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Effects of Varying Podded Nacelle-Nozzle Installations on Transonic Aeropropulsive Characteristics of a Supersonic Fighter Aircraft

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SUMMARY

The aeropropulsive characteristics of an advanced twin-engine fighter designed for supersonic cruise have been investigated in the Langley 16-Foot Transonic Tunnel. The objectives of this investigation were to evaluate the following: (1) the performance characteristics of advanced nonaxisymmetric nozzles installed in various nacelle locations; (2) the effects of thrust-induced forces on overall aircraft aerodynamics; (3) trim characteristics; and (4) thrust reverser performance. The major model variables included nozzle power setting; nozzle duct aspect ratio; forward, mid, and aft nacelle axial locations; inboard and outboard underwing nacelle locations; and underwing and overwing nacelle locations. Thrust-vectoring exhaust nozzle configurations included a wedge nozzle, a two-dimensional convergent-divergent (2-D C-D) nozzle, and a single-expansion ramp nozzle (SERN), all with deflection angles up to 30°. In addition to the nonaxisymmetric nozzles, an axisymmetric nozzle installation was also tested. The use of a canard for trim was also assessed.

The 2-D C-D nozzle, SERN, and axisymmetric nozzle had comparable internal performance at static conditions. The wedge nozzle performance was 3 percent lower than the other nozzles tested. Increasing duct aspect ratio from 1 to 4 did not significantly affect the internal performance of either the wedge nozzle or the SERN.

At zero lift, the 2-D C-D nozzle and SERN configurations had equal untrimmed drag-minus-thrust performance. The wedge nozzle configuration had poorer performance because of low nozzle internal performance. The configurations with either the 2-D C-D nozzle or the SERN also had essentially the same trimmed jet-on drag-minus-thrust polars at a Mach number of 0.87.

The configuration with the 2-D C-D nozzle had better untrimmed drag-minus-thrust performance at zero lift than the configuration with the axisymmetric nozzle for both the dry and the afterburner nozzle power settings. For the afterburner power setting, the configurations with 0° thrust vectoring had nearly equal trimmed jet-on polars at a Mach number of 0.87. For the underwing nacelle location, nozzle aspect ratio effects were small except at a Mach number of 1.20, for which the nozzles with an aspect ratio of 4 had poorer performance because of an increase in nacelle wave drag.

A decrease of 8 to 9 percent in drag due to lift was achieved by 30° thrust vectoring at Mach numbers of 0.60 and 0.87 for the configuration with the 2-D C-D nozzle. There was no effect on drag due to lift at a Mach number of 1.20. Similar results would be expected for the wedge nozzle and the SERN because nozzle type did not affect drag due to lift. Further decreases in drag due to lift were obtainable for the installations having the nozzles with an aspect ratio of 4 because a larger portion of the wing was influenced by the exhaust effects of the higher aspect ratio nozzles. The configuration with 15° thrust vectoring had better trimmed drag minus thrust than that with 0° thrust vectoring (for chosen moment reference center) because the thrust axis, which inclined downward, was located below the model reference axis.

Significant in-flight deceleration capability was demonstrated with the wedge nozzle thrust reverser (duct aspect ratio of 4). Drag-minus-thrust values for

reverse thrust were 94 and 100 percent of drag-minus-thrust values for forward thrust at respective Mach numbers of 0.60 and 0.87.

INTRODUCTION

The mission requirements for the next-generation fighter aircraft may dictate a highly versatile vehicle capable of operating over a wide range of flight conditions. This aircraft will most likely be designed for high maneuverability and agility, will operate in a highly hostile environment, and will possess short take-off and landing (STOL) characteristics to operate from bomb-damaged airfields. An aircraft designed for supersonic cruise may be required to maximize attack options and to minimize exposure to hostile action. Many design guidelines tend to be contradictory for the subsonic and the supersonic speed regimes, and aircraft performance can often be compromised by small changes in mission requirements.

The next-generation aircraft may require additional exhaust system features and capabilities in order that the required aircraft design objectives can be achieved (ref. 1). Nozzle concepts may be required which can improve stealth by reducing infrared signatures and radar cross section, improve maneuverability and STOL potential by using thrust vectoring and reversing, provide acceptable aerodynamic and weight performance, and integrate acceptably with other aircraft systems, particularly flight controls and mechanical systems. The nonaxisymmetric nozzle installed on advanced aircraft may offer the designer the opportunity to satisfy many of these different mission requirements (ref. 2).

Previous studies of advanced engine exhaust systems have been performed on isolated single- and twin-jet wind-tunnel models (refs. 3 to 5). Experimental investigations have also been conducted on models of existing aircraft (refs. 6 to 8) in order to determine the feasibility of using these aircraft as technology demonstrators. However, these configurations were not designed to utilize advanced nozzle concept capabilities to their fullest potential. Studies on models of advanced fighter aircraft designed to use thrust vectoring for maneuver are reported in references 9 to 12.

This paper presents detailed results from a wind-tunnel investigation of an advanced tactical fighter designed for supersonic cruise. This investigation was a cooperative program of NASA Langley Research Center, Boeing Military Airplane Co., and General Electric Co. The results of this investigation are summarized in references 13 and 14 and low-speed results for the same model are presented in reference 15. The effects of wing maneuver devices on the configuration are presented in reference 16.

The objectives of this investigation were to evaluate the following: (1) the performance characteristics of advanced nonaxisymmetric nozzles installed in various nacelle locations; (2) the effects of thrust-induced forces on overall aircraft aerodynamics; (3) trim characteristics; and (4) thrust reverser performance. The wind-tunnel model simulated a Mach 2.0 design 22 230 kg aircraft. The major model geometric variables included nacelle location, nozzle type, and nozzle duct aspect ratio. Thrust-vectoring exhaust nozzle configurations included a wedge nozzle, a single-expansion ramp nozzle (SERN), and a two-dimensional convergent-divergent (2-D C-D) nozzle; all were capable of deflecting thrust up to 30°. A thrust reverser was investigated on the high-aspect-ratio wedge nozzle. In addition to the nonaxisymmetric nozzles, an axisymmetric installation was also tested. The use of a canard for trim was also assessed.

This investigation was conducted in the Langley 16-Foot Transonic Tunnel at Mach numbers from 0.60 to 1.20. Angle of attack was varied from about 0^{o} to 20^{o} and nozzle pressure ratio was varied from about 1.0 (jet off) to about 12.0, depending on nozzle power setting and Mach number.

SYMBOLS

Model forces and moments are referred to the stability axis system with the model moment reference center located at fuselage station (FS) 174.82 cm, which corresponds to $0.28\bar{c}$. Aerodynamic coefficients for the nozzle are for one nozzle and are specified below. The symbols used in the computer-generated tables are given in parentheses in the second column. A discussion of the data-reduction procedure and definitions of the aerodynamic force and moment terms and the propulsion relationships used herein are presented in the section entitled "Data Reduction."

A_e		nozzle exit area, cm^2
A_t		nozzle throat area, cm^2
AR		nozzle duct aspect ratio, ratio of duct width to height upstream of nozzle throat
C_D	(CDAERO)	drag coefficient, $\frac{D}{q_\infty S}$
$C_{D,n}$	(CDAN)	nozzle drag coefficient for one engine, $\frac{D_n}{q_\infty S}$
$C_{D,o}$		C_D at $C_L = 0$
$C_{(D-F)}$	(C(D-F))	drag-minus-thrust coefficient, $\frac{D - F}{q_\infty S}$ $\left(C_{(D-F)} \equiv C_D \text{ at } NPR = 1.0 \text{ (jet off)}\right)$
$C_{(D-F),o}$		$C_{(D-F)}$ at $C_L = 0$
$C_{(D_n-F)}$	(C(DN-F))	nozzle drag-minus-thrust coefficient for one engine, $\frac{D_n - F}{q_\infty S}$
$\Delta C_{D,o,nac}$		incremental nacelle drag coefficient
$C_{F,jet}$	(CFJET)	thrust coefficient along stability axis, $\frac{F}{q_\infty S}$
C_L	(CL)	total lift coefficient including thrust component, $\frac{Lift}{q_\infty S}$
$C_{L,a}$	(CLAERO)	aerodynamic (thrust component removed) lift coefficient $\left(C_{L,a} \equiv C_L \text{ at } NPR = 1.0 \text{ (jet off)}\right)$
$C_{L,a,n}$	(CLAN)	nozzle aerodynamic (thrust component removed) lift coefficient for one engine
$C_{L,n}$	(CLN)	nozzle lift coefficient (including thrust component) for one engine

$C_{L,jet}$	(CLJET)	jet-lift coefficient
$C_{L,o}$		C_L at $\alpha = 0^o$
C_m	(CM)	pitching-moment coefficient (including thrust component), $\frac{\text{Pitching moment}}{q_\infty S\bar{c}}$
	(CMJET)	jet pitching-moment coefficient
	(CMN)	nozzle pitching-moment coefficient (including thrust component) for one engine
	(CT)	gross thrust coefficient, $\frac{F_g}{q_\infty S}$
$\bar{c}$		wing mean geometric chord, 80.46 cm
D		drag, N
D_n		nozzle drag, N
F		thrust along stability axis, N
F_g		gross thrust, N
F_i		ideal isentropic gross thrust, N
F_j		thrust along body axis, N
$F_{N,jet}$		jet normal force, N
M	(MACH)	free-stream Mach number
$\dot{m}$		measured mass flow rate, kg/sec
$\dot{m}_i$		ideal mass flow rate, kg/sec
NPR	(NPR)	nozzle pressure ratio, $\frac{p_{t,j}}{p_\infty}$ or $\frac{p_{t,j}}{p_a}$
p_a		ambient pressure, Pa
$p_{t,j}$		average jet total pressure, Pa
p_∞		free-stream static pressure, Pa
q_∞		free-stream dynamic pressure, Pa
R		gas constant (for $\gamma = 1.3997$), 287.3 J/kg-K
S		wing reference area, 6043.1 cm^2
$T_{t,j}$		jet total temperature, K

α	(ALPHA)	angle of attack, deg
β		nozzle boattail angle, deg
γ		ratio of specific heats, 1.3997 for air
Δ		increment
δ		effective jet-turning angle, measured with respect to model center line, deg
δ'		effective turning angle with respect to the nozzle thrust axis, δ plus the thrust-axis inclination angle for the nozzle of interest, deg
δ_c	(CANALP)	canard incidence angle, positive leading edge up, deg
δ_v		geometric jet-turning angle, positive direction deflects jet flow downward, measured with respect to nozzle thrust axis, deg

Subscripts:

c	canard
cal	calculated
nac	nacelle
p	potential
trim	trimmed
vle	vortex effect at leading edge
vse	vortex effect at side edge
w	wing
wave	wave drag

Abbreviations:

A	aft location of nozzle exit
A/B	maximum afterburner nozzle power setting
axi	axisymmetric
C-D	convergent-divergent
cg	center of gravity
F	forward location of nozzle exit

FS	fuselage station, cm
I	inboard spanwise location of nacelle
M	mid location of nozzle exit
NRP	nozzle reference plane
O	outboard (spanwise) or overwing (vertical) location of nacelle
part A/B	partial afterburner nozzle power setting
SERN	single-expansion ramp nozzle
2-D	two-dimensional
U	underwing vertical location of nacelle
WBL	wing butt line, cm
WL	water line, cm

MODEL

This investigation was conducted with a 10.5-percent-scale model of a twin-engine fighter aircraft designed to cruise at supersonic speeds. A sketch showing the general arrangement of the model and support system is presented in figure 1. Photographs of the model are shown in figure 2. The model featured a high-performance cambered and twisted wing and canard and had two single-engine podded nacelles mounted under the wing. The overall objectives of this investigation dictated a versatile wind-tunnel model with which various nacelle integrations could be evaluated. Nozzle variables included type of nozzle, duct aspect ratio, power setting, thrust vectoring, and thrust reversing.

Wing-Canard-Fuselage Design

The configuration was designed for self-trimming at a cruise speed of Mach 2 and a design lift coefficient of 0.10. The trim condition for the vehicle was established from the criterion that the vehicle be 5 percent unstable subsonically, which resulted in the vehicle being 4 percent stable for the supersonic design case.

The aerodynamic design of the lifting surfaces was accomplished by the use of the FLEXSTAB code (ref. 17). This code uses the aerodynamic influence coefficient method and includes the effects of nonplanar surfaces such as a canard above the wing plane. The method is based upon linearized potential-flow theory with constant-pressure panels. The twist and the camber of both the canard and the wing surfaces are determined simultaneously such that the induced drag is minimized. Figure 3 illustrates the modeling of the vehicle for the FLEXSTAB code and the resulting wing and canard design.

The planform geometry of the wing is shown in figure 4. The wing had a leading-edge sweep of 68°, an aspect ratio of 1.53, a reference area of 6043.1 cm^2, and a wing mean geometric chord of 80.46 cm. The planform geometry of the canard is shown in figure 5. The canard incidence angle was remotely controlled about the canard hinge axis located at FS 117.29 cm. The canard also had 10° dihedral (fig. 5).

Conventional aerodynamic area-ruling design techniques were used to establish the fuselage cross-sectional area distribution.

Nozzle Designs

Four nozzle types (three nonaxisymmetric and one axisymmetric) based upon full-scale concepts were tested. The nonaxisymmetric nozzles represented three generically different types: (1) a two-dimensional wedge with combined internal-external expansion, (2) a two-dimensional convergent-divergent (2-D C-D) design, and (3) a single-expansion ramp with combined internal-external expansion (SERN).

The nozzle designs were based on nozzle throat areas A_t and internal expansion ratios A_e/A_t determined from mission and engine-sizing studies using data provided by General Electric for an advanced engine cycle. Three power settings and associated expansion ratios were tested depending on the nozzle type. These power settings consisted of dry (subsonic cruise) power, partial afterburner (part A/B) power, and maximum afterburner (A/B) power. Other nozzle variables included thrust vectoring, thrust reversing, and aspect ratio. Nozzle aspect ratio in this paper is defined as the ratio of the duct width to height upstream of the nozzle throat. A summary of important geometric parameters for the nozzles tested is given in the following table:

Nozzle type	Power setting	A_t, cm^2	A_e/A_t	Duct AR	Throat AR	δ_v, deg	Thrust reverser
Wedge	Dry	20.00	1.50	1	2.84	0	No
Wedge	Dry	20.00	1.50	4	11.64	0	Yes
Wedge	A/B	31.61	1.50	1	1.83	0,15,30	No
Wedge	A/B	31.61	1.50	4	7.38	0,15,30	No
2-D C-D	Dry	20.00	1.20	1	2.84	0	No
2-D C-D	A/B	31.61	1.50	1	1.83	0,15,30	
SERN	A/B	31.61	1.50	1	1.83	0,15,30	No
SERN	A/B	31.61	1.50	4	7.38	0,15,30	
Axi	Dry	20.00	1.20	(a)	(a)	0	
Axi	Part A/B	25.79	1.35	(a)	(a)	0	No
Axi	A/B	31.61	1.50	(a)	(a)	0	

[a]Not applicable.

<u>Wedge nozzle</u>.- The wedge nozzle model geometry and photographs are shown in figure 6. The low-aspect-ratio (AR = 1) wedge nozzle is shown in figure 6(a) and the high-aspect-ratio (AR = 4) wedge nozzle is shown in figure 6(b). Wedge geometry is given in figure 6(c). The dry power wedge nozzles for both aspect ratios were tested at $\delta_v = 0^{\circ}$ only, whereas the A/B power wedge nozzles for both aspect ratios were tested at $\delta_v = 0^{\circ}$, 15°, and 30°. In addition, the high-aspect-ratio dry power wedge

nozzle was tested with a thrust reverser with and without reverser sidewalls. (See fig. 6(b).) Photographs of the low- and high-aspect-ratio wedge nozzles are shown in figure 6(d).

The full-scale wedge nozzle design features a fixed-geometry cowl (or boattail closure), fully modulated nozzle throat and exit area control, thrust-vectoring and reversing actuation, and airframe-nozzle structural integration. Nozzle area variation is achieved by using a variable-geometry center-body wedge. An actuation and control system provides nozzle exit area variations independent of power settings. Thrust vectoring at A/B or dry power settings is achieved by deflecting the center-body wedge to obtain a double-cambered wedge geometry. Center-body wedge panels are also used during dry power thrust modulation and thrust reversing by using an actuation system that is independent of the power setting and the thrust-vectoring control functions. Previous studies have verified the feasibility of the basic nozzle mechanism design, thrust-vectoring actuation design, and thrust-reversing system (ref. 18).

2-D C-D nozzle.- The 2-D C-D nozzle model geometry is presented in figure 7. The A/B power nozzle (fig. 7(a)) was tested at $\delta_v = 0^\circ$, 15°, and 30°. The dry power nozzle (fig. 7(b)) was tested only at $\delta_v = 0^\circ$. The nozzle aspect ratio was 1. The 2-D C-D nozzle full-scale design allows independent actuation of the throat area control flaps and the divergent flaps. The nozzle expansion ratio can therefore be set, within mechanical limits, independently from the nozzle throat area for good internal performance over a wide variety of flight conditions.

The length of the divergent flaps was selected to provide good internal nozzle performance at the supersonic design point. The flap actuators are integral to the flaps to reduce sidewall thickness. For thrust vectoring, the divergent flaps are differentially actuated. Since the nozzle flow is turned at a relatively low Mach number, high internal performance is maintained during vectored operation.

SERN.- The SERN model geometry and photographs are shown in figure 8. Both SERN's (AR = 1 and 4) were tested only in the A/B power setting at $\delta_v = 0^\circ$, 15°, and 30°. In the full-scale SERN design, nozzle throat area is controlled by the upper ramp convergent flap. Nozzle area ratio can be set by rotating the lower divergent flap during normal forward operation. Flap actuation mechanisms are integrated into the flap structure rather than the sidewalls, minimizing sidewall thickness. Thrust vectoring is accomplished by rotating both the upper ramp and the lower nozzle flap, thus turning the flow near the throat in order to minimize turning losses (primarily subsonic turning). Previous investigations with SERN's (refs. 4 and 5) indicated turning losses of up to 7.5 percent of ideal thrust when the flow was vectored by the rear portion of the upper external ramp (supersonic flow deflection).

Axisymmetric nozzle.- The axisymmetric nozzle model geometry illustrated in figure 9 simulated a hinged-flap, variable-position, convergent-divergent nozzle designed for efficient supersonic cruise. The full-scale hardware has a dual actuation system to vary nozzle throat and exit area independently. This design did not contain thrust-vectoring or thrust-reversing capabilities.

Nacelle Integration

The model was designed to study the effects of various nacelle installations. The nacelle-nozzle integration philosophy shown in figure 10 illustrates the problem of a multiplicity of nacelle locations and nozzle types, thrust alignment, exit plane location relative to the wing trailing edge, boattail closure angle, and potential base regions considered in the nacelle and nozzle model designs. The relatively flat surfaces of the nonaxisymmetric nozzles enabled integration with the wing surface to be simplified considerably, resulting in a smooth transition from the wing upper surface to the nozzle boattail surface. The resulting thrust axis was inclined downward about 5°. (This value varies slightly with configuration for best integration.)

Nacelle locations and configuration code.- The various nacelle-nozzle integration options tested are shown schematically in figure 11. The baseline low-aspect-ratio (AR = 1) inboard underwing nacelle model was specifically tailored to simulate a full-scale propulsion system installation. Model hard-points constrained the geometry of the outboard underwing and inboard overwing nacelles such that the nozzle exit was positioned at the desired location but the nacelle was not completely simulated. However, within the above constraints, the geometry of each nacelle-nozzle combination was then carefully designed to minimize boattail, base, and aerodynamic interference problems.

A three-letter configuration code is used to designate the various nacelle-nozzle exit locations tested. The first letter denotes nacelle spanwise location as follows:

I inboard

O outboard

The second letter denotes nacelle vertical location as follows:

U underwing

O overwing

The third letter denotes axial location of nozzle exit as follows:

F forward

M mid

A aft

A configuration code with an asterisk indicates that that particular location is a variable. For example, IU* indicates the location of nozzle exit is varying, and I*M indicates the nacelle vertical location is varying.

Nacelle general features.- For all locations, each nacelle had a 2° toe-in and had a faired-over inlet. The inlet leading edge was located at approximately FS 180.00 cm for the inboard underwing (IU*) nacelle locations. The installation of the nozzle thrust strain-gage balance (left-hand nacelle only) and the transition-instrumentation section (contains choke plates and nozzle flow instrumentation) common for all the low-aspect-ratio nozzles is shown in figure 12. The instrumentation-nozzle interface location of FS 220.78 cm and water line (WL) 22.88 cm was the same for all the low-aspect-ratio nozzles for the IU* nacelle locations. The thrust-axis inclination angle for each nozzle installation was set by the angle of the forward face of the nozzle flange that attached to the instrumentation section. For the IU* installations, the nozzles were rolled inboard 6.5° (fig. 12).

The installation of the nozzle thrust strain-gage balance (left-hand nacelle only) and the transition-instrumentation section common for the high-aspect-ratio (AR = 4) nozzles is shown in figure 13. Typical right-hand nacelle installations are shown in figure 14 (left side shown). The flow tube connecting the wing to the transition section varied in length depending upon the particular nacelle configuration.

The nacelle metric break for all the nozzle installations using the thrust strain-gage balance was at FS 225.37 cm. Hence, in addition to nozzle internal forces (thrust), any effects due to external flow exerted on the nozzle downstream of FS 225.37 cm are measured by the nozzle thrust strain-gage balance. At the nacelle metric break (fig. 12), a thin Teflon[1] strip was used as a seal to prevent flow into the nacelle. Fuselage station 225.37 cm is indicated in all subsequent IUM nacelle locations even though the thrust strain-gage balance may not be shown.

A summary of the various nacelle-nozzle installations tested is given in the following table:

Nozzle	AR	Spanwise location	Vertical location	Location of nozzle exit	Configuration code	Thrust strain-gage balance
Wedge	1	Inboard	Underwing	Mid	IUM	Yes
Wedge	1	Outboard	Underwing	Mid	OUM	No
Wedge	4	Inboard	Underwing	Mid	IUM	Yes
2-D C-D	1	Inboard	Underwing	Forward	IUF	No
2-D C-D	1	Inboard	Underwing	Mid	IUM	Yes
2-D C-D	1	Inboard	Underwing	Aft	IUA	No
SERN	1	Inboard	Underwing	Mid	IUM	Yes
SERN	4	Inboard	Underwing	Mid	IUM	Yes
SERN	4	Inboard	Overwing	Mid	IOM	No
Axi	(a)	Inboard	Underwing	Aft	IUA	No

[a]Not applicable.

<u>Wedge nozzle installations</u>.- Sketches of the three wedge nozzle nacelle installations are presented in figures 12 to 14. Photographs of these installations are shown in figure 15. The low-aspect-ratio wedge nozzle with the nacelle in the baseline inboard underwing location with the nozzle exit at the mid axial position (IUM) is shown in figure 12. The thrust-axis inclination was 4.17°.

The high-aspect-ratio IUM wedge nozzle installation is shown in figure 13. Note that the shape of this nacelle up to what would be the inlet (approximately FS 180.00 cm) is the same as that for the low-aspect-ratio nozzle installation. The half-round section on the lower surface of the nacelle shown in view A-A of figure 13 and in the top photograph of figure 15 is not only necessary to fit around the

[1]Teflon: Registered trade name of E. I. du Pont de Nemours & Co., Inc.

nozzle thrust strain-gage balance, but would also be required for the installation of a real engine.

The low-aspect-ratio nozzle installed in the outboard underwing position (OUM) is shown in figure 14. This nacelle was moved outboard 7.53 cm from the inboard position, or from 34.3 percent to 49.7 percent of the wing semispan. As mentioned previously, a complete simulation of this nacelle was not possible because of model hard-point constraints. In addition, by keeping the nozzle exit in the mid position, the nacelle would have had to extend forward of the wing leading edge for the same length nacelle of figure 12. The outboard nacelle location represents the approximate maximum outboard position possible when problems associated with one-engine-out operation are considered. It was anticipated that results from this configuration would provide an end point of spanwise nacelle location on thrust-induced vectoring effects.

2-D C-D nozzle installations.- The 2-D C-D nozzle nacelle installations are shown in the sketches of figures 16 and 17 and in the photographs of figure 18. Figure 16 shows the 2-D C-D nozzle installed with the nacelle in the baseline position (IUM) without the nozzle thrust strain-gage balance, although the balance was used for the left-hand nacelle installation. The sketches of figures 16 and 17 again illustrate typical installations for the right-hand nacelle. The 2-D C-D nozzle was also tested with the exit at two other axial locations as indicated in figure 17. The nozzle was tested 7.52 cm forward (IUF) and aft (IUA) of the baseline mid location (IUM).

SERN installations.- Sketches showing the three SERN nacelle installations are presented in figures 19 to 21 and photographs of the high-aspect-ratio installations are shown in figure 22. Figures 19 and 20 show, respectively, the low- and high-aspect-ratio SERN installations with the nacelle in the baseline position (IUM). The nozzle thrust strain-gage balance was used for these two installations. The SERN in the overwing installation (IOM) is shown in figure 21. It was necessary to provide some nacelle fairing below the wing in order to cover the air supply lines to the nozzle. The nozzle exit was raised approximately 6.20 cm from the baseline position.

Axisymmetric nozzle installation.- A sketch and photographs of the axisymmetric nozzle installation are presented in figures 23 and 24, respectively. This nozzle was installed in the inboard underwing aft nozzle exit nacelle position (IUA). The relatively flat surfaces of the nonaxisymmetric nozzles enabled integration with the wing surface to be simplified considerably, resulting in a smooth transition from the wing upper surface to the nozzle boattail surface. (See figs. 12 to 22.) However, the axisymmetric nozzle installation was complicated by the need for a "gutter" interfairing between the nacelle and the wing lower surface. In order to avoid base regions and excessive drag due to flow separation on the nozzle boattail, the aft exit location was selected for the axisymmetric nozzle installation; this position reduced local closure angles in the gutter region. This nozzle was tested without the nozzle thrust strain-gage balance and had its own separate transition-instrumentation section. (See fig. 23.)

APPARATUS AND PROCEDURE

Wind-Tunnel and Support System

This investigation was conducted in the Langley 16-Foot Transonic Tunnel, which is a single-return, atmospheric tunnel with a slotted, octagonal test section and continuous air exchange. Test-section plenum suction is used for speeds above a Mach number of 1.10. A complete description of this facility and operating characteristics can be found in reference 19.

The model was supported in the wind tunnel by a sting-strut support system (figs. 1 and 2) in which the strut replaced the vertical tail. The strut had a NACA 0006 airfoil section with a 60° sweep and maximum thickness of 4.46 cm.

Propulsion Simulation System and Instrumentation

An external high-pressure air system provided a continuous source of clean, dry air at a controlled temperature of about 294 K at the nozzles. The air was brought to a plenum mounted within the wind-tunnel support system ahead of the sting. Here, the flow was divided into two separate flows and passed through remotely controlled flow valves to two critical-flow venturis which were used to determine mass flow rate of the individual nozzles. The air was then routed through the sting-strut and forward through the fuselage from the bottom of the strut, as shown in figure 25. Three bellows were installed in each air line to provide a three-dimensional, flexible air-line bridge across the main balance and model. The air was then routed out through each wing to the nacelles and nozzles. (See fig. 12.)

Round to rectangular transition sections were fabricated for each of the two nozzle aspect ratios. At the end of each transition section, a choke plate and two screens were installed to regulate and smooth the flow prior to entry to the nozzle instrumentation, or charging, station. (See fig. 12.) The transition sections were made to interface with the flow supply pipe on the right and left ducts or with the nozzle thrust strain-gage balance when it was in use, and the sections were common to all nozzle configurations of each aspect ratio. Nine total-pressure probes, arranged in an equal-area-weighted, cruciform fashion, were used to determine average nozzle total pressure in each duct. The values from the total-pressure probes (left- and right-hand sides) were averaged to give overall nozzle total pressure. Two total-temperature probes in each duct measured stagnation temperature of the exhaust flow.

Thrust and external aerodynamic forces and moments on the entire model were measured with a six-component main strain-gage balance which attached directly to the bottom of the strut (fig. 25). A gap between the metric model fuselage and the non-metric vertical-tail support strut prevented grounding of the model main force balance. In addition, a six-component flow-through strain-gage balance was mounted within the left-hand nacelle for some configurations. This balance measured internal nozzle thrust and external aerodynamic forces and moments exerted on the left-hand nozzle aft of the nozzle common connection station (metric break) at FS 225.37 cm (fig. 12). Additional instrumentation was used to measure pressure and temperature of the air flow through the venturis and the internal tare static pressures.

Data Reduction

All data were recorded simultaneously on magnetic tape. Twenty-four frames of data, taken at the approximate rate of one frame per second, were used for each data point. Average values of the recorded data were used to compute standard force and moment coefficients based on wing area and mean geometric chord for reference area and length.

Axial force of the main force balance was corrected for a tare force that resulted from pressurizing the air supply lines and bellows. This tare force was determined by capping off the air supply system at the wings and recording balance data as the lines were pressurized. No corrections because of pressurization were found to be necessary for the other balance components. Normal force and pitching moment of the main force balance were also adjusted to the condition of the free-stream static pressure acting across the gap (metric break) around the support strut. Note that no pressure-area correction for axial force is required for this type support system.

Axial force, pitching moment, and yawing moment of the nozzle thrust strain-gage balance were adjusted to the condition of free-stream static pressure acting across the balance metric break at FS 225.37 cm (fig. 12). Reference 20 gives a more complete description of this procedure.

The reference axis system for the adjusted forces and moments measured by both balances was transferred from the body axis system (WL 26.67 cm) to the stability axis system. Angle of attack α was obtained by applying deflection values (resulting from model and balance bending under aerodynamic loads) and a flow-angularity value to the angle of the model support system. An adjustment of 0.1° for flow angularity was applied, which is the average tunnel upflow angle measured in the Langley 16-Foot Transonic Tunnel.

Thrust-removed aerodynamic force and moment coefficients were obtained by determining the components of thrust in axial force, normal force, and pitching moment and subtracting these values from the measured total (aerodynamic plus thrust) forces and moments. These thrust components at forward speeds were determined from measured static data and were a function of the free-stream static and dynamic pressures. Forces and moments were measured at static conditions with the main force balance for each combination of nozzle, aspect ratio, and thrust-vector angle tested. This procedure retains external flow effects on thrust in the thrust-removed aerodynamic coefficients. These effects, which are generally favorable, are caused by recompression of the external flow on the free expansion surface of either the wedge nozzle or the SERN. Thrust-removed aerodynamic coefficients are

$$C_{L,a} = C_L - C_{L,jet}$$

$$C_D = C_{(D-F)} + C_{F,jet}$$

and thrust-removed nozzle coefficients are

$$C_{L,a,n} = C_{L,n} - \frac{C_{L,jet}}{2}$$

$$C_{D,n} = C_{(D_n-F)} + \frac{C_{F,jet}}{2}$$

Note that tabulated results for nozzle coefficients are for one nozzle.

Nozzle Performance

From the measured axial and normal components of the jet resultant force (determined at static conditions for each vectored-nozzle configuration), the nozzle gross thrust and effective jet-turning angle are defined, respectively, as

$$F_g = \sqrt{F_j^2 + F_{N,jet}^2}$$

and

$$\delta = \tan^{-1}(F_{N,jet}/F_j)$$

where δ is measured with respect to the model center line. The effective turning angle with respect to the nozzle thrust axis δ' is simply δ plus the thrust-axis inclination angle for the nozzle of interest.

The total ideal isentropic gross thrust or exhaust jet momentum for both nozzles is

$$F_i = \dot{m}\sqrt{RT_{t,j}\left(\frac{2\gamma}{\gamma - 1}\right)\left[1 - \left(\frac{p_\infty}{p_{t,j}}\right)^{\frac{\gamma-1}{\gamma}}\right]}$$

where $\dot{m}$ is the mass flow rate measured by the critical-flow venturis and $p_{t,j}$ is the average jet stagnation pressure for both nozzles.

Tests

This investigation was conducted at Mach numbers from 0.60 to 1.20. Angle of attack was varied from about 0° to 20°. Nozzle pressure ratio NPR was varied from jet off (1.0) up to about 12.0, depending on Mach number. Canard incidence angle δ_c was varied from -10° to 15° for selected configurations in order to determine model trim characteristics; canard incidence angle was held at 0° for all other configurations. Reynolds number per meter varied from 9.24×10^6 to 10.56×10^6. All tests were conducted with 0.20-cm-wide boundary-layer transition strips consisting of No. 100 silicon carbide grit sparsely distributed in a thin film of lacquer. These strips were located 5.08 cm from the tips of the forebody nose and the nacelles and on both the upper and lower surfaces of the wings and the canards at 0.51 cm normal to the leading edges.

Basic data for unvectored ($\delta_v = 0^\circ$) nozzle configurations were obtained by varying angle of attack with jet on and with jet off at constant nozzle pressure ratios. Angle of attack was usually varied at only jet-on conditions for vectored configurations. However, some vectored configurations were also tested with jet off at various angles of attack. Model vibration in the lateral plane during thrust vectoring limited the angle-of-attack range for some configurations (for example, the 2-D C-D at $\delta_v = 30^\circ$ at $M = 1.2$).

PRESENTATION OF RESULTS

The aeropropulsive characteristics for selected configurations from this investigation are presented in plotted coefficient and ratio form in figures 26 to 115. Table 1 is an index to the basic data figures and table 2 is an index to the summary figures. All plotted data are for the model untrimmed unless otherwise specified. Table 3 is an index to tables 4 to 49, in which data are given for all the configurations tested. The correlation of computer symbols appearing in the printout with mathematical symbols has been given in the "Symbols" section of the paper. Tabulated data for the nozzle thrust strain-gage balance (flow-through balance mounted in nacelle) are labeled as "Nozzle Characteristics" for those configurations in which the thrust balance was installed, and the values listed are for one nozzle.

DISCUSSION

Nozzle Static Performance

Static ($M = 0$) performance characteristics for the various nozzles showing the effects of power setting, aspect ratio, thrust vectoring, and thrust reversing (where applicable) are presented in figures 26 to 31. These results are summarized in figures 32 to 34. The basic performance parameter for nozzles at static conditions is F_g/F_i, which is the ratio of measured resultant, or gross, thrust to ideal thrust.

Unvectored performance.- Comparisons of the unvectored-nozzle static performance are presented in figure 32. The primary purpose of these comparisons is to show the relative performance levels obtained for the various nonaxisymmetric and axisymmetric nozzles. Figure 32 shows relatively small performance differences between the 2-D C-D and axisymmetric nozzles at the dry (subsonic cruise) power setting, with the 2-D C-D nozzle having slightly higher peak performance levels. This characteristic is consistent with results obtained in previous studies (refs. 4 and 8). Facility air flow limitations prevented the obtaining of static data at the design pressure ratio of the A/B power nozzle models. However, the data trends indicate peak performance levels of the axisymmetric nozzle, the 2-D C-D nozzle, and the SERN are all within 1 percent of ideal thrust of each other. The performance of the wedge A/B power nozzle was approximately 3 percent of ideal thrust lower than the other nozzles, which is consistent with previous studies (refs. 3, 4, and 8).

Increasing the duct aspect ratio from 1 to 4 did not significantly affect the performance of either the wedge nozzle or SERN configuration. The performance level of these nozzles was within 0.5 to 1 percent of ideal thrust relative to the low-aspect-ratio nozzles. (See figs. 26, 27, and 30.)

Vectored performance.- Two different flow turning mechanisms for vectored-thrust operation were used during the investigation. The 2-D C-D nozzle and the SERN simulated full-scale designs with fully articulating expansion surfaces that enabled low Mach number turning of the jet at the nozzle throat. The nozzle throat was repositioned during thrust deflection in an attempt to avoid potential performance losses associated with high Mach number jet deflections. (See figs. 7 or 8.) The wedge nozzle had the double-cambered center-body wedge (fig. 6) to deflect the jet after it had been internally expanded through a combination of supersonic expansion and deflection turning.

A comparison of static vectored-nozzle characteristics for the three nozzles at NPR = 3.5 is shown in figure 33. The effects of nozzle aspect ratio are also presented for the wedge nozzle and the SERN. Incremental-performance comparisons show that there are performance advantages for thrust-vectoring mechanisms with low Mach number turning and repositioning of the nozzle throat. At the nozzle pressure ratio shown, both the 2-D C-D nozzle and the SERN did not experience turning losses during vectored-thrust operation. The performance of the SERN improved for the $\delta_v = 15^{\circ}$ and $\delta_v = 30^{\circ}$ models (fig. 30). Part of the beneficial performance increment obtained with the SERN could have been caused by differences in under-expansion loss characteristics. The effective area ratio of this nozzle may be different when the nozzle is deflected than when it is undeflected, even though the measured geometric (throat) areas are the same. The advantage of low Mach number flow turning is evident when the present SERN results are compared with the nozzle of references 4 and 8, in which the aft portion of the external expansion ramp was used for thrust vectoring. Turning losses as great as 6 percent of ideal thrust were measured for the nozzles of references 4 and 8 during vectored-thrust operation. Expansion characteristics of the 2-D C-D nozzle vectored-thrust geometry were less affected by the geometry differences due to thrust deflection. Loss characteristics of the wedge nozzle of this investigation were similar to data obtained in previous studies (refs. 4 and 8).

The low-aspect-ratio nozzles exhibit similar variations of effective jet-turning angle with geometric deflection angle as did previous nozzles. (See fig. 33.) As indicated, the SERN effective angle through which the flow was turned was essentially the same as the geometric deflection angle, with the 2-D C-D nozzle having a higher effective jet-turning angle. With 30° deflection, the wedge effective jet-turning angle was 23°. At the nozzle pressure ratio shown, the high-aspect-ratio nozzles had similar performance characteristics as the low-aspect-ratio nozzles. Reference 11 shows that the effective jet-turning angle of the high-aspect-ratio wedge nozzle was significantly reduced at NPR = 5.5 with 15° geometric deflection. The current data indicate a sharp increase in effective jet-turning angle above NPR = 4.0 for the high-aspect-ratio wedge nozzle with $\delta_v = 15^{\circ}$ (fig. 27), which was due to flow separation over the top of the wedge. This result is in contrast to the high-aspect-ratio SERN, which maintained higher effective jet-turning angles compared with the wedge nozzle (fig. 30).

Reverser performance.- Thrust reversing was accomplished on the wedge nozzle by deploying panels from the center-body section of the wedge (fig. 6(b)). Reverser sidewalls may be necessary in order to prevent lateral spillage of the exhaust flow around the sides of the reverser panels, which can degrade reverser performance. In general, reverse thrust levels of 50 percent of forward thrust are required for effective reduction of ground roll. Elimination of reverser-panel sidewalls is one means of reducing nozzle weight and complexity.

The effect of reverser sidewalls on the performance of the high-aspect-ratio wedge nozzle thrust reverser is presented in figure 28. A comparison of reverser performance of the high-aspect-ratio (AR = 4) wedge nozzle of this investigation with the wedge nozzle of reference 8 (AR = 1) is shown in figure 34. The nozzle pressure ratio was 2.5 for both nozzles, a value typical for landing. As indicated in the figure, the high-aspect-ratio wedge reverser produced almost 50 percent reverse thrust with the sidewalls on. The wedge reverser of reference 8 produced more than 50 percent reverse thrust with the sidewalls on. Removal of reverser-panel sidewalls on the AR = 1 nozzle reduced reverser performance about 19 percent whereas performance was reduced about 4 percent for the AR = 4 nozzle of the current investigation. The reduced sensitivity of the higher aspect ratio nozzle to reverser panel sidewall installation is caused by a large reduction in the ratio of sidewall flow area to total exhaust flow area. (For the same throat area, the reverser-panel height of the AR = 4 nozzle was about 50 percent less than that of the AR = 1 nozzle.)

A comparison of discharge coefficient, jet-lift coefficient, and turning angle for the high-aspect-ratio wedge nozzle with the reverser stowed and with it deployed is presented in figure 28(b). At NPR < 4.0, there was a large reduction in discharge coefficient due to reverse thrust operation, indicating a decrease in the effective throat area for the nozzle. Ideally there should have been no decrease in the effective throat area because the reverser panels were located downstream of the nozzle throat. The reduction in discharge coefficient shown in figure 28(b) was probably caused by an increase in back pressure due to the reverser panels. It is believed that this is a nozzle-aspect-ratio effect, since unpublished results for a wedge nozzle with AR = 1 (used for the investigation of ref. 8) indicated a decrease in discharge coefficient of about 0.01 due to reverse thrust operation over the entire nozzle pressure range tested. If the reverse-thrust-mode discharge coefficient is significantly lower or higher than the forward-thrust-mode discharge coefficient, engine operation can be adversely affected. Further development of high-aspect-ratio wedge nozzles with reversers would require careful placement of the reverser panels to minimize the effect of reverse thrust operation on discharge coefficient.

An indication of probable asymmetric reduction in throat area between the upper and lower throats of this nozzle during reverse thrust operation is shown by the jet-lift coefficients presented in figure 28(b). If the effective throat areas (upper and lower) were equal, then the jet-lift coefficient would be negative. This was the case for the forward-thrust-mode nozzle, where the effective jet-turning angle δ was nearly equal to the nozzle thrust-axis inclination angle (fig. 10). In this case, the effective jet-turning angle for the reverser would be about 185° (180° plus the thrust-axis inclination angle).

Wing-Body-Canard Aerodynamics

Basic characteristics.- Basic wing-body-canard longitudinal aerodynamic characteristics (nacelle off) are presented in figure 35. Data for the canard off are also shown. At angles of attack up to about 4°, addition of the canard at $\delta_c = 0^{\circ}$ had no significant effect on lift. This indicates, as do earlier studies, that the additional lift associated with a close-coupled canard mounted on or above the wing plane is counteracted by a comparable loss in wing lift because of the canard downwash flow field. At angles of attack above 4°, the model with the canard on produced more lift, and the lift curve remains nearly linear with increasing angle of attack. This effect was probably caused by favorable interference between the canard and wing flow fields which resulted in a delay in the breakdown of the vortices on the wing.

The effect of canard deflection on drag coefficient shown in figure 35 is also typical for close-coupled canard configurations and indicates that trimming this vehicle at canard deflections between -5° and 0° would result in minimum trim drag. At lift coefficients greater than 0.35, the configuration with canard deflections between -10° and 0° had less drag than the configuration without the canard. Pitching-moment characteristics shown in figure 35 are also typical for this type of configuration.

Comparison with theory.- A comparison of the experimental lift with theoretical lift at $M = 0.60$ and $\delta_c = 0^{\circ}$ is presented in figure 36. The lift curve for the potential-flow case $(C_{L,p,w} + C_{L,p,c})$ was predicted with the method of reference 21 and the vortex-lift case $\left((C_{L,p} + C_{L,vle} + C_{L,vse})_w + C_{L,p,c}\right)$ with the method of reference 22. Only the canard potential lift was used in the estimate for the vortex-lift case because experimental results indicate that canards of this type do not develop any significant vortex lift. As shown in figure 36, the agreement between theory (with vortex effects included) and experiment is excellent. Similar results not presented were found at $M = 0.87$.

The drag data are also compared to drag estimates for both zero and full leading-edge suction in figure 36. Since the wing for this configuration was designed for supersonic speeds, it has a sharp leading edge and the experimental drag should compare well to the curve for zero leading-edge suction. However, the agreement between theory and experiment is not good, probably because wing camber effects produced some distributed suction, which tends to reduce the drag.

Component Drag Characteristics

The zero-lift drag characteristics for the configuration with the low-aspect-ratio SERN's are presented in figure 37 for Mach numbers from 0.60 to 1.20. For each Mach number shown, the left bar is the measured drag coefficient and the right bar is the predicted drag coefficient. The predicted drag coefficient is composed of profile drag coefficient at $M = 0.60$ and 0.87 and profile plus wave drag coefficient at $M = 1.20$.

The differences shown between the measured and predicted zero-lift drag are primarily due to interference and camber effects at subsonic speeds and due to the faired-over inlet. The effect of the faired-over inlet is believed to be small at subsonic speeds. Results from reference 23 for a twin-engine fighter indicate increments in drag coefficient because of faired-over inlets of 0.0008 to 0.0020 at $M = 0.60$ and 0 to 0.0009 at $M = 0.90$. The magnitude of these increments was dependent upon nozzle power setting and aft-end geometry.

For $M = 1.20$, it is possible to estimate the effect of the faired-over inlet by computing the wave drag for the configuration with the faired-over inlet (model) and with an inlet (airplane). This increment is shown in figure 37.

Installed Nacelle-Nozzle Characteristics

Total aerodynamic characteristics and thrust-removed aerodynamic characteristics for some of the various nacelle-nozzle configurations (including thrust-vectoring configurations) are shown in figures 38 to 78. The drag-minus-thrust results for $\delta_v = 0^{\circ}$ only are summarized in figures 79 to 85. Jet-off incremental nacelle drag coefficients at zero lift for the various nacelle-nozzle combinations tested are presented in the upper portion of the figures. The incremental nacelle drag coefficient is the difference between the total jet-off drag coefficient for a particular configuration and the total wing-body-canard drag coefficient (nacelle off) at $C_L = 0$.

The lower portions of figures 79 to 85 present the zero-lift drag-minus-thrust performance (wing-body-canard-nacelle configurations) for the various nacelle-nozzle combinations. It should be noted that increasing magnitude of negative numbers for $C_{(D-F)}$ indicates improved configuration performance (lower drag or higher thrust). With both $\Delta C_{D,o,nac}$ and $C_{(D-F),o}$ on the same figure, it becomes easier to see how both the jet-off nozzle installation (drag) and the nozzle thrust performance affect the aeropropulsive characteristics of the various nacelle-nozzle combinations.

Effects of nozzle type.- The effects of installing the various types of nonaxisymmetric nozzles in the baseline nacelle location (IUM) are shown for AR = 1 and 4 in figures 79 and 80, respectively. Figure 81 presents a comparison of the 2-D C-D and axisymmetric nozzles for both dry and A/B power settings with the nacelles in the IUA position.

In general, the differences in incremental nacelle drag coefficient at zero lift between all configurations were small at subsonic speeds. The configuration with the low-aspect-ratio (AR = 1) wedge nozzle had the least incremental nacelle drag at all Mach numbers because of reduced closure area. The difference between the configuration with the 2-D C-D nozzle and with the wedge nozzle (AR = 4) was 0.0019 at M = 1.20. The higher nacelle drag for the 2-D C-D nozzle at supersonic speeds is partly attributed to higher nozzle drag. The difference in nozzle drag coefficient for these same two configurations at M = 1.20 was found to be 0.0030, with the 2-D C-D nozzle having higher drag. (See tables 8 and 24.) A contributing factor to this increase in nozzle drag was the discontinuity of the external contour of the 2-D C-D nozzle in the A/B position (fig. 7). In contrast, the wedge nozzle had a smooth contour because of its fixed cowl (fig. 6). Similarly, the 2-D C-D nozzle had higher incremental nacelle drag than did the smooth axisymmetric nozzle when mounted in the aft position for both power settings (fig. 81).

The jet-off drag for the low-aspect-ratio wedge nozzle was lower than for the SERN and for the 2-D C-D nozzle in the IUM position over the lift coefficient range, as shown in figures 41(a), 42(a), and 43(a). Because of its smooth, fixed cowl and lower boattail angle, the wedge nozzle was expected to have lower jet-off drag than the other two nonaxisymmetric nozzle types. Similarly, the axisymmetric nozzles (both dry and A/B power setting) had lower jet-off drag over the lift coefficient range than did the 2-D C-D nozzle in the IUA position (figs. 49(a), 50(a), 51(a), 52(a), and 53(a)). The data for the axisymmetric nozzle represented by the dashed line (e.g., fig. 49(b)) was obtained by interpolating between data measured at two values of NPR for the desired NPR.

When the nozzle types are compared at jet-on conditions, however (NPR > 1.0), the relative performance position of the nozzle types changes. The poor internal performance of the wedge nozzle (fig. 32) resulted in both the SERN and the 2-D C-D nozzle configurations having better drag-minus-thrust performance (more negative values of $C_{(D-F),o}$) than the wedge nozzle at all Mach numbers for both aspect ratios (figs. 79 and 80). A comparison of the performance of the low-aspect-ratio SERN and 2-D C-D nozzle at subsonic speeds indicates that both had essentially equivalent performance at zero lift. At M = 1.20, favorable jet interference on the 2-D C-D nozzle resulted in this nozzle type having the best drag-minus-thrust performance, which is opposite of the jet-off drag trends. Examining jet-on drag-minus-thrust polars for the three nozzle types in figures 38(a), 39(a), and 40(a) shows that the 2-D C-D nozzle and the SERN types had almost the same levels of drag minus thrust over the lift coefficient range whereas the wedge nozzle type always had lower performance.

Similarly, the 2-D C-D nozzle configurations had better drag-minus-thrust performance at zero lift (fig. 81) over the lift coefficient range than did the axisymmetric nozzle configurations (figs. 47 and 48). Part of the reason for the lower performance of the axisymmetric nozzle is its lower internal thrust performance, as shown in figure 32. The lower performance of the axisymmetric installation may also be influenced by detrimental propulsion-induced effects because of the "gutter," even though this configuration had lower nacelle drag than the configuration with the 2-D C-D nozzle.

Effects of aspect ratio.- The effects of nozzle aspect ratio on incremental nacelle drag for both the wedge nozzle and the SERN installed in the baseline IUM nacelle position are shown in the upper part of figure 82. Increasing nozzle aspect ratio increased nacelle drag at all the Mach numbers tested. At subsonic Mach numbers the increases were small. At $M = 1.20$, part of this increase in incremental nacelle drag coefficient was calculated to be an increase in wave drag coefficient of 0.0048, which resulted from an increase in volume of the high-aspect-ratio nacelle-nozzle combination. This increase in volume results from an increase in cross-sectional area of the nacelle because of the external transition sections which are necessary to go from the inlet (same for both aspect ratios) to the round engine and then to the high-aspect-ratio nozzle. For this installation these external sections must be relatively longer and more gradual for the high-aspect-ratio nozzle than for the low-aspect-ratio nozzle in order to reduce the potential for flow separation. Nacelle volume may be reduced by redesigning the inlet from half-round to elliptical.

The difference in the incremental nacelle drag coefficient between the low- and high-aspect-ratio wedge nozzles occurred over the entire lift range for the three Mach numbers tested (figs. 57(a), 58(a), and 59(a)). However, for the SERN (figs. 65(a), 66(a), and 67(a)), there was no difference in the jet-off drag polars above a lift coefficient of 0.3 except at $M = 1.20$, for which the drag characteristics were similar to those for the wedge nozzles shown in figure 59(a).

Although the incremental nacelle drag coefficients were higher for the high-aspect-ratio nozzle installations than for the low-aspect-ratio nozzle installations, jet-on drag-minus-thrust performance for $AR = 4$ at $M = 0.60$ was equal to or better than that for $AR = 1$. (See fig. 82.) At $M = 0.87$, drag-minus-thrust performance of the $AR = 1$ nozzle installations was only slightly better than that of the $AR = 4$ nozzle installations. These results indicate that propulsion-induced (jet interference) effects were more beneficial on the $AR = 4$ nozzle installations than on the $AR = 1$ nozzle installations at subsonic speeds. As shown in figures 54(a) and 55(a), drag-minus-thrust performance of the two aspect ratio installations was nearly equal up to about $C_L = 0.3$ for the wedge nozzle configurations. For the SERN configurations, both aspect ratio nozzles have nearly identical jet-on polars (figs. 62(a) and 63(a)).

Effects of nacelle-nozzle location.- The effects of nozzle exit location and nacelle location on incremental nacelle drag and drag-minus-thrust performance are shown in figures 83 to 85. The effects of varying nozzle exit axial location for the configuration with the low-aspect-ratio ($AR = 1$) 2-D C-D nozzles are shown in figure 83. At $M = 0.60$ and 0.87, incremental nacelle drag increased as the nozzle exit was moved aft, which occurred because of an increase in friction drag. However, at $M = 1.20$, just the opposite was true, as the incremental nacelle drag decreased as the nozzle exit was moved aft. This decrease in drag is attributed to a decrease in wave drag which probably results from an improved area distribution of the configuration. However, at $M = 1.20$, similar trends in drag-minus-thrust performance are not present, which indicates that the propulsion-induced jet effects are more detrimental for the mid nozzle installation. (See fig. 83.)

The effects of nacelle spanwise location on incremental nacelle drag and drag-minus-thrust performance for the low-aspect-ratio wedge nozzle are presented in figure 84. There was a small increase in drag-minus-thrust performance as the nacelle was moved outboard. However, even though there was a small increase in performance, this nacelle location would probably not be considered because of engine-out problems. In addition, thrust-induced effects at $\delta_v = 15^{\circ}$ were essentially the same as those for the nacelle in the inboard position (ref. 13).

The effects on incremental nacelle drag and drag-minus-thrust performance for the high-aspect-ratio SERN installed under the wing (IUM) and over the wing (IOM) are presented in figure 85. With the exception of the underwing-overwing comparison at $M = 1.20$, the effects of nacelle location on both incremental nacelle drag and drag-minus-thrust performance were generally small. At $M = 1.20$, the overwing nacelle installation had lower nacelle drag and better drag-minus-thrust performance (more negative values of $C_{(D-F),o}$) than the underwing installation because of lower wave drag. The purpose of the overwing configuration (simulating a wing-buried engine) was to obtain a relatively "clean" flow field under the wing. This was largely accomplished with the model hardware, except a fairing was necessary on the lower wing surface to cover air supply lines. Consequently, this nacelle was smaller than the underwing configuration and hence had less wave drag. However, in this instance, these summary results may be misleading. Drag-minus-thrust polars for these configurations (figs. 70(a), 71(a), and 72(a)) indicate that at subsonic speeds the underwing configuration had better drag-minus-thrust performance at the higher lift coefficients than did the overwing configuration. Even at $M = 1.20$, for which the overwing configuration showed much better performance at $C_L = 0$ (fig. 85), the overwing configuration only had better drag-minus-thrust performance than the underwing configuration below $C_L = 0.3$. The reason for this phenomenon is that the overwing configuration produces less lift at all Mach numbers than does the underwing configuration at the same angle of attack. At the high lift coefficients (which result in higher angles of attack for the overwing configuration), there is a drag penalty associated with the increased angle of attack necessary for a given lift level for the overwing configuration.

Effects of Thrust Vectoring

The effects of thrust vectoring on the total and thrust-removed aerodynamic characteristics are presented in figures 86 to 100 for the three nacelle installations tested with the SERN. The results shown are for the nacelle under the wing with the low-aspect-ratio nozzle (figs. 86 to 90) and with the high-aspect-ratio nozzle (figs. 91 to 95) and for the nacelle over the wing with the high-aspect-ratio nozzle (figs. 96 to 100). As thrust-vectoring angle increased at subsonic Mach numbers, there was the typical "crossover" of the individual drag-minus-thrust polars, with the crossovers occurring at successively higher lift coefficients. Similar results were obtained for the other nacelle-nozzle installations tested.

Vectored-thrust incremental effects.- The effects of thrust vectoring on incremental lift and drag for various nozzle types, for various nozzle exit locations, and for various aspect ratios and vertical exit locations are presented in figures 101 to 103. These increments were obtained by taking the difference between thrust-removed coefficients for configurations with thrust vectoring ($\delta_v > 0^{\circ}$) and thrust-removed coefficients for the configurations without thrust vectoring ($\delta_v = 0^o$) at $\alpha = 0^o$ and 10^o. It should be noted that these increments include the jet-off aerodynamic "flap" effects that result from deflecting either the upper and lower nozzle flaps or the wedge. Jet-off flap forces are summarized in figure 104 for those configurations at $\alpha = 0^o$ and $\delta_v = 30^o$.

The results shown in figures 101 to 103 generally show that the thrust-induced effects are beneficial to both lift and drag. That is, jet operation increases lift and decreases drag. However, the jet-off nozzle flap forces make up a significant portion of the increments shown. For example, 50 to 83 percent of the incremental lift is due to the flap effect (fig. 101(a) or 101(c)) and, for these cases, the nozzle flap drag increment is actually larger than the jet-on increment.

The effects of varying nozzle type on the incremental thrust-removed aerodynamic forces with the baseline (IUM) nacelle installation are presented in figure 101. In general, the effects of nozzle type on incremental lift and drag were small, although the 2-D C-D nozzle generally produced the highest incremental lift. The increases in ΔC_D for the nozzles with $\delta_v = 30^o$ at $\alpha = 0^o$ were due to the jet-off aerodynamic drag on the deflected flaps (fig. 104), whereas at $\alpha = 10^o$, increases in ΔC_D were due to both nozzle flap drag and drag due to lift. The overall effects of thrust vectoring on the aircraft drag due to lift is addressed in the next section.

Since jet-off data were not obtained for all vectored-nozzle configurations, an assessment in terms of the usual gain factor (ref. 20) for thrust-induced or supercirculation lift capabilities of the three nozzles shown in figure 101 cannot be made. This is because jet-off nozzle flap lift is included in the jet-on incremental lift term $\Delta C_{L,a}$. However, for those configurations in which jet-off data were measured at $\delta_v > 0^o$, a gain factor can be determined as follows:

$$\text{Gain factor} = \frac{(\Delta C_{L,a} - \Delta C_{L,o}) + C_{L,jet}}{C_{L,jet}}$$

where $\Delta C_{L,a}$ at NPR > 1.0 and $\Delta C_{L,o}$ at NPR = 1.0 can be obtained from figures 101 and 104, respectively, and $C_{L,jet}$ is given in the tabulated results. The gain factor for the 2-D C-D nozzle was 1.35 for $M = 0.60$, $\alpha = 0^o$, and NPR = 3.0, which is considerably lower than that from previous studies (refs. 8, 10, and 20). Two reasons for this lower gain factor are the longitudinal location of the nozzle exit with respect to the wing and the underwing position of the nozzle. A previous study (ref. 24) indicated no induced lift due to vectoring for a round jet in which the nozzle exit was rotated below the wing.

During this investigation, other nacelle-nozzle installations were studied that were more conducive to increasing induced lift due to vectoring. For example, the 2-D C-D nozzle was tested with the exit at two alternative longitudinal locations (fig. 17). As shown in figure 102, incremental lift was nearly doubled when the nozzle exit was moved to the forward position (exit near the wing trailing edge).

Increasing nozzle aspect ratio is another means of increasing induced lift. This is illustrated in figure 103, in which incremental lift is compared for the three nacelle installations of the SERN. At some conditions, $\Delta C_{L,a}$ more than doubled as aspect ratio was increased from 1 to 4. Similar results were found for the wedge nozzle (ref. 13). In addition, further increases in $\Delta C_{L,a}$ are evident as the nozzle exit was moved from under to over the wing. This improvement in induced lift may have resulted from the vectored jet exhaust inducing higher local velocities over the wing upper surface because of flow entrainment. Or it could be that the change in lift due to thrust vectoring was greater for the overwing installation because of its poorer overall unvectored lift characteristics.

Drag-due-to-lift characteristics.- The use of thrust vectoring at or near the trailing edge of a wing can reduce drag due to lift by improving the wing span load distribution (ref. 20). Drag-due-to-lift characteristics for the configuration with the 2-D C-D nozzle installed at the nacelle baseline position (IUM) are presented in figure 105, in which $C_D - C_{D,o}$ is shown as a function of $C_{L,a}^2$. As indicated in the upper portion of the figure, jet operation had no effect on drag due to lift for the unvectored nozzle ($\delta_v = 0^o$). However, there was about a 5-percent decrease in drag due to lift at $M = 0.60$ and 0.87 simply by vectoring the 2-D C-D nozzles to $\delta_v = 30^o$ at jet-off conditions. This decrease resulted from the flap effects of the 2-D C-D nozzle. As expected, there was no effect on drag due to lift at $M = 1.20$. At jet-on conditions, drag due to lift was further reduced such that there was a total 8- to 9-percent reduction from the configuration with the unvectored nozzle ($\delta_v = 0^o$) at NPR = 1.0 to the one with the vectored nozzle ($\delta_v = 30^o$) at NPR (jet on) at subsonic speeds.

Drag-due-to-lift characteristics are compared in figure 106 for the configurations with the low-aspect-ratio wedge nozzle, 2-D C-D nozzle, and SERN. As would be expected from the small effect of nozzle type on $\Delta C_{L,a}$ shown previously in figure 101, there was no effect of nozzle type on drag due to lift at these conditions. Figure 107 shows that increasing the SERN aspect ratio from 1 to 4 decreased drag due to lift 6.5 percent at $M = 0.60$ (NPR = 3.0) and 9.5 percent at $M = 0.87$ (NPR = 3.9). This probably resulted from a further improvement of the span load distribution (load distributed over a wider portion of the wing) because of the higher aspect ratio. The total improvement in drag due to lift for the AR = 4 SERN installation at $M = 0.60$ from $\delta_v = 0^o$ and NPR = 1.0 to $\delta_v = 30^o$ and NPR = 3.0 was probably between 12 and 14 percent, since the AR = 4 wedge nozzle installation experienced a 13-percent reduction in drag due to lift (ref. 13). Note that the drag-due-to-lift characteristics of the AR = 4 SERN installed above the wing were approximately equal to the AR = 1 SERN installed below the wing. This result was expected, since the overwing nacelle installation had poorer lift and thrust-removed polar characteristics relative to the underwing installation. (See, for example, fig. 73(a) or 74(a).)

Trimmed Aerodynamic Characteristics

The previous discussion of nacelle-nozzle integration effects has dealt only with untrimmed jet-on drag-minus-thrust polars. The lift and drag increments associated with trimming the vectored-thrust induced lift and drag can negate any benefits of thrust vectoring. To understand the trim characteristics of this model, it is helpful to review the resulting moment contributions from various force inputs (fig. 108). For this configuration, the nozzle gross thrust at $\delta_v = 0^o$ induces a nose-up pitching moment because the thrust axis is located below the moment reference center (cg). For thrust-vectoring angles greater than about 5^o, a nose-down pitching moment results from the nozzle thrust. This angle is a function of the cg location. It should be noted that an adjustment has been made to the pitching-moment data to account for the faired-over inlet. Addition of the nacelle with the faired-over inlet caused a C_m shift at $C_L = 0$ of about 0.046 (nose up). In order to account for the faired-over inlet, an assumed value of 0.02 was subtracted from the untrimmed pitching moment over the entire angle-of-attack range. The wing-body-canard data of figure 35 were used to trim the configuration.

Trimmed drag-minus-thrust polars are presented in figure 109 for the baseline (IUM) nacelle configuration with the 2-D C-D nozzle at $\delta_v = 0^o$, 15^o, and 30^o for $M = 0.87$ and NPR = 3.9. The best trimmed drag-minus-thrust performance over the entire angle-of-attack range tested occurred for the configuration with $\delta_v = 15^o$. This also occurred at $M = 0.60$ and NPR = 3.0 (ref. 16) and most likely would be true at $M = 1.20$. These results are due to the canard deflections required to trim the thrust-induced pitching moments. The canard deflection required to trim and the resulting trimmed drag increments are presented in figure 110. At angles of attack up to 10^o, a canard deflection of -12^o to -14^o was required to trim the configuration at $\delta_v = 0^o$ whereas only -4.5^o to -5.5^o canard deflection was necessary at $\delta_v = 15^o$. Figure 35 indicates that trimming this vehicle with canard deflections between -5^o and 0^o will result in minimum trim drag. As shown in figure 110, there was essentially no trim drag penalty between $\alpha = 0^o$ and 10^o for $\delta_v = 15^o$. These results indicate a potential benefit for trimming and control of the vehicle by using thrust-vectoring nozzles. Similar results were indicated in reference 12.

The effects on trimmed jet-on polars of various nacelle-nozzle installations are shown in figures 111 to 113. Figure 111 indicates essentially the same trimmed jet-on polar for either the 2-D C-D nozzle or the SERN installed in the baseline nacelle position. The poorer performance for the wedge nozzle configuration resulted from the lower internal performance of this nozzle. At $\delta_v = 0^o$, moving the 2-D C-D nozzle exit to the aft position had little effect, and the configuration with the axisymmetric nozzle had essentially the same performance as the configuration with the 2-D C-D nozzle (fig. 112).

The effects of varying nozzle aspect ratio or nozzle exit vertical location on trimmed jet-on polars are presented in figure 113. Increasing the aspect ratio from 1 to 4 for the SERN at either $\delta_v = 15^o$ or 30^o had essentially no effect on the polars. Similar results were found for the configuration with the wedge nozzle. However, there was a significant decrease in performance for the AR = 4 SERN installed over the wing, particularly at $\delta_v = 30^o$. With the nozzle in this position, there was a larger nose-down moment to trim which required canard deflections 5^o to 7^o greater than when the nozzle was located under the wing.

In-Flight Thrust-Reversing Characteristics

Thrust reversing is an effective means for decelerating an aircraft in flight (ref. 2). High throttle settings can be maintained, thereby taking advantage of the significant engine air flow ram drag component in addition to the reversed gross thrust. Operation of this type of reverser eliminates the need to "spool up" the engine from an idle power setting and reduces time to reaccelerate to the desired speed. Although no definite requirements for in-flight reverse thrust levels have been established, an in-flight reverse thrust (drag direction) of 30 percent of forward thrust was assumed in some early studies summarized in reference 2. However, for landing operation, reverse thrust levels of 50 percent of forward thrust are desirable for effective ground-roll reduction. Some limited thrust reverser tests were conducted with the high-aspect-ratio wedge nozzles in the current investigation (fig. 6(b)). The reverser was tested with and without reverser-panel sidewalls. These sidewalls are intended to prevent spillage of the exhaust flow around the sides of the reverser panels.

In-flight thrust-reversing characteristics are presented in figures 114 and 115. Significant deceleration capability is indicated. Thrust reverser effectiveness, which is the ratio of $C_{(D-F)}$ at reversed-thrust conditions to $C_{(D-F)}$ at forward-thrust conditions, varies from 0.94 at $M = 0.60$ to 1.00 at $M = 0.87$ (at $C_L = 0$). These values far exceed the assumed in-flight goal of 30-percent reverse thrust and exceed the values at static conditions (fig. 34). This increase in reverser effectiveness at forward speeds results from significant base drag on the rear face of the deployed reverser panels (ref. 3). There is about a 6-percent reduction in reverser effectiveness with the reverser sidewalls off when compared with the configuration with sidewalls on. It should be noted that in order to achieve 30-percent reverse thrust, the reverser would have to be deployed to some intermediate position.

Moment characteristics (ref. 14) show no sharp change occurred because of reverser operation. However, there could be adverse effects on trailing-edge flap effectiveness such as those shown in reference 16. Additional testing is required to evaluate the effects of the reverser exhaust flow on lateral stability and control.

CONCLUSIONS

An investigation has been conducted in the Langley 16-Foot Transonic Tunnel to determine the aeropropulsive characteristics of an advanced tactical fighter designed for supersonic cruise. The objectives of this investigation were to evaluate the following: (1) the performance characteristics of advanced nonaxisymmetric nozzles installed in various nacelle locations; (2) the effects of thrust-induced forces on overall aircraft aerodynamics; (3) trim characteristics; and (4) thrust reverser performance. The major model variables included nozzle power setting; nozzle duct aspect ratio; forward, mid, and aft nacelle axial locations; inboard and outboard underwing nacelle locations; and underwing and overwing nacelle locations. Thrust-vectoring exhaust nozzle configurations included a wedge nozzle, a two-dimensional convergent-divergent (2-D C-D) nozzle, and a single-expansion ramp nozzle (SERN), all with deflection angles up to 30°. In addition to the nonaxisymmetric nozzles, an axisymmetric nozzle installation was also tested. The use of a canard for trim was also assessed.

The results of this investigation indicate the following:

1. The 2-D C-D nozzle, the SERN, and the axisymmetric nozzle had comparable internal performance at static conditions. The wedge nozzle performance was 3 percent lower than the other nozzles tested. Increasing duct aspect ratio from 1 to 4 did not significantly affect the internal performance of either the wedge nozzle or the SERN.

2. At zero lift, the 2-D C-D nozzle and SERN configurations had equal untrimmed drag-minus-thrust performance. The wedge nozzle configuration had poorer performance because of low nozzle internal performance. The configurations with either the 2-D C-D nozzle or SERN also had essentially the same trimmed jet-on drag-minus-thrust polars at a Mach number of 0.87.

3. The configuration with the 2-D C-D nozzle had better untrimmed drag-minus-thrust performance at zero lift than the configuration with the axisymmetric nozzle for both the dry and the afterburner nozzle power settings. For the afterburner power setting, the configurations without thrust vectoring had nearly equal trimmed jet-on polars at a Mach number of 0.87.

4. For the underwing nacelle location, nozzle aspect ratio effects were small except at a Mach number of 1.20, for which the high-aspect-ratio nozzles (aspect ratio of 4) had poorer performance because of an increase in nacelle wave drag.

5. A decrease of 8 to 9 percent in jet-on drag due to lift was achieved by thrust vectoring 30° at Mach numbers of 0.60 and 0.87 for the configuration with the 2-D C-D nozzle. There was no effect on drag due to lift at a Mach number of 1.20. Similar results would be expected for the wedge nozzle and the SERN because nozzle type did not affect drag due to lift. Further decreases in drag due to lift were obtainable for the installations with the high-aspect-ratio nozzles, as a larger portion of the wing is influenced by the exhaust effects of the higher aspect ratio nozzles.

6. The configuration with 15° thrust vectoring had better trimmed drag minus thrust than the one with 0° thrust vectoring (for the chosen moment reference center) because the thrust axis, which inclined downward, was located below the model reference axis.

7. Significant in-flight deceleration capability was demonstrated with the wedge nozzle thrust reverser (duct aspect ratio of 4). Drag-minus-thrust values for reverse thrust were 94 and 100 percent of drag-minus-thrust values for forward thrust at respective Mach numbers of 0.60 and 0.87.

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TABLE 1.- INDEX TO BASIC DATA FIGURES

Figure	Nacelle installation	Nozzle	AR	Power setting	δ_v, deg	δ_c, deg	M	NPR	Remarks
				Nozzle static performance characteristics					
26	IUM	Wedge	Variable	Dry	0	(a)	0	Variable	
27	↓	Wedge	Variable	A/B	Variable	↓	↓	↓	
28	↓	Wedge	4	Dry	0	↓	↓	↓	Reverser performance
29	↓	2-D C-D	4	Variable	Variable	↓	↓	↓	
30	↓	SERN	Variable	A/B	Variable	↓	↓	↓	
31	IUA	Axi	(a)	Variable	0	↓	↓	↓	
				Wing-body-canard aerodynamic characteristics					
35	(a)	(a)	(a)	(a)	(a)	Variable	Variable	(a)	
				Comparison of nonaxisymmetric nozzle types					
38	IUM	Variable	1	A/B	Variable	0	0.60	3.0	Total aerodynamic characteristics
39	↓	↓	↓	↓	↓	↓	.87	3.9	Total aerodynamic characteristics
40	↓	↓	↓	↓	↓	↓	1.20	6.6	Total aerodynamic characteristics
41	↓	↓	↓	↓	↓	↓	.60	1.0, 3.0	Thrust-removed characteristics
42	↓	↓	↓	↓	↓	↓	.87	1.0, 3.9	Thrust-removed characteristics
43	↓	↓	↓	↓	↓	↓	1.20	1.0, 6.6	Thrust-removed characteristics
44	↓	↓	↓	↓	0	↓	Variable	Variable	Thrust removed, $\alpha = 4^{\circ}$
45	↓	↓	↓	↓	15	↓	Variable	Variable	Thrust removed, $\alpha = 4^{\circ}$
46	↓	↓	↓	↓	30	↓	Variable	Variable	Thrust removed, $\alpha = 4^{\circ}$
				Comparison of 2-D C-D and axisymmetric nozzle characteristics					
47	IUA	Variable	1	Dry	0	0	Variable	Variable	Total aerodynamic characteristics
48	↓	↓	↓	A/B	↓	↓	Variable	Variable	Total aerodynamic characteristics
49	↓	↓	↓	Dry	↓	↓	0.60	1.0, 3.0	Thrust-removed characteristics
50	↓	↓	↓	Dry	↓	↓	.87	1.0, 3.9	↓
51	↓	↓	↓	A/B	↓	↓	.60	1.0, 3.0	↓
52	↓	↓	↓	A/B	↓	↓	.87	1.0, 3.9	↓
53	↓	↓	↓	A/B	↓	↓	1.20	1.0, 6.6	↓
				Effects of nozzle aspect ratio					
54	IUM	Wedge	Variable	A/B	Variable	0	0.60	3.0	Total aerodynamic characteristics
55	↓	↓	↓	↓	↓	↓	.87	3.9	Total aerodynamic characteristics
56	↓	↓	↓	↓	↓	↓	1.20	6.6	Total aerodynamic characteristics
57	↓	↓	↓	↓	↓	↓	.60	1.0, 3.0	Thrust-removed characteristics
58	↓	↓	↓	↓	↓	↓	.87	1.0, 3.9	Thrust-removed characteristics
59	↓	↓	↓	↓	↓	↓	1.20	1.0, 6.6	Thrust-removed characteristics
60	↓	↓	↓	↓	0	↓	Variable	Variable	Thrust removed, $\alpha = 4^{\circ}$
61	↓	↓	↓	↓	15	↓	Variable	Variable	Thrust removed, $\alpha = 4^{\circ}$
62	↓	SERN	↓	↓	Variable	↓	0.60	3.0	Total aerodynamic characteristics
63	↓	↓	↓	↓	↓	↓	.87	3.9	Total aerodynamic characteristics
64	↓	↓	↓	↓	↓	↓	1.20	6.6	Total aerodynamic characteristics
65	↓	↓	↓	↓	↓	↓	.60	1.0, 3.0	Thrust-removed characteristics
66	↓	↓	↓	↓	↓	↓	.87	1.0, 3.9	Thrust-removed characteristics
67	↓	↓	↓	↓	↓	↓	1.20	1.0, 6.6	Thrust-removed characteristics
68	↓	↓	↓	↓	0	↓	Variable	Variable	Thrust removed, $\alpha = 4^{\circ}$
69	↓	↓	↓	↓	15	↓	Variable	Variable	Thrust removed, $\alpha = 4^{\circ}$

[a]Not applicable.

TABLE 1.- Concluded

Figure	Nacelle installation	Nozzle	AR	Power setting	δ_v, deg	δ_c, deg	M	NPR	Remarks
Effects of nozzle vertical location and aspect ratio									
70	Variable	SERN	4	A/B	Variable	0	0.60	3.0	Total aerodynamic characteristics
71							.87	3.9	Total aerodynamic characteristics
72							1.20	6.6	Total aerodynamic characteristics
73							.60	1.0, 3.0	Thrust-removed characteristics
74							.87	1.0, 3.9	Thrust-removed characteristics
75							1.20	1.0, 6.6	Thrust-removed characteristics
76			Variable				.60	Variable	Thrust removed, $\alpha = 4^\circ$
77			Variable				.87	Variable	Thrust removed, $\alpha = 4^\circ$
78			Variable				1.20	Variable	Thrust removed, $\alpha = 4^\circ$
Effects of thrust vectoring									
86	IUM	SERN	1	A/B	Variable	0	Variable	Variable	Total aerodynamic characteristics
87							Variable		Thrust-removed characteristics
88							0.60		
89							.87		
90							1.20		
91			4				Variable		Total aerodynamic characteristics
92							Variable		Thrust-removed characteristics
93							0.60		
94							.87		
95							1.20		
96	IOM						Variable		Total aerodynamic characteristics
97							Variable		Thrust-removed characteristics
98							0.60		
99							.87		
100							1.20		
Effects of thrust reversing									
114	IUM	Wedge	4	Dry	0	0	Variable	Variable	Total aerodynamic characteristics
115	IUM	Wedge	4	Dry	0	0	Variable	Variable	Thrust-removed characteristics

TABLE 2.- INDEX TO SUMMARY FIGURES

Figure	Nacelle installation	Nozzle	AR	Power setting	δ_v, deg	δ_c, deg	M	NPR	Parameters or remarks
Comparisons of nozzle static performance									
32	(a)	Variable	1	Variable	0	(a)	0	Variable	F_g/F_i
33	(a)	Variable	Variable	A/B	Variable	(a)	0	3.5	$\Delta F_g/F_i$ and δ'
34	(a)	Wedge	4	Dry	0	(a)	0	2.5	F_g/F_i
Jet-off aerodynamic characteristics									
36	Off	(a)	(a)	(a)	(a)	0	0.60	1.0	Comparison to theory
37	Off	(a)	(a)	(a)	(a)	0	Variable	1.0	Component $C_{D,o}$
Installed nacelle-nozzle characteristics									
79	IUM	Variable	1	A/B	0	0	Variable	Variable	$\Delta C_{D,o,nac}$ and $C_{(D-F),o}$
80	IUM	↓	4	↓	↓	↓	↓	↓	↓
81	IUA	↓	1	↓	↓	↓	↓	↓	↓
82	IUM	↓	Variable	↓	↓	↓	↓	↓	↓
83	Variable	2-D C-D	1	↓	↓	↓	↓	↓	↓
84	Variable	Wedge	1	↓	↓	↓	↓	↓	↓
85	Variable	SERN	4	↓	↓	↓	↓	↓	↓
Thrust-induced effects									
101	IUM	Variable	1	A/B	Variable	0	Variable	Variable	$\Delta C_{L,a}$ and ΔC_D
102	IU*	2-D C-D	1	↓	15	↓	↓	Variable	$\Delta C_{L,a}$ and ΔC_D
103	I*M	SERN	Variable	↓	Variable	↓	↓	Variable	$\Delta C_{L,a}$ and ΔC_D
104	Variable	Variable	Variable	↓	30	↓	↓	1.0	$\Delta C_{L,o}$ and $\Delta C_{D,o}$
105	IUM	2-D C-D	1	↓	Variable	↓	↓	Variable	$C_D - C_{D,o}$ and $C_{L,a}^2$
106	IUM	Variable	1	↓	Variable	↓	↓	Variable	$C_D - C_{D,o}$ and $C_{L,a}^2$
107	I*M	SERN	Variable	↓	Variable	↓	↓	Variable	$C_D - C_{D,o}$ and $C_{L,a}^2$
Trimmed effects									
108	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	Force diagram
109	IUM	2-D C-D	1	A/B	Variable	Variable	0.87	3.9	$C_{L,trim}$ and $C_{(D-F),trim}$
110	IUM	2-D C-D	↓	↓	Variable	↓	↓	↓	$\delta_{c,trim}$ and $\Delta C_{D,trim}$
111	IUM	Variable	↓	↓	15	↓	↓	↓	$C_{L,trim}$ and $C_{(D-F),trim}$
112	IU*	Variable	↓	↓	0, 15	↓	↓	↓	$C_{L,trim}$ and $C_{(D-F),trim}$
113	I*M	SERN	Variable	↓	15, 30	↓	↓	↓	$C_{L,trim}$ and $C_{(D-F),trim}$

[a]Not applicable.

TABLE 3.- INDEX TO TABULATED DATA

Table	Nacelle installation	Nozzle	AR	Power setting	A_e/A_t	δ_v, deg
4, 5	IUM	Wedge	1	Dry	1.50	0
6	↓	↓	4	Dry	↓	0
7, 8	↓	↓	1	A/B	↓	0
9, 10	↓	↓	↓	↓	↓	15
11, 12	↓	↓	↓	↓	↓	30
13	OUM	↓	↓	↓	↓	0
14	OUM	↓	↓	↓	↓	15
15, 16	IUM	↓	4	↓	↓	0
17, 18	IUM	↓	4	↓	↓	15
19	IUM	↓	4	↓	↓	30
20	IUA	2-D C-D	1	Dry	1.20	0
21	IUF	↓	↓	A/B	1.50	0
22	IUF	↓	↓	↓	↓	15
23, 24	IUM	↓	↓	↓	↓	0
25, 26	IUM	↓	↓	↓	↓	15
27, 28	IUM	↓	↓	↓	↓	30
29	IUA	↓	↓	↓	↓	0
30	IUA	↓	↓	↓	↓	15
31, 32	IUM	SERN	1	A/B	1.50	0
33, 34	↓	↓	1	↓	↓	15
35, 36	↓	↓	1	↓	↓	30
37, 38	↓	↓	4	↓	↓	0
39, 40	↓	↓	↓	↓	↓	15
41	↓	↓	↓	↓	↓	30
42	IOM	↓	↓	↓	↓	0
43	IOM	↓	↓	↓	↓	15
44	IOM	↓	↓	↓	↓	30
45	IUA	Axi	(a)	Dry	1.20	0
46	IUA	Axi	(a)	Part A/B	1.35	0
47	IUA	Axi	(a)	A/B	1.50	0
48, 49	IUM	Wedge[b]	4	Dry	1.50	0

[a]Not applicable.
[b]Thrust reverser data.

TABLE 4.- AERODYNAMIC CHARACTERISTICS: IUM WEDGE NOZZLE, AR = 1, DRY POWER SETTING, $\delta_v = 0^o$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
.87	.00	1.01	.01	-.1004	.0205	.0622	-.1004	.0205	0.0000	0.0000	0.0000	0.0000
.87	2.00	1.01	-.01	-.0173	.0170	.0588	-.0173	.0170	0.0000	0.0000	0.0000	0.0000
.87	4.01	1.02	-.04	.0655	.0188	.0592	.0655	.0188	0.0000	0.0000	0.0000	0.0000
.87	5.98	1.02	-.11	.1478	.0254	.0640	.1478	.0254	0.0000	0.0000	0.0000	0.0000
.87	7.99	1.02	-.17	.2465	.0412	.0662	.2465	.0412	0.0000	0.0000	0.0000	0.0000
.87	10.01	1.01	-.20	.3555	.0673	.0670	.3555	.0673	0.0000	0.0000	0.0000	0.0000
.87	14.99	1.00	-.31	.6319	.1696	.0640	.6319	.1696	0.0000	0.0000	0.0000	0.0000
.87	18.48	.99	-.36	.8097	.2691	.0633	.8097	.2691	0.0000	0.0000	0.0000	0.0000
.87	.01	3.31	-.03	-.1034	-.0176	.0666	-.1004	.0196	-.0030	.0372	.0048	.0373
.87	3.98	3.29	-.10	.0633	-.0193	.0629	.0637	.0176	-.0004	.0369	.0047	.0369
.87	10.00	3.30	-.25	.3582	.0292	.0700	.3547	.0662	.0035	.0370	.0048	.0371
.87	18.49	3.31	-.41	.8269	.2342	.0656	.8179	.2703	.0089	.0361	.0048	.0372
.87	-.00	5.71	-.06	-.1081	-.0562	.0723	-.1019	.0200	-.0062	.0763	.0094	.0765
.88	1.99	5.72	-.09	-.0203	-.0599	.0688	-.0168	.0165	-.0035	.0764	.0093	.0764
.87	3.97	5.70	-.14	.0628	-.0591	.0683	.0637	.0179	-.0009	.0770	.0094	.0770
.87	6.00	5.70	-.20	.1526	-.0517	.0728	.1508	.0252	.0019	.0769	.0094	.0769
.87	7.98	5.70	-.25	.2551	-.0359	.0743	.2505	.0411	.0045	.0770	.0094	.0772
.87	9.99	5.72	-.29	.3647	-.0100	.0746	.3575	.0669	.0072	.0768	.0094	.0772
.87	15.00	5.69	-.40	.6512	.0944	.0709	.6373	.1702	.0139	.0758	.0094	.0771
.87	18.47	5.70	-.44	.8319	.1938	.0710	.8134	.2689	.0185	.0751	.0095	.0773
.87	-.02	7.87	-.09	-.1085	-.0940	.0764	-.0993	.0189	-.0092	.1129	.0136	.1133
.87	3.98	7.92	-.16	.0646	-.0968	.0732	.0659	.0170	-.0013	.1138	.0137	.1138
.87	10.00	7.90	-.31	.3698	-.0466	.0800	.3592	.0665	.0106	.1131	.0137	.1136
.87	18.51	7.91	-.46	.8465	.1608	.0745	.8193	.2710	.0272	.1102	.0137	.1135
.87	4.00	11.36	-.21	.0683	-.1551	.0782	.0702	.0167	-.0019	.1717	.0205	.1717
.80	3.99	5.39	-.20	.0669	-.0675	.0646	.0678	.0169	-.0009	.0844	.0104	.0844
.60	-.02	1.00	-.11	-.0831	.0173	.0482	-.0831	.0173	0.0000	0.0000	0.0000	0.0000
.60	2.01	1.00	-.12	-.0070	.0149	.0476	-.0070	.0149	0.0000	0.0000	0.0000	0.0000
.60	3.98	1.00	-.14	.0663	.0161	.0488	.0663	.0161	0.0000	0.0000	0.0000	0.0000
.60	6.02	1.00	-.16	.1434	.0226	.0541	.1434	.0226	0.0000	0.0000	0.0000	0.0000
.60	7.99	1.00	-.16	.2333	.0368	.0581	.2333	.0368	0.0000	0.0000	0.0000	0.0000
.60	9.99	1.00	-.18	.3339	.0599	.0609	.3339	.0599	0.0000	0.0000	0.0000	0.0000
.60	15.00	.99	-.23	.5921	.1532	.0723	.5921	.1532	0.0000	0.0000	0.0000	0.0000
.60	19.10	.99	-.26	.8003	.2670	.0836	.8003	.2670	0.0000	0.0000	0.0000	0.0000
.60	.00	2.00	-.08	-.0864	-.0191	.0524	-.0838	.0169	-.0025	.0360	.0047	.0361
.60	4.00	2.01	-.11	.0676	-.0201	.0527	.0677	.0159	-.0000	.0360	.0047	.0360
.60	9.98	2.01	-.15	.3419	.0245	.0637	.3381	.0604	.0037	.0359	.0047	.0361
.60	19.01	2.00	-.23	.8133	.2317	.0855	.8040	.2664	.0093	.0347	.0047	.0359
.60	-.01	3.21	-.05	-.0901	-.0573	.0574	-.0842	.0167	-.0059	.0740	.0096	.0743
.60	2.02	3.20	-.07	-.0079	-.0602	.0564	-.0045	.0143	-.0033	.0745	.0096	.0745
.60	3.98	3.20	-.08	.0668	-.0588	.0577	.0676	.0156	-.0008	.0744	.0096	.0744
.60	5.99	3.21	-.09	.1451	-.0524	.0624	.1433	.0219	.0018	.0743	.0096	.0744
.60	7.99	3.20	-.12	.2439	-.0370	.0658	.2395	.0371	.0044	.0741	.0096	.0743
.60	9.98	3.20	-.14	.3456	-.0140	.0682	.3386	.0600	.0070	.0740	.0096	.0743
.60	15.00	3.21	-.19	.6144	.0816	.0786	.6010	.1547	.0134	.0731	.0096	.0743
.60	19.02	3.21	-.22	.8266	.1954	.0899	.8080	.2674	.0185	.0719	.0096	.0743
.60	.00	4.31	-.04	-.0931	-.0966	.0625	-.0840	.0165	-.0091	.1131	.0142	.1134
.60	3.99	4.31	-.07	.0665	-.0972	.0624	.0677	.0154	-.0012	.1126	.0141	.1126
.60	9.98	4.30	-.12	.3477	-.0531	.0730	.3370	.0598	.0106	.1129	.0142	.1134
.60	19.01	4.30	-.21	.8417	.1594	.0948	.8136	.2690	.0281	.1096	.0141	.1132
.60	3.99	4.50	-.09	.0666	-.1051	.0635	.0679	.0148	-.0013	.1199	.0149	.1199
.60	3.99	5.41	-.09	.0655	-.1358	.0667	.0672	.0159	-.0017	.1517	.0186	.1517
.60	4.00	8.76	-.09	.0650	-.2547	.0820	.0679	.0135	-.0029	.2682	.0322	.2682

TABLE 5.- NOZZLE CHARACTERISTICS: IUM WEDGE NOZZLE, AR = 1, DRY POWER SETTING, $\delta_V = 0^o$

MACH	ALPHA	NPR	CANALP	CLN	C(DN-F)	CMN	CLAN	CDAN
.87	.00	1.01	.01	-.0033	-.0034	.0013	-.0033	-.0034
.87	2.00	1.01	-.01	-.0029	-.0031	.0012	-.0029	-.0031
.87	4.01	1.02	-.04	-.0027	-.0033	.0012	-.0027	-.0033
.87	5.98	1.02	-.11	-.0024	-.0033	.0012	-.0024	-.0033
.87	7.99	1.02	-.17	-.0020	-.0035	.0011	-.0020	-.0035
.87	10.01	1.01	-.20	-.0015	-.0039	.0010	-.0015	-.0039
.87	14.99	1.00	-.31	.0015	-.0040	.0001	.0015	-.0040
.87	18.48	.99	-.36	.0057	-.0041	-.0012	.0057	-.0041
.87	.01	3.31	-.03	-.0075	-.0411	.0039	-.0044	-.0037
.87	3.98	3.29	-.10	-.0040	-.0407	.0036	-.0036	-.0036
.87	10.00	3.30	-.25	.0021	-.0418	.0031	-.0014	-.0046
.87	18.49	3.31	-.41	.0155	-.0416	.0008	.0064	-.0052
.87	-.00	5.71	-.06	-.0117	-.0805	.0066	-.0055	-.0038
.88	1.99	5.72	-.09	-.0085	-.0808	.0064	-.0050	-.0039
.87	3.97	5.70	-.14	-.0054	-.0814	.0064	-.0045	-.0040
.87	6.00	5.70	-.20	-.0022	-.0816	.0062	-.0041	-.0042
.87	7.98	5.70	-.25	.0016	-.0821	.0059	-.0030	-.0045
.87	9.99	5.72	-.29	.0053	-.0822	.0056	-.0019	-.0048
.87	15.00	5.69	-.40	.0155	-.0818	.0046	.0016	-.0055
.87	18.47	5.70	-.44	.0235	-.0814	.0038	.0049	-.0059
.87	-.02	7.87	-.09	-.0144	-.1187	.0085	-.0051	-.0051
.87	3.98	7.92	-.16	-.0056	-.1199	.0084	-.0043	-.0054
.87	10.00	7.90	-.31	.0081	-.1202	.0080	-.0026	-.0064
.87	18.51	7.91	-.46	.0330	-.1181	.0057	.0056	-.0072
.87	4.00	11.36	-.21	-.0071	-.1791	.0120	-.0052	-.0063
.80	3.99	5.39	-.20	-.0054	-.0884	.0067	-.0045	-.0035
.60	-.02	1.00	-.11	-.0033	-.0010	.0012	-.0033	-.0010
.60	2.01	1.00	-.12	-.0030	-.0009	.0011	-.0030	-.0009
.60	3.98	1.00	-.14	-.0027	-.0010	.0010	-.0027	-.0010
.60	6.02	1.00	-.16	-.0024	-.0011	.0009	-.0024	-.0011
.60	7.99	1.00	-.16	-.0020	-.0012	.0008	-.0020	-.0012
.60	9.99	1.00	-.18	-.0015	-.0012	.0006	-.0015	-.0012
.60	15.00	.99	-.23	.0010	-.0010	-.0003	.0010	-.0010
.60	19.10	.99	-.26	.0046	-.0011	-.0016	.0046	-.0011
.60	.00	2.00	-.08	-.0074	-.0386	.0036	-.0048	-.0024
.60	4.00	2.01	-.11	-.0038	-.0384	.0033	-.0038	-.0022
.60	9.98	2.01	-.15	.0022	-.0384	.0025	-.0016	-.0023
.60	19.01	2.00	-.23	.0139	-.0368	.0005	.0046	-.0019
.60	-.01	3.21	-.05	-.0117	-.0775	.0063	-.0056	-.0030
.60	2.02	3.20	-.07	-.0085	-.0779	.0061	-.0051	-.0030
.60	3.98	3.20	-.08	-.0053	-.0779	.0059	-.0045	-.0030
.60	5.99	3.21	-.09	-.0023	-.0778	.0058	-.0041	-.0030
.60	7.99	3.20	-.12	.0012	-.0779	.0055	-.0032	-.0033
.60	9.98	3.20	-.14	.0048	-.0779	.0052	-.0022	-.0034
.60	15.00	3.21	-.19	.0145	-.0772	.0042	.0010	-.0037
.60	19.02	3.21	-.22	.0230	-.0759	.0031	.0043	-.0035
.60	.00	4.31	-.04	-.0165	-.1174	.0092	-.0073	-.0037
.60	3.99	4.31	-.07	-.0075	-.1171	.0089	-.0062	-.0038
.60	9.98	4.30	-.12	.0068	-.1179	.0083	-.0039	-.0043
.60	19.01	4.30	-.21	.0316	-.1147	.0060	.0033	-.0044
.60	3.99	4.50	-.09	-.0064	-.1248	.0089	-.0051	-.0042
.60	3.99	5.41	-.09	-.0073	-.1559	.0109	-.0056	-.0033
.60	4.00	8.76	-.09	-.0105	-.2768	.0185	-.0075	-.0070

TABLE 6.- AERODYNAMIC CHARACTERISTICS: IUM WEDGE NOZZLE, AR = 4, DRY POWER SETTING, $\delta_v = 0^o$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
.87	-.00	1.02	-.00	-.1081	.0240	.0681	-.1081	.0240	0.0000	0.0000	0.0000	0.0000
.87	2.02	1.02	-.00	-.0249	.0200	.0656	-.0249	.0200	0.0000	0.0000	0.0000	0.0000
.87	4.03	1.03	-.02	.0550	.0212	.0667	.0550	.0212	0.0000	0.0000	0.0000	0.0000
.87	6.01	1.03	-.06	.1391	.0278	.0719	.1391	.0278	0.0000	0.0000	0.0000	0.0000
.87	8.02	1.03	-.12	.2341	.0426	.0752	.2341	.0426	0.0000	0.0000	0.0000	0.0000
.87	10.02	1.03	-.16	.3389	.0673	.0770	.3389	.0673	0.0000	0.0000	0.0000	0.0000
.87	15.01	1.02	-.09	.6124	.1682	.0796	.6124	.1682	0.0000	0.0000	0.0000	0.0000
.87	19.28	1.02	-.16	.8261	.2911	.0829	.8261	.2911	0.0000	0.0000	0.0000	0.0000
.87	.01	3.46	.06	-.1117	-.0168	.0752	-.1076	.0238	-.0041	.0406	.0046	.0408
.87	4.03	3.47	.05	.0563	-.0201	.0716	.0575	.0207	-.0012	.0408	.0046	.0408
.87	6.01	3.46	.01	.1425	-.0136	.0756	.1424	.0271	.0002	.0407	.0046	.0407
.87	10.03	3.46	-.11	.3491	.0271	.0793	.3460	.0678	.0030	.0407	.0046	.0408
.87	18.44	3.45	-.11	.8032	.2265	.0841	.7943	.2664	.0090	.0399	.0046	.0409
.87	.03	6.01	.02	-.1165	-.0590	.0811	-.1079	.0240	-.0086	.0830	.0095	.0834
.87	2.03	6.02	.01	-.0300	-.0637	.0772	-.0243	.0195	-.0057	.0833	.0095	.0835
.87	4.03	6.03	-.01	.0547	-.0629	.0771	.0574	.0206	-.0028	.0835	.0095	.0836
.87	6.01	6.01	-.07	.1421	-.0560	.0810	.1419	.0275	.0001	.0835	.0095	.0835
.87	8.01	6.03	-.14	.2424	-.0404	.0838	.2394	.0430	.0031	.0835	.0095	.0835
.87	10.01	6.03	-.04	.3537	-.0146	.0855	.3478	.0687	.0060	.0833	.0095	.0835
.87	15.03	6.03	-.13	.6363	.0875	.0864	.6229	.1705	.0133	.0830	.0096	.0840
.87	17.02	6.03	-.17	.7418	.1422	.0874	.7256	.2244	.0162	.0823	.0096	.0839
.87	-.01	8.38	.01	-.1129	-.1012	.0787	-.1000	.0235	-.0130	.1247	.0143	.1253
.87	4.01	8.38	-.06	.0623	-.1040	.0735	.0665	.0206	-.0042	.1246	.0143	.1247
.87	6.01	8.37	-.13	.1516	-.0971	.0780	.1514	.0278	.0002	.1249	.0143	.1249
.87	10.03	8.37	-.26	.3652	-.0559	.0821	.3563	.0693	.0090	.1252	.0143	.1255
.87	16.43	8.40	-.36	.7231	.0849	.0859	.7002	.2085	.0229	.1236	.0144	.1257
.87	4.03	11.50	-.01	.0488	-.1564	.0917	.0548	.0232	-.0060	.1796	.0206	.1797
.80	4.02	5.68	.01	.0547	-.0738	.0742	.0577	.0182	-.0030	.0920	.0105	.0921
.60	.02	1.01	.01	-.0933	.0183	.0550	-.0933	.0183	0.0000	0.0000	0.0000	0.0000
.60	2.01	1.01	.01	-.0172	.0155	.0541	-.0172	.0155	0.0000	0.0000	0.0000	0.0000
.60	4.03	1.01	.01	.0573	.0168	.0557	.0573	.0168	0.0000	0.0000	0.0000	0.0000
.60	6.02	1.01	.01	.1326	.0227	.0614	.1326	.0227	0.0000	0.0000	0.0000	0.0000
.60	8.03	1.01	.00	.2253	.0375	.0662	.2253	.0375	0.0000	0.0000	0.0000	0.0000
.60	10.03	1.01	-.02	.3219	.0598	.0704	.3219	.0598	0.0000	0.0000	0.0000	0.0000
.60	15.03	1.01	-.08	.5771	.1517	.0844	.5771	.1517	0.0000	0.0000	0.0000	0.0000
.60	19.23	1.01	-.12	.7850	.2658	.0995	.7850	.2658	0.0000	0.0000	0.0000	0.0000
.60	.01	2.07	.00	-.1032	-.0209	.0614	-.0990	.0170	-.0043	.0378	.0044	.0381
.60	4.03	2.07	-.01	.0541	-.0231	.0603	.0557	.0149	-.0016	.0380	.0044	.0380
.60	6.02	2.06	-.00	.1334	-.0165	.0647	.1337	.0212	-.0003	.0378	.0044	.0378
.60	10.01	2.06	-.00	.3292	.0213	.0719	.3269	.0589	.0023	.0376	.0044	.0377
.60	19.23	2.06	-.09	.8023	.2299	.0995	.7939	.2667	.0083	.0367	.0044	.0377
.60	.02	3.36	.03	-.1049	-.0622	.0662	-.0966	.0192	-.0082	.0814	.0092	.0818
.60	2.03	3.36	.03	-.0229	-.0656	.0643	-.0175	.0162	-.0054	.0818	.0092	.0820
.60	4.03	3.36	.02	.0557	-.0645	.0647	.0582	.0173	-.0025	.0818	.0092	.0818
.60	6.03	3.36	.02	.1365	-.0583	.0691	.1362	.0235	.0003	.0818	.0092	.0818
.60	8.03	3.35	.02	.2340	-.0432	.0726	.2308	.0388	.0032	.0820	.0092	.0820
.60	10.03	3.36	.02	.3375	-.0199	.0756	.3315	.0616	.0060	.0815	.0092	.0818
.60	15.01	3.36	-.03	.5991	.0732	.0886	.5861	.1539	.0131	.0807	.0092	.0817
.60	19.21	3.36	-.07	.8179	.1906	.1011	.7989	.2702	.0190	.0796	.0092	.0819
.60	.03	4.52	.04	-.1094	-.1050	.0711	-.0974	.0172	-.0120	.1221	.0138	.1227
.60	4.02	4.52	.03	.0546	-.1073	.0696	.0581	.0152	-.0035	.1225	.0138	.1226
.60	6.03	4.53	.03	.1370	-.1008	.0737	.1362	.0215	.0008	.1222	.0138	.1222
.60	10.03	4.53	.02	.3400	-.0624	.0796	.3306	.0593	.0094	.1217	.0137	.1221
.60	19.23	4.53	-.07	.8306	.1497	.1063	.8017	.2693	.0289	.1197	.0139	.1231
.60	4.02	5.72	.01	.0512	-.1471	.0758	.0566	.0170	-.0054	.1641	.0187	.1641
.60	4.02	6.91	.01	.0523	-.1924	.0799	.0592	.0160	-.0069	.2084	.0238	.2085

TABLE 7.- AERODYNAMIC CHARACTERISTICS: IUM WEDGE NOZZLE, AR = 1, A/B POWER SETTING, $\delta_v = 0^{\circ}$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
1.20	.03	.81	.04	-.0651	.0446	.0571	-.0651	.0446	0.0000	0.0000	0.0000	0.0000
1.20	2.02	.82	-.00	.0146	.0425	.0523	.0146	.0425	0.0000	0.0000	0.0000	0.0000
1.20	4.00	.83	-.12	.0969	.0454	.0483	.0969	.0454	0.0000	0.0000	0.0000	0.0000
1.20	6.04	.83	-.20	.1866	.0547	.0427	.1866	.0547	0.0000	0.0000	0.0000	0.0000
1.20	8.03	.83	-.06	.2816	.0718	.0375	.2816	.0718	0.0000	0.0000	0.0000	0.0000
1.20	10.04	.83	-.11	.3786	.0968	.0308	.3786	.0968	0.0000	0.0000	0.0000	0.0000
1.20	15.01	.78	-.19	.6054	.1881	.0143	.6054	.1881	0.0000	0.0000	0.0000	0.0000
1.20	16.68	.74	-.23	.6808	.2284	.0083	.6808	.2284	0.0000	0.0000	0.0000	0.0000
1.20	.02	3.80	.06	-.0631	.0042	.0633	-.0600	.0406	-.0030	.0364	.0046	.0365
1.20	4.02	3.81	-.05	.0993	.0051	.0545	.0998	.0418	-.0005	.0368	.0046	.0368
1.20	10.04	3.83	-.27	.3869	.0572	.0338	.3835	.0939	.0034	.0367	.0046	.0368
1.20	16.93	3.82	-.36	.7018	.1939	.0085	.6941	.2299	.0078	.0360	.0046	.0368
1.20	.03	6.62	.00	-.0645	-.0353	.0677	-.0581	.0381	-.0063	.0734	.0092	.0736
1.20	2.05	6.61	-.06	.0188	-.0370	.0624	.0225	.0364	-.0037	.0734	.0092	.0735
1.20	4.02	6.61	-.11	.1033	-.0331	.0583	.1045	.0403	-.0012	.0734	.0092	.0734
1.20	6.01	6.62	-.20	.1968	-.0235	.0523	.1955	.0498	.0013	.0733	.0092	.0733
1.20	8.03	6.61	-.29	.2939	-.0061	.0456	.2900	.0673	.0039	.0734	.0092	.0735
1.20	10.02	6.62	-.05	.3936	.0195	.0399	.3873	.0930	.0065	.0735	.0092	.0738
1.20	15.02	6.60	-.03	.6284	.1126	.0222	.6156	.1849	.0128	.0722	.0092	.0734
1.20	16.48	6.61	-.06	.6933	.1470	.0172	.6786	.2191	.0147	.0722	.0092	.0737
1.20	.01	9.31	-.01	-.0633	-.0727	.0711	-.0538	.0361	-.0096	.1088	.0136	.1092
1.20	4.02	9.31	-.01	.1058	-.0704	.0629	.1077	.0385	-.0019	.1090	.0136	.1090
1.20	10.04	9.31	-.03	.3993	-.0173	.0447	.3898	.0916	.0095	.1089	.0136	.1094
1.20	16.46	9.31	-.06	.7025	.1106	.0229	.6808	.2179	.0217	.1073	.0137	.1095
1.20	4.04	5.40	-.01	.1045	-.0164	.0574	.1054	.0411	-.0009	.0575	.0072	.0576
.95	4.04	5.40	-.02	.0681	-.0730	.0757	.0695	.0192	-.0014	.0922	.0116	.0922
.92	4.03	5.40	-.01	.0700	-.0778	.0740	.0715	.0196	-.0015	.0974	.0122	.0974
.90	4.02	5.39	-.01	.0715	-.0837	.0718	.0731	.0188	-.0016	.1024	.0128	.1025
.87	.04	1.01	.11	-.1040	.0205	.0609	-.1040	.0205	0.0000	0.0000	0.0000	0.0000
.87	2.04	1.01	.08	-.0189	.0171	.0574	-.0189	.0171	0.0000	0.0000	0.0000	0.0000
.87	4.04	1.01	.04	.0622	.0185	.0571	.0622	.0185	0.0000	0.0000	0.0000	0.0000
.87	6.04	1.01	-.01	.1469	.0256	.0614	.1469	.0256	0.0000	0.0000	0.0000	0.0000
.87	8.00	1.01	-.06	.2435	.0410	.0631	.2435	.0410	0.0000	0.0000	0.0000	0.0000
.87	10.04	1.01	-.10	.3504	.0664	.0647	.3504	.0664	0.0000	0.0000	0.0000	0.0000
.87	15.04	.99	-.17	.6314	.1692	.0600	.6314	.1692	0.0000	0.0000	0.0000	0.0000
.87	19.03	.98	-.23	.8454	.2884	.0591	.8454	.2884	0.0000	0.0000	0.0000	0.0000
.87	.02	2.40	.01	-.1019	-.0158	.0630	-.0993	.0198	-.0026	.0356	.0044	.0356
.87	4.05	2.39	-.03	.0661	-.0176	.0601	.0662	.0179	-.0001	.0355	.0044	.0355
.87	10.00	2.41	-.18	.3563	.0301	.0680	.3527	.0657	.0036	.0355	.0044	.0357
.87	19.01	2.41	-.30	.8529	.2515	.0605	.8437	.2862	.0092	.0347	.0044	.0359
.87	.02	3.92	-.03	-.1025	-.0525	.0676	-.0964	.0199	-.0060	.0724	.0091	.0727
.87	2.05	3.90	-.06	-.0157	-.0554	.0641	-.0123	.0166	-.0034	.0720	.0091	.0721
.87	4.01	3.90	-.09	.0660	-.0542	.0645	.0670	.0181	-.0010	.0722	.0091	.0722
.87	6.06	3.91	-.15	.1552	-.0467	.0693	.1536	.0256	.0016	.0723	.0091	.0723
.87	7.99	3.90	-.20	.2549	-.0310	.0693	.2508	.0412	.0041	.0722	.0091	.0723
.87	10.03	3.90	-.23	.3620	-.0055	.0717	.3554	.0665	.0066	.0720	.0091	.0723
.87	15.04	3.90	-.30	.6541	.1003	.0653	.6413	.1711	.0128	.0708	.0091	.0720
.87	18.55	3.90	-.34	.8394	.2021	.0647	.8223	.2721	.0172	.0700	.0091	.0720
.87	.02	5.42	-.07	-.1048	-.0908	.0723	-.0954	.0191	-.0094	.1099	.0138	.1103
.87	4.07	5.38	-.13	.0692	-.0914	.0691	.0708	.0180	-.0016	.1094	.0137	.1094
.87	10.04	5.40	-.26	.3677	-.0425	.0761	.3579	.0666	.0098	.1091	.0137	.1095
.87	18.52	5.40	-.36	.8501	.1652	.0685	.8244	.2718	.0258	.1066	.0137	.1096
.87	4.02	7.72	-.16	.0701	-.1520	.0755	.0730	.0159	-.0029	.1678	.0210	.1679
.80	4.03	5.42	-.01	.0727	-.1133	.0701	.0747	.0166	-.0020	.1299	.0163	.1299
.60	.02	1.00	.07	-.0800	.0174	.0473	-.0800	.0174	0.0000	0.0000	0.0000	0.0000
.60	2.01	1.00	.06	-.0034	.0151	.0467	-.0034	.0151	0.0000	0.0000	0.0000	0.0000
.60	4.02	1.00	.05	.0705	.0164	.0483	.0705	.0164	0.0000	0.0000	0.0000	0.0000
.60	6.03	1.00	.04	.1471	.0229	.0536	.1471	.0229	0.0000	0.0000	0.0000	0.0000
.60	8.02	1.00	.02	.2385	.0378	.0569	.2385	.0378	0.0000	0.0000	0.0000	0.0000
.60	10.02	1.00	-.05	.3371	.0609	.0599	.3371	.0609	0.0000	0.0000	0.0000	0.0000
.60	15.00	.99	-.03	.5961	.1547	.0711	.5961	.1547	0.0000	0.0000	0.0000	0.0000
.60	18.52	.99	-.04	.7756	.2508	.0812	.7756	.2508	0.0000	0.0000	0.0000	0.0000
.60	.02	2.31	-.01	-.0874	-.0533	.0554	-.0824	.0168	-.0050	.0701	.0087	.0703
.60	4.02	2.31	-.05	.0692	-.0539	.0560	.0693	.0164	-.0001	.0703	.0087	.0703
.60	10.03	2.31	-.15	.3489	-.0083	.0655	.3417	.0614	.0072	.0696	.0086	.0700
.60	18.53	2.31	-.04	.7997	.1853	.0866	.7823	.2530	.0174	.0678	.0086	.0700
.60	.04	3.01	.01	-.0872	-.0876	.0595	-.0789	.0178	-.0083	.1054	.0132	.1057
.60	2.02	3.01	-.01	-.0085	-.0897	.0588	-.0038	.0155	-.0046	.1052	.0132	.1053
.60	4.04	3.01	-.03	.0702	-.0888	.0601	.0712	.0168	-.0009	.1057	.0132	.1057
.60	6.03	3.01	-.08	.1533	-.0820	.0648	.1506	.0234	.0027	.1054	.0132	.1055
.60	8.03	3.00	-.11	.2501	-.0666	.0671	.2437	.0387	.0064	.1052	.0132	.1054
.60	10.03	3.01	-.15	.3521	-.0430	.0693	.3420	.0620	.0101	.1049	.0132	.1054
.60	15.04	3.00	-.04	.6254	.0543	.0803	.6062	.1580	.0192	.1037	.0132	.1055
.60	18.52	3.00	-.05	.8111	.1514	.0908	.7856	.2542	.0256	.1028	.0133	.1060
.60	.03	4.50	.10	-.0888	-.1661	.0663	-.0734	.0162	-.0154	.1824	.0230	.1830
.60	4.02	4.49	.07	.0759	-.1677	.0669	.0786	.0160	-.0026	.1838	.0231	.1838
.60	10.01	4.50	-.09	.3656	-.1198	.0767	.3491	.0621	.0165	.1819	.0229	.1826
.60	18.54	4.50	-.20	.8403	.0786	.0965	.7968	.2571	.0435	.1785	.0231	.1837
.60	4.02	4.50	.00	.0760	-.1674	.0665	.0786	.0160	-.0026	.1834	.0230	.1834
.60	4.03	5.42	.00	.0705	-.2165	.0776	.0740	.0145	-.0036	.2310	.0289	.2310

TABLE 8.- NOZZLE CHARACTERISTICS: IUM WEDGE NOZZLE, AR = 1, A/B POWER SETTING, $\delta_V = 0^{\circ}$

MACH	ALPHA	NPR	CANALP	CLN	C(DN-F)	CMN	CLAN	CDAN
1.20	.03	.81	.04	-.0086	.0000	.0026	-.0086	.0000
1.20	2.02	.82	-.00	-.0067	-.0006	.0020	-.0067	-.0006
1.20	4.00	.83	-.12	-.0049	-.0009	.0014	-.0049	-.0009
1.20	6.04	.83	-.20	-.0028	-.0012	.0007	-.0028	-.0012
1.20	8.03	.83	-.06	-.0006	-.0016	.0001	-.0006	-.0016
1.20	10.04	.83	-.11	.0016	-.0020	-.0005	.0016	-.0020
1.20	15.01	.78	-.19	.0085	-.0016	-.0026	.0085	-.0016
1.20	16.68	.74	-.23	.0118	-.0002	-.0037	.0118	-.0002
1.20	.02	3.80	.06	-.0146	-.0374	.0060	-.0115	-.0009
1.20	4.02	3.81	-.05	-.0072	-.0401	.0045	-.0067	-.0029
1.20	10.04	3.83	-.27	.0056	-.0414	.0018	.0021	-.0046
1.20	16.93	3.82	-.36	.0237	-.0400	-.0025	.0159	-.0039
1.20	.03	6.62	.00	-.0181	-.0768	.0085	-.0117	-.0032
1.20	2.05	6.61	-.06	-.0130	-.0778	.0077	-.0092	-.0042
1.20	4.02	6.61	-.11	-.0079	-.0786	.0069	-.0067	-.0050
1.20	6.01	6.62	-.20	-.0025	-.0791	.0060	-.0038	-.0056
1.20	8.03	6.61	-.29	.0031	-.0798	.0051	-.0008	-.0062
1.20	10.02	6.62	-.05	.0087	-.0805	.0042	.0022	-.0068
1.20	15.02	6.60	-.03	.0247	-.0793	.0013	.0118	-.0069
1.20	16.48	6.61	-.06	.0298	-.0785	.0003	.0151	-.0062
1.20	.01	9.31	-.01	-.0207	-.1141	.0105	-.0111	-.0050
1.20	4.02	9.31	-.01	-.0084	-.1162	.0091	-.0065	-.0070
1.20	10.04	9.31	-.03	.0114	-.1181	.0068	.0018	-.0089
1.20	16.46	9.31	-.06	.0359	-.1161	.0032	.0141	-.0086
1.20	4.04	5.40	-.01	-.0077	-.0617	.0059	-.0068	-.0041
.95	4.04	5.40	-.02	-.0061	-.0956	.0072	-.0047	-.0032
.92	4.03	5.40	-.01	-.0065	-.1018	.0077	-.0050	-.0042
.90	4.02	5.39	-.01	-.0058	-.1064	.0077	-.0042	-.0037
.87	.04	1.01	.11	-.0035	-.0037	.0011	-.0035	-.0037
.87	2.04	1.01	.08	-.0031	-.0035	.0011	-.0031	-.0035
.87	4.04	1.01	.04	-.0029	-.0032	.0010	-.0029	-.0032
.87	6.04	1.01	-.01	-.0027	-.0033	.0010	-.0027	-.0033
.87	8.00	1.01	-.06	-.0022	-.0035	.0009	-.0022	-.0035
.87	10.04	1.01	-.10	-.0017	-.0036	.0008	-.0017	-.0036
.87	15.04	.99	-.17	.0012	-.0043	.0000	.0012	-.0043
.87	19.03	.98	-.23	.0063	-.0043	-.0015	.0063	-.0043
.87	.02	2.40	.01	-.0071	-.0382	.0036	-.0045	-.0026
.87	4.05	2.39	-.03	-.0039	-.0385	.0034	-.0038	-.0029
.87	10.00	2.41	-.18	.0021	-.0395	.0028	-.0015	-.0039
.87	19.01	2.41	-.30	.0157	-.0399	.0006	.0065	-.0051
.87	.02	3.92	-.03	-.0106	-.0758	.0060	-.0046	-.0032
.87	2.05	3.90	-.06	-.0076	-.0757	.0059	-.0042	-.0034
.87	4.01	3.90	-.09	-.0049	-.0759	.0058	-.0039	-.0034
.87	6.06	3.91	-.15	-.0019	-.0763	.0057	-.0035	-.0038
.87	7.99	3.90	-.20	.0018	-.0766	.0054	-.0023	-.0042
.87	10.03	3.90	-.23	.0053	-.0767	.0051	-.0013	-.0045
.87	15.04	3.90	-.30	.0151	-.0764	.0041	.0022	-.0053
.87	18.55	3.90	-.34	.0229	-.0754	.0032	.0057	-.0052
.87	.02	5.42	-.07	-.0155	-.1144	.0089	-.0060	-.0042
.87	4.07	5.38	-.13	-.0062	-.1142	.0084	-.0046	-.0044
.87	10.04	5.40	-.26	.0080	-.1150	.0076	-.0018	-.0056
.87	18.52	5.40	-.36	.0320	-.1133	.0055	.0061	-.0064
.87	4.02	7.72	-.16	-.0075	-.1757	.0121	-.0046	-.0073
.80	4.03	5.42	-.01	-.0078	-.1338	.0100	-.0058	-.0036
.60	.02	1.00	.07	-.0034	-.0000	.0011	-.0034	-.0000
.60	2.01	1.00	.06	-.0030	-.0000	.0010	-.0030	-.0000
.60	4.02	1.00	.05	-.0027	-.0003	.0009	-.0027	-.0003
.60	6.03	1.00	.04	-.0025	-.0006	.0008	-.0025	-.0006
.60	8.02	1.00	.02	-.0021	-.0010	.0007	-.0021	-.0010
.60	10.02	1.00	-.05	-.0016	-.0012	.0005	-.0016	-.0012
.60	15.00	.99	-.03	.0008	-.0014	-.0003	.0008	-.0014
.60	18.52	.99	-.04	.0036	-.0014	-.0013	.0036	-.0014
.60	.02	2.31	-.01	-.0114	-.0725	.0059	-.0063	-.0023
.60	4.02	2.31	-.05	-.0053	-.0728	.0055	-.0052	-.0023
.60	10.03	2.31	-.15	.0042	-.0724	.0047	-.0030	-.0026
.60	18.53	2.31	-.04	.0201	-.0709	.0030	.0026	-.0030
.60	.04	3.01	.01	-.0148	-.1075	.0081	-.0065	-.0019
.60	2.02	3.01	-.01	-.0106	-.1072	.0079	-.0060	-.0018
.60	4.04	3.01	-.03	-.0065	-.1080	.0078	-.0055	-.0021
.60	6.03	3.01	-.08	-.0023	-.1077	.0076	-.0050	-.0021
.60	8.03	3.00	-.11	.0023	-.1079	.0073	-.0041	-.0024
.60	10.03	3.01	-.15	.0070	-.1079	.0070	-.0030	-.0027
.60	15.04	3.00	-.04	.0194	-.1069	.0060	.0001	-.0030
.60	18.52	3.00	-.05	.0281	-.1061	.0054	.0025	-.0031
.60	.03	4.50	.10	-.0188	-.1872	.0116	-.0034	-.0045
.60	4.02	4.49	.07	-.0050	-.1884	.0114	-.0024	-.0043
.60	10.01	4.50	-.09	.0160	-.1869	.0109	-.0005	-.0047
.60	18.54	4.50	-.20	.0487	-.1833	.0094	.0051	-.0044
.60	4.02	4.50	.00	-.0048	-.1882	.0114	-.0021	-.0044
.60	4.03	5.42	.00	-.0123	-.2377	.0171	-.0087	-.0063

TABLE 9.- AERODYNAMIC CHARACTERISTICS: IUM WEDGE NOZZLE, AR = 1, A/B POWER SETTING, $\delta_v = 15^{\circ}$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
1.20	.00	3.81	-.08	-.0521	.0048	.0495	-.0575	.0409	.0054	.0361	-.0022	.0365
1.20	4.03	3.81	-.06	.1109	.0073	.0407	.1029	.0429	.0080	.0356	-.0023	.0365
1.20	10.00	3.85	-.27	.3921	.0600	.0205	.3804	.0949	.0117	.0349	-.0023	.0369
1.20	16.85	3.82	-.37	.7065	.1975	-.0040	.6907	.2309	.0158	.0333	-.0023	.0369
1.20	-.01	6.60	-.01	-.0459	-.0333	.0494	-.0564	.0413	.0106	.0745	-.0036	.0753
1.20	1.99	6.63	-.11	.0361	-.0347	.0442	.0229	.0396	.0132	.0743	-.0036	.0755
1.20	4.03	6.62	-.19	.1209	-.0307	.0400	.1051	.0431	.0158	.0738	-.0036	.0755
1.20	6.02	6.64	-.30	.2128	-.0203	.0341	.1944	.0529	.0184	.0732	-.0036	.0755
1.20	8.02	6.61	-.36	.3082	-.0021	.0277	.2873	.0703	.0209	.0724	-.0036	.0754
1.20	10.01	6.61	-.14	.4058	.0245	.0221	.3825	.0957	.0233	.0712	-.0036	.0749
1.20	15.00	6.62	-.13	.6367	.1180	.0057	.6073	.1870	.0294	.0689	-.0036	.0749
1.20	16.42	6.61	-.15	.6975	.1514	.0016	.6663	.2196	.0311	.0683	-.0036	.0750
1.20	-.00	9.30	-.05	-.0414	-.0702	.0500	-.0568	.0409	.0154	.1111	-.0048	.1122
1.20	4.00	9.35	-.27	.1258	-.0674	.0407	.1027	.0427	.0232	.1101	-.0048	.1125
1.20	10.01	9.31	-.11	.4155	-.0117	.0234	.3810	.0953	.0346	.1070	-.0048	.1124
1.20	16.58	9.35	-.10	.7197	.1212	.0007	.6731	.2236	.0466	.1024	-.0048	.1125
1.20	4.01	5.40	-.03	.1178	-.0138	.0415	.1054	.0431	.0124	.0569	-.0031	.0582
1.20	4.02	.92	-.03	.1038	.0455	.0478	.1038	.0455	0.0000	0.0000	0.0000	0.0000
1.16	3.99	5.41	-.07	.1141	-.0190	.0434	.1009	.0421	.0133	.0612	-.0033	.0626
.95	4.01	5.40	-.08	.0959	-.0710	.0533	.0761	.0201	.0198	.0911	-.0049	.0932
.92	4.00	5.40	-.08	.0986	-.0756	.0498	.0777	.0206	.0209	.0963	-.0052	.0985
.90	3.98	5.40	-.06	.1006	-.0814	.0470	.0786	.0200	.0220	.1014	-.0055	.1038
.87	.02	2.42	-.03	-.0781	-.0154	.0482	-.0834	.0200	.0053	.0354	-.0011	.0358
.87	4.02	2.41	-.09	.0904	-.0152	.0456	.0827	.0197	.0077	.0349	-.0011	.0357
.87	10.02	2.41	-.07	.3874	.0374	.0522	.3760	.0713	.0113	.0339	-.0011	.0357
.87	19.03	2.41	-.22	.8736	.2626	.0451	.8570	.2944	.0165	.0318	-.0011	.0358
.87	.00	3.92	-.06	-.0722	-.0510	.0459	-.0830	.0200	.0108	.0711	-.0045	.0719
.87	2.01	3.91	-.12	.0145	-.0535	.0425	.0012	.0171	.0132	.0706	-.0045	.0718
.87	4.03	3.90	-.17	.0981	-.0510	.0424	.0824	.0191	.0157	.0701	-.0045	.0718
.87	6.00	3.91	-.09	.1850	-.0423	.0479	.1669	.0272	.0181	.0695	-.0045	.0718
.87	7.99	3.90	-.14	.2868	-.0250	.0488	.2663	.0437	.0205	.0688	-.0045	.0718
.87	10.01	3.91	-.17	.3954	.0020	.0494	.3724	.0702	.0230	.0682	-.0045	.0720
.87	15.00	3.92	-.11	.6804	.1092	.0447	.6515	.1752	.0289	.0660	-.0045	.0721
.87	19.21	3.91	-.16	.9028	.2372	.0417	.8690	.3012	.0338	.0640	-.0045	.0723
.87	.00	5.40	.20	-.0673	-.0902	.0483	-.0832	.0197	.0160	.1099	-.0059	.1110
.87	4.00	5.40	.15	.1040	-.0894	.0452	.0804	.0189	.0236	.1084	-.0059	.1109
.87	10.01	5.43	.03	.4079	-.0354	.0510	.3730	.0705	.0349	.1059	-.0059	.1115
.87	18.53	5.42	-.06	.8852	.1793	.0438	.8348	.2791	.0504	.0997	-.0059	.1117
.87	3.99	7.68	-.05	.1215	-.1459	.0363	.0859	.0219	.0356	.1678	-.0077	.1715
.87	4.00	1.03	-.05	.0723	.0199	.0541	.0723	.0199	0.0000	0.0000	0.0000	0.0000
.80	4.00	5.40	-.05	.1099	-.1114	.0401	.0819	.0175	.0280	.1288	-.0070	.1318
.60	-.01	2.29	.02	-.0524	-.0507	.0323	-.0628	.0175	.0103	.0682	-.0017	.0689
.60	4.02	2.30	.01	.1036	-.0496	.0330	.0885	.0180	.0151	.0675	-.0018	.0692
.60	10.01	2.30	-.06	.3824	-.0004	.0421	.3602	.0653	.0221	.0657	-.0018	.0693
.60	19.02	2.30	-.16	.8592	.2148	.0621	.8270	.2763	.0322	.0615	-.0018	.0694
.60	.01	3.01	.04	-.0510	-.0865	.0329	-.0657	.0176	.0147	.1040	-.0052	.1051
.60	2.01	3.01	.03	.0304	-.0878	.0320	.0121	.0156	.0182	.1034	-.0052	.1050
.60	4.01	3.01	.02	.1068	-.0850	.0332	.0848	.0177	.0219	.1027	-.0052	.1050
.60	6.00	3.01	.00	.1906	-.0766	.0381	.1651	.0252	.0255	.1018	-.0051	.1049
.60	8.02	3.01	-.02	.2878	-.0596	.0403	.2588	.0412	.0290	.1008	-.0051	.1049
.60	10.02	3.00	-.04	.3943	-.0339	.0422	.3618	.0659	.0325	.0997	-.0051	.1049
.60	15.00	3.00	-.09	.6620	.0652	.0511	.6209	.1619	.0411	.0967	-.0051	.1051
.60	19.00	3.00	-.12	.8769	.1834	.0615	.8292	.2770	.0478	.0936	-.0051	.1050
.60	.01	4.50	.07	-.0379	-.1655	.0292	-.0650	.0164	.0271	.1818	-.0108	.1838
.60	3.99	4.51	.05	.1237	-.1626	.0297	.0841	.0165	.0396	.1791	-.0108	.1834
.60	10.00	4.50	-.03	.4174	-.1097	.0390	.3593	.0642	.0581	.1739	-.0108	.1833
.60	19.00	4.50	-.10	.9128	.1121	.0577	.8281	.2751	.0848	.1631	-.0108	.1838
.60	4.02	5.41	.03	.1314	-.2137	.0323	.0814	.0163	.0501	.2300	-.0124	.2354

TABLE 10.- NOZZLE CHARACTERISTICS: IUM WEDGE NOZZLE, AR = 1, A/B POWER SETTING, $\delta_v = 15^o$

MACH	ALPHA	NPR	CANALP	CLN	C(DN-F)	CMN	CLAN	CDAN
1.20	.00	3.81	-.08	.0032	-.0382	-.0009	-.0022	-.0022
1.20	4.03	3.81	-.06	.0110	-.0383	-.0027	.0031	-.0026
1.20	10.00	3.85	-.27	.0245	-.0372	-.0059	.0127	-.0023
1.20	16.85	3.82	-.37	.0426	-.0326	-.0106	.0267	.0008
1.20	-.01	6.60	-.01	.0059	-.0762	-.0010	-.0047	-.0017
1.20	1.99	6.63	-.11	.0109	-.0765	-.0017	-.0023	-.0022
1.20	4.03	6.62	-.19	.0159	-.0764	-.0025	.0001	-.0026
1.20	6.02	6.64	-.30	.0211	-.0759	-.0033	.0027	-.0027
1.20	8.02	6.61	-.36	.0268	-.0751	-.0043	.0059	-.0027
1.20	10.01	6.61	-.14	.0322	-.0735	-.0053	.0089	-.0023
1.20	15.00	6.62	-.13	.0477	-.0704	-.0083	.0183	-.0014
1.20	16.42	6.61	-.15	.0521	-.0687	-.0092	.0210	-.0004
1.20	-.00	9.30	-.05	.0072	-.1124	-.0004	-.0082	-.0013
1.20	4.00	9.35	-.27	.0195	-.1126	-.0019	-.0036	-.0026
1.20	10.01	9.31	-.11	.0398	-.1099	-.0048	.0053	-.0030
1.20	16.58	9.35	-.10	.0649	-.1035	-.0091	.0184	-.0012
1.20	4.01	5.40	-.03	.0131	-.0591	-.0023	.0007	-.0022
1.20	4.02	.92	-.03	-.0022	.0000	.0003	-.0022	.0000
1.16	3.99	5.41	-.07	.0143	-.0632	-.0025	.0011	-.0021
.95	4.01	5.40	-.08	.0203	-.0936	-.0025	.0005	-.0025
.92	4.00	5.40	-.08	.0214	-.0995	-.0026	.0005	-.0033
.90	3.98	5.40	-.06	.0229	-.1046	-.0029	.0009	-.0032
.87	.02	2.42	-.03	.0095	-.0377	-.0026	.0042	-.0023
.87	4.02	2.41	-.09	.0127	-.0369	-.0028	.0049	-.0020
.87	10.02	2.41	-.07	.0189	-.0358	-.0036	.0075	-.0019
.87	19.03	2.41	-.22	.0329	-.0324	-.0063	.0163	-.0006
.87	-.00	3.92	-.06	.0141	-.0742	-.0035	.0033	-.0031
.87	2.01	3.91	-.12	.0169	-.0734	-.0036	.0037	-.0029
.87	4.03	3.90	-.17	.0197	-.0728	-.0037	.0040	-.0028
.87	6.00	3.91	-.09	.0224	-.0722	-.0037	.0043	-.0028
.87	7.99	3.90	-.14	.0259	-.0716	-.0041	.0054	-.0028
.87	10.01	3.91	-.17	.0292	-.0712	-.0043	.0063	-.0030
.87	15.00	3.92	-.11	.0393	-.0691	-.0054	.0104	-.0030
.87	19.21	3.91	-.16	.0501	-.0661	-.0073	.0163	-.0021
.87	.00	5.40	.20	.0151	-.1136	-.0026	-.0009	-.0038
.87	4.00	5.40	.15	.0237	-.1120	-.0028	.0001	-.0037
.87	10.01	5.43	.03	.0376	-.1100	-.0035	.0027	-.0042
.87	18.53	5.42	-.06	.0621	-.1035	-.0062	.0117	-.0038
.87	3.99	7.68	-.05	.0392	-.1688	-.0061	.0036	-.0013
.87	4.00	1.03	-.05	.0020	-.0022	-.0011	.0020	-.0022
.80	4.00	5.40	-.05	.0270	-.1325	-.0029	-.0010	-.0037
.60	-.01	2.29	.02	.0145	-.0696	-.0037	.0042	-.0014
.60	4.02	2.30	.01	.0204	-.0683	-.0041	.0053	-.0008
.60	10.01	2.30	-.06	.0299	-.0657	-.0050	.0078	.0000
.60	19.02	2.30	-.16	.0466	-.0597	-.0072	.0145	.0018
.60	.01	3.01	.04	.0168	-.1062	-.0036	.0021	-.0022
.60	2.01	3.01	.03	.0211	-.1052	-.0039	.0028	-.0018
.60	4.01	3.01	.02	.0252	-.1045	-.0040	.0033	-.0018
.60	6.00	3.01	.00	.0293	-.1033	-.0042	.0038	-.0015
.60	8.02	3.01	-.02	.0340	-.1022	-.0046	.0050	-.0014
.60	10.02	3.00	-.04	.0387	-.1011	-.0050	.0062	-.0014
.60	15.00	3.00	-.09	.0511	-.0971	-.0062	.0100	-.0005
.60	19.00	3.00	-.12	.0611	-.0930	-.0073	.0133	.0006
.60	.01	4.50	.07	.0268	-.1864	-.0053	-.0003	-.0047
.60	3.99	4.51	.05	.0400	-.1831	-.0054	.0005	-.0042
.60	10.00	4.50	-.03	.0612	-.1774	-.0062	.0032	-.0036
.60	19.00	4.50	-.10	.0950	-.1652	-.0083	.0103	-.0023
.60	4.02	5.41	.03	.0450	-.2351	-.0040	-.0050	-.0053

TABLE 11.- AERODYNAMIC CHARACTERISTICS: IUM WEDGE NOZZLE, AR = 1, A/R POWER SETTING, $\delta_v = 30^o$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
1.20	.05	3.82	.01	-.0366	.0118	.0344	-.0492	.0458	.0126	.0340	-.0081	.0363
1.20	4.04	3.79	-.11	.1278	.0164	.0242	.1131	.0492	.0148	.0328	-.0080	.0360
1.20	10.03	3.81	-.34	.4087	.0713	.0036	.3904	.1026	.0183	.0313	-.0081	.0363
1.20	17.04	3.80	-.44	.7248	.2140	-.0203	.7029	.2427	.0218	.0287	-.0080	.0361
1.20	.05	6.62	-.11	-.0286	-.0270	.0339	-.0548	.0432	.0262	.0702	-.0168	.0749
1.20	2.04	6.60	-.16	.0525	-.0272	.0289	.0239	.0420	.0286	.0692	-.0168	.0748
1.20	4.04	6.61	-.22	.1369	-.0225	.0244	.1059	.0458	.0310	.0683	-.0168	.0750
1.20	6.05	6.59	-.33	.2292	-.0113	.0187	.1958	.0558	.0334	.0671	-.0168	.0749
1.20	8.05	6.60	-.40	.3229	.0071	.0117	.2871	.0731	.0358	.0660	-.0169	.0751
1.20	10.03	6.60	-.01	.4224	.0346	.0065	.3843	.0993	.0380	.0647	-.0169	.0751
1.20	15.05	6.63	-.06	.6516	.1307	-.0110	.6080	.1919	.0436	.0612	-.0169	.0751
1.20	16.68	6.61	-.10	.7245	.1711	-.0168	.6793	.2310	.0453	.0599	-.0169	.0751
1.20	.05	9.32	.28	-.0208	-.0635	.0337	-.0586	.0424	.0378	.1059	-.0238	.1125
1.20	4.03	9.31	-.10	.1457	-.0584	.0232	.1006	.0446	.0450	.1029	-.0238	.1124
1.20	10.04	9.28	-.11	.4349	-.0002	.0044	.3794	.0974	.0555	.0976	-.0237	.1123
1.20	17.00	9.31	-.22	.7560	.1459	-.0200	.6889	.2362	.0671	.0903	-.0238	.1125
1.20	4.05	5.41	.08	.1375	-.0052	.0253	.1127	.0477	.0248	.0529	-.0138	.0585
1.20	4.04	.86	.08	.1162	.0530	.0354	.1162	.0530	0.0000	0.0000	0.0000	0.0000
1.16	4.03	5.44	-.02	.1353	-.0099	.0256	.1086	.0469	.0266	.0568	-.0148	.0627
.95	4.05	5.44	-.05	.1411	-.0561	.0143	.1014	.0287	.0398	.0848	-.0220	.0936
.92	4.04	5.40	-.04	.1461	-.0600	.0100	.1043	.0291	.0418	.0892	-.0232	.0985
.91	4.05	5.41	-.04	.1500	-.0645	.0080	.1063	.0286	.0437	.0931	-.0242	.1028
.87	.03	1.00	.05	-.0822	.0263	.0431	-.0822	.0263	0.0000	0.0000	0.0000	0.0000
.87	4.03	1.00	.01	.0847	.0261	.0381	.0847	.0261	0.0000	0.0000	0.0000	0.0000
.87	10.02	.99	-.10	.3790	.0781	.0424	.3790	.0781	0.0000	0.0000	0.0000	0.0000
.87	19.01	.97	-.26	.8662	.3034	.0333	.8662	.3034	0.0000	0.0000	0.0000	0.0000
.87	19.05	.97	-.27	.8678	.3045	.0331	.8678	.3045	0.0000	0.0000	0.0000	0.0000
.87	.03	2.41	.07	-.0502	-.0096	.0264	-.0626	.0231	.0124	.0326	-.0080	.0349
.87	4.06	2.39	.03	.1196	-.0067	.0229	.1052	.0245	.0144	.0312	-.0079	.0344
.87	10.05	2.39	-.08	.4182	.0489	.0259	.4005	.0785	.0177	.0296	-.0080	.0345
.87	19.08	2.40	-.24	.9154	.2847	.0130	.8932	.3112	.0222	.0265	-.0080	.0346
.87	.06	3.90	.03	-.0291	-.0421	.0138	-.0540	.0244	.0250	.0665	-.0161	.0710
.87	2.04	3.90	.00	.0578	-.0426	.0104	.0305	.0230	.0273	.0656	-.0161	.0710
.87	4.05	3.89	-.03	.1410	-.0380	.0101	.1116	.0264	.0294	.0644	-.0160	.0708
.87	6.04	3.88	-.05	.2305	-.0278	.0136	.1989	.0355	.0316	.0634	-.0160	.0708
.87	8.09	3.89	-.10	.3376	-.0080	.0129	.3037	.0543	.0339	.0623	-.0161	.0709
.87	10.03	3.90	-.15	.4428	.0200	.0129	.4066	.0811	.0361	.0612	-.0161	.0711
.87	15.07	3.91	-.26	.7337	.1335	.0033	.6921	.1916	.0416	.0581	-.0163	.0714
.87	19.04	3.91	-.31	.9454	.2595	-.0013	.8999	.3144	.0455	.0550	-.0162	.0713
.87	.03	5.39	-.03	-.0203	-.0783	.0077	-.0604	.0253	.0401	.1036	-.0262	.1110
.87	4.08	5.38	-.07	.1557	-.0733	.0037	.1085	.0271	.0472	.1003	-.0262	.1109
.87	10.03	5.38	-.19	.4559	-.0145	.0067	.3983	.0807	.0576	.0953	-.0263	.1113
.87	19.05	5.41	-.35	.9666	.2285	-.0061	.8951	.3133	.0715	.0848	-.0261	.1109
.87	.02	7.83	-.05	-.0131	-.1409	.0083	-.0726	.0228	.0595	.1637	-.0378	.1741
.60	.07	2.31	-.06	-.0110	-.0428	.0059	-.0357	.0210	.0246	.0637	-.0160	.0683
.60	10.06	2.29	-.10	.4241	.0162	.0142	.3892	.0740	.0349	.0577	-.0159	.0674
.60	19.02	2.29	-.18	.9055	.2406	.0317	.8620	.2922	.0435	.0516	-.0159	.0675
.60	.03	3.00	-.05	-.0038	-.0743	.0001	-.0381	.0224	.0343	.0966	-.0217	.1025
.60	2.04	2.99	-.05	.0764	-.0731	-.0010	.0390	.0216	.0374	.0948	-.0216	.1019
.60	4.04	2.99	-.06	.1542	-.0687	.0001	.1134	.0248	.0408	.0935	-.0216	.1020
.60	6.04	2.99	-.07	.2351	-.0594	.0041	.1910	.0327	.0441	.0921	-.0216	.1021
.60	8.04	2.99	-.08	.3361	-.0408	.0052	.2886	.0501	.0475	.0910	-.0217	.1026
.60	10.05	3.00	-.09	.4432	-.0124	.0068	.3928	.0765	.0504	.0889	-.0216	.1022
.60	15.05	2.99	-.11	.7165	.0933	.0136	.6585	.1776	.0581	.0843	-.0217	.1024
.60	19.05	2.99	-.15	.9284	.2150	.0221	.8645	.2952	.0639	.0802	-.0217	.1026
.60	.06	4.51	-.03	.0355	-.1460	-.0266	-.0335	.0247	.0690	.1708	-.0459	.1842
.60	4.05	4.50	-.05	.1997	-.1378	-.0269	.1190	.0278	.0807	.1656	-.0459	.1843
.60	10.06	4.50	-.07	.4940	-.0762	-.0206	.3966	.0797	.0974	.1559	-.0458	.1838
.60	19.04	4.50	-.14	.9927	.1619	-.0051	.8719	.3009	.1207	.1390	-.0458	.1841
.60	4.02	4.50	-.06	.1987	-.1378	-.0270	.1182	.0276	.0805	.1653	-.0458	.1839
.60	4.03	5.40	-.06	.2026	-.1882	-.0242	.1035	.0231	.0991	.2113	-.0550	.2334
.60	4.04	6.05	-.06	.2025	-.2253	-.0186	.0902	.0186	.1123	.2439	-.0615	.2686

TABLE 12.- THRUST-REMOVED NOZZLE CHARACTERISTICS: IUM WEDGE NOZZLE, AR = 1, A/B POWER SETTING, $\delta_v = 30^\circ$

MACH	ALPHA	NPR	CANALP	CLN	C(DN-F)	CMN	CLAN	CDAN
1.20	.05	3.82	.01	.0220	-.0311	-.0085	.0094	.0029
1.20	4.04	3.79	-.11	.0297	-.0290	-.0105	.0150	.0038
1.20	10.03	3.81	-.34	.0422	-.0256	-.0138	.0239	.0058
1.20	17.04	3.80	-.44	.0580	-.0185	-.0182	.0361	.0103
1.20	.05	6.62	-.11	.0239	-.0701	-.0080	-.0022	.0001
1.20	2.04	6.60	-.16	.0290	-.0692	-.0089	.0004	-.0000
1.20	4.04	6.61	-.22	.0341	-.0683	-.0098	.0031	-.0000
1.20	6.05	6.59	-.33	.0395	-.0667	-.0109	.0061	.0004
1.20	8.05	6.60	-.40	.0450	-.0652	-.0120	.0092	.0009
1.20	10.03	6.60	-.01	.0503	-.0631	-.0132	.0122	.0016
1.20	15.05	6.63	-.06	.0656	-.0567	-.0167	.0220	.0045
1.20	16.68	6.61	-.10	.0706	-.0538	-.0180	.0253	.0061
1.20	.05	9.32	.28	.0288	-.1061	-.0087	-.0090	-.0003
1.20	4.03	9.31	-.10	.0413	-.1038	-.0105	-.0037	-.0009
1.20	10.04	9.28	-.11	.0612	-.0977	-.0139	.0057	-.0002
1.20	17.00	9.31	-.22	.0858	-.0873	-.0185	.0188	.0029
1.20	4.05	5.41	.08	.0326	-.0508	-.0104	.0078	.0021
1.20	4.04	.86	.08	.0114	.0074	-.0057	.0114	.0074
1.16	4.03	5.44	-.02	.0345	-.0546	-.0109	.0078	.0022
.95	4.05	5.44	-.05	.0586	-.0776	-.0185	.0189	.0071
.92	4.04	5.40	-.04	.0599	-.0834	-.0186	.0181	.0058
.91	4.05	5.41	-.04	.0609	-.0878	-.0188	.0172	.0053
.87	.03	1.00	.05	.0146	.0005	-.0063	.0146	.0005
.87	4.03	1.00	.01	.0161	.0028	-.0069	.0161	.0028
.87	10.02	.99	-.10	.0190	.0051	-.0081	.0190	.0051
.87	19.01	.97	-.26	.0280	.0093	-.0115	.0280	.0093
.87	19.05	.97	-.27	.0280	.0095	-.0115	.0280	.0095
.87	.03	2.41	.07	.0288	-.0330	-.0101	.0164	-.0002
.87	4.06	2.39	.03	.0321	-.0295	-.0106	.0176	.0018
.87	10.05	2.39	-.08	.0384	-.0257	-.0118	.0206	.0040
.87	19.08	2.40	-.24	.0541	-.0176	-.0159	.0318	.0090
.87	.06	3.90	.03	.0450	-.0655	-.0153	.0199	.0012
.87	2.04	3.90	.00	.0481	-.0635	-.0156	.0207	.0023
.87	4.05	3.89	-.03	.0508	-.0613	-.0158	.0213	.0033
.87	6.04	3.88	-.05	.0537	-.0593	-.0162	.0219	.0042
.87	8.09	3.89	-.10	.0575	-.0573	-.0168	.0234	.0051
.87	10.03	3.90	-.15	.0608	-.0553	-.0173	.0245	.0060
.87	15.07	3.91	-.26	.0715	-.0499	-.0194	.0297	.0083
.87	19.04	3.91	-.31	.0814	-.0432	-.0218	.0358	.0119
.87	.03	5.39	-.03	.0549	-.1018	-.0184	.0147	.0020
.87	4.08	5.38	-.07	.0637	-.0966	-.0192	.0163	.0039
.87	10.03	5.38	-.19	.0769	-.0896	-.0204	.0191	.0059
.87	19.05	5.41	-.35	.1002	-.0757	-.0238	.0285	.0093
.87	.02	7.83	-.05	.0579	-.1650	-.0176	-.0017	-.0011
.60	.07	2.31	-.06	.0404	-.0629	-.0136	.0157	.0010
.60	10.06	2.29	-.10	.0544	-.0533	-.0151	.0194	.0046
.60	19.02	2.29	-.18	.0699	-.0423	-.0180	.0262	.0094
.60	.03	3.00	-.05	.0503	-.0953	-.0167	.0159	.0015
.60	2.04	2.99	-.05	.0543	-.0923	-.0169	.0167	.0026
.60	4.04	2.99	-.06	.0583	-.0901	-.0173	.0174	.0036
.60	6.04	2.99	-.07	.0623	-.0877	-.0177	.0181	.0047
.60	8.04	2.99	-.08	.0667	-.0856	-.0182	.0191	.0056
.60	10.05	3.00	-.09	.0710	-.0826	-.0187	.0204	.0065
.60	15.05	2.99	-.11	.0827	-.0755	-.0204	.0245	.0090
.60	19.05	2.99	-.15	.0926	-.0682	-.0222	.0284	.0121
.60	.06	4.51	-.03	.0878	-.1677	-.0294	.0186	.0034
.60	4.05	4.50	-.05	.1010	-.1602	-.0301	.0201	.0058
.60	10.06	4.50	-.07	.1200	-.1474	-.0313	.0223	.0088
.60	19.04	4.50	-.14	.1499	-.1249	-.0344	.0289	.0143
.60	4.02	4.50	-.06	.1008	-.1606	-.0300	.0201	.0050
.60	4.03	5.40	-.06	.1061	-.2114	-.0291	.0067	.0003
.60	4.04	6.05	-.06	.1054	-.2490	-.0263	-.0071	-.0047

TABLE 13.- AERODYNAMIC CHARACTERISTICS: OUM WEDGE NOZZLE, AR = 1, A/B POWER SETTING, $\delta_v = 15^o$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
.87	.00	1.01	.02	-.1060	.0215	.0748	-.1060	.0215	0.0000	0.0000	0.0000	0.0000
.87	2.02	1.01	0.00	-.0221	.0177	.0714	-.0221	.0177	0.0000	0.0000	0.0000	0.0000
.87	4.03	1.02	-.06	.0647	.0191	.0701	.0647	.0191	0.0000	0.0000	0.0000	0.0000
.87	6.03	1.02	-.02	.1557	.0275	.0734	.1557	.0275	0.0000	0.0000	0.0000	0.0000
.87	8.00	1.01	-.05	.2559	.0441	.0755	.2559	.0441	0.0000	0.0000	0.0000	0.0000
.87	10.00	1.01	-.08	.3690	.0712	.0753	.3690	.0712	0.0000	0.0000	0.0000	0.0000
.87	14.99	.98	0.00	.6455	.1785	.0727	.6455	.1785	0.0000	0.0000	0.0000	0.0000
.87	18.69	.95	-.06	.8403	.2892	.0688	.8403	.2892	0.0000	0.0000	0.0000	0.0000
.87	.04	2.41	.02	-.0985	-.0162	.0767	-.0959	.0197	-.0026	.0359	.0045	.0360
.87	4.01	2.42	-.01	.0697	-.0179	.0729	.0698	.0182	-.0001	.0361	.0045	.0361
.87	6.02	2.42	-.05	.1628	-.0092	.0757	.1616	.0269	.0011	.0361	.0045	.0361
.87	10.00	2.42	-.15	.3770	.0346	.0781	.3733	.0705	.0036	.0359	.0045	.0361
.87	18.47	2.42	-.05	.8493	.2481	.0685	.8404	.2831	.0089	.0350	.0045	.0361
.87	.03	3.91	-.02	-.1010	-.0522	.0810	-.0951	.0198	-.0060	.0720	.0091	.0722
.87	2.03	3.91	-.04	-.0157	-.0562	.0772	-.0123	.0164	-.0035	.0725	.0091	.0726
.87	4.02	3.91	-.01	.0708	-.0543	.0778	.0717	.0181	-.0010	.0724	.0091	.0724
.87	6.00	3.91	-.04	.1652	-.0455	.0806	.1636	.0269	.0016	.0724	.0091	.0725
.87	8.03	3.91	-.01	.2710	-.0279	.0833	.2669	.0444	.0041	.0723	.0091	.0724
.87	10.01	3.92	-.03	.3804	-.0015	.0828	.3738	.0708	.0066	.0723	.0091	.0726
.87	14.99	3.91	-.12	.6696	.1071	.0765	.6567	.1785	.0129	.0714	.0091	.0726
.87	18.60	3.91	-.03	.8706	.2187	.0712	.8532	.2892	.0174	.0706	.0091	.0727
.87	.02	5.43	-.01	-.1037	-.0916	.0856	-.0942	.0188	-.0095	.1104	.0139	.1108
.87	4.01	5.40	-.06	.0708	-.0932	.0812	.0725	.0170	-.0017	.1102	.0138	.1102
.87	6.02	5.41	-.14	.1676	-.0837	.0850	.1655	.0259	.0021	.1096	.0137	.1096
.87	10.01	5.40	-.23	.3851	-.0395	.0864	.3753	.0698	.0098	.1093	.0137	.1097
.87	17.05	5.40	-.01	.7949	.1307	.0777	.7718	.2381	.0231	.1074	.0138	.1098
.87	4.01	7.83	-.04	.0724	-.1555	.0898	.0753	.0148	-.0029	.1704	.0213	.1704
.80	4.01	5.40	-.02	.0771	-.1147	.0765	.0792	.0158	-.0021	.1305	.0163	.1305
.60	.01	1.00	.00	-.0765	.0168	.0516	-.0765	.0168	0.0000	0.0000	0.0000	0.0000
.60	2.01	1.00	-.02	.0005	.0150	.0509	.0005	.0150	0.0000	0.0000	0.0000	0.0000
.60	4.01	1.00	-.05	.0771	.0170	.0527	.0771	.0170	0.0000	0.0000	0.0000	0.0000
.60	6.01	1.00	-.01	.1591	.0249	.0592	.1591	.0249	0.0000	0.0000	0.0000	0.0000
.60	7.99	1.00	-.02	.2481	.0397	.0637	.2481	.0397	0.0000	0.0000	0.0000	0.0000
.60	10.00	1.00	-.02	.3467	.0637	.0678	.3467	.0637	0.0000	0.0000	0.0000	0.0000
.60	15.01	.99	-.04	.6143	.1635	.0796	.6143	.1635	0.0000	0.0000	0.0000	0.0000
.60	19.17	.97	-.05	.8259	.2826	.0899	.8259	.2826	0.0000	0.0000	0.0000	0.0000
.60	.02	2.33	-.01	-.0829	-.0552	.0604	-.0778	.0158	-.0051	.0710	.0088	.0712
.60	4.03	2.32	-.03	.0771	-.0538	.0614	.0772	.0165	-.0001	.0704	.0087	.0704
.60	6.01	2.31	-.07	.1584	-.0465	.0662	.1561	.0238	.0023	.0703	.0087	.0704
.60	10.02	2.31	-.01	.3577	-.0064	.0757	.3505	.0637	.0072	.0701	.0087	.0705
.60	19.17	2.31	-.00	.8565	.2174	.0954	.8382	.2855	.0183	.0681	.0087	.0705
.60	.02	2.99	.02	-.0857	-.0881	.0652	-.0774	.0169	-.0083	.1050	.0132	.1053
.60	2.03	3.01	-.00	-.0034	-.0905	.0643	.0012	.0150	-.0046	.1054	.0132	.1055
.60	4.02	3.00	-.02	.0770	-.0885	.0660	.0780	.0170	-.0010	.1056	.0132	.1056
.60	6.01	3.01	0.00	.1607	-.0808	.0711	.1580	.0243	.0027	.1051	.0132	.1051
.60	8.01	3.01	-.01	.2587	-.0650	.0756	.2524	.0400	.0064	.1050	.0132	.1052
.60	10.01	3.00	-.02	.3587	-.0416	.0795	.3486	.0634	.0100	.1050	.0132	.1055
.60	15.02	3.00	-.01	.6390	.0606	.0891	.6198	.1642	.0192	.1036	.0132	.1054
.60	19.18	3.00	-.01	.8668	.1843	.0987	.8401	.2864	.0267	.1022	.0132	.1056
.60	.02	4.52	.02	-.0868	-.1683	.0714	-.0713	.0153	-.0155	.1836	.0231	.1843
.60	4.01	4.51	-.01	.0792	-.1689	.0722	.0819	.0156	-.0027	.1845	.0231	.1845
.60	6.02	4.50	-.03	.1675	-.1607	.0775	.1637	.0233	.0038	.1839	.0231	.1840
.60	9.99	4.51	-.08	.3701	-.1197	.0861	.3536	.0629	.0164	.1825	.0230	.1833
.60	19.20	4.51	-.02	.8881	.1090	.1087	.8425	.2874	.0457	.1784	.0231	.1841
.60	4.01	5.41	-.02	.0733	-.2168	.0831	.0770	.0142	-.0036	.2311	.0289	.2311

TABLE 14.- AERODYNAMIC CHARACTERISTICS: OUM WEDGE NOZZLE, AR = 1, A/B POWER SETTING, $\delta_v = 15^o$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
.57	.02	1.02	-.00	-.1016	.0220	.0722	-.1016	.0220	0.0000	0.0000	0.0000	0.0000
.87	2.01	1.02	-.02	-.0171	.0181	.0672	-.0171	.0181	0.0000	0.0000	0.0000	0.0000
.87	4.02	1.02	-.05	.0708	.0202	.0652	.0708	.0202	0.0000	0.0000	0.0000	0.0000
.87	6.02	1.02	-.08	.1628	.0286	.0676	.1628	.0286	0.0000	0.0000	0.0000	0.0000
.87	8.03	1.01	-.08	.2644	.0457	.0691	.2644	.0457	0.0000	0.0000	0.0000	0.0000
.87	10.04	1.00	-.09	.3784	.0739	.0686	.3784	.0739	0.0000	0.0000	0.0000	0.0000
.87	15.01	.97	-.00	.6565	.1826	.0642	.6565	.1826	0.0000	0.0000	0.0000	0.0000
.87	18.69	.94	-.03	.8523	.2951	.0582	.8523	.2951	0.0000	0.0000	0.0000	0.0000
.87	.04	2.43	-.02	-.0783	-.0167	.0612	-.0837	.0190	.0053	.0357	-.0011	.0361
.87	4.03	2.41	-.08	.0944	-.0163	.0558	.0867	.0185	.0077	.0348	-.0011	.0357
.87	6.02	2.41	.02	.1871	-.0061	.0595	.1781	.0284	.0089	.0346	-.0011	.0357
.87	10.03	2.40	-.06	.4019	.0401	.0603	.3906	.0738	.0113	.0337	-.0011	.0356
.87	18.86	2.41	-.05	.8956	.2717	.0470	.8792	.3034	.0164	.0317	-.0011	.0357
.87	.02	3.91	-.05	-.0729	-.0519	.0587	-.0836	.0191	.0108	.0710	-.0045	.0718
.87	2.02	3.91	0.00	.0147	-.0548	.0549	.0014	.0160	.0133	.0708	-.0045	.0720
.87	4.03	3.91	-.03	.1006	-.0518	.0544	.0849	.0182	.0157	.0701	-.0045	.0718
.87	6.01	3.90	-.04	.1955	-.0418	.0573	.1774	.0278	.0181	.0696	-.0045	.0719
.87	8.02	3.91	-.01	.2991	-.0233	.0595	.2786	.0454	.0205	.0688	-.0045	.0718
.87	10.03	3.91	-.04	.4142	.0055	.0589	.3912	.0735	.0229	.0680	-.0045	.0718
.87	15.02	3.91	-.04	.7035	.1176	.0520	.6746	.1836	.0289	.0661	-.0045	.0721
.87	19.04	3.90	-.03	.9236	.2451	.0439	.8901	.3090	.0335	.0639	-.0045	.0721
.87	.03	5.38	.04	-.0700	-.0911	.0612	-.0859	.0179	.0159	.1090	-.0058	.1102
.87	4.01	5.39	-.03	.1037	-.0912	.0552	.0801	.0170	.0235	.1082	-.0059	.1107
.87	6.03	5.39	-.05	.2044	-.0805	.0586	.1769	.0272	.0274	.1077	-.0059	.1111
.87	10.02	5.39	-.05	.4224	-.0330	.0597	.3876	.0724	.0348	.1054	-.0059	.1110
.87	18.29	5.41	-.05	.9023	.1852	.0459	.8528	.2841	.0495	.0990	-.0058	.1107
.87	4.02	7.60	-.03	.1220	-.1451	.0485	.0869	.0199	.0351	.1650	-.0077	.1687
.80	4.01	5.41	-.02	.1151	-.1128	.0471	.0871	.0158	.0280	.1286	-.0070	.1317
.60	.01	1.00	-.00	-.0700	.0171	.0464	-.0700	.0171	0.0000	0.0000	0.0000	0.0000
.60	2.03	1.00	-.01	.0087	.0156	.0455	.0087	.0156	0.0000	0.0000	0.0000	0.0000
.60	4.02	1.00	-.04	.0847	.0179	.0465	.0847	.0179	0.0000	0.0000	0.0000	0.0000
.60	6.01	1.00	-.12	.1682	.0264	.0515	.1682	.0264	0.0000	0.0000	0.0000	0.0000
.60	8.04	1.00	-.02	.2609	.0426	.0567	.2609	.0426	0.0000	0.0000	0.0000	0.0000
.60	10.02	.99	-.03	.3578	.0667	.0603	.3578	.0667	0.0000	0.0000	0.0000	0.0000
.60	15.04	.98	-.06	.6248	.1681	.0697	.6248	.1681	0.0000	0.0000	0.0000	0.0000
.60	19.19	.97	-.09	.8387	.2894	.0798	.8387	.2894	0.0000	0.0000	0.0000	0.0000
.60	-.00	2.31	.04	-.0486	-.0530	.0374	-.0590	.0161	.0104	.0691	-.0018	.0699
.60	4.02	2.30	.03	.1109	-.0501	.0381	.0957	.0177	.0152	.0678	-.0018	.0695
.60	6.03	2.30	.03	.1957	-.0407	.0431	.1782	.0263	.0175	.0670	-.0018	.0692
.60	10.04	2.30	.02	.3936	.0020	.0509	.3715	.0677	.0221	.0657	-.0018	.0693
.60	19.17	2.30	-.03	.8897	.2312	.0681	.8572	.2929	.0325	.0617	-.0018	.0697
.60	-.00	3.00	-.02	-.0459	-.0888	.0371	-.0606	.0154	.0147	.1043	-.0052	.1053
.60	2.04	3.02	-.01	.0380	-.0895	.0362	.0195	.0145	.0184	.1041	-.0052	.1057
.60	4.02	3.02	-.03	.1169	-.0866	.0378	.0948	.0173	.0221	.1038	-.0052	.1062
.60	6.02	3.03	-.04	.2039	-.0769	.0427	.1783	.0257	.0256	.1025	-.0052	.1057
.60	8.03	3.02	-.02	.3003	-.0599	.0468	.2710	.0419	.0292	.1017	-.0052	.1059
.60	10.04	3.02	-.04	.4053	-.0333	.0503	.3725	.0674	.0328	.1007	-.0052	.1059
.60	15.04	3.02	-.03	.6818	.0728	.0587	.6406	.1697	.0412	.0968	-.0052	.1052
.60	19.17	3.02	-.05	.9072	.1991	.0671	.8588	.2933	.0484	.0942	-.0052	.1059
.60	-.02	4.50	-.00	-.0355	-.1687	.0330	-.0626	.0142	.0272	.1829	-.0109	.1849
.60	4.01	4.51	-.04	.1324	-.1642	.0337	.0925	.0157	.0398	.1799	-.0108	.1843
.60	6.02	4.51	-.00	.2192	-.1542	.0395	.1732	.0237	.0460	.1779	-.0108	.1837
.60	10.04	4.51	-.03	.4270	-.1095	.0471	.3685	.0652	.0585	.1747	-.0108	.1842
.60	19.19	4.51	-.05	.9473	.1305	.0638	.8622	.2929	.0851	.1624	-.0108	.1834
.60	4.02	5.40	.01	.1373	-.2152	.0372	.0872	.0146	.0500	.2299	-.0124	.2352

TABLE 15.- AERODYNAMIC CHARACTERISTICS: IUM WEDGE NOZZLE, AR = 4, A/B POWER SETTING, $\delta_v = 0^o$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
1.20	.04	.70	-.08	-.0545	.0515	.0593	-.0545	.0515	0.0000	0.0000	0.0000	0.0000
1.20	2.03	.72	-.11	.0215	.0498	.0563	.0215	.0498	0.0000	0.0000	0.0000	0.0000
1.20	4.06	.74	-.17	.1042	.0531	.0539	.1042	.0531	0.0000	0.0000	0.0000	0.0000
1.20	6.03	.75	-.29	.1933	.0627	.0493	.1933	.0627	0.0000	0.0000	0.0000	0.0000
1.20	8.06	.75	-.37	.2869	.0802	.0442	.2869	.0802	0.0000	0.0000	0.0000	0.0000
1.20	10.04	.75	-.46	.3800	.1048	.0391	.3800	.1048	0.0000	0.0000	0.0000	0.0000
1.20	15.03	.71	-.57	.6033	.1963	.0264	.6033	.1963	0.0000	0.0000	0.0000	0.0000
1.20	16.59	.70	-.60	.6698	.2334	.0226	.6698	.2334	0.0000	0.0000	0.0000	0.0000
1.20	.05	3.85	-.23	-.0627	.0087	.0687	-.0602	.0466	-.0025	.0379	.0035	.0380
1.20	2.03	3.81	-.27	.0169	.0071	.0641	.0182	.0447	-.0013	.0376	.0035	.0376
1.20	4.05	3.82	-.33	.1035	.0104	.0598	.1034	.0481	.0000	.0376	.0035	.0376
1.20	6.06	3.81	-.42	.1973	.0205	.0534	.1959	.0581	.0014	.0376	.0035	.0376
1.20	10.04	3.81	-.57	.3834	.0633	.0406	.3844	.1005	.0039	.0372	.0035	.0374
1.20	16.57	3.79	-.68	.6834	.1919	.0211	.6753	.2283	.0081	.0364	.0035	.0373
1.20	.05	6.61	-.29	-.0635	-.0309	.0730	-.0531	.0429	-.0103	.0738	.0111	.0745
1.20	2.02	6.61	-.33	.0168	-.0326	.0688	.0246	.0416	-.0078	.0742	.0112	.0746
1.20	4.06	6.61	-.39	.1033	-.0293	.0645	.1084	.0450	-.0052	.0743	.0111	.0745
1.20	6.03	6.57	-.47	.1989	-.0192	.0578	.2015	.0554	-.0026	.0745	.0111	.0746
1.20	8.04	6.60	-.55	.2960	-.0016	.0511	.2960	.0730	.0000	.0746	.0112	.0746
1.20	10.06	6.58	-.61	.3941	.0239	.0448	.3914	.0985	.0027	.0746	.0111	.0746
1.20	15.02	6.62	-.71	.6240	.1157	.0290	.6149	.1899	.0091	.0742	.0112	.0747
1.20	16.50	6.60	-.72	.6910	.1519	.0250	.6800	.2258	.0110	.0740	.0112	.0748
1.20	.04	9.31	-.32	-.0613	-.0709	.0740	-.0426	.0383	-.0186	.1091	.0192	.1107
1.20	4.04	9.28	-.42	.1068	-.0687	.0666	.1177	.0415	-.0110	.1102	.0192	.1107
1.20	6.05	9.32	-.51	.2046	-.0581	.0597	.2117	.0523	-.0071	.1104	.0192	.1106
1.20	10.03	9.34	-.64	.3958	-.0155	.0492	.3952	.0954	.0005	.1108	.0192	.1108
1.20	16.54	9.31	-.74	.6987	.1147	.0309	.6856	.2245	.0131	.1098	.0192	.1106
1.20	4.04	5.42	-.52	.1045	-.0124	.0619	.1072	.0465	-.0027	.0589	.0077	.0589
1.16	4.02	5.42	-.52	.0972	-.0164	.0642	.1001	.0462	-.0029	.0626	.0081	.0627
.95	4.05	5.42	-.53	.0567	-.0670	.0929	.0610	.0266	-.0042	.0936	.0122	.0937
.93	4.04	5.42	-.53	.0546	-.0733	.0913	.0591	.0257	-.0045	.0990	.0129	.0991
.90	4.03	5.41	-.51	.0544	-.0818	.0872	.0591	.0227	-.0047	.1045	.0136	.1046
.87	.02	1.02	-.43	-.1004	.0242	.0689	-.1004	.0242	0.0000	0.0000	0.0000	0.0000
.87	2.04	1.03	-.44	-.0200	.0200	.0670	-.0200	.0200	0.0000	0.0000	0.0000	0.0000
.87	4.06	1.03	-.46	.0620	.0213	.0684	.0620	.0213	0.0000	0.0000	0.0000	0.0000
.87	6.03	1.03	-.50	.1436	.0284	.0735	.1436	.0284	0.0000	0.0000	0.0000	0.0000
.87	8.04	1.03	-.55	.2390	.0435	.0770	.2390	.0435	0.0000	0.0000	0.0000	0.0000
.87	10.05	1.03	-.59	.3452	.0688	.0784	.3452	.0688	0.0000	0.0000	0.0000	0.0000
.87	15.02	1.02	-.68	.6138	.1686	.0798	.6138	.1686	0.0000	0.0000	0.0000	0.0000
.87	19.02	1.02	-.74	.8205	.2859	.0811	.8205	.2859	0.0000	0.0000	0.0000	0.0000
.87	.03	2.42	-.42	-.1072	-.0137	.0747	-.1040	.0230	-.0032	.0367	.0040	.0369
.87	4.05	2.41	-.45	.0612	-.0165	.0706	.0618	.0200	-.0006	.0365	.0040	.0365
.87	6.04	2.41	-.49	.1486	-.0092	.0748	.1480	.0274	.0007	.0365	.0040	.0365
.87	10.04	2.40	-.58	.3542	.0320	.0777	.3510	.0683	.0032	.0363	.0040	.0365
.87	19.04	2.41	-.72	.8395	.2518	.0791	.8307	.2873	.0089	.0355	.0040	.0366
.87	.04	3.90	-.40	-.1073	-.0500	.0776	-.1025	.0238	-.0048	.0738	.0066	.0739
.87	2.03	3.90	-.42	-.0216	-.0540	.0739	-.0194	.0195	-.0022	.0735	.0066	.0736
.87	4.04	3.90	-.44	.0617	-.0535	.0735	.0614	.0202	.0004	.0737	.0066	.0737
.87	6.06	3.90	-.48	.1530	-.0459	.0778	.1500	.0277	.0029	.0736	.0066	.0737
.87	8.08	3.89	-.52	.2541	-.0296	.0800	.2486	.0439	.0055	.0736	.0066	.0738
.87	10.04	3.89	-.57	.3590	-.0045	.0809	.3509	.0688	.0080	.0733	.0066	.0737
.87	15.04	3.90	-.65	.6365	.0984	.0842	.6221	.1706	.0144	.0722	.0066	.0736
.87	19.02	3.90	-.70	.8458	.2167	.0862	.8264	.2876	.0194	.0710	.0066	.0736
.87	.05	5.40	-.40	-.1190	-.0876	.0892	-.1063	.0232	-.0127	.1108	.0144	.1116
.87	4.04	5.43	-.44	.0541	-.0927	.0845	.0592	.0197	-.0051	.1124	.0146	.1125
.87	5.93	5.41	-.47	.1403	-.0854	.0877	.1417	.0264	-.0014	.1118	.0145	.1118
.87	6.05	5.41	-.47	.1445	-.0847	.0877	.1456	.0271	-.0011	.1118	.0145	.1118
.87	10.03	5.40	-.57	.3603	-.0427	.0886	.3537	.0688	.0067	.1114	.0144	.1116
.87	18.94	5.39	-.70	.8532	.1764	.0875	.8293	.2856	.0239	.1092	.0145	.1118
.87	4.06	7.86	-.47	.0570	-.1577	.0902	.0719	.0157	-.0150	.1735	.0284	.1741
.80	4.04	5.42	-.46	.0566	-.1151	.0808	.0626	.0175	-.0060	.1326	.0172	.1327
.60	.04	1.01	-.41	-.0874	.0186	.0551	-.0874	.0186	0.0000	0.0000	0.0000	0.0000
.60	2.05	1.01	-.41	-.0110	.0162	.0546	-.0110	.0162	0.0000	0.0000	0.0000	0.0000
.60	4.04	1.01	-.05	.0636	.0176	.0575	.0636	.0176	0.0000	0.0000	0.0000	0.0000
.60	6.04	1.01	-.05	.1387	.0247	.0635	.1387	.0247	0.0000	0.0000	0.0000	0.0000
.60	8.04	1.01	-.05	.2307	.0389	.0686	.2307	.0389	0.0000	0.0000	0.0000	0.0000
.60	10.06	1.01	-.07	.3288	.0622	.0720	.3288	.0622	0.0000	0.0000	0.0000	0.0000
.60	15.00	1.01	-.10	.5791	.1540	.0867	.5791	.1540	0.0000	0.0000	0.0000	0.0000
.60	19.14	1.00	-.11	.7854	.2672	.1015	.7854	.2672	0.0000	0.0000	0.0000	0.0000
.60	.03	2.30	.02	-.0967	-.0525	.0653	-.0906	.0185	-.0062	.0710	.0078	.0713
.60	4.04	2.31	0.00	.0629	-.0543	.0643	.0640	.0171	-.0012	.0714	.0078	.0714
.60	6.05	2.31	-.00	.1450	-.0481	.0694	.1436	.0239	.0013	.0720	.0079	.0720
.60	10.04	2.31	-.03	.3424	-.0091	.0759	.3360	.0625	.0063	.0717	.0079	.0719
.60	19.16	2.31	-.07	.8174	.2020	.1033	.8000	.2712	.0175	.0692	.0078	.0714
.60	.03	3.02	.05	-.1001	-.0894	.0689	-.0907	.0191	-.0094	.1085	.0116	.1089
.60	2.06	3.02	.03	-.0151	-.0922	.0671	-.0096	.0164	-.0055	.1087	.0116	.1088
.60	4.06	3.01	.03	.0642	-.0907	.0680	.0659	.0179	-.0017	.1086	.0116	.1086
.60	6.06	3.01	.02	.1461	-.0838	.0731	.1440	.0247	.0021	.1084	.0116	.1085
.60	8.04	3.01	.01	.2446	-.0678	.0761	.2387	.0402	.0058	.1080	.0115	.1081
.60	10.04	3.01	-.01	.3482	-.0446	.0795	.3386	.0637	.0096	.1083	.0116	.1087
.60	15.04	3.01	-.05	.6149	.0519	.0938	.5959	.1585	.0190	.1067	.0116	.1083
.60	19.16	3.01	-.07	.8289	.1671	.1060	.8022	.2727	.0267	.1055	.0116	.1089
.60	.03	4.51	.06	-.1016	-.1686	.0750	-.0857	.0178	-.0159	.1864	.0198	.1871
.60	4.04	4.51	.03	.0638	-.1708	.0752	.0667	.0166	-.0029	.1874	.0198	.1875
.60	6.04	4.52	.02	.1459	-.1631	.0818	.1423	.0240	.0036	.1870	.0198	.1871
.60	10.05	4.51	-.00	.3520	-.1245	.0910	.3352	.0629	.0168	.1873	.0199	.1881
.60	19.16	4.52	-.06	.8447	.0888	.1177	.7985	.2709	.0462	.1821	.0199	.1878
.60	4.06	4.51	.01	.0655	-.1700	.0756	.0683	.0171	-.0028	.1871	.0198	.1871
.60	4.04	5.38	.02	.0576	-.2196	.0851	.0679	.0149	-.0103	.2345	.0303	.2347
.60	4.05	6.03	.02	.0599	-.2536	.0870	.0757	.0131	-.0158	.2667	.0377	.2672

TABLE 16.- NOZZLE CHARACTERISTICS: IUM WEDGE NOZZLE, AR = 4, A/B POWER SETTING, $\delta_v = 0^o$

MACH	ALPHA	NPR	CANALP	CLN	C(DN-F)	CMN	CLAN	CDAN
1.20	.04	.70	-.08	-.0128	.0081	.0041	-.0128	.0081
1.20	2.03	.72	-.11	-.0111	.0079	.0034	-.0111	.0079
1.20	4.06	.74	-.17	-.0090	.0069	.0027	-.0090	.0069
1.20	6.03	.75	-.29	-.0070	.0054	.0021	-.0070	.0054
1.20	8.06	.75	-.37	-.0037	.0045	.0011	-.0037	.0045
1.20	10.04	.75	-.46	-.0006	.0044	.0001	-.0006	.0044
1.20	15.03	.71	-.57	.0076	.0030	-.0025	.0076	.0030
1.20	16.59	.70	-.60	.0114	.0032	-.0037	.0114	.0032
1.20	.05	3.85	-.23	-.0268	-.0308	.0093	-.0240	.0073
1.20	2.03	3.81	-.27	-.0218	-.0320	.0080	-.0203	.0058
1.20	4.05	3.82	-.33	-.0161	-.0336	.0066	-.0161	.0043
1.20	6.06	3.81	-.42	-.0101	-.0349	.0050	-.0114	.0030
1.20	10.04	3.81	-.57	.0012	-.0366	.0022	-.0027	.0009
1.20	16.57	3.79	-.68	.0221	-.0365	-.0031	.0138	.0002
1.20	.05	6.61	-.29	-.0331	-.0702	.0121	-.0225	.0042
1.20	2.02	6.61	-.33	-.0270	-.0720	.0109	-.0190	.0027
1.20	4.06	6.61	-.39	-.0203	-.0736	.0094	-.0149	.0012
1.20	6.03	6.57	-.47	-.0128	-.0751	.0078	-.0101	.0001
1.20	8.04	6.60	-.55	-.0052	-.0764	.0062	-.0052	-.0012
1.20	10.06	6.58	-.61	.0017	-.0770	.0049	-.0010	-.0018
1.20	15.02	6.62	-.71	.0213	-.0774	.0007	.0120	-.0026
1.20	16.50	6.60	-.72	.0275	-.0766	-.0007	.0163	-.0020
1.20	.04	9.31	-.32	-.0358	-.1084	.0133	-.0168	.0016
1.20	4.04	9.28	-.42	-.0210	-.1126	.0110	-.0099	-.0015
1.20	6.05	9.32	-.51	-.0129	-.1140	.0096	-.0057	-.0027
1.20	10.03	9.34	-.64	.0026	-.1164	.0073	.0020	-.0047
1.20	16.54	9.31	-.74	.0307	-.1152	.0026	.0174	-.0045
1.20	4.04	5.42	-.52	-.0170	-.0580	.0078	-.0142	.0013
1.16	4.02	5.42	-.52	-.0176	-.0623	.0081	-.0146	.0008
.95	4.05	5.42	-.53	-.0263	-.0955	.0123	-.0219	-.0012
.93	4.04	5.42	-.53	-.0252	-.1006	.0121	-.0205	-.0008
.90	4.03	5.41	-.51	-.0198	-.1068	.0104	-.0149	-.0015
.87	.02	1.02	-.43	.0000	-.0035	.0005	.0000	-.0035
.87	2.04	1.03	-.44	.0013	-.0035	.0001	.0013	-.0035
.87	4.06	1.03	-.46	.0020	-.0033	-.0000	.0020	-.0033
.87	6.03	1.03	-.50	.0021	-.0029	-.0001	.0021	-.0029
.87	8.04	1.03	-.55	.0027	-.0025	-.0002	.0027	-.0025
.87	10.05	1.03	-.59	.0035	-.0023	-.0004	.0035	-.0023
.87	15.02	1.02	-.68	.0073	-.0014	-.0017	.0073	-.0014
.87	19.02	1.02	-.74	.0147	-.0005	-.0039	.0147	-.0005
.87	.03	2.42	-.42	-.0096	-.0365	.0038	-.0063	.0005
.87	4.05	2.41	-.45	-.0031	-.0368	.0025	-.0025	.0000
.87	6.04	2.41	-.49	-.0008	-.0368	.0022	-.0014	.0000
.87	10.04	2.40	-.58	.0041	-.0371	.0014	.0008	-.0005
.87	19.04	2.41	-.72	.0215	-.0350	-.0022	.0125	.0007
.87	.04	3.90	-.40	-.0151	-.0718	.0058	-.0102	.0025
.87	2.03	3.90	-.42	-.0107	-.0721	.0052	-.0084	.0020
.87	4.04	3.90	-.44	-.0067	-.0726	.0047	-.0071	.0017
.87	6.06	3.90	-.48	-.0033	-.0728	.0044	-.0062	.0013
.87	8.08	3.89	-.52	.0003	-.0728	.0041	-.0052	.0013
.87	10.04	3.89	-.57	.0035	-.0729	.0039	-.0046	.0010
.87	15.04	3.90	-.65	.0108	-.0728	.0038	-.0037	.0000
.87	19.02	3.90	-.70	.0214	-.0714	.0022	.0019	.0002
.87	.05	5.40	-.40	-.0284	-.1085	.0109	-.0155	.0031
.87	4.04	5.43	-.44	-.0167	-.1114	.0096	-.0114	.0019
.87	5.93	5.41	-.47	-.0114	-.1114	.0090	-.0099	.0013
.87	6.05	5.41	-.47	-.0110	-.1113	.0090	-.0099	.0014
.87	10.03	5.40	-.57	.0003	-.1114	.0077	-.0064	.0009
.87	18.94	5.39	-.70	.0299	-.1092	.0038	.0058	.0009
.87	4.06	7.86	-.47	-.0221	-.1758	.0135	-.0070	-.0010
.80	4.04	5.42	-.46	-.0177	-.1327	.0106	-.0115	.0009
.60	.04	1.01	-.41	.0035	-.0065	-.0001	.0035	-.0065
.60	2.05	1.01	-.41	.0044	-.0054	-.0004	.0044	-.0054
.60	4.04	1.01	-.05	.0051	-.0047	-.0006	.0051	-.0047
.60	6.04	1.01	-.05	.0055	-.0036	-.0007	.0055	-.0036
.60	8.04	1.01	-.05	.0060	-.0028	-.0009	.0060	-.0028
.60	10.06	1.01	-.07	.0071	-.0017	-.0012	.0071	-.0017
.60	15.00	1.01	-.10	.0099	-.0005	-.0022	.0099	-.0005
.60	19.14	1.00	-.11	.0136	.0012	-.0035	.0136	.0012
.60	.03	2.30	.02	-.0122	-.0700	.0051	-.0059	.0015
.60	4.04	2.31	0.00	-.0048	-.0704	.0042	-.0036	.0015
.60	6.05	2.31	-.00	-.0013	-.0702	.0038	-.0026	.0024
.60	10.04	2.31	-.03	.0062	-.0697	.0029	-.0002	.0026
.60	19.16	2.31	-.07	.0244	-.0657	.0003	.0067	.0041
.60	.03	3.02	.05	-.0184	-.1045	.0074	-.0089	.0048
.60	2.06	3.02	.03	-.0131	-.1048	.0068	-.0075	.0048
.60	4.06	3.01	.03	-.0082	-.1047	.0064	-.0065	.0047
.60	6.06	3.01	.02	-.0034	-.1046	.0060	-.0054	.0047
.60	8.04	3.01	.01	.0015	-.1040	.0055	-.0044	.0048
.60	10.04	3.01	-.01	.0066	-.1045	.0051	-.0031	.0046
.60	15.04	3.01	-.05	.0189	-.1026	.0039	-.0002	.0049
.60	19.16	3.01	-.07	.0310	-.1009	.0025	.0041	.0054
.60	.03	4.51	.06	-.0271	-.1815	.0108	-.0110	.0063
.60	4.04	4.51	.03	-.0136	-.1830	.0106	-.0106	.0058
.60	6.04	4.52	.02	-.0082	-.1830	.0110	-.0118	.0055
.60	10.05	4.51	-.00	.0031	-.1841	.0118	-.0138	.0047
.60	19.16	4.52	-.06	.0410	-.1794	.0087	-.0055	.0041
.60	4.06	4.51	.01	-.0137	-.1827	.0106	-.0108	.0058
.60	4.04	5.38	.02	-.0238	-.2318	.0159	-.0133	.0045
.60	4.05	6.03	.02	-.0254	-.2654	.0175	-.0094	.0034

TABLE 17.- AERODYNAMIC CHARACTERISTICS: IUM WEDGE NOZZLE, AR = 4, A/B POWER SETTING, $\delta_v = 15^o$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
1.20	.02	3.81	-.01	-.0387	.0089	.0499	-.0469	.0449	.0081	.0360	-.0047	.0369
1.20	4.02	3.81	-.13	.1282	.0125	.0407	.1176	.0478	.0106	.0353	-.0047	.0369
1.20	6.02	3.82	-.19	.2213	.0236	.0343	.2094	.0586	.0119	.0349	-.0047	.0369
1.20	10.02	3.82	-.34	.4150	.0688	.0215	.4006	.1028	.0143	.0341	-.0047	.0369
1.20	16.41	3.84	-.48	.7054	.1986	.0036	.6873	.2309	.0181	.0323	-.0047	.0370
1.21	.03	6.62	-.19	-.0357	-.0308	.0516	-.0312	.0451	-.0045	.0759	.0076	.0760
1.20	2.04	6.62	-.24	.0450	-.0321	.0477	.0469	.0445	-.0019	.0766	.0077	.0767
1.20	4.05	6.61	-.28	.1305	-.0276	.0438	.1296	.0489	.0009	.0766	.0077	.0766
1.20	6.03	6.61	-.33	.2265	-.0164	.0379	.2230	.0602	.0035	.0765	.0077	.0766
1.20	8.03	6.62	-.40	.3221	.0024	.0317	.3159	.0787	.0062	.0763	.0077	.0766
1.20	10.04	6.58	-.45	.4216	.0295	.0257	.4126	.1055	.0090	.0760	.0076	.0766
1.20	15.03	6.64	-.57	.6510	.1253	.0123	.6356	.2005	.0154	.0752	.0078	.0768
1.20	16.04	6.59	-.59	.7001	.1510	.0096	.6832	.2259	.0169	.0749	.0076	.0768
1.20	.04	9.33	-.23	-.0332	-.0700	.0512	-.0183	.0451	-.0149	.1151	.0184	.1161
1.20	4.02	9.33	-.31	.1349	-.0659	.0432	.1418	.0497	-.0069	.1156	.0184	.1158
1.20	6.02	9.30	-.39	.2321	-.0549	.0376	.2349	.0615	-.0028	.1164	.0184	.1165
1.20	10.04	9.30	-.51	.4302	-.0082	.0264	.4249	.1077	.0053	.1159	.0184	.1160
1.20	16.17	9.32	-.65	.7147	.1167	.0089	.6971	.2314	.0176	.1147	.0184	.1161
1.20	4.04	5.43	-.44	.1268	-.0108	.0442	.1226	.0486	.0042	.0593	.0030	.0595
.87	.04	2.40	-.35	-.0646	-.0135	.0476	-.0695	.0225	.0049	.0360	-.0030	.0364
.87	4.04	2.39	-.39	.1032	-.0135	.0447	.0957	.0221	.0074	.0356	-.0030	.0363
.87	6.01	2.40	-.40	.1890	-.0044	.0492	.1804	.0308	.0086	.0353	-.0030	.0363
.87	10.01	2.40	-.50	.4004	.0409	.0506	.3893	.0755	.0111	.0345	-.0030	.0363
.87	18.62	2.39	-.66	.8642	.2560	.0487	.8481	.2885	.0161	.0325	-.0030	.0363
.87	.02	3.94	-.34	-.0617	-.0504	.0461	-.0785	.0209	.0168	.0713	-.0097	.0732
.87	2.03	3.89	-.36	.0245	-.0517	.0427	.0057	.0179	.0188	.0695	-.0094	.0720
.87	4.03	3.90	-.38	.1085	-.0490	.0425	.0871	.0202	.0214	.0692	-.0095	.0724
.87	6.05	3.90	-.41	.1989	-.0396	.0467	.1752	.0287	.0237	.0682	-.0094	.0722
.87	8.03	3.90	-.45	.3003	-.0216	.0483	.2742	.0459	.0261	.0674	-.0095	.0723
.87	10.03	3.89	-.48	.4139	.0071	.0474	.3855	.0736	.0284	.0665	-.0094	.0723
.87	15.03	3.89	-.57	.6946	.1156	.0447	.6605	.1792	.0340	.0637	-.0094	.0722
.87	18.70	3.89	-.63	.8920	.2291	.0412	.8540	.2904	.0380	.0614	-.0094	.0722
.87	.04	5.42	-.32	-.0678	-.0905	.0540	-.0679	.0229	.0002	.1134	.0057	.1134
.87	4.02	5.41	-.36	.1039	-.0900	.0513	.0958	.0226	.0081	.1126	.0055	.1128
.87	6.05	5.41	-.40	.1957	-.0810	.0562	.1836	.0312	.0121	.1122	.0055	.1128
.87	10.04	5.40	-.47	.4142	-.0344	.0558	.3942	.0769	.0200	.1113	.0055	.1131
.87	18.64	5.40	-.63	.9017	.1889	.0478	.8653	.2959	.0363	.1069	.0055	.1130
.87	4.01	7.55	-.38	.1224	-.1453	.0426	.1260	.0275	-.0036	.1727	.0218	.1728
.60	.02	2.31	-.02	-.0358	-.0523	.0287	-.0456	.0190	.0098	.0713	-.0061	.0719
.60	4.03	2.32	-.03	.1212	-.0493	.0293	.1065	.0210	.0147	.0703	-.0061	.0718
.60	10.02	2.31	-.02	.4048	.0040	.0404	.3828	.0723	.0220	.0683	-.0061	.0718
.60	19.03	2.30	-.05	.8839	.2261	.0621	.8514	.2903	.0325	.0642	-.0061	.0720
.60	6.02	2.30	.06	.2042	-.0399	.0351	.1870	.0296	.0171	.0695	-.0061	.0716
.60	.02	3.00	.00	-.0304	-.0869	.0248	-.0443	.0180	.0139	.1049	-.0076	.1058
.60	2.02	3.00	-.02	.0520	-.0870	.0235	.0345	.0171	.0176	.1041	-.0075	.1056
.60	4.03	2.99	-.05	.1308	-.0835	.0248	.1095	.0202	.0212	.1036	-.0081	.1058
.60	6.02	3.00	-.09	.2134	-.0746	.0299	.1886	.0282	.0248	.1028	-.0081	.1058
.60	8.03	3.00	-.05	.3157	-.0556	.0336	.2873	.0464	.0284	.1020	-.0076	.1059
.60	10.02	3.00	-.05	.4188	-.0287	.0358	.3869	.0720	.0319	.1007	-.0081	.1056
.60	15.02	2.99	-.07	.6870	.0741	.0471	.6462	.1722	.0407	.0980	-.0081	.1062
.60	19.03	3.01	-.09	.8996	.1949	.0580	.8524	.2893	.0472	.0944	-.0075	.1056
.60	.04	4.51	.02	-.0378	-.1693	.0329	-.0577	.0158	.0199	.1851	-.0089	.1861
.60	4.03	4.50	.01	.1299	-.1654	.0324	.0971	.0173	.0328	.1828	-.0090	.1857
.60	6.03	4.50	-.01	.2165	-.1556	.0374	.1775	.0253	.0390	.1809	-.0089	.1851
.60	10.03	4.50	-.02	.4307	-.1099	.0430	.3790	.0683	.0517	.1782	-.0089	.1856
.60	19.05	4.51	-.08	.9258	.1174	.0648	.8469	.2853	.0789	.1679	-.0089	.1855
.60	4.03	4.51	-.01	.1311	-.1657	.0327	.0985	.0170	.0327	.1827	-.0089	.1856
.60	4.02	5.42	-.00	.1315	-.2174	.0380	.1145	.0206	.0169	.2380	.0119	.2386
.60	4.01	5.94	-.01	.1439	-.2439	.0306	.1330	.0240	.0110	.2678	.0201	.2681

TABLE 18.- NOZZLE CHARACTERISTICS: IUM WEDGE NOZZLE, AR = 4, A/B POWER SETTING, $\delta_v = 15^o$

MACH	ALPHA	NPR	CANALP	CLN	C(DN-F)	CMN	CLAN	CDAN
1.20	.02	3.81	-.01	.0027	-.0383	-.0012	-.0054	-.0020
1.20	4.02	3.81	-.13	.0136	-.0393	-.0039	.0029	-.0037
1.20	6.02	3.82	-.19	.0195	-.0394	-.0054	.0075	-.0041
1.20	10.02	3.82	-.34	.0306	-.0389	-.0082	.0161	-.0046
1.20	16.41	3.84	-.48	.0511	-.0355	-.0133	.0326	-.0029
1.21	.03	6.62	-.19	-.0009	-.0713	.0004	.0037	.0052
1.20	2.04	6.62	-.24	.0051	-.0709	-.0009	.0069	.0063
1.20	4.05	6.61	-.28	.0114	-.0711	-.0021	.0104	.0060
1.20	6.03	6.61	-.33	.0182	-.0713	-.0035	.0146	.0058
1.20	8.03	6.62	-.40	.0247	-.0711	-.0048	.0183	.0058
1.20	10.04	6.58	-.45	.0311	-.0708	-.0061	.0219	.0058
1.20	15.03	6.64	-.57	.0489	-.0683	-.0098	.0332	.0074
1.20	16.04	6.59	-.59	.0529	-.0674	-.0107	.0356	.0081
1.20	.04	9.33	-.23	-.0004	-.1062	.0002	.0146	.0097
1.20	4.02	9.33	-.31	.0140	-.1073	-.0020	.0207	.0092
1.20	6.02	9.30	-.39	.0220	-.1082	-.0033	.0247	.0091
1.20	10.04	9.30	-.51	.0370	-.1072	-.0056	.0314	.0096
1.20	16.17	9.32	-.65	.0636	-.1032	-.0105	.0455	.0124
1.20	4.04	5.43	-.44	.0100	-.0537	-.0022	.0057	.0060
.87	.04	2.40	-.35	.0163	-.0347	-.0056	.0113	.0016
.87	4.04	2.39	-.39	.0225	-.0331	-.0069	.0149	.0027
.87	6.01	2.40	-.40	.0252	-.0316	-.0074	.0164	.0040
.87	10.01	2.40	-.50	.0321	-.0305	-.0088	.0208	.0043
.87	18.62	2.39	-.66	.0541	-.0236	-.0145	.0376	.0091
.87	.02	3.94	-.34	.0191	-.0685	-.0067	.0021	.0033
.87	2.03	3.89	-.36	.0237	-.0663	-.0074	.0047	.0038
.87	4.03	3.90	-.38	.0277	-.0657	-.0080	.0061	.0041
.67	6.05	3.90	-.41	.0319	-.0638	-.0087	.0080	.0049
.87	8.03	3.90	-.45	.0363	-.0629	-.0094	.0099	.0050
.87	10.03	3.89	-.48	.0413	-.0625	-.0102	.0125	.0044
.87	15.03	3.89	-.57	.0562	-.0586	-.0132	.0217	.0056
.87	18.70	3.89	-.63	.0714	-.0525	-.0173	.0329	.0093
.87	.04	5.42	-.32	.0114	-.1063	-.0034	.0111	.0079
.87	4.02	5.41	-.36	.0216	-.1050	-.0043	.0133	.0084
.87	6.05	5.41	-.40	.0251	-.1046	-.0041	.0129	.0084
.87	10.04	5.40	-.47	.0379	-.1035	-.0059	.0177	.0086
.87	18.64	5.40	-.63	.0761	-.0925	-.0139	.0392	.0151
.87	4.01	7.55	-.38	.0322	-.1600	-.0068	.0355	.0140
.60	.02	2.31	-.02	.0273	-.0691	-.0091	.0173	.0027
.60	4.03	2.32	-.03	.0346	-.0659	-.0100	.0196	.0049
.60	10.02	2.31	-.02	.0457	-.0612	-.0115	.0234	.0076
.60	19.03	2.30	-.05	.0676	-.0511	-.0160	.0346	.0136
.60	6.02	2.30	.06	.0380	-.0622	-.0105	.0206	.0078
.60	.02	3.00	.00	.0321	-.0994	-.0109	.0179	.0063
.60	2.02	3.00	-.02	.0367	-.0974	-.0113	.0138	.0075
.60	4.03	2.99	-.05	.0411	-.0957	-.0117	.0196	.0087
.60	6.02	3.00	-.09	.0455	-.0938	-.0121	.0203	.0097
.60	8.03	3.00	-.05	.0501	-.0923	-.0125	.0212	.0104
.60	10.02	3.00	-.05	.0549	-.0901	-.0131	.0226	.0113
.60	15.02	2.99	-.07	.0680	-.0852	-.0149	.0267	.0134
.60	19.03	3.01	-.09	.0793	-.0791	-.0167	.0314	.0159
.60	.04	4.51	.02	.0226	-.1784	-.0070	.0025	.0080
.60	4.03	4.50	.01	.0379	-.1753	-.0080	.0048	.0089
.60	6.03	4.50	-.01	.0453	-.1733	-.0085	.0059	.0090
.60	10.03	4.50	-.02	.0605	-.1704	-.0095	.0084	.0091
.60	19.05	4.51	-.08	.0981	-.1580	-.0133	.0185	.0111
.60	4.03	4.51	-.01	.0375	-.1753	-.0078	.0046	.0087
.60	4.02	5.42	-.00	.0359	-.2266	-.0054	.0187	.0131
.60	4.01	5.94	-.01	.0460	-.2528	-.0084	.0347	.0170

TABLE 19.- AERODYNAMIC CHARACTERISTICS: IUM WEDGE NOZZLE, AR = 4, A/B POWER SETTING, $\delta_v = 30^\circ$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
1.20	4.00	.87	.02	.1165	.0544	.0491	.1165	.0544	0.0000	0.0000	0.0000	.0131
1.20	4.00	3.06	.02	.1422	.0293	.0305	.1311	.0513	.0111	.0219	-.0096	.0258
1.20	3.99	4.10	.01	.1476	.0180	.0268	.1295	.0540	.0181	.0360	-.0158	.0364
1.20	4.01	6.72	.00	.1510	-.0197	.0293	.1155	.0515	.0356	.0711	-.0331	.0638
1.20	4.00	10.77	-.01	.1680	-.0768	.0216	.1050	.0495	.0630	.1263	-.0604	.1168
1.20	-.01	10.53	.06	-.0024	-.0784	.0284	-.0546	.0474	.0521	.1258	-.0582	.1096
.87	3.99	1.05	-.01	.0720	.0216	.0578	.0720	.0216	0.0000	0.0000	0.0000	.0041
.87	4.02	3.02	-.02	.1523	-.0157	.0094	.1317	.0250	.0206	.0407	-.0181	.0614
.87	4.00	4.06	-.02	.1586	-.0404	.0062	.1246	.0271	.0339	.0675	-.0295	.0819
.87	4.01	6.10	-.03	.1628	-.0927	.0067	.1028	.0270	.0599	.1197	-.0553	.1239
.87	4.01	7.32	-.03	.1673	-.1242	.0068	.0916	.0267	.0755	.1509	-.0708	.1501
.87	-.01	1.04	.01	-.0973	.0243	.0634	-.0973	.0243	0.0000	0.0000	0.0000	.0033
.87	1.99	1.04	-.01	-.0106	.0202	.0591	-.0106	.0202	0.0000	0.0000	0.0000	.0038
.87	4.02	1.06	-.02	.0754	.0220	.0577	.0754	.0220	0.0000	0.0000	0.0000	.0044
.87	5.98	1.06	-.02	.1642	.0302	.0612	.1642	.0302	0.0000	0.0000	0.0000	.0057
.87	8.00	1.08	-.01	.2670	.0474	.0638	.2670	.0474	0.0000	0.0000	0.0000	.0079
.87	9.98	1.07	-.00	.3813	.0753	.0619	.3813	.0753	0.0000	0.0000	0.0000	.0087
.87	15.01	1.06	0.00	.6620	.1835	.0591	.6620	.1835	0.0000	0.0000	0.0000	.0129
.87	18.40	1.06	.02	.8432	.2871	.0581	.8432	.2871	0.0000	0.0000	0.0000	.0179
.86	.00	2.44	-.01	-.0310	-.0084	.0204	-.0425	.0186	.0115	.0270	-.0148	.0454
.87	.00	2.46	-.02	-.0317	-.0084	.0209	-.0433	.0189	.0116	.0273	-.0149	.0455
.87	1.98	2.46	-.02	.0546	-.0092	.0180	.0420	.0177	.0126	.0269	-.0148	.0472
.87	3.99	2.46	-.02	.1399	-.0048	.0184	.1265	.0215	.0134	.0263	-.0148	.0482
.87	5.99	2.45	-.02	.2296	.0056	.0225	.2153	.0312	.0143	.0257	-.0147	.0493
.87	8.00	2.45	-.01	.3335	.0249	.0247	.3184	.0500	.0151	.0251	-.0147	.0514
.87	9.99	2.46	-.00	.4477	.0555	.0230	.4317	.0801	.0160	.0246	-.0147	.0543
.87	15.01	2.46	.02	.7399	.1725	.0115	.7217	.1958	.0182	.0232	-.0148	.0691
.87	18.70	2.45	-.02	.9314	.2876	.0093	.9118	.3095	.0196	.0220	-.0148	.0797
.87	-.01	3.98	-.04	-.0163	-.0427	.0105	-.0445	.0247	.0282	.0674	-.0284	.0776
.87	1.99	3.98	-.11	.0727	-.0428	.0065	.0423	.0233	.0304	.0661	-.0283	.0788
.87	4.00	3.98	-.01	.1604	-.0376	.0072	.1278	.0274	.0327	.0650	-.0283	.0800
.87	5.99	3.98	-.02	.2523	-.0260	.0104	.2174	.0379	.0349	.0638	-.0283	.0812
.87	8.01	3.97	-.00	.3569	-.0059	.0123	.3198	.0566	.0371	.0625	-.0283	.0832
.87	10.01	3.96	-.01	.4732	.0249	.0107	.4337	.0865	.0395	.0616	-.0285	.0861
.87	14.99	4.00	.00	.7594	.1409	.0050	.7142	.1993	.0451	.0584	-.0287	.0944
.87	18.45	4.00	-.03	.9441	.2507	.0024	.8958	.3061	.0484	.0553	-.0286	.1013
.87	.00	5.48	.01	-.0066	-.0781	.0056	-.0512	.0289	.0445	.1069	-.0474	.1092
.87	1.98	5.50	.01	.0836	-.0780	.0016	.0353	.0274	.0482	.1054	-.0474	.1105
.87	4.01	5.51	-.02	.1760	-.0718	-.0010	.1238	.0322	.0521	.1040	-.0476	.1121
.87	5.99	5.49	-.03	.2714	-.0590	.0005	.2156	.0434	.0558	.1024	-.0477	.1135
.87	8.02	5.50	-.03	.3776	-.0377	.0025	.3183	.0625	.0593	.1002	-.0476	.1148
.87	10.01	5.49	-.01	.4922	-.0068	.0013	.4292	.0916	.0630	.0984	-.0478	.1180
.87	15.00	5.52	-.01	.7835	.1129	-.0062	.7118	.2060	.0717	.0930	-.0481	.1270
.87	18.43	5.51	0.00	.9705	.2242	-.0078	.8933	.3129	.0772	.0887	-.0481	.1335
.60	4.01	1.03	-.02	.1031	.0213	.0368	.1031	.0213	0.0000	0.0000	0.0000	.0085
.60	4.01	3.06	-.02	.2041	-.0634	-.0170	.1601	.0235	.0440	.0869	-.0381	.1052
.60	4.00	4.59	-.02	.2639	-.1283	-.0560	.1790	.0407	.0849	.1691	-.0756	.1856
.60	4.02	5.76	-.02	.2430	-.2050	-.0347	.1270	.0265	.1160	.2314	-.1064	.2362
.60	.00	1.02	.03	-.0614	.0200	.0401	-.0614	.0200	0.0000	0.0000	0.0000	.0061
.60	2.01	1.03	.01	.0216	.0185	.0367	.0216	.0185	0.0000	0.0000	0.0000	.0075
.60	4.00	1.03	-.01	.0988	.0212	.0370	.0988	.0212	0.0000	0.0000	0.0000	.0085
.60	6.01	1.03	-.02	.1815	.0297	.0424	.1815	.0297	0.0000	0.0000	0.0000	.0093
.60	7.98	1.04	.01	.2754	.0464	.0467	.2754	.0464	0.0000	0.0000	0.0000	.0100
.60	10.01	1.03	-.01	.3798	.0718	.0493	.3798	.0718	0.0000	0.0000	0.0000	.0109
.60	15.01	1.03	-.02	.6413	.1714	.0618	.6413	.1714	0.0000	0.0000	0.0000	.0138
.60	19.36	1.02	.00	.8651	.2997	.0761	.8651	.2997	0.0000	0.0000	0.0000	.0170
.60	-.02	2.36	-.00	.0144	-.0422	-.0049	-.0076	.0092	.0220	.0515	-.0293	.0738
.60	1.99	2.36	-.02	.0968	-.0407	-.0064	.0729	.0102	.0239	.0509	-.0294	.0757
.60	3.98	2.36	-.03	.1733	-.0346	-.0047	.1481	.0146	.0252	.0492	-.0291	.0762
.60	6.03	2.35	-.03	.2616	-.0229	.0001	.2349	.0250	.0267	.0479	-.0290	.0775
.60	8.02	2.34	-.03	.3605	-.0027	.0023	.3323	.0440	.0282	.0467	-.0289	.0791
.60	10.00	2.36	-.04	.4652	.0247	.0033	.4348	.0713	.0305	.0467	-.0293	.0816
.60	15.01	2.36	-.03	.7405	.1347	.0123	.7059	.1787	.0346	.0440	-.0294	.0868
.60	18.82	2.36	-.01	.9449	.2537	.0218	.9075	.2953	.0374	.0416	-.0294	.0923
.60	-.01	3.07	-.03	.0334	-.0737	-.0168	-.0048	.0170	.0382	.0907	-.0383	.1040
.60	1.99	3.07	.00	.1155	-.0715	-.0179	.0742	.0177	.0413	.0892	-.0383	.1050
.60	3.99	3.07	-.02	.1964	-.0652	-.0172	.1521	.0225	.0444	.0877	-.0383	.1057
.60	6.02	3.07	-.01	.2827	-.0529	-.0127	.2353	.0331	.0474	.0860	-.0383	.1073
.60	7.97	3.06	-.02	.3835	-.0323	-.0110	.3333	.0520	.0503	.0843	-.0383	.1091
.60	10.01	3.06	-.04	.4925	-.0025	-.0101	.4391	.0802	.0534	.0827	-.0384	.1113
.60	15.01	3.06	-.00	.7739	.1115	-.0022	.7134	.1894	.0605	.0779	-.0385	.1171
.60	19.35	3.06	-.02	1.0100	.2526	.0062	.9438	.3257	.0662	.0730	-.0385	.1245
.60	.00	4.55	.02	.0904	-.1413	-.0553	.0181	.0319	.0723	.1732	-.0749	.1813
.60	1.99	4.55	-.01	.1762	-.1369	-.0567	.0980	.0336	.0782	.1705	-.0749	.1822
.60	4.01	4.56	-.01	.2600	-.1285	-.0556	.1757	.0394	.0843	.1679	-.0750	.1835
.60	5.98	4.56	-.03	.3487	-.1155	-.0528	.2581	.0505	.0906	.1659	-.0754	.1860
.60	8.02	4.57	-.02	.4562	-.0916	-.0517	.3595	.0715	.0967	.1630	-.0757	.1889
.60	9.98	4.58	-.01	.5660	-.0580	-.0502	.4646	.1004	.1014	.1583	-.0751	.1897
.60	14.98	4.58	-.03	.8489	.0613	-.0434	.7338	.2106	.1151	.1493	-.0753	.1955
.60	19.12	4.57	.00	1.0819	.2013	-.0353	.9554	.3429	.1265	.1416	-.0758	.2027

TABLE 20.- AERODYNAMIC CHARACTERISTICS: IUA 2-D C-D NOZZLE, AR = 1, DRY POWER SETTING, $\delta_v = 0^\circ$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
.87	-.00	1.08	.04	-.1108	.0212	.0706	-.1108	.0212	0.0000	0.0000	0.0000	0.0000
.87	2.00	1.08	.03	-.0241	.0176	.0671	-.0241	.0176	0.0000	0.0000	0.0000	0.0000
.87	4.00	1.08	-.03	.0585	.0190	.0667	.0585	.0190	0.0000	0.0000	0.0000	0.0000
.87	6.02	1.08	-.09	.1465	.0266	.0716	.1465	.0266	0.0000	0.0000	0.0000	0.0000
.87	8.00	1.08	-.02	.2467	.0428	.0740	.2467	.0428	0.0000	0.0000	0.0000	0.0000
.87	10.02	1.08	-.04	.3626	.0707	.0731	.3626	.0707	0.0000	0.0000	0.0000	0.0000
.87	15.01	1.08	-.06	.6397	.1750	.0691	.6397	.1750	0.0000	0.0000	0.0000	0.0000
.87	18.51	1.08	-.03	.8269	.2801	.0672	.8269	.2801	0.0000	0.0000	0.0000	0.0000
.87	.00	2.42	.26	-.1052	-.0055	.0729	-.1035	.0204	-.0017	.0259	.0034	.0260
.87	3.99	2.41	-.11	.0624	-.0070	.0685	.0623	.0189	.0001	.0259	.0034	.0259
.87	6.00	2.40	-.21	.1519	.0008	.0733	.1509	.0266	.0010	.0258	.0034	.0258
.87	10.01	2.39	.03	.3655	.0449	.0760	.3627	.0703	.0028	.0254	.0033	.0256
.87	18.62	2.38	-.15	.8459	.2599	.0691	.8394	.2844	.0065	.0245	.0033	.0254
.87	-.01	3.90	-.02	-.1072	-.0300	.0749	-.1036	.0206	-.0037	.0506	.0068	.0507
.87	2.00	3.90	-.08	-.0198	-.0335	.0711	-.0179	.0173	-.0019	.0508	.0068	.0508
.87	3.99	3.90	-.00	.0637	-.0315	.0727	.0638	.0191	-.0001	.0507	.0067	.0507
.87	6.02	3.90	.01	.1549	-.0235	.0777	.1532	.0274	.0017	.0508	.0068	.0508
.87	8.01	3.91	-.03	.2567	-.0067	.0797	.2532	.0440	.0034	.0507	.0068	.0508
.87	10.02	3.90	-.06	.3686	.0206	.0785	.3634	.0711	.0052	.0505	.0068	.0508
.87	15.00	3.89	-.02	.6564	.1276	.0756	.6468	.1774	.0096	.0498	.0067	.0507
.87	18.17	3.90	-.08	.8227	.2201	.0731	.8104	.2692	.0123	.0491	.0067	.0506
.87	.00	5.40	.21	-.1051	-.0550	.0792	-.0995	.0207	-.0056	.0757	.0102	.0759
.87	4.00	5.38	-.01	.0660	-.0562	.0758	.0664	.0193	-.0003	.0756	.0101	.0756
.87	6.00	5.36	-.03	.1562	-.0481	.0803	.1539	.0273	.0023	.0754	.0101	.0754
.87	10.01	5.40	-.09	.3732	-.0043	.0810	.3656	.0712	.0076	.0755	.0102	.0759
.87	18.42	5.40	-.26	.8466	.2045	.0745	.8280	.2781	.0186	.0736	.0102	.0759
.87	4.00	6.00	.10	.0670	-.0662	.0778	.0675	.0193	-.0004	.0856	.0115	.0856
.87	3.99	11.10	.09	.0705	-.1529	.0872	.0718	.0177	-.0013	.1706	.0230	.1706
.80	4.02	5.40	.06	.0697	-.0712	.0730	.0701	.0180	-.0004	.0892	.0120	.0892
.60	.01	1.03	.10	-.0860	.0171	.0546	-.0860	.0171	0.0000	0.0000	0.0000	0.0000
.60	2.00	1.03	.09	-.0098	.0146	.0539	-.0098	.0146	0.0000	0.0000	0.0000	0.0000
.60	4.00	1.03	.07	.0653	.0164	.0556	.0653	.0164	0.0000	0.0000	0.0000	0.0000
.60	6.01	1.03	.06	.1461	.0237	.0614	.1461	.0237	0.0000	0.0000	0.0000	0.0000
.60	7.99	1.03	.05	.2390	.0391	.0653	.2390	.0391	0.0000	0.0000	0.0000	0.0000
.60	10.01	1.03	.04	.3394	.0628	.0674	.3394	.0628	0.0000	0.0000	0.0000	0.0000
.60	15.00	1.03	.04	.6007	.1585	.0777	.6007	.1585	0.0000	0.0000	0.0000	0.0000
.60	19.02	1.03	0.00	.8131	.2738	.0883	.8131	.2738	0.0000	0.0000	0.0000	0.0000
.60	.02	2.29	.09	-.0892	-.0327	.0606	-.0860	.0173	-.0032	.0500	.0065	.0501
.60	4.00	2.30	.08	.0663	-.0338	.0614	.0660	.0168	.0003	.0506	.0066	.0506
.60	6.01	2.30	.03	.1483	-.0268	.0668	.1462	.0238	.0021	.0506	.0066	.0507
.60	9.99	2.30	-.01	.3450	.0125	.0723	.3393	.0629	.0056	.0505	.0066	.0508
.60	19.19	2.30	-.03	.8345	.2305	.0936	.8209	.2794	.0136	.0488	.0066	.0507
.60	.01	3.01	.03	-.0914	-.0572	.0634	-.0862	.0179	-.0052	.0752	.0099	.0753
.60	2.02	3.00	.02	-.0107	-.0600	.0627	-.0081	.0157	-.0025	.0757	.0100	.0757
.60	4.00	3.01	.00	.0675	-.0576	.0643	.0674	.0176	.0001	.0752	.0099	.0752
.60	6.01	3.01	-.00	.1479	-.0510	.0695	.1451	.0244	.0027	.0753	.0099	.0754
.60	8.00	3.01	-.03	.2480	-.0348	.0732	.2426	.0403	.0053	.0751	.0099	.0753
.60	10.01	3.01	-.04	.3502	-.0108	.0753	.3422	.0641	.0080	.0749	.0099	.0753
.60	15.00	3.01	-.08	.6205	.0863	.0854	.6060	.1606	.0145	.0743	.0100	.0757
.60	19.19	3.01	-.10	.8424	.2075	.0953	.8225	.2802	.0198	.0727	.0099	.0754
.60	.01	4.51	-.03	-.0947	-.1092	.0701	-.0854	.0184	-.0093	.1276	.0171	.1279
.60	3.99	4.51	-.03	.0669	-.1106	.0703	.0674	.0175	-.0004	.1281	.0171	.1281
.60	6.02	4.51	-.03	.1502	-.1038	.0759	.1461	.0246	.0041	.1284	.0172	.1285
.60	9.98	4.51	-.06	.3559	-.0631	.0811	.3429	.0643	.0129	.1273	.0171	.1280
.60	19.20	4.51	.01	.8615	.1583	.1025	.8282	.2826	.0333	.1243	.0172	.1287
.60	4.00	5.43	.01	.0686	-.1427	.0751	.0693	.0175	-.0007	.1602	.0215	.1602
.60	4.01	6.50	.01	.0701	-.1798	.0797	.0711	.0176	-.0010	.1974	.0265	.1974
.60	4.01	8.73	.01	.0715	-.2598	.0892	.0732	.0166	-.0018	.2764	.0373	.2764

TABLE 21.- AERODYNAMIC CHARACTERISTICS: IUF 2-D C-D NOZZLE, AR = 1, A/B POWER SETTING, $\delta_v = 0^o$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
1.20	.01	6.59	.01	-.0829	-.0366	.0747	-.0758	.0408	-.0071	.0774	.0103	.0777
1.20	2.02	6.62	-.00	-.0017	-.0398	.0710	.0026	.0381	-.0044	.0779	.0104	.0781
1.20	4.00	6.64	-.09	.0818	-.0381	.0680	.0835	.0406	-.0017	.0787	.0105	.0787
1.20	6.02	6.63	-.08	.1776	-.0285	.0638	.1766	.0499	.0011	.0785	.0104	.0785
1.20	8.02	6.60	-.11	.2749	-.0110	.0582	.2711	.0667	.0038	.0776	.0103	.0777
1.20	9.98	6.62	-.03	.3738	.0131	.0528	.3674	.0909	.0065	.0778	.0104	.0781
1.20	14.99	6.63	-.12	.6106	.1033	.0376	.5973	.1805	.0133	.0773	.0104	.0784
1.20	15.91	6.61	-.16	.6522	.1242	.0345	.6376	.2013	.0146	.0772	.0104	.0785
1.20	.01	9.29	.02	-.0807	-.0764	.0768	-.0701	.0386	-.0105	.1150	.0154	.1155
1.20	4.02	9.30	-.06	.0903	-.0763	.0703	.0928	.0391	-.0025	.1154	.0154	.1154
1.20	6.02	9.31	-.10	.1862	-.0673	.0661	.1847	.0485	.0016	.1158	.0155	.1158
1.19	10.00	9.30	-.17	.3832	-.0261	.0546	.3736	.0897	.0096	.1158	.0155	.1162
1.20	10.01	9.35	-.08	.3838	-.0258	.0552	.3741	.0900	.0096	.1158	.0155	.1162
1.19	15.79	9.30	-.08	.6632	.0844	.0365	.6419	.1989	.0213	.1145	.0156	.1165
1.20	4.01	5.40	-.01	.0817	-.0196	.0682	.0830	.0419	-.0013	.0615	.0082	.0615
1.20	-.00	3.81	.03	-.0833	.0039	.0741	-.0798	.0431	-.0036	.0392	.0052	.0394
1.20	4.01	3.81	-.01	.0807	.0040	.0668	.0815	.0432	-.0008	.0392	.0051	.0392
1.20	6.03	3.81	-.10	.1749	.0129	.0621	.1743	.0522	.0006	.0393	.0052	.0393
1.20	10.06	3.80	-.03	.3696	.0549	.0518	.3663	.0940	.0033	.0391	.0051	.0392
1.20	10.01	3.82	-.03	.3679	.0541	.0520	.3646	.0933	.0033	.0392	.0052	.0394
1.20	15.75	3.83	-.12	.6279	.1588	.0361	.6206	.1978	.0073	.0390	.0052	.0397
1.20	-.02	.72	-.00	-.0835	.0487	.0701	-.0835	.0487	0.0000	0.0000	0.0000	0.0000
1.20	2.03	.73	-.04	-.0025	.0455	.0656	-.0025	.0455	0.0000	0.0000	0.0000	0.0000
1.20	4.04	.75	-.05	.0825	.0479	.0620	.0825	.0479	0.0000	0.0000	0.0000	0.0000
1.20	6.00	.76	-.13	.1688	.0562	.0578	.1688	.0562	0.0000	0.0000	0.0000	0.0000
1.20	7.99	.77	-.04	.2628	.0725	.0535	.2628	.0725	0.0000	0.0000	0.0000	0.0000
1.20	10.01	.79	-.05	.3602	.0965	.0476	.3602	.0965	0.0000	0.0000	0.0000	0.0000
1.20	15.00	.80	-.09	.5857	.1847	.0347	.5857	.1847	0.0000	0.0000	0.0000	0.0000
1.20	15.73	.80	-.09	.6192	.2015	.0327	.6192	.2015	0.0000	0.0000	0.0000	0.0000
.95	4.00	5.40	.18	.0352	-.0788	.0917	.0372	.0188	-.0021	.0976	.0129	.0976
.93	3.98	5.40	.19	.0418	-.0853	.0843	.0440	.0178	-.0022	.1031	.0137	.1031
.90	4.01	5.44	.19	.0441	-.0927	.0820	.0464	.0172	-.0023	.1099	.0146	.1099
.87	.01	1.02	.26	-.1170	.0213	.0661	-.1170	.0213	0.0000	0.0000	0.0000	0.0000
.87	2.01	1.03	.24	-.0334	.0172	.0636	-.0334	.0172	0.0000	0.0000	0.0000	0.0000
.87	4.01	1.03	.22	.0488	.0179	.0634	.0488	.0179	0.0000	0.0000	0.0000	0.0000
.87	6.01	1.03	.20	.1355	.0250	.0691	.1355	.0250	0.0000	0.0000	0.0000	0.0000
.87	8.01	1.03	.16	.2312	.0395	.0735	.2312	.0395	0.0000	0.0000	0.0000	0.0000
.87	10.00	1.03	.11	.3379	.0646	.0741	.3379	.0646	0.0000	0.0000	0.0000	0.0000
.87	15.01	1.02	.01	.6158	.1655	.0735	.6158	.1655	0.0000	0.0000	0.0000	0.0000
.87	18.67	1.02	-.05	.8048	.2700	.0735	.8048	.2700	0.0000	0.0000	0.0000	0.0000
.87	.00	2.39	.28	-.1287	-.0170	.0751	-.1254	.0205	-.0033	.0375	.0049	.0376
.87	4.01	2.38	.24	.0412	-.0208	.0727	.0419	.0165	-.0007	.0373	.0049	.0374
.87	6.00	2.40	.22	.1271	-.0144	.0793	.1265	.0232	.0006	.0376	.0049	.0376
.87	10.00	2.41	.14	.3336	.0252	.0852	.3303	.0628	.0032	.0376	.0049	.0378
.87	18.59	2.40	-.03	.8084	.2291	.0818	.7996	.2658	.0088	.0367	.0049	.0378
.87	.00	3.94	.29	-.1348	-.0563	.0819	-.1277	.0215	-.0071	.0778	.0103	.0782
.87	2.02	3.91	.27	-.0445	-.0609	.0782	-.0402	.0165	-.0043	.0774	.0102	.0775
.87	3.99	3.89	.26	.0392	-.0600	.0784	.0408	.0172	-.0016	.0772	.0101	.0772
.87	5.99	3.90	.23	.1294	-.0532	.0839	.1283	.0241	.0011	.0774	.0102	.0774
.87	8.00	3.91	.17	.2299	-.0384	.0882	.2260	.0389	.0038	.0773	.0102	.0774
.87	9.99	3.89	.14	.3393	-.0133	.0875	.3329	.0634	.0064	.0767	.0101	.0770
.87	14.99	3.90	.04	.6279	.0887	.0859	.6147	.1648	.0132	.0761	.0101	.0772
.87	17.72	3.91	-.01	.7758	.1653	.0851	.7590	.2409	.0168	.0756	.0102	.0775
.87	.00	5.40	.29	-.1304	-.0959	.0838	-.1198	.0200	-.0106	.1159	.0154	.1164
.87	4.01	5.40	.25	.0473	-.1003	.0800	.0498	.0165	-.0025	.1168	.0155	.1168
.87	6.00	5.40	.23	.1390	-.0933	.0851	.1374	.0235	.0016	.1168	.0155	.1168
.87	10.02	5.41	.13	.3576	-.0518	.0874	.3478	.0650	.0098	.1168	.0155	.1172
.87	16.96	5.41	-.00	.7564	.1069	.0845	.7326	.2211	.0237	.1142	.0154	.1166
.87	4.00	7.48	.23	.0584	-.1566	.0804	.0621	.0150	-.0037	.1716	.0229	.1716
.80	4.00	5.40	.24	.0487	-.1231	.0788	.0516	.0150	-.0029	.1382	.0183	.1382
.60	.00	1.00	-.04	-.1014	.0181	.0513	-.1014	.0181	0.0000	0.0000	0.0000	0.0000
.60	2.01	1.00	-.02	-.0226	.0149	.0512	-.0226	.0149	0.0000	0.0000	0.0000	0.0000
.60	3.99	1.00	-.03	.0513	.0157	.0525	.0513	.0157	0.0000	0.0000	0.0000	0.0000
.60	6.01	1.00	-.04	.1301	.0218	.0580	.1301	.0218	0.0000	0.0000	0.0000	0.0000
.60	8.00	1.01	-.05	.2216	.0358	.0632	.2216	.0358	0.0000	0.0000	0.0000	0.0000
.60	10.01	1.01	-.07	.3191	.0577	.0672	.3191	.0577	0.0000	0.0000	0.0000	0.0000
.60	14.98	1.00	-.07	.5763	.1488	.0796	.5763	.1488	0.0000	0.0000	0.0000	0.0000
.60	19.11	1.00	-.08	.7880	.2618	.0922	.7880	.2618	0.0000	0.0000	0.0000	0.0000
.60	-.00	2.30	.01	-.1229	-.0556	.0681	-.1165	.0174	-.0065	.0730	.0096	.0733
.60	4.02	2.30	.00	.0363	-.0597	.0685	.0376	.0137	-.0013	.0735	.0096	.0735
.60	6.01	2.30	-.01	.1168	-.0543	.0739	.1156	.0193	.0012	.0736	.0096	.0736
.60	10.00	2.30	-.03	.3111	-.0186	.0827	.3048	.0545	.0063	.0731	.0096	.0733
.60	19.14	2.31	-.09	.8033	.1883	.1059	.7853	.2601	.0180	.0718	.0096	.0740
.60	-.01	3.00	.03	-.1270	-.0931	.0733	-.1169	.0182	-.0100	.1113	.0146	.1117
.60	1.97	2.99	.03	-.0443	-.0972	.0723	-.0382	.0145	-.0062	.1118	.0146	.1119
.60	4.02	2.99	.02	.0378	-.0973	.0733	.0399	.0149	-.0022	.1122	.0147	.1122
.60	6.01	2.99	.01	.1176	-.0920	.0785	.1159	.0200	.0017	.1121	.0146	.1121
.60	8.01	3.00	-.01	.2156	-.0775	.0833	.2100	.0340	.0056	.1115	.0146	.1117
.60	9.99	2.99	-.01	.3166	-.0557	.0867	.3071	.0557	.0095	.1114	.0146	.1118
.60	14.99	2.99	-.05	.5886	.0360	.0984	.5694	.1468	.0192	.1108	.0147	.1125
.60	19.01	3.00	-.07	.8084	.1476	.1094	.7813	.2576	.0272	.1100	.0148	.1133
.60	.00	4.47	.04	-.1286	-.1749	.0819	-.1111	.0175	-.0175	.1924	.0255	.1932
.60	4.00	4.50	.02	.0399	-.1813	.0819	.0440	.0141	-.0041	.1954	.0258	.1955
.60	5.99	4.50	.01	.1251	-.1760	.0867	.1224	.0196	.0027	.1956	.0258	.1956
.60	9.99	4.50	-.01	.3319	-.1391	.0932	.3155	.0561	.0164	.1952	.0258	.1959
.60	19.15	4.50	-.08	.8472	.0749	.1167	.7999	.2651	.0473	.1903	.0259	.1960
.60	4.00	5.40	0.00	.0436	-.2316	.0855	.0488	.0128	-.0052	.2444	.0324	.2444

TABLE 22.- AERODYNAMIC CHARACTERISTICS: IUF 2-D C-D NOZZLE, AR = 1, A/B POWER SETTING, $\delta_v = 15^o$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
1.20	-.01	3.80	-.05	-.0492	.0059	.0477	-.0576	.0443	.0084	.0384	-.0035	.0393
1.20	3.97	3.81	.01	.1145	.0079	.0416	.1034	.0459	.0111	.0380	-.0035	.0395
1.20	6.00	3.80	-.07	.2059	.0180	.0369	.1935	.0555	.0124	.0375	-.0035	.0395
1.20	9.99	3.82	-.04	.3994	.0607	.0253	.3842	.0975	.0151	.0368	-.0035	.0398
1.20	16.20	3.81	-.09	.6804	.1807	.0081	.6615	.2155	.0190	.0348	-.0035	.0397
1.20	-.03	6.59	.04	-.0410	-.0353	.0452	-.0600	.0405	.0190	.0757	-.0085	.0781
1.20	1.98	6.60	-.05	.0410	-.0362	.0413	.0194	.0387	.0216	.0750	-.0085	.0780
1.20	3.98	6.61	-.04	.1281	-.0324	.0386	.1038	.0420	.0243	.0744	-.0085	.0783
1.20	5.98	6.62	-.10	.2195	-.0222	.0340	.1925	.0514	.0270	.0737	-.0085	.0785
1.20	8.00	6.63	-.01	.3168	-.0037	.0287	.2873	.0690	.0295	.0727	-.0085	.0784
1.20	9.98	6.63	-.02	.4149	.0214	.0226	.3827	.0934	.0322	.0720	-.0086	.0789
1.20	14.97	6.64	-.03	.6500	.1160	.0078	.6118	.1847	.0382	.0686	-.0086	.0785
1.20	16.18	6.64	-.05	.7010	.1434	.0044	.6613	.2115	.0398	.0681	-.0086	.0788
1.20	-.00	9.34	-.01	-.0289	-.0749	.0418	-.0582	.0371	.0293	.1121	-.0133	.1158
1.20	3.99	9.25	-.11	.1385	-.0700	.0355	.1018	.0388	.0367	.1087	-.0132	.1147
1.20	5.99	9.34	-.05	.2346	-.0601	.0311	.1937	.0483	.0408	.1084	-.0133	.1158
1.20	9.99	9.35	-.02	.4339	-.0146	.0195	.3855	.0907	.0484	.1054	-.0133	.1159
1.20	16.18	9.38	-.11	.7263	.1099	-.0017	.6667	.2097	.0596	.0998	-.0134	.1163
1.20	3.99	5.40	.02	.1204	-.0151	.0407	.1018	.0434	.0186	.0585	-.0064	.0614
.87	-.02	2.41	0.00	-.0686	-.0188	.0398	-.0742	.0194	.0056	.0382	-.0012	.0386
.87	3.98	2.41	-.11	.0990	-.0183	.0385	.0908	.0194	.0082	.0376	-.0012	.0385
.87	5.99	2.41	-.02	.1850	-.0101	.0454	.1754	.0273	.0096	.0374	-.0012	.0386
.87	10.01	2.41	-.09	.3912	.0338	.0504	.3790	.0704	.0121	.0366	-.0012	.0385
.87	18.93	2.41	-.11	.8821	.2596	.0469	.8645	.2939	.0177	.0343	-.0012	.0386
.87	-.04	3.90	.00	-.0510	-.0563	.0314	-.0677	.0194	.0168	.0757	-.0071	.0776
.87	2.00	3.90	-.00	.0372	-.0578	.0287	.0177	.0175	.0195	.0753	-.0071	.0778
.87	4.01	3.90	-.02	.1214	-.0541	.0296	.0993	.0202	.0221	.0743	-.0071	.0776
.87	6.00	3.90	-.09	.2102	-.0456	.0344	.1854	.0284	.0248	.0739	-.0071	.0780
.87	7.95	3.90	-.08	.3083	-.0279	.0378	.2811	.0451	.0272	.0730	-.0071	.0779
.87	9.97	3.90	-.10	.4188	.0001	.0384	.3890	.0719	.0297	.0718	-.0071	.0778
.87	14.98	3.92	-.08	.7061	.1101	.0367	.6700	.1793	.0361	.0692	-.0071	.0780
.87	18.92	3.91	-.09	.9173	.2315	.0339	.8765	.2982	.0408	.0667	-.0071	.0782
.87	-.02	5.42	.03	-.0330	-.0966	.0247	-.0607	.0174	.0277	.1141	-.0122	.1174
.87	3.97	5.42	-.01	.1410	-.0941	.0224	.1054	.0182	.0357	.1122	-.0122	.1178
.87	6.01	5.41	-.05	.2326	-.0839	.0267	.1929	.0271	.0397	.1110	-.0122	.1179
.87	10.00	5.43	-.06	.4475	-.0359	.0293	.4003	.0718	.0472	.1077	-.0122	.1176
.87	19.06	5.42	-.09	.9568	.2050	.0242	.8929	.3043	.0638	.0993	-.0123	.1181
.87	3.98	7.19	.17	.1650	-.1392	.0156	.1138	.0161	.0512	.1553	-.0181	.1635
.60	-.02	2.29	-.02	-.0521	-.0569	.0313	-.0626	.0172	.0105	.0741	-.0021	.0748
.60	3.98	2.29	-.09	.1036	-.0558	.0331	.0880	.0171	.0156	.0729	-.0021	.0745
.60	5.98	2.34	-.11	.1848	-.0513	.0384	.1657	.0241	.0191	.0754	-.0023	.0778
.60	9.98	2.31	-.11	.3787	-.0088	.0468	.3552	.0631	.0235	.0719	-.0022	.0756
.60	19.15	2.32	-.09	.8710	.2114	.0702	.8362	.2790	.0349	.0676	-.0022	.0760
.60	-.03	2.99	-.03	-.0415	-.0937	.0267	-.0612	.0177	.0197	.1114	-.0068	.1131
.60	1.99	2.99	-.06	.0403	-.0948	.0265	.0166	.0160	.0236	.1108	-.0067	.1132
.60	4.00	3.00	-.09	.1196	-.0921	.0280	.0919	.0182	.0277	.1102	-.0068	.1137
.60	5.99	3.00	-.03	.1992	-.0835	.0339	.1679	.0252	.0313	.1086	-.0068	.1131
.60	7.97	3.01	-.04	.2956	-.0675	.0384	.2603	.0407	.0353	.1082	-.0068	.1138
.60	9.97	3.01	-.05	.4014	-.0427	.0413	.3621	.0648	.0393	.1075	-.0069	.1144
.60	14.99	3.01	-.07	.6721	.0586	.0534	.6239	.1615	.0482	.1029	-.0068	.1137
.60	19.15	3.00	-.04	.8990	.1832	.0646	.8434	.2825	.0556	.0993	-.0068	.1138
.60	-.03	4.48	-.01	-.0113	-.1746	.0142	-.0555	.0159	.0443	.1905	-.0191	.1956
.60	3.96	4.50	-.08	.1562	-.1714	.0148	.0983	.0167	.0578	.1881	-.0193	.1968
.60	5.97	4.50	-.05	.2427	-.1617	.0205	.1783	.0243	.0644	.1859	-.0193	.1968
.60	9.99	4.50	-.07	.4491	-.1165	.0267	.3717	.0649	.0774	.1814	-.0193	.1972
.60	19.13	4.50	-.04	.9580	.1168	.0488	.8529	.2833	.1051	.1665	-.0193	.1969
.60	4.00	5.39	-.00	.1761	-.2192	.0100	.1018	.0145	.0744	.2337	-.0254	.2452

TABLE 23.- AERODYNAMIC CHARACTERISTICS: IUM 2-D C-D NOZZLE, AR = 1, A/B POWER SETTING, $\delta_v = 0^{\circ}$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
1.20	-.02	.81	-.03	-.0696	.0463	.0638	-.0696	.0463	0.0000	0.0000	0.0000	0.0000
1.20	1.97	.82	-.07	.0101	.0442	.0589	.0101	.0442	0.0000	0.0000	0.0000	0.0000
1.20	3.96	.82	-.03	.0951	.0469	.0552	.0951	.0469	0.0000	0.0000	0.0000	0.0000
1.20	5.95	.82	-.13	.1836	.0561	.0502	.1836	.0561	0.0000	0.0000	0.0000	0.0000
1.20	7.97	.82	-.03	.2790	.0733	.0446	.2790	.0733	0.0000	0.0000	0.0000	0.0000
1.20	9.94	.82	-.07	.3737	.0975	.0382	.3737	.0975	0.0000	0.0000	0.0000	0.0000
1.20	14.96	.79	-.18	.6044	.1890	.0219	.6044	.1890	0.0000	0.0000	0.0000	0.0000
1.20	16.05	.79	-.01	.6522	.2147	.0208	.6522	.2147	0.0000	0.0000	0.0000	0.0000
1.20	-.06	3.79	.01	-.0720	.0039	.0696	-.0684	.0429	-.0036	.0389	.0051	.0391
1.20	3.97	3.80	-.06	.0966	.0045	.0611	.0974	.0436	-.0008	.0391	.0051	.0391
1.20	9.96	3.80	-.07	.3843	.0566	.0435	.3811	.0955	.0033	.0389	.0051	.0391
1.20	16.00	3.82	-.06	.6594	.1717	.0252	.6520	.2103	.0074	.0385	.0051	.0392
1.20	-.03	6.63	.00	-.0696	-.0372	.0741	-.0624	.0405	-.0071	.0776	.0104	.0780
1.20	1.97	6.60	-.09	.0125	-.0390	.0693	.0170	.0387	-.0044	.0776	.0103	.0778
1.20	3.95	6.60	-.03	.0979	-.0361	.0663	.0996	.0418	-.0017	.0779	.0104	.0779
1.20	5.96	6.59	-.06	.1929	-.0263	.0611	.1919	.0515	.0010	.0778	.0103	.0778
1.20	7.96	6.60	-.00	.2904	-.0087	.0557	.2867	.0691	.0037	.0778	.0104	.0779
1.20	9.95	6.60	-.03	.3893	.0166	.0491	.3829	.0942	.0064	.0776	.0104	.0779
1.20	14.97	6.62	-.12	.6248	.1088	.0330	.6116	.1857	.0132	.0770	.0104	.0781
1.20	15.98	6.60	-.14	.6687	.1322	.0297	.6541	.2088	.0145	.0766	.0104	.0779
1.20	-.04	9.28	.01	-.0687	-.0757	.0779	-.0581	.0384	-.0106	.1141	.0153	.1146
1.20	3.96	9.33	-.04	.1012	-.0753	.0701	.1037	.0400	-.0026	.1153	.0154	.1154
1.20	9.95	9.32	-.18	.3934	-.0228	.0533	.3839	.0925	.0095	.1153	.0154	.1157
1.20	15.70	9.33	-.07	.6669	.0881	.0365	.6458	.2023	.0211	.1141	.0155	.1161
1.20	3.97	5.41	-.00	.0990	-.0186	.0647	.1003	.0427	-.0013	.0613	.0081	.0613
1.16	3.98	5.38	-.03	.0928	-.0233	.0675	.0943	.0422	-.0014	.0655	.0087	.0655
.95	3.96	5.39	-.05	.0570	-.0777	.0873	.0591	.0200	-.0021	.0977	.0129	.0977
.93	3.96	5.39	-.04	.0552	-.0821	.0872	.0574	.0205	-.0023	.1026	.0136	.1026
.90	3.95	5.40	-.03	.0574	-.0899	.0843	.0598	.0192	-.0024	.1091	.0145	.1091
.87	-.03	1.03	.03	-.1101	.0220	.0719	-.1101	.0220	0.0000	0.0000	0.0000	0.0000
.87	1.97	1.04	-.00	-.0271	.0176	.0685	-.0271	.0176	0.0000	0.0000	0.0000	0.0000
.87	3.98	1.04	-.05	.0561	.0189	.0690	.0561	.0189	0.0000	0.0000	0.0000	0.0000
.87	5.96	1.04	-.09	.1394	.0257	.0743	.1394	.0257	0.0000	0.0000	0.0000	0.0000
.87	7.98	1.03	-.03	.2387	.0416	.0773	.2387	.0416	0.0000	0.0000	0.0000	0.0000
.87	9.98	1.03	-.07	.3468	.0671	.0781	.3468	.0671	0.0000	0.0000	0.0000	0.0000
.87	14.97	1.02	-.03	.6216	.1685	.0767	.6216	.1685	0.0000	0.0000	0.0000	0.0000
.87	18.37	1.02	-.08	.7953	.2650	.0777	.7953	.2650	0.0000	0.0000	0.0000	0.0000
.87	-.03	2.41	.12	-.1121	-.0169	.0752	-.1087	.0209	-.0034	.0377	.0049	.0379
.87	3.97	2.41	-.14	.0549	-.0199	.0720	.0556	.0179	-.0007	.0378	.0049	.0378
.87	9.97	2.41	-.34	.3495	.0280	.0812	.3462	.0659	.0032	.0379	.0050	.0380
.87	18.32	2.41	-.06	.8048	.2262	.0825	.7961	.2633	.0087	.0371	.0050	.0381
.87	-.04	3.90	.01	-.1118	-.0558	.0792	-.1047	.0214	-.0071	.0772	.0102	.0775
.87	1.95	3.90	.02	-.0273	-.0592	.0763	-.0229	.0175	-.0043	.0767	.0101	.0769
.87	3.96	3.90	-.02	.0572	-.0584	.0772	.0588	.0188	-.0016	.0772	.0101	.0772
.87	5.98	3.90	-.07	.1462	-.0514	.0828	.1452	.0261	.0011	.0775	.0102	.0775
.87	5.96	3.92	-.07	.1448	-.0517	.0827	.1437	.0260	.0011	.0776	.0102	.0777
.87	7.94	3.91	-.12	.2469	-.0358	.0852	.2432	.0415	.0037	.0774	.0102	.0774
.87	9.94	3.90	-.03	.3558	-.0099	.0860	.3494	.0673	.0064	.0772	.0102	.0775
.87	14.95	3.92	-.04	.6403	.0935	.0850	.6272	.1697	.0131	.0763	.0102	.0774
.87	16.29	3.93	-.06	.7129	.1293	.0862	.6980	.2055	.0150	.0762	.0102	.0777
.87	-.04	5.42	.02	-.1141	-.0964	.0834	-.1034	.0201	-.0107	.1165	.0155	.1170
.87	3.97	5.40	-.08	.0580	-.0983	.0815	.0605	.0180	-.0025	.1163	.0154	.1164
.87	9.97	5.39	-.25	.3653	-.0491	.0889	.3556	.0672	.0097	.1163	.0155	.1167
.87	14.90	5.41	-.05	.6483	.0532	.0894	.6286	.1684	.0197	.1152	.0155	.1169
.87	3.97	7.43	-.01	.0632	-.1546	.0871	.0670	.0162	-.0038	.1708	.0228	.1709
.80	3.95	5.47	.00	.0606	-.1224	.0801	.0637	.0166	-.0031	.1390	.0184	.1390
.60	-.03	1.01	.06	-.0917	.0185	.0557	-.0917	.0185	0.0000	0.0000	0.0000	0.0000
.60	1.97	1.01	.06	-.0138	.0158	.0548	-.0138	.0158	0.0000	0.0000	0.0000	0.0000
.60	3.98	1.01	.04	.0605	.0167	.0566	.0605	.0167	0.0000	0.0000	0.0000	0.0000
.60	5.95	1.01	.01	.1363	.0229	.0619	.1363	.0229	0.0000	0.0000	0.0000	0.0000
.60	7.98	1.01	-.03	.2303	.0379	.0658	.2303	.0379	0.0000	0.0000	0.0000	0.0000
.60	9.96	1.01	-.06	.3279	.0603	.0689	.3279	.0603	0.0000	0.0000	0.0000	0.0000
.60	14.98	1.01	-.10	.5856	.1530	.0811	.5856	.1530	0.0000	0.0000	0.0000	0.0000
.60	18.51	1.00	-.08	.7682	.2499	.0928	.7682	.2499	0.0000	0.0000	0.0000	0.0000
.60	-.04	2.30	.04	-.1012	-.0561	.0655	-.0946	.0175	-.0066	.0736	.0096	.0739
.60	3.98	2.30	-.03	.0568	-.0585	.0661	.0582	.0155	-.0014	.0740	.0096	.0740
.60	9.98	2.30	-.09	.3369	-.0135	.0789	.3306	.0598	.0063	.0733	.0096	.0736
.60	18.51	2.30	-.10	.7900	.1777	.1016	.7727	.2498	.0173	.0721	.0097	.0742
.60	-.03	2.98	.07	-.1031	-.0932	.0704	-.0930	.0185	-.0101	.1117	.0146	.1121
.60	1.96	3.01	.06	-.0228	-.0975	.0698	-.0165	.0156	-.0063	.1131	.0148	.1133
.60	3.97	3.00	.05	.0571	-.0960	.0711	.0594	.0164	-.0023	.1124	.0147	.1124
.60	5.97	3.00	.04	.1376	-.0904	.0766	.1359	.0226	.0017	.1130	.0148	.1130
.60	7.98	3.01	.03	.2376	-.0748	.0803	.2320	.0377	.0056	.1125	.0147	.1126
.60	9.98	3.00	.01	.3421	-.0507	.0838	.3326	.0612	.0095	.1119	.0147	.1123
.60	14.96	3.01	-.03	.6091	.0426	.0956	.5899	.1537	.0192	.1111	.0147	.1127
.60	18.50	3.01	-.05	.7992	.1405	.1058	.7731	.2502	.0261	.1097	.0147	.1128
.60	-.03	4.51	.00	-.1083	-.1780	.0801	-.0905	.0170	-.0178	.1950	.0258	.1958
.60	-.03	4.50	.01	-.1089	-.1777	.0807	-.0910	.0173	-.0178	.1950	.0258	.1958

TABLE 24.- NOZZLE CHARACTERISTICS: IUM 2-D C-D NOZZLE, AR = 1, A/B POWER SETTING, $\delta_v = 0^o$

MACH	ALPHA	NPR	CANALP	CLN	C(DN-F)	CMN	CLAN	CDAN
1.20	-.02	.81	-.03	-.0126	.0030	.0041	-.0126	.0030
1.20	1.97	.82	-.07	-.0104	.0025	.0034	-.0104	.0025
1.20	3.96	.82	-.03	-.0086	.0021	.0027	-.0086	.0021
1.20	5.95	.82	-.13	-.0063	.0016	.0019	-.0063	.0016
1.20	7.97	.82	-.03	-.0037	.0012	.0011	-.0037	.0012
1.20	9.94	.82	-.07	-.0014	.0008	.0003	-.0014	.0008
1.20	14.96	.79	-.18	.0061	-.0001	-.0022	.0061	-.0001
1.20	16.05	.79	-.01	.0076	-.0003	-.0027	.0076	-.0003
1.20	-.06	3.79	.01	-.0170	-.0389	.0069	-.0134	.0001
1.20	3.97	3.80	-.06	-.0101	-.0399	.0055	-.0092	-.0007
1.20	9.96	3.80	-.07	.0017	-.0409	.0030	-.0016	-.0019
1.20	16.00	3.82	-.06	.0156	-.0406	-.0002	.0082	-.0020
1.20	-.03	6.63	.00	-.0213	-.0806	.0097	-.0141	-.0027
1.20	1.97	6.60	-.09	-.0160	-.0810	.0089	-.0116	-.0031
1.20	3.95	6.60	-.03	-.0113	-.0816	.0082	-.0095	-.0035
1.20	5.96	6.59	-.06	-.0062	-.0821	.0075	-.0072	-.0040
1.20	7.96	6.60	-.00	-.0010	-.0827	.0067	-.0047	-.0046
1.20	9.95	6.60	-.03	.0042	-.0828	.0060	-.0022	-.0050
1.20	14.97	6.62	-.12	.0193	-.0829	.0034	.0060	-.0056
1.20	15.98	6.60	-.14	.0222	-.0825	.0028	.0076	-.0057
1.20	-.04	9.28	.01	-.0251	-.1193	.0122	-.0145	-.0049
1.20	3.96	9.33	-.04	-.0128	-.1215	.0109	-.0102	-.0058
1.20	9.95	9.32	-.18	.0073	-.1225	.0085	-.0022	-.0068
1.20	15.70	9.33	-.07	.0288	-.1214	.0054	.0077	-.0069
1.20	3.97	5.41	-.00	-.0107	-.0646	.0070	-.0093	-.0031
1.16	3.98	5.38	-.03	-.0110	-.0688	.0073	-.0096	-.0031
.95	3.96	5.39	-.05	-.0107	-.1079	.0093	-.0085	-.0099
.93	3.96	5.39	-.04	-.0114	-.1112	.0097	-.0091	-.0083
.90	3.95	5.40	-.03	-.0101	-.1175	.0097	-.0077	-.0080
.87	-.03	1.03	.03	-.0078	-.0079	.0027	-.0078	-.0079
.87	1.97	1.04	-.00	-.0070	-.0070	.0025	-.0070	-.0070
.87	3.98	1.04	-.05	-.0065	-.0061	.0023	-.0065	-.0061
.87	5.96	1.04	-.09	-.0061	-.0053	.0022	-.0061	-.0053
.87	7.98	1.03	-.03	-.0054	-.0046	.0018	-.0054	-.0046
.87	9.98	1.03	-.07	-.0047	-.0042	.0015	-.0047	-.0042
.87	14.97	1.02	-.03	-.0013	-.0043	.0002	-.0013	-.0043
.87	18.37	1.02	-.08	.0018	-.0044	-.0010	.0018	-.0044
.87	-.03	2.41	.12	-.0111	-.0462	.0049	-.0076	-.0083
.87	3.97	2.41	-.14	-.0072	-.0445	.0046	-.0065	-.0065
.87	9.97	2.41	-.34	-.0021	-.0428	.0041	-.0053	-.0048
.87	18.32	2.41	-.06	.0101	-.0433	.0018	.0014	-.0060
.87	-.04	3.90	.01	-.0157	-.0853	.0077	-.0086	-.0078
.87	1.95	3.90	.02	-.0121	-.0839	.0075	-.0077	-.0069
.87	3.96	3.90	-.02	-.0089	-.0836	.0074	-.0073	-.0061
.87	5.98	3.90	-.07	-.0059	-.0832	.0073	-.0069	-.0055
.87	5.96	3.92	-.07	-.0059	-.0835	.0073	-.0069	-.0055
.87	7.94	3.91	-.12	-.0026	-.0826	.0070	-.0064	-.0049
.87	9.94	3.90	-.03	.0008	-.0821	.0067	-.0056	-.0046
.87	14.95	3.92	-.04	.0112	-.0816	.0053	-.0020	-.0051
.87	16.29	3.93	-.06	.0146	-.0816	.0048	-.0004	-.0051
.87	-.04	5.42	.02	-.0201	-.1257	.0106	-.0093	-.0088
.87	3.97	5.40	-.08	-.0105	-.1241	.0102	-.0079	-.0074
.87	9.97	5.39	-.25	.0038	-.1227	.0094	-.0059	-.0059
.87	14.90	5.41	-.05	.0175	-.1220	.0081	-.0022	-.0064
.87	3.97	7.43	-.01	-.0123	-.1808	.0140	-.0085	-.0094
.80	3.95	5.47	.00	-.0115	-.1472	.0118	-.0084	-.0078
.60	-.03	1.01	.06	-.0089	-.0057	.0029	-.0089	-.0057
.60	1.97	1.01	.06	-.0080	-.0049	.0027	-.0080	-.0049
.60	3.98	1.01	.04	-.0073	-.0043	.0024	-.0073	-.0043
.60	5.95	1.01	.01	-.0068	-.0035	.0022	-.0068	-.0035
.60	7.98	1.01	-.03	-.0059	-.0030	.0017	-.0059	-.0030
.60	9.96	1.01	-.06	-.0050	-.0029	.0013	-.0050	-.0029
.60	14.98	1.01	-.10	-.0013	-.0028	-.0004	-.0013	-.0028
.60	18.51	1.00	-.08	.0025	-.0023	-.0021	.0025	-.0023
.60	-.04	2.30	.04	-.0163	-.0799	.0076	-.0096	-.0060
.60	3.98	2.30	-.03	-.0097	-.0791	.0073	-.0083	-.0049
.60	9.98	2.30	-.09	.0002	-.0776	.0063	-.0062	-.0040
.60	18.51	2.30	-.10	.0187	-.0763	.0030	.0014	-.0040
.60	-.03	2.98	.07	-.0202	-.1173	.0102	-.0100	-.0052
.60	1.96	3.01	.06	-.0156	-.1184	.0101	-.0093	-.0049
.60	3.97	3.00	.05	-.0110	-.1174	.0098	-.0087	-.0046
.60	5.97	3.00	.04	-.0065	-.1177	.0096	-.0081	-.0043
.60	7.98	3.01	.03	-.0016	-.1168	.0092	-.0071	-.0040
.60	9.98	3.00	.01	.0034	-.1162	.0087	-.0061	-.0039
.60	14.96	3.01	-.03	.0173	-.1153	.0070	-.0020	-.0038
.60	18.50	3.01	-.05	.0286	-.1135	.0051	.0024	-.0034
.60	-.03	4.51	.00	-.0298	-.2022	.0162	-.0119	-.0066
.60	-.03	4.50	.01	-.0287	-.2017	.0159	-.0108	-.0060

TABLE 25.- AERODYNAMIC CHARACTERISTICS: IUM 2-D C-D NOZZLE, AR = 1, A/B POWER SETTING, $\delta_v = 15^{\circ}$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
1.20	.02	6.62	.03	-.0371	-.0357	.0480	-.0562	.0403	.0191	.0759	-.0085	.0783
1.20	2.03	6.59	-.03	.0460	-.0361	.0433	.0243	.0388	.0217	.0749	-.0085	.0780
1.20	4.03	6.62	-.00	.1317	-.0317	.0397	.1073	.0426	.0244	.0743	-.0085	.0782
1.20	6.03	6.62	-.04	.2269	-.0206	.0344	.1999	.0529	.0270	.0735	-.0085	.0783
1.20	8.04	6.61	-.11	.3236	-.0018	.0278	.2941	.0707	.0295	.0725	-.0085	.0782
1.20	10.04	6.62	-.00	.4243	.0254	.0217	.3922	.0969	.0321	.0715	-.0085	.0784
1.20	15.02	6.62	-.07	.6538	.1201	.0061	.6155	.1887	.0383	.0686	-.0086	.0786
1.20	15.89	6.61	-.09	.6942	.1418	.0033	.6551	.2095	.0391	.0678	-.0085	.0782
.87	.02	2.40	.18	-.0727	-.0178	.0506	-.0783	.0202	.0056	.0380	-.0012	.0384
.87	4.05	2.41	-.03	.0962	-.0171	.0478	.0879	.0205	.0083	.0376	-.0012	.0385
.87	10.04	2.41	-.14	.3885	.0358	.0568	.3763	.0724	.0122	.0366	-.0012	.0386
.87	18.29	2.41	-.10	.8472	.2410	.0514	.8299	.2755	.0173	.0345	-.0012	.0386
.87	.03	3.91	.03	-.0582	-.0559	.0414	-.0752	.0204	.0170	.0764	-.0071	.0782
.87	2.03	3.91	-.04	.0283	-.0574	.0383	.0087	.0181	.0196	.0756	-.0071	.0781
.87	4.03	3.91	.06	.1127	-.0541	.0396	.0904	.0209	.0223	.0750	-.0071	.0783
.87	6.03	3.91	.02	.2014	-.0445	.0446	.1765	.0296	.0249	.0742	-.0071	.0782
.87	8.04	3.92	-.04	.3046	-.0263	.0469	.2772	.0468	.0275	.0731	-.0071	.0781
.87	10.02	3.91	-.07	.4124	.0013	.0472	.3823	.0736	.0300	.0723	-.0071	.0783
.87	15.02	3.92	-.03	.6989	.1121	.0431	.6628	.1813	.0361	.0692	-.0071	.0780
.87	18.41	3.92	-.07	.8811	.2144	.0407	.8409	.2814	.0402	.0670	-.0071	.0781
.87	.05	5.41	.07	-.0431	-.0949	.0353	-.0708	.0188	.0277	.1137	-.0122	.1170
.87	4.05	5.41	-.07	.1297	-.0926	.0329	.0939	.0193	.0357	.1119	-.0122	.1175
.87	10.04	5.40	-.25	.4337	-.0349	.0391	.3866	.0725	.0471	.1074	-.0122	.1173
.87	18.27	5.41	-.10	.9009	.1775	.0328	.8388	.2771	.0621	.0996	-.0122	.1174
.87	4.04	7.33	.01	.1503	-.1429	.0265	.0974	.0164	.0528	.1593	-.0186	.1679
.60	.05	2.30	.06	-.0488	-.0563	.0368	-.0595	.0182	.0107	.0744	-.0022	.0752
.60	4.03	2.30	.03	.1054	-.0546	.0386	.0895	.0191	.0159	.0737	-.0022	.0754
.60	10.02	2.30	.00	.3822	-.0050	.0518	.3587	.0665	.0234	.0715	-.0022	.0752
.60	18.54	2.30	-.07	.8355	.1956	.0722	.8017	.2629	.0338	.0673	-.0022	.0753
.60	.01	3.01	.09	-.0400	-.0928	.0315	-.0600	.0189	.0199	.1118	-.0068	.1136
.60	2.03	3.01	.09	.0426	-.0940	.0310	.0187	.0172	.0239	.1113	-.0069	.1138
.60	4.04	3.01	.08	.1197	-.0906	.0325	.0920	.0196	.0278	.1102	-.0068	.1136
.60	6.02	3.01	.07	.2017	-.0818	.0384	.1701	.0275	.0316	.1093	-.0069	.1138
.60	8.04	3.01	.05	.3013	-.0642	.0418	.2659	.0439	.0354	.1081	-.0069	.1138
.60	10.03	3.01	.03	.4026	-.0386	.0449	.3633	.0684	.0392	.1070	-.0069	.1140
.60	15.04	3.01	-.02	.6740	.0631	.0561	.6256	.1663	.0484	.1032	-.0069	.1140
.60	18.57	3.00	-.03	.8641	.1664	.0650	.8093	.2667	.0548	.1003	-.0069	.1144
.60	.01	4.50	.12	-.0119	-.1743	.0176	-.0567	.0176	.0448	.1919	-.0193	.1970
.60	4.01	4.51	.10	.1546	-.1694	.0185	.0965	.0189	.0581	.1884	-.0193	.1971
.60	10.03	4.50	.05	.4474	-.1138	.0291	.3696	.0681	.0778	.1819	-.0194	.1978
.60	18.52	4.51	-.02	.9205	.1003	.0481	.8174	.2675	.1031	.1673	-.0193	.1965
.60	4.04	4.51	.08	.1551	-.1699	.0183	.0969	.0185	.0582	.1884	-.0193	.1972
.60	4.04	5.41	.08	.1724	-.2181	.0127	.0975	.0164	.0749	.2345	-.0256	.2462
.60	4.05	5.82	.08	.1813	-.2426	.0099	.0980	.0154	.0833	.2580	-.0287	.2711

TABLE 26.- NOZZLE CHARACTERISTICS: IUM 2-D C-D NOZZLE, AR = 1, A/B POWER SETTING, $\delta_v = 15^o$

MACH	ALPHA	NPR	CANALP	CLN	C(DN-F)	CMN	CLAN	CDAN
1.20	.02	6.62	.03	.0161	-.0765	-.0033	-.0031	-.0003
1.20	2.03	6.59	-.03	.0207	-.0757	-.0039	-.0011	-.0007
1.20	4.03	6.62	-.00	.0254	-.0755	-.0046	.0011	-.0011
1.20	6.03	6.62	-.04	.0303	-.0750	-.0054	.0033	-.0015
1.20	8.04	6.61	-.11	.0354	-.0741	-.0062	.0059	-.0016
1.20	10.04	6.62	-.00	.0402	-.0732	-.0070	.0081	-.0017
1.20	15.02	6.62	-.07	.0530	-.0702	-.0092	.0147	-.0016
1.20	15.89	6.61	-.09	.0551	-.0692	-.0097	.0159	-.0015
.87	.02	2.40	.18	.0073	-.0397	-.0011	.0017	-.0017
.87	4.05	2.41	-.03	.0113	-.0389	-.0015	.0031	-.0013
.87	10.04	2.41	-.14	.0167	-.0381	-.0021	.0045	-.0014
.87	18.29	2.41	-.10	.0307	-.0342	-.0056	.0134	.0003
.87	.03	3.91	.03	.0199	-.0780	-.0044	.0029	-.0016
.87	2.03	3.91	-.04	.0232	-.0770	-.0045	.0035	-.0014
.87	4.03	3.91	.06	.0263	-.0762	-.0047	.0040	-.0011
.87	6.03	3.91	.02	.0292	-.0753	-.0048	.0043	-.0011
.87	8.04	3.92	-.04	.0326	-.0742	-.0052	.0051	-.0010
.87	10.02	3.91	-.07	.0359	-.0733	-.0055	.0059	-.0010
.87	15.02	3.92	-.03	.0464	-.0695	-.0073	.0102	-.0003
.87	18.41	3.92	-.07	.0547	-.0662	-.0091	.0145	.0009
.87	.05	5.41	.07	.0294	-.1175	-.0065	.0017	-.0038
.87	4.05	5.41	-.07	.0388	-.1153	-.0069	.0030	-.0034
.87	10.04	5.40	-.25	.0528	-.1106	-.0078	.0057	-.0032
.87	18.27	5.41	-.10	.0761	-.1015	-.0111	.0140	-.0019
.87	4.04	7.33	.01	.0527	-.1660	-.0089	-.0001	-.0067
.60	.05	2.30	.06	.0113	-.0767	-.0013	.0006	-.0021
.60	4.03	2.30	.03	.0174	-.0754	-.0016	.0015	-.0015
.60	10.02	2.30	.00	.0264	-.0728	-.0024	.0029	-.0011
.60	18.54	2.30	-.07	.0431	-.0677	-.0056	.0092	-.0003
.60	.01	3.01	.09	.0216	-.1132	-.0039	.0016	-.0012
.60	2.03	3.01	.09	.0262	-.1122	-.0041	.0022	-.0007
.60	4.04	3.01	.08	.0305	-.1109	-.0043	.0026	-.0005
.60	6.02	3.01	.07	.0346	-.1098	-.0045	.0029	-.0002
.60	8.04	3.01	.05	.0389	-.1084	-.0047	.0034	-.0000
.60	10.03	3.01	.03	.0434	-.1071	-.0051	.0041	.0002
.60	15.04	3.01	-.02	.0557	-.1025	-.0068	.0071	.0010
.60	18.57	3.00	-.03	.0651	-.0993	-.0083	.0101	.0012
.60	.01	4.50	.12	.0440	-.1947	-.0095	-.0008	-.0024
.60	4.01	4.51	.10	.0589	-.1907	-.0100	.0007	-.0019
.60	10.03	4.50	.05	.0810	-.1837	-.0111	.0030	-.0014
.60	18.52	4.51	-.02	.1129	-.1681	-.0144	.0095	-.0004
.60	4.04	4.51	.08	.0591	-.1910	-.0100	.0008	-.0022
.60	4.04	5.41	.08	.0728	-.2403	-.0119	-.0022	-.0053
.60	4.05	5.82	.08	.0797	-.2652	-.0129	-.0037	-.0067

TABLE 27.- AERODYNAMIC CHARACTERISTICS: IUM 2-D C-D NOZZLE, AR = 1, A/B POWER SETTING, $\delta_v = 30^o$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
1.20	.03	.55	.12	-.0493	.0536	.0479	-.0493	.0536	0.0000	0.0000	0.0000	0.0000
1.20	2.03	.55	.09	.0304	.0527	.0437	.0304	.0527	0.0000	0.0000	0.0000	0.0000
1.20	4.03	.55	.05	.1129	.0563	.0398	.1129	.0563	0.0000	0.0000	0.0000	0.0000
1.20	4.03	.55	.04	.1132	.0562	.0399	.1132	.0562	0.0000	0.0000	0.0000	0.0000
1.20	6.03	.55	-.04	.2036	.0668	.0350	.2036	.0668	0.0000	0.0000	0.0000	0.0000
1.20	6.03	.55	-.04	.2040	.0670	.0350	.2040	.0670	0.0000	0.0000	0.0000	0.0000
1.20	8.01	.55	.10	.2975	.0851	.0297	.2975	.0851	0.0000	0.0000	0.0000	0.0000
1.20	8.00	.55	.10	.2971	.0850	.0297	.2971	.0850	0.0000	0.0000	0.0000	0.0000
1.20	10.02	.55	.08	.3955	.1114	.0228	.3955	.1114	0.0000	0.0000	0.0000	0.0000
1.20	10.02	.55	.08	.3962	.1114	.0225	.3962	.1114	0.0000	0.0000	0.0000	0.0000
1.20	15.02	.55	.01	.6202	.2040	.0075	.6202	.2040	0.0000	0.0000	0.0000	0.0000
1.20	15.01	.56	.01	.6194	.2036	.0075	.6194	.2036	0.0000	0.0000	0.0000	0.0000
1.20	16.05	.55	-.02	.6658	.2282	.0038	.6658	.2282	0.0000	0.0000	0.0000	0.0000
1.20	.10	3.82	.04	-.0281	.0119	.0371	-.0464	.0469	.0183	.0350	-.0112	.0395
1.20	.11	3.82	.04	-.0256	.0126	.0370	-.0439	.0476	.0183	.0350	-.0111	.0395
.87	.02	.82	-.07	-.0659	.0305	.0350	-.0659	.0305	0.0000	0.0000	0.0000	0.0000
.87	2.03	.82	-.09	.0208	.0288	.0313	.0208	.0288	0.0000	0.0000	0.0000	0.0000
.87	4.03	.81	-.16	.1051	.0322	.0310	.1051	.0322	0.0000	0.0000	0.0000	0.0000
.87	6.04	.81	-.23	.1905	.0406	.0356	.1905	.0406	0.0000	0.0000	0.0000	0.0000
.87	8.04	.82	-.31	.2912	.0583	.0364	.2912	.0583	0.0000	0.0000	0.0000	0.0000
.87	10.03	.81	-.37	.3997	.0863	.0361	.3997	.0863	0.0000	0.0000	0.0000	0.0000
.87	15.04	.79	-.45	.6810	.1955	.0277	.6810	.1955	0.0000	0.0000	0.0000	0.0000
.87	19.03	.76	-.53	.8890	.3188	.0257	.8890	.3188	0.0000	0.0000	0.0000	0.0000
.87	.04	2.40	-.02	-.0385	-.0100	.0231	-.0553	.0244	.0168	.0344	-.0099	.0383
.87	4.02	2.40	-.07	.1307	-.0064	.0198	.1116	.0266	.0191	.0330	-.0099	.0382
.87	10.06	2.40	-.20	.4309	.0515	.0244	.4084	.0824	.0225	.0308	-.0099	.0381
.87	19.03	2.41	-.38	.9246	.2889	.0132	.8974	.3159	.0272	.0271	-.0099	.0384
.87	.03	3.91	-.08	-.0111	-.0418	.0058	-.0468	.0267	.0357	.0686	-.0218	.0773
.87	2.02	3.91	-.09	.0761	-.0418	.0024	.0380	.0256	.0381	.0674	-.0218	.0774
.87	4.03	3.91	-.11	.1606	-.0363	.0024	.1203	.0296	.0403	.0658	-.0217	.0772
.87	6.02	3.91	-.17	.2493	-.0255	.0063	.2067	.0389	.0426	.0644	-.0217	.0772
.87	8.05	3.91	-.23	.3526	-.0058	.0065	.3076	.0572	.0450	.0630	-.0218	.0774
.87	10.02	3.91	-.27	.4645	.0243	.0059	.4175	.0857	.0470	.0613	-.0218	.0773
.87	15.02	3.92	-.36	.7509	.1391	-.0028	.6984	.1963	.0524	.0572	-.0218	.0776
.87	18.99	3.92	-.45	.9619	.2670	-.0069	.9058	.3203	.0561	.0533	-.0218	.0774
.87	.03	5.41	.07	.0122	-.0765	-.0060	-.0401	.0278	.0523	.1043	-.0316	.1167
.87	4.04	5.40	.02	.1873	-.0693	-.0097	.1279	.0310	.0594	.1003	-.0316	.1166
.87	10.03	5.39	-.12	.4951	-.0051	-.0070	.4255	.0885	.0696	.0936	-.0316	.1166
.87	16.03	5.40	-.24	.8391	.1427	-.0160	.7601	.2286	.0791	.0859	-.0317	.1167
.87	4.02	7.93	-.03	.2273	-.1271	-.0309	.1354	.0337	.0920	.1607	-.0484	.1852
.80	4.02	5.41	-.03	.2007	-.0884	-.0186	.1303	.0306	.0704	.1189	-.0374	.1382
.60	.03	.90	.04	-.0429	.0276	.0261	-.0429	.0276	0.0000	0.0000	0.0000	0.0000
.60	2.03	.90	.03	.0349	.0268	.0254	.0349	.0268	0.0000	0.0000	0.0000	0.0000
.60	4.03	.90	.02	.1080	.0301	.0272	.1080	.0301	0.0000	0.0000	0.0000	0.0000
.60	6.04	.90	.00	.1878	.0383	.0325	.1878	.0383	0.0000	0.0000	0.0000	0.0000
.60	8.02	.90	-.02	.2790	.0546	.0353	.2790	.0546	0.0000	0.0000	0.0000	0.0000
.60	10.02	.90	-.04	.3790	.0799	.0378	.3790	.0799	0.0000	0.0000	0.0000	0.0000
.60	15.04	.89	-.09	.6415	.1799	.0474	.6415	.1799	0.0000	0.0000	0.0000	0.0000
.60	19.04	.89	-.11	.8471	.2981	.0578	.8471	.2981	0.0000	0.0000	0.0000	0.0000
.60	.04	2.33	.05	-.0014	-.0457	.0027	-.0347	.0227	.0333	.0684	-.0196	.0761
.60	4.03	2.30	.03	.1530	-.0380	.0046	.1161	.0263	.0369	.0643	-.0190	.0741
.60	10.04	2.27	-.03	.4355	.0186	.0143	.3927	.0779	.0428	.0593	-.0187	.0731
.60	19.02	2.31	-.10	.9115	.2435	.0330	.8589	.2964	.0526	.0529	-.0191	.0746
.60	.00	3.01	.07	.0235	-.0745	-.0134	-.0278	.0271	.0513	.1016	-.0306	.1138
.60	2.04	3.00	.06	.1066	-.0715	-.0140	.0523	.0271	.0543	.0986	-.0303	.1126
.60	4.02	3.00	.05	.1837	-.0665	-.0130	.1259	.0305	.0578	.0970	-.0304	.1129
.60	6.02	3.00	.04	.2656	-.0553	-.0080	.2046	.0394	.0610	.0946	-.0303	.1126
.60	8.02	3.00	.02	.3642	-.0358	-.0060	.2997	.0570	.0645	.0927	-.0304	.1130
.60	10.02	3.00	.00	.4691	-.0075	-.0043	.4014	.0830	.0677	.0905	-.0304	.1130
.60	15.04	3.00	-.05	.7417	.1021	.0044	.6666	.1861	.0752	.0840	-.0303	.1127
.60	19.03	3.00	-.08	.9543	.2267	.0145	.8734	.3054	.0809	.0786	-.0303	.1128
.60	.02	4.48	.08	.0684	-.1455	-.0370	-.0203	.0267	.0887	.1723	-.0539	.1938
.60	4.05	4.51	.06	.2337	-.1349	-.0373	.1331	.0310	.1006	.1659	-.0539	.1940
.60	10.04	4.52	.00	.5309	-.0698	-.0298	.4131	.0852	.1178	.1550	-.0541	.1947
.60	19.04	4.52	-.08	1.0250	.1741	-.0130	.8838	.3093	.1411	.1353	-.0543	.1955
.60	4.02	4.51	.03	.2327	-.1355	-.0374	.1319	.0308	.1008	.1663	-.0540	.1945
.60	4.02	5.44	.04	.2628	-.1793	-.0513	.1370	.0335	.1259	.2128	-.0670	.2473
.60	19.03	5.77	-.08	1.0860	.1300	-.0341	.8958	.3172	.1902	.1872	-.0718	.2669

TABLE 28.- NOZZLE CHARACTERISTICS: IUM 2-D C-D NOZZLE, AR = 1, A/B POWER SETTING, $\delta_V = 30^o$

MACH	ALPHA	NPR	CANALP	CLN	C(DN-F)	CMN	CLAN	CDAN
1.20	.03	.55	.12	.0078	.0134	-.0038	.0078	.0134
1.20	2.03	.55	.09	.0092	.0134	-.0044	.0092	.0134
1.20	4.03	.55	.05	.0106	.0138	-.0050	.0106	.0138
1.20	4.03	.55	.04	.0106	.0137	-.0050	.0106	.0137
1.20	6.03	.55	-.04	.0124	.0142	-.0058	.0124	.0142
1.20	6.03	.55	-.04	.0124	.0139	-.0058	.0124	.0139
1.20	8.01	.55	.10	.0144	.0144	-.0066	.0144	.0144
1.20	8.00	.55	.10	.0144	.0142	-.0066	.0144	.0142
1.20	10.02	.55	.08	.0163	.0151	-.0075	.0163	.0151
1.20	10.02	.55	.08	.0163	.0147	-.0075	.0163	.0147
1.20	15.02	.55	.01	.0214	.0167	-.0099	.0214	.0167
1.20	15.01	.56	.01	.0217	.0157	-.0099	.0217	.0157
1.20	16.05	.55	-.02	.0231	.0162	-.0105	.0231	.0162
1.20	.10	3.82	.04	.0260	-.0290	-.0088	.0076	.0061
1.20	.11	3.82	.04	.0261	-.0265	-.0089	.0077	.0086
.87	.02	.82	-.07	.0140	.0093	-.0052	.0140	.0093
.87	2.03	.62	-.09	.0147	.0105	-.0055	.0147	.0105
.87	4.03	.81	-.16	.0152	.0115	-.0058	.0152	.0115
.87	6.04	.81	-.23	.0152	.0116	-.0059	.0152	.0116
.87	8.04	.82	-.31	.0156	.0114	-.0062	.0156	.0114
.67	10.03	.81	-.37	.0166	.0121	-.0068	.0166	.0121
.87	15.04	.79	-.45	.0206	.0150	-.0090	.0206	.0150
.87	19.03	.76	-.53	.0241	.0187	-.0112	.0241	.0187
.87	.04	2.40	-.02	.0313	-.0336	-.0098	.0144	.0009
.87	4.02	2.40	-.07	.0349	-.0277	-.0104	.0156	.0055
.87	10.06	2.40	-.20	.0408	-.0238	-.0117	.0182	.0071
.87	19.03	2.41	-.38	.0546	-.0150	-.0162	.0273	.0121
.87	.03	3.91	-.08	.0526	-.0634	-.0163	.0167	.0054
.87	2.02	3.91	-.09	.0560	-.0613	-.0167	.0176	.0063
.87	4.03	3.91	-.11	.0590	-.0592	-.0170	.0184	.0068
.87	6.02	3.91	-.17	.0620	-.0573	-.0174	.0192	.0073
.87	8.05	3.91	-.23	.0656	-.0553	-.0180	.0204	.0079
.87	10.02	3.91	-.27	.0689	-.0529	-.0186	.0216	.0086
.87	15.02	3.92	-.36	.0781	-.0464	-.0206	.0254	.0110
.87	18.99	3.92	-.45	.0858	-.0394	-.0228	.0294	.0141
.87	.03	5.41	.07	.0698	-.0986	-.0212	.0172	.0061
.87	4.04	5.40	.02	.0787	-.0931	-.0219	.0190	.0075
.87	10.03	5.39	-.12	.0921	-.0847	-.0235	.0223	.0092
.87	16.03	5.40	-.24	.1061	-.0739	-.0259	.0267	.0122
.87	4.02	7.93	-.03	.1100	-.1516	-.0295	.0178	.0095
.80	4.02	5.41	-.03	.0891	-.1120	-.0246	.0186	.0071
.60	.03	.90	.04	.0127	.0064	-.0045	.0127	.0064
.60	2.03	.90	.03	.0131	.0075	-.0047	.0131	.0075
.60	4.03	.90	.02	.0135	.0085	-.0050	.0135	.0085
.60	6.04	.90	.00	.0138	.0092	-.0053	.0138	.0092
.60	8.02	.90	-.02	.0141	.0096	-.0056	.0141	.0096
.60	10.02	.90	-.04	.0150	.0106	-.0062	.0150	.0106
.60	15.04	.89	-.09	.0176	.0129	-.0082	.0176	.0129
.60	19.04	.69	-.11	.0204	.0163	-.0104	.0204	.0163
.60	.04	2.33	.05	.0480	-.0665	-.0148	.0146	.0021
.60	4.03	2.30	.03	.0529	-.0603	-.0151	.0158	.0042
.60	10.04	2.27	-.03	.0610	-.0534	-.0163	.0180	.0060
.60	19.02	2.31	-.10	.0760	-.0419	-.0202	.0232	.0111
.60	.00	3.01	.07	.0694	-.0957	-.0217	.0179	.0062
.60	2.04	3.00	.06	.0731	-.0915	-.0218	.0186	.0074
.60	4.02	3.00	.05	.0774	-.0888	-.0223	.0194	.0084
.60	6.02	3.00	.04	.0811	-.0854	-.0226	.0199	.0094
.60	8.02	3.00	.02	.0853	-.0828	-.0231	.0206	.0102
.60	10.02	3.00	.00	.0894	-.0796	-.0237	.0214	.0111
.60	15.04	3.00	-.05	.0992	-.0706	-.0255	.0237	.0136
.60	19.03	3.00	-.08	.1075	-.0619	-.0276	.0263	.0168
.60	.02	4.48	.08	.1037	-.1660	-.0314	.0148	.0067
.60	4.05	4.51	.06	.1175	-.1578	-.0322	.0166	.0085
.60	10.04	4.52	.00	.1374	-.1449	-.0339	.0193	.0105
.60	19.04	4.52	-.08	.1668	-.1200	-.0381	.0252	.0156
.60	4.02	4.51	.03	.1175	-.1588	-.0322	.0164	.0079
.60	4.02	5.44	.04	.1414	-.2028	-.0379	.0152	.0105
.60	19.03	5.77	-.08	.2139	-.1693	-.0460	.0233	.0183

TABLE 29.- AERODYNAMIC CHARACTERISTICS: IUA 2-D C-D NOZZLE, AR = 1, A/B POWER SETTING, $\delta_v = 0^o$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
1.20	.03	.87	.01	-.0605	.0444	.0602	-.0605	.0444	0.0000	0.0000	0.0000	0.0000
1.20	2.02	.88	-.04	.0200	.0428	.0544	.0200	.0428	0.0000	0.0000	0.0000	0.0000
1.20	4.02	.88	-.07	.1071	.0463	.0494	.1071	.0463	0.0000	0.0000	0.0000	0.0000
1.20	6.03	.87	-.11	.1994	.0566	.0429	.1994	.0566	0.0000	0.0000	0.0000	0.0000
1.20	8.03	.87	-.18	.2958	.0747	.0353	.2958	.0747	0.0000	0.0000	0.0000	0.0000
1.20	8.02	.87	-.19	.2959	.0747	.0346	.2959	.0747	0.0000	0.0000	0.0000	0.0000
1.20	10.04	.86	-.24	.3967	.1013	.0268	.3967	.1013	0.0000	0.0000	0.0000	0.0000
1.20	15.02	.81	-.40	.6281	.1964	.0057	.6281	.1964	0.0000	0.0000	0.0000	0.0000
1.20	16.18	.80	-.44	.6806	.2246	.0009	.6806	.2246	0.0000	0.0000	0.0000	0.0000
1.20	.03	3.80	.03	-.0595	.0021	.0654	-.0560	.0410	-.0035	.0389	.0051	.0390
1.20	4.03	3.81	-.07	.1088	.0041	.0546	.1096	.0434	-.0008	.0392	.0052	.0393
1.20	6.02	3.82	-.10	.2041	.0143	.0480	.2035	.0538	.0006	.0394	.0052	.0394
1.20	10.05	3.81	-.24	.4051	.0597	.0324	.4017	.0990	.0033	.0393	.0052	.0394
1.20	16.09	3.82	-.08	.6926	.1832	.0082	.6852	.2219	.0075	.0387	.0052	.0394
1.20	.02	6.66	.02	-.0618	-.0396	.0708	-.0547	.0388	-.0071	.0784	.0105	.0787
1.20	2.02	6.62	.00	.0227	-.0406	.0647	.0271	.0375	-.0044	.0780	.0104	.0781
1.20	4.03	6.59	-.09	.1096	-.0363	.0594	.1112	.0413	-.0016	.0776	.0103	.0776
1.20	6.03	6.59	-.18	.2082	-.0258	.0527	.2071	.0519	.0011	.0777	.0103	.0777
1.20	8.02	6.60	-.25	.3069	-.0070	.0452	.3031	.0705	.0038	.0775	.0103	.0776
1.20	10.04	6.60	-.32	.4095	.0197	.0371	.4030	.0972	.0065	.0775	.0103	.0777
1.20	15.02	6.64	-.43	.6504	.1157	.0157	.6370	.1931	.0134	.0774	.0104	.0785
1.20	16.09	6.62	-.46	.6982	.1419	.0112	.6835	.2186	.0147	.0767	.0104	.0781
1.20	.01	9.32	-.05	-.0615	-.0773	.0752	-.0510	.0371	-.0105	.1145	.0153	.1149
1.20	4.04	9.31	-.17	.1134	-.0757	.0639	.1158	.0396	-.0024	.1153	.0154	.1153
1.20	6.02	9.30	-.20	.2121	-.0641	.0572	.2106	.0506	.0016	.1147	.0153	.1148
1.20	10.03	9.33	-.06	.4149	-.0186	.0432	.4053	.0964	.0096	.1150	.0154	.1154
1.20	15.74	9.34	-.04	.6975	.0977	.0193	.6764	.2118	.0211	.1141	.0155	.1160
1.20	4.01	5.44	.20	.1110	-.0193	.0592	.1123	.0424	-.0013	.0617	.0082	.0617
1.16	4.04	5.40	.01	.1072	-.0239	.0601	.1086	.0416	-.0013	.0655	.0087	.0655
.95	4.03	5.41	-.01	.0734	-.0766	.0824	.0755	.0214	-.0020	.0980	.0130	.0980
.93	4.03	5.41	0.00	.0724	-.0824	.0827	.0745	.0207	-.0021	.1032	.0137	.1032
.90	4.01	5.43	.01	.0700	-.0901	.0820	.0723	.0193	-.0023	.1094	.0145	.1094
.87	.02	1.03	.02	-.0986	.0211	.0686	-.0986	.0211	0.0000	0.0000	0.0000	0.0000
.87	2.05	1.03	.03	-.0133	.0178	.0653	-.0133	.0178	0.0000	0.0000	0.0000	0.0000
.87	4.04	1.04	.03	.0675	.0196	.0662	.0675	.0196	0.0000	0.0000	0.0000	0.0000
.87	6.03	1.03	-.02	.1548	.0277	.0710	.1548	.0277	0.0000	0.0000	0.0000	0.0000
.87	8.03	1.03	-.08	.2535	.0441	.0727	.2535	.0441	0.0000	0.0000	0.0000	0.0000
.87	10.02	1.03	-.03	.3667	.0717	.0721	.3667	.0717	0.0000	0.0000	0.0000	0.0000
.87	15.02	1.02	-.13	.6438	.1768	.0680	.6438	.1768	0.0000	0.0000	0.0000	0.0000
.87	18.56	1.02	-.19	.8269	.2804	.0661	.8269	.2804	0.0000	0.0000	0.0000	0.0000
.87	.03	2.41	.01	-.0983	-.0182	.0714	-.0949	.0197	-.0033	.0379	.0050	.0380
.87	4.03	2.41	-.03	.0684	-.0192	.0693	.0691	.0188	-.0007	.0379	.0049	.0379
.87	6.02	2.41	-.13	.1574	-.0111	.0741	.1567	.0269	.0006	.0380	.0050	.0380
.87	10.03	2.40	-.02	.3707	.0335	.0766	.3675	.0711	.0033	.0376	.0049	.0377
.87	18.72	2.41	-.16	.8476	.2491	.0703	.8386	.2860	.0089	.0369	.0049	.0379
.87	.01	3.91	-.02	-.1015	-.0569	.0761	-.0945	.0201	-.0070	.0770	.0102	.0773
.87	2.02	3.91	-.07	-.0140	-.0601	.0730	-.0098	.0172	-.0043	.0773	.0102	.0774
.87	4.00	3.91	-.13	.0687	-.0582	.0739	.0703	.0192	-.0016	.0774	.0102	.0774
.87	5.99	3.91	.00	.1595	-.0499	.0796	.1584	.0275	.0011	.0774	.0102	.0774
.87	8.01	3.92	-.02	.2627	-.0329	.0818	.2589	.0444	.0038	.0773	.0102	.0774
.87	10.01	3.91	-.06	.3768	-.0055	.0803	.3703	.0717	.0065	.0772	.0102	.0775
.87	15.02	3.91	-.00	.6658	.1023	.0772	.6525	.1787	.0132	.0764	.0102	.0775
.87	18.70	3.90	-.04	.8603	.2120	.0748	.8421	.2874	.0181	.0755	.0102	.0776
.87	.03	5.39	.03	-.1010	-.0970	.0816	-.0905	.0192	-.0105	.1161	.0154	.1166
.87	4.01	5.41	.00	.0704	-.0984	.0793	.0729	.0182	-.0025	.1165	.0154	.1166
.87	6.02	5.40	-.03	.1638	-.0902	.0840	.1621	.0266	.0016	.1168	.0155	.1168
.87	10.03	5.40	.01	.3838	-.0449	.0849	.3741	.0713	.0098	.1161	.0154	.1165
.87	17.08	5.40	-.09	.7851	.1216	.0807	.7611	.2357	.0240	.1141	.0155	.1166
.87	4.04	7.64	.14	.0758	-.1591	.0874	.0794	.0166	-.0037	.1756	.0234	.1757
.80	4.02	5.42	.15	.0742	-.1218	.0783	.0771	.0169	-.0029	.1387	.0184	.1387
.60	.02	1.01	.04	-.0837	.0179	.0532	-.0837	.0179	0.0000	0.0000	0.0000	0.0000
.60	2.03	1.01	.04	-.0067	.0158	.0525	-.0067	.0158	0.0000	0.0000	0.0000	0.0000
.60	4.04	1.01	.04	.0689	.0172	.0543	.0689	.0172	0.0000	0.0000	0.0000	0.0000
.60	6.04	1.01	.02	.1477	.0246	.0597	.1477	.0246	0.0000	0.0000	0.0000	0.0000
.60	8.05	1.01	-.00	.2436	.0404	.0635	.2436	.0404	0.0000	0.0000	0.0000	0.0000
.60	10.03	1.01	-.03	.3421	.0639	.0658	.3421	.0639	0.0000	0.0000	0.0000	0.0000
.60	15.03	1.01	-.09	.6048	.1604	.0760	.6048	.1604	0.0000	0.0000	0.0000	0.0000
.60	19.14	1.00	-.03	.8160	.2778	.0874	.8160	.2778	0.0000	0.0000	0.0000	0.0000
.60	.05	2.30	.02	-.0863	-.0568	.0622	-.0798	.0168	-.0065	.0736	.0096	.0739
.60	4.04	2.30	.01	.0701	-.0573	.0630	.0714	.0163	-.0013	.0737	.0096	.0737
.60	6.05	2.30	-.04	.1526	-.0499	.0686	.1513	.0237	.0013	.0736	.0096	.0737
.60	10.00	2.30	-.12	.3522	-.0101	.0745	.3459	.0632	.0063	.0733	.0096	.0736
.60	19.20	2.30	-.05	.8435	.2086	.0956	.8255	.2800	.0180	.0713	.0096	.0736
.60	.03	3.01	.09	-.0893	-.0946	.0676	-.0792	.0176	-.0100	.1121	.0147	.1126
.60	2.03	3.01	.08	-.0077	-.0972	.0669	-.0016	.0154	-.0061	.1126	.0147	.1128
.60	4.02	3.00	.07	.0707	-.0957	.0685	.0729	.0173	-.0022	.1129	.0148	.1130
.60	6.00	3.01	.07	.1541	-.0885	.0740	.1524	.0245	.0017	.1130	.0148	.1130
.60	8.02	3.01	.06	.2532	-.0718	.0776	.2475	.0407	.0057	.1125	.0147	.1126
.60	10.04	3.01	.05	.3614	-.0471	.0804	.3518	.0654	.0097	.1124	.0147	.1128
.60	15.01	3.01	.02	.6337	.0509	.0901	.6144	.1621	.0194	.1112	.0147	.1129
.60	19.18	3.00	-.02	.8557	.1717	.1001	.8283	.2812	.0274	.1095	.0147	.1129
.60	.03	4.49	.04	-.0936	-.1791	.0777	-.0760	.0159	-.0176	.1950	.0258	.1958
.60	4.00	4.50	.02	.0707	-.1797	.0784	.0747	.0158	-.0041	.1955	.0258	.1956
.60	6.02	4.50	-.03	.1562	-.1723	.0832	.1534	.0231	.0028	.1954	.0258	.1954
.60	10.00	4.50	-.09	.3688	-.1307	.0890	.3524	.0640	.0164	.1947	.0258	.1954
.60	19.29	4.50	.01	.8889	.0963	.1103	.8412	.2864	.0477	.1900	.0258	.1959
.60	4.02	5.41	.09	.0737	-.2326	.0854	.0788	.0142	-.0052	.2468	.0327	.2468

TABLE 30.- AERODYNAMIC CHARACTERISTICS: IUA 2-D C-D NOZZLE, AR = 1, A/B POWER SETTING, $\delta_v = 15^o$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
.87	-.02	2.43	.01	-.0776	-.0180	.0512	-.0834	.0209	.0057	.0389	-.0012	.0393
.87	3.99	2.41	-.04	.0921	-.0171	.0483	.0838	.0208	.0083	.0378	-.0012	.0387
.87	6.00	2.41	-.08	.1820	-.0079	.0526	.1724	.0295	.0096	.0374	-.0012	.0386
.87	9.99	2.41	-.17	.3968	.0380	.0522	.3847	.0746	.0122	.0367	-.0012	.0386
.87	18.59	2.41	-.10	.8783	.2586	.0432	.8608	.2931	.0175	.0344	-.0012	.0386
.87	-.03	3.90	.21	-.0616	-.0549	.0428	-.0785	.0214	.0169	.0763	-.0071	.0781
.87	1.99	3.90	-.11	.0262	-.0567	.0381	.0067	.0188	.0196	.0755	-.0071	.0780
.87	4.02	3.91	-.17	.1117	-.0531	.0382	.0895	.0216	.0222	.0747	-.0071	.0779
.87	5.98	3.91	-.24	.2005	-.0438	.0419	.1757	.0300	.0247	.0739	-.0071	.0779
.87	7.98	3.91	-.32	.3039	-.0255	.0423	.2766	.0476	.0273	.0731	-.0071	.0781
.87	9.99	3.90	-.35	.4163	.0029	.0412	.3865	.0749	.0299	.0721	-.0071	.0780
.87	14.99	3.91	-.46	.7093	.1146	.0337	.6733	.1837	.0360	.0691	-.0071	.0779
.87	18.79	3.92	-.05	.9205	.2374	.0314	.8800	.3040	.0405	.0666	-.0071	.0779
.87	-.02	5.37	.26	-.0495	-.0939	.0366	-.0770	.0195	.0275	.1134	-.0121	.1167
.87	4.00	5.40	-.11	.1259	-.0918	.0319	.0903	.0198	.0356	.1117	-.0122	.1172
.87	5.98	5.39	-.05	.2171	-.0819	.0364	.1777	.0287	.0394	.1105	-.0122	.1173
.87	9.99	5.39	-.05	.4375	-.0329	.0359	.3905	.0745	.0470	.1074	-.0122	.1172
.87	18.77	5.39	-.10	.9446	.2026	.0249	.8816	.3018	.0630	.0992	-.0122	.1175
.87	3.97	7.37	-.01	.1447	-.1440	.0247	.0915	.0169	.0532	.1609	-.0188	.1694
.60	.00	2.31	-.04	-.0501	-.0573	.0345	-.0609	.0183	.0108	.0755	-.0022	.0763
.60	3.98	2.31	-.11	.1067	-.0549	.0354	.0907	.0195	.0160	.0744	-.0022	.0761
.60	6.00	2.31	-.03	.1864	-.0465	.0413	.1679	.0268	.0185	.0733	-.0022	.0756
.60	9.96	2.30	-.04	.3893	-.0036	.0463	.3657	.0684	.0235	.0720	-.0022	.0758
.60	19.16	2.30	-.06	.8825	.2225	.0650	.8479	.2895	.0346	.0670	-.0022	.0754
.60	-.00	3.02	.12	-.0408	-.0930	.0291	-.0608	.0192	.0200	.1122	-.0069	.1140
.60	1.98	3.02	-.04	.0406	-.0937	.0271	.0166	.0179	.0239	.1116	-.0069	.1142
.60	4.00	3.01	-.07	.1204	-.0901	.0283	.0927	.0203	.0277	.1104	-.0069	.1138
.60	5.98	3.00	-.11	.2013	-.0809	.0331	.1699	.0281	.0314	.1090	-.0068	.1134
.60	7.96	3.01	-.03	.3024	-.0635	.0369	.2672	.0446	.0353	.1081	-.0068	.1137
.60	10.01	3.00	-.04	.4102	-.0361	.0387	.3711	.0706	.0390	.1067	-.0068	.1136
.60	15.00	3.01	-.05	.6846	.0672	.0477	.6364	.1702	.0482	.1030	-.0068	.1137
.60	19.17	3.00	-.05	.9080	.1928	.0570	.8522	.2924	.0558	.0997	-.0069	.1142
.60	-.01	4.41	.02	-.0145	-.1684	.0130	-.0578	.0184	.0433	.1868	-.0186	.1917
.60	-.02	4.51	.02	-.0123	-.1735	.0122	-.0569	.0181	.0446	.1916	-.0193	.1967
.60	4.00	4.51	.01	.1545	-.1689	.0123	.0964	.0195	.0581	.1885	-.0193	.1972
.60	5.98	4.51	-.00	.2405	-.1586	.0171	.1760	.0276	.0645	.1862	-.0193	.1971
.60	10.00	4.51	-.03	.4536	-.1113	.0208	.3761	.0702	.0776	.1816	-.0193	.1975
.60	19.16	4.51	-.08	.9686	.1275	.0374	.8630	.2947	.1056	.1672	-.0194	.1977
.60	3.98	5.40	-.01	.1721	-.2170	.0052	.0975	.0175	.0746	.2345	-.0256	.2461

TABLE 31.- AERODYNAMIC CHARACTERISTICS: IUM SERN, AR = 1, A/B POWER SETTING, $\delta_v = 0^o$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
1.20	.07	.84	-.01	-.0659	.0451	.0635	-.0659	.0451	0.0000	0.0000	0.0000	0.0000
1.20	2.05	.86	-.05	.0129	.0430	.0587	.0129	.0430	0.0000	0.0000	0.0000	0.0000
1.20	4.04	.86	-.07	.0952	.0459	.0555	.0952	.0459	0.0000	0.0000	0.0000	0.0000
1.20	6.04	.87	-.12	.1839	.0554	.0510	.1839	.0554	0.0000	0.0000	0.0000	0.0000
1.20	8.07	.87	-.01	.2802	.0732	.0462	.2802	.0732	0.0000	0.0000	0.0000	0.0000
1.20	10.03	.87	-.05	.3728	.0975	.0404	.3728	.0975	0.0000	0.0000	0.0000	0.0000
1.20	15.07	.85	-.13	.5989	.1884	.0255	.5989	.1884	0.0000	0.0000	0.0000	0.0000
1.20	16.12	.84	-.02	.6429	.2131	.0245	.6429	.2131	0.0000	0.0000	0.0000	0.0000
1.20	.04	3.82	.02	-.0636	.0026	.0676	-.0609	.0415	-.0027	.0390	.0046	.0390
1.20	4.03	3.81	0.00	.0998	.0042	.0605	.0997	.0433	.0001	.0391	.0046	.0391
1.20	10.06	3.80	.02	.3851	.0576	.0442	.3810	.0965	.0042	.0389	.0046	.0391
1.20	16.05	3.81	-.05	.6541	.1714	.0259	.6458	.2098	.0082	.0384	.0046	.0393
1.20	.05	6.61	.01	-.0578	-.0370	.0669	-.0520	.0396	-.0057	.0766	.0094	.0768
1.20	2.05	6.61	-.04	.0238	-.0385	.0623	.0269	.0382	-.0031	.0767	.0094	.0768
1.20	4.05	6.61	.03	.1094	-.0348	.0594	.1098	.0419	-.0004	.0767	.0093	.0767
1.20	6.06	6.61	-.00	.2046	-.0242	.0546	.2023	.0525	.0023	.0767	.0093	.0767
1.20	8.06	6.62	-.05	.3001	-.0065	.0488	.2951	.0704	.0050	.0768	.0094	.0770
1.20	10.03	6.63	-.11	.3948	.0184	.0425	.3871	.0952	.0077	.0768	.0094	.0772
1.20	15.06	6.62	-.01	.6295	.1130	.0282	.6151	.1868	.0144	.0758	.0094	.0771
1.20	15.95	6.64	-.01	.6697	.1337	.0253	.6542	.2094	.0156	.0757	.0094	.0773
1.20	.04	9.31	.07	-.0483	-.0758	.0642	-.0414	.0373	-.0069	.1131	.0121	.1133
1.20	4.05	9.30	-.01	.1195	-.0723	.0564	.1184	.0404	.0010	.1127	.0120	.1127
1.20	10.05	9.31	-.01	.4112	-.0167	.0400	.3984	.0957	.0128	.1123	.0121	.1131
1.20	15.90	9.30	-.08	.6830	.0976	.0220	.6588	.2083	.0243	.1107	.0121	.1133
1.20	4.05	5.40	.07	.1100	-.0177	.0610	.1110	.0429	-.0010	.0607	.0081	.0607
1.20	.04	.82	-10.01	-.0883	.0522	.0237	-.0883	.0522	0.0000	0.0000	0.0000	0.0000
1.20	2.06	.83	-10.02	-.0097	.0471	.0204	-.0097	.0471	0.0000	0.0000	0.0000	0.0000
1.20	4.04	.85	-10.05	.0712	.0473	.0173	.0712	.0473	0.0000	0.0000	0.0000	0.0000
1.20	6.04	.86	-10.02	.1627	.0541	.0110	.1627	.0541	0.0000	0.0000	0.0000	0.0000
1.20	8.07	.86	-10.04	.2537	.0688	.0034	.2537	.0688	0.0000	0.0000	0.0000	0.0000
1.20	10.04	.86	-10.08	.3425	.0898	-.0054	.3425	.0898	0.0000	0.0000	0.0000	0.0000
1.20	15.06	.85	-10.02	.5651	.1704	-.0258	.5651	.1704	0.0000	0.0000	0.0000	0.0000
1.20	19.46	.82	-10.02	.7514	.2751	-.0417	.7514	.2751	0.0000	0.0000	0.0000	0.0000
1.20	.06	6.64	-10.02	-.0835	-.0300	.0261	-.0778	.0473	-.0058	.0772	.0094	.0774
1.20	2.05	6.63	-10.02	-.0018	-.0341	.0230	.0012	.0428	-.0031	.0769	.0094	.0770
1.20	4.07	6.61	-10.04	.0828	-.0334	.0195	.0831	.0434	-.0004	.0769	.0094	.0769
1.20	6.08	6.65	-10.04	.1789	-.0257	.0129	.1765	.0512	.0024	.0769	.0094	.0769
1.20	8.04	6.65	-10.06	.2690	-.0112	.0055	.2640	.0657	.0050	.0770	.0094	.0771
1.20	10.05	6.62	-10.01	.3606	.0104	-.0029	.3529	.0872	.0077	.0768	.0094	.0772
1.20	15.03	6.61	-10.01	.5911	.0929	-.0229	.5768	.1686	.0143	.0757	.0094	.0770
1.20	19.47	6.63	-10.02	.7875	.2012	-.0406	.7673	.2759	.0202	.0747	.0094	.0773
1.20	.04	.82	5.01	-.0413	.0472	.0846	-.0413	.0472	0.0000	0.0000	0.0000	0.0000
1.20	2.06	.83	5.02	.0405	.0477	.0832	.0405	.0477	0.0000	0.0000	0.0000	0.0000
1.20	4.05	.85	5.04	.1253	.0537	.0824	.1253	.0537	0.0000	0.0000	0.0000	0.0000
1.20	6.03	.85	5.03	.2131	.0661	.0787	.2131	.0661	0.0000	0.0000	0.0000	0.0000
1.20	8.05	.85	5.01	.3054	.0861	.0735	.3054	.0861	0.0000	0.0000	0.0000	0.0000
1.20	10.05	.84	5.04	.3983	.1133	.0689	.3983	.1133	0.0000	0.0000	0.0000	0.0000
1.20	11.21	.84	5.03	.4478	.1315	.0663	.4478	.1315	0.0000	0.0000	0.0000	0.0000
1.20	.05	6.60	5.03	-.0354	-.0340	.0867	-.0297	.0425	-.0057	.0766	.0094	.0768
1.20	2.09	6.63	5.00	.0490	-.0337	.0851	.0520	.0434	-.0030	.0772	.0094	.0772
1.20	4.04	6.64	5.05	.1333	-.0269	.0844	.1337	.0499	-.0004	.0769	.0093	.0769
1.20	6.06	6.61	5.01	.2280	-.0131	.0802	.2257	.0635	.0023	.0766	.0093	.0766
1.20	8.05	6.65	5.04	.3219	.0065	.0756	.3169	.0838	.0050	.0773	.0094	.0775
1.20	10.08	6.63	5.03	.4181	.0347	.0709	.4104	.1116	.0077	.0768	.0094	.0772
1.20	10.83	6.61	5.03	.4529	.0473	.0688	.4442	.1236	.0087	.0763	.0094	.0768
1.16	4.07	5.41	.03	.1087	-.0219	.0629	.1098	.0429	-.0011	.0648	.0087	.0648
.95	4.05	5.41	.01	.0706	-.0761	.0844	.0722	.0209	-.0016	.0970	.0130	.0970
.93	4.03	5.41	.02	.0726	-.0809	.0820	.0744	.0214	-.0017	.1023	.0137	.1023
.90	4.04	5.41	.03	.0740	-.0877	.0795	.0758	.0202	-.0018	.1080	.0145	.1080
.87	.07	1.02	-.02	-.0980	.0219	.0698	-.0980	.0219	0.0000	0.0000	0.0000	0.0000
.87	2.03	1.03	-.05	-.0181	.0181	.0664	-.0181	.0181	0.0000	0.0000	0.0000	0.0000
.87	4.06	1.03	-.01	.0647	.0197	.0678	.0647	.0197	0.0000	0.0000	0.0000	0.0000
.87	6.05	1.03	-.05	.1510	.0275	.0734	.1510	.0275	0.0000	0.0000	0.0000	0.0000
.87	8.05	1.02	-.01	.2480	.0439	.0770	.2480	.0439	0.0000	0.0000	0.0000	0.0000
.87	10.09	1.02	-.04	.3578	.0708	.0780	.3578	.0708	0.0000	0.0000	0.0000	0.0000

TABLE 31.- Continued

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
.87	15.07	1.02	-.04	.6247	.1727	.0787	.6247	.1727	0.0000	0.0000	0.0000	0.0000
.87	18.12	1.01	-.08	.7819	.2597	.0793	.7819	.2597	0.0000	0.0000	0.0000	0.0000
.87	.03	2.41	.05	-.0999	-.0171	.0732	-.0953	.0215	-.0046	.0387	.0063	.0389
.87	4.05	2.41	-.01	.0665	-.0187	.0710	.0684	.0200	-.0019	.0387	.0062	.0387
.87	10.07	2.41	-.01	.3635	.0324	.0804	.3613	.0712	.0022	.0388	.0063	.0389
.87	18.39	2.41	-.03	.8057	.2305	.0815	.7979	.2686	.0078	.0381	.0063	.0388
.87	.04	3.91	.02	-.0950	-.0557	.0722	-.0896	.0210	-.0054	.0768	.0092	.0769
.87	2.04	3.91	-.03	-.0101	-.0592	.0692	-.0074	.0179	-.0027	.0770	.0092	.0771
.87	4.06	3.92	-.07	.0742	-.0571	.0704	.0742	.0199	.0000	.0770	.0092	.0770
.87	6.05	3.91	-.06	.1632	-.0491	.0760	.1605	.0280	.0027	.0771	.0092	.0771
.87	8.04	3.91	.02	.2638	-.0317	.0792	.2585	.0450	.0054	.0767	.0092	.0769
.87	10.06	3.91	-.01	.3742	-.0048	.0796	.3662	.0717	.0080	.0765	.0092	.0769
.87	15.05	3.92	-.03	.6519	.0993	.0806	.6372	.1751	.0147	.0759	.0092	.0773
.87	18.31	3.91	-.06	.8208	.1935	.0802	.8018	.2683	.0190	.0748	.0092	.0772
.87	.02	5.41	.05	-.0975	-.0954	.0781	-.0874	.0199	-.0100	.1153	.0155	.1157
.87	4.05	5.42	-.03	.0750	-.0968	.0766	.0769	.0189	-.0019	.1157	.0155	.1157
.87	10.07	5.41	-.04	.3811	-.0442	.0847	.3709	.0715	.0103	.1158	.0156	.1162
.87	16.53	5.42	.03	.7387	.1016	.0863	.7156	.2151	.0232	.1135	.0155	.1159
.87	4.04	7.57	.07	.0943	-.1531	.0704	.0941	.0176	.0002	.1707	.0197	.1707
.87	.04	1.02	-10.00	-.1337	.0293	.0261	-.1337	.0293	0.0000	0.0000	0.0000	0.0000
.87	2.03	1.02	-10.02	-.0491	.0221	.0254	-.0491	.0221	0.0000	0.0000	0.0000	0.0000
.87	4.05	1.03	-10.05	.0326	.0203	.0278	.0326	.0203	0.0000	0.0000	0.0000	0.0000
.87	6.05	1.03	-10.11	.1180	.0250	.0322	.1180	.0250	0.0000	0.0000	0.0000	0.0000
.87	8.04	1.02	-10.15	.2100	.0378	.0313	.2100	.0378	0.0000	0.0000	0.0000	0.0000
.87	10.04	1.02	-10.04	.3071	.0587	.0300	.3071	.0587	0.0000	0.0000	0.0000	0.0000
.87	15.05	1.02	-9.98	.5943	.1521	.0122	.5943	.1521	0.0000	0.0000	0.0000	0.0000
.87	19.42	1.01	-10.06	.8170	.2694	.0070	.8170	.2694	0.0000	0.0000	0.0000	0.0000
.87	.03	3.93	-10.02	-.1272	-.0489	.0285	-.1217	.0283	-.0054	.0771	.0092	.0773
.87	2.04	3.92	-10.04	-.0407	-.0554	.0283	-.0379	.0217	-.0027	.0771	.0092	.0771
.87	4.06	3.92	-10.00	.0437	-.0569	.0311	.0437	.0204	-.0000	.0773	.0092	.0773
.87	6.04	3.92	-10.02	.1299	-.0521	.0352	.1272	.0251	.0027	.0772	.0092	.0773
.87	8.06	3.92	-10.02	.2259	-.0385	.0346	.2205	.0386	.0054	.0771	.0092	.0773
.87	10.04	3.92	-10.02	.3248	-.0169	.0330	.3167	.0599	.0080	.0769	.0092	.0773
.87	15.05	3.92	-10.04	.6148	.0773	.0123	.6001	.1531	.0147	.0757	.0092	.0771
.87	19.46	3.92	-10.05	.8523	.1999	.0076	.8318	.2744	.0205	.0744	.0092	.0772
.87	.04	1.02	5.01	-.0872	.0240	.0895	-.0872	.0240	0.0000	0.0000	0.0000	0.0000
.87	2.05	1.03	5.02	.0009	.0230	.0898	.0009	.0230	0.0000	0.0000	0.0000	0.0000
.87	4.04	1.03	5.01	.0861	.0280	.0956	.0861	.0280	0.0000	0.0000	0.0000	0.0000
.87	6.05	1.03	5.01	.1724	.0391	.1038	.1724	.0391	0.0000	0.0000	0.0000	0.0000
.87	8.04	1.02	5.01	.2685	.0586	.1077	.2685	.0586	0.0000	0.0000	0.0000	0.0000
.87	10.04	1.02	5.03	.3752	.0882	.1094	.3752	.0882	0.0000	0.0000	0.0000	0.0000
.87	12.59	1.02	5.08	.5086	.1369	.1116	.5086	.1369	0.0000	0.0000	0.0000	0.0000
.87	.04	3.93	5.03	-.0833	-.0531	.0927	-.0779	.0237	-.0054	.0768	.0092	.0770
.87	2.05	3.91	5.03	.0078	-.0548	.0925	.0105	.0225	-.0027	.0772	.0092	.0773
.87	4.02	3.90	5.04	.0940	-.0487	.0984	.0940	.0282	-.0000	.0769	.0091	.0769
.87	6.03	3.89	5.01	.1834	-.0372	.1063	.1808	.0396	.0027	.0768	.0091	.0768
.87	8.05	3.92	5.03	.2832	-.0180	.1100	.2778	.0594	.0054	.0774	.0093	.0776
.87	10.05	3.91	5.02	.3889	.0117	.1115	.3808	.0884	.0081	.0767	.0092	.0771
.87	11.46	3.91	5.02	.4698	.0382	.1117	.4598	.1148	.0100	.0766	.0092	.0772
.80	4.04	5.42	.00	.0766	-.1197	.0750	.0789	.0175	-.0023	.1372	.0184	.1372
.60	.04	1.00	-.00	-.0851	.0186	.0555	-.0851	.0186	0.0000	0.0000	0.0000	0.0000
.60	2.04	1.00	-.00	-.0080	.0158	.0549	-.0080	.0158	0.0000	0.0000	0.0000	0.0000
.60	4.07	1.01	-.01	.0670	.0173	.0572	.0670	.0173	0.0000	0.0000	0.0000	0.0000
.60	6.06	1.00	-.00	.1423	.0240	.0632	.1423	.0240	0.0000	0.0000	0.0000	0.0000
.60	8.06	1.00	-.01	.2354	.0395	.0678	.2354	.0395	0.0000	0.0000	0.0000	0.0000
.60	10.04	1.00	-.01	.3329	.0627	.0719	.3329	.0627	0.0000	0.0000	0.0000	0.0000
.60	15.05	1.00	.00	.5868	.1560	.0857	.5868	.1560	0.0000	0.0000	0.0000	0.0000
.60	19.24	1.00	-.00	.7958	.2722	.0995	.7958	.2722	0.0000	0.0000	0.0000	0.0000
.60	.05	2.31	.01	-.0924	-.0567	.0662	-.0832	.0189	-.0092	.0756	.0125	.0762
.60	4.06	2.30	.00	.0649	-.0579	.0677	.0688	.0180	-.0039	.0759	.0125	.0760
.60	10.07	2.31	-.01	.3454	-.0113	.0803	.3413	.0646	.0041	.0759	.0125	.0760
.60	19.23	2.31	.00	.8205	.2003	.1065	.8043	.2747	.0162	.0744	.0125	.0761
.60	.05	3.02	.01	-.0922	-.0944	.0694	-.0800	.0192	-.0122	.1135	.0172	.1142
.60	2.07	3.02	-.01	-.0103	-.0976	.0687	-.0021	.0167	-.0082	.1143	.0172	.1145
.60	4.04	3.01	.01	.0659	-.0951	.0708	.0702	.0184	-.0043	.1136	.0171	.1137
.60	6.04	3.00	-.00	.1484	-.0881	.0766	.1487	.0257	-.0003	.1138	.0172	.1138
.60	6.07	3.01	-.00	.1488	-.0876	.0755	.1490	.0257	-.0002	.1133	.0171	.1133
.60	6.05	3.00	-.00	.1496	-.0877	.0766	.1499	.0255	-.0003	.1131	.0171	.1131
.60	8.05	3.00	.01	.2474	-.0720	.0804	.2437	.0413	.0037	.1134	.0171	.1134
.60	10.04	3.00	.01	.3499	-.0488	.0835	.3423	.0647	.0076	.1135	.0171	.1137

TABLE 31.- Concluded

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
.60	-.04	3.01	.00	-.1063	-.0951	.0657	-.0939	.0182	-.0124	.1133	.0172	.1140
.60	1.98	3.01	-.01	-.0229	-.0981	.0650	-.0145	.0154	-.0083	.1134	.0171	.1137
.60	3.97	3.00	-.01	.0549	-.0965	.0661	.0593	.0164	-.0044	.1130	.0170	.1131
.60	5.98	3.01	-.02	.1349	-.0916	.0709	.1353	.0223	-.0004	.1138	.0171	.1138
.60	7.96	3.01	-.04	.2340	-.0769	.0735	.2305	.0369	.0035	.1138	.0172	.1139
.60	9.98	3.01	-.06	.3379	-.0540	.0761	.3303	.0597	.0075	.1137	.0172	.1140
.60	14.97	3.01	-.10	.6086	.0391	.0871	.5911	.1524	.0175	.1133	.0173	.1146
.60	18.96	3.02	-.14	.8254	.1528	.0988	.8002	.2641	.0252	.1113	.0172	.1141
.60	-.03	4.01	-.01	-.1018	-.1502	.0672	-.0895	.0169	-.0123	.1671	.0203	.1675
.60	3.98	4.50	-.06	.0573	-.1790	.0778	.0634	.0146	-.0061	.1936	.0288	.1937
.60	9.96	4.50	-.10	.3471	-.1359	.0882	.3329	.0587	.0142	.1945	.0290	.1951
.60	18.97	4.52	-.16	.8486	.0746	.1104	.8042	.2640	.0444	.1894	.0289	.1946
.60	-.03	1.00	-10.01	-.1340	.0291	.0085	-.1340	.0291	0.0000	0.0000	0.0000	0.0000
.60	1.98	1.00	-10.01	-.0522	.0213	.0096	-.0522	.0213	0.0000	0.0000	0.0000	0.0000
.60	3.97	1.00	-10.03	.0240	.0190	.0128	.0240	.0190	0.0000	0.0000	0.0000	0.0000
.60	5.97	1.00	-10.05	.0999	.0221	.0183	.0999	.0221	0.0000	0.0000	0.0000	0.0000
.60	7.96	1.00	-10.07	.1918	.0341	.0200	.1918	.0341	0.0000	0.0000	0.0000	0.0000
.60	9.96	1.00	-10.02	.2873	.0536	.0190	.2873	.0536	0.0000	0.0000	0.0000	0.0000
.60	14.97	1.00	-10.00	.5452	.1350	.0155	.5452	.1350	0.0000	0.0000	0.0000	0.0000
.60	18.97	1.00	-10.01	.7534	.2352	.0192	.7534	.2352	0.0000	0.0000	0.0000	0.0000
.60	-.05	2.99	-10.01	-.1372	-.0837	.0221	-.1249	.0285	-.0123	.1122	.0170	.1129
.60	1.97	3.00	-10.02	-.0538	-.0914	.0228	-.0455	.0214	-.0083	.1127	.0170	.1130
.60	3.96	3.00	-10.00	.0259	-.0934	.0267	.0303	.0192	-.0044	.1126	.0170	.1127
.60	5.97	2.99	-10.02	.1060	-.0902	.0318	.1065	.0226	-.0005	.1128	.0170	.1128
.60	7.97	2.99	-10.02	.2026	-.0783	.0333	.1992	.0347	.0035	.1130	.0170	.1130
.60	9.97	3.00	-10.00	.3058	-.0572	.0321	.2984	.0551	.0074	.1123	.0170	.1126
.60	14.98	3.00	-10.02	.5737	.0255	.0263	.5564	.1372	.0173	.1117	.0170	.1130
.60	18.95	3.00	-10.03	.7913	.1283	.0295	.7664	.2383	.0249	.1100	.0170	.1128
.60	-.03	1.00	4.99	-.0894	.0192	.0693	-.0894	.0192	0.0000	0.0000	0.0000	0.0000
.60	1.97	1.00	4.99	-.0093	.0178	.0703	-.0093	.0178	0.0000	0.0000	0.0000	0.0000
.60	3.97	1.00	5.00	.0697	.0212	.0751	.0697	.0212	0.0000	0.0000	0.0000	0.0000
.60	5.95	1.00	5.00	.1483	.0299	.0838	.1483	.0299	0.0000	0.0000	0.0000	0.0000
.60	7.96	1.00	4.99	.2380	.0466	.0904	.2380	.0466	0.0000	0.0000	0.0000	0.0000
.60	9.97	1.00	5.00	.3386	.0716	.0949	.3386	.0716	0.0000	0.0000	0.0000	0.0000
.60	14.98	1.00	5.00	.5862	.1689	.1124	.5862	.1689	0.0000	0.0000	0.0000	0.0000
.60	18.96	.99	5.00	.7843	.2816	.1254	.7843	.2816	0.0000	0.0000	0.0000	0.0000
.60	-.04	3.01	5.00	-.0937	-.0935	.0830	-.0814	.0192	-.0123	.1127	.0171	.1133
.60	1.98	3.00	4.94	-.0106	-.0954	.0839	-.0023	.0180	-.0084	.1133	.0171	.1136
.60	3.94	3.01	4.99	.0720	-.0919	.0885	.0764	.0217	-.0045	.1137	.0171	.1137
.60	5.97	3.01	5.00	.1555	-.0834	.0972	.1559	.0306	-.0004	.1139	.0172	.1139
.60	7.97	3.00	4.99	.2534	-.0658	.1029	.2499	.0480	.0035	.1138	.0172	.1139
.60	9.97	3.01	5.00	.3558	-.0403	.1072	.3483	.0732	.0075	.1135	.0171	.1137
.60	14.97	3.00	5.00	.6156	.0587	.1243	.5982	.1715	.0174	.1128	.0172	.1141
.60	18.96	3.01	4.99	.8259	.1753	.1354	.8008	.2861	.0251	.1109	.0171	.1137

TABLE 32.- NOZZLE CHARACTERISTICS: IUM SERN, AR = 1, A/B POWER SETTING, $\delta_v = 0^\circ$

MACH	ALPHA	NPR	CANALP	CLN	C(DN-F)	CMN	CLAN	CDAN
1.20	.07	.84	-.C1	-.0101	.0037	.0032	-.0101	.0037
1.20	2.05	.86	-.05	-.0081	.0023	.0026	-.0081	.0023
1.20	4.04	.86	-.07	-.0061	.0013	.0019	-.0061	.0013
1.20	6.04	.87	-.12	-.0043	.0004	.0013	-.0043	.0004
1.20	8.07	.87	-.01	-.0024	-.0004	.0008	-.0024	-.0004
1.20	10.03	.87	-.05	-.0008	-.0010	.0003	-.0008	-.0010
1.20	15.07	.85	-.13	.0049	-.0023	-.0013	.0049	-.0023
1.20	16.12	.84	-.02	.0060	-.0026	-.0017	.0060	-.0026
1.20	.04	3.82	.02	-.0131	-.0390	.0057	-.0104	.0001
1.20	4.03	3.81	0.00	-.0064	-.0407	.0045	-.0065	-.0015
1.20	10.06	3.80	.02	.0043	-.0426	.0025	.0001	-.0035
1.20	16.05	3.81	-.05	.0169	-.0435	-.0000	.0086	-.0050
1.20	.05	6.61	.01	-.0086	-.0799	.0052	-.0029	-.0031
1.20	2.05	6.61	-.04	-.0040	-.0806	.0046	-.0010	-.0037
1.20	4.05	6.61	.03	.0005	-.0810	.0041	.0009	-.0041
1.20	6.06	6.61	-.00	.0052	-.0814	.0035	.0029	-.0045
1.20	8.06	6.62	-.05	.0101	-.0820	.0029	.0051	-.0049
1.20	10.03	6.63	-.11	.0152	-.0821	.0022	.0075	-.0051
1.20	15.06	6.62	-.01	.0285	-.0818	.0003	.0141	-.0058
1.20	15.95	6.64	-.C1	.0312	-.0820	-.0001	.0155	-.0061
1.20	.04	9.31	.07	-.0029	-.1193	.0040	.0041	-.0060
1.20	4.05	9.30	-.01	.0089	-.1191	.0029	.0079	-.0062
1.20	10.05	9.31	-.01	.0275	-.1188	.0009	.0147	-.0062
1.20	15.90	9.30	-.08	.0469	-.1171	-.0013	.0225	-.0062
1.20	4.05	5.40	.07	-.0031	-.0647	.0044	-.0020	-.0039
1.20	.04	.82	-10.01	-.0102	.0017	.0033	-.0102	.0017
1.20	2.06	.83	-10.02	-.0082	.0006	.0026	-.0082	.0006
1.20	4.04	.85	-10.05	-.0063	-.0002	.0020	-.0063	-.0002
1.20	6.04	.86	-10.02	-.0043	-.0007	.0014	-.0043	-.0007
1.20	8.07	.86	-10.04	-.0024	-.0009	.0008	-.0024	-.0009
1.20	10.04	.86	-10.08	-.0009	-.0016	.0003	-.0009	-.0016
1.20	15.06	.85	-10.02	.0052	-.0029	-.0014	.0052	-.0029
1.20	19.46	.82	-10.02	.0112	-.0011	-.0035	.0112	-.0011
1.20	.06	6.64	-10.02	-.0085	-.0814	.0050	-.0027	-.0040
1.20	2.05	6.63	-10.02	-.0039	-.0814	.0044	-.0008	-.0043
1.20	4.07	6.61	-10.04	.0007	-.0818	.0039	.0011	-.0047
1.20	6.08	6.65	-10.04	.0054	-.0816	.0033	.0030	-.0045
1.20	8.04	6.65	-10.06	.0100	-.0817	.0027	.0050	-.0045
1.20	10.05	6.62	-10.01	.0147	-.0818	.0022	.0070	-.0048
1.20	15.03	6.61	-10.01	.0276	-.0812	.0004	.0133	-.0053
1.20	19.47	6.63	-10.02	.0411	-.0779	-.0021	.0208	-.0030
1.20	.04	.82	5.01	-.0111	.0012	.0034	-.0111	.0012
1.20	2.06	.83	5.02	-.0089	.0000	.0027	-.0089	.0000
1.20	4.05	.85	5.04	-.0068	-.0009	.0020	-.0068	-.0009
1.20	6.03	.85	5.03	-.0050	-.0017	.0014	-.0050	-.0017
1.20	8.05	.85	5.01	-.0030	-.0023	.0009	-.0030	-.0023
1.20	10.05	.84	5.04	-.0015	-.0026	.0004	-.0015	-.0026
1.20	11.21	.84	5.03	-.0004	-.0028	.0001	-.0004	-.0028
1.20	.05	6.60	5.03	-.0092	-.0813	.0051	-.0034	-.0044
1.20	2.09	6.63	5.00	-.0043	-.0825	.0045	-.0012	-.0051
1.20	4.04	6.64	5.05	.0002	-.0825	.0040	.0006	-.0054
1.20	6.06	6.61	5.01	.0049	-.0826	.0034	.0025	-.0057
1.20	8.05	6.65	5.04	.0099	-.0835	.0028	.0048	-.0060
1.20	10.08	6.63	5.03	.0148	-.0831	.0021	.0071	-.0060
1.20	10.83	6.61	5.03	.0166	-.0826	.0019	.0079	-.0061
1.16	4.07	5.41	.03	-.0033	-.0689	.0046	-.0023	-.0039
.95	4.05	5.41	.01	-.0065	-.1036	.0079	-.0048	-.0064
.93	4.03	5.41	.02	-.0055	-.1098	.0079	-.0038	-.0072
.90	4.04	5.41	.03	-.0043	-.1151	.0078	-.0025	-.0068
.87	.07	1.02	-.02	-.0060	-.0053	.0018	-.0060	-.0053
.87	2.03	1.03	-.05	-.0056	-.0048	.0017	-.0056	-.0048
.87	4.06	1.03	-.01	-.0052	-.0047	.0016	-.0052	-.0047
.87	6.05	1.03	-.05	-.0048	-.0049	.0015	-.0048	-.0049
.87	8.05	1.02	-.01	-.0043	-.0047	.0014	-.0043	-.0047
.87	10.09	1.02	-.04	-.0038	-.0050	.0014	-.0038	-.0050

TABLE 32.- Continued

MACH	ALPHA	NPR	CANALP	CLN	C(DN-F)	CMN	CLAN	CDAN
.87	15.07	1.02	-.04	-.0018	-.0051	.0008	-.0018	-.0051
.87	18.12	1.01	-.08	-.0001	-.0057	.0005	-.0001	-.0057
.87	.03	2.41	.05	-.0100	-.0439	.0045	-.0054	-.0051
.87	4.05	2.41	-.01	-.0064	-.0438	.0043	-.0045	-.0050
.87	10.07	2.41	-.01	-.0001	-.0439	.0037	-.0023	-.0050
.87	18.39	2.41	-.03	.0102	-.0440	.0025	.0024	-.0058
.87	.04	3.91	.02	-.0087	-.0820	.0050	-.0033	-.0050
.87	2.04	3.91	-.03	-.0054	-.0822	.0048	-.0027	-.0049
.87	4.06	3.92	-.07	-.0022	-.0821	.0047	-.0022	-.0049
.87	6.05	3.91	-.06	.0010	-.0821	.0046	-.0017	-.0047
.87	8.04	3.91	.02	.0045	-.0818	.0043	-.0009	-.0048
.87	10.06	3.91	-.01	.0079	-.0818	.0042	-.0001	-.0050
.87	15.05	3.92	-.03	.0167	-.0813	.0038	.0019	-.0052
.87	18.31	3.91	-.06	.0233	-.0808	.0032	.0042	-.0057
.87	.02	5.41	.05	-.0136	-.1220	.0084	-.0035	-.0064
.87	4.05	5.42	-.03	-.0043	-.1222	.0082	-.0024	-.0061
.87	10.07	5.41	-.04	.0100	-.1226	.0077	-.0003	-.0065
.87	16.53	5.42	.03	.0266	-.1207	.0068	.0034	-.0069
.87	4.04	7.57	.07	.0092	-.1795	.0061	.0090	-.0083
.87	.04	1.02	-10.00	-.0063	-.0044	.0019	-.0063	-.0044
.87	2.03	1.02	-10.02	-.0058	-.0044	.0017	-.0058	-.0044
.87	4.05	1.03	-10.05	-.0055	-.0045	.0017	-.0055	-.0045
.87	6.05	1.03	-10.11	-.0052	-.0039	.0017	-.0052	-.0039
.87	8.04	1.02	-10.15	-.0046	-.0040	.0015	-.0046	-.0040
.87	10.04	1.02	-10.04	-.0045	-.0038	.0015	-.0045	-.0038
.87	15.05	1.02	-9.98	-.0029	-.0046	.0011	-.0029	-.0046
.87	19.42	1.01	-10.06	.0002	-.0055	.0005	.0002	-.0055
.87	.03	3.93	-10.02	-.0083	-.0825	.0049	-.0029	-.0052
.87	2.04	3.92	-10.04	-.0052	-.0824	.0048	-.0024	-.0050
.87	4.06	3.92	-10.00	-.0021	-.0824	.0047	-.0020	-.0049
.87	6.04	3.92	-10.02	.0009	-.0818	.0046	-.0018	-.0044
.87	8.06	3.92	-10.02	.0040	-.0816	.0046	-.0014	-.0042
.87	10.04	3.92	-10.02	.0069	-.0813	.0046	-.0012	-.0042
.87	15.05	3.92	-10.04	.0163	-.0807	.0038	.0016	-.0047
.87	.04	1.02	5.01	-.0059	-.0044	.0018	-.0059	-.0044
.87	2.05	1.03	5.02	-.0052	-.0047	.0016	-.0052	-.0047
.87	4.04	1.03	5.01	-.0049	-.0049	.0016	-.0049	-.0049
.87	6.05	1.03	5.01	-.0045	-.0050	.0015	-.0045	-.0050
.87	8.04	1.02	5.01	-.0039	-.0050	.0013	-.0039	-.0050
.87	10.04	1.02	5.03	-.0034	-.0051	.0013	-.0034	-.0051
.87	12.59	1.02	5.08	-.0027	-.0053	.0012	-.0027	-.0053
.87	.04	3.93	5.03	-.0082	-.0827	.0049	-.0028	-.0057
.87	2.05	3.91	5.03	-.0049	-.0828	.0047	-.0021	-.0053
.87	4.02	3.90	5.04	-.0016	-.0825	.0046	-.0016	-.0054
.87	6.03	3.89	5.01	.0015	-.0821	.0044	-.0011	-.0052
.87	8.05	3.92	5.03	.0049	-.0829	.0044	-.0005	-.0053
.87	10.05	3.91	5.02	.0079	-.0823	.0043	-.0001	-.0054
.87	11.46	3.91	5.02	.0102	-.0822	.0042	.0002	-.0054
.80	4.04	5.42	.00	-.0043	-.1435	.0094	-.0020	-.0060
.60	.04	1.00	-.00	-.0067	-.0034	.0020	-.0067	-.0034
.60	2.04	1.00	-.00	-.0062	-.0032	.0018	-.0062	-.0032
.60	4.07	1.01	-.01	-.0058	-.0033	.0017	-.0058	-.0033
.60	6.06	1.00	-.00	-.0053	-.0032	.0015	-.0053	-.0032
.60	8.06	1.00	-.01	-.0051	-.0030	.0015	-.0051	-.0030
.60	10.04	1.00	-.01	-.0047	-.0030	.0014	-.0047	-.0030
.60	15.05	1.00	.00	-.0026	-.0028	.0007	-.0026	-.0028
.60	19.24	1.00	-.00	-.0011	-.0032	.0004	-.0011	-.0032
.60	.05	2.31	.01	-.0167	-.0791	.0079	-.0075	-.0033
.60	4.06	2.30	.00	-.0102	-.0790	.0075	-.0063	-.0030
.60	10.07	2.31	-.01	.0001	-.0788	.0068	-.0040	-.0028
.60	19.23	2.31	.00	.0168	-.0780	.0055	.0006	-.0034
.60	.05	3.02	.01	-.0187	-.1167	.0098	-.0065	-.0028
.60	2.07	3.02	-.01	-.0141	-.1174	.0096	-.0058	-.0028
.60	4.04	3.01	.01	-.0097	-.1166	.0095	-.0054	-.0027
.60	6.04	3.00	-.00	-.0051	-.1166	.0093	-.0048	-.0025
.60	6.07	3.01	-.00	-.0051	-.1159	.0092	-.0048	-.0023
.60	6.05	3.00	-.00	-.0050	-.1160	.0092	-.0047	-.0026
.60	8.05	3.00	.01	-.0003	-.1163	.0090	-.0040	-.0026
.60	10.04	3.00	.01	.0045	-.1163	.0087	-.0032	-.0026

TABLE 32.- Concluded.

MACH	ALPHA	NPR	CANALP	CLN	C(DN-F)	CMN	CLAN	CDAN
.60	-.04	3.01	.00	-.0180	-.1156	.0098	-.0056	-.0020
.60	1.98	3.01	-.01	-.0134	-.1155	.0096	-.0050	-.0017
.60	3.97	3.00	-.01	-.0089	-.1148	.0094	-.0045	-.0015
.60	5.98	3.01	-.02	-.0044	-.1156	.0093	-.0040	-.0015
.60	7.96	3.01	-.04	.0003	-.1157	.0090	-.0033	-.0015
.60	9.98	3.01	-.06	.0053	-.1155	.0087	-.0023	-.0014
.60	14.97	3.01	-.10	.0175	-.1154	.0081	-.0000	-.0018
.60	18.96	3.02	-.14	.0272	-.1141	.0076	.0019	-.0025
.60	-.03	4.01	-.01	-.0180	-.1713	.0114	-.0057	-.0038
.60	3.98	4.50	-.06	-.0128	-.1987	.0161	-.0067	-.0046
.60	9.96	4.50	-.10	.0099	-.1999	.0155	-.0043	-.0048
.60	18.97	4.52	-.16	.0447	-.1958	.0144	.0002	-.0058
.60	-.03	1.00	-10.01	-.0058	-.0024	.0019	-.0058	-.0024
.60	1.98	1.00	-10.01	-.0049	-.0023	.0016	-.0049	-.0023
.60	3.97	1.00	-10.03	-.0045	-.0020	.0015	-.0045	-.0020
.60	5.97	1.00	-10.05	-.0042	-.0020	.0014	-.0042	-.0020
.60	7.96	1.00	-10.07	-.0042	-.0017	.0014	-.0042	-.0017
.60	9.96	1.00	-10.02	-.0041	-.0015	.0013	-.0041	-.0015
.60	14.97	1.00	-10.00	-.0028	-.0013	.0010	-.0028	-.0013
.60	18.97	1.00	-10.01	-.0013	-.0018	.0006	-.0013	-.0018
.60	-.05	2.99	-10.01	-.0179	-.1139	.0097	-.0055	-.0014
.60	1.97	3.00	-10.02	-.0132	-.1146	.0095	-.0048	-.0016
.60	3.96	3.00	-10.00	-.0088	-.1145	.0093	-.0043	-.0016
.60	5.97	2.99	-10.02	-.0046	-.1147	.0093	-.0041	-.0017
.60	7.97	2.99	-10.02	-.0003	-.1148	.0091	-.0037	-.0015
.60	9.97	3.00	-10.00	.0039	-.1141	.0090	-.0036	-.0015
.60	14.98	3.00	-10.02	.0164	-.1137	.0082	-.0009	-.0017
.60	18.95	3.00	-10.03	.0260	-.1124	.0077	.0010	-.0021
.60	-.03	1.00	4.99	-.0057	-.0028	.0019	-.0057	-.0028
.60	1.97	1.00	4.99	-.0051	-.0027	.0017	-.0051	-.0027
.60	3.97	1.00	5.00	-.0045	-.0029	.0015	-.0045	-.0029
.60	5.95	1.00	5.00	-.0042	-.0025	.0014	-.0042	-.0025
.60	7.96	1.00	4.99	-.0039	-.0024	.0013	-.0039	-.0024
.60	9.97	1.00	5.00	-.0033	-.0023	.0011	-.0033	-.0023
.60	14.98	1.00	5.00	-.0022	-.0027	.0008	-.0022	-.0027
.60	18.96	.99	5.00	.0003	-.0026	.0002	.0003	-.0026
.60	-.04	3.01	5.00	-.0180	-.1151	.0098	-.0057	-.0021
.60	1.98	3.00	4.94	-.0135	-.1159	.0096	-.0051	-.0023
.60	3.94	3.01	4.99	-.0088	-.1161	.0094	-.0043	-.0022
.60	5.97	3.01	5.00	-.0040	-.1166	.0091	-.0035	-.0024
.60	7.97	3.00	4.99	.0005	-.1165	.0090	-.0030	-.0024
.60	9.97	3.01	5.00	.0055	-.1164	.0087	-.0020	-.0026
.60	14.97	3.00	5.00	.0171	-.1165	.0084	-.0004	-.0034
.60	18.96	3.01	4.99	.0288	-.1139	.0070	.0036	-.0027

TABLE 33.- AERODYNAMIC CHARACTERISTICS: IUM SERN, AR = 1, A/B Power Setting, $\delta_v = 15^o$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
1.20	2.04	6.62	-.01	.0466	-.0349	.0369	.0291	.0418	.0175	.0767	-.0058	.0787
1.20	4.01	6.62	-.05	.1311	-.0306	.0324	.1109	.0453	.0201	.0760	-.0058	.0786
1.20	6.02	6.60	-.07	.2277	-.0194	.0264	.2049	.0557	.0227	.0751	-.0058	.0785
1.20	8.03	6.62	-.12	.3237	-.0013	.0200	.2982	.0732	.0255	.0745	-.0058	.0788
1.20	10.04	6.63	-.04	.4258	.0254	.0133	.3976	.0993	.0282	.0739	-.0059	.0791
1.20	15.04	6.62	-.10	.6620	.1217	-.0033	.6275	.1929	.0345	.0711	-.0058	.0791
1.20	16.58	6.62	.01	.7332	.1610	-.0070	.6968	.2313	.0364	.0703	-.0059	.0792
.87	.02	2.41	-.03	-.0777	-.0182	.0470	-.0834	.0207	.0057	.0389	-.0017	.0393
.87	4.03	2.40	-.05	.0913	-.0181	.0441	.0829	.0203	.0084	.0384	-.0017	.0393
.87	10.02	2.41	-.06	.3876	.0337	.0517	.3752	.0711	.0124	.0374	-.0017	.0394
.87	19.30	2.40	-.03	.8963	.2709	.0476	.8781	.3058	.0182	.0349	-.0017	.0393
.87	.03	3.91	.05	-.0683	-.0570	.0431	-.0811	.0204	.0128	.0774	-.0045	.0784
.87	2.02	3.91	-.03	.0188	-.0592	.0398	.0032	.0178	.0155	.0771	-.0045	.0786
.87	4.02	3.91	-.08	.1015	-.0563	.0400	.0833	.0201	.0182	.0764	-.0045	.0786
.87	6.03	3.91	.03	.1919	-.0476	.0454	.1710	.0282	.0209	.0758	-.0045	.0786
.87	8.03	3.91	-.02	.2956	-.0296	.0466	.2720	.0454	.0235	.0750	-.0045	.0786
.87	10.02	3.90	-.05	.4047	-.0027	.0467	.3785	.0715	.0261	.0742	-.0045	.0787
.87	15.02	3.91	.00	.6916	.1057	.0435	.6590	.1774	.0325	.0717	-.0045	.0787
.87	19.34	3.91	-.05	.9237	.2405	.0413	.8859	.3095	.0378	.0690	-.0045	.0786
.87	.02	5.39	.01	-.0559	-.0953	.0373	-.0770	.0203	.0211	.1156	-.0080	.1175
.87	4.03	5.42	-.03	.1190	-.0941	.0341	.0897	.0204	.0293	.1145	-.0081	.1182
.87	10.04	5.42	-.15	.4259	-.0385	.0395	.3846	.0724	.0412	.1110	-.0081	.1184
.87	19.25	5.42	-.04	.9476	.2069	.0322	.8893	.3095	.0583	.1026	-.0081	.1180
.87	4.04	7.49	-.02	.1500	-.1444	.0173	.1048	.0227	.0451	.1671	-.0133	.1731
.60	.02	2.33	.02	-.0590	-.0610	.0306	-.0701	.0167	.0112	.0777	-.0032	.0785
.60	4.05	2.32	-.02	.1019	-.0586	.0311	.0855	.0173	.0164	.0759	-.0032	.0777
.60	10.04	2.32	-.02	.3865	-.0093	.0409	.3621	.0649	.0243	.0742	-.0032	.0781
.60	19.29	2.32	.03	.8933	.2201	.0611	.8573	.2895	.0360	.0693	-.0032	.0781
.60	.02	3.01	.04	-.0452	-.0956	.0245	-.0649	.0181	.0198	.1137	-.0079	.1154
.60	4.05	3.01	-.01	.1187	-.0936	.0253	.0909	.0189	.0278	.1125	-.0080	.1159
.60	4.04	3.00	-.03	.1184	-.0937	.0252	.0905	.0190	.0278	.1127	-.0080	.1161
.60	6.02	3.00	.02	.1995	-.0857	.0304	.1677	.0261	.0318	.1118	-.0080	.1163
.60	8.04	3.01	0.00	.3012	-.0677	.0331	.2657	.0424	.0355	.1101	-.0079	.1157
.60	10.02	3.00	-.00	.4047	-.0424	.0350	.3653	.0668	.0394	.1092	-.0080	.1161
.60	15.02	3.00	-.03	.6810	.0590	.0449	.6319	.1649	.0491	.1060	-.0080	.1168
.60	19.24	3.00	-.09	.9104	.1870	.0549	.8540	.2885	.0564	.1015	-.0080	.1161
.60	-.00	4.50	.04	-.0316	-.1778	.0220	-.0650	.0168	.0334	.1946	-.0121	.1974
.60	4.05	4.51	.02	.1390	-.1749	.0225	.0918	.0175	.0473	.1923	-.0122	.1980
.60	10.02	4.51	-.01	.4360	-.1211	.0311	.3688	.0658	.0672	.1870	-.0122	.1987
.60	19.27	4.51	-.11	.9557	.1158	.0497	.8595	.2892	.0962	.1734	-.0122	.1983
.60	4.02	4.50	.06	.1383	-.1749	.0228	.0912	.0173	.0471	.1922	-.0121	.1979
.60	4.01	5.40	.06	.1611	-.2208	.0119	.0998	.0190	.0613	.2398	-.0169	.2475
.60	4.01	5.88	.05	.1738	-.2444	.0051	.1050	.0202	.0687	.2645	-.0193	.2733

TABLE 34.- NOZZLE CHARACTERISTICS: IUM SERN,
AR = 1, A/B POWER SETTING, $\delta_v = 15^o$

MACH	ALPHA	NPR	CANALP	CLN	C(DN-F)	CMN	CLAN	CDAN
1.20	2.04	6.62	-.01	.0244	-.0762	-.0062	.0068	.0006
1.20	4.01	6.62	-.05	.0292	-.0754	-.0070	.0090	.0007
1.20	6.02	6.60	-.07	.0342	-.0746	-.0077	.0113	.0007
1.20	8.03	6.62	-.12	.0390	-.0740	-.0084	.0135	.0007
1.20	10.04	6.63	-.04	.0441	-.0736	-.0092	.0158	.0005
1.20	15.04	6.62	-.10	.0571	-.0706	-.0112	.0225	.0007
1.20	16.58	6.62	.01	.0613	-.0694	-.0120	.0247	.0011
.87	.02	2.41	-.03	.0122	-.0428	-.0034	.0065	-.0037
.87	4.03	2.40	-.05	.0157	-.0413	-.0037	.0073	-.0028
.87	10.02	2.41	-.06	.0218	-.0397	-.0043	.0094	-.0022
.87	19.30	2.40	-.03	.0355	-.0361	-.0066	.0172	-.0012
.87	.03	3.91	.05	.0194	-.0813	-.0049	.0065	-.0038
.87	2.02	3.91	-.03	.0227	-.0805	-.0051	.0071	-.0032
.87	4.02	3.91	-.08	.0256	-.0795	-.0051	.0073	-.0029
.87	6.03	3.91	.03	.0288	-.0787	-.0052	.0078	-.0027
.87	8.03	3.91	-.02	.0324	-.0776	-.0055	.0088	-.0025
.87	10.02	3.90	-.05	.0359	-.0766	-.0059	.0097	-.0022
.87	15.02	3.91	.00	.0459	-.0738	-.0069	.0133	-.0019
.87	19.34	3.91	-.05	.0557	-.0705	-.0082	.0178	-.0014
.87	.02	5.39	.01	.0284	-.1200	-.0070	.0072	-.0042
.87	4.03	5.42	-.03	.0379	-.1181	-.0073	.0085	-.0034
.87	10.04	5.42	-.15	.0525	-.1139	-.0081	.0112	-.0027
.87	19.25	5.42	-.04	.0785	-.1040	-.0108	.0201	-.0012
.87	4.04	7.49	-.02	.0628	-.1690	-.0139	.0176	-.0016
.60	.02	2.33	.02	.0179	-.0781	-.0042	.0067	-.0005
.60	4.05	2.32	-.02	.0241	-.0755	-.0046	.0077	.0004
.60	10.04	2.32	-.02	.0337	-.0735	-.0052	.0094	.0007
.60	19.29	2.32	.03	.0513	-.0675	-.0071	.0155	.0017
.60	.02	3.01	.04	.0276	-.1162	-.0067	.0078	-.0026
.60	4.05	3.01	-.01	.0370	-.1139	-.0072	.0093	-.0015
.60	4.04	3.00	-.03	.0370	-.1142	-.0072	.0092	-.0016
.60	6.02	3.00	.02	.0412	-.1131	-.0073	.0095	-.0013
.60	8.04	3.01	0.00	.0458	-.1108	-.0076	.0103	-.0008
.60	10.02	3.00	-.00	.0506	-.1095	-.0079	.0112	-.0004
.60	15.02	3.00	-.03	.0630	-.1053	-.0089	.0140	.0007
.60	19.24	3.00	-.09	.0736	-.0996	-.0100	.0172	.0019
.60	-.00	4.50	.04	.0385	-.1996	-.0079	.0051	-.0052
.60	4.05	4.51	.02	.0539	-.1964	-.0083	.0066	-.0041
.60	10.02	4.51	-.01	.0762	-.1901	-.0091	.0090	-.0031
.60	19.27	4.51	-.11	.1122	-.1747	-.0113	.0161	-.0014
.60	4.02	4.50	.06	.0535	-.1966	-.0083	.0064	-.0044
.60	4.01	5.40	.06	.0726	-.2435	-.0127	.0113	-.0038
.60	4.01	5.88	.05	.0837	-.2674	-.0156	.0150	-.0030

TABLE 35.- AERODYNAMIC CHARACTERISTICS: IUM SERN, AR = 1, A/B POWER SETTING, $\delta_v = 30^\circ$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
1.20	-.00	6.59	4.98	.0006	-.0185	.0411	-.0348	.0517	.0354	.0702	-.0228	.0786
1.20	-.00	6.58	4.98	.0006	-.0182	.0406	-.0348	.0519	.0353	.0701	-.0228	.0785
1.20	2.00	6.58	4.98	.0836	-.0169	.0375	.0459	.0520	.0378	.0688	-.0228	.0785
1.20	3.99	6.57	4.94	.1727	-.0095	.0368	.1325	.0581	.0402	.0676	-.0228	.0786
1.20	5.99	6.60	4.92	.2667	.0041	.0332	.2239	.0706	.0428	.0665	-.0229	.0790
1.20	8.00	6.60	4.90	.3642	.0262	.0270	.3191	.0912	.0451	.0649	-.0230	.0791
1.20	10.00	6.57	4.98	.4629	.0563	.0218	.4158	.1194	.0471	.0631	-.0229	.0788
1.20	11.90	6.56	4.97	.5511	.0904	.0165	.5018	.1519	.0492	.0616	-.0229	.0788
1.20	-.01	3.80	-.02	-.0333	.0122	.0346	-.0501	.0484	.0168	.0361	-.0105	.0398
1.20	4.00	6.58	-.05	.1564	-.0146	.0119	.1164	.0527	.0401	.0673	-.0227	.0784
1.20	6.00	6.61	-.10	.2469	-.0038	.0066	.2042	.0626	.0427	.0664	-.0229	.0790
1.20	8.00	6.60	-.15	.3441	.0152	.0003	.2990	.0802	.0451	.0649	-.0229	.0790
1.20	10.00	6.62	-.03	.4435	.0427	-.0057	.3961	.1061	.0474	.0634	-.0230	.0792
1.20	15.00	6.61	-.07	.6767	.1417	-.0219	.6245	.2002	.0522	.0585	-.0228	.0784
1.20	16.49	6.58	-.03	.7438	.1788	-.0263	.6899	.2361	.0539	.0573	-.0228	.0787
.87	.01	3.90	4.98	-.0121	-.0428	.0300	-.0452	.0284	.0330	.0711	-.0206	.0784
.87	2.00	3.90	4.99	.0768	-.0417	.0293	.0413	.0283	.0355	.0700	-.0206	.0785
.87	3.98	3.90	4.98	.1664	-.0344	.0334	.1285	.0343	.0379	.0687	-.0206	.0784
.87	5.99	3.90	4.96	.2561	-.0206	.0398	.2159	.0466	.0402	.0673	-.0206	.0784
.87	8.00	3.91	4.97	.3576	.0016	.0429	.3151	.0674	.0426	.0658	-.0206	.0784
.87	10.01	3.91	5.00	.4701	.0343	.0427	.4253	.0986	.0448	.0643	-.0206	.0783
.87	14.99	3.92	4.93	.7400	.1502	.0414	.6897	.2105	.0504	.0603	-.0206	.0786
.87	-.01	2.37	-.06	-.0481	-.0085	.0227	-.0642	.0268	.0161	.0354	-.0101	.0388
.87	4.01	2.39	-.06	.1229	-.0064	.0193	.1042	.0281	.0187	.0345	-.0103	.0393
.87	10.00	2.40	-.14	.4218	.0492	.0241	.3993	.0818	.0224	.0326	-.0104	.0396
.87	19.06	2.40	-.12	.9195	.2872	.0162	.8923	.3158	.0272	.0286	-.0104	.0395
.87	-.01	3.91	-.03	-.0264	-.0447	.0107	-.0594	.0264	.0330	.0711	-.0206	.0784
.87	2.02	3.90	-.12	.0616	-.0450	.0071	.0261	.0249	.0355	.0699	-.0206	.0784
.87	4.01	3.91	-.06	.1460	-.0405	.0073	.1081	.0281	.0379	.0687	-.0206	.0784
.87	5.90	3.91	-.05	.2300	-.0313	.0111	.1898	.0362	.0402	.0674	-.0206	.0785
.87	8.02	3.91	-.09	.3374	-.0112	.0115	.2949	.0546	.0426	.0658	-.0206	.0784
.87	9.99	3.91	-.09	.4494	.0184	.0117	.4046	.0826	.0447	.0642	-.0205	.0782
.87	15.00	3.91	-.13	.7384	.1322	.0045	.6881	.1924	.0503	.0602	-.0206	.0784
.87	19.23	3.91	-.03	.9655	.2698	.0021	.9109	.3261	.0546	.0563	-.0206	.0784
.87	.00	5.41	-.07	.0027	-.0773	-.0081	-.0495	.0288	.0522	.1060	-.0333	.1182
.87	4.00	5.39	-.09	.1775	-.0712	-.0116	.1180	.0310	.0594	.1022	-.0333	.1183
.87	10.00	5.40	-.07	.4867	-.0081	-.0090	.4169	.0872	.0698	.0954	-.0333	.1181
.87	19.27	5.40	-.05	1.0105	.2518	-.0214	.9262	.3348	.0843	.0830	-.0333	.1183
.87	3.98	7.80	-.02	.2283	-.1186	-.0434	.1342	.0372	.0941	.1558	-.0538	.1820
.60	.01	3.01	4.98	.0298	-.0769	.0026	-.0208	.0283	.0506	.1052	-.0323	.1167
.60	.01	3.01	4.98	.0305	-.0773	.0024	-.0207	.0284	.0512	.1057	-.0327	.1174
.60	2.00	3.02	4.97	.1141	-.0745	.0035	.0595	.0296	.0546	.1041	-.0325	.1176
.60	3.99	3.02	4.98	.1959	-.0662	.0086	.1378	.0358	.0581	.1020	-.0325	.1174
.60	5.98	3.01	4.97	.2794	-.0524	.0164	.2181	.0470	.0613	.0994	-.0323	.1168
.60	8.00	3.00	4.97	.3784	-.0307	.0208	.3128	.0671	.0655	.0978	-.0328	.1177
.60	9.99	3.01	4.98	.4801	.0000	.0241	.4114	.0952	.0687	.0951	-.0327	.1173
.60	15.01	3.01	4.97	.7463	.1140	.0383	.6696	.2027	.0767	.0887	-.0326	.1172
.60	19.20	3.01	4.96	.9634	.2475	.0481	.8805	.3303	.0829	.0828	-.0326	.1171
.60	-.01	2.30	-.02	-.0043	-.0452	-.0018	-.0358	.0251	.0316	.0703	-.0199	.0771
.60	4.03	2.30	-.03	.1540	-.0402	-.0015	.1174	.0279	.0366	.0682	-.0200	.0774
.60	10.01	2.29	-.04	.4391	.0156	.0064	.3958	.0794	.0433	.0638	-.0199	.0771
.60	19.17	2.30	-.15	.9285	.2475	.0249	.8755	.3037	.0530	.0562	-.0200	.0772
.60	.01	3.00	-.06	.0179	-.0782	-.0158	-.0328	.0267	.0508	.1049	-.0324	.1166
.60	2.01	3.00	-.10	.0985	-.0766	-.0169	.0442	.0263	.0543	.1029	-.0324	.1163
.60	3.99	2.99	-.13	.1743	-.0716	-.0158	.1164	.0296	.0579	.1012	-.0324	.1166
.60	6.00	2.99	-.09	.2604	-.0606	-.0108	.1991	.0381	.0612	.0987	-.0323	.1162
.60	7.99	3.00	-.10	.3592	-.0417	-.0097	.2943	.0552	.0649	.0969	-.0324	.1166
.60	10.01	3.01	-.05	.4647	-.0139	-.0074	.3962	.0810	.0685	.0948	-.0326	.1170
.60	14.99	3.00	-.07	.7360	.0931	.0011	.6597	.1814	.0762	.0883	-.0325	.1167
.60	19.13	3.00	-.08	.9590	.2220	.0103	.8762	.3050	.0829	.0830	-.0326	.1173
.60	-.01	4.48	-.02	.0554	-.1512	-.0377	-.0290	.0261	.0844	.1773	-.0532	.1964
.60	4.00	4.47	-.09	.2218	-.1420	-.0385	.1249	.0295	.0969	.1715	-.0534	.1970
.60	9.99	4.49	-.21	.5200	-.0794	-.0335	.4051	.0818	.1149	.1612	-.0537	.1980
.60	19.00	4.50	-.05	1.0234	.1657	-.0165	.8851	.3065	.1384	.1408	-.0536	.1974
.60	3.99	4.50	.01	.2238	-.1433	-.0387	.1260	.0296	.0978	.1729	-.0539	.1986
.60	3.98	5.41	.01	.2594	-.1819	-.0597	.1342	.0335	.1252	.2154	-.0702	.2492
.60	4.01	5.54	.01	.2659	-.1879	-.0631	.1363	.0340	.1296	.2219	-.0727	.2570

TABLE 36.- NOZZLE CHARACTERISTICS: IUM SERN, AR = 1, A/B POWER SETTING, $\delta_V = 30^\circ$

MACH	ALPHA	NPR	CANALP	CLN	C(DN-F)	CMN	CLAN	CDAN
1.20	-.00	6.59	4.98	.0461	-.0053	-.0160	.0106	.0649
1.20	-.00	6.58	4.98	.0451	-.0510	-.0157	.0097	.0191
1.20	2.00	6.58	4.98	.0493	-.0503	-.0164	.0114	.0186
1.20	3.99	6.57	4.94	.0532	-.0515	-.0170	.0130	.0161
1.20	5.99	6.60	4.92	.0590	-.0554	-.0180	.0161	.0112
1.20	8.00	6.60	4.90	.0647	-.0565	-.0190	.0195	.0086
1.20	10.00	6.57	4.98	.0694	-.0543	-.0200	.0222	.0090
1.20	11.90	6.56	4.97	.0739	-.0519	-.0209	.0246	.0098
1.20	-.01	3.80	-.02	.0254	-.0305	-.0091	.0085	.0057
1.20	4.00	6.58	-.05	.0527	-.0399	-.0171	.0125	.0275
1.20	6.00	6.61	-.10	.0586	-.0521	-.0180	.0157	.0144
1.20	8.00	6.60	-.15	.0649	-.0560	-.0191	.0197	.0091
1.20	10.00	6.62	-.03	.0696	-.0544	-.0200	.0221	.0092
1.20	15.00	6.61	-.07	.0812	-.0479	-.0224	.0287	.0106
1.20	16.49	6.58	-.03	.0846	-.0461	-.0230	.0305	.0112
.87	.01	3.90	4.98	.0524	-.0688	-.0171	.0193	.0025
.87	2.00	3.90	4.99	.0556	-.0672	-.0174	.0200	.0030
.87	3.98	3.90	4.98	.0588	-.0653	-.0177	.0208	.0036
.87	5.99	3.90	4.96	.0620	-.0632	-.0180	.0217	.0042
.87	8.00	3.91	4.97	.0655	-.0608	-.0184	.0227	.0051
.87	10.01	3.91	5.00	.0688	-.0584	-.0189	.0239	.0060
.87	14.99	3.92	4.93	.0783	-.0519	-.0205	.0277	.0085
.87	-.01	2.37	-.06	.0362	-.0324	-.0126	.0201	.0030
.87	4.01	2.39	-.06	.0400	-.0295	-.0131	.0211	.0051
.87	10.00	2.40	-.14	.0458	-.0257	-.0141	.0232	.0070
.87	19.06	2.40	-.12	.0577	-.0167	-.0170	.0304	.0119
.87	-.01	3.91	-.03	.0525	-.0685	-.0172	.0193	.0028
.87	2.02	3.90	-.12	.0556	-.0662	-.0175	.0200	.0038
.87	4.01	3.91	-.06	.0585	-.0642	-.0177	.0205	.0046
.87	5.90	3.91	-.05	.0614	-.0623	-.0180	.0211	.0053
.87	8.02	3.91	-.09	.0649	-.0601	-.0184	.0222	.0058
.87	9.99	3.91	-.09	.0682	-.0579	-.0188	.0233	.0064
.87	15.00	3.91	-.13	.0779	-.0516	-.0204	.0274	.0087
.87	19.23	3.91	-.03	.0866	-.0444	-.0223	.0318	.0120
.87	.00	5.41	-.07	.0725	-.0954	-.0238	.0202	.0108
.87	4.00	5.39	-.09	.0835	-.0952	-.0251	.0239	.0073
.87	10.00	5.40	-.07	.0974	-.0859	-.0266	.0274	.0096
.87	19.27	5.40	-.05	.1209	-.0664	-.0306	.0363	.0167
.87	3.98	7.80	-.02	.1143	-.0861	-.0364	.0201	.0698
.60	.01	3.01	4.98	.0727	-.1013	-.0238	.0219	.0041
.60	.01	3.01	4.98	.0729	-.1019	-.0239	.0216	.0040
.60	2.00	3.02	4.97	.0773	-.0992	-.0242	.0225	.0051
.60	3.99	3.02	4.98	.0815	-.0962	-.0245	.0233	.0060
.60	5.98	3.01	4.97	.0854	-.0924	-.0248	.0239	.0072
.60	8.00	3.00	4.97	.0898	-.0897	-.0252	.0241	.0083
.60	9.99	3.01	4.96	.0937	-.0857	-.0255	.0248	.0095
.60	15.01	3.01	4.97	.1036	-.0774	-.0264	.0267	.0115
.60	19.20	3.01	4.96	.1137	-.0681	-.0281	.0306	.0148
.60	-.01	2.30	-.02	.0536	-.0676	-.0179	.0219	.0029
.60	4.03	2.30	-.03	.0600	-.0629	-.0185	.0233	.0054
.60	10.01	2.29	-.04	.0686	-.0553	-.0195	.0251	.0086
.60	19.17	2.30	-.15	.0836	-.0418	-.0219	.0304	.0144
.60	.01	3.00	-.06	.0730	-.1005	-.0240	.0220	.0046
.60	2.01	3.00	-.10	.0770	-.0971	-.0243	.0226	.0060
.60	3.99	2.99	-.13	.0813	-.0942	-.0246	.0232	.0072
.60	6.00	2.99	-.09	.0848	-.0907	-.0248	.0234	.0082
.60	7.99	3.00	-.10	.0889	-.0881	-.0251	.0238	.0090
.60	10.01	3.01	-.05	.0933	-.0850	-.0255	.0246	.0100
.60	14.99	3.00	-.07	.1032	-.0763	-.0265	.0267	.0122
.60	19.13	3.00	-.08	.1127	-.0675	-.0280	.0296	.0156
.60	-.01	4.48	-.02	.1065	-.1739	-.0337	.0218	.0038
.60	4.00	4.47	-.09	.1206	-.1657	-.0345	.0234	.0062
.60	9.99	4.49	-.21	.1412	-.1526	-.0359	.0261	.0089
.60	19.00	4.50	-.05	.1708	-.1258	-.0386	.0321	.0152
.60	3.99	4.50	.01	.1214	-.1670	-.0348	.0234	.0063
.60	3.98	5.41	.01	.1528	-.2060	-.0443	.0273	.0098
.60	4.01	5.54	.01	.1579	-.2120	-.0458	.0280	.0103

TABLE 37.- AERODYNAMIC CHARACTERISTICS: IUM SERN, AR = 4, A/B POWER SETTING, $\delta_V = 0^{\circ}$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
1.20	.02	.76	.04	-.0572	.0506	.0638	-.0572	.0506	0.0000	0.0000	0.0000	0.0000
1.20	.03	.76	.02	-.0548	.0504	.0632	-.0548	.0504	0.0000	0.0000	0.0000	0.0000
1.20	2.05	.78	-.04	.0247	.0490	.0591	.0247	.0490	0.0000	0.0000	0.0000	0.0000
1.20	4.04	.79	-.10	.1082	.0525	.0559	.1082	.0525	0.0000	0.0000	0.0000	0.0000
1.20	6.06	.80	-.17	.2010	.0629	.0504	.2010	.0629	0.0000	0.0000	0.0000	0.0000
1.20	8.06	.81	-.22	.2940	.0810	.0450	.2940	.0810	0.0000	0.0000	0.0000	0.0000
1.20	10.04	.81	-.29	.3895	.1064	.0397	.3895	.1064	0.0000	0.0000	0.0000	0.0000
1.20	15.03	.80	-.39	.6108	.1986	.0280	.6108	.1986	0.0000	0.0000	0.0000	0.0000
1.20	15.92	.79	-.42	.6509	.2202	.0261	.6509	.2202	0.0000	0.0000	0.0000	0.0000
1.20	.04	3.80	.18	-.0517	.0067	.0665	-.0479	.0459	-.0038	.0392	.0047	.0394
1.20	4.02	3.81	.01	.1117	.0089	.0592	.1128	.0485	-.0011	.0396	.0048	.0396
1.20	6.05	3.80	-.06	.2073	.0200	.0539	.2070	.0596	.0003	.0396	.0048	.0396
1.20	10.02	3.82	-.21	.3985	.0636	.0426	.3956	.1035	.0029	.0398	.0049	.0399
1.20	15.66	3.79	-.30	.6509	.1720	.0281	.6439	.2108	.0069	.0388	.0047	.0394
1.20	.02	6.61	-.00	-.0413	-.0344	.0580	-.0392	.0443	-.0021	.0788	.0048	.0788
1.20	2.04	6.62	-.04	.0417	-.0354	.0536	.0410	.0436	.0007	.0789	.0048	.0789
1.20	4.04	6.60	-.06	.1274	-.0307	.0502	.1240	.0479	.0034	.0786	.0048	.0787
1.20	6.03	6.59	-.12	.2227	-.0193	.0449	.2166	.0590	.0061	.0783	.0048	.0786
1.20	8.04	6.61	-.20	.3203	-.0007	.0392	.3113	.0780	.0090	.0787	.0048	.0792
1.20	10.05	6.61	-.28	.4185	.0260	.0339	.4068	.1042	.0117	.0783	.0048	.0791
1.20	15.02	6.60	-.11	.6465	.1219	.0251	.6281	.1987	.0184	.0769	.0048	.0790
1.20	15.37	6.60	-.11	.6612	.1303	.0245	.6424	.2068	.0188	.0764	.0048	.0787
1.20	.02	9.32	.35	-.0282	-.0738	.0530	-.0296	.0435	.0015	.1173	.0032	.1173
1.20	4.03	9.31	.31	.1412	-.0695	.0455	.1315	.0476	.0097	.1171	.0033	.1175
1.20	6.02	9.30	.04	.2387	-.0572	.0395	.2250	.0592	.0137	.1164	.0033	.1172
1.20	10.01	9.30	-.05	.4346	-.0108	.0288	.4128	.1045	.0218	.1153	.0033	.1173
1.20	15.42	9.32	-.14	.6847	.0954	.0170	.6520	.2088	.0328	.1135	.0033	.1181
1.20	4.03	5.39	.03	.1225	-.0134	.0546	.1219	.0482	.0006	.0616	.0055	.0616
1.16	4.05	5.44	.02	.1181	-.0191	.0566	.1173	.0481	.0008	.0672	.0059	.0672
.95	4.04	5.38	.01	.0884	-.0713	.0788	.0874	.0266	.0009	.0979	.0087	.0979
.93	4.03	5.39	.01	.0878	-.0769	.0773	.0868	.0266	.0010	.1035	.0092	.1035
.90	4.03	5.40	.02	.0836	-.0861	.0766	.0825	.0237	.0011	.1098	.0097	.1098
.87	.02	1.04	.11	-.0975	.0238	.0736	-.0975	.0238	0.0000	0.0000	0.0000	0.0000
.87	2.02	1.05	.09	-.0140	.0199	.0699	-.0140	.0199	0.0000	0.0000	0.0000	0.0000
.87	4.04	1.06	.07	.0694	.0217	.0710	.0694	.0217	0.0000	0.0000	0.0000	0.0000
.87	6.02	1.06	.04	.1549	.0297	.0769	.1549	.0297	0.0000	0.0000	0.0000	0.0000
.87	8.05	1.06	-.00	.2552	.0465	.0798	.2552	.0465	0.0000	0.0000	0.0000	0.0000
.87	10.04	1.06	-.05	.3652	.0734	.0797	.3652	.0734	0.0000	0.0000	0.0000	0.0000
.87	15.02	1.05	-.13	.6277	.1751	.0838	.6277	.1751	0.0000	0.0000	0.0000	0.0000
.87	18.08	1.05	-.00	.7792	.2616	.0897	.7792	.2616	0.0000	0.0000	0.0000	0.0000
.87	.02	2.39	.39	-.0946	-.0155	.0740	-.0931	.0229	-.0015	.0384	.0014	.0385
.87	4.04	2.40	.34	.0758	-.0176	.0713	.0746	.0213	.0013	.0389	.0014	.0389
.87	6.02	2.40	.32	.1646	-.0091	.0769	.1620	.0296	.0026	.0387	.0014	.0388
.87	10.02	2.40	-.04	.3742	.0348	.0773	.3689	.0731	.0053	.0384	.0014	.0387
.87	18.19	2.39	-.16	.8054	.2291	.0845	.7948	.2663	.0106	.0371	.0014	.0386
.87	.03	3.90	.13	-.0951	-.0554	.0755	-.0861	.0224	-.0090	.0778	.0106	.0783
.87	2.05	3.90	.11	-.0073	-.0586	.0708	-.0010	.0194	-.0063	.0780	.0106	.0782
.87	4.03	3.89	.09	.0781	-.0561	.0711	.0815	.0216	-.0035	.0778	.0104	.0778
.87	6.03	3.89	.05	.1703	-.0474	.0763	.1711	.0303	-.0008	.0777	.0104	.0777
.87	8.02	3.93	.01	.2714	-.0307	.0790	.2699	.0477	.0015	.0784	.0109	.0784
.87	10.03	3.93	-.03	.3843	-.0028	.0782	.3801	.0755	.0043	.0783	.0109	.0784
.87	15.03	3.90	-.04	.6590	.1022	.0831	.6475	.1798	.0115	.0776	.0105	.0784
.87	16.28	3.91	-.04	.7229	.1365	.0850	.7099	.2136	.0130	.0772	.0107	.0783
.87	.04	5.45	-.02	-.0935	-.0959	.0762	-.0867	.0221	-.0068	.1180	.0103	.1182
.87	4.03	5.41	-.15	.0815	-.0966	.0734	.0803	.0209	.0013	.1175	.0104	.1175
.87	6.02	5.38	-.05	.1723	-.0880	.0793	.1671	.0293	.0052	.1173	.0104	.1174
.87	10.02	5.38	.00	.3916	-.0420	.0819	.3782	.0746	.0134	.1166	.0104	.1174
.87	15.80	5.40	-.07	.7097	.0842	.0866	.6845	.1991	.0252	.1150	.0104	.1177
.87	4.04	7.34	.14	.1077	-.1483	.0610	.0980	.0212	.0098	.1696	.0083	.1699
.80	4.05	5.40	.15	.0874	-.1194	.0702	.0859	.0192	.0014	.1387	.0123	.1387
.60	.03	1.01	.19	-.0829	.0188	.0575	-.0829	.0188	0.0000	0.0000	0.0000	0.0000
.60	2.05	1.02	.18	-.0023	.0171	.0560	-.0023	.0171	0.0000	0.0000	0.0000	0.0000
.60	4.05	1.02	.17	.0727	.0188	.0587	.0727	.0188	0.0000	0.0000	0.0000	0.0000
.60	6.03	1.02	.16	.1513	.0262	.0649	.1513	.0262	0.0000	0.0000	0.0000	0.0000
.60	8.03	1.02	.15	.2417	.0418	.0697	.2417	.0418	0.0000	0.0000	0.0000	0.0000
.60	10.01	1.02	.14	.3406	.0655	.0737	.3406	.0655	0.0000	0.0000	0.0000	0.0000
.60	15.01	1.02	.12	.5923	.1599	.0902	.5923	.1599	0.0000	0.0000	0.0000	0.0000
.60	19.02	1.02	.10	.7930	.2719	.1051	.7930	.2719	0.0000	0.0000	0.0000	0.0000
.60	.04	2.31	.21	-.0802	-.0582	.0599	-.0770	.0187	-.0032	.0769	.0028	.0770
.60	4.01	2.29	.19	.0793	-.0572	.0597	.0772	.0186	.0021	.0758	.0028	.0758
.60	6.03	2.29	.00	.1612	-.0493	.0645	.1565	.0261	.0047	.0753	.0027	.0755
.60	10.04	2.29	-.04	.3632	-.0081	.0715	.3532	.0670	.0100	.0751	.0028	.0756
.60	19.05	2.29	-.11	.8332	.2037	.1015	.8115	.2764	.0217	.0727	.0028	.0759
.60	.02	3.00	-.02	-.0764	-.0942	.0586	-.0728	.0193	-.0035	.1135	.0071	.1136
.60	2.02	3.01	-.03	.0056	-.0970	.0571	.0053	.0175	.0004	.1146	.0072	.1146
.60	4.02	3.01	-.04	.0865	-.0953	.0584	.0821	.0196	.0044	.1149	.0072	.1149
.60	6.01	3.01	-.04	.1676	-.0871	.0640	.1592	.0270	.0084	.1142	.0072	.1145
.60	8.02	3.01	-.05	.2698	-.0698	.0680	.2575	.0436	.0123	.1134	.0072	.1141
.60	10.01	3.00	-.06	.3712	-.0458	.0709	.3537	.0674	.0175	.1131	.0036	.1145
.60	15.01	3.01	-.08	.6389	.0537	.0864	.6128	.1648	.0261	.1111	.0072	.1141
.60	19.03	3.00	-.09	.8520	.1701	.1005	.8182	.2792	.0338	.1091	.0072	.1143
.60	.04	4.49	-.00	-.0972	-.1769	.0796	-.0778	.0181	-.0195	.1950	.0239	.1960
.60	4.02	4.50	-.02	.0706	-.1789	.0790	.0764	.0174	-.0058	.1964	.0239	.1965
.60	6.02	4.50	-.03	.1573	-.1721	.0852	.1563	.0252	.0010	.1973	.0240	.1973
.60	10.04	4.50	-.05	.3695	-.1298	.0921	.3547	.0664	.0148	.1962	.0239	.1968
.60	19.04	4.51	-.09	.8613	.0853	.1214	.8159	.2768	.0454	.1915	.0239	.1968
.60	4.04	4.53	-.03	.0684	-.1823	.0799	.0739	.0172	-.0055	.1995	.0240	.1996
.60	4.04	5.41	-.03	.0926	-.2292	.0685	.0900	.0179	.0026	.2470	.0218	.2470
.60	4.04	5.78	-.03	.0995	-.2493	.0643	.0935	.0177	.0060	.2670	.0209	.2671

TABLE 38.- NOZZLE CHARACTERISTICS: IUM SERN, AR = 4, A/B POWER SETTING, $\delta_v = 0^o$

MACH	ALPHA	NPR	CANALP	CLN	C(DN-F)	CMN	CLAN	CDAN
1.20	.02	.76	.04	-.0128	.0574	.0047	-.0128	.0574
1.20	.03	.76	.02	-.0129	.0002	.0048	-.0129	.0002
1.20	2.05	.78	-.04	-.0100	-.0010	.0039	-.0100	-.0010
1.20	4.04	.79	-.10	-.0070	-.0020	.0029	-.0070	-.0020
1.20	6.06	.80	-.17	-.0033	-.0030	.0018	-.0033	-.0030
1.20	8.06	.81	-.22	.0000	-.0041	.0008	.0000	-.0041
1.20	10.04	.81	-.29	.0034	-.0047	-.0002	.0034	-.0047
1.20	15.03	.80	-.39	.0125	-.0056	-.0028	.0125	-.0056
1.20	15.92	.79	-.42	.0148	-.0055	-.0035	.0148	-.0055
1.20	.04	3.80	.18	-.0171	-.0407	.0066	-.0131	-.0012
1.20	4.02	3.81	.01	-.0085	-.0431	.0048	-.0073	-.0032
1.20	6.05	3.80	-.06	-.0034	-.0437	.0036	-.0037	-.0038
1.20	10.02	3.82	-.21	.0060	-.0442	.0015	.0030	-.0041
1.20	15.66	3.79	-.30	.0224	-.0441	-.0023	.0153	-.0050
1.20	.02	6.61	-.00	-.0068	-.0798	.0030	-.0047	-.0004
1.20	2.04	6.62	-.04	-.0007	-.0805	.0019	-.0014	-.0009
1.20	4.04	6.60	-.06	.0053	-.0809	.0009	.0019	-.0017
1.20	6.03	6.59	-.12	.0113	-.0811	-.0002	.0051	-.0022
1.20	8.04	6.61	-.20	.0173	-.0819	-.0011	.0082	-.0026
1.20	10.05	6.61	-.28	.0230	-.0818	-.0020	.0112	-.0029
1.20	15.02	6.60	-.11	.0408	-.0862	-.0046	.0221	-.0087
1.20	15.37	6.60	-.11	.0419	-.0851	-.0049	.0228	-.0080
1.20	.02	9.32	.35	.0016	-.1123	-.0001	.0001	.0058
1.20	4.03	9.31	.31	.0159	-.1121	-.0022	.0061	.0059
1.20	6.02	9.30	.04	.0227	-.1116	-.0033	.0089	.0057
1.20	10.01	9.30	-.05	.0364	-.1113	-.0051	.0143	.0049
1.20	15.42	9.32	-.14	.0578	-.1099	-.0084	.0246	.0045
1.20	4.03	5.39	.03	-.0004	-.0553	.0019	-.0010	.0067
1.16	4.05	5.44	.02	.0005	-.0590	.0016	-.0003	.0086
.95	4.04	5.38	.01	-.0063	-.0892	.0056	-.0071	.0094
.93	4.03	5.39	.01	-.0060	-.0954	.0056	-.0069	.0089
.87	.02	1.04	.11	.0003	.0060	.0004	.0003	.0060
.87	2.02	1.05	.09	.0020	.0056	-.0002	.0020	.0056
.87	4.04	1.06	.07	.0027	.0055	-.0005	.0027	.0055
.87	6.02	1.06	.04	.0028	.0054	-.0006	.0028	.0054
.87	8.05	1.06	-.00	.0032	.0055	-.0008	.0032	.0055
.87	10.04	1.06	-.05	.0035	.0050	-.0009	.0035	.0050
.87	15.02	1.05	-.13	.0057	.0050	-.0017	.0057	.0050
.87	18.08	1.05	-.00	.0091	.0056	-.0028	.0091	.0056
.87	.02	2.39	.39	-.0033	-.0297	.0017	-.0019	.0089
.87	4.04	2.40	.34	.0013	-.0311	.0008	.0001	.0080
.87	6.02	2.40	.32	.0031	-.0311	.0005	.0005	.0078
.87	10.02	2.40	-.04	.0104	-.0502	.0007	.0051	-.0114
.87	18.19	2.39	-.16	.0256	-.0479	-.0018	.0148	-.0104
.87	.03	3.90	.13	-.0086	-.0865	.0045	.0004	-.0081
.87	2.05	3.90	.11	-.0034	-.0869	.0037	.0030	-.0082
.87	4.02	3.89	.09	.0014	-.0867	.0031	.0049	-.0083
.87	6.03	3.89	.05	.0057	-.0869	.0026	.0064	-.0085
.87	8.02	3.93	.01	.0091	-.0878	.0026	.0075	-.0087
.87	10.03	3.93	-.03	.0135	-.0880	.0022	.0091	-.0090
.87	15.03	3.90	-.04	.0245	-.0866	.0011	.0128	-.0084
.87	16.28	3.91	-.04	.0269	-.0862	.0010	.0137	-.0083
.87	.04	5.45	-.02	-.0116	-.1254	.0060	-.0047	-.0064
.87	4.03	5.41	-.15	-.0009	-.1257	.0054	-.0021	-.0072
.87	6.02	5.38	-.05	.0041	-.1255	.0052	-.0011	-.0073
.87	10.02	5.38	.00	.0136	-.1199	.0044	.0002	-.0024
.87	15.80	5.40	-.07	.0298	-.1168	.0029	.0044	-.0009
.87	4.04	7.34	.14	.0158	-.1682	.0002	.0059	.0027
.80	4.05	5.40	.15	-.0015	-.1375	.0057	-.0029	.0023
.60	.03	1.01	.19	.0013	.0014	.0007	.0013	.0014
.60	2.05	1.02	.18	.0022	.0015	.0004	.0022	.0015
.60	4.05	1.02	.17	.0025	.0018	.0002	.0025	.0018
.60	6.03	1.02	.16	.0033	.0019	-.0000	.0033	.0019
.60	8.03	1.02	.15	.0035	.0020	-.0002	.0035	.0020
.60	10.01	1.02	.14	.0042	.0020	-.0004	.0042	.0020
.60	15.01	1.02	.12	.0065	.0021	-.0012	.0065	.0021
.60	19.02	1.02	.10	.0095	.0027	-.0022	.0095	.0027
.60	.04	2.31	.21	-.0069	-.0706	.0033	-.0037	.0069
.60	4.01	2.29	.19	-.0002	-.0696	.0026	-.0023	.0068
.60	6.03	2.29	.00	.0034	-.0696	.0023	-.0014	.0063
.60	10.04	2.29	-.04	.0104	-.0695	.0015	.0003	.0062
.60	19.05	2.29	-.11	.0282	-.0674	-.0007	.0063	.0059
.60	.02	3.00	-.02	-.0078	-.1060	.0037	-.0043	.0083
.60	2.02	3.01	-.03	-.0030	-.1072	.0034	-.0034	.0082
.60	4.02	3.01	-.04	.0016	-.1074	.0030	-.0029	.0083
.60	6.01	3.01	-.04	.0064	-.1069	.0026	-.0020	.0081
.60	8.02	3.01	-.05	.0112	-.1066	.0023	-.0012	.0077
.60	10.01	3.00	-.06	.0161	-.1067	.0019	-.0015	.0074
.60	15.01	3.01	-.08	.0283	-.1048	.0009	.0020	.0071
.60	19.03	3.00	-.09	.0399	-.1031	-.0004	.0058	.0069
.60	.04	4.49	-.00	-.0340	-.1875	.0144	-.0143	.0090
.60	4.02	4.50	-.02	-.0189	-.1899	.0137	-.0129	.0080
.60	6.02	4.50	-.03	-.0111	-.1915	.0133	-.0120	.0074
.60	10.04	4.50	-.05	.0044	-.1915	.0126	-.0104	.0062
.60	19.04	4.51	-.09	.0414	-.1889	.0104	-.0044	.0041
.60	4.04	4.53	-.03	-.0183	-.1930	.0136	-.0126	.0081
.60	4.03	5.41	-.03	-.0022	-.2402	.0092	-.0048	.0086
.60	4.04	5.78	-.03	.0043	-.2600	.0074	-.0017	.0091

TABLE 39.- AERODYNAMIC CHARACTERISTICS: IUM SERN, AR = 4, A/B POWER SETTING, $\delta_v = 15^o$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
1.20	.02	3.80	.07	-.0283	.0080	.0429	-.0347	.0474	.0064	.0394	-.0031	.0399
1.20	4.03	3.81	.00	.1385	.0124	.0349	.1293	.0513	.0092	.0390	-.0031	.0400
1.20	6.01	3.80	-.04	.2310	.0243	.0288	.2205	.0629	.0105	.0386	-.0031	.0400
1.20	10.01	3.81	-.03	.4232	.0713	.0177	.4101	.1090	.0132	.0378	-.0031	.0400
1.20	15.92	3.81	-.09	.6904	.1911	.0028	.6735	.2271	.0169	.0361	-.0031	.0398
1.20	.01	6.56	.04	-.0081	-.0295	.0289	-.0283	.0479	.0202	.0775	-.0125	.0800
1.20	2.01	6.60	-.05	.0728	-.0291	.0243	.0499	.0474	.0229	.0765	-.0125	.0799
1.20	4.00	6.57	-.14	.1580	-.0237	.0211	.1325	.0520	.0255	.0757	-.0124	.0799
1.20	5.99	6.60	-.23	.2498	-.0119	.0170	.2215	.0634	.0283	.0753	-.0126	.0804
1.20	7.99	6.61	-.31	.3447	.0076	.0126	.3137	.0819	.0309	.0742	-.0126	.0804
1.20	10.00	6.60	-.01	.4431	.0359	.0101	.4097	.1089	.0335	.0730	-.0125	.0803
1.20	15.02	6.62	-.05	.6706	.1339	-.0007	.6307	.2039	.0399	.0699	-.0126	.0805
1.20	15.86	6.61	-.06	.7092	.1553	-.0031	.6685	.2245	.0408	.0692	-.0126	.0803
1.20	-.01	9.32	.10	.0096	-.0669	.0163	-.0245	.0477	.0341	.1146	-.0221	.1195
1.20	4.02	9.30	-.10	.1796	-.0591	.0093	.1377	.0524	.0419	.1114	-.0220	.1190
1.20	6.03	9.27	-.17	.2736	-.0460	.0058	.2278	.0641	.0458	.1100	-.0220	.1192
1.20	9.99	9.32	-.00	.4671	.0027	-.0021	.4135	.1098	.0535	.1071	-.0221	.1197
1.20	15.66	9.30	-.08	.7268	.1194	-.0155	.6630	.2206	.0638	.1011	-.0221	.1196
1.20	4.00	5.40	.11	.1497	-.0081	.0292	.1314	.0518	.0183	.0599	-.0083	.0626
.87	-.01	2.41	.20	-.0500	-.0157	.0405	-.0578	.0228	.0078	.0386	-.0045	.0393
.87	4.01	2.42	.16	.1206	-.0142	.0379	.1101	.0240	.0105	.0382	-.0046	.0396
.87	6.02	2.40	-.03	.2073	-.0042	.0422	.1956	.0331	.0117	.0373	-.0045	.0391
.87	10.02	2.40	-.12	.4211	.0436	.0432	.4068	.0802	.0143	.0366	-.0045	.0393
.87	18.63	2.39	-.14	.8854	.2658	.0420	.8658	.2998	.0196	.0340	-.0045	.0392
.87	.00	3.91	.17	-.0464	-.0555	.0401	-.0592	.0222	.0128	.0777	-.0062	.0787
.87	2.00	3.92	.02	.0386	-.0578	.0356	.0230	.0199	.0156	.0777	-.0062	.0792
.87	4.03	3.92	-.04	.1259	-.0534	.0365	.1076	.0234	.0182	.0768	-.0062	.0789
.87	6.01	3.90	-.10	.2155	-.0430	.0406	.1947	.0329	.0208	.0759	-.0062	.0787
.87	8.04	3.90	-.04	.3213	-.0230	.0425	.2978	.0521	.0235	.0751	-.0062	.0786
.87	10.00	3.90	-.06	.4321	.0061	.0410	.4061	.0803	.0260	.0742	-.0061	.0786
.87	14.99	3.90	-.14	.7162	.1189	.0382	.6837	.1907	.0324	.0718	-.0062	.0788
.87	18.58	3.91	-.19	.9036	.2301	.0362	.8668	.2996	.0368	.0695	-.0062	.0786
.87	.00	5.40	.04	-.0236	-.0930	.0253	-.0504	.0231	.0268	.1162	-.0158	.1192
.87	4.00	5.40	-.03	.1487	-.0893	.0228	.1139	.0246	.0348	.1140	-.0158	.1192
.87	6.00	5.39	-.11	.2413	-.0787	.0275	.2025	.0343	.0388	.1129	-.0157	.1194
.87	10.03	5.41	-.19	.4601	-.0279	.0277	.4133	.0821	.0468	.1100	-.0158	.1195
.87	18.15	5.39	.05	.9112	.1856	.0277	.8495	.2880	.0618	.1023	-.0158	.1195
.87	4.00	7.49	.34	.1928	-.1387	-.0007	.1337	.0288	.0591	.1675	-.0299	.1776
.60	-.00	1.03	.43	-.0527	.0168	.0400	-.0527	.0168	0.0000	0.0000	0.0000	0.0000
.60	.01	2.31	.03	-.0113	-.0560	.0152	-.0263	.0192	.0150	.0752	-.0087	.0767
.60	4.00	2.31	-.04	.1448	-.0517	.0160	.1245	.0229	.0204	.0746	-.0088	.0773
.60	6.01	2.31	-.08	.2263	-.0421	.0213	.2033	.0317	.0230	.0738	-.0088	.0773
.60	9.99	2.31	-.13	.4282	.0044	.0263	.4002	.0762	.0280	.0718	-.0087	.0770
.60	19.01	2.31	.02	.9061	.2314	.0507	.8671	.2981	.0390	.0667	-.0088	.0773
.60	-.00	3.04	.03	-.0044	-.0946	.0105	-.0281	.0198	.0236	.1144	-.0138	.1168
.60	2.03	3.02	.02	.0782	-.0941	.0094	.0502	.0200	.0280	.1142	-.0141	.1176
.60	4.01	3.01	-.01	.1556	-.0889	.0109	.1236	.0237	.0320	.1126	-.0141	.1170
.60	6.02	3.01	-.05	.2395	-.0780	.0156	.2037	.0329	.0358	.1109	-.0141	.1165
.60	8.02	3.01	-.08	.3425	-.0586	.0175	.3026	.0519	.0399	.1105	-.0142	.1174
.60	10.00	3.01	-.11	.4478	-.0309	.0197	.4041	.0781	.0437	.1090	-.0142	.1175
.60	15.03	3.01	-.15	.7210	.0776	.0310	.6679	.1822	.0531	.1046	-.0142	.1172
.60	19.00	3.01	-.03	.9354	.2014	.0424	.8753	.3019	.0601	.1005	-.0142	.1171
.60	.00	4.50	.04	.0049	-.1772	.0077	-.0331	.0186	.0381	.1958	-.0205	.1994
.60	4.01	4.51	-.01	.1731	-.1703	.0081	.1215	.0217	.0516	.1920	-.0205	.1988
.60	6.01	4.49	-.06	.2585	-.1611	.0125	.1998	.0308	.0586	.1919	-.0206	.2007
.60	9.99	4.50	-.12	.4724	-.1110	.0165	.4008	.0755	.0716	.1865	-.0206	.1997
.60	19.01	4.50	-.22	.9780	.1262	.0369	.8775	.3000	.1004	.1738	-.0207	.2008
.60	3.99	4.50	-.14	.1708	-.1702	.0085	.1194	.0218	.0514	.1921	-.0204	.1989
.60	3.99	5.39	-.14	.2068	-.2156	-.0115	.1335	.0248	.0733	.2403	-.0331	.2513
.60	3.99	5.81	-.09	.2245	-.2371	-.0207	.1409	.0261	.0836	.2632	-.0391	.2761

TABLE 40.- NOZZLE CHARACTERISTICS: IUM SERN, AR = 4, A/B POWER SETTING, $\delta_v = 15^o$

MACH	ALPHA	NPR	CANALP	CLN	C(DN-F)	CMN	CLAN	CDAN
0.00	.01	1.00	.02	.0012	-.0006	-.0002	.0012	-.0006
1.20	.02	3.80	.07	.0126	-.0342	-.0045	.0061	.0055
1.20	4.03	3.81	.00	.0215	-.0348	-.0066	.0121	.0045
1.20	6.01	3.80	-.04	.0284	-.0339	-.0087	.0176	.0050
1.20	10.01	3.81	-.03	.0392	-.0326	-.0115	.0257	.0055
1.20	15.92	3.81	-.09	.0568	-.0287	-.0161	.0394	.0076
1.20	.01	6.56	.04	.0324	-.0714	-.0113	.0120	.0066
1.20	2.01	6.60	-.05	.0379	-.0710	-.0123	.0148	.0061
1.20	4.00	6.57	-.14	.0433	-.0705	-.0133	.0175	.0058
1.20	5.99	6.60	-.23	.0489	-.0703	-.0142	.0202	.0055
1.20	7.99	6.61	-.31	.0543	-.0697	-.0151	.0229	.0051
1.20	10.00	6.60	-.01	.0592	-.0687	-.0158	.0253	.0048
1.20	15.02	6.62	-.05	.0745	-.0652	-.0187	.0341	.0053
1.20	15.86	6.61	-.06	.0776	-.0641	-.0194	.0362	.0057
1.20	-.01	9.32	.10	.0487	-.1081	-.0170	.0143	.0073
1.20	4.02	9.30	-.10	.0623	-.1055	-.0190	.0199	.0067
1.20	6.03	9.27	-.17	.0688	-.1045	-.0199	.0225	.0064
1.20	9.99	9.32	-.00	.0824	-.1018	-.0219	.0282	.0061
1.20	15.66	9.30	-.08	.1043	-.0950	-.0256	.0397	.0069
1.20	4.00	5.40	.11	.0337	-.0571	-.0101	.0152	.0033
.87	-.01	2.41	.20	.0267	-.0414	-.0085	.0187	-.0025
.87	4.01	2.42	.16	.0320	-.0399	-.0093	.0212	-.0014
.87	6.02	2.40	-.03	.0344	-.0387	-.0096	.0224	-.0011
.87	10.02	2.40	-.12	.0412	-.0371	-.0110	.0265	-.0002
.87	18.63	2.39	-.14	.0651	-.0271	-.0173	.0449	.0071
.87	.00	3.91	.17	.0268	-.0805	-.0081	.0138	-.0022
.87	2.00	3.92	.02	.0310	-.0801	-.0086	.0152	-.0018
.87	4.03	3.92	-.04	.0352	-.0788	-.0091	.0167	-.0013
.87	6.01	3.90	-.10	.0395	-.0774	-.0097	.0184	-.0008
.87	8.04	3.90	-.04	.0448	-.0760	-.0105	.0210	-.0003
.87	10.00	3.90	-.06	.0504	-.0746	-.0116	.0240	.0002
.87	14.99	3.90	-.14	.0664	-.0689	-.0149	.0334	.0034
.87	18.58	3.91	-.19	.0806	-.0628	-.0182	.0431	.0072
.87	.00	5.40	.04	.0433	-.1169	-.0138	.0161	.0002
.87	4.00	5.40	-.03	.0532	-.1140	-.0144	.0179	.0009
.87	6.00	5.39	-.11	.0586	-.1129	-.0149	.0193	.0010
.87	10.03	5.41	-.19	.0705	-.1096	-.0162	.0231	.0012
.87	18.15	5.39	.05	.1026	-.0958	-.0220	.0400	.0073
.87	4.00	7.49	.34	.0847	-.1641	-.0245	.0250	.0047
.60	-.00	1.03	.43	.0167	-.0099	-.0042	.0167	-.0099
.60	.01	2.31	.03	.0372	-.0789	-.0119	.0219	-.0031
.60	4.00	2.31	-.04	.0444	-.0763	-.0125	.0237	-.0011
.60	6.01	2.31	-.08	.0481	-.0748	-.0129	.0248	-.0004
.60	9.99	2.31	-.13	.0568	-.0710	-.0142	.0284	.0014
.60	19.01	2.31	.02	.0797	-.0597	-.0184	.0401	.0075
.60	-.00	3.04	.03	.0455	-.1161	-.0148	.0215	-.0008
.60	2.03	3.02	.02	.0506	-.1145	-.0151	.0221	.0006
.60	4.01	3.01	-.01	.0551	-.1121	-.0154	.0226	.0014
.60	6.02	3.01	-.05	.0601	-.1100	-.0157	.0238	.0018
.60	8.02	3.01	-.08	.0658	-.1082	-.0164	.0254	.0031
.60	10.00	3.01	-.11	.0714	-.1059	-.0171	.0271	.0040
.60	15.03	3.01	-.15	.0860	-.0991	-.0190	.0322	.0062
.60	19.00	3.01	-.03	.0995	-.0918	-.0213	.0386	.0094
.60	.00	4.50	.04	.0495	-.1980	-.0153	.0111	-.0006
.60	4.01	4.51	-.01	.0647	-.1929	-.0159	.0126	.0007
.60	6.01	4.49	-.06	.0728	-.1922	-.0163	.0136	.0013
.60	9.99	4.50	-.12	.0894	-.1861	-.0176	.0171	.0018
.60	19.01	4.50	-.22	.1308	-.1695	-.0219	.0294	.0056
.60	3.99	4.50	-.14	.0645	-.1931	-.0158	.0126	.0006
.60	3.99	5.39	-.14	.0925	-.2385	-.0247	.0185	.0038
.60	3.99	5.81	-.09	.1054	-.2600	-.0287	.0210	.0053

TABLE 41.- AERODYNAMIC CHARACTERISTICS: IUM SERN, AR = 4, A/B POWER SETTING, $\delta_v = 30^o$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
1.20	.03	6.79	.00	.0191	-.0154	.0016	-.0209	.0531	.0400	.0685	-.0336	.0808
1.20	2.06	6.77	.00	.1017	-.0137	-.0010	.0594	.0531	.0422	.0668	-.0335	.0825
1.20	4.03	6.71	-.03	.1864	-.0066	-.0034	.1423	.0582	.0441	.0648	-.0332	.0843
1.20	6.05	6.76	-.04	.2785	.0055	-.0077	.2318	.0691	.0467	.0636	-.0335	.0876
1.20	8.03	6.78	-.04	.3701	.0246	-.0103	.3210	.0868	.0491	.0622	-.0336	.0900
1.20	10.01	6.76	-.02	.4648	.0526	-.0130	.4137	.1129	.0511	.0604	-.0335	.0924
1.20	10.01	6.76	-.02	.4651	.0527	-.0127	.4140	.1130	.0510	.0603	-.0335	.0922
1.20	15.04	6.78	-.02	.6947	.1526	-.0258	.6384	.2083	.0562	.0557	-.0336	.1022
1.20	.12	9.75	.01	.0543	-.0510	-.0188	-.0096	.0520	.0638	.1030	-.0539	.1241
1.20	.12	9.92	.01	.0556	-.0521	-.0196	-.0090	.0518	.0646	.1039	-.0545	.1248
1.20	2.20	9.94	-.01	.1432	-.0499	-.0232	.0745	.0522	.0687	.1021	-.0548	.1273
1.20	3.24	9.94	-.04	.1881	-.0461	-.0244	.1178	.0543	.0703	.1004	-.0546	.1279
1.20	6.21	9.95	-.04	.3225	-.0275	-.0297	.2469	.0694	.0756	.0969	-.0548	.1319
1.20	7.18	9.95	.05	.3685	-.0176	-.0305	.2913	.0781	.0773	.0957	-.0548	.1330
1.20	11.46	9.99	.03	.5739	.0472	-.0400	.4898	.1368	.0942	.0896	-.0548	.1395
1.20	16.61	10.08	.02	.8182	.1676	-.0608	.7255	.2500	.0927	.0824	-.0554	.1504
1.20	.13	6.73	4.99	.0390	-.0121	.0232	-.0006	.0556	.0396	.0677	-.0332	.0792
1.20	2.29	6.76	4.99	.1286	-.0091	.0218	.0862	.0574	.0425	.0666	-.0335	.0822
1.20	4.31	6.72	5.01	.2157	.0009	.0223	.1712	.0656	.0445	.0647	-.0333	.0839
1.20	6.34	6.73	4.98	.3116	.0176	.0199	.2650	.0807	.0468	.0632	-.0333	.0875
1.20	6.34	6.74	4.99	.3104	.0174	.0197	.2634	.0807	.0470	.0634	-.0334	.0870
1.20	8.37	6.75	5.02	.4094	.0428	.0165	.3601	.1044	.0492	.0616	-.0334	.0897
1.20	11.57	6.77	5.02	.5556	.0946	.0103	.5028	.1536	.0528	.0590	-.0336	.0950
1.20	.13	10.06	5.01	.0728	-.0518	.0006	.0071	.0536	.0657	.1055	-.0554	.1257
1.20	2.26	10.08	5.01	.1617	-.0479	-.0014	.0918	.0556	.0699	.1035	-.0557	.1285
1.20	4.27	10.10	5.00	.2513	-.0374	-.0011	.1778	.0635	.0735	.1010	-.0556	.1309
.87	.00	4.00	-.01	.0021	-.0431	.0012	-.0326	.0270	.0347	.0701	-.0286	.0842
.87	2.12	3.99	-.01	.0953	-.0424	-.0016	.0581	.0262	.0372	.0686	-.0285	.0849
.87	4.12	3.98	.02	.1815	-.0359	-.0011	.1423	.0309	.0392	.0668	-.0283	.0858
.87	6.12	3.99	.05	.2742	-.0243	.0015	.2322	.0417	.0419	.0660	-.0286	.0878
.87	8.15	3.99	-.01	.3828	-.0023	.0007	.3384	.0623	.0444	.0646	-.0287	.0901
.87	11.36	4.00	-.04	.5720	.0542	-.0037	.5238	.1165	.0482	.0623	-.0289	.0948
.87	16.58	4.00	.02	.8659	.1955	-.0070	.8124	.2530	.0535	.0575	-.0288	.1046
.87	19.13	4.00	.03	.9985	.2827	-.0100	.9424	.3379	.0561	.0552	-.0288	.1102
.87	.03	5.83	-.03	.0417	-.0803	-.0319	-.0205	.0298	.0622	.1101	-.0521	.1328
.87	2.03	5.76	0.00	.1321	-.0763	-.0344	.0674	.0297	.0647	.1060	-.0510	.1323
.87	4.04	5.77	-.05	.2221	-.0691	-.0358	.1535	.0351	.0687	.1042	-.0513	.1349
.87	6.04	5.78	0.00	.3168	-.0562	-.0349	.2442	.0459	.0726	.1021	-.0515	.1380
.87	8.04	5.76	-.05	.4256	-.0330	-.0363	.3496	.0664	.0760	.0994	-.0514	.1398
.87	10.04	5.76	-.02	.5442	.0012	-.0368	.4650	.0977	.0792	.0964	-.0513	.1419
.87	15.05	5.80	-.12	.8353	.1262	-.0442	.7482	.2150	.0871	.0888	-.0512	.1519
.87	19.41	5.76	-.01	1.0776	.2802	-.0475	.9838	.3624	.0938	.0822	-.0512	.1614
.87	.02	4.25	5.00	.0145	-.0460	.0170	-.0240	.0296	.0385	.0756	-.0319	.0906
.87	2.03	4.20	5.02	.1049	-.0431	.0178	.0646	.0298	.0403	.0729	-.0312	.0909
.87	4.04	4.19	5.00	.1981	-.0343	.0223	.1554	.0371	.0427	.0715	-.0311	.0923
.87	6.03	4.20	4.97	.2904	-.0193	.0276	.2450	.0509	.0454	.0702	-.0313	.0945
.87	8.01	4.21	4.95	.3956	.0051	.0291	.3478	.0736	.0478	.0685	-.0312	.0967
.87	10.03	4.21	4.99	.5125	.0405	.0278	.4622	.1075	.0503	.0669	-.0313	.0997
.87	15.03	4.22	5.00	.7900	.1639	.0243	.7338	.2265	.0562	.0625	-.0315	.1089
.87	.01	5.79	5.05	.0589	-.0764	-.0129	-.0027	.0328	.0616	.1092	-.0516	.1342
.87	2.02	5.79	5.03	.1519	-.0718	-.0130	.0870	.0346	.0649	.1064	-.0512	.1347
.87	4.04	5.79	5.01	.2466	-.0614	-.0098	.1777	.0429	.0688	.1043	-.0514	.1371
.87	6.05	5.77	4.97	.3445	-.0445	-.0058	.2717	.0579	.0728	.1024	-.0517	.1399
.87	8.04	5.79	4.98	.4516	-.0176	-.0059	.3754	.0819	.0762	.0995	-.0516	.1423
.87	8.04	5.82	4.98	.4500	-.0176	-.0049	.3737	.0819	.0752	.0995	-.0516	.1418
.87	10.04	5.79	5.00	.5666	.0190	-.0066	.4867	.1161	.0799	.0972	-.0517	.1448
.87	14.63	5.80	4.92	.8252	.1346	-.0109	.7376	.2252	.0876	.0906	-.0519	.1545
.60	.13	3.06	.08	.0514	-.0793	-.0295	.0066	.0251	.0448	.1044	-.0386	.1268
.60	2.14	3.04	.02	.1370	-.0738	-.0316	.0898	.0274	.0473	.1012	-.0383	.1274
.60	4.14	3.04	-.01	.2204	-.0665	-.0307	.1697	.0327	.0506	.0992	-.0382	.1284
.60	6.10	3.06	-.03	.3054	-.0552	-.0276	.2508	.0432	.0546	.0984	-.0385	.1307
.60	8.06	3.08	.00	.4044	-.0345	-.0263	.3459	.0623	.0585	.0968	-.0385	.1325
.60	10.03	3.07	-.02	.5152	-.0031	-.0255	.4536	.0914	.0615	.0946	-.0385	.1339
.60	14.98	3.06	-.05	.7933	.1112	-.0185	.7241	.1999	.0692	.0887	-.0384	.1378
.60	19.09	3.07	-.08	1.0250	.2474	-.0103	.9493	.3311	.0757	.0837	-.0384	.1431
.60	.19	4.56	-.00	.1163	-.1456	-.0676	.0247	.0280	.0916	.1736	-.0757	.2084
.60	2.20	4.58	-.04	.2044	-.1402	-.0694	.1064	.0304	.0980	.1706	-.0759	.2103
.60	4.17	4.56	-.01	.2867	-.1304	-.0682	.1835	.0360	.1032	.1664	-.0755	.2106
.60	6.15	4.57	-.04	.3773	-.1144	-.0653	.2689	.0476	.1084	.1620	-.0751	.2113
.60	8.10	4.57	-.05	.4842	-.0903	-.0657	.3697	.0687	.1145	.1589	-.0756	.2145
.60	10.09	4.56	.02	.5962	-.0575	-.0644	.4758	.0980	.1204	.1555	-.0758	.2169
.60	15.06	4.58	-.02	.8865	.0671	-.0589	.7528	.2118	.1336	.1447	-.0760	.2212
.60	19.08	4.57	-.04	1.1157	.2070	-.0523	.9719	.3424	.1439	.1354	-.0762	.2262
.60	.04	3.07	5.02	.0595	-.0762	-.0108	.0153	.0275	.0442	.1037	-.0384	.1265
.60	.04	3.09	5.02	.0600	-.0774	-.0108	.0152	.0274	.0448	.1048	-.0387	.1276
.60	2.09	3.05	4.99	.1483	-.0706	-.0107	.1009	.0308	.0474	.1014	-.0383	.1273
.60	4.02	3.04	4.99	.2333	-.0598	-.0059	.1830	.0393	.0503	.0991	-.0381	.1279
.60	5.99	3.06	5.00	.3193	-.0463	.0007	.2649	.0521	.0544	.0984	-.0384	.1299
.60	7.97	3.05	4.98	.4230	-.0204	.0038	.3657	.0753	.0573	.0957	-.0381	.1314
.60	9.98	3.05	5.03	.5320	.0129	.0062	.4711	.1069	.0608	.0940	-.0383	.1337
.60	14.71	3.07	5.00	.7930	.1249	.0165	.7238	.2144	.0692	.0895	-.0386	.1389
.60	19.14	3.06	5.00	1.0286	.2727	.0284	.9529	.3564	.0757	.0837	-.0385	.1438
.60	.10	4.58	5.00	.1266	-.1435	-.0493	.0350	.0304	.0916	.1739	-.0758	.2084
.60	2.14	4.57	5.04	.2158	-.1358	-.0480	.1186	.0340	.0972	.1697	-.0754	.2087
.60	4.07	4.57	5.02	.3020	-.1242	-.0435	.1990	.0424	.1031	.1666	-.0756	.2104
.60	6.05	4.57	5.00	.3929	-.1061	-.0380	.2842	.0567	.1086	.1628	-.0755	.2128
.60	8.03	4.58	4.99	.4990	-.0791	-.0358	.3844	.0803	.1145	.1594	-.0757	.2160
.60	10.04	4.58	4.98	.6109	-.0418	-.0340	.4912	.1130	.1197	.1549	-.0755	.2164
.60	14.97	4.58	4.99	.8898	.0850	-.0243	.7565	.2298	.1333	.1449	-.0760	.2209
.60	19.13	4.59	5.01	1.1216	.2338	-.0146	.9777	.3687	.1439	.1349	-.0762	.2284
.60	.12	4.61	14.97	.1644	-.1236	-.0009	.0727	.0499	.0917	.1735	-.0759	.2085
.60	2.22	4.60	15.01	.2593	-.1091	.0055	.1610	.0617	.0983	.1708	-.0761	.2102
.60	4.18	4.59	15.00	.3477	-.0890	.0140	.2439	.0780	.1038	.1670	-.0760	.2107
.60	6.15	4.58	14.98	.4345	-.0649	.0229	.3251	.0984	.1094	.1633	-.0759	.2118
.60	8.16	4.56	14.97	.5350	-.0326	.0268	.4199	.1269	.1150	.1595	-.0758	.2143
.60	11.27	4.56	15.02	.6989	.0350	.0326	.5763	.1870	.1226	.1520	-.0753	.2155
.60	16.37	4.58	14.98	.9663	.1858	.0390	.8298	.3270	.1365	.1412	-.0758	.2224
.60	19.06	4.55	15.00	1.1142	.2893	.0350	.9720	.4233	.1421	.1341	-.0752	.2247

TABLE 42.- AERODYNAMIC CHARACTERISTICS: IOM SERN, AR = 4, A/B POWER SETTING, $\delta_V = 0^o$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
1.20	.04	.85	.02	-.1207	.0469	.0755	-.1207	.0469	0.0000	0.0000	0.0000	0.0000
1.20	2.06	.85	-.00	-.0410	.0421	.0716	-.0410	.0421	0.0000	0.0000	0.0000	0.0000
1.20	4.05	.85	-.04	.0400	.0422	.0690	.0400	.0422	0.0000	0.0000	0.0000	0.0000
1.20	6.04	.85	-.03	.1321	.0496	.0673	.1321	.0496	0.0000	0.0000	0.0000	0.0000
1.20	8.04	.85	-.06	.2294	.0646	.0624	.2294	.0646	0.0000	0.0000	0.0000	0.0000
1.20	10.04	.84	-.10	.3303	.0874	.0565	.3303	.0874	0.0000	0.0000	0.0000	0.0000
1.20	14.77	.74	-.06	.5464	.1691	.0514	.5464	.1691	0.0000	0.0000	0.0000	0.0000
1.20	.04	3.96	.00	-.1167	.0014	.0755	-.1141	.0429	-.0025	.0416	.0020	.0416
1.20	4.05	3.95	-.12	.0467	-.0025	.0695	.0463	.0391	.0005	.0416	.0019	.0416
1.20	10.04	3.95	-.10	.3391	.0432	.0568	.3343	.0845	.0048	.0413	.0020	.0416
1.20	14.76	3.98	-.08	.5639	.1249	.0471	.5558	.1660	.0081	.0411	.0021	.0419
1.20	.02	6.89	-.02	-.1008	-.0412	.0628	-.1037	.0406	.0029	.0818	-.0036	.0818
1.20	2.03	6.89	-.07	-.0200	-.0450	.0597	-.0259	.0369	.0058	.0819	-.0036	.0821
1.20	4.03	6.91	-.11	.0651	-.0442	.0572	.0563	.0378	.0088	.0820	-.0037	.0825
1.20	6.04	6.89	.01	.1615	-.0349	.0560	.1500	.0461	.0115	.0810	-.0036	.0818
1.20	8.02	6.89	-.02	.2598	-.0192	.0509	.2454	.0615	.0143	.0807	-.0036	.0819
1.20	10.05	6.91	-.06	.3616	.0045	.0448	.3443	.0848	.0173	.0803	-.0037	.0822
1.20	14.79	6.94	-.14	.5876	.0880	.0339	.5637	.1666	.0239	.0786	-.0037	.0822
1.20	.02	9.71	-.06	-.0887	-.0817	.0526	-.0984	.0386	.0097	.1204	-.0104	.1207
1.20	4.05	9.73	-.01	.0803	-.0831	.0478	.0621	.0363	.0182	.1194	-.0104	.1208
1.20	10.05	9.75	-.12	.3775	-.0345	.0345	.3467	.0831	.0308	.1176	-.0105	.1216
1.20	14.57	9.73	-.05	.6000	.0474	.0239	.5602	.1620	.0398	.1146	-.0104	.1213
1.20	4.03	5.63	-.03	.0586	-.0256	.0630	.0542	.0387	.0044	.0643	-.0006	.0644
1.16	4.04	5.69	-.06	.0562	-.0304	.0641	.0512	.0392	.0050	.0697	-.0008	.0698
.95	4.03	5.65	-.07	.0405	-.0756	.0671	.0333	.0274	.0072	.1030	-.0010	.1033
.92	4.03	5.65	-.07	.0357	-.0871	.0676	.0280	.0219	.0076	.1091	-.0011	.1093
.90	4.05	5.64	-.07	.0415	-.0955	.0620	.0335	.0191	.0080	.1146	-.0011	.1149
.87	.03	1.03	-.03	-.1431	.0244	.0700	-.1431	.0244	0.0000	0.0000	0.0000	0.0000
.87	2.05	1.04	-.04	-.0580	.0190	.0660	-.0580	.0190	0.0000	0.0000	0.0000	0.0000
.87	4.04	1.04	-.06	.0246	.0187	.0653	.0246	.0187	0.0000	0.0000	0.0000	0.0000
.87	6.07	1.04	-.11	.1127	.0248	.0704	.1127	.0248	0.0000	0.0000	0.0000	0.0000
.87	8.03	1.04	-.08	.2042	.0383	.0752	.2042	.0383	0.0000	0.0000	0.0000	0.0000
.87	10.07	1.04	-.05	.3073	.0613	.0789	.3073	.0613	0.0000	0.0000	0.0000	0.0000
.87	15.04	1.02	-.02	.5593	.1565	.0887	.5593	.1565	0.0000	0.0000	0.0000	0.0000
.87	17.10	1.00	-.04	.6562	.2086	.0930	.6562	.2086	0.0000	0.0000	0.0000	0.0000
.87	.03	2.49	0.00	-.1403	-.0173	.0659	-.1402	.0236	-.0001	.0409	-.0001	.0409
.87	4.04	2.49	-.09	.0319	-.0224	.0606	.0291	.0183	.0028	.0407	-.0001	.0408
.84	10.03	2.44	-.08	.3372	.0223	.0737	.3300	.0642	.0072	.0419	-.0000	.0425
.87	.02	4.04	.22	-.1434	-.0573	.0720	-.1378	.0241	-.0056	.0814	.0044	.0816
.87	2.04	4.08	.21	-.0567	-.0633	.0685	-.0537	.0191	-.0030	.0824	.0047	.0824
.87	4.06	4.09	.19	.0307	-.0634	.0682	.0309	.0191	-.0002	.0824	.0048	.0824
.87	6.06	4.08	-.06	.1189	-.0576	.0704	.1161	.0249	.0028	.0825	.0047	.0825
.87	8.03	4.08	-.06	.2201	-.0429	.0732	.2144	.0394	.0057	.0823	.0047	.0825
.87	10.03	4.07	-.08	.3253	-.0197	.0749	.3167	.0623	.0086	.0820	.0046	.0825
.87	15.03	4.07	-.04	.5862	.0769	.0873	.5705	.1579	.0157	.0810	.0047	.0825
.87	17.12	4.07	-.07	.6920	.1309	.0896	.6733	.2114	.0186	.0805	.0047	.0826
.87	.04	5.64	-.01	-.1335	-.1009	.0618	-.1335	.0222	-.0000	.1231	-.0012	.1231
.87	4.03	5.65	-.11	.0448	-.1053	.0562	.0362	.0176	.0086	.1230	-.0013	.1233
.87	10.04	5.65	-.03	.3480	-.0590	.0657	.3266	.0624	.0214	.1214	-.0012	.1233
.87	17.88	5.66	-.06	.7630	.1184	.0734	.7250	.2363	.0380	.1178	-.0013	.1238
.87	4.03	7.41	-.05	.0740	-.1516	.0394	.0541	.0169	.0199	.1685	-.0093	.1696
.80	4.03	5.66	-.04	.0550	-.1296	.0510	.0447	.0168	.0103	.1464	-.0015	.1468
.60	.06	1.02	.03	-.1214	.0200	.0547	-.1214	.0200	0.0000	0.0000	0.0000	0.0000
.60	2.04	1.02	.02	-.0454	.0165	.0543	-.0454	.0165	0.0000	0.0000	0.0000	0.0000
.60	4.05	1.02	.02	.0302	.0169	.0560	.0302	.0169	0.0000	0.0000	0.0000	0.0000
.60	6.04	1.02	.01	.1064	.0215	.0617	.1064	.0215	0.0000	0.0000	0.0000	0.0000
.60	8.05	1.02	0.00	.1954	.0339	.0675	.1954	.0339	0.0000	0.0000	0.0000	0.0000
.60	10.04	1.02	-.00	.2889	.0545	.0726	.2889	.0545	0.0000	0.0000	0.0000	0.0000
.60	15.04	1.01	-.01	.5295	.1395	.0925	.5295	.1395	0.0000	0.0000	0.0000	0.0000
.60	19.01	1.00	-.03	.7164	.2402	.1112	.7164	.2402	0.0000	0.0000	0.0000	0.0000
.60	.02	2.40	.02	-.1181	-.0612	.0499	-.1177	.0198	-.0004	.0809	.0001	.0809
.60	4.06	2.39	-.00	.0463	-.0631	.0497	.0411	.0169	.0052	.0800	.0001	.0801
.60	10.05	2.39	-.10	.3190	-.0229	.0623	.3056	.0561	.0135	.0789	.0001	.0801
.60	19.05	2.38	-.08	.7704	.1714	.0966	.7447	.2477	.0258	.0763	.0001	.0806
.60	.05	3.15	.02	-.1096	-.1013	.0463	-.1118	.0204	.0022	.1217	-.0025	.1217
.60	2.05	3.14	.01	-.0274	-.1037	.0445	-.0338	.0171	.0064	.1208	-.0024	.1209
.60	4.06	3.13	.00	.0552	-.1031	.0457	.0446	.0181	.0106	.1211	-.0024	.1216
.60	6.03	3.14	-.00	.1358	-.0969	.0507	.1211	.0230	.0147	.1199	-.0024	.1208
.60	8.04	3.13	-.02	.2295	-.0839	.0552	.2105	.0357	.0189	.1196	-.0024	.1211
.60	10.05	3.13	-.02	.3335	-.0614	.0586	.3103	.0578	.0232	.1192	-.0024	.1214
.60	15.04	3.13	-.05	.5863	.0283	.0765	.5530	.1446	.0334	.1163	-.0024	.1210
.60	19.06	3.13	-.06	.7946	.1377	.0907	.7532	.2514	.0414	.1137	-.0024	.1210
.60	.06	4.69	.03	-.1260	-.1872	.0589	-.1169	.0190	-.0091	.2062	.0065	.2064
.60	4.05	4.70	.01	.0449	-.1912	.0581	.0395	.0161	.0054	.2074	.0065	.2075
.60	10.06	4.70	-.02	.3343	-.1488	.0713	.3073	.0559	.0269	.2047	.0065	.2065
.60	19.03	4.69	-.07	.8107	.0498	.1018	.7519	.2488	.0588	.1991	.0066	.2076
.60	4.04	5.67	-.02	.0725	-.2438	.0409	.0542	.0150	.0183	.2588	-.0028	.2595
.60	4.04	5.85	-.02	.0776	-.2536	.0375	.0568	.0154	.0208	.2691	-.0046	.2699

TABLE 43.- AERODYNAMIC CHARACTERISTICS: IOM SERN, AR = 4, A/B POWER SETTING, $\delta_v = 15^o$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
1.20	.01	6.91	.03	-.0652	-.0346	.0327	-.0881	.0480	.0229	.0827	-.0183	.0858
1.20	2.03	6.90	-.01	.0158	-.0372	.0294	-.0100	.0447	.0258	.0819	-.0184	.0859
1.20	4.02	6.92	-.05	.0965	-.0347	.0284	.0679	.0462	.0286	.0809	-.0184	.0858
1.20	6.01	6.90	-.11	.1900	-.0257	.0267	.1586	.0542	.0314	.0799	-.0183	.0858
1.20	8.01	6.91	-.10	.2871	-.0094	.0229	.2529	.0695	.0342	.0789	-.0184	.0860
1.20	10.01	6.91	-.13	.3889	.0151	.0169	.3519	.0928	.0370	.0777	-.0184	.0860
1.20	14.77	6.90	-.10	.6172	.1020	.0049	.5738	.1765	.0433	.0744	-.0184	.0861
1.20	.03	9.72	-.04	-.0436	-.0731	.0154	-.0799	.0491	.0363	.1222	-.0293	.1274
1.20	4.04	9.73	-.12	.1217	-.0711	.0109	.0769	.0482	.0447	.1193	-.0293	.1274
1.20	10.00	9.74	-.09	.4172	-.0184	-.0028	.3602	.0958	.0570	.1141	-.0293	.1276
1.20	14.22	9.68	-.11	.6242	.0589	-.0134	.5590	.1686	.0652	.1097	-.0293	.1276
1.20	4.01	5.62	.01	.0848	-.0190	.0392	.0635	.0446	.0213	.0636	-.0134	.0671
1.20	.02	3.97	-.01	-.0897	.0037	.0540	-.0987	.0454	.0090	.0418	-.0070	.0427
1.20	4.01	3.98	-.17	.0717	.0021	.0473	.0598	.0431	.0119	.0410	-.0070	.0427
1.20	10.02	3.97	-.10	.3656	.0525	.0316	.3495	.0919	.0161	.0395	-.0070	.0426
1.20	14.65	3.98	-.09	.5827	.1351	.0216	.5635	.1731	.0192	.0381	-.0070	.0427
.87	.02	2.51	-.08	-.0831	-.0159	.0265	-.0935	.0246	.0104	.0405	-.0081	.0418
.87	4.02	2.50	-.07	.0909	-.0164	.0213	.0777	.0232	.0132	.0396	-.0081	.0417
.87	10.03	2.50	-.06	.3868	.0351	.0258	.3696	.0730	.0172	.0379	-.0080	.0416
.87	17.88	2.50	-.11	.7886	.2193	.0307	.7664	.2546	.0222	.0352	-.0081	.0416
.87	.00	4.08	.01	-.0796	-.0573	.0237	-.0977	.0249	.0181	.0822	-.0141	.0842
.87	2.02	4.07	-.02	.0109	-.0603	.0184	-.0100	.0213	.0209	.0816	-.0141	.0843
.87	4.02	4.07	-.06	.0972	-.0578	.0172	.0734	.0231	.0238	.0809	-.0141	.0844
.87	5.99	4.07	-.09	.1880	-.0492	.0203	.1614	.0309	.0266	.0801	-.0141	.0844
.87	8.03	4.08	-.13	.2911	-.0314	.0211	.2616	.0476	.0294	.0790	-.0141	.0843
.87	10.01	4.08	-.04	.4004	-.0050	.0197	.3682	.0731	.0322	.0780	-.0141	.0844
.87	15.00	4.08	-.12	.6662	.1005	.0223	.6274	.1753	.0388	.0748	-.0141	.0843
.87	17.88	4.08	-.05	.8116	.1825	.0238	.7692	.2552	.0424	.0727	-.0141	.0842
.87	-.00	5.65	-.01	-.0416	-.0965	-.0032	-.0738	.0275	.0322	.1240	-.0256	.1281
.87	4.02	5.65	-.04	.1358	-.0944	-.0079	.0949	.0270	.0408	.1214	-.0257	.1281
.87	10.03	5.63	-.02	.4381	-.0387	-.0028	.3847	.0780	.0534	.1168	-.0257	.1284
.87	18.10	5.67	-.10	.8733	.1633	-.0044	.8037	.2718	.0696	.1085	-.0258	.1289
.87	4.02	7.48	-.00	.1795	-.1366	-.0371	.1188	.0322	.0607	.1689	-.0392	.1795
.60	.02	2.38	-.05	-.0387	-.0581	.0008	-.0590	.0206	.0203	.0786	-.0157	.0812
.60	4.01	2.38	-.10	.1216	-.0552	.0006	.0959	.0217	.0257	.0770	-.0157	.0811
.60	10.01	2.38	-.09	.3997	-.0053	.0105	.3662	.0683	.0335	.0737	-.0157	.0809
.60	19.07	2.38	-.12	.8658	.2093	.0339	.8210	.2770	.0448	.0676	-.0157	.0811
.60	-.02	3.12	-.01	-.0242	-.0963	-.0106	-.0543	.0234	.0301	.1198	-.0238	.1235
.60	2.02	3.12	-.01	.0609	-.0965	-.0126	.0265	.0222	.0344	.1186	-.0238	.1235
.60	4.03	3.11	-.02	.1411	-.0921	-.0114	.1026	.0252	.0385	.1173	-.0238	.1235
.60	6.01	3.12	-.03	.2239	-.0833	-.0060	.1819	.0324	.0420	.1157	-.0234	.1231
.60	8.01	3.12	-.02	.3191	-.0660	-.0034	.2727	.0479	.0464	.1139	-.0237	.1230
.60	9.99	3.12	-.02	.4239	-.0399	-.0020	.3739	.0725	.0499	.1124	-.0233	.1230
.60	15.00	3.11	-.04	.6888	.0600	.0080	.6286	.1680	.0602	.1080	-.0238	.1237
.60	19.07	3.12	-.07	.9026	.1808	.0190	.8351	.2841	.0676	.1032	-.0238	.1234
.60	.01	4.68	.02	-.0051	-.1823	-.0223	-.0544	.0239	.0493	.2061	-.0388	.2119
.60	4.01	4.69	.00	.1643	-.1783	-.0237	.1003	.0252	.0640	.2035	-.0391	.2133
.60	10.01	4.69	-.00	.4588	-.1230	-.0155	.3737	.0728	.0850	.1958	-.0392	.2135
.60	19.09	4.70	-.06	.9559	.1070	.0025	.8411	.2869	.1149	.1799	-.0392	.2135
.60	4.03	5.62	.00	.2085	-.2240	-.0511	.1233	.0298	.0852	.2538	-.0535	.2677

TABLE 44.- AERODYNAMIC CHARACTERISTICS: IOM SERN, AR = 4, A/B POWER SETTING, $\delta_v = 30^o$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
1.20	.05	3.96	.02	-.0706	.0109	.0400	-.0896	.0482	.0189	.0373	-.0146	.0418
1.20	4.04	3.96	-.05	.0918	.0113	.0339	.0702	.0473	.0216	.0360	-.0147	.0419
1.20	6.05	3.97	-.11	.1831	.0205	.0316	.1603	.0557	.0229	.0352	-.0147	.0420
1.20	10.04	3.98	-.04	.3845	.0639	.0171	.3592	.0976	.0253	.0337	-.0148	.0421
1.20	14.51	3.97	-.07	.5947	.1453	.0047	.5669	.1767	.0278	.0315	-.0147	.0420
1.20	.02	6.92	.00	-.0309	-.0190	.0084	-.0748	.0548	.0440	.0738	-.0345	.0859
1.20	2.04	6.91	-.06	.0494	-.0208	.0054	.0028	.0515	.0465	.0723	-.0345	.0859
1.20	4.05	6.92	-.03	.1353	-.0172	.0041	.0862	.0533	.0490	.0706	-.0345	.0859
1.20	6.07	6.90	-.05	.2264	-.0069	.0025	.1750	.0618	.0514	.0687	-.0345	.0858
1.20	8.05	6.90	-.09	.3228	.0106	-.0027	.2691	.0775	.0537	.0669	-.0345	.0858
1.20	10.04	6.93	-.08	.4248	.0367	-.0099	.3687	.1017	.0561	.0650	-.0345	.0859
1.20	14.39	6.89	-.01	.6327	.1191	-.0230	.5719	.1798	.0609	.0606	-.0345	.0859
1.20	.03	9.75	-.02	.0056	-.0526	-.0192	-.0626	.0566	.0682	.1092	-.0538	.1288
1.20	4.04	9.72	-.03	.1731	-.0468	-.0248	.0977	.0571	.0754	.1038	-.0536	.1283
1.20	6.04	9.75	-.07	.2655	-.0352	-.0269	.1865	.0659	.0790	.1011	-.0536	.1283
1.20	10.05	9.72	-.00	.4665	.0114	-.0388	.3807	.1068	.0858	.0953	-.0536	.1283
1.20	14.62	9.72	-.03	.6902	.1006	-.0565	.5969	.1890	.0933	.0884	-.0537	.1285
1.20	4.04	5.62	-.00	.1155	-.0051	.0195	.0785	.0504	.0370	.0555	-.0259	.0667
.87	.02	2.49	-.03	-.0326	-.0063	-.0094	-.0522	.0289	.0196	.0351	-.0152	.0402
.87	4.04	2.49	-.06	.1449	-.0026	-.0168	.1229	.0311	.0220	.0337	-.0152	.0403
.87	6.03	2.49	-.09	.2339	.0079	-.0146	.2106	.0410	.0233	.0330	-.0153	.0404
.87	10.02	2.50	-.07	.4437	.0560	-.0160	.4182	.0874	.0255	.0314	-.0152	.0404
.87	18.29	2.50	-.21	.8665	.2617	-.0110	.8367	.2891	.0298	.0274	-.0152	.0405
.87	.03	4.09	.04	-.0015	-.0438	-.0261	-.0396	.0302	.0381	.0740	-.0295	.0833
.87	2.02	4.07	.03	.0840	-.0429	-.0306	.0437	.0293	.0403	.0721	-.0292	.0826
.87	4.03	4.06	.01	.1737	-.0375	-.0324	.1309	.0333	.0428	.0708	-.0292	.0828
.87	6.03	4.06	-.03	.2647	-.0257	-.0304	.2194	.0435	.0453	.0692	-.0292	.0827
.87	8.04	4.06	-.08	.3663	-.0052	-.0311	.3187	.0622	.0476	.0674	-.0292	.0825
.87	10.03	4.06	-.13	.4771	.0244	-.0338	.4271	.0904	.0500	.0659	-.0292	.0827
.87	15.04	4.07	-.23	.7409	.1360	-.0329	.6851	.1976	.0558	.0616	-.0294	.0831
.87	18.27	4.08	-.29	.9089	.2366	-.0341	.8497	.2948	.0591	.0582	-.0294	.0830
.87	.03	5.64	-.04	.0488	-.0747	-.0622	-.0146	.0362	.0634	.1109	-.0496	.1277
.87	4.03	5.63	-.16	.2241	-.0636	-.0687	.1535	.0422	.0706	.1058	-.0493	.1272
.87	6.02	5.63	-.09	.3166	-.0505	-.0664	.2421	.0530	.0744	.1035	-.0495	.1275
.87	10.02	5.63	-.15	.5312	.0030	-.0703	.4496	.1012	.0816	.0983	-.0495	.1277
.87	18.07	5.63	-.19	.9724	.2224	-.0739	.8781	.3079	.0943	.0856	-.0494	.1273
.87	4.05	7.95	.04	.2929	-.1140	-.1115	.1808	.0440	.1121	.1580	-.0793	.1937
.80	4.03	5.64	.04	.2511	-.0822	-.0811	.1675	.0431	.0837	.1253	-.0585	.1507
.60	.04	2.38	.04	.0379	-.0411	-.0434	-.0018	.0277	.0397	.0688	-.0308	.0795
.60	4.02	2.38	-.02	.2010	-.0325	-.0471	.1567	.0334	.0444	.0659	-.0307	.0794
.60	10.02	2.38	-.11	.4814	.0271	-.0413	.4306	.0878	.0508	.0607	-.0306	.0792
.60	19.13	2.37	-.19	.9610	.2631	-.0273	.9010	.3151	.0601	.0520	-.0308	.0795
.60	.04	3.13	-.07	.0493	-.0804	-.0519	-.0006	.0277	.0499	.1081	-.0387	.1191
.60	2.04	3.13	-.08	.1329	-.0778	-.0549	.0792	.0288	.0537	.1065	-.0387	.1193
.60	4.05	3.12	-.09	.2123	-.0706	-.0534	.1550	.0335	.0573	.1041	-.0386	.1188
.60	6.03	3.13	-.10	.2952	-.0595	-.0492	.2342	.0429	.0610	.1023	-.0387	.1191
.60	8.05	3.13	-.10	.3933	-.0395	-.0472	.3287	.0607	.0646	.1003	-.0388	.1193
.60	10.02	3.13	-.10	.4974	-.0096	-.0470	.4297	.0878	.0677	.0974	-.0386	.1186
.60	15.03	3.12	-.12	.7696	.1000	-.0422	.6933	.1915	.0762	.0915	-.0387	.1191
.60	19.09	3.12	-.13	.9842	.2293	-.0331	.9016	.3152	.0826	.0859	-.0388	.1192
.60	19.10	2.38	-.13	.9538	.2607	-.0235	.8941	.3125	.0597	.0518	-.0306	.0791
.60	.01	4.70	.04	.1283	-.1530	-.1048	.0276	.0328	.1007	.1857	-.0784	.2113
.60	4.03	4.70	.03	.2961	-.1362	-.1065	.1826	.0421	.1135	.1783	-.0784	.2114
.60	6.04	4.70	.02	.3846	-.1202	-.1030	.2649	.0540	.1197	.1742	-.0785	.2114
.60	10.03	4.69	.00	.5927	-.0635	-.1025	.4609	.1023	.1318	.1659	-.0786	.2119
.60	19.07	4.70	-.04	1.0918	.1931	-.0939	.9353	.3364	.1565	.1433	-.0787	.2122
.60	4.04	5.64	.01	.3512	-.1787	-.1406	.2018	.0449	.1494	.2236	-.1043	.2689

TABLE 45.- AERODYNAMIC CHARACTERISTICS: IUA AXISYMMETRIC NOZZLE, DRY POWER SETTING, $\delta_v = 0^o$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
1.20	-.00	.83	.02	-.0654	.0437	.0634	-.0654	.0437	0.0000	0.0000	0.0000	0.0000
1.20	2.01	.85	-.00	.0147	.0418	.0582	.0147	.0418	0.0000	0.0000	0.0000	0.0000
1.20	4.01	.87	-.10	.1012	.0448	.0532	.1012	.0448	0.0000	0.0000	0.0000	0.0000
1.20	6.00	.87	-.05	.1944	.0549	.0487	.1944	.0549	0.0000	0.0000	0.0000	0.0000
1.20	8.00	.86	-.08	.2904	.0731	.0414	.2904	.0731	0.0000	0.0000	0.0000	0.0000
1.20	10.03	.85	-.04	.3915	.0997	.0340	.3915	.0997	0.0000	0.0000	0.0000	0.0000
1.20	15.01	.77	-.02	.6207	.1945	.0157	.6207	.1945	0.0000	0.0000	0.0000	0.0000
1.20	15.26	.77	-.03	.6329	.2005	.0147	.6329	.2005	0.0000	0.0000	0.0000	0.0000
1.20	-.00	3.83	-.03	-.0639	.0022	.0679	-.0619	.0400	-.0020	.0378	.0044	.0379
1.20	4.03	3.81	-.07	.1065	.0043	.0579	.1058	.0421	.0007	.0379	.0044	.0379
1.20	6.03	3.81	-.12	.2020	.0147	.0525	.2000	.0526	.0020	.0379	.0044	.0379
1.20	10.00	3.82	-.04	.3989	.0593	.0388	.3943	.0970	.0046	.0377	.0044	.0379
1.20	15.16	3.82	-.03	.6385	.1575	.0200	.6305	.1946	.0080	.0371	.0044	.0380
1.20	-.01	6.61	.00	-.0636	-.0378	.0719	-.0600	.0389	-.0036	.0767	.0088	.0768
1.20	2.01	6.61	-.07	.0205	-.0393	.0664	.0214	.0374	-.0009	.0767	.0088	.0767
1.20	4.02	6.61	-.08	.1076	-.0357	.0623	.1059	.0410	.0017	.0767	.0088	.0767
1.20	6.01	6.60	-.01	.2052	-.0247	.0576	.2008	.0517	.0044	.0765	.0088	.0766
1.20	8.01	6.61	-.02	.3027	-.0062	.0507	.2956	.0702	.0071	.0764	.0088	.0767
1.20	9.99	6.62	-.06	.4049	.0200	.0430	.3951	.0961	.0097	.0761	.0088	.0767
1.20	15.01	6.62	-.03	.6420	.1157	.0243	.6256	.1908	.0164	.0752	.0088	.0769
1.20	15.10	6.63	-.03	.6489	.1186	.0237	.6324	.1937	.0165	.0751	.0088	.0769
1.20	.02	9.32	.04	-.0621	-.0763	.0762	-.0569	.0382	-.0052	.1145	.0131	.1146
1.20	4.00	9.33	-.01	.1097	-.0739	.0663	.1070	.0405	.0027	.1143	.0131	.1143
1.20	6.03	9.35	-.08	.2107	-.0628	.0610	.2039	.0515	.0068	.1143	.0131	.1145
1.20	10.01	9.34	.01	.4109	-.0177	.0473	.3961	.0960	.0147	.1136	.0131	.1146
1.20	15.23	9.35	-.07	.6586	.0813	.0277	.6336	.1938	.0250	.1125	.0132	.1153
1.20	4.01	5.39	-.01	.1083	-.0182	.0609	.1070	.0415	.0013	.0597	.0068	.0597
.87	.02	1.06	.03	-.0998	.0196	.0630	-.0998	.0196	0.0000	0.0000	0.0000	0.0000
.87	2.02	1.06	.02	-.0157	.0160	.0592	-.0157	.0160	0.0000	0.0000	0.0000	0.0000
.87	4.02	1.06	.00	.0676	.0184	.0607	.0676	.0184	0.0000	0.0000	0.0000	0.0000
.87	6.03	1.06	-.03	.1544	.0260	.0669	.1544	.0260	0.0000	0.0000	0.0000	0.0000
.87	8.03	1.06	-.07	.2536	.0426	.0694	.2536	.0426	0.0000	0.0000	0.0000	0.0000
.87	10.01	1.06	.01	.3682	.0705	.0692	.3682	.0705	0.0000	0.0000	0.0000	0.0000
.87	15.00	1.06	-.06	.6432	.1748	.0658	.6432	.1748	0.0000	0.0000	0.0000	0.0000
.87	17.96	1.05	-.10	.8030	.2619	.0649	.8030	.2619	0.0000	0.0000	0.0000	0.0000
.87	.01	2.44	.12	-.0954	-.0056	.0644	-.0945	.0189	-.0009	.0244	.0027	.0245
.87	4.02	2.43	-.07	.0721	-.0065	.0620	.0713	.0179	.0008	.0244	.0027	.0244
.87	6.03	2.41	-.19	.1595	.0017	.0681	.1578	.0258	.0017	.0241	.0026	.0241
.87	10.01	2.43	-.07	.3732	.0460	.0706	.3698	.0702	.0034	.0242	.0027	.0245
.87	17.96	2.44	-.06	.8111	.2383	.0668	.8044	.2619	.0067	.0236	.0027	.0246
.87	-.01	3.94	.04	-.0968	-.0299	.0671	-.0942	.0186	-.0026	.0484	.0057	.0485
.87	2.02	4.03	-.02	-.0095	-.0346	.0641	-.0086	.0155	-.0009	.0501	.0059	.0501
.87	4.02	4.04	-.08	.0737	-.0325	.0660	.0729	.0177	.0008	.0502	.0059	.0502
.87	6.03	4.05	-.18	.1621	-.0243	.0720	.1596	.0257	.0026	.0500	.0059	.0501
.87	8.05	4.04	.01	.2651	-.0068	.0757	.2607	.0432	.0044	.0500	.0059	.0502
.87	10.01	4.04	-.01	.3773	.0206	.0748	.3712	.0702	.0060	.0497	.0059	.0501
.87	15.02	4.04	-.10	.6615	.1273	.0714	.6512	.1763	.0104	.0490	.0059	.0501
.87	17.91	4.04	-.03	.8142	.2118	.0712	.8014	.2603	.0128	.0484	.0059	.0501
.87	.02	5.43	.11	-.0962	-.0546	.0702	-.0919	.0180	-.0043	.0727	.0086	.0728
.87	4.02	5.44	.07	.0751	-.0554	.0695	.0743	.0174	.0008	.0727	.0086	.0727
.87	6.02	5.44	.03	.1652	-.0469	.0758	.1618	.0258	.0034	.0727	.0086	.0728
.87	10.01	5.43	-.05	.3804	-.0025	.0768	.3720	.0698	.0084	.0723	.0086	.0728
.87	17.93	5.45	-.06	.8233	.1910	.0726	.8051	.2614	.0183	.0704	.0086	.0727
.87	4.02	11.33	.02	.0807	-.1505	.0794	.0799	.0166	.0008	.1671	.0197	.1671
.80	4.03	5.43	.02	.0778	-.0693	.0668	.0768	.0164	.0010	.0857	.0101	.0857
.60	.01	1.02	.07	-.0797	.0163	.0499	-.0797	.0163	0.0000	0.0000	0.0000	0.0000
.60	2.01	1.02	.06	-.0015	.0145	.0496	-.0015	.0145	0.0000	0.0000	0.0000	0.0000
.60	4.04	1.02	.06	.0735	.0160	.0519	.0735	.0160	0.0000	0.0000	0.0000	0.0000
.60	6.02	1.02	.04	.1507	.0233	.0582	.1507	.0233	0.0000	0.0000	0.0000	0.0000
.60	8.02	1.02	.03	.2441	.0390	.0630	.2441	.0390	0.0000	0.0000	0.0000	0.0000
.60	10.02	1.02	.02	.3451	.0629	.0658	.3451	.0629	0.0000	0.0000	0.0000	0.0000
.60	15.03	1.02	.01	.6084	.1602	.0768	.6084	.1602	0.0000	0.0000	0.0000	0.0000
.60	19.14	1.02	-.00	.8176	.2764	.0881	.8176	.2764	0.0000	0.0000	0.0000	0.0000
.60	.00	2.32	.09	-.0829	-.0314	.0548	-.0814	.0162	-.0016	.0476	.0051	.0477
.60	4.04	2.32	.08	.0748	-.0319	.0566	.0730	.0161	.0018	.0480	.0051	.0480
.60	6.02	2.32	.07	.1528	-.0245	.0627	.1493	.0232	.0035	.0477	.0051	.0478
.60	10.02	2.32	.05	.3536	.0157	.0698	.3468	.0632	.0068	.0475	.0051	.0479
.60	19.17	2.33	-.01	.8352	.2323	.0916	.8210	.2779	.0142	.0456	.0051	.0477
.60	.01	3.04	.08	-.0847	-.0557	.0579	-.0814	.0157	-.0032	.0713	.0085	.0714
.60	2.02	3.04	.00	-.0030	-.0580	.0570	-.0022	.0139	-.0008	.0719	.0086	.0719
.60	4.01	3.04	-.02	.0727	-.0562	.0589	.0710	.0157	.0018	.0719	.0086	.0719
.60	6.00	3.04	-.08	.1532	-.0489	.0650	.1490	.0226	.0042	.0716	.0085	.0717
.60	8.02	3.01	-.08	.2518	-.0319	.0696	.2451	.0387	.0067	.0706	.0084	.0709
.60	10.02	3.02	-.09	.3539	-.0082	.0716	.3447	.0623	.0092	.0705	.0084	.0711
.60	15.00	3.02	-.02	.6236	.0899	.0835	.6083	.1593	.0153	.0695	.0084	.0711
.60	19.19	3.02	-.03	.8459	.2113	.0948	.8256	.2795	.0203	.0682	.0084	.0712
.60	.02	4.53	.07	-.0862	-.1057	.0635	-.0795	.0157	-.0067	.1214	.0143	.1216
.60	4.02	4.53	.01	.0748	-.1060	.0648	.0731	.0155	.0017	.1215	.0143	.1215
.60	6.01	4.53	-.04	.1575	-.0994	.0709	.1515	.0226	.0060	.1220	.0144	.1221
.60	10.02	4.53	-.01	.3635	-.0584	.0782	.3490	.0630	.0145	.1214	.0144	.1222
.60	19.18	4.52	-.04	.8670	.1649	.1004	.8334	.2814	.0336	.1174	.0144	.1222
.60	4.01	5.43	.04	.0783	-.1372	.0691	.0766	.0156	.0017	.1529	.0180	.1529

TABLE 46.- AERODYNAMIC CHARACTERISTICS: IUA AXISYMMETRIC NOZZLE, PART A/B POWER SETTING, $\delta_v = 0^{\circ}$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
.87	-.00	1.02	-.02	-.0975	.0198	.0626	-.0975	.0198	0.0000	0.0000	0.0000	0.0000
.87	2.00	1.02	.00	-.0130	.0168	.0597	-.0130	.0168	0.0000	0.0000	0.0000	0.0000
.87	4.01	1.03	-.01	.0690	.0186	.0614	.0690	.0186	0.0000	0.0000	0.0000	0.0000
.87	6.00	1.03	-.04	.1546	.0265	.0679	.1546	.0265	0.0000	0.0000	0.0000	0.0000
.87	7.98	1.03	-.08	.2535	.0428	.0705	.2535	.0428	0.0000	0.0000	0.0000	0.0000
.87	9.97	1.03	-.12	.3642	.0697	.0696	.3642	.0697	0.0000	0.0000	0.0000	0.0000
.87	15.00	1.01	-.11	.6457	.1763	.0670	.6457	.1763	0.0000	0.0000	0.0000	0.0000
.87	18.00	1.01	-.03	.8001	.2631	.0665	.8001	.2631	0.0000	0.0000	0.0000	0.0000
.87	.00	2.42	-.02	-.0939	-.0111	.0646	-.0923	.0195	-.0016	.0306	.0034	.0306
.87	3.98	2.41	-.11	.0717	-.0120	.0633	.0712	.0185	.0005	.0305	.0034	.0305
.87	6.01	2.41	-.08	.1614	-.0036	.0706	.1598	.0269	.0016	.0305	.0034	.0305
.87	9.99	2.42	-.15	.3717	.0401	.0720	.3679	.0705	.0037	.0303	.0034	.0306
.87	18.20	2.41	-.09	.8215	.2402	.0691	.8134	.2697	.0080	.0295	.0034	.0306
.87	.01	3.92	-.05	-.0940	-.0431	.0674	-.0907	.0192	-.0033	.0623	.0068	.0624
.87	2.00	3.91	-.08	-.0075	-.0458	.0641	-.0063	.0164	-.0011	.0623	.0068	.0623
.87	4.01	3.92	-.14	.0756	-.0437	.0662	.0746	.0185	.0010	.0622	.0068	.0622
.87	6.01	3.92	-.08	.1639	-.0351	.0736	.1607	.0269	.0032	.0620	.0068	.0621
.87	7.97	3.92	-.07	.2619	-.0189	.0761	.2566	.0433	.0054	.0622	.0068	.0624
.87	10.00	3.92	-.06	.3772	.0092	.0757	.3697	.0711	.0075	.0618	.0068	.0623
.87	15.00	3.92	-.14	.6611	.1157	.0730	.6481	.1767	.0129	.0610	.0068	.0624
.87	17.87	3.92	-.04	.8129	.1990	.0722	.7969	.2593	.0159	.0603	.0068	.0623
.87	.01	5.43	-.01	-.0941	-.0754	.0711	-.0891	.0185	-.0050	.0940	.0102	.0941
.87	4.00	5.44	-.05	.0765	-.0757	.0703	.0749	.0182	.0015	.0939	.0102	.0939
.87	5.99	5.44	-.08	.1652	-.0671	.0770	.1605	.0264	.0048	.0935	.0102	.0936
.87	10.01	5.43	-.02	.3848	-.0218	.0789	.3735	.0714	.0114	.0932	.0102	.0939
.87	17.63	5.43	-.07	.8135	.1627	.0749	.7899	.2536	.0236	.0909	.0102	.0939
.87	4.00	9.07	-.03	.0812	-.1529	.0785	.0785	.0170	.0027	.1699	.0184	.1699
.80	4.01	5.43	-.03	.0804	-.0943	.0689	.0786	.0171	.0018	.1115	.0121	.1115
.60	-.01	1.00	-.03	-.0784	.0169	.0493	-.0784	.0169	0.0000	0.0000	0.0000	0.0000
.60	2.01	1.01	-.03	-.0012	.0147	.0487	-.0012	.0147	0.0000	0.0000	0.0000	0.0000
.60	3.99	1.01	-.06	.0715	.0165	.0509	.0715	.0165	0.0000	0.0000	0.0000	0.0000
.60	6.00	1.01	-.13	.1518	.0235	.0574	.1518	.0235	0.0000	0.0000	0.0000	0.0000
.60	7.99	1.01	-.07	.2430	.0393	.0625	.2430	.0393	0.0000	0.0000	0.0000	0.0000
.60	9.99	1.01	-.05	.3411	.0628	.0653	.3411	.0628	0.0000	0.0000	0.0000	0.0000
.60	15.01	1.00	-.06	.6071	.1604	.0773	.6071	.1604	0.0000	0.0000	0.0000	0.0000
.60	19.18	1.00	-.07	.8177	.2780	.0883	.8177	.2780	0.0000	0.0000	0.0000	0.0000
.60	-.01	2.31	-.03	-.0817	-.0426	.0557	-.0785	.0172	-.0031	.0598	.0066	.0599
.60	4.00	2.31	-.08	.0731	-.0431	.0572	.0720	.0171	.0011	.0601	.0067	.0602
.60	6.00	2.32	-.14	.1543	-.0356	.0635	.1512	.0243	.0032	.0599	.0067	.0600
.60	10.00	2.30	-.11	.3551	.0057	.0712	.3479	.0646	.0072	.0589	.0066	.0594
.60	19.19	2.32	-.07	.8407	.2228	.0936	.8239	.2805	.0168	.0577	.0067	.0601
.60	-.01	3.01	.09	-.0836	-.0723	.0594	-.0788	.0182	-.0048	.0906	.0100	.0907
.60	2.00	3.02	-.05	-.0024	-.0747	.0580	-.0008	.0161	-.0016	.0908	.0100	.0909
.60	3.99	3.01	-.08	.0756	-.0730	.0603	.0741	.0178	.0015	.0908	.0100	.0908
.60	6.01	3.01	-.11	.1558	-.0661	.0665	.1510	.0247	.0047	.0908	.0100	.0910
.60	8.01	3.02	-.11	.2552	-.0495	.0710	.2473	.0411	.0079	.0906	.0100	.0910
.60	10.00	3.02	-.12	.3568	-.0261	.0736	.3457	.0647	.0111	.0909	.0101	.0915
.60	15.01	3.02	-.05	.6305	.0733	.0857	.6115	.1627	.0190	.0894	.0101	.0914
.60	19.20	3.02	-.05	.8506	.1939	.0963	.8252	.2818	.0255	.0879	.0101	.0915
.60	.00	4.53	-.05	-.0847	-.1404	.0658	-.0762	.0173	-.0084	.1577	.0172	.1579
.60	4.01	4.54	-.05	.0788	-.1415	.0682	.0762	.0171	.0026	.1586	.0173	.1586
.60	6.00	4.54	-.06	.1602	-.1339	.0742	.1520	.0243	.0081	.1582	.0173	.1584
.60	10.00	4.53	-.06	.3681	-.0929	.0812	.3490	.0642	.0192	.1571	.0173	.1583
.60	19.20	4.54	-.05	.8705	.1301	.1026	.8267	.2814	.0438	.1513	.0172	.1575
.60	4.01	5.43	0.00	.0804	-.1807	.0729	.0772	.0166	.0033	.1973	.0215	.1973

TABLE 47.- AERODYNAMIC CHARACTERISTICS: IUA AXISYMMETRIC NOZZLE, A/B POWER SETTING, $\delta_v = 0^o$

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
.87	.02	.98	-.03	-.0968	.0204	.0598	-.0968	.0204	0.0000	0.0000	0.0000	0.0000
.87	1.99	.99	-.03	-.0130	.0171	.0566	-.0130	.0171	0.0000	0.0000	0.0000	0.0000
.87	3.99	.99	-.07	.0701	.0190	.0581	.0701	.0190	0.0000	0.0000	0.0000	0.0000
.87	6.02	.99	-.10	.1561	.0266	.0642	.1561	.0266	0.0000	0.0000	0.0000	0.0000
.87	8.01	.99	-.14	.2543	.0432	.0670	.2543	.0432	0.0000	0.0000	0.0000	0.0000
.87	9.99	.99	-.17	.3665	.0702	.0655	.3665	.0702	0.0000	0.0000	0.0000	0.0000
.87	15.00	.98	-.30	.6468	.1753	.0619	.6468	.1753	0.0000	0.0000	0.0000	0.0000
.87	18.52	.96	-.37	.8375	.2812	.0599	.8375	.2812	0.0000	0.0000	0.0000	0.0000
.87	-.01	2.42	-.07	-.0937	-.0176	.0628	-.0916	.0192	-.0022	.0367	.0043	.0368
.87	4.02	2.40	-.12	.0741	-.0182	.0621	.0737	.0183	.0004	.0365	.0043	.0365
.87	5.98	2.40	-.15	.1592	-.0107	.0675	.1575	.0259	.0017	.0365	.0043	.0366
.87	10.00	2.41	-.05	.3759	.0342	.0701	.3717	.0705	.0042	.0363	.0043	.0366
.87	18.24	2.41	-.21	.8336	.2369	.0646	.8242	.2722	.0094	.0353	.0043	.0366
.87	-.00	3.92	.08	-.0935	-.0566	.0675	-.0896	.0183	-.0039	.0749	.0086	.0750
.87	2.00	3.90	.07	-.0064	-.0590	.0646	-.0051	.0156	-.0013	.0746	.0086	.0746
.87	3.99	3.91	.04	.0757	-.0571	.0667	.0744	.0177	.0013	.0748	.0086	.0748
.87	6.01	3.91	-.01	.1659	-.0485	.0730	.1620	.0259	.0040	.0745	.0086	.0746
.87	7.98	3.91	-.04	.2662	-.0320	.0756	.2597	.0423	.0065	.0743	.0086	.0745
.87	10.01	3.91	-.08	.3804	-.0043	.0741	.3712	.0698	.0092	.0741	.0086	.0747
.87	15.01	3.91	-.08	.6678	.1029	.0714	.6522	.1760	.0156	.0731	.0086	.0747
.87	18.20	3.92	-.05	.8404	.1982	.0696	.8208	.2702	.0196	.0720	.0086	.0746
.87	-.01	5.42	-.03	-.0943	-.0971	.0710	-.0887	.0176	-.0056	.1147	.0132	.1148
.87	4.01	5.43	-.05	.0782	-.0973	.0708	.0758	.0172	.0024	.1145	.0131	.1146
.87	5.98	5.43	-.08	.1676	-.0891	.0769	.1612	.0255	.0064	.1146	.0132	.1148
.87	10.00	5.43	-.10	.3872	-.0445	.0779	.3728	.0695	.0144	.1140	.0132	.1149
.87	17.81	5.41	-.27	.8365	.1476	.0726	.8068	.2585	.0297	.1109	.0132	.1148
.87	4.01	7.38	-.06	.0816	-.1497	.0761	.0778	.0167	.0039	.1664	.0191	.1665
.60	-.01	.99	-.05	-.0774	.0168	.0479	-.0774	.0168	0.0000	0.0000	0.0000	0.0000
.60	1.99	.99	-.06	-.0012	.0148	.0476	-.0012	.0148	0.0000	0.0000	0.0000	0.0000
.60	4.00	.99	-.06	.0741	.0168	.0497	.0741	.0168	0.0000	0.0000	0.0000	0.0000
.60	6.02	.99	-.06	.1540	.0241	.0559	.1540	.0241	0.0000	0.0000	0.0000	0.0000
.60	8.04	.99	-.06	.2475	.0402	.0600	.2475	.0402	0.0000	0.0000	0.0000	0.0000
.60	10.03	.99	-.06	.3466	.0637	.0624	.3466	.0637	0.0000	0.0000	0.0000	0.0000
.60	15.01	.99	-.07	.6071	.1598	.0735	.6071	.1598	0.0000	0.0000	0.0000	0.0000
.60	19.15	.98	-.07	.8190	.2769	.0845	.8190	.2769	0.0000	0.0000	0.0000	0.0000
.60	.01	2.33	-.05	-.0821	-.0552	.0566	-.0777	.0173	-.0043	.0725	.0086	.0727
.60	3.99	2.30	-.07	.0742	-.0542	.0579	.0735	.0169	.0007	.0711	.0084	.0711
.60	6.02	2.30	-.08	.1546	-.0473	.0639	.1514	.0238	.0032	.0711	.0084	.0711
.60	10.01	2.30	-.10	.3566	-.0069	.0699	.3485	.0638	.0081	.0706	.0084	.0711
.60	19.18	2.30	-.08	.8486	.2128	.0916	.8294	.2812	.0193	.0685	.0084	.0711
.60	.02	2.98	.08	-.0835	-.0891	.0602	-.0777	.0177	-.0059	.1068	.0122	.1069
.60	1.99	3.01	.07	-.0018	-.0929	.0598	.0004	.0157	-.0022	.1086	.0124	.1086
.60	4.00	3.01	.06	.0757	-.0911	.0619	.0741	.0174	.0016	.1084	.0123	.1085
.60	6.02	3.01	-.08	.1596	-.0841	.0671	.1542	.0245	.0054	.1086	.0124	.1088
.60	7.99	3.01	-.12	.2555	-.0684	.0709	.2464	.0398	.0092	.1082	.0124	.1086
.60	10.03	3.01	-.14	.3655	-.0428	.0732	.3525	.0649	.0130	.1077	.0123	.1085
.60	15.01	3.01	-.04	.6377	.0554	.0851	.6154	.1620	.0224	.1066	.0124	.1089
.60	19.16	3.01	-.05	.8604	.1766	.0954	.8303	.2814	.0301	.1048	.0124	.1090
.60	.01	4.50	.09	-.0852	-.1748	.0694	-.0757	.0153	-.0095	.1901	.0219	.1904
.60	4.01	4.51	-.11	.0795	-.1747	.0698	.0757	.0151	.0038	.1898	.0218	.1898
.60	5.99	4.51	-.18	.1636	-.1684	.0755	.1532	.0220	.0104	.1904	.0219	.1907
.60	9.97	4.51	-.21	.3711	-.1275	.0815	.3476	.0615	.0235	.1890	.0219	.1904
.60	19.19	4.51	-.08	.8880	.0984	.1035	.8345	.2812	.0535	.1828	.0219	.1904
.60	4.00	5.41	.01	.0819	-.2250	.0760	.0768	.0147	.0051	.2397	.0275	.2398

TABLE 48.- AERODYNAMIC CHARACTERISTICS: IUM WEDGE NOZZLE, AR = 4, DRY POWER SETTING. $\delta_v = 0^o$, REVERSER WITH SIDEWALLS

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
.87	.02	1.23	.13	-.1021	.0295	.0663	-.1040	.0284	.0019	-.0011	-.0012	.0021
.87	3.99	1.21	.06	.0603	.0263	.0643	.0585	.0252	.0018	-.0011	-.0012	.0021
.87	4.02	1.22	.06	.0608	.0264	.0640	.0590	.0254	.0018	-.0011	-.0012	.0021
.87	6.01	1.21	-.02	.1445	.0333	.0693	.1427	.0322	.0018	-.0011	-.0012	.0021
.87	8.00	1.21	-.08	.2303	.0479	.0794	.2286	.0467	.0017	-.0012	-.0012	.0021
.87	9.99	1.23	-.13	.3272	.0717	.0842	.3255	.0704	.0017	-.0014	-.0012	.0021
.87	14.98	1.33	-.24	.6174	.1767	.0754	.6161	.1744	.0013	-.0023	-.0013	.0026
.87	18.97	1.29	-.30	.8122	.2894	.0842	.8110	.2873	.0012	-.0021	-.0013	.0024
.87	.01	3.46	-.03	-.1053	.0477	.0696	-.1112	.0287	.0060	-.0190	-.0053	.0199
.87	2.01	3.45	-.06	-.0242	.0440	.0670	-.0294	.0249	.0053	-.0191	-.0053	.0198
.87	4.02	3.45	-.08	.0560	.0454	.0665	.0514	.0261	.0046	-.0193	-.0053	.0198
.87	6.01	3.45	-.12	.1444	.0531	.0680	.1405	.0337	.0039	-.0194	-.0053	.0198
.87	10.01	3.46	-.20	.3511	.0949	.0694	.3486	.0751	.0026	-.0197	-.0053	.0199
.87	19.45	3.49	-.38	.8396	.3231	.0789	.8403	.3030	-.0007	-.0201	-.0053	.0201
.87	.00	6.01	-.08	-.1056	.0692	.0676	-.1153	.0296	.0097	-.0396	-.0075	.0408
.87	2.01	6.01	-.10	-.0272	.0657	.0668	-.0355	.0258	.0083	-.0399	-.0074	.0408
.87	4.00	6.02	-.13	.0503	.0674	.0680	.0434	.0272	.0069	-.0402	-.0074	.0407
.87	6.03	6.03	-.16	.1362	.0754	.0691	.1308	.0350	.0054	-.0404	-.0074	.0407
.87	8.00	6.01	-.20	.2324	.0913	.0703	.2283	.0508	.0041	-.0405	-.0074	.0407
.87	10.01	6.01	-.23	.3400	.1161	.0695	.3373	.0756	.0027	-.0405	-.0074	.0405
.87	15.02	6.03	-.35	.6005	.2115	.0812	.6015	.1708	-.0010	-.0407	-.0074	.0407
.87	19.20	6.01	-.42	.8106	.3303	.0866	.8145	.2894	-.0039	-.0409	-.0075	.0410
.87	-.00	8.35	-.10	-.0990	.0879	.0617	-.1037	.0309	.0048	-.0570	-.0061	.0572
.87	4.01	8.37	-.15	.0478	.0864	.0650	.0471	.0290	.0007	-.0574	-.0061	.0574
.87	6.01	8.37	-.18	.1373	.0950	.0631	.1386	.0376	-.0013	-.0573	-.0061	.0574
.87	10.01	8.38	-.27	.3389	.1358	.0644	.3442	.0786	-.0053	-.0573	-.0061	.0575
.87	18.62	8.39	-.44	.7627	.3250	.0929	.7766	.2690	-.0139	-.0560	-.0061	.0577
.87	4.01	12.42	-.20	.0538	.1183	.0540	.0638	.0313	-.0099	-.0870	-.0038	.0876
.60	.00	1.10	-.14	-.0797	.0247	.0477	-.0797	.0247	0.0000	0.0000	0.0000	0.0000
.60	2.03	1.10	-.15	-.0026	.0223	.0477	-.0026	.0223	0.0000	0.0000	0.0000	0.0000
.60	4.02	1.10	-.16	.0684	.0236	.0495	.0684	.0236	0.0000	0.0000	0.0000	0.0000
.60	5.99	1.10	-.18	.1398	.0297	.0570	.1398	.0297	0.0000	0.0000	0.0000	0.0000
.60	8.01	1.10	-.18	.2135	.0427	.0701	.2135	.0427	0.0000	0.0000	0.0000	0.0000
.60	10.02	1.11	-.19	.3084	.0656	.0765	.3084	.0656	0.0000	0.0000	0.0000	0.0000
.60	15.03	1.15	-.21	.5742	.1598	.0841	.5742	.1598	0.0000	0.0000	0.0000	0.0000
.60	18.99	1.13	-.24	.7683	.2662	.1037	.7683	.2662	0.0000	0.0000	0.0000	0.0000
.60	-.01	2.07	-.12	-.1095	.0429	.0651	-.1131	.0264	.0036	-.0164	-.0031	.0168
.60	4.00	2.07	-.14	.0408	.0399	.0653	.0383	.0232	.0025	-.0167	-.0032	.0169
.60	6.00	2.07	-.15	.1227	.0466	.0683	.1209	.0299	.0019	-.0167	-.0031	.0168
.60	10.01	2.06	-.16	.3072	.0817	.0775	.3065	.0649	.0007	-.0168	-.0032	.0168
.60	19.00	2.08	-.22	.7703	.2834	.1020	.7723	.2666	-.0020	-.0169	-.0032	.0170
.60	.01	3.36	-.09	-.1109	.0667	.0665	-.1227	.0286	.0119	-.0382	-.0106	.0400
.60	2.01	3.36	-.11	-.0377	.0638	.0665	-.0482	.0251	.0106	-.0387	-.0106	.0401
.60	4.03	3.36	-.12	.0331	.0641	.0692	.0239	.0252	.0092	-.0389	-.0106	.0399
.60	5.99	3.35	-.12	.1081	.0703	.0737	.1003	.0309	.0078	-.0394	-.0107	.0401
.60	8.01	3.35	-.14	.2040	.0842	.0743	.1976	.0449	.0064	-.0393	-.0106	.0398
.60	10.01	3.35	-.14	.2946	.1046	.0811	.2896	.0650	.0050	-.0396	-.0106	.0399
.60	15.01	3.36	-.16	.5437	.1921	.1002	.5421	.1521	.0016	-.0400	-.0106	.0400
.60	19.00	3.36	-.19	.7468	.2994	.1114	.7480	.2591	-.0012	-.0403	-.0107	.0404
.60	.01	4.53	-.07	-.1063	.0875	.0626	-.1254	.0296	.0192	-.0580	-.0161	.0610
.60	4.00	4.51	-.10	.0307	.0850	.0672	.0156	.0257	.0151	-.0593	-.0161	.0612
.60	6.01	4.52	-.10	.1078	.0906	.0703	.0949	.0312	.0129	-.0594	-.0160	.0608
.60	10.02	4.52	-.13	.2949	.1256	.0775	.2861	.0655	.0087	-.0601	-.0160	.0607
.60	19.00	4.52	-.18	.7115	.3085	.1256	.7122	.2474	-.0008	-.0611	-.0161	.0611
.60	4.00	5.71	-.11	.0332	.1045	.0626	.0171	.0254	.0162	-.0791	-.0160	.0808

TABLE 49.- AERODYNAMIC CHARACTERISTICS: IUM WEDGE NOZZLE, AR = 4, DRY POWER SETTING, $\delta_v = 0^{\circ}$, REVERSER WITH NO SIDEWALLS

MACH	ALPHA	NPR	CANALP	CL	C(D-F)	CM	CLAERO	CDAERO	CLJET	CFJET	CMJET	CT
.87	.02	3.46	0.00	-.1083	.0452	.0702	-.1142	.0274	.0059	-.0177	-.0047	.0187
.87	4.01	3.46	-.04	.0544	.0425	.0666	.0497	.0244	.0047	-.0182	-.0047	.0188
.87	6.02	3.45	-.06	.1428	.0503	.0687	.1388	.0320	.0041	-.0184	-.0047	.0188
.87	10.02	3.45	-.13	.3481	.0917	.0702	.3454	.0731	.0028	-.0186	-.0047	.0188
.87	19.24	3.47	-.31	.8332	.3150	.0799	.8334	.2960	-.0003	-.0189	-.0047	.0189
.87	-.01	5.98	-.02	-.1022	.0647	.0663	-.1094	.0277	.0072	-.0370	-.0060	.0377
.87	2.02	6.01	-.04	-.0245	.0613	.0657	-.0304	.0239	.0058	-.0374	-.0060	.0379
.87	4.02	6.01	-.05	.0509	.0627	.0670	.0464	.0251	.0045	-.0376	-.0060	.0379
.87	6.00	5.99	-.07	.1378	.0703	.0686	.1346	.0329	.0032	-.0374	-.0059	.0376
.87	8.02	5.99	-.12	.2345	.0868	.0706	.2326	.0490	.0019	-.0378	-.0060	.0378
.87	9.98	6.03	-.17	.3381	.1114	.0705	.3375	.0734	.0006	-.0380	-.0060	.0380
.87	15.01	6.03	-.28	.5992	.2067	.0840	.6020	.1688	-.0028	-.0380	-.0060	.0381
.87	18.01	6.02	-.35	.7530	.2895	.0874	.7577	.2518	-.0047	-.0377	-.0060	.0380
.87	.00	8.40	-.06	-.0965	.0809	.0613	-.1042	.0259	.0077	-.0550	-.0078	.0555
.87	4.01	8.38	-.08	.0475	.0794	.0657	.0435	.0238	.0039	-.0556	-.0078	.0558
.87	6.01	8.36	-.12	.1371	.0878	.0640	.1351	.0323	.0020	-.0555	-.0078	.0556
.87	10.01	8.37	-.03	.3373	.1289	.0681	.3392	.0735	-.0019	-.0554	-.0078	.0554
.87	18.22	8.43	-.08	.7354	.3064	.0976	.7453	.2513	-.0099	-.0551	-.0079	.0559
.87	4.02	12.53	.05	.0550	.1079	.0553	.0522	.0213	.0028	-.0866	-.0114	.0866
.60	.01	2.08	.08	-.1025	.0408	.0648	-.1086	.0254	.0062	-.0154	-.0049	.0166
.60	4.00	2.07	-.11	.0452	.0380	.0645	.0401	.0222	.0051	-.0158	-.0049	.0166
.60	6.03	2.07	-.12	.1263	.0446	.0674	.1218	.0286	.0045	-.0159	-.0049	.0166
.60	10.02	2.07	-.12	.3119	.0803	.0763	.3085	.0640	.0034	-.0162	-.0049	.0166
.60	19.17	2.10	-.01	.7758	.2865	.1040	.7750	.2694	.0008	-.0171	-.0050	.0171
.60	.02	3.35	-.07	-.1059	.0625	.0641	-.1182	.0266	.0124	-.0359	-.0098	.0379
.60	2.01	3.36	-.08	-.0330	.0594	.0641	-.0441	.0231	.0111	-.0363	-.0098	.0379
.60	4.01	3.36	-.09	.0366	.0596	.0670	.0268	.0231	.0098	-.0365	-.0097	.0378
.60	6.01	3.35	-.11	.1147	.0655	.0706	.1061	.0287	.0086	-.0369	-.0098	.0379
.60	7.98	3.37	-.12	.2090	.0798	.0704	.2018	.0427	.0072	-.0371	-.0097	.0378
.60	10.00	3.34	-.14	.3008	.1004	.0778	.2949	.0633	.0060	-.0371	-.0097	.0376
.60	15.00	3.35	-.08	.5438	.1878	.0999	.5411	.1502	.0027	-.0377	-.0097	.0378
.60	19.16	3.36	-.10	.7590	.3012	.1099	.7591	.2632	-.0001	-.0380	-.0098	.0380
.60	.02	4.60	.05	-.1082	.0819	.0632	-.1224	.0264	.0141	-.0554	-.0118	.0572
.60	4.00	4.52	.04	.0310	.0780	.0674	.0208	.0230	.0103	-.0549	-.0117	.0559
.60	6.00	4.53	.04	.1093	.0844	.0700	.1009	.0287	.0084	-.0557	-.0117	.0564
.60	10.01	4.54	.02	.2964	.1197	.0776	.2919	.0636	.0044	-.0562	-.0117	.0563
.60	19.17	4.53	-.09	.7140	.3071	.1293	.7185	.2508	-.0045	-.0563	-.0118	.0565
.60	4.00	5.71	.01	.0275	.0964	.0653	.0178	.0223	.0097	-.0741	-.0124	.0747
.60	3.99	6.88	.02	.0304	.1132	.0608	.0213	.0204	.0091	-.0929	-.0137	.0933
.60	3.98	9.64	.04	.0455	.1553	.0434	.0379	.0188	.0076	-.1365	-.0187	.1367

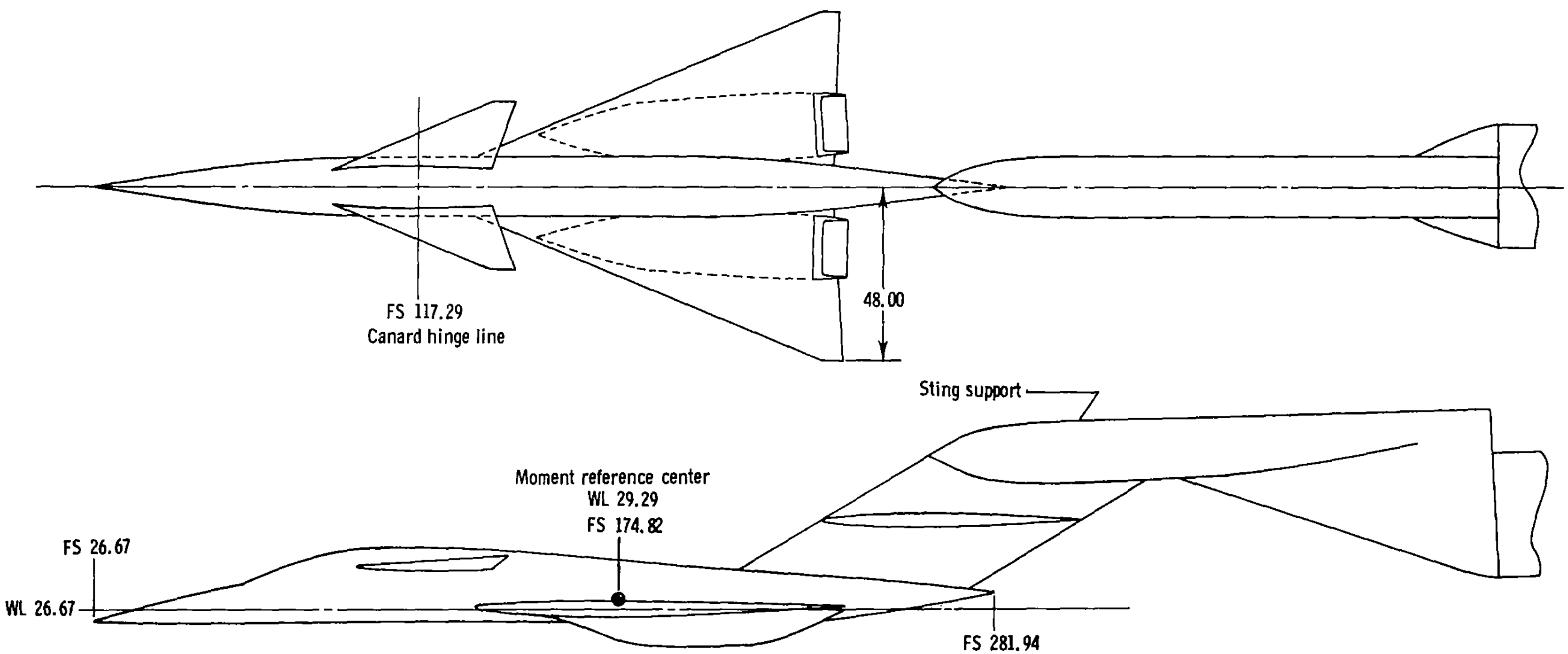
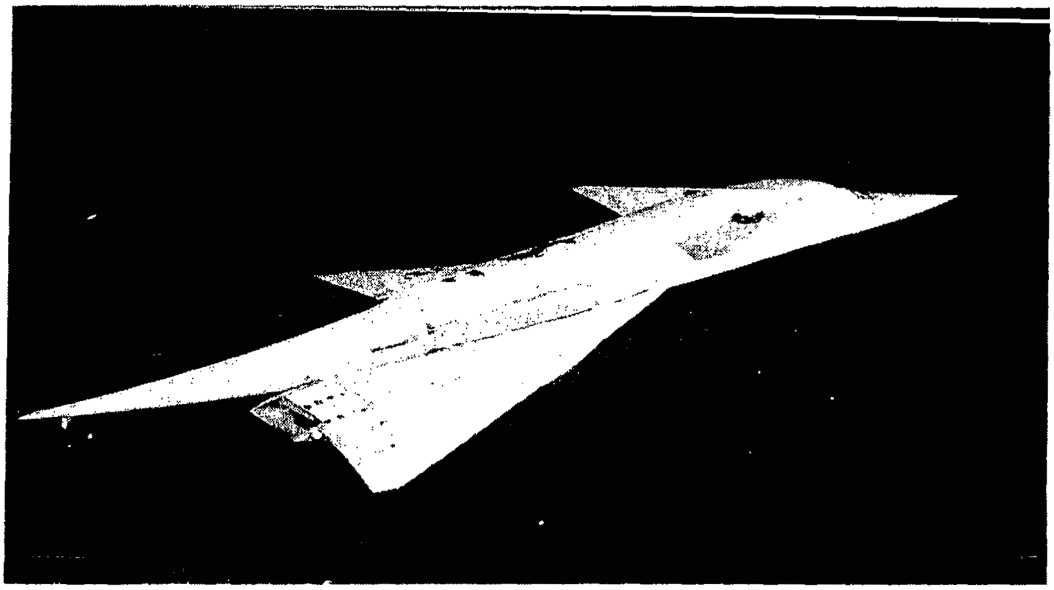
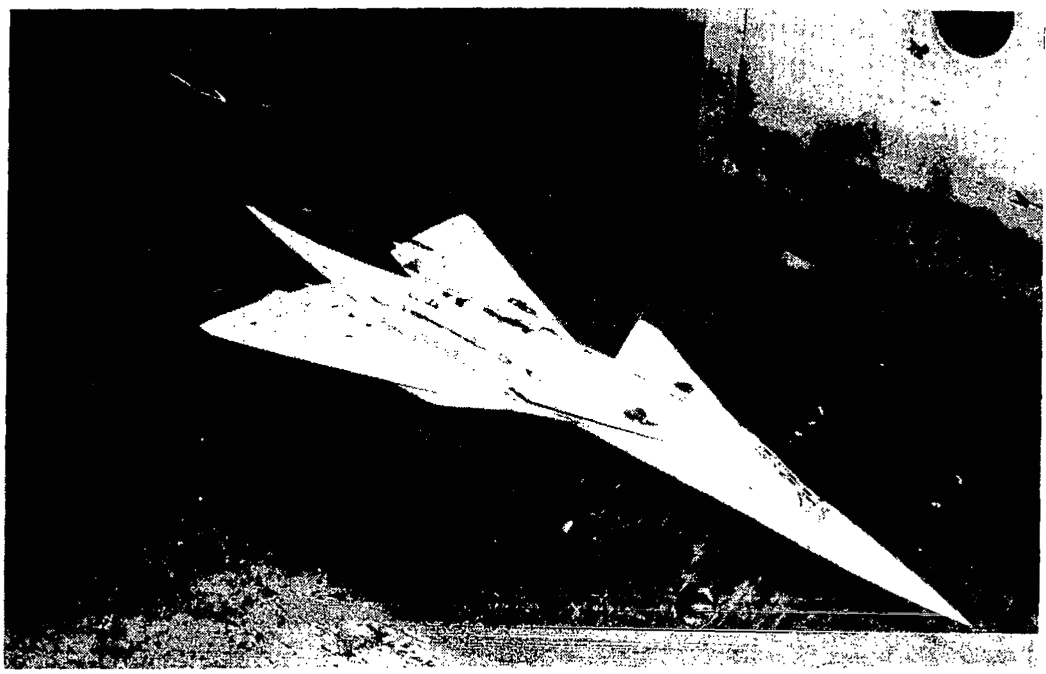


Figure 1.- Sketch showing general arrangement of model and support system. All dimensions in centimeters unless otherwise noted.



NASA
L-80-564

Three-quarter rear view



NASA
L 79 5471

Three-quarter front view

Figure 2.- Photographs showing overall view of model.

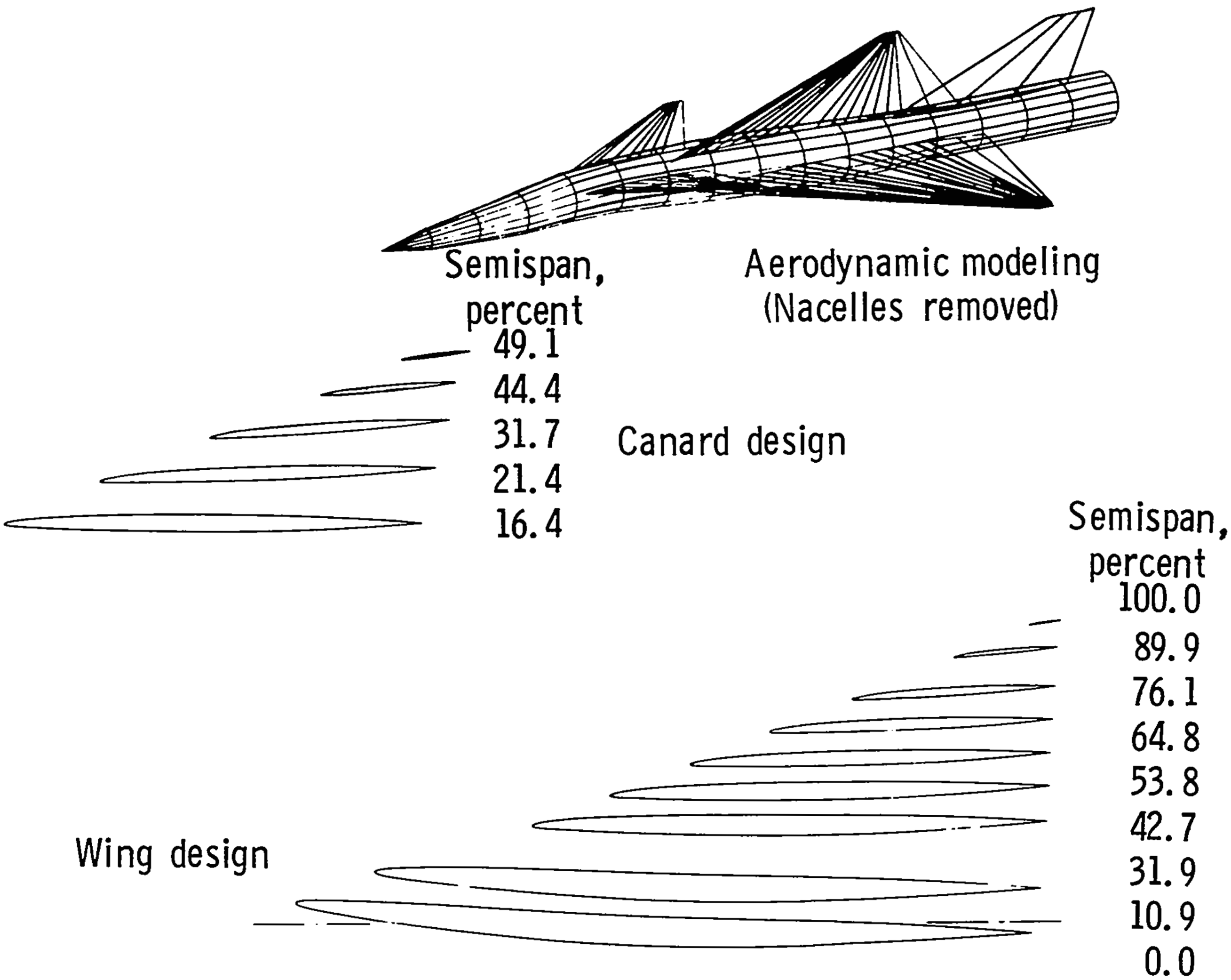


Figure 3.- Wing-canard design characteristics.

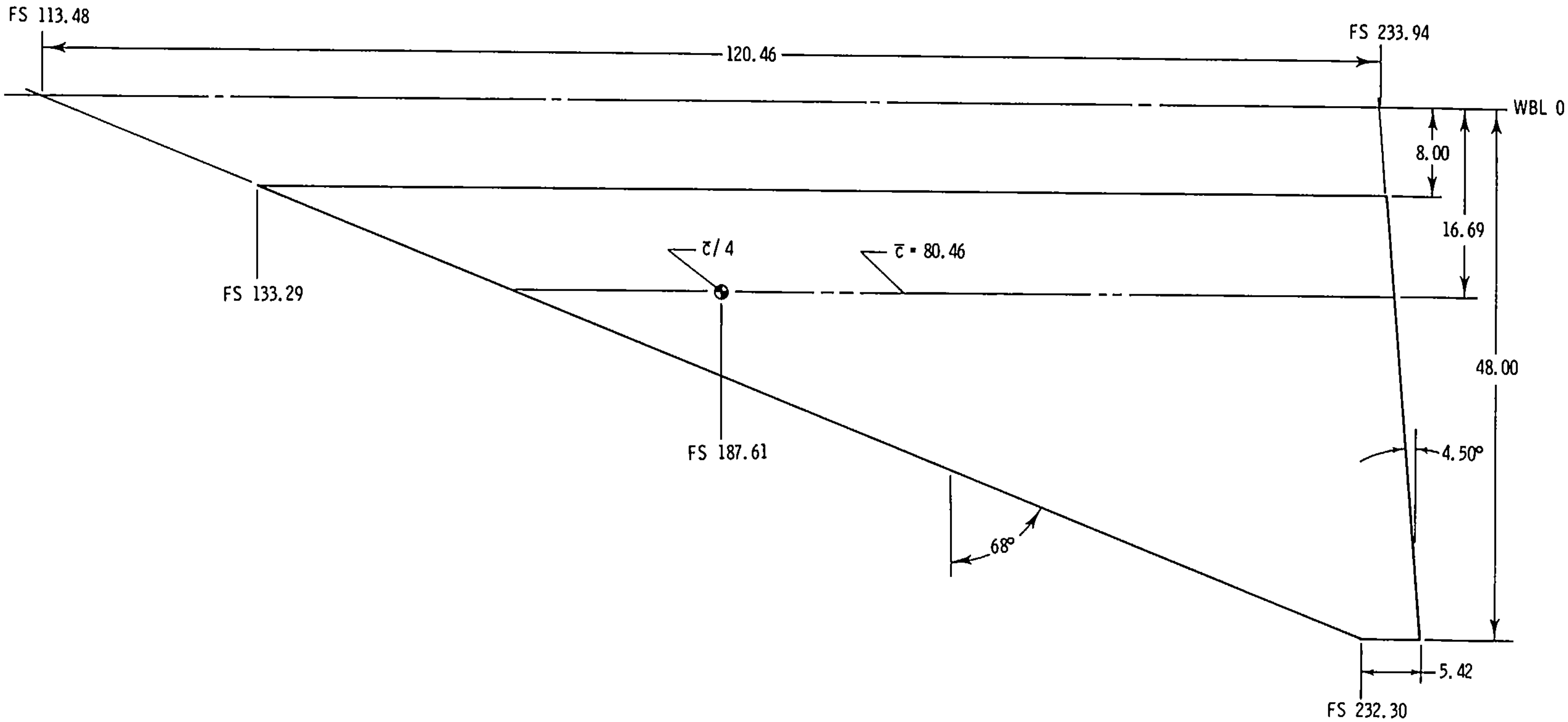


Figure 4.- Sketch showing planform geometry of wing. All dimensions in centimeters unless otherwise noted.

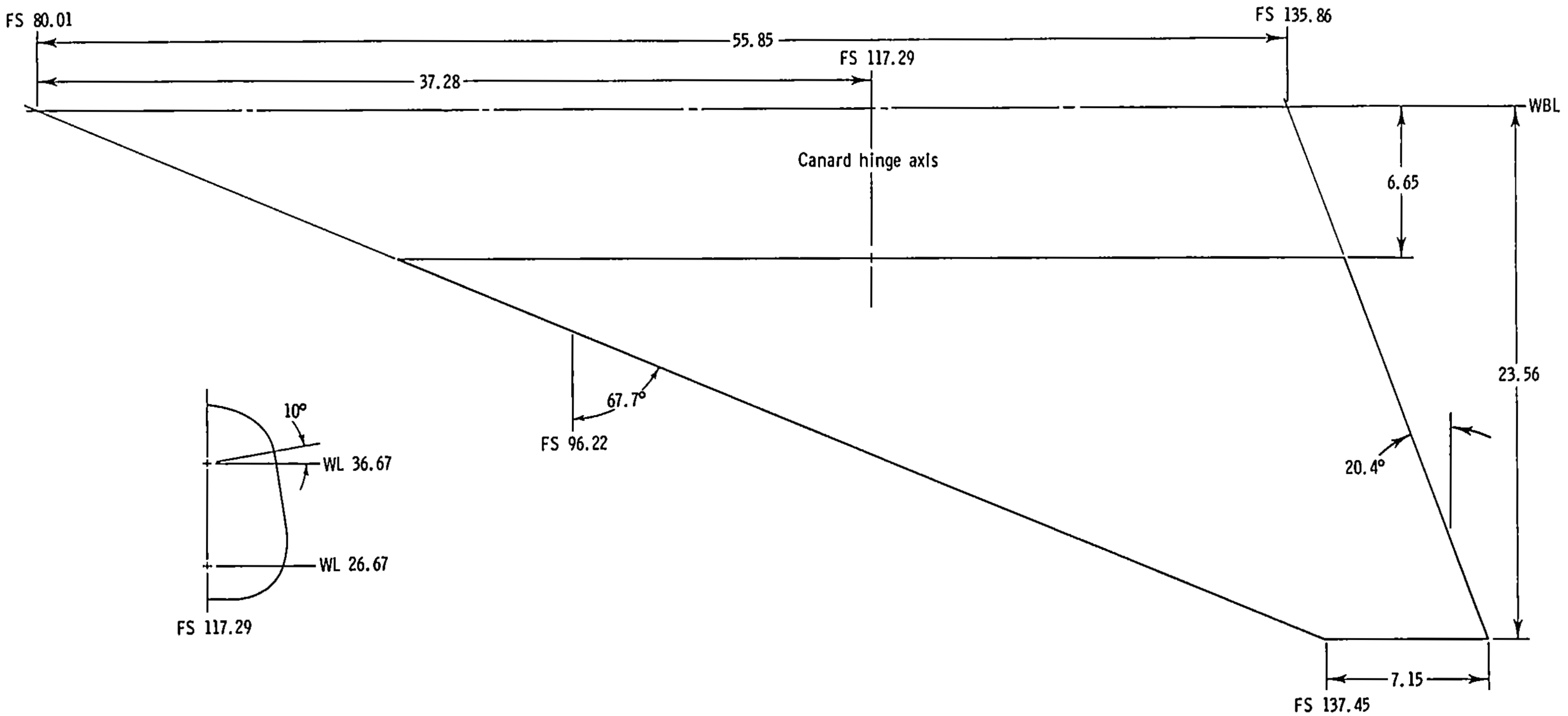
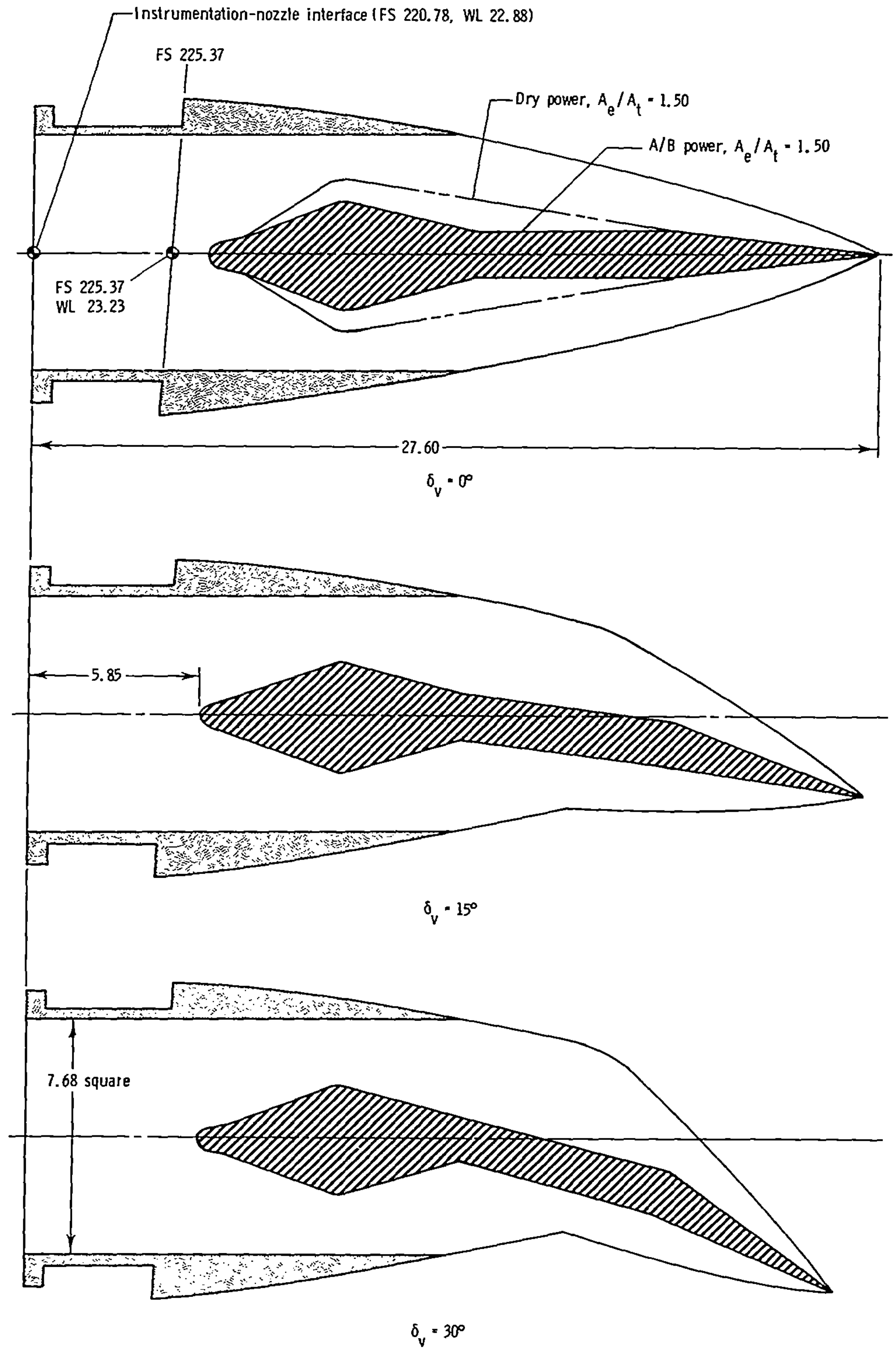
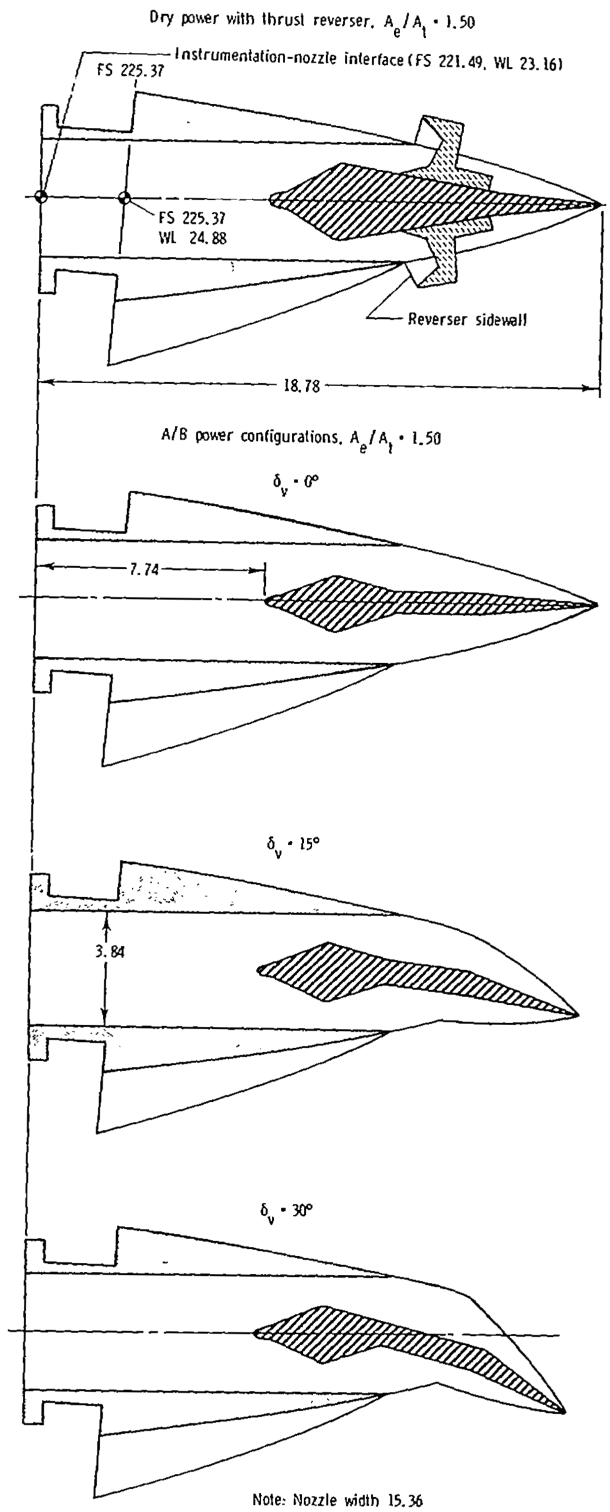


Figure 5.- Sketch showing planform geometry of canard. All dimensions in centimeters unless otherwise noted.



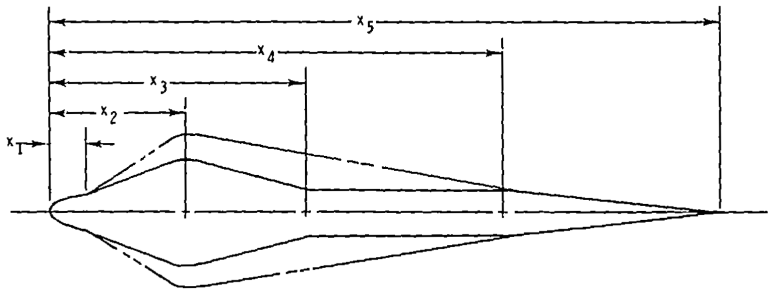
(a) AR = 1.

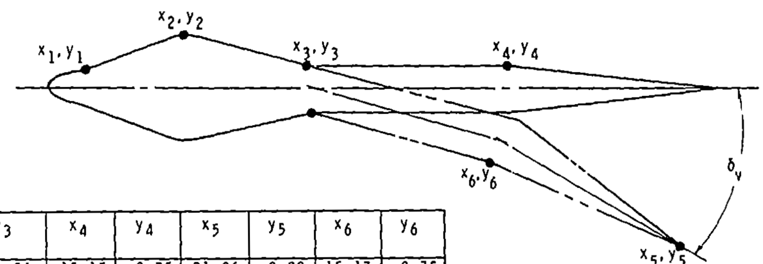
Figure 6.- Details of wedge nozzle configurations. All dimensions in centimeters unless otherwise noted.



(b) AR = 4.

Figure 6.- Continued.

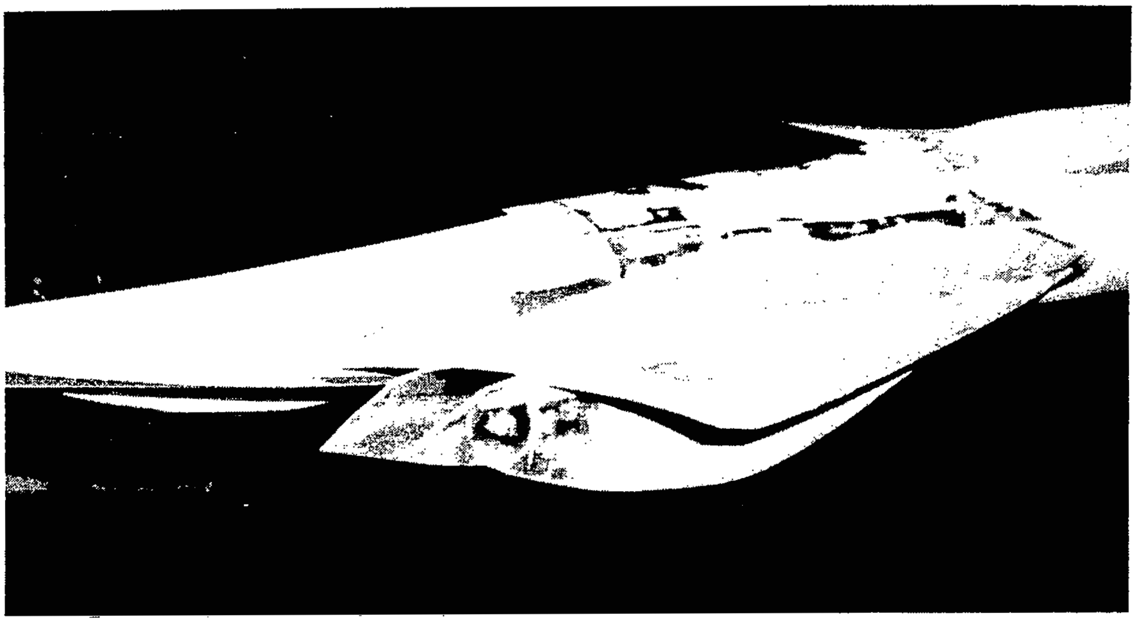




Power setting	Aspect ratio	δ_v, deg	x_1	y_1	x_2	y_2	x_3	y_3	x_4	y_4	x_5	y_5	x_6	y_6
Dry	1	0	1.25	±0.58	4.48	±2.49	8.47	±1.86	15.17	0.75	21.86	0.00	15.17	-0.75
Afterburner	1	0	1.25	±0.58	4.48	±1.74	8.47	±0.75	15.17	0.75	21.86	0.00	15.17	-0.75
↓	1	15	1.25	±0.58	4.48	±1.74	8.47	±0.75	15.31	-0.14	21.58	-2.59	14.91	-1.56
↓	1	30	1.25	±0.58	4.48	±1.74	8.47	±0.75	15.32	-1.07	20.75	-5.07	14.57	-2.35
Dry	4	0	0.63	±0.30	2.27	±1.26	4.28	±0.93	7.66	0.38	11.04	0.00	7.66	0.38
Afterburner	4	0	0.63	±0.30	2.27	±0.88	4.28	±0.38	7.66	0.38	11.04	0.00	7.66	0.38
↓	4	15	0.63	±0.30	2.27	±0.88	4.28	±0.38	7.73	-0.08	10.90	-1.29	7.54	-0.80
↓	4	30	0.63	±0.30	2.27	±0.88	4.28	±0.38	7.74	-0.55	10.49	-2.55	7.36	-1.20

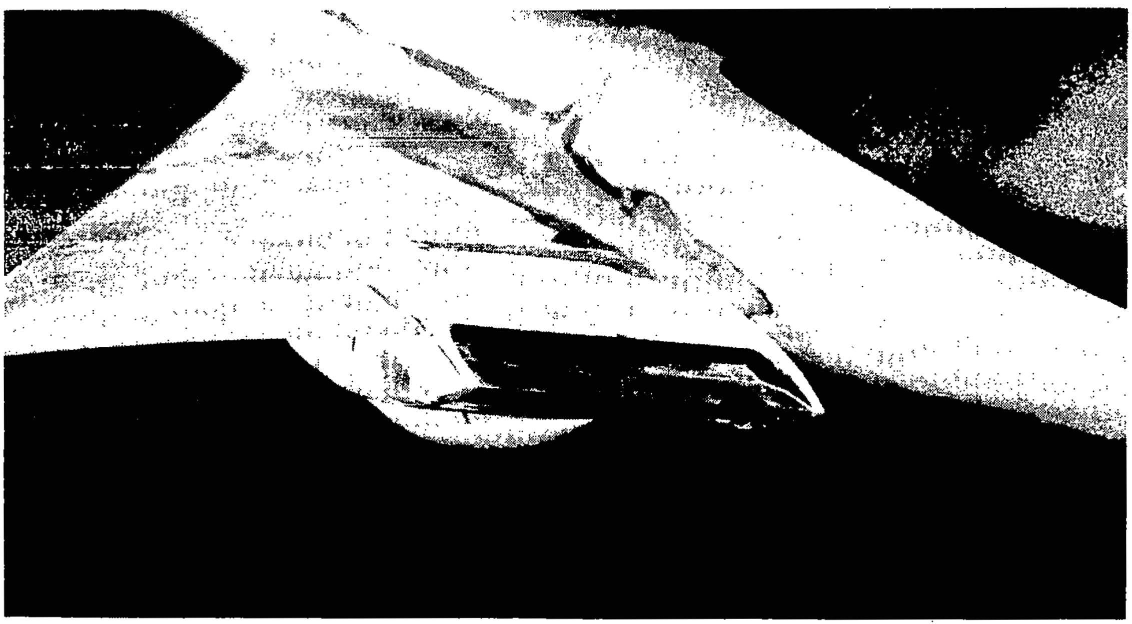
(c) Wedge details.

Figure 6.- Continued.



L-80-1288

AR = 1

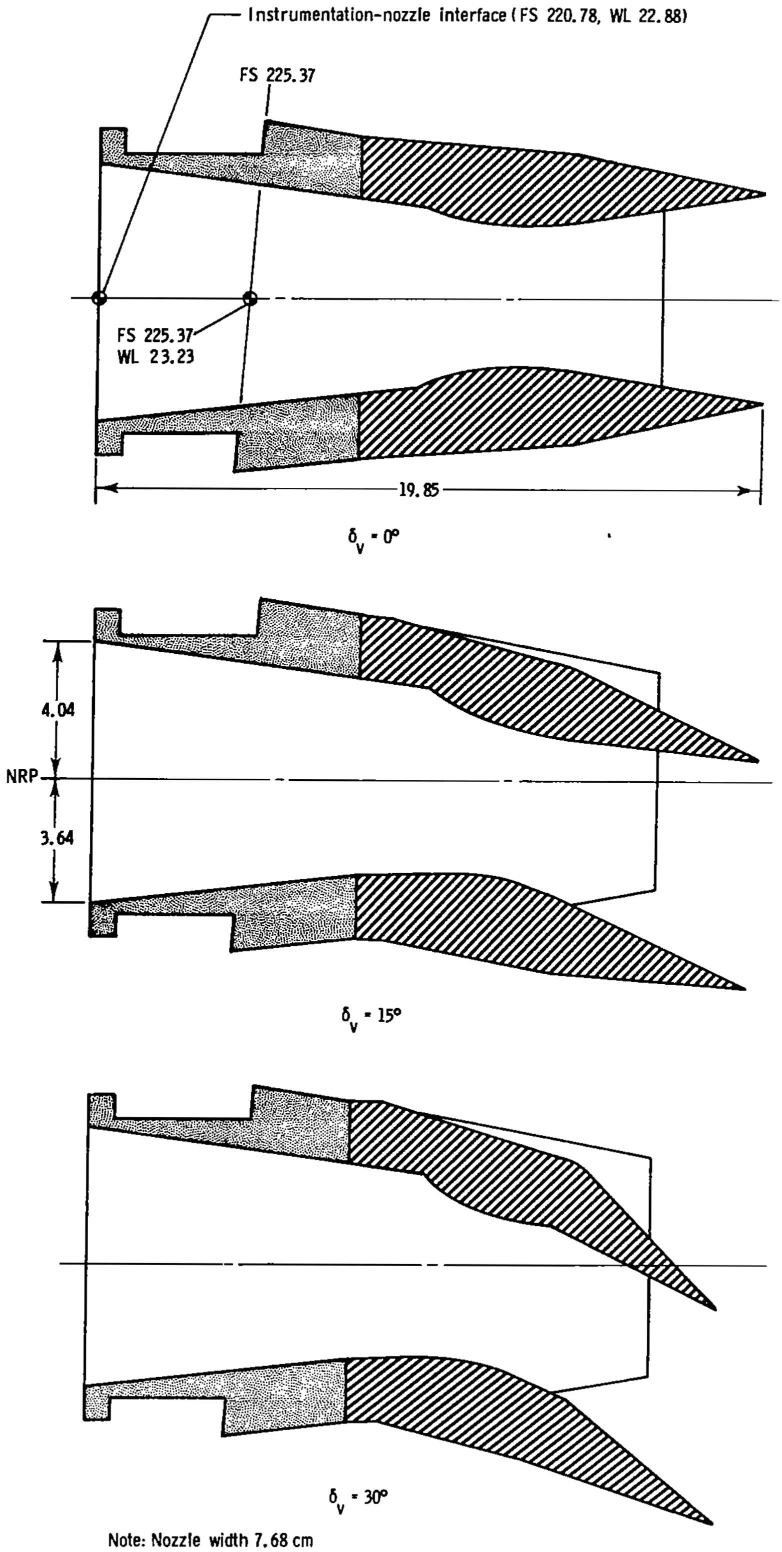


L-79-5472

AR = 4

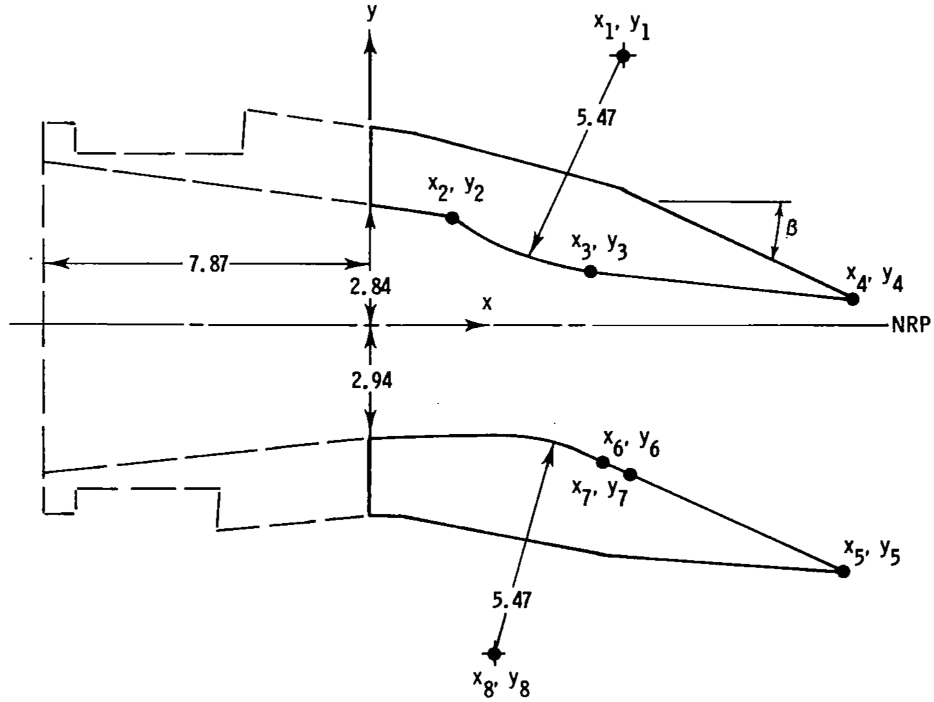
(d) Photographs.

Figure 6.- Concluded.



(a) A/B nozzle power setting configurations.

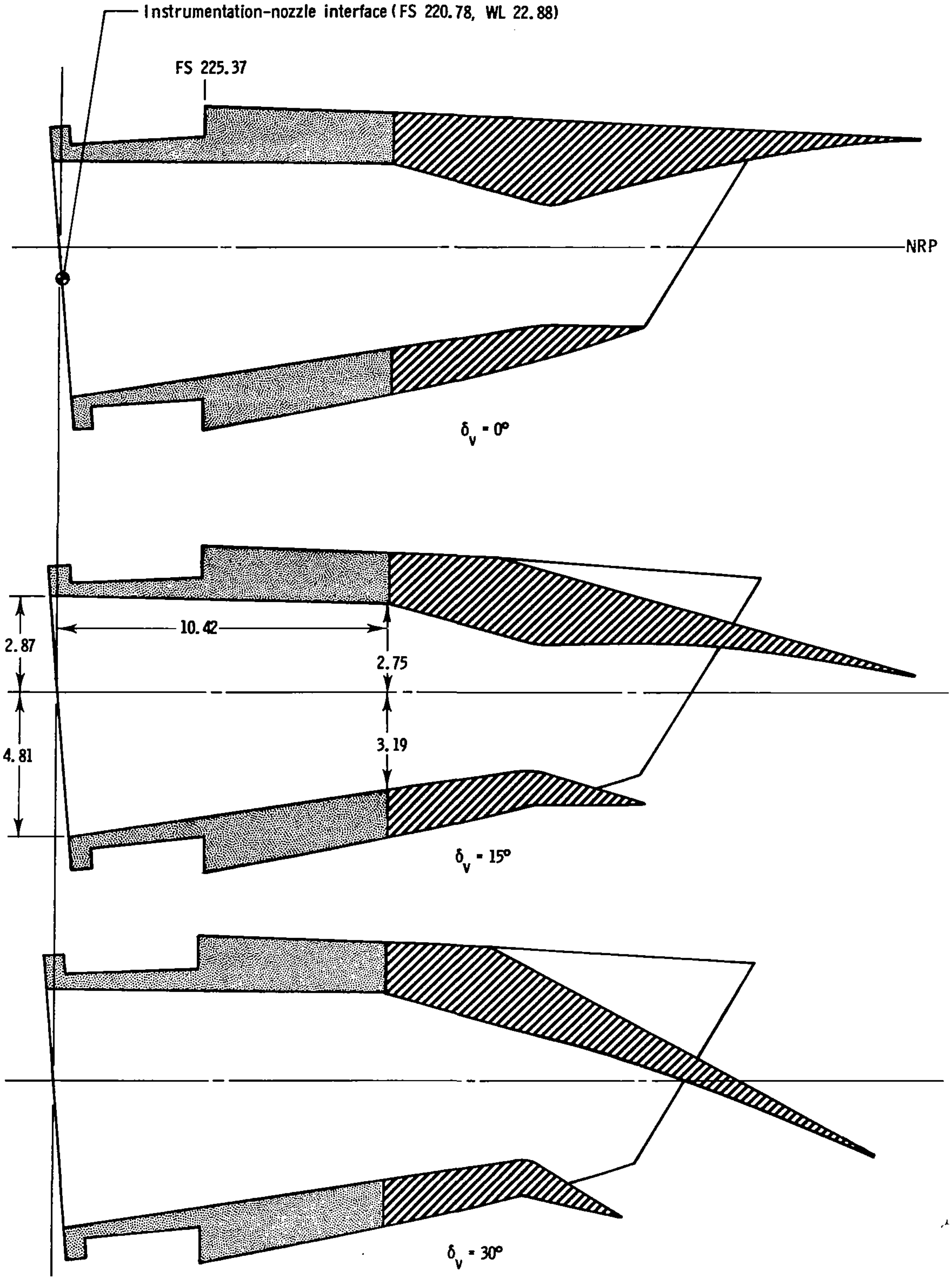
Figure 7.- Details of 2-D C-D nozzle configurations. All dimensions in centimeters unless otherwise noted.



	A/B power δ_v, deg			Dry power δ_v, deg
	0	15	30	0
x_1	4.60	6.21	5.84	4.60
y_1	7.53	6.74	6.57	6.77
x_2	2.03	2.03	2.03	2.03
y_2	2.70	2.70	2.70	2.70
x_3	5.40	5.08	5.86	5.35
y_3	2.12	1.29	1.03	1.40
x_4	11.98	11.68	10.79	11.86
y_4	3.13	0.59	-1.32	1.56
x_5	11.98	11.45	10.78	11.86
y_5	-3.13	-6.20	-7.72	-1.56
x_6	5.40	5.94	6.36	5.35
y_6	-2.12	-3.42	-3.96	-1.40
x_7	5.40	5.50	5.48	5.35
y_7	-2.12	-3.20	-3.44	-1.40
x_8	4.60	8.07	2.70	4.60
y_8	-7.53	-8.10	-8.16	-6.77
β, deg	12.13	27.16	46.77	17.50

(b) Nozzle details.

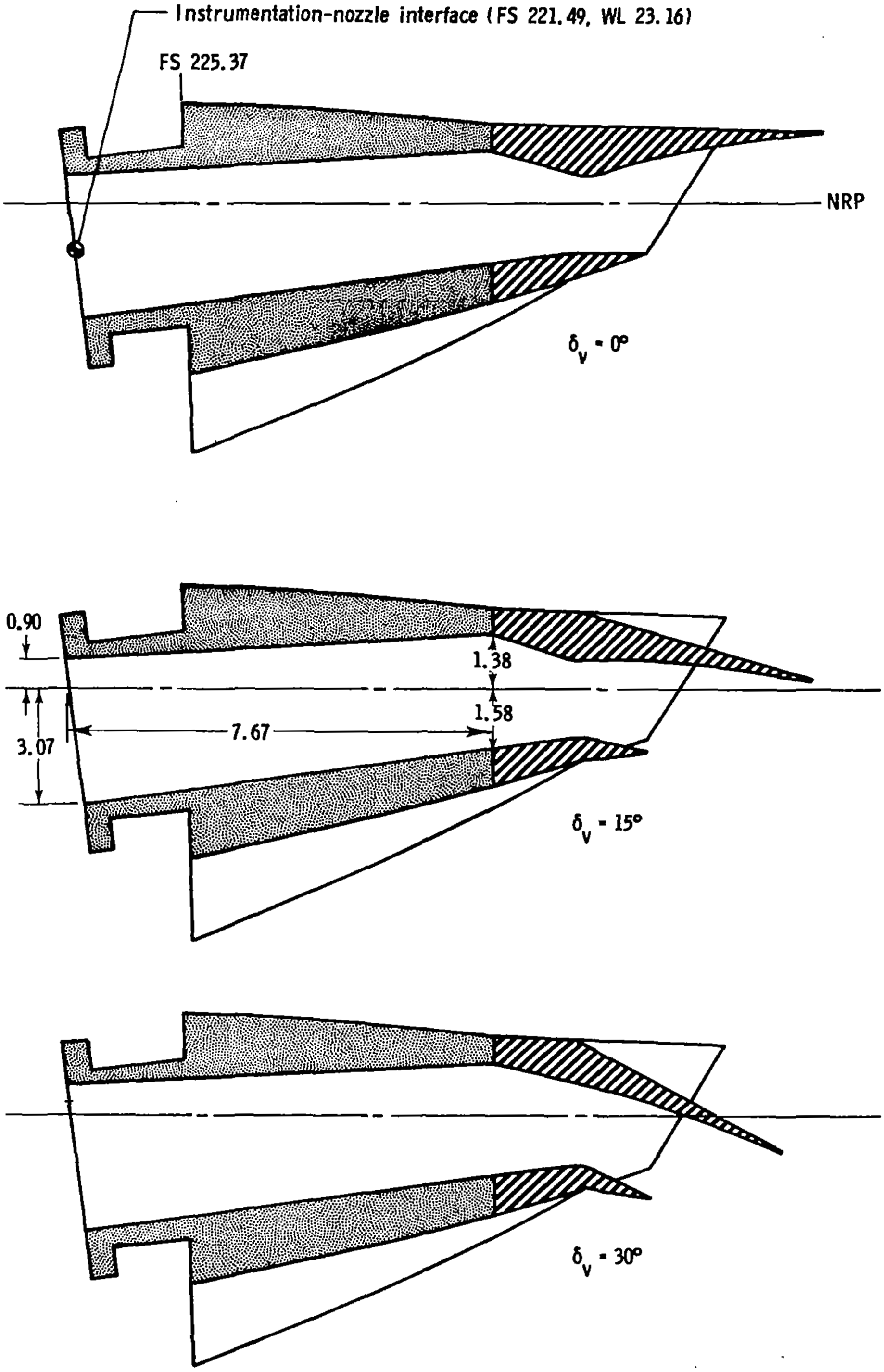
Figure 7.- Concluded.



Note: Nozzle width 7.68 cm

(a) AR = 1.

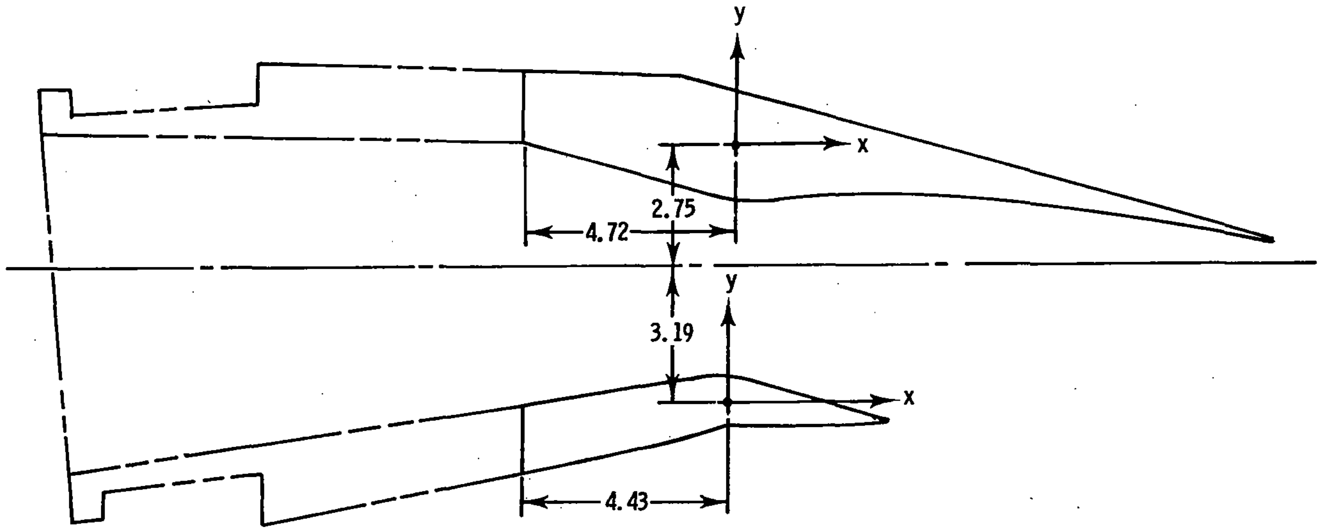
Figure 8.- Details of SERN configurations. All dimensions in centimeters unless noted.



Note: Nozzle width 15.36 cm

(b) AR = 4.

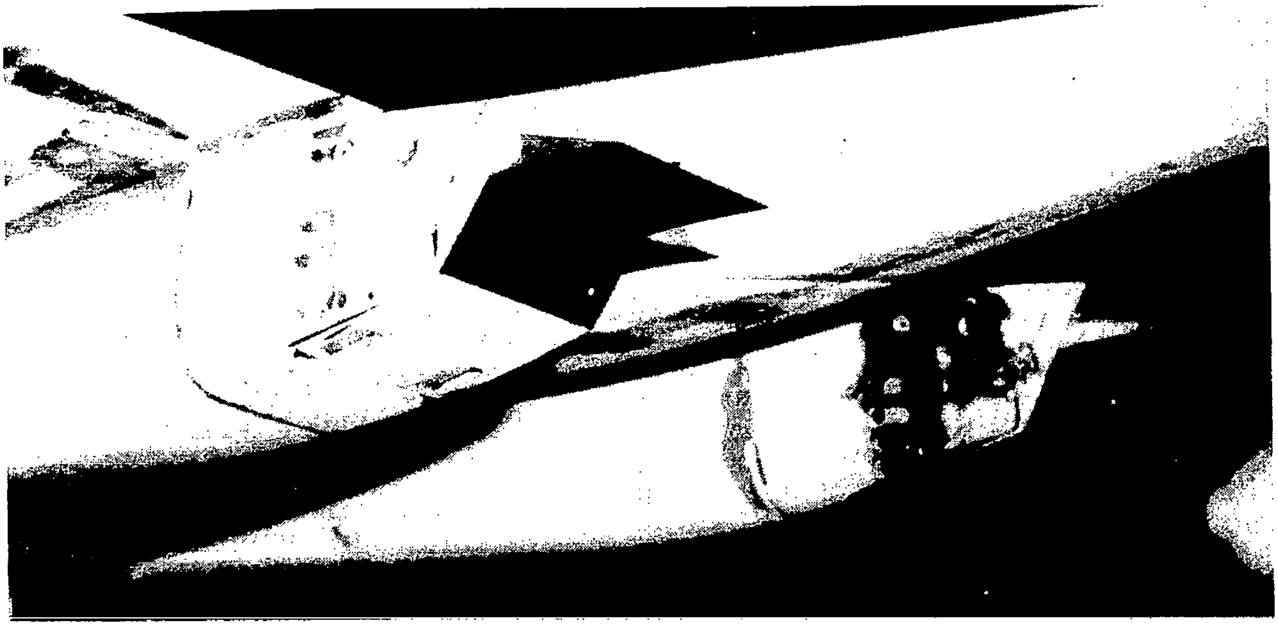
Figure 8.- Continued.



$\delta_v = 0°$		$\delta_v = 15°$		$\delta_v = 30°$	
Upper ramp					
x	y	x	y	x	y
0.000	-1.184	0.000	-1.184	-0.302	-1.019
0.307	-1.143	0.737	-1.184	0.409	-1.209
1.019	-.953	1.786	-1.184	1.422	-1.481
2.032	-.681	3.068	-1.191	2.657	-1.819
3.272	-.356	4.117	-1.209	3.668	-2.108
4.290	-.102	5.255	-1.250	4.755	-2.443
5.400	.152	6.038	-1.303	5.499	-2.697
6.170	.305	7.018	-1.407	6.416	-3.051
7.140	.457	8.049	-1.552	7.376	-3.457
8.176	.584	9.225	-1.748	8.461	-3.952
9.362	.699	10.178	-1.925	9.337	-4.369
10.330	.775	11.308	-2.149	10.368	-4.877
11.478	.851	11.714	-2.225	10.739	-5.062
11.892	.876				
Lower flap					
0.000	.558	0.000	.558	0.000	.558
3.505	.558	3.546	-.150	3.385	-1.064

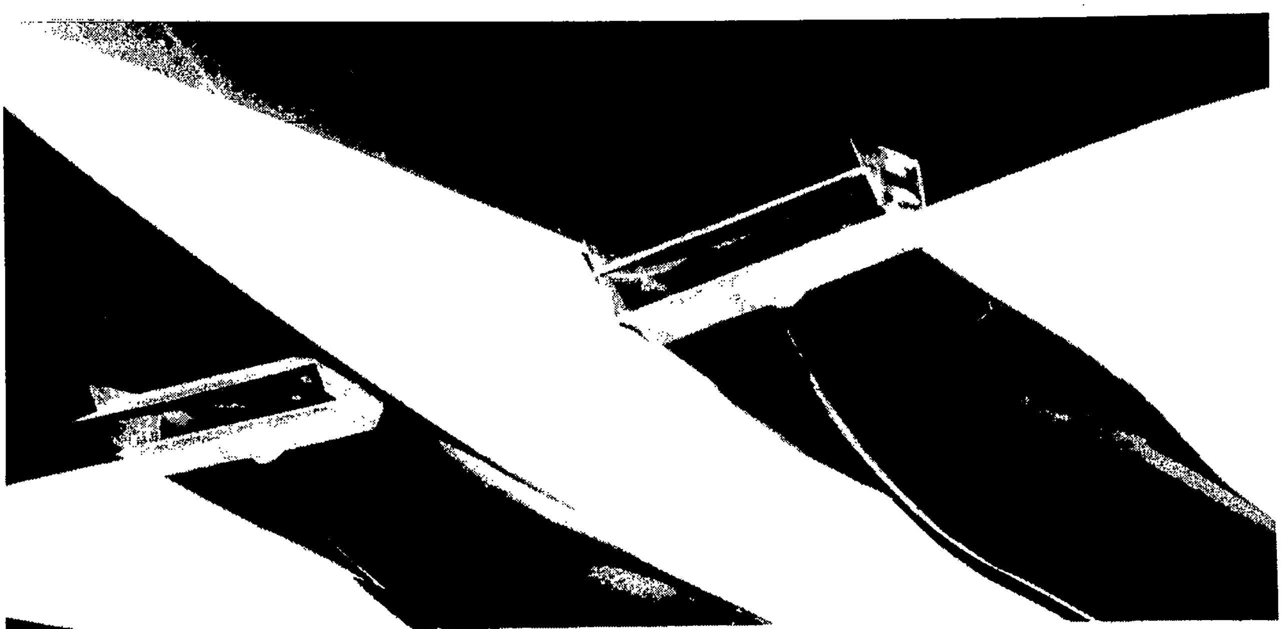
(c) Nozzle internal ordinates for AR = 1. (Divide by 2 for AR = 4 ordinates.)

Figure 8.- Continued.



L-80-4568

AR = 1



L-80-1290

AR = 4

(d) Photographs.

Figure 8.- Concluded.

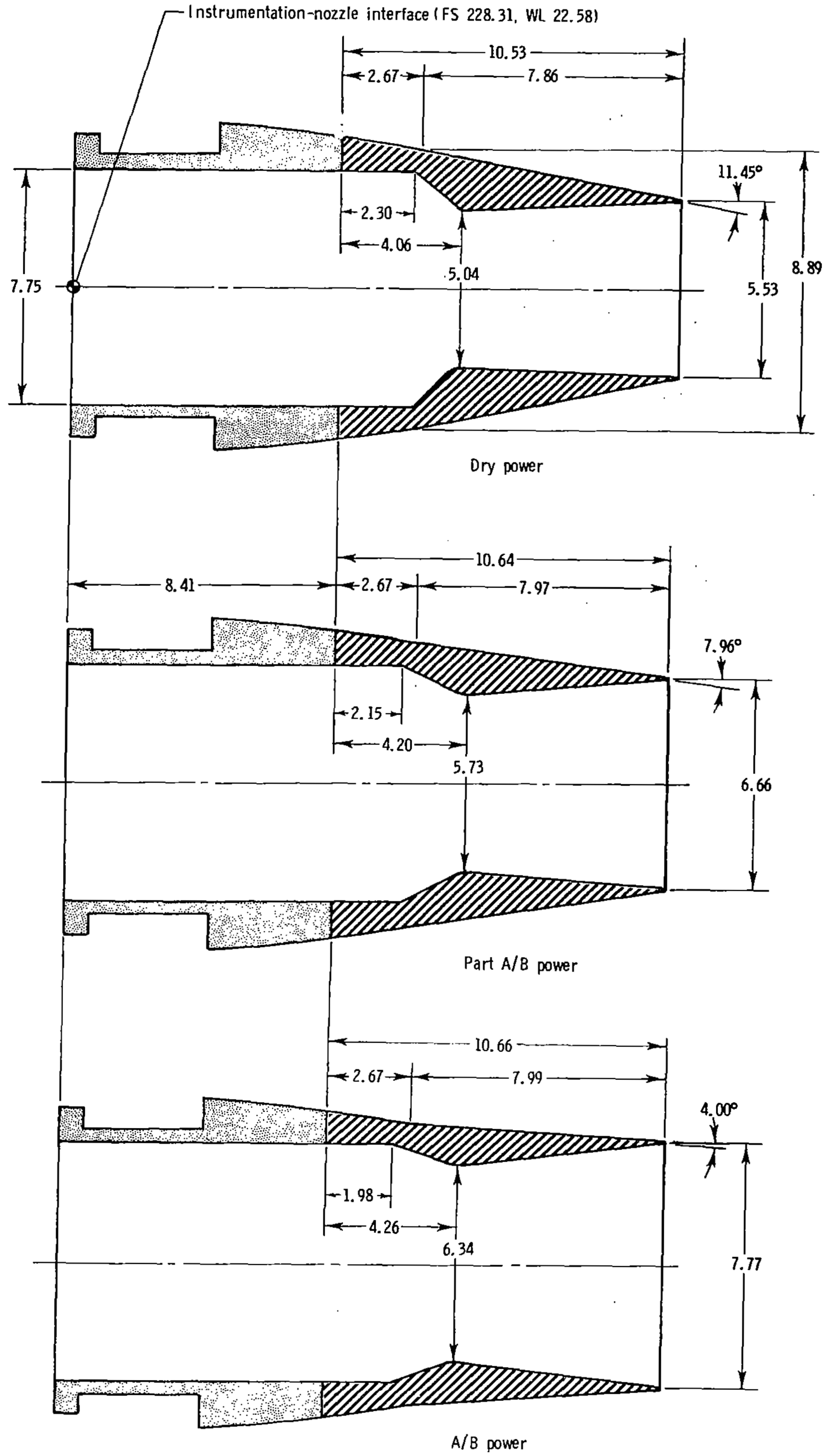


Figure 9.- Details of axisymmetric nozzle model geometry.

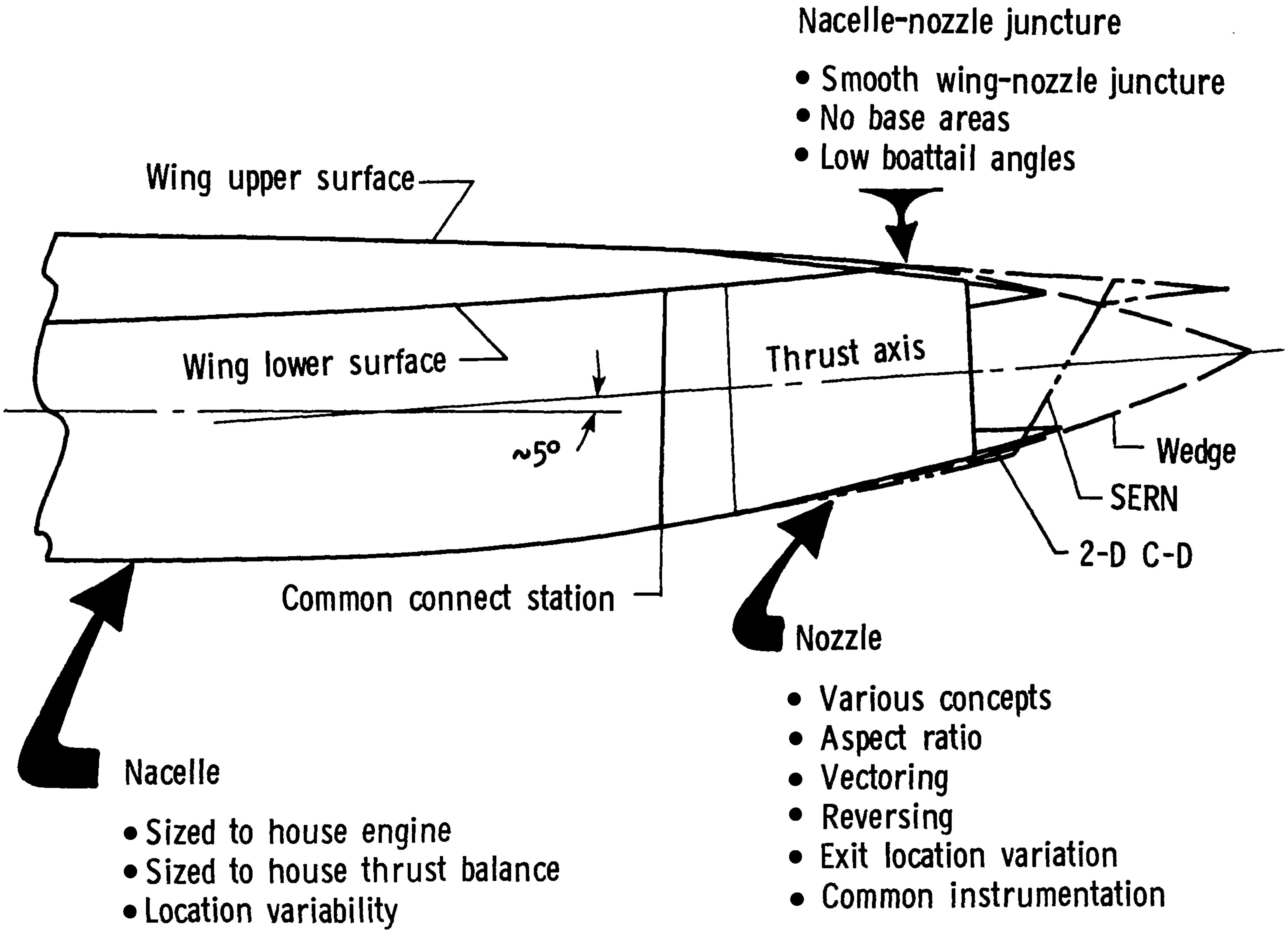


Figure 10.- Nacelle-nozzle integration philosophy.

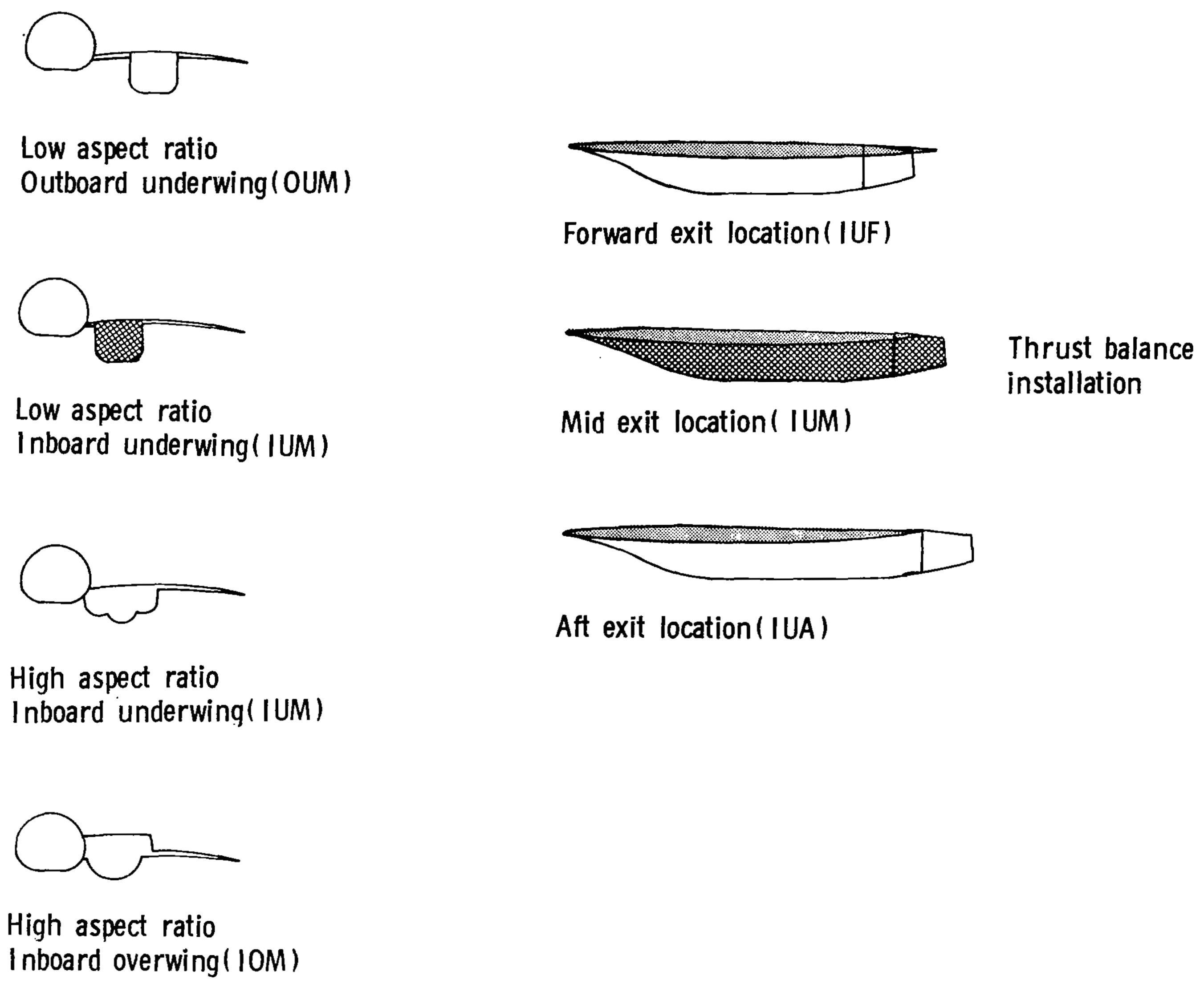


Figure 11.- Nacelle-nozzle integration options.

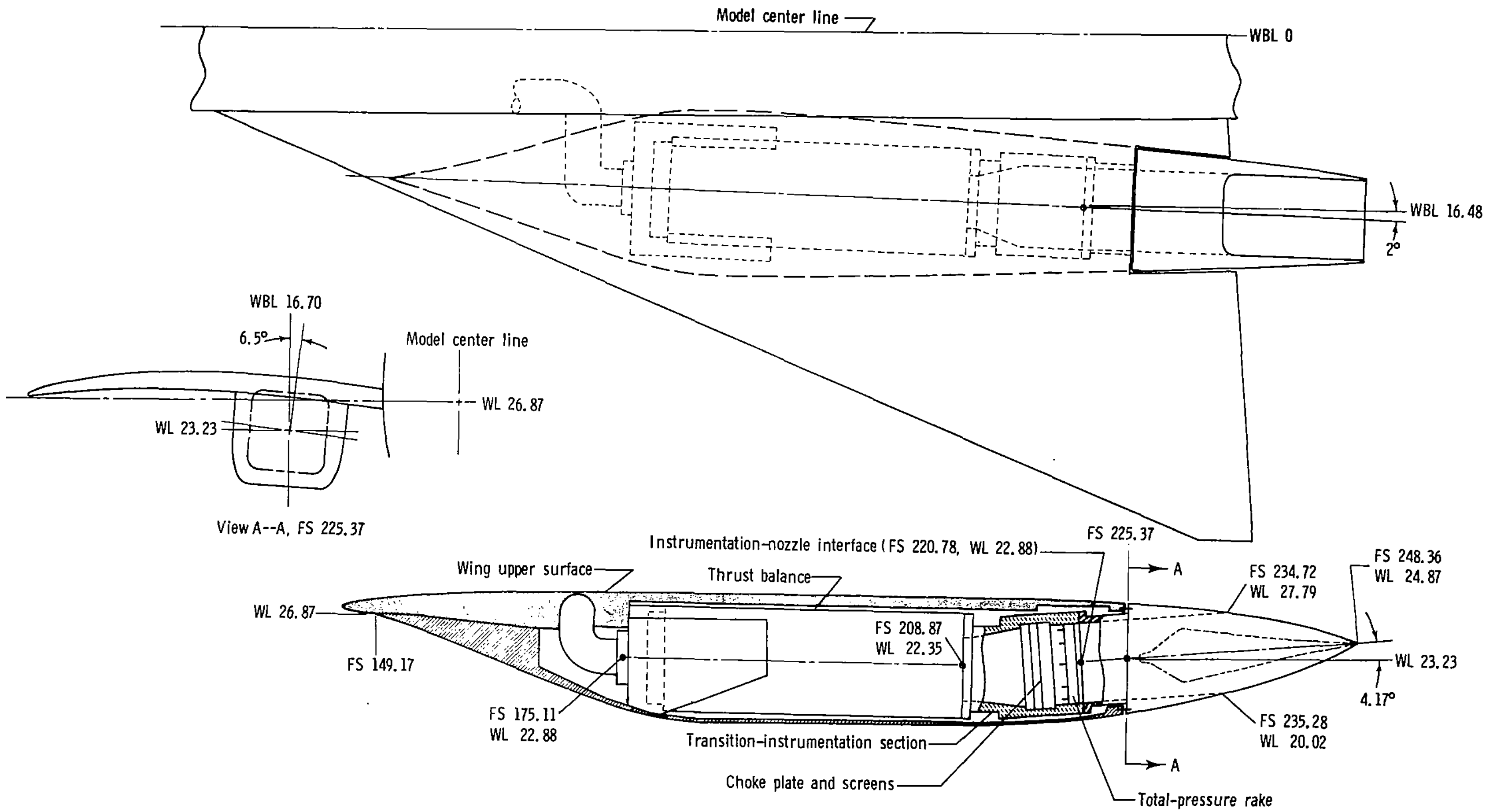


Figure 12.- Nacelle-nozzle installation for low-aspect-ratio IUM wedge nozzle with nozzle thrust strain-gage balance and transition-instrumentation section. All dimensions in centimeters unless otherwise noted.

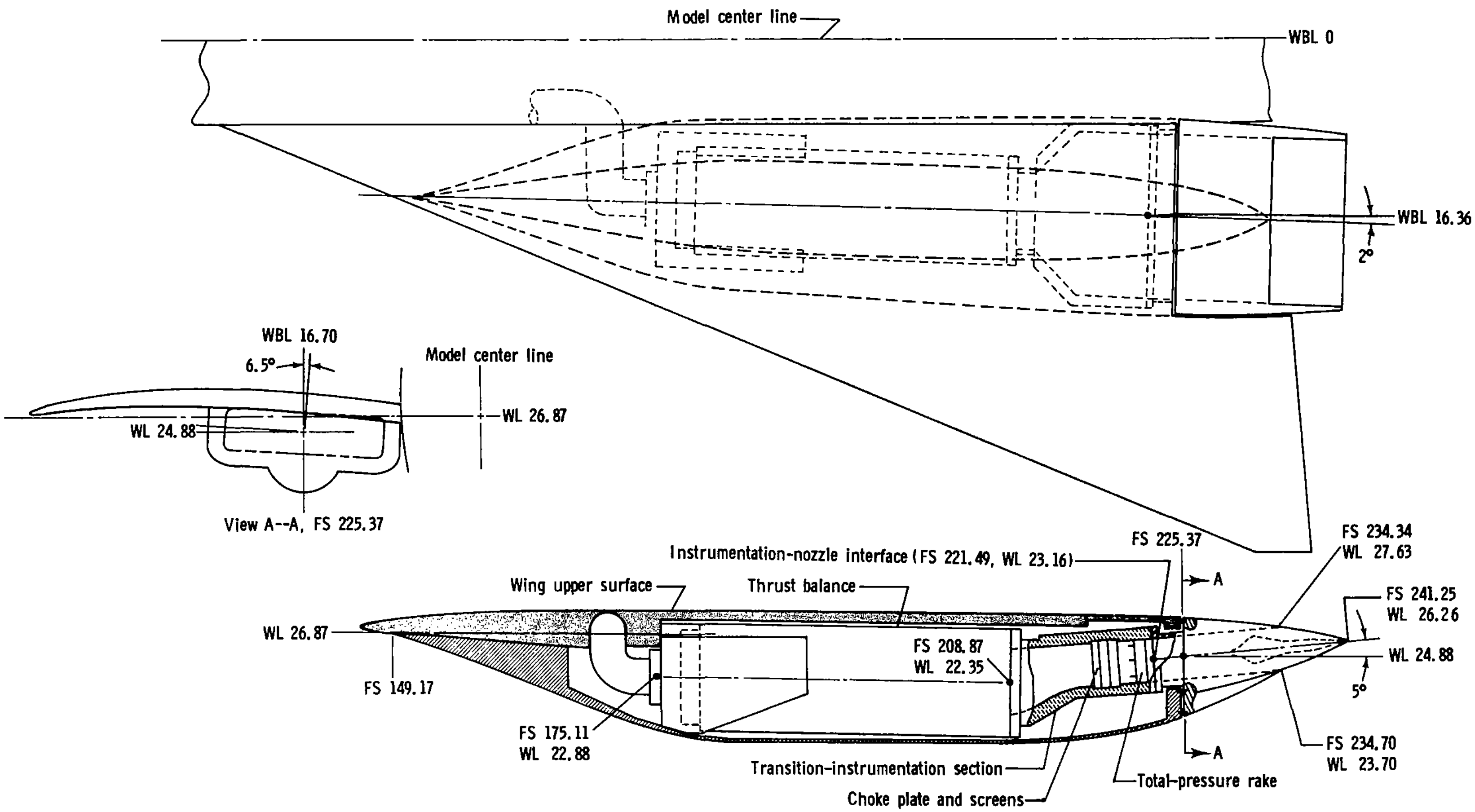


Figure 13.- Nacelle-nozzle installation for high-aspect-ratio IUM wedge nozzle with nozzle thrust strain-gage balance and transition-instrumentation section. All dimensions in centimeters unless otherwise noted.

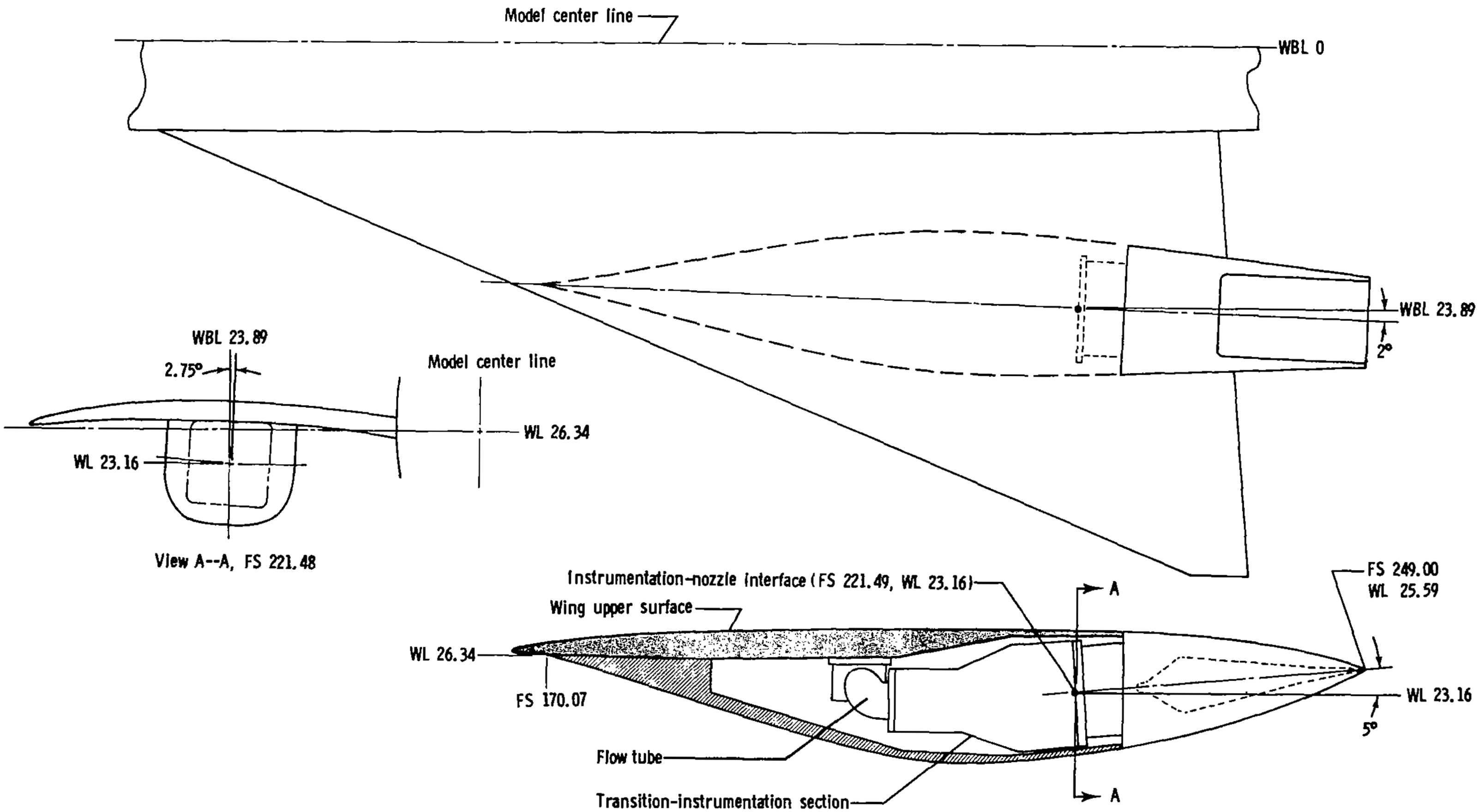
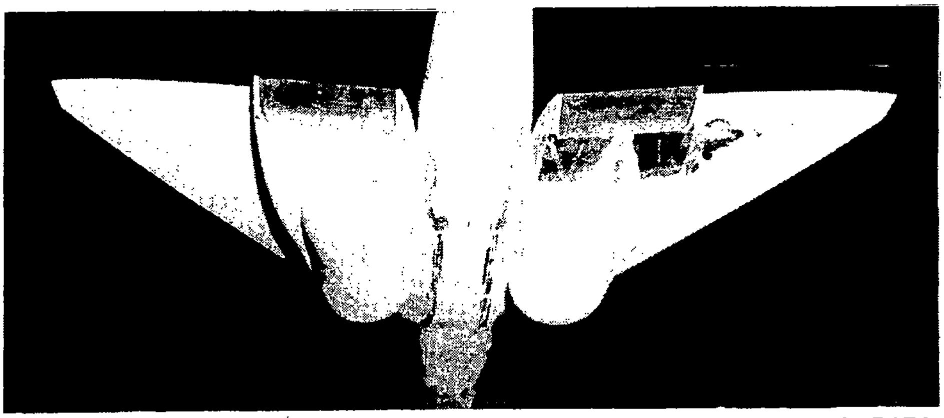
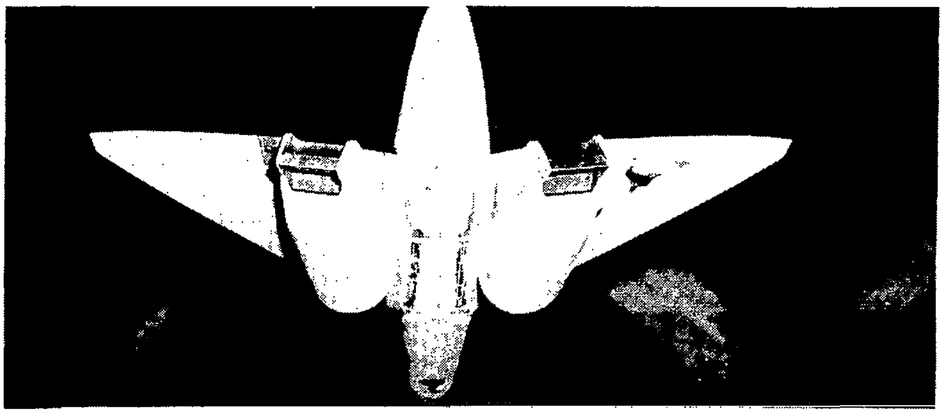


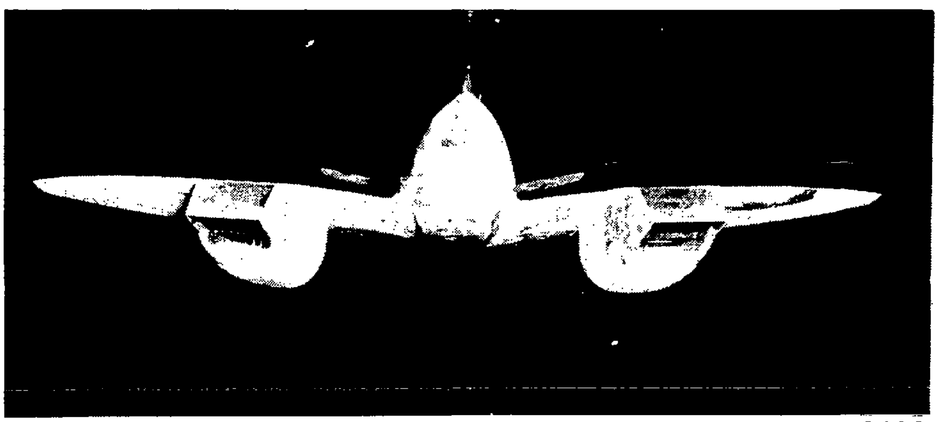
Figure 14.- Nacelle-nozzle installation for low-aspect-ratio OUM wedge nozzle. All dimensions in centimeters unless otherwise noted.



AR = 4, IUM L-79-5473



AR = 1, IUM L-80-565



AR = 1, OUM L-80-1286

Figure 15.- Photographs showing various wedge nozzle installations.

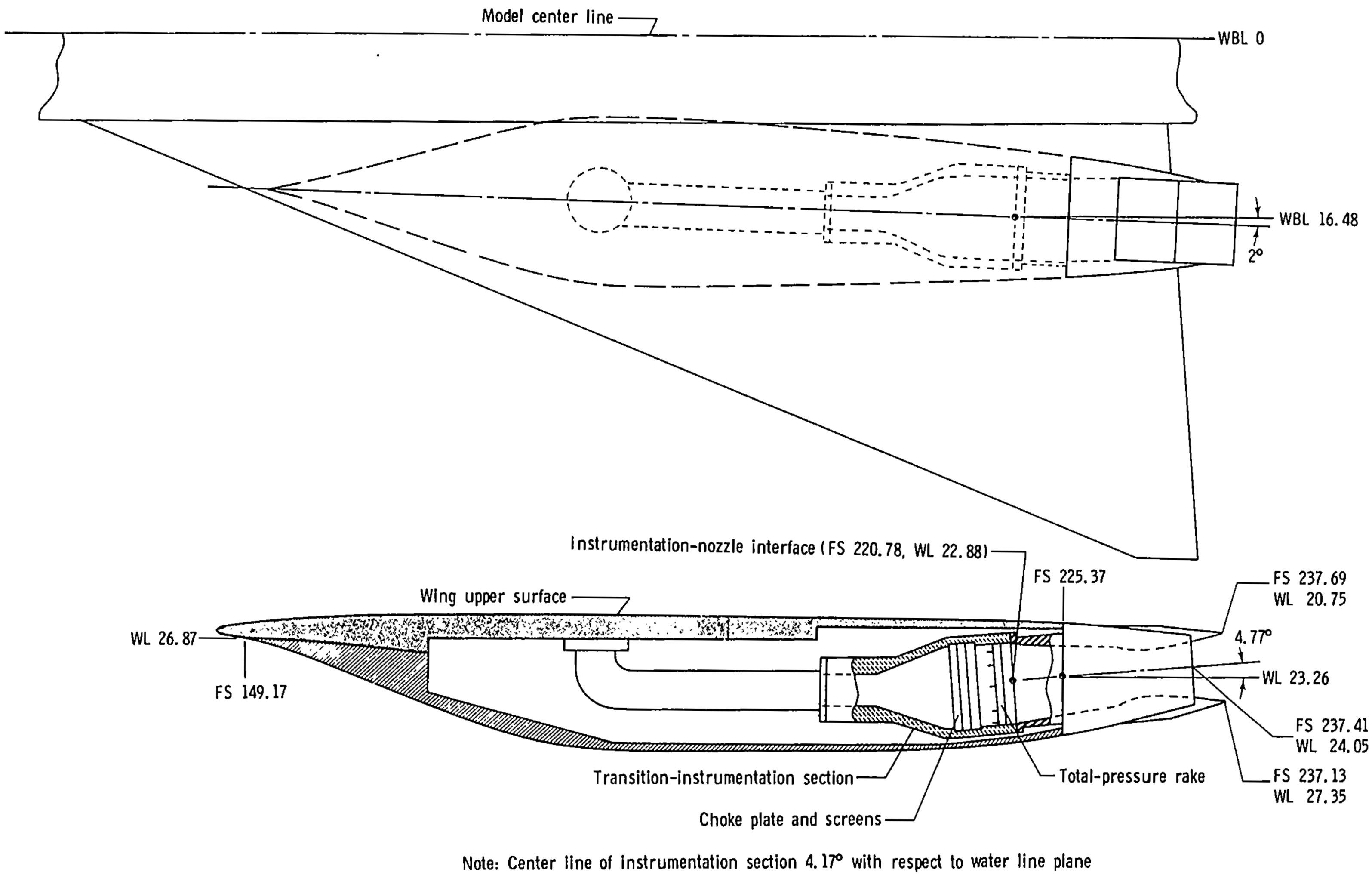


Figure 16.- Nacelle-nozzle installation for low-aspect-ratio IUM 2-D C-D nozzle. All dimensions in centimeters unless otherwise noted.

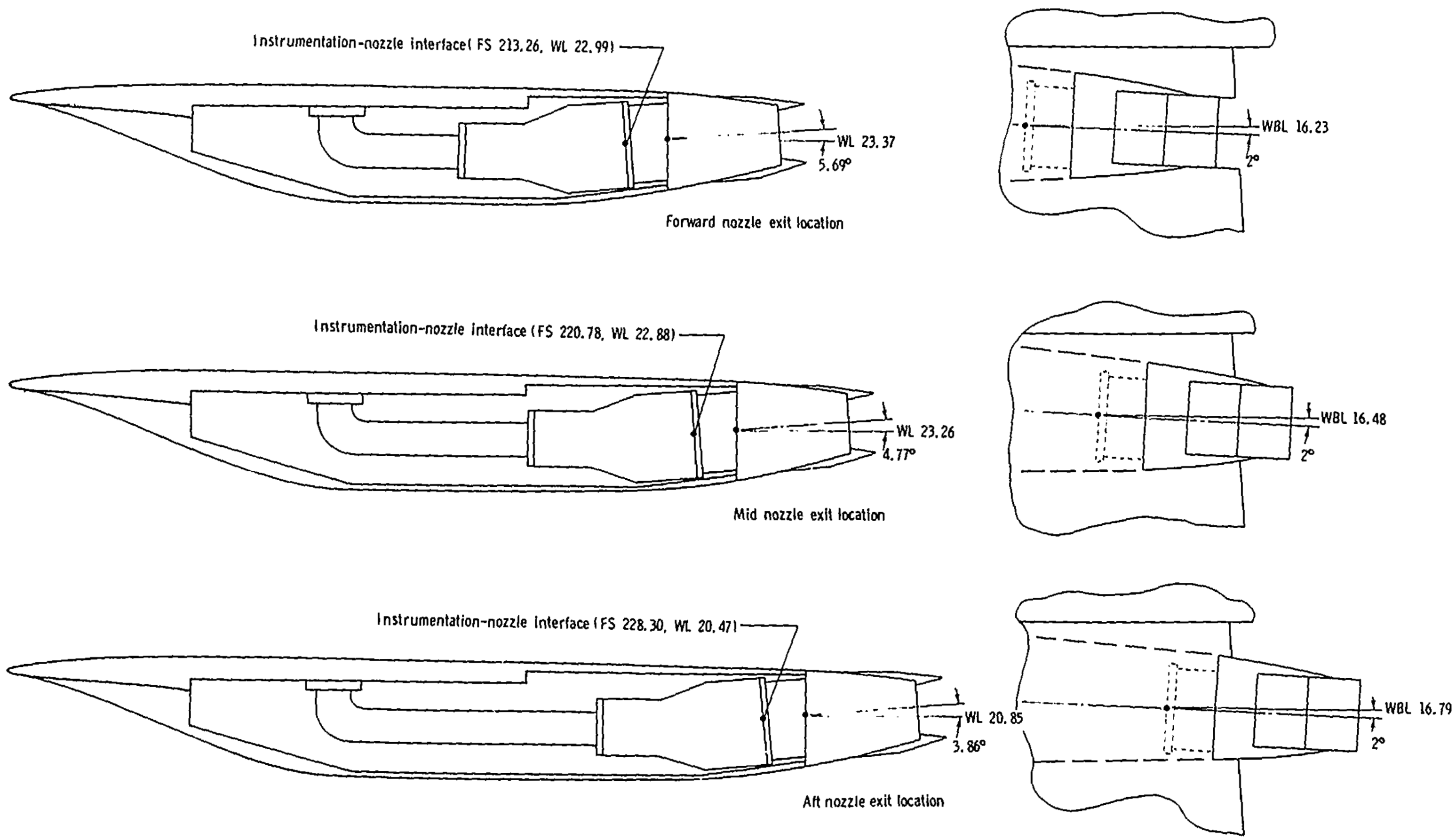
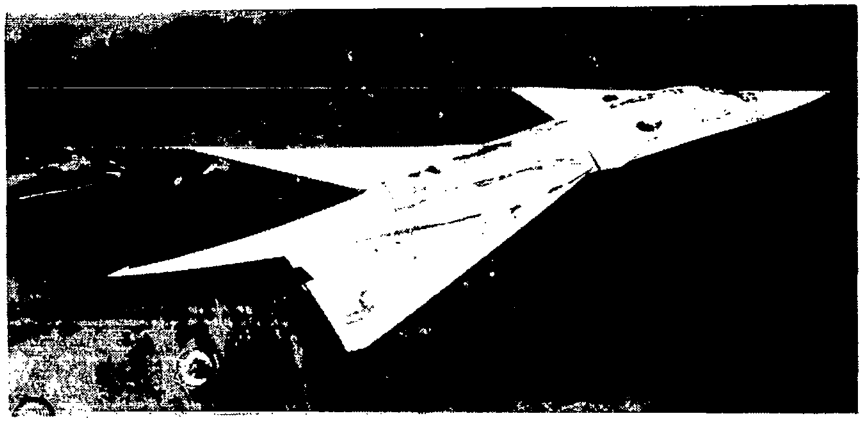
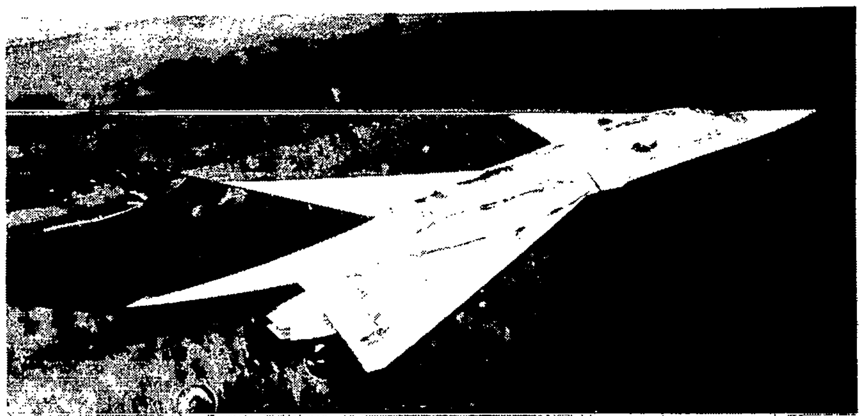


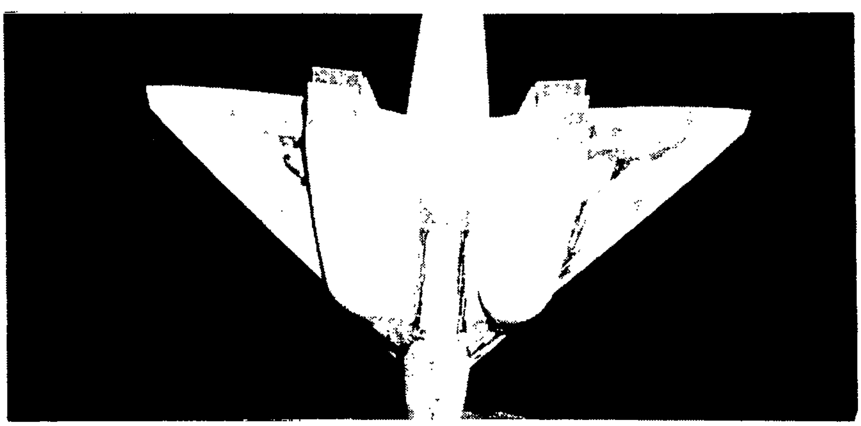
Figure 17.- Sketch showing the various 2-D C-D nozzle exit locations for inboard underwing nacelle. All dimensions in centimeters unless otherwise noted.



Forward exit, three-quarter front L-80-1228



Aft exit, three-quarter front L-80-1222



Aft exit, rear below L-80-1223

Figure 18.- Photographs showing 2-D C-D nozzle exit variation.

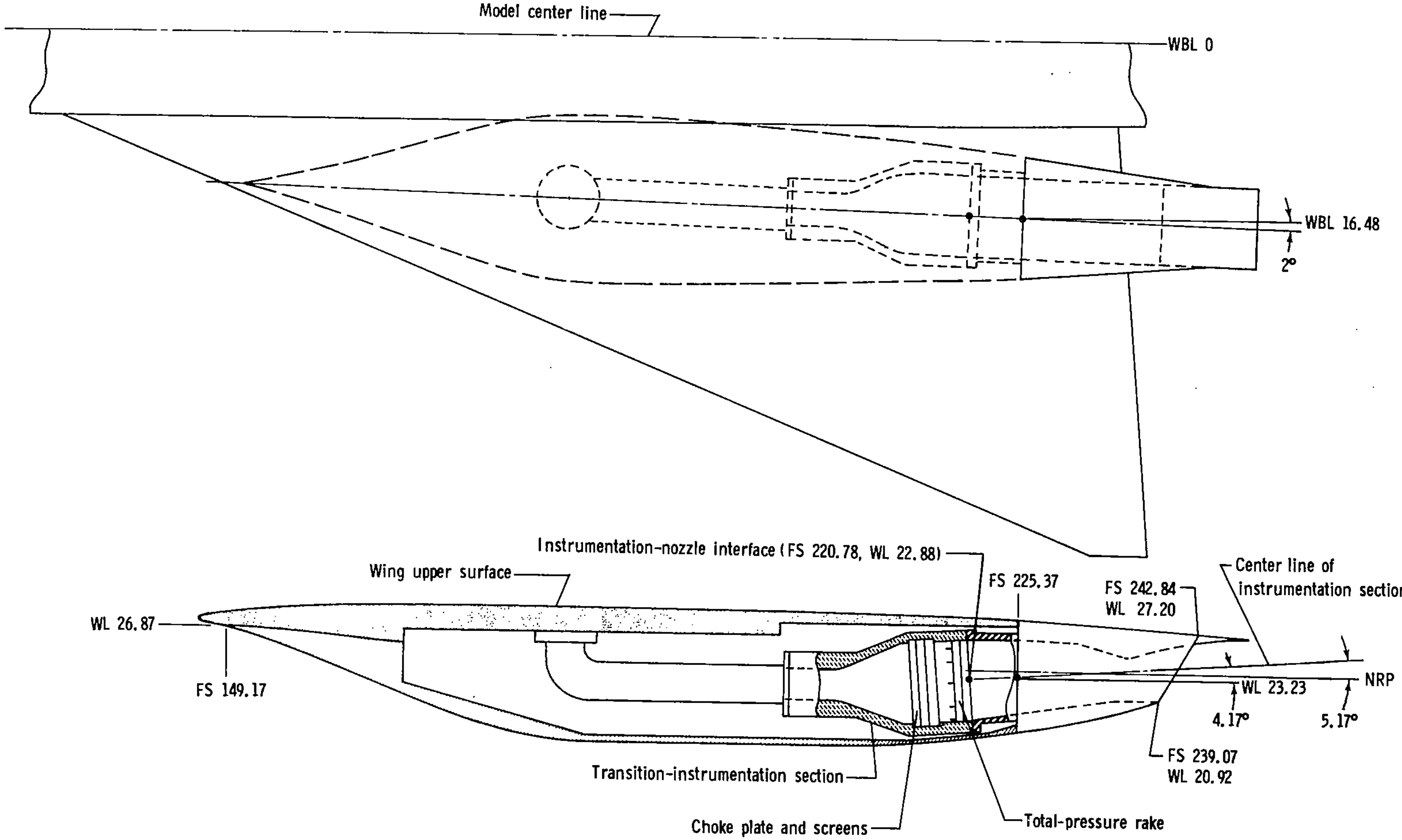


Figure 19.- Nacelle-nozzle installation for low-aspect-ratio IUM SERN.
All dimensions in centimeters unless otherwise noted.

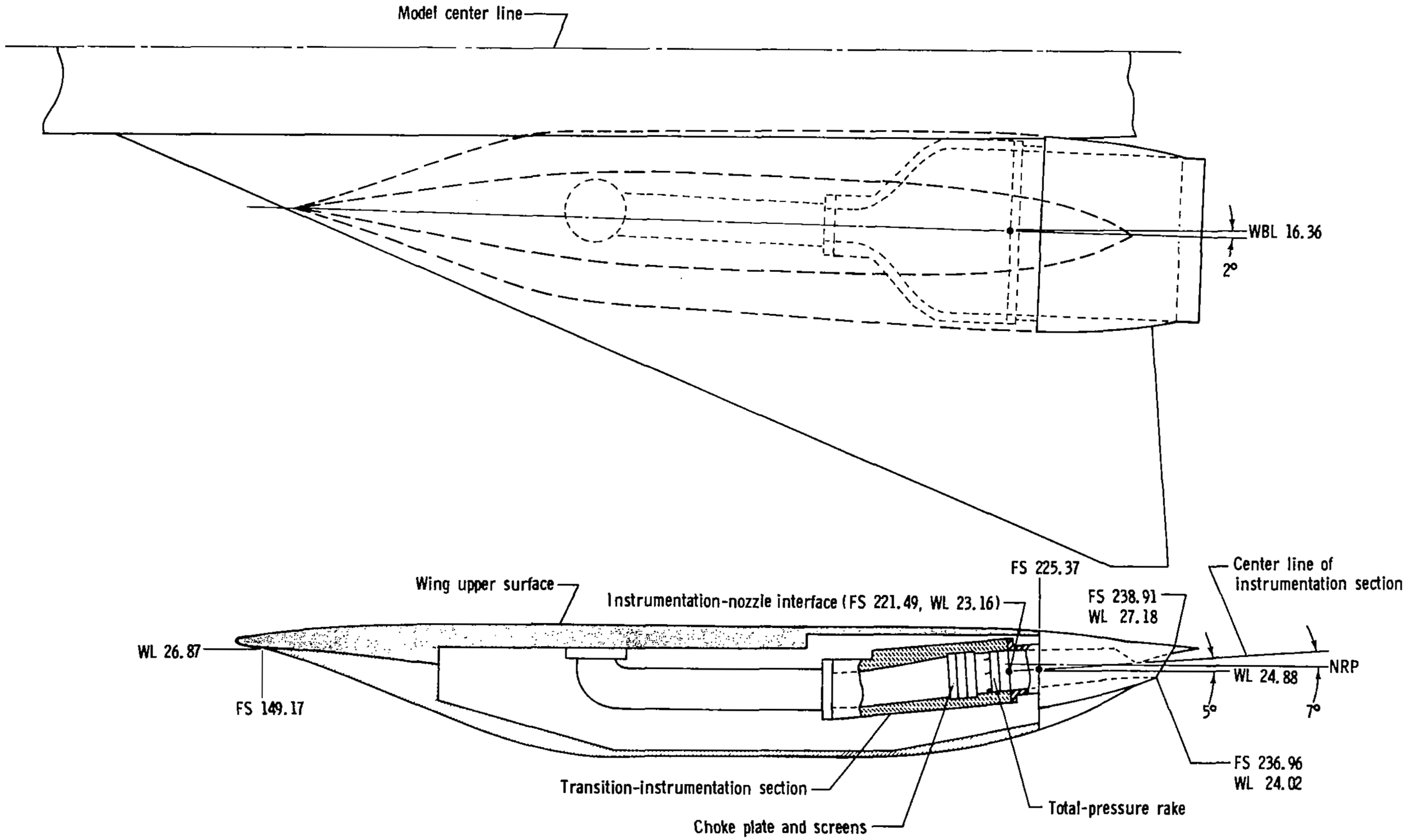


Figure 20.- Nacelle-nozzle installation for high-aspect-ratio IUM SERN.
All dimensions in centimeters unless otherwise noted.

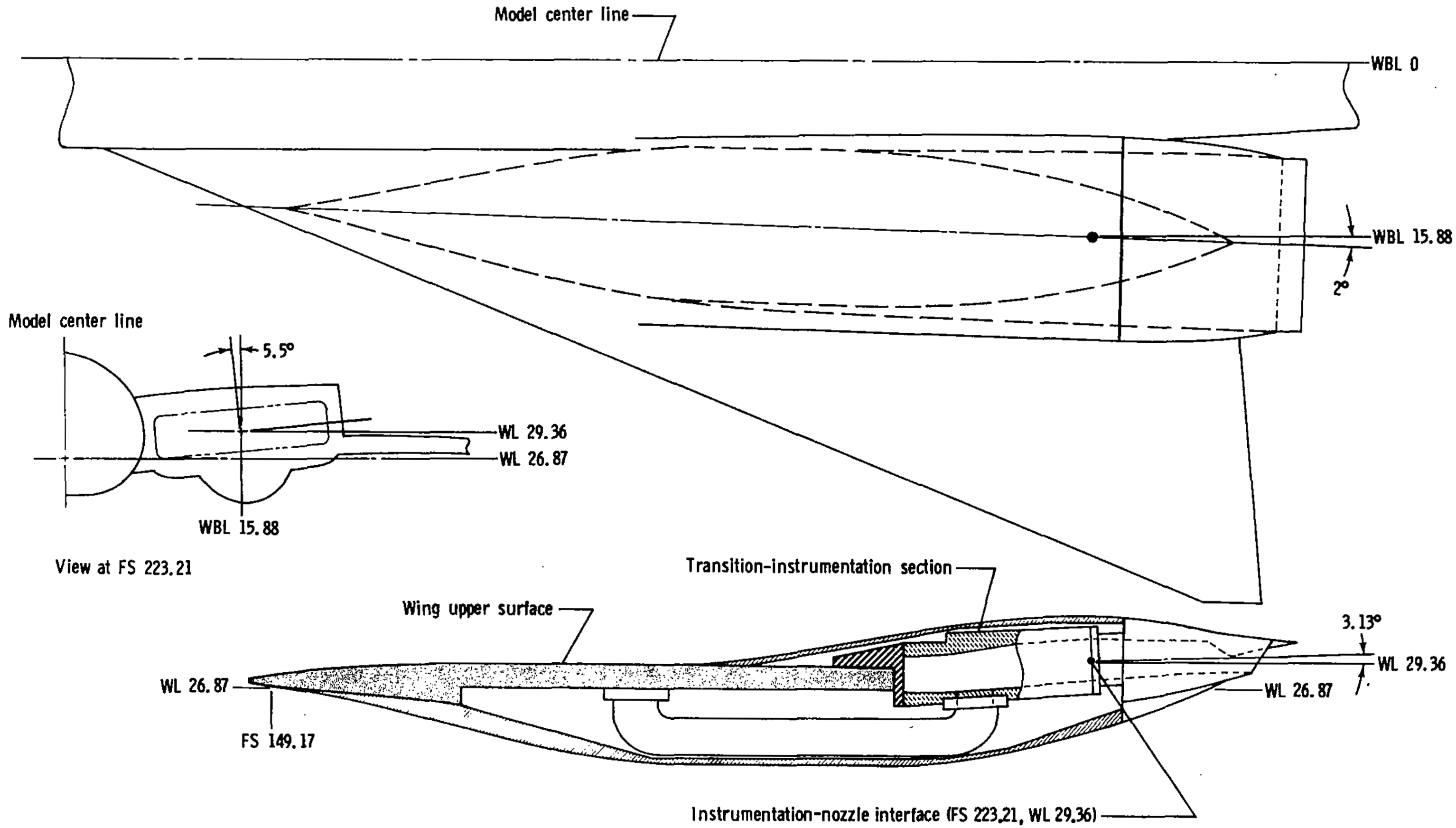
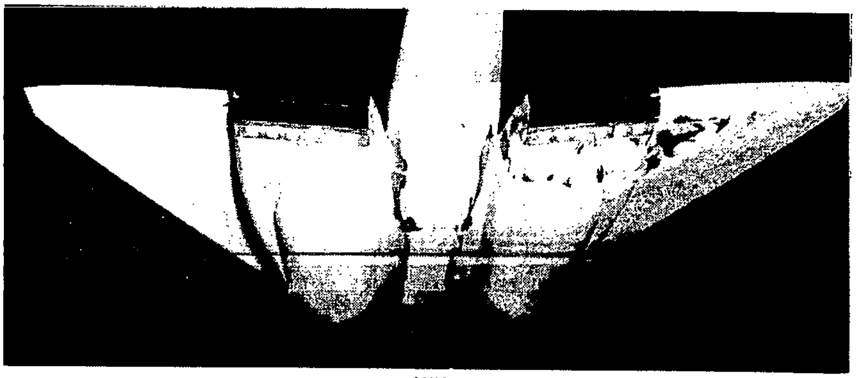
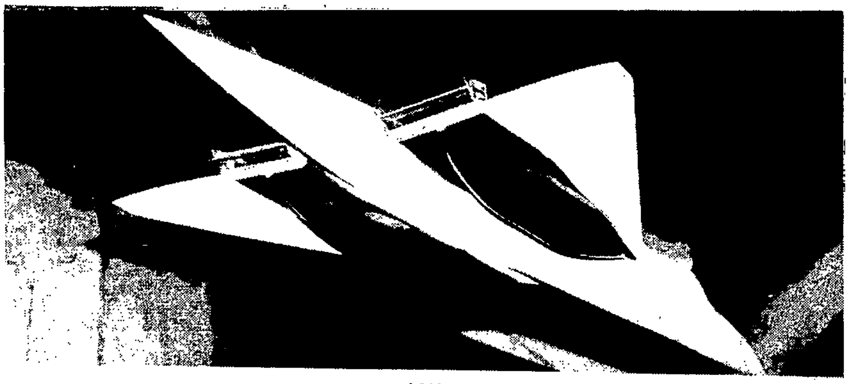


Figure 21.- Nacelle-nozzle installation for high-aspect-ratio IOM SERN. All dimensions in centimeters unless otherwise noted.



IUM L-79-5311



IOM L-80-1290

IOM L-80-1291

Figure 22.- Photographs showing various SERN installations. AR = 4.

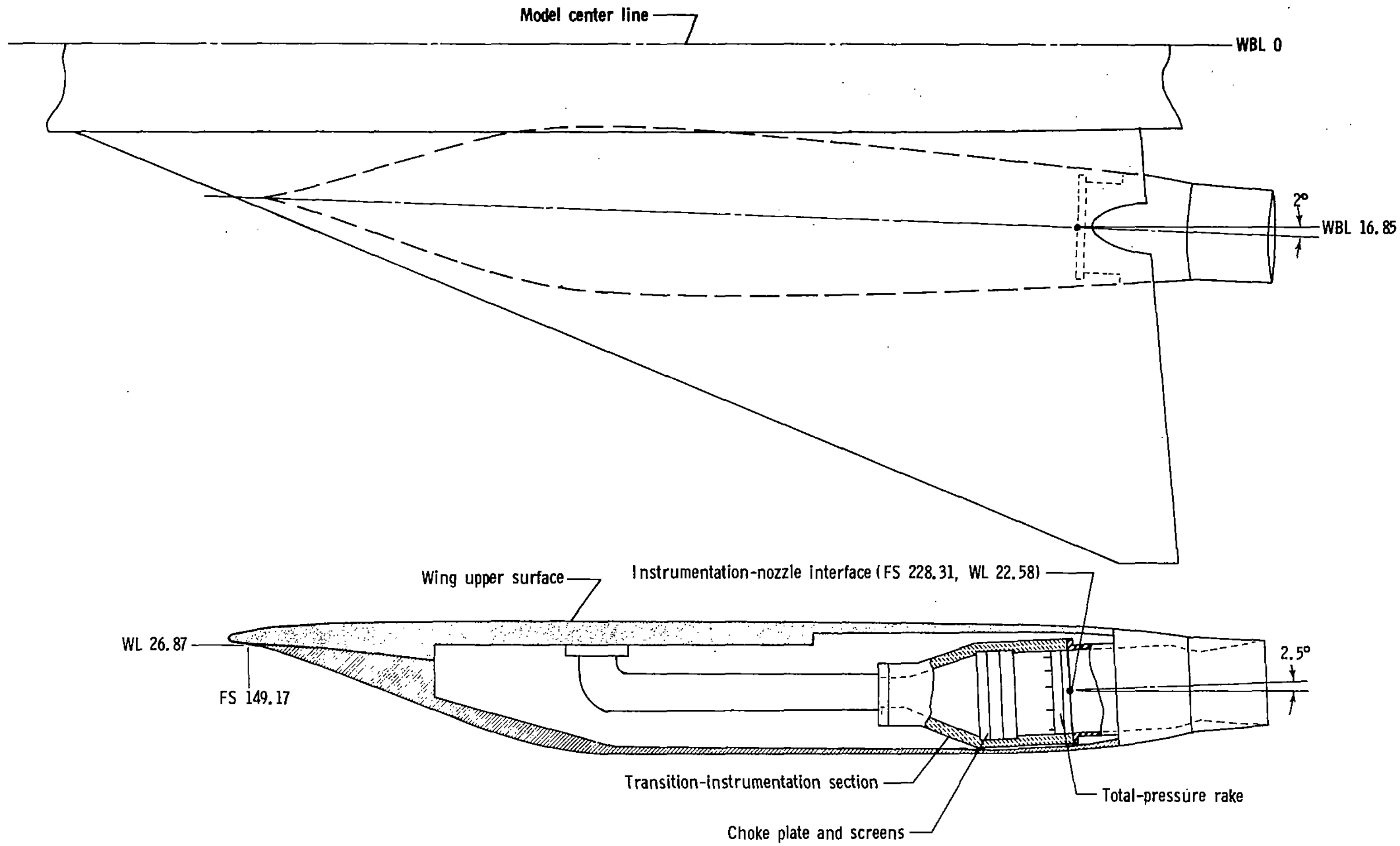
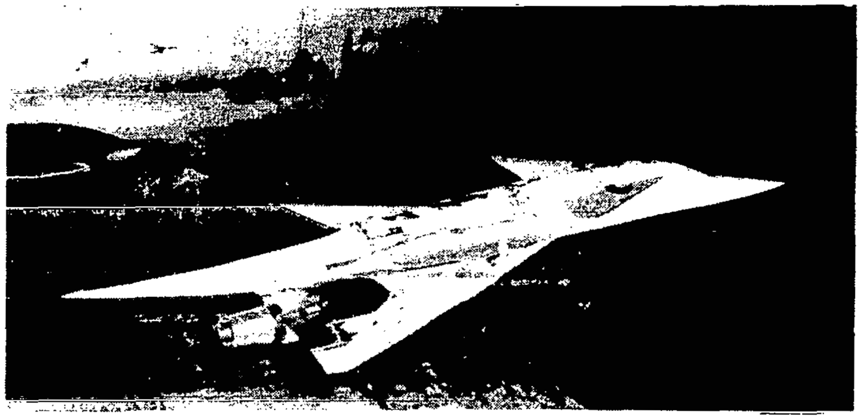
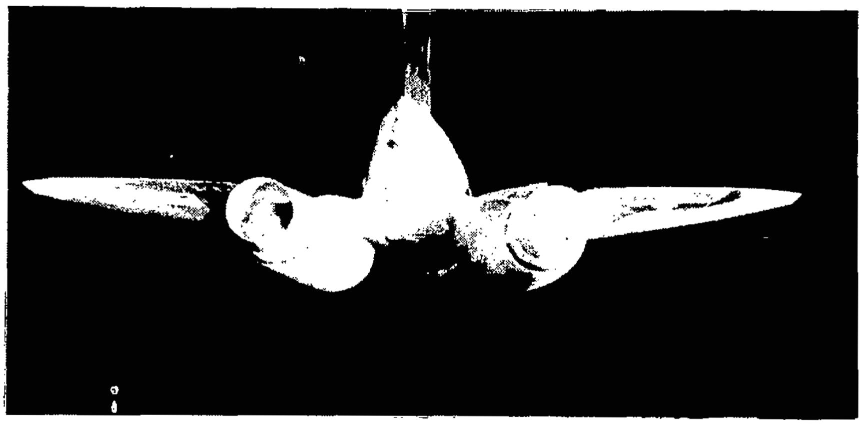


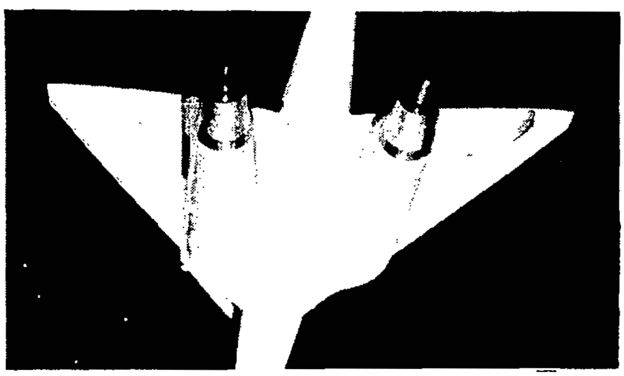
Figure 23.- Nacelle-nozzle installations for IUA axisymmetric nozzle. All dimensions in centimeters unless otherwise noted.



Three-quarter front L-80-1213



Rear L-80-1212



Rear below L-80-1214

Figure 24.- Photographs showing the IUA axisymmetric nozzle installation.

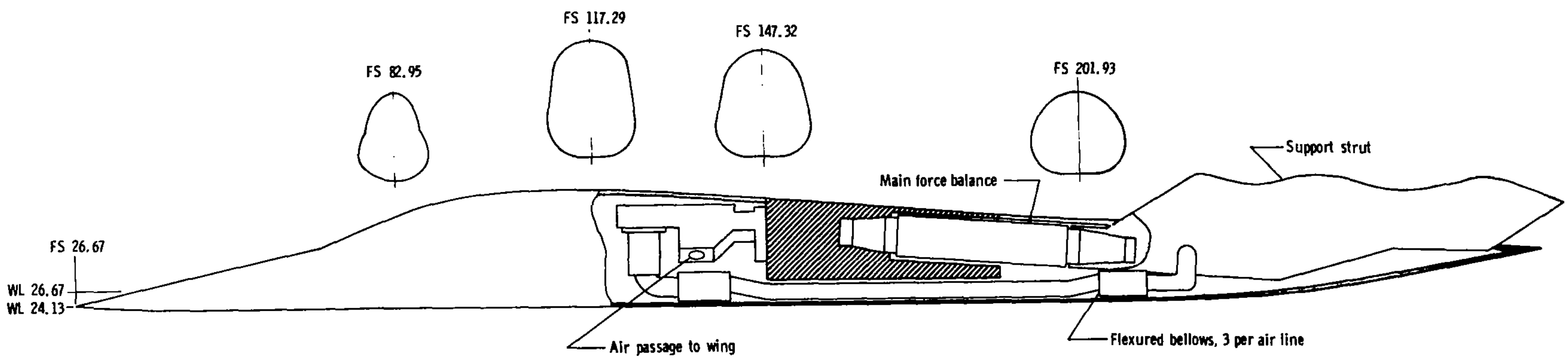


Figure 25.- Sketch showing body arrangement and internal-flow hardware. All dimensions in centimeters unless otherwise noted.

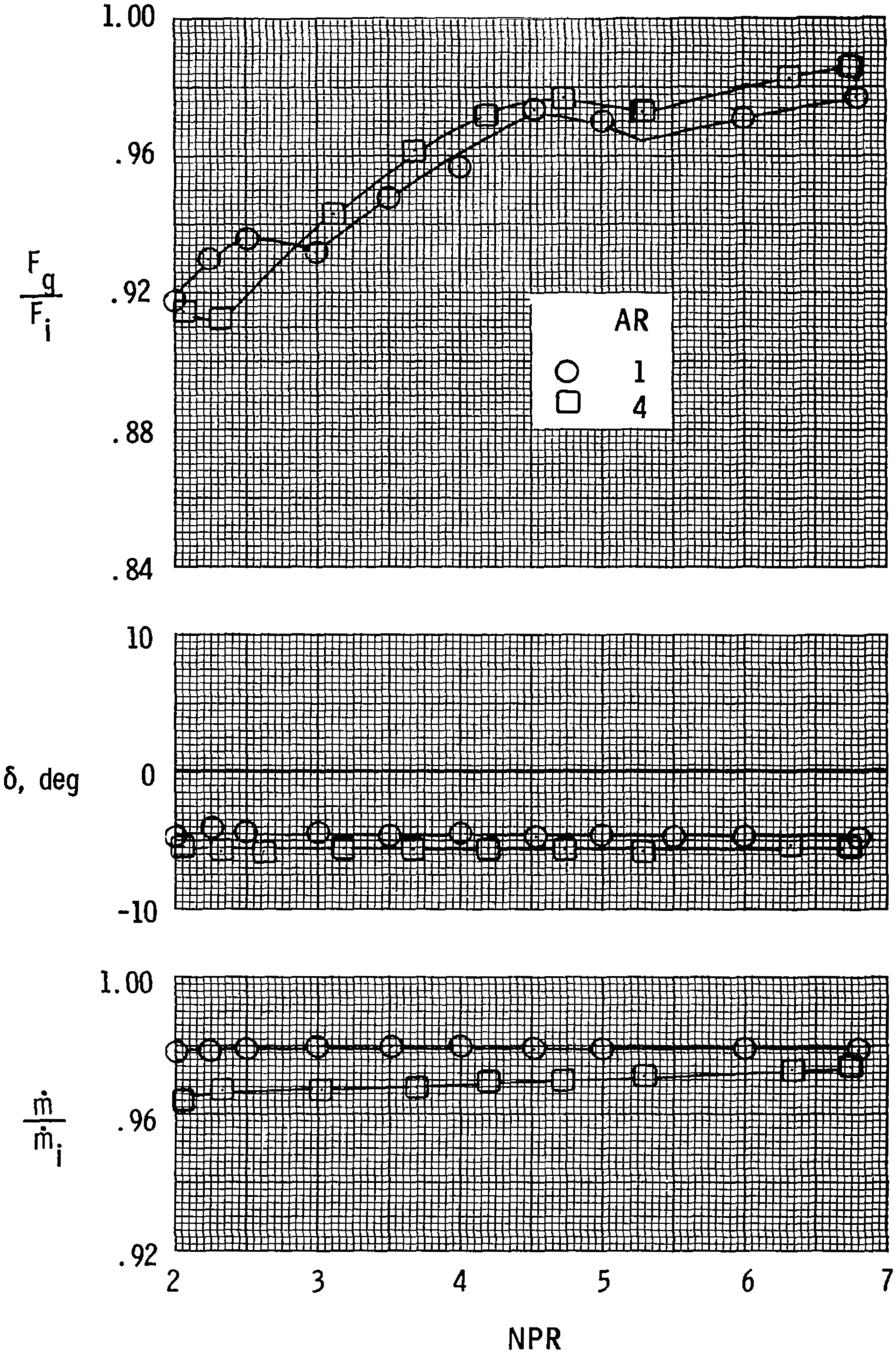


Figure 26.- Static performance characteristics for the IUM wedge nozzle with dry power setting. $\delta_v = 0^\circ$; M = 0.

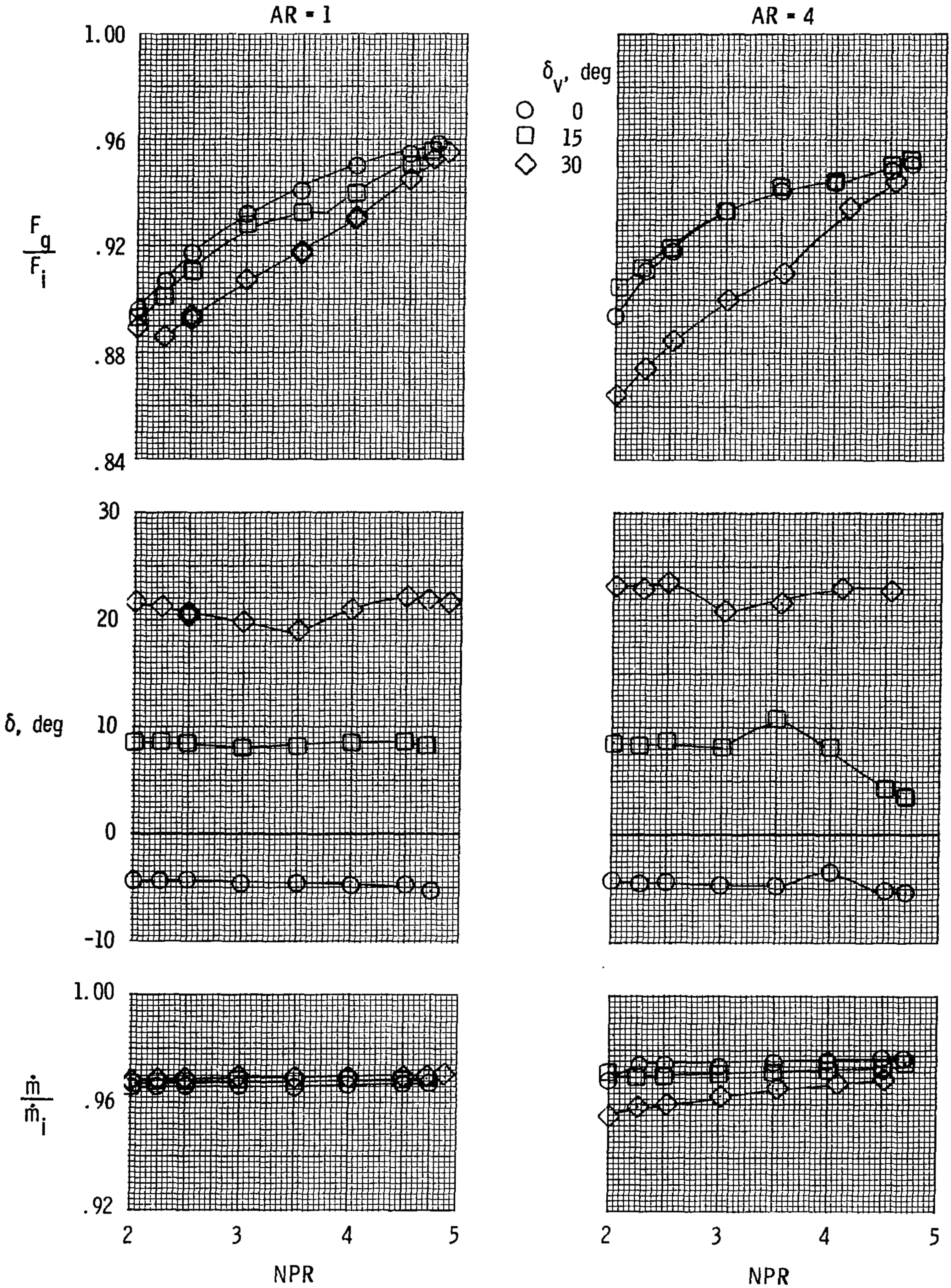
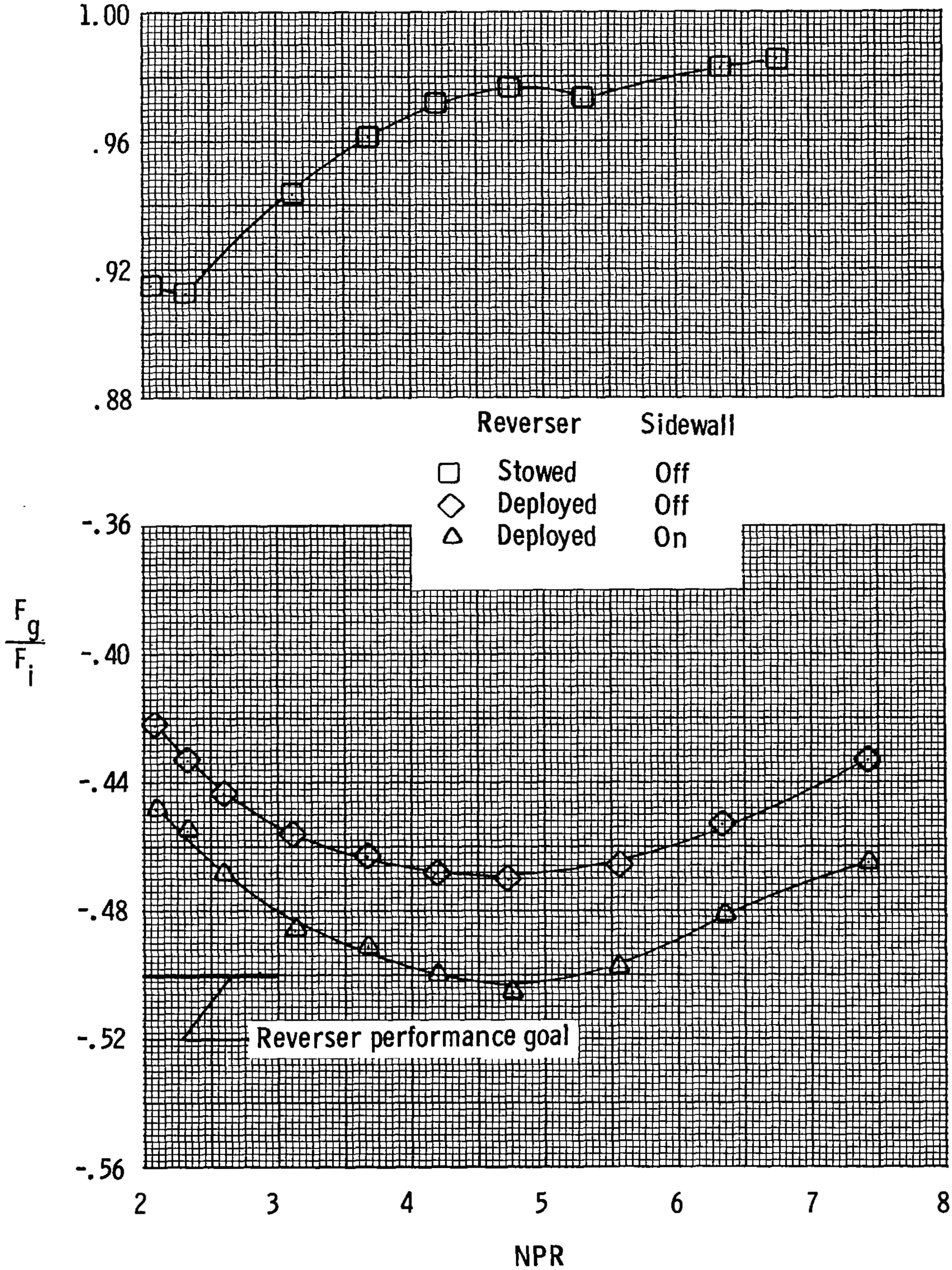
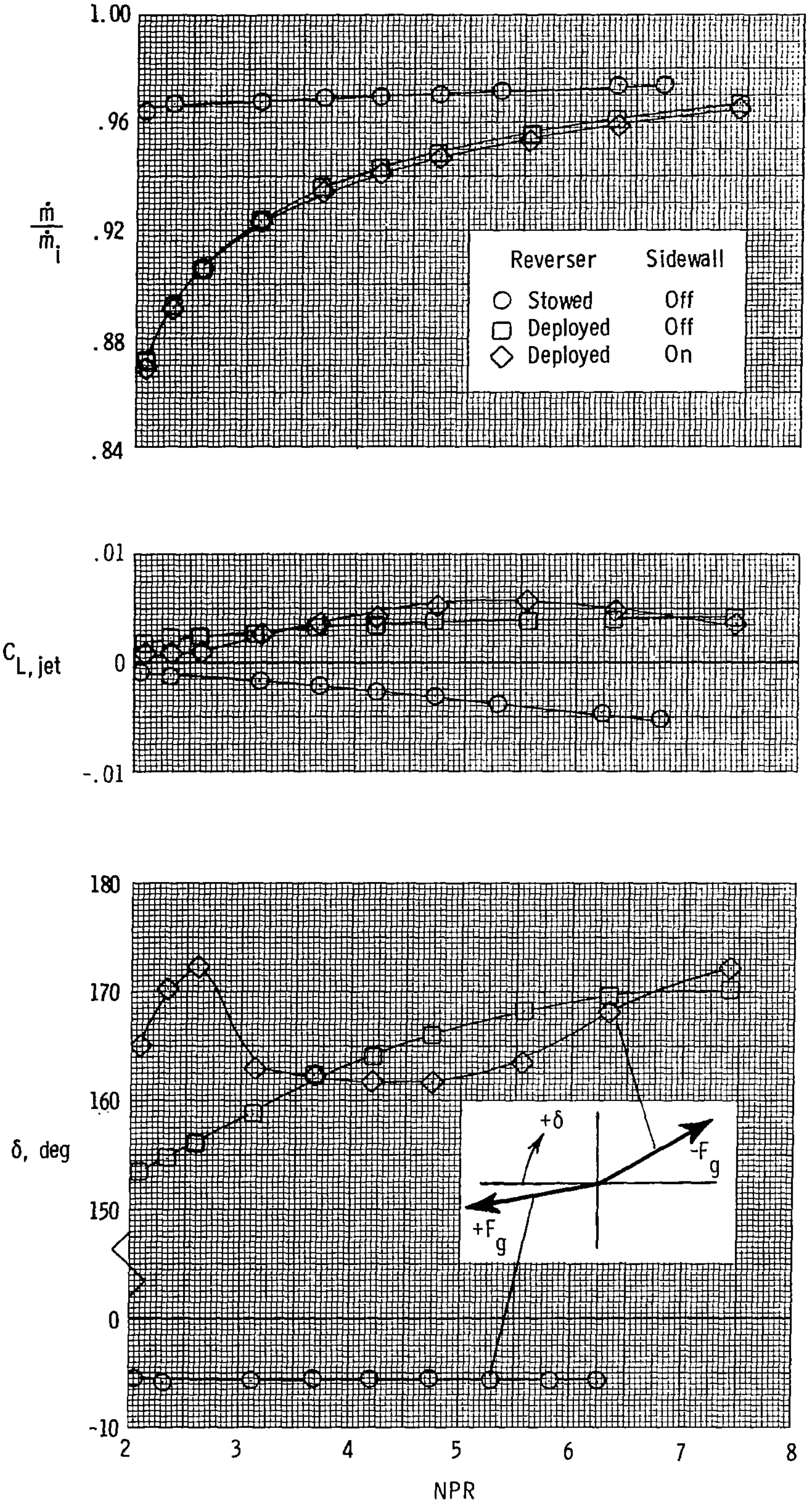


Figure 27.- Static performance characteristics for the IUM wedge nozzle with A/B power setting. M = 0.



(a) Thrust ratio.

Figure 28.- Static reverser performance characteristics for the IUM wedge nozzle with dry power setting. AR = 4; $\delta_v = 0^{\circ}$; M = 0.



(b) Discharge coefficient, jet-lift coefficient, and turning angle.

Figure 28.- Concluded.

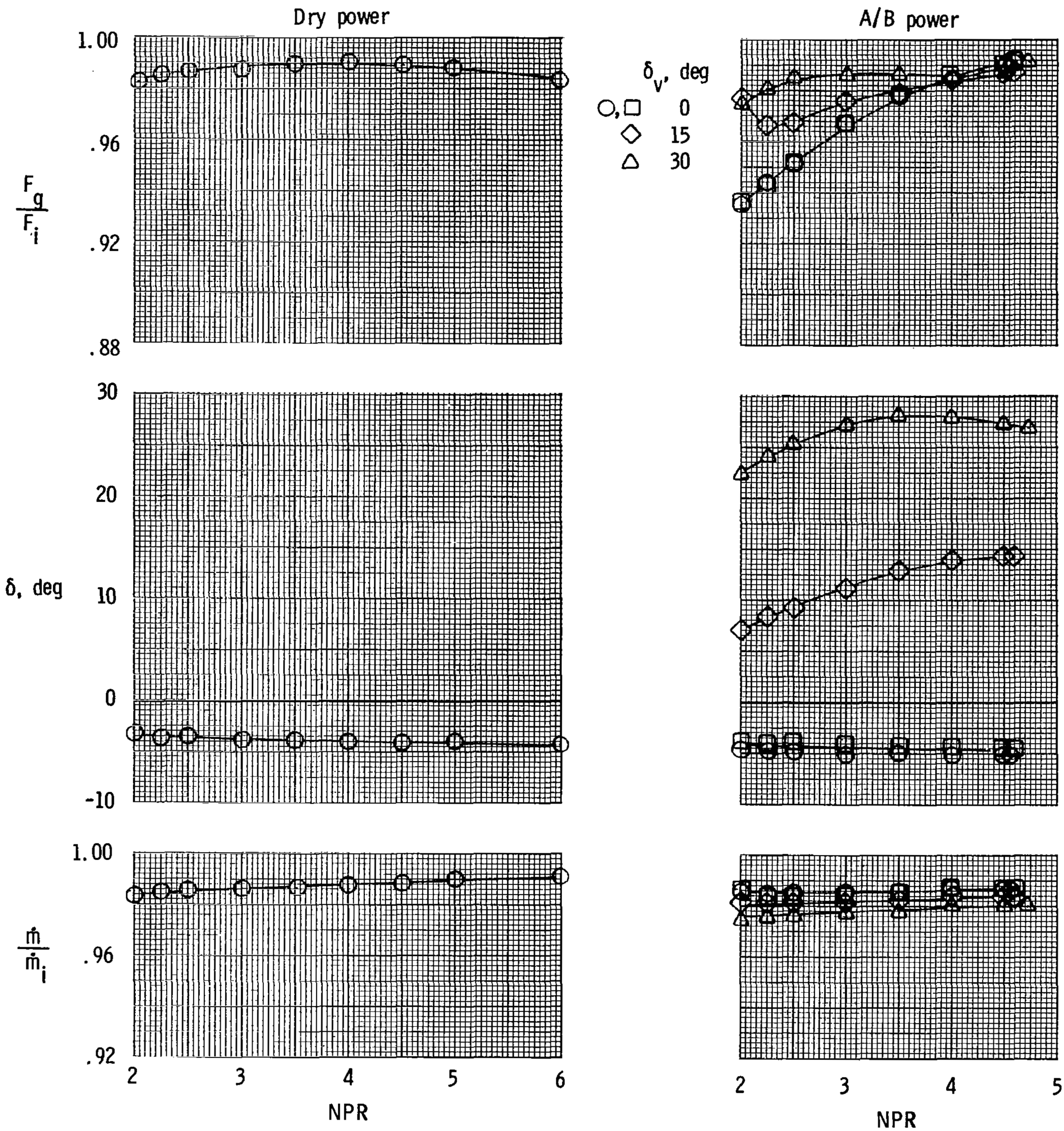


Figure 29.- Static performance characteristics for the IUM 2-D C-D nozzle. AR = 1; M = 0.

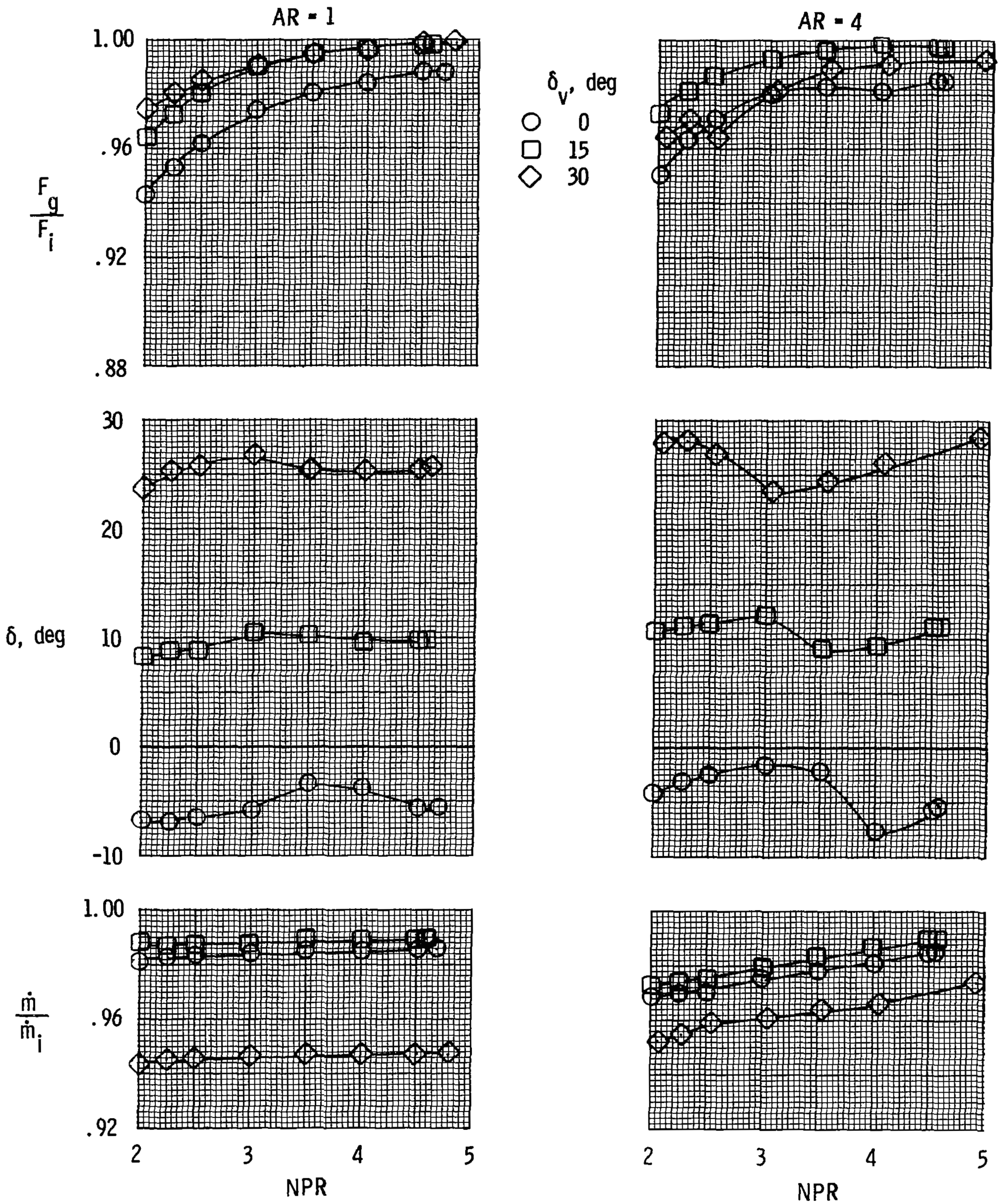


Figure 30.- Static performance characteristics for the IUM SERN with A/B power setting. M = 0.

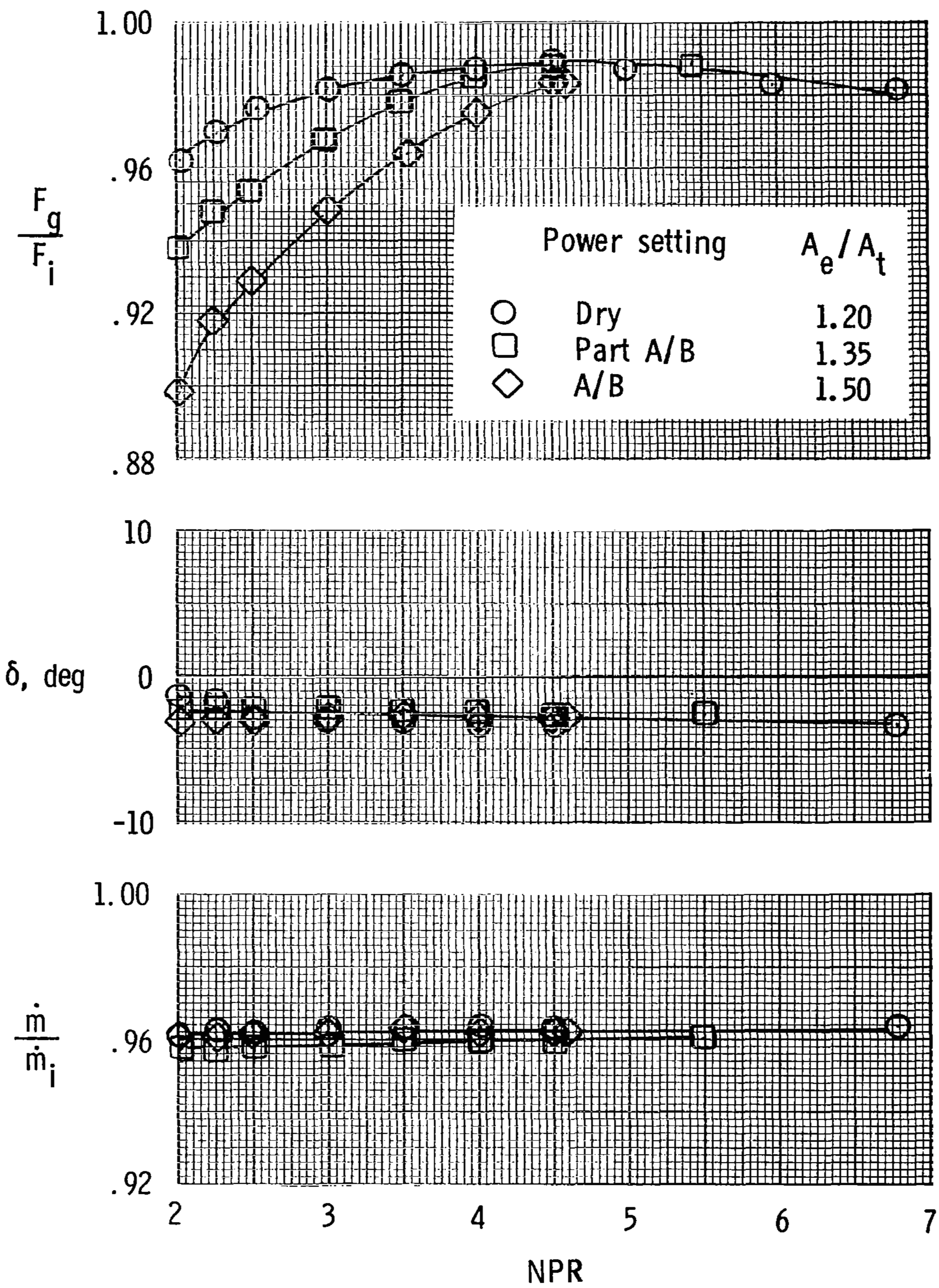


Figure 31.- Static performance characteristics for the IUA axisymmetric nozzle. $\delta_v = 0^o$; M = 0.

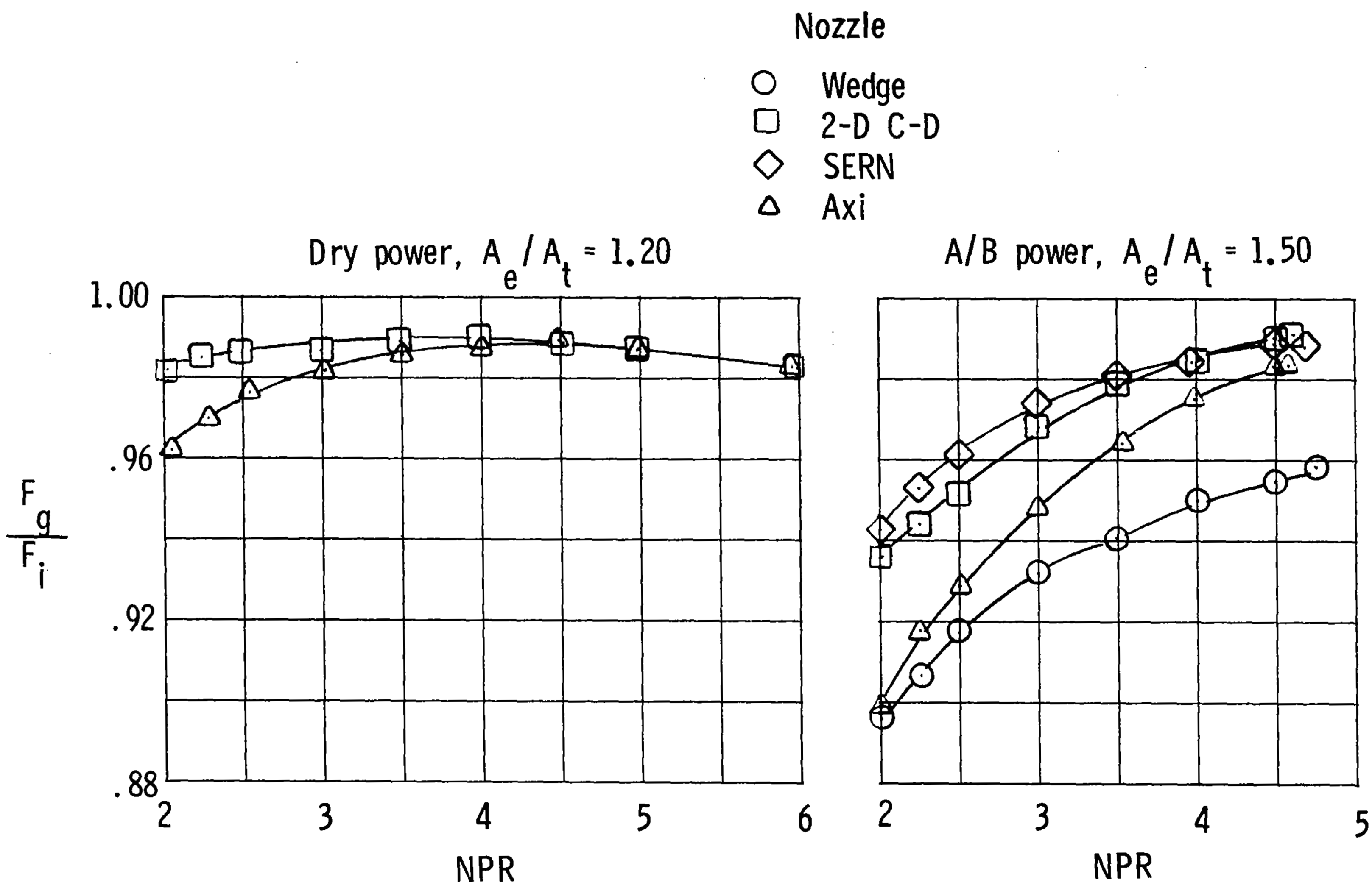


Figure 32.- Comparison of unvectored-nozzle static performance for AR = 1. $\delta_v = 0^{\circ}$; M = 0.

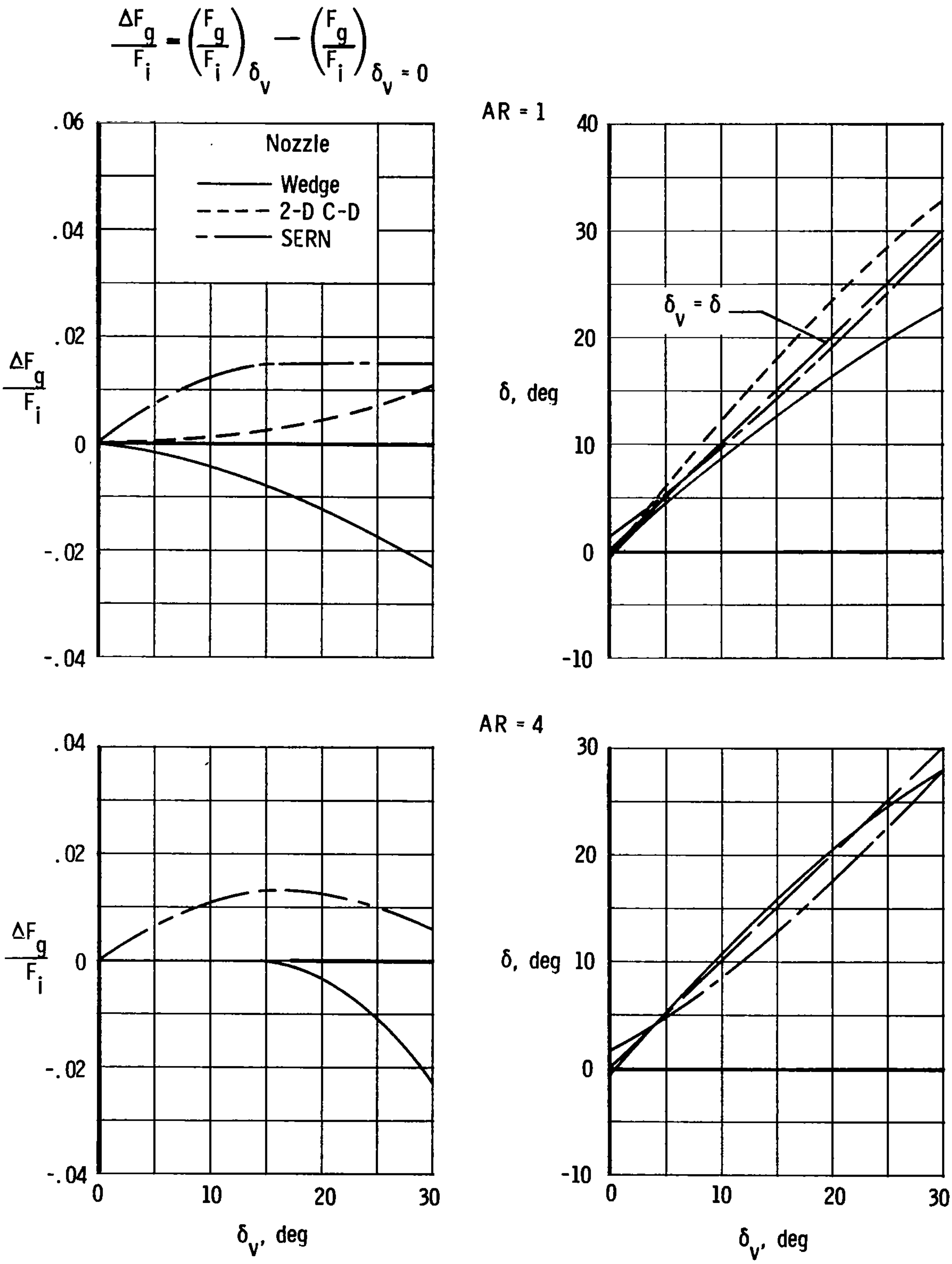


Figure 33.- Comparison of vectored-nozzle performance with A/B power setting. NPR = 3.5; M = 0.

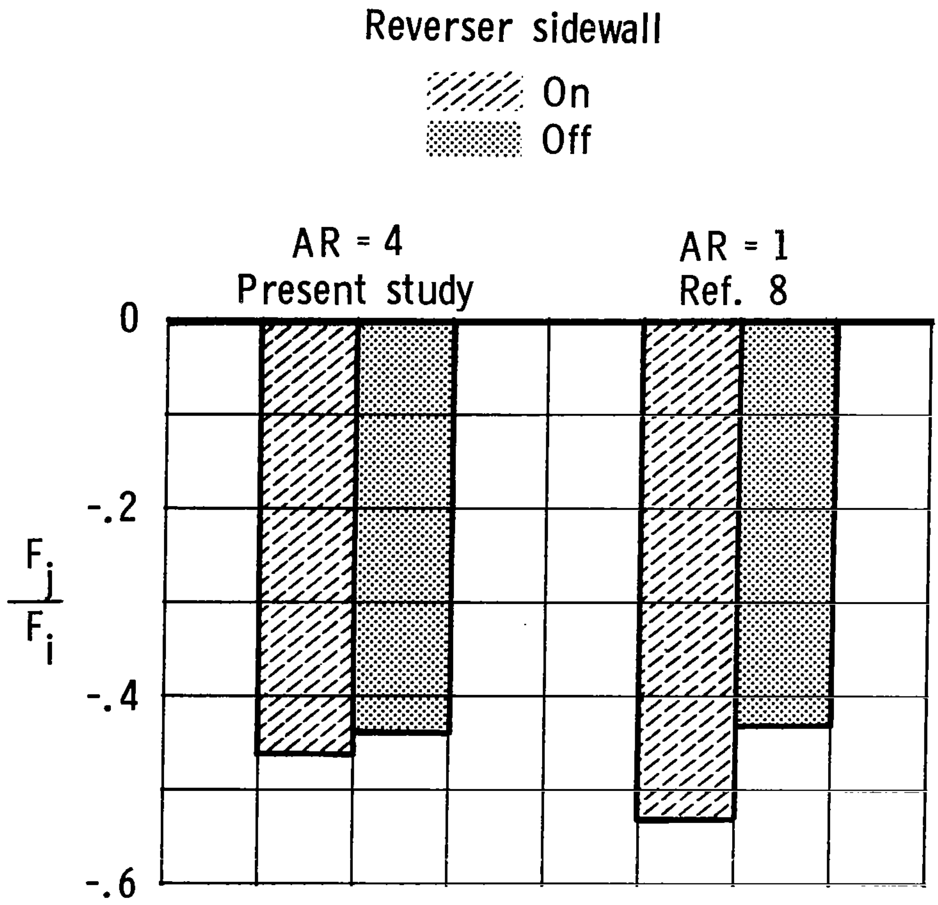
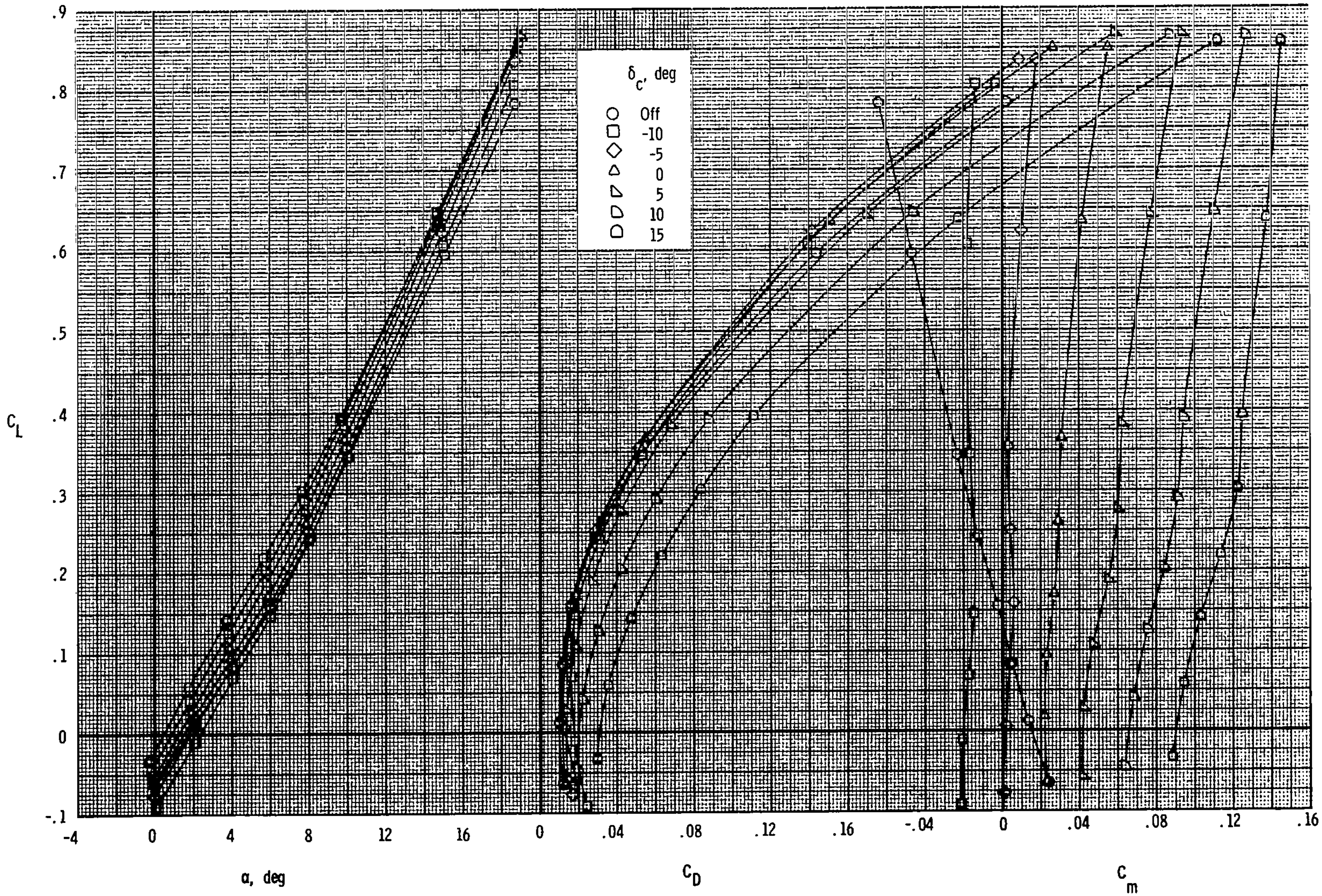
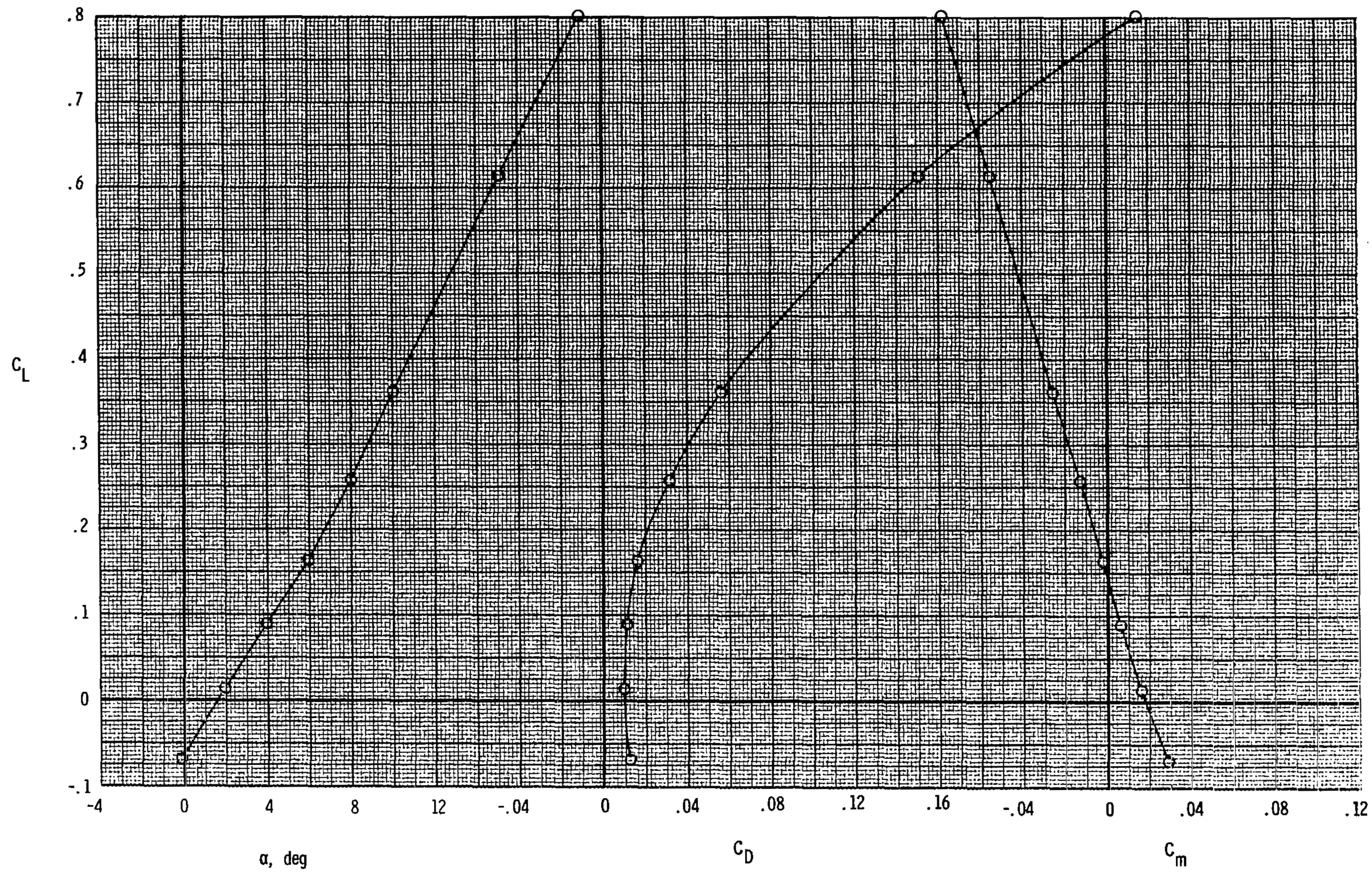


Figure 34.- Effects of sidewalls on wedge reverser static performance. NPR = 2.5; $\delta_v = 0^{\circ}$; M = 0.



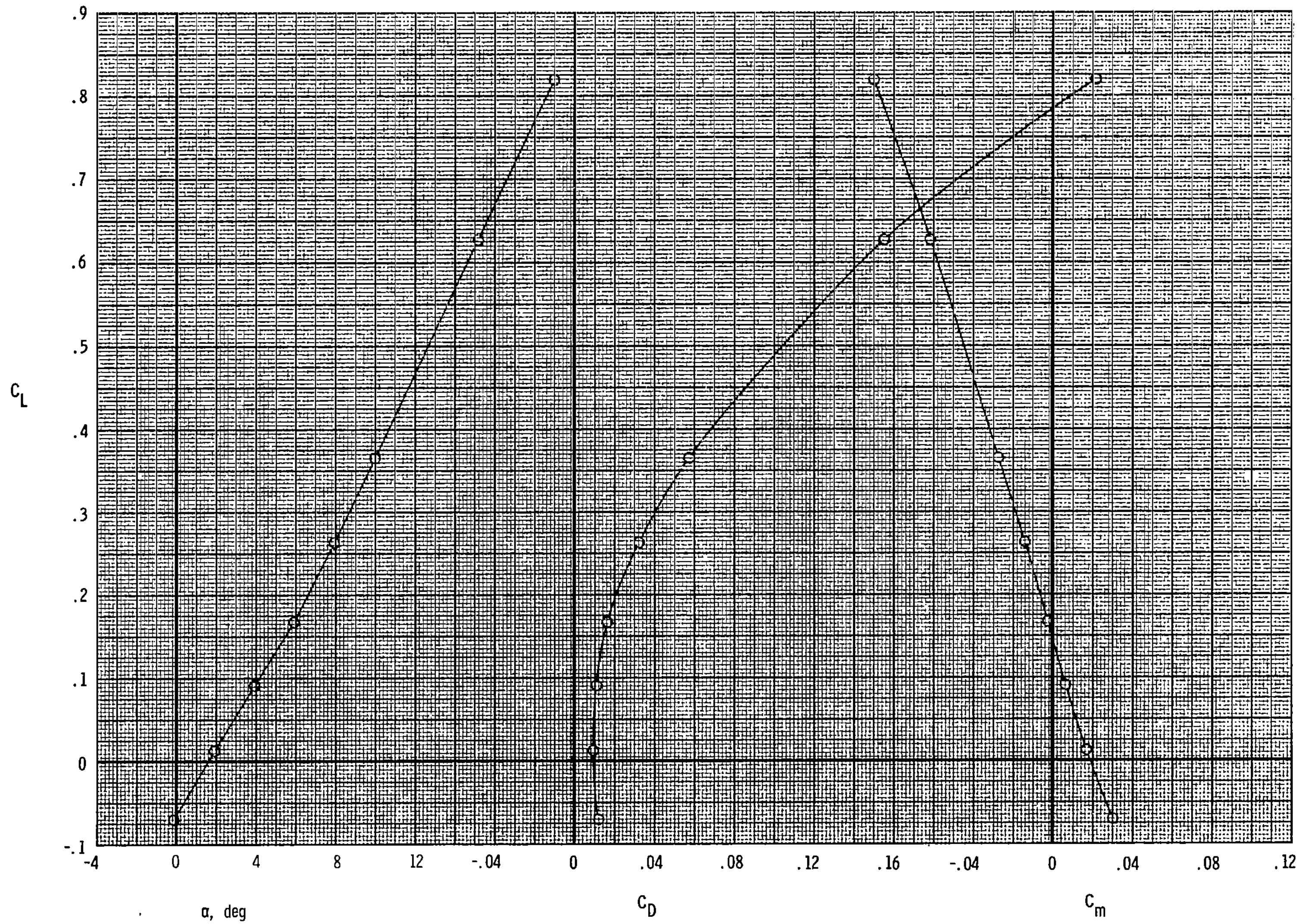
(a) M = 0.60.

Figure 35.- Longitudinal aerodynamic characteristics for the wing-body-canard combination.



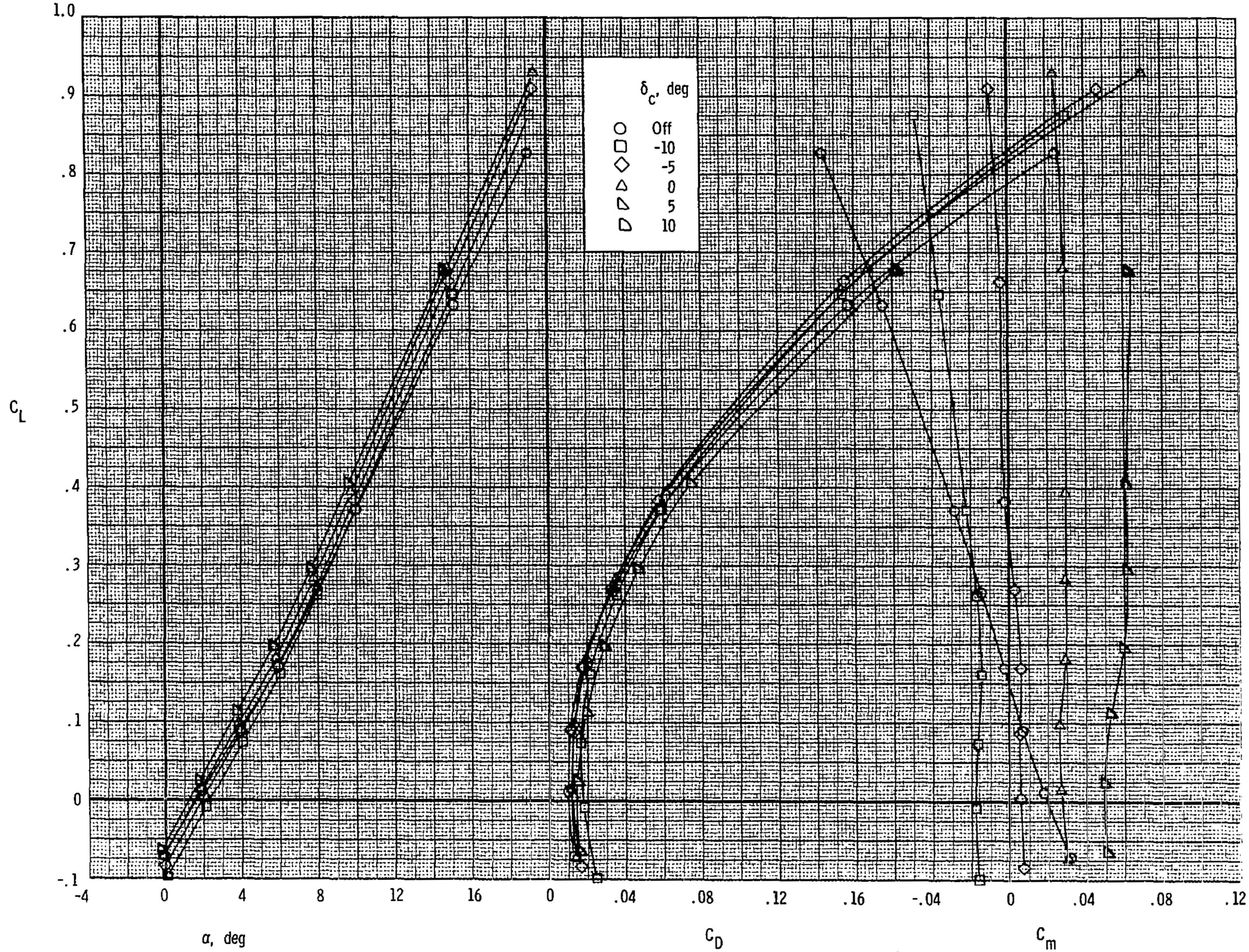
(b) M = 0.80, canard off.

Figure 35.- Continued.



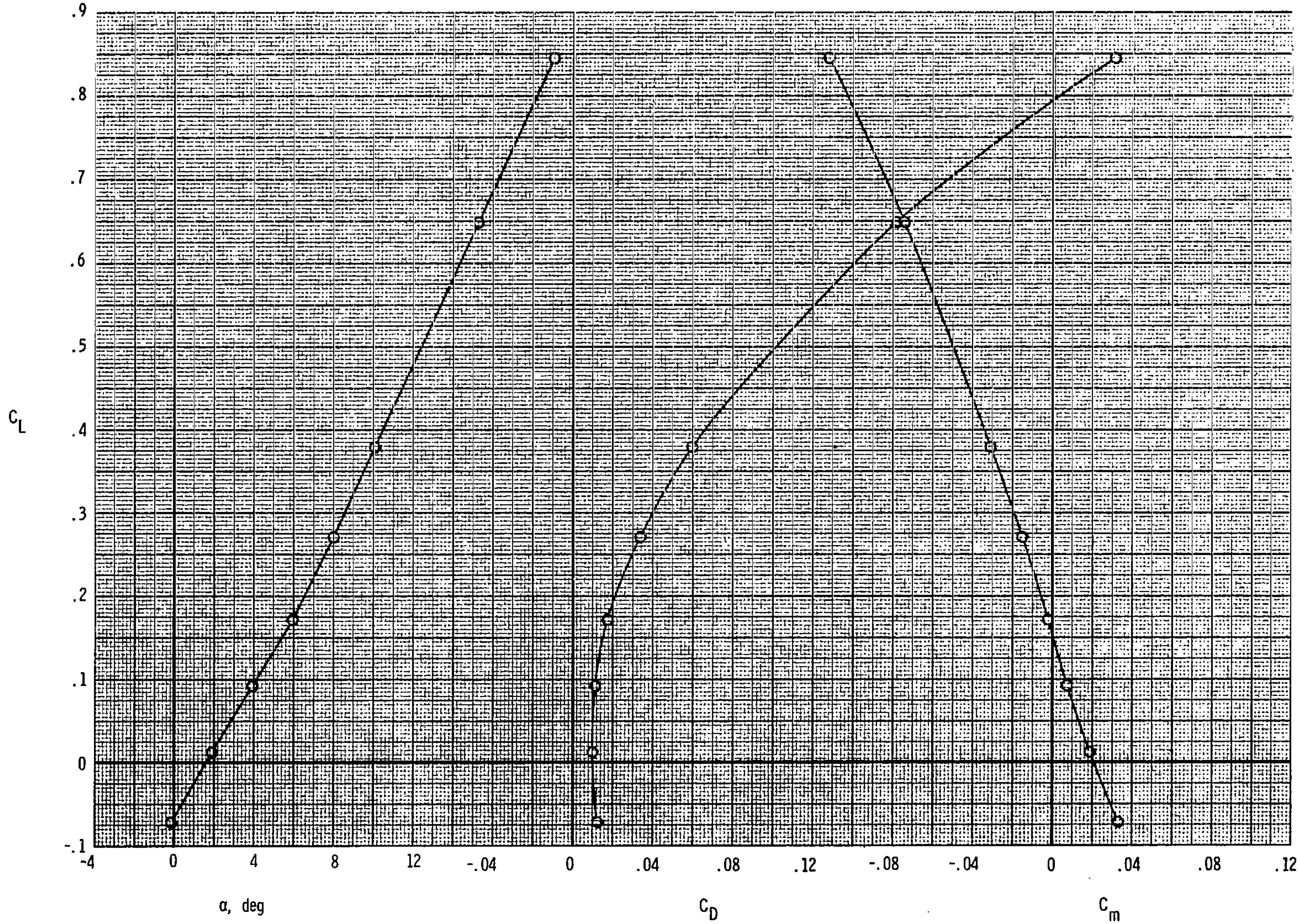
(c) M = 0.85, canard off.

Figure 35.- Continued.



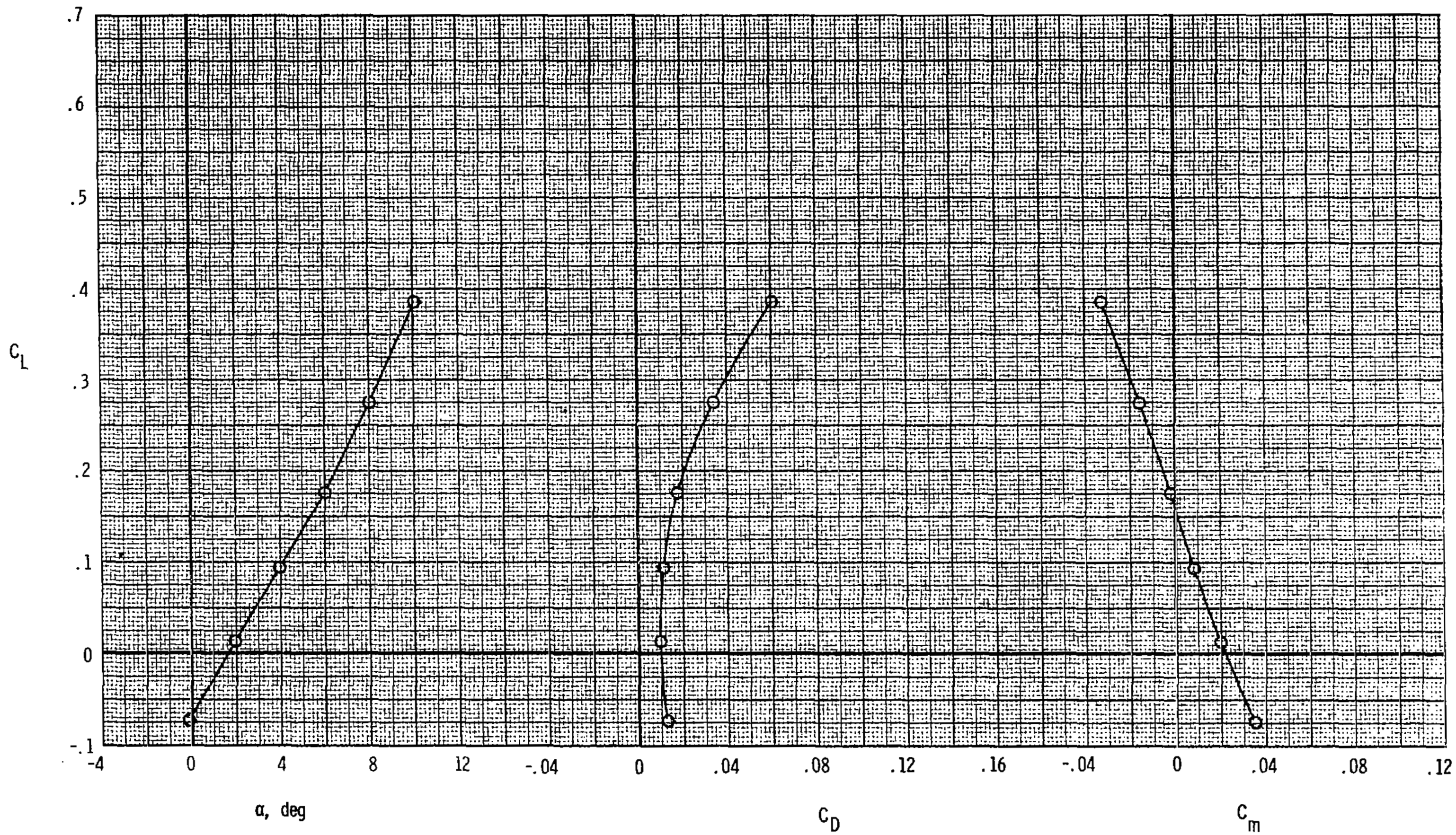
(d) M = 0.87.

Figure 35.- Continued.



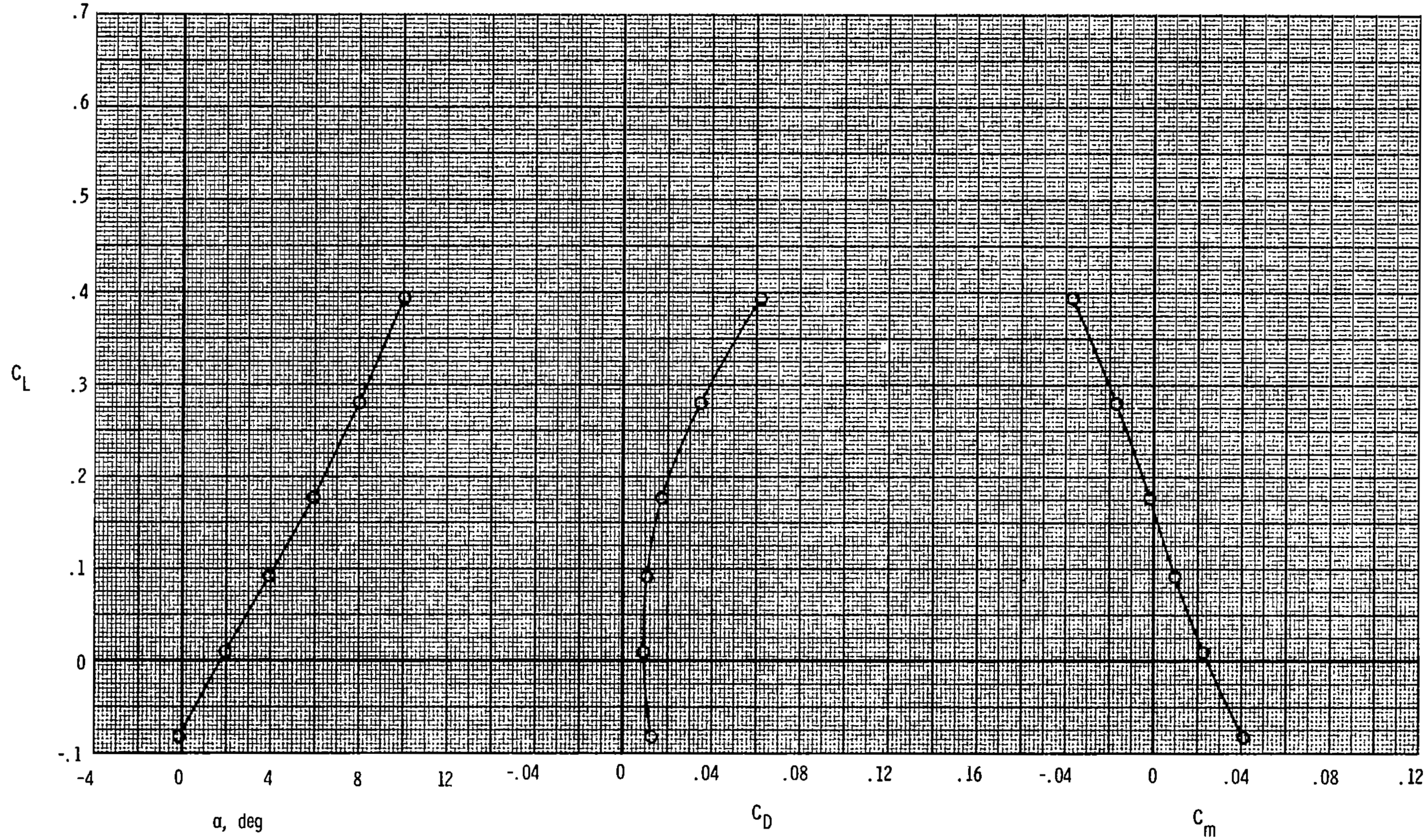
(e) M = 0.90, canard off.

Figure 35.- Continued.



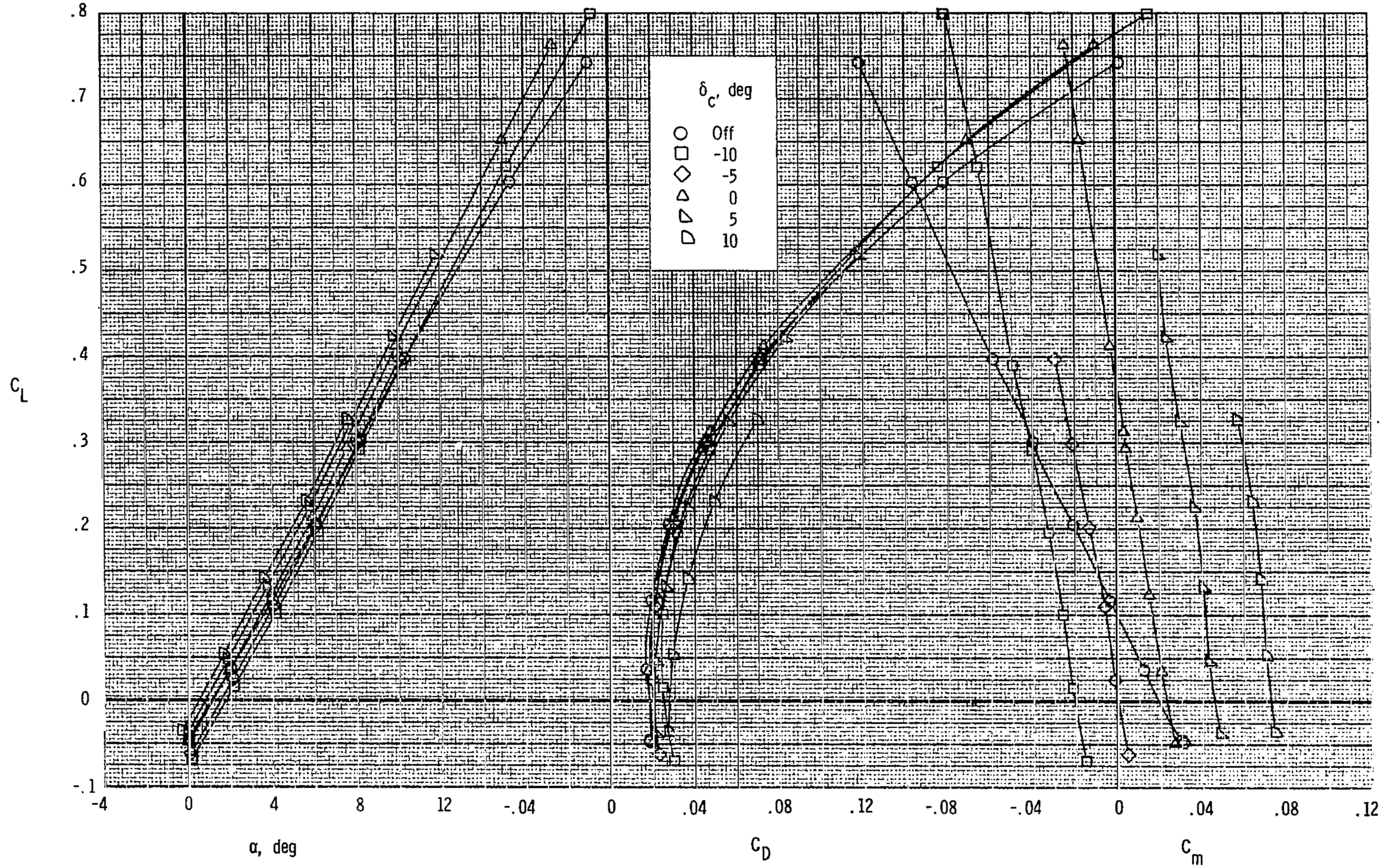
(f) M = 0.92, canard off.

Figure 35.- Continued.



(g) M = 0.95, canard off.

Figure 35.- Continued.



(h) M = 1.20.

Figure 35.- Concluded.

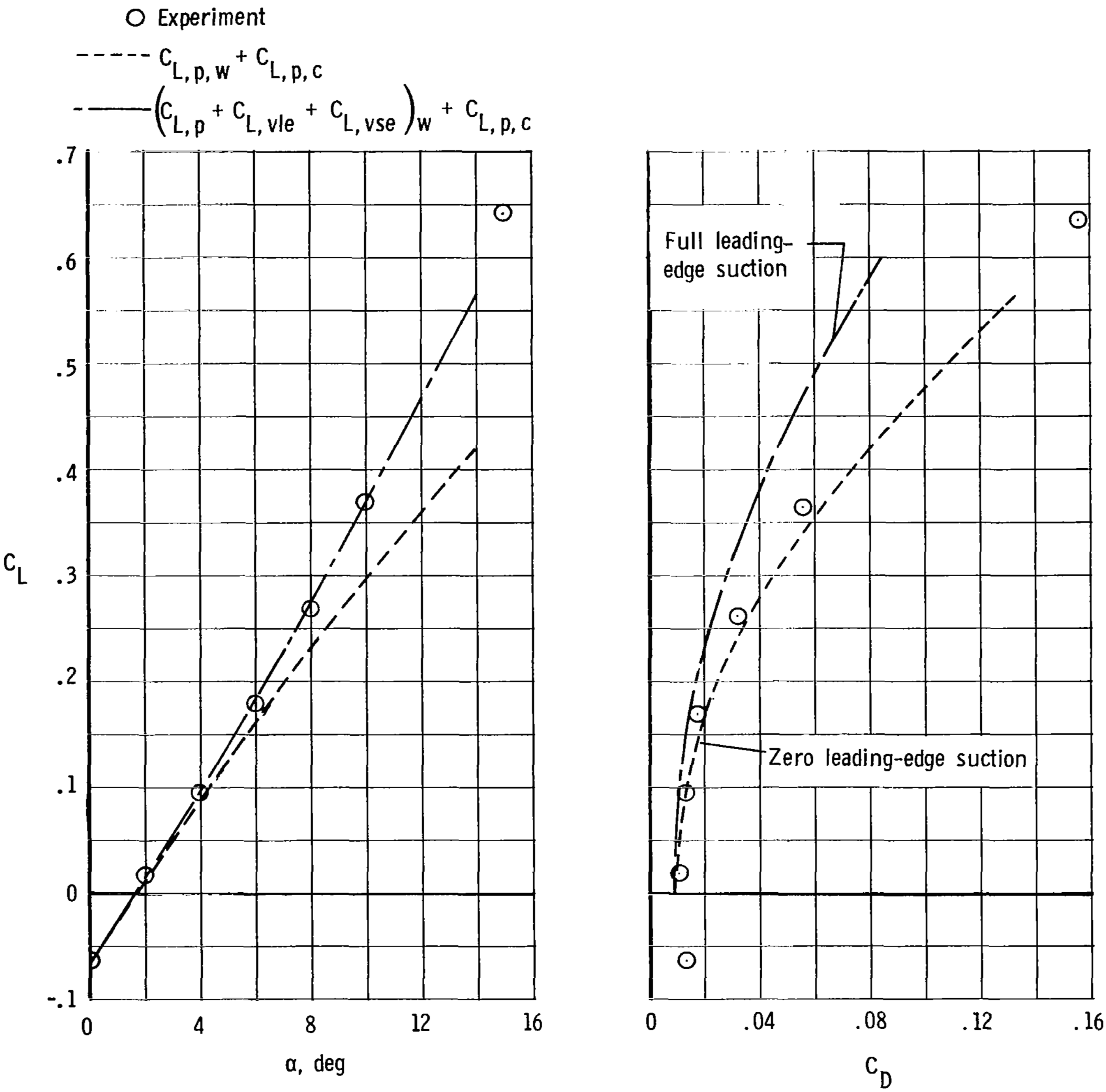


Figure 36.- Comparison of experimental and theoretical wing-body-canard aerodynamic characteristics for nacelles off. M = 0.60; $\delta_c = 0^\circ$.

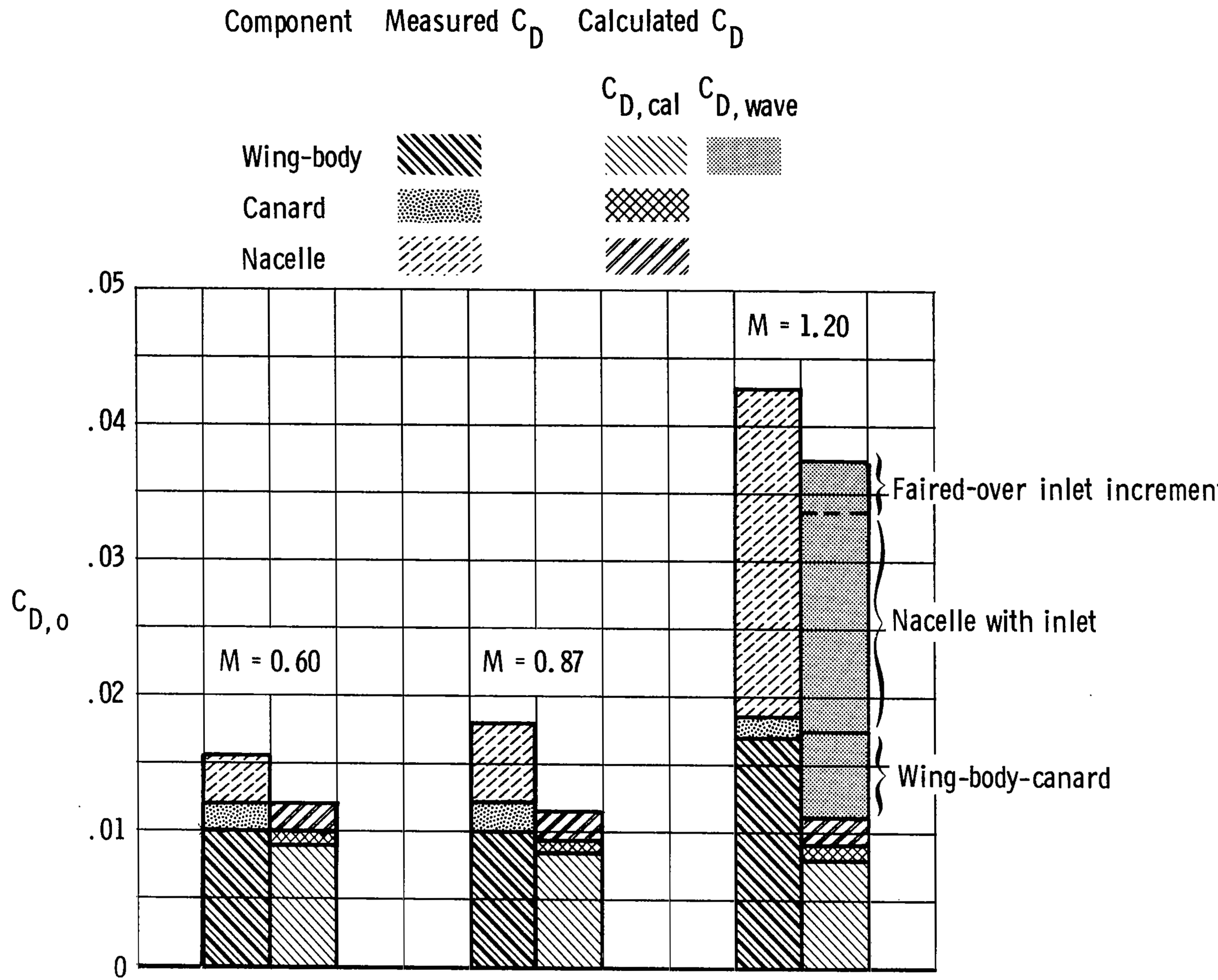
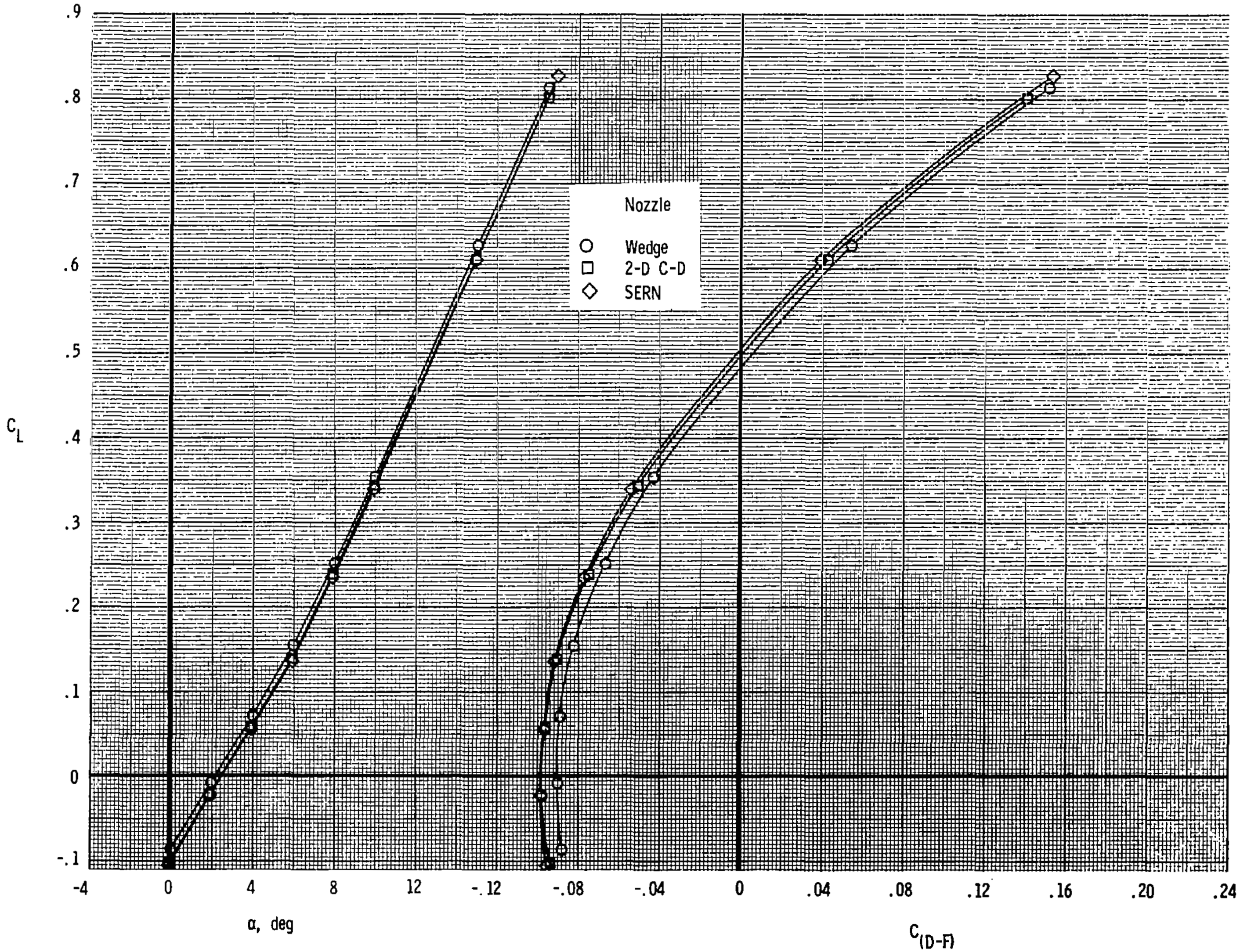
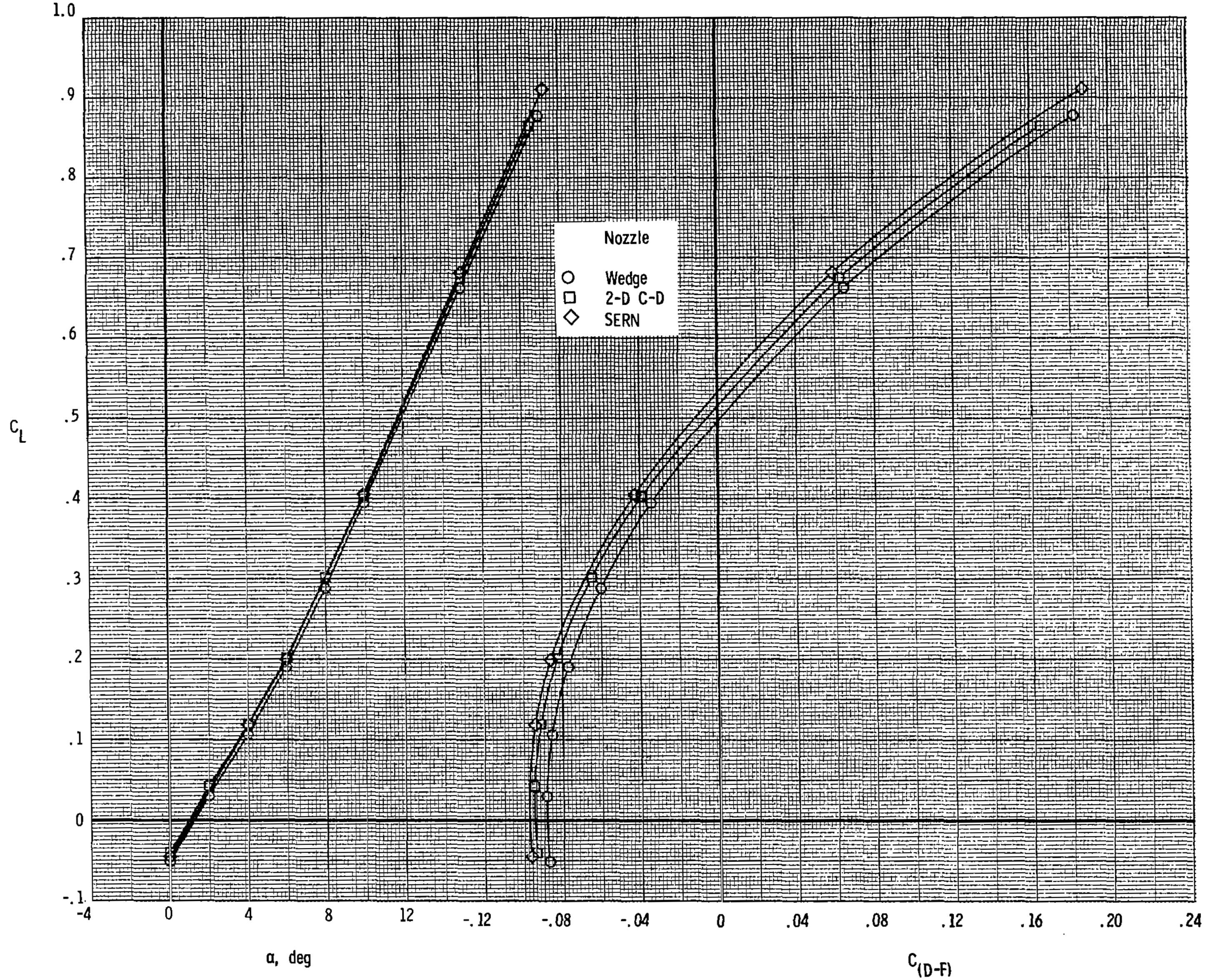


Figure 37.- Component zero-lift drag characteristics. $\delta_c = 0^\circ$.



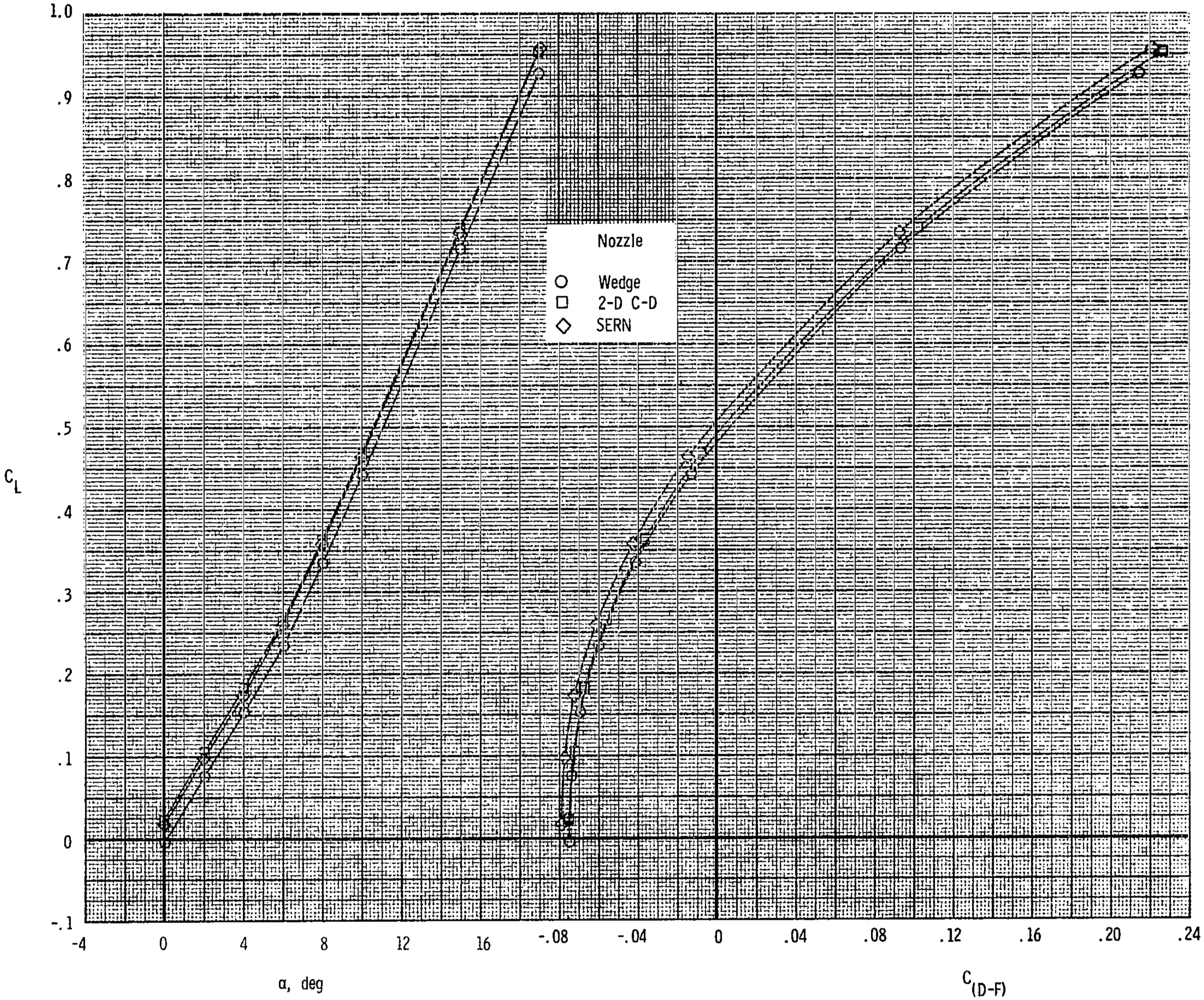
(a) $\delta_v = 0^o$.

Figure 38.- Effects of nozzle type on total aerodynamic characteristics. IUM; AR = 1; A/B power setting; $\delta_c = 0^o$; M = 0.60; NPR = 3.0.



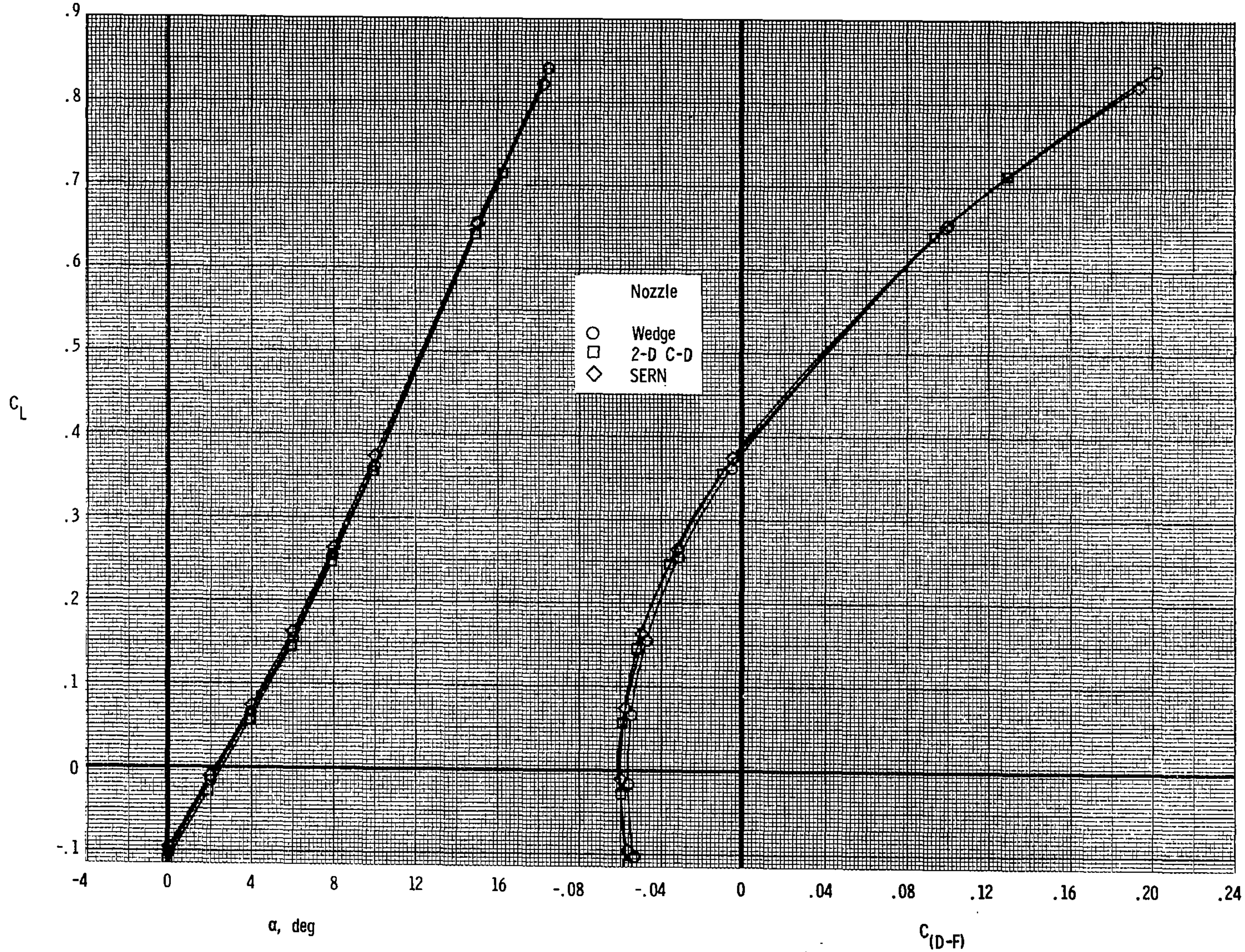
(b) $\delta_v = 15^\circ$.

Figure 38.- Continued.



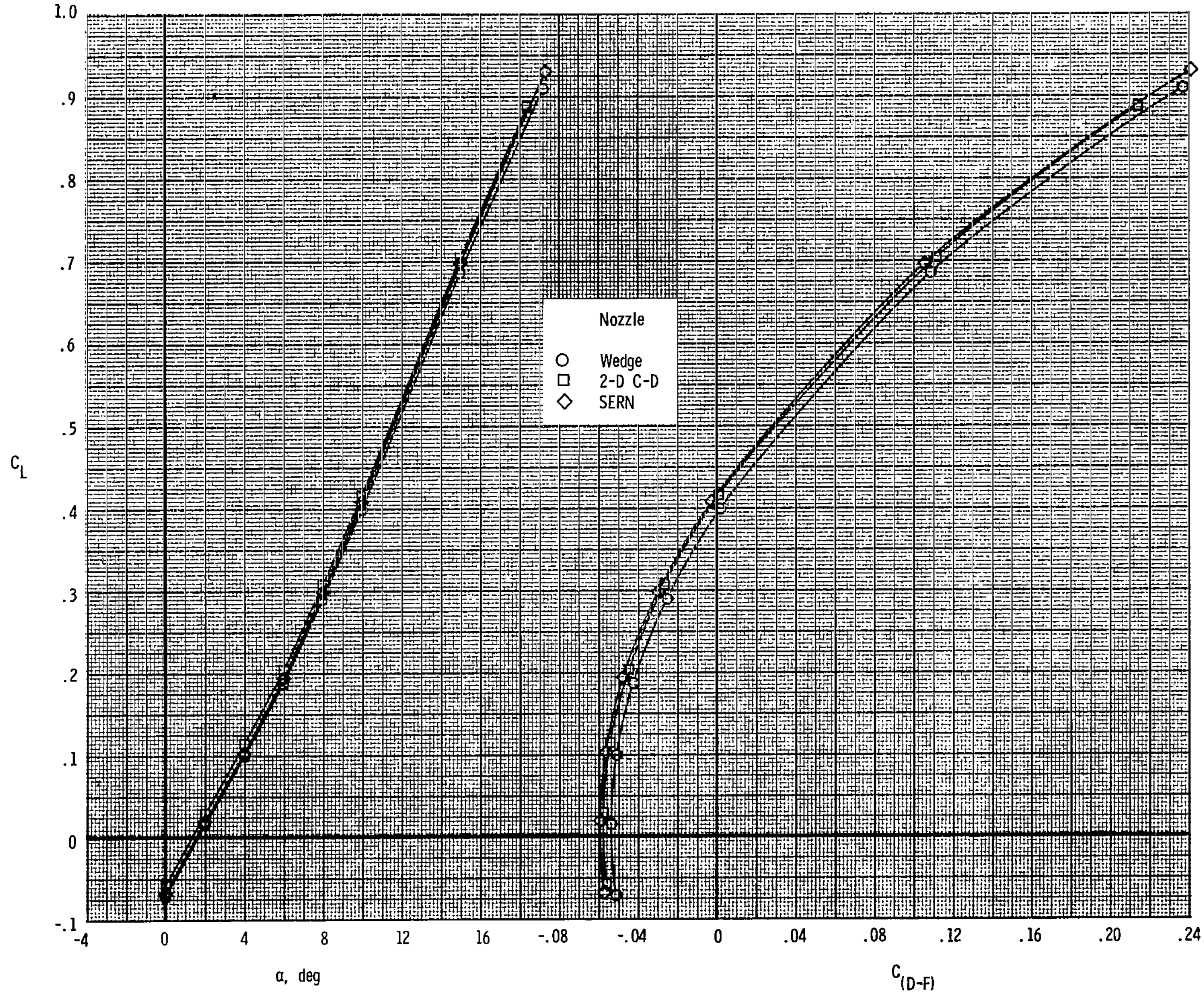
(c) $\delta_v = 30^\circ$.

Figure 38.- Concluded.



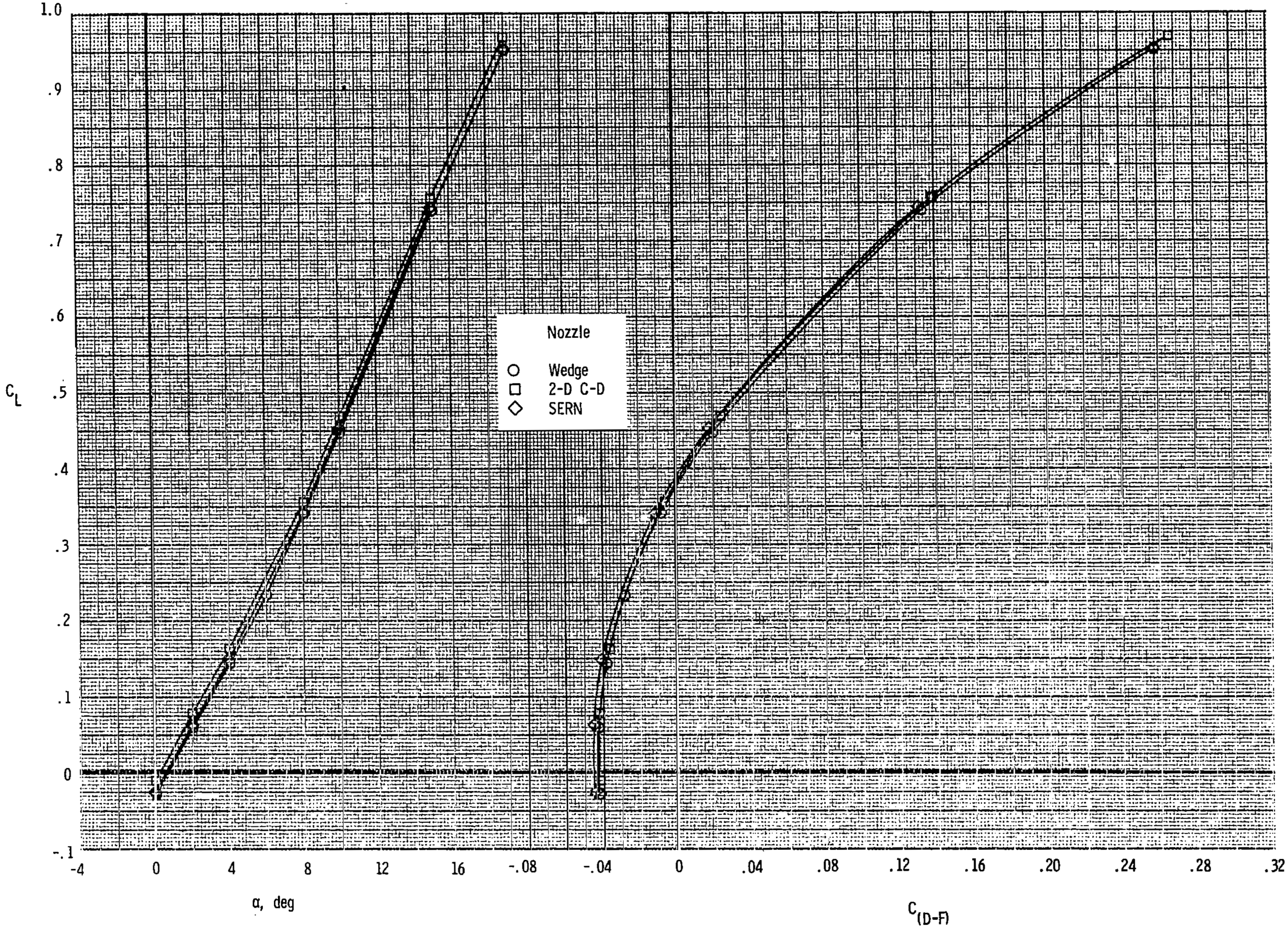
(a) $\delta_v = 0^\circ$.

Figure 39.- Effects of nozzle type on total aerodynamic characteristics. IUM; AR = 1; A/B power setting; $\delta_c = 0^\circ$; M = 0.87; NPR = 3.9.



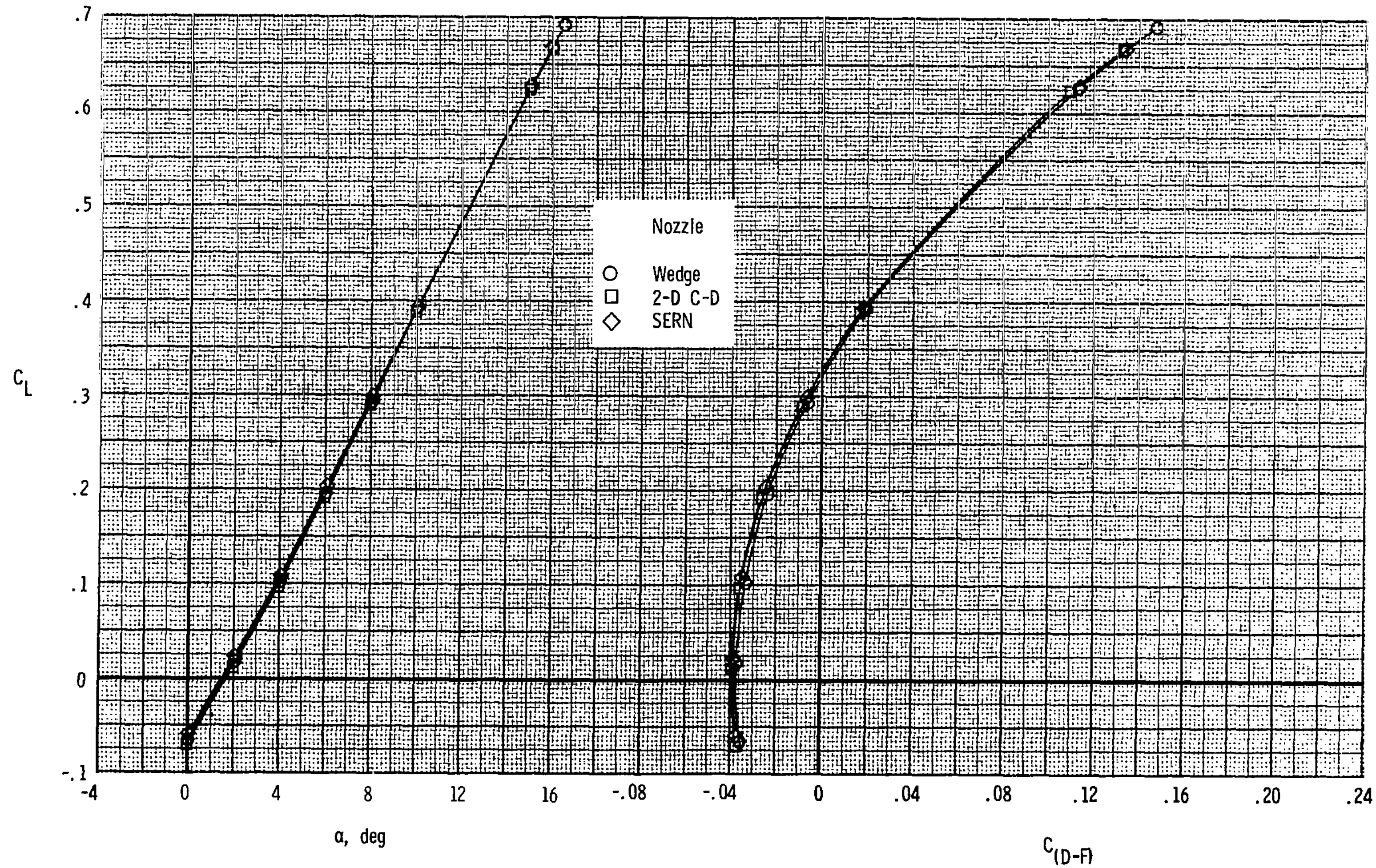
(b) $\delta_v = 15^\circ$.

Figure 39.- Continued.



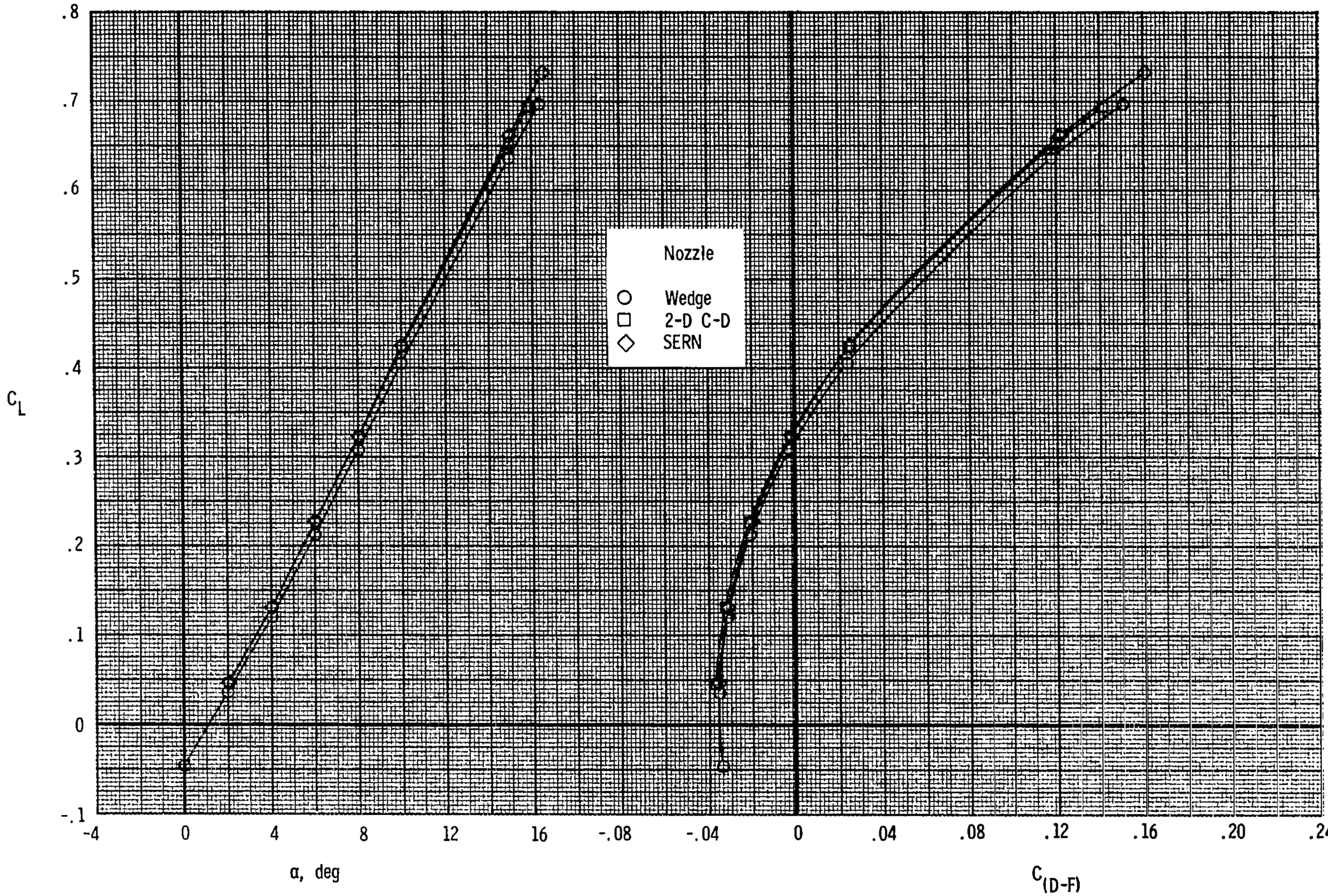
(c) $\delta_v = 30^\circ$.

Figure 39.- Concluded.



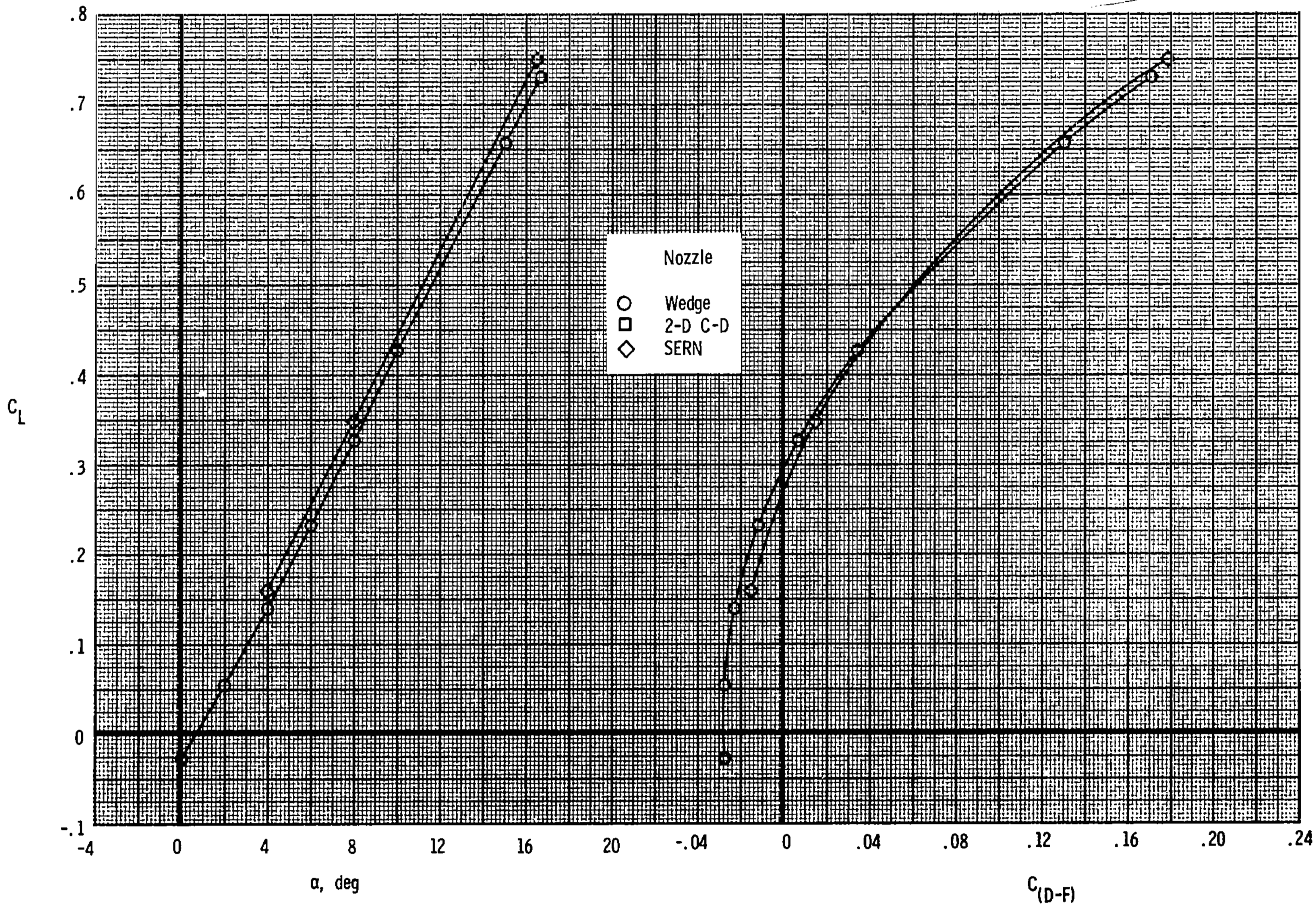
(a) $\delta_v = 0^\circ$.

Figure 40.- Effects of nozzle type on total aerodynamic characteristics. IUM; AR = 1; A/B power setting; $\delta_c = 0^\circ$; M = 1.20; NPR = 6.6.



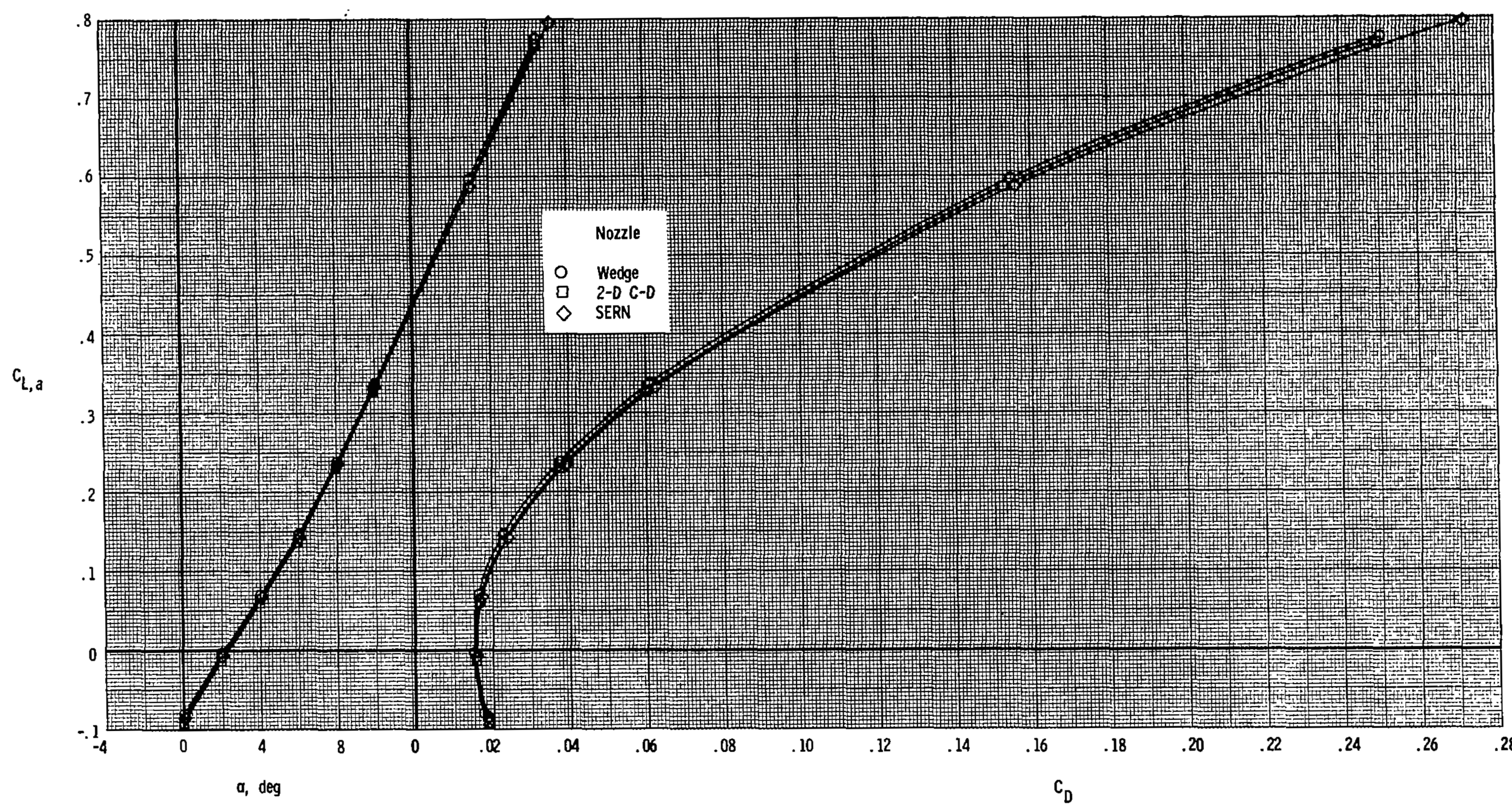
(b) $\delta_v = 15^\circ$.

Figure 40.- Continued.



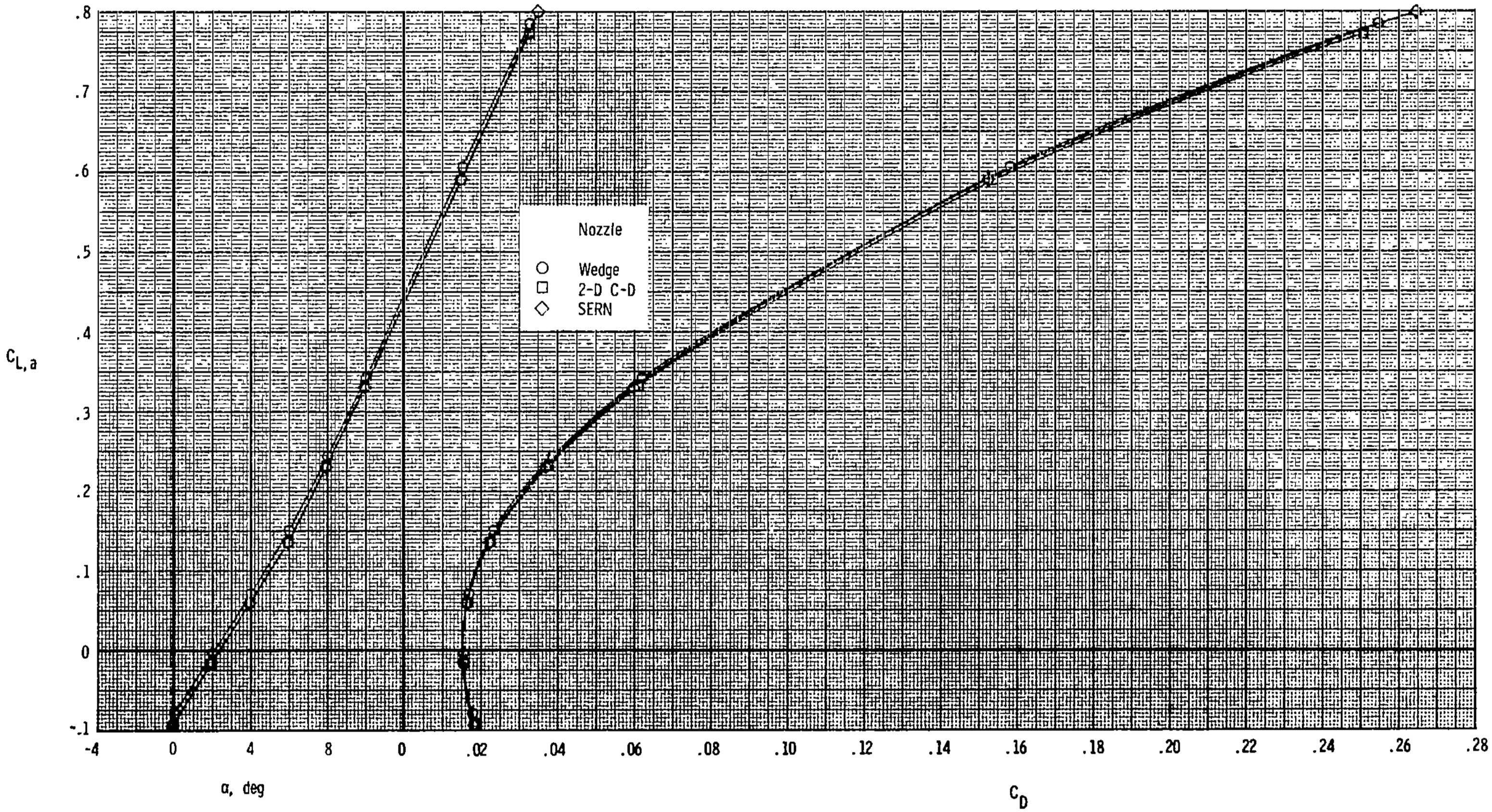
(c) $\delta_v = 30^{\circ}$.

Figure 40.- Concluded.



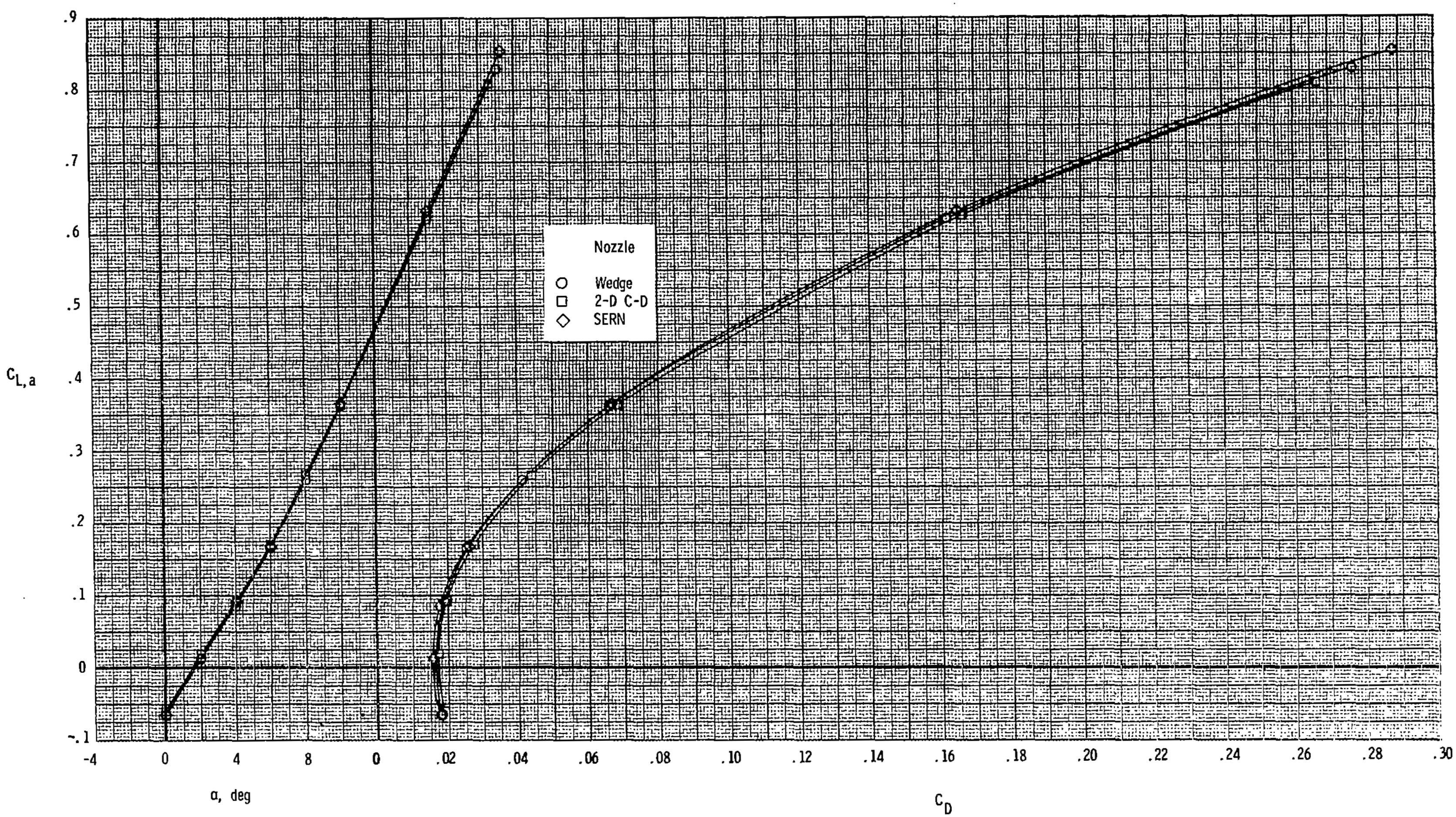
(a) $\delta_v = 0^{\circ}$; NPR = 1.0.

Figure 41.- Effects of nozzle type on thrust-removed aerodynamic characteristics. IUM; AR = 1; A/B power setting; $\delta_c = 0^{\circ}$; M = 0.60.



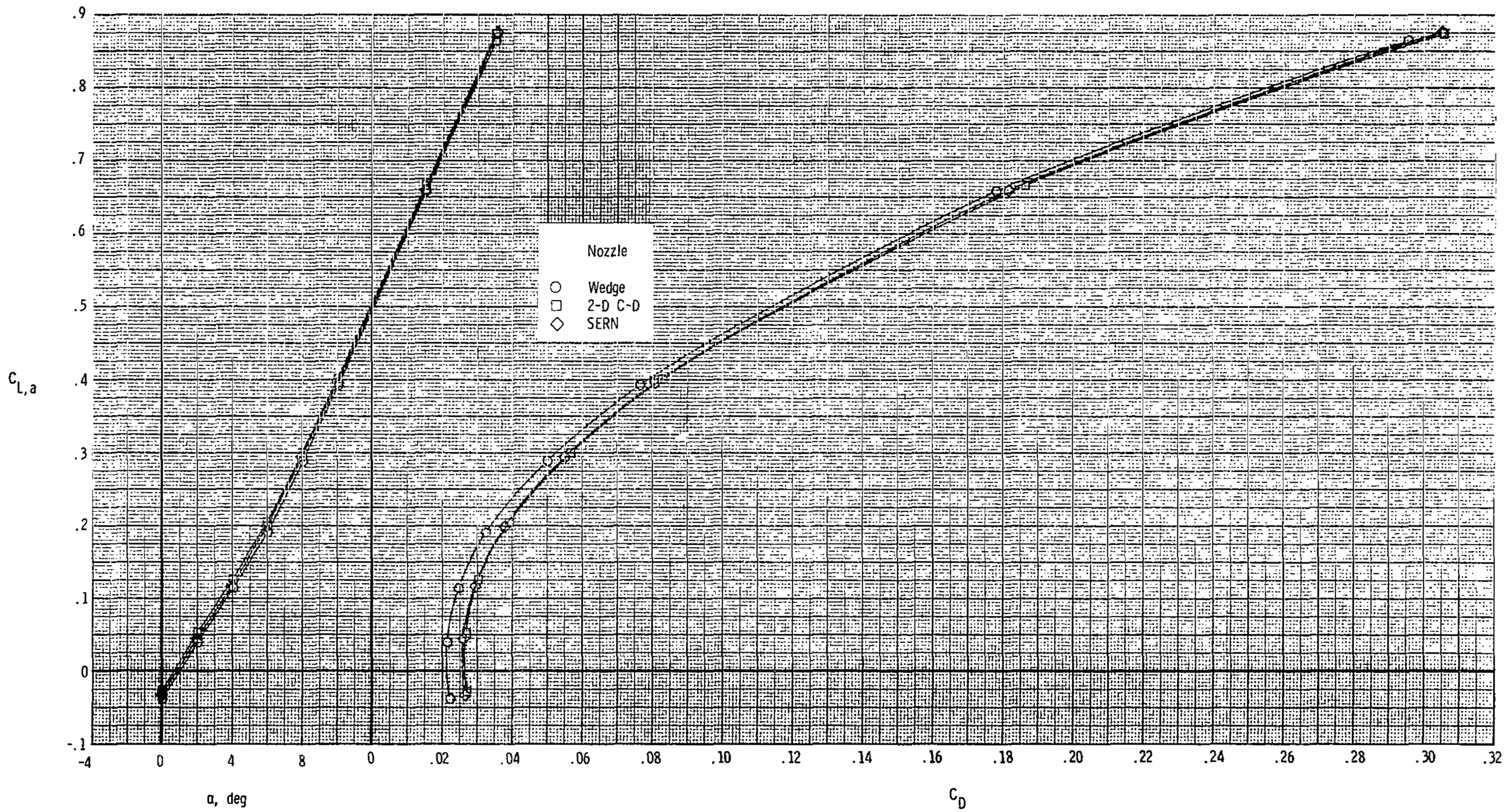
(b) $\delta_v = 0^{\circ}$; NPR = 3.0.

Figure 41.- Continued.



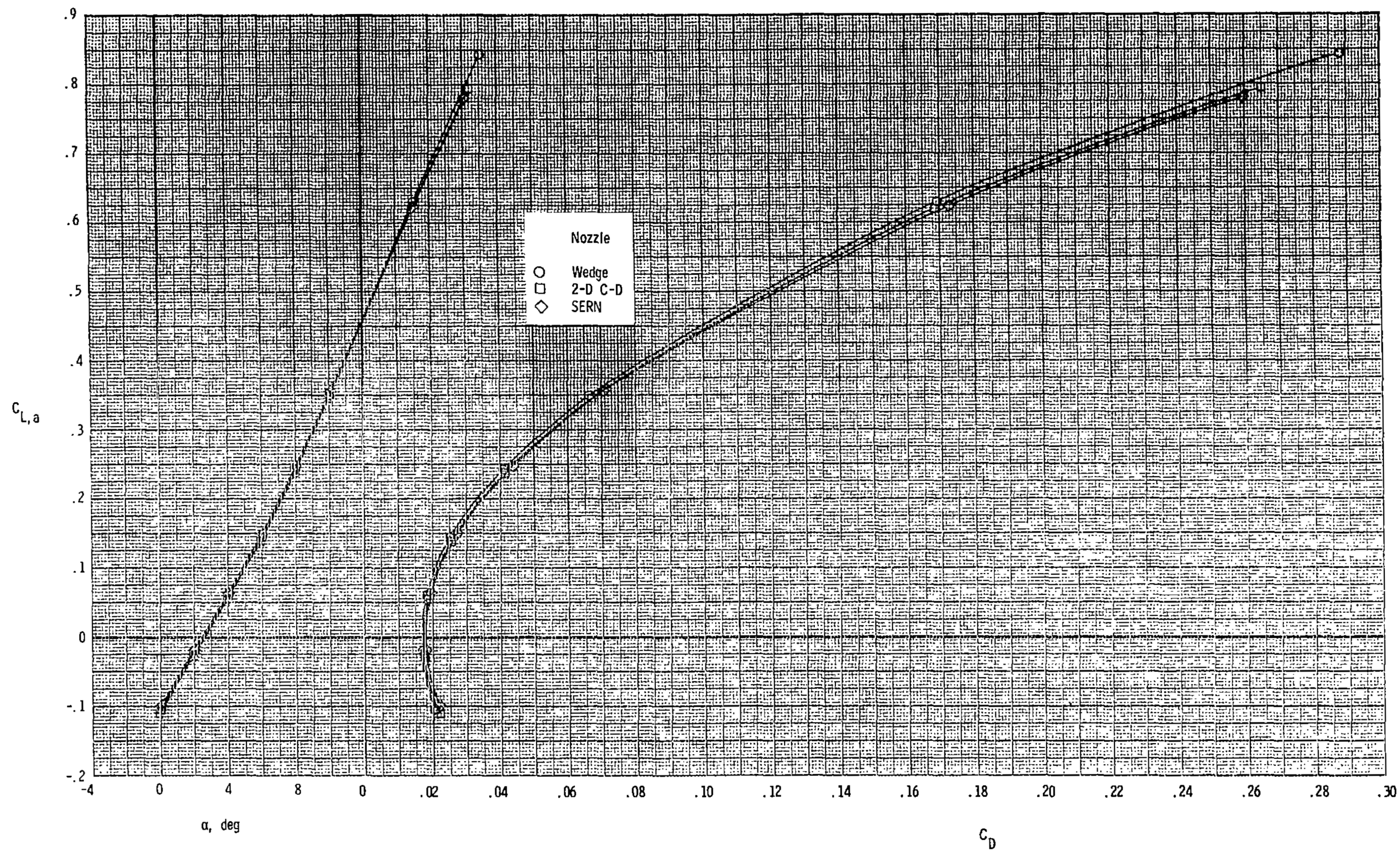
(c) $\delta_v = 15^{\circ}$; NPR = 3.0.

Figure 41.- Continued.



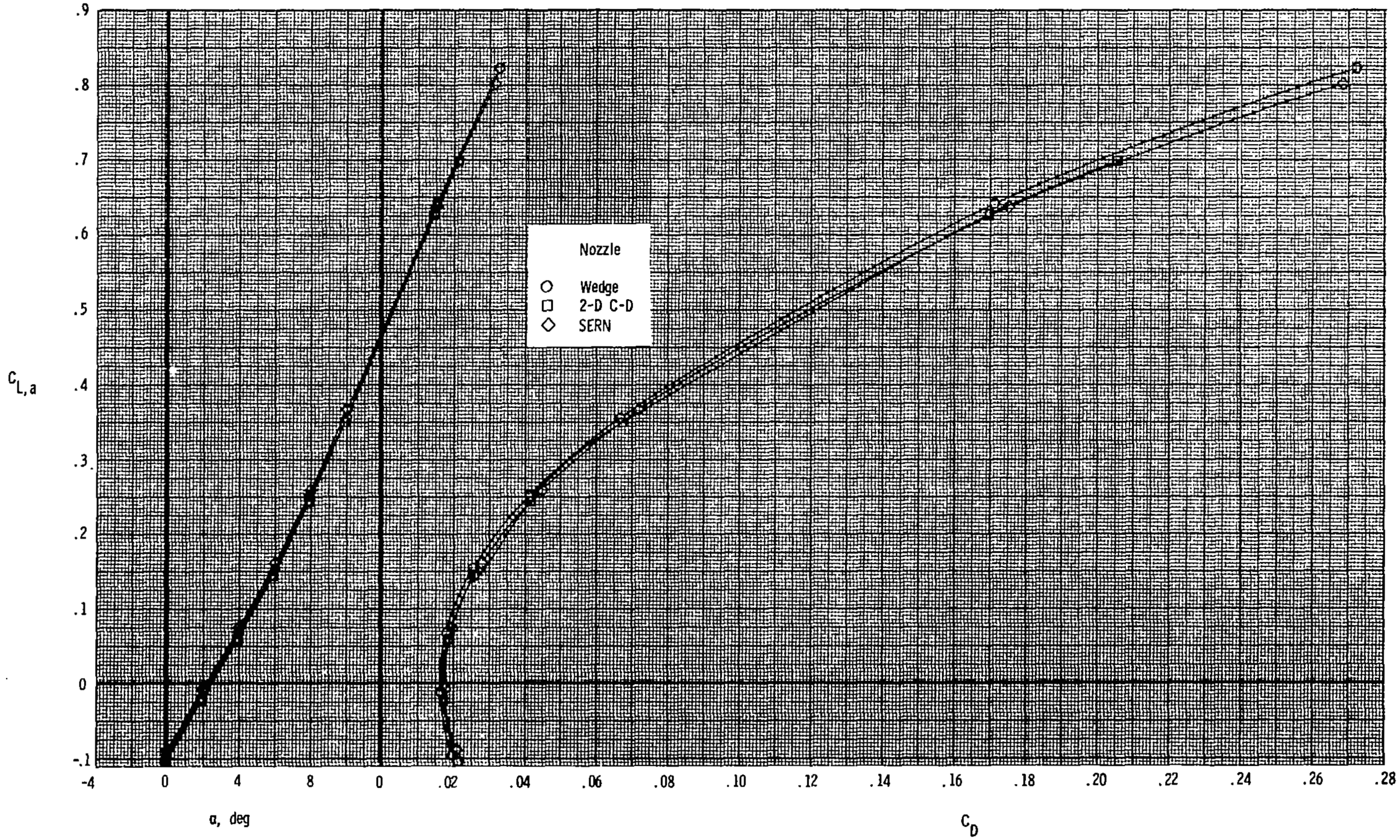
(d) $\delta_v = 30^{\circ}$; NPR = 3.0.

Figure 41.- Concluded.



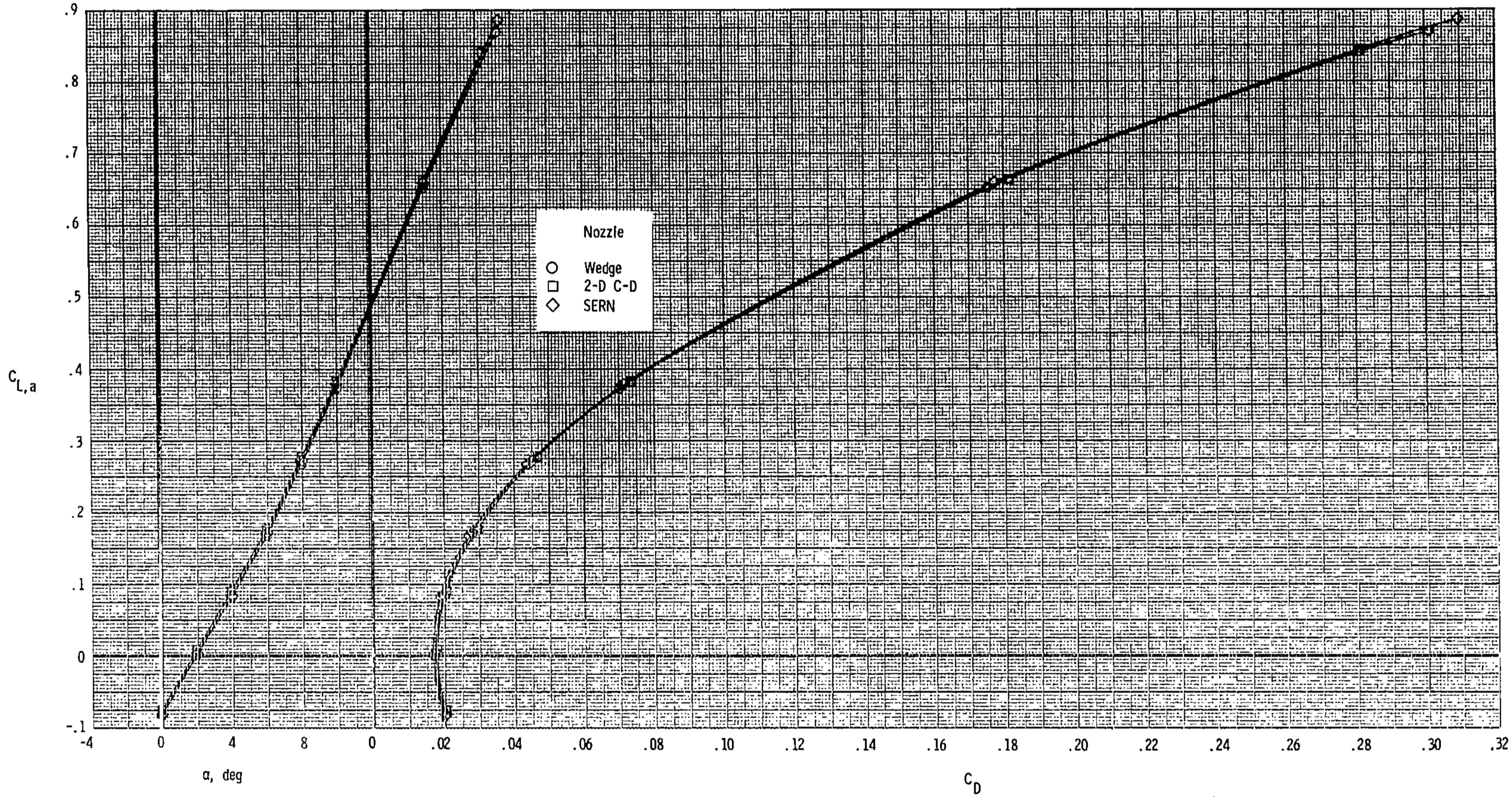
(a) $\delta_v = 0^{\circ}$; NPR = 1.0.

Figure 42.- Effects of nozzle type on thrust-removed aerodynamic characteristics. IUM; AR = 1; A/B power setting; $\delta_c = 0^{\circ}$; M = 0.87.



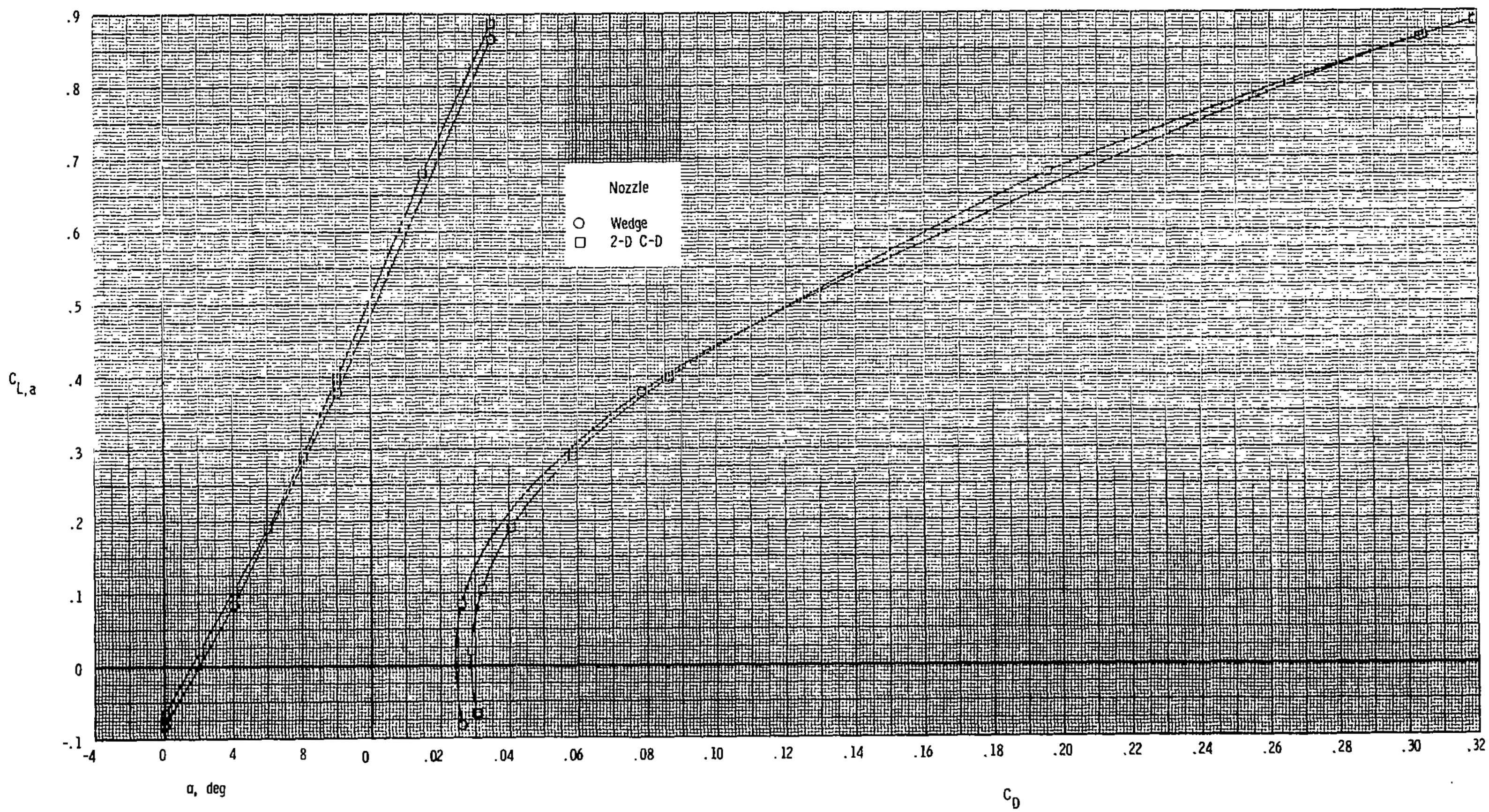
(b) $\delta_v = 0^\circ$; NPR = 3.9.

Figure 42.- Continued.



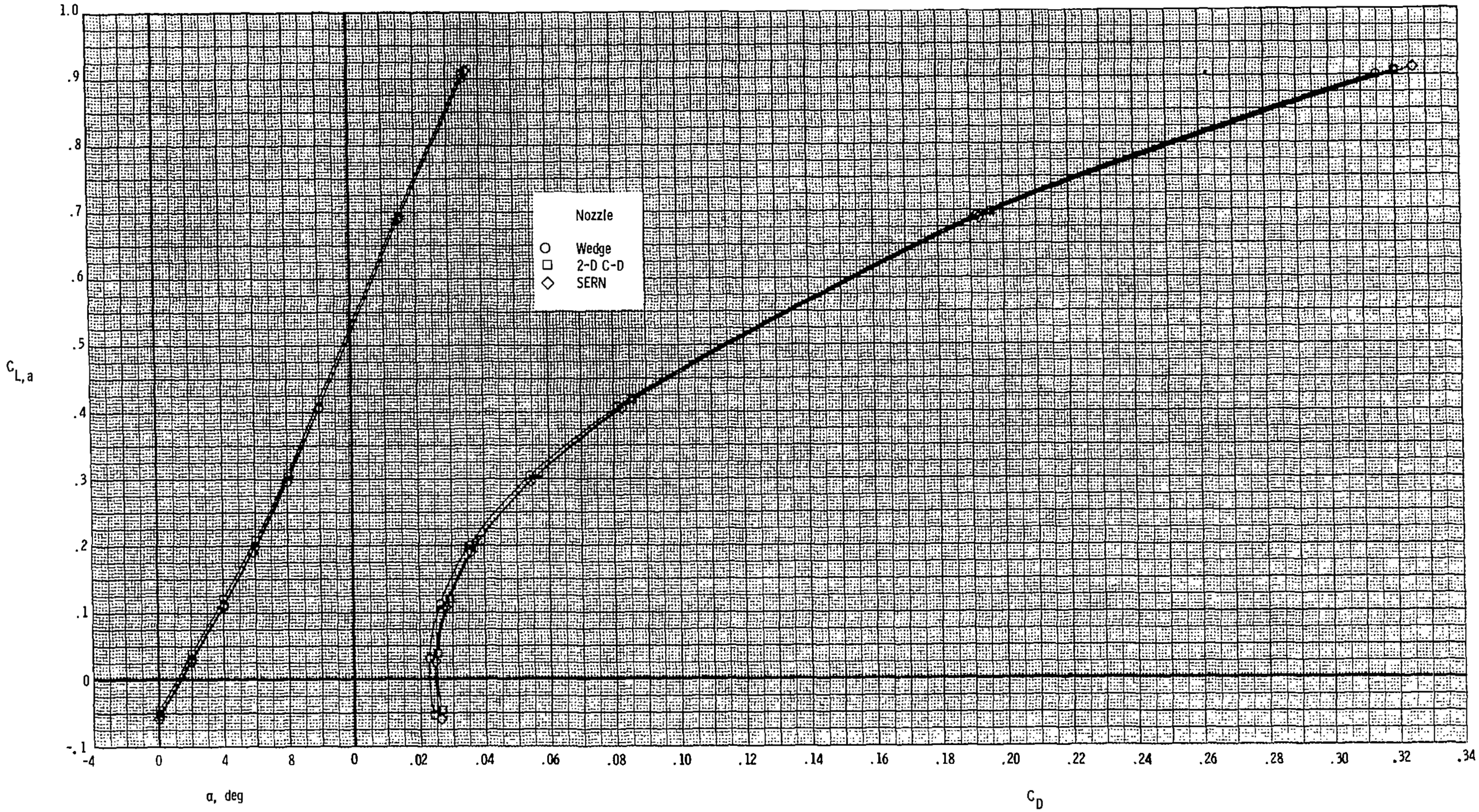
(c) $\delta_v = 15^\circ$; NPR = 3.9.

Figure 42.- Continued.



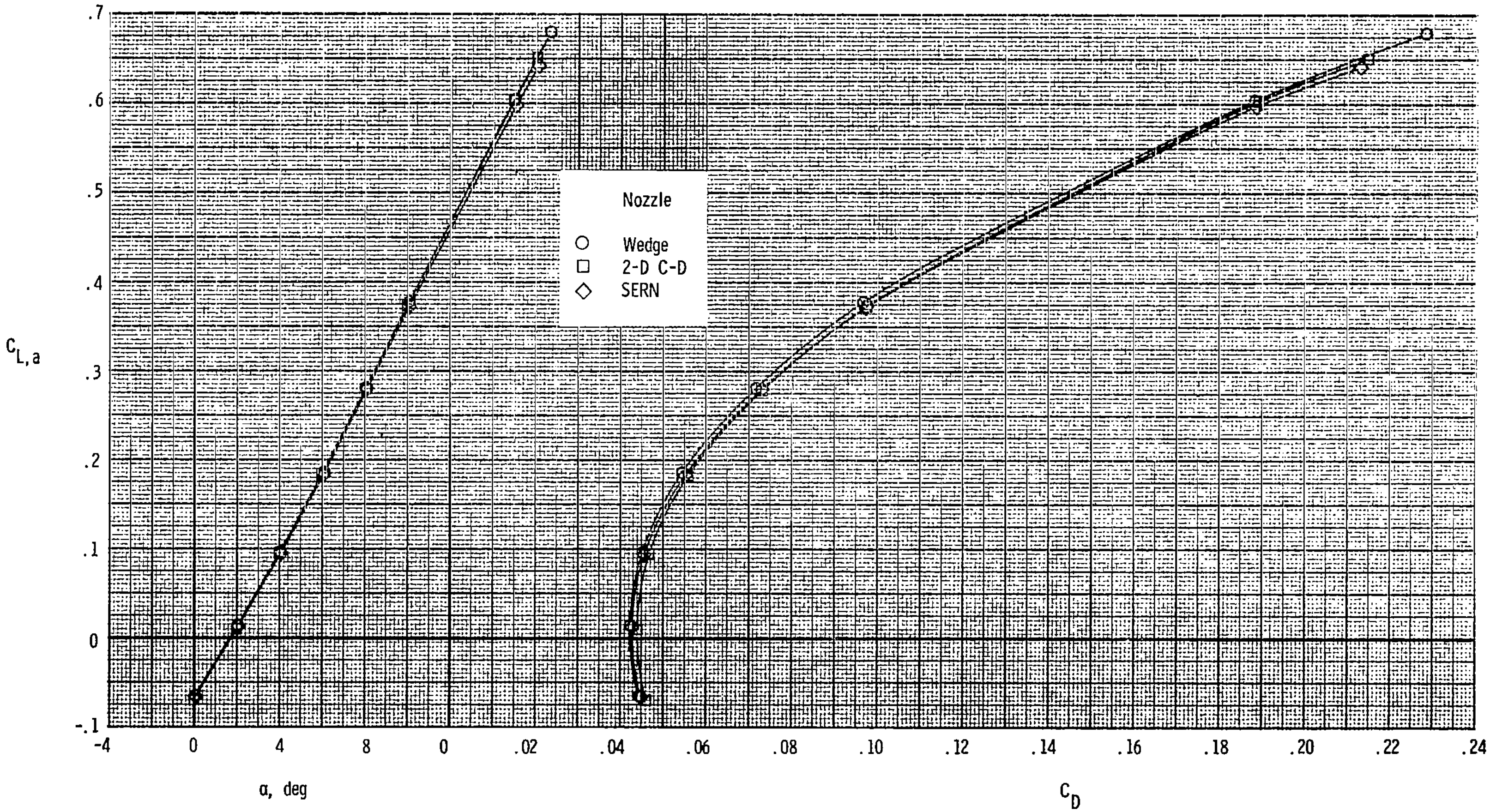
(d) $\delta_v = 30^{\circ}$; NPR = 1.0.

Figure 42.- Continued.



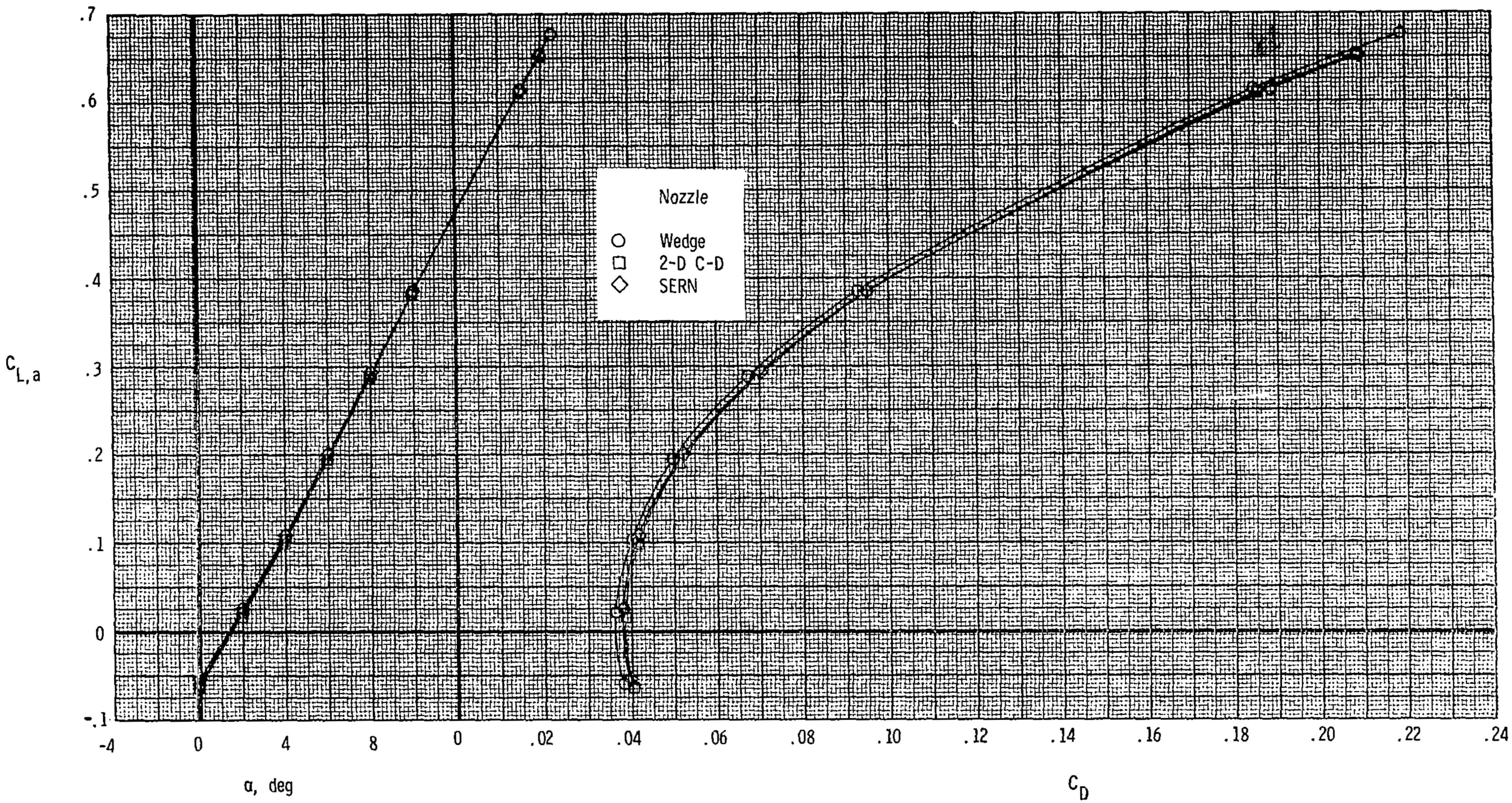
(e) $\delta_v = 30^\circ$; NPR = 3.9.

Figure 42.- Concluded.



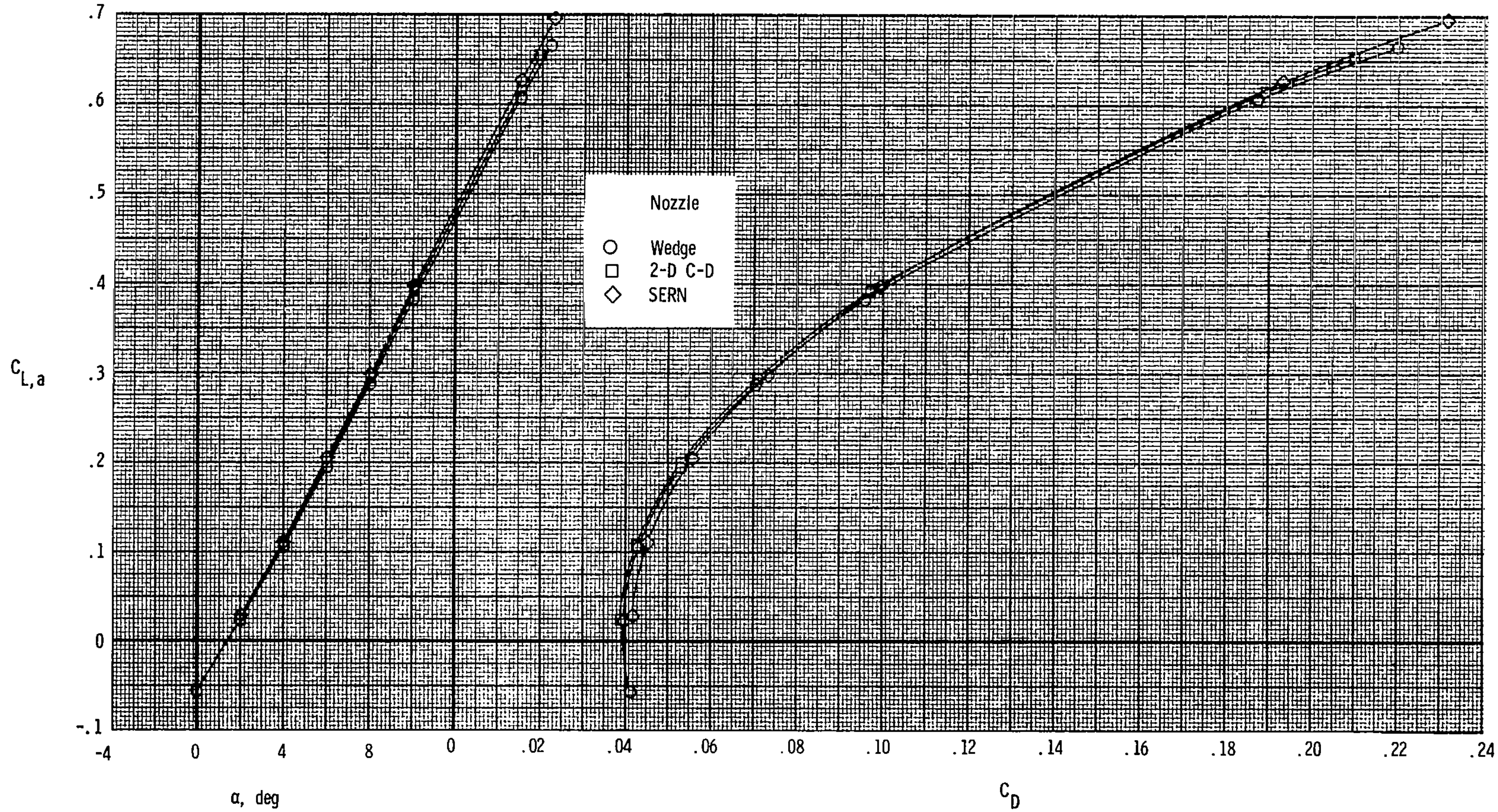
(a) $\delta_v = 0^{\circ}$; NPR = 1.0.

Figure 43.- Effects of nozzle type on thrust-removed aerodynamic characteristics. IUM; AR = 1; A/B power setting; $\delta_c = 0^{\circ}$; M = 1.20.



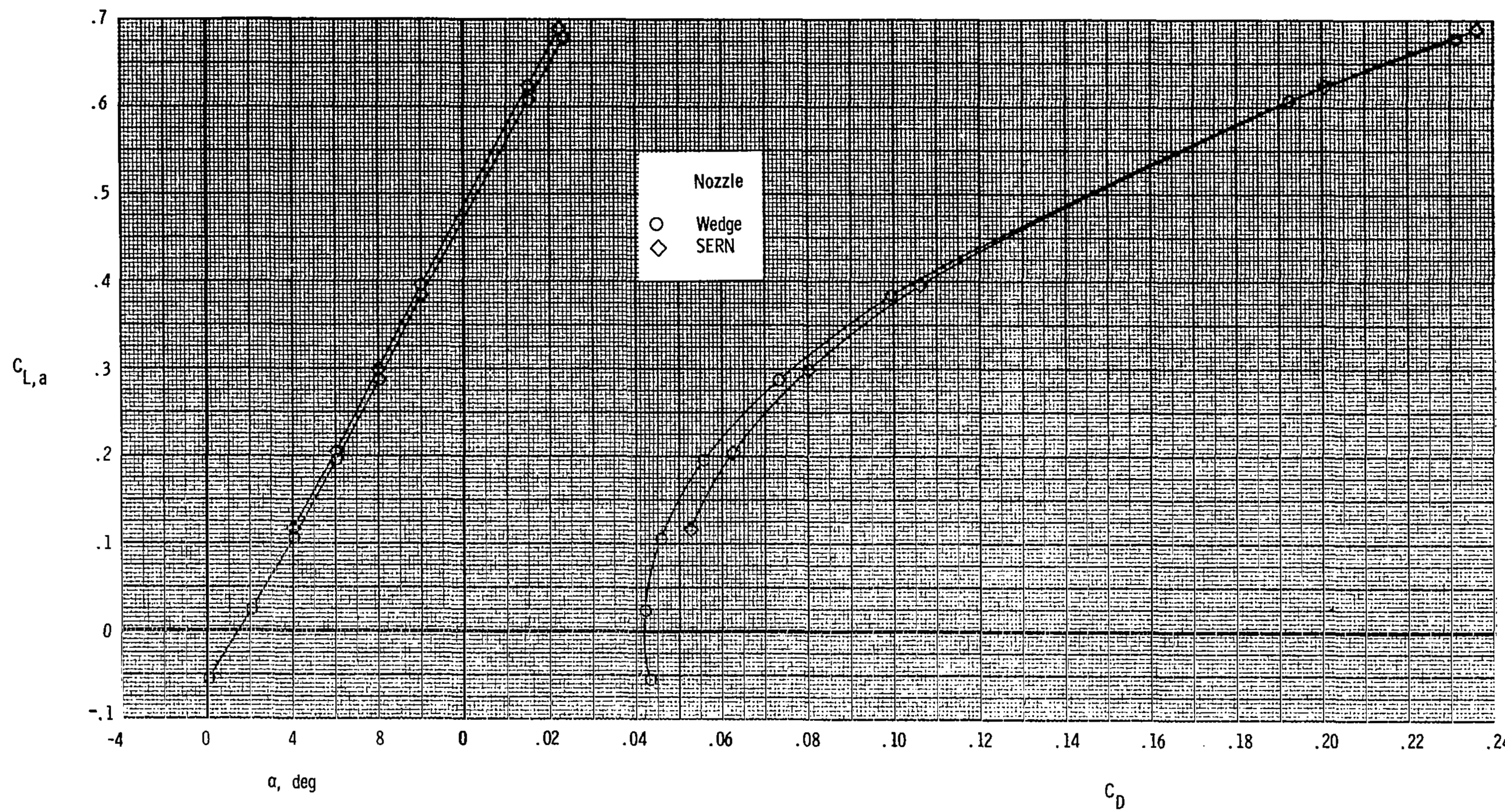
(b) $\delta_v = 0^o$; NPR = 6.6.

Figure 43.- Continued.



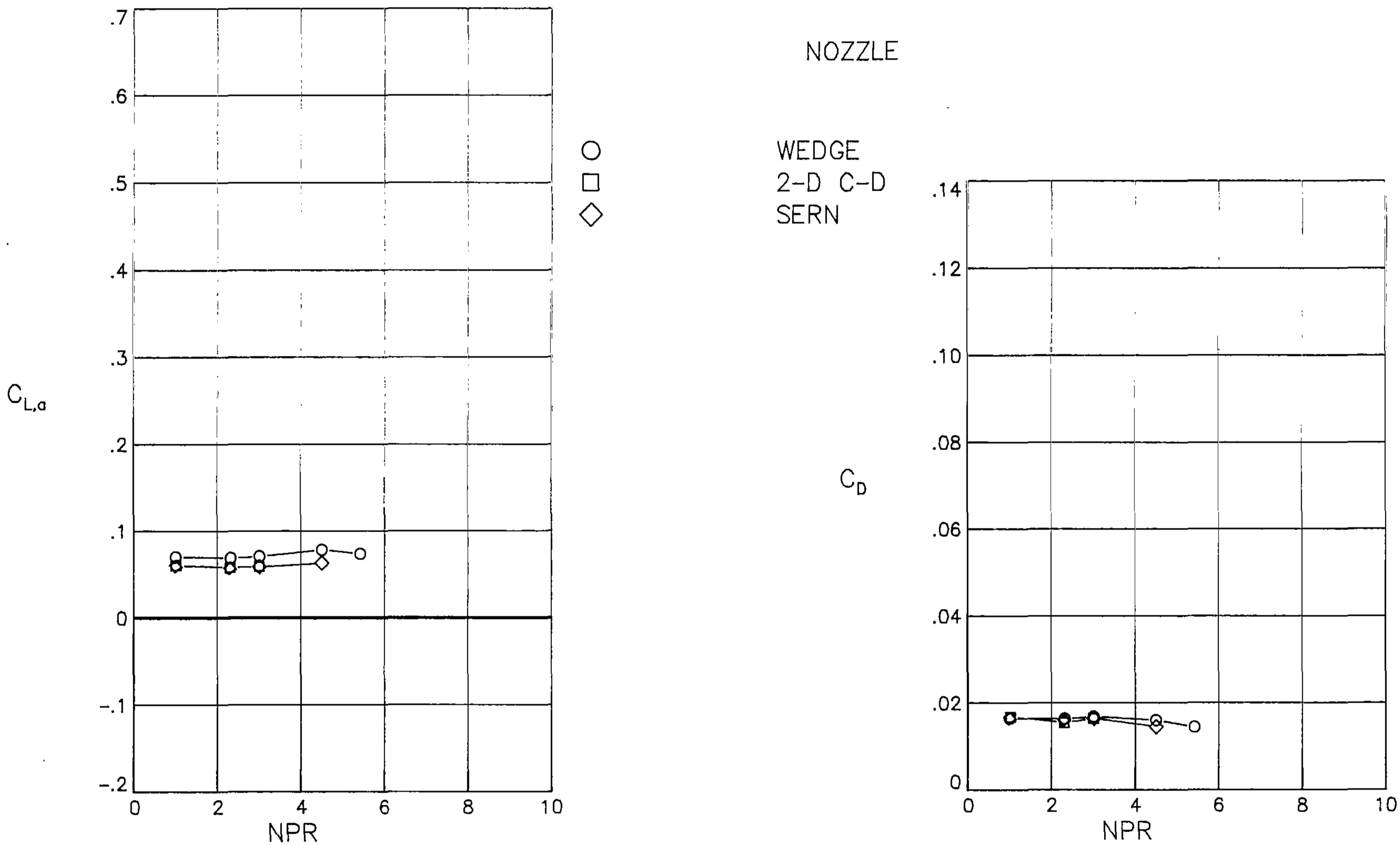
(c) $\delta_v = 15^{\circ}$; NPR = 6.6.

Figure 43.- Continued.



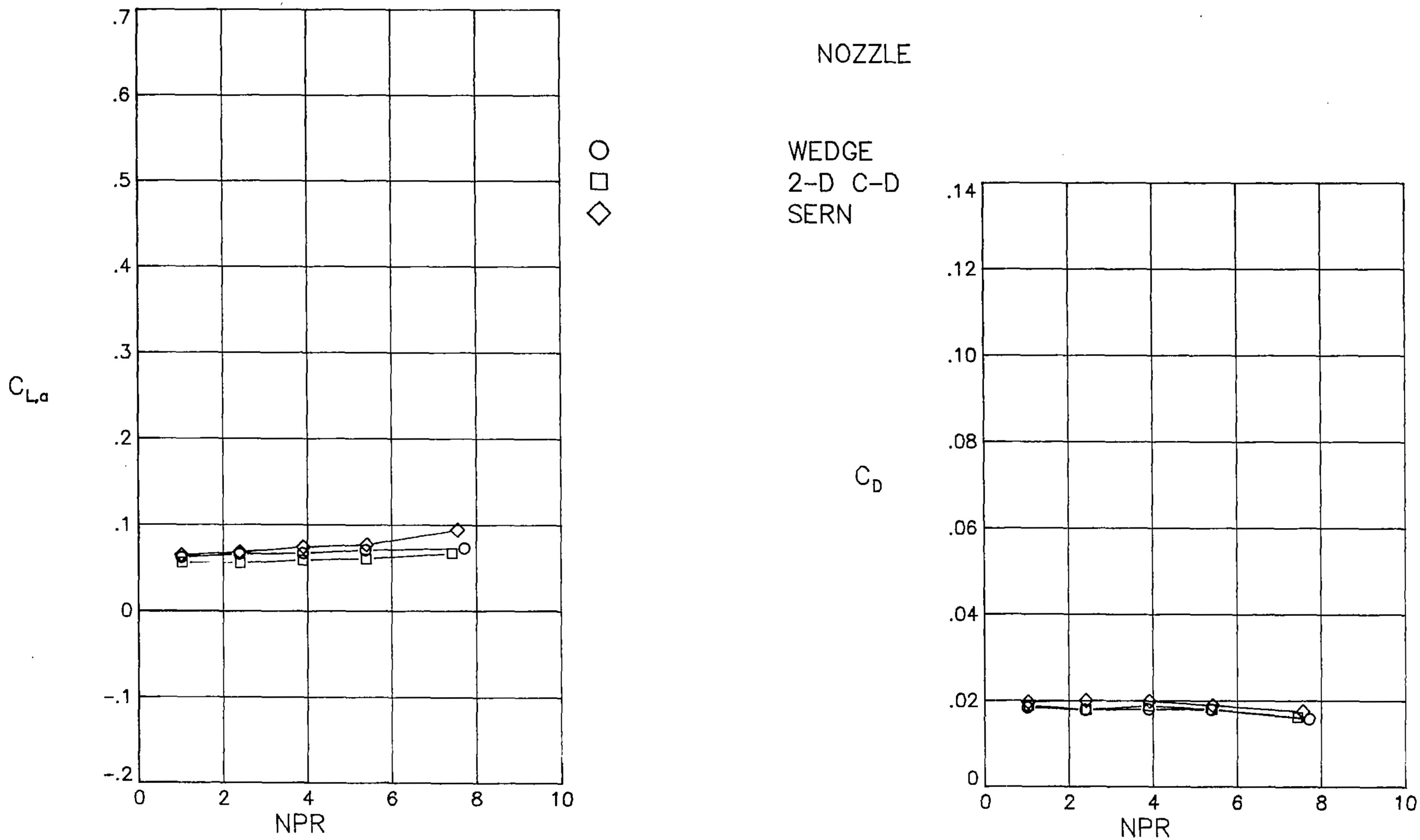
(d) $\delta_v = 30^{\circ}$; NPR = 6.6.

Figure 43.- Concluded.



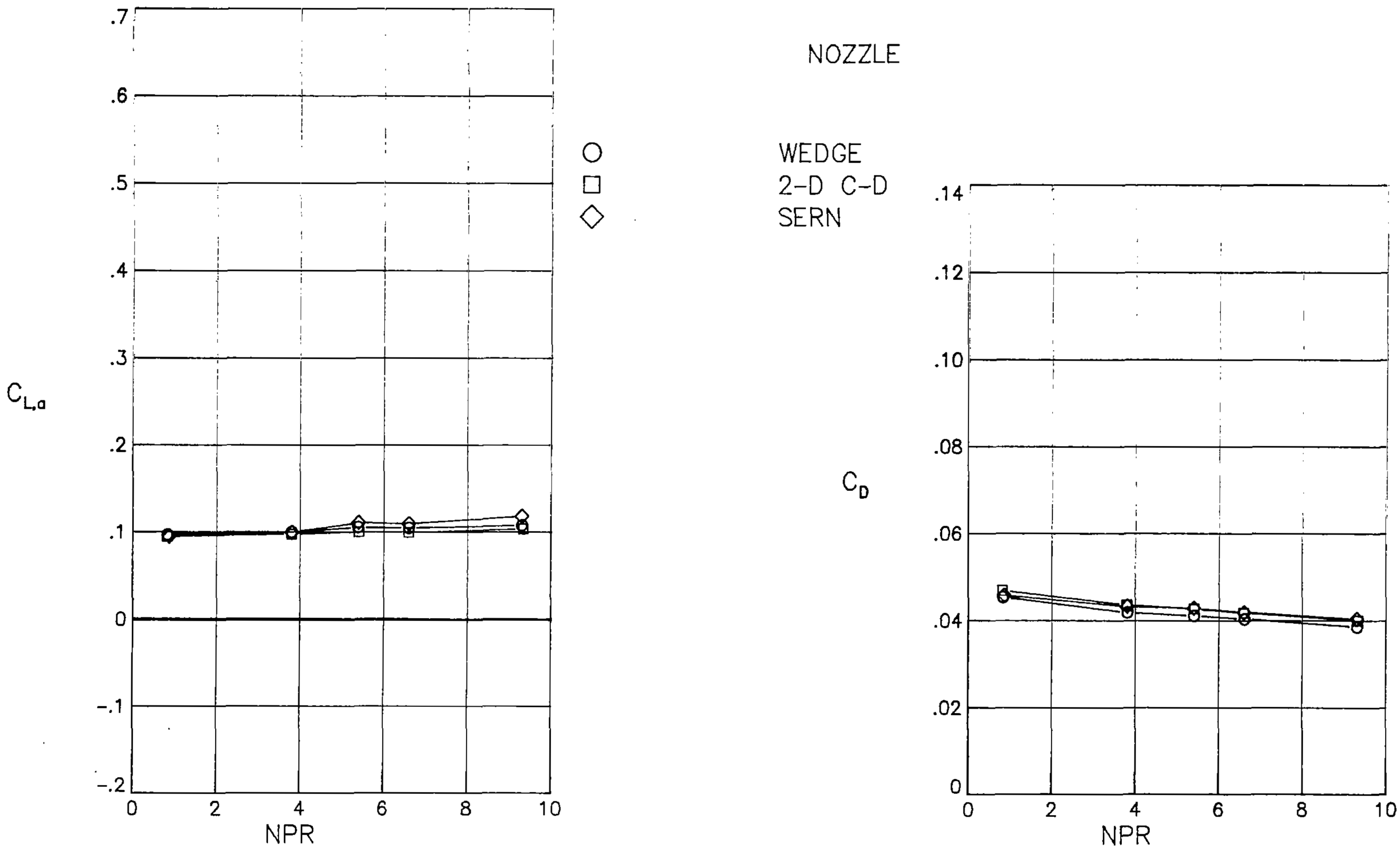
(a) M = 0.60.

Figure 44.- Effects of nozzle type on thrust-removed aerodynamic characteristics. IUM; AR = 1; A/B power setting; $\delta_v = 0^o$; $\delta_c = 0^o$; $\alpha = 4^o$.



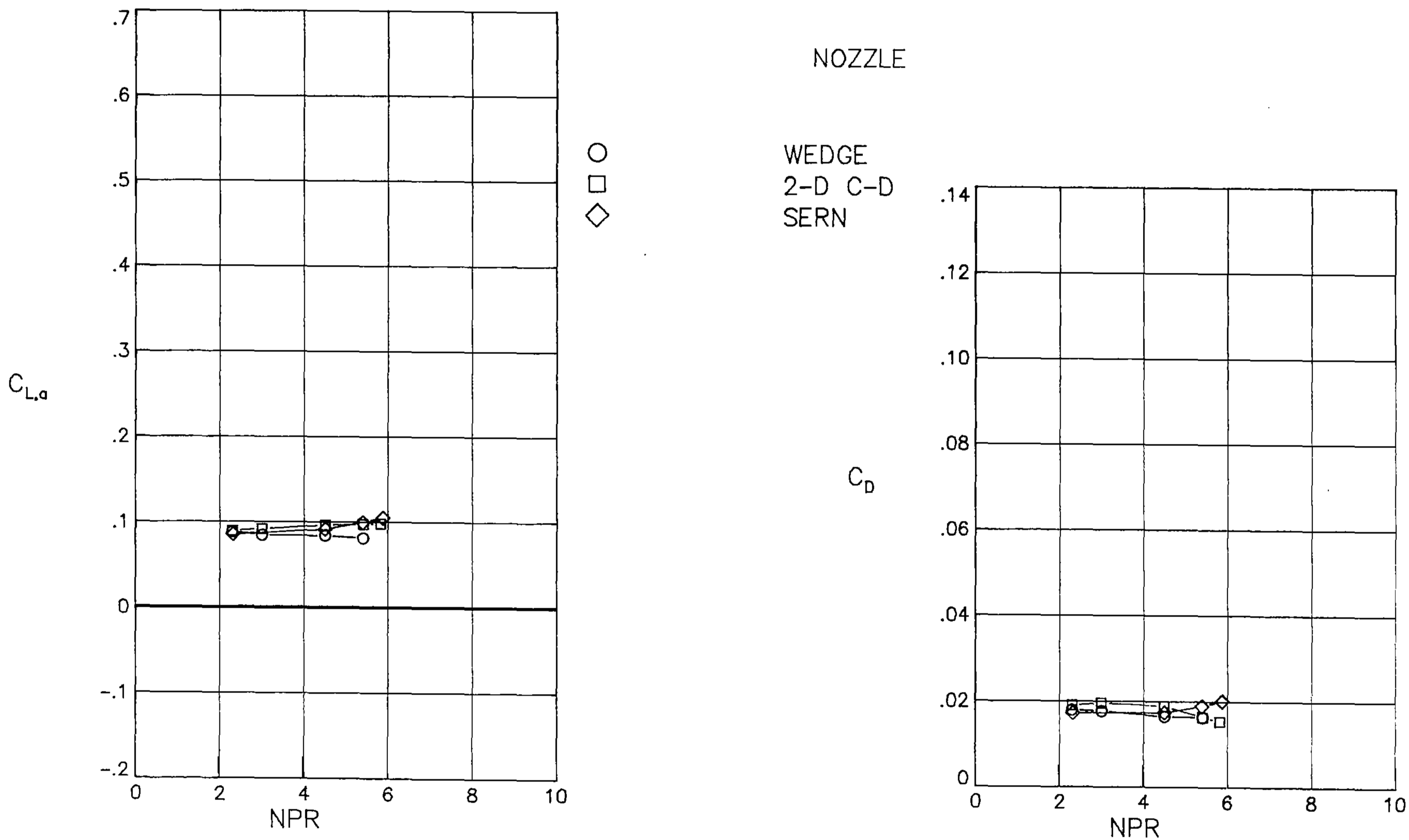
(b) M = 0.87.

Figure 44.- Continued.



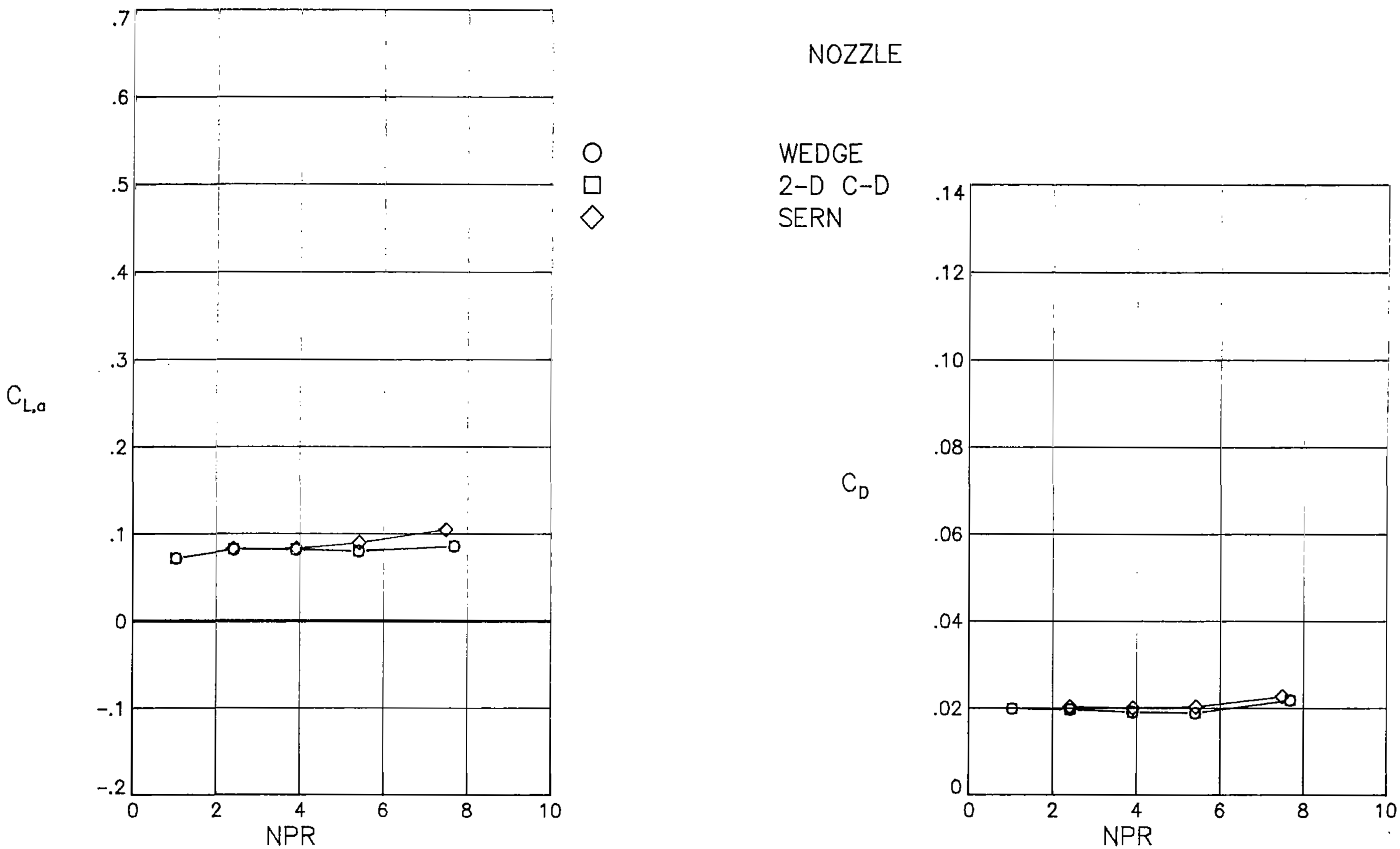
(c) M = 1.20.

Figure 44.- Concluded.



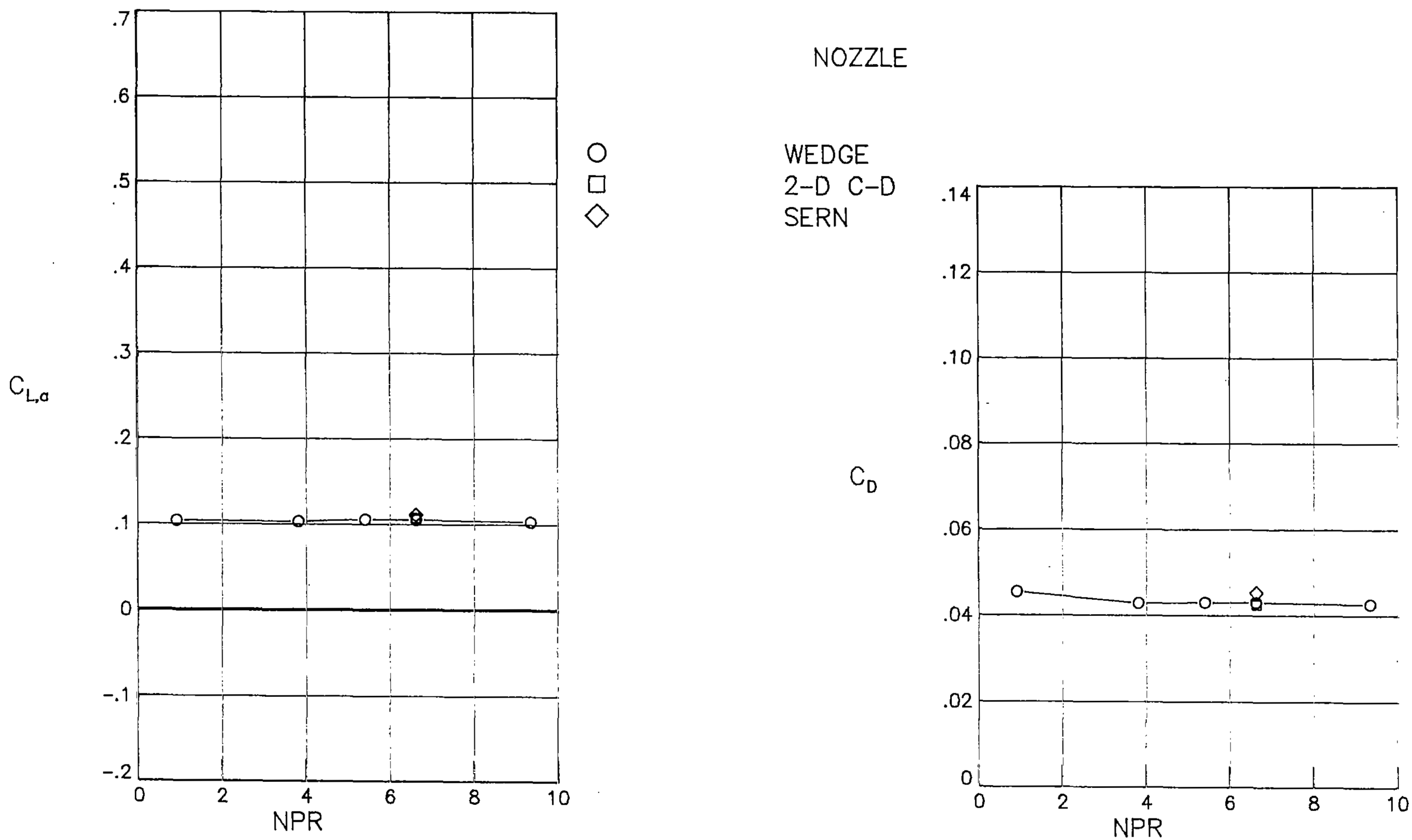
(a) M = 0.60.

Figure 45.- Effects of nozzle type on thrust-removed aerodynamic characteristics. IUM; AR = 1; A/B power setting; $\delta_v = 15^{\circ}$; $\delta_c = 0^{\circ}$; $\alpha = 4^{\circ}$.



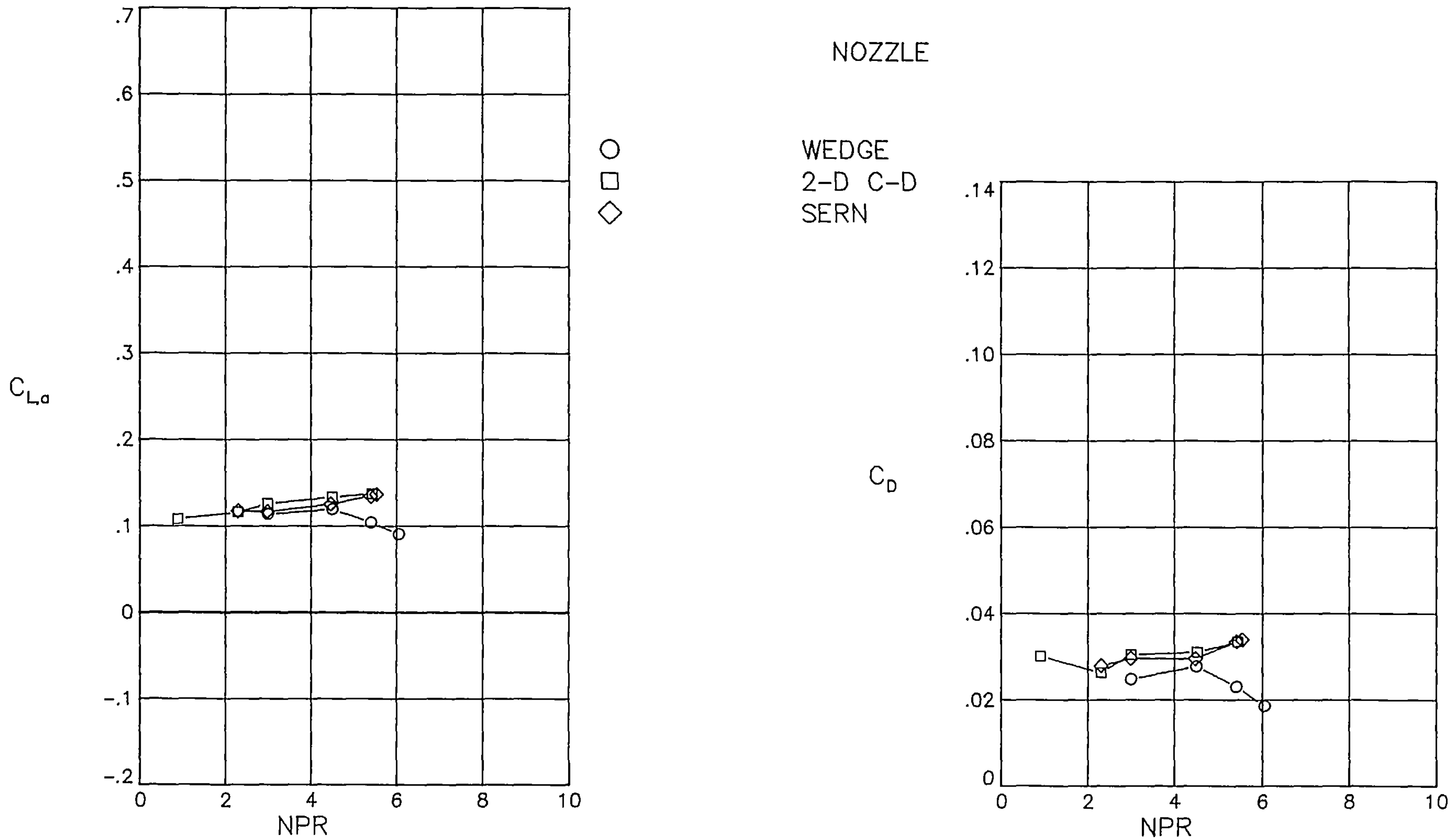
(b) M = 0.87.

Figure 45.- Continued.



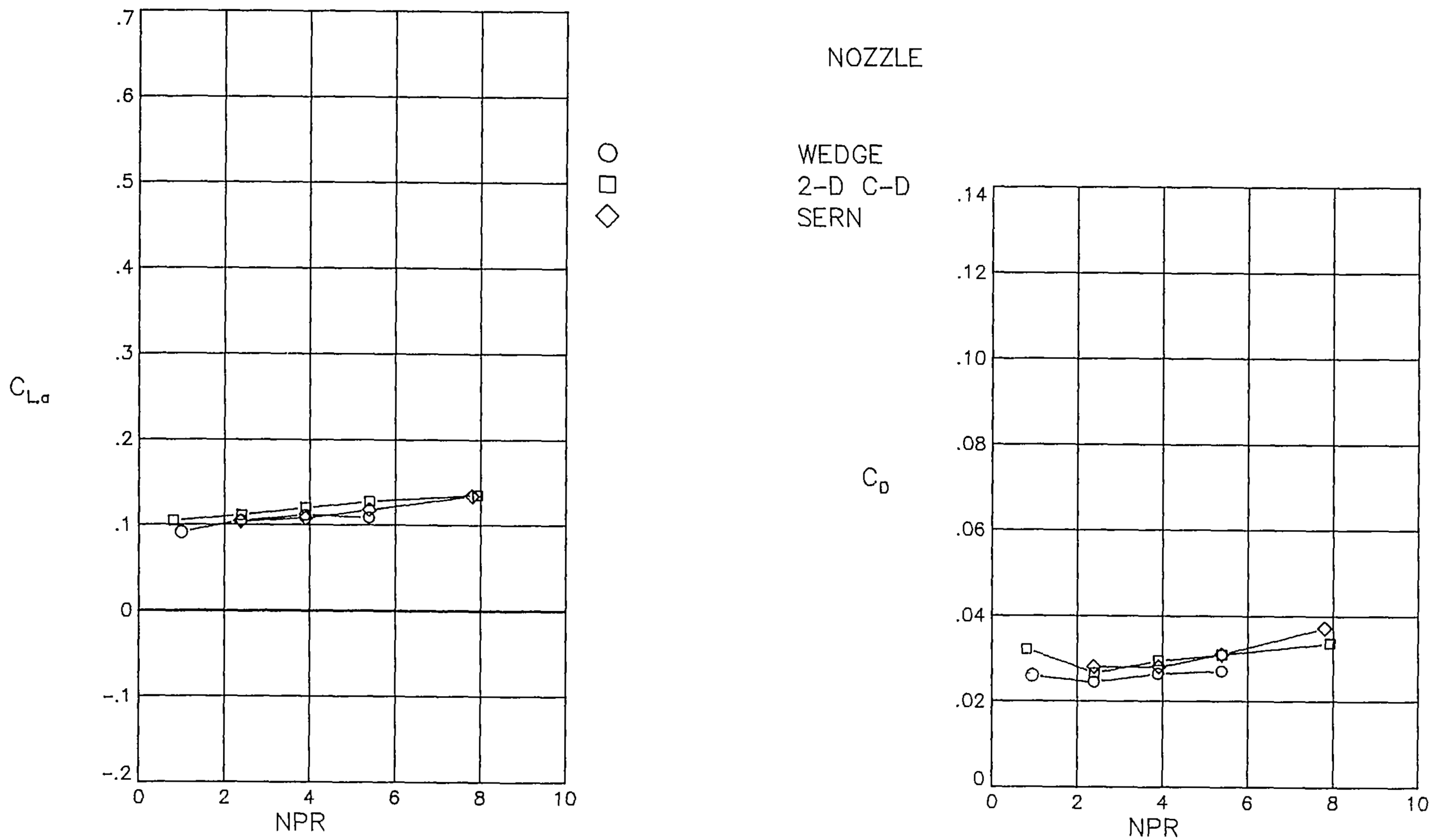
(c) M = 1.20.

Figure 45.- Concluded.



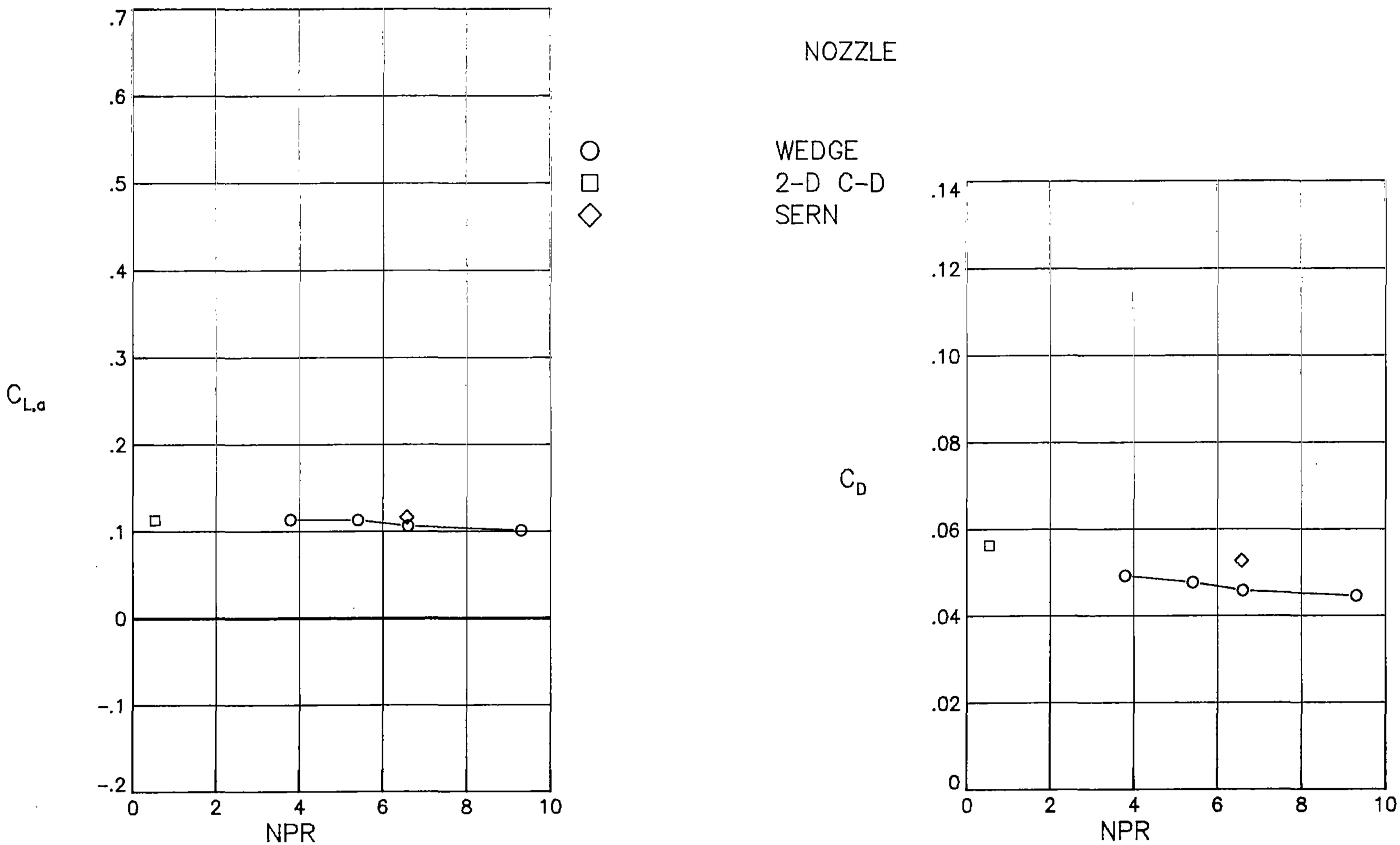
(a) M = 0.60.

Figure 46.- Effects of nozzle type on thrust-removed aerodynamic characteristics. IUM; AR = 1; A/B power setting; $\delta_v = 30^\circ$; $\delta_c = 0^\circ$; $\alpha = 4^\circ$.



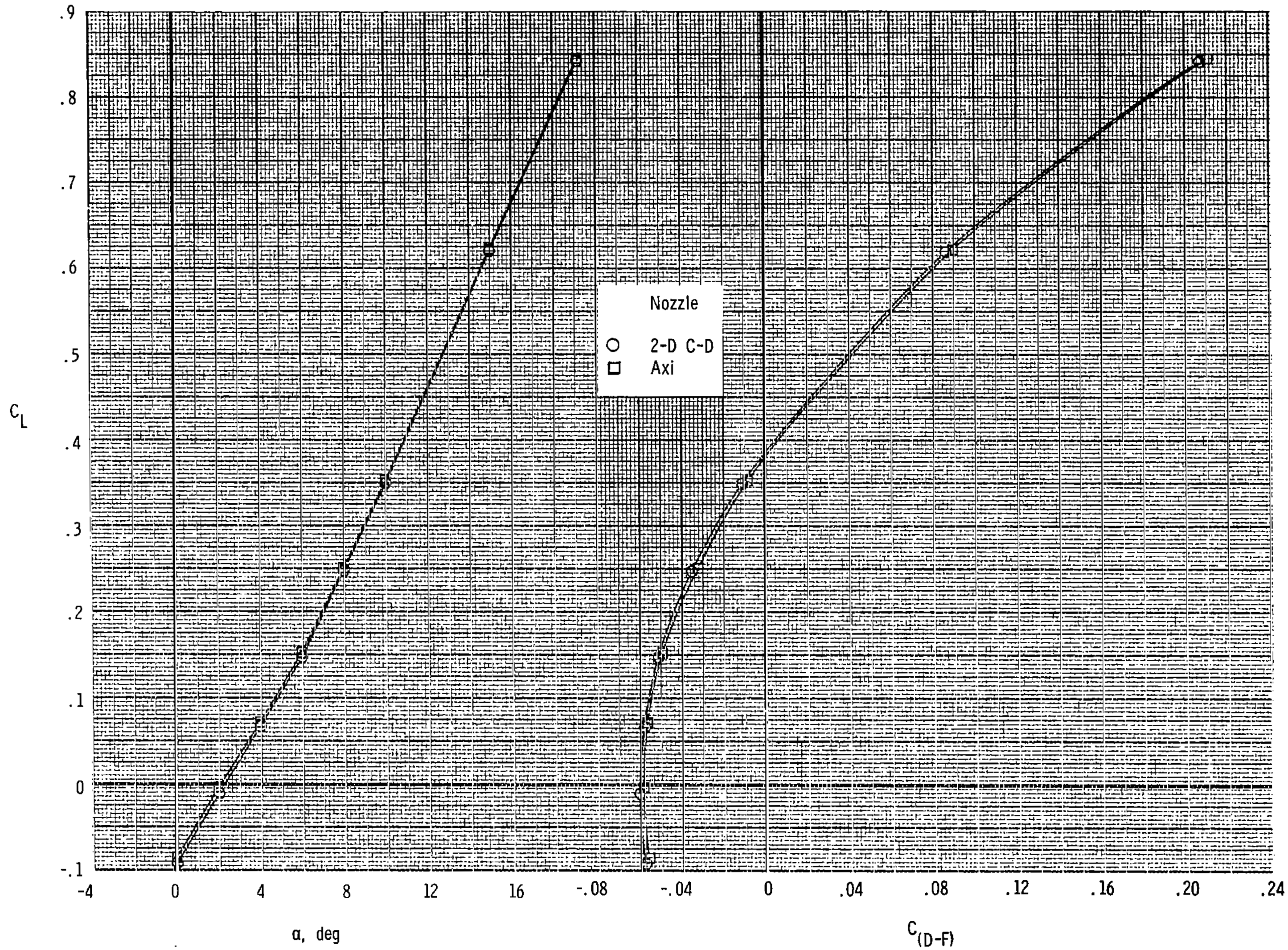
(b) M = 0.87.

Figure 46.- Continued.



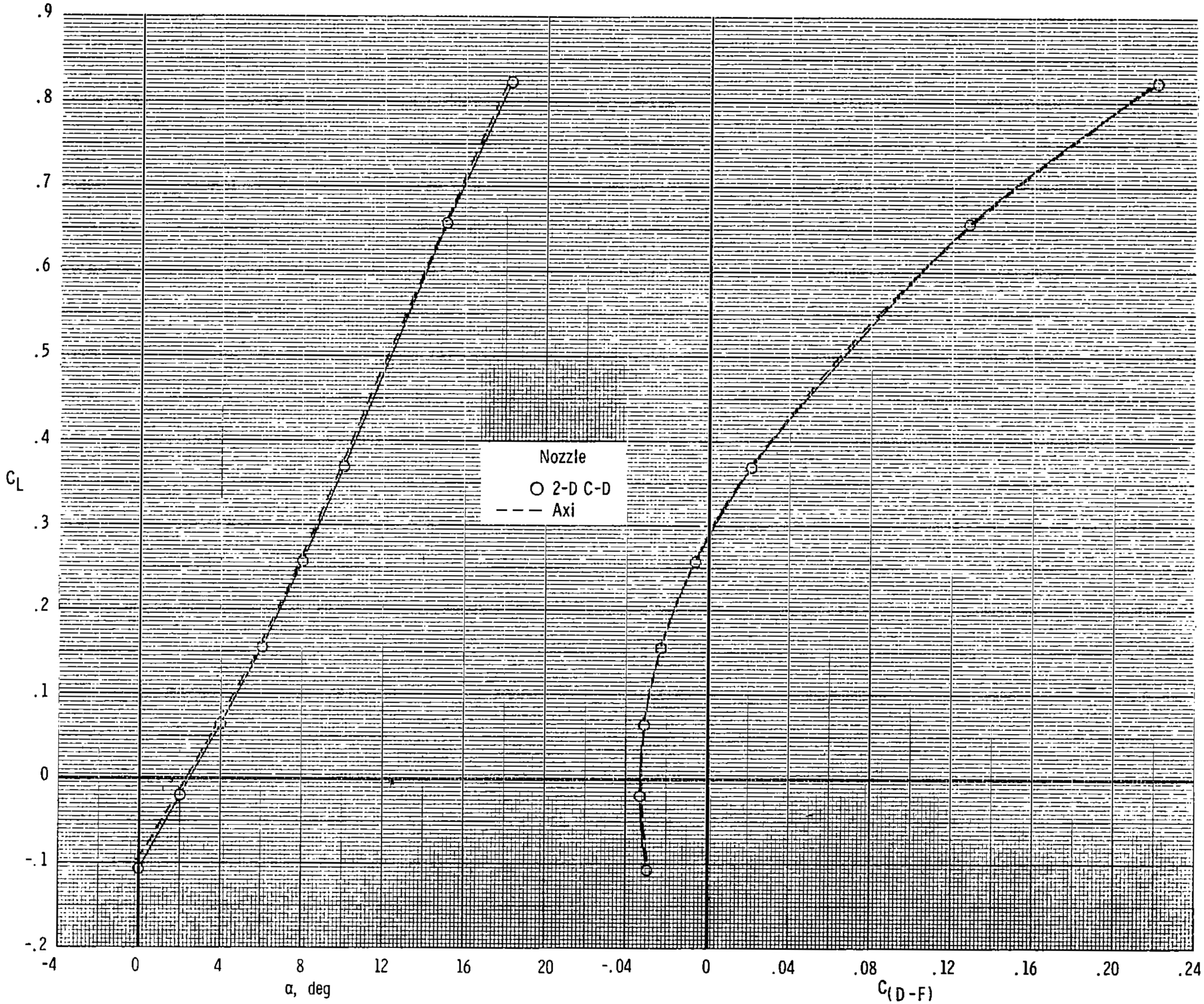
(c) M = 1.20.

Figure 46.- Concluded.



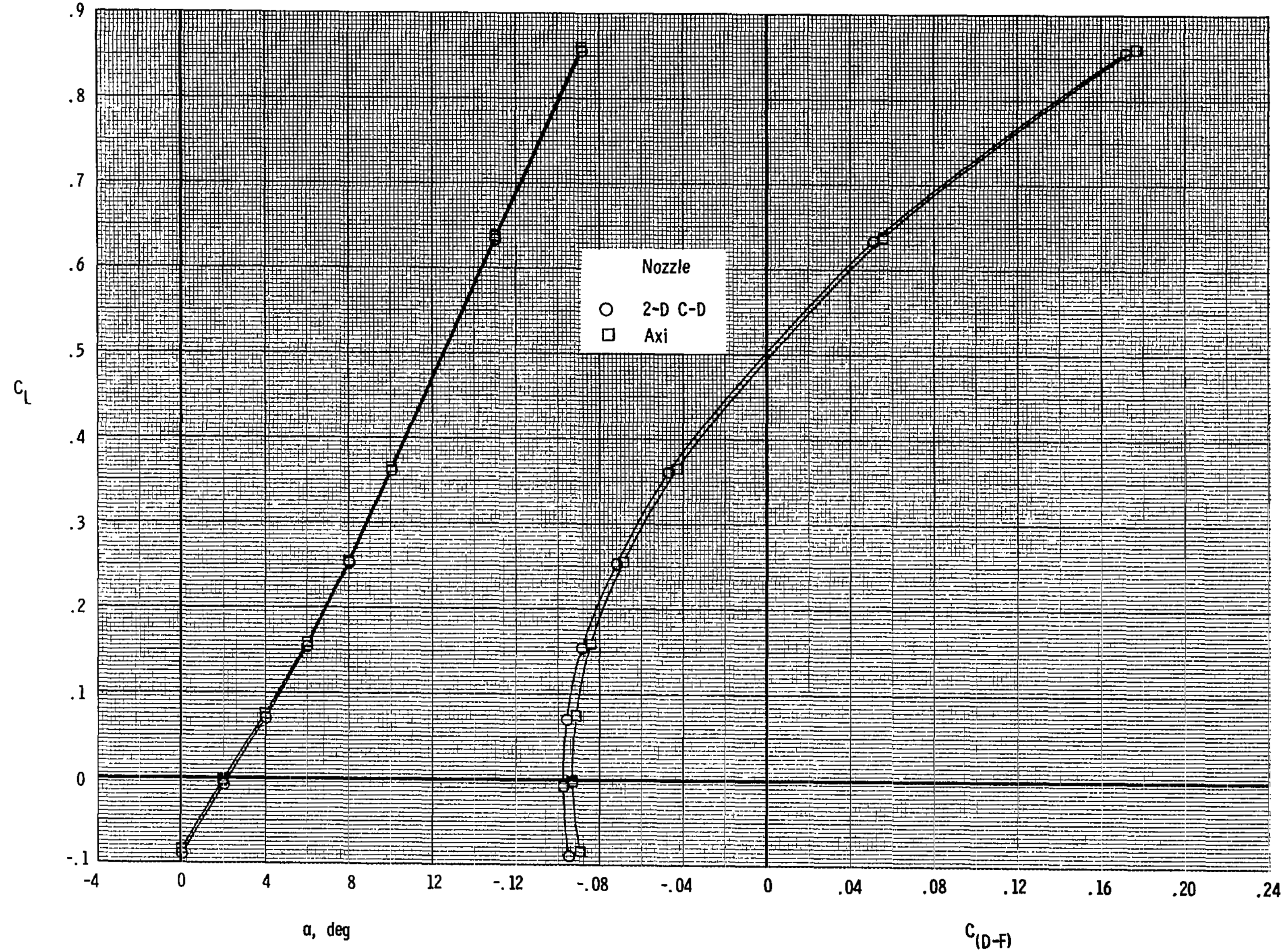
(a) M = 0.60; NPR = 3.0.

Figure 47.- Effects of nozzle type on total aerodynamic characteristics. Dashed curve indicates interpolated data. IUA; AR = 1; dry power setting; $\delta_v = 0^\circ$; $\delta_c = 0^\circ$.



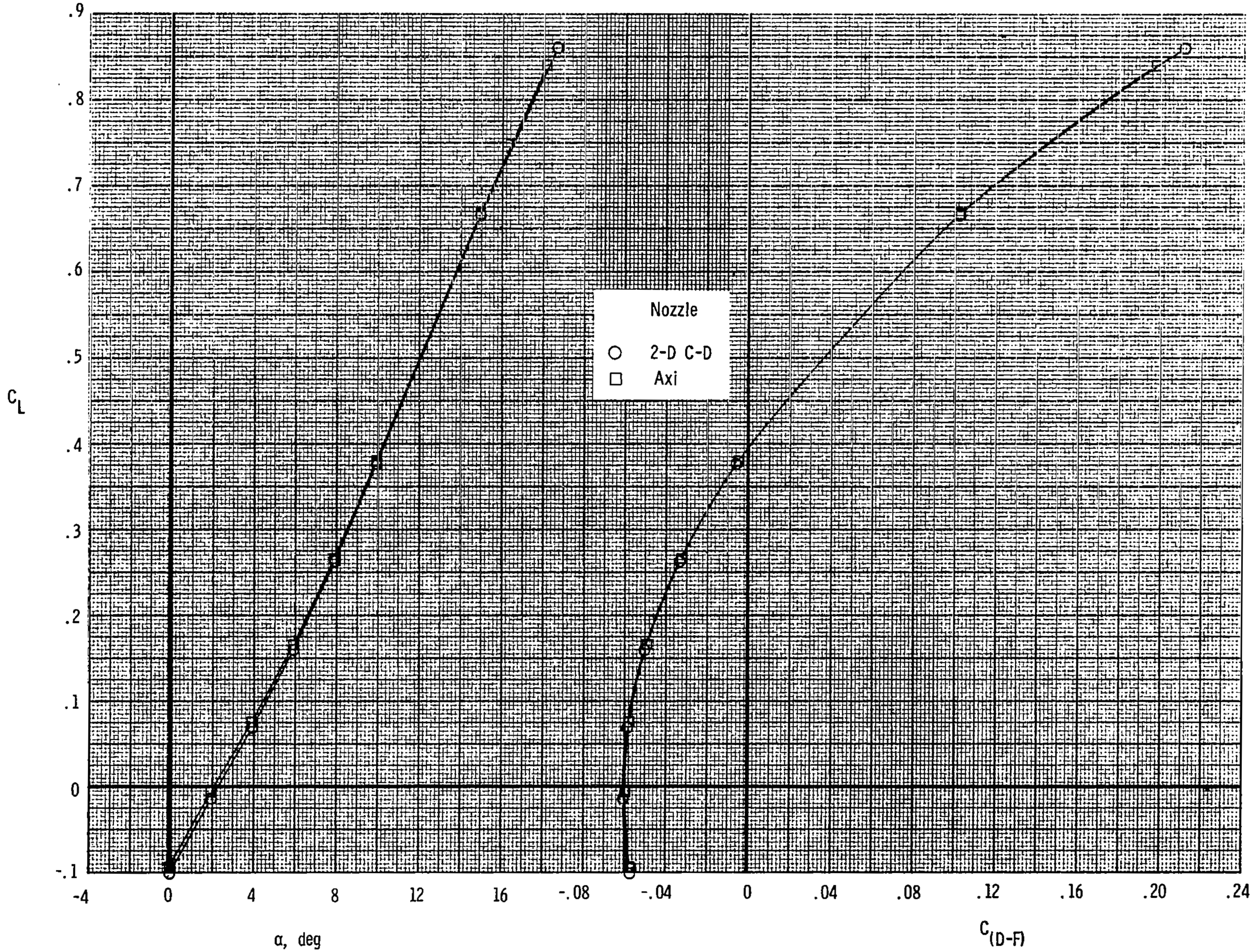
(b) M = 0.87; NPR = 3.9.

Figure 47.- Concluded.



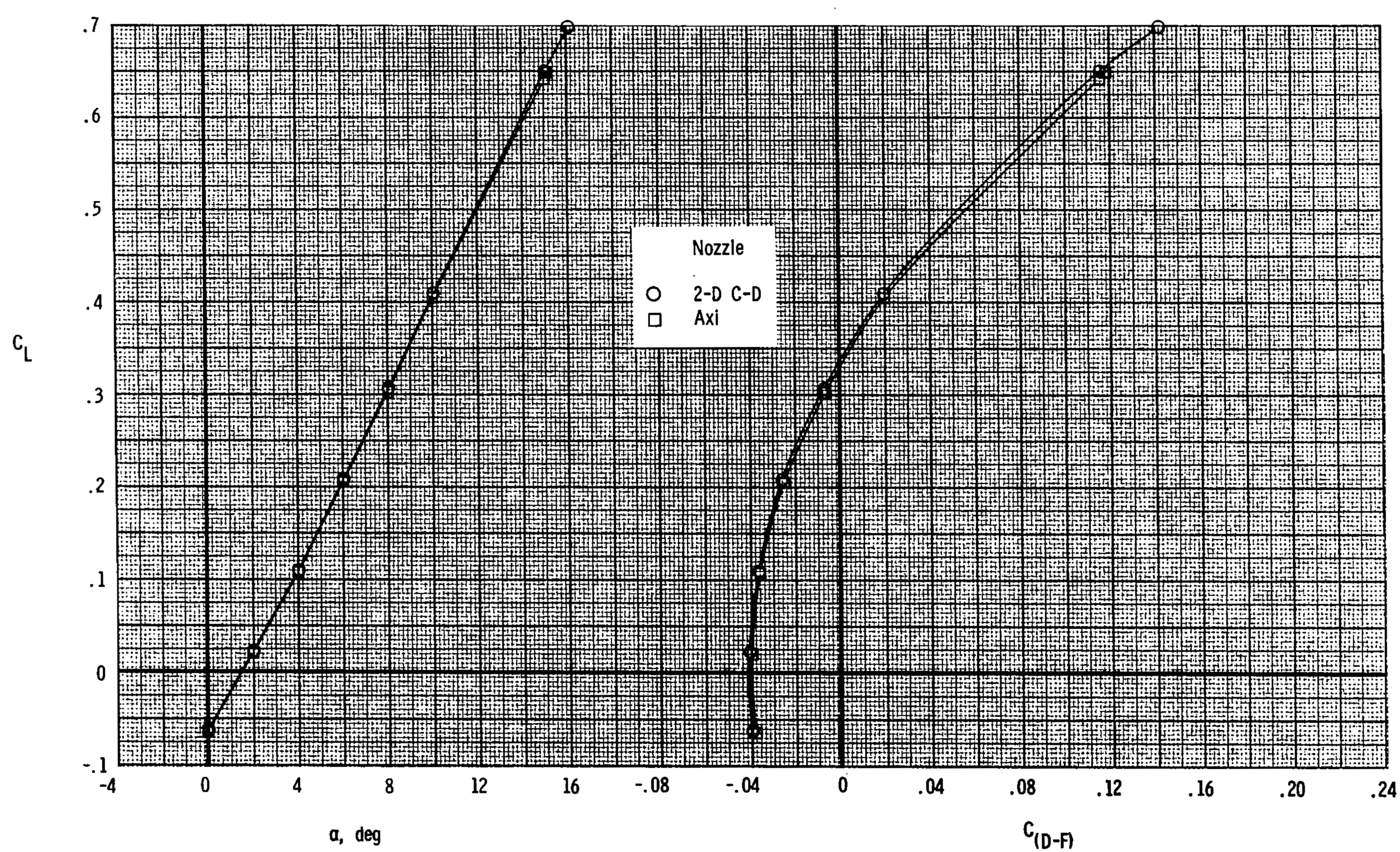
(a) M = 0.60; NPR = 3.0.

Figure 48.- Effects of nozzle type on total aerodynamic characteristics. IUA; AR = 1; A/B power setting; $\delta_v = 0^\circ$; $\delta_c = 0^\circ$.



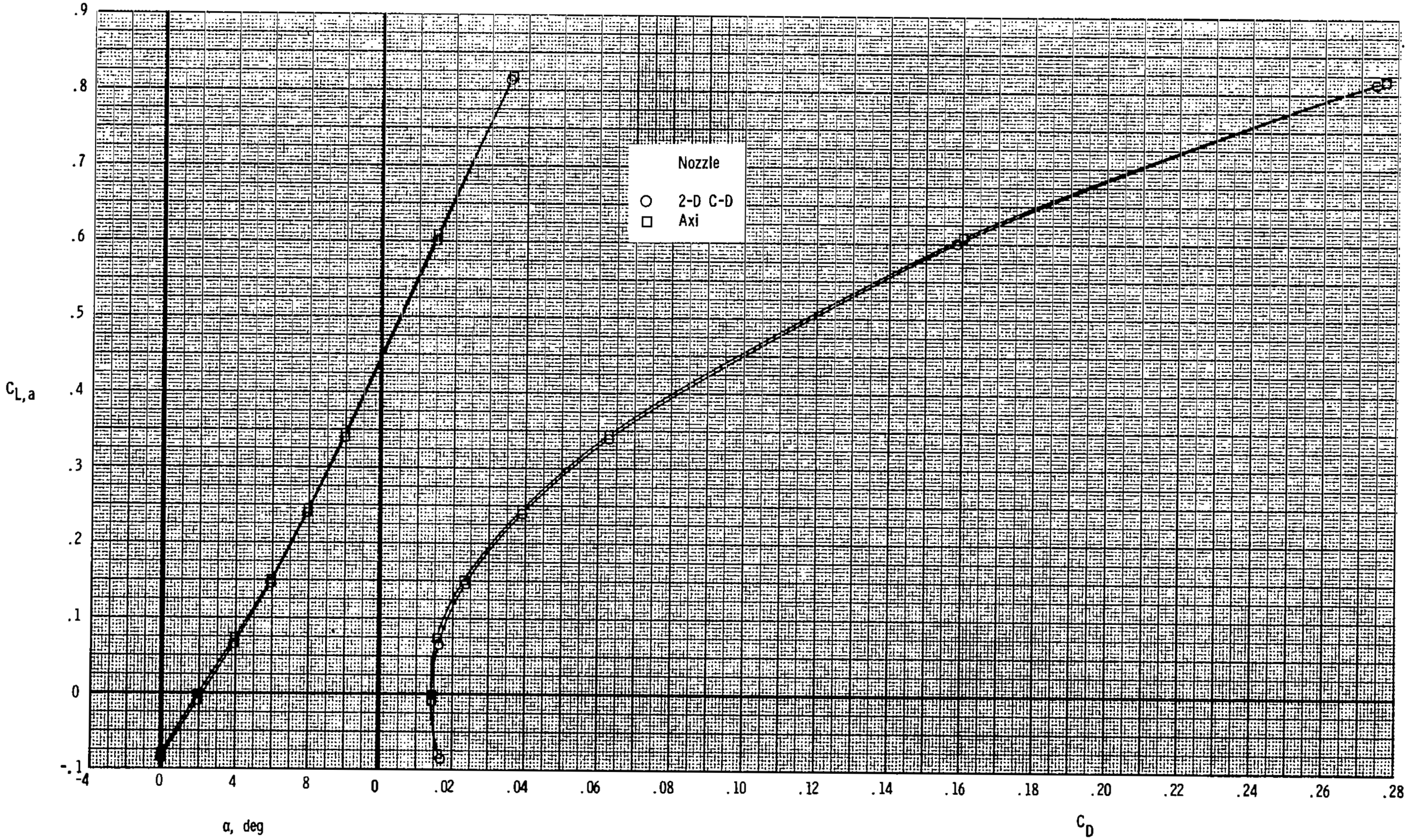
(b) M = 0.87; NPR = 3.9.

Figure 48.- Continued.



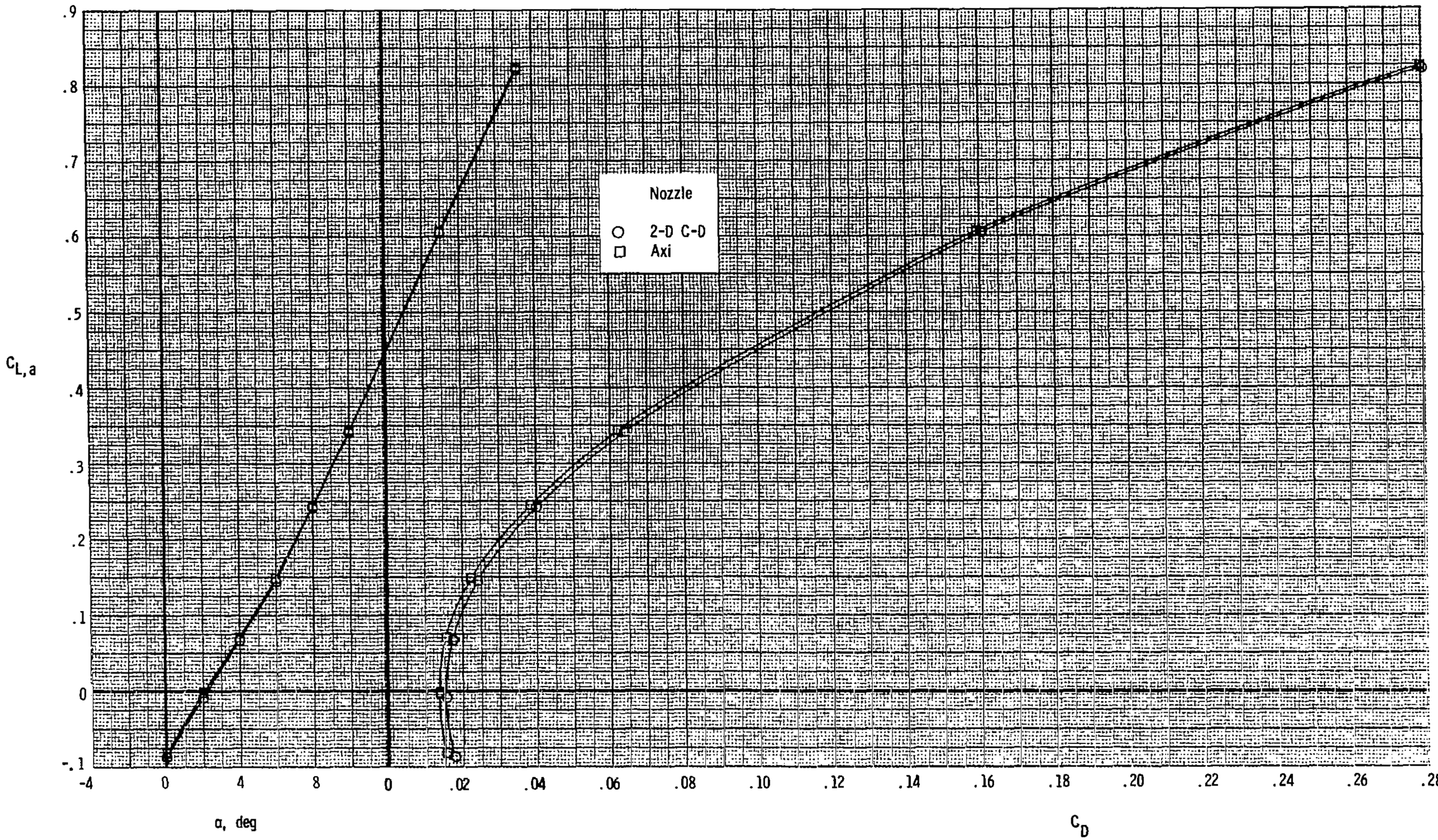
(c) M = 1.20; NPR = 6.6.

Figure 48.- Concluded.



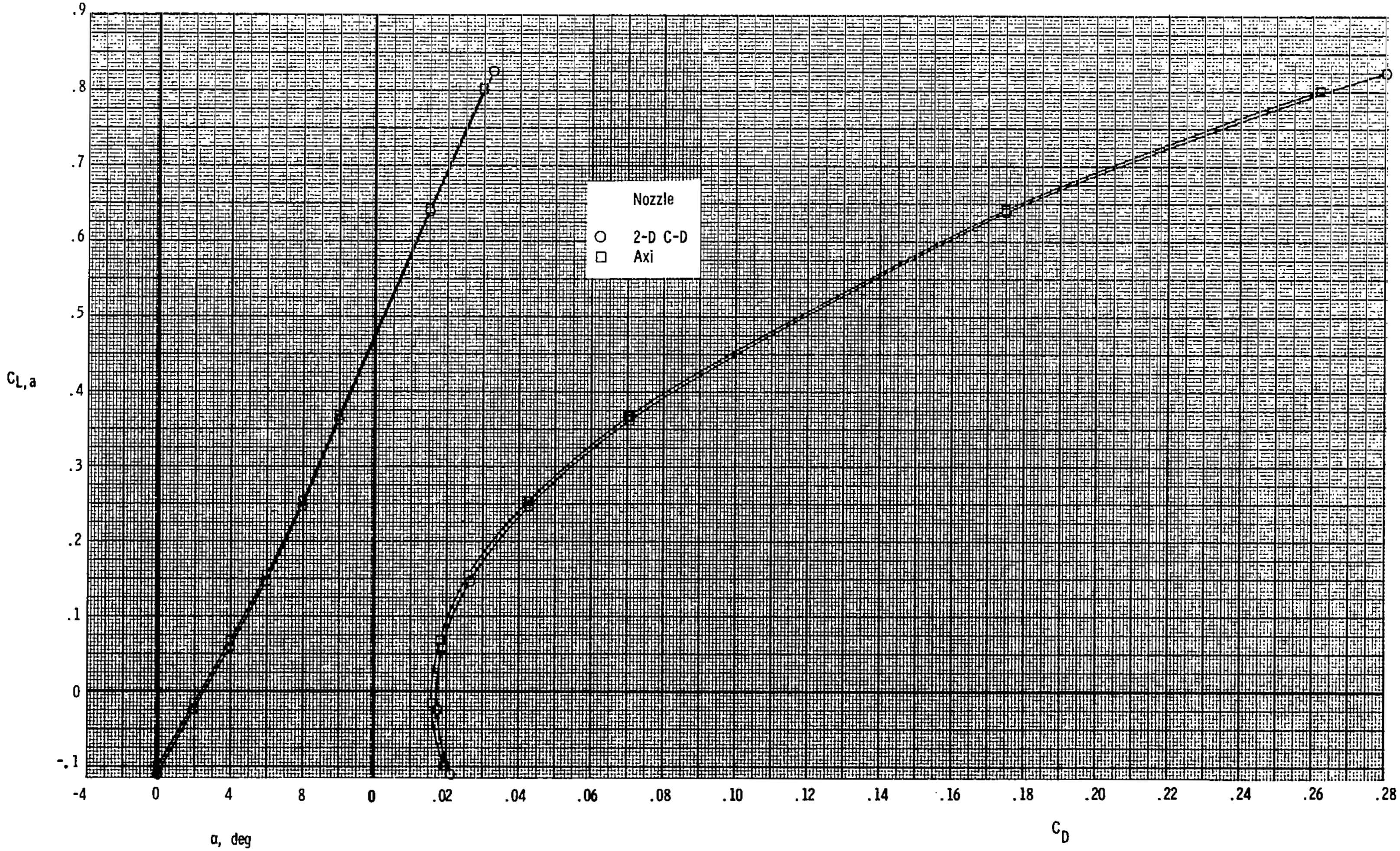
(a) NPR = 1.0.

Figure 49.- Effects of nozzle type on thrust-removed aerodynamic characteristics. IUA; AR = 1; dry power setting; $\delta_v = 0^o$; $\delta_c = 0^o$; M = 0.60.



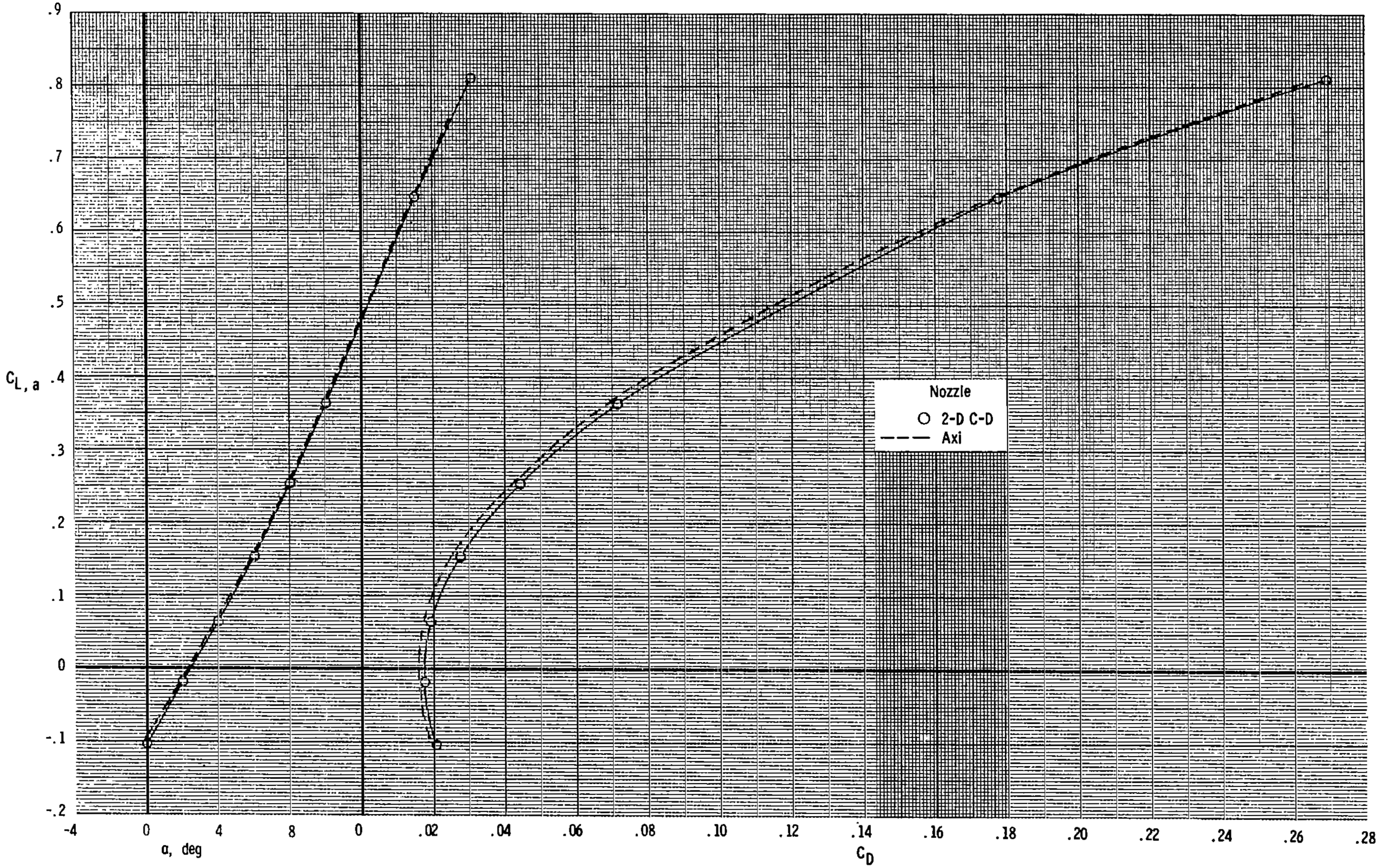
(b) NPR = 3.0.

Figure 49.- Concluded.



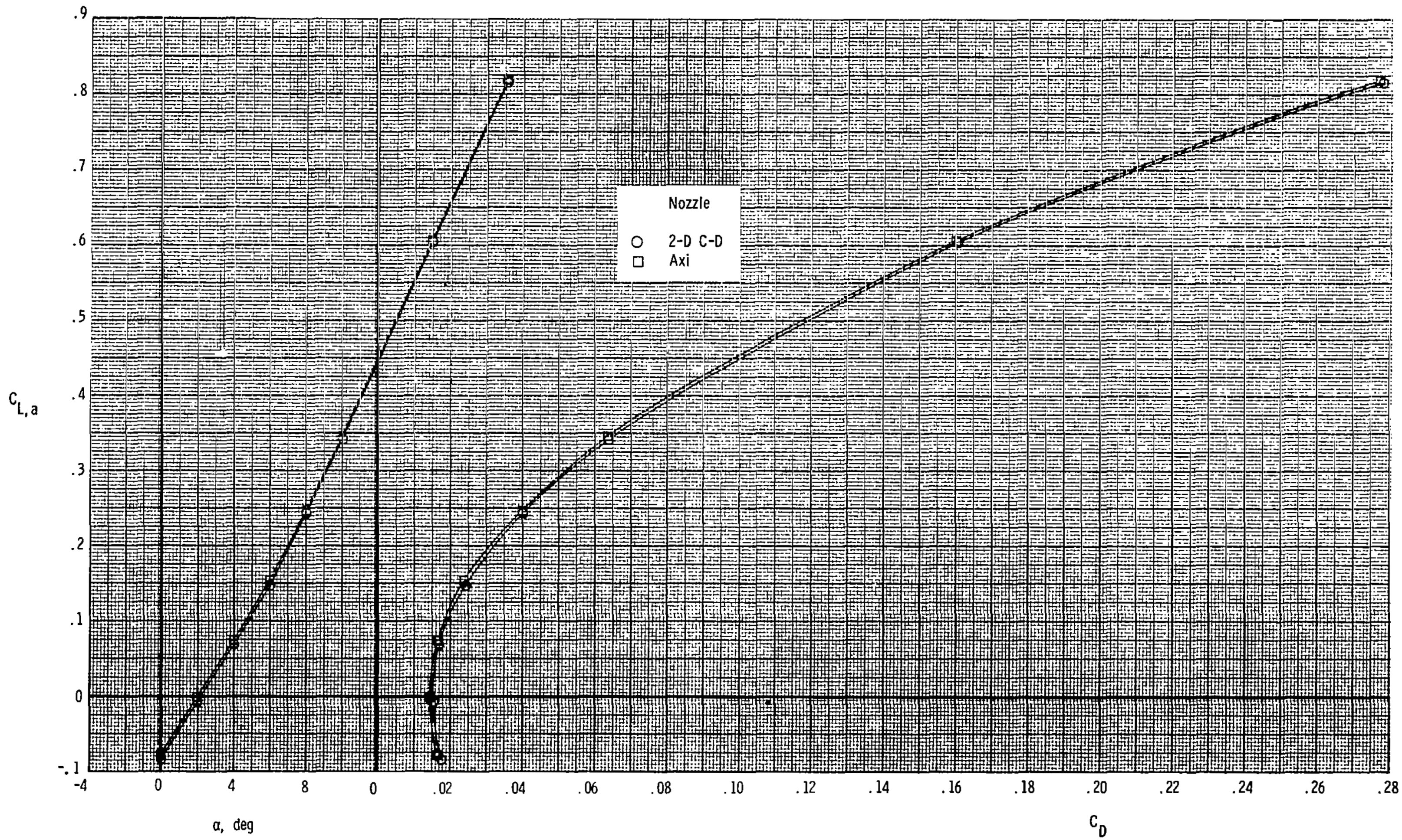
(a) NPR = 1.0.

Figure 50.- Effects of nozzle type on thrust-removed aerodynamic characteristics. IUA; AR = 1; dry power setting; $\delta_v = 0^{\circ}$; $\delta_c = 0^{\circ}$; M = 0.87.



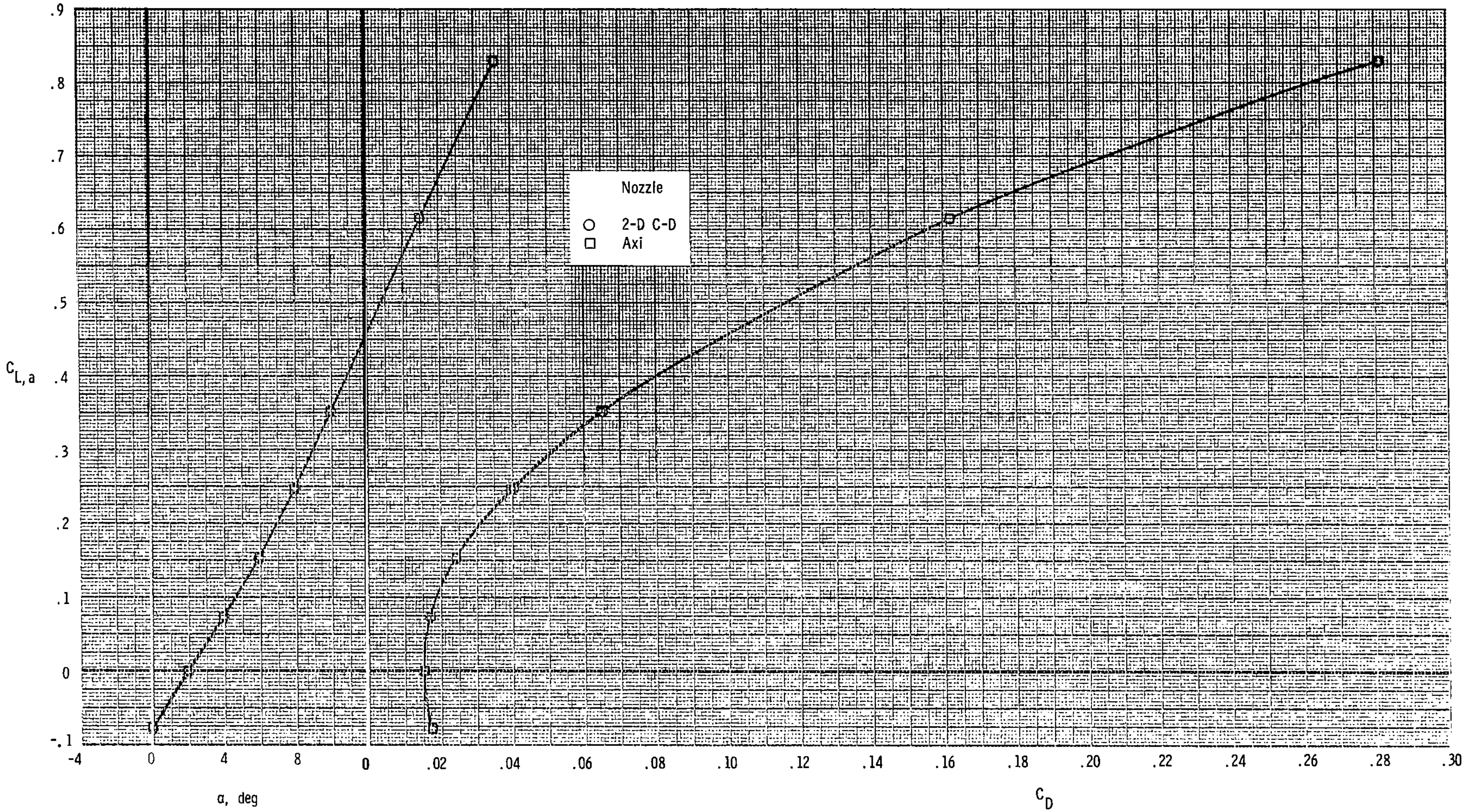
(b) NPR = 3.9.

Figure 50.- Concluded.



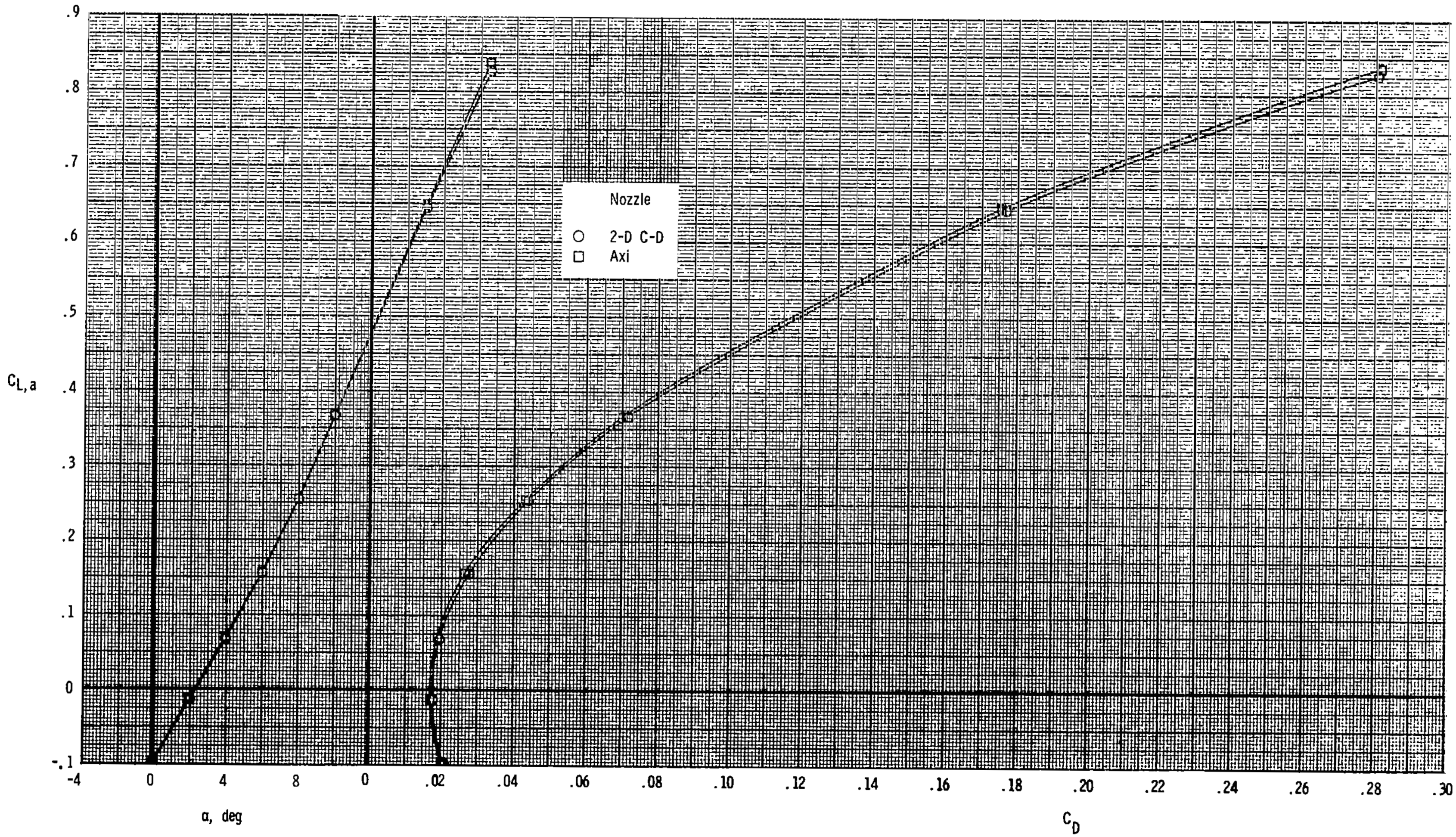
(a) NPR = 1.0.

Figure 51.- Effects of nozzle type on thrust-removed aerodynamic characteristics. IUA; AR = 1; A/B power setting; $\delta_v = 0^\circ$; $\delta_c = 0^\circ$; M = 0.60.



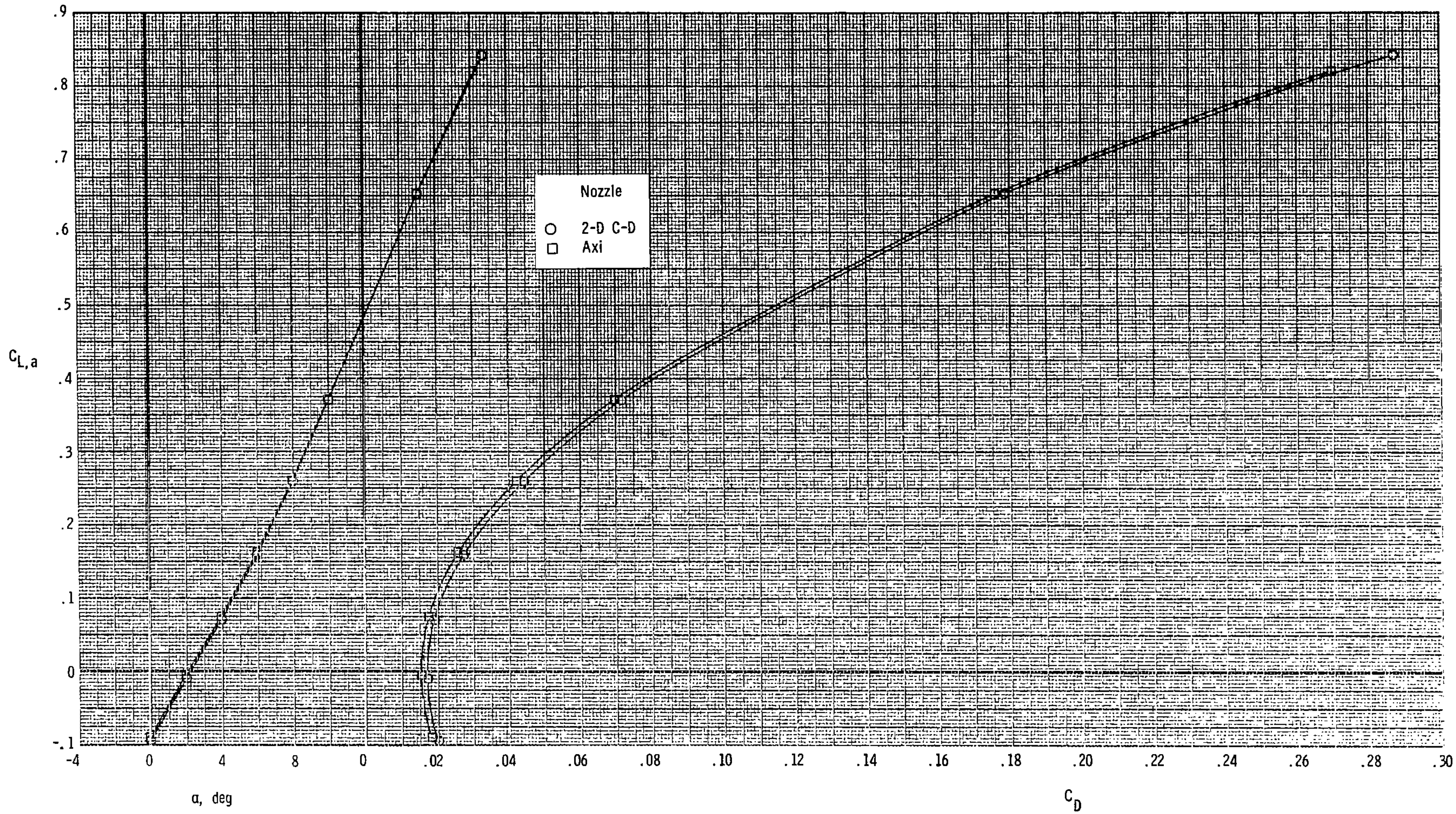
(b) NPR = 3.0.

Figure 51.- Concluded.



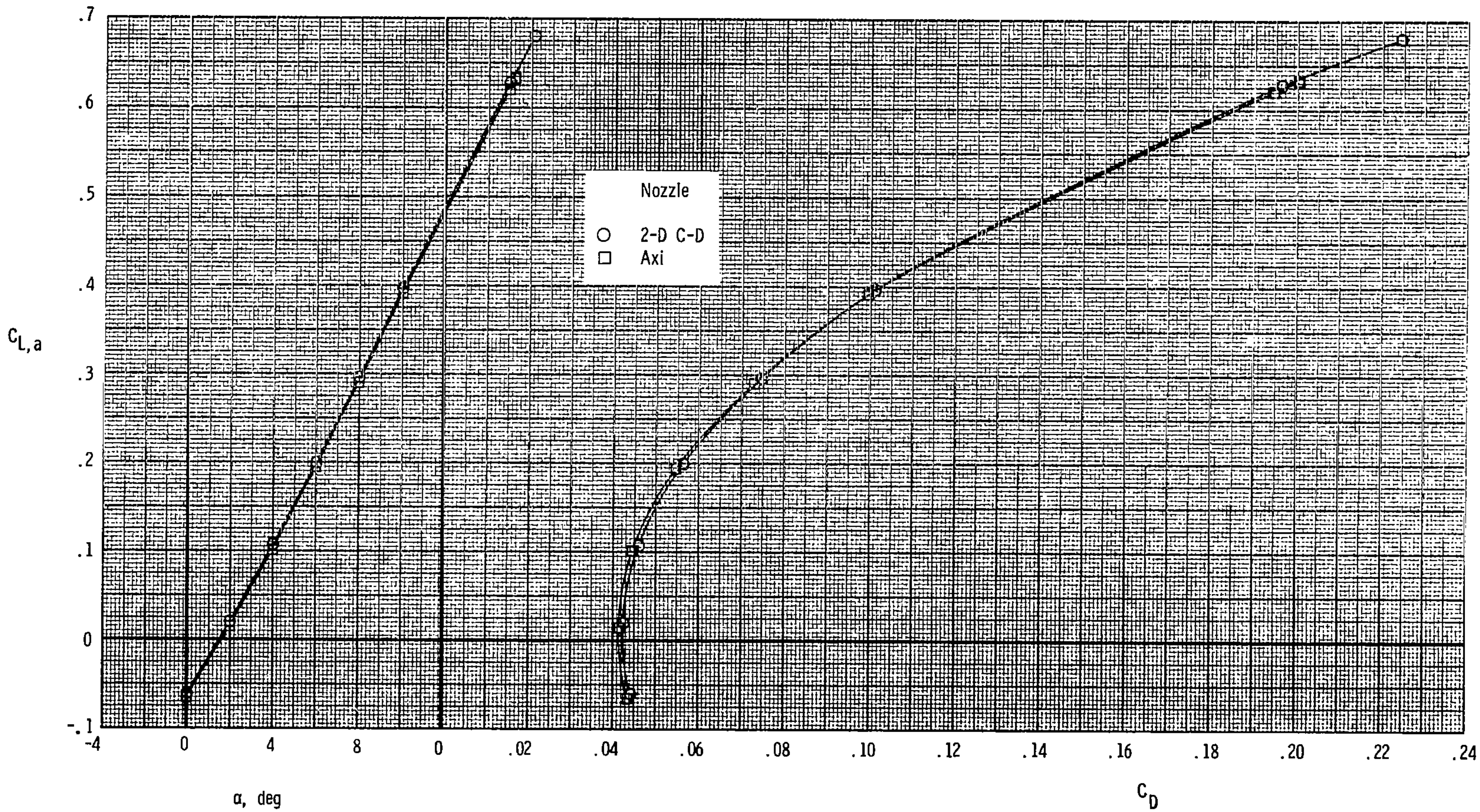
(a) NPR = 1.0.

Figure 52.- Effects of nozzle type on thrust-removed aerodynamic characteristics; IUA; AR = 1; A/B power setting; $\delta_v = 0^o$; $\delta_c = 0^o$; M = 0.87.



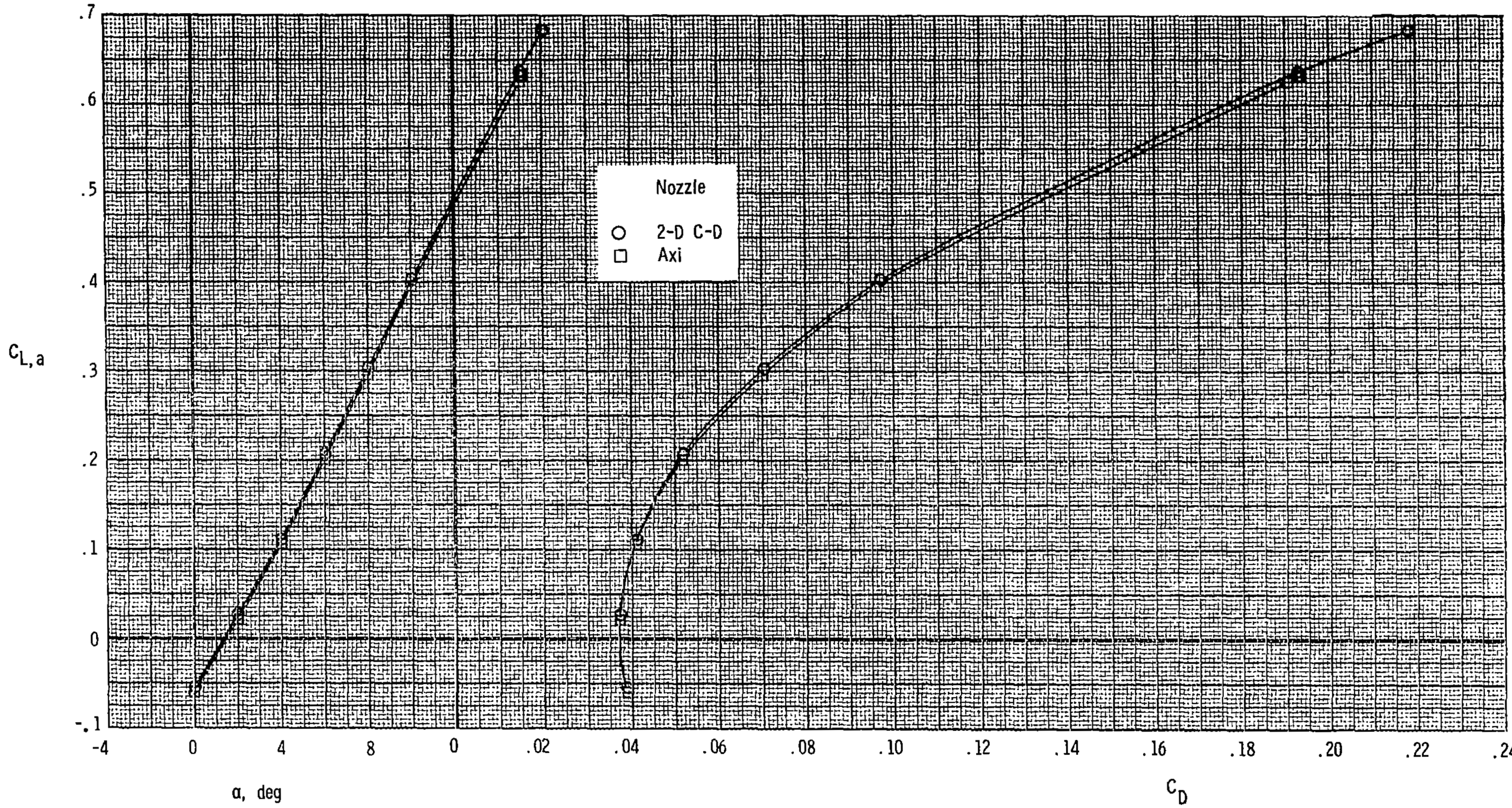
(b) NPR = 3.9.

Figure 52.- Concluded.



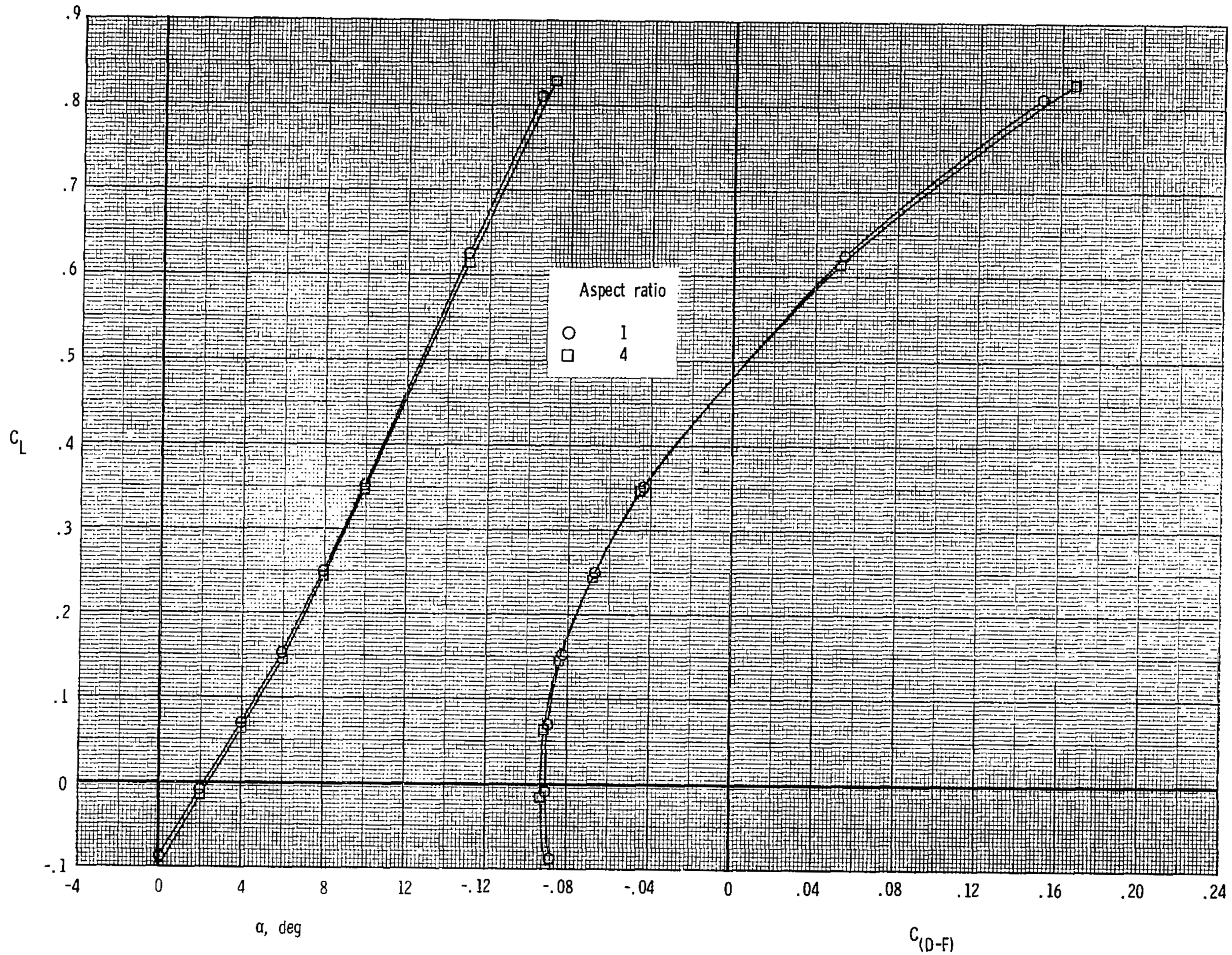
(a) NPR = 1.0.

Figure 53.- Effects of nozzle type on thrust-removed aerodynamic characteristics. IUA; AR = 1; A/B power setting; $\delta_v = 0^\circ$; $\delta_c = 0^\circ$; M = 1.20.



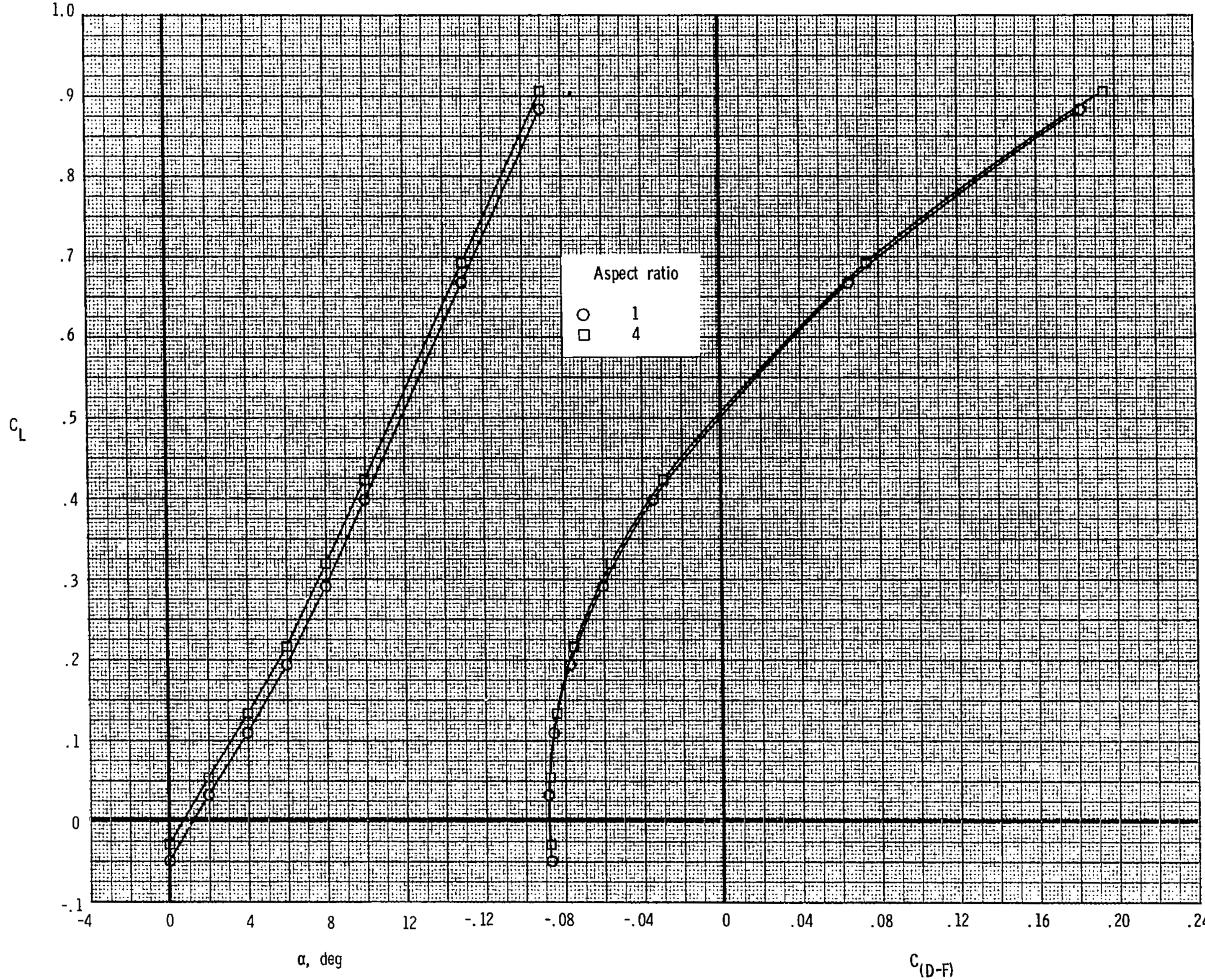
(b) NPR = 6.6.

Figure 53.- Concluded.



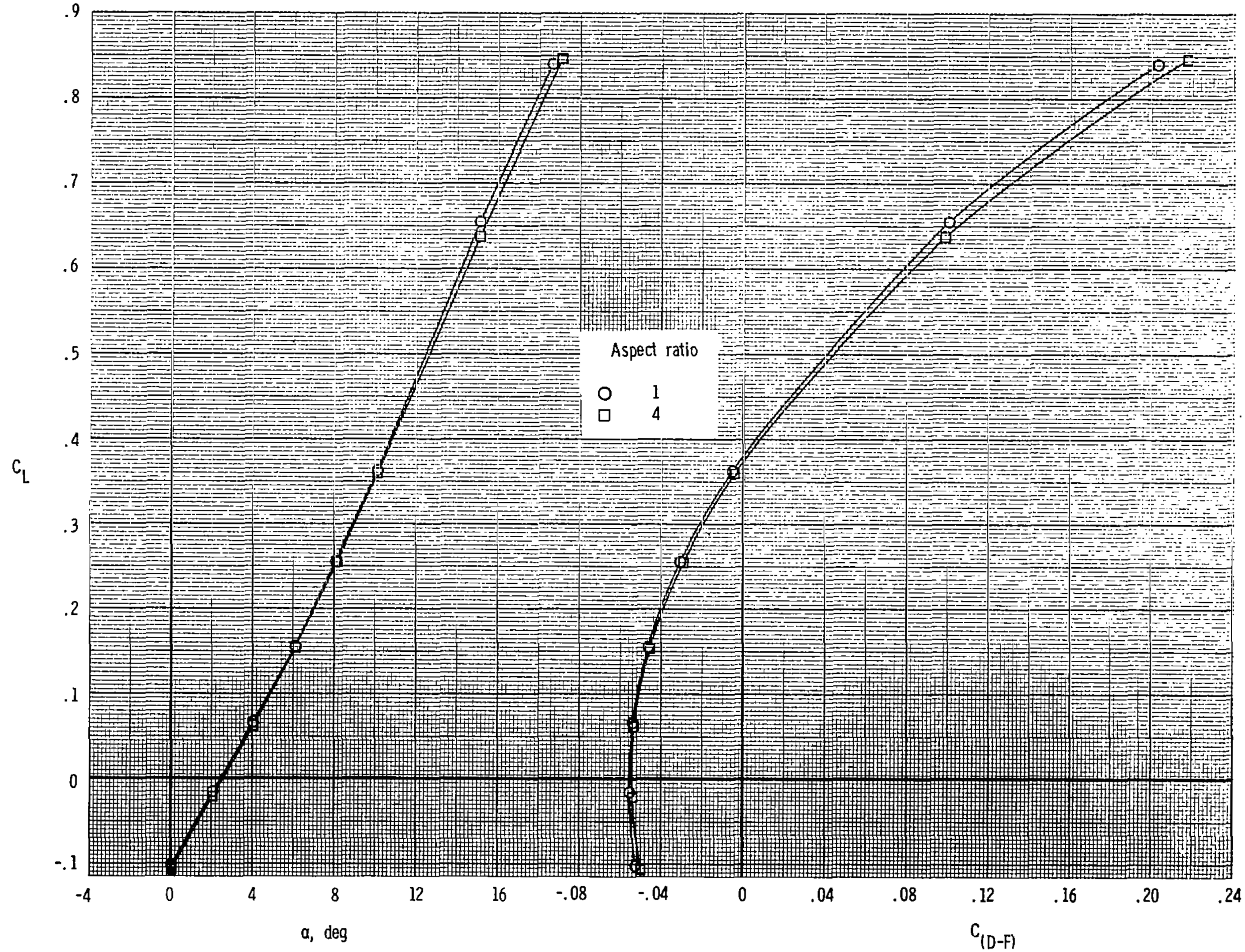
(a) $\delta_v = 0^\circ$.

Figure 54.- Effects of nozzle aspect ratio on total aerodynamic characteristics for IUM wedge nozzle. A/B power setting; $\delta_c = 0^\circ$; M = 0.60; NPR = 3.0.



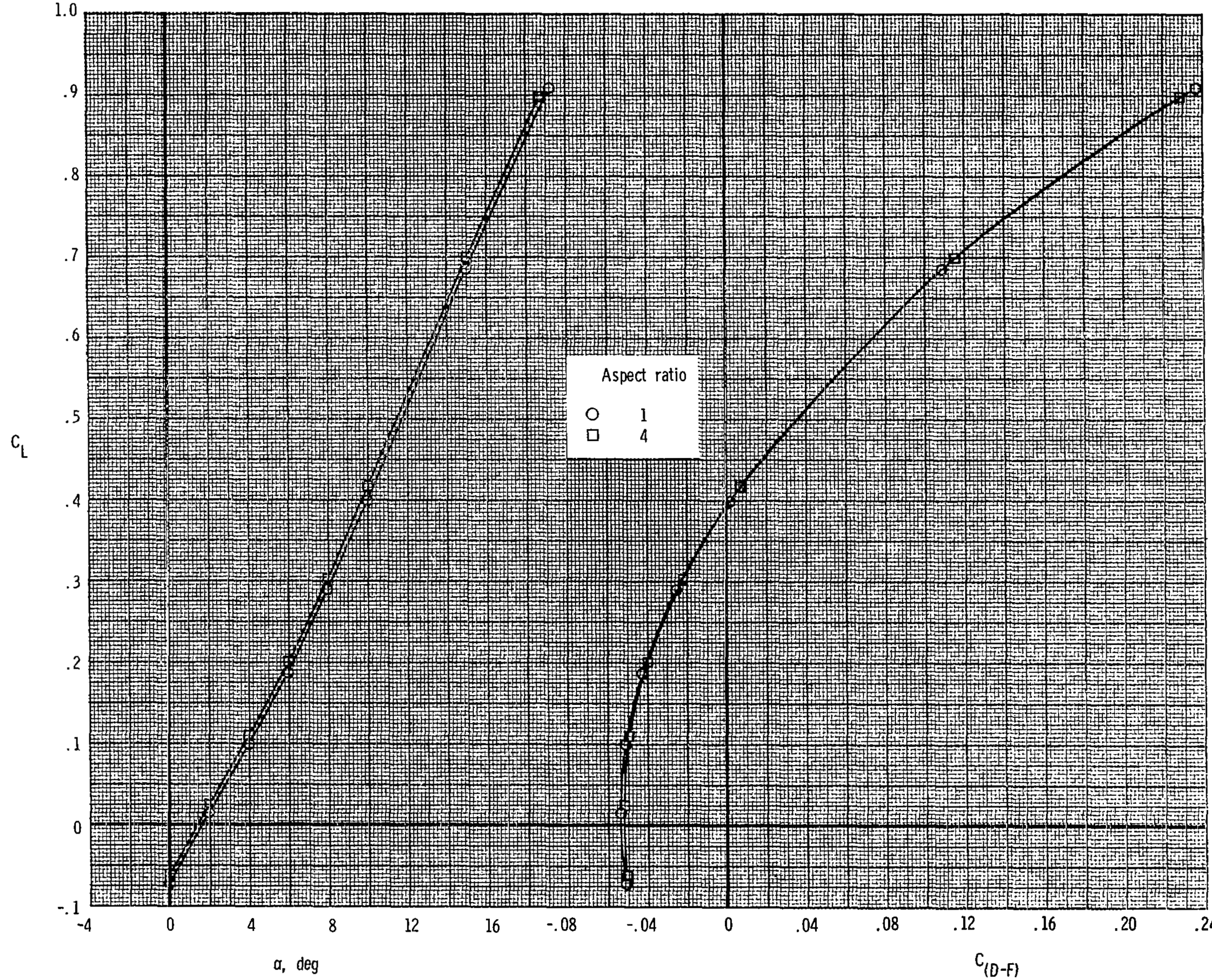
(b) $\delta_v = 15^\circ$.

Figure 54.- Concluded.



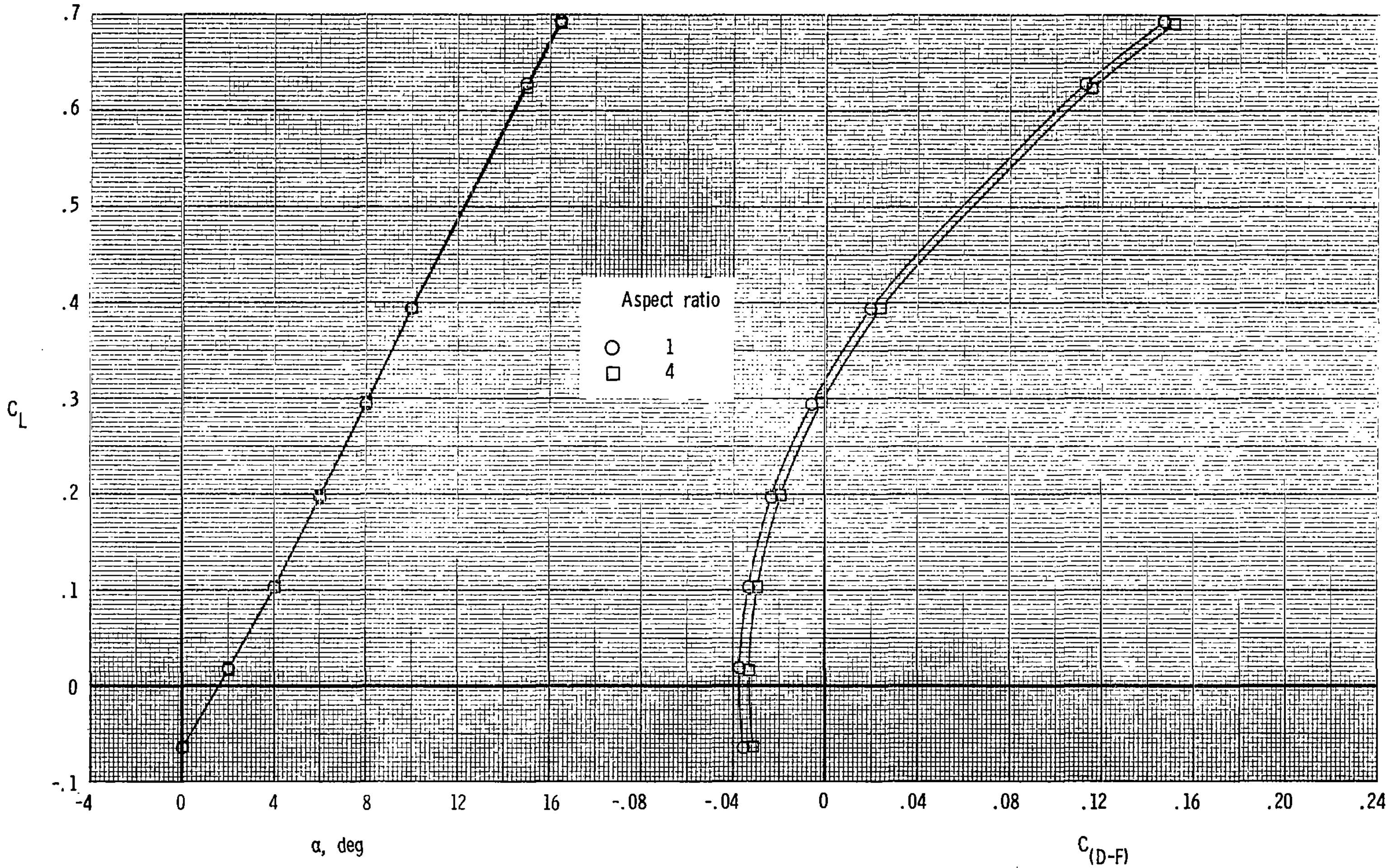
(a) $\delta_v = 0^{\circ}$.

Figure 55.- Effects of nozzle aspect ratio on total aerodynamic characteristics for IUM wedge nozzle. A/B power setting; $\delta_c = 0^{\circ}$; M = 0.87; NPR = 3.9.



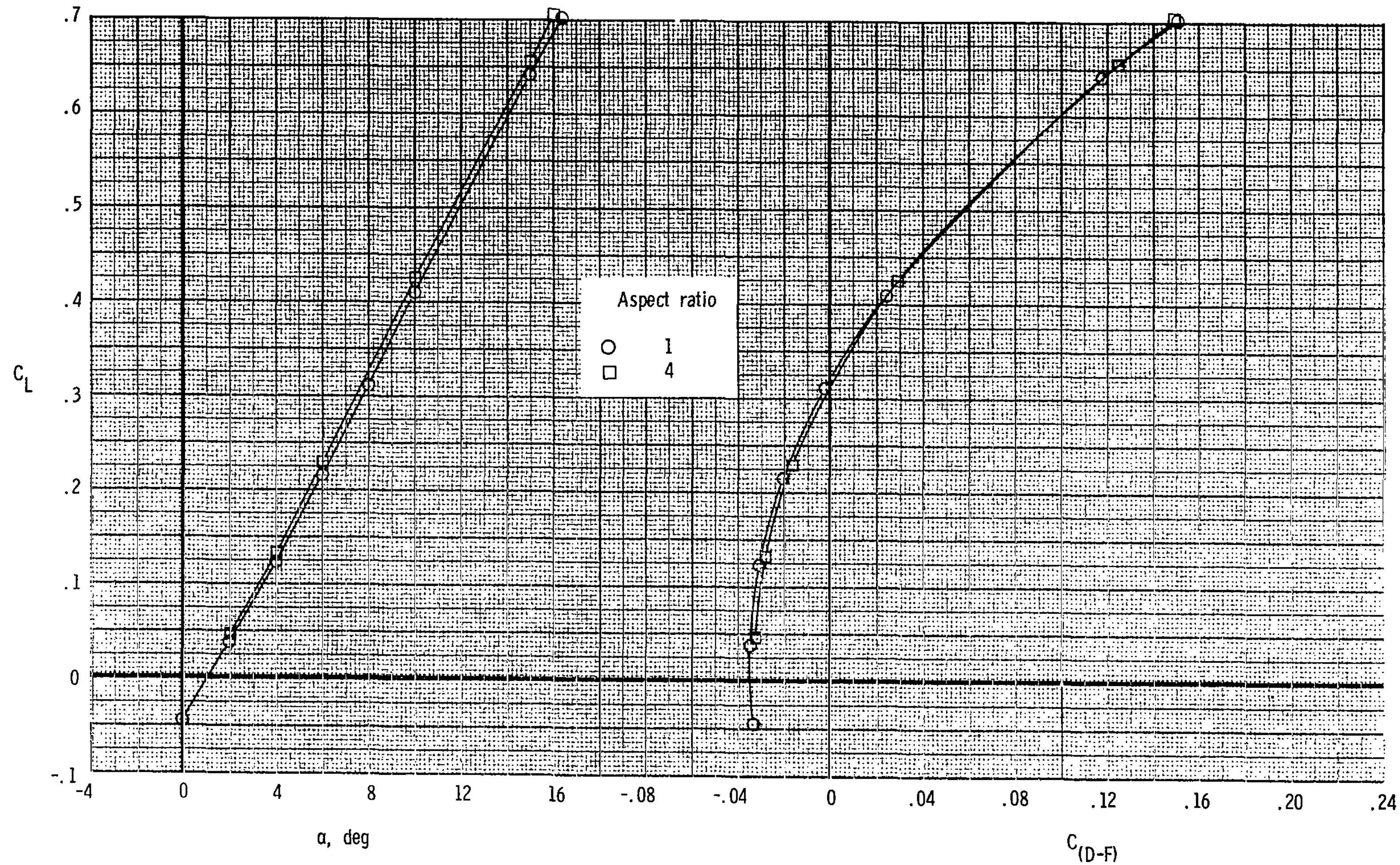
(b) $\delta_v = 15^\circ$.

Figure 55.- Concluded.



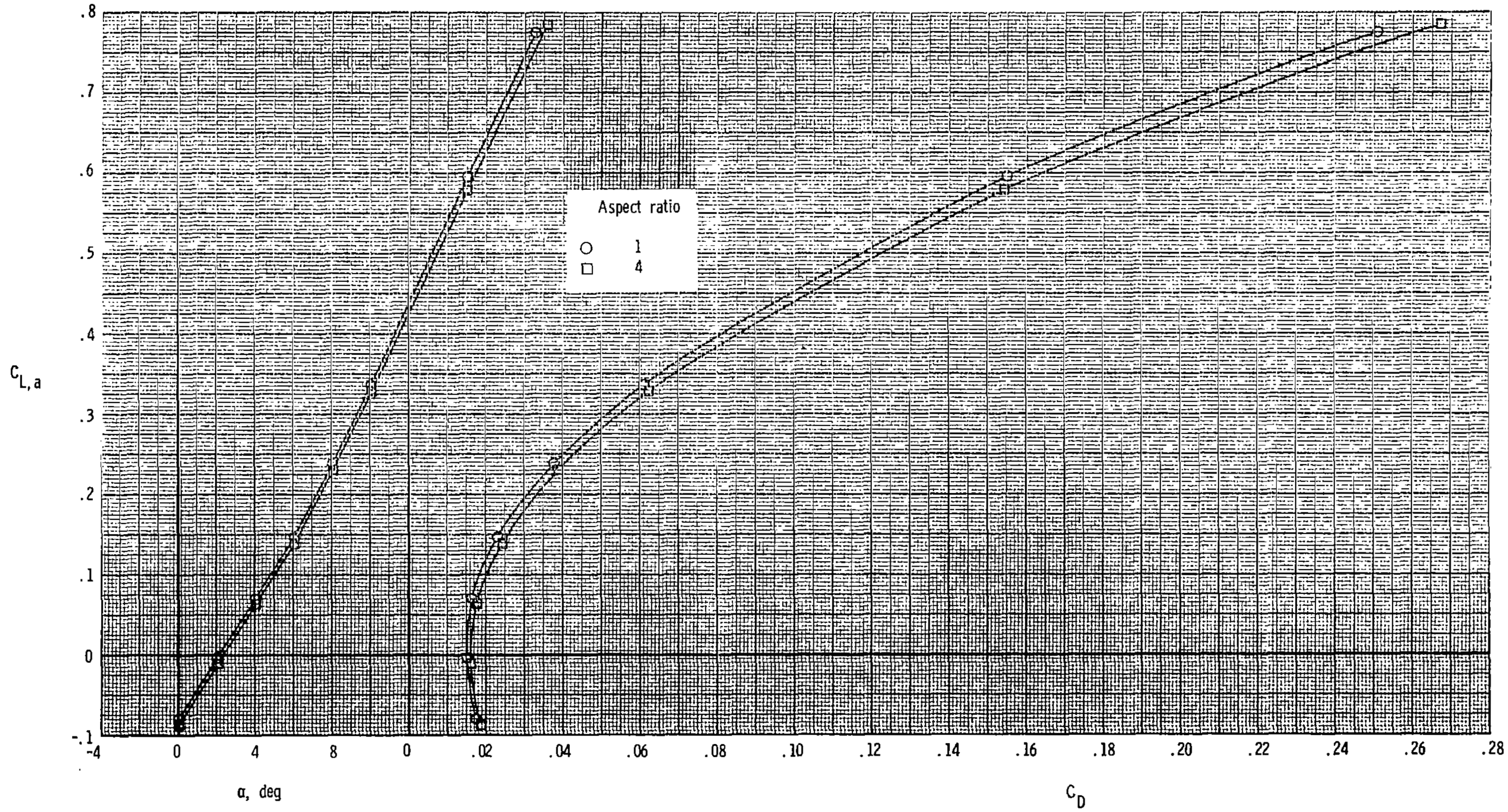
(a) $\delta_v = 0^{\circ}$.

Figure 56.- Effects of nozzle aspect ratio on total aerodynamic characteristics for IUM wedge nozzle. A/B power setting; $\delta_c = 0^{\circ}$; M = 1.20; NPR = 6.6.



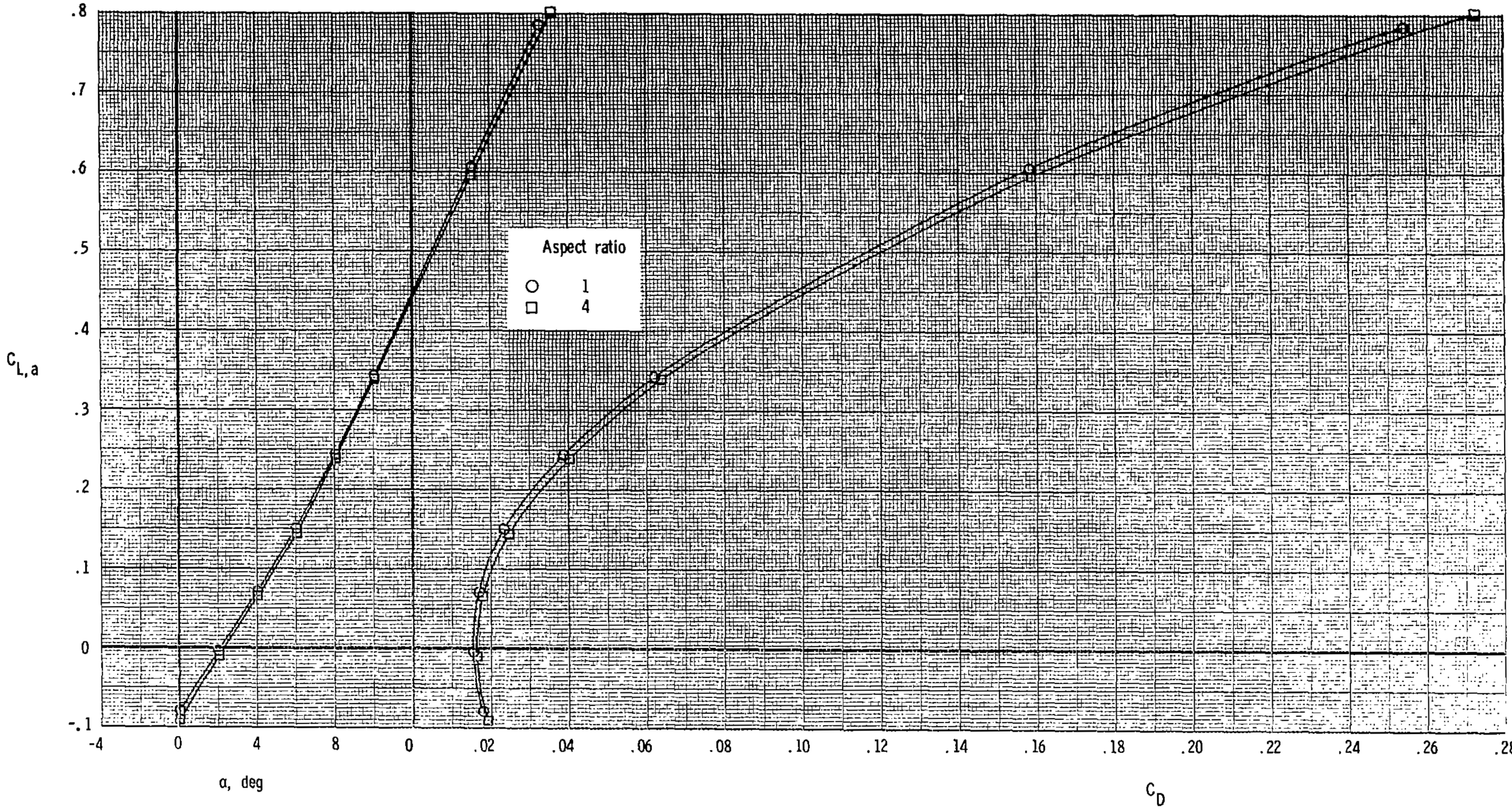
(b) $\delta_v = 15^\circ$.

Figure 56.- Concluded.



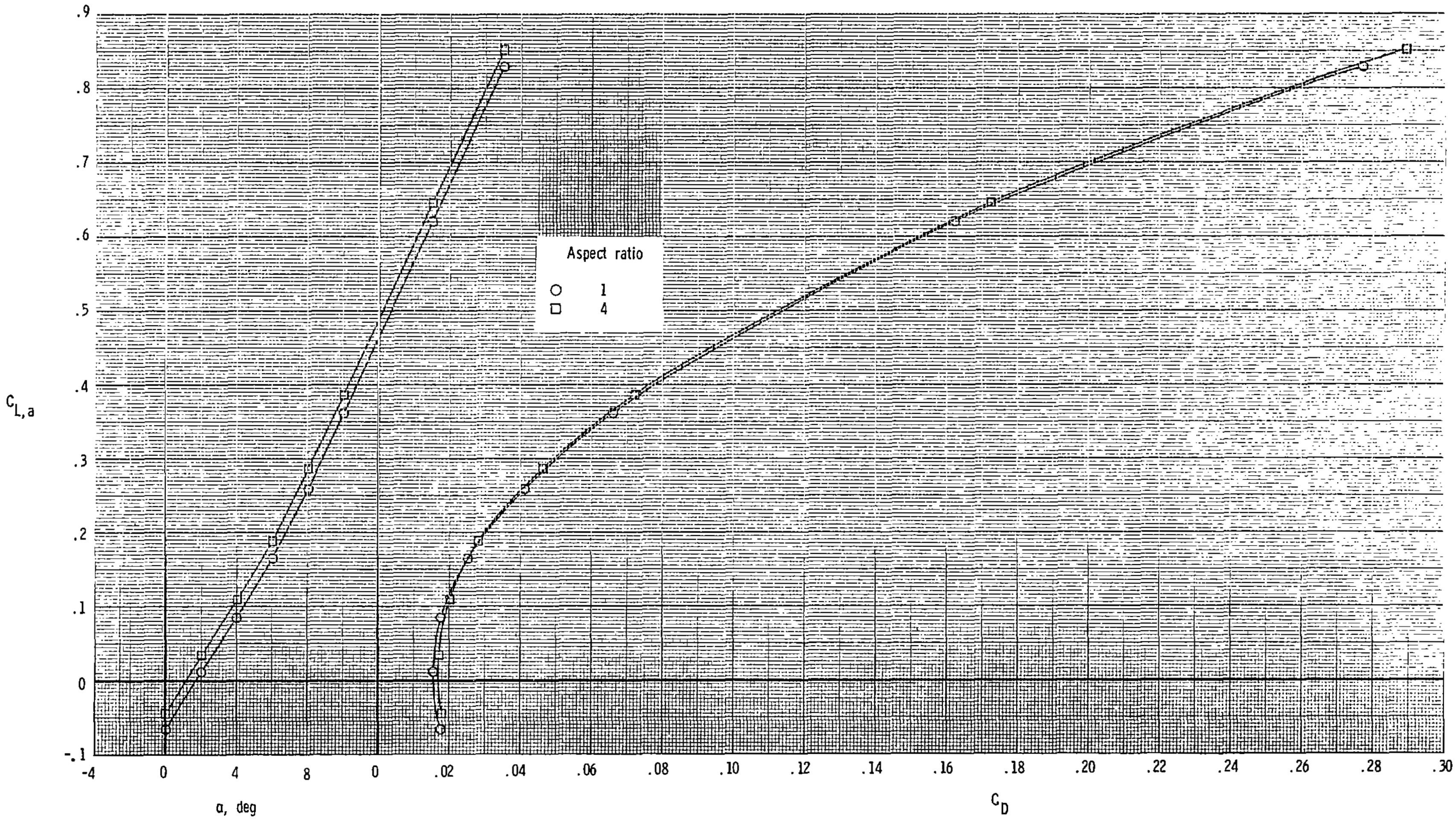
(a) $\delta_v = 0^\circ$; NPR = 1.0.

Figure 57.- Effects of nozzle aspect ratio on thrust-removed aerodynamic characteristics for IUM wedge nozzle. A/B power setting; $\delta_c = 0^\circ$; M = 0.60.



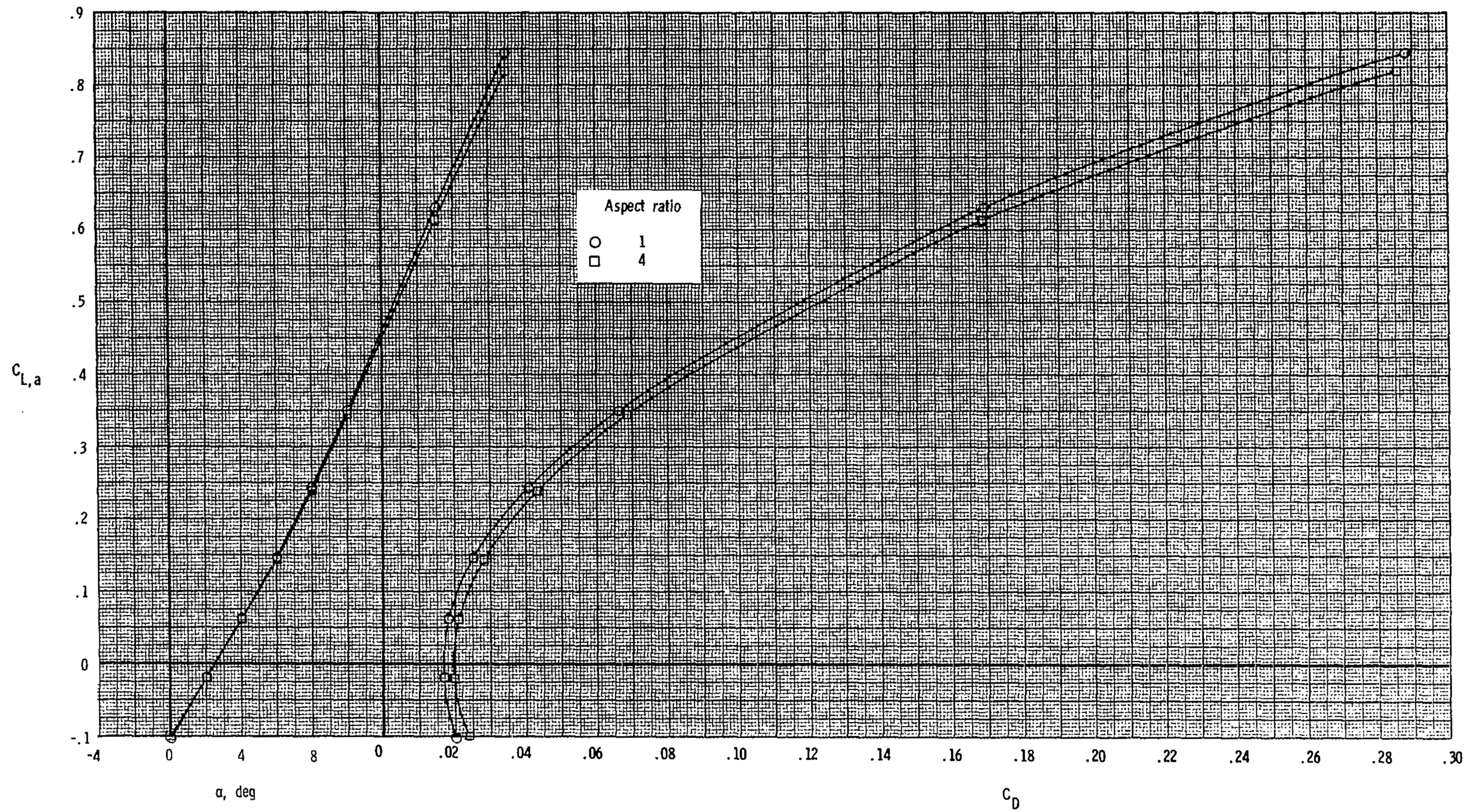
(b) $\delta_v = 0^{\circ}$; NPR = 3.0.

Figure 57.- Continued.



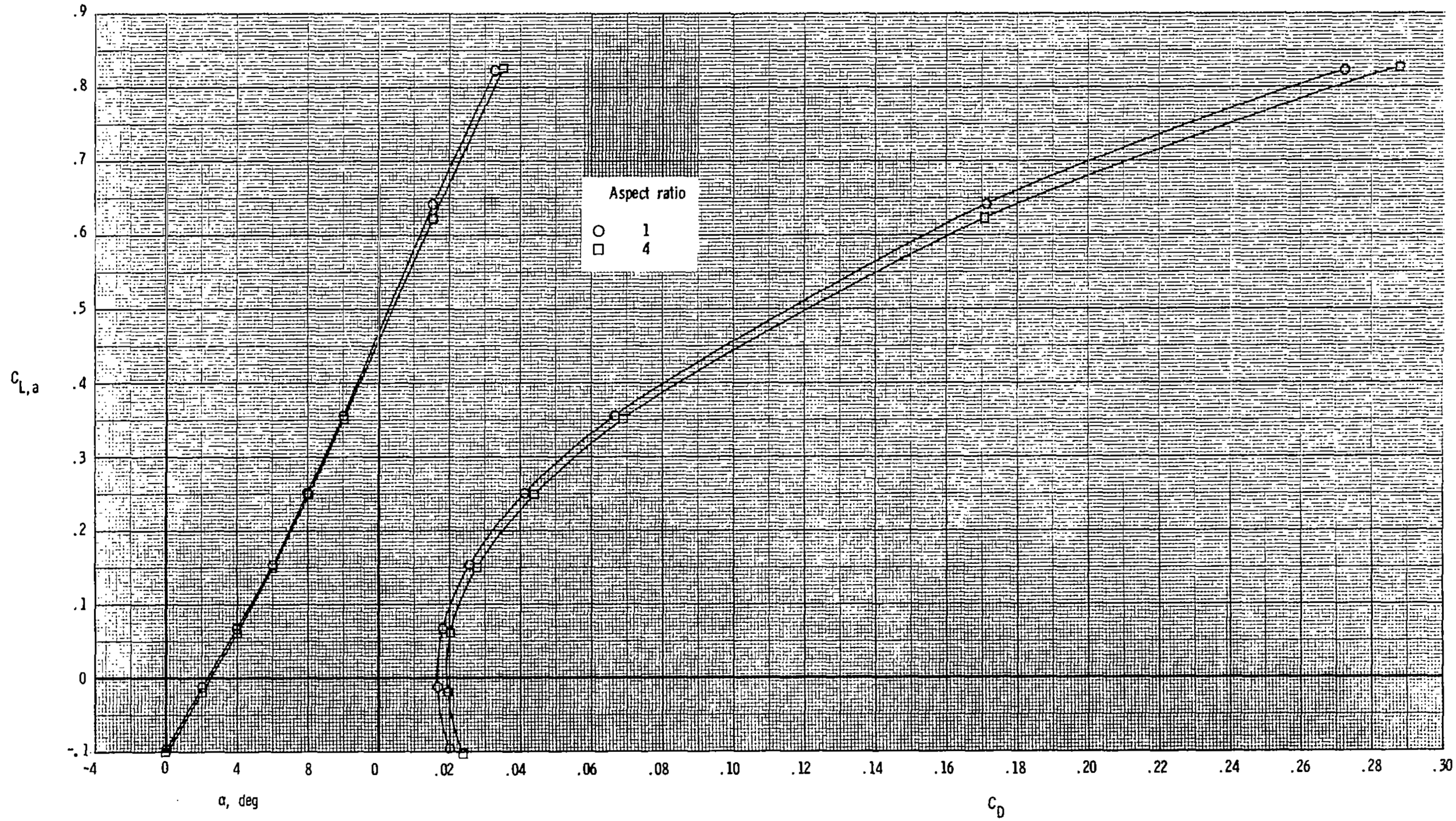
(c) $\delta_v = 15^{\circ}$; NPR = 3.0.

Figure 57.- Concluded.



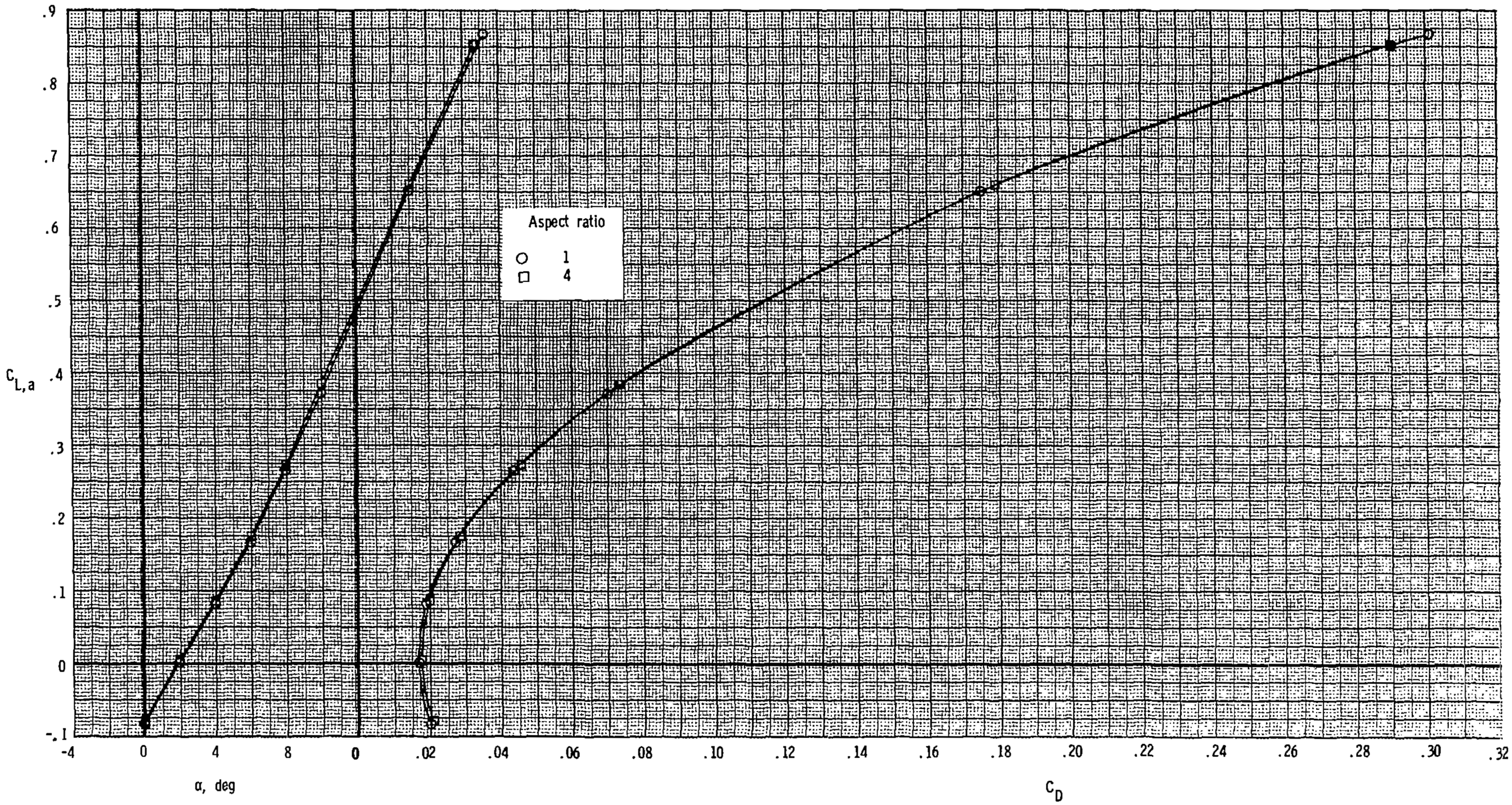
(a) $\delta_v = 0^\circ$; NPR = 1.0.

Figure 58.- Effects of nozzle aspect ratio on thrust-removed aerodynamic characteristics for IUM wedge nozzle. A/B power setting; $\delta_c = 0^\circ$; M = 0.87.



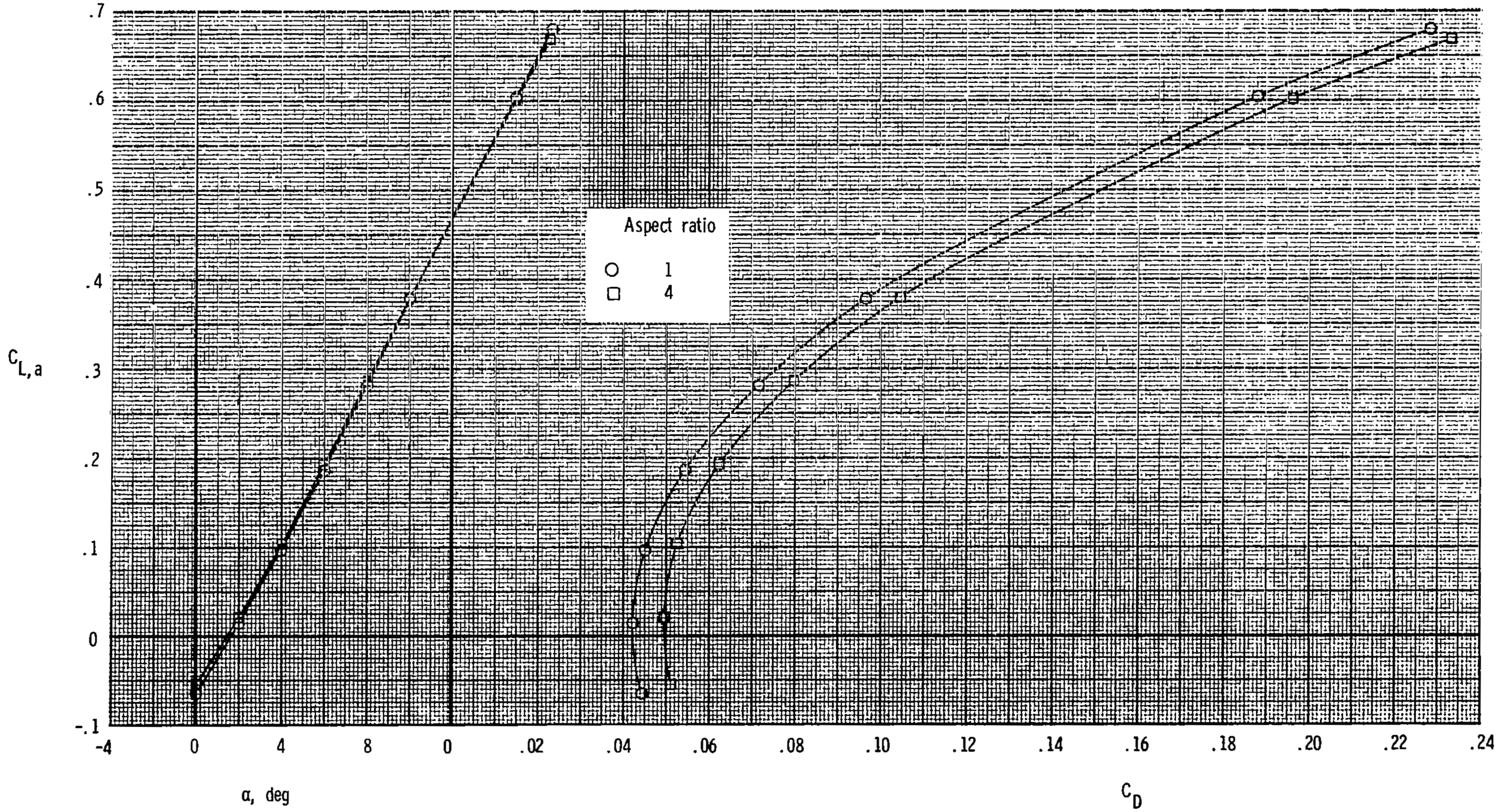
(b) $\delta_v = 0^{\circ}$; NPR = 3.9.

Figure 58.- Continued.



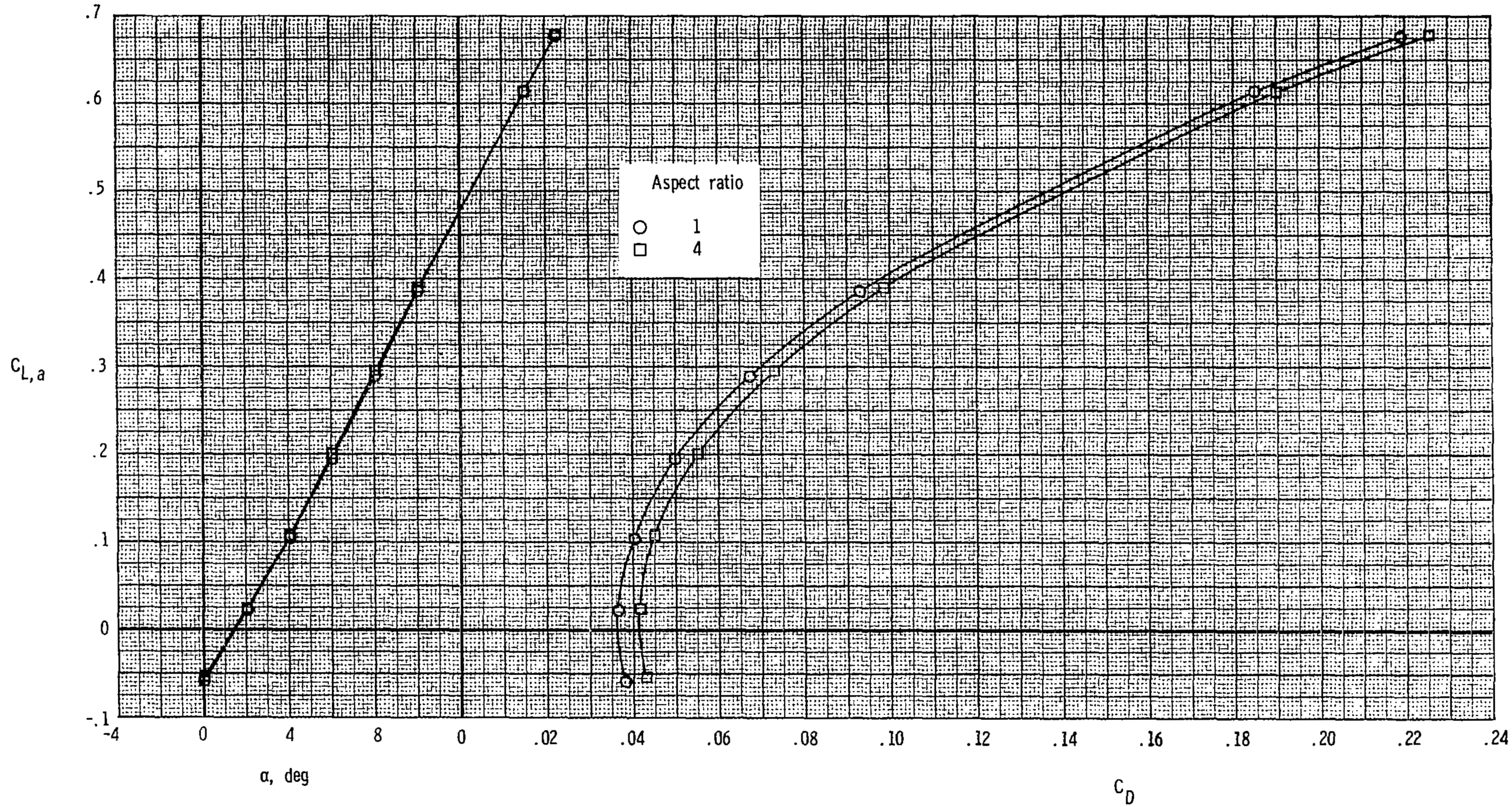
(c) $\delta_v = 15^{\circ}$; NPR = 3.9.

Figure 58.- Concluded.



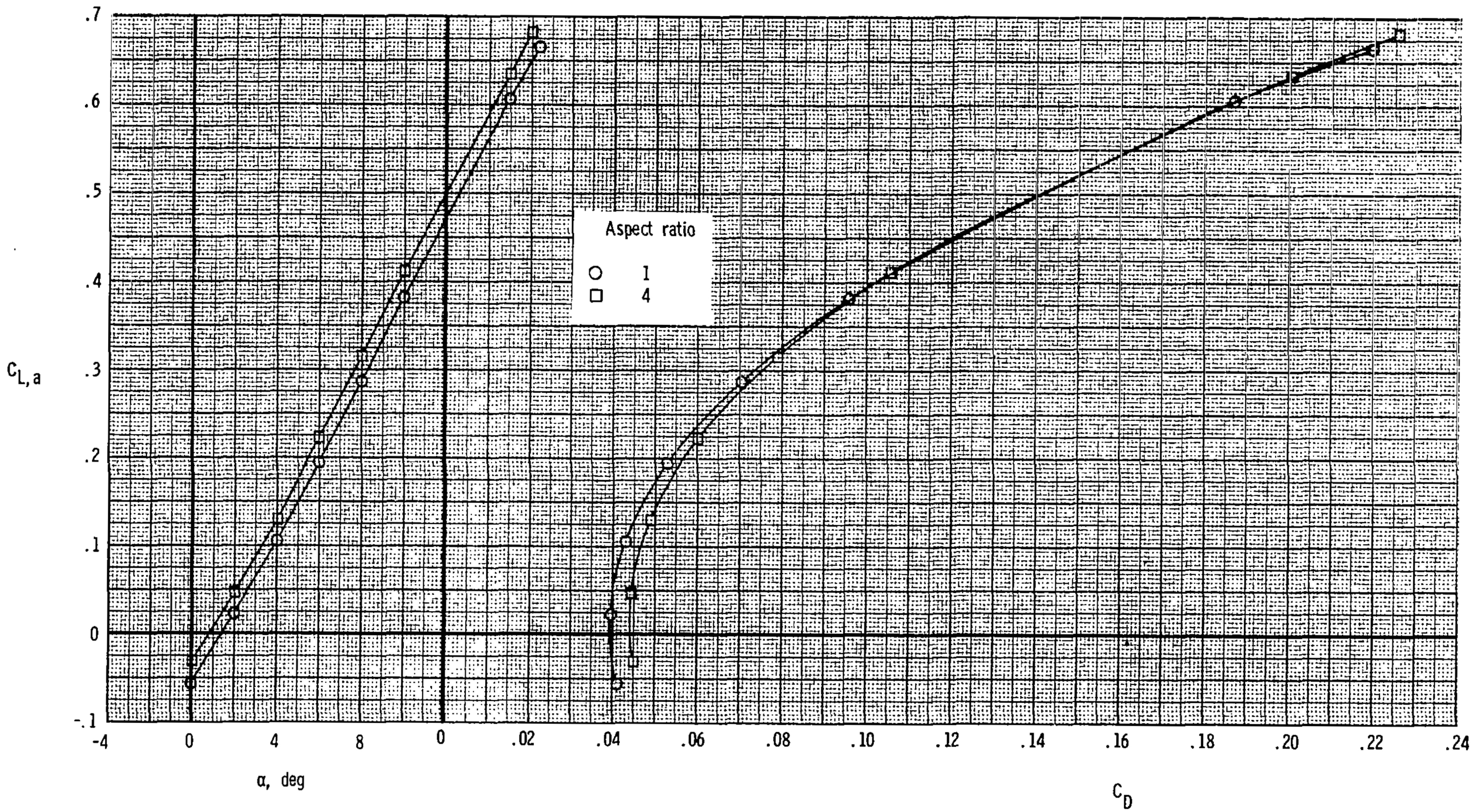
(a) $\delta_v = 0^o$; NPR = 1.0.

Figure 59.- Effects of nozzle aspect ratio on thrust-removed aerodynamic characteristics for IUM wedge nozzle. A/B power setting; $\delta_c = 0^o$; M = 1.20.



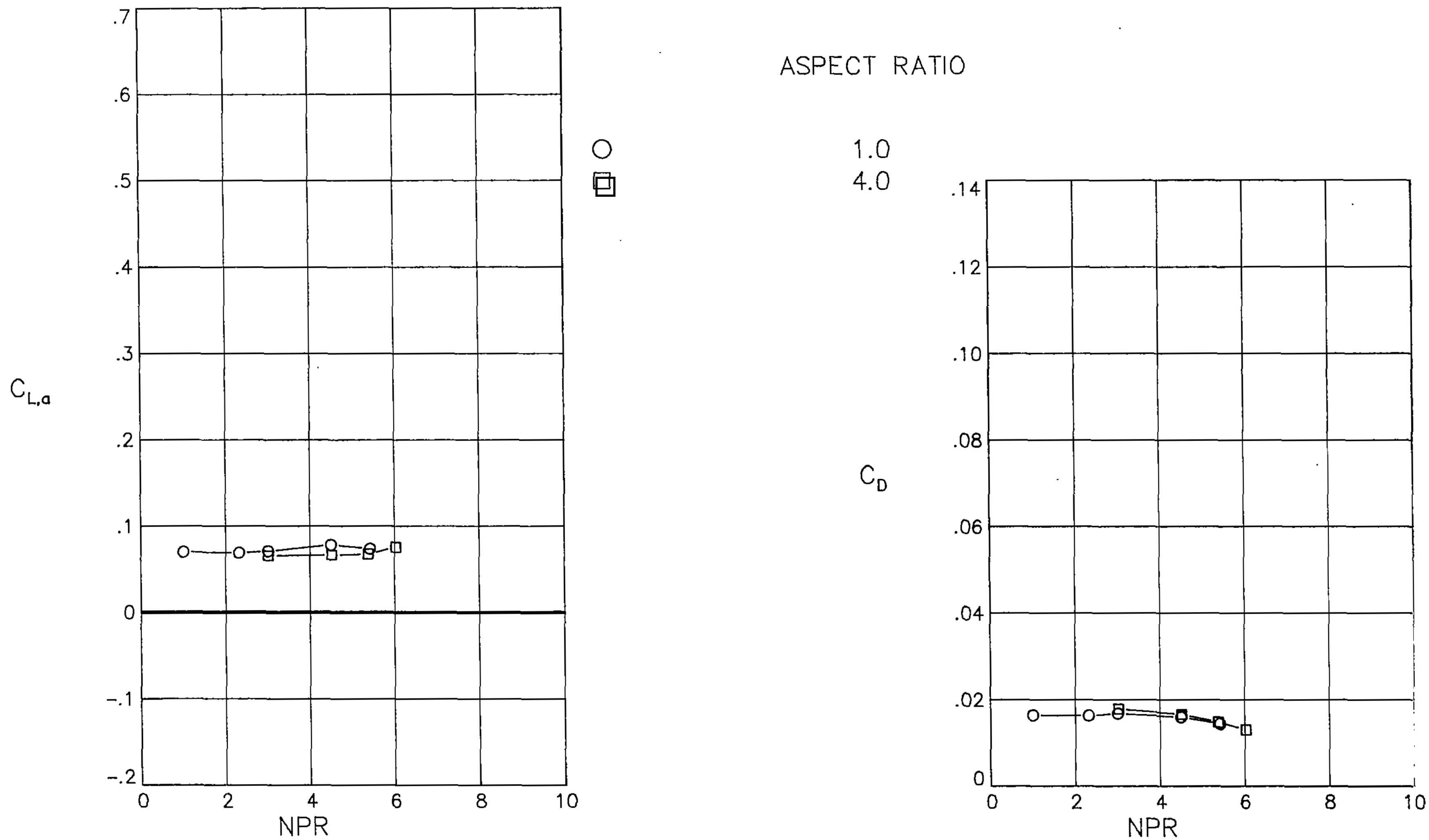
(b) $\delta_v = 0^{\circ}$; NPR = 6.6.

Figure 59.- Continued.



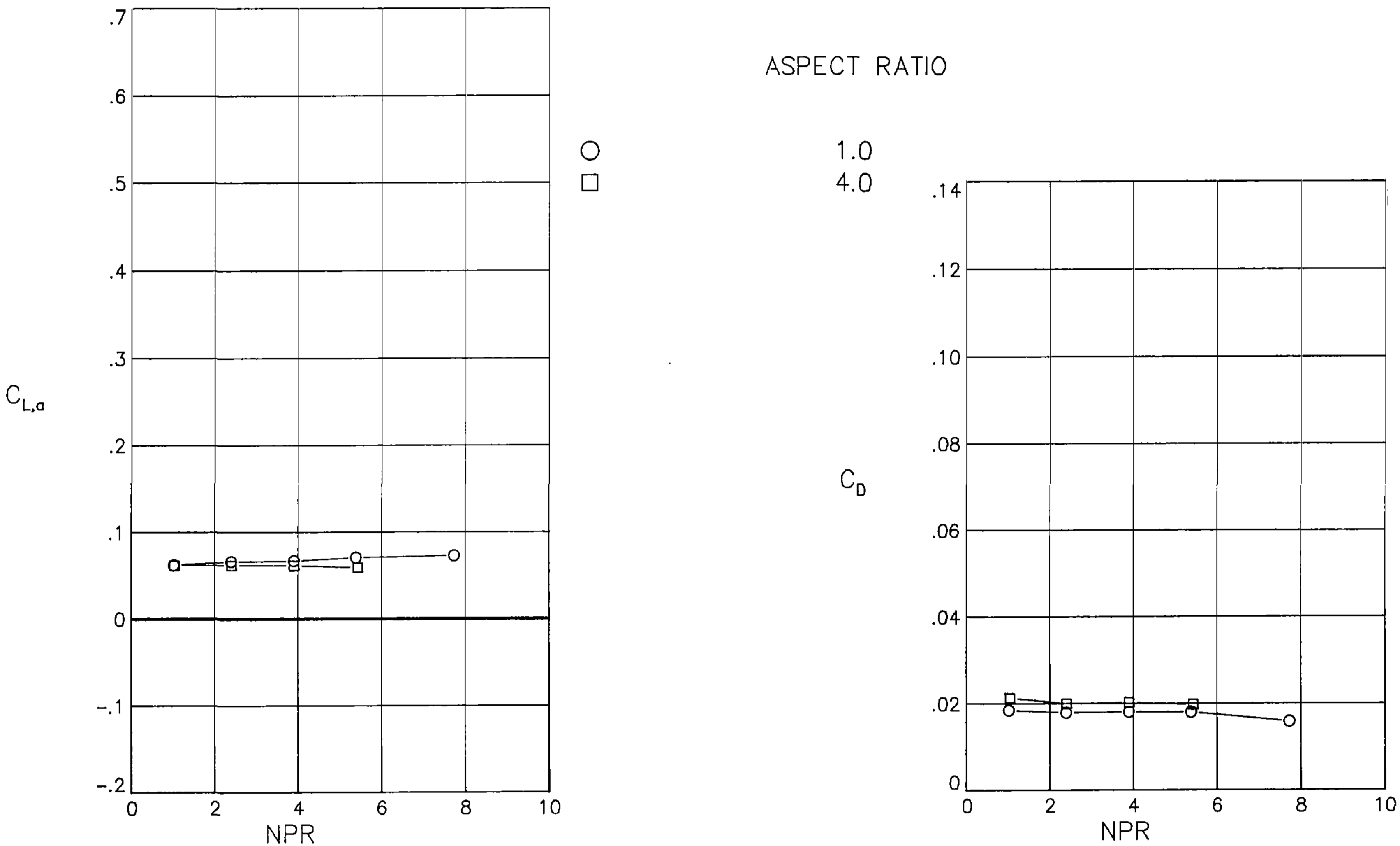
(c) $\delta_v = 15^{\circ}$; NPR = 6.6.

Figure 59.- Concluded.



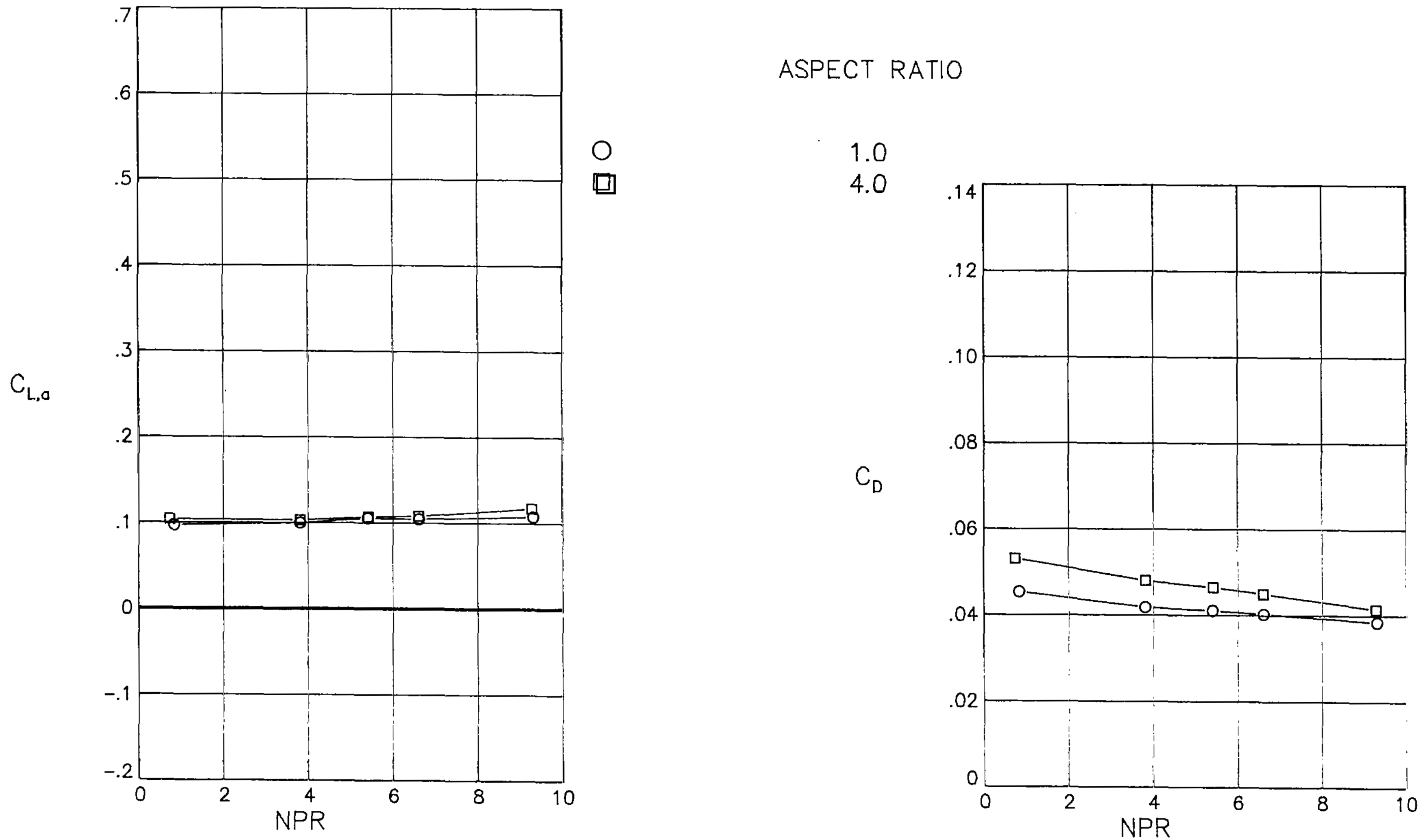
(a) M = 0.60.

Figure 60.- Effects of nozzle aspect ratio on thrust-removed aerodynamic characteristics for IUM wedge nozzle. A/B power setting; $\delta_v = 0^{\circ}$; $\delta_c = 0^{\circ}$; $\alpha = 4^{\circ}$.



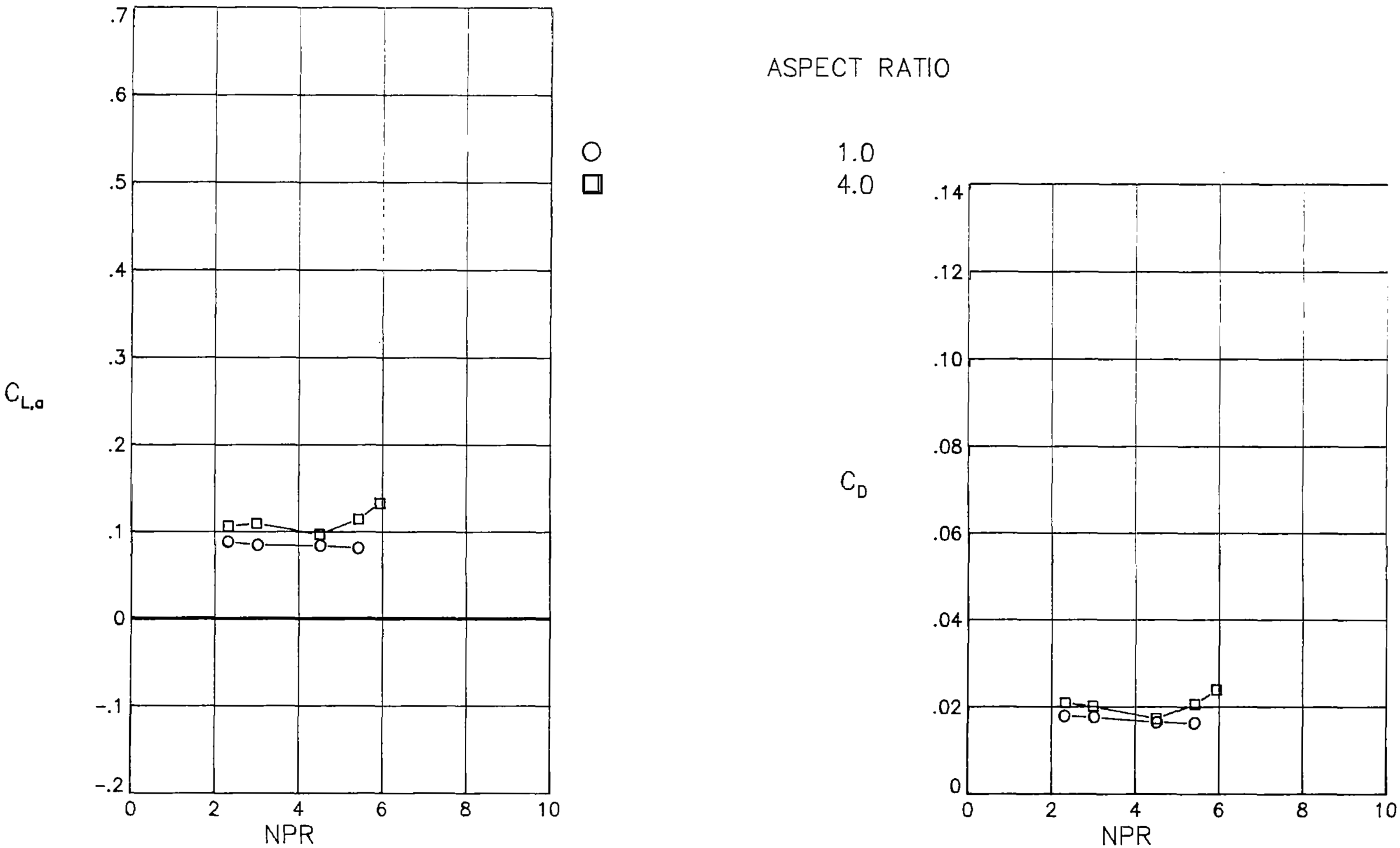
(b) M = 0.87.

Figure 60.- Continued.



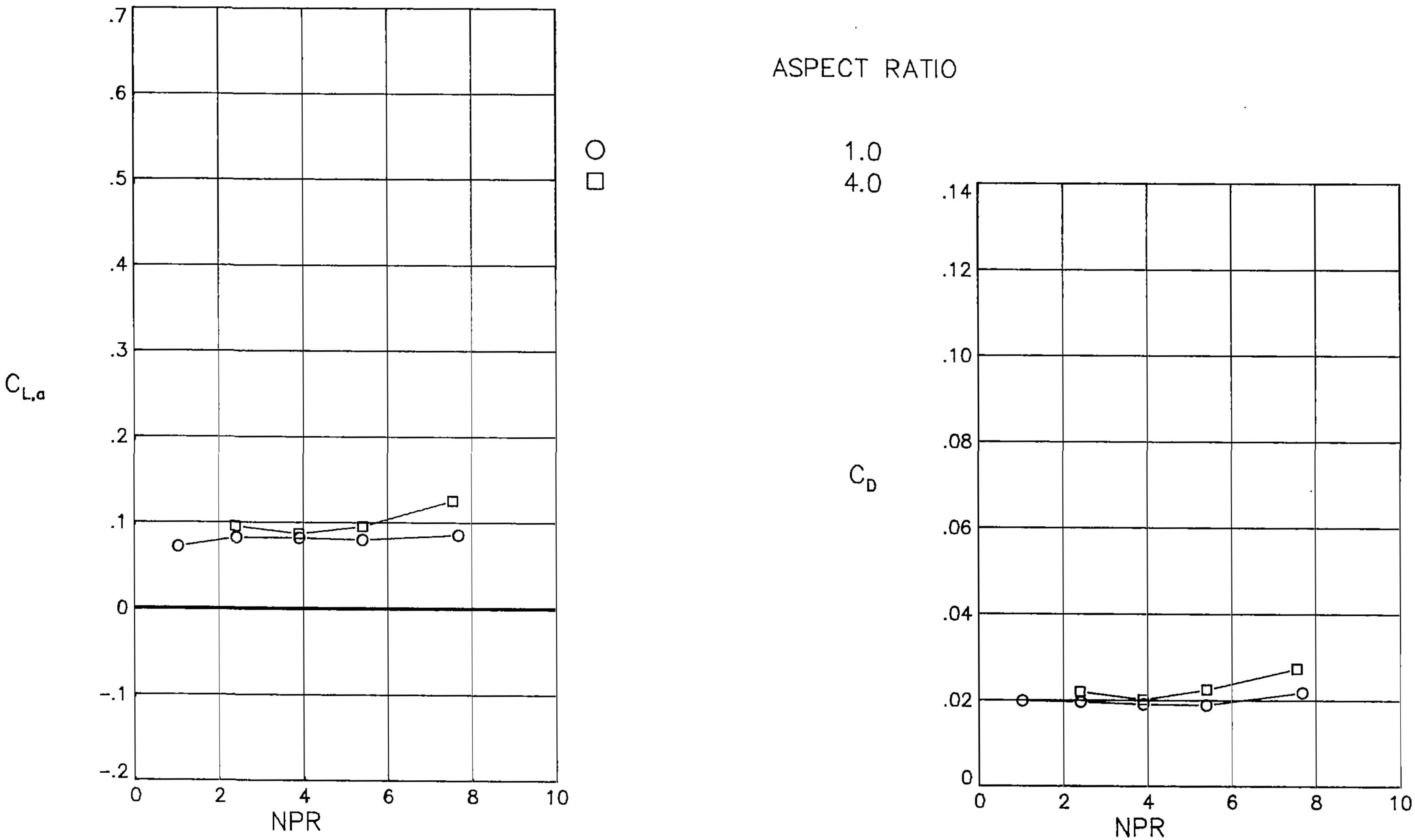
(c) M = 1.20.

Figure 60.- Concluded.



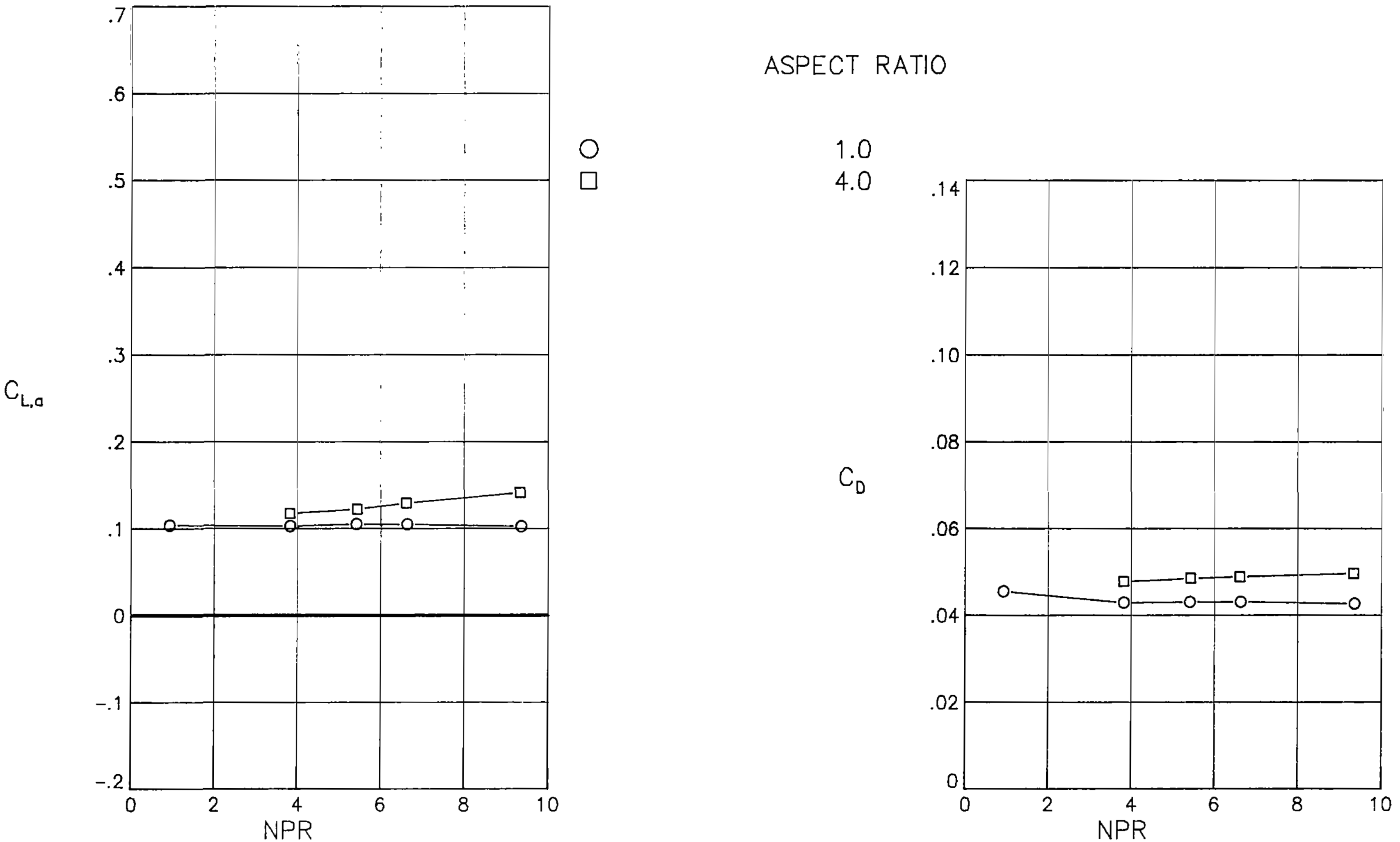
(a) M = 0.60.

Figure 61.- Effects of nozzle aspect ratio on thrust-removed aerodynamic characteristics for IUM wedge nozzle. A/B power setting; $\delta_v = 15^\circ$; $\delta_c = 0^\circ$; $\alpha = 4^\circ$.



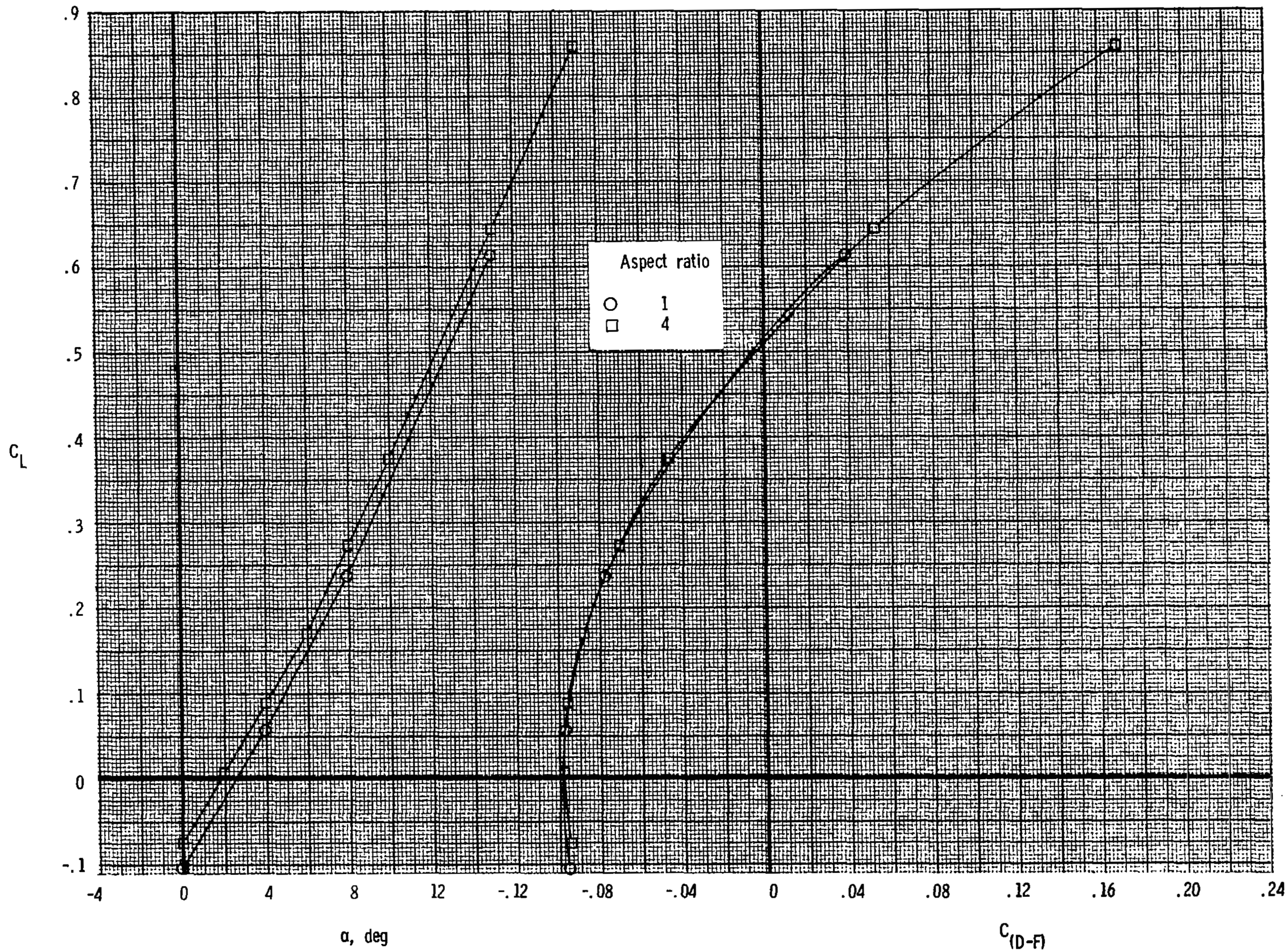
(b) M = 0.87.

Figure 61.- Continued.



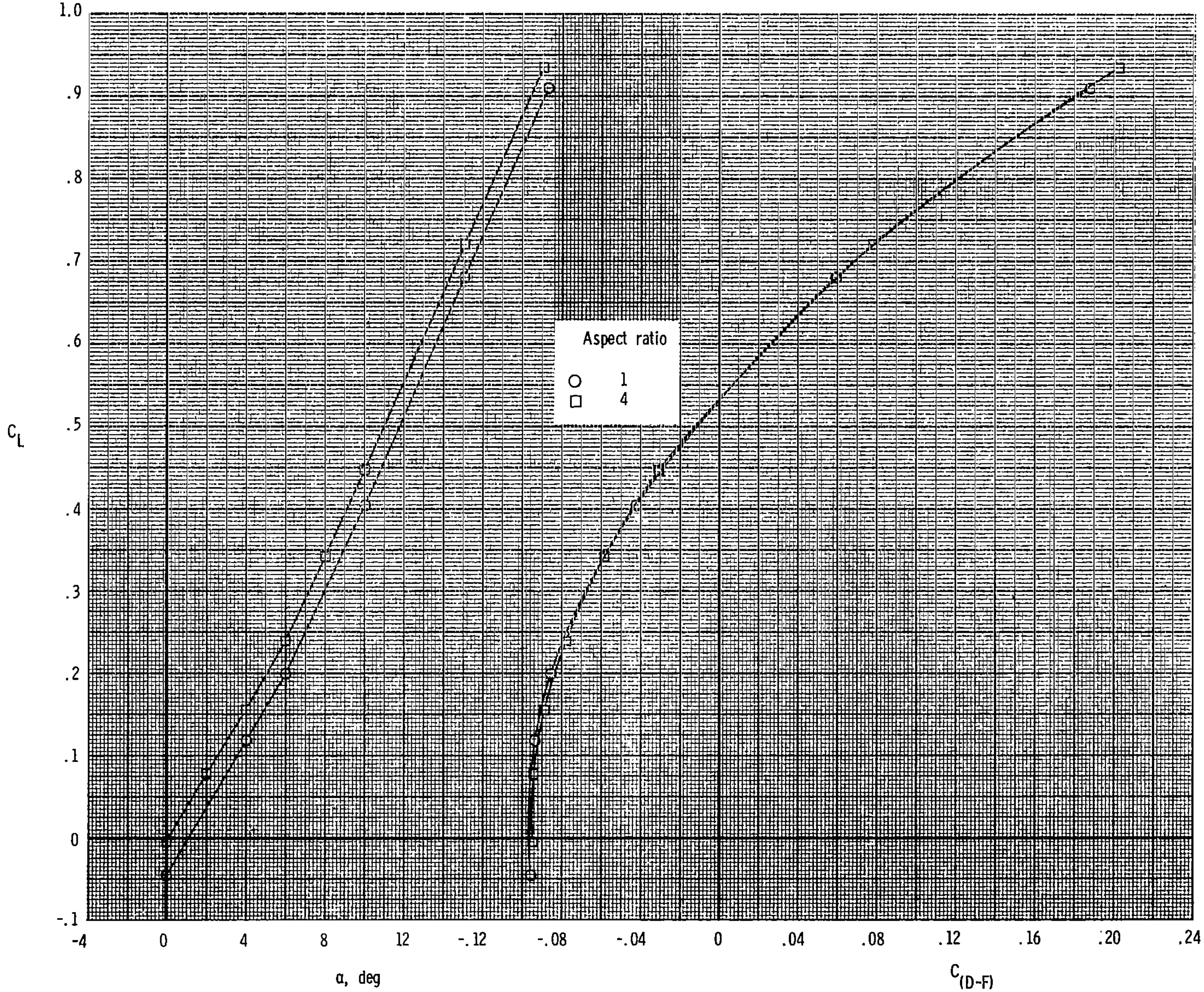
(c) M = 1.20.

Figure 61.- Concluded.



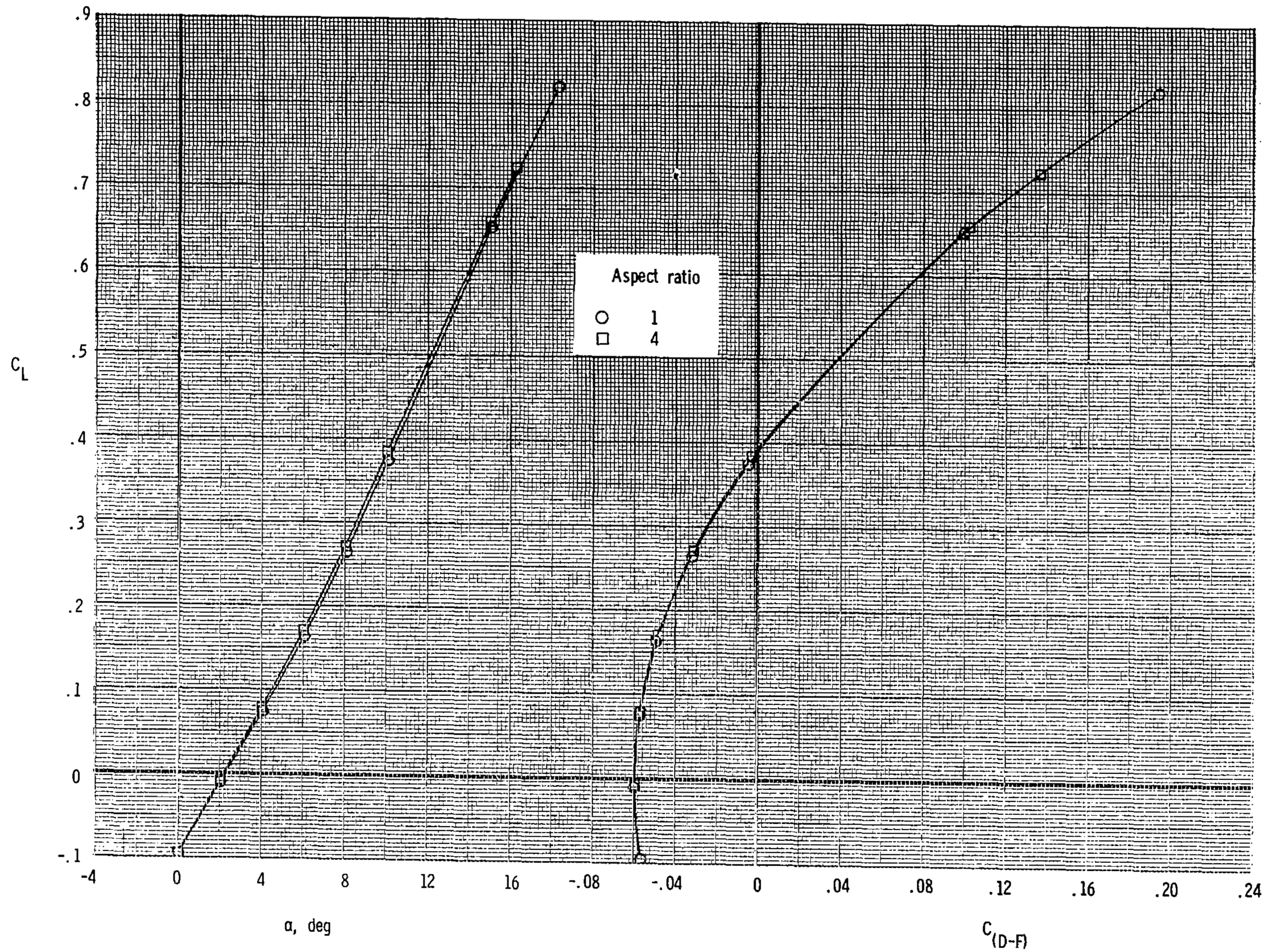
(a) $\delta_v = 0^{\circ}$.

Figure 62.- Effects of nozzle aspect ratio on total aerodynamic characteristics for IUM SERN. A/B power setting; $\delta_c = 0^{\circ}$; M = 0.60; NPR = 3.0.



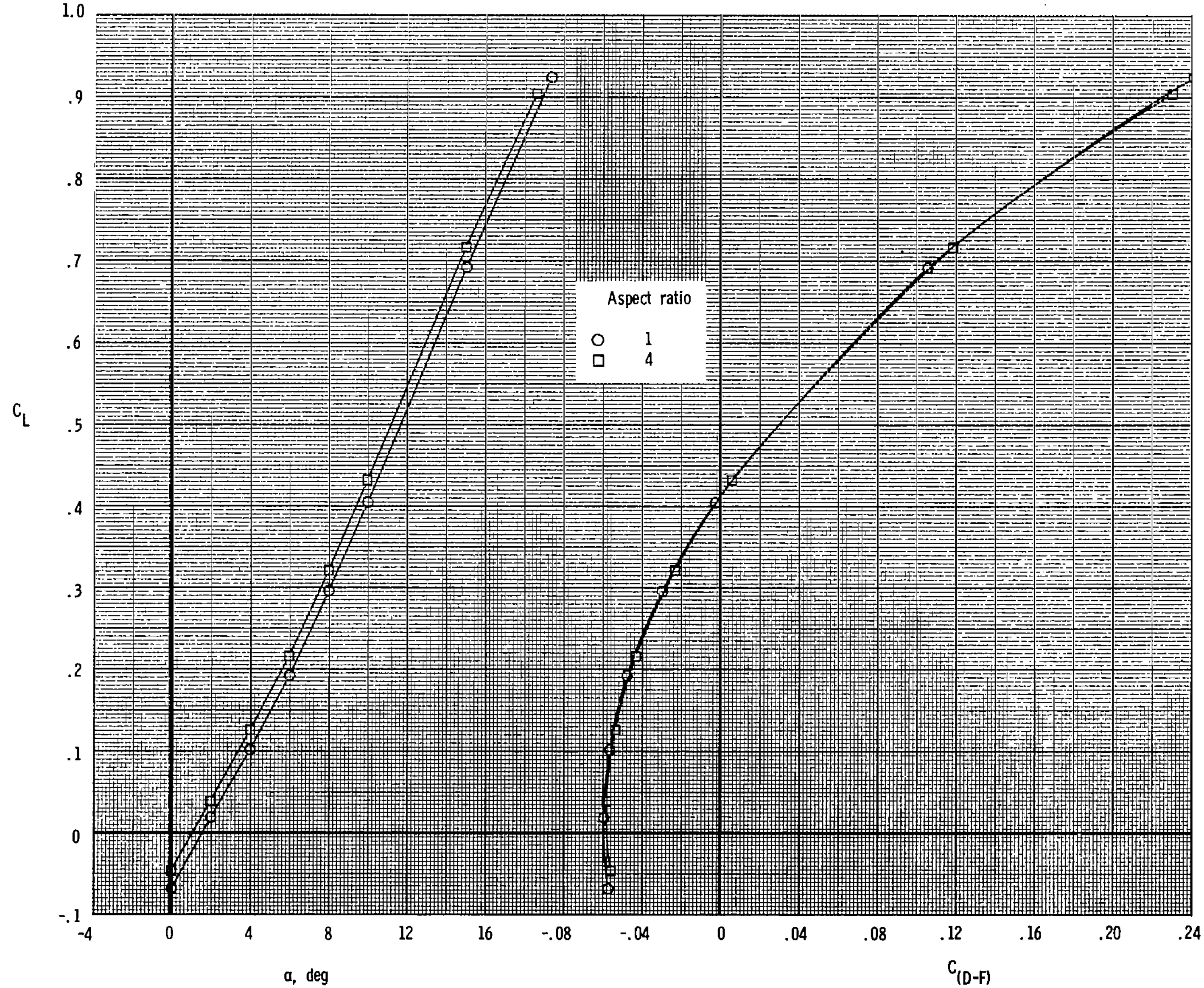
(b) $\delta_v = 15^{\circ}$.

Figure 62.- Concluded.



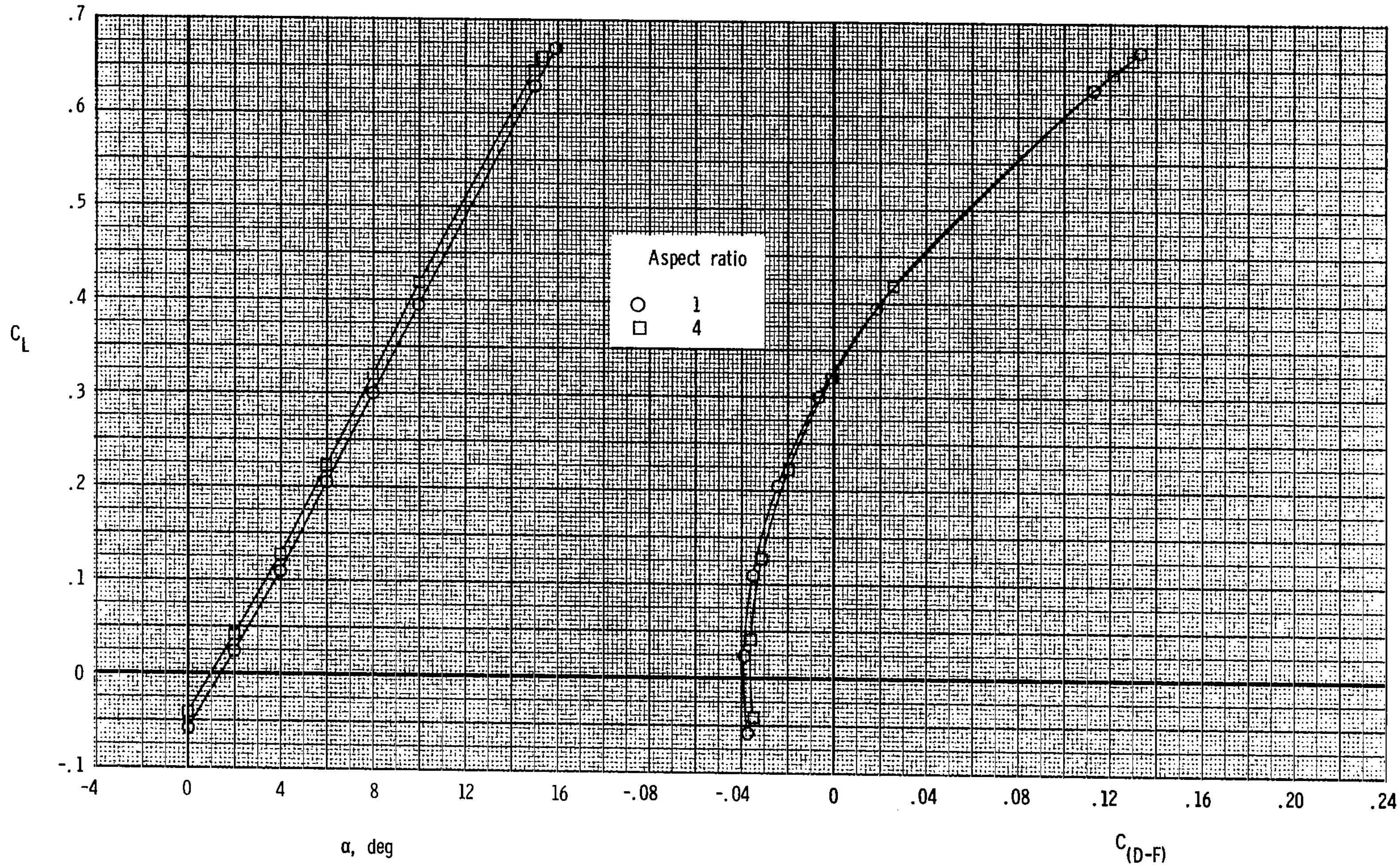
(a) $\delta_v = 0^\circ$.

Figure 63.- Effects of nozzle aspect ratio on total aerodynamic characteristics for IUM SERN. A/B power setting; $\delta_c = 0^\circ$; M = 0.87; NPR = 3.9.



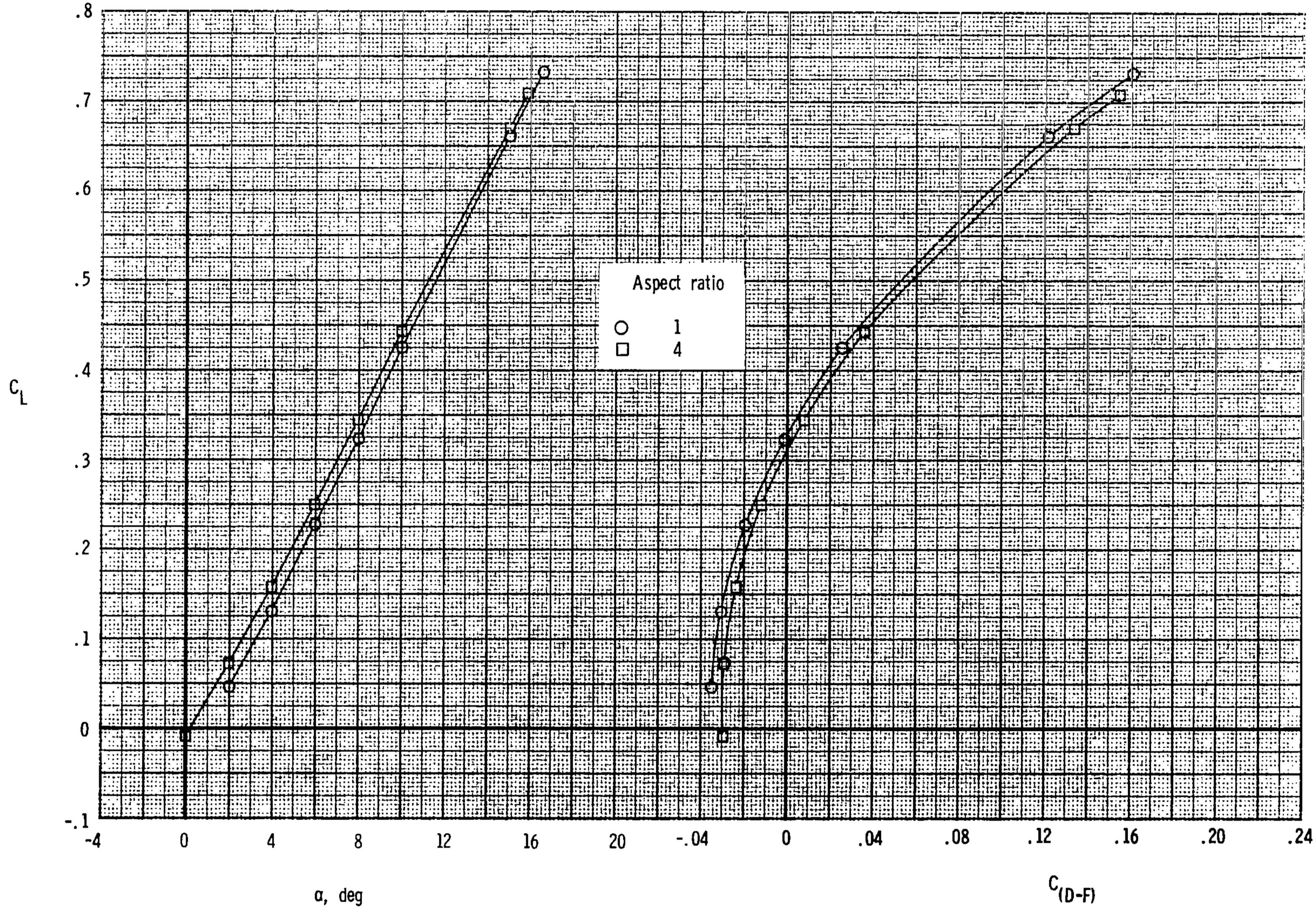
(b) $\delta_v = 15^{\circ}$.

Figure 63.- Concluded.



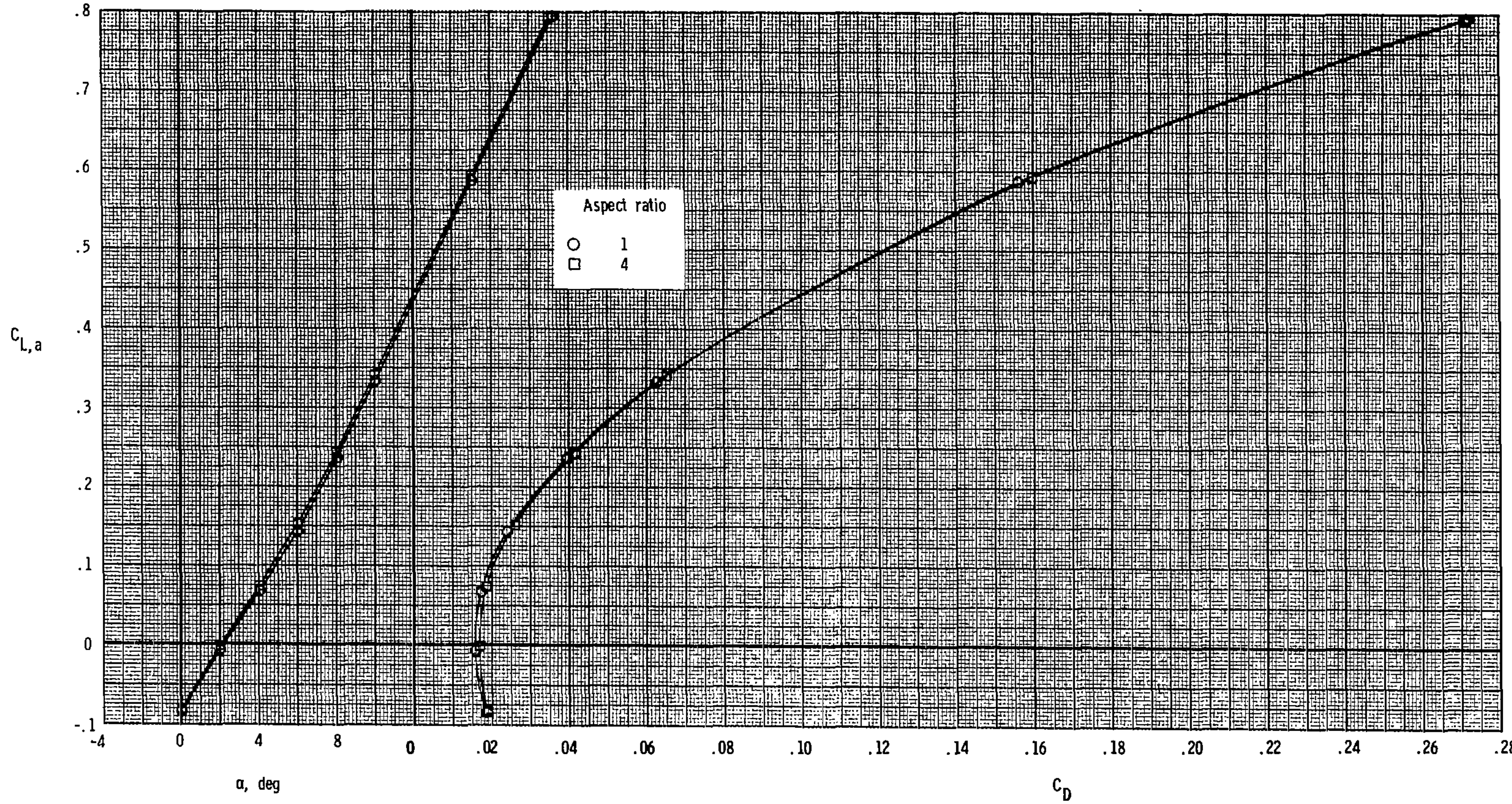
(a) $\delta_v = 0^\circ$.

Figure 64.- Effects of nozzle aspect ratio on total aerodynamic characteristics for IUM SERN. A/B power setting; $\delta_c = 0^\circ$; $M = 1.20$; NPR = 6.6.



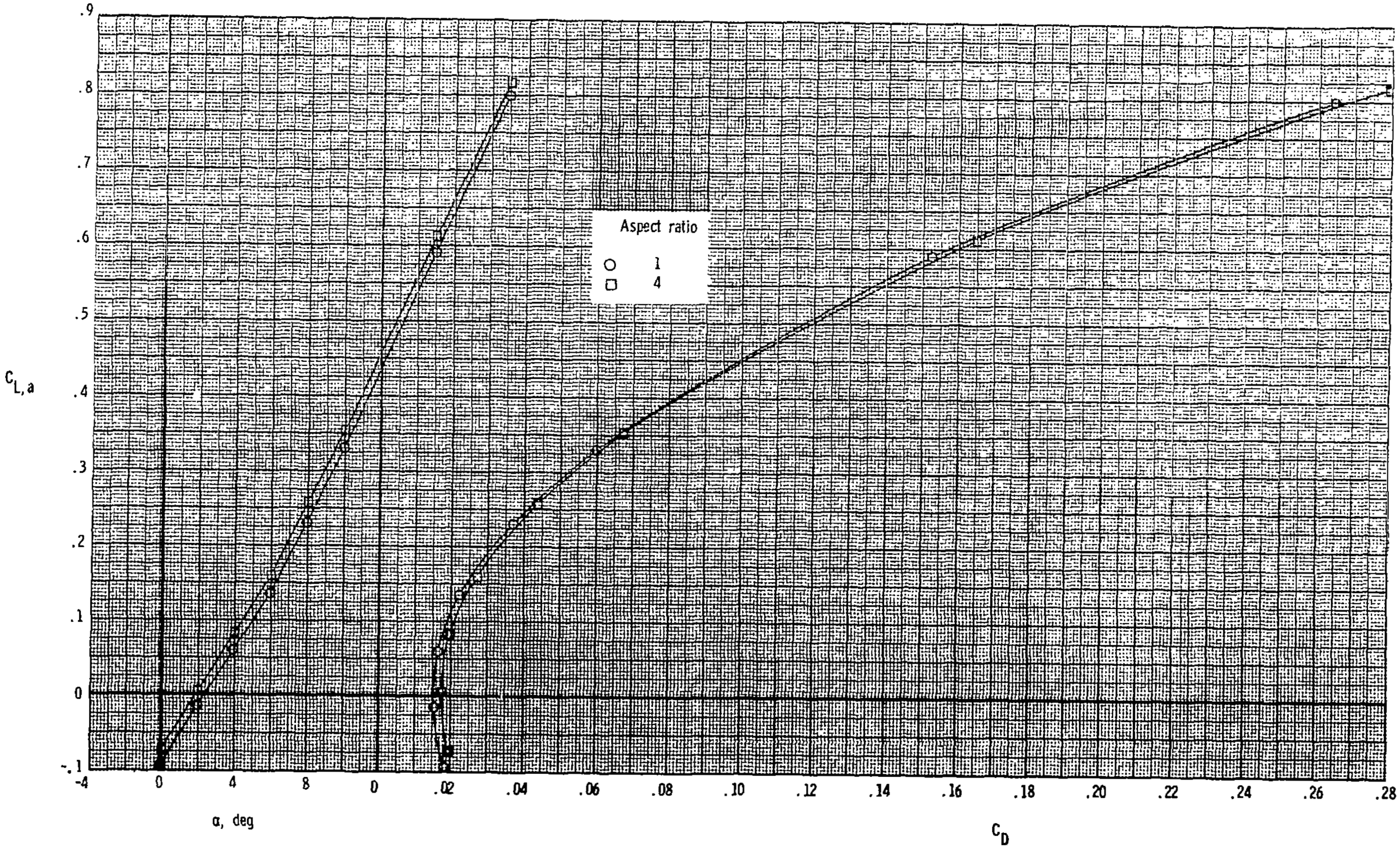
(b) $\delta_v = 15^{\circ}$.

Figure 64.- Concluded.



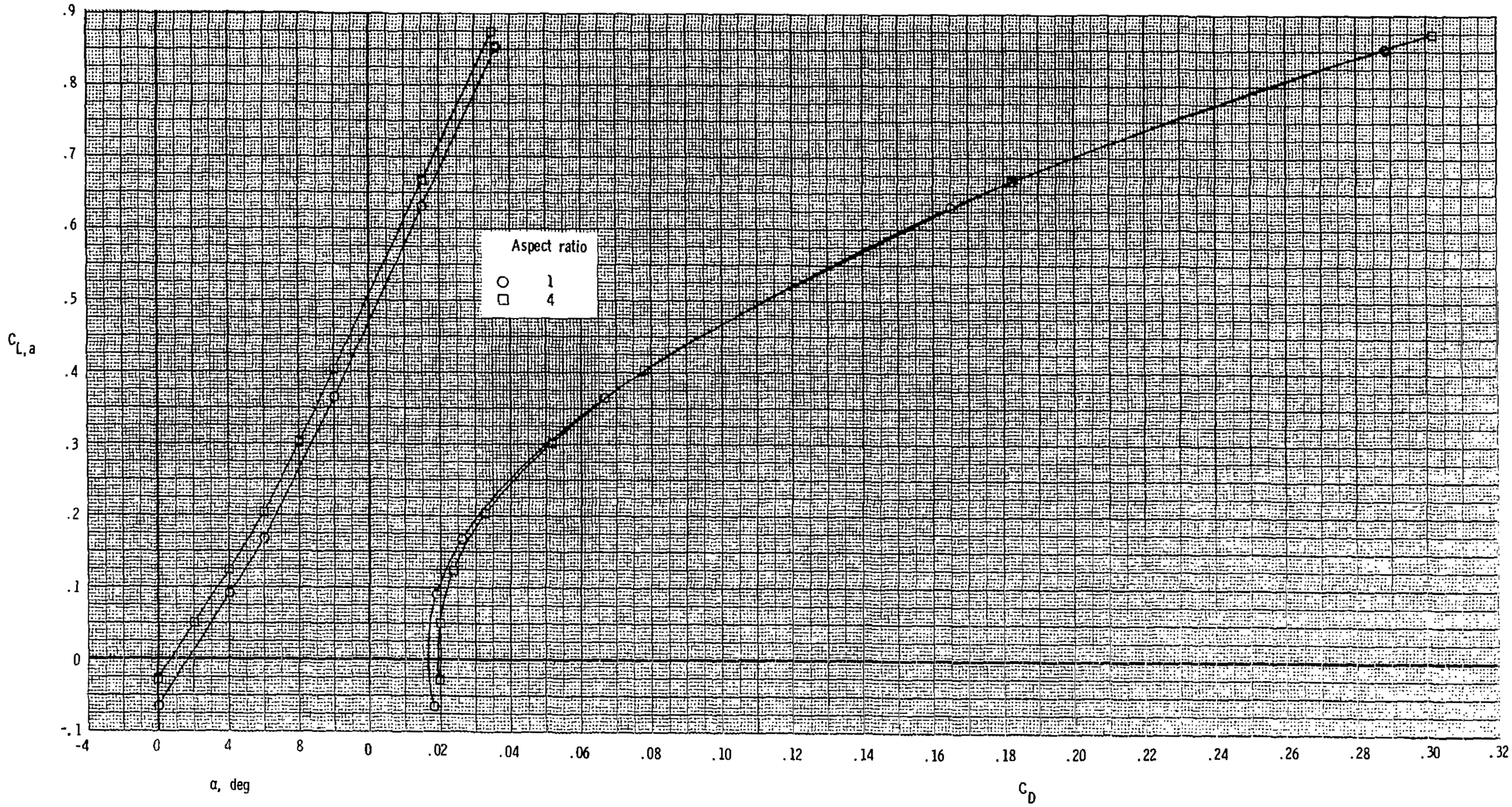
(a) $\delta_v = 0^{\circ}$; NPR = 1.0.

Figure 65.- Effects of nozzle aspect ratio on thrust-removed aerodynamic characteristics for IUM SERN. A/B power setting; $\delta_c = 0^{\circ}$; M = 0.60.



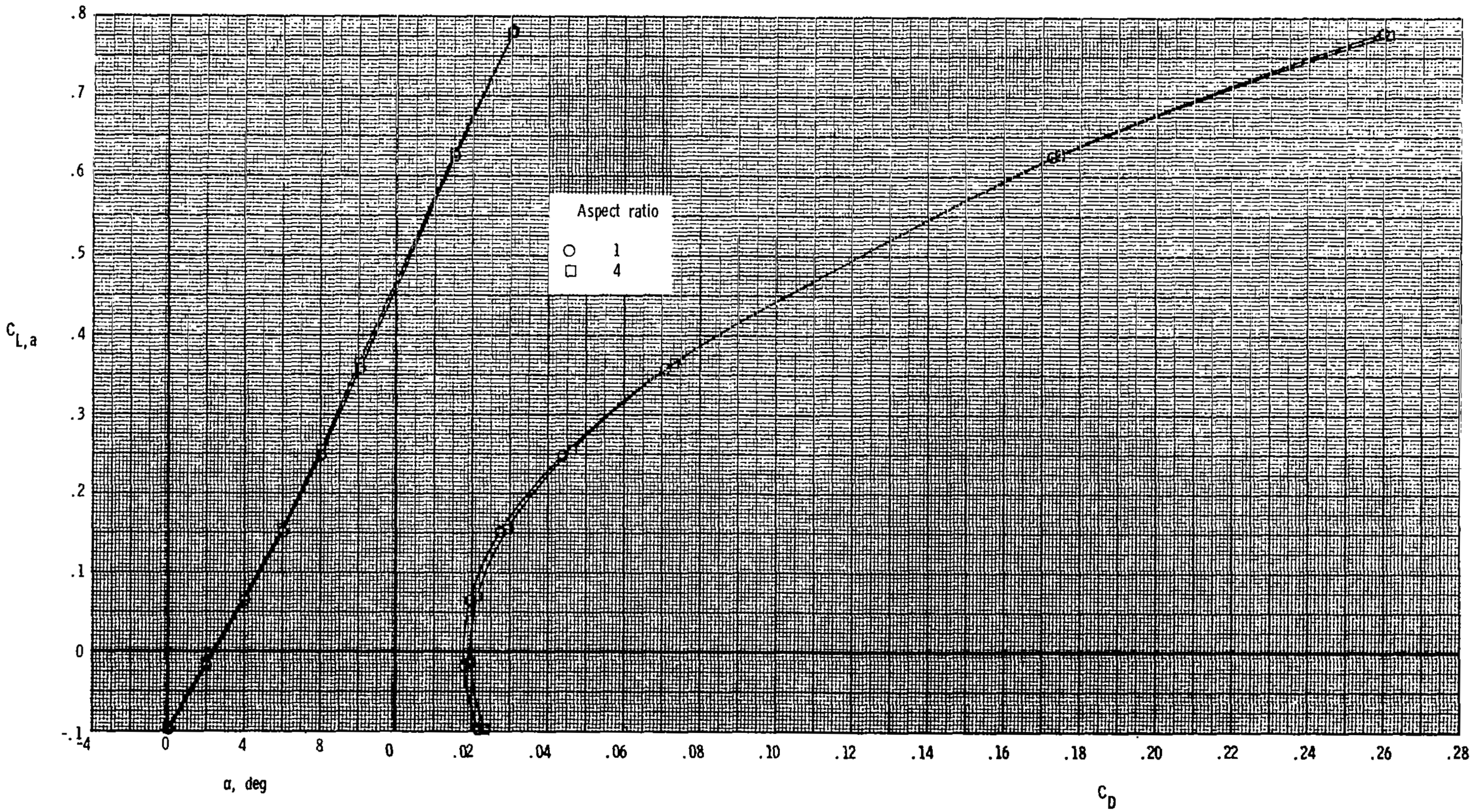
(b) $\delta_v = 0^{\circ}$; NPR = 3.0.

Figure 65.- Continued.



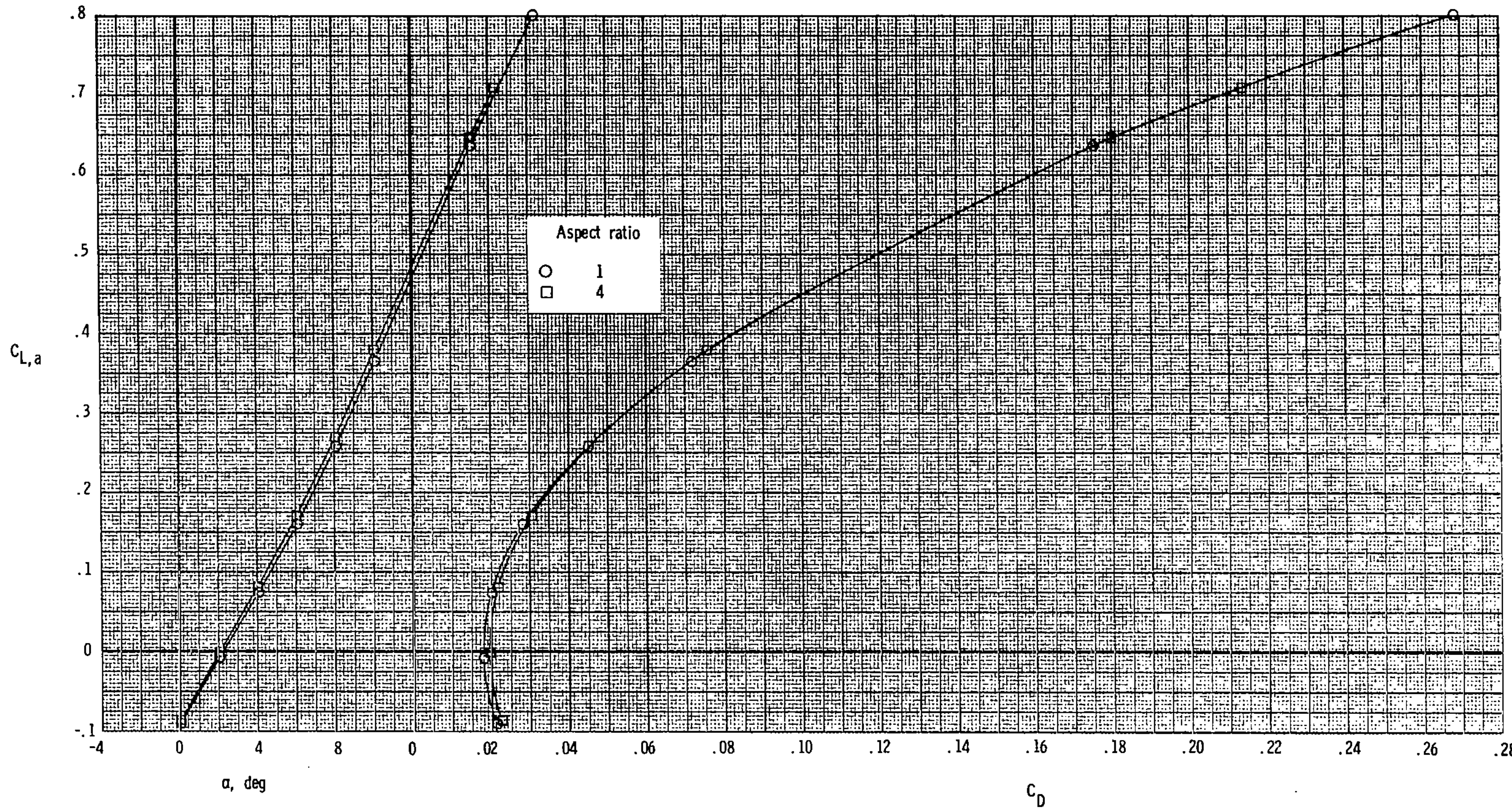
(c) $\delta_v = 15^o$; NPR = 3.0.

Figure 65.- Concluded.



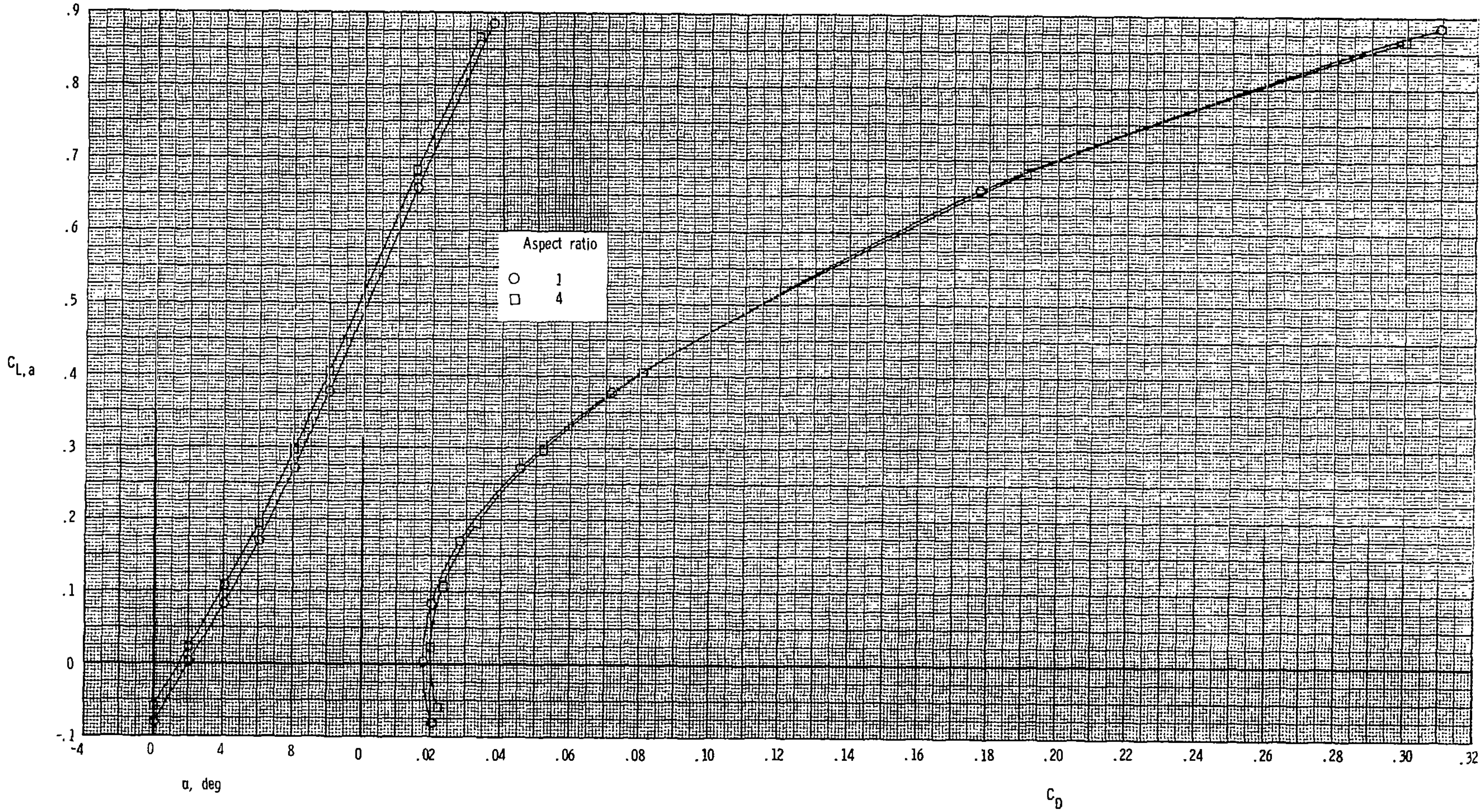
(a) $\delta_v = 0^{\circ}$; NPR = 1.0.

Figure 66.- Effects of nozzle aspect ratio on thrust-removed aerodynamic characteristics for IUM SERN. A/B power setting; $\delta_c = 0^{\circ}$; M = 0.87.



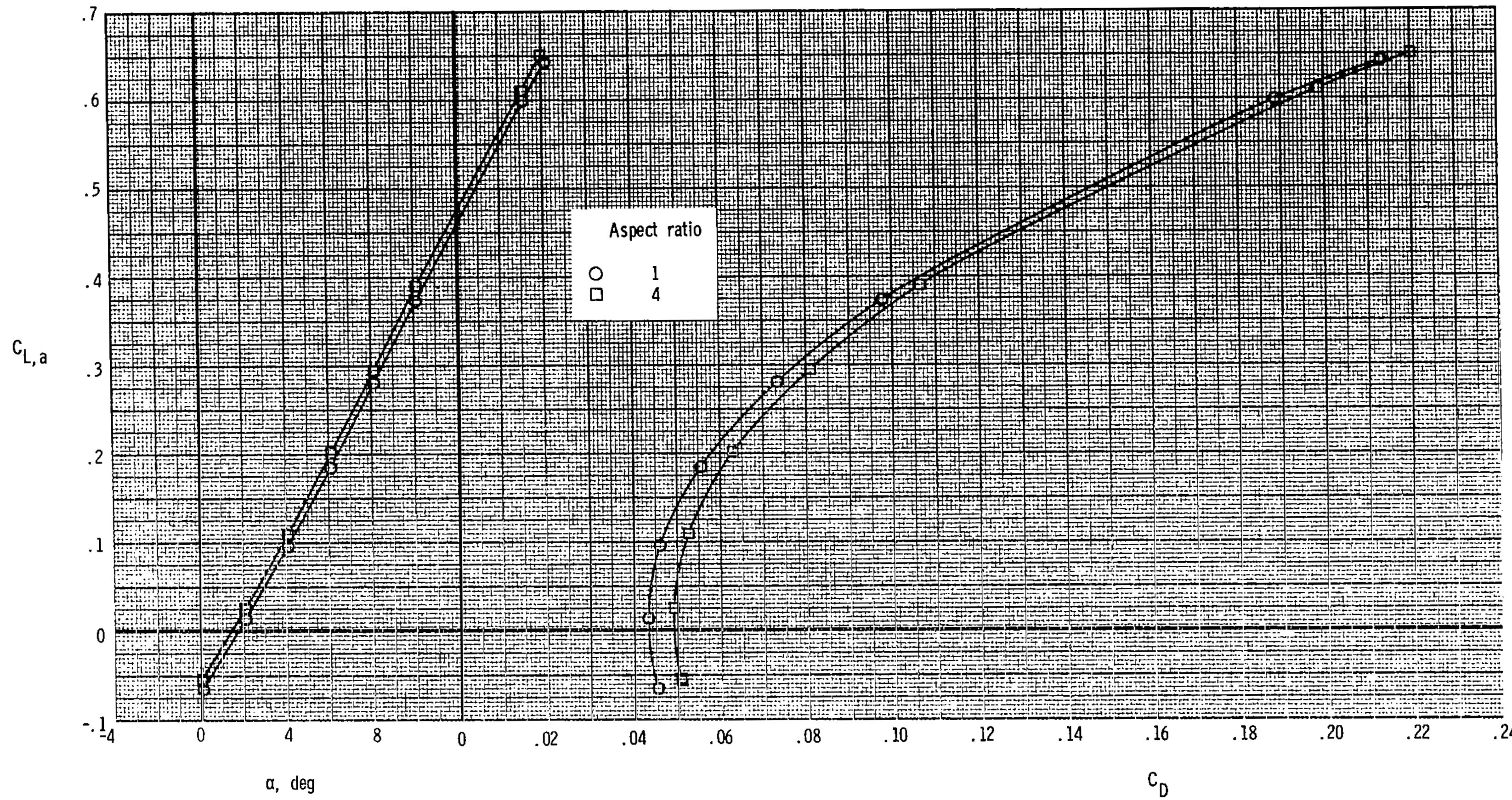
(b) $\delta_v = 0^{\circ}$; NPR = 3.9.

Figure 66.- Continued.



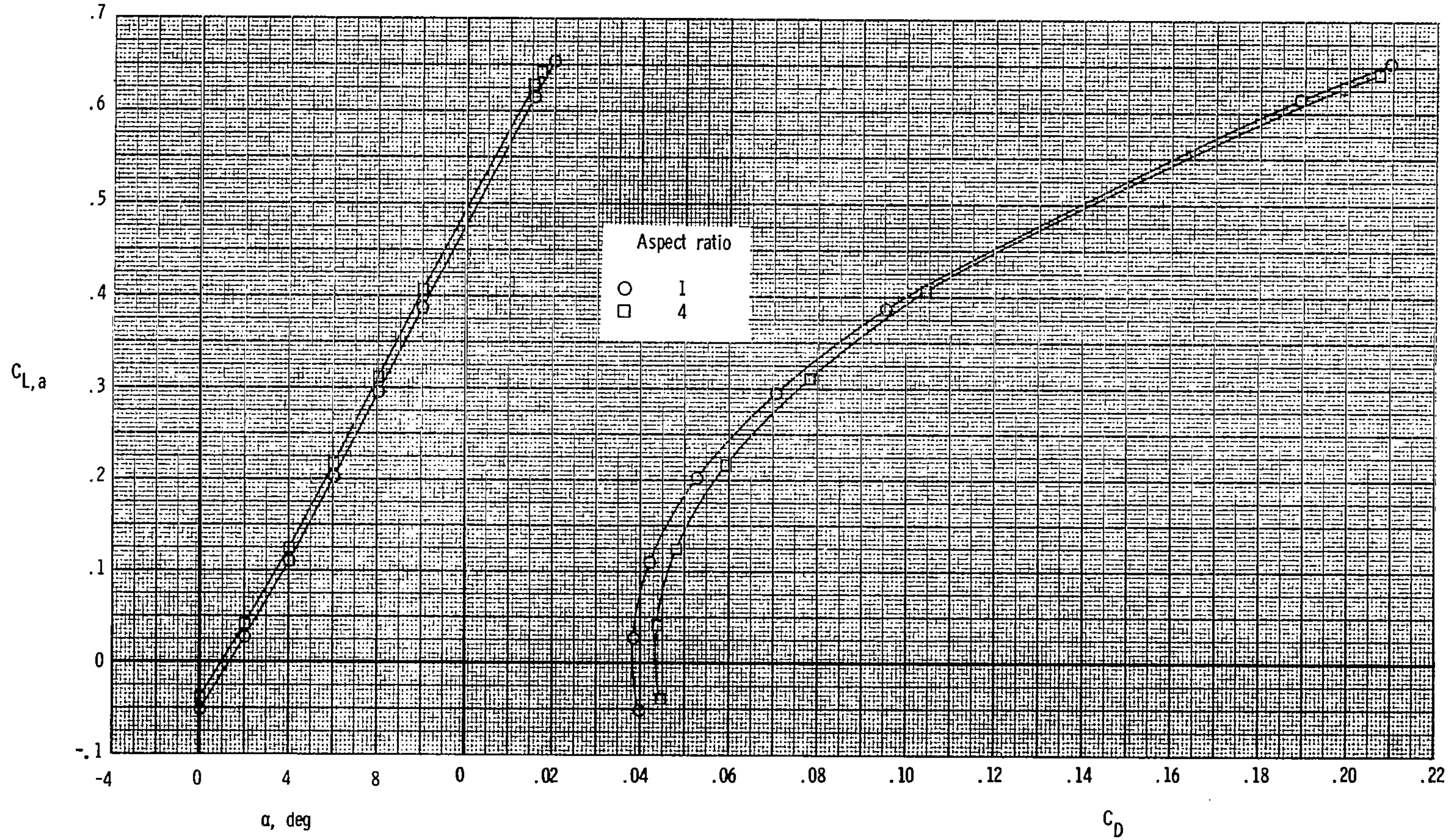
(c) $\delta_v = 15^\circ$; NPR = 3.9.

Figure 66.- Concluded.



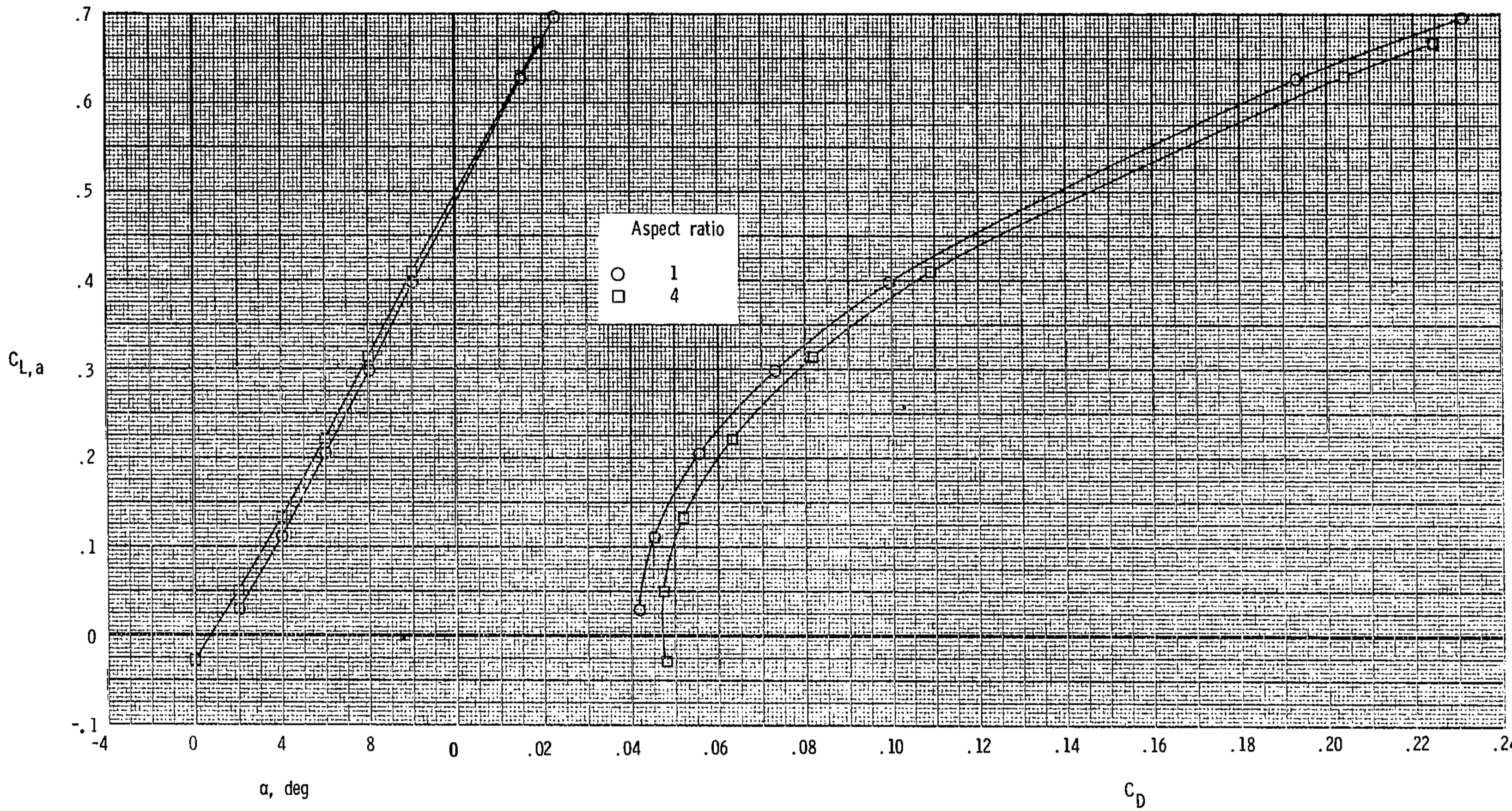
(a) $\delta_v = 0^{\circ}$; NPR = 1.0.

Figure 67.- Effects of nozzle aspect ratio on thrust-removed aerodynamic characteristics for IUM SERN. A/B power setting; $\delta_c = 0^{\circ}$; M = 1.20.



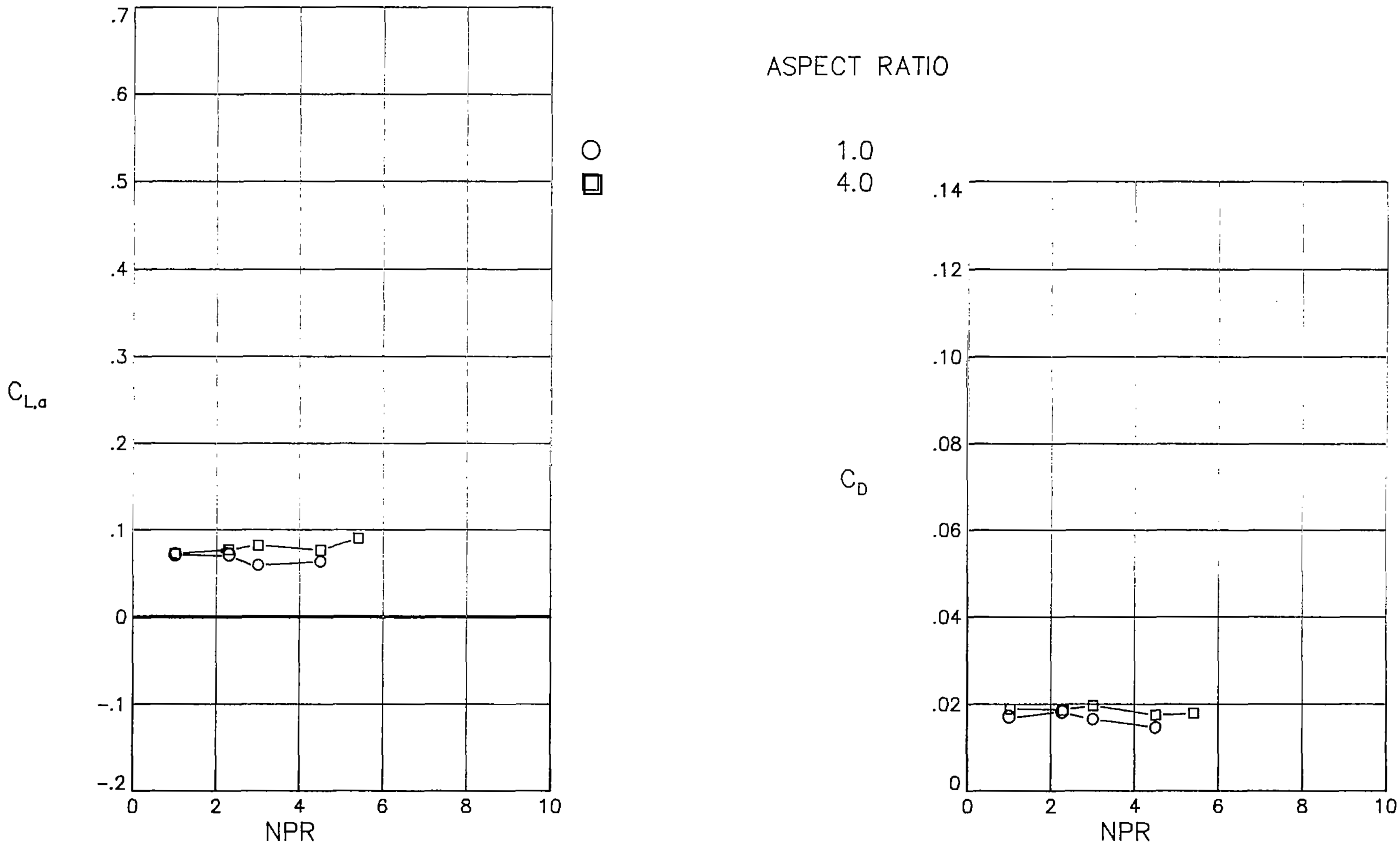
(b) $\delta_v = 0^\circ$; NPR = 6.6.

Figure 67.- Continued.



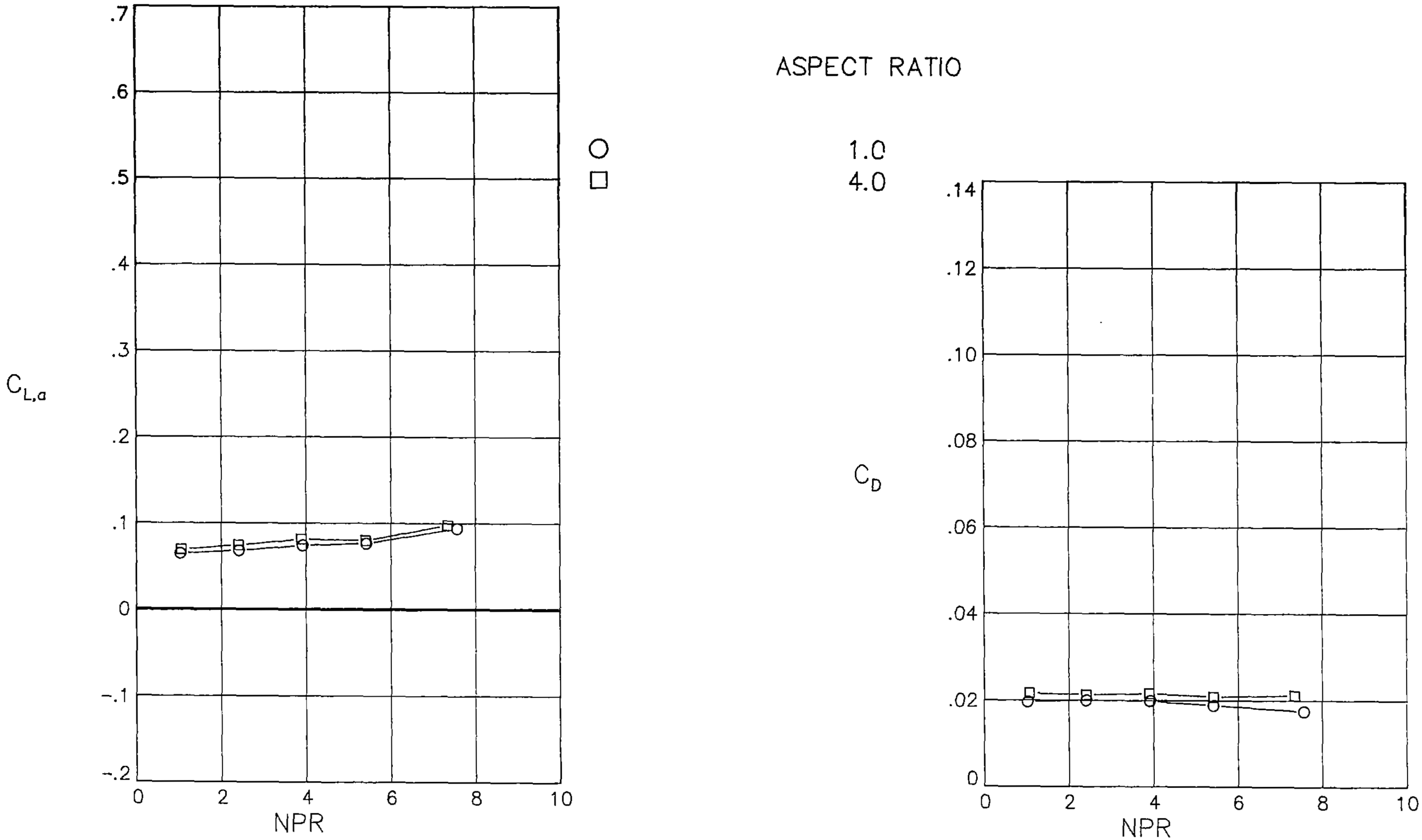
(c) $\delta_v = 15^o$; NPR = 6.6.

Figure 67.- Concluded.



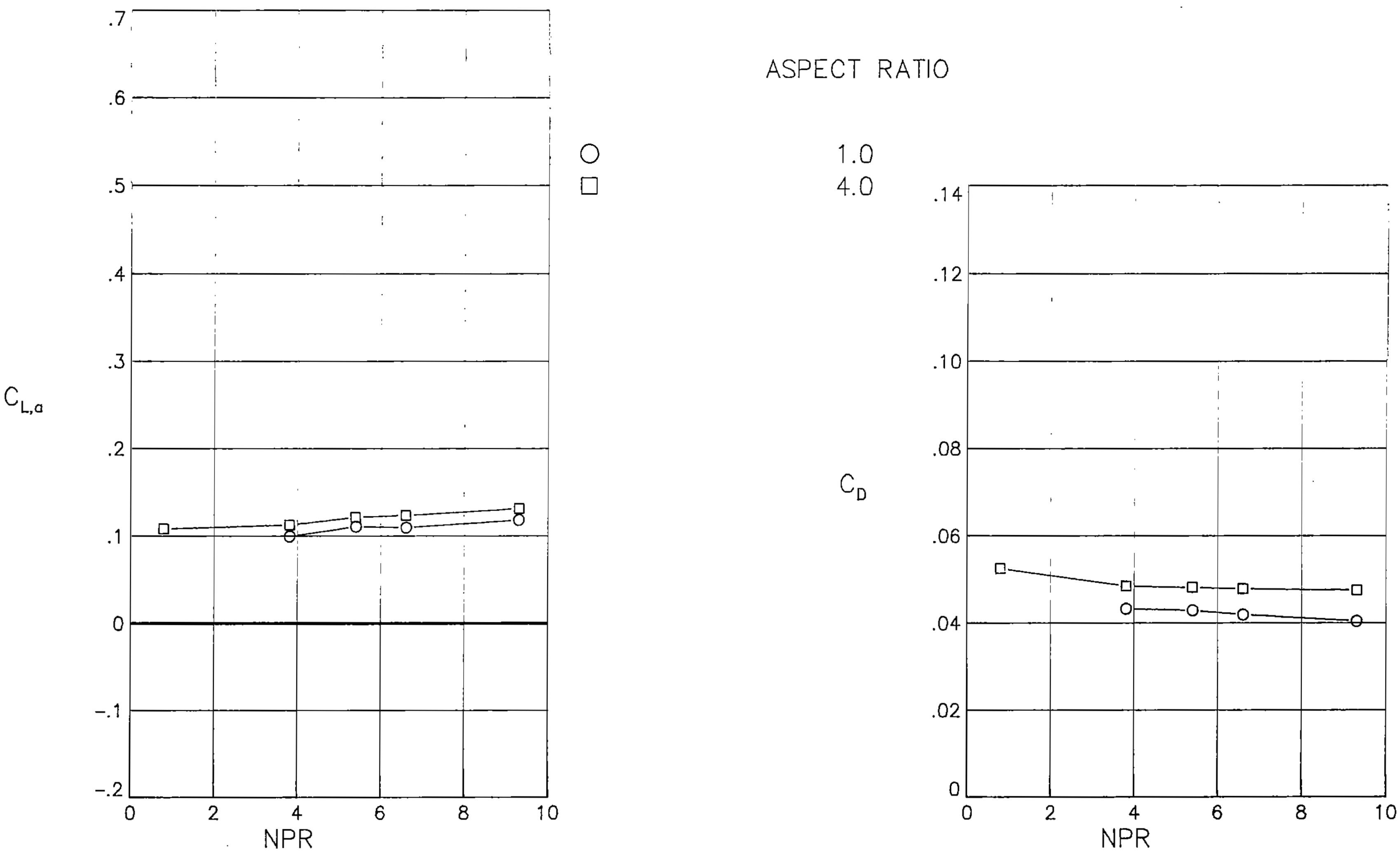
(a) M = 0.60.

Figure 68.- Effects of nozzle aspect ratio on thrust-removed aerodynamic characteristics for IUM SERN. A/B power setting; $\delta_v = 0^\circ$; $\delta_c = 0^\circ$; $\alpha = 4^\circ$.



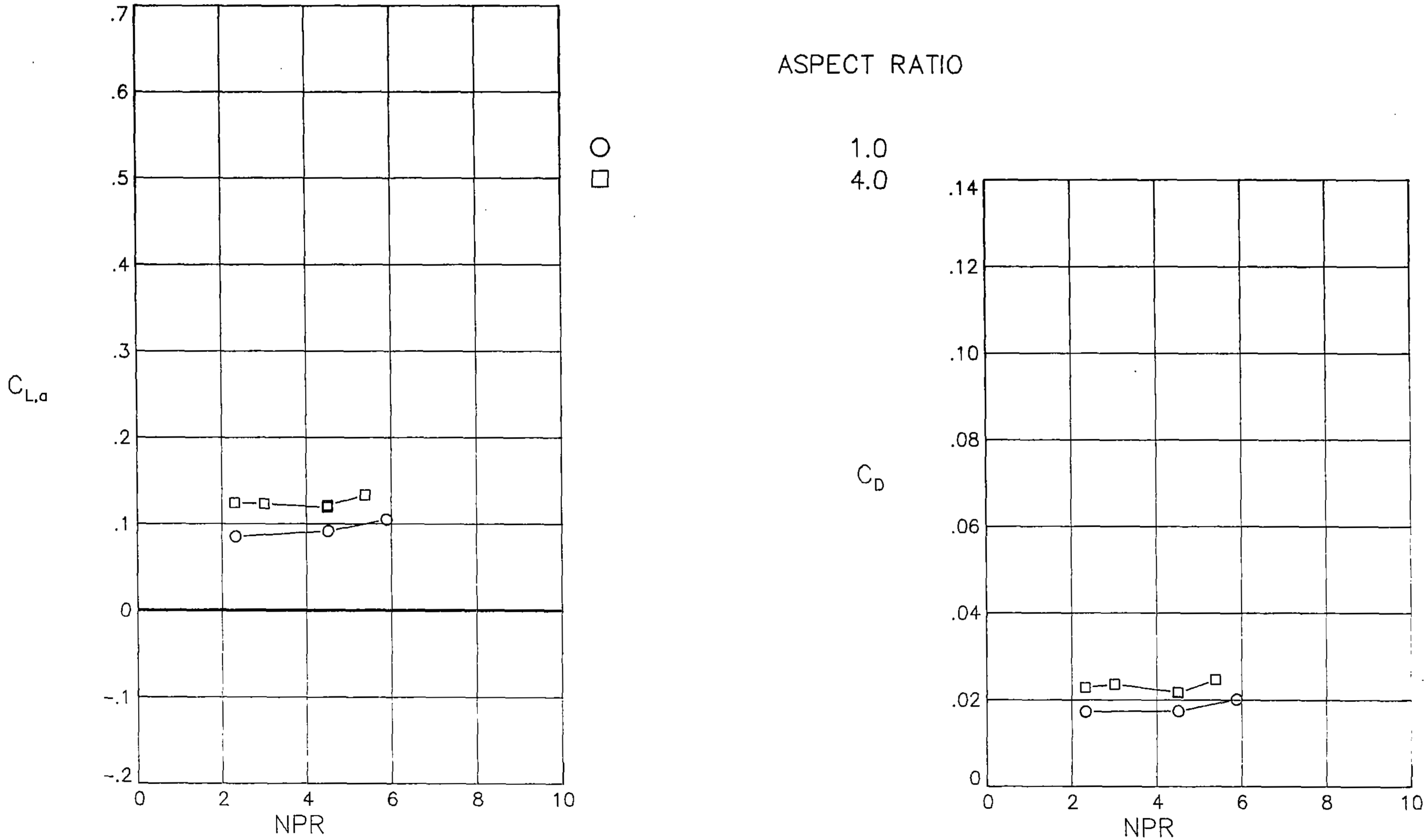
(b) M = 0.87.

Figure 68.- Continued.



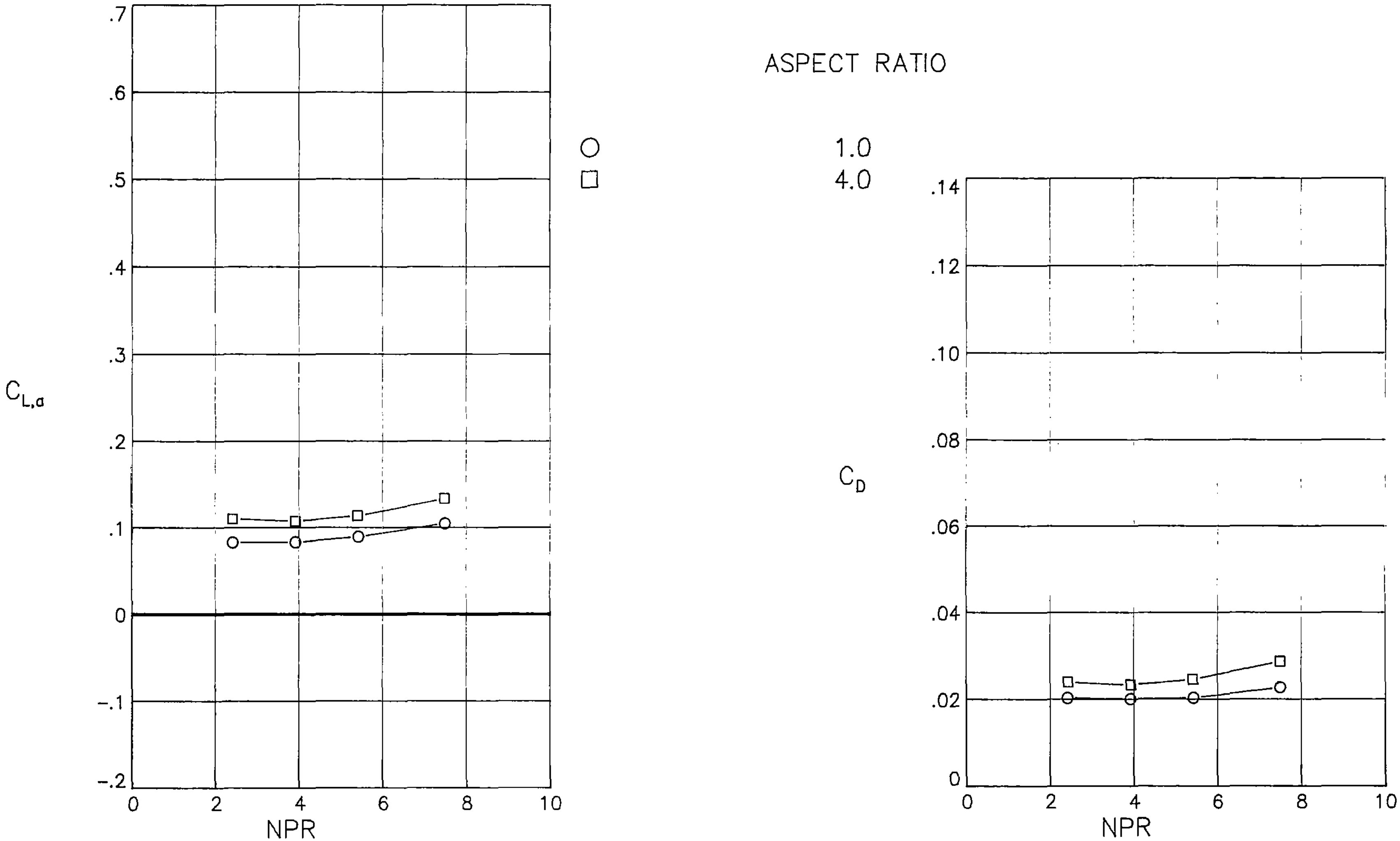
(c) M = 1.20.

Figure 68.- Concluded.



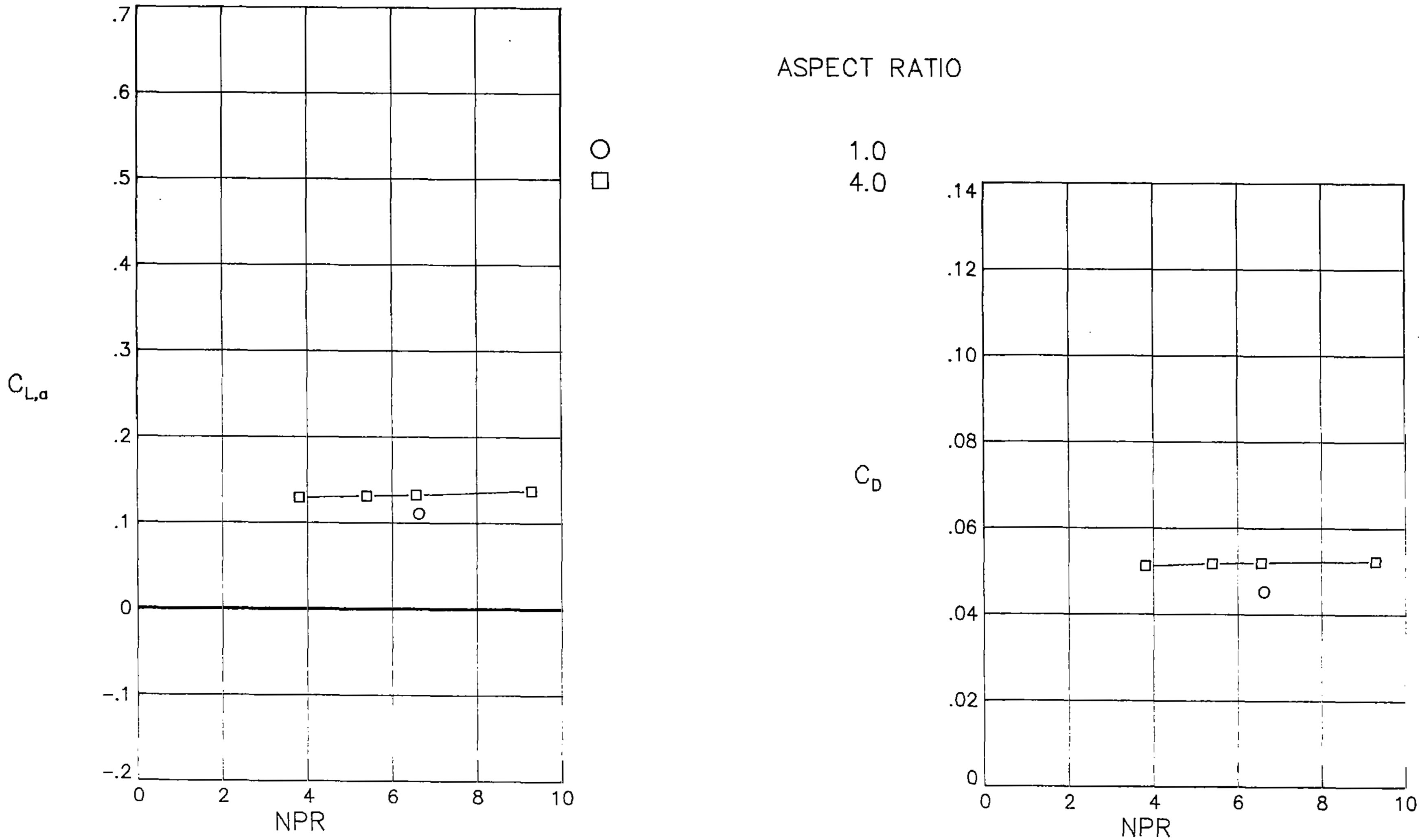
(a) M = 0.60.

Figure 69.- Effects of nozzle aspect ratio on thrust-removed aerodynamic characteristics for IUM SERN. A/B power setting; $\delta_v = 15^{\circ}$; $\delta_c = 0^{\circ}$; $\alpha = 4^{\circ}$.



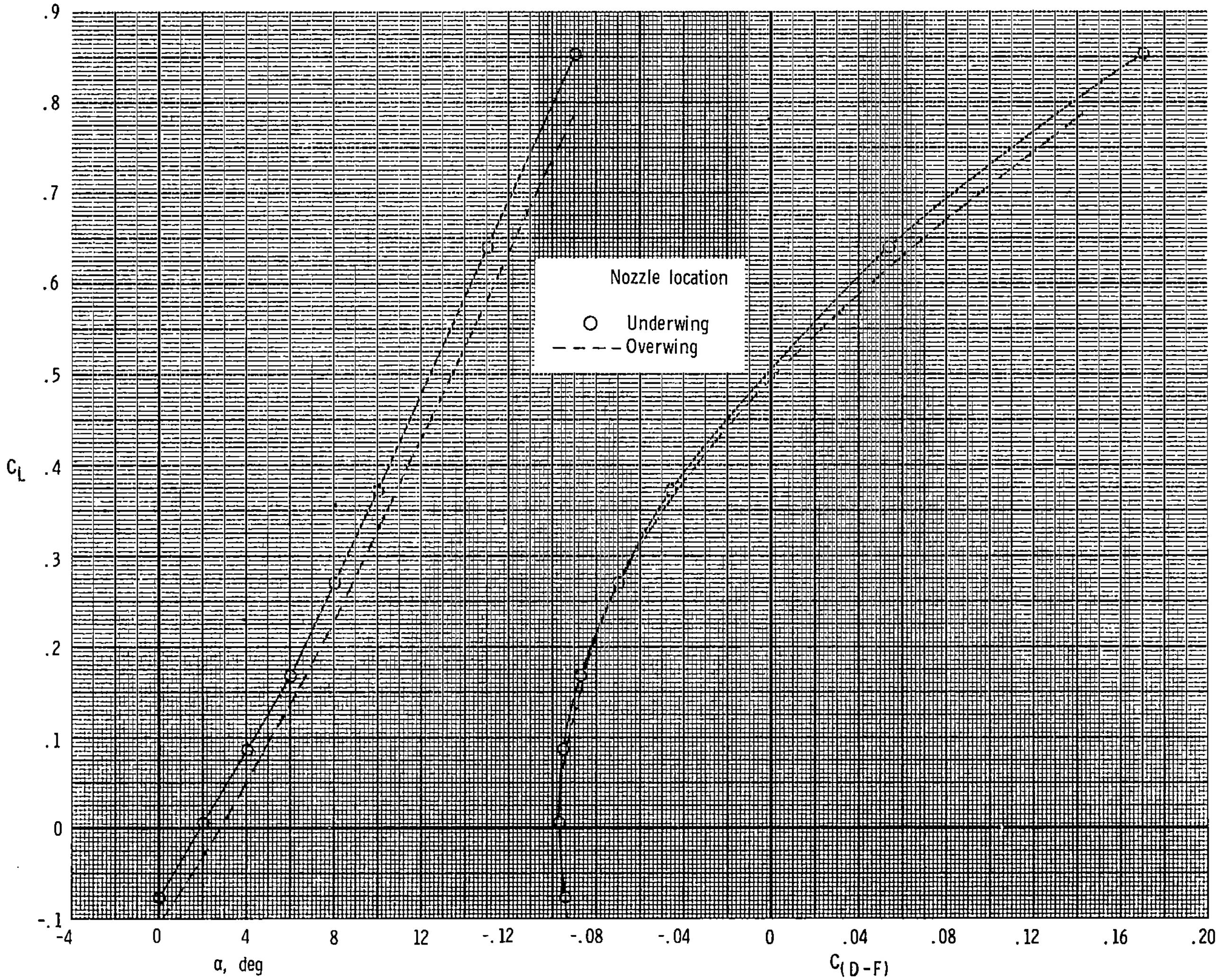
(b) M = 0.87.

Figure 69.- Continued.



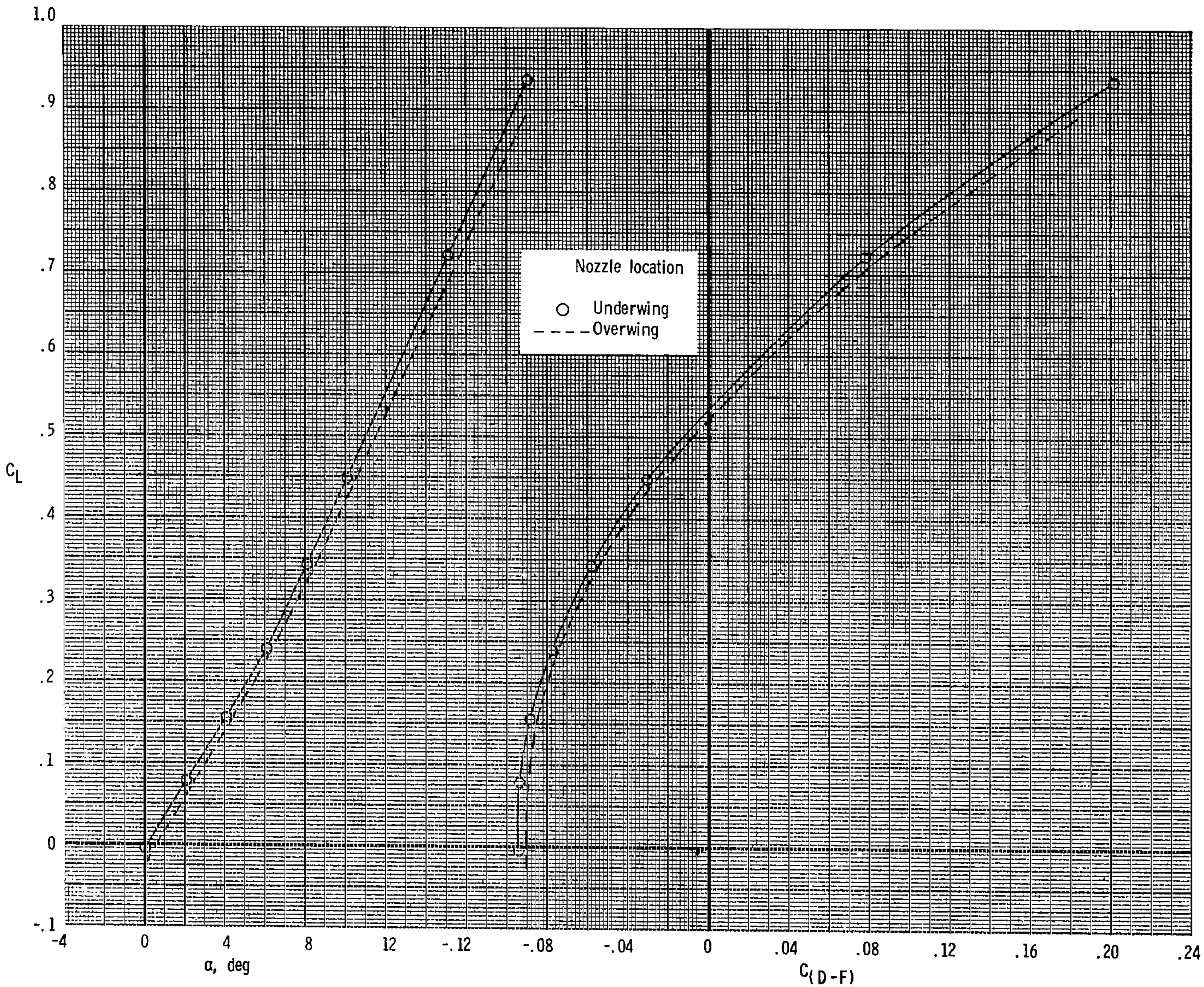
(c) M = 1.20.

Figure 69.- Concluded.



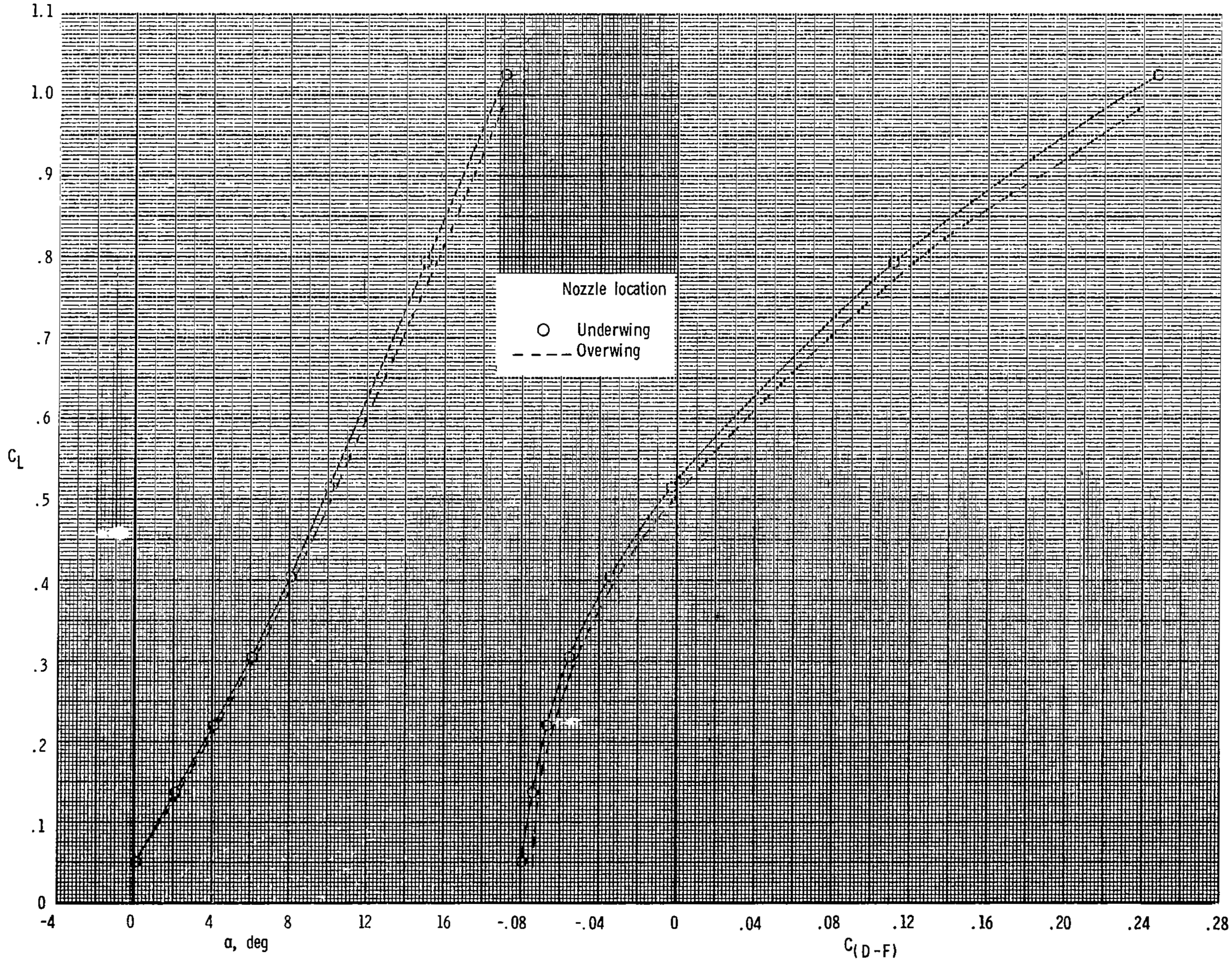
(a) $\delta_v = 0^{\circ}$.

Figure 70.- Effects of nozzle vertical location on total aerodynamic characteristics for I*M SERN. Dashed curves indicate interpolated data. AR = 4; A/B power setting; $\delta_c = 0^{\circ}$; M = 0.60; NPR = 3.0.



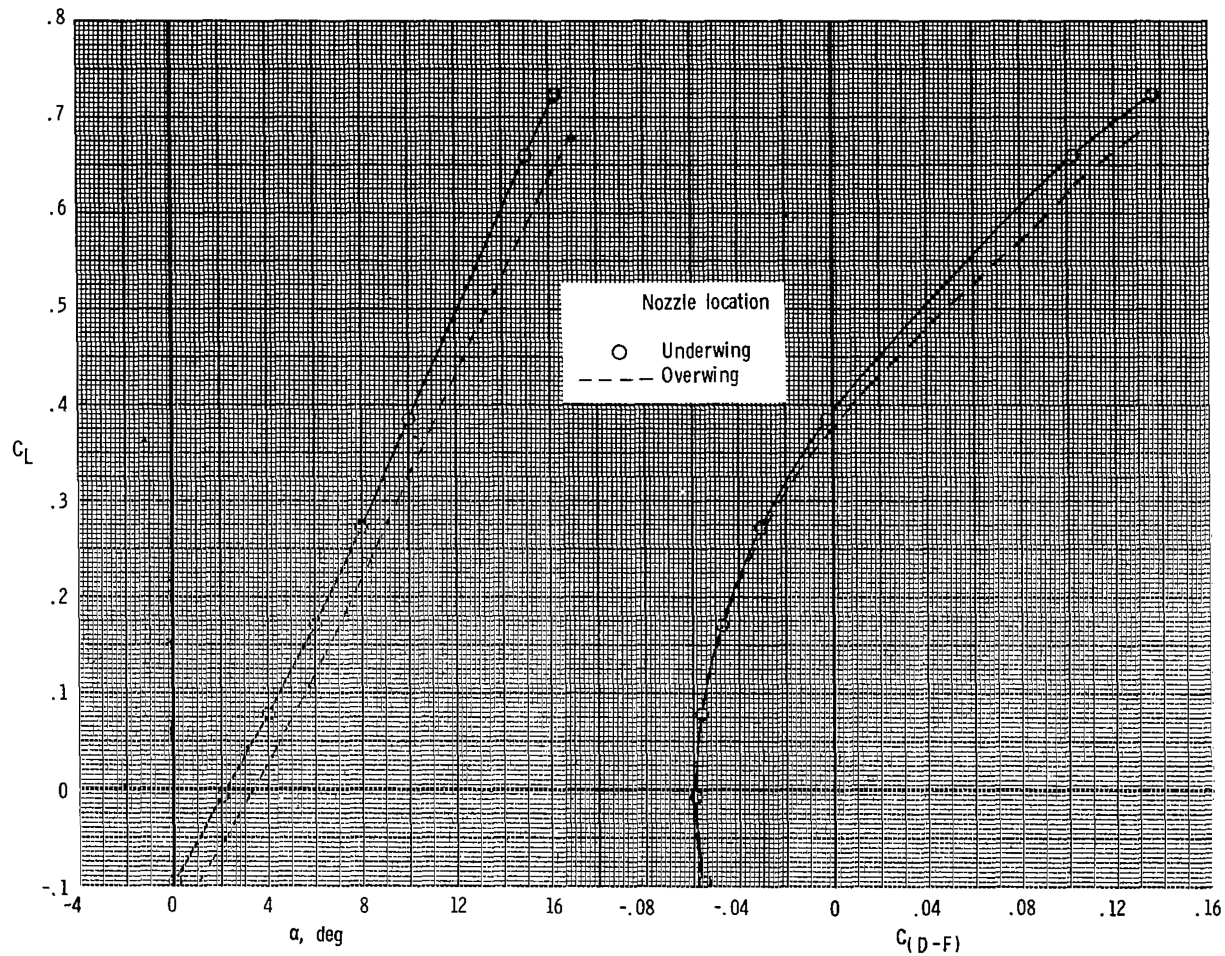
(b) $\delta_v = 15^\circ$.

Figure 70.- Continued.



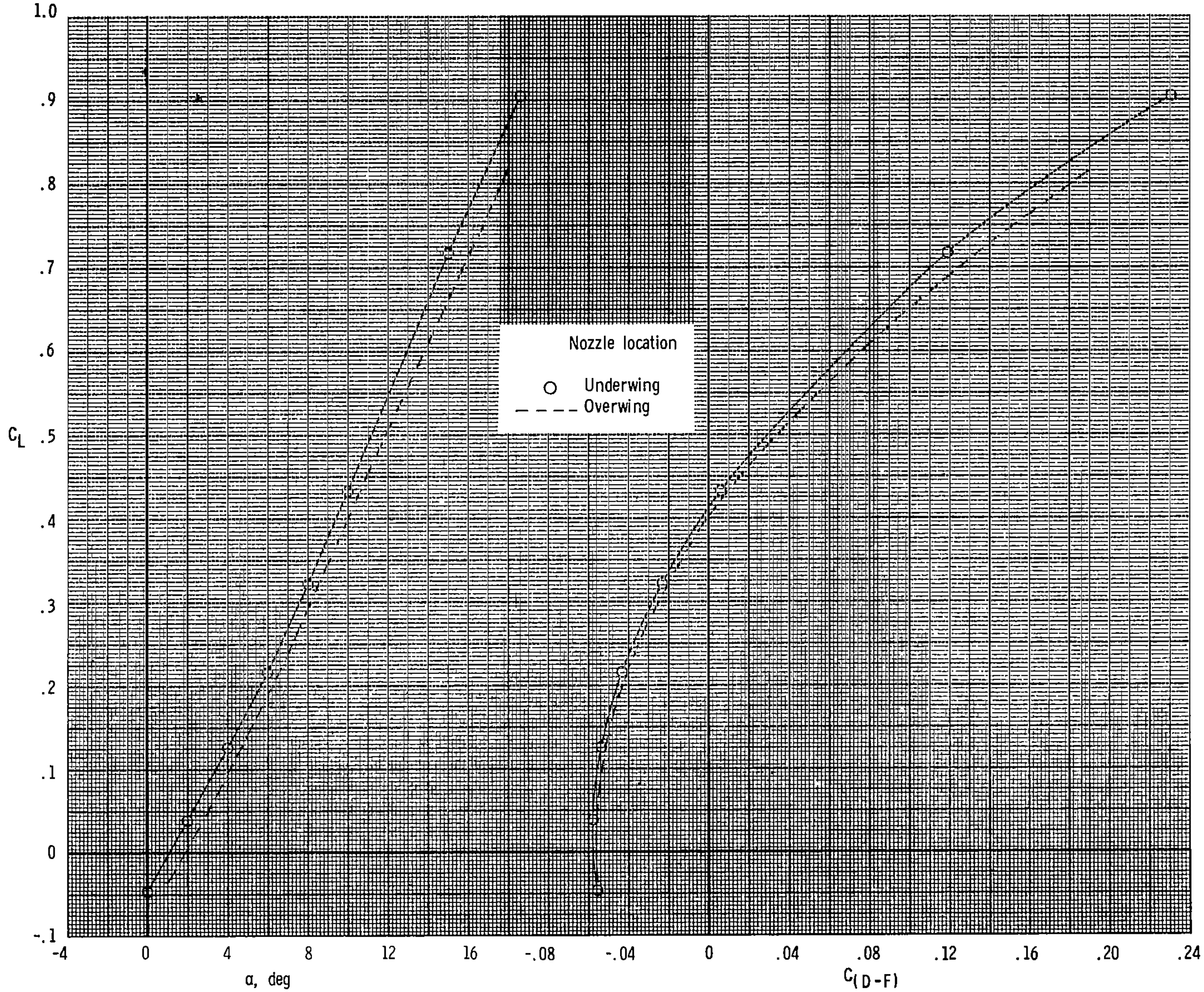
(c) $\delta_v = 30^{\circ}$.

Figure 70.- Concluded.



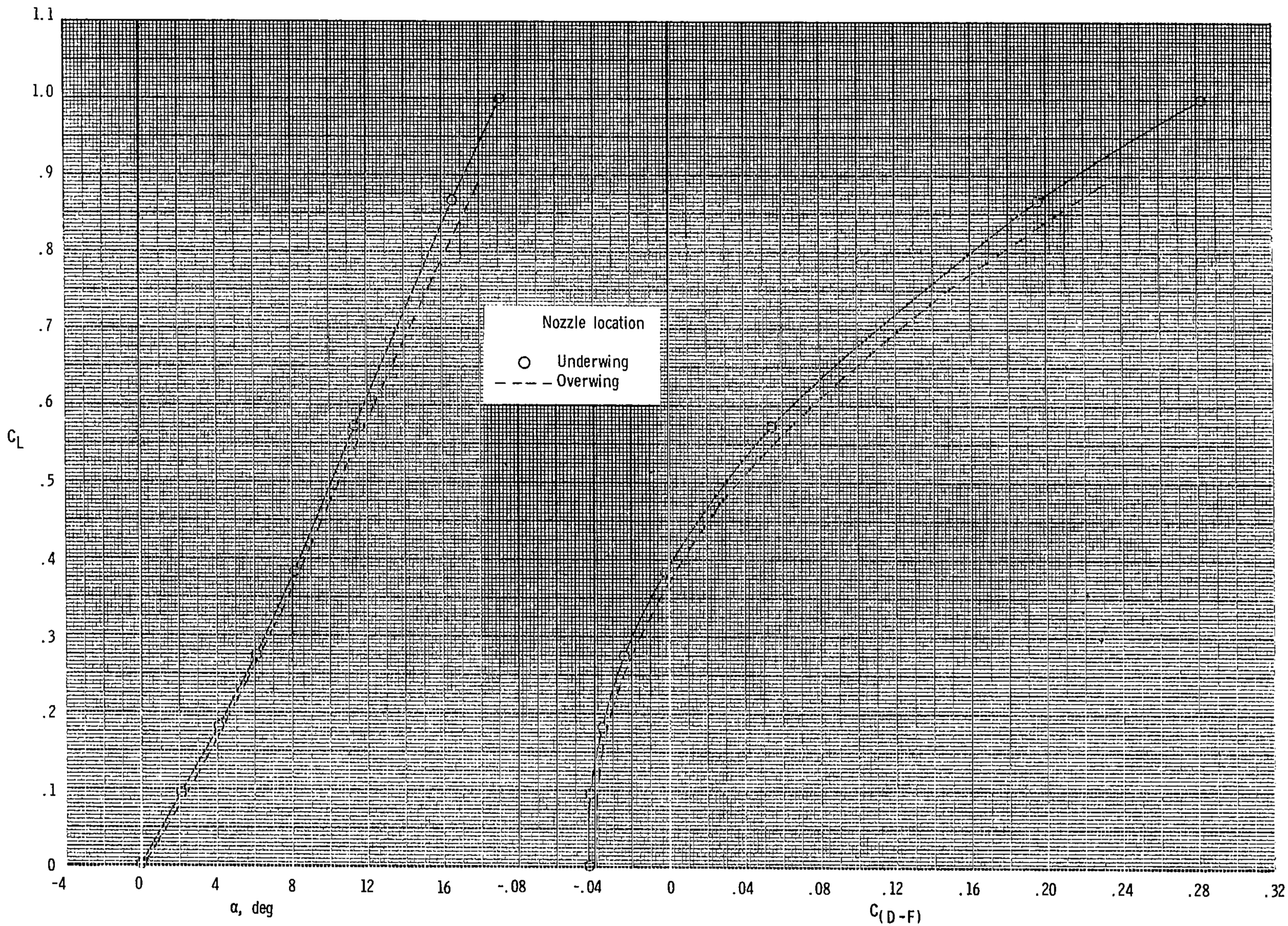
(a) $\delta_v = 0^\circ$.

Figure 71.- Effects of nozzle vertical location on total aerodynamic characteristics for I*M SERN. Dashed curves indicate interpolated data. AR = 4; A/B power setting; $\delta_c = 0^\circ$; M = 0.87; NPR = 3.9.



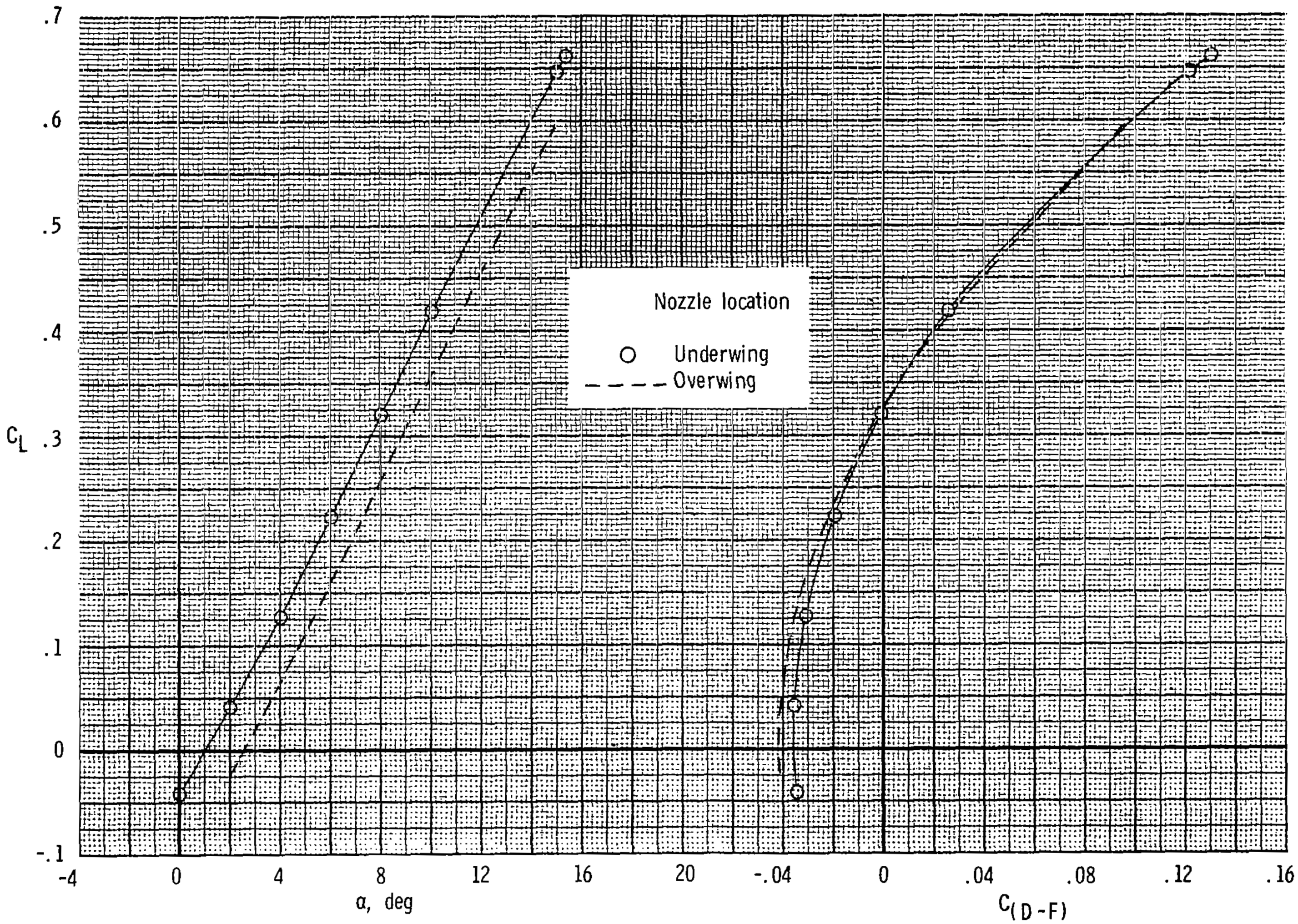
(b) $\delta_v = 15^{\circ}$.

Figure 71.- Continued.



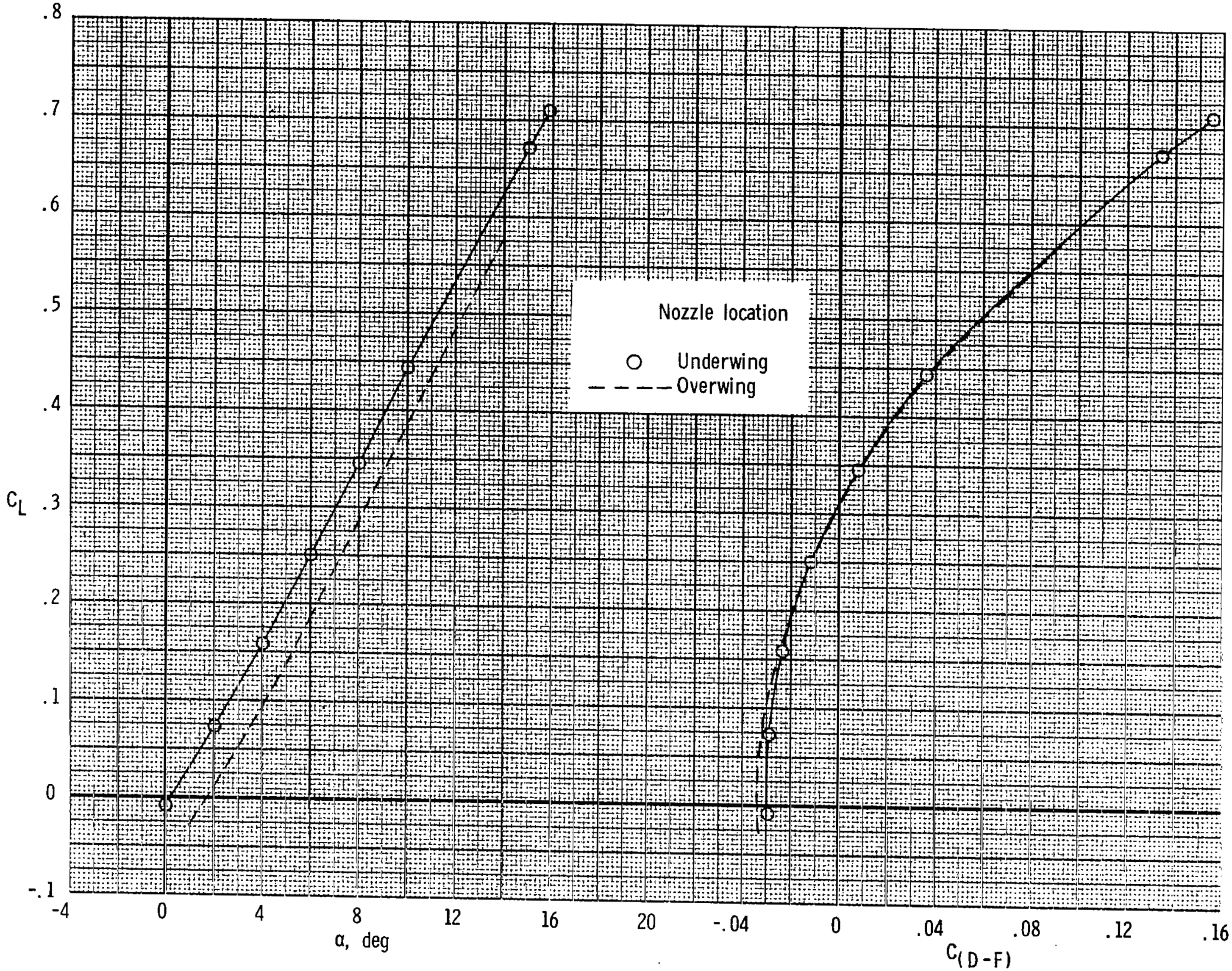
(c) $\delta_v = 30^{\circ}$.

Figure 71.- Concluded.



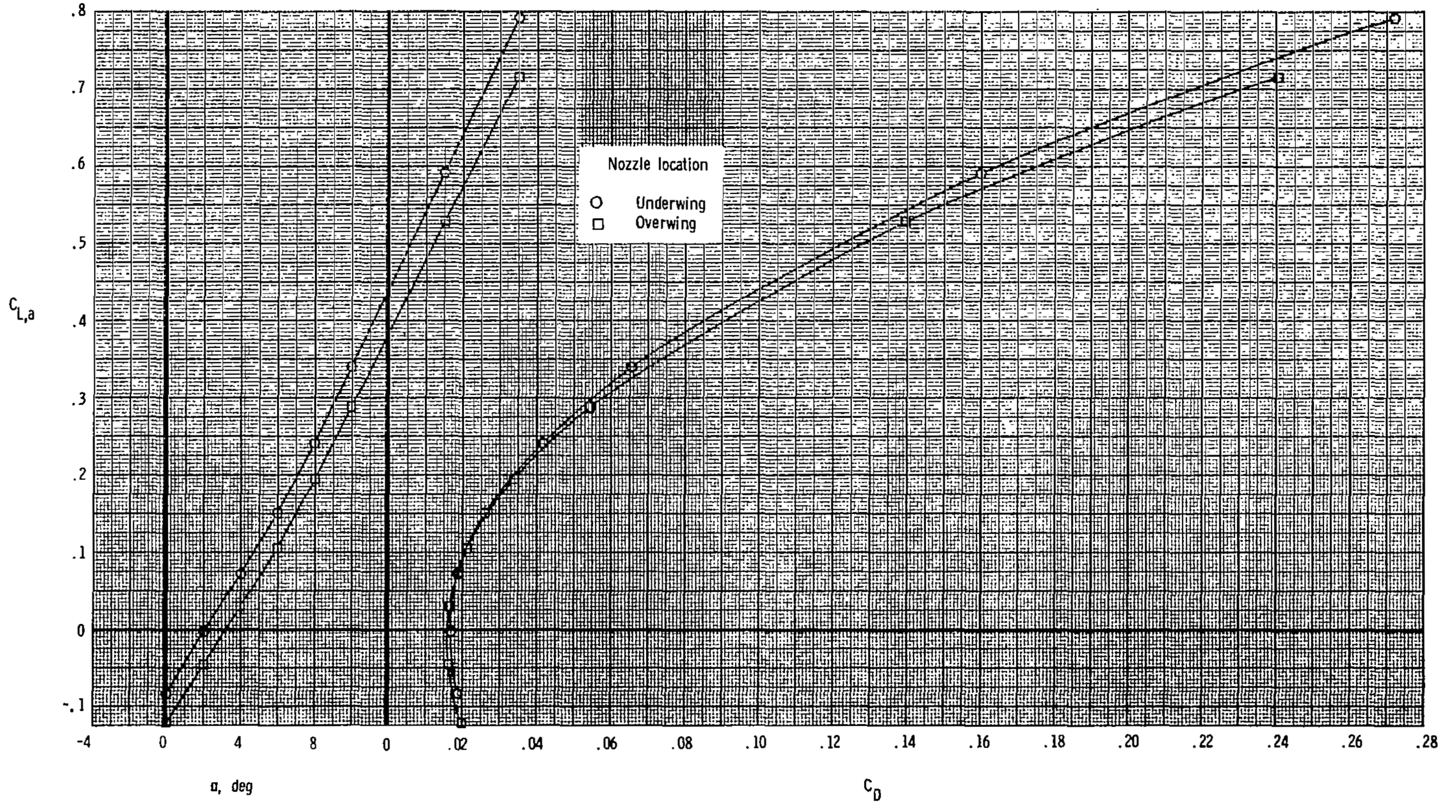
(a) $\delta_v = 0^{\circ}$.

Figure 72.- Effects of nozzle vertical location on total aerodynamic characteristics for I*M SERN. Dashed curves indicate interpolated data. AR = 4; A/B power setting; $\delta_c = 0^{\circ}$; M = 1.20; NPR = 6.6.



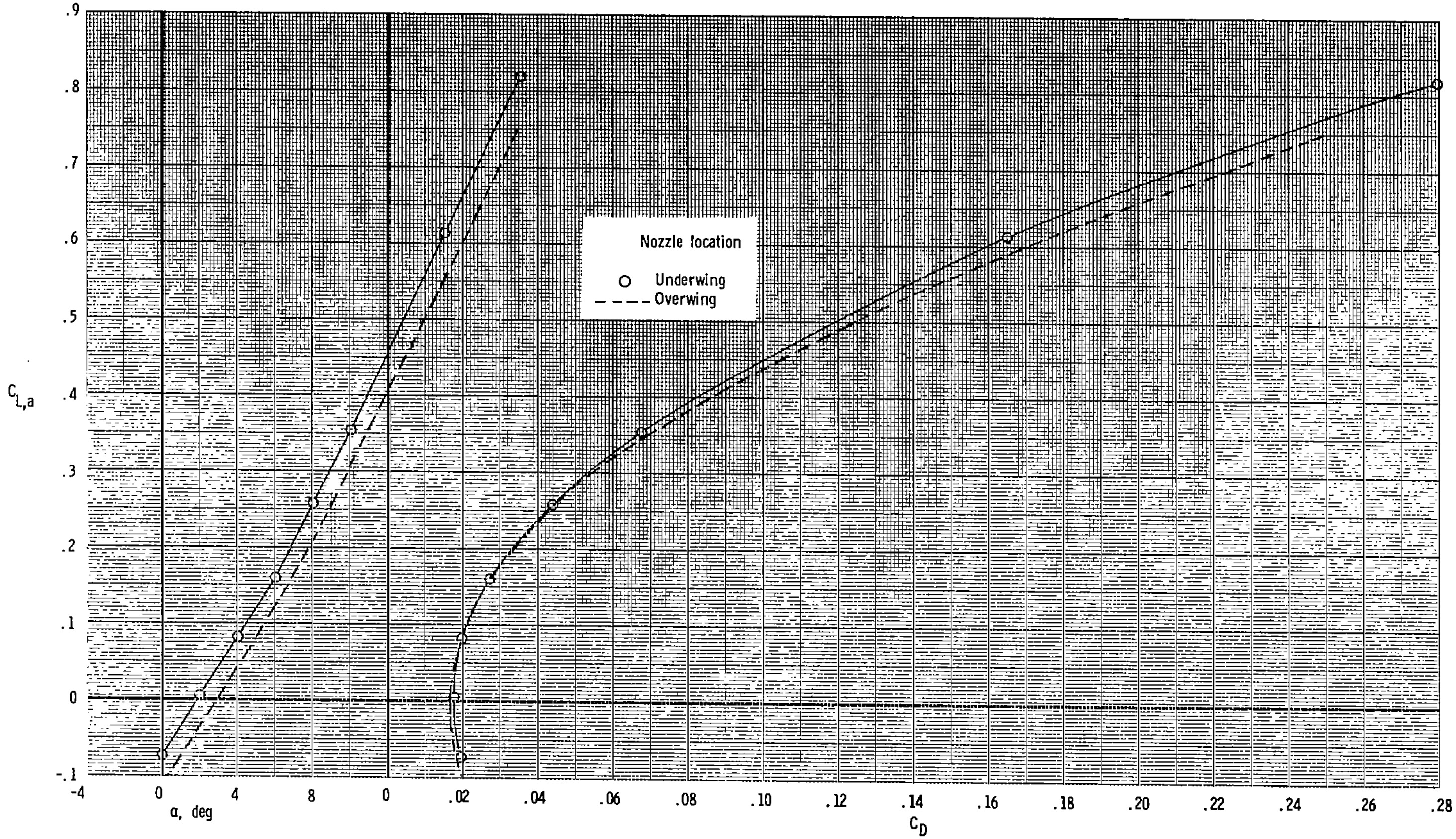
(b) $\delta_v = 15^o$.

Figure 72.- Concluded.



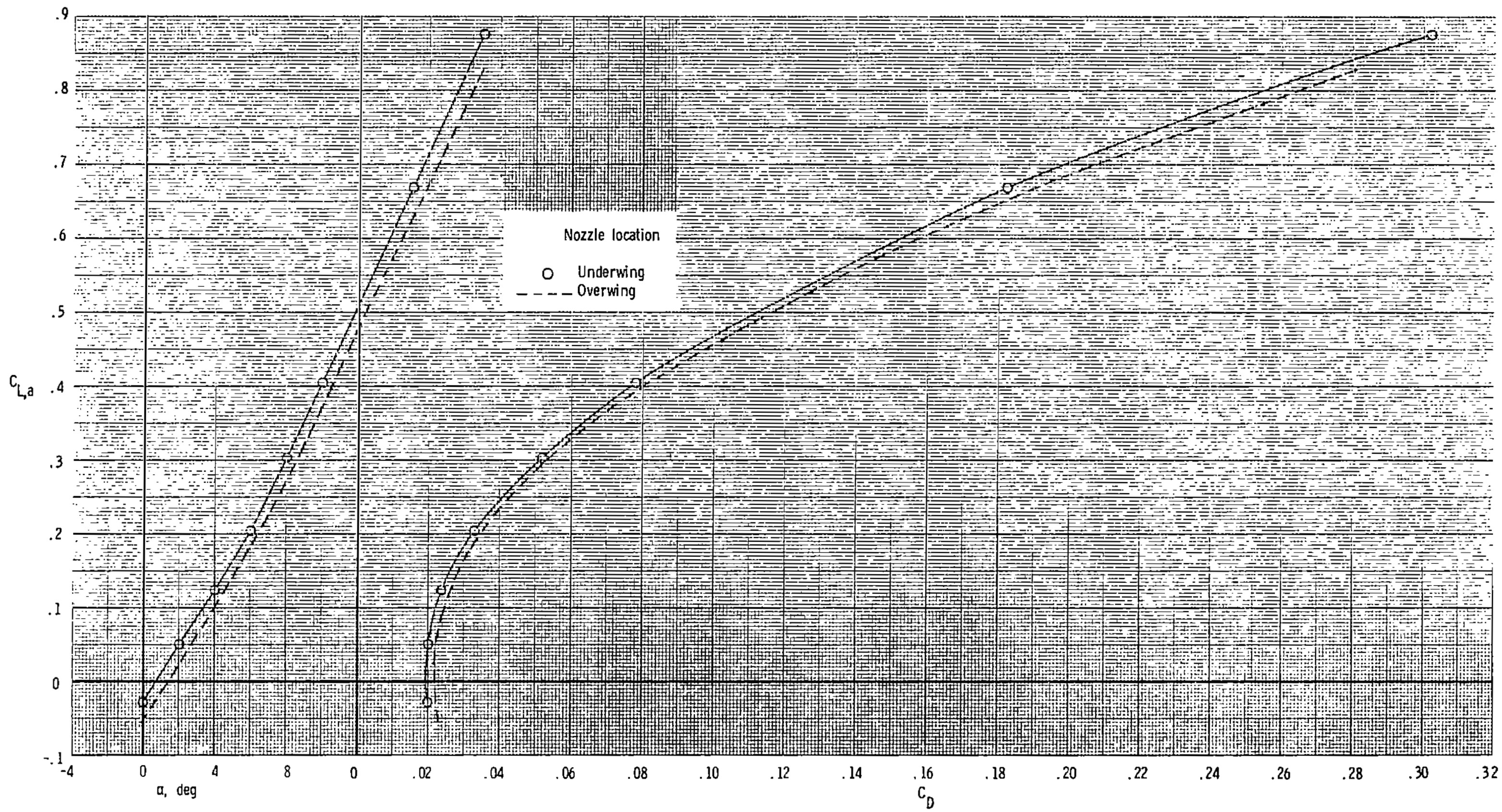
(a) $\delta_v = 0^\circ$; NPR = 1.0.

Figure 73.- Effects of nozzle vertical location on thrust-removed aerodynamic characteristics for I*M SERN. Dashed curves indicate interpolated data. AR = 4; A/B power setting; $\delta_c \approx 0^\circ$; M = 0.60.



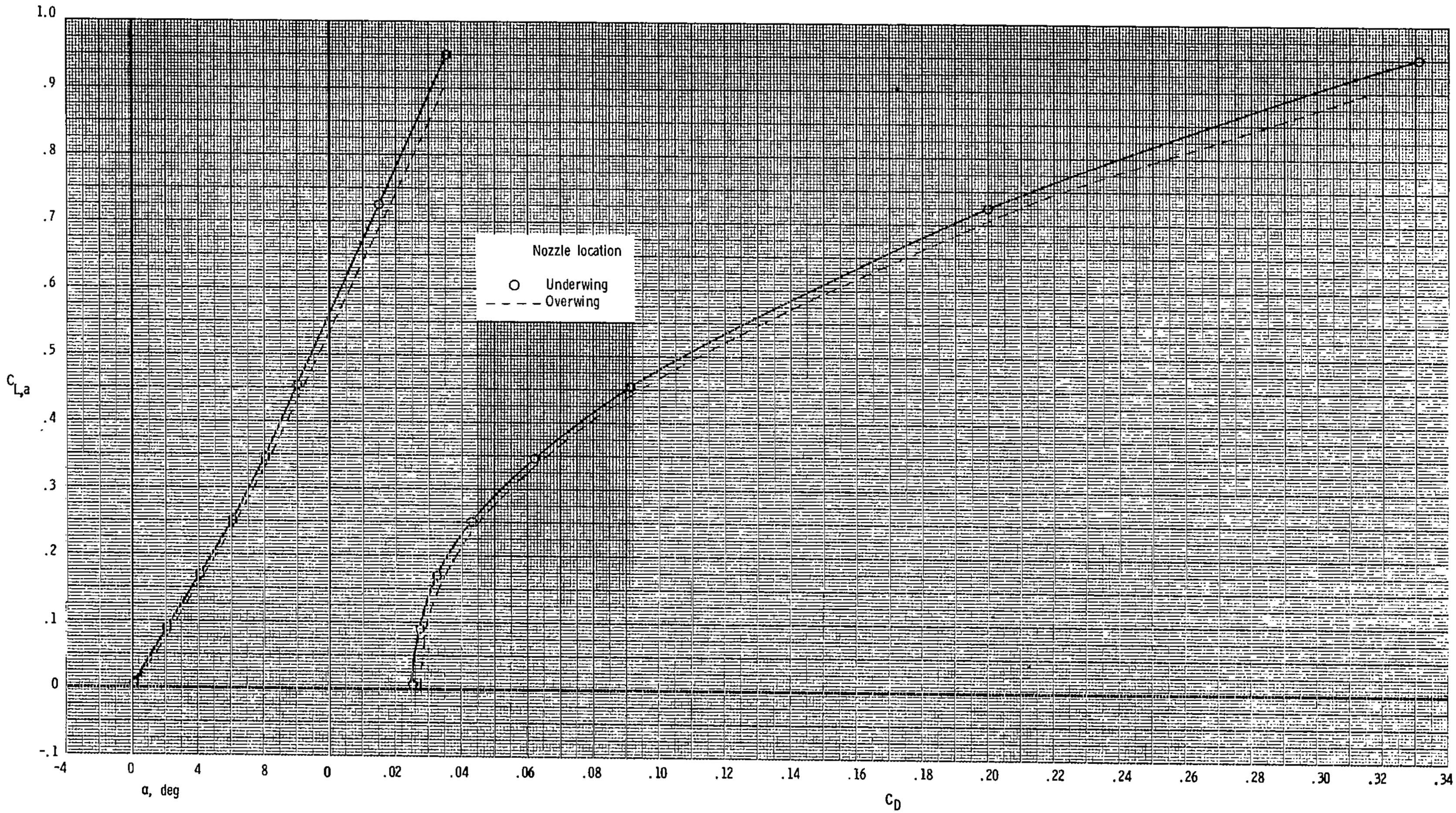
(b) $\delta_v = 0^{\circ}$; NPR = 3.0.

Figure 73.- Continued.



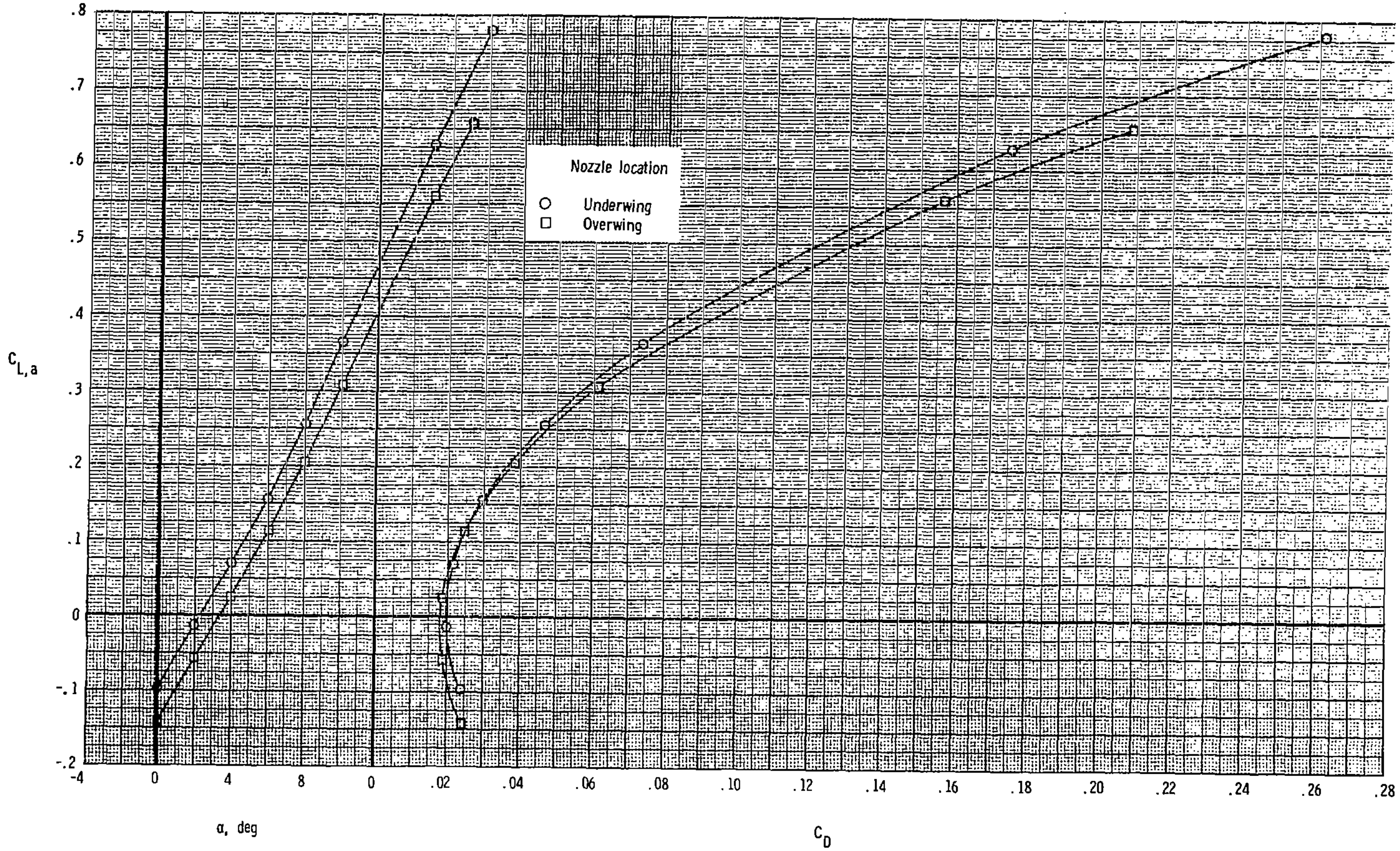
(c) $\delta_v = 15^\circ$; NPR = 3.0.

Figure 73.- Continued.



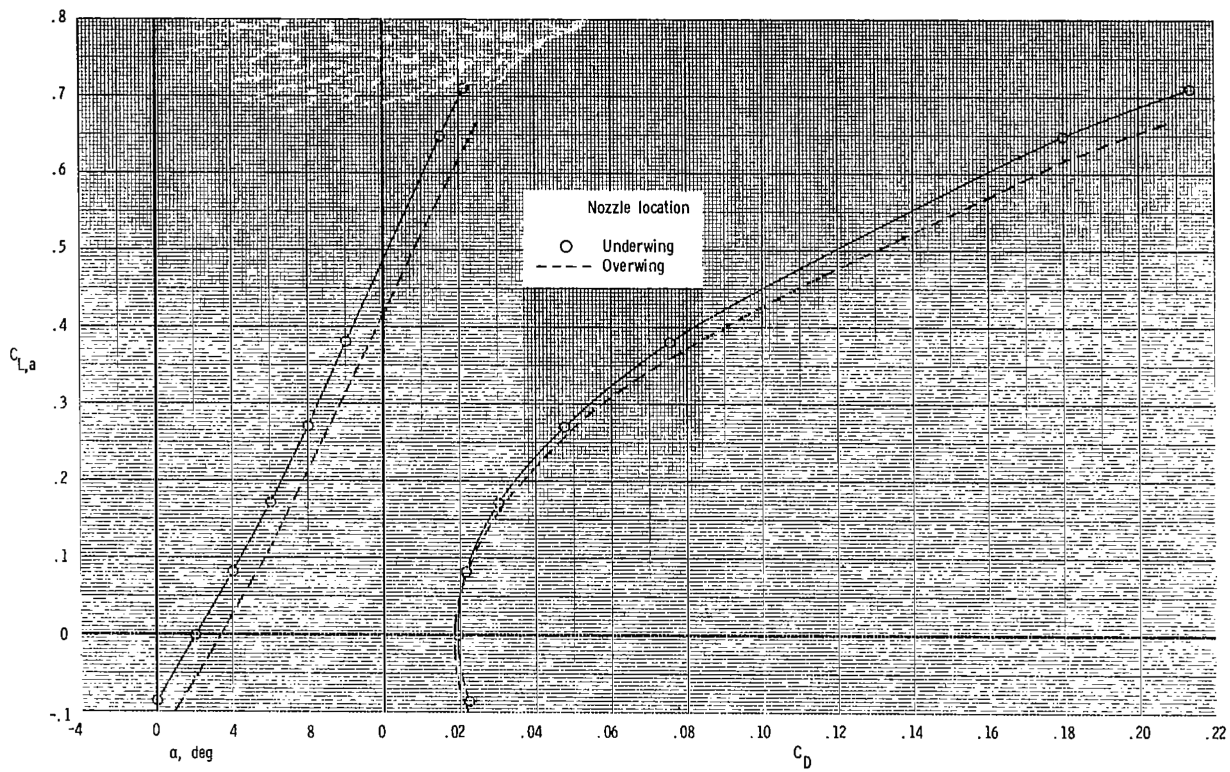
(d) $\delta_v = 30^\circ$; NPR = 3.0.

Figure 73.- Concluded.



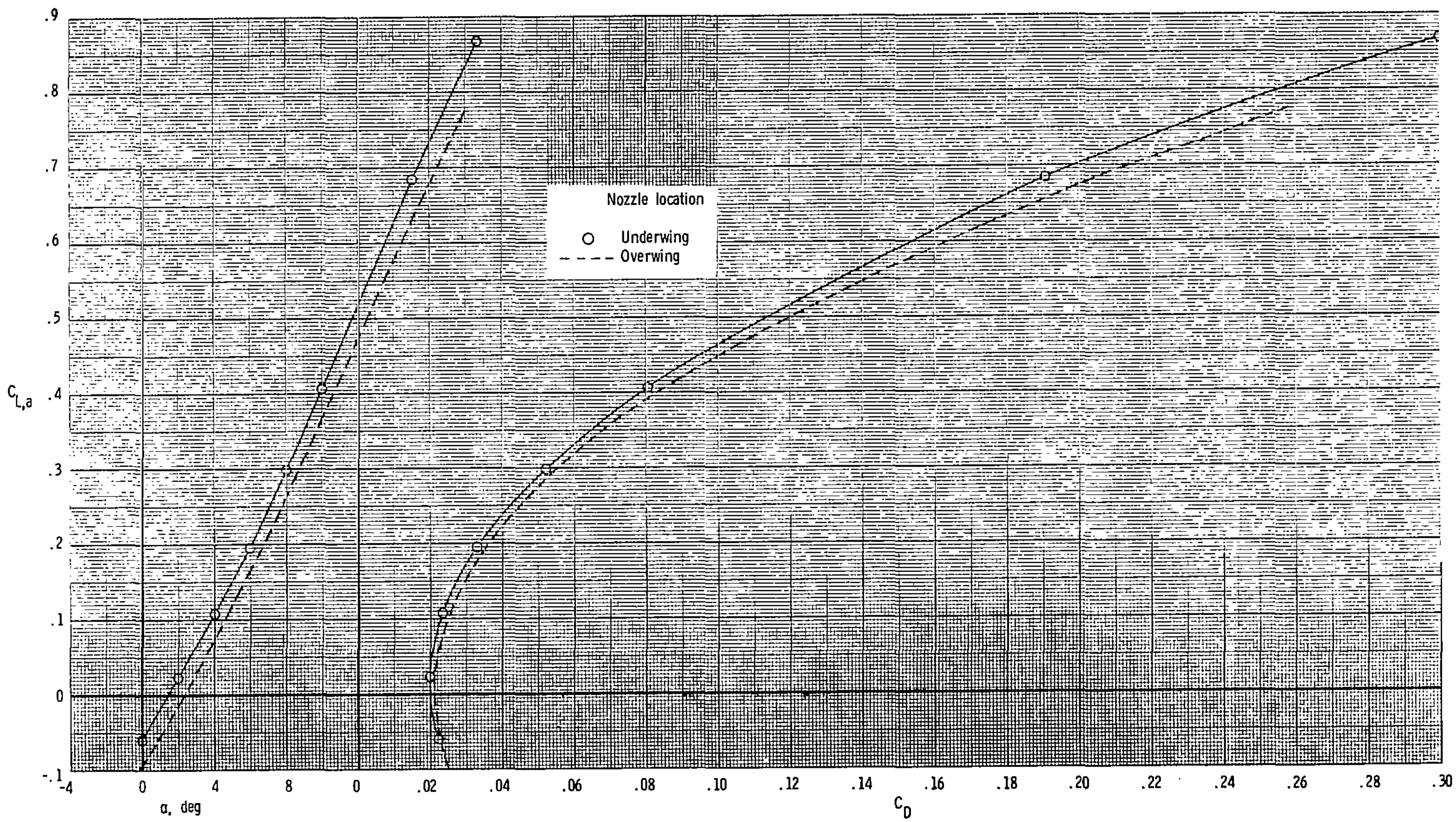
(a) $\delta_v = 0^o$; NPR = 1.0.

Figure 74.- Effects of nozzle vertical location on thrust-removed aerodynamic characteristics for I*M SERN. Dashed curves indicate interpolated data. AR = 4; A/B power setting; $\delta_c = 0^o$; M = 0.87.



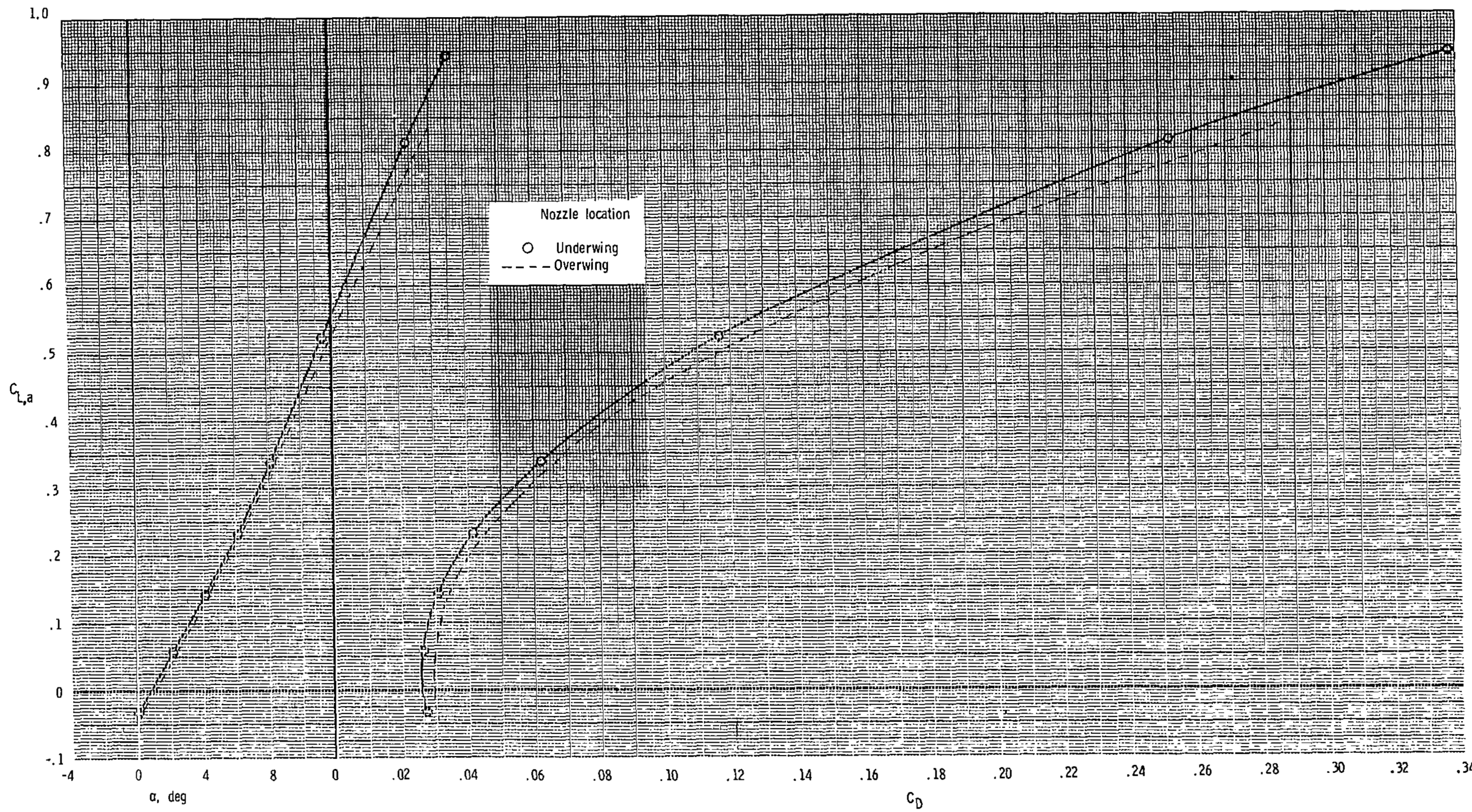
(b) $\delta_v = 0^\circ$; NPR = 3.9.

Figure 74.- Continued.



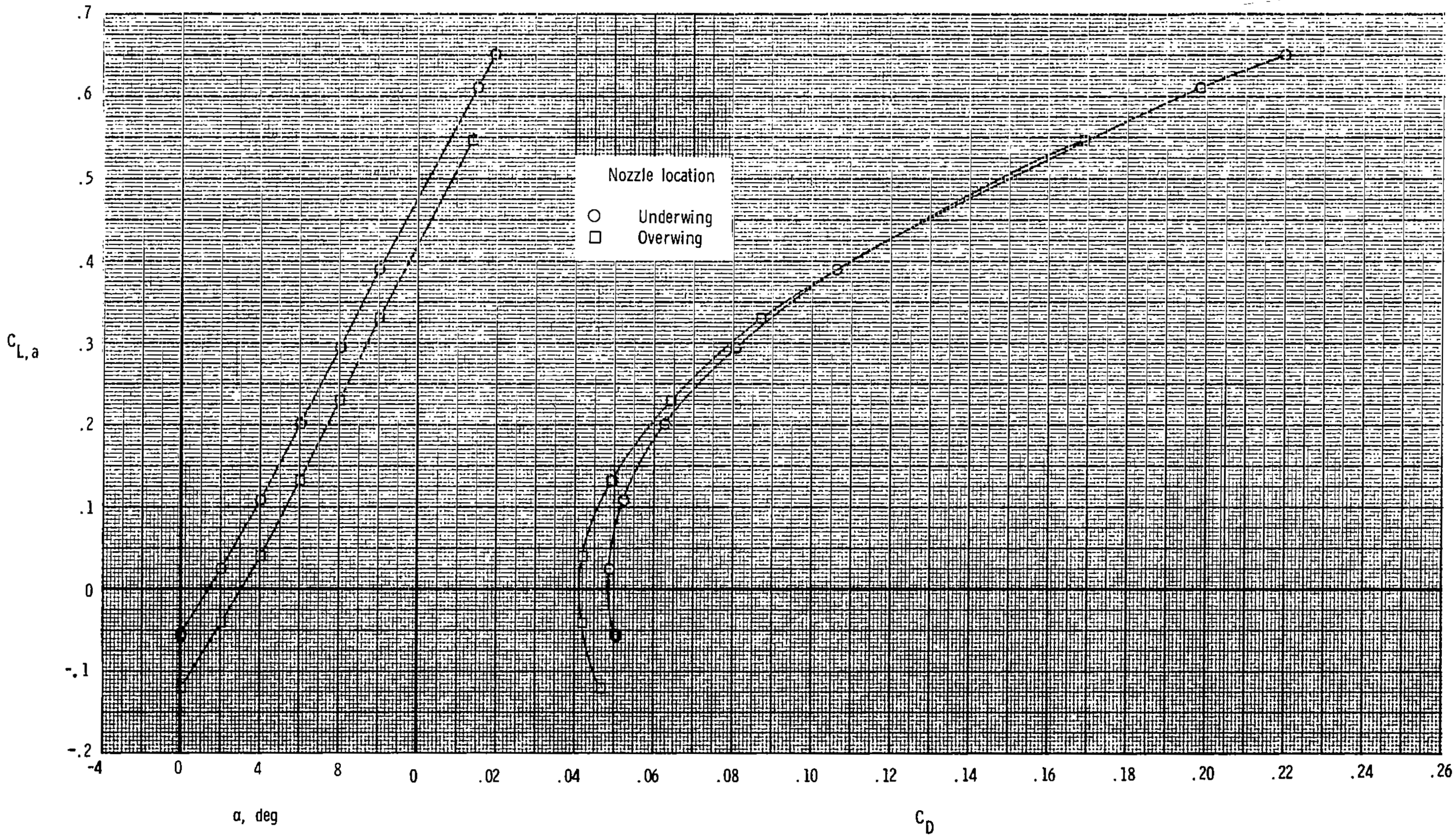
(c) $\delta_v = 15^o$; NPR = 3.9.

Figure 74.- Continued.



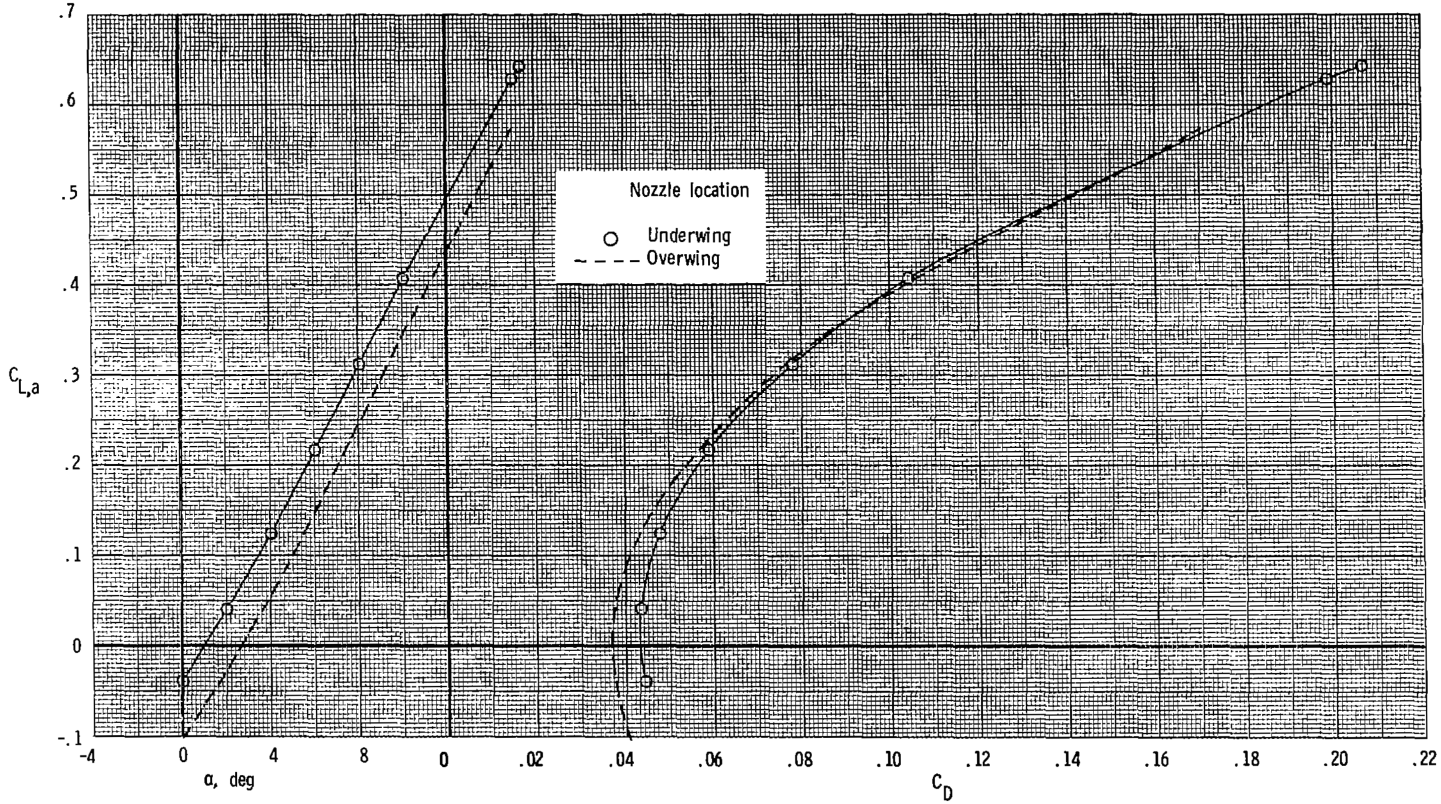
(d) $\delta_v = 30^{\circ}$; NPR = 3.9.

Figure 74.- Concluded.



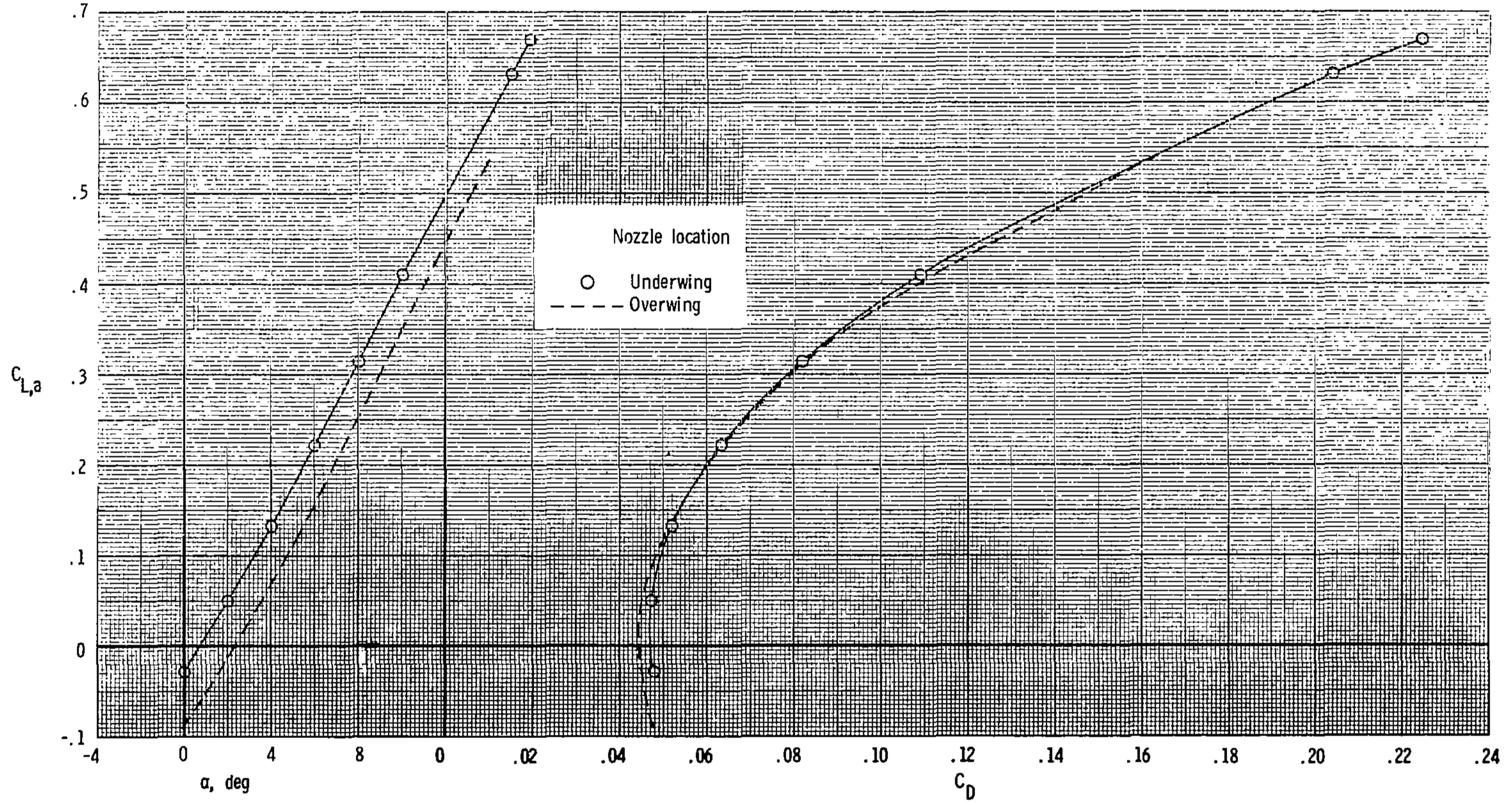
(a) $\delta_v = 0^\circ$; NPR = 1.0.

Figure 75.- Effects of nozzle vertical location on thrust-removed aerodynamic characteristics for I*M SERN. Dashed curves indicate interpolated data. AR = 4; A/B power setting; $\delta_c = 0^\circ$; M = 1.20.



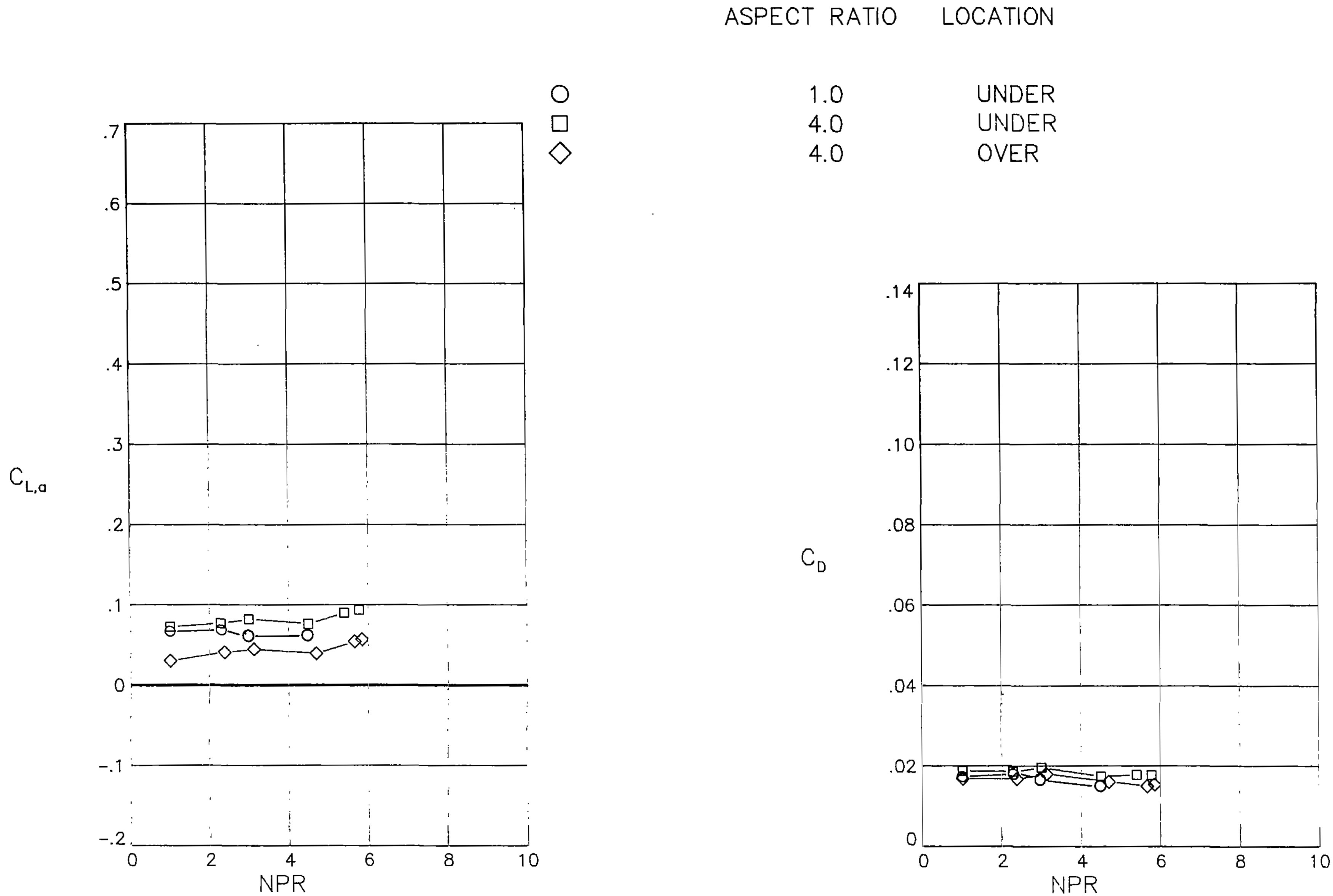
(b) $\delta_v = 0^{\circ}$; NPR = 6.6.

Figure 75.- Continued.



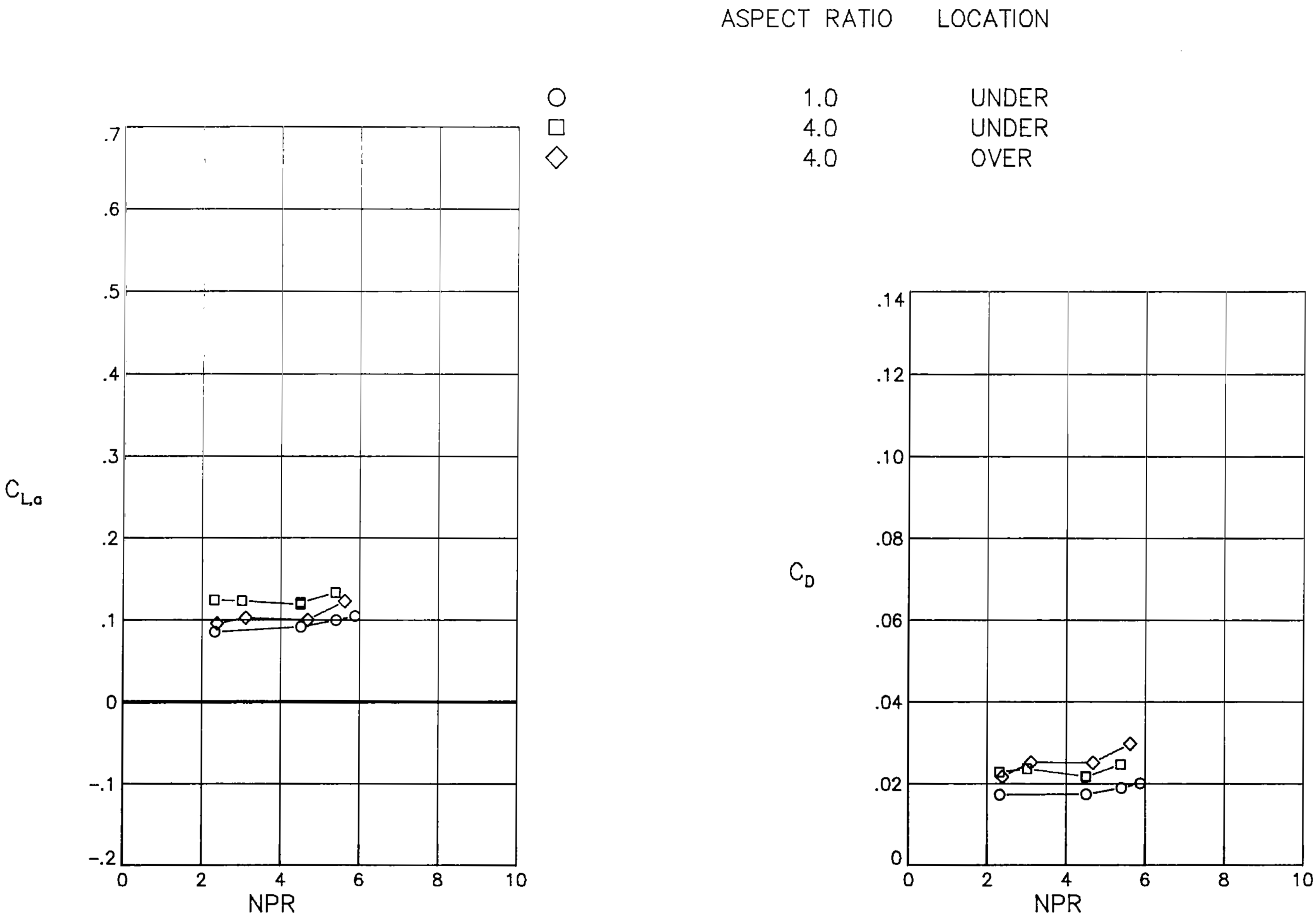
(c) $\delta_v = 15^\circ$; NPR = 6.6.

Figure 75.- Concluded.



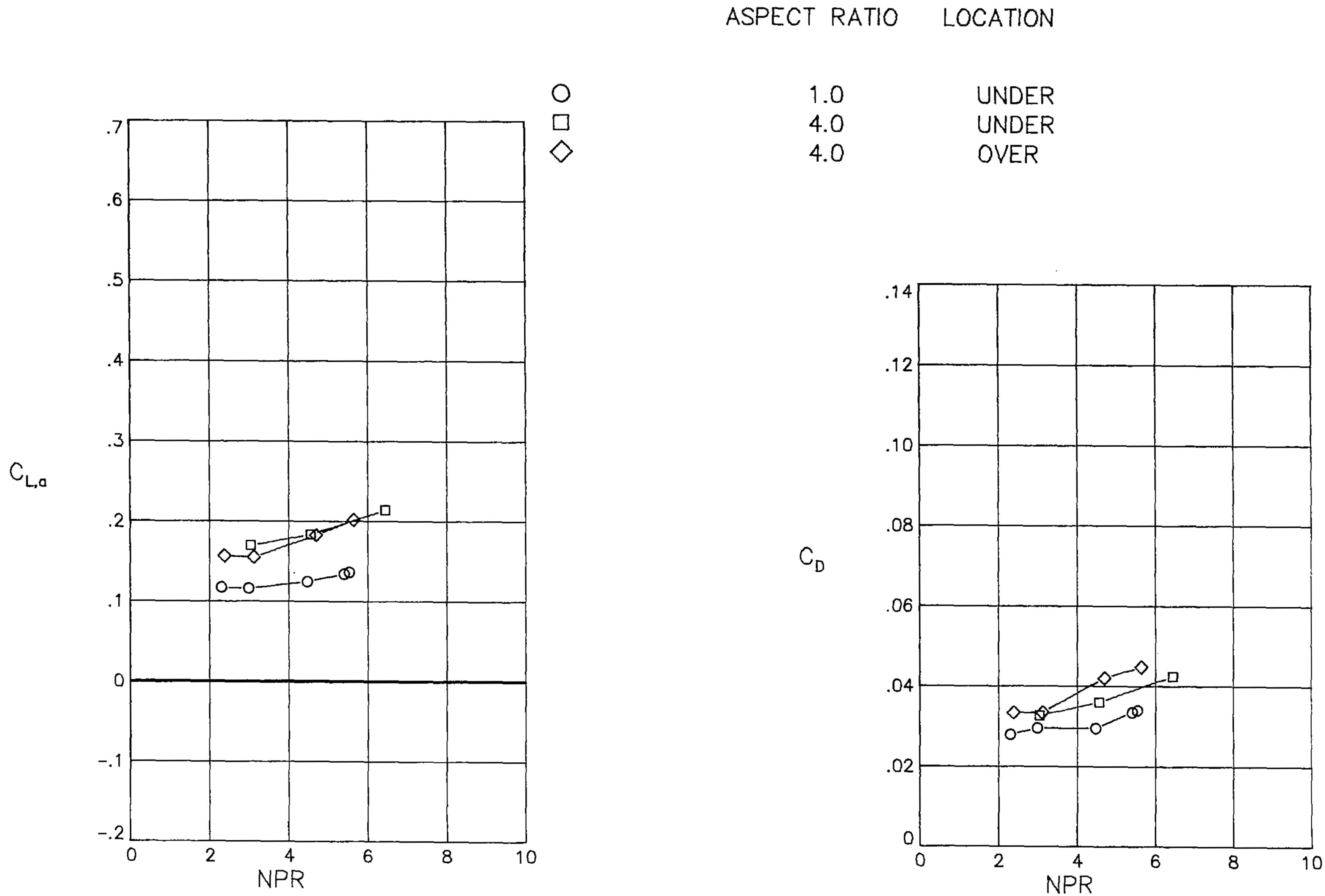
(a) $\delta_v = 0^\circ$.

Figure 76.- Effects of nozzle aspect ratio and vertical location on thrust-removed aerodynamic characteristics for I*M SERN. A/B power setting; $\delta_c = 0^\circ$; M = 0.60; $\alpha = 4^\circ$.



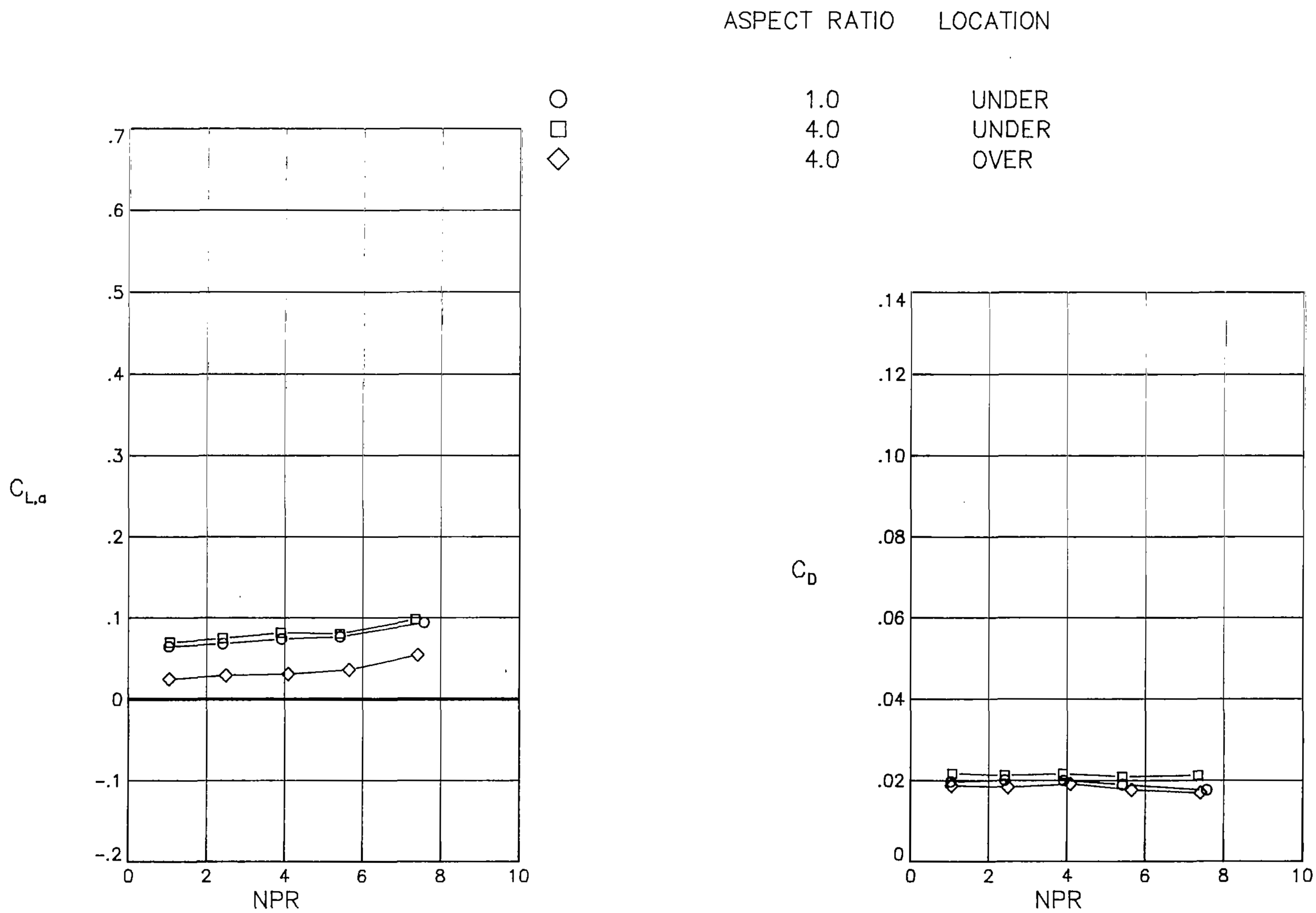
(b) $\delta_v = 15^{\circ}$.

Figure 76.- Continued.



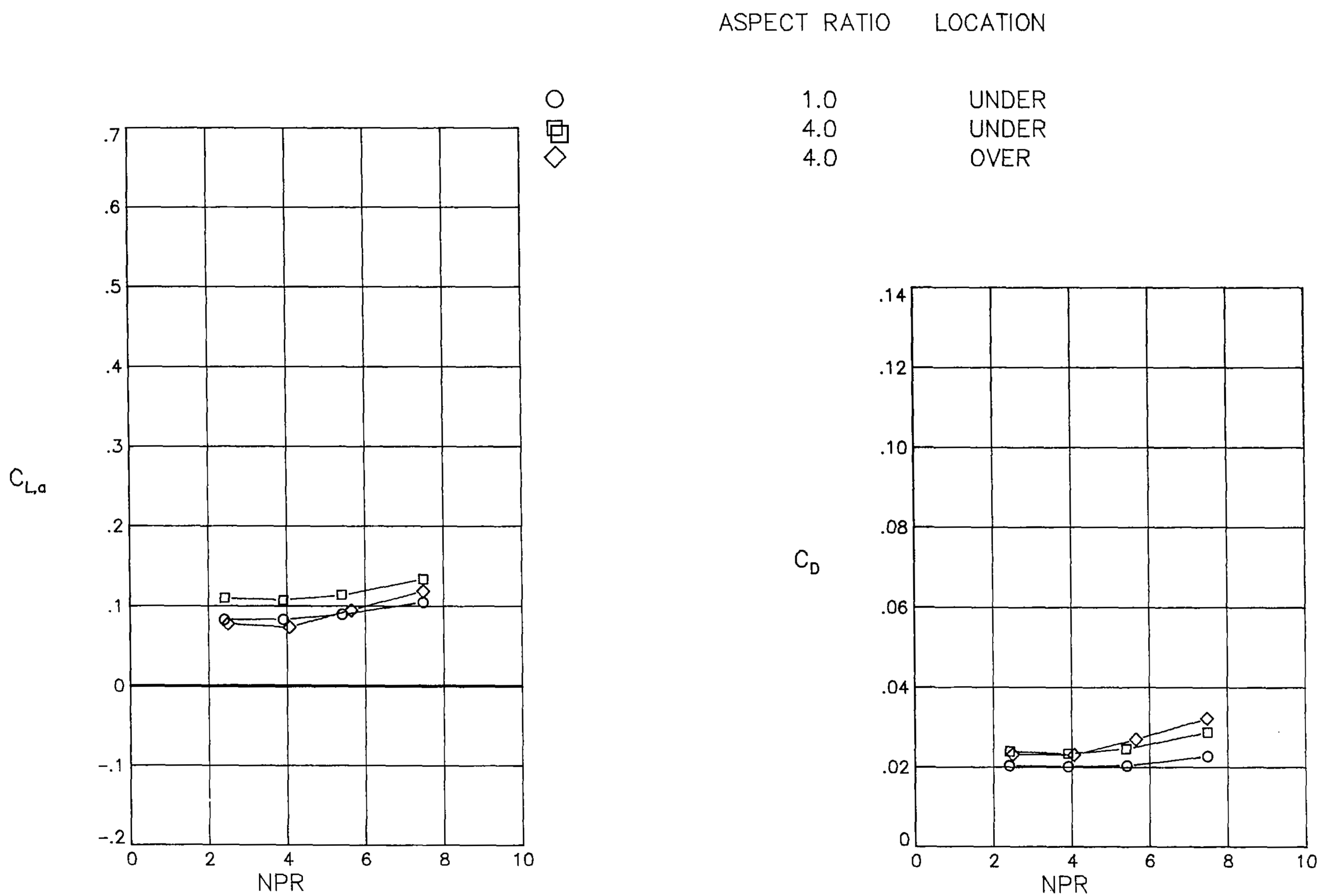
(c) $\delta_v = 30^{\circ}$.

Figure 76.- Concluded.



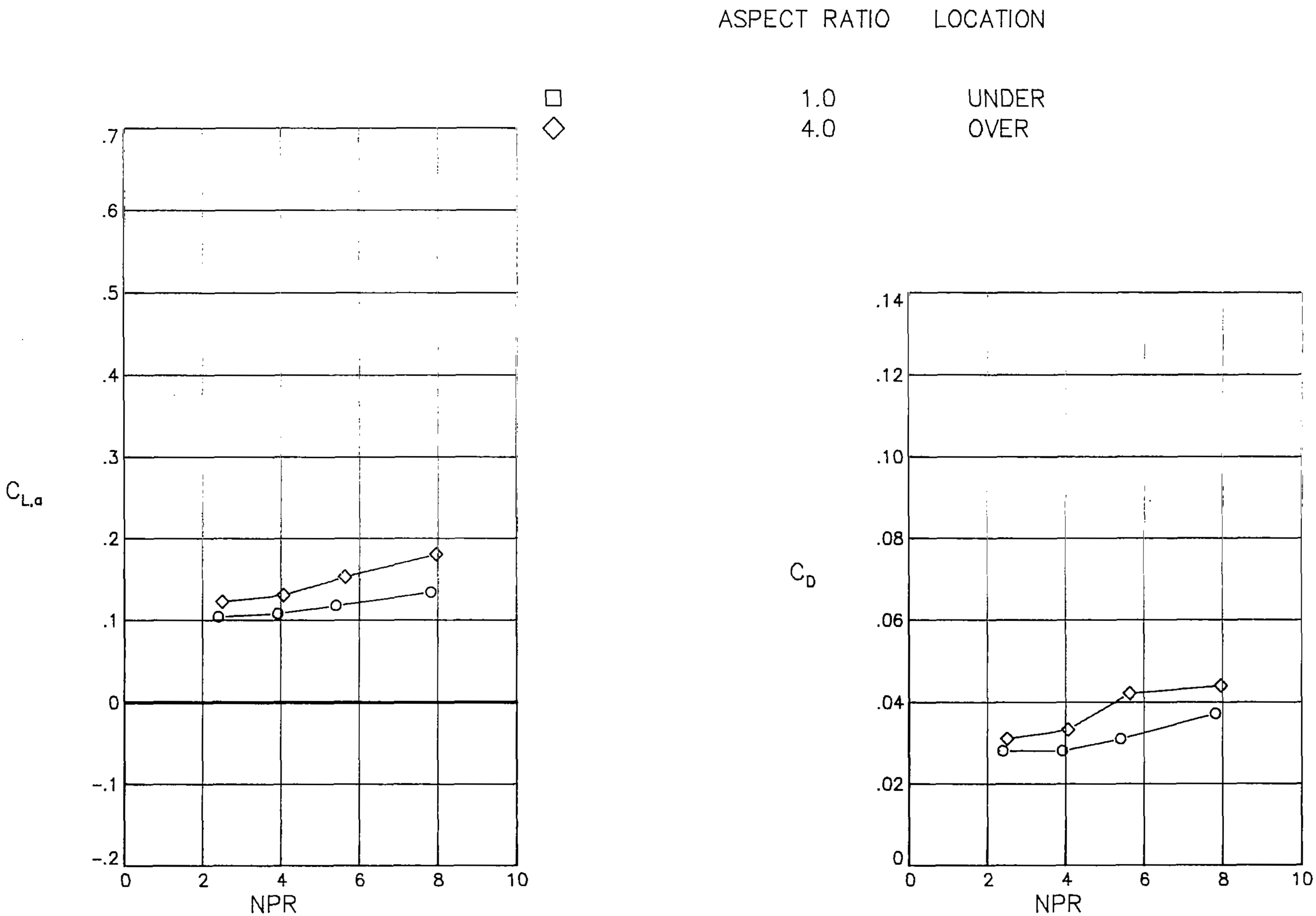
(a) $\delta_v = 0^{\circ}$.

Figure 77.- Effects of nozzle aspect ratio and vertical location on thrust-removed aerodynamic characteristics for I*M SERN. A/B power setting; $\delta_c = 0^{\circ}$; $M = 0.87$; $\alpha = 4^{\circ}$.



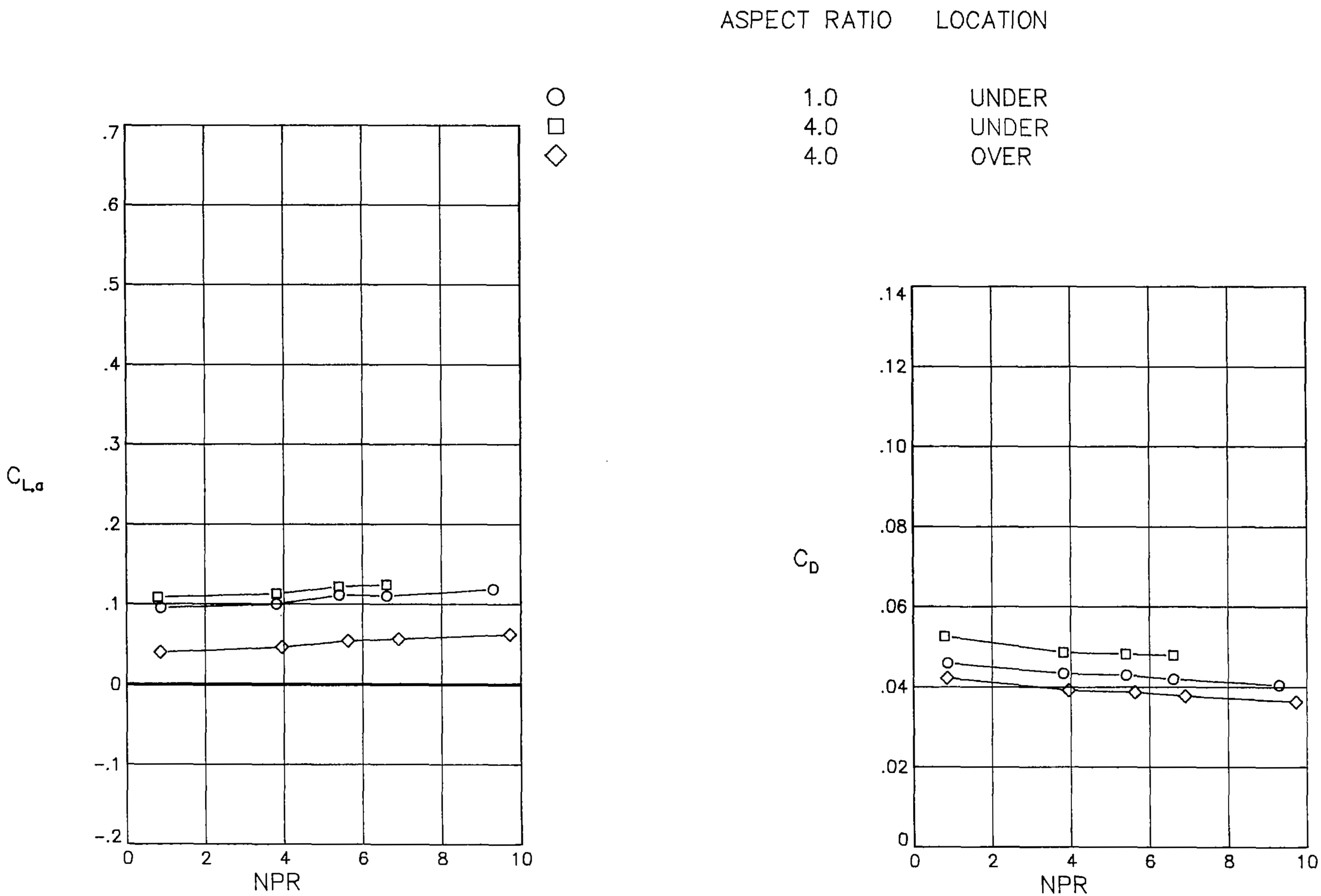
(b) $\delta_v = 15^\circ$.

Figure 77.- Continued.



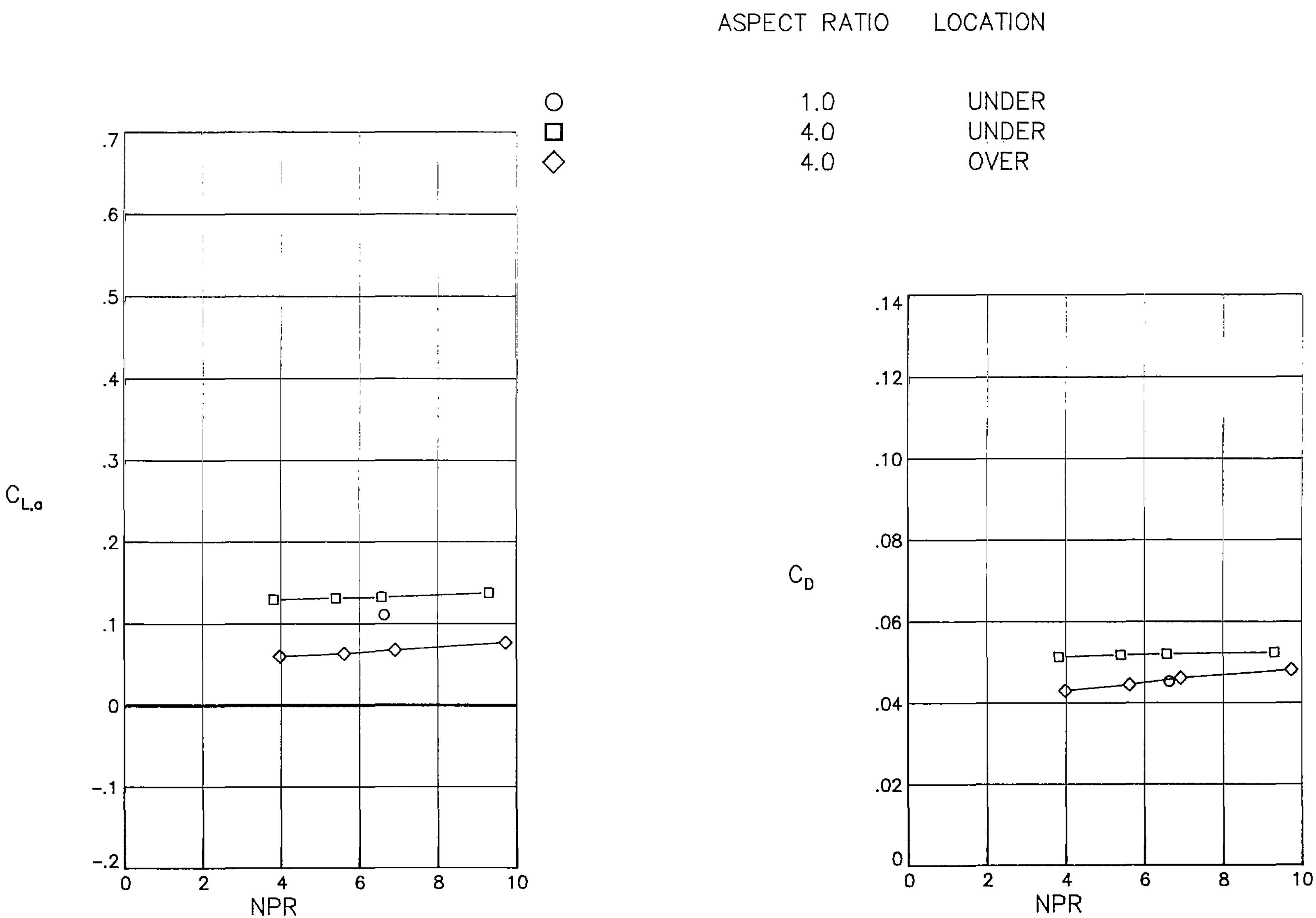
(c) $\delta_v = 30^{\circ}$.

Figure 77.- Concluded.



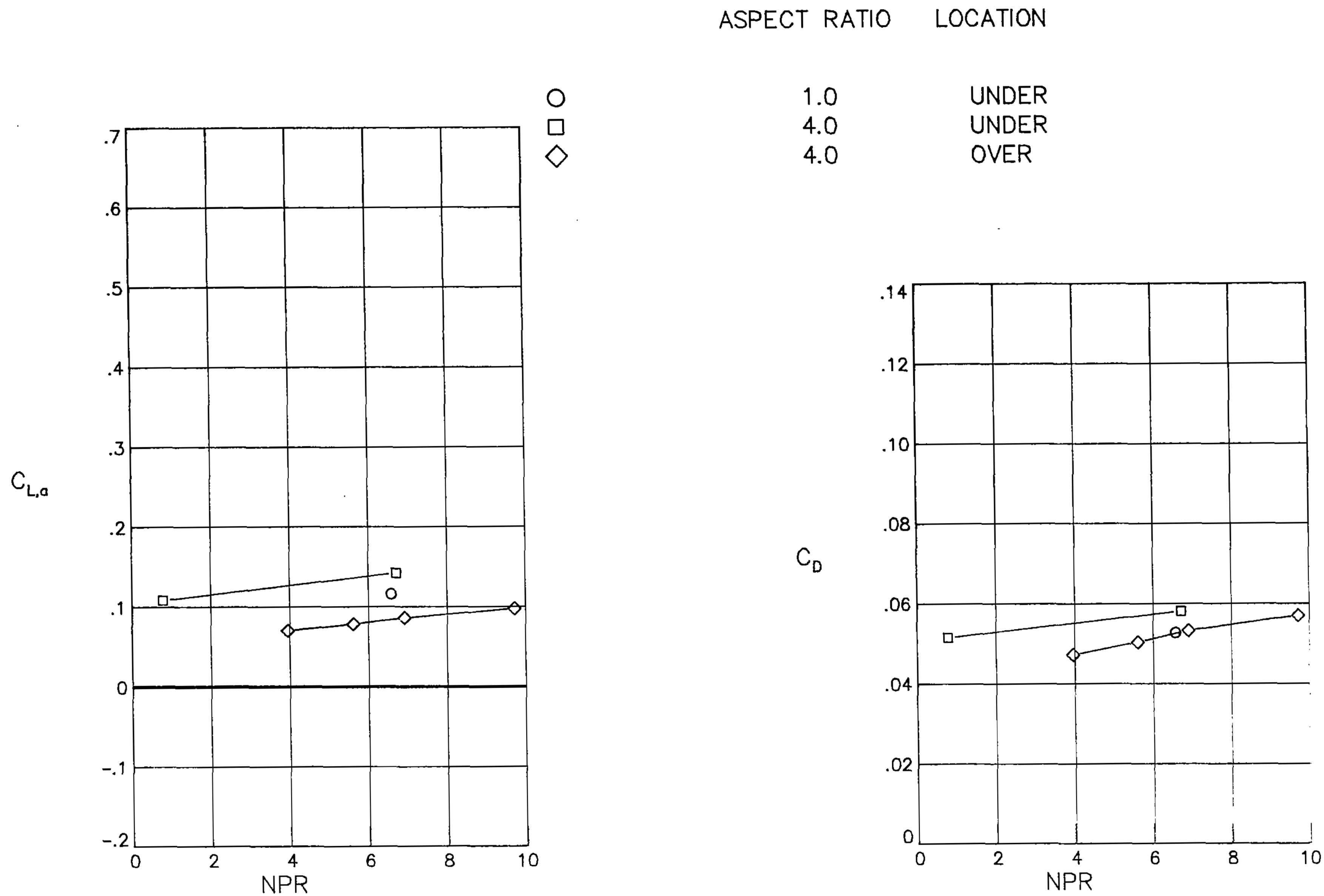
(a) $\delta_v = 0^{\circ}$.

Figure 78.- Effects of nozzle aspect ratio and vertical location on thrust-removed aerodynamic characteristics for I*M SERN. A/B power setting; $\delta_c = 0^{\circ}$; $M = 1.20$; $\alpha = 4^{\circ}$.



(b) $\delta_v = 15^{\circ}$.

Figure 78.- Continued.



(c) $\delta_v = 30^{\circ}$.

Figure 78.- Concluded.

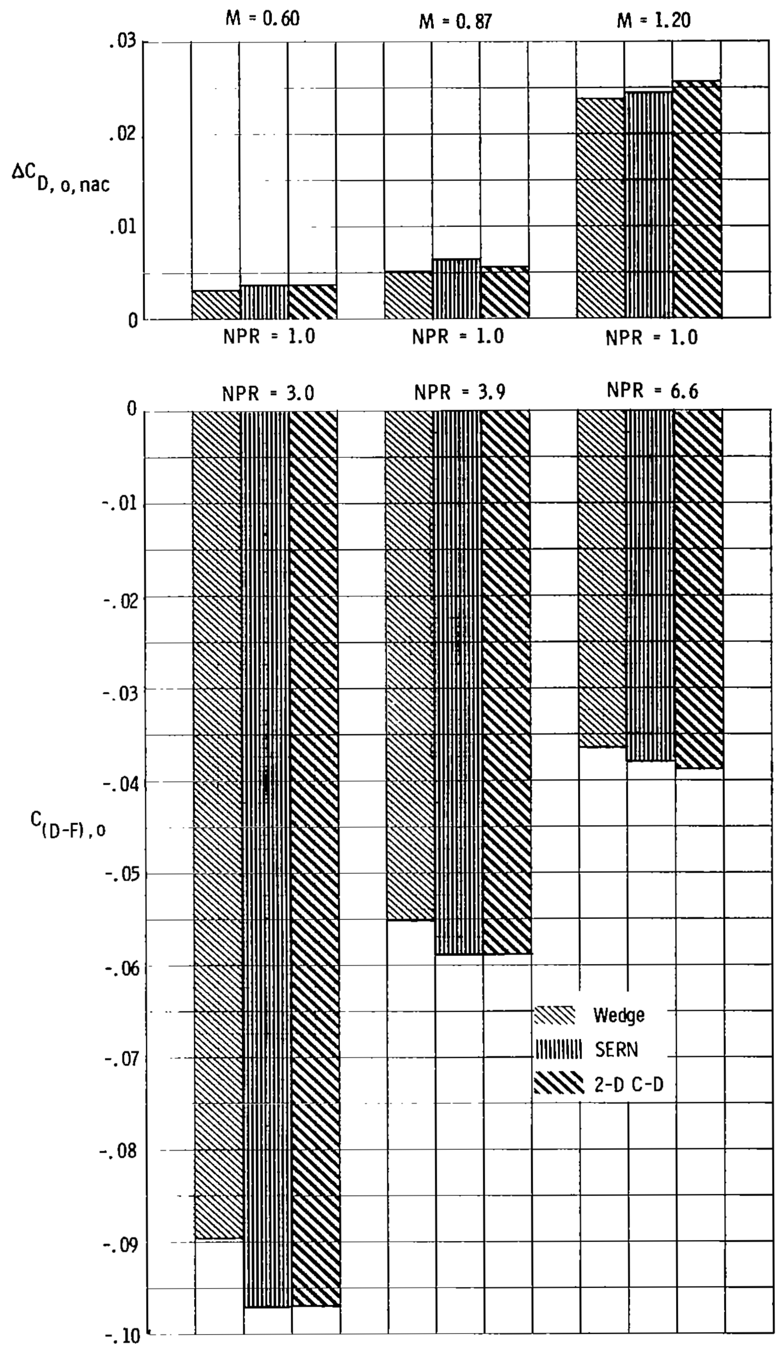


Figure 79.- Effects of nozzle type on nacelle incremental drag and drag-minus-thrust performance. IUM; AR = 1; A/B power setting; $\delta_v = 0^o$; $\delta_c = 0^o$; $C_L = 0$.

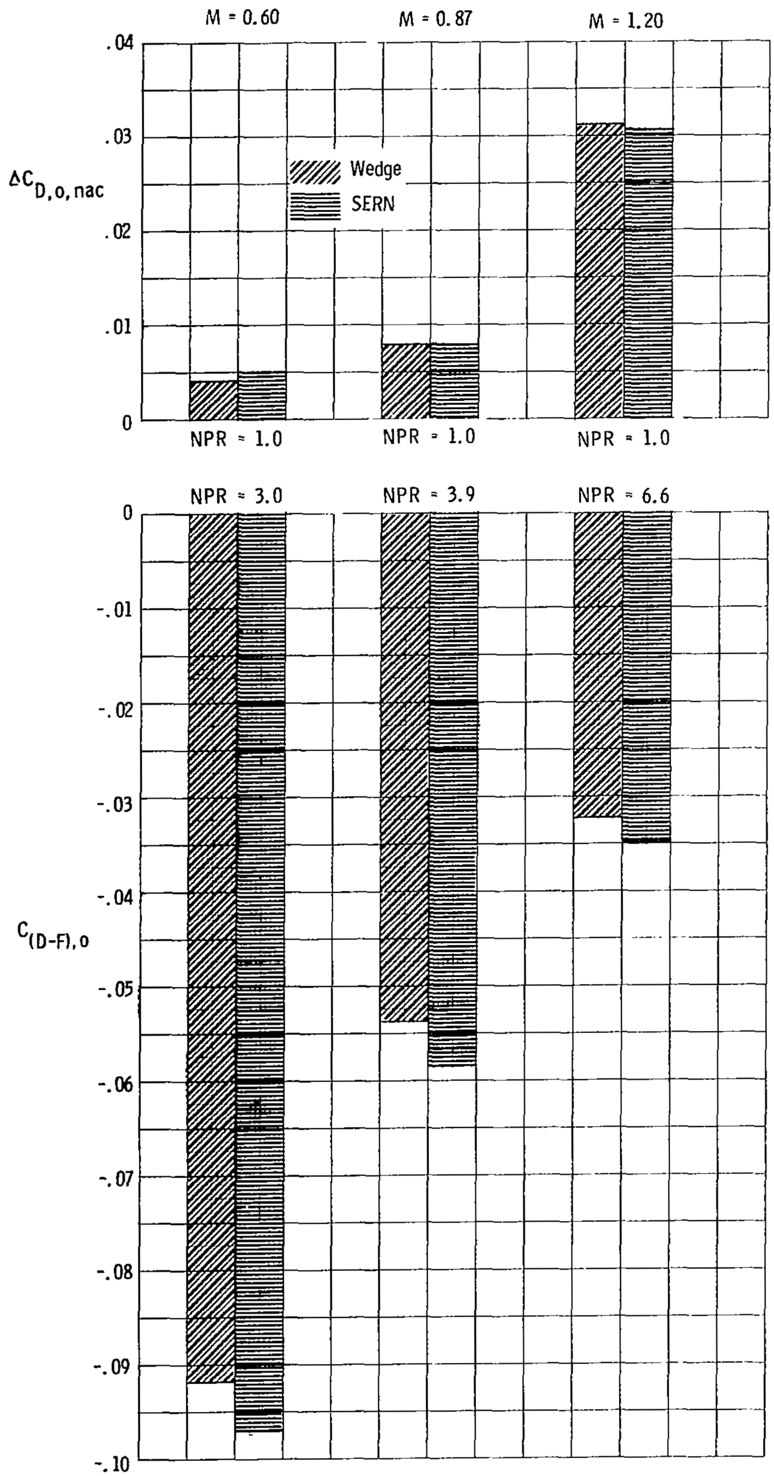


Figure 80.- Effects of nozzle type on nacelle incremental drag and drag-minus-thrust performance. IUM; AR = 4; A/B power setting; $\delta_v = 0^o$; $\delta_c = 0^o$; $C_L = 0$.

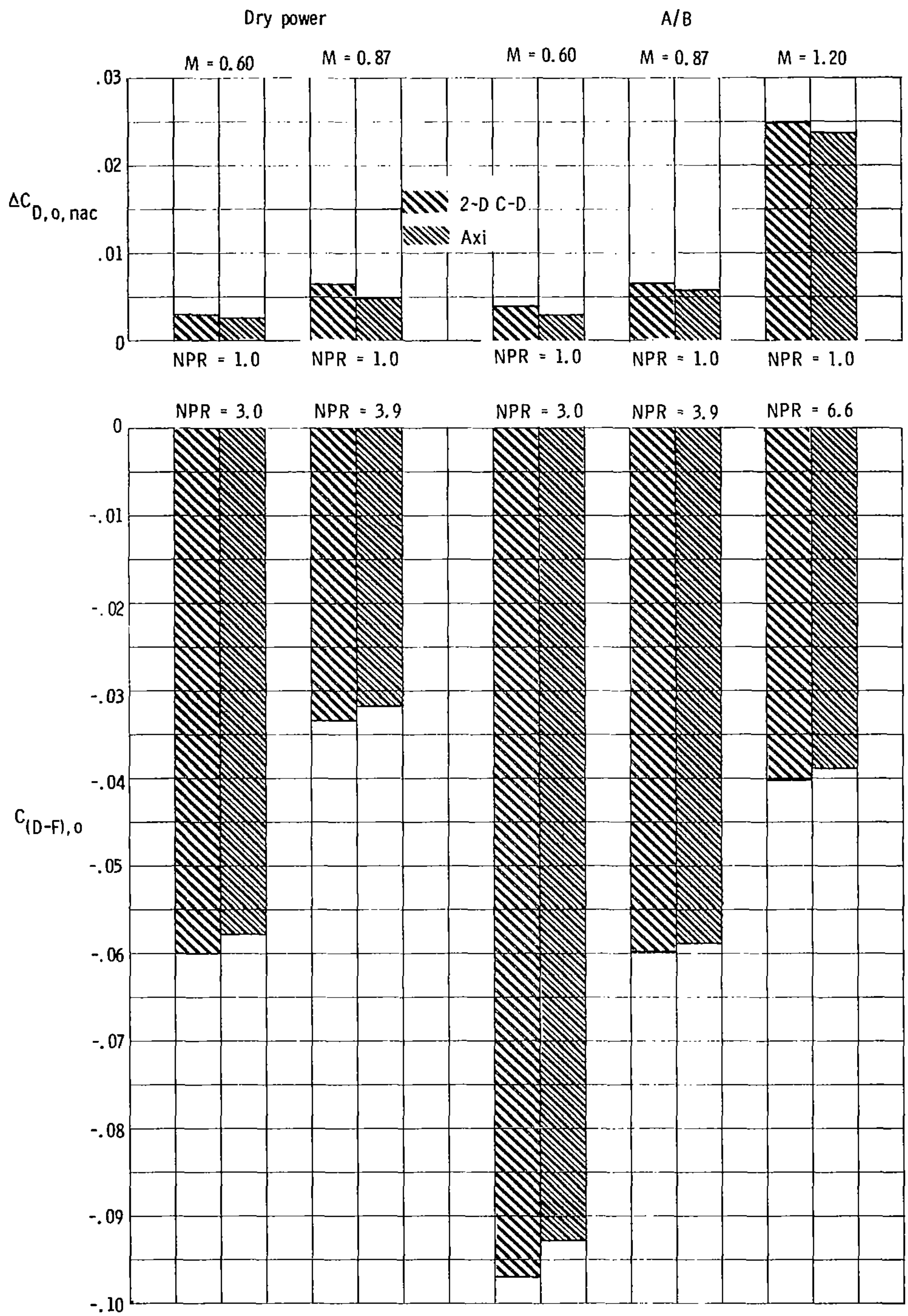


Figure 81.- Effects of nozzle type on nacelle incremental drag and drag-minus-thrust performance. IUA; AR = 1; $\delta_v = 0^o$; $\delta_c = 0^o$; $C_L = 0$.

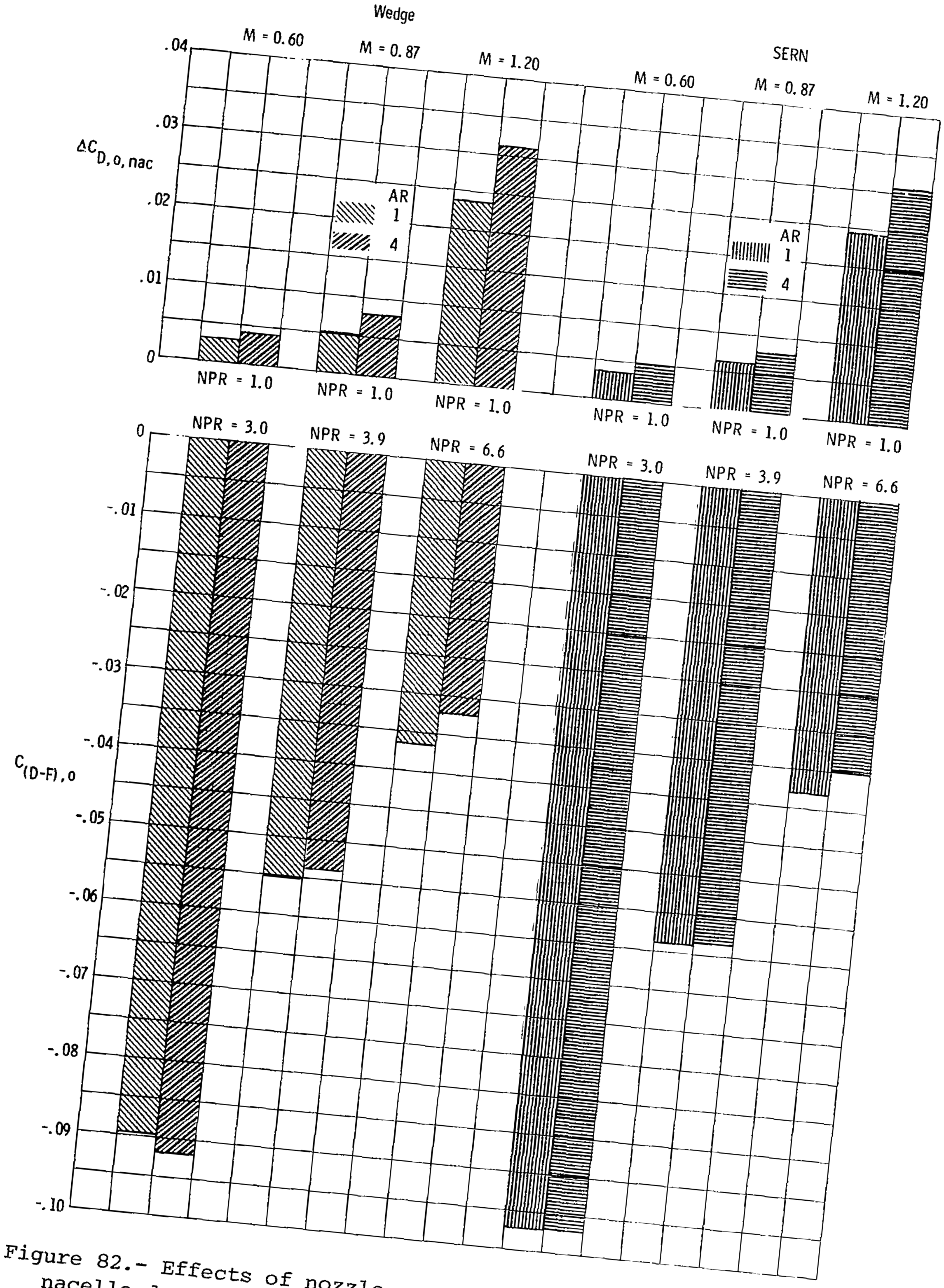


Figure 82.- Effects of nozzle aspect ratio on incremental nacelle drag and drag-minus-thrust performance. IUM; A/B power setting; $\delta_v = 0^o$; $\delta_c = 0^o$; $C_L = 0$.

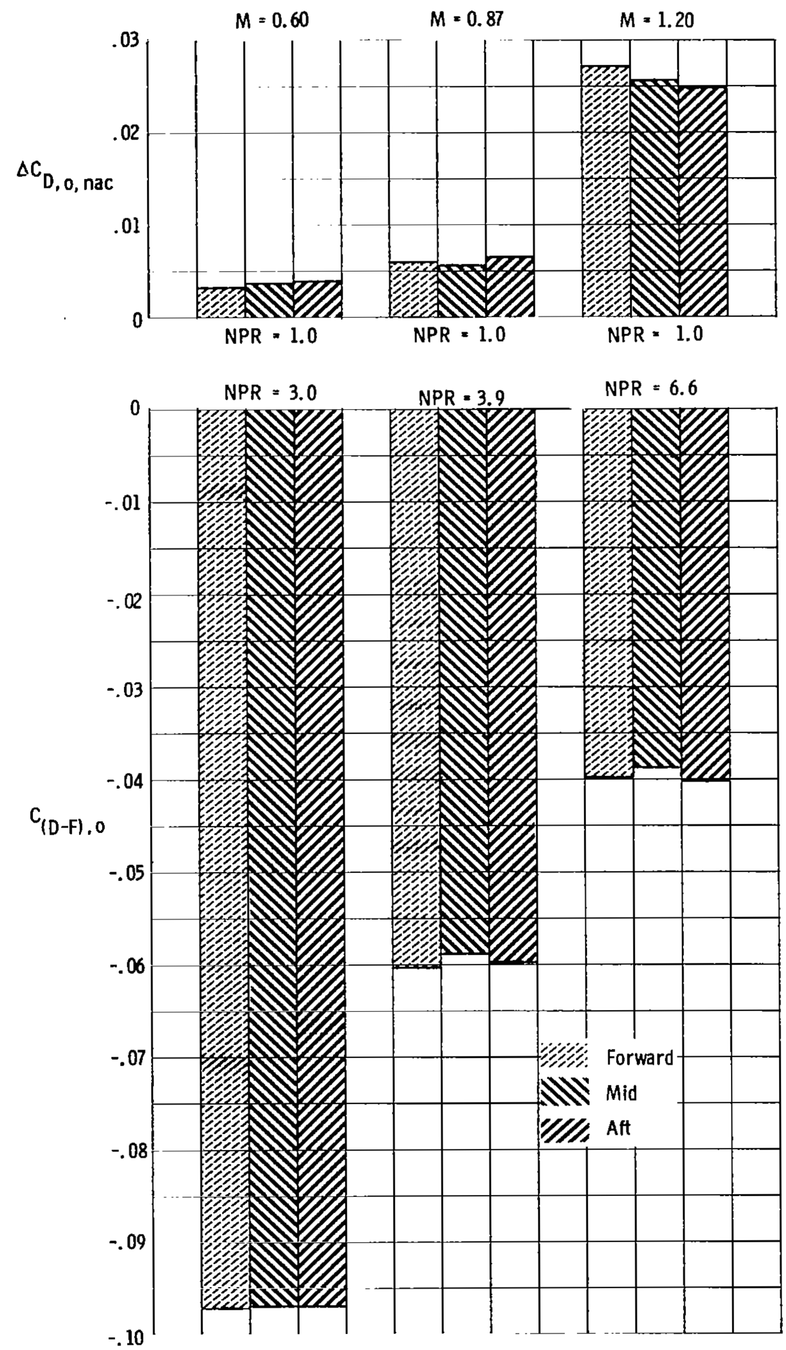


Figure 83.- Effects of nozzle exit location on incremental nacelle drag and drag-minus-thrust performance for IU* 2-D C-D nozzle. AR = 1; A/B power setting; $\delta_c = 0^o$; $\delta_c = 0^o$; $C_L = 0$.

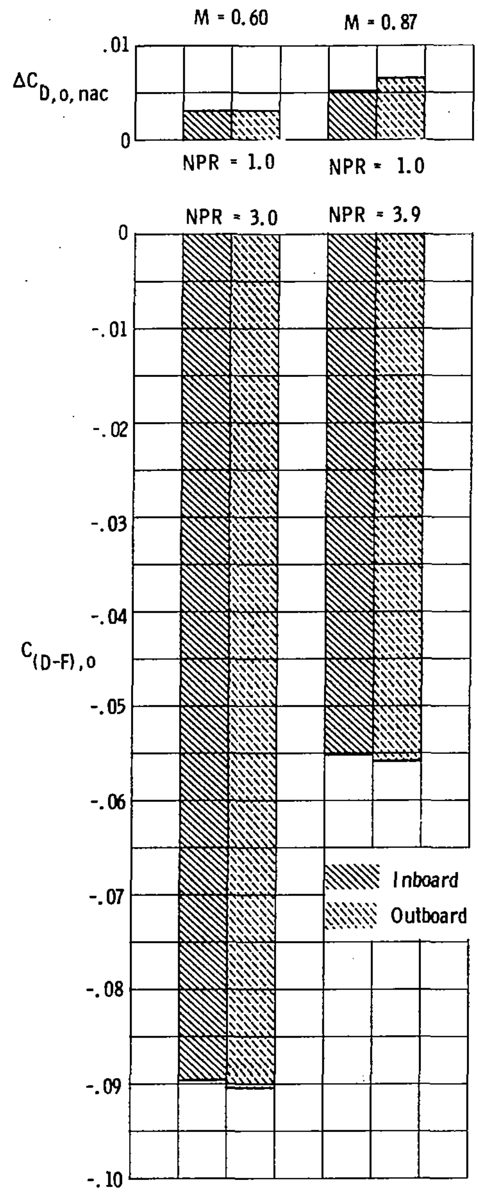


Figure 84.- Effects of nacelle spanwise location on incremental nacelle drag and drag-minus-thrust performance for *UM wedge nozzle. AR = 1; A/B power setting; $\delta_v = 0^o$; $\delta_c = 0^o$; $C_L = 0$.

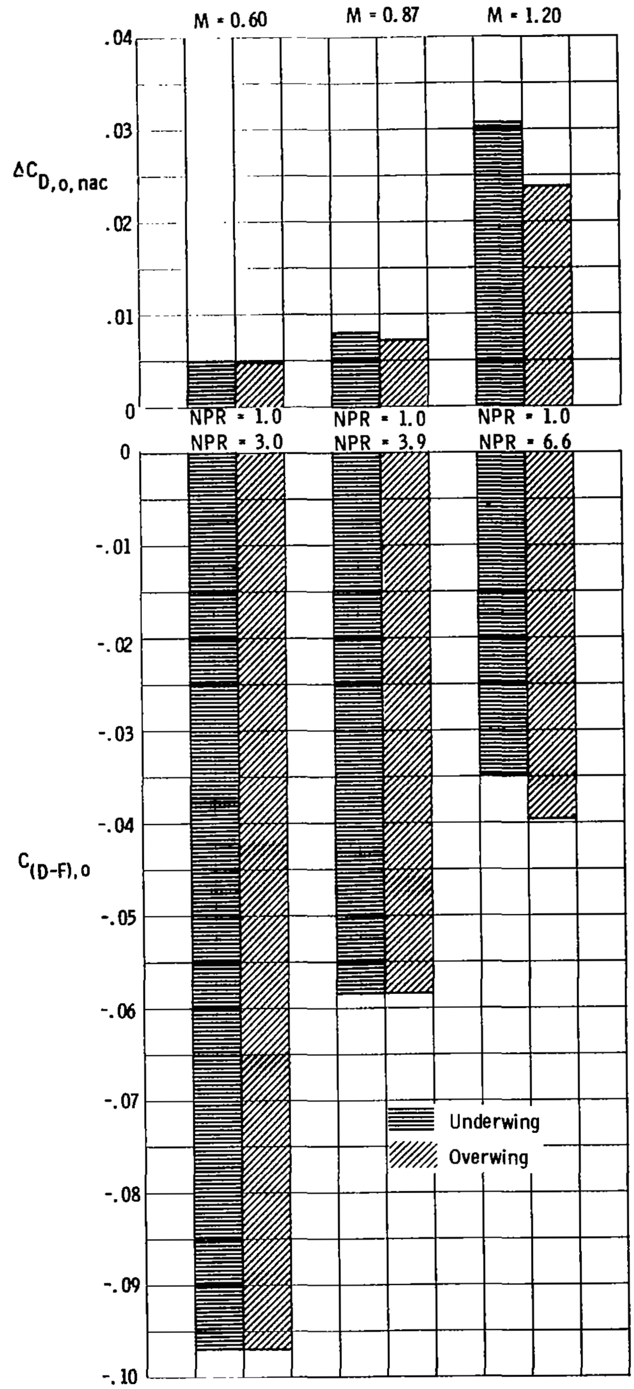
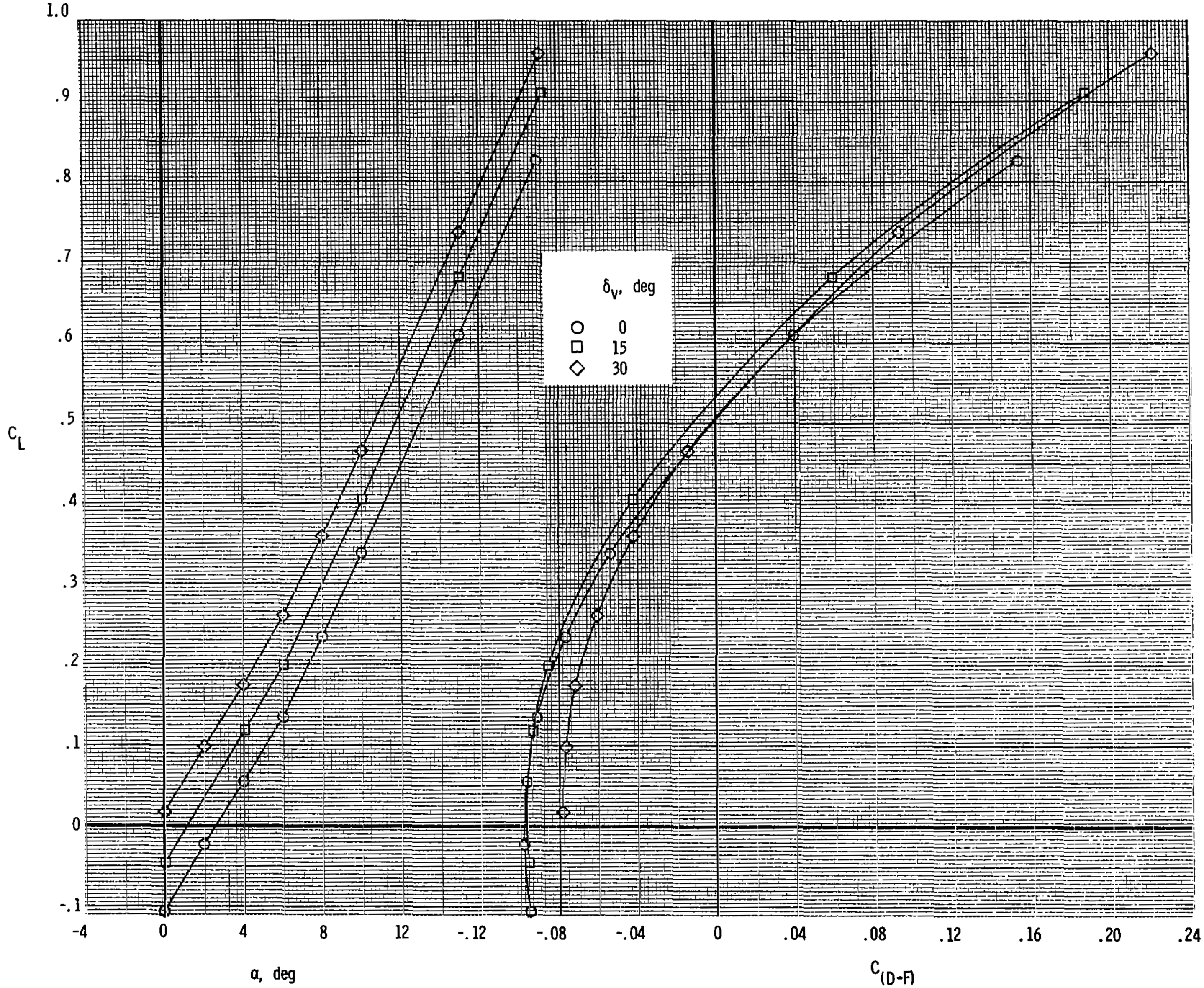
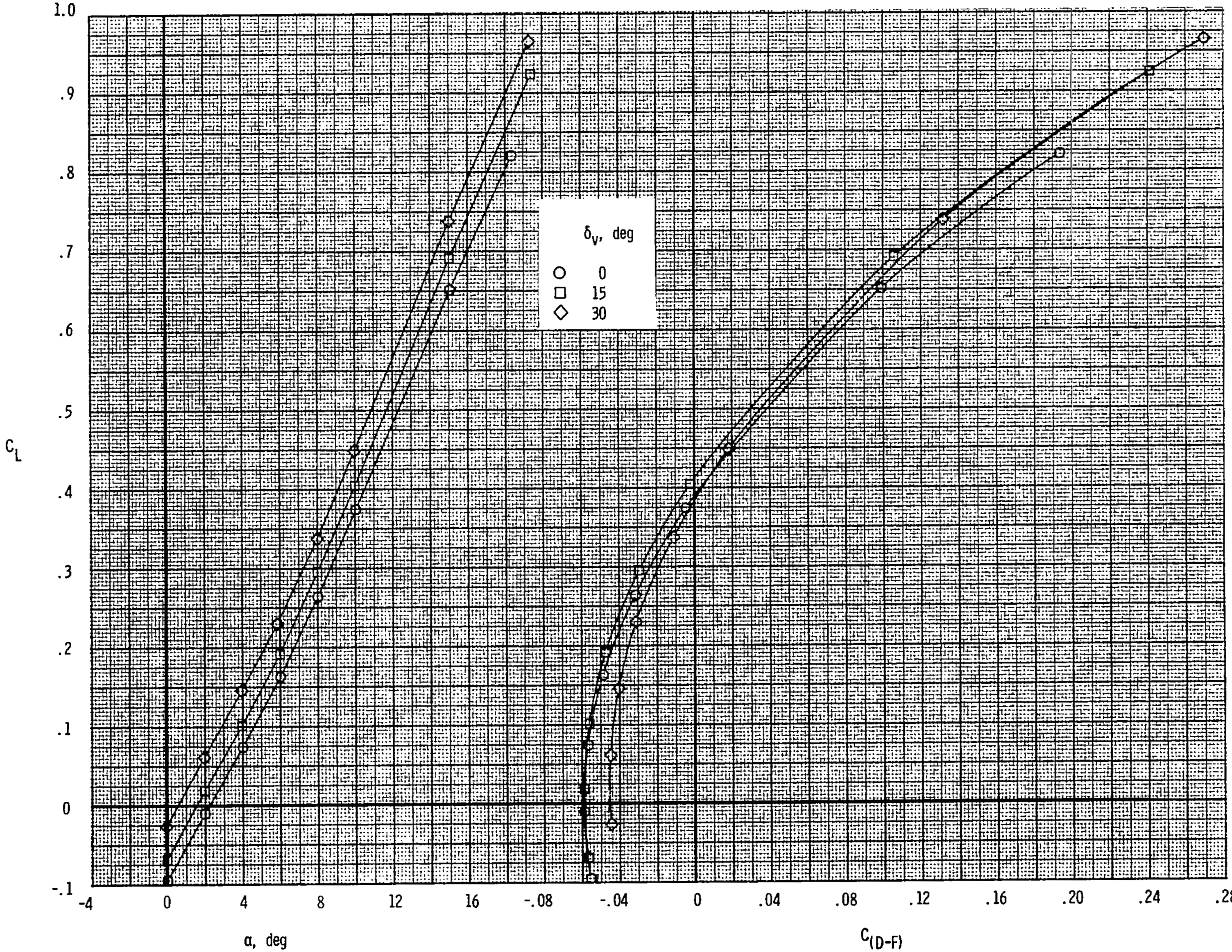


Figure 85.- Effects of nacelle vertical location on incremental nacelle drag and drag-minus-thrust performance for I*M SERN. AR = 4; A/B power setting; $\delta_v = 0^o$; $\delta_c = 0^o$; $C_L = 0$.



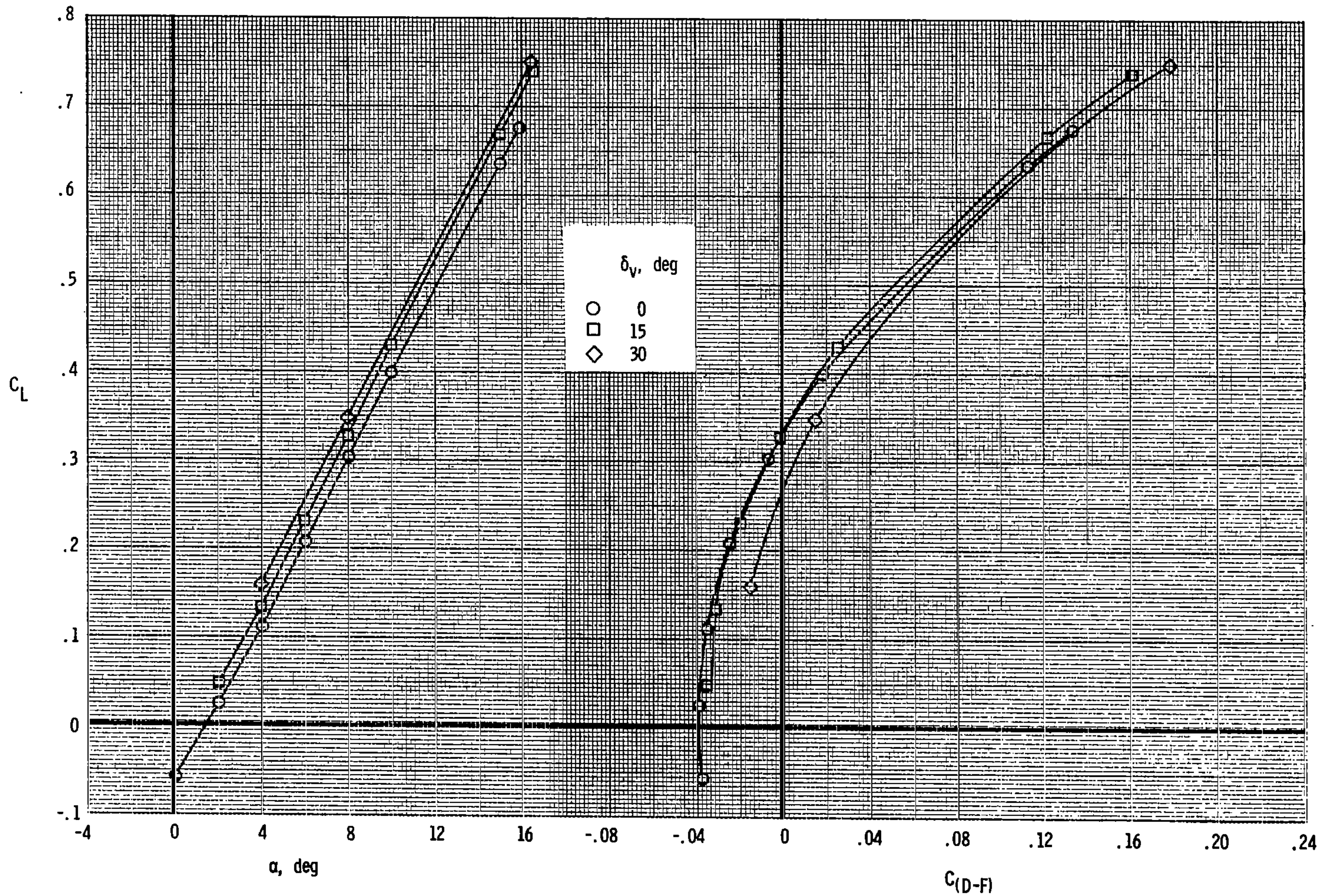
(a) M = 0.60; NPR = 3.0.

Figure 86.- Effects of thrust-vectoring angle on total aerodynamic characteristics for IUM SERN. AR = 1; A/B power setting; $\delta_c = 0^\circ$.



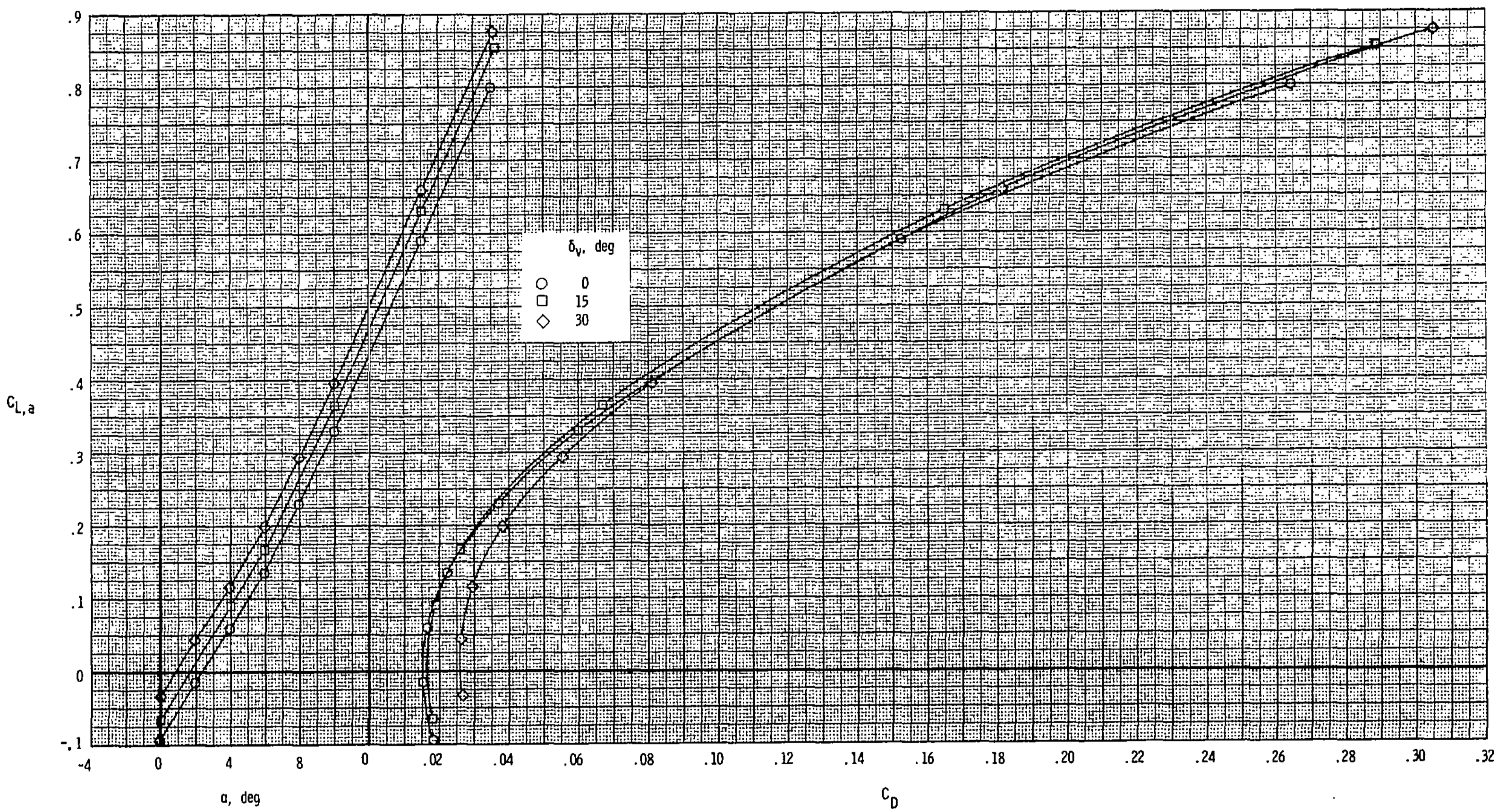
(b) M = 0.87; NPR = 3.9.

Figure 86.- Continued.



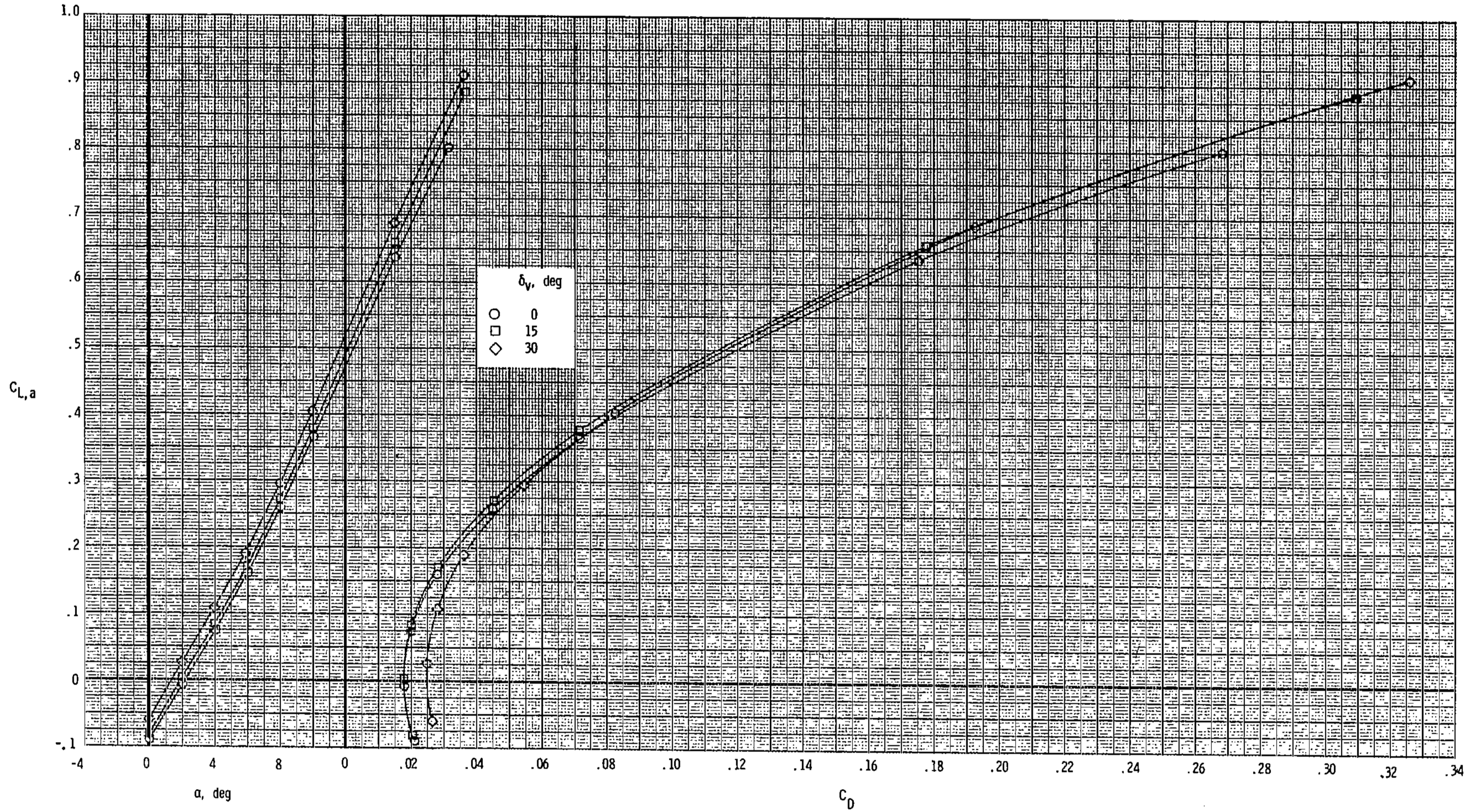
(c) M = 1.20; NPR = 6.6.

Figure 86.- Concluded.



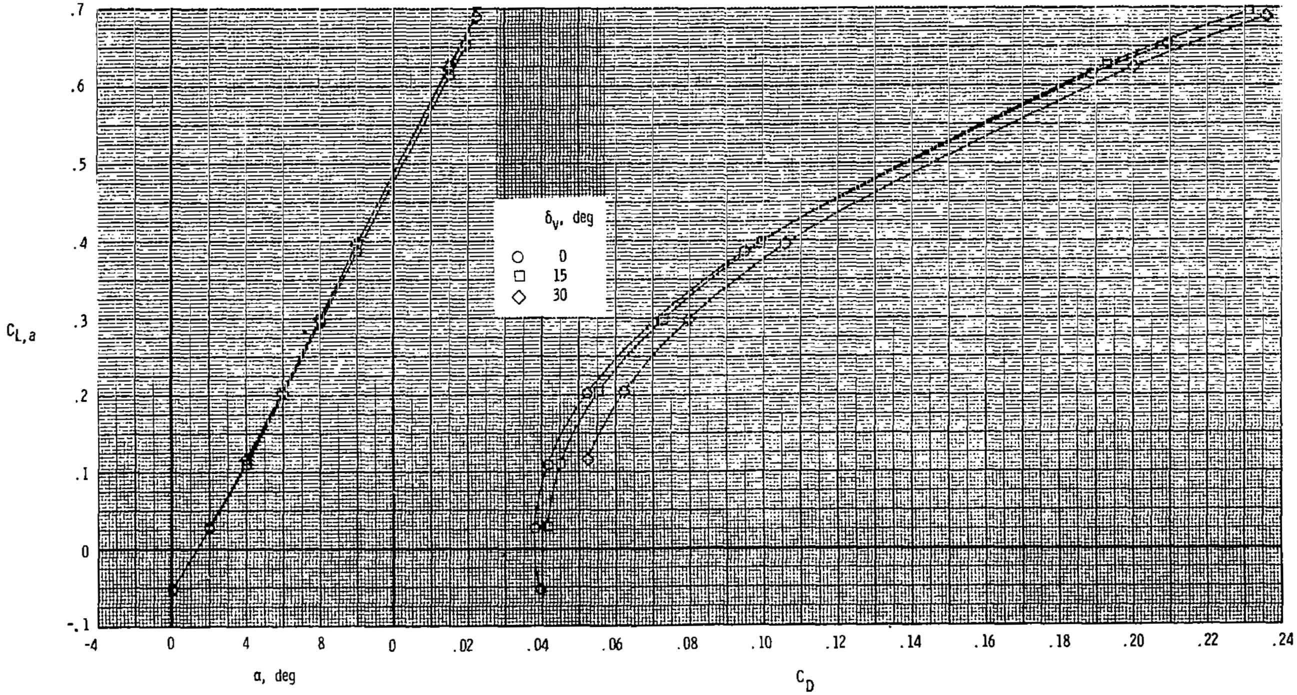
(a) M = 0.60; NPR = 3.0.

Figure 87.- Effects of thrust-vectoring angle on thrust-removed aerodynamic characteristics for IUM SERN. AR = 1; A/B power setting; $\delta_c = 0^{\circ}$.



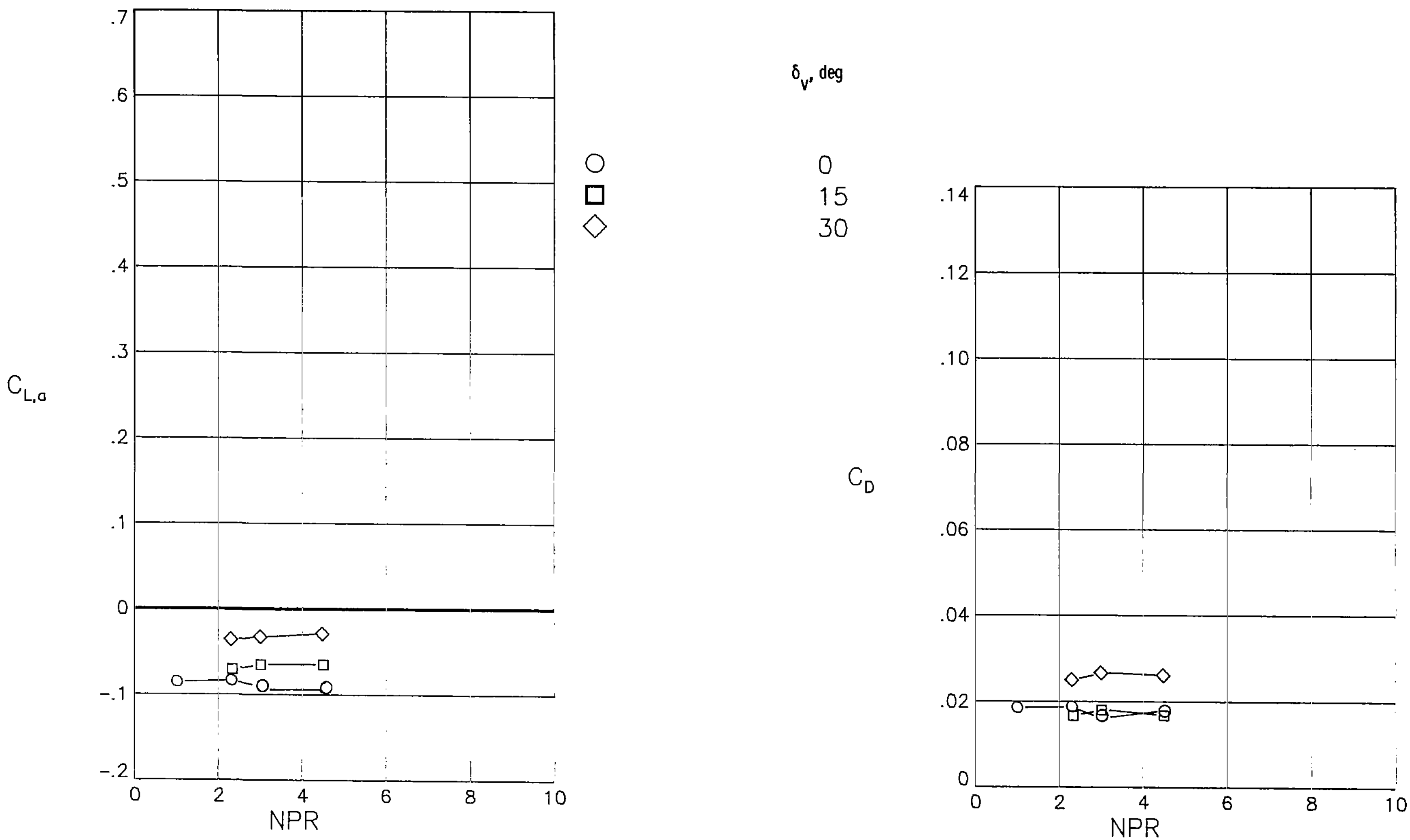
(b) M = 0.87; NPR = 3.9.

Figure 87.- Continued.



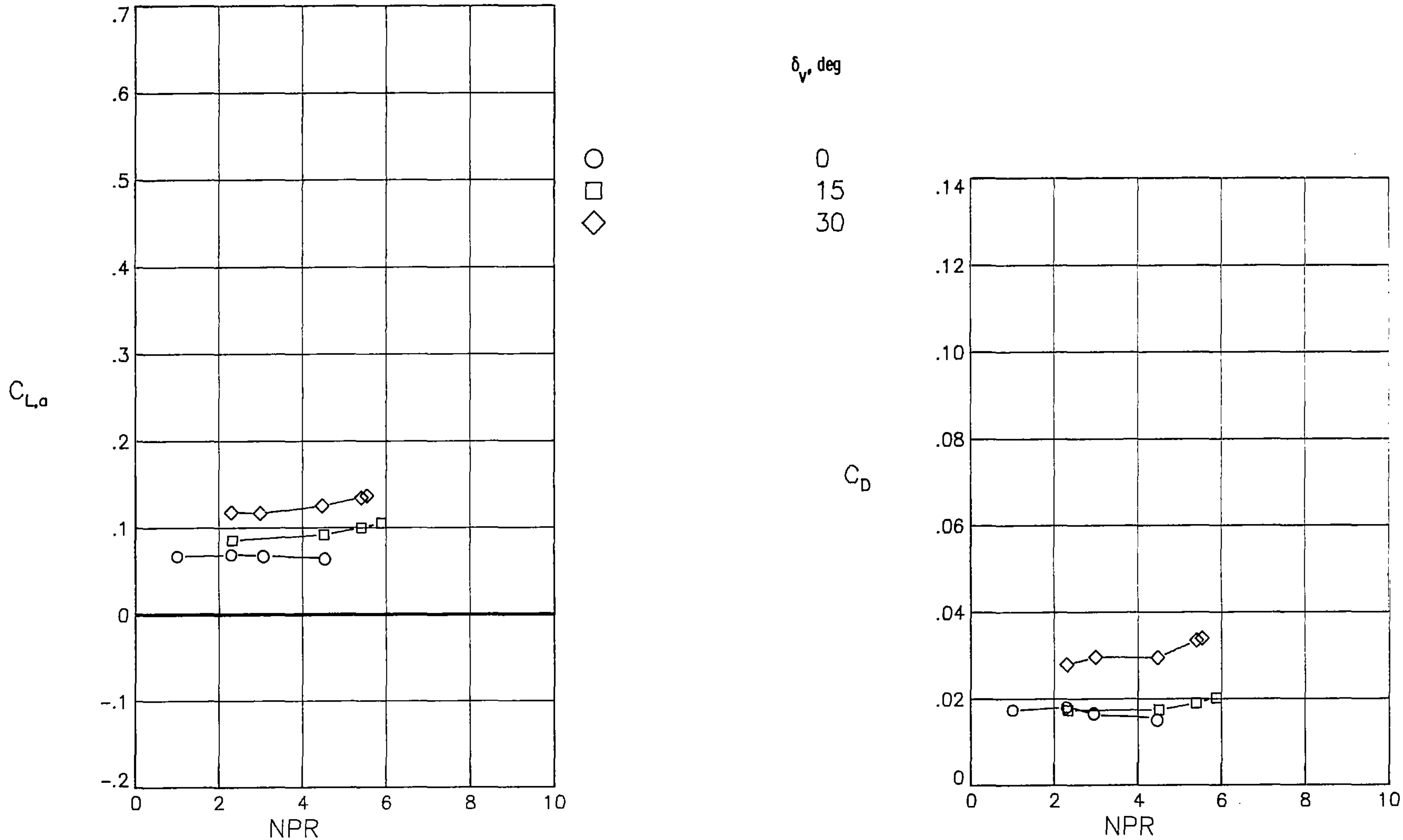
(c) M = 1.20; NPR ≈ 6.6.

Figure 87.- Concluded.



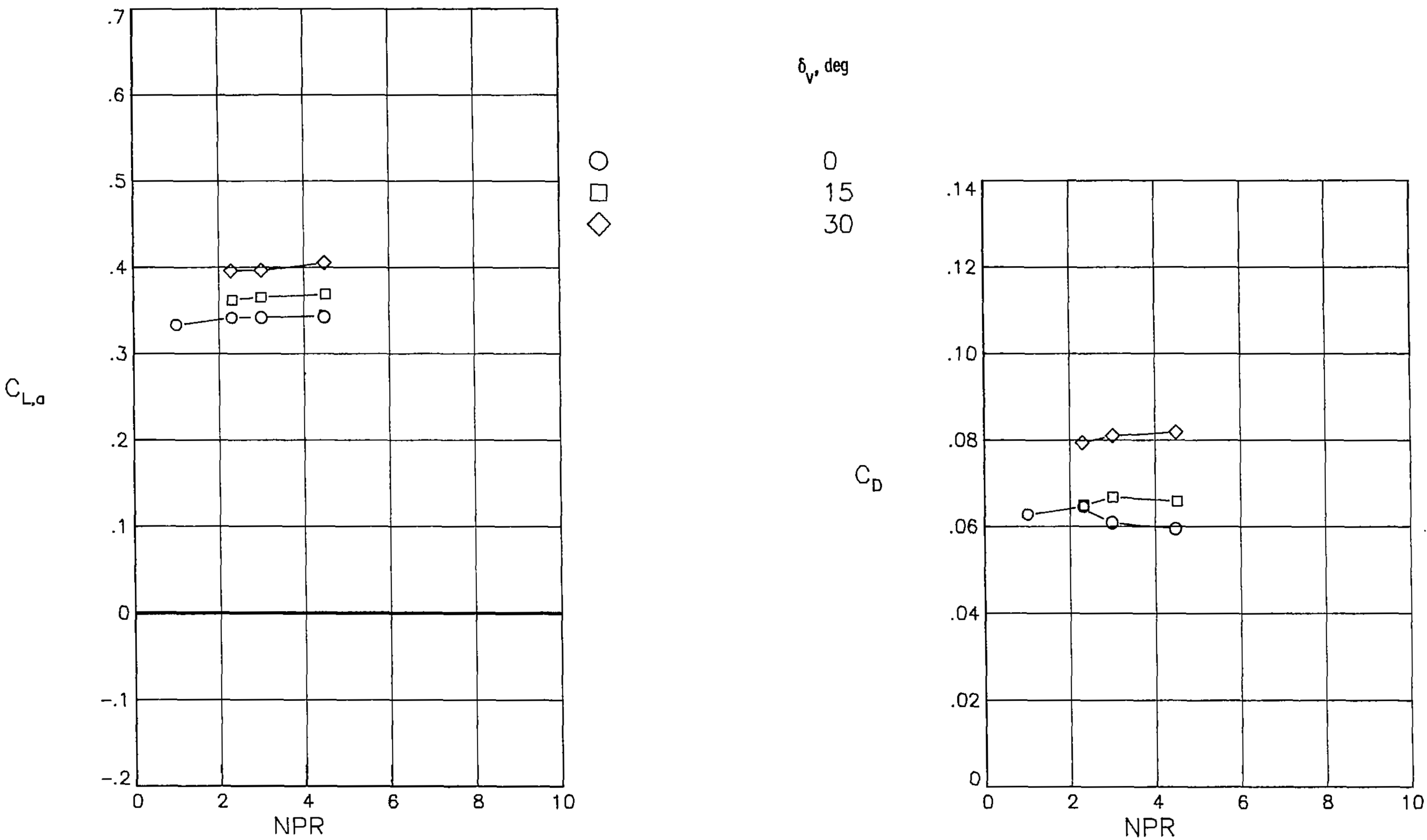
(a) $\alpha = 0^{\circ}$.

Figure 88.- Effects of thrust-vectoring angle on thrust-removed aerodynamic characteristics for IUM SERN. AR = 1; A/B power setting; $\delta_c = 0^{\circ}$; M = 0.60.



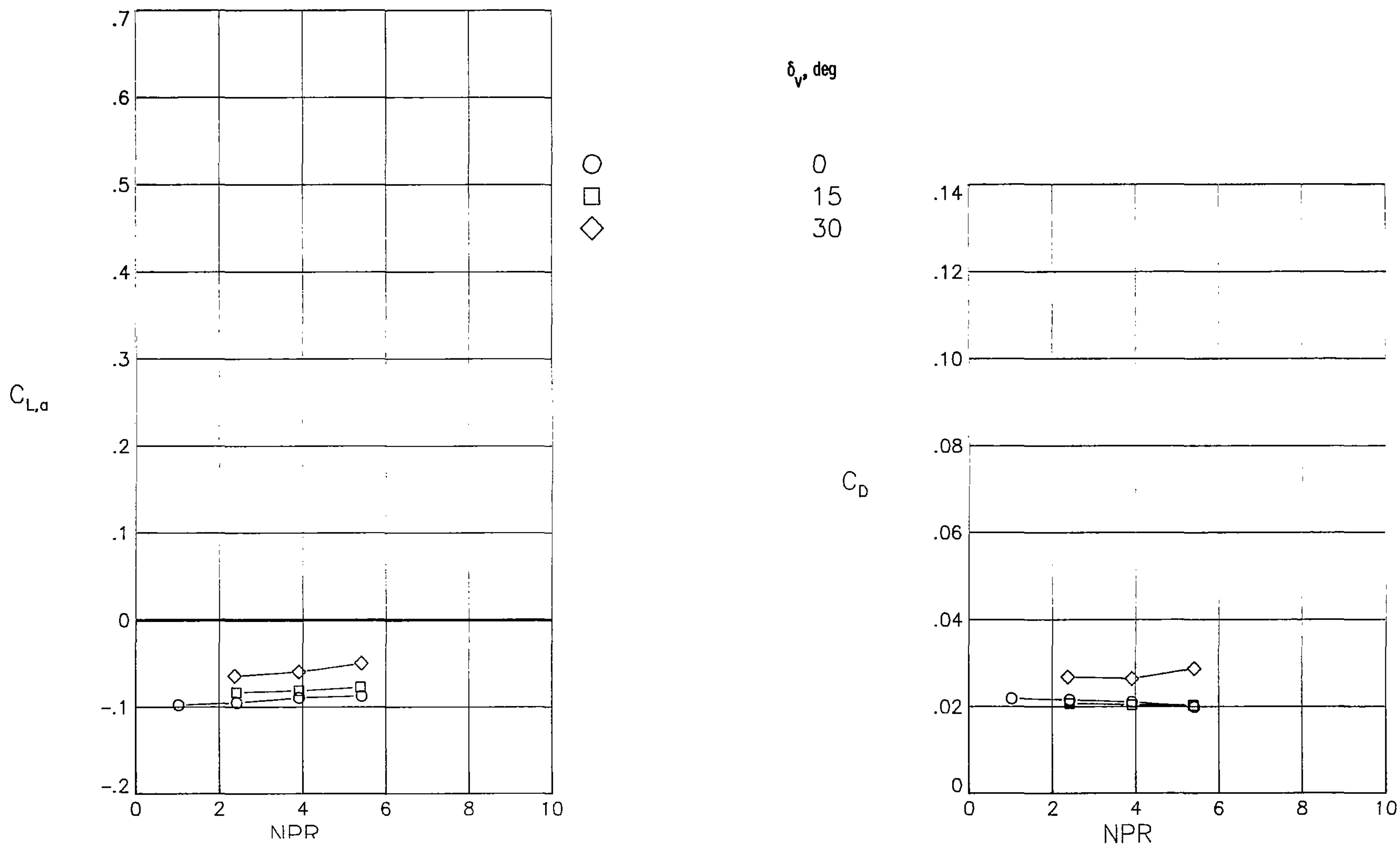
(b) $\alpha = 4^{o}$.

Figure 88.- Continued.



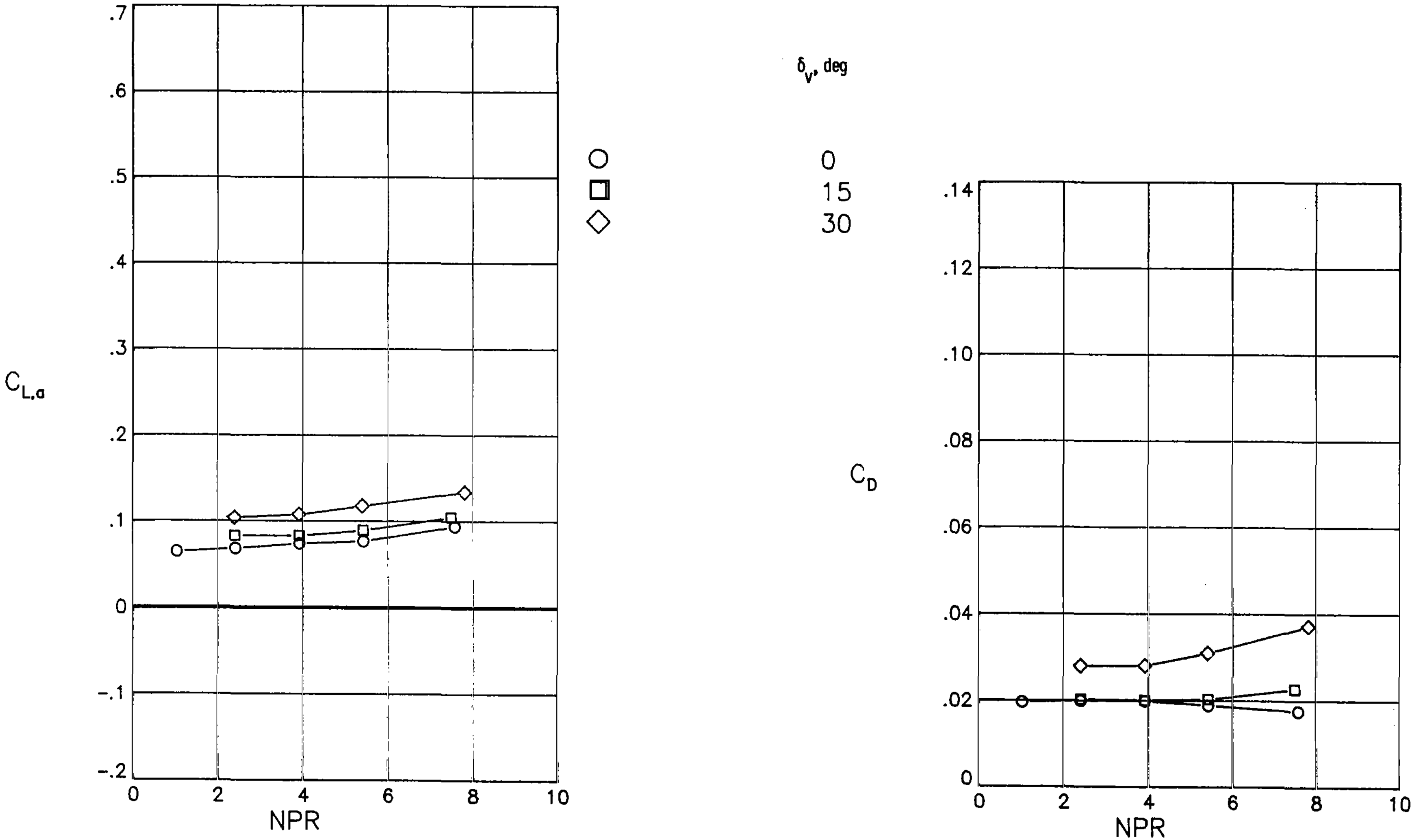
(c) $\alpha = 10^{\circ}$.

Figure 88.- Concluded.



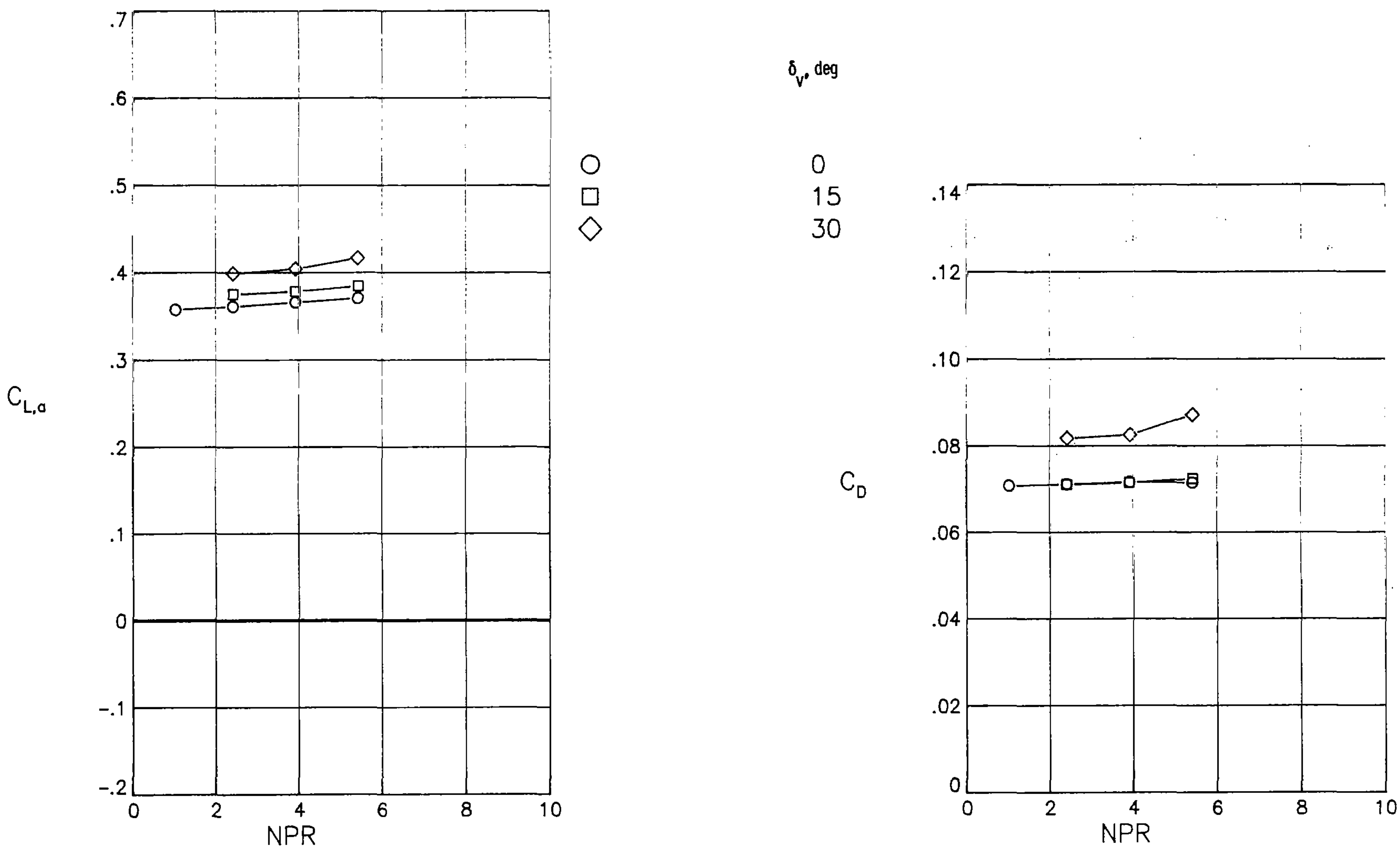
(a) $\alpha = 0^{\circ}$.

Figure 89.- Effects of thrust-vectoring angle on thrust-removed aerodynamic characteristics for IUM SERN. AR = 1; A/B power setting; $\delta_c = 0^{\circ}$; M = 0.87.



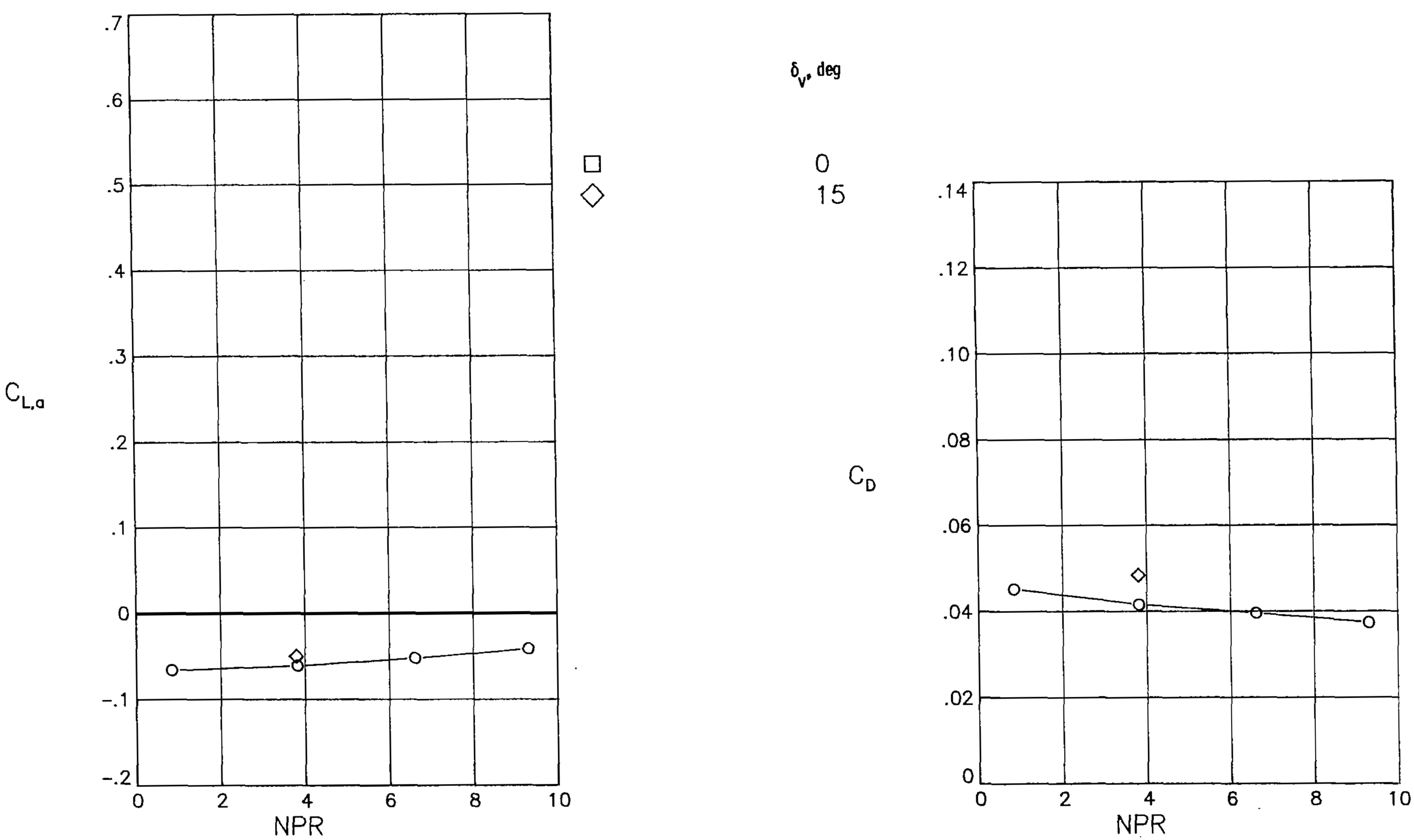
(b) $\alpha = 4^{\circ}$.

Figure 89.- Continued.



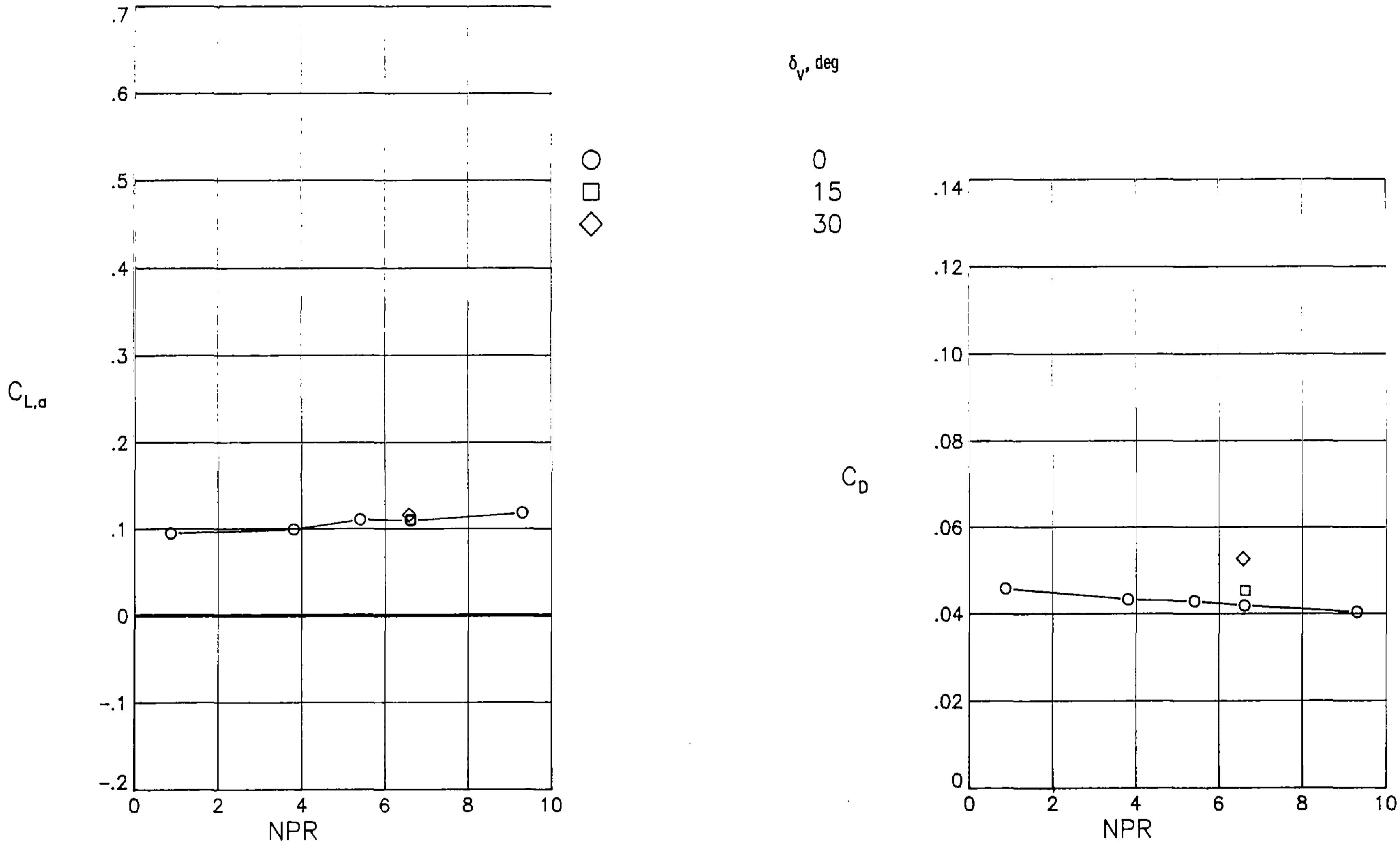
(c) $\alpha = 10^{\circ}$.

Figure 89.- Concluded.



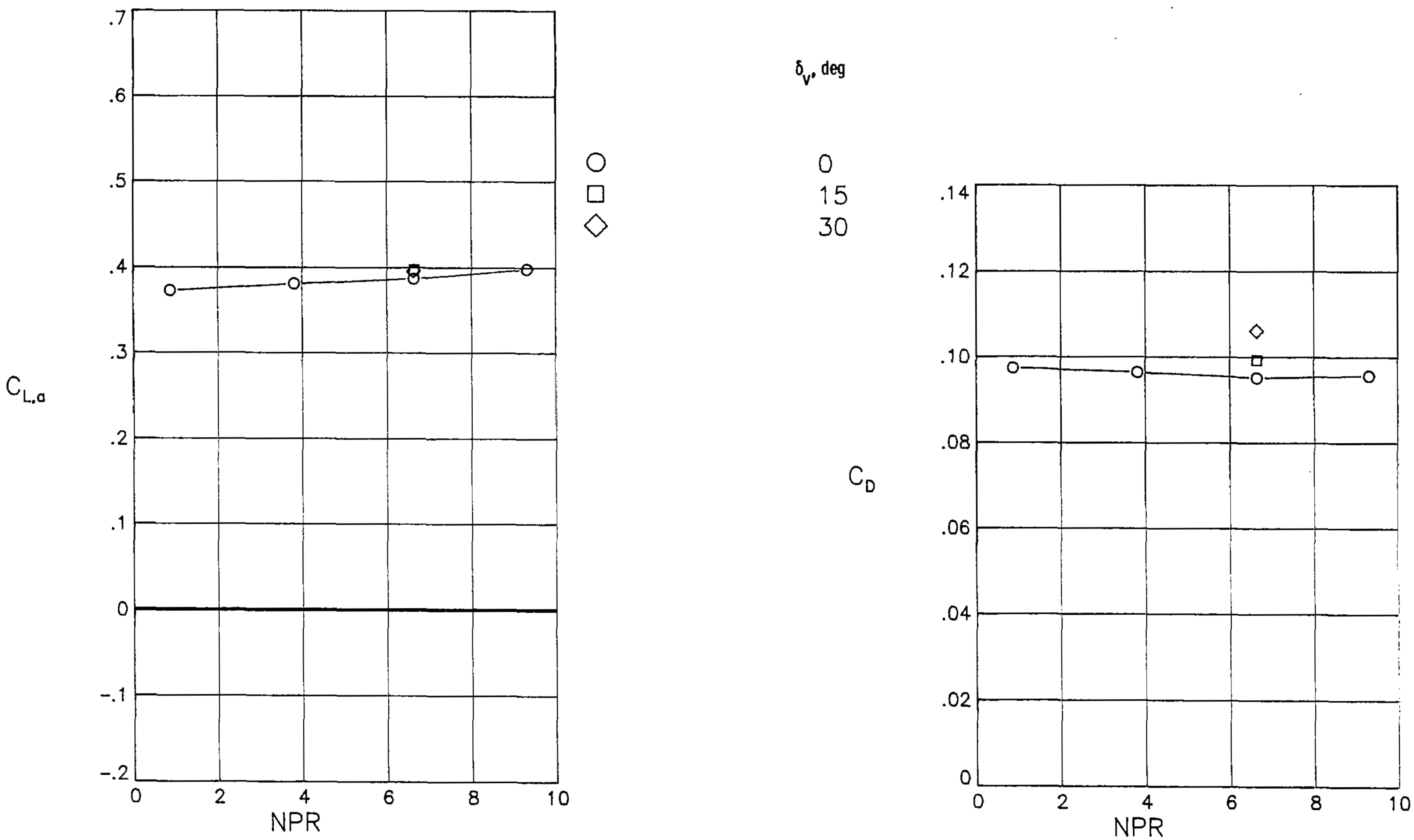
(a) $\alpha = 0^{\circ}$.

Figure 90.- Effects of thrust-vectoring angle on thrust-removed aerodynamic characteristics for IUM SERN. AR = 1; A/B power setting; $\delta_c = 0^{\circ}$; M = 1.20.



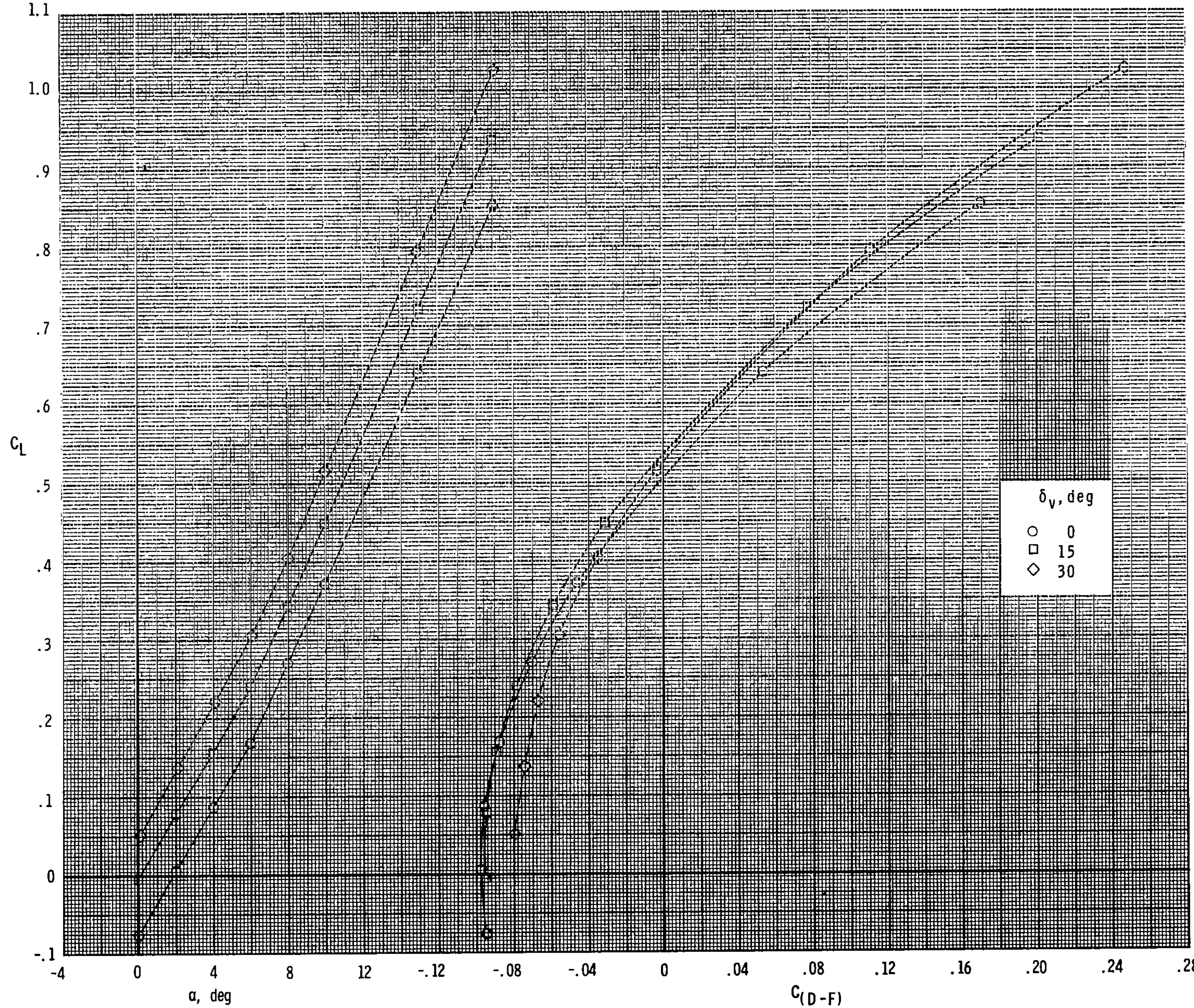
(b) $\alpha = 4^{\circ}$.

Figure 90.- Continued.



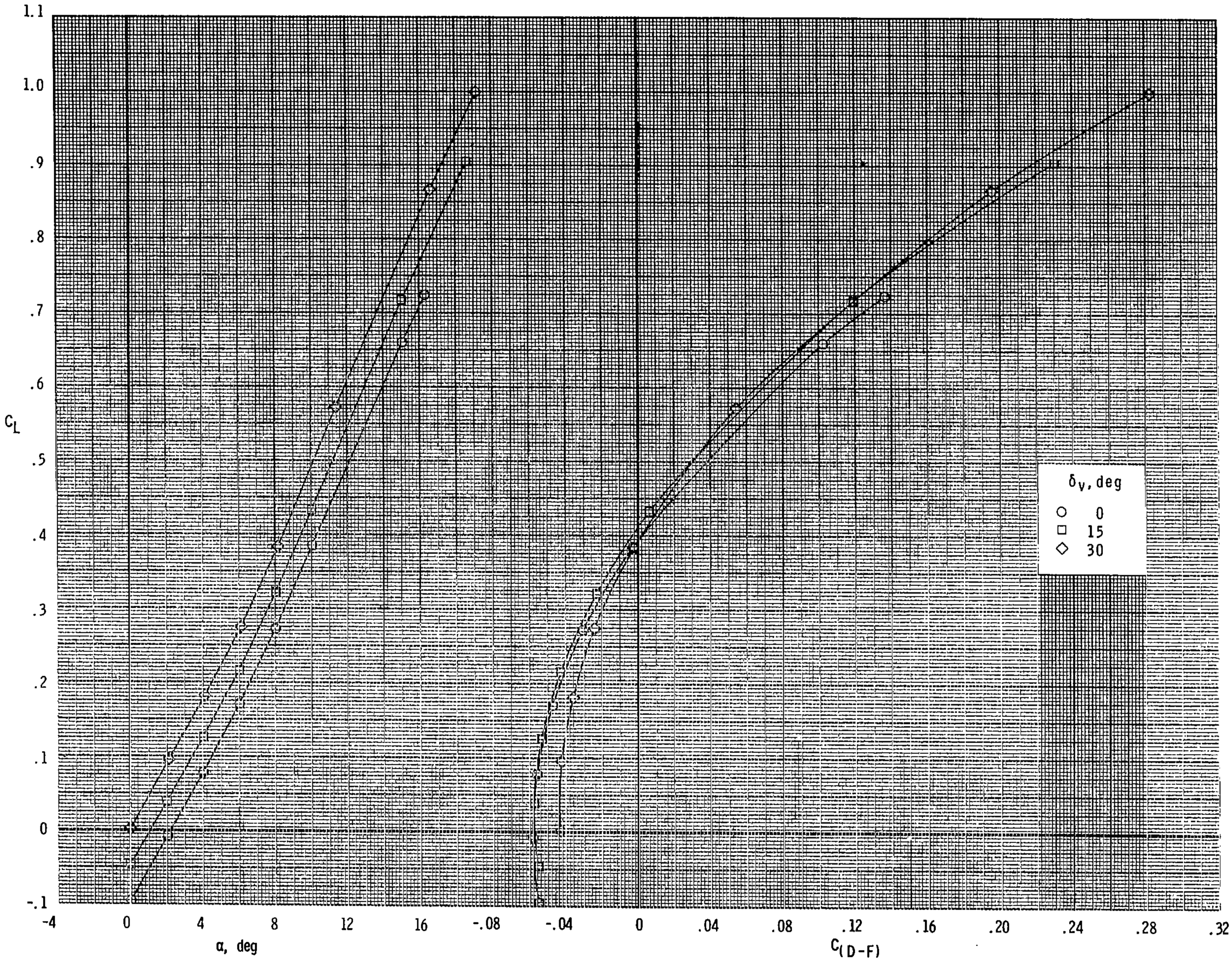
(c) $\alpha = 10^{\circ}$.

Figure 90.- Concluded.



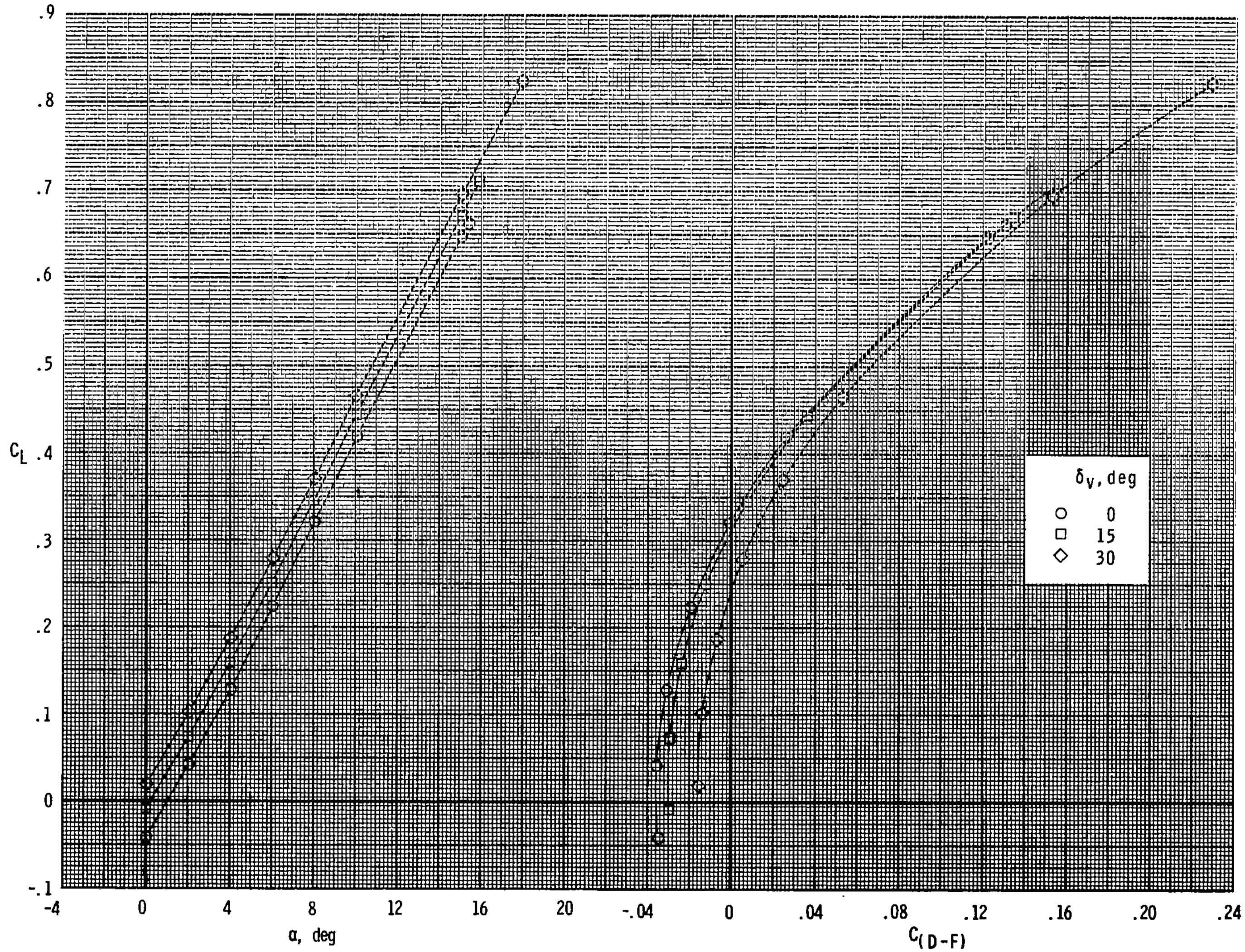
(a) M = 0.60; NPR = 3.0.

Figure 91.- Effects of thrust-vectoring angle on total aerodynamic characteristics for IUM SERN. AR = 4; A/B power setting; $\delta_c = 0^{\circ}$.



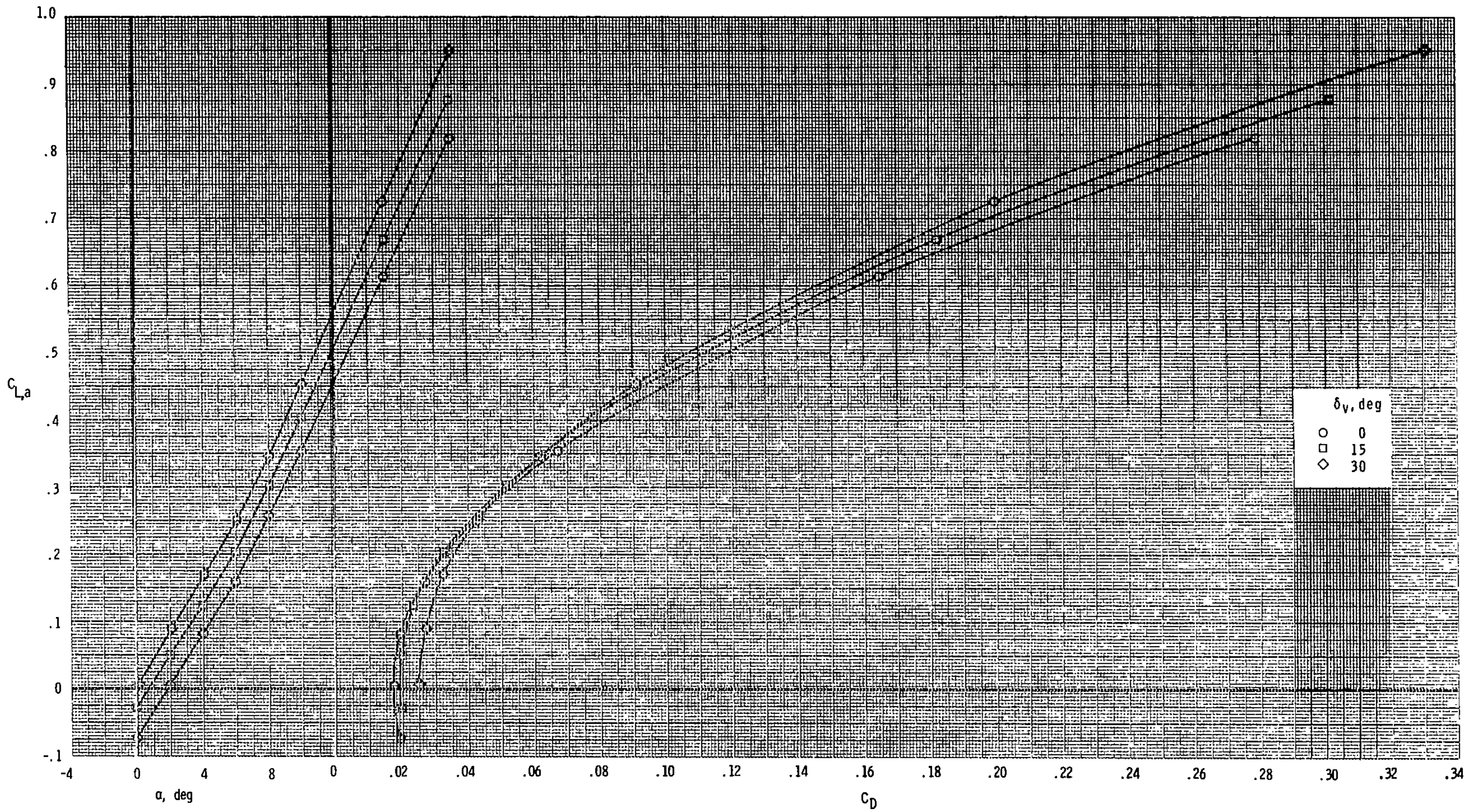
(b) M = 0.87; NPR = 3.9.

Figure 91.- Continued.



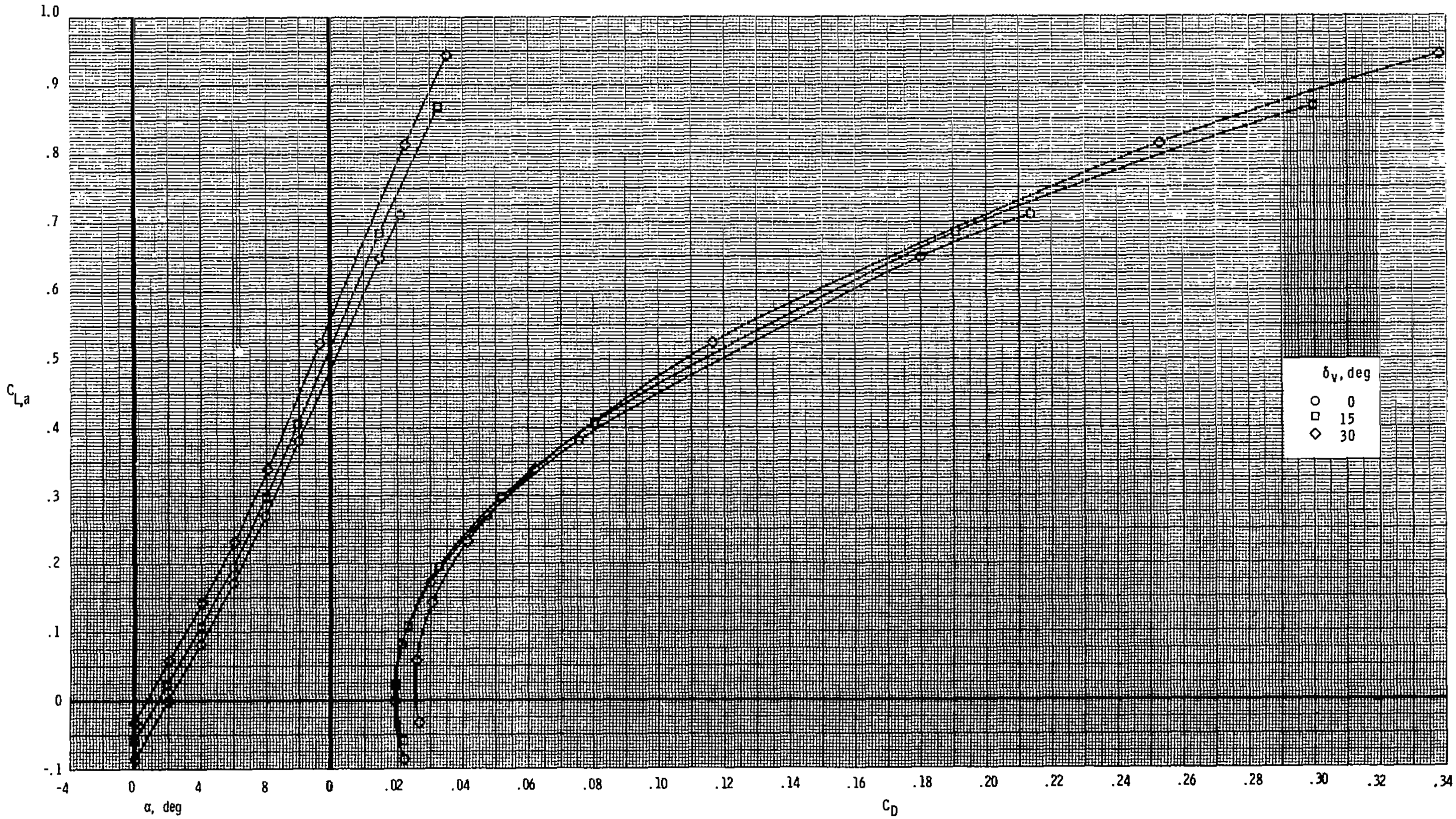
(c) M = 1.20; NPR = 6.6.

Figure 91.- Concluded.



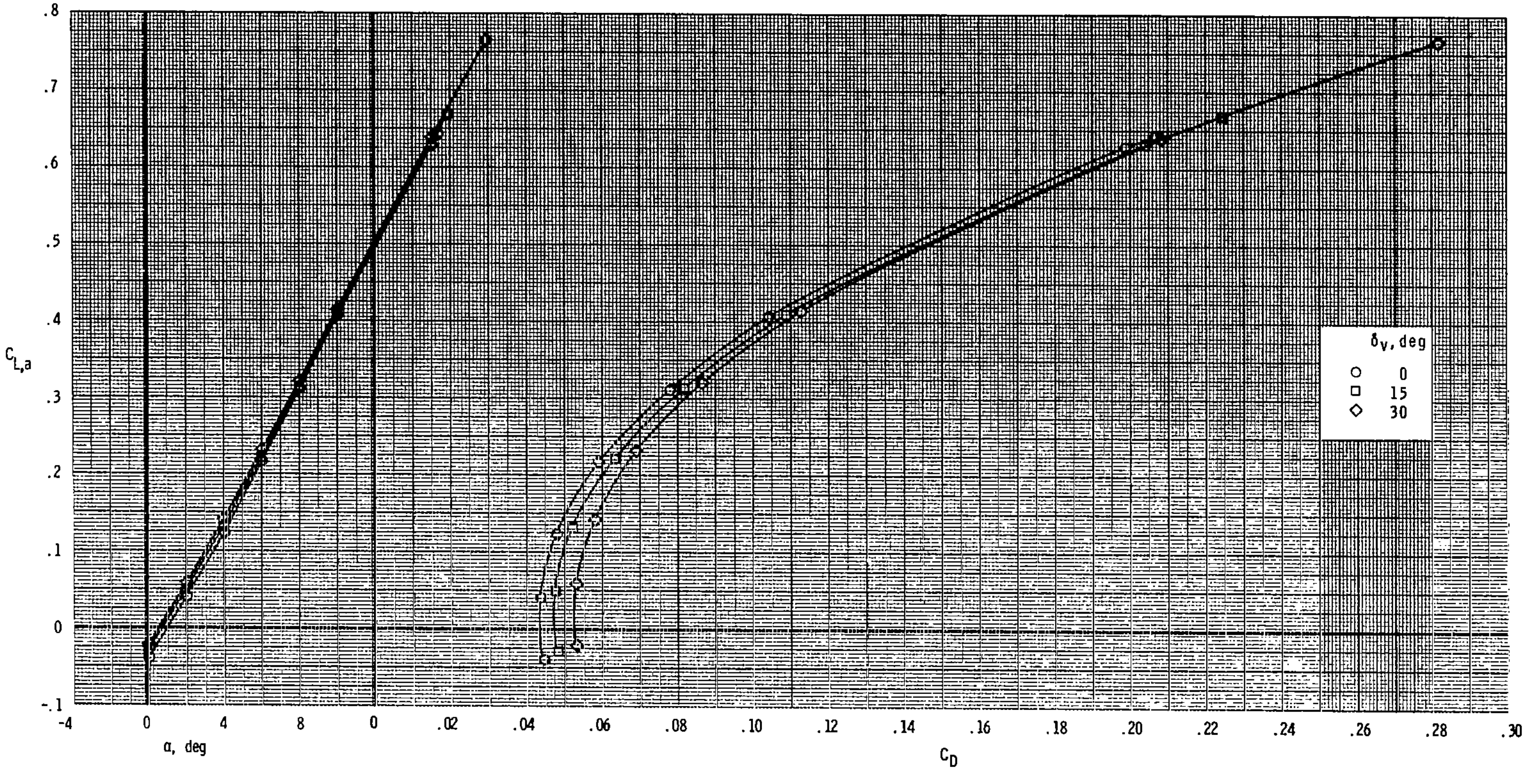
(a) M = 0.60; NPR = 3.0.

Figure 92.- Effects of thrust-vectoring angle on thrust-removed aerodynamic characteristics for IUM SERN. AR = 4; A/B power setting; $\delta_c = 0^{\circ}$.



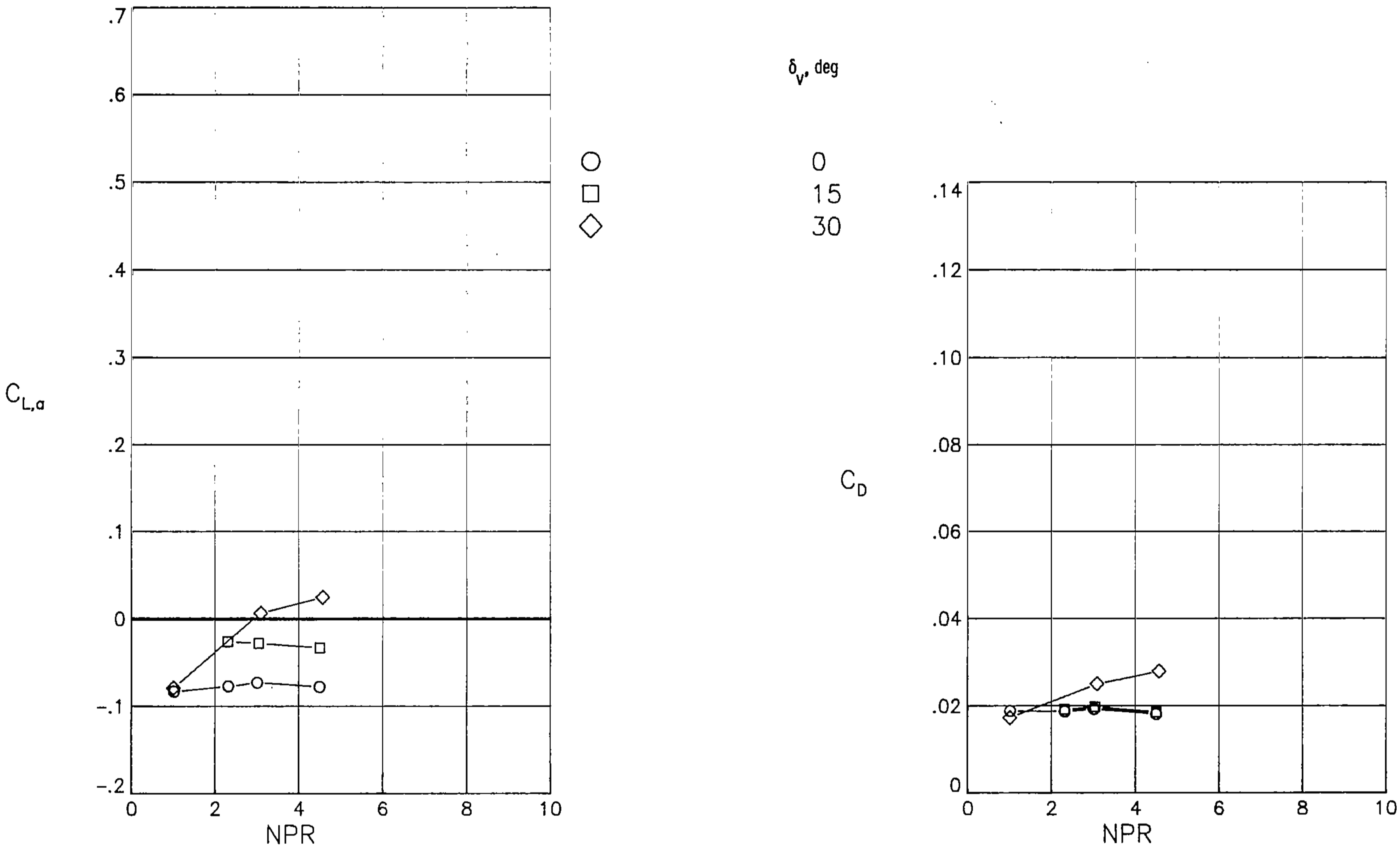
(b) M = 0.87; NPR = 3.9.

Figure 92.- Continued.



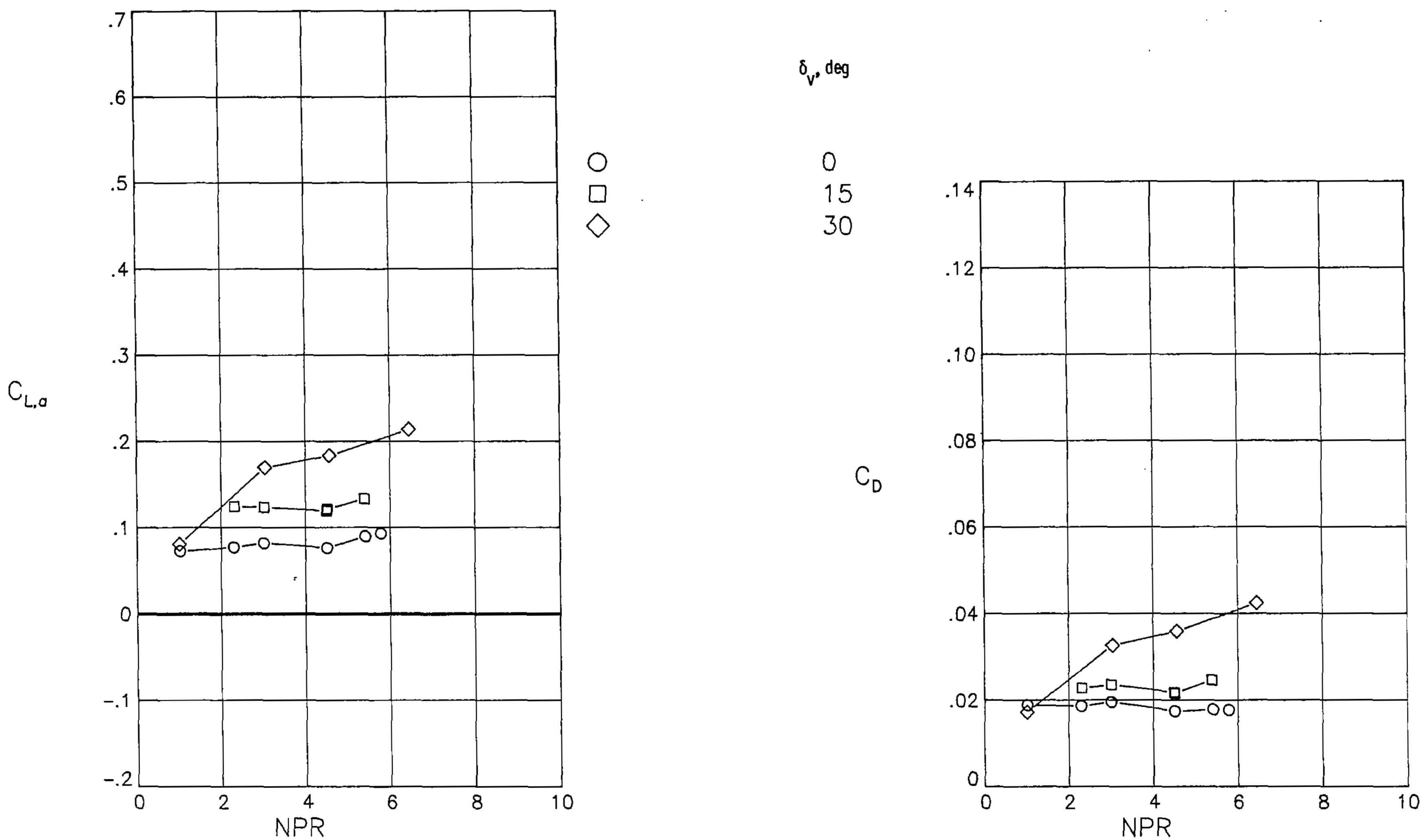
(c) M = 1.20; NPR = 6.60.

Figure 92.- Concluded.



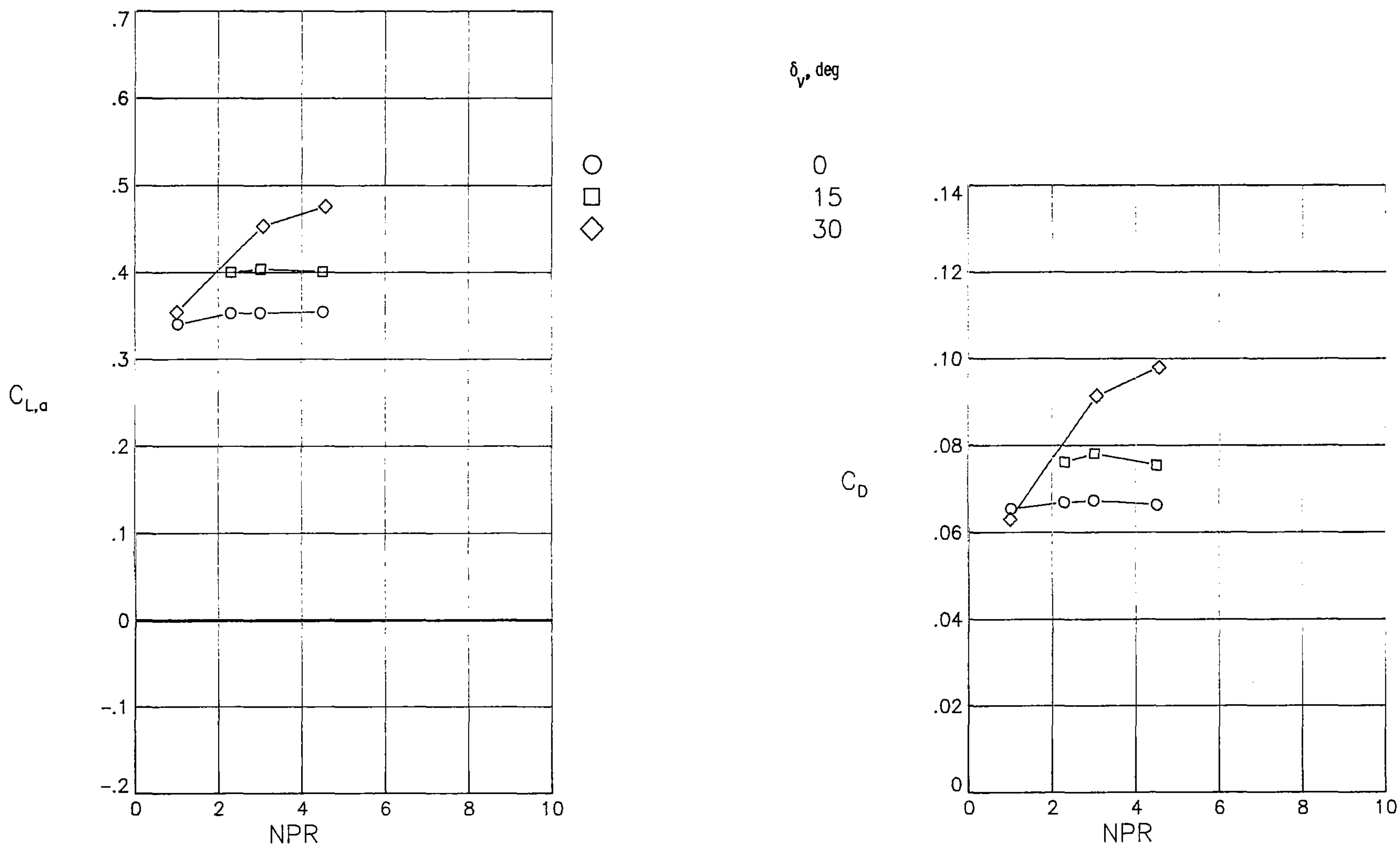
(a) $\alpha = 0^{\circ}$.

Figure 93.- Effects of thrust-vectoring angle on thrust-removed aerodynamic characteristics for IUM SERN. AR = 4; A/B power setting; $\delta_c = 0^{\circ}$; M = 0.60.



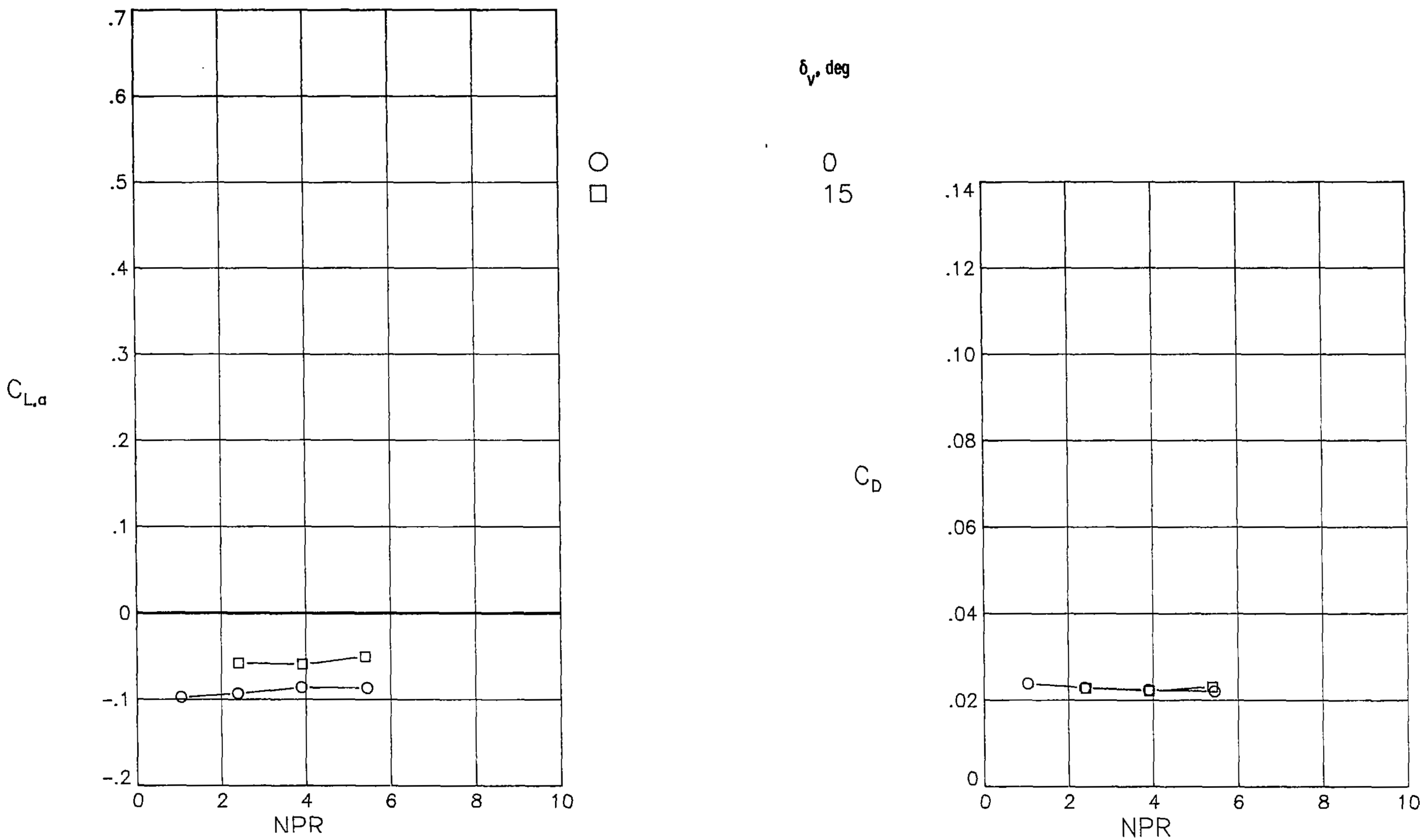
(b) $\alpha = 4^{\circ}$.

Figure 93.- Continued.



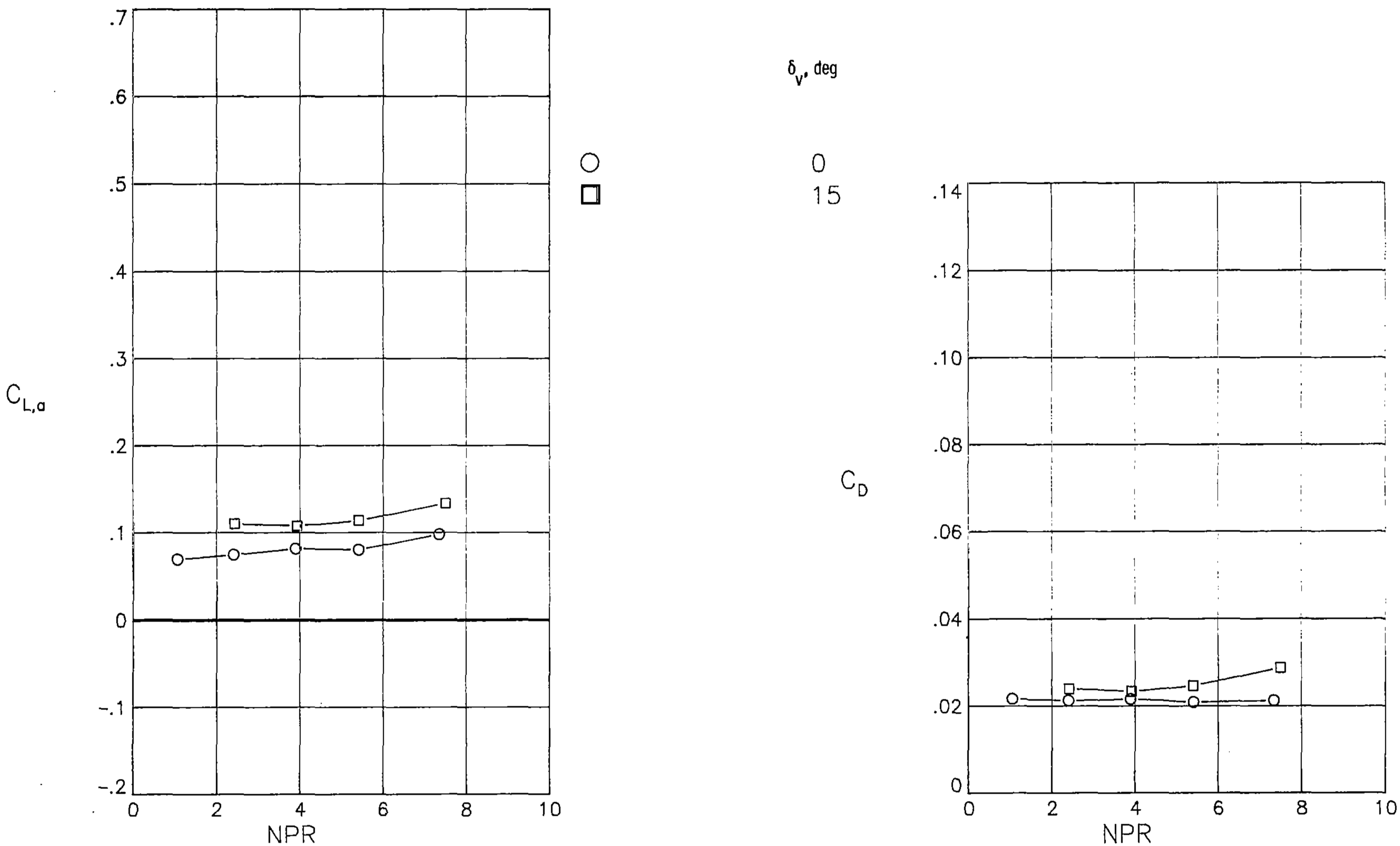
(c) $\alpha = 10^{\circ}$.

Figure 93.- Concluded.



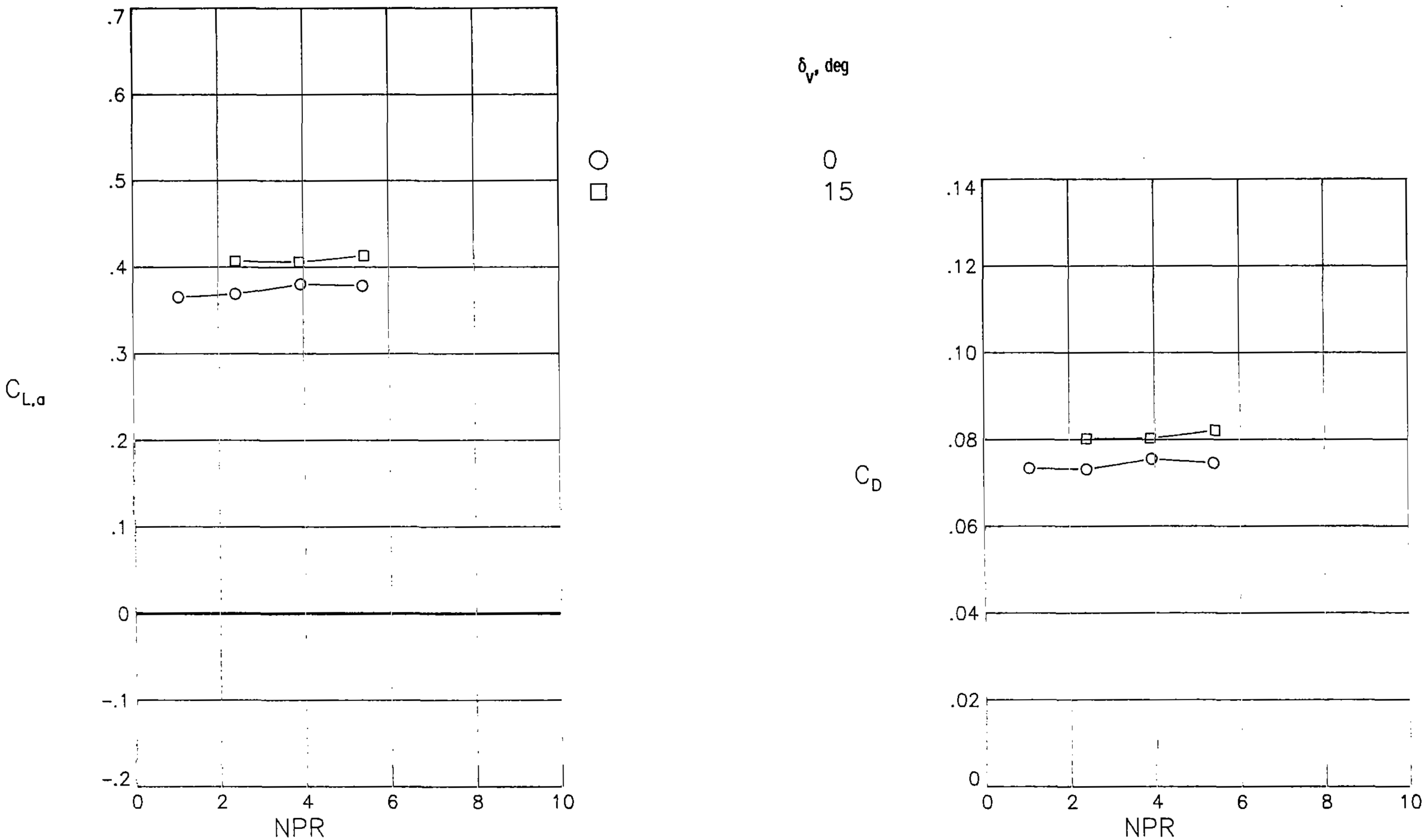
(a) $\alpha = 0^{\circ}$.

Figure 94.- Effects of thrust-vectoring angle on thrust-removed aerodynamic characteristics for IUM SERN. AR = 4; A/B power setting; $\delta_c = 0^{\circ}$; M = 0.87.



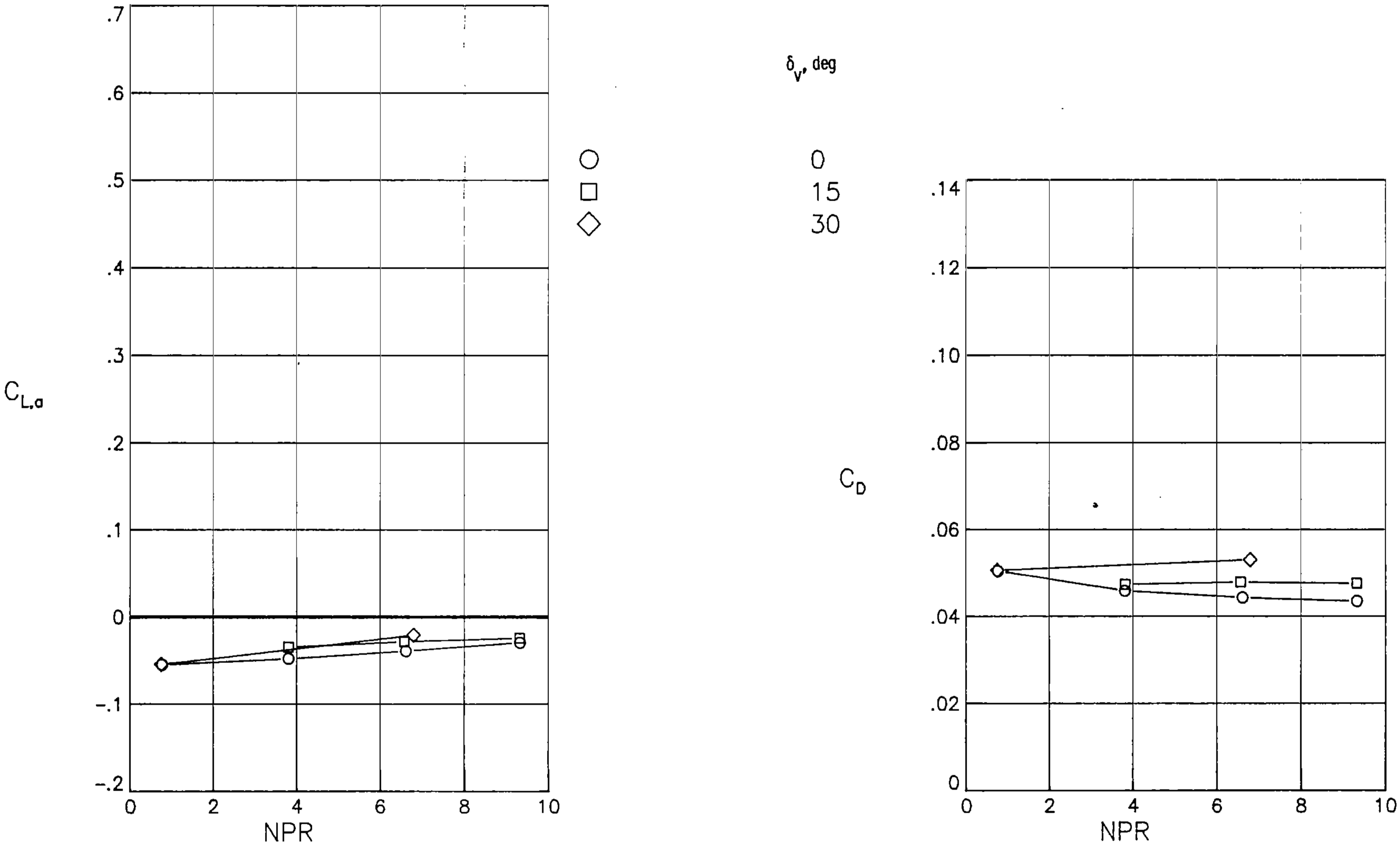
(b) $\alpha = 4^{\circ}$.

Figure 94.- Continued.



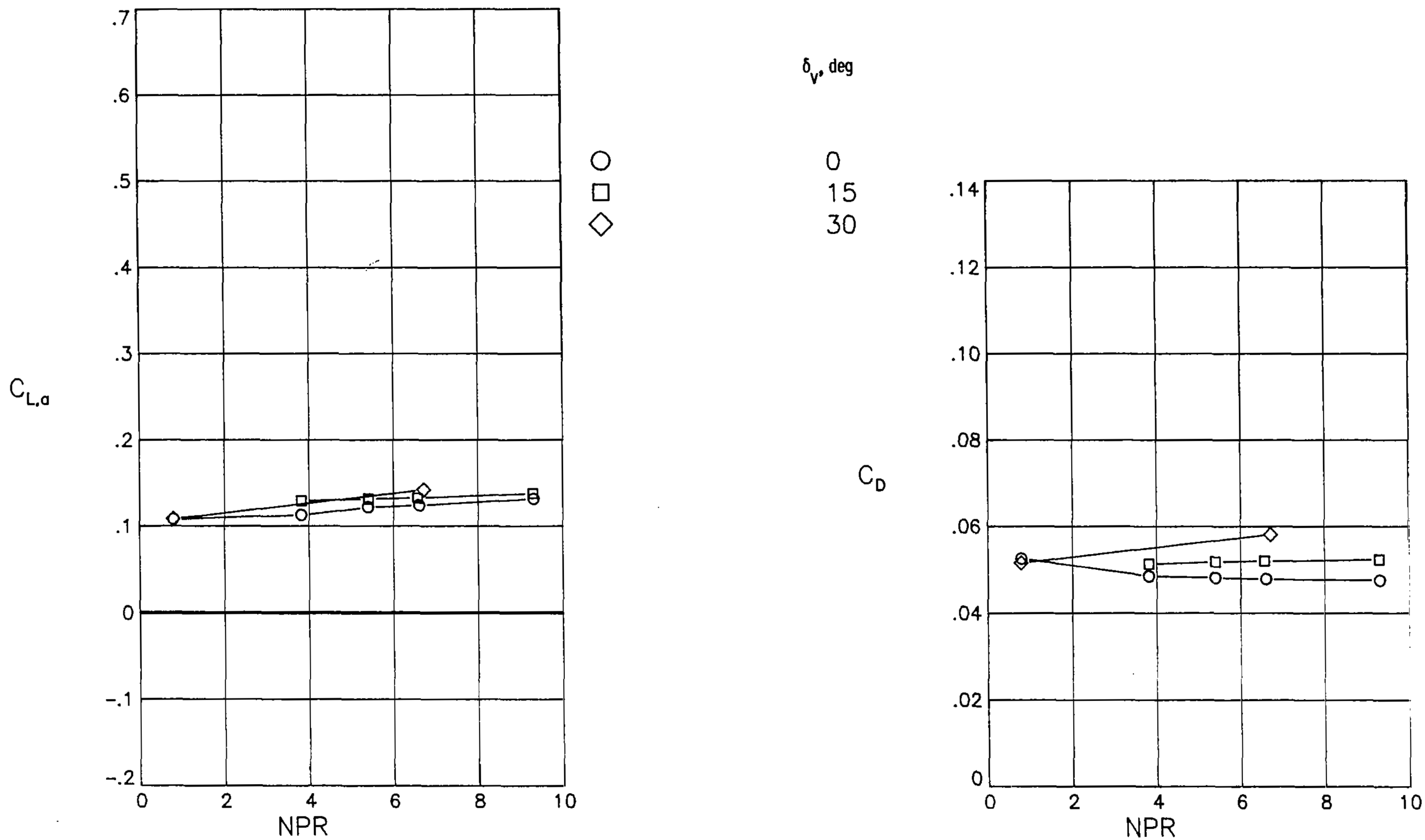
(c) $\alpha = 10^{\circ}$.

Figure 94.- Concluded.



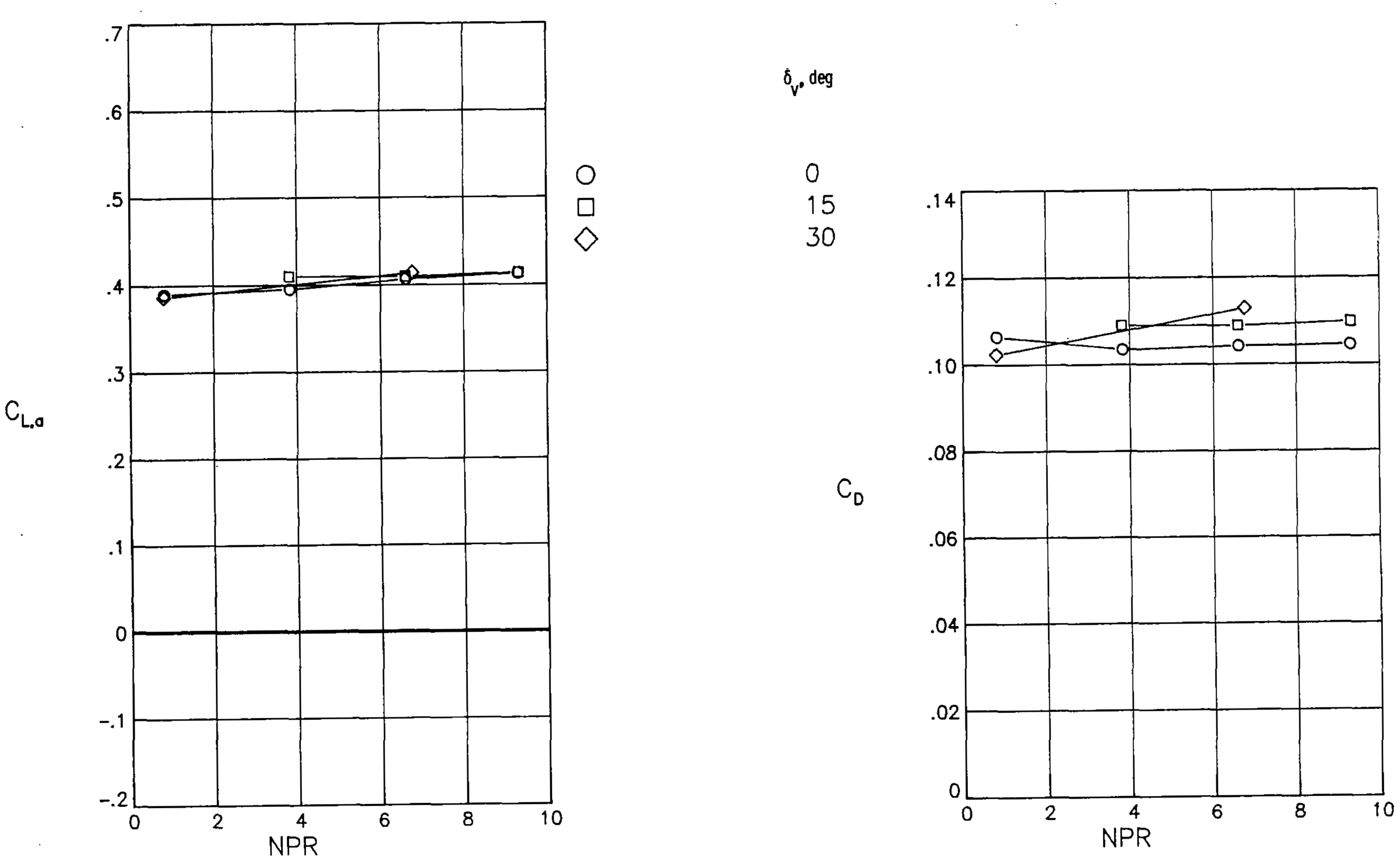
(a) $\alpha = 0^{\circ}$.

Figure 95.- Effects of thrust-vectoring angle on thrust-removed aerodynamic characteristics for IUM SERN. AR = 4; A/B power setting; M = 1.20.



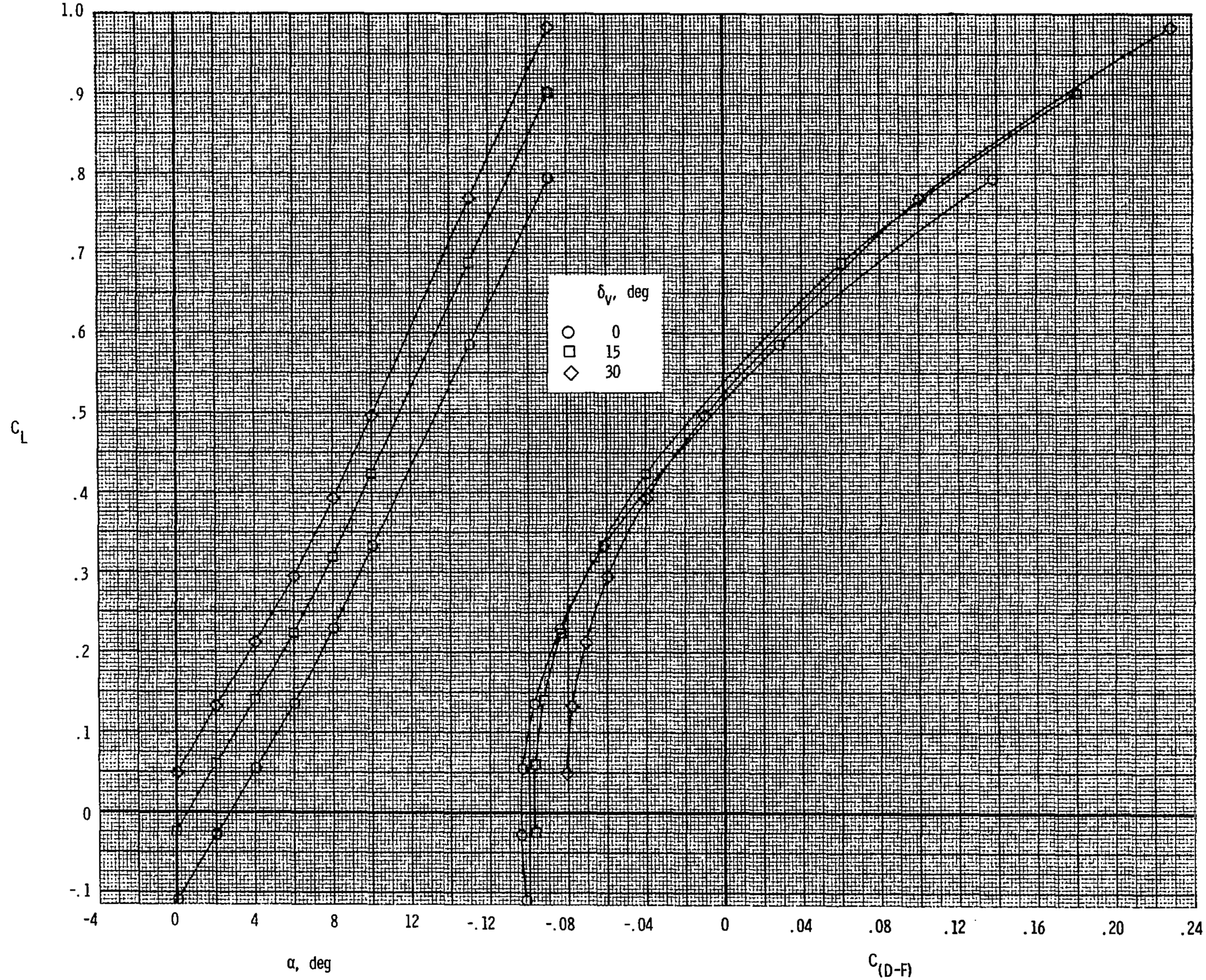
(b) $\alpha = 4^{\circ}$.

Figure 95.- Continued.



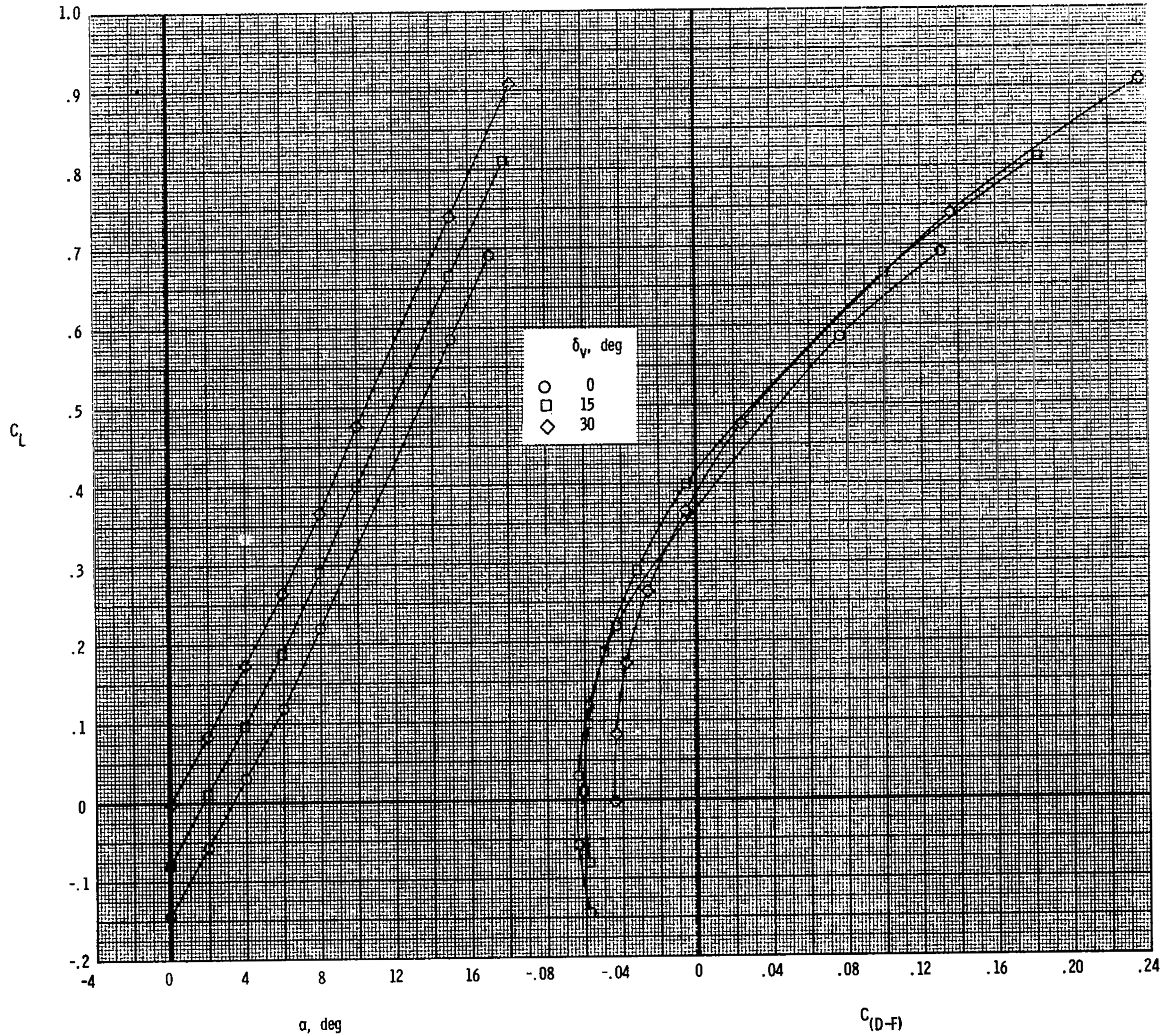
(c) $\alpha = 10^{\circ}$.

Figure 95.- Concluded.



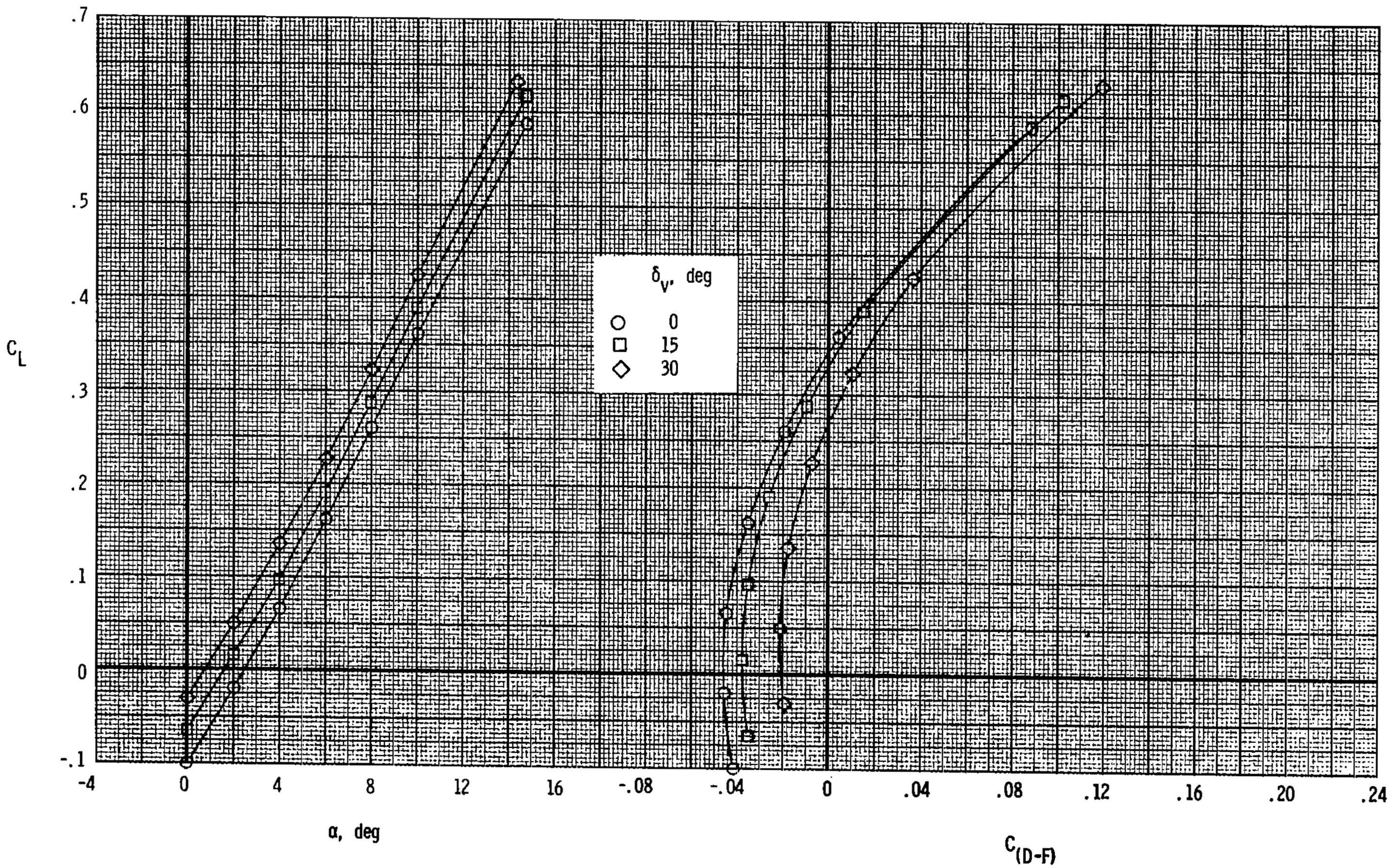
(a) M = 0.60; NPR = 3.1.

Figure 96.- Effects of thrust-vectoring angle on total aerodynamic characteristics for IOM SERN. AR = 4; A/B power setting; $\delta_c = 0^{\circ}$.



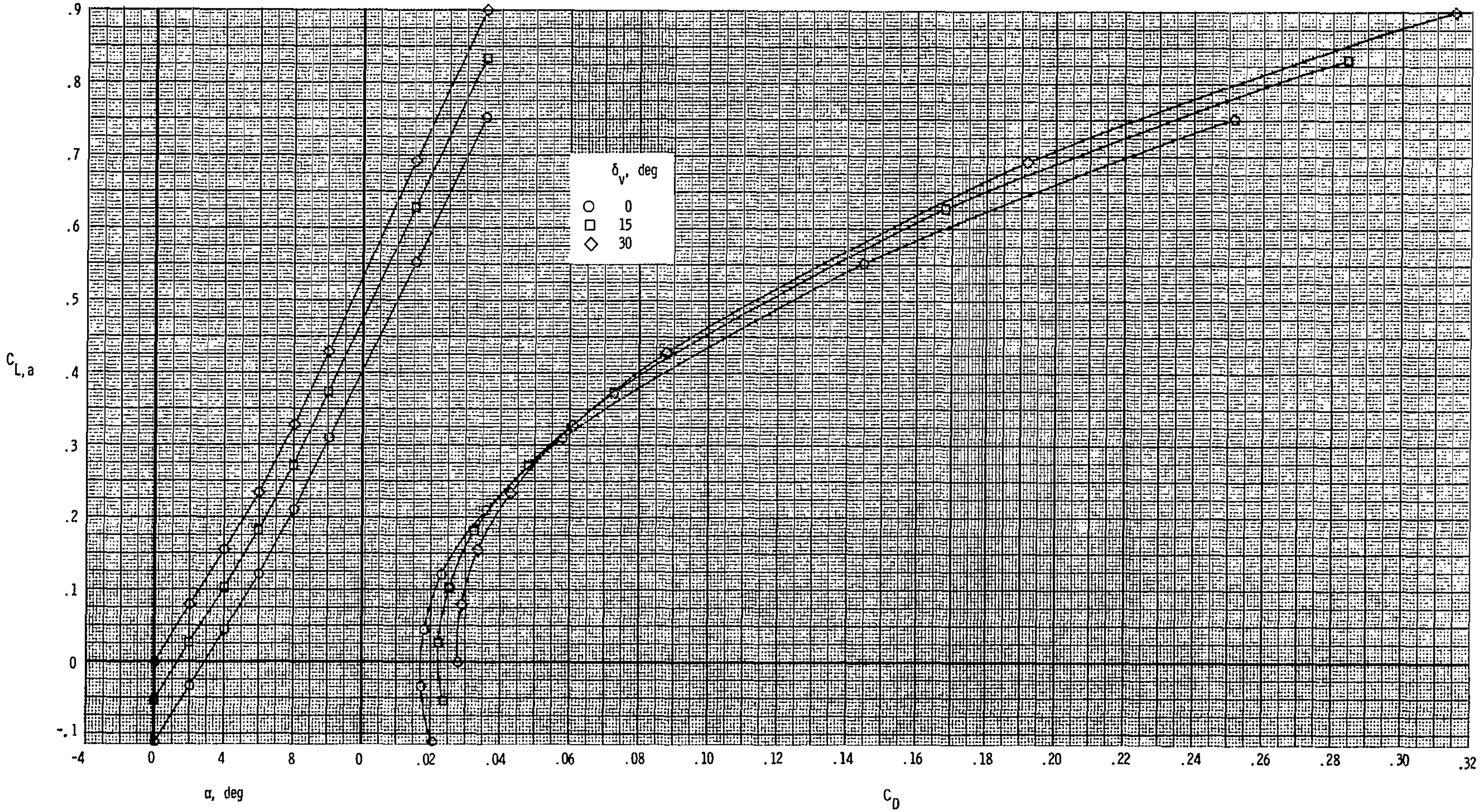
(b) M = 0.87; NPR = 4.1.

Figure 96.- Continued.



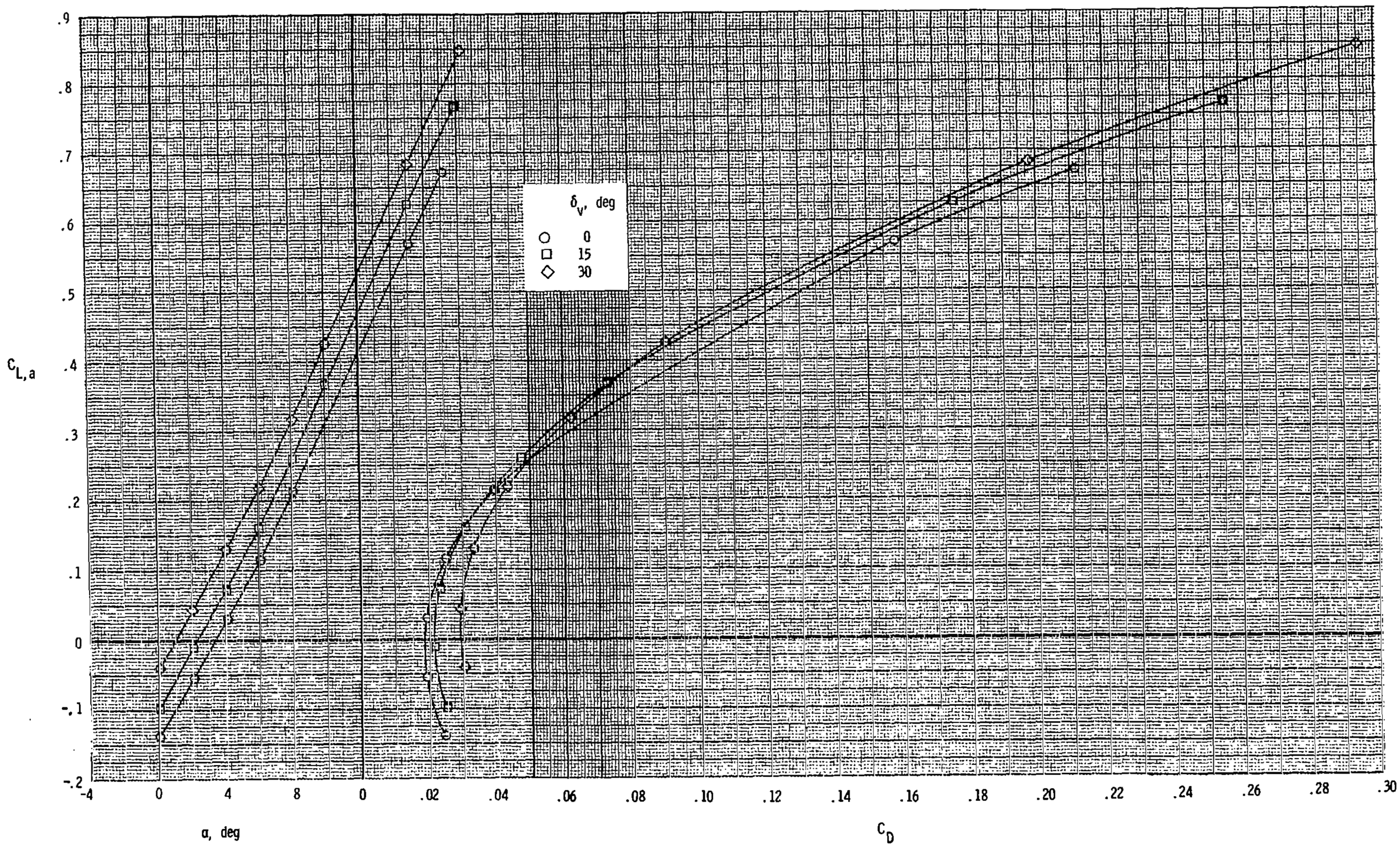
(c) M = 1.20; NPR = 6.9.

Figure 96.- Concluded.



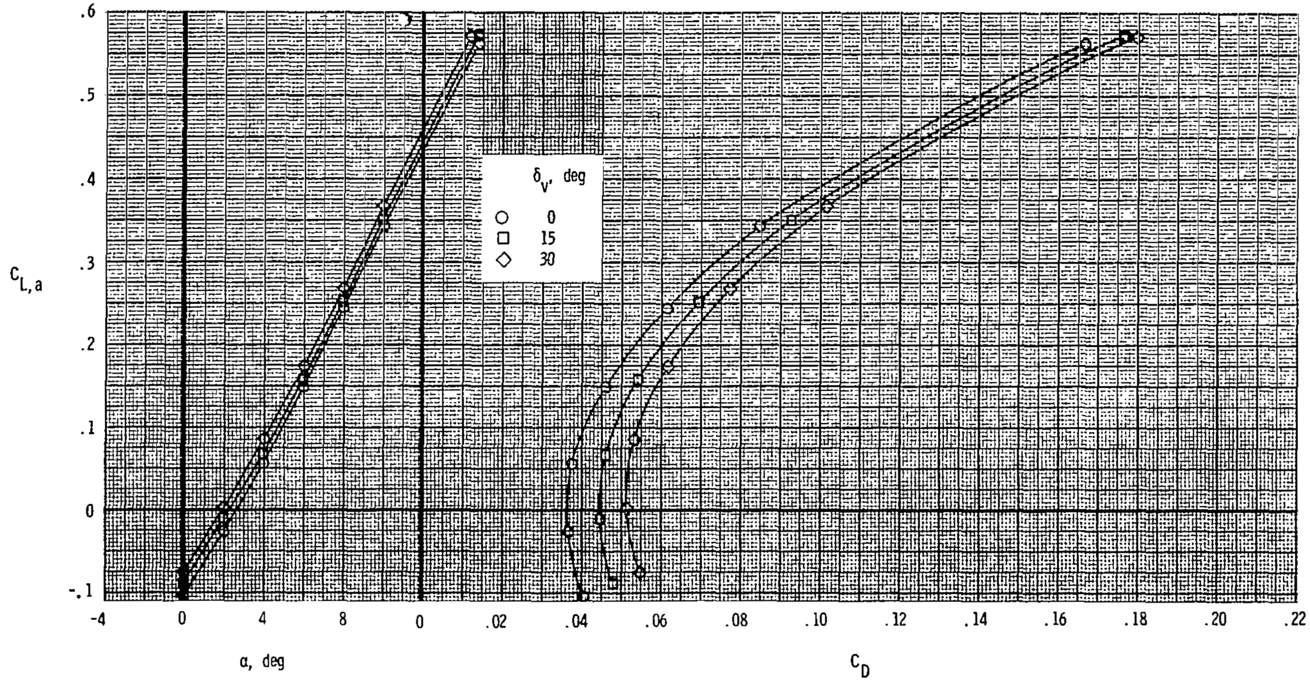
(a) M = 0.60; NPR = 3.1.

Figure 97.- Effects of thrust-vectoring angle on thrust-removed aerodynamic characteristics for IOM SERN. AR = 4; A/B power setting; $\delta_c = 0^\circ$.



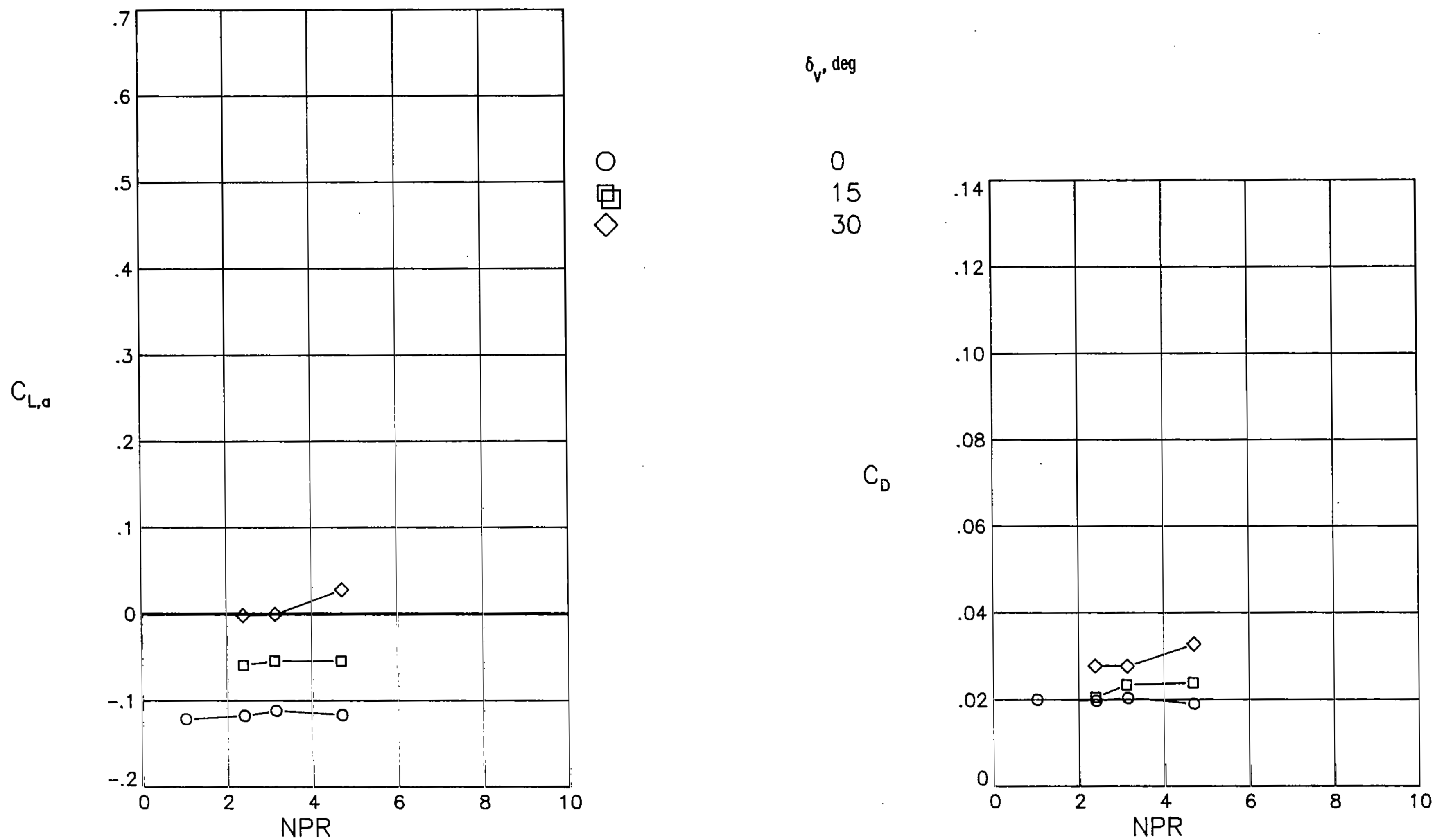
(b) M = 0.87; NPR = 4.1.

Figure 97.- Continued.



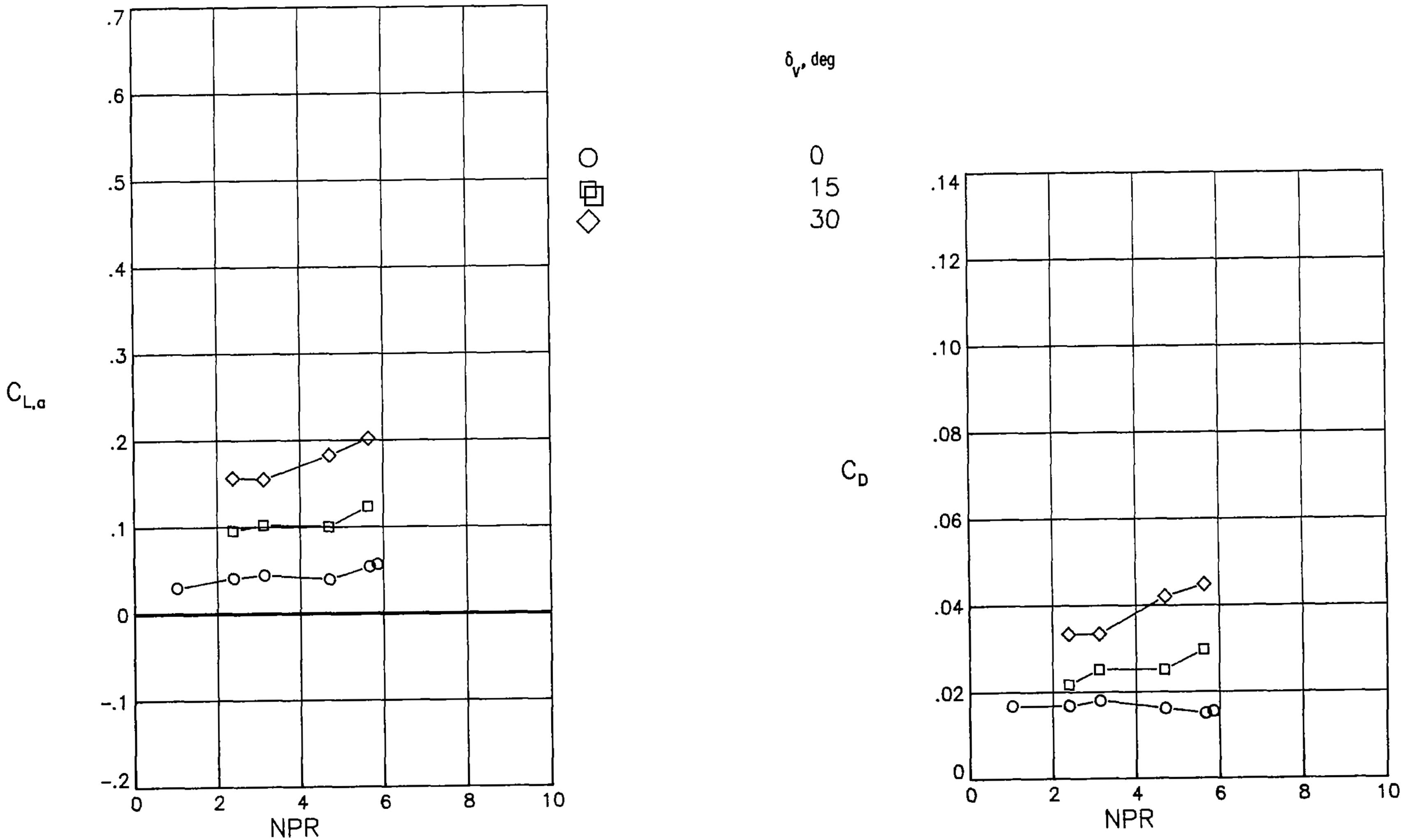
(c) M = 1.20; NPR = 6.9.

Figure 97.- Concluded.



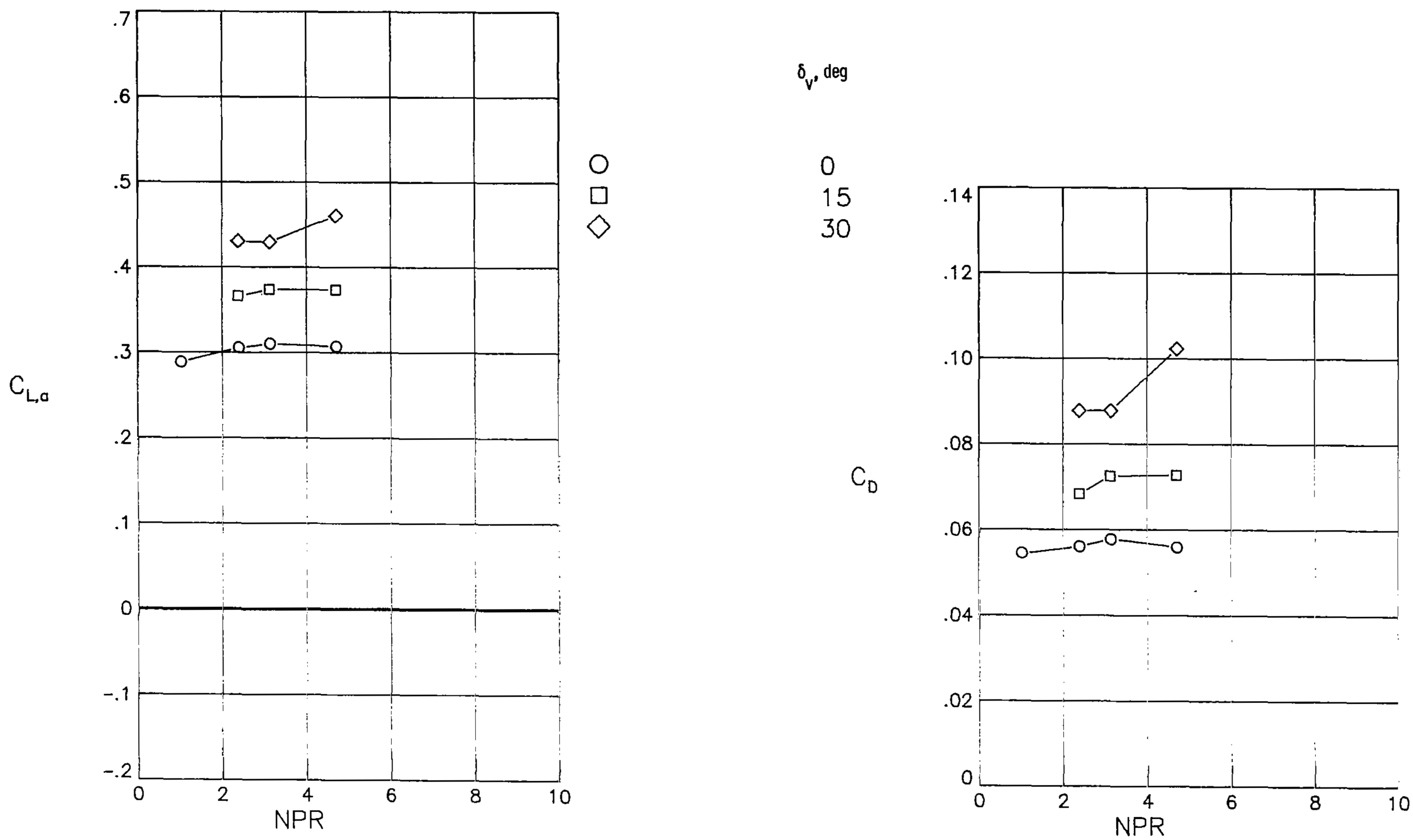
(a) $\alpha = 0^{o}$.

Figure 98.- Effects of thrust-vectoring angle on thrust-removed aerodynamic characteristics for IOM SERN. AR = 4; A/B power setting; $\delta_c = 0^{o}$; M = 0.60.



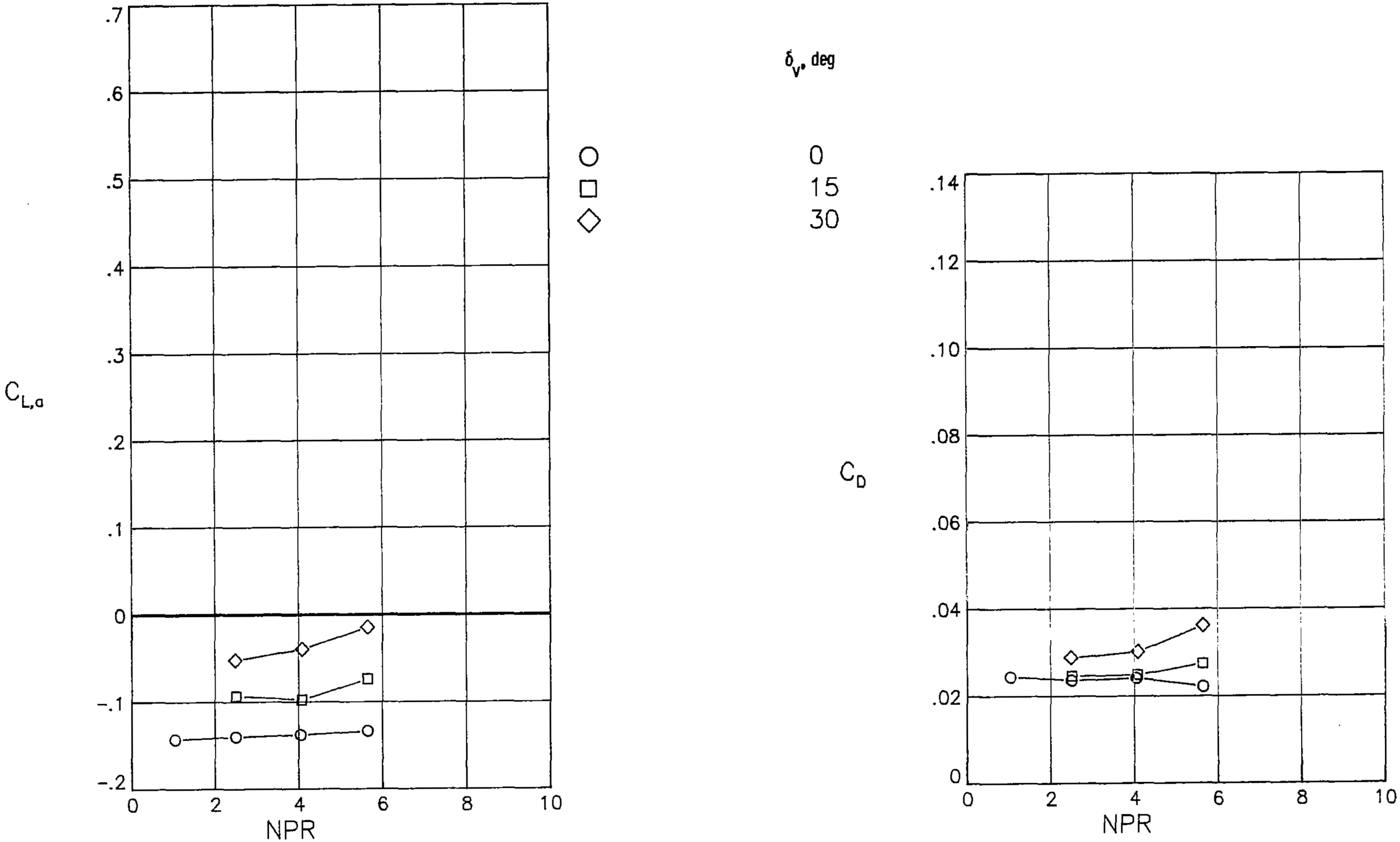
(b) $\alpha = 4^{\circ}$.

Figure 98.- Continued.



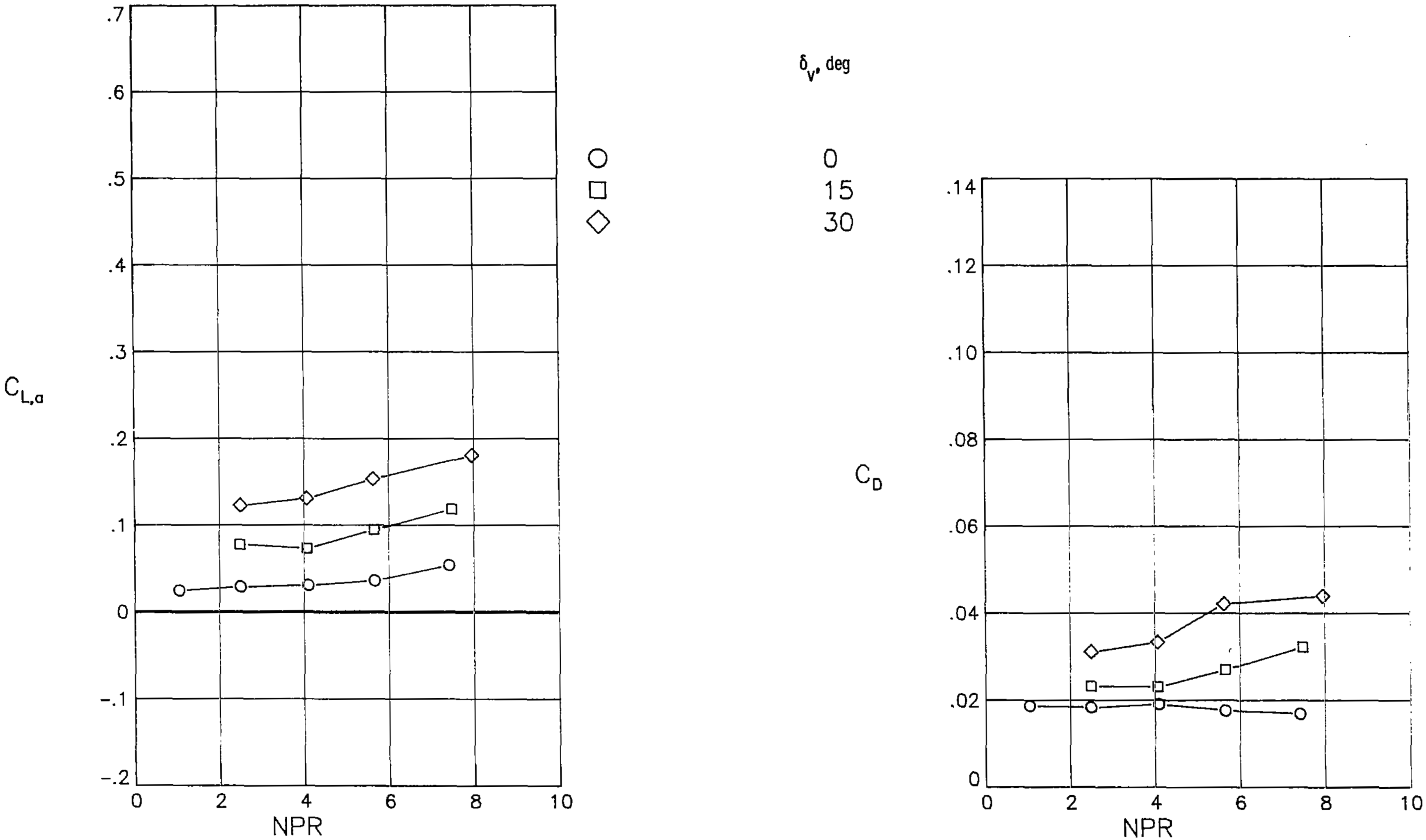
(c) $\alpha = 10^\circ$.

Figure 98.- Concluded.



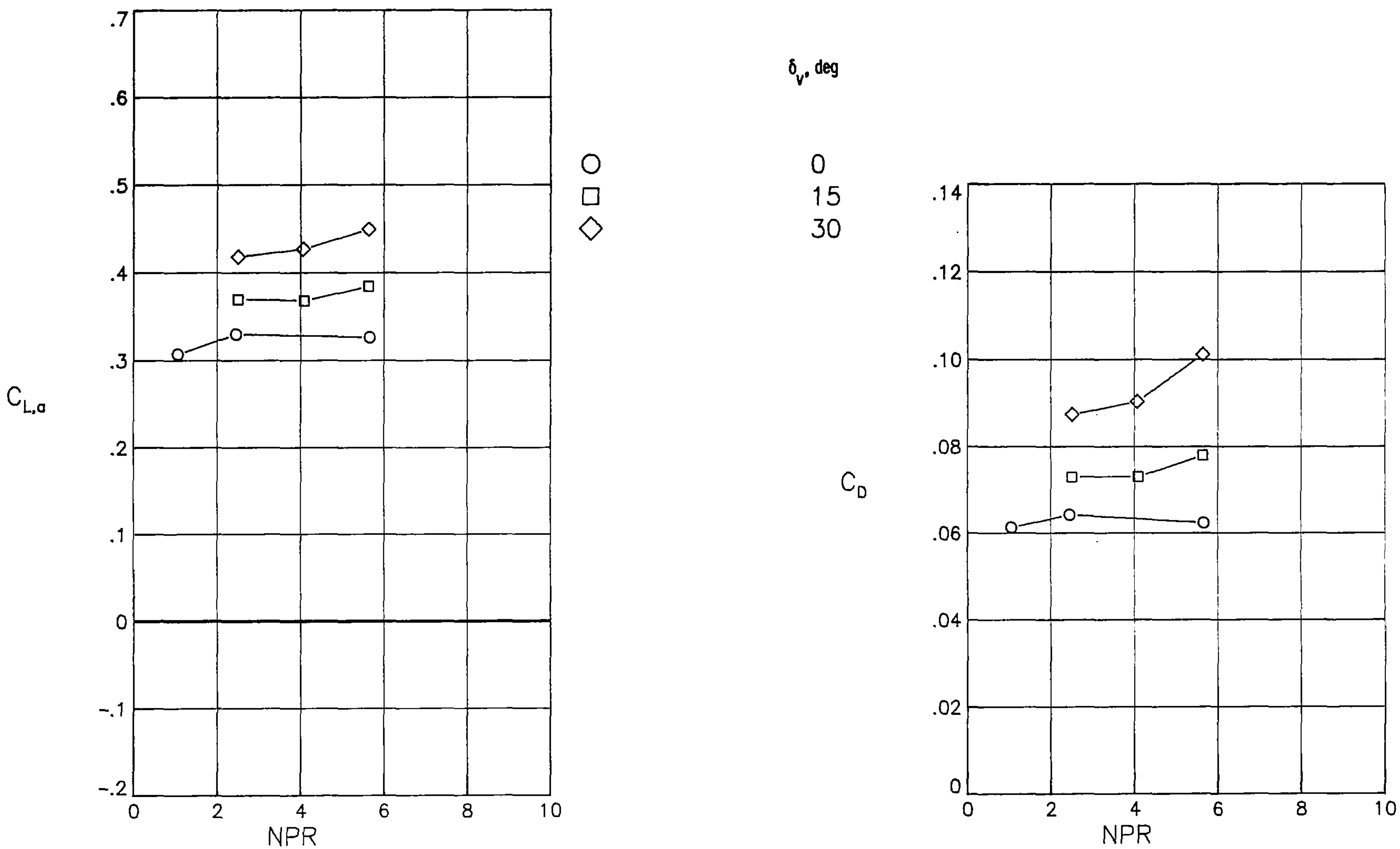
(a) $\alpha = 0^{\circ}$.

Figure 99.- Effects of thrust-vectoring angle on thrust-removed aerodynamic characteristics for IOM SERN. AR = 4; A/B power setting; $\delta_c = 0^{\circ}$; M = 0.87.



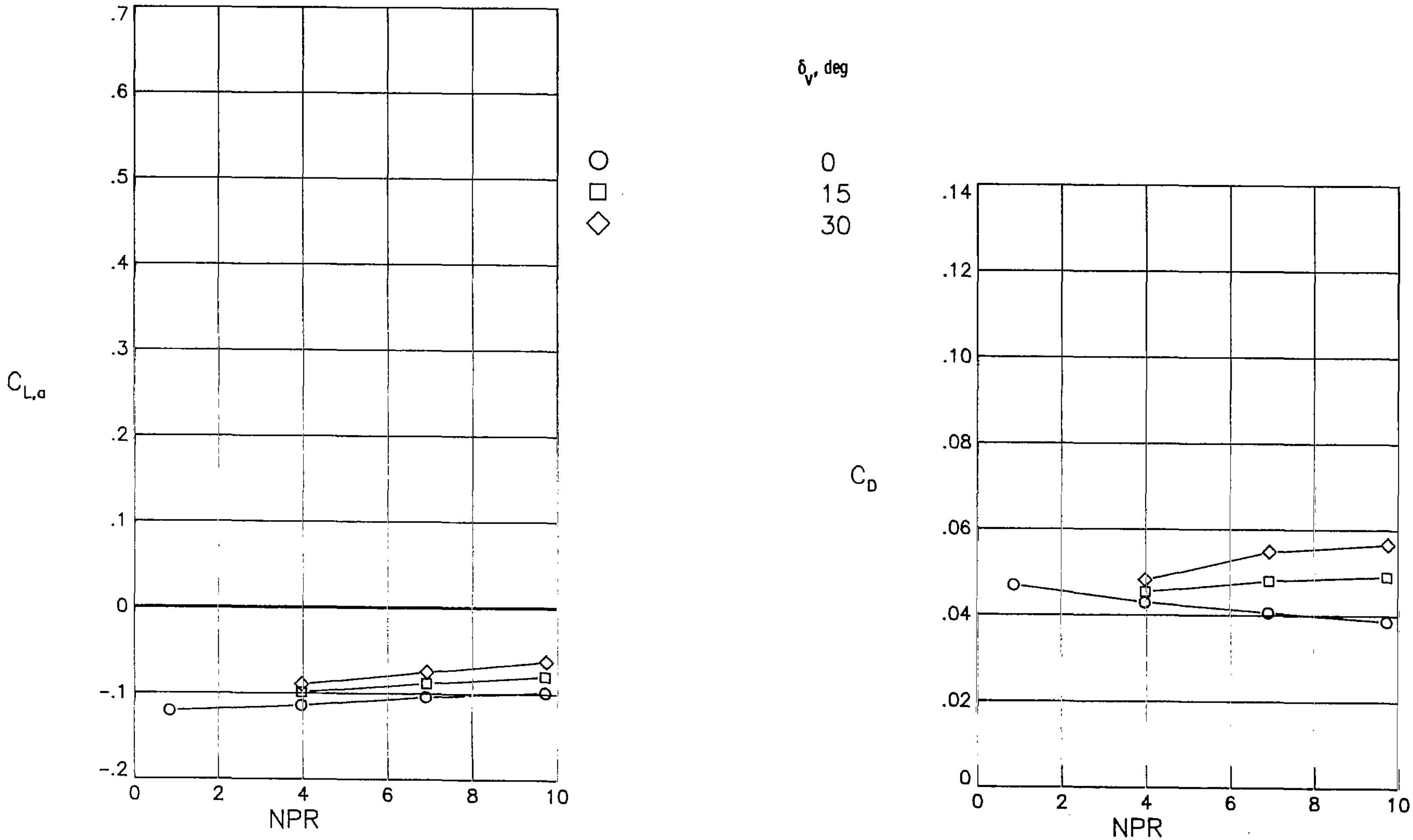
(b) $\alpha = 4^{\circ}$.

Figure 99.- Continued.



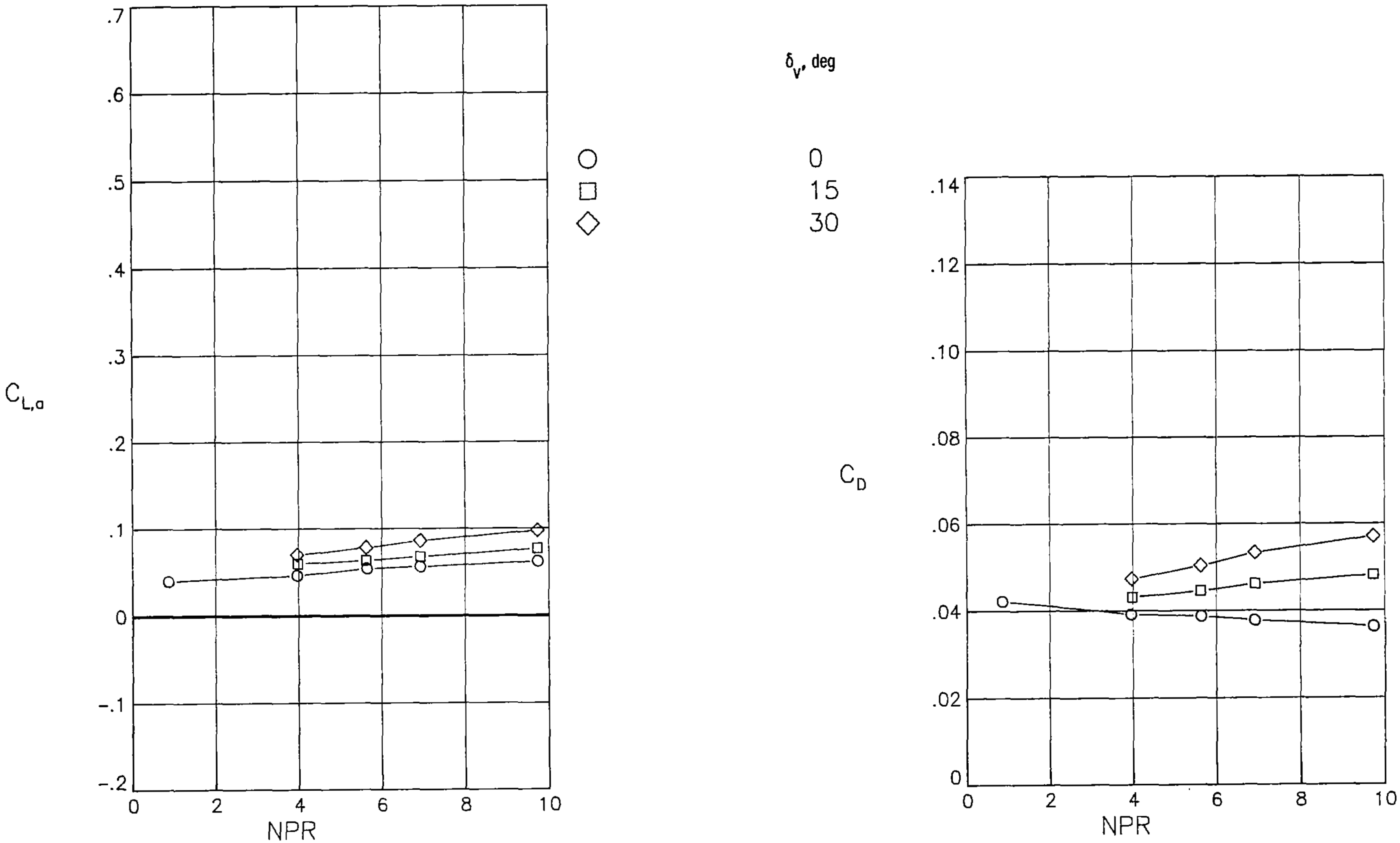
(c) $\alpha = 10^{\circ}$.

Figure 99.- Concluded.



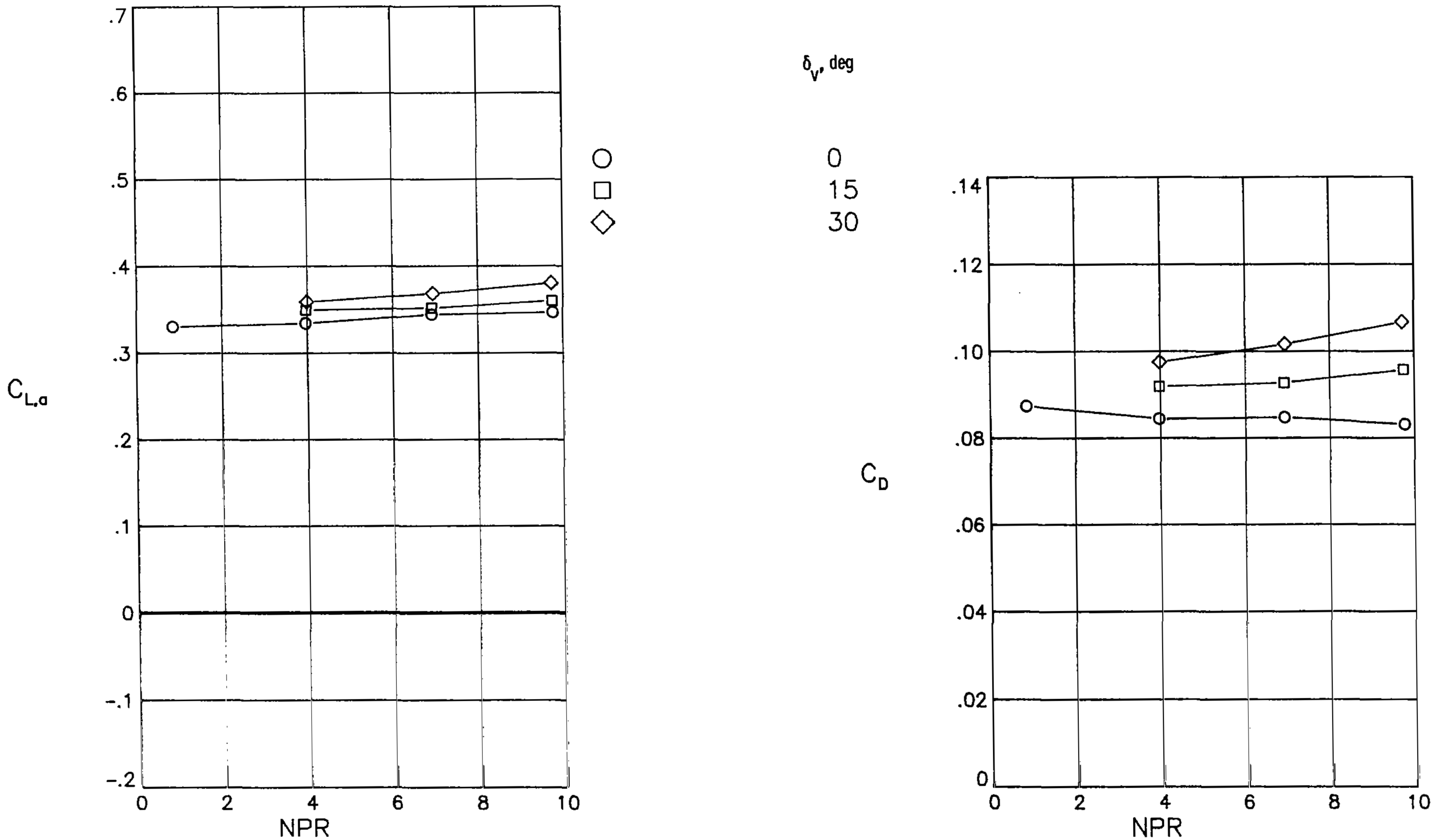
(a) $\alpha = 0^{\circ}$.

Figure 100.- Effects of thrust-vectoring angle on thrust-removed aerodynamic characteristics for IOM SERN. AR = 4; A/B power setting; $\delta_c = 0^{\circ}$; M = 1.20.



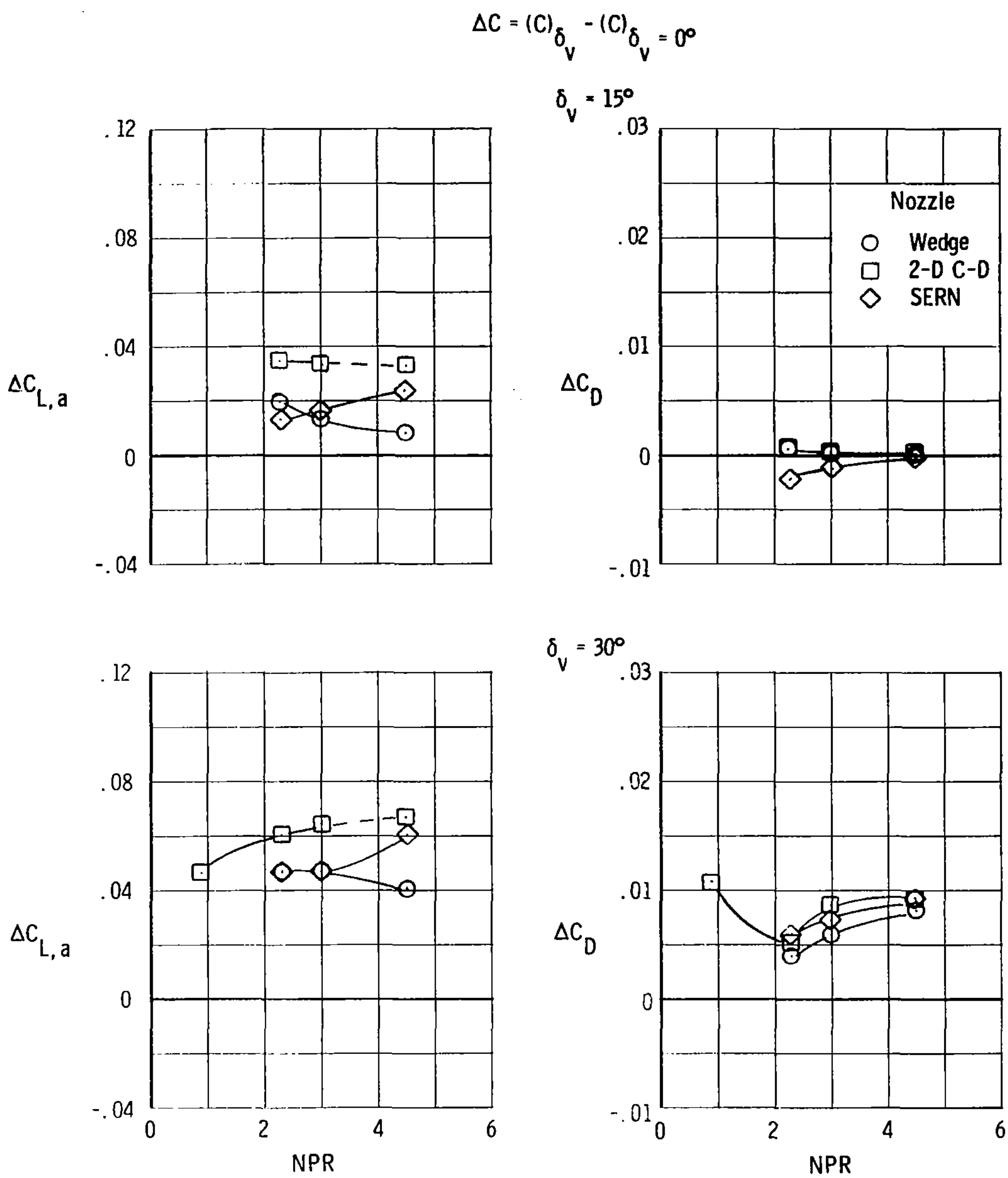
(b) $\alpha = 4^o$.

Figure 100.- Continued.



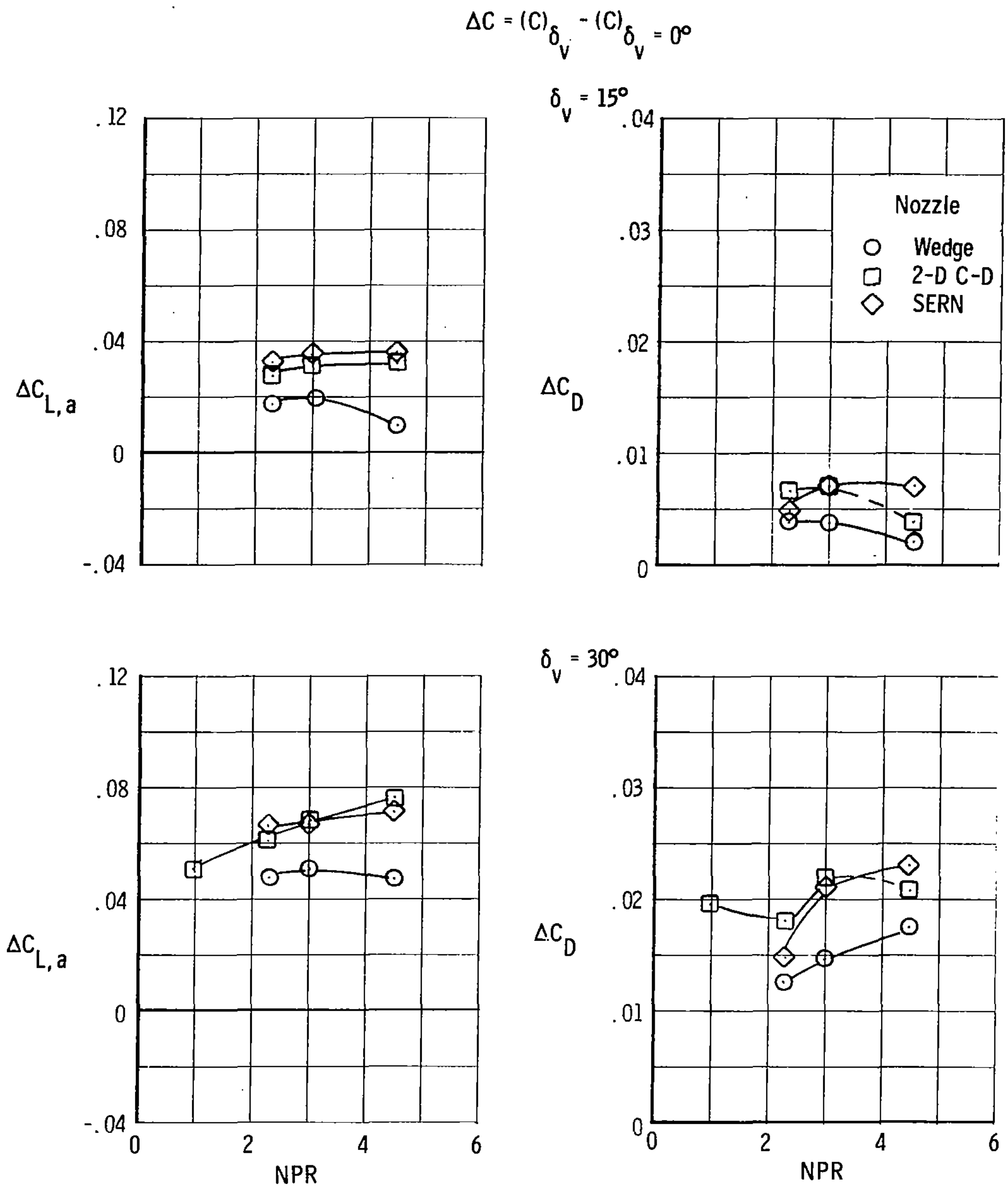
(c) $\alpha = 10^{\circ}$.

Figure 100.- Concluded.



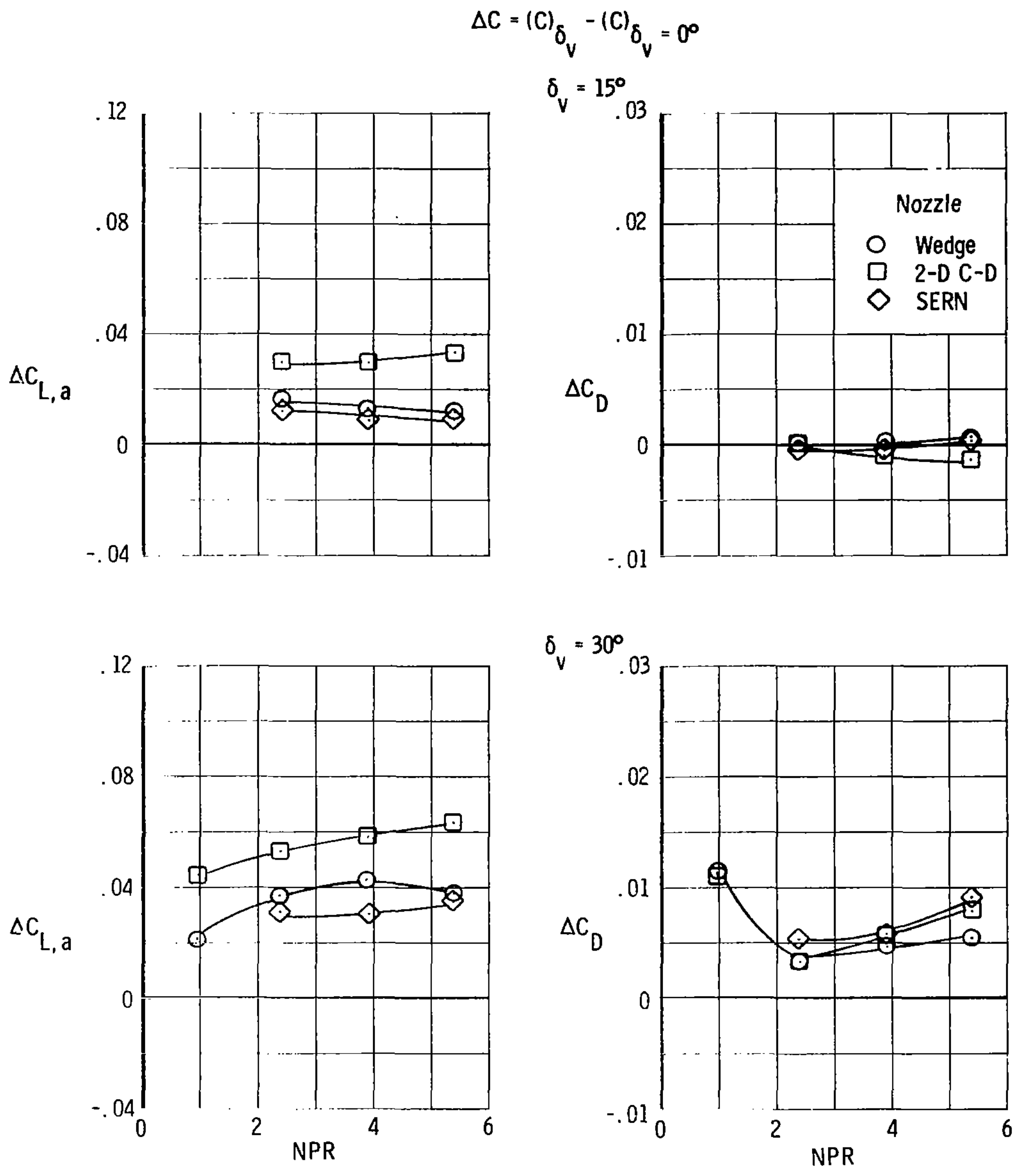
(a) $M = 0.60$; $\alpha = 0^{o}$.

Figure 101.- Effects of nozzle type on incremental thrust-induced aerodynamic characteristics. Symbols do not represent data points; dashed curves represent extrapolated data. IUM; AR = 1; A/B power setting; $\delta_c = 0^{o}$.



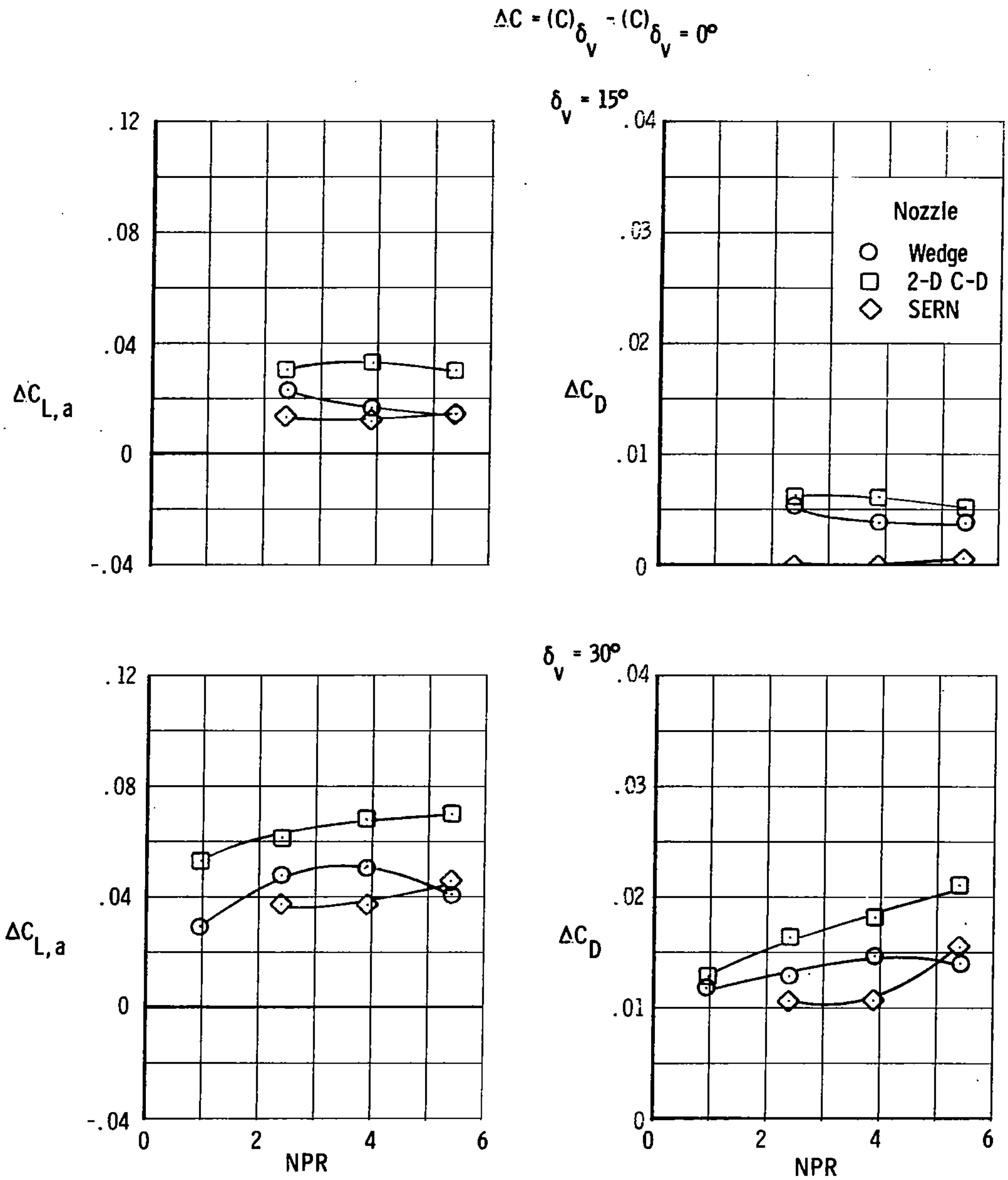
(b) M = 0.60; $\alpha = 10^{\circ}$.

Figure 101.- Continued.



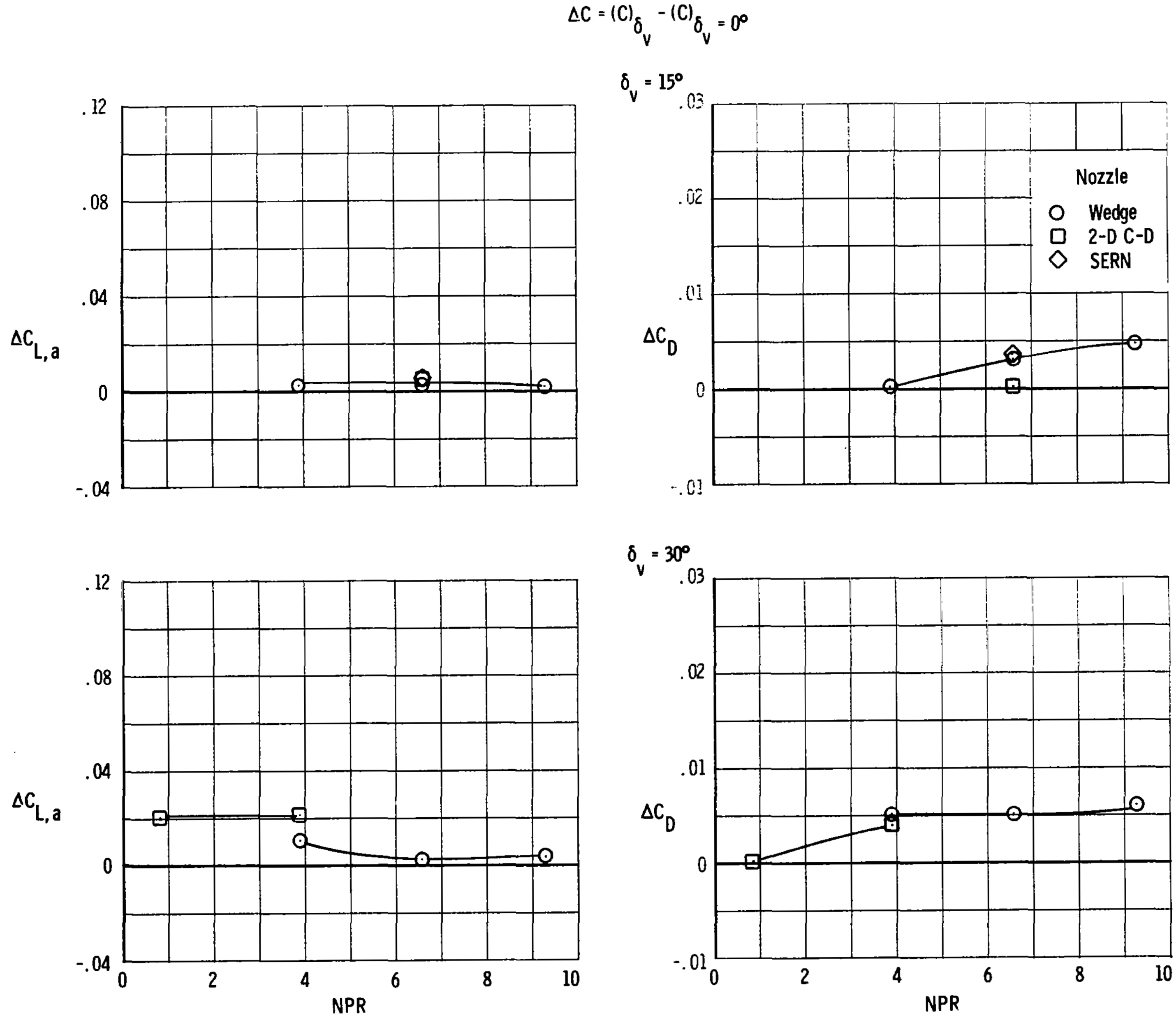
(c) $M = 0.87$; $\alpha = 0^{\circ}$.

Figure 101.- Continued.



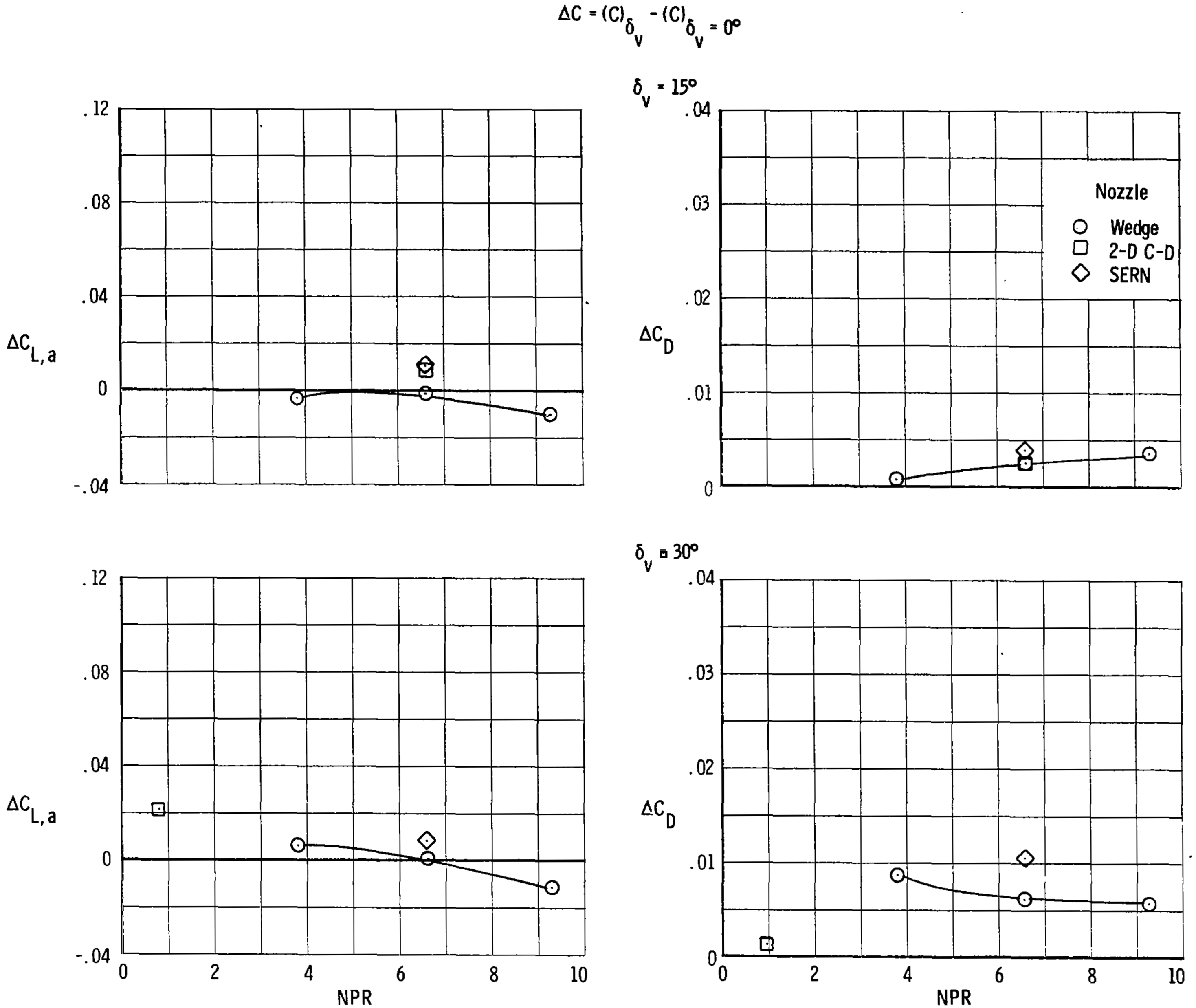
(d) $M = 0.87$; $\alpha = 10^{\circ}$.

Figure 101.- Continued.



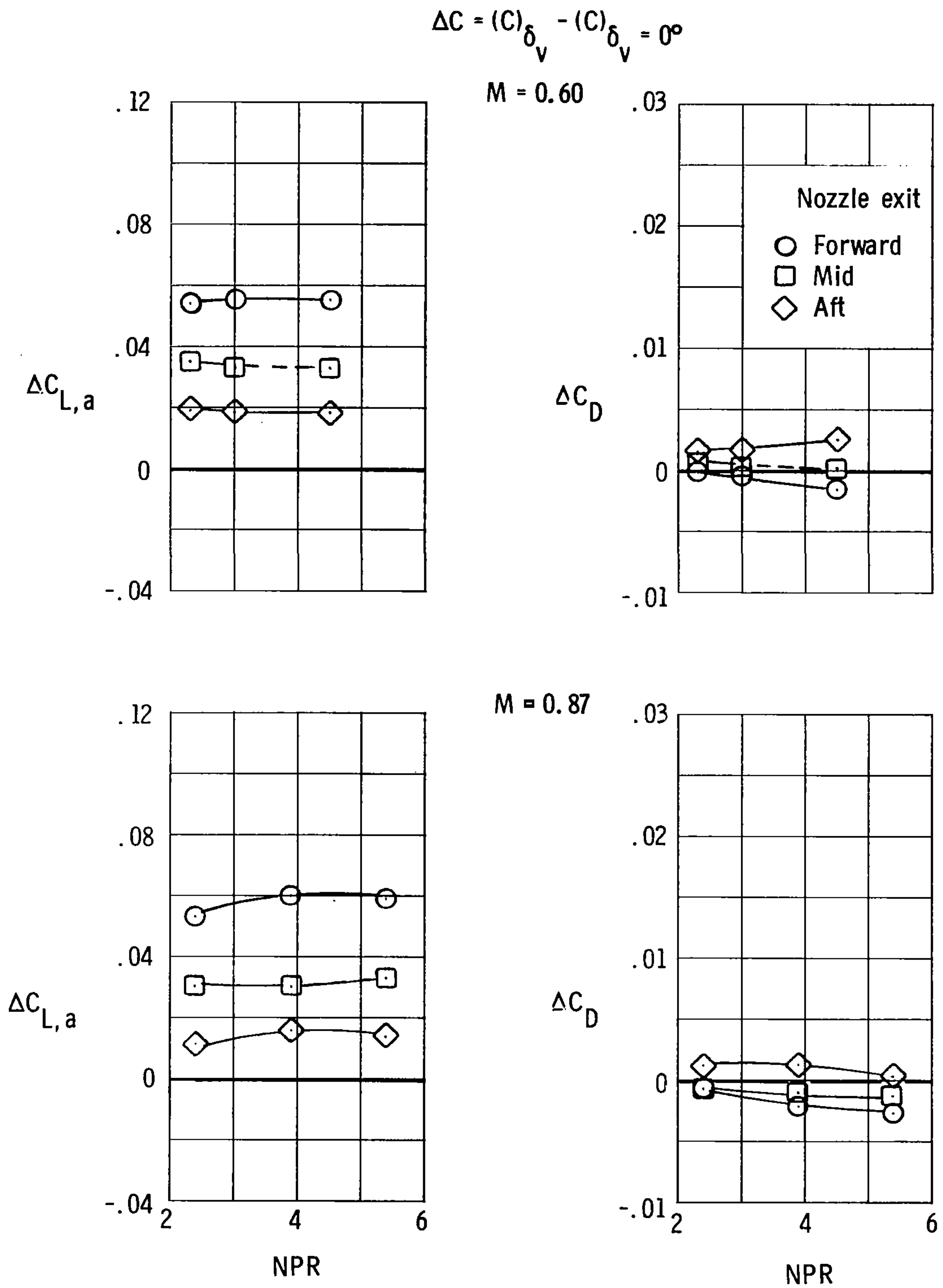
(e) $M = 1.20$; $\alpha = 0^{\circ}$.

Figure 101.- Continued.



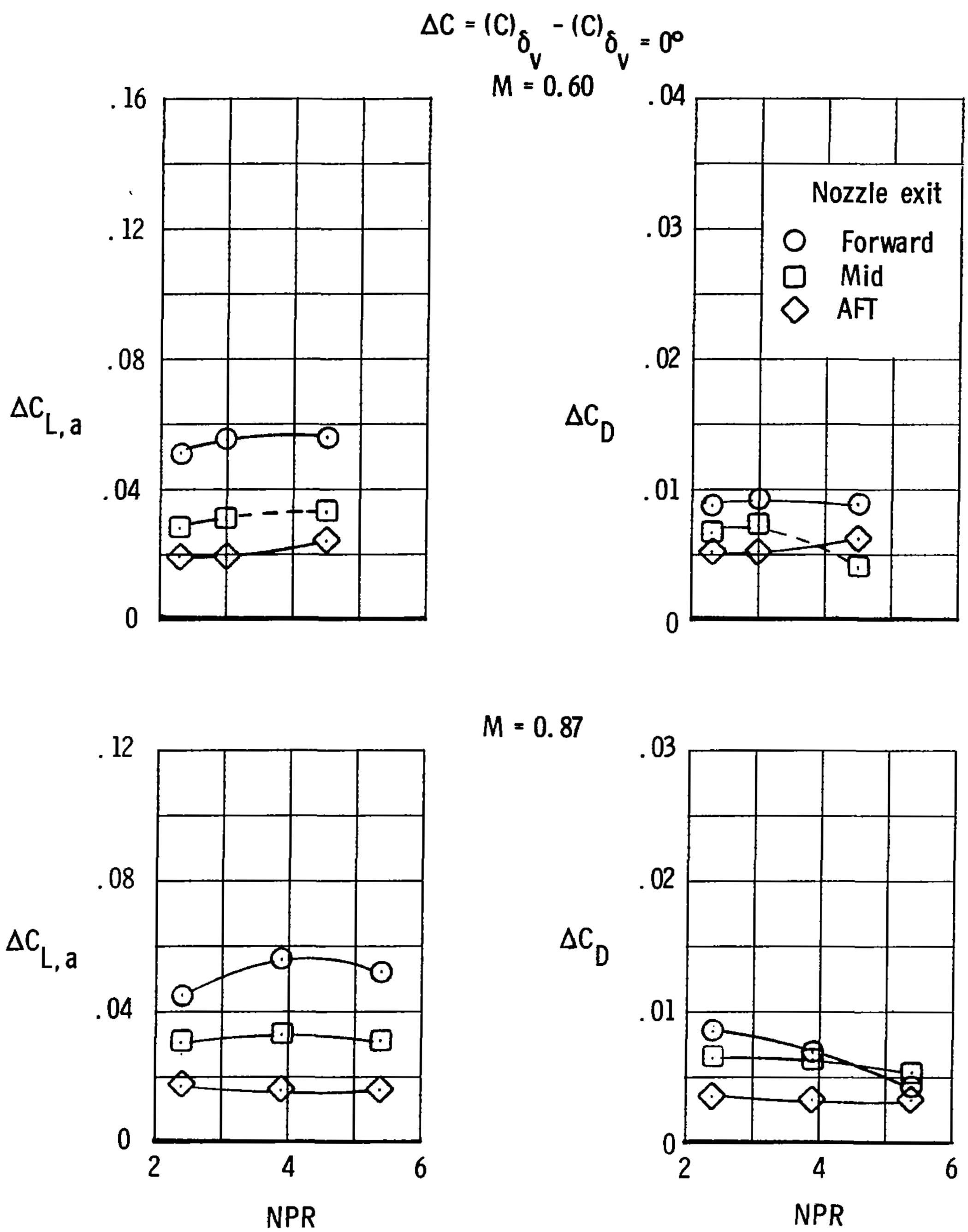
(f) M = 1.20; $\alpha = 10^{\circ}$.

Figure 101.- Concluded.



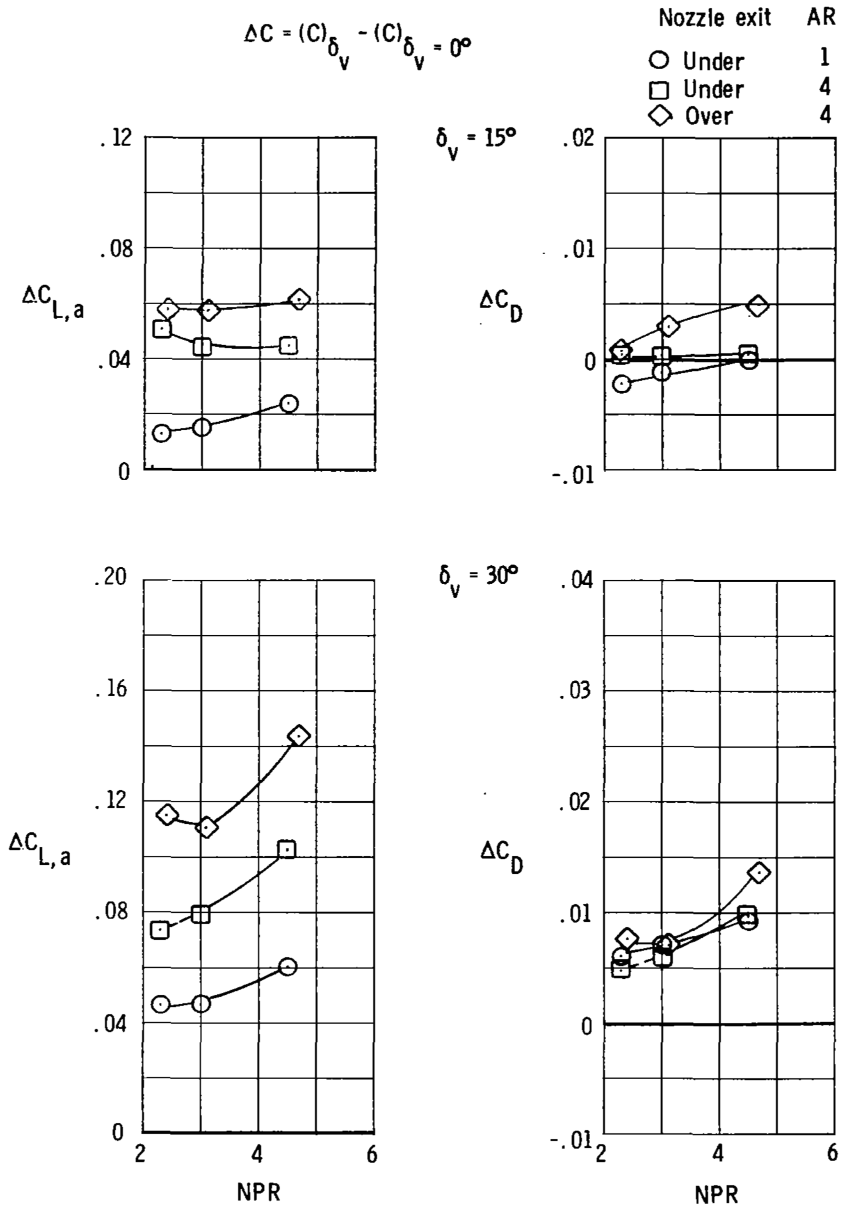
(a) $\alpha = 0^{o}$.

Figure 102.- Effects of nozzle exit location on incremental thrust-induced aerodynamic characteristics for IU* 2-D C-D nozzle. Symbols do not represent data points; dashed curves represent extrapolated data. AR = 1; A/B power setting; $\delta_v = 15^{o}$; $\delta_c = 0^{o}$.



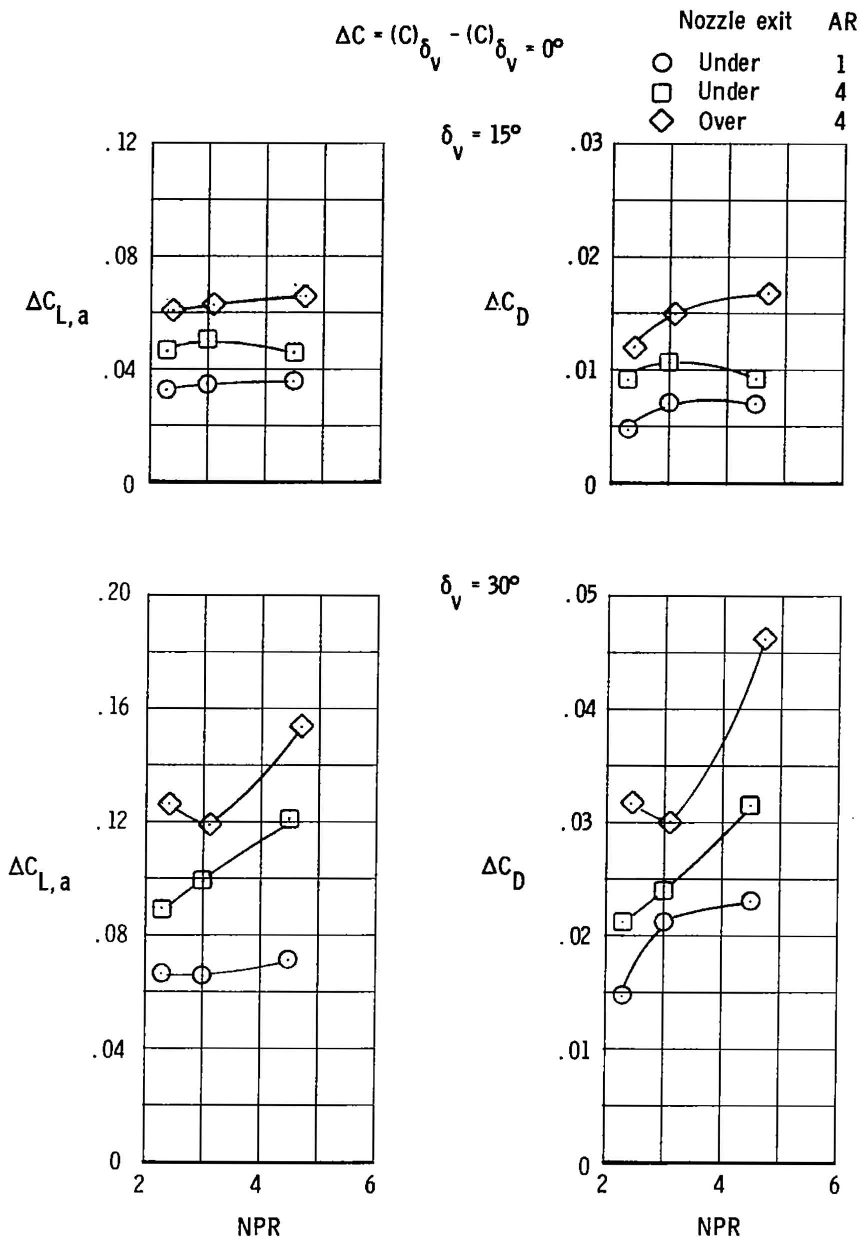
(b) $\alpha = 10^{\circ}$.

Figure 102.- Concluded.



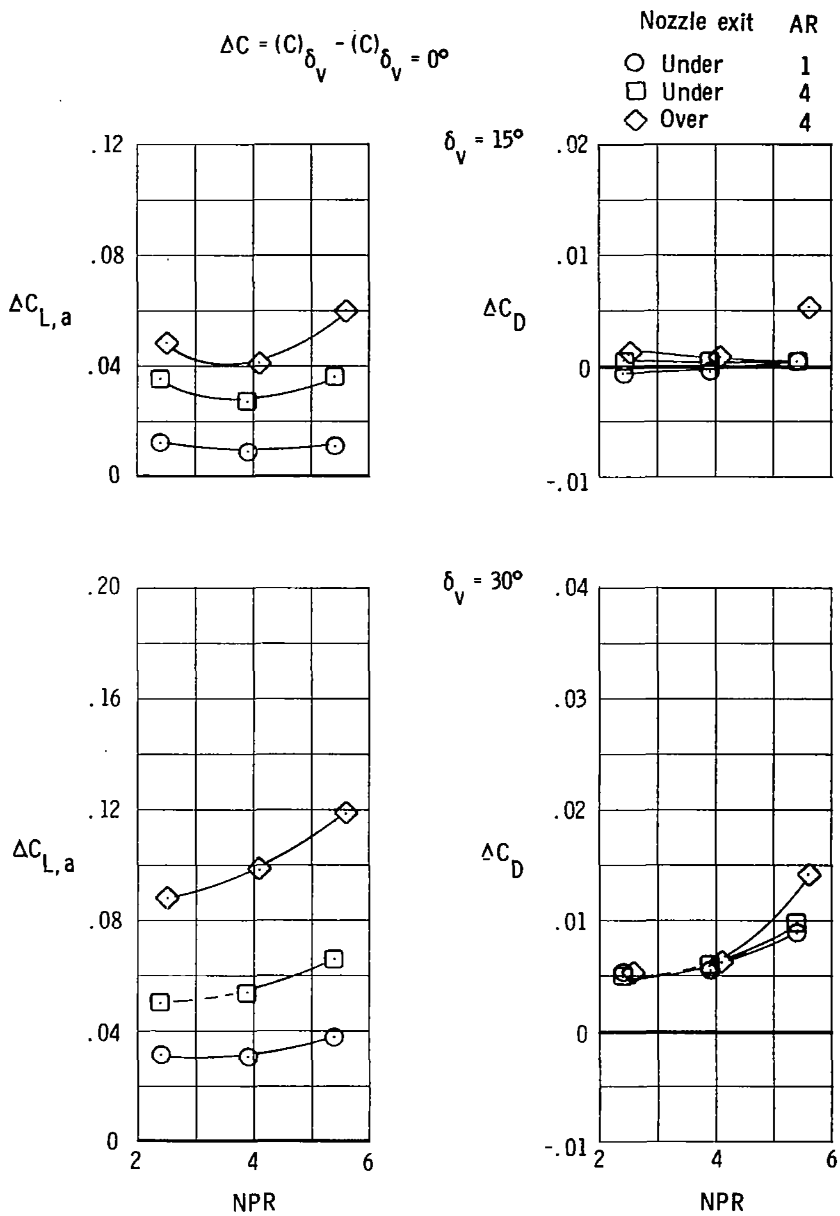
(a) $M = 0.60$; $\alpha = 0^{\circ}$.

Figure 103.- Effects of nozzle aspect ratio and exit vertical location on incremental thrust-induced aerodynamic characteristics for I*M SERN. A/B power setting; $\delta_c = 0^{\circ}$. Symbols do not represent data points.



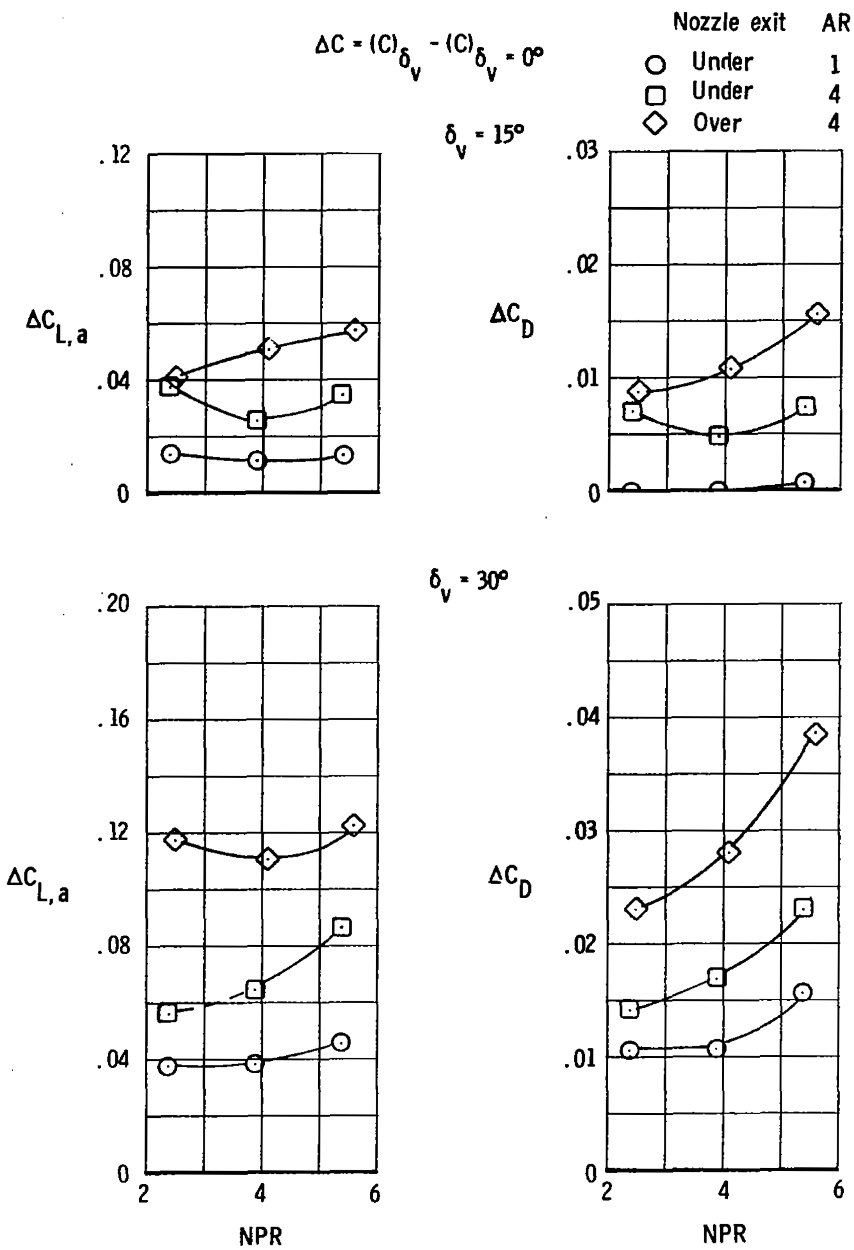
(b) $M = 0.60; \quad \alpha = 10^{\circ}$.

Figure 103.- Continued.



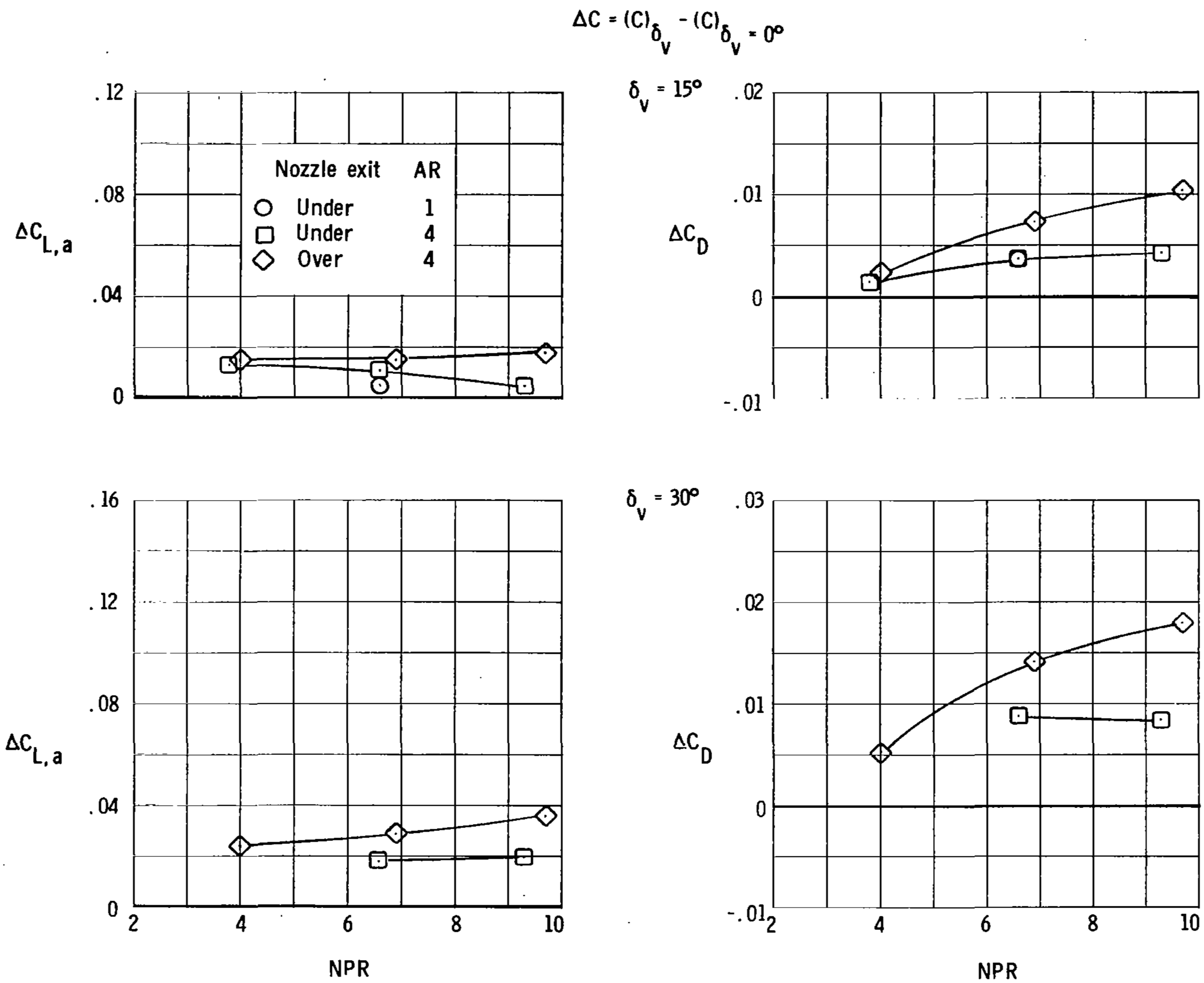
(c) $M = 0.87$; $\alpha = 0^{\circ}$.

Figure 103.- Continued.



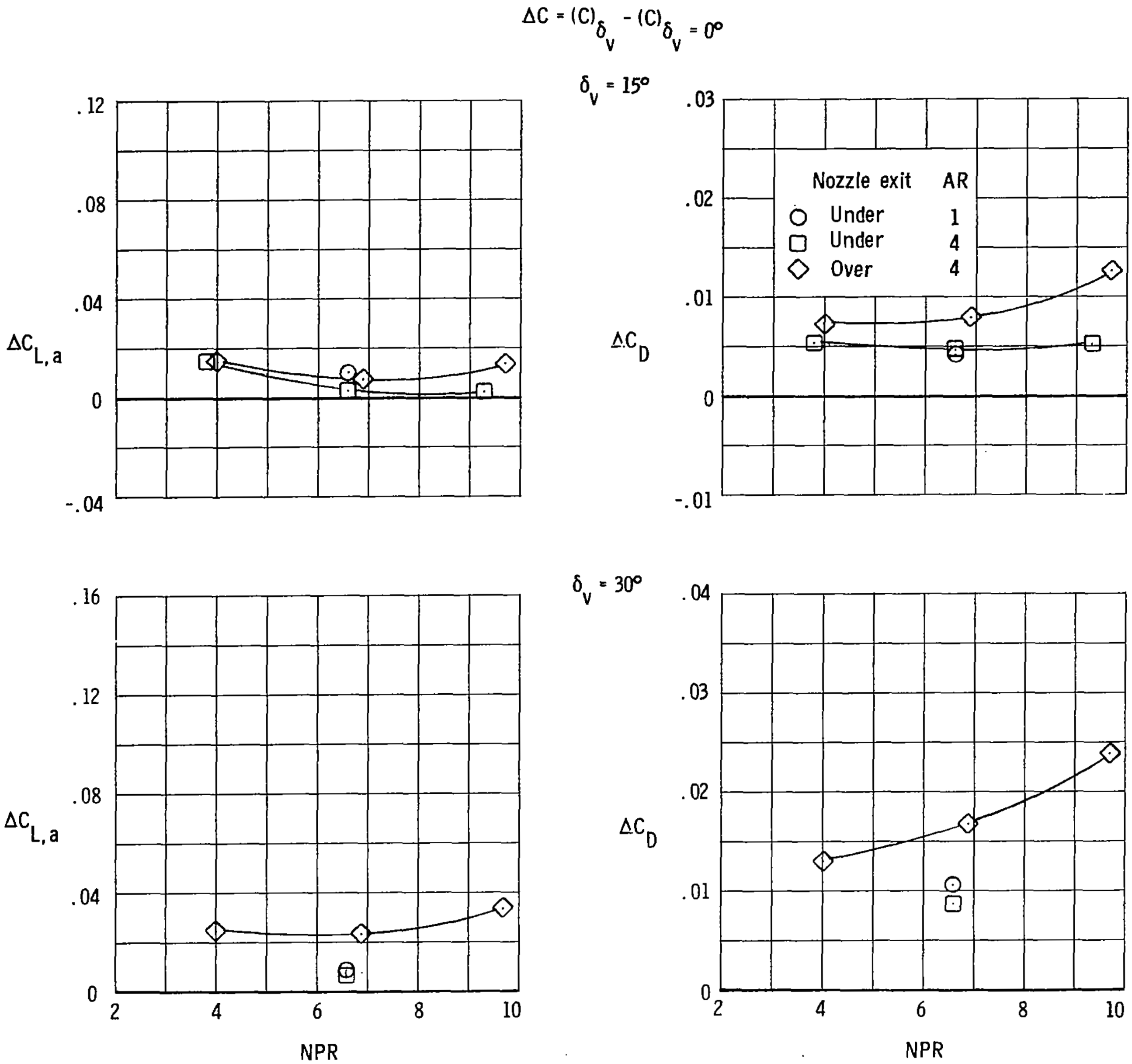
(d) M = 0.87; $\alpha = 10^{\circ}$.

Figure 103.- Continued.



(e) $M = 1.20$; $\alpha = 0^{\circ}$.

Figure 103.- Continued.



(f) M = 1.20; α = 10°.

Figure 103.- Concluded.

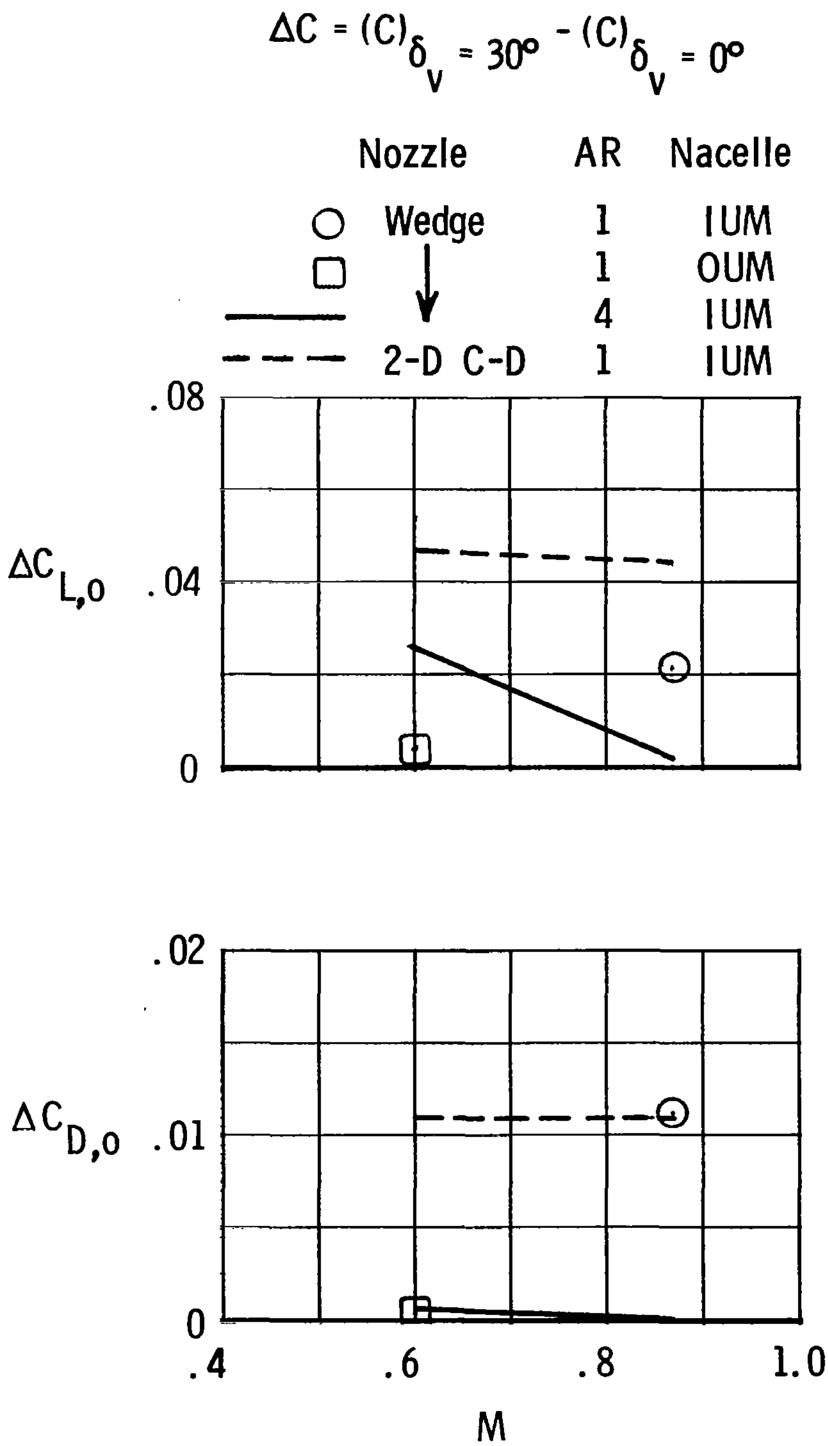
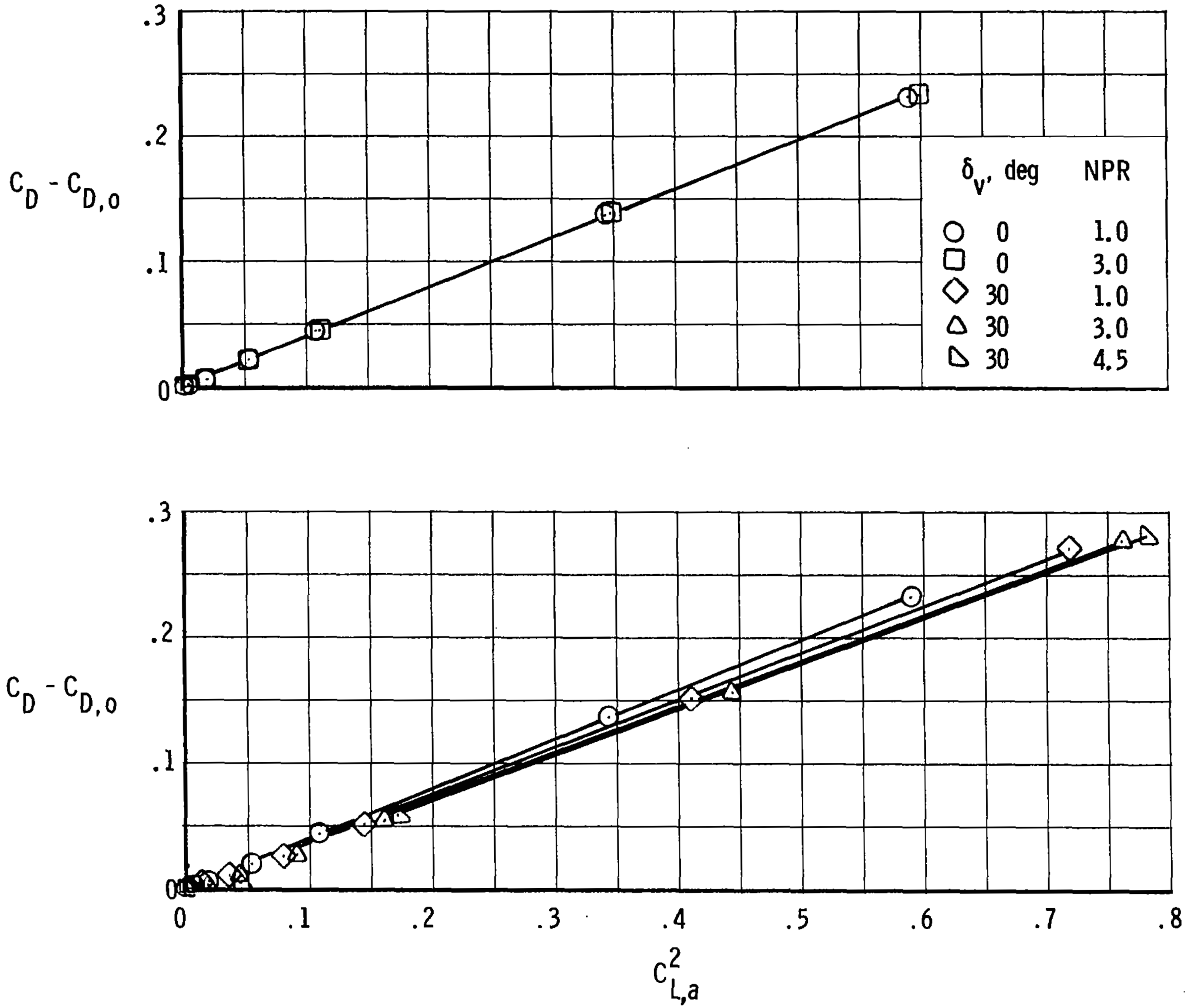
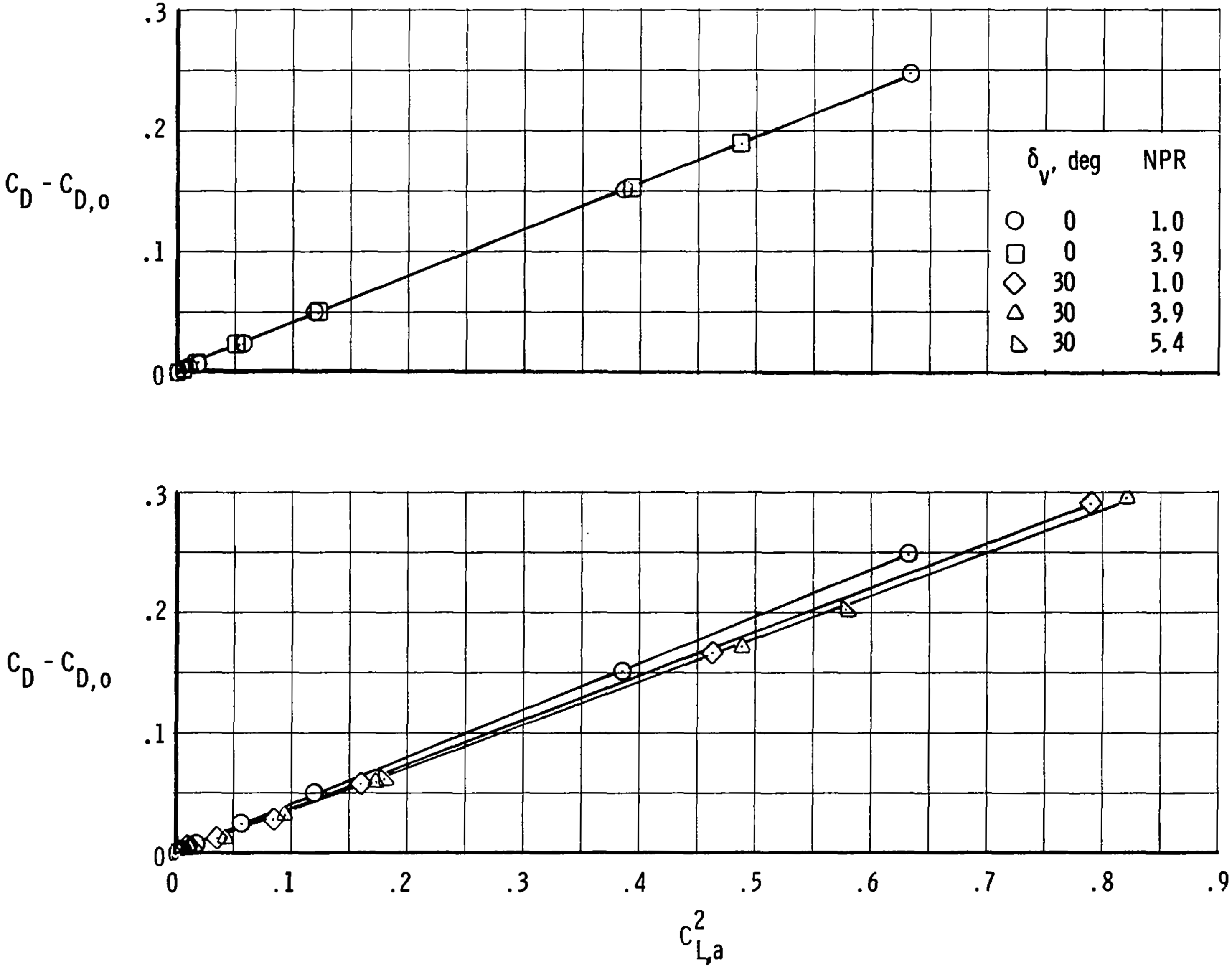


Figure 104.- Nozzle flap incremental aerodynamic lift and drag. A/B power setting; $\delta_v = 30^\circ$; $\delta_c = 0^\circ$; NPR = 1.0; $\alpha = 0^\circ$.



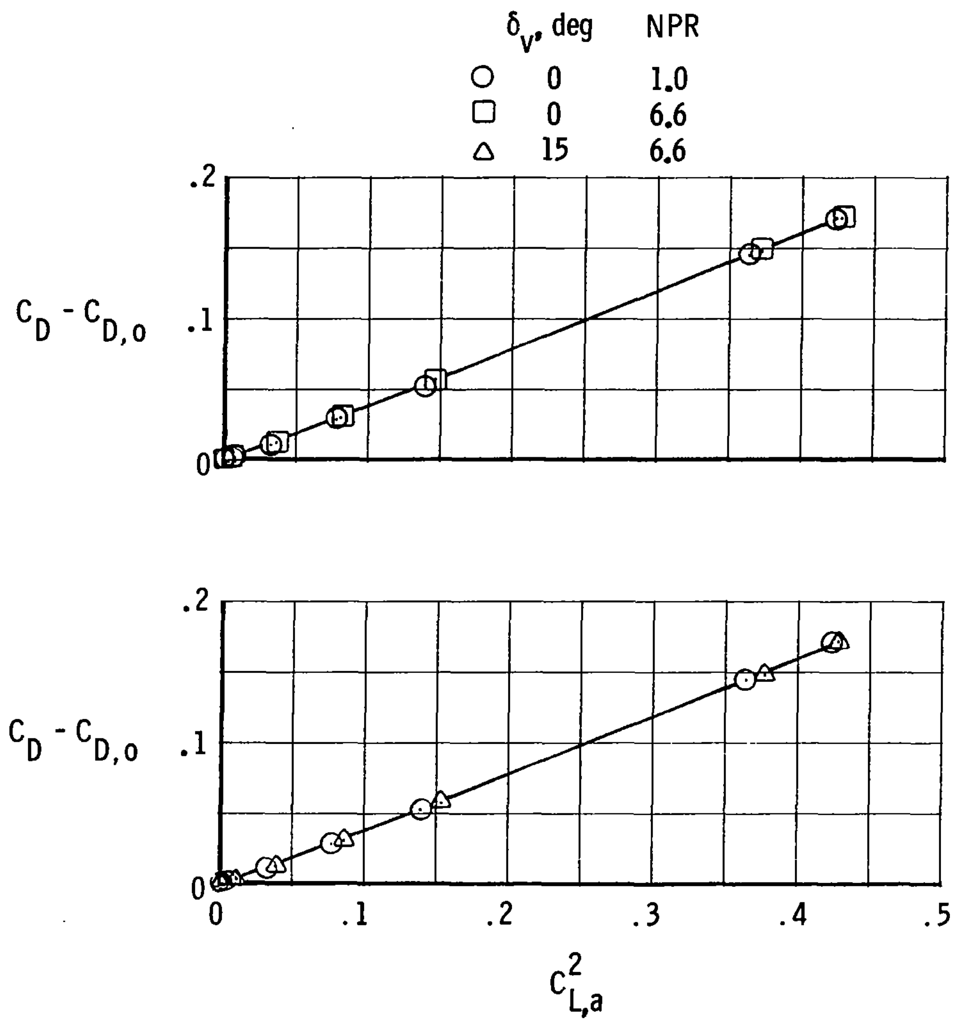
(a) M = 0.60.

Figure 105.- Effects of thrust vectoring on drag-due-to-lift characteristics for IUM 2-D C-D nozzle. AR = 1; A/B power setting; $\delta_c = 0^o$.



(b) M = 0.87.

Figure 105.- Continued.



(c) M = 1.20.

Figure 105.- Concluded.

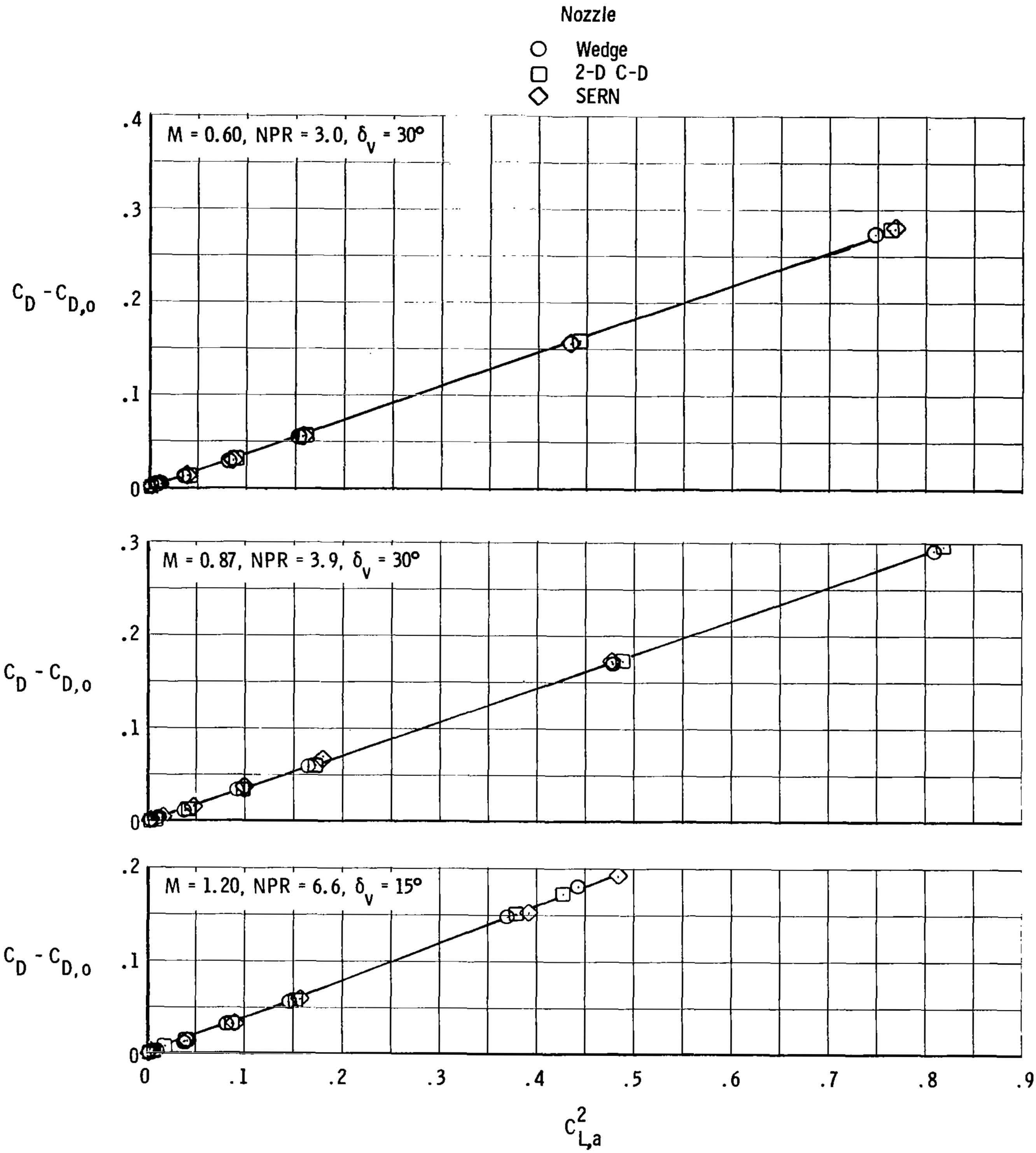


Figure 106.- Effects of nozzle type on drag-due-to-lift characteristics. IUM; AR = 1; A/B power setting; $\delta_c = 0^\circ$.

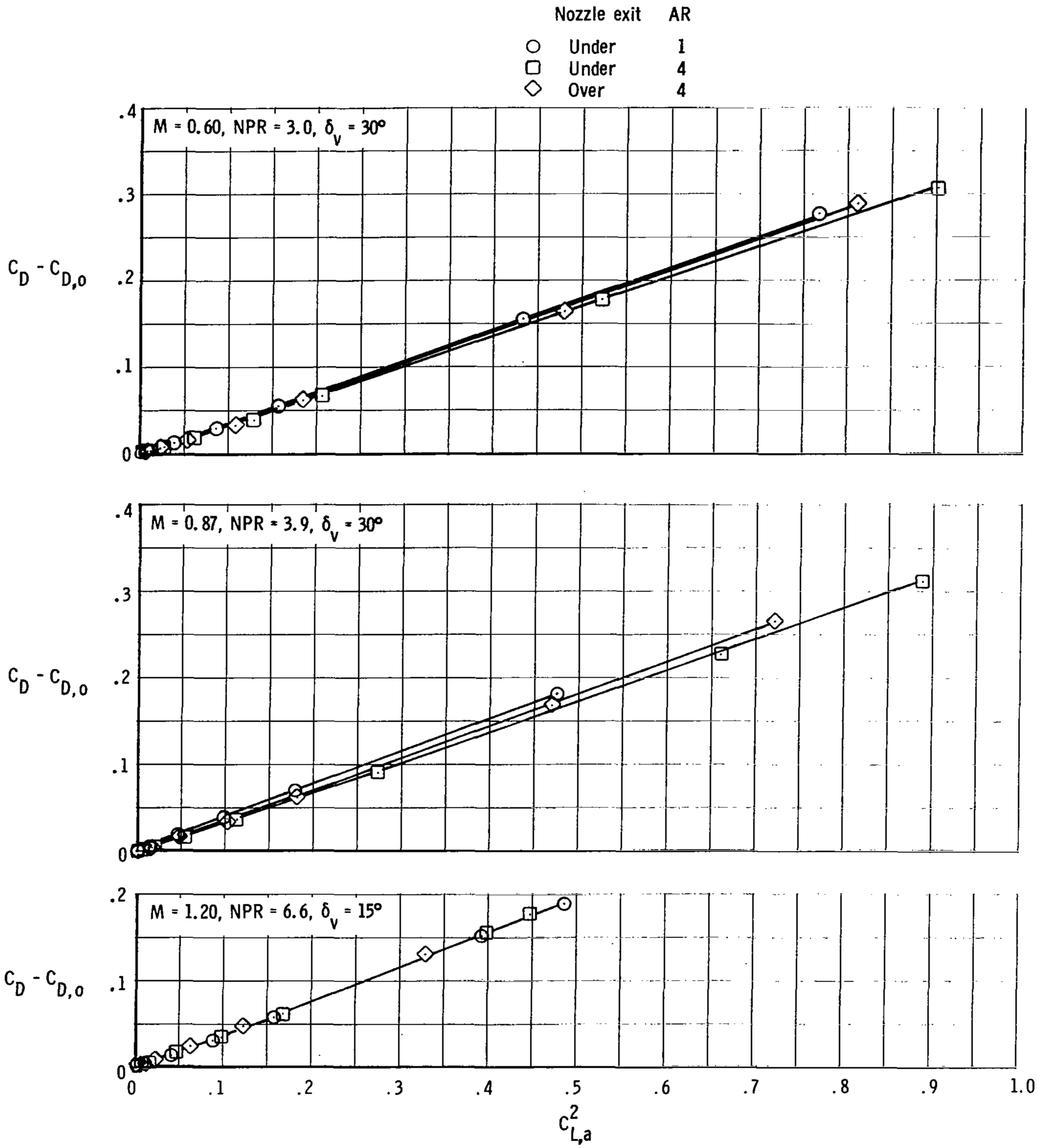
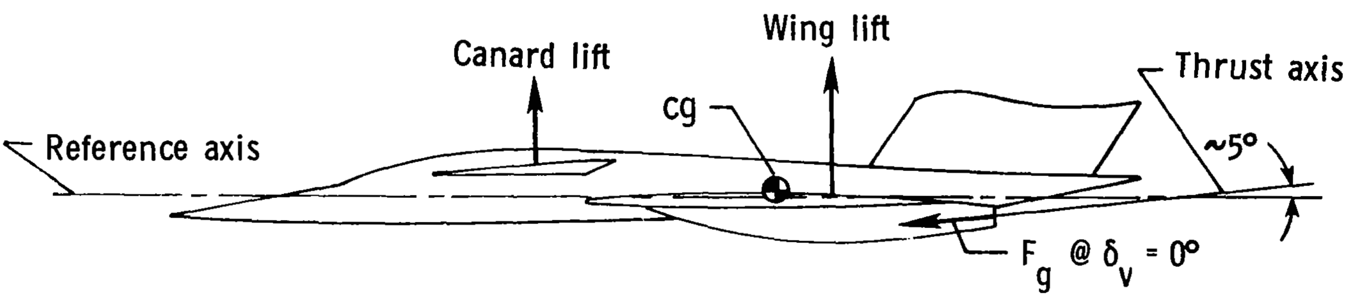


Figure 107.- Effects of nozzle aspect ratio and exit vertical location on drag-due-to-lift characteristics for I*M SERN. A/B power setting; $\delta_c = 0^o$.



Force input	Moment direction
F_g @ $\delta_v = 0°$	Nose up
F_g @ $\delta_v > 5°$	Nose down

Figure 108.- Vehicle force diagram.

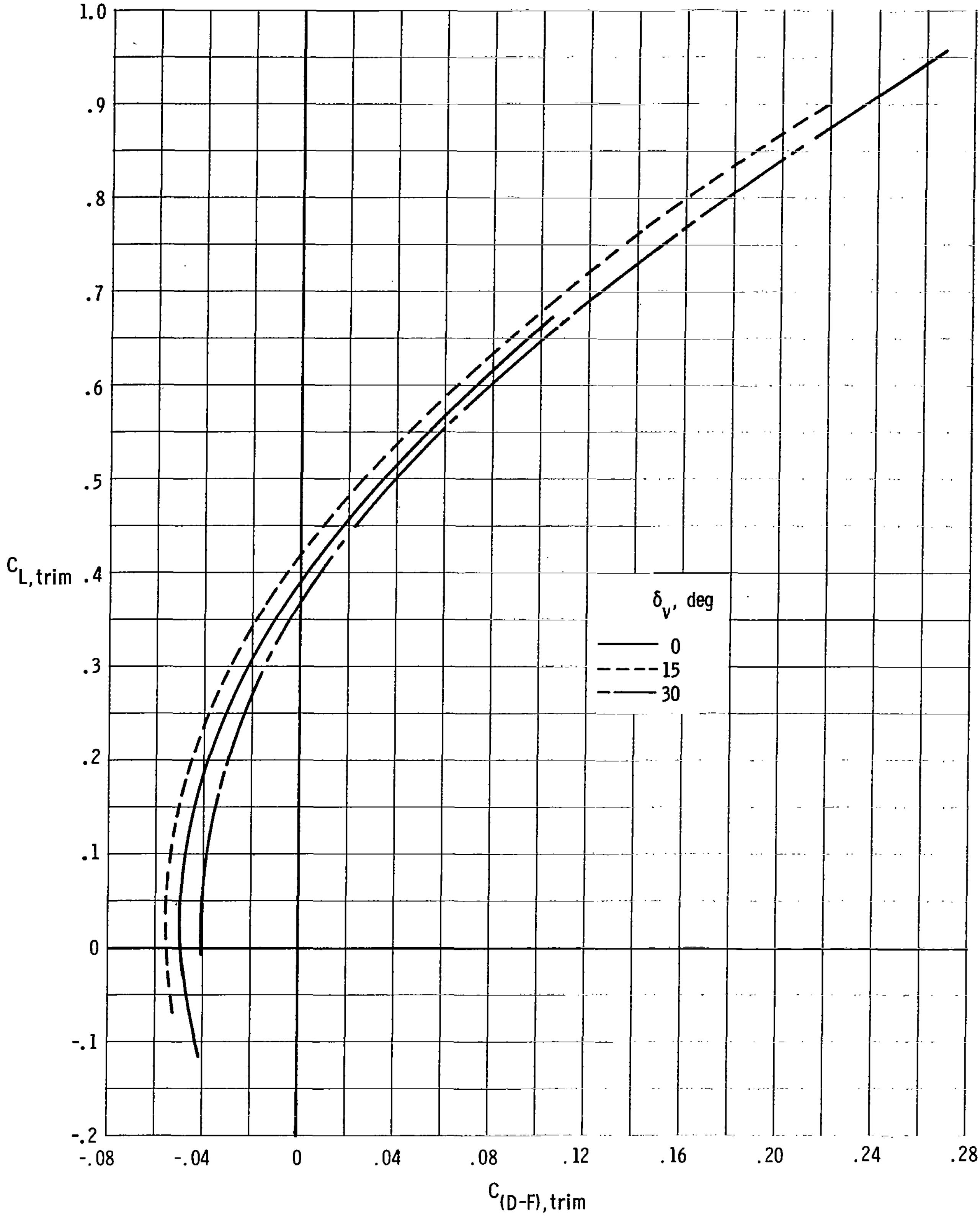


Figure 109.- Effects of thrust-vectoring angle on trimmed jet-on polars for IUM 2-D C-D nozzle. AR = 1; A/B power setting; M = 0.87; NPR = 3.9.

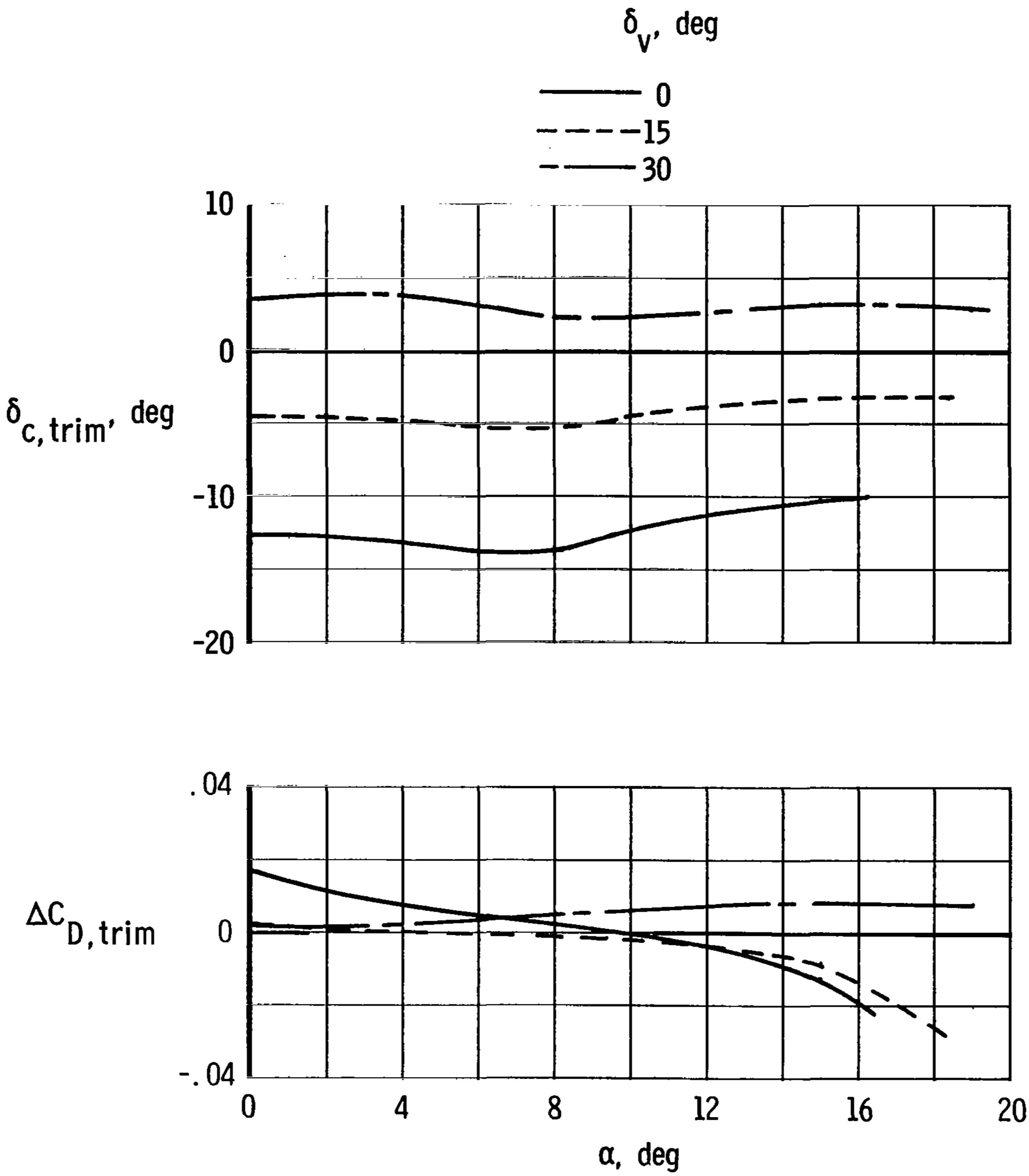


Figure 110.- Effects of thrust-vectoring angle on canard angle required for trim and trimmed drag increments for IUM 2-D C-D nozzle. AR = 1; A/B power setting; M = 0.87; NPR = 3.9.

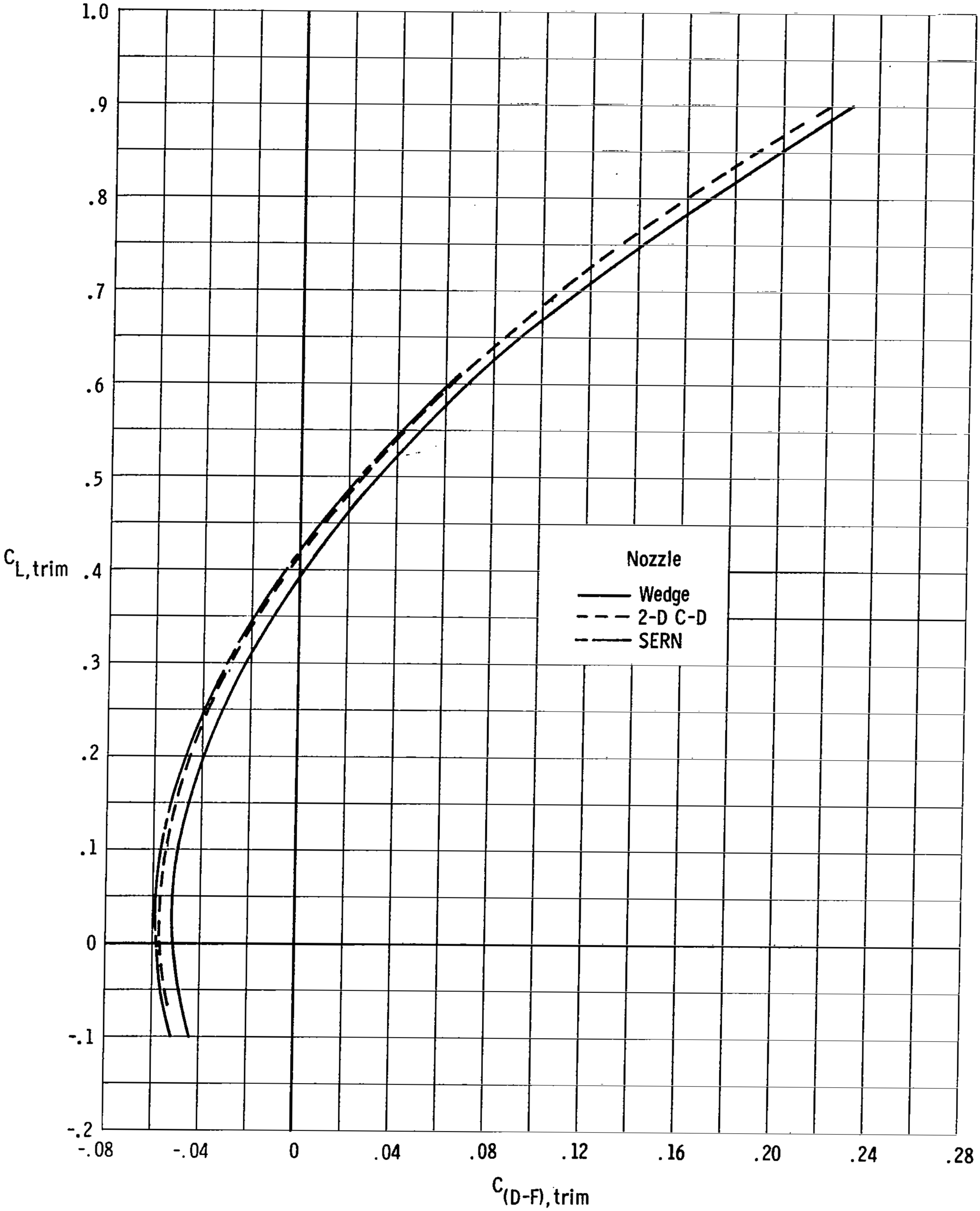


Figure 111.- Effects of nozzle type on trimmed jet-on polars. IUM; AR = 1; A/B power setting; $\delta_v = 15^{\circ}$; M = 0.87; NPR = 3.9.

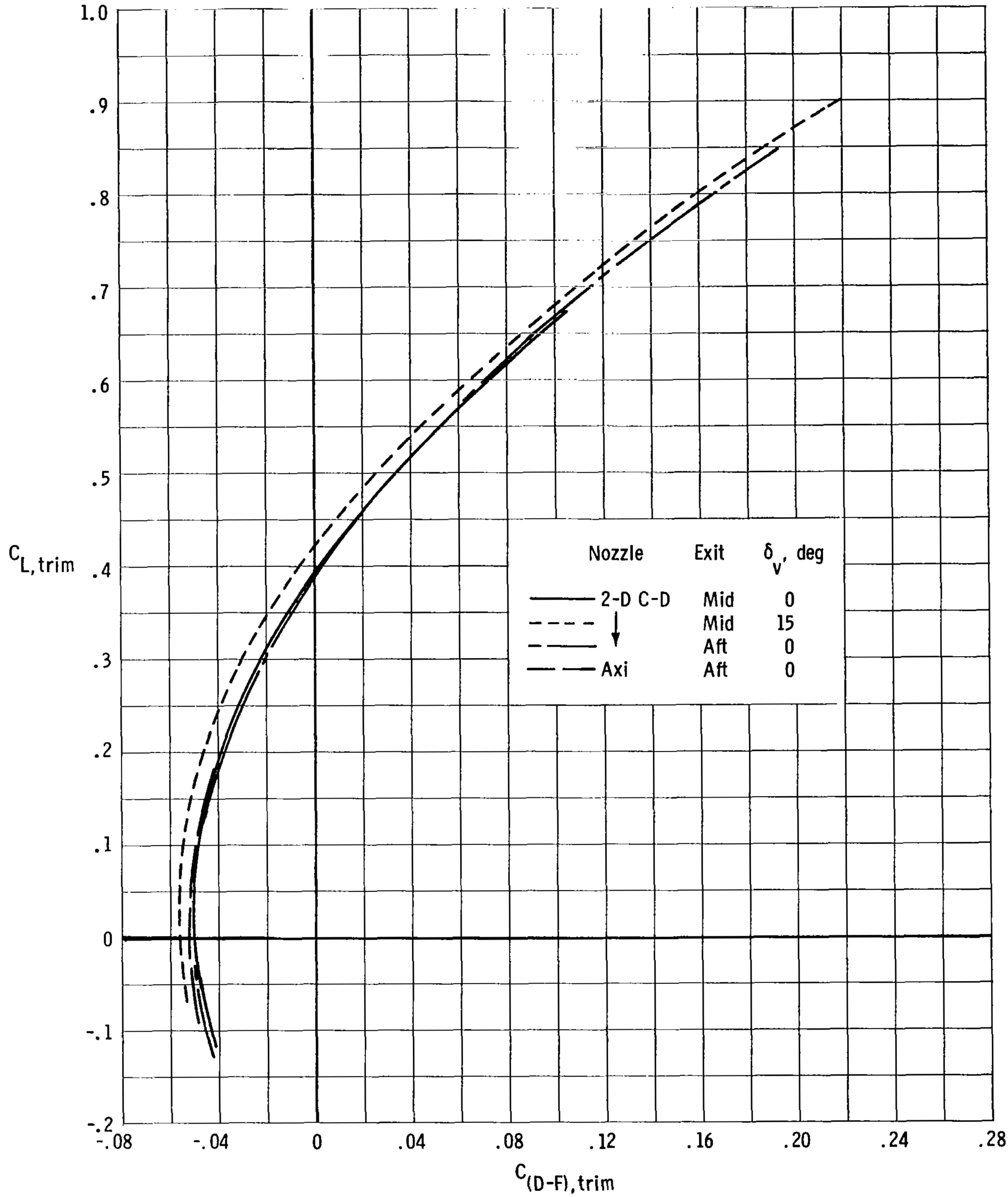


Figure 112.- Effects of nozzle type, exit location, and thrust-vectoring angle on trimmed jet-on polars. IU*; AR = 1; A/B power setting; M = 0.87; NPR = 3.9.

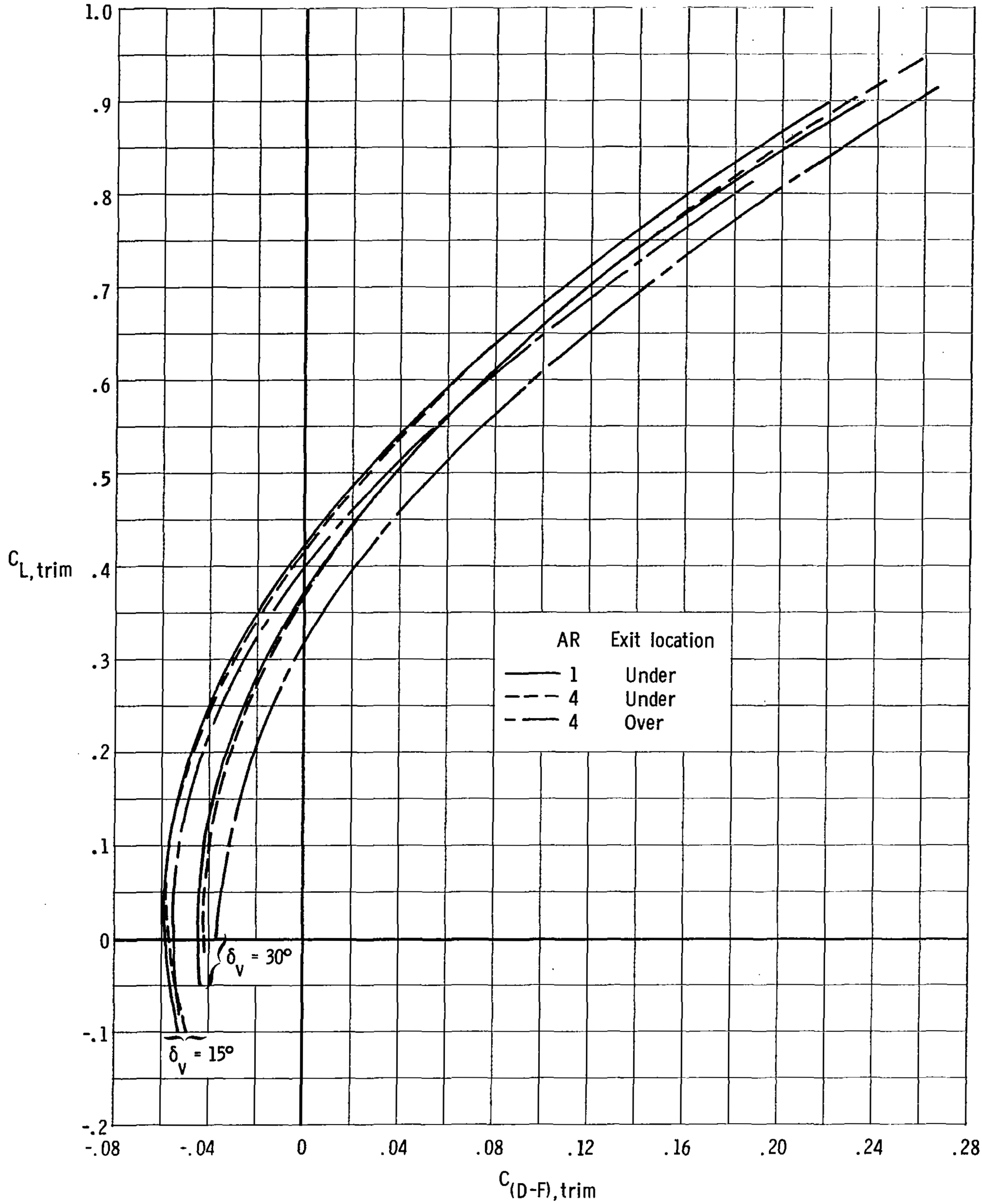
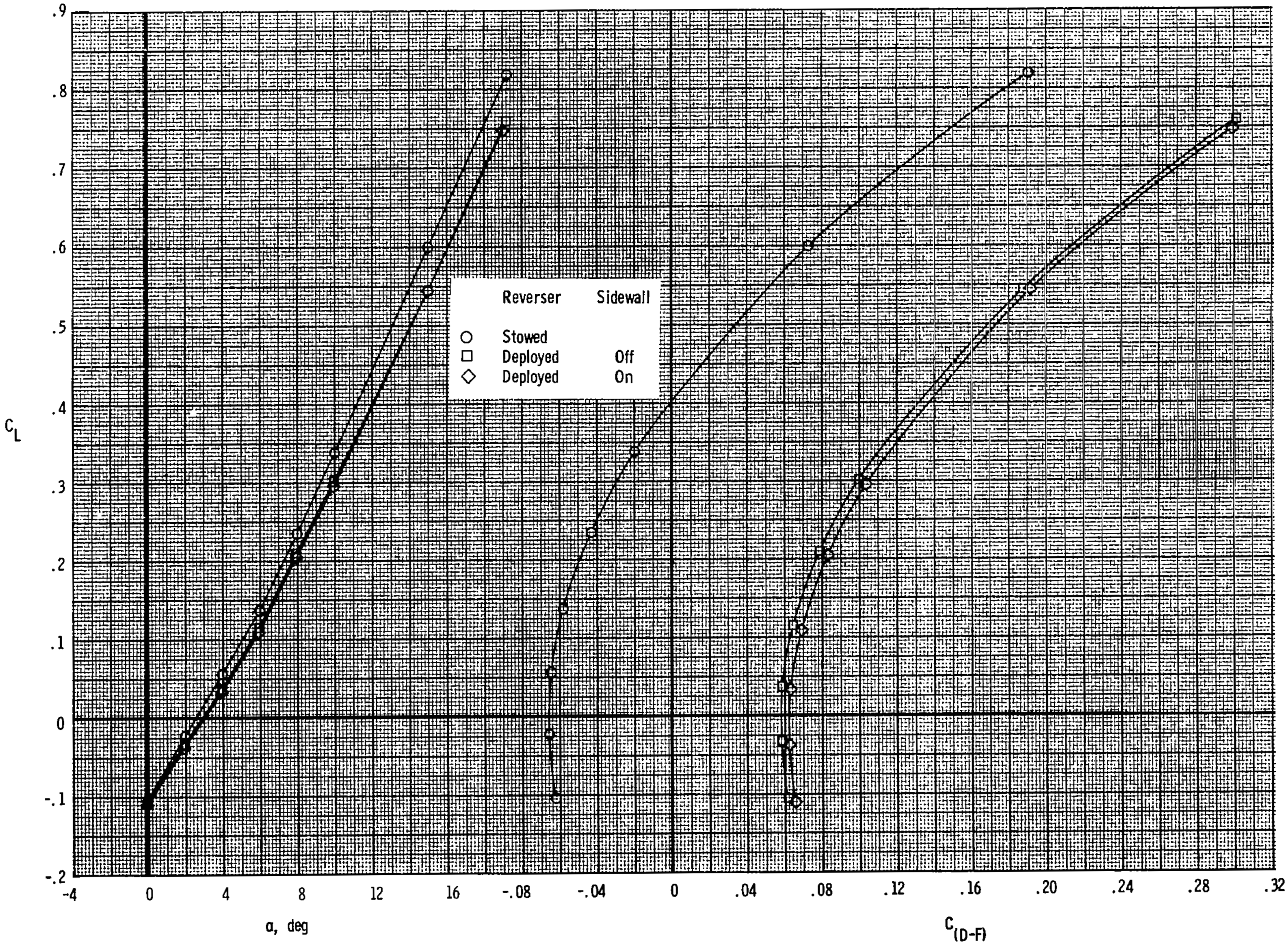
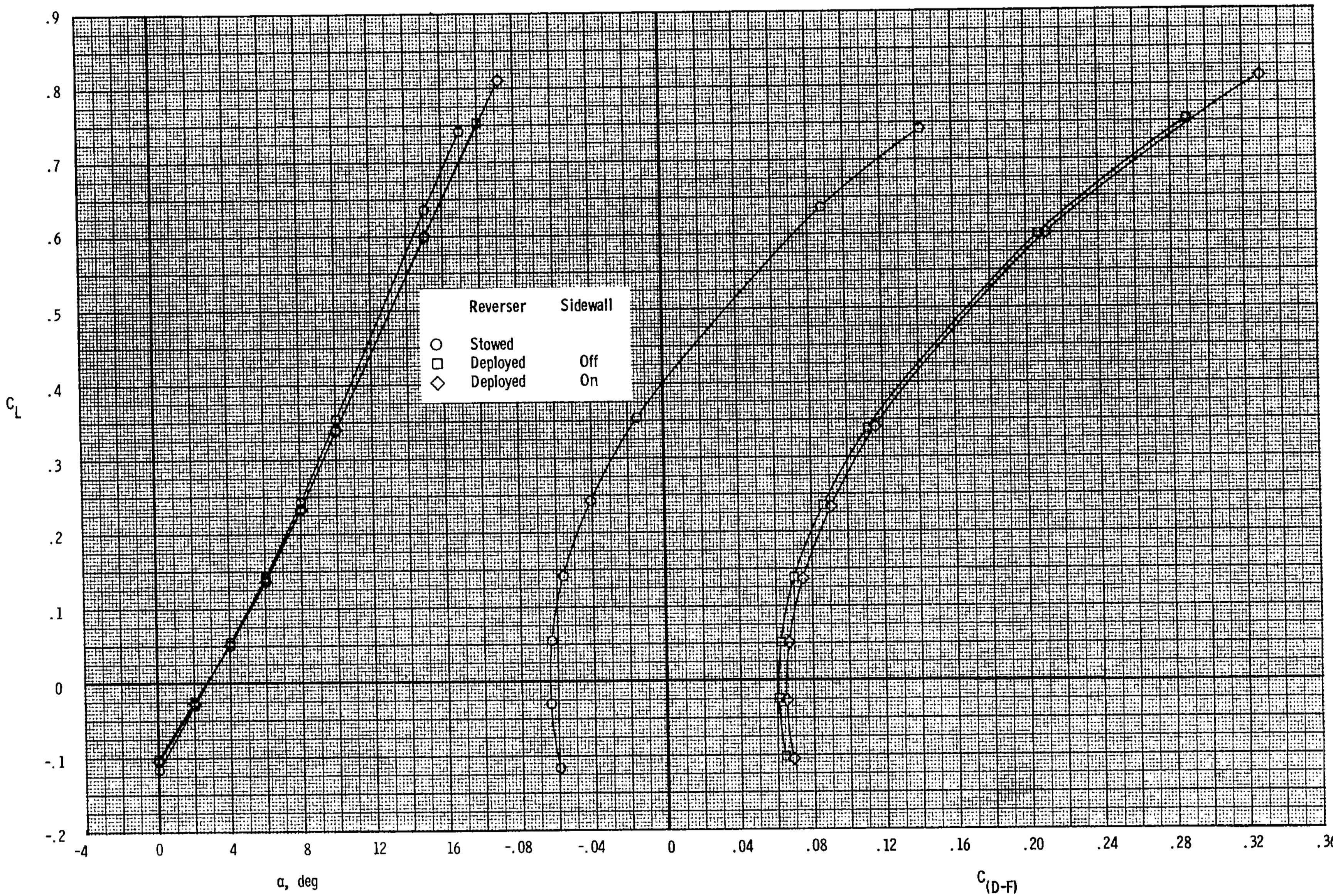


Figure 113.- Effects of nozzle aspect ratio and exit vertical location on trimmed jet-on polars for I*M SERN. A/B power setting; M = 0.87; NPR = 3.9.



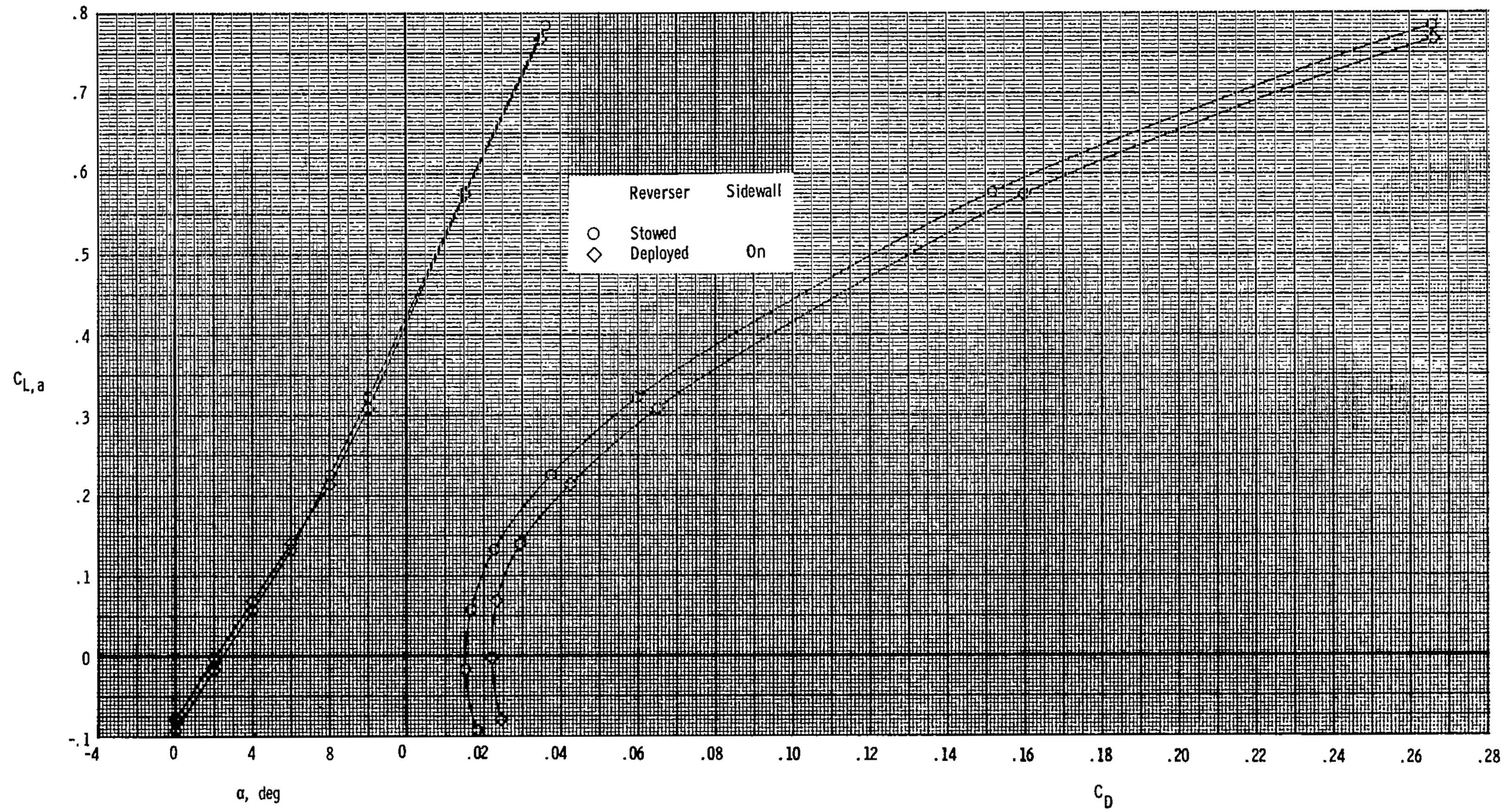
(a) M = 0.60; NPR = 3.2.

Figure 114.- Effects of thrust reverser on total aerodynamic characteristics for IUM wedge nozzle. AR = 4; dry power setting; $\delta_v = 0^o$; $\delta_c = 0^o$.



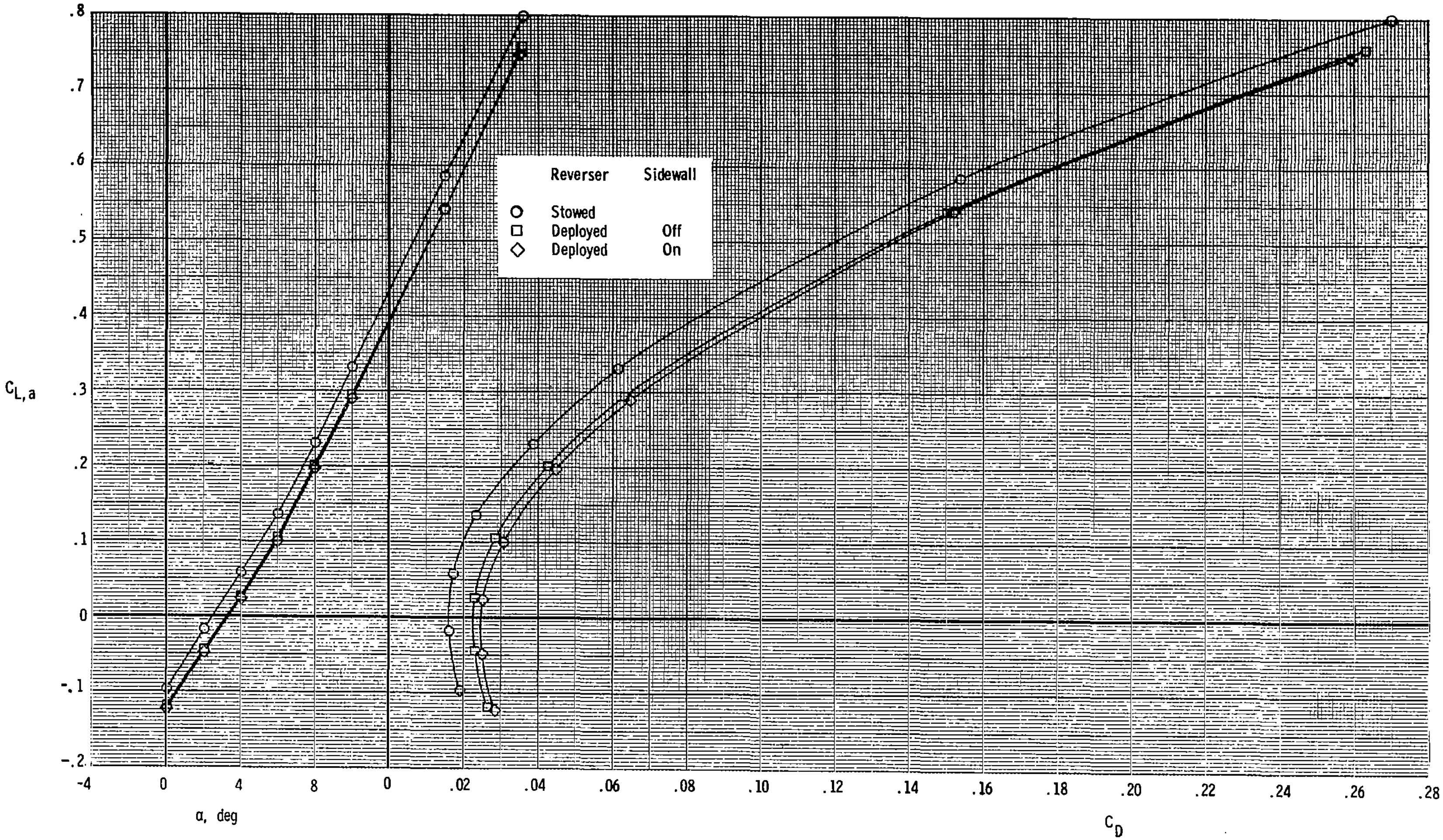
(b) M = 0.87; NPR = 5.7.

Figure 114.- Concluded.



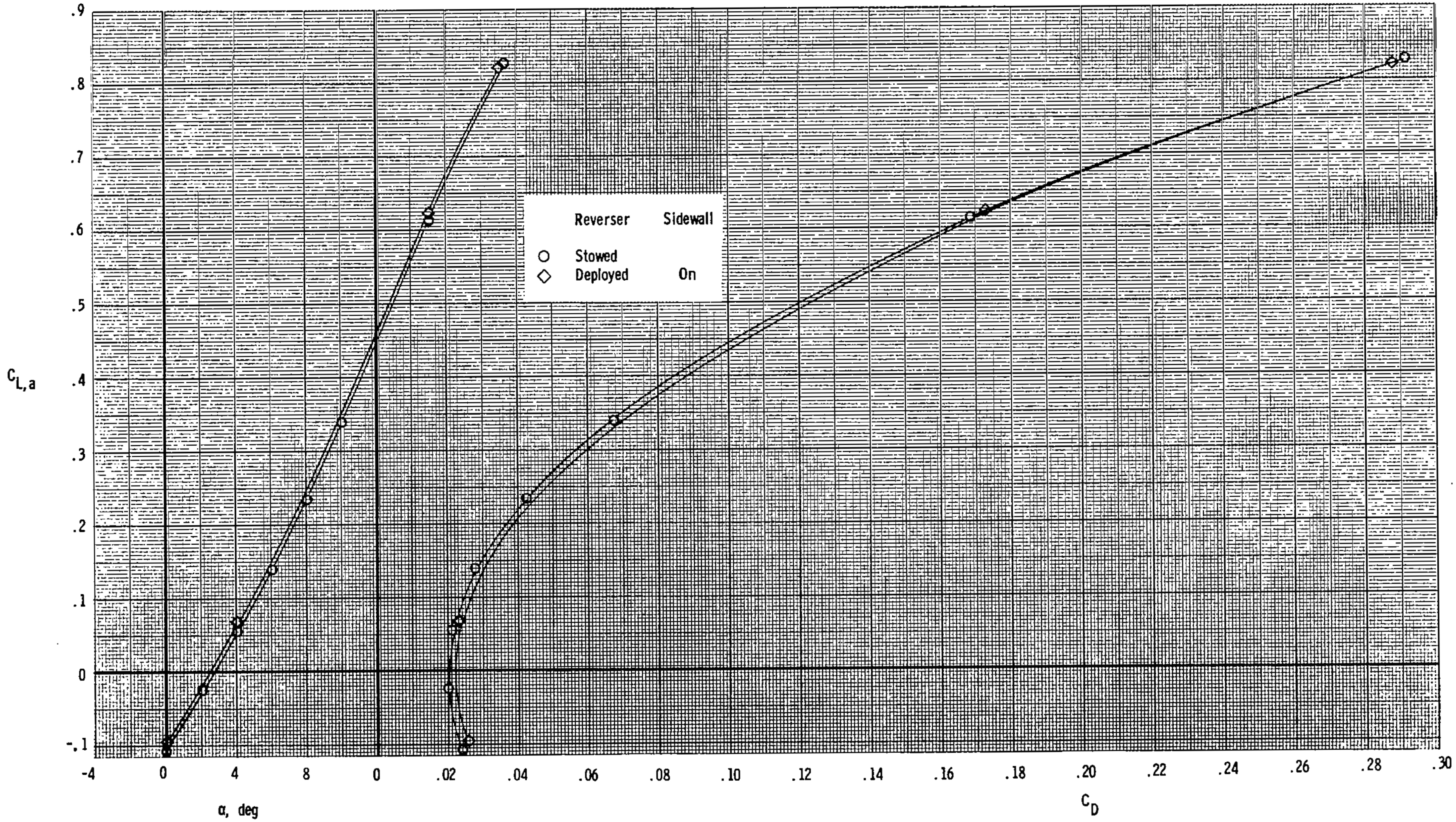
(a) M = 0.60; NPR = 1.0.

Figure 115.- Effects of thrust reverser on thrust-removed aerodynamic characteristics for IUM wedge nozzle. AR = 4; dry power setting; $\delta_v = 0^o$; $\delta_c = 0^o$.



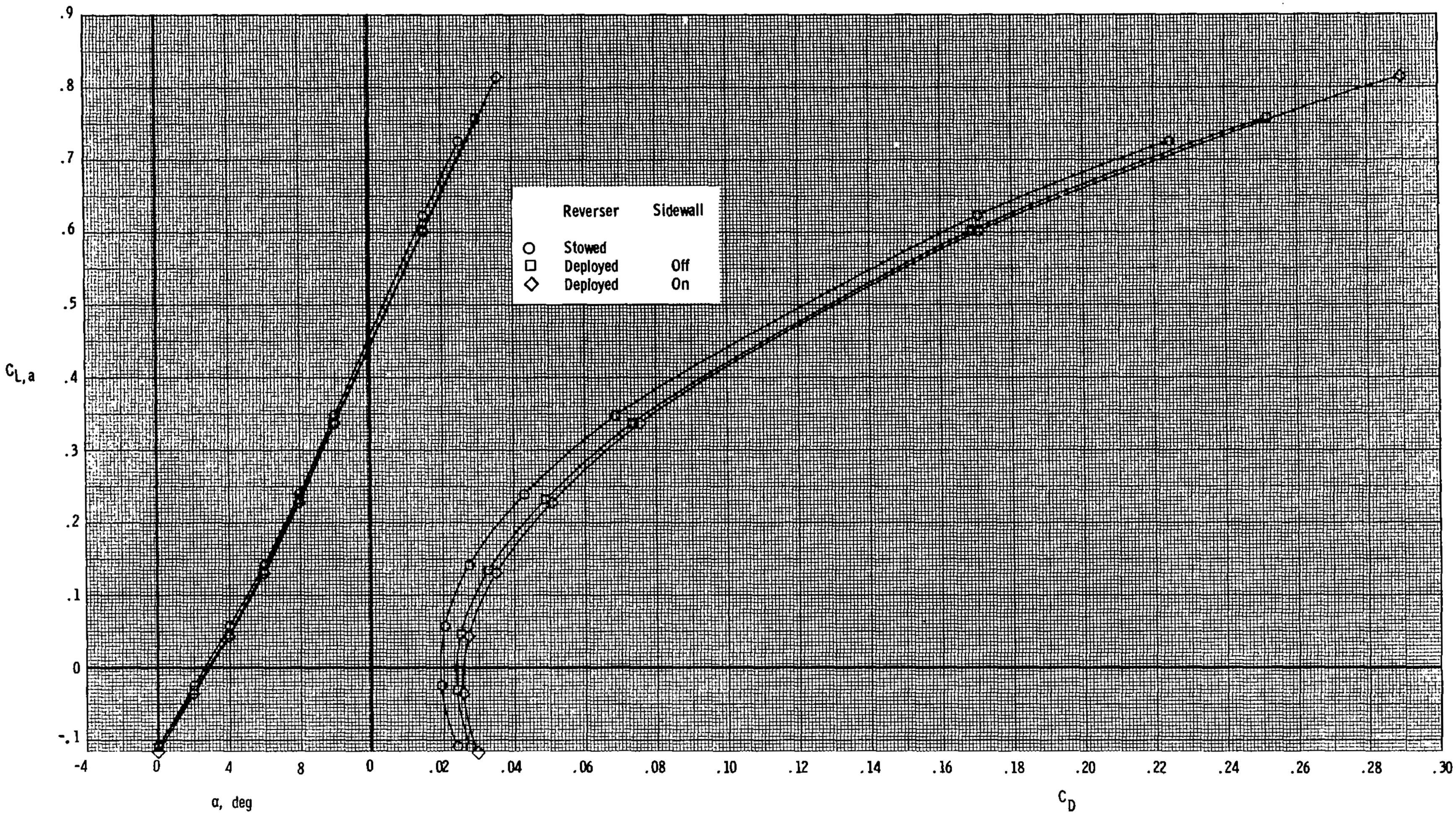
(b) M = 0.60; NPR = 3.2.

Figure 115.- Continued.



(c) M = 0.87; NPR = 1.0.

Figure 115.- Continued.



(d) M = 0.87; NPR = 5.7.

Figure 115.- Concluded.

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15. Supplementary Notes

16. Abstract

The aeropropulsive characteristics of an advanced twin-engine fighter designed for supersonic cruise have been investigated in the Langley 16-Foot Transonic Tunnel. The objectives of this investigation were to evaluate the performance characteristics of advanced nonaxisymmetric nozzles installed in various nacelle locations, the effects of thrust-induced forces on overall aircraft aerodynamics, the trim characteristics, and the thrust reverser performance. The major model variables included nozzle power setting; nozzle duct aspect ratio; forward, mid, and aft nacelle axial locations; inboard and outboard underwing nacelle locations; and underwing and overwing nacelle locations. Thrust-vectoring exhaust nozzle configurations included a wedge nozzle, a two-dimensional convergent-divergent nozzle, and a single-expansion ramp nozzle, each with deflection angles up to 30°. In addition to the nonaxisymmetric nozzles, an axisymmetric nozzle installation was also tested. The use of a canard for trim was also assessed.

17. Key Words (Suggested by Author(s))	18. Distribution Statement
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