PART V
OPERATING DATA

96. Pressure error corrections

From	150	200	350 knots
To	200	350	450 I.A.S.
At 26,000 lb. ... Add	3	2	1
At 40,000 lb. ... Add	5	4	3

Large errors in both airspeeds and altitude are induced on the instruments if the aircraft is yawed, the instruments tending to read low. Mod. 262 moves the pressure head to the centre of the nose, but P.E.C.'s are not affected.

97. C.G. movement

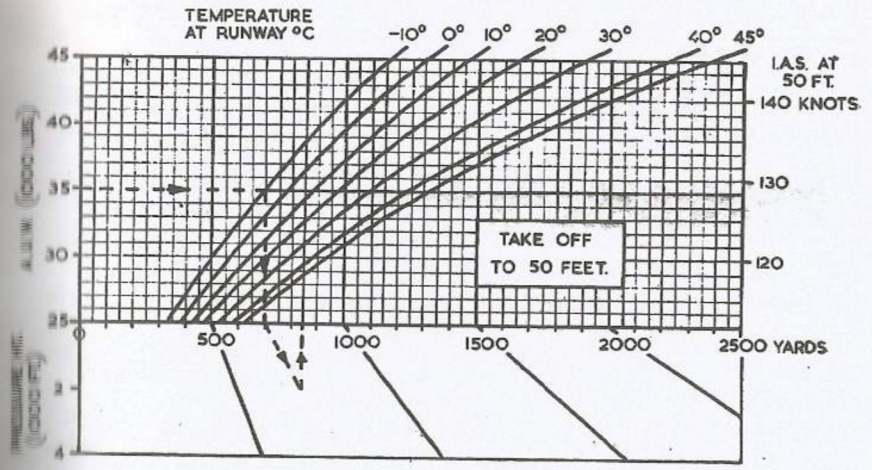
(a) The C.G. limits are very wide; nevertheless it is possible through mismanagement of the fuel system combined with load distribution, for the C.G. to be well outside its forward or aft limits. C.G.'s forward of 21 in. aft of datum and aft of 37 in. should be counted exceptional cases and the necessary precautions taken.

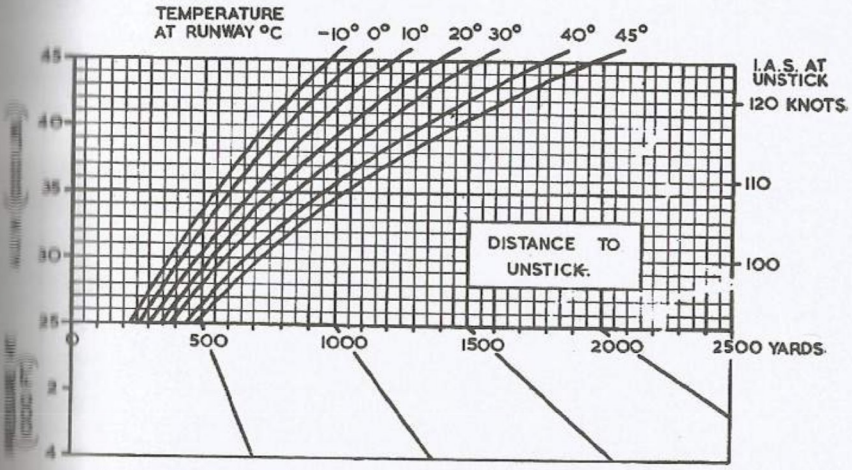
(b) A.P.4326B, Vol. 1 contains loading diagrams and data which should be used to calculate C.G. positions for particular roles and stages of flight.

(c) Use of the recommended fuel drill will ensure that the C.G. remains between 21 and 28 in. aft of datum, whether the aircraft is loaded or not.

98. Take-off distances

The graphs on page 91 can be used to provide an estimate of the take-off distance and the distance to 50 feet if the take-off technique recommended in para. 65 is used. Variations in pilot technique, errors in A.S.I.s and changing conditions will lead to a scatter in actual distances above and below the figures given by the graphs. If care is taken to standardize technique,





The example shows that in still air at a temperature of – 10°C. and a pressure height of 2,000 feet, the distance from wheels rolling to 50 feet, at an all-up weight of 35,000 lb. will be about 850 yards.

To correct approximately for headwind enter the chart with a corrected temperature found by subtracting 1°C. from the actual temperature for every knot of headwind.

and instrument errors are allowed for, this scatter can be kept down to about ± 100 yards. If such precautions are not taken it can be as large as 30% of the take-off distance.

99. Flying for range and endurance

(a) *Climbing*

(i) Climb as recommended in para. 66 or, if it is necessary to reach cruising altitude in the shortest practical distance, climb at any speed down to 280 knots and 0.7M above the coincident height. The overall range is unlikely to vary to any significant extent if climbing speeds between the two extremes (280/0.7M to 330/0.72M) are used. Climb to an altitude at which the rate of climb has fallen to about 300 ft. per minute.

(ii) The following tables show time to height from wheels rolling, distance covered and fuel used, based on a climb as in para. 66. The fuel used includes the taxy and take-off allowance of 70 gallons (560 lb.).

CLIMB DATA

	Height (ft.)	Time (mins.)	Distance (a.n.m.)	Gallons	lb. AVTUR
No tip tanks 32,000 lb. a.u.w.	10,000	2.1	11	115	920
	20,000	4.7	26	160	1,280
	30,000	8.2	48	200	1,600
	40,000	13.7	83	250	2,000
No tip tanks 42,000 lb. a.u.w.	10,000	2.8	13	140	1,120
	20,000	6	32	200	1,600
	30,000	11	60	270	2,160
	40,000	21	110	340	2,720
With tip tanks 36,000 lb. a.u.w.	10,000	2.5	13	125	1,000
	20,000	5.9	32	180	1,440
	30,000	10.5	60	230	1,840
	40,000	18.5	112	340	2,400
With tip tanks 46,000 lb. a.u.w.	10,000	3	20	156	1,200
	20,000	6	40	220	1,760
	30,000	12	90	290	2,320
	40,000	25	160	370	2,960

(b) *Cruising*

(i) When cruising height has been reached adjust speed and r.p.m. as required. If height is not maintained the aircraft should be allowed to find its own cruising height by permitting it to gain or lose height without changing speed or r.p.m. For extreme range the speeds and r.p.m. given in the following tables should be maintained and as the weight of the aircraft decreases with the use of fuel, it should be allowed to climb. Under these conditions the aircraft should gain height at approximately 1,500 ft. per hour.

(ii) The following table gives the a.n.m.p.g. and the a.n.m./100 lb. (based on AVTUR) at the best range speed and at a fast cruising speed, for various weights in different configuration.

(iii) The table also gives the speeds for greatest endurance, together with the gallons per minute and pounds (AVTUR) per minute at these speeds, for various weights.

RANGE AND ENDURANCE DATA

Clean Aircraft

	Weight (lb.)	30,000	35,000	40,000	42,500
Best range 0.72M 7,350 r.p.m.	A.N.M.P.G	1.552	1.344	1.184	1.112
	A.N.M./100 lb.	19.4	16.8	14.8	13.9
	Height (ft.)	49,000	45,750	43,000	42,000
Fast cruise 0.74M 7,400 r.p.m.	A.N.M.P.G.	1.536	1.336	1.168	1.112
	A.N.M./100 lb.	19.2	16.7	14.6	13.9
	Height (ft.)	49,000	45,750	43,000	42,000
Best endurance	Gall/min.	3.96	4.60	5.25	5.60
	Pounds/min.	31.7	36.8	42.0	44.8
	Height (ft.)	38,500	35,000	32,500	31,000
	I.A.S. (knots)	158	169	180	185

With Tip Tanks

	Weight (lb.)	30,000	35,000	40,000	42,500
Best range 0.72M, 7,400 r.p.m.	A.N.M.P.G.	1.376	1.184	1.048	0.984
	ANM/100 lb.	17.2	14.8	13.1	12.3
	Height (ft.)	47,600	44,500	41,500	40,500
Best endurance	Gall/min.	4.21	4.69	5.63	6.00
	Pounds/min.	33.7	37.5	45.0	48.0
	Height (ft.)	37,000	33,750	31,000	29,500
	I.A.S. (knots)	153	165	174	180

(iv) In an emergency, if it is necessary to fly at 20,000 ft. or below, some increase in range can be obtained by flying on one engine. An indicated airspeed of 240 knots should be maintained and all non-essential electrical load must be switched off. Above 20,000 ft. no worthwhile advantage is gained by flying on one engine. Below this height the advantage increases progressively provided the r.p.m. are maintained above 7,000. At 10,000 ft. the gain in range with a full fuel load is of the order of 90 miles.

100. Descent data

(a) *Normal descent*

Descend at 6,500 r.p.m. above 35,000 ft. and idling r.p.m. below. Above 25,000 ft. descend at 0.75M, and then 350 knots. At low altitudes r.p.m. must be checked frequently and the throttles opened if necessary to prevent r.p.m. falling below 4,500.

Altitude (feet)	Time (mins) to sea level	Fuel used galls.	Fuel used lb.AVTUR	Distance (N.M.)
50,000	26	77	616	190
40,000	15	48	384	115
30,000	6	17	136	35
20,000	4	12	96	25
10,000	2	7	56	15

(b) *Gliding*

Maximum gliding range will be achieved by gliding at a speed of between 165 and 185 knots, depending on weight. The range from 40,000 ft., engines idling, is over 100 nautical miles and takes 25 to 30 minutes.

101. Use of different fuels

(a) The engines are set up for 100 AVTUR (S.G. 0.8), but AVTAG and JP4 may be used provided the engines are adjusted accordingly. The aircraft may then have a flight restriction imposed unless certain modifications are embodied.

(b) The a.n.m.p.g. is related to the specific gravity of the fuel used and due allowance must be made for this.

(c) Aircraft which do not have Mod. 55, 411 and 648 embodied are subject to a restriction when AVTAG or JP4 is used in a hot climate. If the fuel temperature is over 44°C., or, if no measurements can be taken, if the ambient temperature on take-off is above this figure or the fuel temperature is suspected to be high, the rate of climb above 39,000 ft. must be restricted to 750 ft. per minute.