WIND ENGINEERING STUDY OF
MOUNTAIN BELL DENVER SERVICE CENTER

by

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October 1973

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CER73-74JAP-JEC14

Mountain Bell Denver Service Center

ACKNOWLEDGMENTS

The support of Rogers - Nagel - Langhart in carrying out this study is gratefully acknowledged. Construction of the building model and pressure switch was accomplished by personnel of the Engineering Research Center Machine Shop. Mr. James A. Garrison made the motion pictures of flow visualization. Mr. Robert E. Akins supervised pressure data acquisition and reduction. Dr. S. K. Nayak was responsible for velocity measurements.

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LIST OF SYMBOLS

Symbol	Definition
U	Local mean velocity
D	Characteristic dimension (building height, width, etc.)
ν	Kinematic viscosity of approach flow
$\frac{UD}{\nu}$	Reynolds number
E	Mean voltage
A	Constant
B	Constant
n	Constant
U_{rms}	Root-mean-square of fluctuating velocity
E_{rms}	Root-mean-square of fluctuating voltage
U_∞	Reference mean velocity outside the boundary layer
Y	Height above surface
δ	Height of boundary layer
T_u	Turbulence intensity U_{rms}/U_∞ or U_{rms}/U
$C_{p_{mean}}$	Mean pressure coefficient, $\frac{(p-p_\infty)_{mean}}{\frac{1}{2}\rho U_\infty^2}$
$C_{p_{rms}}$	Root-mean-square pressure coefficient, $\frac{(p-p_\infty)_{rms}}{\frac{1}{2}\rho U_\infty^2}$
$C_{p_{max}}$	Peak maximum pressure coefficient, $\frac{(p-p_\infty)_{max}}{\frac{1}{2}\rho U_\infty^2}$
$C_{p_{min}}$	Peak minimum pressure coefficient, $\frac{(p-p_\infty)_{min}}{\frac{1}{2}\rho U_\infty^2}$
ρ	Density of approach flow
$(\quad)_{min}$	Minimum value during data record
$(\quad)_{max}$	Maximum value during data record

LIST OF SYMBOLS (Cont.)

Symbol	Definition
p	Fluctuating pressure at a pressure tap on the structure
p_∞	Static pressure in the wind tunnel above the model

1. INTRODUCTION

1.1 General

A significant characteristic of modern tall building design is lighter cladding and more flexible frames. These features combine to produce an increased vulnerability of glass lights and cladding to wind damage. In addition, increased use of pedestrian plazas has brought about a need to consider wind and gustiness in the design of these areas. Techniques have been developed during the past decade for wind-tunnel modeling of proposed structures which allow the prediction of wind pressures on cladding and wind environment about the building. Knowledge of pressures on the structure permits adequate but economical selection of window strength to meet selected maximum design winds while information on sidewalk level gustiness allows plaza areas to be protected by design changes before the structure is constructed. Where exhaust vents from underground parking garages or other obnoxious exhausts can enter pedestrian areas or air ventilation intakes, model tests of concentrations of the exhausts can point to design changes to alleviate the problem.

Modeling the aerodynamic loading on a structure requires special consideration of flow conditions in order to guarantee similitude between model and prototype. A detailed discussion of the similarity requirements and their wind-tunnel implementation can be found in References 1,2 and 3. In general, the requirements are that the model and prototype be scaled in geometry, that the approach mean velocity at the building site have a vertical profile shape similar to the full-scale flow, that the turbulence characteristics of the flows be similar, and that the Reynolds number for the model and prototype be equal.

These criteria are satisfied by constructing a scale model of the structure and its surroundings and performing the wind tests in a wind tunnel specifically designed to model atmospheric boundary layer flows. Reynolds number similarity requires that the quantity UD/ν be similar for model and prototype. Since ν, the kinematic viscosity of air, is identical for both, Reynolds numbers cannot be made precisely equal with reasonable wind velocities. Wind velocity in the wind tunnel would have to be the model scale factor times the prototype wind. However, for sufficiently high Reynolds number ($>10^5$) a pressure coefficient at any location on the structure will be essentially constant with Reynolds number. Typical values encountered are 10^8 for the full scale and 10^6 for the wind tunnel model. Thus acceptable flow similarity is achieved without precise Reynolds number equality.

1.2 The Mountain Bell Denver Service Center (Telephone Building)*

A wind study was performed for the proposed Telephone Building in Denver, Colorado. The 323 ft high structure was modeled at a 1:180 scale. The objectives of the wind study were to obtain mean and fluctuating pressures on the building as well as wind velocity and gustiness in the plaza adjacent to the structure. In addition, a flow visualization study was performed to define overall flow patterns and regions where local flow features might cause difficulties in panel loading or pedestrian discomfort. Concentration measurements were made at numerous points near the surface around the building and in the plaza to determine the extent to which pedestrians and building air intakes would be subjected to exhaust gases from the underground parking garage vents.

*The designation Telephone Building is used throughout the text.

The Telephone Building will occupy the block between 17th and 18th Streets and between Curtis and Arapahoe Streets in Denver. The structure consists of a tower occupying the half-block nearest to 18th Street with a lower structure and large elevated plaza occupying the remaining area. The site is in the center of the downtown area on flat terrain. Surrounding structures range from nearly the same height on the southwest to parking lots on the north and northwest. The flow approaching the site crosses relatively flat terrain with low structures except for the tall buildings in the downtown area close the the building site.

2. EXPERIMENTAL CONFIGURATION

2.1 Wind Tunnel

The wind study was performed in the meteorological Wind Tunnel located in the Fluid Dynamics and Diffusion Laboratory at Colorado State University, Figure 1. The tunnel is a closed circuit facility driven by a 250 h.p. variable-pitch, variable-speed propeller. The test section is nominally 6 feet square and 88 feet long fed through a 9-to-1 contraction ratio. The test section walls diverge 1 in./10 ft and the roof is adjustable to maintain a zero pressure gradient along the test section. The mean velocity can be adjusted continuously from 1 to 120 fps. The facility is described in detail by Plate and Cermak [4].

2.2 Model

In order to obtain an accurate assessment of local pressures using piezometer taps, the model was constructed to the largest scale that would not produce serious blockage in the wind tunnel. A 1:180 scale model was constructed using 3/4 in. "Lucite" plastic for the tower portion of the structure on which pressure measurements were to be made and using styrofoam for the lower structure and plaza where flow visualization, velocity and diffusion data were required. A site plan is shown in Figure 2.

Piezometer taps (1/16 in. dia.) were drilled normal to the exterior surface at 46 locations on each side of the structure, at 16 locations on the top, and at several special points of interest such as door locations and behind the grillwork on the lower sides. The location of the taps on the structure is shown in Figures 3a to 3c. Of the 206 total taps on the building, 68 were selected for measurement of fluctuating pressures and are marked by filled circles on Figure 3, 4 were in doors for which fluctuating measurements were obtained, and the remaining 134 taps were designated for mean pressure measurement.

An area of 1100 ft radius surrounding the building site was modeled in detail. Structures located within this region were modeled from styrofoam retaining the overall height and shape but omitting small surface details. The Building model and surrounding area was mounted on a 76 in. dia. turntable centered 84 ft from the test section entrance. That portion of the modeled area which did not fit on the turntable was placed upstream and downstream from the turntable and changed to match the turntable azimuthal position each time the turntable was rotated. The turntable indicated azimuthal orientation to ± 0.1 degree.

The region upstream from the modeled area was covered with a randomized roughness constructed from bricks. A 12 in. high vortex generator provided a boundary layer trip at the entrance to the test section. The distribution of bricks was designed to provide a boundary layer thickness of approximately 50 in., a velocity profile power law exponent similar to that for a city environment, and a logarithmic velocity profile with a realistic roughness length. A photograph of the complete model in-place in the wind tunnel is shown in Figure 4. The wind-tunnel ceiling was adjusted after placement of the model to obtain a zero pressure gradient along the test section.

3. INSTRUMENTATION AND DATA ACQUISITION

3.1 Flow Visualization

Visualization of the flow in the vicinity of the model is helpful in understanding and interpreting mean and fluctuating pressures, in defining zones of separated flow and reattachment where pressure coefficients may be expected to be high, and in indicating areas where pedestrian discomfort may be a problem. Titanium tetrachloride smoke was released from sources on and near the model and motion pictures records made. Conclusions obtained from these smoke studies are discussed in section 4.1.

3.2 Pressures

Mean and fluctuating pressures were obtained at each of the 68 locations on the building indicated by filled circles on Figure 3. A 12 in. length of 1/16 I.D. plastic tubing connected the 68 pressure ports on the building to a 72 tap pressure switch mounted inside the model. The switch (Model 1) was designed and fabricated in the Fluid Dynamics and Diffusion Laboratory to minimize the attenuation of pressure fluctuations across the switch. Each of the 68 measurement ports was directed in turn by the switch to one of 4 pressure transducers mounted close to the switch. The switch was operated manually by means of a shaft projecting through the floor of the wind tunnel. A mechanical indexing feature locked the switch into each of the 18 required positions while a potentiometer provided an indication of the switch position on a digital voltmeter. The 4 pressure switch input taps not used for transmitting building pressures were connected to a common tube leading outside the wind tunnel and provided a means of performing in-place calibration of the transducers. A photograph of the pressure switch in place is shown in Figure 5.

The pressure transducers used were "statham" differential strain-gage transducers (Model PM283TC) with a 0.15 psid range. They were selected for the stability and linearity in the working range required. The frequency response of the transducers was greater than 200 Hz adequately covering the range of frequencies encountered. A reference pressure was obtained by connecting the reference side of the transducer with plastic tubing to the static side of a pitot tube mounted in the wind tunnel free stream above the model building. In this way the transducer measured the instantaneous difference between the local surface pressure and the static pressure in the free stream above the model.

Each pressure transducer bridge was monitored by a Honeywell Accudata 118 Gage Control/Amplifier unit which provided excitation to the bridge and amplified the bridge output. These instruments are characterized by a very stable excitation voltage and amplifier gain. Output from the Honeywell signal conditioners was fed to an on-line 8 channel System Development, Inc., analog-to-digital conversion unit. The data was processed onto digital tape for later data analysis by computer. Resolution of conversion was ± 0.0016 in pressure coefficient. All 4 transducers were recorded simultaneously for 16 seconds at a 240 sample per second rate. The results of an experiment to determine the length of record required to obtain stable mean and rms pressures is shown in Figure 6. A typical pressure port record was integrated for a number of time periods to obtain the data shown. Fluctuations in results for a 16 second average are within 1 percent for mean pressure and 2 percent for fluctuating pressure. Definitions for the pressure coefficients are given in section 4.3.

Reduction of the raw data to usable form was performed on the Colorado State University CDC 6400 computer as described in Section 4.3.

The 134 pressure taps for which mean velocity only was recorded were connected to a 256 port pressure switch located outside the wind tunnel by 8 ft lengths of 1/8 I.D. plastic tubing. The 4 position switch (Model 0) was designed and fabricated in the Fluid Dynamics and Diffusion laboratory for this purpose. Each of the 134 measurement ports was connected in three switch positions to one of 64 output taps on the switch. These 64 pressures were directed in turn to a single Statham pressure transducer by a 64 port scanivalve pressure switch. In this way each pressure port on the structure was examined sequentially. The signal from the pressure transducer was processed in the same way as the fluctuating pressures with the exception that computations recorded only mean values. The long tube lengths attenuated the fluctuating pressures sufficiently that fluctuating information could not be obtained.

3.3 Velocity

Velocity and turbulence intensity profiles were made upstream from the detailed model area and at the building location (with the model removed) for several approach flow directions. In addition, mean velocity and turbulence intensity measurements were made 0.2 in. (3.0 ft prototype) above the surface for 4 wind directions near the building at locations 1 through 8 shown in Figure 2. The surface measurements were intended to indicate the environment to which a pedestrian in the plaza area would be subjected.

Measurements were made with a single hot-wire anemometer mounted with its axis vertical. The instrumentation used was a DISA constant temperature anemometer (Model 55D05) with a 0.0004 in. dia. platinum (80%) - iridium (20%) sensing element 0.080 in. long. Output was read from a Hewlett-Packard integrating digital voltmeter (Model 2401C) for mean voltage and a DISA RMS meter (Model 55D35) for rms voltage.

Calibration was performed by placing the anemometer in the free stream near the pitot tube used to record wind tunnel velocity and recording the output for several velocities. The calibration data was fit to a variable exponent King's Law relationship

$$E^2 = A + BU^n$$

where E is the hot-wire output voltage, U the approach velocity and A, B and n are coefficients selected to fit the data. A typical calibration showing the linear relationship between E^2 and U^n is plotted in Figure 7. The above relationship was used to recover the mean veloicty at measurement points from the measured mean voltage. The fluctuating veloicty in the form U_{rms} (root-mean-square velocity) was obtained from

$$U_{rms} = \frac{2\ E\ E_{rms}}{B\ n\ U^{n-1}}$$

where E_{rms} is the root-mean-square voltage output from the anemometer. All turbulence measurements were divided by either local mean velocity U or mean velocity outside the boundary layer U_∞. Division by U gives an indication of the relative unsteadiness at the location while division by U_∞ permits easy determination of the actual magnitude of rms velocity fluctuations at a point for various approach velocities.

3.4 Diffusion

Concentration measurements were made to determine the extent to which the environment about the structure would be exposed to exhaust gases emitted from the 4 underground garage vents. Surface measurements were made at 14 locations shown on Figure 2. The prototype conditions modeled were 9.5 ft/sec velocity from the vents with an 18 mi/hr ambient wind velocity. The purpose of the low ambient wind was to simulate a typical case where concentrations would be expected to be relatively high in the plaza area. Measurements were taken for each vent operating alone for 4 wind directions.

The exhaust gas used for the experiment was Kr-85, a beta emitting radioactive gas, diluted approximately a million times in air. The mixture was supplied to each vent in turn and regulated with a flow meter. Concentrations at the various plaza locations was determined by placing one end of a 1/8 I.D. plastic tube at the measurement location and drawing air into one of a bank of 16 Geiger-Mueller tubes with a suction pump. Counts emitted by the Geiger-Meuller circuitry were converted to concentrations by a suitable calibration against a known standard. Concentrations measured at each point were divided by the concentration of the gas supplied to the vents to record the concentration as a percentage of the source gas.

4. RESULTS

4.1 Flow Visualization

A 1200 ft. film is included as part of this report showing the characteristics of flow about the structure with smoke. A listing of the contents of the film is shown in Table 1. Several features can be noted from the visualization. With flow approaching the upper portion of the structure from a direction approximately parallel to a face, the flow was seen to separate from the upstream corner of the diagonals on the upstream edge of the side and to remain separated with a thin separated region across the entire face. Fluctuations in the separated flow indicated the possibility of relatively high pressure fluctuations on the side and the upstream diagonal. For flow at other angles, flow separated cleanly from the building with much less evidence of high pressure fluctuations on the surface.

Visualization of smoke near the surface indicated the plaza area should be reasonably well protected from strong winds and exhaust gases except for winds from the west through north. For those directions, a high velocity jet of air swept under the connecting roof between the tower and adjacent structure and continued across the plaza near the tower. Blocking that passageway provided protection to the plaza area. Smoke sources placed at the garage exhaust vents showed that the highest concentrations in the plaza would be expected for west through north winds where the jet discussed above carried garage exhaust into the plaza. Again, blocking the passage prevented some of the smoke from entering the plaza. For easterly winds, smoke from one exhaust vent (Curtis St. nearest 18th St.) was observed in the plaza in the region near the corner of 17th and Curtis St.

4.2 Velocity

Typical approach velocity profiles are shown in Figure 8a and b. One profile was taken 89 in. upstream from the model (1335 ft. prototype) and is characteristic of the boundary layer approaching the model. The boundary layer thickness, δ, was 52 inches corresponding to a prototype value of approximately 800 ft. In the form

$$\frac{U}{U_\infty} = \left(\frac{Y}{\delta}\right)^n$$

the velocity profile has an exponent n of 0.215 which is a reasonable value for city environments such as Denver with relatively low building heights extending right to the downtown area. The profiles plotted in Figure 8b are shown in semilogarithmic form. The roughness height indicated by the zero velocity intercept of the best fit line is 7.2 ft which is reasonable for the site modeled. A velocity profile taken at the building site with the building removed is shown in Figure 8a. Some modification to the approach flow is evident in the profile caused by nearby structures.

Profiles of longitudinal turbulence intensity are shown in Figure 9 for the upstream approach conditions and for the building site. Modifications to the profiles due to topography and local structures is evident. For the purpose of this report, turbulence intensity is defined as the root-mean-square of the longitudinal velocity fluctuations divided by the reference mean velocity U_∞ at the outer edge of the boundary layer,

$$Tu_1 = \frac{U_{rms}}{U_\infty} ,$$

or as the rms velocity divided by the local mean velocity,

$$Tu_2 = \frac{U_{rms}}{U} \ .$$

Mean velocity and turbulence intensity at plaza locations 1-8 shown in Figure 2 for 4 wind directions are listed in Table 2. Measurements were taken 0.2 in. (3.0 ft prototype) above the surface. Locations marked 'A' were repeat measurements with the passage from the plaza to Arapahoe adjacent to the tower portion of the structure blocked to prevent occurance of the high velocity jet of air noted in the flow visualization. The largest mean velocities were recorded at point 1 for 0 and 300 degree winds and point 2 for 0 and 90 degrees with velocities ranging from 50 to 85 percent of U_∞. These values dropped sharply when the passage was blocked. The highest 'gustiness' values (U_{rms}/U) were obtained for locations 8 for 300 degrees at 45 percent, 1A for 180 degrees at 38 percent, 3A for 300 degrees at 29 percent, 3 for 180 degrees at 28 percent, and 6 for 300 degrees at 27 percent. Large values of gustiness must be interpreted in terms of the magnitude of mean velocity since a low wind velocity can lead to large values as effectively as large rms velocities. The large values of U_{rms}/U for these locations are due in large part to low mean velocities.

4.3 Pressures

For each of the 206 pressure ports at each of the 10 wind directions (36 directions for 4 ports) examined (2164 total measurements), the data record was analysed to obtain pressure coefficients. One pressure coefficient was computed for the 134 mean pressure taps while 4 coefficients were computed for each of the fluctuating pressure taps. The first was the mean pressure coefficient

$$C_{p_{mean}} = \frac{(p - p_\infty)_{mean}}{\frac{1}{2} \rho U_\infty^2}$$

where the symbols are as defined in the List of Symbols. It represents the mean of the instantaneous pressure difference between building pressure port and static pressure in the wind tunnel outside the boundary layer non-dimensionalized by the dynamic pressure $\frac{1}{2} \rho U_\infty^2$ outside the boundary layer. The magnitude of the fluctuating pressure was obtained by the rms pressure coefficient

$$C_{p_{rms}} = \frac{(p - p_\infty)_{rms}}{\frac{1}{2} \rho U_\infty^2}$$

in which the numerator is the root-mean-square of the instantaneous pressure difference.

If the pressure fluctuations followed a Gaussian probability distribution, no additional data would be required to predict the frequency with which any given pressure level would be observed. However, the pressure fluctuations do not follow a Gaussian probability distribution so that additional information is required to show the extreme values of pressure expected. The peak maximum and peak minimum pressure coefficients are used to determine these values:

$$C_{p_{max.}} = \frac{(p - p_\infty)_{max}}{\frac{1}{2} \rho U_\infty^2}$$

$$C_{p_{min.}} = \frac{(p - p_\infty)_{min}}{\frac{1}{2} \rho U_\infty^2}$$

The values of $p - p_\infty$ which were digitized at 240 samples-per-second for 16 seconds were examined individually by the computer to obtain the most positive and most negative values during the 16 second period. These were converted to Cp_{max} and Cp_{min} by non-dimensionalizing with the free stream dynamic pressure.

The four pressure coefficients were calculated by the CSU CDC 6400 computer and tabulated on microfilm. The list of coefficients is included as Appendix A. The tap code number in the appendix is given in Figure 3. The first digit of the code gives the building side while the second and third give sequential tap numbers on the side. Additional information provided in the appendix includes approach wind azimuth in degrees from true north, temperature in the wind tunnel in degrees F, barametric pressure in inches of Hg, and reference velocity outside the boundary layer in feet per second. The largest values of peak maximum C_p values were 1.25 to 1.43 on and adjacent to the diagonal corners for wind directions perpendicular to the diagonals. The largest values of peak minimum C_p occurred on and adjacent to the diagonal corners and near the top of each side with flow roughly perpendicular to a face. Values of -2.0 to -2.7 were common on and near the corner diagonal for these wind directions. Negative C_p values up to -2.0 were seen on the roof near the corners.

To insure that no flow pattern developed between the azimuths used for approach flow direction which would cause sharply higher pressure coefficients than were anticipated from the normally spaced data, one pressure tap was examined for small angular increments. Tap 422 was selected for examination for a range of approach flow azimuths from 45 to 65 degrees in one degree increments. The tap was chosen because of high negative mean, rms and peak minimum pressure coefficients and because smoke flow indicated a region of large amplitude fluctuations in a separated flow at that point. The results of that investigation are shown in Table 3. The pressure coefficients do reach a maximum value within the 20 degree span higher than indicated by the end-point values alone. However, the largest value of peak minimum pressure coefficient (-1.35 at 49 degrees) was only 7.3 percent larger than the value at 45 degrees indicating that no sharp peak in pressure coefficient appears in that azimuthal range.

In order to determine the pressures acting on the air doors opening from side 1 of the tower onto the plaza (see Figure 2), pressure taps were installed in the door recesses and data was taken for every 10 degrees of wind azimuth. Results of those measurements are listed in Table 4 and shown graphically in Figures 10 and 11. Part 'a' of each figure shows $C_{p_{rms}}$ while the 'b' portion gives $C_{p_{min}}$, $C_{p_{mean}}$, and $C_{p_{max}}$ in order from the center outward. Note that the zero is not placed at the origin on the latter set. The pressures on door 1 (nearest to Arapahoe st) are not large--maximum pressure coefficients are near one. For door 2, the positive peak does not exceed one; however, for an easterly wind, large negative values appear peaking at a $C_{p_{min}}$ of -2.35 for a 90 degree wind azimuth.

Determination of pressures on the two corner doors at 18th St. and Arapahoe St. was accomplished by installing pressure taps at the door locations. Data was obtained for every 10 degrees of wind azimuth. Results of the measurements are listed in Table 5 and are shown graphically in Figures 12 to 14. Table 5 lists pressure coefficients for the corner door on building side 2, for the corner door in building side 3, and for the instantaneous difference between the two doors. The information is presented in Figures 12 to 14 in the same way as for Figures 10 and 11 described above. The positive pressure coefficient on each door was less than one while the peak negative value reached -2.0 only for a wind azimuth of 320 degrees. The pressure coefficients for the instantaneous difference between the two doors reached both +2 and -2 in pressure coefficient for winds from 330 and 50 degrees respectively (Figure 14). Other wind directions showed more moderate pressures.

4.4 Diffusion

Concentration measurements of exhaust gases emitted from the 4 underground garage vents were divided by the concentration of the emitted exhaust gas to obtain a percentage of pollutant at a given location compared to the vented concentration. The data for the 14 points shown in Figure 2 for each exhaust vent for 4 wind directions is shown in Table 6. Presentation of the data for each vent operating alone permits the concentration at a location to be calculated assuming any desired distribution of exhaust gases to the four vents.

The largest concentrations were found at points 12 and 13 located on the sidewalk adjacent to vents 1 and 3. These locations--particulary 12--showed high concentrations from the adjacent vent for several wind directions. The plaza area in general showed low concentrations for all vents for all wind directions. Blocking the passage from the plaza to Arapahoe St. for a 300 degree wind increased concentrations somewhat at locations 1 and 2 but tended to decrease concentrations elsewhere.

CONCLUSIONS

A boundary layer flow over the Telephone Building model was established whose characteristics compared favorably with the expected flow over the Denver area. Flow visualization showed fluctuating separation features around the diagonal corners suggesting high values of pressure coefficient in those regions. Observation of the flow showed rather large velocities in the plaza near the entrances to the main structure. Blocking the passage from the plaza to Arapahoe St. provided a large reduction in velocity.

Measurements of fluctuating velocity in the plaza area indicated the largest value of root-mean-square velocities occurred at plaza points 8, 1 and 1A for 300, 0 and 90 degree wind azimuths respectively. RMS velocities were 6 to 7 percent of the reference velocity above the boundary layer. These correspond to a local turbulence intensity of 45, 7 and 16 percent of the local mean velocity. Only the first of these local values is large. Points experiencing relatively high local turbulence intensity (greater than 30 percent of local mean) were point 8 at 300 degrees and point 1A at 180 degrees. These points both experienced low values of local mean velocity.

Pressure measurements on the structure supported the flow visualization conclusion that the area near the diagonal corners would receive the largest pressure coefficients. The largest peak negative pressure coefficient was -2.72 at tap 228 for a wind azimuth of 330 degrees. Other corner locations showing high negative coefficients were taps 102 and 104 for a 330 degree wind direction. Negative values of above -2.0 were common on the diagonal corners. In addition to showing the largest negative pressures, the corners also showed the largest positive pressure coefficients. Tap 403 recorded a +1.43 at 180 degrees, tap 201 had a +1.42 at 0 degrees, and tap 228 recorded a +1.35 for 270 degrees. Several other values above +1.2 were also noted.

Diffusion measurements of exhaust gas emitted from the garage vents showed generally low concentrations in the plaza area. The highest concentrations were observed at sidewalk level immediately adjacent to the Curtis Street exhaust vents.

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TABLE 1

MOTION PICTURE SCENE GUIDE

SCENE NUMBER	WIND AZ. (1)	PASSAGE 1 (2)	PASSAGE 2 (3)	SOURCE ELEVATION	SOURCE LOCATION (4)
1	300°			Ground	Data point 3
2	"			"	Data Point 1
3	"	X		"	Data Point 1
4	"			"	Data Point 5
5	"			"	Data Point 13
6	"	X		"	17th & Arapahoe
7	"			"	Data Point 13
8	"			"	Data Point 14
9	"			"	Data Point 8
10	"			"	Data Point 11
11	"			"	Data Point 12
12	"			"	Data Point 2
13	"			"	Data Point 13
14	"		X	"	Data Point 13
15	"	X	X	"	Data Point 13
16	"	X		"	Data Point 13
17	"			200'	Upwind Side
18	"			300'	Upwind Side
19	"			Roof	Penthouse Lee
20	"			200'	Upwind of Bldg
21	300°-255°			200'	Bldg. rotated CW
22	255°-315°			200'	Bldg. rotated CCW

(1) All data taken at 24 fr./sec. and a wind velocity of 10 ft./sec.

(2) Passage 1 represents passage from plaza to Arapahoe St. adjacent to tower portion of structure. X indicates passage was closed to air movement.

(3) Passage 2 represents passage from plaza to 17th St. pedestrian bridge. X indicates passage was closed to air movement.

(4) Data point locations are shown in Figure 2.

TABLE 1 (Cont.)

SCENE NUMBER	WIND AZ.	PASSAGE 1	PASSAGE 2	SOURCE ELEVATION	SOURCE LOCATION
23	000		X	Ground	Data Point 1
24	"			"	Data Point 5
25	"			"	17th & Arapahoe
26	"			"	Data Point 13
27	"			"	Data Point 14
28	"			"	18th & Arapahoe
29	"			"	Data Point 3
30	"	X		"	Data Point 3
31	"			"	Data Point 5
32	"			"	Data Point 6
33	"			"	Data Point 12
34	"			"	Data Point 2
35	"			"	Data Point 11
36	"			"	18th & Curtis
37	"			"	18th
38	"			"	Plaza from NE
39	090			"	18th & Curtis
40	"			"	Data Point 8
41	"			"	Data Point 11
42	"			"	Data Point 2
43	"			"	Data Point 12
44	"			"	Data Point 5
45	"		X	"	Data Point 5
46	"	X	X	"	Data Point 5
47	"			"	Data Point 5
48	"			"	Data Point 14
49	"			"	Data Point 3
50	"	X		"	Data Point 3
51	"			"	Data Point 13
52	"			"	Data Point 7
53	"			"	Data Point 2
54	180			"	Data Point 6

TABLE 1 (Cont.)

SCENE NUMBER	WIND AZ.	PASSAGE 1	PASSAGE 2	SOURCE ELEVATION	SOURCE LOCATION
55	180			Ground	Data Point 12
56	"			"	Data Point 5
57	"			"	Data Point 2
58	"			"	Data Point 11
59	"			"	Data Point 8
60	"			"	Data Point 7
61	"			"	Data Point 13
62	"			"	Data Point 3
63	"			"	Data Point 14

TABLE 2

MEAN AND FLUCTUATING VELOCITIES IN THE PLAZA

Wind Azimuth	Location	U/U_∞ Percent	U_{rms}/U_∞ Percent	U_{rms}/U Percent
000	1	84.5	6.24	7.4
	1A*	14.4	3.00	20.8
	2	50.6	7.12	14.1
	2A	23.5	4.97	21.1
	3	25.0	4.63	18.4
	3A	22.1	4.45	20.1
	4	29.9	4.46	15.0
	5	38.6	5.34	13.8
	6	23.5	5.42	23.0
	7	20.8	3.84	18.5
	8	24.5	5.78	23.6
090	1	25.5	5.53	21.7
	1A	38.6	6.26	16.2
	2	77.6	4.21	5.42
	2A	--	--	--
	3	18.6	4.51	24.2
	3A	15.1	3.44	22.7
	4	20.3	3.96	19.5
	5	22.6	3.88	17.2
	6	31.0	5.61	18.1
	7	23.1	4.12	17.9
	8	63.1	4.29	6.8

* Locations designated 'A' indicate measurements were taken with passage from plaza to Arapahoe St. closed.

TABLE 2 (Cont.)

Wind Azimuth	Location	U/U_∞ Percent	U_{rms}/U_∞ Percent	U_{rms}/U Percent
180	1	20.8	3.28	15.8
	1A	15.1	2.99	37.7
	2	25.5	4.77	18.7
	2A	26.6	4.81	18.1
	3	10.7	2.99	28.0
	3A	21.7	3.95	18.2
	4	15.1	3.58	23.6
	5	15.9	3.65	23.0
	6	26.6	4.33	16.3
	7	32.2	5.49	17.1
	8	14.4	3.33	23.0
300	1	60.1	5.02	8.3
	1A	5.9	1.38	2.3
	2	33.5	5.26	15.7
	2A	14.0	3.63	25.9
	3	17.2	3.58	20.8
	3A	11.2	3.26	29.1
	4	18.1	3.58	19.8
	5	14.0	2.72	19.4
	6	17.2	4.68	27.2
	7	14.8	3.02	20.5
	8	15.5	7.02	45.2

TABLE 3

PRESSURE DATA FOR ONE DEGREE WIND AZIMUTH
TAP NO 422

Wind Azimuth	Primary Data Mean	RMS	P.Max	P.Min	Repeat Data Mean	RMS	P.Max	P.Min
045	-.440	.202	.152	-1.261	-.436	.203	.199	-1.315
46	-.423	.194	.261	-1.161	-.431	.211	.175	-1.305
47	-.412	.201	.152	-1.262	-.395	.191	.374	-1.142
48	-.388	.191	.284	-1.129	-.362	.183	.235	-1.223
49	-.379	.189	.158	-1.354	-.353	.182	.155	-1.264
50	-.352	.176	.186	-1.066	-.337	.169	.232	-1.091
51	-.322	.161	.134	-1.057	-.337	.164	.186	-1.132
52	-.316	.156	.160	-1.168	-.296	.143	.170	-1.285
53	-.297	.134	.109	-.991	-.287	.125	.090	-1.035
54	-.283	.127	.242	-1.186	-.276	.115	.183	-.867
55	-.272	.114	.126	-.919	-.262	.104	.255	-.779
56	-.263	.100	.163	-.890	-.256	.093	.051	-.959
57	-.253	.093	.054	-.862	-.254	.082	.137	-.707
58	-.258	.096	.087	-.808	-.248	.079	.082	-.887
59	-.244	.076	.044	-.781	-.240	.075	.008	-.823
60	-.243	.072	.052	-.647	-.237	.068	.029	-.624
61	-.245	.066	.039	-.756	-.236	.065	.042	-.676
62	-.238	.060	.042	-.545	-.233	.057	.028	-.505
63	-.231	.058	-.020	-.514	-.232	.054	.002	-.606
64	-.226	.051	.015	-.738	-.229	.052	-.011	-.514
65	-.226	.052	-.046	-.482				

TABLE 4

PRESSURE DATA FOR THE AIR DOORS

PROJECT NO 6644

AIR DOOR 1

WIND DIRECTION	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
0	-.253	.163	.428	-.727
10	-.170	.155	.526	-.763
20	-.152	.108	.377	-.523
30	-.181	.075	.127	-.541
40	-.142	.054	.116	-.338
50	-.208	.074	.100	-.506
60	-.307	.069	-.096	-.542
70	-.308	.079	-.039	-.637
80	-.233	.096	.165	-.492
90	-.174	.106	.261	-.529
100	-.184	.109	.287	-.552
110	-.201	.126	.297	-.751
120	-.234	.114	.555	-.707
130	-.227	.107	.296	-.621
140	-.260	.095	.139	-.590
150	-.269	.108	.519	-.665
160	-.281	.127	.343	-.900
170	-.324	.194	.657	-1.080
180	-.365	.152	.294	-1.058
190	-.390	.129	.062	-1.058
200	-.362	.124	.056	-.908
210	-.354	.115	.100	-1.017
220	-.311	.118	.057	-1.055
230	-.204	.096	.269	-.746
240	.039	.120	.660	-.431
250	.088	.137	.629	-.413
260	.067	.187	.934	-.567
270	-.050	.190	.732	-.560
280	-.181	.150	.438	-.670
290	-.306	.155	.369	-.786
300	-.406	.153	.430	-.823
310	-.467	.134	.314	-1.068
320	-.407	.121	.186	-.869
330	-.385	.122	.173	-.768
340	-.368	.142	.367	-.828
350	-.287	.159	.374	-.787

TABLE 4 (CONTINUED)

PRESSURE DATA FOR THE AIR DOORS

PROJECT NO 6644

AIR DOOR 2

WIND DIRECTION	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
0	-.501	.086	-.252	-.996
10	-.431	.079	-.150	-.704
20	-.366	.062	-.158	-.630
30	-.262	.057	-.067	-.479
40	-.165	.058	-.002	-.521
50	-.208	.072	.026	-.461
60	-.337	.077	-.131	-.676
70	-.507	.085	-.252	-.818
80	-.663	.111	-.341	-1.383
90	-.793	.172	-.271	-2.350
100	-.826	.192	-.240	-1.842
110	-.808	.211	-.064	-1.957
120	-.649	.205	-.018	-1.777
130	-.382	.170	.064	-1.192
140	-.155	.119	.336	-1.032
150	-.033	.103	.291	-.593
160	-.020	.118	.501	-.622
170	.043	.139	.653	-.612
180	-.030	.104	.425	-.552
190	-.091	.101	.421	-.359
200	-.139	.128	.626	-.418
210	-.180	.148	.758	-.536
220	-.184	.130	.454	-.570
230	-.176	.111	.341	-.753
240	-.045	.148	.612	-.475
250	.046	.179	.890	-.405
260	-.021	.209	.952	-.472
270	-.140	.161	.717	-.505
280	-.275	.108	.227	-.580
290	-.410	.086	-.008	-.804
300	-.504	.076	-.284	-.866
310	-.526	.094	-.217	-.900
320	-.466	.082	-.176	-.874
330	-.458	.077	-.173	-.810
340	-.469	.086	-.170	-.934
350	-.479	.083	-.176	-.820

TABLE 5

PRESSURE DATA FOR THE CORNER DOORS

PROJECT NO 6644

CORNER SIDE 2

WIND DIRECTION	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
0	.295	.134	.815	-.121
10	.182	.109	.777	-.314
20	-.222	.187	.349	-1.112
30	-.508	.217	.093	-1.511
40	-.580	.218	-.015	-1.628
50	-.531	.238	.131	-1.677
60	-.441	.199	0.000	-1.689
70	-.440	.149	0.000	-1.174
80	-.467	.117	-.121	-1.076
90	-.496	.095	-.201	-.978
100	-.488	.070	-.194	-.869
110	-.467	.054	-.296	-.645
120	-.431	.050	-.240	-.619
130	-.373	.045	-.189	-.591
140	-.329	.046	-.167	-.490
150	-.382	.085	-.153	-.862
160	-.469	.106	-.137	-.887
170	-.536	.104	0.000	-1.004
180	-.436	.087	-.044	-.771
190	-.344	.074	.073	-.758
200	-.263	.064	.015	-.550
210	-.240	.070	.028	-.688
220	-.210	.067	.224	-.772
230	-.196	.056	-.023	-.506
240	-.243	.043	-.091	-.402
250	-.294	.046	-.147	-.467
260	-.325	.050	-.129	-.505
270	-.304	.057	-.093	-.479
280	-.271	.070	0.000	-.554
290	-.251	.082	.101	-.684
300	-.254	.107	.206	-.751
310	-.293	.126	.173	-.870
320	-.326	.132	.314	-.879
330	-.203	.141	.436	-.720
340	.033	.143	.639	-.379
350	.237	.149	.978	-.127

TABLE 5 (CONTINUED)

PRESSURE DATA FOR THE CORNER DOORS

PROJECT NO 6644

CORNER SIDE 3

WIND DIRECTION	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
0	.156	.162	.600	-.441
10	.246	.114	.704	-.072
20	.176	.126	.804	-.240
30	-.030	.124	.400	-.415
40	-.193	.127	.335	-.604
50	-.206	.150	.261	-.804
60	-.177	.127	.220	-.795
70	-.199	.096	.305	-.665
80	-.241	.077	.069	-.565
90	-.310	.070	-.052	-.572
100	-.346	.054	-.131	-.539
110	-.363	.045	-.106	-.516
120	-.354	.042	-.167	-.506
130	-.320	.042	-.154	-.400
140	-.302	.042	-.150	-.452
150	-.306	.115	-.039	-1.400
160	-.556	.200	-.077	-1.592
170	-.592	.145	-.101	-1.664
180	-.474	.106	-.090	-1.066
190	-.365	.071	-.051	-.861
200	-.325	.073	-.041	-.766
210	-.271	.054	-.080	-.563
220	-.237	.064	-.057	-.797
230	-.242	.071	-.054	-.761
240	-.313	.040	-.160	-.400
250	-.309	.052	-.232	-.593
260	-.447	.050	-.201	-.650
270	-.455	.065	-.225	-.694
280	-.471	.082	-.245	-.993
290	-.510	.106	-.103	-1.192
300	-.563	.151	-.134	-1.457
310	-.639	.100	.005	-1.625
320	-.810	.237	-.252	-2.086
330	-.709	.221	-.194	-1.743
340	-.360	.104	.222	-1.447
350	-.060	.157	.449	-.923

TABLE 5 (CONTINUED)

PRESSURE DATA FOR THE CORNER DOORS

PROJECT NO 6644

SIDE 2-SIDE 3

WIND DIRECTION	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
0	.139	.142	1.093	-.203
10	-.065	.104	.302	-.657
20	-.398	.210	.057	-1.612
30	-.479	.231	-.003	-1.898
40	-.387	.186	-.002	-1.468
50	-.325	.152	.072	-1.618
60	-.264	.115	.049	-1.195
70	-.242	.086	.026	-.691
80	-.226	.067	-.024	-.603
90	-.187	.054	.038	-.524
100	-.142	.034	-.038	-.359
110	-.104	.026	.060	-.216
120	-.077	.023	.010	-.180
130	-.046	.024	.080	-.214
140	-.027	.021	.057	-.132
150	.004	.093	1.195	-.390
160	.087	.176	1.244	-.423
170	.056	.126	1.101	-.397
180	.038	.121	.849	-.403
190	.021	.100	.691	-.648
200	.062	.087	.612	-.242
210	.031	.079	.529	-.483
220	.027	.057	.594	-.341
230	.045	.043	.415	-.196
240	.070	.020	.176	.003
250	.095	.026	.248	.015
260	.122	.034	.312	-.041
270	.152	.041	.351	.021
280	.200	.058	.632	-.026
290	.260	.082	.717	.011
300	.308	.115	.978	-.134
310	.346	.136	1.097	-.060
320	.484	.233	1.805	-.016
330	.587	.264	2.084	-.026
340	.393	.190	1.552	-.070
350	.297	.173	1.288	-.116

TABLE 6

EXHAUST VENT DIFFUSION DATA

WIND DIRECTION 0 DEGREES

SAMPLING LOCATION	PERCENT OF EXHAUST CONCENTRATION VENT 1	VENT 2	VENT 3	VENT 4
1	.007	.000	.030	1.370
2	.306	.116	.356	1.820
3	.000	.000	.031	1.980
4	.082	.000	6.090	1.030
5	.722	.156	1.720	.429
6	.112	.001	2.000	.630
7	.098	.003	3.230	1.130
8	.007	.004	.015	.114
9	.007	.017	.112	2.500
10	.033	2.140	.226	.194
11	.189	5.960	.048	.073
12	33.100	1.540	.709	.193
13	.006	.000	.362	4.070
14	.034	.007	.106	.865

WIND DIRECTION 90 DEGREES

SAMPLING LOCATION	VENT 1	VENT 2	VENT 3	VENT 4
1	.008	.089	.008	.014
2	.004	.099	.005	.024
3	.048	.123	.730	.157
4	.063	.194	.003	.020
5	.189	.414	.004	.003
6	5.880	3.920	.006	.014
7	.838	.644	.005	.021
8	.002	.006	.000	.000
9	.032	.068	.004	.051
10	.000	.000	.013	.012
11	.006	.304	.003	.000
12	10.500	7.890	.003	.005
13	.668	.363	32.400	.678
14	1.080	.294	4.240	3.680

TABLE 6 (Continued)

WIND DIRECTION 180 DEGREES

SAMPLING LOCATION	PERCENT OF EXHAUST CONCENTRATION VENT 1	VENT 2	VENT 3	VENT 4
1	1.090	.025	.044	.000
2	1.370	.060	.009	.000
3	.537	.008	2.910	.013
4	.762	.033	.001	.000
5	.629	.016	.003	.000
6	.169	.005	.005	.000
7	.501	.027	.009	.000
8	.234	.135	.504	.889
9	1.010	.020	.001	.000
10	.713	.057	.006	.000
11	1.770	4.800	.215	.001
12	17.900	.064	.012	.003
13	.103	.006	31.400	.002
14	.282	.035	2.070	4.840

WIND DIRECTION 300 DEGREES

SAMPLING LOCATION	PERCENT OF EXHAUST CONCENTRATION VENT 1	VENT 2	VENT 3	VENT 3*	VENT 4	VENT 4*
1	.013	.000	.590	1.300	.371	.234
2	.046	.001	.770	1.100	.382	.188
3	.045	.005	.500	.252	1.220	.946
4	.033	.012	2.890	2.750	.258	.188
5	.107	.005	.100	.969	.297	.204
6	.690	.030	3.300	2.360	.279	.146
7	.034	.004	1.950	1.530	.215	.123
8	.147	.230	.056	.068	1.860	1.810
9	.025	.006	.695	1.250	.467	.256
10	1.350	8.510	.450	.612	.158	.140
11	5.450	6.370	.720	.643	.175	.111
12	26.400	.636	.858	.791	.100	.110
13	.024	.010	5.660	4.560	.960	.987
14	.187	.013	.113	.055	.913	.908

* Measurements taken with door from plaza to Arapahoe St. closed.

APPENDIX A

PRESSURE DATA

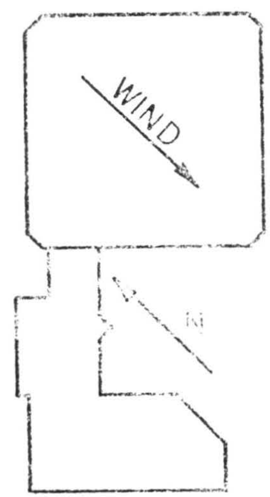
Notes -

1. Pressure coefficients are defined in section 4.3

   Pressure tap designation is explained in Figure 3
2. Pressure taps found to have erroneous information have been deleted in the data.

WIND DIRECTION 0 TEMPERATURE 69.50 DEGREES F
BAROMETRIC PRESS 25.05 IN HG VELOCITY 50.67FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
1	-.155	.111	.340	-.616
2	-.218			
3	-.705	.142	-.297	-1.436
4	-.277			
5	-.468			
6	-.617			
7	-.146			
8	-.392			
9	-.891			
10	-.895			
11	-.255			
12	-.191			
13	-.297			
14	-.347	.115	-.038	-.959
15	-.868			
16	-1.113	.185	-.371	-1.999
17	-.460			
18	-.086			
101	-.603	.096	-.304	-1.106
102	-.540	.086	-.273	-.911
103	-.486	.082	-.227	-.875
104	-.516	.092	-.229	-.882
105	-.540			
106	-.551			
107	-.571	.107	-.278	-1.017
108	-.523	.104	-.216	-.959
109				
110	-.491			
111	-.537			
112	-.517			
113	-.537			
114	-.512			
115	-.560			
116	-.558			
117	-.550			
118	-.528			
119	-.542			
120	-.598	.121	-.212	-1.721
121	-.641			
122				
123	-.672			
124	-.621			
125	-.565	.087	-.284	-.921
126	-.521			
127	-.477	.099	-.139	-.897
128	-.449	.080	-.083	-.733
129	-.763			
130	-.744			
131	-.754			
132	-.761			
133	-.720			
134	-.612			
135	-.516			
136	-.466			

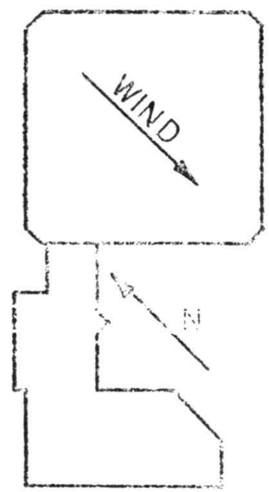


WIND DIRECTION 0 TEMPERATURE 69.50 DEGREES F
BAROMETRIC PRESS 25.05 IN HG VELOCITY 50.67FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
137	-.454			
138	-.775	.215	-.240	-1.592
139	-.524			
140	-.535			
141	-.482			
142	-.469			
143	-.412	.087	-.108	-.702
144	-.434			
145	-.440	.094	-.060	-.815
146	-.513			
201	.638	.207	1.424	-.010
202	.479	.218	.993	-.560
203	.511	.170	1.016	0.000
204	.391	.145	.795	-.157
205	.350			
206	.295			
207	.133	.111	.443	-.255
208				
209	-.173	.080	.114	-.483
210	-.540			
211	.739			
212	.632			
213	.592			
214	.533			
215	.438			
216	.344			
217	.230			
218	.058			
219	-.202			
220	.523	.200	1.269	-.178
221	.512			
222	.345	.152	.851	-.057
223	.390			
224	.316			
225				
226	-.006			
227	-.236	.084	.087	-.606
228	-.606	.118	-.271	-1.556
229	.365			
230	.312			
231	.337			
232	.316			
233	.292			
234	.250			
235	.154			
236	-.040			
237	-.342			
238	.075	.119	.493	-.482
239	.322			
240				
241	.271			
242	.232			
243	.184	.088	.544	-.056
244	.017			

WIND DIRECTION 0 TEMPERATURE 69.50 DEGREES F
BAROMETRIC PRESS 25.05 IN HG VELOCITY 50.67FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
245	-.250	.112	.265	-.692
246	-.472			
301	-.457	.060	-.253	-.733
302				
303	.041	.083	.361	-.232
304	.145	.097	.521	-.186
305	.236			
306	.289			
307				
308				
309	.369	.257	.983	-.635
310	.679			
311	-.397			
312	-.189			
313	.001			
314	.156			
315	.261			
316	.342			
317	.412			
318	.481			
319	.408			
320	-.210	.063	.047	-.456
321	-.057			
322	.034	.080	.323	-.238
323	.217			
324	.281			
325				
326	.404			
327	.336	.242	1.037	-.552
328	.517	.185	1.097	.013
329	-.418			
330	-.228			
331	-.080			
332	.056			
333	.153			
334	.188			
335	.224			
336	.235			
337	.176			
338	-.333	.064	-.121	-.634
339	-.087			
340	-.004	.068	.385	-.206
341	.136			
342	.149			
343	.167	.086	.503	-.096
344	.111			
345	.047	.134	.573	-.446
346	.099			
401	-.374	.013	-.310	-.415
402	-.468	.088	-.188	-1.021
403	-.395	.082	-.119	-.985
404	-.398	.084	-.087	-.905
405	-.405			
406	-.399			

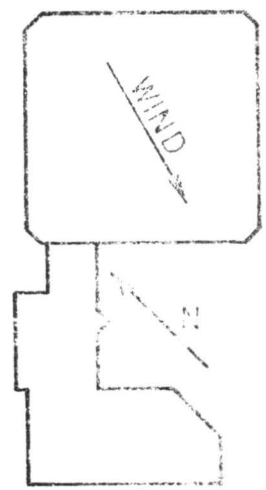


WIND DIRECTION 0 TEMPERATURE 69.50 DEGREES F
BAROMETRIC PRESS 25.05 IN HG VELOCITY 50.67FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
407	-.459	.064	-.261	-.678
408	-.410	.067	-.204	-.684
409	-.359	.069	-.145	-.647
410	-.403			
411	-.481			
412	-.446			
413	-.434			
414	-.412			
415	-.391			
416	-.393			
417	-.396			
418	-.385			
419	-.383			
420	-.430	.071	-.211	-.764
421	-.433			
422	-.496	.058	-.279	-.723
423	-.410			
424	-.325			
425	-.434	.057	-.227	-.696
426	-.404			
427	-.375	.061	-.175	-.694
428	-.399	.057	-.212	-.645
429	-.445			
430	-.483			
431	-.461			
432	-.446			
433	-.449			
434	-.192			
435	-.428			
436	-.429			
437	-.419			
438	-.575	.135	-.261	-1.449
439	-.495			
440	-.494	.084	-.292	-.826
441	-.465			
442	-.480			
443	-.428	.090	-.211	-.817
444	-.425			
445	-.435	.090	-.173	-1.060
446	-.455			

WIND DIRECTION 20 TEMPERATURE 68.50 DEGREES F
BAROMETRIC PRESS 24.95 IN HG VELOCITY 50.72FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
1	-.306	.125	.327	-.804
2	-.226			
3	-.346	.125	.057	-.936
4	-.319			
5	-.263			
6	-.274			
7	-.508			
8	-.503			
9	-.137			
10	-.499			
11	-.643			
12	-.020			
13	-.450			
14	-.640	.161	-.136	-1.041
15	-.752			
16	-.897	.168	-.323	-1.759
17	-.327			
18	-.061			
101	-.403	.064	-.188	-.704
102	-.343	.062	-.144	-.630
103	-.307	.061	-.151	-.601
104	-.336	.066	-.070	-.611
105	-.327			
106	-.329			
107	-.413	.075	-.091	-.704
108	-.368	.085	-.101	-.746
109	-.350	.010	-.096	-.446
110	-.406			
111	-.316			
112	-.324			
113	-.317			
114	-.292			
115	-.333			
116	-.339			
117	-.335			
118	-.332			
119	-.346			
120	-.326	.056	-.003	-.513
121	-.326			
122				
123	-.340			
124	-.329			
125	-.347	.067	-.101	-.562
126	-.321			
127	-.319	.084	.056	-.637
128	-.367	.102	.090	-.949
129	-.356			
130	-.353			
131	-.374			
132	-.349			
133	-.347			
134	-.334			
135	-.338			
136	-.334			

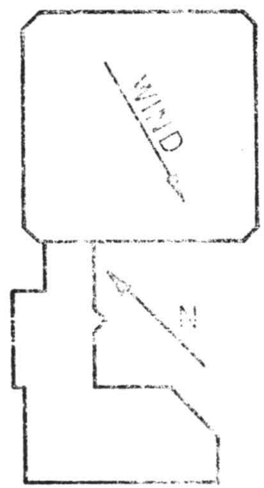


WIND DIRECTION 20 TEMPERATURE 68.50 DEGREES F
BAROMETRIC PRESS 24.95 IN HG VELOCITY 50.72FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
137	-.352			
138	-.692	.170	-.278	-1.630
139	-.217			
140				
141	-.354			
142	-.343			
143	-.340	.062	-.122	-.532
144	-.359			
145	-.410	.090	-.134	-.781
146	-.442			
201	.323	.187	.812	-.240
202	-.695	.219	.147	-1.535
203	-.130	.266	.397	-1.406
204	.022	.083	.341	-.472
205	.036			
206	.024			
207	-.077	.064	.144	-.287
208				
209	-.195	.056	-.015	-.412
210	-.313			
211	.385			
212	-.558			
213	-.254			
214	.081			
215	.070			
216	.038			
217	-.022			
218	-.107			
219	-.221			
220	-.580	.228	.554	-1.966
221	-.204			
222	-.058	.145	.327	-.893
223	.041			
224	.011			
225				
226	-.131			
227	-.203	.053	-.020	-.385
228	-.324	.059	-.149	-.547
229	.145			
230	-.549			
231	-.361			
232	-.081			
233	-.000			
234	-.013			
235	-.061			
236	-.149			
237	-.252			
238	-.443	.172	.015	-1.238
239	-.041			
240				
241	.020			
242	.027			
243	-.000	.055	.191	-.207
244	-.137			

WIND DIRECTION 20 TEMPERATURE 68.50 DEGREES F
BAROMETRIC PRESS 24.95 IN HG VELOCITY 50.72FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
245	-.320	.080	-.036	-.609
246	-.323			
301	-.576	.142	-.261	-1.651
302				
303	.280	.135	.728	-.193
304	.410	.151	.975	-.088
305	.490			
306	.551			
307				
308	.729	.011	.759	.694
309	.769	.208	1.559	.217
310	.487			
311	-.400			
312	-.003			
313	.262			
314	.479			
315	.599			
316	.678			
317	.768			
318	.802			
319	.754			
320	-.039	.091	.335	-.559
321	.234			
322	.324	.131	.751	-.049
323	.560			
324	.620			
325	.724	.012	.759	.688
326	.706			
327	.657	.206	1.285	.046
328	.306	.287	1.106	-.999
329	-.427			
330	-.074			
331	.179			
332	.364			
333	.485			
334	.544			
335	.614			
336	.594			
337	.511			
338	-.219	.081	.224	-.671
339	.111			
340	.265	.109	.686	-.008
341	.438			
342	.497			
343	.539	.157	1.095	.152
344	.495			
345	.326	.157	.848	-.304
346	-.086			
401	-.125	.015	.073	-.263
402	-.500	.169	.011	-1.387
403	-.430	.136	.028	-1.045
404	-.442	.126	-.024	-1.024
405	-.436			
406	-.447			



WIND DIRECTION 20 TEMPERATURE 68.50 DEGREES F
BAROMETRIC PRESS 24.95 IN HG VELOCITY 50.72FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
407	-.515	.113	-.154	-1.383
408	-.441	.115	-.064	-1.129
409	-.403	.112	-.046	-.975
410	-.492			
411	-.370			
412	-.493			
413	-.440			
414	-.431			
415	-.393			
416	-.409			
417	-.391			
418	-.378			
419	-.377			
420	-.507	.140	-.103	-1.225
421	-.447			
422	-.517	.078	-.253	-.802
423	-.419			
424	-.316			
425	-.417	.090	-.118	-1.062
426	-.376			
427	-.360	.096	-.064	-1.042
428	-.420	.109	-.163	-1.308
429	-.399			
430	-.500			
431	-.446			
432	-.438			
433	-.446			
434	-.106			
435	-.408			
436	-.406			
437	-.401			
438	-.524	.132	-.131	-1.462
439	-.440			
440	-.467	.102	-.201	-.921
441	-.463			
442	-.459			
443	-.446	.157	-.087	-1.460
444	-.396			
445	-.457	.150	-.122	-1.512
446	-.473			

WIND DIRECTION 45 TEMPERATURE 69.50 DEGREES F
BAROMETRIC PRESS 24.95 IN HG VELOCITY 50.77FPS

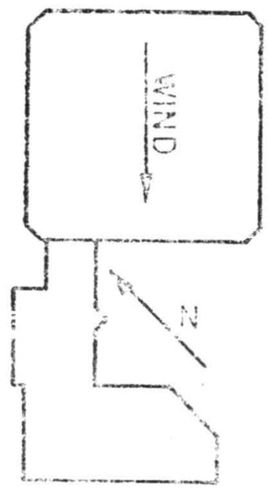
PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
1	-.281	.198	.472	-1.091
2	-.234			
3	-.229	.194	.616	-.977
4	-.418			
5	-.225			
6	-.401			
7	-.572			
8	-.545			
9	-.538			
10	-.566			
11	-.686			
12	-.704			
13	-.688			
14	-.604	.120	-.163	-1.161
15	-.674			
16	-.670	.130	-.250	-1.493
17	-.103			
18	.100			
101	-.287	.136	.134	-1.011
102	-.204	.099	.105	-.616
103	-.152	.088	.093	-.532
104	-.168	.083	.073	-.487
105	-.175			
106	-.167			
107	-.241	.082	.033	-.608
108	-.190	.095	.095	-.681
109				
110	-.222			
111	-.217			
112	-.189			
113	-.183			
114	-.133			
115	-.157			
116	-.152			
117	-.163			
118	-.174			
119	-.179			
120	-.176	.110	.188	-.715
121	-.150			
122				
123	-.132			
124	-.136			
125	-.163	.064	.028	-.488
126	-.153			
127	-.155	.100	.140	-.621
128	-.206	.138	.152	-1.081
129	-.206			
130	-.153			
131	-.124			
132	-.108			
133	-.105			
134	-.104			
135	-.112			
136	-.116			

WIND DIRECTION 45 TEMPERATURE 69.50 DEGREES F
BAROMETRIC PRESS 24.95 IN HG VELOCITY 50.77FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
137	-.136			
138	-.218	.086	.034	-.678
139	-.117			
140				
141	-.097			
142	-.100			
143	-.083	.060	.100	-.327
144	-.101			
145	-.104	.064	.116	-.395
146	-.106			
201	-.354	.166	.069	-1.292
202	-.766	.167	-.340	-1.638
203	-.746	.174	-.291	-1.548
204	-.745	.183	-.010	-1.803
205	-.616			
206	-.478			
207	-.374	.197	.276	-1.565
208				
209	-.202	.160	.271	-1.017
210	-.224			
211	-.429			
212	-.680			
213	-.657			
214	-.709			
215	-.633			
216	-.521			
217	-.341			
218	-.251			
219	-.236			
220	-.624	.203	-.049	-1.805
221	-.604			
222	-.708	.220	-.044	-1.819
223	-.582			
224	-.471			
225				
226	-.259			
227	-.237	.183	.224	-1.057
228	-.226	.145	.155	-.856
229	-.565			
230	-.606			
231	-.613			
232	-.611			
233	-.543			
234	-.432			
235	-.301			
236	-.249			
237	-.246			
238	-.669	.204	-.108	-1.555
239	-.415			
240				
241	-.474			
242	-.345			
243	-.230	.149	.222	-1.026
244	-.181			

WIND DIRECTION 45 TEMPERATURE 69.50 DEGREES F
BAROMETRIC PRESS 24.95 IN HG VELOCITY 50.77FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
245	-.173	.112	.227	-.777
246	.020			
301	-.947	.386	.209	-2.381
302				
303	.535	.180	1.083	-.049
304	.607	.185	1.176	-.051
305	.645			
306	.646			
307				
308				
309	.228	.196	1.035	-.526
310	-.803			
311	-1.099			
312	.083			
313	.481			
314	.687			
315	.765			
316	.749			
317	.684			
318	.545			
319	.152			
320	.005	.171	.639	-.621
321	.421			
322	.521	.170	1.035	.070
323	.666			
324	.679			
325				
326	.453			
327	.067	.194	.774	-.554
328	-1.012	.373	.263	-2.345
329	-1.078			
330	-.050			
331	.327			
332	.500			
333	.578			
334	.553			
335	.490			
336	.323			
337	-.046			
338	-.195	.154	.349	-.753
339	.197			
340	.343	.138	.874	-.005
341	.403			
342	.414			
343	.364	.131	.936	.005
344	.162			
345	-.149	.155	.588	-.766
346	-.937			
401	-.160	.017	-.028	-.283
402	-.231	.153	.238	-1.055
403	-.203	.171	.322	-1.097
404	-.306	.207	.330	-1.264
405	-.467			
406	-.636			

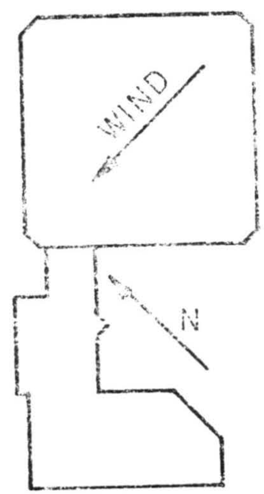


WIND DIRECTION 45 TEMPERATURE 69.50 DEGREES F
BAROMETRIC PRESS 24.95 IN HG VELOCITY 50.77FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
407	-.809	.170	-.297	-1.605
408	-.740	.156	-.263	-1.645
409	-.700	.160	-.183	-1.769
410	-.333			
411	-.219			
412	-.234			
413	-.244			
414	-.335			
415	-.469			
416	-.624			
417	-.672			
418	-.676			
419	-.656			
420	-.215	.149	.176	-.854
421	-.243			
422	-.407	.195	.266	-1.173
423	-.483			
424	-.512			
425	-.701	.197	.010	-1.723
426				
427	-.635	.175	-.054	-1.429
428	-.599	.335	.291	-2.072
429	-.160			
430	-.175			
431	-.184			
432	-.255			
433	-.397			
434	-.432			
435	-.658			
436	-.697			
437	-.706			
438	-.196	.068	.038	-.663
439	-.118			
440	-.186	.092	.119	-.720
441	-.220			
442	-.372			
443	-.621	.238	.149	-1.429
444	-.704			
445	-.769	.242	-.114	-2.010
446	-.494			

WIND DIRECTION 90 TEMPERATURE 68.00 DEGREES F
BAROMETRIC PRESS 24.95 IN HG VELOCITY 50.70FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
1	-.744	.138	-.258	-1.447
2	-.334			
3	-.293	.150	.309	-.867
4	-.521			
5				
6	-.414			
7	-1.055			
8	-.708			
9	-.598			
10	-.622			
11	-.321			
12	-.650			
13	-.546			
14	-1.326	.222	-.723	-2.126
15	-1.037			
16	-.646	.138	-.245	-1.440
17	-.538			
18	.464			
101	-.714	.101	-.397	-1.238
102	-.660	.112	-.323	-1.174
103	-.677	.096	-.387	-1.191
104	-.669	.105	-.325	-1.088
105	-.657			
106	-.641			
107	-.687	.088	-.402	-1.050
108	-.604	.090	-.284	-.951
109	-.661			
110	-.641			
111	-.653			
112	-.699			
113	-.671			
114	-.592			
115	-.657			
116	-.657			
117	-.635			
118	-.626			
119	-.617			
120	-.679	.114	-.323	-1.166
121	-.654			
122	-.656	.015	-.614	-.704
123	-.663			
124	-.666			
125	-.604	.078	-.367	-.939
126	-.621			
127	-.613	.078	-.361	-.975
128	-.607	.076	-.372	-.993
129				
130	-.648			
131	-.640			
132				
133	-.702			
134	-.732			
135	-.704			
136	-.676			

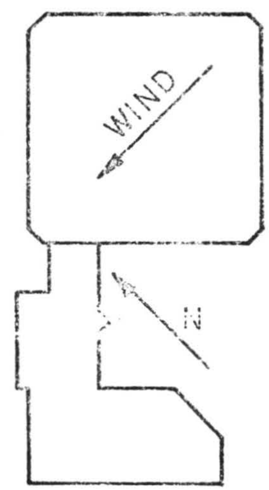


WIND DIRECTION 90 TEMPERATURE 68.00 DEGREES F
BAROMETRIC PRESS 24.95 IN HG VELOCITY 50.70FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
137	-.669			
138	-.606	.077	-.381	-1.011
139	-.580			
140	-.483	.019	-.441	-.526
141	-.532			
142	-.743			
143	-.793	.106	-.500	-1.292
144	-.719			
145	-.704	.094	-.361	-1.040
146	-.705			
201	-.627	.078	-.400	-1.009
202	-.546	.078	-.318	-.919
203	-.580	.076	-.358	-.906
204	-.584	.072	-.358	-.866
205	-.576			
206	-.588			
207	-.620	.089	-.345	-.983
208				
209	-.649	.091	-.405	-1.145
210	-.652			
211	-.566			
212	-.571			
213	-.571			
214	-.576			
215	-.587			
216	-.587			
217	-.598			
218	-.606			
219	-.628			
220	-.553	.080	-.268	-1.088
221	-.544			
222	-.599	.070	-.317	-.875
223	-.567			
224	-.578			
225				
226	-.596			
227	-.621	.083	-.366	-1.042
228	-.628	.092	-.279	-1.160
229	-.532			
230	-.526			
231	-.525			
232	-.534			
233	-.540			
234	-.552			
235	-.560			
236	-.558			
237	-.564			
238	-.536	.099	-.269	-1.231
239	-.210			
240				
241	-.523			
242	-.526			
243	-.524	.098	-.255	-1.213
244	-.497			

WIND DIRECTION 90 TEMPERATURE 68.00 DEGREES F
BAROMETRIC PRESS 24.95 IN HG VELOCITY 50.70FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
245	-.521	.098	-.238	-1.115
246	-.270			
301	.613	.194	1.127	.052
302				
303	.425	.157	.892	-.020
304	.309	.134	.727	-.069
305	.226			
306	.164			
307	.745	.073	.923	-.188
308	-.251	.233	.764	-.332
309	-.296	.069	.034	-.529
310	-.527			
311	.672			
312	.540			
313	.513			
314	.432			
315	.322			
316	.264			
317	.113			
318	-.073			
319	-.291			
320	.448	.260	1.052	-.513
321	.452			
322	.813	.149	.867	-.717
323	.300			
324	.214			
325	-.243	.119	.859	-.292
326	-.098			
327	-.305	.077	.036	-.621
328	-.555	.081	-.260	-1.164
329	.481			
330	.326			
331	.345			
332	.285			
333	.214			
334	.136			
335	.037			
336	-.119			
337	-.306			
338				
339	.227			
340				
341	.141			
342	.088			
343	-.016	.079	.389	-.284
344	-.149			
345	-.322	.077	.024	-.715
346	-.488			
401				
402	-.317	.074	-.036	-.557
403	-.128	.087	.176	-.423
404	.008	.098	.410	-.359
405	.100			
406	.178			

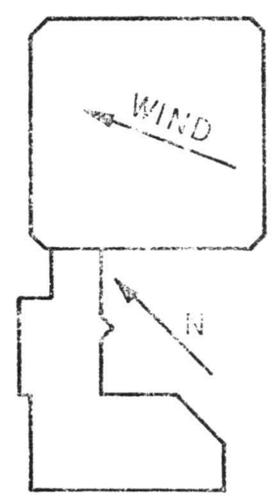


WIND DIRECTION 90 TEMPERATURE 68.00 DEGREES F
BAROMETRIC PRESS 24.95 IN HG VELOCITY 50.70FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
407	.186	.123	.593	-.186
408	.341	.141	.857	-.036
409	.289	.243	.975	-.626
410	.627			
411	-.620			
412	-.356			
413	-.129			
414	.054			
415	.187			
416	.259			
417	.348			
418	.434			
419	.389			
420	-.358	.069	-.090	-.637
421	-.142			
422	-.018	.084	.382	-.250
423	.155			
424	.295			
425	.358	.118	.769	.029
426	.420			
427	.376	.223	.936	-.583
428	.573	.175	1.168	.093
429	-.651			
430	-.397			
431	-.178			
432	.008			
433	.142			
434	.467			
435	.314			
436	.387			
437	.328			
438	-.461	.068	-.082	-.923
439	-.191			
440	.026	.064	.336	-.140
441	.142			
442	.211			
443	.290	.119	.781	-.188
444	.331			
445	.321	.169	1.099	-.284
446	.362			

WIND DIRECTION 150 TEMPERATURE 68.00 DEGREES F
BAROMETRIC PRESS 25.00 IN HG VELOCITY 50.69FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
1	-.721	.167	-.225	-1.324
2	-.256			
3	-.104	.105	.255	-.670
4	-.249			
5	-.105			
6	-.189			
7	-.545			
8	-.534			
9	-.169			
10	-.270			
11	-.363			
12	-.295			
13	-.172			
14	-.501	.158	-.047	-1.672
15	-.233			
16	-.109	.111	.467	-.443
17	.020			
18	.716			
101	-.275	.041	-.144	-.456
102	-.188	.038	-.051	-.367
103	-.169	.041	-.016	-.323
104	-.134	.056	.103	-.340
105	-.115			
106	-.116			
107	-.152	.077	.136	-.532
108	-.175	.142	.209	-.967
109				
110	-.056			
111	-.240			
112	-.212			
113	-.175			
114	-.082			
115	-.111			
116	-.097			
117	-.093			
118	-.127			
119	-.327			
120	-.213	.041	-.024	-.400
121	-.179			
122				
123	-.106			
124	-.086			
125	-.035	.080	.322	-.405
126	-.067			
127	-.211	.192	.450	-1.009
128	.056	.164	.670	-.485
129	-.240			
130	-.210			
131	-.185			
132	-.133			
133	-.113			
134	-.073			
135	-.046			
136	-.052			

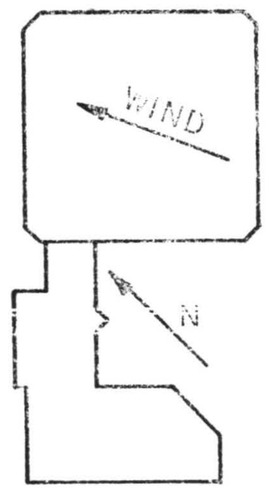


WIND DIRECTION 150 TEMPERATURE 68.00 DEGREES F
BAROMETRIC PRESS 25.00 IN HG VELOCITY 50.69FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
137	-.154			
138	-.311	.053	-.124	-.500
139	-.270			
140				
141	.012			
142	-.008			
143	-.050	.065	.312	-.240
144	-.073			
145	-.149	.112	.395	-.640
146	-.035			
201	-.311	.066	-.062	-.934
202	-.247	.052	-.011	-.457
203	-.268	.046	-.067	-.477
204	-.253	.042	-.101	-.430
205	-.245			
206	-.242			
207	-.256	.039	-.144	-.441
208				
209	-.252	.042	-.090	-.410
210	-.245			
211	-.283			
212	-.269			
213	-.258			
214	-.249			
215	-.248			
216	-.250			
217	-.243			
218	-.245			
219	-.246			
220	-.271	.051	-.059	-.599
221	-.259			
222	-.283	.038	-.167	-.447
223	-.252			
224	-.246			
225				
226	-.243			
227	-.250	.041	-.124	-.537
228	-.246	.045	-.090	-.596
229	-.274			
230	-.263			
231	-.258			
232	-.256			
233	-.252			
234	-.252			
235	-.253			
236	-.252			
237	-.252			
238	-.265	.046	-.134	-.487
239	-.202			
240	-.125	.031	-.095	-.327
241	-.236			
242	-.239			
243	-.266	.056	-.118	-.434
244	-.274			

WIND DIRECTION 150 TEMPERATURE 68.80 DEGREES F
BAROMETRIC PRESS 25.00 IN HG VELOCITY 50.69FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
245	-.294	.065	-.103	-.696
246	-.106			
301	-.597	.180	-.127	-1.400
302				
303	-.624	.160	-.181	-1.445
304	-.528	.140	.072	-1.266
305	-.419			
306	-.371			
307	-.280	.017	.046	-.670
308				
309	-.313	.083	.018	-.853
310	-.263			
311	-.560			
312	-.552			
313	-.528			
314	-.532			
315	-.461			
316	-.395			
317	-.350			
318	-.295			
319	-.285			
320	-.487	.151	-.072	-1.568
321	-.467			
322				
323	-.416			
324	-.390			
325				
326	-.291			
327	-.302	.066	-.087	-.635
328	-.285	.057	-.090	-.559
329	-.486			
330	-.461			
331	-.453			
332	-.458			
333	-.426			
334	-.373			
335	-.325			
336	-.292			
337	.145			
338				
339	-.475			
340	-.434	.117	-.131	-1.135
341	-.407			
342	-.346			
343	-.294	.085	-.005	-.719
344	-.255			
345	-.251	.066	-.042	-.758
346	-.258			
401	-.204	.015	-.144	-.247
402	.201	.167	.892	-.271
403	.192	.160	.929	-.204
404	.174	.155	.928	-.176
405	.171			
406	.147			

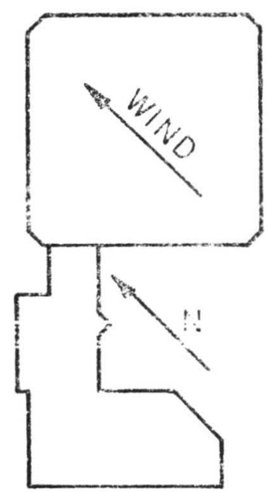


WIND DIRECTION 150 TEMPERATURE 68.80 DEGREES F
BAROMETRIC PRESS 25.00 IN HG VELOCITY 50.69FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
407	.098	.171	.813	-.462
408	.060	.173	.758	-.526
409	-.196	.171	.477	-.727
410	-.684			
411	.054			
412	.154			
413	.204			
414	.182			
415	.173			
416	.149			
417	.095			
418	-.026			
419	-.242			
420	.174	.130	.737	-.299
421	.180			
422	.129	.078	.498	-.157
423	.130			
424	.153			
425	.054	.087	.513	-.225
426	-.065			
427	-.269	.115	.119	-.758
428	-.598	.218	-.096	-1.677
429	.098			
430	.149			
431	.149			
432	.122			
433	.104			
434	.148			
435	.015			
436	-.092			
437	-.269			
438	.018	.083	.483	-.245
439	.077			
440	.105	.061	.354	-.088
441	.076			
442	.054			
443	-.010	.063	.332	-.191
444	-.075			
445	-.281	.086	.065	-.657
446	-.566			

WIND DIRECTION 180 TEMPERATURE 71.20 DEGREES F
BAROMETRIC PRESS 24.70 IN HG VELOCITY 51.11FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
1	.022	.207	-.126	-1.665
2	-.454			
3	-.196	.140	.250	-1.027
4	-.211			
5	-.077			
6	-.220			
7	-.609			
8	-.513			
9	-.217			
10	-.283			
11	-.379			
12	-.358			
13	-.206			
14	-.014	.160	.462	-1.058
15	-.240			
16	-.077	.114	.474	-.676
17	-.089			
18				
101	-.250	.086	.052	-.758
102	-.159	.084	.211	-.606
103				
104	-.063	.119	.542	-.732
105	-.047			
106	-.034			
107	.011	.138	.560	-.421
108	.056	.168	.812	-.720
109				
110	.246			
111	-.264			
112	-.225			
113	-.196			
114	-.106			
115	-.137			
116	-.126			
117	-.104			
118	-.129			
119	-.308			
120	-.250	.054	.126	-.469
121	-.233			
122				
123	-.182			
124	-.157			
125	-.118	.074	.291	-.412
126	-.164			
127				
128	-.099	.123	.425	-.506
129	-.321			
130	-.269			
131	-.236			
132	-.206			
133	-.167			
134	-.140			
135	-.124			
136	-.151			

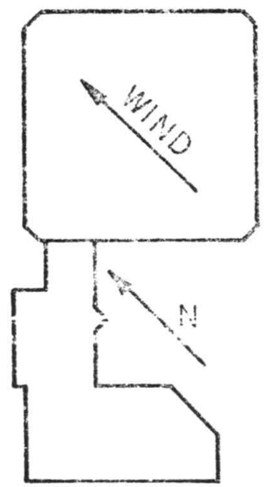


WIND DIRECTION 180 TEMPERATURE 71.20 DEGREES F
BAROMETRIC PRESS 24.70 IN HG VELOCITY 51.11FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
137	-.239			
138				
139	-.316			
140	-.283	.133	.232	-.846
141	-.094			
142	-.111			
143				
144				
145	-.217	.131	.294	-.977
146	-.096			
201	-.293	.102	-.024	-.800
202	-.246	.096	.029	-.728
203				
204	-.246	.090	.039	-.838
205	-.278			
206	-.266			
207	-.228	.068	-.013	-.528
208	-.224	.077	.026	-.591
209				
210	-.261			
211	-.301			
212	-.275			
213	-.259			
214	-.269			
215	-.276			
216	-.274			
217	-.265			
218	-.255			
219	-.251			
220	-.301	.073	.075	-.622
221	-.284			
222	-.284	.053	-.106	-.483
223	-.297			
224	-.295			
225				
226	-.286			
227				
228	-.284	.061	-.069	-.627
229	-.359			
230	-.320			
231	-.310			
232	-.325			
233	-.322			
234	-.307			
235	-.315			
236	-.309			
237	-.306			
238	-.322	.068	-.036	-.640
239	-.278			
240				
241	-.331			
242	-.328			
243				
244	-.311			

WIND DIRECTION 180 TEMPERATURE 71.20 DEGREES F
BAROMETRIC PRESS 24.70 IN HG VELOCITY 51.11FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
245	-.322	.069	-.111	-.614
246	-.117			
301	-.329	.086	-.064	-.841
302				
303				
304	-.331	.087	.016	-.699
305	-.341			
306	-.348			
307	-.358	.099	.023	-.813
308	-.349	.099	-.042	-.743
309				
310	-.310			
311	-.320			
312	-.315			
313	-.313			
314	-.321			
315	-.343			
316	-.342			
317	-.365			
318	-.385			
319	-.454			
320	-.336	.077	-.114	-1.019
321	-.334			
322	-.346	.064	-.157	-.559
323	-.320			
324	-.363			
325	-.369	.065	-.163	-.671
326	-.403			
327				
328	-.378	.082	-.020	-.658
329	-.375			
330	-.356			
331	-.362			
332	-.357			
333	-.370			
334	-.379			
335	-.391			
336	-.423			
337	-.448			
338	-.380	.096	-.091	-1.282
339	-.387			
340	-.377	.091	-.114	-1.111
341	-.407			
342	-.405			
343				
344	-.420			
345	-.441	.108	-.122	-1.014
346	-.388			
401				
402	.393	.246	1.109	-.376
403	.760	.213	1.429	.116
404	.278	.181	.805	-.382
405	.237			
406	.215			

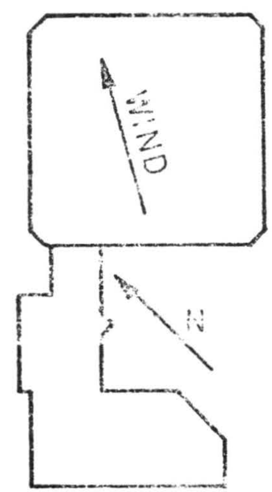


WIND DIRECTION 180 TEMPERATURE 71.20 DEGREES F
BAROMETRIC PRESS 24.70 IN HG VELOCITY 51.11FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
407	.148	.133	.555	-.372
408	.055	.117	.444	-.462
409	.297	.081	.599	-.052
410	-.331			
411	.132			
412	.251			
413	.272			
414	.228			
415	.246			
416	.213			
417	.122			
418	-.005			
419				
420	.079	.175	.908	-.434
421	.123			
422	.156	.161	.875	-.194
423	.143			
424	.174			
425	.076	.123	.514	-.297
426	-.052			
427	.237	.079	.545	-.064
428	-.353	.085	-.142	-.947
429	-.053			
430	.014			
431	.047			
432	.075			
433	.057			
434	.067			
435	-.021			
436	-.114			
437	-.229			
438	.038	.111	.661	-.307
439	.029			
440	.073	.085	.459	-.155
441	.036			
442	-.012			
443	.371	.073	.608	.087
444	-.126			
445	-.255	.074	.038	-.528
446	-.414			

WIND DIRECTION 210 TEMPERATURE 69.00 DEGREES F
BAROMETRIC PRESS 24.70 IN HG VELOCITY 51.00FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
1	-.415	.149	.170	-1.173
2	-.203			
3	-.095	.192	.709	-.833
4	-.093			
5	-.028			
6	-.120			
7	-.220			
8	.016			
9	-.118			
10	-.095			
11	-.118			
12	-.103			
13	-.075			
14	.102	.097	.420	-.284
15	.091			
16	.030	.108	.493	-.372
17	-.144			
18	.427			
101	-.525	.293	.165	-2.259
102	-.331	.158	.310	-.955
103	-.081	.127	.523	-.405
104	-.035	.150	.557	-.657
105	-.033			
106	.006			
107	.121	.161	.746	-.441
108	.289	.208	1.106	-.648
109				
110	.518			
111	-.355			
112	-.293			
113	-.241			
114	-.142			
115	-.130			
116	-.062			
117	.074			
118	.251			
119	.388			
120	-.205	.077	.098	-.642
121	-.255			
122				
123	-.173			
124	-.115			
125	.020	.121	.611	-.358
126	.109			
127	.337	.177	.999	-.198
128	.276	.174	.906	-.318
129	-.528			
130	-.298			
131	-.276			
132	-.261			
133	-.247			
134				
135				
136	-.114			

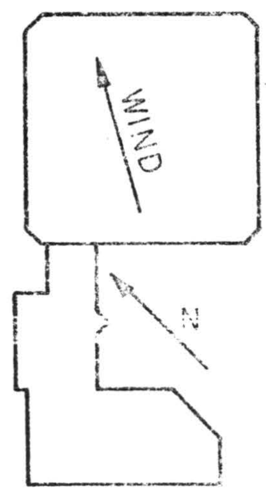


WIND DIRECTION 210 TEMPERATURE 69.00 DEGREES F
BAROMETRIC PRESS 24.70 IN HG VELOCITY 51.00FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
137	-.066			
138	.062	.011	.176	-.388
139	-.241			
140				
141	-.177			
142	-.251			
143	-.172	.074	.091	-.513
144	-.303			
145	-.240	.101	.198	-.710
146	-.272			
201	-.286	.100	.007	-.717
202	-.292	.111	-.003	-.825
203	-.163	.111	.142	-.804
204	-.205	.122	.152	-1.024
205	-.301			
206	-.323			
207	-.335	.160	.121	-1.194
208	-.375	.178	.136	-1.262
209	-.301	.253	.245	-2.223
210	-.431			
211	-.286			
212	-.279			
213	-.281			
214	-.289			
215	-.302			
216	-.316			
217	-.327			
218	-.343			
219	-.343			
220	-.193	.072	.047	-.475
221	-.271			
222	-.285	.076	-.051	-.550
223	-.283			
224	-.299			
225				
226	-.326			
227	-.199	.084	.064	-1.089
228	-.240	.087	.015	-.769
229	-.260			
230	-.252			
231	-.241			
232	-.251			
233	-.265			
234	-.277			
235	-.316			
236	-.321			
237	-.346			
238	-.232	.052	-.031	-.464
239	-.183			
240				
241	-.236			
242	-.247			
243	-.157	.081	.077	-.506
244	-.304			

WIND DIRECTION 210 TEMPERATURE 69.00 DEGREES F
BAROMETRIC PRESS 24.70 IN HG VELOCITY 51.00FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
245	-.242	.104	.085	-.714
246	-.111			
301	-.212	.048	-.067	-.480
302				
303	-.081	.047	.077	-.240
304	-.121	.047	.047	-.284
305	-.213			
306	-.216			
307				
308				
309	-.142	.078	.082	-.477
310	-.273			
311	-.210			
312	-.206			
313	-.205			
314	-.207			
315	-.216			
316	-.261			
317	-.257			
318	-.245			
319	-.263			
320	-.124	.046	.015	-.320
321	-.209			
322	-.219	.040	-.091	-.358
323	-.201			
324	-.255			
325				
326	-.251			
327	-.148	.060	.008	-.475
328	-.197	.069	-.023	-.552
329	-.208			
330	-.201			
331	-.218			
332	-.217			
333	-.224			
334	-.241			
335	-.244			
336	-.258			
337	-.263			
338	-.258	.066	-.029	-.627
339	-.257			
340	-.257	.066	-.080	-.541
341	-.244			
342	-.242			
343	-.117	.051	.042	-.340
344	-.257			
345	-.165	.059	.028	-.547
346	-.258			
401	.453	.171	.988	-.263
402	-.246	.245	.447	-1.514
403	.144	.096	.477	-.220
404	.092	.080	.431	-.234
405	-.001			
406	-.019			

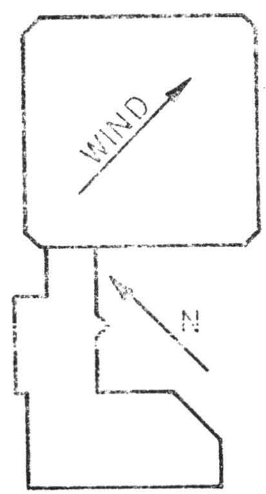


WIND DIRECTION 210 TEMPERATURE 69.00 DEGREES F
BAROMETRIC PRESS 24.70 IN HG VELOCITY 51.00FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
407	-.038	.062	.203	-.260
408	-.086	.058	.178	-.292
409	-.021	.046	.165	-.176
410	-.209			
411	.333			
412	-.265			
413	-.028			
414	-.039			
415	-.044			
416	-.075			
417	-.096			
418	-.129			
419	-.170			
420	-.262	.212	.237	-1.132
421	-.132			
422	-.125	.058	.067	-.349
423	-.123			
424	-.060			
425	-.147	.043	.059	-.392
426	-.159			
427	-.060	.040	.098	-.234
428	-.125	.043	.038	-.312
429	-.088			
430	-.331			
431	-.187			
432	-.158			
433	-.142			
434	-.089			
435	-.147			
436	-.164			
437	-.187			
438	-.211	.073	.059	-.650
439	-.169			
440	-.152	.055	.075	-.382
441	-.117			
442	-.121			
443	-.009	.051	.168	-.206
444	-.139			
445	-.113	.050	.059	-.328
446	-.237			

WIND DIRECTION 270 TEMPERATURE 69.00 DEGREES F
BAROMETRIC PRESS 24.70 IN HG VELOCITY 51.00FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
1	-.793	.147	-.398	-1.723
2	-.902			
3	-1.047	.142	-.508	-1.632
4	-.691			
5	-.881			
6	-.566			
7	-.520			
8	-.605			
9	-.937			
10	-.902			
11	-.433			
12	-.527			
13	-.670			
14	-.018	.137	.534	-.483
15	-.368			
16	-.659	.177	.152	-1.708
17	-.231			
18	.334			
101	.598	.203	1.186	-.083
102	.395	.245	1.006	-.586
103	.483	.169	.982	-.020
104	.307	.146	.774	-.292
105	.122			
106	.057			
107	-.089	.106	.425	-.421
108	-.195	.096	.343	-.513
109				
110	-.546			
111	.676			
112	.498			
113	.461			
114	.370			
115	.206			
116	.124			
117	-.021			
118	-.181			
119	-.346			
120	.489	.262	1.336	-.581
121	.421			
122				
123	.180			
124	.069			
125				
126	-.211			
127	-.268	.076	.194	-.532
128	-.465	.073	-.095	-.928
129	.468			
130	.334			
131	.322			
132	.210			
133	.085			
134	-.009			
135	-.129			
136	-.284			

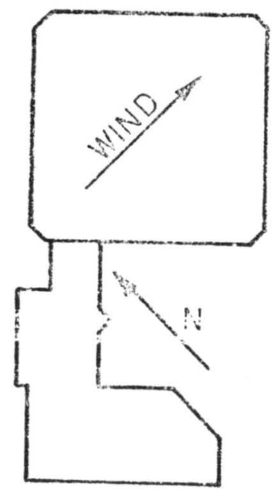


WIND DIRECTION 270 TEMPERATURE 69.00 DEGREES F
BAROMETRIC PRESS 24.70 IN HG VELOCITY 51.00FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
137	-.438			
138				
139	.266			
140				
141	-.215			
142	-.145			
143	-.065	.089	.366	-.330
144	-.304			
145	-.390	.076	-.114	-.701
146	-.656			
201	-.505	.073	-.240	-.911
202	-.286	.036	-.090	-.465
203	.020	.094	.461	-.278
204	.090	.108	.568	-.247
205	.086			
206	.146			
207	.199	.122	.581	-.242
208	.317	.075	.629	-.158
209	.394	.264	1.060	-.606
210	.660			
211	-.429			
212	-.255			
213	-.081			
214	.068			
215	.159			
216	.248			
217	.336			
218	.410			
219	.371			
220	-.179	.063	.065	-.385
221	-.087			
222	.017	.089	.398	-.242
223	.159			
224	.249			
225				
226	.387			
227	.506	.245	1.084	-.408
228	.705	.191	1.349	.178
229	-.422			
230	-.267			
231	-.113			
232	.011			
233	.115			
234	.188			
235	.259			
236	.323			
237	.280			
238	-.345	.054	-.139	-.521
239	-.119			
240				
241	.072			
242	.124			
243	.295	.075	.621	.098
244	.219			

WIND DIRECTION 270 TEMPERATURE 69.00 DEGREES F
BAROMETRIC PRESS 24.70 IN HG VELOCITY 51.00FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
245	.286	.128	.759	-.554
246	.449			
301	-.655	.146	-.304	-1.318
302				
303	-.355	.095	-.088	-.95[illegible]
304	-.369	.091	-.077	-.836
305	-.445			
306	-.442			
307				
308				
309	-.330	.076	-.069	-.657
310	-.424			
311	-.605			
312	-.517			
313	-.471			
314	-.454			
315	-.441			
316	-.433			
317	-.436			
318	-.421			
319	-.426			
320	-.410	.077	-.101	-1.050
321	-.459			
322	-.498	.056	-.312	-.689
323	-.427			
324	-.441			
325	[illegible]			
326	-.422			
327	-.306	.062	-.060	-.545
328	-.352	.063	-.090	-.647
329	-.517			
330	-.479			
331	-.468			
332	-.454			
333	-.456			
334	-.450			
335	-.441			
336	-.431			
337	-.428			
338	-.552	.069	-.260	-.800
339	-.496			
340	-.492	.064	-.255	-.697
341	-.486			
342	-.481			
343	-.354	.064	-.144	-.580
344	-.465			
345	-.383	.063	-.145	-.621
346	-.457			
401	-.589	.048	-.426	-.761
402	-.550	.084	-.248	-1.099
403	-.433	.082	-.151	-.763
404	-.482	.082	-.150	-.766
405	-.568			
406	-.569			

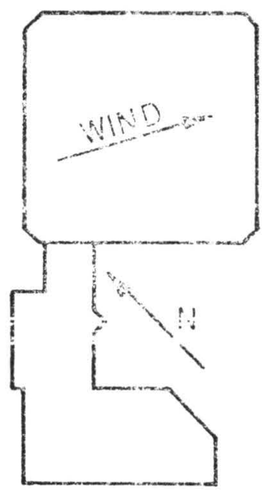


WIND DIRECTION 270 TEMPERATURE 69.00 DEGREES F
BAROMETRIC PRESS 24.70 IN HG VELOCITY 51.00FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
407	-.632	.104	-.201	-1.075
408	-.618	.121	-.191	-1.184
409	-.546	.149	-.109	-1.372
410	-.596			
411	-.523			
412	-.529			
413	-.532			
414	-.556			
415	-.533			
416	-.578			
417	-.606			
418	-.642			
419	-.695			
420	-.460	.078	-.162	-1.158
421	-.551			
422	-.606	.070	-.351	-.931
423	-.586			
424	-.500			
425	-.608	.065	-.403	-.869
426	-.613			
427	-.572	.125	-.247	-1.084
428	-.482	.082	-.165	-.848
429	-.597			
430	-.605			
431	-.597			
432	-.626			
433	-.639			
434	-.541			
435	-.593			
436	-.598			
437	-.646			
438	-.696	.097	-.415	-1.253
439	-.669			
440	-.691	.100	-.384	-1.269
441	-.682			
442	-.631			
443	-.461	.076	-.199	-.818
444	-.547			
445	-.492	.086	-.275	-1.075
446	-.542			

WIND DIRECTION 300 TEMPERATURE 70.00 DEGREES F
BAROMETRIC PRESS 25.05 IN HG VELOCITY 50.69FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
1	-.406	.150	.095	-.928
2	-.676			
3	-.963	.159	-.555	-1.762
4	-.490			
5	-.430			
6	-.965			
7	-.307			
8	-.468			
9	-.961			
10	-.934			
11	-.562			
12	-.684			
13	-.895			
14	-.338	.149	.318	-.960
15	-.726			
16	-.814	.153	-.371	-1.601
17	-.530			
18	-.346			
101	-.302	.159	.394	-.965
102	-1.244	.219	-.681	-2.089
103	-.945	.289	-.114	-1.749
104	-.413	.162	.002	-1.383
105				
106	-.298			
107	-.372	.192	-.139	-2.293
108	-.359	.048	-.152	-.545
109	-.509	.036	-.214	-.552
110	-.399			
111	-.288			
112	-1.102			
113	-.977			
114	-.439			
115	-.294			
116	-.293			
117	-.312			
118	-.345			
119	-.375			
120	-1.086	.268	-.188	-2.228
121	-.918			
122				
123	-.335			
124	-.328			
125	-.374	.051	-.206	-.617
126	-.359			
127	-.363	.052	-.211	-.544
128	-.388	.057	-.214	-.573
129	-.356			
130	-1.061			
131	-.822			
132	-.479			
133	-.395			
134	-.393			
135	-.402			
136	-.395			

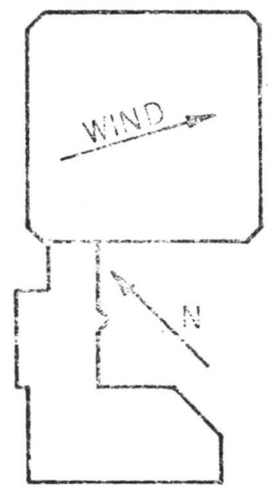


WIND DIRECTION 300 TEMPERATURE 70.00 DEGREES F
BAROMETRIC PRESS 25.05 IN HG VELOCITY 50.69FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
137	-.391			
138				
139	-.306			
140				
141	-.541			
142	-.528			
143	-.464	.083	-.206	-.898
144	-.448			
145	-.452	.077	-.118	-.745
146	-.470			
201	-.804	.224	-.314	-1.754
202	-.117	.140	.340	-.692
203	.289	.162	.872	-.297
204	.422	.172	1.093	-.121
205	.457			
206	.531			
207	.577	.191	1.102	-.116
208	.593	.158	1.042	-.069
209	.549	.210	1.217	-.252
210	.019			
211	-.667			
212	-.072			
213	.273			
214	.495			
215	.591			
216	.662			
217	.713			
218	.667			
219	.475			
220	-.086	.138	.367	-.653
221	.192			
222	.391	.165	.913	.015
223	.516			
224	.584			
225				
226	.595			
227	.421	.209	1.073	-.198
228	-.109	.224	.671	-1.369
229	-.572			
230	-.141			
231	.144			
232	.322			
233	.463			
234	.510			
235	.537			
236	.469			
237	.306			
238	-.271	.113	.124	-.768
239	.093			
240				
241	.334			
242	.384			
243	.435	.130	.990	-.029
244	.403			

WIND DIRECTION 300　　TEMPERATURE 70.00 DEGREES F
BAROMETRIC PRESS 25.05 IN HG　　VELOCITY 50.69FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
245	.294	.163	1.065	-.384
246	.198			
301	-.583	.157	-.034	-1.403
302				
303	-.547	.168	.024	-1.471
304	-.556	.166	.024	-1.571
305	-.581			
306	-.608			
307	-.642	.073	-.405	-1.017
308				
309	-.577	.134	-.126	-1.233
310	-.573			
311	-.537			
312	-.607			
313	-.568			
314	-.545			
315	-.528			
316	-.553			
317	-.537			
318	-.535			
319	-.525			
320	-.635	.159	-.250	-1.246
321	-.583			
322	-.599	.106	-.299	-1.192
323	-.518			
324	-.518			
325				
326	-.505			
327	-.509	.142	-.160	-1.463
328	-.585	.171	-.203	-1.725
329	-.540			
330	-.646			
331	-.579			
332	-.568			
333	-.526			
334	-.543			
335	-.525			
336	-.488			
337	-.499			
338	-.641	.177	-.273	-1.571
339	-.575			
340	-.582	.122	-.268	-1.253
341	-.591			
342	-.556			
343	-.531	.140	-.234	-1.264
344	-.541			
345	-.527	.132	-.204	-1.614
346	-.579			
401				
402	-.447	.062	-.209	-.678
403	-.399	.063	-.175	-.612
404	-.417	.066	-.173	-.650
405	-.414			
406	-.418			

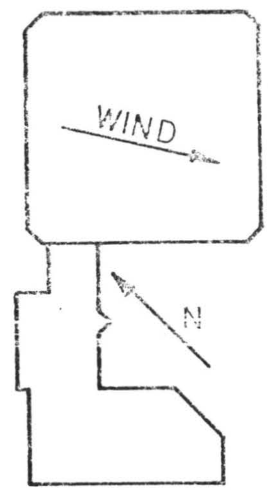


WIND DIRECTION 300　　TEMPERATURE 70.00 DEGREES F
BAROMETRIC PRESS 25.05 IN HG　　VELOCITY 50.69FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
407	-.467	.082	-.237	-.875
408	-.495	.101	-.191	-.937
409	-.482	.127	-.091	-1.029
410	-.547			
411	-.410			
412	-.410			
413	-.416			
414	-.416			
415	-.393			
416	-.425			
417	-.430			
418	-.455			
419	-.482			
420	-.404	.060	-.211	-.606
421	-.406			
422	-.452	.055	-.279	-.630
423	-.417			
424	-.323			
425	-.453	.056	-.225	-.642
426	-.431			
427	-.445	.084	-.204	-.854
428	-.534	.114	-.224	-1.460
429	-.395			
430	-.414			
431	-.408			
432	-.429			
433	-.433			
434	-.259			
435	-.404			
436	-.400			
437	-.440			
438	-.515	.079	-.307	-.933
439	-.483			
440	-.543	.074	-.356	-.879
441	-.473			
442	-.439			
443	-.384	.064	-.160	-.604
444	-.380			
445	-.449	.089	-.185	-.854
446	-.517			

WIND DIRECTION 330 TEMPERATURE 68.50 DEGREES F
BAROMETRIC PRESS 25.05 IN HG VELOCITY 50.62FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
1	-.259	.149	.413	-.763
2	-.601			
3	-.807	.158	-.433	-1.904
4	-.408			
5	-.642			
6	-.895			
7	-.078			
8	-.311			
9	-.926			
10	-.928			
11	-.330			
12	-.102			
13	-.914			
14	.015	.143	.498	-.555
15	-.297			
16	-1.018	.163	-.474	-1.813
17	-.426			
18	-.246			
101	-.803	.180	-.392	-1.875
102	-.984	.198	-.475	-2.535
103	-.937	.177	-.513	-1.806
104	-.941	.218	.105	-2.442
105	-.803			
106	-.601			
107	-.552	.210	.157	-1.403
108	-.451	.186	.157	-1.318
109				
110	-.418			
111	-.822			
112	-.827			
113	-.853			
114	-.827			
115	-.800			
116	-.665			
117	-.473			
118	-.389			
119	-.374			
120	-.903	.187	-.265	-2.058
121	-.901			
122				
123	-.786			
124	-.602			
125	-.493	.169	.067	-1.328
126	-.382			
127	-.356	.186	.047	-.934
128	-.388	.105	-.127	-1.381
129	-.810			
130	-1.019			
131	-1.026			
132	-.858			
133	-.628			
134	-.452			
135	-.389			
136	-.356			

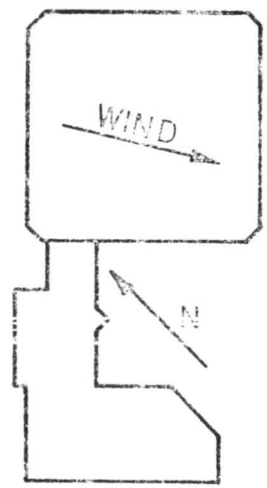


WIND DIRECTION 330 TEMPERATURE 68.50 DEGREES F
BAROMETRIC PRESS 25.05 IN HG VELOCITY 50.62FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
137	-.374			
138	-.672	.162	-.150	-1.421
139	-.631			
140				
141	-.417			
142	-.407			
143	-.361	.088	-.062	-.848
144	-.352			
145	-.369	.082	-.042	-.921
146	-.400			
201	-.121	.188	.425	-1.271
202	.401	.212	.968	-.284
203	.663	.211	1.233	.021
204	.640	.195	1.267	.021
205	.591			
206	.562			
207	.437	.172	1.009	-.301
208	.460	.034	.681	-.098
209	-.086	.187	.536	-.603
210	-.893			
211	-.216			
212	.331			
213	.607			
214	.696			
215	.681			
216	.659			
217	.550			
218	.300			
219	-.195			
220	.179	.235	.962	-.596
221	.481			
222	.517	.200	1.117	-.018
223	.574			
224	.535			
225				
226	.208			
227	-.220	.178	.461	-.779
228	-1.160	.505	-.013	-2.719
229	-.438			
230	.065			
231	.296			
232	.439			
233	.442			
234	.421			
235	.328			
236	.131			
237	-.274			
238	-.185	.157	.447	-.642
239	.185			
240				
241	.316			
242	.306			
243	.268	.112	.828	-.028
244	.141			

WIND DIRECTION 330 TEMPERATURE 68.50 DEGREES F
BAROMETRIC PRESS 25.05 IN HG VELOCITY 50.62FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
245	-.094	.162	.642	-.634
246	-.247			
301	-.379	.045	-.201	-.643
302				
303	-.172	.042	.028	-.397
304	-.155	.048	.044	-.503
305	-.158			
306	-.204			
307	-.538	.106	-.225	-1.050
308				
309	-1.119	.221	-.506	-1.939
310	-.328			
311	-.306			
312	-.265			
313	-.214			
314	-.178			
315	-.177			
316	-.256			
317	-.667			
318	-.947			
319	-.945			
320	-.272	.049	-.078	-.725
321	-.228			
322	-.274	.063	-.023	-.701
323	-.222			
324	-.350			
325				
326	-.912			
327	-.911	.200	-.359	-1.834
328	-.418	.157	.113	-1.277
329	-.316			
330	-.267			
331	-.240			
332	-.225			
333	-.273			
334	-.362			
335	-.632			
336	-.791			
337	-.835			
338	-.343	.052	-.163	-.647
339	-.233			
340	-.251	.070	.013	-.647
341	-.234			
342	-.308			
343	-.471	.173	.002	-1.329
344	-.619			
345	-.643	.184	-.176	-1.586
346	-.446			
401	-.382	.009	-.268	-.621
402	-.385	.094	-.085	-.906
403	-.317	.072	-.064	-.670
404	-.327	.060	-.144	-.585
405	-.315			
406	-.309			



WIND DIRECTION 330 TEMPERATURE 68.50 DEGREES F
BAROMETRIC PRESS 25.05 IN HG VELOCITY 50.62FPS

PRESSURE TAP NUMBER	MEAN PRESSURE COEFFICIENT	RMS PRESSURE COEFFICIENT	MAXIMUM PRESSURE COEFFICIENT	MINIMUM PRESSURE COEFFICIENT
407	-.374	.043	-.225	-.567
408	-.340	.045	-.173	-.549
409	-.289	.047	-.140	-.501
410	-.313			
411	-.377			
412	-.341			
413	-.330			
414	-.329			
415	-.295			
416	-.312			
417	-.306			
418	-.303			
419	-.303			
420	-.354	.079	-.033	-.973
421	-.338			
422	-.409	.049	-.243	-.617
423	-.324			
424	-.230			
425	-.340	.040	-.203	-.467
426	-.301			
427	-.286	.048	-.129	-.516
428	-.316	.053	-.162	-.635
429	-.400			
430	-.392			
431	-.390			
432	-.349			
433	-.319			
434	-.182			
435	-.299			
436	-.303			
437	-.301			
438	-.437	.074	-.203	-.906
439	-.356			
440	-.359	.049	-.219	-.616
441	-.298			
442	-.305			
443	-.294	.043	-.149	-.475
444	-.278			
445	-.310	.051	-.155	-.559
446	-.317			

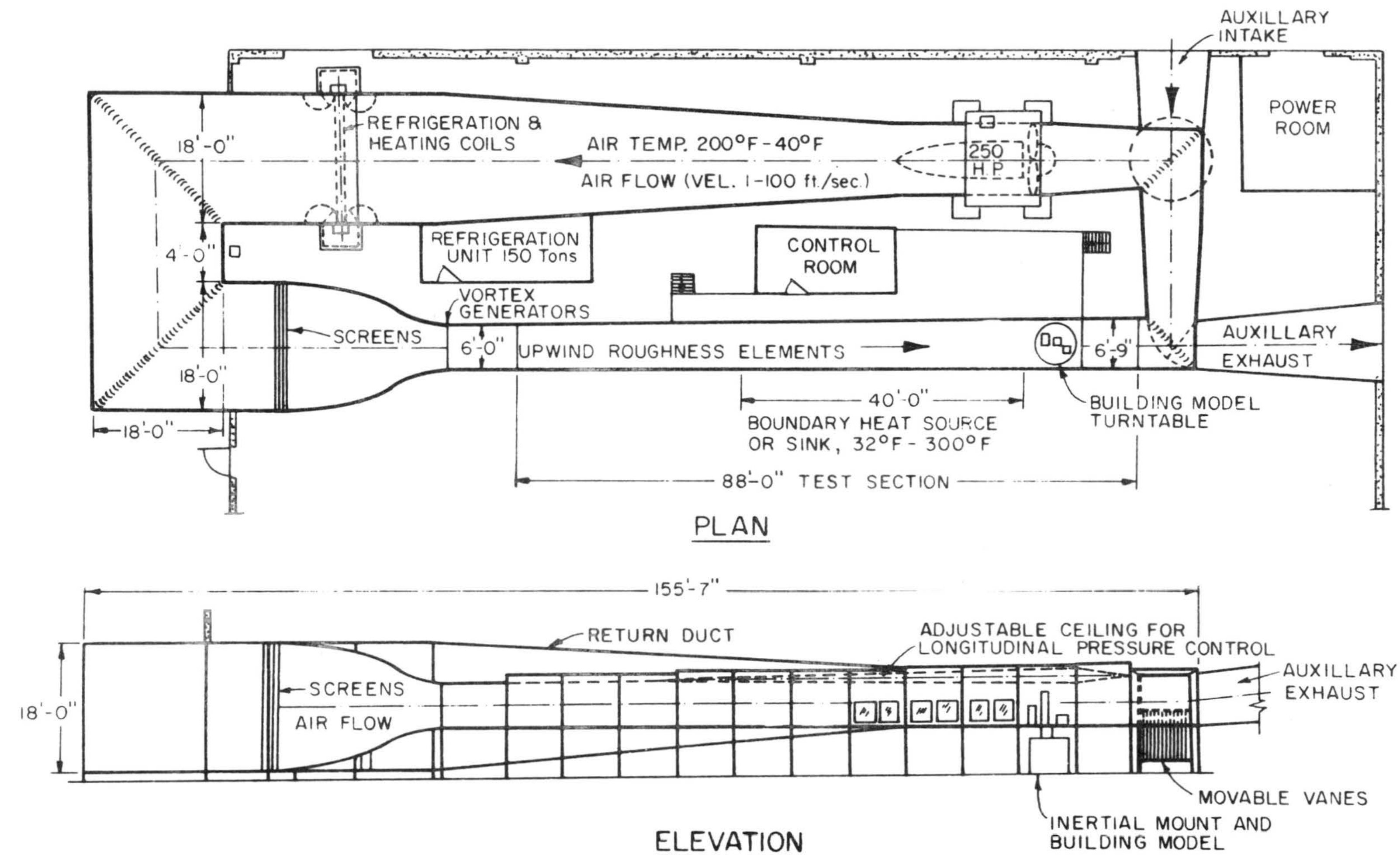


Figure 1. Plan View of Meteorological Wind Tunnel

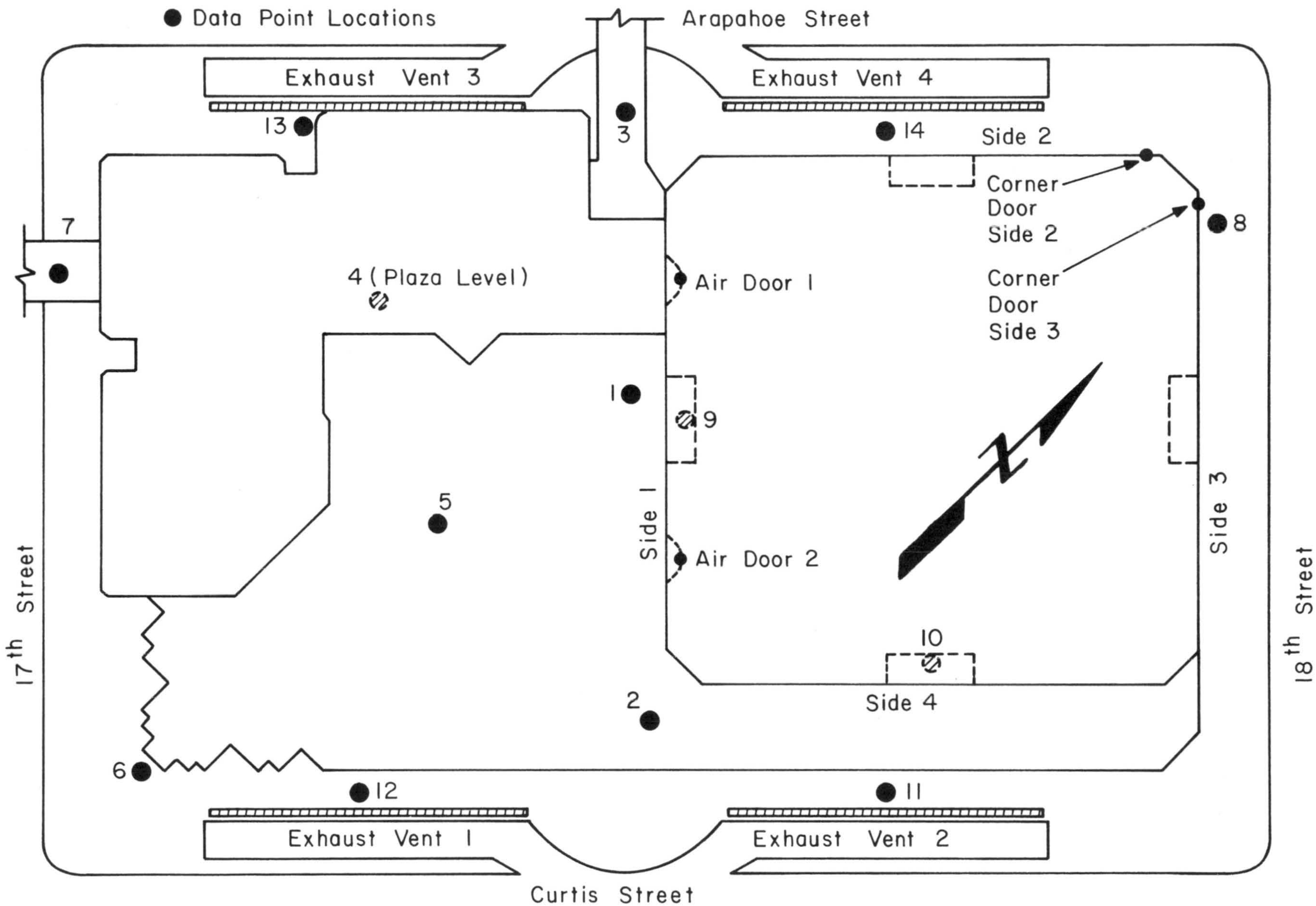


Figure 2. Site Plan for Telephone Building

Note:

Taps 17 and 18 on Side Zero are Located Behind Grillwork on Building Sides 1 and 4 Respectively

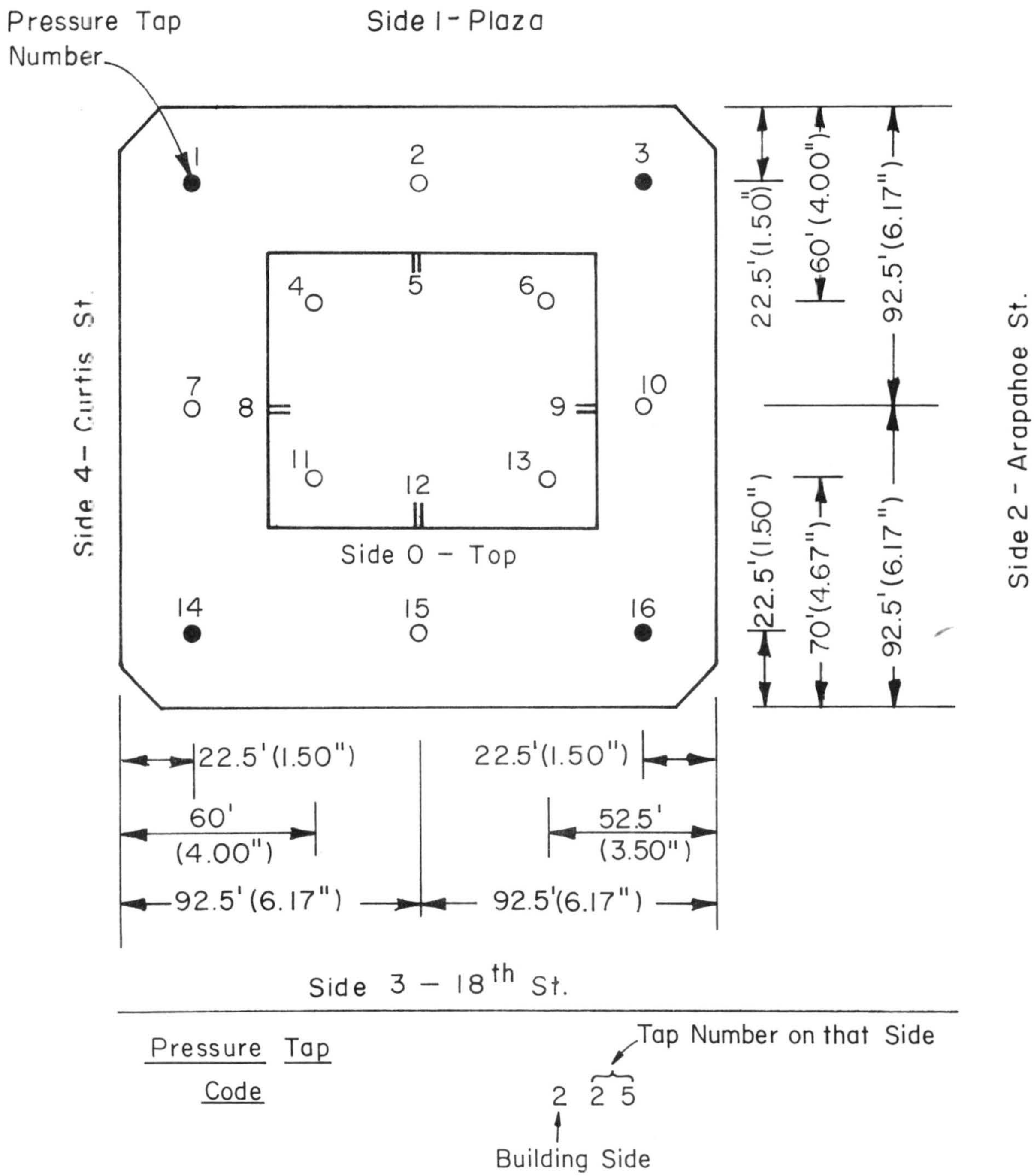


Figure 3a. Pressure Tap Locations

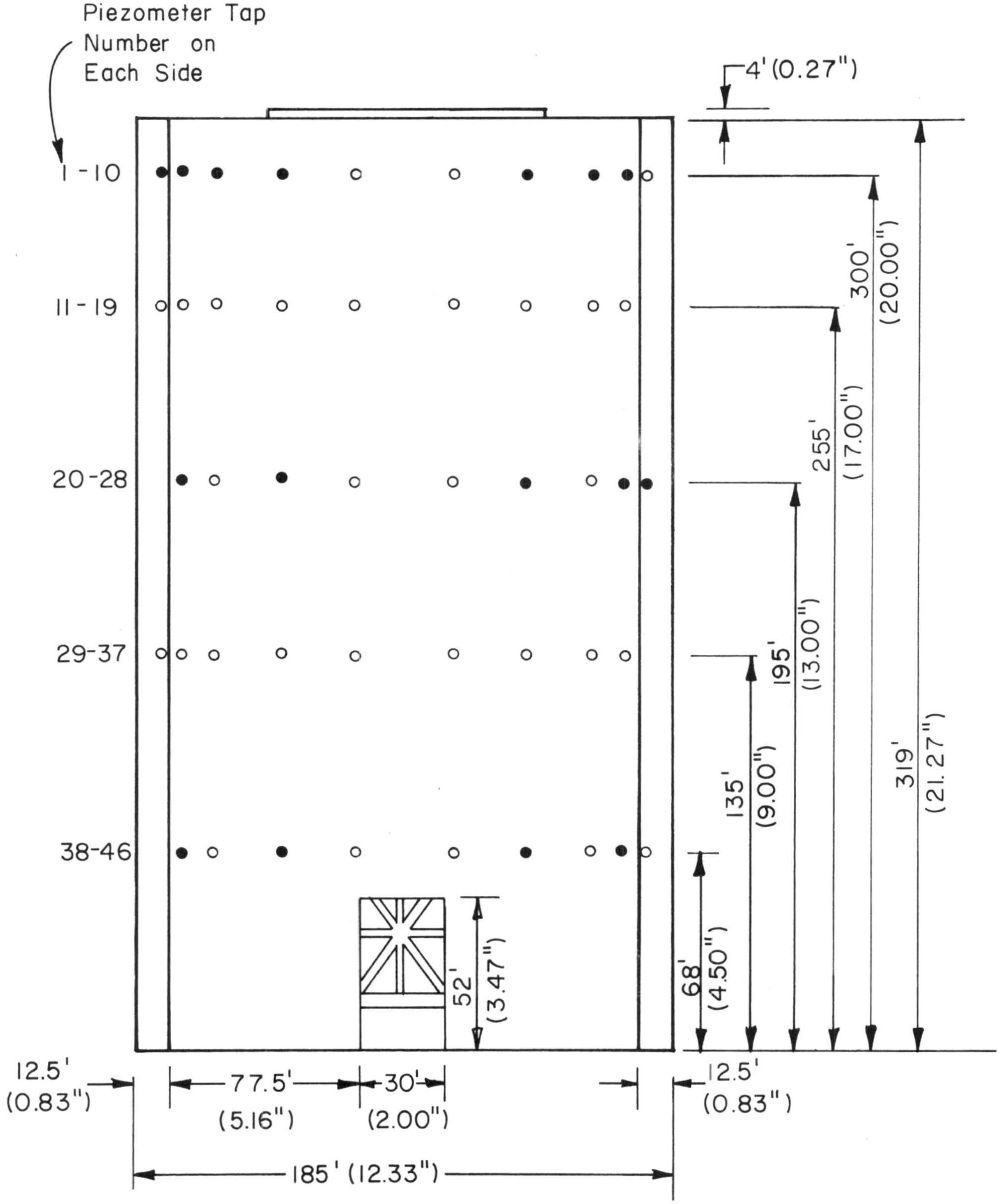


Figure 3b. Pressure Tap Locations

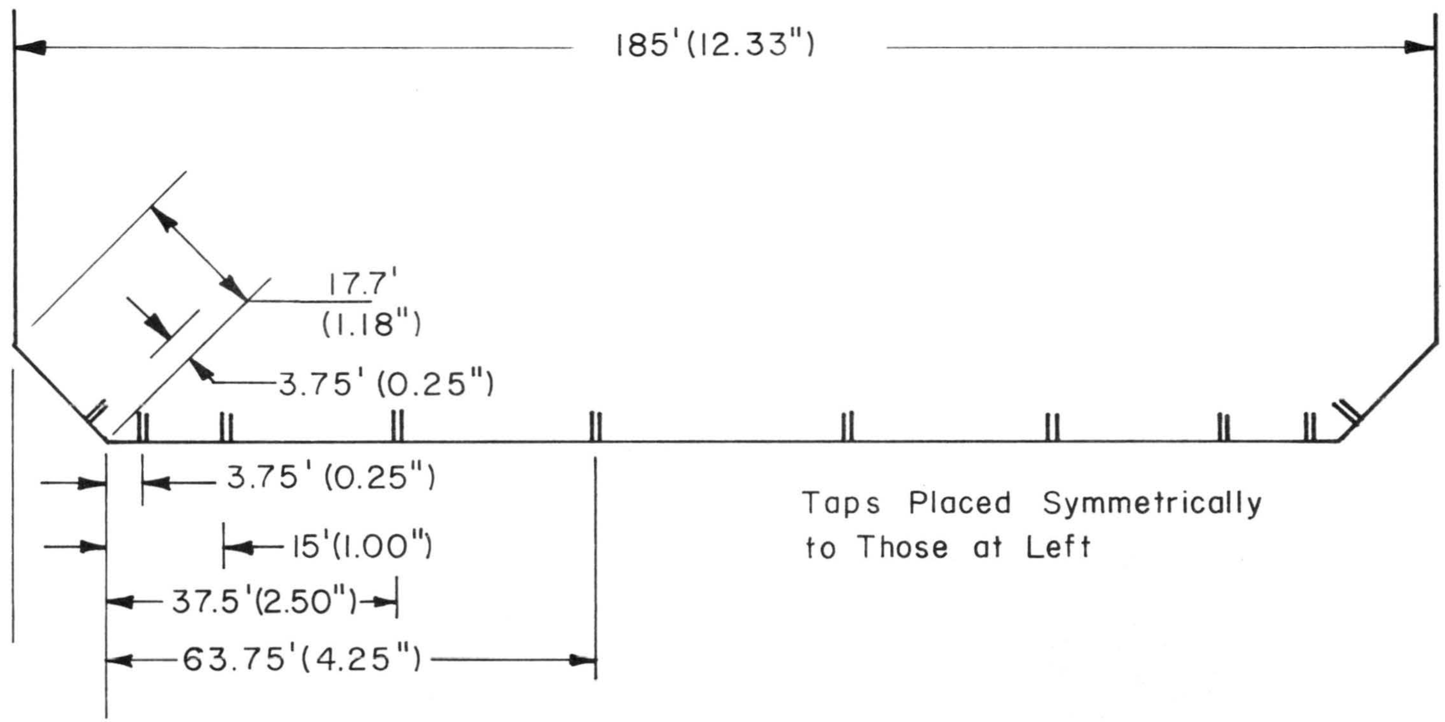


Figure 3c. Pressure Tap Locations

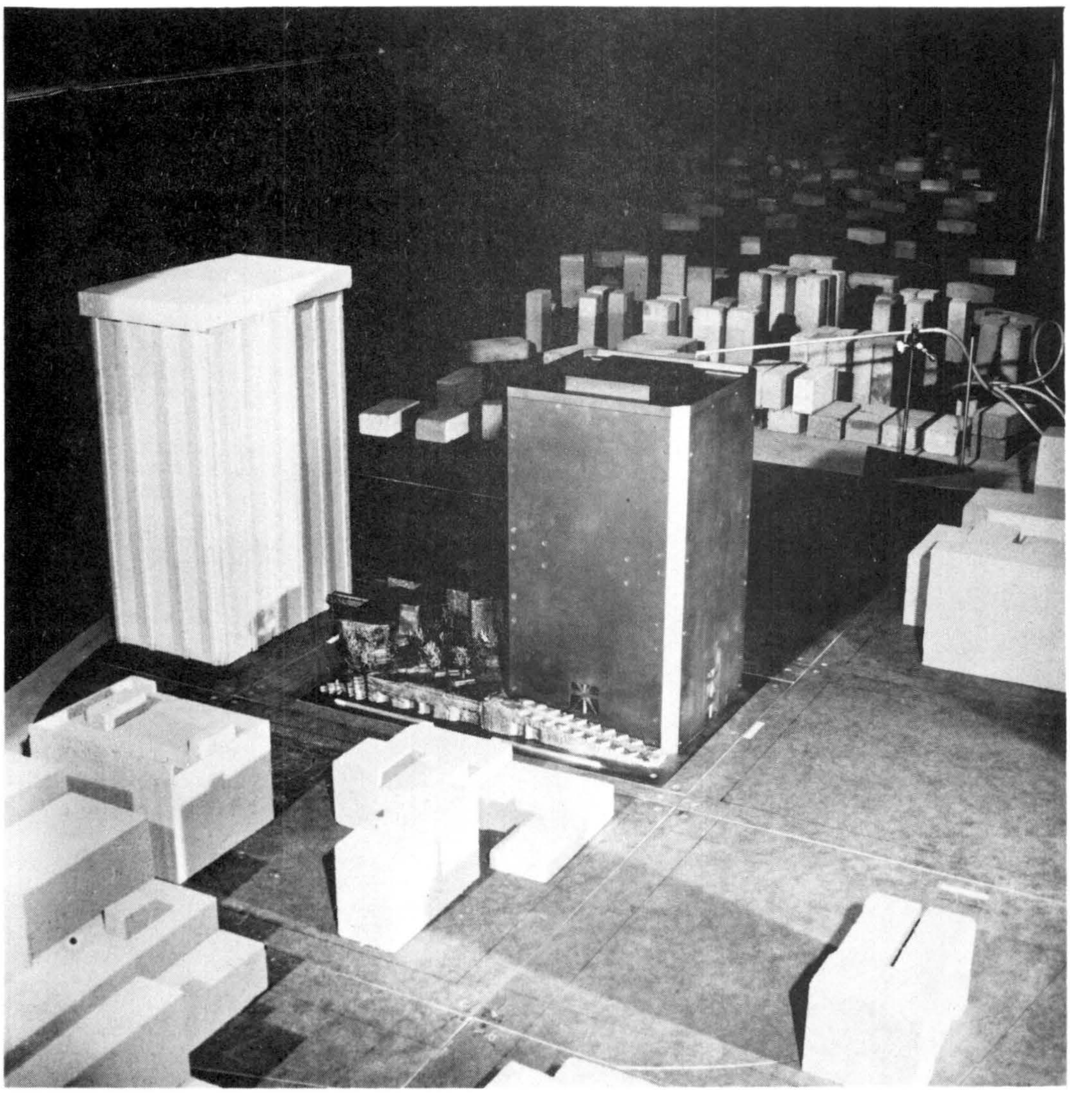


Figure 4. Completed model installed in the Wind Tunnel

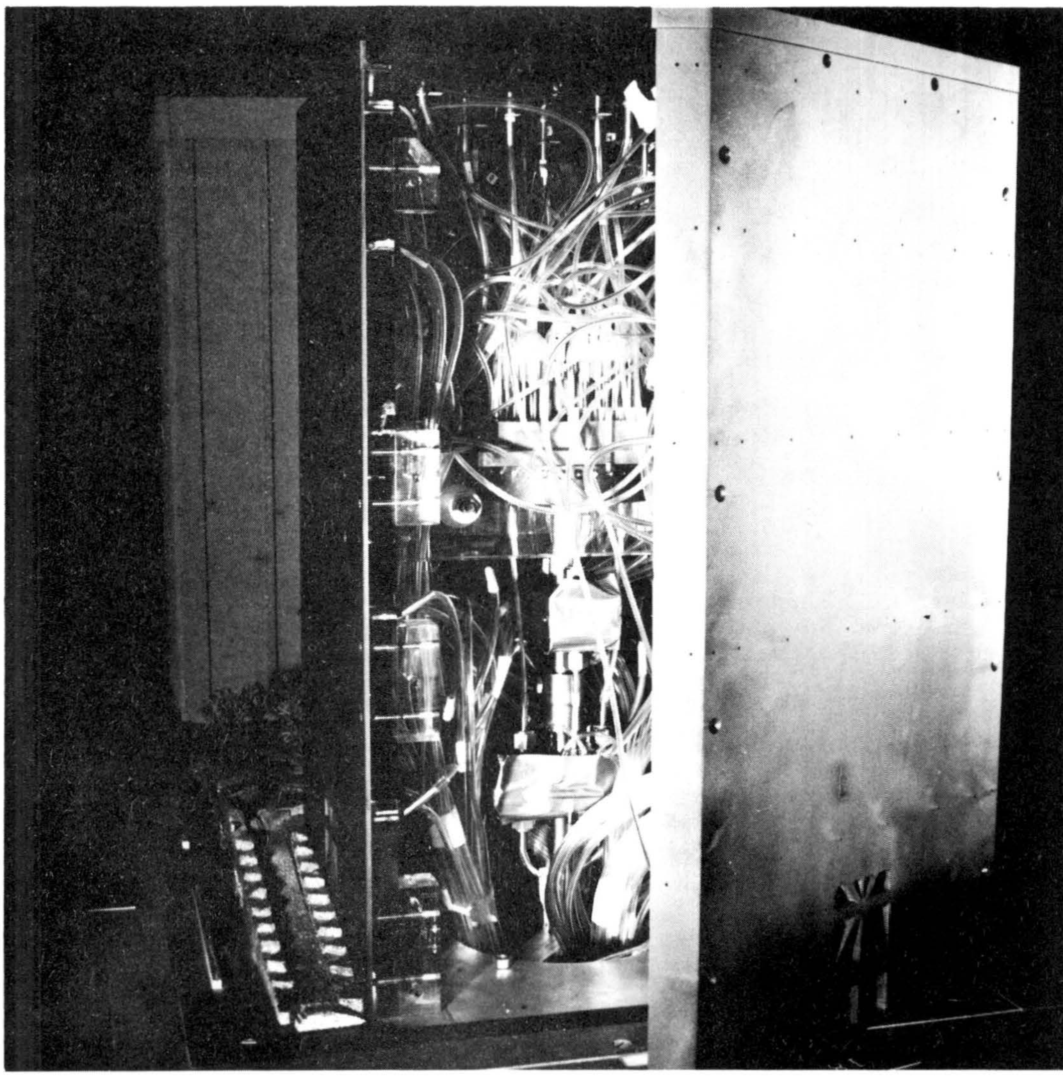


Figure 5. Pressure Switch Installed in the Model

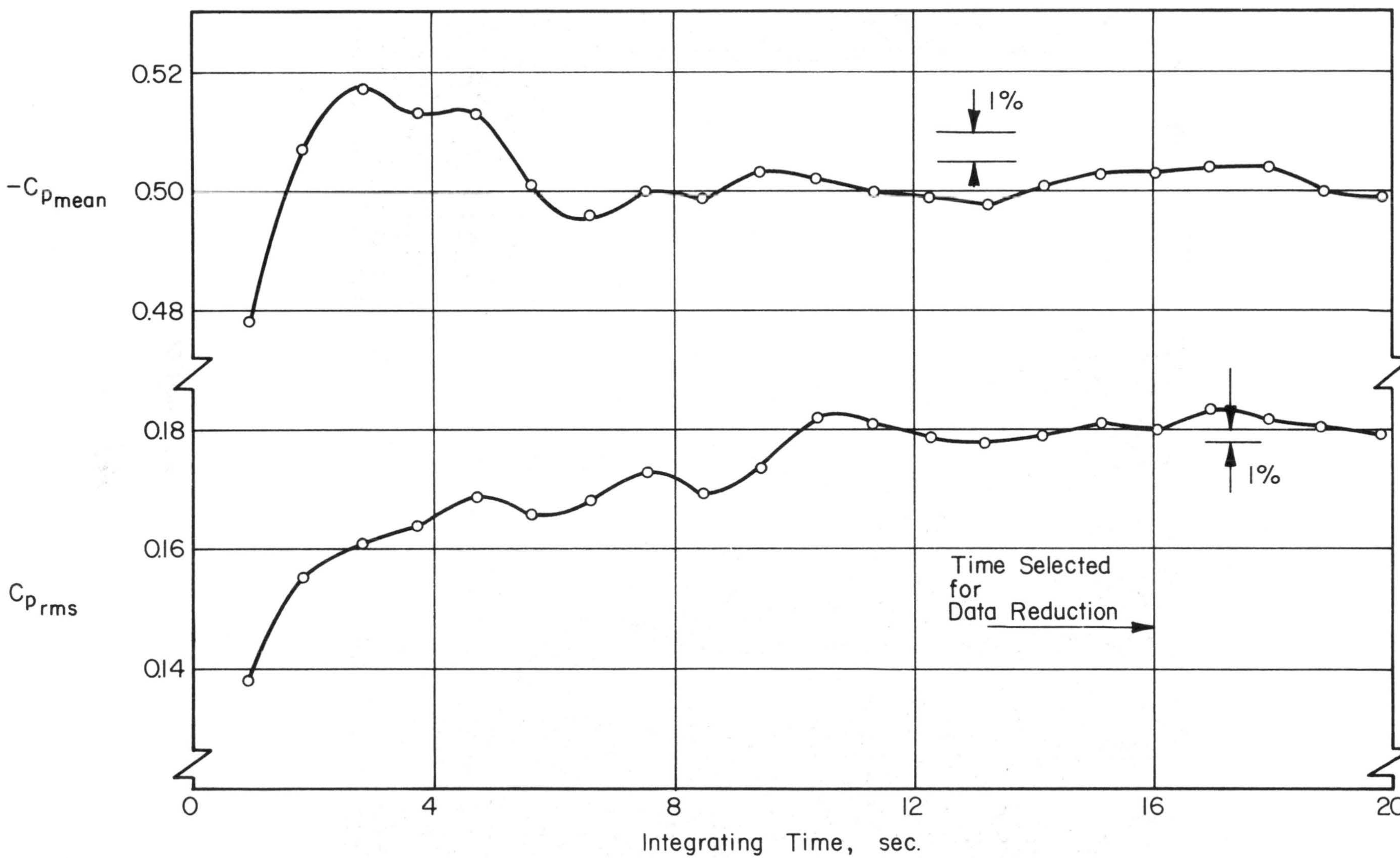


Figure 6. Data Sampling Time Verification

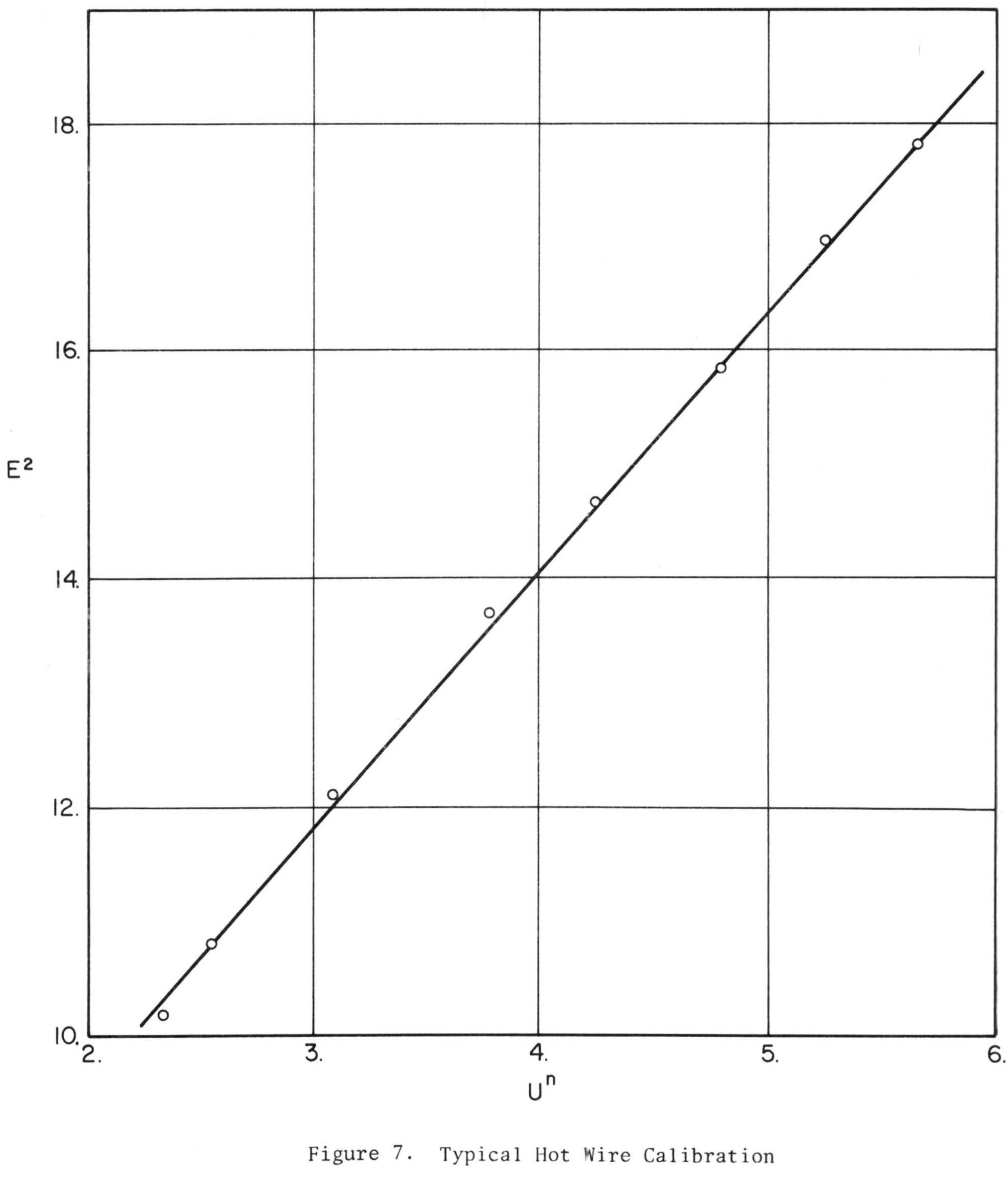


Figure 7. Typical Hot Wire Calibration

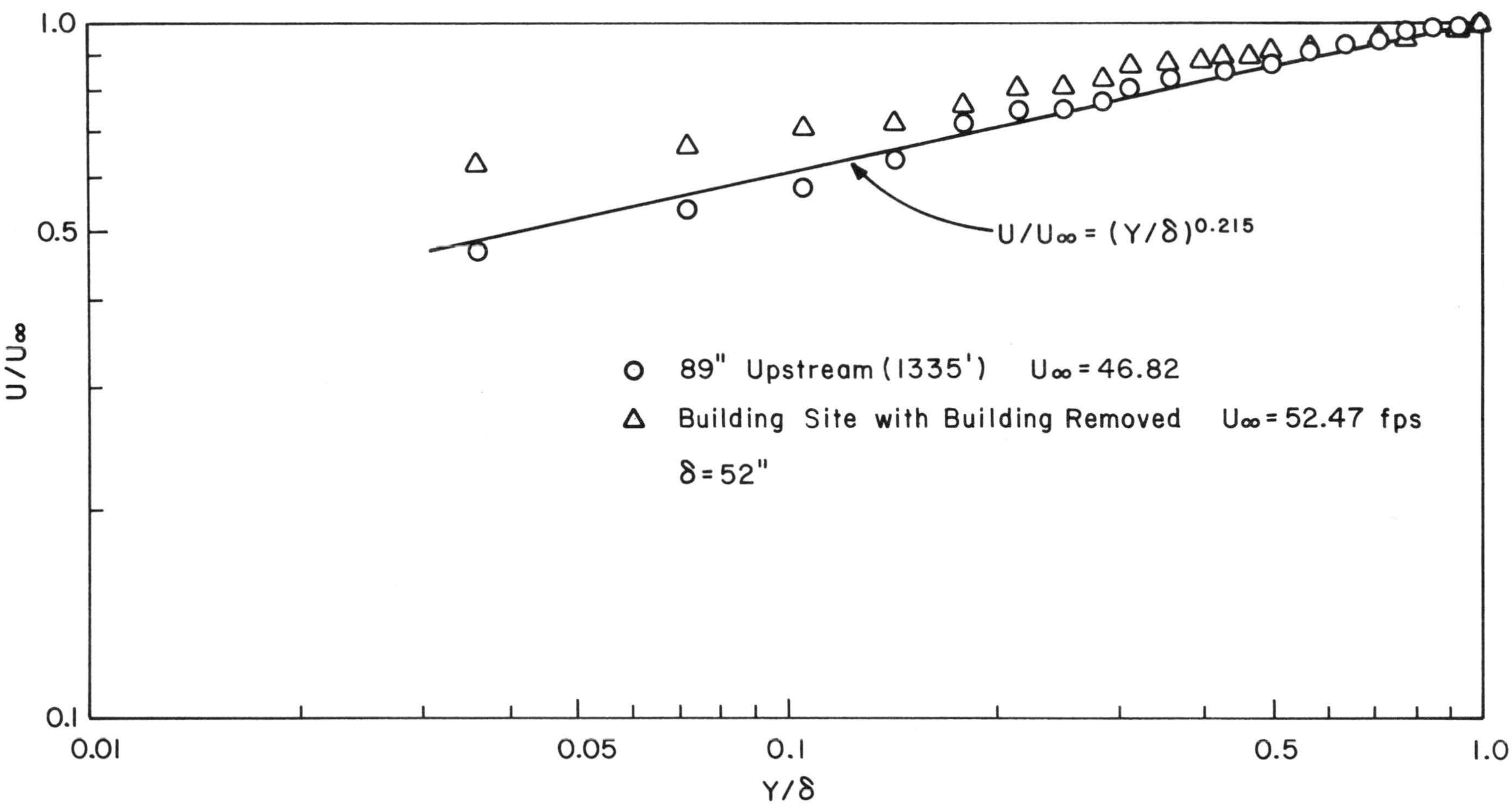


Figure 8a. Mean Velocity Profiles Approaching the Model

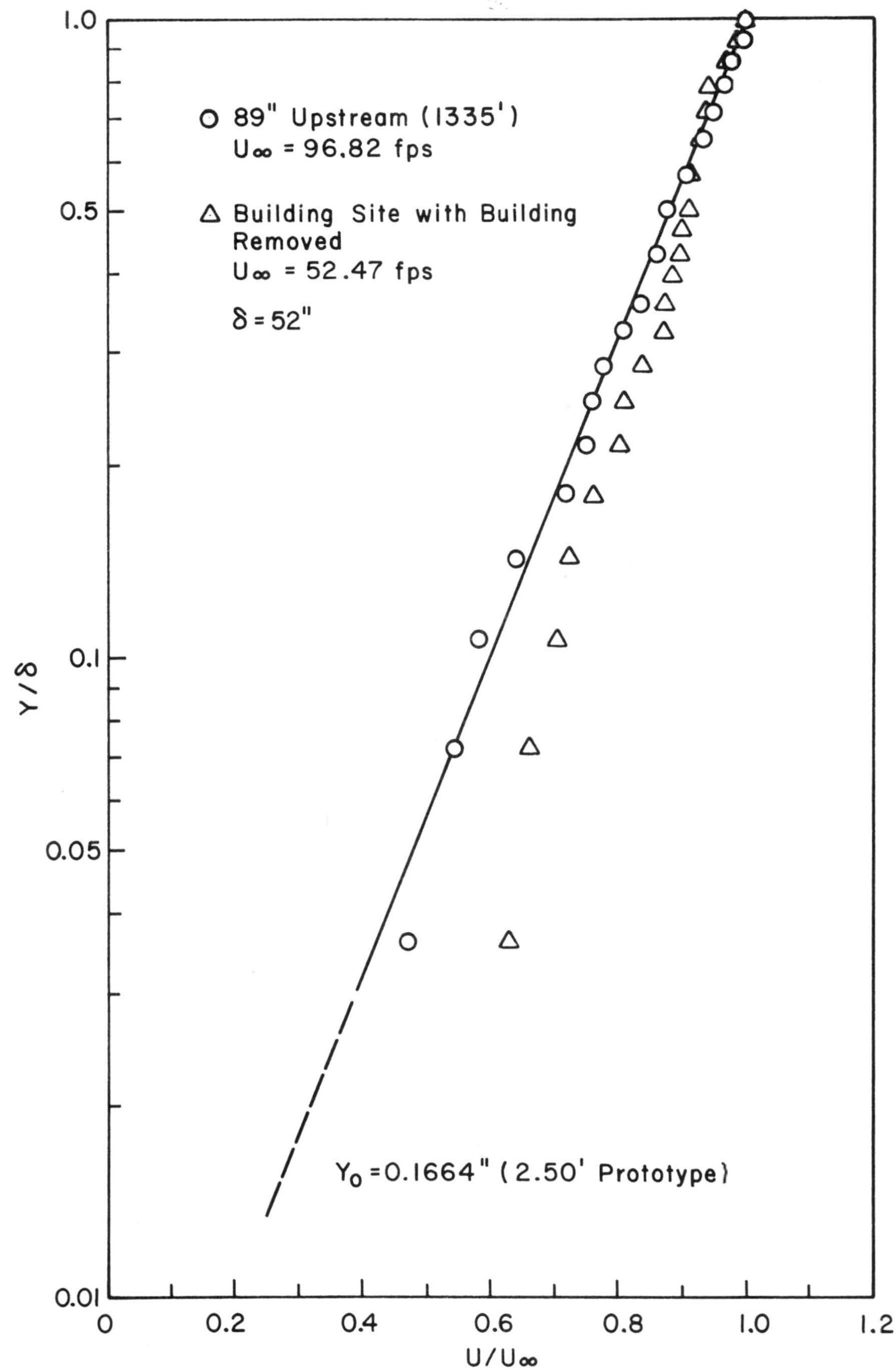


Figure 8b. Mean Velocity Profiles Approaching the Model

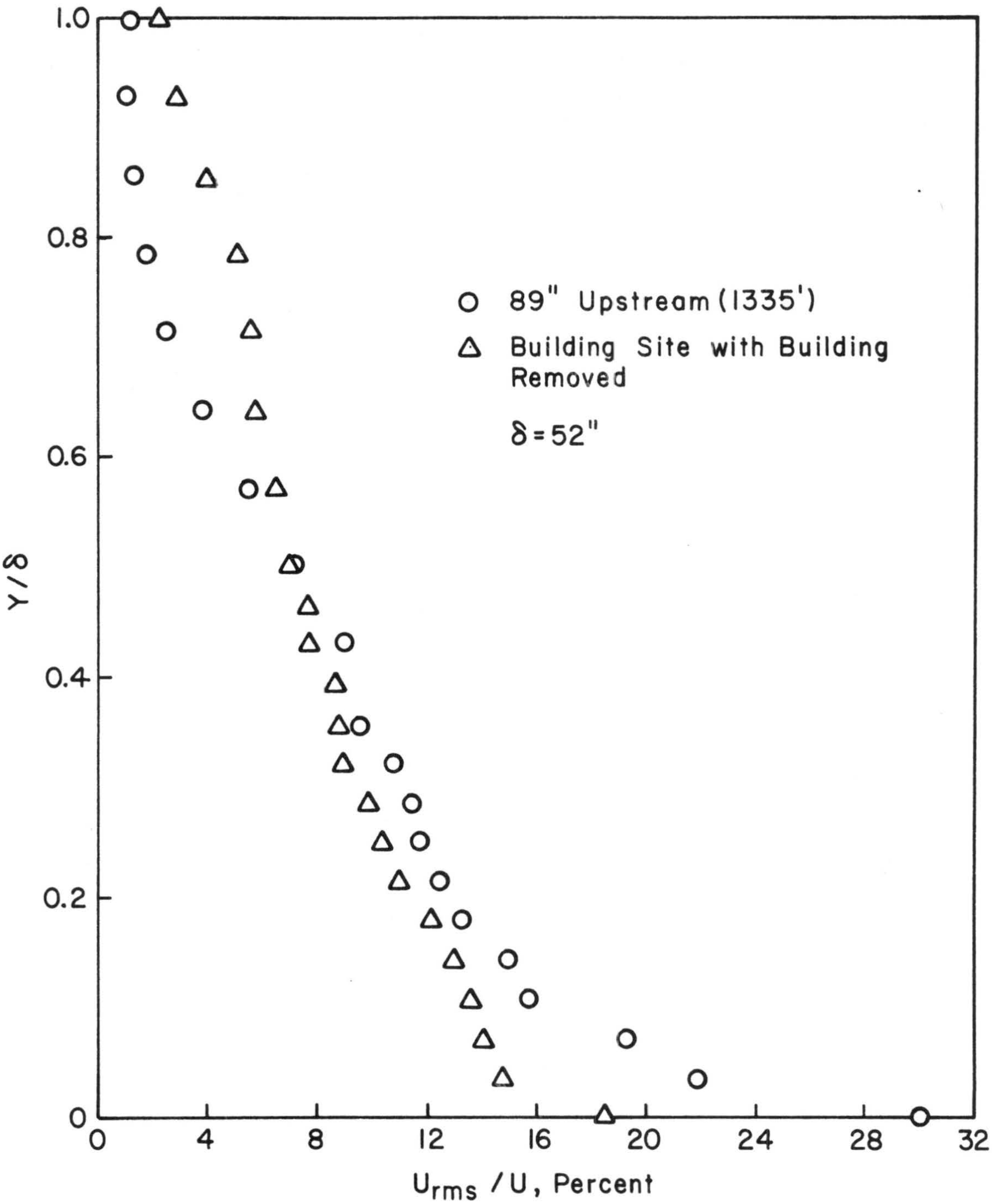


Figure 9. Turbulence Intensity Profiles

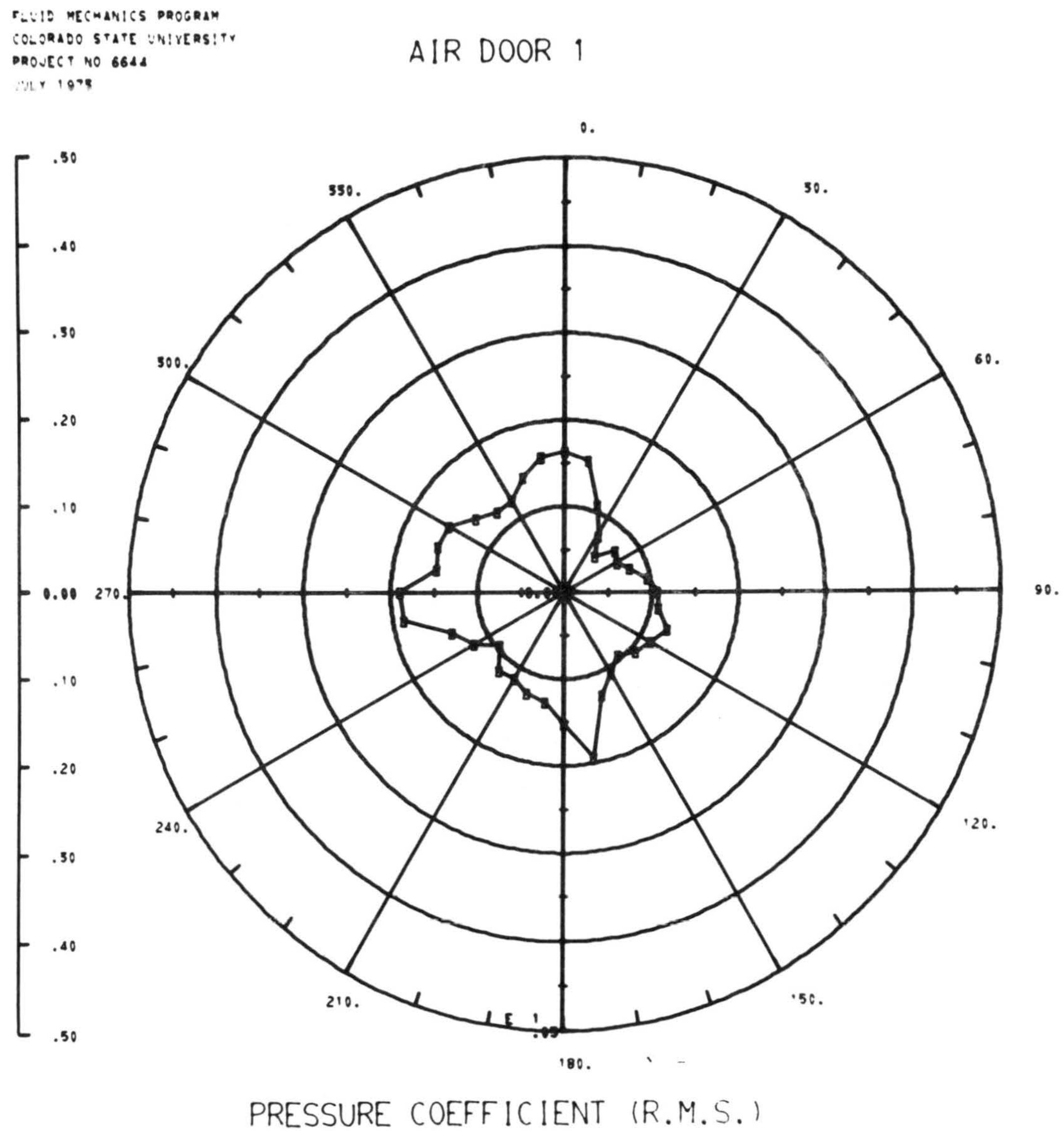


Figure 10a. Pressure Coefficients for Air Door 1

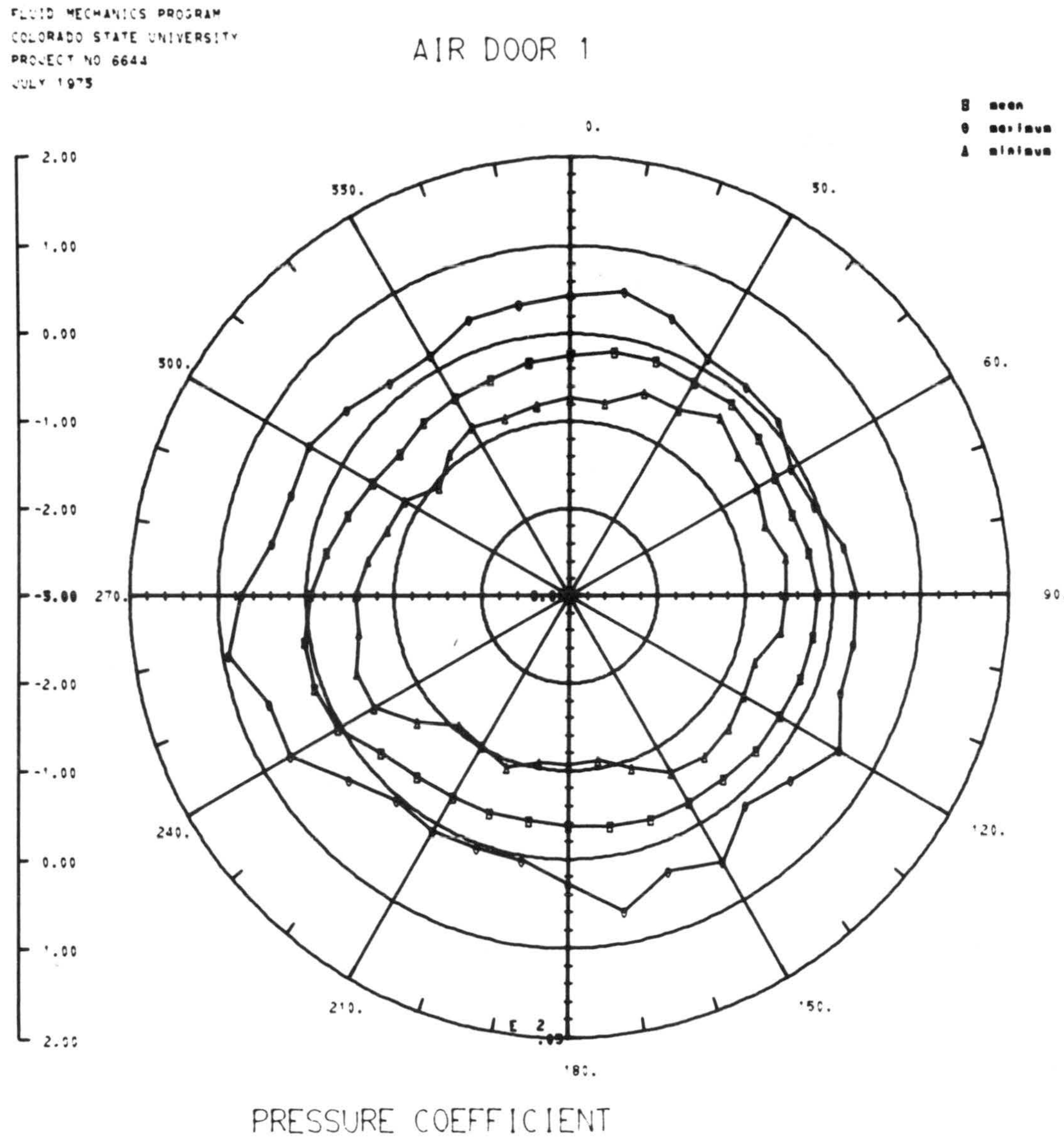


Figure 10b. Pressure Coefficients for Air Door 1

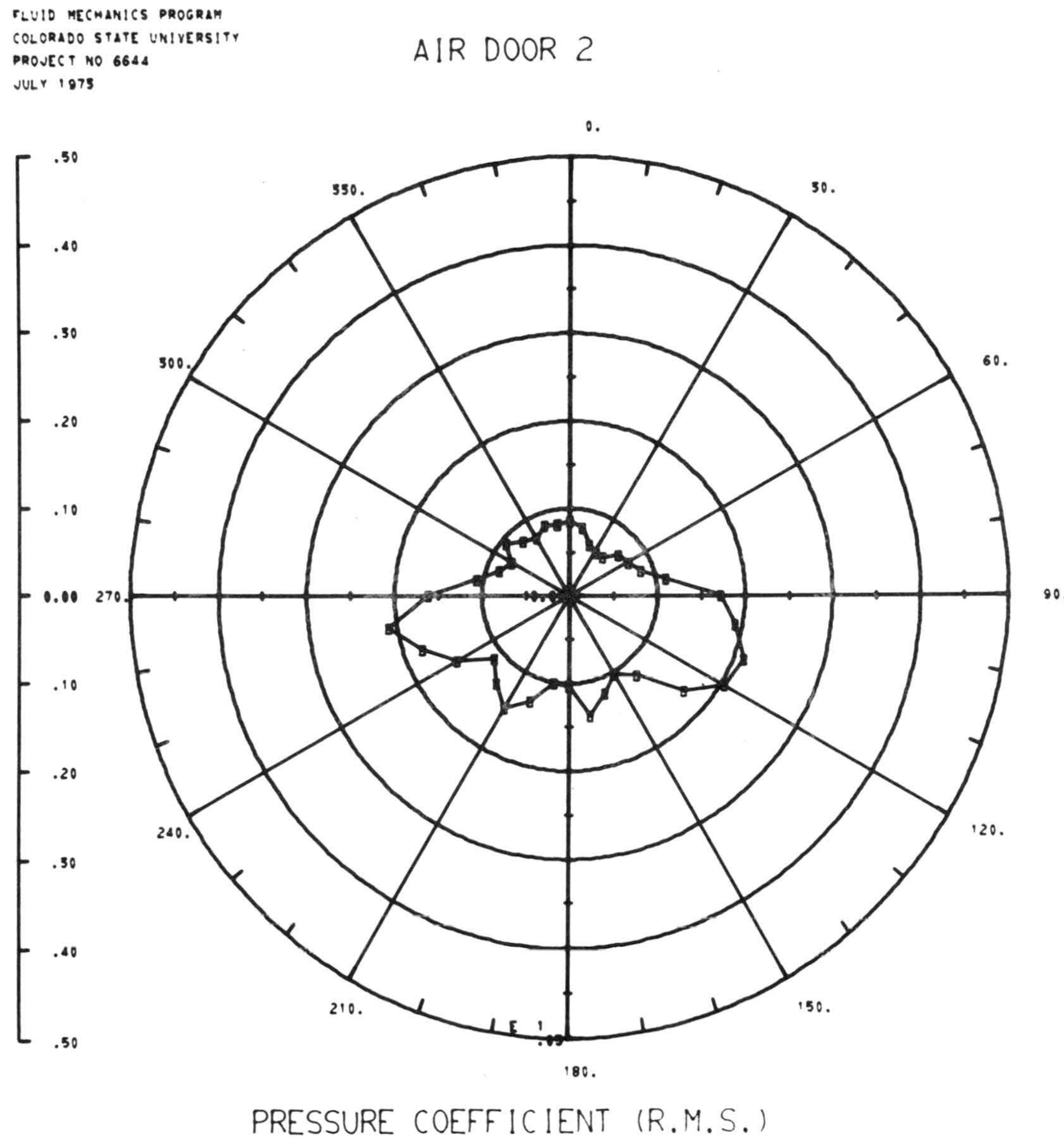


Figure 11a. Pressure Coefficients for Air Door 2

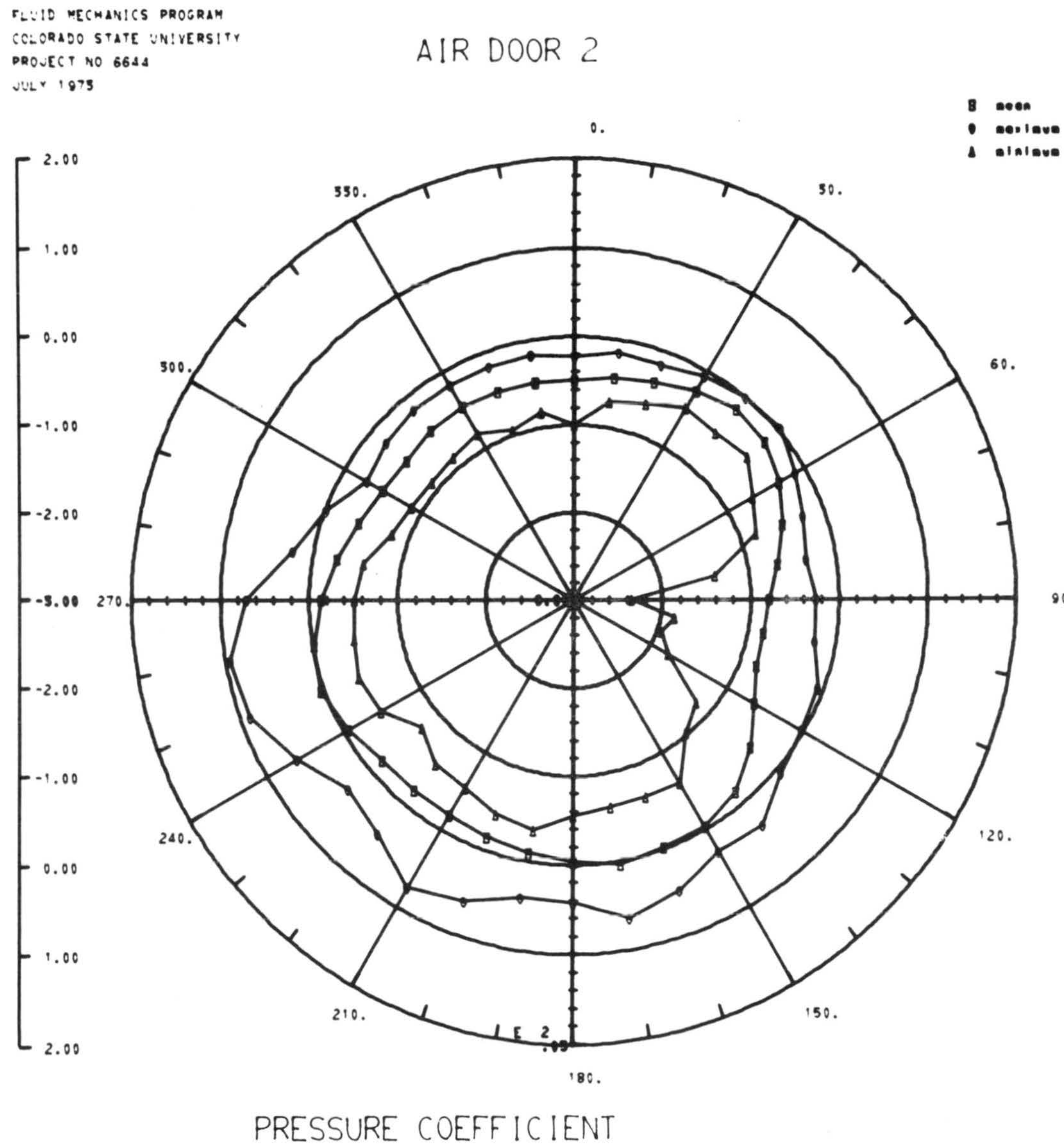


Figure 11b. Pressure Coefficients for Air Door 2

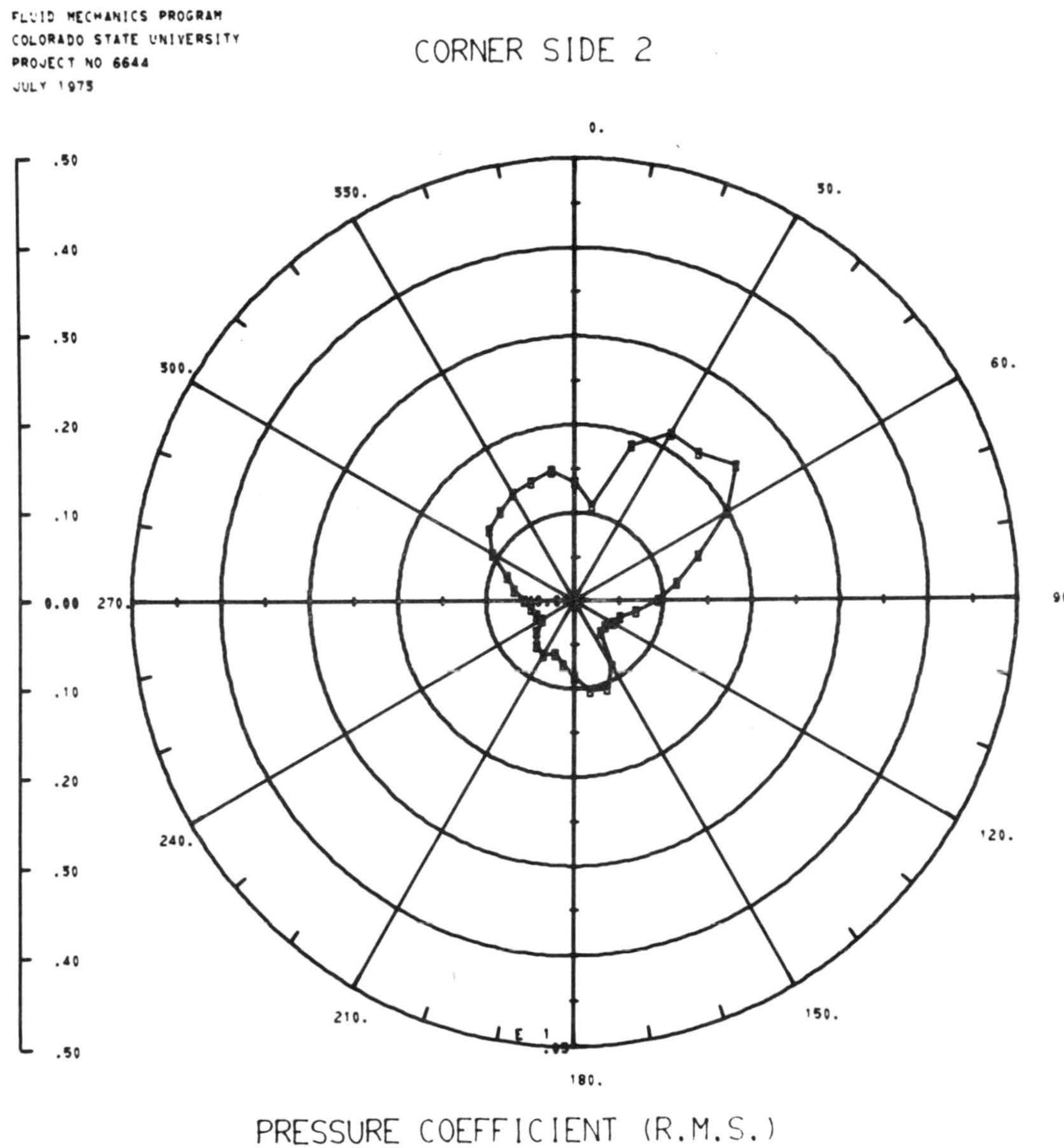


Figure 12a. Pressure Coefficients for Corner Door Side 2

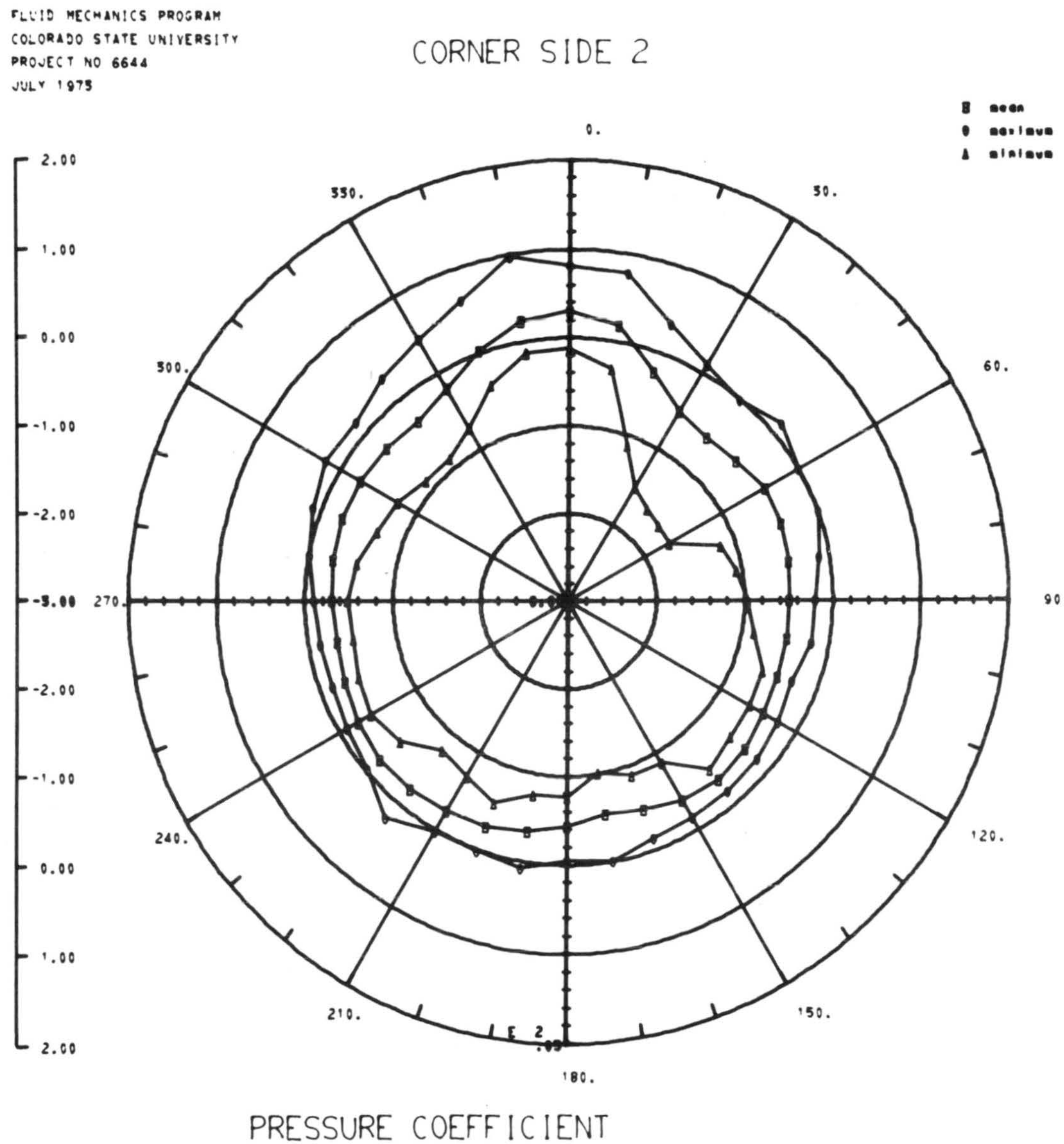


Figure 12b. Pressure Coefficients for Corner Door Side 2

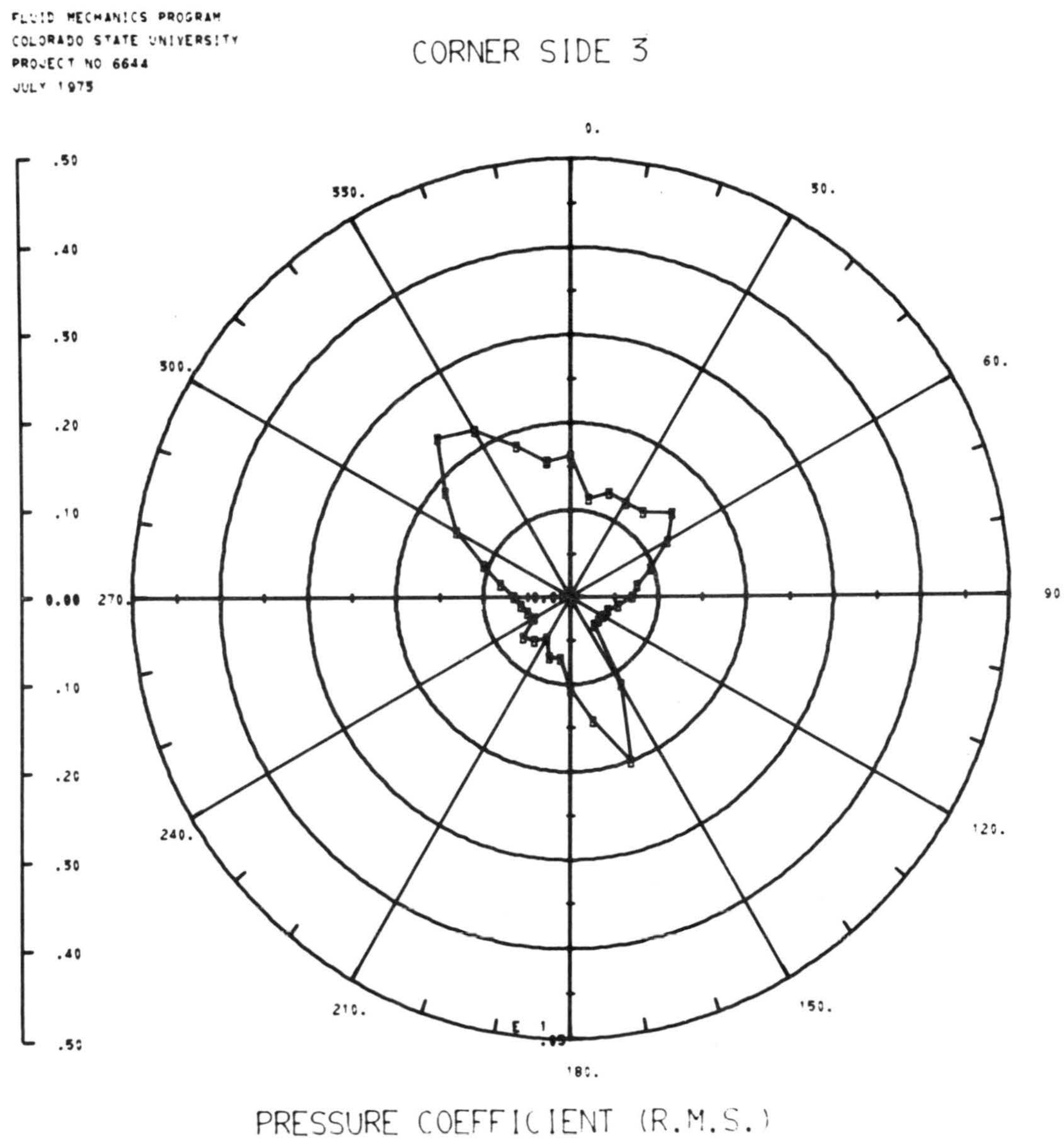


Figure 13a. Pressure Coefficients for Corner Door Side 3

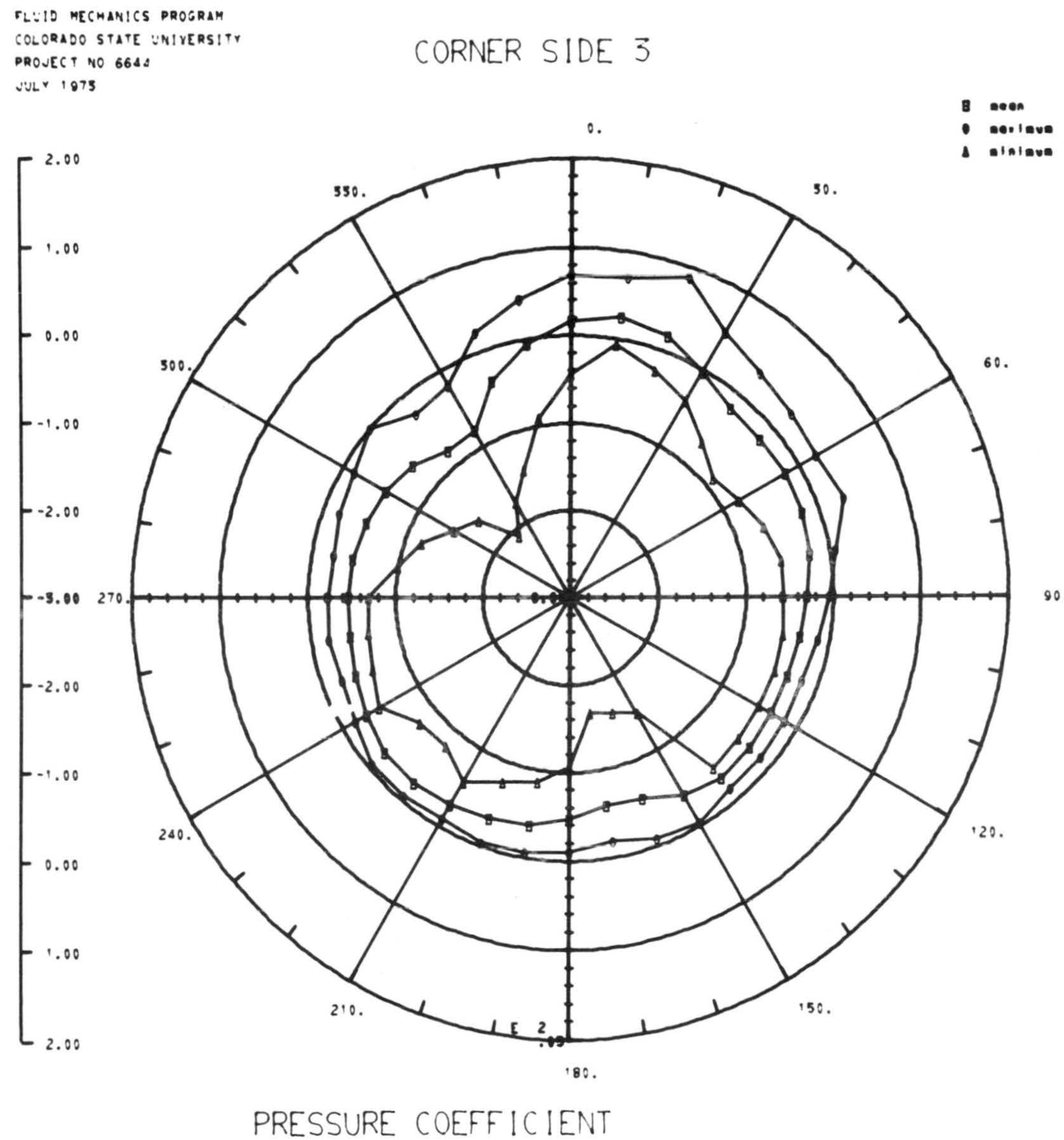


Figure 13b. Pressure Coefficients for Corner Door Side 3

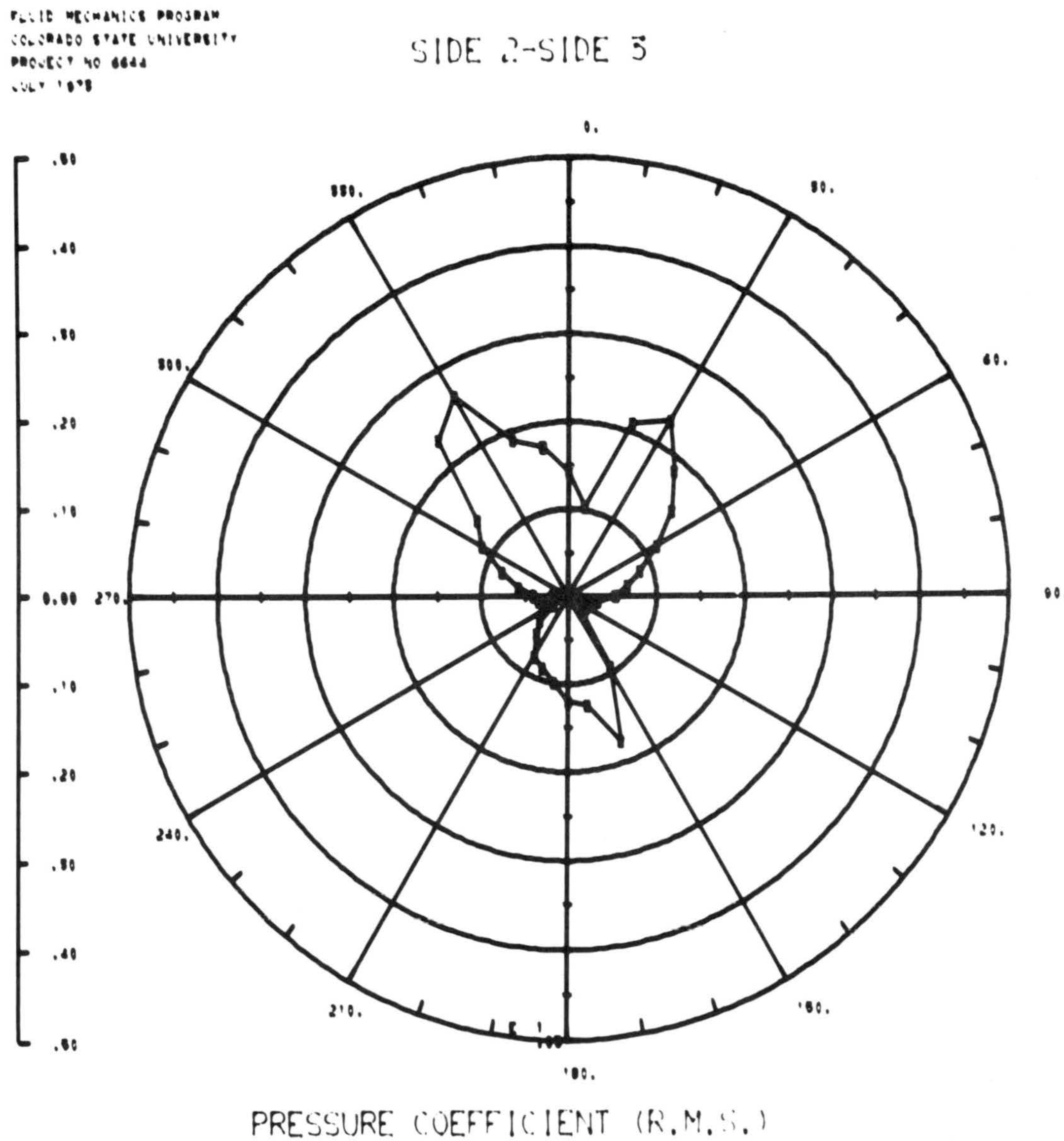


Figure 14a. Pressure Coefficients for Corner Door Side 2-3

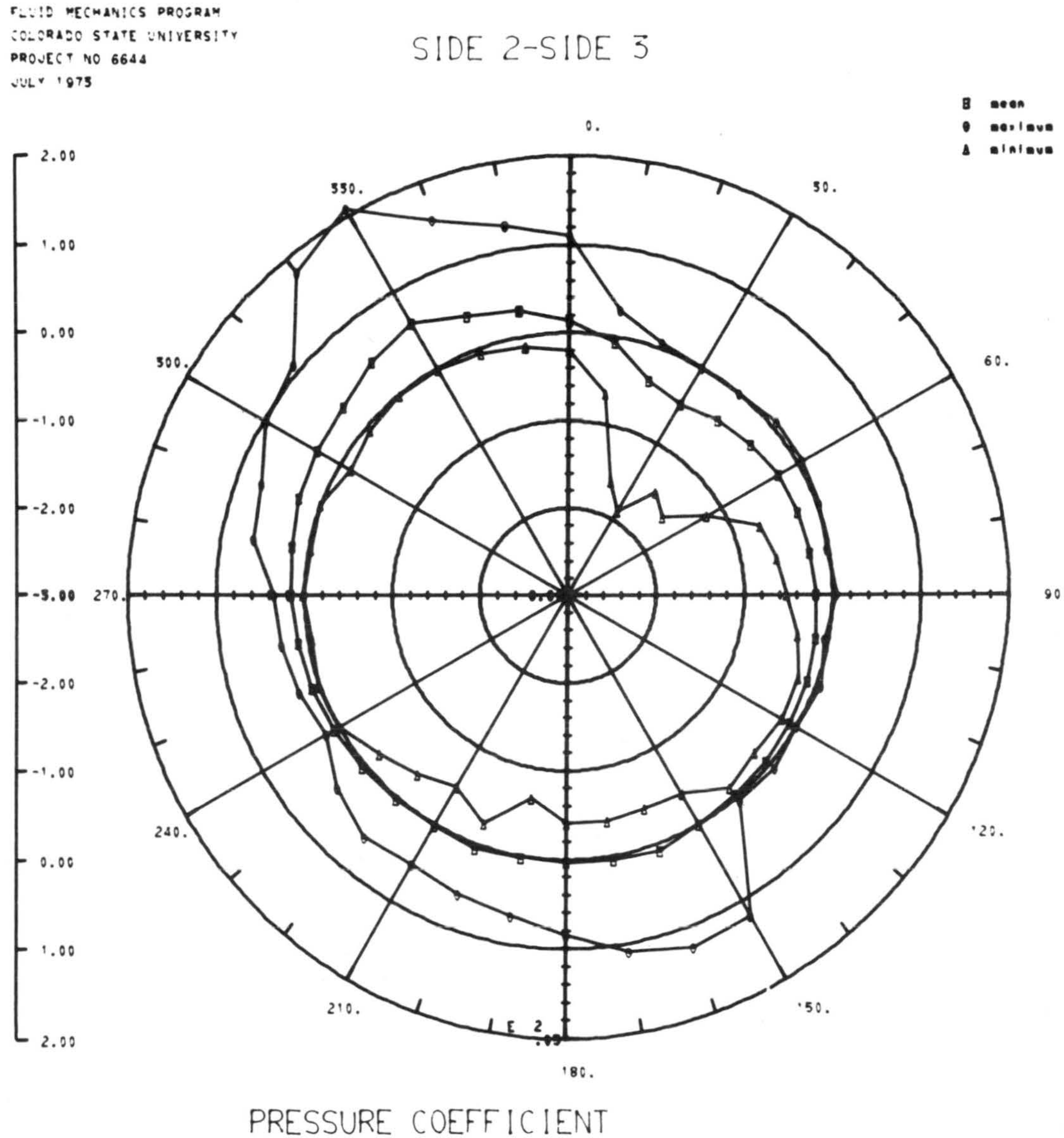


Figure 14b. Pressure Coefficients for Corner Door Side 2-3