

Table 8.1a) Homebuilt Airplanes: Horizontal Tail Volume and Elevator Data

Type	Wing Area S ft ²	Wing mgc $\bar{c}$ ft	Wing Airfoil root/tip NACA*	Hor. Tail Area S _h ft ²	S _e /S _h	x _h ft	$\bar{V}_h$	Elevator Chord root/tip fr.c _h
PIK-21	76.4	4.50	64212	10.4	0.45	10.1	0.30	0.45
Durable RD-03C	119	4.30	23018/23012	22.2	0.33	11.3	0.49	.47/.32
PIEL	118	3.82	23012	23.5	0.51	12.6	0.66	.55/.47
CP-750	104	3.81	NA	22.3	0.50	11.8	0.66	.56/.38
POTTIER	80.7	3.74	23015/23012	13.4	0.52	10.6	0.47	.50/.55
P-50R	77.5	4.10	4415	14.5	0.60	9.68	0.44	0.60
O-O	80.7	3.77	23012	15.4	0.48	10.6	0.54	0.48
Aerosport	81.0	3.00	GA(Pc)-1	11.7	0.25	6.27	0.30	.28/.33
Aerocar	112	4.50	63415	16.5	0.46	10.9	0.36	0.46
Micro-imp	130	4.37	64A215/64A210	25.5	0.43	13.2	0.59	0.43
Coats SA-III	125	5.25	RAF48	25.4	0.49	11.1	0.43	0.49
Sequoia 300	135	4.54	3415	26.0	0.52	12.2	0.52	0.52
Ord-Hume OH-4B	96.7	5.0	63,015	19.4	0.14	7.64	0.31	0.17
Procter Petrel								
Bede BD-8								

* Unless otherwise indicated.

Table 8.1b) Homebuilt Airplanes: Vertical Tail Volume, Rudder and Aileron Data

Type	Wing Area S ft ²	Wing Span b ft	Vert. Tail Area S _v ft ²	S _r /S _v	x _v ft	$\bar{V}_v$	Rudder Chord root/tip fr.c _v	S _a /S	Ail. Span Loc. in/out fr.b/2	Ail. Chord in/out fr.c _w
PIK-21	76.4	17.0	3.49	0.33	10.5	0.028	.24/.49	0.130	0/1.0	0.13
Durable RD-03C	119	28.7	8.35	0.30	12.5	0.031	.38/.32	0.063	.63/.93	.22/.24
PIEL	118	26.4	9.49	0.53	12.9	0.039	.50/.64	0.077	.44/.96	.19/.14
CP-750	104	23.6	7.64	0.50	11.9	0.037	.47/.54	0.092	.42/.91	.22/.18
POTTIER	80.7	20.3	11.3	0.42	10.4	0.072	.34/.61	0.067	.60/.98	.24/.22
P-50R	77.5	19.4	4.36	0.67	10.5	0.051	.59/.76	0.082	.52/.88	0.20
O-O	80.7	21.3	6.86	0.38	10.0	0.040	.34/.44	0.080	.54/.97	0.19
Aerosport	81.0	27.0	7.15	0.31	6.27	0.020	.33/.43	0.140	.07/.95	0.16
Aerocar	112	25.0	7.53	0.44	10.6	0.028	.35/.68	0.130	.55/1.0	0.26
Micro-imp	130	30.0	16.5	0.31	13.2	0.055	.27/.43	0.085	.60/.95	0.29
Coats SA-III	125	25.0	6.73	0.71	12.5	0.027	.57/1.0	0.110	.35/.91	0.20
Sequoia 300	135	30.0	11.7	0.35	11.4	0.033	.31/.57	0.097	.62/.98	0.26
Ord-Hume OH-4B	96.7	19.3	6.89	0.24	8.65	0.032	.20/.34	0.083	.53/.92	0.22
Procter Petrel										
Bede BD-8										

Table 8.2a) Single Engine Propeller Driven Airplanes: Horizontal Tail Volume

and Elevator Data

Type	Wing Area S ft ²	Wing mgc $\bar{c}$ ft	Wing Airfoil root/tip NACA*	Hor. Tail Area S_h ft ²	S_e/S_h	x_h ft	$\bar{V}_h$	Elevator Chord root/tip fr.c _h
CESSNA Skywagon 207	174	4.55	2412	44.9	0.45	16.2	0.92	.48/.47
Cardinal RG	174	4.79	64A215/64A412	35.0	1.00	14.3	0.60	stabilator
Skylane RG	174	4.52	2412	38.8	0.41	14.3	0.71	.47/.39
PIPER Cherokee								
Lance	175	5.25	65,415	34.6	1.00	16.1	0.61	stabilator
Warrior	170	4.44	65,415	26.5	1.00	13.5	0.48	stabilator
Turbo Saratoga SP	178	4.71	NA	36.2	1.00	16.2	0.70	stabilator
Bellanca Skyrocket	183	5.30	63,215	42.6	0.38	13.8	0.61	.36/.42
Grumman Tiger	140	4.44	NA	37.6	0.28	12.6	0.76	0.39
Rockwell Commander	152	4.58	63415	31.2	0.34	10.9	0.49	.33/.44
Trago Mills SAB-1	120	3.94	2413.6	22.0	0.46	17.8	0.83	0.46
Scottish Aviation Bullfinch	129	3.97	63,615	27.5	0.58	11.9	0.63	0.45

* Unless otherwise indicated.

Table 8.2b) Single Engine Propeller Driven Airplanes: Vertical Tail Volume,

Rudder and Aileron Data

Type	Wing Area S ft ²	Wing Span b ft	Vert. Tail Area S_v ft ²	S_r/S_v	x_v ft	$\bar{V}_v$	Rudder Chord root/tip fr.c _v	S_a/S	Ail. Span Loc. in/out	Ail. Chord in/out fr.c _w
CESSNA Skywagon 207	174	35.8	16.0	0.44	18.0	0.046	.46/.46	0.10	.61/.94	.25/.22
Cardinal RG	174	35.5	17.4	0.37	13.5	0.038	.35/.43	0.11	.65/.97	.38/.37
Skylane RG	174	35.8	18.6	0.37	15.8	0.047	.41/.42	0.11	.47/.96	.17/.24
PIPER Cherokee										
Lance	175	32.8	13.8	0.31	15.3	0.037	.26/.50	0.064	.56/.88	0.20
Warrior	170	35.0	11.5	0.36	13.2	0.026	.29/.52	0.078	.48/.96	.27/.24
Turbo Saratoga SP	178	36.2	15.9	0.29	15.2	0.038	.23/.58	0.057	.52/.84	0.19
Bellanca Skyrocket	183	35.0	18.1	0.33	13.2	0.037	.28/.40	0.076	.60/1.0	.25/.22
Grumman Tiger	140	31.5	8.4	0.43	12.6	0.024	.36/.46	0.055	.56/.92	0.24
Rockwell Commander	152	32.8	17.0	0.28	11.4	0.039	.30/.46	0.072	.64/.97	.27/.36
Trago Mills SAB-1	120	30.7	17.1	0.40	18.6	0.086	.35/.54	0.080	.58/.97	.25/.29
Scottish Aviation Bullfinch	129	33.8	22.7	0.39	11.9	0.062	.35/.56	0.073	.61/.95	.23/.30

Table 8.3a) Twin Engine Propeller Driven Airplanes: Horizontal Tail Volume
and Elevator Data

Type	Wing Area S ft ²	Wing mcg $\bar{c}$ ft	Wing Airfoil root/tip NACA*	Hor. Tail Area S_h ft ²	S_e/S_h	x_h ft	$\bar{V}_h$	Elevator Chord root/tip fr.c _h
CESSNA 310R	179	4.77	23018/23009	54.3	0.41	14.9	0.95	.42/.39
402B	196	4.77	23018/23009	60.7	0.29	16.5	1.07	.41/.39
414A	226	4.73	23018/23009	60.7	0.27	16.4	0.93	.37/.38
T303	189	4.9	23017/23012	48.1	0.42	14.9	0.78	.41/.44
PIPER PA-31P	229	5.79	63,415/63,212	68.7	0.44	16.2	0.84	.41/.51
PA-44-180T	184	4.34	NA	23.4	1.0	15.7	0.46	stabilator 0.38
Chieftain	229	6.00	63,A415/63,A212	61.4	0.38	16.1	0.72	.40/.41
Cheyenne I	229	5.69	63,A415/63,A212	70.5	0.40	15.7	0.85	.40/.41
Cheyen. III	293	7.33	63,A415/63,A212	61.8	0.39	23.7	0.68	.35/.44
BEECH Duchess	181	5.08	63,A415	39.4	0.35	15.6	0.67	0.40
Duke B60	213	6.60	23016.5/23010.5	62.0	0.27	14.5	0.64	0.39
Lear Fan 2100	163	4.36	NA	55.0	0.23	13.1	1.01	.36/.31
Rockwell Comdr 700	200	5.28	NA	55.4	0.37	19.7	1.03	0.37
Piaggio P166-DL3	286	6.06	230 series	51.6	0.27	17.2	0.51	.40/.50
EMB-121	296	6.62	NA	62.9	0.43	20.3	0.65	.39/.46

* Unless otherwise indicated

Table 8.3b) Twin Engine Propeller Driven Airplanes: Vertical Tail, Rudder and
Aileron Data

Type	Wing Area S ft ²	Wing Span b ft	Vert. Tail Area S_v ft ²	S_r/S_v	x_v ft	$\bar{V}_v$	Rudder Chord root/tip fr.c _v	S_a/S	Ail. Span Loc. in/out fr.b/2	Ail. Chord in/out fr.c _w
CESSNA 310R	179	36.9	26.1	0.43	15.9	0.063	.48/.41	0.064	.60/.90	.30/.29
402B	196	39.9	37.9	0.47	16.3	0.080	.48/.40	0.058	.64/.91	.29/.27
414A	226	44.1	41.3	0.38	17.0	0.071	.49/.37	0.061	.62/.87	.30/.28
T303	189	39.0	23.2	0.44	16.5	0.052	.46/.39	0.087	.64/.97	.31/.30
Conquest I	225	44.1	41.3	0.38	17.1	0.071	.47/.34	0.060	.61/.86	0.29
PIPER PA-31P	229	40.7	30.1	0.38	17.2	0.056	.37/.40	0.056	.59/.97	.24/.29
PA44-180T	184	38.6	21.5	0.37	14.4	0.044	.30/.50	0.077	.45/.90	.19/.18
Chieftain	229	40.7	29.5	0.40	17.3	0.055	.40/.38	0.060	.66/.98	.24/.30
Cheyen. I	229	42.7	26.5	0.40	16.5	0.045	.37/.42	0.057	.62/.93	.24/.29
Cheye. III	293	47.7	43.6	0.46	20.8	0.065	0.33	0.046	.66/.94	.23/.26
BEECH Duchess	181	38.0	25.6	0.29	14.2	0.053	.34/.42	0.059	.67/.97	0.28
Duke B60	213	39.3	28.8	0.43	17.4	0.060	.44/.46	0.054	.50/.84	.24/.26
Lear Fan 2100	163	39.3	44.4	0.17	14.0	0.097	.32/.34	0.044	.72/.98	.31/.24
Rockwell Comdr 700	200	42.5	39.9	0.38	20.5	0.096	.37/.38	0.087	.58/.99	.28/.24
Piaggio P166-DL3	286	48.2	30.7	0.43	18.3	0.041	.38/.43	0.073	.61/.94	.19/.22
EMB-121	296	46.4	42.6	0.45	17.8	0.055	.42/.41	0.052	.71/.97	0.22

Table 8.4a) Agricultural Airplanes: Horizontal Tail Volume and Elevator Data

Type	Wing Area S ft ²	Wing mgc $\bar{c}$ ft	Wing Airfoil root/tip NACA*	Hor. Tail Area S_h ft ²	S_e/S_h	x_h ft	$\bar{V}_h$	Elevator Chord ^d root/tip fr.c _h
PXL-104	167	4.60	2415	34.0	0.60	17.3	0.77	0.51
PXL-106A	306	6.23	Clark Y	81.4	0.56	18.6	0.79	.30/.50
PXL-M18	431	7.50	4416/4412	70.0	0.49	17.4	0.38	0.49
NDN-6	338	6.71	NA	60.4	0.36	17.4	0.46	0.36
EMB201A	215	5.63	23015	50.3	0.32	13.6	0.56	0.56
Cessna								
Ag Husky	203	4.55	2412	40.7	0.41	13.6	0.68	.43/.37
Schweizer								
Ag-Cat B	392	4.83	4412	45.0	0.49	12.9	0.31	.38/.60
Aero Boero								
260Ag	189	5.29	23012	25.5	0.41	14.1	0.36	0.44
Let L-37A	256	5.91	33015/43012A	54.1	0.41	16.8	0.60	.44/.42
Hal HA-31	251	6.54	USA35B	45.6	0.43	17.9	0.50	0.46
IAR-822	280	6.90	23014	48.4	0.44	17.4	0.44	0.46
Piper								
PA-36	226	6.22	63,618	43.3	0.48	15.0	0.46	.38/.62

* Unless otherwise indicated.

Table 8.4b) Agricultural Airplanes: Vertical Tail Volume, Rudder and Aileron Data

Type	Wing Area S ft ²	Wing Span b ft	Vert. Tail Area S_v ft ²	S_r/S_v	x_v ft	$\bar{V}_v$	Rudder Chord root/tip fr.c _v	S_a/S	Ail. Span Loc. in/out fr.b/2	Ail. Chord in/out fr.c _w
PXL-104	167	36.5	20.3	0.49	16.1	0.034	.41/.50	0.10	.58/.94	0.23
PXL-106A	306	48.5	31.0	0.56	17.1	0.036	.45/.51	0.087	.53/.96	0.22
PXL-M18	431	58.1	28.5	0.65	18.5	0.021	.50/.46	0.11	.59/.92	0.32
NDN-6	338	50.3	31.0	0.54	18.4	0.034	.50/.64	0.047	.73/1.0	.19/.14
EMB201A	215	38.4	13.0	0.52	14.1	0.022	.39/.36	0.08	.57/.90	0.19
Cessna										
Ag Husky	203	41.7	18.0	0.38	16.2	0.034	.32/.39	0.11	.53/.94	.27/.28
Schweizer										
Ag-Cat B	392	42.3	30.0	0.40	13.5	0.024	.25/.31	0.08	.53/.86	0.29
Aero Boero										
260Ag	189	35.8	9.94	0.39	15.1	0.022	.32/.31	0.11	.52/.94	.20/.19
Let L-37A	256	40.1	22.1	0.52	15.3	0.033	.59/.65	0.086	.64/1.0	0.32
HAL HA-31	251	39.4	20.7	0.45	16.6	0.035	.50/.46	0.092	.55/.89	0.28
IAR-822	280	42.0	22.9	0.69	17.9	0.035	.56/.64	0.11	.63/.98	0.27
Piper										
PA-36	226	38.8	19.9	0.49	16.5	0.038	.59/.21	0.096	.52/.92	0.28

Table 8.5a) Business Jets: Horizontal Tail Volume and Elevator Data

Type	Wing Area S ft ²	Wing mpc $\bar{c}$ ft	Wing Airfoil root/tip NACA*	Hor. Tail Area S _h ft ²	S _e /S _h	x _h ft	$\bar{V}_h$	Elevator Chord root/tip fr.c _h
DASSAULT-BREGUET								
Falcon 10 259		6.71	NA	72.7	0.20	16.5	0.69	.31/.29
Falcon 20 440		9.33	NA	122	0.22	21.9	0.65	.28/.31
Falcon 50 495		9.31	NA	144	0.23	21.7	0.68	.31/.34
CESSNA CITATION								
500 260		6.44	23014/23012	70.6	0.29	27.3	0.73	.32/.23
II 323		6.77	NA	73.1	0.36	19.2	0.64	.37/.35
III 312		6.07	NASA Sprcrt	69.6	0.34	26.9	0.99	.39/.42
GATES LEARJET								
24 232		7.03	64A109	54.0	0.26	20.2	0.67	.36/.26
35A 253		7.22	64A109	54.0	0.33	21.9	0.65	.33
55 265		6.88	NA	57.8	0.32	23.8	0.76	.31/.35
Canadair Challenger								
CL-601 450		11.3	NA	103	0.28	32.2	0.67	.30/.31
Aerospatiale								
SN-601 237		5.60	NA	58.9	0.42	16.7	0.74	.40/.44
ISRAEL AIRCRAFT IND.								
Astra 317		5.62	Sigma 2	77.1	0.25	22.8	0.99	.30/.32
Westwind 308		7.58	64A212	70.1	0.25	19.8	0.59	.29/.26
British Aerospace HS								
125-700 353		7.52	NA	100	0.48	19.1	0.72	.37/.67
G.A.-III 935		13.8	NA	184	0.33	35.6	0.51	0.33
MU Diam.I 241		6.23	NA	57.2	0.37	22.4	0.85	0.37

* Unless otherwise indicated.

Table 8.5b) Business Jets: Vertical Tail Volume, Rudder and Aileron Data

Type	Wing Area S ft ²	Wing Span b ft	Vert. Tail Area S _v ft ²	S _r /S _v	x _v ft	$\bar{V}_v$	Rudder Chord root/tip fr.c _v	S _a /S	Ail. Span Loc. in/out fr.b/2	Ail. Chord in/out fr.c _w
DASSAULT BREGUET										
Falcon 10 259		42.9	48.9	0.32	14.4	0.063	.34/.49	0.051	.67/.95	.27/.31
Falcon 20 440		53.5	81.8	0.23	18.1	0.063	.25/.39	0.057	.62/.92	0.25
Falcon 50 495		61.9	106	0.12	18.7	0.064	.21/.32	0.049	.68/.97	0.27
CESSNA CITATION										
500 260		43.9	50.9	0.36	18.2	0.081	0.36	0.096	.55/.94	.32/.30
II 323		51.7	53.0	0.34	19.36	0.062	.35/.31	0.078	.56/.89	.32/.30
III 312		53.5	70.2	0.30	20.5	0.086	.37/.38	NA*	.70/.86	.21/.17
GATES LEARJET										
24 232		35.6	38.4	0.17	16.6	0.077	.23/.22	0.050	.63/.89	.25/.23
35A 253		38.1	38.4	0.17	16.6	0.066	.26/.25	0.066	.55/.79	.30/.27
55 265		43.8	52.4	0.17	19.2	0.086	.26/.25	0.062	.49/.71	0.30
Can.CL601 450		64.3	96.0	0.26	24.9	0.083	.29/.31	0.033	.73/.91	.23/.26
Aerospatiale										
SN-601 237		42.2	45.4	0.30	15.7	0.071	.36/.32	0.033	.68/.91	.22/.20
ISRAEL AIRCRAFT IND.										
Astra 317		52.7	48.3	0.21	22.0	0.064	.33/.32	0.040	.67/.95	.26/.25
Westwind 308		44.8	59.7	0.18	20.1	0.087	.34/.44	0.050	.59/.90	.21/.31
British Aerospace HS										
125-700 353		47.0	63.8	0.22	15.9	0.061	.31/.37	0.084	.66/1.0	.33/.46
G.A. III 935		77.8	159	0.24	26.9	0.039	0.28	0.038	.66/.86	.24/.27
MU Diam.I 241		43.4	55.9	0.25	17.4	0.093	.33/.28	0.012	.86/.94	.20/.22

* Also uses spoilers for lateral control

Table 8.6a) Regional Turboprop Airplanes: Horizontal Tail Volume and Elevator Data

Type	Wing Area S ft ²	Wing mcg $\bar{c}$ ft	Wing Airfoil root/tip NACA*	Hor. Tail Area S _h ft ²	S _e /S _h	x _h ft	$\bar{V}_h$	Elevator Chord root/tip fr.c _h
CASA C-212-200	431	6.68	653-218	135	0.35	24.9	1.17	.49/.53
SHORTS								
330	453	6.06	NA	83.6	0.33	27.3	0.83	0.50
360	453	6.06	NA	106	0.39	33.0	1.28	0.48
BEECH								
1900	303	5.35	23018/23015	71.3	0.43	30.3	1.33**	.43/.48
B200	303	5.35	23018.5/23011.3	68.0	0.28	24.6	0.91	0.42
CESSNA CONQUEST			*** I airfoils carry -63 mod.					
I***	225	4.73	23018/23009	62.0	0.33	16.4	0.95	.36/.43
II	254	4.98	23018/23009	63.4	0.29	18.0	0.90	.43/.40
GA Ic	610	8.28	NA	134	0.26	36.5	0.97	.29/.32
GAF N22B	324	5.94	23018	78.0	1.00	20.6	0.83	stabilator
Fokker F27-200	754	8.43	64-421/64-415	172	0.27	36.0	0.98	.29/.34
DeHAVILLAND CANADA								
DHC-6-300	420	6.50	NA	100	0.35	24.8	0.91	0.47
DHC-7	860	9.45	63A418/63A415	217	0.46	41.6	1.11	.42/.47
DHC-8	585	6.51	NA	154	0.42	36.3	1.47	.41/.43
EMB-120	409	6.57	23018/23012	108	0.39	31.7	1.27	.38/.44
BAe 31	270	5.27	63A418/63A412	84.0	0.46	20.7	1.22	.43/.48
Metro III	309	6.03	65A215/64A415	76.0	0.28	26.1	1.07	.31/.48

* Unless otherwise indicated. ** 1900 also has a small fixed stabilizer.

Table 8.6b) Regional Turboprop Airplanes: Vertical Tail Volume, Rudder and Aileron Data

Type	Wing Area S ft ²	Wing Span b ft	Vert. Tail Area S _v ft ²	S _r /S _v	x _v ft	$\bar{V}_v$	Rudder Chord root/tip fr.c _v	S _a /S	Ail. Span Loc. in/out fr.b/2	Ail. Chord in/out fr.c _w
CASA C-212-200	431	62.3	77.5	0.41	24.8	0.072	0.41	0.061	.69/1.0	.24/.26
SHORTS										
330	453	74.7	93.1	0.26	27.3	0.075	0.41	0.061	.70/.95	0.27
360	453	74.7	91.4	0.37	33.9	0.091	.39/.36	0.074	.69/.98	0.27
BEECH										
1900*	303	54.5	47.5	0.35	26.5	0.076	.40/.38	0.064	.60/1.0	0.21
B200	303	54.5	52.3	0.29	20.5	0.065	.47/.41	0.059	.60/1.0	0.21
CESSNA CONQUEST										
I	225	44.1	41.3	0.38	17.1	0.071	.46/.38	0.060	.61/.86	.29/.28
II	254	49.3	43.5	0.37	18.7	0.065	.48/.33	0.058	.62/.89	.30/.32
GA Ic	610	78.3	117	0.25	35.4	0.087	.29/.33	0.061	.65/.98	.27/.22
GAF N22B	324	54.2	70.2	0.44	21.6	0.086	.49/.43	0.085	.54/1.0	0.24
Fokker F27-200	754	95.2	153	0.30	36.0	0.077	.33/.29	0.050	.69/.98	.31/.29
DeHAVILLAND CANADA										
DHC-6-300	420	65.0	82.0	0.42	25.7	0.077	.35/.44	0.079	.44/.97	0.20
DHC-7	860	93.0	170	0.28	35.7	0.076	.25/.30	0.027	.81/1.0	.27/.31
DHC-8	585	84.0	190	0.26	31.4	0.121	.27/.35	0.031	.80/1.0	.23/.22
EMB-120	409	64.9	74.3	0.38	27.3	0.076	.32/.31	0.084	.63/.97	0.24
BAe 31	270	52.0	83.1	0.26	20.7	0.120	.34/.39	0.061	.59/.97	.28/.30
Metro III	309	57.0	56.0	0.35	27.9	0.089	.37/.56	0.046	.61/.98	.31/.36

* 1900 also has taillets on horizontal tail.

Table 8.7a) Jet Transports: Horizontal Tail Volume and Elevator Data

Type	Wing Area S ft ²	Wing mcg $\bar{c}$ ft	Wing Airfoil root/tip	Hor. Tail Area S _h ft ²	S _e /S _h	x _h ft	$\bar{V}_h$	Elevator Chord root/tip fr.c _h
BOEING								
727-200	1,700	18.0	BAC	376	0.25	67.0	0.82	.29/.31
737-200	980	11.2	BAC	321	0.27	43.8	1.28	.30/.32
737-300	1,117	10.9	BAC	330	0.24	49.7	1.35	.24/.34
747-200B	5,500	38.0	BAC	1,470	0.24	104.5	0.74	.0.29
747SP	5,500	38.0	BAC	1,534	0.21	72.9	0.54	.32/.20
757-200	1,951	14.9	BAC	585	0.25	56.9	1.15	.29/.38
767-200	3,050	19.8	BAC	856	0.23	67.6	0.94	.30/.25
MCDONNELL-DOUGLAS								
DC-9 S80	1,270	15.7	N.A.	314	0.34	61.4	0.96	.39/.38
DC-9-50	1,001	11.8	N.A.	276	0.38	56.8	1.32	.41/.47
DC-10-30	3,958	24.7	N.A.	1,338	0.22	65.9	0.90	.25/.30
AIRBUS								
A300-B4	2,799	19.2	N.A.	748	0.26	80.4	1.12	.0.35
A310	2,357	19.3	N.A.	689	0.26	72.0	1.09	.33/.30
Lockheed L1011-500	3,541	24.5	N.A.	1,282	0.19	55.9	0.83	stabulator
Fokker F-28-4000	850	10.9	N.A.	210	0.20	47.2	1.07	.34/.33
Rombac/British Aerospace								
1-11 495	1,031	11.8	N.A.	258	0.27	40.7	0.86	.41/.35
British Aerospace								
146-200	832	10.2	N.A.	276	0.39	45.3	1.48	.42/.44
Tu-154	2,169	16.8	N.A.	436	0.18	58.9	0.71	.27/.25

Table 8.7b) Jet Transports: Vert. Tail Volume, Rudder, Aileron and Spoiler Data

Type	Wing Area S ft ²	Wing Span b ft	Vert. Tail Area S _v ft ²	S _r /S _v	x _v ft	$\bar{V}_v$	Rudder Chord root/tip fr.c _v	S _a /S	Inb'd Ail. Span in/out fr.b/2	Inb'd Ail. Chord in/out fr.c _w
BOEING										
727-200	1,700	108	422	0.16	47.4	0.110	.29/.28	0.034	.38/.46	.17/.24
737-200	980	93.0	233	0.24	40.7	0.100	.25/.22	0.024	none	none
737-300	1,117	94.8	239	0.31	45.7	0.100	.26/.50	0.021	none	none
747-200B	5,500	196	830	0.30	102	0.079	.0.30	0.040	.38/.44	.17/.25
747-SP	5,500	196	885	0.27	69.5	0.057	.31/.34	0.040	.38/.44	.17/.25
757-200	1,951	125	384	0.34	54.2	0.086	.35/.33	0.027	none	none
767-200	3,050	156	497	0.35	64.6	0.067	.33/.36	0.041	.31/.40	.23/.20
MCDONNELL-DOUGLAS										
DC-9 S80	1,270	108	168	0.39	50.5	0.062	.49/.46	0.030	none	none
DC-9-50	1,001	93.4	161	0.41	46.2	0.079	.45/.44	0.038	none	none
DC-10-30	3,958	165	605	0.18	64.6	0.060	.0.35	0.047	.32/.39	.20/.25
AIRBUS										
A300-B4	2,799	147	487	0.30	79.5	0.094	.35/.36	0.049	.29/.39	.23/.27
A310	2,357	144	487	0.35	68.5	0.098	.33/.35	0.027	.32/.40	.23/.27
Lockheed L1011-500	3,541	164	550	0.23	58.2	0.055	.29/.26	0.051	.40/.49	.22/.23
Fokker F-28-4000	850	82.3	157	0.16	37.9	0.085	.29/.31	0.034	none	none
Rombac/British Aerospace										
1-11 495	1,031	93.5	117	0.28	31.6	0.038	.39/.37	0.030	none	none
British Aerospace										
146-200	832	86.4	224	0.44	38.9	0.12	.0.29	0.046	none	none
Tu-154	2,169	123	341	0.27	45.3	0.055	.0.37	0.036	none	none

Table 8.7c) Jet Transports: Vert. Tail Volume, Rudder, Aileron and Spoiler Data

Type	Outb'd Ail. Span	Outb'd Ail. Chord	Inb'd Spoiler Span Loc.	Inb'd Spoiler Chord	Inb'd Spoiler Hinge Loc.	Outb'd Spoiler Span Loc.	Outb'd Spoiler Chord	Outb'd Spoiler Hinge Loc.
	in/out	in/out	in/out	in/out	in/out	in/out	in/out	in/out
	fr.b/2	fr.c _w	fr.b/2	fr.c _w	fr.c _w	fr.c _w	fr.c _w	fr.c _w
BOEING								
727-200	.76/.93	.23/.30	.14/.37	.09/.14	.79/.69	.48/.72	.16/.20	.65/.63
737-200	.74/.94	.20/.28	.40/.66	.14/.18	.66/.67	none	none	none
737-300	.72/.91	.23/.30	.38/.64	0.14	.64/.70	none	none	none
747-200B	.70/.95	.11/.17	.46/.67	.12/.16	0.71	none	none	none
747-SP	.70/.95	.11/.17	.46/.67	.12/.16	0.71	none	none	none
757-200	.76/.97	.22/.36	.41/.74	.12/.13	.73/.69	none	none	none
767-200	.76/.98	.16/.15	.16/.31	.09/.11	.85/.78	.44/.67	.12/.17	.74/.71
McDONNELL-DOUGLAS								
DC-9 S80	.64/.85	.31/.36	.35/.60	.10/.08	.69/.65	none	none	none
DC-9-50	.78/.95	.30/.35	.35/.60	.10/.08	.69/.65	none	none	none
DC-10-30	.75/.93	.29/.27	.17/.30	.05/.06	.78/.74	.43/.72	.11/.16	.75/.70
AIRBUS								
A300-B4	.83/.99	.32/.30	.57/.79	.16/.22	.73/.72	none	none	none
A310	none	none	.62/.83	.16/.22	.69/.66	none	none	none
Lockheed L1011								
-500	.77/.98	.26/.22	.13/.39	.08/.12	.82/.73	.50/.74	.14/.14	.67/.67
Fokker F-28								
-4000	.66/.91	.29/.28	no lateral control spoilers					
Rombac/British Aerospace								
1-11 495	.72/.92	0.26	.37/.68	.06/.11	.68/.63	none	none	none
British Aerospace								
146-200	.78/1.0	.33/.31	.14/.70	.22/.27	.76/.68	none	none	none
Tu-154	.76/.98	.34/.27	.43/.70	.14/.20	.62/.60	none	none	none

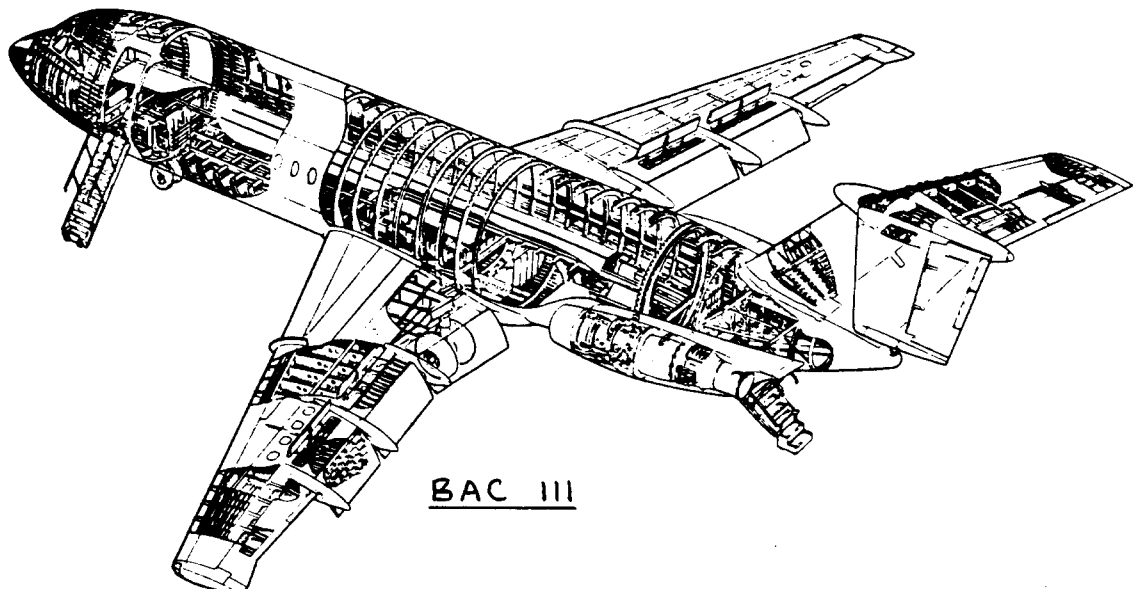


Table 8.8a) Military Trainers: Horizontal Tail Volume and Elevator Data

Type	Wing Area	Wing m_{gc}	Wing Airfoil	Hor. Tail Area	S_e/S_h	x_h	$\bar{V}_h$	Elevator Chord
	S	$\bar{c}$	root/tip	S_h				root/tip
	ft ²	ft	NACA*	ft ²		ft		fr.c _h
Turbopropeller Driven								
EMB-312	209	5.77	63,A415/63A212	49.2	0.44	16.9	0.69	.42/.44
Pil. PC-7	179	5.23	64,A415/64,A612	36.9	0.49	16.2	0.64	.49/.50
NDN 1T	126	5.4	23012	25.8	0.47	14.0	0.53	.44
T-34C	180	4.01	23016.5/23012	37.2	0.37	14.8	0.76	.43/.44
Epsilon	96.9	3.97	RA1643/RA1243	21.5	0.48	13.8	0.77	.49/.54
SP-260M	109	4.35	64,212/64,210	26.0	0.40	12.7	0.70	.35/.56
Yak-52	162	5.20	Clark YN	30.8	0.54	13.3	0.49	.54/.60
Neiva T25	185	5.19	63,A315/63,A212	33.0	0.44	15.0	0.52	.46/.40
Jet Driven								
Aero L39C	202	7.04	64A012	54.6	0.23	15.2	0.58	.35/.44
Microturbo Microjet								
200B	65.9	2.79	RA16.3C3	22.9	0.32	8.98	1.12	.37/.34
Dassault-Breguet/Dornier								
Alphajet	188	7.37	N.A.	42.4	1.0	14.1	0.43	stabilator
Aermacchi								
MB-339A	208	6.34	64A114/64A212	46.9	0.23	14.6	0.52	.26/.36
SM S-211	136	5.40	KU .17 sprcrt.	36.4	0.40	15.2	0.75	.41/.40
PZL TS-11	188	5.80	64209/64009	38.1	0.33	16.3	0.57	.31/.32
CASA C101	215	6.32	Norcan 15	47.8	0.23	15.2	0.54	.33/.46
British Aerospace								
Hawk Mk1	180	6.30	N.A.	46.6	1.0	14.8	0.61	stabilator

* Unless otherwise indicated.

Table 8.8b) Military Trainers: Vertical Tail Volume, Rudder and Aileron Data

Type	Wing Area	Wing Span	Vert. Tail Area	S_r/S_v	x_v	$\bar{V}_v$	Rudder Chord	S_a/S	Ail. Span Loc.	Ail. Chord
	S	b	S_v				root/tip		in/out	in/out
	ft ²	ft	ft ²		ft		fr.c _v		fr.b/2	fr.c _w
Turbopropeller Driven										
EMB-312	209	36.3	22.4	0.70	16.6	0.049	.37/1.0*	0.100	.56/.99	.21/.31
Pil. PC-7	179	34.1	20.2	0.47	14.4	0.048	.52/.49	0.082	.56/.97	.23/.27
NDN 1T	126	26.0	13.5	0.52	11.8	0.049	.38/.57	0.110	.50/.87	.26
T-34C	180	33.3	19.8	0.35	14.4	0.048	.41/.40	0.063	.55/.95	.22/.23
Epsilon	96.9	26.0	11.0	0.39	13.4	0.058	.48/.45	0.090	.58/.91	.30/.29
SP-260M	109	27.4	16.4	0.40	12.5	0.069	.35/.63	0.075	.61/.92	.23/.30
Yak-52	162	30.5	15.9	0.59	13.9	0.045	.46/.51	0.130	.47/.98	.27/.26
Neiva T25	185	36.1	18.5	0.52	13.7	0.043	.53/.52	0.085	.51/.96	.16/.22
Jet Driven										
Aero L39C	202	31.0	37.8	0.28	13.9	0.083	.36/.33	0.066	.62/.93	.36/.34
Microturbo Microjet										
200B	65.9	24.8	14.5	0.39	10.0	0.089	.37/.43	0.073	.64/.96	.29/.32
Dassault-Breguet/Dornier										
Alphajet	188	29.9	32.0	0.21	14.8	0.084	.32/.36	0.059	.68/1.0	.23/.27
Aermacchi										
MB-339A	208	35.6	25.5	0.26	12.6	0.043	.30/.38	0.069	.60/.92	.25
SM S-211	136	27.7	21.6	0.33	13.5	0.078	.37/.36	0.100	.58/.97	.22/.21
PZL TS-11	188	33.0	24.2	0.31	16.8	0.066	.24/.47	0.085	.55/.95	.23/.27
CASA C101	215	34.8	34.4	0.41	15.8	0.072	.37/.36	0.080	.61/.93	.26/.27
British Aerospace										
Hawk Mk1	180	30.8	27.0	0.23	12.1	0.059	.28/.31	0.063	.65/1.0	.26/.32

* Large hornbalance at tip.

Table 8.9a) Fighters: Horizontal Tail Volume and Elevator Data

Type	Wing Area S ft ²	Wing $\bar{c}$ ft	Wing Airfoil root/tip NACA*	Hor. Tail Area S_h ft ²	S_e/S_h	x_h ft	$\bar{V}_h$	Elevator Chord root/tip fr. c_h
DASSAULT-BREGUET								
Mir. IIIE 377		17.7	NA	0	0	0	0	elevons
Mir. F1C 269		10.4	NA	96.9	1.0	14.9	0.51	stabilator
Mir. 2000 441		18.2	NA	0	0	0	0	elevons
Super Et. 306		10.5	NA	59.7	1.0	15.3	0.29	stabilator
FR A-10A 506		8.94	6716/6713	89.4	0.32	20.6	0.41	0.33
Grum. A6A 529		10.9	NA	109.8	1.0	24.2	0.46	stabilator
Grum. F14A 565		10.2	NA	140	1.0	16.4	0.40	stabilator
North. F5E 186		8.05	65A004.8	59.0	1.0	13.0	0.51	stabilator
Vht A7A 375		10.8	65A007	56.2	1.0	16.2	0.22	stabilator
MCDONNELL DOUGLAS								
F-4E 530		15.5	64A005.9	96.9	1.0	22.2	0.26	stabilator
F-15 608		17.8	McD .003	104	1.0	20.7	0.20	stabilator
GENERAL DYNAMICS								
FB-111A 476		8.22	63(NA)	168	1.0	17.6	0.75	stabilator
F-16 300		11.4	64A204	66.6	1.0	15.4	0.30	stabilator
Cessna A37B 184		5.61	2418/2412	46.7	0.25	15.1	0.68	.34/.31
Aermacchi MB339K 208		6.30	64A114/64A212	36.4	0.29	14.5	0.40	.26/.37
MIG-25 612		17.3	NA	236	1.0	16.0	0.36	stabilator
Su-7BMK 329		12.5	0.008 thick	92.7	1.0	17.9	0.40	stabilator

* Unless otherwise indicated.

Table 8.9b) Fighters: Vertical Tail Volume, Rudder and Aileron Data

Type	Wing Area S ft ²	Wing Span b ft	Vert. Tail Area S_v ft ²	S_r/S_v	x_v ft	$\bar{V}_v$	Rudder Chord root/tip fr. c_v	S_a/S	Ail. Span Loc. in/out fr. $b/2$	Ail. Chord in/out fr. c_w
DASSAULT BREGUET										
Mir. IIIE 377		27.0	48.4	0.20	13.9	0.066	.22/.29	0.14	.18/1.0	.13/1.0
Mir. F1C 269		27.6	53.9	0.16	13.5	0.098	.21/.35	0.031	.77/1.0	.23/.25
Mir. 2000 441		29.5	71.8	0.16	13.6	0.075	.21/.34	0.13	.19/1.0	.13/1.0
Super Et. 306		31.5	48.3	0.18	12.4	0.062	.25/.49	0.053	.57/.81	.23/.27
FR A-10A 506		57.5	84.0	0.28	20.9	0.060	.31/.34	0.094	.58/.91	.42/.40
Grum. A6A 529		53.0	79.3	0.21	24.6	0.069	.28/.21	see Jane's 81-81		
Grum. F14A 565		64.1	118	0.29	18.4	0.060	.29/.33	see Jane's 81-82		
North. F5E 186		26.7	41.4	0.15	11.7	0.098	.26/.30	0.050	.76/.99	.34/.33
Vht A7A 375		38.8	115	0.13	16.1	0.13	.21/.29	0.053	.59/.90	.20/.24
MCDONNELL DOUGLAS										
F-4E 530		38.4	59.6	0.20	18.3	0.054	.20/.29	0.040	.63/.98	.23/.28
F-15 608		42.8	143	0.25	17.8	0.098	.30/.50	0.053	.60/.86	.25/.27
GENERAL DYNAMICS										
FB-111A 476		63.0	96.1	0.21	17.0	0.054	.25/.26	look under Grumman		
F-16 300		31.8	62.2	0.25	14.4	0.094	.34/.33	0.13*	.30/.73	.21/.23
Cessna A37B 184		35.9	17.8	0.35	15.1	0.041	.37/.39	0.061	.56/.91	.27/.32
Aermacchi MB339K 208		36.2	25.5	0.26	12.6	0.043	.26/.41	0.069	.58/.90	.24/.26
MIG-25 612		45.8	174	0.15	16.8	0.10	0.24	0.053	.54/.79	.22/.21
Su-7BMK 329		29.3	58.2	0.26	16.9	0.10	.28/.25	0.11	.62/.97	.29/.35

* Flaperon

Table 8.10a) Military Patrol, Bomb and Transport Airplanes: Horizontal Tail

Volume and Elevator Data								
Type	Wing Area	Wing $\bar{m}gc$	Wing Airfoil	Hor. Tail Area	S_e/S_h	x_h	$\bar{V}_h$	Elevator Chord
	S	$\bar{c}$	root/tip	S_h				root/tip
	ft ²	ft	NACA*	ft ²		ft		fr.c _h
Turbopropeller Driven								
LOCKHEED								
C-130E	1,745	13.7	64A318/64A412	536	0.29	42.1	0.94	.34/.44
P3C	1,300	14.1	0014/0012	322	0.25	48.5	0.85	.29/.37
ANTONOV								
An-12BP	1,310	11.3	NA	319	0.24	52.5	1.13	.33/.36
An-22	3,713	18.8	NA	846	0.28	87.4	1.06	.34/.53
An-26	807	8.79	NA	213	0.28	43.5	1.31	.34/.38
Grum.E2C	700	9.73	NA	174	0.29	26.9	0.69	.29/.36
D/B Atlant.2	1,295	11.5	NA	355	0.25	43.4	1.04	.35/.36
Aerital.G222	883	8.65	NA	255	0.20	37.0	1.24	.39/.30
Jet Driven								
LOCKHEED								
S-3A Viking	598	9.85	NA	176	0.28	20.0	0.60	.35/.25
C-141B	3,406	21.4	NA	545	0.26	82.5	0.62	.28/.29
C-5A	6,200	32.9	NA	966	0.27	130.4	0.62	0.30
BA Nimrod 2	2,121	20.5	NA	435	0.31	50.5	0.51	.32/.40
Boeing YC-14	1,762	16.8	NA	690	0.40	61.5	1.43	0.46
McDD KC-10A	3,958	24.7	NA	1,338	0.22	65.1	0.89	0.27
Tu-16	1,772	15.9	NA	360	0.27	50.6	0.65	.26/.41
Il-76T	3,229	20.7	NA	639	0.25	71.2	0.68	.31/.30

* Unless otherwise indicated.

Table 8.10b) Military Patrol, Bomb and Transport Airplanes: Vertical Tail Volume.

Rudder, Aileron and Spoiler Data										
Type	Wing Area	Wing Span	Vert. Tail Area	S_r/S_v	x_v	$\bar{V}_v$	Rudder Chord	S_a/S	Inb'd Ail. Span	Inb'd Ail. Chord
	S	b	S_v				root/tip		in/out	in/out
	ft ²	ft	ft ²		ft		fr.c _v		fr.b/2	fr.c _w
Turbopropeller Driven										
LOCKHEED										
C-130E	1,745	133	300	0.25	40.5	0.053	.26/.31	0.063	none	none
P3C	1,300	99.7	176	0.34	46.1	0.063	.32/.39	0.069	none	none
ANTONOV										
An-12BP	1,310	125	205	0.28	48.9	0.061	.42/.44	0.064	none	none
An-22	3,713	211	700	0.44	82.6	0.074	.54/.40	0.040	none	none
An-26	807	95.8	171	0.40	39.9	0.088	.41/.43	0.071	none	none
Grum.E2C	700	80.6	199	0.52	27.7	0.098	.44/.64	0.077	none	none
D/B Atl.2	1,295	123	179	0.36	44.3	0.050	.37/.42	0.044	none	none
Aer.G222	883	94.2	207	0.37	36.7	0.091	.39/.47	0.045	none	none
Jet Driven										
LOCKHEED										
S-3A Viking	598	68.7	129	0.29	20.0	0.063	.37/.35	0.022	none	none
C-141B	3,406	160	455	0.21	72.1	0.060	.24/.28	0.056	none	none
C-5A	6,200	223	961	0.24	113	0.079	.27/.31	0.041	none	none
BA Nimr.2	2,121	115	118	0.35	50.4	0.024	.45/.37	0.058	none	none
B. YC-14	1,762	129	650	0.26	55.7	0.160	0.40	0.048	none	none
MDD KC10A	3,958	165	605	0.18	62.9	0.058	.39/.40	0.047	.32/.39	.20/.25
Tu-16	1,772	108	276	0.24	48.5	0.070	.35/.29	0.057	none	none
Il-76T	3,229	166	596	0.26	60.7	0.068	.46/.38	0.040	none	none

Table 8.10c) Military Patrol, Bomb and Transport Airplanes: Vertical Tail Volume.

Rudder, Aileron and Spoiler Data

Type	Outb'd Ail. Span	Outb'd Ail. Chord	Inb'd Spoiler Span Loc.	Inb'd Spoiler Chord	Inb'd Spoiler Hinge Loc.	Outb'd Spoiler Span Loc.	Outb'd Spoiler Chord	Outb'd Spoiler Hinge Loc.
	in/out	in/out	in/out	in/out	in/out	in/out	in/out	in/out
	fr.b/2	fr.c _w	fr.b/2	fr.c _w	fr.c _w	fr.c _w	fr.c _w	fr.c _w

Turbopropeller Driven

LOCKHEED

C-130E .70/.99 0.29 no lateral control spoilers

P3C .63/.96 .22/.25 no lateral control spoilers

ANTONOV

An-12BP .68/.98 .31/.33 no lateral control spoilers

An-22 .63/.98 .27/.32 no lateral control spoilers

An-26 .66/.98 .32/.26 no lateral control spoilers

Grum.E2C .57/.98 .22/.33 no lateral control spoilers

D/B Atl.2 .70/.95 .24/.25 .37/.65 .06/.08 .74/.68 none none none

Aer.G222 .72/1.0 .35/.45 .48/.70 .07/.08 .70/.66 none none none

Jet Driven

LOCKHEED

S-3A Vik. .79/.96 .23/.25 .24/.79 .12/.15 .67/.56 none none none

C-141B .67/1.0 .26/.23 .15/.41 .09/.12 .85/.80 .43/.66 .10/.13 .83/.83

C-5A .72/.93 .28/.30 .36/.70 .13/.12 0.80 none none none

BA Nimr.2 .61/.96 .26/.27 no lateral control spoilers

B. YC-14 .78/1.0 .37/.33 none none none .53/.78 0.16 .74/.64

MDD KC10A .75/.93 .29/.27 .17/.30 .05/.06 .78/.74 .43/.72 .11/.16 .75/.70

Tu-16 .66/.97 .25/.29 no lateral control spoilers

IL-76T .74/.98 .25/.26 .17/.71 .10/.13 .80/.69 none none none

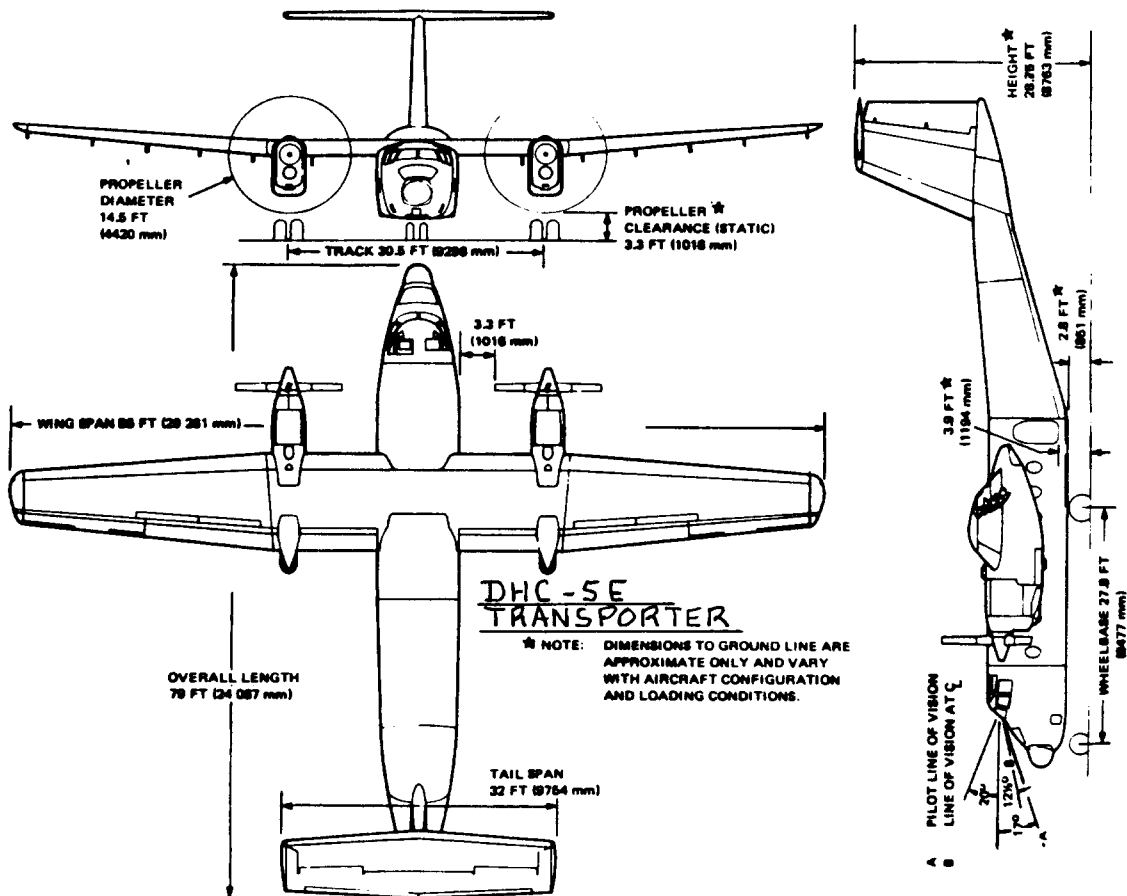


Table 8.11a) Flying Boats, Amphibious and Float Airplanes: Horizontal Tail

Volume and Elevator Data (Piston/Prop. Except as Indicated)

Type	Wing Area	Wing mjc	Wing Airfoil	Hor. Tail Area	S_e/S_h	x_h	$\bar{V}_h$	Elevator Chord
	S	$\bar{c}$	root/tip	S_h				root/tip
	ft ²	ft	NACA*	ft ²		ft		fr.c _h
SHORTS								
Sandringham	1,487	16.6	NA	259	0.35	44.1	0.46	.53/.35
Shetland	2,773	20.0	Gott. 436	388	0.32	55.8	0.39	.45/.41
DORNIER								
Do 24	1,162	13.8	NA	202	0.35	33.6	0.42	0.42
Do 24/72	1,129	12.4	NA	262	0.25	40.2	0.75	.25/.31
Do Seastar**	258	5.27	23018	52.6	0.41	18.7	0.72	0.41
GRUMMAN								
JRF-6B	375	8.33	NA	79.9	0.38	21.8	0.56	0.42
J4F-1	245	5.85	NA	50.4	0.43	16.8	0.56	.45/.48
SM S-700	258	5.31	NASA GAW-1	76.1	0.47	18.5	1.03	0.47
Can. CL-215	1,080	11.5	NA	306	0.28	28.2	0.70	0.40
BV-222	3,077	18.1	NA	413	0.23	59.0	0.44	.31/.17
SM US-1**	1,462	12.6	NA	343	0.28	51.3	0.95	.33/.34
Boeing 314-A	3,001	22.3	BAC	580	0.26	52.8	0.46	.31/.39
Martin PBM-3	1,385	12.8	NA	257	0.42	39.8	0.58	0.50
Beriev M-12***	1,130	10.2	NA	244	0.40	39.9	0.85	.37/.57
Part. P68B****	200	5.08	NA	47.5	1.00	15.7	0.74	stabilator
McK G-21G	378	7.78	23000	84.5	0.53	22.1	0.64	.49/.69

* Unless otherwise indicated. ** Turbopropeller driven *** Jet Driven
 **** Float Airplane

Table 8.11b) Flying Boats, Amphibious and Float Airplanes: Vertical Tail Volume.

Rudder and Aileron Data

Type	Wing Area	Wing Span	Vert. Tail Area	S_r/S_v	x_v	$\bar{V}_v$	Rudder Chord	S_a/S	Ail. Span Loc.	Ail. Chord
	S	b	S_v				root/tip		in/out	in/out
	ft ²	ft	ft ²		ft		fr.c _v		fr.b/2	fr.c _w
SHORTS										
Sandr'ham	1,487	113	157	0.31	43.5	0.041	.43/.36	0.089	.52/.93	.26/.20
Shetland	2,773	150	247	0.28	53.6	0.032	.33/.30	0.069	.51/.92	.22/.23
DORNIER										
Do 24	1,162	88.6	98.4	0.46	33.6	0.032	.41/.56	0.090	.32/.94	.15/.21
Do 24/72	1,129	91.8	200	0.38	42.2	0.081	.28/1.0	0.088	.63/.97	.29/.27
Do Seastar*	258	48.6	31.3	0.35	18.5	0.046	.33/.41	0.098	.60/.96	0.28
GRUMMAN										
JRF-6B	375	49.0	45.3	0.44	20.7	0.051	.41/.57	0.077	.56/.92	.27/.21
J4F-1	245	40.0	26.8	0.43	16.5	0.045	.35/.59	0.063	.57/.94	.20/.23
SM S-700	258	49.2	47.8	0.34	17.9	0.067	.29/.44	0.058	.63/.94	0.19
Can. CL215	1,080	93.8	186	0.35	29.2	0.053	.41/.57	0.080	.64/.95	0.26
BV-222	3,077	157	255	0.40	60.6	0.032	.36/.64	0.052	.56/.97	.12/.16
SM US-1*	1,462	109	265	0.29	46.4	0.077	.17/.30	0.047	.72/.98	.23/.21
B 314A	3,001	152	252	0.41	54.8	0.030	0.41	0.033	.58/.95	.09/.23
M PBM-3	1,385	118	196	0.44	39.7	0.048	.48/.39	0.053	.66/.96	.25/.28
Beriev M-12**	1,130	97.5	203	0.38	41.9	0.077	.36/.38	0.076	.58/.98	.29/.30
P68B***	200	39.4	21.9	0.22	15.5	0.043	.36/.40	0.096	.62/.96	0.21
McK G21-G	378	50.8	40.1	0.56	22.3	0.047	.39/.71	0.078	.55/.89	.23/.21

* Turbopropeller driven ** Jet Driven *** Float Airplane

Table 8.12a) Supersonic Cruise Airplanes: Horiz. Tail Volume and Elevator Data

Type	Wing Area S ft ²	Wing mpc c ft	Wing Airfoil root/tip	Hor. Tail Area S _h ft ²	S _e /S _h	x _h ft	$\bar{V}_h$	Elevator Chord root/tip fr.c _h
NORTH AMERICAN AVIATION (Now Rockwell)								
XB-70A	6,297	78.5	NA	delta	with elevons and small canard			
RA-5C	700	15.7	NA	356	1.0	17.1	0.56	stabilator
BOEING								
SST*	9,000	29.0**	NA	592	0.16	161	0.36	.24/.74
AST-100*	11,630	96.2	NA	547	1.0	107	0.052	stabilator
NASA*								
SSXjet I	965	30.6	.002/.003	65.0	1.0	47.2	0.10	stabilator
SSXjet II	965	30.6	.002/.003	80.0	1.0	41.2	0.09	stabilator
SSXjet III	1,128	33.1	.002/.003	80.0	1.0	41.9	0.09	stabilator
TUPOLEV								
Tu-144	4,715	58.3		delta	with elevons and folding canard			
Tu-22M	1,585	15.4**	NA	727	1.0	37.2	1.11	stabilator
Tu-22	2,062	23.7***	NA	620	0.12	34.7	0.44	.29/.30
Dassault								
Mirage IVA	840	24.7	NA	delta	with elevons			
GD F-111A	530	9.12**	NA	352	1.0	17.6	1.28	stabilator
Concorde	3,856	61.7	NA	ogive	with elevons			
Rockwell B1B	1,950	15.8**	NA	494	1.0	49.9	0.80	stabilator
Convair B58	1,481	34.6	NA	delta	with elevons			

* Study projects only ** Measured at forward sweep *** Fixed sweep airplane
See Refs. xx - yy

Table 8.12b) Supersonic Cruise Airplanes: Vertical Tail Volume, Rudder, Aileron and Spoiler Data

Type	Wing Area S ft ²	Wing Span b ft	Vert. Tail Area S _v ft ²	S _r /S _v	x _v ft	$\bar{V}_v$	Rudder Chord root/tip fr.c _v	S _a /S fr.b/2	Ail. Span Loc. in/out	Ail. Chord in/out fr.c _w
NORTH AMERICAN AVIATION (Now Rockwell)										
XB-70A	6,297	105	468	0.75	48.5	0.034	****	0.067	.33/.72	.13/.31*
RA-5C	700	33.0	102	1.0**	21.8	0.060	1.0**	no ailerons		
BOEING***										
SST	9,000	174	866	0.26	88.5	0.049	.23/.46	0.014	.78/.96	.32/.43
AST-100	11,630	138	890	1.0**	121	0.067	1.0**	0.017	.72/1.0	.15/.29
NASA***										
SSXjet I	965	42.1	75.0	1.0**	38.3	0.071	1.0**	0.018	.76/1.0	.21/.26
SSXjet II	965	42.1	75.0	1.0**	35.5	0.066	1.0**	0.018	.76/1.0	.21/.26
SSXjt III	1,128	45.6	97.0	1.0**	32.1	0.061	1.0**	0.017	.74/1.0	.19/.26
TUPOLEV										
Tu-144	4,715	94.5	648	0.19	55.6	0.081	.20/.35	0.100	.31/.97	.11/.51*
Tu-22M	1,585	113	437	0.17	35.6	0.087	.39/.36	NA	.80/.95	.24/.28
Tu-22	2,062	90.9	376	0.14	29.6	0.059	.25/.33	0.051	.66/.95	.29/.31
Dassault										
Mirage IVA	840	38.9	129	0.12	14.1	0.056	.14/.24	0.120	.30/.96	.17/.63*
GD F-111A	530	63.0	115	0.25	18.6	0.064	.27/.29	no ailerons		
Concorde	3,856	84.0	477	0.24	54.1	0.080	.18/.47	0.089	.51/1.0	.15/.27*
Rockw.B1B	1,950	137	230	0.30	45.8	0.039	.29/.38	no ailerons		
Conv. B58	1,481	57.0	153	0.24	31.8	0.057	.32/.31	0.120	.18/.69	.16/.28*

* Elevon equipped ** Slab vertical tail ***Study projects only
**** Rudder hingeline skewed

Table 8.12c) Supersonic Cruise Airplanes: Vertical Tail Volume, Rudder, Aileron
and Spoiler Data

Type	Inb'd Ail. Span	Inb'd Ail. Chord	Inb'd Spoiler Span Loc.	Inb'd Spoiler Chord	Inb'd Spoiler Hinge Loc.	Outb'd Spoiler Span Loc.	Outb'd Spoiler Chord	Outb'd Spoiler Hinge Loc.
	in/out	in/out	in/out	in/out	in/out	in/out	in/out	in/out
	fr.b/2	fr.c _w	fr.b/2	fr.c _w	fr.c _w	fr.c _w	fr.c _w	fr.c _w
NORTH AMERICAN AVIATION (Now Rockwell)								
XB-70A	none	none	no lateral control spoilers			.25/.73	.14/.19	.60/.65
RA-5C	none	none	none	none	none			
BOEING*								
SST	none	none	none	none	none	.36/.78	.17/.15	.69/.67
AST-100	none	none	none	none	none	.60/.70	.08/.11	.73/.65
NASA*								
SSXjet I	none	none	none	none	none	.38/.75	.04/.07	.88/.78
SSXjet II	none	none	none	none	none	.31/.75	.04/.07	.85/.78
SSXjt III	none	none	none	none	none	.31/.74	.04/.06	.86/.78
TUPOLEV								
Tu-144	none	none	no lateral control spoilers			.32/.80	.08/.13	.69/.66
Tu-22M	none	none	none	none	none			
Dassault								
Mir. IVA	none	none	no lateral control spoilers			.25/.79	0.17	.65/.66
GD F111A	none	none	none	none	none			
Concorde	none	none	no lateral control spoilers			.47/.81	.36/.35	.64/.65
Rockw.B1B	none	none	none	none	none			
Conv. B58	none	none	no lateral control spoilers					

* Study projects only

