# PART III

# *OPERATING DATA*

54. **Engine data:** Sabre IIA.

(i) *Fuel*—100 octane only.

(ii) *Oil.*—See A.P. 1464/C37.

(iii) *Engine limitations.*—The *maximum* permissible r.p.m., boost and temperatures for the conditions of flight and periods stated are as follows:

| | | R.p.m. | Boost lb./sq.in. | Temp. °C. Coolant | Oil |
|---|---|---|---|---|---|
| TAKE-OFF TO 1,000 FT. | M | 3,700 | +7 | — | — |
| CLIMBING 1 HR. LIMIT | M, S | 3,500 (3,700) | +6(+7) | 125 | 90 |
| RICH CONTINUOUS | M, S | 3,150 | +4½ | 110 | 80 |
| WEAK CONTINUOUS | M, S | 3,150 | +3 | 110 | 80 |
| COMBAT 5 MINS. LIMIT | M, S | 3,700 | +7(+9) | 130 | 95 |

Figures in brackets apply to engines embodying Mod. Sabre 158 or 297 and Mod. Sabre 276.

OIL PRESSURE:
- NORMAL .. .. .. .. .. 60–90 lb./sq.in.
- EMERGENCY MINM. (5 MINS.) .. 50 ,,

MINM. TEMP. FOR TAKE-OFF:
- OIL: NORMAL TAKE-OFF .. .. .. 40° C.
- OPERATIONAL NECESSITY .. .. 20° C.
- COOLANT .. .. .. .. .. 65° C.

FUEL PRESSURE .. .. .. .. 2½ lb./sq.in.

(iv) *Supercharger gear change.*—Gear changes between 10,000 and 12,000 feet may be made at 3,500 r.p.m., but at all other altitudes and for ground checks r.p.m. must not exceed 3,150. Gear changes may, however, be made at 3,700 r.p.m. when in contact with the enemy, on engines with increased climb rating.

55. **Flying limitations**

The aircraft is designed for the following speeds:

| | m.p.h. I.A.S. |
|---|---|
| Diving below 30,000 ft. .. .. | 370 |
| ,, ,, 25,000 ft. .. .. | 410 |
| ,, ,, 20,000 ft. .. .. | 450 |
| ,, ,, 15,000 ft. .. .. | 490 |
| ,, ,, 10,000 ft. .. .. | 540 |
| Hood open .. .. .. .. | 300 |
| Undercarriage down .. .. .. | 215 |
| Flaps down .. .. .. .. | 160 |

For restrictions when carrying drop tanks, *see* Para. 36.

56. **Position error corrections**

(i) *Airspeed indicator*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| From | 120 | 160 | 200 | 240 | 280 | 320 | 360 | m.p.h. |
| To | 160 | 200 | 240 | 280 | 320 | 360 | 400 | I.A.S. |
| Add | 2 | — | — | — | — | — | — | m.p.h. |
| Subtract | — | 2 | 6 | 10 | 14 | 18 | 22 | |

(ii) *Altimeter*

| | | | | | | |
|---|---|---|---|---|---|---|
| From | 200 | 250 | 290 | 320 | 350 | m.p.h. |
| To | 250 | 290 | 320 | 350 | 390 | I.A.S. |
| Subtract | 100 | 200 | 300 | 400 | 500 | feet |

57. **Maximum performance**

(i) *Climbing.*—The speeds for maximum rate of climb are as follows:

| | |
|---|---|
| S.L. to 20,000 feet .. .. | 185 m.p.h. I.A.S. |
| 20,000 to 24,000 feet .. .. | 175 m.p.h. I.A.S. |
| 24,000 to 27,000 feet .. .. | 165 m.p.h. I.A.S. |
| 27,000 to 29,000 feet .. .. | 160 m.p.h. I.A.S. |
| 29,000 to 31,000 feet .. .. | 155 m.p.h. I.A.S. |
| 31,000 to 33,000 feet .. .. | 150 m.p.h. I.A.S. |
| Above 33,000 feet .. .. | 145 m.p.h. I.A.S. |

Change to S ratio when the boost has dropped to +3 lb./sq.in. with the throttle fully open.

(ii) *Combat.*—Change to S ratio when the boost has dropped to + 4 lb./sq.in. with the throttle fully open.

## 58. Economical Flying

(i) *Climbing.*—Use +3 lb./sq.in. boost and 3,150 r.p.m. at the speed recommended for maximum rate of climb. Change to S ratio when the boost has fallen to +2 lb./sq.in.

(ii) *Cruising.*—To obtain any required I.A.S. the lowest possible r.p.m. should be used, provided the boost does not exceed +3 lb./sq.in. R.p.m. down to 2,000 may be used, but it may be found that the engine will not run smoothly below about 2,150. S gear should not be used at heights at which the required speed can be obtained without exceeding 3,150 r.p.m. in M gear.

(iii) *Maximum range.*—The recommended speed is 210 m.p.h. I.A.S. reducing to 190 m.p.h. I.A.S. at 20,000 feet and above. At low altitudes boost should not be reduced below −3½ lb./sq.in., even though 210 m.p.h. I.A.S. is thereby exceeded.

(iv) *Maximum endurance.*—Use the lowest possible r.p.m. and the lowest boost at which height can be maintained. The best speed is about 180 m.p.h. I.A.S. but at low altitudes boost should not be reduced below −4½ lb./sq.in., even though 180 m.p.h. I.A.S. is thereby exceeded.

## 59. Fuel capacity and consumptions

(i) *Fuel capacity :*

| | | |
|---|---|---|
| Main tank .. .. .. .. .. | 76 | gallons |
| Inter-spar tanks (28 gallons each) .. | 56 | ,, |
| Nose tank (if fitted) .. .. .. | 30 | ,, |
| Total .. .. .. | 162 | ,, |

(ii) *Fuel consumptions* (approx. gals./hr.)

(*a*) *Weak mixture*

*M ratio at 5,000 feet.*

| Boost lb./sq.in. | R.P.M. | | | | |
|---|---|---|---|---|---|
| | 3,150 | 2,900 | 2,700 | 2,500 | 2,300 |
| +3 | 100 | 91 | 84 | — | — |
| +1¾ | 91 | 84 | 78 | 72 | 66 |
| +1 | — | — | — | — | 63 |
| 0 | — | — | — | — | 58 |
| −2 | — | — | — | — | 49 |
| −4 | — | — | — | — | 42 |

*M ratio at 15,000 feet.*

| Boost lb./sq.in. | R.P.M. | | | | |
|---|---|---|---|---|---|
| | 3,150 | 2,900 | 2,700 | 2,500 | 2,300 |
| 0 | 94 | — | — | — | — |
| −1 | 87 | 79 | — | — | — |
| −2 | 80 | 74 | 69 | 63 | — |
| −3 | 74 | 68 | 63 | 59 | — |
| −4 | 67 | 62 | 58 | 54 | 49 |

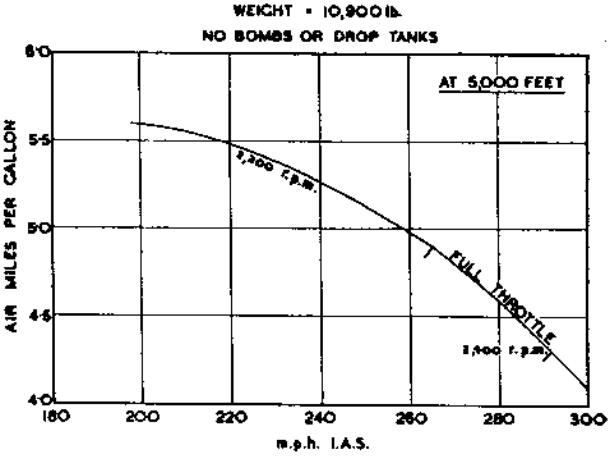
*S ratio at 25,000 feet*

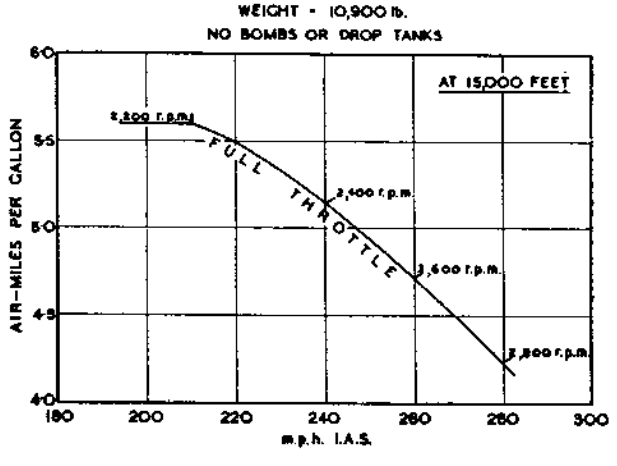
| Boost lb./sq.in. | R.P.M. | | | | | |
|---|---|---|---|---|---|---|
| | 3,150 | 3,000 | 2,900 | 2,800 | 2,700 | 2,600 |
| 0 | 94 | — | — | — | — | — |
| −1 | — | 86 | — | — | — | — |
| −1½ | — | — | 81 | — | — | — |
| −2 | — | — | — | 75 | — | — |
| −3 | — | — | — | — | 70 | — |
| −3¾ | — | — | — | — | — | 64 |

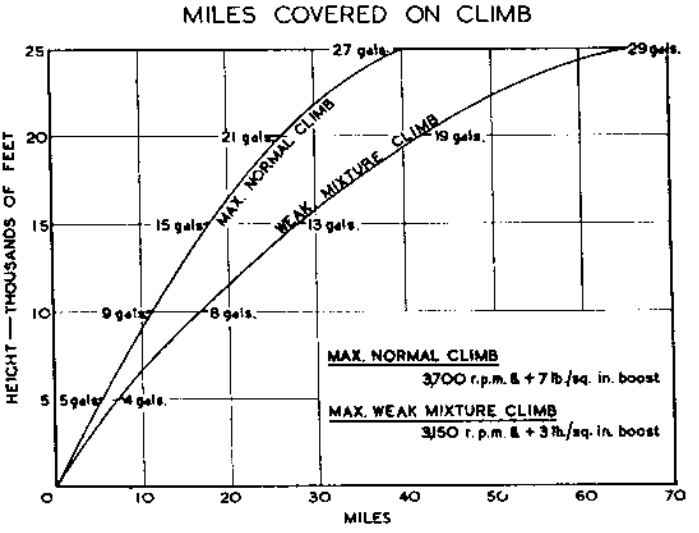
(*b*) *Rich mixture*

| Boost lb/sq.in. | R.p.m. | M ratio at 5,000 ft. | S ratio at 15,000 ft. |
|---|---|---|---|
| +7 | 3,700 | 190 | 190 |
| +6 | 3,500 | 150 | 165 |
| +4½ | 3,150 | 125 | 132 |

## AIR MILES PER GALLON




MILES COVERED ON CLIMB
HEIGHT — THOUSANDS OF FEET
MILES
25
20
15
10
5
0
10
20
30
40
50
60
70
27 gals.
29 gals.
21 gals.
19 gals.
15 gals.
13 gals.
9 gals.
8 gals.
5 gals.
4 gals.
MAX. NORMAL CLIMB
WEAK MIXTURE CLIMB
MAX. NORMAL CLIMB
3,700 r.p.m. & + 7 lb./sq. in. boost
MAX. WEAK MIXTURE CLIMB
3,150 r.p.m. & + 3 lb./sq. in. boost