

4. PRESSURE DISTRIBUTION MEASURED IN THE RAE 8ft x 6ft TRANSONIC WIND TUNNEL ON RAE WING 'A' IN COMBINATION WITH AN AXI-SYMMETRIC BODY AT MACH NUMBERS OF 0.4, 0.8 AND 0.9

by

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1. INTRODUCTION

This contribution contains selected data from measurements of surface pressure distributions made in the RAE 8ft x 6ft transonic wind tunnel on RAE research wing 'A' in combination with an axisymmetric body. Wing A is a wing of simple planform without dihedral or twist and is based on a uncambered RAE 101 aerofoil section. The tests were made on a complete model of a size that renders the tunnel wall interference relatively small. Although the test Reynolds number (one million based on the geometric mean chord) is low, it raises no particular problems for the cases presented here, since the adverse pressure gradients are mild and boundary-layer transition was controlled.

Tables and graphs of the pressure distribution on the wing and body are given for the conditions given below:

Case number	Mach number	Angle of incidence
1	0.4	0
2	0.8	0
3	0.9	0
4	0.4	2°
5	0.8	2°
6	0.9	1°

2. DATA SET

1. General description

- | | | |
|-----|---|--|
| 1.1 | Model designation or name | RAE Wing A mounted symmetrically on the cylindrical body $B_2(W_{AB_2}(0)0)$ |
| 1.2 | Model type (<i>eg</i> full span wing-body, semi-span wing) | Full-span wing-body model |
| 1.3 | Design requirements/conditions | Wing body model of simple geometric form |
| 1.4 | Additional remarks | |

2. Model geometry

- | | | |
|--------|---|--|
| 2.1 | Wing data | See Fig 4.1 |
| 2.1.1 | Wing planform | Swept wing with straight leading and trailing edges |
| 2.1.2 | Aspect ratio | Gross aspect ratio 6 (gross planform defined by the straight line extension of the leading and trailing edges to the body centre-line) |
| 2.1.3 | Leading-edge sweep | 36.65° |
| 2.1.4 | Trailing-edge sweep | 22.34° |
| 2.1.5 | Taper ratio | 1/3 |
| 2.1.6 | Twist | Zero |
| 2.1.7 | Mean aerodynamic chord | 152.4 mm (0.5 ft) |
| 2.1.8 | Span or semispan | 914.4 mm (3.00 ft) span |
| 2.1.9 | Number of airfoil sections used to define wing | One |
| 2.1.10 | Spanwise location of reference section and section coordinates (Note if ordinates are design or actual measured values) | Root and tip
RAE 101 section thickness/chord ratio 9%
See Table 4.1 |
| 2.1.11 | Lofting procedure between reference sections | Straight lines between root and tip stations at constant x/c |
| 2.1.12 | Form of wing-body fillet, strakes | No fillets or strakes fitted |
| 2.1.13 | Form of wing tip | Cross-section formed by a radius of half local wing thickness (see Fig 4.1) |

2.2	Body data (detail description of body geometry)	Axisymmetric body with a nose profile given by $\frac{R \left(\frac{x'}{\ell'} \right)}{R_0 (1)} = \frac{\ell'}{R_0} \left\{ \frac{1}{2} \frac{x'}{\ell'} - \frac{3}{8} \left(\frac{x'}{\ell'} \right)^2 + \frac{1}{16} \left(\frac{x'}{\ell'} \right)^4 \right\},$ $\frac{\ell'}{R_0} = 5.33, \quad 0 < \frac{x'}{\ell'} < 1$								
		See Fig 4.1								
2.3	Wing-body combination									
2.3.1	Relative body diameter (average body diameter at wing location divided by wing span)	1/6								
2.3.2	Relative vertical location of wing (height above or below body axis divided by average body radius at wing location)	Aligned with the axis of symmetry of the body								
2.3.3	Wing setting angle	Zero								
2.3.4	Dihedral	Zero								
2.4	Cross sectional area development	No 'area-rule' development - simple wing with a cylindrical body								
2.5	Fabrication tolerances/waviness	In general the wing is within the specified manufacturing tolerance of ± 0.05 mm for the wing ordinates and the limit on waviness of 0.05 mm/25 mm. An inspection report is available on request								
2.6	Additional remarks									
3.	<u>Wind tunnel</u>									
3.1	Designation	RAE 8ft x 6ft transonic wind tunnel								
3.2	Type of tunnel									
3.2.1	Continuous or blowdown	Continuous, closed circuit								
3.2.2	Stagnation pressure	10 to 355 kN/m ² pumping and pressure shell limitation; for operational limits due to power of main drive see section 3.6.1								
3.2.3	Stagnation temperature	290 K to 323 K								
3.3	Test section									
3.3.1	Shape of test section	Rectangular with corner fillets (160.5 mm x 160.5 mm x 45°)								
3.3.2	Size of test section (width, height, length)	2.43 m wide, 1.83 m high, 2.8 m long								
3.3.3	Type of test section walls closed, open, slotted, perforated Open area ratio (give range if variable) Slot/hole geometry (eg 30-degree slanted holes) treatment of side wall boundary layer	Slots in all four walls for three dimensional complete model tests. 11% Sharp edged slots: six slots in both roof and floor and five slots in each side wall. All are vented to a common plenum chamber of large volume								
	Full span models Half-model testing	None -								
3.4	Flow field (empty test section)									
3.4.1	Reference static pressure	Plenum chamber								
3.4.2	Flow angularity	<table><tr><td>M</td><td>0.4</td><td>0.8</td><td>0.9</td></tr><tr><td>flow angularity</td><td>$\pm 0.13^\circ$</td><td>$\pm 0.13^\circ$</td><td>$\pm 0.07^\circ$</td></tr></table>	M	0.4	0.8	0.9	flow angularity	$\pm 0.13^\circ$	$\pm 0.13^\circ$	$\pm 0.07^\circ$
M	0.4	0.8	0.9							
flow angularity	$\pm 0.13^\circ$	$\pm 0.13^\circ$	$\pm 0.07^\circ$							

3.4.3	Mach number distribution	}	ΔM	± 0.002	± 0.002	± 0.003	
3.4.4	Pressure gradient						
3.4.5	Turbulence/noise level						
3.4.6	Side wall boundary layer						
See Fig 3 of Ref 1 reproduced as Fig 6.3 in Data Set A6.							
-							
3.5	Freestream Mach number (or velocity)						
3.5.1	Range	Mach number 0.40-1.24					
3.5.2	Pressures used to determine Mach number (<i>eg</i> settling chamber total pressure and plenum chamber pressure)	A total head measured in the maximum section of the tunnel circuit and a static pressure measured in the plenum chamber					
3.5.3	Accuracy of Mach number determination (ΔM)	± 0.001					
3.5.4	Maximum Mach number variation in x, y, z-direction (empty tunnel; specify at what Mach number)	}	See section 3.4				
	Maximum variation of flow direction						
	Maximum Mach number variation during a run						
			± 0.001				
3.6	Reynolds number range						
3.6.1	Unit Reynolds number range. (Give range at representative Mach numbers; l/m)	M	0.4	0.6	0.8	1.0	1.2
		$\frac{R_e}{m} \times 10^{-6}$	25-0.85	17-1.1	10-1.3	10-1.3	10-1.3
3.6.2	Means of varying Reynolds number (<i>eg</i> by pressurisation)	Pressurisation					
3.7	Temperature range and dewpoint. Can temperature be controlled?	290 K to 323 K. Absolute humidity <0.003 . Temperature can be controlled manually					
3.8	Model attitudes						
3.8.1	Angle of attack, yaw, roll	Calibrated differential screw-jacks giving a range of incidence from -4° to $+22^\circ$. The sting mounting may be rolled through $\pm 180^\circ$					
3.8.2	Accuracy in determining angles	Angle of attack $\pm 0.01^\circ$. Roll angle $\pm 0.10^\circ$					
3.9	Organization operating the tunnel and location of tunnel	The Royal Aircraft Establishment, Farnborough, Hants, England					
3.10	Who is to be contacted for additional information	Mr D. Pierce, Aerodynamics Department					
3.11	Literature concerning this facility	-					
3.12	Additional remarks	-					
4.	<u>Tests</u>						
4.1	Type of tests	Surface pressure measurements					
4.2	Wing span of semispan to tunnel width	Span/tunnel width = 0.375					
4.3	Test conditions						
4.3.1	Angle of attack	0, 1° and 2°					
4.3.2	Mach number	0.40, 0.80, 0.90					
4.3.3	Dynamic pressure	Dependent on Mach number and temperature to give a constant Reynolds number					
4.3.4	Reynolds number	1.0×10^6 based on the geometric mean chord of the gross wing					
4.3.5	Stagnation temperature	≈ 320 K					

4.4 Transition

- | | | |
|-------|--|--|
| 4.4.1 | Free or fixed | Fixed |
| 4.4.2 | Position of free transition | - |
| 4.4.3 | Position of fixed transition, width of strips, size and type of roughness elements | 12.5%C and on the body nose Ballotini 120 grade 0.13 mm to 0.16 mm (0.005 in to 0.0064 in) diameter in a band 2.5 mm (0.1 in) wide |
| 4.4.4 | Were checks made to determine if transition occurred at trip locations? | Yes. Acenaphthene sublimation |

4.5 Bending or torsion under load

- | | | |
|-------|---|--|
| 4.5.1 | Describe any aeroelastic measurements made during tests | None made |
| 4.5.2 | Describe results of any bench calibrations | Bench tests were made and a stiffness matrix determined - see additional remarks under section 6.2.6 |

4.6 Were different sized models used in wind-tunnel investigation? If so, indicate sizes

No

4.7 Areas and lengths used to form coefficients

Local chord. (The root chord in the case of the body junction.) Local pitching moments are quoted about the local leading edge

4.8 References on tests

-

4.9 Related reports

-

5. Instrumentation

5.1 Surface pressure measurements

- | | | |
|-------|--|----------------------------------|
| 5.1.1 | Pressure orifices in wing. Location and number on upper and lower surfaces | 206 (see Fig 4.1 and Table 4.2a) |
| 5.1.2 | Pressure orifices on fuselage. Location and number | 213 (see Fig 4.1 and Table 4.2b) |
| 5.1.3 | Pressure orifices on components, give component and orifice location | - |

5.1.4 Geometry of orifices

Hole diameter	Depth/ diameter	Location
0.34 mm (0.0135 in)	1.5	to x/c of 0.1
0.34 mm (0.0135 in)	3.0	from x/c 0.15 to 0.90
0.25 mm (0.0100 in)	1.0	for x/c 0.95 and 0.975

5.1.5 Type of pressure transducer and scanning devices used. Indicate range and accuracy

Midwood self-balancing capsule manometer
0-1.0 atmosphere.
Accuracy $\pm 0.03\%$ of full scale

5.2 Force measurements

- | | | |
|-------|---|--------------------------------|
| 5.2.1 | Type and location of balance | } No balance measurements made |
| 5.2.2 | Forces and moments that can be measured. Maximum loads and accuracy | |
| 5.2.3 | Forces and moments on components | |
| | Type and location of balance | |
| | Maximum load and accuracy | |

5.3 Boundary layer and flow-field measurements

5.3.1	Boundary-layer probe, type, position, and drive mechanism	} No boundary-layer or flow-field measurements made
5.3.2	Probe dimension relative to boundary-layer thickness	
5.3.3	Laser-Doppler velocimeter. Give description of apparatus and accuracy	
5.3.4	Method and/or instrument used to determine boundary-layer transition	
5.3.5	Describe any downstream rakes or probes used. Reason for use.	
5.4	Surface flow visualization	
5.4.1	Indicate method used to determine	
	- Streamline pattern	Oil flow
	- Boundary-layer transition	Acenaphthene sublimation tests made in a few cases
5.4.2	Accuracy of method	
5.5	Skin friction measurements	
5.5.1	Type of instrument	} No measurements made
5.5.2	Geometry and accuracy of instrument	
5.5.3	Locations where probe used	
5.6	Simulation of exhaust jet	-
5.6.1	Describe ducting of air	-
5.7	Additional remarks	
6.	<u>Data</u>	
6.1	Accuracy	
6.1.1	Pressure coefficients	± 0.01 in general (see section 6.1.5)
6.1.2	Aerodynamic coefficients	
6.1.3	Boundary layer and wake quantities	} (a) Because of the high sensitivity of the pressure to position near the leading edge and to the non-uniformity of the tunnel airstream, there are apparent errors for the nominal $x/c = 0$ tappings that are in excess of the tolerance quoted in section 6.1.1
6.1.4	Repeatability	
6.1.5	Additional remarks	
		(b) Spurious values of the pressure coefficients given at some points on the body should be ignored. These are the result of some malfunctioning of the digitising equipment during the tests
6.2	Wall interference corrections	
6.2.1	Solid and wake blockage. Give procedures and equations	None applied
6.2.2	Give blockage factors as functions of Mach number	None applied
6.2.3	Downwash, streamline curvature and lift interference. Give procedure and equations	Corrections for flow angularity in the tunnel have been made by appeal to model symmetry. Details of constraint and aeroelastic correction are given in section 6.2.6
6.2.4	Give lift interference parameters as function of Mach number	See section 6.2.6

6.2.5	Reference on wall-interference corrections	See Ref 2
6.2.6	Additional remarks	The corrections required for aeroelastic distortion of the model and for the effects of tunnel wall constraint are of a similar order of magnitude. A matrix of influence coefficients defining the structural stiffness has been derived from the measurement of deflection under known static loads. The aeroelastic distortion has then been calculated using the stiffness matrix, together with the aerodynamic loading obtained by integrating the measured pressure distribution. Correction for tunnel wall constraint has been derived by interpolation with respect to open area ratio $1/(1+F)$, between solutions of the linearised formulation for the velocity induced in the given test section according to the assumption of (a) fully open, and (b) fully closed, wall boundary conditions ² . Computation of the incremental loading arising from distortion and constraint confirmed that only spanwise variation was significant and therefore a local correction to the nominal incidence of an 'equivalent flat wing' was obtained as indicated in Table 4.3a and 4.3b. The adjustments to the measured data have been made by curve-fitting the variation of static pressure coefficient at each orifice with incidence, and interpolating to a corrected nominal incidence
6.3	Data presentation	
6.3.1	Aerodynamic coefficients	Tables 4.7 to 4.9 give local normal force C_N and pitching moment coefficient C_M
6.3.2	Surface pressure coefficients	Tables 4.4 to 4.9 Figs 4.2 to 4.7 give pressure coefficients for the wing and body
6.3.3	Flow conditions for	
	- Aerodynamic coefficient data	Mach numbers 0.4, 0.6 and 0.8 for $R_e 1.0 \times 10^6$
	- Pressure data	
6.3.4	Boundary layer and/or wake data	No measurements made
6.3.5	Flow conditions for boundary layer and/or wake data	-
6.3.6	Wall interference corrections included?	See Table 4.3a
6.3.7	Aeroelastic corrections included?	See section 6.2.6 and Table 4.3b
6.3.8	Other corrections?	-
6.3.9	Additional remarks	-
6.4	Were tests carried out in different facilities on the current model? If so, what facilities. Are data included in present data base?	No
6.5	Were tests carried out in different facilities on the current model? If so, what facilities. Are data included in present data base?	No

7. References

- 1 D.G. Mabey Boundary-layer transition measurements on the AEDC 10° cone in three RAE wind tunnels and their implications.
RAE Technical Report 76077 (1976)
- 2 H.C. Garner Subsonic wind tunnel wall corrections.
E.W.E. Rogers AGARDograph 109 (1966)
W.E.A. Acum
E.C. Maskell

8. List of Symbols

c	local chord
\bar{c}	geometric mean chord of the gross wing
C_M	local pitching moment coefficient about the leading edge = $\frac{\text{local pitching moment}}{\frac{1}{2}\rho V^2 c^2}$
C_N	local normal force coefficient = $\frac{\text{local normal force}}{\frac{1}{2}\rho V^2 c}$
C_p	pressure coefficient = $\frac{p - p_\infty}{\frac{1}{2}\rho V^2}$
F	non-dimensional slotted wall parameter = $\frac{d}{\sqrt{\pi b h}} \log_e \operatorname{cosec} \frac{\pi a}{2d}$, (see Ref 2)
L	length of the body
M	Mach number
R	local body cross-section radius
R_e	Reynolds number based on \bar{c}
R_0	radius of the cylindrical section of the body
S	semi-span of the gross wing (excluding tip fairing)
V	free stream velocity
X	distance measured along the chord from the leading-edge of the wing section
X'	distance measured from the extended nose of the body
Y	distance measured spanwise
Z	distance from the plane of the wing
a	width of the slots in the tunnel walls
b	breadth of the tunnel working section
d	periodic spacing of the slots in the tunnel wall
h	height of the tunnel working section
l'	length of the profiled portion of the body
p	local static pressure
p_∞	free stream static pressure
α	angle of incidence
$\Delta_c \alpha$	correction applied to the local angle of incidence for wind tunnel wall constraint
$\Delta_e \alpha$	correction applied to the local angle of incidence for aeroelastic distortion of the model and deflection of the sting support
η	Y/S non-dimensional spanwise location
ρ	density of the free stream
ϕ	median angle measured from the plane of the wing

Table 4.1

CO-ORDINATES OF RAE 101 T/C = 0.09 SECTION

X	100Y	X	100Y
0.0	0.0	0.35	4.4582
0.001	0.3515	0.36	4.4376
0.002	0.4966	0.38	4.3855
0.003	0.6078	0.4	4.3205
0.004	0.7013	0.42	4.2438
0.005	0.7835	0.44	4.1565
0.006	0.8576	0.45	4.1091
0.007	0.9256	0.46	4.0595
0.0075	0.9578	0.48	3.9539
0.008	0.9888	0.5	3.8403
0.009	1.0480	0.52	3.7196
0.01	1.1039	0.54	3.5924
0.012	1.2074	0.55	3.5265
0.0125	1.2318	0.56	3.4592
0.014	1.3022	0.58	3.3209
0.016	1.3901	0.6	3.1779
0.018	1.4721	0.62	3.0308
0.02	1.5494	0.64	2.8803
0.025	1.7257	0.65	2.8039
0.03	1.8832	0.66	2.7267
0.035	2.0262	0.68	2.5707
0.04	2.1577	0.7	2.4126
0.05	2.3903	0.72	2.2531
0.06	2.6008	0.74	2.0926
0.07	2.7863	0.75	2.0121
0.075	2.8722	0.76	1.9317
0.08	2.9540	0.78	1.7707
0.09	3.1067	0.8	1.6097
0.1	3.2466	0.82	1.4487
0.12	3.4938	0.84	1.2878
0.14	3.7046	0.85	1.2073
0.15	3.7982	0.86	1.1268
0.16	3.8847	0.88	0.9658
0.18	4.0380	0.9	0.8049
0.2	4.1674	0.92	0.6439
0.22	4.2746	0.925	0.6036
0.24	4.3610	0.94	0.4829
0.25	4.3966	0.95	0.4024
0.26	4.4271	0.96	0.3219
0.28	4.4730	0.975	0.2012
0.3	4.4972	0.98	0.1610
0.32	4.4960	0.9875	0.1006
0.34	4.4752	1.0	0.0

Table 4.2

(a) Location of the pressure tappings in the wing

Nominal X/C	$\eta = Y/S$					
	0.25	0.40	0.60	0.75	0.85	0.925
0.005	0.005	0.005	-	-	-	-
0.010	0.010	0.010	0.010	0.010	0.011	0.011
0.025	0.025	0.025	0.026	0.025	0.026	0.026
0.050	0.051	0.050	0.051	0.050	0.052	0.051
0.075	0.075	0.075	0.076	0.075	0.076	0.076
0.100	0.100	0.100	0.100	0.100	0.101	0.101
0.150	0.151	0.150	0.150	0.150	0.150	0.150
0.200	0.201	0.200	0.200	0.200	0.201	0.200
0.300	0.301	0.300	0.300	0.301	0.301	0.301
0.400	0.401	0.400	0.400	0.401	0.401	0.400
0.500	0.501	0.500	0.500	0.501	0.501	0.500
0.600	0.601	0.600	0.601	0.601	0.600	0.601
0.700	0.701	0.700	0.701	0.701	0.701	0.700
0.800	0.801	0.800	0.801	0.801	0.800	0.800
0.900	0.900	0.899	0.899	0.899	0.899	0.899
0.950	0.950	0.949	0.949	0.950	0.949	0.949
0.975	0.976	0.974	-	-	-	-

(b) Location of the pressure tappings in the wing-body junction

X/C*	-0.013	0.010	0.025	0.050	0.075	0.100	0.150
X'/L	0.4817	0.4856	0.4881	0.4924	0.4968	0.5011	0.5097
Z/L	0	0.00277	0.00392	0.00509	0.00585	0.00664	0.00756
X/C*	0.200	0.250	0.300	0.400	0.500	0.600	0.700
X'/L	0.5184	0.5271	0.5358	0.5532	0.5707	0.5882	0.6056
Z/L	0.00822	0.00860	0.00876	0.00840	0.00759	0.00639	0.00517
X/C*	0.800	0.900					
X'/L	0.6231	0.6405					
Z/L	0.00356	0.00226					

* X and C appropriate to the normal projection onto the gross wing defined by the straight extension of the leading- and trailing-edges to the centre-line of the body.

Table 4.3

(a) Corrections applied to the local angle of incidence for tunnel wall constraint

$$\Delta_c \alpha = \Delta_c \alpha(0) + \Delta_c \alpha(\eta)/\text{per degree}$$

M	$\Delta_c \alpha(0)$	$\Delta_c \alpha(\eta)$						
		$\eta \leq 0.167$	$\eta = 0.25$	$\eta = 0.40$	$\eta = 0.60$	$\eta = 0.75$	$\eta = 0.85$	$\eta = 0.925$
0.40	-0.0223	0.00000	-0.00040	-0.00063	-0.00088	-0.00097	-0.00111	-0.00114
0.80	-0.0220	0.00000	-0.00101	-0.00130	-0.00189	-0.00230	-0.00249	-0.00263
0.90	-0.0218	0.00000	-0.00158	-0.00219	-0.00313	-0.00390	-0.00431	-0.00461

(b) Corrections applied to the local angle of incidence for the aero-elastic deformation of the wing and the deflection of the sting support

$$\Delta_e \alpha = \Delta_e \alpha(0) + \Delta_e \alpha(\eta)/\text{per degree at } \text{Re } 1.0 \times 10^6$$

M	$\Delta_e \alpha(0)$	$\Delta_e \alpha(\eta)$						
		$\eta \leq 0.167$	$\eta = 0.25$	$\eta = 0.40$	$\eta = 0.60$	$\eta = 0.75$	$\eta = 0.85$	$\eta = 0.925$
0.40	0.0262	0.00000	-0.0034	-0.0050	-0.0060	-0.0080	-0.0095	-0.0104
0.80	0.0643	0.00000	-0.0091	-0.0128	-0.0154	-0.0198	-0.0230	-0.0252
0.90	0.0768	0.00000	-0.0114	-0.0156	-0.0183	-0.0237	-0.0277	-0.0301

Table 4.4

TABULATED DATA

Case No.1 : Mach number 0.40 Angle of incidence 0

Upper/lower surface

Pressures on the wing and at the wing/body junction

n	0.167*	0.250	0.400	0.600	0.750	0.850	0.925
CN=	-	-	-	-	-	-	-
CM=	-	-	-	-	-	-	-
X/C	CP	CP	CP	CP	CP	CP	CP
0.000		0.651	0.636	0.639	0.643	0.622	0.634
0.005		0.205	0.174				
0.010	0.222	0.057	0.016	0.031	0.050	0.030	0.031
0.025	0.140	-0.102	-0.118	-0.137	-0.120	-0.137	-0.144
0.050	0.043	-0.147	-0.206	-0.206	-0.209	-0.210	-0.219
0.075	-0.019	-0.197	-0.238	-0.246	-0.225	-0.244	-0.235
0.100	-0.053	-0.197	-0.244	-0.253	-0.244	-0.254	-0.240
0.150	-0.112	*****	*****	*****	*****	*****	*****
0.200	-0.132	-0.223	-0.269	-0.271	-0.289	-0.259	-0.270
0.300	-0.184	-0.250	-0.277	-0.269	-0.278	-0.273	-0.262
0.400	-0.187	-0.211	-0.229	-0.228	-0.239	-0.222	-0.220
0.500	-0.166	-0.173	-0.179	-0.176	-0.174	-0.168	-0.165
0.600	-0.136	-0.129	-0.129	-0.124	-0.126	-0.114	*****
0.700	-0.103	-0.085	-0.078	-0.074	-0.073	-0.065	-0.060
0.800	-0.068	-0.042	-0.028	-0.027	-0.029	-0.021	-0.014
0.900	-0.033	0.004	0.019	*****	0.022	0.025	0.035
0.950		0.043	0.057	0.056	0.055	0.061	0.062
0.975		0.068	0.076				

* Nominal value for body/wing junction
 NB Pressure measured on body, see Table 4.2

Pressures on the body

ϕ DEG	0*	± 15	± 30	± 45	± 60	± 75	± 90
X/L	CP	CP	CP	CP	CP	CP	CP
0.268	-0.124	-0.128	-0.126	-0.126	-0.125	-0.128	-0.125
0.307	-0.087	-0.090	-0.088	-0.088	-0.087	-0.088	-0.089
0.366	-0.039	-0.040	-0.044	-0.044	-0.048	-0.050	-0.046
0.385	-0.033	-0.031	-0.036	-0.036	-0.037	-0.042	-0.036
0.405	-0.021	-0.020	-0.023	-0.026	-0.033	-0.033	-0.034
0.424	-0.007	-0.010	-0.013	-0.021	-0.030	-0.030	-0.032
0.444	0.011	-0.003	-0.007	-0.019	-0.021	-0.034	-0.032
0.463	0.063	0.038	0.005	-0.015	-0.024	-0.031	-0.026
0.482	0.290	0.063	0.002	-0.019	-0.027	-0.031	-0.034
0.492	0.043	0.024	-0.011	-0.027	-0.032	-0.033	-0.034
0.501	-0.054	-0.032	-0.029	-0.031	-0.033	-0.038	-0.037
0.510	-0.112	-0.076	-0.046	-0.039	-0.032	-0.043	-0.035
0.518	-0.133	-0.109	-0.071	-0.050	-0.042	-0.041	-0.039
0.527	-0.170	-0.132	-0.082	-0.058	-0.046	-0.051	-0.043
0.571	-0.166	-0.138	-0.102	-0.073	-0.059	-0.051	-0.050
0.588	-0.137	-0.122	-0.094	-0.064	-0.052	-0.046	-0.049
0.606	-0.104	-0.096	-0.069	-0.062	-0.054	-0.042	-0.044
0.623	-0.069	-0.067	-0.059	-0.051	-0.046	-0.037	-0.036
0.641	-0.033	-0.034	-0.043	-0.039	-0.040	-0.037	-0.037
0.660	0.073	-0.001	-0.026	-0.030	-0.032	-0.032	-0.029
0.671	0.038	0.012	-0.016	-0.025	-0.030	-0.031	-0.033
0.691	0.018	0.004	-0.010	-0.023	-0.025	-0.024	-0.028
0.730	-0.004	-0.011	-0.010	-0.022	-0.021	-0.030	-0.027
0.750	-0.018	0.003	-0.017	-0.033	-0.024	-0.027	-0.025
0.769	-0.013	-0.025	-0.023	-0.027	-0.026	-0.025	-0.026
0.789	-0.014	-0.017	-0.018	-0.019	-0.030	-0.029	-0.027
0.808	-0.022	-0.024	-0.021	-0.033	-0.026	-0.027	-0.031
0.828	-0.028	-0.039	-0.030	-0.026	-0.028	-0.035	-0.024

Table 4.5

TABULATED DATA

Case No.2 : Mach number 0.80 Angle of incidence 0

Upper/lower surface

Pressures on the wing and at the wing/body junction

η	0.167*	0.250	0.400	0.600	0.750	0.850	0.925
CN=	-	-	-	-	-	-	-
CM=	-	-	-	-	-	-	-
X/C	CP	CP	CP	CP	CP	CP	CP
0.000		0.729	0.688	0.691	0.691	0.666	0.682
0.005		0.309	0.252				
0.010	0.305	0.154	0.083	0.095	0.110	0.088	0.074
0.025	0.236	-0.033	-0.084	-0.112	-0.099	-0.117	-0.134
0.050	0.132	-0.126	-0.204	-0.217	-0.228	-0.224	-0.254
0.075	0.050	-0.172	-0.255	-0.271	-0.258	-0.273	-0.283
0.100	-0.001	-0.190	-0.269	-0.294	-0.292	-0.303	-0.308
0.150	*****	*****	*****	*****	*****	*****	*****
0.200	-0.128	-0.251	-0.330	-0.338	-0.378	-0.343	-0.388
0.300	-0.218	-0.304	-0.352	-0.360	-0.368	-0.359	-0.362
0.400	-0.238	-0.269	-0.297	-0.286	-0.302	-0.283	-0.284
0.500	-0.220	-0.218	-0.223	-0.210	-0.211	-0.198	-0.189
0.600	-0.182	-0.159	-0.151	-0.133	-0.138	-0.120	-0.101
0.700	-0.142	-0.100	-0.081	-0.066	-0.066	-0.053	-0.039
0.800	-0.086	-0.041	-0.013	-0.004	-0.008	0.007	0.016
0.900	-0.030	0.023	0.048	0.075	0.059	0.067	0.074
0.950		0.062	0.087	0.097	0.094	0.102	0.103
0.975		0.092	0.110				

* Nominal value for body/wing junction
 NB Pressure measured on body, see Table 4.2

Pressures on the body

ϕ DEG	0*	± 15	± 30	± 45	± 60	± 75	± 90
X/L	CP	CP	CP	CP	CP	CP	CP
0.268	-0.147	-0.148	-0.148	-0.145	-0.145	-0.147	-0.147
0.307	-0.095	-0.098	-0.097	-0.098	-0.098	-0.097	-0.098
0.366	-0.025	-0.027	-0.025	-0.039	-0.031	-0.028	-0.028
0.385	-0.015	-0.013	-0.017	-0.017	-0.021	-0.021	-0.020
0.405	-0.001	-0.004	-0.003	-0.006	-0.010	-0.011	-0.011
0.424	0.085	0.014	0.010	0.006	-0.003	-0.003	-0.006
0.444	0.039	0.033	0.024	0.013	0.008	-0.003	0.001
0.463	0.106	0.082	0.046	0.024	0.007	0.001	-0.002
0.482	0.342	0.134	0.055	0.020	0.006	-0.004	-0.007
0.492	0.132	0.084	0.036	0.010	-0.002	-0.009	-0.011
0.501	-0.001	0.009	0.005	-0.004	-0.011	-0.024	-0.017
0.510	-0.089	-0.055	-0.028	-0.022	-0.021	-0.031	-0.021
0.518	-0.126	-0.101	-0.062	-0.040	-0.032	-0.038	-0.031
0.527	-0.179	-0.141	-0.090	-0.058	-0.045	-0.047	-0.038
0.536	-0.218	-0.167	-0.113	-0.074	-0.056	-0.060	-0.044
0.553	-0.238	-0.195	-0.139	-0.094	-0.073	-0.069	-0.058
0.571	-0.220	-0.186	-0.143	-0.104	-0.082	-0.068	-0.064
0.588	-0.182	-0.161	-0.128	-0.093	-0.079	-0.060	-0.063
0.606	-0.142	-0.069	-0.106	-0.084	-0.071	-0.050	-0.059
0.623	-0.086	-0.082	-0.077	-0.064	-0.058	-0.039	-0.048
0.641	-0.030	-0.033	-0.042	-0.041	-0.041	-0.028	-0.039
0.660	0.097	0.021	-0.008	-0.018	-0.024	-0.017	-0.022
0.671	0.070	0.033	0.004	-0.009	-0.015	-0.015	-0.020
0.691	0.046	0.028	0.014	-0.001	-0.008	-0.002	-0.013
0.730	0.018	0.012	0.008	0.002	-0.004	-0.007	-0.007
0.750	0.009	0.007	-0.031	-0.002	-0.002	-0.004	-0.004
0.769	0.005	0.003	-0.002	-0.003	-0.003	-0.006	-0.004
0.789	0.004	-0.000	-0.001	-0.002	-0.003	-0.008	-0.007
0.808	-0.003	-0.004	-0.004	-0.004	-0.007	-0.009	-0.011
0.828	-0.002	-0.031	-0.008	-0.009	-0.009	-0.011	-0.009

Table 4.6

TABULATED DATA

Case No.3 : Mach number 0.90 Angle of incidence 0

Upper/lower surface

Pressures on the wing and at the wing/body junction

η	0.167*	0.250	0.400	0.600	0.750	0.850	0.925
CN=	-	-	-	-	-	-	-
CM=	-	-	-	-	-	-	-
X/C	CP	CP	CP	CP	CP	CP	CP
0.000		0.766	0.714	0.699	0.706	0.674	0.702
0.005		0.360	0.295				
0.010	0.357	0.207	0.133	0.118	0.120	0.110	-0.149
0.025	0.299	0.017	-0.042	-0.097	-0.097	-0.105	-0.106
0.050	0.201	-0.081	-0.174	-0.219	-0.241	-0.231	-0.244
0.075	0.119	-0.134	-0.235	-0.289	-0.273	-0.292	-0.283
0.100	0.066	-0.156	-0.255	-0.323	-0.309	-0.334	-0.316
0.150	*****	*****	*****	*****	*****	*****	*****
0.200	-0.078	-0.246	-0.355	-0.431	-0.480	-0.442	-0.480
0.300	-0.194	-0.341	-0.457	-0.535	-0.535	-0.493	-0.509
0.400	-0.258	-0.338	-0.455	-0.409	-0.358	-0.333	-0.409
0.500	-0.278	-0.329	-0.310	-0.212	-0.218	-0.217	-0.152
0.600	-0.260	-0.244	-0.164	-0.130	-0.132	-0.117	-0.048
0.700	-0.197	-0.135	-0.075	-0.052	-0.051	-0.033	0.008
0.800	-0.107	-0.052	0.004	0.017	0.015	0.036	0.062
0.900	-0.032	0.029	0.072	*****	0.087	0.099	0.117
0.950		0.081	0.114	0.123	0.122	0.138	0.156
0.975		0.113	0.138				

* Nominal value for body/wing junction
 NB Pressure measured on body, see Table 4.2

Pressures on the body

ϕ DEG	0*	± 15	± 30	± 45	± 60	± 75	± 90
X/L	CP	CP	CP	CP	CP	CP	CP
0.268	-0.162	-0.165	-0.164	-0.167	-0.153	-0.162	-0.164
0.307	-0.096	-0.096	-0.097	-0.093	-0.097	-0.113	-0.093
0.366	-0.014	-0.014	-0.013	-0.015	-0.016	-0.019	-0.018
0.385	-0.001	0.002	-0.002	-0.003	-0.003	-0.004	-0.001
0.405	0.016	0.014	0.014	0.012	0.009	0.007	0.008
0.424	0.176	0.035	0.030	0.028	0.019	0.020	0.017
0.444	0.060	0.055	0.048	0.035	0.037	0.022	0.025
0.463	0.139	0.117	0.081	0.057	0.040	0.030	0.029
0.482	0.374	0.180	0.099	0.058	0.039	0.028	0.026
0.492	0.202	0.135	0.084	0.048	0.032	0.021	0.018
0.501	0.066	0.057	0.051	0.033	0.021	-0.000	0.009
0.510	-0.032	-0.012	0.014	0.010	0.006	-0.013	0.002
0.518	-0.078	-0.068	-0.022	-0.014	-0.010	-0.026	-0.012
0.527	-0.142	-0.116	-0.063	-0.043	-0.030	-0.044	-0.026
0.536	-0.194	-0.154	-0.100	-0.067	-0.049	-0.074	-0.041
0.553	-0.258	-0.219	-0.153	-0.110	-0.086	-0.101	-0.070
0.571	-0.278	-0.247	-0.191	-0.147	-0.116	-0.111	-0.095
0.588	-0.260	-0.237	-0.195	-0.151	-0.124	-0.099	-0.107
0.606	-0.197	-0.185	-0.160	-0.134	-0.111	-0.076	-0.096
0.623	-0.107	-0.111	-0.104	-0.091	-0.084	-0.051	-0.073
0.641	-0.032	-0.037	-0.051	-0.050	-0.051	-0.023	-0.051
0.660	0.111	0.033	0.001	-0.011	-0.020	-0.013	-0.022
0.671	0.092	0.052	0.020	0.004	-0.007	-0.002	-0.013
0.691	0.071	0.049	0.035	0.017	0.008	0.004	0.001
0.730	0.042	-0.000	0.027	0.021	0.017	0.015	0.011
0.750	0.030	0.029	0.024	0.016	0.020	0.014	0.014
0.769	0.025	0.022	0.017	0.017	0.014	0.014	0.017
0.789	0.025	0.019	0.018	0.017	0.013	0.007	0.009
0.808	0.014	0.013	0.016	0.011	0.012	0.006	0.007
0.828	0.012	-0.012	0.006	0.008	0.008	0.005	0.008

Table 4.7

TABULATED DATA

Case No.4 : Mach number 0.40 Angle of incidence 2.0°

Upper surface

Pressures on the wing and at the wing/body junction

η	0.167*	0.250	0.400	0.600	0.750	0.850	0.925
CN=	0.138	0.162	0.172	0.186	0.191	0.183	0.165
CM=	-0.043	-0.042	-0.042	-0.046	-0.047	-0.041	-0.034
X/L	CP	CP	CP	CP	CP	CP	CP
0.000		0.515	0.453	0.457	0.444	0.406	0.415
0.005		-0.311	-0.449				
0.010	0.046	-0.415	-0.525	-0.554	-0.553	-0.578	-0.574
0.025	-0.043	-0.463	-0.525	-0.577	-0.576	-0.596	-0.598
0.050	-0.143	-0.436	-0.511	-0.536	-0.550	-0.554	-0.558
0.075	-0.189	-0.417	-0.486	-0.509	-0.502	-0.522	-0.507
0.100	-0.209	-0.389	-0.456	-0.481	-0.478	-0.496	-0.476
0.150	-0.245	*****	*****	*****	*****	*****	*****
0.200	-0.253	-0.347	-0.405	-0.415	-0.443	-0.404	-0.402
0.300	-0.277	-0.344	-0.374	-0.378	-0.392	-0.378	-0.354
0.400	-0.251	-0.284	-0.306	-0.310	-0.321	-0.304	-0.285
0.500	-0.225	-0.229	-0.236	-0.235	-0.236	-0.226	-0.207
0.600	-0.182	-0.171	-0.172	-0.167	-0.171	-0.153	*****
0.700	-0.139	-0.117	-0.107	-0.106	-0.104	-0.094	-0.076
0.800	-0.094	-0.065	-0.046	-0.048	-0.050	-0.037	-0.024
0.900	-0.046	-0.007	0.010	*****	0.013	0.017	0.031
0.950		0.035	0.051	0.046	0.050	0.069	0.060
0.975		0.062	0.076				

* Nominal value for body/wing junction

NB Pressure measured on body, see Table 4.2

Pressures on the body

ϕ DEG	0*	15	30	45	60	75	90
X/L	CP	CP	CP	CP	CP	CP	CP
0.268	-0.125	-0.134	-0.136	-0.134	-0.137	-0.136	-0.136
0.307	-0.093	-0.095	-0.097	-0.096	-0.097	-0.098	-0.095
0.366	-0.051	-0.052	-0.057	-0.052	-0.058	-0.060	-0.055
0.385	-0.041	-0.039	-0.046	-0.049	-0.050	-0.052	-0.050
0.405	-0.029	-0.032	-0.036	-0.042	-0.046	-0.047	-0.047
0.424	-0.014	-0.021	-0.031	-0.037	-0.041	-0.043	-0.044
0.444	0.004	-0.016	-0.029	-0.036	-0.045	-0.049	-0.046
0.463	0.054	0.007	-0.030	-0.044	-0.048	-0.049	-0.049
0.482	0.262	-0.009	-0.049	-0.056	-0.056	-0.056	-0.056
0.492	-0.144	-0.082	-0.075	-0.070	-0.064	-0.059	-0.059
0.501	-0.210	-0.145	-0.096	-0.076	-0.058	-0.068	-0.063
0.510	-0.248	-0.186	-0.116	-0.090	-0.070	-0.072	-0.063
0.518	-0.253	-0.207	-0.140	-0.100	-0.079	-0.072	-0.068
0.527	-0.274	-0.223	-0.150	-0.108	-0.084	-0.082	-0.072
0.571	-0.225	-0.197	-0.151	-0.113	-0.093	-0.078	-0.077
0.588	-0.193	-0.170	-0.135	-0.100	-0.083	-0.072	-0.077
0.606	-0.140	-0.132	-0.106	-0.092	-0.080	-0.064	-0.068
0.623	-0.094	-0.095	-0.087	-0.077	-0.071	-0.057	-0.057
0.641	-0.047	-0.054	-0.063	-0.060	-0.061	-0.054	-0.054
0.660	0.072	-0.011	-0.039	-0.047	-0.051	-0.048	-0.044
0.671	0.040	-0.002	-0.029	-0.041	-0.045	-0.044	-0.047
0.691	0.019	-0.001	-0.021	-0.034	-0.039	-0.032	-0.041
0.730	-0.007	-0.015	-0.016	-0.029	-0.031	-0.039	-0.036
0.750	-0.016	0.002	-0.020	-0.030	-0.034	-0.034	-0.033
0.769	-0.016	-0.021	-0.028	-0.031	-0.031	-0.031	-0.036
0.789	-0.018	-0.019	-0.024	-0.028	-0.037	-0.033	-0.034
0.808	-0.023	-0.024	-0.032	-0.032	-0.034	-0.028	-0.036
0.828	-0.032	-0.068	-0.032	-0.033	-0.031	-0.035	-0.031

Table 4.7 (continued)

TABULATED DATA

Case No.4 : Mach number 0.40 Angle of incidence 2.0°

Lower surface

Pressures on the wing and at the wing/body junction

η	0.167*	0.250	0.400	0.600	0.750	0.850	0.925
CN=	0.138	0.162	0.172	0.186	0.191	0.183	0.165
CM=	-0.043	-0.042	-0.042	-0.046	-0.047	-0.041	-0.034
X/L	CP	CP	CP	CP	CP	CP	CP
0.000		0.500	0.474	0.460	0.466	0.450	0.520
0.005		0.517	0.525				
0.010	0.332	0.382	0.377	0.415	0.433	0.419	0.414
0.025	0.287	0.181	0.189	0.202	0.221	0.209	0.197
0.050	0.201	0.054	0.043	0.062	0.072	0.068	0.053
0.075	0.129	-0.003	-0.028	-0.011	0.011	-0.007	-0.005
0.100	0.086	-0.030	-0.059	-0.047	-0.036	-0.041	-0.047
0.150	0.012	*****	*****	*****	*****	*****	*****
0.200	-0.024	-0.109	-0.141	-0.132	-0.142	-0.121	-0.142
0.300	-0.096	-0.157	-0.179	-0.169	-0.169	-0.168	-0.167
0.400	-0.119	-0.139	-0.154	-0.146	-0.155	-0.144	-0.154
0.500	-0.108	-0.117	-0.119	-0.113	-0.111	-0.111	-0.121
0.600	-0.091	-0.085	-0.086	-0.076	-0.079	-0.072	*****
0.700	-0.067	-0.050	-0.046	-0.040	-0.038	*****	-0.041
0.800	-0.040	-0.018	-0.009	-0.003	-0.008	-0.003	-0.002
0.900	-0.016	0.018	0.031	*****	0.033	0.035	0.039
0.950		0.045	0.062	0.065	0.060	0.059	0.060
0.975		0.070	0.080				

* Nominal value for body/wing junction
 NB Pressure measured on body, see Table 4.2

Pressures on the body

ϕ DEG	0*	-15	-30	-45	-60	-75	-90
X/L	CP	CP	CP	CP	CP	CP	CP
0.268	-0.129	-0.126	-0.125	-0.119	-0.116	-0.115	-0.115
0.307	-0.093	-0.089	-0.088	-0.076	-0.084	-0.079	-0.079
0.366	-0.043	-0.043	-0.037	-0.040	-0.033	-0.032	-0.036
0.385	-0.035	-0.030	-0.029	-0.029	-0.026	-0.024	-0.023
0.405	-0.026	-0.019	-0.017	-0.017	-0.020	-0.018	-0.018
0.424	-0.008	-0.004	-0.002	-0.005	-0.009	-0.010	-0.011
0.444	0.004	0.007	0.006	-0.002	-0.007	-0.012	-0.013
0.463	0.058	0.056	0.025	0.009	-0.000	-0.010	-0.005
0.482	0.271	0.124	0.043	0.015	0.001	-0.003	-0.006
0.492	0.201	0.117	0.040	0.014	-0.001	-0.003	-0.007
0.501	0.086	0.069	0.029	0.009	0.001	-0.006	-0.007
0.510	0.011	0.022	0.014	0.004	-0.002	-0.009	-0.006
0.518	-0.025	-0.017	-0.005	-0.004	-0.004	-0.009	-0.008
0.527	-0.072	-0.049	-0.021	-0.011	-0.009	-0.020	-0.011
0.571	-0.108	-0.081	-0.057	-0.031	-0.025	-0.021	-0.018
0.588	-0.092	-0.074	-0.050	-0.025	-0.020	-0.020	-0.021
0.606	-0.068	-0.055	-0.040	-0.030	-0.024	-0.016	-0.018
0.623	-0.041	-0.037	-0.032	-0.022	-0.021	-0.013	-0.011
0.641	-0.017	-0.013	-0.019	-0.019	-0.017	-0.015	-0.013
0.660	0.071	0.010	-0.007	-0.010	-0.014	-0.014	-0.005
0.671	0.040	0.012	-0.003	-0.008	-0.012	-0.015	-0.012
0.691	0.019	0.006	0.005	-0.008	-0.010	-0.011	-0.010
0.730	-0.005	-0.007	-0.003	-0.011	-0.009	-0.011	-0.013
0.750	-0.015	-0.011	-0.014	-0.024	-0.016	-0.018	-0.016
0.769	-0.014	-0.015	-0.020	-0.014	-0.017	-0.018	-0.020
0.789	-0.019	-0.016	-0.021	-0.017	-0.019	-0.022	-0.028
0.808	-0.022	-0.026	-0.026	-0.026	-0.023	-0.018	-0.022
0.828	-0.026	-0.008	-0.024	-0.020	-0.015	-0.035	-0.019

Table 4.8

TABULATED DATA

Case No.5 : Mach number 0.80 Angle of incidence 2.0°

Upper surface

Pressures on the wing and at the wing/body junction

η	0.167*	0.250	0.400	0.600	0.750	0.850	0.925
CN=	0.177	0.184	0.206	0.224	0.229	0.230	0.201
CM=	-0.062	-0.051	-0.052	-0.052	-0.051	-0.047	-0.032
X/C	CP	CP	CP	CP	CP	CP	CP
0.000		0.662	0.578	0.573	0.565	0.513	0.520
0.005		-0.093	-0.256				
0.010	0.171	-0.244	-0.400	-0.472	-0.476	-0.519	-0.541
0.025	0.076	-0.386	-0.499	-0.624	-0.619	-0.663	-0.707
0.050	-0.044	-0.406	-0.555	-0.645	-0.681	-0.705	-0.753
0.075	-0.125	-0.416	-0.557	-0.644	-0.638	-0.690	-0.705
0.100	-0.170	-0.407	-0.536	-0.624	-0.616	-0.670	-0.675
0.150	*****	*****	*****	*****	*****	*****	*****
0.200	-0.271	-0.426	-0.518	-0.592	-0.603	-0.624	-0.652
0.300	-0.350	-0.444	-0.514	-0.519	-0.524	-0.520	-0.466
0.400	-0.355	-0.379	-0.407	-0.399	-0.406	-0.371	-0.323
0.500	-0.313	-0.302	-0.299	-0.282	-0.275	-0.254	-0.212
0.600	-0.254	-0.220	-0.204	-0.182	-0.177	-0.148	-0.113
0.700	-0.193	-0.144	-0.116	-0.098	-0.090	-0.071	-0.045
0.800	-0.119	-0.068	-0.034	-0.022	-0.020	0.002	0.014
0.900	-0.048	0.010	0.038	0.083	0.056	0.064	0.073
0.950		0.058	0.085	0.083	0.094	0.105	0.103
0.975		0.092	0.109				

* Nominal value for body/wing junction
NB Pressure measured on body, see Table 4.2

Pressures on the body

ϕ DEG	0*	15	30	45	60	75	90
X/L	CP	CP	CP	CP	CP	CP	CP
0.268	-0.146	-0.154	-0.153	-0.151	-0.151	-0.154	-0.157
0.307	-0.098	-0.101	-0.102	-0.096	-0.100	-0.099	-0.100
0.366	-0.031	-0.032	-0.031	-0.029	-0.036	-0.031	-0.035
0.385	-0.018	-0.018	-0.024	-0.025	-0.025	-0.025	-0.024
0.405	-0.006	-0.008	-0.011	-0.013	-0.017	-0.017	-0.018
0.424	0.051	0.007	-0.001	-0.007	-0.013	-0.014	-0.015
0.444	0.034	0.023	0.010	-0.007	-0.012	-0.019	-0.017
0.463	0.102	0.063	0.019	-0.002	-0.017	-0.023	-0.021
0.482	0.321	0.070	-0.001	-0.024	-0.032	-0.034	-0.040
0.492	-0.044	-0.024	-0.038	-0.044	-0.045	-0.046	-0.046
0.501	-0.170	-0.116	-0.083	-0.065	-0.057	-0.067	-0.056
0.510	-0.248	-0.181	-0.121	-0.089	-0.075	-0.079	-0.063
0.518	-0.271	-0.210	-0.162	-0.113	-0.088	-0.089	-0.076
0.527	-0.318	-0.262	-0.192	-0.130	-0.104	-0.101	-0.087
0.536	-0.350	-0.282	-0.213	-0.150	-0.116	-0.114	-0.095
0.553	-0.356	-0.300	-0.232	-0.165	-0.133	-0.121	-0.109
0.571	-0.313	-0.273	-0.226	-0.169	-0.140	-0.115	-0.113
0.588	-0.254	-0.232	-0.190	-0.148	-0.131	-0.100	-0.112
0.606	-0.193	-0.175	-0.156	-0.131	-0.113	-0.085	-0.097
0.623	-0.120	-0.120	-0.112	-0.100	-0.092	-0.064	-0.080
0.641	-0.048	-0.055	-0.070	-0.070	-0.068	-0.052	-0.066
0.660	0.094	0.010	-0.025	-0.039	-0.046	-0.039	-0.045
0.671	0.071	0.026	-0.008	-0.027	-0.034	-0.029	-0.039
0.691	0.049	0.020	0.004	-0.014	-0.021	-0.010	-0.027
0.730	0.022	0.012	0.004	-0.004	-0.015	-0.012	-0.016
0.750	0.010	0.007	0.034	-0.010	-0.006	-0.011	-0.011
0.769	0.006	0.002	-0.005	-0.006	-0.008	-0.009	-0.013
0.789	0.008	-0.002	-0.003	-0.007	-0.003	-0.014	-0.012
0.808	-0.001	0.003	-0.009	-0.008	-0.010	-0.015	-0.015
0.828	-0.004	-0.076	-0.013	-0.011	-0.010	-0.011	-0.012

Table 4.8 (continued)

TABULATED DATA

Case No.5 : Mach number 0.80 Angle of incidence 2.0°

Lower surface

Pressures on the wing and at the wing/body junction

η	0.167*	0.250	0.400	0.600	0.750	0.850	0.925
CN=	0.177	0.184	0.206	0.224	0.229	0.230	0.201
CM=	-0.062	-0.051	-0.052	-0.052	-0.051	-0.047	-0.032
X/C	CP	CP	CP	CP	CP	CP	CP
0.000		0.647	0.582	0.572	0.568	0.541	0.596
0.005		0.548	0.549				
0.010	0.389	0.414	0.400	0.426	0.466	0.452	0.450
0.025	0.358	0.209	0.208	0.208	0.250	0.241	0.234
0.050	0.280	0.071	0.052	0.061	0.086	0.089	0.072
0.075	0.204	0.009	-0.028	-0.023	0.017	-0.003	0.001
0.100	0.150	-0.025	-0.066	-0.070	-0.042	-0.044	-0.050
0.150	*****	*****	*****	*****	*****	*****	*****
0.200	0.005	-0.125	-0.173	-0.174	-0.178	-0.147	-0.190
0.300	-0.098	-0.198	-0.225	-0.230	-0.217	-0.212	-0.235
0.400	-0.132	-0.184	-0.198	-0.190	-0.194	-0.185	-0.213
0.500	-0.133	-0.153	-0.150	-0.145	-0.137	-0.137	-0.152
0.600	-0.112	-0.110	-0.103	-0.088	-0.091	-0.082	-0.084
0.700	-0.086	-0.066	-0.047	-0.037	-0.037	-0.033	-0.034
0.800	-0.044	-0.020	0.006	0.013	0.008	0.015	0.014
0.900	-0.005	0.031	0.056	0.078	0.062	0.065	0.067
0.950		0.067	0.090	0.102	0.092	0.103	0.097
0.975		0.092	0.111				

* Nominal value for body/wing junction
 NB Pressure measured on body, see Table 4.2

Pressures on the body

ϕ DEG	0*	-15	-30	-45	-60	-75	-90
X/L	CP	CP	CP	CP	CP	CP	CP
0.268	-0.145	-0.149	-0.144	-0.142	-0.126	-0.138	-0.136
0.307	-0.097	-0.098	-0.095	-0.088	-0.092	-0.090	-0.089
0.366	-0.029	-0.026	-0.025	-0.043	-0.026	-0.022	-0.023
0.385	-0.016	-0.013	-0.015	-0.012	-0.013	-0.011	-0.010
0.405	-0.004	-0.002	-0.000	-0.001	-0.001	-0.002	-0.001
0.424	0.070	0.017	0.015	0.016	0.011	0.012	0.009
0.444	0.035	0.036	0.031	0.024	0.021	0.013	0.015
0.463	0.107	0.097	0.067	0.046	0.029	0.024	0.021
0.482	0.332	0.189	0.098	0.056	0.039	0.026	0.023
0.492	0.280	0.177	0.097	0.057	0.034	0.025	0.021
0.501	0.150	0.117	0.079	0.051	0.031	0.017	0.018
0.510	0.056	0.056	0.054	0.037	0.025	0.012	0.019
0.518	0.006	0.003	0.027	0.024	0.016	0.007	0.010
0.527	-0.055	-0.037	-0.002	0.007	0.006	-0.001	0.005
0.536	-0.098	-0.064	-0.026	-0.007	-0.002	-0.011	-0.000
0.553	-0.132	-0.102	-0.056	-0.030	-0.018	-0.021	-0.011
0.571	-0.133	-0.106	-0.071	-0.044	-0.029	-0.023	-0.018
0.588	-0.111	-0.094	-0.070	-0.041	-0.031	-0.020	-0.022
0.606	-0.086	-0.071	-0.057	-0.038	-0.030	-0.016	-0.020
0.623	-0.044	-0.041	-0.040	-0.027	-0.024	-0.010	-0.017
0.641	-0.005	-0.006	-0.017	-0.011	-0.014	-0.005	-0.012
0.660	0.099	0.033	0.008	0.004	-0.003	-0.001	-0.001
0.671	0.074	0.038	0.017	0.009	0.002	0.002	-0.000
0.691	0.050	0.033	0.023	0.013	0.006	0.011	0.003
0.730	0.019	0.017	0.018	0.012	0.007	-0.000	0.005
0.750	0.010	0.012	-0.009	0.005	0.007	0.004	0.005
0.769	0.009	0.006	0.004	0.005	0.003	0.006	0.003
0.789	0.009	0.007	0.006	0.009	-0.000	0.001	0.007
0.808	0.001	0.018	0.001	0.002	0.002	-0.004	-0.000
0.828	-0.009	0.010	-0.004	-0.005	-0.003	-0.011	-0.003

Table 4.9

TABULATED DATA

Case No.6 : Mach number 0.90 Angle of incidence 1.0°

Upper surface

Pressures on the wing and at the wing/body junction

η	0.167*	0.250	0.400	0.600	0.750	0.850	0.925
CN=	0.127	0.139	0.149	0.174	0.185	0.178	0.150
CM=	-0.055	-0.050	-0.047	-0.047	-0.045	-0.037	-0.024
X/C	CP	CP	CP	CP	CP	CP	CP
0.000		0.751	0.688	0.680	0.674	0.634	0.653
0.005		0.184	0.089				
0.010	0.289	0.027	-0.063	-0.104	-0.127	-0.153	-0.143
0.025	0.219	-0.146	-0.216	-0.304	-0.327	-0.355	-0.374
0.050	0.116	-0.215	-0.327	-0.397	-0.458	-0.460	-0.497
0.075	0.036	-0.253	-0.370	-0.443	-0.471	-0.494	-0.507
0.100	-0.018	-0.261	-0.373	-0.456	-0.464	-0.514	-0.509
0.150	*****	*****	*****	*****	*****	*****	*****
0.200	-0.152	-0.331	-0.452	-0.614	-0.700	-0.684	-0.700
0.300	-0.264	-0.419	-0.555	-0.655	-0.728	-0.769	-0.788
0.400	-0.328	-0.421	-0.575	-0.753	-0.836	-0.717	-0.607
0.500	-0.358	-0.404	-0.540	-0.310	-0.244	-0.191	-0.167
0.600	-0.353	-0.381	-0.219	-0.126	-0.114	-0.079	-0.027
0.700	-0.307	-0.197	-0.090	-0.045	-0.036	-0.003	0.032
0.800	-0.158	-0.075	-0.001	0.021	0.027	0.054	0.076
0.900	-0.052	0.020	0.071	*****	0.094	0.107	0.122
0.950		0.081	0.113	0.118	0.128	0.137	0.158
0.975		0.113	0.134				

* Nominal value for body/wing junction
 NB Pressure measured on body, see Table 4.2

Pressures on the body

ϕ DEG	0*	15	30	45	60	75	90
X/L	CP	CP	CP	CP	CP	CP	CP
0.268	-0.167	-0.171	-0.166	-0.175	-0.133	-0.166	-0.166
0.307	-0.096	-0.099	-0.097	-0.096	-0.096	-0.159	-0.095
0.366	0.043	*****	*****	-0.015	*****	*****	*****
0.385	-0.003	0.053	-0.005	*****	-0.008	-0.008	-0.005
0.405	0.012	0.010	0.012	0.008	0.004	0.002	0.003
0.424	0.213	0.031	0.026	0.025	0.014	0.015	0.012
0.444	*****	*****	0.042	*****	0.030	*****	*****
0.463	0.138	0.107	0.070	0.045	0.027	0.019	0.017
0.482	0.355	0.148	0.075	0.036	0.020	0.011	-0.002
0.492	0.116	0.079	0.048	0.018	0.008	0.001	-0.002
0.501	-0.018	0.051	0.008	-0.003	-0.007	-0.027	-0.015
0.510	-0.113	-0.080	-0.035	-0.029	-0.025	-0.044	-0.022
0.518	-0.152	-0.136	-0.091	-0.059	-0.045	-0.060	-0.042
0.527	-0.212	-0.180	-0.119	-0.092	-0.067	-0.024	-0.060
0.536	-0.264	-0.217	-0.155	-0.116	-0.090	-0.118	-0.076
0.553	-0.326	-0.289	-0.213	-0.165	-0.135	-0.156	-0.113
0.571	-0.357	-0.319	-0.259	-0.213	-0.176	-0.176	-0.148
0.588	-0.353	-0.340	-0.284	-0.226	-0.196	-0.165	-0.167
0.606	-0.307	-0.292	-0.261	-0.216	-0.130	-0.125	-0.159
0.623	-0.158	-0.163	-0.163	-0.145	-0.136	-0.081	-0.117
0.641	-0.051	-0.062	-0.079	-0.081	-0.083	-0.046	-0.084
0.660	0.105	0.023	-0.013	-0.030	-0.040	-0.029	-0.040
0.671	0.148	*****	0.009	-0.010	-0.023	-0.014	-0.030
0.691	0.070	-0.028	0.027	0.006	-0.005	0.020	-0.011
0.730	*****	0.032	-0.026	0.016	-6.225	-0.027	*****
0.750	*****	*****	-0.028	-0.029	*****	*****	2.253
0.769	0.020	*****	*****	*****	0.050	0.009	*****
0.789	0.025	0.014	0.013	0.014	0.009	0.004	0.004
0.808	0.014	0.014	0.011	0.003	0.010	-0.002	0.003
0.828	0.011	-0.042	0.004	0.005	0.008	0.005	0.006

Table 4.9 (continued)

TABULATED DATA

Case No.6 : Mach number 0.90 Angle of incidence 1.0°

Lower surface

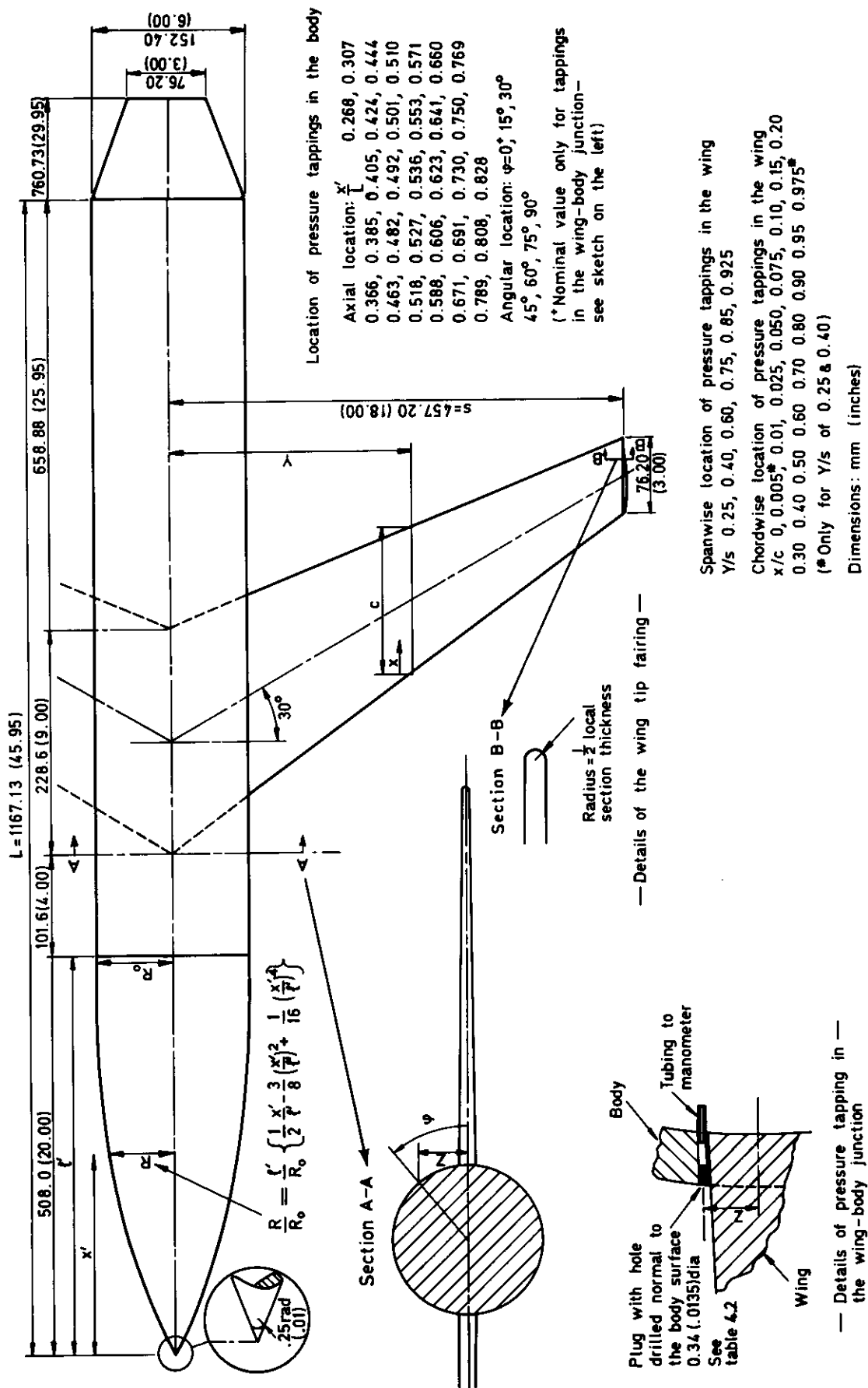
Pressures on the wing and at the wing/body junction

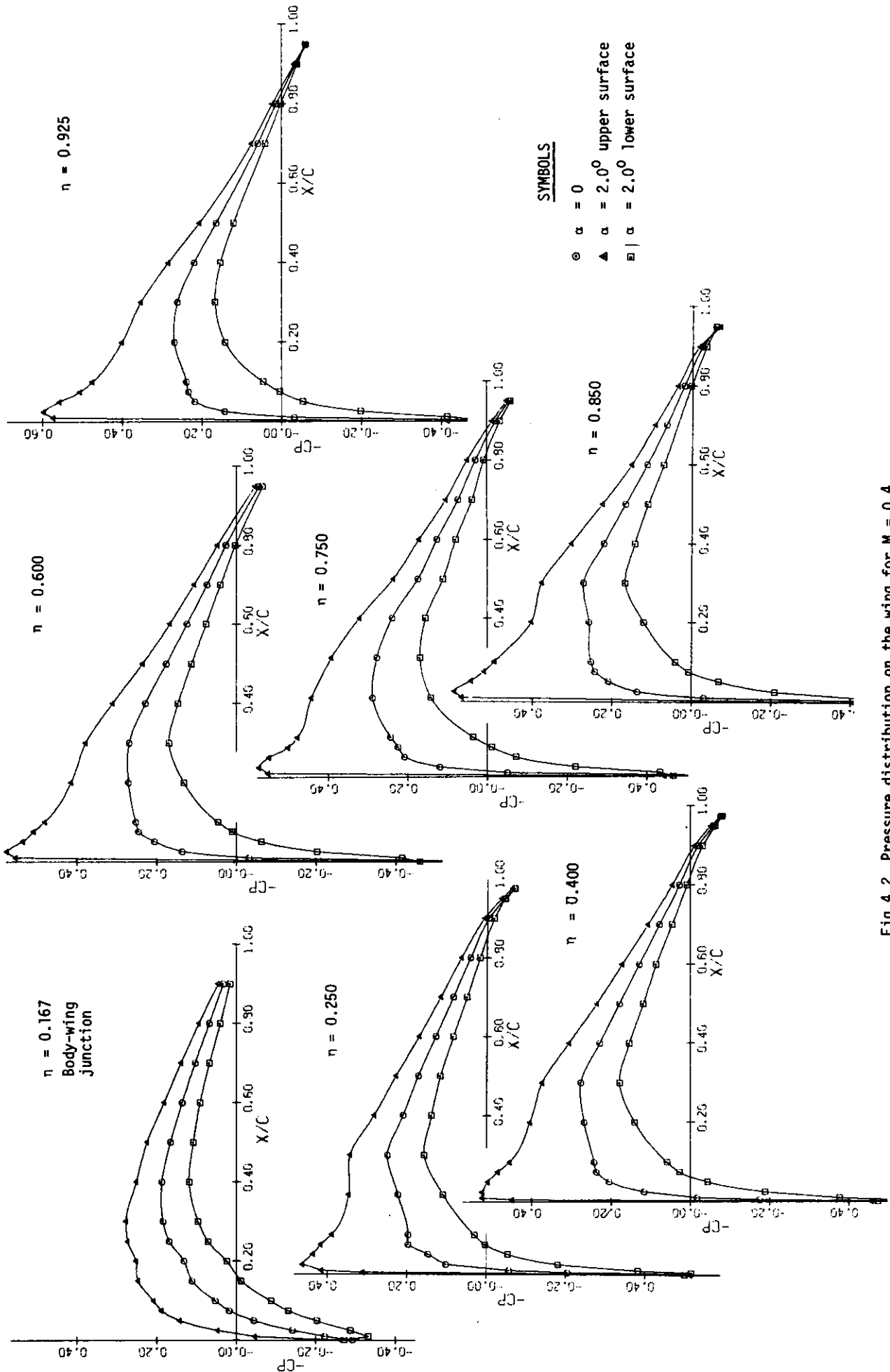
η	0.167*	0.250	0.400	0.600	0.750	0.850	0.925
CN=	0.127	0.139	0.149	0.174	0.185	0.178	0.150
CM=	-0.055	-0.050	-0.047	-0.047	-0.045	-0.037	-0.024
X/C	CP	CP	CP	CP	CP	CP	CP
0.000		0.742	0.693	0.678	0.686	0.654	0.686
0.005		0.499	0.450				
0.010	0.394	0.355	0.291	0.296	0.306	0.313	0.291
0.025	0.357	0.157	0.105	0.077	0.088	0.096	0.092
0.050	0.279	0.037	-0.042	-0.060	-0.066	-0.045	-0.058
0.075	0.198	-0.026	-0.115	-0.140	-0.123	-0.119	-0.117
0.100	0.146	-0.061	-0.148	-0.183	-0.182	-0.165	-0.163
0.150	*****	*****	*****	*****	*****	*****	*****
0.200	-0.009	-0.161	-0.263	-0.289	-0.327	-0.273	-0.321
0.300	-0.127	-0.262	-0.351	-0.358	-0.355	-0.342	-0.371
0.400	-0.188	-0.266	-0.321	-0.273	-0.285	-0.267	-0.361
0.500	-0.205	-0.215	-0.223	-0.191	-0.193	-0.194	-0.180
0.600	-0.183	-0.170	-0.136	-0.110	-0.116	-0.113	-0.063
0.700	-0.140	-0.102	-0.061	-0.039	-0.040	-0.034	-0.003
0.800	-0.075	-0.035	0.010	0.024	0.019	0.033	0.053
0.900	-0.020	0.035	0.073	*****	0.087	0.094	0.110
0.950		0.081	0.115	0.127	0.122	0.144	0.138
0.975		0.110	0.137				

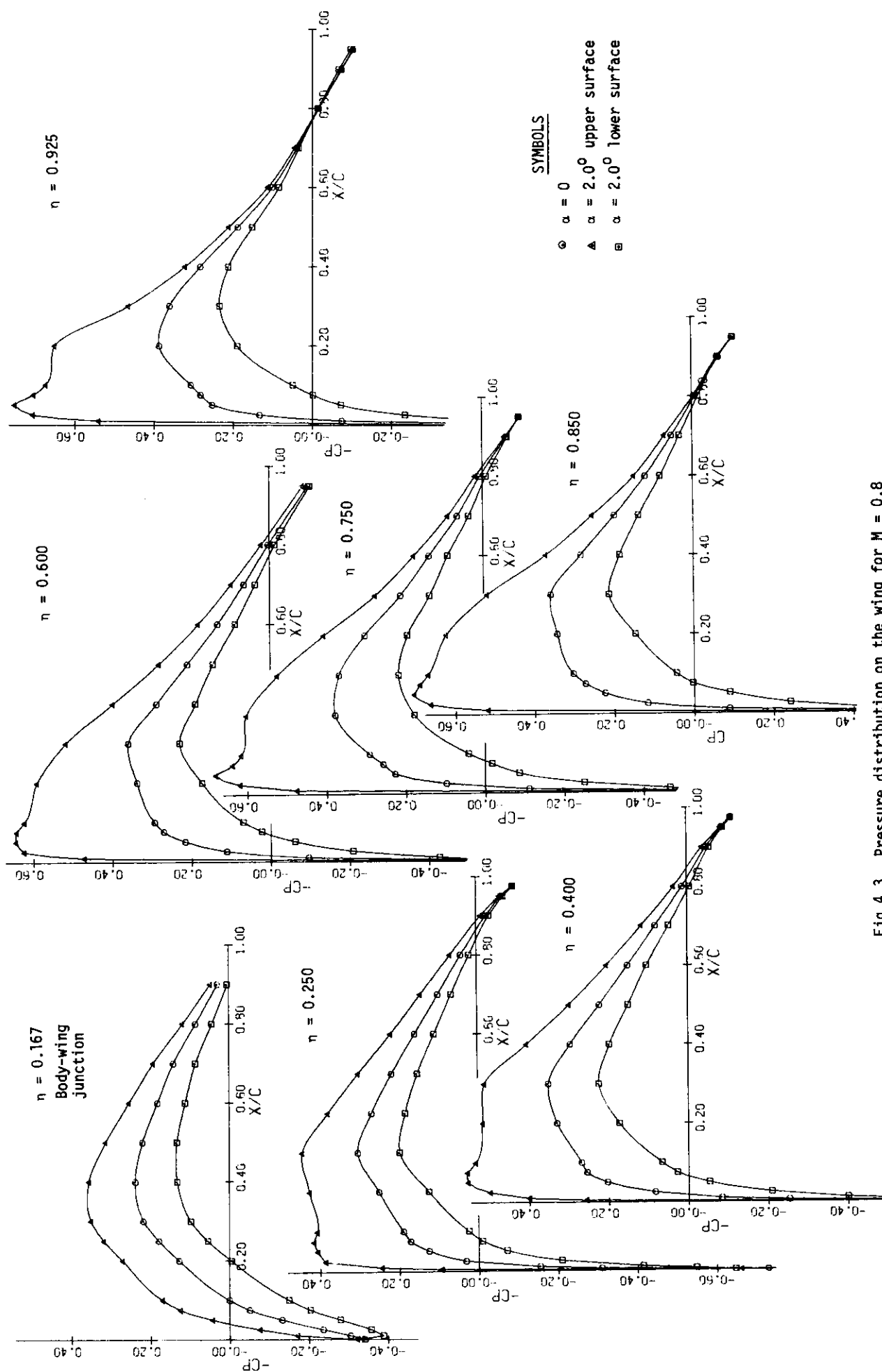
* Nominal value for body/wing junction
 NB Pressure measured on body, see Table 4.2

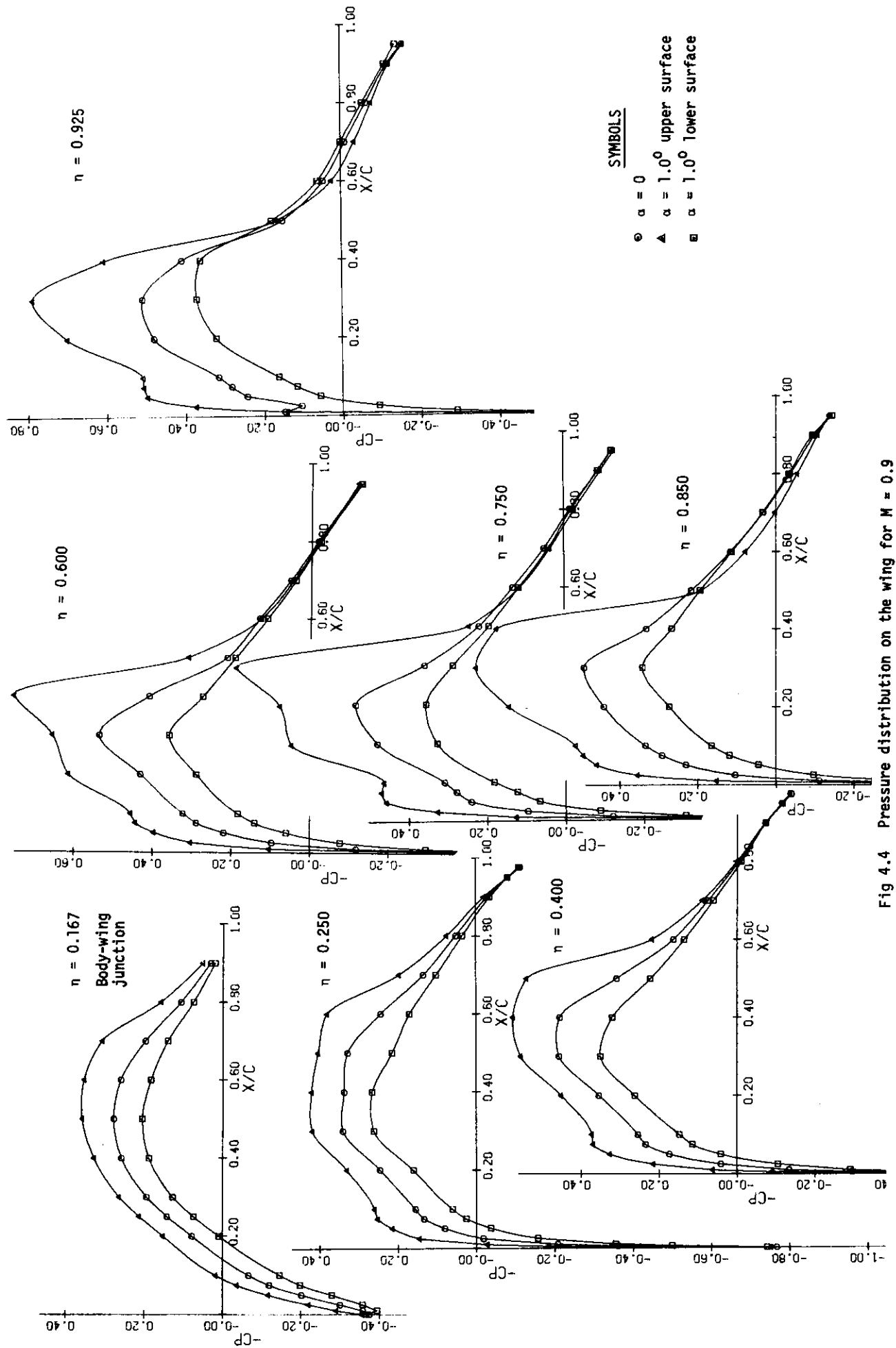
Pressures on the body

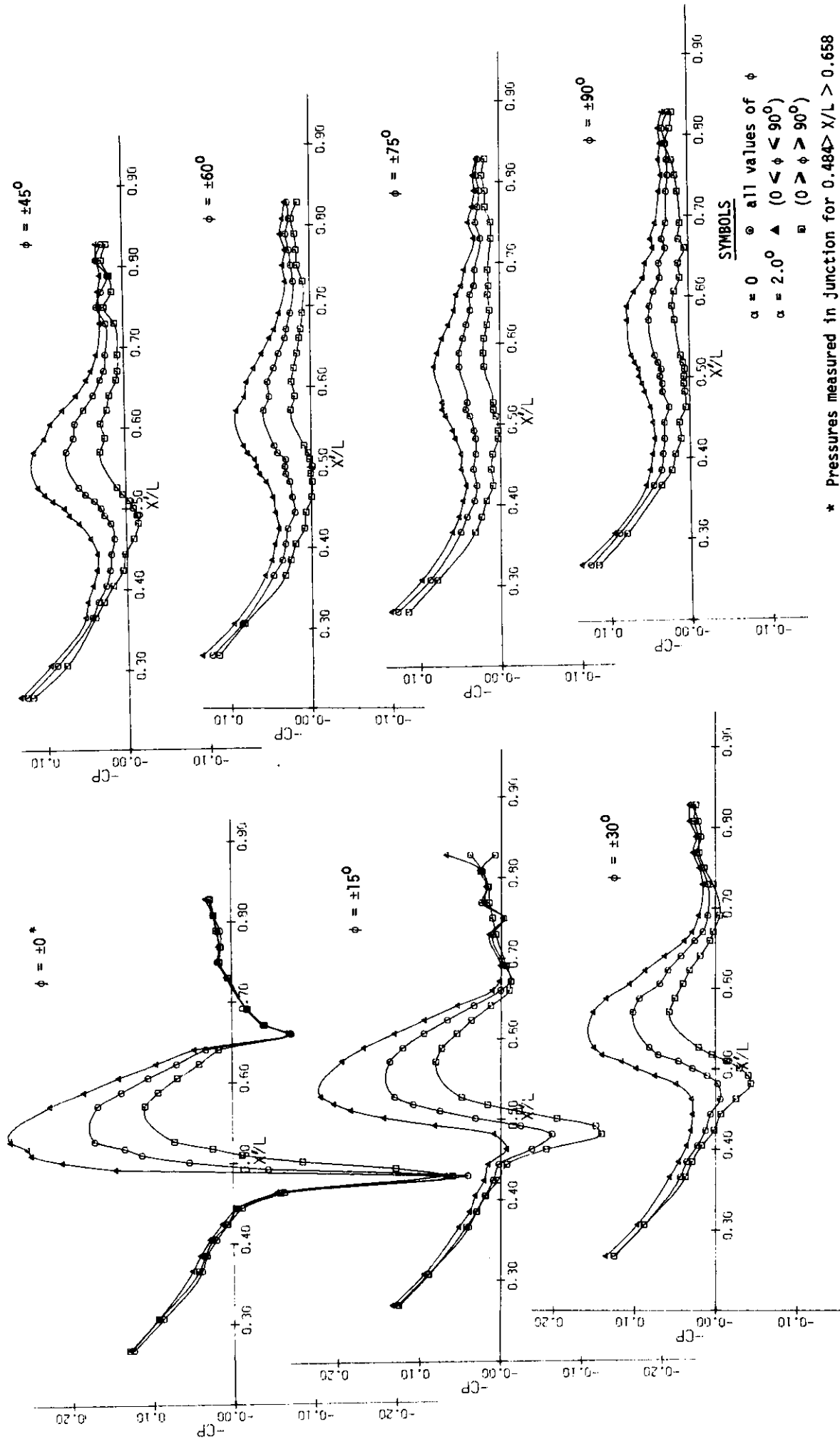
ϕ DEG	0*	-15	-30	-45	-60	-75	-90
X/L	CP	CP	CP	CP	CP	CP	CP
0.268	-0.163	-0.165	-0.163	-0.162	-0.141	-0.161	-0.161
0.307	-0.096	-0.098	-0.097	-0.093	-0.096	-0.121	-0.094
0.366	-0.012	-0.015	-0.011	-0.014	-0.013	-0.017	-0.016
0.385	-0.003	0.002	-0.001	-0.001	-0.001	-0.000	0.001
0.405	0.016	0.014	0.015	0.014	0.012	0.011	0.011
0.424	0.167	0.036	0.034	0.032	0.026	0.026	0.023
0.444	0.061	0.056	0.054	0.042	0.044	0.031	0.033
0.463	0.140	0.124	0.091	0.068	0.051	0.042	0.039
0.482	0.366	0.205	0.122	0.076	0.056	0.044	0.038
0.492	0.279	0.180	0.117	0.072	0.053	0.040	0.037
0.501	0.146	0.112	0.090	0.061	0.046	0.025	0.031
0.510	0.043	0.045	0.059	0.042	0.034	0.014	0.027
0.518	-0.009	-0.014	0.026	0.021	0.021	0.003	0.014
0.527	-0.074	-0.058	-0.014	-0.009	0.004	-0.010	0.004
0.536	-0.126	-0.096	-0.046	-0.026	-0.011	-0.035	-0.008
0.553	-0.187	-0.158	-0.097	-0.065	-0.043	-0.056	-0.032
0.571	-0.204	-0.181	-0.125	-0.094	-0.067	-0.063	-0.050
0.588	-0.182	-0.164	-0.128	-0.096	-0.074	-0.057	-0.063
0.606	-0.140	-0.128	-0.105	-0.086	-0.068	-0.045	-0.054
0.623	-0.075	-0.078	-0.071	-0.060	-0.052	-0.026	-0.042
0.641	-0.020	-0.021	-0.031	-0.030	-0.029	-0.008	-0.027
0.660	0.107	0.039	0.011	0.002	-0.005	-0.000	-0.006
0.671	0.093	0.053	0.027	0.013	0.007	0.010	-0.000
0.691	0.072	0.052	0.042	0.024	0.017	0.023	0.011
0.730	0.041	0.037	0.031	0.028	0.022	-0.006	0.018
0.750	0.029	0.030	0.027	0.021	0.023	0.018	0.018
0.769	0.025	0.023	0.021	0.020	0.019	0.016	0.017
0.789	0.024	0.020	0.019	0.019	0.016	0.011	0.014
0.808	0.016	0.014	0.016	0.011	0.015	0.014	0.012
0.826	0.014	0.014	0.011	0.010	0.012	0.005	0.012

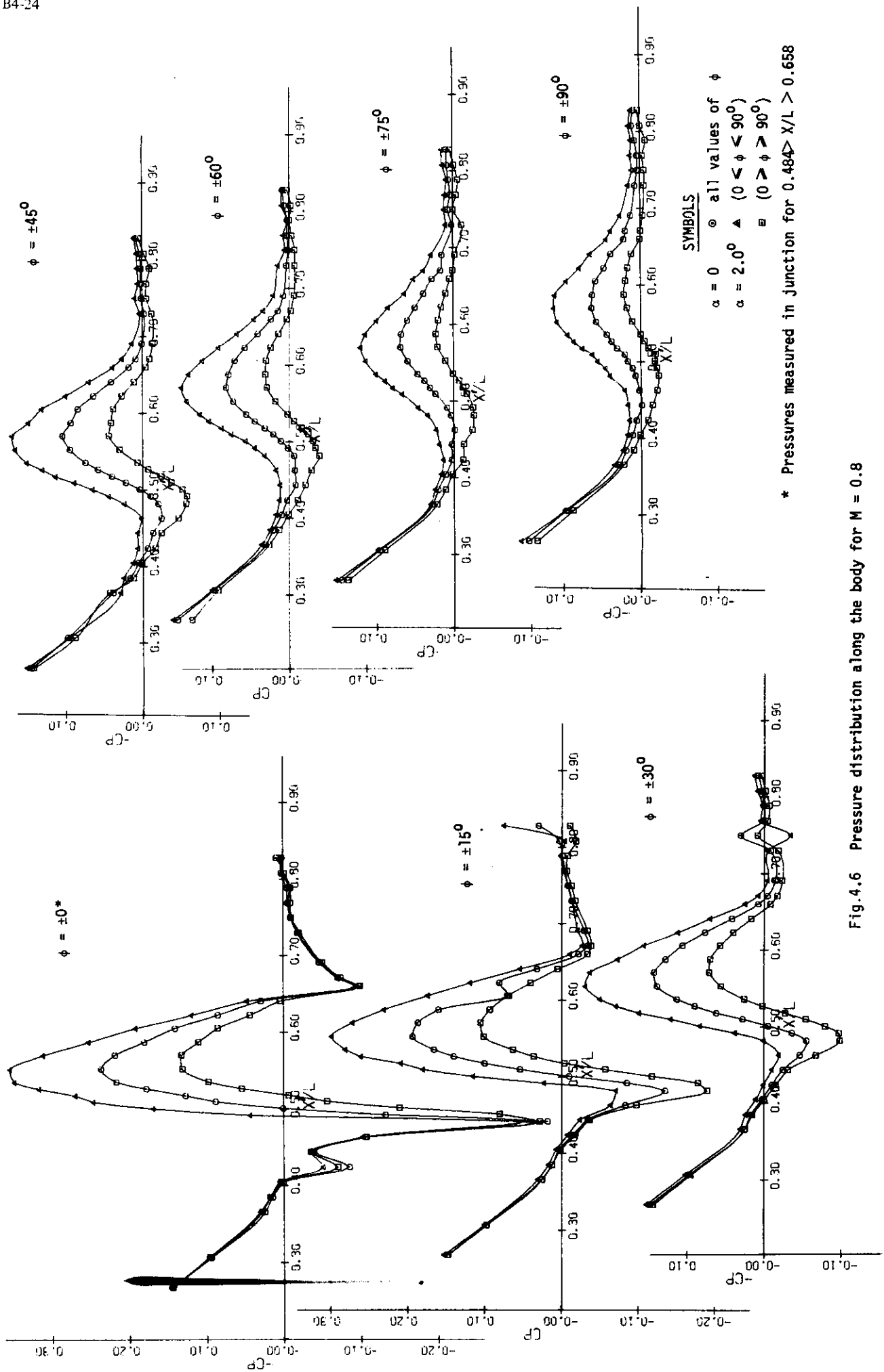
Fig 4.1 Sketch of wing A mounted on body B₂: Configuration W_A B₂ (O)O

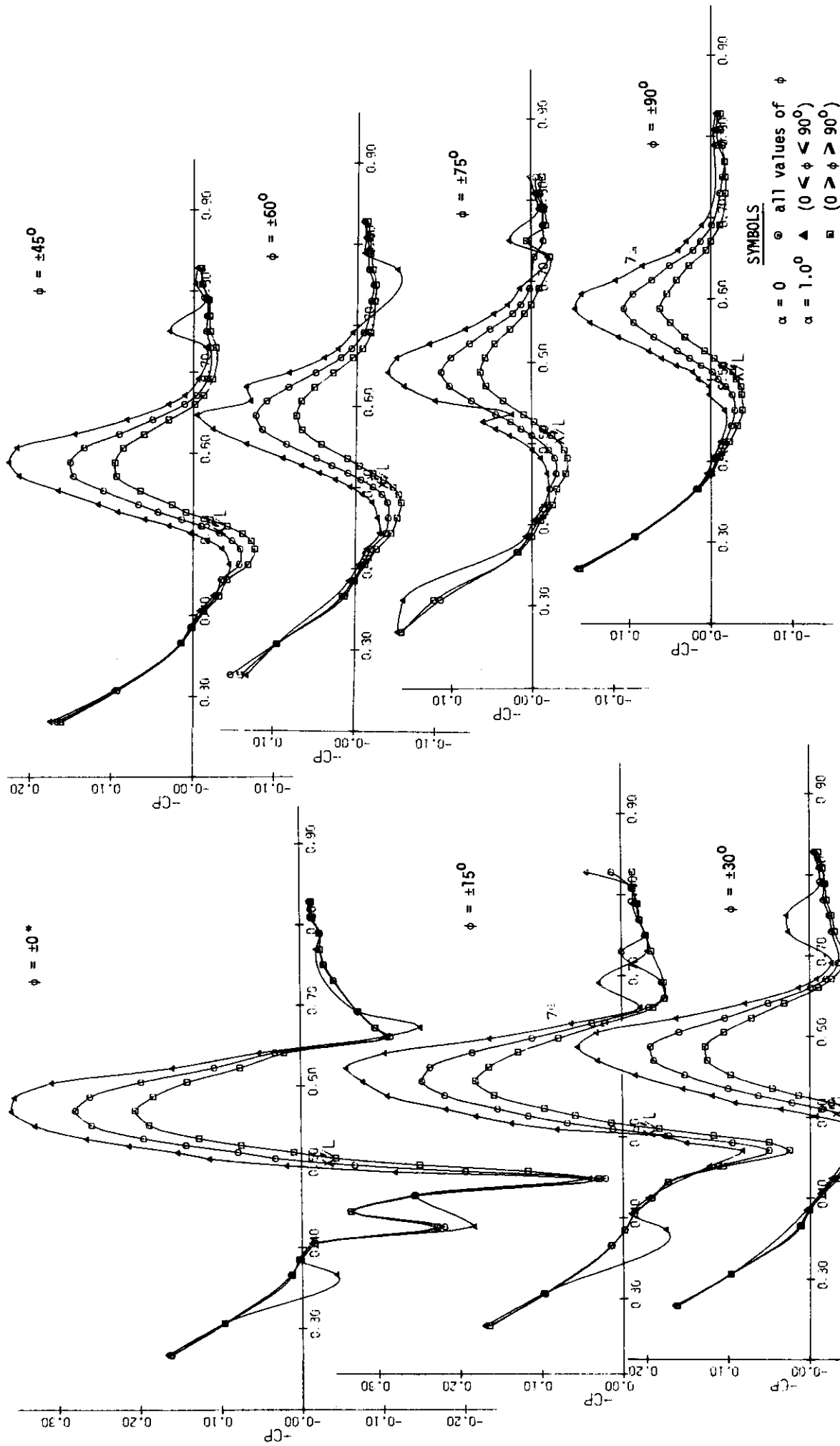
Fig 4.2 Pressure distribution on the wing for $M = 0.4$

Fig 4.3 Pressure distribution on the wing for $M = 0.8$

Fig 4.4 Pressure distribution on the wing for $M = 0.9$

Fig 4.5 Pressure distribution along the body for $M = 0.4$

Fig.4.6 Pressure distribution along the body for $M = 0.8$

Fig 4.7 Pressure distribution along the body for $M = 0.9$