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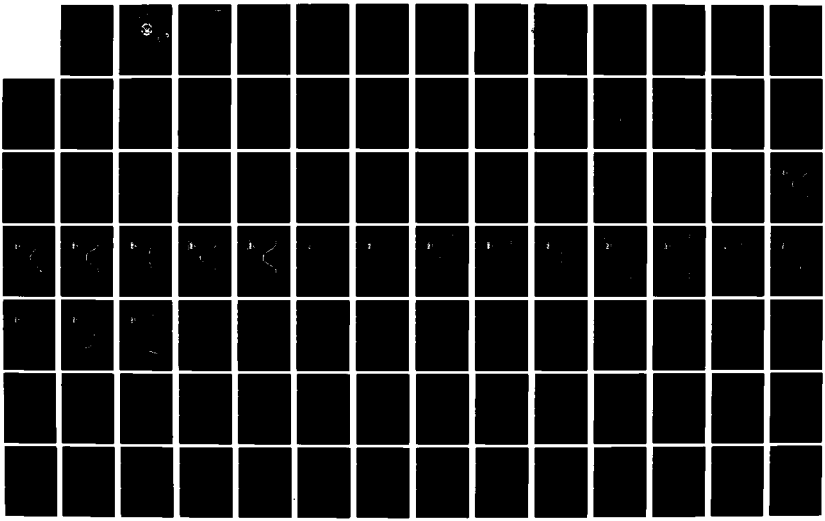

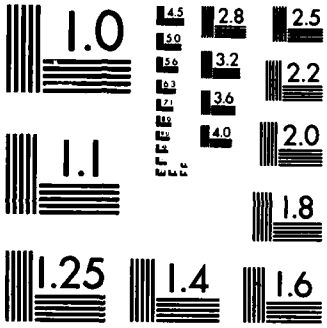

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EXPERIMENTAL INVESTIGATION OF
THRUST AUGMENTING EJECTORS
USING VANE EXCITED PRIMARY JETS

by

Thomas Robert McClellan

March 1982

Thesis Advisor: M. F. Platzer

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Experimental Investigation of Thrust Augmenting Ejectors Using Vane Excited Primary Jets

by

Thomas Robert McClellan
Lieutenant, United States Navy
B.S., United States Naval Academy, 1974

Submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN AERONAUTICAL ENGINEERING

from the

NAVAL POSTGRADUATE SCHOOL
March 1982

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ABSTRACT

An experimental investigation has been conducted to evaluate the entrainment characteristics of a thrust augmenting ejector, with a small, oscillating airfoil inserted in the potential core of the primary jet. Velocity distributions were measured across the width of the jet, at downstream distances of 20 and 40 nozzle widths, with the jet exhausting into still air and with the jet exhausting into an instrumented ejector shroud, for the following range of parameters: Pressure ratio 1.137 and 1.268, amplitude of oscillation 2.6° and 6.9° zero-to-peak, frequency of oscillation 0, 20, 40 and 60 Hz. Static pressure distributions were measured within the shroud when the ejector was installed. The results amplify previously conducted studies. Jet spreading and entrainment appear to increase with increasing amplitude and frequency of oscillation and to decrease with increasing nozzle pressure ratio.

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I. INTRODUCTION

In recent years, considerable effort has been directed towards the development of high-performance, fixed-wing aircraft with V/STOL capability. This V/STOL requirement presents an immediate design dilemma; the powerplant and engine inlet must be of sufficient size to produce the large vectored thrust components necessary for vertical takeoff or landing, but small enough to prevent excessive ram drag and weight penalties from being incurred in the fixed-wing mode of operation.

The two operational high-performance V/STOL aircraft, the Soviet YAK-36 and the British-American AV-8B, use the Lift/Lift-Cruise Engine and *Thrust Vectoring Nozzle concepts*, respectively. Disadvantages of these two concepts include high jet exit velocities and temperatures and excessive fuel consumption.

Another attractive solution to the V/STOL problem is to design the propulsion system for conventional flight and to provide the aircraft with variable geometry thrust augmenting ejectors, which can be faired into the airframe, to boost the available thrust for vertical flight regimes. The Rockwell International XFV-12 utilizes this concept. However, tests to date on the XFV-12 have demonstrated insufficient lift from its thrust augmented wings to provide a VTOL capability.

A thrust augmenting ejector is a device which transfers the energy of a high velocity jet into flow with greatly increased mass, at reduced velocity. A typical ejector construction is diagrammed in figure 1.

The high velocity jet from the primary nozzle is directed into the ejector shroud inlet, where viscous effects, at the edge of the jet, cause mixing and entrainment of the surrounding air. As this flow progresses downstream, a low pressure area is formed within the shroud inlet, thus inducing the secondary flow. The thrust of the device is proportional to the net efflux of momentum at the shroud exit.

When designing ejectors for aircraft applications, many of the physical parameters of the devices, such as ejector length and area ratio, are necessrily constrained by other airframe design considerations. Therefore, recent research in the optimization of ejector performance has focused primarily on increasing the mixing rate of the primary and secondary flows within relatively short, low area ratio ejectors.

The state-of-the-art of thrust augmenting ejectors has been reviewed by Viets [Ref. 1] where details about the hypermixing principle, employed by the XFV-12 ejectors, as well as other promising concepts, can be found. For example, Viets showed that jet oscillation can have a beneficial effect on flow entrainment and he developed several fluidic nozzles to demonstrate this

phenomenon. In general, however, most of the entrainment increasing concepts, discussed in [Ref. 1], involve modification of the primary nozzle, accepting a decrease in nozzle efficiency, in order to increase the overall efficiency of the ejector device.

Platzer and Simmons [Ref. 2] recently suggested a different method for enhancing secondary flow entrainment. A small airfoil, situated in the potential core of the primary jet, was excited into small pitch oscillations such that both frequency and amplitude of oscillation could be varied over a significant range. A first series of results was reported by Simmons et. al. [Ref. 3] for vane excited free-jets using pitot tube and hot wire measurements. Collins et. al. [Ref. 4] provided additional data on the vane excited free-jet utilizing pitot tube, hot wire and laser doppler velocimetry measurements.

It is the objective of the experiments described in the following sections to extend the range of parameters measured by Simmons et. al. and Collins et. al., and to explore the effectiveness of vane excited jets in an actual ejector configuration.

II. APPARATUS

The major components of the experimental apparatus include the plenum chamber, nozzle and ejector shroud.

The plenum chamber is a duplicate of the one used by Collins et. al., as described in [Ref. 4], and it is depicted in figures 2 and 3. Inlet air is provided from a compressor through five one inch flexible tubes in the rear face of the chamber. Two honeycomb flow straighteners are installed as indicated to reduce turbulence. Chamber stagnation pressure and temperature are monitored with a manometer and thermocouple respectively.

Every effort was made to construct the nozzle to provide identical exit conditions to those encountered in the previous experiments. However, the nozzle assembly was modified extensively, from the original flat plate, to one with more suitable aerodynamic fairing for use in an ejector. The nozzle itself remains unchanged, with length L=300 mm and width h=6 mm. The nozzle assembly is illustrated in figures 4 and 5.

The same vane, which is a symmetric airfoil section, with a thickness of 1.3 mm, a span of 360 mm, and a chord of 10 mm, is located symmetrically, in the potential core, at 1.42h from the nozzle. The vane is supported with two bearings, 4.5 mm thick, each, and 123 mm apart, to prevent vane flutter at high nozle pressure ratios, thereby reducing the nozzle's aspect ratio to an

effective 1:20. Vane and oscillator mechanisms are depicted in figures 2, 3, 6 and 7.

A more complicated vane oscillation mechanism was required to remove the electric motor from the shroud inlet area. Variation in vane deflection amplitude is accomplished by changing the off-center attachment points, or eccentricity (e), of the two cams on the drive shaft. The cams were designed to provide vane amplitude options of 2.6°, 5.2° and 6.9° zero to peak. Adjustment of the turnbuckles on the push-rods is required after each amplitude change to ensure that the vane oscillates about 0° angle of attack.

The vane oscillation frequency is controlled by varying the power output of a DC power supply. Frequency readout is available on a frequency meter which utilizes a magnetic pickup to "count" the passages of six small screws inserted around the circumference of the motor shaft extension sleeve.

Details of the construction of the ejector shroud are provided in figures 8 through 17. Shroud length is fixed at 38 in (152h). Shroud width is 20 in. Although ejector area ratio is variable, and is controlled by adjusting the distance between the top and bottom shroud sections, the height between the sections remained fixed at 5.5 in (23.3h) throughout the experiment.

The shroud is instrumented for measurement of static pressures along the centerline of the bottom shroud section. Figures 15 and

16 diagram the location of the 31 static pressure taps. Figure 17 illustrates the configuration of the pressure taps. A manometer board is used for display of static pressure information.

Pitot tube alignment points along the top section and right side section provide the capability to measure velocity distributions at any cross-section in the shroud in both the horizontal and vertical directions.

A pitot-static tube with hole internal diameter 0.74 mm was used. The tube has four static holes located symmetrically around the periphery at 17 tube diameters from the tip. Identical pneumatic capacitors of volume 500 ml were used in both the total pressure and static pressure lines to dampen fluctuations. Pitot tube output is indicated on a manometer. The pitot tube, as well as the pitot tube alignment stations, are depicted in figure 7.

III. EXPERIMENTAL INVESTIGATION

Two series of velocity measurements were performed. In the first series, the jet exhausted into still air and mean velocity measurements were made across the width of the jet at its midspan, at a distance of 20 and 40 nozzle widths downstream, for the following range of parameters:

Nozzle Pressure Ratio	1.137	1.268
Jet Exit Reynold Number	5.85×10^4	8.19×10^4
Vane Amplitude of Oscillation	2.6°	6.9° zero-to-peak
Vane Frequency of Oscillation	0, 20, 40, 60 HZ	

In the second series of velocity measurements, the constant area ejector shroud was mounted symmetrically, with the nozzle exit plane flush with the shroud inlet plane. Again, mean velocity measurements were made across the ejector height, at its midspan, at distances of 20 and 40 nozzle widths downstream for the same range of parameters. In addition, shroud static pressure distributions were measured, with the nozzle and shroud in the same configuration, for the same range of parameters.

IV. RESULTS

Mean centerline velocity distributions are plotted in figures 18 through 23 for the vane excited free-jet operating at pressure ratios 1.137 and 1.268, vane amplitudes of 2.6° and 6.9° zero to peak, and frequencies of oscillation of 0, 20, 40, and 60 HZ. Tables 1 through 23 give detailed tabulations of these distributions.

The mean velocity distributions at the mid-span of the ejector are plotted in figures 24 through 31. These distributions are tabulated in tables 24 through 48.

Static pressure distributions at the mid-span of the ejector are shown in figures 32 through 35 and are tabulated in tables 49 through 62.

The free-jet and jet with ejector shroud velocity profiles were integrated to provide data for mean entrainment calculations. In order to provide a uniform method of integration, the free-jet curves were arbitrarily terminated at the points on the horizontal axis where the value for U/U'_o decreased to 0.1. The curves from the ejector measurements were integrated from wall to wall. Tabulations of the mean entrainment calculations, where mean entrainment is defined as $[Q(x)/Q_E-1]$, are provided in tables 63 and 64.

V. DISCUSSION

The free jet velocity distributions plotted in figures 18 through 23 show several consistent trends. The vane oscillation produces a substantial spreading of the jet which is accompanied by a much faster center velocity decay than is obtained for the steady jet. The effect of vane frequency of oscillation is seen to produce increased spreading with increasing frequency, at least up to the highest measured frequency (60 HZ). Also, as one would expect, the spreading increases with increasing vane amplitude, but decreases with increasing pressure ratio. The present results then confirm the earlier measurements by Simmons et. al. [Ref. 3], which were obtained for a rather low pressure ratio and add new information about the effect of pressure ratio and also extend the frequency range. The present trends are also in agreement with the measurements by Collins et. al. [Ref. 4].

The velocity distributions, figures 24-31, measured in the constant area ejector at 20 and 40 nozzle widths downstream show again the effectiveness of vane oscillation on jet spreading. While little effect is visible at 20 nozzle widths at the smaller vane amplitude (2.6°), the larger amplitude (6.9°) produces a quite significant effect already at 20 nozzle widths. The effect of vane oscillation is again seen quite clearly for both vane amplitudes. In fact, for the larger amplitude a rather flat distribution is already produced.

The vane effectiveness is further corroborated by the static pressure distributions. Greater suction peaks are seen to occur at the well-rounded ejector inlet with increasing vane amplitude and frequency, figures 32 through 35.

VI. CONCLUSIONS AND RECOMMENDATIONS

Jet excitation by an oscillating vane situated in the jet's potential core produces increased jet spreading and hence secondary flow entrainment for the two measured pressure ratios. This method therefore may have applications in thrust augmenting aircraft ejectors where weight and volume need to be minimized. More detailed measurements, especially at higher pressure ratios, should be performed in order to assess the potential of this jet mixing device.

APPENDIX A

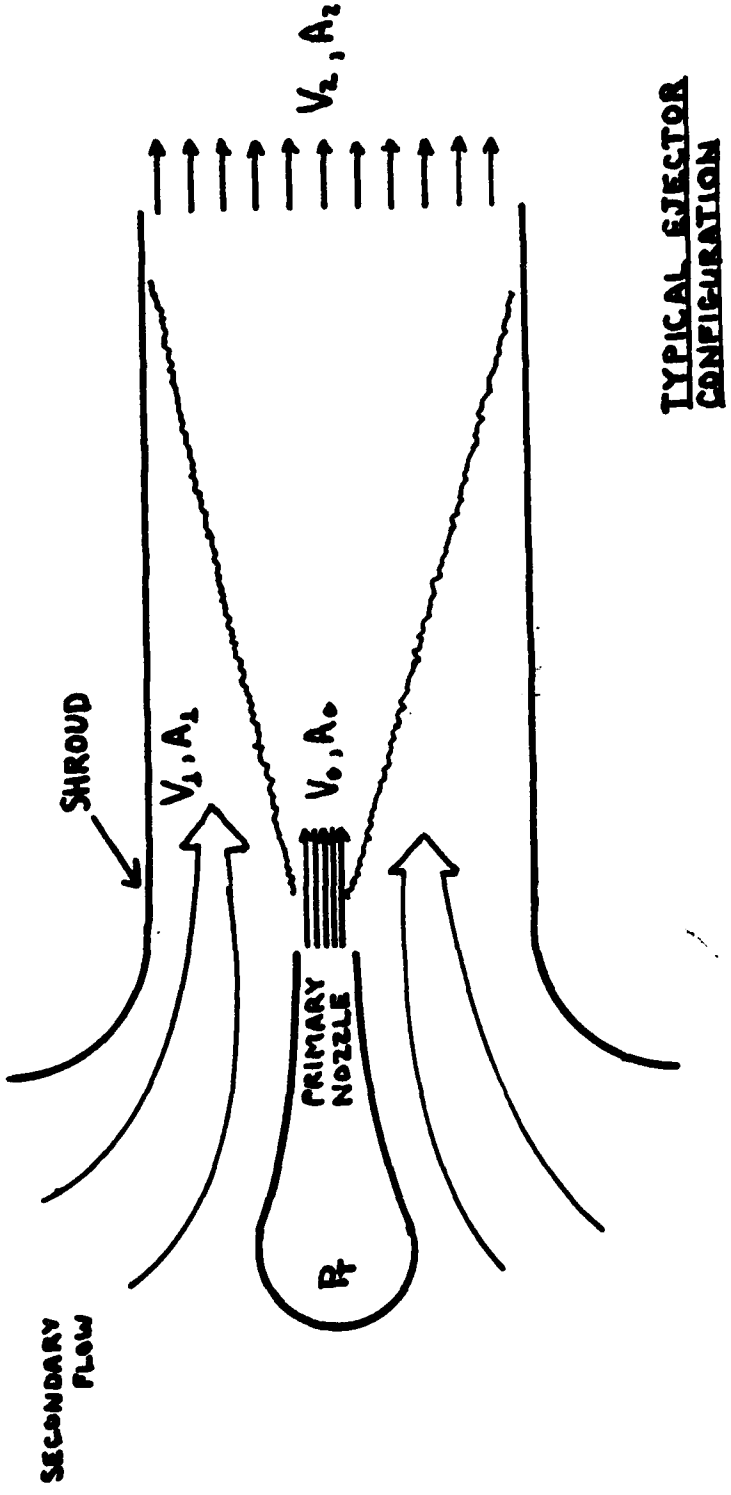
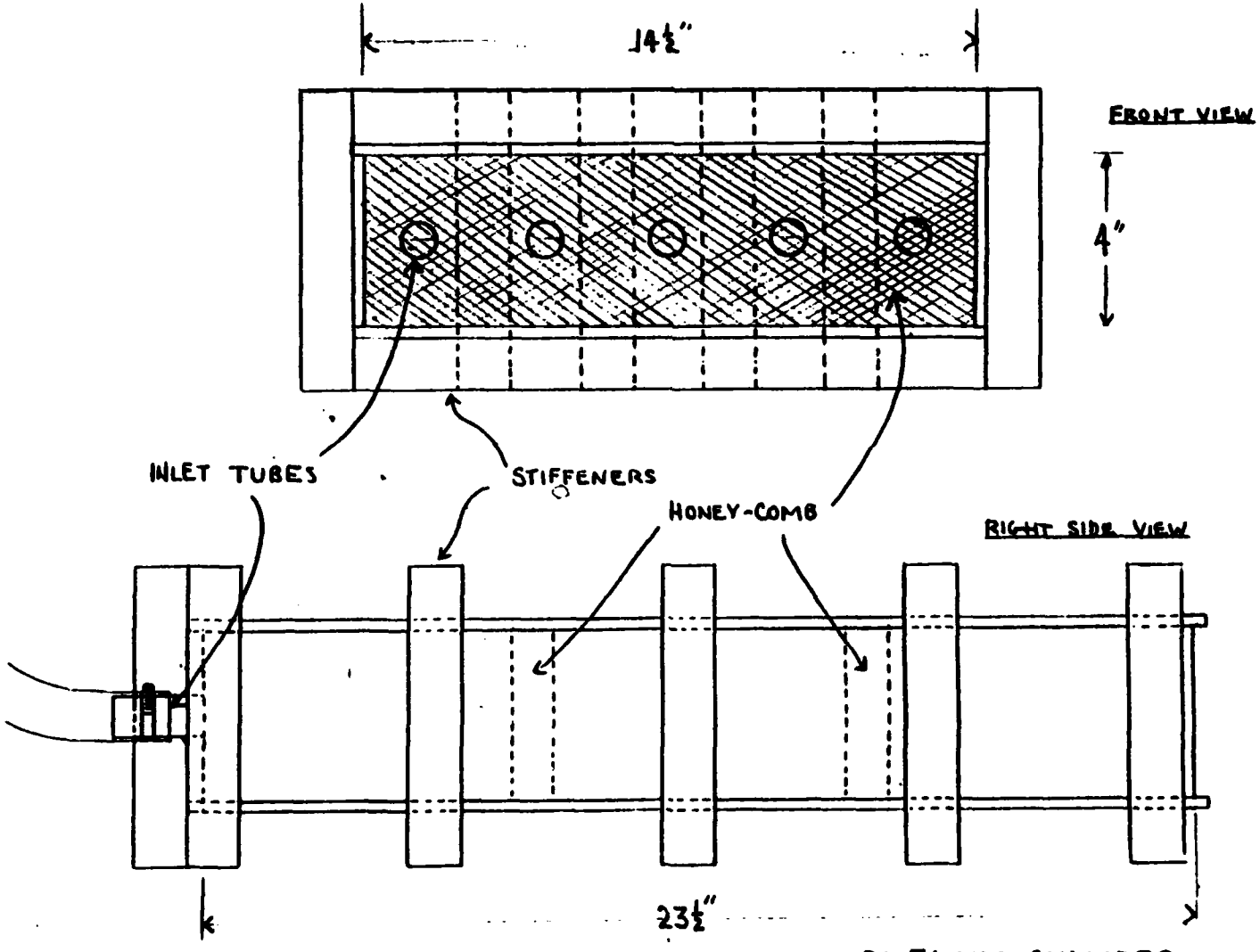


Figure 1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FRONT VIEW
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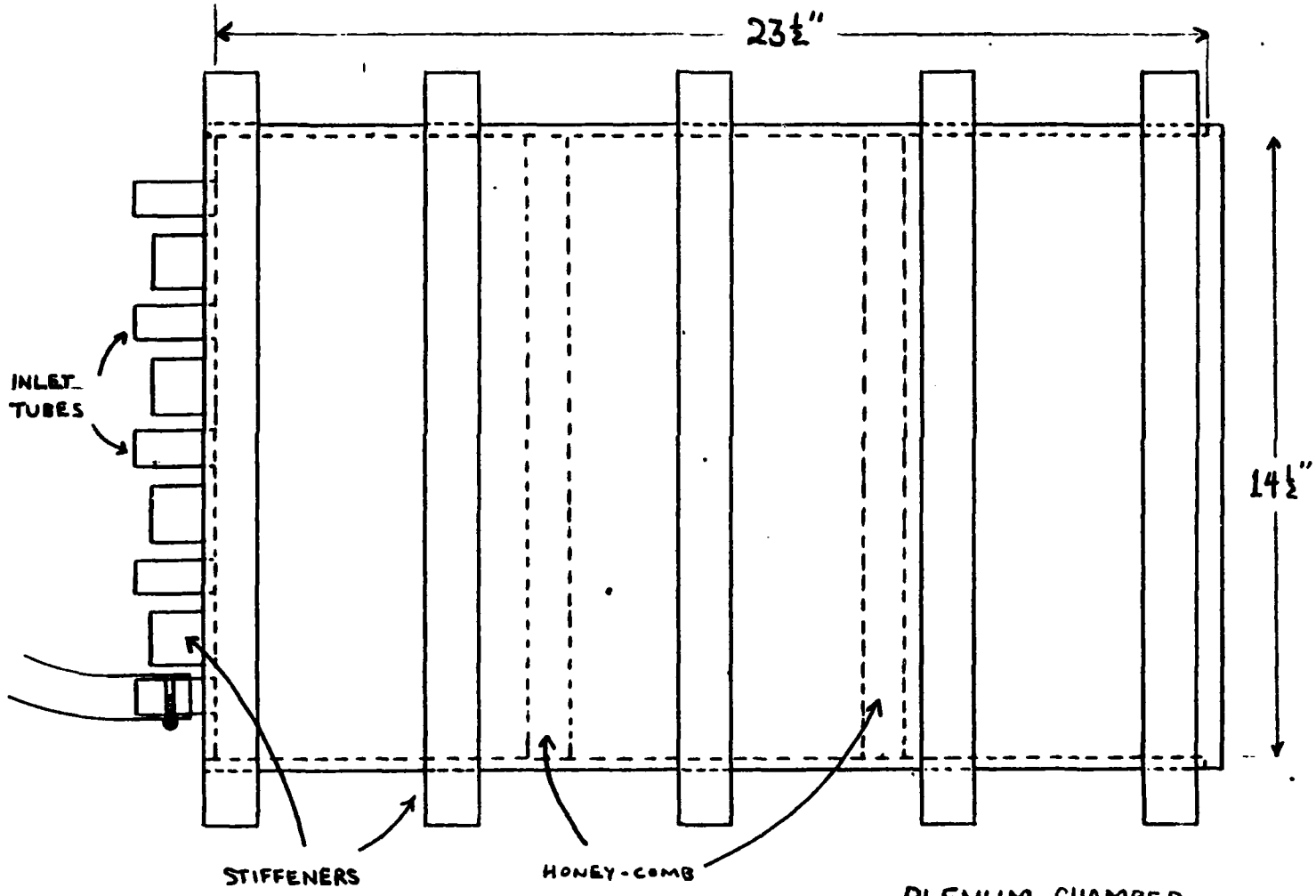
INLET TUBES
STIFFENERS
HONEY-COMB
RIGHT SIDE VIEW
23½"
PLENUM CHAMBER

Figure 2



PLENUM CHAMBER

TOP VIEW

Figure 3

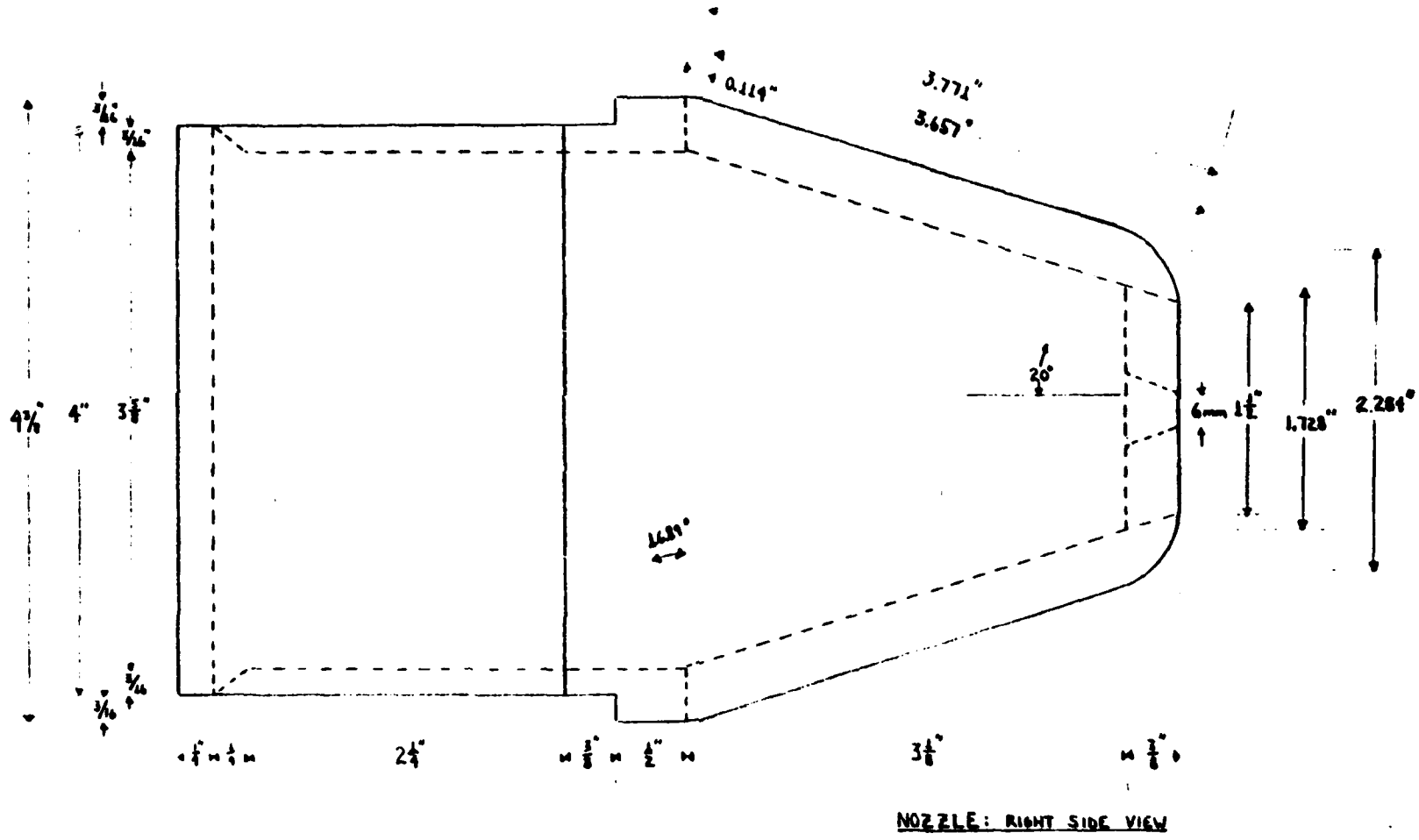
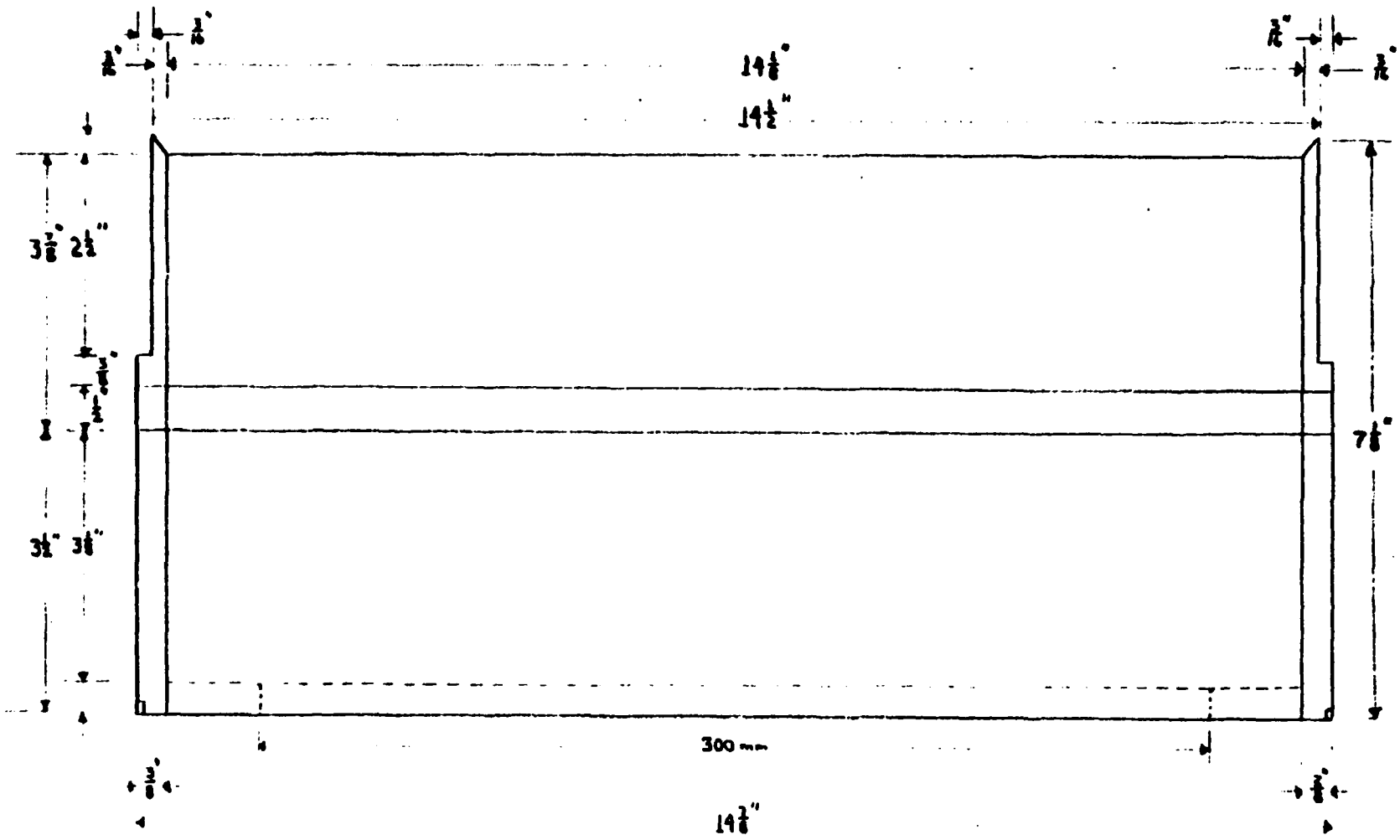


Figure 4



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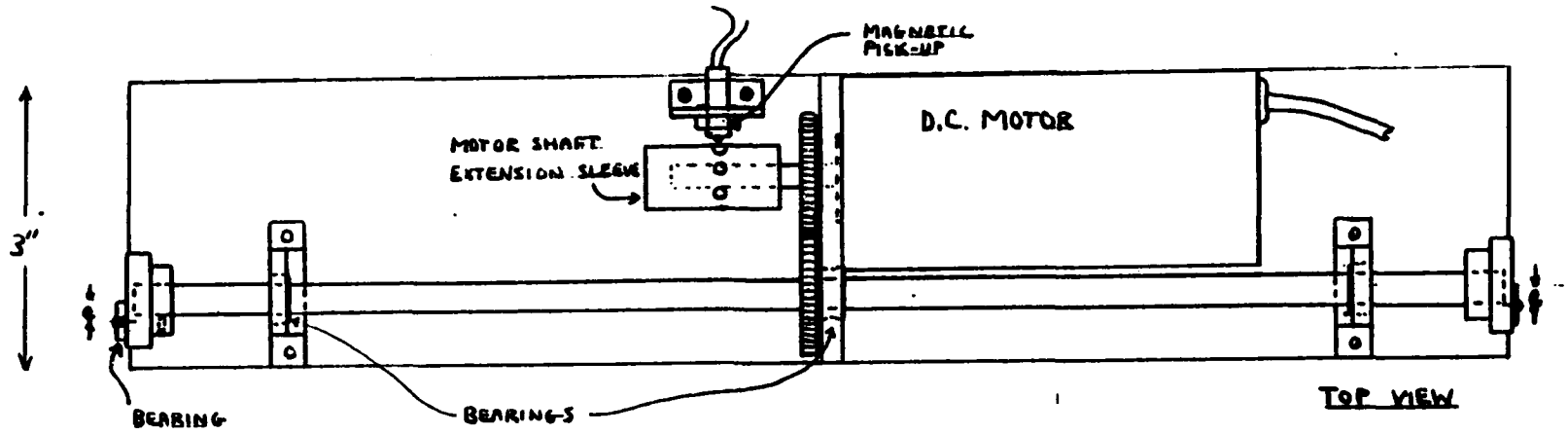
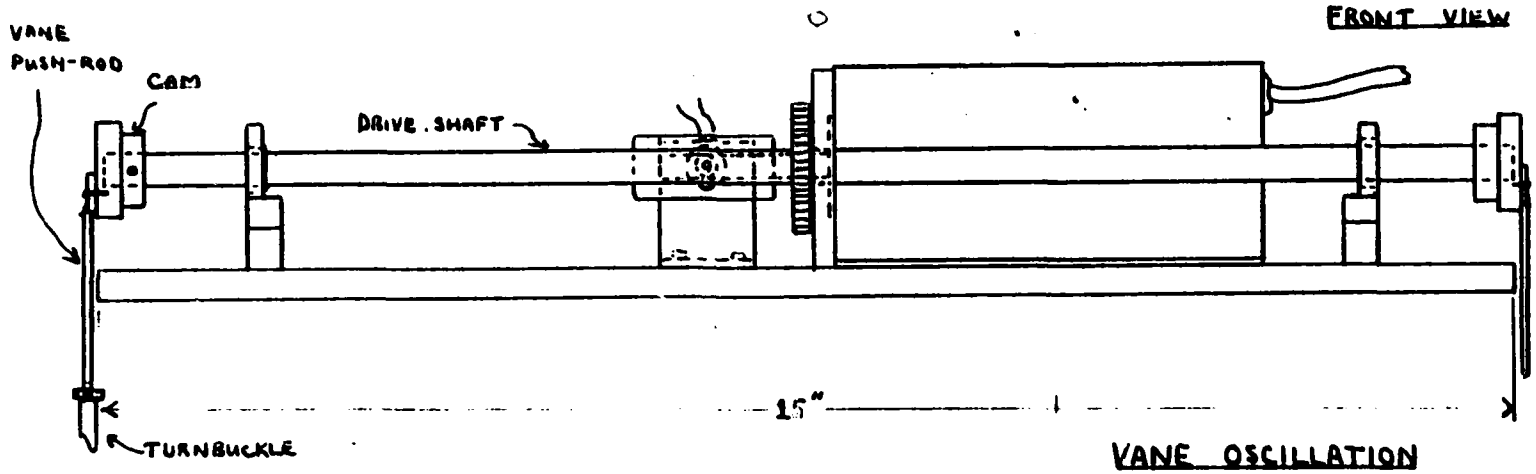
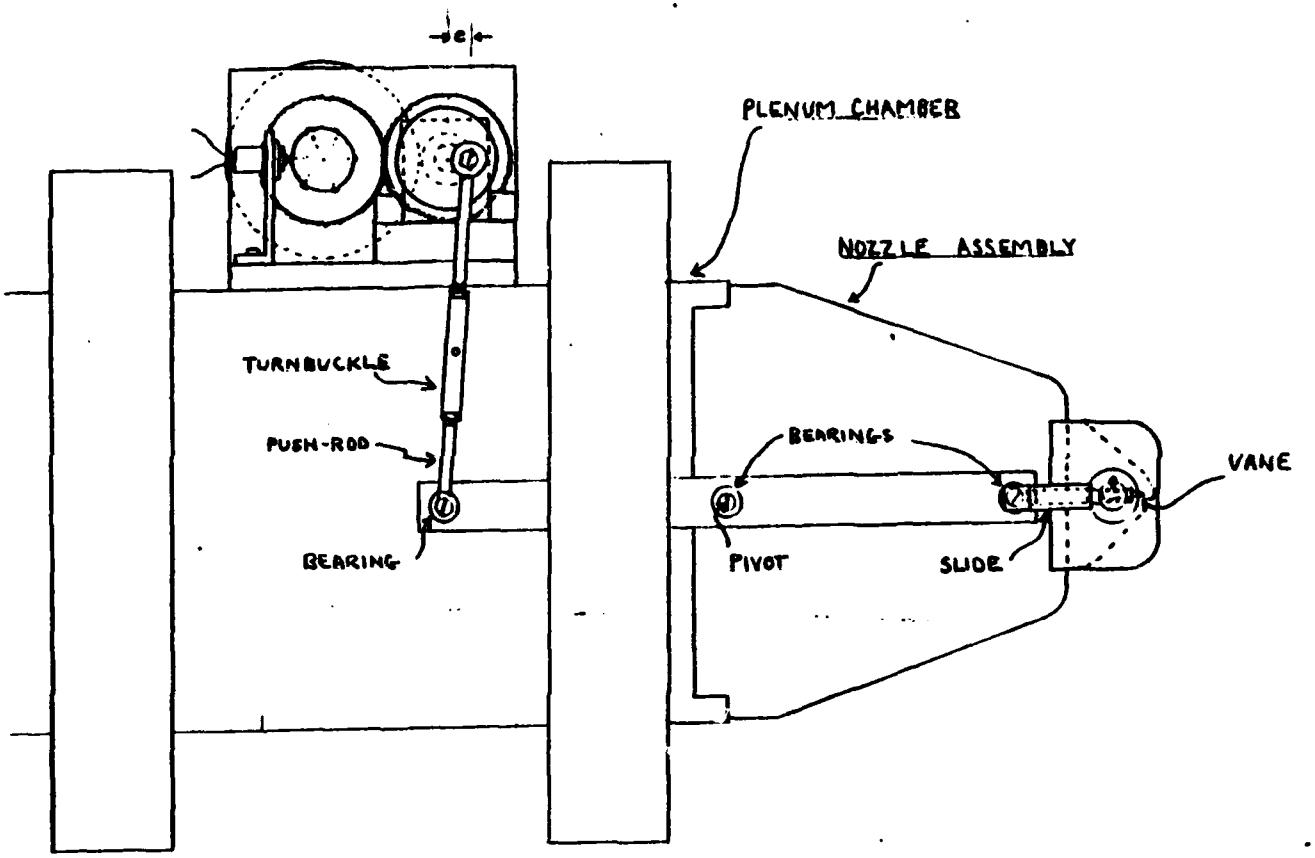




VANE OSCILLATION MECHANISM

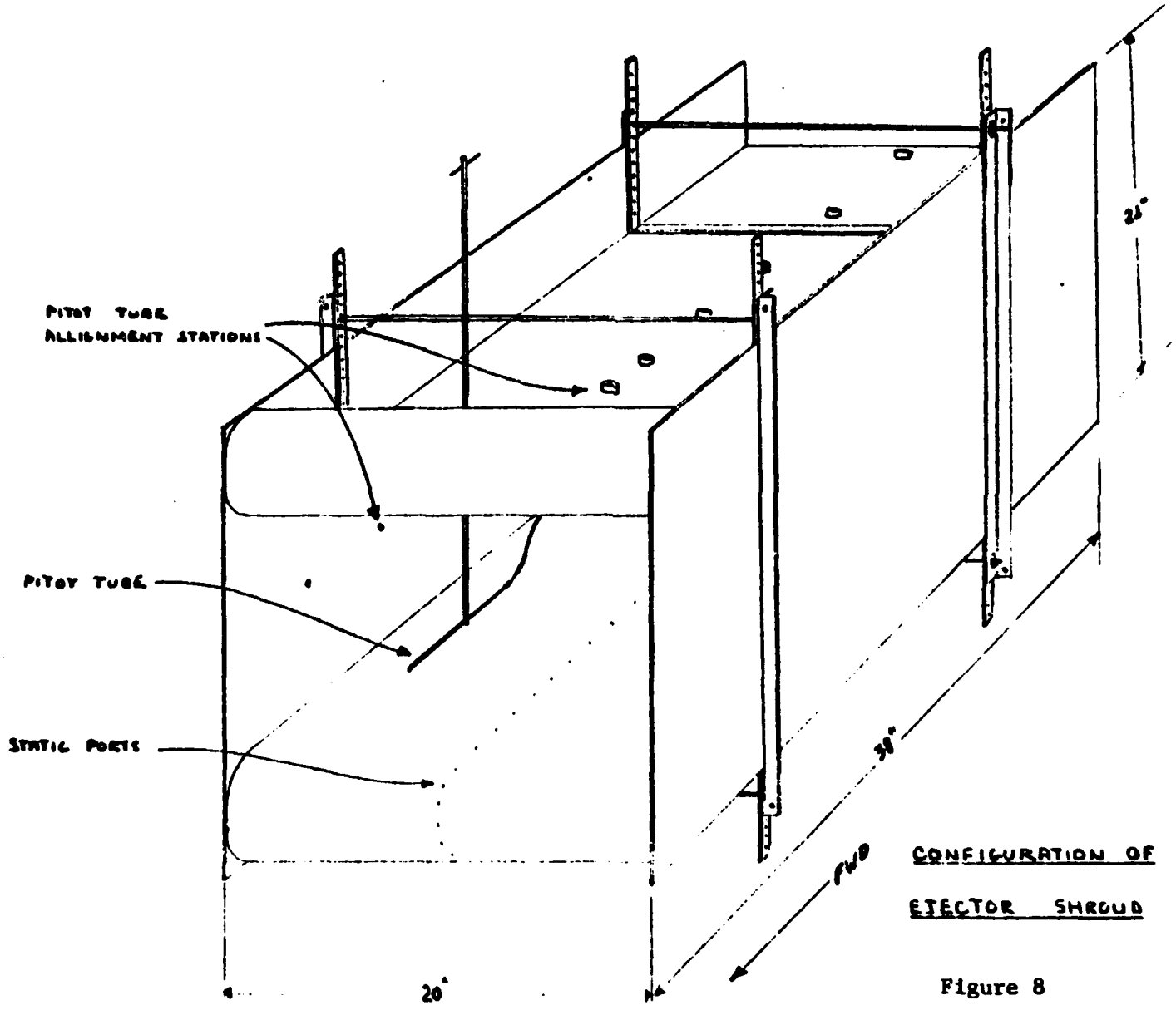
Figure 6



VANE OSCILLATION MECHANISM

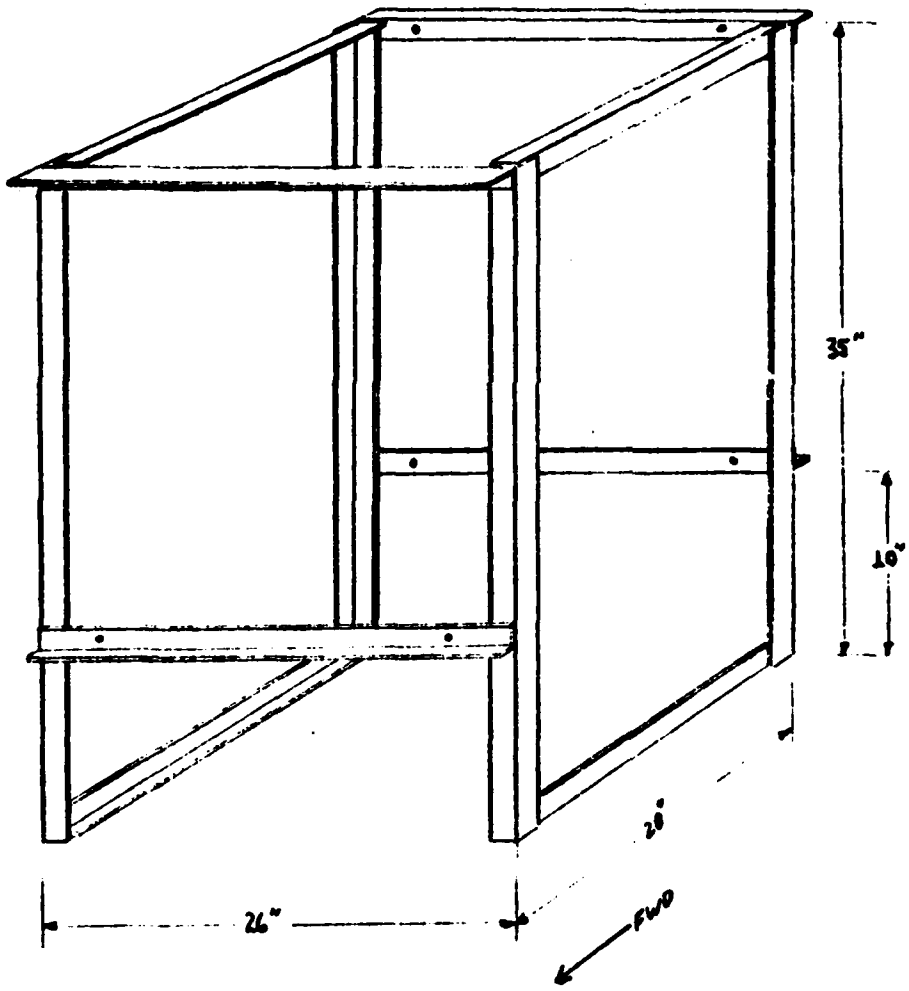
RIGHT SIDE VIEW

Figure 7



CONFIGURATION OF
EJECTOR SHROUD

Figure 8



CONFIGURATION OF EJECTOR SHROUD SUPPORT FRAME

Figure 9

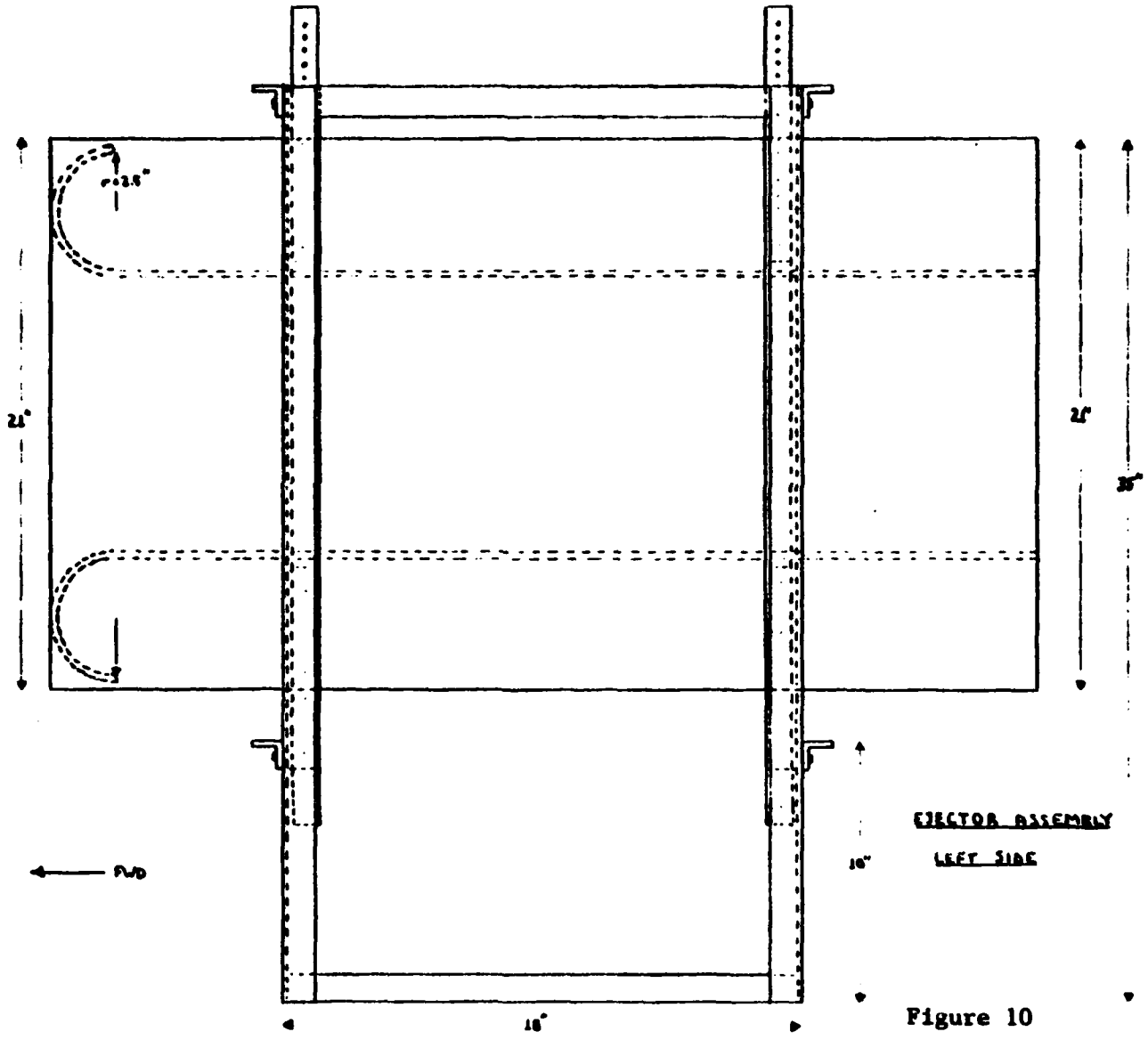


Figure 10

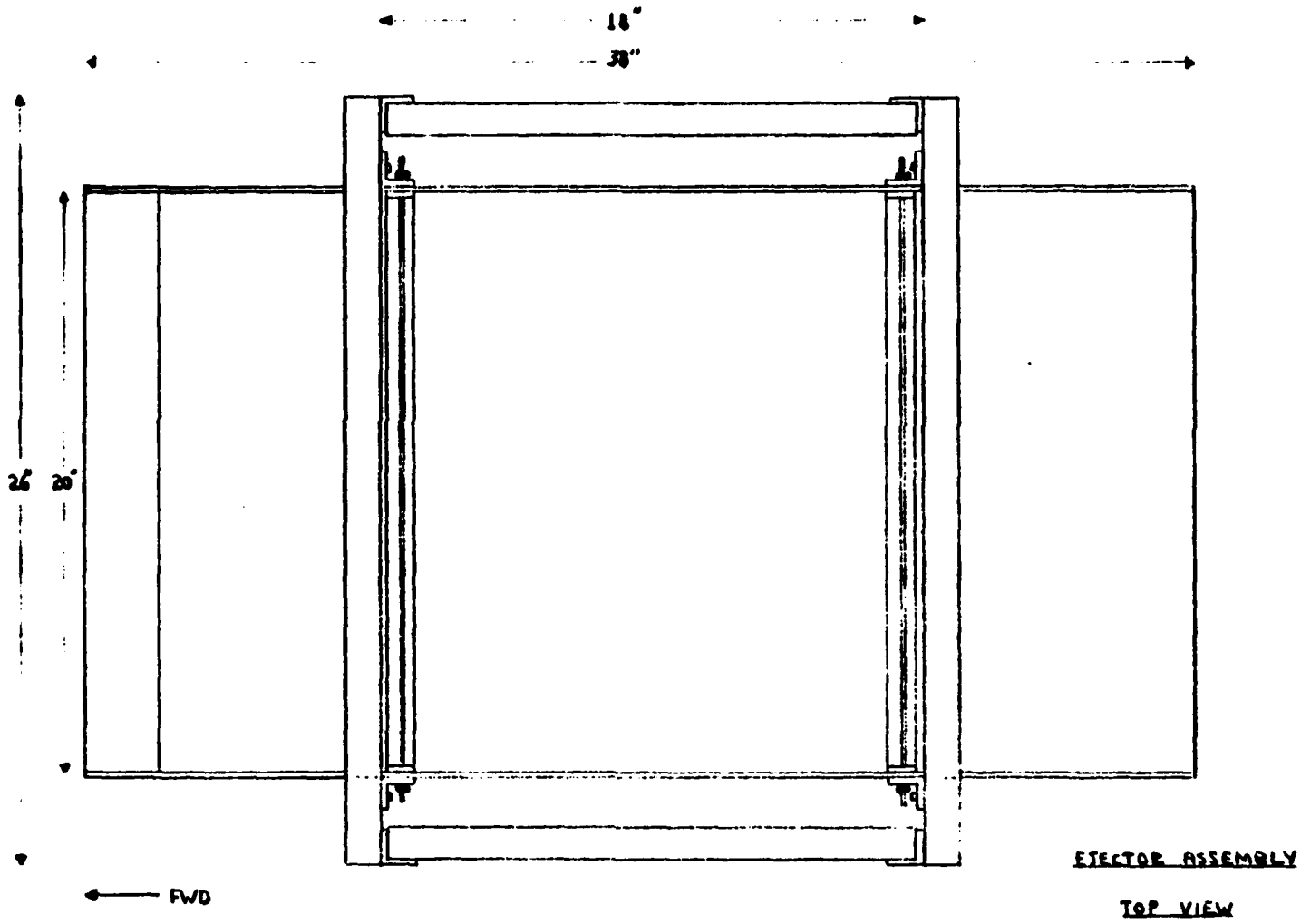
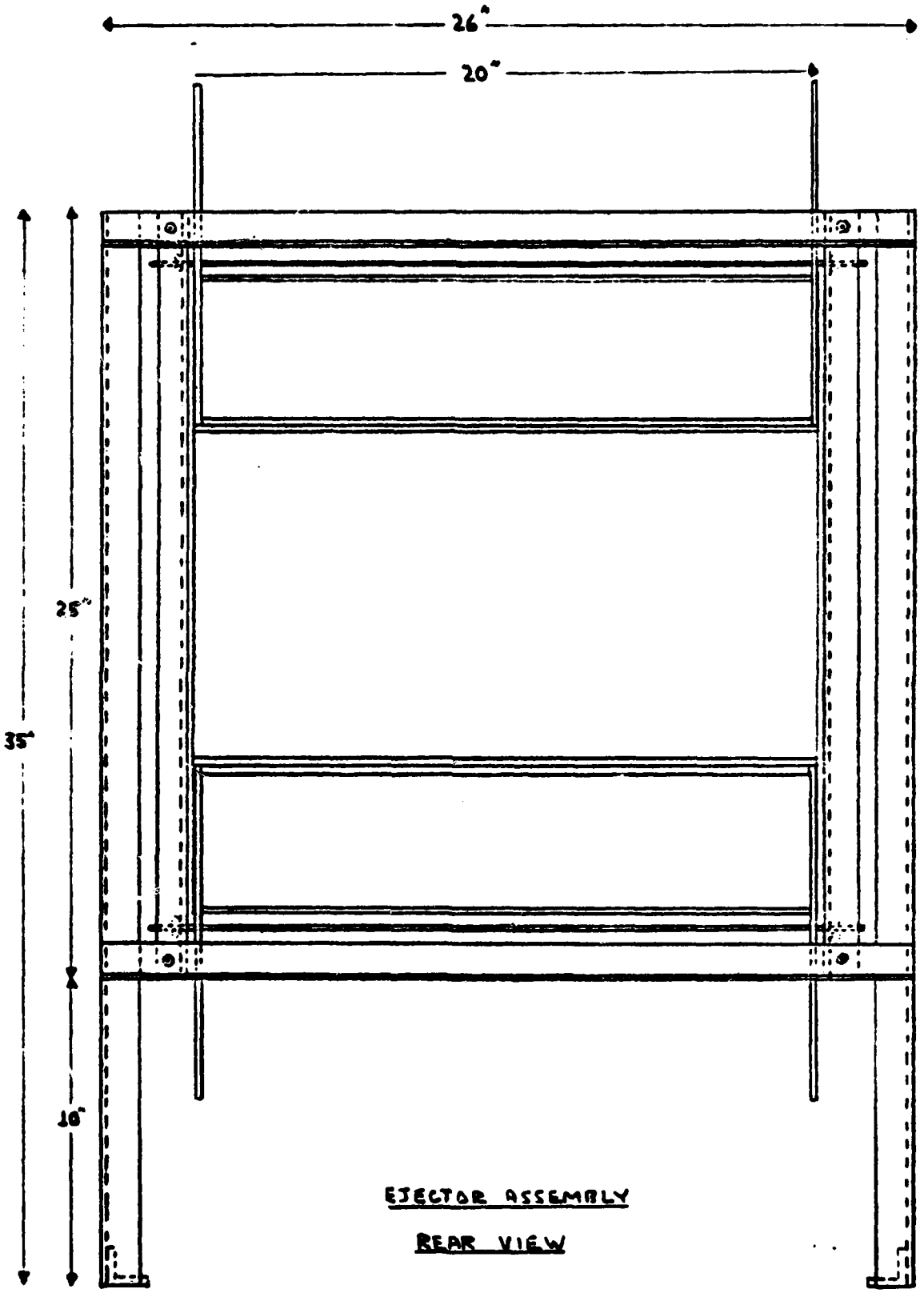


Figure 11



EJECTOR ASSEMBLY

REAR VIEW

Figure 12

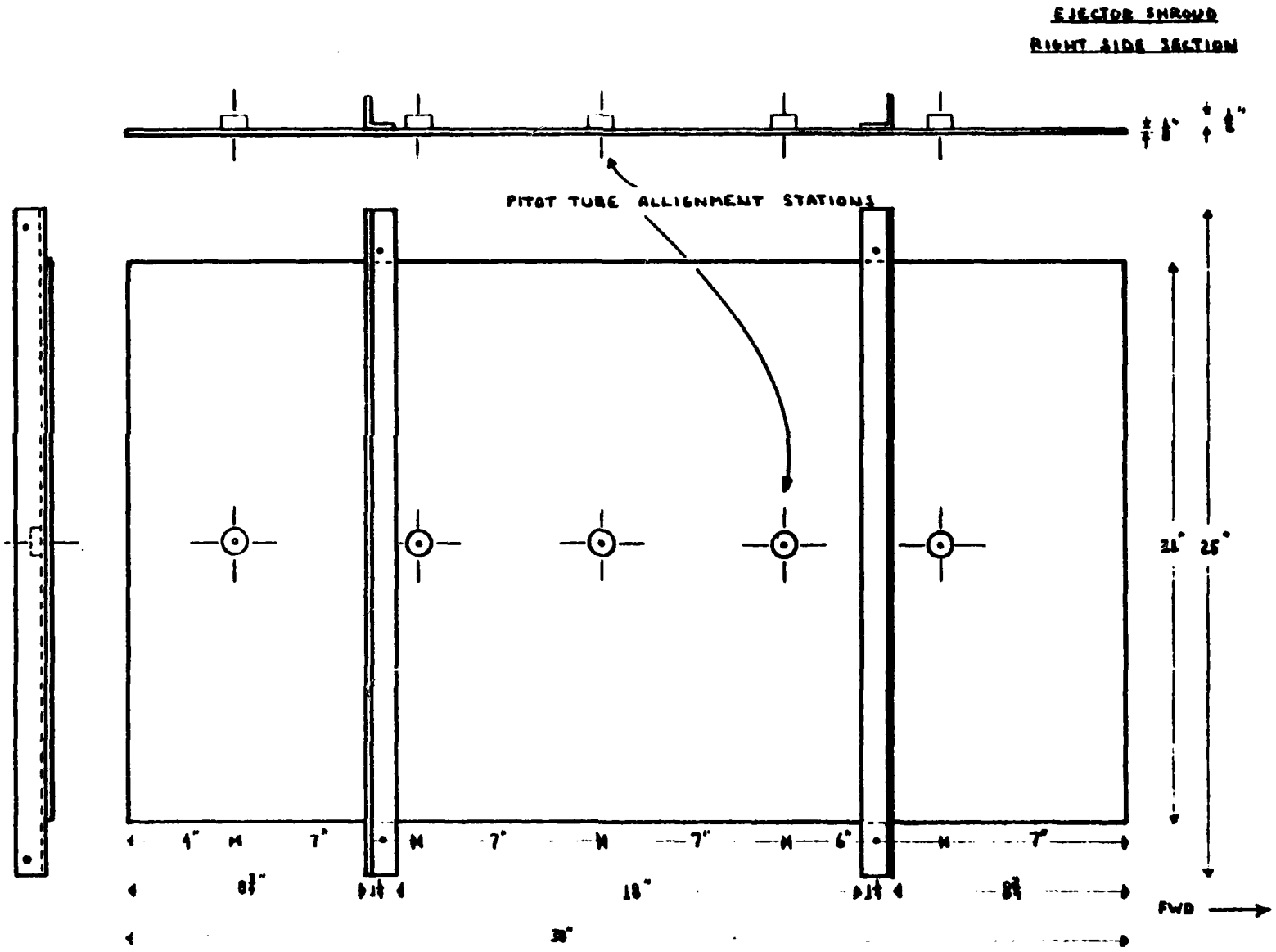

EJECTOR SHROUD
RIGHT SIDE SECTION
PITOT TUBE ALLIGNMENT STATIONS
21"
25"
4"
7"
7"
7"
6"
7"
18"
FWD

Figure 13

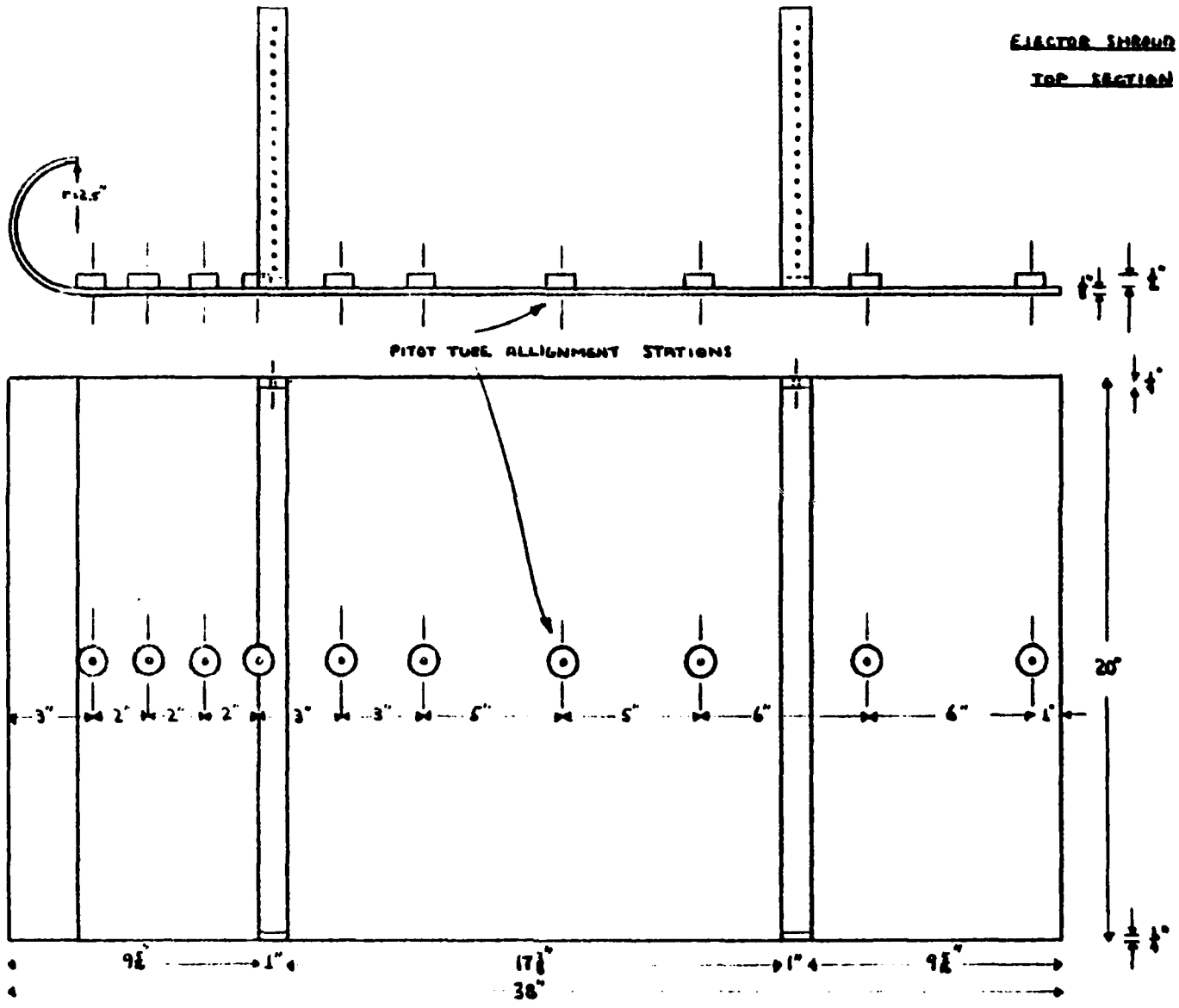

EJECTOR SHROUD
TOP SECTION
PITOT TUBE ALLIGNMENT STATIONS
3"
2"
2"
2"
3"
3"
5"
5"
6"
6"
1"
20"
9½"
1"
17½"
1"
9½"
38"

Figure 14

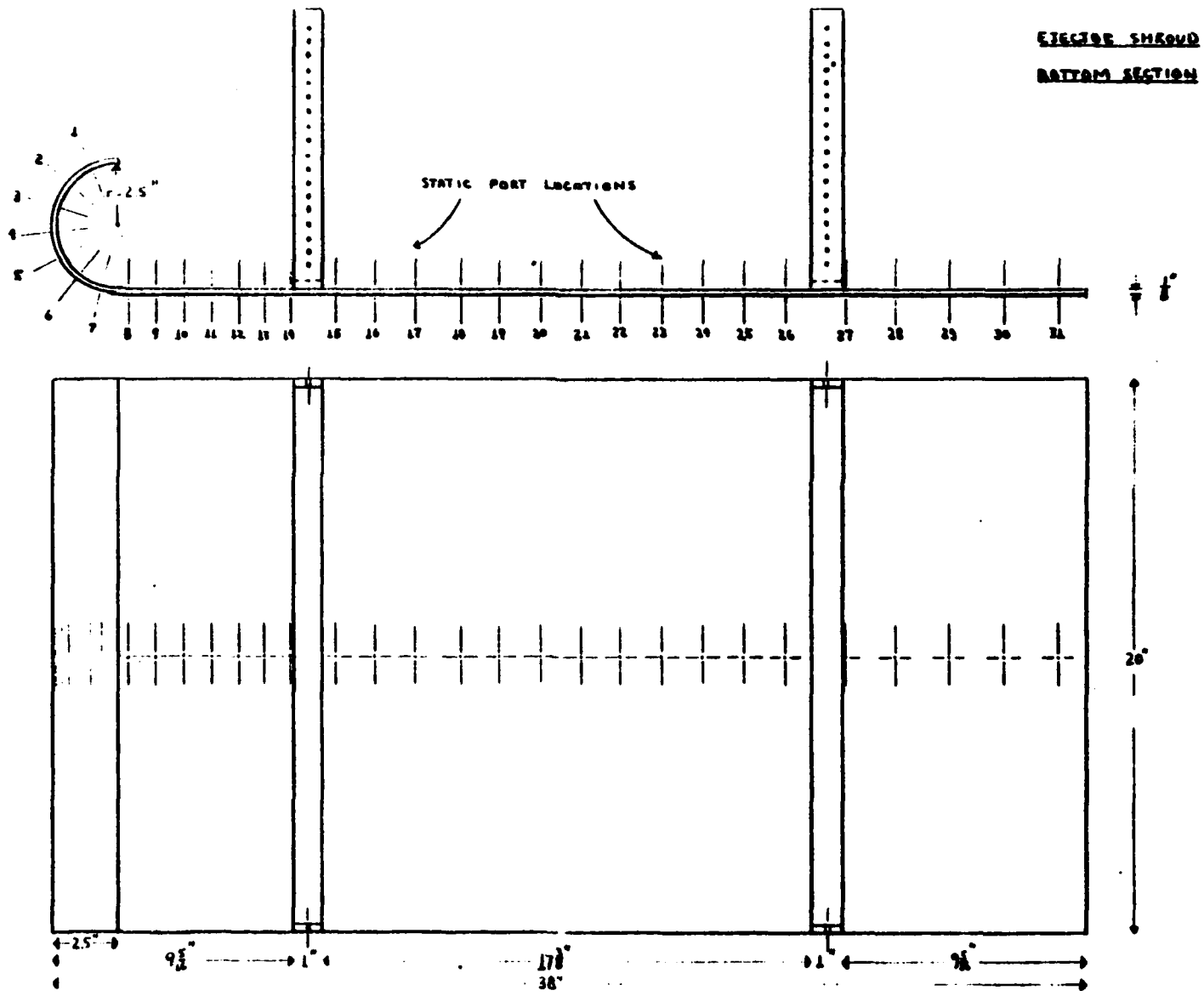

EJECTOR SHROUD
BOTTOM SECTION
STATIC PORT LOCATIONS
r=2.5"
20"
2.5"
1"
38"

Figure 15

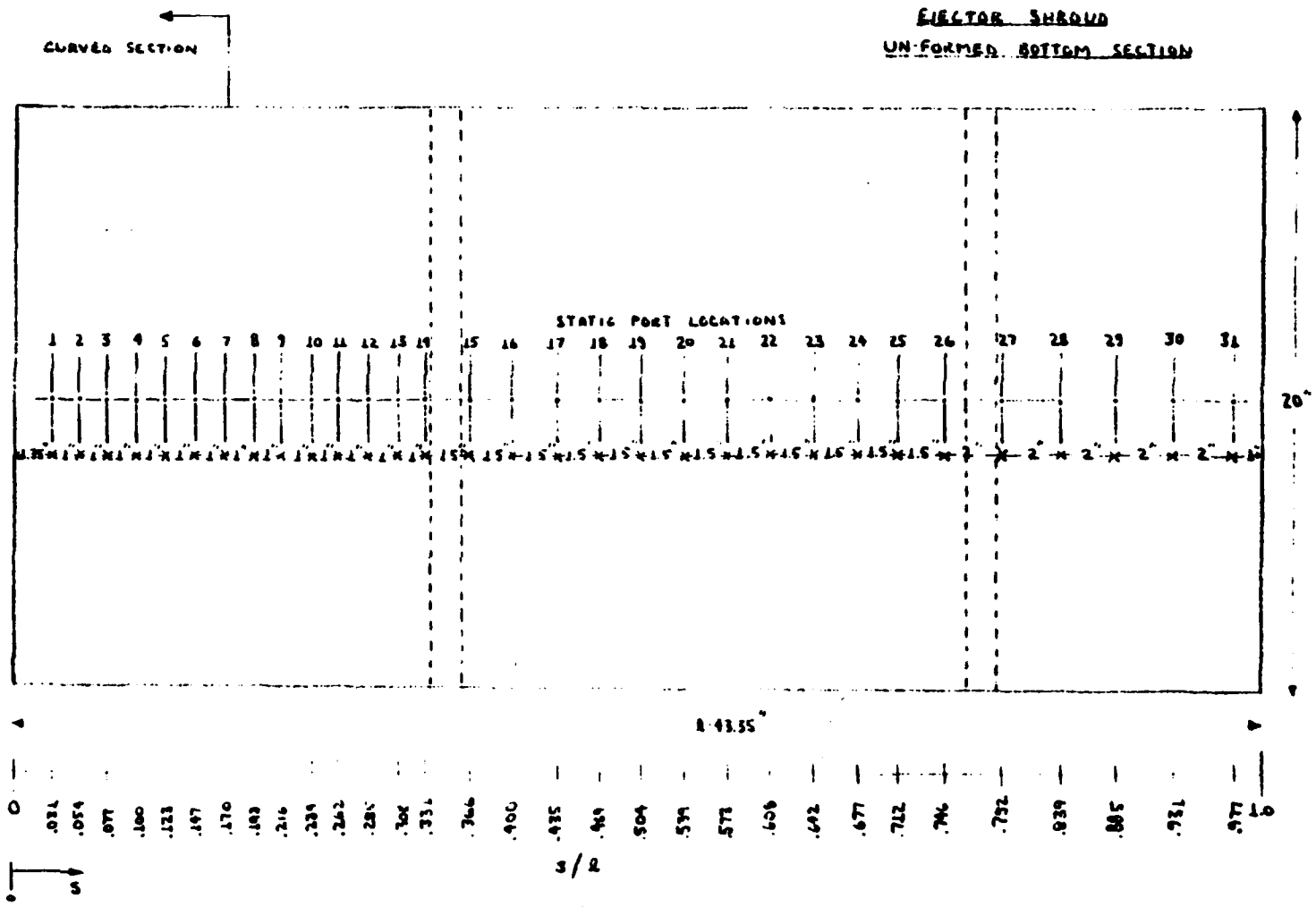

EJECTOR SHROUD
UNFORMED BOTTOM SECTION
CURVED SECTION
STATIC PORT LOCATIONS
20"
R 43.55"
s/R

Figure 16

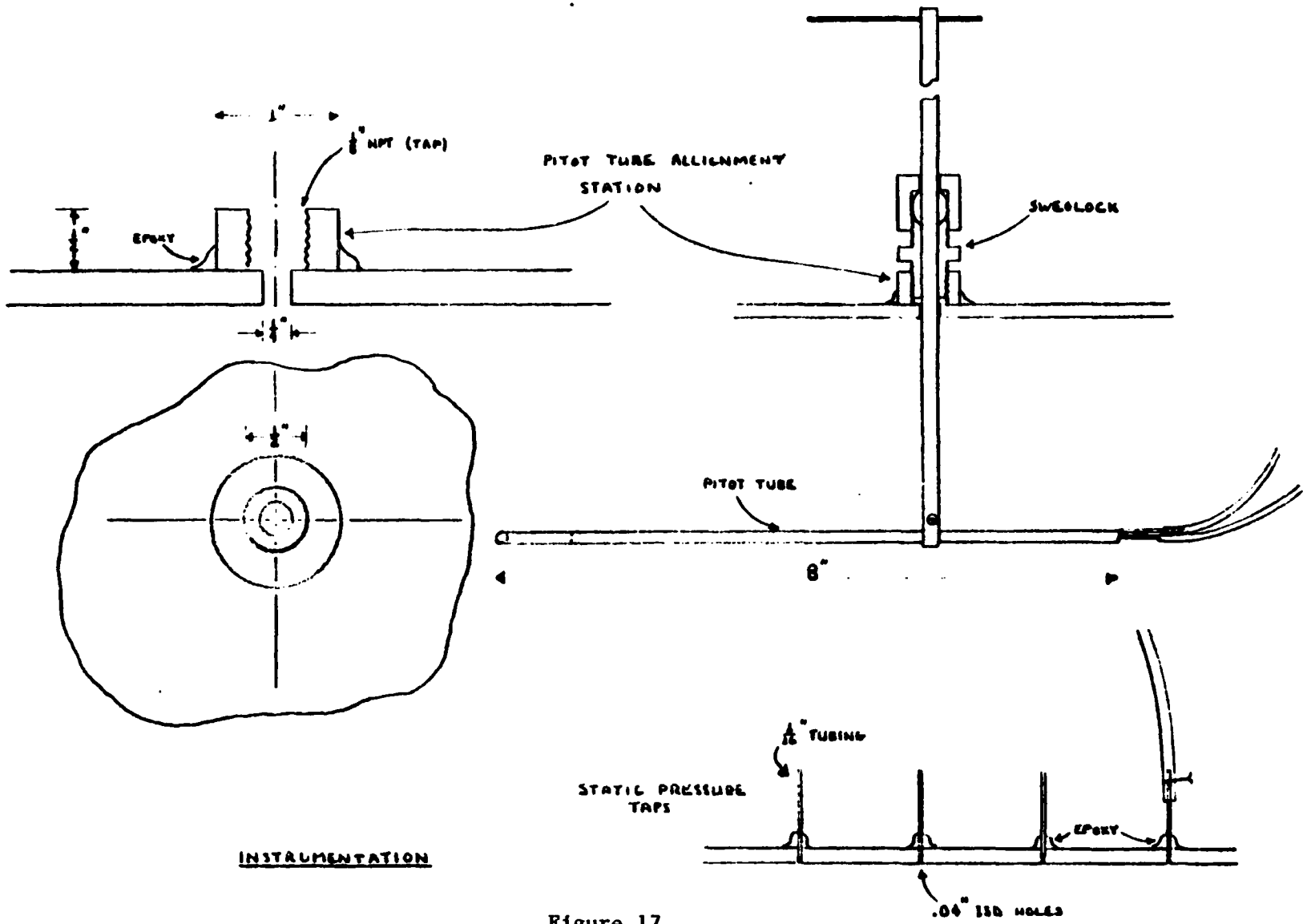

1"
1/8" NPT (TAP)
EPOXY
PITOT TUBE ALLIGNMENT STATION
SWEGLOCK
PITOT TUBE
8"
1/16" TUBING
STATIC PRESSURE TAPS
EPOXY
.04" DIA HOLES
INSTRUMENTATION

Figure 17

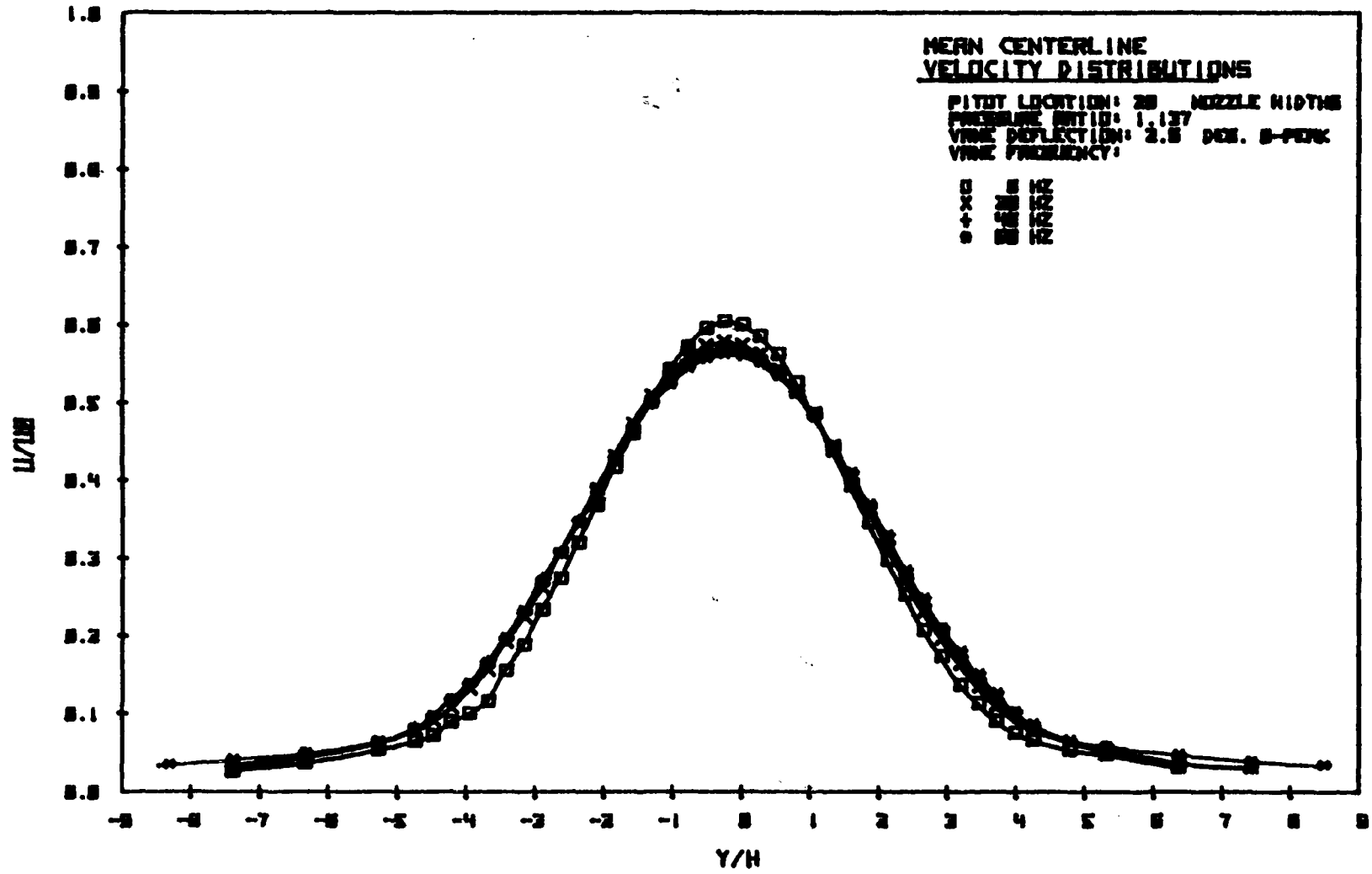


Figure 18 (Free Jet)

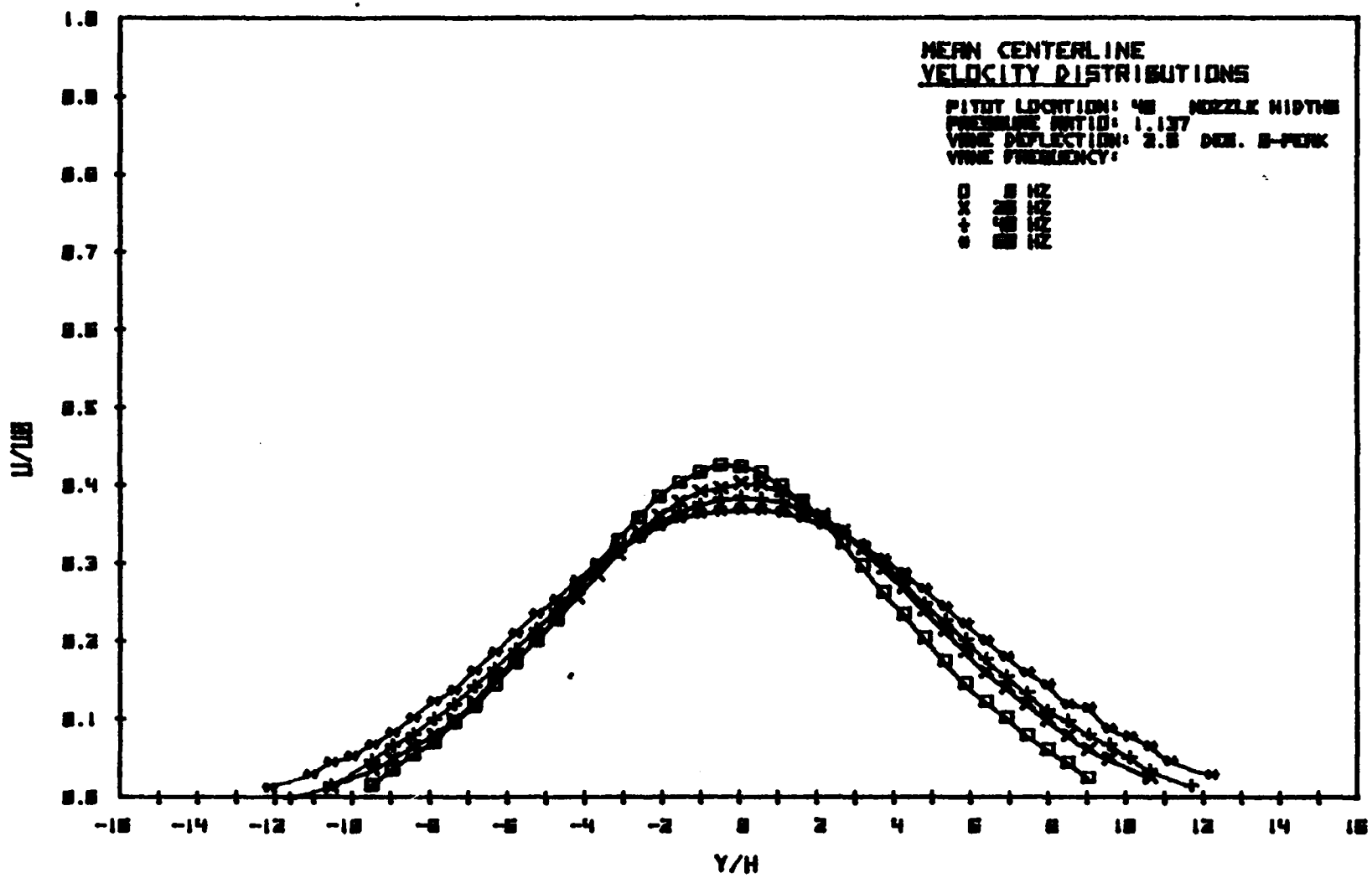


Figure 19 (Free Jet)

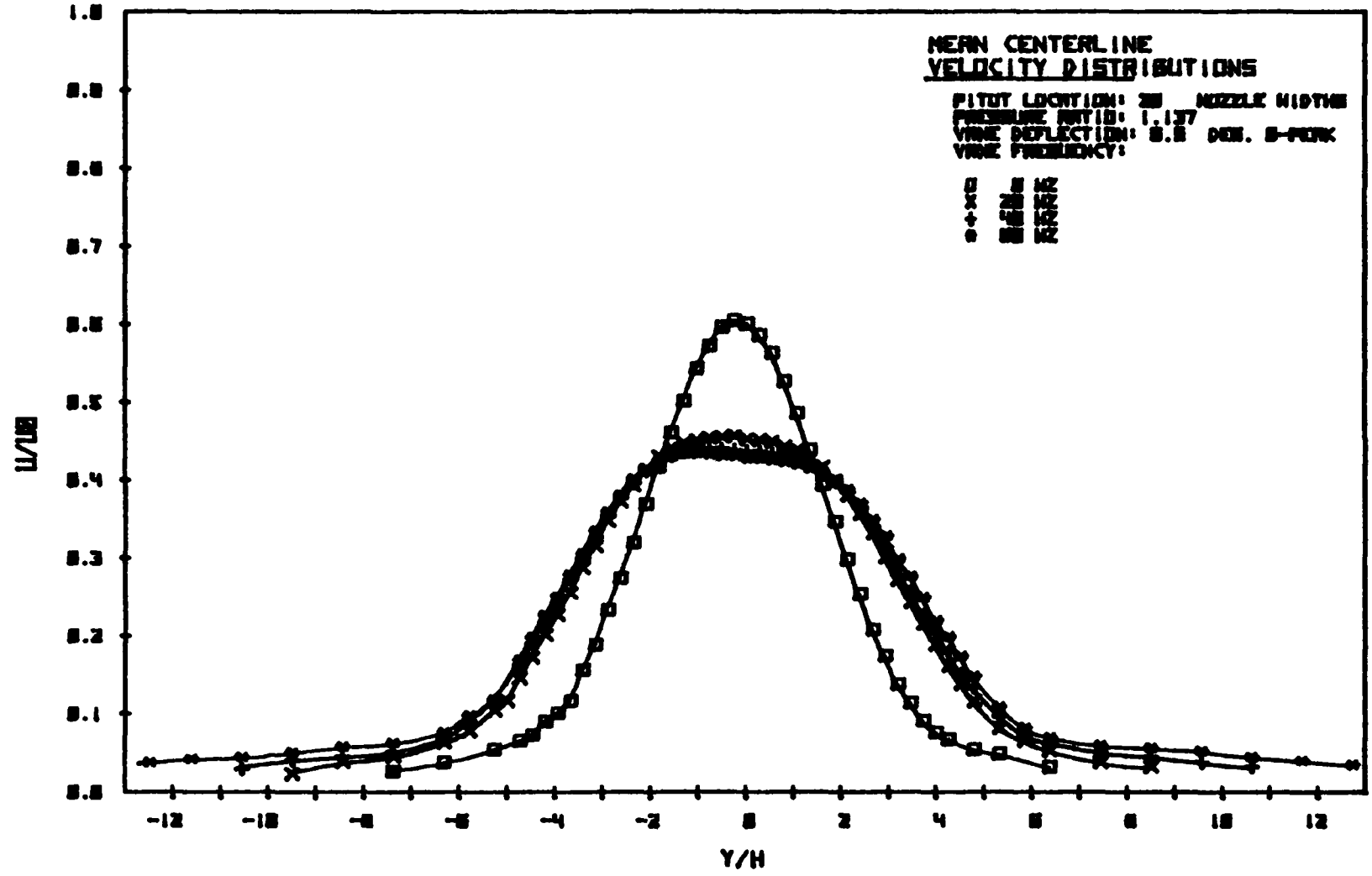


Figure 20 (Free Jet)

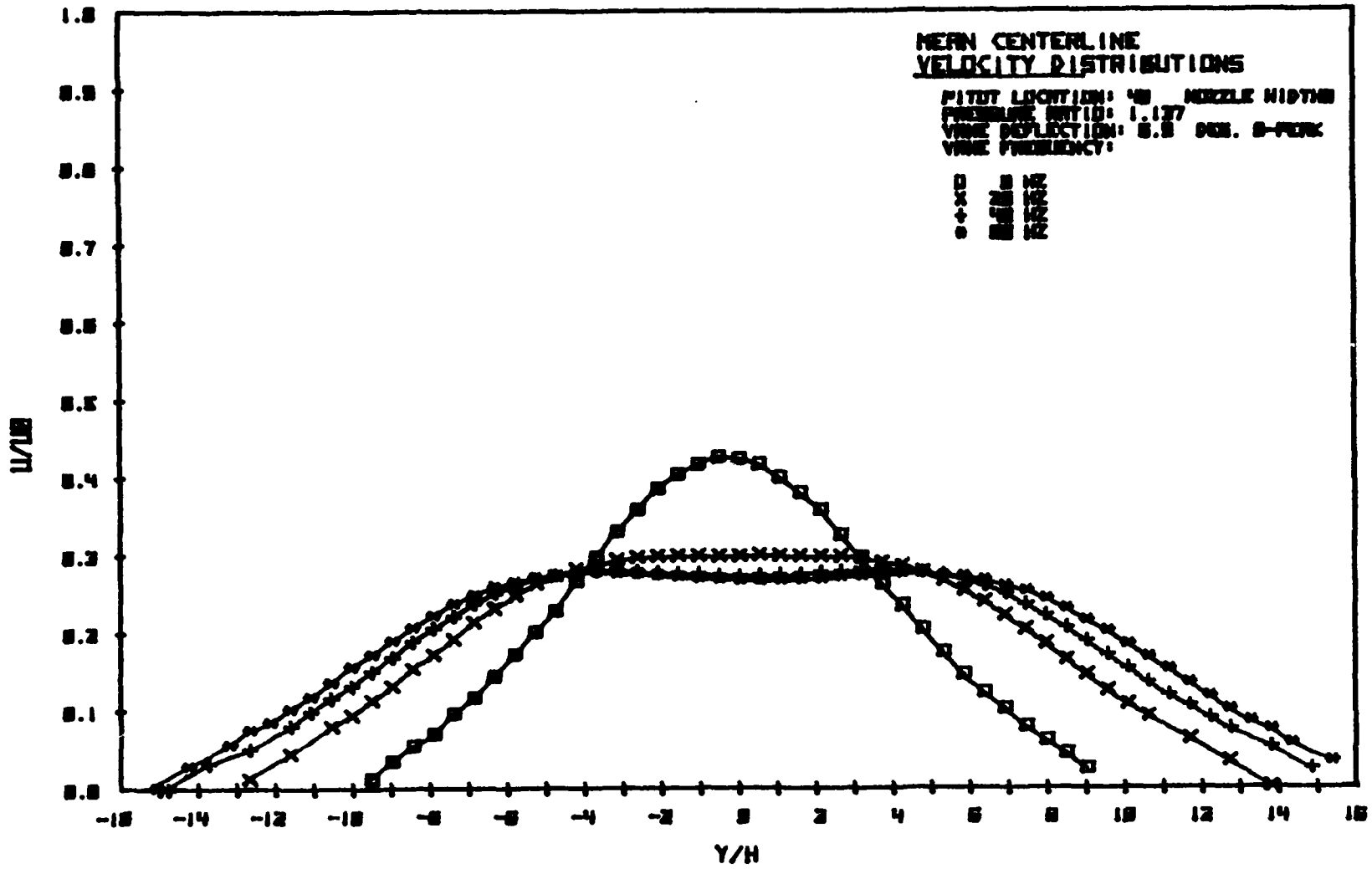


Figure 21 (Free Jet)

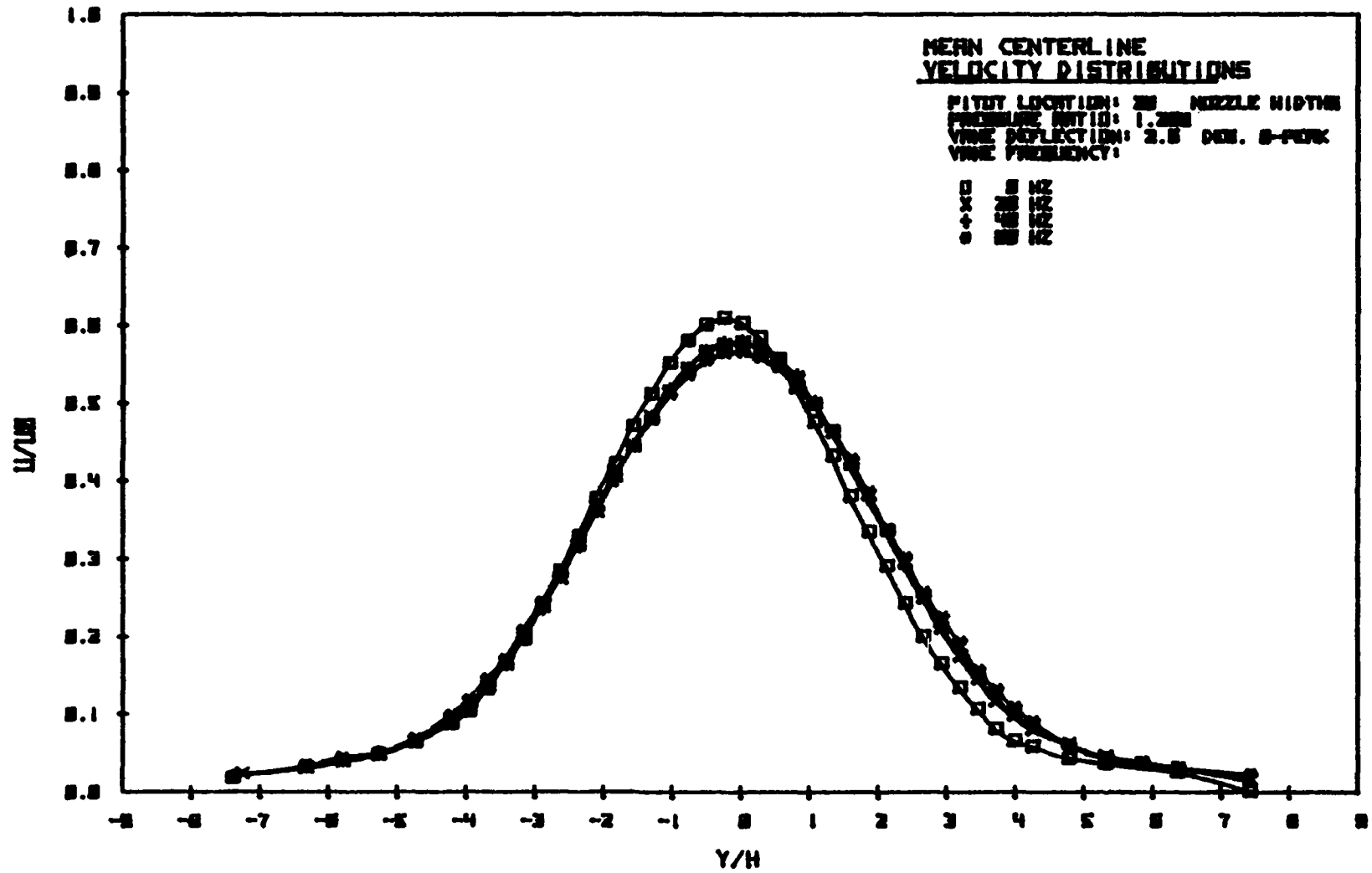


Figure 22 (Free Jet)

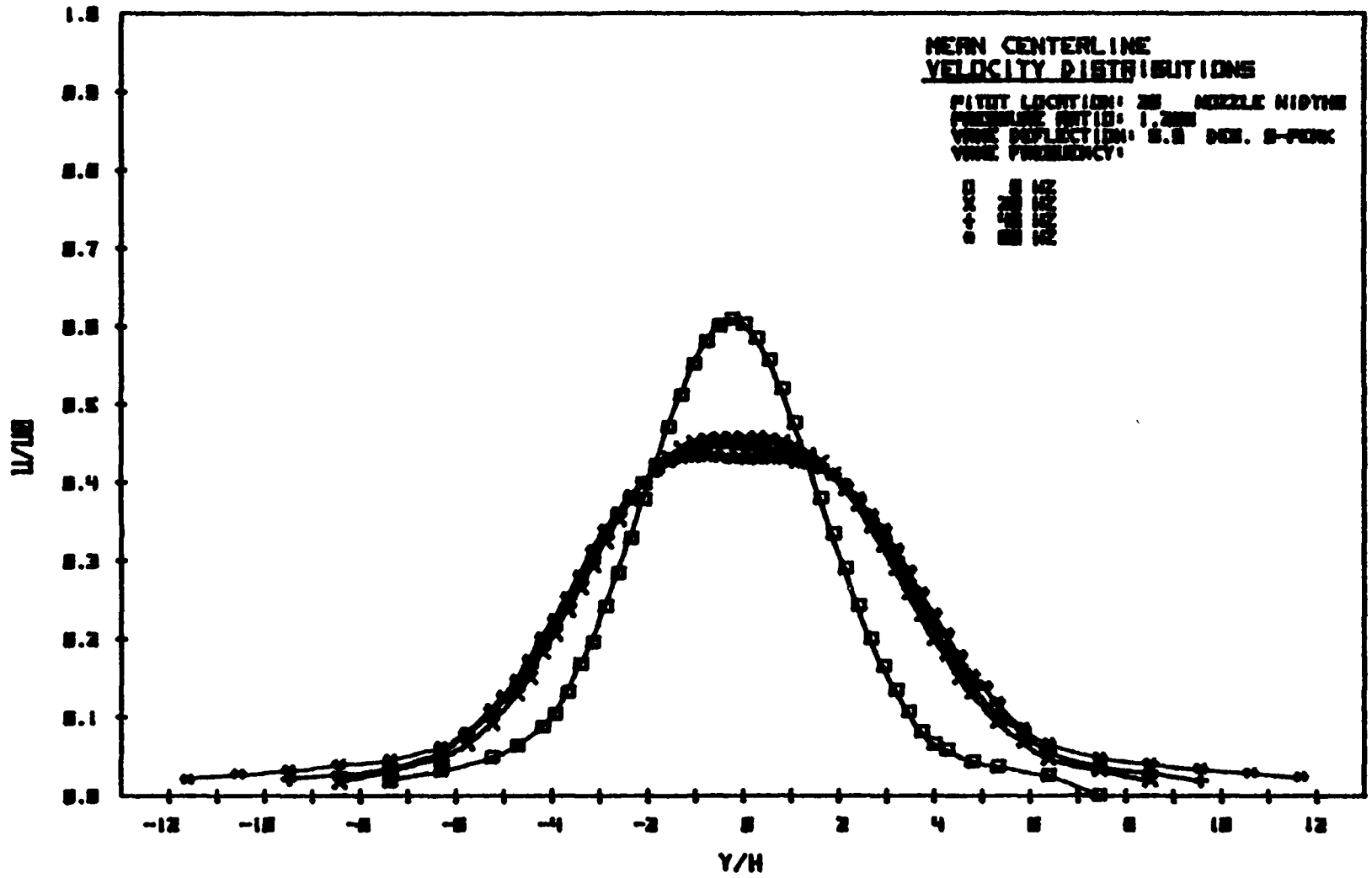


Figure 23 (Free Jet)

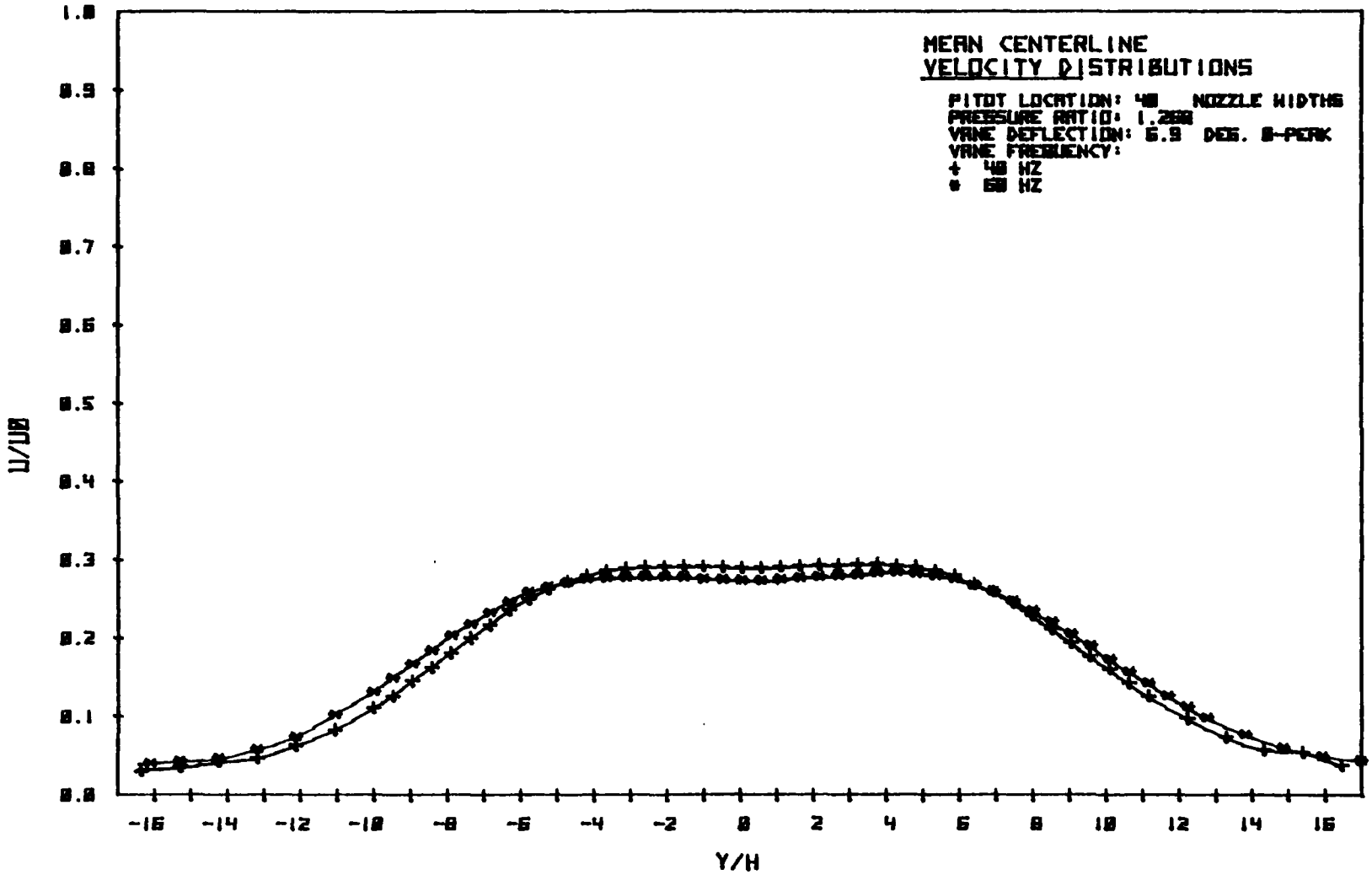


Figure 24 (Free Jet)

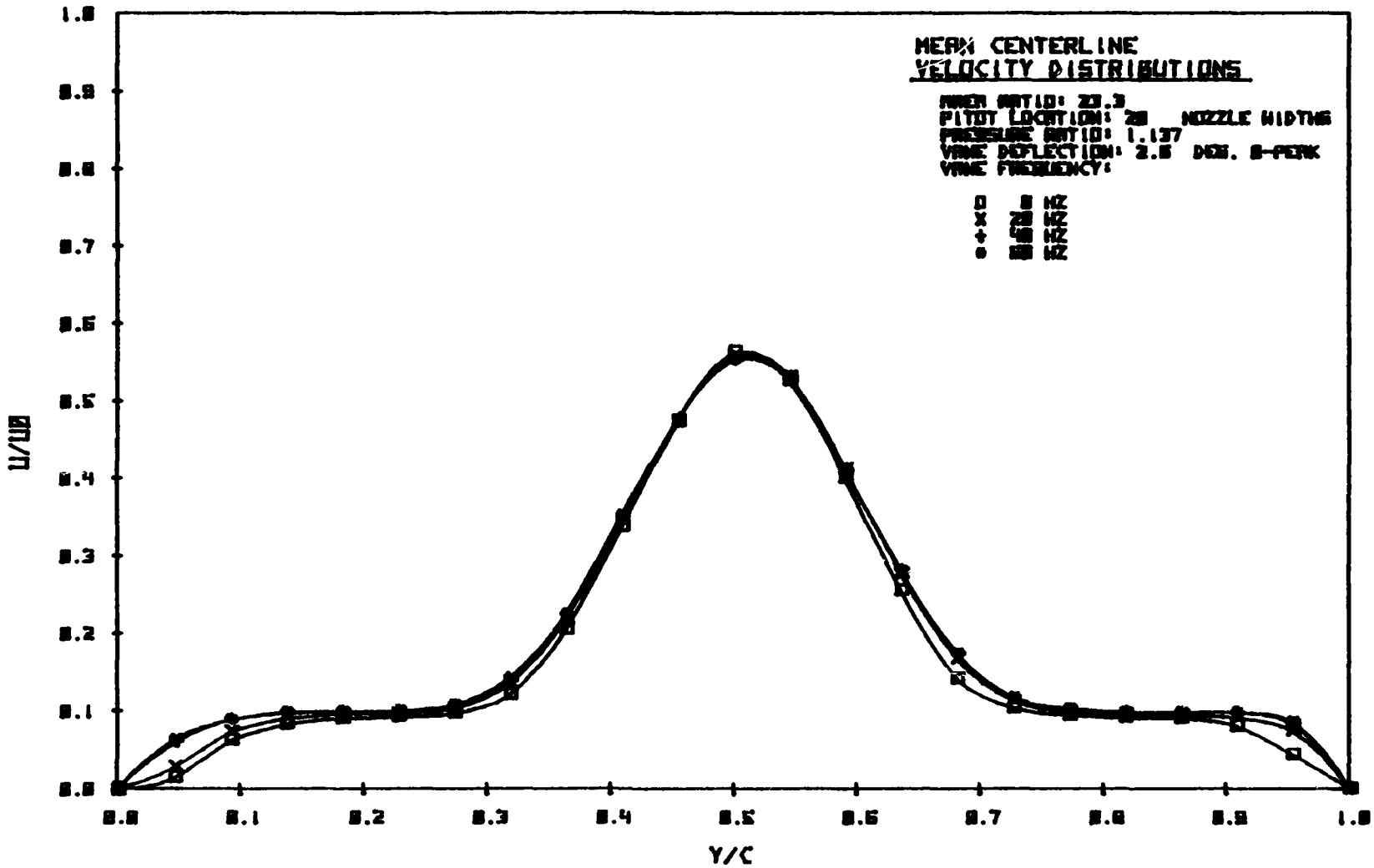


Figure 25 (Ejector Installed)

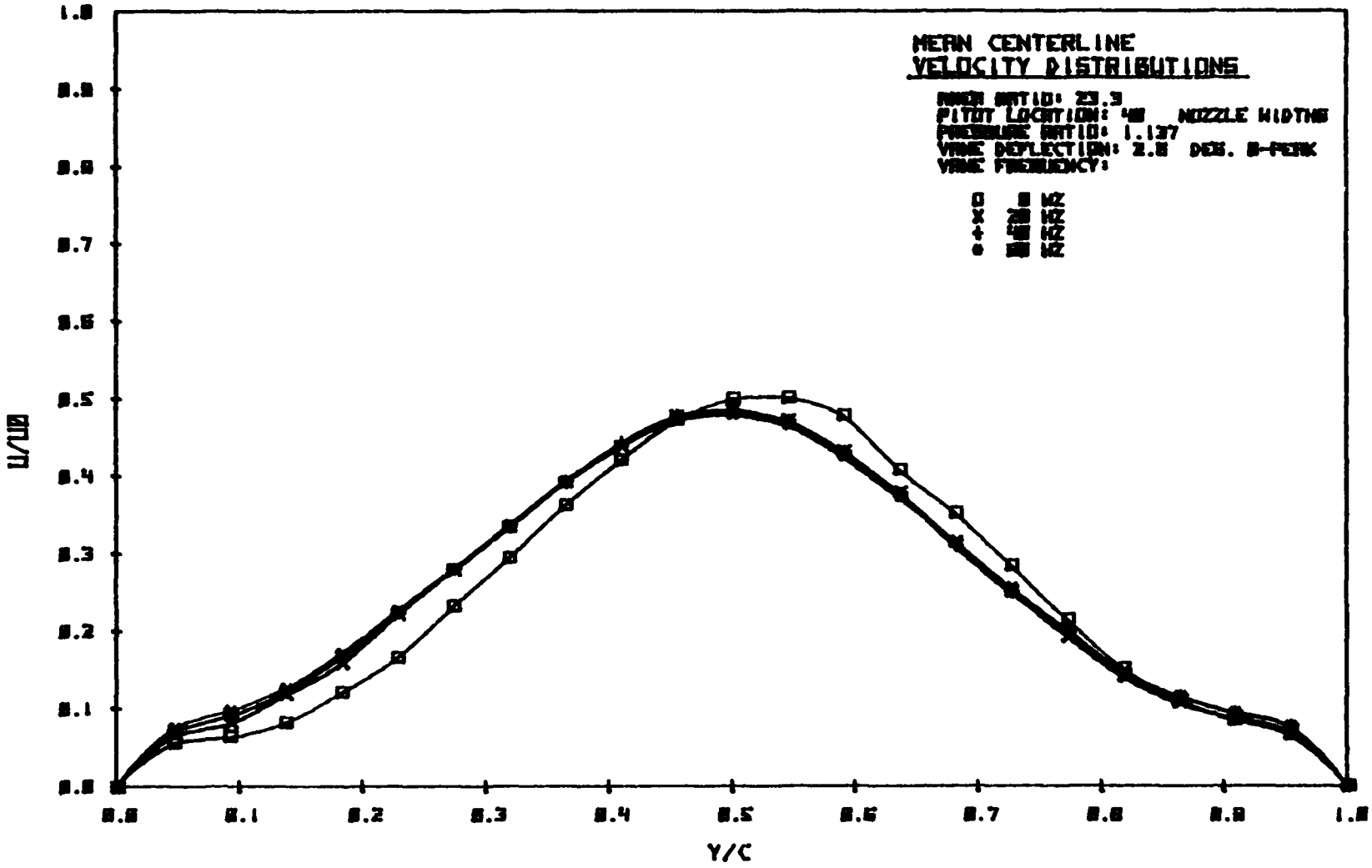


Figure 26 (Ejector Installed)

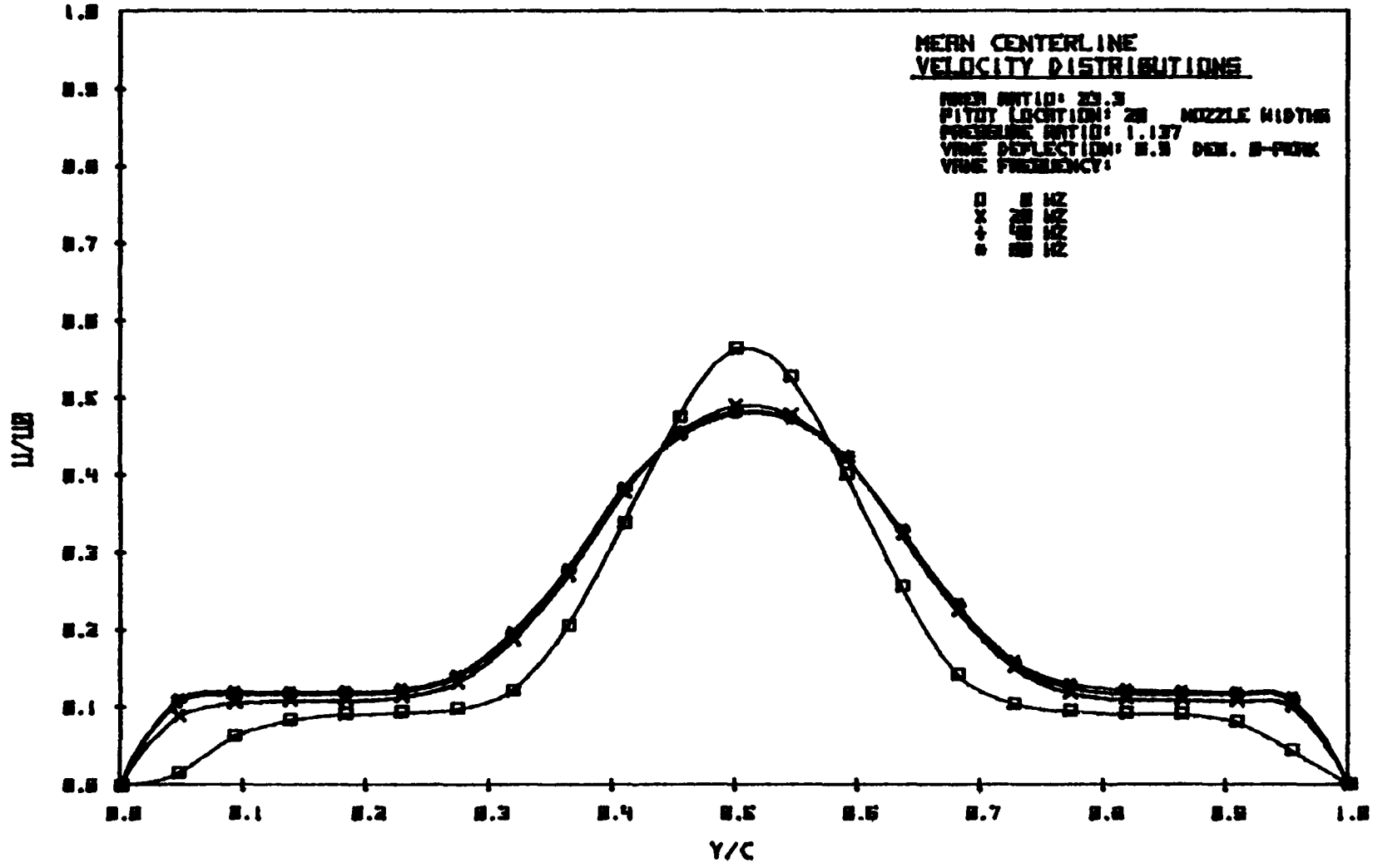


Figure 27 (Ejector Installed)

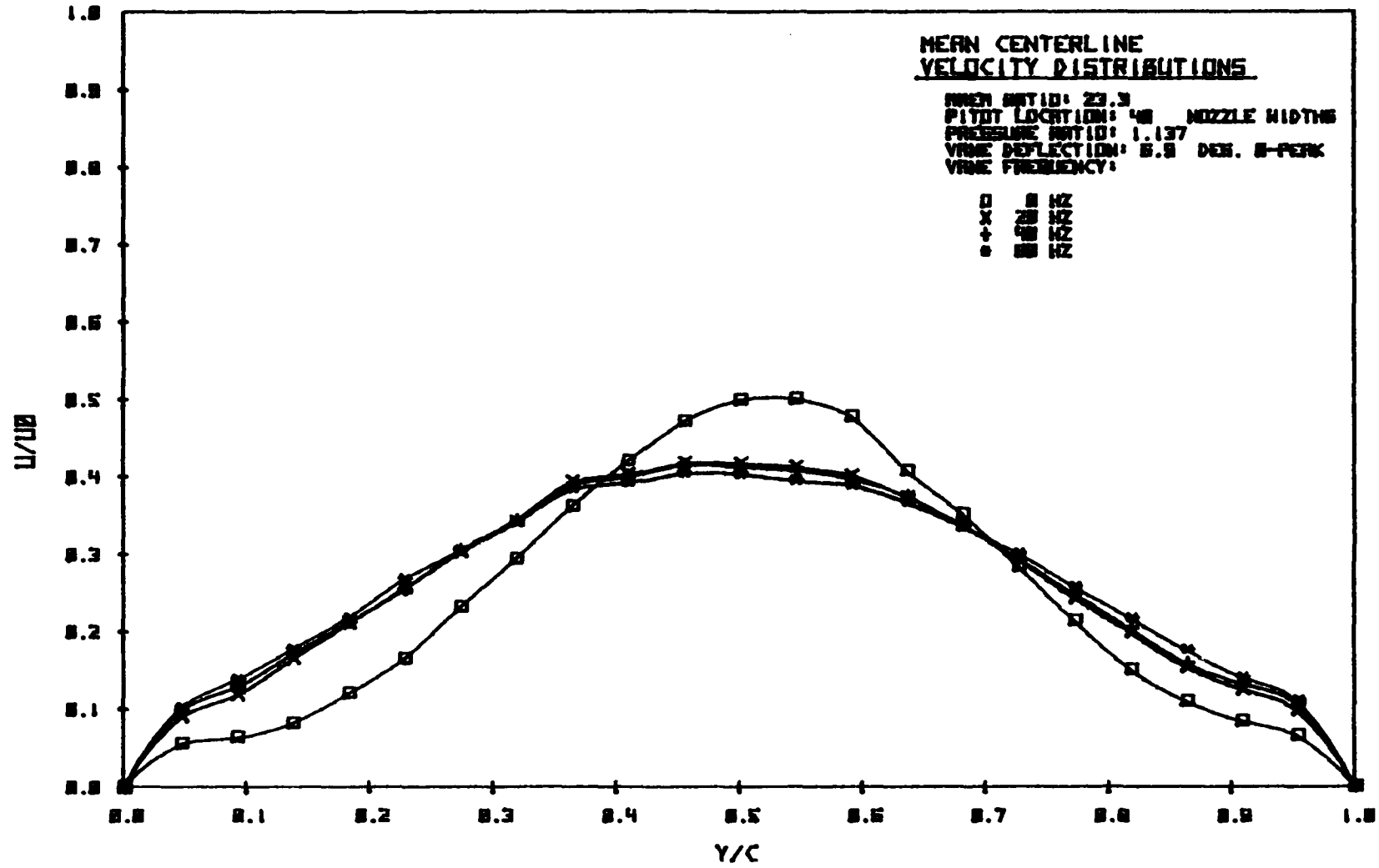


Figure 28 (Ejector Installed)

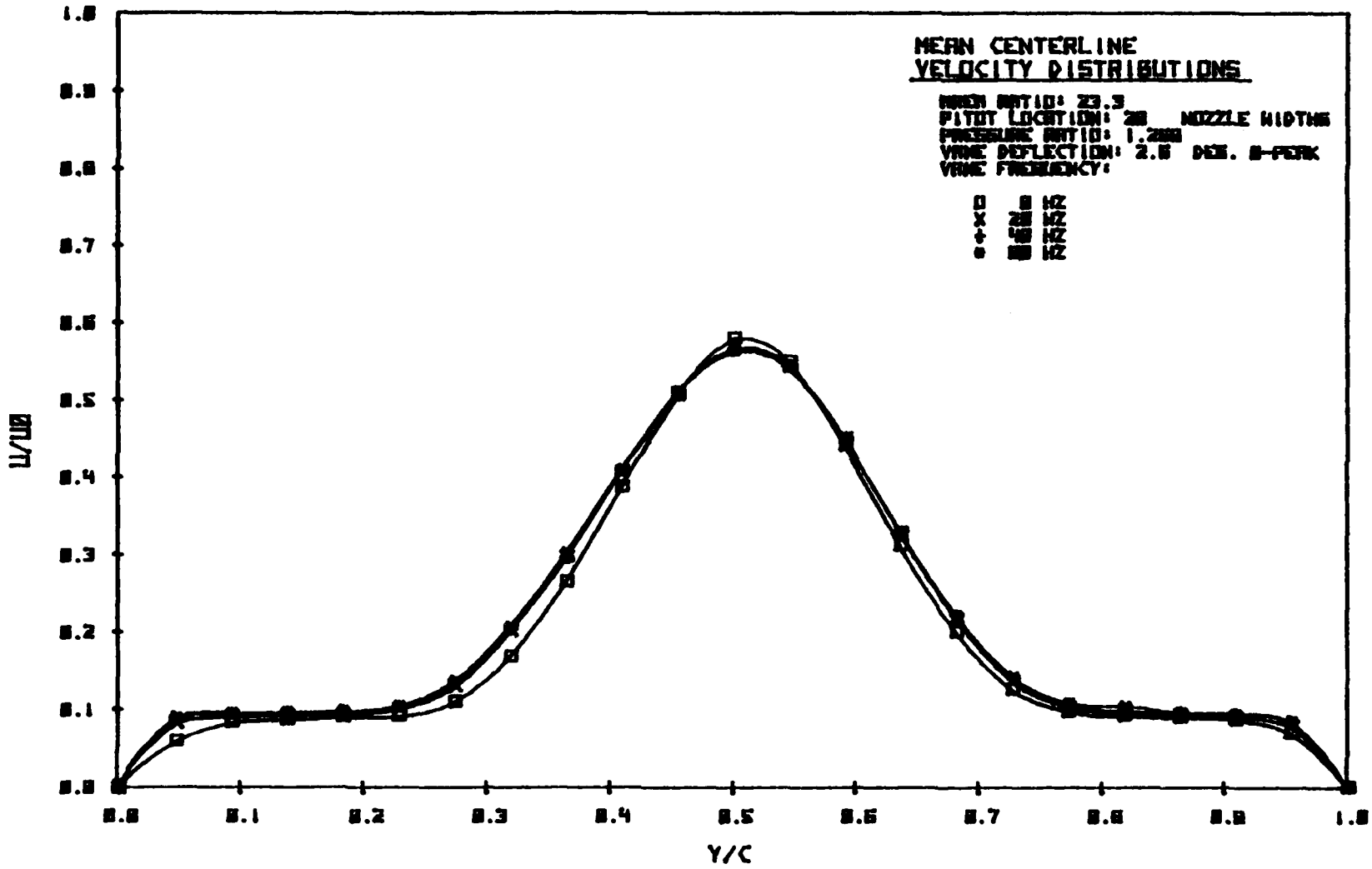


Figure 29 (Ejector Installed)

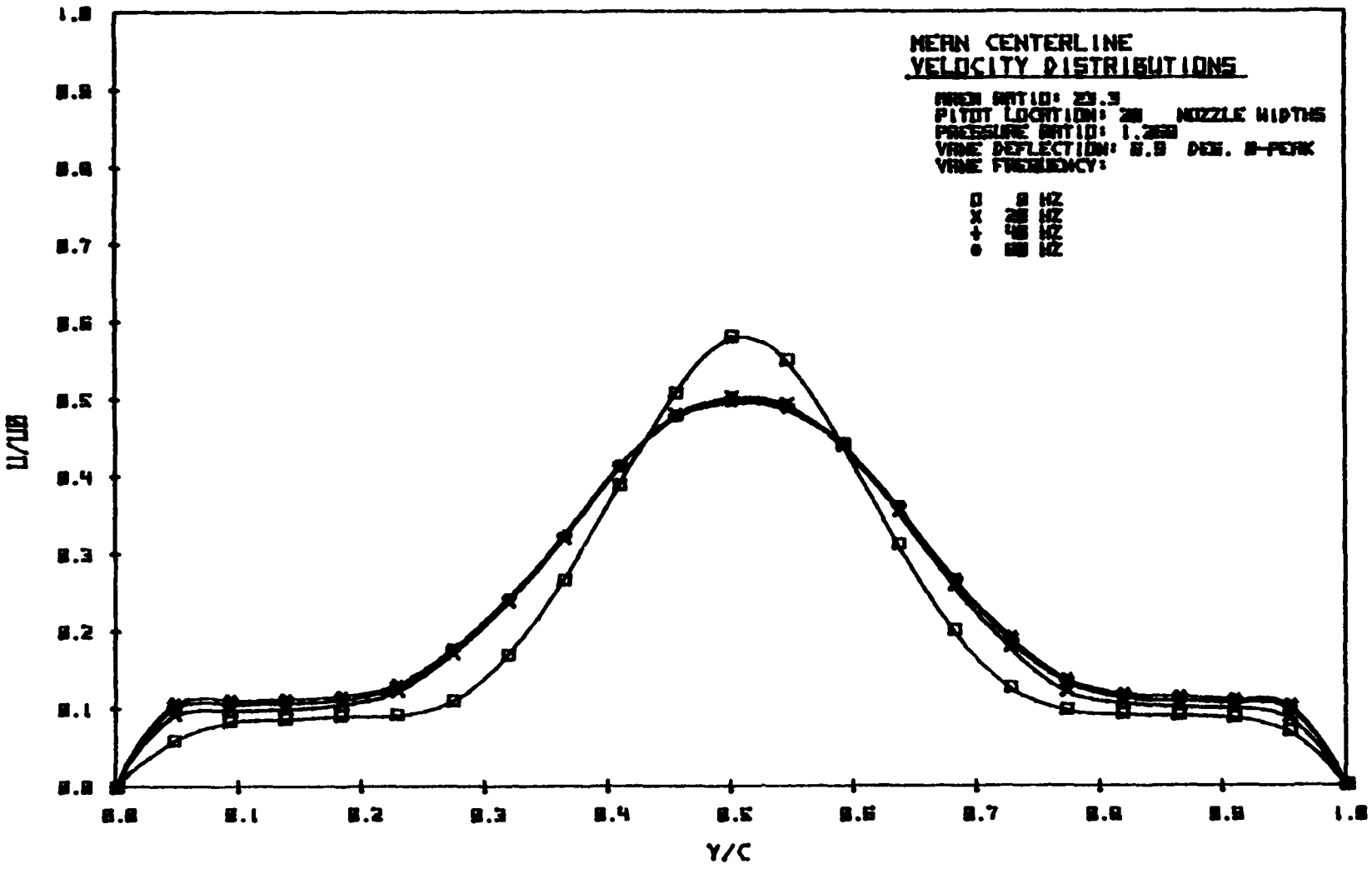


Figure 30 (Ejector Installed)

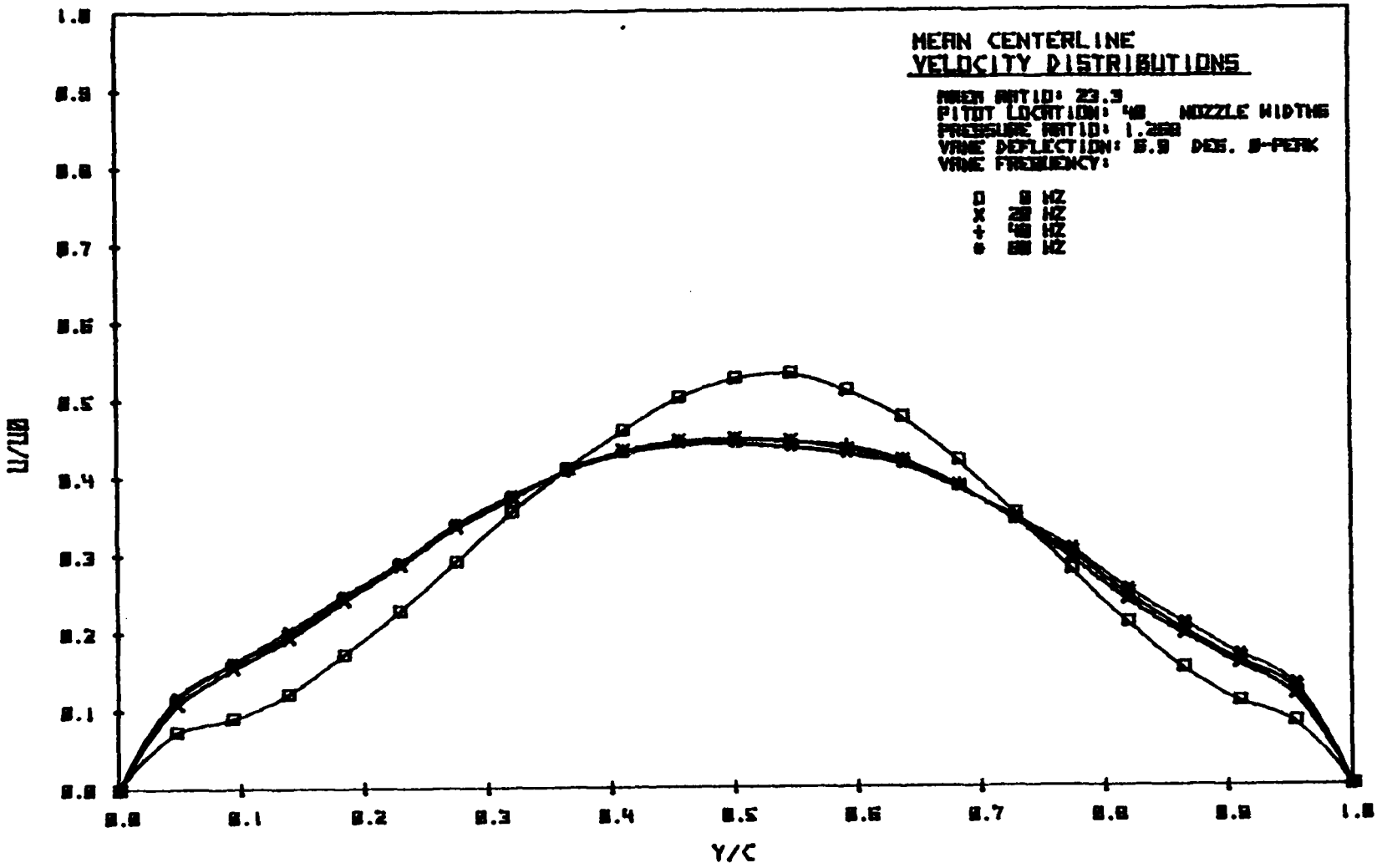


Figure 31 (Ejector Installed)

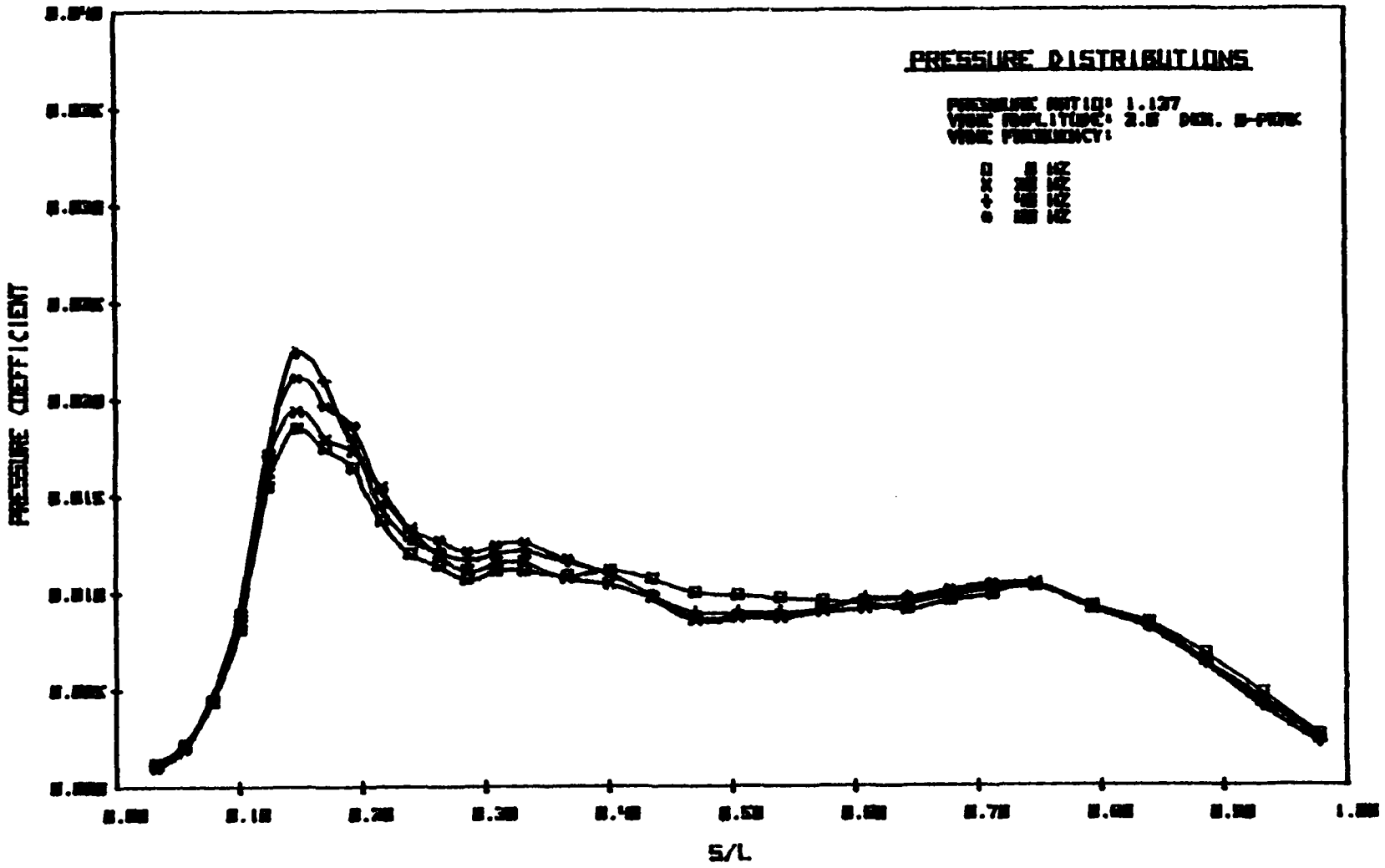

PRESSURE DISTRIBUTIONS
PRESSURE RATIO: 1.127
VANE AMPLITUDE: 2.0° DEG. P-PEAK
VANE FREQUENCY:
PRESSURE COEFFICIENT
S/L

Figure 32

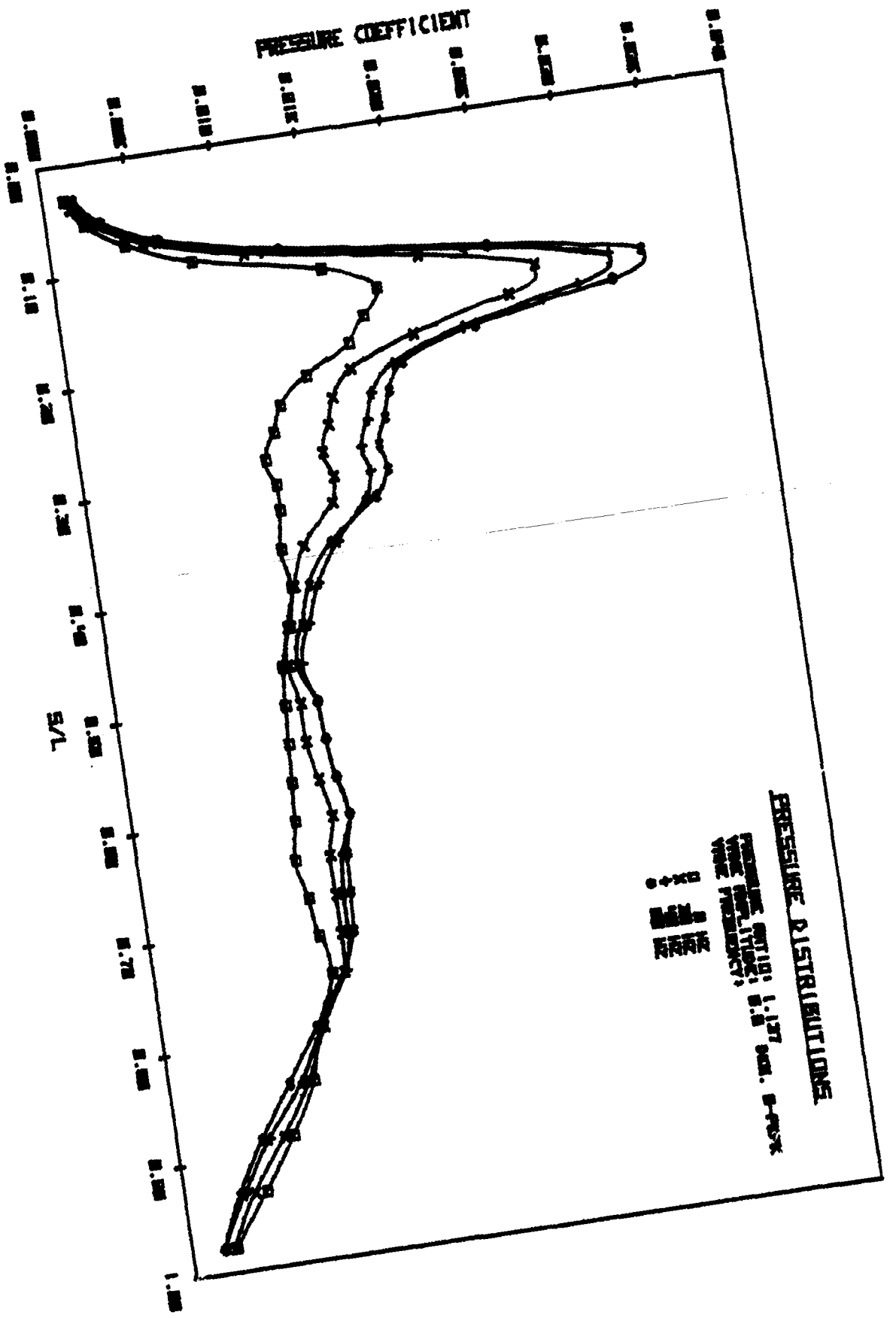


Figure 33

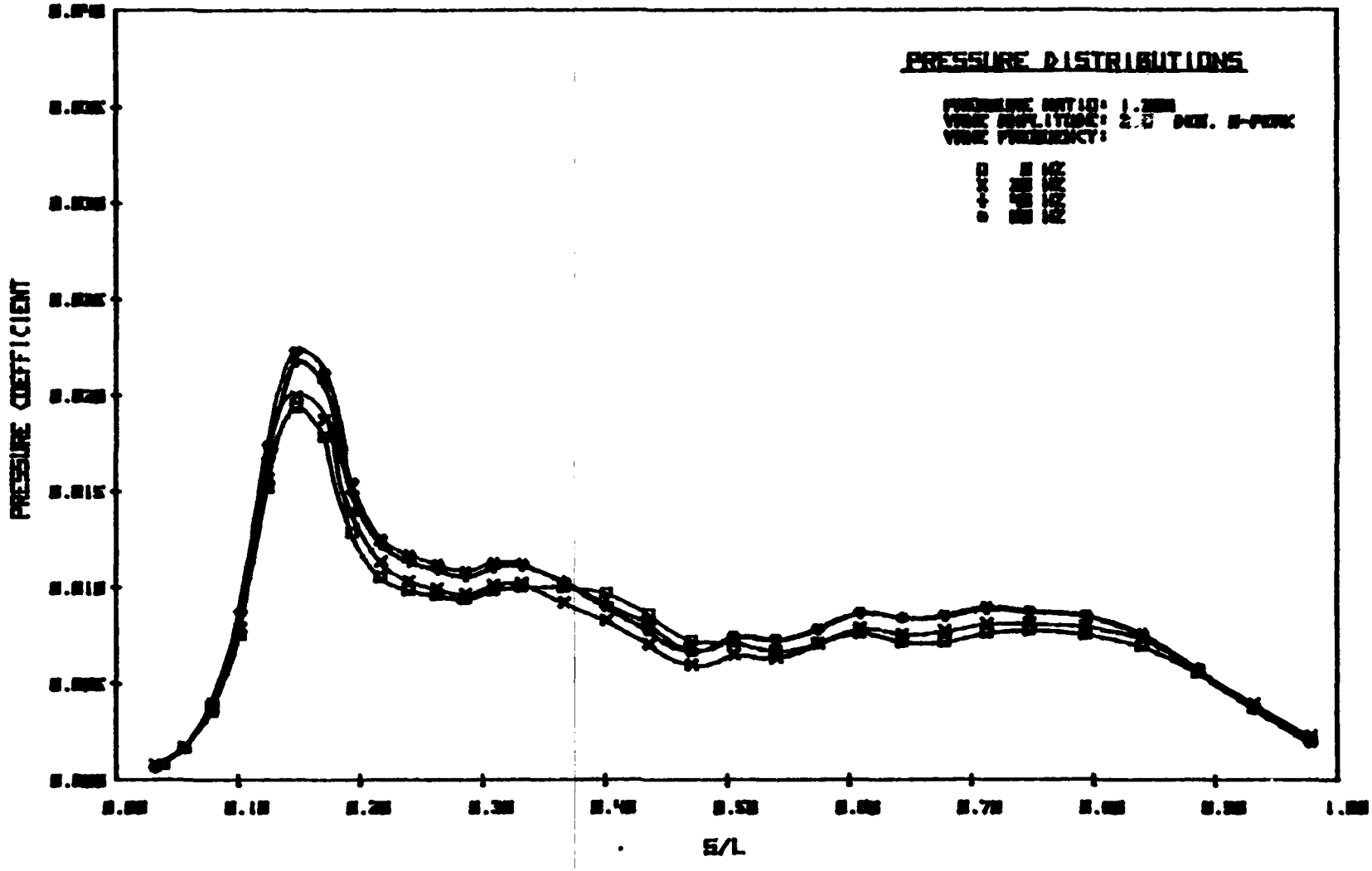


Figure 34

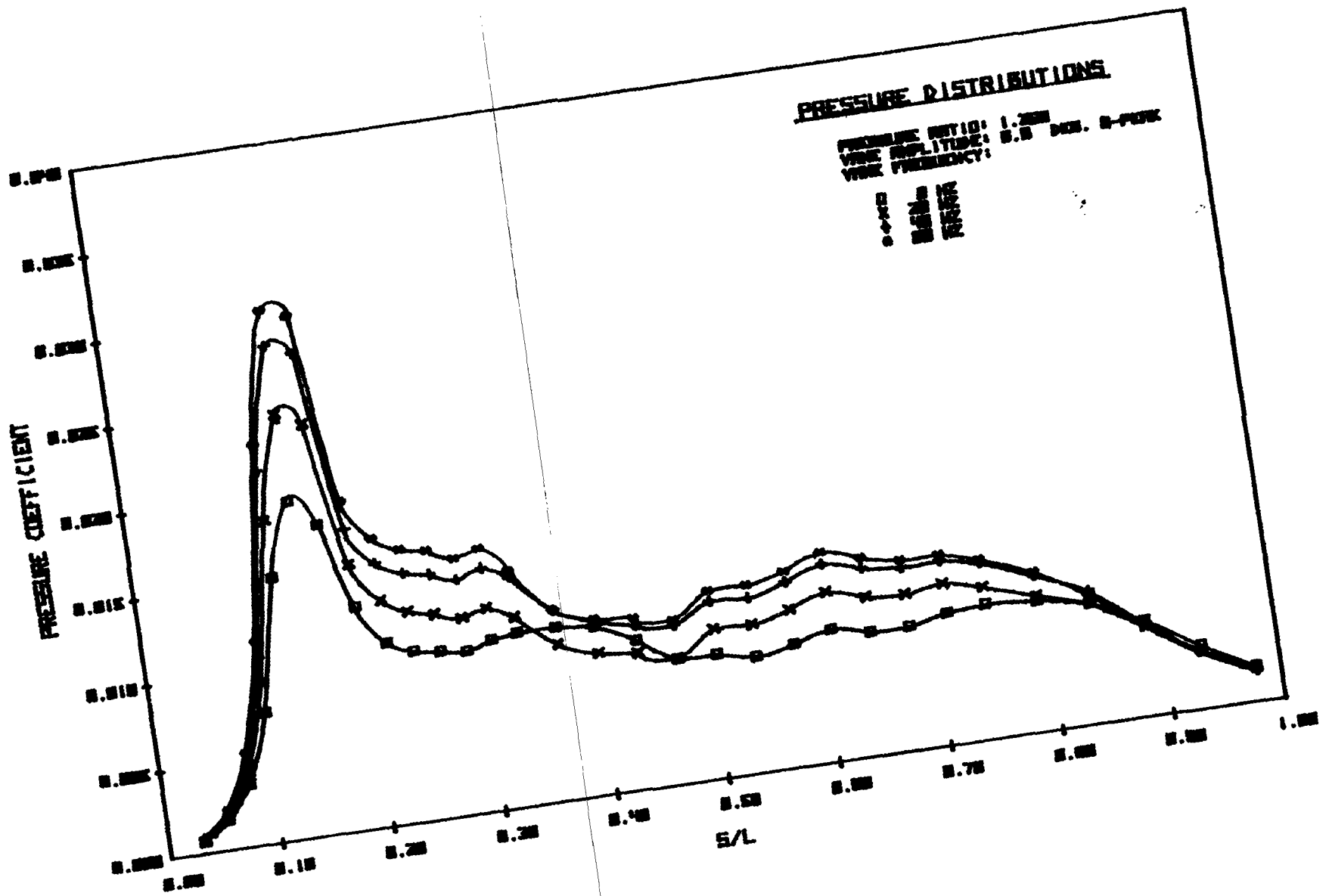


Figure 35

APPENDIX B

TABLE 1

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

FREE JET
U0= 487.6 FT/SEC
VANE FREQUENCY: 0 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.137
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 0.0 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-14.0	-7.408	0.04	13.3	0.027
-12.0	-6.350	0.07	17.6	0.036
-10.0	-5.292	0.15	25.8	0.053
-9.0	-4.763	0.22	31.3	0.064
-8.5	-4.498	0.27	34.6	0.071
-8.0	-4.233	0.42	43.2	0.089
-7.5	-3.969	0.53	48.5	0.100
-7.0	-3.704	0.71	56.2	0.115
-6.5	-3.440	1.28	75.4	0.155
-6.0	-3.175	1.87	91.2	0.187
-5.5	-2.910	2.88	113.1	0.232
-5.0	-2.646	3.97	132.8	0.272
-4.5	-2.381	5.41	155.1	0.318
-4.0	-2.117	7.19	178.7	0.367
-3.5	-1.852	9.22	202.4	0.415
-3.0	-1.588	11.26	223.7	0.459
-2.5	-1.323	13.36	243.7	0.500
-2.0	-1.058	15.67	263.9	0.541
-1.5	-0.794	17.40	278.1	0.570
-1.0	-0.529	18.90	289.8	0.594
-0.5	-0.265	19.45	294.0	0.603
0.0	0.000	19.20	292.1	0.599
0.5	0.265	18.24	284.7	0.584
1.0	0.529	16.85	273.6	0.561
1.5	0.794	14.74	255.9	0.525
2.0	1.058	12.55	236.2	0.484
2.5	1.323	10.23	213.2	0.437
3.0	1.588	8.22	191.1	0.392
3.5	1.852	6.34	167.8	0.344
4.0	2.117	4.70	144.5	0.296
4.5	2.381	3.40	122.9	0.252
5.0	2.646	2.28	100.7	0.206
5.5	2.910	1.60	84.3	0.173
6.0	3.175	1.00	66.7	0.137
6.5	3.440	0.68	55.0	0.113

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TABLE 1 (CONT.)

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
7.0	3.704	0.43	43.7	0.090
7.5	3.969	0.30	36.5	0.075
8.0	4.233	0.23	32.0	0.066
9.0	4.763	0.15	25.8	0.053
10.0	5.292	0.12	23.1	0.047
12.0	6.350	0.05	14.9	0.031

TABLE 2

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

FREE JET
U0= 487.6 FT/SEC
VANE FREQUENCY: 20 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.137
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 2.6 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-14.0	-7.408	0.05	14.9	0.031
-12.0	-6.350	0.10	21.1	0.043
-10.0	-5.292	0.20	29.8	0.061
-9.0	-4.763	0.32	37.7	0.077
-8.5	-4.498	0.42	43.2	0.089
-8.0	-4.233	0.60	51.6	0.106
-7.5	-3.969	0.91	63.6	0.130
-7.0	-3.704	1.27	75.1	0.154
-6.5	-3.440	1.93	92.6	0.190
-6.0	-3.175	2.64	108.3	0.222
-5.5	-2.910	3.58	126.1	0.259
-5.0	-2.646	4.95	148.3	0.304
-4.5	-2.381	6.25	166.7	0.342
-4.0	-2.117	8.03	188.9	0.387
-3.5	-1.852	9.90	209.7	0.430
-3.0	-1.588	11.90	230.0	0.472
-2.5	-1.323	13.80	247.6	0.508
-2.0	-1.058	15.10	259.0	0.531
-1.5	-0.794	16.56	271.3	0.556
-1.0	-0.529	17.45	278.5	0.571
-0.5	-0.265	17.80	281.2	0.577
0.0	0.000	17.55	279.3	0.573
0.5	0.265	16.82	273.4	0.561
1.0	0.529	15.62	263.5	0.540
1.5	0.794	14.08	250.1	0.513
2.0	1.058	12.60	236.6	0.485
2.5	1.323	10.52	216.2	0.443
3.0	1.588	8.61	195.6	0.401
3.5	1.852	6.96	175.9	0.361
4.0	2.117	5.26	152.9	0.314
4.5	2.381	3.93	132.2	0.271
5.0	2.646	2.83	112.1	0.230
5.5	2.910	2.04	95.2	0.195
6.0	3.175	1.43	79.7	0.163
6.5	3.440	0.96	65.3	0.134
7.0	3.704	0.63	52.9	0.109
8.0	4.233	0.32	37.7	0.077
10.0	5.292	0.14	24.9	0.051
12.0	6.350	0.07	17.6	0.036
14.0	7.408	0.05	14.9	0.031

TABLE 3

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

FREE JET
U0= 487.6 FT/SEC
VANE FREQUENCY: 40 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.137
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 2.6 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-14.0	-7.408	0.06	16.3	0.033
-12.0	-6.350	0.12	23.1	0.047
-10.0	-5.292	0.20	29.8	0.061
-9.0	-4.763	0.35	39.4	0.081
-8.5	-4.498	0.48	46.2	0.095
-8.0	-4.233	0.73	57.0	0.117
-7.5	-3.969	1.00	66.7	0.137
-7.0	-3.704	1.48	81.1	0.166
-6.5	-3.440	2.02	94.7	0.194
-6.0	-3.175	2.77	110.9	0.228
-5.5	-2.910	3.98	133.0	0.273
-5.0	-2.646	5.02	149.4	0.306
-4.5	-2.381	6.46	169.4	0.347
-4.0	-2.117	7.49	182.4	0.374
-3.5	-1.852	9.80	208.7	0.428
-3.0	-1.588	11.62	227.2	0.466
-2.5	-1.323	13.30	243.1	0.499
-2.0	-1.058	14.87	257.1	0.527
-1.5	-0.794	16.22	268.5	0.551
-1.0	-0.529	17.02	275.0	0.564
-0.5	-0.265	17.32	277.4	0.569
0.0	0.000	17.22	276.6	0.567
0.5	0.265	16.60	271.6	0.557
1.0	0.529	15.48	262.3	0.538
1.5	0.794	14.05	249.9	0.512
2.0	1.058	12.53	236.0	0.484
2.5	1.323	10.45	215.5	0.442
3.0	1.588	8.53	194.7	0.399
3.5	1.852	7.05	177.0	0.363
4.0	2.117	5.40	154.9	0.318
4.5	2.381	3.98	133.0	0.273
5.0	2.646	3.02	115.8	0.238
5.5	2.910	2.29	100.9	0.207
6.0	3.175	1.60	84.3	0.173
6.5	3.440	1.10	69.9	0.143

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TABLE 3 (CONT.)

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
7.0	3.704	0.73	57.0	0.117
7.5	3.969	0.54	49.0	0.100
8.0	4.233	0.33	38.3	0.079
10.0	5.292	0.17	27.5	0.056
12.0	6.350	0.07	17.6	0.036
14.0	7.408	0.05	14.9	0.031

TABLE 4

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

FREE JET
U0= 487.6 FT/SEC
VANE FREQUENCY: 60 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.137
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 2.6 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-16.0	-8.467	0.06	16.3	0.033
-14.0	-7.408	0.09	20.0	0.041
-12.0	-6.350	0.13	24.0	0.049
-10.0	-5.292	0.22	31.3	0.064
-9.0	-4.763	0.35	39.4	0.081
-8.5	-4.498	0.50	47.1	0.097
-8.0	-4.233	0.75	57.7	0.118
-7.5	-3.969	1.03	67.7	0.139
-7.0	-3.704	1.46	80.5	0.165
-6.5	-3.440	2.06	95.7	0.196
-6.0	-3.175	2.86	112.7	0.231
-5.5	-2.910	3.93	132.2	0.271
-5.0	-2.646	4.97	148.6	0.305
-4.5	-2.381	6.40	168.6	0.346
-4.0	-2.117	8.10	189.7	0.389
-3.5	-1.852	9.85	209.2	0.429
-3.0	-1.588	11.66	227.6	0.467
-2.5	-1.323	13.24	242.6	0.497
-2.0	-1.058	14.54	254.2	0.521
-1.5	-0.794	15.80	265.0	0.543
-1.0	-0.529	16.55	271.2	0.556
-0.5	-0.265	16.93	274.3	0.562
0.0	0.000	16.77	273.0	0.560
0.5	0.265	16.25	268.7	0.551
1.0	0.529	15.25	260.3	0.534
1.5	0.794	14.06	250.0	0.513
2.0	1.058	12.35	234.3	0.480
2.5	1.323	10.59	216.3	0.445
3.0	1.588	8.96	199.5	0.409
3.5	1.852	7.26	179.6	0.368
4.0	2.117	5.80	160.5	0.329
4.5	2.381	4.31	138.4	0.284
5.0	2.646	3.28	120.7	0.248
5.5	2.910	2.36	102.4	0.210
6.0	3.175	1.74	87.9	0.180

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TABLE 4 (CONT.)

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
6.5	3.440	1.22	73.6	0.151
7.0	3.704	0.85	61.5	0.126
7.5	3.969	0.56	49.9	0.102
8.0	4.233	0.40	42.2	0.086
9.0	4.763	0.23	32.0	0.066
10.0	5.292	0.18	28.3	0.058
12.0	6.350	0.12	23.1	0.047
14.0	7.408	0.08	18.9	0.039
16.0	8.467	0.06	16.3	0.033

TABLE 5

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

FREE JET
U0= 487.6 FT/SEC
VANE FREQUENCY: 20 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.137
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 6.9 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-18.0	-9.525	0.03	11.5	0.024
-16.0	-8.467	0.07	17.6	0.036
-14.0	-7.408	0.10	21.1	0.043
-12.0	-6.350	0.20	29.8	0.061
-11.0	-5.821	0.31	37.1	0.076
-10.0	-5.292	0.56	49.9	0.102
-9.5	-5.027	0.70	55.8	0.114
-9.0	-4.763	1.10	69.9	0.143
-8.5	-4.498	1.54	82.7	0.170
-8.0	-4.233	2.12	97.1	0.199
-7.5	-3.969	2.70	109.5	0.225
-7.0	-3.704	3.42	123.3	0.253
-6.5	-3.440	4.34	138.9	0.285
-6.0	-3.175	5.24	152.6	0.313
-5.5	-2.910	6.37	168.2	0.345
-5.0	-2.646	7.30	180.1	0.369
-4.5	-2.381	8.15	190.3	0.390
-4.0	-2.117	9.00	200.0	0.410
-3.5	-1.852	9.82	208.9	0.428
-3.0	-1.588	10.26	213.5	0.438
-2.5	-1.323	10.59	216.9	0.445
-2.0	-1.058	10.77	218.8	0.449
-1.5	-0.794	10.92	220.3	0.452
-1.0	-0.529	10.97	220.8	0.453
-0.5	-0.265	11.05	221.6	0.454
0.0	0.000	10.86	219.7	0.450
0.5	0.265	10.80	219.1	0.449
1.0	0.529	10.70	218.1	0.447
1.5	0.794	10.42	215.2	0.441
2.0	1.058	10.20	212.9	0.437
2.5	1.323	9.67	207.3	0.425
3.0	1.588	9.23	202.5	0.415
3.5	1.852	8.40	193.2	0.396
4.0	2.117	7.66	184.5	0.378
4.5	2.381	6.71	172.7	0.354

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TABLE 5 (CONT.)

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
5.0	2.646	5.82	160.8	0.330
5.5	2.910	4.78	145.7	0.299
6.0	3.175	3.90	131.6	0.270
6.5	3.440	3.12	117.7	0.241
7.0	3.704	2.43	103.9	0.213
7.5	3.969	1.88	91.4	0.187
8.0	4.233	1.37	78.0	0.160
8.5	4.498	1.00	66.7	0.137
9.0	4.763	0.70	55.8	0.114
10.0	5.292	0.34	38.9	0.080
11.0	5.821	0.22	31.3	0.064
12.0	6.350	0.14	24.9	0.051
14.0	7.408	0.07	17.6	0.036
16.0	8.467	0.05	14.9	0.031

TABLE 6

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

FREE JET
U0= 487.6 FT/SEC
VANE FREQUENCY: 40 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.137
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 6.9 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-20.0	-10.583	0.05	14.9	0.031
-18.0	-9.525	0.08	18.9	0.039
-16.0	-8.467	0.10	21.1	0.043
-14.0	-7.408	0.13	24.0	0.049
-12.0	-6.350	0.23	32.0	0.066
-11.0	-5.82[illegible]	0.42	43.2	0.089
-10.0	-5.292	0.72	56.6	0.116
-9.0	-4.763	1.38	78.3	0.161
-8.5	-4.498	1.89	91.6	0.188
-8.0	-4.233	2.49	105.2	0.216
-7.5	-3.969	3.12	117.7	0.241
-7.0	-3.704	3.92	132.0	0.271
-6.5	-3.440	4.74	145.1	0.298
-6.0	-3.175	5.65	158.5	0.325
-5.5	-2.910	6.63	171.6	0.352
-5.0	-2.646	7.52	182.8	0.375
-4.5	-2.381	8.30	192.0	0.394
-4.0	-2.117	9.00	200.0	0.410
-3.5	-1.852	9.47	205.1	0.421
-3.0	-1.588	9.85	209.2	0.429
-2.5	-1.323	10.05	211.3	0.433
-2.0	-1.058	10.17	212.6	0.436
-1.5	-0.794	10.26	213.5	0.438
-1.0	-0.529	10.26	213.5	0.438
-0.5	-0.265	10.19	212.8	0.436
0.0	0.000	10.11	212.0	0.435
0.5	0.265	10.10	211.9	0.434
1.0	0.529	9.97	210.5	0.432
1.5	0.794	9.90	209.7	0.430
2.0	1.058	9.65	207.1	0.425
2.5	1.323	9.45	204.9	0.420
3.0	1.588	8.95	199.4	0.409
3.5	1.852	8.37	192.9	0.395
4.0	2.117	7.83	186.5	0.383
4.5	2.381	7.00	176.4	0.362

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TABLE 6 (CONT.)

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
5.0	2.646	6.11	164.8	0.338
5.5	2.910	5.22	152.3	0.312
6.0	3.175	4.31	138.4	0.284
6.5	3.440	3.49	124.5	0.255
7.0	3.704	2.72	109.9	0.225
7.5	3.969	2.20	98.9	0.203
8.0	4.233	1.69	86.7	0.178
8.5	4.498	1.20	73.0	0.150
9.0	4.763	0.93	64.3	0.132
10.0	5.292	0.48	46.2	0.095
11.0	5.821	0.27	34.6	0.071
12.0	6.350	0.20	29.8	0.061
14.0	7.408	0.13	24.0	0.049
16.0	8.467	0.10	21.1	0.043
18.0	9.525	0.07	17.6	0.036
20.0	10.583	0.05	14.9	0.031

TABLE 7

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

FREE JET
U0= 487.6 FT/SEC
VANE FREQUENCY: 60 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.137
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 6.9 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-24.0	-12.700	0.07	17.6	0.036
-22.0	-11.642	0.09	20.0	0.041
-20.0	-10.583	0.10	21.1	0.043
-18.0	-9.525	0.13	24.0	0.049
-16.0	-8.467	0.17	27.5	0.056
-14.0	-7.408	0.20	29.8	0.061
-12.0	-6.350	0.30	36.5	0.075
-11.0	-5.821	0.50	47.1	0.097
-10.0	-5.292	0.73	57.0	0.117
-9.0	-4.763	1.50	81.6	0.167
-8.5	-4.498	2.05	95.4	0.196
-8.0	-4.233	2.71	109.7	0.225
-7.5	-3.969	3.31	121.3	0.249
-7.0	-3.704	4.12	135.3	0.277
-6.5	-3.440	4.95	148.3	0.304
-6.0	-3.175	5.94	162.5	0.333
-5.5	-2.910	6.83	174.2	0.357
-5.0	-2.646	7.69	184.9	0.379
-4.5	-2.381	8.56	195.0	0.400
-4.0	-2.117	9.12	201.3	0.413
-3.5	-1.852	9.48	205.2	0.421
-3.0	-1.588	9.80	208.7	0.428
-2.5	-1.323	9.98	210.6	0.432
-2.0	-1.058	10.00	210.8	0.432
-1.5	-0.794	9.98	210.6	0.432
-1.0	-0.529	9.87	209.4	0.429
-0.5	-0.265	9.86	209.3	0.429
0.0	0.000	9.74	208.0	0.427
0.5	0.265	9.70	207.6	0.426
1.0	0.529	9.60	206.5	0.424
1.5	0.794	9.50	205.5	0.421
2.0	1.058	9.37	204.1	0.418
2.5	1.323	9.12	201.3	0.413
3.0	1.588	8.88	198.6	0.407
3.5	1.852	8.51	194.5	0.399

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TABLE 7 (CONT.)

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
4.0	2.117	7.98	188.3	0.386
4.5	2.381	7.27	179.7	0.369
5.0	2.646	6.47	169.6	0.348
5.5	2.910	5.70	159.2	0.326
6.0	3.175	4.72	144.8	0.297
6.5	3.440	4.05	134.2	0.275
7.0	3.704	3.29	120.9	0.248
7.5	3.969	2.55	106.4	0.218
8.0	4.233	2.08	96.1	0.197
8.5	4.498	1.60	84.3	0.173
9.0	4.763	1.15	71.5	0.147
10.0	5.292	0.62	52.5	0.108
11.0	5.821	0.35	39.4	0.081
12.0	6.350	0.25	33.3	0.068
14.0	7.408	0.18	28.3	0.058
16.0	8.467	0.16	26.7	0.055
18.0	9.525	0.14	24.9	0.051
20.0	10.583	0.10	21.1	0.043
22.0	11.642	0.08	18.9	0.039
24.0	12.700	0.06	16.3	0.033

TABLE 8

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

FREE JET
U0= 485.6 FT/SEC
VANE FREQUENCY: 0 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.137
PITOT LOCATION: 40 NOZZLE WIDTHS
VANE DEFLECTION: 0.0 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-18.0	-9.525	0.01	6.7	0.014
-17.0	-8.996	0.06	16.4	0.034
-16.0	-8.467	0.15	25.9	0.053
-15.0	-7.938	0.25	33.4	0.069
-14.0	-7.408	0.47	45.8	0.094
-13.0	-6.879	0.70	55.9	0.115
-12.0	-6.350	1.08	69.4	0.143
-11.0	-5.821	1.55	83.1	0.171
-10.0	-5.292	2.10	96.8	0.199
-9.0	-4.763	2.72	110.1	0.227
-8.0	-4.233	3.72	128.8	0.265
-7.0	-3.704	4.64	143.8	0.296
-6.0	-3.175	5.71	159.5	0.329
-5.0	-2.646	6.73	173.2	0.357
-4.0	-2.117	7.80	186.5	0.384
-3.0	-1.588	8.57	195.5	0.403
-2.0	-1.058	9.13	201.7	0.415
-1.0	-0.529	9.55	206.3	0.425
0.0	0.000	9.45	205.2	0.423
1.0	0.529	9.14	201.9	0.416
2.0	1.058	8.40	193.5	0.399
3.0	1.588	7.59	183.9	0.379
4.0	2.117	6.74	173.3	0.357
5.0	2.646	5.58	157.7	0.325
6.0	3.175	4.62	143.5	0.296
7.0	3.704	3.63	127.2	0.262
8.0	4.233	2.89	113.5	0.234
9.0	4.763	2.18	98.6	0.203
10.0	5.292	1.60	84.5	0.174
11.0	5.821	1.11	70.3	0.145
12.0	6.350	0.78	59.0	0.121
13.0	6.879	0.54	49.1	0.101
14.0	7.408	0.32	37.8	0.078
15.0	7.938	0.19	29.1	0.060
16.0	8.467	0.10	21.1	0.043
17.0	8.996	0.03	11.6	0.024

TABLE 9

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

FREE JET
U0= 485.6 FT/SEC
VANE FREQUENCY: 20 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.137
PITOT LOCATION: 40 NOZZLE WIDTHS
VANE DEFLECTION: 2.6 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-20.0	-10.583	0.01	6.7	0.014
-18.0	-9.525	0.06	16.4	0.034
-17.0	-8.996	0.12	23.1	0.048
-16.0	-8.467	0.21	30.6	0.063
-15.0	-7.938	0.32	37.8	0.078
-14.0	-7.408	0.50	47.2	0.097
-13.0	-6.879	0.76	58.2	0.120
-12.0	-6.350	1.20	73.1	0.151
-11.0	-5.821	1.59	84.2	0.173
-10.0	-5.292	2.11	97.0	0.200
-9.0	-4.763	2.72	110.1	0.227
-8.0	-4.233	3.41	123.3	0.254
-7.0	-3.704	4.23	137.3	0.283
-6.0	-3.175	5.08	150.5	0.310
-5.0	-2.646	6.04	164.1	0.338
-4.0	-2.117	6.81	174.2	0.359
-3.0	-1.588	7.52	183.1	0.377
-2.0	-1.058	8.06	189.6	0.390
-1.0	-0.529	8.24	191.7	0.395
0.0	0.000	8.50	194.7	0.401
1.0	0.529	8.43	193.9	0.399
2.0	1.058	8.10	190.0	0.391
3.0	1.588	7.52	183.1	0.377
4.0	2.117	6.85	174.7	0.360
5.0	2.646	6.12	165.2	0.340
6.0	3.175	5.32	154.0	0.317
7.0	3.704	4.50	141.6	0.292
8.0	4.233	3.78	129.8	0.267
9.0	4.763	3.00	115.6	0.238
10.0	5.292	2.38	103.0	0.212
11.0	5.821	1.83	90.3	0.186
12.0	6.350	1.34	77.3	0.159
13.0	6.879	1.02	67.4	0.139
14.0	7.408	0.73	57.0	0.117
15.0	7.938	0.50	47.2	0.097
16.0	8.467	0.32	37.8	0.078
17.0	8.996	0.19	29.1	0.060
18.0	9.525	0.12	23.1	0.048
20.0	10.583	0.03	11.6	0.024

TABLE 10

MEAN CENTERLINE VELOCITY DISTRISUTION DATA

FREE JET
U0= 485.6 FT/SEC
VANE FREQUENCY: 40 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.137
PITOT LOCATION: 40 NOZZLE WIDTHS
VANE DEFLECTION: 2.6 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-22.0	-11.642	0.00	0.0	0.000
-20.0	-10.583	0.01	6.7	0.014
-18.0	-9.525	0.11	22.1	0.046
-17.0	-8.996	0.22	31.3	0.064
-16.0	-8.467	0.33	38.4	0.079
-15.0	-7.938	0.51	47.7	0.098
-14.0	-7.408	0.73	57.0	0.117
-13.0	-6.879	1.05	68.4	0.141
-12.0	-6.350	1.41	79.3	0.163
-11.0	-5.821	1.86	91.1	0.188
-10.0	-5.292	2.41	103.7	0.213
-9.0	-4.763	3.01	115.8	0.239
-8.0	-4.233	3.74	129.1	0.266
-7.0	-3.704	4.47	141.2	0.291
-6.0	-3.175	5.21	152.4	0.314
-5.0	-2.646	5.85	161.5	0.333
-4.0	-2.117	6.47	169.8	0.350
-3.0	-1.588	7.00	176.6	0.364
-2.0	-1.058	7.40	181.6	0.374
-1.0	-0.529	7.65	184.7	0.380
0.0	0.000	7.75	185.9	0.383
1.0	0.529	7.67	184.9	0.381
2.0	1.058	7.52	183.1	0.377
3.0	1.588	7.15	178.5	0.368
4.0	2.117	6.68	172.6	0.355
5.0	2.646	6.07	164.5	0.339
6.0	3.175	5.47	156.2	0.322
7.0	3.704	4.69	144.6	0.298
8.0	4.233	4.03	134.0	0.276
9.0	4.763	3.21	119.6	0.246
10.0	5.292	2.69	109.5	0.226
11.0	5.821	2.13	97.4	0.201
12.0	6.350	1.64	85.5	0.176
13.0	6.879	1.25	74.6	0.154
14.0	7.408	0.93	64.4	0.133

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TABLE 10 (CONT.)

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
15.0	7.938	0.64	53.4	0.110
16.0	8.467	0.49	46.7	0.096
17.0	8.996	0.33	38.4	0.079
18.0	9.525	0.23	32.0	0.066
19.0	10.054	0.13	24.1	0.050
20.0	10.583	0.06	16.4	0.034
22.0	11.642	0.01	6.7	0.014

TABLE 11

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

FREE JET
U0= 485.6 FT/SEC
VANE FREQUENCY: 60 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.137
PITOT LOCATION: 40 NOZZLE WIDTHS
VANE DEFLECTION: 2.6 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-23.0	-12.171	0.01	6.7	0.014
-21.0	-11.113	0.04	13.4	0.028
-20.0	-10.583	0.10	21.1	0.043
-19.0	-10.054	0.14	25.0	0.051
-18.0	-9.525	0.23	32.0	0.066
-17.0	-8.996	0.35	39.5	0.081
-16.0	-8.467	0.53	48.6	0.100
-15.0	-7.938	0.78	59.0	0.121
-14.0	-7.408	0.98	66.1	0.136
-13.0	-6.879	1.37	78.1	0.161
-12.0	-6.350	1.80	89.6	0.184
-11.0	-5.821	2.30	101.3	0.209
-10.0	-5.292	2.88	113.3	0.233
-9.0	-4.763	3.38	122.7	0.253
-8.0	-4.233	4.06	134.5	0.277
-7.0	-3.704	4.69	144.6	0.298
-6.0	-3.175	5.32	154.0	0.317
-5.0	-2.646	5.81	160.9	0.331
-4.0	-2.117	6.34	168.1	0.346
-3.0	-1.588	6.70	172.8	0.356
-2.0	-1.058	6.93	175.8	0.362
-1.0	-0.529	7.04	177.2	0.365
0.0	0.000	7.14	178.4	0.367
1.0	0.529	7.12	178.2	0.367
2.0	1.058	7.00	176.6	0.364
3.0	1.588	6.75	173.5	0.357
4.0	2.117	6.40	168.9	0.348
5.0	2.646	6.00	163.5	0.337
6.0	3.175	5.46	156.0	0.321
7.0	3.704	4.92	148.1	0.305
8.0	4.233	4.35	139.3	0.287
9.0	4.763	3.75	129.3	0.266
10.0	5.292	3.14	118.3	0.244
11.0	5.821	2.61	107.9	0.222
12.0	6.350	2.11	97.0	0.200

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TABLE 11 (CONT.)

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
13.0	6.879	1.70	87.1	0.179
14.0	7.408	1.34	77.3	0.159
15.0	7.938	1.09	69.7	0.144
16.0	8.467	0.74	57.4	0.118
17.0	8.996	0.68	55.1	0.113
18.0	9.525	0.40	42.2	0.087
19.0	10.054	0.31	37.2	0.077
20.0	10.583	0.22	31.3	0.064
21.0	11.113	0.11	22.1	0.046
23.0	12.171	0.04	13.4	0.028

TABLE 12

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

FREE JET
U0= 486.0 FT/SEC
VANE FREQUENCY: 20 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.137
PITOT LOCATION: 40 NOZZLE WIDTHS
VANE DEFLECTION: 6.9 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-24.0	-12.700	0.01	6.7	0.014
-22.0	-11.642	0.10	21.1	0.043
-20.0	-10.583	0.32	37.8	0.078
-19.0	-10.054	0.45	44.8	0.092
-18.0	-9.525	0.66	54.2	0.112
-17.0	-8.996	0.89	63.0	0.130
-16.0	-8.467	1.22	73.8	0.152
-15.0	-7.938	1.54	82.9	0.170
-14.0	-7.408	1.91	92.3	0.190
-13.0	-6.879	2.38	103.0	0.212
-12.0	-6.350	2.79	111.5	0.229
-11.0	-5.821	3.22	119.8	0.247
-10.0	-5.292	3.62	127.0	0.261
-9.0	-4.763	3.92	132.2	0.272
-8.0	-4.233	4.18	136.5	0.281
-7.0	-3.704	4.31	138.6	0.285
-6.0	-3.175	4.53	142.1	0.292
-5.0	-2.646	4.63	143.7	0.296
-4.0	-2.117	4.67	144.3	0.297
-3.0	-1.588	4.69	144.6	0.298
-2.0	-1.058	4.68	144.5	0.297
-1.0	-0.529	4.68	144.5	0.297
0.0	0.000	4.68	144.5	0.297
1.0	0.529	4.73	145.2	0.299
2.0	1.058	4.70	144.8	0.298
3.0	1.588	4.68	144.5	0.297
4.0	2.117	4.67	144.3	0.297
5.0	2.646	4.66	144.1	0.297
6.0	3.175	4.61	143.4	0.295
7.0	3.704	4.43	140.5	0.289
8.0	4.233	4.30	138.5	0.285
9.0	4.763	4.06	134.5	0.277
10.0	5.292	3.75	129.3	0.266
11.0	5.821	3.38	122.8	0.253
12.0	6.350	3.01	115.8	0.238

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TABLE 12 (CONT.)

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
13.0	6.879	2.59	107.5	0.221
14.0	7.408	2.17	98.4	0.202
15.0	7.938	1.80	89.6	0.184
16.0	8.467	1.42	79.6	0.164
17.0	8.996	1.11	70.4	0.145
18.0	9.525	0.82	60.5	0.124
19.0	10.054	0.60	51.7	0.106
20.0	10.583	0.44	44.3	0.091
22.0	11.642	0.20	29.9	0.061
24.0	12.700	0.06	16.4	0.034
26.0	13.758	0.00	0.0	0.000

TABLE 13

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

FREE JET
U0= 486.0 FT/SEC
VANE FREQUENCY: 40 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.137
PITOT LOCATION: 40 NOZZLE WIDTHS
VANE DEFLECTION: 6.9 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-28.0	-14.817	0.00	0.0	0.000
-26.0	-13.758	0.05	14.9	0.031
-24.0	-12.700	0.13	24.1	0.050
-22.0	-11.642	0.33	38.4	0.079
-21.0	-11.113	0.50	47.2	0.097
-20.0	-10.583	0.69	55.5	0.114
-19.0	-10.054	0.90	63.3	0.130
-18.0	-9.525	1.18	72.5	0.149
-17.0	-8.996	1.48	81.2	0.167
-16.0	-8.467	1.85	90.8	0.187
-15.0	-7.938	2.20	99.0	0.204
-14.0	-7.408	2.55	106.6	0.219
-13.0	-6.879	2.94	114.5	0.236
-12.0	-6.350	3.30	121.3	0.250
-11.0	-5.821	3.59	126.5	0.260
-10.0	-5.292	3.81	130.3	0.268
-9.0	-4.763	3.95	132.7	0.273
-8.0	-4.233	4.05	134.4	0.276
-7.0	-3.704	4.12	135.5	0.279
-6.0	-3.175	4.13	135.7	0.279
-5.0	-2.646	4.07	134.7	0.277
-4.0	-2.117	4.03	134.0	0.276
-3.0	-1.588	4.00	133.5	0.275
-2.0	-1.058	3.99	133.4	0.274
-1.0	-0.529	3.93	132.4	0.272
0.0	0.000	3.92	132.2	0.272
1.0	0.529	3.94	132.5	0.273
2.0	1.058	3.96	132.9	0.273
3.0	1.588	3.98	133.2	0.274
4.0	2.117	4.05	134.4	0.276
5.0	2.646	4.07	134.7	0.277
6.0	3.175	4.15	136.0	0.280
7.0	3.704	4.16	136.2	0.280
8.0	4.233	4.09	135.0	0.278
9.0	4.763	4.04	134.2	0.276

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TABLE 13 (CONT.)

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
10.0	5.292	3.96	132.9	0.273
11.0	5.821	3.76	129.5	0.266
12.0	6.350	3.55	125.8	0.259
13.0	6.879	3.29	121.1	0.249
14.0	7.408	2.92	114.1	0.235
15.0	7.938	2.58	107.3	0.221
16.0	8.467	2.22	99.5	0.205
17.0	8.996	1.87	91.3	0.188
18.0	9.525	1.53	82.6	0.170
19.0	10.054	1.24	74.4	0.153
20.0	10.583	0.97	65.8	0.135
21.0	11.113	0.74	57.4	0.118
22.0	11.642	0.58	50.9	0.105
23.0	12.171	0.42	43.3	0.089
24.0	12.700	0.30	36.6	0.075
26.0	13.758	0.14	25.0	0.051
28.0	14.817	0.03	11.6	0.024

TABLE 14

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

FREE JET
U0= 486.0 FT/SEC
VANE FREQUENCY: 60 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.137
PITOT LOCATION: 40 NOZZLE WIDTHS
VANE DEFLECTION: 6.9 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-29.0	-15.346	0.00	0.0	0.000
-27.0	-14.288	0.04	13.4	0.027
-25.0	-13.229	0.16	26.7	0.055
-24.0	-12.700	0.29	36.0	0.074
-23.0	-12.171	0.37	40.6	0.084
-22.0	-11.642	0.54	49.1	0.101
-21.0	-11.113	0.72	56.7	0.117
-20.0	-10.583	0.96	65.4	0.135
-19.0	-10.054	1.27	75.3	0.155
-18.0	-9.525	1.55	83.1	0.171
-17.0	-8.996	1.88	91.6	0.188
-16.0	-8.467	2.22	99.5	0.205
-15.0	-7.938	2.59	107.5	0.221
-14.0	-7.408	2.95	114.7	0.236
-13.0	-6.879	3.24	120.2	0.247
-12.0	-6.350	3.54	125.6	0.258
-11.0	-5.821	3.71	128.6	0.265
-10.0	-5.292	3.86	131.2	0.270
-9.0	-4.763	3.96	132.9	0.273
-8.0	-4.233	4.02	133.9	0.275
-7.0	-3.704	4.08	134.9	0.278
-6.0	-3.175	4.02	133.9	0.275
-5.0	-2.646	4.01	133.7	0.275
-4.0	-2.117	3.96	132.9	0.273
-3.0	-1.588	3.90	131.9	0.271
-2.0	-1.058	3.84	130.9	0.269
-1.0	-0.529	3.83	130.7	0.269
0.0	0.000	3.78	129.8	0.267
1.0	0.529	3.77	129.7	0.267
2.0	1.058	3.78	129.8	0.267
3.0	1.588	3.80	130.2	0.268
4.0	2.117	3.81	130.3	0.268
5.0	2.646	3.88	131.5	0.271
6.0	3.175	3.91	132.0	0.272
7.0	3.704	3.99	133.4	0.274

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TABLE 14 (CONT.)

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
8.0	4.233	4.01	133.7	0.275
9.0	4.763	4.03	134.0	0.276
10.0	5.292	3.93	132.4	0.272
11.0	5.821	3.91	132.0	0.272
12.0	6.350	3.76	129.5	0.266
13.0	6.879	3.57	126.2	0.260
14.0	7.408	3.38	122.8	0.253
15.0	7.938	3.10	117.6	0.242
16.0	8.467	2.79	111.5	0.229
17.0	8.996	2.44	104.3	0.215
18.0	9.525	2.14	97.7	0.201
19.0	10.054	1.79	89.3	0.184
20.0	10.583	1.48	81.2	0.167
21.0	11.113	1.22	73.8	0.152
22.0	11.642	0.95	65.1	0.134
23.0	12.171	0.72	56.7	0.117
24.0	12.700	0.53	48.6	0.100
25.0	13.229	0.38	41.2	0.085
26.0	13.758	0.29	36.0	0.074
27.0	14.288	0.17	27.5	0.057
29.0	15.346	0.06	16.4	0.034

TABLE 15

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

FREE JET
U0= 670.0 FT/SEC
VANE FREQUENCY: 0 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.268
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 0.0 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-14.0	-7.408	0.04	13.4	0.020
-12.0	-6.350	0.10	21.1	0.032
-10.0	-5.292	0.23	32.0	0.048
-9.0	-4.763	0.40	42.3	0.063
-8.0	-4.233	0.76	58.2	0.087
-7.5	-3.969	1.06	68.8	0.103
-7.0	-3.704	1.73	87.9	0.131
-6.5	-3.440	2.80	111.8	0.167
-6.0	-3.175	3.81	130.4	0.195
-5.5	-2.910	5.80	160.9	0.240
-5.0	-2.646	8.05	189.5	0.283
-4.5	-2.381	10.80	219.6	0.328
-4.0	-2.117	14.27	252.4	0.377
-3.5	-1.852	17.85	282.3	0.421
-3.0	-1.588	22.17	314.6	0.470
-2.5	-1.323	26.20	342:0	0.510
-2.0	-1.058	30.45	368.7	0.550
-1.5	-0.794	33.75	388.1	0.579
-1.0	-0.529	36.15	401.7	0.600
-0.5	-0.265	37.20	407.5	0.608
0.0	0.000	36.45	403.3	0.602
0.5	0.265	34.25	391.0	0.584
1.0	0.529	31.10	372.6	0.556
1.5	0.794	27.10	347.8	0.519
2.0	1.058	22.70	318.3	0.475
2.5	1.323	18.70	288.9	0.431
3.0	1.588	14.45	254.0	0.379
3.5	1.852	11.15	223.1	0.333
4.0	2.117	8.43	194.0	0.290
4.5	2.381	5.87	161.9	0.242
5.0	2.646	4.00	132.6	0.199
5.5	2.910	2.71	110.0	0.164
6.0	3.175	1.80	89.6	0.134
6.5	3.440	1.13	71.0	0.106
7.0	3.704	0.65	53.9	0.080

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TABLE 15 (CONT.)

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
7.5	3.969	0.42	43.3	0.065
8.0	4.233	0.33	38.4	0.057
9.0	4.763	0.18	28.3	0.042
10.0	5.292	0.13	24.1	0.036
12.0	6.350	0.06	16.4	0.024
14.0	7.408	0.00	0.0	0.000

TABLE 16

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

FREE JET
U0= 670.0 FT/SEC
VANE FREQUENCY: 20 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.268
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 2.6 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-14.0	-7.408	0.05	14.9	0.022
-12.0	-6.350	0.09	20.0	0.030
-11.0	-5.821	0.15	25.9	0.039
-10.0	-5.292	0.22	31.3	0.047
-9.0	-4.763	0.41	42.8	0.064
-8.0	-4.233	0.82	60.5	0.090
-7.5	-3.969	1.26	75.0	0.112
-7.0	-3.704	1.80	89.6	0.134
-6.5	-3.440	2.66	109.0	0.163
-6.0	-3.175	3.90	131.9	0.197
-5.5	-2.910	5.60	158.1	0.236
-5.0	-2.646	7.45	182.3	0.272
-4.5	-2.381	10.00	211.3	0.315
-4.0	-2.117	12.90	239.9	0.358
-3.5	-1.852	16.40	270.5	0.404
-3.0	-1.588	19.70	296.5	0.443
-2.5	-1.323	23.15	321.4	0.480
-2.0	-1.058	26.60	344.6	0.514
-1.5	-0.794	29.70	364.1	0.543
-1.0	-0.529	32.10	378.5	0.565
-0.5	-0.265	33.10	384.4	0.574
0.0	0.000	33.45	386.4	0.577
0.5	0.265	32.70	382.0	0.570
1.0	0.529	30.90	371.4	0.554
1.5	0.794	28.50	356.7	0.532
2.0	1.058	25.00	334.0	0.499
2.5	1.323	21.40	309.1	0.461
3.0	1.588	17.75	281.5	0.420
3.5	1.852	14.55	254.8	0.380
4.0	2.117	11.30	224.6	0.335
4.5	2.381	8.65	196.5	0.293
5.0	2.646	6.20	166.3	0.248
5.5	2.910	4.40	140.1	0.209
6.0	3.175	3.05	116.7	0.174
6.5	3.440	2.10	96.8	0.145

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TABLE 16 (CONT.)

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
7.0	3.704	1.35	77.6	0.116
7.5	3.969	0.95	65.1	0.097
8.0	4.233	0.62	52.6	0.079
9.0	4.763	0.37	40.6	0.061
10.0	5.292	0.20	29.9	0.045
11.0	5.821	0.13	24.1	0.036
12.0	6.350	0.09	20.0	0.030
14.0	7.408	0.02	9.4	0.014

TABLE 17

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

FREE JET
U0= 670.0 FT/SEC
VANE FREQUENCY: 40 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.268
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 2.6 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-14.0	-7.408	0.05	14.9	0.022
-12.0	-6.350	0.10	21.1	0.032
-11.0	-5.821	0.16	26.7	0.040
-10.0	-5.292	0.25	33.4	0.050
-9.0	-4.763	0.40	42.3	0.063
-8.0	-4.233	0.83	60.9	0.091
-7.5	-3.969	1.20	73.2	0.109
-7.0	-3.704	1.80	89.6	0.134
-6.5	-3.440	2.67	109.2	0.163
-6.0	-3.175	3.85	131.1	0.196
-5.5	-2.910	5.50	156.7	0.234
-5.0	-2.646	7.60	184.2	0.275
-4.5	-2.381	9.90	210.2	0.314
-4.0	-2.117	13.00	240.9	0.360
-3.5	-1.852	16.00	267.2	0.399
-3.0	-1.588	19.80	297.3	0.444
-2.5	-1.323	23.20	321.8	0.480
-2.0	-1.058	26.95	346.8	0.518
-1.5	-0.794	29.80	364.7	0.544
-1.0	-0.529	32.20	379.1	0.566
-0.5	-0.265	33.45	386.4	0.577
0.0	0.000	33.55	387.0	0.578
0.5	0.265	32.70	382.0	0.570
1.0	0.529	31.00	372.0	0.555
1.5	0.794	28.75	358.2	0.535
2.0	1.058	25.20	335.4	0.501
2.5	1.323	21.55	310.1	0.463
3.0	1.588	17.70	281.1	0.420
3.5	1.852	14.10	250.9	0.374
4.0	2.117	11.20	223.6	0.334
4.5	2.381	8.40	193.6	0.289
5.0	2.646	6.27	167.3	0.250
5.5	2.910	4.50	141.7	0.212
6.0	3.175	3.25	120.4	0.180
6.5	3.440	2.15	98.0	0.146

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TABLE 17 (CONT.)

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
7.0	3.704	1.45	80.4	0.120
7.5	3.969	0.98	66.1	0.099
8.0	4.233	0.68	55.1	0.082
9.0	4.763	0.34	39.0	0.058
10.0	5.292	0.18	28.3	0.042
11.0	5.821	0.13	24.1	0.036
12.0	6.350	0.09	20.0	0.030
14.0	7.408	0.04	13.4	0.020

TABLE 18

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

FREE JET
U0= 670.0 FT/SEC
VANE FREQUENCY: 60 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.268
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 2.6 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-14.0	-7.408	0.04	13.4	0.020
-12.0	-6.350	0.12	23.1	0.035
-11.0	-5.821	0.20	29.9	0.045
-10.0	-5.292	0.26	34.1	0.051
-9.0	-4.763	0.47	45.8	0.068
-8.0	-4.233	0.98	66.1	0.099
-7.5	-3.969	1.42	79.6	0.119
-7.0	-3.704	2.12	97.3	0.145
-6.5	-3.440	2.93	114.4	0.171
-6.0	-3.175	4.32	138.9	0.207
-5.5	-2.910	5.95	163.0	0.243
-5.0	-2.646	7.80	186.6	0.278
-4.5	-2.381	10.27	214.1	0.320
-4.0	-2.117	13.22	242.9	0.363
-3.5	-1.852	16.50	271.4	0.405
-3.0	-1.588	19.60	295.8	0.441
-2.5	-1.323	22.80	319.0	0.476
-2.0	-1.058	26.00	340.7	0.508
-1.5	-0.794	28.65	357.6	0.534
-1.0	-0.529	30.75	370.5	0.553
-0.5	-0.265	31.85	377.0	0.563
0.0	0.000	32.00	377.9	0.564
0.5	0.265	31.25	373.5	0.557
1.0	0.529	29.80	364.7	0.544
1.5	0.794	27.55	350.7	0.523
2.0	1.058	24.80	332.7	0.497
2.5	1.323	21.70	311.2	0.465
3.0	1.588	18.40	286.6	0.428
3.5	1.852	14.95	256.3	0.386
4.0	2.117	11.50	226.6	0.338
4.5	2.381	9.15	202.1	0.302
5.0	2.646	6.65	172.3	0.257
5.5	2.910	5.07	150.4	0.225
6.0	3.175	3.75	129.4	0.193
6.5	3.440	2.47	105.0	0.157

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TABLE 18 (CONT.)

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
7.0	3.704	1.75	88.4	0.132
7.5	3.969	1.19	72.9	0.109
8.0	4.233	0.83	60.9	0.091
9.0	4.763	0.37	40.6	0.061
10.0	5.292	0.21	30.6	0.046
11.0	5.821	0.15	25.9	0.039
12.0	6.350	0.10	21.1	0.032
14.0	7.408	0.05	14.9	0.022

TABLE 19

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

FREE JET
U0= 668.1 FT/SEC
VANE FREQUENCY: 20 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.268
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 6.9 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-16.0	-8.467	0.03	11.6	0.017
-14.0	-7.408	0.10	21.1	0.032
-12.0	-6.350	0.23	32.0	0.048
-11.0	-5.821	0.41	42.7	0.064
-10.0	-5.292	0.81	60.1	0.090
-9.0	-4.763	1.63	85.2	0.128
-8.5	-4.498	2.21	99.3	0.149
-8.0	-4.233	3.28	120.9	0.181
-7.5	-3.969	4.17	136.3	0.204
-7.0	-3.704	5.50	156.6	0.234
-6.5	-3.440	6.94	175.9	0.263
-6.0	-3.175	8.47	194.3	0.291
-5.5	-2.910	10.38	215.1	0.322
-5.0	-2.646	12.33	234.4	0.351
-4.5	-2.381	14.10	250.7	0.375
-4.0	-2.117	15.85	265.8	0.398
-3.5	-1.852	17.50	279.3	0.418
-3.0	-1.588	18.55	287.5	0.430
-2.5	-1.323	19.60	295.6	0.442
-2.0	-1.058	20.25	300.4	0.450
-1.5	-0.794	20.60	303.0	0.454
-1.0	-0.529	20.70	303.8	0.455
-0.5	-0.265	20.80	304.5	0.456
0.0	0.000	20.70	303.8	0.455
0.5	0.265	20.80	304.5	0.456
1.0	0.529	20.60	303.0	0.454
1.5	0.794	20.30	300.8	0.450
2.0	1.058	19.75	296.7	0.444
2.5	1.323	18.95	290.6	0.435
3.0	1.588	18.10	284.0	0.425
3.5	1.852	16.80	273.6	0.410
4.0	2.117	15.20	260.3	0.390
4.5	2.381	13.70	247.1	0.370
5.0	2.646	11.70	228.4	0.342
5.5	2.910	10.10	212.2	0.318

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TABLE 19 (CONT.)

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
6.0	3.175	8.30	192.3	0.288
6.5	3.440	6.60	171.5	0.257
7.0	3.704	5.25	153.0	0.229
7.5	3.969	3.95	132.7	0.199
8.0	4.233	3.20	119.4	0.179
8.5	4.498	2.23	99.7	0.149
9.0	4.763	1.70	87.0	0.130
10.0	5.292	0.85	61.6	0.092
11.0	5.821	0.46	45.3	0.068
12.0	6.350	0.21	30.6	0.046
14.0	7.408	0.10	21.1	0.032
16.0	8.467	0.03	11.6	0.017

TABLE 20

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

FREE JET
U0= 668.1 FT/SEC
VANE FREQUENCY: 40 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.268
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 6.9 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-18.0	-9.525	0.05	14.9	0.022
-16.0	-8.467	0.07	17.7	0.026
-14.0	-7.408	0.12	23.1	0.035
-12.0	-6.350	0.30	36.6	0.055
-11.0	-5.821	0.60	51.7	0.077
-10.0	-5.292	1.05	68.4	0.102
-9.0	-4.763	1.98	93.9	0.141
-8.5	-4.498	2.70	109.7	0.164
-8.0	-4.233	3.75	129.3	0.194
-7.5	-3.969	4.62	143.5	0.215
-7.0	-3.704	5.90	162.2	0.243
-6.5	-3.440	7.35	181.0	0.271
-6.0	-3.175	9.15	202.0	0.302
-5.5	-2.910	10.90	220.4	0.330
-5.0	-2.646	12.70	237.9	0.356
-4.5	-2.381	14.40	253.3	0.379
-4.0	-2.117	15.90	266.2	0.398
-3.5	-1.852	17.17	276.6	0.414
-3.0	-1.588	18.35	286.0	0.428
-2.5	-1.323	19.15	292.2	0.437
-2.0	-1.058	19.60	295.6	0.442
-1.5	-0.794	19.80	297.1	0.445
-1.0	-0.529	19.95	298.2	0.446
-0.5	-0.265	19.85	297.5	0.445
0.0	0.000	19.65	295.9	0.443
0.5	0.265	19.75	296.7	0.444
1.0	0.529	19.45	294.4	0.441
1.5	0.794	19.25	292.9	0.438
2.0	1.058	19.00	291.0	0.436
2.5	1.323	18.55	287.5	0.430
3.0	1.588	17.60	280.1	0.419
3.5	1.852	16.70	272.8	0.408
4.0	2.117	15.65	264.1	0.395
4.5	2.381	14.10	250.7	0.375
5.0	2.646	12.35	234.6	0.351

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TABLE 20 (CONT.)

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
5.5	2.910	10.75	218.9	0.328
6.0	3.175	9.10	201.4	0.301
6.5	3.440	7.35	181.0	0.271
7.0	3.704	5.85	161.5	0.242
7.5	3.969	4.65	144.0	0.215
8.0	4.233	3.55	125.8	0.188
8.5	4.498	2.70	109.7	0.164
9.0	4.763	2.02	94.9	0.142
10.0	5.292	1.05	68.4	0.102
11.0	5.821	0.67	54.6	0.082
12.0	6.350	0.30	36.6	0.055
14.0	7.408	0.13	24.1	0.036
16.0	8.467	0.08	18.9	0.028
18.0	9.525	0.03	11.6	0.017

TABLE 21

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

FREE JET
U0= 668.1 FT/SEC
VANE FREQUENCY: 60 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.268
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 6.9 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-22.0	-11.642	0.05	14.9	0.022
-20.0	-10.583	0.07	17.7	0.026
-18.0	-9.525	0.10	21.1	0.032
-16.0	-8.467	0.15	25.9	0.039
-14.0	-7.408	0.21	30.6	0.046
-12.0	-6.350	0.38	41.2	0.062
-11.0	-5.821	0.63	53.0	0.079
-10.0	-5.292	1.19	72.8	0.109
-9.5	-5.027	1.60	84.4	0.126
-9.0	-4.763	2.18	98.6	0.148
-8.5	-4.498	3.00	115.6	0.173
-8.0	-4.233	4.05	134.4	0.201
-7.5	-3.969	5.05	150.0	0.225
-7.0	-3.704	6.40	168.9	0.253
-6.5	-3.440	7.90	187.7	0.281
-6.0	-3.175	9.80	209.0	0.313
-5.5	-2.910	11.55	226.9	0.340
-5.0	-2.646	13.05	241.2	0.361
-4.5	-2.381	14.65	255.5	0.383
-4.0	-2.117	16.00	267.1	0.400
-3.5	-1.852	17.10	276.1	0.413
-3.0	-1.588	17.95	282.9	0.423
-2.5	-1.323	18.45	286.8	0.429
-2.0	-1.058	18.55	287.5	0.430
-1.5	-0.794	18.65	288.3	0.432
-1.0	-0.529	18.55	287.5	0.430
-0.5	-0.265	18.50	287.2	0.430
0.0	0.000	18.45	286.8	0.429
0.5	0.265	18.40	286.4	0.429
1.0	0.529	18.45	286.8	0.429
1.5	0.794	18.40	286.4	0.429
2.0	1.058	18.00	283.3	0.424
2.5	1.323	17.80	281.7	0.422
3.0	1.588	17.40	278.5	0.417
3.5	1.852	16.70	272.8	0.408

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TABLE 21 (CONT.)

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
4.0	2.117	15.75	265.0	0.397
4.5	2.381	14.45	253.8	0.380
5.0	2.646	12.90	239.8	0.359
5.5	2.910	11.55	226.9	0.340
6.0	3.175	9.90	210.1	0.314
6.5	3.440	8.25	191.8	0.287
7.0	3.704	6.70	172.8	0.259
7.5	3.969	5.37	154.7	0.232
8.0	4.233	4.25	137.6	0.206
8.5	4.498	3.20	119.4	0.179
9.0	4.763	2.35	102.3	0.153
9.5	5.027	1.93	92.8	0.139
10.0	5.292	1.40	79.0	0.118
11.0	5.821	0.73	57.0	0.085
12.0	6.350	0.43	43.8	0.066
14.0	7.408	0.23	32.0	0.048
16.0	8.467	0.16	26.7	0.040
18.0	9.525	0.11	22.1	0.033
20.0	10.583	0.08	18.9	0.028
22.0	11.642	0.05	14.9	0.022

AD-A120 424 EXPERIMENTAL INVESTIGATION OF THRUST AUGMENTING EJECTORS USING VANE EXCITED PRIMARY JETS(U) NAVAL POSTGRADUATE SCHOOL MONTEREY CA T R MCCLELLAN MAR 82 2/2

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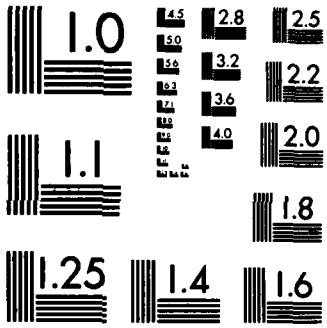

MICROCOPY RESOLUTION TEST CHART
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TABLE 22

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

FREE JET
U0= 661.7 FT/SEC
VANE FREQUENCY: 40 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.268
PITOT LOCATION: 40 NOZZLE WIDTHS
VANE DEFLECTION: 6.9 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-31.0	-16.404	0.10	21.0	0.032
-29.0	-15.346	0.12	23.0	0.035
-27.0	-14.288	0.17	27.3	0.041
-25.0	-13.229	0.21	30.4	0.046
-23.0	-12.171	0.38	40.9	0.062
-21.0	-11.113	0.66	53.8	0.081
-19.0	-10.054	1.20	72.6	0.110
-18.0	-9.525	1.55	82.5	0.125
-17.0	-8.996	2.08	95.6	0.144
-16.0	-8.467	2.60	106.9	0.162
-15.0	-7.938	3.23	119.1	0.180
-14.0	-7.408	3.92	131.2	0.198
-13.0	-6.879	4.63	142.6	0.216
-12.0	-6.350	5.48	155.2	0.234
-11.0	-5.821	6.15	164.4	0.248
-10.0	-5.292	6.81	173.0	0.261
-9.0	-4.763	7.37	179.9	0.272
-8.0	-4.233	7.77	184.8	0.279
-7.0	-3.704	8.10	188.6	0.285
-6.0	-3.175	8.27	190.6	0.288
-5.0	-2.646	8.36	191.9	0.290
-4.0	-2.117	8.38	191.9	0.290
-3.0	-1.588	8.42	192.3	0.291
-2.0	-1.058	8.41	192.2	0.290
-1.0	-0.529	8.35	191.5	0.289
0.0	0.000	8.30	191.0	0.289
1.0	0.529	8.30	191.0	0.289
2.0	1.058	8.35	191.5	0.289
3.0	1.588	8.43	192.5	0.291
4.0	2.117	8.49	193.1	0.292
5.0	2.646	8.52	193.5	0.292
6.0	3.175	8.57	194.0	0.293
7.0	3.704	8.60	194.4	0.294
8.0	4.233	8.48	193.0	0.292
9.0	4.763	8.37	191.8	0.290

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TABLE 22 (CONT.)

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
10.0	5.292	8.12	188.9	0.285
11.0	5.821	7.77	184.8	0.279
12.0	6.350	7.15	177.2	0.268
13.0	6.879	6.63	170.7	0.258
14.0	7.408	5.95	161.7	0.244
15.0	7.938	5.18	150.9	0.228
16.0	8.467	4.40	139.0	0.210
17.0	8.996	3.71	127.7	0.193
18.0	9.525	3.07	116.1	0.176
19.0	10.054	2.53	105.4	0.159
20.0	10.583	1.99	93.5	0.141
21.0	11.113	1.54	82.3	0.124
23.0	12.171	0.92	63.6	0.096
25.0	13.229	0.52	47.8	0.072
27.0	14.288	0.31	36.9	0.056
29.0	15.346	0.28	35.1	0.053
31.0	16.404	0.13	23.9	0.036

TABLE 23

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

FREE JET
U0= 661.7 FT/SEC
VANE FREQUENCY: 60 HZ
Y SPACING 0.125 IN.

PRESSURE RATIO: 1.268
PITOT LOCATION: 40 NOZZLE WIDTHS
VANE DEFLECTION: 6.9 DEG.

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
-31.0	-16.404	0.15	25.7	0.039
-29.0	-15.346	0.18	28.1	0.042
-27.0	-14.288	0.21	30.4	0.046
-25.0	-13.229	0.33	38.1	0.058
-23.0	-12.171	0.53	48.3	0.073
-21.0	-11.113	1.02	66.9	0.101
-19.0	-10.054	1.69	86.2	0.130
-18.0	-9.525	2.19	98.1	0.148
-17.0	-8.996	2.74	109.7	0.166
-16.0	-8.467	3.34	121.1	0.183
-15.0	-7.938	4.07	133.7	0.202
-14.0	-7.408	4.67	143.2	0.216
-13.0	-6.879	5.34	153.2	0.231
-12.0	-6.350	5.99	162.2	0.245
-11.0	-5.821	6.64	170.8	0.258
-10.0	-5.292	6.97	175.0	0.264
-9.0	-4.763	7.26	178.6	0.270
-8.0	-4.233	7.52	181.8	0.275
-7.0	-3.704	7.58	182.5	0.276
-6.0	-3.175	7.61	182.9	0.276
-5.0	-2.646	7.67	183.6	0.277
-4.0	-2.117	7.62	183.0	0.277
-3.0	-1.588	7.62	183.0	0.277
-2.0	-1.058	7.50	181.5	0.274
-1.0	-0.529	7.46	181.0	0.274
0.0	0.000	7.41	180.4	0.273
1.0	0.529	7.39	180.2	0.272
2.0	1.058	7.47	181.2	0.274
3.0	1.588	7.57	182.4	0.276
4.0	2.117	7.66	183.5	0.277
5.0	2.646	7.75	184.5	0.279
6.0	3.175	7.79	185.0	0.280
7.0	3.704	7.95	186.9	0.282
8.0	4.233	7.99	187.4	0.283
9.0	4.763	7.90	186.3	0.282

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TABLE 23 (CONT.)

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

STATION	Y/H	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
10.0	5.292	7.75	184.5	0.279
11.0	5.821	7.52	181.8	0.275
12.0	6.350	7.08	176.4	0.267
13.0	6.879	6.65	170.9	0.258
14.0	7.408	6.07	163.3	0.247
15.0	7.938	5.46	154.9	0.234
16.0	8.467	4.80	145.2	0.219
17.0	8.996	4.17	135.4	0.205
18.0	9.525	3.58	125.4	0.190
19.0	10.054	2.95	113.8	0.172
20.0	10.583	2.43	103.3	0.156
21.0	11.113	2.00	93.7	0.142
22.0	11.642	1.56	82.8	0.125
23.0	12.171	1.23	73.5	0.111
24.0	12.700	0.94	64.3	0.097
26.0	13.758	0.57	50.0	0.076
28.0	14.817	0.35	39.2	0.059
30.0	15.875	0.23	31.8	0.048
32.0	16.933	0.18	28.1	0.042

TABLE 24

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 481.9 FT/SEC
VANE FREQUENCY: 0 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.137
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 0.0 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	0.01	6.6	0.014
3	0.092	0.20	29.6	0.061
4	0.137	0.36	39.6	0.082
5	0.183	0.43	43.3	0.090
6	0.228	0.45	44.3	0.092
7	0.273	0.50	46.7	0.097
8	0.319	0.77	58.0	0.120
9	0.364	2.22	96.5	0.204
10	0.409	6.03	162.3	0.337
11	0.455	11.91	228.0	0.473
12	0.500	16.87	271.4	0.563
13	0.545	14.75	253.8	0.527
14	0.591	8.52	192.9	0.400
15	0.636	3.45	122.7	0.255
16	0.681	1.06	68.0	0.141
17	0.727	0.57	49.9	0.104
18	0.772	0.47	45.3	0.094
19	0.817	0.44	43.8	0.091
20	0.863	0.43	43.3	0.090
21	0.908	0.34	38.5	0.080
22	0.954	0.10	20.9	0.043
23	1.000	0.00	0.0	0.000

TABLE 25

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 482.8 FT/SEC
VANE FREQUENCY: 20 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.137
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 2.6 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	0.04	13.2	0.027
3	0.092	0.28	35.0	0.072
4	0.137	0.43	43.3	0.090
5	0.183	0.49	46.3	0.096
6	0.228	0.51	47.2	0.098
7	0.273	0.57	49.9	0.103
8	0.319	0.97	65.1	0.135
9	0.364	2.54	105.3	0.218
10	0.409	6.32	166.1	0.344
11	0.455	12.02	229.1	0.475
12	0.500	16.59	269.2	0.558
13	0.545	15.06	256.5	0.531
14	0.591	9.07	199.0	0.412
15	0.636	4.10	133.8	0.277
16	0.681	1.49	80.7	0.167
17	0.727	0.68	54.5	0.113
18	0.772	0.52	47.7	0.099
19	0.817	0.49	46.3	0.096
20	0.863	0.47	45.3	0.094
21	0.908	0.44	43.8	0.091
22	0.954	0.29	35.6	0.074
23	1.000	0.00	0.0	0.000

TABLE 26

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 482.8 FT/SEC
VANE FREQUENCY: 40 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.137
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 2.6 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	0.19	28.8	0.060
3	0.092	0.42	42.8	0.089
4	0.137	0.50	46.7	0.097
5	0.183	0.52	47.7	0.099
6	0.228	0.53	48.1	0.100
7	0.273	0.61	51.6	0.107
8	0.319	1.01	66.4	0.138
9	0.364	2.66	107.8	0.223
10	0.409	6.45	167.8	0.348
11	0.455	12.11	230.0	0.476
12	0.500	16.42	267.8	0.555
13	0.545	15.05	256.4	0.531
14	0.591	9.02	198.5	0.411
15	0.636	4.23	135.9	0.282
16	0.681	1.58	83.1	0.172
17	0.727	0.72	56.1	0.116
18	0.772	0.56	49.5	0.102
19	0.817	0.52	47.7	0.099
20	0.863	0.51	47.2	0.098
21	0.908	0.51	47.2	0.098
22	0.954	0.37	40.2	0.083
23	1.000	0.00	0.0	0.000

TABLE 27

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 482.8 FT/SEC
VANE FREQUENCY: 60 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.137
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION; 2.6 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	0.22	31.0	0.064
3	0.092	0.42	42.8	0.089
4	0.137	0.52	47.7	0.099
5	0.183	0.53	48.1	0.100
6	0.228	0.54	48.6	0.101
7	0.273	0.62	52.0	0.108
8	0.319	1.09	69.0	0.143
9	0.364	2.69	108.4	0.225
10	0.409	6.62	170.0	0.352
11	0.455	12.08	229.7	0.476
12	0.500	16.41	267.7	0.554
13	0.545	14.80	254.2	0.527
14	0.591	9.00	198.3	0.411
15	0.636	4.20	135.4	0.281
16	0.681	1.62	84.1	0.174
17	0.727	0.74	56.8	0.118
18	0.772	0.57	49.9	0.103
19	0.817	0.52	47.7	0.099
20	0.863	0.52	47.7	0.099
21	0.908	0.51	47.2	0.098
22	0.954	0.40	41.8	0.087
23	1.000	0.00	0.0	0.000

TABLE 28

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 482.8 FT/SEC
VANE FREQUENCY: 20 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.137
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 6.9 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	0.40	41.8	0.087
3	0.092	0.58	50.3	0.104
4	0.137	0.61	51.6	0.107
5	0.183	0.62	52.0	0.108
6	0.228	0.67	54.1	0.112
7	0.273	0.90	62.7	0.130
8	0.319	1.83	89.4	0.185
9	0.364	3.85	129.7	0.269
10	0.409	7.53	181.3	0.376
11	0.455	10.95	218.7	0.453
12	0.500	12.75	236.0	0.489
13	0.545	12.15	230.4	0.477
14	0.591	9.50	203.7	0.422
15	0.636	5.53	155.4	0.322
16	0.681	2.66	107.8	0.223
17	0.727	1.21	72.7	0.151
18	0.772	0.73	56.5	0.117
19	0.817	0.64	52.9	0.110
20	0.863	0.62	52.0	0.108
21	0.908	0.61	51.6	0.107
22	0.954	0.53	48.1	0.100
23	1.000	0.00	0.0	0.000

TABLE 29

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 482.8 FT/SEC
VANE FREQUENCY: 40 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.137
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 6.9 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	0.59	50.8	0.105
3	0.092	0.72	56.1	0.116
4	0.137	0.72	56.1	0.116
5	0.183	0.73	56.5	0.117
6	0.228	0.76	57.6	0.119
7	0.273	1.01	66.4	0.138
8	0.319	1.97	92.8	0.192
9	0.364	4.05	133.0	0.275
10	0.409	7.66	182.9	0.379
11	0.455	10.96	218.8	0.453
12	0.500	12.35	232.2	0.481
13	0.545	11.90	228.0	0.472
14	0.591	9.50	203.7	0.422
15	0.636	5.67	157.4	0.326
16	0.681	2.83	111.2	0.230
17	0.727	1.28	74.8	0.155
18	0.772	0.83	60.2	0.125
19	0.817	0.73	56.5	0.117
20	0.863	0.72	56.1	0.116
21	0.908	0.72	56.1	0.116
22	0.954	0.63	52.5	0.109
23	1.000	0.00	0.0	0.000

TABLE 30

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 482.8 FT/SEC
VANE FREQUENCY: 60 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.137
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 6.9 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	0.64	52.9	0.110
3	0.092	0.76	57.6	0.119
4	0.137	0.76	57.6	0.119
5	0.183	0.77	58.0	0.1[illegible]
6	0.228	0.81	59.5	0.1[illegible]
7	0.273	1.06	68.0	0.1[illegible]
8	0.319	2.05	94.6	0.1[illegible]
9	0.364	4.13	134.3	0.2[illegible]
10	0.409	7.83	184.9	0.3[illegible]
11	0.455	10.75	216.7	0.4[illegible]
12	0.500	12.25	231.3	0.47[illegible]
13	0.545	11.86	227.6	0.471
14	0.591	9.44	203.0	0.421
15	0.636	5.74	158.3	0.328
16	0.681	2.88	112.2	0.232
17	0.727	1.36	77.1	0.160
18	0.772	0.90	62.7	0.130
19	0.817	0.80	59.1	0.122
20	0.863	0.77	58.0	0.120
21	0.908	0.75	57.2	0.119
22	0.954	0.67	54.1	0.112
23	1.000	0.00	0.0	0.000

TABLE 31

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 489.0 FT/SEC
VANE FREQUENCY: 0 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.137
PITOT LOCATION: 40 NOZZLE WIDTHS
VANE DEFLECTION; 0.0 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	0.16	26.7	0.055
3	0.092	0.21	30.6	0.063
4	0.137	0.35	39.5	0.081
5	0.183	0.77	58.5	0.120
6	0.228	1.45	80.3	0.164
7	0.273	2.86	112.8	0.231
8	0.319	4.61	143.2	0.293
9	0.364	6.99	176.4	0.361
10	0.409	9.44	205.0	0.419
11	0.455	11.92	230.3	0.471
12	0.500	13.38	244.0	0.499
13	0.545	13.44	244.6	0.500
14	0.591	12.25	233.5	0.477
15	0.636	8.90	199.0	0.407
16	0.681	6.62	171.7	0.351
17	0.727	4.32	138.7	0.284
18	0.772	2.45	104.4	0.214
19	0.817	1.22	73.7	0.151
20	0.863	0.64	53.4	0.109
21	0.908	0.38	41.1	0.084
22	0.954	0.23	32.0	0.065
23	1.000	0.00	0.0	0.000

TABLE 32

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 487.4 FT/SEC
VANE FREQUENCY: 20 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.137
PITOT LOCATION: 40 NOZZLE WIDTHS
VANE DEFLECTION: 2.6 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	0.22	31.2	0.064
3	0.092	0.34	38.8	0.080
4	0.137	0.73	56.8	0.117
5	0.183	1.32	76.4	0.157
6	0.228	2.60	107.2	0.220
7	0.273	4.12	135.0	0.277
8	0.319	5.95	162.2	0.333
9	0.364	8.18	190.2	0.390
10	0.409	10.25	212.9	0.437
11	0.455	12.16	231.9	0.476
12	0.500	12.60	236.0	0.484
13	0.545	11.90	229.4	0.471
14	0.591	9.98	210.1	0.431
15	0.636	7.65	183.9	0.377
16	0.681	5.28	152.8	0.313
17	0.727	3.35	121.7	0.250
18	0.772	1.97	93.3	0.191
19	0.817	1.05	68.1	0.140
20	0.863	0.60	51.5	0.106
21	0.908	0.40	42.1	0.086
22	0.954	0.26	33.9	0.070
23	1.000	0.00	0.0	0.000

TABLE 33

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 487.4 FT/SEC
VANE FREQUENCY: 40 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.137
PITOT LOCATION: 40 NOZZLE WIDTHS
VANE DEFLECTION; 2.6 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	0.26	33.9	0.070
3	0.092	0.43	43.6	0.089
4	0.137	0.78	58.7	0.120
5	0.183	1.47	80.6	0.165
6	0.228	2.65	108.2	0.222
7	0.273	4.18	136.0	0.279
8	0.319	5.95	162.2	0.333
9	0.364	8.23	190.8	0.391
10	0.409	10.50	215.5	0.442
11	0.455	12.20	232.3	0.477
12	0.500	12.54	235.5	0.483
13	0.545	11.86	229.0	0.470
14	0.591	9.93	209.5	0.430
15	0.636	7.60	183.3	0.376
16	0.681	5.10	150.2	0.308
17	0.727	3.32	121.2	0.249
18	0.772	2.07	95.7	0.196
19	0.817	1.07	68.8	0.141
20	0.863	0.71	56.0	0.115
21	0.908	0.46	45.1	0.093
22	0.954	0.31	37.0	0.076
23	1.000	0.00	0.0	0.000

TABLE 34

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 487.4 FT/SEC
VANE FREQUENCY: 60 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.137
PITOT LOCATION: 40 NOZZLE WIDTHS
VANE DEFLECTION; 2.6 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	0.30	36.4	0.075
3	0.092	0.50	47.0	0.096
4	0.137	0.85	61.3	0.126
5	0.183	1.57	83.3	0.171
6	0.228	2.73	109.9	0.225
7	0.273	4.21	136.4	0.280
8	0.319	6.05	163.6	0.336
9	0.364	8.27	191.2	0.392
10	0.409	10.25	212.9	0.437
11	0.455	11.95	229.9	0.472
12	0.500	12.32	233.4	0.479
13	0.545	11.60	226.5	0.465
14	0.591	9.63	206.4	0.423
15	0.636	7.40	180.9	0.371
16	0.681	5.32	153.4	0.315
17	0.727	3.50	124.4	0.255
18	0.772	2.16	97.7	0.201
19	0.817	1.16	71.6	0.147
20	0.863	0.72	56.4	0.116
21	0.908	0.48	46.1	0.095
22	0.954	0.32	37.6	0.077
23	1.000	0.00	0.0	0.000

TABLE 35

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 480.0 FT/SEC
VANE FREQUENCY: 20 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.137
PITOT LOCATION: 40 NOZZLE WIDTHS
VANE DEFLECTION: 6.9 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	0.42	42.6	0.089
3	0.092	0.73	56.1	0.117
4	0.137	1.43	78.5	0.164
5	0.183	2.34	100.5	0.209
6	0.228	3.47	122.3	0.255
7	0.273	4.85	144.6	0.301
8	0.319	6.22	163.8	0.341
9	0.364	8.25	188.6	0.393
10	0.409	8.62	192.8	0.402
11	0.455	9.31	200.4	0.417
12	0.500	9.27	199.9	0.417
13	0.545	9.07	197.8	0.412
14	0.591	8.59	192.5	0.401
15	0.636	7.42	178.9	0.373
16	0.681	6.04	161.4	0.336
17	0.727	4.57	140.4	0.292
18	0.772	3.13	116.2	0.242
19	0.817	2.10	95.2	0.198
20	0.863	1.25	73.4	0.153
21	0.908	0.83	59.8	0.125
22	0.954	0.51	46.9	0.098
23	1.000	0.00	0.0	0.000

TABLE 36

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 480.0 FT/SEC
VANE FREQUENCY: 40 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.137
PITOT LOCATION: 40 NOZZLE WIDTHS
VANE DEFLECTION; 6.9 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	0.51	46.9	0.098
3	0.092	0.87	61.3	0.128
4	0.137	1.54	81.5	0.170
5	0.183	2.38	101.3	0.211
6	0.228	3.43	121.6	0.253
7	0.273	4.95	146.1	0.304
8	0.319	6.29	164.7	0.343
9	0.364	8.06	186.4	0.388
10	0.409	8.49	191.3	0.399
11	0.455	9.22	199.4	0.415
12	0.500	9.09	198.0	0.412
13	0.545	8.90	195.9	0.408
14	0.591	8.40	190.3	0.397
15	0.636	7.49	179.7	0.374
16	0.681	6.05	161.5	0.337
17	0.727	4.60	140.8	0.293
18	0.772	3.28	118.9	0.248
19	0.817	2.20	97.4	0.203
20	0.863	1.34	76.0	0.158
21	0.908	0.93	63.3	0.132
22	0.954	0.61	51.3	0.107
23	1.000	0.00	0.0	0.000

TABLE 37

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 480.0 FT/SEC
VANE FREQUENCY: 60 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.137
PITOT LOCATION: 40 NOZZLE WIDTHS
VANE DEFLECTION: 6.9 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	0.55	48.7	0.101
3	0.092	1.01	66.0	0.137
4	0.137	1.67	84.9	0.177
5	0.183	2.52	104.2	0.217
6	0.228	3.81	128.2	0.267
7	0.273	4.92	145.7	0.303
8	0.319	6.16	163.0	0.340
9	0.364	7.84	183.9	0.383
10	0.409	8.15	187.5	0.391
11	0.455	8.71	193.8	0.404
12	0.500	8.66	193.3	0.403
13	0.545	8.30	189.2	0.394
14	0.591	8.05	186.3	0.388
15	0.636	7.15	175.6	0.366
16	0.681	5.98	160.6	0.335
17	0.727	4.83	144.3	0.301
18	0.772	3.54	123.6	0.257
19	0.817	2.51	104.0	0.217
20	0.863	1.65	84.4	0.176
21	0.908	1.06	67.6	0.141
22	0.954	0.66	53.4	0.111
23	1.000	0.00	0.0	0.000

TABLE 38

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 660.5 FT/SEC
VANE FREQUENCY: 0 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.268
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 0.0 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	0.33	38.0	0.057
3	0.092	0.67	54.1	0.082
4	0.137	0.73	56.5	0.085
5	0.183	0.80	59.1	0.089
6	0.228	0.82	59.8	0.091
7	0.273	1.17	71.5	0.108
8	0.319	2.80	110.6	0.167
9	0.364	6.97	174.5	0.264
10	0.409	14.90	255.1	0.386
11	0.455	25.51	333.8	0.505
12	0.500	33.51	382.5	0.579
13	0.545	30.09	362.5	0.549
14	0.591	19.39	291.0	0.441
15	0.636	9.65	205.3	0.311
16	0.681	3.97	131.7	0.199
17	0.727	1.57	82.8	0.125
18	0.772	0.93	63.7	0.096
19	0.817	0.83	60.2	0.091
20	0.863	0.80	59.1	0.089
21	0.908	0.75	57.2	0.087
22	0.954	0.48	45.8	0.069
23	1.000	0.00	0.0	0.000

TABLE 39

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 659.2 FT/SEC
VANE FREQUENCY: 20 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.268
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION; 2.6 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	0.65	53.1	0.081
3	0.092	0.81	59.3	0.090
4	0.137	0.84	60.3	0.092
5	0.183	0.88	61.8	0.094
6	0.228	1.00	65.8	0.100
7	0.273	1.65	84.6	0.128
8	0.319	4.03	132.2	0.201
9	0.364	8.82	195.5	0.297
10	0.409	16.63	268.5	0.407
11	0.455	25.95	335.4	0.509
12	0.500	32.23	373.8	0.567
13	0.545	29.70	358.8	0.544
14	0.591	20.34	296.9	0.450
15	0.636	10.77	216.1	0.328
16	0.681	4.74	143.3	0.217
17	0.727	1.86	89.8	0.136
18	0.772	1.06	67.8	0.103
19	0.817	0.90	62.5	0.095
20	0.863	0.87	61.4	0.093
21	0.908	0.82	59.6	0.090
22	0.954	0.61	51.4	0.078
23	1.000	0.00	0.0	0.000

TABLE 40

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 659.2 FT/SEC
VANE FREQUENCY: 40 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.268
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 2.6 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	0.75	57.0	0.087
3	0.092	0.88	61.8	0.094
4	0.137	0.90	62.5	0.095
5	0.183	0.93	63.5	0.096
6	0.228	1.07	68.1	0.103
7	0.273	1.79	88.1	0.134
8	0.319	4.12	133.6	0.203
9	0.364	8.72	194.4	0.295
10	0.409	16.67	268.8	0.408
11	0.455	25.97	335.5	0.509
12	0.500	32.02	372.6	0.565
13	0.545	29.55	357.9	0.543
14	0.591	20.33	296.9	0.450
15	0.636	10.80	216.4	0.328
16	0.681	4.89	145.6	0.221
17	0.727	1.95	91.9	0.139
18	0.772	1.13	70.0	0.106
19	0.817	0.96	64.5	0.098
20	0.863	0.92	63.2	0.096
21	0.908	0.89	62.1	0.094
22	0.954	0.71	55.5	0.084
23	1.000	0.00	0.0	0.000

TABLE 41

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 659.2 FT/SEC
VANE FREQUENCY: 60 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.368
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 2.6 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	0.80	58.9	0.089
3	0.092	0.91	62.8	0.095
4	0.137	0.93	63.5	0.096
5	0.183	0.97	64.8	0.098
6	0.228	1.10	69.1	0.105
7	0.273	1.87	90.0	0.137
8	0.319	4.30	136.5	0.207
9	0.364	9.14	199.1	0.302
10	0.409	16.85	270.3	0.410
11	0.455	26.20	337.0	0.511
12	0.500	31.85	371.6	0.564
13	0.545	29.38	356.9	0.541
14	0.591	20.30	296.7	0.450
15	0.636	10.90	217.4	0.330
16	0.681	4.95	146.5	0.222
17	0.727	2.05	94.3	0.143
18	0.772	1.18	71.5	0.109
19	0.817	1.10	69.1	0.105
20	0.863	0.94	63.8	0.097
21	0.908	0.91	62.8	0.095
22	0.954	0.73	56.3	0.085
23	1.000	0.00	0.0	0.000

TABLE 42

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 659.2 FT/SEC
VANE FREQUENCY: 20 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.268
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 6.9 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	0.81	59.3	0.090
3	0.092	0.94	63.8	0.097
4	0.137	0.98	65.2	0.099
5	0.183	1.08	68.4	0.104
6	0.228	1.45	79.3	0.120
7	0.273	2.88	111.7	0.170
8	0.319	5.54	155.0	0.235
9	0.364	10.10	209.2	0.317
10	0.409	16.73	269.3	0.409
11	0.455	22.91	315.1	0.478
12	0.500	25.20	330.5	0.501
13	0.545	24.25	324.2	0.492
14	0.591	19.21	288.6	0.438
15	0.636	12.51	232.9	0.353
16	0.681	6.59	169.0	0.256
17	0.727	3.15	116.9	0.177
18	0.772	1.45	79.3	0.120
19	0.817	1.12	69.7	0.106
20	0.863	1.02	66.5	0.101
21	0.908	0.98	65.2	0.099
22	0.954	0.75	57.0	0.087
23	1.000	0.00	0.0	0.000

TABLE 43

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 659.2 FT/SEC
VANE FREQUENCY: 40 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.268
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION; 6.9 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	1.01	66.2	0.100
3	0.092	1.11	69.4	0.105
4	0.137	1.14	70.3	0.107
5	0.183	1.23	73.0	0.111
6	0.228	1.61	83.5	0.127
7	0.273	3.04	114.8	0.174
8	0.319	5.78	158.3	0.240
9	0.364	10.37	212.0	0.322
10	0.409	16.95	271.1	0.411
11	0.455	22.76	314.1	0.477
12	0.500	25.02	329.3	0.500
13	0.545	24.01	322.6	0.489
14	0.591	19.47	290.5	0.441
15	0.636	12.86	236.1	0.358
16	0.681	7.01	174.3	0.264
17	0.727	3.49	123.0	0.187
18	0.772	1.78	87.8	0.133
19	0.817	1.28	74.5	0.113
20	0.863	1.19	71.8	0.109
21	0.908	1.14	70.3	0.107
22	0.954	0.99	65.5	0.099
23	1.000	0.00	0.0	0.000

TABLE 44

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 659.2 FT/SEC
VANE FREQUENCY: 60 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.268
PITOT LOCATION: 20 NOZZLE WIDTHS
VANE DEFLECTION: 6.9 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	1.13	70.0	0.106
3	0.092	1.22	72.7	0.110
4	0.137	1.26	73.9	0.112
5	0.183	1.34	76.2	0.116
6	0.228	1.70	85.8	0.130
7	0.273	3.11	116.1	0.176
8	0.319	5.82	158.8	0.241
9	0.364	10.25	210.8	0.320
10	0.409	17.01	271.6	0.412
11	0.455	22.60	313.0	0.475
12	0.500	24.57	326.4	0.495
13	0.545	23.64	320.1	0.486
14	0.591	19.33	289.5	0.439
15	0.636	12.98	237.2	0.360
16	0.681	7.13	175.8	0.267
17	0.727	3.69	126.5	0.192
18	0.772	1.89	90.5	0.137
19	0.817	1.40	77.9	0.118
20	0.863	1.31	75.4	0.114
21	0.908	1.23	73.0	0.111
22	0.954	1.09	68.7	0.104
23	1.000	0.00	0.0	0.000

TABLE 45

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 669.3 FT/SEC
VANE FREQUENCY: 0 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.268
PITOT LOCATION: 40 NOZZLE WIDTHS
VANE DEFLECTION: 0.0 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	0.52	48.0	0.072
3	0.092	0.80	59.6	0.089
4	0.137	1.46	80.5	0.120
5	0.183	2.96	114.6	0.171
6	0.228	5.18	151.6	0.227
7	0.273	8.50	194.2	0.290
8	0.319	12.65	237.0	0.354
9	0.364	16.96	274.4	0.410
10	0.409	21.25	307.1	0.459
11	0.455	25.31	335.2	0.501
12	0.500	27.88	351.8	0.526
13	0.545	28.57	356.1	0.532
14	0.591	26.26	341.4	0.510
15	0.636	22.82	318.3	0.475
16	0.681	17.73	280.5	0.419
17	0.727	12.41	234.7	0.351
18	0.772	7.83	186.4	0.279
19	0.817	4.46	140.7	0.210
20	0.863	2.30	101.0	0.151
21	0.908	1.18	72.4	0.108
22	0.954	0.67	54.5	0.081
23	1.000	0.00	0.0	0.000

TABLE 46

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 665.5 FT/SEC
VANE FREQUENCY: 20 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.268
PITOT LOCATION: 40 NOZZLE WIDTHS
VANE DEFLECTION: 6.9 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	1.12	70.4	0.106
3	0.092	2.33	101.5	0.153
4	0.137	3.67	127.4	0.191
5	0.183	5.75	159.5	0.240
6	0.228	8.16	190.0	0.286
7	0.273	11.18	222.4	0.334
8	0.319	13.83	247.4	0.372
9	0.364	16.72	272.0	0.409
10	0.409	18.83	288.7	0.434
11	0.455	19.86	296.5	0.445
12	0.500	20.09	298.2	0.448
13	0.545	19.84	296.3	0.445
14	0.591	18.82	288.6	0.434
15	0.636	17.62	279.2	0.420
16	0.681	14.95	257.2	0.386
17	0.727	11.73	227.8	0.342
18	0.772	8.61	195.2	0.293
19	0.817	5.70	158.8	0.239
20	0.863	3.77	129.2	0.194
21	0.908	2.45	104.1	0.156
22	0.954	1.33	76.7	0.115
23	1.000	0.00	0.0	0.000

TABLE 47

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 665.5 FT/SEC
VANE FREQUENCY: 40 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.268
PITOT LOCATION: 40 NOZZLE WIDTHS
VANE DEFLECTION: 6.9 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	1.30	75.8	0.114
3	0.092	2.55	106.2	0.160
4	0.137	3.86	130.7	0.196
5	0.183	5.99	162.8	0.245
6	0.228	8.33	192.0	0.288
7	0.273	11.43	224.9	0.338
8	0.319	13.98	248.7	0.374
9	0.364	16.62	271.2	0.407
10	0.409	18.75	288.0	0.433
11	0.455	19.79	295.9	0.445
12	0.500	20.00	297.5	0.447
13	0.545	19.68	295.1	0.443
14	0.591	19.21	291.6	0.438
15	0.636	17.67	279.6	0.420
16	0.681	15.02	257.8	0.387
17	0.727	11.75	228.0	0.343
18	0.772	9.05	200.1	0.301
19	0.817	6.09	164.2	0.247
20	0.863	4.00	133.0	0.200
21	0.908	2.58	106.8	0.161
22	0.954	1.55	82.8	0.124
23	1.000	0.00	0.0	0.000

TABLE 48

MEAN CENTERLINE VELOCITY DISTRIBUTION DATA

EJECTOR INSTALLED
U0= 665.5 FT/SEC
VANE FREQUENCY: 60 HZ
AREA RATIO: 23.3

PRESSURE RATIO: 1.268
PITOT LOCATION: 40 NOZZLE WIDTHS
VANE DEFLECTION: 6.9 DEG.
Y SPACING 0.25 IN.

STATION	Y/C	DELTA H (IN.H2O)	VELOCITY (FT/SEC)	U/U0
1	0.000	0.00	0.0	0.000
2	0.046	1.38	78.1	0.117
3	0.092	2.60	107.3	0.161
4	0.137	4.09	134.5	0.202
5	0.183	6.14	164.8	0.248
6	0.228	8.38	192.6	0.289
7	0.273	11.52	225.8	0.339
8	0.319	14.17	250.4	0.376
9	0.364	16.67	271.6	0.408
10	0.409	18.47	285.9	0.430
11	0.455	19.45	293.4	0.441
12	0.500	19.55	294.1	0.442
13	0.545	19.05	290.3	0.436
14	0.591	18.30	284.6	0.428
15	0.636	17.15	275.5	0.414
16	0.681	14.73	255.3	0.384
17	0.727	12.08	231.2	0.347
18	0.772	9.40	204.0	0.306
19	0.817	6.44	168.8	0.254
20	0.863	4.41	139.7	0.210
21	0.908	2.87	112.7	0.169
22	0.954	1.71	87.0	0.131
23	1.000	0.00	0.0	0.000

TABLE 49

EJECTOR PRESSURE DISTRIBUTION DATA

PRESSURE RATIO: 1.137 U0= 487.9 FT/SEC
VANE FREQUENCY: 0 HZ VANE DEFLECTION: 0.0 DEG.

STATION	S/L	DELTA H (IN.H2O)	PRESSURE COEFFICIENT
1	0.031	0.07	0.0013
2	0.054	0.11	0.0022
3	0.077	0.23	0.0043
4	0.100	0.43	0.0081
5	0.123	0.82	0.0154
6	0.147	0.98	0.0184
7	0.170	0.93	0.0174
8	0.193	0.87	0.0164
9	0.216	0.73	0.0137
10	0.239	0.64	0.0120
11	0.262	0.61	0.0114
12	0.285	0.57	0.0107
13	0.308	0.59	0.0111
14	0.331	0.59	0.0111
15	0.366	0.57	0.0108
16	0.400	0.59	0.0111
17	0.435	0.57	0.0107
18	0.469	0.53	0.0099
19	0.504	0.52	0.0098
20	0.539	0.51	0.0097
21	0.573	0.51	0.0095
22	0.608	0.50	0.0094
23	0.642	0.48	0.0091
24	0.677	0.51	0.0095
25	0.712	0.52	0.0098
26	0.746	0.54	0.0102
27	0.792	0.48	0.0091
28	0.839	0.44	0.0084
29	0.885	0.36	0.0068
30	0.931	0.25	0.0048
31	0.977	0.14	0.0026

TABLE 50

EJECTOR PRESSURE DISTRIBUTION DATA

PRESSURE RATIO: 1.137 U0= 487.9 FT/SEC
VANE FREQUENCY: 20 HZ VANE DEFLECTION: 2.6 DEG.

STATION	S/L	DELTA H (IN.H2O)	PRESSURE COEFFICIENT
1	0.031	0.06	0.0012
2	0.054	0.11	0.0020
3	0.077	0.23	0.0043
4	0.100	0.44	0.0084
5	0.123	0.86	0.0161
6	0.147	1.03	0.0193
7	0.170	0.95	0.0179
8	0.193	0.92	0.0173
9	0.216	0.82	0.0154
10	0.239	0.70	0.0133
11	0.262	0.64	0.0120
12	0.285	0.59	0.0111
13	0.308	0.61	0.0115
14	0.331	0.61	0.0115
15	0.366	0.57	0.0107
16	0.400	0.55	0.0104
17	0.435	0.51	0.0097
18	0.469	0.45	0.0085
19	0.504	0.46	0.0086
20	0.539	0.46	0.0086
21	0.573	0.47	0.0089
22	0.608	0.48	0.0091
23	0.642	0.50	0.0094
24	0.677	0.52	0.0098
25	0.712	0.54	0.0102
26	0.746	0.55	0.0104
27	0.792	0.49	0.0092
28	0.839	0.44	0.0084
29	0.885	0.34	0.0063
30	0.931	0.23	0.0043
31	0.977	0.13	0.0025

TABLE 51

EJECTOR PRESSURE DISTRIBUTION DATA

PRESSURE RATIO: 1.137 U0= 487.9 FT/SEC
VANE FREQUENCY: 40 HZ VANE DEFLECTION: 2.6 DEG.

STATION	S/L	DELTA H (IN.H2O)	PRESSURE COEFFICIENT
1	0.031	0.06	0.0012
2	0.054	0.11	0.0020
3	0.077	0.25	0.0046
4	0.100	0.48	0.0091
5	0.123	0.92	0.0173
6	0.147	1.19	0.0223
7	0.170	1.11	0.0209
8	0.193	0.95	0.0179
9	0.216	0.77	0.0144
10	0.239	0.67	0.0127
11	0.262	0.64	0.0121
12	0.285	0.62	0.0117
13	0.308	0.64	0.0120
14	0.331	0.64	0.0121
15	0.366	0.61	0.0115
16	0.400	0.58	0.0110
17	0.435	0.52	0.0098
18	0.469	0.47	0.0089
19	0.504	0.47	0.0089
20	0.539	0.47	0.0089
21	0.573	0.48	0.0091
22	0.608	0.51	0.0097
23	0.642	0.51	0.0097
24	0.677	0.52	0.0098
25	0.712	0.54	0.0101
26	0.746	0.54	0.0102
27	0.792	0.49	0.0092
28	0.839	0.43	0.0081
29	0.885	0.33	0.0062
30	0.931	0.21	0.0040
31	0.977	0.11	0.0022

TABLE 52

EJECTOR PRESSURE DISTRIBUTION DATA

PRESSURE RATIO: 1.137 U0= 487.9 FT/SEC
VANE FREQUENCY: 60 HZ VANE DEFLECTION: 2.6 DEG.

STATION	S/L	DELTA H (IN.H2O)	PRESSURE COEFFICIENT
1	0.031	0.05	0.0010
2	0.054	0.10	0.0019
3	0.077	0.23	0.0043
4	0.100	0.47	0.0088
5	0.123	0.90	0.0170
6	0.147	1.12	0.0210
7	0.170	1.04	0.0196
8	0.193	0.99	0.0186
9	0.216	0.81	0.0153
10	0.239	0.70	0.0133
11	0.262	0.67	0.0127
12	0.285	0.64	0.0121
13	0.308	0.66	0.0124
14	0.331	0.67	0.0125
15	0.366	0.62	0.0117
16	0.400	0.58	0.0110
17	0.435	0.52	0.0098
18	0.469	0.46	0.0086
19	0.504	0.47	0.0088
20	0.539	0.47	0.0088
21	0.573	0.48	0.0091
22	0.608	0.51	0.0095
23	0.642	0.51	0.0097
24	0.677	0.54	0.0101
25	0.712	0.55	0.0104
26	0.746	0.55	0.0104
27	0.792	0.48	0.0091
28	0.839	0.43	0.0081
29	0.885	0.34	0.0063
30	0.931	0.24	0.0045
31	0.977	0.13	0.0025

TABLE 53

EJECTOR PRESSURE DISTRIBUTION DATA

PRESSURE RATIO: 1.137 U0= 487.9 FT/SEC
VANE FREQUENCY: 20 HZ VANE DEFLECTION: 6.9 DEG.

STATION	S/L	DELTA H (IN.H2O)	PRESSURE COEFFICIENT
1	0.031	0.08	0.0014
2	0.054	0.14	0.0026
3	0.077	0.28	0.0053
4	0.100	0.59	0.0111
5	0.123	1.12	0.0210
6	0.147	1.47	0.0277
7	0.170	1.38	0.0259
8	0.193	1.07	0.0202
9	0.216	0.87	0.0163
10	0.239	0.80	0.0150
11	0.262	0.77	0.0146
12	0.285	0.74	0.0140
13	0.308	0.77	0.0144
14	0.331	0.75	0.0141
15	0.366	0.64	0.0121
16	0.400	0.60	0.0112
17	0.435	0.56	0.0105
18	0.469	0.54	0.0102
19	0.504	0.57	0.0107
20	0.539	0.57	0.0107
21	0.573	0.59	0.0111
22	0.608	0.61	0.0115
23	0.642	0.59	0.0111
24	0.677	0.59	0.0111
25	0.712	0.59	0.0111
26	0.746	0.58	0.0110
27	0.792	0.50	0.0094
28	0.839	0.43	0.0081
29	0.885	0.33	0.0062
30	0.931	0.21	0.0040
31	0.977	0.13	0.0025

TABLE 54

EJECTOR PRESSURE DISTRIBUTION DATA

PRESSURE RATIO: 1.137 U0= 487.9 FT/SEC
VANE FREQUENCY: 40 HZ VANE DEFLECTION: 6.9 DEG.

STATION	S/L	DELTA H (IN.H2O)	PRESSURE COEFFICIENT
1	0.031	0.08	0.0016
2	0.054	0.16	0.0030
3	0.077	0.32	0.0061
4	0.100	0.64	0.0121
5	0.123	1.26	0.0238
6	0.147	1.70	0.0320
7	0.170	1.59	0.0300
8	0.193	1.23	0.0231
9	0.216	1.00	0.0187
10	0.239	0.92	0.0173
11	0.262	0.90	0.0169
12	0.285	0.87	0.0163
13	0.308	0.88	0.0166
14	0.331	0.86	0.0161
15	0.366	0.75	0.0141
16	0.400	0.67	0.0127
17	0.435	0.63	0.0118
18	0.469	0.59	0.0111
19	0.504	0.62	0.0117
20	0.539	0.63	0.0118
21	0.573	0.64	0.0121
22	0.608	0.67	0.0125
23	0.642	0.63	0.0118
24	0.677	0.61	0.0115
25	0.712	0.61	0.0115
26	0.746	0.59	0.0111
27	0.792	0.49	0.0092
28	0.839	0.41	0.0076
29	0.885	0.28	0.0053
30	0.931	0.18	0.0035
31	0.977	0.10	0.0019

TABLE 55

EJECTOR PRESSURE DISTRIBUTION DATA

PRESSURE RATIO: 1.137 U0= 487.9 FT/SEC
VANE FREQUENCY: 60 HZ VANE DEFLECTION: 6.9 DEG.

STATION	S/L	DELTA H (IN.H2O)	PRESSURE COEFFICIENT
1	0.031	0.10	0.0019
2	0.054	0.17	0.0032
3	0.077	0.34	0.0063
4	0.100	0.70	0.0131
5	0.123	1.33	0.0251
6	0.147	1.80	0.0339
7	0.170	1.70	0.0320
8	0.193	1.26	0.0238
9	0.216	1.03	0.0193
10	0.239	0.97	0.0183
11	0.262	0.95	0.0179
12	0.285	0.92	0.0173
13	0.308	0.93	0.0176
14	0.331	0.89	0.0167
15	0.366	0.73	0.0137
16	0.400	0.64	0.0121
17	0.435	0.61	0.0114
18	0.469	0.57	0.0108
19	0.504	0.62	0.0117
20	0.539	0.63	0.0118
21	0.573	0.64	0.0121
22	0.608	0.67	0.0125
23	0.642	0.64	0.0121
24	0.677	0.64	0.0120
25	0.712	0.63	0.0118
26	0.746	0.58	0.0110
27	0.792	0.47	0.0089
28	0.839	0.37	0.0069
29	0.885	0.26	0.0049
30	0.931	0.17	0.0032
31	0.977	0.10	0.0019

TABLE 56

EJECTOR PRESSURE DISTRIBUTION DATA

PRESSURE RATIO: 1.268 U0= 668.7 FT/SEC
VANE FREQUENCY: 0 HZ VANE DEFLECTION: 0.0 DEG.

STATION	S/L	DELTA H (IN.H2O)	PRESSURE COEFFICIENT
1	0.031	0.08	0.0008
2	0.054	0.17	0.0017
3	0.077	0.35	0.0035
4	0.100	0.75	0.0075
5	0.123	1.51	0.0151
6	0.147	1.93	0.0193
7	0.170	1.78	0.0178
8	0.193	1.28	0.0128
9	0.216	1.05	0.0105
10	0.239	0.98	0.0098
11	0.262	0.96	0.0096
12	0.285	0.93	0.0094
13	0.308	0.98	0.0098
14	0.331	1.00	0.0100
15	0.366	1.00	0.0100
16	0.400	0.97	0.0097
17	0.435	0.86	0.0086
18	0.469	0.72	0.0072
19	0.504	0.71	0.0071
20	0.539	0.67	0.0067
21	0.573	0.70	0.0071
22	0.608	0.76	0.0076
23	0.642	0.71	0.0071
24	0.677	0.71	0.0071
25	0.712	0.76	0.0076
26	0.746	0.77	0.0077
27	0.792	0.75	0.0075
28	0.839	0.69	0.0069
29	0.885	0.55	0.0055
30	0.931	0.37	0.0037
31	0.977	0.21	0.0021

TABLE 57

EJECTOR PRESSURE DISTRIBUTION DATA

PRESSURE RATIO: 1.268 U0= 668.7 FT/SEC
VANE FREQUENCY: 20 HZ VANE DEFLECTION: 2.6 DEG.

STATION	S/L	DELTA H (IN.H2O)	PRESSURE COEFFICIENT
1	0.031	0.09	0.0009
2	0.054	0.17	0.0017
3	0.077	0.38	0.0038
4	0.100	0.79	0.0079
5	0.123	1.56	0.0157
6	0.147	1.99	0.0199
7	0.170	1.87	0.0187
8	0.193	1.39	0.0140
9	0.216	1.13	0.0114
10	0.239	1.03	0.0104
11	0.262	1.00	0.0100
12	0.285	0.97	0.0097
13	0.308	1.01	0.0101
14	0.331	1.02	0.0102
15	0.366	0.92	0.0092
16	0.400	0.83	0.0083
17	0.435	0.70	0.0071
18	0.469	0.60	0.0060
19	0.504	0.65	0.0065
20	0.539	0.64	0.0064
21	0.573	0.70	0.0071
22	0.608	0.79	0.0079
23	0.642	0.76	0.0076
24	0.677	0.77	0.0077
25	0.712	0.81	0.0081
26	0.746	0.81	0.0081
27	0.792	0.80	0.0080
28	0.839	0.74	0.0074
29	0.885	0.57	0.0058
30	0.931	0.40	0.0040
31	0.977	0.23	0.0023

TABLE 58

EJECTOR PRESSURE DISTRIBUTION DATA

PRESSURE RATIO: 1.268 U0= 668.7 FT/SEC
VANE FREQUENCY: 40 HZ VANE DEFLECTION: 2.6 DEG.

STATION	S/L	DELTA H (IN.H2O)	PRESSURE COEFFICIENT
1	0.031	0.08	0.0008
2	0.054	0.17	0.0017
3	0.077	0.38	0.0038
4	0.100	0.81	0.0081
5	0.123	1.67	0.0167
6	0.147	2.18	0.0218
7	0.170	2.07	0.0207
8	0.193	1.49	0.0150
9	0.216	1.23	0.0123
10	0.239	1.13	0.0114
11	0.262	1.10	0.0110
12	0.285	1.06	0.0106
13	0.308	1.10	0.0110
14	0.331	1.11	0.0111
15	0.366	1.03	0.0104
16	0.400	0.91	0.0091
17	0.435	0.81	0.0081
18	0.469	0.67	0.0068
19	0.504	0.74	0.0074
20	0.539	0.73	0.0073
21	0.573	0.78	0.0078
22	0.608	0.87	0.0087
23	0.642	0.84	0.0084
24	0.677	0.85	0.0085
25	0.712	0.89	0.0089
26	0.746	0.87	0.0087
27	0.792	0.85	0.0085
28	0.839	0.75	0.0075
29	0.885	0.58	0.0058
30	0.931	0.37	0.0037
31	0.977	0.21	0.0021

TABLE 59

EJECTOR PRESSURE DISTRIBUTION DATA

PRESSURE RATIO: 1.268 U0= 668.7 FT/SEC
VANE FREQUENCY: 60 HZ VANE DEFLECTION: 2.6 DEG.

STATION	S/L	DELTA H (IN.H2O)	PRESSURE COEFFICIENT
1	0.031	0.08	0.0008
2	0.054	0.17	0.0017
3	0.077	0.41	0.0041
4	0.100	0.87	0.0087
5	0.123	1.74	0.0174
6	0.147	2.23	0.0223
7	0.170	2.11	0.0212
8	0.193	1.55	0.0155
9	0.216	1.26	0.0126
10	0.239	1.17	0.0117
11	0.262	1.13	0.0113
12	0.285	1.09	0.0109
13	0.308	1.13	0.0114
14	0.331	1.13	0.0113
15	0.366	1.03	0.0103
16	0.400	0.90	0.0090
17	0.435	0.77	0.0077
18	0.469	0.67	0.0067
19	0.504	0.75	0.0075
20	0.539	0.74	0.0074
21	0.573	0.79	0.0079
22	0.608	0.87	0.0087
23	0.642	0.84	0.0084
24	0.677	0.86	0.0086
25	0.712	0.90	0.0091
26	0.746	0.88	0.0088
27	0.792	0.86	0.0086
28	0.839	0.77	0.0077
29	0.885	0.57	0.0058
30	0.931	0.38	0.0038
31	0.977	0.19	0.0019

TABLE 60

EJECTOR PRESSURE DISTRIBUTION DATA

PRESSURE RATIO: 1.268 U0= 668.7 FT/SEC
VANE FREQUENCY: 20 HZ VANE DEFLECTION: 6.9 DEG.

STATION	S/L	DELTA H (IN.H2O)	PRESSURE COEFFICIENT
1	0.031	0.08	0.0008
2	0.054	0.18	0.0018
3	0.077	0.42	0.0042
4	0.100	0.92	0.0092
5	0.123	1.84	0.0184
6	0.147	2.44	0.0244
7	0.170	2.36	0.0236
8	0.193	1.52	0.0153
9	0.216	1.29	0.0130
10	0.239	1.21	0.0121
11	0.262	1.17	0.0117
12	0.285	1.13	0.0113
13	0.308	1.16	0.0117
14	0.331	1.09	0.0109
15	0.366	0.90	0.0090
16	0.400	0.81	0.0081
17	0.435	0.78	0.0078
18	0.469	0.72	0.0072
19	0.504	0.86	0.0086
20	0.539	0.85	0.0085
21	0.573	0.90	0.0091
22	0.608	0.97	0.0097
23	0.642	0.91	0.0091
24	0.677	0.90	0.0090
25	0.712	0.93	0.0093
26	0.746	0.87	0.0087
27	0.792	0.78	0.0078
28	0.839	0.69	0.0069
29	0.885	0.51	0.0051
30	0.931	0.34	0.0034
31	0.977	0.20	0.0020

TABLE 61

EJECTOR PRESSURE DISTRIBUTION DATA

PRESSURE RATIO: 1.268 U0= 668.7 FT/SEC
VANE FREQUENCY: 40 HZ VANE DEFLECTION: 6.9 DEG.

STATION	S/L	DELTA H (IN.H2O)	PRESSURE COEFFICIENT
1	0.031	0.10	0.0010
2	0.054	0.21	0.0021
3	0.077	0.48	0.0048
4	0.100	1.06	0.0107
5	0.123	2.13	0.0213
6	0.147	2.83	0.0284
7	0.170	2.77	0.0278
8	0.193	1.73	0.0173
9	0.216	1.51	0.0151
10	0.239	1.43	0.0143
11	0.262	1.40	0.0140
12	0.285	1.35	0.0135
13	0.308	1.39	0.0140
14	0.331	1.32	0.0132
15	0.366	1.10	0.0110
16	0.400	1.00	0.0100
17	0.435	0.94	0.0094
18	0.469	0.91	0.0091
19	0.504	1.02	0.0102
20	0.539	1.00	0.0101
21	0.573	1.06	0.0107
22	0.608	1.13	0.0114
23	0.642	1.08	0.0108
24	0.677	1.05	0.0105
25	0.712	1.06	0.0106
26	0.746	1.01	0.0101
27	0.792	0.90	0.0090
28	0.839	0.77	0.0077
29	0.885	0.54	0.0054
30	0.931	0.33	0.0033
31	0.977	0.18	0.0018

TABLE 62

EJECTOR PRESSURE DISTRIBUTION DATA

PRESSURE RATIO: 1.268 U0= 668.7 FT/SEC
VANE FREQUENCY: 60 HZ VANE DEFLECTION: 6.9 DEG.

STATION	S/L	DELTA H (IN.H2O)	PRESSURE COEFFICIENT
1	0.031	0.10	0.0010
2	0.054	0.23	0.0023
3	0.077	0.54	0.0054
4	0.100	1.16	0.0117
5	0.123	2.28	0.0229
6	0.147	3.04	0.0305
7	0.170	2.99	0.0299
8	0.193	1.89	0.0190
9	0.216	1.65	0.0166
10	0.239	1.57	0.0157
11	0.262	1.54	0.0154
12	0.285	1.47	0.0147
13	0.308	1.51	0.0151
14	0.331	1.36	0.0136
15	0.366	1.10	0.0110
16	0.400	1.01	0.0101
17	0.435	0.99	0.0099
18	0.469	0.94	0.0094
19	0.504	1.08	0.0108
20	0.539	1.08	0.0108
21	0.573	1.13	0.0113
22	0.608	1.20	0.0120
23	0.642	1.14	0.0114
24	0.677	1.10	0.0110
25	0.712	1.10	0.0110
26	0.746	1.03	0.0104
27	0.792	0.92	0.0092
28	0.839	0.74	0.0074
29	0.885	0.51	0.0051
30	0.931	0.32	0.0032
31	0.977	0.18	0.0018

TABLE 63

MEAN ENTRAINMENT DATA (FREE JET)

TABULATED VALUES FOR $[Q(X)/Q_E-1]$

PRESSURE RATIO 1.137

VANE AMPLITUDE 2.6° ZERO-PEAK

FREQUENCY (HZ)	0	20	40	60
PITOT LOCATION				
20 NOZZLE WIDTHS	1.77	1.89	1.96	1.97
40 NOZZLE WIDTHS	3.00	3.17	3.33	3.63

VANE AMPLITUDE 6.9° ZERO-PEAK

FREQUENCY (HZ)	0	20	40	60
PITOT LOCATION				
20 NOZZLE WIDTHS	1.77	2.35	2.45	2.55
40 NOZZLE WIDTHS	3.00	3.84	4.29	4.66

PRESSURE RATIO 1.268

VANE AMPLITUDE 2.6° ZERO-PEAK

FREQUENCY (HZ)	0	20	40	60
PITOT LOCATION				
20 NOZZLE WIDTHS	1.84	1.89	1.87	1.93
40 NOZZLE WIDTHS	---	---	---	---

VANE AMPLITUDE 6.9° ZERO-PEAK

FREQUENCY (HZ)	0	20	40	60
PITOT LOCATION				
20 NOZZLE WIDTHS	1.84	2.36	2.39	2.42
40 NOZZLE WIDTHS	---	---	4.31	4.50

TABLE 64

MEAN ENTRAINMENT DATA (EJECTOR INSTALLED)

TABULATED VALUE FOR $[Q(X)/Q_E-1]$

PRESSURE RATIO 1.137

VANE AMPLITUDE 2.6° ZERO-PEAK

FREQUENCY (HZ)	0	20	40	60
PITOT LOCATION				
20 NOZZLE WIDTHS	4.19	4.42	4.54	4.57
40 NOZZLE WIDTHS	5.71	5.79	5.85	5.88

VANE AMPLITUDE 6.9° ZERO-PEAK

FREQUENCY (HZ)	0	20	40	60
PITOT LOCATION				
20 NOZZLE WIDTHS	4.19	4.83	4.97	5.03
40 NOZZLE WIDTHS	5.71	6.08	6.13	6.16

PRESSURE RATIO 1.268

VANE AMPLITUDE 2.6° ZERO-PEAK

FREQUENCY (HZ)	0	20	40	60
PITOT LOCATION				
20 NOZZLE WIDTHS	4.74	4.99	5.04	5.09
40 NOZZLE WIDTHS	6.71	---	---	---

VANE AMPLITUDE 6.9° ZERO-PEAK

FREQUENCY (HZ)	0	20	40	60
PITOT LOCATION				
20 NOZZLE WIDTHS	4.74	5.14	5.28	5.33
40 NOZZLE WIDTHS	6.71	6.83	6.90	6.93

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