	103.9	106.9	107.8	109.2	111.8	113.6	114.8	116.0	109.3	127.0
100	108.8	107.8	107.6	107.6	108.5	110.0	107.6	107.1	109.0	110.6	111.5	112.2	114.1	114.6	115.8	115.8	111.3	129.0
125	111.6	113.1	113.6	111.8	111.5	112.3	110.3	111.5	112.5	113.6	114.5	115.1	115.8	116.1	116.6	114.7	113.7	131.4
160	114.3	114.2	113.0	111.5	110.0	112.5	111.3	112.2	113.2	115.7	114.3	115.9	114.5	115.5	115.2	113.6	113.8	131.5
200	114.3	115.3	113.0	112.0	111.8	111.8	109.0	109.2	110.8	110.0	111.0	112.1	113.3	114.0	113.0	112.7	111.9	129.6
250	117.7	117.5	115.8	114.5	113.7	111.8	111.2	110.3	111.8	114.0	114.7	116.3	116.5	116.0	113.8	112.4	114.3	132.0
315	120.0	119.0	117.6	115.8	115.5	114.3	114.5	113.5	115.1	117.1	118.6	119.6	119.8	117.0	116.5	114.0	117.0	134.7
400	120.5	121.0	120.9	117.9	116.0	115.7	115.0	115.7	116.2	118.5	119.7	120.5	120.9	118.9	116.0	114.4	118.3	136.0
500	128.4	130.5	128.4	127.2	125.2	124.4	127.4	124.4	125.5	124.9	126.4	128.1	127.9	125.4	123.2	121.1	126.4	144.1
630	126.9	129.5	126.9	125.7	123.7	122.7	125.9	123.4	125.0	125.2	126.0	127.8	127.4	124.9	122.5	120.4	125.6	143.3
800	119.8	121.3	121.0	120.5	119.7	117.5	118.2	119.3	120.5	122.7	123.5	124.3	124.9	122.5	117.2	115.1	121.5	139.2
1000	122.6	125.9	124.9	125.3	124.9	122.9	120.9	121.3	123.3	124.8	124.9	126.5	126.8	122.6	118.8	117.3	124.2	141.9
1250	123.2	126.2	125.2	125.2	124.2	122.3	120.5	121.3	123.3	124.7	124.3	126.4	126.5	123.5	119.3	117.9	124.0	141.7
1600	123.3	124.6	125.1	125.1	124.0	123.3	119.6	119.5	121.1	123.0	124.1	125.7	128.2	123.1	118.5	115.5	123.7	141.4
2000	121.2	122.4	122.6	122.7	121.9	119.9	117.6	117.6	119.2	121.1	122.4	123.5	126.1	120.9	116.4	114.0	121.5	139.2
2500	120.1	121.1	121.5	122.0	121.1	118.6	117.1	116.5	118.1	120.0	121.6	122.1	124.0	120.1	115.0	113.0	120.3	138.0
3150	119.6	120.6	120.6	121.1	120.1	118.5	116.8	115.6	117.0	119.6	121.0	121.9	122.6	119.5	114.5	112.2	119.6	137.3
4000	119.5	120.2	120.7	121.0	120.0	117.5	115.5	114.7	116.5	118.2	119.5	120.4	122.0	119.0	114.0	111.6	118.8	136.5
5000	117.9	118.2	118.6	120.2	117.9	115.1	112.9	112.6	114.6	116.6	118.1	118.2	120.4	116.2	113.1	109.3	117.0	134.7
6300	117.3	118.6	117.6	117.9	115.9	115.8	113.4	111.1	113.1	117.1	118.9	119.4	119.1	117.6	111.9	109.0	116.7	134.4
8000	117.7	118.6	117.9	118.2	116.2	114.6	112.2	111.4	114.6	116.2	117.7	118.2	120.6	117.6	113.2	109.2	116.6	134.3
10000	116.0	116.3	115.8	116.7	114.2	113.4	110.4	110.2	112.7	115.2	117.0	117.2	119.0	116.0	112.5	108.4	115.2	132.9
12500	115.5	115.7	114.8	116.5	114.0	112.5	109.7	109.5	113.2	114.8	116.8	117.2	119.5	116.0	113.7	107.7	115.1	132.8
16000	112.4	113.2	112.7	113.0	111.0	109.2	106.8	106.7	110.0	112.5	114.2	114.9	116.7	114.7	110.9	106.5	112.5	130.2
20000	110.0	109.6	109.5	110.2	106.8	105.3	103.3	104.7	108.4	110.5	111.7	112.5	114.5	112.3	109.5	103.9	110.0	127.7
OVERALL	134.7	136.5	135.3	135.0	133.7	132.3	132.4	131.1	132.7	133.9	134.8	136.2	137.0	134.0	130.9	129.1	134.1	151.8

TABLE VI. - Concluded. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 95 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(e) Concluded. 100 Percent speed; fan physical speed, 2227 rpm; fundamental blade passage frequency, 556 hertz

(e-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	75.5	73.2	73.4	73.6	74.4	75.1	75.6	75.9	74.2	77.6	77.2	78.7	79.6	81.4	83.1	83.6
63	72.3	74.4	73.3	72.6	73.8	73.1	73.8	73.9	72.9	75.8	75.8	77.9	80.1	82.1	83.4	85.0
80	79.9	79.9	76.9	74.1	76.6	76.1	75.4	74.4	74.2	77.2	78.1	79.5	82.1	83.9	85.1	86.3
100	79.1	78.1	77.9	77.9	78.8	80.3	77.9	77.4	79.3	80.9	81.8	82.5	84.4	84.9	86.1	86.1
125	81.9	83.4	83.9	82.1	81.8	82.6	80.6	81.8	82.8	83.9	84.8	85.4	86.1	86.4	86.9	85.0
160	84.6	84.5	83.3	81.8	80.3	82.8	81.6	82.5	83.5	86.0	84.6	86.2	84.8	85.8	85.5	83.9
200	84.6	85.6	83.3	82.3	82.1	82.1	79.3	79.5	81.1	80.3	81.3	82.4	83.6	84.3	83.3	83.0
250	88.0	87.8	86.1	84.8	84.0	82.1	81.5	80.6	82.1	84.3	85.0	86.6	86.8	86.3	84.1	82.7
315	90.3	89.3	87.9	86.1	85.8	84.6	84.8	83.8	85.4	87.4	88.9	89.9	90.1	87.3	86.8	84.3
400	90.7	91.2	91.1	88.1	86.2	85.9	85.2	85.9	86.4	88.7	89.9	90.7	91.1	89.1	86.2	84.6
500	98.6	100.7	98.6	97.4	95.4	94.6	97.6	94.6	95.7	95.1	96.6	98.3	98.1	95.6	93.4	91.3
630	97.1	99.7	97.1	95.9	93.9	92.9	96.1	93.6	95.2	95.4	96.2	98.0	97.6	95.1	92.7	90.6
800	90.0	91.5	91.2	90.7	89.9	87.7	88.4	89.5	90.7	92.9	93.7	94.5	95.1	92.7	87.4	85.3
1000	92.8	96.0	95.1	95.4	95.1	93.0	91.1	91.5	93.5	95.0	95.1	96.7	97.0	93.8	89.0	87.5
1250	93.3	96.3	95.3	95.3	94.3	92.4	90.6	91.4	93.4	94.8	94.4	96.5	96.6	93.6	89.4	88.0
1600	93.4	94.7	95.2	95.2	94.1	93.4	89.7	89.6	91.2	93.1	94.2	95.8	98.3	93.2	88.6	85.6
2000	91.2	92.4	92.6	92.7	91.9	89.9	87.6	87.6	89.2	91.1	92.4	93.5	96.1	90.9	86.4	84.0
2500	90.0	91.0	91.4	91.9	91.0	88.5	87.0	86.4	88.0	89.9	91.5	92.0	93.9	90.0	84.9	82.9
3150	89.3	90.3	90.3	90.8	89.8	88.2	86.5	85.3	86.7	89.3	90.7	91.6	92.3	89.2	84.2	81.9
4000	89.0	89.7	90.2	90.5	89.5	87.0	85.0	84.2	86.0	87.7	89.0	89.9	91.5	88.5	83.5	81.1
5000	87.1	87.4	87.8	89.4	87.1	84.3	82.1	81.8	83.8	85.8	87.3	87.4	89.6	85.4	82.3	78.5
6300	86.0	87.3	86.3	86.7	84.6	84.5	82.1	79.8	81.8	85.8	87.6	88.1	87.8	86.3	80.6	77.7
8000	85.8	86.7	86.0	86.3	84.3	82.7	80.3	79.5	82.7	84.3	85.8	86.3	88.7	85.7	81.2	77.3
10000	83.1	83.4	82.9	83.8	81.3	80.5	77.5	77.3	79.8	82.3	84.1	84.3	86.1	83.1	79.6	75.5
12500	81.3	81.4	80.5	82.2	79.7	78.3	75.5	75.3	78.9	80.5	82.5	82.9	85.2	81.7	79.4	73.4
16000	76.3	77.1	76.6	76.9	74.9	73.1	70.7	70.6	73.9	76.4	78.1	78.8	80.6	78.5	74.8	70.3
20000	71.2	70.8	70.7	71.4	68.0	66.5	64.5	65.8	69.5	71.6	72.9	73.7	75.6	73.5	70.6	65.1
OVERALL	104.6	106.5	105.3	104.9	103.6	102.2	102.4	101.2	102.7	103.9	104.8	106.1	106.9	103.9	100.9	99.2
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	78.6	88.8	92.4	95.1	95.9	96.1	96.0	95.2	96.9	98.5	99.2	99.4	99.6	94.1	87.5	81.2
304.8 M	68.8	80.1	83.7	86.6	87.7	88.1	88.5	87.6	89.2	90.7	91.1	91.5	91.4	85.6	79.3	72.6

TABLE VII. - FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) 60 Percent speed; fan physical speed, 1331 rpm; fundamental blade passage frequency, 332 hertz

(a-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	95.3	95.4	93.8	98.0	97.9	96.8	96.3	95.8	96.4	95.6	94.9	95.5	98.6	98.8	100.8	95.5	97.0	114.7
63	92.2	93.7	92.7	96.1	94.6	92.9	92.7	93.1	92.6	93.2	92.2	94.2	96.7	97.1	99.1	95.6	94.5	112.2
80	93.0	94.9	94.3	94.8	94.3	93.8	92.6	93.1	92.9	93.1	93.4	95.2	96.9	98.1	99.3	95.6	94.9	112.6
100	99.8	99.3	99.5	100.6	97.9	97.1	97.9	95.6	96.9	98.4	97.4	98.2	100.8	100.3	100.4	96.7	98.6	116.3
125	103.5	106.6	105.8	104.6	104.1	102.0	101.6	102.5	101.6	102.5	103.0	103.4	104.1	102.8	102.3	99.0	103.2	120.9
160	104.0	104.7	104.6	103.5	101.6	100.8	100.0	100.3	100.6	101.5	102.0	103.2	102.1	102.0	101.3	98.7	101.9	119.6
200	107.1	106.7	105.0	104.0	100.0	98.6	98.5	99.3	98.6	98.6	99.1	99.7	101.3	101.1	100.3	98.5	101.0	118.7
250	111.2	111.8	110.1	108.4	105.4	103.8	101.4	101.4	101.8	102.9	104.4	105.4	106.1	106.1	103.9	100.2	105.6	123.3
315	124.8	121.2	123.0	123.3	118.0	116.0	115.7	112.7	112.8	115.7	115.0	115.6	117.3	116.3	115.5	112.2	117.8	135.5
400	117.4	116.4	116.2	114.6	110.4	108.5	107.0	105.7	106.9	108.7	109.5	111.0	111.4	111.2	108.9	104.8	110.5	128.2
500	116.2	115.9	115.0	112.2	109.5	106.9	105.2	105.4	106.2	107.9	108.5	109.8	111.2	112.9	110.4	104.9	109.7	127.4
630	119.5	118.2	117.8	115.3	113.2	109.8	110.2	110.3	110.5	111.3	112.2	113.4	116.5	116.5	113.5	108.4	113.5	131.2
800	118.9	118.9	119.4	118.9	116.8	107.3	106.1	106.6	107.3	109.4	111.1	112.3	113.1	113.8	109.9	104.6	110.9	128.6
1000	119.1	119.8	119.0	119.1	111.9	108.1	106.3	106.5	107.1	109.8	112.1	113.9	115.1	115.5	111.0	105.7	111.8	129.5
1250	111.5	113.3	112.3	112.2	110.7	106.7	104.3	104.7	105.2	107.5	109.2	110.4	112.5	113.2	109.3	102.9	109.7	127.4
1600	110.4	112.1	111.4	110.9	109.1	105.6	102.6	102.6	103.6	106.1	107.7	109.5	112.1	112.4	108.2	100.6	108.6	126.3
2000	109.8	110.8	110.3	110.5	108.5	104.3	101.0	100.8	102.3	104.2	106.5	107.3	110.7	110.7	106.0	99.7	107.3	125.0
2500	109.0	109.9	109.5	109.4	107.0	102.9	99.9	98.9	100.5	103.2	105.2	105.8	108.7	108.5	105.2	98.4	105.9	123.6
3150	109.0	110.0	109.1	109.3	106.8	103.3	99.8	98.0	99.6	102.5	104.5	105.4	107.3	107.5	104.3	98.1	105.4	123.1
4000	109.6	110.6	110.0	110.5	107.6	103.1	98.6	97.4	99.5	101.3	103.3	104.6	107.1	106.4	103.8	97.5	105.5	123.2
5000	108.4	108.9	108.9	110.1	107.1	102.1	97.8	95.7	98.2	99.6	102.4	102.9	106.1	104.6	102.7	95.5	104.5	122.2
6300	108.5	111.3	109.7	109.6	106.6	104.0	99.3	95.1	98.2	100.8	103.8	105.2	105.8	106.5	102.1	96.6	105.2	122.9
8000	111.5	111.6	111.0	110.6	107.3	103.6	98.8	95.8	99.8	100.6	103.6	104.8	107.5	106.6	104.1	97.2	105.9	123.6
10000	110.3	110.6	109.6	109.9	106.1	103.3	97.4	94.8	98.4	99.9	103.3	104.2	106.6	105.4	103.4	96.4	105.0	122.7
12500	110.5	110.8	109.5	110.7	106.8	103.0	97.0	93.8	98.5	100.0	103.2	104.4	107.5	105.5	104.0	96.2	105.3	123.0
16000	109.2	109.8	109.0	109.5	105.8	101.0	94.6	91.8	96.3	98.7	102.0	103.2	105.3	105.0	101.8	95.8	103.9	121.6
20000	108.9	108.4	107.7	107.7	104.2	99.9	93.2	91.2	96.1	98.1	100.4	102.5	104.7	104.0	101.7	94.8	102.9	120.6
OVERALL	127.8	126.7	127.1	126.8	123.2	120.4	119.1	117.9	118.5	120.5	121.5	122.7	124.5	124.5	121.8	117.0	122.9	140.6

TABLE VII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) Concluded. 60 Percent speed; fan physical speed, 1331 rpm; fundamental blade passage frequency, 332 hertz

(a-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	65.6	65.7	64.1	68.5	68.2	67.1	66.6	66.1	66.7	65.9	65.2	65.8	68.9	69.1	71.1	65.8
63	62.5	64.0	63.0	65.4	64.9	63.2	63.0	63.4	62.9	63.5	62.5	64.5	67.0	67.4	69.4	65.9
80	63.9	65.2	64.6	65.1	64.6	64.1	62.9	63.4	63.2	63.4	63.7	65.5	67.2	68.4	69.6	65.9
100	70.1	69.6	70.2	70.9	68.2	67.4	68.2	65.9	67.2	68.7	67.7	68.5	71.1	70.6	70.7	67.0
125	73.8	76.9	76.1	74.9	74.4	72.3	71.9	72.8	71.9	72.8	73.3	73.7	74.4	73.1	72.6	69.3
160	74.3	74.9	74.9	73.8	71.9	71.1	70.3	70.6	70.9	71.8	72.3	73.5	72.4	72.3	71.6	69.0
200	77.4	76.9	75.3	74.3	70.3	68.9	68.8	69.6	68.9	68.9	69.4	70.0	71.6	71.4	70.6	68.8
250	81.6	82.1	80.4	78.7	75.7	74.1	71.7	71.7	72.1	73.2	74.7	75.7	76.4	76.4	74.2	70.5
315	89.1	91.5	93.3	93.6	88.3	86.3	86.0	83.0	83.1	86.0	85.3	85.9	87.6	86.6	85.8	82.5
400	85.6	84.6	85.4	84.2	80.6	78.7	77.2	75.9	77.1	78.9	79.7	81.2	81.6	81.4	79.1	75.0
500	84.4	84.1	83.2	82.4	79.7	77.1	75.4	75.6	76.4	78.1	78.7	80.0	81.4	83.1	80.6	75.1
630	85.7	86.4	88.0	85.5	83.4	80.0	80.4	80.5	80.7	81.5	82.4	83.6	86.7	86.7	83.7	78.6
800	83.1	84.1	84.8	83.1	81.0	77.5	76.3	76.8	77.5	79.6	81.3	82.5	83.2	84.0	80.1	74.8
1000	84.3	85.0	84.2	83.3	81.2	78.3	76.5	76.7	77.3	80.0	82.3	84.1	85.3	85.7	81.2	75.9
1250	81.6	83.4	82.4	82.3	80.8	76.8	74.4	74.8	75.3	77.6	79.3	80.5	82.6	83.3	79.4	73.0
1600	80.5	82.2	81.5	81.0	79.2	75.7	72.7	72.7	73.7	76.2	77.8	79.6	82.2	82.5	78.3	70.7
2000	79.8	80.8	80.3	80.5	78.5	74.3	71.0	70.8	72.3	74.2	76.5	77.3	80.7	80.7	76.0	69.7
2500	78.9	79.8	79.4	79.3	76.9	72.8	69.8	68.8	70.4	73.1	75.1	75.7	78.6	78.4	75.1	68.3
3150	78.7	79.7	78.8	79.0	76.5	73.0	69.5	67.7	69.3	72.2	74.2	75.1	77.0	77.2	74.0	67.8
4000	79.1	80.1	79.5	80.0	77.1	72.6	68.1	66.9	69.0	70.8	72.8	74.1	76.6	75.9	73.3	67.0
5000	78.5	78.1	78.1	79.3	76.3	71.3	67.0	64.9	67.4	68.8	71.6	72.1	75.3	73.8	71.9	64.7
6300	78.2	80.0	78.4	78.3	75.3	72.7	68.0	63.8	66.9	69.5	72.5	73.9	74.5	75.2	70.8	65.3
8000	79.5	79.7	79.1	78.6	75.4	71.7	66.9	63.9	67.8	68.7	71.7	72.9	75.5	74.7	72.1	65.3
10000	77.9	77.7	76.7	77.0	73.2	70.4	64.5	61.9	65.5	67.0	70.4	71.3	73.7	72.5	70.5	63.5
12500	76.0	76.5	75.2	76.4	72.5	68.7	62.7	59.5	64.2	65.7	68.9	70.1	73.2	71.2	69.7	61.9
16000	73.0	73.6	72.8	72.3	69.6	64.8	58.5	55.6	60.1	62.5	65.8	67.0	69.1	68.8	65.6	59.6
20000	70.0	69.5	68.8	68.8	65.3	61.0	54.3	52.3	57.2	59.2	61.5	63.6	65.8	65.1	62.8	55.9
OVERALL	97.7	98.5	97.1	96.7	93.1	90.4	89.3	88.0	88.5	90.6	91.5	92.6	94.5	94.5	91.8	87.0
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	71.7	78.5	83.5	86.1	84.3	82.8	82.1	81.0	81.9	84.0	84.4	84.5	85.4	83.5	77.8	68.6
304.8 M	62.4	69.9	75.4	78.2	76.5	75.1	74.7	73.6	74.4	76.6	76.7	76.8	77.3	75.2	69.6	60.1

TABLE VII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) 70 Percent speed; fan physical speed, 1541 rpm; fundamental blade passage frequency, 385 hertz

(b-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	107.9	100.2	98.1	103.2	100.9	103.2	101.9	98.4	98.9	99.7	98.7	103.0	103.4	101.4	102.1	100.8	101.5	119.2
63	95.5	96.3	96.3	95.3	97.0	95.9	97.0	96.6	95.5	96.0	96.3	96.7	100.3	100.8	102.3	100.3	97.7	115.4
80	97.5	97.6	96.8	95.0	96.1	95.1	95.6	95.8	95.8	95.5	97.8	98.4	101.1	102.3	102.8	101.3	98.2	115.9
100	102.7	102.9	103.0	102.2	100.0	101.0	101.2	99.5	100.9	101.9	102.4	102.8	103.9	103.7	104.0	101.8	102.1	119.8
125	106.0	107.5	106.5	106.2	106.4	103.9	104.5	104.7	104.4	105.4	105.9	106.0	106.4	105.9	105.0	102.9	105.5	123.2
160	104.1	107.2	106.9	105.2	104.9	103.4	103.2	102.7	103.9	104.2	104.9	105.5	105.1	105.4	103.4	101.9	104.6	122.3
200	103.9	108.9	106.9	103.9	102.7	101.2	101.1	100.6	101.1	101.4	102.2	103.1	104.2	103.7	103.7	101.1	103.3	121.0
250	112.1	112.2	110.1	108.2	107.2	106.1	103.7	103.7	104.2	105.9	107.2	108.2	108.9	108.6	106.1	102.1	107.3	125.0
315	117.0	117.6	116.6	114.5	113.6	112.6	109.6	108.1	108.8	109.6	110.0	112.7	112.1	111.6	108.8	105.0	112.2	129.9
400	126.5	128.1	130.1	127.3	128.0	126.6	123.3	118.8	120.3	121.3	121.3	124.7	123.8	123.5	119.8	114.5	124.7	142.4
500	116.1	116.5	115.6	114.8	113.6	110.6	109.3	108.5	109.5	111.3	112.3	113.7	114.8	115.3	111.5	107.3	112.8	130.5
630	115.3	116.8	116.0	115.0	113.0	110.0	109.0	108.8	110.6	112.3	112.8	113.4	115.5	114.8	110.5	106.2	112.9	130.6
800	118.9	120.0	120.7	119.4	117.9	113.9	113.9	114.7	116.7	116.9	118.4	120.8	120.9	120.7	116.4	112.6	118.2	135.9
1000	115.4	116.7	115.9	115.4	113.4	110.4	109.0	109.4	110.7	113.0	114.0	116.0	116.2	115.5	110.7	106.8	113.6	131.3
1250	116.1	118.0	116.8	116.5	114.8	111.5	110.3	110.5	111.6	114.3	114.0	116.6	117.1	117.3	112.0	107.2	114.6	132.3
1600	114.7	116.1	116.2	115.9	114.6	110.9	108.4	107.4	111.1	112.1	113.4	114.7	117.4	116.6	111.6	105.8	113.7	131.4
2000	113.6	115.0	115.0	115.1	113.5	110.0	105.1	105.3	107.3	110.0	111.5	112.1	115.5	113.8	109.5	103.5	111.9	129.6
2500	112.6	113.8	113.4	113.9	112.3	108.6	105.1	103.9	105.9	108.6	110.3	111.1	113.3	112.4	107.6	102.2	110.5	128.2
3150	112.4	113.7	113.4	113.7	111.9	109.0	105.0	103.0	104.7	107.5	109.7	110.5	111.4	111.4	106.7	101.6	109.9	127.6
4000	113.6	114.2	114.5	114.6	112.4	108.7	104.0	102.4	104.7	106.0	108.4	109.3	111.4	110.2	106.5	100.6	109.9	127.6
5000	113.0	113.1	113.4	114.5	111.8	107.8	103.0	100.9	103.3	104.8	107.8	107.4	110.2	108.3	105.8	98.9	109.0	126.7
6300	113.2	115.0	114.0	114.0	111.0	109.8	104.5	100.0	103.0	106.5	108.8	109.0	109.8	109.8	105.1	100.0	109.5	127.2
8000	114.7	115.2	115.0	114.7	112.0	109.4	103.7	100.7	104.4	106.2	108.5	109.1	111.4	110.2	106.6	100.4	110.1	127.8
10000	112.9	114.5	113.5	113.9	110.5	108.7	102.4	99.7	102.9	105.2	108.4	108.3	111.2	109.2	105.9	99.8	109.2	126.9
12500	114.1	114.3	113.0	114.5	111.3	108.6	102.1	99.1	103.6	105.3	108.8	108.6	111.3	109.3	106.8	99.5	109.4	127.1
16000	112.9	113.6	112.9	112.4	110.4	106.6	99.9	97.1	101.4	103.9	107.2	107.3	109.4	108.8	104.6	99.1	108.1	125.8
20000	112.5	112.3	111.8	111.8	108.1	105.0	98.3	96.7	101.2	103.3	106.0	106.6	108.8	108.0	104.2	98.1	107.1	124.8
OVERALL	130.1	131.4	132.2	130.5	130.0	128.1	125.1	122.5	124.2	125.4	126.3	128.5	128.9	128.4	124.5	119.9	127.8	145.6

TABLE VII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) Concluded. 70 Percent speed; fan physical speed, 1541 rpm; fundamental blade passage frequency, 385 hertz

(b-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	76.2	70.5	68.4	73.5	71.2	73.5	72.2	68.7	69.2	70.0	69.0	73.3	73.7	71.7	72.4	71.1
63	65.8	66.6	66.6	65.6	67.3	66.1	67.3	66.9	65.8	66.3	66.6	67.0	70.6	71.1	72.6	70.6
80	67.8	67.9	67.1	65.3	66.4	65.4	65.9	66.1	66.1	65.8	68.1	68.7	71.4	72.6	73.1	71.6
100	73.0	73.2	73.3	72.5	70.3	71.3	71.5	69.8	71.2	72.2	72.7	73.1	74.2	74.0	74.3	72.1
125	76.3	77.8	76.8	76.5	76.7	74.2	74.8	75.0	74.7	75.7	76.2	76.3	76.7	76.2	75.3	73.2
160	76.4	77.5	77.2	75.5	75.2	73.7	73.5	73.0	74.2	74.5	75.2	75.8	75.4	75.7	73.7	72.2
200	79.2	75.2	77.2	74.2	73.0	71.5	71.4	70.9	71.4	71.7	72.5	73.4	74.5	74.0	74.0	71.4
250	82.4	82.5	80.4	78.5	77.5	76.4	74.0	74.0	74.5	76.2	77.5	78.5	79.2	78.9	76.4	72.4
315	87.3	87.9	86.9	84.8	83.9	82.9	79.9	78.4	79.1	79.9	80.3	83.0	82.4	81.9	79.1	75.3
400	96.7	98.3	100.3	97.5	98.2	96.8	93.5	89.0	90.5	91.5	91.5	94.9	94.0	93.7	90.0	84.7
500	86.3	86.7	85.8	85.0	83.8	80.8	79.5	78.7	79.7	81.5	82.5	83.9	85.0	85.5	81.7	77.5
630	85.5	87.0	86.2	85.2	83.2	80.2	79.2	79.0	80.8	82.5	83.0	83.6	85.7	85.0	80.7	76.4
800	89.1	90.2	90.5	89.6	88.1	84.1	84.1	84.9	86.9	87.1	88.6	91.0	91.1	90.9	86.6	82.8
1000	85.6	86.9	86.1	85.6	83.6	80.6	79.2	79.6	80.9	83.2	84.2	86.2	86.4	85.7	80.9	77.0
1250	86.2	88.1	86.9	86.6	84.9	81.6	80.4	80.6	81.7	84.4	84.1	86.7	87.2	87.4	82.1	77.3
1600	84.8	86.2	86.3	86.0	84.7	81.0	78.5	77.5	81.2	82.2	83.5	84.8	87.5	86.7	81.7	75.9
2000	83.6	85.0	85.0	85.1	83.5	80.0	76.1	75.3	77.3	80.0	81.5	82.1	85.5	83.8	79.5	73.5
2500	82.5	83.7	83.3	83.8	82.2	78.5	75.0	73.8	75.8	78.5	80.2	81.0	83.2	82.3	77.5	72.1
3150	82.1	83.4	83.1	83.4	81.6	78.7	74.7	72.7	74.4	77.2	79.4	80.2	81.1	81.1	76.4	71.3
4000	83.1	83.7	84.0	84.1	81.9	78.2	73.5	71.9	74.2	75.5	77.9	78.8	80.5	79.7	76.0	70.1
5000	82.2	82.3	82.6	83.7	81.0	77.0	72.2	70.1	72.5	74.0	77.0	76.6	79.5	77.5	75.0	68.1
6300	81.5	83.7	82.7	82.7	79.7	78.5	73.2	68.7	71.7	75.2	77.5	77.7	78.5	78.5	73.8	68.7
8000	82.7	83.3	83.1	82.8	80.1	77.5	71.8	68.8	72.5	74.3	76.6	77.2	79.4	78.3	74.6	68.5
10000	81.0	81.6	80.6	81.0	77.6	75.8	69.5	66.8	70.0	72.3	75.5	75.4	78.2	76.3	73.0	66.9
12500	79.8	80.0	78.7	80.2	77.0	74.3	67.8	64.8	69.3	71.0	74.5	74.3	77.0	75.0	72.5	65.2
16000	76.7	77.4	76.7	76.2	74.2	70.4	63.8	60.9	65.2	67.7	71.0	71.1	73.2	72.6	68.4	62.9
20000	73.6	73.4	72.9	72.9	69.3	66.1	59.4	57.8	62.3	64.4	67.1	67.7	69.9	69.1	65.3	59.2
OVERALL	100.0	101.3	102.2	100.4	100.1	98.2	95.3	92.6	94.3	95.5	96.2	96.6	98.9	98.4	94.5	89.9
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	74.5	84.1	89.2	90.3	91.7	90.8	88.6	86.4	88.3	89.6	89.9	91.2	90.4	88.0	81.4	72.1
304.8 M	65.1	75.7	81.3	82.5	84.1	83.3	81.3	79.1	81.0	82.2	82.4	83.7	82.7	80.2	73.4	63.6

TABLE VII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) 86 Percent speed; fan physical speed, 1887 rpm; fundamental blade passage frequency, 471 hertz

(c-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE POWER LEVEL	
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	102.0	99.5	101.0	101.0	101.2	100.3	101.7	102.2	103.0	103.0	103.2	104.6	104.8	106.3	107.3	106.2	103.4	121.1
63	111.0	102.5	101.8	99.8	100.8	100.6	104.8	100.8	103.6	103.6	105.5	105.4	106.1	106.8	107.8	106.4	104.5	122.2
80	101.0	101.0	99.0	98.8	99.0	98.0	98.0	99.5	101.7	102.2	103.5	104.6	106.7	108.5	109.2	108.4	103.7	121.4
100	107.2	107.2	107.3	105.2	103.0	104.0	103.0	103.7	105.8	106.5	107.7	108.3	109.5	110.3	110.0	108.7	107.0	124.7
125	110.7	112.3	111.0	110.3	109.2	107.2	107.5	107.8	109.2	109.8	110.5	112.1	111.7	111.0	111.7	108.9	110.1	127.8
160	110.3	110.8	110.3	109.7	107.8	107.3	106.8	107.3	108.7	108.8	109.8	110.4	109.7	109.7	109.2	107.4	109.0	126.7
200	111.7	113.0	111.5	108.5	108.2	105.7	105.0	106.0	106.7	106.9	107.5	108.3	108.9	108.7	108.5	106.6	108.1	125.8
250	114.6	116.5	114.5	112.6	111.1	109.5	108.5	108.8	110.0	111.5	112.1	112.7	112.6	112.6	112.6	110.3	111.7	129.4
315	118.2	118.4	115.5	113.0	111.4	110.0	108.9	110.4	111.7	112.2	113.2	113.5	112.9	113.7	110.0	107.7	112.7	130.4
400	123.7	124.0	126.0	123.7	120.8	119.5	116.5	118.3	119.2	119.7	119.2	120.6	120.7	118.3	114.8	113.4	120.5	138.2
500	131.2	131.7	135.7	133.4	128.7	129.2	125.4	127.0	128.2	128.0	126.0	128.3	129.5	125.4	122.0	120.7	129.2	146.9
630	119.9	121.2	120.6	118.6	116.7	114.1	113.2	113.6	115.7	117.6	118.2	118.2	119.4	118.2	113.2	110.8	117.3	135.0
800	120.3	120.8	121.0	119.8	118.6	115.5	115.0	116.0	117.6	119.1	121.0	120.2	121.3	120.1	114.8	111.8	118.9	136.6
1000	124.1	124.5	125.1	124.5	125.1	120.3	118.3	118.5	121.0	122.1	123.8	124.1	125.1	122.6	117.1	115.9	122.7	140.4
1250	119.1	121.0	121.0	120.1	118.8	115.6	114.1	115.1	116.6	118.0	119.6	120.6	121.3	119.0	114.0	111.2	118.5	136.2
1600	119.3	121.3	122.1	121.3	120.4	117.1	114.3	114.8	116.6	117.6	119.3	120.4	122.6	119.3	113.8	110.3	119.0	136.7
2000	119.4	121.1	121.2	121.2	120.1	117.2	114.1	113.4	115.2	116.7	118.6	119.7	122.1	119.1	113.6	110.0	118.5	136.2
2500	117.9	120.2	119.4	120.4	118.6	115.7	112.6	112.2	113.4	115.1	117.2	117.7	119.2	116.9	111.4	108.0	116.8	134.5
3150	117.7	119.9	119.4	119.7	118.1	115.6	112.7	111.2	112.4	114.9	116.7	117.5	117.6	116.4	110.9	107.5	116.3	134.0
4000	118.8	120.3	120.2	121.0	118.5	115.6	111.8	111.0	112.1	113.3	115.6	116.4	117.6	115.5	111.0	106.9	116.3	134.0
5000	118.2	118.8	118.8	120.7	117.7	113.8	110.5	109.3	111.0	111.7	114.7	114.1	116.3	113.2	109.5	104.8	115.1	132.8
6300	118.2	120.3	118.5	119.0	116.3	115.7	111.3	108.3	110.0	112.8	115.5	115.8	115.6	114.5	108.7	105.1	115.1	132.8
8000	119.7	120.7	119.8	120.0	117.2	114.8	110.8	108.8	111.8	112.5	115.3	115.0	117.0	114.5	110.5	105.7	115.6	133.3
10000	118.4	119.2	118.2	119.1	115.4	114.1	109.2	107.7	110.2	111.0	114.4	114.5	115.9	113.4	109.9	104.5	114.4	132.1
12500	118.7	119.4	117.4	119.4	115.5	113.7	108.7	107.0	110.7	111.0	114.7	114.5	116.6	113.4	110.7	104.4	114.5	132.2
16000	117.2	118.4	116.9	117.2	114.3	111.7	106.5	105.0	108.5	110.2	113.7	113.6	114.7	112.9	108.8	104.2	113.1	130.8
20000	116.7	117.0	116.0	115.7	112.5	109.8	105.0	104.7	108.4	109.0	112.2	112.7	114.0	112.6	108.2	103.1	112.0	129.7
OVERALL	134.9	135.7	137.7	136.2	133.2	131.9	128.7	129.6	131.0	131.6	131.9	132.9	134.1	131.4	127.3	125.1	132.7	150.4

TABLE VII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) Concluded. 86 Percent speed; fan physical speed, 1887 rpm; fundamental blade passage frequency, 471 hertz

(c-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	72.3	69.8	71.3	71.3	71.5	70.6	72.0	72.5	73.3	73.3	73.5	74.9	75.1	76.6	77.6	76.5
63	81.3	72.8	72.1	70.1	71.1	70.9	75.1	71.1	73.9	73.9	75.8	75.7	76.4	77.1	78.1	76.7
80	71.3	71.3	69.3	69.1	69.3	68.3	68.3	69.8	72.0	72.5	73.8	74.9	77.0	78.8	79.5	78.7
100	77.5	77.5	77.6	75.5	73.3	74.3	73.3	74.0	76.1	76.8	78.0	78.6	79.8	80.6	80.3	79.0
125	81.0	82.6	81.3	80.6	79.5	77.5	77.8	78.1	79.5	80.1	80.8	82.4	82.0	81.3	82.0	79.2
160	80.6	81.1	80.6	80.0	78.1	77.6	77.1	77.6	79.0	79.1	80.1	80.7	80.0	80.0	79.5	77.7
200	82.0	83.3	81.8	78.8	78.5	76.0	75.3	76.3	77.0	77.2	77.8	78.6	79.2	79.0	78.8	76.9
250	84.9	86.8	84.8	82.9	81.4	79.8	78.8	79.1	80.3	81.8	82.4	83.0	82.9	82.9	80.6	77.8
315	88.5	88.7	85.8	83.3	81.7	80.3	79.2	80.7	82.0	82.5	83.5	83.8	83.2	84.0	80.3	78.0
400	92.9	94.2	96.2	93.9	91.0	89.7	86.7	88.5	89.4	89.9	89.4	90.8	90.9	88.5	85.0	83.6
500	101.4	101.9	105.9	103.6	98.9	99.4	95.6	97.2	98.4	98.2	96.2	98.5	99.7	95.6	92.2	90.9
630	90.1	91.4	90.8	88.8	86.9	84.3	83.4	83.8	85.9	87.8	88.4	88.4	89.6	88.4	83.4	81.0
800	90.5	91.0	91.2	90.0	88.8	85.7	85.2	86.2	87.8	89.3	91.2	90.4	91.5	90.3	85.0	82.0
1000	94.3	94.7	95.3	94.7	95.3	90.5	88.5	88.7	91.2	92.3	94.0	94.3	95.3	92.8	87.3	86.1
1250	89.2	91.1	91.1	90.2	88.9	85.7	84.2	85.2	86.7	88.1	89.7	90.7	91.4	89.1	84.1	81.3
1600	89.4	91.4	92.2	91.4	90.5	87.2	84.4	84.9	86.7	87.7	89.4	90.5	92.7	89.4	83.9	80.4
2000	89.4	91.1	91.2	91.2	90.1	87.2	84.1	83.4	85.2	86.7	88.6	89.7	92.1	89.1	83.6	80.0
2500	87.8	90.1	89.3	90.3	88.5	85.6	82.5	82.1	83.3	85.0	87.1	87.6	89.1	86.8	81.3	77.9
3150	87.4	89.6	89.1	89.4	87.8	85.3	82.4	80.9	82.1	84.6	86.4	87.2	87.2	86.1	80.6	77.2
4000	88.3	89.8	89.7	90.5	88.0	85.1	81.3	80.5	81.6	82.8	85.1	85.9	87.1	85.0	80.5	76.4
5000	87.4	88.0	88.0	89.9	86.9	83.0	79.7	78.5	80.2	80.9	83.9	83.3	85.5	82.4	78.7	74.0
6300	86.9	89.0	87.2	87.7	85.0	84.4	80.0	77.0	78.7	81.5	84.2	84.5	84.3	83.2	77.4	73.8
8000	87.7	88.8	87.9	88.0	85.3	82.9	78.9	76.9	79.8	80.6	83.4	83.1	85.0	82.6	78.5	73.8
10000	85.5	86.3	85.3	86.2	82.5	81.2	76.3	74.8	77.3	78.1	81.5	81.6	83.0	80.5	77.0	71.6
12500	84.4	85.1	83.1	85.1	81.2	79.4	74.4	72.7	76.4	76.7	80.4	80.2	82.3	79.1	76.4	70.1
16000	81.0	82.2	80.7	81.1	78.1	75.6	70.4	68.8	72.3	74.0	77.5	77.4	78.5	76.7	72.6	68.0
20000	77.8	78.1	77.1	76.8	73.6	70.9	66.1	65.8	69.5	70.1	73.3	73.8	75.1	73.7	69.3	64.2
OVERALL	104.7	105.5	107.8	106.1	103.1	101.8	98.7	99.7	101.1	101.6	101.8	102.9	104.0	101.3	97.3	95.2
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	79.1	88.5	94.6	96.0	94.9	94.9	92.7	93.8	95.4	95.9	95.6	96.0	95.8	91.2	84.4	77.9
304.8 M	69.5	79.7	86.6	88.0	87.0	87.3	85.2	86.5	88.1	88.5	88.0	88.4	88.1	83.2	76.3	69.4

TABLE VII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) 93 Percent speed; fan physical speed, 2047 rpm; fundamental blade passage frequency, 511 hertz

(d-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	103.0	101.5	104.2	102.7	102.8	102.7	104.5	104.2	104.8	103.5	105.5	106.4	106.8	108.5	111.0	108.4	105.6	123.3
63	103.3	103.5	103.0	101.5	102.3	104.1	105.6	103.1	104.3	104.1	103.8	106.2	107.1	109.3	110.1	109.5	105.6	123.3
80	102.8	103.5	101.8	100.0	101.0	101.5	102.0	102.0	103.0	104.5	105.5	107.6	109.3	111.6	112.1	111.0	106.4	124.1
100	111.5	110.1	107.6	107.3	105.3	109.3	107.6	106.3	108.6	109.3	109.5	110.7	111.1	112.5	113.0	111.7	109.6	127.3
125	110.7	113.2	112.0	111.7	109.5	108.8	109.3	110.2	111.3	111.8	112.3	113.6	113.5	113.5	113.7	111.4	111.8	129.5
160	112.5	113.5	112.0	110.3	109.7	110.0	109.3	111.7	110.7	111.3	112.0	113.1	112.5	111.7	111.7	110.1	111.4	129.1
200	114.1	114.1	112.4	108.8	108.4	107.6	106.8	107.9	108.8	108.9	109.6	110.2	111.1	110.6	111.3	109.3	109.8	127.5
250	116.1	117.1	115.6	113.6	112.6	111.6	109.9	110.6	110.4	112.1	113.3	114.5	115.1	114.1	112.6	109.5	113.1	130.8
315	119.0	119.1	116.0	114.6	112.8	111.3	111.0	111.8	112.6	114.0	115.3	116.1	115.1	114.0	112.1	110.0	114.2	131.9
400	120.5	122.8	121.7	119.8	116.8	115.0	114.8	115.2	115.5	117.2	118.5	119.9	119.0	118.2	115.0	112.6	118.0	135.7
500	130.5	134.8	134.2	130.2	130.2	127.2	127.3	127.2	125.7	126.3	126.3	127.1	129.3	127.3	123.5	122.4	128.7	146.4
630	121.5	123.4	122.5	121.2	119.7	116.8	116.8	117.0	117.8	119.8	120.2	121.1	121.7	119.7	115.5	113.4	119.7	137.4
800	120.2	121.6	121.6	120.9	119.6	117.4	116.9	118.1	118.7	120.9	121.9	121.8	122.4	120.7	115.7	113.1	120.1	137.8
1000	124.7	125.6	127.6	127.2	125.6	122.6	121.1	122.4	121.9	125.4	125.4	128.2	126.7	123.4	119.1	116.5	124.9	142.6
1250	120.0	122.0	122.2	122.2	120.7	118.2	116.7	117.5	118.5	120.4	121.7	123.1	122.9	119.7	115.4	113.1	120.4	138.1
1600	121.9	124.2	124.6	124.9	123.4	121.2	117.9	118.4	118.7	120.4	122.6	123.0	126.1	121.4	116.7	112.6	122.1	139.8
2000	120.6	122.8	123.0	123.5	122.3	119.6	115.7	116.1	117.0	118.5	120.5	122.1	124.0	120.0	115.0	111.5	120.5	138.2
2500	119.2	121.4	121.4	122.0	120.9	118.5	116.0	114.7	115.5	117.4	119.5	120.6	121.5	118.0	113.4	109.9	119.0	136.7
3150	119.4	121.4	121.1	121.4	120.4	118.4	115.6	113.8	114.9	117.1	118.8	119.7	119.9	117.8	112.4	109.7	118.4	136.1
4000	120.1	121.8	121.8	122.3	120.6	117.8	114.8	113.5	114.5	116.1	118.0	118.9	120.0	117.1	112.8	108.9	118.3	136.0
5000	119.6	120.5	120.6	122.0	119.3	116.3	113.1	111.3	112.9	114.1	116.8	116.9	118.8	114.5	111.6	106.9	117.0	134.7
6300	119.4	121.8	119.9	120.4	117.9	117.6	113.6	110.6	111.9	115.1	117.3	118.1	118.1	115.8	110.6	107.3	116.9	134.6
8000	120.6	122.3	121.3	121.5	118.4	116.9	112.9	110.9	113.5	114.4	116.8	117.5	119.3	115.9	111.8	107.6	117.3	135.0
10000	119.5	120.7	119.7	120.4	116.4	116.0	111.0	109.9	111.5	113.4	116.0	116.4	118.0	114.5	111.1	106.3	116.0	133.7
12500	119.7	120.7	119.2	120.7	116.7	115.6	110.7	109.1	111.8	113.0	116.5	116.6	118.5	114.8	112.0	106.0	116.1	133.8
16000	118.4	120.2	118.4	118.5	115.7	113.3	108.7	107.0	109.8	111.9	114.8	115.2	116.5	113.9	110.0	105.3	114.6	132.3
20000	118.4	119.0	117.7	117.5	113.7	111.7	107.2	106.6	109.6	111.2	113.7	114.7	115.7	113.4	110.1	104.5	113.7	131.4
OVERALL	135.1	137.8	137.4	135.9	134.7	132.2	130.8	130.9	130.7	132.5	133.4	134.6	135.4	132.8	129.1	126.8	133.6	151.3

TABLE VII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) Concluded. 93 Percent speed; fan physical speed, 2047 rpm; fundamental blade passage frequency, 511 hertz

(d-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	73.3	71.8	74.5	73.0	73.1	73.0	74.8	74.5	75.1	73.8	75.8	76.7	77.1	78.8	81.3	78.7
63	73.6	73.8	73.3	71.8	72.6	74.4	75.9	73.4	74.6	74.4	74.1	76.5	77.4	79.6	80.4	79.8
80	73.1	72.8	72.1	70.3	71.3	71.8	72.3	72.3	73.3	74.8	75.8	77.9	79.6	81.9	82.4	81.3
100	81.8	80.4	77.9	77.6	75.6	79.6	77.9	76.6	78.9	79.6	79.8	81.0	81.4	82.8	83.3	82.0
125	81.0	82.5	82.3	82.0	79.8	79.1	79.6	80.5	81.6	82.1	82.6	83.9	83.8	83.8	84.0	81.7
160	82.8	83.8	82.3	80.6	80.0	80.3	79.6	82.0	81.0	81.6	82.3	83.4	82.8	82.0	82.0	80.4
200	84.4	84.4	82.7	79.1	78.7	77.9	77.1	78.2	79.1	79.2	79.9	80.5	81.4	80.9	81.6	79.6
250	86.4	87.4	85.9	83.9	82.9	81.9	80.2	80.9	80.7	82.4	83.6	84.8	85.4	84.4	82.9	79.8
315	89.3	89.4	86.3	84.9	83.1	81.6	81.3	82.1	82.9	84.3	85.6	86.4	85.4	84.3	82.4	80.3
400	90.7	93.0	91.9	90.0	87.0	85.2	85.0	85.4	85.7	87.4	88.7	90.1	89.2	88.4	85.2	82.8
500	100.7	105.0	104.4	100.4	100.4	97.4	97.5	97.4	95.9	96.9	96.5	97.3	99.5	97.5	93.7	92.6
630	91.7	94.0	92.7	91.4	89.9	87.0	87.0	87.2	88.0	90.0	90.4	91.3	91.9	89.9	85.7	83.6
800	90.4	91.8	91.8	91.1	89.8	87.6	87.1	88.3	88.9	91.1	92.1	92.0	92.6	90.9	85.9	83.3
1000	94.9	95.8	97.8	97.4	95.8	92.8	91.3	92.6	92.1	95.6	95.6	98.4	96.9	93.6	89.3	86.7
1250	90.1	92.1	92.3	92.3	90.8	88.3	86.8	87.6	88.6	90.5	91.8	93.2	93.0	89.8	85.5	83.2
1600	92.0	94.3	94.7	95.0	93.5	91.3	88.0	88.5	88.8	90.5	92.7	93.1	96.2	91.5	86.8	82.7
2000	90.6	92.8	93.0	93.5	92.3	89.6	86.7	86.1	87.0	88.5	90.5	92.1	94.0	90.0	85.0	81.5
2500	89.1	91.3	91.3	91.9	90.8	88.4	85.9	84.6	85.4	87.3	89.4	90.5	91.4	87.9	83.3	79.8
3150	89.1	91.1	90.8	91.1	90.1	88.1	85.3	83.5	84.6	86.8	88.5	89.4	89.6	87.5	82.1	79.4
4000	89.6	91.3	91.3	91.8	90.1	87.3	84.3	83.0	84.0	85.6	87.5	88.4	89.5	86.6	82.3	78.4
5000	88.8	89.7	89.8	91.2	88.5	85.5	82.3	80.5	82.1	83.3	86.0	86.1	88.0	83.7	80.8	76.1
6300	88.1	90.5	88.6	89.1	86.6	86.3	82.3	79.3	80.6	83.8	86.0	86.8	86.8	84.5	79.3	76.0
8000	88.6	90.4	89.4	89.6	86.5	85.0	81.0	79.0	81.6	82.5	84.9	85.6	87.4	84.0	79.8	75.7
10000	86.6	87.8	86.8	87.5	83.5	83.1	78.1	77.0	78.6	80.5	83.1	83.5	85.1	81.6	78.2	73.4
12500	85.4	86.4	84.9	86.4	82.4	81.3	76.4	74.8	77.5	78.7	82.2	82.3	84.2	80.5	77.7	71.7
16000	82.2	84.0	82.2	82.3	79.5	77.2	72.5	70.8	73.6	75.7	78.6	79.0	80.3	77.7	73.8	69.1
20000	79.5	80.1	78.8	78.6	74.8	72.8	68.3	67.7	70.7	72.3	74.8	75.8	76.8	74.5	71.2	65.6
OVERALL	104.8	107.7	107.3	105.7	104.5	102.0	100.8	100.9	100.6	102.4	103.2	104.5	105.3	102.7	99.0	96.9
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	79.2	90.6	94.5	95.5	96.4	95.3	95.0	95.2	95.2	96.6	97.3	97.5	97.5	92.7	86.2	79.7
304.8 M	69.3	82.0	86.3	87.3	88.6	87.5	87.4	87.8	87.7	89.1	89.4	89.4	89.3	84.7	78.0	71.2

TABLE VII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(e) 100 Percent speed; fan physical speed, 2201 rpm; fundamental blade passage frequency, 550 hertz

(e-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	105.4	102.9	104.2	103.7	105.4	104.1	104.7	105.6	105.4	105.7	108.1	107.8	108.9	110.4	112.9	112.1	107.4	125.1
63	102.2	104.9	102.7	103.0	104.4	103.9	103.4	103.2	103.7	104.5	106.7	107.0	109.9	111.9	113.9	112.9	107.4	125.1
80	108.6	105.6	105.5	103.5	106.0	107.1	104.8	104.3	106.6	106.5	109.3	109.5	112.1	113.6	115.6	114.5	109.5	127.2
100	109.7	109.6	109.5	107.9	108.5	108.4	107.9	107.0	109.0	110.0	111.9	112.1	114.0	115.2	115.7	114.8	111.4	129.1
125	112.4	114.4	114.4	112.9	111.1	111.7	111.1	110.9	111.4	112.9	114.9	115.2	116.1	116.1	116.4	113.8	113.7	131.4
160	113.3	114.5	113.6	112.6	111.5	111.8	111.0	111.3	112.6	114.5	115.0	116.2	115.8	115.3	114.8	113.5	113.8	131.5
200	114.6	116.1	113.7	112.6	109.7	109.6	109.1	109.1	109.9	110.9	111.7	113.2	113.7	113.7	113.9	112.3	112.0	129.7
250	118.1	118.6	116.7	114.6	113.7	112.6	110.6	110.9	112.9	114.6	115.9	116.8	117.1	116.7	114.4	112.3	114.9	132.6
315	119.5	119.8	118.3	116.3	115.3	114.6	113.3	113.5	115.5	115.8	117.6	118.9	119.3	118.0	115.6	113.2	116.7	134.4
400	121.1	121.3	121.9	119.6	117.6	116.1	114.9	115.8	116.6	118.1	119.9	121.0	121.1	118.8	115.9	113.8	118.7	136.4
500	129.1	132.6	130.3	131.8	128.3	128.6	128.6	124.3	124.6	125.3	127.6	128.2	126.6	125.3	121.1	119.5	127.8	145.5
630	125.8	129.3	126.7	128.0	125.2	125.5	125.3	122.0	122.8	123.5	125.3	126.4	125.5	124.2	119.7	117.5	125.1	142.8
800	120.7	122.7	122.7	122.2	120.7	118.9	118.9	119.7	121.5	122.7	124.0	123.8	124.5	122.5	117.4	114.4	121.5	139.6
1000	124.7	128.1	128.6	127.7	126.4	125.1	123.7	123.4	122.7	124.9	125.4	127.0	128.2	125.1	119.4	117.3	125.6	143.3
1250	123.4	126.3	126.9	126.4	125.1	123.4	122.1	122.1	122.1	123.8	124.6	126.0	127.1	124.3	118.9	116.7	124.4	142.1
1600	123.1	125.3	126.3	126.6	124.1	122.8	120.8	120.6	122.1	122.6	124.7	125.9	128.3	122.6	118.0	114.7	124.1	141.8
2000	121.3	123.5	124.0	124.1	122.6	121.1	118.8	118.0	119.6	120.8	122.6	123.4	126.3	121.0	116.3	113.4	122.0	139.7
2500	120.3	122.2	122.7	123.7	122.3	120.3	117.8	116.8	118.2	119.8	121.7	122.4	124.2	120.2	115.2	112.2	120.9	138.6
3150	119.9	121.8	122.1	122.8	121.3	120.1	117.9	116.1	117.8	120.1	121.6	122.4	122.8	120.1	114.6	111.7	120.4	138.1
4000	120.4	122.0	122.5	122.9	121.0	119.4	116.2	115.4	117.0	118.0	120.4	121.2	122.7	119.0	114.5	110.8	119.8	137.5
5000	119.2	120.2	120.9	121.9	119.9	117.2	114.7	113.1	115.2	116.1	119.4	119.2	121.6	116.7	113.2	108.7	118.3	136.0
6300	118.7	121.6	119.7	120.7	118.0	118.4	115.1	112.0	113.9	117.1	119.7	120.4	120.1	116.1	112.4	108.7	118.1	135.8
8000	120.2	121.5	120.5	120.9	118.4	117.2	113.8	112.2	115.4	116.3	118.8	119.2	121.2	117.5	113.4	109.1	118.0	135.7
10000	118.7	119.7	119.2	119.9	116.3	116.4	112.0	111.0	113.5	114.8	118.4	118.2	120.2	116.2	112.7	108.1	116.8	134.5
12500	118.6	120.0	118.1	120.1	116.8	115.8	111.6	110.3	113.6	114.8	118.3	118.3	120.5	116.1	113.5	107.8	116.8	134.5
16000	117.1	119.0	117.7	117.6	115.5	113.3	109.6	108.0	111.6	113.3	116.5	116.5	117.8	115.5	111.5	107.1	115.0	132.7
20000	117.1	117.3	116.7	116.9	113.2	111.5	107.5	107.4	110.9	112.4	115.0	115.7	117.0	114.5	111.1	106.0	113.9	131.6
OVERALL	135.2	137.8	137.0	137.5	135.2	134.4	133.3	131.5	132.3	133.6	135.4	136.2	137.1	134.2	130.3	128.0	134.8	152.6

TABLE VII. - Concluded. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(e) Concluded. 100 Percent speed; fan physical speed, 2201 rpm; fundamental blade passage frequency, 550 hertz

(e-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	75.7	73.2	74.5	74.0	75.7	74.4	75.0	75.9	75.7	76.0	78.4	78.1	79.2	80.7	83.2	82.4
63	72.5	75.2	73.0	73.3	74.7	74.2	73.7	73.5	74.0	74.8	77.0	77.3	80.2	82.2	84.2	83.2
80	78.9	79.9	75.8	73.8	76.3	77.4	75.1	74.6	76.9	76.8	79.6	79.8	82.4	82.9	85.9	84.8
100	80.6	79.8	79.9	78.2	78.8	78.7	78.2	77.3	79.3	80.3	82.2	83.4	84.3	85.5	86.0	85.1
125	82.7	84.7	84.7	83.2	81.4	82.0	81.4	81.2	81.7	83.2	85.2	85.5	86.4	86.4	86.7	84.1
160	82.6	84.8	83.9	82.9	81.8	82.1	81.3	81.6	82.9	84.8	85.3	86.5	86.1	85.6	85.1	83.8
200	84.9	86.4	84.0	82.9	80.0	79.9	79.4	79.4	80.2	81.2	82.0	83.5	84.0	84.0	84.2	82.6
250	85.4	88.0	87.3	84.9	84.0	82.9	80.9	81.2	83.2	84.9	86.2	87.1	87.4	87.0	84.7	82.6
315	85.8	90.1	88.6	86.5	85.6	84.9	83.6	83.8	85.8	86.1	87.9	89.2	89.6	88.3	85.9	83.5
400	91.3	91.6	92.1	89.8	87.8	86.3	85.1	86.0	86.8	88.3	90.1	91.2	91.3	89.0	86.1	84.0
500	99.3	102.9	100.5	102.0	98.5	98.8	98.8	94.5	94.8	95.5	97.8	98.4	96.8	95.5	91.3	89.7
630	96.0	99.5	96.9	98.2	95.4	95.7	95.5	92.2	93.0	93.7	95.5	96.6	95.7	94.4	89.9	87.7
800	90.9	92.9	92.9	92.4	90.9	89.1	89.1	89.9	91.7	92.9	94.2	94.0	94.7	92.7	87.6	84.6
1000	94.9	98.3	93.8	97.9	96.6	95.3	93.9	93.6	92.9	95.1	95.6	97.2	98.4	95.3	89.6	87.5
1250	93.5	96.4	97.0	96.5	95.2	93.5	92.2	92.2	92.2	93.9	94.7	96.1	97.2	94.4	89.0	86.8
1600	93.2	95.4	96.4	96.7	94.2	92.9	90.9	90.7	92.2	92.7	94.8	96.0	98.4	92.7	88.1	84.8
2000	91.3	93.5	94.0	94.1	92.6	91.1	88.8	88.0	89.6	90.8	92.6	93.4	96.3	91.0	86.3	83.4
2500	90.2	92.1	92.6	93.6	92.2	90.2	87.7	86.7	88.1	89.7	91.6	92.3	94.1	90.1	85.1	82.1
3150	89.6	91.5	91.8	92.5	91.0	89.0	87.6	85.8	87.5	89.8	91.3	92.1	92.5	89.8	84.3	81.4
4000	89.9	91.5	92.0	92.4	90.5	88.9	85.7	84.9	86.5	87.5	89.9	90.7	92.2	88.5	84.0	80.3
5000	88.4	85.4	90.1	91.1	89.1	86.4	83.9	82.3	84.4	85.3	88.6	88.4	90.8	85.9	82.4	77.9
6300	87.4	90.3	88.4	89.4	86.7	87.1	83.8	80.7	82.6	85.8	88.4	89.1	88.8	86.8	81.1	77.4
8000	88.2	89.6	88.6	89.0	86.5	85.3	81.9	80.3	83.5	84.4	86.9	87.3	89.2	85.6	81.4	77.2
10000	85.8	86.8	86.3	87.0	83.4	83.5	79.1	78.1	80.6	81.9	85.5	85.3	87.3	83.3	79.8	75.2
12500	84.3	85.7	83.8	85.8	82.5	81.5	77.3	76.0	79.3	80.5	84.0	84.0	86.2	81.8	79.2	73.5
16000	80.9	82.8	81.5	81.5	79.3	77.2	73.5	71.8	75.4	77.1	80.3	80.3	81.7	79.3	75.3	70.9
20000	78.2	78.4	77.8	78.0	74.4	72.6	68.6	68.5	72.0	73.5	76.1	76.8	78.1	75.6	72.2	67.1
OVERALL	105.1	107.8	107.0	107.4	105.1	104.3	103.3	101.5	102.3	103.5	105.2	106.1	106.9	104.1	100.2	98.0
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	79.1	90.3	93.8	97.1	97.1	97.2	97.0	95.7	97.2	98.4	99.6	99.6	99.8	94.1	87.0	80.0
304.8 M	69.2	81.6	85.4	89.0	88.7	89.5	89.5	88.0	89.4	90.3	91.6	91.6	91.6	85.6	78.4	71.3

TABLE VIII. - FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 105 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) 60 Percent speed; fan physical speed, 1332 rpm; fundamental blade passage frequency, 333 hertz

(a-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	101.0	96.7	96.4	97.7	97.4	98.7	99.7	98.7	94.7	96.4	97.7	95.9	98.0	97.7	97.0	95.4	97.6	115.3
63	95.0	94.7	95.0	96.7	96.7	97.0	97.7	96.7	93.7	94.0	96.3	95.6	98.0	97.7	98.0	96.0	96.4	114.1
80	96.8	96.1	96.1	96.7	96.1	97.1	96.1	94.7	93.7	95.4	96.7	96.7	98.4	98.1	98.4	96.5	96.5	114.2
100	100.4	99.4	101.1	99.4	97.8	99.1	97.8	96.1	97.8	98.8	99.8	99.0	101.1	99.8	99.4	96.8	99.0	116.7
125	103.4	105.7	104.7	104.7	103.7	101.7	102.4	100.4	101.4	103.4	105.0	104.0	105.0	104.4	103.7	100.1	103.5	121.2
160	104.0	104.0	103.0	103.0	101.0	100.0	99.4	98.7	100.0	100.4	101.7	102.5	102.0	102.0	100.4	98.7	101.3	119.0
200	106.7	107.0	106.0	102.7	100.7	99.7	99.4	98.7	98.7	99.0	101.0	100.6	101.4	100.0	99.7	98.8	101.3	119.0
250	111.1	110.7	110.1	108.1	105.4	104.7	101.7	101.7	102.4	104.4	106.4	106.6	108.1	107.7	105.4	101.8	106.2	123.9
315	122.1	124.1	123.1	122.7	121.7	119.7	117.7	117.1	117.7	117.4	119.7	120.0	120.7	117.7	120.1	116.5	120.0	137.7
400	115.1	116.1	116.4	114.4	113.1	111.1	109.1	108.7	109.1	109.7	111.7	112.7	112.7	111.4	110.4	107.1	112.0	129.7
500	113.1	113.7	113.4	111.7	110.4	107.4	105.7	105.1	107.1	108.4	109.7	111.7	111.7	112.4	109.1	103.1	110.0	127.7
630	115.4	115.8	116.1	114.8	114.1	111.8	109.4	109.4	111.1	113.1	114.8	115.0	116.8	116.4	113.8	107.8	113.9	131.6
800	112.8	113.8	114.1	112.5	110.8	108.1	106.1	105.8	106.8	108.8	111.1	113.1	114.1	114.5	110.5	105.5	111.1	128.8
1000	113.3	114.8	113.5	111.8	110.5	107.8	105.5	105.2	106.8	109.8	111.8	113.4	115.5	115.5	111.8	106.2	111.6	129.3
1250	112.2	113.6	112.9	111.9	110.6	107.6	104.2	104.6	105.6	108.2	110.2	112.2	114.2	113.9	110.2	104.3	110.5	128.2
1600	111.0	111.6	111.6	110.6	109.0	106.0	102.3	102.0	104.0	106.0	108.3	109.9	113.3	113.0	109.0	102.4	109.0	126.7
2000	109.0	110.3	110.0	109.3	108.0	104.3	100.7	99.6	102.0	104.0	106.3	108.2	111.6	111.0	106.6	100.0	107.3	125.0
2500	108.1	109.1	108.1	107.8	105.8	102.8	99.1	97.8	100.1	102.5	105.1	106.4	109.1	109.1	104.8	97.9	105.5	123.2
3150	107.3	108.3	107.6	106.6	104.3	102.3	97.9	96.6	98.9	101.9	104.6	106.2	107.9	107.6	104.9	97.3	104.6	122.3
4000	106.4	107.4	107.1	106.1	104.4	102.1	95.8	95.4	98.4	100.4	102.8	104.7	108.1	107.4	104.4	96.8	104.0	121.7
5000	105.8	106.4	106.1	106.8	103.8	100.8	95.4	93.8	97.8	99.1	102.4	103.4	107.1	105.1	104.1	95.2	103.1	120.8
6300	104.6	106.9	105.6	105.6	102.2	101.9	96.6	92.2	96.2	99.9	102.9	104.5	105.9	106.2	102.9	95.7	102.9	120.6
8000	105.3	106.2	105.6	105.2	102.9	100.6	95.2	92.6	97.6	99.2	102.2	103.9	106.9	105.2	104.3	96.1	102.8	120.5
10000	104.1	105.1	104.5	104.5	101.1	99.8	93.5	91.1	96.1	97.8	101.1	102.1	106.1	104.5	103.1	94.7	101.7	119.4
12500	101.4	102.5	101.1	102.5	99.1	97.1	90.8	88.1	93.1	95.1	98.4	100.5	103.4	101.4	101.5	92.0	99.2	116.9
16000	102.3	103.7	102.3	102.6	99.6	97.0	90.6	88.3	93.3	95.6	99.3	101.1	103.3	102.7	101.3	93.7	99.7	117.4
20000	98.8	99.8	98.5	98.5	95.5	94.2	86.5	85.1	89.8	91.5	95.8	97.0	99.8	98.8	97.5	89.9	95.9	113.6
OVERALL	125.9	127.2	126.6	125.7	124.5	122.3	120.1	119.6	120.5	121.4	123.5	124.4	125.8	124.8	123.5	119.0	123.6	141.4

TABLE VIII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 105 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) Concluded. 60 Percent speed; fan physical speed, 1332 rpm; fundamental blade passage frequency, 333 hertz

(a-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG														
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	71.3	67.0	66.7	68.0	67.7	69.0	70.0	69.0	65.0	66.7	68.0	66.2	66.3	66.0	67.3	65.7
63	65.3	65.0	65.3	67.0	67.0	67.3	68.0	67.0	64.0	64.3	66.6	65.9	68.3	68.0	68.3	66.3
80	67.1	66.4	66.4	67.0	66.4	67.4	66.4	65.0	64.0	65.7	67.0	67.0	68.7	68.4	68.7	66.8
100	70.7	69.7	71.4	69.7	68.1	69.4	68.1	66.4	68.1	69.1	70.1	69.3	71.4	70.1	69.7	67.1
125	73.7	76.0	75.0	75.0	74.0	72.0	72.7	70.7	71.7	73.7	75.3	74.3	75.3	74.7	74.0	70.4
160	74.3	74.3	73.3	73.3	71.3	70.3	69.7	69.0	70.3	70.7	72.0	73.2	72.3	72.3	70.7	69.0
200	77.0	77.3	76.3	73.0	71.0	70.0	69.7	69.0	69.0	69.3	71.3	70.9	71.7	70.3	70.0	69.1
250	81.4	81.0	80.4	78.4	75.7	75.0	72.0	72.0	72.7	74.7	76.7	76.9	78.4	78.0	75.7	72.1
315	92.4	94.4	93.4	93.0	92.0	90.0	88.0	87.4	88.0	87.7	90.0	90.3	91.0	88.0	90.4	86.8
400	85.3	86.3	86.6	84.6	83.3	81.3	79.3	78.9	79.3	79.9	81.9	82.9	82.9	81.6	80.6	77.3
500	83.3	83.9	83.6	81.9	80.6	77.6	75.9	75.3	77.3	78.6	79.9	81.9	81.9	82.6	79.3	73.3
630	85.6	86.0	86.3	85.0	84.3	82.0	79.6	79.6	81.3	83.3	85.0	85.2	87.0	86.6	84.0	78.0
800	82.0	84.0	84.3	82.7	81.0	78.3	76.3	76.0	77.0	79.0	81.3	83.3	84.3	84.7	80.7	76.1
1000	84.0	85.0	84.7	82.0	80.7	78.0	75.7	75.4	77.0	80.0	82.0	83.6	85.7	85.7	82.0	76.4
1250	82.3	83.7	83.0	82.0	80.7	77.7	74.3	74.7	75.7	78.3	80.3	82.3	84.3	84.0	80.3	74.4
1600	81.1	81.7	81.7	80.7	79.1	76.1	72.4	72.1	74.1	76.1	78.4	80.0	83.4	82.1	79.1	72.5
2000	79.0	80.3	80.0	79.3	78.0	74.3	70.7	69.6	72.0	74.0	76.3	78.2	81.6	81.0	76.6	70.0
2500	78.0	79.0	78.0	77.7	75.7	72.7	69.0	67.7	70.0	72.4	75.0	76.3	79.0	79.0	74.7	67.8
3150	77.0	78.0	77.3	76.3	74.0	72.0	67.6	66.3	68.6	71.6	74.3	75.9	77.6	77.3	74.6	67.0
4000	75.9	76.9	76.6	75.6	73.9	71.6	66.3	64.9	67.9	69.9	72.3	74.2	77.6	76.9	73.9	66.3
5000	75.0	75.6	75.3	76.0	73.0	70.0	64.6	63.0	67.0	68.3	71.6	72.6	76.3	74.3	73.3	64.4
6300	73.3	75.6	74.3	74.3	70.9	70.6	65.3	60.9	64.9	68.6	71.6	73.2	74.6	74.9	71.6	64.4
8000	73.4	74.3	73.7	73.3	71.0	68.7	63.3	60.7	65.7	67.3	70.3	72.0	74.9	73.3	72.3	64.2
10000	71.2	72.2	71.6	71.6	68.2	66.9	60.6	58.2	63.2	64.9	68.2	69.2	73.2	71.6	70.2	61.8
12500	67.1	68.2	66.9	68.2	64.8	62.9	56.6	53.9	58.9	60.9	64.1	66.2	69.2	67.2	67.2	57.7
16000	66.1	67.5	66.1	66.4	63.4	60.8	54.4	52.1	57.1	59.4	63.1	64.9	67.1	66.5	65.1	57.5
20000	60.0	61.0	59.7	59.7	56.7	55.4	47.7	46.3	51.0	52.7	57.0	58.2	61.0	60.0	58.7	51.1
OVERALL	96.0	97.4	96.8	95.9	94.7	92.5	90.4	89.8	90.7	91.6	93.7	94.5	95.5	94.9	93.6	89.2
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 m	76.0	79.5	83.1	85.0	85.5	84.5	82.7	82.5	83.9	84.8	86.6	86.6	86.8	83.9	80.0	70.9
304.8 m	68.7	71.2	75.2	77.3	78.0	77.1	75.5	75.3	76.6	77.4	79.2	79.1	79.2	75.6	72.0	62.7

TABLE VIII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 105 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) 70 Percent speed; fan physical speed, 1555 rpm; fundamental blade passage frequency, 388 hertz

(b-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE POWER LEVEL	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	100.7	96.7	98.4	100.4	100.4	101.1	102.1	97.1	96.4	97.4	97.1	101.0	101.4	100.1	100.1	98.8	99.9	117.6
63	96.4	95.4	96.7	96.7	98.4	97.4	99.0	96.7	95.4	96.0	96.0	97.6	100.0	100.0	99.0	98.7	97.7	115.4
80	96.3	97.7	98.0	96.7	99.0	97.0	97.7	96.3	95.7	97.7	98.0	99.3	101.3	101.0	101.7	100.4	98.6	116.3
100	104.1	104.1	103.1	101.4	101.7	103.7	101.1	99.4	101.4	101.4	101.7	102.3	103.4	103.7	103.1	100.8	102.2	119.9
125	104.7	107.4	105.7	107.4	105.7	103.7	104.7	102.4	104.7	105.7	106.1	106.3	105.7	105.4	105.7	102.1	105.4	123.1
160	106.1	106.4	105.4	104.8	103.4	103.1	102.1	103.1	103.8	103.8	105.4	105.7	106.1	105.1	103.8	101.8	104.4	122.1
200	107.8	108.8	106.1	104.1	104.1	101.1	100.4	101.1	100.8	102.1	102.8	103.0	104.4	103.4	103.4	101.1	103.3	121.0
250	111.0	111.7	110.4	109.0	107.0	106.4	103.7	103.7	104.7	107.0	108.7	109.6	111.0	110.0	107.4	103.8	108.1	125.8
315	118.0	117.0	115.7	114.7	113.4	112.7	108.0	107.0	108.4	111.4	111.7	113.3	113.0	112.7	109.7	106.7	112.4	130.1
400	126.1	124.8	127.4	127.8	126.8	126.8	120.4	116.8	116.4	119.4	124.1	126.0	124.4	122.8	121.4	117.8	124.1	141.8
500	115.4	115.7	115.1	114.4	113.4	111.7	109.4	108.7	110.7	111.7	114.1	114.7	115.1	114.7	110.4	106.5	113.0	130.7
630	114.8	115.5	115.5	114.5	111.5	109.8	108.5	108.2	109.8	113.2	114.5	114.8	116.5	116.8	110.8	106.2	113.3	131.0
800	119.2	119.5	119.5	119.2	116.8	113.8	114.8	113.8	114.8	118.8	119.8	121.1	121.5	121.8	117.2	112.9	118.5	136.2
1000	114.5	115.5	115.5	114.5	112.9	109.9	108.5	108.5	110.5	112.2	114.9	115.8	116.9	116.2	111.2	107.3	113.5	131.2
1250	116.2	117.5	116.8	116.2	114.2	111.5	109.8	109.5	111.5	112.8	115.5	117.1	119.2	118.2	112.8	109.2	115.0	132.7
1600	114.6	115.2	115.6	114.6	113.2	110.6	107.2	107.2	108.6	110.9	113.2	114.5	117.2	117.9	111.2	106.6	113.3	131.0
2000	113.3	114.0	114.3	113.6	112.0	109.0	105.6	105.3	107.6	109.3	111.0	112.2	115.6	115.6	108.6	104.0	111.6	129.3
2500	111.4	112.1	112.1	112.1	110.1	107.8	104.4	103.4	106.4	107.8	110.1	111.4	113.8	113.8	107.4	101.8	110.0	127.7
3150	110.9	111.3	111.3	110.9	109.3	107.3	103.6	101.6	104.3	106.9	109.3	110.5	112.3	112.3	105.9	101.0	108.9	126.6
4000	110.4	111.1	110.7	111.1	109.1	106.4	102.1	101.1	104.4	105.4	107.7	109.0	112.1	111.1	105.7	99.8	108.2	125.9
5000	109.7	109.7	110.1	110.7	107.7	104.7	100.7	99.4	102.7	104.4	107.1	107.4	111.4	109.4	105.7	99.2	107.2	124.9
6300	108.6	110.3	109.2	109.6	106.2	106.3	101.6	98.2	102.3	105.3	107.6	108.6	109.9	110.3	104.6	99.4	107.0	124.7
8000	109.2	109.8	109.1	109.5	106.5	104.8	100.1	97.8	102.8	104.1	106.8	107.5	110.8	109.1	105.8	99.3	106.7	124.4
10000	107.8	108.1	108.1	108.8	104.8	103.8	98.1	97.1	101.8	103.1	105.4	106.8	110.5	108.5	105.5	98.0	105.8	123.5
12500	105.4	105.4	105.1	106.1	102.4	101.1	95.4	93.8	99.8	100.4	103.5	104.2	108.1	105.4	104.1	95.7	103.3	121.0
16000	105.9	106.2	105.6	105.9	102.9	100.2	95.2	93.9	98.9	100.9	104.2	105.4	107.6	106.9	103.9	97.6	103.6	121.3
20000	102.5	101.8	101.1	101.5	97.4	96.1	91.8	90.1	95.5	97.5	99.8	101.0	103.5	102.5	100.8	93.2	99.4	117.1
OVERALL	129.3	128.9	130.0	130.0	128.6	128.0	123.2	121.2	122.3	124.9	127.7	129.2	129.4	128.8	125.1	121.2	127.3	145.1

TABLE VIII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 105 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) Concluded. 70 Percent speed; fan physical speed, 1555 rpm; fundamental blade passage frequency, 388 hertz

(b-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	77.0	67.0	68.7	70.7	70.7	71.4	72.4	67.4	66.7	67.7	67.4	71.3	71.7	70.4	70.4	69.1
63	66.7	65.7	67.0	67.0	68.7	67.7	69.3	67.0	65.7	66.3	66.3	67.9	70.3	70.3	69.3	69.0
80	66.6	68.0	68.3	67.0	69.3	67.3	68.0	66.6	66.0	68.0	68.3	69.6	71.6	71.3	72.0	70.7
100	74.4	74.4	73.4	71.7	72.0	74.0	71.4	69.7	71.7	71.7	72.0	72.6	73.7	74.0	73.4	71.1
125	75.0	77.7	76.0	77.7	76.0	74.0	75.0	72.7	75.0	76.0	76.4	76.6	76.0	75.7	76.0	72.4
160	76.4	76.7	75.7	75.1	73.7	73.4	72.4	73.4	74.1	74.1	75.7	76.0	76.4	75.4	74.1	72.1
200	78.1	79.1	76.4	74.4	74.4	71.4	70.7	71.4	71.1	72.4	73.1	73.3	74.7	72.7	73.7	71.4
250	81.3	82.0	80.7	79.3	77.3	76.7	74.0	74.0	75.0	77.3	79.0	79.9	81.3	80.3	77.7	74.1
315	88.3	87.3	86.0	85.0	83.7	83.0	78.3	77.3	78.7	81.7	82.0	83.6	83.2	83.0	80.0	77.0
400	96.3	95.0	97.6	98.0	97.0	97.0	90.6	87.0	86.6	89.6	94.3	96.2	94.6	93.0	91.6	88.0
500	85.6	85.9	85.3	84.6	83.6	81.9	79.6	78.9	80.9	81.9	84.3	84.9	85.3	84.9	80.6	76.7
630	85.0	85.7	85.7	84.7	81.7	80.0	78.7	78.4	80.0	83.4	84.7	85.0	86.7	87.0	81.0	76.4
800	89.4	89.7	89.7	89.4	87.0	84.0	85.0	84.0	85.0	89.0	90.0	91.3	91.7	92.0	87.4	83.1
1000	84.7	85.7	85.7	84.7	83.1	80.1	78.7	78.7	80.7	82.4	85.1	86.0	87.1	86.4	81.4	77.5
1250	86.3	87.6	86.9	86.3	84.3	81.6	79.9	79.6	81.6	82.9	85.6	87.2	89.3	88.3	82.9	79.3
1600	84.7	85.3	85.7	84.7	83.3	80.7	77.3	77.3	78.7	81.0	83.3	84.6	87.3	86.0	81.3	76.7
2000	83.3	84.0	84.3	83.6	82.0	79.0	75.6	75.3	77.6	79.3	81.0	82.2	85.6	85.6	78.6	74.0
2500	81.3	82.0	82.0	82.0	80.0	77.7	74.3	73.3	76.3	77.7	80.0	81.3	83.7	83.7	77.3	71.7
3150	80.6	81.0	81.0	80.6	79.0	77.0	73.3	71.3	74.0	76.6	79.0	80.2	82.0	82.0	75.6	70.7
4000	79.9	80.6	80.2	80.6	78.6	75.9	71.6	70.6	73.9	74.9	77.2	78.5	81.6	80.6	75.2	69.3
5000	78.9	78.9	79.3	79.9	76.9	73.9	69.9	68.6	71.9	73.6	76.3	76.6	80.6	78.6	74.9	68.4
6300	77.3	79.0	77.9	78.3	74.9	75.0	70.3	66.9	71.0	74.0	76.3	77.3	78.6	79.0	73.3	68.1
8000	77.3	77.9	77.2	77.6	74.6	72.9	68.2	65.9	70.9	72.2	74.9	75.6	78.8	77.2	73.8	67.4
10000	74.9	75.2	75.2	75.9	71.9	70.9	65.2	64.2	68.9	70.2	72.5	73.9	77.6	75.6	72.6	65.1
12500	71.1	71.1	70.9	71.9	68.1	66.9	61.2	59.6	65.6	66.2	69.2	69.9	73.9	71.1	69.8	61.4
16000	69.7	70.0	69.4	69.7	66.7	64.1	59.0	57.7	62.7	64.7	68.0	69.2	71.4	70.7	67.7	61.4
20000	63.7	63.0	62.3	62.7	58.7	57.3	53.0	51.3	56.7	58.7	61.0	62.2	64.7	63.7	62.0	54.4
OVERALL	99.4	99.0	100.1	100.1	98.8	98.2	93.4	91.4	92.4	95.0	97.8	99.3	99.5	98.9	95.2	91.4
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	74.1	81.9	87.1	89.8	90.2	90.5	86.8	85.1	86.4	88.7	91.3	91.9	91.0	88.3	82.1	73.9
304.8 M	64.8	73.4	79.3	82.2	82.8	83.2	79.5	77.8	79.0	81.3	83.9	84.5	83.3	80.4	74.2	65.6

TABLE VIII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 105 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) 86 Percent speed; fan physical speed, 1903 rpm; fundamental blade passage frequency, 475 hertz

(c-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	101.7	99.4	99.1	100.4	101.7	101.1	101.4	101.7	98.1	101.7	100.7	102.0	103.7	105.1	106.1	104.8	102.1	119.8
63	100.7	103.3	103.3	100.7	101.3	102.3	104.7	101.3	99.3	102.7	103.0	102.3	104.7	106.0	107.3	106.7	103.4	121.1
80	100.8	101.8	100.1	100.8	99.8	99.3	99.4	99.4	99.8	101.4	102.4	104.0	105.8	107.4	107.8	106.8	103.0	120.7
100	106.7	106.7	106.1	104.7	103.7	104.4	105.1	103.4	104.7	108.1	108.1	109.0	110.4	110.7	110.7	108.1	107.4	125.1
125	110.8	113.4	111.8	110.1	108.8	107.8	107.1	108.1	107.8	110.4	111.4	110.7	112.1	111.1	110.8	108.5	110.1	127.8
160	109.1	111.1	110.1	108.1	106.8	107.8	106.1	107.4	108.1	110.1	109.8	111.0	110.4	109.4	108.8	106.8	109.0	126.7
200	110.7	111.7	111.7	108.7	109.4	107.0	106.0	106.7	106.7	107.4	108.0	108.3	109.0	108.7	108.0	106.7	108.3	126.0
250	114.8	115.4	113.1	112.8	111.4	109.4	109.1	109.1	111.4	112.1	113.1	113.4	114.8	113.8	110.4	107.8	112.2	129.9
315	119.1	118.1	116.1	115.4	112.4	111.4	111.4	111.4	112.8	115.1	115.8	115.7	116.1	115.1	111.1	109.5	114.4	132.1
400	124.8	123.4	123.8	120.4	118.8	118.4	116.8	116.8	116.8	118.8	119.8	120.3	121.4	118.8	114.8	111.5	119.5	137.2
500	135.8	134.5	135.1	131.8	129.1	130.1	125.8	125.8	125.8	127.8	129.1	129.4	131.8	128.1	123.8	118.8	129.8	147.5
630	120.1	120.1	120.1	116.8	116.8	115.1	114.1	113.8	115.8	118.8	119.8	120.1	121.5	119.8	114.1	110.5	118.2	135.9
800	120.2	120.5	120.8	119.2	118.2	116.2	115.8	115.8	117.5	119.5	120.5	121.1	123.2	122.2	115.8	113.2	119.4	137.1
1000	121.2	123.2	122.9	122.2	122.9	121.9	118.5	116.5	118.5	122.2	122.9	123.8	126.5	124.9	118.9	115.3	122.3	140.0
1250	119.2	120.5	120.5	119.9	117.5	115.9	113.9	113.9	116.5	118.5	119.9	121.1	122.5	119.9	114.5	112.3	118.8	136.5
1600	119.3	121.0	121.0	120.3	118.7	116.3	114.0	114.0	116.0	117.7	118.7	121.3	124.0	120.3	114.7	111.4	119.0	136.7
2000	118.0	120.0	120.0	119.3	118.0	115.3	112.6	112.0	115.0	116.3	117.6	119.2	122.3	119.6	113.3	109.4	117.7	135.4
2500	116.7	118.7	119.1	118.4	116.7	114.1	112.4	111.1	113.1	114.7	116.4	117.7	120.1	117.1	111.7	107.8	116.1	133.8
3150	116.3	117.6	117.3	117.3	115.3	113.9	111.9	109.6	111.9	114.6	115.9	117.2	118.3	116.6	110.3	106.7	115.2	132.9
4000	115.5	116.8	117.5	117.5	115.2	113.5	110.2	109.2	110.5	112.8	114.2	115.8	118.2	115.5	110.5	105.9	114.5	132.2
5000	114.7	115.7	116.1	116.7	113.4	111.1	108.4	107.4	109.7	111.1	113.4	113.7	117.1	113.4	109.7	104.2	113.1	130.8
6300	112.6	115.6	114.2	114.6	111.9	111.9	108.9	105.2	108.2	111.9	113.6	114.5	116.2	113.9	109.2	104.0	112.6	130.3
8000	113.8	114.3	114.8	114.2	111.5	110.1	107.1	105.8	108.8	110.1	112.5	113.1	116.8	112.8	110.2	104.3	112.1	129.8
10000	112.1	113.1	112.8	112.8	109.5	109.1	105.1	104.8	107.8	109.8	111.8	112.5	115.8	112.1	109.5	103.3	111.0	128.7
12500	109.4	110.4	109.4	110.4	106.8	105.4	102.4	102.1	105.8	107.4	109.8	110.5	114.1	109.4	108.1	100.7	108.7	126.4
16000	110.0	111.0	110.0	109.6	107.0	105.0	102.0	102.3	106.0	108.7	110.3	111.1	114.0	111.3	109.0	102.7	109.1	126.8
20000	106.1	106.5	106.5	105.8	101.1	99.4	97.1	100.9	102.1	104.5	105.4	107.0	110.1	107.1	105.5	99.3	105.0	122.7
OVERALL	137.0	136.3	136.7	134.2	132.1	132.0	129.2	128.4	129.3	131.5	132.7	133.3	135.6	132.9	128.2	124.4	132.7	150.4

TABLE VIII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 105 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) Concluded. 86 Percent speed; fan physical speed, 1903 rpm; fundamental blade passage frequency, 475 hertz

(c-2) Data adjusted to standard day of 15^{0} C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	72.0	69.7	69.4	70.7	72.0	71.4	71.7	72.0	68.4	72.0	71.0	72.3	74.0	75.4	76.4	75.1
63	77.0	73.6	70.6	71.0	71.6	72.6	75.0	71.6	69.6	73.0	73.3	72.6	75.0	76.3	77.6	77.0
80	71.1	72.1	70.4	71.1	70.1	70.1	69.7	69.7	70.1	71.7	72.7	74.3	76.1	77.7	78.1	77.1
100	77.0	77.0	76.4	75.0	74.0	74.7	75.4	73.7	75.0	78.4	78.4	79.3	80.7	81.0	81.0	78.4
125	81.1	83.7	82.1	80.4	79.1	78.1	77.4	78.4	78.1	80.7	81.7	81.0	82.4	81.4	81.1	78.8
160	79.4	81.4	80.4	78.4	77.1	78.1	76.4	77.7	78.4	80.4	80.1	81.3	80.7	79.7	79.1	77.1
200	81.0	82.0	82.0	79.0	79.7	77.3	76.3	77.0	77.0	77.7	78.3	78.6	79.2	79.0	78.3	77.0
250	85.1	85.7	83.4	83.1	81.7	79.7	79.4	79.4	81.7	82.4	83.4	83.7	85.1	84.1	80.7	78.1
315	89.4	88.4	86.4	85.7	82.7	81.7	81.7	81.7	83.1	85.4	86.1	86.0	86.4	85.4	81.4	79.8
400	95.0	93.6	94.0	90.6	89.0	88.6	87.0	87.0	87.0	89.0	90.0	90.5	91.6	89.0	85.0	81.7
500	106.0	104.7	105.3	02.0	99.3	100.3	97.0	96.0	96.0	98.0	99.3	99.6	102.0	98.3	94.0	89.0
630	90.3	90.3	90.3	89.0	87.0	85.3	84.3	84.0	86.0	89.0	90.0	90.3	91.7	90.0	84.3	80.7
800	90.4	90.7	91.0	89.4	88.4	86.4	86.0	86.0	87.7	89.7	90.7	91.3	93.4	92.4	86.0	83.4
1000	91.4	93.4	93.1	92.4	93.1	92.1	88.7	86.7	88.7	92.4	93.1	94.0	96.7	95.1	89.1	85.5
1250	89.3	90.6	91.0	90.0	88.0	86.0	84.0	84.0	86.6	88.6	90.0	91.2	93.0	90.0	84.6	82.4
1600	89.4	91.1	91.1	90.4	88.8	86.4	84.1	84.1	86.1	87.8	88.8	91.4	94.1	90.4	84.8	81.5
2000	88.0	90.0	90.0	89.3	88.0	85.3	82.6	82.0	85.0	86.3	87.6	89.2	92.3	89.6	83.3	79.4
2500	86.6	88.6	88.0	88.3	86.6	84.0	82.3	81.0	83.0	84.6	86.3	87.6	90.0	87.0	81.6	77.7
3150	86.0	87.3	87.0	87.0	85.0	83.6	81.6	79.3	81.6	84.3	85.6	86.9	88.0	86.3	80.0	76.4
4000	85.0	86.3	87.0	87.0	84.7	83.0	79.7	78.7	80.0	82.3	83.7	85.3	87.7	85.0	80.0	75.4
5000	83.9	84.9	85.3	85.9	82.6	80.3	77.6	76.6	78.9	80.3	82.6	82.9	86.3	82.6	78.9	73.4
6300	82.3	84.3	82.9	83.4	80.7	80.6	77.6	73.9	76.9	80.6	82.3	83.2	84.9	82.6	77.9	72.7
8000	81.9	82.9	82.9	82.3	79.6	78.2	75.2	73.9	76.9	78.2	80.6	81.2	84.9	80.9	78.2	72.4
10000	79.2	80.2	79.9	79.9	76.6	76.2	72.2	71.9	74.9	76.9	78.9	79.6	82.9	79.2	76.6	70.4
12500	75.2	76.2	75.2	76.2	72.6	71.2	68.2	67.9	71.5	73.1	75.5	76.2	79.8	75.1	73.8	66.4
16000	73.8	74.8	73.8	73.4	70.8	68.9	65.8	66.1	69.8	72.5	74.1	74.9	77.8	75.1	72.8	66.5
20000	67.3	67.7	67.7	67.0	62.4	60.7	58.3	62.0	63.3	65.7	66.6	68.2	71.3	68.3	66.7	60.5
OVERALL	107.2	106.5	106.8	104.3	102.2	102.2	99.4	98.6	99.4	101.6	102.7	103.4	105.7	102.9	98.2	94.5
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	81.5	89.2	93.6	94.2	94.0	94.9	93.1	92.7	93.9	95.8	96.6	96.5	97.4	92.7	85.3	77.0
304.8 M	72.3	80.9	85.7	86.5	86.4	87.4	85.7	85.4	86.5	88.5	89.2	88.9	89.7	84.8	77.3	68.4

TABLE VIII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 105 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) 93 Percent speed; fan physical speed, 2065 rpm; fundamental blade passage frequency, 516 hertz

(d-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE LEVEL (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	102.4	100.4	102.4	101.7	102.0	102.0	103.0	103.4	101.7	104.4	103.7	105.0	105.4	107.0	107.7	107.4	104.1	121.8
63	104.3	103.3	102.7	102.0	102.3	103.3	104.7	102.7	102.0	105.7	103.7	105.3	106.3	108.3	108.7	108.1	104.9	122.6
80	103.4	103.7	103.0	101.7	102.0	102.4	102.0	101.4	101.7	105.0	104.7	105.9	107.7	109.4	110.7	109.1	105.3	123.0
100	109.0	108.7	108.4	110.4	108.0	109.7	105.7	108.0	108.7	111.7	111.7	111.6	112.7	112.7	112.7	111.1	110.5	128.2
125	111.4	110.4	110.7	110.4	111.0	110.0	109.4	110.4	110.0	112.4	113.7	113.6	114.4	114.0	113.7	109.7	112.3	130.0
160	112.1	113.4	113.1	109.7	109.7	109.1	108.7	110.1	110.7	111.7	112.4	113.0	112.4	112.4	111.4	109.1	111.3	129.0
200	114.4	114.7	113.4	109.7	109.1	107.7	107.4	108.1	108.1	108.7	110.4	110.6	111.4	111.1	110.4	108.4	110.1	127.8
250	116.4	116.0	115.7	113.7	113.0	112.0	113.4	110.4	111.4	113.4	114.7	115.3	116.4	115.4	112.4	109.4	113.7	131.4
315	117.4	119.7	117.4	116.1	114.4	113.1	112.1	113.1	114.1	115.4	117.4	117.6	116.7	115.1	112.4	111.1	115.5	133.2
400	119.8	121.8	121.1	118.1	116.1	114.8	114.5	115.8	116.8	117.8	119.1	120.4	120.5	118.8	113.8	111.5	118.1	135.8
500	132.4	135.1	130.4	132.1	129.1	127.8	128.8	128.4	127.1	128.1	130.1	132.7	134.8	129.8	122.8	122.2	130.4	148.1
630	122.8	124.2	122.2	121.8	119.5	118.5	117.8	117.5	118.8	121.5	123.2	123.8	125.2	122.5	116.2	113.2	121.4	139.1
800	120.5	120.9	121.5	119.5	118.9	116.9	115.9	117.5	119.9	122.2	123.2	123.8	125.2	122.5	117.2	114.2	121.1	138.8
1000	122.5	123.2	125.2	124.2	123.2	121.5	119.5	118.8	121.2	123.2	126.5	127.1	126.8	124.5	120.5	117.9	123.8	141.5
1250	120.2	121.2	121.5	120.5	119.9	117.2	116.6	116.9	119.6	120.9	122.2	123.2	124.9	120.9	115.9	114.0	120.7	138.4
1600	121.2	122.3	123.0	122.3	121.6	120.6	118.0	117.6	120.0	121.0	122.0	124.6	127.0	122.0	116.6	113.7	121.9	139.6
2000	120.0	121.0	121.7	121.0	120.0	117.7	115.7	115.0	117.7	119.0	120.3	122.3	125.0	120.7	115.0	111.4	120.0	137.7
2500	118.8	119.5	120.1	119.8	119.1	116.8	114.8	114.1	115.8	117.8	119.1	121.4	122.1	119.1	113.1	109.5	118.5	136.2
3150	117.6	119.3	119.6	119.3	118.3	116.3	114.6	113.3	115.3	117.3	118.9	120.5	121.3	118.6	112.3	108.7	117.9	135.6
4000	118.1	118.7	119.1	119.4	117.4	115.7	113.4	112.4	114.4	115.4	117.4	119.4	120.7	118.1	112.4	107.8	117.1	134.8
5000	117.0	117.4	118.0	118.7	116.0	113.7	111.0	110.7	113.0	114.4	116.4	117.0	119.7	115.7	112.0	106.1	115.7	133.4
6300	115.5	117.2	116.5	116.5	113.8	114.2	111.5	108.8	111.2	114.9	116.2	117.8	118.2	116.2	110.2	106.0	115.0	132.7
8000	115.9	116.9	116.9	116.5	113.2	112.2	109.5	108.5	112.5	112.9	115.5	116.5	118.9	115.9	111.9	106.4	114.6	132.3
10000	114.1	115.1	114.8	114.8	111.1	111.5	107.8	107.8	111.2	112.5	114.5	115.5	118.2	114.1	111.2	105.3	113.4	131.1
12500	111.4	112.4	111.8	112.8	109.1	107.8	104.4	105.1	109.1	110.5	112.5	113.5	116.1	112.1	110.2	102.7	111.2	128.9
16000	111.3	112.3	112.0	112.0	109.0	107.6	104.3	105.0	109.0	111.0	113.0	114.4	116.0	114.0	110.7	105.0	111.5	129.2
20000	107.9	108.2	107.5	108.9	104.5	103.2	99.8	102.5	105.2	107.5	109.2	110.3	112.2	110.2	107.5	101.3	107.7	125.4
OVERALL	135.1	137.1	134.8	135.1	132.9	131.5	131.2	130.9	131.4	132.9	134.7	136.4	138.0	134.2	129.0	126.7	134.0	151.7

TABLE VIII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 105 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) Concluded. 93 Percent speed; fan physical speed, 2065 rpm; fundamental blade passage frequency, 516 hertz

(d-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	72.7	70.7	72.7	72.0	72.3	72.3	73.3	73.7	72.0	74.7	74.0	75.3	75.7	77.3	78.0	77.7
63	74.6	73.6	73.0	72.3	72.6	73.6	75.0	73.0	72.3	76.0	74.0	75.6	76.6	78.6	79.0	78.4
80	73.7	74.0	73.3	72.0	72.3	72.7	72.3	71.7	72.0	75.3	75.0	76.2	78.0	79.7	81.0	79.4
100	79.3	79.0	78.7	80.7	78.3	80.0	77.0	78.3	79.0	82.0	82.0	81.9	83.0	82.0	83.0	81.4
125	81.7	85.7	84.0	80.7	81.3	80.3	79.7	80.7	80.3	82.7	84.0	83.9	84.7	84.3	84.0	80.0
160	82.4	83.7	83.4	80.0	80.0	79.4	79.0	80.4	81.0	82.0	82.7	83.3	82.7	82.7	81.7	79.4
200	84.7	85.0	83.7	80.0	79.4	78.0	77.7	78.4	78.4	79.0	80.7	80.9	81.7	81.4	80.7	78.7
250	86.7	86.3	86.0	84.0	83.3	82.3	80.7	80.7	81.7	83.7	85.0	85.6	86.7	85.7	82.7	79.7
315	87.7	90.0	87.7	86.4	84.7	83.4	82.4	83.4	84.4	85.7	87.7	87.9	87.0	85.4	82.7	81.4
400	90.0	92.0	91.3	88.3	86.3	85.0	84.7	86.0	87.0	88.0	89.3	90.6	90.7	89.0	84.0	81.7
500	102.6	105.3	100.6	102.3	99.3	98.0	99.0	98.6	97.3	98.3	100.3	102.9	105.0	100.0	93.0	92.4
630	93.0	94.4	92.4	92.0	89.7	88.7	88.0	87.7	89.0	91.7	93.4	94.0	95.4	92.7	86.4	83.4
800	90.7	91.1	91.7	89.7	89.1	87.1	86.1	87.7	90.1	92.4	93.4	94.0	95.4	92.7	87.4	84.4
1000	93.7	93.4	95.4	94.4	93.4	91.7	89.7	89.0	91.4	93.4	96.7	97.3	97.0	94.7	90.7	88.1
1250	90.3	91.3	92.0	91.0	90.0	87.3	86.7	87.0	89.7	91.0	92.3	93.3	95.0	91.0	86.0	84.1
1600	91.4	92.4	93.1	92.4	91.7	90.7	88.1	87.7	90.1	91.1	92.1	94.7	97.1	92.1	86.7	83.8
2000	90.0	91.0	91.7	91.0	90.0	87.7	85.7	85.0	87.7	89.0	90.3	92.3	95.0	90.7	85.0	81.4
2500	88.7	89.4	90.0	89.7	89.0	86.7	84.7	84.0	85.7	87.7	89.0	91.3	92.0	89.0	83.0	79.4
3150	87.3	89.0	89.3	89.0	88.0	86.0	84.3	83.0	85.0	87.0	88.6	90.2	91.0	88.3	82.0	78.4
4000	87.6	88.2	88.6	88.9	86.9	85.2	82.9	81.9	83.9	84.9	86.9	88.9	90.2	87.6	81.9	77.3
5000	86.2	86.6	87.2	87.9	85.2	82.9	80.2	79.9	82.2	83.6	85.6	86.2	88.9	84.9	81.2	75.3
6300	84.2	85.9	85.2	85.3	82.6	82.9	80.2	77.6	79.9	83.6	84.9	86.5	86.9	84.9	78.9	74.7
8000	84.0	85.0	85.0	84.6	81.3	80.3	77.6	76.6	80.5	81.0	83.6	84.6	87.0	84.0	79.9	74.5
10000	81.2	82.2	81.9	81.9	78.2	78.6	74.9	74.9	78.3	79.6	81.6	82.6	85.3	81.2	78.3	72.4
12500	77.2	78.2	77.6	78.6	74.8	73.6	70.2	70.9	74.8	76.2	78.2	79.2	81.8	77.8	75.9	68.4
16000	75.1	76.1	75.8	75.8	72.8	71.4	69.1	68.8	72.8	74.8	76.8	78.2	79.8	77.8	74.5	68.8
20000	69.1	69.4	68.7	70.1	65.7	64.4	61.0	63.7	66.4	68.7	70.4	71.5	73.4	71.4	68.7	62.5
OVERALL	105.2	107.2	104.8	105.1	103.0	101.5	101.3	101.0	101.4	102.9	104.8	106.5	108.1	104.2	99.0	96.8
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	79.9	90.1	92.2	95.2	95.0	94.9	95.2	95.4	96.0	97.3	98.6	99.6	99.9	94.3	85.9	79.6
304.8 M	70.3	81.7	84.0	87.3	87.3	87.2	87.8	88.0	88.6	89.9	91.1	92.0	92.3	86.4	77.7	71.1

TABLE VIII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 105 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(e) 100 Percent speed; fan physical speed, 2221 rpm; fundamental blade passage frequency, 555 hertz

(e-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	105.2	101.7	102.7	102.2	103.7	103.7	106.2	104.7	103.7	106.2	106.2	106.9	106.7	106.7	109.7	110.1	106.0	123.7
63	102.2	101.7	103.2	102.2	104.2	103.7	105.2	103.7	103.2	105.7	105.2	106.0	108.7	110.7	111.7	110.6	106.5	124.2
80	107.7	107.7	104.7	102.7	106.7	105.2	107.2	104.7	105.2	107.7	107.7	109.0	110.2	113.2	113.7	112.6	108.5	126.3
100	110.2	110.2	111.2	106.7	106.7	107.7	108.7	107.7	108.7	110.7	111.7	111.9	114.2	115.7	115.7	114.1	111.4	129.1
125	113.2	115.7	114.2	110.7	112.2	110.7	111.2	112.2	112.2	114.7	116.7	115.9	116.2	115.7	116.2	113.6	114.2	131.9
160	114.2	116.7	115.7	112.2	112.7	110.7	112.7	112.2	113.7	115.2	115.7	117.0	115.7	115.7	115.2	112.1	114.5	132.3
200	114.8	117.3	116.2	111.8	111.8	110.3	111.7	110.7	110.7	111.7	113.8	113.0	114.3	113.3	112.7	111.1	112.8	130.5
250	117.7	117.7	117.2	115.7	114.7	113.7	112.7	112.2	113.7	115.7	117.2	118.5	119.7	117.7	114.7	112.1	116.1	133.8
315	119.2	121.2	118.7	118.2	117.2	115.7	115.7	116.2	119.2	120.7	122.2	121.0	121.2	117.7	115.2	115.1	119.1	136.8
400	119.7	122.2	121.2	117.7	116.7	115.7	116.7	116.7	117.7	119.7	120.2	121.0	121.2	118.7	115.7	113.6	118.9	136.6
500	126.8	128.8	127.3	131.8	123.3	124.8	125.8	122.8	124.8	129.3	128.3	128.5	131.8	126.8	122.3	119.6	127.6	145.3
630	125.2	127.8	126.3	125.8	121.8	123.8	124.3	121.8	123.8	127.8	127.3	128.1	130.2	126.3	121.3	119.2	126.4	144.1
800	118.8	120.3	120.8	120.3	118.8	118.3	118.3	120.3	121.8	124.8	124.2	126.1	127.6	123.8	119.8	116.7	122.9	140.6
1000	119.9	121.9	120.9	121.9	120.4	119.4	120.4	120.9	122.4	124.9	125.9	126.1	126.9	123.9	119.9	117.3	123.3	141.0
1250	120.4	123.4	122.9	123.4	121.9	120.4	120.9	121.9	122.9	124.9	125.9	126.6	127.9	123.9	119.9	117.3	123.9	141.6
1600	120.4	122.4	122.4	121.9	119.9	119.4	118.4	119.4	121.9	123.9	124.4	126.2	128.9	122.9	118.9	115.8	123.2	140.9
2000	119.0	120.5	120.5	120.0	118.5	117.0	116.0	117.0	119.5	121.5	122.5	124.3	127.0	121.0	116.0	113.4	121.2	138.9
2500	118.0	120.0	119.5	119.0	118.0	116.0	115.0	116.0	118.0	120.5	121.5	122.8	124.5	120.0	115.0	112.4	119.7	137.5
3150	117.2	119.8	118.8	118.8	117.3	116.3	115.3	115.8	118.3	120.3	121.8	122.5	123.8	119.8	114.8	111.7	119.5	137.2
4000	117.5	119.5	119.0	118.5	116.5	115.5	114.0	114.5	116.5	119.0	120.0	121.2	123.5	119.5	114.5	110.4	118.6	136.3
5000	116.2	117.7	117.2	118.2	115.7	113.7	112.2	112.2	116.2	116.7	119.2	120.0	122.2	117.2	113.7	109.1	117.3	135.0
6300	114.7	117.7	115.7	116.2	113.1	114.2	112.2	111.2	114.2	117.7	119.2	120.0	121.2	118.2	113.2	108.6	116.8	134.5
8000	115.3	116.8	115.8	115.8	112.8	111.8	110.3	110.8	114.8	116.3	118.3	119.2	121.8	117.3	113.9	108.8	116.4	134.1
10000	113.8	114.7	114.2	114.8	110.7	111.3	108.8	109.8	113.3	115.8	117.3	117.6	120.3	116.3	113.8	107.3	115.1	132.8
12500	111.0	112.0	110.5	112.0	108.0	108.0	106.0	107.0	111.0	113.0	115.0	115.4	118.0	114.1	112.1	105.6	112.7	130.4
16000	110.9	111.9	110.9	111.4	108.4	107.4	105.9	107.9	111.4	113.9	115.4	116.9	118.4	116.0	112.9	107.1	113.4	131.1
20000	107.5	108.0	107.0	107.0	104.5	103.0	101.0	104.5	108.0	110.5	111.0	112.5	114.5	112.0	109.5	103.3	109.4	127.1
OVERALL	132.5	135.0	134.0	135.8	131.2	131.1	131.4	130.8	132.7	135.6	135.9	136.7	138.8	134.6	130.8	128.2	134.4	152.2

TABLE VIII. - Concluded. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 105 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(e) Concluded. 100 Percent speed; fan physical speed, 2221 rpm; fundamental blade passage frequency, 555 hertz

(e-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	75.5	72.0	73.0	72.5	74.0	74.0	76.5	75.0	74.0	76.5	76.5	77.2	77.0	79.0	80.0	80.4
63	72.5	74.0	73.5	72.5	74.5	74.0	75.5	74.0	73.5	76.0	75.5	76.3	79.0	81.0	82.0	80.9
80	78.0	78.0	75.0	73.0	77.0	75.5	77.5	75.0	75.5	78.0	78.0	79.3	80.5	83.5	84.0	82.9
100	80.5	80.5	81.5	79.0	77.0	78.0	79.0	78.0	79.0	81.0	82.0	82.2	84.5	86.0	86.0	84.4
125	82.5	86.0	84.5	81.0	82.5	81.0	81.5	82.5	82.5	85.0	87.0	86.2	86.5	86.0	86.5	83.9
160	84.5	87.0	87.0	82.5	83.0	81.0	83.0	82.5	84.0	85.5	86.0	87.3	86.0	86.0	85.5	82.4
200	85.1	87.6	86.5	82.1	82.1	80.6	82.0	81.0	81.0	82.0	84.1	83.3	84.6	82.6	83.0	81.4
250	87.0	88.0	87.5	86.0	85.0	84.0	83.0	82.5	84.0	86.0	87.5	88.8	90.0	88.0	85.0	82.4
315	89.5	91.5	89.0	88.5	87.5	86.0	86.0	86.5	89.5	91.0	92.5	91.3	91.5	88.0	85.5	85.4
400	89.9	92.4	91.4	87.5	86.9	85.9	86.9	86.9	87.9	89.9	90.4	91.2	91.4	88.9	85.9	83.8
500	97.0	99.0	97.5	102.0	93.5	95.0	95.0	93.0	95.0	99.5	98.5	98.7	102.0	97.0	92.5	89.8
630	95.5	98.0	96.5	100.0	92.0	94.0	94.5	92.0	94.0	98.0	97.5	98.3	100.5	96.5	91.5	89.4
800	89.0	90.5	91.0	90.5	89.0	88.5	88.5	90.5	92.0	95.0	94.5	96.3	98.0	94.0	90.0	86.9
1000	90.1	92.1	91.1	92.1	90.6	89.6	90.6	91.1	92.6	95.1	96.1	96.3	97.1	94.1	90.1	87.5
1250	90.5	93.5	93.0	93.5	92.0	90.5	91.0	92.0	93.0	95.0	96.0	96.7	98.0	94.0	90.0	87.4
1600	90.5	92.5	92.5	92.0	90.0	89.5	88.5	89.5	92.0	94.0	94.5	96.3	99.0	93.0	89.0	85.9
2000	89.0	90.5	90.5	90.0	88.5	87.0	86.0	87.0	89.5	91.5	92.5	94.3	97.0	91.0	86.0	83.4
2500	87.9	89.9	89.4	88.9	87.9	85.9	84.9	85.9	87.9	90.4	91.4	92.7	94.4	89.9	84.9	82.3
3150	87.0	85.5	88.5	88.5	87.0	86.0	85.0	85.5	88.0	90.0	91.5	92.2	93.5	89.5	84.5	81.4
4000	87.0	89.0	89.5	88.0	86.0	85.0	83.5	84.0	86.0	88.5	89.5	90.7	93.0	89.0	84.0	79.9
5000	85.4	86.9	86.4	87.4	84.9	82.9	81.4	81.4	85.4	85.9	88.4	89.2	91.4	86.4	82.9	78.3
6300	83.4	86.4	94.4	85.0	81.9	82.9	80.9	79.9	82.9	86.4	87.9	88.7	89.9	86.9	81.9	77.3
8000	83.4	84.9	83.9	83.9	80.9	79.9	78.4	78.9	82.9	84.4	86.4	87.3	89.9	85.4	81.9	76.9
10000	80.9	81.9	81.3	81.9	77.8	78.4	75.9	76.9	80.4	82.9	84.4	84.7	87.4	83.4	80.9	74.4
12500	76.8	77.9	76.3	77.8	73.8	73.8	71.8	72.7	76.7	78.7	80.7	81.1	83.7	79.8	77.8	71.3
16000	74.7	75.7	74.7	75.2	72.2	71.2	69.7	71.7	75.2	77.7	79.2	80.7	82.2	79.8	76.7	70.9
20000	68.7	69.2	69.2	68.2	65.7	64.2	62.2	65.7	69.2	71.7	72.2	73.7	75.7	72.2	70.7	64.5
OVERALL	102.9	105.0	104.0	105.9	101.2	101.2	101.5	100.8	102.7	105.6	105.9	106.7	108.7	104.6	103.8	98.2
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	77.0	87.6	91.0	95.4	93.4	94.0	95.0	95.1	97.4	99.7	100.0	100.1	100.8	94.3	87.6	80.2
304.8 M	67.2	78.9	82.7	87.5	85.0	86.3	87.6	87.3	89.7	92.2	91.9	92.1	92.7	86.1	79.0	71.5

TABLE IX. - FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) 60 Percent speed; fan physical speed, 1342 rpm; fundamental blade passage frequency, 335 hertz

(a-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	101.4	97.4	105.4	103.4	104.3	102.6	100.9	103.8	101.9	100.6	101.1	101.4	102.9	106.4	122.3	127.5	114.2	131.9
63	97.5	95.5	104.5	100.5	101.8	100.3	98.5	100.8	100.3	97.8	99.3	99.1	100.8	104.0	121.1	126.4	113.0	130.7
80	97.9	98.1	102.7	99.2	100.9	99.4	97.2	99.4	99.4	98.4	99.4	98.8	101.2	102.7	119.9	125.1	111.8	129.5
101	100.9	98.9	101.9	100.7	101.2	99.1	97.9	99.7	98.9	98.9	99.4	98.7	99.4	102.7	118.4	123.8	110.5	128.2
125	103.4	105.1	104.8	102.6	102.9	101.6	100.3	102.8	100.8	102.1	102.9	102.2	102.4	103.6	117.6	123.5	110.4	128.1
160	102.9	103.7	103.7	101.4	102.6	99.7	99.4	100.7	100.4	100.9	101.6	103.8	100.7	103.2	116.1	122.0	109.0	126.7
200	104.6	104.4	103.6	101.6	99.8	97.1	96.8	98.3	98.3	98.1	98.4	99.2	100.4	101.4	115.1	120.7	107.7	125.4
250	108.3	108.2	106.8	105.0	103.5	101.5	99.7	100.0	100.7	102.0	103.5	105.3	105.3	106.8	113.7	119.9	108.0	125.7
315	117.1	116.5	118.5	118.6	111.8	109.8	110.1	108.8	109.8	110.3	112.5	112.1	113.0	113.8	115.0	119.4	113.8	131.5
400	111.4	111.4	112.0	111.7	107.9	105.2	104.4	104.2	104.5	106.0	108.0	108.8	108.5	110.2	112.2	116.3	109.1	126.8
500	109.1	109.2	109.1	108.9	106.4	102.9	102.4	102.6	103.1	104.4	106.4	107.5	106.7	109.4	110.9	113.9	107.2	124.9
630	111.2	110.7	110.9	112.2	110.0	105.7	103.9	104.4	105.0	107.0	110.0	110.3	114.0	113.9	112.9	114.7	110.3	128.0
800	109.2	108.7	108.9	108.9	107.1	103.2	101.7	102.4	102.9	104.4	107.1	108.5	109.6	110.9	111.1	111.6	107.5	125.2
1000	109.3	109.6	109.4	110.1	107.3	103.8	101.9	102.4	102.8	104.8	106.9	108.2	109.9	111.9	111.1	110.2	107.8	125.5
1250	107.9	108.6	107.9	108.4	106.3	101.9	100.3	100.6	100.9	102.9	105.3	106.4	108.1	108.8	108.1	107.5	105.8	123.5
1600	107.0	107.6	107.5	107.6	105.5	101.3	98.6	99.0	100.0	102.5	104.6	105.7	108.2	108.8	107.5	105.0	105.2	122.9
2000	106.5	106.7	106.4	106.5	104.4	100.0	97.0	97.2	98.9	101.0	103.9	104.6	107.2	108.0	106.9	103.9	104.2	121.9
2500	104.6	105.1	105.0	104.6	102.5	98.8	95.3	95.6	97.5	100.0	102.8	103.6	105.6	106.1	104.6	100.7	102.6	120.3
3150	104.1	103.9	103.8	103.4	101.1	97.8	95.3	93.9	96.4	99.6	101.9	102.7	104.8	105.6	103.8	100.8	101.7	119.4
4000	103.1	102.8	103.3	103.1	100.3	96.1	93.0	92.8	95.1	97.8	100.6	101.6	104.1	104.8	103.3	100.4	100.8	118.5
5000	101.1	100.6	100.8	101.3	97.0	93.6	90.1	89.5	92.0	95.1	98.5	98.8	102.1	101.5	101.6	98.7	98.4	116.1
6300	99.4	100.6	99.6	99.6	96.8	94.4	90.4	87.6	92.8	95.9	98.8	99.2	100.4	102.1	99.1	95.7	97.8	115.5
8000	99.6	100.0	99.9	98.9	97.1	92.9	88.9	87.4	91.9	94.4	97.5	97.8	101.2	100.4	99.2	95.3	97.2	114.9
10000	97.8	98.1	97.9	98.3	94.9	91.4	86.6	84.9	89.9	92.1	95.9	95.9	99.1	98.4	97.8	92.9	95.4	113.1
12500	96.7	97.2	96.7	97.7	93.5	90.4	85.0	83.5	88.2	90.7	94.3	95.0	98.2	97.4	97.5	92.4	94.4	112.1
16000	94.1	95.6	94.9	94.7	91.4	87.4	82.1	80.4	85.6	88.6	91.7	92.6	95.2	95.9	94.6	93.1	92.1	109.8
20000	92.4	92.4	92.7	91.9	88.9	84.2	79.5	78.7	82.5	85.9	88.2	90.2	93.1	93.7	92.4	95.4	89.9	107.6
OVERALL	121.7	121.5	122.4	122.3	118.8	115.8	114.8	115.0	115.4	116.6	118.7	119.3	120.8	121.9	*128.8	*133.8	*122.6	*140.3

*Affected by fan exhaust.

TABLE IX. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) Concluded. 60 Percent speed; fan physical speed, 1342 rpm; fundamental blade passage frequency, 335 hertz

(a-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	71.7	67.7	75.7	73.7	74.6	72.9	71.2	74.1	72.2	70.9	71.4	71.7	73.2	76.7	92.6	97.8
63	67.8	65.8	74.8	70.8	72.1	70.6	68.8	71.1	70.6	68.1	69.6	69.4	71.1	74.3	91.4	96.7
80	68.2	68.4	73.0	69.5	71.2	69.7	67.5	69.7	69.7	68.7	69.7	69.1	71.5	73.0	90.2	95.4
100	71.2	69.2	72.2	71.0	71.5	69.4	68.2	70.0	69.2	69.2	69.7	69.0	69.7	72.0	88.7	94.1
125	73.7	75.4	75.1	72.9	73.2	71.9	70.6	73.1	71.1	72.4	73.2	72.5	72.7	73.9	87.9	93.8
160	73.2	74.0	74.0	71.7	72.9	70.0	69.7	71.0	70.7	71.2	71.9	74.1	71.0	73.5	86.4	92.3
200	74.9	74.7	73.9	71.9	70.1	67.4	67.1	68.6	68.6	68.4	68.7	69.5	70.7	71.7	85.4	91.0
250	78.6	78.5	77.1	75.3	73.8	71.8	70.0	70.3	71.0	72.3	73.8	75.6	75.6	77.1	84.0	90.2
315	87.4	86.8	88.8	88.9	82.1	80.1	80.4	79.1	80.1	80.6	82.8	82.4	83.3	84.1	85.3	89.7
400	81.6	81.6	82.2	81.9	78.1	75.4	74.6	74.4	74.7	76.2	78.2	79.0	78.7	80.4	82.4	86.5
500	79.3	79.4	79.3	79.1	76.6	73.1	72.6	72.8	73.3	74.6	76.6	77.7	76.9	79.6	81.1	84.1
630	81.4	80.9	81.1	82.4	80.2	75.9	74.1	74.6	75.2	77.2	80.2	80.5	84.2	84.1	83.1	84.9
800	79.4	78.9	79.1	79.1	77.3	73.4	71.9	72.6	73.1	74.6	77.3	78.7	79.8	81.1	81.3	81.8
1000	79.5	79.8	79.6	80.3	77.5	74.0	72.1	72.6	73.0	75.0	77.1	78.4	80.1	82.1	81.3	80.4
1250	78.0	78.7	77.9	78.5	76.4	72.0	70.4	70.7	71.0	73.0	75.4	76.5	78.2	78.9	78.2	77.6
1600	77.1	77.7	77.6	77.7	75.6	71.4	68.7	69.1	70.1	72.6	74.7	75.8	78.3	78.9	77.6	75.1
2000	76.5	76.7	76.4	76.5	74.4	70.0	67.0	67.2	68.9	71.0	73.9	74.6	77.2	78.0	76.9	73.9
2500	74.5	75.0	74.9	74.5	72.4	68.7	65.2	65.5	67.4	69.9	72.7	73.5	75.5	76.0	74.5	70.6
3150	73.8	73.6	73.5	73.1	70.8	67.5	65.0	63.6	66.1	69.3	71.6	72.4	74.5	75.3	73.5	70.5
4000	72.6	72.3	72.8	72.6	69.8	65.6	62.5	62.3	64.6	67.3	70.1	71.1	73.6	74.3	72.8	69.9
5000	70.3	69.8	70.0	70.5	66.2	62.8	59.3	58.7	61.2	64.3	67.7	68.0	71.3	70.7	70.8	67.9
6300	68.1	69.3	68.3	68.4	65.5	63.1	59.1	56.4	61.5	64.6	67.5	67.9	65.1	70.8	67.9	64.5
8000	67.7	68.1	68.0	67.0	65.2	61.0	57.0	55.5	60.0	62.5	65.6	65.5	65.3	68.5	67.3	63.4
10000	64.9	65.2	65.0	65.4	62.0	58.5	53.7	52.0	57.0	59.2	63.0	63.0	66.2	65.5	64.9	60.0
12500	62.5	62.9	62.4	63.5	59.3	56.2	50.8	49.3	54.0	56.5	60.1	60.8	64.0	63.1	63.2	58.1
16000	58.0	59.5	58.9	58.6	55.3	51.3	45.0	44.3	49.5	52.5	55.6	56.5	59.1	59.7	58.5	56.8
20000	53.5	53.6	53.8	53.1	50.1	45.4	40.7	39.8	43.7	47.1	49.4	51.4	54.2	54.8	53.5	56.4
OVERALL	91.9	91.7	92.6	92.5	89.0	86.0	85.0	85.3	85.6	86.7	88.9	89.4	90.9	92.0	*99.0	*104.1
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	65.7	73.7	79.0	81.5	79.5	77.7	77.3	77.5	78.7	79.9	81.7	81.5	82.1	81.0	*80.6	*79.7
304.8 M	56.1	65.3	71.0	73.8	71.7	70.1	70.0	70.2	71.3	72.5	74.2	73.7	74.3	72.9	*72.7	*71.8

*Affected by fan exhaust.

TABLE IX. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) 70 Percent speed; fan physical speed, 1567 rpm; fundamental blade passage frequency, 391 hertz

(b-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	109.5	101.3	102.0	105.5	106.5	104.8	104.7	103.3	100.7	100.2	103.0	105.2	109.7	103.8	106.0	125.0	110.8	128.6
63	105.0	97.3	100.6	101.0	104.1	101.6	102.3	100.8	98.6	96.1	101.3	102.6	102.6	101.3	105.0	124.5	110.0	127.7
80	104.8	99.3	100.6	99.6	103.6	101.0	102.3	99.3	98.6	97.6	101.6	101.9	102.3	101.8	104.3	123.5	109.1	126.8
100	105.3	100.7	102.7	102.3	103.3	101.2	104.0	99.8	99.7	100.0	101.3	103.6	104.0	102.3	105.0	122.2	108.3	126.0
125	106.0	107.3	105.8	104.5	104.8	103.0	104.0	103.3	102.0	105.2	105.5	104.8	106.0	104.8	105.5	122.2	109.0	126.7
160	109.7	105.5	105.0	104.2	104.2	101.4	102.9	101.0	101.4	103.5	105.0	105.3	104.4	103.4	103.9	119.9	107.2	124.9
200	106.0	106.2	105.3	102.7	101.0	99.7	100.0	97.8	98.8	100.5	102.0	103.6	103.3	101.8	103.0	118.6	105.7	123.4
250	110.0	109.8	109.2	106.3	104.2	104.2	101.8	100.3	102.0	105.0	106.8	108.3	109.3	110.7	106.7	118.2	108.1	125.8
315	112.8	111.7	112.5	109.5	106.8	106.3	105.2	103.7	104.8	107.7	108.7	109.6	110.5	111.0	107.2	117.0	109.3	127.0
400	121.9	123.4	125.5	121.0	117.7	117.7	116.5	112.5	116.2	118.9	118.4	118.5	118.4	120.5	116.7	119.2	119.2	136.9
500	113.2	112.3	113.0	111.2	109.3	107.7	105.2	105.3	106.3	109.0	109.7	110.9	110.7	112.2	110.2	113.2	109.9	127.6
630	112.0	111.2	112.4	110.5	109.0	106.5	105.4	104.0	105.2	109.0	110.7	111.1	111.4	112.4	110.4	112.2	109.7	127.4
800	114.3	116.3	116.9	115.1	112.1	109.3	108.8	110.6	110.6	111.1	112.4	114.2	115.9	116.9	114.3	112.0	113.4	131.1
1000	111.1	111.6	111.8	110.9	108.9	106.4	105.4	104.6	105.3	107.9	109.8	110.9	112.3	113.3	110.9	108.5	109.6	127.3
1250	112.7	113.0	112.9	112.4	110.7	107.4	105.7	105.0	105.7	108.7	109.9	111.1	112.5	113.0	111.0	107.6	110.2	127.9
1600	111.4	111.9	111.9	111.6	109.8	106.4	104.3	103.6	104.6	107.1	109.3	109.9	112.1	112.3	109.4	105.0	109.2	126.9
2000	110.3	110.3	110.6	110.0	108.5	105.0	102.1	101.5	103.0	106.0	107.8	108.6	111.6	111.3	109.0	103.9	108.0	125.7
2500	108.7	109.2	109.1	108.9	106.6	103.4	100.9	100.1	102.1	104.7	106.7	107.5	109.9	110.4	107.6	102.0	106.7	124.4
3150	107.6	107.8	107.4	106.9	105.1	102.3	99.9	98.3	101.3	104.1	106.3	106.7	108.4	109.3	106.6	101.0	105.5	123.2
4000	106.9	106.9	107.1	106.9	104.8	100.8	97.9	97.1	99.8	102.6	104.9	105.9	108.4	108.4	106.1	100.5	104.8	122.5
5000	105.4	104.7	105.4	105.7	102.1	98.9	95.9	94.4	97.1	100.4	103.4	103.4	106.6	105.6	105.1	98.3	102.8	120.5
6300	104.3	104.8	103.8	104.1	101.8	99.6	95.1	92.8	97.7	100.6	103.5	103.9	104.8	105.8	102.1	97.8	102.2	119.9
8000	105.1	104.4	104.4	104.1	101.7	98.1	94.7	93.2	96.9	99.1	102.2	102.4	105.4	105.2	102.7	98.0	101.8	119.5
10000	103.1	102.3	102.6	103.2	99.8	97.1	92.8	91.3	95.5	98.0	100.8	101.0	104.0	103.5	101.3	97.3	100.3	118.0
12500	102.6	101.5	101.3	103.1	99.1	96.3	92.1	90.5	94.3	96.8	99.8	100.5	104.0	102.3	101.1	97.5	99.7	117.4
16000	100.2	99.8	99.5	99.8	96.8	93.1	89.3	87.3	91.5	94.7	97.5	98.2	100.6	101.2	98.7	96.8	97.3	115.0
20000	99.5	96.8	97.2	96.8	94.3	89.8	86.3	85.4	88.8	92.4	94.5	95.8	98.7	98.7	96.0	98.7	95.0	112.7
OVERALL	125.6	126.3	127.6	124.7	122.3	120.8	119.8	117.8	119.6	122.0	122.8	123.4	124.4	125.4	122.8	*132.0	*123.9	*141.6

*Affected by fan exhaust.

TABLE IX. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) Concluded. 70 Percent speed; fan physical speed, 1567 rpm; fundamental blade passage frequency, 391 hertz

(b-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG														
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	75.9	71.6	72.3	75.8	76.8	75.1	75.0	73.6	71.6	70.5	73.3	75.5	76.0	74.1	76.3	95.3
63	75.3	67.6	70.9	71.3	74.4	71.9	72.6	71.1	68.9	66.4	71.6	72.9	72.9	71.6	75.3	94.8
80	75.1	69.6	70.5	69.9	73.9	71.3	72.6	69.6	68.9	67.9	71.9	72.2	72.6	72.1	74.6	93.8
100	75.6	71.0	73.0	72.6	73.6	71.5	74.0	70.1	70.0	70.3	71.6	73.9	74.3	72.6	75.3	92.5
125	76.3	77.6	76.1	74.8	75.1	73.3	74.3	73.6	72.3	75.5	75.8	75.1	76.3	75.1	75.8	92.5
160	74.0	75.8	75.3	74.5	74.5	71.7	73.2	71.3	71.7	73.8	75.3	75.6	74.7	73.7	74.2	90.2
200	76.3	76.5	75.6	73.6	71.5	70.3	70.3	68.1	69.1	70.8	72.3	73.9	73.6	72.1	73.3	88.9
250	80.4	80.4	79.5	76.6	74.5	74.5	72.1	70.6	72.3	75.3	77.1	78.6	79.6	81.0	77.0	88.5
315	83.1	82.0	82.3	79.8	77.1	76.6	75.5	74.0	75.1	78.0	79.0	79.9	80.8	81.3	77.5	87.3
400	92.1	93.6	95.7	91.2	87.9	87.9	86.7	82.7	86.4	89.1	88.6	88.7	88.6	90.7	86.9	89.4
500	83.4	82.5	83.2	81.4	79.5	77.9	78.4	75.5	76.5	79.2	79.9	81.1	80.5	82.4	80.4	83.4
630	82.2	81.4	82.6	80.7	79.2	76.7	75.6	74.2	75.4	79.2	80.9	81.3	81.6	82.6	80.6	82.4
800	84.5	86.5	87.1	85.3	82.3	79.5	79.0	80.3	80.6	81.3	82.6	84.4	86.1	87.1	84.5	82.2
1000	81.2	81.3	82.0	81.1	79.1	76.6	75.6	74.8	75.5	78.1	80.0	81.1	82.5	83.5	81.1	78.7
1250	82.8	83.1	83.0	82.5	80.8	77.5	75.8	75.1	75.8	78.8	80.0	81.2	82.6	83.1	81.1	77.7
1600	81.5	82.0	82.0	81.7	79.9	76.5	74.4	73.7	74.7	77.2	79.4	80.0	82.2	82.4	79.5	75.1
2000	80.3	80.3	80.6	80.0	78.5	75.0	72.1	71.5	73.6	76.0	77.8	78.6	81.6	81.3	79.0	73.9
2500	78.6	79.1	79.0	78.8	76.5	73.3	70.8	70.0	72.0	74.6	76.6	77.4	79.8	80.3	77.5	71.9
3150	77.8	77.5	77.1	76.6	74.8	72.0	69.6	69.0	71.0	73.8	76.0	76.4	78.1	79.0	76.3	70.7
4000	75.4	76.4	76.6	76.4	74.3	73.3	67.4	66.5	69.3	72.1	74.4	75.4	77.9	77.9	75.6	70.0
5000	74.6	73.9	74.6	74.9	71.3	68.1	65.1	63.6	66.3	69.6	72.6	72.6	75.8	74.8	74.3	67.5
6300	73.0	73.5	72.5	72.8	70.5	68.3	64.8	61.5	66.4	69.3	72.2	72.6	73.5	74.5	70.9	66.5
8000	73.2	72.6	72.5	72.2	69.8	66.2	62.8	61.3	65.0	67.2	70.3	70.5	73.5	73.3	70.8	66.1
10000	70.2	69.4	69.7	70.3	66.9	64.2	59.9	58.4	62.6	65.1	67.9	68.1	71.1	70.6	68.4	64.4
12500	68.3	67.2	67.1	68.9	64.8	62.1	57.9	56.3	60.1	62.6	65.6	66.2	69.7	68.0	66.8	63.2
16000	64.1	63.7	63.4	63.7	60.7	57.0	53.2	51.2	55.4	58.6	61.4	62.1	64.5	65.0	62.6	60.6
20000	59.6	59.0	59.1	58.0	55.5	51.0	47.5	46.5	50.0	53.6	56.7	57.0	59.8	59.9	57.2	59.7
OVERALL	95.8	96.4	97.8	94.8	92.4	91.0	90.0	88.0	89.7	92.2	92.9	93.6	94.5	95.5	92.9*	102.3
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	75.5	79.3	84.7	84.7	84.1	83.8	83.2	81.4	83.9	86.4	86.8	86.5	86.1	85.3	79.8	*79.3
304.8 M	61.0	71.1	76.5	77.3	76.5	76.3	76.0	74.1	76.6	79.1	79.3	79.0	78.4	77.5	71.6	*71.4

*Affected by fan exhaust.

TABLE IX. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) 86 Percent speed; fan physical speed, 1918 rpm; fundamental blade passage frequency, 479 hertz

(c-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	103.6	103.1	103.6	103.7	102.7	102.2	103.4	104.1	102.2	102.4	102.4	102.2	102.7	102.2	101.7	102.1	102.8	120.5
63	107.9	103.8	102.9	102.8	102.6	103.3	103.1	102.8	102.8	102.1	104.1	102.0	102.8	102.8	101.6	103.1	103.0	120.7
80	100.2	102.4	102.0	102.4	100.7	99.4	98.9	101.2	100.7	100.2	101.5	102.1	102.5	103.5	102.7	104.1	101.5	119.2
100	105.4	105.0	105.7	104.7	102.2	102.7	102.4	103.0	104.0	104.7	105.0	104.8	106.7	107.2	106.4	105.1	104.7	122.4
125	106.9	107.9	107.5	107.0	106.7	104.2	105.4	105.4	106.5	106.7	107.2	107.5	108.2	107.7	106.4	105.1	106.7	124.4
160	107.2	107.9	107.7	106.1	106.1	105.6	104.6	104.9	105.7	105.7	106.1	107.0	106.6	107.1	104.2	103.1	106.0	123.7
200	107.6	107.9	108.4	105.1	103.6	101.7	101.1	102.1	102.7	103.4	103.9	104.3	105.9	105.7	104.1	102.1	104.3	122.0
250	110.7	112.1	110.7	108.6	107.1	105.2	104.6	104.6	105.4	107.1	107.9	110.0	109.9	110.1	107.7	104.4	108.0	125.7
315	112.9	112.1	111.7	110.2	107.6	106.1	105.1	105.9	106.4	107.7	108.9	110.0	109.9	109.7	106.9	106.8	108.6	126.3
400	118.2	120.6	121.2	117.7	116.4	112.6	111.2	111.9	113.1	114.6	115.4	115.3	114.9	116.2	113.2	111.1	115.6	133.3
500	129.6	132.3	132.8	127.6	127.6	123.0	120.1	121.6	123.5	124.6	126.1	125.1	124.5	125.6	123.6	120.3	126.2	143.9
630	115.7	115.7	116.8	114.5	112.7	109.8	108.8	109.0	110.3	113.5	114.2	114.6	115.0	115.8	111.3	110.4	113.3	131.0
800	115.0	114.8	116.1	115.6	113.1	111.1	109.8	110.8	111.3	113.6	115.0	116.2	117.1	118.0	112.3	110.7	114.3	132.0
1000	118.2	118.2	119.7	120.7	118.7	118.2	115.2	115.9	117.5	117.7	120.4	121.6	121.0	123.0	116.5	113.4	119.2	136.9
1250	114.1	115.5	115.8	115.1	113.0	111.3	109.6	109.8	110.5	112.5	113.6	115.5	116.0	116.0	111.0	108.5	113.4	131.1
1600	115.8	116.5	117.2	116.8	115.3	114.2	110.8	110.0	110.7	113.2	114.3	115.3	117.2	117.0	111.3	107.2	114.5	132.2
2000	114.1	115.6	116.6	116.2	113.9	112.1	108.9	108.2	109.6	112.2	113.4	114.2	117.1	116.6	111.2	106.8	113.6	131.3
2500	112.4	113.6	114.4	114.1	112.1	110.1	108.1	106.8	108.3	110.8	112.1	113.7	115.3	115.6	110.1	105.3	112.1	129.8
3150	111.5	112.7	113.0	112.7	111.2	110.0	107.5	105.7	107.4	110.7	112.2	113.3	114.2	115.0	109.0	104.6	111.4	129.1
4000	111.4	112.5	112.9	112.9	110.7	108.4	105.0	105.0	106.2	109.0	110.5	112.3	113.7	114.2	109.0	104.1	110.6	128.3
5000	110.3	110.4	111.3	111.4	108.1	106.8	103.6	102.6	103.8	106.9	109.1	109.9	112.3	111.4	108.4	102.8	108.7	126.4
6300	110.0	110.8	110.5	110.6	108.1	108.1	104.3	101.3	105.3	108.0	110.0	110.9	111.1	111.8	106.3	101.6	108.8	126.5
8000	110.9	111.2	111.1	110.6	108.2	106.6	102.9	101.4	104.6	106.9	108.9	109.9	111.6	111.7	107.4	101.7	108.5	126.2
10000	109.7	109.5	109.0	109.5	106.3	105.5	101.0	99.5	103.5	105.5	107.8	108.8	110.7	110.0	106.7	100.8	107.2	124.9
12500	109.3	108.7	108.3	109.5	105.5	105.2	100.7	99.2	102.7	105.3	107.8	108.7	111.0	109.5	107.3	100.2	107.0	124.7
16000	107.4	107.4	106.3	106.4	103.8	102.4	98.3	96.6	100.6	103.8	105.9	107.0	108.8	108.6	105.4	101.8	105.1	122.8
20000	105.5	104.5	104.2	104.2	100.8	99.1	95.3	94.7	98.3	101.5	102.6	105.0	106.8	106.7	102.8	101.9	102.8	120.5
OVERALL	131.3	133.5	134.0	130.4	129.6	126.4	123.8	124.6	126.1	127.5	129.0	129.2	129.4	130.2	126.5	123.5	128.8	146.6

TABLE IX. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) Concluded. 86 Percent speed; fan physical speed, 1918 rpm; fundamental blade passage frequency, 479 hertz

(c-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	73.9	73.4	73.9	74.0	73.0	72.5	73.7	74.4	72.5	72.7	72.7	72.5	73.0	72.5	72.0	72.4
63	78.2	74.1	73.2	73.1	72.9	73.6	73.4	73.1	73.1	72.4	74.4	72.3	73.1	73.1	71.9	73.4
80	70.5	72.7	72.3	72.7	71.0	69.7	69.2	71.5	71.0	70.5	71.8	72.4	72.8	72.8	73.0	74.4
100	75.7	75.3	76.0	75.0	72.5	73.0	72.7	73.3	74.3	75.0	75.3	75.1	77.0	77.5	76.7	75.4
125	77.2	78.2	77.8	77.3	77.0	74.5	75.7	75.7	76.8	77.0	77.5	77.8	78.5	78.0	76.7	75.4
160	77.5	78.2	78.0	76.4	76.4	75.9	74.9	75.2	76.0	76.0	76.4	77.3	76.9	77.4	74.5	73.4
200	77.9	78.2	78.7	75.4	73.9	72.0	71.4	72.4	73.0	73.7	74.2	74.6	76.2	76.0	74.4	72.4
250	81.0	82.4	81.0	78.9	77.4	75.5	74.9	74.9	75.7	77.4	78.2	80.3	80.2	80.4	78.0	74.7
315	83.2	82.4	82.0	80.5	77.9	76.4	75.4	76.2	76.7	78.0	79.2	80.3	80.2	80.0	77.2	77.1
400	88.4	90.8	91.4	87.9	86.6	82.8	81.4	82.1	83.3	84.8	85.6	85.5	85.1	86.4	83.4	81.3
500	99.8	102.5	103.0	97.8	97.8	93.2	90.3	91.8	93.7	94.8	96.3	95.3	94.7	95.8	93.8	90.5
630	85.0	85.9	87.0	84.7	82.9	80.0	79.0	79.2	80.5	83.7	84.4	84.8	85.2	86.0	81.5	80.6
800	85.2	85.0	86.3	85.8	83.3	81.3	80.0	81.0	81.5	83.8	85.2	86.4	87.3	88.2	82.5	80.9
1000	88.4	88.4	89.9	90.9	88.9	88.4	85.4	86.1	87.7	87.9	90.6	91.8	91.2	93.2	86.7	83.6
1250	84.2	85.6	85.9	85.2	83.1	81.4	79.7	79.9	80.6	82.6	83.7	85.6	86.1	86.1	81.1	78.6
1600	85.9	86.6	87.3	86.9	85.4	84.3	80.9	80.1	80.8	83.3	84.4	85.4	87.4	87.1	81.4	77.3
2000	84.1	85.6	86.6	86.2	83.9	82.1	78.9	78.2	79.6	82.2	83.4	84.2	87.1	86.6	81.2	76.8
2500	82.3	83.5	84.3	84.0	82.0	80.0	78.0	76.7	78.2	80.7	82.0	83.6	85.2	85.5	80.0	75.2
3150	81.2	82.4	82.7	82.4	80.9	79.7	77.2	75.4	77.1	80.4	81.9	83.0	83.9	84.7	78.7	74.3
4000	80.9	82.0	82.4	82.4	80.2	77.9	75.5	74.5	75.7	78.5	80.0	81.8	83.2	83.7	78.5	73.6
5000	79.5	79.6	80.5	80.6	77.3	76.0	72.8	71.8	73.0	76.1	78.3	79.1	81.5	80.6	77.6	72.0
6300	78.7	79.5	79.2	79.3	76.8	76.3	73.0	70.0	74.0	76.7	78.7	79.6	79.8	80.5	75.0	70.3
8000	79.0	79.3	79.2	78.7	76.3	74.7	71.0	69.5	72.7	75.0	77.0	78.0	79.7	79.8	75.4	69.8
10000	76.8	76.6	76.1	76.6	73.4	72.6	68.1	66.6	70.6	72.6	74.9	75.9	77.8	77.1	73.8	67.9
12500	75.6	74.4	74.0	75.2	71.2	70.9	66.4	64.9	68.4	71.0	73.5	74.4	76.7	75.2	73.0	65.9
16000	71.3	71.2	70.2	70.3	67.7	66.3	62.2	60.5	64.5	67.6	69.8	70.8	72.7	72.4	69.3	65.5
20000	66.6	65.7	66.3	65.3	62.0	60.3	56.5	55.3	59.5	62.7	63.8	66.1	67.9	67.8	64.0	63.0
OVERALL	101.5	103.7	104.2	100.5	99.7	96.5	93.9	94.7	96.3	97.6	99.1	99.2	99.4	100.2	96.6	93.6
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	76.0	86.0	90.7	90.3	91.1	89.4	87.7	88.7	90.4	91.9	92.8	92.1	91.2	90.0	83.7	76.2
304.8 M	66.5	77.8	82.9	82.5	83.6	81.8	80.3	81.4	83.1	84.5	85.4	84.5	83.4	82.1	75.7	67.8

TABLE IX. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) 93 Percent speed; fan physical speed, 2081 rpm; fundamental blade passage frequency, 520 hertz

(d-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	103.3	100.6	101.6	100.5	101.0	102.1	104.6	101.8	102.3	101.6	102.3	102.1	102.3	102.6	103.8	124.9	110.4	128.1
63	104.0	100.8	100.5	99.0	100.2	106.0	105.8	100.8	106.8	105.5	102.2	104.4	103.2	103.3	104.7	123.2	109.5	127.2
80	102.7	100.9	99.9	98.6	99.6	103.6	104.7	100.7	104.2	103.6	102.4	103.8	103.6	104.1	105.4	122.3	108.5	126.2
100	107.9	105.0	105.9	105.4	104.0	108.0	107.2	104.7	105.0	106.2	105.0	106.8	107.5	106.5	108.5	121.6	109.4	127.1
125	106.3	109.2	107.5	107.5	107.0	106.5	105.8	105.8	106.8	108.3	108.7	108.4	108.5	108.2	108.0	120.4	109.5	127.2
160	107.9	109.2	108.4	106.6	106.9	106.7	106.2	106.4	106.6	107.7	107.9	108.5	107.9	107.9	106.9	119.9	109.2	126.9
200	108.8	109.6	108.3	104.6	105.0	103.8	103.6	103.8	103.5	104.3	105.0	105.2	107.0	106.6	106.1	117.5	107.1	124.8
250	113.4	112.2	111.2	109.9	108.5	109.0	107.0	107.7	108.4	109.5	110.2	111.3	111.5	111.0	108.4	117.3	110.4	128.1
315	113.9	113.4	112.6	110.7	109.2	108.2	107.7	107.9	108.2	108.9	110.1	111.0	112.1	111.6	107.9	116.3	110.5	128.2
400	115.8	115.4	117.8	116.4	115.3	113.9	112.9	111.4	112.1	113.4	113.8	114.7	114.8	114.6	110.6	116.1	114.3	132.0
500	125.1	127.4	130.1	132.7	130.4	123.9	130.2	125.7	124.9	125.6	126.1	128.2	127.1	125.6	123.4	122.3	127.8	145.5
630	117.6	118.1	119.6	120.1	118.1	113.8	116.9	114.4	114.6	115.9	116.9	118.0	118.4	118.4	113.8	115.2	117.1	134.8
800	116.5	116.6	116.6	115.6	114.5	112.1	111.8	112.1	113.3	115.1	116.8	117.4	118.5	118.6	112.1	113.2	115.5	133.2
1000	120.6	120.1	121.8	121.8	121.1	118.8	118.3	117.6	117.8	119.9	119.9	121.9	123.4	123.3	116.4	115.7	120.4	138.1
1250	116.0	116.8	117.2	116.2	115.3	113.2	111.7	112.2	113.0	115.0	116.2	117.4	118.3	117.7	111.8	111.4	115.4	133.1
1600	117.9	118.6	119.9	119.3	118.4	116.1	114.6	113.9	113.6	115.6	117.3	118.4	120.3	118.8	112.8	111.0	117.2	134.9
2000	116.3	117.0	118.2	118.2	116.3	113.7	111.8	111.8	112.2	113.8	116.2	116.6	119.3	118.0	112.3	109.6	115.7	133.4
2500	114.7	114.9	116.2	115.9	114.7	112.4	111.4	110.5	111.0	112.7	114.7	115.3	117.9	116.5	111.2	109.1	114.2	131.9
3150	114.1	114.6	115.7	115.2	114.1	112.4	111.6	109.9	110.4	112.9	114.6	115.5	116.7	116.2	110.4	108.5	113.8	131.5
4000	113.9	114.2	115.9	115.0	114.2	111.5	109.9	109.2	109.9	111.4	113.5	114.3	116.5	115.5	110.9	106.9	113.2	130.9
5000	113.2	112.5	114.0	114.0	111.4	109.2	107.5	106.7	107.2	109.2	111.9	112.0	115.5	113.2	110.2	105.5	111.4	129.1
6300	112.3	112.8	113.3	113.1	111.6	110.6	108.3	105.8	108.6	110.4	112.8	113.4	113.5	114.1	108.8	104.7	111.5	129.2
8000	113.5	113.2	114.0	113.7	111.7	109.4	107.0	106.2	108.0	109.9	112.0	112.3	114.9	113.5	109.4	105.3	111.4	129.1
10000	112.4	111.3	112.0	112.9	109.7	108.7	105.4	104.8	107.2	108.9	111.2	111.2	113.9	112.0	108.9	103.7	110.2	127.9
12500	112.2	111.0	111.5	112.8	108.8	108.0	105.2	104.0	106.8	108.5	111.0	111.4	114.2	112.2	109.8	104.7	110.1	127.8
16000	109.8	109.5	109.6	110.1	106.6	105.1	102.6	101.6	104.6	107.0	109.5	110.1	111.6	111.3	108.3	103.1	108.2	125.9
20000	108.2	106.8	107.3	107.3	104.6	101.9	99.4	99.8	102.0	105.0	106.8	108.4	110.5	109.8	106.1	102.5	106.2	123.9
OVERALL	129.9	130.8	132.7	134.2	132.2	127.8	131.3	127.9	127.8	129.0	129.9	131.4	131.9	130.9	127.0	*131.9	*130.7	*148.4

*Affected by fan exhaust.

TABLE IX. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) Concluded. 93 Percent speed; fan physical speed, 2081 rpm; fundamental blade passage frequency, 520 hertz

(d-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG 10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	73.6	70.9	71.9	70.8	71.3	72.4	74.9	72.1	72.6	71.9	72.6	72.4	72.6	72.9	74.1	95.2
63	74.3	71.1	70.8	69.3	70.5	76.3	77.1	71.1	77.1	75.8	72.5	74.7	73.5	73.6	75.0	93.5
80	73.0	71.2	70.2	68.9	69.9	73.9	75.0	71.0	74.5	73.9	72.7	74.1	73.9	74.4	75.7	92.6
100	78.2	75.3	76.2	75.7	74.3	78.3	77.5	75.0	75.3	76.5	75.3	77.1	77.6	78.8	78.8	91.9
125	76.6	78.5	77.8	77.8	77.3	76.8	77.1	76.1	77.1	78.6	79.0	78.7	78.8	78.5	78.3	90.7
160	78.2	79.5	78.7	76.9	77.2	77.0	76.5	76.7	76.9	78.0	78.2	78.8	78.2	78.2	77.2	90.2
200	79.1	79.9	78.6	74.9	75.3	74.1	73.9	74.1	73.8	74.6	75.3	75.5	77.3	76.9	76.4	87.8
250	83.7	82.5	81.5	80.2	78.8	79.3	77.3	78.0	78.7	79.8	80.5	81.6	81.8	81.3	78.7	87.6
315	84.2	83.7	82.9	81.0	79.5	78.5	78.0	78.2	78.5	79.2	80.4	81.3	82.4	81.9	78.2	86.6
400	86.0	85.6	83.0	86.6	85.5	84.1	83.1	81.6	82.3	83.6	84.0	84.9	85.0	84.8	80.8	86.3
500	95.3	97.6	100.3	102.9	100.6	94.1	100.4	95.9	95.1	95.8	96.3	98.4	97.3	95.8	93.6	92.5
630	87.8	88.3	89.8	90.3	88.3	84.0	87.1	84.6	84.8	86.1	87.1	88.2	88.6	88.6	84.0	85.4
800	86.7	86.8	86.8	85.8	84.7	82.3	82.0	82.3	83.5	85.3	87.0	87.6	88.7	88.8	82.3	83.4
1000	90.8	90.3	92.0	92.0	91.3	89.0	88.5	87.8	88.0	90.1	90.1	92.1	93.6	93.5	86.6	85.9
1250	86.1	86.9	87.3	86.3	85.4	83.3	81.8	82.3	83.1	85.1	86.3	87.5	88.4	87.8	81.9	81.5
1600	88.0	88.7	90.0	89.4	88.5	86.2	84.7	84.0	83.7	85.7	87.4	88.5	90.4	88.9	82.9	81.1
2000	86.3	87.0	88.2	88.2	86.3	83.7	81.8	81.8	82.2	83.8	86.2	86.6	89.3	88.0	82.3	79.6
2500	84.6	84.8	86.1	85.8	84.6	82.3	81.3	80.4	80.9	82.6	84.6	85.2	87.8	86.4	81.1	79.0
3150	83.8	84.3	85.4	84.9	83.8	82.1	81.3	79.6	80.1	82.6	84.3	85.2	86.4	85.9	80.1	78.2
4000	83.4	83.7	85.4	84.5	83.7	81.0	79.4	78.7	79.4	80.9	83.0	83.8	86.0	85.0	80.4	76.4
5000	82.4	81.7	83.2	83.2	80.6	78.4	76.7	75.9	76.4	78.4	81.1	81.2	84.7	82.4	79.4	74.7
6300	81.0	81.5	82.0	81.8	80.3	79.3	77.0	74.5	77.3	79.1	81.5	82.1	82.6	82.8	77.5	73.4
8000	81.5	81.3	82.1	81.8	79.8	77.5	75.1	74.3	76.1	78.0	80.1	80.4	83.0	81.6	77.5	73.4
10000	79.5	78.4	79.1	80.0	76.8	75.8	72.5	71.9	74.3	76.0	78.3	78.3	81.0	79.1	76.0	70.8
12500	77.9	76.7	77.2	78.5	74.5	73.8	70.9	69.7	72.5	74.2	76.7	77.1	79.9	77.9	75.5	70.4
16000	73.7	73.3	73.5	74.0	70.5	69.0	65.5	65.5	68.5	70.8	73.3	73.9	75.5	75.1	72.1	66.9
20000	69.3	68.0	68.5	68.5	65.7	63.1	60.6	60.9	63.2	66.1	68.0	69.5	71.6	70.9	67.2	63.6
OVERALL	99.9	100.9	102.8	104.3	102.4	97.8	101.5	98.1	97.8	99.0	99.9	101.4	101.6	100.9	96.9	*102.2
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	74.2	83.8	89.9	93.7	93.8	91.0	94.4	92.2	92.3	93.4	94.0	94.5	93.6	90.7	84.2	*81.7
304.8 M	64.3	75.2	81.9	86.0	86.2	83.4	87.2	84.9	85.0	86.0	86.4	86.9	85.8	82.7	76.1	*73.5

*Affected by fan exhaust.

TABLE IX. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(e) 100 Percent speed; fan physical speed, 2238 rpm; fundamental blade passage frequency, 559 hertz

(e-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																
50	107.3	108.9	105.1	106.0	104.6	104.1	103.3	101.3	105.8	103.6	105.9	105.9	103.4	104.5	107.6	114.6	105.9	123.6
63	106.7	105.2	103.2	104.3	103.8	105.3	102.8	101.1	104.6	102.5	105.3	105.2	103.3	105.0	107.3	116.5	106.0	123.7
80	108.3	109.1	104.8	106.9	109.1	111.1	108.3	106.0	110.3	108.5	109.8	107.8	106.3	106.3	108.5	115.4	109.0	126.7
100	108.2	107.0	107.1	105.1	106.7	106.2	105.7	104.5	106.5	107.6	108.1	108.9	108.8	109.6	109.6	114.4	107.9	125.6
125	109.0	109.5	110.4	110.0	108.9	108.4	108.5	107.8	109.7	110.4	111.7	111.4	111.2	111.7	110.5	114.2	110.3	128.0
160	110.9	111.7	112.6	111.7	109.8	108.3	107.8	107.7	109.8	112.2	111.4	112.8	111.2	109.4	110.1	114.1	110.8	128.5
200	111.5	111.2	112.7	110.0	107.4	109.0	108.0	105.7	107.1	108.9	108.9	109.1	110.0	109.5	107.7	111.6	109.1	126.8
250	114.6	114.2	113.8	111.9	111.3	109.3	107.4	108.3	109.6	111.2	113.2	113.2	113.3	112.8	109.7	110.9	111.6	129.3
315	115.1	114.4	113.9	112.4	110.4	109.3	108.9	108.9	110.3	112.4	113.6	113.3	113.2	112.8	109.4	110.6	111.9	129.6
400	118.3	117.7	118.2	115.8	113.7	112.4	111.1	112.1	113.2	114.9	116.8	116.2	115.9	115.7	111.6	110.7	114.9	132.6
500	126.6	127.5	130.6	125.7	124.0	122.7	122.6	122.9	126.0	126.4	127.9	127.8	125.9	123.9	121.0	120.6	125.8	143.5
630	126.6	127.2	130.1	125.7	123.8	122.7	122.6	122.7	125.7	126.3	127.6	127.6	125.8	124.2	121.1	120.9	125.6	143.3
800	117.6	118.3	118.9	117.6	116.0	113.5	113.1	113.6	115.5	117.6	119.4	119.5	120.4	120.0	113.8	112.0	117.4	135.1
1000	119.7	121.4	121.8	123.0	120.2	117.3	116.9	116.8	119.2	122.3	122.4	123.8	122.8	122.9	117.3	114.9	121.0	138.7
1250	120.3	122.3	122.4	123.9	121.0	117.5	117.4	117.2	119.9	123.2	122.2	124.2	123.0	123.2	118.7	115.8	121.5	139.2
1600	118.5	120.4	121.5	121.8	119.8	117.1	114.3	115.0	117.3	120.0	120.0	120.6	122.0	120.9	114.8	111.8	119.3	137.0
2000	116.9	118.4	119.7	120.1	117.9	115.1	112.4	112.3	115.1	116.8	118.4	118.5	120.2	119.1	113.2	110.7	117.3	135.0
2500	116.2	117.7	118.5	119.2	117.3	114.5	112.2	111.7	114.4	116.0	117.9	118.2	119.2	118.5	112.8	109.7	116.6	134.3
3150	115.7	116.9	117.9	118.2	117.1	114.8	112.4	111.2	113.8	116.1	117.8	117.6	118.4	118.1	112.6	109.5	116.2	133.9
4000	115.6	116.8	117.6	118.2	116.4	113.6	110.9	110.4	113.1	114.8	116.8	118.6	117.4	117.4	112.4	108.7	115.6	133.3
5000	114.4	115.3	116.3	117.3	113.9	111.8	108.7	108.4	110.5	112.9	115.2	114.7	117.3	115.3	111.8	107.2	113.9	131.6
6300	114.1	115.6	115.3	116.2	114.2	113.2	110.0	107.3	112.0	113.8	116.1	115.8	116.2	116.1	110.6	106.4	114.1	131.8
8000	114.9	116.3	116.3	116.7	114.4	112.3	108.8	107.9	111.5	113.0	115.2	115.1	117.4	115.8	111.7	107.6	114.1	131.8
10000	113.8	114.8	115.1	115.6	113.0	111.4	107.3	107.1	110.8	112.0	114.7	114.2	116.4	114.6	111.2	106.6	113.1	130.8
12500	113.4	114.2	114.0	116.0	112.0	111.3	107.2	106.6	110.1	112.0	114.9	114.6	117.0	114.5	112.5	107.3	113.1	130.8
16000	111.4	112.7	112.1	113.1	109.7	107.8	104.6	104.2	108.6	110.5	112.9	113.4	114.7	113.8	110.7	105.6	111.2	128.9
20000	109.4	109.9	110.1	110.6	107.7	104.9	101.7	102.4	106.1	108.8	110.4	111.9	113.2	111.8	108.9	104.4	109.2	126.9
OVERALL	122.4	123.3	125.3	123.2	121.1	119.2	118.3	118.3	121.1	122.5	123.6	123.9	123.4	122.4	119.4	118.1	122.0	139.7

TABLE IX. - Concluded. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(e) Concluded. 100 Percent speed; fan physical speed, 2238 rpm; fundamental blade passage frequency, 559 hertz

(e-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	78.1	76.2	75.4	76.3	74.9	74.4	73.6	71.6	76.1	73.9	76.2	76.2	73.7	74.8	77.9	84.9
63	78.6	75.5	73.5	74.6	74.1	75.6	73.1	71.4	74.9	72.8	75.6	75.5	73.6	75.3	77.6	86.8
80	78.6	79.4	75.1	77.2	79.4	81.4	78.6	76.3	80.6	78.8	80.1	78.1	76.6	76.6	78.8	85.7
100	78.5	77.3	77.4	75.4	77.0	76.5	76.0	74.8	76.8	77.9	78.4	79.2	79.1	79.9	79.9	84.7
125	79.3	79.8	80.7	80.3	79.2	78.7	78.8	78.1	80.0	80.7	82.0	81.7	81.5	82.0	80.8	84.5
160	81.2	82.0	82.9	82.0	80.1	78.6	78.1	78.0	80.1	82.5	81.7	83.1	81.5	79.7	80.4	84.4
200	81.8	81.5	83.0	80.3	77.7	79.3	78.3	76.0	77.4	79.2	79.2	79.4	80.3	79.8	78.0	81.5
250	84.9	84.5	84.1	82.2	81.6	79.6	77.7	78.0	79.9	81.5	83.5	83.5	83.6	83.1	80.0	81.2
315	85.4	84.7	84.2	82.7	80.7	79.6	79.2	79.2	80.6	82.7	83.9	83.6	83.5	83.1	79.7	80.9
400	88.5	87.9	88.4	86.0	83.9	82.6	81.3	82.3	83.4	85.1	87.0	86.4	86.1	85.9	81.8	80.9
500	96.8	97.7	100.8	95.9	94.2	92.9	92.8	93.1	96.2	96.6	98.1	98.0	96.1	94.1	91.2	90.8
630	96.8	97.4	100.3	95.9	94.0	92.9	92.8	92.9	95.9	96.5	97.8	97.8	96.0	94.4	91.3	91.1
800	87.8	88.5	87.1	87.8	86.2	83.7	83.3	83.8	85.7	87.8	89.6	89.7	90.6	90.2	84.0	82.2
1000	89.9	91.6	92.8	93.1	90.3	87.5	87.1	87.8	89.3	92.4	92.6	93.9	93.0	93.1	87.4	85.1
1250	90.4	92.4	92.9	94.0	91.1	87.6	87.5	87.3	90.6	93.3	92.3	94.3	93.1	93.3	88.8	85.9
1600	88.6	90.5	91.6	91.9	89.9	87.2	84.4	85.1	87.4	90.1	90.1	90.7	92.1	91.0	84.9	81.9
2000	86.9	88.4	89.7	90.1	87.9	85.1	82.4	82.3	85.1	86.8	88.4	88.5	90.2	89.1	83.2	80.7
2500	86.1	87.6	88.4	89.1	87.2	84.4	82.1	81.6	84.3	85.9	87.8	88.1	89.1	88.4	82.7	79.6
3150	85.4	86.6	87.6	87.9	86.8	84.5	82.1	80.9	83.5	85.8	87.5	87.2	88.1	87.8	82.3	79.2
4000	85.1	86.3	87.1	87.7	85.9	83.1	80.4	79.9	82.6	84.3	86.3	86.3	88.1	86.9	81.9	78.2
5000	82.6	84.9	85.5	86.5	83.1	81.0	77.9	77.6	79.7	82.1	84.4	83.9	86.5	84.5	81.0	76.4
6300	82.8	84.5	84.9	84.9	82.9	81.9	78.7	76.0	80.7	82.5	84.8	84.5	84.9	84.8	79.3	75.1
8000	82.9	84.4	84.4	84.2	82.5	80.4	76.9	76.0	79.6	81.1	83.3	83.2	85.4	83.9	79.7	75.6
10000	80.9	81.9	82.2	82.7	80.1	78.5	74.4	74.2	77.9	79.1	81.8	81.3	83.5	81.7	78.3	73.7
12500	79.1	79.9	79.7	81.7	77.8	76.7	72.9	72.3	75.8	77.7	80.6	80.3	82.7	80.2	78.2	73.0
16000	79.3	76.6	76.0	77.0	73.6	71.7	68.5	68.1	72.4	74.3	76.8	77.2	78.6	77.6	74.5	69.4
20000	76.5	71.1	71.2	71.6	68.8	66.1	62.9	63.5	67.3	69.9	71.6	73.0	74.3	72.9	70.0	65.5
OVERALL	102.4	102.3	105.2	103.1	101.0	99.2	98.4	98.4	101.2	102.5	103.6	103.9	103.2	102.3	98.2	98.2
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	76.2	85.5	91.7	92.6	92.7	92.0	91.6	92.0	95.0	96.1	97.0	96.3	94.8	92.0	84.7	79.7
304.8 M	69.4	76.8	83.6	84.2	84.5	84.2	84.1	84.6	87.5	88.7	89.4	88.6	86.6	83.4	76.4	71.2

TABLE X. - FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 95 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) 60 Percent speed; fan physical speed, 1307 rpm; fundamental blade passage frequency, 326 hertz

(a-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE POWER LEVEL	
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	96.4	95.4	92.9	93.9	94.6	95.1	96.6	95.6	95.9	94.3	95.4	93.2	95.6	93.4	93.4	91.8	94.9	112.6
63	96.8	92.6	91.6	91.1	92.3	92.6	91.0	90.6	91.8	92.0	94.1	92.6	94.8	92.6	93.1	90.8	92.5	110.2
80	99.5	95.0	96.3	94.8	94.8	94.0	93.5	92.1	94.0	94.0	96.5	95.4	98.3	96.8	96.0	94.8	95.2	112.9
100	97.6	97.2	97.7	99.2	97.2	97.1	96.4	94.4	94.7	96.7	97.4	95.8	99.1	97.7	95.1	94.0	96.9	114.6
125	101.5	104.3	103.5	102.2	103.7	101.0	101.0	101.2	97.3	100.0	100.5	99.3	101.2	100.5	100.8	97.4	101.1	118.8
160	102.5	101.6	102.0	101.5	99.8	98.3	97.5	98.6	99.5	98.6	99.5	101.1	98.3	99.8	100.3	98.8	99.7	117.4
200	103.3	104.1	102.9	101.1	98.1	96.3	96.3	96.8	97.3	95.8	96.6	97.7	98.6	98.6	98.4	96.0	98.6	116.3
250	107.8	106.3	105.0	104.2	101.8	100.2	98.2	98.7	99.3	100.0	101.3	101.9	102.7	102.5	102.7	98.6	101.9	119.6
315	119.7	115.5	116.5	116.2	115.0	111.8	112.0	109.5	109.8	109.3	113.2	111.1	114.2	114.7	111.7	109.4	113.2	130.9
400	109.9	108.4	109.4	107.9	106.1	103.3	102.3	101.4	102.4	103.3	105.1	104.9	106.3	106.4	104.8	102.2	105.3	123.0
500	109.0	107.6	107.5	107.1	105.0	101.0	100.3	99.5	101.3	102.3	103.3	103.9	105.1	106.1	105.0	101.0	104.1	121.8
630	110.4	109.6	111.2	111.4	108.6	104.6	104.1	103.7	105.1	105.7	107.1	108.0	113.7	112.6	111.1	105.1	108.9	126.6
800	107.5	107.0	107.4	107.4	105.2	101.5	100.4	100.2	100.9	102.4	104.5	105.6	107.7	108.2	106.4	101.2	104.9	122.6
1000	108.7	108.5	108.5	108.2	106.2	102.9	100.4	99.7	100.9	102.9	105.0	105.8	108.2	109.2	107.7	102.4	105.7	123.4
1250	109.0	108.5	107.8	107.8	106.2	102.0	99.2	98.5	99.5	101.3	103.7	103.9	106.3	107.8	105.7	100.2	104.6	122.3
1600	106.9	107.3	106.8	106.5	104.6	100.8	97.5	96.8	98.8	100.6	103.0	103.6	106.3	107.1	105.3	98.8	103.7	121.4
2000	105.5	106.4	105.7	105.5	103.7	100.2	97.5	97.4	99.5	101.0	102.5	103.1	106.0	107.2	105.0	100.8	103.3	121.0
2500	104.4	104.7	103.7	103.9	101.7	97.7	94.7	93.5	96.4	98.6	101.2	101.5	104.1	105.1	103.1	96.6	101.3	119.0
3150	103.1	103.4	102.4	102.4	100.1	96.6	93.3	91.9	95.1	98.3	100.8	100.7	102.9	104.3	102.4	96.7	100.3	118.0
4000	102.8	103.0	102.3	102.1	100.0	96.0	92.1	92.0	95.0	97.1	99.1	99.4	102.8	103.3	102.3	97.1	99.7	117.4
5000	100.8	100.6	99.6	100.1	97.3	92.6	88.1	87.1	92.3	94.0	97.8	96.6	100.8	100.1	99.8	93.2	97.2	114.9
6300	98.8	99.5	98.2	98.5	95.8	93.3	88.3	85.0	90.3	94.0	97.5	97.5	99.5	100.8	98.3	93.3	96.5	114.2
8000	98.6	99.3	99.3	98.5	95.5	91.6	85.1	84.5	90.8	92.5	95.8	95.5	99.7	100.0	98.3	92.7	95.9	113.6
10000	95.7	96.7	95.6	96.6	93.3	89.8	83.2	81.4	87.7	89.7	93.2	92.6	97.1	96.7	95.9	90.0	93.3	111.0
12500	94.5	95.7	94.0	95.8	92.9	88.8	82.2	80.4	86.9	88.2	91.5	91.3	96.4	95.2	94.7	89.0	92.2	109.9
16000	92.5	93.9	93.0	93.0	91.2	86.3	80.9	80.3	85.7	86.9	89.5	89.6	94.0	93.5	92.3	89.5	90.3	108.0
20000	93.0	93.8	93.0	93.5	90.8	86.5	83.3	84.2	88.1	87.0	89.3	90.1	94.7	93.5	92.5	91.0	90.7	108.4
OVERALL	122.4	120.4	120.7	120.4	118.7	115.5	114.8	113.4	114.2	114.8	117.3	116.9	120.0	120.2	118.4	114.2	117.8	135.5

TABLE X. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 95 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) Concluded. 60 Percent speed; fan physical speed, 1307 rpm; fundamental blade passage frequency, 326 hertz

(a-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	66.7	65.7	63.2	64.2	64.9	65.4	66.9	65.9	66.2	64.6	65.7	63.5	65.9	63.7	63.7	62.1
63	66.1	62.9	61.9	61.4	62.6	62.9	61.3	60.9	62.1	62.3	64.4	62.9	65.1	62.9	63.4	61.1
80	65.8	65.3	66.6	65.1	65.1	64.3	63.8	62.4	64.3	64.3	66.8	65.7	68.6	67.1	66.3	65.1
100	67.5	67.5	68.0	69.5	67.5	67.4	66.7	64.7	65.0	67.0	67.7	66.1	69.4	68.0	69.4	64.3
125	71.8	74.6	73.8	72.5	74.0	71.3	71.3	71.5	67.6	70.3	70.8	69.6	71.5	70.8	71.1	67.7
160	72.8	71.9	72.3	71.3	70.1	68.6	67.8	68.9	69.8	68.9	69.8	71.4	68.6	70.1	70.6	69.1
200	73.6	74.4	73.2	71.4	68.4	66.6	66.6	67.1	67.6	66.1	66.9	68.0	68.9	68.9	68.7	66.3
250	78.1	76.6	75.3	74.5	72.1	70.5	68.5	69.0	69.6	70.3	71.6	72.2	73.0	72.8	73.0	68.9
315	81.0	85.3	84.8	86.5	85.3	82.1	82.3	79.8	80.1	79.6	83.5	81.4	84.5	85.0	82.0	79.7
400	80.1	78.6	79.6	78.1	76.3	73.5	72.5	71.6	72.6	73.5	75.3	75.1	76.5	76.6	75.0	72.4
500	78.2	77.8	77.7	77.3	75.2	71.2	70.5	69.7	71.5	72.5	73.5	74.1	75.3	76.3	75.2	71.2
630	80.6	79.3	81.4	81.6	78.8	74.8	74.3	73.9	75.3	75.9	77.3	78.2	83.9	82.8	81.3	75.3
800	77.7	77.2	77.6	77.6	75.4	71.7	70.6	70.4	71.1	72.6	74.7	75.8	77.9	78.4	76.6	71.4
1000	78.9	78.7	78.7	78.4	76.4	73.1	73.6	69.9	71.1	73.1	75.2	76.0	78.4	79.4	77.9	72.6
1250	79.1	78.5	77.4	77.9	76.3	72.1	69.3	68.6	69.6	71.4	73.8	74.0	76.4	77.9	75.8	70.3
1600	77.0	77.4	76.9	76.6	74.7	70.9	67.6	66.9	68.9	70.7	73.1	73.7	76.4	77.2	75.4	68.9
2000	75.5	76.4	75.7	75.5	73.7	70.2	67.5	67.4	69.5	71.0	72.5	73.1	76.0	77.2	75.0	70.8
2500	74.3	74.6	73.6	73.8	71.6	67.6	64.6	63.4	66.3	68.5	71.1	71.4	74.0	75.0	73.0	66.5
3150	72.3	73.1	72.1	72.1	69.8	66.3	63.0	61.6	64.8	68.0	70.5	70.4	72.6	74.0	72.1	66.4
4000	72.3	72.5	71.8	71.6	69.5	65.5	61.6	61.5	64.5	66.6	68.6	68.9	72.3	72.8	71.8	66.6
5000	70.3	69.8	68.9	69.3	66.5	61.8	57.3	56.3	61.5	63.2	67.0	65.8	70.0	69.3	69.0	62.4
6300	67.6	68.2	66.5	67.2	64.5	62.0	57.0	53.8	59.0	62.7	66.2	66.2	68.2	65.5	67.0	62.0
8000	66.7	67.4	66.4	66.6	63.6	59.7	54.2	52.6	58.9	60.6	63.9	63.6	67.8	68.1	66.4	60.8
10000	62.8	63.8	62.7	63.7	60.4	56.9	50.3	48.5	54.8	56.8	60.3	59.7	64.2	63.8	63.0	57.1
12500	60.3	61.4	59.7	61.6	58.6	54.6	47.9	46.1	52.6	53.9	57.3	57.1	62.1	61.0	60.5	54.7
16000	56.3	57.7	56.3	56.8	55.0	50.1	44.7	44.0	49.5	50.7	53.3	53.4	57.8	57.3	56.1	53.2
20000	54.0	54.9	54.1	54.5	51.9	47.6	44.2	45.1	49.0	48.1	50.4	51.1	55.7	54.6	53.6	52.0
OVERALL	82.6	80.5	80.9	80.6	88.9	85.7	85.0	83.7	84.4	85.0	87.5	87.1	90.1	90.3	88.5	84.4
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	66.6	72.7	77.2	79.7	79.8	77.7	77.3	76.3	77.7	78.4	80.7	79.2	81.0	79.3	74.7	66.2
304.8 M	57.2	64.2	69.3	71.9	72.3	70.2	70.1	69.1	70.4	70.9	73.2	71.6	73.2	71.5	66.3	57.4

TABLE X. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 95 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) 70 Percent speed; fan physical speed, 1526 rpm; fundamental blade passage frequency, 381 hertz

(b-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
315	100.7	100.0	95.9	100.7	97.5	101.0	102.9	103.4	100.7	101.2	100.2	99.5	100.5	100.9	94.9	96.6	101.0	118.7
400	98.7	94.0	93.6	95.7	93.9	94.4	93.4	94.6	94.1	95.9	94.1	94.5	97.2	96.2	95.7	95.1	94.9	112.6
500	97.0	97.2	97.3	97.4	95.4	95.7	95.5	95.9	95.5	97.4	96.5	96.8	98.2	97.9	98.5	97.9	96.8	114.5
630	101.0	99.9	100.2	101.2	97.9	99.2	98.2	98.0	99.5	100.3	100.8	98.9	100.2	101.8	99.5	97.2	99.7	117.4
800	105.0	103.4	103.0	103.2	103.9	102.4	101.7	102.4	100.2	102.4	103.4	102.8	101.9	103.9	102.9	99.6	102.8	120.5
1000	104.9	104.3	104.8	103.3	101.3	101.0	99.8	100.8	101.5	102.0	102.0	102.8	102.3	103.2	100.5	101.0	102.1	119.8
1250	105.4	105.7	103.5	101.0	98.5	98.0	96.9	97.5	98.0	98.4	99.9	99.8	101.5	102.2	100.9	98.6	100.4	118.1
1600	108.1	108.0	105.3	104.9	103.9	102.4	99.7	100.2	100.4	102.0	104.2	103.6	104.9	105.9	103.9	100.9	103.6	121.3
2000	111.1	111.4	112.4	110.9	108.4	107.6	104.9	103.5	103.3	104.9	107.1	105.7	107.4	108.4	105.9	102.1	107.5	125.2
2500	121.1	120.2	119.1	121.4	121.1	120.1	115.7	113.6	113.2	115.4	118.1	116.1	117.7	115.1	115.6	112.9	118.7	136.4
3150	113.9	110.4	111.4	109.9	107.7	105.4	103.6	103.7	103.9	105.6	107.6	106.8	107.9	110.4	107.6	103.4	107.3	125.0
4000	110.6	110.5	110.6	110.3	107.9	104.4	102.4	103.4	104.3	106.1	108.4	108.2	109.9	111.3	107.8	103.5	107.8	125.5
5000	113.3	113.4	113.1	114.1	111.3	108.3	108.4	109.1	108.9	109.9	112.4	112.9	116.1	116.6	113.1	108.5	112.7	130.4
6300	110.9	111.0	110.6	110.1	108.3	105.0	102.6	103.3	103.8	105.8	108.3	108.9	110.2	111.8	107.6	103.8	108.0	125.7
8000	110.0	110.7	111.9	111.2	109.2	105.7	103.4	103.9	104.2	106.5	108.0	109.3	111.2	112.5	108.9	104.1	108.8	126.5
10000	111.7	111.7	111.5	111.3	109.3	106.2	102.2	102.3	104.2	105.2	107.5	108.3	110.2	111.5	107.7	101.9	108.2	125.9
12500	109.4	110.4	110.7	109.7	107.0	104.4	100.7	100.7	103.1	104.6	106.7	106.8	109.7	110.7	107.1	102.6	107.1	124.8
16000	107.9	108.3	108.3	108.1	105.0	102.1	98.8	98.4	101.1	102.8	105.8	105.7	108.6	110.1	105.9	100.5	105.6	123.3
20000	107.1	107.7	107.4	106.6	103.9	101.2	97.4	96.9	99.6	102.4	104.9	105.0	106.9	108.7	105.9	100.0	104.5	122.2
OVERALL	125.4	124.5	126.9	124.6	123.5	121.7	118.3	117.4	117.6	119.4	121.7	121.2	123.1	124.3	121.0	117.2	122.0	139.7

TABLE X. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 95 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) Concluded. 70 Percent speed; fan physical speed, 1526 rpm; fundamental blade passage frequency, 381 hertz

(b-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	77.0	70.3	64.2	73.0	67.8	71.3	73.2	73.7	71.0	71.5	70.5	69.8	70.8	71.2	65.2	66.9
63	65.0	64.9	62.9	66.0	64.2	64.7	63.7	64.9	64.4	66.2	64.4	64.8	67.5	66.5	66.0	65.4
80	67.2	67.5	67.3	67.7	65.7	66.0	65.8	66.2	65.8	67.7	66.8	67.1	68.5	66.2	68.8	68.2
100	71.3	70.1	70.6	71.3	68.6	69.5	68.5	68.3	69.8	70.6	71.1	69.2	70.5	72.1	69.8	67.5
125	74.3	75.7	75.3	73.5	74.2	72.7	72.0	72.7	70.5	72.7	73.7	73.1	72.2	74.2	73.2	69.9
160	75.8	74.8	74.8	73.6	71.3	71.3	70.1	71.1	71.8	72.3	72.2	73.1	72.6	73.5	70.8	71.3
200	75.7	76.0	73.8	71.5	70.2	68.3	67.2	67.8	68.3	68.7	70.2	70.1	72.2	72.5	71.2	68.9
250	78.3	78.3	76.3	75.2	73.2	72.7	70.0	70.5	70.7	72.3	74.5	73.9	75.2	76.2	74.2	71.2
315	82.4	81.7	82.7	80.7	78.7	77.9	75.2	73.9	73.6	75.2	77.4	76.0	77.7	78.7	76.2	72.4
400	93.3	90.4	95.3	91.6	91.3	90.3	85.9	83.8	83.4	85.6	88.3	86.3	87.5	89.3	85.8	83.1
500	81.1	80.6	80.6	80.1	77.9	75.6	73.8	73.9	74.1	75.8	77.8	77.0	78.1	80.6	77.8	73.6
630	80.8	80.5	80.8	80.5	78.1	74.6	72.6	73.6	74.5	76.3	78.6	78.4	80.1	81.5	78.0	73.7
800	83.5	85.6	85.3	85.0	81.5	78.5	78.6	79.3	79.1	80.1	82.6	84.1	86.3	86.8	83.3	78.7
1000	80.7	81.2	80.8	80.3	78.5	75.2	72.8	73.5	74.0	76.0	78.5	79.1	80.5	82.0	77.8	74.0
1250	82.1	82.8	81.6	81.3	79.3	75.8	73.5	74.0	74.3	76.6	78.1	79.4	81.3	82.6	79.0	74.2
1600	81.8	81.8	81.6	81.4	79.4	76.3	72.3	72.4	74.3	75.3	77.6	78.4	80.4	81.6	77.8	72.0
2000	79.4	80.4	80.7	79.7	77.6	74.4	70.7	70.7	73.1	74.6	76.7	76.8	79.7	80.7	77.1	72.6
2500	77.8	78.2	78.2	78.0	75.5	72.0	68.7	68.3	71.0	72.7	75.7	75.6	78.5	80.0	75.8	70.4
3150	76.8	77.4	77.1	76.3	73.6	70.9	67.1	66.6	69.3	72.1	74.6	74.7	76.6	78.4	75.6	69.7
4000	76.1	76.4	76.4	76.3	73.1	69.6	65.4	65.6	68.8	70.6	73.1	73.7	76.6	77.7	75.1	69.5
5000	74.2	74.4	73.7	74.6	70.6	66.8	62.2	61.7	66.4	67.8	71.1	70.4	74.1	74.1	72.6	65.9
6300	72.1	73.0	71.8	72.2	68.5	67.2	62.2	59.7	64.3	67.8	70.7	70.8	72.2	74.5	70.3	65.7
8000	71.6	72.3	71.5	71.6	68.3	64.8	59.3	58.5	64.5	65.6	68.8	68.5	72.3	72.3	70.5	64.2
10000	67.9	68.9	67.8	68.8	64.8	61.9	55.8	55.1	60.8	62.3	65.8	65.5	69.3	69.1	66.8	61.2
12500	65.6	66.6	65.1	67.2	62.7	60.1	53.2	52.2	58.7	59.6	63.0	63.0	67.1	66.2	65.2	58.4
16000	62.6	63.5	62.6	63.3	59.3	56.1	49.8	49.3	54.4	56.5	59.4	59.8	63.6	63.3	60.4	56.8
20000	61.5	61.3	60.1	61.1	55.3	52.9	47.3	48.4	53.0	53.5	56.0	57.0	61.3	60.7	58.7	55.4
OVERALL	95.8	94.6	97.1	94.7	93.4	91.9	88.5	87.6	87.7	89.5	91.8	91.3	93.2	94.4	91.0	87.3
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	70.6	77.4	83.9	84.5	84.9	84.3	81.6	81.1	81.9	83.7	85.7	84.1	84.7	84.1	78.0	69.9
304.8 M	61.3	69.0	76.2	76.8	77.5	77.1	74.4	73.9	74.6	76.4	78.3	76.5	77.0	76.2	69.8	61.3

TABLE X. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 95 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) 86 Percent speed; fan physical speed, 1868 rpm; fundamental blade passage frequency, 467 hertz

(c-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	98.6	96.1	97.3	97.1	96.1	97.3	97.6	97.6	97.0	97.8	98.5	100.5	99.1	99.5	103.0	99.5	98.5	116.2
63	109.4	99.6	99.3	97.6	97.4	101.3	105.9	100.3	99.9	101.8	103.6	103.5	100.8	101.6	104.1	101.0	102.3	120.0
80	99.0	99.1	98.5	97.5	97.6	97.5	96.8	97.1	97.3	97.6	100.1	101.4	100.8	103.6	104.0	102.0	99.7	117.4
100	104.8	104.6	104.3	104.1	103.8	104.5	102.0	101.0	104.0	104.1	104.6	104.7	105.8	105.6	105.5	103.5	104.2	121.9
125	108.5	109.0	107.8	108.3	109.5	105.7	110.0	110.7	106.3	106.5	107.0	106.9	107.7	107.8	108.7	104.0	108.1	125.8
160	106.8	107.9	108.4	107.3	106.6	107.9	106.6	106.4	106.8	105.1	105.4	106.4	106.1	105.8	104.6	103.8	106.5	124.2
200	107.8	108.6	107.0	106.0	104.3	101.6	100.6	101.6	101.1	101.5	103.6	104.1	105.0	104.8	103.6	102.9	103.9	121.6
250	110.2	110.8	108.8	107.8	107.3	106.3	103.0	103.2	105.0	106.0	107.8	109.1	109.2	108.7	106.0	103.9	107.2	124.9
315	112.0	111.9	110.9	109.7	107.7	106.4	104.4	104.0	105.9	106.9	108.5	108.8	109.2	109.9	106.5	103.9	108.0	125.7
400	118.1	123.1	124.4	118.9	116.1	112.6	110.1	111.4	113.2	113.6	115.4	115.7	116.6	116.9	112.6	111.8	116.7	134.4
500	125.7	131.9	133.5	126.9	123.9	118.9	114.7	117.7	120.0	120.7	122.7	121.5	123.4	124.9	119.7	119.3	124.7	142.4
630	113.9	114.7	114.9	114.4	112.5	109.4	106.9	106.9	108.9	111.0	112.7	113.3	114.7	114.9	109.9	107.4	112.1	129.8
800	114.4	115.1	115.9	115.4	114.7	112.1	109.9	110.7	112.7	113.6	115.7	117.0	117.6	117.2	111.7	111.0	114.6	132.3
1000	116.4	118.3	118.8	119.8	119.9	116.6	115.9	117.9	119.6	118.6	120.9	122.4	121.8	120.6	115.8	118.3	119.5	137.2
1250	114.4	115.2	115.4	115.7	114.5	111.9	107.9	107.9	109.2	111.4	113.2	114.4	115.2	114.5	109.9	107.4	112.9	130.6
1600	114.3	115.3	115.6	116.1	114.8	112.3	107.3	107.1	108.8	110.8	112.5	113.4	115.5	114.6	109.1	105.9	112.8	130.5
2000	114.2	115.7	115.4	115.9	114.4	111.0	106.9	105.9	108.7	110.5	112.4	113.5	115.5	115.2	110.2	106.4	112.7	130.4
2500	112.5	113.1	113.1	114.5	112.5	108.6	105.1	104.1	107.5	109.5	112.1	112.7	114.0	114.5	109.1	105.5	111.3	129.0
3150	111.1	112.5	111.9	112.6	111.0	108.5	104.0	102.8	106.1	109.3	111.5	112.3	112.6	114.1	108.7	104.6	110.4	128.1
4000	111.6	111.7	111.9	112.9	110.9	107.6	102.4	102.4	105.6	107.4	109.9	111.0	112.9	113.2	108.7	104.0	109.8	127.5
5000	109.7	110.0	109.7	111.8	109.0	105.2	100.0	99.3	103.5	105.5	108.7	108.5	111.0	109.8	107.3	101.6	107.8	125.5
6300	108.6	109.6	108.4	109.8	107.3	105.9	100.3	98.1	102.3	106.1	108.6	109.1	109.6	110.4	105.6	101.8	107.2	124.9
8000	108.9	109.9	108.7	110.2	107.2	104.4	98.9	97.9	103.2	104.9	107.5	107.2	110.1	109.4	106.4	101.1	106.8	124.5
10000	107.9	107.9	105.1	108.8	104.9	103.1	96.6	96.1	100.8	102.8	105.8	105.2	108.3	107.3	104.6	99.4	104.9	122.6
12500	106.7	107.2	105.4	108.4	104.7	102.5	95.9	94.3	100.7	102.2	105.2	105.3	108.4	106.4	104.5	98.4	104.5	122.2
16000	105.6	106.3	105.0	106.1	102.9	100.6	94.1	93.5	99.3	101.1	103.9	104.3	106.6	105.8	102.1	98.9	103.1	120.8
20000	106.3	106.9	104.9	106.8	102.2	99.7	93.9	94.3	101.1	102.3	103.4	104.5	107.4	105.9	103.5	99.2	103.5	121.2
OVERALL	126.8	132.3	134.6	130.3	127.9	124.3	121.7	123.0	124.9	125.4	127.5	127.8	128.8	129.0	124.5	123.7	127.9	145.7

TABLE X. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 95 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) Concluded. 86 Percent speed; fan physical speed, 1868 rpm; fundamental blade passage frequency, 467 hertz

(c-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	68.9	66.4	67.6	67.4	66.4	67.6	67.9	67.9	67.3	68.1	68.8	70.8	69.4	69.8	73.3	69.8
63	79.7	69.9	69.6	67.9	67.7	71.6	76.2	70.6	70.2	72.1	73.9	73.8	71.1	71.9	74.4	71.3
80	69.3	69.4	68.8	67.8	67.9	67.8	67.1	67.4	67.6	67.9	70.4	71.7	71.1	72.9	74.3	72.3
100	75.1	74.9	74.6	74.4	74.1	74.8	72.3	71.3	74.3	74.4	74.9	75.0	76.1	75.9	75.8	73.8
125	78.8	79.3	78.1	78.6	79.8	76.0	80.3	81.0	76.6	76.8	77.3	77.2	78.0	78.1	79.0	74.3
160	77.1	78.2	78.7	77.6	76.9	78.2	76.9	76.7	77.1	75.4	75.7	76.7	76.4	76.1	74.9	74.1
200	78.1	78.9	77.3	76.3	74.6	71.9	70.9	71.9	71.4	71.8	73.9	74.4	75.3	75.1	72.9	73.2
250	80.5	81.1	79.1	78.1	77.6	76.6	73.3	73.5	75.3	76.3	78.1	79.4	79.5	79.0	76.3	74.2
315	82.3	82.2	81.2	80.0	78.0	76.7	74.7	74.3	76.2	77.2	78.8	79.1	79.5	80.2	76.8	74.2
400	88.3	93.3	94.6	89.1	86.3	82.8	80.3	81.6	83.4	83.8	85.6	85.9	86.8	87.1	82.8	82.0
500	95.9	102.1	103.7	97.1	94.1	89.1	84.9	87.9	90.2	90.9	92.9	91.7	93.6	95.1	89.5	89.5
630	84.1	84.9	85.1	84.6	82.7	79.6	77.1	77.1	79.1	81.2	82.9	83.5	84.9	85.1	80.1	77.6
800	84.6	85.3	86.1	85.6	84.9	82.3	80.1	80.9	82.9	83.8	85.9	87.2	87.8	87.4	81.9	81.2
1000	86.6	88.5	89.0	90.0	96.1	96.0	86.1	88.1	89.8	88.8	91.1	92.6	92.0	90.8	86.0	88.5
1250	84.5	85.3	85.5	85.8	84.6	82.0	78.0	78.0	79.3	81.5	83.3	84.5	85.3	84.6	80.0	77.5
1600	84.4	85.4	85.7	86.2	84.9	82.4	77.4	77.2	78.9	80.9	82.6	83.5	85.6	84.7	79.2	76.0
2000	84.2	85.7	85.4	85.9	84.4	81.0	76.9	75.9	78.7	80.5	82.4	83.5	85.5	85.2	80.2	76.4
2500	82.4	83.0	83.0	84.4	82.4	78.5	75.0	74.0	77.4	79.4	82.0	82.6	83.5	84.4	79.0	75.4
3150	80.8	82.2	81.5	82.3	80.7	78.2	73.7	72.5	75.8	79.0	81.2	82.0	82.3	83.8	78.4	74.3
4000	81.1	81.2	81.4	82.4	80.4	77.1	71.9	71.9	75.1	76.9	79.4	80.5	82.4	82.7	78.2	73.5
5000	78.9	79.2	78.9	81.0	78.2	74.4	69.2	68.5	72.7	74.7	77.9	77.7	80.2	79.0	76.5	70.8
6300	77.3	78.3	77.1	78.5	76.0	74.6	69.0	66.8	71.0	74.8	77.3	77.8	78.3	75.1	74.3	70.5
8000	77.0	78.0	76.8	78.3	75.3	72.5	67.0	66.0	71.3	73.0	75.6	75.3	78.2	77.5	74.5	69.2
10000	74.4	75.0	73.2	75.9	72.0	70.2	63.7	63.2	67.9	69.9	72.9	72.3	75.4	74.4	71.7	66.5
12500	72.4	72.9	71.1	74.1	70.4	68.2	61.6	60.1	66.4	67.9	70.9	71.0	74.1	72.1	70.2	64.1
16000	69.4	70.1	68.8	69.9	66.7	64.4	57.9	57.3	63.1	64.9	67.7	68.1	70.4	69.6	65.9	62.7
20000	67.3	67.9	66.0	67.8	63.3	60.8	55.0	55.3	62.1	63.3	64.5	65.6	68.4	67.0	64.5	60.2
OVERALL	98.9	103.5	104.8	100.1	98.0	94.4	91.8	93.2	95.0	95.5	97.5	97.9	98.8	99.1	94.5	93.8
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	73.5	85.7	90.7	89.9	89.6	87.2	84.8	86.1	88.5	89.5	91.0	90.4	90.3	89.0	81.5	75.7
304.8 M	63.8	77.5	83.1	82.1	82.0	79.6	77.2	78.8	81.1	82.0	83.5	82.6	82.5	81.1	73.4	67.2

TABLE X. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 95 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) 93 Percent speed; fan physical speed, 2027 rpm; fundamental blade passage frequency, 506 hertz

(d-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																
50	100.4	97.4	97.1	97.2	97.1	98.4	100.2	99.2	101.1	99.7	100.7	100.0	101.7	104.6	104.2	104.6	100.7	118.4
63	105.3	101.0	101.6	98.8	101.5	106.0	106.7	98.2	106.2	105.2	102.0	101.9	101.8	104.7	104.5	105.2	103.9	121.6
80	101.0	100.2	99.0	97.8	98.0	99.3	100.7	98.8	101.0	100.8	101.8	102.1	103.7	105.5	105.5	106.2	101.8	119.5
100	105.7	105.7	107.0	105.4	102.7	104.7	104.9	103.7	105.4	107.0	107.0	107.8	108.9	108.2	107.9	106.6	106.4	124.1
125	107.9	109.5	108.9	109.4	108.2	107.5	107.4	105.9	107.0	108.5	109.0	109.5	109.7	109.9	108.0	106.6	108.4	126.1
160	109.3	109.5	108.0	107.5	106.2	107.0	105.2	105.5	106.8	107.2	108.8	108.4	107.8	107.3	106.3	106.2	107.3	125.0
200	109.9	110.4	108.5	106.7	104.7	103.5	102.2	102.9	102.7	103.9	105.5	105.8	106.5	107.0	105.9	105.1	105.5	123.2
250	112.4	111.8	110.9	110.1	107.8	108.3	105.6	105.4	106.4	107.9	109.6	110.5	110.6	110.4	108.1	105.6	108.9	126.6
315	113.5	113.5	112.1	111.5	108.8	107.6	106.5	106.6	107.5	108.8	110.5	111.4	111.6	112.3	108.1	106.2	109.9	127.6
400	115.8	116.4	116.6	116.4	115.1	113.1	113.1	111.9	112.8	113.8	114.6	115.2	114.4	114.6	110.9	109.3	114.2	131.9
500	125.9	130.1	127.4	130.5	130.9	127.8	130.8	128.1	128.6	127.9	125.1	125.0	126.3	126.4	119.6	121.0	128.1	145.8
630	116.4	117.6	117.2	117.4	116.6	113.4	114.6	113.2	114.1	115.6	116.1	116.5	117.4	117.6	111.9	110.0	115.7	133.4
800	116.0	116.7	117.2	115.8	115.0	112.3	110.8	111.5	112.7	114.7	116.8	117.6	118.5	118.3	112.0	109.6	115.4	133.1
1000	119.8	119.7	121.7	121.5	120.7	116.3	115.8	116.2	115.8	118.2	121.8	124.4	123.5	122.3	115.0	114.2	120.3	138.0
1250	115.2	116.6	116.6	116.4	114.9	112.2	109.9	110.4	111.9	113.9	115.7	117.0	117.4	115.9	111.2	109.1	114.6	132.3
1600	116.7	118.5	119.2	119.5	119.5	116.5	111.5	111.4	112.7	115.0	116.2	117.5	119.5	118.2	112.9	109.1	116.7	134.4
2000	115.5	116.5	117.6	117.6	116.1	113.1	109.6	108.8	111.3	113.3	115.5	115.7	117.8	117.0	111.5	108.2	114.8	132.5
2500	112.9	114.9	115.3	116.3	114.3	111.6	107.8	107.4	109.4	111.9	114.3	114.7	116.9	115.9	110.3	106.8	113.4	131.1
3150	112.9	114.4	114.4	115.1	113.7	111.2	107.7	106.7	109.1	112.2	113.9	114.7	116.2	115.9	109.9	106.7	113.0	130.7
4000	112.4	114.1	114.4	115.1	113.1	110.2	105.7	105.7	108.6	110.4	112.6	113.4	115.4	115.2	110.1	106.0	112.2	129.9
5000	111.3	112.4	112.4	113.9	111.3	107.9	103.6	103.3	106.8	108.6	110.9	110.9	113.8	112.3	108.3	103.4	110.3	128.0
6300	110.3	112.8	111.5	112.5	109.4	108.6	104.3	101.6	105.6	108.8	111.3	111.8	112.6	113.1	107.0	104.1	109.9	127.6
8000	111.1	112.2	111.7	112.7	109.4	107.2	102.4	101.6	106.2	108.1	110.1	109.9	112.9	111.5	107.6	103.4	109.4	127.1
10000	109.5	110.4	109.7	111.2	107.4	105.7	100.0	99.5	104.4	105.9	108.9	108.4	111.2	109.9	105.9	101.6	107.7	125.4
12500	108.9	110.1	108.4	111.1	106.7	105.4	99.6	99.1	104.4	105.2	108.2	108.4	111.6	109.2	106.2	101.1	107.4	125.1
16000	108.1	109.4	108.2	109.2	105.7	103.5	98.4	98.4	103.0	104.6	107.4	107.4	109.9	108.9	104.7	101.7	106.3	124.0
20000	109.7	110.2	108.4	109.8	105.0	103.2	98.3	99.6	104.0	105.4	106.7	107.8	110.5	108.8	105.4	101.6	106.6	124.3
OVERALL	129.4	132.2	131.6	132.7	132.5	129.5	131.4	129.1	129.8	129.9	129.5	130.3	131.1	130.7	125.0	124.2	130.4	148.1

TABLE X. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 95 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) Concluded. 93 Percent speed; fan physical speed, 2027 rpm; fundamental blade passage frequency, 506 hertz

(d-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	70.7	67.7	67.4	67.5	67.4	68.7	70.5	69.5	71.4	70.0	71.0	70.3	72.0	74.9	74.5	74.9
63	75.5	71.3	71.8	69.1	71.8	76.3	77.0	68.5	76.5	75.5	72.3	72.2	72.1	75.0	74.8	75.5
80	71.3	70.5	69.3	68.1	68.3	69.6	71.0	69.1	71.3	71.1	72.1	72.4	74.0	75.8	75.8	76.5
100	76.0	76.0	77.3	75.7	73.0	75.0	75.2	74.0	75.7	77.3	77.3	78.1	79.2	78.5	78.2	76.9
125	78.2	79.8	79.2	79.7	78.5	77.8	77.7	76.2	77.3	78.8	79.3	79.8	80.0	80.2	78.3	76.9
160	79.6	79.8	78.3	77.8	76.5	77.3	75.5	75.8	77.1	77.5	79.1	78.7	78.1	77.6	76.6	76.5
200	80.2	80.7	78.8	76.0	75.0	73.8	72.5	73.2	73.0	74.2	75.8	76.1	77.2	77.3	76.2	75.4
250	82.7	82.1	81.2	80.4	78.1	78.6	75.9	75.7	76.7	78.2	79.9	80.8	80.5	80.7	78.4	75.9
315	83.8	83.8	82.4	81.8	79.1	77.9	76.8	76.9	77.8	79.1	80.8	81.7	81.5	82.6	78.4	76.5
400	86.0	86.6	86.8	86.6	85.3	83.3	83.3	82.1	83.0	84.0	84.8	85.4	84.6	84.8	81.1	79.5
500	96.1	100.3	97.6	100.8	101.1	98.0	101.0	98.3	98.8	98.1	95.3	95.2	96.5	96.6	89.8	91.2
630	86.6	87.8	87.4	87.6	86.8	83.6	84.8	83.4	84.3	85.8	86.3	86.7	87.6	87.8	82.1	80.2
800	86.2	86.9	87.4	86.0	85.2	82.5	81.0	81.7	82.9	84.9	87.0	87.8	88.7	86.5	82.2	79.8
1000	90.0	89.9	91.9	91.7	90.9	86.5	86.0	86.4	86.0	88.4	92.0	94.6	93.7	92.5	85.2	84.4
1250	85.3	86.7	86.7	86.5	85.0	82.3	80.0	80.5	82.0	84.0	85.8	87.1	87.5	86.0	81.3	79.2
1600	86.8	88.6	89.3	89.6	89.6	86.6	81.6	81.5	82.8	85.1	86.3	87.6	89.6	86.3	83.0	79.2
2000	85.5	86.5	87.6	87.6	86.1	83.1	79.6	78.8	81.3	83.3	85.5	85.7	87.8	87.0	81.5	78.2
2500	82.8	84.7	85.2	86.2	84.2	81.5	77.7	77.3	79.3	81.8	84.2	84.6	86.8	85.8	80.2	76.7
3150	82.6	84.1	84.1	84.8	83.4	80.9	77.4	76.4	78.8	81.9	83.6	84.4	85.5	85.6	79.6	76.4
4000	81.9	83.6	83.9	84.6	82.6	79.7	75.2	75.2	78.1	79.9	82.1	82.9	84.5	84.7	79.6	75.5
5000	81.0	81.6	81.6	83.1	80.5	77.1	72.8	72.5	76.0	77.8	80.1	80.1	83.0	81.5	77.5	72.6
6300	79.0	80.7	80.2	81.2	78.2	77.3	73.0	70.3	74.3	77.5	80.0	80.5	81.3	81.8	75.7	72.8
8000	79.2	80.3	79.8	80.8	77.5	75.3	70.5	69.7	74.3	76.2	78.2	78.0	81.0	75.6	75.7	71.5
10000	76.6	77.5	76.8	78.3	74.5	72.8	67.1	66.6	71.5	73.0	76.0	75.5	78.3	77.0	73.0	68.7
12500	74.6	75.8	74.1	76.8	72.4	71.1	65.3	64.8	70.1	70.9	73.9	74.1	77.3	74.9	71.9	66.8
16000	71.9	73.2	72.0	73.0	69.5	67.3	62.2	62.2	66.8	68.4	71.2	71.2	73.7	72.7	68.5	65.5
20000	69.7	71.0	69.5	70.9	66.1	64.3	59.4	60.6	65.0	66.4	67.8	68.8	71.5	69.9	66.4	62.7
OVERALL	99.7	102.3	101.0	102.8	102.6	99.6	101.6	99.3	99.9	100.0	99.5	100.3	101.1	100.7	95.0	94.3
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	74.2	85.2	88.2	92.5	93.8	92.3	93.7	92.3	93.6	94.1	93.3	92.9	92.8	90.7	82.2	77.1
304.8 M	64.5	76.7	80.1	84.8	86.3	84.9	86.6	85.2	86.4	86.7	85.8	85.3	85.1	82.8	73.9	68.6

TABLE X. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 95 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(e) 100 Percent speed; fan physical speed, 2179 rpm; fundamental blade passage frequency, 544 hertz

(e-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	101.6	98.3	100.6	100.5	100.5	100.6	101.1	100.0	101.3	101.6	102.8	103.7	103.0	103.5	106.3	105.2	102.2	119.9
63	101.8	101.3	99.2	101.2	102.8	105.3	104.5	102.0	104.8	103.0	104.5	103.9	103.3	104.5	106.3	106.6	103.9	121.6
80	106.8	105.5	101.3	104.8	108.5	111.0	109.7	106.8	110.7	108.7	109.0	107.9	107.0	106.7	108.0	107.2	108.4	126.1
100	109.6	109.3	108.8	107.8	105.8	106.1	109.5	107.6	107.1	109.3	111.0	110.4	110.0	110.3	110.0	109.2	109.0	126.7
125	109.2	111.7	111.5	110.5	108.5	109.0	110.0	109.2	109.2	110.2	111.4	111.8	111.5	111.7	110.5	108.2	110.4	128.1
160	110.6	111.3	111.1	110.1	108.6	109.1	109.4	108.3	110.3	108.4	110.8	111.9	110.9	109.6	108.6	108.0	109.9	127.6
200	111.1	112.3	111.5	109.1	109.5	109.5	106.8	105.6	108.1	106.6	108.6	110.5	109.3	109.5	107.8	107.2	108.9	126.6
250	115.2	114.2	113.3	111.8	112.0	110.5	108.7	107.8	108.8	110.2	112.2	113.4	112.7	111.5	109.2	107.4	111.3	129.0
315	115.0	114.9	114.9	113.2	110.5	110.2	109.5	109.2	110.2	111.5	113.0	113.1	113.5	113.0	110.4	107.8	112.0	129.7
400	117.1	116.8	117.6	115.0	114.0	113.0	111.1	111.8	113.0	114.0	116.1	115.9	115.5	114.6	111.1	109.9	114.4	132.1
500	126.2	128.0	133.9	127.9	125.2	128.5	121.9	128.0	126.2	123.0	126.7	129.3	125.4	125.2	120.9	122.2	127.2	144.9
630	122.0	122.8	127.5	122.7	120.0	122.7	115.2	121.3	120.3	119.0	122.3	123.4	121.3	121.2	116.5	116.7	121.7	139.4
800	117.0	118.5	119.2	117.0	116.4	114.4	113.0	113.4	114.4	116.5	118.7	118.4	120.2	119.0	113.0	111.4	116.9	134.6
1000	119.6	122.1	122.6	122.3	120.6	119.6	116.0	116.6	117.3	121.6	122.5	127.6	124.0	122.8	117.1	118.0	121.9	139.6
1250	117.5	119.7	120.5	119.9	117.9	116.2	113.4	113.9	115.4	118.5	120.2	123.6	121.4	119.4	114.7	114.6	118.9	136.6
1600	118.2	120.1	121.6	121.9	120.1	117.9	114.1	113.9	115.7	117.4	119.4	119.7	122.4	119.2	113.9	111.5	118.8	136.5
2000	116.4	118.2	119.7	120.1	118.2	115.4	111.9	111.2	113.9	115.9	117.7	117.2	119.9	117.6	112.7	109.8	116.8	134.5
2500	114.7	116.4	117.9	118.5	116.5	114.5	110.7	110.2	112.5	114.7	116.7	116.5	119.0	116.7	111.9	109.0	115.6	133.3
3150	114.0	115.8	117.2	117.3	116.2	114.5	110.5	109.7	111.7	114.7	116.7	116.3	118.0	116.5	111.7	108.7	115.1	132.8
4000	114.2	115.9	117.0	117.9	116.0	114.0	108.7	108.7	111.5	113.5	115.5	115.3	118.2	116.5	112.2	108.1	114.8	132.5
5000	113.0	114.4	115.2	117.0	113.5	111.0	106.5	106.2	109.7	111.5	114.0	112.8	116.2	113.4	110.5	105.7	112.8	130.5
6300	112.0	113.7	113.9	115.2	111.9	112.0	107.0	105.0	108.9	112.0	114.0	113.2	115.0	114.4	109.4	106.4	112.3	130.0
8000	112.5	114.9	114.7	115.7	112.0	110.7	105.3	104.9	109.7	110.7	113.0	112.0	115.7	113.2	109.9	106.2	112.1	129.8
10000	110.9	112.8	112.1	114.1	109.8	109.3	103.1	103.3	107.3	108.9	111.8	110.7	113.9	111.3	108.3	104.0	110.3	128.0
12500	110.8	112.7	111.2	114.3	109.8	109.0	102.5	102.2	107.5	108.8	111.3	110.6	114.0	111.0	108.7	103.5	110.2	127.9
16000	109.8	112.2	111.2	112.6	108.6	107.8	101.6	101.7	105.8	108.2	110.6	109.8	113.1	110.8	107.1	104.3	109.3	127.0
20000	110.4	112.5	111.4	113.2	107.8	107.3	101.2	102.4	106.5	108.5	110.3	110.1	113.5	110.9	107.9	104.3	109.5	127.2
OVERALL	130.9	132.4	136.1	132.7	130.5	131.4	126.5	130.0	129.4	129.4	131.8	133.9	132.5	131.2	126.9	126.5	131.4	149.1

TABLE X. - Concluded. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 95 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(e) Concluded. 100 Percent speed; fan physical speed, 2179 rpm; fundamental blade passage frequency, 544 hertz

(e-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	71.9	69.1	70.9	70.8	70.8	70.9	71.4	70.3	71.6	71.9	73.1	74.0	73.3	73.8	76.6	75.5
63	72.1	71.6	69.5	71.5	73.1	75.6	74.8	72.3	75.1	73.3	74.8	74.2	73.6	74.8	76.6	76.9
80	77.1	75.8	71.6	75.1	78.8	81.3	80.0	77.1	81.0	79.0	79.3	78.2	77.3	77.0	78.3	77.5
100	79.9	79.6	79.1	78.1	76.1	76.4	79.8	77.9	77.4	79.6	81.3	80.7	80.3	80.6	80.3	79.5
125	79.5	82.0	81.8	80.8	78.8	79.3	80.3	79.5	79.5	80.5	81.7	82.1	81.8	82.0	80.8	78.5
160	80.9	81.6	81.4	80.4	78.9	79.4	79.7	78.6	80.6	78.7	81.1	82.2	81.2	79.9	78.9	78.3
200	81.4	82.6	81.8	79.4	79.8	79.8	77.1	75.9	78.4	76.9	78.9	80.8	79.6	79.8	78.1	77.5
250	85.5	84.5	83.6	82.1	82.3	80.8	79.0	78.1	79.1	80.5	82.5	83.7	83.0	81.8	79.5	77.7
315	85.3	85.2	85.2	83.5	80.8	80.5	79.8	79.5	80.5	81.8	83.3	83.4	83.8	83.3	80.7	78.1
400	87.3	87.0	87.8	85.2	84.2	83.2	81.3	82.0	83.2	84.2	86.3	86.1	85.7	84.8	81.3	80.1
500	96.4	98.2	104.1	98.1	95.4	98.7	92.1	98.2	96.4	93.2	96.9	99.5	95.6	95.4	91.1	92.4
630	92.2	93.0	97.7	92.9	90.2	92.9	86.4	91.5	90.5	89.2	92.5	93.6	91.5	91.4	86.7	86.5
800	87.2	88.7	89.4	87.2	86.6	84.6	83.2	83.6	84.6	86.7	88.9	88.6	90.4	85.2	83.2	81.6
1000	89.8	92.3	92.8	92.5	90.8	89.8	85.2	86.8	87.5	91.8	92.7	97.8	94.2	93.0	87.3	88.2
1250	87.6	89.8	90.6	90.0	88.0	86.3	83.5	84.0	85.5	88.6	90.3	93.7	91.5	89.5	84.8	84.7
1600	88.3	90.2	91.7	92.0	90.2	88.0	84.2	84.0	85.8	87.5	89.5	89.8	92.5	89.3	84.0	81.6
2000	86.4	88.2	89.7	90.1	88.2	85.4	81.9	81.2	83.9	85.9	87.7	87.2	89.9	87.6	82.7	79.8
2500	84.6	86.3	87.8	88.4	86.4	84.4	80.6	80.1	82.4	84.6	86.6	86.4	88.9	86.6	81.8	78.9
3150	83.7	85.5	86.9	87.0	85.9	84.2	80.2	79.4	81.4	84.4	86.4	86.0	87.7	86.2	81.4	78.4
4000	82.7	85.4	86.5	87.4	85.5	83.5	78.2	78.2	81.0	83.0	85.0	84.8	87.7	86.0	81.7	77.6
5000	82.2	83.6	84.4	86.2	82.7	80.2	75.7	75.4	78.9	80.7	83.2	82.0	85.4	82.6	79.7	74.9
6300	80.7	82.4	82.6	83.9	80.6	80.7	75.7	73.7	77.6	80.7	82.7	81.9	83.7	83.1	78.1	75.1
8000	80.6	83.0	82.8	83.8	80.1	78.8	73.4	73.0	77.8	78.8	81.1	80.1	83.8	81.3	78.0	74.3
10000	78.0	79.9	79.2	81.2	76.9	76.4	70.2	70.4	74.4	76.0	78.9	77.8	81.0	78.4	75.4	71.1
12500	76.5	78.4	76.9	80.0	75.5	74.7	68.2	67.9	73.2	74.5	77.0	76.3	79.7	76.7	74.4	69.2
16000	73.6	76.0	75.0	76.4	72.4	71.6	65.4	65.5	69.6	72.0	74.4	73.6	76.9	74.6	70.9	68.1
20000	71.4	73.5	72.5	74.2	68.9	68.4	62.3	63.4	67.5	69.5	71.4	71.1	74.5	72.0	68.9	65.4
OVERALL	100.9	102.4	106.2	102.7	100.5	101.5	96.6	100.2	99.5	99.4	101.8	104.0	102.4	101.2	96.9	96.6
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	75.3	85.2	93.0	92.6	92.4	94.4	90.5	93.7	94.0	93.6	95.7	96.3	94.5	91.0	83.9	79.1
304.8 M	65.6	76.6	85.0	84.6	84.6	86.9	83.0	86.5	86.6	86.0	88.2	88.8	86.3	83.0	75.7	70.6

TABLE XI. - FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) 60 Percent speed; fan physical speed, 1311 rpm; fundamental blade passage frequency, 327 hertz

(a-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	101.3	99.1	100.3	97.8	99.0	97.5	99.6	97.3	97.3	98.0	96.8	95.9	95.5	96.8	97.6	97.5	97.9	115.6
63	101.2	99.2	99.7	96.5	98.2	96.8	95.0	95.5	95.0	95.8	93.7	94.1	95.2	96.3	97.7	96.0	96.4	114.1
80	100.2	100.8	101.5	97.7	98.2	97.3	97.0	97.0	96.8	97.8	98.0	98.6	99.7	99.8	99.7	99.0	98.5	116.2
100	104.7	103.4	103.2	102.6	101.2	100.1	100.9	99.1	98.9	100.4	99.7	99.3	101.4	102.2	101.1	98.1	100.9	118.6
125	107.8	109.8	107.1	107.3	107.8	106.5	104.0	105.5	102.3	105.0	103.8	104.0	105.5	104.3	105.8	102.5	105.6	123.3
160	106.8	107.3	106.4	104.3	102.9	103.3	102.1	103.3	103.4	103.4	103.3	105.0	104.3	102.4	103.3	100.8	103.9	121.6
200	110.0	109.0	107.0	104.7	102.2	100.8	100.8	101.7	102.8	100.8	100.5	101.1	102.0	102.5	101.3	99.9	103.0	120.7
250	113.5	112.1	109.5	107.3	106.3	105.0	102.6	102.3	103.1	104.6	105.3	106.9	107.8	107.5	107.0	102.8	106.5	124.2
315	125.8	123.6	121.1	118.5	117.6	115.6	114.6	113.3	113.1	114.8	118.8	116.4	119.3	118.6	116.0	112.2	117.8	135.5
400	116.5	115.1	113.8	111.0	109.6	108.0	106.6	105.6	106.1	108.6	109.5	110.2	111.1	110.5	108.8	104.5	109.9	127.6
500	114.0	113.3	111.5	109.8	109.0	106.2	105.0	104.5	105.5	107.0	107.5	108.8	109.8	110.2	108.8	104.2	108.5	126.2
630	115.0	115.2	115.0	113.5	112.4	109.9	108.2	109.4	110.5	113.4	111.9	113.8	116.9	115.5	114.7	109.8	113.1	130.8
800	112.4	112.0	111.4	110.0	109.0	106.5	104.5	104.2	104.9	107.5	108.4	110.5	112.0	112.5	109.7	104.9	109.1	126.8
1000	112.6	113.1	111.8	110.4	108.8	107.4	104.4	104.3	104.9	107.1	109.1	111.2	113.8	113.9	111.1	105.7	109.9	127.6
1250	111.9	112.3	109.9	109.3	108.8	105.6	102.6	102.3	102.9	105.1	106.8	108.2	110.6	110.3	108.6	102.3	107.7	125.4
1600	110.7	111.0	109.7	108.7	107.3	104.3	101.0	100.3	101.5	104.2	106.0	107.1	110.3	109.5	107.5	100.7	106.8	124.5
2000	110.0	110.0	109.0	107.6	106.3	103.3	99.5	99.0	100.6	103.5	105.3	105.9	109.5	108.8	106.8	100.9	105.9	123.6
2500	107.3	107.9	106.5	106.1	104.3	101.3	98.0	97.1	99.5	102.3	104.6	105.4	108.0	108.0	106.3	99.5	104.5	122.2
3150	106.3	107.5	106.0	105.1	103.1	100.5	96.8	95.8	98.6	101.6	104.0	104.6	106.8	107.1	104.6	99.1	103.6	121.3
4000	105.9	106.2	105.2	104.7	102.7	99.4	94.9	94.9	98.1	100.1	102.2	103.2	106.4	106.1	104.2	98.2	102.7	120.4
5000	103.8	103.8	103.1	103.1	100.6	96.5	92.3	91.9	96.1	98.0	101.3	101.1	104.6	103.5	102.5	95.6	100.7	118.4
6300	101.9	104.4	101.7	101.4	98.9	97.3	92.6	89.9	94.6	98.3	101.2	101.7	103.3	103.6	100.9	96.2	100.1	117.8
8000	102.0	102.6	101.7	100.8	99.0	95.8	90.1	88.8	94.7	96.8	99.1	100.0	103.5	102.3	100.5	93.8	99.2	116.9
10000	99.1	100.3	99.0	99.0	97.0	93.8	87.1	86.5	91.6	94.0	97.3	97.7	101.3	99.6	98.3	91.6	96.9	114.6
12500	98.3	98.8	97.8	98.7	96.0	92.3	85.7	84.6	90.8	92.7	95.5	96.4	100.5	98.0	97.7	90.3	95.8	113.5
16000	95.4	97.2	95.9	95.3	93.0	89.2	82.9	82.0	87.3	89.7	92.7	93.5	96.5	95.7	93.8	88.0	92.8	110.5
20000	95.6	95.2	94.2	93.9	91.2	87.5	83.6	83.0	86.7	88.6	90.2	91.6	95.0	93.5	92.0	87.1	91.2	108.9
OVERALL	127.9	126.6	124.8	122.9	121.8	119.7	118.1	117.6	118.0	120.1	121.9	121.8	124.3	123.8	121.9	117.3	121.9	139.7

TABLE XI. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-8 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) Concluded. 60 Percent speed; fan physical speed, 1311 rpm; fundamental blade passage frequency, 327 hertz

(a-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG 10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	71.6	69.4	70.6	68.1	69.3	67.8	69.9	67.6	67.6	68.3	67.1	66.2	65.8	67.1	67.9	67.8
63	71.5	69.5	70.0	66.8	68.5	67.1	65.3	65.8	65.3	66.1	64.0	64.4	65.5	66.6	68.0	66.3
80	70.5	71.1	71.8	68.0	68.5	67.6	67.3	67.3	67.1	68.1	68.3	68.9	70.0	70.1	70.0	69.3
100	75.0	73.7	73.5	72.9	71.5	70.4	71.2	69.4	69.2	70.7	70.0	69.6	71.7	72.5	71.4	68.4
125	78.1	80.1	77.4	77.6	78.1	76.9	74.3	75.8	72.6	75.3	74.1	74.3	75.8	74.6	76.1	72.8
160	77.1	77.6	76.7	74.6	73.2	73.6	72.4	73.6	73.7	73.7	73.6	75.3	74.6	73.7	73.6	71.1
200	80.3	79.3	77.3	75.0	72.5	71.1	71.1	72.0	73.1	71.1	70.8	71.4	72.3	72.8	71.6	70.2
250	83.8	82.4	79.8	77.6	76.6	75.3	72.9	72.6	73.4	74.9	75.6	77.2	78.1	77.8	77.3	73.1
315	96.1	93.9	91.4	88.8	87.9	85.9	84.9	83.6	83.4	85.1	89.1	86.7	89.6	88.9	86.3	82.5
400	86.7	85.3	84.0	81.2	79.8	78.2	76.8	75.8	76.3	78.8	79.7	80.4	81.3	80.7	79.0	74.7
500	84.2	83.5	81.7	80.0	79.2	76.4	75.2	74.7	75.7	77.2	77.7	79.0	80.0	80.4	79.0	74.4
630	85.2	85.4	85.2	83.7	82.6	80.1	78.4	79.6	80.7	83.6	82.1	84.0	87.1	85.7	84.9	80.0
800	82.6	82.2	81.6	80.2	79.2	76.7	74.7	74.4	75.1	77.7	78.6	80.7	82.2	82.7	79.9	75.1
1000	82.8	83.3	82.0	80.6	79.0	77.6	74.6	74.5	75.1	77.3	79.3	81.4	84.0	84.1	81.3	75.5
1250	82.0	82.4	80.0	79.4	78.9	75.7	72.7	72.4	73.0	75.2	76.9	78.3	80.7	80.4	78.7	72.4
1600	80.8	81.1	79.8	78.9	77.4	74.4	71.1	70.4	71.6	74.3	76.1	77.2	80.4	79.6	77.6	70.8
2000	80.0	80.0	79.0	77.6	76.3	73.3	69.5	69.0	70.6	73.5	75.3	75.9	79.5	78.8	76.8	70.9
2500	77.2	77.7	76.4	76.0	74.2	71.2	67.9	67.0	69.4	72.2	74.5	75.3	77.9	77.9	76.2	69.4
3150	76.0	77.2	75.7	74.8	72.8	70.2	66.5	65.5	68.3	71.3	73.7	74.3	76.5	76.8	74.3	68.8
4000	75.4	75.7	74.7	74.2	72.2	68.9	64.4	64.4	67.6	69.6	71.7	72.7	75.9	75.6	73.7	67.7
5000	73.0	73.0	72.3	72.3	69.8	65.7	61.5	61.1	65.3	67.2	70.5	70.3	73.8	72.7	71.7	64.8
6300	70.7	73.1	70.4	70.2	67.6	66.0	61.3	58.7	63.3	67.0	70.0	70.4	72.0	72.3	69.7	64.9
8000	70.1	70.7	69.8	68.9	67.1	63.9	58.2	56.9	62.8	64.9	67.2	68.1	71.6	70.4	68.6	61.9
10000	66.2	67.4	66.1	66.1	64.1	60.9	54.2	53.6	58.7	61.1	64.4	64.8	68.4	66.7	65.4	58.7
12500	64.1	64.6	63.6	64.4	61.8	58.1	51.5	50.4	56.6	58.5	61.3	62.2	66.3	63.8	63.5	56.1
16000	59.2	61.0	59.7	59.2	56.9	53.1	46.7	45.8	51.2	53.6	56.6	57.4	60.4	59.6	57.7	51.8
20000	56.7	56.3	55.3	55.6	52.3	48.6	44.6	44.0	47.8	49.7	51.4	52.7	56.1	54.6	53.1	48.2
OVERALL	93.2	96.8	95.0	93.0	92.0	89.9	88.3	87.9	89.2	90.2	92.1	92.0	94.4	93.9	92.0	87.5
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	72.4	75.1	81.4	82.2	82.9	81.9	80.7	80.4	81.4	83.3	85.2	84.0	85.3	82.9	78.1	69.1
304.8 M	69.3	70.9	73.5	74.5	75.3	74.5	73.5	73.2	74.0	75.9	77.8	76.5	77.7	75.1	70.0	60.6

TABLE XI. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) 70 Percent speed; fan physical speed, 1530 rpm; fundamental blade passage frequency, 382 hertz

(b-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	111.1	100.1	99.9	105.7	104.6	104.9	106.2	103.4	104.2	104.4	103.4	105.3	104.9	103.2	100.7	100.6	104.4	122.1
63	98.2	96.7	96.8	97.2	95.8	96.8	95.2	95.3	94.8	97.5	95.5	96.7	98.5	98.5	99.2	98.4	96.9	114.6
80	101.0	101.6	101.0	99.3	98.8	99.1	99.0	99.0	98.1	100.3	100.0	100.9	102.3	103.1	102.1	101.4	100.4	118.1
100	106.8	104.5	105.5	106.0	103.7	102.3	103.7	102.0	103.0	104.0	102.0	103.6	105.2	105.7	103.8	102.2	103.9	121.6
125	108.8	109.7	109.2	108.5	109.3	108.3	106.8	106.8	105.3	106.3	105.7	106.9	108.0	108.0	107.0	104.7	107.4	125.1
160	107.6	109.2	108.9	107.4	106.1	105.4	104.2	105.9	105.7	105.2	105.2	107.5	106.4	107.1	105.7	103.1	106.3	124.0
200	111.3	110.7	109.2	106.3	104.5	102.7	101.0	102.2	102.3	101.8	102.7	104.6	105.5	105.7	104.8	102.6	104.8	122.5
250	112.4	112.4	111.4	110.4	108.5	107.5	106.5	104.4	105.4	106.0	107.5	109.1	110.5	110.4	107.9	104.9	108.4	126.1
315	117.1	116.6	116.7	116.2	114.1	114.7	109.7	107.7	108.2	109.1	110.1	110.6	112.4	112.1	110.9	107.4	112.5	130.2
400	127.4	126.6	126.2	128.6	127.2	128.2	122.2	116.7	118.4	119.1	120.1	119.3	122.6	121.9	121.7	117.3	124.2	141.9
500	115.2	115.4	114.6	114.7	113.4	111.4	108.9	108.1	108.4	109.2	110.9	111.7	113.4	113.7	111.7	108.1	111.9	129.6
630	114.4	115.1	115.7	114.6	113.4	110.2	107.7	107.9	108.7	109.9	111.7	113.0	114.6	115.2	111.7	107.6	112.3	130.0
800	117.5	120.6	120.1	119.1	117.5	115.1	115.1	114.8	113.5	115.3	116.8	118.7	119.5	119.8	117.8	113.9	117.4	135.1
1000	114.0	114.5	114.5	113.9	112.4	109.5	107.4	107.4	108.4	109.4	111.7	113.9	114.9	114.9	111.9	107.2	112.0	129.7
1250	114.9	115.6	115.4	115.3	112.8	110.1	107.8	107.6	108.3	110.1	111.1	114.5	115.4	114.4	112.8	106.8	112.5	130.2
1600	114.5	114.6	114.8	114.8	113.3	109.6	106.3	105.8	108.6	109.1	110.8	112.4	115.0	114.0	110.5	104.2	111.7	129.4
2000	112.8	113.8	114.1	113.1	111.6	108.4	104.1	103.4	105.6	107.1	109.3	110.2	113.4	112.4	109.3	103.5	110.2	127.9
2500	111.2	111.7	111.5	111.2	109.4	106.0	102.4	102.2	104.7	106.4	108.2	109.6	112.2	112.2	108.7	102.8	108.8	126.5
3150	110.3	111.0	110.5	110.0	107.8	105.0	101.2	100.8	103.5	105.8	107.8	108.9	110.8	111.7	108.5	102.3	107.9	125.6
4000	109.7	110.5	110.2	110.3	107.2	104.2	99.3	99.5	102.8	103.8	106.5	107.6	110.5	110.3	107.3	101.1	107.1	124.8
5000	108.0	108.0	108.4	108.9	105.7	101.9	97.2	97.0	100.7	102.2	104.9	105.5	108.9	107.4	106.2	98.7	105.2	122.9
6300	107.0	108.3	106.8	106.3	104.2	102.3	97.5	95.5	99.3	102.7	105.0	106.5	107.3	108.0	104.5	99.3	104.6	122.3
8000	106.7	107.6	107.1	106.9	104.4	100.7	95.6	95.1	100.3	101.1	104.1	105.4	107.9	106.9	104.6	98.3	104.2	121.9
10000	104.5	105.0	104.7	105.4	102.7	99.4	93.0	92.5	97.5	99.0	102.4	103.2	106.0	104.9	102.5	96.4	102.2	119.9
12500	103.2	103.5	103.2	105.2	101.9	98.4	91.9	91.2	96.9	97.5	101.0	102.1	105.2	103.4	102.0	94.9	101.2	118.9
16000	101.1	102.1	101.8	102.1	98.9	95.5	89.3	88.4	93.8	95.3	98.4	99.6	102.3	101.8	98.7	92.9	98.7	116.4
20000	100.7	100.8	100.3	101.3	97.5	93.7	87.7	87.7	92.9	93.8	96.0	98.3	101.4	100.3	97.5	91.9	97.4	115.1
OVERALL	129.7	129.6	131.0	130.4	128.9	129.1	124.2	121.3	122.2	123.2	124.5	125.5	127.5	127.2	125.6	121.2	126.8	144.6

TABLE XI. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) Concluded. 70 Percent speed; fan physical speed, 1530 rpm; fundamental blade passage frequency, 382 hertz

(b-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	81.4	70.4	70.2	76.0	73.9	75.2	76.5	73.7	74.5	74.7	73.7	75.6	75.2	73.5	71.0	70.9
63	68.5	67.0	67.1	67.5	66.1	67.1	66.5	65.6	66.1	67.8	65.8	67.0	68.8	68.8	69.5	68.7
80	71.3	71.9	71.3	69.6	69.1	69.4	69.3	69.3	68.4	70.6	70.3	71.2	72.6	73.4	72.4	71.7
100	77.1	74.3	75.8	76.1	74.0	72.3	74.0	72.3	73.3	74.3	72.3	73.9	75.5	76.0	74.1	72.5
125	79.1	80.3	79.5	78.8	79.0	78.6	75.1	77.1	75.6	76.6	76.0	77.2	78.3	78.3	77.3	75.0
160	77.9	79.5	79.2	77.7	76.4	75.7	74.5	76.2	76.3	75.9	75.5	77.8	76.7	77.4	76.0	73.4
200	80.6	81.0	79.5	76.6	74.8	73.0	71.3	72.5	72.6	72.1	73.0	74.9	75.6	76.0	75.1	72.9
250	82.7	82.7	81.7	80.7	78.8	77.8	74.8	74.7	75.7	76.3	77.8	79.4	80.8	80.7	78.2	75.2
315	87.4	86.9	87.0	86.5	84.4	85.0	80.0	78.0	78.5	79.4	80.4	80.9	82.7	82.4	81.2	77.7
400	97.6	96.8	99.4	98.0	97.4	98.4	92.4	86.9	88.0	89.3	90.3	89.5	92.8	92.1	91.9	87.5
500	85.4	85.6	84.8	84.9	83.6	81.6	79.1	78.3	78.6	79.4	81.1	81.9	83.6	83.9	81.9	78.3
630	84.6	85.3	85.9	84.8	83.6	80.4	77.9	78.1	78.9	80.1	81.9	83.2	84.8	85.4	81.9	77.8
800	87.7	90.8	90.3	89.3	87.7	85.3	95.3	85.0	83.7	85.5	87.0	86.9	89.7	90.0	88.0	84.1
1000	84.2	84.7	84.7	84.1	82.6	79.7	77.0	77.6	78.6	79.6	81.9	84.1	85.1	85.1	82.1	77.4
1250	85.0	85.7	85.5	85.4	82.9	80.2	77.9	77.7	78.4	80.2	81.2	84.6	85.5	84.5	82.9	76.9
1600	84.6	84.7	84.9	84.1	83.4	79.7	76.4	75.9	78.7	79.2	80.9	82.5	85.1	84.1	80.6	74.3
2000	82.8	83.8	84.1	83.1	81.6	78.4	74.1	73.4	75.6	77.1	79.3	80.2	83.4	82.4	79.3	73.5
2500	81.1	81.6	81.4	81.1	79.3	75.9	72.3	72.1	74.6	76.3	78.1	79.5	82.1	82.1	78.6	72.7
3150	80.0	80.7	80.2	79.7	77.5	74.7	70.9	70.5	73.2	75.5	77.5	78.6	80.5	81.4	78.2	72.0
4000	79.2	80.3	79.7	79.8	76.7	73.7	68.3	69.0	72.3	73.3	76.0	77.1	80.0	79.8	76.8	70.6
5000	77.2	77.2	77.6	78.1	74.9	71.1	66.4	66.2	69.9	71.4	74.1	74.7	78.1	76.6	75.4	67.9
6300	75.7	77.0	75.5	75.6	72.9	71.0	66.2	64.3	68.0	71.4	73.7	75.2	76.0	76.7	73.2	68.0
8000	74.8	75.7	75.2	75.3	72.5	68.8	63.7	63.2	68.4	69.2	72.2	73.5	76.0	75.0	72.7	66.4
10000	71.6	72.1	71.8	72.5	69.8	66.5	60.1	59.6	64.6	66.1	69.5	70.3	73.1	72.0	69.6	63.5
12500	69.0	69.3	69.0	70.9	67.7	64.2	57.7	57.0	62.7	63.3	66.8	67.9	71.0	69.2	67.8	60.7
16000	64.9	65.9	65.6	66.3	62.8	59.5	53.2	52.3	57.7	59.2	62.3	63.5	66.2	65.6	62.6	56.7
20000	61.8	61.9	61.4	62.1	58.6	54.8	48.8	48.8	54.0	54.9	57.2	59.4	62.5	61.4	58.6	53.0
OVERALL	99.9	99.8	101.2	100.6	99.1	99.4	94.4	91.6	92.4	93.4	94.7	95.6	97.6	97.3	95.7	91.4
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	74.8	82.6	83.1	90.1	90.3	91.0	87.1	84.8	86.5	87.4	88.3	88.1	89.2	87.0	82.7	73.8
304.8 M	65.6	74.4	80.4	82.6	83.0	83.9	80.1	77.6	79.3	80.1	80.9	80.6	81.6	79.2	74.8	65.5

TABLE XI. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) 86 Percent speed; fan physical speed, 1874 rpm; fundamental blade passage frequency, 468 hertz

(c-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	103.8	99.8	101.0	100.5	100.0	100.2	101.5	101.5	101.7	103.0	102.2	103.4	103.7	105.2	106.0	103.5	102.5	120.2
63	112.3	105.2	102.7	102.2	99.0	104.2	108.8	103.3	105.2	107.2	109.5	108.1	105.0	106.8	108.0	104.6	106.5	124.2
80	103.8	104.3	103.5	101.7	100.7	100.0	100.5	100.3	101.7	102.8	104.0	105.4	106.2	107.7	108.2	105.9	103.9	121.6
100	111.1	109.4	110.6	108.9	107.6	108.2	106.6	106.1	108.2	108.6	109.2	110.0	110.1	111.4	110.9	108.1	109.0	126.7
125	112.8	115.5	114.8	113.0	113.5	110.7	113.7	114.2	111.3	111.8	112.0	112.4	112.7	113.3	115.0	109.6	113.0	130.7
160	112.4	113.4	114.5	112.4	111.5	112.7	111.4	110.9	111.7	110.4	111.0	112.0	111.4	111.4	110.5	108.4	111.7	129.4
200	113.6	115.1	113.4	110.9	108.9	106.7	106.1	106.4	106.6	107.2	108.7	109.0	109.4	109.7	108.7	106.6	109.2	126.9
250	116.0	116.0	114.8	113.3	111.3	110.8	108.3	108.3	109.5	110.8	113.0	114.3	114.3	114.3	112.0	108.6	112.4	130.1
315	117.7	117.2	116.3	115.0	111.3	110.8	109.2	109.5	111.3	112.2	113.5	115.1	114.7	114.0	111.5	108.9	113.2	130.9
400	122.4	125.9	123.6	121.7	120.2	117.6	115.1	115.4	116.4	118.2	118.7	119.5	119.7	119.1	116.6	114.5	120.4	138.1
500	121.6	134.4	137.4	129.7	128.4	123.6	120.9	121.1	123.4	124.7	125.1	125.7	124.9	125.1	123.2	121.8	128.1	145.8
630	118.7	119.7	120.1	118.6	116.9	113.7	111.6	112.2	113.4	116.1	117.2	118.1	119.6	118.9	114.4	111.3	116.7	134.4
800	119.1	120.3	120.9	119.8	118.1	115.6	113.4	115.4	117.1	119.4	120.4	120.2	122.4	121.4	116.1	112.7	119.0	136.7
1000	121.5	123.2	122.5	124.7	121.9	118.4	117.7	122.4	125.2	127.2	127.5	124.1	128.4	124.5	120.2	118.8	124.5	142.2
1250	117.6	119.1	119.6	118.4	117.2	115.2	112.4	112.5	113.5	115.9	117.2	118.1	119.2	117.9	113.4	109.9	116.6	134.3
1600	117.3	119.1	119.6	119.0	118.0	115.1	111.8	111.8	113.0	114.8	116.6	117.2	119.6	118.3	113.1	108.0	116.5	134.2
2000	117.8	120.1	119.3	119.3	117.8	114.6	111.0	110.6	112.8	115.1	116.0	116.9	118.6	118.1	114.1	108.7	116.3	134.0
2500	115.4	117.2	116.7	117.1	115.2	112.2	109.1	108.2	110.2	112.7	114.9	115.5	117.2	116.7	112.1	107.0	114.3	132.0
3150	114.6	116.0	115.6	116.0	114.0	112.0	108.3	107.5	109.8	112.8	114.8	115.4	116.8	116.8	111.8	106.6	113.8	131.5
4000	114.4	115.7	115.7	115.9	113.9	110.7	106.9	106.7	109.4	111.2	113.4	114.2	116.6	116.2	112.2	106.0	113.2	130.9
5000	112.9	113.5	113.7	114.4	111.9	108.2	103.9	103.9	107.4	109.0	111.7	112.0	114.5	113.2	110.4	103.2	111.1	128.8
6300	111.7	114.2	112.5	113.0	110.1	109.3	104.8	102.5	105.7	109.5	111.7	112.5	113.5	113.8	109.0	104.7	110.7	128.4
8000	111.8	113.5	113.1	113.1	110.1	107.8	103.3	102.5	107.0	108.8	111.0	111.3	114.0	113.0	109.5	103.3	110.4	128.1
10000	110.2	111.5	110.5	111.6	108.4	106.4	101.2	100.5	104.5	106.9	109.7	109.6	112.7	111.0	108.1	101.6	108.7	126.4
12500	109.2	110.4	109.6	111.4	107.9	105.9	100.6	99.6	104.4	106.1	109.2	109.4	112.4	110.1	108.1	101.6	108.2	125.9
16000	107.4	109.1	108.4	108.7	105.2	103.1	97.9	97.1	101.4	104.1	107.1	107.6	110.1	108.9	105.1	99.9	106.1	123.8
20000	107.3	107.6	106.9	108.0	103.8	101.6	95.3	96.3	101.0	102.9	105.4	106.2	108.9	107.8	104.3	98.9	104.9	122.6
OVERALL	134.0	136.3	133.6	133.3	131.6	128.2	126.0	127.2	129.3	131.1	131.8	131.3	133.0	131.6	128.4	125.9	131.8	149.5

TABLE XI. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) Concluded. 86 Percent speed; fan physical speed, 1874 rpm; fundamental blade passage frequency, 468 hertz

(c-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	74.1	70.1	71.3	70.8	70.3	70.5	71.8	71.8	72.0	73.3	72.5	73.7	74.0	75.5	76.3	73.8
63	82.6	75.5	73.0	72.3	69.3	74.5	79.1	73.6	75.5	77.5	79.8	78.4	75.3	77.1	78.3	74.9
80	74.1	74.5	73.8	72.0	71.0	70.3	70.8	70.6	72.0	73.1	74.3	75.7	76.5	78.0	78.5	76.2
100	81.4	79.7	80.9	79.2	77.9	78.5	76.9	76.4	78.5	78.9	79.5	80.3	80.4	81.7	81.2	78.4
125	83.1	85.8	85.1	83.3	83.8	81.3	84.0	84.5	81.6	82.1	82.3	82.7	83.0	83.6	85.3	79.9
160	82.7	83.7	84.8	82.7	81.8	83.0	81.7	81.2	82.0	80.7	81.3	82.3	81.7	81.7	80.8	78.7
200	83.9	85.4	85.7	81.2	79.2	77.0	76.4	76.7	76.9	77.5	79.0	79.3	79.7	80.0	79.0	76.9
250	86.3	86.3	85.1	83.6	81.6	81.1	78.6	78.6	79.8	81.1	83.3	84.6	84.6	84.6	82.3	78.9
315	88.0	87.5	86.6	85.3	81.6	81.1	79.5	79.3	81.6	82.5	83.8	85.4	85.0	84.3	81.8	79.2
400	92.6	96.1	98.8	91.9	90.4	87.8	85.3	85.6	86.6	88.4	88.9	89.7	89.9	89.3	86.8	84.7
500	101.8	104.6	107.6	99.9	98.6	93.8	91.1	91.3	93.6	94.9	95.3	95.9	95.1	95.3	93.4	92.0
630	88.9	89.9	90.3	88.8	86.1	83.9	81.8	82.4	83.6	86.3	87.4	88.3	89.8	89.1	84.6	81.5
800	89.3	90.5	91.1	90.0	88.3	85.8	83.6	85.6	87.3	89.6	90.6	90.4	92.6	91.6	86.3	82.9
1000	91.7	93.4	92.7	94.9	92.1	88.6	87.9	92.6	95.4	97.4	97.7	94.3	98.6	94.7	90.4	89.0
1250	87.7	89.2	89.7	88.5	87.3	85.3	82.5	82.5	83.6	86.0	87.3	88.2	89.3	88.0	83.5	80.0
1600	87.4	89.2	89.7	89.1	88.1	85.2	81.9	81.9	83.1	84.9	86.7	87.3	89.7	88.4	83.2	78.1
2000	87.8	90.1	89.3	89.3	87.8	84.6	81.0	80.6	82.8	85.1	86.0	86.9	88.6	88.1	84.1	78.7
2500	85.3	87.1	86.6	87.0	85.1	82.1	79.0	78.1	80.1	82.6	84.8	85.4	87.1	86.6	82.0	76.9
3150	84.3	85.7	85.3	85.7	83.7	81.7	78.0	77.2	79.5	82.5	84.5	85.1	86.5	86.5	81.5	76.3
4000	83.9	85.2	85.2	85.4	83.4	80.2	76.4	76.2	78.9	80.7	82.9	83.7	86.1	85.7	81.7	75.5
5000	82.1	82.7	82.9	83.6	81.1	77.4	73.1	73.1	76.6	78.2	80.9	81.2	83.7	82.4	79.6	72.4
6300	80.4	82.9	81.2	81.7	78.9	78.0	73.5	71.2	74.4	78.2	80.4	81.2	82.2	82.5	77.7	73.4
8000	79.9	81.6	81.2	81.2	78.2	75.9	71.4	70.6	75.1	76.9	79.1	79.4	82.1	81.1	77.6	71.4
10000	77.3	78.6	77.6	78.7	75.5	73.5	68.3	67.6	71.6	74.0	76.8	76.7	79.8	78.1	75.2	68.7
12500	74.9	76.1	75.3	77.1	73.6	71.6	66.3	65.4	70.1	71.8	74.9	75.1	78.1	75.8	73.8	67.3
16000	71.2	72.9	72.2	72.6	69.1	67.0	61.8	61.0	65.3	67.9	71.0	71.4	74.0	72.7	69.0	63.7
20000	68.1	68.7	68.0	69.1	64.9	62.7	57.4	57.4	62.1	64.0	66.5	67.3	70.0	68.9	65.4	60.0
OVERALL	104.1	106.4	108.8	103.4	101.7	98.3	96.1	97.4	99.4	101.2	101.9	101.2	103.0	101.6	98.5	96.0
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	78.9	89.1	94.9	93.2	93.4	91.3	89.6	90.6	93.0	94.8	95.2	94.1	94.5	91.2	85.5	78.4
304.8 M	69.5	80.3	87.3	85.4	85.8	83.8	82.2	83.2	85.5	87.3	87.7	86.6	86.7	83.3	77.4	70.0

TABLE XI. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) 93 Percent speed; fan physical speed, 2033 rpm; fundamental blade passage frequency, 508 hertz

(d-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																
50	104.6	102.5	103.9	101.9	100.9	102.3	102.4	103.3	104.1	103.8	103.9	105.4	105.8	106.9	108.9	107.5	104.5	122.2
63	110.8	107.5	105.5	101.6	104.6	108.8	109.8	102.1	110.5	110.6	104.8	107.4	106.3	107.6	109.3	107.4	107.9	125.6
80	106.8	106.1	109.3	101.0	101.9	103.9	103.9	102.8	105.1	105.4	105.8	107.2	108.8	109.8	110.3	108.7	106.2	123.9
100	109.1	110.5	113.8	109.6	110.0	110.6	109.1	110.1	113.1	112.6	112.0	113.7	114.3	113.6	113.0	111.0	112.4	130.1
125	111.7	115.4	114.9	113.5	112.0	111.9	111.2	112.0	112.9	113.4	114.4	114.0	114.9	114.7	113.9	110.8	113.4	131.1
160	114.3	115.5	114.3	112.3	111.0	111.3	110.7	111.0	112.0	112.3	114.2	113.7	113.3	113.2	112.0	110.5	112.6	130.3
200	115.6	116.6	114.1	109.6	109.5	107.6	107.1	108.6	108.3	108.6	110.1	110.4	111.6	111.1	110.6	108.7	110.4	128.2
250	118.7	118.0	116.7	113.9	113.1	112.7	110.1	110.7	111.6	112.9	115.1	115.3	116.2	116.1	113.2	109.8	114.1	131.8
315	120.0	119.7	117.8	115.8	113.2	112.2	111.3	112.8	113.5	114.2	116.2	116.9	117.0	115.7	113.3	111.1	115.2	132.9
400	121.4	123.1	122.1	119.7	118.7	116.2	116.7	117.2	118.1	118.7	120.6	119.6	120.6	119.2	115.9	113.4	119.1	136.8
500	125.2	125.9	123.2	122.5	134.5	129.2	133.4	133.2	133.7	133.9	134.2	131.0	132.4	130.2	126.7	126.6	132.8	150.5
630	122.0	122.5	122.5	121.4	120.4	116.4	118.0	118.5	119.5	120.7	121.7	121.0	122.7	121.7	116.9	114.9	120.5	138.2
800	121.2	121.7	122.2	119.9	118.4	116.7	115.2	116.1	117.4	118.9	121.2	121.8	123.6	122.7	115.9	113.0	119.9	137.6
1000	124.8	126.2	127.7	124.5	122.7	122.0	121.2	122.0	122.7	124.8	126.0	127.6	128.0	127.3	120.2	118.0	124.9	142.6
1250	119.7	121.0	120.9	119.9	118.4	116.5	114.2	115.2	116.9	118.2	120.4	121.3	121.9	120.2	115.5	112.6	118.9	136.6
1600	121.1	122.3	122.4	122.6	122.0	120.0	115.0	115.8	118.1	118.5	121.1	121.2	123.5	122.1	116.5	112.7	120.4	138.1
2000	119.6	121.1	121.3	120.8	119.6	117.6	113.3	113.6	115.9	117.3	119.4	119.4	122.1	119.6	115.1	111.0	118.6	136.3
2500	117.1	118.0	118.9	119.1	117.3	115.1	111.6	111.8	114.1	116.3	118.3	118.0	120.3	118.6	113.8	109.7	116.9	134.6
3150	116.7	118.2	118.2	118.0	116.7	114.8	111.5	111.0	113.5	115.5	118.2	118.1	120.0	118.7	113.3	109.9	116.5	134.2
4000	116.3	118.3	118.1	118.3	116.1	114.0	109.8	110.4	113.0	114.1	116.6	116.7	119.1	118.3	113.6	108.5	115.8	133.5
5000	114.6	115.6	116.1	117.1	114.0	111.8	107.5	107.6	111.1	112.0	115.1	114.1	117.6	115.1	111.8	105.8	113.8	131.5
6300	113.8	116.5	115.3	115.1	112.5	112.7	108.0	106.6	109.5	112.7	115.5	115.0	116.0	115.7	110.6	106.5	113.4	131.1
8000	114.4	115.9	115.6	115.4	112.6	111.4	105.6	106.4	110.4	111.6	114.4	113.6	117.0	114.8	111.3	105.8	113.1	130.8
10000	112.5	113.8	113.3	114.7	111.0	110.2	104.5	104.7	108.3	109.7	113.0	112.2	115.3	113.0	109.7	104.1	111.5	129.2
12500	112.2	112.5	112.6	114.4	110.2	109.7	103.6	103.9	108.4	109.4	112.6	112.2	115.6	112.2	110.1	103.9	111.2	128.9
16000	110.4	112.1	111.0	111.5	107.5	106.7	101.2	102.0	105.7	107.4	110.7	110.4	113.0	111.6	107.4	102.5	109.1	126.8
20000	109.6	110.6	110.3	110.6	106.4	105.4	100.1	101.4	105.3	106.3	109.2	109.4	112.3	110.3	107.1	101.5	108.1	125.8
OVERALL	134.2	137.8	136.2	135.2	135.9	132.0	134.3	134.2	134.9	135.5	136.3	134.8	136.2	134.6	130.4	128.9	135.0	152.7

TABLE XI. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) Concluded. 93 Percent speed; fan physical speed, 2033 rpm; fundamental blade passage frequency, 508 hertz

(d-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG 10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	74.9	72.9	74.2	72.2	71.2	72.6	72.7	73.6	74.4	74.1	74.2	75.7	76.1	77.2	79.2	77.8
63	81.1	77.8	75.8	71.9	74.9	79.1	80.1	72.4	80.6	80.9	75.1	77.7	76.6	77.9	79.6	77.7
80	77.1	76.4	75.6	72.1	72.2	74.1	74.2	73.1	75.4	75.7	76.1	77.5	79.1	80.1	80.6	79.0
100	85.4	84.3	84.1	79.9	80.3	80.9	79.4	80.4	83.4	82.9	82.3	84.0	84.6	83.9	83.3	81.3
125	84.0	85.7	85.2	83.8	82.3	82.2	81.5	82.3	83.2	83.7	84.7	84.3	85.2	85.0	84.2	81.1
160	84.6	85.8	84.6	82.6	81.3	81.6	81.0	81.3	82.3	82.6	84.5	84.0	83.6	82.5	82.3	80.8
200	86.1	86.9	84.4	79.9	79.8	77.9	77.4	78.9	78.6	78.9	80.4	80.7	81.9	81.4	80.5	79.0
250	89.0	88.9	86.0	84.2	83.4	83.0	80.4	81.0	81.9	83.2	85.4	85.6	86.5	86.4	83.5	80.1
315	90.3	90.0	88.1	86.1	83.5	82.5	81.6	83.1	83.8	84.5	86.5	87.2	87.3	86.0	83.6	81.4
400	91.6	93.3	92.3	89.9	88.9	86.4	86.9	87.4	88.3	88.9	90.8	89.8	90.8	89.4	86.1	83.6
500	100.4	100.1	103.4	102.7	104.7	99.4	103.6	103.4	103.9	104.1	104.4	101.2	102.6	100.4	96.9	96.8
630	92.2	93.7	92.7	91.6	90.6	86.6	88.2	88.7	89.7	90.9	91.9	91.2	92.9	91.9	87.1	85.1
800	91.4	91.9	92.4	90.1	88.8	86.9	85.4	86.3	87.6	89.1	91.4	92.0	93.8	92.9	86.1	83.2
1000	95.0	96.4	97.9	94.7	92.9	92.2	91.4	92.2	92.9	95.0	96.2	97.8	98.2	97.5	90.4	88.2
1250	89.8	91.1	91.0	90.0	88.5	86.6	84.3	85.3	87.0	88.3	90.5	91.4	92.0	90.3	85.6	82.7
1600	91.2	92.4	92.7	92.7	92.1	90.1	85.1	85.9	88.2	88.6	91.2	91.3	93.6	92.2	86.6	82.8
2000	89.6	91.1	91.3	90.8	89.6	87.6	83.3	83.6	85.9	87.3	89.4	89.4	92.1	89.6	85.1	81.0
2500	87.0	88.7	89.9	89.0	87.2	85.0	81.5	81.7	84.0	86.2	88.2	87.9	90.2	88.5	83.7	79.6
3150	86.4	87.9	87.9	87.7	86.4	84.5	81.2	80.7	83.2	85.2	87.9	87.8	89.7	88.4	83.0	79.6
4000	85.8	87.3	87.6	87.6	85.0	83.5	79.3	79.9	82.5	83.6	86.1	86.2	88.6	87.8	83.1	78.0
5000	83.8	84.8	85.3	86.3	83.2	81.0	76.7	76.8	80.3	81.2	84.2	83.3	86.8	84.3	81.0	75.0
6300	82.5	85.2	84.3	83.8	81.2	81.4	76.7	75.3	78.2	81.4	84.2	83.7	84.7	84.4	79.3	75.2
8000	82.5	84.0	84.7	83.5	80.7	79.5	74.7	74.5	78.5	79.7	82.5	81.7	85.1	82.9	79.4	73.9
10000	79.6	80.9	82.4	81.8	78.1	77.3	71.6	71.8	75.4	76.8	80.1	79.3	82.4	80.1	76.8	71.2
12500	77.9	78.6	79.3	80.1	76.0	75.4	69.4	69.6	74.1	75.1	78.3	77.9	81.3	77.9	75.8	69.6
16000	74.2	75.9	74.8	75.4	71.4	70.6	65.1	65.8	69.6	71.2	74.5	74.2	76.9	75.4	71.3	66.3
20000	70.9	71.7	71.4	71.7	67.5	66.5	61.2	62.5	66.4	67.4	70.3	70.5	73.4	71.4	68.2	62.6
OVERALL	104.4	107.9	106.4	105.3	106.1	102.1	104.5	104.4	105.1	105.6	106.4	104.9	106.3	104.7	100.4	99.0
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	79.1	80.8	83.4	85.2	87.3	85.2	86.9	87.4	88.8	89.3	100.0	87.8	88.0	84.5	87.8	81.8
304.8 M	69.5	82.5	85.5	87.4	89.9	87.7	89.8	90.4	91.6	92.1	92.7	90.3	90.4	86.7	79.7	73.5

TABLE XI. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(e) 100 Percent speed; fan physical speed, 2186 rpm; fundamental blade passage frequency, 546 hertz

(e-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																
50	105.6	102.9	101.7	103.9	103.7	103.9	104.7	105.1	105.1	106.6	106.6	107.0	108.6	110.1	111.2	110.0	106.7	124.4
63	105.3	106.0	103.3	103.3	105.5	107.8	107.2	105.5	107.3	106.7	107.3	107.6	109.0	109.8	111.0	110.4	107.5	125.2
80	112.0	111.9	106.7	107.4	111.2	114.5	113.5	111.2	113.9	112.0	113.0	112.5	111.4	112.5	113.0	112.8	112.4	130.1
100	113.2	113.3	113.5	113.2	109.3	111.3	111.3	112.3	111.2	113.5	116.7	115.8	114.7	116.3	115.8	114.6	113.9	131.6
125	114.8	115.3	115.7	115.7	113.0	114.3	113.7	113.8	114.0	115.8	116.7	116.8	117.0	117.5	116.8	113.9	115.5	133.2
160	115.5	116.4	116.4	114.9	113.2	115.4	113.2	114.9	115.0	115.9	116.2	116.5	116.7	115.7	115.4	113.4	115.4	133.1
200	117.1	117.3	115.9	113.8	113.6	112.1	110.9	111.3	112.4	111.3	112.8	114.2	113.9	113.9	113.6	111.6	113.3	131.0
250	119.4	118.9	117.6	117.4	116.2	115.4	113.2	113.2	112.9	114.9	116.7	116.5	117.9	118.4	115.6	113.0	116.3	134.0
315	119.6	120.9	118.5	117.8	115.9	116.8	113.6	114.6	115.3	116.3	117.8	119.2	118.5	116.1	115.1	113.3	117.1	134.8
400	121.6	122.4	122.5	120.6	119.3	118.1	115.9	116.9	117.4	119.6	120.8	121.9	121.6	120.9	116.4	114.8	119.8	137.5
500	131.8	131.6	134.9	133.2	132.9	129.8	128.8	131.9	132.1	129.9	128.8	132.5	133.6	128.1	124.8	125.7	131.6	149.1
630	127.6	127.6	130.1	128.6	127.9	124.9	123.2	126.6	126.6	125.9	125.1	128.2	129.6	125.6	120.9	120.8	126.8	144.5
800	122.3	122.8	123.7	122.6	121.5	120.2	118.3	118.7	119.0	121.3	122.8	124.4	125.3	124.5	117.8	115.2	122.0	139.7
1000	124.2	125.7	125.0	126.2	123.7	123.7	121.2	122.5	123.0	123.7	126.8	128.6	129.5	125.7	119.2	118.9	125.3	143.0
1250	121.6	123.9	124.1	124.1	122.1	121.1	118.4	119.7	120.4	121.6	124.2	126.0	126.7	123.2	118.2	116.5	122.9	140.6
1600	122.9	124.0	125.9	125.9	124.2	120.9	118.0	118.9	120.0	121.4	123.2	124.3	125.9	122.7	116.7	114.1	122.7	140.4
2000	121.1	122.1	123.0	123.6	121.6	120.1	116.6	116.5	117.8	120.1	121.1	121.9	124.0	120.6	115.5	112.4	120.7	138.4
2500	119.4	120.3	120.6	122.3	120.3	118.9	115.3	114.6	116.6	118.8	120.4	121.0	122.6	119.8	114.4	111.3	119.4	137.1
3150	118.2	119.8	120.2	121.3	119.3	119.5	115.3	114.0	115.7	118.5	120.3	120.8	121.8	120.0	114.0	111.3	119.0	136.7
4000	118.4	119.5	120.0	121.5	119.4	118.5	114.2	113.5	114.9	117.0	118.7	120.2	121.9	119.7	114.7	110.3	118.5	136.2
5000	116.7	117.2	118.2	120.2	116.7	115.3	111.5	110.7	112.8	114.5	117.5	116.8	119.8	116.2	112.8	107.3	116.2	133.9
6300	115.7	118.2	117.0	118.5	115.3	116.2	112.2	109.5	111.7	115.3	117.5	117.8	118.3	117.5	111.5	108.3	115.9	133.6
8000	116.6	117.6	118.0	119.0	115.3	115.1	110.3	109.1	112.6	114.3	116.5	116.6	119.0	116.5	112.7	107.7	115.6	133.3
10000	114.8	115.3	115.2	117.7	113.7	113.9	108.2	108.2	110.5	112.5	115.2	115.1	117.5	114.8	111.2	105.8	114.0	131.7
12500	114.6	115.3	114.8	118.0	113.1	113.6	108.1	107.5	110.8	112.1	114.8	115.3	117.8	114.0	111.8	106.0	113.9	131.6
16000	112.3	114.3	113.4	115.2	111.3	110.9	105.6	105.3	108.2	110.4	113.6	113.8	115.2	113.5	109.9	104.7	112.0	129.7
20000	113.0	113.2	112.5	114.5	110.2	109.7	104.2	104.9	107.9	109.8	112.3	112.9	114.7	112.8	109.9	104.4	111.2	128.9
OVERALL	136.0	136.4	138.2	137.4	136.2	134.2	132.2	134.5	134.8	134.4	135.2	137.3	138.4	135.0	130.8	129.8	135.6	153.3

TABLE XI. - Concluded. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(e) Concluded. 100 Percent speed; fan physical speed, 2186 rpm; fundamental blade passage frequency, 546 hertz

(e-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	75.9	73.2	76.C	74.2	74.0	74.2	75.0	75.4	75.4	76.9	76.9	77.3	78.5	8C.4	81.5	8C.3
63	75.6	76.3	73.6	73.6	75.8	78.1	77.5	75.8	77.6	77.0	77.6	77.9	79.3	80.1	81.3	80.7
80	82.3	82.2	77.C	77.7	81.5	84.8	83.8	81.5	84.2	82.3	83.3	82.8	81.7	82.8	83.3	83.1
1CC	85.C	83.6	83.8	83.5	79.6	81.6	81.6	82.6	81.5	83.8	87.0	86.1	85.C	86.6	86.1	84.5
125	85.1	85.6	86.0	86.0	83.3	84.6	84.0	84.1	84.3	86.1	87.0	87.1	87.3	87.8	87.1	84.2
160	85.8	86.7	86.7	85.2	83.5	85.7	83.5	85.2	85.3	86.2	86.5	86.8	87.C	86.0	85.7	83.7
200	87.4	87.6	86.2	84.1	83.9	82.4	81.2	81.6	82.7	81.6	83.1	84.5	84.2	84.2	83.9	81.9
250	89.7	89.2	87.9	87.7	86.5	85.7	83.5	83.5	83.2	85.2	87.0	88.8	88.2	88.7	85.9	83.3
315	90.9	91.1	89.2	88.1	86.2	86.1	83.9	84.9	85.6	86.6	88.1	89.5	89.2	88.4	85.4	83.6
400	91.8	92.6	93.1	90.8	89.5	88.3	86.1	87.1	87.6	89.8	91.0	92.1	91.8	91.1	86.6	85.C
500	102.8	101.8	105.1	103.5	103.1	100.8	99.0	102.1	102.3	100.1	99.0	102.7	103.8	98.3	95.0	95.9
630	97.8	97.8	101.3	98.8	98.1	95.1	93.4	96.8	96.8	96.1	95.3	98.4	99.8	95.8	91.1	91.C
800	92.5	93.0	93.9	93.0	91.7	90.4	88.5	88.9	89.2	91.5	93.0	94.6	95.5	94.7	88.0	85.4
1000	94.4	95.9	96.2	96.4	93.9	93.9	91.4	92.7	93.2	93.9	97.0	98.8	99.7	95.9	89.4	89.1
1250	92.7	94.0	94.2	94.2	92.2	91.2	88.5	89.8	90.5	91.7	94.3	96.1	96.8	93.3	88.3	86.6
1600	93.0	94.1	95.6	96.C	94.3	91.0	88.1	89.0	90.1	91.5	93.3	94.4	96.C	92.8	86.8	84.2
2000	91.1	92.1	93.0	93.6	91.6	90.1	86.6	86.5	87.8	90.1	91.1	91.5	94.C	90.6	85.5	82.4
2500	89.3	90.2	90.5	92.2	90.2	88.8	85.2	84.5	86.5	88.7	90.3	90.9	92.5	89.7	84.3	81.2
3150	87.9	89.5	89.9	91.0	89.0	89.2	85.0	83.7	85.4	88.2	90.0	90.5	91.5	89.7	83.7	81.0
4000	87.9	89.0	89.5	91.0	88.9	88.0	83.7	83.0	84.4	86.5	88.2	89.7	91.4	89.2	84.2	79.8
5000	85.9	86.4	87.4	89.4	86.9	84.5	80.7	79.9	82.0	83.7	86.7	86.0	89.C	85.4	82.0	76.5
6300	84.4	86.9	85.7	87.2	84.0	84.9	80.9	78.2	80.4	84.0	86.2	86.5	87.C	86.2	80.2	77.0
8000	84.7	85.7	86.1	87.1	83.4	83.2	79.4	77.2	80.7	82.4	84.6	84.7	87.1	84.6	80.8	75.8
10000	81.9	82.9	82.3	84.8	80.8	81.0	75.3	75.3	77.6	79.6	82.3	82.2	84.6	81.9	78.3	72.9
12500	81.3	81.0	80.5	82.7	78.8	79.3	73.8	73.2	76.5	77.8	80.5	81.0	83.5	79.7	77.5	71.7
16000	77.1	78.1	77.2	79.1	75.1	74.8	69.5	69.1	72.0	74.2	77.4	77.6	79.1	77.3	73.7	68.5
20000	74.1	74.3	73.C	75.6	71.3	70.8	65.3	66.0	69.0	70.9	73.4	74.0	75.8	73.9	71.0	65.5
OVERALL	106.1	106.4	108.3	107.5	106.3	104.2	102.4	104.6	105.0	104.5	105.2	107.4	108.4	105.0	100.8	100.C
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	90.7	89.3	95.3	97.4	98.0	97.5	95.2	98.3	99.1	98.9	99.0	100.2	100.C	94.7	87.9	82.6
304.8 M	71.1	80.7	87.3	89.5	90.4	89.9	88.8	91.1	91.8	91.5	91.4	92.7	92.4	86.7	79.7	74.3

TABLE XII. - FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 105 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) 60 Percent speed; fan physical speed, 1301 rpm; fundamental blade passage frequency, 325 hertz

(a-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	101.7	102.4	102.9	101.9	100.4	99.0	99.4	99.0	98.4	97.0	98.7	96.5	96.9	95.9	97.4	98.6	99.2	116.9
63	105.0	101.4	101.7	99.3	98.5	97.2	95.0	96.2	96.0	94.2	96.2	94.8	95.7	94.9	97.4	97.9	97.5	115.2
80	100.7	101.6	102.4	99.6	98.9	99.1	97.9	98.4	97.9	98.7	100.2	99.3	100.6	99.6	99.9	99.9	99.5	117.2
100	102.7	102.7	103.5	103.5	100.7	100.5	100.8	98.7	99.5	100.2	100.5	99.9	101.7	101.0	100.8	99.0	100.9	118.6
125	107.2	109.0	108.3	106.5	106.2	105.0	105.3	103.8	102.5	106.3	106.5	105.3	105.7	104.3	105.7	103.7	105.7	123.4
160	105.7	106.5	106.5	105.2	104.2	102.0	101.2	101.4	102.4	102.2	102.5	103.6	102.4	102.9	102.5	101.6	103.2	120.9
200	106.7	108.4	106.7	105.2	102.4	100.4	99.2	100.0	100.9	99.9	100.4	101.6	102.2	101.9	102.2	100.7	102.4	120.1
250	110.4	110.7	109.2	109.0	107.7	106.2	103.4	102.7	103.0	104.9	106.0	107.3	108.0	107.7	106.9	103.3	106.7	124.4
315	122.6	122.6	121.6	125.4	123.6	118.6	118.4	114.6	114.4	119.1	120.4	121.3	120.7	122.4	118.1	116.4	120.6	138.3
400	114.2	114.5	114.2	113.9	112.2	109.0	107.2	106.5	107.4	109.5	111.5	112.5	112.2	112.2	110.2	106.4	111.1	128.8
500	112.6	112.9	111.6	110.8	109.8	107.3	104.9	104.4	105.9	107.6	109.4	110.5	111.6	111.6	111.1	104.8	109.4	127.1
630	115.1	115.1	115.0	114.6	114.1	110.5	109.0	107.6	108.0	110.0	113.1	114.1	116.1	116.6	114.6	109.4	113.1	130.8
800	112.2	112.8	112.5	111.8	111.2	107.7	104.7	103.7	105.0	107.5	110.7	112.4	113.2	113.7	111.8	106.9	110.4	128.1
1000	114.4	115.2	114.6	113.4	111.2	108.4	105.6	104.1	104.9	107.6	110.2	112.0	113.9	114.4	113.4	107.5	111.2	128.9
1250	113.1	113.4	112.1	111.7	110.2	106.7	103.4	102.2	103.7	106.6	109.1	110.0	112.6	112.6	110.9	104.8	109.5	127.2
1600	110.6	112.1	111.4	110.9	109.2	106.1	101.6	101.6	103.1	105.4	108.6	109.0	112.4	113.1	110.9	104.1	108.9	126.6
2000	110.7	111.5	110.5	110.0	108.2	104.7	100.5	99.8	101.7	104.2	107.3	107.9	111.8	111.7	109.8	102.6	107.9	125.6
2500	109.3	109.7	108.5	108.7	106.7	102.8	99.5	98.0	100.2	103.2	106.2	107.1	109.3	109.8	108.7	100.8	106.3	124.0
3150	108.5	109.1	107.5	107.6	105.1	102.1	98.1	96.3	99.3	102.5	105.6	107.1	108.6	109.8	108.6	101.1	105.7	123.4
4000	107.6	108.2	107.4	107.7	105.1	100.9	95.4	95.1	98.6	101.4	104.4	105.7	108.7	109.1	108.9	101.5	105.2	122.9
5000	106.2	105.3	105.0	106.2	103.0	98.5	93.8	92.0	96.5	99.3	103.2	103.2	107.0	105.7	106.7	98.5	103.0	120.7
6300	104.6	106.3	103.8	104.1	101.4	99.4	93.9	90.4	94.9	99.4	102.9	104.1	105.4	106.6	104.9	98.4	102.4	120.1
8000	105.3	105.4	104.3	104.3	101.4	97.9	92.2	89.9	95.3	98.3	102.3	102.5	106.1	105.1	105.1	98.0	102.0	119.7
10000	104.3	104.0	102.6	103.5	100.0	96.7	90.1	87.5	93.3	96.6	100.5	101.1	104.3	103.5	103.7	96.4	100.5	118.2
12500	103.7	103.6	102.1	103.2	100.4	96.7	89.7	86.9	92.9	95.9	99.9	100.9	104.1	102.9	103.6	95.8	100.2	117.9
16000	102.3	102.7	101.5	100.8	97.6	94.1	87.1	85.0	90.3	94.0	97.5	99.0	101.5	101.7	100.8	94.8	98.2	115.9
20000	101.7	101.4	100.2	99.4	96.0	92.4	86.2	85.1	89.9	92.7	95.7	97.5	100.6	100.7	99.9	93.6	97.0	114.7
OVERALL	126.2	126.5	125.6	127.3	125.7	121.5	120.4	117.9	118.4	121.7	123.6	124.5	125.4	126.2	123.8	119.8	123.8	141.5

TABLE XII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 105 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) Concluded. 60 Percent speed; fan physical speed, 1301 rpm; fundamental blade passage frequency, 325 hertz

(a-2) Data adjusted to standard day of 15^{0} C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 20.5 METER RADIUS															
50	72.0	72.7	73.2	72.2	70.7	69.3	69.7	69.3	68.7	67.3	69.0	66.8	67.2	66.2	67.7	68.9
63	75.3	71.7	72.0	69.3	68.8	67.5	66.3	66.5	66.3	64.5	66.5	65.1	66.0	65.2	67.7	68.2
80	71.0	71.9	72.7	69.9	69.2	69.4	68.2	68.7	68.2	69.0	70.5	69.6	70.9	69.9	70.2	70.2
100	73.0	73.0	73.8	73.8	71.0	70.8	71.1	69.0	69.8	70.5	70.8	70.2	72.0	71.3	71.1	69.3
125	77.5	79.3	79.6	76.8	76.5	75.3	75.6	74.1	72.8	76.6	76.8	75.6	76.0	74.6	76.0	74.0
160	76.0	76.8	76.8	75.5	74.5	72.3	71.5	71.7	72.7	72.5	72.8	73.9	72.7	73.2	72.8	71.5
200	77.0	78.7	77.0	75.5	72.7	70.7	69.5	70.3	71.2	70.2	70.7	71.9	72.5	72.2	72.5	71.0
250	80.7	81.0	79.5	79.3	78.0	76.5	73.7	73.0	73.3	75.2	76.3	77.6	78.3	78.0	77.2	73.6
315	92.9	92.9	91.9	95.7	93.9	88.9	88.7	84.9	84.7	89.4	90.7	91.6	91.0	92.7	98.4	86.7
400	84.4	84.7	84.4	84.1	82.4	79.2	77.4	76.7	77.6	79.7	81.7	82.7	82.4	82.4	80.4	76.6
500	82.8	83.1	81.9	81.0	80.0	77.5	75.1	74.6	76.1	77.8	79.6	80.7	81.8	81.8	81.3	75.0
630	85.3	85.3	85.2	84.8	84.3	80.7	79.2	77.8	78.2	80.2	83.3	84.3	86.3	86.8	84.8	79.6
800	82.4	83.0	82.7	82.0	81.4	77.9	74.9	73.9	75.2	77.7	80.9	82.6	83.4	83.9	82.0	77.1
1000	84.6	85.4	84.8	83.6	81.4	78.6	75.8	74.3	75.1	77.8	80.4	82.2	84.1	84.6	83.6	77.7
1250	83.2	83.5	82.2	81.8	80.3	76.8	73.5	72.3	73.8	76.7	79.2	80.1	82.7	82.7	81.0	74.9
1600	82.7	82.2	81.5	81.0	79.3	76.2	71.7	71.7	73.2	75.5	78.7	79.1	82.5	83.2	81.0	74.2
2000	83.7	81.5	80.5	80.0	78.2	74.7	70.5	69.8	71.7	74.2	77.3	77.9	81.8	81.7	79.8	72.6
2500	79.2	79.6	78.4	78.6	76.6	72.7	69.4	67.9	70.1	73.1	76.1	77.0	79.2	79.7	78.6	70.7
3150	78.2	78.8	77.2	77.3	74.8	71.8	67.8	66.0	69.0	72.2	75.3	76.8	78.3	79.5	78.3	70.8
4000	77.1	77.7	76.9	77.2	74.6	70.4	65.9	64.6	68.1	70.9	73.9	75.2	78.2	78.6	78.4	71.0
5000	75.4	74.5	74.2	75.4	72.2	67.7	63.0	61.2	65.7	68.5	72.4	72.4	76.2	74.9	75.9	67.7
6300	73.3	75.0	72.5	72.9	70.1	68.1	62.6	59.2	63.6	68.1	71.6	72.8	74.1	75.3	73.6	67.1
8000	73.4	73.5	72.4	72.4	69.5	66.0	60.3	58.0	63.4	66.4	70.4	70.6	74.2	73.2	73.2	66.1
10000	71.4	71.1	69.7	70.6	67.1	63.8	57.2	54.6	60.4	63.7	67.6	68.2	71.4	70.6	70.8	63.5
12500	69.4	69.3	67.8	68.9	66.1	62.4	55.4	52.6	58.6	61.6	65.6	66.6	69.8	68.6	69.3	61.5
16000	66.1	66.5	65.3	64.7	61.5	58.0	51.0	48.8	54.1	57.8	61.4	62.8	65.4	65.5	64.7	58.6
20000	62.8	62.5	61.3	60.5	57.1	53.5	47.3	46.2	51.0	53.8	56.8	58.6	61.7	61.8	61.0	54.7
OVERALL	96.3	96.6	95.8	97.5	95.9	91.7	90.7	88.1	88.6	91.9	93.7	94.7	95.4	96.3	93.9	89.9
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	76.5	79.0	82.3	86.6	86.6	83.8	82.9	81.0	82.1	85.3	86.9	87.0	86.7	85.6	80.4	72.0
304.8 M	61.1	70.6	74.4	79.0	79.2	76.4	75.7	73.8	74.7	78.0	79.5	79.5	79.0	77.8	72.2	63.6

TABLE XII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 105 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) 70 Percent speed; fan physical speed, 1518 rpm; fundamental blade passage frequency, 379 hertz

(b-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	109.2	103.2	102.0	103.9	103.0	104.5	103.9	100.9	102.2	100.7	103.0	103.0	101.2	103.0	101.2	101.9	102.9	120.6
63	102.1	99.6	100.9	98.7	100.7	97.9	95.9	96.9	96.9	97.4	98.9	97.1	97.6	97.6	99.9	100.9	98.5	116.2
80	102.6	102.3	103.0	100.2	100.7	99.8	98.8	99.8	99.0	100.0	101.2	100.9	100.8	101.5	102.2	101.6	100.7	118.4
100	106.2	104.5	105.2	105.2	102.7	103.0	103.2	102.2	101.8	106.0	104.7	104.4	104.5	104.3	103.5	102.4	104.0	121.7
125	108.5	109.2	109.0	107.4	106.7	106.2	105.4	104.9	105.7	107.4	107.4	106.4	106.4	105.9	106.5	104.7	106.6	124.3
160	107.9	108.6	107.6	106.6	105.7	104.6	103.6	103.9	105.1	105.4	105.6	106.5	105.6	105.2	104.1	102.8	105.5	123.2
200	109.2	109.2	107.7	104.4	103.6	101.9	101.1	102.1	101.4	101.7	102.9	103.3	104.2	104.2	104.1	102.4	103.8	121.5
250	112.9	112.4	110.3	108.5	106.9	106.0	104.2	103.9	104.2	105.5	107.7	107.8	109.4	110.0	107.7	104.1	107.6	125.3
315	118.9	116.6	117.1	116.8	114.6	114.6	111.6	109.1	108.4	109.6	110.6	112.0	112.3	112.4	109.8	107.5	113.0	130.7
400	130.4	125.2	129.1	129.2	126.9	127.4	123.9	119.9	118.1	119.6	119.9	122.1	120.1	121.4	119.2	117.6	124.3	142.0
500	115.7	115.7	114.9	113.9	113.0	110.4	109.0	107.5	108.7	110.4	112.2	113.0	114.1	115.2	112.9	107.1	112.3	130.0
630	114.4	115.4	115.1	114.1	111.7	109.6	107.6	106.9	108.1	110.2	113.2	114.5	115.9	116.4	112.9	107.3	112.7	130.4
800	118.5	119.3	119.6	116.8	116.3	114.0	112.8	111.5	112.1	114.0	118.6	122.0	119.2	121.1	117.5	112.5	117.5	135.2
1000	116.0	116.5	115.8	114.6	113.0	110.5	107.8	107.1	108.3	110.8	113.3	114.6	116.0	117.0	113.5	108.9	113.2	130.9
1250	116.5	118.0	116.8	115.5	114.3	111.3	108.1	107.0	108.5	110.6	113.5	115.1	116.5	116.6	114.0	108.7	113.7	131.4
1600	119.3	116.2	116.0	115.5	113.8	111.0	107.0	106.3	107.7	109.8	112.5	113.6	116.7	116.8	112.5	107.7	113.1	130.8
2000	113.7	115.2	115.0	114.2	112.0	109.5	104.9	104.2	106.5	108.9	111.4	112.3	115.2	115.9	112.5	105.9	111.9	129.6
2500	112.3	113.7	112.8	112.8	110.7	107.5	103.7	102.3	104.7	107.5	110.3	111.5	113.5	114.3	111.2	103.8	110.4	128.1
3150	111.7	113.0	111.9	111.7	109.3	106.7	102.5	100.8	103.3	107.2	110.0	111.1	112.2	114.0	111.7	103.6	109.7	127.4
4000	111.4	112.4	111.9	111.9	109.5	105.9	100.7	99.9	103.0	105.4	108.5	109.8	112.9	113.2	112.2	103.5	109.3	127.0
5000	109.8	110.2	109.8	110.7	107.5	104.0	99.2	97.3	101.1	104.2	107.7	107.6	111.2	110.5	110.8	101.3	107.5	125.2
6300	108.9	111.1	108.6	108.9	105.9	104.7	99.2	95.9	99.7	104.9	107.4	108.6	110.1	111.4	109.1	101.8	107.1	124.8
8000	110.2	110.4	109.2	109.6	105.9	103.7	97.7	95.7	100.9	103.4	106.7	107.4	110.6	109.7	109.7	101.3	106.8	124.5
10000	108.6	109.5	107.5	108.3	104.8	102.6	95.8	94.1	98.8	102.5	105.6	106.1	109.2	108.6	108.0	100.1	105.5	123.2
12500	109.0	109.4	106.9	108.4	104.7	102.2	95.3	93.5	99.4	101.8	105.2	106.5	109.5	108.0	107.8	99.5	105.4	123.1
16000	107.9	108.6	106.3	105.9	102.6	99.7	93.6	91.6	97.1	100.4	103.8	104.9	107.2	106.9	105.1	99.2	103.7	121.4
20000	107.3	107.6	105.1	104.9	101.1	98.4	91.9	91.1	96.6	99.6	102.6	104.2	106.8	106.4	105.0	98.1	102.9	120.6
OVERALL	132.0	129.5	131.1	130.9	128.8	128.5	125.3	122.2	121.8	123.7	125.7	127.6	127.6	128.4	125.8	121.6	127.3	145.0

TABLE XII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH

105 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) Concluded. 70 Percent speed; fan physical speed, 1518 rpm; fundamental blade passage frequency, 379 hertz

(b-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	75.5	73.5	72.3	74.2	73.3	74.8	74.2	71.2	72.5	71.0	73.3	73.3	71.5	73.3	71.5	72.2
63	72.4	69.9	71.2	69.8	71.3	68.2	67.2	67.2	67.2	67.7	69.2	67.4	67.9	67.9	70.2	71.2
80	73.1	72.6	73.3	70.5	71.0	70.1	69.1	70.1	69.3	70.3	71.5	71.2	71.1	71.8	72.5	71.9
100	75.6	74.8	75.5	75.5	73.0	73.3	73.5	72.5	72.1	76.3	75.0	74.7	74.8	74.6	73.8	72.7
125	78.8	79.5	78.3	77.7	77.0	76.5	75.7	75.2	74.0	77.7	77.7	76.7	76.7	76.2	76.8	75.0
160	78.2	78.9	77.9	76.9	76.0	74.9	73.9	74.2	75.4	75.7	75.9	76.8	75.9	75.5	74.4	73.1
200	79.5	79.5	78.0	74.7	73.9	72.2	71.4	72.4	71.7	72.0	73.2	73.6	74.5	74.5	74.4	72.7
250	83.2	82.7	80.3	78.8	77.2	76.3	74.5	74.2	74.5	75.8	78.0	78.1	79.1	80.3	78.0	74.4
315	89.2	86.9	87.4	87.1	84.9	84.9	81.9	79.4	78.7	79.9	80.9	82.3	82.6	82.7	80.1	77.8
400	100.6	95.4	99.3	99.4	97.1	97.6	94.1	90.1	88.3	89.8	90.1	92.3	90.3	91.6	89.4	87.8
500	85.9	85.9	85.1	84.1	83.2	80.6	79.2	77.7	78.9	80.6	82.4	83.2	84.2	85.4	83.1	77.3
630	84.6	85.0	85.3	84.3	81.9	79.8	77.8	77.1	78.3	80.4	83.4	84.7	86.1	86.6	83.1	77.5
800	88.7	85.5	89.8	87.0	86.5	84.2	83.0	81.7	82.3	84.2	88.8	92.2	85.5	91.3	87.7	82.7
1000	86.2	86.7	86.0	84.9	83.2	80.7	78.0	77.3	78.5	81.0	83.5	84.8	86.2	87.2	83.7	79.1
1250	86.6	88.1	86.9	85.6	84.4	81.4	78.2	77.1	78.6	80.7	83.6	85.2	86.6	86.7	84.1	78.8
1600	85.4	86.3	86.1	85.6	83.9	81.1	77.1	76.4	77.8	79.9	82.6	83.7	86.8	86.9	82.6	77.8
2000	83.7	85.2	85.6	84.2	82.6	79.5	74.9	74.2	76.5	78.9	81.4	82.3	85.2	85.9	82.5	75.9
2500	82.2	83.5	82.7	82.7	80.6	77.4	73.6	72.2	74.6	77.4	80.2	81.4	83.4	84.2	81.1	73.7
3150	81.4	82.7	81.6	81.4	79.0	76.4	72.2	70.5	73.0	76.9	79.7	80.8	81.9	83.7	81.4	73.3
4000	80.6	81.9	81.4	81.4	79.0	75.4	70.2	69.4	72.5	74.9	78.0	79.3	82.4	82.7	81.7	73.0
5000	79.0	79.4	77.0	79.9	76.7	73.2	68.4	66.5	70.3	73.4	76.9	76.8	80.4	79.7	80.0	70.5
6300	77.6	78.9	77.3	77.6	74.6	73.4	67.9	64.6	68.4	73.6	76.1	77.3	78.8	80.1	77.8	70.5
8000	73.3	78.5	77.3	77.7	74.0	71.8	65.8	63.8	69.0	71.5	74.8	75.5	78.7	77.8	77.8	69.4
10000	75.7	76.6	74.6	75.4	71.9	69.7	62.9	61.2	65.9	69.6	72.7	73.2	76.3	75.7	75.1	67.2
12500	74.7	75.1	72.6	74.1	70.4	67.3	61.0	59.2	65.1	67.5	70.9	72.2	75.2	73.7	73.5	65.2
16000	71.7	72.4	70.1	69.8	66.5	63.6	57.4	55.4	60.9	64.2	67.6	68.7	71.0	70.7	68.9	63.0
20000	69.4	68.7	66.2	66.0	62.2	59.5	53.0	52.2	57.7	60.7	63.7	65.3	67.9	67.5	66.1	59.2
OVERALL	102.2	99.5	101.3	101.0	98.9	98.7	95.5	92.4	92.0	93.8	95.7	97.7	97.5	98.4	95.8	91.7
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	77.0	82.5	88.3	90.7	90.4	90.8	88.3	86.1	86.3	88.2	89.4	90.1	89.3	88.0	82.7	74.4
304.8 M	67.9	74.0	80.5	83.1	83.0	83.5	81.2	79.0	79.0	80.8	81.9	82.6	81.1	79.9	74.4	66.0

TABLE XII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 105 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) 86 Percent speed; fan physical speed, 1859 rpm; fundamental blade passage frequency, 464 hertz

(c-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																
50	103.3	105.6	101.1	102.1	102.4	101.6	102.4	102.1	102.1	101.4	101.9	102.0	102.4	104.1	105.3	104.0	102.6	120.3
63	111.2	107.7	102.4	101.7	104.4	109.0	104.0	104.0	103.4	105.2	105.9	105.0	102.7	106.4	105.5	105.1	105.4	123.1
80	104.6	105.9	104.4	101.6	101.9	101.6	100.3	100.6	101.6	101.9	102.9	104.0	104.8	105.4	106.1	105.6	103.2	120.9
100	109.8	109.6	108.6	107.0	104.6	107.0	104.6	104.3	107.6	108.1	107.8	109.2	105.1	108.8	108.5	106.8	107.6	125.3
125	113.1	114.4	115.3	111.3	111.6	109.3	111.4	110.3	108.9	110.6	111.1	110.7	110.1	110.9	112.3	108.3	111.2	128.9
160	111.1	111.6	110.8	109.4	107.4	107.9	106.8	108.1	108.3	108.6	109.4	110.3	109.4	109.1	107.8	107.5	108.9	126.6
200	111.4	113.8	111.3	108.6	107.3	105.9	105.1	105.3	105.3	106.1	106.9	107.2	107.4	108.3	107.1	106.6	107.6	125.3
250	114.4	115.1	112.7	112.2	110.9	109.6	107.9	107.9	108.4	110.6	111.7	113.0	113.4	113.4	109.7	107.8	111.3	129.0
315	116.3	116.5	115.7	114.2	111.8	110.5	109.2	109.8	110.2	111.2	112.7	114.1	113.7	114.0	110.0	108.2	112.5	130.2
400	123.4	129.3	131.8	125.8	121.8	120.3	116.3	116.8	120.9	120.6	122.1	122.2	124.5	122.3	120.1	118.8	123.6	141.3
500	129.8	137.3	140.1	133.1	128.5	127.3	121.8	121.8	128.3	127.5	129.0	128.7	132.6	129.6	127.3	126.7	131.2	148.9
630	118.5	119.7	120.0	118.7	115.8	113.8	112.2	111.5	112.7	115.3	117.8	118.6	120.2	120.5	114.8	111.5	117.0	134.7
800	120.2	120.7	120.5	119.5	117.8	116.8	113.5	114.8	116.5	119.5	120.0	121.1	122.5	123.2	117.0	117.0	119.3	137.0
1000	124.6	124.2	123.7	123.7	122.4	122.2	117.2	119.7	122.1	124.9	122.4	122.3	126.6	126.2	120.7	123.9	123.5	141.2
1250	119.3	120.8	120.8	120.3	118.5	116.3	113.0	112.7	114.0	116.3	118.3	120.1	121.5	120.8	114.8	112.6	118.2	135.9
1600	118.7	120.4	121.1	121.2	118.7	116.7	112.6	112.2	113.4	116.2	118.1	119.2	121.2	120.9	114.9	111.3	118.1	135.8
2000	118.2	120.6	120.4	120.7	118.7	115.9	111.9	111.4	113.2	115.6	118.1	118.7	121.6	121.2	114.9	110.6	117.9	135.6
2500	116.8	118.4	118.4	118.6	116.9	114.3	110.5	109.4	111.6	114.5	116.6	118.6	119.6	119.9	114.3	109.2	116.4	134.1
3150	116.1	117.9	117.4	117.7	116.1	114.1	109.9	107.9	110.6	113.9	116.1	117.2	118.7	118.9	113.1	108.1	115.5	133.2
4000	116.3	118.2	117.8	118.2	116.0	113.5	108.7	107.3	110.5	112.8	115.0	116.5	119.2	118.8	114.0	108.3	115.4	133.1
5000	115.4	116.2	116.0	116.9	114.0	111.2	106.9	104.7	108.5	111.4	114.4	114.4	117.2	116.2	112.7	106.2	113.6	131.3
6300	114.6	117.1	115.1	115.3	112.4	112.1	106.9	103.9	108.1	112.1	114.1	115.4	116.1	117.3	111.6	107.3	113.4	131.1
8000	116.4	117.2	116.0	115.9	112.8	111.0	105.8	104.0	109.0	111.2	114.0	114.5	117.4	116.3	113.0	107.2	113.5	131.2
10000	115.3	115.8	114.3	114.8	111.3	110.5	104.5	102.8	107.8	110.2	113.3	113.8	116.3	114.7	112.2	106.3	112.4	130.1
12500	115.8	116.5	114.0	115.3	111.4	110.6	104.4	102.9	108.5	110.5	113.5	114.6	117.3	115.3	113.1	106.5	112.9	130.6
16000	114.5	115.8	113.7	113.2	109.3	107.8	102.3	101.3	106.3	109.2	112.2	113.4	115.5	114.7	111.5	106.5	111.5	129.2
20000	114.3	114.8	112.6	112.5	108.1	106.8	101.1	100.8	106.5	108.8	110.9	112.7	115.0	114.3	111.0	105.7	110.8	128.5
OVERALL	133.7	138.8	141.1	135.6	132.1	130.8	126.4	126.7	130.8	131.6	132.6	132.9	135.5	134.8	130.7	130.0	133.8	151.5

TABLE XII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 105 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) Concluded. 86 Percent speed; fan physical speed, 1859 rpm; fundamental blade passage frequency, 464 hertz

(c-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	72.6	75.9	71.4	72.4	72.7	71.9	72.7	72.4	72.4	71.7	72.2	72.3	72.7	74.4	75.6	74.3
63	81.5	78.0	72.7	72.0	74.7	79.3	74.3	74.3	73.7	75.5	76.2	75.3	73.0	76.7	75.8	75.4
80	74.9	76.2	74.7	71.9	72.2	71.9	70.6	70.9	71.9	72.2	73.2	74.3	75.1	75.7	76.4	75.9
100	80.1	79.9	78.9	77.3	74.9	77.3	74.9	74.6	77.9	78.4	78.1	79.5	79.4	79.1	78.8	77.1
125	83.4	84.7	85.6	81.6	81.9	79.6	81.7	80.6	79.2	80.9	81.4	81.0	80.4	81.2	82.6	78.6
160	81.4	81.9	81.1	79.7	77.7	78.2	77.1	78.4	78.6	78.9	79.7	80.6	79.7	79.4	78.1	77.8
200	81.7	84.1	81.6	78.9	77.6	76.2	75.4	75.6	75.6	76.4	77.2	77.5	77.7	78.6	77.4	76.9
250	84.7	85.4	83.0	82.5	81.2	79.9	78.2	78.2	78.7	80.9	82.0	83.3	83.7	83.7	80.0	78.1
315	86.6	86.8	86.0	84.5	82.1	80.8	79.5	80.1	80.5	81.5	83.0	84.4	84.0	84.3	80.3	78.5
400	93.6	99.5	102.0	96.0	92.0	90.5	86.5	87.0	91.1	90.8	92.3	92.4	95.1	92.5	90.3	89.0
500	100.0	107.5	110.3	103.3	98.7	97.5	92.0	92.0	98.5	97.7	99.2	98.9	102.8	99.8	97.5	96.9
630	88.7	89.9	90.2	88.9	86.0	84.0	82.4	81.7	82.9	85.5	88.0	88.8	90.4	90.7	85.0	81.7
800	90.4	90.9	90.7	89.7	88.0	87.0	83.7	85.0	86.7	89.7	90.2	91.3	92.7	93.4	87.2	87.2
1000	94.8	94.4	93.9	93.9	92.6	92.4	87.4	89.9	92.3	95.1	92.6	92.5	96.8	98.4	90.9	94.1
1250	89.4	90.9	90.9	90.4	88.6	86.4	83.1	82.8	84.1	86.4	88.4	90.2	91.6	90.9	84.9	82.7
1600	88.8	90.5	91.2	91.3	88.8	86.8	82.7	82.3	83.5	86.3	88.2	89.3	91.3	91.0	85.0	81.4
2000	88.2	90.6	90.4	90.7	88.7	85.9	81.9	81.4	83.2	85.6	88.1	88.7	91.6	91.2	84.9	80.6
2500	86.7	88.3	88.3	88.5	86.8	84.2	80.4	79.3	81.5	84.4	86.5	88.5	89.5	89.8	84.2	79.1
3150	85.8	87.6	87.1	87.4	85.8	83.8	79.6	77.6	80.3	83.6	85.8	86.9	88.4	88.6	82.8	77.8
4000	85.8	87.7	87.3	87.7	85.5	83.0	78.2	76.8	80.0	82.3	84.5	86.0	88.7	88.3	83.5	77.8
5000	84.6	85.4	85.2	86.1	83.2	80.4	76.1	73.9	77.7	80.6	83.6	83.6	86.4	85.4	81.9	75.4
6300	83.3	85.8	83.8	84.0	81.1	80.8	75.6	72.6	76.8	80.8	82.8	84.1	84.8	86.0	80.3	76.0
8000	84.4	85.3	84.1	84.0	80.9	79.1	73.9	72.1	77.1	79.3	82.1	82.6	85.4	84.4	81.0	75.3
10000	82.4	82.9	81.4	81.9	78.4	77.6	71.6	69.9	74.9	77.3	80.4	80.9	83.4	81.8	79.3	73.4
12500	81.5	82.2	79.7	81.0	77.1	76.3	70.1	68.6	74.2	76.2	79.2	80.3	83.0	81.0	78.8	72.2
16000	78.3	79.6	77.5	77.0	73.1	71.7	66.1	65.1	70.1	73.0	76.0	77.2	79.3	78.5	75.3	70.3
20000	75.4	75.9	73.7	73.6	69.2	67.9	62.2	61.9	67.6	69.9	72.0	73.8	76.1	75.4	72.1	66.8
OVERALL	103.7	109.0	111.3	105.7	102.2	100.9	96.4	96.8	101.0	101.6	102.6	102.9	105.9	104.8	100.7	100.1
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	78.1	91.2	97.0	95.4	94.0	93.8	90.2	90.5	94.7	95.5	96.5	96.1	97.5	94.3	87.8	81.9
304.8 M	68.5	83.0	89.3	87.6	86.3	86.3	82.8	83.1	87.5	88.1	89.0	88.5	89.9	86.4	79.7	73.7

TABLE XII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 105 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) 93 Percent speed; fan physical speed, 2016 rpm; fundamental blade passage frequency, 504 hertz

(d-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	104.5	104.8	103.2	102.2	103.3	102.2	102.8	103.3	105.0	103.5	103.7	103.8	104.2	105.2	105.5	106.5	103.9	121.6
63	112.3	106.5	106.8	104.3	107.5	109.0	108.8	101.0	109.2	108.5	105.0	104.1	105.7	105.7	106.8	106.5	107.1	124.8
80	105.8	105.3	104.3	102.3	103.0	102.7	102.7	102.0	104.2	104.2	104.8	105.4	107.0	107.3	108.0	107.4	104.8	122.5
100	113.4	112.9	111.2	107.9	106.0	110.5	106.5	107.4	109.7	109.7	109.7	111.3	112.2	111.4	110.5	110.1	110.0	127.7
125	111.0	113.5	113.7	112.7	110.3	111.3	110.0	109.8	110.0	111.8	113.5	113.1	112.7	113.0	112.3	109.5	111.9	129.6
160	111.7	113.0	111.7	110.8	109.7	111.8	108.5	110.0	109.7	111.0	111.3	112.6	111.8	111.0	110.0	108.7	110.9	128.6
200	113.3	114.6	112.5	110.0	108.8	107.3	106.5	107.6	107.1	108.0	108.8	109.2	110.6	109.8	108.8	107.5	109.3	127.0
250	116.2	117.2	114.5	113.7	112.2	111.5	109.4	110.2	110.7	112.4	113.5	114.1	115.4	115.4	112.2	109.1	113.1	130.8
315	117.6	118.0	115.3	114.5	112.6	111.8	110.8	112.0	112.0	113.5	114.6	115.4	115.2	114.6	111.6	109.7	113.8	131.5
400	119.5	120.8	121.2	118.7	117.7	117.5	116.0	119.0	117.5	119.3	119.7	120.1	120.7	118.7	114.8	112.6	118.8	136.5
500	127.7	132.9	136.0	131.5	126.5	134.0	131.4	136.2	133.4	134.2	132.5	131.0	132.9	129.2	126.4	122.3	132.8	150.5
630	121.1	121.6	122.1	120.4	117.9	118.6	116.4	119.4	118.4	120.4	121.4	121.7	123.1	122.1	116.6	113.4	120.2	137.9
800	120.1	121.4	120.9	119.7	118.9	116.6	114.9	115.4	117.1	119.7	121.4	122.3	123.6	122.7	117.6	114.6	119.9	137.6
1000	124.8	125.2	124.8	124.8	125.0	124.5	122.7	119.5	121.2	125.8	125.5	127.9	131.5	128.7	121.0	118.1	125.8	143.5
1250	120.2	121.6	121.1	120.6	119.1	117.1	114.4	114.7	116.4	118.9	120.4	122.0	123.7	121.6	116.1	114.0	119.6	137.3
1600	121.5	122.7	123.5	123.5	123.8	120.8	115.8	116.0	117.0	119.3	122.0	122.6	124.8	123.2	118.2	114.2	121.4	139.1
2000	120.1	122.0	122.5	122.5	121.3	118.5	114.3	114.0	116.1	118.1	120.1	121.7	124.1	122.3	116.1	112.5	120.1	137.8
2500	118.0	120.0	119.9	120.9	119.4	117.0	113.5	112.5	114.5	117.0	119.2	120.3	122.0	121.2	115.0	110.8	118.5	136.2
3150	117.6	119.6	119.1	120.0	118.8	117.1	113.8	111.6	113.8	116.9	118.6	120.2	121.6	121.0	114.6	110.4	118.1	135.8
4000	118.0	119.9	119.5	120.2	118.7	116.2	112.0	111.0	113.4	115.5	117.7	119.0	121.5	120.9	114.9	110.1	117.7	135.4
5000	117.0	117.8	117.4	119.8	116.9	114.5	110.3	108.8	112.1	114.5	117.3	116.9	120.6	118.1	114.3	107.9	116.3	134.0
6300	116.7	119.2	117.4	118.4	115.7	115.2	110.7	108.1	111.4	115.2	117.4	118.2	119.2	119.1	113.4	109.2	116.2	133.9
8000	117.9	119.2	118.0	119.0	116.2	114.3	109.8	108.5	112.7	114.5	116.9	117.4	120.5	118.2	114.9	109.2	116.3	134.0
10000	117.3	118.3	116.9	118.1	115.1	113.5	108.4	107.3	111.3	113.6	116.5	117.0	119.6	117.6	114.1	108.6	115.5	133.2
12500	117.5	118.5	116.5	118.5	115.0	114.0	108.5	107.3	112.2	113.6	116.8	117.6	120.5	117.7	115.8	108.5	115.9	133.6
16000	115.9	117.9	115.8	116.7	113.1	111.9	106.6	106.2	110.4	112.8	115.6	116.6	118.7	117.4	113.7	109.1	114.6	132.3
20000	115.6	117.1	115.3	116.1	111.6	110.7	105.2	105.6	110.3	112.4	114.7	116.3	118.6	116.9	113.9	107.9	114.1	131.8
OVERALL	133.6	136.2	137.7	135.3	132.9	135.5	132.9	136.7	134.6	135.9	135.4	135.5	137.7	135.4	130.8	127.2	135.4	153.1

TABLE XII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 105 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) Concluded. 93 Percent speed; fan physical speed, 2016 rpm; fundamental blade passage frequency, 504 hertz

(d-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	74.8	75.1	73.5	72.5	73.6	72.5	73.1	73.6	75.3	73.8	74.0	74.1	74.5	75.5	75.8	76.8
63	82.6	76.8	77.1	74.6	77.8	79.3	79.1	71.3	79.5	78.8	75.3	74.4	76.0	76.0	77.1	76.8
80	76.1	75.6	74.6	72.6	73.3	73.0	73.0	72.3	74.5	74.5	75.1	75.7	77.3	77.6	78.3	77.7
100	83.7	83.2	81.5	78.2	76.3	80.8	76.8	77.7	80.0	80.0	80.0	81.6	82.5	81.7	80.8	80.4
125	81.3	83.8	84.0	83.0	80.6	81.6	80.3	80.1	80.3	82.1	83.8	83.4	83.0	83.3	82.6	79.8
160	82.0	83.3	82.0	81.1	80.0	82.1	78.8	80.3	80.0	81.3	81.6	82.9	82.1	81.3	80.3	79.0
200	83.6	84.9	82.8	80.3	79.1	77.6	76.8	77.9	77.4	78.3	79.1	79.5	80.9	80.1	79.1	77.8
250	86.5	87.5	84.8	84.0	82.5	81.8	79.7	80.5	81.0	82.7	83.8	84.4	85.7	85.7	82.5	79.4
315	87.9	88.3	85.6	84.8	82.9	82.1	81.1	82.3	82.3	83.8	84.9	85.7	85.6	84.9	81.9	80.0
400	89.7	91.0	91.4	88.9	87.9	87.7	86.2	89.2	87.7	89.5	89.9	90.3	90.9	88.9	85.0	82.8
500	97.9	103.1	106.2	101.7	96.7	104.2	101.6	106.4	103.6	104.4	102.7	101.2	103.1	99.4	96.6	92.5
630	91.3	91.8	92.3	90.6	88.1	88.8	86.6	89.6	88.6	90.6	91.6	91.9	93.3	92.3	86.8	83.6
800	90.3	91.6	91.1	89.9	89.1	86.8	85.1	85.6	87.3	89.9	91.6	92.5	93.8	92.9	87.8	84.8
1000	99.0	95.4	95.0	95.0	95.2	94.7	92.9	89.7	91.4	96.0	95.7	98.1	101.7	98.9	91.2	88.3
1250	90.3	91.7	91.2	90.7	89.2	87.2	84.5	84.8	86.5	89.0	90.5	92.1	93.8	91.7	86.2	84.1
1600	91.6	92.8	93.6	93.6	93.9	90.9	85.9	86.1	87.1	89.4	92.1	92.7	94.9	93.3	88.3	84.3
2000	90.1	92.0	92.5	92.5	91.3	88.5	84.3	84.0	86.1	88.1	90.1	91.7	94.1	92.3	86.1	82.5
2500	87.9	89.9	89.8	90.8	89.3	86.9	83.4	82.4	84.4	86.9	89.1	90.2	91.9	91.1	84.9	80.7
3150	87.3	89.3	88.8	89.7	88.5	86.8	83.5	81.3	83.5	86.6	88.3	89.9	91.3	90.7	84.3	80.1
4000	87.5	89.4	89.0	89.7	88.2	85.7	81.5	80.5	82.9	85.0	87.2	88.5	91.0	90.4	84.4	79.6
5000	86.2	87.0	86.6	89.0	86.1	83.7	79.5	78.0	81.3	83.7	86.5	86.1	89.8	87.3	83.5	77.1
6300	85.4	87.9	86.1	87.1	84.4	83.9	79.4	76.8	80.1	83.9	86.1	86.9	87.9	87.8	82.1	77.9
8000	85.9	87.3	86.1	87.1	84.3	82.4	77.9	76.6	80.8	82.6	85.0	85.5	88.5	86.3	82.9	77.3
10000	84.4	85.4	84.0	85.2	82.2	80.6	75.5	74.4	78.4	80.7	83.6	84.1	86.7	84.7	81.2	75.7
12500	83.2	84.2	82.2	84.2	80.7	79.7	74.2	73.0	77.9	79.3	82.5	83.3	86.2	83.4	81.5	74.2
16000	79.7	81.7	79.6	80.5	76.9	75.7	70.4	70.0	74.2	76.6	79.4	80.4	82.5	81.2	77.5	72.9
20000	76.7	78.2	76.4	77.2	72.7	71.8	66.3	66.7	71.4	73.5	75.8	77.4	79.7	78.0	75.0	69.0
OVERALL	103.4	106.1	107.8	105.2	102.8	105.7	103.0	106.9	104.7	106.0	105.4	105.4	107.6	105.2	100.6	97.1
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	77.5	89.1	94.8	95.3	95.1	98.2	95.2	99.2	98.4	99.8	99.3	98.4	99.0	94.8	87.9	79.9
304.8 M	67.7	80.6	86.8	87.3	86.8	90.8	88.9	92.2	91.2	92.5	91.9	90.8	91.2	86.8	79.7	71.2

TABLE XII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 105 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(e) 100 Percent speed; fan physical speed, 2168 rpm; fundamental blade passage frequency, 542 hertz

(e-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																
50	106.4	104.5	105.0	103.2	104.0	103.5	104.5	104.7	104.7	105.2	105.2	105.6	105.7	107.5	108.7	107.9	105.4	123.1
63	105.5	106.9	103.7	103.4	106.2	108.7	107.7	105.7	107.0	106.9	106.7	106.5	107.0	105.0	109.2	108.9	107.1	124.8
80	109.4	110.4	107.2	106.6	110.4	114.1	113.1	109.9	111.9	111.7	111.1	111.0	111.2	112.2	111.4	110.6	111.4	129.1
100	113.5	114.0	113.5	110.7	108.7	109.7	108.2	110.0	112.5	112.4	111.0	112.5	112.9	113.9	113.4	112.2	111.8	129.5
125	113.0	115.2	115.3	113.3	110.8	112.8	110.8	111.8	112.2	113.5	114.7	115.3	114.8	114.7	113.7	111.9	113.5	131.2
160	113.9	114.0	114.7	112.4	111.4	112.2	110.4	111.9	111.9	112.7	113.2	114.8	114.0	113.2	112.0	111.3	112.8	130.5
200	115.0	116.2	114.4	112.4	110.5	111.2	108.9	109.2	110.0	110.2	111.7	112.0	112.9	112.2	114.2	110.6	111.8	129.5
250	119.4	118.6	118.1	114.9	114.2	113.9	113.1	112.2	112.9	114.9	115.7	116.6	117.1	117.1	114.1	110.9	115.3	133.0
315	119.2	119.2	117.6	116.4	114.9	114.1	113.2	114.4	114.4	115.7	116.4	117.8	117.7	117.1	114.1	112.1	116.0	133.7
400	121.2	121.9	121.1	118.6	117.9	116.2	116.2	117.2	117.9	119.1	120.7	121.2	120.9	119.9	116.4	114.0	119.1	136.8
500	127.3	126.9	125.9	120.1	125.6	128.8	131.1	125.9	124.8	123.4	129.6	124.9	120.3	125.9	121.6	123.6	123.4	141.1
630	120.1	120.1	129.4	125.4	128.2	122.6	124.1	128.7	127.6	127.1	125.6	129.0	126.9	126.2	125.2	118.8	127.1	144.8
800	121.5	122.6	122.8	121.3	120.5	118.5	116.8	117.6	119.1	122.1	124.0	124.4	125.8	125.1	118.8	116.8	122.0	139.7
1000	124.2	127.0	126.5	128.4	126.2	125.2	122.4	121.8	123.7	125.0	126.0	127.8	130.7	130.0	123.0	119.9	126.4	144.1
1250	122.1	124.3	124.1	124.6	123.0	121.5	118.6	118.5	120.6	122.5	124.0	125.2	127.3	126.1	120.0	117.4	123.3	141.0
1600	122.8	124.3	124.8	125.4	125.8	122.9	118.3	118.1	119.9	122.6	123.8	125.4	127.8	124.8	118.8	116.3	123.6	141.3
2000	121.6	123.2	123.9	124.6	123.0	120.7	116.9	116.9	118.4	120.9	122.6	123.3	125.7	124.1	117.4	114.5	122.0	139.7
2500	120.0	121.4	122.4	122.9	121.7	120.0	116.5	115.5	117.2	120.2	122.0	122.8	124.9	123.0	116.7	113.4	121.0	138.7
3150	119.8	121.2	121.3	122.2	121.3	119.7	116.2	114.7	116.8	120.0	121.2	122.6	124.0	123.0	116.3	112.8	120.5	138.2
4000	119.7	121.6	121.9	122.7	121.4	118.9	114.9	114.6	116.4	119.1	120.6	121.9	124.6	122.9	117.2	112.3	120.4	138.1
5000	118.5	119.4	120.4	122.4	119.4	117.4	113.2	112.2	115.4	117.4	120.0	120.2	123.4	120.5	116.2	110.8	119.0	136.7
6300	118.6	121.0	119.6	120.8	118.3	118.6	113.9	111.6	114.6	118.6	120.4	121.6	122.3	122.0	115.8	112.0	119.1	136.8
8000	119.8	121.1	120.8	121.6	118.8	117.9	113.2	111.8	115.9	117.6	120.3	120.4	123.5	121.1	117.5	111.8	119.2	136.9
10000	119.1	120.6	119.4	121.2	117.4	117.2	111.7	111.1	114.9	117.1	119.6	120.0	122.9	120.4	116.9	111.7	118.5	136.2
12500	119.4	120.7	119.4	121.5	117.5	117.3	111.7	111.0	115.5	117.2	120.0	120.7	123.5	120.7	118.0	111.9	118.9	136.6
16000	118.0	120.2	119.2	119.3	115.8	115.1	110.1	109.5	113.5	116.0	119.0	119.8	121.6	120.5	116.3	112.1	117.6	135.3
20000	117.1	118.9	118.1	118.6	114.4	113.9	108.6	108.9	113.6	115.6	118.1	119.2	121.6	119.8	116.8	111.3	117.0	134.7
OVERALL	139.3	139.5	138.8	136.8	136.2	134.1	133.7	137.3	136.7	136.6	135.9	138.6	138.5	137.3	134.7	129.4	137.0	154.7

TABLE XII. - Concluded. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 105 PERCENT OF TAKEOFF NOZZLE AREA AND APPROACH ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(e) Concluded. 100 Percent speed; fan physical speed, 2168 rpm; fundamental blade passage frequency, 542 hertz

(e-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	73.9	70.6	72.7	70.7	71.2	71.7	72.2	72.6	73.9	74.1	74.1	75.2	75.4	76.7	78.4	80.1
63	70.9	72.3	70.1	69.9	70.9	72.3	72.4	71.8	72.3	72.6	73.3	74.5	75.8	77.1	78.8	80.3
80	77.4	76.5	72.4	73.0	73.9	78.5	77.0	73.4	76.7	75.7	77.4	77.8	78.5	79.2	81.0	81.4
100	81.2	78.9	78.2	80.5	75.9	77.7	81.7	79.5	77.5	81.0	79.9	81.8	83.4	84.0	83.2	81.9
125	81.4	83.6	83.9	83.1	79.6	81.2	81.9	81.7	81.2	83.4	84.1	84.6	85.1	84.1	84.1	81.1
160	82.5	83.0	83.4	82.5	80.5	80.9	80.0	82.9	82.2	84.9	83.0	84.1	83.5	82.5	81.5	80.9
200	82.4	84.1	82.1	81.1	78.7	78.9	78.1	78.1	79.7	78.4	79.7	80.5	81.6	80.9	80.2	79.8
250	84.6	85.4	85.6	84.1	83.4	81.9	80.6	80.4	81.9	83.6	83.9	85.9	86.8	85.6	82.4	80.1
315	85.6	86.5	85.6	84.8	83.3	82.1	81.6	82.5	83.5	85.3	85.6	87.2	86.6	85.5	82.0	80.0
400	87.9	88.9	88.4	86.9	85.7	84.5	84.2	84.7	85.0	86.9	87.9	88.6	88.9	87.2	83.7	81.2
500	97.3	97.2	98.7	91.5	97.7	96.2	95.8	99.9	98.7	94.5	95.7	98.9	97.3	93.5	88.5	91.9
630	94.7	94.9	95.5	89.9	94.0	92.4	93.0	96.0	95.0	92.4	93.4	96.0	95.9	92.4	87.5	88.6
800	88.1	89.6	90.1	88.9	87.6	85.4	86.2	87.1	88.2	90.4	90.9	92.5	93.5	91.2	85.6	82.6
1000	89.9	91.6	93.1	91.9	92.6	89.9	87.4	87.9	88.8	91.1	93.1	95.2	95.9	93.4	88.9	85.0
1250	88.5	90.7	91.3	91.2	91.0	88.7	86.2	86.7	87.8	89.8	91.7	93.6	94.0	91.5	87.8	83.7
1600	89.0	90.3	91.5	91.0	90.8	88.3	86.3	86.5	87.3	89.3	90.0	92.0	94.6	89.3	85.1	81.7
2000	86.7	88.7	89.5	89.5	89.0	87.2	85.0	84.0	85.5	87.8	89.2	90.1	92.3	88.0	83.3	80.2
2500	85.6	87.4	88.1	88.6	87.6	85.9	83.8	82.8	84.6	86.6	87.6	89.4	90.2	87.3	82.4	79.2
3150	84.4	86.7	86.9	87.7	87.0	85.5	83.7	82.2	83.9	86.7	88.0	89.1	89.4	87.5	81.5	78.6
4000	84.4	85.9	86.6	87.6	86.4	83.8	81.9	81.1	82.9	84.9	86.4	87.9	89.3	86.8	81.4	77.9
5000	82.3	83.8	84.4	86.3	82.8	81.6	79.4	78.4	79.9	82.4	84.3	85.1	86.3	83.8	80.8	75.7
6300	81.7	83.8	83.2	84.3	83.0	82.3	79.3	76.8	80.8	83.0	84.7	85.7	86.2	84.9	79.5	74.6
8000	81.9	83.4	83.1	83.8	81.7	80.2	77.2	76.1	79.2	81.1	82.7	83.9	85.9	83.6	78.8	74.7
10000	79.6	80.6	80.3	81.8	78.8	78.1	74.3	74.0	77.3	78.8	80.8	81.7	83.3	81.1	78.0	72.5
12500	77.4	78.3	77.4	80.0	76.0	76.0	72.2	71.2	75.0	76.8	79.3	80.4	81.1	79.3	76.5	71.1
16000	73.1	74.5	73.7	74.9	72.1	70.9	67.6	67.1	70.8	73.4	75.5	76.4	77.4	76.7	73.1	67.4
20000	68.3	68.9	68.8	69.9	66.4	64.9	61.5	62.5	65.7	68.2	69.9	71.9	72.8	72.3	68.8	63.7
OVERALL	101.9	102.7	103.5	101.1	102.4	100.7	100.4	102.5	102.0	101.2	102.3	104.5	104.8	101.8	97.8	96.8
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	76.2	85.3	90.5	91.8	94.1	93.8	94.1	96.0	96.2	95.7	96.4	97.3	96.7	91.6	84.3	79.3
304.8 M	66.5	76.6	82.4	83.1	86.3	86.2	85.7	88.8	88.8	87.9	88.4	89.7	88.6	82.1	75.6	70.8

TABLE XIII. - FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF PLUS 7° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) 60 Percent speed; fan physical speed, 1332 rpm; fundamental blade passage frequency, 330 hertz

(a-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE POWER LEVEL	
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL) (PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																
50	100.8	95.5	94.3	96.7	92.9	97.3	95.3	93.7	95.0	95.5	95.3	94.8	93.5	94.3	96.5	97.2	
63	93.7	91.7	93.4	91.7	92.1	93.4	92.4	90.9	92.1	93.4	91.9	93.0	93.9	94.7	95.9	96.0	95.4 113.1
80	94.0	94.2	94.9	93.0	93.0	93.5	92.9	92.9	93.5	94.5	95.2	95.8	96.7	97.7	99.7	98.6	93.1 110.8
100	96.9	96.0	97.7	97.7	96.0	95.0	95.9	94.4	95.9	97.2	96.0	96.8	98.0	99.0	100.7	99.2	95.2 112.9
125	102.1	104.2	103.1	102.6	102.6	100.7	101.6	100.9	99.1	100.2	101.7	102.0	100.9	102.9	102.9	102.1	97.1 114.8
160	100.6	101.9	101.2	100.4	99.1	97.9	97.6	98.2	98.9	99.9	100.4	101.0	99.9	102.1	101.1	99.3	101.7 119.4
200	103.8	104.4	101.8	100.6	97.8	96.8	95.3	97.9	96.6	98.1	97.9	98.0	98.5	100.1	99.9	99.7	99.9 117.6
250	108.3	107.8	106.4	104.6	102.6	101.8	99.6	98.6	99.4	101.3	101.9	103.0	103.6	105.1	103.8	101.0	99.0 116.7
315	122.1	122.2	119.1	120.6	114.6	112.4	110.4	109.9	110.1	110.7	112.4	115.2	111.4	111.7	112.9	109.6	103.0 120.7
400	111.7	112.6	110.9	110.2	106.9	104.7	103.7	102.6	103.9	106.2	107.4	108.3	108.1	107.9	104.9	101.8	115.0 132.7
500	108.1	109.5	108.3	107.5	105.3	103.6	102.5	102.0	103.0	104.8	105.3	105.7	106.6	108.0	105.5	101.2	107.3 125.0
630	112.2	111.3	111.5	110.5	108.0	106.0	105.2	105.0	106.5	109.3	108.5	110.1	112.8	113.5	111.5	105.5	105.5 123.2
800	108.4	109.1	108.8	107.6	106.1	103.4	102.1	101.3	102.4	104.8	106.8	107.7	109.4	110.4	106.8	101.3	109.6 127.3
1000	109.0	110.0	108.7	108.0	106.5	103.8	102.5	101.3	102.5	105.2	107.3	108.6	111.0	110.5	107.3	102.1	106.5 124.2
1250	108.8	108.8	107.3	107.2	105.7	103.0	100.5	99.8	100.5	103.3	105.0	106.4	107.8	108.2	104.7	99.7	107.1 124.8
1600	107.2	108.2	107.4	106.6	104.6	101.9	98.9	97.9	98.9	101.2	103.7	104.5	107.1	107.9	103.4	97.3	105.2 122.9
2000	106.0	107.2	106.0	106.0	103.8	100.7	97.5	96.0	97.8	100.3	103.0	103.9	106.3	106.8	103.2	96.7	104.2 121.9
2500	104.6	105.3	104.5	104.1	102.0	99.0	95.1	94.8	96.3	99.5	102.0	102.9	105.0	105.8	103.5	96.0	103.3 121.0
3150	103.6	104.5	103.1	103.0	101.0	98.5	95.3	93.5	95.6	99.0	101.6	102.6	104.0	105.3	102.0	95.7	102.0 119.7
4000	103.2	103.7	103.0	102.9	100.4	96.9	93.5	92.0	94.5	97.2	99.9	101.0	103.7	104.2	100.9	95.5	101.2 118.9
5000	101.4	101.3	100.9	101.6	97.6	95.3	91.1	89.4	92.1	94.9	98.4	98.9	101.3	101.4	101.1	93.5	100.3 118.0
6300	100.0	101.5	100.0	100.0	98.7	96.4	91.9	88.0	93.2	96.0	98.7	100.0	101.7	102.5	100.0	92.5	98.3 116.0
8000	100.1	101.1	100.2	100.4	98.1	94.7	89.9	87.7	92.1	94.7	98.1	98.6	101.6	101.6	99.1	93.6	98.5 116.2
10000	98.2	98.5	97.5	99.0	96.2	93.5	87.7	85.3	90.3	92.7	96.2	97.0	99.5	99.8	98.8	91.4	97.9 115.6
12500	96.7	96.9	96.2	98.4	94.5	92.2	86.2	83.9	88.5	91.2	95.2	96.0	98.0	98.2	97.2	90.8	96.1 113.8
16000	93.8	95.2	94.2	95.0	92.1	88.4	83.0	80.3	85.3	88.5	92.1	93.3	95.3	96.1	94.5	88.0	94.8 112.5
20000	91.3	91.7	91.8	93.3	88.6	85.2	80.6	79.1	82.6	85.9	88.4	90.5	92.6	93.1	91.4	85.9	92.1 109.8
OVERALL	124.1	124.3	122.2	122.7	118.7	116.5	114.9	114.1	114.9	116.7	118.0	119.6	120.1	120.6	118.8	114.7	89.3 107.0
																	119.1 136.8

TABLE XIII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF PLUS 7° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) Concluded. 60 Percent speed; fan physical speed, 1332 rpm; fundamental blade passage frequency, 330 hertz

(a-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	71.1	65.8	64.6	67.6	62.3	67.6	66.6	64.0	65.3	65.8	65.6	65.1	63.8	64.6	66.8	67.5
63	64.6	62.0	63.7	62.0	62.4	63.7	62.7	61.2	62.4	63.7	62.2	63.3	64.2	65.0	66.2	66.3
80	64.3	64.5	65.2	63.3	62.3	63.8	63.2	63.2	63.8	64.8	65.5	66.1	67.0	68.0	70.0	68.9
100	67.2	66.3	63.0	68.6	66.3	65.3	67.2	64.7	66.2	67.5	66.3	67.1	68.3	69.3	71.0	69.5
125	72.4	74.5	73.4	72.9	72.9	71.3	71.9	71.2	69.4	70.5	72.0	72.3	71.2	73.2	73.2	72.4
160	70.9	72.2	71.5	70.7	69.4	68.2	67.9	68.5	69.2	70.2	70.7	71.3	70.2	72.4	71.4	69.6
200	74.1	74.7	72.1	70.9	68.1	67.1	65.6	68.2	66.9	68.4	68.2	68.3	69.2	70.4	70.2	70.0
250	78.6	78.1	76.7	74.9	72.9	72.1	69.9	68.9	69.7	71.6	72.2	73.3	73.9	75.4	74.1	71.3
315	82.4	82.5	80.4	80.9	84.9	82.7	80.7	80.2	80.4	81.0	82.7	85.5	81.7	82.0	83.2	79.9
400	81.4	82.8	81.1	80.4	77.1	74.9	73.9	72.8	74.1	76.4	77.6	78.5	78.3	78.1	75.1	72.0
500	78.3	79.7	78.9	77.7	75.5	73.8	72.7	72.2	73.2	75.0	75.5	75.9	76.8	78.2	75.7	71.4
630	83.4	81.5	81.7	80.7	78.2	76.2	75.4	75.2	76.7	79.5	78.7	80.3	83.0	83.7	81.7	75.7
800	78.6	79.3	79.3	77.8	76.3	73.6	72.3	71.5	72.6	75.0	77.0	77.9	79.6	80.6	77.0	71.5
1000	79.2	80.2	78.8	78.2	76.7	74.9	72.7	71.5	72.7	75.4	77.5	78.8	81.2	80.7	77.5	72.3
1250	78.9	78.9	77.4	77.3	75.8	73.1	70.6	69.9	70.6	73.4	75.1	76.5	77.9	78.3	74.8	69.8
1600	77.3	79.3	77.5	76.7	74.7	72.0	69.0	68.3	69.0	71.3	73.8	74.6	77.2	78.0	73.5	67.4
2000	76.6	77.2	76.0	76.0	73.8	70.7	67.5	66.0	67.8	70.3	73.0	73.9	76.3	76.8	73.2	66.7
2500	74.5	75.2	74.4	74.0	71.9	68.9	65.0	64.7	66.2	69.4	71.9	72.8	74.9	75.7	73.4	65.9
3150	73.3	74.2	72.8	72.7	70.7	68.2	65.0	63.2	65.3	68.7	71.3	72.3	73.7	75.0	71.7	65.4
4000	72.7	73.2	72.5	72.4	69.9	66.4	63.0	61.5	64.0	66.7	69.4	70.5	73.2	72.7	70.4	65.0
5000	70.6	70.9	70.1	70.9	66.8	64.5	60.3	58.6	61.3	64.1	67.6	68.1	70.5	70.6	70.3	62.7
6300	68.7	70.2	68.7	68.7	67.4	65.1	60.6	56.7	61.9	64.7	67.4	68.7	70.4	71.2	68.8	61.2
8000	68.2	69.2	69.3	68.5	66.2	62.3	58.0	55.8	60.2	62.8	66.2	66.7	69.7	69.7	67.2	61.7
10000	65.3	65.6	64.6	66.1	63.3	60.6	54.8	52.4	57.4	59.8	63.3	64.1	66.6	66.9	65.9	58.5
12500	62.5	62.7	62.0	64.2	60.3	58.3	52.0	49.7	54.3	57.0	61.0	61.8	63.8	64.0	63.0	56.5
16000	57.7	59.1	59.1	58.9	56.0	52.3	45.9	44.2	49.2	52.4	56.0	57.2	59.2	60.0	58.4	51.9
20000	52.5	52.9	53.0	54.4	49.8	46.4	41.8	40.2	43.8	47.1	49.6	51.7	53.8	54.3	52.6	47.0
OVERALL	94.3	94.5	92.4	92.9	88.8	86.6	85.1	84.4	85.1	86.9	88.2	89.8	90.1	90.7	88.9	84.9
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	68.2	76.2	78.7	81.9	79.8	78.3	77.5	77.1	78.2	79.9	81.1	82.0	81.2	79.9	75.0	66.3
304.8 M	59.0	68.4	70.8	74.2	72.2	71.2	70.1	69.8	70.8	72.4	73.6	74.4	73.3	71.9	66.8	57.6

TABLE XIII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF PLUS 7° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) 70 Percent speed; fan physical speed, 1542 rpm; fundamental blade passage frequency, 385 hertz

(b-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE LEVEL (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																
50	108.9	100.7	96.2	101.4	96.4	103.2	100.9	94.2	100.9	99.4	99.9	100.9	100.7	101.7	99.2	100.8	100.7	118.4
63	95.8	97.0	94.0	92.5	94.0	94.3	94.3	93.8	94.3	94.8	95.3	95.8	95.8	98.5	98.8	99.1	95.5	113.2
80	96.2	97.7	96.2	94.9	94.9	94.2	95.2	94.7	95.4	95.9	97.4	97.5	98.4	102.4	101.7	101.1	97.5	115.2
100	101.3	102.0	102.0	101.0	98.3	98.8	99.3	96.8	99.3	100.5	100.5	101.3	102.0	105.5	104.5	102.4	101.1	118.8
125	103.7	106.7	105.5	105.0	104.2	102.5	103.7	102.0	101.2	103.2	104.5	104.7	105.2	106.7	106.0	104.4	104.3	122.0
160	103.7	106.0	104.5	103.0	102.2	101.7	100.5	101.2	101.7	102.2	103.7	104.5	104.2	106.5	103.0	101.9	103.2	120.9
200	104.5	106.0	104.5	101.5	99.8	98.3	98.0	99.3	98.5	99.5	100.8	101.0	102.5	105.0	101.3	100.9	101.3	119.0
250	109.2	110.0	108.0	106.7	104.2	102.7	101.5	101.7	102.5	105.2	106.5	107.5	109.0	108.0	105.2	102.4	105.9	123.6
315	112.0	113.5	111.8	110.0	108.3	107.3	105.3	103.8	105.5	106.8	107.8	107.5	108.5	108.3	106.0	102.9	108.0	125.7
400	119.5	125.3	124.5	122.0	120.3	119.8	117.0	112.3	115.8	117.5	118.0	117.3	118.0	118.3	116.0	109.6	119.1	136.8
500	111.3	112.3	111.8	110.8	110.1	106.6	105.8	106.1	107.1	108.6	110.1	110.6	110.3	110.3	107.6	105.0	109.2	126.9
630	111.0	111.9	112.5	111.5	108.8	106.0	105.0	104.3	106.3	108.0	109.8	110.8	112.8	112.8	107.5	103.9	109.5	127.2
800	114.1	115.3	116.3	115.1	112.8	111.6	109.8	110.8	109.8	112.6	113.8	116.6	117.8	115.1	111.3	109.9	114.3	132.0
1000	111.6	112.6	111.6	111.1	109.3	106.8	105.8	105.3	106.3	108.8	110.1	111.3	113.1	111.6	106.8	103.9	109.6	127.3
1250	112.7	113.4	111.9	111.4	109.7	107.2	105.2	105.2	106.2	108.4	110.2	112.2	113.7	111.9	108.2	104.1	110.0	127.7
1600	111.2	112.0	112.2	111.0	110.0	106.5	104.2	103.2	105.2	106.7	108.7	110.0	112.7	111.5	106.2	101.6	109.0	126.7
2000	109.7	111.2	111.2	110.2	108.2	105.2	102.0	101.0	102.7	105.0	107.5	108.8	111.2	110.2	105.5	100.6	107.7	125.4
2500	108.7	109.9	109.1	108.7	106.4	103.4	100.9	99.7	101.9	104.4	106.7	107.7	109.4	109.9	104.7	99.3	106.4	124.1
3150	107.5	108.5	108.0	107.3	105.3	102.5	100.0	98.3	101.0	104.0	106.3	107.3	109.2	109.5	103.8	99.4	105.7	123.4
4000	107.0	107.5	107.3	107.3	105.0	101.5	98.0	97.0	100.0	102.0	104.5	105.8	108.2	108.3	103.6	98.7	104.7	122.4
5000	105.4	105.6	105.6	106.1	102.4	99.9	95.9	94.9	97.4	100.1	103.1	103.4	105.6	105.6	103.4	96.8	102.7	120.4
6300	104.2	105.9	105.2	105.2	103.4	100.7	96.7	93.7	98.9	101.2	104.2	105.0	106.2	107.4	102.9	96.1	103.3	121.0
8000	104.9	105.6	105.4	105.4	102.6	99.1	95.3	93.4	97.8	100.1	103.1	103.7	106.6	106.6	102.9	96.9	102.8	120.5
10000	102.7	103.2	102.9	103.7	101.2	97.7	92.9	91.7	96.9	98.2	101.9	102.3	104.9	104.9	102.7	95.5	101.2	118.9
12500	101.6	102.1	101.3	103.6	99.6	96.6	91.8	90.1	95.1	97.3	100.8	102.0	103.6	104.1	101.3	94.7	100.2	117.9
16000	98.8	99.5	99.3	100.2	97.3	93.0	88.7	86.7	92.5	94.8	98.3	99.5	101.3	102.0	99.3	92.2	97.7	115.4
20000	96.6	96.6	96.8	97.3	94.1	89.8	85.8	84.6	89.3	92.3	95.1	96.9	98.6	99.9	96.1	90.4	95.0	112.7
OVERALL	124.3	127.5	126.8	125.1	123.3	122.0	119.7	117.6	119.5	121.4	122.6	123.4	124.7	124.9	120.9	117.1	123.0	140.7

TABLE XIII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF PLUS 7° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) Concluded. 70 Percent speed; fan physical speed, 1542 rpm; fundamental blade passage frequency, 385 hertz

(b-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	69.2	71.0	66.5	71.7	66.7	73.5	71.2	64.5	71.2	69.7	70.2	71.2	71.0	72.0	69.5	71.1
63	66.1	67.3	64.3	62.8	64.3	64.6	64.6	64.1	64.6	65.1	65.6	66.1	66.1	68.8	69.1	69.4
80	66.5	68.0	66.5	65.2	65.2	64.5	65.5	65.0	65.7	66.2	67.7	67.8	68.7	72.7	72.0	71.4
100	71.6	72.3	72.3	71.3	68.6	69.1	69.6	67.1	69.6	70.8	70.8	71.6	72.3	75.8	74.8	72.7
125	74.0	77.0	75.8	75.3	74.5	72.8	74.0	72.3	71.5	73.5	74.8	75.0	75.5	77.0	76.3	74.7
160	74.0	76.3	74.8	73.3	72.5	72.0	70.8	71.5	72.0	72.5	74.0	74.8	74.5	76.8	73.3	72.2
200	74.8	76.3	74.8	71.8	70.1	68.6	68.3	69.6	68.8	69.8	71.1	71.3	72.8	75.3	71.6	71.2
250	79.5	80.3	78.3	77.0	74.5	73.0	71.8	72.0	72.8	75.5	76.8	77.8	79.3	78.3	75.5	72.7
315	82.3	83.8	82.1	80.3	78.6	77.6	75.6	74.1	75.8	77.1	78.1	77.8	78.8	78.6	76.3	73.2
400	89.7	95.5	94.7	92.2	90.5	90.0	87.2	82.5	86.0	87.7	88.2	87.5	88.2	88.5	86.2	79.8
500	81.5	82.5	82.0	81.0	80.3	76.8	76.0	76.3	77.3	78.8	80.3	80.8	80.5	80.5	77.8	75.2
630	81.2	82.0	82.7	81.7	79.0	76.2	75.2	74.5	76.5	78.2	80.0	81.0	83.0	83.0	77.7	74.1
800	84.3	85.5	86.5	85.3	83.0	81.8	80.0	81.0	80.0	82.8	84.0	86.8	88.0	89.3	81.5	80.1
1000	81.8	82.8	81.8	81.3	79.5	77.0	75.0	75.5	76.5	79.0	80.3	81.5	83.3	81.8	77.0	74.1
1250	82.8	83.5	82.0	81.5	79.8	77.3	75.3	75.3	76.3	78.5	80.3	82.3	83.8	82.0	78.3	74.2
1600	81.3	82.1	82.3	81.1	80.1	76.6	74.3	73.3	75.3	76.8	78.8	80.1	82.8	81.6	76.3	71.7
2000	79.7	81.2	81.2	80.2	78.2	75.2	72.0	71.0	72.7	75.0	77.5	78.8	81.2	80.2	75.5	70.6
2500	78.6	79.8	79.0	78.6	76.3	73.3	70.8	69.6	71.8	74.3	76.6	77.6	79.3	79.8	74.6	69.2
3150	77.2	78.2	77.7	77.0	75.0	72.2	69.7	68.0	70.7	73.7	76.0	77.0	79.0	79.2	73.5	69.1
4000	76.5	77.0	76.8	76.8	74.5	71.0	67.5	66.5	69.5	71.5	74.0	75.3	77.8	77.8	73.1	68.2
5000	74.6	74.8	74.8	75.3	71.6	69.1	65.1	64.1	66.6	69.3	72.3	72.6	74.8	74.8	72.6	66.0
6300	72.9	74.6	73.9	73.9	72.1	69.4	65.4	62.4	67.6	69.9	72.9	73.7	74.9	76.1	71.6	64.8
8000	73.0	73.7	73.5	73.5	70.7	67.2	63.4	61.5	65.9	68.2	71.2	71.8	74.7	74.7	71.0	65.0
10000	69.8	70.3	70.0	70.8	68.3	64.8	60.0	58.8	64.0	65.3	69.0	69.4	72.0	72.0	69.8	62.6
12500	67.4	67.9	67.1	69.3	65.4	62.4	57.6	55.9	60.9	63.1	66.6	67.7	69.4	69.8	67.1	60.4
16000	62.7	63.4	63.2	64.1	61.2	56.9	52.6	50.6	56.4	58.7	62.2	63.4	65.2	65.9	63.2	56.1
20000	57.7	57.8	58.0	58.5	55.3	51.0	47.0	45.7	50.5	53.5	56.3	58.1	59.8	61.0	57.3	51.5
OVERALL	94.4	97.6	97.0	95.2	93.4	92.2	89.9	87.8	89.6	91.5	92.7	93.5	94.8	95.0	90.9	87.2
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	68.8	80.5	84.0	85.1	85.1	84.8	83.2	81.2	83.8	85.6	86.5	86.0	86.0	84.4	77.9	68.8
304.8 M	59.2	72.3	76.2	77.4	77.6	77.5	75.0	73.9	76.5	78.3	79.0	78.5	78.3	76.4	69.8	60.2

TABLE XIII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF PLUS 7° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) 86 Percent speed; fan physical speed, 1889 rpm; fundamental blade passage frequency, 472 hertz

(c-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																
50	[illegible]	98.4	98.2	97.0	97.9	97.9	98.9	98.2	100.0	101.4	100.2	101.0	100.5	102.2	103.5	103.9	100.2	117.9
63	101.8	106.0	98.3	96.7	99.2	105.2	104.3	98.2	104.3	99.8	107.0	103.2	103.2	103.5	104.8	105.0	103.6	121.3
80	98.8	100.2	99.0	97.3	97.2	97.2	99.0	98.8	100.5	102.7	102.0	102.1	102.8	104.3	105.5	105.9	101.4	119.1
100	105.0	107.3	106.2	105.3	103.7	103.3	104.3	105.8	105.5	107.8	108.3	107.6	108.5	107.7	108.7	107.9	106.7	124.4
125	108.5	109.8	111.0	109.6	107.3	106.0	103.0	106.6	107.8	109.3	110.1	110.2	109.6	109.8	109.5	107.5	108.9	126.6
160	105.5	110.5	108.1	106.5	105.5	105.6	105.8	106.6	108.6	108.3	108.5	109.2	108.6	107.3	106.6	106.4	107.7	125.4
200	108.3	110.8	108.8	105.3	104.7	103.3	102.8	104.3	105.3	105.5	105.2	105.6	106.3	105.8	105.7	105.2	105.7	123.4
250	112.0	113.0	111.6	110.3	109.1	107.8	106.0	106.0	107.5	109.6	110.1	110.9	111.5	110.3	108.1	106.2	109.5	127.2
315	114.5	114.3	113.2	111.2	109.0	107.0	106.5	107.8	109.7	111.3	112.2	113.1	113.0	111.5	107.8	106.6	110.9	128.6
400	119.3	122.4	125.6	120.6	117.3	115.1	112.6	112.1	116.1	116.1	117.6	116.8	117.3	116.3	112.3	115.0	117.9	135.6
500	128.2	132.6	136.1	130.7	126.2	124.2	121.2	119.6	125.4	124.1	126.2	124.0	124.6	124.7	119.7	124.9	127.3	145.0
630	116.1	117.2	117.7	115.7	113.7	111.1	109.9	110.1	111.9	114.4	115.2	116.3	117.9	116.6	111.2	109.5	114.6	132.3
800	115.4	117.1	117.9	116.1	115.2	112.4	112.4	112.2	113.1	115.2	116.9	117.6	120.1	118.6	111.6	109.6	115.9	133.6
1000	118.3	120.2	120.3	119.6	118.0	115.7	115.7	116.0	115.3	118.2	119.7	119.7	124.8	120.5	113.5	113.4	119.1	136.8
1250	115.2	116.5	117.2	115.8	114.7	112.2	113.3	110.8	111.8	114.0	115.7	117.1	117.8	115.2	110.7	108.7	114.6	132.3
1600	115.3	116.4	117.3	116.6	115.4	113.3	109.9	110.1	111.3	113.3	114.8	116.7	119.1	116.3	110.4	106.8	114.8	132.5
2000	115.1	116.5	116.8	116.5	114.5	112.3	109.3	108.6	110.5	112.1	114.3	115.6	117.8	115.1	109.8	106.4	114.0	131.7
2500	112.7	114.4	114.7	114.5	113.0	110.2	107.4	106.8	108.9	111.0	112.9	114.0	115.7	114.5	108.2	105.1	112.3	130.0
3150	112.0	113.5	113.5	113.4	112.4	110.2	107.5	88.1	108.2	110.9	113.0	114.3	115.0	114.5	107.4	104.9	111.8	129.5
4000	111.5	113.4	113.4	113.4	111.9	108.7	105.8	86.9	107.5	109.7	111.2	112.8	114.9	114.4	107.7	104.9	111.1	128.8
5000	110.4	110.5	111.7	112.6	109.0	107.1	103.6	102.6	105.2	107.1	110.1	110.7	112.0	111.2	107.6	102.6	109.1	126.8
6300	109.2	111.1	110.2	110.7	109.6	108.1	104.2	101.5	106.4	108.4	110.2	111.5	112.6	112.2	106.9	101.8	109.3	127.0
8000	109.9	111.0	110.9	111.2	108.9	106.7	102.7	101.5	104.9	107.4	109.4	110.5	112.4	111.5	106.4	102.4	108.8	126.5
10000	108.1	108.7	108.5	109.6	107.6	105.6	100.9	99.9	104.1	105.9	108.4	109.4	110.9	110.1	106.8	101.1	107.4	125.1
12500	107.3	107.8	106.8	109.1	105.8	104.5	99.8	98.8	102.8	105.5	108.0	109.2	110.2	109.7	106.3	101.1	106.7	124.4
16000	104.2	105.2	105.1	106.1	103.6	101.2	95.6	96.3	100.4	102.9	105.6	107.2	108.3	108.3	104.6	98.8	104.5	122.2
20000	102.2	102.5	102.7	103.2	100.5	98.0	94.1	94.1	97.7	100.9	102.5	104.8	105.9	106.1	102.6	97.4	102.0	119.7
OVERALL	130.7	134.1	137.0	132.5	129.0	127.0	124.8	123.8	127.6	127.8	129.6	129.2	131.0	129.5	124.5	126.5	129.8	147.5

TABLE XIII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF PLUS 7° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW]

(c) Concluded. 86 Percent speed; fan physical speed, 1889 rpm; fundamental blade passage frequency, 472 hertz

(c-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	70.0	68.7	68.5	67.3	68.2	68.2	69.2	68.5	70.3	71.7	70.5	71.3	70.8	72.5	73.8	74.2
63	79.1	76.3	68.6	67.0	69.5	75.5	74.6	68.5	74.6	70.1	77.3	73.5	73.5	73.8	75.1	75.3
80	69.1	70.5	69.3	67.6	67.5	67.5	68.3	69.1	70.8	73.0	72.3	72.4	72.1	74.6	75.8	76.2
100	75.3	77.6	76.5	75.6	74.0	73.6	74.6	76.1	75.8	78.1	78.6	77.9	78.8	78.0	79.0	78.2
125	78.8	80.1	81.3	79.9	77.6	76.3	78.3	76.9	78.1	79.6	80.4	80.5	79.9	80.1	79.8	77.8
160	79.8	80.8	78.4	76.8	75.8	75.9	76.1	76.9	78.9	78.6	78.8	79.5	78.9	77.6	76.9	76.7
200	78.6	81.1	79.1	75.6	75.0	73.6	73.1	74.6	75.6	75.8	75.5	75.9	76.6	76.1	76.0	75.5
250	82.3	83.3	81.9	80.6	79.4	78.1	76.3	76.3	77.8	79.9	80.4	81.2	81.8	80.6	78.4	76.5
315	84.8	84.6	83.5	81.5	79.3	77.3	76.8	78.1	80.0	81.6	82.5	83.4	83.3	81.8	78.1	76.9
400	89.5	92.6	95.8	90.8	87.5	85.3	82.8	82.3	86.3	86.3	87.8	87.0	87.5	86.5	82.5	85.2
500	98.4	102.8	106.3	100.9	96.4	94.4	91.4	89.8	95.6	94.3	96.4	94.2	94.8	94.9	89.9	95.1
630	86.3	87.4	87.9	85.9	83.9	81.3	80.1	80.3	82.1	84.6	85.4	86.5	88.1	86.8	81.4	79.7
800	86.6	87.3	88.1	86.3	85.4	82.6	82.6	82.4	83.3	85.4	87.1	87.8	90.3	88.8	81.8	79.8
1000	88.5	90.4	90.5	90.0	88.2	85.9	85.9	86.2	85.5	88.4	89.9	89.9	95.0	90.7	83.7	83.6
1250	85.3	86.6	87.3	85.9	84.6	82.3	80.4	80.9	81.9	84.1	85.8	87.2	87.9	85.3	80.8	78.8
1600	85.4	86.5	87.4	86.7	85.5	83.4	80.0	80.2	81.4	83.4	84.9	86.8	89.2	86.4	80.5	76.9
2000	85.1	86.5	86.8	86.5	84.6	82.3	79.3	78.6	80.5	82.1	84.3	85.6	87.8	85.1	79.8	76.4
2500	82.6	84.3	84.6	84.4	82.9	80.1	77.3	76.7	78.8	80.9	82.8	83.9	85.6	84.4	78.1	75.0
3150	81.7	83.2	83.2	83.1	82.1	79.9	77.2	57.9	77.9	80.6	82.7	84.0	84.7	84.2	77.1	74.6
4000	81.0	82.9	82.9	82.9	81.4	78.2	75.3	56.4	77.0	79.2	80.7	82.3	84.4	83.9	77.2	74.4
5000	79.6	79.7	80.9	81.8	78.2	76.3	72.8	71.7	74.4	76.3	79.3	79.9	81.2	80.4	76.8	71.8
6300	77.9	79.8	78.9	79.4	78.3	76.8	72.9	70.2	75.1	77.1	78.9	80.2	81.3	80.9	75.6	70.5
8000	78.0	79.1	79.0	79.3	77.0	74.8	70.8	69.6	73.0	75.5	77.5	78.6	80.5	79.6	74.5	70.5
10000	75.2	75.8	75.6	76.7	74.7	72.7	68.0	67.0	71.2	73.0	75.5	76.5	78.0	77.2	73.9	68.2
12500	73.1	73.6	72.6	74.8	71.6	70.3	65.6	64.6	68.6	71.2	73.7	74.9	75.9	75.4	72.0	66.8
16000	68.1	69.1	69.0	70.0	67.5	65.1	60.5	60.2	64.3	66.8	69.5	71.1	72.2	72.1	68.4	62.7
20000	63.3	63.7	63.9	64.4	61.7	59.2	55.3	55.2	58.9	62.0	63.7	66.0	67.1	67.2	63.7	58.5
OVERALL	100.8	104.2	107.2	102.6	99.2	97.1	95.0	94.0	97.7	97.9	99.7	99.2	101.0	99.5	94.5	96.7
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	75.5	86.7	93.0	92.1	90.9	90.1	88.5	87.2	91.9	92.2	93.5	92.3	92.2	89.4	81.7	79.1
304.8 M	69.9	78.5	85.4	84.5	83.3	82.6	81.1	80.0	84.6	84.8	86.1	84.7	84.5	81.5	73.5	70.9

TABLE XIII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF PLUS 7° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) 93 Percent speed; fan physical speed, 2049 rpm; fundamental blade passage frequency, 512 hertz

(d-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	101.3	99.0	101.0	99.2	98.2	101.2	101.5	101.5	101.2	101.7	101.7	102.6	103.2	105.0	106.2	107.0	102.3	120.0
63	103.4	103.6	99.8	98.0	101.6	105.8	106.8	101.6	107.1	106.3	102.9	104.7	104.8	104.4	105.9	107.3	104.8	122.5
80	102.2	102.2	100.7	98.2	100.7	103.2	104.7	101.8	103.2	103.7	102.7	103.9	105.0	106.7	108.0	108.9	104.0	121.7
100	111.1	107.3	107.1	106.3	106.6	108.1	107.6	108.6	109.1	110.5	109.8	109.6	110.6	110.1	110.6	109.7	109.1	126.8
125	109.4	111.2	111.0	110.7	108.9	109.7	108.7	109.4	109.2	110.2	111.2	112.1	111.7	111.2	110.9	109.7	110.4	128.1
160	110.5	111.0	110.2	109.0	108.7	109.3	108.2	109.3	109.2	110.7	110.3	111.6	109.8	110.5	108.8	108.6	109.8	127.5
200	110.5	112.1	110.1	106.8	106.8	106.5	105.5	105.8	105.5	106.1	106.3	107.9	108.8	107.8	107.8	107.2	107.4	125.1
250	113.1	114.5	112.8	112.3	110.8	110.0	108.1	107.8	108.3	110.0	111.3	112.6	113.0	112.3	110.0	108.2	111.0	128.7
315	114.8	115.7	113.2	112.5	110.7	109.3	109.7	110.3	110.7	112.8	114.3	115.3	114.3	112.3	109.8	108.4	112.5	130.2
400	117.0	118.0	117.3	115.7	114.2	112.8	112.8	113.2	113.2	115.2	116.5	117.3	117.0	114.5	111.3	109.9	115.1	132.8
500	128.7	130.4	131.5	129.4	126.5	126.3	128.2	129.0	125.2	125.9	125.7	125.3	127.9	123.0	120.2	119.3	127.2	144.9
630	119.1	119.8	119.8	119.3	116.6	114.4	115.1	115.4	115.1	117.3	117.9	119.0	120.8	118.4	112.9	111.3	117.5	135.2
800	117.4	118.4	118.9	117.2	116.6	114.1	113.9	114.1	115.2	117.2	118.6	120.0	121.7	119.4	113.2	110.8	117.5	135.2
1000	119.1	120.6	122.6	120.6	120.1	118.1	117.1	120.1	120.7	120.4	122.6	127.5	123.4	121.6	115.7	114.6	121.7	139.4
1250	116.0	118.2	118.3	117.7	115.8	114.2	112.2	113.5	114.7	116.8	117.8	119.8	119.5	116.5	112.3	110.4	116.6	134.3
1600	117.7	118.9	119.6	120.2	118.4	117.4	113.4	113.7	114.6	116.9	117.6	119.5	121.7	117.4	112.4	109.6	117.7	135.4
2000	116.1	117.9	118.4	117.9	116.8	114.6	111.4	111.1	112.8	114.8	116.4	117.4	119.8	116.6	111.4	108.0	115.9	133.6
2500	113.8	116.0	116.2	116.5	115.2	113.0	110.5	109.8	111.2	113.7	115.5	116.4	118.0	115.7	110.5	106.9	114.5	132.2
3150	113.3	115.3	115.8	116.1	115.1	113.6	111.1	109.6	111.4	114.1	115.6	116.7	117.3	115.8	109.3	106.8	114.4	132.1
4000	113.2	115.1	115.5	116.3	114.5	112.0	109.1	109.0	110.5	112.3	114.0	115.3	117.3	116.0	109.7	106.4	113.7	131.4
5000	111.8	112.9	113.6	114.8	111.1	109.9	107.1	105.8	107.9	109.9	112.4	112.9	114.3	113.1	109.3	104.5	111.4	129.1
6300	111.2	113.6	112.6	113.7	112.2	110.7	107.6	105.0	109.7	111.1	113.1	114.2	114.7	114.4	108.6	104.0	111.9	129.6
8000	112.1	113.4	113.6	113.9	111.3	109.4	106.3	104.8	108.3	110.3	112.1	112.8	115.1	113.6	108.5	104.8	111.4	129.1
10000	110.4	111.4	111.1	112.4	109.4	108.8	104.4	103.4	107.1	108.8	110.8	112.0	113.8	111.9	109.0	103.1	110.0	127.7
12500	109.3	110.5	109.7	112.0	107.8	107.8	103.2	102.5	106.5	108.5	110.7	111.9	112.8	111.5	108.5	103.1	109.4	127.1
16000	107.0	108.5	107.8	109.0	105.8	104.1	100.5	99.6	104.0	106.3	108.5	109.9	111.0	110.7	107.2	101.5	107.3	125.0
20000	105.0	105.2	104.8	106.1	102.8	100.9	97.4	97.4	101.1	103.9	105.6	107.7	108.8	108.6	105.1	100.3	104.8	122.5
OVERALL	131.4	132.9	133.7	132.3	130.1	129.0	129.7	130.5	128.7	129.8	130.6	132.3	132.8	130.0	125.9	124.3	130.7	148.4

TABLE XIII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF PLUS 7° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) Concluded. 93 Percent speed; fan physical speed, 2049 rpm; fundamental blade passage frequency, 512 hertz

(d-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	71.6	69.3	71.3	69.5	68.5	71.5	71.8	71.8	71.5	72.0	72.0	72.9	73.5	75.3	76.5	77.3
63	73.7	73.9	70.1	69.2	71.9	76.1	77.1	71.9	77.4	76.6	73.2	75.0	75.1	74.7	76.2	77.6
80	72.5	72.5	71.0	68.5	71.0	73.5	75.0	72.1	73.5	74.0	73.0	74.2	75.2	77.0	78.3	79.2
100	81.4	77.6	77.4	76.6	76.9	78.4	77.9	78.9	79.4	80.8	80.1	79.9	80.9	80.4	80.9	80.0
125	79.7	81.5	81.3	81.0	79.2	80.0	79.0	79.7	79.5	80.5	81.5	82.4	82.0	81.5	81.2	80.0
160	80.8	81.3	80.5	79.3	79.0	79.6	78.5	79.6	79.5	81.0	80.6	81.9	80.1	80.8	79.1	78.9
200	80.8	82.4	80.4	77.1	77.1	76.8	75.8	76.1	75.8	76.4	76.6	78.2	79.1	78.1	78.1	77.5
250	83.4	84.8	83.1	82.6	81.1	80.3	78.4	78.1	78.6	80.3	81.6	82.9	83.3	82.6	80.3	78.5
315	85.1	86.0	83.5	82.8	81.0	79.6	80.0	80.6	81.0	83.1	84.6	85.6	84.6	82.6	80.1	78.7
400	87.2	88.2	87.5	85.9	84.4	83.0	83.0	83.4	83.4	85.4	86.7	87.5	87.2	84.7	81.5	80.1
500	98.9	100.6	101.7	99.6	96.7	96.2	93.4	99.2	95.4	96.1	95.9	95.5	98.1	93.2	90.4	89.5
630	89.3	90.0	90.0	89.5	86.8	84.6	85.3	85.6	85.3	87.5	88.1	89.2	91.0	88.6	83.1	81.5
800	87.6	88.6	89.1	87.4	86.8	84.3	84.1	84.3	85.4	87.4	88.8	90.2	91.5	89.6	83.4	81.0
1000	89.3	90.8	92.8	90.8	90.3	88.3	87.3	90.3	90.9	90.6	92.8	97.7	93.6	91.8	85.9	84.8
1250	86.1	88.3	88.4	87.8	85.9	84.3	82.3	83.6	84.8	86.9	87.9	89.9	89.6	86.6	82.4	80.5
1600	87.8	89.0	89.7	90.3	88.5	87.5	83.5	83.8	84.7	87.0	87.7	89.6	91.8	87.5	82.5	79.7
2000	86.1	87.9	88.4	87.9	86.8	84.6	81.4	81.1	82.8	84.8	86.4	87.4	89.8	86.6	81.4	78.0
2500	83.7	85.9	86.1	86.4	85.1	82.9	80.4	79.7	81.1	83.6	85.4	86.3	87.9	85.6	80.4	76.8
3150	82.0	85.0	85.5	85.8	84.8	83.3	80.8	79.3	81.1	83.8	85.3	86.4	87.0	85.5	79.0	76.5
4000	82.7	84.6	85.0	85.8	84.0	81.5	78.6	78.5	80.0	81.8	83.5	84.8	86.8	85.5	79.2	75.9
5000	81.0	82.1	82.8	84.0	80.3	79.1	75.3	75.0	77.1	79.1	81.6	82.1	83.5	82.3	78.5	73.7
6300	79.9	82.3	81.3	82.4	80.9	79.4	76.3	73.7	78.4	79.8	81.8	82.9	83.4	83.1	77.3	72.7
8000	80.2	81.5	81.7	82.0	79.4	77.5	74.4	72.9	76.4	78.4	80.2	80.9	83.2	81.7	76.5	72.9
10000	77.5	78.5	78.2	79.5	76.5	75.9	71.5	70.5	74.2	75.9	77.9	79.1	80.5	79.0	76.1	70.2
12500	75.1	76.2	75.5	77.7	73.6	73.6	69.0	68.3	72.2	74.2	76.4	77.6	78.5	77.2	74.2	68.8
16000	70.9	72.4	71.7	72.9	69.7	68.0	64.4	63.5	67.9	70.2	72.4	73.8	74.9	74.5	71.0	65.3
20000	66.1	66.4	66.0	67.3	64.0	62.1	58.6	58.5	62.3	65.1	66.8	68.8	69.5	69.7	66.2	61.4
OVERALL	101.5	103.0	103.8	102.3	100.2	99.1	99.9	100.7	98.8	99.9	100.7	102.4	102.8	99.9	95.8	94.3
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	76.3	86.0	90.9	92.4	92.1	92.4	93.3	94.2	93.1	94.3	94.6	95.1	94.6	89.6	82.9	76.9
304.8 M	66.7	77.6	82.9	84.5	84.4	84.8	86.0	87.0	85.8	86.9	87.0	87.3	86.5	81.5	74.7	68.4

TABLE XIII. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF PLUS 7° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(e) 100 Percent speed; fan physical speed, 2203 rpm; fundamental blade passage frequency, 550 hertz

(e-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	103.6	100.3	103.4	100.4	100.9	101.4	101.9	102.3	103.6	103.8	103.8	104.9	105.1	106.4	108.1	109.8	104.1	121.8
63	100.6	102.0	99.8	99.6	100.6	102.0	102.1	101.5	102.0	102.3	103.0	104.2	105.5	106.8	108.5	110.0	103.8	121.5
80	107.1	106.2	102.1	102.7	103.6	104.2	106.7	103.1	106.4	105.4	107.1	107.5	108.6	108.9	110.7	111.1	107.0	124.7
100	110.9	108.6	107.9	110.2	105.8	107.4	111.4	109.2	107.2	110.7	109.6	111.5	113.1	113.7	112.9	111.6	110.5	128.2
125	111.1	113.3	113.6	112.8	109.3	110.9	111.6	111.4	110.9	113.1	113.8	114.3	114.8	113.8	113.8	110.8	112.7	130.4
160	113.2	112.7	113.1	112.2	110.2	110.6	109.7	112.6	111.9	114.6	112.7	113.8	113.6	112.2	111.2	110.6	112.4	130.1
200	113.1	113.8	111.8	110.9	108.4	108.6	107.8	107.8	109.4	108.1	109.4	110.2	111.2	110.6	109.9	109.5	109.8	127.5
250	114.3	115.1	115.3	113.3	113.1	111.6	110.3	110.1	111.6	113.3	113.6	115.6	116.5	115.3	112.1	109.8	113.5	131.2
315	115.2	116.2	116.3	114.5	113.0	111.8	111.3	112.2	113.2	115.0	115.3	116.9	116.3	115.2	111.7	109.7	114.3	132.0
400	117.7	118.7	119.2	116.7	115.5	114.3	114.0	114.5	114.8	116.7	117.7	118.4	118.7	117.0	113.5	111.0	116.5	134.2
500	127.1	127.0	128.5	121.3	127.5	126.0	125.6	129.7	128.5	124.3	125.5	126.7	127.1	123.3	118.3	121.7	126.8	144.5
630	124.5	124.7	125.3	119.7	123.8	122.2	122.3	125.8	124.8	122.2	123.2	125.8	125.7	122.2	117.3	118.4	123.8	141.5
800	117.9	119.4	119.9	118.7	117.4	115.2	116.0	116.9	118.0	120.2	120.7	122.3	123.7	121.0	115.4	112.4	119.5	137.2
1000	119.7	121.4	122.9	121.7	122.4	119.7	117.2	117.7	118.6	120.9	122.9	125.0	125.7	123.2	118.7	114.8	121.8	139.5
1250	118.4	120.6	121.2	121.1	120.9	118.6	116.1	116.6	117.7	119.7	121.6	123.5	123.9	121.4	117.7	113.6	120.4	138.1
1600	118.9	120.2	121.4	120.9	120.7	118.2	116.2	116.4	117.2	119.2	119.9	121.9	124.5	119.2	115.0	111.6	119.8	137.5
2000	116.7	119.7	119.5	119.5	119.0	117.2	115.0	114.3	115.5	117.8	119.2	120.1	122.3	118.0	113.3	110.2	118.2	135.9
2500	115.7	117.5	118.2	118.7	117.7	116.3	113.9	112.9	114.7	116.7	117.7	119.5	120.3	117.4	112.5	109.3	117.0	134.7
3150	114.7	117.0	117.2	118.0	117.3	115.8	114.0	112.5	114.2	117.0	118.3	119.4	119.7	117.8	111.8	108.9	116.8	134.5
4000	114.9	116.4	117.1	118.1	116.9	114.3	112.4	111.6	113.4	115.4	116.9	118.4	119.8	117.3	111.9	108.4	116.1	133.8
5000	113.1	114.6	115.2	117.1	113.6	112.4	110.2	109.2	110.7	113.2	115.1	115.9	117.1	114.6	111.6	106.5	113.9	131.6
6300	113.0	115.1	114.5	115.6	114.3	113.6	110.6	108.1	112.1	114.3	116.0	117.0	117.5	116.2	110.8	105.9	114.4	132.1
8000	113.8	115.3	115.0	115.7	113.6	112.1	109.1	108.0	111.1	113.0	114.6	115.8	117.8	115.5	110.7	106.6	113.8	131.5
10000	112.5	113.5	113.2	114.7	111.7	111.0	107.2	106.9	110.2	111.7	113.7	114.6	116.2	114.0	110.9	105.4	112.5	130.2
12500	111.7	112.6	111.6	114.2	110.2	110.2	106.4	105.4	109.2	111.1	113.6	114.7	115.4	113.6	110.8	105.4	111.9	129.6
16000	109.2	110.6	109.9	111.0	108.2	107.0	103.7	103.2	106.9	109.6	111.6	112.5	113.6	112.9	109.3	103.6	109.9	127.6
20000	107.2	107.7	107.7	108.7	105.2	103.7	100.3	101.4	104.5	107.0	108.7	110.8	111.7	111.2	107.7	102.6	107.7	125.4
OVERALL	131.8	132.6	134.5	131.2	132.4	130.7	130.3	132.4	131.9	131.2	132.4	134.4	134.8	131.9	127.9	126.7	132.2	149.9

TABLE XIII. - Concluded. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF PLUS 7° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(e) Concluded. 100 Percent speed; fan physical speed, 2203 rpm; fundamental blade passage frequency, 550 hertz

(e-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	76.7	74.9	75.3	73.5	74.3	73.8	74.8	75.0	75.0	75.5	75.5	75.9	76.0	77.8	79.0	78.2
63	75.8	77.2	74.0	73.7	76.5	79.0	78.0	76.0	77.3	77.2	77.0	76.8	77.3	79.3	79.5	79.2
80	79.7	80.7	77.5	76.9	80.7	84.4	83.4	80.2	82.2	82.0	81.4	81.3	81.5	82.5	81.7	80.9
100	83.8	84.3	83.9	81.0	79.0	80.0	78.5	80.3	82.8	82.7	81.3	82.8	83.2	84.2	83.7	82.5
125	83.3	85.5	85.6	83.6	81.1	83.1	81.1	82.1	82.5	83.8	85.0	85.6	85.1	85.0	84.0	82.2
160	84.2	84.3	85.0	82.7	81.7	82.5	80.7	82.2	82.2	83.0	83.5	85.1	84.3	83.5	82.3	81.6
200	89.3	86.5	84.7	82.7	80.8	81.5	79.2	79.5	80.3	80.5	82.0	82.3	83.2	82.5	84.5	80.9
250	89.7	88.9	84.4	85.2	84.5	84.2	83.4	82.5	83.2	85.2	86.0	86.9	87.4	87.4	84.4	81.2
315	89.5	89.5	87.9	86.7	85.2	84.4	83.5	84.7	84.7	86.0	86.7	88.1	88.0	87.4	84.4	82.4
400	91.4	92.1	91.3	88.8	88.1	86.4	86.4	87.4	89.1	89.3	90.9	91.4	91.1	90.1	86.6	84.2
500	107.5	107.1	106.1	100.3	105.8	99.0	101.3	106.1	105.0	103.6	99.8	105.1	100.5	100.1	101.8	93.8
630	100.3	100.3	99.6	95.6	98.4	92.8	94.3	98.9	97.8	97.3	95.8	99.2	97.1	96.4	95.4	89.0
800	91.7	92.8	93.0	91.5	90.7	88.7	87.0	87.8	89.3	92.3	94.2	94.6	96.0	95.3	89.0	87.0
1000	94.4	97.2	96.7	98.6	96.4	95.4	92.6	92.0	93.9	95.2	96.2	98.0	100.9	100.2	93.2	90.1
1250	92.2	94.4	94.2	94.7	93.1	91.6	88.7	88.6	90.7	92.6	94.1	95.3	97.4	96.2	90.1	87.5
1600	92.9	94.4	94.9	95.5	95.9	93.0	88.4	88.2	90.0	92.7	93.9	95.5	97.5	94.9	88.9	86.4
2000	91.6	93.2	93.9	94.6	93.0	90.7	86.9	86.9	88.4	90.9	92.6	93.3	95.7	94.1	87.4	84.5
2500	89.9	91.3	92.3	92.8	91.6	89.9	86.4	85.4	87.1	90.1	91.9	92.7	94.8	92.9	86.6	83.3
3150	89.5	90.9	91.0	91.9	91.0	89.4	85.9	84.4	86.5	89.7	90.9	92.3	93.7	92.7	86.0	82.5
4000	89.2	91.1	91.4	92.2	90.9	88.4	84.4	84.1	85.9	88.6	90.1	91.4	94.1	92.4	86.7	81.8
5000	87.7	88.6	89.6	91.6	88.6	86.6	82.4	81.4	84.6	86.6	89.2	89.4	92.6	89.7	85.4	80.0
6300	87.3	89.7	88.3	89.5	87.0	87.3	82.6	80.3	83.3	87.3	89.1	90.3	91.0	90.7	84.5	80.7
8000	87.9	89.2	88.9	89.6	86.9	86.0	81.3	79.9	83.9	85.7	88.4	88.5	91.5	89.2	85.5	79.9
10000	86.2	87.7	86.5	88.3	84.5	84.3	78.8	78.2	82.0	84.2	86.7	87.1	90.0	87.5	84.0	78.8
12500	85.1	86.4	85.1	87.2	83.2	83.0	77.4	76.7	81.2	82.9	85.7	86.4	89.2	86.4	83.7	77.6
16000	81.9	84.0	83.0	83.1	79.6	78.9	73.9	73.3	77.3	79.8	82.8	83.6	85.4	84.3	80.1	75.9
20000	78.2	80.0	79.2	79.7	75.5	75.0	69.7	70.0	74.7	76.7	79.2	80.3	82.7	80.9	77.8	72.4
OVERALL	109.4	109.5	108.8	106.5	108.2	104.0	103.8	107.5	106.9	106.6	105.7	108.6	108.2	107.1	104.6	99.3
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	83.7	92.2	95.9	96.3	99.8	97.2	97.4	100.4	100.7	100.9	99.8	101.6	100.1	96.6	91.7	81.9
304.8 M	74.4	83.8	87.9	88.0	92.2	89.5	90.1	93.3	93.4	93.5	92.0	94.0	91.5	88.4	83.6	73.2

TABLE XIV. - FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF MINUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) 70 Percent speed; fan physical speed, 1535 rpm; fundamental blade passage frequency, 383 hertz

(a-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	103.0	107.4	107.4	106.2	105.8	106.3	106.3	104.3	105.0	106.2	106.5	108.6	104.3	104.3	113.0	116.0	107.9	125.6
63	103.4	106.4	106.2	103.9	103.4	106.0	104.0	102.0	102.4	105.0	104.4	107.1	103.7	104.9	111.9	115.4	106.5	124.2
80	102.8	105.0	106.9	102.8	102.2	105.3	103.5	101.8	102.0	104.0	105.0	106.1	105.0	105.3	110.3	114.1	105.7	123.4
100	106.1	107.4	108.0	105.1	104.4	106.6	104.6	103.3	104.9	105.6	106.8	107.5	107.6	106.4	110.6	113.3	106.9	124.6
125	107.8	110.2	110.9	109.5	109.3	107.8	107.5	106.3	106.8	108.0	109.5	109.8	109.7	108.8	110.2	111.2	108.9	126.6
160	108.9	110.1	111.2	106.9	106.6	106.6	105.9	105.2	105.7	107.4	108.4	109.5	108.9	107.7	108.7	110.3	107.9	125.6
200	110.0	111.6	111.5	107.1	105.4	105.4	103.9	103.8	103.8	105.1	106.6	107.7	107.3	107.1	108.4	108.8	107.0	124.7
250	114.2	114.7	113.3	110.7	109.0	109.0	106.7	106.7	106.5	109.2	110.2	111.8	112.0	111.4	109.0	109.4	110.2	127.9
315	120.4	120.8	120.5	117.3	116.4	115.3	112.1	111.4	110.9	112.6	115.1	115.8	115.6	115.4	112.1	112.5	115.5	133.2
400	129.6	130.8	132.0	127.1	128.9	127.4	122.8	121.6	120.9	121.9	126.4	127.7	126.4	125.9	122.1	123.6	126.5	144.2
500	114.3	119.1	114.8	116.8	115.8	114.1	112.1	111.8	112.0	114.5	115.5	116.0	116.3	117.1	112.6	112.2	115.3	133.0
630	117.8	119.2	119.6	117.2	115.3	112.7	111.5	112.3	112.2	115.2	116.5	116.9	117.7	118.5	113.0	111.4	115.8	133.5
800	122.7	122.8	123.3	123.5	120.5	113.3	110.6	119.0	117.6	119.6	121.3	122.2	123.1	125.1	118.3	116.0	121.2	138.9
1000	119.2	119.3	119.1	117.7	115.5	113.8	112.5	113.0	113.0	116.0	117.5	118.9	118.7	118.8	112.7	111.2	116.5	134.2
1250	119.9	120.2	120.1	118.5	117.4	115.0	113.4	113.9	113.7	116.4	117.9	119.3	119.4	119.9	113.9	111.9	117.3	135.0
1600	117.6	118.6	119.2	117.8	116.5	114.1	111.8	112.1	112.1	114.8	116.8	117.7	119.8	119.0	112.1	110.4	116.3	134.0
2000	116.6	117.8	118.3	117.3	115.4	113.4	110.6	110.1	110.3	112.8	114.8	115.2	117.9	117.3	110.8	109.0	114.8	132.5
2500	115.2	116.2	116.4	115.7	114.0	111.9	109.9	108.5	108.5	111.5	113.5	113.8	115.9	115.4	109.0	107.1	113.2	130.9
3150	115.1	116.3	116.5	115.1	113.8	112.1	109.6	107.6	107.3	111.0	113.1	113.4	114.3	114.6	108.0	105.9	112.7	130.4
4000	115.7	116.7	117.2	115.7	113.7	111.4	108.6	106.9	106.7	109.6	111.6	112.2	114.1	113.9	107.4	105.3	112.4	130.1
5000	115.2	115.9	116.0	115.2	112.5	110.2	107.1	104.9	105.5	108.1	110.7	110.5	112.9	111.4	106.2	104.3	111.2	128.9
6300	115.0	115.7	115.6	115.0	111.8	112.0	109.4	104.0	105.0	109.5	111.5	112.2	112.4	112.9	105.7	103.0	111.5	129.2
8000	116.2	117.0	116.7	115.9	112.7	111.9	107.3	104.7	106.5	109.2	111.7	111.9	113.9	112.7	107.4	103.6	112.1	129.8
10000	115.0	116.0	114.9	115.0	111.2	110.7	106.7	103.9	104.9	108.2	110.9	111.1	113.2	111.5	106.9	102.6	111.0	128.7
12500	114.4	115.6	114.7	115.5	111.2	110.8	105.5	103.1	105.7	108.5	111.5	111.8	113.5	111.7	107.8	103.5	111.2	128.9
16000	113.2	114.0	113.9	113.0	109.0	108.5	103.3	101.2	103.3	107.4	110.0	110.7	111.5	110.5	105.5	102.1	109.5	127.2
20000	112.6	113.7	112.5	112.2	107.4	106.7	101.7	100.5	103.1	106.4	108.2	109.6	110.5	109.9	104.9	100.6	108.5	126.2
OVERALL	132.9	132.9	134.5	131.7	131.4	129.3	126.6	126.1	125.5	127.6	130.3	131.2	131.4	131.5	126.9	127.4	130.2	147.9

TABLE XIV. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF MINUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) Concluded 70 Percent speed; fan physical speed, 1535 rpm; fundamental blade passage frequency, 383 hertz

(a-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	78.3	76.1	77.7	76.5	76.1	78.6	76.6	74.6	75.3	76.5	76.8	78.9	74.6	74.6	83.3	86.3
63	73.7	76.7	76.5	74.2	73.7	76.3	74.3	73.2	72.7	75.3	74.7	77.4	74.0	75.2	82.2	85.7
80	73.1	75.3	76.2	73.1	72.5	75.8	73.8	72.1	72.3	74.3	75.3	76.4	75.3	75.6	80.6	84.4
100	76.4	77.7	78.3	75.4	74.7	76.9	74.9	73.6	75.2	75.9	77.1	77.8	77.9	76.7	80.9	83.6
125	78.1	80.5	81.2	79.8	79.6	78.1	77.8	76.6	77.1	78.3	79.8	80.1	80.0	79.1	80.5	81.5
160	79.2	80.4	81.5	77.2	76.9	76.9	76.2	75.5	76.0	77.7	78.7	79.8	79.2	78.0	79.0	80.6
200	81.2	81.9	81.8	77.4	75.7	75.7	74.2	74.1	74.1	75.4	76.9	78.0	77.6	77.4	78.7	79.1
250	84.5	85.0	84.3	81.0	79.3	79.3	77.0	77.0	76.8	79.5	80.5	82.1	82.3	81.7	79.3	79.7
315	90.7	91.1	90.9	87.6	86.7	85.6	82.4	81.7	81.2	82.9	85.4	86.1	85.9	85.7	82.4	82.8
400	99.8	101.0	102.2	97.3	99.1	97.6	93.0	91.8	91.1	92.1	96.6	97.9	96.6	96.1	92.3	93.8
500	88.5	89.3	89.0	87.0	86.0	84.3	82.3	82.0	82.2	84.7	85.7	86.2	86.5	87.3	82.8	82.4
630	88.0	89.4	89.8	87.4	85.5	82.9	81.7	82.5	82.4	85.4	86.7	87.1	87.9	88.7	83.2	81.6
800	93.0	93.0	93.5	93.7	90.7	88.5	88.8	89.3	87.8	89.8	91.5	92.4	93.3	95.3	88.5	86.2
1000	88.4	89.5	89.3	87.9	85.7	84.0	82.7	83.2	83.2	86.2	87.7	89.1	88.5	89.0	82.9	81.4
1250	89.0	90.3	90.2	88.6	87.5	85.1	83.5	84.0	83.8	86.5	88.0	89.4	89.5	90.0	84.0	82.0
1600	87.7	88.7	89.3	87.9	86.6	84.2	81.9	82.2	82.2	84.9	86.9	87.8	89.5	89.1	82.2	80.5
2000	86.6	87.9	88.3	87.3	85.4	83.4	80.6	80.1	80.3	82.8	84.8	85.2	87.9	87.3	80.8	79.0
2500	85.1	86.1	86.3	85.6	83.9	81.8	79.8	78.4	78.4	81.4	83.4	83.7	85.8	85.3	78.9	77.0
3150	84.8	85.0	86.2	84.8	83.5	81.8	79.3	77.3	77.0	80.7	82.8	83.1	84.0	84.3	77.7	75.6
4000	85.2	86.2	86.7	85.2	83.2	80.7	78.1	76.4	76.2	79.1	81.1	81.7	83.6	83.4	76.9	74.8
5000	84.4	85.1	85.2	84.4	81.7	79.4	76.3	74.1	74.7	77.3	79.9	79.7	82.1	80.6	75.4	73.5
6300	83.7	84.4	84.3	83.7	80.5	80.7	77.1	72.7	73.7	78.2	80.2	80.9	81.1	81.6	74.4	71.7
8000	84.2	85.0	84.8	84.0	80.8	80.0	75.4	72.8	74.6	77.3	79.8	80.0	81.9	80.8	75.4	71.7
10000	82.1	82.1	82.0	82.1	78.3	77.8	72.8	71.0	72.0	75.3	78.0	78.2	80.3	78.6	74.0	69.7
12500	81.3	81.3	80.4	81.2	76.9	76.5	71.2	68.8	71.4	74.2	77.2	77.5	79.2	77.4	73.5	69.2
16000	77.0	77.8	77.7	76.9	72.9	72.4	67.2	65.0	67.1	71.2	73.8	74.5	75.3	74.3	69.3	65.9
20000	73.7	74.4	73.6	73.3	68.5	67.9	62.8	61.7	64.2	67.5	69.3	70.7	72.0	71.0	66.0	61.7
OVERALL	102.9	103.9	104.6	101.6	101.4	99.9	95.7	96.2	95.6	97.6	100.3	101.3	101.3	101.5	97.0	97.6
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 m	77.6	86.8	91.8	91.5	93.2	92.0	90.5	90.0	89.9	91.7	94.1	94.2	93.0	90.9	83.8	79.9
304.8 m	68.2	79.5	83.9	83.5	85.6	85.4	83.0	82.7	82.5	84.3	86.7	86.8	85.2	83.1	75.9	71.8

TABLE XIV. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF MINUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) 86 Percent speed; fan physical speed, 1879 rpm; fundamental blade passage frequency, 469 hertz

(b-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	107.8	104.8	106.3	105.4	107.9	106.9	105.1	107.9	106.4	106.3	106.9	110.0	109.9	112.1	112.3	115.3	109.6	127.3
63	110.0	105.2	105.7	105.0	107.2	106.8	103.3	106.5	107.2	104.3	107.3	108.4	110.3	111.7	112.0	117.9	109.1	126.8
80	105.8	104.6	105.1	103.3	104.8	104.1	103.4	105.3	104.6	105.1	106.1	109.9	109.9	112.4	113.1	117.2	108.5	126.2
100	109.5	108.5	108.5	107.5	107.5	107.4	106.0	108.0	109.5	108.4	109.9	112.0	111.5	113.5	112.9	116.1	110.2	127.9
125	112.4	116.2	114.4	110.7	112.0	111.0	109.0	111.2	110.7	111.7	114.2	114.3	114.4	114.9	113.5	115.1	112.9	130.6
160	112.4	113.2	112.2	109.7	109.9	110.7	109.2	110.0	109.9	111.0	110.5	113.6	111.7	112.0	111.2	113.7	111.2	128.9
200	113.9	115.8	113.1	109.8	110.8	109.3	107.3	107.9	107.4	108.4	109.9	111.7	111.9	113.3	111.4	113.0	110.8	128.5
250	116.6	117.7	114.4	112.7	112.1	111.1	109.2	110.2	110.6	112.4	113.9	115.5	115.6	115.1	112.1	112.3	113.3	131.0
315	119.4	119.6	117.3	114.8	114.6	112.9	111.4	112.1	112.8	114.3	115.4	116.3	116.1	116.1	112.8	112.5	114.9	132.6
400	125.5	127.3	125.6	124.8	124.3	123.1	120.0	120.3	119.5	123.1	123.3	123.2	123.8	124.5	119.3	117.7	123.1	140.8
500	132.9	135.4	133.1	132.8	130.9	130.6	128.1	127.6	126.6	131.8	132.1	130.4	132.1	132.9	126.9	124.5	131.0	148.7
630	121.7	122.5	121.3	119.7	119.2	117.0	115.2	115.8	117.0	119.3	120.2	121.4	121.3	121.5	115.0	113.9	119.3	137.0
800	121.8	123.4	121.9	121.1	121.4	119.4	118.1	119.3	119.8	121.9	122.9	124.0	123.9	122.8	116.3	115.5	121.5	139.2
1000	125.1	127.6	126.2	126.2	128.2	125.7	122.2	123.2	122.2	125.2	128.7	129.3	128.4	125.6	118.9	120.3	126.2	143.9
1250	121.9	123.6	121.9	121.6	121.4	118.7	117.7	118.2	119.6	120.9	122.1	123.5	123.2	122.1	115.9	114.5	121.0	138.7
1600	122.3	123.9	122.4	121.9	122.1	119.8	118.3	118.3	118.8	120.4	121.8	123.5	124.6	122.3	115.8	113.8	121.3	139.0
2000	121.9	123.9	122.4	122.7	122.5	119.7	118.0	117.0	118.2	119.5	121.5	122.5	124.2	122.0	115.2	113.4	121.0	138.7
2500	120.2	122.2	120.2	121.2	120.7	118.0	117.0	115.7	116.3	118.3	119.8	121.0	122.3	119.8	113.5	111.8	119.3	137.0
3150	120.5	122.1	120.0	121.0	120.1	117.5	116.5	114.5	115.3	118.0	119.1	120.6	121.0	119.1	112.6	110.4	118.7	136.4
4000	120.6	121.9	120.1	121.4	120.1	116.9	115.2	113.7	114.7	116.4	117.4	119.3	120.6	118.4	112.2	110.1	118.1	135.8
5000	119.7	120.4	118.5	120.2	118.4	115.0	113.9	111.4	112.7	114.4	116.2	117.3	119.4	115.7	110.9	108.8	116.5	134.2
6300	119.1	120.5	118.3	118.9	117.1	116.1	113.9	110.4	111.6	115.5	117.1	118.4	118.1	117.0	109.8	107.2	116.4	134.1
8000	120.2	120.6	119.1	119.8	117.5	115.5	113.0	110.6	112.8	114.6	116.6	117.5	119.2	116.3	111.7	108.0	116.5	134.2
10000	118.8	119.9	117.5	118.5	115.7	114.3	111.0	109.3	111.4	113.5	115.7	116.4	118.2	115.5	110.5	106.6	115.3	133.0
12500	119.0	119.5	116.8	119.3	115.8	113.6	110.8	109.1	112.0	113.5	116.0	116.7	118.3	115.3	111.7	107.5	115.4	133.1
16000	117.2	118.2	115.8	116.8	113.5	111.3	108.5	106.8	109.5	112.2	114.0	115.2	116.0	114.3	109.3	106.6	113.5	131.2
20000	116.4	117.7	115.1	115.7	111.7	109.7	107.0	106.1	109.8	111.6	112.2	114.3	115.4	113.6	109.1	104.6	112.6	130.3
OVERALL	136.5	138.5	136.5	136.4	135.5	134.1	131.7	131.5	131.4	134.8	135.9	136.0	136.7	136.1	130.5	130.0	134.9	152.6

TABLE XIV. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF MINUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) Concluded. 86 Percent speed; fan physical speed, 1879 rpm; fundamental blade passage frequency, 469 hertz

(b-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG 10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	78.1	75.1	76.6	75.7	78.2	77.2	76.4	78.2	76.7	76.6	77.2	80.3	80.2	82.4	82.6	89.6
63	80.3	75.5	76.0	75.3	77.5	77.1	73.6	76.8	77.5	74.6	77.6	78.7	80.6	82.0	82.3	88.2
80	76.1	74.9	75.4	73.6	75.1	74.4	73.7	75.6	74.9	75.4	76.4	80.2	80.2	82.7	83.4	87.5
100	79.8	78.8	78.8	77.8	77.8	77.7	76.3	78.3	79.8	78.7	80.2	82.3	81.8	83.8	83.2	86.4
125	82.7	86.5	84.7	81.0	82.3	81.3	79.3	81.5	81.0	82.0	84.5	84.6	84.7	85.2	83.8	85.4
160	82.7	83.5	82.5	80.2	80.2	81.0	79.5	80.3	80.2	81.3	80.8	83.9	82.0	82.3	81.5	84.0
200	84.2	86.1	83.4	80.1	81.1	79.6	77.6	78.2	77.7	78.7	80.2	82.0	82.2	83.6	81.7	83.3
250	86.9	88.0	84.7	83.0	82.4	81.4	79.5	80.5	80.9	82.7	84.2	85.8	85.9	85.4	82.4	82.6
315	89.7	89.9	87.6	85.1	84.9	83.2	81.7	82.4	83.1	84.6	85.7	86.6	86.4	86.4	83.1	82.8
400	95.7	97.5	95.8	95.0	94.5	93.3	90.2	90.5	89.7	93.3	93.5	93.4	94.0	94.7	89.5	87.9
500	103.1	105.6	103.3	103.0	101.1	100.3	98.3	97.8	96.8	102.0	102.3	100.6	102.3	103.1	97.1	94.7
630	91.9	92.7	91.5	89.9	89.4	87.2	85.4	86.0	87.2	89.5	90.4	91.6	91.5	91.7	85.2	84.1
800	92.0	93.6	92.1	91.3	91.6	89.6	88.3	89.5	90.0	92.1	93.1	94.2	94.1	93.0	86.5	85.7
1000	95.3	97.8	96.4	96.4	98.4	95.9	92.4	93.4	92.4	95.4	98.9	99.5	98.6	95.8	89.1	90.5
1250	92.0	93.7	92.0	91.7	91.5	88.8	87.8	88.3	89.7	91.0	92.2	93.6	93.3	92.2	86.0	84.6
1600	92.4	94.0	92.5	92.0	92.2	89.9	88.4	88.4	88.9	90.5	91.9	93.6	94.7	92.4	85.9	83.9
2000	91.9	93.9	92.4	92.7	92.5	89.7	88.0	87.0	88.2	89.5	91.5	92.5	94.2	92.0	85.2	83.4
2500	90.1	92.1	90.1	91.1	90.6	87.9	86.9	85.6	86.2	88.2	89.7	90.9	92.2	89.7	83.4	81.7
3150	90.2	91.8	89.7	90.7	89.8	87.2	86.2	84.2	85.0	87.7	88.8	90.3	90.7	88.8	82.3	80.1
4000	90.1	91.4	89.6	90.9	89.6	86.4	84.7	83.2	84.2	85.9	86.9	88.8	90.1	87.9	81.7	79.6
5000	88.9	89.6	87.7	89.4	87.6	84.2	83.1	80.6	81.9	83.6	85.4	86.5	88.6	84.9	80.1	78.0
6300	87.8	89.2	87.0	87.6	85.8	84.8	82.6	79.1	80.3	84.2	85.8	87.1	86.8	85.7	78.5	75.9
8000	88.3	88.7	87.2	87.9	85.6	83.6	81.1	78.7	80.9	82.7	84.7	85.6	87.2	84.4	79.7	76.1
10000	85.9	87.0	84.6	85.6	82.8	81.4	78.1	76.4	78.5	80.6	82.8	83.5	85.3	82.6	77.6	73.7
12500	84.7	85.2	82.5	85.0	81.5	79.3	76.5	74.8	77.7	79.2	81.7	82.4	84.0	81.0	77.4	73.2
16000	81.0	82.0	79.6	80.7	77.4	75.2	72.4	70.6	73.3	76.0	77.9	79.0	79.8	78.1	73.1	70.4
20000	77.5	78.8	76.2	76.8	72.8	70.8	68.1	67.2	70.8	72.7	73.3	75.4	76.5	74.7	70.2	65.7
OVERALL	106.4	108.5	106.5	106.3	105.5	104.1	101.8	101.6	101.4	104.9	106.0	106.0	106.7	106.2	100.6	100.2
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	81.0	91.4	93.7	96.2	97.1	97.0	95.8	95.8	95.9	99.1	99.6	98.8	98.5	96.2	87.8	82.3
304.8 M	71.3	82.9	85.6	88.3	89.4	89.5	88.3	88.4	88.5	91.7	92.2	91.2	90.8	88.4	79.8	73.9

TABLE XIV. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF MINUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) 93 Percent speed; fan physical speed, 2039 rpm; fundamental blade passage frequency, 509 hertz

(c-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	106.8	108.8	109.0	108.6	107.3	108.6	107.1	108.0	108.3	107.8	108.6	108.4	110.6	110.5	112.5	114.4	109.2	126.9
63	106.0	110.3	108.1	109.0	106.6	108.0	106.5	106.3	106.8	108.3	108.5	108.4	110.3	110.8	113.3	115.5	109.1	126.8
80	106.7	108.9	107.4	106.7	105.5	107.2	104.4	105.2	105.9	107.0	108.9	109.3	111.4	113.0	114.7	116.2	109.4	127.1
100	111.6	112.0	112.1	111.5	108.5	110.5	108.8	108.5	110.0	110.8	111.1	112.6	114.1	114.8	115.0	115.2	111.8	129.5
125	112.7	115.3	113.8	113.2	112.0	112.3	110.8	112.5	112.7	114.0	114.5	114.8	115.7	114.5	115.0	113.5	113.7	131.4
160	113.6	114.8	113.5	113.0	111.5	112.1	110.8	112.1	112.5	113.3	113.3	115.2	114.1	113.6	113.3	112.7	113.1	130.8
200	116.8	116.8	114.6	112.8	110.8	110.1	108.6	109.3	109.3	110.5	111.5	112.1	113.6	113.5	112.6	111.9	112.0	129.7
250	120.8	119.1	116.5	116.0	114.5	114.6	111.6	112.3	113.0	114.5	116.0	116.1	117.0	115.8	113.5	112.7	115.2	132.9
315	121.5	121.4	119.4	118.2	115.9	114.5	114.0	113.7	114.5	115.9	117.7	117.6	117.7	116.9	114.2	112.4	116.7	134.4
400	122.9	124.4	123.5	121.4	120.4	118.7	117.0	118.2	118.7	120.5	120.9	121.5	122.2	119.9	115.7	115.9	120.4	138.1
500	123.4	136.4	133.4	133.4	131.7	131.3	130.5	130.9	131.2	133.2	132.9	132.8	134.0	130.5	125.7	126.3	132.2	149.9
630	124.3	125.9	124.6	123.9	122.8	120.4	119.3	120.1	121.3	123.6	123.8	124.2	124.9	121.9	117.6	116.8	122.7	140.4
800	122.6	123.7	122.9	122.7	121.1	119.6	118.7	120.7	122.1	123.7	124.2	124.0	125.2	122.1	117.6	116.1	122.4	140.1
1000	128.9	129.1	130.1	130.2	129.6	125.6	125.4	125.7	126.2	128.1	128.4	130.3	129.4	125.9	121.2	120.1	127.9	145.6
1250	123.0	124.3	124.0	123.8	122.5	120.5	119.2	121.0	121.7	123.3	123.8	124.9	125.5	121.3	117.8	115.5	122.7	140.4
1600	125.9	126.4	126.3	127.3	127.5	123.4	121.4	122.9	123.6	125.1	124.8	126.2	128.3	122.6	119.1	116.0	125.0	142.7
2000	124.2	125.0	125.2	125.8	124.0	121.7	119.5	120.5	120.8	122.8	123.7	124.1	126.5	121.0	117.3	115.1	123.1	140.8
2500	122.1	123.3	123.1	124.3	122.3	120.1	118.3	118.6	119.4	121.6	122.4	122.7	124.6	119.6	115.4	113.2	121.5	139.2
3150	122.2	122.9	122.7	123.5	121.4	120.0	118.5	117.9	118.7	121.2	122.0	122.3	123.0	119.2	114.5	112.0	120.9	138.6
4000	121.7	123.0	122.7	123.7	121.7	119.0	116.8	117.2	118.0	119.3	120.2	121.1	122.7	118.5	114.5	111.8	120.2	137.9
5000	120.3	121.5	120.8	122.3	119.3	116.5	115.0	114.8	116.1	117.5	119.0	119.0	121.1	116.2	113.1	110.4	118.4	136.1
6300	119.4	120.6	119.7	120.4	117.6	117.9	115.2	113.4	114.4	118.1	119.4	120.2	119.9	117.6	112.3	108.7	118.0	135.7
8000	120.6	121.4	120.4	120.8	117.8	116.8	113.7	113.3	116.0	117.1	118.4	119.1	120.8	117.1	113.5	109.3	117.9	135.6
10000	118.9	119.6	119.7	119.4	115.5	114.9	111.5	111.9	113.9	115.2	117.4	117.9	119.7	116.1	112.1	107.8	116.4	134.1
12500	118.7	119.7	117.9	119.7	115.5	114.7	111.4	111.0	114.2	115.4	117.5	118.3	119.5	115.7	113.2	108.4	116.4	134.1
16000	116.6	118.1	116.6	116.9	113.0	112.0	109.1	109.1	112.1	113.7	115.9	116.4	117.1	115.1	111.1	106.6	114.4	132.1
20000	116.0	117.4	115.5	116.3	111.3	110.5	107.5	108.5	111.7	113.0	114.3	115.8	116.7	113.8	110.5	105.0	113.5	131.2
OVERALL	137.7	139.4	138.0	138.1	136.7	134.8	133.8	134.3	134.9	136.8	137.0	137.6	138.6	134.9	131.1	130.4	136.3	154.1

TABLE XIV. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF MINUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) Concluded. 93 Percent speed; fan physical speed, 2039 rpm; fundamental blade passage frequency, 509 hertz

(c-2) Data adjusted to standard day 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	77.1	79.1	79.3	79.1	77.6	78.9	77.4	78.3	78.6	78.1	78.9	78.7	80.9	80.8	82.8	84.7
63	78.3	80.6	80.4	78.3	76.9	78.3	75.8	76.6	77.1	78.6	78.8	78.7	80.6	81.1	83.6	85.8
80	76.0	79.2	77.7	77.0	75.8	77.5	74.7	75.5	76.2	77.3	79.2	79.6	81.7	83.3	85.0	86.5
100	81.9	82.3	82.4	81.8	78.8	80.8	79.1	78.8	80.3	81.1	81.4	82.9	84.4	85.1	85.3	85.5
125	83.0	85.6	84.1	83.5	83.1	82.6	81.1	82.8	83.0	84.3	84.8	85.1	86.0	84.8	85.3	83.8
160	83.9	85.1	83.8	83.3	81.8	82.4	81.1	82.4	82.8	83.6	83.6	85.5	84.4	83.9	83.6	83.0
200	87.1	87.1	84.9	83.1	81.1	80.4	78.9	79.6	79.6	80.8	81.8	82.4	83.9	83.8	82.9	82.2
250	91.1	89.4	86.9	86.3	84.8	84.9	81.9	82.6	83.3	84.8	86.3	86.4	87.3	86.1	83.8	83.0
315	91.8	91.7	89.7	88.5	86.2	84.8	84.3	84.0	84.8	86.2	88.0	87.9	88.0	87.2	84.5	82.7
400	93.1	94.6	93.7	91.6	90.6	88.9	87.2	88.4	88.9	90.7	91.1	91.7	92.4	90.1	85.9	86.1
500	103.6	106.6	103.6	103.6	101.9	101.2	100.7	101.1	101.4	103.4	103.1	103.0	104.2	100.7	95.9	96.5
630	94.5	96.1	94.8	94.1	93.0	90.6	89.5	90.3	91.5	93.8	94.0	94.4	95.1	92.1	87.8	87.0
800	92.8	93.9	93.1	92.9	91.3	89.8	88.9	90.9	92.3	93.9	94.4	94.2	95.4	92.3	87.8	86.3
1000	99.1	99.3	100.3	100.4	99.8	95.8	95.6	95.9	96.4	98.3	98.6	100.5	99.6	96.1	91.4	90.3
1250	93.1	94.4	94.1	93.9	92.6	90.6	89.3	91.1	91.8	93.4	93.9	95.0	95.6	91.4	87.9	85.6
1600	96.6	96.5	96.4	97.4	97.4	93.5	91.5	93.0	93.7	95.2	94.9	96.3	98.4	92.7	89.2	86.1
2000	94.2	95.0	95.2	95.8	94.0	91.7	89.5	90.5	90.8	92.8	93.7	94.1	96.5	91.0	87.3	85.1
2500	92.0	93.2	91.6	94.2	92.2	90.0	88.2	88.5	89.3	91.5	92.3	92.6	94.5	89.5	85.3	83.1
3150	91.9	92.6	92.4	93.2	91.1	89.7	88.2	87.6	88.4	90.9	91.7	92.0	92.7	88.9	84.2	81.7
4000	91.2	92.5	92.2	93.2	91.2	88.5	86.3	86.7	87.5	88.8	89.7	90.6	92.2	88.0	84.0	81.3
5000	89.5	90.7	90.0	91.5	88.5	85.7	84.2	84.0	85.3	86.7	88.2	88.2	90.3	85.4	82.3	79.6
6300	88.1	88.3	88.4	89.1	86.3	86.6	83.9	82.1	83.1	86.8	88.1	88.9	88.6	86.3	81.0	77.4
8000	88.7	89.5	88.5	89.9	85.9	84.9	81.8	81.4	84.1	85.2	86.5	87.2	88.9	85.2	81.6	77.4
10000	86.0	86.7	85.8	86.5	82.6	82.0	78.6	79.0	81.0	82.3	84.5	85.0	86.8	83.2	79.2	74.9
12500	84.4	85.4	83.6	85.4	81.2	80.4	77.1	76.7	79.9	81.1	83.2	84.0	85.2	81.4	78.9	74.1
16000	80.4	81.0	80.4	80.9	76.9	75.9	73.0	72.9	75.9	77.5	79.7	80.2	80.9	78.9	74.9	70.4
20000	77.1	78.5	76.6	77.1	72.4	71.6	68.6	69.6	72.8	74.1	75.4	76.9	77.8	74.9	71.6	66.1
OVERALL	107.6	109.4	108.0	108.1	106.7	104.3	103.9	104.4	105.0	106.9	107.1	107.6	108.5	104.9	101.0	100.5
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	82.1	92.4	95.1	98.0	98.4	98.1	97.8	98.8	99.5	101.2	101.1	100.6	100.4	95.0	88.3	83.3
304.8 M	72.4	83.9	86.9	90.0	90.5	90.5	90.3	91.4	92.1	93.8	93.5	93.0	92.7	87.1	80.1	74.9

TABLE XIV. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF MINUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) 100 Percent speed; fan physical speed, 2192 rpm; fundamental blade passage frequency, 548 hertz

(d-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	110.9	107.4	109.9	108.4	110.9	110.1	109.4	112.3	109.3	108.9	110.8	112.5	113.9	115.4	119.4	122.1	113.3	131.0
63	109.3	109.6	108.1	108.3	109.9	108.8	108.4	110.9	108.1	107.4	109.9	111.0	113.9	115.4	119.6	123.2	113.2	130.9
80	110.7	112.1	109.1	107.9	108.9	108.7	108.4	110.6	109.1	109.7	111.9	112.8	114.9	116.4	120.7	121.4	113.5	131.2
100	113.4	113.2	111.2	111.1	111.7	112.2	110.2	112.2	112.6	112.4	115.1	115.7	116.4	117.9	120.4	120.8	114.9	132.6
125	116.1	117.3	115.6	113.8	114.6	114.3	113.1	114.4	113.6	115.4	117.3	117.2	117.8	117.4	120.1	120.0	116.2	133.9
160	116.2	116.7	115.9	113.9	113.9	114.7	113.6	115.2	115.1	115.7	116.4	117.8	115.7	116.2	118.6	120.1	116.0	133.7
200	119.4	119.7	116.7	114.7	113.9	113.2	111.2	113.2	112.4	113.9	116.1	115.8	117.2	117.1	117.9	118.0	115.5	133.2
250	122.1	122.9	119.4	118.3	116.3	116.8	114.4	114.8	115.6	117.4	118.8	119.9	119.4	118.6	117.8	117.6	118.1	135.8
315	124.1	123.6	121.4	120.9	118.8	118.3	117.1	118.6	118.8	120.3	122.3	122.4	122.3	120.8	119.1	118.0	120.5	138.2
400	123.6	125.1	123.4	120.6	119.6	119.4	117.9	118.8	120.1	121.4	123.6	124.4	123.1	120.8	118.1	117.7	121.5	139.2
500	136.8	137.1	134.6	133.5	131.5	130.3	130.1	131.0	130.1	133.0	135.0	134.0	133.3	132.5	127.5	126.8	132.7	150.4
630	122.3	132.5	130.8	129.8	127.8	127.0	125.8	126.5	126.7	129.5	131.0	130.6	129.8	128.7	124.2	123.2	128.9	146.6
800	123.8	125.1	124.0	123.1	122.1	122.0	122.0	123.5	124.6	125.8	126.6	126.9	127.0	124.0	119.6	118.9	124.5	142.2
1000	129.1	131.6	129.6	129.1	128.4	127.7	127.1	127.6	127.9	128.9	130.6	130.8	131.9	126.2	121.7	121.9	128.9	146.6
1250	126.9	129.1	127.1	126.9	126.2	125.4	124.2	125.4	126.2	126.7	128.7	129.5	129.7	124.9	120.7	120.5	126.9	144.6
1600	127.5	129.1	127.6	126.6	126.6	126.0	123.6	125.1	125.3	127.0	129.0	129.6	130.3	124.3	120.1	119.0	127.0	144.7
2000	125.3	126.6	125.4	124.9	124.3	123.6	121.1	122.1	123.1	124.8	127.1	126.9	128.4	122.8	119.1	117.3	124.8	142.5
2500	124.1	125.3	123.9	123.6	123.3	122.1	120.4	120.8	121.4	123.3	125.8	125.9	126.4	121.6	117.8	116.2	123.4	141.1
3150	123.6	124.6	123.1	122.9	122.1	121.9	119.8	120.4	120.8	123.3	125.4	125.4	125.1	121.1	116.8	115.0	122.8	140.5
4000	123.6	124.6	123.0	123.5	122.1	121.1	118.1	119.4	120.3	121.8	123.9	124.2	125.0	120.4	116.5	114.7	122.1	139.8
5000	121.7	122.5	120.9	121.9	119.7	118.6	115.9	116.9	118.2	119.7	122.7	122.5	123.2	118.1	114.9	113.0	120.2	137.9
6300	120.1	121.3	119.3	119.9	118.1	119.3	116.1	115.8	117.3	120.4	122.9	123.3	122.3	119.3	114.3	111.7	119.9	137.6
8000	120.8	121.3	120.0	119.3	117.5	118.0	114.8	116.0	118.5	119.7	122.3	122.2	123.0	118.8	115.3	112.0	119.6	137.3
10000	118.8	119.8	117.6	118.1	115.5	116.1	112.6	114.1	116.5	118.1	121.3	120.7	121.6	118.0	114.3	110.5	118.1	135.8
12500	117.9	119.1	116.6	118.0	115.1	115.8	112.1	113.3	116.6	117.8	121.0	120.7	121.6	118.1	114.8	111.0	117.9	135.6
16000	115.6	116.8	115.0	114.9	112.1	112.6	109.6	111.1	114.1	116.1	119.0	119.1	119.3	117.0	112.5	109.5	115.8	133.5
20000	114.6	115.6	113.8	113.6	110.6	110.8	108.1	110.6	113.6	115.1	117.3	118.0	118.6	115.9	112.1	108.0	114.7	132.4
OVERALL	143.4	141.2	139.2	138.5	137.1	136.4	135.2	136.2	136.4	138.3	140.3	140.1	140.3	137.3	134.0	133.8	138.2	155.9

TABLE XIV. - Concluded. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF MINUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) Concluded. 100 Percent speed; fan physical speed, 2192 rpm; fundamental blade passage frequency, 548 hertz

(d-2) Data adjusted to standard day 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	81.2	77.7	80.1	76.7	81.2	80.4	79.7	82.6	79.6	79.2	81.1	82.8	84.2	85.7	89.7	92.4
63	78.6	79.9	78.4	78.6	80.2	79.1	78.7	81.2	78.4	77.7	80.2	81.3	84.2	85.7	89.9	93.5
80	81.0	82.4	79.4	78.2	79.2	79.0	78.7	80.9	79.4	80.0	82.2	83.1	85.2	86.7	91.0	91.7
100	83.7	83.5	83.5	81.4	82.0	82.5	80.5	82.5	82.9	82.7	85.4	86.0	86.7	88.2	90.7	91.1
125	86.4	87.6	85.9	84.1	84.9	84.6	83.4	84.7	83.9	85.7	87.6	87.5	88.1	87.7	90.4	90.3
160	86.5	87.0	86.2	84.2	84.2	85.0	83.9	85.5	85.4	86.0	86.7	88.1	86.0	86.5	88.9	90.4
200	89.7	90.0	87.0	85.0	84.2	83.5	81.5	83.5	82.7	84.2	86.4	86.1	87.5	81.4	88.2	88.3
250	93.4	93.2	89.7	88.6	86.6	87.1	84.7	85.1	85.9	87.7	89.1	90.2	89.7	88.9	88.1	87.9
315	94.4	93.9	91.7	91.2	89.1	88.6	87.4	88.9	89.1	90.6	92.6	92.7	92.6	91.1	89.4	88.3
400	93.3	95.3	93.6	90.8	89.8	89.6	88.1	89.0	90.3	91.6	93.8	94.6	93.3	91.0	88.3	87.5
500	107.0	107.3	104.8	103.7	101.7	100.5	100.3	101.2	100.3	103.2	105.2	104.2	103.5	102.7	97.7	97.0
630	102.5	102.7	101.0	100.0	98.0	97.2	96.0	96.7	96.9	99.7	101.2	100.8	100.0	98.9	94.4	93.4
800	94.0	95.3	94.2	93.3	92.3	92.2	92.2	93.7	94.8	96.0	96.8	97.1	97.2	94.2	89.8	89.1
1000	99.3	101.8	99.8	99.3	98.6	97.9	97.3	97.8	98.1	99.1	100.8	101.0	102.1	96.4	91.9	92.1
1250	97.0	99.2	97.2	97.0	96.3	95.5	94.3	95.5	96.3	96.8	98.8	99.6	99.8	95.0	90.8	90.6
1600	97.6	99.2	97.7	96.7	96.7	96.1	93.7	95.2	95.4	97.1	99.1	99.7	100.4	94.4	90.2	89.1
2000	95.3	96.6	95.4	94.9	94.3	93.6	91.1	92.1	93.1	94.8	97.1	96.9	98.4	92.8	89.1	87.3
2500	94.0	95.2	93.8	93.5	93.2	92.0	90.3	90.7	91.3	93.2	95.7	95.8	96.3	91.5	87.7	86.1
3150	93.3	94.3	92.8	92.6	91.8	91.6	89.5	90.1	90.5	93.0	95.1	95.1	94.8	90.8	86.5	84.7
4000	93.1	94.1	92.5	93.0	91.6	90.6	87.6	88.9	89.8	91.3	93.4	93.7	94.5	89.9	86.0	84.2
5000	90.9	91.7	90.1	91.1	88.9	87.8	85.1	86.1	87.4	88.9	91.9	91.7	92.4	87.3	84.1	82.2
6300	88.8	90.0	89.0	88.7	86.9	88.0	84.8	84.5	86.0	89.1	91.6	92.0	91.0	86.0	83.0	80.4
8000	88.9	89.4	88.1	87.4	85.6	86.1	82.9	84.1	86.6	87.8	90.4	90.3	91.1	86.9	83.4	80.1
10000	85.9	86.9	84.7	85.2	82.6	83.2	79.7	81.2	83.6	85.2	88.4	87.8	88.7	85.1	81.4	77.6
12500	83.6	84.8	82.3	83.7	80.8	81.5	77.8	79.0	82.3	83.5	86.7	86.4	87.3	83.8	80.5	76.7
16000	79.4	80.7	78.8	78.8	76.0	76.5	73.5	74.9	77.9	79.9	82.9	82.9	83.1	80.8	76.3	73.3
20000	75.7	76.7	74.9	74.7	71.7	71.9	69.2	71.7	74.7	76.2	78.4	79.1	79.7	77.0	73.2	69.1
OVERALL	110.5	111.3	109.3	108.5	107.2	106.4	105.3	106.3	106.4	108.3	110.2	110.1	110.2	107.3	104.1	104.0
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	85.1	94.1	96.3	98.3	98.8	99.5	99.0	100.5	100.7	102.6	104.2	103.2	102.3	97.3	91.0	86.0
304.8 M	75.4	85.5	88.2	90.4	91.1	91.7	91.5	93.0	93.2	95.1	96.6	95.4	94.1	89.5	82.9	77.6

TABLE XV. - FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND APPROACH PLUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) 60 Percent speed; fan physical speed, 1323 rpm; fundamental blade passage frequency, 330 hertz

(a-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE POWER LEVEL (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) DB 1.0 METER RADIUS																	
50	97.6	100.1	101.3	101.6	103.0	105.3	105.3	105.6	105.0	107.3	105.3	106.8	106.5	105.3	107.0	101.7	105.8	123.5
63	97.6	100.7	99.3	99.6	102.3	105.4	106.3	104.8	101.3	105.0	103.5	104.5	105.0	106.3	104.8	101.4	104.2	121.9
80	97.3	101.4	98.8	98.7	101.8	105.3	102.0	102.4	99.8	103.3	102.2	103.0	104.5	107.0	104.5	100.6	103.0	120.7
100	100.9	101.7	100.7	101.2	102.0	104.7	101.5	102.0	98.5	102.7	102.0	103.2	104.7	105.2	103.5	100.6	102.6	120.3
125	104.7	105.7	104.7	103.2	104.0	106.3	102.0	102.5	101.2	103.5	102.2	103.2	104.5	105.2	104.0	102.4	103.8	121.5
160	106.5	106.4	104.8	101.0	102.3	103.8	100.6	101.8	100.3	101.3	100.8	102.6	103.2	105.3	103.3	101.2	102.6	120.3
200	105.8	105.4	103.3	99.8	100.3	101.3	98.5	101.3	99.0	98.8	97.5	99.0	102.0	102.8	101.8	99.9	101.0	118.7
250	107.6	108.1	107.3	104.3	102.3	102.8	99.6	100.3	99.1	100.1	100.6	103.3	106.6	107.1	105.8	101.2	103.8	121.5
315	111.3	112.5	110.3	110.5	110.3	110.3	112.3	110.3	111.5	112.0	111.3	114.6	115.3	115.5	115.0	113.9	115.0	132.7
400	112.3	112.0	111.3	110.0	107.5	104.5	102.3	102.0	102.3	104.0	104.3	107.2	109.0	110.3	108.3	104.7	107.5	125.2
500	110.5	110.0	109.1	108.3	105.3	102.8	100.8	100.3	100.8	102.1	102.8	105.3	109.1	110.6	108.6	102.7	106.0	123.7
630	112.1	111.3	111.4	110.6	108.0	106.4	104.9	103.6	104.9	106.6	106.1	108.9	112.9	113.4	111.1	106.3	109.1	126.8
800	109.2	109.1	108.3	107.4	105.8	102.3	101.1	100.1	101.1	102.8	104.6	107.1	109.6	111.3	108.8	102.2	106.4	124.1
1000	109.8	111.4	111.3	110.4	107.3	105.3	101.9	100.7	101.2	102.7	104.9	107.4	109.9	111.9	110.4	103.3	107.4	125.2
1250	107.4	107.4	108.3	107.2	105.7	101.9	99.9	99.7	99.4	101.4	103.7	105.2	107.7	109.2	108.4	101.5	105.3	123.0
1600	106.5	106.0	107.5	106.5	104.5	101.0	97.5	97.0	98.0	100.2	103.0	104.7	107.5	106.5	106.5	99.4	104.3	122.0
2000	106.4	107.2	107.2	106.2	104.2	100.7	98.2	97.7	98.2	100.7	101.9	103.9	106.9	106.7	106.7	101.8	103.8	121.5
2500	104.0	105.3	104.9	104.6	102.1	98.8	96.3	95.8	96.3	99.1	101.1	102.9	105.1	105.8	105.1	99.0	102.2	119.9
3150	104.3	104.1	103.0	103.5	100.8	97.5	94.3	91.4	94.3	97.5	99.8	101.8	103.5	105.0	104.0	97.7	101.0	118.7
4000	103.3	103.8	103.4	103.4	100.9	97.1	93.1	91.0	94.4	96.6	98.9	100.9	103.9	104.4	104.1	97.5	100.7	118.4
5000	101.9	102.8	101.4	101.3	98.9	94.1	90.9	88.4	91.4	94.2	97.9	98.7	101.9	101.1	102.1	96.1	98.6	116.3
6300	101.6	101.1	99.5	100.0	96.5	93.0	89.6	85.7	89.5	94.5	98.3	99.2	100.2	101.8	100.2	93.7	97.7	115.4
8000	101.7	101.2	99.7	99.7	96.2	92.0	87.4	84.7	90.2	92.7	96.7	97.8	101.0	100.7	100.4	93.0	97.2	114.9
10000	100.0	99.5	97.5	97.7	94.0	90.7	84.7	82.2	87.5	90.2	94.7	95.9	99.0	98.7	98.5	91.1	95.2	112.9
12500	97.5	99.2	96.3	97.0	93.5	89.8	83.3	81.0	87.3	89.3	93.5	95.2	98.2	97.5	98.8	90.7	94.6	112.3
16000	97.2	97.3	94.5	94.9	90.9	86.4	80.9	78.2	83.9	87.4	91.4	93.2	95.7	96.2	95.4	89.4	92.3	110.0
20000	97.0	96.0	94.0	93.2	89.2	85.0	81.3	79.9	84.3	87.0	89.7	92.6	95.3	95.8	94.8	88.4	91.6	109.3
OVERALL	123.0	122.9	121.4	122.2	119.8	117.4	116.4	115.6	119.5	117.2	117.2	119.6	121.5	122.6	121.1	117.4	119.7	137.4

TABLE XV. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND APPROACH PLUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) Concluded. 60 Percent speed; fan physical speed, 1323 rpm; fundamental blade passage frequency, 330 hertz

(a-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG 10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	69.8	74.1	71.6	71.8	74.1	76.6	75.6	76.1	75.3	77.6	75.6	77.1	76.8	79.6	77.3	72.0
63	67.3	72.3	69.6	69.3	72.6	75.6	75.6	75.1	71.6	75.3	73.8	74.8	75.3	78.6	75.1	71.7
80	67.6	72.1	69.1	69.1	72.1	75.6	72.3	73.1	70.1	73.6	72.6	73.3	74.8	77.3	74.8	70.9
100	70.8	72.6	71.6	71.3	72.8	75.0	71.8	72.3	68.8	73.0	72.3	73.5	75.0	75.5	73.8	70.9
125	75.0	76.0	76.0	73.5	74.3	76.3	72.3	72.8	71.5	73.8	72.5	73.5	74.8	75.5	74.3	72.7
160	79.1	74.6	75.1	71.9	75.1	74.1	70.9	72.1	70.6	71.6	71.1	72.9	73.6	75.6	73.6	71.5
200	76.1	76.1	73.6	70.1	71.1	72.1	68.8	71.6	69.3	69.1	67.8	69.3	72.3	73.1	72.1	70.2
250	79.9	79.4	77.6	74.6	73.1	73.1	69.9	70.6	69.4	70.4	70.9	73.6	76.9	77.4	76.1	71.5
315	85.6	88.3	90.6	89.8	86.3	80.3	82.6	80.6	81.6	82.3	81.3	84.9	85.6	85.8	85.3	84.2
400	82.5	82.2	83.6	80.2	77.7	74.7	73.0	72.2	72.5	74.2	74.5	77.5	79.2	80.5	78.5	74.9
500	80.8	80.3	79.3	77.3	75.5	73.3	71.0	70.5	71.0	72.5	73.0	75.5	79.3	80.8	79.8	72.9
630	82.3	82.1	81.6	80.6	78.3	76.6	75.1	73.8	75.1	76.8	76.3	79.1	83.1	83.6	81.3	76.5
800	79.5	79.3	79.3	77.8	76.3	73.3	71.3	70.3	71.3	73.0	74.8	77.3	79.8	81.5	79.0	72.4
1000	80.1	81.0	81.6	79.6	78.1	74.1	72.1	70.3	71.4	72.9	75.1	77.6	80.1	82.1	80.6	73.5
1250	78.5	79.5	79.3	77.3	75.8	72.3	70.0	68.8	69.5	71.5	73.8	75.3	77.8	79.3	78.5	71.6
1600	76.6	78.1	77.6	76.0	74.6	71.1	67.6	67.1	68.1	70.3	73.1	74.8	77.6	78.6	76.6	69.5
2000	77.4	77.2	77.2	76.2	74.2	70.7	68.2	67.7	68.2	70.7	71.9	73.9	76.9	76.7	76.7	71.8
2500	74.5	75.5	74.7	74.5	72.0	68.7	66.2	65.7	66.2	69.0	71.0	72.8	75.0	75.7	75.0	68.9
3150	74.0	74.5	73.5	73.2	70.5	67.2	64.0	61.5	64.0	67.2	69.5	71.5	73.2	74.7	73.7	67.4
4000	73.4	74.1	72.9	72.9	70.4	66.6	62.6	61.4	63.9	66.1	68.4	70.4	73.4	73.9	73.6	67.0
5000	71.1	71.8	70.6	71.1	68.1	63.4	59.1	57.6	60.6	63.4	67.1	67.9	71.1	70.3	71.3	65.3
6300	69.7	70.0	68.2	68.8	65.3	63.7	58.3	54.5	58.2	63.2	67.0	68.0	69.0	70.5	68.9	62.5
8000	69.8	69.3	67.8	67.3	64.3	61.0	55.5	52.8	58.3	60.8	64.8	65.9	69.1	66.8	68.5	61.1
10000	67.1	66.6	64.6	64.8	61.1	57.8	51.8	49.3	54.6	57.3	61.8	63.0	66.1	65.8	65.6	58.2
12500	65.2	65.0	62.0	63.2	59.2	55.6	49.1	46.8	53.0	55.0	59.3	60.9	64.0	63.2	64.5	56.4
16000	61.0	61.0	58.7	58.9	54.8	50.3	44.7	42.0	47.8	51.2	55.3	57.0	59.5	60.0	59.3	53.2
20000	58.1	57.9	55.1	54.3	50.3	46.1	42.3	40.9	45.3	48.1	50.8	53.7	56.4	56.9	55.9	49.5
OVERALL	93.2	93.1	93.6	92.4	90.0	87.6	86.6	85.9	85.9	87.4	87.3	89.7	91.7	92.7	91.3	87.6
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	67.1	75.2	79.9	81.5	80.9	78.5	75.5	77.7	78.6	80.1	80.1	81.8	82.4	81.3	77.5	69.4
304.8 M	57.7	66.8	72.1	73.8	73.3	70.3	71.2	73.1	71.2	72.7	72.5	74.3	74.7	73.5	69.3	60.9

TABLE XV. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND APPROACH PLUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) 70 Percent speed; fan physical speed, 1544 rpm; fundamental blade passage frequency, 386 hertz

(b-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	101.5	100.7	100.7	103.7	102.0	104.2	104.2	103.0	103.2	106.7	103.7	108.0	107.2	106.0	107.0	102.1	104.9	122.6
63	95.0	98.0	97.5	100.3	101.3	101.0	102.0	98.0	101.5	104.5	99.5	103.5	105.3	103.8	106.3	100.7	102.3	120.0
80	97.1	99.1	100.1	100.3	100.3	100.6	100.1	96.8	101.1	103.1	99.6	101.8	104.1	102.3	105.6	100.2	101.4	119.1
100	101.5	102.3	101.5	102.3	101.8	102.5	101.3	98.5	101.8	103.5	101.0	103.3	103.8	102.0	104.0	100.1	102.2	119.9
125	105.2	106.2	105.2	105.2	105.0	102.5	102.5	101.7	102.2	104.5	102.5	104.5	105.0	103.5	105.7	100.9	103.9	121.6
160	104.6	104.8	104.6	103.3	102.8	101.0	100.8	99.3	101.8	103.1	102.8	104.3	103.8	103.1	103.3	101.0	102.8	120.5
200	107.3	105.3	104.3	101.5	99.5	98.8	98.3	97.8	98.5	100.3	100.0	101.0	101.8	101.3	104.0	99.1	101.0	118.7
251	108.3	108.8	107.3	105.3	103.8	101.6	100.3	98.3	100.3	102.6	103.8	105.9	107.6	106.6	107.3	100.5	104.6	122.3
315	112.8	112.1	112.3	110.3	108.6	107.8	105.3	103.8	103.3	105.1	106.6	109.3	109.1	109.3	106.8	103.2	108.1	125.8
400	122.8	121.2	120.1	118.6	121.8	122.3	119.1	116.6	111.1	114.6	117.3	119.8	118.3	120.3	116.8	113.5	119.9	137.6
500	112.3	112.1	111.3	110.6	108.3	105.6	104.1	103.1	104.3	106.1	107.6	109.8	111.6	111.3	108.6	104.2	108.5	126.2
630	110.6	110.9	110.4	110.1	107.9	104.1	103.1	101.9	102.9	105.9	107.4	109.9	112.4	111.6	107.9	102.8	108.2	125.9
800	112.8	113.1	112.8	111.6	110.3	108.8	107.3	107.3	107.8	109.6	111.8	113.5	117.6	117.8	113.8	108.5	113.2	130.9
1000	110.7	111.2	111.7	110.4	108.7	105.4	103.9	102.7	103.4	106.2	107.9	110.4	112.2	113.2	109.2	103.8	108.9	126.6
1250	111.7	111.7	111.5	111.6	111.0	108.7	104.5	104.0	103.7	106.2	108.2	111.5	113.5	113.7	111.2	105.1	110.2	127.9
1600	110.2	112.0	111.8	110.8	109.6	106.0	101.6	101.5	103.3	105.8	107.0	110.0	112.5	112.8	108.5	102.4	108.8	126.5
2000	109.2	111.2	110.5	109.4	108.2	104.9	100.7	100.2	101.7	103.9	106.7	108.4	111.2	111.4	108.4	103.1	107.6	125.3
2500	108.1	109.8	108.8	108.8	106.6	103.3	99.3	98.4	99.6	102.6	105.3	107.1	109.6	109.8	106.3	100.0	106.1	123.8
3150	107.6	108.3	107.6	107.1	105.3	102.6	97.8	96.6	98.6	102.3	104.8	106.8	108.2	109.3	106.1	99.5	105.2	122.9
4000	107.4	108.1	107.6	107.4	105.1	101.6	95.6	96.1	97.9	100.9	103.4	105.7	108.1	109.1	106.4	100.1	104.8	122.5
5000	106.2	106.9	105.7	106.4	103.2	99.4	94.2	93.4	96.7	98.4	102.7	103.2	107.2	106.2	104.7	98.6	103.1	120.8
6300	105.9	106.1	104.6	104.3	101.6	100.3	94.3	90.8	94.8	99.3	103.1	104.4	105.6	107.1	103.1	96.8	102.6	120.3
8000	104.5	106.3	104.8	104.0	101.3	98.8	92.5	90.8	95.8	98.3	102.0	102.6	106.5	106.5	103.5	96.8	102.3	120.0
10000	104.3	104.8	102.3	102.5	99.0	97.0	89.6	88.5	93.3	96.3	101.0	101.4	104.8	104.8	102.0	94.9	100.6	118.3
12500	103.8	104.3	101.1	102.3	98.3	96.0	88.8	87.3	93.3	95.8	100.1	100.8	104.8	104.1	102.1	95.0	100.1	117.8
16000	102.2	102.7	100.0	99.2	95.7	93.2	85.2	84.9	90.2	93.9	97.7	99.0	101.9	102.7	99.2	94.0	97.9	115.6
20000	102.1	102.4	99.1	98.3	94.1	92.1	85.1	84.9	89.9	92.8	96.1	97.9	101.6	102.1	98.9	92.5	97.2	114.9
OVERALL	125.6	125.4	127.1	125.8	124.1	123.5	120.7	118.6	116.9	119.6	121.3	124.0	124.8	125.4	122.5	117.8	123.1	140.8

TABLE XV. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND APPROACH PLUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) Concluded. 70 Percent speed; fan physical speed, 1544 rpm; fundamental blade passage frequency, 386 hertz

(b-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG 10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	71.8	71.0	71.0	74.0	72.3	74.5	74.5	73.3	73.5	77.0	74.0	78.3	77.5	76.3	77.3	72.4
63	66.1	68.3	67.8	70.3	71.6	71.3	72.3	68.3	71.8	74.8	69.8	73.8	75.6	74.1	76.6	71.0
80	67.4	70.1	70.4	70.6	70.6	70.9	70.4	67.1	71.4	73.4	69.9	72.1	74.4	72.6	75.9	70.5
100	71.8	72.6	71.8	72.6	72.1	72.3	71.6	68.8	72.1	73.8	71.3	73.6	74.1	73.3	74.3	70.4
125	75.5	76.5	75.5	75.5	75.3	72.8	72.8	72.0	72.5	74.8	72.8	74.8	75.3	73.8	76.0	71.2
160	74.9	75.1	74.5	73.6	73.1	71.9	71.1	69.6	72.1	73.4	73.1	74.6	74.1	73.4	73.6	71.3
200	76.6	76.1	74.6	71.8	70.1	69.1	68.6	68.1	68.8	70.6	70.3	71.3	72.1	71.6	74.3	69.4
250	78.6	79.1	77.6	75.6	74.1	71.9	70.6	68.6	70.6	72.9	74.1	76.2	77.9	76.9	77.6	70.8
315	83.1	82.4	82.6	80.6	78.9	78.1	75.6	74.1	73.6	75.4	76.9	79.6	79.4	75.6	77.1	73.5
400	93.0	91.5	95.3	93.8	92.0	92.5	89.3	86.8	81.3	84.8	87.5	90.0	88.5	90.5	87.0	83.7
500	82.5	82.3	81.5	80.8	78.5	75.8	74.3	73.3	74.5	76.3	77.8	80.0	81.8	81.5	78.8	74.4
630	80.8	81.1	80.6	80.3	78.1	74.3	73.3	72.1	73.1	76.1	77.6	80.1	82.6	81.8	78.1	73.0
800	88.0	85.3	85.0	83.8	82.5	79.0	77.5	77.5	78.0	79.8	82.0	86.1	87.8	88.0	84.0	78.7
1000	80.9	82.4	81.9	80.6	78.9	75.6	74.1	72.9	73.6	76.4	78.1	80.6	82.4	83.4	79.4	74.0
1250	81.8	83.8	83.6	83.1	81.1	78.8	74.6	74.1	73.8	76.3	78.3	81.6	83.6	83.8	81.3	75.2
1600	80.4	82.1	81.9	80.9	79.9	76.1	71.9	71.6	73.4	75.9	77.1	80.1	82.6	82.9	78.6	72.5
2000	79.2	81.2	80.9	79.4	78.2	74.9	70.7	70.2	71.7	73.9	76.7	78.4	81.2	81.4	78.4	73.1
2500	78.0	79.7	78.7	78.7	76.5	73.2	69.2	68.5	69.5	72.5	75.2	77.0	79.5	79.7	76.2	69.9
3150	77.3	78.5	77.3	76.8	75.0	72.3	67.5	66.3	68.3	72.0	74.5	76.5	78.0	79.0	75.8	69.2
4000	76.9	77.6	77.1	76.9	74.6	71.1	66.1	65.6	67.4	70.4	72.9	75.2	77.6	78.6	75.9	69.6
5000	75.4	76.1	74.9	75.6	72.4	68.6	63.4	62.6	65.9	67.6	71.9	72.4	76.4	75.4	73.9	67.8
6300	74.5	74.8	73.3	73.1	70.4	69.0	63.0	59.6	63.5	68.0	71.8	73.1	74.5	75.8	71.8	65.6
8000	74.6	74.4	72.9	72.1	69.4	66.9	60.6	58.9	63.9	66.4	70.1	70.7	74.6	74.6	71.6	64.9
10000	71.9	71.9	69.4	69.6	66.1	64.1	56.9	55.6	60.4	63.4	68.1	68.5	71.9	71.9	69.1	62.0
12500	69.5	70.0	66.8	68.0	64.0	61.8	54.6	53.1	59.0	61.5	65.9	66.5	70.5	69.8	67.8	60.7
16000	66.0	66.5	63.8	63.1	59.6	57.1	50.1	48.7	54.1	57.7	61.6	62.8	65.8	66.5	63.1	57.8
20000	63.2	63.5	60.2	59.4	55.2	53.2	45.2	46.0	51.0	53.9	57.2	59.0	62.7	63.2	60.0	53.6
OVERALL	95.7	95.5	97.2	96.0	94.2	93.7	90.9	88.9	87.0	89.7	91.4	94.1	94.9	95.5	92.6	87.9
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	76.5	78.4	84.2	85.8	85.8	86.0	83.7	82.3	80.9	83.7	85.3	86.9	86.2	85.2	79.5	70.4
304.8 M	61.1	70.0	76.4	78.2	78.4	78.7	76.5	75.2	73.5	76.3	77.9	79.4	78.5	77.3	71.4	61.9

TABLE XV. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND APPROACH PLUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) 86 Percent speed; fan physical speed, 1890 rpm; fundamental blade passage frequency, 472 hertz

(c-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) EN 1.0 METER RADIUS																
50	96.9	97.4	101.4	102.7	104.2	105.7	105.7	107.2	108.7	109.7	105.9	106.9	107.9	110.9	106.7	103.8	107.0	124.7
63	104.7	103.7	101.9	101.9	102.7	105.7	107.9	108.9	107.4	108.7	107.4	105.9	106.9	109.4	106.7	103.6	106.9	124.6
80	98.0	98.5	99.7	101.2	101.2	104.0	102.5	106.5	106.0	106.7	102.2	102.7	105.0	107.5	105.0	103.4	104.4	122.1
100	104.7	103.2	103.2	105.0	103.7	105.5	103.5	106.5	106.7	107.0	103.0	105.0	106.2	108.0	105.7	103.9	105.5	123.2
125	108.5	108.0	106.7	107.2	108.7	106.0	107.2	108.5	108.2	109.2	106.0	106.5	107.2	107.7	108.0	105.4	107.6	125.3
160	108.2	107.8	107.8	106.5	110.8	109.3	107.8	108.5	107.0	106.8	106.8	107.8	107.2	107.0	106.5	104.6	107.8	125.5
200	109.2	108.3	106.0	105.3	109.0	104.5	104.0	105.5	103.8	103.5	103.0	104.0	105.0	104.5	105.5	102.4	104.8	122.5
250	111.8	111.8	109.3	107.5	109.0	106.3	104.0	105.3	105.3	106.0	107.0	108.3	110.3	109.3	109.0	104.4	107.8	125.5
315	113.7	111.7	110.2	109.0	110.0	106.2	105.2	107.2	106.5	107.2	109.0	110.7	110.0	109.2	107.5	105.1	108.7	126.4
400	118.5	115.3	121.8	117.5	115.8	113.0	110.5	112.0	112.5	115.3	116.0	115.6	117.2	116.0	112.0	112.4	115.8	133.5
500	124.5	128.8	132.3	126.8	121.5	121.5	118.3	121.0	121.3	124.8	124.5	122.0	126.3	125.0	119.5	121.9	124.7	142.4
630	116.3	114.8	115.5	113.5	113.3	109.3	107.8	107.8	109.5	111.3	112.5	113.3	115.8	115.0	111.8	107.7	112.5	130.2
800	115.4	115.6	116.3	114.9	114.3	110.3	109.1	109.6	111.9	113.1	116.4	116.1	118.6	116.8	112.8	109.7	114.5	132.2
1000	118.8	120.0	122.3	120.5	119.8	114.3	112.0	115.3	119.0	119.0	123.0	121.1	125.3	121.5	118.0	114.9	120.3	138.0
1250	114.9	115.9	115.9	115.1	114.6	110.6	108.4	107.9	108.9	111.1	113.6	114.9	116.6	116.4	111.9	107.8	113.4	131.1
1600	115.0	116.3	116.3	116.8	116.0	111.5	108.8	108.0	109.3	111.3	113.5	114.8	117.3	117.0	112.3	106.9	114.0	131.7
2000	114.1	116.1	116.4	116.0	114.8	111.1	107.4	107.1	108.6	111.1	113.6	114.6	117.6	116.4	112.9	107.0	113.7	131.4
2500	112.7	114.2	114.0	114.2	112.7	109.5	106.0	104.7	106.5	109.0	112.0	112.7	115.5	114.7	110.7	104.9	111.7	129.4
3150	112.4	113.7	113.7	113.9	111.7	108.9	104.9	103.7	105.7	109.2	111.9	112.5	114.4	114.7	111.2	104.4	111.3	129.0
4000	112.4	113.6	113.6	113.6	111.8	108.1	103.8	102.8	105.3	108.3	111.1	111.6	114.6	114.6	111.3	104.8	111.0	128.7
5000	111.8	112.3	112.1	112.6	109.8	106.1	101.8	100.6	103.6	106.1	110.1	109.9	113.3	111.6	109.8	104.0	109.4	127.1
6300	110.5	112.2	111.0	111.2	107.7	107.0	102.2	99.2	102.5	107.2	110.2	111.3	112.2	113.0	108.5	102.4	109.1	126.8
8000	111.9	112.4	111.6	111.1	108.4	105.6	100.4	99.1	103.4	106.4	109.6	109.5	113.1	112.4	109.7	102.4	109.0	126.7
10000	110.2	110.9	109.7	110.2	105.9	103.9	97.9	97.9	101.4	104.7	108.2	108.6	111.4	111.2	108.2	100.8	107.5	125.2
12500	110.3	110.8	109.3	109.8	105.3	103.2	97.5	96.7	102.0	104.8	108.5	109.2	112.0	111.0	108.8	101.7	107.6	125.3
16000	108.4	109.2	108.8	107.2	102.7	100.4	94.7	94.7	99.4	102.9	105.9	107.5	109.7	110.0	106.4	101.0	105.6	123.3
20000	108.0	108.5	107.3	105.7	101.0	99.3	94.3	94.5	99.0	102.0	104.5	106.6	109.3	109.3	105.8	99.7	104.8	122.5
OVERALL	128.9	131.3	133.8	130.0	127.4	125.0	122.6	124.3	125.4	127.7	128.9	128.0	131.2	129.8	125.8	124.4	128.3	146.1

TABLE XV. - Continued. FAR-FIELD NOIZE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND APPROACH PLUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) Concluded. 86 Percent speed; fan physical speed, 1890 rpm; fundamental blade passage frequency, 472 hertz

(c-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG 10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	67.2	67.7	71.7	73.0	74.5	76.0	76.0	77.5	79.0	80.0	76.2	77.2	78.2	81.2	77.0	74.1
63	75.0	74.0	72.2	72.2	73.0	76.0	78.2	79.2	77.7	79.0	77.7	76.2	77.2	79.7	77.0	73.9
80	68.3	66.8	70.0	71.5	71.5	74.3	72.8	76.8	76.3	77.0	72.5	73.0	75.3	77.8	75.3	73.7
100	75.0	73.5	73.5	75.3	74.0	75.8	73.8	76.8	77.0	77.3	73.3	75.3	76.5	76.3	76.0	74.2
125	78.8	78.3	77.0	77.5	79.0	76.3	77.5	78.8	78.5	79.5	76.3	76.8	77.5	78.0	78.3	75.7
160	78.0	78.1	78.1	76.8	81.1	79.6	78.1	78.8	77.3	77.1	77.1	78.1	77.6	77.3	76.8	74.9
200	79.8	78.6	76.3	75.6	75.3	74.8	74.3	75.8	74.1	73.8	72.2	74.3	75.2	74.8	75.8	72.7
250	82.1	82.1	79.6	77.8	79.3	76.6	74.3	76.1	75.6	76.3	77.3	78.6	80.6	79.6	79.3	74.7
315	84.6	82.0	80.5	79.3	80.3	76.5	75.5	77.5	76.8	77.5	79.3	81.0	80.3	79.5	77.8	75.4
400	88.7	89.5	92.0	87.7	86.0	83.2	80.7	82.2	82.7	85.5	86.2	85.8	87.5	86.2	82.2	82.6
500	94.7	99.0	102.5	97.0	91.7	91.5	88.5	91.2	91.5	95.0	94.7	92.2	96.5	95.2	89.7	92.1
630	85.5	85.0	85.7	83.7	83.5	79.5	79.0	78.0	79.7	81.5	82.7	83.5	86.0	85.2	82.0	77.9
800	86.5	85.8	86.5	85.0	84.5	80.5	79.3	79.8	82.1	83.3	86.6	86.3	88.8	87.0	83.0	79.9
1000	89.0	90.2	92.5	90.7	90.0	84.5	83.0	85.5	89.2	89.2	93.2	91.3	95.5	91.7	88.2	85.1
1250	85.0	86.0	86.0	85.2	84.7	80.7	78.5	78.0	79.0	81.2	83.7	85.0	86.7	86.5	82.0	77.9
1600	85.1	86.4	86.9	86.9	86.1	81.6	78.9	78.1	79.4	81.4	83.6	84.9	87.4	87.1	82.4	77.0
2000	84.1	86.1	86.4	86.6	84.8	81.1	77.4	77.1	78.6	81.1	83.6	84.6	87.6	86.4	82.9	77.0
2500	82.6	84.1	83.9	84.1	82.6	79.4	75.9	74.6	76.4	78.9	81.9	82.6	85.4	84.6	80.6	74.8
3150	82.1	83.4	83.4	83.6	81.4	78.6	74.6	73.4	75.4	78.9	81.6	82.2	84.1	84.4	80.9	74.1
4000	81.9	83.1	83.1	83.1	81.3	77.6	73.3	72.3	74.8	77.8	80.6	81.1	84.1	84.1	80.8	74.3
5000	81.3	81.5	81.3	82.0	79.3	75.3	71.0	69.8	72.8	75.3	79.3	79.1	82.5	80.8	79.0	73.2
6300	79.2	80.9	79.7	79.9	76.4	75.7	70.9	67.9	71.2	75.9	78.9	80.0	80.9	81.7	77.2	71.1
8000	80.0	80.5	79.7	79.2	76.5	73.7	68.5	67.2	71.5	74.5	77.7	77.6	81.2	80.5	77.8	70.5
10000	77.3	78.0	76.4	77.3	73.0	71.0	65.0	65.0	68.5	71.8	75.3	75.7	78.5	78.3	75.3	67.9
12500	74.0	76.5	75.0	75.5	71.0	69.0	63.2	62.5	67.7	70.5	74.2	74.9	77.7	76.7	74.5	67.4
16000	72.2	73.0	71.8	71.1	66.0	64.3	58.6	58.5	63.2	66.7	69.8	71.3	73.5	73.8	70.2	64.8
20000	69.1	69.5	68.4	66.8	62.1	60.4	55.4	55.6	60.1	63.1	65.6	67.7	70.4	70.4	66.9	60.8
OVERALL	98.9	101.3	104.0	100.1	97.5	95.1	92.7	94.5	95.5	97.8	99.0	97.9	101.3	99.8	95.7	94.5
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	73.3	84.1	90.4	90.0	89.0	88.3	86.4	88.1	89.2	91.8	92.3	90.7	92.5	89.7	82.7	77.0
304.8 M	69.5	75.7	82.5	82.1	81.3	80.3	78.9	80.9	81.9	84.4	84.8	83.0	84.8	81.7	74.3	68.7

TABLE XV. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND APPROACH PLUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) 93 Percent speed; fan physical speed, 2051 rpm; fundamental blade passage frequency, 512 hertz

(d-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	104.8	104.6	105.1	102.6	103.3	105.3	104.3	109.1	107.6	109.8	108.1	108.3	108.6	109.8	109.3	105.5	107.5	125.2
63	106.8	104.8	101.3	101.6	104.6	107.3	106.1	109.3	109.3	108.3	107.3	107.1	107.1	109.6	108.8	105.0	107.4	125.1
80	103.6	103.4	100.6	101.6	102.4	103.6	103.4	107.4	106.4	105.9	105.4	104.4	105.9	107.1	107.4	105.0	105.2	122.9
100	107.3	107.3	104.5	105.8	104.5	104.8	105.5	107.3	105.8	107.0	106.8	106.1	107.3	109.0	108.0	105.7	106.5	124.2
125	108.0	109.3	108.5	108.8	106.3	105.2	107.0	107.0	106.8	107.0	108.5	108.8	108.3	109.3	109.0	105.9	107.9	125.6
160	109.6	110.3	109.0	107.8	107.0	105.0	105.8	107.3	106.5	107.8	108.5	109.1	107.8	107.8	107.5	106.2	107.7	125.4
200	109.6	111.6	109.8	106.3	105.3	103.1	103.8	104.8	103.8	104.3	105.8	105.8	106.8	106.3	107.6	104.7	106.0	123.7
250	112.6	113.1	111.1	109.3	108.6	106.6	104.8	106.1	105.3	107.6	109.6	111.3	111.6	110.8	109.8	106.2	109.2	126.9
315	114.9	115.2	112.7	111.7	110.2	107.2	106.7	107.4	107.9	109.2	111.2	112.7	111.9	111.2	109.2	107.0	110.5	128.2
400	116.6	117.4	118.4	116.6	114.9	111.4	112.1	111.6	112.1	112.6	114.9	116.1	116.1	115.1	112.1	109.5	114.5	132.2
500	126.9	130.4	132.6	131.6	130.1	122.6	130.4	129.1	129.6	126.6	126.6	128.4	129.9	126.4	124.6	121.8	128.9	146.6
630	117.9	119.4	119.9	119.1	117.1	111.9	115.4	114.6	115.4	115.4	116.9	118.1	119.4	117.9	114.6	111.5	116.9	134.6
800	116.2	117.4	117.9	116.7	115.2	111.9	111.4	111.2	111.9	114.4	116.7	118.4	118.9	118.7	113.4	110.0	115.7	133.4
1000	120.5	122.0	121.7	121.7	121.0	118.0	115.7	115.7	116.2	119.0	122.5	127.0	125.0	125.0	118.5	113.8	121.7	139.4
1250	116.0	117.8	117.5	117.0	115.8	113.0	110.8	110.3	111.0	114.0	116.3	117.8	119.0	118.5	113.5	110.2	115.6	133.3
1600	117.6	119.4	119.6	119.6	118.9	114.9	112.4	111.6	113.4	115.1	117.1	118.4	120.6	119.9	114.9	109.8	117.2	134.9
2000	116.2	117.4	118.2	118.4	117.2	114.2	110.4	109.4	111.2	114.4	116.2	116.9	119.7	118.4	114.2	108.8	115.9	133.6
2500	114.6	115.6	116.4	117.1	115.6	112.4	109.4	107.4	109.6	112.4	115.1	116.2	117.9	117.4	113.4	107.3	114.5	132.2
3150	114.7	115.9	115.4	116.4	115.2	112.7	108.9	106.7	108.7	112.4	115.4	115.9	117.2	117.4	113.2	107.1	114.2	131.9
4000	115.0	116.0	115.8	117.0	115.5	112.5	107.8	106.5	108.8	111.8	114.5	115.0	118.0	117.3	113.8	107.5	114.2	131.9
5000	113.0	114.7	114.5	116.2	113.2	110.2	105.7	104.0	107.2	109.7	113.2	113.3	116.0	115.0	112.2	106.7	112.5	130.2
6300	112.9	113.6	113.4	114.9	111.6	111.1	106.1	102.9	105.9	110.7	114.2	114.2	114.9	116.2	111.4	105.4	112.3	130.0
8000	114.1	114.9	114.1	114.6	111.6	110.1	104.8	102.8	107.1	109.8	113.3	113.2	116.4	115.8	112.1	105.4	112.3	130.0
10000	112.6	113.1	112.1	113.1	109.6	108.1	102.3	101.1	105.6	108.4	112.1	112.3	114.9	114.4	111.1	103.7	110.8	128.5
12500	111.9	113.2	111.4	113.6	109.4	107.9	101.6	100.4	105.6	108.1	111.9	112.6	115.4	114.2	111.9	104.8	110.9	128.6
16000	110.3	111.5	110.0	110.5	106.7	104.7	99.3	98.3	103.0	106.5	110.0	111.0	113.8	113.0	109.0	104.1	109.0	126.7
20000	109.9	111.1	109.1	109.6	105.1	103.3	98.4	97.9	103.1	105.9	108.6	110.0	113.1	112.4	109.1	102.5	108.2	125.9
OVERALL	130.7	133.0	134.3	133.7	132.2	127.0	131.2	130.0	130.6	129.3	130.7	132.7	133.5	132.0	128.6	124.9	131.4	149.1

TABLE XV. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND APPROACH PLUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) Concluded. 93 Percent speed; fan physical speed, 2051 rpm; fundamental blade passage frequency, 512 hertz

(d-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	75.1	74.9	73.4	72.9	73.6	75.6	74.6	79.4	77.9	80.1	78.4	78.6	78.9	80.1	79.6	75.8
63	77.1	75.1	71.6	71.9	74.9	77.6	75.4	79.6	79.6	78.6	77.6	77.4	77.4	79.9	79.1	75.3
80	72.9	73.7	70.9	71.9	72.7	73.9	73.7	77.7	76.7	76.2	75.7	74.7	76.2	77.4	77.7	75.3
100	77.6	77.6	74.8	76.1	74.8	75.1	75.8	77.3	76.1	77.3	77.1	76.4	77.6	79.3	78.3	76.0
125	78.3	79.6	78.8	79.1	78.6	75.6	77.3	77.3	77.1	77.3	78.8	79.1	78.6	79.6	79.3	76.2
160	79.3	80.6	79.3	78.1	77.3	75.3	77.1	77.6	76.8	78.1	78.8	79.4	78.1	78.1	77.8	76.5
200	79.9	81.9	79.1	76.6	75.6	73.4	74.1	75.1	74.1	74.6	76.1	76.1	77.1	76.6	77.9	75.0
250	82.9	83.4	81.4	80.1	78.9	76.9	75.1	76.4	75.6	77.9	79.9	81.6	81.9	81.1	80.1	76.5
315	85.2	85.5	83.0	82.0	80.5	77.5	77.0	77.7	78.2	79.5	81.5	83.0	82.2	81.5	79.5	77.3
400	86.8	87.6	88.6	86.8	85.1	81.6	82.3	81.8	82.3	82.8	85.1	86.3	86.3	85.3	82.3	79.7
500	97.1	100.6	102.8	101.8	100.3	92.8	100.6	99.3	99.8	96.8	96.8	98.6	100.1	96.6	94.8	92.0
630	88.1	89.6	90.1	89.3	87.3	82.1	85.6	84.8	85.6	85.6	87.1	88.3	89.6	88.1	84.8	81.7
800	86.4	87.6	88.1	86.9	85.4	82.1	81.6	81.4	82.1	84.6	86.9	88.6	89.1	88.9	83.6	80.2
1000	90.7	92.2	91.9	91.9	91.2	88.2	85.9	85.9	86.4	89.2	92.7	97.2	95.2	95.2	86.7	84.0
1250	86.1	87.9	87.6	87.1	85.9	83.1	80.9	80.4	81.1	84.1	86.4	87.9	89.1	88.6	83.6	80.3
1600	87.7	89.5	89.7	89.7	88.0	85.0	82.5	81.7	83.5	85.2	87.2	88.5	90.7	90.0	85.0	79.9
2000	86.2	87.4	88.2	88.4	87.2	84.2	80.4	79.4	81.2	84.4	86.2	86.9	89.7	88.4	84.2	78.8
2500	84.5	85.5	86.3	87.0	85.5	82.3	79.3	77.3	79.5	82.3	85.0	86.1	87.8	87.3	83.3	77.2
3150	84.4	85.6	85.1	86.1	84.9	82.4	78.6	76.4	78.4	82.1	85.1	85.6	86.9	87.1	82.9	76.8
4000	84.5	85.5	85.3	86.5	85.0	82.0	77.3	76.0	78.3	81.3	84.0	84.5	87.5	86.8	83.3	77.0
5000	83.2	83.9	83.7	85.4	82.4	79.4	74.9	73.2	76.4	78.9	82.4	82.5	85.2	84.2	81.4	75.9
6300	81.6	82.3	82.1	83.6	80.3	79.8	74.8	71.6	74.6	79.4	82.9	82.9	83.6	84.9	80.1	74.1
8000	82.2	83.0	82.2	82.7	79.7	78.2	72.9	70.9	75.2	77.9	81.4	81.3	84.4	83.9	80.2	73.5
10000	79.7	80.2	79.2	80.2	76.7	75.2	69.4	68.2	72.7	75.5	79.2	79.4	82.0	81.5	78.2	70.8
12500	77.6	78.9	77.1	79.3	75.1	73.6	67.3	66.1	71.3	73.8	77.6	78.3	81.1	79.9	77.6	70.5
16000	74.1	75.3	73.8	74.4	70.6	68.6	63.1	62.1	66.8	70.3	73.8	74.8	77.6	76.8	72.8	67.9
20000	71.0	72.2	70.2	70.7	66.2	64.4	59.5	59.0	64.2	67.0	69.7	71.1	74.2	73.5	70.2	63.6
OVERALL	100.7	103.1	104.4	103.7	102.3	97.0	101.4	100.3	100.8	99.4	100.6	102.7	103.5	101.9	98.5	94.9
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	75.2	86.0	91.3	93.5	93.9	90.3	93.8	93.3	94.3	93.8	94.6	95.2	95.2	91.6	85.9	77.8
304.8 M	65.4	77.5	83.4	85.7	86.3	82.6	86.7	86.2	87.1	86.4	87.1	87.6	87.5	83.6	77.6	69.2

TABLE XV. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND APPROACH PLUS 5^{0} ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(e) 100 Percent speed; fan physical speed, 2205 rpm; fundamental blade passage frequency, 551 hertz

(e-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	102.8	102.8	103.3	100.5	103.5	105.5	108.3	105.5	109.8	107.5	110.8	110.8	110.5	110.0	109.0	105.4	108.2	125.9
63	101.1	103.1	101.1	100.1	103.6	105.9	108.1	105.1	110.9	105.9	109.9	108.4	109.1	109.1	109.4	105.7	107.6	125.3
80	106.6	104.8	101.6	103.8	108.6	110.6	109.8	108.3	111.6	108.1	111.3	107.8	108.8	108.8	108.1	106.2	109.0	126.7
100	106.2	106.2	106.1	105.6	102.8	103.8	107.6	104.8	108.1	105.6	108.3	107.8	109.8	108.8	108.6	106.7	107.1	124.8
125	108.6	109.6	109.3	109.3	107.8	106.3	108.3	107.1	109.1	109.1	110.1	109.8	111.1	110.3	110.3	107.4	109.1	126.8
160	110.1	111.3	111.3	108.3	107.3	107.8	107.3	107.6	111.6	112.3	110.3	110.3	110.1	109.6	107.6	108.5	109.8	127.5
200	110.8	111.6	111.3	108.1	109.8	110.3	108.1	107.3	110.3	106.6	107.8	108.1	109.6	108.8	108.8	106.4	109.0	126.7
250	112.5	113.5	112.3	111.0	110.0	108.3	105.5	107.5	107.5	109.0	110.5	112.1	114.3	113.3	111.5	106.9	110.7	128.4
315	115.6	115.6	113.6	112.6	111.6	109.1	109.1	109.1	110.9	111.4	112.4	113.6	114.4	113.6	110.6	108.8	112.1	129.8
400	117.3	117.8	117.6	116.1	114.6	111.8	110.8	111.8	112.6	113.6	115.3	116.8	117.6	116.8	111.8	109.7	114.8	132.5
500	129.6	127.1	130.1	129.9	131.1	127.4	123.6	131.9	130.4	123.9	123.4	126.6	126.9	125.4	120.9	120.5	128.1	145.8
630	125.2	124.2	126.9	126.2	127.4	123.4	119.9	127.4	126.7	120.9	121.4	123.9	124.7	122.9	118.7	117.3	124.6	142.3
800	117.2	118.2	119.7	117.4	116.9	114.2	112.7	113.4	114.4	116.4	118.2	119.7	121.5	120.9	114.9	111.5	117.5	135.2
1000	120.2	121.2	123.0	121.5	120.5	119.2	116.7	115.0	116.5	119.0	119.7	122.5	126.5	124.0	117.2	115.1	120.9	138.6
1250	119.5	120.2	122.0	120.5	119.5	117.2	115.2	114.0	115.2	118.0	119.2	121.3	124.7	123.0	116.5	113.9	119.7	137.4
1600	118.6	120.1	121.1	120.8	122.1	117.1	113.8	114.1	116.6	117.6	119.6	121.1	123.6	121.8	115.6	111.7	119.5	137.2
2000	117.2	118.4	119.7	119.7	119.4	115.9	112.4	111.9	114.2	116.4	118.2	119.2	122.4	120.2	115.2	110.6	117.9	135.6
2500	116.1	117.3	118.1	118.8	118.3	115.8	112.3	110.8	112.6	115.1	117.6	118.4	120.8	119.6	113.8	109.8	116.9	134.6
3150	115.8	117.3	117.3	118.3	117.8	115.8	112.3	110.3	112.3	115.1	118.1	118.6	120.1	119.6	113.8	109.3	116.7	134.4
4000	116.4	117.2	117.4	118.9	118.2	114.9	111.2	109.7	112.4	114.7	116.9	118.0	120.7	119.7	114.2	109.1	116.6	134.3
5000	115.0	116.0	116.6	118.5	116.2	112.7	109.2	107.7	110.7	113.0	116.2	116.0	119.2	117.5	113.2	108.9	115.1	132.8
6300	113.8	115.1	115.3	116.8	114.6	113.6	109.3	106.3	109.6	114.1	116.3	117.4	118.6	118.9	112.6	107.6	115.0	132.7
8000	115.1	116.0	116.0	117.5	115.3	113.0	108.0	106.5	111.3	113.5	115.8	115.9	119.8	118.3	113.6	107.8	115.1	132.8
10000	113.5	114.5	114.0	116.0	113.3	111.8	106.3	105.3	108.8	111.5	114.8	115.2	118.3	117.3	112.6	106.4	113.7	131.4
12500	113.3	115.1	113.6	116.3	112.8	111.3	105.3	104.6	109.4	111.6	114.6	115.3	118.6	116.6	113.6	107.5	113.7	131.4
16000	111.5	112.8	112.3	113.5	110.5	108.2	103.0	102.0	106.8	109.8	112.8	113.8	116.5	115.8	111.8	106.8	111.8	129.5
20000	111.1	112.3	111.6	112.5	108.8	106.5	101.5	101.8	106.3	108.8	111.5	112.9	115.8	115.1	111.1	105.2	110.9	128.6
OVERALL	132.7	132.5	134.3	134.0	134.4	131.1	127.9	133.7	132.9	129.8	131.0	132.8	134.9	133.3	128.4	125.8	132.5	150.2

TABLE XV. - Concluded. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND APPROACH PLUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(e) Concluded. 100 Percent speed; fan physical speed, 2205 rpm; fundamental blade passage frequency, 551 hertz

(e-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG														
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	73.1	72.1	73.6	70.8	73.8	75.8	78.6	75.8	80.1	77.8	81.1	81.1	80.8	80.3	79.3	75.7
63	71.4	73.4	71.4	70.4	73.9	76.2	78.4	75.4	81.2	76.2	80.2	78.7	79.4	75.4	79.7	76.0
80	76.9	75.1	71.9	74.1	78.9	80.9	80.1	78.6	81.9	78.4	81.6	78.1	79.1	79.1	78.4	76.5
100	76.6	76.6	76.4	75.9	78.1	74.1	77.9	75.1	78.4	75.9	78.6	78.1	80.1	79.1	78.9	77.0
125	78.9	79.9	79.6	79.6	78.1	76.6	78.6	77.4	79.4	79.4	80.4	80.1	81.4	80.6	80.6	77.7
160	80.4	81.6	81.6	78.6	77.6	78.1	77.6	77.9	81.9	82.6	80.6	80.6	80.4	79.9	77.9	78.8
200	81.1	81.9	81.6	78.4	80.1	80.6	78.4	77.6	80.6	76.9	78.1	78.4	79.5	79.1	79.1	76.7
250	82.8	83.8	82.6	81.3	80.3	78.6	75.8	77.8	77.8	79.3	80.8	82.4	84.6	83.6	81.8	77.2
315	85.9	85.9	83.9	82.9	81.9	79.4	79.4	79.4	81.2	81.7	82.7	83.9	84.7	83.9	80.9	79.1
400	87.5	88.0	87.8	85.3	84.8	82.0	81.0	82.0	82.8	83.8	85.5	87.0	87.8	87.0	82.0	79.9
500	98.8	97.3	100.3	100.1	101.3	97.6	93.8	102.1	100.6	94.1	93.6	96.8	97.1	95.6	91.1	90.7
630	95.4	94.4	97.1	96.4	97.6	93.6	90.1	97.6	96.9	91.1	91.6	94.1	94.9	93.1	88.9	87.5
800	87.4	88.4	88.9	87.6	87.1	84.4	82.9	83.6	84.6	86.6	88.4	89.9	92.1	91.1	85.1	81.7
1000	90.4	91.4	93.2	91.7	90.7	89.4	85.9	85.2	86.7	89.2	89.9	92.7	96.7	94.2	87.4	85.3
1250	89.6	90.3	92.1	90.6	89.6	87.3	85.3	84.1	85.3	88.1	89.3	91.4	94.8	93.1	86.6	84.0
1600	88.7	90.2	91.2	90.9	92.2	87.2	83.9	84.2	86.7	87.7	89.7	91.2	93.7	91.9	85.7	81.8
2000	87.2	88.4	89.7	89.7	89.4	85.9	82.4	81.9	84.2	86.4	88.2	89.2	92.4	90.2	85.2	80.6
2500	86.0	87.2	88.0	88.7	88.2	85.7	82.2	80.7	82.5	85.0	87.5	88.3	90.7	89.5	83.7	79.7
3150	85.5	87.0	87.0	88.0	87.5	85.5	82.0	80.0	82.0	84.8	87.8	88.3	89.8	89.3	83.5	79.0
4000	85.9	86.7	86.9	88.4	87.7	84.4	80.7	79.2	81.9	84.2	86.4	87.5	90.2	89.2	83.7	78.6
5000	84.2	85.2	85.2	87.7	85.4	81.9	78.4	76.9	79.9	82.2	85.4	85.2	88.4	86.7	82.4	78.1
6300	82.5	82.9	84.3	85.5	83.3	82.3	78.0	75.0	78.3	82.8	85.0	86.1	87.3	87.6	81.3	76.3
8000	82.2	84.1	84.1	85.6	83.4	81.1	76.1	74.6	79.4	81.6	83.9	84.0	87.9	86.4	81.7	75.9
10000	80.6	81.6	81.1	83.1	80.4	78.9	73.4	72.4	75.9	78.6	81.9	82.3	85.4	84.4	79.7	73.5
12500	79.0	80.8	79.3	82.0	78.5	77.1	71.1	70.3	75.1	77.3	80.3	81.0	84.3	82.3	79.3	73.2
16000	75.3	76.6	76.1	77.4	74.4	72.1	66.9	65.8	70.7	73.6	76.6	77.6	80.3	79.6	75.6	70.6
20000	72.2	73.4	72.7	73.6	69.9	67.6	62.6	62.9	67.4	69.9	72.6	74.0	76.9	76.2	72.2	66.3
OVERALL	102.7	102.4	104.3	103.9	104.5	101.2	98.0	103.9	103.1	99.7	100.8	102.7	104.7	103.1	98.1	95.8
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	76.9	85.0	91.1	93.7	95.9	94.1	91.8	96.2	96.6	94.2	95.6	95.7	96.5	93.0	85.0	78.3
304.8 M	67.2	76.3	83.0	85.7	88.2	86.5	84.3	89.1	89.3	86.6	87.1	87.9	88.1	84.4	76.5	69.6

TABLE XVI. - FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF PLUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) 100 Percent speed; fan physical speed, 2155 rpm; fundamental blade passage frequency, 538 hertz

(a-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	108.6	100.9	103.4	105.6	105.1	104.1	105.4	104.1	105.6	104.9	104.6	107.1	107.1	109.6	110.9	112.8	106.6	124.3
63	103.9	104.4	103.6	104.9	105.6	106.4	106.1	104.6	104.4	105.6	104.9	106.9	107.4	110.1	111.9	113.0	107.0	124.7
80	106.9	108.4	104.9	104.9	107.1	109.1	108.1	106.4	106.6	108.1	107.6	109.6	110.1	112.6	113.4	113.8	109.1	126.8
100	110.6	111.4	113.4	115.6	113.9	111.9	113.9	109.4	113.1	113.9	112.6	115.9	114.6	114.4	114.4	114.5	113.7	131.4
125	113.4	115.4	115.6	113.4	112.9	114.1	112.4	113.6	113.6	115.4	115.6	116.4	116.1	115.1	113.9	113.7	114.6	132.3
160	114.4	114.7	114.7	112.2	111.7	113.2	111.9	113.7	113.9	116.2	115.2	116.9	114.9	113.9	112.7	113.3	114.3	132.0
200	115.2	116.9	115.4	111.2	111.7	110.4	110.7	110.4	110.4	111.2	111.4	113.2	113.2	113.4	112.4	112.3	112.3	130.0
250	119.2	117.7	116.9	115.4	114.4	114.4	112.7	112.9	113.7	114.7	116.2	117.4	117.7	116.2	113.7	112.5	115.4	133.1
315	120.4	119.9	118.1	116.4	115.4	114.9	114.6	115.1	115.9	117.6	119.1	119.7	118.4	117.4	114.9	113.5	117.2	134.9
400	120.9	121.4	121.7	118.9	118.2	117.4	116.7	117.2	118.2	119.9	120.4	121.9	120.7	119.2	114.9	114.6	119.3	137.0
500	131.2	134.5	131.2	133.0	127.0	127.5	130.2	131.5	130.2	129.2	131.2	135.0	130.2	129.5	124.0	126.4	130.9	148.6
630	124.2	126.4	123.9	125.4	121.2	120.7	121.9	123.7	123.4	124.2	125.2	128.2	126.0	124.2	119.0	119.1	124.3	142.0
800	119.5	121.2	121.2	119.5	119.2	117.7	118.0	119.2	120.2	122.5	123.0	124.3	126.0	122.2	116.7	115.1	121.5	139.2
1000	122.4	123.1	123.9	123.4	122.9	122.4	120.6	121.6	122.9	124.6	126.4	128.9	127.4	126.4	120.4	117.5	124.6	142.3
1250	119.7	121.2	121.0	120.5	120.0	119.2	117.7	119.0	120.7	122.5	123.2	125.5	124.5	122.0	117.2	115.4	121.6	139.3
1600	121.1	122.1	122.3	121.3	120.8	119.8	118.1	118.8	120.3	122.3	122.8	124.9	126.1	120.6	116.3	114.2	121.8	139.5
2000	118.9	119.9	120.7	119.9	119.7	118.2	115.4	116.4	118.4	120.4	121.2	123.2	124.4	119.2	114.7	112.8	120.1	137.8
2500	117.4	119.2	119.4	118.9	117.9	116.7	115.4	114.9	117.2	118.9	120.4	121.7	122.4	118.2	113.2	111.3	118.7	136.4
3150	117.3	118.5	118.8	118.0	117.3	116.3	115.3	114.5	116.0	119.0	120.0	121.6	121.3	118.0	113.3	110.0	118.2	135.9
4000	117.2	118.2	118.2	118.2	117.2	115.7	113.2	113.9	116.0	117.4	118.2	120.2	121.5	118.0	113.2	110.4	117.5	135.2
5000	115.8	116.5	116.5	117.0	115.5	113.3	111.0	111.5	113.3	115.8	117.3	117.6	119.5	115.3	112.3	109.0	115.6	133.3
6300	116.9	116.9	115.9	115.6	113.6	114.4	111.7	110.1	112.4	115.9	116.9	118.8	118.4	116.7	111.2	107.4	115.4	133.1
8000	117.1	117.9	116.9	116.4	113.6	113.4	110.6	110.1	113.4	115.4	116.6	117.5	119.4	116.1	112.4	108.2	115.4	133.1
10000	116.0	116.7	115.2	115.7	112.2	113.0	109.2	109.5	112.0	114.2	116.0	116.6	118.2	115.2	111.2	107.1	114.4	132.1
12500	116.5	117.5	115.0	116.2	112.5	113.2	109.7	110.0	113.2	114.7	116.5	117.4	115.5	115.5	113.0	108.7	115.1	132.8
16000	115.4	116.9	114.7	114.9	111.9	111.6	108.6	108.4	111.6	114.2	114.9	116.6	117.4	114.9	111.7	108.1	113.9	131.6
20000	114.7	116.5	114.0	114.7	110.2	111.0	107.7	108.8	112.0	114.5	114.7	116.5	117.5	115.5	112.0	107.5	113.8	131.5
OVERALL	134.8	137.0	135.1	135.7	132.4	132.1	132.7	133.8	133.7	134.4	135.7	138.4	136.7	134.6	130.0	129.9	134.8	152.5

TABLE XVI. - Continued. FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF PLUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) Concluded. 100 Percent speed; fan physical speed, 2155 rpm; fundamental blade passage frequency, 538 hertz

(a-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG 10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	75.9	71.2	73.7	75.9	75.4	74.4	75.7	74.4	75.9	75.2	74.9	77.4	77.4	79.9	81.2	83.1
63	74.2	74.7	73.9	75.2	75.9	76.7	75.4	74.9	74.7	75.9	75.2	77.2	77.7	80.4	82.2	83.3
80	77.2	78.7	75.2	75.2	77.4	79.4	78.4	76.7	76.9	78.4	77.9	79.9	80.4	82.9	83.7	84.1
100	80.9	81.7	83.7	85.9	84.2	82.2	84.2	79.7	83.4	84.2	82.9	86.2	84.9	84.7	84.7	84.8
125	83.7	85.7	85.9	83.7	83.2	84.4	82.7	83.9	83.9	85.7	85.9	86.7	86.4	85.4	84.2	84.0
160	84.7	85.0	85.0	82.5	82.0	83.5	82.2	84.0	84.2	86.5	85.5	87.2	85.2	84.2	83.0	83.6
200	85.5	87.2	85.7	81.5	82.0	80.7	81.0	80.7	80.7	81.5	81.7	83.5	83.5	83.7	82.7	82.6
250	89.5	88.0	87.2	85.7	84.7	84.7	83.0	83.2	84.0	85.0	86.5	87.7	88.0	86.5	84.0	82.8
315	90.7	90.2	88.4	86.7	85.7	85.2	84.9	85.4	86.2	87.9	89.4	90.0	88.7	87.7	85.2	83.8
400	91.1	91.6	91.5	89.1	88.4	87.6	86.9	87.4	88.4	90.1	90.6	92.1	90.9	89.4	85.1	84.8
500	101.4	104.7	101.4	103.2	97.2	97.7	100.4	101.7	100.4	99.4	101.4	105.2	100.4	95.7	94.2	96.6
630	94.4	96.6	94.1	95.6	91.4	90.9	92.1	93.9	93.6	94.4	95.4	98.4	96.2	94.4	89.2	89.3
800	89.7	91.4	91.4	89.7	89.4	87.9	88.2	89.4	90.4	92.7	93.2	94.5	96.2	92.4	86.9	85.3
1000	92.6	93.3	94.1	93.6	93.1	92.6	90.8	91.8	93.1	94.8	96.6	99.1	97.6	96.6	90.6	87.7
1250	89.8	91.3	91.1	90.6	90.1	89.3	87.8	89.1	90.8	92.6	93.3	95.6	94.6	92.1	87.3	85.5
1600	91.2	92.2	92.4	91.4	90.9	89.9	88.2	88.9	90.4	92.4	92.9	95.0	96.2	90.7	86.4	84.3
2000	88.9	89.9	90.7	89.9	89.7	88.2	86.4	86.4	88.4	90.4	91.2	93.2	94.4	89.2	84.7	82.8
2500	87.3	89.1	89.3	88.8	87.8	86.6	85.3	84.8	87.1	88.8	90.3	91.6	92.3	88.1	83.1	81.2
3150	87.0	88.2	88.5	87.7	87.0	86.0	85.0	84.2	85.7	88.7	89.7	91.3	91.0	87.7	83.0	79.7
4000	86.7	87.7	87.7	87.7	86.7	85.2	82.7	83.4	85.5	86.9	87.7	89.7	91.0	87.5	82.7	79.9
5000	85.0	85.7	85.7	86.2	84.7	82.5	80.2	80.7	82.5	85.0	86.5	86.8	88.7	84.5	81.5	78.2
6300	84.6	85.6	84.6	84.3	82.4	83.1	80.4	78.8	81.1	84.6	85.6	87.5	87.1	85.4	79.9	76.1
8000	85.1	86.0	85.0	84.4	81.7	81.5	78.7	78.2	81.5	83.5	84.7	85.6	87.5	84.2	80.4	76.3
10000	83.1	83.3	82.3	82.8	79.3	80.1	76.3	76.6	79.1	81.3	83.1	83.7	85.3	82.3	78.3	74.2
12500	82.2	83.2	80.7	81.9	78.2	78.9	75.4	75.7	78.9	80.4	82.2	83.1	85.2	81.2	78.7	74.4
16000	79.2	80.7	78.5	78.7	75.7	75.4	72.4	72.2	75.4	78.0	78.7	80.4	81.2	78.7	75.5	71.9
20000	75.8	77.6	75.1	75.8	71.3	72.1	68.8	69.8	73.0	75.5	75.8	77.6	78.6	76.5	73.0	68.6
OVERALL	104.7	107.0	105.1	105.7	102.4	102.1	102.9	103.9	103.7	104.4	105.7	108.5	106.6	104.6	99.9	100.0
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	79.5	89.0	92.5	95.6	94.3	95.3	96.7	97.9	98.2	98.8	99.6	101.4	98.5	94.4	87.0	82.9
304.8 M	69.9	81.5	84.4	87.9	86.6	87.7	89.3	90.7	90.9	91.3	92.2	94.0	90.5	86.5	78.8	74.5

TABLE XVI. - Continued. FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF PLUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) 110 Percent speed; fan physical speed, 2371 rpm; fundamental blade passage frequency, 592 hertz

(b-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) CN 1.0 METER RADIUS																	
50	106.8	104.1	106.3	106.3	106.5	106.6	107.8	107.8	108.8	108.3	108.6	110.2	109.8	111.6	113.8	115.2	109.3	127.0
63	104.4	105.6	103.9	104.9	105.1	104.4	105.3	105.3	104.8	106.1	107.8	109.2	110.6	112.4	114.1	116.2	108.7	126.4
80	109.0	112.3	103.8	107.1	109.0	108.0	110.5	111.5	110.6	110.1	110.6	111.6	113.6	115.1	116.0	117.9	111.9	129.6
100	112.9	112.3	112.3	110.3	110.3	111.3	111.1	111.6	113.4	114.6	114.9	116.0	116.3	117.6	116.9	117.0	114.2	131.9
125	116.6	118.3	116.8	115.3	117.9	115.9	117.9	117.6	119.4	120.8	120.9	122.2	121.9	121.3	118.8	116.8	119.5	137.2
160	116.3	118.5	117.0	114.3	114.0	116.0	115.3	115.8	117.3	117.2	118.7	119.8	118.3	117.7	116.3	115.5	117.1	134.8
200	116.8	117.7	116.2	113.3	112.5	113.2	112.0	113.0	113.0	115.0	115.0	115.9	116.0	116.7	115.5	114.4	114.7	132.4
250	117.3	119.0	117.0	117.5	116.2	115.5	114.3	116.2	117.0	119.7	119.3	121.3	121.2	120.0	117.0	115.9	118.3	136.0
315	120.0	120.5	119.8	118.8	116.8	116.8	117.2	118.3	118.8	120.7	121.2	121.4	120.8	119.2	116.3	115.0	119.3	137.0
400	121.2	122.0	120.9	119.4	118.4	118.2	117.5	118.7	120.5	122.2	123.0	124.0	124.2	121.4	117.7	116.9	121.1	138.8
500	122.6	124.6	122.9	124.1	123.9	120.9	121.9	122.6	124.7	127.2	127.4	127.3	129.6	126.6	121.6	119.1	125.4	143.1
630	128.9	130.4	129.6	132.9	132.6	127.2	129.2	129.9	132.7	135.4	136.1	134.6	139.1	135.4	130.1	125.4	133.7	151.4
800	119.8	120.6	120.6	119.6	119.3	118.6	120.4	121.9	123.8	126.1	126.6	127.7	128.6	124.9	119.6	118.3	124.2	141.9
1000	119.7	120.5	120.5	119.8	119.3	119.8	120.2	121.8	123.8	125.5	127.0	128.3	127.8	123.8	118.8	118.2	124.1	141.8
1250	123.5	124.7	124.5	123.7	123.7	124.7	122.4	125.7	126.7	127.4	131.5	131.8	131.7	126.9	121.7	121.6	127.7	145.4
1600	119.5	120.2	120.2	120.2	119.9	119.0	118.4	120.5	122.9	125.2	126.4	128.0	128.7	123.0	118.2	116.4	123.8	141.5
2000	119.5	120.2	120.0	120.5	120.0	118.9	118.2	120.0	122.5	124.7	126.4	127.5	128.5	123.2	118.5	116.8	123.6	141.3
2500	118.3	118.8	119.3	119.4	118.6	117.3	117.1	118.1	120.4	123.3	124.4	125.9	126.6	121.8	116.9	114.8	121.9	139.6
3150	117.8	118.3	118.4	118.1	117.4	117.3	116.9	117.6	120.6	123.1	124.3	125.6	125.3	121.3	116.6	114.0	121.4	139.1
4000	117.5	118.0	118.0	118.3	117.2	116.5	115.2	117.0	119.7	121.2	122.8	124.1	125.2	121.3	116.7	113.6	120.5	138.2
5000	115.8	116.0	115.8	117.3	115.7	114.0	113.3	115.2	117.7	119.7	122.2	121.8	123.5	118.7	114.7	112.1	118.8	136.5
6300	114.9	116.0	115.1	115.4	113.6	114.9	113.8	113.4	116.8	119.8	121.9	122.8	122.4	120.1	114.1	110.3	118.6	136.3
8000	116.3	117.1	115.8	116.3	113.6	114.0	113.0	113.6	118.0	119.1	121.3	121.8	123.7	119.8	115.5	111.4	118.6	136.3
10000	114.9	115.9	114.6	115.4	111.9	113.4	111.6	112.9	116.4	118.1	120.6	120.8	122.6	119.1	114.9	110.0	117.6	135.3
12500	115.1	116.4	114.6	116.3	112.3	113.9	112.3	113.6	117.3	118.6	120.6	121.7	123.3	119.4	116.4	112.1	118.2	135.9
16000	114.0	115.7	114.2	114.2	111.7	112.3	111.2	112.2	115.7	117.9	119.9	120.7	121.7	119.2	114.5	111.1	117.1	134.8
20000	113.2	115.2	113.7	113.9	110.2	111.6	110.6	112.4	116.1	117.9	119.2	120.6	121.9	119.1	115.6	110.5	117.0	134.7
OVERALL	133.8	135.0	134.3	135.6	135.1	132.7	133.1	134.3	136.6	138.8	140.1	140.1	142.2	138.5	133.8	131.4	137.5	155.2

TABLE XVI. - Continued. FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF PLUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) Concluded. 110 Percent speed; fan physical speed, 2371 rpm; fundamental blade passage frequency, 592 hertz

(b-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	77.1	74.4	76.6	76.6	76.8	76.9	78.1	78.1	79.1	78.6	78.9	80.5	80.1	81.9	84.1	85.5
63	74.7	75.9	74.2	75.2	75.4	74.7	75.6	75.6	75.1	76.4	78.1	79.5	80.9	82.7	84.4	86.5
80	79.3	82.6	79.1	77.4	79.3	78.3	80.8	81.9	80.9	80.4	80.9	81.9	83.9	85.4	86.3	88.2
100	83.2	82.6	82.6	80.6	80.6	81.6	81.4	81.9	83.7	84.9	85.2	86.3	86.6	87.9	87.2	87.3
125	86.9	88.9	87.1	85.6	88.2	86.2	88.2	87.9	89.7	91.1	91.2	92.5	92.2	91.6	89.1	87.1
160	86.6	88.8	87.3	84.6	84.3	86.3	85.6	86.1	87.6	87.5	89.0	90.1	88.6	88.0	86.6	85.8
200	87.1	88.0	86.5	83.6	82.8	83.5	82.3	83.3	83.3	85.3	85.3	86.2	86.3	87.0	85.8	84.7
250	87.6	88.3	87.3	87.8	86.5	85.8	84.6	86.5	87.3	90.0	89.6	91.6	91.5	90.3	87.3	86.2
315	90.3	90.8	90.1	89.1	87.1	87.1	87.5	88.6	89.1	91.0	91.5	91.7	91.1	89.5	86.6	85.3
400	91.4	92.2	91.1	89.6	88.6	88.4	87.7	88.9	90.7	92.4	93.2	94.2	94.4	91.6	87.9	87.1
500	92.8	94.8	93.1	94.3	94.1	91.1	92.1	92.8	94.9	97.4	97.6	97.5	99.8	96.8	91.8	89.3
630	99.1	100.6	99.8	103.1	102.8	97.4	99.4	100.1	102.9	105.6	106.3	104.8	105.3	105.6	100.3	95.6
800	90.6	90.8	90.8	85.8	89.5	88.8	90.6	92.1	94.0	96.3	96.8	97.9	98.8	95.1	89.8	88.5
1000	89.9	90.6	90.6	89.5	89.4	89.9	90.4	91.9	94.0	95.7	97.1	98.4	98.0	94.0	89.0	88.4
1250	93.6	94.8	94.6	93.8	93.8	94.8	92.5	95.8	96.8	97.5	101.6	101.9	101.8	97.0	91.8	91.7
1600	89.6	90.3	90.3	90.3	90.0	89.1	88.5	90.6	93.0	95.3	96.5	98.1	98.8	93.1	88.3	86.5
2000	89.5	90.2	90.0	90.5	90.0	88.9	88.2	90.0	92.5	94.7	96.4	97.5	98.5	93.2	88.5	86.8
2500	89.2	88.7	89.2	89.3	88.5	87.2	87.0	88.0	90.3	93.2	94.3	95.8	96.5	91.7	86.8	84.7
3150	87.5	88.0	88.1	87.8	87.1	87.0	86.6	87.3	90.3	92.8	94.0	95.3	95.0	91.0	86.3	83.7
4000	87.0	87.5	87.5	87.8	86.7	86.0	84.7	86.5	89.2	90.7	92.3	93.6	94.7	90.8	86.2	83.1
5000	85.0	85.2	85.0	86.5	84.9	83.2	82.5	84.4	86.9	88.9	91.4	91.0	92.7	87.9	83.9	81.3
6300	83.6	84.7	83.8	84.1	82.4	83.6	82.5	82.1	85.5	88.5	90.6	91.5	91.1	88.8	82.8	79.0
8000	84.3	85.2	83.9	84.4	81.7	82.1	81.1	81.7	86.1	87.2	89.4	89.9	91.7	87.9	83.5	79.5
10000	82.0	83.0	81.7	82.5	79.0	80.5	78.7	80.0	83.5	85.2	87.7	87.9	89.7	86.2	82.0	77.1
12500	80.8	82.1	80.3	82.0	78.0	79.6	78.0	79.3	83.0	84.3	86.3	87.4	89.0	85.1	82.1	77.8
16000	77.8	79.5	78.0	78.0	75.5	75.3	75.0	76.0	79.5	81.7	83.7	84.5	85.5	83.0	78.3	74.9
20000	74.3	76.3	74.8	75.0	71.3	72.7	71.7	73.5	77.1	79.0	80.3	81.7	83.0	80.2	76.6	71.6
OVERALL	103.8	105.0	104.3	105.6	105.2	102.6	103.1	104.4	106.6	108.8	110.0	110.0	112.2	108.5	103.8	101.4
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	78.2	87.8	91.6	95.6	97.0	95.7	97.2	98.7	101.3	103.4	104.0	103.2	104.0	98.6	91.2	83.9
304.8 M	68.2	79.2	83.4	87.8	89.4	88.1	89.7	91.3	93.8	96.0	96.5	95.5	96.4	90.7	83.0	75.3

TABLE XVI. - Continued. FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF PLUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) 115 Percent speed; fan physical speed, 2478 rpm; fundamental blade passage frequency, 619 hertz

(c-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	108.6	106.2	108.4	107.1	108.1	109.1	109.2	109.2	109.4	110.1	110.2	111.5	112.1	113.9	115.7	117.6	111.1	128.8
63	105.7	106.2	106.0	105.0	104.7	105.5	105.7	106.2	106.4	107.9	108.5	110.6	111.9	113.5	116.2	117.3	110.0	127.7
80	113.4	113.1	112.2	115.2	115.9	109.9	112.4	114.2	113.4	112.9	113.9	119.0	120.2	120.2	119.6	121.0	116.4	134.1
100	113.9	114.1	112.1	111.6	111.7	112.1	111.1	113.2	114.1	115.7	116.9	117.2	117.9	118.9	119.1	119.4	115.6	133.3
125	119.6	119.7	119.2	117.6	117.9	116.6	120.2	121.4	121.4	123.1	122.4	124.7	124.2	122.9	120.9	119.5	121.6	139.3
160	116.7	117.7	117.9	114.7	116.7	117.7	118.7	118.2	119.2	120.2	121.4	122.0	121.1	119.5	118.9	118.5	119.4	137.1
200	116.2	118.5	117.5	113.7	113.8	113.8	113.3	114.0	114.7	115.8	117.2	118.1	118.0	117.7	117.0	116.7	116.1	133.8
250	117.9	119.2	117.4	116.9	116.6	116.7	116.6	116.6	119.2	120.6	121.7	123.0	122.9	122.2	118.6	116.6	119.8	137.5
315	120.9	120.6	119.8	120.1	119.1	119.4	118.8	120.1	121.3	122.9	124.1	123.4	122.1	120.6	117.9	117.0	121.2	138.9
400	120.2	121.5	121.2	119.9	120.7	120.4	119.5	120.4	122.7	124.4	126.2	126.1	125.4	123.2	120.0	118.6	123.0	140.7
500	121.7	123.4	122.4	122.4	122.2	121.9	121.9	123.6	125.6	127.2	127.9	128.0	128.1	125.1	120.9	119.6	125.2	142.9
630	128.1	130.0	132.1	131.5	132.0	130.5	131.5	133.6	135.6	137.0	136.8	139.4	140.0	133.5	130.5	127.0	135.3	153.0
800	120.5	120.9	121.4	121.0	120.9	121.2	122.4	124.5	126.9	128.9	129.4	130.0	130.2	127.2	122.0	121.1	126.5	144.2
1000	119.1	120.8	120.4	120.3	119.4	120.2	121.4	123.6	126.1	128.1	129.2	129.2	128.4	125.2	121.1	120.5	125.6	143.3
1250	123.1	125.6	125.1	125.0	124.5	123.9	124.1	126.5	128.1	129.5	130.6	133.2	131.8	127.8	123.5	123.0	128.4	146.1
1600	118.2	119.4	120.0	119.7	119.7	119.9	120.1	122.4	125.2	127.1	128.2	129.2	129.2	124.6	120.2	118.5	125.1	142.8
2000	119.9	121.1	121.8	121.6	121.6	121.6	121.1	123.4	125.9	127.6	129.1	130.4	131.4	126.3	121.6	120.0	126.4	144.1
2500	117.4	118.6	119.1	119.8	119.4	118.9	119.3	120.8	123.3	126.0	127.3	127.7	128.3	124.1	119.3	117.0	124.0	141.7
3150	117.0	118.0	118.7	118.3	118.3	118.8	119.0	120.5	123.2	125.8	127.3	127.3	127.2	123.8	119.0	116.1	123.6	141.3
4000	117.1	118.3	118.6	118.8	118.3	118.3	117.1	119.6	122.9	124.6	125.8	126.2	127.4	123.9	118.9	116.4	122.9	140.6
5000	115.0	116.0	116.2	117.7	116.9	115.4	115.4	117.5	120.9	122.9	124.7	124.0	125.7	121.0	117.9	115.0	121.1	138.8
6300	114.2	115.5	115.5	115.6	114.6	116.5	116.0	115.8	119.7	123.2	124.7	125.2	124.8	123.2	117.0	113.5	121.1	138.8
8000	115.1	116.6	115.8	115.8	114.1	115.8	114.8	116.1	120.8	122.6	123.8	124.2	125.8	122.3	118.5	114.9	120.9	138.6
10000	113.4	115.4	113.9	114.9	112.6	114.7	113.4	115.1	119.2	121.1	123.2	123.1	124.6	121.6	117.8	113.2	119.8	137.5
12500	113.9	115.4	114.0	115.2	113.0	115.0	114.0	116.0	120.0	121.7	123.2	124.0	125.4	121.9	119.4	114.9	120.4	138.1
16000	112.3	114.7	113.5	113.7	112.5	113.8	113.0	114.7	118.7	121.2	122.5	123.0	124.2	121.9	117.7	114.4	119.5	137.2
20000	111.4	114.2	112.7	113.1	110.7	113.1	112.4	114.8	119.3	120.9	122.1	122.6	124.1	121.9	118.1	113.5	119.3	137.0
OVERALL	133.4	134.9	135.5	135.1	135.2	134.5	135.1	137.0	139.2	140.8	141.5	143.0	143.3	138.8	135.3	133.5	139.1	156.8

TABLE XVI. - Continued. FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF PLUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) Concluded. 115 Percent speed; fan physical speed, 2478 rpm; fundamental blade passage frequency, 619 hertz

(c-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	78.9	76.5	78.7	77.4	78.4	79.4	79.5	79.5	79.7	80.4	80.5	81.8	82.4	84.2	86.0	87.9
63	76.0	76.5	76.3	75.3	75.0	75.8	77.0	76.5	76.7	78.2	78.8	80.9	82.2	83.8	86.5	87.6
80	83.7	83.4	82.5	85.5	86.2	80.2	82.7	84.5	83.7	83.2	84.2	89.3	90.5	90.5	89.9	91.3
100	84.2	84.4	82.4	81.9	82.0	82.4	81.4	83.5	84.4	86.0	87.2	87.5	88.2	86.2	89.4	89.7
125	89.9	90.0	89.5	87.9	88.2	86.9	90.5	91.7	91.7	93.4	92.7	95.0	94.5	93.2	91.2	89.8
160	87.0	88.0	88.2	85.0	87.0	88.0	89.0	88.5	89.5	90.5	91.7	92.3	91.4	90.2	89.2	88.8
200	86.5	88.8	87.8	84.0	84.1	84.1	83.6	84.3	85.0	86.1	87.5	88.4	88.2	86.0	87.3	87.0
250	88.2	89.5	87.7	87.2	86.9	87.0	86.9	86.9	89.5	90.9	92.0	93.3	93.2	92.5	88.9	86.9
315	91.2	90.9	90.1	90.4	89.4	89.7	89.1	90.4	91.6	93.2	94.4	93.7	92.4	90.9	88.2	87.3
400	90.4	91.7	91.4	90.1	90.9	90.6	89.7	90.6	92.9	94.6	96.4	96.3	95.6	93.4	90.2	88.8
500	91.9	93.6	92.6	92.6	92.4	92.1	92.1	93.8	95.8	97.4	98.1	98.2	98.3	95.3	91.1	89.8
630	98.3	100.2	102.3	101.7	102.2	100.7	101.7	103.8	105.8	107.2	107.0	109.6	110.2	103.7	100.7	97.2
800	90.7	91.1	91.6	91.2	91.1	91.4	92.6	94.7	97.1	99.1	99.6	100.2	100.4	97.4	92.2	91.3
1000	89.3	90.9	90.5	90.4	89.5	90.4	91.6	93.8	96.3	98.3	99.4	99.4	98.6	95.4	91.3	90.7
1250	93.2	95.7	95.2	95.1	94.6	93.9	94.2	96.6	98.2	99.6	100.7	103.3	101.9	97.9	93.6	93.1
1600	88.3	89.5	90.1	89.8	89.8	90.0	90.2	92.5	95.3	97.2	98.3	99.3	99.3	94.7	90.3	88.6
2000	89.9	91.1	91.8	91.6	91.6	91.6	91.1	93.4	95.9	97.6	99.1	100.4	101.4	96.3	91.6	90.0
2500	87.3	88.5	89.0	89.7	89.3	88.8	89.2	90.7	93.2	95.9	97.2	97.6	98.2	94.0	89.2	86.9
3150	86.7	87.7	88.4	88.0	88.0	88.5	88.7	90.2	92.9	95.5	97.0	97.0	96.9	93.5	88.7	85.8
4000	86.6	87.8	88.1	88.3	87.8	87.8	86.6	89.1	92.4	94.1	95.3	95.7	96.9	93.4	88.4	85.9
5000	84.2	85.2	85.4	86.9	86.1	84.6	84.6	86.7	90.1	92.1	93.9	93.2	94.9	90.2	87.1	84.2
6300	82.9	84.2	84.2	84.4	83.4	85.2	84.7	84.5	88.4	91.9	93.4	93.9	93.5	91.9	85.7	82.2
8000	83.2	84.7	83.9	83.9	82.2	83.9	82.9	84.2	88.9	90.7	91.9	92.3	93.9	90.4	86.5	83.0
10000	80.5	82.5	81.0	82.0	79.7	81.8	80.5	82.2	86.3	88.2	90.3	90.2	91.7	88.7	84.9	80.3
12500	75.6	81.1	79.7	80.9	78.7	80.7	79.7	81.7	85.7	87.4	88.9	89.7	91.1	87.6	85.1	80.6
16000	76.1	78.5	77.3	77.5	76.3	77.6	76.8	78.5	82.5	85.0	86.3	86.8	88.0	85.7	81.5	78.2
20000	72.5	75.3	73.8	74.2	71.8	74.2	73.5	75.9	80.3	82.0	83.2	83.7	85.2	83.0	79.1	74.6
OVERALL	103.4	104.9	105.6	105.2	105.3	104.5	105.1	107.0	109.1	110.8	111.4	113.0	113.2	108.6	105.2	103.5
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	77.8	87.8	93.0	95.3	97.3	97.9	99.2	101.6	103.9	105.5	105.7	106.3	105.3	98.9	92.6	85.9
304.8 M	67.9	79.1	84.9	87.4	89.6	90.3	91.8	94.2	96.5	98.0	98.1	98.7	97.6	90.8	84.4	77.2

TABLE XVI. - Continued. FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF PLUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) 120 Percent speed; fan physical speed, 2586 rpm; fundamental blade passage frequency, 646 hertz

(d-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) CN 1.0 METER RADIUS																	
50	108.9	112.6	111.1	112.9	110.9	113.6	113.2	110.7	110.7	109.9	111.7	114.7	114.2	116.2	116.7	119.1	113.4	131.1
63	105.1	106.9	106.3	105.3	105.9	106.3	107.1	107.1	107.1	108.1	109.1	110.8	112.9	115.1	116.4	118.6	110.8	128.5
80	114.9	116.3	114.6	110.6	109.1	107.3	110.6	110.9	111.6	113.8	115.8	116.0	116.9	119.6	118.7	120.6	115.0	132.7
100	115.2	115.5	114.7	112.9	112.4	113.4	112.5	113.5	114.4	116.2	117.5	117.8	118.2	119.9	119.5	119.6	116.3	134.0
125	119.9	122.5	122.9	123.5	119.9	116.7	119.4	121.4	120.7	122.4	123.2	124.5	125.5	122.4	121.2	120.1	122.2	139.9
160	119.2	120.9	119.1	117.2	118.1	119.7	120.2	119.7	120.7	122.1	122.6	124.8	122.6	121.7	120.6	119.0	121.2	138.9
200	120.6	121.9	119.9	116.9	116.3	116.6	115.9	117.4	116.6	118.3	119.8	120.9	120.9	119.4	118.4	118.5	118.7	136.4
250	120.4	122.2	121.7	121.1	119.1	118.4	119.7	119.4	121.4	122.6	124.1	125.5	124.4	124.4	119.6	118.1	122.1	139.8
315	122.3	121.9	121.1	121.1	120.8	121.3	121.6	122.3	123.6	124.1	125.1	125.0	124.1	123.3	119.4	118.6	122.9	140.6
400	122.0	122.1	122.5	121.1	121.6	122.3	122.1	123.1	125.5	126.5	128.0	128.4	127.8	125.6	121.1	120.0	125.1	142.8
500	121.5	123.1	122.8	123.3	122.8	122.8	123.8	124.9	126.8	128.0	128.3	129.2	128.5	126.6	122.1	120.9	126.1	143.8
630	129.5	128.8	131.0	128.5	130.7	130.7	131.8	134.3	137.2	135.8	136.3	141.1	136.8	135.8	132.8	127.4	135.4	153.1
800	121.9	122.4	122.9	122.4	122.9	123.2	125.4	126.9	129.7	131.0	130.9	132.3	131.7	129.7	124.4	122.6	128.6	146.3
1000	119.9	121.4	121.6	121.7	121.1	122.7	123.7	125.7	128.2	129.6	130.6	131.0	130.6	127.6	122.9	121.8	127.4	145.1
1250	124.2	125.7	125.7	125.9	125.5	125.4	127.2	127.4	130.7	130.9	132.7	134.1	135.2	130.2	126.0	123.4	130.3	148.0
1600	118.8	119.9	120.6	120.8	121.1	121.3	122.4	124.4	127.3	128.3	129.9	131.0	131.3	126.8	122.1	120.0	126.9	144.6
2000	120.3	121.8	122.3	122.7	122.3	124.5	123.2	125.2	128.8	129.0	130.7	131.9	132.3	128.0	123.2	121.4	127.9	145.6
2500	117.9	119.4	119.9	121.2	120.6	120.4	121.1	122.4	125.4	127.2	129.2	129.7	130.4	125.9	121.1	119.0	125.8	143.5
3150	117.5	118.9	119.5	119.9	119.4	120.5	121.0	122.0	125.0	127.2	129.0	129.7	129.4	126.2	120.7	117.8	125.5	143.2
4000	117.2	118.5	119.4	120.2	119.5	119.3	119.3	121.7	124.7	125.9	127.9	128.7	129.9	126.0	120.9	117.8	124.9	142.6
5000	115.7	116.7	117.0	119.0	117.7	116.7	117.6	119.4	122.9	124.4	127.2	126.7	128.0	124.1	119.7	117.2	123.3	141.0
6300	115.0	116.4	116.4	117.2	115.7	118.0	118.2	118.0	121.9	124.9	126.9	128.1	127.4	125.7	119.2	115.7	123.4	141.1
8000	115.7	117.2	116.7	117.7	115.4	117.4	117.4	118.2	123.1	124.2	126.4	126.9	128.9	125.2	120.7	117.0	123.4	141.1
10000	114.3	115.6	115.1	116.4	113.6	116.6	115.8	117.4	121.4	122.8	125.6	126.0	127.6	124.6	119.8	115.6	122.3	140.0
12500	113.9	115.9	114.7	116.7	114.2	116.5	116.5	117.9	122.0	123.2	125.9	126.5	128.4	124.9	121.2	117.2	122.8	140.5
16000	113.8	115.0	114.1	115.0	113.5	115.3	115.5	116.5	120.8	122.5	125.0	125.3	126.6	124.0	119.5	116.4	121.6	139.3
20000	112.1	114.3	113.3	114.0	111.8	114.3	114.5	116.5	121.3	122.7	123.8	125.5	126.3	124.2	120.2	115.6	121.4	139.1
OVERALL	134.6	135.4	135.9	135.3	135.4	135.6	136.6	138.2	141.1	141.4	142.6	144.8	143.7	141.0	137.2	134.5	140.3	158.1

TABLE XVI. - Concluded. FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF PLUS 5° ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) Concluded. 120 Percent speed; fan physical speed, 2586 rpm; fundamental blade passage frequency, 646 hertz

(d-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	79.2	82.9	81.4	83.2	81.2	83.9	83.5	81.0	81.0	80.2	82.0	85.0	84.5	86.5	87.0	89.4
63	75.4	77.2	76.6	75.6	76.2	76.6	77.4	77.4	77.4	78.4	79.4	81.1	83.2	85.4	86.7	88.9
80	85.2	86.6	84.5	80.5	79.4	77.6	80.9	81.2	81.9	84.1	86.1	86.3	87.2	89.9	89.0	90.9
100	85.5	85.9	85.0	83.2	82.7	83.7	82.8	83.8	84.7	86.5	87.8	88.1	88.5	90.2	89.8	89.9
125	90.2	92.8	93.2	93.8	90.2	87.0	89.7	91.7	91.0	92.7	93.5	94.8	95.8	92.7	91.5	90.4
160	89.5	91.2	89.4	87.5	88.4	90.0	90.5	90.0	91.0	92.4	92.9	95.1	92.9	92.0	90.9	89.3
200	90.9	92.2	90.2	87.2	86.6	86.9	86.2	87.7	86.9	88.6	90.1	91.2	91.2	89.7	88.7	88.8
250	90.7	92.5	92.0	91.4	89.4	88.7	89.0	89.7	91.7	92.9	94.4	95.8	94.7	94.7	89.9	88.4
315	92.6	92.2	91.4	91.4	91.1	91.6	91.9	92.6	93.9	94.4	95.4	95.3	94.4	93.6	89.7	88.9
400	92.2	92.3	92.7	91.3	91.8	92.5	92.3	93.3	95.7	96.7	98.2	98.6	98.0	95.8	91.3	90.2
500	91.7	93.3	93.0	93.5	93.0	93.0	94.0	95.0	97.0	98.2	98.5	99.4	98.7	96.8	92.3	91.1
630	99.7	99.0	101.2	98.7	100.9	100.9	102.0	104.5	107.4	106.0	106.5	111.3	107.0	106.0	103.0	97.6
800	92.1	92.6	93.1	92.6	93.1	93.4	95.6	97.1	99.9	101.2	101.1	102.5	101.5	99.9	94.6	92.8
1000	90.1	91.6	91.8	91.9	91.3	92.9	93.9	95.9	98.4	99.8	100.8	101.2	100.8	97.8	93.1	92.0
1250	94.3	95.8	95.8	96.0	95.6	95.5	97.3	97.5	100.8	101.0	102.8	104.2	105.3	100.3	96.1	93.5
1600	88.9	90.0	90.7	90.9	91.2	91.4	92.5	94.5	97.4	98.4	100.0	101.1	101.4	96.9	92.2	90.1
2000	90.3	91.8	92.3	92.7	92.3	92.5	93.2	95.2	98.8	99.0	100.7	101.9	102.3	98.0	93.2	91.4
2500	87.8	89.3	89.8	91.1	90.5	90.3	91.0	92.3	95.3	97.1	99.1	99.6	100.3	95.8	91.0	88.9
3150	87.2	88.6	89.2	89.6	89.1	90.2	90.7	91.7	94.7	96.9	98.7	99.4	99.1	95.9	90.4	87.5
4000	86.7	88.0	88.9	89.7	89.0	88.8	88.8	91.2	94.2	95.4	97.4	98.2	99.4	95.5	90.4	87.3
5000	84.9	85.9	86.2	88.2	86.9	85.9	86.8	88.6	92.1	93.6	96.4	95.9	97.2	93.3	88.9	86.4
6300	83.7	85.1	85.1	85.9	84.5	86.7	86.9	86.7	90.6	93.6	95.6	96.8	96.1	94.4	87.9	84.4
8000	83.8	85.3	84.8	85.8	83.5	85.5	85.5	86.3	91.2	92.3	94.5	95.0	96.9	93.3	88.7	85.1
10000	81.4	82.7	82.2	83.5	80.7	83.7	82.9	84.5	88.5	89.9	92.7	93.1	94.7	91.7	86.9	82.7
12500	79.6	81.6	80.4	82.4	79.9	82.2	82.2	83.6	87.7	88.9	91.6	92.2	94.1	90.6	86.9	82.9
16000	76.6	78.8	77.9	78.8	77.3	79.1	79.3	80.3	84.6	86.3	88.8	89.1	90.4	87.8	83.3	80.2
20000	73.2	75.4	74.4	75.1	72.9	75.4	75.6	77.6	82.3	83.8	84.9	86.6	87.4	85.3	81.2	76.7
OVERALL	104.7	105.4	105.9	105.2	105.4	105.6	106.6	108.3	111.1	111.2	112.4	114.7	113.4	110.8	107.0	104.4
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	79.1	88.0	93.2	95.2	97.4	98.9	100.7	102.9	105.8	105.9	106.9	108.1	105.8	101.1	94.5	86.9
304.8 M	69.3	79.3	85.1	87.1	89.7	91.3	93.1	95.5	98.4	98.3	98.9	100.5	97.4	93.0	86.3	78.2

TABLE XVII. - FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) 100 Percent speed; fan physical speed, 2164 rpm; fundamental blade passage frequency, 541 hertz

(a-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	105.1	102.9	104.7	104.4	104.7	105.6	106.2	105.9	106.7	106.7	107.2	108.3	109.1	110.6	112.2	115.3	108.0	125.7
63	103.0	104.5	103.2	103.5	104.4	104.5	105.9	105.5	106.0	106.7	107.0	108.3	110.2	111.9	113.4	115.6	108.3	126.0
80	106.3	108.7	105.0	104.5	105.7	108.2	107.8	108.2	108.8	110.0	110.7	111.2	113.2	114.0	115.0	116.2	110.6	128.3
100	111.2	110.7	110.7	111.3	107.8	110.3	109.8	109.2	111.0	113.5	113.2	114.1	114.8	115.8	115.8	116.1	112.7	130.4
125	113.7	115.6	115.1	112.1	112.9	112.6	112.1	112.6	113.6	115.6	116.1	116.3	116.6	116.2	115.7	115.3	114.7	132.4
160	115.6	115.1	116.3	112.4	114.8	113.1	113.6	113.6	115.1	116.8	116.1	118.3	115.6	115.9	115.3	114.6	115.4	133.1
200	115.8	117.3	115.3	111.9	110.9	111.1	110.6	110.6	111.1	111.9	113.6	113.8	114.8	114.3	113.9	113.3	113.0	130.7
250	117.8	118.4	116.3	115.1	113.8	113.6	112.3	113.3	114.1	115.9	116.9	118.4	118.4	117.1	114.3	113.3	115.8	133.5
315	119.3	120.3	120.9	117.1	116.9	117.9	115.9	117.6	117.8	120.8	121.4	120.2	120.5	119.6	115.9	114.8	119.1	136.8
400	119.9	122.4	121.2	119.2	118.9	116.5	116.6	117.4	118.4	120.5	121.4	122.5	122.7	118.9	115.5	114.9	119.8	137.5
500	128.3	129.9	128.8	130.6	126.1	126.1	128.6	127.3	126.4	126.9	128.6	131.5	131.2	126.9	120.9	124.7	128.4	146.1
630	123.1	124.5	123.8	124.3	121.1	120.6	122.1	121.6	122.8	124.8	125.3	126.4	127.0	123.5	119.1	118.7	123.8	141.5
800	119.9	121.2	121.7	120.9	119.2	119.2	119.2	121.2	123.2	124.7	125.2	125.1	127.0	123.9	118.9	117.1	123.0	140.7
1000	122.6	125.3	125.6	127.1	123.8	122.5	122.0	123.0	124.6	126.3	126.8	129.1	128.8	125.5	120.3	118.7	125.6	143.3
1250	120.1	122.8	122.9	122.6	120.6	119.6	119.5	120.6	122.6	124.1	125.3	126.6	126.1	122.5	118.5	117.0	123.1	140.8
1600	121.6	123.3	123.8	123.1	122.8	121.1	119.5	120.8	122.3	124.6	125.1	126.1	128.1	122.6	117.6	116.0	123.6	141.3
2000	119.8	122.1	121.8	121.6	120.5	119.1	117.3	118.1	120.5	122.3	123.8	124.1	126.6	120.8	116.3	114.2	121.8	139.5
2500	118.4	120.8	120.4	120.4	119.3	117.8	115.6	116.6	118.6	121.1	122.3	123.1	124.3	119.8	114.8	112.9	120.3	138.0
3150	119.2	120.5	120.0	120.0	118.5	117.3	116.3	116.3	118.0	121.0	122.3	122.8	123.3	119.7	114.2	111.9	119.9	137.6
4000	118.5	120.5	120.0	120.3	118.2	116.6	114.6	115.8	117.8	119.5	120.8	121.8	123.0	118.8	114.3	111.6	119.2	136.9
5000	117.1	118.8	117.8	119.3	116.4	114.5	112.8	113.4	115.8	117.6	119.8	119.8	121.9	117.0	112.8	110.3	117.6	135.3
6300	117.0	119.0	117.3	117.5	114.4	115.6	112.8	112.3	115.0	118.3	120.1	120.8	120.8	118.3	112.5	109.0	117.5	135.2
8000	118.2	119.7	118.0	118.5	114.8	114.5	112.1	112.1	116.0	117.6	119.8	119.8	122.0	118.1	114.0	109.9	117.6	135.3
10000	117.1	118.8	116.4	117.4	113.6	113.9	113.8	111.4	114.8	116.4	118.8	118.7	120.8	117.4	112.9	108.6	116.5	134.2
12500	117.0	118.6	116.5	118.0	113.5	114.0	111.0	111.8	115.3	117.0	119.1	119.2	121.3	117.5	114.3	110.3	116.9	134.6
16000	115.6	117.8	115.8	115.9	111.9	112.1	109.4	110.4	113.6	116.1	117.9	118.3	119.6	117.1	112.4	109.2	115.6	133.3
20000	114.8	117.2	114.7	115.3	110.7	111.0	108.5	110.5	114.0	116.0	117.0	117.9	119.9	117.0	113.0	108.3	115.3	133.0
OVERALL	133.8	135.6	135.0	135.5	132.8	132.1	132.4	132.4	133.5	135.2	136.3	137.6	138.2	134.6	130.4	130.2	134.8	152.5

TABLE XVII. - Continued. FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) Concluded. 100 Percent speed; fan physical speed, 2164 rpm; fundamental blade passage frequency, 541 hertz

(a-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG														
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	75.4	72.2	75.0	74.7	75.0	75.9	76.5	76.2	77.0	77.0	77.5	78.6	79.4	80.9	82.5	85.6
63	73.3	74.9	73.5	73.8	74.7	74.8	75.2	75.8	76.3	77.0	77.3	78.6	80.5	82.2	83.7	85.9
80	76.6	75.0	75.3	74.8	76.0	78.5	78.1	78.5	79.1	80.3	81.0	81.5	83.5	84.3	85.3	86.5
100	81.5	81.0	81.5	81.6	78.1	80.6	80.1	79.5	81.3	83.8	83.5	84.4	85.1	86.1	86.1	86.4
125	84.0	85.9	85.4	82.4	83.2	82.9	82.4	82.9	83.9	85.9	86.4	86.6	86.9	86.5	86.0	85.6
160	85.9	85.4	86.6	92.7	85.1	83.4	83.9	83.9	85.4	87.1	88.4	88.6	85.9	86.2	85.6	84.9
200	86.1	87.6	85.6	82.2	81.2	81.4	80.9	80.9	81.4	82.2	83.9	84.1	85.1	84.6	84.2	83.6
250	90.1	88.7	86.6	85.4	84.1	83.9	82.6	83.6	84.4	86.2	87.2	88.7	88.7	87.4	84.6	83.6
315	89.6	90.6	91.2	87.4	87.2	88.2	86.2	87.9	88.1	91.1	91.7	90.5	91.2	89.9	86.2	85.1
400	90.1	92.6	91.4	85.4	85.1	86.7	86.8	87.6	88.6	90.7	91.6	92.7	92.9	89.1	85.7	85.1
500	98.5	100.1	99.0	100.8	96.3	96.3	98.8	97.5	96.6	97.1	98.8	101.7	101.5	97.1	91.1	94.9
630	91.2	94.7	94.0	94.5	91.3	90.8	92.3	91.8	93.0	95.0	95.5	96.6	97.2	93.7	89.3	88.9
800	90.1	91.4	91.9	91.1	89.4	89.4	89.4	91.4	93.4	94.9	95.4	95.3	97.2	94.1	89.1	87.3
1000	92.8	95.5	95.8	97.3	94.0	92.7	92.2	93.2	94.8	96.5	97.0	99.3	99.0	95.7	90.5	88.9
1250	90.2	92.9	92.9	92.7	90.7	89.7	89.6	90.7	92.7	94.2	95.4	96.7	96.2	92.6	88.6	87.1
1600	91.7	93.4	93.9	93.2	92.9	91.2	89.6	90.9	92.4	94.7	95.2	96.2	98.2	92.7	87.7	86.1
2000	89.8	92.1	91.8	91.6	90.5	89.1	87.3	88.1	90.5	92.3	93.8	94.1	96.6	90.8	86.3	84.2
2500	88.3	90.7	90.3	90.3	89.2	87.7	86.5	86.5	88.5	91.0	92.2	93.0	94.2	89.7	84.7	82.8
3150	87.9	90.2	89.7	89.7	88.2	87.0	86.0	86.0	87.7	90.7	92.0	92.5	93.0	89.4	82.9	81.6
4000	88.0	90.3	89.5	89.8	87.7	86.1	84.1	85.3	87.3	89.0	90.3	91.3	92.5	88.3	83.8	81.1
5000	86.3	88.0	87.6	88.5	85.6	83.7	82.0	82.6	85.0	86.8	89.0	89.0	91.1	86.2	82.0	79.5
6300	85.7	87.7	86.0	86.2	83.1	84.3	81.5	81.0	83.7	87.0	88.8	89.5	89.5	87.0	81.2	77.7
8000	86.2	87.8	86.1	86.5	82.9	82.6	80.2	80.2	84.1	85.7	87.9	87.9	90.0	86.2	82.0	78.0
10000	84.2	85.9	83.5	84.5	80.7	81.0	77.9	78.5	81.9	83.5	85.9	85.8	87.5	84.5	80.0	75.7
12500	82.7	84.3	82.2	83.7	79.2	79.7	76.7	77.5	81.0	82.7	84.8	85.0	87.0	83.2	80.0	76.0
16000	79.4	81.6	79.6	79.7	75.7	75.9	73.2	74.2	77.4	79.9	81.7	82.1	83.4	80.9	76.2	73.0
20000	75.9	78.3	76.8	76.4	71.8	72.1	69.6	71.6	75.0	77.1	78.1	79.0	80.9	78.1	74.0	69.4
OVERALL	102.7	105.4	104.9	105.4	102.7	102.0	102.5	102.5	103.5	105.1	106.1	107.5	108.1	104.4	100.2	100.2
	SIDELINE PERCEIVED NOISE LEVELS															
DISTANCE																
152.4 M	78.0	80.3	82.0	95.3	94.9	95.2	95.5	96.8	98.0	99.9	100.5	100.6	100.3	94.1	86.9	82.8
304.8 M	68.3	79.0	83.8	87.3	86.8	87.5	89.0	89.4	90.2	92.1	92.4	92.9	92.1	86.0	78.3	74.4

TABLE XVII. - Continued. FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) 110 Percent speed; fan physical speed, 2380 rpm; fundamental blade passage frequency, 595 hertz

(b-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																
[illegible]	107.8	105.4	107.3	106.6	106.6	108.4	108.1	108.8	109.4	108.9	110.1	110.2	112.3	114.3	114.9	117.8	110.7	128.4
[illegible]	105.4	106.4	105.5	105.5	105.5	106.4	106.7	106.0	107.0	107.4	109.7	110.5	112.4	115.0	116.2	118.6	110.6	128.3
[illegible]	110.1	112.2	108.9	107.1	106.4	107.6	107.9	109.7	111.7	112.7	113.6	113.5	115.2	116.9	118.4	120.3	113.3	131.0
[illegible]	113.7	114.0	112.3	111.5	111.4	112.8	111.5	113.0	114.0	114.3	116.6	117.1	118.0	119.0	119.5	119.2	115.5	133.2
[illegible]	114.4	115.2	113.7	113.9	114.1	114.2	113.9	113.4	121.1	120.2	122.7	122.5	121.6	121.7	120.6	118.8	120.4	138.1
[illegible]	116.5	120.1	114.5	115.0	117.5	116.1	117.6	117.3	119.6	120.3	121.2	123.1	121.5	120.0	118.8	115.3	119.6	137.3
[illegible]	117.1	115.3	117.9	114.5	114.5	114.3	113.5	114.0	114.1	115.6	116.6	118.1	118.3	118.0	117.0	116.5	116.2	133.9
[illegible]	120.2	119.7	119.6	119.7	117.4	119.1	117.2	117.4	118.7	120.2	120.7	122.0	122.2	120.9	118.7	117.5	119.7	137.4
[illegible]	122.2	121.6	121.4	119.7	118.9	118.9	119.6	120.2	121.7	123.4	123.7	122.8	123.2	120.9	117.6	116.6	121.4	139.1
[illegible]	121.0	123.2	122.9	119.7	120.0	119.3	120.2	121.2	122.8	124.5	125.2	125.6	126.3	123.0	119.2	118.0	123.0	140.7
[illegible]	121.0	123.8	123.5	125.3	122.3	123.0	122.5	125.3	126.3	127.1	127.3	127.9	128.1	124.5	121.0	120.4	125.5	143.2
[illegible]	127.9	131.0	131.9	130.4	128.4	131.5	129.5	133.9	134.4	135.5	135.0	136.3	136.2	130.5	127.5	127.1	133.6	151.3
[illegible]	119.8	121.1	120.5	121.4	121.1	120.8	122.9	124.6	126.6	128.6	128.8	129.3	130.1	126.8	121.6	120.3	126.2	143.9
1000	119.5	121.3	121.5	121.3	120.0	120.8	122.2	123.7	126.3	128.3	129.0	129.3	129.5	125.3	121.0	120.4	125.9	143.6
1250	122.0	124.3	123.2	125.4	122.9	123.3	124.9	125.1	127.6	130.4	131.4	130.5	134.9	127.8	122.3	121.8	128.6	146.4
1600	119.7	120.8	121.2	121.6	120.3	120.8	120.8	122.8	125.0	126.7	128.5	129.8	130.5	124.3	120.2	118.6	125.6	143.3
2000	119.9	121.1	121.0	122.1	121.1	120.6	120.6	122.3	124.8	126.4	128.4	129.0	131.3	124.6	120.6	118.7	125.6	143.3
2500	119.1	119.8	120.3	120.9	119.6	119.3	119.3	120.5	123.0	125.2	126.8	127.8	128.3	123.0	118.6	116.9	123.8	141.5
3150	117.8	119.0	119.2	120.2	118.7	119.2	118.8	119.8	122.2	125.0	126.5	126.8	127.0	122.5	118.2	115.4	123.1	140.8
4000	117.5	119.6	119.1	120.1	118.5	118.0	117.6	119.3	121.8	123.5	125.0	125.9	127.1	122.6	118.6	115.4	122.4	140.1
5000	116.1	117.3	117.5	118.9	116.6	115.3	115.6	117.3	119.6	121.8	124.0	123.8	125.6	120.6	117.1	114.4	120.7	138.4
6300	115.3	116.9	116.4	116.9	114.7	116.8	116.3	116.1	119.1	122.8	124.3	125.1	124.6	122.4	116.6	113.5	120.9	138.6
8000	115.7	117.3	116.7	117.4	114.7	115.8	114.7	116.0	120.2	121.5	123.7	123.9	126.0	121.7	118.2	113.9	120.7	138.4
10000	114.2	115.9	114.6	116.3	112.6	114.8	113.1	115.1	118.4	120.4	122.6	122.8	125.1	121.1	116.9	112.4	119.6	137.3
12500	113.9	115.8	114.1	116.4	112.9	114.7	113.4	115.4	118.9	120.6	122.4	123.4	125.2	121.1	118.1	114.1	119.8	137.5
16000	112.4	114.5	113.4	114.0	110.8	112.7	112.0	113.2	116.9	119.5	121.4	121.9	123.2	120.6	116.2	113.1	118.3	136.0
20000	111.4	113.7	112.4	113.4	109.4	111.7	111.1	113.4	117.1	119.1	120.4	121.5	123.1	120.3	116.4	111.9	117.9	135.6
OVERALL	131.4	135.5	135.8	137.6	133.6	135.0	134.5	137.0	138.4	140.0	140.7	141.3	142.4	137.6	134.1	133.2	138.4	156.1

TABLE XVII. - Continued. FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) Concluded. 110 Percent speed; fan physical speed, 2380 rpm; fundamental blade passage frequency, 595 hertz

(b-2) Data adjusted to standard day 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	78.1	75.7	77.6	76.9	76.9	78.7	78.4	79.1	79.7	79.2	80.4	80.5	82.6	84.6	85.2	88.1
63	75.7	76.7	75.8	75.8	75.8	76.7	77.0	76.3	77.3	77.7	80.0	80.8	82.7	85.3	86.5	88.9
80	80.4	82.5	79.2	77.4	76.7	77.9	78.2	80.0	82.0	83.0	83.9	83.8	85.5	87.2	88.7	90.6
100	83.9	84.3	82.6	81.6	81.4	83.1	81.8	83.3	84.3	84.6	86.9	87.4	88.3	89.3	89.8	89.5
125	86.7	89.5	89.0	89.2	86.4	89.5	89.2	89.7	91.4	90.5	93.0	92.8	91.9	92.0	90.9	89.1
160	86.8	90.4	89.8	86.3	87.8	86.4	87.9	87.6	89.9	90.6	91.6	93.4	91.8	90.3	89.1	89.6
200	87.4	89.6	89.1	84.8	84.8	84.3	83.8	84.3	84.4	85.9	86.9	88.4	88.6	88.3	87.3	87.2
250	90.5	90.0	89.9	89.0	87.7	89.4	87.5	87.7	89.0	90.5	91.0	92.3	92.5	91.2	89.0	87.8
315	90.5	91.9	91.7	90.0	89.2	89.2	89.9	90.5	92.0	93.7	94.0	93.1	93.5	91.2	87.9	86.9
400	91.2	94.4	93.0	89.9	90.2	89.5	90.4	91.4	93.0	94.7	95.5	95.8	96.5	93.2	89.4	88.2
500	91.8	93.7	93.7	95.5	92.5	93.2	92.7	95.5	96.5	97.3	97.5	98.1	98.3	94.7	91.2	90.6
630	98.1	101.2	102.1	100.6	98.6	101.7	99.7	104.1	104.6	105.7	105.2	106.5	106.4	100.7	97.7	97.3
800	89.8	91.3	91.1	91.6	91.3	91.0	93.1	94.8	96.8	98.8	99.0	99.5	100.3	97.0	91.8	90.5
1000	89.7	91.5	91.6	91.4	90.2	91.0	92.4	93.9	96.5	98.5	99.2	99.5	99.6	95.5	91.2	90.6
1250	92.7	94.4	95.4	95.5	93.0	93.4	95.0	95.2	97.7	100.5	101.5	100.6	100.0	97.9	92.4	91.9
1600	89.8	90.9	91.3	91.6	90.4	90.9	90.9	92.9	95.1	96.8	98.6	99.9	100.6	94.4	90.3	88.7
2000	89.9	91.1	91.6	92.1	91.1	90.6	90.6	92.3	94.8	96.4	98.4	99.0	101.3	94.6	90.6	88.7
2500	89.0	89.7	90.3	90.7	89.5	89.2	89.2	90.4	92.9	95.1	96.7	97.7	98.2	92.9	88.5	86.8
3150	87.5	88.7	89.6	89.9	88.4	88.9	88.5	89.5	91.9	94.7	96.2	96.5	96.7	92.2	87.9	85.1
4000	87.0	88.1	88.6	89.6	88.0	87.5	87.1	88.3	91.3	93.0	94.5	95.4	96.6	92.1	88.1	84.9
5000	85.3	86.5	86.5	88.1	85.8	84.5	84.8	86.5	88.8	91.0	93.2	93.0	94.8	89.8	86.3	83.6
6300	84.0	85.6	86.1	86.6	83.5	85.5	85.0	84.8	87.8	91.5	93.0	92.8	93.3	91.1	85.3	82.2
8000	82.8	85.4	84.8	85.5	82.8	83.9	82.8	84.1	88.3	89.6	91.8	92.0	94.0	89.8	86.2	82.0
10000	81.3	83.0	81.7	83.4	79.7	81.9	80.2	82.2	85.5	87.5	89.7	89.9	92.2	88.2	84.0	79.5
12500	79.6	81.3	79.8	82.1	78.6	80.4	79.1	81.1	84.6	86.3	88.1	89.1	90.9	86.8	83.8	79.8
16000	76.2	78.2	77.2	77.9	74.6	76.5	75.8	77.0	80.7	83.3	85.2	85.7	87.0	84.4	80.0	76.9
20000	72.5	74.4	73.7	74.5	70.5	72.8	72.2	74.5	78.2	80.2	81.5	82.6	84.2	81.4	77.5	73.0
OVERALL	103.4	105.5	105.9	107.7	103.6	105.0	104.5	107.1	108.5	110.0	110.6	111.2	112.2	107.4	104.0	103.2
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	77.6	78.5	83.3	87.6	85.7	98.4	93.5	101.6	103.2	104.6	104.7	104.7	104.4	97.4	91.1	85.8
304.8 M	67.8	70.0	75.1	80.0	87.9	90.8	91.0	94.2	95.7	97.1	97.1	97.0	96.1	89.2	82.8	77.2

TABLE XVII. - Continued. FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) 115 Percent speed; fan physical speed, 2488 rpm; fundamental blade passage frequency, 622 hertz

(c-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE POWER LEVEL	
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	106.5	108.5	107.0	110.0	109.5	110.0	109.4	109.4	110.2	109.9	110.5	111.6	112.2	115.2	116.7	119.1	111.9	129.6
63	106.5	107.5	106.5	106.7	106.7	107.2	107.5	106.3	107.0	109.0	110.0	111.8	113.5	115.9	117.5	119.6	111.6	129.3
80	117.1	117.4	115.1	113.3	114.0	109.9	113.4	110.4	113.8	114.1	113.1	116.0	118.8	120.4	120.9	122.1	116.2	133.9
100	117.2	116.5	114.3	114.2	114.2	113.0	112.7	113.3	113.8	115.7	117.0	117.3	118.5	120.0	120.2	120.4	116.4	134.1
125	124.6	124.8	121.0	122.4	120.6	116.9	119.8	118.4	120.4	121.6	123.9	122.9	122.1	122.6	121.8	119.3	121.6	139.3
160	121.7	122.7	120.2	118.7	119.0	118.0	118.7	119.2	121.8	121.3	123.0	124.4	123.5	121.7	120.3	119.7	121.3	139.0
200	121.0	123.2	120.1	116.5	116.5	115.7	115.2	116.2	116.5	117.2	119.2	120.3	121.0	120.0	118.9	118.4	118.6	136.3
250	122.2	123.4	121.6	120.9	119.9	118.9	118.5	118.4	119.9	121.5	123.0	124.6	124.9	123.5	120.0	119.1	121.7	139.4
315	122.0	123.2	122.0	122.2	120.8	121.2	121.5	122.7	123.2	124.2	125.0	125.1	124.2	122.8	119.8	118.7	123.0	140.7
400	127.0	125.5	125.2	122.5	122.0	121.7	121.8	123.7	125.0	126.7	128.3	129.1	128.7	126.0	121.2	120.6	125.5	143.2
500	121.5	123.4	123.2	120.5	123.2	122.5	123.9	125.9	127.9	129.0	128.9	129.0	129.7	125.7	121.7	121.2	126.6	144.3
630	126.5	130.1	127.1	130.1	126.2	129.2	131.2	136.6	138.9	139.7	136.4	136.2	139.9	131.9	127.6	125.0	135.7	153.4
800	121.0	122.0	122.3	123.5	125.0	122.0	125.0	127.0	129.0	131.1	131.0	131.1	132.0	128.6	123.6	122.2	128.3	146.0
1000	126.3	122.2	127.2	123.2	121.6	122.2	124.2	126.0	129.0	129.5	130.8	131.1	131.5	127.0	122.8	122.2	127.6	145.3
1250	122.0	125.7	126.5	127.2	124.8	124.3	125.3	127.5	129.2	132.2	132.2	134.8	132.2	129.0	125.0	123.7	129.9	147.6
1600	120.3	121.5	121.4	122.3	122.1	121.8	122.3	124.9	126.9	128.4	129.9	131.7	132.3	126.4	122.4	120.7	127.3	145.0
2000	121.9	123.0	123.1	124.1	123.5	123.0	123.0	124.3	127.0	129.0	130.8	131.2	132.8	127.0	123.3	121.5	127.7	145.4
2500	119.2	121.0	120.9	122.0	120.7	120.7	121.0	122.5	125.0	127.4	128.9	129.8	130.5	125.0	120.9	119.0	125.8	143.5
3150	118.1	120.6	121.1	121.3	119.6	120.3	120.9	121.8	124.4	127.1	128.6	129.4	129.6	125.3	120.3	118.0	125.3	143.0
4000	118.1	120.1	120.1	121.6	119.9	119.6	119.1	121.6	124.1	125.4	127.3	128.4	130.0	125.3	120.6	117.7	124.7	142.4
5000	117.5	118.2	117.9	119.9	117.7	116.9	117.5	119.2	122.5	124.0	126.2	126.5	128.5	123.0	119.9	116.9	123.1	140.8
6300	115.9	118.0	116.6	118.1	115.9	118.3	117.9	118.1	121.4	125.0	126.8	127.8	128.0	125.1	119.0	115.6	123.4	141.1
8000	116.4	118.2	117.2	118.4	115.9	117.1	117.1	118.1	122.4	124.1	126.2	126.8	129.1	124.7	120.6	116.8	123.3	141.0
10000	114.5	117.0	115.1	116.5	113.6	116.0	115.3	116.8	120.8	122.5	125.2	125.9	128.2	124.0	119.7	115.1	122.2	139.9
12500	114.6	117.0	114.5	117.2	114.0	116.0	115.3	117.6	121.2	122.8	125.2	126.1	128.5	123.7	120.7	116.7	122.4	140.1
16000	112.6	115.2	113.8	114.6	111.9	113.7	113.6	115.1	119.6	121.6	123.9	124.4	125.9	123.4	118.6	115.5	120.7	138.4
20000	111.8	114.4	112.4	113.8	110.4	112.7	112.9	115.6	120.0	121.4	122.9	123.8	125.8	122.9	118.8	114.2	120.3	138.0
OVERALL	134.6	136.5	135.2	136.3	134.5	134.9	136.1	139.3	141.6	142.9	142.5	143.2	144.6	139.6	135.8	134.3	140.4	158.1

TABLE XVII. - Continued. FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) Concluded. 115 Percent speed; fan physical speed, 2488 rpm; fundamental blade passage frequency, 622 hertz

(c-2) Data adjusted to standard day 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	78.8	78.8	79.3	80.3	79.8	80.3	79.7	79.7	80.5	80.2	80.8	81.9	82.5	85.5	87.0	89.4
63	76.8	77.8	76.8	76.8	77.0	77.5	77.8	77.2	77.3	79.3	80.3	82.1	83.8	86.2	87.8	89.9
80	87.4	87.7	85.4	83.6	84.9	80.2	83.7	80.7	84.1	84.4	83.4	86.3	85.1	90.7	91.2	92.4
100	87.5	86.8	84.6	84.5	84.5	83.3	83.0	83.6	84.1	86.0	87.3	87.6	88.8	90.3	90.5	90.7
125	94.9	95.1	91.9	92.7	90.9	87.2	90.1	88.7	90.7	91.9	94.2	93.2	92.4	92.9	92.1	89.6
160	92.0	93.0	90.5	89.0	89.3	88.3	89.0	89.5	92.1	91.6	93.3	94.7	93.8	92.0	90.6	90.0
200	91.3	93.5	91.2	86.9	86.8	86.0	85.5	86.5	86.8	87.5	89.5	90.6	91.2	90.3	89.2	88.7
250	92.5	93.7	91.8	91.2	90.2	89.2	88.8	88.7	90.2	91.8	93.3	94.9	95.2	93.8	90.3	89.4
315	93.1	93.5	92.3	92.5	91.1	91.5	91.8	93.0	93.5	94.5	95.3	95.4	94.5	93.1	90.1	89.0
400	92.2	93.7	93.4	92.7	92.2	91.9	92.0	93.9	95.2	96.9	98.5	99.3	98.9	96.2	91.4	90.8
500	91.7	93.6	93.4	93.7	93.4	92.7	94.1	96.1	98.1	99.2	99.1	99.2	99.9	95.9	91.9	91.4
630	97.1	100.3	97.3	100.3	96.4	99.4	101.4	106.8	109.1	109.9	106.6	106.4	110.1	102.1	97.8	95.2
800	91.2	92.2	92.5	93.7	93.2	92.8	95.2	97.2	99.2	101.3	101.2	101.3	102.2	96.8	93.8	92.4
1000	90.5	92.4	92.3	93.4	91.7	92.4	94.4	96.2	98.2	99.7	101.0	101.3	101.7	97.2	93.0	92.4
1250	92.1	95.8	96.6	97.8	94.9	94.4	95.4	97.6	99.3	102.3	102.3	104.9	103.3	99.1	95.1	93.8
1600	90.4	91.7	91.5	92.4	92.2	91.9	92.4	95.0	97.0	98.5	100.0	101.8	102.4	96.5	92.5	90.8
2000	91.8	93.0	93.1	94.1	93.5	93.0	93.0	94.3	97.0	99.0	100.8	101.2	102.8	97.0	93.3	91.5
2500	89.1	90.9	90.8	91.9	90.6	90.6	90.9	92.4	94.9	97.3	98.8	99.7	100.4	94.9	90.8	88.9
3150	87.8	90.3	89.9	91.0	89.5	90.0	90.6	91.5	94.1	96.8	98.3	99.1	99.3	95.0	90.0	87.7
4000	87.6	89.6	89.6	91.1	89.4	89.1	88.6	91.1	93.6	94.9	96.8	97.9	99.5	94.8	90.1	87.2
5000	85.7	87.4	87.1	89.1	86.9	86.1	86.7	88.4	91.7	93.2	95.4	95.7	97.7	92.2	89.1	86.1
6300	84.5	86.7	85.3	86.8	84.7	87.0	86.6	86.8	90.1	93.7	95.5	96.5	96.7	93.8	87.7	84.3
8000	84.5	86.3	83.3	86.5	84.0	85.2	85.2	86.2	90.5	92.2	94.3	94.9	97.1	92.8	88.6	84.9
10000	81.6	84.1	82.2	83.9	80.9	83.1	82.4	83.9	87.9	89.6	92.3	93.0	95.3	91.1	86.8	82.2
12500	80.2	82.7	80.2	82.5	79.7	81.7	81.0	83.2	86.9	88.5	90.9	91.8	94.2	89.4	86.4	82.4
16000	76.4	79.0	77.6	78.5	75.8	77.5	77.4	78.9	83.4	85.4	87.7	88.2	89.7	87.2	82.4	79.3
20000	72.9	75.5	73.5	74.9	71.5	73.8	74.0	76.6	81.0	82.5	84.0	84.9	86.9	84.0	79.9	75.3
OVERALL	104.7	106.5	105.3	106.3	104.6	104.9	105.1	109.4	111.6	112.9	112.3	113.0	114.4	109.3	105.6	104.3
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	78.5	80.2	82.6	86.3	87.2	88.4	100.3	103.8	106.2	107.5	106.8	106.6	106.5	95.6	92.9	86.6
304.8 M	68.6	80.5	83.8	88.3	89.0	90.6	92.7	96.5	98.9	100.0	98.8	98.4	98.7	91.1	84.1	77.4

TABLE XVII. - Continued. FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) 120 Percent speed; fan physical speed, 2596 rpm; fundamental blade passage frequency, 649 hertz

(d-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																
50	112.0	112.9	112.0	114.0	109.7	114.0	114.0	112.3	114.2	115.3	111.5	113.8	114.3	118.2	117.7	120.4	114.6	132.3
63	107.4	108.5	107.9	107.4	106.9	107.0	109.2	108.2	108.5	109.2	110.0	112.1	114.5	116.9	118.4	120.6	112.4	130.1
80	115.5	117.0	116.6	115.3	112.8	111.1	109.1	111.8	111.6	112.1	115.1	116.7	120.1	120.5	120.6	123.4	116.6	134.3
100	119.0	118.5	118.2	117.6	115.6	114.8	114.8	115.1	115.0	116.6	118.1	118.9	120.1	121.4	120.6	121.3	117.9	135.6
125	122.6	124.6	124.0	124.3	120.5	119.1	120.1	121.1	121.3	122.1	123.3	123.9	124.5	123.8	122.1	120.7	122.5	140.2
160	122.7	123.8	122.5	121.0	120.0	120.3	120.7	121.0	122.0	123.0	123.7	125.3	123.8	123.0	120.5	120.0	122.4	140.1
200	123.2	126.4	123.2	119.2	118.9	117.9	116.7	118.5	118.2	119.7	120.7	121.8	122.2	121.4	119.9	120.1	120.5	138.2
250	122.8	124.7	123.3	123.0	122.0	120.5	119.5	120.8	122.5	124.2	125.8	126.6	126.7	124.7	121.0	119.9	123.7	141.4
315	123.9	124.9	125.1	124.2	122.7	122.7	122.9	124.1	124.7	126.4	126.9	127.5	126.5	124.7	121.4	119.9	125.0	142.7
400	124.1	124.7	125.4	124.4	124.2	123.7	123.6	125.2	127.2	129.6	130.9	131.7	130.5	127.6	123.4	121.6	127.8	145.5
500	123.6	124.4	124.9	125.2	124.4	124.6	125.7	127.6	128.7	130.1	130.4	131.3	130.7	127.2	123.7	122.6	128.1	145.8
630	126.8	132.0	130.8	131.4	130.4	129.4	134.6	137.4	138.6	138.1	135.3	139.4	140.6	134.9	132.4	126.3	136.3	154.0
800	122.4	124.5	126.0	125.2	125.4	125.0	127.7	129.6	131.3	132.5	132.7	133.4	134.2	130.5	126.0	124.4	130.4	148.1
1000	121.4	123.7	124.9	124.9	124.2	125.0	126.2	128.2	130.0	131.4	132.5	133.0	133.7	128.9	124.9	123.9	129.6	147.3
1250	126.5	126.5	129.1	127.5	127.3	126.9	127.8	130.1	131.1	132.6	134.0	134.2	135.1	131.3	126.3	125.4	131.2	148.9
1600	121.6	122.8	123.9	123.6	123.4	123.6	124.6	126.8	129.1	130.4	131.8	133.4	134.8	128.4	124.1	122.3	129.3	147.0
2000	122.7	124.3	125.0	125.3	124.3	124.5	124.7	125.8	128.8	130.7	132.3	133.1	134.7	128.5	124.5	122.4	129.4	147.1
2500	120.2	122.2	122.7	123.7	122.1	121.9	122.9	124.4	126.9	129.4	130.7	131.8	132.6	126.7	122.7	120.5	127.7	145.4
3150	119.9	121.6	122.1	122.4	121.4	122.2	122.7	123.9	126.2	129.2	130.6	131.5	131.7	127.1	122.4	119.5	127.3	145.0
4000	119.5	121.7	121.9	122.6	121.7	121.7	121.0	123.5	126.1	127.7	129.5	130.9	132.4	127.2	122.4	119.5	126.9	144.6
5000	117.9	119.4	119.8	121.5	119.4	119.3	119.3	121.8	124.8	126.1	129.0	129.0	131.5	125.5	122.0	119.1	125.6	143.3
6300	117.1	119.1	119.1	119.8	117.8	120.3	120.5	120.5	123.8	127.1	129.3	130.2	130.5	127.8	121.6	118.0	125.8	143.5
8000	117.4	119.6	119.1	119.9	117.6	119.4	119.1	120.9	124.8	126.2	128.6	129.1	131.8	127.2	123.3	118.8	125.7	143.4
10000	115.9	118.1	117.0	118.6	115.9	118.6	117.4	119.6	123.2	124.9	127.7	128.5	130.7	126.6	122.4	117.5	124.7	142.4
12500	115.4	117.9	116.6	118.7	115.9	118.6	117.6	119.9	123.6	125.3	127.6	128.7	131.1	126.4	123.1	119.0	124.9	142.6
16000	113.7	116.6	115.9	116.0	113.5	116.4	116.2	117.6	121.4	123.6	126.4	127.2	129.1	125.9	121.6	117.8	123.3	141.0
20000	113.0	115.5	114.3	115.1	112.5	115.3	115.3	118.0	121.5	123.3	125.1	126.9	128.6	125.5	121.8	116.4	122.8	140.5
OVERALL	135.9	138.2	137.8	137.7	136.7	136.6	138.6	140.8	142.4	143.3	143.8	145.3	146.3	141.7	138.2	135.8	141.9	159.6

TABLE XVII. - Concluded. FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) Concluded. 120 Percent speed; fan physical speed, 2596 rpm; fundamental blade passage frequency, 649 hertz

(d-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	82.3	82.3	82.3	84.3	80.0	84.3	84.3	82.6	84.5	85.6	81.8	84.1	84.6	88.5	88.0	90.7
63	77.7	78.3	74.2	77.7	77.2	77.3	78.5	78.5	78.8	79.5	80.3	82.4	84.8	87.2	88.7	90.9
80	85.8	87.3	89.9	85.6	83.1	81.4	79.4	82.1	81.9	82.4	85.4	87.0	90.4	90.8	90.9	93.7
100	89.3	93.8	89.6	87.3	85.9	86.1	85.1	85.4	85.3	86.9	88.4	89.2	90.4	91.7	90.9	91.6
125	92.9	94.9	94.3	94.6	90.8	89.4	90.4	91.4	91.6	92.4	93.6	94.2	94.8	94.1	92.4	91.0
160	93.0	94.1	92.8	91.3	90.3	90.6	91.0	91.3	92.3	93.3	94.0	95.6	94.1	93.3	90.8	90.3
200	93.5	96.7	93.5	89.5	89.2	88.2	87.0	88.8	88.5	90.0	91.0	92.1	92.5	91.7	90.2	90.4
250	94.1	95.0	93.6	93.3	92.3	90.8	89.8	91.1	92.8	94.5	96.1	96.9	97.0	95.0	91.3	90.2
315	94.2	95.2	95.4	94.5	93.0	93.0	93.2	94.4	95.0	96.7	97.2	97.8	97.2	95.0	91.7	90.2
400	94.3	94.9	95.6	94.6	94.4	93.9	93.3	95.4	97.4	99.8	101.1	101.9	101.1	97.8	93.6	91.8
500	93.8	94.9	95.1	95.4	94.6	94.3	95.9	97.8	98.9	100.3	100.6	101.5	100.9	97.4	93.9	92.8
630	97.3	103.0	101.3	101.5	100.6	99.6	104.8	107.6	108.8	108.3	105.5	105.6	110.8	105.1	102.6	96.5
800	92.6	94.7	93.2	95.4	95.6	95.2	97.9	100.0	101.5	102.7	102.9	103.6	104.4	100.7	96.2	94.6
1000	91.5	93.9	95.3	95.1	94.4	95.2	96.4	98.4	100.2	101.6	102.7	103.2	103.9	99.1	95.1	94.1
1250	94.6	96.6	99.2	97.6	97.4	96.9	97.9	100.2	101.2	102.7	104.1	104.3	105.2	101.4	96.4	95.5
1600	91.7	92.9	94.3	93.7	93.6	93.7	94.7	96.9	99.2	100.5	101.9	103.5	104.9	98.5	94.2	92.4
2000	92.7	94.3	95.0	95.3	94.3	94.5	94.7	95.8	98.8	100.7	102.3	103.1	104.7	98.5	94.5	92.4
2500	90.1	92.1	92.6	93.6	92.0	91.3	92.8	94.3	96.8	99.3	100.6	101.7	102.5	96.6	92.6	90.4
3150	89.6	91.8	91.8	92.1	91.1	91.9	92.4	93.6	95.9	98.9	100.3	101.2	101.4	96.8	92.1	89.2
4000	89.0	91.2	91.4	92.1	91.2	91.2	90.5	93.0	95.6	97.2	99.0	100.4	101.9	96.7	91.9	89.0
5000	87.1	88.4	89.0	91.1	88.6	88.5	88.5	91.0	94.0	95.3	98.2	98.2	100.7	94.7	91.2	88.3
6300	85.9	87.8	87.9	88.6	86.5	89.0	89.2	89.2	92.5	95.3	98.0	98.9	99.2	96.5	90.3	86.7
8000	85.3	87.7	87.2	88.0	85.7	87.5	87.2	89.0	92.9	94.3	96.7	97.2	99.8	95.3	91.3	86.9
10000	83.0	85.2	84.1	85.7	83.0	85.7	84.5	86.7	90.3	92.0	94.8	95.6	97.8	93.7	89.5	84.6
12500	81.1	83.6	82.3	84.4	81.6	84.3	83.3	85.6	89.3	91.0	93.3	94.4	96.8	92.1	88.8	84.7
16000	77.5	80.4	78.7	79.9	77.4	80.2	80.0	81.4	86.2	87.4	90.2	91.0	92.9	89.7	85.4	81.6
20000	74.1	76.6	75.4	76.2	73.6	76.4	76.4	79.0	82.6	84.4	86.2	88.0	89.7	86.6	82.9	77.5
OVERALL	105.5	108.2	107.9	107.7	106.4	106.5	108.6	110.3	112.4	113.2	113.6	115.1	116.0	111.4	107.9	105.7
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	74.4	91.1	94.9	97.8	98.7	100.1	102.7	105.4	107.2	107.9	108.4	108.6	108.3	101.5	95.3	87.9
304.8 M	69.4	82.6	84.7	89.8	90.9	92.0	95.3	98.0	99.7	100.4	100.4	100.7	100.2	93.3	87.0	78.8

TABLE XVIII. - FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) 100 Percent speed; fan physical speed, 2164 rpm; fundamental blade passage frequency, 541 hertz

(a-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	105.2	101.7	104.2	104.2	104.7	104.2	106.2	105.7	107.2	107.2	108.7	109.5	109.7	110.7	112.7	114.1	108.2	125.9
63	102.7	104.7	104.7	103.7	105.2	104.7	106.2	105.7	105.7	107.7	108.2	109.5	111.7	112.2	113.7	116.6	109.0	126.7
80	104.7	107.2	104.7	105.2	104.7	107.7	109.2	107.7	108.7	111.2	111.2	111.5	113.7	114.2	115.2	117.1	111.0	128.7
100	110.7	110.7	109.7	110.7	108.2	109.2	109.2	108.2	111.2	112.7	112.7	114.0	114.7	115.2	116.7	115.6	112.4	130.1
125	112.3	114.3	113.8	113.8	111.3	112.3	111.3	111.8	113.3	113.8	115.3	116.0	119.3	115.8	116.8	114.2	114.6	132.3
160	113.7	114.2	113.7	113.2	112.2	112.2	110.7	111.7	112.7	113.7	113.7	115.9	115.7	113.2	114.2	113.6	113.5	131.2
200	115.7	116.2	114.7	112.7	111.2	109.7	109.7	108.7	109.7	110.7	112.7	113.5	114.7	113.7	113.7	112.1	112.4	130.1
250	119.7	118.2	117.2	115.2	114.2	113.2	110.7	111.7	113.2	114.7	115.7	117.0	117.2	115.7	114.7	113.1	115.0	132.8
315	121.2	120.2	117.7	118.7	116.2	113.7	112.2	113.2	114.7	117.2	118.7	119.0	118.7	117.2	115.7	114.1	117.0	134.7
400	122.3	123.3	122.3	119.8	118.3	117.8	115.3	116.3	117.8	119.3	120.3	121.6	121.8	118.8	116.8	115.2	119.5	137.2
500	124.8	131.3	124.3	124.3	124.3	129.3	129.3	122.3	126.8	133.3	131.3	130.5	129.8	128.8	125.8	123.2	130.4	148.1
630	126.3	126.8	127.3	127.3	125.3	123.3	122.8	119.3	122.3	126.8	125.8	125.6	125.8	124.3	121.3	117.7	124.9	142.6
800	121.4	122.4	123.9	122.9	121.9	119.4	119.4	120.4	122.4	123.9	124.4	124.1	124.9	122.4	119.4	116.7	122.5	140.2
1000	124.5	127.5	129.5	131.0	131.0	126.5	122.5	122.5	125.0	128.0	126.0	129.2	128.0	126.5	120.5	118.3	127.3	145.0
1250	124.0	124.0	129.5	127.0	126.5	123.0	119.5	120.5	122.5	124.0	124.5	125.8	125.5	123.0	119.5	116.4	124.0	141.7
1600	124.1	124.6	125.1	125.1	126.6	124.6	120.1	119.6	121.6	123.6	124.1	125.9	128.1	123.1	119.6	116.6	124.9	142.6
2000	122.3	123.3	124.8	126.3	125.3	122.3	117.3	117.3	119.8	121.3	122.8	124.1	125.3	121.3	117.8	114.7	122.6	140.3
2500	120.5	122.0	123.5	125.5	124.5	121.5	117.5	116.5	119.0	120.5	122.5	122.3	124.0	120.0	116.5	113.4	121.6	139.3
3150	120.9	121.9	122.9	124.4	123.4	120.9	117.4	115.9	118.4	120.9	121.9	122.2	122.9	119.9	115.9	112.3	121.0	138.7
4000	121.8	122.3	123.3	124.8	122.8	120.3	115.8	115.3	117.8	119.3	120.8	121.1	122.3	119.3	114.8	111.7	120.5	138.2
5000	120.4	120.9	121.9	124.4	121.4	117.9	114.4	113.4	115.9	117.4	119.9	119.7	121.4	116.9	114.4	110.8	119.2	136.9
6300	120.2	121.7	121.2	122.7	119.7	119.2	114.7	111.7	115.2	117.7	120.2	120.6	119.7	117.7	113.2	109.7	118.8	136.5
8000	122.3	122.3	122.8	122.3	119.3	118.3	114.3	112.3	116.3	117.8	120.3	119.1	120.8	117.8	113.8	110.8	118.9	136.6
10000	120.4	122.0	121.9	122.0	117.9	116.9	113.0	112.0	115.5	116.5	119.5	118.9	120.5	117.5	114.5	109.6	118.2	135.9
12500	121.3	122.8	121.8	122.8	118.3	117.3	113.8	112.3	115.8	117.3	119.8	119.8	121.3	117.8	115.3	111.0	118.8	136.5
16000	121.9	122.4	120.9	121.4	117.4	115.9	111.9	110.9	114.4	116.4	118.4	118.9	119.4	116.9	113.9	110.6	117.6	135.3
20000	120.3	122.3	120.8	120.8	116.2	114.7	111.8	110.8	114.8	116.3	117.8	118.8	119.3	117.3	113.3	109.6	117.3	135.0
OVERALL	127.2	127.1	131.7	129.5	127.3	125.0	122.9	120.6	123.4	127.0	126.6	127.1	127.4	125.0	122.0	119.7	126.0	143.7

TABLE XVIII. - Continued. FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) Concluded. 100 Percent speed; fan physical speed, 2164 rpm; fundamental blade passage frequency, 541 hertz

(a-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	75.5	72.0	74.5	74.5	75.0	74.5	76.5	76.0	77.5	77.5	79.0	79.8	80.0	81.0	83.0	84.4
63	73.0	75.0	75.0	74.0	73.5	75.0	75.5	76.0	76.0	78.0	78.5	79.8	82.0	82.5	84.0	86.9
80	75.0	77.5	75.0	75.5	75.0	78.0	79.5	78.0	79.0	81.5	81.5	81.8	84.0	84.5	85.5	87.4
100	81.0	81.0	80.0	81.0	78.5	79.5	79.5	78.5	81.5	83.0	83.0	84.3	85.0	85.5	87.0	85.9
125	83.1	84.6	84.1	84.1	81.6	82.6	81.6	82.1	83.6	84.1	85.6	86.3	89.6	86.1	87.1	84.5
160	85.0	84.5	84.0	83.5	82.5	82.5	81.0	82.0	83.0	84.0	84.0	86.2	86.0	83.5	84.5	83.9
200	86.0	86.5	85.0	83.0	81.5	80.0	80.0	79.0	80.0	81.0	83.0	83.8	85.0	84.0	84.0	82.4
250	85.0	88.5	87.5	85.5	84.5	83.5	81.0	82.0	83.5	85.0	86.0	87.3	87.5	86.0	85.0	83.4
315	91.5	90.5	88.0	89.0	86.5	84.0	82.5	83.5	85.0	87.5	89.0	89.3	89.0	87.5	86.0	84.4
400	92.5	93.5	92.5	90.0	89.0	88.0	85.5	86.5	88.0	89.5	90.5	91.8	92.0	89.0	87.0	85.4
500	103.0	101.5	104.5	104.5	98.5	99.5	99.5	92.5	97.0	103.5	101.5	100.7	100.0	99.0	96.0	93.4
630	96.5	97.0	99.0	97.5	95.5	94.0	93.0	89.5	92.5	97.0	96.0	95.8	96.0	94.5	91.5	87.9
800	91.6	92.6	94.1	93.1	92.1	89.6	89.6	90.6	92.6	94.1	94.6	94.3	95.1	92.6	89.6	86.9
1000	96.7	97.7	99.7	101.2	101.2	96.7	92.7	92.7	95.2	98.2	96.2	99.4	98.2	96.7	90.7	88.5
1250	93.1	94.1	95.6	97.1	96.6	93.1	89.6	90.6	92.6	94.1	94.6	95.9	95.6	93.1	89.6	86.5
1600	94.2	94.7	96.2	96.2	98.7	94.7	90.2	89.7	91.7	93.7	94.2	96.0	98.2	93.2	89.7	86.1
2000	92.3	93.3	94.8	96.3	95.3	92.3	87.3	87.3	89.8	91.3	92.8	94.1	95.2	91.3	87.8	84.7
2500	90.4	91.9	92.9	95.4	94.4	91.4	87.4	86.4	88.9	90.4	92.4	92.2	93.9	89.9	86.4	83.3
3150	90.6	91.6	92.6	94.1	93.1	90.6	87.1	85.6	88.1	90.6	91.6	91.9	92.6	89.6	85.6	82.0
4000	91.3	91.8	92.8	94.3	92.3	89.3	85.3	84.3	87.3	88.8	90.3	90.6	91.8	88.8	84.3	81.2
5000	89.6	90.1	91.1	93.6	90.6	87.1	83.6	82.6	85.1	86.6	89.1	88.9	90.6	86.1	83.6	80.0
6300	88.9	90.4	89.9	91.5	88.5	87.9	83.4	80.4	83.9	86.4	88.9	89.3	88.4	86.4	81.9	78.4
8000	90.3	90.3	90.8	90.4	87.4	86.4	82.4	80.3	84.3	85.9	88.4	87.2	88.8	85.9	81.8	78.9
10000	87.5	89.1	89.6	89.1	85.6	84.6	80.1	79.1	82.6	83.6	86.6	86.0	87.6	84.6	81.6	76.7
12500	87.0	88.5	87.5	88.5	84.0	83.0	79.5	78.0	81.5	83.0	85.5	85.5	87.0	83.5	81.0	76.7
16000	84.7	86.2	84.7	85.2	81.2	79.7	75.7	74.7	78.2	80.2	82.2	82.7	83.2	80.7	77.7	74.4
20000	81.4	83.4	81.9	81.9	77.3	75.8	72.9	71.9	75.8	77.4	78.9	79.9	80.4	78.3	74.4	70.7
OVERALL	107.0	107.0	108.6	109.3	107.2	104.9	103.0	100.6	103.3	107.0	106.4	106.9	107.2	104.9	101.9	99.7
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	81.4	85.5	85.6	89.2	85.5	88.0	86.9	85.1	87.8	101.3	100.5	89.9	89.8	84.7	89.0	82.1
304.8 M	71.7	80.8	87.4	91.0	91.3	90.2	89.4	87.3	90.1	93.9	92.9	92.2	91.6	86.7	80.8	73.5

TABLE XVIII. - Continued. FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) 110 Percent speed; fan physical speed, 2380 rpm; fundamental blade passage frequency, 595 hertz

(b-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																
50	105.1	105.6	107.1	104.6	107.6	107.1	109.6	108.6	109.1	109.1	111.1	110.9	112.1	114.1	116.6	117.5	111.0	128.7
63	105.6	108.6	106.1	106.1	106.1	106.1	107.1	106.6	107.1	109.1	111.1	112.3	113.6	115.6	118.1	119.5	111.7	129.4
80	111.1	112.6	111.6	110.1	110.6	110.1	109.1	110.1	111.1	112.6	113.6	115.4	116.1	117.6	119.1	120.5	114.0	131.8
100	111.1	112.1	111.6	110.6	110.1	111.1	111.1	112.6	113.1	114.6	116.1	117.3	116.6	116.6	119.6	120.0	115.1	132.8
125	116.6	118.6	119.1	116.1	115.6	114.1	115.6	118.1	116.6	118.1	118.6	118.9	121.6	120.1	119.1	117.5	118.1	135.9
160	116.7	118.7	117.2	118.2	114.7	114.7	115.7	114.2	116.7	118.7	119.2	118.4	117.7	116.7	116.7	116.5	117.1	134.8
200	117.1	117.1	116.1	114.1	114.1	113.6	111.6	112.6	113.1	114.1	116.1	117.9	118.1	117.6	117.6	115.5	115.5	133.2
250	120.6	119.1	119.1	119.6	121.1	120.6	115.1	116.1	116.6	118.1	119.1	121.4	119.6	119.6	118.6	116.5	119.1	136.8
315	121.7	121.7	120.2	117.7	118.2	116.7	115.7	118.2	119.7	122.2	122.7	122.9	121.7	119.7	118.2	115.1	120.2	137.9
400	121.1	122.1	122.1	119.6	119.1	117.1	118.1	118.6	119.6	123.6	124.1	123.9	123.1	121.1	118.6	117.0	121.3	139.0
500	124.1	127.1	126.6	123.1	124.1	123.1	122.6	124.6	125.6	127.1	128.1	126.4	127.1	123.1	121.1	120.0	125.4	143.1
630	129.2	135.7	134.7	130.2	132.7	132.2	133.2	135.2	135.2	136.2	137.2	134.5	135.2	130.7	129.7	126.1	134.3	152.0
800	122.2	123.2	123.2	122.2	122.2	120.7	121.7	124.2	124.7	127.2	127.7	127.0	127.7	124.7	120.7	119.6	124.9	142.6
1000	122.3	124.3	124.3	123.8	123.3	121.3	121.8	123.3	124.3	127.3	128.8	128.1	127.8	124.3	119.8	118.7	125.3	143.0
1250	126.9	129.9	129.9	129.4	129.9	127.9	125.9	128.9	128.9	129.4	130.9	130.7	130.4	127.4	121.9	120.8	129.1	146.8
1600	123.5	124.4	124.9	124.9	123.9	121.9	120.4	122.4	123.4	125.4	127.5	127.2	128.0	123.4	119.5	117.4	124.7	142.4
2000	123.6	125.1	126.1	125.6	124.6	123.1	120.6	122.1	123.1	125.1	127.6	126.9	128.1	123.6	120.1	117.0	124.8	142.6
2500	122.4	123.9	123.9	124.4	123.9	120.9	119.4	120.4	121.4	124.4	126.4	125.7	125.9	121.9	117.4	115.3	123.4	141.1
3150	121.2	122.7	122.7	122.2	122.2	120.7	119.7	119.2	120.2	123.7	126.7	125.0	124.7	121.2	117.2	114.7	122.6	140.4
4000	121.7	122.7	123.2	122.7	122.2	120.7	117.7	118.2	120.2	122.7	124.7	124.5	124.7	121.2	116.7	114.7	122.1	139.8
5000	120.8	121.3	121.3	121.3	120.8	117.8	116.8	116.8	118.3	120.8	124.3	122.1	122.8	118.8	116.3	113.3	120.5	138.2
6300	119.1	120.6	119.6	119.1	119.1	119.1	116.6	115.1	117.6	121.1	124.6	123.5	121.6	120.1	115.1	111.6	120.3	138.0
8000	120.2	121.7	120.7	119.2	117.7	117.7	115.7	115.7	119.2	120.7	124.2	122.5	122.2	119.2	116.2	113.3	120.1	137.8
10000	119.4	120.9	118.9	118.4	116.9	117.4	114.4	114.9	117.9	119.9	123.4	121.8	121.4	118.9	115.9	111.5	119.3	137.0
12500	119.2	120.7	118.2	118.7	117.2	116.7	114.7	115.2	118.2	120.2	122.7	122.2	122.7	119.7	117.2	112.9	119.5	137.2
16000	117.2	119.2	119.7	116.2	115.7	114.7	113.2	113.2	115.7	119.2	122.2	121.2	120.7	119.2	115.7	112.0	118.2	135.9
20000	117.2	119.2	116.2	115.7	114.7	113.7	112.2	113.2	117.3	118.7	121.2	121.3	120.7	119.2	115.2	111.0	117.9	135.6
OVERALL	136.0	139.2	138.6	136.7	137.3	136.1	136.0	137.8	138.2	139.7	141.2	139.8	140.1	136.7	134.3	132.4	138.3	156.1

TABLE XVIII. - Continued. FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) Concluded. 110 Percent speed; fan physical speed, 2380 rpm; fundamental blade passage frequency, 595 hertz

(b-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG 10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	79.4	75.9	77.4	74.9	77.9	77.4	79.9	78.9	79.4	79.4	81.4	81.2	82.4	84.4	86.9	87.8
63	75.9	78.9	76.4	76.4	76.4	76.4	77.4	76.9	77.4	79.4	81.4	82.6	83.9	85.9	88.4	89.8
80	81.4	82.9	81.9	80.4	80.9	80.4	79.4	80.4	81.4	82.9	83.9	85.7	86.4	87.9	89.4	90.8
100	81.4	82.4	81.9	80.9	80.4	81.4	81.4	82.9	83.4	84.9	86.4	87.6	86.9	88.9	89.9	90.3
125	88.9	88.9	89.4	86.4	85.9	84.4	85.9	88.4	86.9	88.4	88.9	89.2	91.9	90.4	89.4	87.8
160	87.0	89.0	87.9	88.5	85.0	85.0	86.0	84.5	87.0	89.0	89.5	88.7	86.0	87.0	87.0	86.8
200	87.4	87.4	86.4	84.4	84.4	83.9	81.9	82.9	83.4	84.4	86.4	88.2	88.4	87.9	87.9	85.8
250	90.9	89.4	89.4	89.9	91.4	90.9	86.4	86.4	86.9	88.4	89.4	91.7	89.9	89.9	88.9	86.8
315	92.0	92.0	90.5	88.0	88.5	87.0	87.0	88.5	90.0	92.5	93.0	93.2	92.0	90.0	88.5	85.4
400	91.3	92.3	92.3	89.9	89.3	87.3	88.3	88.8	89.8	93.8	94.3	94.1	93.3	91.3	88.8	87.2
500	94.3	97.3	96.8	93.3	94.3	93.3	92.8	94.8	95.8	97.3	98.3	96.6	97.3	93.3	91.3	90.2
630	99.4	105.9	104.9	100.4	102.9	102.4	103.4	105.4	105.4	106.4	107.4	104.7	105.4	100.9	99.9	96.3
800	92.4	93.4	93.4	92.4	92.4	90.9	91.9	94.4	94.9	97.4	97.9	97.2	97.9	94.9	90.9	89.8
1000	92.4	94.4	94.4	93.9	93.4	91.4	91.9	93.4	94.4	97.5	99.0	98.3	98.0	94.5	90.0	88.9
1250	97.0	100.0	100.0	99.5	100.0	98.0	97.0	99.0	99.0	99.5	101.0	100.8	100.5	97.5	92.0	90.9
1600	93.6	94.5	95.0	95.0	94.0	92.0	90.5	92.5	93.5	95.5	97.6	97.3	98.1	93.5	89.6	87.5
2000	93.6	95.1	96.1	95.6	94.6	93.1	90.6	92.1	93.1	95.1	97.6	96.9	98.1	93.6	90.1	87.0
2500	92.3	93.8	93.8	94.3	93.8	90.8	89.3	90.3	91.3	94.3	96.3	95.6	95.8	91.8	87.3	85.2
3150	90.9	92.4	92.4	91.9	91.9	90.4	89.4	88.9	89.9	93.4	96.4	94.7	94.4	90.9	86.9	84.4
4000	91.2	92.2	92.7	92.2	91.7	90.2	87.2	87.7	89.7	92.2	94.2	94.0	94.2	90.7	86.2	84.2
5000	90.0	90.5	90.5	90.5	90.0	87.0	86.0	86.0	87.5	90.0	93.5	91.3	92.0	88.0	85.5	82.5
6300	87.8	89.3	88.3	87.9	87.9	87.8	85.3	83.8	86.3	89.8	93.3	92.2	90.3	88.8	83.8	80.3
8000	88.2	89.7	88.8	87.3	85.8	85.8	83.8	83.8	87.2	88.8	92.3	90.6	90.3	87.3	84.2	81.3
10000	86.5	88.0	86.0	85.5	84.0	84.5	81.5	82.0	85.0	87.0	90.5	88.9	88.5	86.0	83.0	78.6
12500	84.9	86.4	83.9	84.4	82.9	82.4	80.4	80.9	83.9	85.9	88.4	87.9	88.4	85.4	82.9	78.6
16000	81.0	83.0	80.5	80.0	79.5	78.5	77.0	77.0	79.5	83.0	86.0	85.0	84.5	82.0	79.5	75.8
20000	78.2	80.3	77.3	76.8	75.8	74.8	73.3	74.3	78.3	79.8	82.3	82.4	81.8	80.3	76.3	72.1
OVERALL	109.8	109.2	108.7	106.7	107.3	106.1	106.1	107.9	108.2	109.7	111.1	109.7	110.0	106.5	104.3	102.4
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	79.7	92.0	95.9	96.9	99.2	99.3	100.0	101.9	102.7	104.2	105.3	103.0	102.0	96.6	91.6	84.8
304.8 M	69.5	83.3	87.7	88.3	91.4	91.7	92.5	94.6	95.3	96.8	97.7	95.3	94.2	88.6	83.4	76.1

TABLE XVIII. - Continued. FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) 115 Percent speed; fan physical speed, 2488 rpm; fundamental blade passage frequency, 622 hertz

(c-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	110.1	107.1	109.1	108.1	108.6	107.6	110.1	110.6	109.6	112.6	112.6	114.4	113.6	116.1	118.1	119.5	112.8	130.6
63	108.1	109.6	107.6	106.6	106.6	108.1	109.1	109.1	109.1	110.1	111.6	112.9	115.6	117.1	120.1	121.0	113.2	131.0
80	117.7	117.7	116.7	117.2	112.7	111.7	116.2	114.7	112.2	113.2	115.7	116.9	118.2	121.7	121.7	123.5	117.2	134.9
100	114.7	114.7	112.7	111.7	111.7	113.7	112.2	113.7	115.2	115.2	117.7	118.5	119.7	120.7	121.7	121.1	116.9	134.6
125	120.1	121.1	118.6	117.1	118.6	117.1	118.6	117.6	118.1	120.6	120.6	121.4	123.6	120.1	120.6	119.5	119.8	137.6
160	119.1	118.6	117.6	116.1	115.6	117.1	116.6	119.1	119.6	117.6	120.1	120.4	118.6	119.1	119.1	120.0	118.6	136.3
200	120.2	120.2	117.2	115.7	114.7	114.2	113.7	114.2	115.2	116.2	118.7	119.9	119.2	119.2	119.2	118.1	117.3	135.0
250	122.7	123.7	119.7	121.2	118.7	118.7	119.2	117.7	118.2	119.7	123.2	124.5	122.2	121.2	119.7	119.6	120.9	138.6
315	123.2	124.2	120.7	120.2	118.7	118.7	119.2	118.7	119.7	121.2	123.2	122.0	122.7	121.7	119.2	118.6	120.9	138.6
400	123.7	126.2	125.2	123.7	122.7	121.2	120.2	121.7	122.2	124.7	126.7	127.0	124.2	124.2	121.2	122.1	124.0	141.7
500	123.7	124.7	123.7	124.7	122.2	121.2	121.7	122.2	123.7	125.2	125.7	126.9	126.7	124.2	121.7	120.6	124.2	141.9
630	130.8	133.3	129.8	132.8	131.8	130.3	128.3	131.3	134.8	135.8	134.3	136.0	138.3	133.8	132.3	128.6	133.8	151.5
800	122.8	124.8	123.8	125.3	122.8	122.8	124.8	125.8	127.8	128.8	129.3	129.0	128.8	126.8	122.8	121.1	126.7	144.4
1000	122.4	124.0	123.9	124.9	122.9	121.9	123.9	125.4	126.9	128.4	129.9	129.6	128.4	125.4	121.9	121.2	126.5	144.2
1250	128.5	131.5	130.5	131.5	128.5	126.5	128.0	129.5	128.5	130.5	133.0	133.2	132.0	127.5	126.5	124.4	130.2	147.9
1600	122.5	124.0	124.0	125.0	123.5	122.0	122.0	123.5	126.0	126.0	128.0	128.8	128.0	123.5	121.0	118.9	125.4	143.1
2000	124.7	126.2	126.7	127.7	126.2	124.2	124.2	124.2	128.7	127.7	129.2	130.0	130.2	124.7	121.7	120.6	127.2	144.9
2500	122.5	124.5	123.5	125.5	124.0	121.5	121.5	121.5	124.5	125.5	127.0	127.3	127.0	122.5	119.5	117.4	124.5	142.2
3150	121.3	123.8	123.3	124.3	122.8	121.3	121.3	120.3	123.3	124.8	126.8	126.6	126.3	122.3	117.8	116.2	123.8	141.5
4000	121.7	123.2	122.7	124.7	122.2	120.2	119.7	120.7	123.2	123.7	125.2	126.0	125.2	122.2	118.2	116.2	123.1	140.8
5000	119.8	121.8	120.8	123.3	121.3	118.3	118.3	118.8	121.8	122.3	124.8	123.6	124.3	120.3	117.3	115.8	121.8	139.5
6300	118.6	121.1	119.6	121.6	119.1	119.1	118.6	117.1	120.6	122.1	125.1	124.5	122.1	121.6	116.1	114.1	121.3	139.0
8000	120.2	121.7	120.2	120.7	118.1	118.7	117.1	117.2	121.2	121.2	124.2	123.5	123.7	121.7	117.2	114.7	121.0	138.7
10000	118.9	120.4	118.9	119.9	116.4	117.4	116.4	116.9	119.9	120.9	123.4	122.9	122.9	120.4	117.5	113.6	120.2	137.9
12500	118.7	120.8	118.2	119.7	116.8	117.7	116.2	117.3	120.8	120.7	123.8	123.7	123.8	120.8	118.3	115.0	120.6	138.3
16000	117.3	119.8	116.8	118.3	115.8	115.3	115.3	115.8	118.8	119.3	122.3	122.3	121.8	120.9	116.8	114.1	119.2	136.9
20000	116.7	119.2	116.2	117.2	113.7	114.7	114.2	115.7	119.2	119.2	121.2	121.8	121.7	119.7	115.7	112.5	118.6	136.3
OVERALL	127.0	139.0	137.4	138.8	136.9	135.6	135.6	136.8	139.1	140.1	141.0	141.6	142.0	138.5	136.5	134.8	139.0	156.7

TABLE XVIII. - Continued. FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) Concluded. 115 Percent speed; fan physical speed, 2488 rpm; fundamental blade passage frequency, 622 hertz

(c-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	80.4	77.4	79.4	78.4	78.9	77.9	80.4	80.9	79.9	82.9	82.9	84.7	83.9	86.4	88.4	89.8
63	78.4	79.9	77.9	76.9	76.9	78.4	79.4	79.4	79.4	80.4	81.9	83.2	85.9	87.4	90.4	91.3
80	88.0	88.0	87.0	87.5	83.0	82.0	85.5	85.0	82.5	83.5	86.0	87.2	88.5	92.0	92.0	93.8
100	85.0	95.0	83.0	82.0	82.0	84.0	82.5	84.0	85.5	85.5	86.0	88.8	90.0	91.0	92.0	91.4
125	90.4	91.4	89.9	87.4	88.9	87.4	88.9	87.9	88.4	90.9	90.9	91.7	93.9	90.4	90.9	89.8
160	89.4	88.9	87.9	86.4	85.9	87.4	86.9	89.4	89.9	87.9	90.4	90.7	88.9	89.4	89.4	90.3
200	90.5	90.5	87.5	86.0	85.0	84.5	84.0	84.5	85.5	86.5	89.0	90.2	89.5	89.5	89.5	88.4
250	93.0	94.0	89.0	91.5	89.0	89.0	89.5	88.0	88.5	90.0	93.5	94.8	92.5	91.5	90.0	89.9
315	93.5	94.5	91.0	90.5	89.0	89.0	89.5	89.0	90.0	91.5	93.5	92.3	93.0	92.0	89.5	88.9
400	93.9	96.4	95.4	93.9	92.9	91.4	90.4	91.9	92.4	94.9	96.9	97.2	94.4	94.4	91.4	92.3
500	93.9	94.9	93.9	94.9	92.4	91.4	91.9	92.4	93.9	95.4	95.9	97.1	96.9	94.4	91.9	90.8
630	101.0	103.5	100.0	103.0	102.0	100.5	98.5	101.5	105.0	106.0	104.5	106.2	108.5	104.0	102.9	98.8
800	92.0	95.0	94.0	95.5	93.0	93.0	95.0	96.0	98.0	99.0	99.5	99.2	99.0	97.0	93.0	91.3
1000	92.5	95.0	94.0	95.0	93.0	92.0	94.1	95.6	97.1	98.6	100.1	99.7	98.6	95.6	92.0	91.4
1250	98.6	101.6	100.6	101.6	98.6	96.6	98.1	99.6	98.6	100.6	103.1	103.3	102.1	97.6	96.6	94.5
1600	92.6	94.1	94.1	95.1	93.6	92.1	92.1	93.6	96.1	96.1	98.1	98.9	98.1	93.6	91.1	89.0
2000	94.7	96.2	96.7	97.7	96.2	94.2	94.2	94.2	98.7	97.7	99.2	100.0	100.2	94.7	91.7	90.6
2500	92.4	94.4	93.4	95.4	93.9	91.4	91.4	91.4	94.4	95.4	96.9	97.2	96.9	92.4	89.4	87.3
3150	91.0	93.5	93.0	94.0	92.5	91.0	91.0	90.0	93.0	94.5	96.5	96.3	96.0	92.0	87.5	85.9
4000	91.2	92.7	92.2	94.2	91.7	89.7	89.2	90.2	92.7	93.2	94.7	95.5	94.7	91.7	87.7	85.7
5000	89.0	91.0	90.0	93.0	90.5	87.5	87.5	88.0	91.0	91.5	94.0	92.8	93.5	89.5	86.5	85.0
6300	87.3	89.8	88.3	90.4	87.9	87.8	87.3	85.8	89.3	90.8	93.8	93.2	90.8	90.3	84.8	82.8
8000	88.2	89.8	88.3	88.3	86.2	86.8	85.2	85.3	89.3	89.3	92.3	91.6	91.7	89.8	85.2	82.8
10000	86.0	87.5	86.0	87.0	83.5	84.5	83.5	84.0	87.0	88.0	90.5	90.0	90.0	87.5	84.6	80.7
12500	84.4	86.5	83.9	85.4	82.5	83.4	81.9	83.0	86.5	86.4	89.5	89.4	89.5	86.5	84.0	80.7
16000	81.1	83.6	80.6	82.1	79.6	79.1	79.1	79.6	82.6	83.1	86.1	86.1	85.6	84.7	80.6	77.9
20000	77.8	80.3	77.3	78.3	74.8	75.8	75.3	76.8	80.2	80.3	82.3	82.9	82.8	80.8	76.8	73.6
OVERALL	106.9	109.0	107.3	108.7	106.9	105.5	105.5	106.8	109.1	110.1	110.9	111.5	111.9	108.4	106.6	104.9
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	81.1	91.7	94.9	98.9	99.2	99.1	100.0	101.1	104.1	104.7	105.2	104.9	104.0	98.6	93.8	87.3
304.8 M	71.0	82.9	85.9	90.5	91.1	91.2	92.1	93.6	96.4	97.2	97.2	97.0	96.3	90.7	85.7	78.7

TABLE XVIII. - Continued. FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) 120 Percent speed; fan physical speed, 2596 rpm; fundamental blade passage frequency, 649 hertz

(d-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																
50	114.7	112.7	111.7	114.7	111.2	114.2	114.2	114.2	113.7	112.2	115.7	116.4	118.2	118.2	119.7	124.1	116.1	133.8
63	109.1	110.6	108.6	108.1	109.6	109.1	110.1	111.1	109.1	111.1	113.6	114.9	117.1	118.6	120.6	125.0	115.1	132.9
80	118.1	115.6	115.1	113.1	114.1	114.1	112.6	112.6	114.6	115.1	117.1	121.9	123.1	122.1	122.1	125.5	118.7	136.4
100	120.1	118.6	118.1	116.6	115.6	116.6	114.6	116.6	117.6	117.6	119.6	121.4	122.1	122.6	123.6	123.5	119.4	137.2
125	123.7	125.7	125.2	122.7	122.2	119.7	119.2	120.2	120.7	122.2	123.2	122.4	123.7	123.2	123.7	123.0	122.4	140.1
160	124.2	123.6	122.6	120.1	121.6	119.6	119.1	121.6	121.1	121.6	122.1	120.9	121.7	121.6	121.6	121.0	121.3	139.1
200	125.6	124.6	123.6	120.6	119.1	118.6	118.1	119.1	117.1	119.1	122.6	122.4	124.1	122.1	121.6	120.5	121.2	138.9
250	127.2	125.7	124.7	124.7	121.7	121.7	120.2	120.7	121.7	123.2	126.7	124.9	126.2	124.7	121.7	121.6	123.8	141.5
315	127.1	125.6	126.6	125.1	122.1	122.6	121.6	122.6	122.6	123.6	125.6	124.9	126.1	124.1	122.6	120.0	124.0	141.8
400	125.7	126.2	128.2	125.7	125.7	124.2	124.2	127.2	126.7	127.2	132.7	131.9	129.7	126.7	123.7	122.0	128.1	145.8
500	125.2	125.7	126.2	126.2	127.2	124.2	124.7	124.7	128.2	127.2	129.2	128.0	130.2	126.7	123.7	122.1	127.0	144.7
630	133.7	131.2	137.2	136.7	134.7	131.7	132.7	132.2	133.7	134.2	137.2	138.5	139.2	134.7	132.7	128.6	135.4	153.1
800	125.8	125.3	127.3	127.3	127.3	125.8	126.8	128.8	130.3	130.8	132.8	131.0	131.8	129.8	125.3	123.6	129.4	147.1
1000	124.3	124.8	126.3	127.8	127.3	125.3	125.3	127.8	129.3	129.8	132.3	130.0	131.8	127.8	123.8	123.2	128.7	146.4
1250	128.5	129.0	131.0	130.5	129.5	128.0	130.5	129.5	130.5	132.5	135.0	131.7	133.0	128.5	125.0	124.9	131.0	148.7
1600	124.3	124.5	126.5	127.0	126.0	125.0	124.0	126.5	128.5	129.0	131.0	130.3	131.0	127.0	123.0	120.9	127.9	145.6
2000	124.7	126.2	126.7	128.7	127.2	126.2	124.2	126.2	129.2	129.7	132.7	130.4	132.2	127.7	123.7	121.6	128.8	146.5
2500	122.4	123.9	124.9	126.4	124.4	123.9	122.9	123.9	126.9	127.9	130.4	128.7	128.9	125.9	121.4	118.9	126.5	144.3
3150	121.7	123.2	124.2	125.7	123.2	123.2	121.7	122.7	125.2	127.7	130.2	127.5	127.7	125.2	120.2	118.2	125.8	143.5
4000	122.2	123.7	124.2	125.7	123.2	123.2	120.7	122.7	125.2	126.2	128.7	126.5	127.7	125.2	120.2	117.6	125.1	142.8
5000	120.3	122.3	123.3	124.8	122.3	120.8	118.8	121.3	123.8	124.8	127.3	125.2	126.8	122.8	120.3	116.8	123.8	141.5
6300	118.7	121.7	121.7	122.1	119.6	121.2	119.2	119.6	122.2	125.2	127.7	126.0	124.7	125.2	118.7	115.7	123.4	141.1
8000	120.2	122.2	121.7	121.7	119.2	120.2	118.2	119.7	123.7	124.7	127.2	124.6	125.7	124.7	119.7	115.8	123.2	140.9
10000	118.3	120.8	120.3	120.8	117.3	119.3	116.8	118.9	121.8	123.3	126.3	123.8	124.8	123.3	119.4	115.0	122.1	139.8
12500	119.2	121.2	119.7	121.2	117.2	119.2	117.2	119.7	123.3	123.7	126.2	124.7	125.2	123.2	120.3	115.9	122.5	140.2
16000	119.8	119.8	119.3	118.8	116.3	117.3	115.8	117.3	121.3	122.3	125.3	123.3	123.8	122.8	119.3	115.0	121.1	138.8
20000	119.7	118.7	117.7	118.2	114.6	116.2	115.2	117.7	121.2	122.2	124.7	123.2	123.2	122.7	118.2	114.0	120.7	138.4
OVERALL	139.0	138.3	141.0	140.5	139.4	137.8	138.0	138.8	140.5	141.3	144.0	143.1	143.8	140.6	137.8	136.4	140.9	158.7

TABLE XVIII. - Concluded. FAR-FIELD OVERSPEED NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION

WITH 92 PERCENT OF TAKEOFF NOZZLE AREA AND TAKEOFF ROTOR SETTING ANGLE

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(d) Concluded. 120 Percent speed; fan physical speed, 2596 rpm; fundamental blade passage frequency, 649 hertz

(d-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG														
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	85.0	83.0	82.0	85.0	81.5	84.5	84.5	84.5	84.0	82.5	86.0	86.7	88.5	88.5	90.0	94.4
63	79.4	80.9	78.9	78.4	79.9	79.4	80.4	81.4	79.4	81.4	83.9	85.2	87.4	88.9	90.9	95.3
80	88.4	85.9	85.4	83.4	84.4	84.4	82.9	82.9	84.9	85.4	87.4	92.2	93.4	92.4	92.4	95.8
100	90.4	88.9	89.4	86.9	85.9	86.9	84.9	86.9	87.9	87.9	89.9	91.7	92.4	92.9	93.9	93.8
125	94.0	96.0	95.5	93.0	92.5	90.0	89.5	90.5	91.0	92.5	93.5	92.7	94.0	93.5	94.0	93.3
160	94.5	93.9	92.9	90.4	91.9	89.9	89.4	91.9	91.4	91.9	92.4	91.2	92.0	91.9	91.9	91.3
200	95.9	94.9	93.9	90.9	89.4	88.9	88.4	89.4	87.4	89.4	92.9	92.7	94.4	92.4	91.9	90.8
250	97.5	96.0	95.0	95.0	92.0	92.0	90.5	91.0	92.0	93.5	97.0	95.2	96.5	95.0	92.0	91.9
315	97.4	95.9	96.9	95.4	92.4	92.9	91.9	92.9	92.9	93.9	95.9	95.2	96.4	94.4	92.9	90.3
400	95.9	96.4	94.4	95.9	95.9	94.4	94.4	97.4	96.9	97.4	102.9	102.1	99.9	96.9	93.9	92.2
500	95.4	95.9	96.4	96.4	97.4	94.4	94.9	94.9	98.4	97.4	99.4	98.2	100.4	96.9	93.9	92.3
630	102.9	101.4	107.4	106.9	104.9	101.9	102.9	102.4	103.9	104.4	107.4	108.7	109.4	104.9	102.9	98.8
800	96.0	95.5	97.5	97.5	97.5	96.0	97.0	99.0	100.5	101.0	103.0	101.2	102.0	100.0	95.5	93.8
1000	94.5	95.0	96.4	98.0	97.5	95.5	95.4	98.0	99.5	100.0	102.5	100.2	102.0	98.0	94.0	93.4
1250	98.6	99.1	101.1	100.6	99.6	98.1	100.6	99.6	100.6	102.6	105.1	101.8	103.1	98.6	95.1	95.0
1600	94.1	94.6	96.6	97.1	96.1	95.1	94.1	96.6	98.6	99.1	101.1	100.4	101.1	97.1	93.1	91.0
2000	94.7	96.2	96.7	98.7	97.2	96.2	94.2	96.2	99.2	99.7	102.7	100.4	102.2	97.7	93.7	91.6
2500	92.3	93.8	94.8	96.3	94.3	93.8	92.8	93.8	96.8	97.8	100.3	98.6	98.8	95.8	91.3	88.8
3150	91.4	92.9	93.5	95.4	92.9	92.9	91.4	92.4	94.9	97.4	99.9	97.2	97.4	94.9	89.9	87.9
4000	91.7	93.2	93.7	95.2	92.7	92.7	90.2	92.2	94.7	95.7	98.2	96.0	97.2	94.7	89.7	87.1
5000	89.5	91.5	91.5	94.0	91.5	90.0	88.0	90.5	93.0	94.0	96.5	94.4	96.0	92.0	89.5	86.0
6300	87.4	90.4	90.4	90.9	88.4	89.9	87.9	88.3	90.9	93.9	96.4	94.7	93.4	92.9	87.4	84.4
8000	88.3	90.3	90.8	89.8	87.3	88.3	86.3	87.8	91.8	92.8	95.3	92.7	93.7	92.8	87.7	83.9
10000	85.4	87.9	87.4	87.9	84.4	86.4	83.9	86.0	88.9	90.4	93.4	90.9	91.9	90.4	86.5	82.1
12500	83.9	86.9	85.4	86.9	82.9	84.9	82.9	85.4	89.0	89.4	91.9	90.4	90.9	88.9	86.0	81.6
16000	80.6	83.6	82.1	82.6	80.1	81.1	79.6	81.1	85.1	86.1	89.1	87.1	87.6	86.6	83.1	78.8
20000	76.8	79.8	78.8	79.3	75.7	77.3	76.3	78.7	82.3	83.3	85.8	84.3	84.3	83.8	79.3	75.1
OVERALL	109.1	108.7	111.1	110.9	109.5	107.8	108.0	108.8	110.4	111.2	113.9	113.0	113.8	110.4	107.8	106.5
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	83.6	91.3	98.5	101.2	101.5	101.4	101.9	103.3	105.6	106.3	108.5	106.5	106.0	100.7	95.1	88.4
304.8 M	73.8	82.5	90.4	93.3	93.8	93.4	94.4	95.6	97.7	98.3	100.5	98.8	98.2	92.6	87.0	79.8

TABLE XIX. - FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH REVERSE NOZZLE AND REVERSE ROTOR SETTING ANGLE, WITH BLAST DEFLECTOR

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) 86 Percent speed; fan physical speed, 1935 rpm; fundamental blade passage frequency, 483 hertz

(a-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	125.2	126.2	123.2	123.9	122.9	123.5	122.4	122.2	121.0	120.7	121.5	122.5	122.5	121.0	120.5	121.4	122.5	140.2
63	123.9	123.2	122.9	120.9	120.9	120.4	118.9	119.6	119.1	118.1	117.1	118.3	117.7	118.6	117.7	118.6	119.6	137.3
80	124.7	125.2	123.4	121.2	120.2	119.7	118.6	117.4	116.9	116.2	116.2	115.8	115.6	116.7	116.7	116.9	119.0	136.7
100	125.6	127.1	126.7	125.9	124.9	124.2	123.6	122.1	121.9	122.1	120.1	121.3	121.7	120.1	119.7	120.6	123.2	140.9
125	126.2	128.6	130.2	128.4	127.2	127.9	125.9	126.4	124.9	125.4	125.4	124.5	126.2	127.1	125.6	123.4	126.6	144.3
160	122.4	127.6	129.2	129.4	128.4	127.6	126.9	126.4	125.4	124.9	125.6	126.7	125.7	126.7	126.9	126.8	126.9	144.6
200	121.8	124.8	125.0	125.3	125.3	124.6	123.3	122.8	122.3	121.8	121.8	123.4	122.5	122.5	123.5	124.7	123.5	141.2
250	121.9	125.6	125.0	125.3	123.9	122.5	121.0	119.8	118.8	118.8	118.8	120.5	119.7	120.6	121.8	121.3	121.8	139.5
315	119.8	124.3	125.3	126.3	124.8	122.7	120.7	118.3	117.7	117.0	117.0	118.4	119.7	120.7	121.2	122.2	121.6	139.3
400	120.6	126.1	126.8	127.0	125.3	123.5	120.1	119.3	117.8	118.5	117.6	118.9	121.0	122.3	122.3	123.0	122.4	140.1
500	127.3	132.7	133.3	133.5	133.3	131.2	124.0	124.3	120.0	122.3	123.2	126.1	131.0	131.8	129.2	129.9	129.5	147.2
630	124.9	129.9	131.5	131.2	128.0	126.0	122.5	120.9	118.2	118.4	118.5	121.3	122.7	124.7	124.9	125.6	125.4	143.1
800	126.9	131.0	132.7	131.2	126.2	125.7	123.5	120.9	119.0	118.4	117.9	120.1	122.5	125.0	124.5	126.4	125.9	143.6
1000	124.7	130.1	131.7	130.1	127.4	125.2	122.7	120.2	118.2	117.1	117.1	120.3	123.9	125.1	125.7	127.3	125.3	143.0
1250	122.5	127.7	129.7	128.3	126.0	123.7	121.7	119.0	116.3	115.3	115.8	119.1	122.2	123.8	124.5	125.1	123.6	141.3
1600	121.8	127.3	129.5	128.2	125.8	123.8	121.0	118.7	116.0	114.8	115.2	118.8	121.7	123.7	124.7	125.1	123.4	141.1
2000	120.2	125.8	127.9	126.0	124.6	122.6	119.8	117.3	114.8	113.6	114.3	117.4	120.6	122.3	123.8	123.5	122.0	139.7
2500	118.2	124.2	125.7	124.7	122.7	120.9	118.4	115.7	113.7	112.5	113.4	116.8	119.4	120.7	122.4	121.8	120.3	138.0
3150	117.1	123.5	124.5	124.0	121.8	120.8	118.6	115.1	113.6	112.1	112.8	116.4	117.2	120.1	121.5	121.4	119.6	137.3
4000	116.6	122.6	124.3	123.6	122.0	120.3	117.6	115.1	112.8	111.0	112.1	115.7	117.3	118.5	120.8	120.4	119.1	136.8
5000	115.4	120.2	122.4	122.2	120.0	118.4	115.9	112.9	111.0	109.2	110.2	112.8	115.7	115.9	119.0	118.3	117.2	134.9
6300	114.3	120.9	120.3	121.1	118.6	120.0	117.1	112.3	112.0	110.6	111.1	112.6	114.4	116.3	117.4	118.1	116.9	134.6
8000	114.1	120.3	121.4	121.1	119.2	118.7	116.1	112.6	111.6	109.4	109.5	112.0	114.4	115.0	118.1	117.7	116.6	134.3
10000	112.8	118.6	119.6	119.8	117.6	118.1	114.5	111.5	110.5	108.1	107.8	109.8	112.3	113.1	115.8	115.6	115.1	132.8
12500	111.8	117.1	119.1	119.5	117.8	117.8	114.0	110.6	109.3	107.5	107.3	108.3	111.1	111.4	115.3	113.5	114.4	132.1
16000	109.4	115.0	116.7	117.4	115.4	115.4	111.9	108.4	107.2	105.7	104.5	105.4	107.5	109.1	110.9	111.6	112.2	129.9
20000	107.4	112.9	114.4	114.7	112.4	112.0	109.2	106.4	104.0	103.1	100.7	102.2	103.7	105.4	107.9	107.3	109.3	127.0
OVERALL	134.5	140.7	141.8	141.2	139.6	138.2	135.6	134.5	133.0	132.8	133.0	134.4	136.4	137.4	137.1	137.6	137.2	154.9

TABLE XIX. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH REVERSE NOZZLE AND REVERSE ROTOR SETTING ANGLE, WITH BLAST DEFLECTOR

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) Concluded. 86 Percent speed; fan physical speed, 1935 rpm; fundamental blade passage frequency, 483 hertz

(a-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG 10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
63	95.5	96.3	94.5	93.8	93.2	93.8	92.7	92.5	91.3	91.0	91.8	92.8	92.8	91.3	90.8	91.7
80	93.2	92.6	93.2	91.2	91.2	90.7	89.2	89.9	89.4	88.4	87.4	88.6	88.0	88.9	88.0	88.9
90	94.0	95.5	93.7	91.5	90.5	90.0	88.9	87.7	87.2	86.5	86.5	86.1	85.5	87.0	87.0	87.2
100	95.5	97.4	97.0	96.2	95.2	94.5	93.9	92.4	92.2	92.4	90.4	91.6	92.0	90.4	90.0	90.9
125	96.5	98.9	100.5	98.7	97.5	98.2	95.2	96.7	95.2	95.7	95.7	94.8	96.5	97.4	95.9	93.7
160	97.7	97.9	99.5	99.7	98.7	97.9	97.2	96.7	95.7	95.2	95.9	97.0	96.0	97.0	97.2	97.1
200	97.1	95.1	95.3	95.6	95.6	94.9	93.6	93.1	92.6	92.1	92.1	93.7	92.8	92.8	93.8	95.0
250	91.8	95.9	95.3	95.3	94.1	92.8	91.3	90.1	89.1	89.1	90.8	90.0	90.9	92.1	91.6	93.0
315	90.1	94.6	96.1	96.6	95.1	93.0	91.0	88.6	88.0	87.3	87.3	88.7	90.0	91.0	91.5	92.5
400	90.9	96.3	97.0	97.2	95.5	93.7	90.3	89.5	88.0	88.7	87.8	89.1	91.2	92.5	92.5	93.2
500	97.5	102.9	103.5	103.7	103.5	101.4	94.2	94.5	90.2	92.5	93.4	96.3	101.2	102.0	99.4	100.1
630	95.1	100.1	101.1	101.4	98.2	96.2	92.7	91.1	88.4	88.6	88.7	91.5	92.9	94.9	95.1	95.8
800	96.1	101.2	102.9	101.4	98.4	95.9	93.7	91.1	89.2	88.6	88.1	90.3	92.7	95.2	94.7	96.6
1000	94.9	100.3	101.9	100.3	97.6	95.4	92.9	90.4	88.4	87.3	87.3	90.5	94.1	95.3	95.9	97.5
1250	92.6	97.8	99.8	98.4	96.1	93.3	91.8	89.1	86.4	85.4	85.9	89.2	92.4	93.9	94.6	95.2
1600	91.9	97.4	99.6	98.5	95.9	93.9	91.1	88.8	86.1	84.9	85.3	88.9	91.8	93.8	94.8	95.2
2000	90.3	95.8	97.9	96.6	94.6	92.6	89.8	87.3	84.8	83.6	84.3	87.4	90.6	92.3	93.8	93.5
2500	88.1	94.1	95.6	94.6	92.6	90.8	88.3	85.6	83.6	82.4	83.3	86.7	89.3	90.6	92.3	91.7
3150	87.8	92.2	94.1	93.7	91.5	90.5	88.3	84.8	83.3	81.8	82.5	86.1	87.0	89.8	91.2	91.1
4000	86.1	92.1	93.8	93.1	91.5	89.8	87.1	84.6	82.3	80.5	81.6	85.2	86.8	88.0	90.3	89.9
5000	84.6	89.4	91.6	91.4	89.2	87.6	85.1	82.1	80.2	78.4	79.4	82.0	84.5	85.1	88.2	87.5
6300	83.0	89.2	89.6	89.8	87.3	86.7	85.8	81.0	80.7	79.3	79.8	82.3	83.1	85.0	86.1	86.8
8000	82.2	88.3	89.5	89.2	87.3	86.8	84.2	80.7	79.7	77.5	77.6	80.1	82.5	83.1	86.2	85.8
10000	79.9	85.6	86.7	86.9	84.7	85.2	81.6	78.6	77.6	75.2	74.9	76.9	79.4	80.2	82.9	82.7
12500	77.6	82.8	83.9	85.2	83.5	83.5	79.7	76.3	75.1	73.2	73.0	74.1	76.9	77.2	81.1	79.3
16000	73.3	79.7	80.5	81.3	79.3	79.3	75.8	72.3	71.1	69.6	68.4	69.3	71.4	73.0	74.8	75.5
20000	69.5	74.1	75.6	75.9	73.6	73.2	70.4	67.5	65.2	64.3	61.9	63.4	64.9	66.6	69.1	68.5
OVERALL	106.7	110.4	111.9	111.8	109.7	108.3	105.7	104.6	103.2	103.0	103.2	104.6	106.5	107.5	107.2	107.7
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	76.9	83.2	90.6	100.8	101.4	101.0	98.7	97.1	95.4	94.8	94.8	96.4	98.0	97.3	94.1	90.2
304.8 M	76.4	84.7	90.4	93.0	93.8	93.5	90.7	89.7	87.6	87.5	87.4	88.9	90.5	89.6	85.9	81.6

TABLE XIX. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH REVERSE NOZZLE AND REVERSE ROTOR SETTING ANGLE, WITH BLAST DEFLECTOR

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW]

(b) 93 Percent speed; fan physical speed, 2099 rpm; fundamental blade passage frequency, 524 hertz

(b-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	129.0	127.3	124.3	124.1	124.0	124.8	124.3	123.6	122.1	121.6	122.6	122.9	122.3	123.1	121.8	122.3	123.7	141.4
63	125.3	124.8	125.5	122.1	122.5	121.8	121.3	121.1	120.0	119.1	118.6	119.9	118.8	119.5	118.1	118.8	121.0	138.7
80	126.0	127.2	126.8	123.3	123.0	122.2	120.7	119.0	118.3	118.0	117.7	116.9	117.2	117.7	117.5	118.5	120.8	138.5
100	127.6	129.1	123.5	128.0	127.0	126.0	125.1	123.8	124.1	123.5	122.1	122.9	123.5	121.5	120.1	121.2	125.0	142.7
125	127.8	130.3	131.2	130.5	129.3	128.8	127.7	128.0	127.3	127.7	127.2	125.4	127.7	128.5	128.0	125.9	128.3	146.0
160	124.5	129.0	131.3	131.3	130.5	129.8	129.5	128.3	128.1	127.3	127.6	128.1	127.8	128.8	129.0	126.0	129.0	146.7
200	124.5	127.3	127.2	127.5	127.2	127.2	125.8	125.2	124.8	123.8	124.0	125.1	126.0	125.0	126.3	127.1	125.8	143.5
250	122.7	128.2	127.6	127.4	126.2	124.9	123.6	122.4	121.9	121.1	121.6	122.5	122.7	123.9	124.2	124.4	124.2	141.9
315	121.4	126.1	127.4	128.1	126.7	124.9	122.4	121.2	120.9	119.6	120.4	120.8	121.9	122.9	123.4	124.0	123.7	141.4
400	120.9	124.8	127.8	128.4	126.3	124.6	122.1	120.8	120.1	120.3	119.8	120.3	120.9	122.1	122.8	123.0	123.5	141.2
500	127.2	134.2	134.9	134.9	134.9	132.9	129.4	126.1	123.9	126.4	123.1	126.3	127.6	127.2	127.7	130.6	130.4	148.1
630	124.2	131.4	132.4	132.2	130.1	128.6	124.7	122.7	120.9	120.4	119.2	121.7	123.7	125.6	125.7	126.6	126.9	144.6
800	126.4	132.9	133.9	133.3	130.8	128.1	125.6	123.1	121.8	119.9	119.8	122.2	124.1	126.6	126.6	128.0	127.8	145.5
1000	125.0	131.3	133.0	131.6	129.6	127.3	125.1	122.5	120.3	118.8	119.1	122.1	124.5	126.1	127.8	128.7	126.9	144.6
1250	122.9	129.4	131.4	129.7	128.0	125.5	123.4	121.4	118.9	117.5	117.4	120.5	124.0	125.0	126.4	126.9	125.3	143.0
1600	122.1	129.1	131.1	130.1	128.2	126.1	123.7	121.2	119.1	116.9	116.9	120.3	123.4	124.9	126.4	126.6	125.3	143.0
2000	121.0	128.3	129.5	128.5	127.2	124.5	122.2	120.2	117.7	115.8	116.5	119.9	123.0	124.2	126.0	125.2	124.1	141.8
2500	119.1	125.6	127.9	126.6	125.1	123.2	121.1	118.6	116.9	115.3	115.8	119.0	121.4	122.7	124.4	124.2	122.5	140.2
3150	118.3	125.4	126.6	125.9	124.4	123.4	121.3	118.4	116.6	115.3	115.9	119.2	120.4	121.8	124.1	123.8	122.0	139.7
4000	117.9	124.7	126.2	125.7	124.5	122.4	120.2	118.0	116.2	114.0	114.4	117.6	120.0	120.7	123.2	122.8	121.4	139.1
5000	116.4	122.6	124.8	124.4	122.6	120.9	118.3	116.1	114.3	111.9	112.8	115.1	117.5	117.4	121.4	120.4	119.6	137.3
6300	115.7	122.4	123.4	123.0	121.4	122.6	119.4	115.2	115.9	113.6	113.9	115.8	116.5	116.0	120.0	120.2	119.3	137.0
8000	115.1	122.1	123.4	123.1	122.1	121.6	118.3	115.6	115.1	112.6	112.4	114.2	116.8	116.9	120.1	120.1	119.0	136.7
10000	114.1	120.2	121.7	122.1	120.4	120.8	117.1	114.8	114.1	110.9	110.9	112.4	114.9	115.1	118.2	118.0	117.6	135.3
12500	112.7	119.4	120.5	121.7	120.4	120.0	116.2	113.7	112.9	110.4	110.2	111.0	113.5	113.2	117.2	116.2	116.8	134.5
16000	110.6	117.9	118.8	119.4	118.4	117.9	114.1	111.3	110.8	108.3	107.2	108.0	109.7	111.1	113.2	113.8	114.6	132.3
20000	108.9	114.9	116.8	116.5	115.3	115.2	111.7	109.0	107.8	105.8	103.6	104.6	106.1	107.5	110.3	109.8	111.8	129.5
OVERALL	127.9	142.4	143.4	142.9	141.7	140.2	138.0	136.5	135.5	135.1	134.7	135.8	137.0	137.9	138.7	139.2	138.9	156.7

TABLE XIX. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH REVERSE NOZZLE AND REVERSE ROTOR SETTING ANGLE, WITH BLAST DEFLECTOR

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) Concluded. 93 Percent speed; fan physical speed, 2099 rpm; fundamental blade passage frequency, 524 hertz

(b-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG														
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	96.3	97.6	94.6	94.4	95.1	95.1	94.6	93.9	92.4	91.9	92.9	93.2	92.6	93.4	92.1	92.6
63	96.6	95.1	93.8	92.4	92.8	92.1	91.6	91.4	90.3	89.4	88.9	90.2	89.1	89.8	88.4	89.1
80	96.3	97.6	94.1	93.6	93.3	92.5	91.0	89.3	88.6	88.3	88.0	87.2	87.5	88.0	87.8	88.8
100	97.9	99.4	98.8	98.3	97.3	96.3	95.4	94.1	94.4	93.8	92.4	93.2	93.8	91.8	90.4	91.5
125	98.1	100.6	101.5	100.8	99.6	99.1	98.0	98.3	97.6	98.0	97.5	95.7	98.0	98.8	98.3	96.2
160	94.8	99.3	101.6	101.6	100.8	100.1	99.8	98.6	98.4	97.6	97.9	98.4	98.1	95.1	99.3	99.3
200	94.8	97.3	97.5	97.8	97.5	97.5	96.1	95.5	95.1	94.1	94.3	95.4	95.3	95.3	96.6	97.4
250	91.0	98.5	97.9	97.7	96.5	95.2	93.9	92.7	92.2	91.4	91.9	92.8	93.0	94.2	94.5	94.7
315	91.7	96.4	97.7	98.4	97.0	95.2	92.7	91.5	91.2	89.9	90.7	91.1	92.2	92.2	93.7	94.3
400	91.0	97.0	98.0	98.6	96.5	94.3	92.3	91.0	90.3	90.5	90.0	90.5	91.1	92.3	93.0	93.2
500	97.4	104.4	105.1	105.1	105.1	103.1	98.6	96.3	94.1	96.6	93.3	96.5	97.8	97.4	97.9	100.8
630	94.4	101.6	102.6	102.4	100.3	98.8	94.9	92.9	91.1	90.6	89.4	91.9	93.5	95.8	95.9	96.8
800	96.6	102.1	104.1	103.5	101.0	98.3	95.8	93.3	92.0	90.1	90.0	92.4	94.3	96.8	96.8	98.2
1000	95.2	101.5	103.2	101.8	99.8	97.5	95.3	92.7	90.5	89.0	89.3	92.3	94.7	96.3	98.0	98.9
1250	93.0	99.5	101.5	99.8	98.1	95.6	93.5	91.5	89.0	87.6	87.5	90.6	94.1	95.1	96.5	97.0
1600	92.2	99.2	101.2	100.2	98.3	96.2	93.8	91.3	89.2	87.0	87.0	90.4	93.5	95.0	96.5	96.7
2000	91.0	98.0	99.5	98.5	97.2	94.5	92.2	90.2	87.7	85.8	86.5	89.9	93.0	94.2	96.0	95.2
2500	89.6	95.5	97.8	96.5	95.0	93.1	91.0	88.5	86.8	85.2	85.7	88.9	91.3	92.6	94.3	94.1
3150	88.0	95.1	96.3	95.6	94.1	93.1	91.0	88.1	86.3	85.0	85.6	88.9	90.1	91.5	93.8	93.5
4000	87.4	94.2	95.7	95.2	94.0	91.9	89.7	87.5	85.7	83.5	83.9	87.1	89.5	90.2	92.7	92.3
5000	85.6	91.8	94.0	93.6	91.8	90.1	87.5	85.3	83.5	81.1	82.0	84.3	87.1	88.6	90.6	89.6
6300	84.4	91.1	92.1	91.7	90.1	91.3	88.1	83.9	84.6	82.3	82.6	84.5	85.2	86.7	88.7	88.9
8000	83.2	90.2	91.5	91.2	90.2	89.7	86.4	83.7	83.2	80.7	80.5	82.3	84.9	85.0	88.2	88.2
10000	81.2	87.3	88.8	89.2	87.5	87.9	84.2	81.9	81.2	78.0	78.0	79.5	82.0	82.2	85.3	85.1
12500	78.5	85.1	86.2	87.4	86.1	85.7	81.9	79.5	78.7	76.1	76.0	76.8	79.3	79.0	83.0	82.0
16000	74.5	81.7	82.6	83.3	82.3	81.8	78.0	75.2	74.7	72.2	71.1	71.9	73.6	75.0	77.1	77.7
20000	70.0	76.0	77.9	77.7	76.5	76.4	72.9	70.2	69.0	67.0	64.8	65.8	67.3	68.7	71.5	71.0
OVERALL	108.1	112.5	113.5	113.0	111.8	110.2	108.1	106.7	105.7	105.3	104.9	106.0	107.2	108.1	108.8	109.2
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 m	89.6	94.9	100.3	102.5	103.4	103.0	101.2	99.6	98.3	97.7	96.5	98.0	98.5	97.6	96.0	91.6
304.8 m	71.2	86.4	92.1	94.7	95.8	95.5	93.5	92.0	90.6	90.4	88.8	90.2	90.4	89.2	87.1	83.0

TABLE XIX. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH REVERSE NOZZLE AND REVERSE ROTOR SETTING ANGLE, WITH BLAST DEFLECTOR

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) 100 Percent speed; fan physical speed, 2257 rpm; fundamental blade passage frequency, 564 hertz

(c-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																
50	133.9	132.6	125.4	125.7	126.1	125.9	125.7	124.7	123.9	122.9	123.4	123.7	123.6	123.4	123.1	123.5	125.6	143.3
63	132.2	130.7	123.8	124.2	123.5	123.5	122.7	122.7	121.5	120.3	119.8	120.1	119.7	119.8	120.3	120.6	123.2	140.9
80	131.5	130.4	125.7	126.0	125.7	124.5	122.7	121.4	120.4	119.7	119.2	118.0	118.4	118.9	118.7	120.1	123.4	141.1
100	131.5	132.2	130.0	129.9	129.4	128.2	126.5	125.7	125.4	125.7	123.0	123.6	125.2	124.5	122.0	122.4	127.0	144.7
125	131.8	133.3	132.2	132.5	131.3	131.2	129.8	129.8	129.0	129.2	128.8	127.8	127.7	129.7	129.7	127.4	130.1	147.8
160	129.7	131.3	133.5	133.5	132.8	132.0	131.3	130.8	129.3	129.2	129.2	129.6	130.0	130.0	130.5	130.7	131.0	148.7
200	128.6	130.4	129.1	129.6	129.6	128.8	128.1	127.6	126.6	126.4	126.4	127.4	127.4	126.8	127.8	129.1	128.0	145.7
250	126.9	130.9	129.6	130.1	128.9	127.1	126.4	124.8	124.3	123.8	123.9	124.5	125.4	126.1	126.6	127.0	126.7	144.4
315	126.1	128.4	128.9	130.1	128.9	126.9	125.3	123.8	123.3	121.9	122.4	123.4	123.9	125.4	125.4	125.8	125.9	143.6
400	124.3	128.5	128.6	129.8	127.3	125.8	123.6	122.6	122.0	122.0	121.6	121.5	122.3	123.8	124.3	124.2	124.9	142.6
500	125.9	132.2	132.6	134.4	132.7	129.2	127.2	125.2	123.7	122.6	122.1	123.0	128.7	132.1	134.9	129.6	129.7	147.4
630	127.3	134.6	136.5	136.6	134.5	130.8	128.8	126.5	125.0	123.8	123.6	124.7	131.0	134.1	136.8	131.7	131.7	149.4
800	125.8	134.0	136.0	135.1	132.8	130.5	127.8	126.0	123.5	122.1	121.3	123.2	125.8	127.1	128.1	129.0	129.6	147.3
1000	125.1	132.4	134.6	133.2	131.1	128.9	126.9	124.7	122.4	120.9	120.6	122.5	125.6	127.1	128.2	129.3	128.3	146.0
1250	123.9	131.4	133.5	132.9	130.9	128.4	126.2	124.0	121.7	120.4	119.9	122.6	125.7	127.4	128.4	128.4	127.8	145.5
1600	122.6	130.1	132.8	131.9	130.1	128.4	126.4	124.1	121.1	119.6	119.3	122.0	125.1	126.6	128.1	127.8	127.2	144.9
2000	121.9	129.4	131.7	130.9	129.4	127.2	124.7	122.4	120.2	118.6	118.7	121.3	124.6	125.7	127.4	126.8	126.2	143.9
2500	119.8	127.9	129.6	129.3	127.4	125.8	123.9	121.4	119.1	117.6	118.1	120.9	122.9	124.4	126.3	125.7	124.7	142.4
3150	119.1	127.2	128.9	128.2	126.9	125.7	123.9	121.1	118.9	117.9	117.9	120.7	122.2	123.9	125.6	125.5	124.2	141.9
4000	118.5	126.7	128.5	128.0	126.7	125.4	123.0	121.0	118.5	116.9	117.0	119.5	121.7	122.7	125.0	124.3	123.7	141.4
5000	117.1	124.8	126.8	127.0	124.8	123.3	121.1	119.1	116.6	115.0	115.6	116.6	119.6	119.8	123.5	122.2	121.9	139.6
6300	116.2	124.4	125.5	125.9	123.7	125.2	122.2	118.0	118.0	116.5	116.7	117.8	118.0	120.0	121.9	122.0	121.7	139.4
8000	116.0	124.4	126.0	125.5	123.9	124.0	121.0	118.5	117.5	115.5	115.4	116.5	118.5	118.7	121.9	121.7	121.3	139.0
10000	114.8	122.1	123.9	124.5	122.4	123.1	119.4	117.4	116.4	114.4	113.8	114.3	116.6	116.8	119.8	119.7	119.8	137.5
12500	114.0	121.2	123.0	124.5	122.3	122.5	119.0	116.6	115.6	113.5	113.1	113.3	115.8	115.3	118.9	117.6	119.2	136.9
16000	111.5	119.9	121.2	121.8	120.2	120.3	117.0	114.0	113.2	111.2	110.0	110.4	112.0	113.0	115.1	115.9	116.9	134.6
20000	109.3	116.9	118.2	118.9	117.1	117.3	114.3	112.0	110.1	108.6	106.3	106.5	108.6	109.8	111.8	111.7	114.0	131.7
OVERALL	141.4	144.5	144.9	145.0	143.4	141.7	140.0	138.6	137.3	136.7	136.5	137.2	139.1	140.7	142.3	140.7	140.9	158.6

TABLE XIX. - Concluded. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH REVERSE NOZZLE AND REVERSE ROTOR SETTING ANGLE, WITH BLAST DEFLECTOR

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) Concluded. 100 Percent speed; fan physical speed, 2257 rpm; fundamental blade passage frequency, 564 hertz

(c-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	104.2	102.9	95.7	96.0	96.4	96.2	96.0	95.0	94.2	93.2	93.7	94.0	93.9	93.7	93.4	93.8
63	102.5	101.0	94.1	94.5	93.8	93.8	93.0	93.0	91.8	90.6	90.1	90.4	90.0	90.1	90.6	90.9
80	101.8	101.2	96.0	96.3	96.0	94.8	93.0	91.7	90.7	90.0	89.5	88.3	88.7	89.2	89.0	90.4
100	102.2	102.5	100.3	100.2	99.7	98.5	96.8	96.0	95.7	96.0	93.3	93.9	95.5	94.8	92.3	92.7
125	102.1	103.6	102.5	102.8	101.6	101.5	100.1	100.1	99.3	99.5	99.1	98.1	98.0	100.0	100.0	97.7
160	99.5	102.1	103.9	103.9	103.1	102.3	101.6	101.1	99.6	99.5	99.5	99.9	100.3	100.3	100.8	101.0
200	98.9	100.7	99.4	99.9	99.9	99.1	98.4	97.9	96.9	96.7	96.7	97.7	97.7	97.1	98.1	99.4
250	97.2	101.2	99.9	100.4	99.2	97.4	95.7	95.1	94.6	94.1	94.2	94.8	95.7	96.4	96.9	97.3
315	96.4	98.7	99.2	100.4	99.2	97.2	95.6	94.1	93.6	92.2	92.7	93.7	94.2	95.7	95.7	96.1
400	94.5	98.7	98.8	100.0	97.5	96.0	93.8	92.8	92.2	92.2	91.8	91.7	92.5	94.0	94.5	94.4
500	96.1	102.4	102.8	104.6	102.9	99.4	97.4	95.4	93.9	92.8	92.3	93.2	98.9	102.3	105.1	99.8
630	97.5	104.8	105.7	106.8	104.7	101.0	99.0	96.7	95.2	94.0	93.8	94.9	101.2	104.3	107.0	101.9
800	96.0	104.2	106.2	105.3	103.0	100.7	98.0	96.2	93.7	92.3	91.5	93.4	96.0	97.3	98.3	99.2
1000	95.3	102.6	104.8	103.4	101.3	99.1	97.1	94.9	92.6	91.1	90.8	92.7	95.8	97.3	98.4	99.5
1250	94.0	101.5	103.6	103.0	101.0	98.5	96.3	94.1	91.8	90.5	90.0	92.7	95.8	97.5	98.5	98.5
1600	92.7	100.2	102.9	102.0	100.2	98.5	96.5	94.2	91.2	89.7	89.4	92.1	95.2	96.7	98.2	97.9
2000	91.9	99.4	101.7	100.9	99.4	97.2	94.7	92.4	90.2	88.6	88.7	91.3	94.6	95.7	97.4	96.8
2500	89.7	97.8	99.5	99.2	97.3	95.7	93.8	91.3	89.0	87.5	88.0	90.8	92.8	94.3	96.2	95.6
3150	88.8	96.9	98.6	97.9	96.6	95.4	93.6	90.8	88.6	87.6	87.6	90.4	91.9	93.6	95.3	95.2
4000	88.0	96.2	99.0	97.5	96.2	94.9	92.5	90.5	88.0	86.4	86.5	89.0	91.2	92.2	94.5	93.8
5000	86.3	94.0	96.0	96.2	94.0	92.5	90.3	88.3	85.8	84.2	84.8	85.8	88.8	89.0	92.7	91.4
6300	84.9	93.1	94.2	94.6	92.4	93.9	90.9	86.7	86.7	85.2	85.4	86.5	86.7	88.7	90.6	90.7
8000	84.1	92.5	94.1	93.6	92.0	92.1	89.1	86.6	85.6	83.6	83.5	84.6	86.6	86.8	90.0	89.8
10000	81.9	89.2	91.0	91.6	89.5	90.2	86.5	84.5	83.5	81.5	80.9	81.4	83.7	83.9	86.9	86.8
12500	79.7	87.0	89.7	90.2	88.0	88.2	84.7	82.4	81.3	79.2	78.9	79.1	81.6	81.1	84.7	83.4
16000	75.4	83.9	86.1	85.7	84.1	84.2	80.9	77.9	77.1	75.1	73.9	74.3	75.9	76.9	79.0	79.8
20000	70.4	78.1	80.0	80.1	78.3	78.5	75.5	73.1	71.3	69.8	67.5	67.7	69.8	71.0	73.0	72.9
OVERALL	111.7	114.6	115.0	115.0	113.5	111.7	110.1	108.3	107.5	106.9	106.6	107.3	109.3	111.8	112.5	110.8
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	82.5	96.4	102.0	104.7	105.1	104.6	103.6	102.0	100.4	99.2	98.6	99.5	100.4	100.4	99.5	93.0
304.8 M	73.2	87.8	93.4	96.7	97.0	96.6	95.7	94.3	92.6	91.4	90.8	91.4	92.7	92.6	91.4	84.3

TABLE XX. - FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH REVERSE NOZZLE AND REVERSE ROTOR SETTING ANGLE, WITHOUT BLAST DEFLECTOR

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) 86 Percent speed; fan physical speed, 1868 rpm; fundamental blade passage frequency, 467 hertz

(a-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	122.8	121.6	121.5	122.5	122.3	122.6	123.6	122.0	121.3	120.5	121.1	121.4	121.6	122.0	121.5	120.9	121.9	139.6
63	120.7	121.8	120.8	121.2	121.7	120.5	121.7	120.2	118.7	117.2	117.8	118.9	118.0	119.0	119.0	118.0	119.8	137.5
80	123.2	125.2	123.1	122.7	121.4	121.1	119.6	118.7	117.7	117.4	117.1	116.3	116.4	116.7	117.1	117.3	119.7	137.4
100	124.3	127.5	127.6	126.6	125.5	125.1	124.3	123.5	124.1	122.6	122.1	122.9	124.1	122.8	120.1	121.7	124.3	142.0
125	124.2	129.5	129.8	128.8	127.5	128.5	127.5	127.2	126.3	125.7	127.2	125.1	126.5	128.7	127.3	126.4	127.4	145.1
160	120.8	126.8	128.8	129.2	128.0	127.5	127.5	125.3	125.7	124.8	125.8	126.4	126.0	125.8	126.7	126.2	126.7	144.4
200	121.5	125.2	125.4	125.2	125.0	124.5	123.9	122.7	122.2	121.5	121.2	122.3	122.4	122.5	123.9	124.6	123.4	141.1
250	119.9	125.4	124.6	124.9	123.6	122.1	121.1	119.6	118.7	118.2	118.9	120.2	120.9	121.9	121.9	122.3	121.6	139.3
315	116.9	125.2	126.6	126.4	124.7	123.2	120.9	118.9	117.9	117.2	117.4	118.2	119.2	121.1	121.6	122.6	121.9	139.6
400	123.6	128.2	129.1	129.1	126.4	125.2	121.4	120.1	119.4	119.1	119.6	120.8	123.2	125.4	124.2	125.0	124.3	142.0
500	130.1	133.1	134.4	134.9	132.9	130.9	125.2	123.4	120.6	121.4	123.7	126.8	130.4	132.9	130.6	130.8	130.0	147.7
630	125.6	130.8	132.1	130.8	128.1	126.1	123.3	121.1	119.3	118.1	118.9	120.7	122.8	124.6	125.4	125.7	125.7	143.4
800	126.6	131.8	132.8	130.3	127.9	125.9	123.8	121.1	119.3	118.1	118.4	121.0	122.8	124.9	125.3	126.8	125.9	143.6
1000	125.8	130.8	132.3	130.0	126.7	124.5	123.5	120.3	118.2	117.2	118.2	120.3	124.3	125.3	125.5	127.9	125.5	143.2
1250	124.0	128.8	130.2	128.0	125.5	123.7	122.0	119.5	116.8	115.2	116.0	119.4	122.0	124.5	124.5	125.2	123.8	141.5
1600	123.5	128.5	129.8	128.0	125.5	123.6	121.8	118.8	116.5	114.8	115.8	118.4	121.8	123.5	124.6	124.7	123.5	141.2
2000	121.6	127.0	128.3	126.6	124.6	122.3	120.5	117.5	115.3	113.8	114.6	117.9	120.8	122.5	124.0	123.7	122.3	140.0
2500	119.5	125.1	126.0	124.5	122.6	120.6	118.8	115.6	114.0	112.3	113.5	116.7	118.8	121.0	122.5	122.0	120.4	138.1
3150	118.9	124.2	124.9	123.4	121.4	120.4	118.7	115.4	113.2	112.0	113.4	116.3	117.5	119.9	121.0	120.9	119.5	137.2
4000	118.3	123.8	124.8	123.3	121.3	120.1	118.0	115.1	113.0	110.5	111.8	114.8	117.1	118.1	120.6	120.3	119.1	136.8
5000	116.6	122.3	123.3	122.1	120.3	118.1	115.9	113.4	111.8	109.1	110.6	112.6	114.8	115.3	119.1	118.7	117.5	135.2
6300	115.5	121.0	121.4	120.0	118.5	119.0	116.5	111.4	110.4	109.2	110.0	112.4	112.6	115.5	116.3	116.5	116.3	134.0
8000	115.7	121.2	121.7	120.0	118.0	118.5	115.8	111.7	111.3	108.6	109.0	110.1	112.5	113.6	116.0	116.4	116.0	133.7
10000	114.5	120.2	120.4	118.7	116.9	118.0	114.2	111.0	109.4	107.4	107.4	108.6	110.5	112.0	114.5	114.3	114.8	132.5
12500	114.3	120.2	119.8	120.0	117.4	117.8	114.4	111.2	110.4	108.2	107.3	108.3	110.5	111.3	114.5	114.7	115.0	132.7
16000	112.1	119.6	118.7	118.7	117.1	116.9	114.6	109.9	108.9	108.3	106.1	107.1	108.2	110.2	112.5	113.3	114.1	131.8
20000	112.7	120.0	119.1	118.8	116.8	117.1	114.3	111.4	110.2	109.9	106.3	107.4	108.8	110.5	111.6	112.5	114.3	132.0
OVERALL	137.0	141.4	142.3	141.4	139.5	138.2	135.4	134.6	133.7	132.8	133.6	134.6	136.4	138.0	137.7	138.0	137.5	155.3

TABLE XX. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH REVERSE NOZZLE AND REVERSE ROTOR SETTING ANGLE, WITHOUT BLAST DEFLECTOR

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(a) Concluded. 86 Percent speed; fan physical speed, 1868 rpm; fundamental blade passage frequency, 467 hertz

(a-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	93.1	91.9	91.8	92.8	92.6	92.9	93.9	92.3	91.6	90.8	91.4	91.7	91.9	92.3	91.8	91.2
63	91.0	92.1	91.1	91.5	92.0	90.8	92.0	90.5	89.0	87.5	88.1	89.2	88.3	89.3	89.3	88.3
80	92.5	95.5	93.4	93.0	91.7	91.4	89.9	89.0	88.0	87.7	87.4	86.6	86.7	87.0	87.4	87.6
100	94.6	97.8	97.9	96.9	95.8	95.4	94.6	93.8	94.4	92.9	92.4	93.2	94.4	93.1	90.4	92.0
125	94.5	99.8	100.1	99.1	97.8	98.8	97.8	97.5	96.6	96.0	97.5	95.4	96.8	99.0	97.6	96.7
160	91.1	97.1	99.1	99.5	98.3	97.8	97.8	95.6	96.0	95.1	96.1	96.7	96.2	96.1	97.0	96.5
200	91.8	95.5	95.7	95.5	95.3	94.8	94.2	93.0	92.5	91.8	91.5	92.6	92.7	92.8	94.2	94.9
250	89.2	95.7	94.9	95.2	93.9	92.4	91.4	89.9	89.0	88.5	89.2	90.5	91.2	92.2	92.2	92.6
315	89.2	95.5	96.9	96.7	95.0	93.5	91.2	89.2	88.2	87.5	87.7	88.5	89.5	91.4	91.9	92.9
400	93.8	98.4	99.3	99.3	96.6	95.4	91.6	90.3	89.6	89.3	89.8	91.0	93.4	95.6	94.4	95.2
500	100.3	103.3	104.6	105.1	103.1	101.1	95.4	93.6	90.8	91.6	93.9	97.0	100.6	103.1	100.8	101.0
630	95.8	101.0	102.3	101.0	98.3	96.3	93.5	91.3	89.5	88.3	89.1	90.9	93.0	94.8	95.6	95.9
800	96.8	102.0	103.0	100.5	98.1	96.1	94.0	91.3	89.5	88.3	88.6	91.2	93.0	95.1	95.5	97.0
1000	96.0	101.0	102.5	100.2	96.9	94.7	93.7	90.5	88.4	87.4	88.4	90.5	94.5	95.5	95.7	98.1
1250	94.1	98.9	100.3	98.1	95.6	93.8	92.1	89.6	86.9	85.3	86.1	89.5	92.1	94.6	94.6	95.3
1600	93.6	98.6	99.9	98.1	95.6	93.7	91.9	88.9	86.6	84.9	85.9	88.5	91.9	93.6	94.7	94.8
2000	91.6	97.0	98.3	96.6	94.6	92.3	90.5	87.5	85.3	83.8	84.6	87.9	90.8	92.5	94.0	93.7
2500	89.4	95.0	95.9	94.4	92.5	90.5	89.7	85.5	83.9	82.2	83.4	86.6	88.7	90.9	92.4	91.9
3150	88.6	93.9	94.6	93.1	91.1	90.1	88.4	85.1	82.9	81.7	83.1	86.0	87.2	89.6	90.7	90.6
4000	87.8	93.3	94.3	92.8	90.8	89.6	87.5	84.6	82.5	80.0	81.3	84.3	86.6	87.6	90.1	89.8
5000	85.8	91.5	92.5	91.3	89.5	87.3	85.1	82.6	81.0	78.3	79.8	81.8	84.0	84.5	88.3	87.9
6300	84.2	89.7	90.1	88.8	87.3	87.7	85.2	80.1	79.1	77.9	78.7	81.2	81.6	84.2	85.1	85.3
8000	83.8	89.3	89.8	88.1	86.1	86.6	83.9	79.8	79.4	76.7	77.1	78.2	80.6	81.7	84.1	84.5
10000	81.6	87.3	87.5	85.8	84.0	85.1	81.3	78.1	76.5	74.5	74.5	75.7	77.6	79.1	81.6	81.4
12500	80.0	85.9	85.5	85.7	83.1	83.5	80.1	76.9	76.1	73.9	73.0	74.0	76.2	77.0	80.2	80.4
16000	76.9	83.4	82.5	82.5	80.9	80.7	78.4	73.7	72.7	72.1	69.9	70.9	72.0	74.0	76.3	77.1
20000	74.7	81.0	80.1	79.9	77.9	78.2	75.4	72.4	71.2	70.9	67.4	68.4	69.8	71.5	72.7	73.6
OVERALL	107.1	111.4	112.4	111.5	109.6	108.3	106.5	104.8	103.8	103.0	103.9	104.8	106.6	106.2	107.8	108.1
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	81.2	93.8	99.2	101.3	101.1	100.9	99.2	97.2	95.7	94.5	95.3	96.7	97.9	97.9	94.7	90.7
304.8 M	71.7	85.3	91.1	93.5	93.6	93.4	91.4	89.6	88.1	87.1	87.9	89.2	90.4	90.3	86.7	82.2

TABLE XX. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH REVERSE NOZZLE AND REVERSE ROTOR SETTING ANGLE, WITHOUT BLAST DEFLECTOR

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) 93 Percent speed; fan physical speed, 2027 rpm; fundamental blade passage frequency, 506 hertz

(b-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG																SIMPLE SOURCE (SPL)	POWER LEVEL (PWL)
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160		
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	126.6	123.1	123.7	124.1	124.4	124.1	125.6	122.7	123.1	122.6	122.1	123.5	123.4	122.4	120.7	122.6		
63	125.8	123.1	123.6	122.8	123.5	123.0	123.0	121.0	121.3	119.5	119.8	120.1	120.3	120.3	119.6	121.0	123.5	141.2
80	126.6	125.6	125.6	124.1	122.8	123.0	121.8	119.8	119.8	118.5	119.0	117.6	117.3	118.5	118.5	118.2	121.7	139.4
100	127.1	129.6	129.4	127.9	127.3	126.6	126.3	125.1	125.4	125.4	124.3	124.3	125.8	124.8	122.8	122.1	121.3	139.0
125	126.5	130.5	131.8	131.2	130.0	129.7	129.3	128.8	128.2	127.8	128.5	126.9	128.0	125.5	128.5	128.0	126.0	143.7
160	123.8	128.3	130.9	130.9	130.3	130.3	129.8	127.8	127.4	127.6	127.9	128.5	127.6	128.1	128.9	129.0	129.1	146.8
200	124.4	126.6	127.6	127.3	127.3	126.9	125.9	124.6	124.8	123.6	123.8	124.2	124.9	124.9	125.8	126.7	128.9	146.6
250	121.3	126.8	127.0	127.3	126.2	125.0	124.0	122.0	121.2	121.0	122.0	122.6	123.3	124.2	124.0	124.4	125.6	143.3
315	120.8	126.3	128.0	128.5	126.8	125.1	122.8	121.0	120.5	119.6	120.3	120.7	122.0	123.8	123.8	124.2	124.1	141.8
400	121.4	127.0	128.5	128.0	126.4	125.4	122.4	120.7	120.5	120.7	120.7	120.6	121.7	123.2	123.5	124.4	123.9	141.6
500	129.0	134.0	135.7	134.2	135.5	135.0	131.2	127.5	125.8	125.3	123.8	125.4	126.2	129.2	130.5	130.4	123.9	141.6
630	125.5	131.2	134.2	133.0	130.8	129.0	125.0	122.8	121.3	120.5	120.7	121.9	124.2	125.8	126.0	126.7	131.2	148.9
800	127.1	132.6	134.7	132.7	130.6	128.2	125.9	123.2	121.6	120.4	120.6	122.5	124.8	126.8	126.9	127.8	127.6	145.3
1000	126.1	131.1	133.4	131.9	129.4	127.4	125.3	122.4	120.3	118.9	119.3	122.2	125.1	126.8	128.1	128.3	127.9	145.6
1250	124.3	129.2	132.2	129.8	127.9	126.4	123.9	121.7	119.4	117.5	118.0	120.9	123.7	125.7	126.2	126.7	127.1	144.8
1600	123.7	129.1	131.9	130.6	128.2	127.1	124.4	121.7	119.6	117.4	118.1	120.3	123.6	125.4	126.9	126.6	125.6	143.3
2000	122.5	128.3	130.5	129.0	127.0	125.4	122.9	120.4	118.2	116.6	117.2	120.3	123.0	124.4	126.4	126.0	125.8	143.5
2500	120.2	126.2	128.4	127.1	124.9	123.7	121.2	118.6	116.7	115.4	116.2	119.7	121.2	123.1	124.7	124.3	124.6	142.3
3150	119.6	125.4	127.2	125.9	124.1	123.4	121.2	117.9	115.9	115.1	115.9	119.0	119.7	121.9	123.2	123.2	122.8	140.5
4000	118.9	124.9	127.2	125.9	124.1	122.9	120.4	117.6	115.6	113.7	114.4	117.5	118.9	120.7	122.9	122.7	121.9	139.6
5000	117.4	123.4	125.4	124.6	122.6	121.4	118.3	116.4	114.6	111.9	113.6	114.7	117.4	117.7	121.6	121.4	121.5	139.2
6300	116.5	122.5	123.9	122.7	121.0	122.2	118.5	114.7	113.2	112.4	113.2	114.7	114.8	117.7	118.7	118.7	119.9	137.6
8000	116.3	122.6	123.9	122.1	120.4	121.3	118.1	114.5	114.0	111.4	111.8	112.6	114.4	116.1	118.4	118.8	118.8	136.5
10000	115.9	121.8	122.9	121.7	119.7	120.9	117.2	114.2	112.7	110.5	111.0	111.6	112.7	114.7	117.3	116.9	118.4	136.1
12500	115.5	121.7	122.7	122.7	120.2	121.4	117.0	114.5	113.2	110.9	110.7	111.3	112.8	114.2	117.7	117.7	117.5	135.2
16000	114.2	120.7	121.4	121.2	119.4	119.9	116.6	112.9	111.7	110.4	109.2	109.2	110.0	112.7	115.2	115.8	117.8	135.5
20000	114.4	121.4	121.2	121.4	118.9	119.9	116.2	113.4	112.4	111.6	108.9	109.2	110.4	113.3	113.9	114.4	116.5	134.2
OVERALL	128.1	142.2	144.1	142.9	141.8	141.0	138.9	136.7	135.9	135.3	135.4	136.1	137.2	138.5	139.1	139.3	116.5	134.2
																	139.3	157.1

TABLE XX. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH REVERSE NOZZLE AND REVERSE ROTOR SETTING ANGLE, WITHOUT BLAST DEFLECTOR

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(b) Concluded. 93 Percent speed; fan physical speed, 2027 rpm; fundamental blade passage frequency, 506 hertz

(b-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG 10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	96.9	93.4	94.0	94.4	94.7	94.4	95.9	93.0	93.4	92.9	92.4	93.8	93.7	92.7	91.0	92.9
63	96.1	93.4	93.9	93.1	93.8	93.3	93.3	91.3	91.6	89.8	90.1	90.4	90.6	90.6	89.9	91.3
80	96.9	95.9	95.9	94.4	93.1	93.3	92.1	90.1	89.1	88.8	89.3	87.9	87.6	88.8	88.8	88.5
100	97.4	98.9	99.7	98.1	97.6	96.9	96.6	95.4	95.7	95.7	94.6	94.6	96.1	95.1	93.1	92.4
125	96.8	100.8	102.1	101.5	100.3	100.0	99.6	99.1	98.5	98.1	98.8	97.2	98.3	95.8	98.8	98.3
160	94.1	98.6	101.2	101.2	100.6	100.5	100.1	98.1	97.7	97.9	98.2	98.8	97.5	98.4	99.2	99.3
200	94.7	96.9	97.9	97.6	97.6	97.2	96.2	94.9	95.1	93.9	94.1	94.5	95.2	95.2	96.1	97.0
250	91.6	97.1	97.3	97.6	96.5	95.3	94.3	92.3	91.5	91.3	92.3	92.9	93.6	94.5	94.3	94.7
315	91.1	96.6	99.3	98.8	97.1	95.4	93.1	91.3	90.8	89.9	90.6	91.0	92.3	94.1	94.1	94.5
400	91.6	97.2	98.7	98.2	96.6	95.6	92.6	90.9	90.7	90.9	90.9	90.8	91.9	93.4	93.7	94.6
500	96.2	104.2	105.9	104.4	105.7	105.2	101.4	97.7	96.0	95.5	94.0	95.6	96.4	99.4	100.7	100.6
630	95.7	101.4	104.4	103.2	101.0	99.2	95.2	93.0	91.5	90.7	90.9	92.1	94.4	96.0	96.2	96.9
800	97.3	102.8	104.9	102.9	100.8	98.4	96.1	93.4	91.8	90.6	90.8	92.7	95.0	97.0	97.1	98.0
1000	96.3	101.3	103.6	102.1	99.6	97.6	95.5	92.6	90.5	89.1	89.5	92.4	95.3	97.0	98.3	98.5
1250	94.4	99.3	102.3	99.9	98.0	96.5	94.0	91.8	89.5	87.6	88.1	91.0	93.8	95.8	96.3	96.8
1600	93.8	99.2	102.0	100.7	98.3	97.2	94.5	91.8	89.7	87.5	88.2	90.4	93.7	95.5	97.0	96.7
2000	92.5	98.0	100.5	99.0	97.0	95.4	92.9	90.4	88.2	86.6	87.2	90.3	93.0	94.4	96.4	96.0
2500	90.1	96.1	98.3	97.0	94.8	93.6	91.1	88.5	86.6	85.3	86.1	89.6	91.1	93.0	94.6	94.2
3150	89.3	95.1	96.9	95.6	93.8	93.1	90.9	87.6	85.6	84.8	85.6	88.7	89.4	91.6	92.9	92.9
4000	88.4	94.4	96.7	95.4	93.6	92.4	89.9	87.1	85.1	83.2	83.9	87.0	88.4	90.2	92.4	92.2
5000	86.6	92.6	94.6	93.8	91.8	90.6	87.5	85.6	83.8	81.1	82.8	83.9	86.6	86.9	90.8	90.6
6300	85.2	91.2	92.6	91.5	89.8	90.9	87.2	83.5	81.9	81.1	81.9	83.4	83.6	86.4	87.5	87.5
8000	84.4	90.7	92.0	90.2	88.5	89.9	85.2	82.6	82.1	79.5	79.9	80.7	82.5	84.2	86.5	86.9
10000	83.0	88.9	89.9	88.8	86.8	88.0	84.3	81.3	79.8	77.6	78.1	78.7	79.8	81.8	84.4	84.0
12500	81.2	87.4	88.4	88.4	85.9	87.1	82.7	80.2	78.9	76.6	76.4	77.0	78.5	79.9	83.4	83.4
16000	78.0	84.5	85.2	85.0	83.2	83.7	80.4	76.7	75.5	74.2	73.0	73.0	73.8	76.5	79.1	79.6
20000	75.5	82.4	82.3	82.5	80.0	81.0	77.3	74.4	73.4	72.6	70.0	70.3	71.4	74.3	75.0	75.5
OVERALL	108.2	112.2	114.2	113.0	111.9	111.0	109.0	106.9	106.1	105.5	105.6	106.2	107.3	108.6	109.2	109.4
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	81.5	94.7	101.0	102.7	103.6	104.0	102.1	99.9	98.6	97.5	97.0	98.2	98.5	98.0	96.3	91.6
304.8 M	72.0	86.1	92.8	94.6	96.0	96.6	94.7	92.5	91.2	90.2	89.5	90.1	90.4	89.9	87.8	83.0

TABLE XX. - Continued. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH REVERSE NOZZLE AND REVERSE ROTOR SETTING ANGLE, WITHOUT BLAST DEFLECTOR

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) 100 Percent speed; fan physical speed, 2179 rpm; fundamental blade passage frequency, 544 hertz

(c-1) Data referred to source and normalized to 1 meter

FREQUENCY	ANGLE, DEG															SIMPLE SOURCE	POWER LEVEL
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	(SPL)	(PWL)
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 1.0 METER RADIUS																	
50	126.7	124.2	126.0	126.4	126.0	126.7	126.0	125.2	125.5	123.4	124.0	123.9	123.5	123.4	122.9	122.9	125.0	142.7
63	125.5	124.0	125.6	125.5	125.1	124.8	123.8	123.1	122.5	121.5	121.0	121.1	120.1	120.3	120.6	121.7	123.1	140.8
80	126.9	127.9	127.4	126.7	125.7	124.5	123.4	121.7	120.9	120.4	120.2	119.1	119.4	119.7	119.7	119.8	123.2	140.9
100	127.7	129.4	130.9	130.4	129.0	128.7	128.2	127.0	126.2	125.5	125.5	125.0	126.5	127.0	123.9	122.6	127.5	145.2
125	127.2	132.1	133.4	132.6	132.1	131.7	131.1	130.2	129.7	128.7	129.1	128.5	128.7	131.1	130.6	129.4	130.6	148.3
160	124.2	129.7	133.3	133.0	132.7	132.2	131.0	129.7	129.8	129.2	129.8	130.4	129.5	129.7	130.7	130.1	130.8	148.5
200	126.2	128.8	130.0	129.5	129.2	129.7	128.2	127.3	126.3	126.0	126.0	126.1	127.2	126.8	127.5	128.6	127.8	145.5
250	122.2	129.6	129.6	129.9	128.9	127.4	125.7	124.7	124.1	123.6	123.7	124.5	125.4	126.7	126.4	126.6	126.5	144.2
315	122.4	127.6	130.2	130.2	128.6	127.4	125.1	123.9	123.2	122.4	122.6	123.2	124.2	125.6	125.7	125.9	126.0	143.7
400	123.0	128.0	130.0	130.0	127.9	126.4	123.5	122.9	122.5	122.0	122.0	122.2	123.0	124.5	124.9	125.4	125.4	143.1
500	127.9	134.6	136.2	135.4	133.6	132.7	129.7	128.1	125.2	124.2	124.1	125.3	129.4	134.7	136.1	132.6	131.7	149.4
630	127.6	133.6	135.9	135.8	132.9	131.1	128.1	126.3	124.3	122.9	122.8	123.4	126.4	130.4	131.1	129.7	130.2	147.9
800	129.0	134.3	136.7	135.0	132.7	131.2	128.3	126.0	123.7	122.2	122.0	123.6	126.2	127.8	128.2	128.9	129.9	147.6
1000	127.7	133.0	135.2	133.4	131.0	129.5	127.4	125.2	122.5	120.9	122.0	124.3	126.7	128.4	129.4	130.6	128.9	146.6
1250	126.6	131.6	134.1	132.4	130.1	128.9	126.6	124.1	121.4	119.6	120.4	122.8	125.6	127.2	128.1	128.6	127.8	145.5
1600	125.5	131.0	133.7	132.3	130.2	129.3	126.5	124.3	121.5	119.3	120.2	121.8	125.2	127.3	128.3	128.4	127.7	145.4
2000	124.5	130.0	132.6	131.1	129.0	127.8	125.1	122.8	120.6	118.8	119.6	121.7	124.5	126.5	127.8	127.5	126.6	144.3
2500	122.6	128.4	130.4	129.1	127.1	125.9	123.9	121.3	119.4	117.6	118.9	120.7	122.9	125.1	126.4	126.2	124.9	142.6
3150	121.9	127.4	129.4	128.1	126.4	125.9	123.8	121.1	118.8	117.6	118.3	120.7	121.9	123.9	125.1	125.4	124.2	141.9
4000	121.6	127.6	129.3	127.6	126.0	125.6	122.8	120.8	118.8	116.1	117.0	119.2	121.3	122.8	124.6	124.6	123.7	141.4
5000	119.9	125.6	127.8	126.4	125.3	123.6	120.8	119.1	117.1	114.9	115.9	116.9	119.1	119.8	122.9	123.2	122.1	139.8
6300	118.6	124.4	125.7	124.2	122.9	124.1	121.3	117.4	115.9	115.4	115.7	116.7	116.7	119.7	120.1	120.7	120.8	138.5
8000	118.5	124.4	126.4	124.2	122.3	123.7	120.7	117.5	116.7	114.5	114.7	114.9	116.7	118.5	120.2	120.7	120.6	138.3
10000	117.7	123.4	124.9	123.1	121.6	123.6	119.6	117.1	115.4	113.2	113.1	113.5	114.9	117.0	118.9	118.8	119.6	137.3
12500	117.4	123.6	124.8	124.1	122.0	123.6	119.8	117.4	116.4	113.6	113.4	113.7	114.9	116.4	119.3	119.8	119.9	137.6
16000	115.8	122.5	123.3	122.4	121.8	122.1	119.3	115.8	114.4	113.0	111.6	111.8	112.8	115.3	117.1	117.9	118.6	136.3
20000	115.8	123.2	123.5	122.5	121.3	122.3	119.0	116.5	115.5	114.0	111.7	111.9	112.8	115.7	115.8	116.9	118.7	136.4
OVERALL	129.1	142.9	145.9	144.9	143.2	142.4	140.4	138.9	137.7	136.7	137.0	137.5	138.9	141.0	141.8	141.1	141.1	158.8

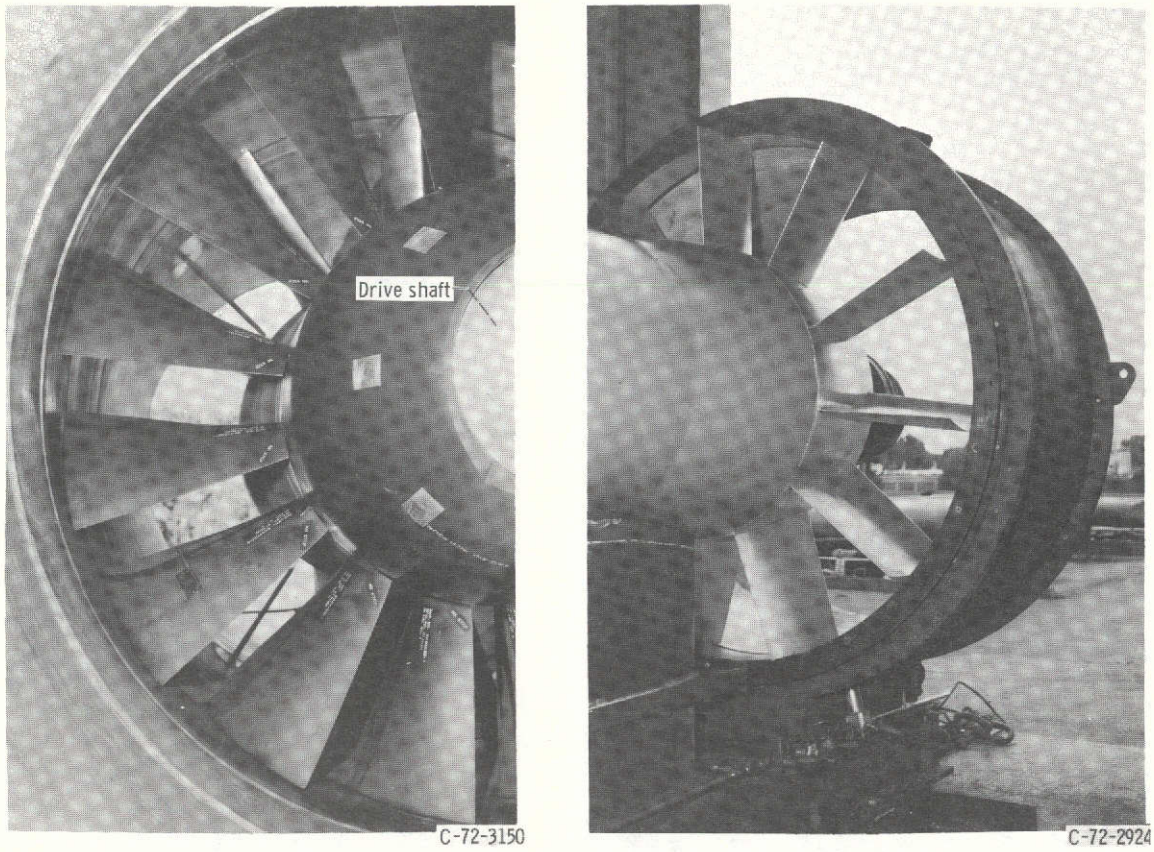
TABLE XX. - Concluded. FAR-FIELD NOISE OF 1.2 PRESSURE RATIO, QF-9 CONFIGURATION WITH REVERSE NOZZLE AND REVERSE ROTOR SETTING ANGLE, WITHOUT BLAST DEFLECTOR

[SPL referenced to 2×10^{-5} Pa; PWL referenced to 0.1 pW.]

(c) Concluded. 100 Percent speed; fan physical speed, 2179 rpm; fundamental blade passage frequency, 544 hertz

(c-2) Data adjusted to standard day of 15° C and 70 percent relative humidity

FREQUENCY	ANGLE, DEG															
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
	1/3-OCTAVE BAND SOUND PRESSURE LEVELS (SPL) ON 30.5 METER RADIUS															
50	97.0	94.5	96.3	96.7	96.3	97.0	96.3	95.5	95.8	93.7	94.3	94.2	93.8	93.7	93.2	93.2
63	95.8	94.3	95.9	95.8	95.4	95.1	94.1	93.4	92.8	91.8	91.3	91.4	90.4	90.6	90.9	92.0
80	97.2	98.2	97.7	97.0	96.0	94.8	93.7	92.0	91.2	90.7	90.5	89.4	89.7	90.0	90.0	90.1
100	98.0	99.7	101.2	100.7	99.3	99.0	98.5	97.3	96.5	95.8	95.8	95.3	96.8	97.3	94.2	92.5
125	97.5	102.4	103.7	102.9	102.4	102.0	101.4	100.5	100.0	99.0	99.4	98.8	99.0	101.4	100.9	99.7
160	94.5	100.0	103.6	103.3	103.0	102.5	101.3	100.0	100.1	99.5	100.1	100.7	99.8	100.0	101.0	100.4
200	96.5	99.1	100.3	99.8	99.5	100.0	98.5	97.6	96.6	96.3	96.3	96.4	97.5	97.1	97.8	98.9
250	92.5	99.4	99.9	100.2	99.2	97.7	95.0	95.0	94.4	93.9	94.0	94.8	95.7	97.0	96.7	96.9
315	92.7	97.9	100.5	100.5	98.9	97.7	95.4	94.2	93.5	92.7	92.9	93.5	94.5	95.9	96.0	96.2
400	93.2	98.2	100.2	100.2	98.1	96.6	93.7	93.1	92.7	92.2	92.2	92.5	93.2	94.7	95.1	95.6
500	98.1	104.8	106.4	105.6	103.8	102.9	99.9	98.3	95.4	94.4	94.3	95.5	99.6	104.9	106.3	102.8
630	97.8	103.8	106.1	106.0	103.1	101.3	98.3	96.5	94.5	93.1	93.0	93.6	96.6	100.6	101.3	99.9
800	99.2	104.5	106.9	105.2	102.9	101.4	98.5	96.2	93.9	92.4	92.2	93.8	96.4	98.0	98.4	99.1
1000	97.9	103.2	105.4	103.6	101.2	99.7	97.6	95.4	92.7	91.1	92.2	94.5	96.9	98.6	99.6	100.8
1250	96.7	101.7	104.2	102.5	100.2	99.0	96.7	94.2	91.5	89.7	90.5	92.9	95.7	97.3	98.2	98.7
1600	95.6	101.1	103.8	102.4	100.3	99.4	96.6	94.4	91.6	89.4	90.3	91.9	95.3	97.4	98.4	98.5
2000	94.5	100.0	102.6	101.1	99.0	97.8	95.1	92.8	90.6	88.8	89.6	91.7	94.5	96.5	97.8	97.5
2500	92.5	98.3	100.3	99.0	97.0	95.8	93.8	91.2	89.3	87.5	88.8	90.6	92.8	95.0	96.3	96.1
3150	91.6	97.1	99.1	97.8	96.1	95.6	93.5	90.8	88.5	87.3	88.0	90.4	91.6	93.6	94.8	95.1
4000	91.1	97.1	98.8	97.1	95.5	95.1	92.3	90.3	88.3	85.6	86.5	88.7	90.8	92.3	94.1	94.1
5000	89.1	94.8	97.0	95.6	94.5	92.8	90.0	88.3	86.3	84.1	85.1	86.1	88.3	89.0	92.1	92.4
6300	87.3	93.1	94.4	93.0	91.7	92.8	90.0	86.1	84.6	84.1	84.4	85.4	85.5	88.4	88.9	89.5
8000	86.6	92.5	94.5	92.3	90.4	91.8	88.8	85.6	84.8	82.6	82.8	83.0	84.8	86.6	88.3	88.8
10000	84.8	90.5	92.0	90.2	88.7	90.7	86.7	84.2	82.5	80.3	80.2	80.6	82.0	84.1	86.0	85.9
12500	83.1	89.3	90.5	89.8	87.7	89.3	85.5	83.1	82.1	79.3	79.1	79.4	80.6	82.1	85.0	85.5
16000	79.6	86.3	87.1	86.2	85.6	85.9	83.1	79.6	78.2	76.8	75.4	75.6	76.6	79.1	81.0	81.7
20000	76.9	84.2	84.6	83.6	82.4	83.4	80.1	77.5	76.5	75.0	72.8	73.0	73.9	76.7	76.9	78.0
OVERALL	109.2	113.9	115.9	115.0	113.3	112.5	110.5	109.0	107.9	106.9	107.2	107.7	109.0	111.2	111.9	111.2
DISTANCE	SIDELINE PERCEIVED NOISE LEVELS															
152.4 M	82.2	96.2	102.9	104.7	104.8	105.2	103.8	102.2	100.6	99.0	99.1	99.6	100.2	100.9	99.2	93.6
304.8 M	72.4	87.5	94.3	96.5	96.8	97.4	95.9	94.5	92.9	91.4	91.3	91.6	92.2	93.2	91.2	85.0



(a) Rotor.

(b) Stator.

Figure 1. - QF-9 blading assembly.

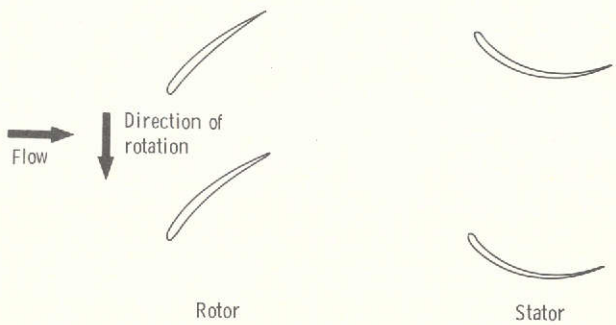


Figure 2. - Blade positions for QF-9 cross-section at tip location. Viewed inward toward hub.

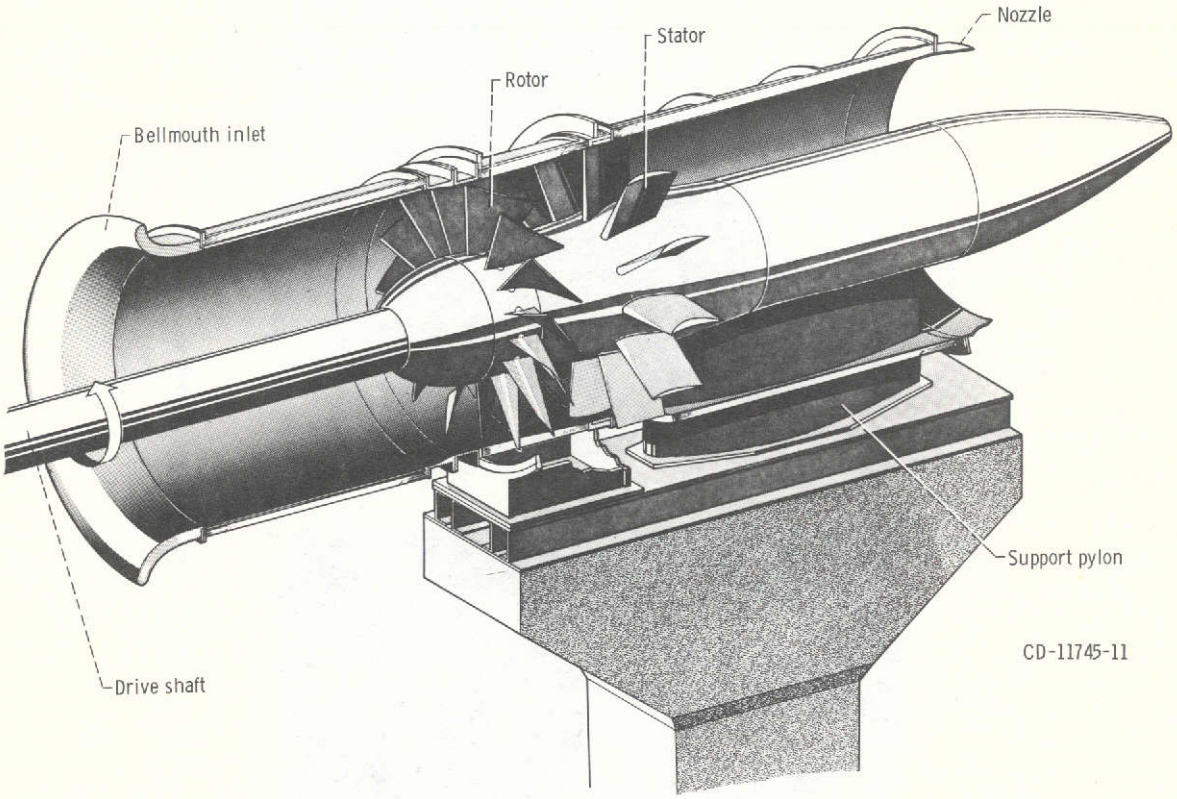
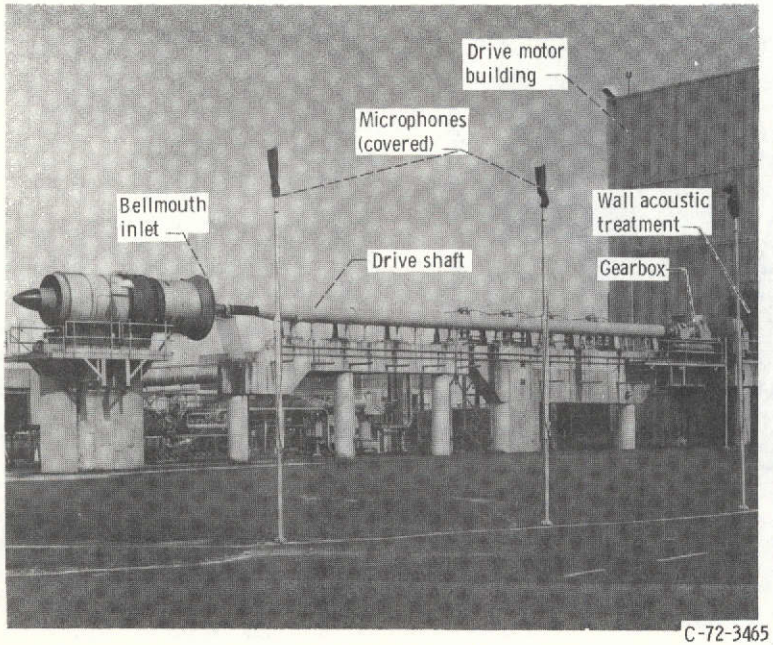
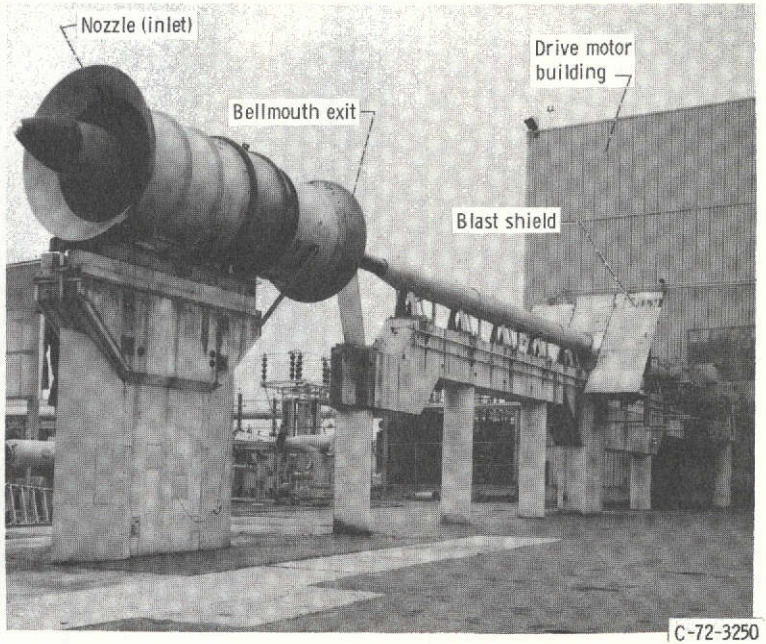


Figure 3. - Cutaway sketch of QF-9 fan installation.



(a) Takeoff configuration.



(b) Reverse thrust configuration.

Figure 4. - Test site showing QF-9 in place.

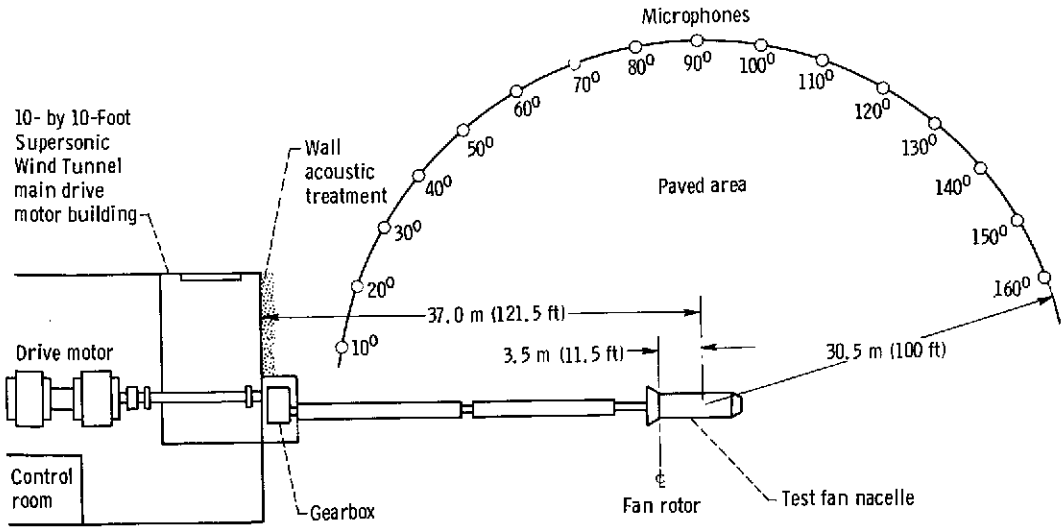


Figure 5. - Plan view of quiet-fan acoustic test facility.

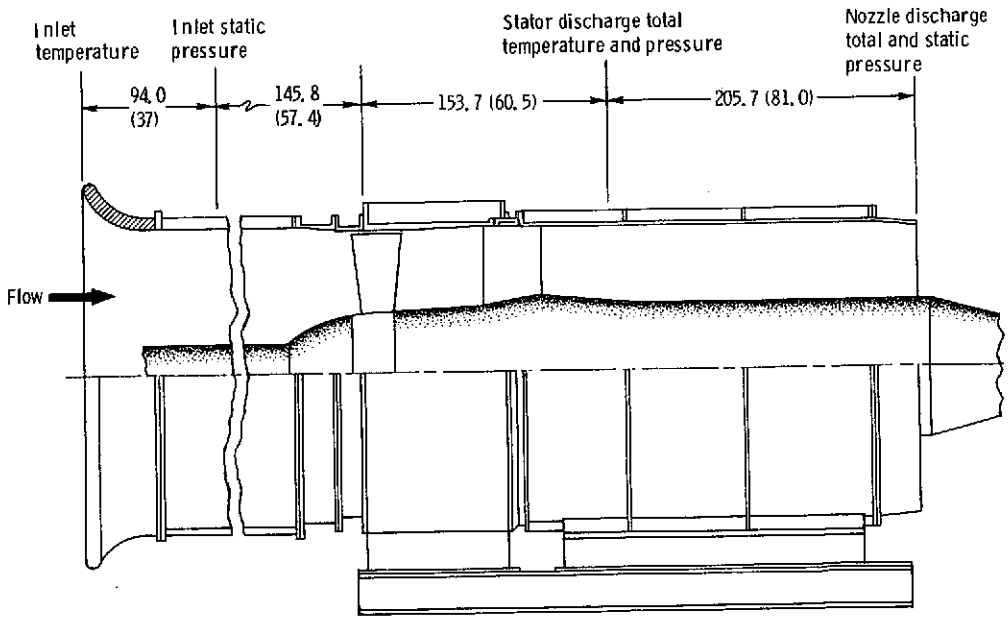
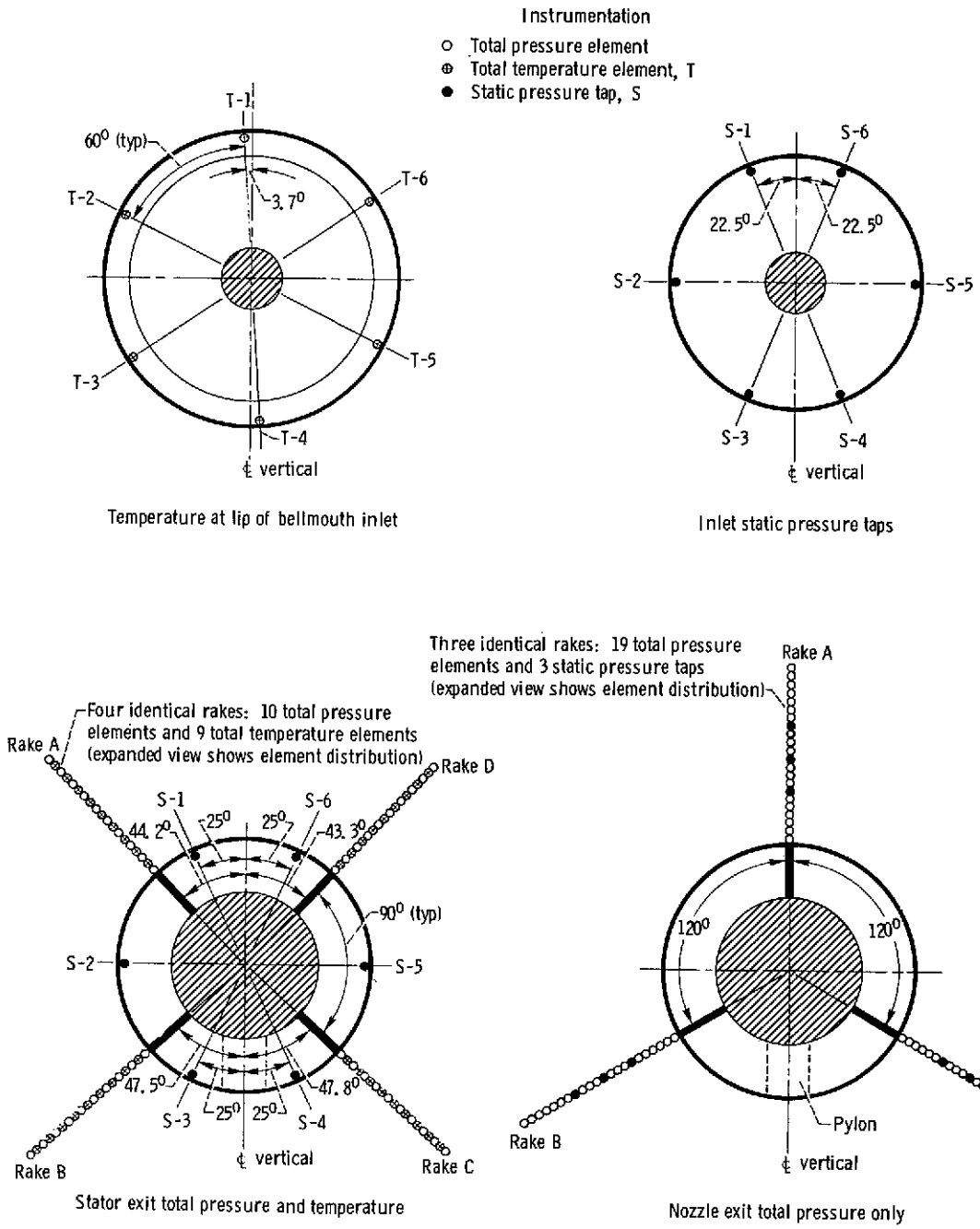
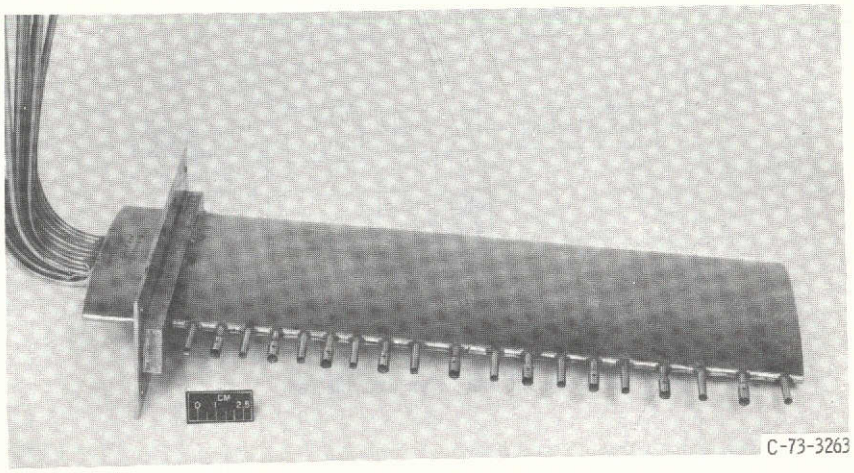


Figure 6. - Cross section of QF-9 stage without suppressive liners showing axial location of instrumentation. (All dimensions are in cm (in.).)

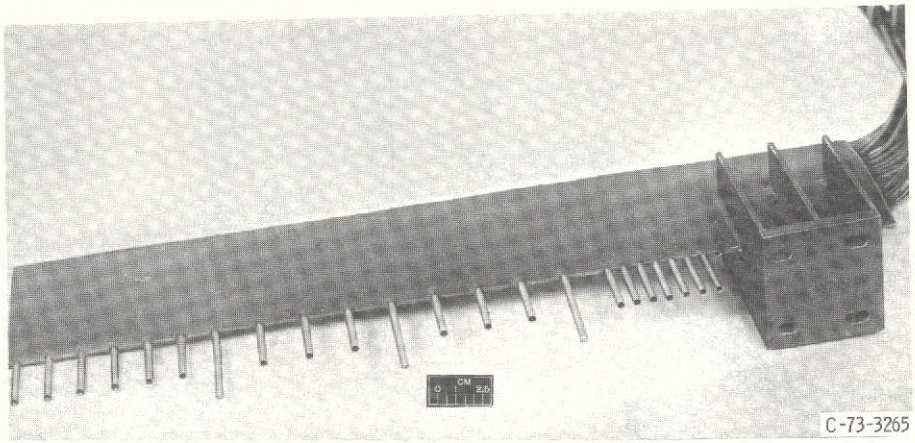


(a) Detail. (All views looking downstream.)

Figure 7. - Fan aerodynamic instrumentation.



(b) Total temperature and pressure rake used at stator discharge station.



(c) Total and static pressure rake used at nozzle discharge station.

Figure 7. - Concluded.

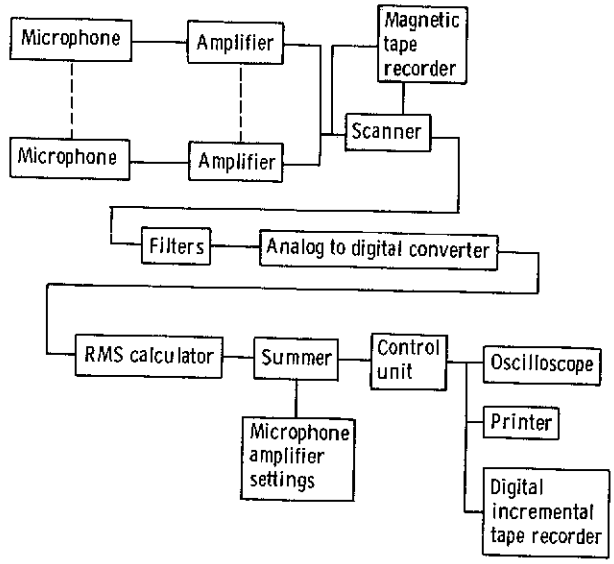
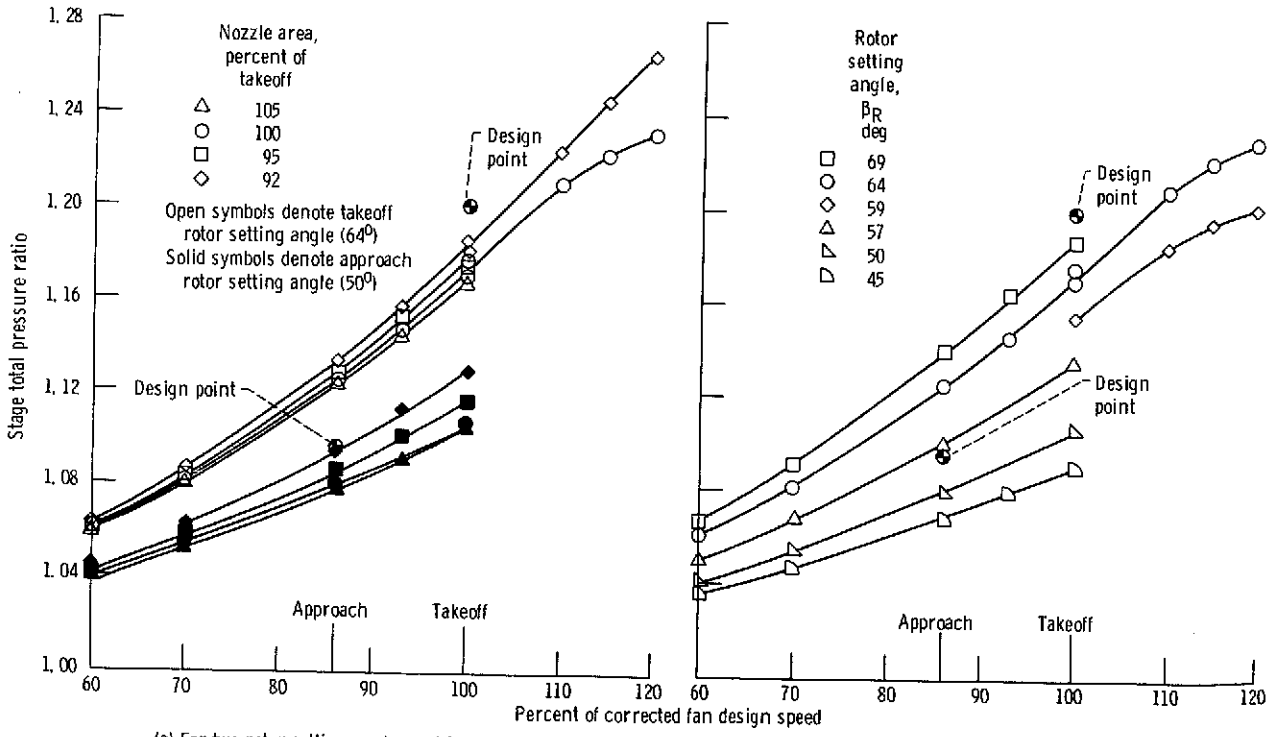


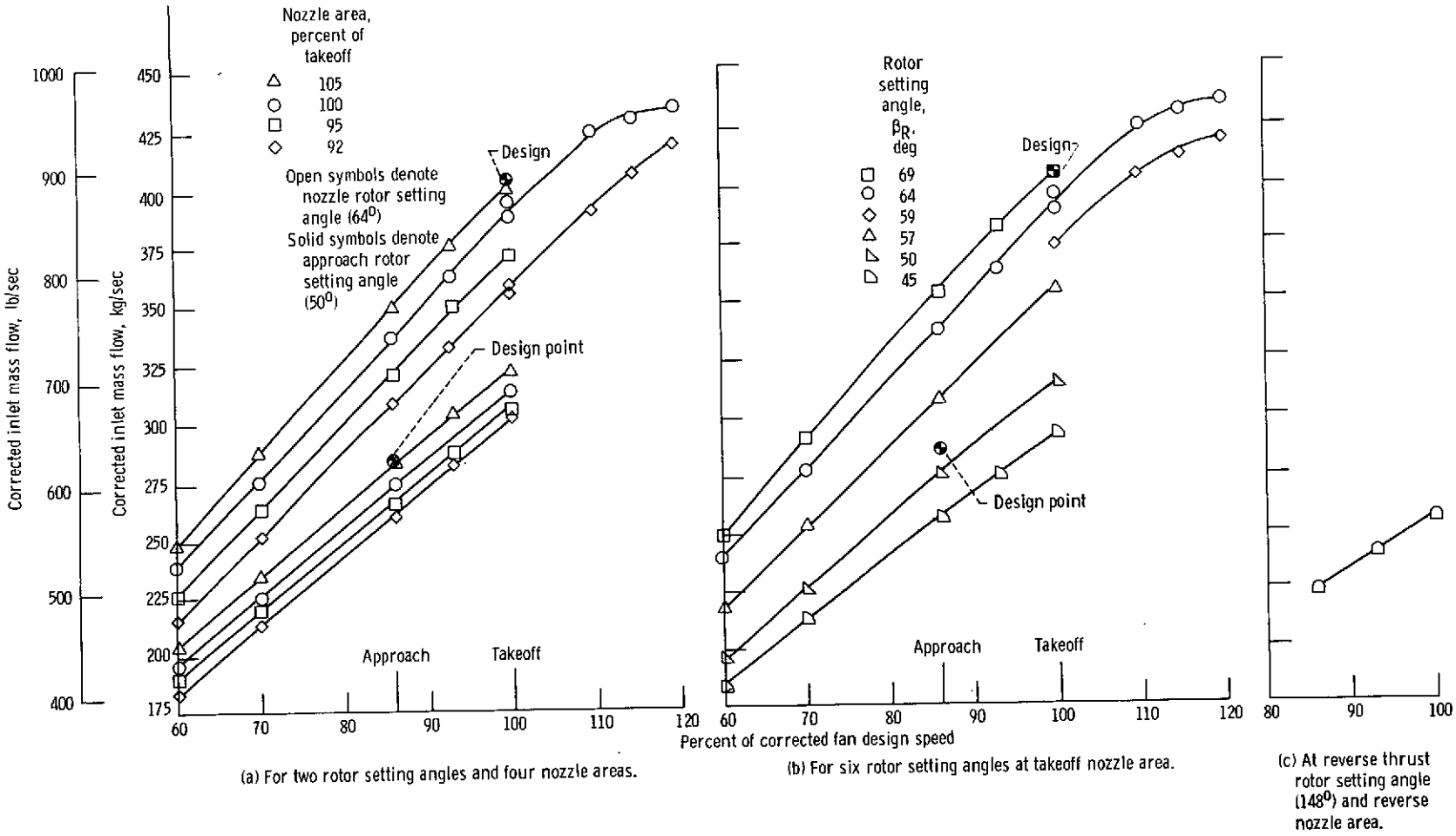
Figure 8. - Acoustic data system block diagram.



(a) For two rotor setting angles and four nozzle areas.

(b) For six rotor setting angles at takeoff nozzle area.

Figure 9. - Stage total pressure ratio as function of percent of corrected fan design speed.

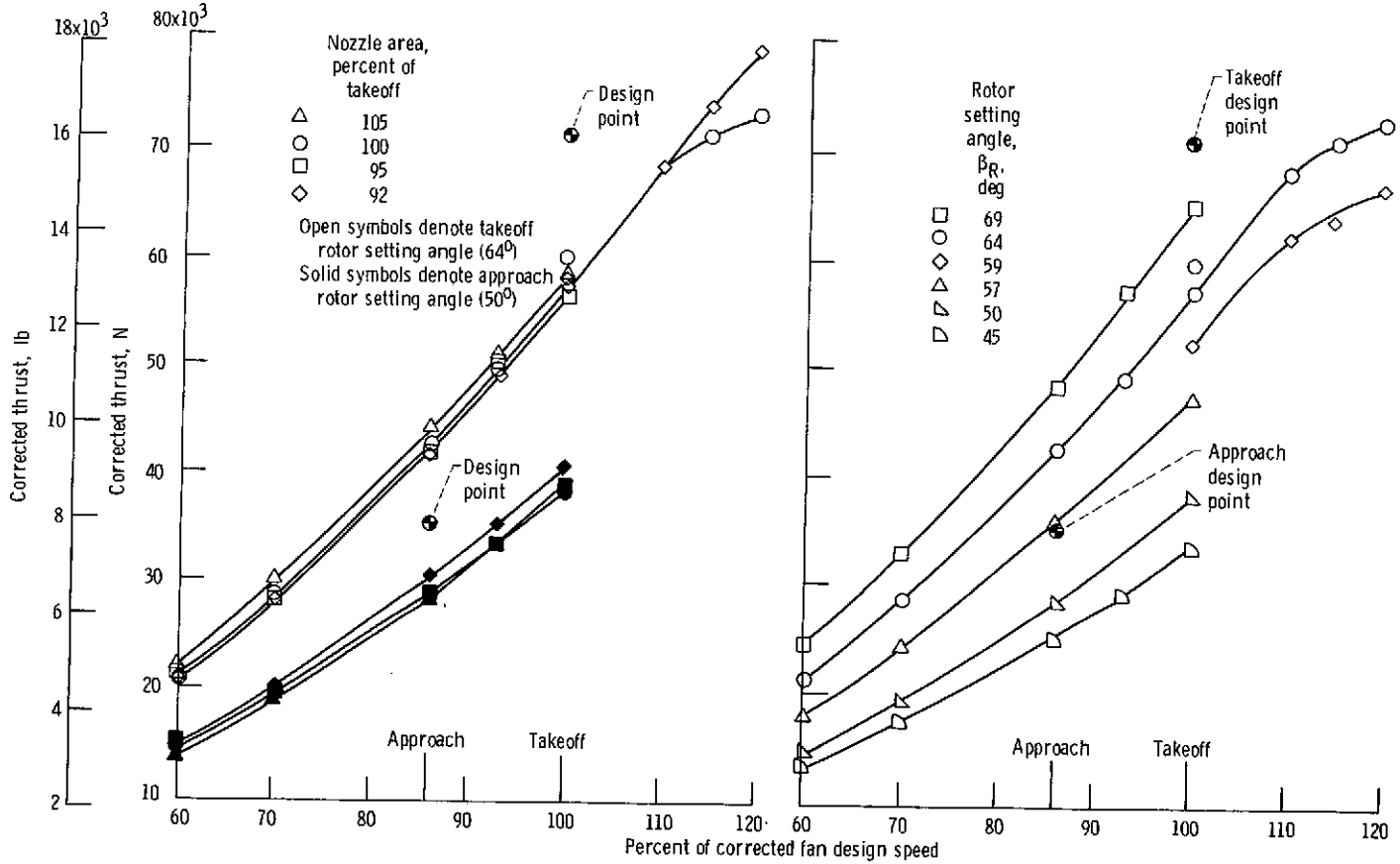


(a) For two rotor setting angles and four nozzle areas.

(b) For six rotor setting angles at takeoff nozzle area.

(c) At reverse thrust rotor setting angle (148°) and reverse nozzle area.

Figure 10. - Corrected inlet mass flow as function of percent of corrected fan design speed.



(a) For two rotor setting angles and four nozzle areas.

(b) For six rotor setting angles at takeoff nozzle area.

Figure 11. - Corrected thrust as function of percent of corrected fan design speed.

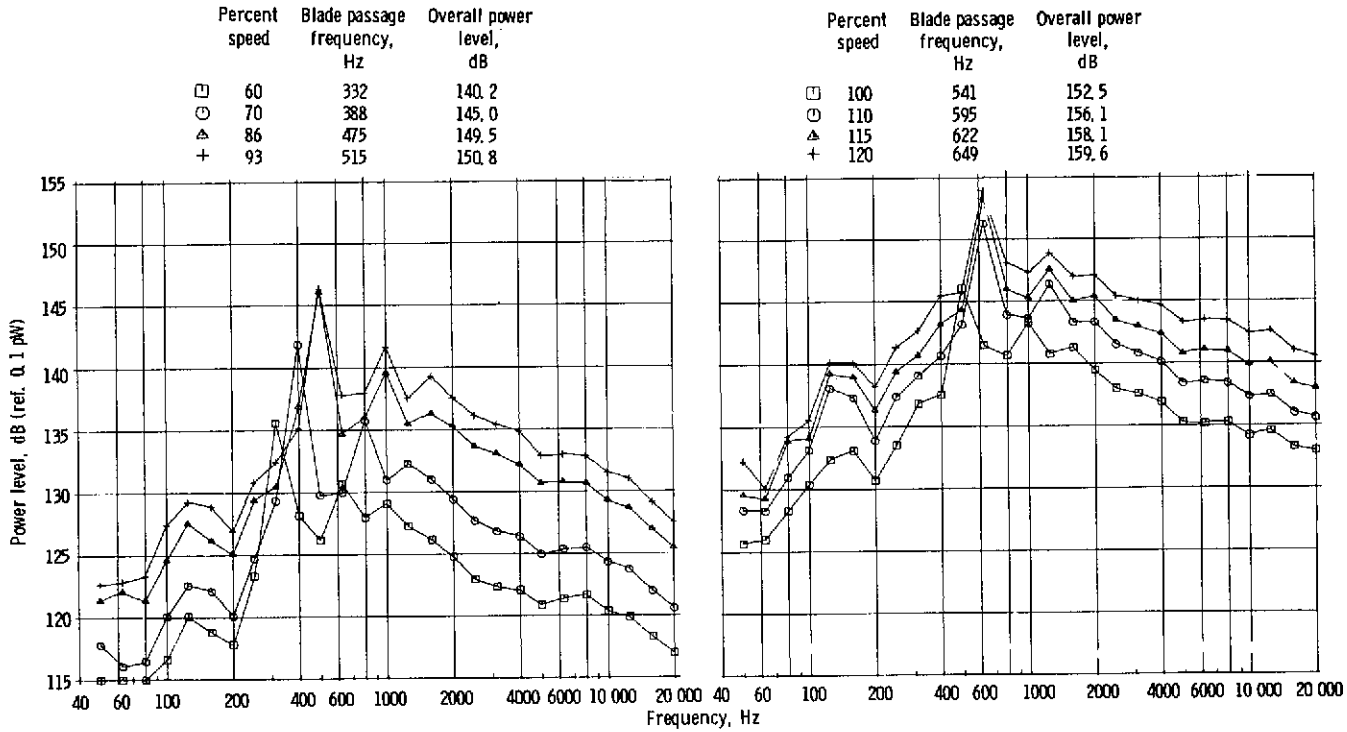


Figure 12. - Power spectra for QF-9. Takeoff rotor blade setting angle, takeoff nozzle area.

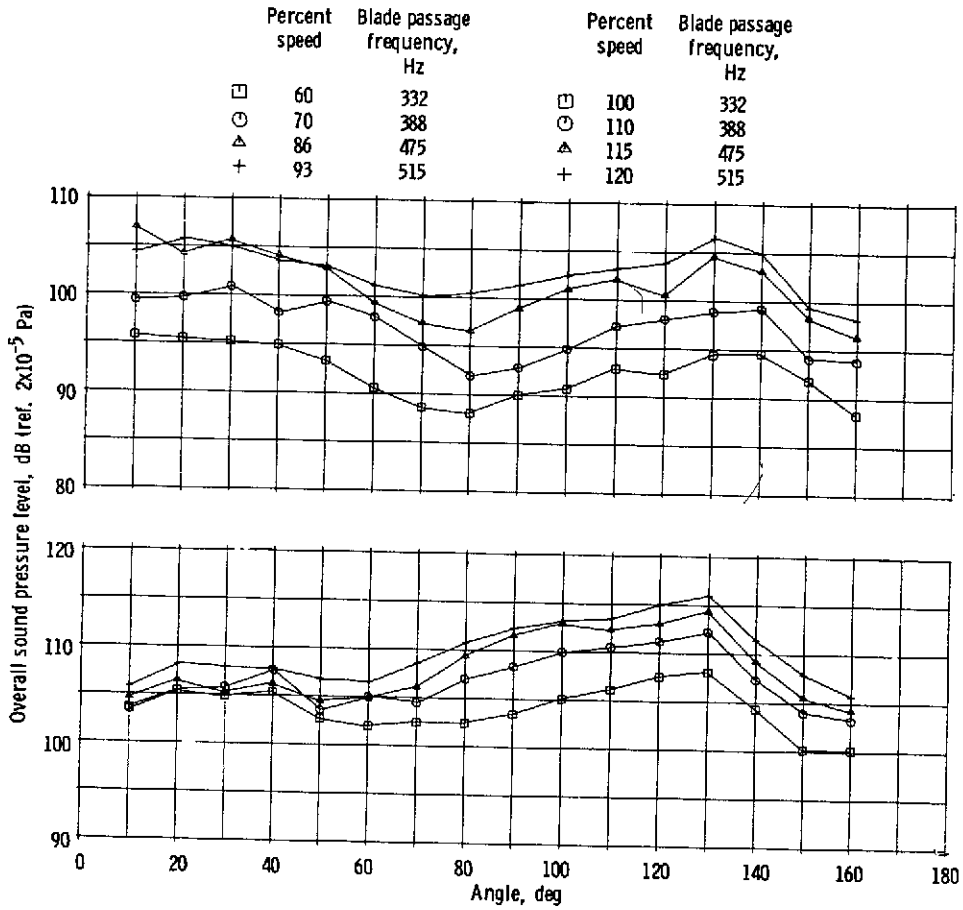


Figure 13. - Overall sound pressure level as function of angle on 30.5-meter (100-ft) radius. Takeoff rotor blade setting angle, takeoff nozzle.

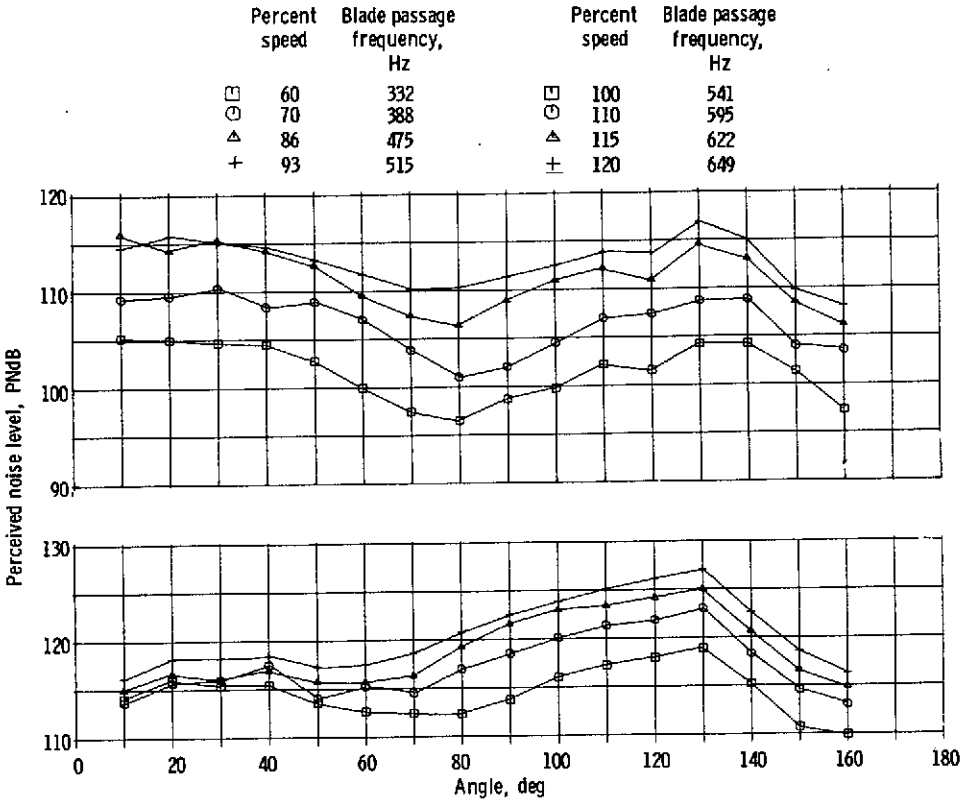


Figure 14. - Perceived noise on 30.5-meter (100-ft) radius. Takeoff rotor blade setting angle, takeoff nozzle area.

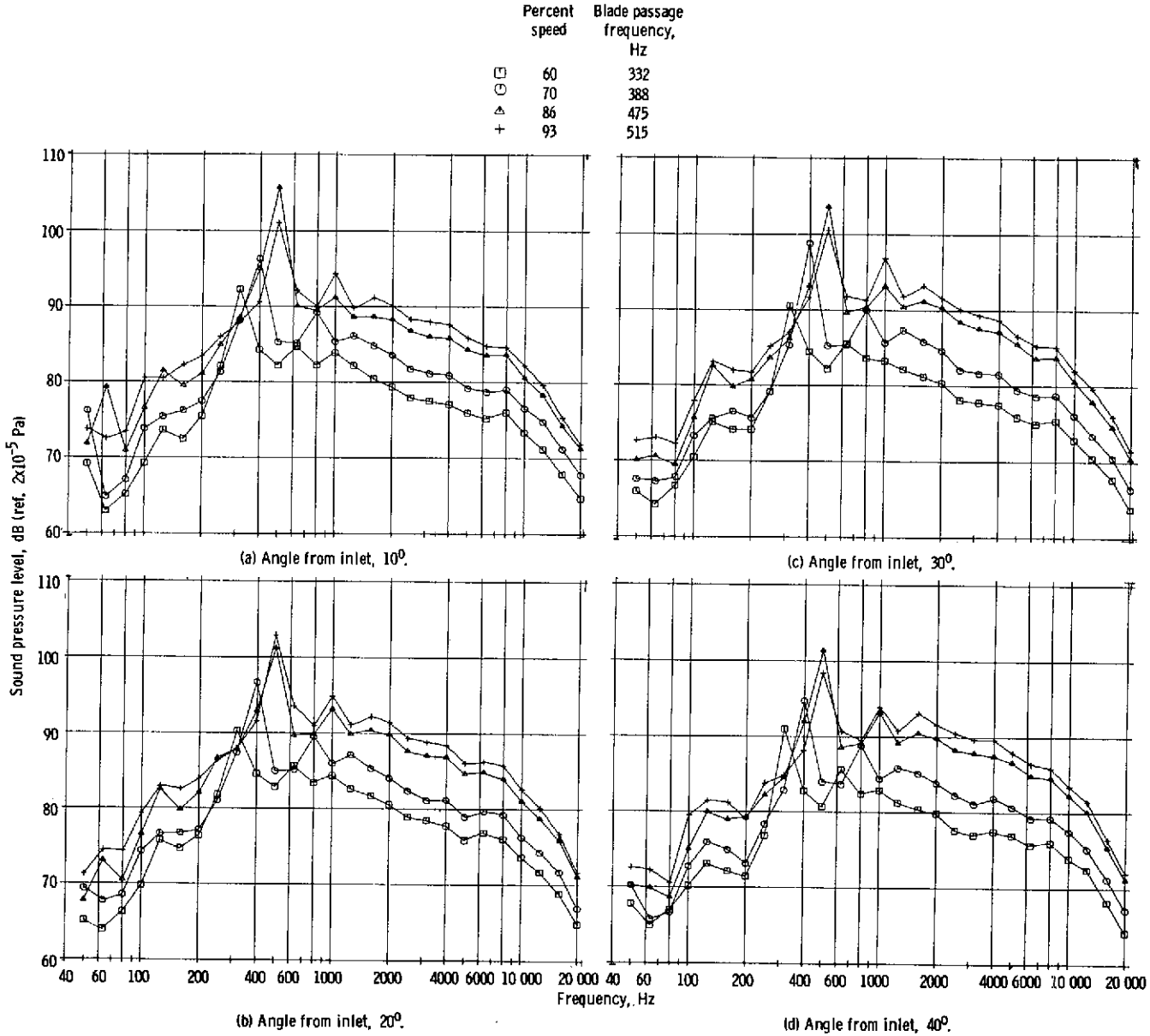


Figure 15. - One-third-octave band spectra on 30.5-meter radius at several speeds and for various angles from the inlet. *Takeoff rotor blade setting and takeoff nozzle area.*

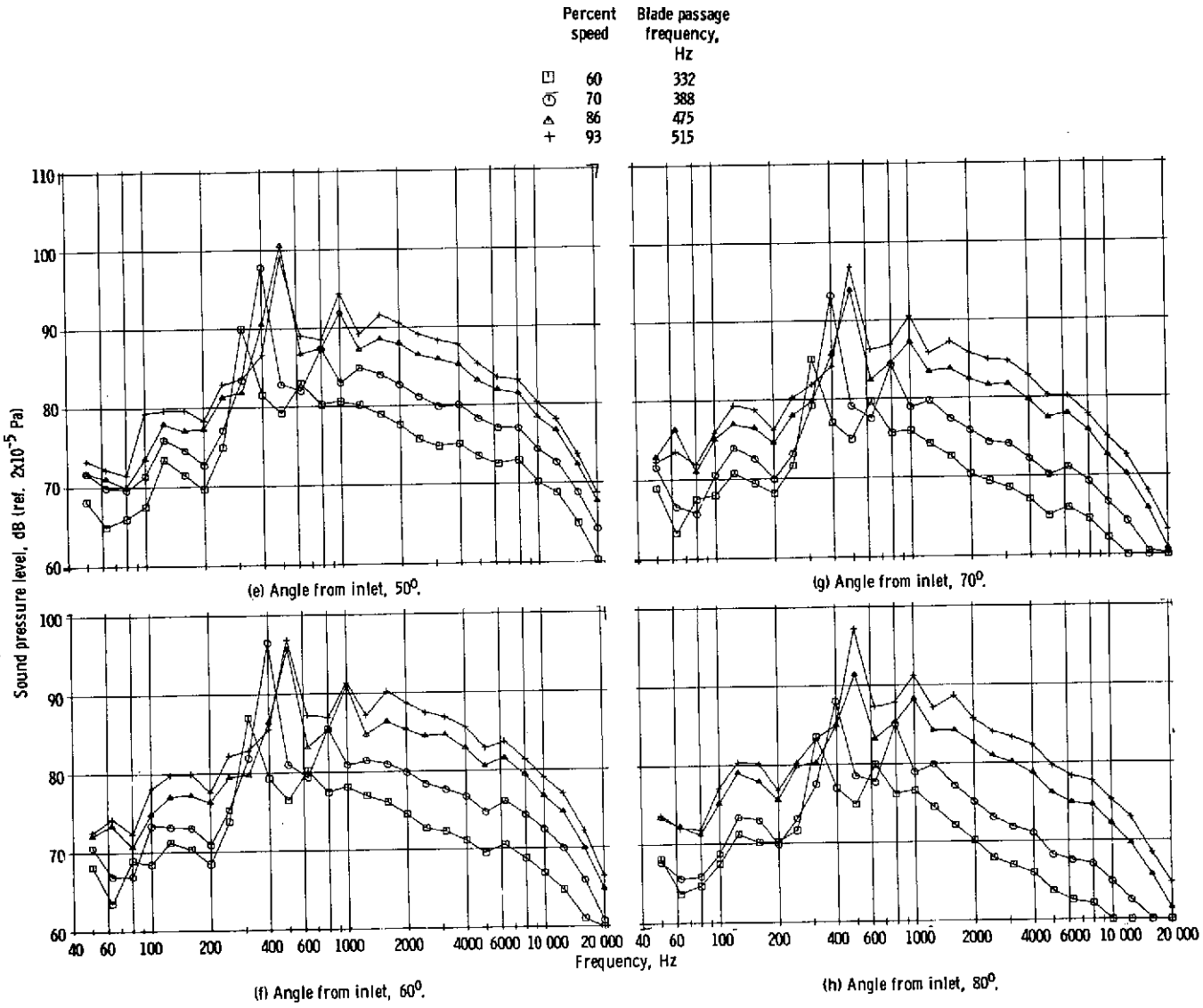


Figure 15. - Continued.

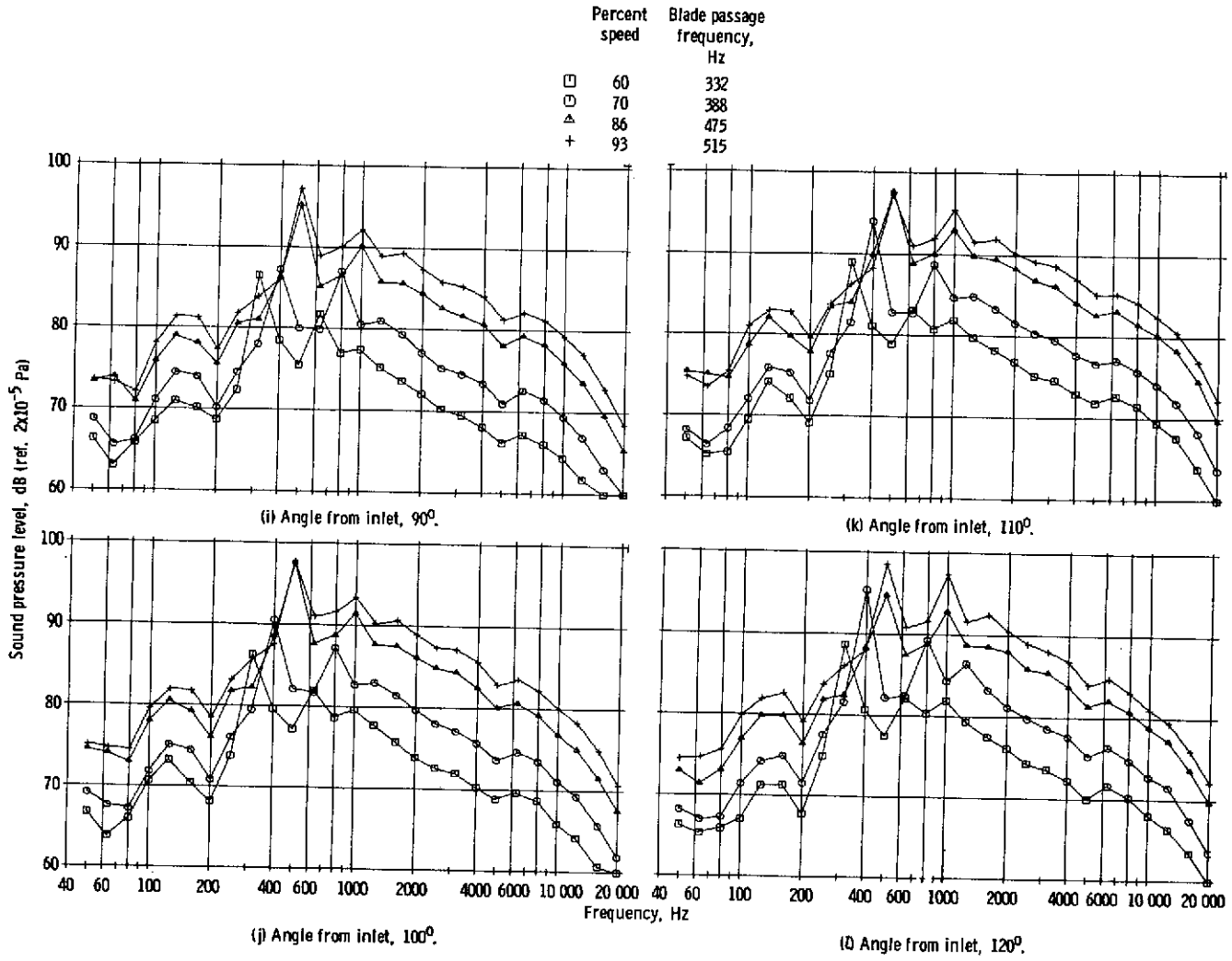


Figure 15. - Continued.

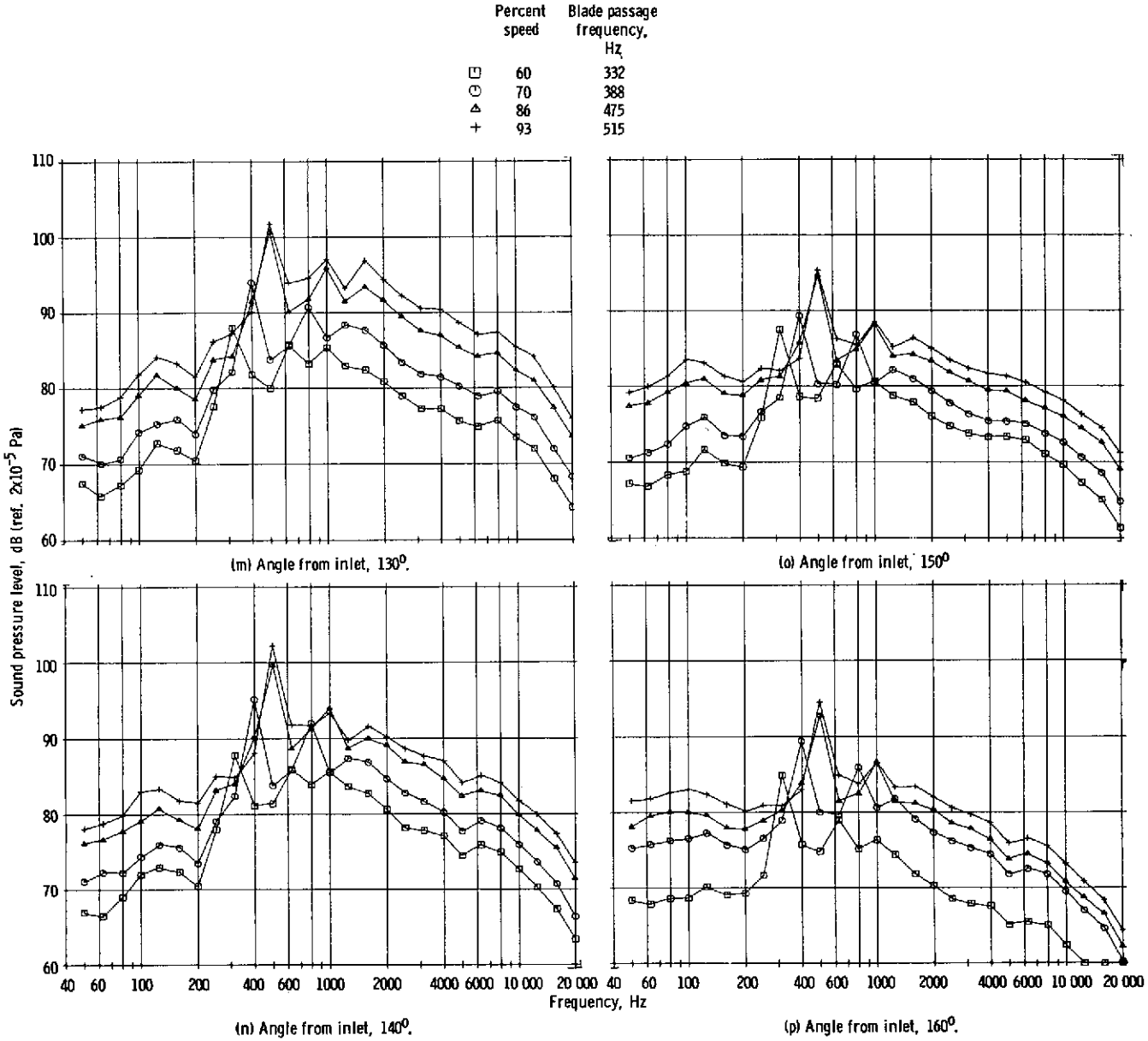


Figure 15. - Concluded.

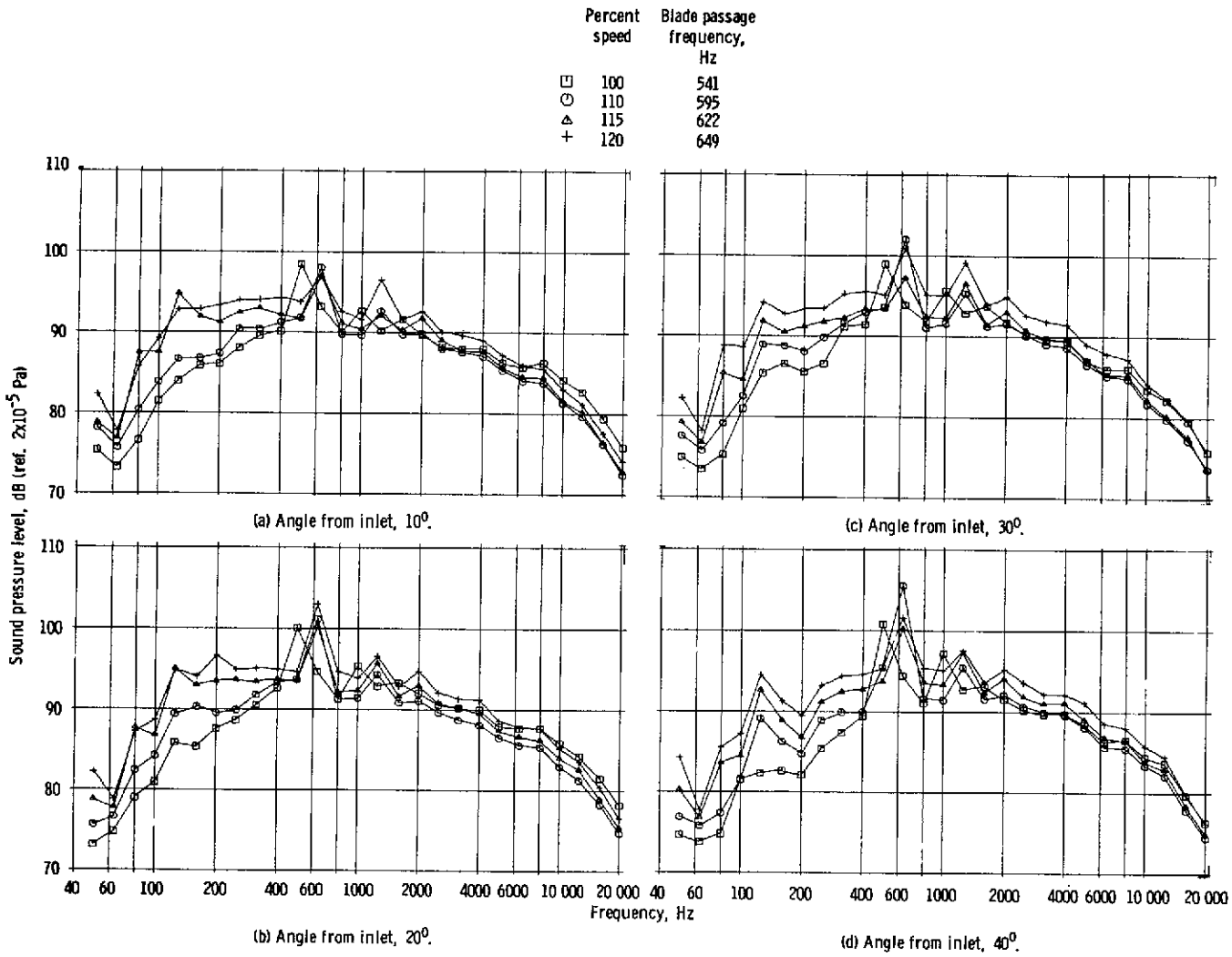


Figure 16. - One-third-octave-band spectra on 30.5-meter radius at several speeds and for various angles from the inlet. Takeoff rotor blade setting angle and takeoff nozzle area.

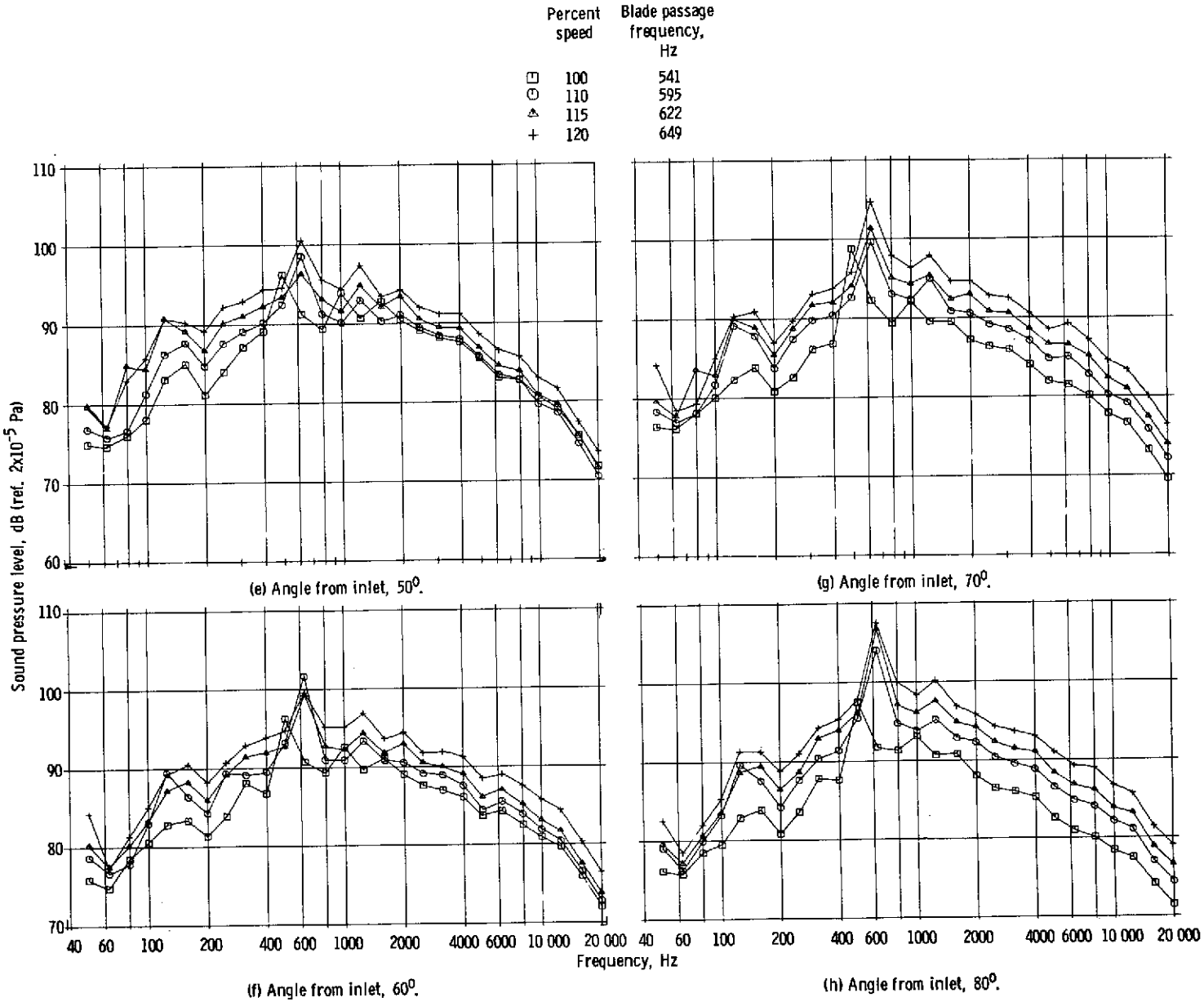


Figure 16. - Continued.

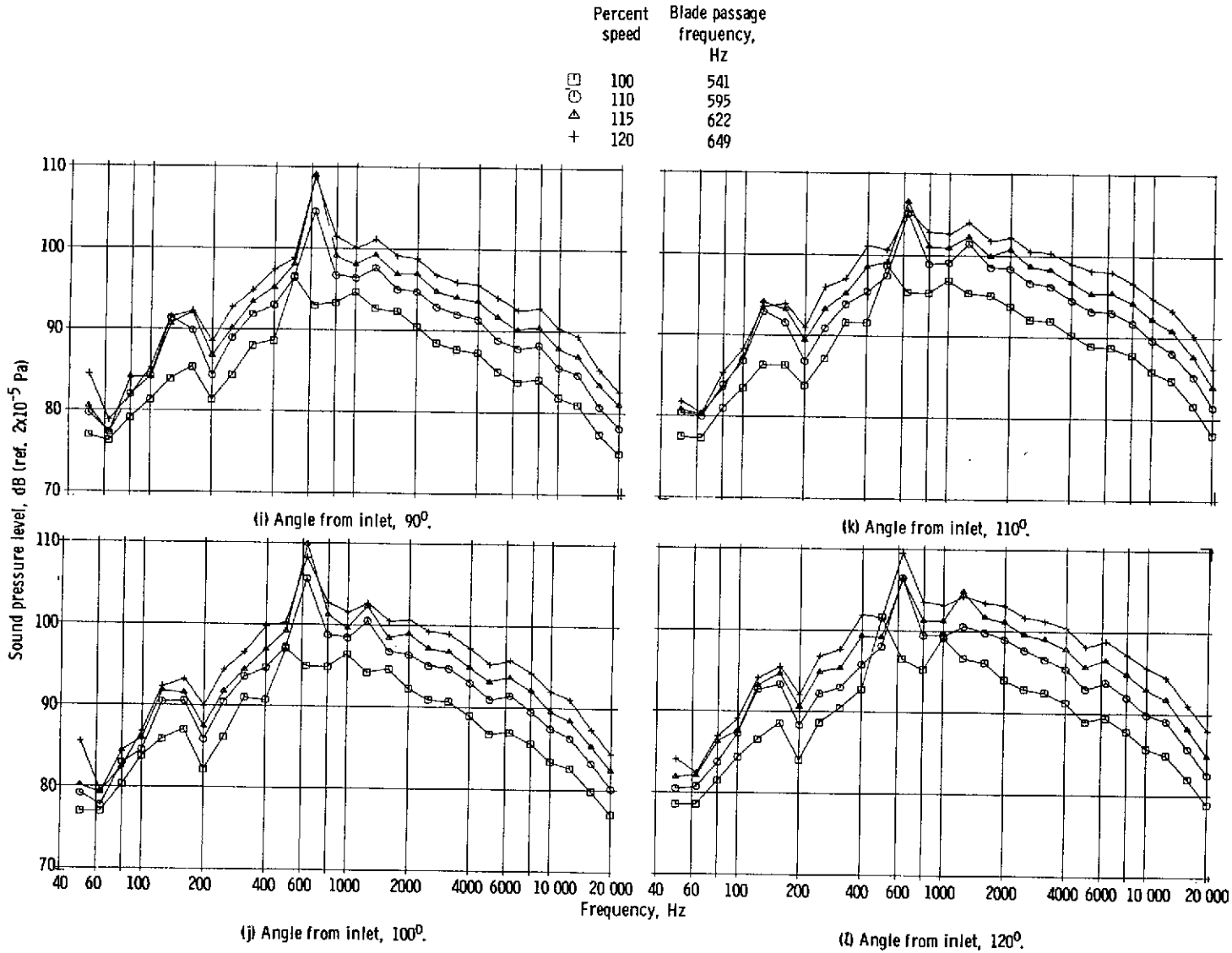


Figure 16. - Continued.

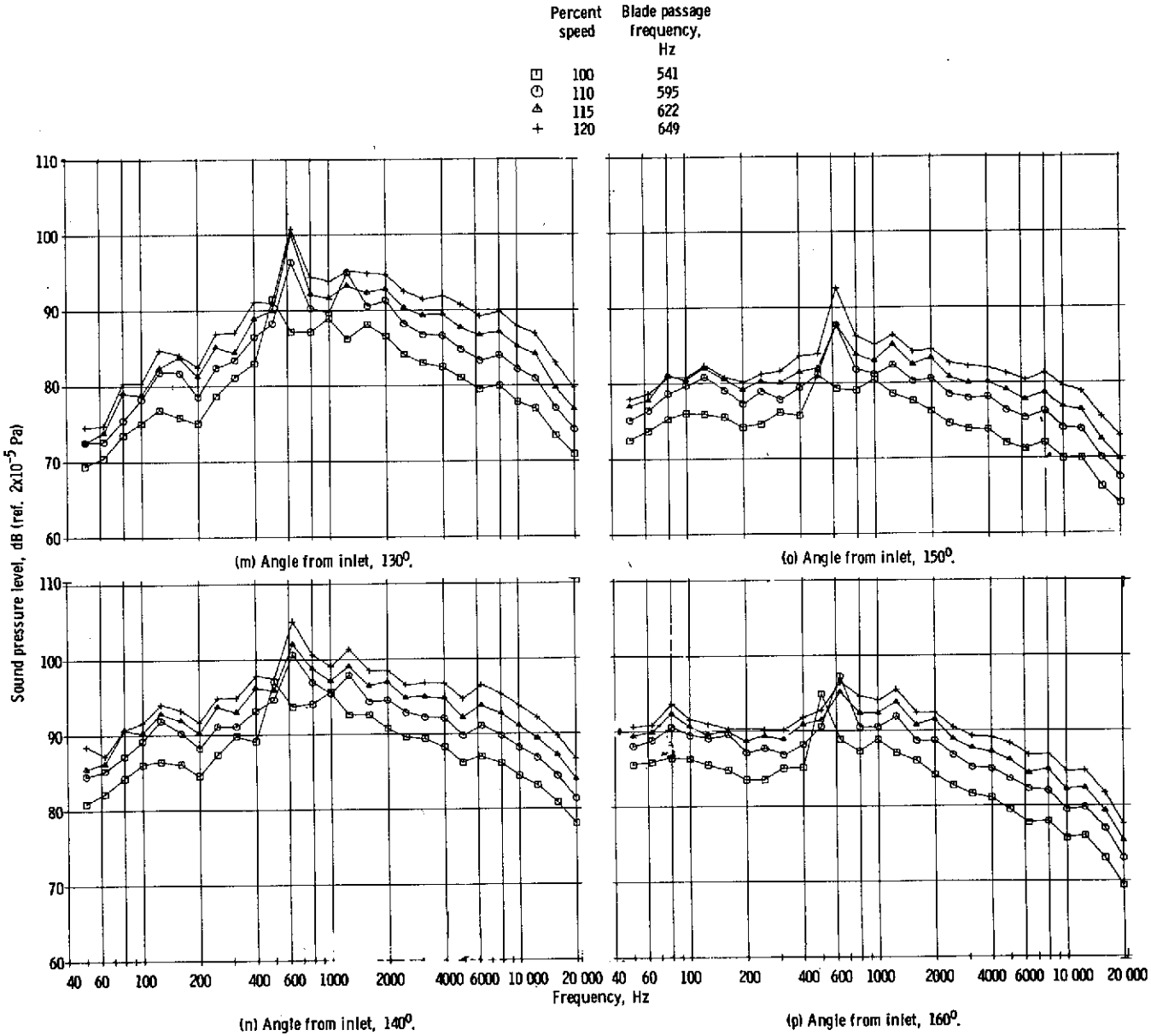


Figure 16. - Concluded.

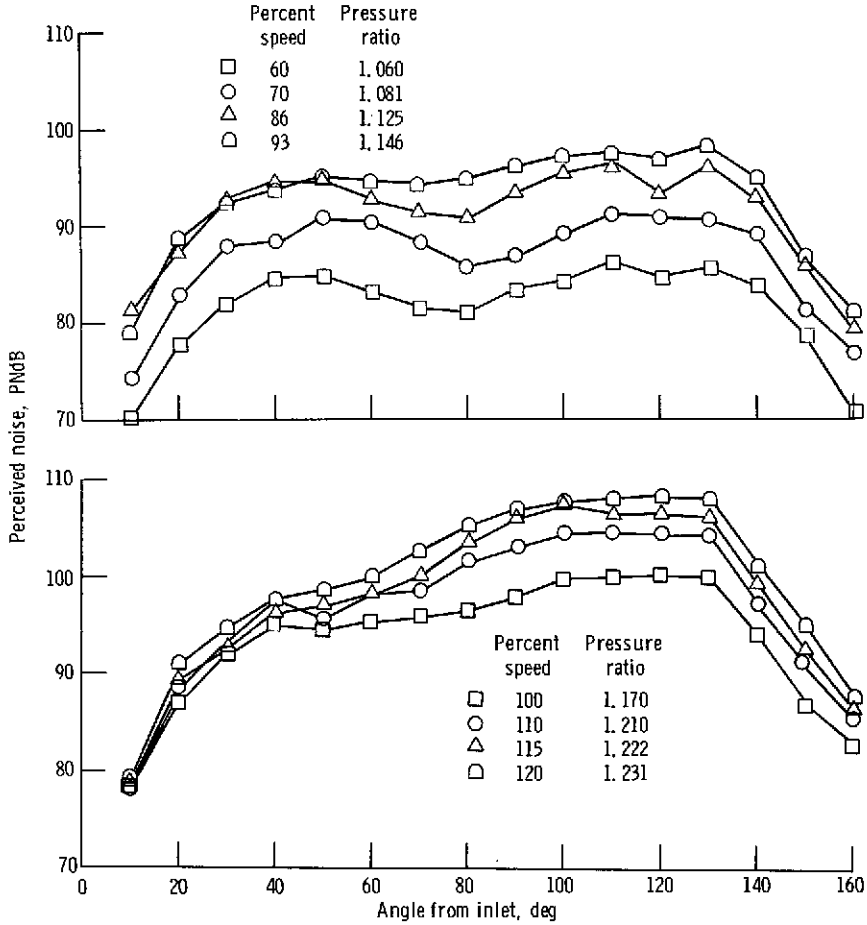


Figure 17. - Perceived noise on 152.5-meter (500-ft) sideline; takeoff rotor blade setting angle, takeoff nozzle area.

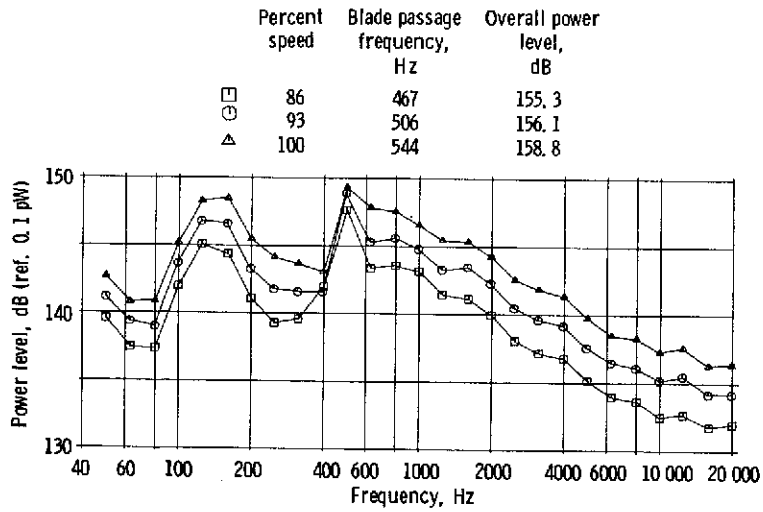


Figure 18. - Power spectra at various speeds; reverse thrust rotor blade setting angle.

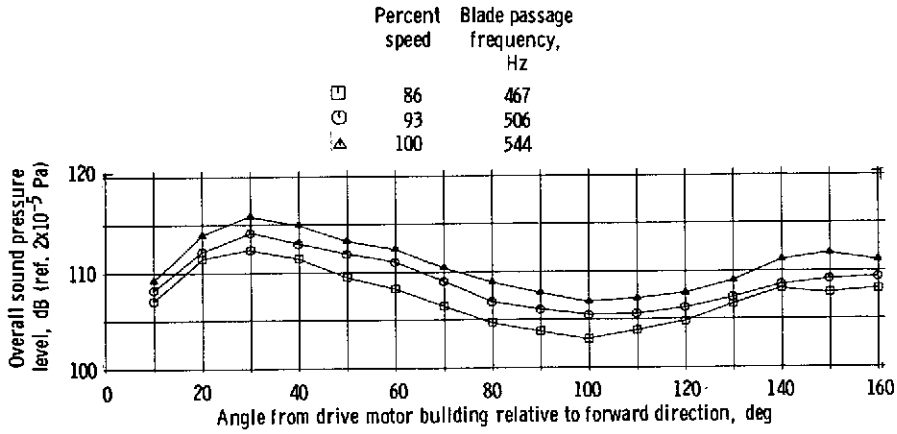


Figure 19. - Overall sound pressure level as function of angle on 30.5-meter (100 ft) radius; reverse thrust rotor blade setting angle.

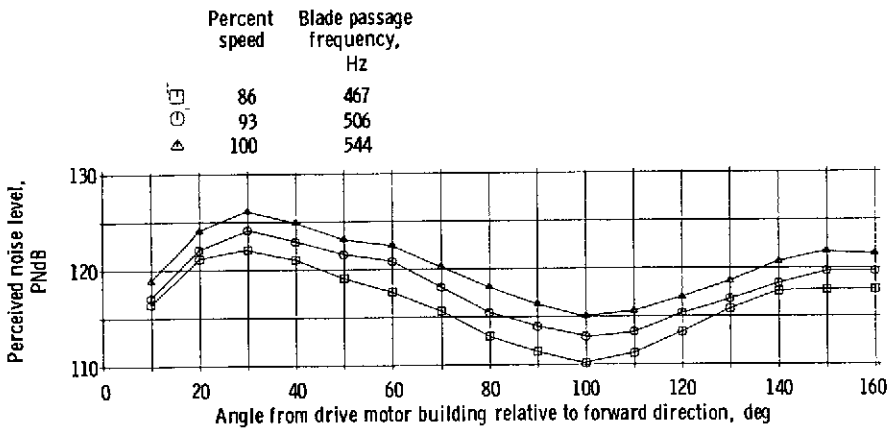


Figure 20. - Perceived noise on 30.5-meter (100 ft) radius; reverse thrust rotor blade setting angle.

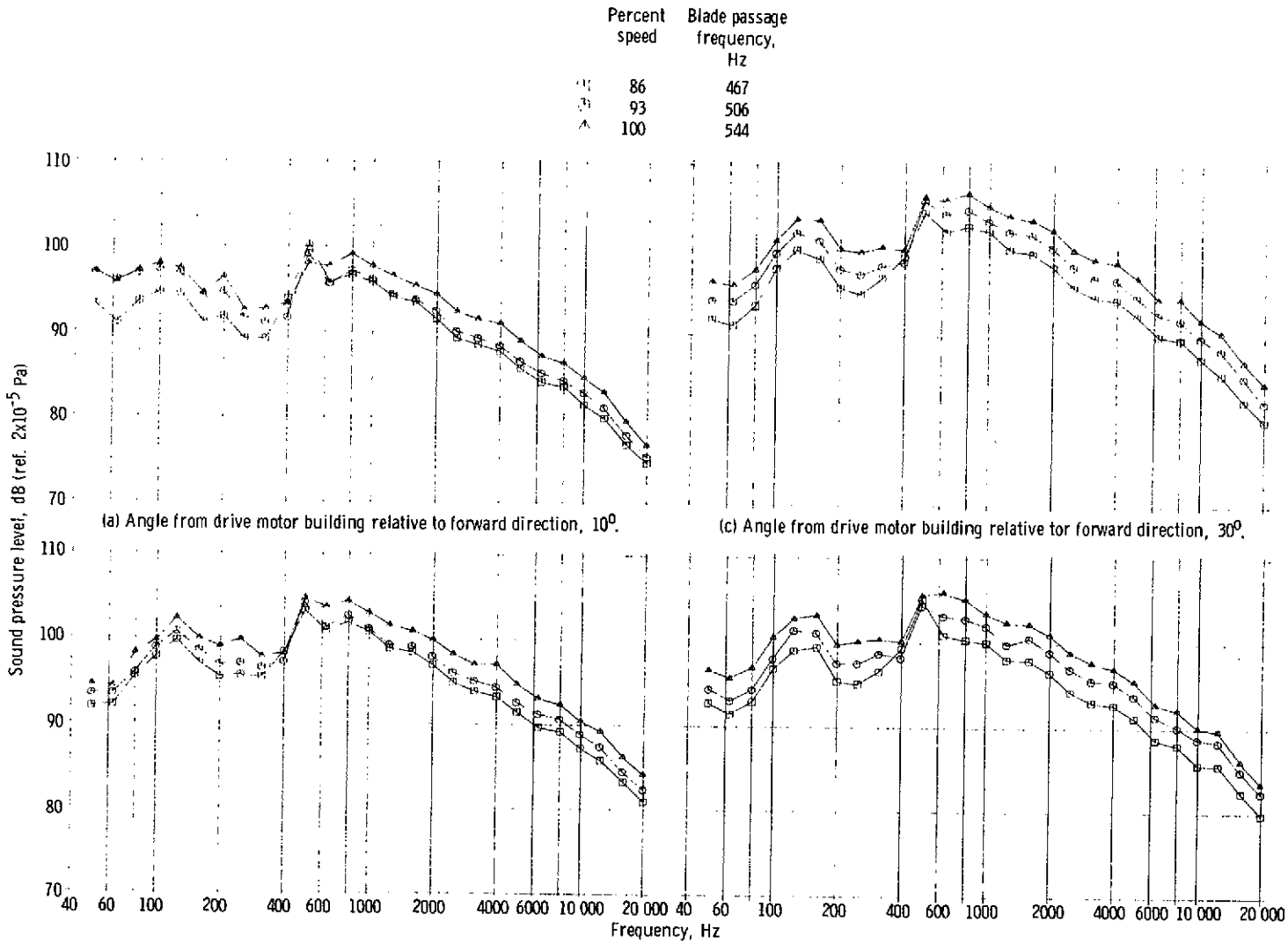
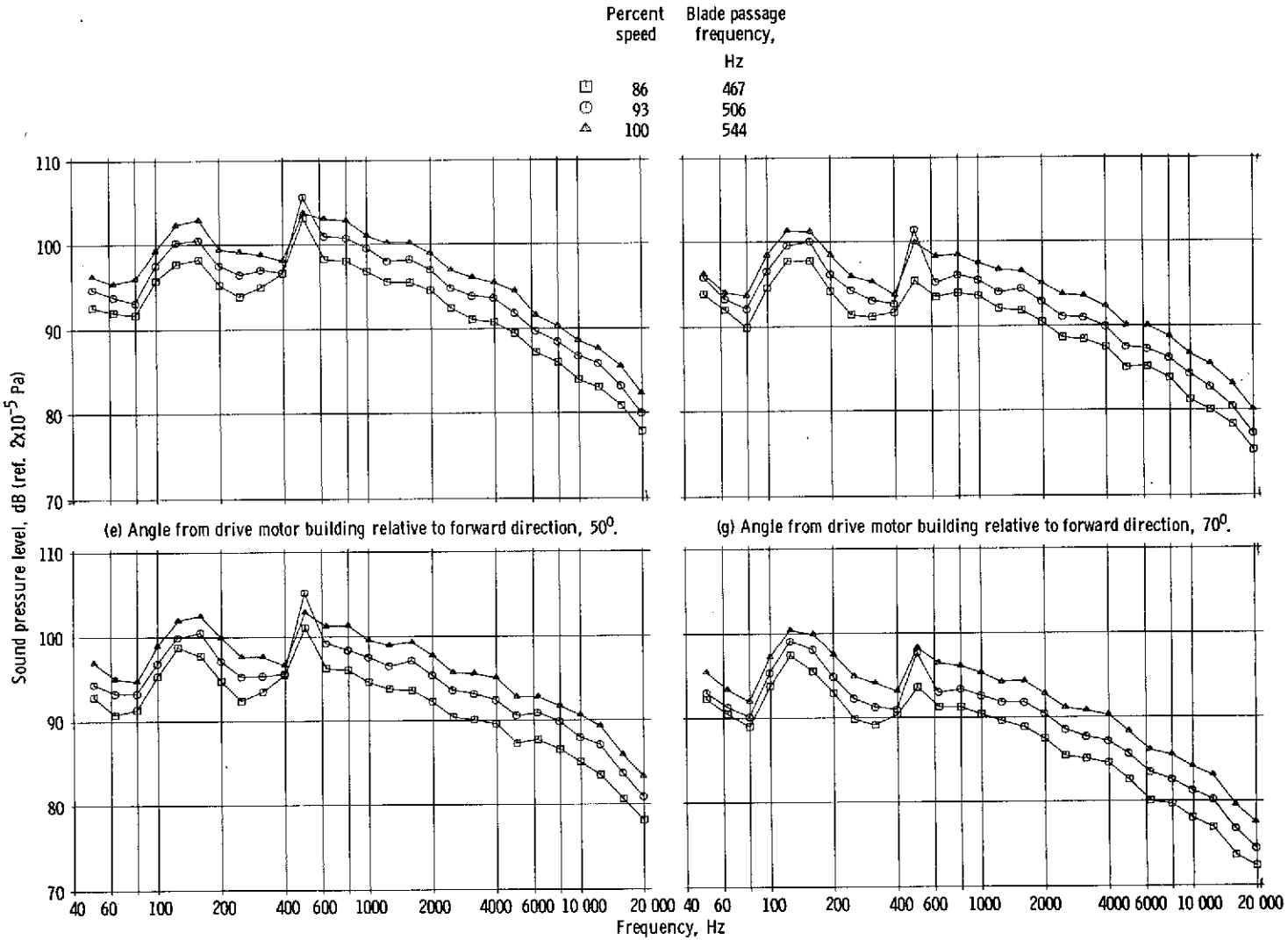


Figure 21. - One-third-octave band spectra on 30.5-meter (100 ft) radius; reverse thrust rotor blade setting angle.



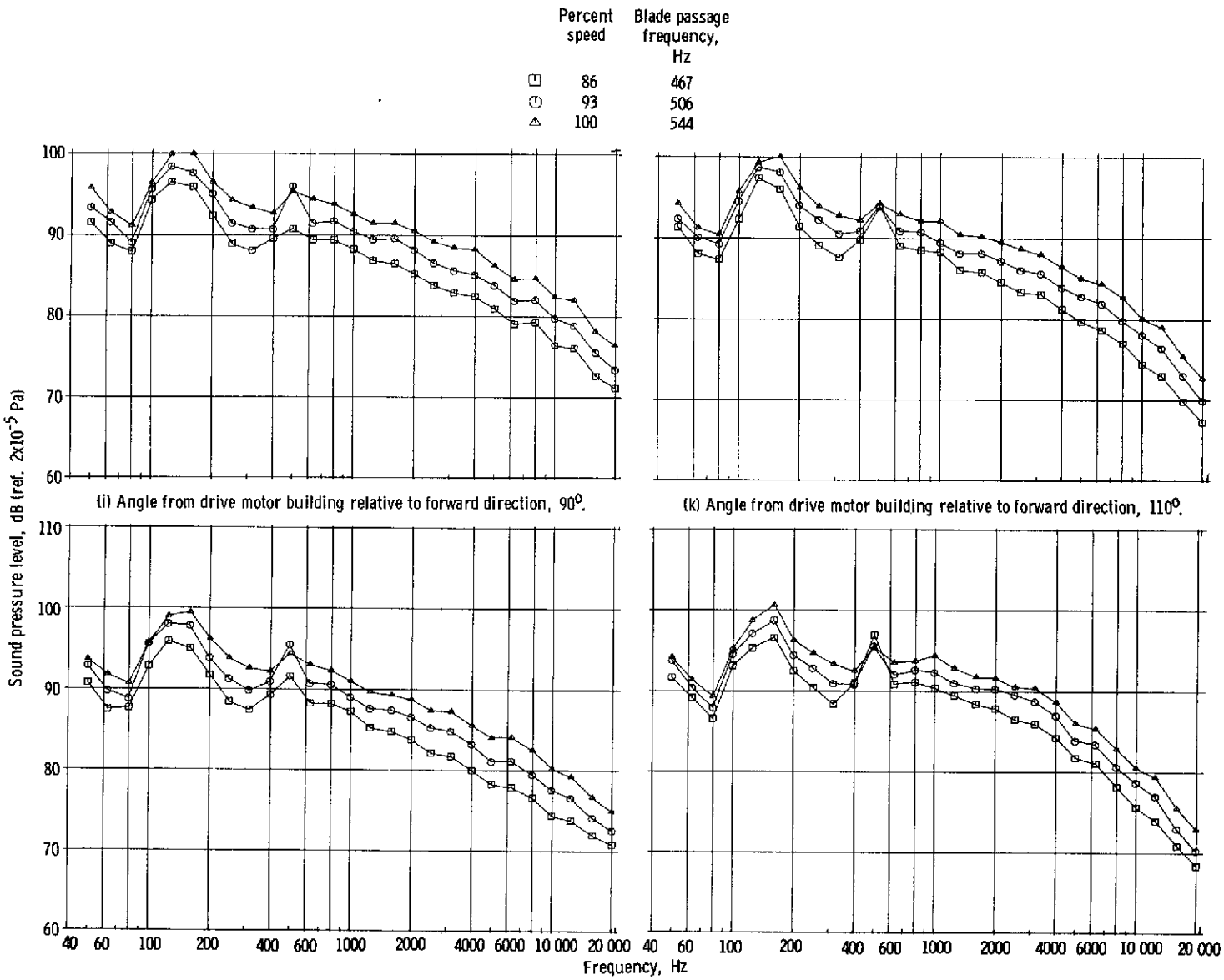
(e) Angle from drive motor building relative to forward direction, 50°.

(g) Angle from drive motor building relative to forward direction, 70°.

(f) Angle from drive motor building relative to forward direction, 60°.

(h) Angle from drive motor building relative to forward direction, 80°.

Figure 21. - Continued.



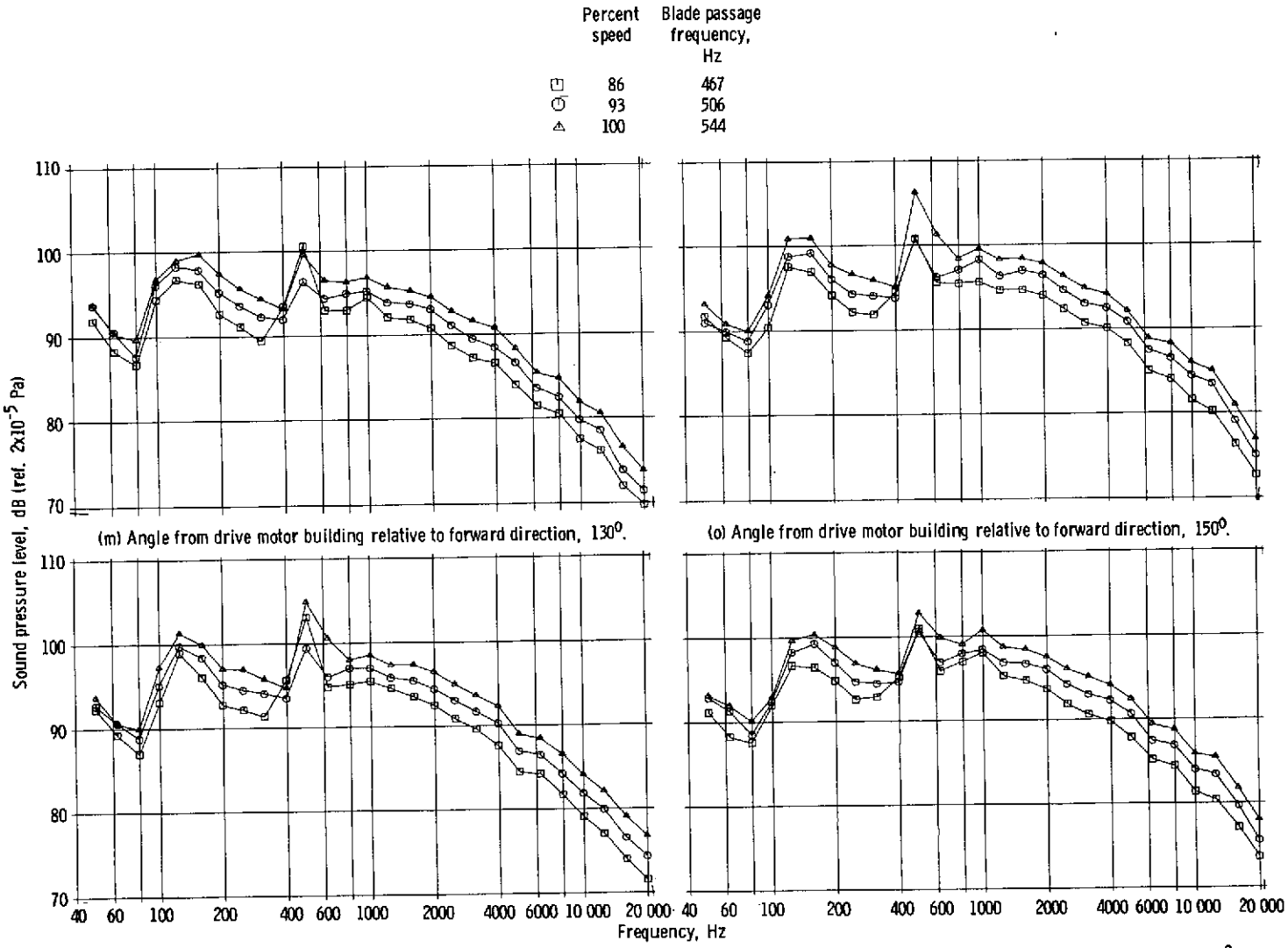
(i) Angle from drive motor building relative to forward direction, 90°.

(k) Angle from drive motor building relative to forward direction, 110°.

(j) Angle from drive motor building relative to forward direction, 100°.

(l) Angle from drive motor building relative to forward direction, 120°.

Figure 21. - Continued.



(m) Angle from drive motor building relative to forward direction, 130°.

(o) Angle from drive motor building relative to forward direction, 150°.

(n) Angle from drive motor building relative to forward direction, 140°.

(p) Angle from drive motor building relative to forward direction, 160°.

Figure 21. Concluded.

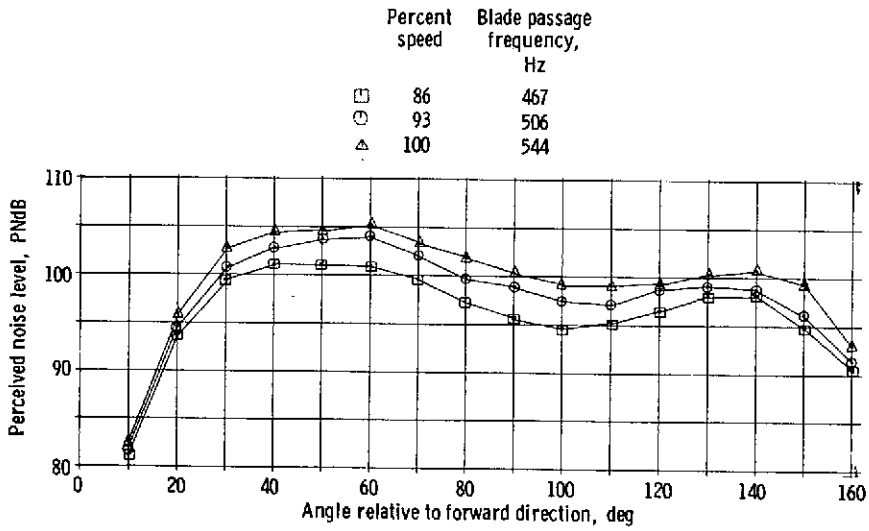
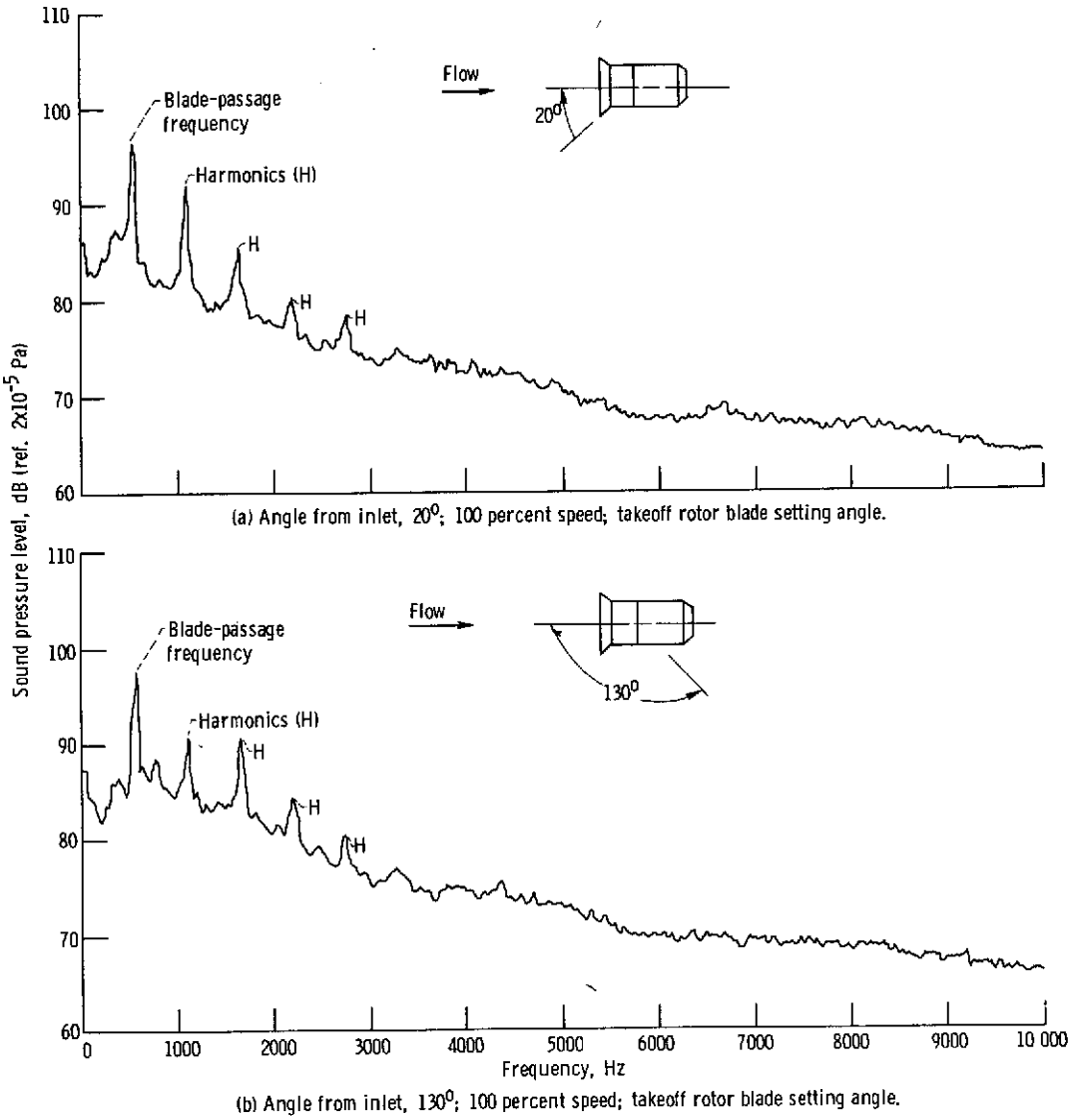


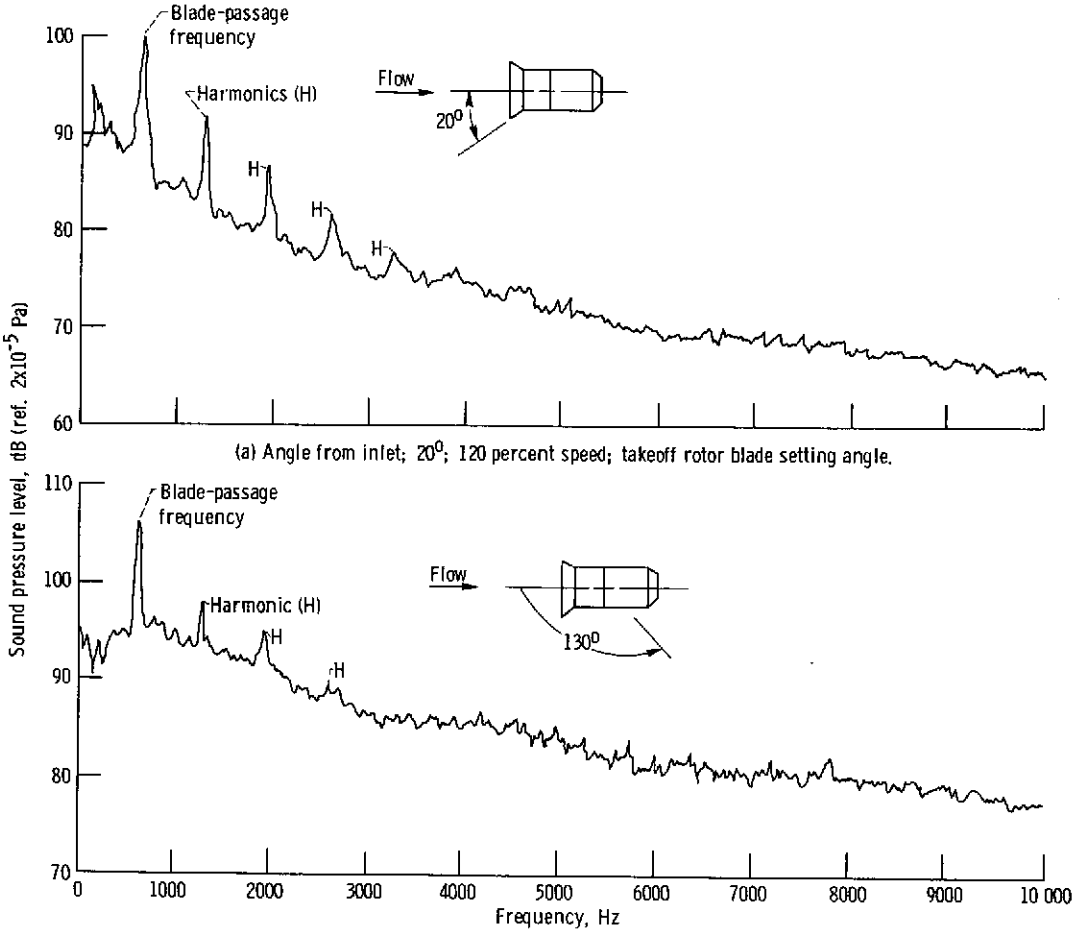
Figure 22. - Perceived noise on 152.5-meter (500-ft) sideline; reverse thrust rotor blade setting angle.



(a) Angle from inlet, 20^0; 100 percent speed; takeoff rotor blade setting angle.

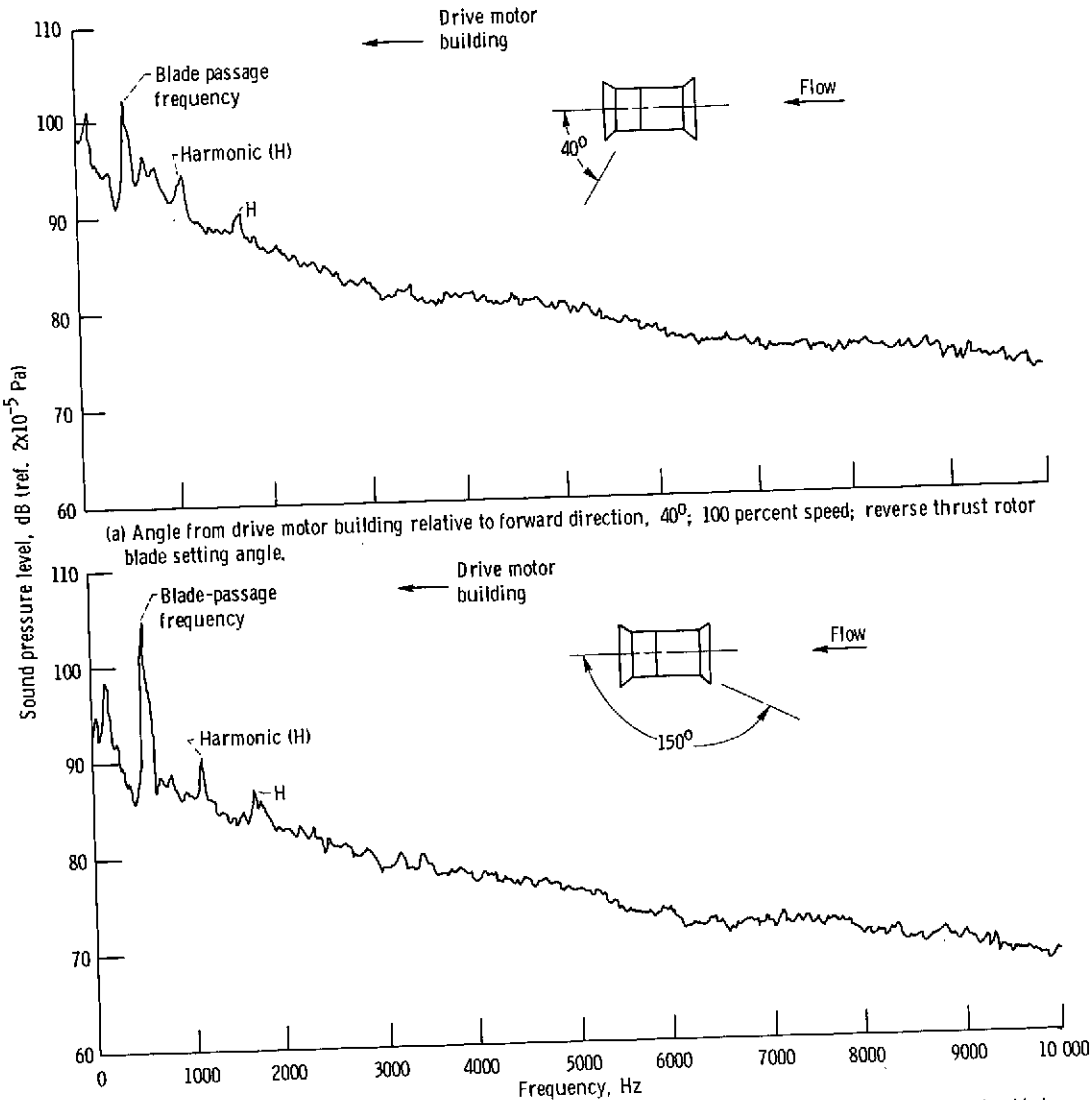
(b) Angle from inlet, 130^0; 100 percent speed; takeoff rotor blade setting angle.

Figure 23. - Narrow band spectra (32-Hz bandwidth) on 30.5-meter (100 ft) radius; design nozzle area.



(b) Angle from inlet, 130°; 120 percent speed; takeoff rotor blade setting angle.

Figure 24. - Narrow band spectra (32-Hz bandwidth) on 30.5-meter (100-ft) radius; design nozzle area.



(a) Angle from drive motor building relative to forward direction, 40°; 100 percent speed; reverse thrust rotor blade setting angle.

(b) Angle from drive motor building relative to forward direction, 100 percent speed, reverse thrust rotor blade setting angle.

Figure 25. - Narrow band spectra (32-Hz bandwidth) on 30.5-meter (100-ft) radius.