SECTION 3

PERFORMANCE

TABLE OF CONTENTS

AIRSPEED LIMITATIONS

AIRSPEED DATA

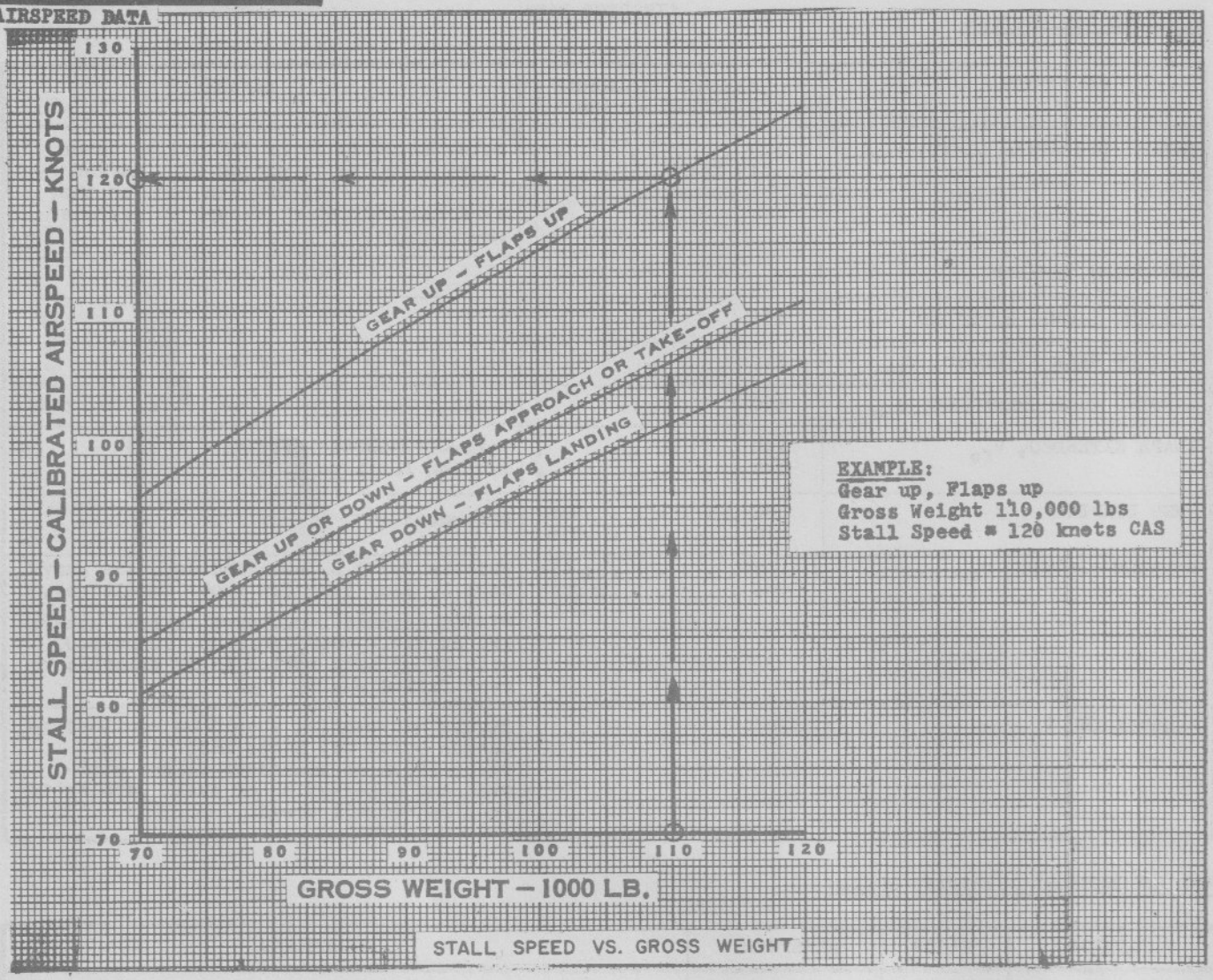
CONDITION	MAXIMUM ALLOWABLE AIRSPEED - KNOTS	REMARKS
NORMAL OPERATING LIMIT, V_{no}	324 . . . . . . .615 Mach	Below 12,000') It is EAL policy never Above 12,000') to exceed V_{no}, marked by the red hand on the airspeed indicator, except in extreme emergencies.
AUTOPILOT ENGAGED	V_{no}	
LANDING LIGHTS EXTENDED	261	
LANDING GEAR EXTENDED, V_{le}	217	Maximum with the gear down.
LANDING GEAR OPERATING, V_{lo}	190	Maximum for extending or retracting gear.
FLAPS EXTENDED, V_{fe}	190 . . . . . . 170	Take-Off/Approach Position (78%) Landing Position (100%)
FUEL DUMPING	200 . . . . . .Max. 140 . . . . . .Min.	Recommend 175.
MINIMUM CONTROL, V_{mc}	110*. . . . . Air 97. . . . . .Ground	This is for S.L. standard day, see curve, page 1, Sec. 3-3, for other conditions. *It is assumed 1 outboard failed, others are at T.O. power, gear up, flaps T.O. with 5° of bank rolled in by ailerons to keep failed engine high.
MANEUVERING V_a	203	Severe maneuvering should be confined to speeds below 203 knots EAS. (Pilot recognition of hazardous flight attitude and observation of stall warning is required at all speeds.)

EAL RECOMMENDED OPERATING SPEEDS

CONDITION	FLAPS	AIRSPEED	REMARKS
ENROUTE CLIMB	UP	200-210	
3-ENGINE CLIMB	UP	160	
IN TURBULENCE	UP	180-195	Max. Landing Weight - 180; Max. T.O. Weight - 195.
MANEUVERING	T.O. UP**	150 190**	For Holding Patterns, Procedure Turns, Down Wind Leg, Circling. **If desirous of holding with no flaps, a speed of 190 Knots may be maintained at about the same power setting as for 150 Knots with T.O. flaps.
APPROACH	T.O.	130-140	For Final Approach with gear down and no subsequent turns contemplated; for let-down-through on straight-in instrument approaches.
THRESHOLD	DOWN	SEE REMARKS	108 - 80,000# G.W. 111 - 85,000# G.W. 114 - 90,000# G.W. 117 - 95,000# G.W. 120 - 100,000# G.W. 124 - 105,000# G.W. 127 - 110,000# G.W. Refer to stall speed chart on next page if using other flap setting and carry adequate margin of speed.

PERFORMANCE

AIRSPEED DATA



STALL SPEED VS. GROSS WEIGHT

V_1-V_2 SPEEDS (Ref. Sec. 3-1, pages 3 & 4)

To determine V_1 speed it is necessary to know the airplane's gross weight, ambient air temperature and runway gradient (slope). Gross weight is determined by inspection of the Cargo and Weight Manifest, EAL form 0-010; ambient air temperature may be determined by observation of the O.A.T. gage; and the runway gradient by inspection of the back side of the V_1-V2 speed tabulation. Runway gradient is not a factor in the determination of V_2 speed.

Only those EAL airports having runways with significant gradients are listed on the reverse side of the V_1-V_2 table. Unlisted runways at these airports and all runways at EAL airports not listed, into which the Electra will be scheduled, are considered level; i.e., no gradient.

EXAMPLE:

Determine V_1-V_2 speeds for runway 9 at Miami when O.A.T. is 25°C and gross weight is 105,000 Lbs.

Inspection of the airport side of the V_1-V_2 data sheet reveals that Miami is not listed, runway 9 is therefore level. Enter the V_1-V_2 tabulation on the left side at 105,000; follow horizontally the V_1 LEVEL line till in the vertical 25°C column; by inspection, V_1 is 108 knots and V_2, two figures below, is 119.

EXAMPLE:

Determine V_1-V_2 speeds for runway 21 at Atlanta when O.A.T. is 35°C and gross weight is 105,000 Lbs.

Inspection of the airport side of the V_1-V_2 data sheet shows that runway 21 has a gradient of +.7%. Enter the V_1-V_2 tabulation on the left at 105,000 Lbs. and follow horizontally to the right until in the vertical column for 35°C. Note V_1 for a 1% slope (+1.%) is 116 knots, for a level runway, 110. The difference of 6 multiplied by .7 gives an interpolation figure of 4.2 knots; add 4 to 110 to get V_1 of 114 knots. V_2 of 119 is determined by inspection.

V_1-V_2 speeds may be determined by interpolation for weights and temperatures between those tabulated.

ELECTRA V_1-V_2 SPEEDS--C.A.S.

THIS CHART GOOD FOR ALTITUDES UP TO 1500 FT.

GROSS WEIGHT	V_1-V_2 SPEED	RUNWAY SLOPE	AMBIENT AIR TEMPERATURE -15°C 5°F	-5°C 23°F	5°C 41°F	15°C 59°F	25°C 77°F	35°C 95°F	45°C 113°F
113,000	V_1	1% UP	114	115	116	120	124		
		LEVEL	110	111	111	114	118		
		1% DOWN	105	108	108	109	110		
	V_2		124	124	124	124	124	124	124
110,000	V_1	1% UP	112	112	113	116	119	122	
		LEVEL	109	110	110	110	113	118	
		1% DOWN	105	106	106	106	107	108	
	V_2		124	124	123	122	122	122	122
105,000	V_1	1% UP	109	109	109	111	111	116	119
		LEVEL	107	107	107	107	108	110	115
		1% DOWN	105	104	104	104	104	104	106
	V_2		124	124	123	121	119	119	119
100,000	V_1	1% UP	106	106	107	108	106	110	113
		LEVEL	105	105	105	105	105	106	109
		1% DOWN	105	103	102	102	102	102	103
	V_2		124	124	123	121	119	116	116
95,000	V_1	1% UP	105	103	105	106	104	106	108
		LEVEL	105	103	104	103	102	102	104
		1% DOWN	105	103	102	100	100	100	100
	V_2		124	124	123	121	119	116	113
90,000	V_1	1% UP	105	103	103	104	102	102	104
		LEVEL	105	103	102	101	100	100	100
		1% DOWN	105	103	102	99	98	98	98
	V_2		124	124	123	121	119	116	112
85,000	V_1	1% UP	105	103	102	102	100	98	100
		LEVEL	105	103	102	100	98	97	97
		1% DOWN	105	103	102	99	98	98	98
	V_2		124	124	123	121	119	116	112
80,000	V_1	1% UP	105	103	102	100	99	99	97
		LEVEL	105	103	102	99	97	96	95
		1% DOWN	105	103	102	99	98	98	98
	V_2		124	124	123	121	119	116	112

PERFORMANCE

AIRSPEED DATA

RUNWAY SLOPES

ALL RUNWAYS ALL FIELDS NOT LISTED BELOW ARE LEVEL. RUNWAY SLOPES BETWEEN -.25% AND +.25% ARE CONSIDERED LEVEL.

STA.	RNWY.	SLOPE
ABE	6	- .3
	24	+ .3
ALB	10	+ .5
	28	- .5
AND	17	- .9
	35	+ .9
ART	6	+ .25
	10	+ .3
	24	- .25
	28	- .3
ATL	3	- .7
	9	- .9
	21	+ .7
	27	+ .7
AVP	4	- .7
	10	+ .3
	22	+ .7
	28	- .3
BGM	10	- .4
	16	-1.0
	28	+ .4
	34	+1.0
BHM	5	+ .25
	8	+ .25
	18	- .75
	23	- .25
	26	- .25
	36	+ .75
BNA	2	- .5
	5	- .4
	15	- .25
	20	+ .5
	23	+ .4
	33	+ .25
BTV	15	+ .65
	33	- .65
BWG	2	- .75
	20	+ .75
CAE	10	- .7
	16	- .7
	28	+ .7
	34	+ .7
CAK	5	+ .6
	14	- .5
	23	- .6
	32	+ .5
CHA	1	- .3
	19	+ .3
CHS	3	+ .3
	21	- .3
CLE	9	+ .6
	14	+ .6
	27	- .6
	32	- .6
CLT	5	+ .75
	18	- .3
	23	- .75
	36	+ .3
CRW	5	-1.0
	14	+1.0
	23	+1.0
	32	-1.0
DAN	6	- .85
	13	-1.0
	24	+ .85
	31	+1.0
EWR	11	- .5
	29	+ .5
FLO	11	- .5
	18	- .6
	29	+ .5
	36	+ .6
GNV	5	- .5
	9	- .6
	13	- .5
	23	+ .5
	27	+ .6
	31	+ .5
GRL	5	+ .8
	18	-1.0
	23	- .8
	36	+1.0
GSO	5	+ .5
	14	- .8
	23	+ .5
	32	+ .8
HSV	18	+ .5
	36	- .5
ILG	1	- .25
	19	+ .25
IND	13	+ .35
	31	+ .35
INT	15	-1.0
	33	+1.0
JAX	5	+ .3
	9	+1.0
	12	+1.0
	23	- .3
	27	-1.0
	30	-1.0
LGA	4	- .3
	22	+ .3
LRP	8	- .35
	26	+ .35
MAL	5	- .7
	14	+1.0
	23	+ .7
	32	-1.0
MCN	5	+ .25
	23	- .25
MEM	3	- .28
	9	+1.0
	14	+ .5
	17	+ .4
	21	+ .28
	27	-1.0
	32	- .5
	35	- .4
MDW	4L	- .25
	18R	+ .25
	22R	+ .25
	36L	- .25
MGM	3	- .75
	9	- .4
	21	+ .75
	27	+ .4
OCF	11	- .35
	29	+ .35
PIT	5	+ .5
	10	-1.0
	14	- .5
	32	- .5
	28	+1.0
	32	+ .5
PLB	1	+ .4
	9	- .6
	14	- .85
	19	- .4
	27	+ .6
	32	+ .85
PNS	3	+ .7
	12	+ .7
	17	- .8
	21	- .7
	30	- .7
	35	+ .8
RDG	5	-1.0
	13	+ .5
	18	+1.0
	23	+1.0
RDG	31	- .5
	36	-1.0
RDU	5	+ .4
	14	- .25
	18	- .8
	23	- .4
	32	+ .25
	36	+ .8
RMG	7	- .4
	25	+ .4
ROA	15	- .5
	33	+ .5
SAT	3	- .25
	12	- .4
	21	+ .25
	30	+ .4
SAV	5	+ .5
	9	+ .5
	18	- .25
	23	- .5
	27	- .5
	36	+ .25
SDF	1	+ .75
	6	+ .7
	19	- .75
	24	- .7
SLK	5	+ .5
	16	- .5
	23	- .5
	34	+ .5
SPA	11	- .4
	17	- .6
	29	+ .4
	35	+ .6
STL	6	- .25
	12	+ .35
	17	+ .4
	24	+ .25
	30	- .35
	35	- .4
SYR	14	- .35
	32	+ .35
TOL	7	- .4
	25	+ .4
TPA	9	+ .2
	27	+ .2
YOW	14	+ .25
	17	+ .36
	32	- .25
	35	- .36

THIS PAGE RESERVED FOR FUTURE USE.

PERFORMANCE

AIRSPEED DATA

THIS PAGE RESERVED FOR FUTURE USE.

AIRSPEED DATA

INDICATED AIR SPEED (IAS) is the airspeed indicator reading, assuming that the mechanical error in the instrument is zero.

CALIBRATED AIR SPEED (CAS) is the value obtained by correcting the IAS for installation error. See pages 8, 9 and 10, Section 3-1.

EXAMPLE: Gear up, flaps up, normal static source, Captain's airspeed indicator, IAS 230 Knots. By reference to graph on page 8, CAS is determined to be 230 Knots. Therefore, under these conditions and at this speed, IAS and CAS are the same.

In the above example, if the static source is changed from normal static source to alternate static source the IAS would be 229 Knots, and by reference to the graph on page 10 it can be determined that the CAS remains 230 Knots.

EQUIVALENT AIR SPEED (EAS) is the value obtained by correcting CAS for the effect of adiabatic compressible flow at the particular altitude. EAS can be determined by reference to the graph on page 11, Section 3-1.

EXAMPLE: Pressure Altitude is 20,000 feet. CAS 230 Knots. By reference to graph on page 11, it is found that EAS is determined to be 226 Knots.

NOTE: The terms "EQUIVALENT AIR SPEED (EAS)" and "TRUE INDICATED AIR SPEED (TIAS)" may be considered to have the same meaning. In the past, there was a tendency to ignore the effect of compressibility in determining TIAS under conditions such that the compressibility factor had little or no practical significance. As altitudes and speeds increase, the correction for compressibility becomes more significant. The term "EQUIVALENT AIR SPEED (EAS)" as used herein, signifies that the effect of compressibility is included.

TRUE AIR SPEED (TAS) is the true speed of the airplane relative to undisturbed air. Therefore, it is said that the TAS is the same as the GROUND SPEED if there is no wind.

TAS may be determined by multiplying the EAS by the "air density correction factor" of $\frac{1}{\sqrt{\sigma}}$ which can be determined from the chart on page 13, Section 3-1. However, before using the chart on page 13, it is necessary to determine the corrected Outside Air Temperature from the chart on page 12, Section 3-1.

EXAMPLE: Pressure Altitude 20,000 feet, EAS 226 Knots (CAS 230 Knots), Indicated Outside Air Temperature +1°C.

From chart on page 12, it is determined that the corrected Outside Air Temperature is -12°C.

From chart on page 13, using -12°C, Pressure Altitude of 20,000 feet, it is found that EAS must be multiplied by 1.41 to obtain TAS. 226 x 1.41 = 318.66 Knots, TAS.

TAS also may be determined by means of a conventional style computer, using Pressure Altitude and corrected Outside Air Temperature for the setting in the "airspeed correction" window, then adjacent to the EAS on the rotatable periphery read TAS on the outer periphery.

The AIRSPEED CONVERSION CHART, on page 14, provides a means of determining TAS and MACH NUMBER directly from CAS.

EXAMPLE: Pressure Altitude 20,000 ft., CAS 230 Knots, Indicated Outside Air Temperature +1°C. By reference to the chart, TAS is found to be 319 Knots, and MACH 0.505.