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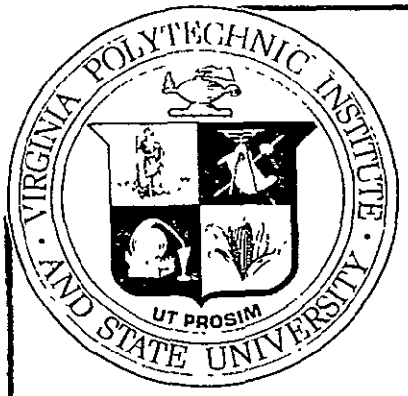

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AN EXPERIMENTAL STUDY OF PRESSURES ON 60° DELTA WINGS WITH LEADING EDGE VORTEX FLAPS

A FINAL REPORT (NAG-1-274)

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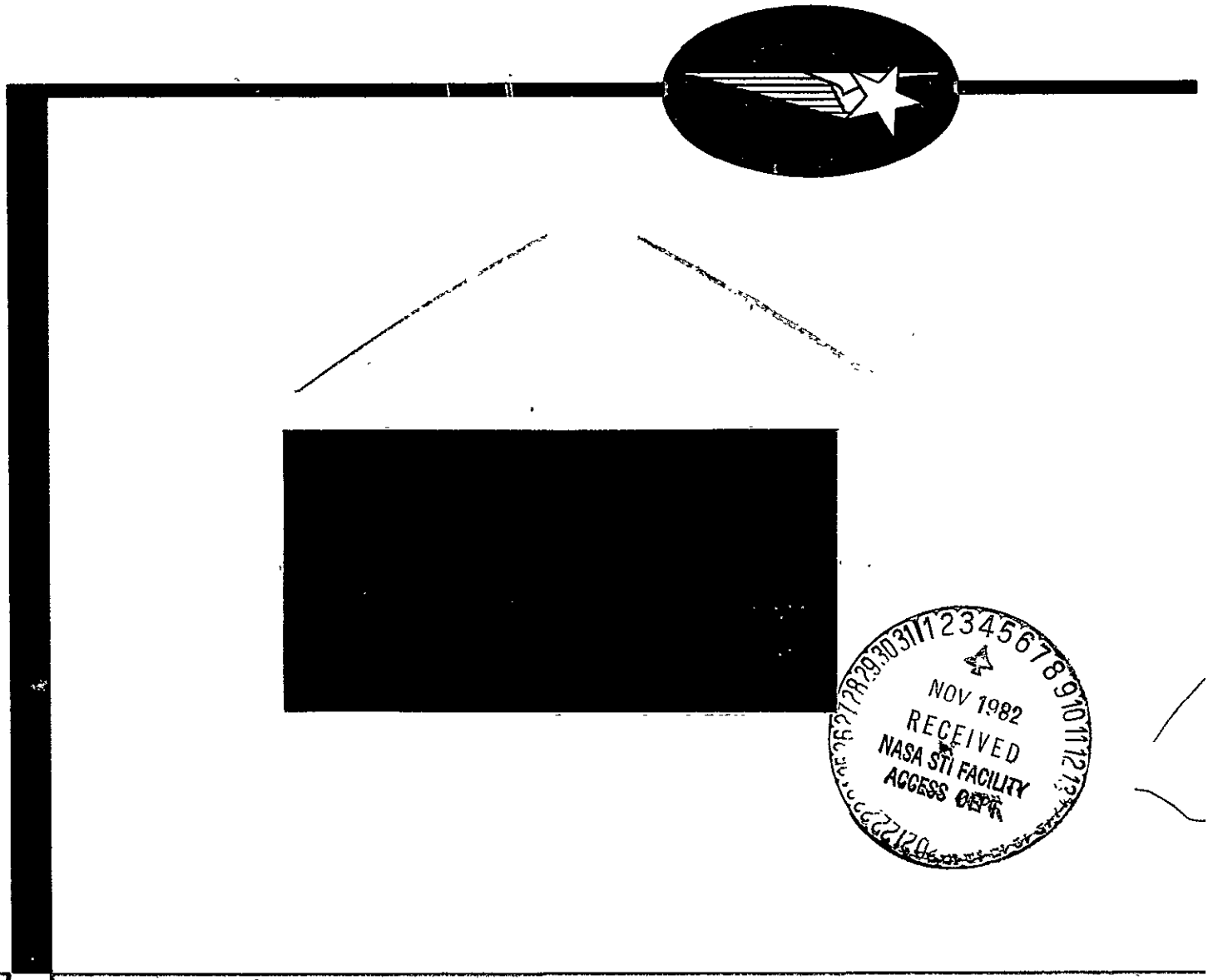

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AN EXPERIMENTAL STUDY OF PRESSURES ON 60° DELTA WINGS WITH LEADING EDGE VORTEX FLAPS - A FINAL REPORT (NAG-1-274)

by

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ABSTRACT

An experimental study was conducted in the Virginia Tech Stability Wind Tunnel to determine surface pressures over a 60° sweep delta wing with three vortex flap designs. Extensive pressure data was collected to provide a base data set for comparison with computational design codes and to allow a better understanding of the flow over vortex flaps. The results indicated that vortex flaps can be designed which will contain the leading edge vortex with no spillage onto the wing upper surface. However, the tests also showed that flaps designed without accounting for flap thickness will not be optimum and the result can be oversized flaps, early flap vortex reattachment and a second separation and vortex at the wing/flap hinge line.

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LIST OF SYMBOLS

α	angle of attack (degrees)
δ_f	flap deflection (degrees)
	pressure coefficient $\left(\frac{p - p_\infty}{q_\infty} \right)$
C_L	lift coefficient $\left(\frac{L}{q_\infty S} \right)$
C_m	moment coefficient $\left(\frac{M}{q_\infty SC} \right)$
L/D	lift to drag ratio
p	local static pressure
p_∞	freestream static pressure
q_∞	freestream dynamic pressure $\left(\frac{1}{2} \rho V_\infty^2 \right)$
L	lift force (lb)
M	pitching moment (ft-lb)
C	root chord (ft)
S	planform area (ft^2)
ρ	density $\left(\frac{slug}{ft^3} \right)$
V_∞	freestream velocity $\left(\frac{ft}{sec} \right)$

AN EXPERIMENTAL STUDY OF PRESSURES ON 60° DELTA WINGS WITH LEADING EDGE VORTEX FLAPS - FINAL REPORT (NAG-1-274)

by

J. F. Marchman, III*, James E. Terry**, and Denise Donatelli**

INTRODUCTION

In recent years, many studies have reported the success of the vortex flap concept of performance improvement for highly swept delta wings.[1-5] A vortex flap is designed to move the leading edge vortex normally produced on a highly swept delta wing from the wing onto the flap as shown in Figure 1. The downward deflection of the flap allows the low pressures in the vortex to produce a thrust instead of the drag normally produced by a leading edge vortex. The thrust results in an increased lift-to-drag ratio for the wing and significant improvement in performance. Previous force tests conducted at VPI have revealed L/D_{max} improvements of up to 70%.[1]

In order to intelligently design vortex flaps for delta wings, there was a need for a large amount of surface pressure data over the wings and flaps. There was very little existing pressure data for vortex flaps[6-7] and such data was needed to better understand the nature of the flow around the wing flap system and to use as a basis of comparison with computer codes

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created for the design of such flap systems. Only such pressure data can confirm the effectiveness of a vortex flap design in containing the vortex over the flap. If the vortex spills over into the wing itself or if it leads to early reattachment on the flap with a subsequent secondary separation at the wing-flap hinge line, additional drag will be created, reducing the flap's performance.

The purpose of the present research was then to provide a data base of surface pressure coefficients over a 60° delta wing with several leading edge vortex flap designs. Tests were conducted using a semispan wing model mounted to the turntable in the flour of the VPI Stability wind tunnel. Three vortex flaps were tested and a wide range of angles of attack were investigated. Some tests included an idealized fuselage model as shown in Figure 2.

EXPERIMENTAL PROCEDURE

The model used for the tests was a 29 inch semispan, flat plate, 60° sweep, delta wing as shown in Figure 3. The wing was designed to be mounted to a circular turntable and mounted to the floor of the VPI Stability Wind Tunnel. The wing model was one and a half inches thick, constructed of two sheets of 3/4 inch plywood sandwiched together. Sandwiched into the wing was tubing for up to 48 pressure taps. Copper tubing was inlaid into the model's upper surface, as shown in Figure 3, such as to allow pressure taps to be drilled along lines either perpendicular to the wing centerline or to the wing's leading edge. All dimensions are given in inches in Figure 3.

Three flaps were tested as shown in Figure 4. The first flap, labeled CCCF for cropped constant chord flap, was designed to match the flap planform

found optimum in earlier force tests at VPI. This flap was designed with pressure taps in rows perpendicular to the flap's leading edge and was tested with similar pressure port allignment on the wing itself.

The other two flaps shown in Figure 4 were designed at NASA-Langley. They are cropped and have a slight inverse taper. The first flap, labeled VPI-8, spanned the entire wing leading edge. The second, VPI-10, was a partial span flap designed to be used with a half cylinder, 5.75 inch radius, idealized fuselage model shown in Figure 2. The fuselage model was constant radius with an ogive shaped nose and was ten feet long.

All flaps were constructed of fir and instrumented with copper tubing for pressure lines. These pressure lines were attached to plastic tubing which was run through the wing model. The CCCF flap was hinged for mounting at a range of deflection angles while the VPI-8 and 10 flaps were designed originally for a 30° upper surface deflection (15° chordline) and later redesigned for a 30° chordline (45° surface) deflection. All flaps were sanded to a smooth finish and sealed and were inspected by NASA personnel for accuracy prior to testing.

Tests were conducted in the six-by-six foot, straight test section of Virginia Tech's Stability Wind Tunnel. This tunnel was originally the NACA Stability Tunnel at Langley Field and is a continuous flow, subsonic facility with a freestream turbulence of less than 0.05%. Testing was usually done at a Reynolds number of 2.2×10^6 and the angles of attack ranged from 0° - 10° in 2° increments and 11° - 15° in 1° increments. Pressure data was collected by a Hewlett-Packard 9825A Acquisition system from a Scanivalve pressure scanning manifold and a Setra Systems transducer (range: 0 to $\pm$ 0.25 psig). Also read by the system were the tunnel static and dynamic pressures and temperature, from which Reynolds number, velocity, density, viscosity, and

pressure coefficients were then plotted on a scale drawing of the wing according to pressure port location. Pressure coefficient was also tabulated.

A few preliminary force tests were conducted to provide global performance data for the NASA flap designs. The force testing was achieved by scaling down the NASA flaps to fit a 60° delta wing that had a 3 foot wing span and 2.667 foot root chord. Two flaps were cut from sheet metal, deflected to 30°, and attached to the leading edges of the wing by small bolts and tape. The tunnel was run at a dynamic pressure of 3.0 inches of water and the angles of attack ranged from 0° - 40° in 5° increments. Forces and moments were measured by strut mounting the wing on a six-component strain gage balance system. This data was collected by the HP Data Acquisition system and reduced to the aerodynamic coefficients which were then printed out and plotted.

Some flow visualization tests were conducted on occasion to verify the results seen in other tests. These were conducted using both tufts and smoke. The results did not photograph particularly well and are not included in this report, but they did confirm some of the results noted by the experimentors.

DATA AND RESULTS

Force Data

As noted, some force tests were run on a three foot span, 60° delta model used in previously reported studies.[1,2] Earlier test data showed that cropped, constant chord flaps (CCCF) and full-span inverse tapered flaps (FTF), both at 30° deflections, gave the highest lift-to-drag ratios.[1] Since the NASA flap design appears to be a hybrid combination of the CCCF and FTF, it was suspected that the NASA design would perform as well as the previous

designs. The force data taken for the NASA VPI-8 flap (full span) showed that this was true. Figure 5 shows that the NASA flap is a good compromise between the CCCF and the FTF, incorporating the higher lift-to-drag ratio of CCCF while maintaining the desirable pitching properties of the FTF. The reduced pitch-up tendency of the NASA flap is due to the smaller flap area near the apex of the delta wing. Yet, even with the smaller flap design, the NASA flap's low drag and high lift-to-drag ratio is some evidence of the flap's ability to maintain a vortex over the majority of its length.

Pressure Analysis

In modeling the wing and flap for surface pressure measurements, appreciable thickness was added to the model for structural strength. The flap model for the force measurements had essentially no thickness (sheet metal construction) and while the delta wing had some thickness, its thickness ratio was approximately three times smaller than that for the wing pressure model.

Since the most computer codes used to predict surface pressures over a wing-flap system do not take into account flap or wing thickness, questions about the validity of comparing the computer and force results to the measured pressure results arise. If a valid comparison can be made, the primary questions become: 1) how should thickness be accounted for and 2) how should the flap deflection be defined on the model with thickness?

For the first tests conducted the flap angle was defined from the flap surface and tested at 30° surface deflection for both the CCCF and the VPI-8. Data for the VPI-8 flaps are shown in Figures 6 to 16. (These figures show the flap deflection as a chordline deflection of 15°). At angles of attack of 0° and 2°, no vortex appeared on either of the flaps. Low pressures were seen at the flap-wing hinge line due to local flow acceleration around the

hinge line. At 4° angle of attack, negative pressures began to appear on the flap. By 8° angle of attack, strong negative pressures indicated a vortex on the flap. The design cruise angle of attack for the test system was supposed to be approximately 11° and the pressure distribution for this angle of attack for the VPI-8 is shown in Figure 12. Two problems are evident from Figure 12; first, the reattachment line for the vortex washes over onto the wing and secondly, the vortex as a whole moves off the flap and onto the wing over the aft portion of the wing. Both of these actions do not allow the full effect of the vortex to be used on the flap and also result in excess drag. As angle of attack is increased further, both of these effects grow worse. A more optimal angle of attack appears to be around 10° (Figure 11). Here, the reattachment is along the hinge line and the vortex movement off the flap is minimal.

These results led to questions about a Reynolds number effect; hence, tests were run at Reynolds numbers of 2.2, 2.8 and 3.7 x 10^6. The results showed the data to be repeatable and independent of Reynolds-number.

The results of tests on the constant chord flap (CCCF) are shown in Figures 17-25. Due to the size of the CCCF, reattachment washover was not a problem, but the CCCF are apparently too large since the reattachment line is on the flap. The results for these flaps are shown in Figures 12 to 20. However, the problem of vortex movement onto the wing was also seen on the CCCF.

Analysis of this data lead to a redefinition of the flap deflection angle. The vortex over the flap was obviously not reattaching at the hinge line as it should on the NASA designed flaps. Since the design was based on a zero thickness model and the wind tunnel model has a substantial thickness, the problem appeared to be in the flap deflection definition. After conferring with NASA-Langley personnel it was decided that the design flap deflection

of 30° should be based on the flap chordline (centerline) rather than on the surface deflection.

Subsequent to the above described redefinition of the flap deflection angle the VPI-8 and VPI-10 flaps were rebuilt for mounting at chordline deflections of 30°. This gave flap surface deflections of 45°. The VPI-8 flap was then retested and the results are shown in Figures 26-36.

With the flap deflected to a 30° chordline valve a new problem is evident near the design wing angle of attack of 11° (Fig. 32). The flap vortex appears to be reattaching on the flap itself with a second vortex forming over the wing as the flow again separates over the hinge line. This appears to be the result of flap thickness effects on a flap designed based on a zero thickness assumption. This will be discussed later in a following section. This second vortex appears at all angles of attack above 4°.

Smoke and tuft flow visualization tests were conducted in an attempt to find the extent and origin of the second vortex. Smoke tests proved inconclusive due to the smoke stream being larger than the vortex and, therefore, covering the details of the flow. The tufts however, indicated that the second vortex formed due to the flow separation at the hinge line. The flow visualization showed the flow accelerating off the flap and over the hinge line.

Because flow visualization tests indicated that the second vortex was initiated at the hinge line, a rounded hinge line modification was made on the VPI-8 to try to eliminate or weaken the vortex. The new hinge line was made by inserting a 3/4" thick strip of styrofoam, "lowering" the flap junction edge approximately 0.24(5.7)% below the surface of the wing and then contouring the styrofoam to make a smooth transition between the flap and the

wing (Figure 37). Flap deflection was maintained at a 30° chordline deflection. The dimensions were chosen in order to give the smoothest flap-to-wing transition. The insert effectively increases the flap size and thus ensures off-design conditions (i.e., early vortex impact) since the sharp hinged tests showed the flaps to be initially slightly oversized.

The local pressure coefficient plots for the rounded hinge case are shown in Figures 38 through 47. Again looking at the results at α = 11° (Figure 40) it appears that the second vortex is significantly weakened, although it may still exist. The pressure distributions over the flap are virtually identical to those seen in the earlier tests with a sharp hinge line but the low pressure areas over the wing are substantially weakened.

Flow visualization with tufts indicated that a weak vortex still existed off the hinge line. It therefore appears that the rounded hinge decreased the strength of the wing hinge line vortex but further testing needs to be done to optimize hinge line radius.

The obvious solution to this problem of hinge line separation is not a rounded hinge line but a resized flap which is designed to account for flap thickness effects on the flow. The effects of flap thickness are illustrated in Figure 48. A flap designed with a zero thickness code to produce a vortex flow which will reattach at the hinge line will experience early reattachment on a flap with finite thickness. The thicker flap results in early vortex impact on the flap and a second separation at the wing flap hinge line.

The effects of thickness are, thus, twofold. The resulting greater then defined deflection angle of the flap surface (45° surface deflection for a 30° chordline deflection on the VPI-8 and VPI-10) results in greater thrust at the defined angle, due to the increased forward tilt of the vortex-induced suction vector. However, the resulting flap chord is now too large for the

design flow and the early vortex reattachment leads to a second vortex over the wing and consequently a drag force.

Further consideration needs to be given to the effects of flap thickness on vortex flap flow. These effects must be better understood if design codes are to be properly developed for vortex flaps. These codes must in some way account for flap thickness.

Figures 49-59 present the data for the VPI-10 flaps at a 30° chordline deflection. These flaps were designed for use with a fuselage model; however, they were first tested without the fuselage. A well defined vortex does not appear over the flap until an angle of attack of about 10 degrees is reached, although a well defined vortex appears to form off the hinge line at lower angles of attack. It also appears that a second inboard vortex or low pressure region appears over the wing in this case due to the leading edge vortex on the unflapped wing apex moving onto the wing after the flap begins. This vortex should not appear when a fuselage model is added.

The fuselage model was added to the wing with the VPI-10 flap and the results are shown in Figures 60-70. These results are very similar to those shown for the same flap without fuselage except that the inboard vortex off the wing apex noted in the earlier case is not present. It appears that the fuselage plays no significant role in the development of the vortex flows over the flap or wing.

DATA ANALYSIS

In examining the data the obvious problem noted is the hinge line vortex. As discussed previously, it is apparent that a flap planform designed without accounting for thickness results in excess flap chord for a flap of finite

thickness. The noted effect of thickness appears to call into question the accuracy of using a chordline code to predict optimum flap deflection angles and planform chords. When comparing the results of these tests for the full span VPI-8 flap with chordline deflections of 15° and 30° an optimum appears to lie somewhere between the two cases. Force tests with the VPI-8 (Figure 5) showed a maximum L/D to be achieved at an angle of attack around 7 to 8 degrees. Thus, examining Figures 10 and 30 (the α = 8° data for VPI-8 at δ_F = 15° and 30° respectively) it appears that the 15° chordline deflection (30° surface deflection) is much more likely to produce the L/D optimum at this angle of attack. This is an interesting result in that the force test results were for a near zero thickness flap at 30° deflection which should correspond more directly to the 30° chordline deflection case of Figure 30.

In Figure 10 there appears to be a good vortex on the flap with vortex reattachment quite near the hinge line, a case which should produce a good L/D. On the other hand, Figure 30 shows no vortex over the flap and a rather strong separation off the hinge line. This, in the authors' opinions calls into question the validity of using flap chordline deflection as the design condition rather than using flap surface deflection.

The problem is complex. Apparently, flap vortex strength depends on the flap chordline deflection. However, the effect of the vortex in producing thrust will depend on the deflection of the surface on which it acts. Obviously, a vortex which reattaches too early, producing a hinge line vortex, needs to be avoided. The results indicate that as the base thickness of the flap increases the flap chord needs to be decreased in order to avoid early vortex reattachment which leads to hinge line separation. The only answer to these problems which is readily apparent is that flap thickness should be kept as small as possible.

In the initial examination of the VPI-8 flap with 15° chordline 30° surface deflection it appeared that in the range of angle of attack between 10 and 15 degrees the primary problem was a tendency of the flap vortex to roll up over the wing itself. Consequently, several tests were run with a modified flap where a flap extension was added onto the rear portion of the existing flap. This was a sheet metal extension with the planform as indicated on the data figures (Fig. 71-76). The purpose of the extension was to pull the flap vortex back onto the flap over the aft portion of the wing. This extension appeared to work well, maintaining the vortex over the flap along the rear part of the wing. At higher angles of attack, however, the extension is not sufficient to the task and a large part of the vortex appears to extend over the wing's upper surface.

CONCLUSIONS

The reported research provided a large base of surface pressure data for a 60° delta wing with three vortex flap designs. The data has been presented in graphical form in the figures and is also tabulated in Appendix A. The data indicates that flap thickness plays an important role in determining the effectiveness of a vortex flap planform design and in the selection of an optimum design deflection angle.

Further research is needed to assess the effect of flap thickness on vortex flap behavior. Design codes developed for use with vortex flaps need to include at least some semi-empirical means of including thickness effects. A flap designed based on a zero thickness model will result in early reattachment of the flap vortex and may result in the formation of a second vortex of the flap wing hinge line. A smoothing or rounding of the hinge line may alleviate some of the hinge line separation problems; however, a design code which

includes the effects of thickness should result in a flap planform which will preclude hinge line separation problems.

A primary result of this research was to show that by proper flap design it is possible to create a vortex flap which will contain the leading edge vortex without spillover of that vortex onto the wing's upper surface. The results also largely confirmed earlier research which indicated that a thirty degree flap deflection was optimal for a 60° delta wing.

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FIGURES

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Figure 1 Formation of Vortex on Leading Edge Vortex Flap and Resultant Force(1)

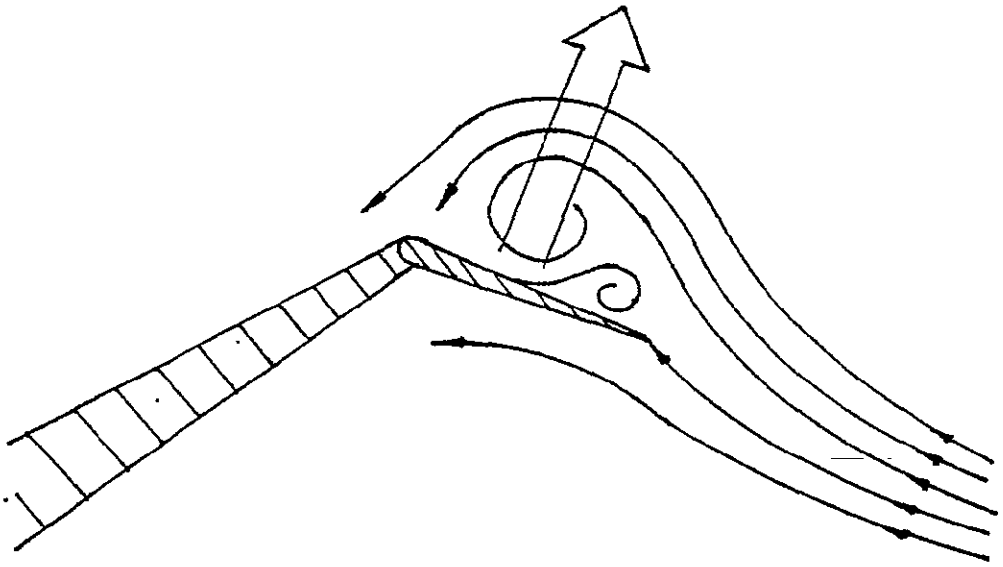

Figure 2 Model Mounting in VPI 6' x 6' Stability Wind Tunnel
(Configuration Shown is VPI-10 Flap with Fuselage).

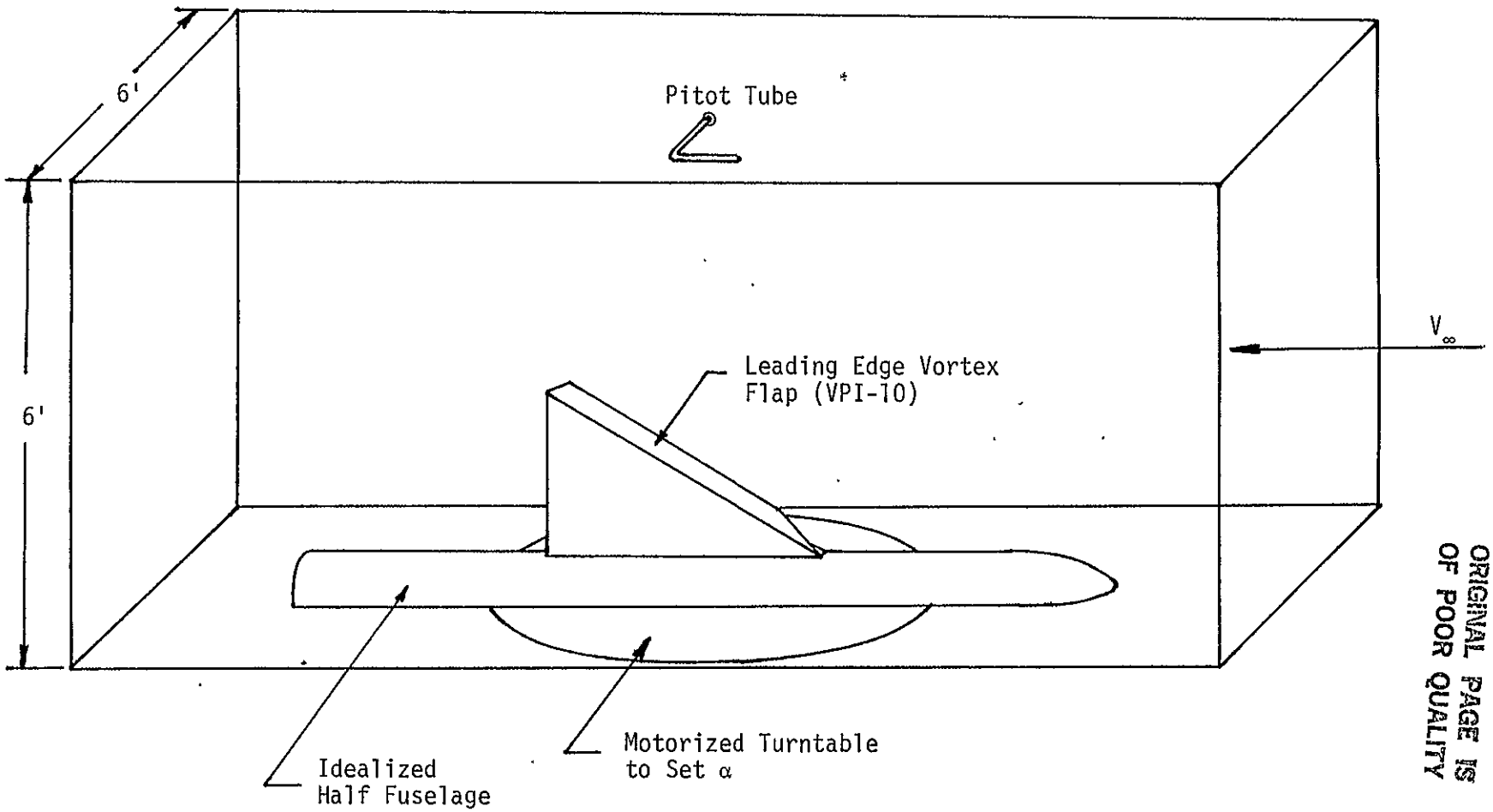

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Figure 3 60 Degree Wing Model Dimensions and Port Locations (without flap)

Note: Wing Secured to Turntable by Steel "L" Brackets Inlaid Into Both Wing and Turntable

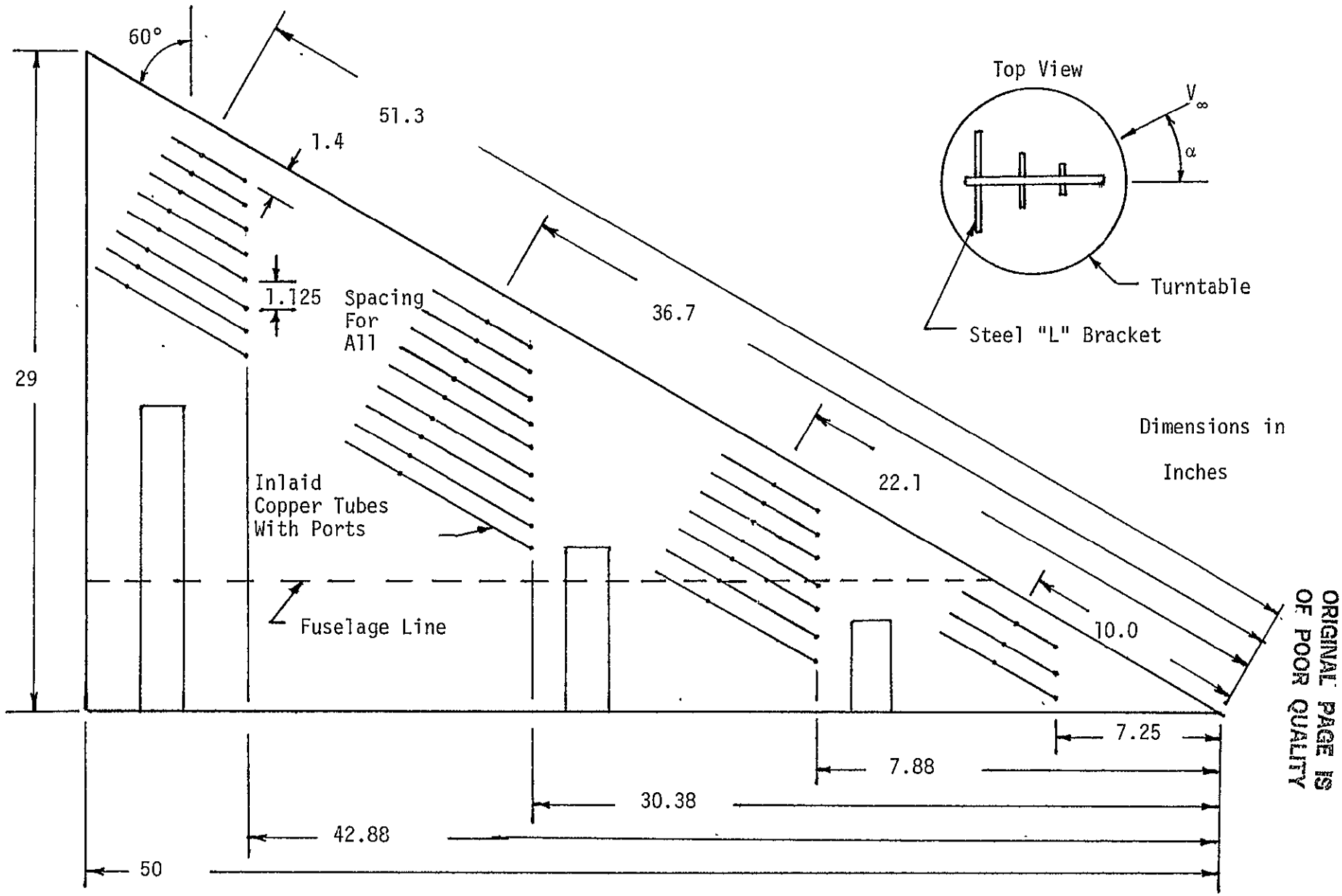

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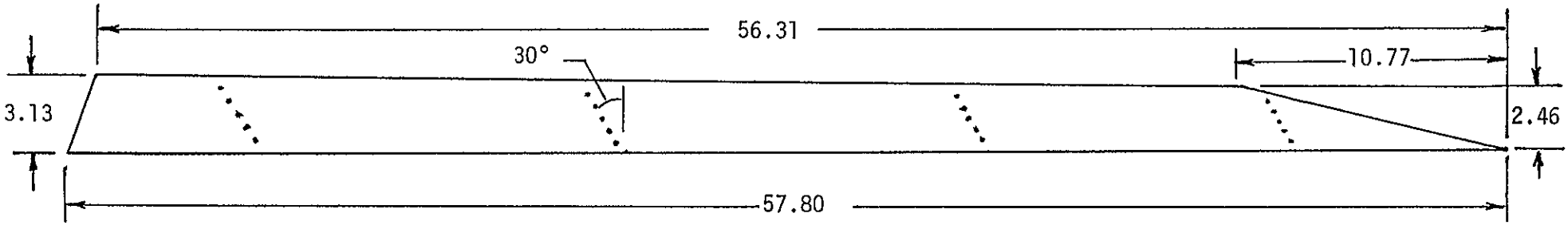
Figure 4 Pressure Flap Model Configurations and Port Locations

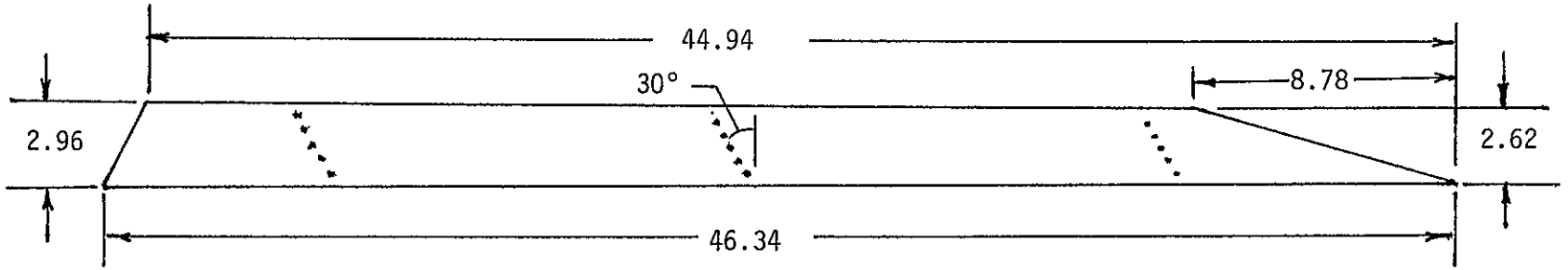
All Ports Equally Spaced

Dimensions in Inches

VPI-8: Port Rows Align With Wing Port Rows Perpendicular to Root Chord



VPI-10: Port Rows Align With Wing Port Rows Perpendicular to Root Chord



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CCCF: Port Rows Align With Wing Port Rows Perpendicular to Leading Edge

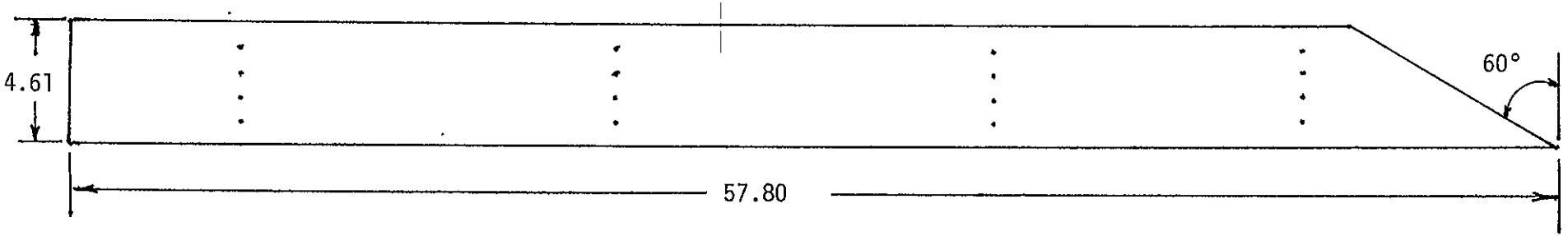

Figure 5 Performance of the NASA VPI-8 LEVF Compared to Previously Tested LEVF(1)

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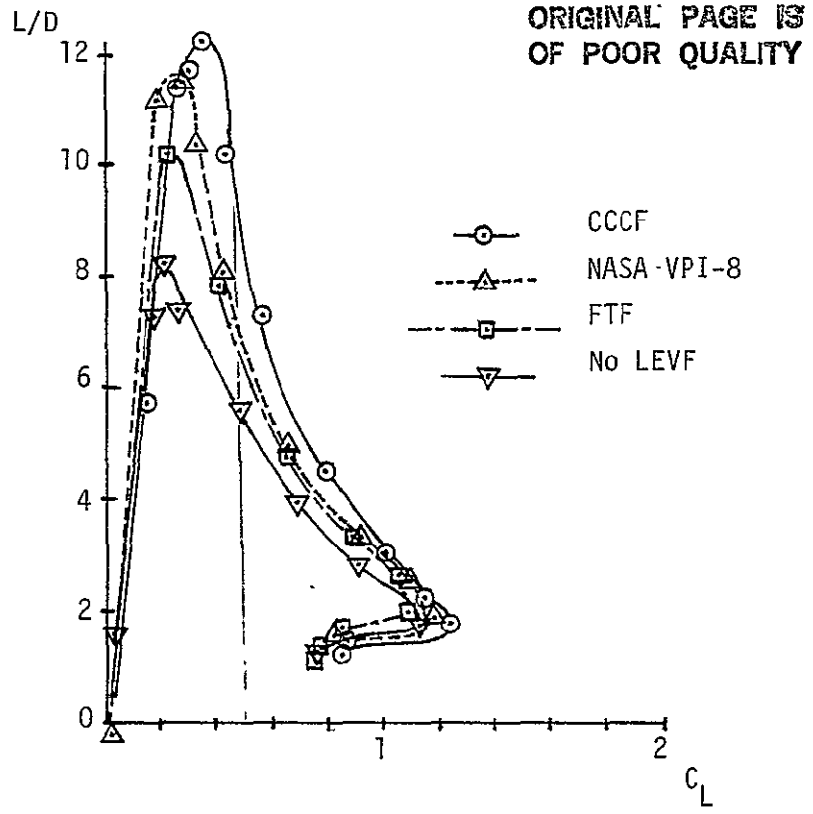

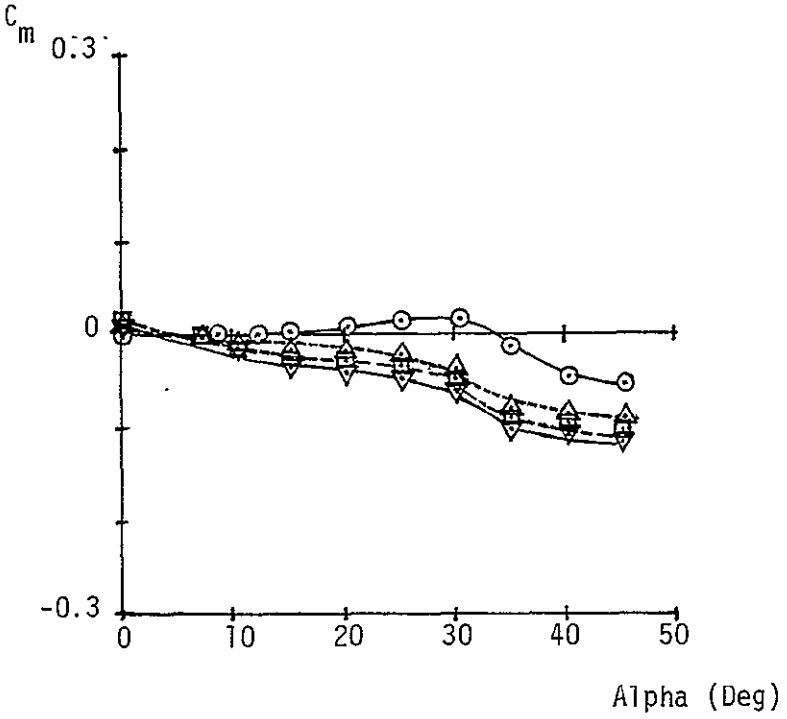

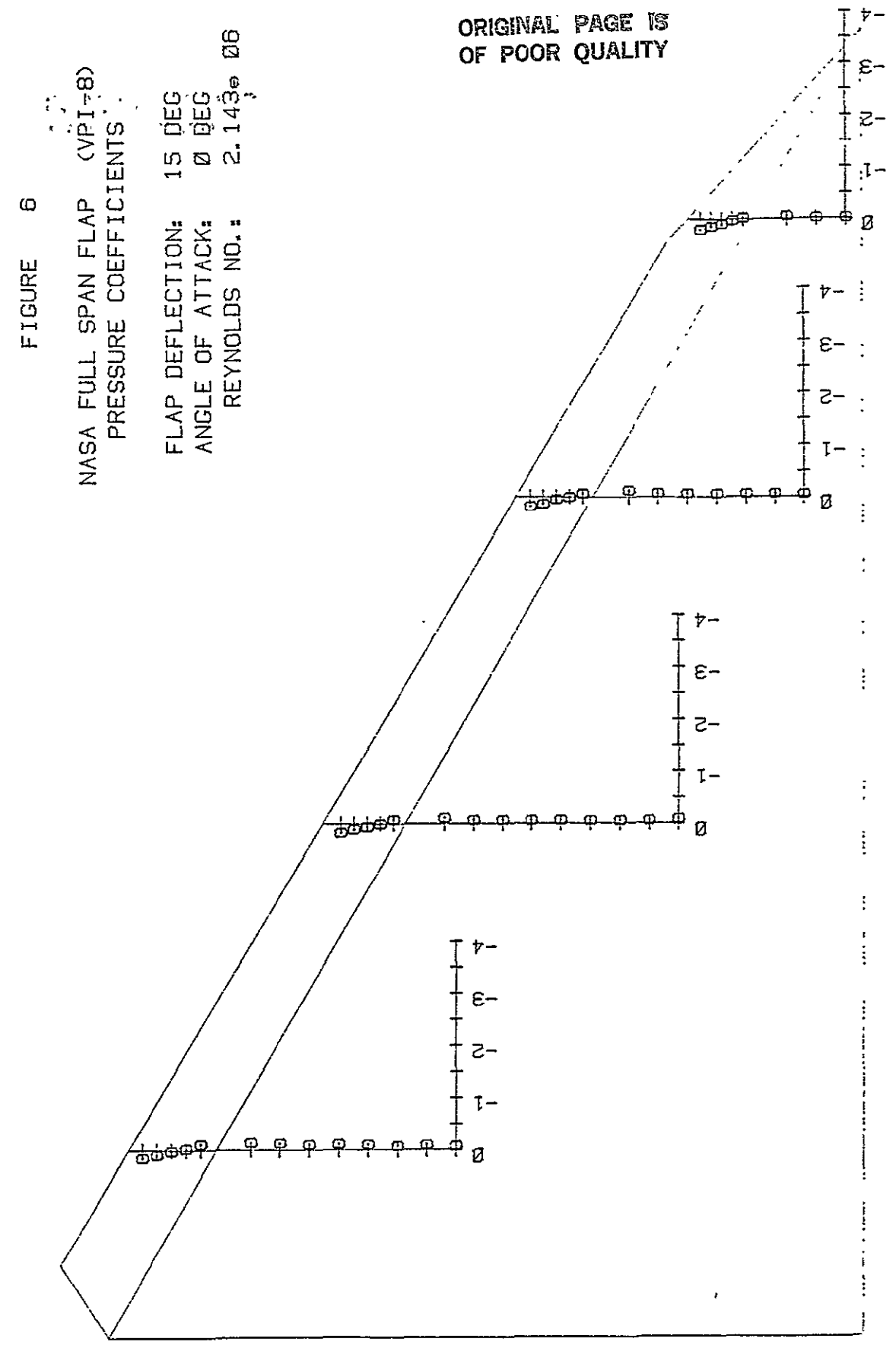
FIGURE 6
NASA FULL SPAN FLAP (VPI-8)
PRESSURE COEFFICIENTS
FLAP DEFLECTION: 15 DEG
ANGLE OF ATTACK: 0 DEG
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FIGURE 7

NASA FULL SPAN FLAP (VPI-8)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 15 DEG
ANGLE OF ATTACK: 2 DEG
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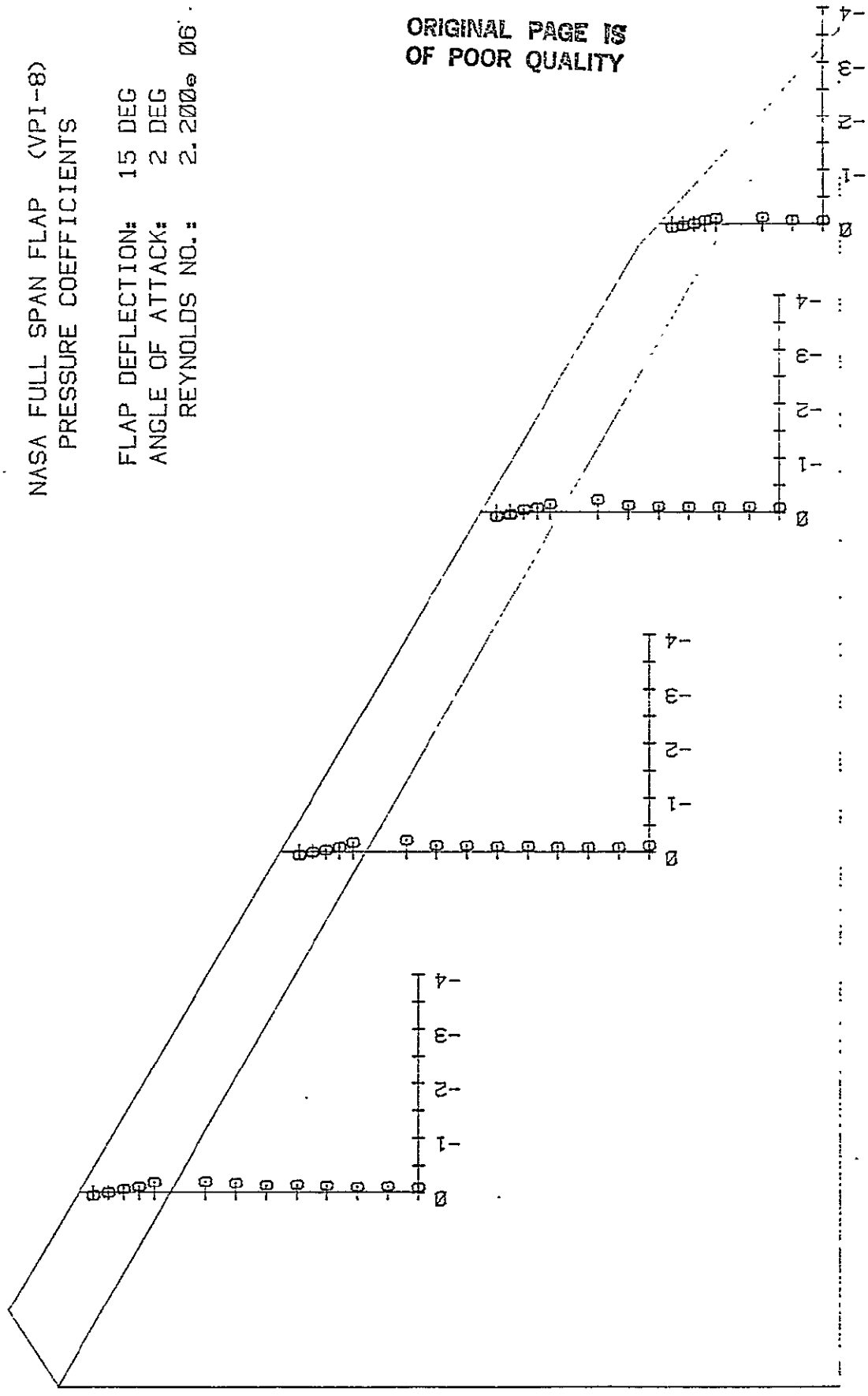

FIGURE 8

NASA FULL SPAN FLAP (VPI-8)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 15 DEG
ANGLE OF ATTACK: 4 DEG
REYNOLDS NO.: 2.206e 06

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FIGURE 9

NASA FULL SPAN FLAP (VPI-8)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 15 DEG
ANGLE OF ATTACK: 6 DEG
REYNOLDS NO.: 2.202e 06

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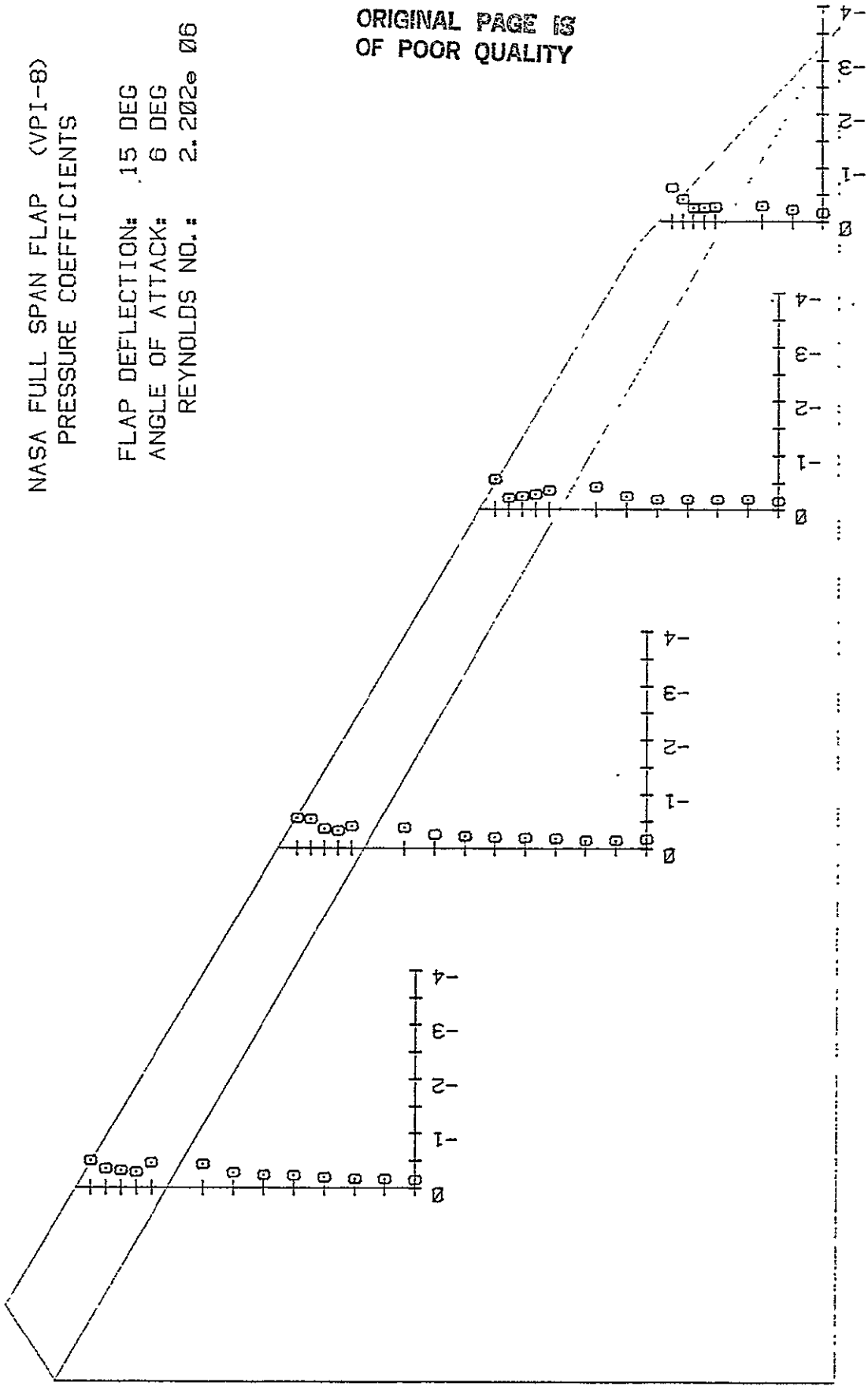

FIGURE 10

NASA FULL SPAN FLAP (VPI-8)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 15 DEG
ANGLE OF ATTACK: 8 DEG
REYNOLDS NO.: 2.197e 06

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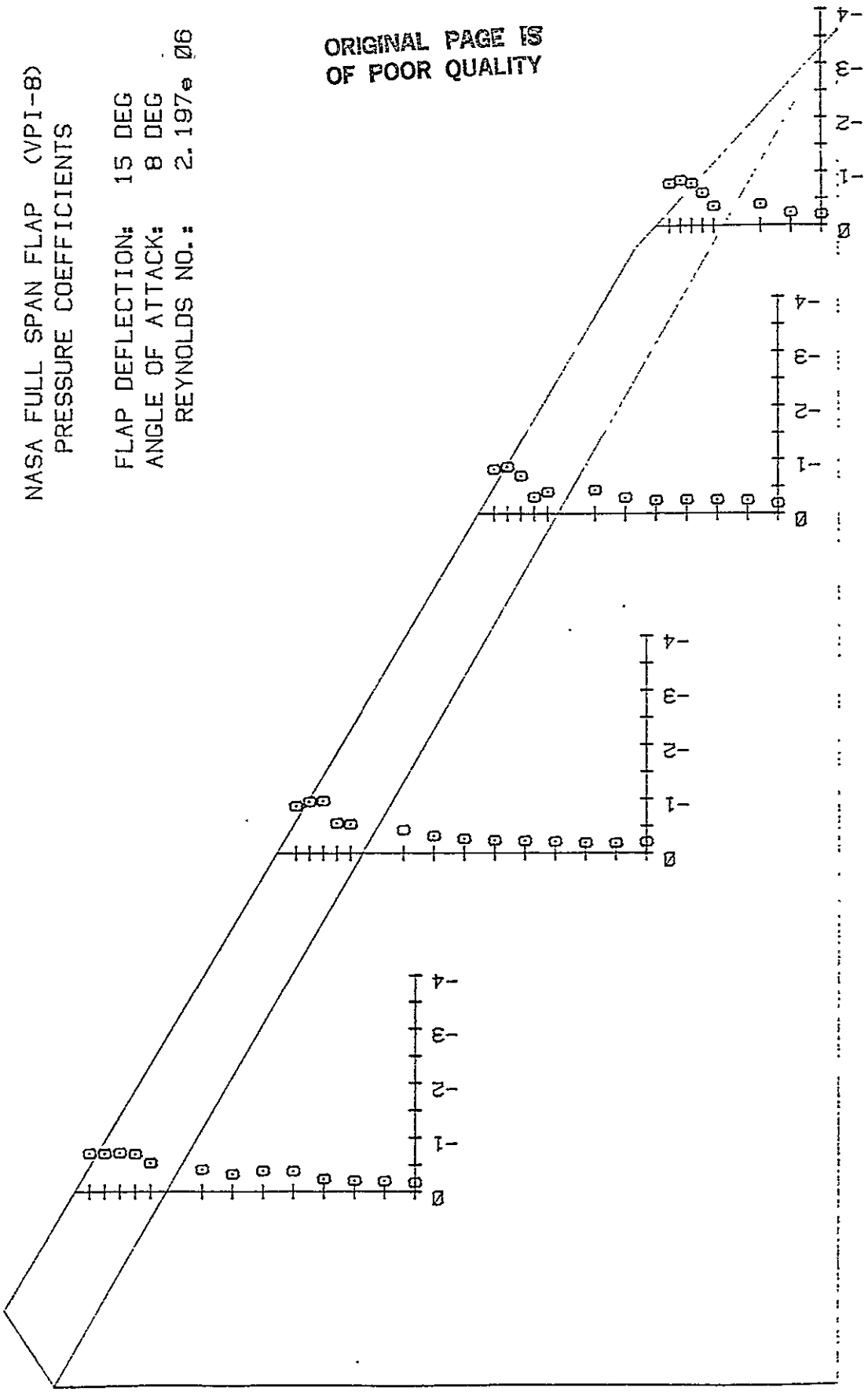

FIGURE 11

NASA FULL SPAN FLAP (VPI-8)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 15 DEG
ANGLE OF ATTACK: 10 DEG
REYNOLDS NO.: 2.197e 06

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FIGURE 12

NASA FULL SPAN FLAP (VPI-8)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 15 DEG
ANGLE OF ATTACK: 11 DEG
REYNOLDS NO.: 2.184e Ø6

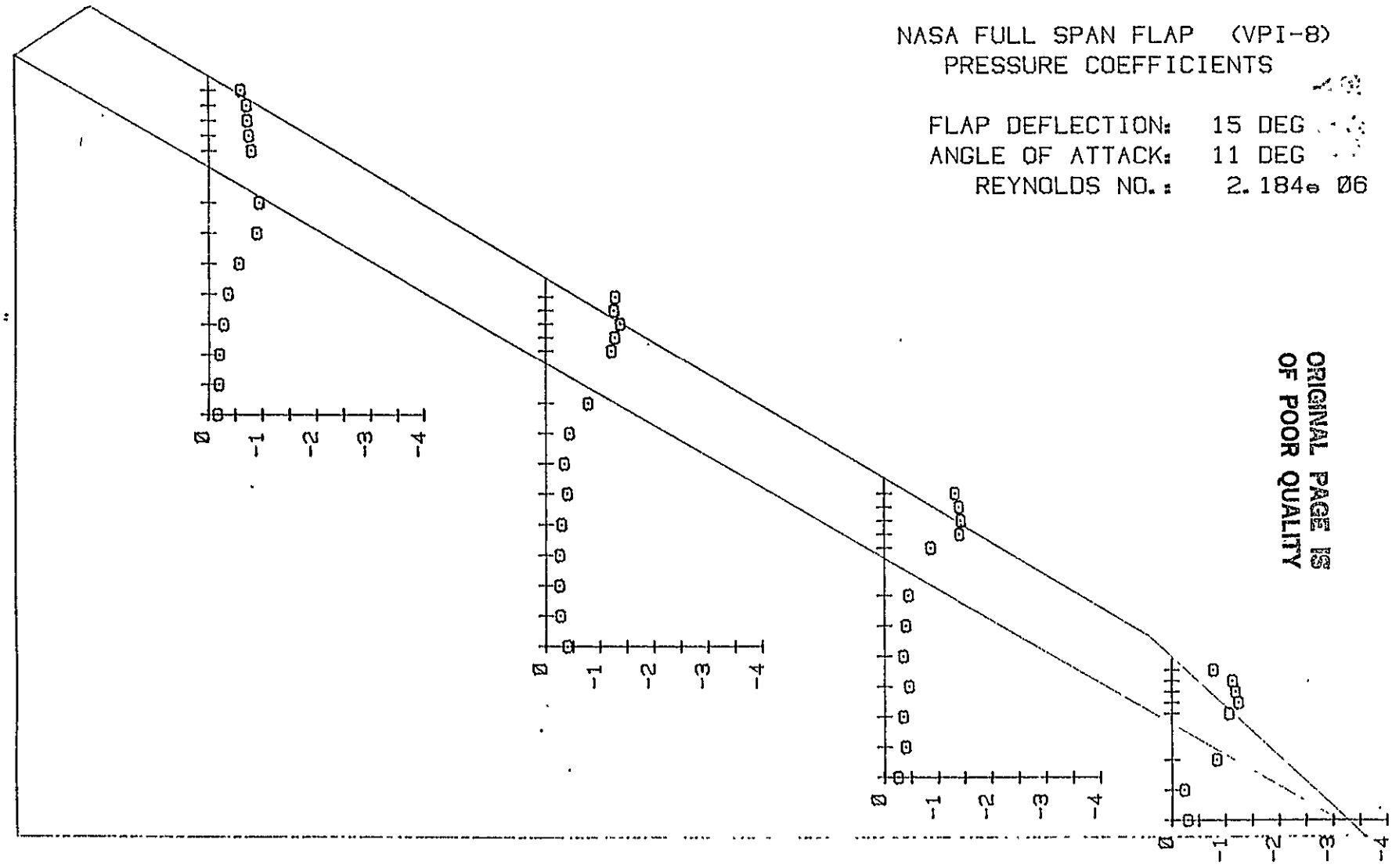

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FIGURE 13

NASA FULL SPAN FLAP (VPI-8)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 15 DEG
ANGLE OF ATTACK: 12 DEG
REYNOLDS NO.: 2.202e Ø6

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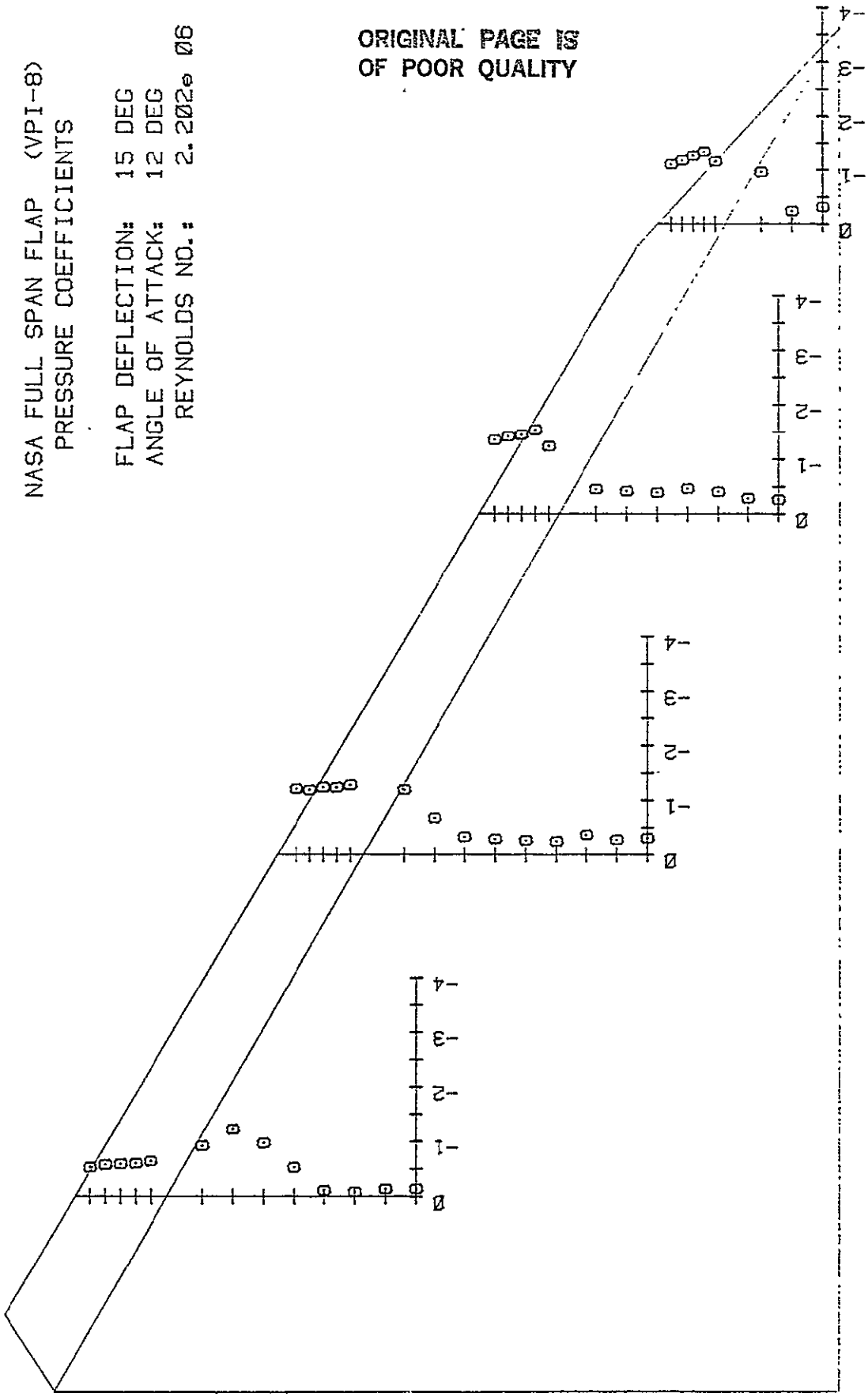

FIGURE 14

NASA FULL SPAN FLAP (VPI-8)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 15 DEG
ANGLE OF ATTACK: 13 DEG
REYNOLDS NO.: 2.211e.06

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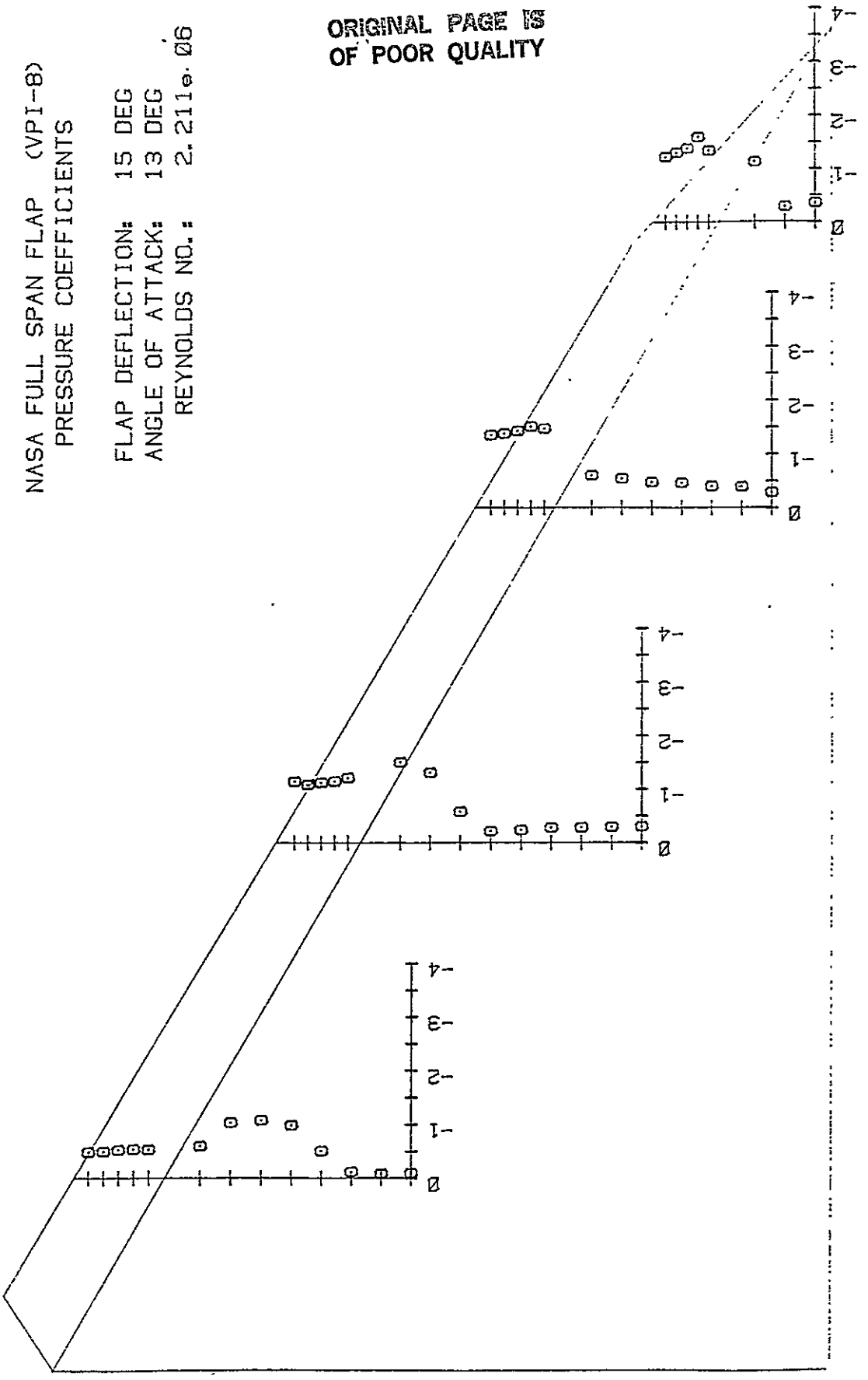

FIGURE 15

NASA FULL SPAN FLAP (VPI-8)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 15 DEG
ANGLE OF ATTACK: 14 DEG
REYNOLDS NO.: 2.198e Ø6

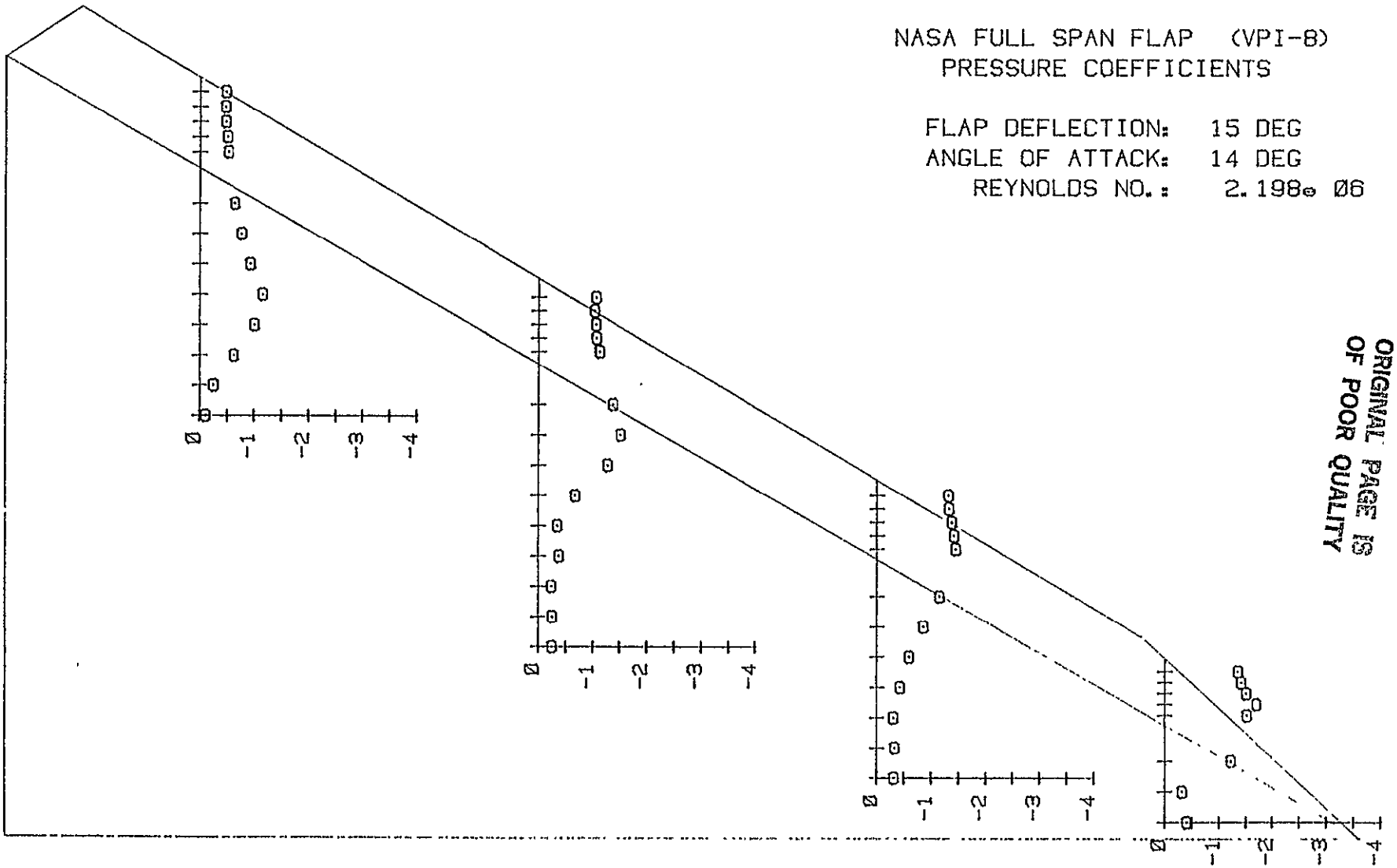

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FIGURE 16

NASA FULL SPAN FLAP (VPI-8)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 15 DEG
ANGLE OF ATTACK: 15 DEG
REYNOLDS NO.: 2.189e Ø6

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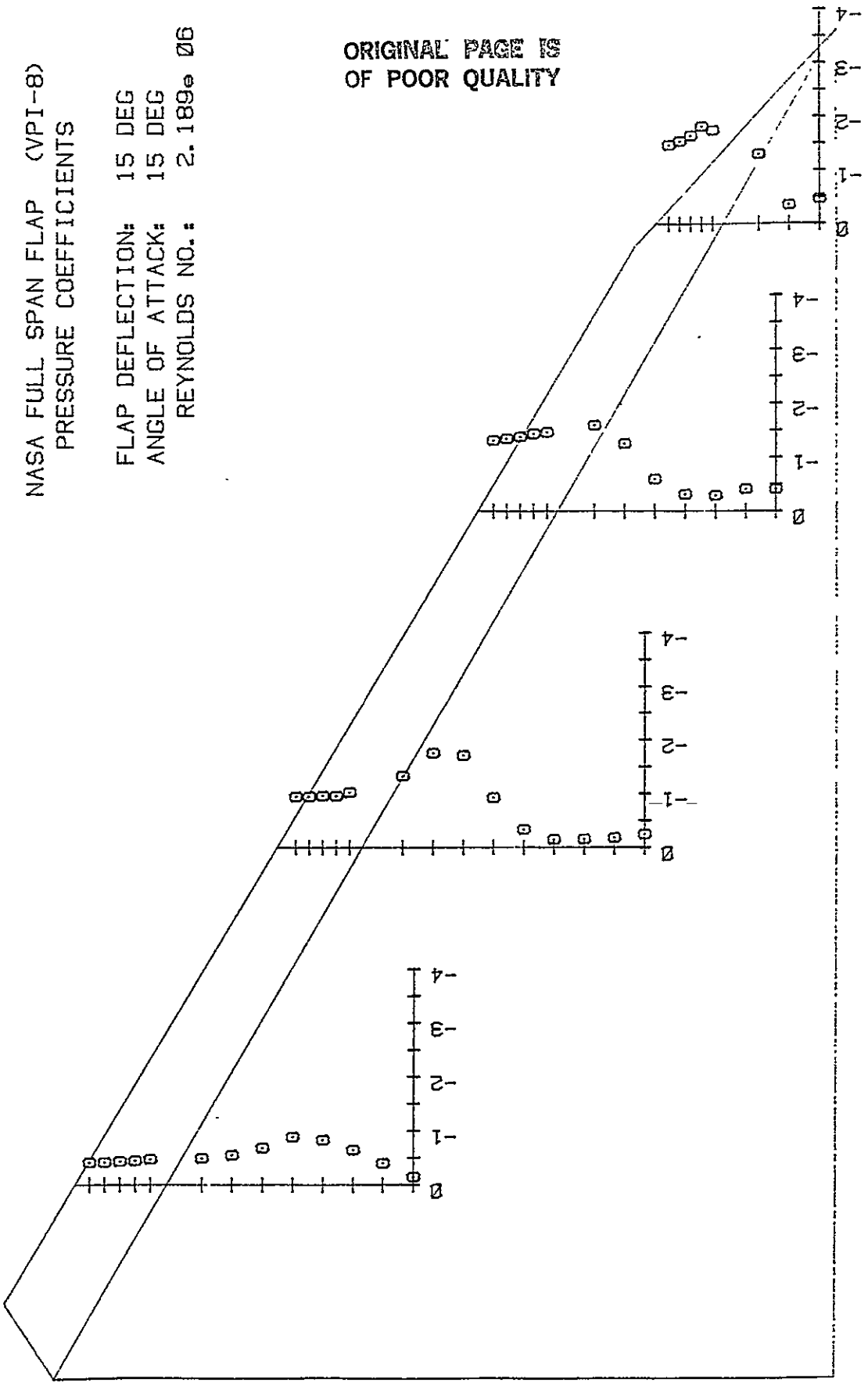

FIGURE 17

CROPPED CONSTANT CHORD FLAP
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 26 DEG
ANGLE OF ATTACK: 5 DEG
REYNOLDS NO.: 2.235e 06

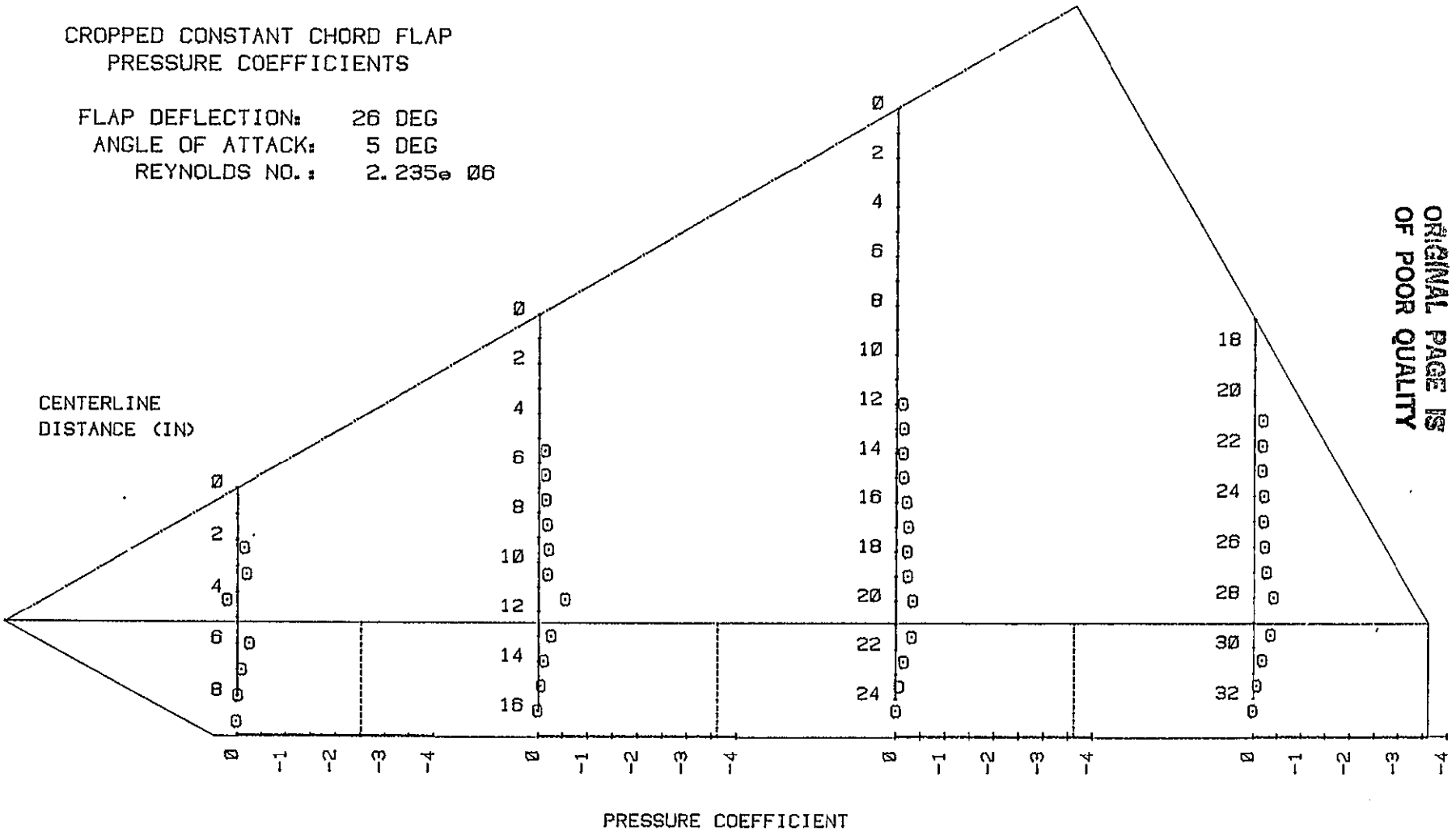

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FIGURE 18

CROPPED CONSTANT CHORD FLAP
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 26 DEG
ANGLE OF ATTACK: 10 DEG
REYNOLDS NO.: 2.232e 06

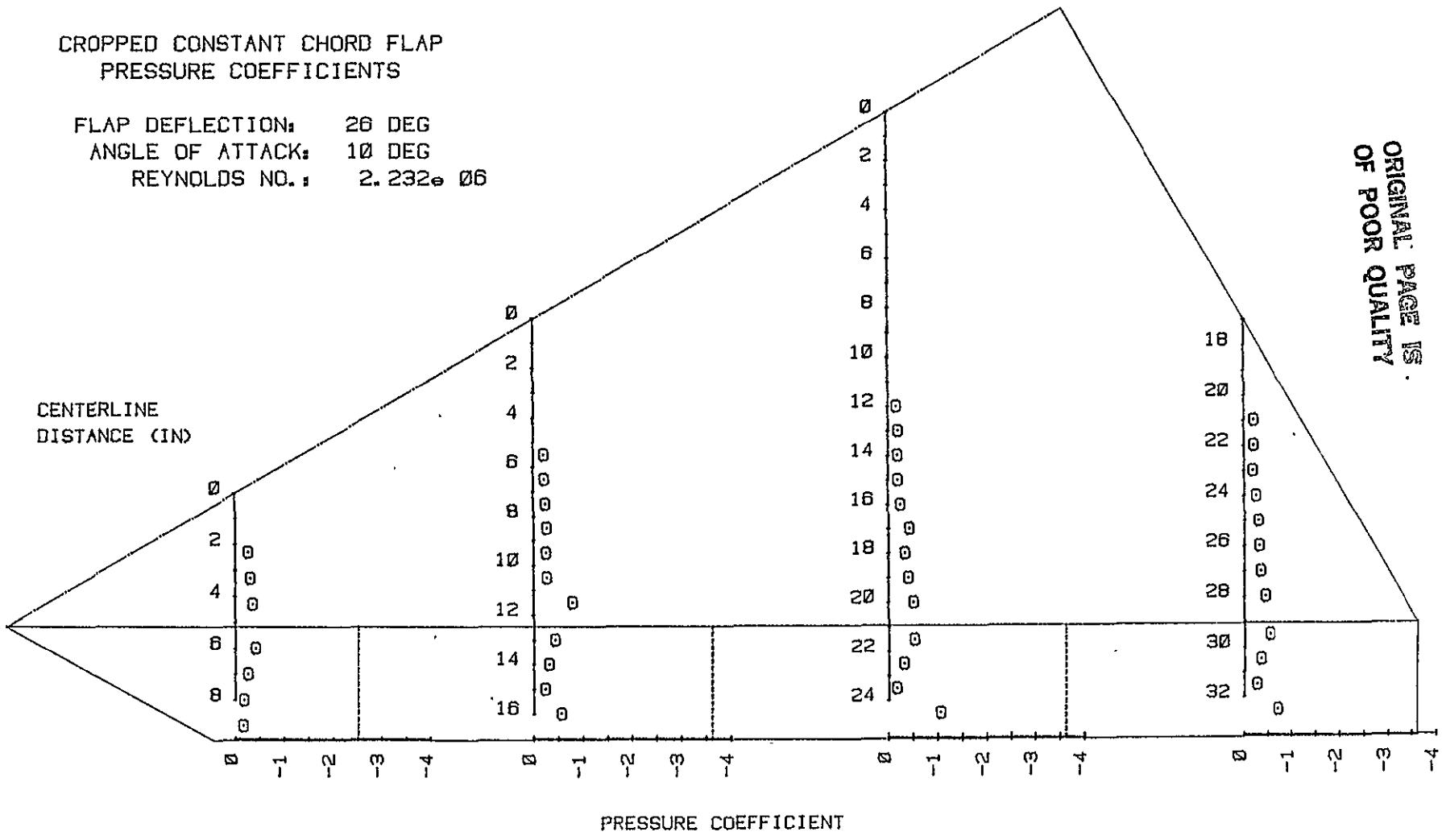

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FIGURE 19

CROPPED CONSTANT CHORD FLAP
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 26 DEG
ANGLE OF ATTACK: 15 DEG
REYNOLDS NO.: 2.229e Ø6

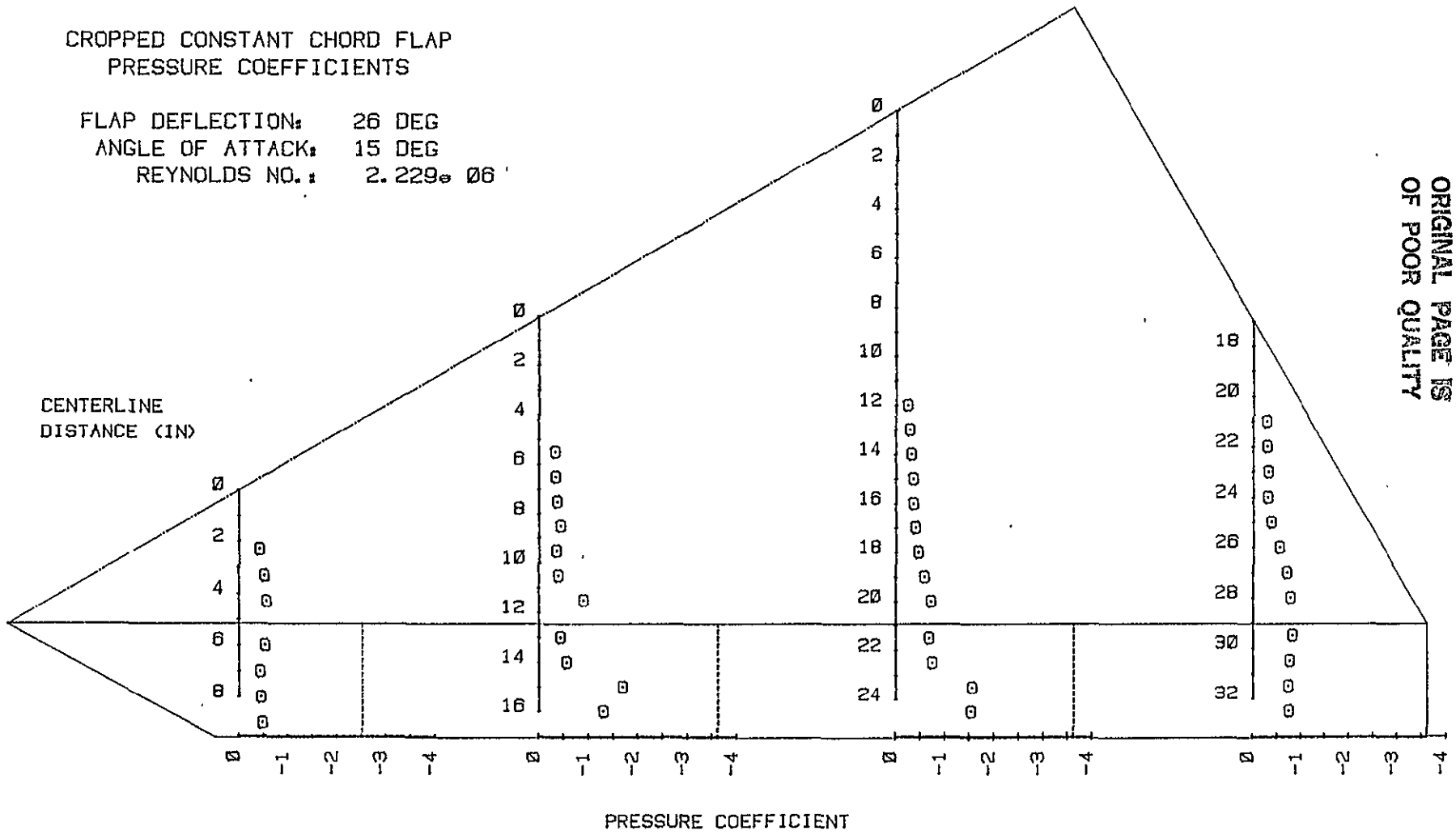

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FIGURE 20

CROPPED CONSTANT CHORD FLAP
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 21 DEG
ANGLE OF ATTACK: 5 DEG
REYNOLDS NO.: 2.242e Ø6

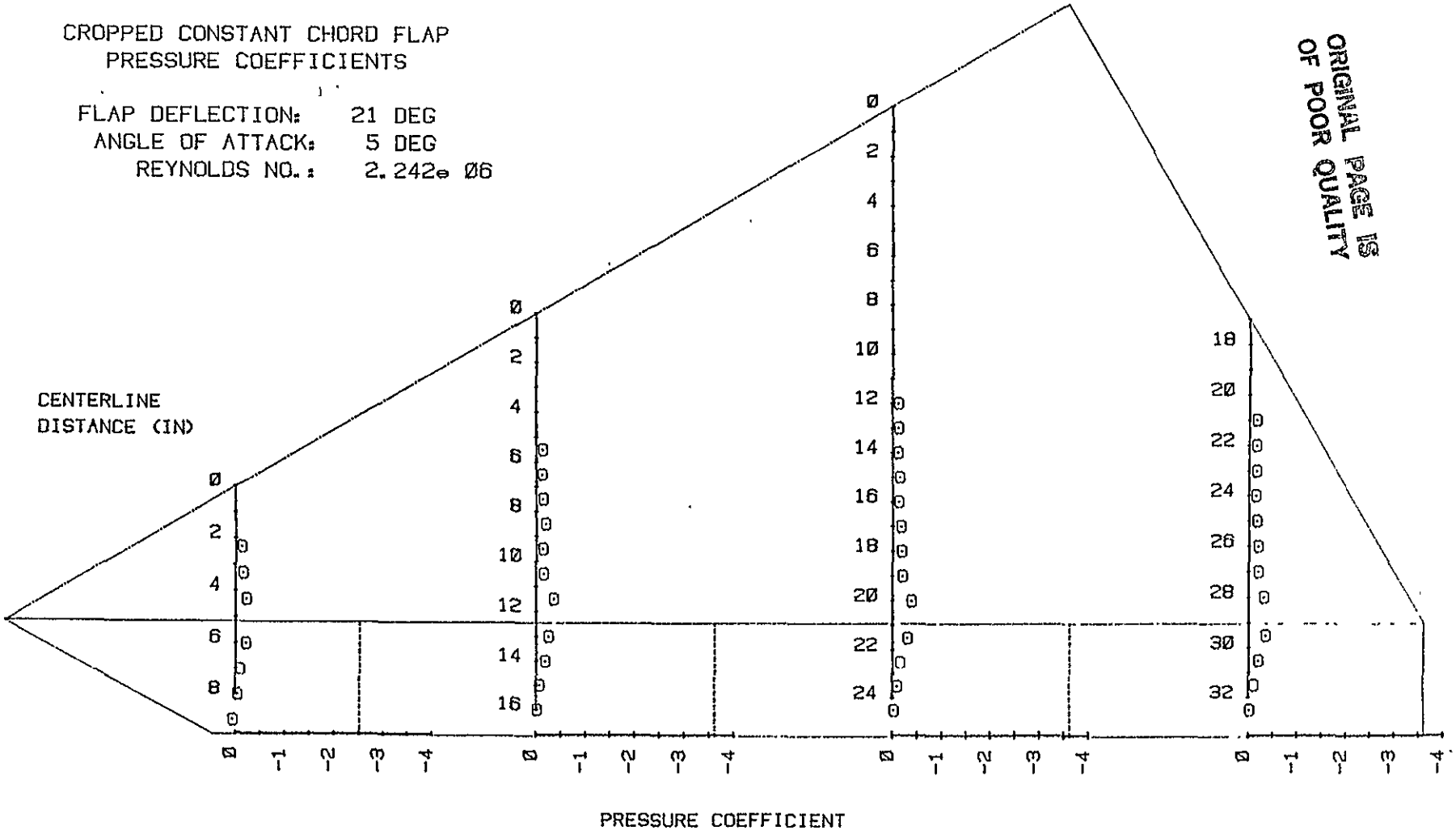

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FIGURE 21

CROPPED CONSTANT CHORD FLAP
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 21 DEG
ANGLE OF ATTACK: 10 DEG
REYNOLDS NO.: 2.231e 06

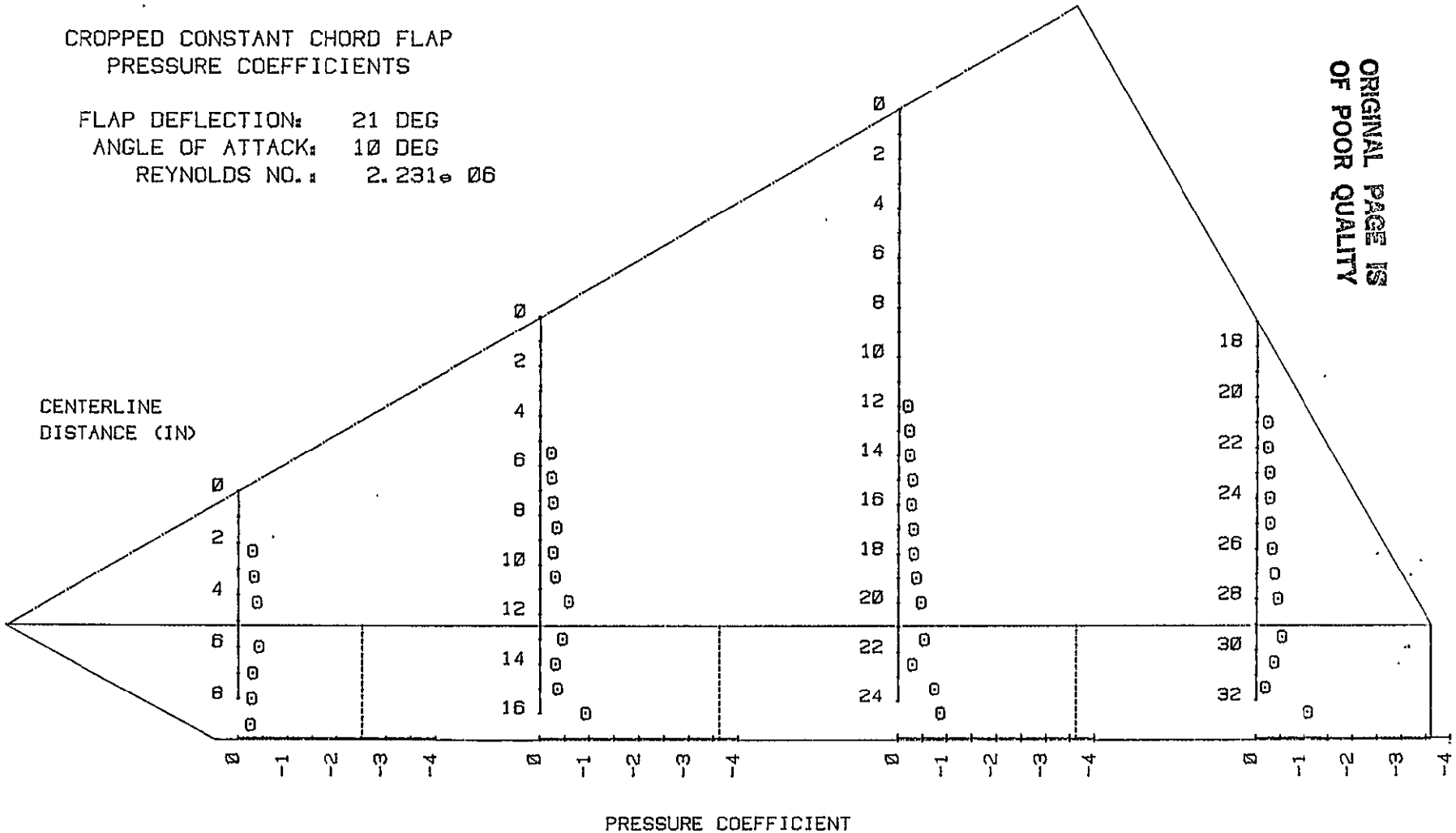

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FIGURE 22

CROPPED CONSTANT CHORD FLAP
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 21 DEG
ANGLE OF ATTACK: 15 DEG
REYNOLDS NO.: 2.240e 06

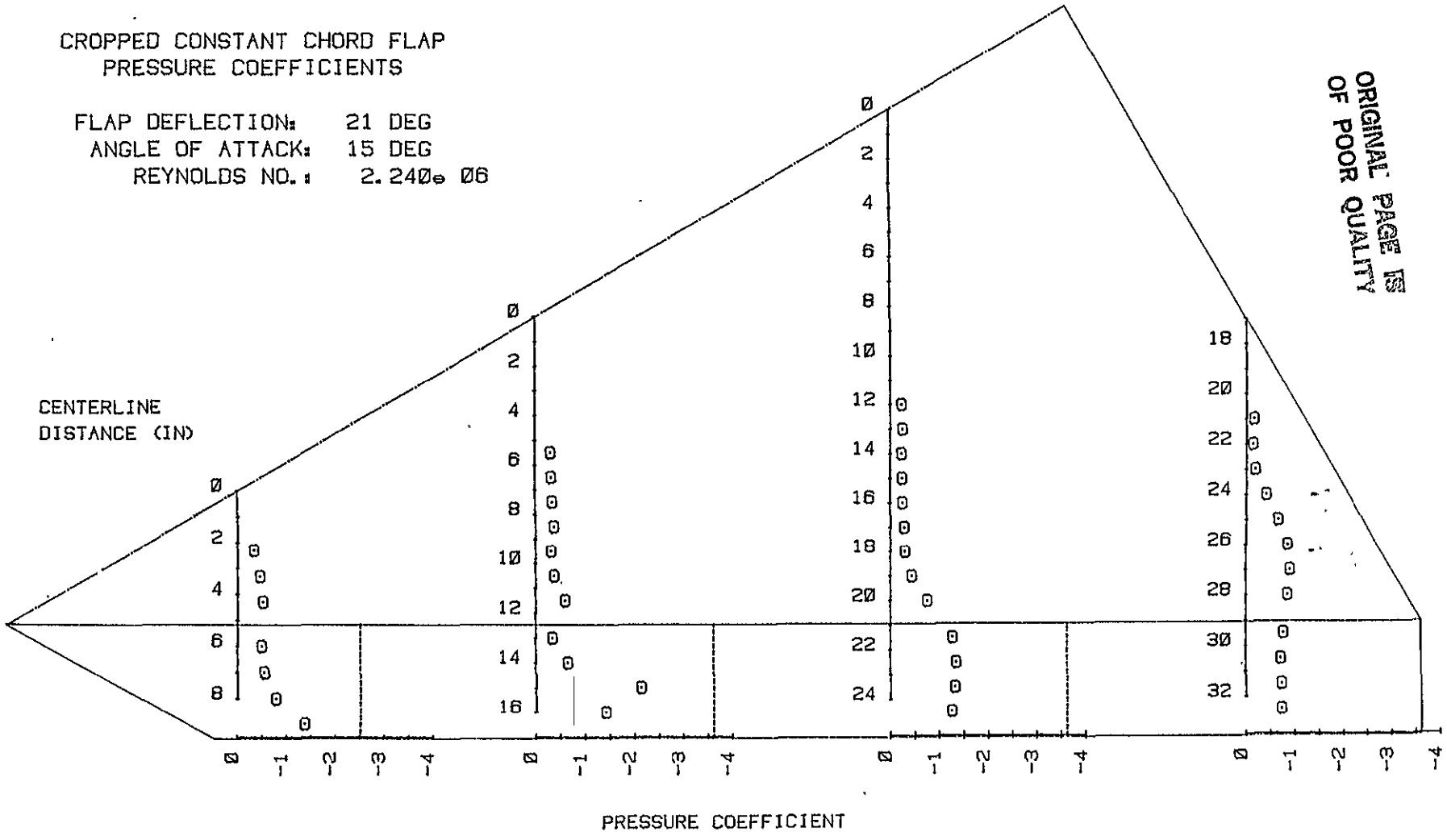

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FIGURE 23

CROPPED CONSTANT CHORD FLAP
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 31 DEG
ANGLE OF ATTACK: 5 DEG
REYNOLDS NO.: 2.166e 06

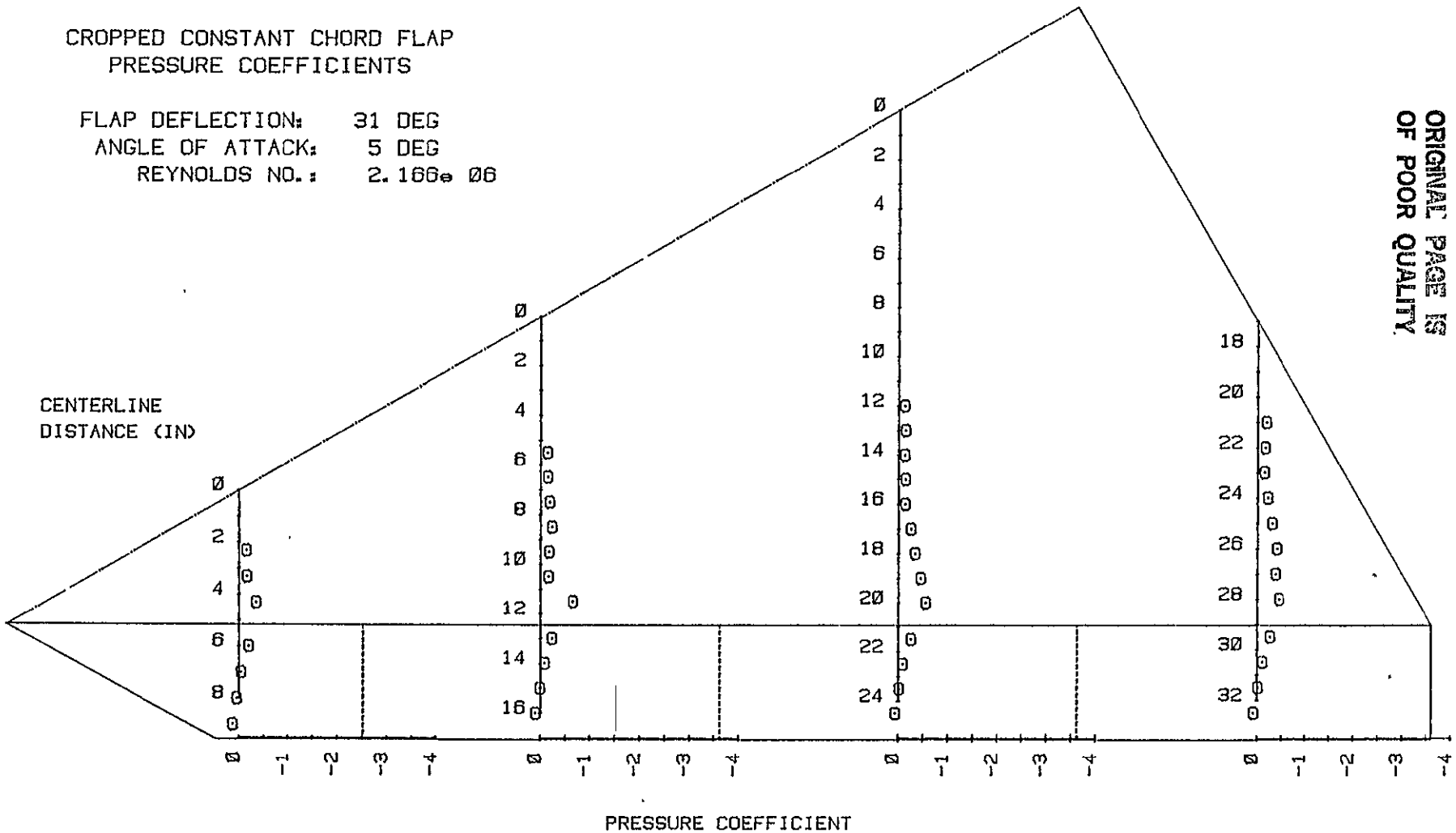

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FIGURE 24

CROPPED CONSTANT CHORD FLAP
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 31 DEG
ANGLE OF ATTACK: 10 DEG
REYNOLDS NO.: 2.159e 06

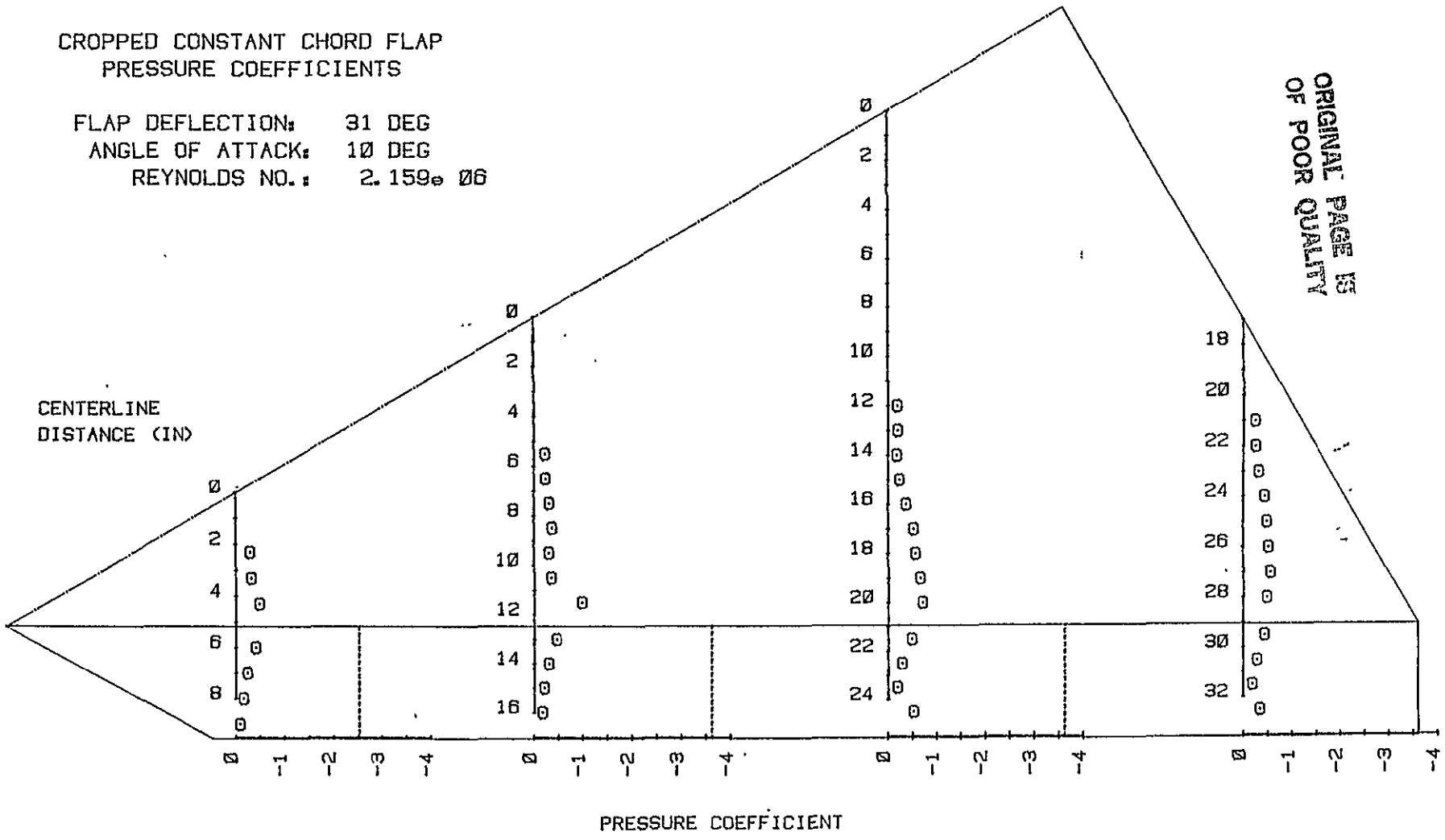

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FIGURE 25

CROPPED CONSTANT CHORD FLAP
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 31 DEG
ANGLE OF ATTACK: 15 DEG
REYNOLDS NO.: 2.173e Ø6

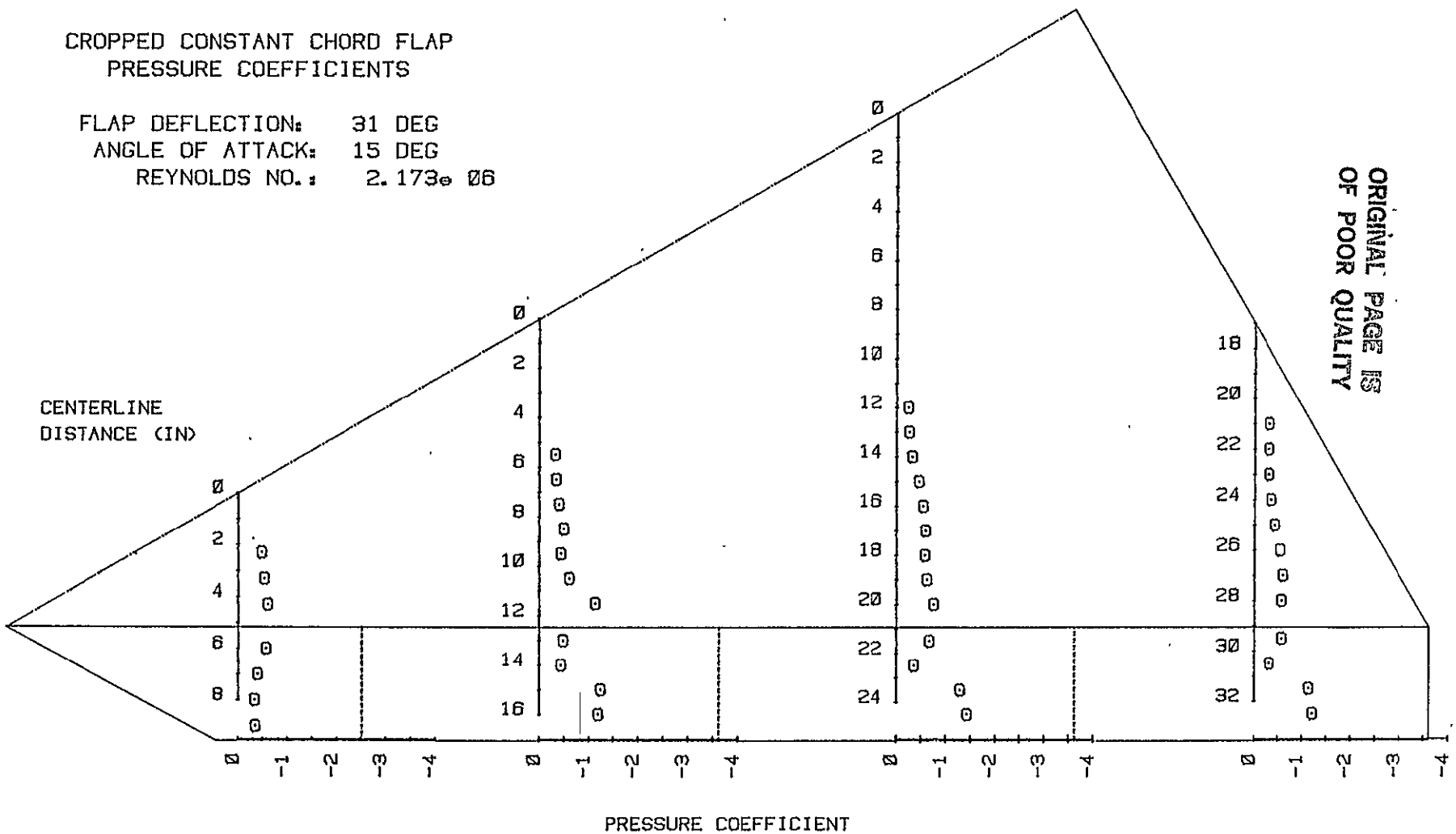

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FIGURE 26

NASA FULL SPAN FLAP (VPI-8)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 0 DEG
REYNOLDS NO.: 2.190E 06

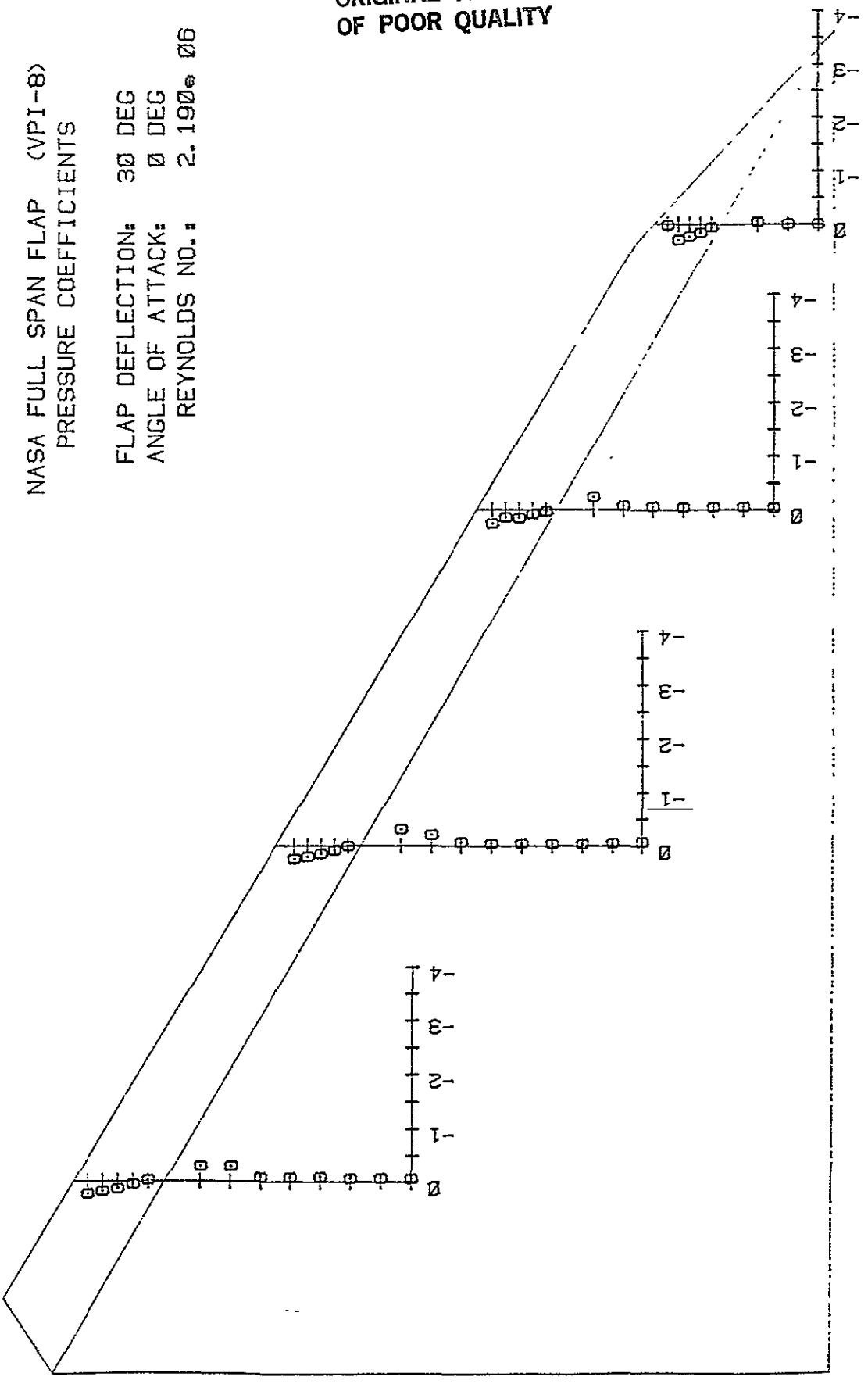

FIGURE 27

NASA FULL SPAN FLAP (VPI-8)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 2 DEG
REYNOLDS NO.: 2.195e 06

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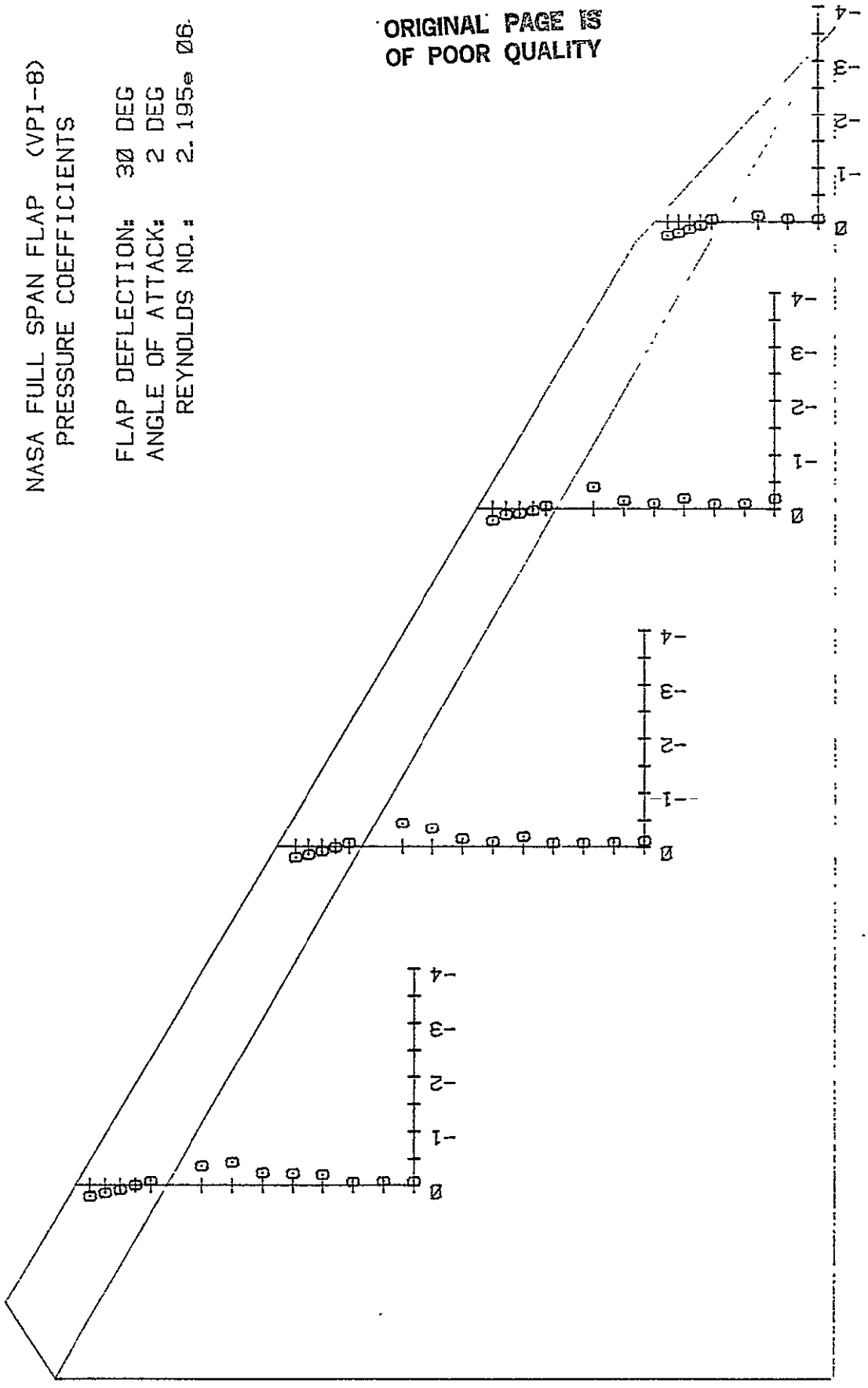

FIGURE 28

NASA FULL SPAN FLAP (VPI-8)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 4 DEG
REYNOLDS NO.: 2.192e 06

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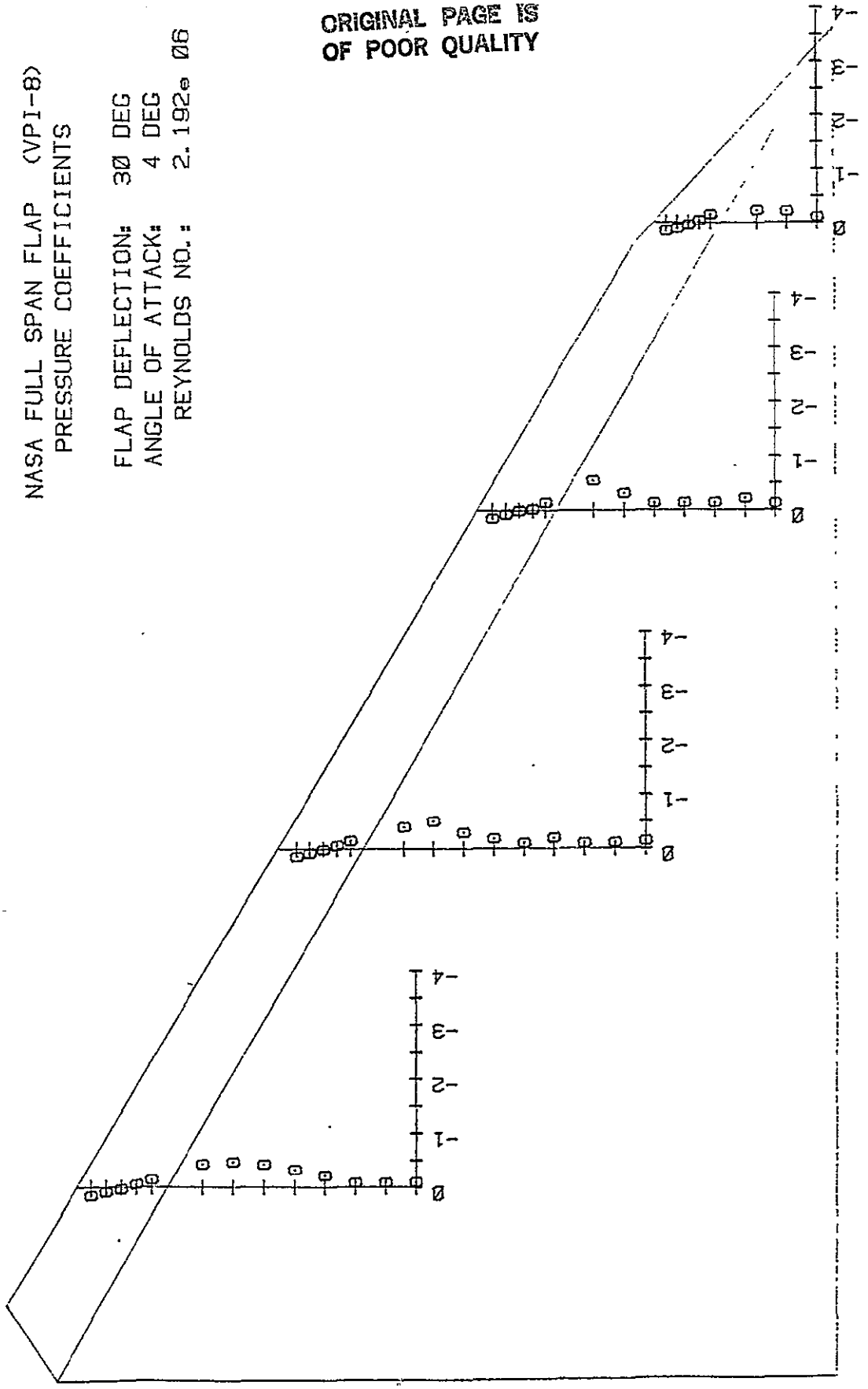

FIGURE 29

NASA FULL SPAN FLAP (VPI-8)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 6 DEG
REYNOLDS NO.: 2.199e 06

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FIGURE 30

NASA FULL SPAN FLAP (VPI-8)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 8 DEG
REYNOLDS NO.: 2.191e 06

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FIGURE 31

NASA FULL SPAN FLAP (VPI-8)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 10 DEG
REYNOLDS NO.: 2.211e 06

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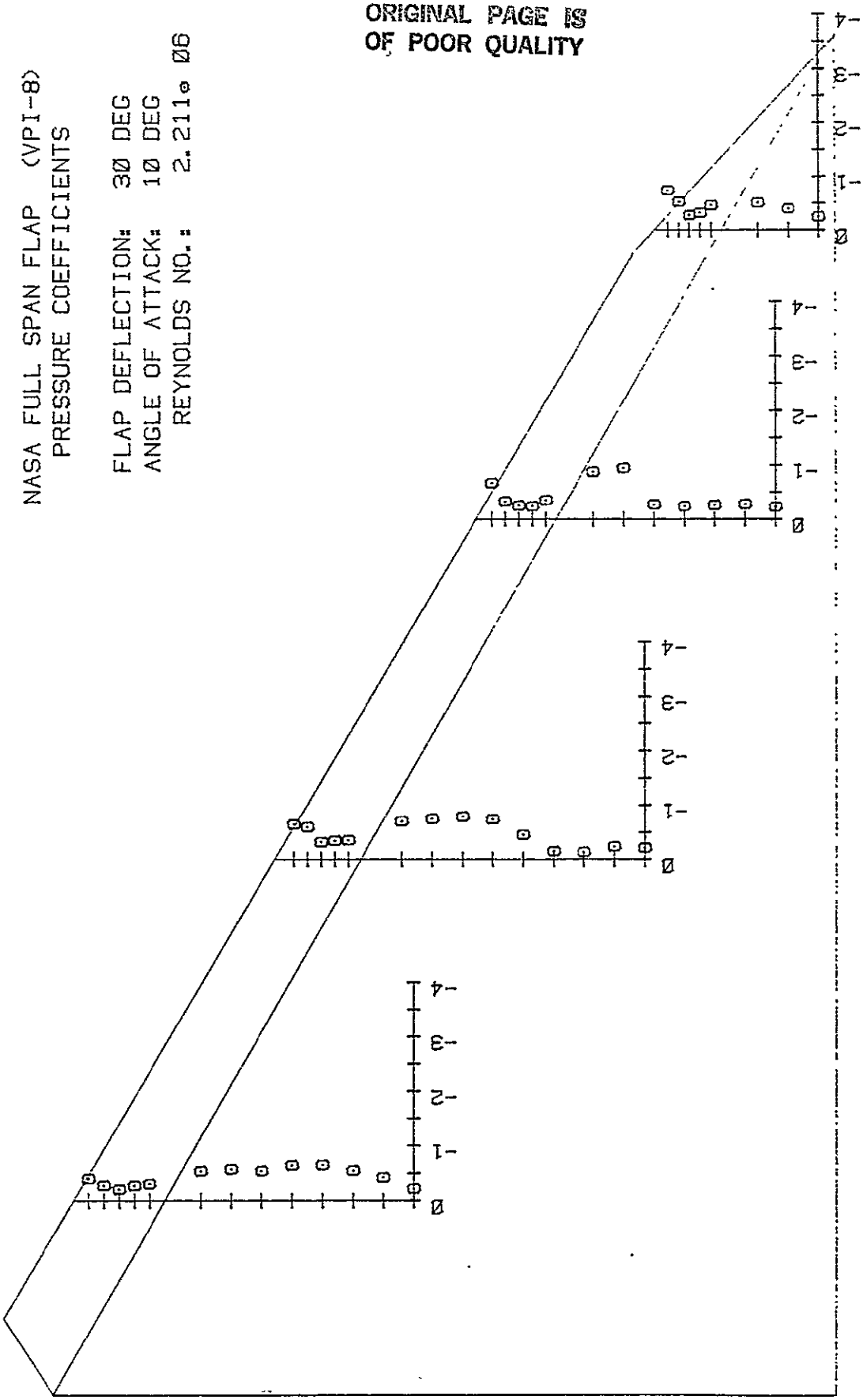

FIGURE 32

NASA FULL SPAN FLAP (VPI-8)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 11 DEG
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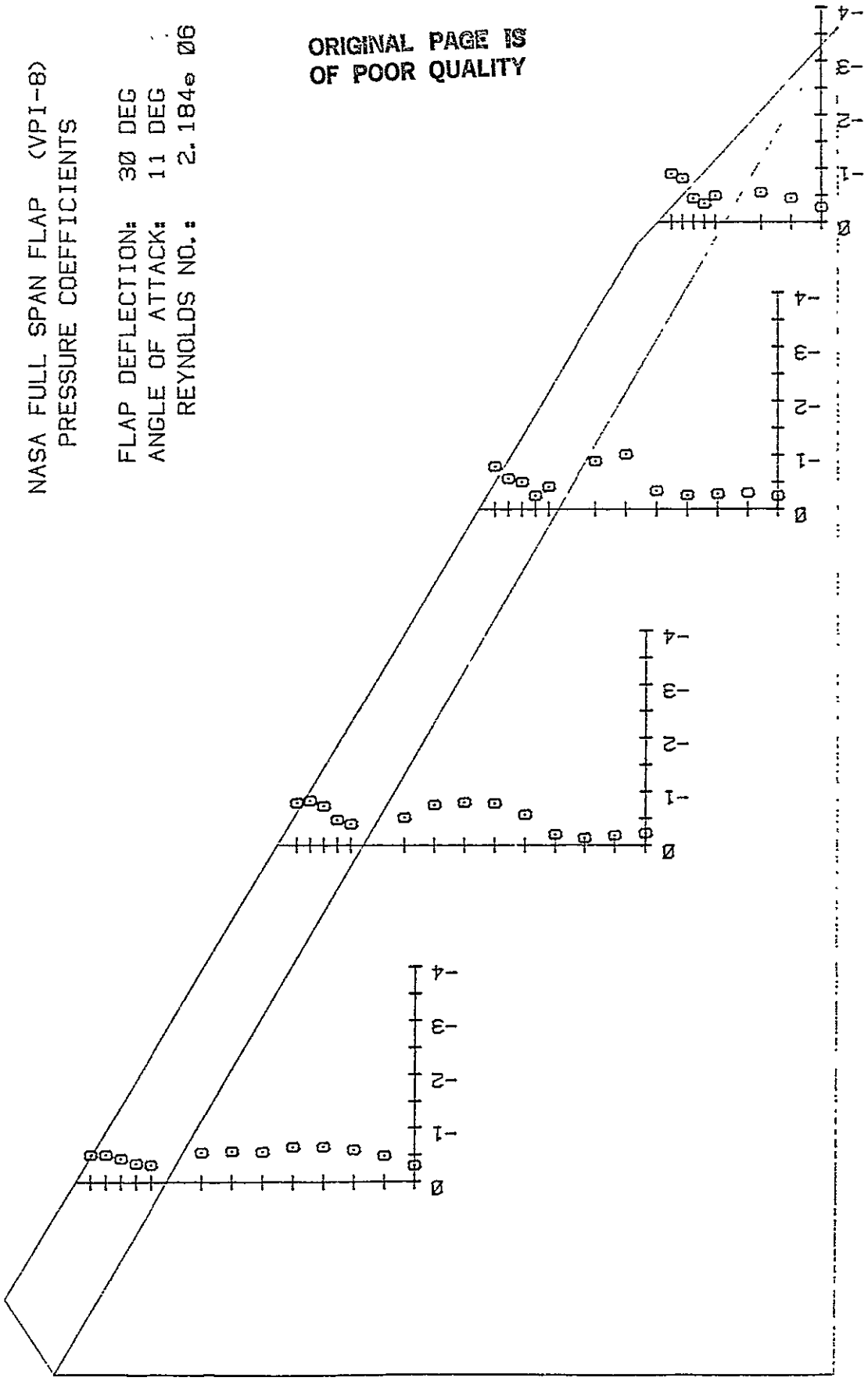

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FIGURE 33

NASA FULL SPAN FLAP (VPI-8)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK: 12 DEG
REYNOLDS NO.: 2.190e 06

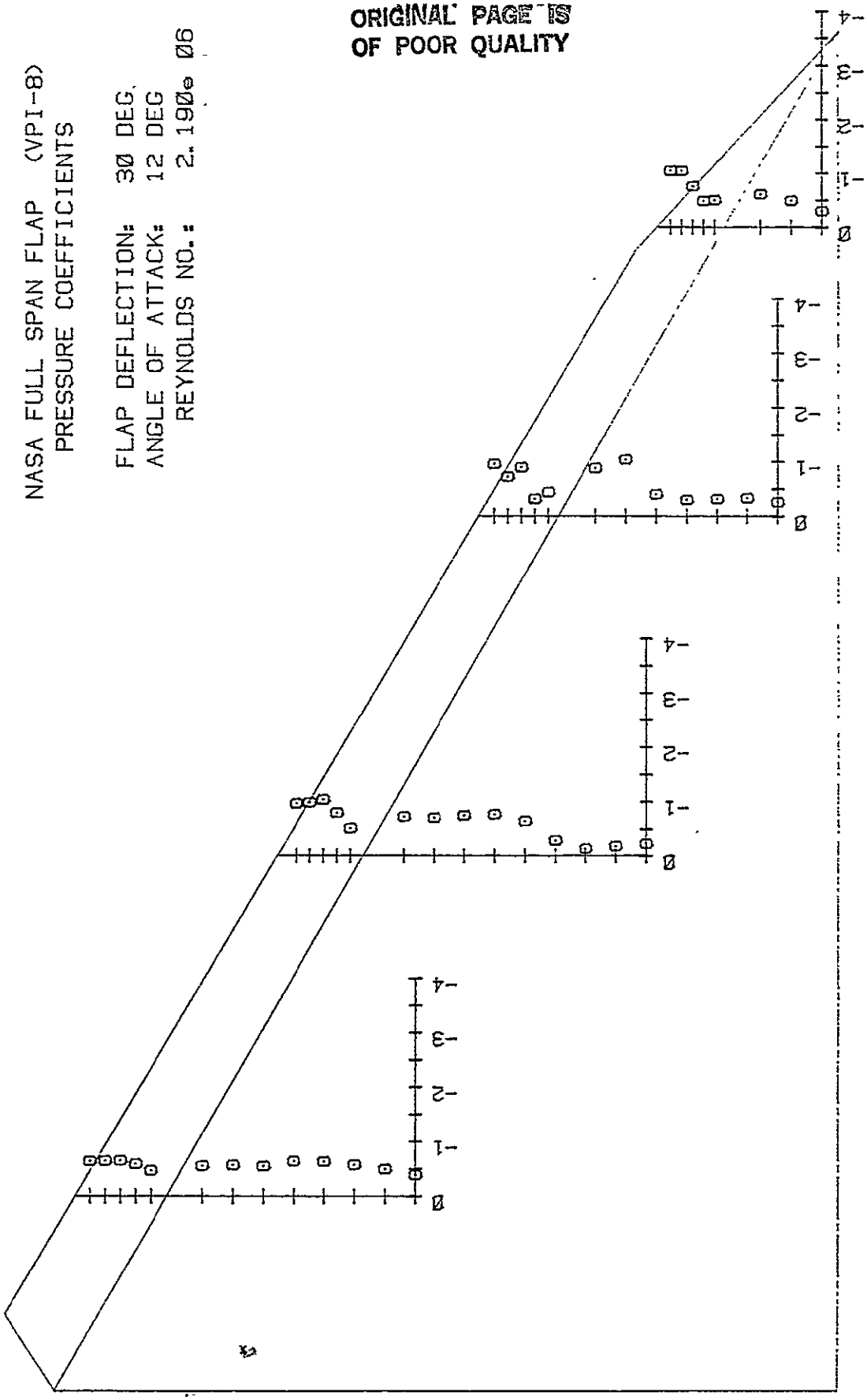

FIGURE 34

NASA FULL SPAN FLAP (VPI-8)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 13 DEG
REYNOLDS NO.: 2.190e 06

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FIGURE 35

NASA FULL SPAN FLAP (VPI-8)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 14 DEG
REYNOLDS NO.: 2.187e 06

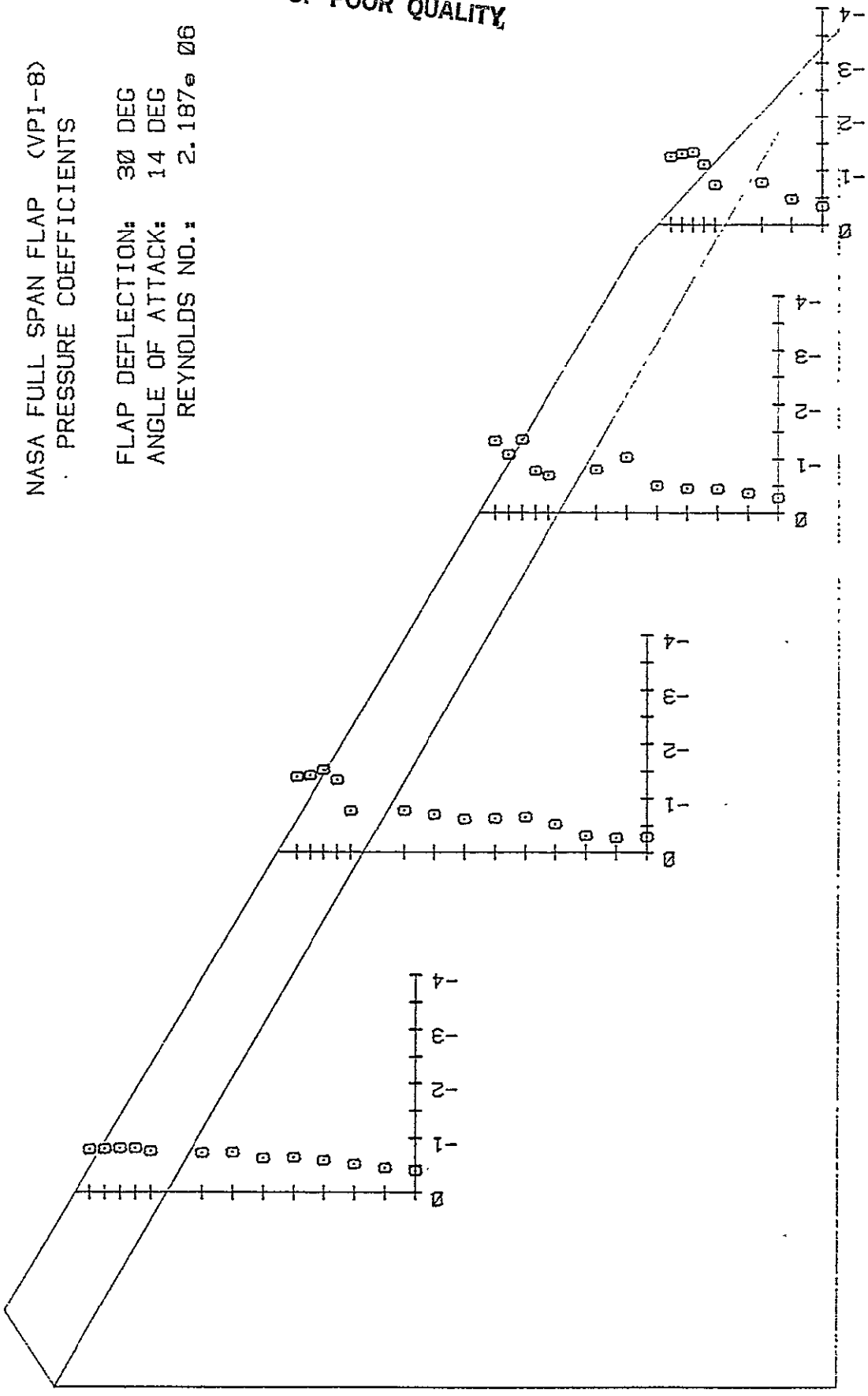

FIGURE 36

NASA FULL SPAN FLAP (VPI-8)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 15 DEG
REYNOLDS NO.: 2.179e Ø6

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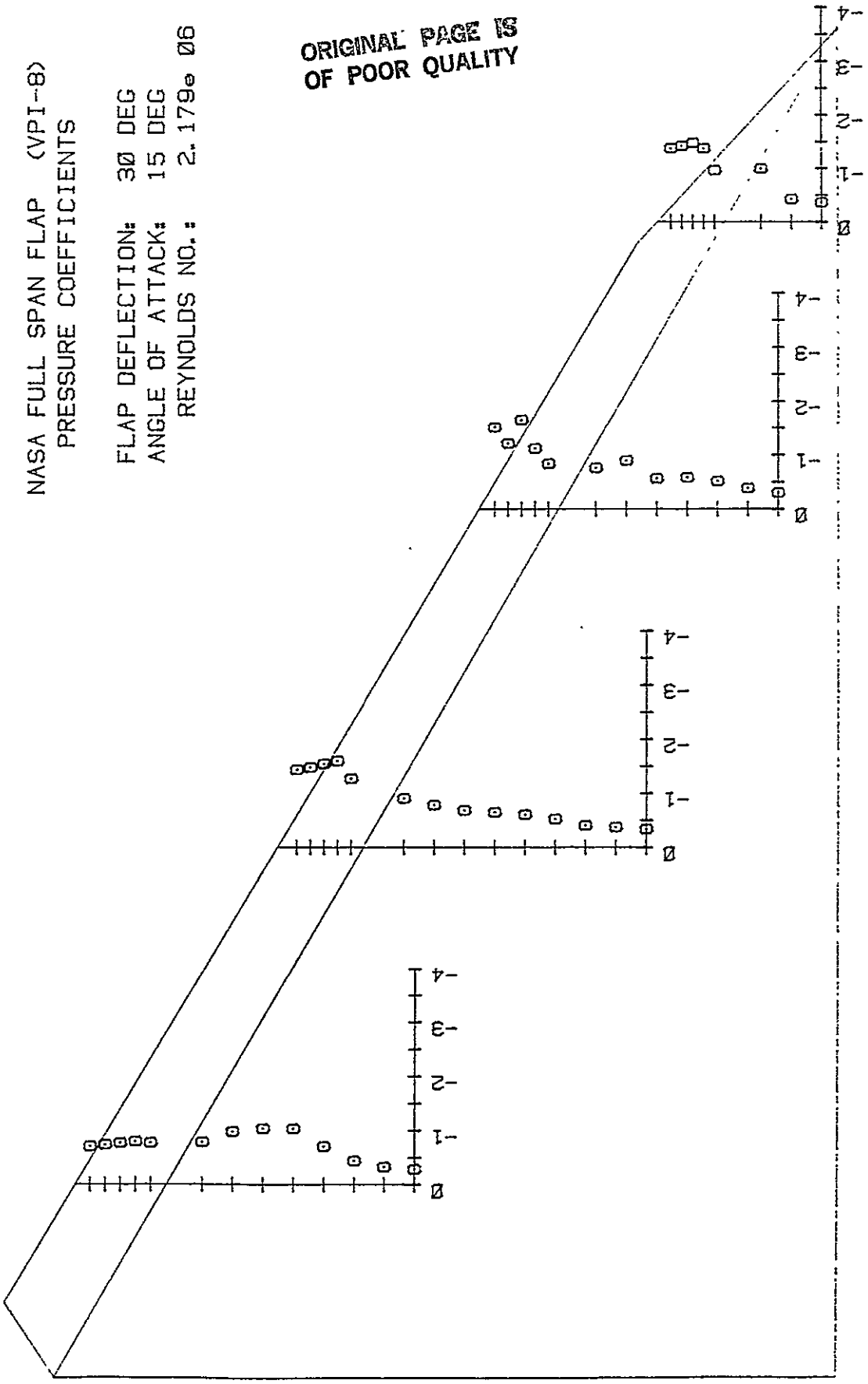

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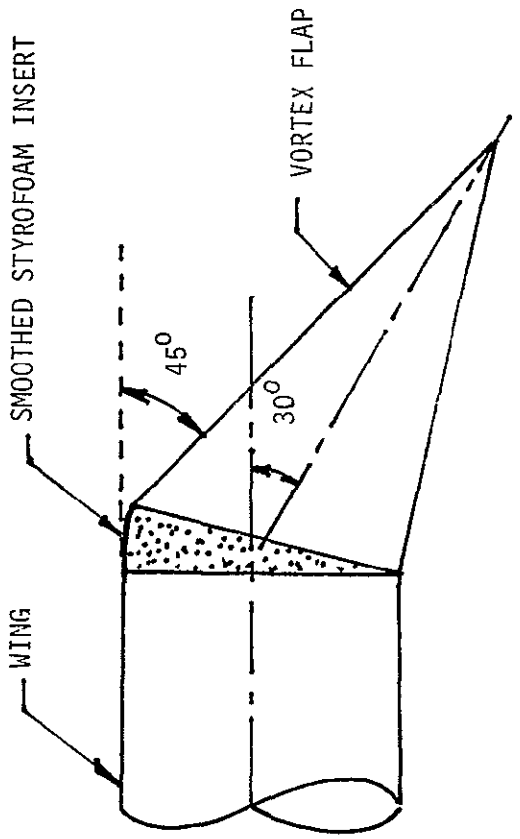

FIGURE 37: SCHEMATIC OF FLAP WITH SMOOTHED HINGE LINE

FIGURE 38

NASA FULL SPAN FLAP (VPI-8)
WITH ROUNDED HINGE LINE
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 8 DEG
REYNOLDS NO.: 1.310e 06

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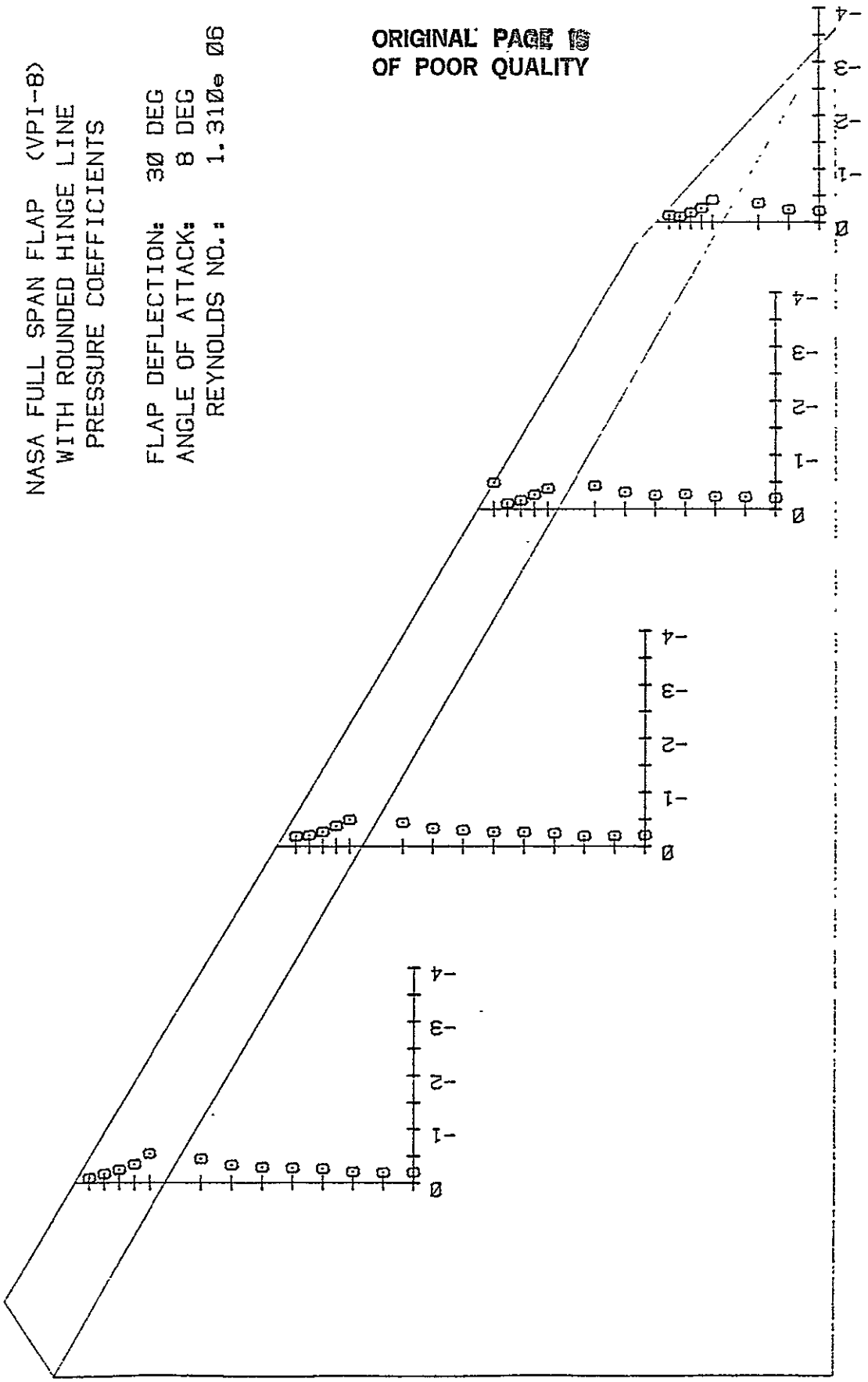

FIGURE 39

NASA FULL SPAN FLAP (VPI-8)
WITH ROUNDED HINGE LINE
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 10 DEG
REYNOLDS NO.: 1.338e 06

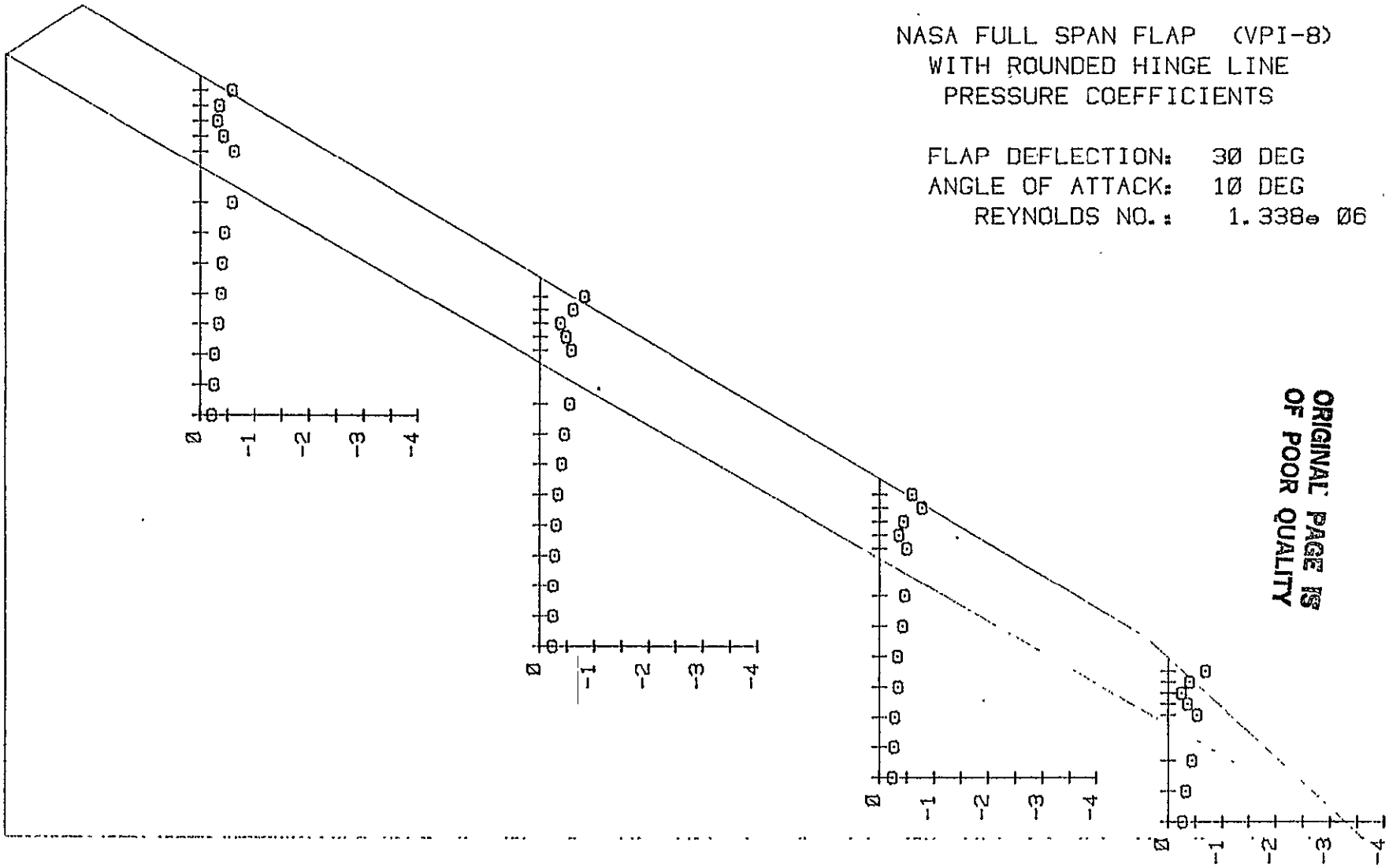

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FIGURE 40

NASA FULL SPAN FLAP (VPI-8)
WITH ROUNDED HINGE LINE
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 11 DEG
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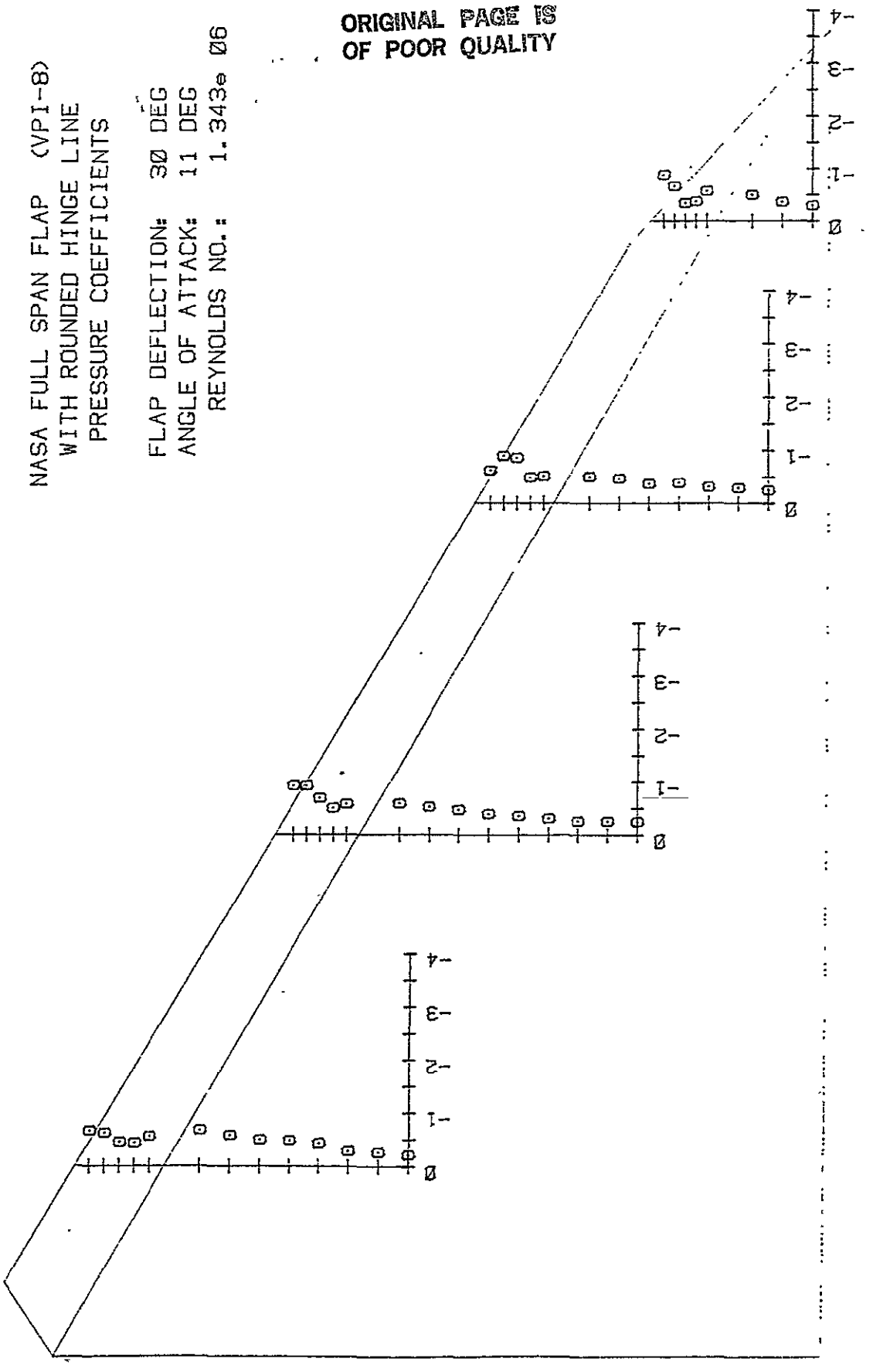

FIGURE 41

NASA FULL SPAN FLAP (VPI-8)
WITH ROUNDED HINGE LINE
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 12 DEG
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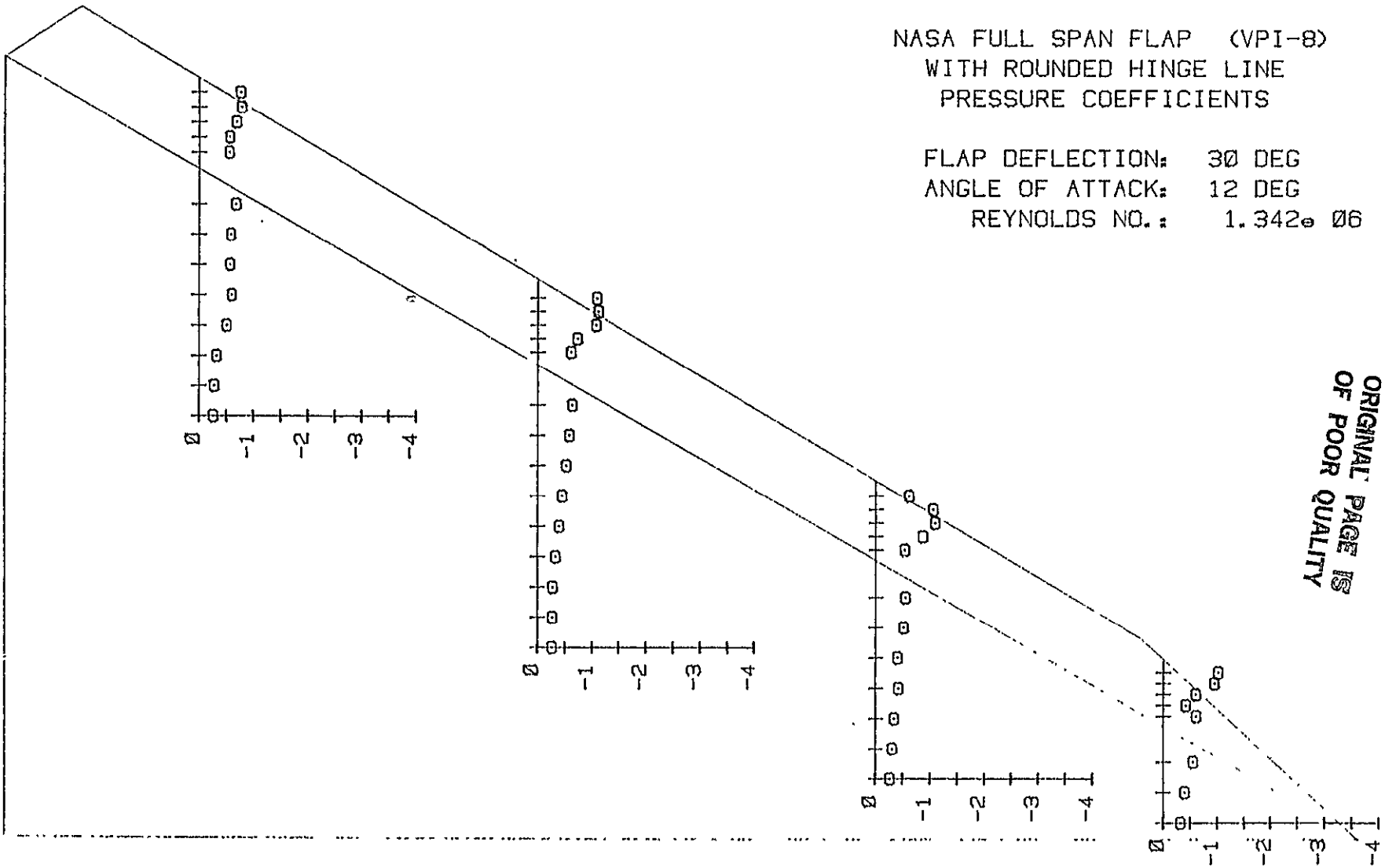

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FIGURE 42

NASA FULL SPAN FLAP (VPI-8)
WITH ROUNDED HINGE LINE
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 13 DEG
REYNOLDS NO.: 1.332e 06

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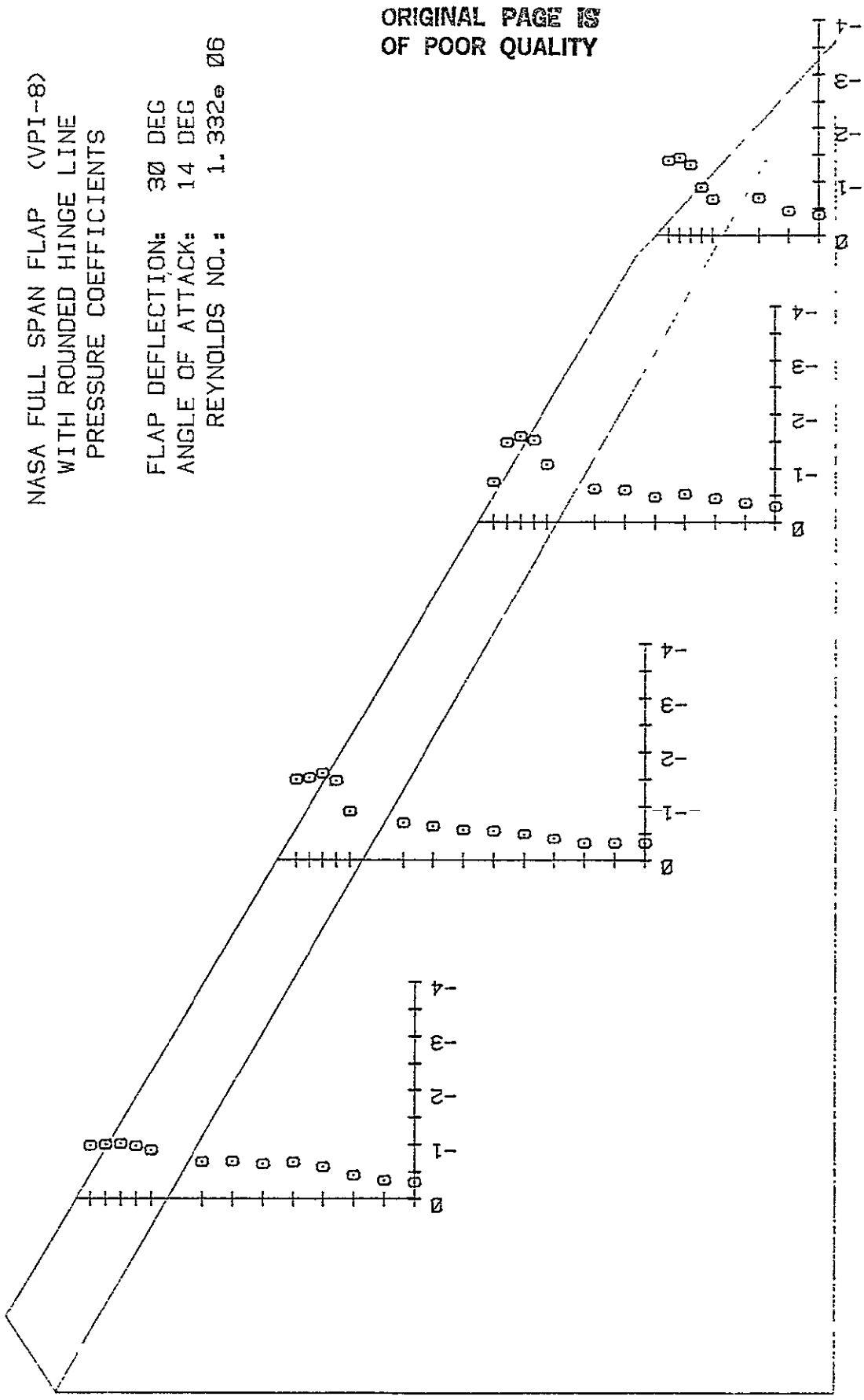

FIGURE 44

NASA FULL SPAN FLAP (VPI-8)
WITH ROUNDED HINGE LINE
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 15 DEG
REYNOLDS NO.: 1.328e 06

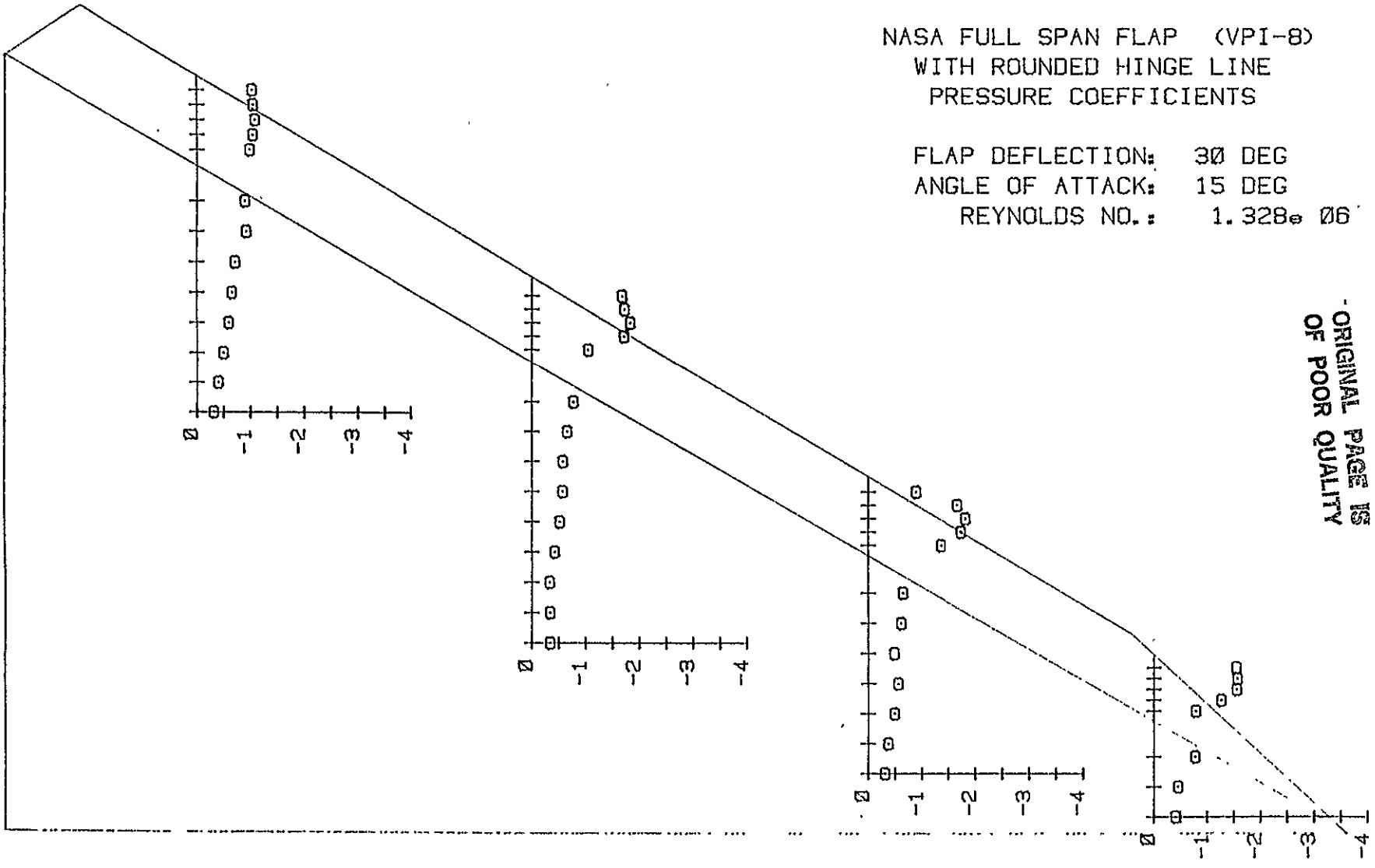

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FIGURE 45

NASA FULL SPAN FLAP (VPI-8)
WITH ROUNDED HINGE LINE
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 16 DEG
REYNOLDS NO.: 1.320e 06

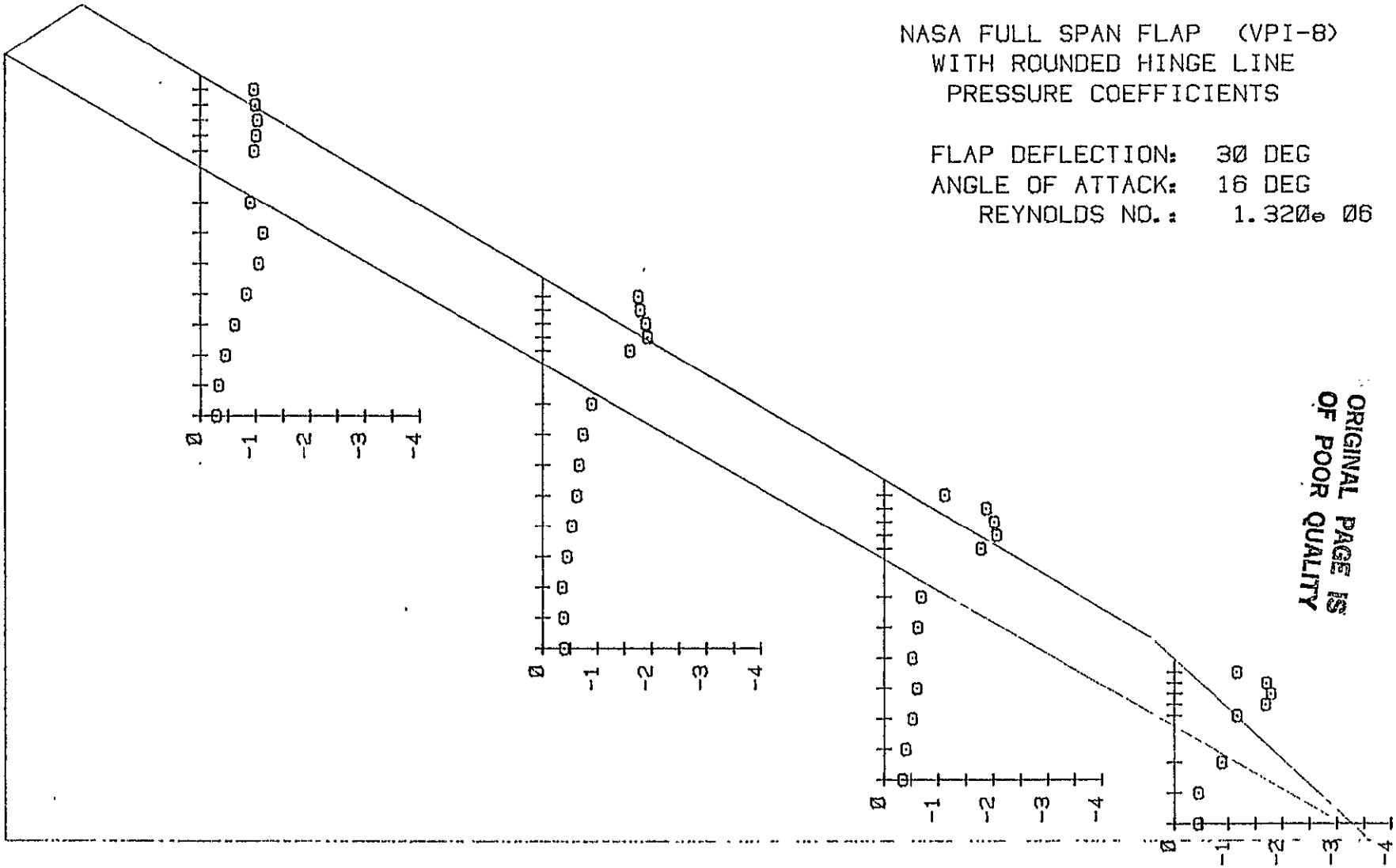

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FIGURE 46

NASA FULL SPAN FLAP (VPI-8)
WITH ROUNDED HINGE LINE
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 18 DEG
REYNOLDS NO.: 1.314e 06

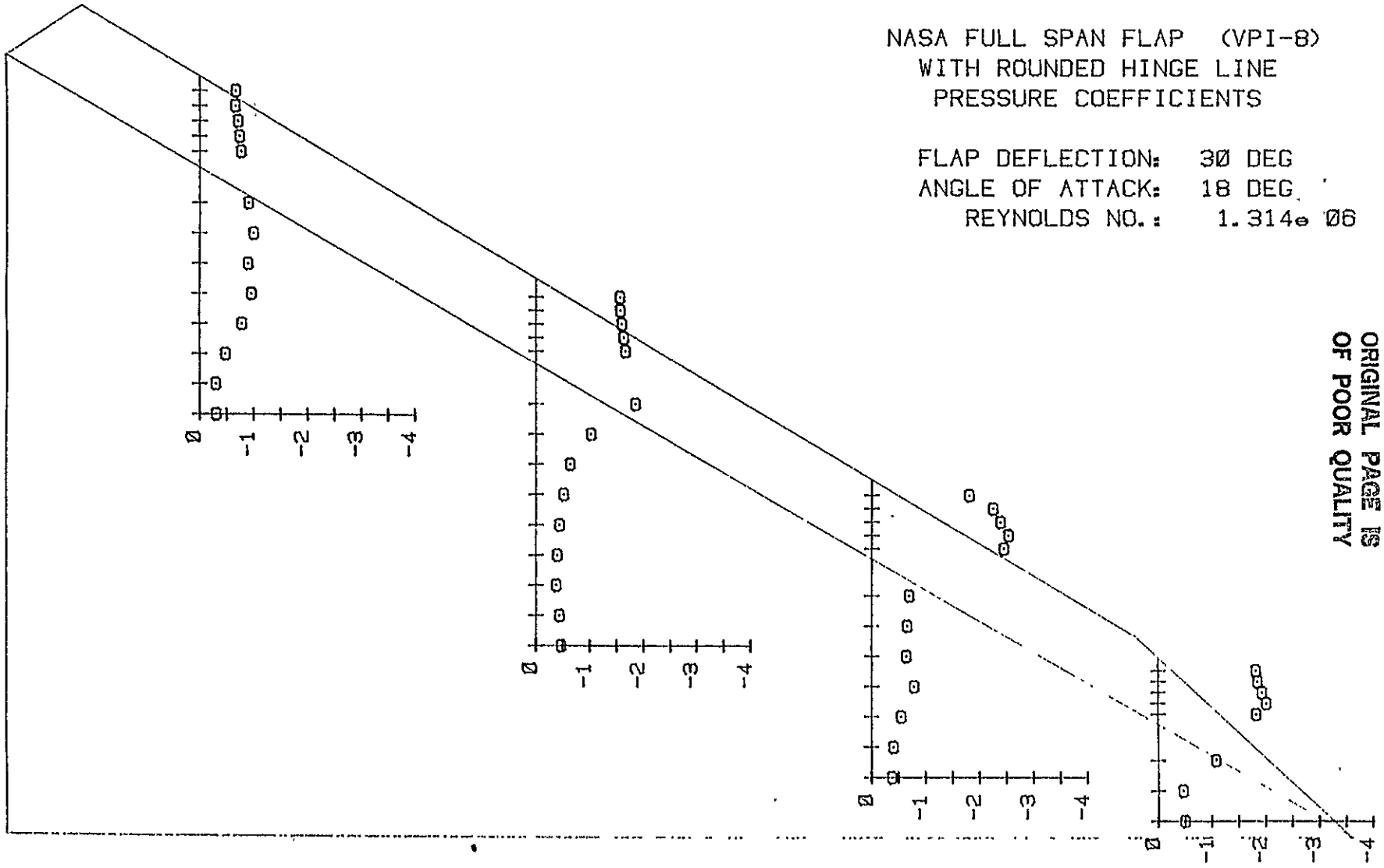

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FIGURE 47

NASA FULL SPAN FLAP (VPI-8)
WITH ROUNDED HINGE LINE
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 20 DEG
REYNOLDS NO.: 1.295e 06

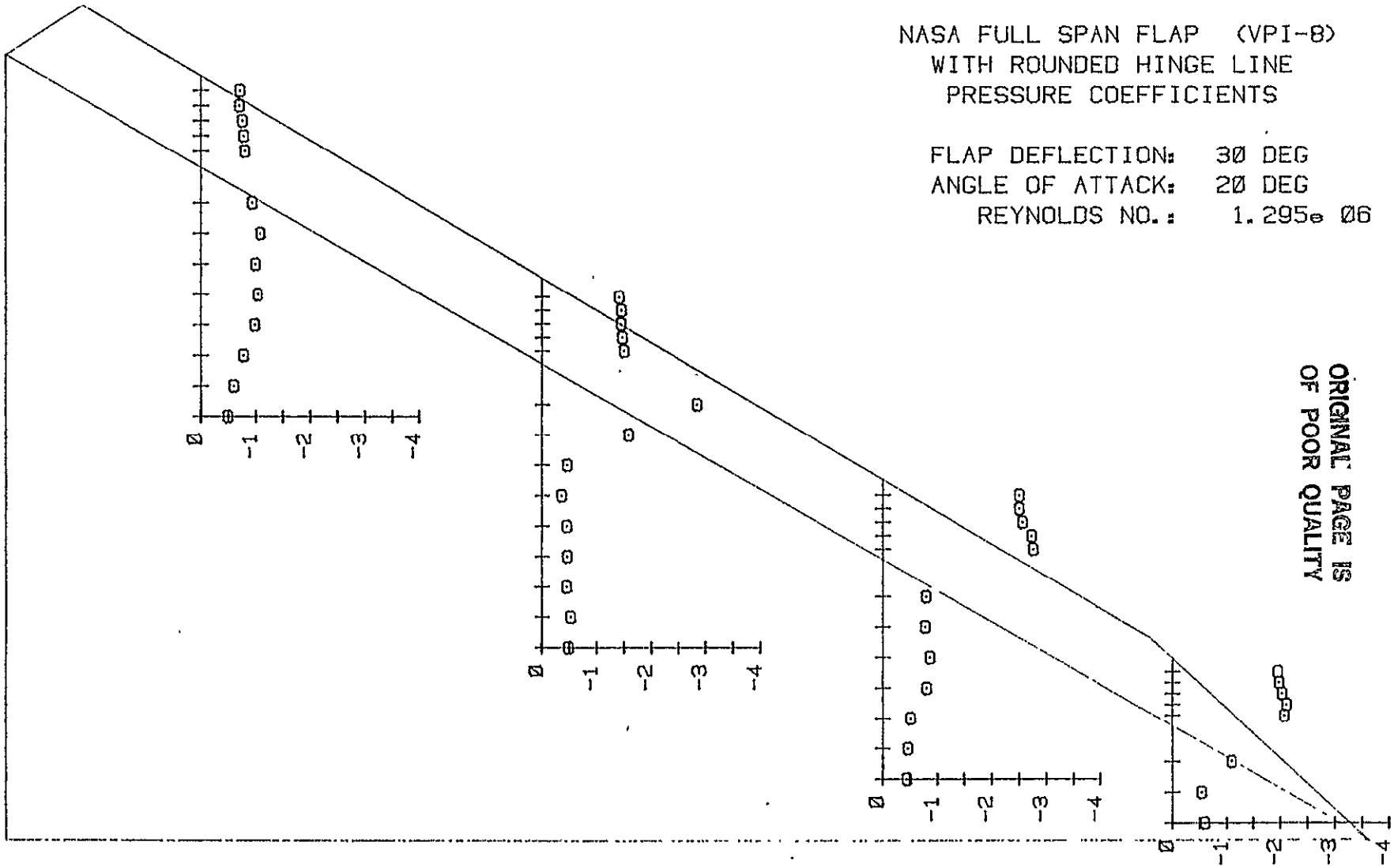

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Figure 48 Possible Effect From Thickness Variation on Vortex Reattachment Position

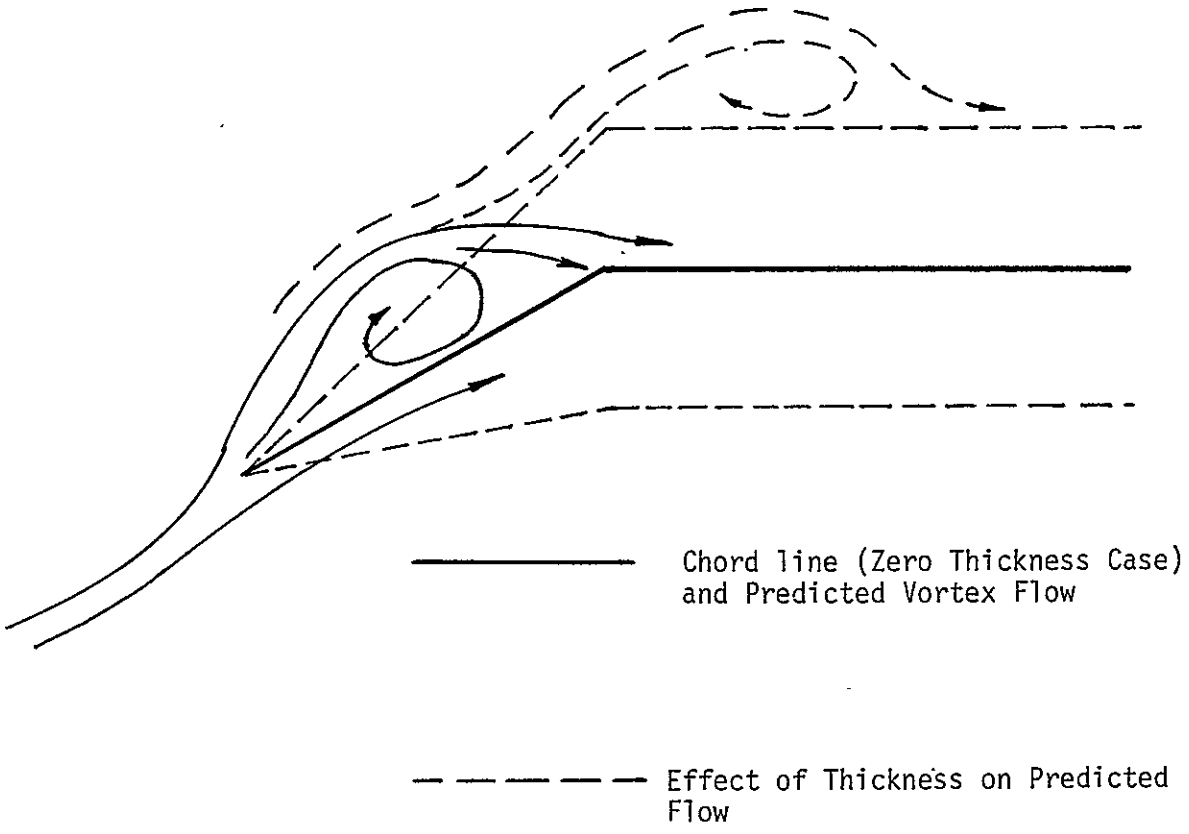

FIGURE 49

NASA PART SPAN FLAP (VPI-10)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 0 DEG
REYNOLDS NO.: 2.236e 06

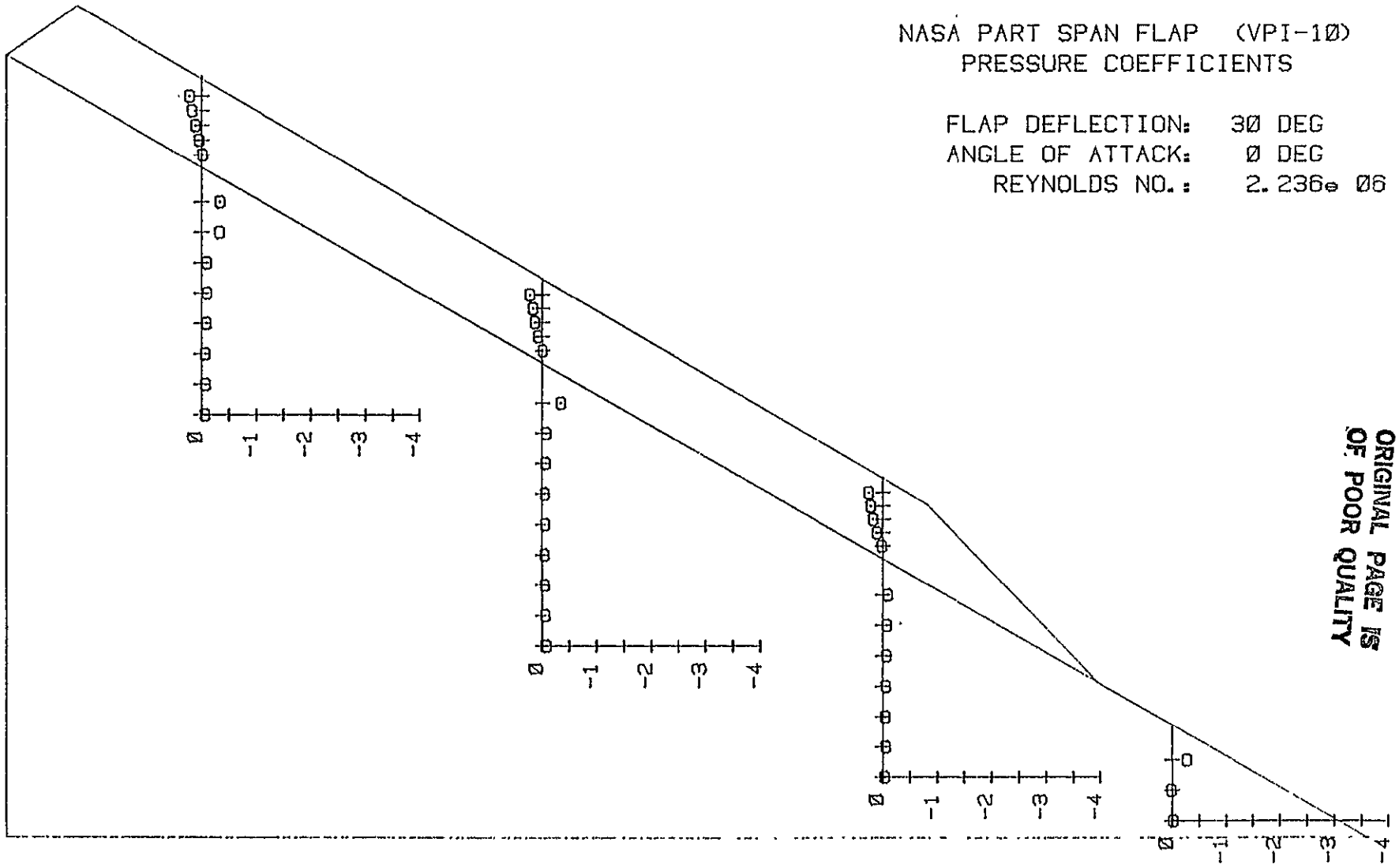

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FIGURE 50

NASA PART SPAN FLAP (VPI-10)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 2 DEG
REYNOLDS NO.: 2.284e 06

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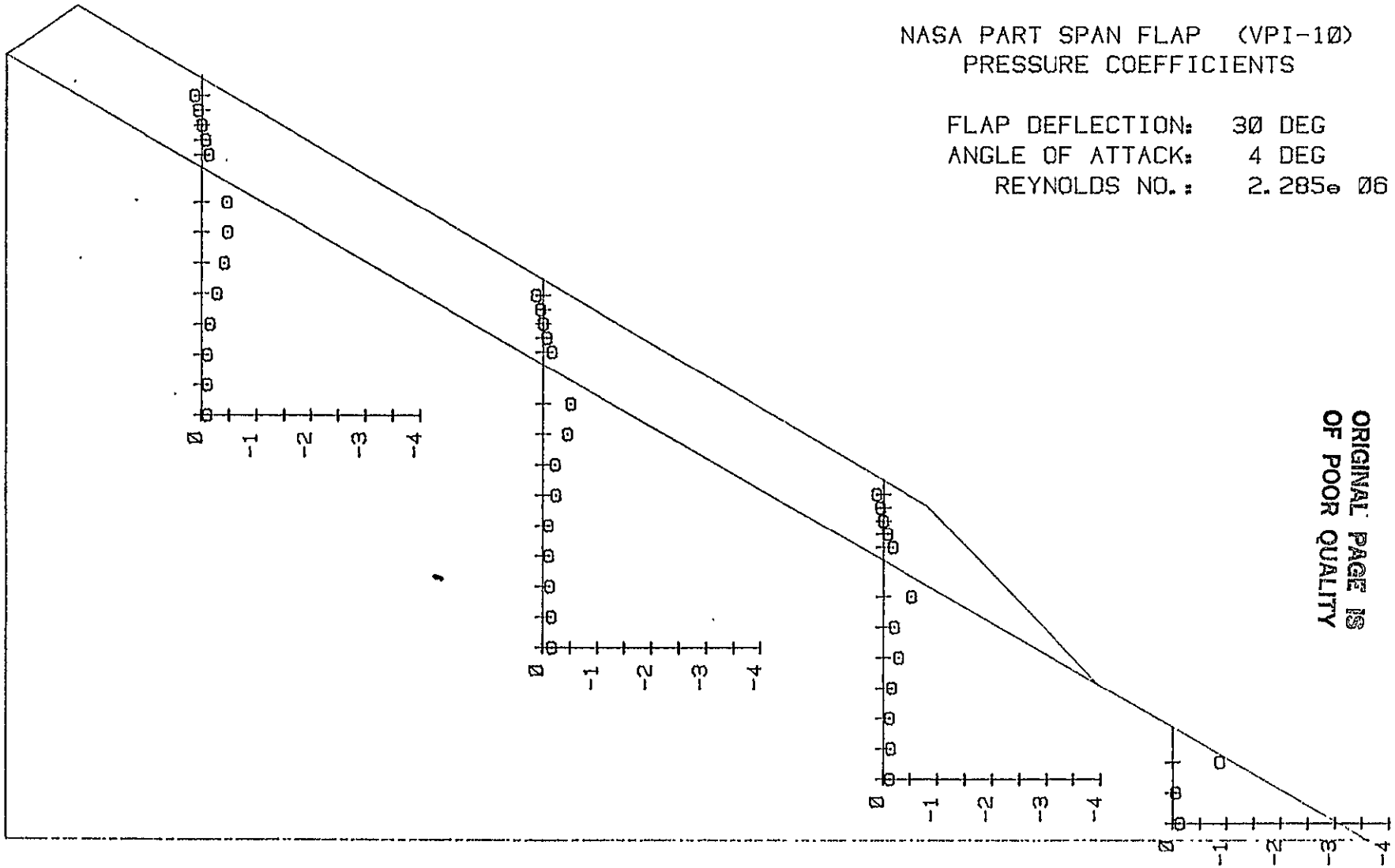
FIGURE 51

NASA PART SPAN FLAP (VPI-10)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 4 DEG
REYNOLDS NO.: 2.285e 06



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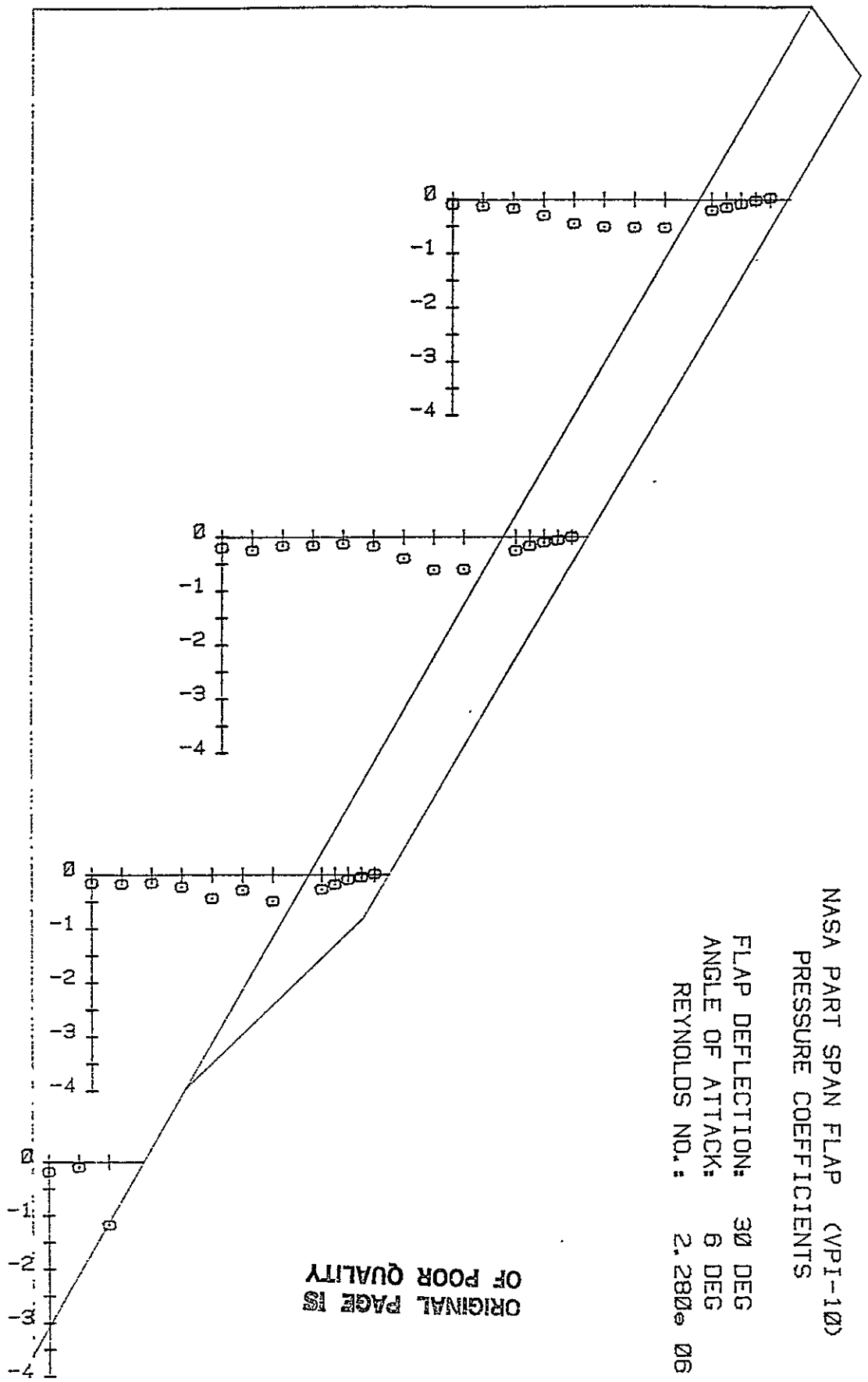

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FIGURE 52

NASA PART SPAN FLAP (VPI-1Ø)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 3Ø DEG
ANGLE OF ATTACK: 6 DEG
REYNOLDS NO.: 2.28Øe Ø6

FIGURE 53.

NASA PART SPAN FLAP (VPI-10)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 8 DEG
REYNOLDS NO.: 2.270e 06

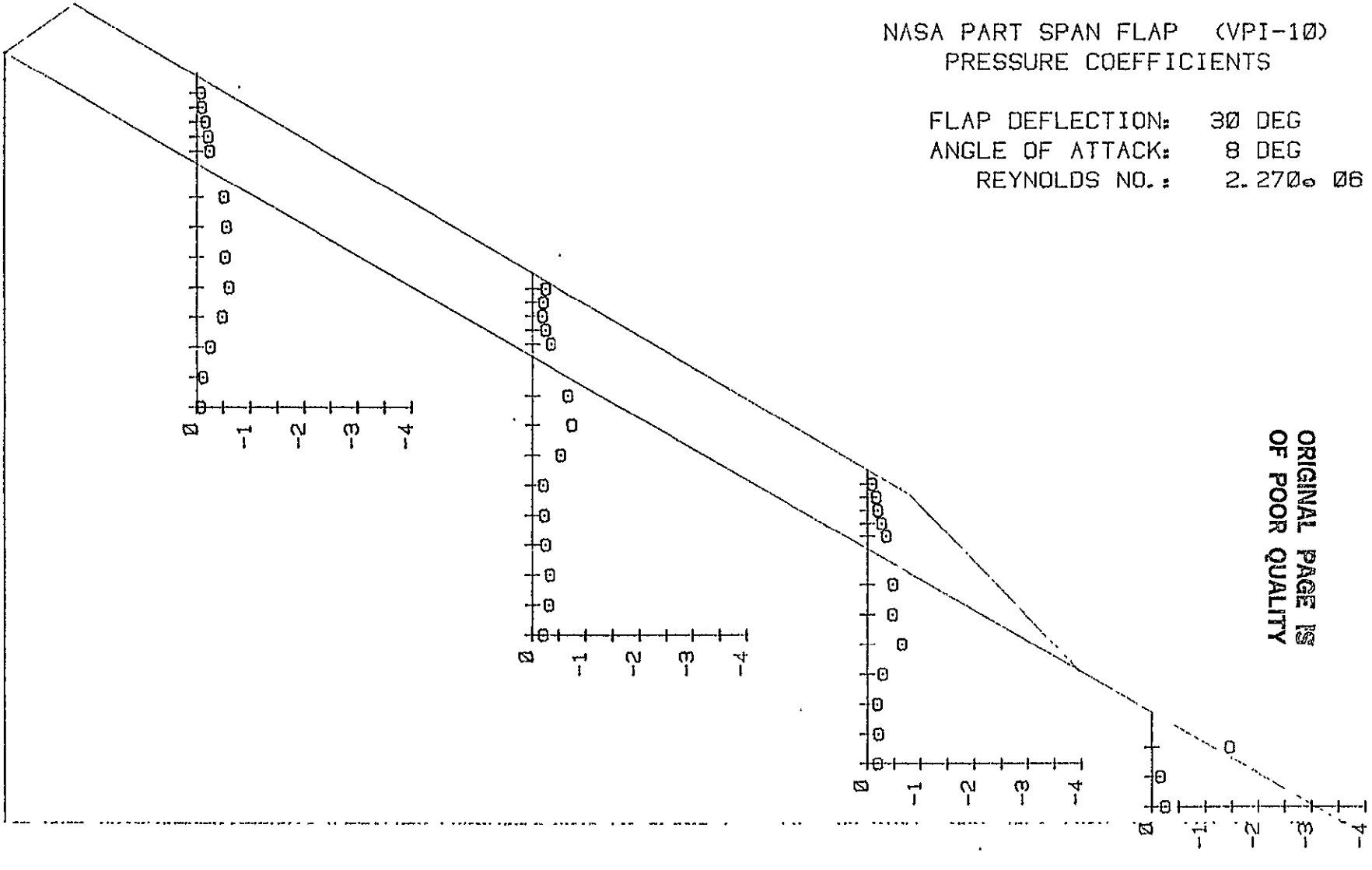

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FIGURE 54

NASA PART SPAN FLAP (VPI-10)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 10 DEG
REYNOLDS NO.: 2.262e 06

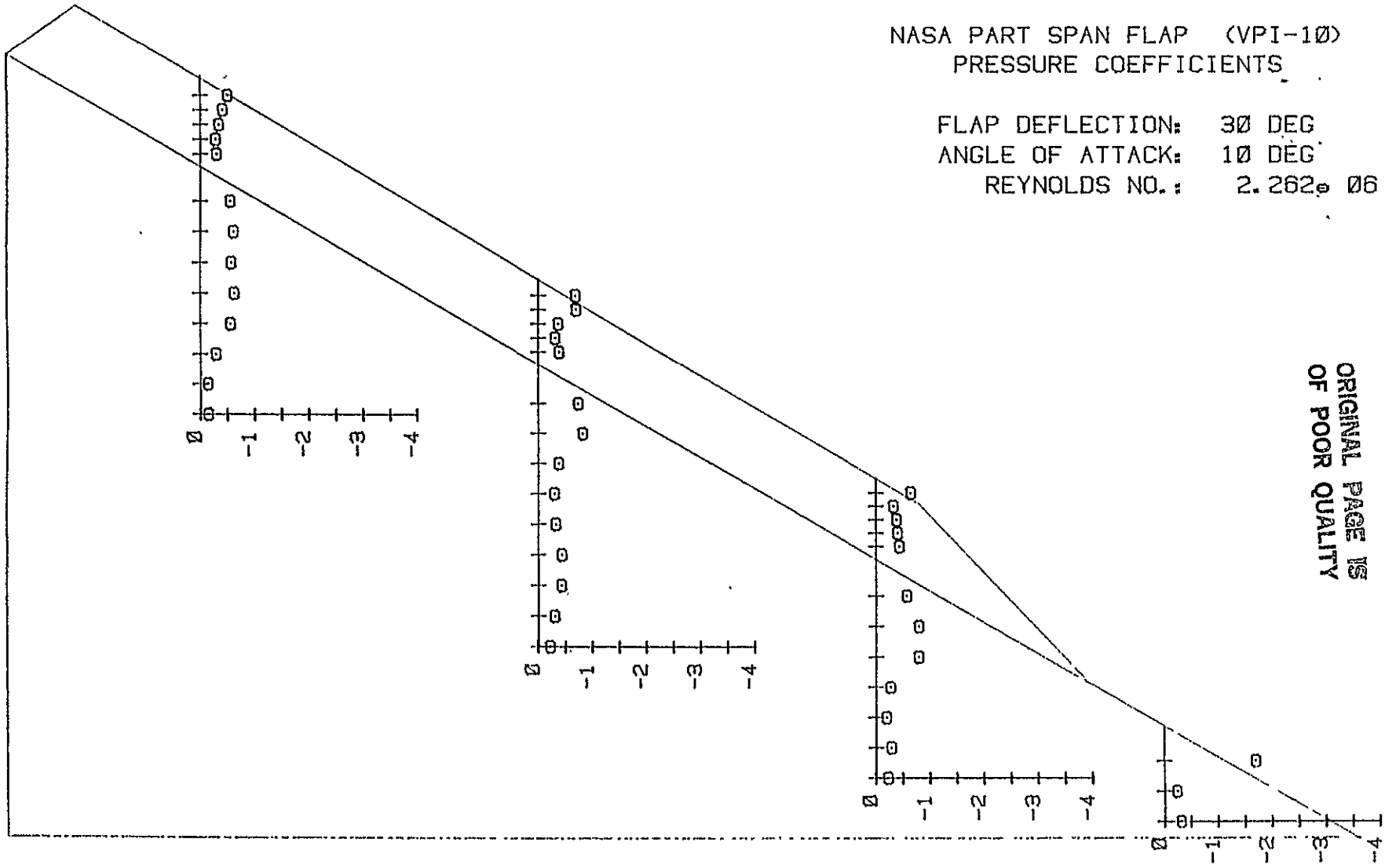

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FIGURE 55

NASA PART SPAN FLAP (VPI-10)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 11 DEG
REYNOLDS NO.: 2.263e.06

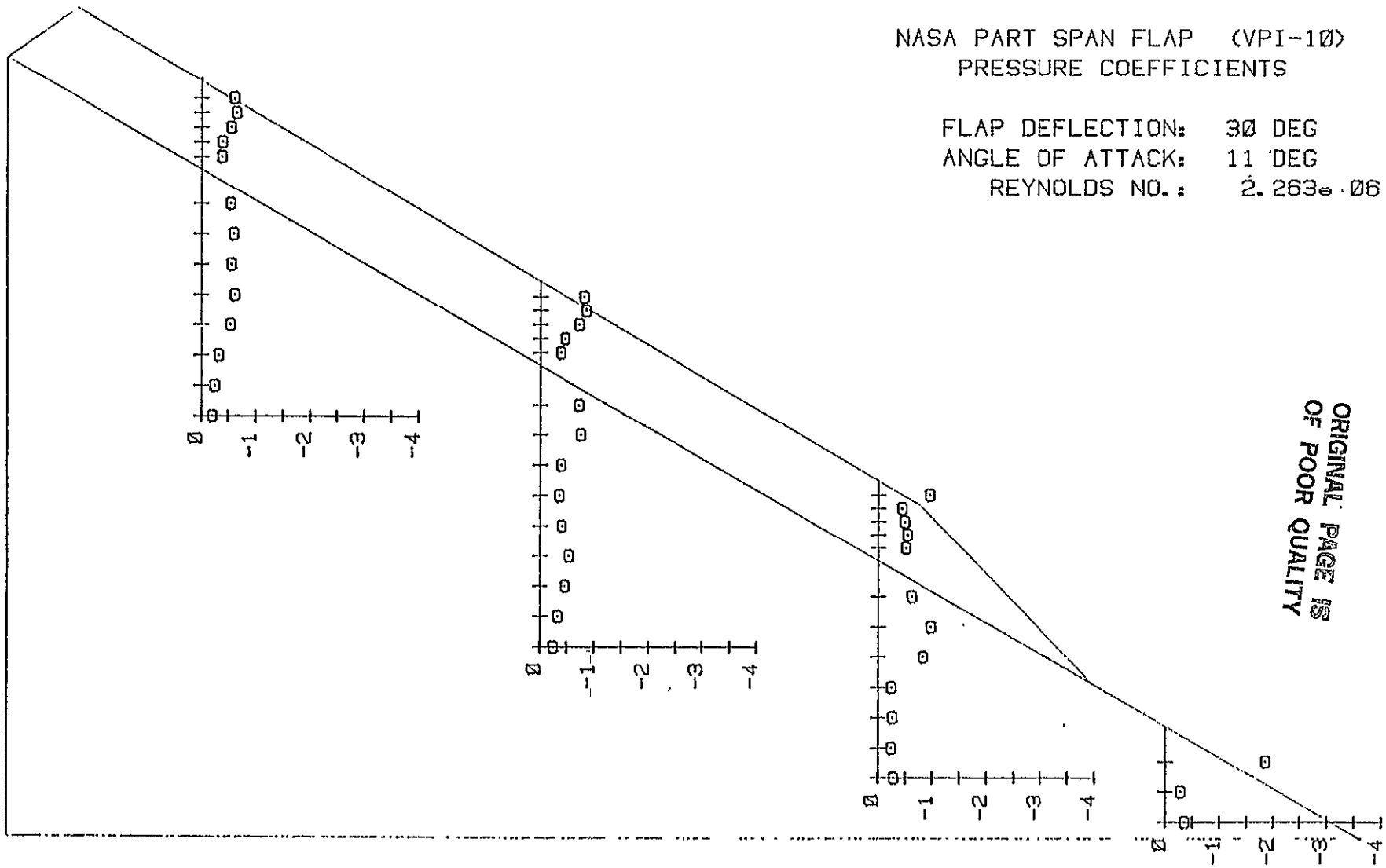

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FIGURE 56

NASA PART SPAN FLAP (VPI-10)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 12 DEG
REYNOLDS NO.: 2.258e 06

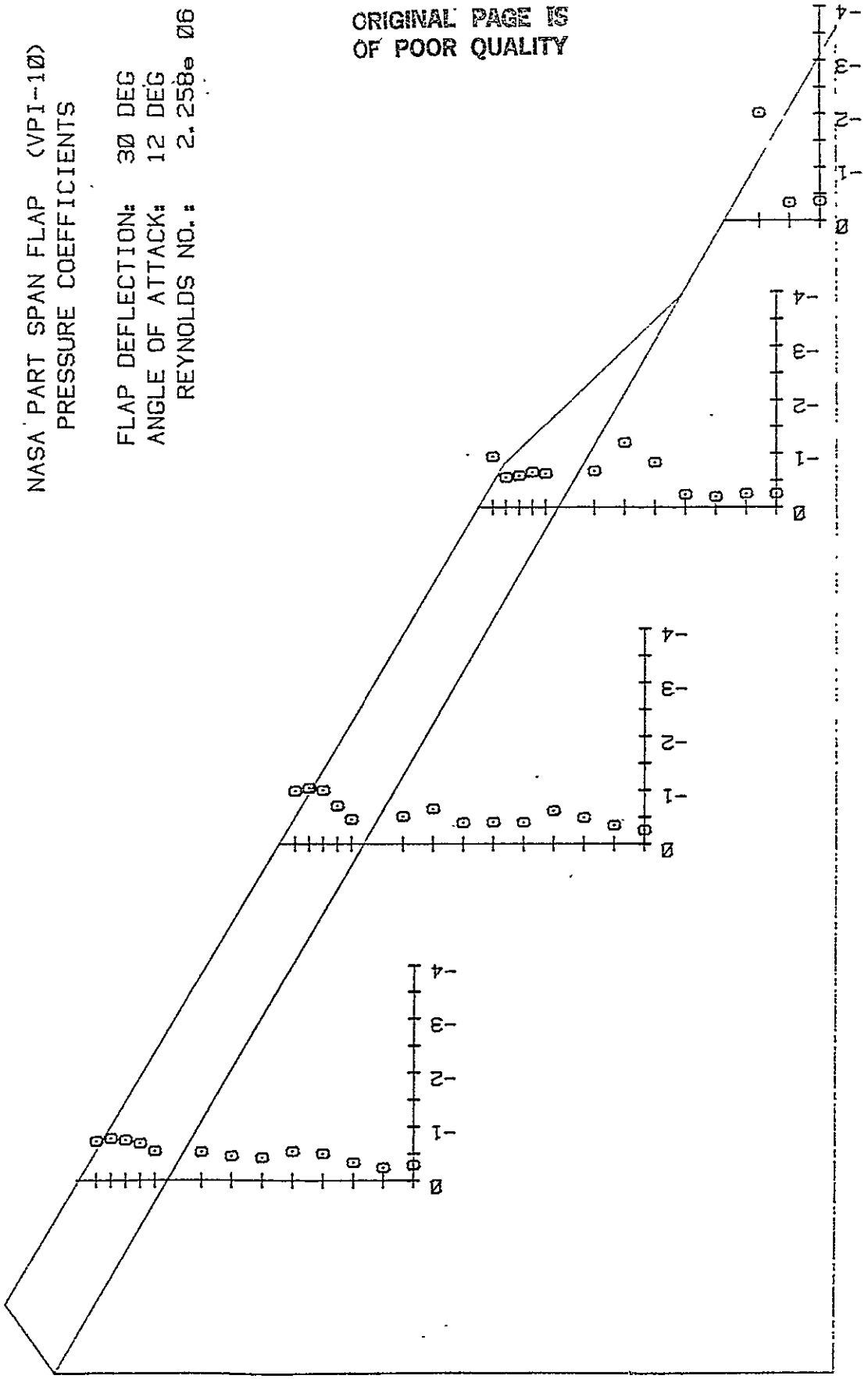

FIGURE 57

NASA PART SPAN FLAP (VPI-10)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 13 DEG
REYNOLDS NO.: 2.257e 06

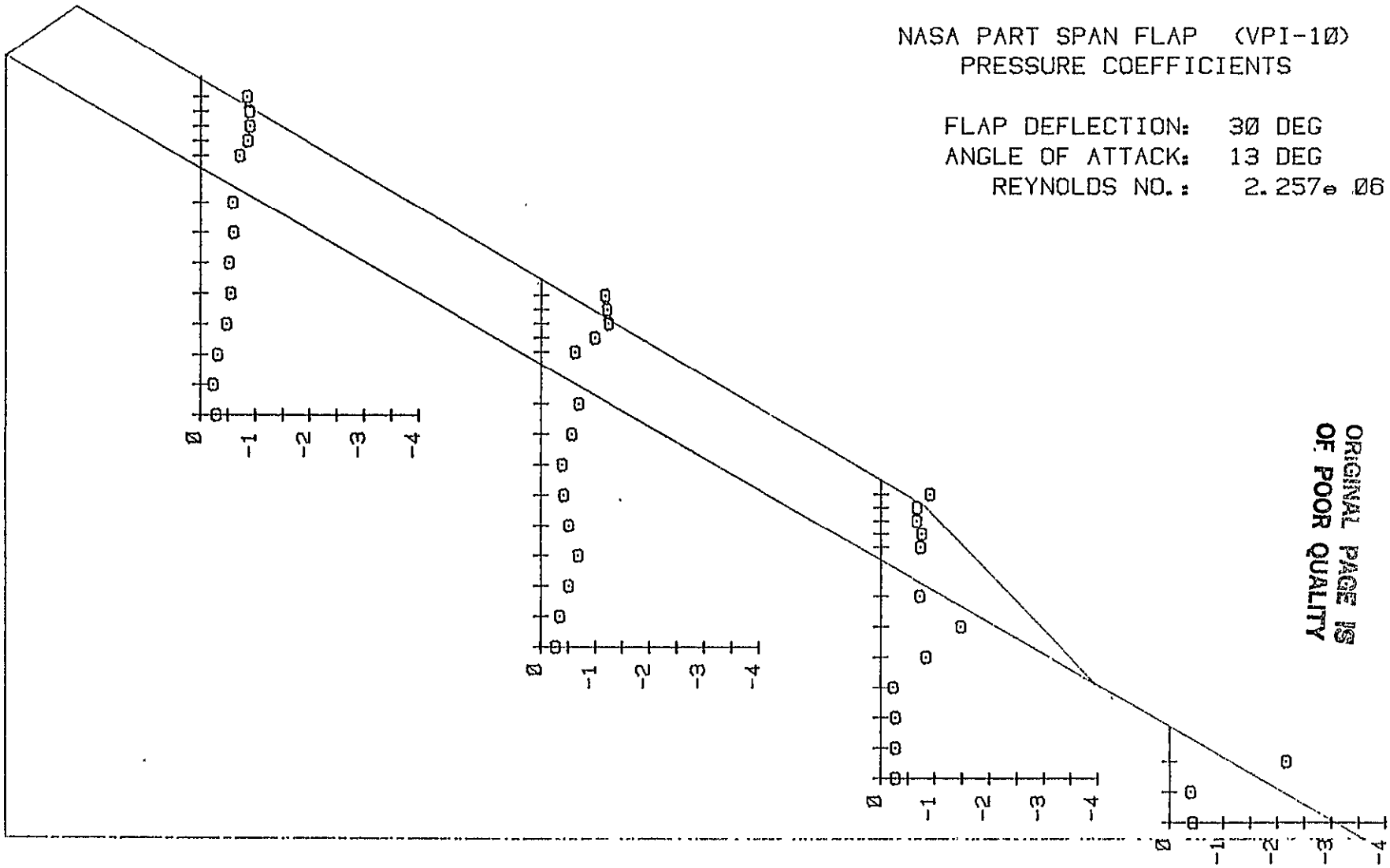

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FIGURE 58

NASA PART SPAN FLAP (VPI-10)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK: 14 DEG
REYNOLDS NO.: 2.255e 06

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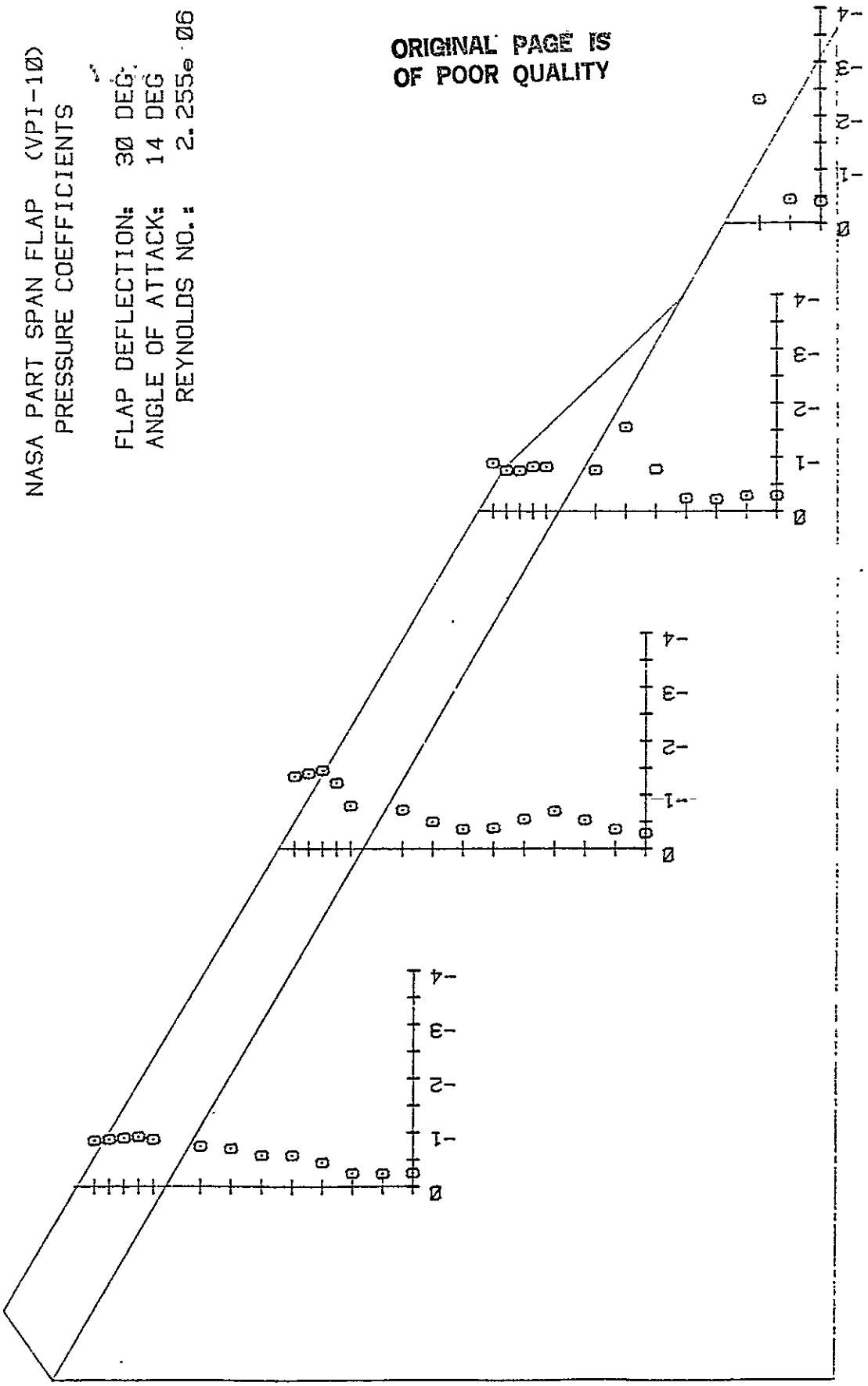

FIGURE 59

NASA PART SPAN FLAP (VPI-10)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 15 DEG
REYNOLDS NO.: 2.249e 06

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FIGURE 60

NASA PART SPAN FLAP (VPI-10)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 0 DEG
REYNOLDS NO.: 1.943e 06

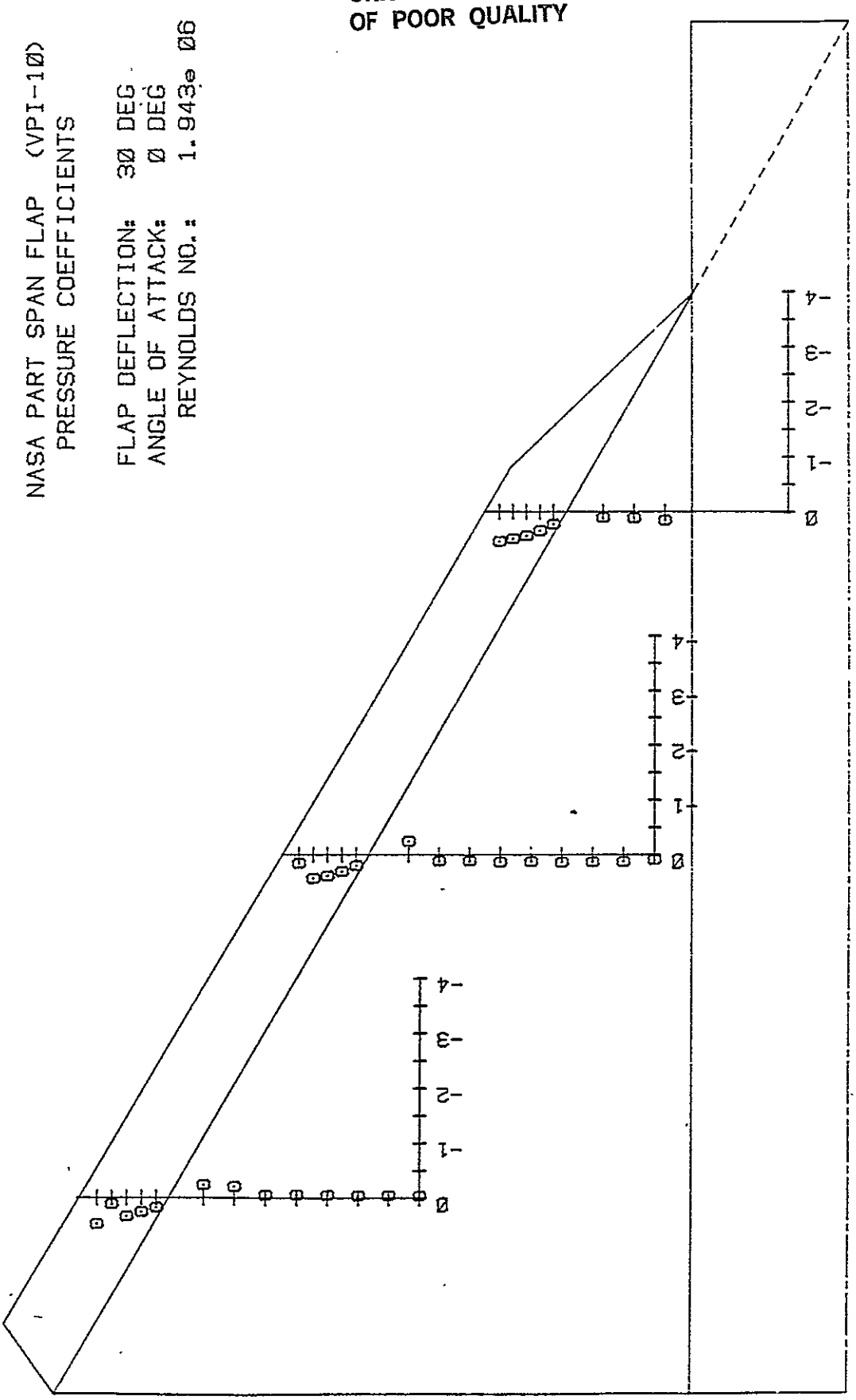

FIGURE 61

NASA PART SPAN FLAP (VPI-10)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 2 DEG
REYNOLDS NO.: 1.952⊖ 06

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FIGURE 62

NASA PART SPAN FLAP (VPI-10)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 4 DEG
REYNOLDS NO.: 2.244e 06

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FIGURE 63

NASA PART SPAN FLAP (VPI-10)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 6 DEG
REYNOLDS NO.: 1.956e 06

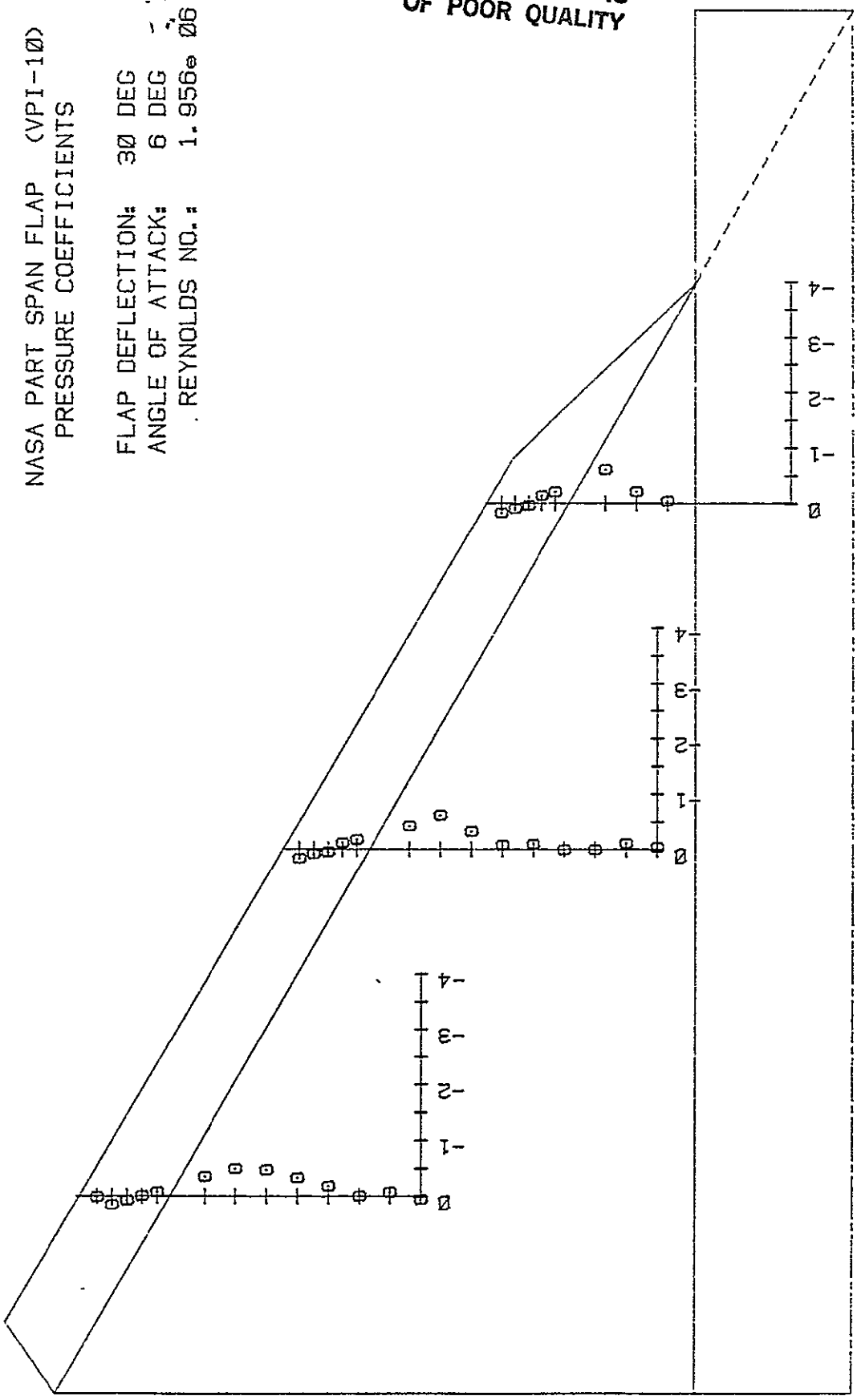

FIGURE 64

NASA PART SPAN FLAP (VPI-10)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 8 DEG
REYNOLDS NO.: 2.251e 06

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FIGURE 65

NASA PART SPAN FLAP (VPI-10)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 10 DEG
REYNOLDS NO.: 1.967e 06

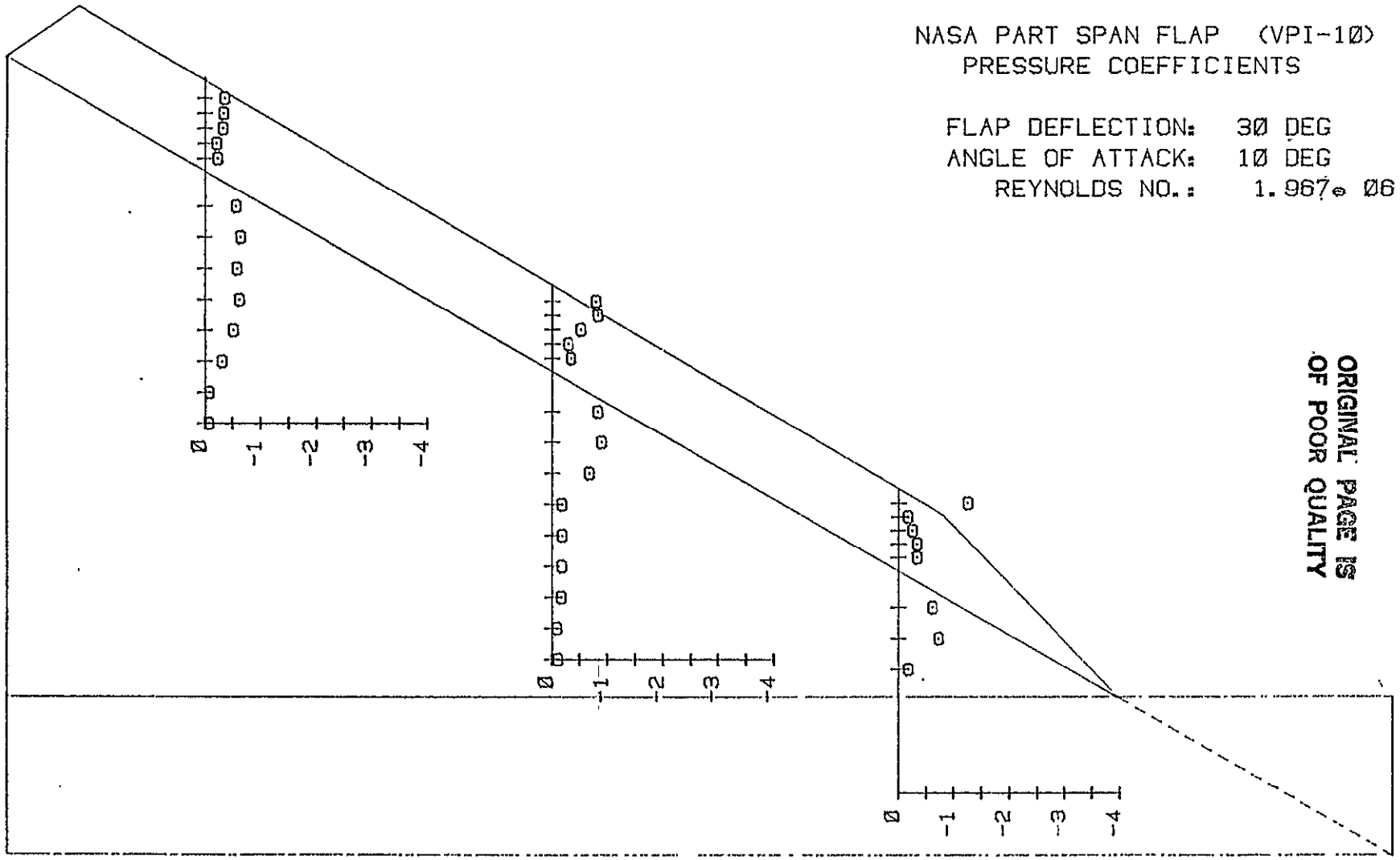

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FIGURE 66

NASA PART SPAN FLAP (VPI-10)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 11 DEG
REYNOLDS NO.: 2.258 06

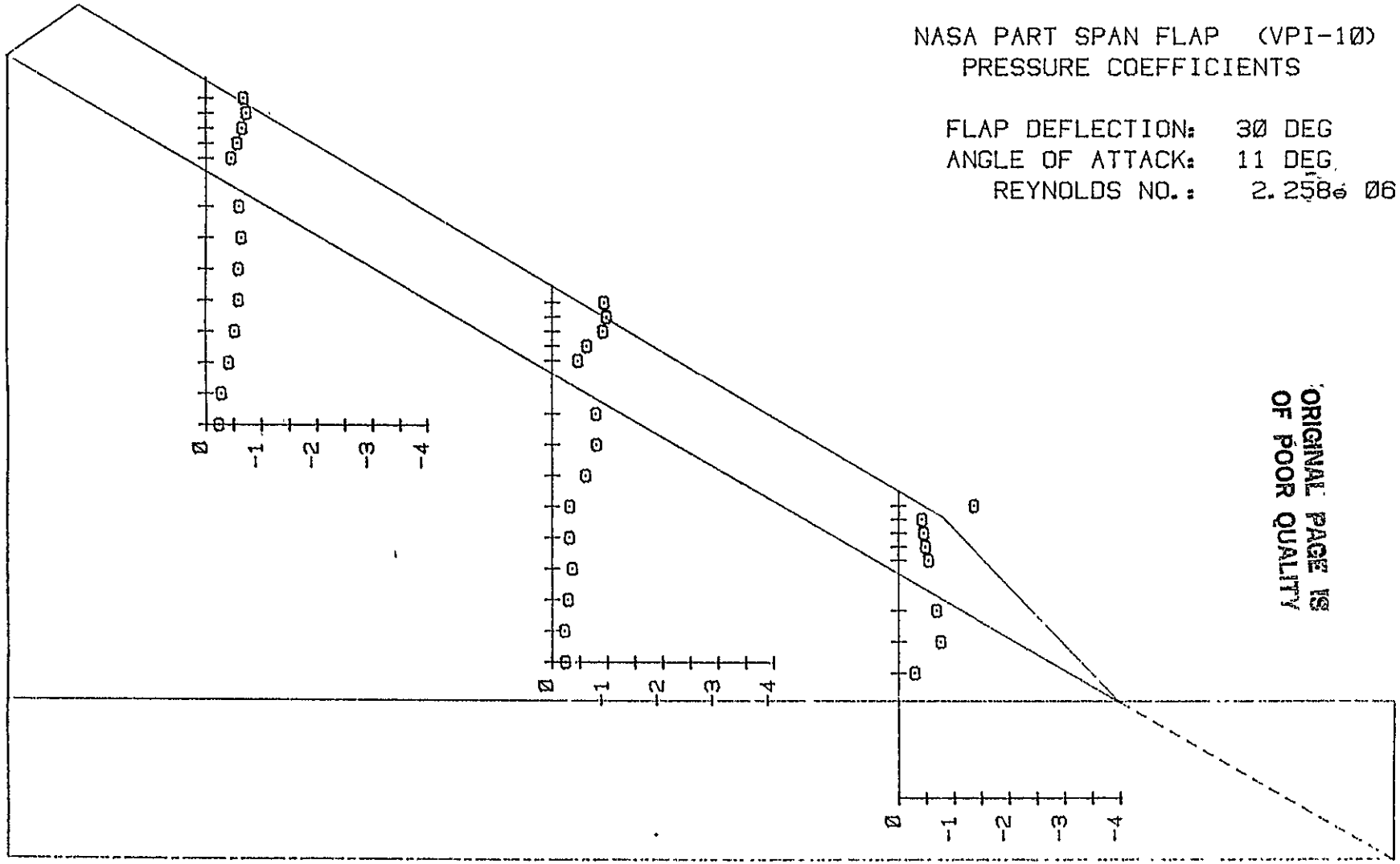

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FIGURE 67

NASA PART SPAN FLAP (VPI-10)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 12 DEG
REYNOLDS NO.: 2.269e 06

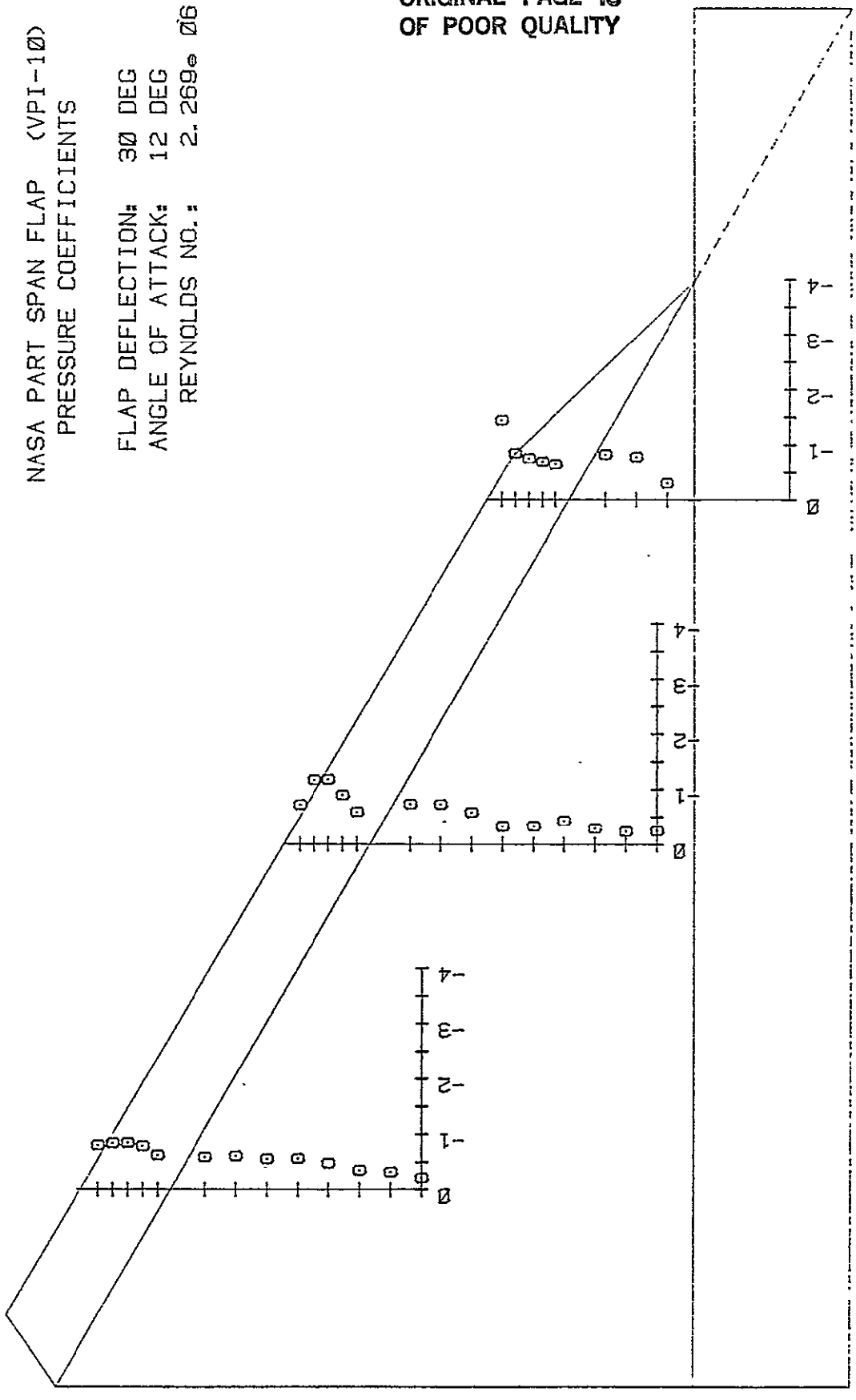

FIGURE 68

NASA PART SPAN FLAP (VPI-10)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 13 DEG
REYNOLDS NO.: 2.272e 06

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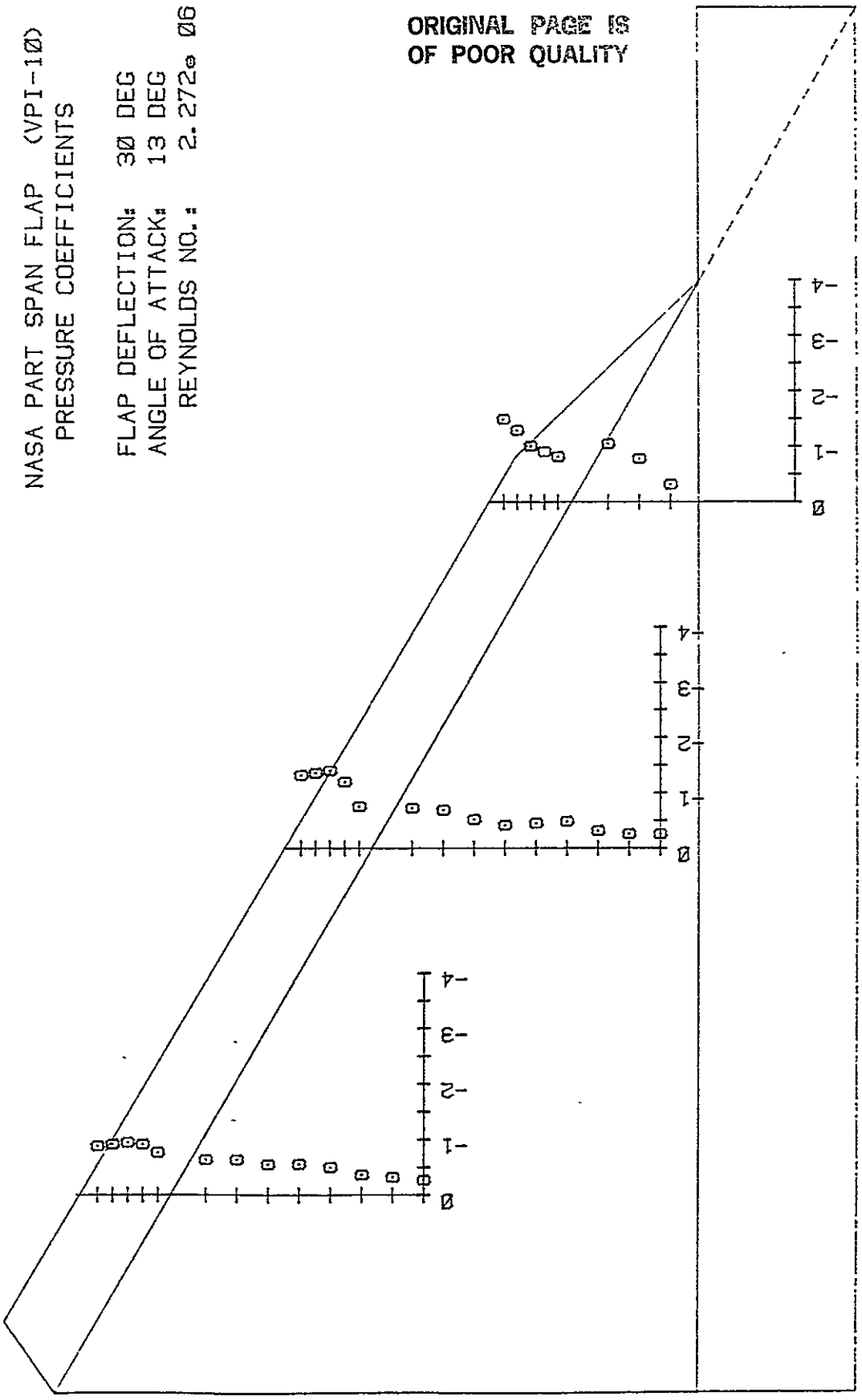

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FIGURE 69

NASA PART SPAN FLAP (VPI-10)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 14 DEG
REYNOLDS NO.: 2.254e 06

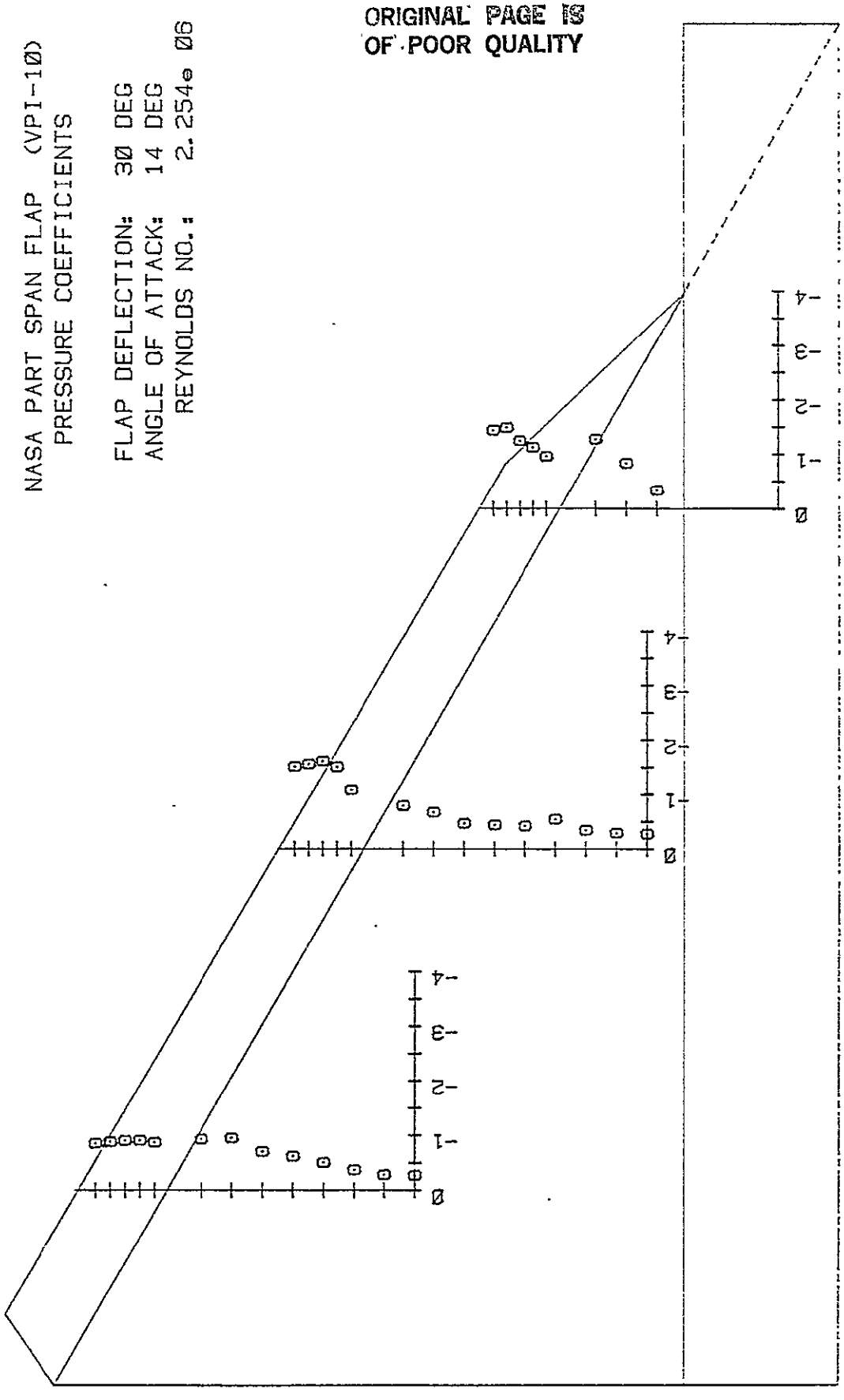

FIGURE 70

NASA PART SPAN FLAP (VPI-10)
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 30 DEG
ANGLE OF ATTACK: 15 DEG
REYNOLDS NO.: 2.248e 06

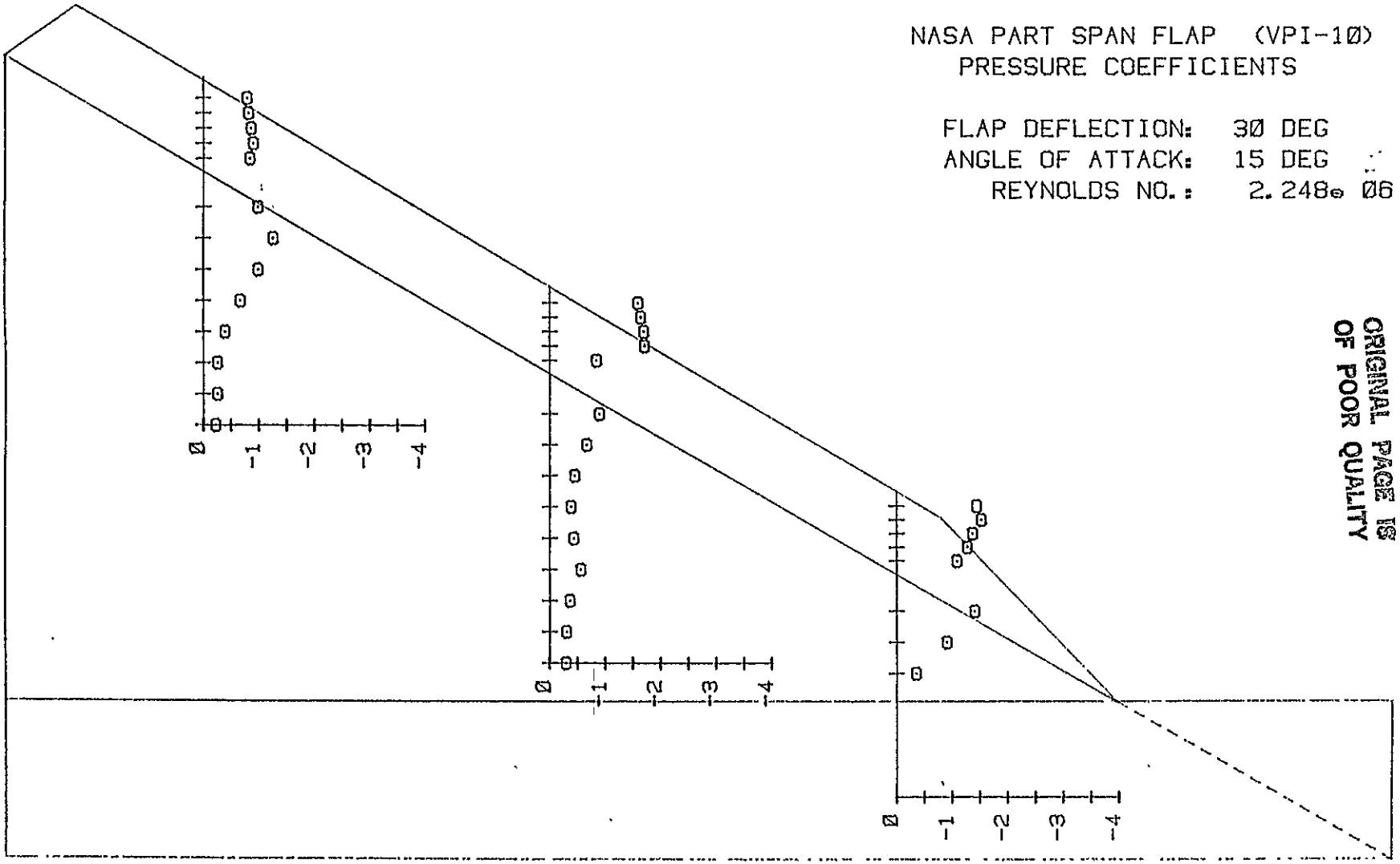

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FIGURE 71

NASA FULL SPAN FLAP (VPI-8)
WITH HALF ANGLE EXTENSION
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 15 DEG
ANGLE OF ATTACK: 10 DEG
REYNOLDS NO.: 2.175e 06

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FIGURE 72

NASA FULL SPAN FLAP (VPI-8)
WITH HALF ANGLE EXTENSION
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 15 DEG
ANGLE OF ATTACK: 11 DEG.
REYNOLDS NO.: 2.190e Ø6

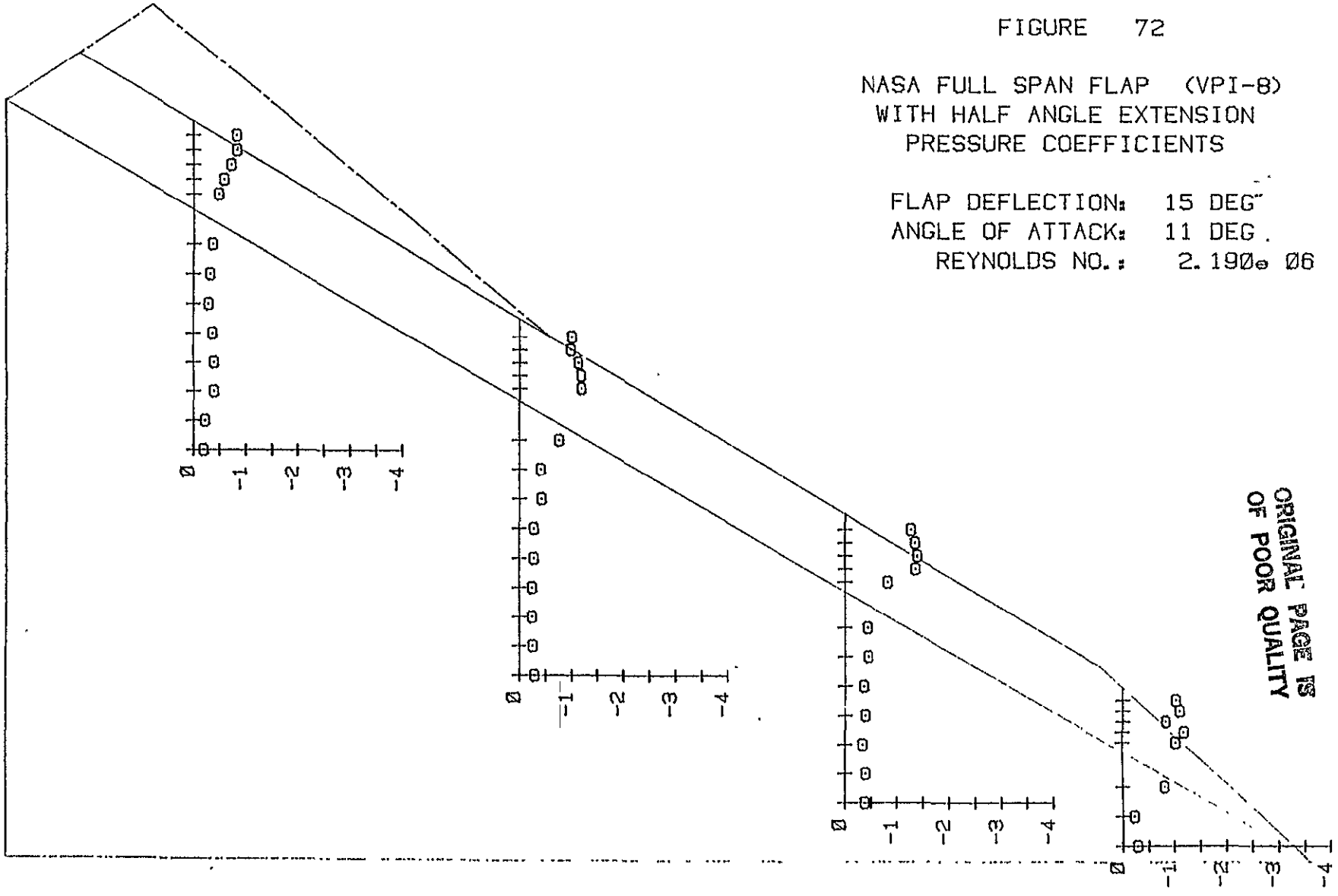

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FIGURE 73

NASA FULL SPAN FLAP (VPI-8)
WITH HALF ANGLE EXTENSION
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 15 DEG
ANGLE OF ATTACK: 12 DEG
REYNOLDS NO.: 2.181e Ø6

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FIGURE 74

NASA FULL SPAN FLAP (VPI-8)
WITH HALF ANGLE EXTENSION
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 15 DEG
ANGLE OF ATTACK: 13 DEG
REYNOLDS NO.: 2.180e Ø6

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FIGURE 75

NASA FULL SPAN FLAP (VPI-8)
WITH HALF ANGLE EXTENSION
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 15 DEG
ANGLE OF ATTACK: 14 DEG
REYNOLDS NO.: 2.184e Ø6

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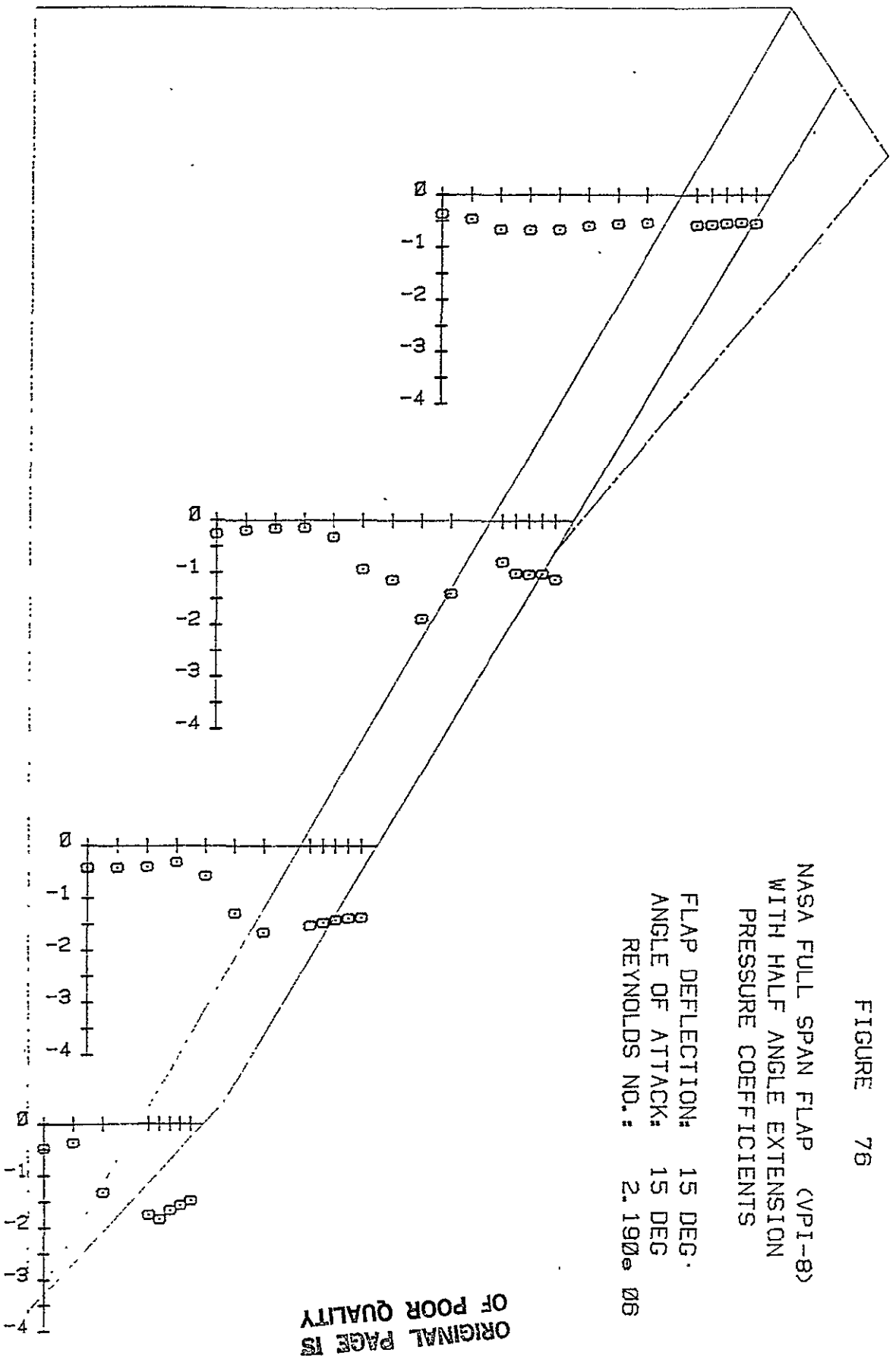

FIGURE 76

NASA FULL SPAN FLAP (VPI-8)
WITH HALF ANGLE EXTENSION
PRESSURE COEFFICIENTS

FLAP DEFLECTION: 15 DEG.
ANGLE OF ATTACK: 15 DEG
REYNOLDS NO.: 2.190e Ø6

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APPENDIX A

TABULATED PRESSURE DATA

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NASA FULL SPAN FLAP VPI-8
FLAP DEFLECTION: 15 DEG.

ANGLE OF ATTACK = 0 DEG REYNOLD'S NO. = 2.143E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	0.2035	12.76	0.1824	20.10	0.1676	27.72	0.1456
5.81	0.1464	12.26	0.1353	19.60	0.1017	27.16	0.0871
5.41	0.0969	11.76	0.0483	19.10	0.0608	26.60	0.0172
5.00	0.0316	11.26	0.0086	18.60	0.0066	26.04	-0.0287
4.59	-0.0189	10.76	-0.0638	18.10	-0.0757	25.47	-0.1126
2.88	-0.0529	9.00	-0.1279	16.13	-0.1099	23.56	-0.1402
1.75	-0.0161	7.88	-0.0766	15.00	-0.0705	22.44	-0.1295
0.63	-0.0199	6.75	-0.0627	13.88	-0.0668	21.31	-0.1055
		5.63	-0.0583	12.75	-0.0561	20.19	-0.1162
		4.50	-0.0588	11.63	-0.0630	19.06	-0.1028
		3.38	-0.0643	10.50	-0.0533	17.94	-0.0820
		2.25	-0.0502	9.38	-0.0553	16.81	-0.0976
				8.25	-0.0566	15.69	-0.0793
				7.13	-0.0905		

NASA FULL SPAN FLAP VPI-8
FLAP DEFLECTION: 15 DEG.

ANGLE OF ATTACK = 2 DEG REYNOLD'S NO. = 2.200E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	0.0675	12.76	0.0843	20.10	0.0621	27.72	0.0552
5.81	0.0333	12.26	0.0447	19.60	0.0068	27.16	0.0010
5.41	-0.0051	11.76	-0.0416	19.10	-0.0297	26.60	-0.0672
5.00	-0.0682	11.26	-0.0781	18.60	-0.0841	26.04	-0.1083
4.59	-0.1058	10.76	-0.1486	18.10	-0.1663	25.47	-0.1923
2.88	-0.1214	9.00	-0.2312	16.13	-0.2152	23.56	-0.2042
1.75	-0.0746	7.88	-0.1254	15.00	-0.1205	22.44	-0.1764
0.63	-0.0636	6.75	-0.1019	13.88	-0.1117	21.31	-0.1366
		5.63	-0.0987	12.75	-0.0955	20.19	-0.1444
		4.50	-0.0990	11.63	-0.1019	19.06	-0.1287
		3.38	-0.1019	10.50	-0.0869	17.94	-0.1039
		2.25	-0.0859	9.38	-0.0838	16.81	-0.1175
				8.25	-0.0852	15.69	-0.0974
				7.13	-0.1162		

NASA FULL SPAN FLAP VPI-8
FLAP DEFLECTION: 15 DEG.

ANGLE OF ATTACK = 4 DEG REYNOLD'S NO. = 2.206E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-0.0778	12.76	-0.0313	20.10	-0.0426	27.72	-0.0801
5.81	-0.0582	12.26	-0.0555	19.60	-0.1252	27.16	-0.1148
5.41	-0.0971	11.76	-0.1648	19.10	-0.1405	26.60	-0.1911
5.00	-0.1666	11.26	-0.1808	18.60	-0.1950	26.04	-0.2201
4.59	-0.1943	10.76	-0.2567	18.10	-0.2988	25.47	-0.3219
2.88	-0.1904	9.00	-0.3294	16.13	-0.2753	23.56	-0.2843
1.75	-0.1459	7.88	-0.1843	15.00	-0.1847	22.44	-0.2208
0.63	-0.1069	6.75	-0.1379	13.88	-0.1622	21.31	-0.1787
		5.63	-0.1390	12.75	-0.1413	20.19	-0.1836
		4.50	-0.1389	11.63	-0.1403	19.06	-0.1605
		3.38	-0.1407	10.50	-0.1281	17.94	-0.1304
		2.25	-0.1217	9.38	-0.1166	16.81	-0.1372
				8.25	-0.1160	15.69	-0.1218
				7.13	-0.1419		

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NASA FULL SPAN FLAP VPI-8
FLAP DEFLECTION: 15 DEG.
ANGLE OF ATTACK = 6 DEG REYNOLD'S NO. = 2.202E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-0.6215	12.76	-0.5613	20.10	-0.5483	27.72	-0.4930
5.81	-0.4076	12.26	-0.2155	19.60	-0.5303	27.16	-0.3446
5.41	-0.2467	11.76	-0.2494	19.10	-0.3543	26.60	-0.3144
5.00	-0.2502	11.26	-0.2857	18.60	-0.3173	26.04	-0.2829
4.59	-0.2651	10.76	-0.3568	18.10	-0.4027	25.47	-0.4523
2.88	-0.2866	9.00	-0.4252	16.13	-0.3779	23.56	-0.4296
1.75	-0.2200	7.88	-0.2525	15.00	-0.2533	22.44	-0.2765
0.63	-0.1610	6.75	-0.1936	13.88	-0.2227	21.31	-0.2353
		5.63	-0.1927	12.75	-0.2044	20.19	-0.2290
		4.50	-0.1886	11.63	-0.1937	19.06	-0.1937
		3.38	-0.1952	10.50	-0.1803	17.94	-0.1658
		2.25	-0.1590	9.38	-0.1467	16.81	-0.1662
				8.25	-0.1485	15.69	-0.1498
				7.13	-0.1737		

NASA FULL SPAN FLAP VPI-8
FLAP DEFLECTION: 15 DEG.
ANGLE OF ATTACK = 8 DEG REYNOLD'S NO. = 2.197E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-0.7771	12.76	-0.8134	20.10	-0.8697	27.72	-0.7057
5.81	-0.8371	12.26	-0.8592	19.60	-0.9491	27.16	-0.7002
5.41	-0.7793	11.76	-0.6945	19.10	-0.9652	26.60	-0.7175
5.00	-0.6051	11.26	-0.3030	18.60	-0.5532	26.04	-0.6943
4.59	-0.3552	10.76	-0.3979	18.10	-0.5343	25.47	-0.5298
2.88	-0.3877	9.00	-0.4369	16.13	-0.4283	23.56	-0.4072
1.75	-0.2364	7.88	-0.2970	15.00	-0.3163	22.44	-0.3224
0.63	-0.2026	6.75	-0.2427	13.88	-0.2638	21.31	-0.3842
		5.63	-0.2515	12.75	-0.2340	20.19	-0.3777
		4.50	-0.2482	11.63	-0.2239	19.06	-0.2320
		3.38	-0.2453	10.50	-0.2114	17.94	-0.2054
		2.25	-0.1883	9.38	-0.1872	16.81	-0.1978
				8.25	-0.1824	15.69	-0.1723
				7.13	-0.2073		

NASA FULL SPAN FLAP VPI-8
FLAP DEFLECTION: 15 DEG.
ANGLE OF ATTACK = 10 DEG REYNOLD'S NO. = 2.197E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-0.7421	12.76	-1.1575	20.10	-1.2325	27.72	-0.8062
5.81	-1.0483	12.26	-1.2223	19.60	-1.2396	27.16	-0.8220
5.41	-1.0826	11.76	-1.1972	19.10	-1.3744	26.60	-0.8440
5.00	-1.1311	11.26	-1.0592	18.60	-1.1142	26.04	-0.8992
4.59	-0.8614	10.76	-0.5619	18.10	-0.9849	25.47	-0.9529
2.88	-0.6264	9.00	-0.4247	16.13	-0.5635	23.56	-0.5395
1.75	-0.2273	7.88	-0.3575	15.00	-0.3662	22.44	-0.4368
0.63	-0.2590	6.75	-0.3832	13.88	-0.3255	21.31	-0.4052
		5.63	-0.3377	12.75	-0.2787	20.19	-0.2874
		4.50	-0.3266	11.63	-0.2731	19.06	-0.2719
		3.38	-0.2800	10.50	-0.2409	17.94	-0.2547
		2.25	-0.2294	9.38	-0.2255	16.81	-0.2329
				8.25	-0.2345	15.69	-0.1893
				7.13	-0.2598		

ORIGINAL PAGE IS
OF POOR QUALITY

NASA FULL SPAN FLAP VPI-8
FLAP DEFLECTION: 15 DEG.
ANGLE OF ATTACK = 11 DEG REYNOLD'S NO. = 2.184E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-0.7635	12.76	-1.3110	20.10	-1.2871	27.72	-0.5952
5.81	-1.1265	12.26	-1.3877	19.60	-1.2633	27.16	-0.7032
5.41	-1.1807	11.76	-1.4244	19.10	-1.3794	26.60	-0.7143
5.00	-1.2358	11.26	-1.3981	18.60	-1.2775	26.04	-0.7428
4.59	-1.0602	10.76	-0.6589	18.10	-1.2150	25.47	-0.7871
2.88	-0.8327	9.00	-0.4431	16.13	-0.7816	23.56	-0.9335
1.75	-0.2305	7.88	-0.3940	15.00	-0.4340	22.44	-0.8921
0.63	-0.2937	6.75	-0.3465	13.88	-0.3380	21.31	-0.5622
		5.63	-0.4535	12.75	-0.3932	20.19	-0.3586
		4.50	-0.3462	11.63	-0.2901	19.06	-0.2758
		3.38	-0.3886	10.50	-0.2548	17.94	-0.2004
		2.25	-0.2499	9.38	-0.2495	16.81	-0.1893
				8.25	-0.2656	15.69	-0.1730
				7.13	-0.3961		

NASA FULL SPAN FLAP VPI-8
FLAP DEFLECTION: 15 DEG.
ANGLE OF ATTACK = 12 DEG REYNOLD'S NO. = 2.202E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-1.0959	12.76	-1.3520	20.10	-1.2063	27.72	-0.5281
5.81	-1.1661	12.26	-1.4174	19.60	-1.1861	27.16	-0.5742
5.41	-1.2541	11.76	-1.4473	19.10	-1.2362	26.60	-0.5886
5.00	-1.3286	11.26	-1.5332	18.60	-1.2349	26.04	-0.5995
4.59	-1.1480	10.76	-1.2382	18.10	-1.2815	25.47	-0.6412
2.88	-0.9541	9.00	-0.4541	16.13	-1.1950	23.56	-0.9225
1.75	-0.2391	7.88	-0.4190	15.00	-0.6770	22.44	-1.2220
0.63	-0.3130	6.75	-0.3907	13.88	-0.3323	21.31	-0.9694
		5.63	-0.4645	12.75	-0.2926	20.19	-0.5281
		4.50	-0.4057	11.63	-0.2682	19.06	-0.1090
		3.38	-0.2883	10.50	-0.2486	17.94	-0.0836
		2.25	-0.2613	9.38	-0.3705	16.81	-0.1396
				8.25	-0.2805	15.69	-0.1399
				7.13	-0.3092		

NASA FULL SPAN FLAP VPI-8
FLAP DEFLECTION: 15 DEG.
ANGLE OF ATTACK = 13 DEG REYNOLD'S NO. = 2.211E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-1.2151	12.76	-1.3528	20.10	-1.1424	27.72	-0.4915
5.81	-1.2914	12.26	-1.3810	19.60	-1.0814	27.16	-0.4988
5.41	-1.3704	11.76	-1.4285	19.10	-1.1199	26.60	-0.5251
5.00	-1.5800	11.26	-1.5111	18.60	-1.1457	26.04	-0.5379
4.59	-1.3259	10.76	-1.4753	18.10	-1.2130	25.47	-0.5311
2.88	-1.1155	9.00	-0.6044	16.13	-1.5035	23.56	-0.5984
1.75	-0.2852	7.88	-0.5439	15.00	-1.3075	22.44	-1.0345
0.63	-0.3582	6.75	-0.4752	13.88	-0.5781	21.31	-1.0755
		5.63	-0.4636	12.75	-0.2141	20.19	-0.9859
		4.50	-0.4022	11.63	-0.2345	19.06	-0.5080
		3.38	-0.3954	10.50	-0.2804	17.94	-0.1214
		2.25	-0.2888	9.38	-0.2853	16.81	-0.0905
				8.25	-0.2954	15.69	-0.0950
				7.13	-0.3016		

ORIGINAL PAGE IS
OF POOR QUALITY

NASA FULL SPAN FLAP VPI-8
FLAP DEFLECTION: 15 DEG.
ANGLE OF ATTACK = 14 DEG REYNOLD'S NO. = 2.198E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-1.3419	12.76	-1.3083	20.10	-1.0519	27.72	-0.4737
5.81	-1.4015	12.26	-1.3230	19.60	-1.0246	27.16	-0.4651
5.41	-1.4948	11.76	-1.3714	19.10	-1.0517	26.60	-0.4699
5.00	-1.6923	11.26	-1.4105	18.60	-1.0594	26.04	-0.5013
4.59	-1.5091	10.76	-1.4439	18.10	-1.1185	25.47	-0.5221
2.88	-1.2175	9.00	-1.1495	16.13	-1.3671	23.56	-0.6414
1.75	-0.3161	7.88	-0.8572	15.00	-1.5160	22.44	-0.7737
0.63	-0.4033	6.75	-0.5941	13.88	-1.2663	21.31	-0.9351
		5.63	-0.4279	12.75	-0.6733	20.19	-1.1585
		4.50	-0.3084	11.63	-0.3458	19.06	-1.0120
		3.38	-0.3320	10.50	-0.3748	17.94	-0.6274
		2.25	-0.3149	9.38	-0.2406	16.81	-0.2498
				8.25	-0.2537	15.69	-0.1059
				7.13	-0.2510		

NASA FULL SPAN FLAP VPI-8
FLAP DEFLECTION: 15 DEG.
ANGLE OF ATTACK = 15 DEG REYNOLD'S NO. = 2.189E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-1.4609	12.76	-1.3073	20.10	-0.9421	27.72	-0.4163
5.81	-1.5298	12.26	-1.3420	19.60	-0.9437	27.16	-0.4191
5.41	-1.6325	11.76	-1.3777	19.10	-0.9586	26.60	-0.4343
5.00	-1.8025	11.26	-1.4339	18.60	-0.9548	26.04	-0.4489
4.59	-1.7276	10.76	-1.4627	18.10	-1.0207	25.47	-0.4788
2.88	-1.2880	9.00	-1.5925	16.13	-1.3269	23.56	-0.4959
1.75	-0.3466	7.88	-1.2542	15.00	-1.7500	22.44	-0.5544
0.63	-0.4650	6.75	-0.5967	13.88	-1.7062	21.31	-0.6847
		5.63	-0.3143	12.75	-0.9254	20.19	-0.8883
		4.50	-0.2923	11.63	-0.3336	19.06	-0.8312
		3.38	-0.4134	10.50	-0.1475	17.94	-0.6482
		2.25	-0.4071	9.38	-0.1568	16.81	-0.4068
				8.25	-0.1822	15.69	-0.1493
				7.13	-0.2441		

ORIGINAL PAGE IS
OF POOR QUALITY

CROPPED CONSTANT CHORD FLAP
FLAP DEFLECTION: 26 DEG.
ANGLE OF ATTACK = 5 DEG REYNOLD'S NO. = 2.235E 06

PORT ROW 1 X = 9.300		PORT ROW 2 X = 21.700		PORT ROW 3 X = 36.200		PORT ROW 4 X = 50.700	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
-1.00	-0.0277	-1.00	0.0520	-1.00	0.0135	-1.00	-0.0377
1.00	0.0200	1.00	0.0110	1.00	-0.0077	1.00	0.0118
2.00	-0.0102	2.00	-0.0589	2.00	-0.0682	2.00	-0.0682
3.00	-0.0859	3.00	-0.1193	3.00	-0.1605	3.00	-0.1855
4.00	-0.2432	4.00	-0.2700	4.00	-0.3191	4.00	-0.3526
5.75	0.2051	5.75	-0.5504	5.75	-0.3420	5.75	-0.4131
6.75	-0.1886	6.75	-0.1931	6.75	-0.2360	6.75	-0.2641
7.75	-0.1426	7.75	-0.2182	7.75	-0.2254	7.75	-0.2236
		8.75	-0.1855	8.75	-0.2471	8.75	-0.1985
		9.75	-0.1555	9.75	-0.2102	9.75	-0.2104
		10.75	-0.1466	10.75	-0.1489	10.75	-0.1623
		11.75	-0.1385	11.75	-0.1353	11.75	-0.1715
				12.75	-0.1497	12.75	-0.1767
				13.75	-0.1240		

CROPPED CONSTANT CHORD FLAP
FLAP DEFLECTION: 26 DEG.
ANGLE OF ATTACK = 10 DEG REYNOLD'S NO. = 2.232E 06

PORT ROW 1 X = 9.300		PORT ROW 2 X = 21.700		PORT ROW 3 X = 36.200		PORT ROW 4 X = 50.700	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
-1.00	0.2002	-1.00	0.2689	-1.00	0.1702	-1.00	0.1245
1.00	-0.1658	1.00	-0.5620	1.00	-1.0592	1.00	-0.7161
2.00	-0.1815	2.00	-0.2322	2.00	-0.1672	2.00	-0.2654
3.00	-0.2645	3.00	-0.3104	3.00	-0.3161	3.00	-0.3476
4.00	-0.4190	4.00	-0.4317	4.00	-0.5259	4.00	-0.5342
5.75	-0.3663	5.75	-0.7919	5.75	-0.5163	5.75	-0.4436
6.75	-0.3093	6.75	-0.2719	6.75	-0.4110	6.75	-0.3440
7.75	-0.2669	7.75	-0.2542	7.75	-0.3420	7.75	-0.3115
		8.75	-0.2648	8.75	-0.4294	8.75	-0.2891
		9.75	-0.2517	9.75	-0.2582	9.75	-0.2495
		10.75	-0.2277	10.75	-0.2027	10.75	-0.1819
		11.75	-0.2172	11.75	-0.1990	11.75	-0.2011
				12.75	-0.2041	12.75	-0.2069
				13.75	-0.1690		

CROPPED CONSTANT CHORD FLAP
FLAP DEFLECTION: 26 DEG.
ANGLE OF ATTACK = 15 DEG REYNOLD'S NO. = 2.229E 06

PORT ROW 1 X = 9.300		PORT ROW 2 X = 21.700		PORT ROW 3 X = 36.200		PORT ROW 4 X = 50.700	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
-1.00	0.2930	-1.00	0.3170	-1.00	0.2979	-1.00	0.2267
1.00	-0.4734	1.00	-1.2909	1.00	-1.5313	1.00	-0.7430
2.00	-0.4427	2.00	-1.6938	2.00	-1.5549	2.00	-0.7296
3.00	-0.4285	3.00	-0.5560	3.00	-0.7386	3.00	-0.7542
4.00	-0.5289	4.00	-0.4359	4.00	-0.6746	4.00	-0.8118
5.75	-0.5605	5.75	-0.8977	5.75	-0.7137	5.75	-0.7738
6.75	-0.5179	6.75	-0.3973	6.75	-0.5860	6.75	-0.7047
7.75	-0.4132	7.75	-0.3494	7.75	-0.4517	7.75	-0.5380
		8.75	-0.4361	8.75	-0.3955	8.75	-0.3719
		9.75	-0.3672	9.75	-0.3548	9.75	-0.3019
		10.75	-0.3397	10.75	-0.3548	10.75	-0.3130
		11.75	-0.3327	11.75	-0.3174	11.75	-0.2898
				12.75	-0.2886	12.75	-0.2833
				13.75	-0.2346		

NOTE: Y VALUES ARE PERPENDICULAR TO THE FLAP LEADING EDGE

ORIGINAL PAGE IS
OF POOR QUALITY

CROPPED CONSTANT CHORD FLAP
FLAP DEFLECTION: 21 DEG.
ANGLE OF ATTACK = 5 DEG REYNOLD'S NO. = 2.242E 06

PORT ROW 1 X = 9.300		PORT ROW 2 X = 21.700		PORT ROW 3 X = 36.200		PORT ROW 4 X = 50.700	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
-1.00	0.0682	-1.00	0.0829	-1.00	0.0702	-1.00	0.0260
1.00	0.0564	1.00	-0.0115	1.00	-0.0228	1.00	-0.0188
2.00	-0.0396	2.00	-0.0671	2.00	-0.0951	2.00	-0.1074
3.00	-0.0842	3.00	-0.1699	3.00	-0.1450	3.00	-0.1890
4.00	-0.2037	4.00	-0.2395	4.00	-0.2961	4.00	-0.3377
5.75	-0.2181	5.75	-0.3478	5.75	-0.3785	5.75	-0.3031
6.75	-0.1557	6.75	-0.1478	6.75	-0.2001	6.75	-0.1931
7.75	-0.1183	7.75	-0.1251	7.75	-0.1732	7.75	-0.1790
		8.75	-0.1821	8.75	-0.1637	8.75	-0.1544
		9.75	-0.1329	9.75	-0.1197	9.75	-0.1336
		10.75	-0.1133	10.75	-0.1398	10.75	-0.1493
		11.75	-0.1252	11.75	-0.1051	11.75	-0.1425
				12.75	-0.1163	12.75	-0.1450
				13.75	-0.1168		

CROPPED CONSTANT CHORD FLAP
FLAP DEFLECTION: 21 DEG.
ANGLE OF ATTACK = 10 DEG REYNOLD'S NO. = 2.231E 06

PORT ROW 1 X = 9.300		PORT ROW 2 X = 21.700		PORT ROW 3 X = 36.200		PORT ROW 4 X = 50.700	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
-1.00	0.1898	-1.00	0.2499	-1.00	0.2309	-1.00	0.1815
1.00	-0.2465	1.00	-0.9319	1.00	-0.8632	1.00	-1.0820
2.00	-0.2763	2.00	-0.3541	2.00	-0.7402	2.00	-0.1864
3.00	-0.2917	3.00	-0.3110	3.00	-0.2874	3.00	-0.3677
4.00	-0.4225	4.00	-0.4491	4.00	-0.5274	4.00	-0.5275
5.75	-0.3811	5.75	-0.5816	5.75	-0.4638	5.75	-0.4405
6.75	-0.3209	6.75	-0.3042	6.75	-0.3656	6.75	-0.3743
7.75	-0.2904	7.75	-0.2618	7.75	-0.3114	7.75	-0.3202
		8.75	-0.3353	8.75	-0.3085	8.75	-0.2737
		9.75	-0.2622	9.75	-0.2639	9.75	-0.2661
		10.75	-0.2354	10.75	-0.2896	10.75	-0.2623
		11.75	-0.2258	11.75	-0.2305	11.75	-0.2261
				12.75	-0.2223	12.75	-0.2213
				13.75	-0.1849		

CROPPED CONSTANT CHORD FLAP
FLAP DEFLECTION: 21 DEG.
ANGLE OF ATTACK = 15 DEG REYNOLD'S NO. = 2.240E 06

PORT ROW 1 X = 9.300		PORT ROW 2 X = 21.700		PORT ROW 3 X = 36.200		PORT ROW 4 X = 50.700	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
-1.00	0.3893	-1.00	0.3231	-1.00	0.3333	-1.00	0.2631
1.00	-1.3769	1.00	-1.4192	1.00	-1.2535	1.00	-0.7316
2.00	-0.7886	2.00	-2.1308	2.00	-1.3144	2.00	-0.7323
3.00	-0.5544	3.00	-0.6551	3.00	-1.3467	3.00	-0.7237
4.00	-0.4991	4.00	-0.3424	4.00	-1.2698	4.00	-0.7747
5.75	-0.5240	5.75	-0.6010	5.75	-0.7544	5.75	-0.8566
6.75	-0.4655	6.75	-0.3797	6.75	-0.4400	6.75	-0.9107
7.75	-0.3419	7.75	-0.3190	7.75	-0.3015	7.73	-0.8598
		8.75	-0.3725	8.75	-0.2866	8.75	-0.6549
		9.75	-0.3474	9.75	-0.2576	9.75	-0.4111
		10.75	-0.3284	10.75	-0.2472	10.75	-0.1848
		11.75	-0.3168	11.75	-0.2332	11.75	-0.1356
				12.75	-0.2521	12.75	-0.1540
				13.75	-0.2325		

NOTE: Y VALUES ARE PERPENDICULAR TO THE FLAP LEADING EDGE

ORIGINAL PAGE IS
OF POOR QUALITY

CROPPED CONSTANT CHORD FLAP
FLAP DEFLECTION: 31 DEG.
ANGLE OF ATTACK = 5 DEG REYNOLD'S NO. = 2.166E 06

PORT ROW 1 X = 9.300		PORT ROW 2 X = 21.700		PORT ROW 3 X = 36.200		PORT ROW 4 X = 50.700	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
-1.00	-0.0746	-1.00	-0.1278	-1.00	0.0358	-1.00	-0.0331
1.00	0.1195	1.00	0.0940	1.00	0.0615	1.00	0.0748
2.00	0.0367	2.00	0.0084	2.00	-0.0157	2.00	-0.0164
3.00	-0.0473	3.00	-0.0845	3.00	-0.0917	3.00	-0.1101
4.00	-0.1990	4.00	-0.2328	4.00	-0.2576	4.00	-0.2659
5.75	-0.3490	5.75	-0.6602	5.75	-0.5541	5.75	-0.4556
6.75	-0.1630	6.75	-0.1611	6.75	-0.4535	6.75	-0.3775
7.75	-0.1529	7.75	-0.1767	7.75	-0.3393	7.75	-0.4016
		8.75	-0.2354	8.75	-0.2559	8.75	-0.3019
		9.75	-0.1858	9.75	-0.1385	9.75	-0.2117
		10.75	-0.1457	10.75	-0.1414	10.75	-0.1377
		11.75	-0.1391	11.75	-0.1273	11.75	-0.1542
				12.75	-0.1440	12.75	-0.1778
				13.75	-0.1275		

CROPPED CONSTANT CHORD FLAP
FLAP DEFLECTION: 31 DEG.
ANGLE OF ATTACK = 10 DEG REYNOLD'S NO. = 2.159E 06

PORT ROW 1 X = 9.300		PORT ROW 2 X = 21.700		PORT ROW 3 X = 36.200		PORT ROW 4 X = 50.700	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
-1.00	0.1860	-1.00	0.2176	-1.00	0.2019	-1.00	0.1351
1.00	-0.0888	1.00	-0.1693	1.00	-0.5226	1.00	-0.3473
2.00	-0.1603	2.00	-0.2095	2.00	-0.1917	2.00	-0.1924
3.00	-0.2416	3.00	-0.3039	3.00	-0.2907	3.00	-0.2871
4.00	-0.4124	4.00	-0.4630	4.00	-0.4866	4.00	-0.4443
5.75	-0.4861	5.75	-0.9886	5.75	-0.7050	5.75	-0.4892
6.75	-0.3217	6.75	-0.3475	6.75	-0.6541	6.75	-0.5574
7.75	-0.3057	7.75	-0.3095	7.75	-0.5671	7.75	-0.5289
		8.75	-0.3704	8.75	-0.5272	8.75	-0.4912
		9.75	-0.3104	9.75	-0.3705	9.75	-0.4451
		10.75	-0.2393	10.75	-0.2375	10.75	-0.3199
		11.75	-0.2284	11.75	-0.1807	11.75	-0.2538
				12.75	-0.1969	12.75	-0.2413
				13.75	-0.1884		

CROPPED CONSTANT CHORD FLAP
FLAP DEFLECTION: 31 DEG.
ANGLE OF ATTACK = 15 DEG REYNOLD'S NO. = 2.173E 06

PORT ROW 1 X = 9.300		PORT ROW 2 X = 21.700		PORT ROW 3 X = 36.200		PORT ROW 4 X = 50.700	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
-1.00	0.3294	-1.00	0.3295	-1.00	0.2925	-1.00	0.2239
1.00	-0.3513	1.00	-1.1815	1.00	-1.4265	1.00	-1.2176
2.00	-0.3368	2.00	-1.2293	2.00	-1.2856	2.00	-1.1428
3.00	-0.3972	3.00	-0.4361	3.00	-0.3535	3.00	-0.3191
4.00	-0.5711	4.00	-0.4804	4.00	-0.6686	4.00	-0.5797
5.75	-0.6066	5.75	-1.1280	5.75	-0.7572	5.75	-0.5801
6.75	-0.5371	6.75	-0.6057	6.75	-0.6202	6.75	-0.6058
7.75	-0.4826	7.75	-0.4373	7.75	-0.5789	7.75	-0.5508
		8.75	-0.4959	8.75	-0.5927	8.75	-0.4368
		9.75	-0.4009	9.75	-0.5430	9.75	-0.3548
		10.75	-0.3414	10.75	-0.4567	10.75	-0.3030
		11.75	-0.3236	11.75	-0.3220	11.75	-0.3022
				12.75	-0.2612	12.75	-0.3094
				13.75	-0.2429		

NOTE: Y VALUES ARE PERPENDICULAR TO THE FLAP LEADING EDGE

ORIGINAL PAGE IS
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NASA FULL SPAN FLAP VPI-8
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 0 DEG REYNOLD'S NO. = 2.190E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	0.0181	12.76	0.2565	20.10	0.2427	27.72	0.2306
5.81	0.2895	12.26	0.1437	19.60	0.2026	27.16	0.1807
5.41	0.2235	11.76	0.1551	19.10	0.1481	26.60	0.1347
5.00	0.1543	11.26	0.0820	18.60	0.0835	26.04	0.0525
4.59	0.0521	10.76	0.0311	18.10	0.0053	25.47	-0.0289
2.88	-0.0443	9.00	-0.2359	16.13	-0.3088	23.56	-0.2962
1.75	-0.0040	7.88	-0.0682	15.00	-0.2021	22.44	-0.2993
0.63	-0.0061	6.75	-0.0592	13.88	-0.0709	21.31	-0.0833
		5.63	-0.0483	12.75	-0.0438	20.19	-0.0876
		4.50	-0.0491	11.63	-0.0475	19.06	-0.0915
		3.38	-0.0556	10.50	-0.0400	17.94	-0.0645
		2.25	-0.0378	9.38	-0.0401	16.81	-0.0763
				8.25	-0.0499	15.69	-0.0665
				7.13	-0.0737		

NASA FULL SPAN FLAP VPI-8
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 2 DEG REYNOLD'S NO. = 2.195E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	0.2595	12.76	0.2183	20.10	0.2022	27.72	0.2019
5.81	0.2102	12.26	0.1120	19.60	0.1483	27.16	0.1409
5.41	0.1399	11.76	0.0897	19.10	0.0866	26.60	0.0839
5.00	0.0609	11.26	0.0355	18.60	0.0146	26.04	-0.0003
4.59	-0.0478	10.76	-0.0498	18.10	-0.0671	25.47	-0.0840
2.88	-0.1172	9.00	-0.3986	16.13	-0.4373	23.56	-0.3675
1.75	-0.0617	7.88	-0.1487	15.00	-0.3400	22.44	-0.4334
0.63	-0.0575	6.75	-0.0994	13.88	-0.1492	21.31	-0.2441
		5.63	-0.1962	12.75	-0.0915	20.19	-0.2318
		4.50	-0.0931	11.63	-0.1865	19.06	-0.2093
		3.38	-0.1011	10.50	-0.0718	17.94	-0.0741
		2.25	-0.1893	9.38	-0.0737	16.81	-0.0862
				8.25	-0.0833	15.69	-0.0843
				7.13	-0.1072		

NASA FULL SPAN FLAP VPI-8
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 4 DEG REYNOLD'S NO. = 2.192E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	0.1524	12.76	0.1475	20.10	0.1370	27.72	0.1562
5.81	0.1125	12.26	0.0755	19.60	0.0753	27.16	0.0883
5.41	0.0450	11.76	0.0087	19.10	0.0112	26.60	0.0287
5.00	-0.0359	11.26	-0.0237	18.60	-0.0649	26.04	-0.0570
4.59	-0.1521	10.76	-0.1418	18.10	-0.1498	25.47	-0.1409
2.88	-0.2335	9.00	-0.5459	16.13	-0.4051	23.56	-0.4276
1.75	-0.2135	7.88	-0.3120	15.00	-0.5134	22.44	-0.4711
0.63	-0.1053	6.75	-0.1310	13.88	-0.3006	21.31	-0.4228
		5.63	-0.1363	12.75	-0.1893	20.19	-0.3266
		4.50	-0.1386	11.63	-0.1064	19.06	-0.2222
		3.38	-0.2209	10.50	-0.1994	17.94	-0.0904
		2.25	-0.1215	9.38	-0.1001	16.81	-0.0869
				8.25	-0.1115	15.69	-0.0947
				7.13	-0.1370		

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NASA FULL SPAN FLAP VPI-8
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 6 DEG REYNOLD'S NO. = 2.199E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	0.0446	12.76	0.0375	20.10	-0.1384	27.72	0.0772
5.81	0.0055	12.26	0.0290	19.60	-0.0291	27.16	0.0135
5.41	-0.0554	11.76	-0.0897	19.10	-0.0861	26.60	-0.0412
5.00	-0.1330	11.26	-0.1938	18.60	-0.1587	26.04	-0.1233
4.59	-0.2546	10.76	-0.2391	18.10	-0.2432	25.47	-0.2013
2.88	-0.3254	9.00	-0.6675	16.13	-0.5840	23.56	-0.4814
1.75	-0.2081	7.88	-0.5537	15.00	-0.6134	22.44	-0.4964
0.63	-0.1493	6.75	-0.1533	13.88	-0.4871	21.31	-0.4971
		5.63	-0.1754	12.75	-0.3308	20.19	-0.5131
		4.50	-0.1787	11.63	-0.1813	19.06	-0.3910
		3.38	-0.1860	10.50	-0.1135	17.94	-0.1903
		2.25	-0.1606	9.38	-0.1156	16.81	-0.1012
				8.25	-0.1346	15.69	-0.2012
				7.13	-0.1659		

NASA FULL SPAN FLAP VPI-8
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 8 DEG REYNOLD'S NO. = 2.191E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-0.3168	12.76	-0.0891	20.10	-0.1568	27.72	-0.0235
5.81	-0.2002	12.26	-0.0329	19.60	-0.1285	27.16	-0.0694
5.41	-0.1608	11.76	-0.1969	19.10	-0.1760	26.60	-0.1081
5.00	-0.2689	11.26	-0.1771	18.60	-0.2594	26.04	-0.1957
4.59	-0.3657	10.76	-0.3303	18.10	-0.3083	25.47	-0.2743
2.88	-0.4375	9.00	-0.7865	16.13	-0.6495	23.56	-0.5215
1.75	-0.3075	7.88	-0.7576	15.00	-0.6882	22.44	-0.5425
0.63	-0.1987	6.75	-0.1993	13.88	-0.6627	21.31	-0.5191
		5.63	-0.2544	12.75	-0.5546	20.19	-0.5971
		4.50	-0.2195	11.63	-0.3070	19.06	-0.5669
		3.38	-0.2320	10.50	-0.1340	17.94	-0.3848
		2.25	-0.1985	9.38	-0.2141	16.81	-0.2746
				8.25	-0.1563	15.69	-0.1413
				7.13	-0.1899		

NASA FULL SPAN FLAP VPI-8
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 10 DEG REYNOLD'S NO. = 2.211E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-0.7286	12.76	-0.6710	20.10	-0.6448	27.72	-0.3976
5.81	-0.5213	12.26	-0.3300	19.60	-0.5979	27.16	-0.2768
5.41	-0.2739	11.76	-0.2554	19.10	-0.3168	26.60	-0.2071
5.00	-0.3186	11.26	-0.2435	18.60	-0.3471	26.04	-0.2724
4.59	-0.4582	10.76	-0.3538	18.10	-0.3526	25.47	-0.3063
2.88	-0.5088	9.00	-0.8774	16.13	-0.7057	23.56	-0.5359
1.75	-0.3975	7.88	-0.9478	15.00	-0.7522	22.44	-0.5699
0.63	-0.2497	6.75	-0.2751	13.88	-0.7913	21.31	-0.5401
		5.63	-0.2405	12.75	-0.7411	20.19	-0.6409
		4.50	-0.2621	11.63	-0.4547	19.06	-0.6456
		3.38	-0.2798	10.50	-0.1505	17.94	-0.5454
		2.25	-0.2315	9.38	-0.1347	16.81	-0.4250
				8.25	-0.2375	15.69	-0.2208
				7.13	-0.2124		

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NASA FULL SPAN FLAP VPI-8
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 11 DEG REYNOLD'S NO. = 2.184E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-0.8896	12.76	-0.7921	20.10	-0.7810	27.72	-0.5039
5.81	-0.8036	12.26	-0.5657	19.60	-0.8221	27.16	-0.5053
5.41	-0.4339	11.76	-0.5024	19.10	-0.7242	26.60	-0.4344
5.00	-0.3380	11.26	-0.2509	18.60	-0.4663	26.04	-0.3431
4.59	-0.4872	10.76	-0.4144	18.10	-0.3921	25.47	-0.3177
2.88	-0.5574	9.00	-0.8922	16.13	-0.5138	23.56	-0.5495
1.75	-0.4490	7.88	-1.0157	15.00	-0.7484	22.44	-0.5669
0.63	-0.2752	6.75	-0.3406	13.88	-0.7946	21.31	-0.5587
		5.63	-0.2592	12.75	-0.7774	20.19	-0.6498
		4.50	-0.2825	11.63	-0.5672	19.06	-0.6520
		3.38	-0.3016	10.50	-0.2011	17.94	-0.5995
		2.25	-0.2436	9.38	-0.1352	16.81	-0.4854
				8.25	-0.1829	15.69	-0.3045
				7.13	-0.2234		

NASA FULL SPAN FLAP VPI-8
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 12 DEG REYNOLD'S NO. = 2.190E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-1.0332	12.76	-0.9537	20.10	-0.9599	27.72	-0.6349
5.81	-1.0317	12.26	-0.7190	19.60	-0.9812	27.16	-0.6418
5.41	-0.7462	11.76	-0.8927	19.10	-1.0332	26.60	-0.6464
5.00	-0.4788	11.26	-0.3146	18.60	-0.7912	26.04	-0.5864
4.59	-0.4941	10.76	-0.4381	18.10	-0.5106	25.47	-0.4665
2.88	-0.6067	9.00	-0.8795	16.13	-0.7216	23.56	-0.5527
1.75	-0.4905	7.88	-1.0376	15.00	-0.7028	22.44	-0.5679
0.63	-0.2966	6.75	-0.4022	13.88	-0.7442	21.31	-0.5506
		5.63	-0.3002	12.75	-0.7655	20.19	-0.6394
		4.50	-0.3157	11.63	-0.6424	19.06	-0.6349
		3.38	-0.3306	10.50	-0.2920	17.94	-0.5759
		2.25	-0.2560	9.38	-0.1418	16.81	-0.4983
				8.25	-0.1892	15.69	-0.3913
				7.13	-0.2346		

NASA FULL SPAN FLAP VPI-8
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 13 DEG REYNOLD'S NO. = 2.190E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-1.1487	12.76	-1.1415	20.10	-1.1564	27.72	-0.5224
5.81	-1.1980	12.26	-0.8833	19.60	-1.1882	27.16	-0.7458
5.41	-1.0797	11.76	-1.1164	19.10	-1.2676	26.60	-0.7618
5.00	-0.7565	11.26	-0.5200	18.60	-1.0878	26.04	-0.7710
4.59	-0.5729	10.76	-0.5298	18.10	-0.6315	25.47	-0.6983
2.88	-0.6612	9.00	-0.8473	16.13	-0.7299	23.56	-0.5865
1.75	-0.4944	7.88	-1.0700	15.00	-0.6722	22.44	-0.5875
0.63	-0.3169	6.75	-0.4390	13.88	-0.6832	21.31	-0.5512
		5.63	-0.3620	12.75	-0.7222	20.19	-0.6106
		4.50	-0.3578	11.63	-0.6833	19.06	-0.5858
		3.38	-0.3574	10.50	-0.4413	17.94	-0.5298
		2.25	-0.2666	9.38	-0.1853	16.81	-0.4956
				8.25	-0.2043	15.69	-0.4315
				7.13	-0.2489		

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NASA FULL SPAN FLAP VPI-8
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 14 DEG REYNOLD'S NO. = 2.187E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-1.2408	12.76	-1.3195	20.10	-1.3821	27.72	-0.7858
5.81	-1.2937	12.26	-1.0734	19.60	-1.4126	27.16	-0.7958
5.41	-1.3269	11.76	-1.3458	19.10	-1.5128	26.60	-0.8095
5.00	-1.0993	11.26	-0.7718	18.60	-1.3323	26.04	-0.8103
4.59	-0.7282	10.76	-0.6836	18.10	-0.7666	25.47	-0.7570
2.88	-0.7768	9.00	-0.7979	16.13	-0.7736	23.56	-0.7276
1.75	-0.4728	7.88	-1.0259	15.00	-0.7013	22.44	-0.7351
0.63	-0.3419	6.75	-0.4983	13.88	-0.6192	21.31	-0.6321
		5.63	-0.4470	12.75	-0.6339	20.19	-0.6455
		4.50	-0.4372	11.63	-0.6581	19.06	-0.5950
		3.38	-0.3638	10.50	-0.5287	17.94	-0.5302
		2.25	-0.2790	9.38	-0.3073	16.81	-0.4602
				8.25	-0.2701	15.69	-0.4102
				7.13	-0.2826		

NASA FULL SPAN FLAP VPI-8
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 15 DEG REYNOLD'S NO. = 2.179E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-1.3614	12.76	-1.5116	20.10	-1.4334	27.72	-0.7031
5.81	-1.4060	12.26	-1.2073	19.60	-1.4749	27.16	-0.7330
5.41	-1.4639	11.76	-1.6583	19.10	-1.5426	26.60	-0.7647
5.00	-1.3610	11.26	-1.1169	18.60	-1.5976	26.04	-0.7948
4.59	-0.9567	10.76	-0.8358	18.10	-1.2713	25.47	-0.7711
2.88	-0.9915	9.00	-0.7573	16.13	-0.9044	23.56	-0.7829
1.75	-0.4263	7.88	-0.8935	15.00	-0.7818	22.44	-0.9778
0.63	-0.3638	6.75	-0.5627	13.88	-0.6825	21.31	-1.0348
		5.63	-0.5822	12.75	-0.6479	20.19	-1.0336
		4.50	-0.5149	11.63	-0.6049	19.06	-0.7058
		3.38	-0.3864	10.50	-0.5239	17.94	-0.4411
		2.25	-0.2991	9.38	-0.4088	16.81	-0.3298
				8.25	-0.3767	15.69	-0.2864
				7.13	-0.3390		

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NASA FULL SPAN FLAP VPI-8 (ROUNDED HINGELINE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 8 DEG REYNOLD'S NO. = 1.310E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-0.1232	12.76	-0.4898	20.10	-0.1804	27.72	-0.0846
5.81	-0.0990	12.26	-0.1027	19.60	-0.2048	27.16	-0.1626
5.41	-0.1755	11.76	-0.1625	19.10	-0.2684	26.60	-0.2418
5.00	-0.2571	11.26	-0.2655	18.60	-0.3756	26.04	-0.3420
4.59	-0.4137	10.76	-0.3793	18.10	-0.4933	25.47	-0.5385
2.88	-0.3587	9.00	-0.4326	16.13	-0.4400	23.56	-0.4431
1.75	-0.2395	7.88	-0.3132	15.00	-0.3333	22.44	-0.3288
0.63	-0.2119	6.75	-0.2540	13.88	-0.3013	21.31	-0.2859
		5.63	-0.2761	12.75	-0.2675	20.19	-0.2738
		4.50	-0.2307	11.63	-0.2633	19.06	-0.2601
		3.38	-0.2252	10.50	-0.2427	17.94	-0.2074
		2.25	-0.2029	9.38	-0.1888	16.81	-0.1956
				8.25	-0.1954	15.69	-0.2014
				7.13	-0.2064		

NASA FULL SPAN FLAP VPI-8 (ROUNDED HINGELINE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 10 DEG REYNOLD'S NO. = 1.338E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-0.6788	12.76	-0.5905	20.10	-0.8086	27.72	-0.5734
5.81	-0.3904	12.26	-0.7745	19.60	-0.6024	27.16	-0.3461
5.41	-0.2412	11.76	-0.4376	19.10	-0.3722	26.60	-0.3116
5.00	-0.3527	11.26	-0.3517	18.60	-0.4736	26.04	-0.4187
4.59	-0.5269	10.76	-0.4968	18.10	-0.5730	25.47	-0.6141
2.88	-0.4376	9.00	-0.4599	16.13	-0.5469	23.56	-0.5814
1.75	-0.3246	7.88	-0.4219	15.00	-0.4519	22.44	-0.4408
0.63	-0.2659	6.75	-0.3294	13.88	-0.4021	21.31	-0.4007
		5.63	-0.3407	12.75	-0.3334	20.19	-0.3793
		4.50	-0.2796	11.63	-0.3032	19.06	-0.3387
		3.38	-0.2693	10.50	-0.2767	17.94	-0.2642
		2.25	-0.2360	9.38	-0.2456	16.81	-0.2567
				8.25	-0.2443	15.69	-0.2182
				7.13	-0.2332		

NASA FULL SPAN FLAP VPI-8 (ROUNDED HINGELINE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 11 DEG REYNOLD'S NO. = 1.343E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-0.8764	12.76	-0.6163	20.10	-0.9210	27.72	-0.6563
5.81	-0.6608	12.26	-0.8929	19.60	-0.9190	27.16	-0.6154
5.41	-0.3380	11.76	-0.8559	19.10	-0.6858	26.60	-0.4451
5.00	-0.3729	11.26	-0.4835	18.60	-0.5004	26.04	-0.4285
4.59	-0.5693	10.76	-0.5113	18.10	-0.5748	25.47	-0.5519
2.88	-0.4960	9.00	-0.5048	16.13	-0.5885	23.56	-0.6690
1.75	-0.3636	7.88	-0.4701	15.00	-0.5261	22.44	-0.5761
0.63	-0.2949	6.75	-0.3716	13.88	-0.4772	21.31	-0.4957
		5.63	-0.3862	12.75	-0.3951	20.19	-0.4813
		4.50	-0.3096	11.63	-0.3586	19.06	-0.4311
		3.38	-0.2893	10.50	-0.3091	17.94	-0.2967
		2.25	-0.2487	9.38	-0.2605	16.81	-0.2734
				8.25	-0.2569	15.69	-0.2241
				7.13	-0.2481		

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NASA FULL SPAN FLAP VPI-8 (ROUNDED HINGELINE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 12 DEG REYNOLD'S NO. = 1.342E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-1.0054	12.76	-0.6119	20.10	-1.0837	27.72	-0.7637
5.81	-0.9371	12.26	-1.0533	19.60	-1.1117	27.16	-0.7864
5.41	-0.5953	11.76	-1.0904	19.10	-1.0671	26.60	-0.6938
5.00	-0.4112	11.26	-0.8647	18.60	-0.7281	26.04	-0.5652
4.59	-0.6010	10.76	-0.5367	18.10	-0.6100	25.47	-0.5581
2.88	-0.5464	9.00	-0.5494	16.13	-0.6336	23.56	-0.6865
1.75	-0.3952	7.88	-0.5169	15.00	-0.5815	22.44	-0.5867
0.63	-0.3205	6.75	-0.4060	13.88	-0.5248	21.31	-0.5707
		5.63	-0.4220	12.75	-0.4507	20.19	-0.6052
		4.50	-0.3433	11.63	-0.3954	19.06	-0.5065
		3.38	-0.3105	10.50	-0.3318	17.94	-0.3183
		2.25	-0.2662	9.38	-0.2783	16.81	-0.2809
				8.25	-0.2746	15.69	-0.2590
				7.13	-0.2679		

NASA FULL SPAN FLAP VPI-8 (ROUNDED HINGELINE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 13 DEG REYNOLD'S NO. = 1.332E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-1.2270	12.76	-0.6583	20.10	-1.2908	27.72	-0.8943
5.81	-1.2347	12.26	-1.2659	19.60	-1.3183	27.16	-0.9119
5.41	-0.9808	11.76	-1.3542	19.10	-1.3690	26.60	-0.9119
5.00	-0.5732	11.26	-1.2326	18.60	-1.1661	26.04	-0.8231
4.59	-0.6175	10.76	-0.7266	18.10	-0.7010	25.47	-0.7300
2.88	-0.6258	9.00	-0.5907	16.13	-0.6630	23.56	-0.6501
1.75	-0.4328	7.88	-0.5630	15.00	-0.6126	22.44	-0.6304
0.63	-0.3576	6.75	-0.4398	13.88	-0.5557	21.31	-0.6175
		5.63	-0.4642	12.75	-0.5162	20.19	-0.6698
		4.50	-0.3838	11.63	-0.4490	19.06	-0.5706
		3.38	-0.3341	10.50	-0.3758	17.94	-0.3764
		2.25	-0.2820	9.38	-0.2986	16.81	-0.3113
				8.25	-0.2992	15.69	-0.2884
				7.13	-0.2924		

NASA FULL SPAN FLAP VPI-8 (ROUNDED HINGELINE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 14 DEG REYNOLD'S NO. = 1.332E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-1.3729	12.76	-0.7406	20.10	-1.4868	27.72	-0.9733
5.81	-1.4233	12.26	-1.4714	19.60	-1.5190	27.16	-0.9959
5.41	-1.2927	11.76	-1.5836	19.10	-1.6030	26.60	-1.0086
5.00	-0.8790	11.26	-1.5139	18.60	-1.4700	26.04	-0.9690
4.59	-0.6623	10.76	-1.0694	18.10	-0.9048	25.47	-0.8944
2.88	-0.6901	9.00	-0.6110	16.13	-0.6987	23.56	-0.6830
1.75	-0.4517	7.88	-0.5899	15.00	-0.6343	22.44	-0.6914
0.63	-0.3829	6.75	-0.4618	13.88	-0.5671	21.31	-0.6454
		5.63	-0.5182	12.75	-0.5495	20.19	-0.6786
		4.50	-0.4391	11.63	-0.4841	19.06	-0.5923
		3.38	-0.3577	10.50	-0.3996	17.94	-0.4425
		2.25	-0.2967	9.38	-0.3152	16.81	-0.3495
				8.25	-0.3178	15.69	-0.3162
				7.13	-0.3174		

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NASA FULL SPAN FLAP VPI-8 (ROUNDED HINGELINE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 15 DEG REYNOLD'S NO. = 1.328E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-1.5339	12.76	-0.8889	20.10	-1.6751	27.72	-1.0218
5.81	-1.5541	12.26	-1.6624	19.60	-1.7196	27.16	-1.0348
5.41	-1.5425	11.76	-1.8167	19.10	-1.8283	26.60	-1.0726
5.00	-1.2546	11.26	-1.7313	18.60	-1.7126	26.04	-1.0307
4.59	-0.7847	10.76	-1.3528	18.10	-1.0473	25.47	-0.9755
2.88	-0.7742	9.00	-0.6414	16.13	-0.7729	23.56	-0.8902
1.75	-0.4523	7.88	-0.6104	15.00	-0.6546	22.44	-0.9144
0.63	-0.4071	6.75	-0.4808	13.88	-0.5737	21.31	-0.7116
		5.63	-0.5550	12.75	-0.5702	20.19	-0.6524
		4.50	-0.4889	11.63	-0.5169	19.06	-0.5885
		3.38	-0.3730	10.50	-0.4264	17.94	-0.4926
		2.25	-0.3110	9.38	-0.3336	16.81	-0.4000
				8.25	-0.3414	15.69	-0.3165
				7.13	-0.3425		

NASA FULL SPAN FLAP VPI-8 (ROUNDED HINGELINE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 16 DEG REYNOLD'S NO. = 1.320E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-1.1487	12.76	-1.1139	20.10	-1.7504	27.72	-0.9626
5.81	-1.6939	12.26	-1.8645	19.60	-1.7874	27.16	-0.9899
5.41	-1.7795	11.76	-2.0067	19.10	-1.8880	26.60	-1.0288
5.00	-1.6803	11.26	-2.0509	18.60	-1.9209	26.04	-1.0053
4.59	-1.1548	10.76	-1.7675	18.10	-1.6024	25.47	-0.9696
2.88	-0.8786	9.00	-0.6839	16.13	-0.8916	23.56	-0.9001
1.75	-0.4387	7.88	-0.6226	15.00	-0.7345	22.44	-1.1311
0.63	-0.4353	6.75	-0.5177	13.88	-0.6640	21.31	-1.0551
		5.63	-0.6073	12.75	-0.6236	20.19	-0.8324
		4.50	-0.5222	11.63	-0.5327	19.06	-0.6183
		3.38	-0.3945	10.50	-0.4434	17.94	-0.4531
		2.25	-0.3346	9.38	-0.3539	16.81	-0.3332
				8.25	-0.3823	15.69	-0.2908
				7.13	-0.3933		

NASA FULL SPAN FLAP VPI-8 (ROUNDED HINGELINE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 18 DEG REYNOLD'S NO. = 1.314E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-1.8178	12.76	-1.8009	20.10	-1.5581	27.72	-0.6670
5.81	-1.8456	12.26	-2.2417	19.60	-1.5651	27.16	-0.6581
5.41	-1.9298	11.76	-2.3794	19.10	-1.5921	26.60	-0.7087
5.00	-2.0088	11.26	-2.5306	18.60	-1.6295	26.04	-0.7376
4.59	-1.8222	10.76	-2.4473	18.10	-1.6619	25.47	-0.7689
2.88	-1.0801	9.00	-0.6960	16.13	-1.8488	23.56	-0.9052
1.75	-0.4642	7.88	-0.6590	15.00	-1.0248	22.44	-1.0017
0.63	-0.4998	6.75	-0.6408	13.88	-0.6358	21.31	-0.8997
		5.63	-0.7873	12.75	-0.5172	20.19	-0.9611
		4.50	-0.5493	11.63	-0.4374	19.06	-0.7846
		3.38	-0.4090	10.50	-0.3932	17.94	-0.4807
		2.25	-0.3794	9.38	-0.3759	16.81	-0.3029
				8.25	-0.4349	15.69	-0.3063
				7.13	-0.4696		

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NASA FULL SPAN FLAP VPI-8 (ROUNDED HINGELINE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 20 DEG REYNOLD'S NO. = 1.295E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-1.9474	12.76	-2.4920	20.10	-1.4040	27.72	-0.7053
5.81	-1.9706	12.26	-2.4918	19.60	-1.4453	27.16	-0.6949
5.41	-2.0255	11.76	-2.5519	19.10	-1.4375	26.60	-0.7479
5.00	-2.1078	11.26	-2.7179	18.60	-1.4642	26.04	-0.7718
4.59	-2.0688	10.76	-2.7497	18.10	-1.4947	25.47	-0.7934
2.88	-1.0898	9.00	-0.7878	16.13	-2.8430	23.56	-0.9284
1.75	-0.5362	7.88	-0.7716	15.00	-1.5797	22.44	-1.0801
0.63	-0.5951	6.75	-0.8606	13.88	-0.4622	21.31	-0.9872
		5.63	-0.7994	12.75	-0.3607	20.19	-1.0338
		4.50	-0.5065	11.63	-0.4553	19.06	-0.9745
		3.38	-0.4570	10.50	-0.4641	17.94	-0.7716
		2.25	-0.4397	9.38	-0.4526	16.81	-0.5993
				8.25	-0.5267	15.69	-0.4895
				7.13	-0.4853		

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NASA PART SPAN FLAP VPI-10 (NO FUSELAGE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 0 DEG REYNOLD'S NO. = 2.236E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
2.88	-0.2686	12.76	0.2591	20.10	0.2413	27.72	0.2178
1.75	0.0135	12.26	0.2208	19.60	0.1820	27.16	0.1702
0.63	-0.0224	11.76	0.1778	19.10	0.1465	26.60	0.1080
		11.26	0.1069	18.60	0.0858	26.04	0.0438
		10.76	0.0180	18.10	-0.0003	25.47	-0.0189
		9.00	-0.0910	16.13	-0.3423	23.56	-0.3336
		7.88	-0.0714	15.00	-0.0738	22.44	-0.3252
		6.75	-0.0651	13.88	-0.0659	21.31	-0.0922
		5.63	-0.0547	12.75	-0.0444	20.19	-0.0977
		4.50	-0.0444	11.63	-0.0530	19.06	-0.0868
		3.38	-0.0534	10.50	-0.0430	17.94	-0.0686
		2.25	-0.0365	9.38	-0.0464	16.81	-0.0760
				8.25	-0.0612	15.69	-0.0646
				7.13	-0.0850		

NASA PART SPAN FLAP VPI-10 (NO FUSELAGE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 2 DEG REYNOLD'S NO. = 2.284E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
2.88	-0.5420	12.76	0.2086	20.10	0.1952	27.72	0.1793
1.75	-0.0139	12.26	0.1488	19.60	0.1228	27.16	0.1227
0.63	-0.0742	11.76	0.1001	19.10	0.0797	26.60	0.0561
		11.26	0.0215	18.60	0.0153	26.04	-0.0085
		10.76	-0.0712	18.10	-0.0742	25.47	-0.0719
		9.00	-0.3498	16.13	-0.4174	23.56	-0.3921
		7.88	-0.2326	15.00	-0.2746	22.44	-0.4228
		6.75	-0.1307	13.88	-0.1142	21.31	-0.2403
		5.63	-0.1084	12.75	-0.0833	20.19	-0.1518
		4.50	-0.0743	11.63	-0.0802	19.06	-0.0955
		3.38	-0.0922	10.50	-0.0681	17.94	-0.0811
		2.25	-0.0765	9.38	-0.0860	16.81	-0.0881
				8.25	-0.1009	15.69	-0.0847
				7.13	-0.1242		

NASA PART SPAN FLAP VPI-10 (NO FUSELAGE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 4 DEG REYNOLD'S NO. = 2.285E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
2.88	-0.8731	12.76	0.1251	20.10	0.1266	27.72	0.1264
1.75	-0.0546	12.26	0.0572	19.60	0.0460	27.16	0.0638
0.63	-0.1296	11.76	0.0035	19.10	-0.0013	26.60	-0.0050
		11.26	-0.0754	18.60	-0.0688	26.04	-0.0725
		10.76	-0.1723	18.10	-0.1622	25.47	-0.1317
		9.00	-0.5272	16.13	-0.5088	23.56	-0.4584
		7.88	-0.2010	15.00	-0.4502	22.44	-0.4722
		6.75	-0.2822	13.88	-0.2241	21.31	-0.4157
		5.63	-0.1554	12.75	-0.2396	20.19	-0.2809
		4.50	-0.1148	11.63	-0.1010	19.06	-0.1571
		3.38	-0.1342	10.50	-0.1062	17.94	-0.1052
		2.25	-0.1165	9.38	-0.1252	16.81	-0.1048
				8.25	-0.1586	15.69	-0.1007
				7.13	-0.1666		

ORIGINAL PAGE IS
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NASA PART SPAN FLAP VPI-10 (NO FUSELAGE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 6 DEG REYNOLD'S NO. = 2.280E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
2.88	-1.1742	12.76	0.0157	20.10	0.0054	27.72	0.0331
1.75	-0.0981	12.26	-0.0464	19.60	-0.0607	27.16	-0.0188
0.63	-0.1857	11.76	-0.0904	19.10	-0.0989	26.60	-0.0814
		11.26	-0.1789	18.60	-0.1650	26.04	-0.1450
		10.76	-0.2707	18.10	-0.2543	25.47	-0.1994
		9.00	-0.4877	16.13	-0.6020	23.56	-0.5198
		7.88	-0.2830	15.00	-0.6083	22.44	-0.5161
		6.75	-0.4336	13.88	-0.3962	21.31	-0.5051
		5.63	-0.2258	12.75	-0.1676	20.19	-0.4462
		4.50	-0.1511	11.63	-0.1282	19.06	-0.2940
		3.38	-0.1726	10.50	-0.1580	17.94	-0.1655
		2.25	-0.1565	9.38	-0.1625	16.81	-0.1298
				8.25	-0.2486	15.69	-0.0974
				7.13	-0.2012		

NASA PART SPAN FLAP VPI-10 (NO FUSELAGE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 8 DEG REYNOLD'S NO. = 2.270E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
2.88	-1.4499	12.76	-0.0856	20.10	-0.2435	27.72	-0.0830
1.75	-0.1594	12.26	-0.1626	19.60	-0.2007	27.16	-0.1037
0.63	-0.2500	11.76	-0.1918	19.10	-0.1829	26.60	-0.1684
		11.26	-0.2628	18.60	-0.2443	26.04	-0.2222
		10.76	-0.3469	18.10	-0.3445	25.47	-0.2505
		9.00	-0.4708	16.13	-0.6694	23.56	-0.5161
		7.88	-0.4677	15.00	-0.7438	22.44	-0.5620
		6.75	-0.6438	13.88	-0.5393	21.31	-0.5384
		5.63	-0.2868	12.75	-0.2047	20.19	-0.6093
		4.50	-0.1861	11.63	-0.2232	19.06	-0.4844
		3.38	-0.2092	10.50	-0.2469	17.94	-0.2646
		2.25	-0.1945	9.38	-0.3288	16.81	-0.1261
				8.25	-0.3066	15.69	-0.0901
				7.13	-0.2001		

NASA PART SPAN FLAP VPI-10 (NO FUSELAGE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 10 DEG REYNOLD'S NO. = 2.262E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
2.88	-1.6996	12.76	-0.6410	20.10	-0.6869	27.72	-0.5021
1.75	-0.2389	12.26	-0.3208	19.60	-0.6979	27.16	-0.4099
0.63	-0.3154	11.76	-0.3800	19.10	-0.3694	26.60	-0.3408
		11.26	-0.3988	18.60	-0.3137	26.04	-0.2815
		10.76	-0.4330	18.10	-0.3866	25.47	-0.2995
		9.00	-0.5708	16.13	-0.7404	23.56	-0.5494
		7.88	-0.7908	15.00	-0.8224	22.44	-0.6134
		6.75	-0.7878	13.88	-0.3789	21.31	-0.5752
		5.63	-0.2677	12.75	-0.2982	20.19	-0.6325
		4.50	-0.1950	11.63	-0.3231	19.06	-0.5621
		3.38	-0.2872	10.50	-0.4337	17.94	-0.2921
		2.25	-0.2250	9.38	-0.4295	16.81	-0.1443
				8.25	-0.2937	15.69	-0.1482
				7.13	-0.2193		

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NASA PART SPAN FLAP VPI-10 (NO FUSELAGE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 11 DEG REYNOLD'S NO. = 2.263E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
2.88	-1.8525	12.76	-0.9574	20.10	-0.8126	27.72	-0.6102
1.75	-0.2816	12.26	-0.4377	19.60	-0.8539	27.16	-0.6452
0.63	-0.3515	11.76	-0.4846	19.10	-0.7265	26.60	-0.5520
		11.26	-0.5342	18.60	-0.4635	26.04	-0.3930
		10.76	-0.5113	18.10	-0.3803	25.47	-0.3838
		9.00	-0.6172	16.13	-0.7241	23.56	-0.5445
		7.88	-0.9797	15.00	-0.7584	22.44	-0.6016
		6.75	-0.8312	13.88	-0.3882	21.31	-0.5617
		5.63	-0.2467	12.75	-0.3552	20.19	-0.6200
		4.50	-0.2650	11.63	-0.4038	19.06	-0.5439
		3.38	-0.2440	10.50	-0.5380	17.94	-0.3308
		2.25	-0.2867	9.38	-0.4625	16.81	-0.2621
				8.25	-0.3253	15.69	-0.2092
				7.13	-0.2396		

NASA PART SPAN FLAP VPI-10 (NO FUSELAGE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 12 DEG REYNOLD'S NO. = 2.258E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
2.88	-2.0060	12.76	-0.9381	20.10	-0.9816	27.72	-0.7271
1.75	-0.3346	12.26	-0.5554	19.60	-1.0352	27.16	-0.7784
0.63	-0.3619	11.76	-0.5887	19.10	-0.9970	26.60	-0.7483
		11.26	-0.6527	18.60	-0.7074	26.04	-0.6874
		10.76	-0.6283	18.10	-0.4570	25.47	-0.5459
		9.00	-0.6756	16.13	-0.5115	23.56	-0.5296
		7.88	-1.2014	15.00	-0.6517	22.44	-0.4541
		6.75	-0.8329	13.88	-0.3940	21.31	-0.4278
		5.63	-0.2362	12.75	-0.4031	20.19	-0.5463
		4.50	-0.1971	11.63	-0.4009	19.06	-0.5010
		3.38	-0.2548	10.50	-0.6160	17.94	-0.3384
		2.25	-0.2546	9.38	-0.4867	16.81	-0.2446
				8.25	-0.3442	15.69	-0.2885
				7.13	-0.2531		

NASA PART SPAN FLAP VPI-10 (NO FUSELAGE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 13 DEG REYNOLD'S NO. = 2.257E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
2.88	-2.1638	12.76	-0.9083	20.10	-1.1669	27.72	-0.8391
1.75	-0.3877	12.26	-0.6708	19.60	-1.2050	27.16	-0.8812
0.63	-0.4252	11.76	-0.6650	19.10	-1.2372	26.60	-0.8891
		11.26	-0.7598	18.60	-0.9793	26.04	-0.8514
		10.76	-0.7353	18.10	-0.6175	25.47	-0.7085
		9.00	-0.7246	16.13	-0.6902	23.56	-0.5854
		7.88	-1.4741	15.00	-0.5613	22.44	-0.6010
		6.75	-0.8416	13.88	-0.3876	21.31	-0.5211
		5.63	-0.2272	12.75	-0.4179	20.19	-0.3528
		4.50	-0.2706	11.63	-0.5095	19.06	-0.4759
		3.38	-0.2704	10.50	-0.6824	17.94	-0.3141
		2.25	-0.2707	9.38	-0.5081	16.81	-0.2353
				8.25	-0.3492	15.69	-0.2916
				7.13	-0.2691		

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NASA PART SPAN FLAP VPI-10 (NO FUSELAGE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 14 DEG REYNOLD'S NO. = 2.255E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
2.88	-2.2975	12.76	-0.8840	20.10	-1.3358	27.72	-0.8478
1.75	-0.4407	12.26	-0.7532	19.60	-1.3893	27.16	-0.8732
0.63	-0.3983	11.76	-0.7484	19.10	-1.4474	26.60	-0.8964
		11.26	-0.8273	18.60	-1.2180	26.04	-0.9211
		10.76	-0.8254	18.10	-0.7937	25.47	-0.8682
		9.00	-0.7642	16.13	-0.7189	23.56	-0.7446
		7.88	-1.5610	15.00	-0.5001	22.44	-0.7031
		6.75	-0.7783	13.88	-0.3652	21.31	-0.5810
		5.63	-0.2431	12.75	-0.3847	20.19	-0.5820
		4.50	-0.2278	11.63	-0.5483	19.06	-0.4495
		3.38	-0.2883	10.50	-0.6968	17.94	-0.2491
		2.25	-0.2883	9.38	-0.5311	16.81	-0.2404
				8.25	-0.3604	15.69	-0.2528
				7.13	-0.2828		

NASA PART SPAN FLAP VPI-10 (NO FUSELAGE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 15 DEG REYNOLD'S NO. = 2.249E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
2.88	-2.4535	12.76	-0.8860	20.10	-1.4114	27.72	-0.7203
1.75	-0.5258	12.26	-0.8275	19.60	-1.4573	27.16	-0.7822
0.63	-0.4209	11.76	-0.8119	19.10	-1.5738	26.60	-0.7952
		11.26	-0.8984	18.60	-1.4378	26.04	-0.8152
		10.76	-0.9016	18.10	-1.0695	25.47	-0.8023
		9.00	-0.9925	16.13	-0.7868	23.56	-1.0210
		7.88	-1.5962	15.00	-0.4854	22.44	-1.0492
		6.75	-0.8240	13.88	-0.4561	21.31	-0.8040
		5.63	-0.3418	12.75	-0.4795	20.19	-0.6219
		4.50	-0.2901	11.63	-0.4948	19.06	-0.3628
		3.38	-0.3411	10.50	-0.7477	17.94	-0.2445
		2.25	-0.3343	9.38	-0.5571	16.81	-0.3053
				8.25	-0.4416	15.69	-0.3064
				7.13	-0.3230		

ORIGINAL PAGE IS
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NASA PART SPAN FLAP VPI-10 (WITH FUSELAGE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 0 DEG REYNOLD'S NO. = 1.943E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
		12.76	0.5361	20.10	0.1569	27.72	0.4754
		12.26	0.4884	19.60	0.4320	27.16	0.1107
		11.76	0.4345	19.10	0.3862	26.60	0.3349
		11.26	0.3412	18.60	0.3064	26.04	0.2535
		10.76	0.2234	18.10	0.1961	25.47	0.1709
		9.00	0.1012	16.13	-0.2452	23.56	-0.2394
		7.88	0.1106	15.00	0.1120	22.44	-0.2098
		6.75	0.1540	13.88	0.1089	21.31	-0.0557
				12.75	0.1306	20.19	-0.0645
				11.63	0.1225	19.06	-0.0580
				10.50	0.1344	17.94	-0.0456
				9.38	0.1299	16.81	-0.0507
				8.25	0.1212	15.69	-0.0414
				7.13	0.0884		

NASA PART SPAN FLAP VPI-10 (WITH FUSELAGE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 2 DEG REYNOLD'S NO. = 1.952E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
		12.76	0.4688	20.10	0.4481	27.72	0.4276
		12.26	0.3893	19.60	0.3536	27.16	0.3508
		11.76	0.3237	19.10	0.2956	26.60	0.2642
		11.26	0.2214	18.60	0.2086	26.04	0.1779
		10.76	0.0929	18.10	0.0894	25.47	0.0964
		9.00	-0.2151	16.13	-0.3806	23.56	-0.2674
		7.88	0.0398	15.00	-0.1647	22.44	-0.2868
		6.75	0.0875	13.88	-0.0701	21.31	-0.1118
				12.75	-0.0600	20.19	-0.0016
				11.63	0.0747	19.06	-0.0657
				10.50	0.0915	17.94	0.0852
				9.38	-0.0542	16.81	-0.0593
				8.25	-0.0625	15.69	0.0894
				7.13	0.0459		

NASA PART SPAN FLAP VPI-10 (WITH FUSELAGE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 4 DEG REYNOLD'S NO. = 2.244E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
		12.76	0.1132	20.10	0.1141	27.72	-0.0891
		12.26	0.0425	19.60	0.0352	27.16	0.0548
		11.76	-0.0091	19.10	-0.0128	26.60	-0.0141
		11.26	-0.0915	18.60	-0.0806	26.04	-0.0805
		10.76	-0.2463	18.10	-0.2354	25.47	-0.1398
		9.00	-0.4474	16.13	-0.4082	23.56	-0.4717
		7.88	-0.2432	15.00	-0.3984	22.44	-0.3849
		6.75	-0.1330	13.88	-0.2219	21.31	-0.3683
				12.75	-0.1569	20.19	-0.3096
				11.63	-0.2031	19.06	-0.1492
				10.50	-0.1121	17.94	-0.1997
				9.38	-0.2053	16.81	-0.1999
				8.25	-0.1286	15.69	-0.1053
				7.13	-0.1521		

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NASA PART SPAN FLAP VPI-10 (WITH FUSELAGE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 6 DEG REYNOLD'S NO. = 1.956E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
		12.76	0.1759	20.10	0.1693	27.72	0.0107
		12.26	0.0966	19.60	0.0856	27.16	0.1526
		11.76	0.0370	19.10	0.0493	26.60	0.0753
		11.26	-0.1408	18.60	-0.1129	26.04	-0.0097
		10.76	-0.2071	18.10	-0.1754	25.47	-0.0783
		9.00	-0.6090	16.13	-0.4211	23.56	-0.3547
		7.88	-0.2134	15.00	-0.6137	22.44	-0.4927
		6.75	-0.0416	13.88	-0.3253	21.31	-0.4717
				12.75	-0.0774	20.19	-0.3293
				11.63	-0.0945	19.06	-0.1827
				10.50	0.0075	17.94	-0.0082
				9.38	0.0022	16.81	-0.0782
				8.25	-0.1124	15.69	0.0530
				7.13	-0.0408		

NASA PART SPAN FLAP VPI-10 (WITH FUSELAGE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 8 DEG REYNOLD'S NO. = 2.251E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
		12.76	-0.1168	20.10	-0.4128	27.72	-0.2027
		12.26	-0.2118	19.60	-0.2641	27.16	-0.1186
		11.76	-0.2442	19.10	-0.2501	26.60	-0.1828
		11.26	-0.3223	18.60	-0.2706	26.04	-0.2671
		10.76	-0.4337	18.10	-0.3402	25.47	-0.2810
		9.00	-0.5583	16.13	-0.5135	23.56	-0.5479
		7.88	-0.4298	15.00	-0.7775	22.44	-0.5824
		6.75	-0.2607	13.88	-0.6199	21.31	-0.5701
				12.75	-0.2285	20.19	-0.6267
				11.63	-0.1832	19.06	-0.5130
				10.50	-0.2431	17.94	-0.2741
				9.38	-0.1872	16.81	-0.1315
				8.25	-0.2517	15.69	-0.1964
				7.13	-0.2050		

NASA PART SPAN FLAP VPI-10 (WITH FUSELAGE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 10 DEG REYNOLD'S NO. = 1.967E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
		12.76	-1.2536	20.10	-0.7939	27.72	-0.3593
		12.26	-0.1700	19.60	-0.8296	27.16	-0.3404
		11.76	-0.2498	19.10	-0.5253	26.60	-0.3312
		11.26	-0.3344	18.60	-0.2920	26.04	-0.2171
		10.76	-0.3342	18.10	-0.3426	25.47	-0.2349
		9.00	-0.6159	16.13	-0.8308	23.56	-0.5632
		7.88	-0.7297	15.00	-0.8980	22.44	-0.6414
		6.75	-0.1760	13.88	-0.6779	21.31	-0.5816
				12.75	-0.1748	20.19	-0.6228
				11.63	-0.1796	19.06	-0.5155
				10.50	-0.1724	17.94	-0.3154
				9.38	-0.1655	16.81	-0.0837
				8.25	-0.0864	15.69	-0.0797
				7.13	-0.1042		

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NASA PART SPAN FLAP VPI-10 (WITH FUSELAGE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 11 DEG REYNOLD'S NO. = 2.258E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
		12.76	-1.3605	20.10	-0.9323	27.72	-0.6779
		12.26	-0.4219	19.60	-0.9777	27.16	-0.7251
		11.76	-0.4545	19.10	-0.9137	26.60	-0.6516
		11.26	-0.4855	18.60	-0.6216	26.04	-0.5619
		10.76	-0.5417	18.10	-0.4638	25.47	-0.4515
		9.00	-0.6842	16.13	-0.7893	23.56	-0.5898
		7.88	-0.7590	15.00	-0.7985	22.44	-0.6352
		6.75	-0.2896	13.88	-0.6033	21.31	-0.5863
				12.75	-0.3150	20.19	-0.5931
				11.63	-0.3106	19.06	-0.5196
				10.50	-0.3621	17.94	-0.4115
				9.38	-0.2870	16.81	-0.2785
				8.25	-0.2253	15.69	-0.2271
				7.13	-0.2378		

NASA PART SPAN FLAP VPI-10 (WITH FUSELAGE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 12 DEG REYNOLD'S NO. = 2.269E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
		12.76	-1.4362	20.10	-0.7111	27.72	-0.7979
		12.26	-0.8421	19.60	-1.1623	27.16	-0.8381
		11.76	-0.7485	19.10	-1.1723	26.60	-0.8409
		11.26	-0.6876	18.60	-0.8875	26.04	-0.7841
		10.76	-0.6402	18.10	-0.5830	25.47	-0.6199
		9.00	-0.8223	16.13	-0.7285	23.56	-0.5861
		7.88	-0.7780	15.00	-0.7210	22.44	-0.6054
		6.75	-0.2991	13.88	-0.5784	21.31	-0.5544
				12.75	-0.3271	20.19	-0.5655
				11.63	-0.3303	19.06	-0.4799
				10.50	-0.4282	17.94	-0.3513
				9.38	-0.2929	16.81	-0.3247
				8.25	-0.2380	15.69	-0.2206
				7.13	-0.2468		

NASA PART SPAN FLAP VPI-10 (WITH FUSELAGE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 13 DEG REYNOLD'S NO. = 2.272E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
		12.76	-1.4860	20.10	-1.3174	27.72	-0.8802
		12.26	-1.2880	19.60	-1.3565	27.16	-0.9117
		11.76	-1.0038	19.10	-1.4014	26.60	-0.9455
		11.26	-0.9040	18.60	-1.1966	26.04	-0.9114
		10.76	-0.8160	18.10	-0.7529	25.47	-0.7651
		9.00	-1.0462	16.13	-0.7229	23.56	-0.6336
		7.88	-0.7782	15.00	-0.6881	22.44	-0.6349
		6.75	-0.3123	13.88	-0.5176	21.31	-0.5518
				12.75	-0.4154	20.19	-0.5563
				11.63	-0.4484	19.06	-0.4984
				10.50	-0.4854	17.94	-0.3597
				9.38	-0.3142	16.81	-0.3202
				8.25	-0.2601	15.69	-0.2691
				7.13	-0.2582		

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NASA PART SPAN FLAP VPI-10 (WITH FUSELAGE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 14 DEG REYNOLD'S NO. = 2.254E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
		12.76	-1.4351	20.10	-1.5127	27.72	-0.8475
		12.26	-1.4833	19.60	-1.5576	27.16	-0.8776
		11.76	-1.2439	19.10	-1.6130	26.60	-0.9028
		11.26	-1.1250	18.60	-1.5068	26.04	-0.9048
		10.76	-0.9574	18.10	-1.0842	25.47	-0.8698
		9.00	-1.2728	16.13	-0.7943	23.56	-0.9267
		7.88	-0.8337	15.00	-0.6741	22.44	-0.9504
		6.75	-0.3346	13.88	-0.4685	21.31	-0.7047
				12.75	-0.4415	20.19	-0.6199
				11.63	-0.4244	19.06	-0.5053
				10.50	-0.5472	17.94	-0.3737
				9.38	-0.3475	16.81	-0.2872
				8.25	-0.2944	15.69	-0.2747
				7.13	-0.2763		

NASA PART SPAN FLAP VPI-10 (WITH FUSELAGE)
FLAP DEFLECTION: 30 DEG.
ANGLE OF ATTACK = 15 DEG REYNOLD'S NO. = 2.248E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
		12.76	-1.4406	20.10	-1.5906	27.72	-0.7866
		12.26	-1.5264	19.60	-1.6416	27.16	-0.8122
		11.76	-1.3658	19.10	-1.6960	26.60	-0.8576
		11.26	-1.2702	18.60	-1.7077	26.04	-0.8975
		10.76	-1.0831	18.10	-0.8429	25.47	-0.8357
		9.00	-1.4078	16.13	-0.8956	23.56	-0.9821
		7.88	-0.9067	15.00	-0.6664	22.44	-1.2602
		6.75	-0.3536	13.88	-0.4522	21.31	-0.9896
				12.75	-0.3850	20.19	-0.6667
				11.63	-0.4335	19.06	-0.3940
				10.50	-0.5615	17.94	-0.2584
				9.38	-0.3656	16.81	-0.2591
				8.25	-0.3051	15.69	-0.2277
				7.13	-0.2961		

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NASA FULL SPAN FLAP VPI-8 (WITH HALF ANGLE EXT.)
FLAP DEFLECTION: 15 DEG.
ANGLE OF ATTACK = 10 DEG REYNOLD'S NO. = 2.175E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-0.9641	12.76	-1.1647	20.10	-0.9176	27.72	-0.7847
5.81	-1.0630	12.26	-1.2329	19.60	-0.9538	27.16	-0.6639
5.41	-1.0940	11.76	-1.2040	19.10	-1.1931	26.60	-0.5360
5.00	-1.1291	11.26	-1.0675	18.60	-1.1039	26.04	-0.4105
4.59	-0.8602	10.76	-0.5503	18.10	-1.0102	25.47	-0.3715
2.88	-0.6481	9.00	-0.4265	16.13	-0.5713	23.56	-0.4604
1.75	-0.2244	7.88	-0.3558	15.00	-0.4474	22.44	-0.4375
0.63	-0.2591	6.75	-0.3158	13.88	-0.3298	21.31	-0.2780
		5.63	-0.3362	12.75	-0.2786	20.19	-0.3082
		4.50	-0.3269	11.63	-0.2755	19.06	-0.3293
		3.38	-0.2792	10.50	-0.2430	17.94	-0.3911
		2.25	-0.2309	9.38	-0.2259	16.81	-0.3737
				8.25	-0.2350	15.69	-0.1908
				7.13	-0.2597		

NASA FULL SPAN FLAP VPI-8 (WITH HALF ANGLE EXT.)
FLAP DEFLECTION: 15 DEG.
ANGLE OF ATTACK = 11 DEG REYNOLD'S NO. = 2.190E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-1.0281	12.76	-1.2705	20.10	-0.9936	27.72	-0.8212
5.81	-1.0999	12.26	-1.3484	19.60	-0.9730	27.16	-0.8271
5.41	-0.8273	11.76	-1.3920	19.10	-1.1212	26.60	-0.7151
5.00	-1.1861	11.26	-1.3555	18.60	-1.1784	26.04	-0.5797
4.59	-1.0288	10.76	-0.8279	18.10	-1.1845	25.47	-0.4788
2.88	-0.8052	9.00	-0.4300	16.13	-0.7563	23.56	-0.3601
1.75	-0.2223	7.88	-0.4458	15.00	-0.4059	22.44	-0.3229
0.63	-0.2821	6.75	-0.3583	13.88	-0.4190	21.31	-0.2883
		5.63	-0.3858	12.75	-0.2837	20.19	-0.3650
		4.50	-0.3402	11.63	-0.2800	19.06	-0.3942
		3.38	-0.3940	10.50	-0.2459	17.94	-0.3882
		2.25	-0.3761	9.38	-0.2422	16.81	-0.2251
				8.25	-0.2545	15.69	-0.1952
				7.13	-0.2852		

NASA FULL SPAN FLAP VPI-8 (WITH HALF ANGLE EXT.)
FLAP DEFLECTION: 15 DEG.
ANGLE OF ATTACK = 12 DEG REYNOLD'S NO. = 2.181E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-1.0910	12.76	-1.3476	20.10	-1.0784	27.72	-0.8620
5.81	-1.1714	12.26	-1.4008	19.60	-1.0233	27.16	-0.8875
5.41	-1.2450	11.76	-1.4798	19.10	-1.0995	26.60	-0.8308
5.00	-1.3384	11.26	-1.5644	18.60	-1.1634	26.04	-0.7289
4.59	-1.1605	10.76	-1.2477	18.10	-1.2322	25.47	-0.5928
2.88	-0.9539	9.00	-0.4488	16.13	-1.1910	23.56	-0.4151
1.75	-0.2417	7.88	-0.4289	15.00	-0.6581	22.44	-0.3145
0.63	-0.3150	6.75	-0.4675	13.88	-0.3091	21.31	-0.4030
		5.63	-0.4372	12.75	-0.2658	20.19	-0.4819
		4.50	-0.3274	11.63	-0.2575	19.06	-0.4936
		3.38	-0.2843	10.50	-0.2446	17.94	-0.3944
		2.25	-0.2602	9.38	-0.2612	16.81	-0.2237
				8.25	-0.2745	15.69	-0.1871
				7.13	-0.3069		

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NASA FULL SPAN FLAP VPI-8 (WITH HALF ANGLE EXT.)
FLAP DEFLECTION: 15 DEG.
ANGLE OF ATTACK = 13 DEG REYNOLD'S NO. = 2.180E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-1.2086	12.76	-1.3288	20.10	-1.1014	27.72	-0.6981
5.81	-1.2675	12.26	-1.3951	19.60	-1.0272	27.16	-0.7078
5.41	-1.3723	11.76	-1.4062	19.10	-1.0695	26.60	-0.8560
5.00	-1.5273	11.26	-1.4908	18.60	-1.0772	26.04	-0.8131
4.59	-1.3272	10.76	-1.4379	18.10	-1.1789	25.47	-0.6013
2.88	-1.0856	9.00	-0.6048	16.13	-1.4685	23.56	-0.2974
1.75	-0.2724	7.88	-0.5438	15.00	-1.2667	22.44	-0.3314
0.63	-0.4315	6.75	-0.5041	13.88	-0.5087	21.31	-0.3330
		5.63	-0.4785	12.75	-0.3683	20.19	-0.5496
		4.50	-0.4089	11.63	-0.3721	19.06	-0.5383
		3.38	-0.3032	10.50	-0.2606	17.94	-0.3354
		2.25	-0.3956	9.38	-0.2691	16.81	-0.2184
				8.25	-0.2874	15.69	-0.1551
				7.13	-0.3018		

NASA FULL SPAN FLAP VPI-8 (WITH HALF ANGLE EXT.)
FLAP DEFLECTION: 15 DEG.
ANGLE OF ATTACK = 14 DEG REYNOLD'S NO. = 2.184E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-1.3534	12.76	-1.3158	20.10	-1.1226	27.72	-0.5333
5.81	-1.4130	12.26	-1.3343	19.60	-1.0349	27.16	-0.5676
5.41	-1.5354	11.76	-1.3665	19.10	-1.0467	26.60	-0.5638
5.00	-1.7173	11.26	-1.3947	18.60	-1.0695	26.04	-0.6558
4.59	-1.5385	10.76	-1.4630	18.10	-1.0908	25.47	-0.6766
2.88	-1.2078	9.00	-1.1793	16.13	-1.3670	23.56	-0.5219
1.75	-0.3247	7.88	-0.8966	15.00	-1.4722	22.44	-0.5317
0.63	-0.4562	6.75	-0.6123	13.88	-1.3690	21.31	-0.6341
		5.63	-0.4610	12.75	-0.6063	20.19	-0.8124
		4.50	-0.4094	11.63	-0.3696	19.06	-0.8536
		3.38	-0.3321	10.50	-0.2500	17.94	-0.5855
		2.25	-0.3180	9.38	-0.2308	16.81	-0.3421
				8.25	-0.2410	15.69	-0.3262
				7.13	-0.2547		

NASA FULL SPAN FLAP VPI-8 (WITH HALF ANGLE EXT.)
FLAP DEFLECTION: 15 DEG.
ANGLE OF ATTACK = 15 DEG REYNOLD'S NO. = 2.190E 06

PORT ROW 1 X = 42.750		PORT ROW 2 X = 32.125		PORT ROW 3 X = 19.625		PORT ROW 4 X = 7.125	
Y	Cp	Y	Cp	Y	Cp	Y	Cp
6.22	-1.4775	12.76	-1.3639	20.10	-1.1175	27.72	-0.5503
5.81	-1.5630	12.26	-1.3821	19.60	-1.0111	27.16	-0.5275
5.41	-1.6599	11.76	-1.4151	19.10	-1.0223	26.60	-0.5432
5.00	-1.8316	11.26	-1.4684	18.60	-1.0021	26.04	-0.5687
4.59	-1.7494	10.76	-1.5226	18.10	-0.7844	25.47	-0.5766
2.88	-1.3184	9.00	-1.6546	16.13	-1.3935	23.56	-0.5377
1.75	-0.3692	7.88	-1.2849	15.00	-1.8734	22.44	-0.5549
0.63	-0.4771	6.75	-0.5725	13.88	-1.1328	21.31	-0.5994
		5.63	-0.3124	12.75	-0.9333	20.19	-0.6644
		4.50	-0.3997	11.63	-0.3204	19.06	-0.6702
		3.38	-0.4225	10.50	-0.1437	17.94	-0.6572
		2.25	-0.4170	9.38	-0.1592	16.81	-0.4656
				8.25	-0.1923	15.69	-0.3672
				7.13	-0.2583		