47

3

RESTRICTED

Australian Air Publication No. 721:79.

VOLUME 1, PART 5

(2nd Edition, February, 1956)

[redacted] Copy No. 2.

VAMPIRE

WEIGHT SHEET SUMMARY

AUSTRALIAN IDENTIFICATION No. A.79

ISSUED FOR THE INFORMATION AND GUIDANCE OF ALL CONCERNED
By Command of the Air Board,

Secretary.

DEPARTMENT OF AIR,
MELBOURNE, S.C.1

RESTRICTED

Australian Air Publication No. 721:79.
VOLUME 1, PART 5
(2nd Edition, February, 1956)

VAMPIRE

WEIGHT SHEET SUMMARY

(AUSTRALIAN IDENTIFICATION No. A.79

ISSUED FOR THE INFORMATION AND GUIDANCE OF ALL CONCERNED
By Command of the Air Board,

Secretary.

DEPARTMENT OF AIR,
MELBOURNE, S.C.1

A.A.P. 721:79, Vol. 1, Part 5

AMENDMENT CERTIFICATE

to

AUSTRALIAN AIR PUBLICATION 721:79

VOLUME 1, PART 5

(2nd Edition, February, 1956)

Certified that the amendments promulgated in the undermentioned amendment lists have been made in this publication.

Amendment List		Amendment Made By	Date
No.	Date		
1	30 · 9 · 57	E. J. Dade LAC.	7. 4. 60
2	MAR 58	Stoper Sgt	18 - 1 - 63
3	SEPT. 1959	E. J. Dade LAC.	7. 4. 60.

NOTE TO OFFICIAL USERS

1. Department of Air Technical Modifications, Orders and D.T.S. Special Instructions as issued from time to time may affect the subject matter of this publication. It will be re-issued to include:—

(a) Alterations due to the incorporation of modifications as detailed in the appropriate paragraph (Effect on Weight and Balance) of Technical Modifications and Orders.

(b) Additional or revised loadings.

2. When a Technical Modification, Order or D.T.S. Special Instruction contradicts any portion of this publication, an Amendment List will normally be issued, but when this is not done, the Modification, Order or Instruction must be taken as the over-riding authority.

LIST OF CONTENTS

AUSTRALIAN AIR PUBLICATION No. 721:79

VOLUME 1, PART 5

(2nd Edition, February, 1956)

Australian Air Publcaton 721:79
Volume 1, Part 5
(2nd Edition, February, 1956)

SECTION 1

VAMPIRE (MARK 30)
WEIGHT SHEET SUMMARY

VAMPIRE (MARK 30)

WEIGHT SHEET SUMMARY

GENERAL INSTRUCTIONS

1. The following general instructions govern the loading of Vampire (Mark 30) Aircraft:—

(a) TOTAL WEIGHT

The maximum permissible weight for take-off and for flying subject to gentle manoeuvres (overload limit) .. .. = 12,400 lb.
The maximum permissible weight for all forms of flying .. .. = 10,400 lb.
The maximum prmissible weight for landing on—
(i) prepared runways .. .. = 10,134 lb.
(ii) unprepared runways . .. . = 8,500 lb.

(b) DATUM

The datum point of this aircraft is marked by a peg on the fuselage side under the port wing. The aircraft is rigged in flying position with the datum line horizontal by means of a jig stick and blocks in the cockpit.

THE LIMITING POSITIONS OF THE CENTRE OF GRAVITY

2. The maximum permissible *forward* position of the C.G. is 3.6 inches aft of the datum (undercarriage down).

The maximum permissible *aft* position of the C.G. is 8.4 inches aft of the datum (undercarriage down).

Note.—Retraction of the undercarriage moves the C.G. 0.13 inch further aft at 12,400 lb. Expressed as percentages of the standard mean chord (S.M.C.), these limits are:—
The forward limit = 24.8% S.M.C.
The aft limit = 30.8% S.M.C.

All moment arms are measured from the datum. For computation purposes, moment arms forward of the datum are considered negative (—) and those aft, positive (+). To obtain the approximate percentage of S.M.C. for horizontal balance, use the following equation:

$$\frac{X + 16.2}{79.92} \times 100$$

where X = distance (±) of the calculated centre of gravity from the datum.

TARE WEIGHT

3. Tare weight .. .. = 6,810 lb.
Position of its C.G. (undercarriage down) . .. . = 11.6 inches aft of the datum.
Horizontal moment of tare weight about datum .. .. = 78,930 lb. in.

Note.—Retraction of the undercarriage causes an additional moment of 1,632 lb. in.

METHOD OF DETERMINING THE C.G. POSITION

4. (a) Table I of Appendix to this Section contains all the normally removable items of equipment and indicates for each item the
(i) weight (lb.);

(ii) position relative to the datum (in.);
(iii) resultant horizontal moment about the datum (lb. in.).

(b) To determine the C.G. position for any particular loading, make a list of all items of removable load as shown in Table I of Appendix to this Section.

(c) On the right-hand side of this list, draw three columns. By referring to Table I, the appropriate weight, position relative to the datum and moment about the datum can be entered alongside each item.

(d) Add the weights in the weight column to obtain the total weight of the loaded aircraft. Add the moments set out in the moment column to find the resultant moment of the loaded aircraft.

(e) Divide the resultant moment by the weight of the loaded aircraft. The answer gives the position of the centre of gravity relative to the datum.

(f) Refer to paragraph 2 of this Section to find whether the C.G. lies within the permissible limits. If it does not, items of load must be removed or repositioned until a satisfactory C.G. position is obtained.

(g) Additional checks should be made to make sure that satisfactory balance will be maintained under the following conditions of operation:—
(i) Progressive consumption of fuel;
(ii) Release of droppable fuel tanks.

ADJUSTING FOR LOAD CHANGE

5. Whenever an item of load is added or removed, its weight and moment should be added to or subtracted from the previously determined total. Addition or subtraction of moments must be made algebracically.

OPERATIONAL LOADS

6. Details of the following operational loads are given after Table I:—
(a) Table II — Standard Fighter Role.
(b) Table III — When Carrying Droppable Fuel Tanks.

Reference: File Department of Air 9/84/24.

Attachment: Loading and C.G. Diagram R.A.A.F. Drawing No. A11062 attached.

Table I (Mark 30)

GENERAL DETAILS OF LOADING

ITEM	Weight (lb.)	Arm (in.)	Moment (lb. in.)
REMOVABLE			
CREW			
Pilot (with parachute, dinghy (Type K) and water cushion)	218	–61·4	–13,385
ARMAMENT			
20 mm. guns (4) and accessories	450	–42·3	–19,035
Ammunition (600 rounds)	375	–36·0	–13,500
Gyro gunsight (Mark 4E)	12·2	–74·4	–908
Gun camera (Type G45B)	7·6	–117·6	–894
RADIO			
V.H.F. (TR.1936)	27	–35·6	–961
OXYGEN			
Charge for cylinders	4·7	–36·0	–169
MISCELLANEOUS			
Control locks and tank cap tool	3·2	–60·0	–192
Crowbar	2	–60·0	–120
Covers	5	–36·0	–180
Tool kit	3·1	–60·0	–186
Droppable fuel tanks	160	10·8	1,728
TARGET TOWING			
Self release for target towing	7	–60·0	–420
* FUEL (at 8·1 lb./Imp. gal.)			
Wing tanks (234 Imp. gal.)	1,895	20·1	38,090
Fuselage tank (96 Imp. gal.)	778	–15·6	–12,137
Droppable tanks (200 Imp. gal.)	1,620	9·5	15,390
TARE WEIGHT			
As at 31.10.55	6,810	11·6	78,930
Undercarriage retraction moment			1,632

Notes.—(a) The fiixed portions of the following Vampire Modifications are incorporated in the above tare weight:—

R.A.A.F. Modification Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17 18, 19, 20, 22, 23, 24, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 49, 51, 52, 53, 54, 55, 57, 58, 59, 61, 62, 63, 64, 68, 70, 71, 72, 73, 74, 76, 79, 85, 86, 87, 90, 91, 92, 93, 94, 96, 101, 106, 107, 110, 112, 113, 116, 121, 122, 123, 126, 127, 129, 130, 136, 138, 139, 142, 145, 146, 151, 152, 160, 164, 166.

(b) The specific gravity of the fuel varies according to the source of supply and ambient temperature. A nominal specific gravity of 0.81, i.e., 8.1 pounds weight per Imperial gallon is to be used in calculating aircraft loadings.

(c) It is stressed that irrespective of the fuel capacities stated in the relevant Australian Air Publications or marked on or near the tanks, it is the unit's responsibility to make sure that the exact quantity of fuel available for use is known to unit personnel.

(d) *It is important to note that, with Vampire (Mark 30) aircraft in normal flight attitudes, a certain amount of fuel is not available due to the wing tank outlets being above the bottom of the tanks. Therefore, all range and endurance calculations should be based on the worst case of 35 gallons of "lost" fuel giving a total available capacity of (330-35) which equals 295 gallons.

The actual usable fuel for different fore and aft attitudes is as follows:—

Datum: Horizontal	314 gallons
Datum: 5 deg. nose up (normal cruising)	312 gallons
Datum: 8 deg. nose up	295 gallons

Table II (Mark 30)

STANDARD FIGHTER ROLE

ITEM	Weight (lb.)	Arm (in.)	Moment (lb. in.)
CREW			
Pilot (with equipment)	218	–61·4	–13,385
ARMAMENT			
20 mm. guns (4) and accessories	450	–42·3	–19,035
Ammunition (600 rounds)	375	–36·0	–13,500
Gyro gunsight	12·2	–74·4	–908
Gun camera	7·6	–117·6	–894
RADIO			
V.H.F.	27	–35·6	–961
OXYGEN			
Charge for cylinder	4·7	–36·0	–169
MISCELLANEOUS			
Control locks etc.	3·2	–60·0	–192
Crowbar	2	–60·0	–120
FUEL (at 8·1 lb./gal.)			
Wing tanks (234 gal.)	1,895	20·1	38,090
Fuselage tank (96 gal.)	778	–15·6	–12,137
TOTAL REMOVABLE	3,773		
TARE WEIGHT	6,810	11·6	78,930
TOTALS	10,583	5·3	55,719

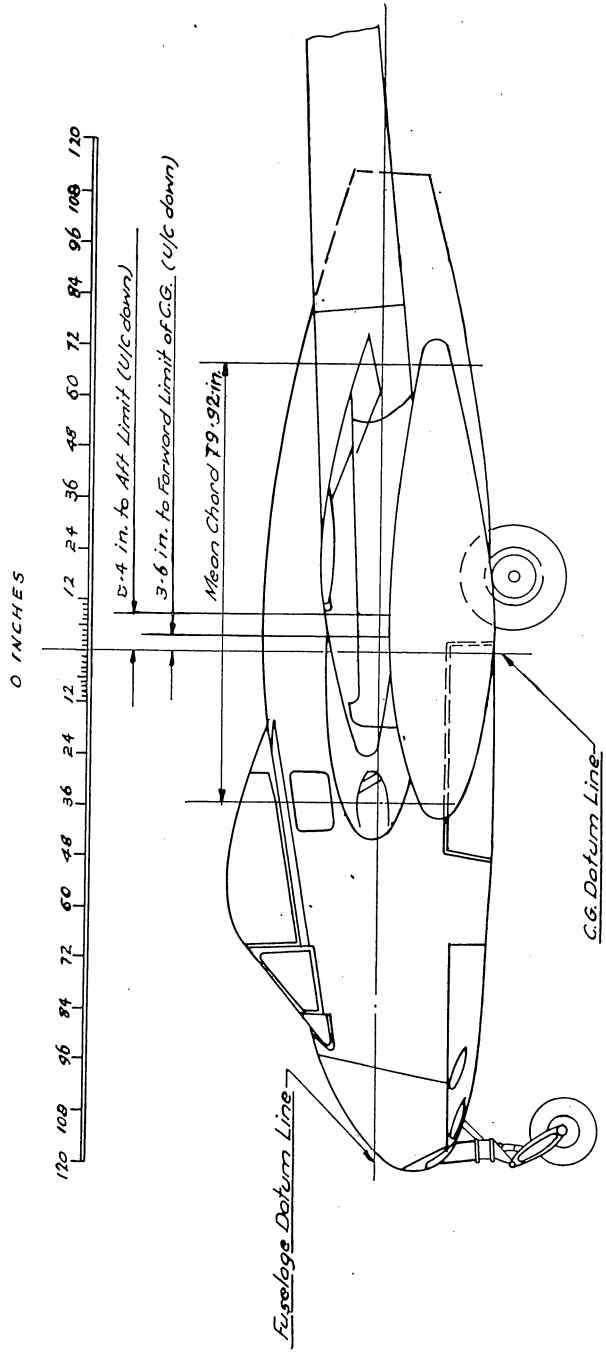
C.G. = 5·3 inches aft of datum.

Table III (Mark 30)

LOADING DETAILS WHEN CARRYING DROPPABLE FUEL TANKS

ITEM	Weight (lb.)	Arm. (in.)	Moment (lb. in.)
CREW			
Pilot (with equipment)	218	–61·4	–13,385
ARMAMENT			
20 mm. guns (4) and accessories	450	–42·3	–19,035
Ammunition (600 rounds)	375	–36·0	–13,500
Gyro gunsight	12·2	–74·4	–908
Gun camera	7·6	–117·6	–894
RADIO			
V.H.F.	27	–35·6	–961
OXYGEN			
Charge for cylinders	4·7	–36·0	–169
MISCELLANEOUS			
Control locks etc.	3·2	–60·0	–192
Crowbar	2	–60·0	–120
Droppable fuel tanks	160	10·8	–1,728
FUEL (at 8·1 lb./gal.)			
Wing tanks (234 gal.)	1,895	20·1	38,090
Fuselage tank (96 gal.)	778	–15·6	–12,137
Droppable tanks (200 gal.)	1,620	9·5	15,390
TOTAL REMOVABLE	5,553		
TARE WEIGHT	6,810	11·6	78,930
TOTALS	12,363	5·9	72,837

C.G. = 5·9 inches aft of the datum.


0 INCHES
12 24 36 48 60 72 84 96 108 120
120 108 96 84 72 60 48 36 24 12
5·4 in. to Aft Limit (U/C down)
3·6 in. to Forward Limit of C.G. (U/C down)
Mean Chord 79·92 in.
C.G. Datum Line
Fuselage Datum Line

Australian Air Publcaton 721:79
Volume 1, Part 5
(2nd Edition, February, 1956)

SECTION II

VAMPIRE (MARK 31)
WEIGHT SHEET SUMMARY

WEIGHT SHEET SUMMARY
VAMPIRE (MARK 31)

GENERAL INSTRUCTIONS

1. The following general instructions govern the loading of Vampire (Mark 31) aircraft:—

(a) TOTAL WEIGHT

The maximum permissible weight for take-off from prepared runways and for flying subject to gentle manoeuvres:—

Aircraft with clipped wing	=	13,100 lb.
Aircraft with unmodified wing	=	12,400 lb.

The maximum permissible weight for all forms of flying and take-off from grass airfields:—

Aircraft with clipped wing	=	10,560 lb.
Aircraft with unmodified wing	=	10,400 lb.

The maximum permissible weight for landing:—

Aircraft with clipped wing	=	10,560 lb.
Aircraft with unmodified wing	=	10,134 lb.

(b) DATUM

The datum point of this aircraft is marked by a peg on the fuselage side under the port wing. The aircraft is rigged in flying position with the datum line horizontal by means of a jig stick and blocks in the cockpit.

THE LIMITING POSITIONS OF THE CENTRE OF GRAVITY

2. The maximum permissible *forward* position of the C.G. is 3.6 inches aft of the datum (undercarriage down).

The maximum permissible *aft* position of the C.G. is 8.4 inches aft of the datum (undercarriage down).

Note.—Retraction of the undercarriage moves the C.G. 0.12 inch further aft at 13,100 lb.

Expressed as percentages of the standard mean chord (S.M.C.), these limits are:—

The forward limit = 24.8% S.M.C.
The aft limit = 30.8% S.M.C.

All moment arms are measured from the datum. For computation purposes, moment arms forward of the datum are considered negative (—) and those aft, positive (+). To obtain approximate percentage of S.M.C. for horizontal balance, use the following equation:—

$$\text{The horizontal position in \% S.M.C.} = \frac{X + 16.2}{79.92} \times 100$$

where X = distance (±) of the calculated centre of gravity from the datum.

TARE WEIGHT

3. Tare weight	=	6,900 lb.
Position of its C.G. (undercarriage down)	=	11.6 inches aft of the datum.
Horizontal moment of tare weight about datum	=	79,900 lb. in.

Note.—Retraction of the undercarriage causes an additional moment of 1,632 lb. in.

METHOD OF DETERMINING THE C.G. POSITION

4. (a) Table I of Appendix to this Section contains all the normally removable items of equipment and indicates for each item the
   (i) weight (lb.);
   (ii) position relative to the datum (in.);
   (iii) resultant horizontal moment about the datum (lb. in.).
   (b) To determine the C.G. position for any particular loading, make a list of all items of removable load as shown in Table I of Appendix to this Section.
   (c) On the right-hand side of this list, draw three columns. By referring to Table I, the appropriate weight, position relative to the datum and moment about the datum can be entered alongside each item.
   (d) Add the weights in the weight column to obtain the total weight of the loaded aircraft. Add the moments set out in the moment column to find the resultant moment of the loaded aircraft.
   (e) Divide the resultant moment by the weight of the loaded aircraft. The answer gives the position of the centre of gravity relative to the datum.
   (f) Refer to paragraph 2 of this Section to find whether the C.G. lies within the permissible limits. If it does not, items of load must be removed or repositioned until a satisfactory C.G. position is obtained.
   (g) Additional checks should be made to make sure that satisfactory balance will be maintained under the following conditions of operation:—
      (i) Progressive consumption of fuel;
      (ii) Release of droppable fuel tanks;
      (iii) Release of rocket projectiles;
      (iv) Release of bombs.

ADJUSTING FOR LOAD CHANGE

5. Whenever an item of load is added or removed, its weight and moment should be added to or subtracted from the previously determined total. Addition or subtraction of moments must be made algebracically.

OPERATIONAL LOADS

6. Details of the following operational loads are given after Table I:—
   (a) Table II — Standard Fighter Role.
   (b) Table III — Droppable Fuel Tanks.
   (c) Table IV — Rocket Projectiles.
   (d) Table V — 2 x 1000 lb. Bombs.
   (e) Table VI — Bombs and Rocket Projectiles.
   (f) Table VII — Droppable Fuel Tanks and Rocket Projectiles.

Reference: File Department of Air 9/84/24.

Attachment: Loading and C.G. Diagram R.A.A.F. Drawing No. A11062 attached.

Table I (Mark 31)

GENERAL DETAILS OF LOADING

ITEM	Weight (lb.)	Arm. (in.)	Moment (lb. in.)
REMOVABLE			
CREW			
Pilot (with parachute, dinghy (Type K) and water cushion)	218	-61·4	-13,385
ARMAMENT			
20 mm. guns (4) and accessories	450	-42·3	-19,035
Ammunition (600 rounds)	375	-36·0	-13,500
Gyro gunsight (Mark 4E)	12·2	-74·4	-908
Gun camera (Type G45B)	7·6	-117·6	-894
RADIO			
V.H.F. (TR.1936)	27	-35·6	-961
OXYGEN			
Charge for cylinders	4·7	-36·0	-169
MISCELLANEOUS			
Control locks and tank cap tool	3·2	-60·0	-192
Crowbar	2	-60·0	-120
Covers	5	-36·0	-180
Tool kit	3·1	-60·0	-186
Droppable fuel tanks	160	10·8	1,728
TARGET TOWING			
Self release for target towing	7	-60·0	-420
BOMBS			
Bomb carriers (2) and fairings	80	0·0	0
500 lb. bombs (2)	1,000	-3·3	-3,300
1,000 lb. bombs (2)	2,000	-2·7	-5,400
ROCKET PROJECTILES			
Rocket carriages (4)	42·5	19·8	842
25 lb. concrete head (8)	472	5·0	2,360
25 lb. AP shot No. 1 Mk. 1 (8)	488	5·2	2,538
60 lb. concrete head (8)	744	-5·7	-4,241
60 lb. SAP HE head (8)	760	-5·2	-3,952
*FUEL (at 8·1 lb./Imp. gal.)			
Wing tanks (234 Imp. gal.)	1,895	20·1	38,090
Fuselage tank (96 Imp. gal.)	778	-15·6	-12,137
Droppable tanks (200 Imp. gal.)	1,620	9·5	15,390
TARE WEIGHT			
As at 31st October, 1955	6,900	11·6	79,900
Undercarriage retraction moment			1,632

Notes.—(a) The fiixed portions of the following Vampire Modifications are incorporated in the above tare weight:—

R.A.A.F. Modification Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17 18, 19, 20, 22, 23, 24, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 49, 50, 51, 52, 53, 54, 55, 57, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 79, 85, 86, 87, 92, 93, 94, 96, 101, 106, 110, 112, 113, 116, 121, 122, 123, 126, 127, 129, 130, 136, 138, 139, 142, 145, 146, 151, 152, 160, 164, 166.

(b) The specific gravity of the fuel varies according to the source of supply and ambient temperature. A nominal specific gravity of 0.81, i.e., 8.1 pounds weight per Imperial gallon is to be used in calculating aircraft loadings.

(c) It is stressed that irrespective of the fuel capacities stated in the relevant Australian Air Publications or marked on or near the tanks, it is the unit's responsibility to make sure that the exact quantity of fuel available for use is known to unit personnel.

(d) *It is important to note that, with Vampire (Mark 31) aircraft in normal flight attitudes, a certain amount of fuel is not available due to the wing tank outlets being above the bottom of the tanks. Therefore, all range and endurance calculations should be based on the worst case of 35 gallons of "lost" fuel giving a total available capacity of (330-35) which equals 295 gallons.

The actual usable fuel for different fore and aft attitudes is as follows:—

Datum: Horizontal	314 gallons
Datum: 5 deg. nose up (normal cruising)	312 gallons
Datum: 8 deg. nose up	295 gallons

Table II (Mark 31)

STANDARD FIGHTER ROLE

ITEM	Weight (lb.)	Arm (in.)	Moment (lb. in.)
CREW			
Pilot (with equipment)	218	–61·4	–13,385
ARMAMENT			
20 mm. guns (4) and accessories	450	–42·3	–19,035
Ammunition (600 rounds)	375	–36·0	–13,500
Gyro gunsight	12·2	–74·4	–908
Gun camera	7·6	–117·6	–894
RADIO			
V.H.F.	27	–35·6	–961
OXYGEN			
Charge for cylinder	4·7	–36·0	–169
MISCELLANEOUS			
Control locks, etc.	3·2	–60·0	–192
Crowbar	2	–60·0	–120
FUEL (at 8·1 lb./gal.)			
Wing tanks (234 gal.)	1,895	20·1	38,090
Fuselage tank (96 gal.)	778	–15·6	–12,137
TOTAL REMOVABLE	3,773		
TARE WEIGHT	6,900	11·6	79,900
TOTALS	10,673	5·3	56,689

C.G. = 5·3 inches aft of the datum.

Table III (Mark 31)

LOADING DETAILS WHEN CARRYING DROPPABLE FUEL TANKS

ITEM	Weight (lb.)	Arm (in.)	Moment (lb. in.)
CREW			
Pilot (with equipment)	218	–61·4	–13,385
ARMAMENT			
20 mm. guns (4) and accessories	450	–42·3	–19,035
Ammunition (600 rounds)	375	–36·0	–13,500
Gyro gunsight	12·2	–74·4	–908
Gun camera	7·6	–117·6	–894
RADIO			
V.H.F.	27	–35·6	–961
OXYGEN			
Charge for cylinders	4·7	–36·0	–169
MISCELLANEOUS			
Control locks, etc.	3·2	–60·0	–192
Crowbar	2	–60·0	–120
Droppable fuel tanks	160	10·8	1,728
FUEL (at 8·1 lb./gal.)			
Wing tanks (234 gal.)	1,895	20·1	38,090
Fuselage tank (90 gal.)	778	–15·6	–12,137
Droppable tanks (200 gal.)	1,620	9·5	15,390
TOTAL REMOVABLE	5,553		
TARE WEIGHT	6,900	11·6	79,900
TOTALS	12,453	5·9	73,807

C.G. = 5·9 inches aft of the datum.

Table IV (Mark 31)

LOADING DETAILS WHEN CARRYING ROCKET PROJECTILES

ITEM	Weight (lb.)	Arm (in.)	Moment (lb. in.)
CREW			
Pilot (with equipment)	218	–61·4	–13,385
ARMAMENT			
20 mm. guns (4) and accessories	450	–42·3	–19,035
Ammunition (600 rounds)	375	–36·0	–13,500
Gyro gunsight	12·2	–74·4	–908
Gun camera	7·6	–117·6	–894
RADIO			
V.H.F.	27	–35·6	–961
OXYGEN			
Charges for cylinders	4·7	–36·0	–169
MISCELLANEOUS			
Control locks, etc.	3·2	–60·0	–192
Crowbar	2	–60·0	–120
ROCKET PROJECTILES			
Rocket carriages (4)	42·5	19·8	842
60 lb. S.A.P. H.E.head (8)	760	–5·2	–3,952
FUEL (at 8·1 lb./gal.)			
Wing tanks (234 gal.)	1,895	20·1	38,090
Fuselage tank (96 gal.)	778	–15·6	–12,137
TOTAL REMOVABLE	4,575		
TARE WEIGHT	6,900	11·6	79,900
TOTALS	11,475	4·7	53,579

C.G. = 4·7 inches aft of the datum.

Table V (Mark 31)

LOADING DETAILS WHEN CARRYING 2 x 1,000 LB. BOMBS

ITEM	Weight (lb.)	Arm (in.)	Moment (lb. in.)
CREW			
Pilot (with equipment)	218	-61·4	-13,385
ARMAMENT			
20 mm. guns (4) and accessories	450	-42·3	-19,035
Ammunition (600 rounds)	375	-36·0	-13,500
Gyro gunsight	12·2	-74·4	-908
Gun camera	7·6	-117·6	-894
RADIO			
V.H.F.	27	-35·6	-961
OXYGEN			
Charge for cylinder	4·7	-36·0	-169
MISCELLANEOUS			
Control locks, etc.	3·2	-60·0	-192
Crowbar	2	-60·0	-120
BOMBS			
Bomb carriers (2) and fairings	80	0·0	0
1,000 lb. bombs (2)	2,000	-2·7	-5,400
FUEL (at 8·1 lb./gal.)			
Wing tanks (234 gal.)	1,895	20·1	38,090
Fuselage tank (96 gal.)	778	-15·6	-12,137
TOTAL REMOVABLE	5,853		
TARE WEIGHT	6,900	11·6	79,900
TOTALS	18,753	4·0	51,289

C.G. = 4·0 inches aft of the datum.

Table VI (Mark 31)

LOADING DETAILS WHEN CARRYING BOMBS AND ROCKET PROJECTILES

ITEM	Weight (lb.)	Arm (in.)	Moment (lb. in.)
CREW			
Pilot (with equipment)	218	–61·4	–13,385
ARMAMENT			
20 mm. guns (4) and accessories	450	–42·3	–19,035
Ammunition (600 rounds)	375	–36·0	–13,500
Gyro gunsight	12·2	–74·4	–908
Gun camera	7·6	–117·6	–894
RADIO			
V.H.F.	27	–35·6	–961
OXYGEN			
Charge for cylinder	4·7	–36·0	–169
MISCELLANEOUS			
Control locks, etc.	3·2	–60·0	–192
Crowbar	2	–60·0	–120
BOMBS			
Bomb carriers (2) and fairings	80	0·0	0
500 lb. bombs (2)	1,000	–2·7	–2,700
ROCKET PROJECTILES			
Rocket carriages (4)	42·5	19·8	842
60 lb. S.A.P. H.E. head (8)	760	–5·2	–3,952
FUEL (at 8·1 lb./gal.)			
Wing tanks (234 gal.)	1,895	20·1	38,090
Fuselage tank (96 gal.)	778	–15·6	–12,137
TOTAL REMOVABLE	5,655		
TARE WEIGHT	6,900	11·6	79,900
TOTALS	12,555	4·1	50,879

C.G. = 4·1 inches aft of the datum.

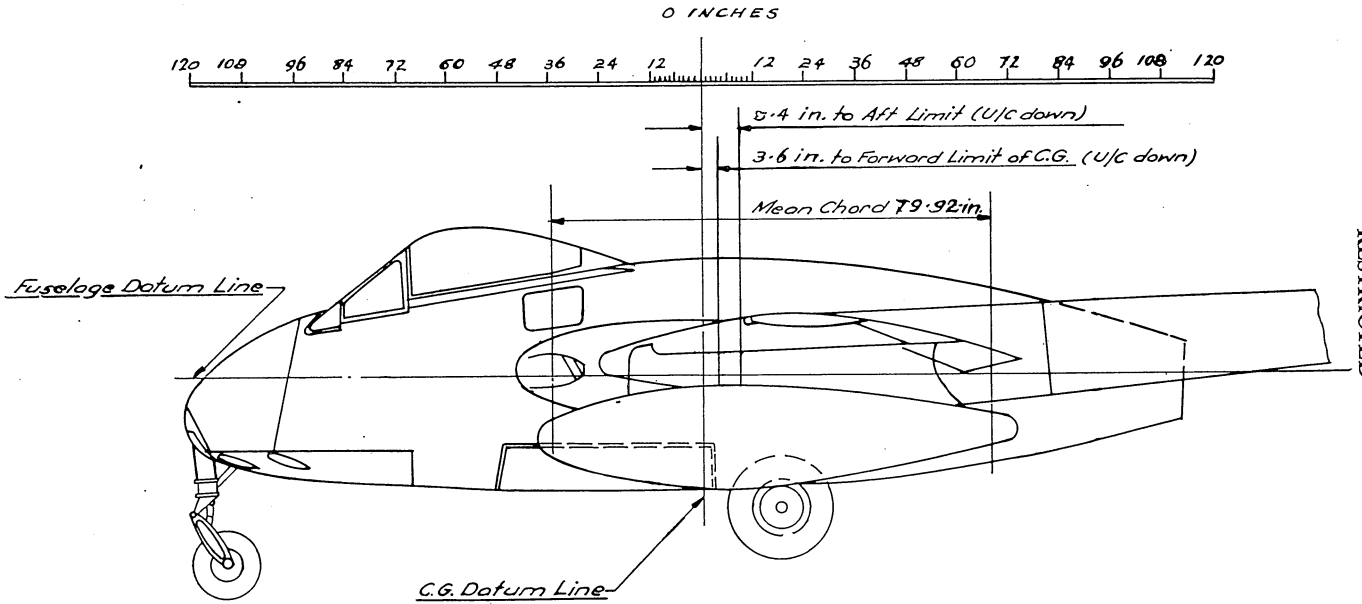
Table VII (Mark 31)

LOADING DETAILS WHEN CARRYING DROPPABLE FUEL TANKS AND ROCKET PROJECTILES

ITEM	Weight (lb.)	Arm (in.)	Moment (lb. in.)
CREW			
Pilot (with equipment)	218	–61·4	–13,385
ARMAMENT			
20 mm. guns (4) and accessories	450	–42·3	–19,035
Ammunition (600 rounds)	375	–36·0	–13,500
Gyro gunsight	12·2	–74·4	–908
Gun camera	7·6	–117·6	–894
RADIO			
V.H.F.	27	–35·6	–961
OXYGEN			
Charge for cylinders	4·7	–36·0	–169
MISCELLANEOUS			
Control locks, etc.	3·2	–60·0	–192
Crowbar	2	–60·0	–120
Tool kit			
Droppable fuel tanks (2)	160	10·8	1,728
ROCKET PROJECTILES			
Rocket carriages (4)	42·5	19·8	842
60 lb. S.A.P. H.E. head (8)	760	–5·2	–3,952
FUEL (at 8·1 lb./gal.)			
Wing tanks (234 gal.)	1,895	20·1	38,090
Fuselage tank (76 gal.)	616	–15·6	–9,610
Droppable tanks (200 gal.)	1,620	9·5	15,390
TOTAL REMOVABLE	6,193		
TARE WEIGHT	6,900	11·6	79,900
TOTALS	13,093	5·6	73,224

C.G. = 5·6 inches aft of the datum.

Note.—Fuselage tank must be reduced by 20 gallons fuel when rocket projectiles and droppable tanks are carried.


0 INCHES
120 108 96 84 72 60 48 36 24 12
12 24 36 48 60 72 84 96 108 120
5·4 in. to Aft Limit (U/C down)
3·6 in. to Forward Limit of C.G. (U/C down)
Mean Chord 79·92 in.
Fuselage Datum Line
C.G. Datum Line

Australian Air Publcaton 721:79
Volume 1, Part 5
(2nd Edition, February, 1956)

SECTION III

VAMPIRE (MARK 33)

WEIGHT SHEET SUMMARY

VAMPIRE (MARK 33)

WEIGHT SHEET SUMMARY

GENERAL INSTRUCTIONS

1. The following general instructions govern the loading of Vampire (Mark 33) aircraft:—

(a) TOTAL WEIGHT

The maximum permissible weight for take-off, straight flying and gentle turns (overload limit) .. .. = 13,470 lb.
The maximum permissible weight for all forms of flying .. = 11,700 lb.
The maximum permissible weight for landing .. .. .. = 11,700 lb.

(b) DATUM

The datum point of this aircraft is marked by a peg on the fuselage side under the port wing. The aircraft is rigged in flying position with the datum line horizontal by means of a jig stick and blocks in the cockpit.

THE LIMITING POSITIONS OF THE CENTRE OF GRAVITY

2. The maximum permissible *forward* position of the C.G. is ~~2.82~~ 3.24 inches forward of the datum (undercarriage down).

The maximum permissible *aft* position of the C.G. in inches aft of the datum (undercarriage down) is as follows:—
Normal flying = ~~3.4~~ 4.4 inches.
Ferrying = ~~3.94~~ 4.8 inches.

Note.—Retraction of the undercarriage moves the C.G. 0.12 inch further aft at 13,470 lb.

Expressed as percentages of the standard mean chord (S.M.C.) these limits are:—
The forward limit = ~~17.2%~~ 16.7 S.M.C.
The aft limit —
Normal flying = ~~24.8%~~ 26.0 S.M.C.
Ferrying = ~~25.4%~~ 26.5 S.M.C.

All moment arms are measured from the datum. Moment arms forward of the datum are considered negative (—) and those aft of the datum positive (+). To obtain the approximate percentage of S.M.C. for horizontal balance, use the following equation:—

$$\text{The horizontal position in \% S.M.C.} = \frac{X + 17.04}{82.44} \times 100$$

where X = distance (±) of the calculated centre of gravity from the datum.

BALLAST

3. When ballast is required due to the removal or non-fitment of equipment, this may be installed as follows:—

(a) Ballast of the same weight may be secured in the same manner and on the same mounting as the item it replaces.

(b) Ballast having an equivalent effect on the aircraft's C.G. may be installed in the ammunition boxes. The weight of such ballast may be calculated using weights and moments or from the following equation:—

$$B_A = \frac{M + 4.8W_E}{40.8}$$

where B_A = weight of ballast in ammunition boxes.

M = total moment change due to equipment items removed.

W_E = total weight of the equipment removed.

Example

Find the Ballast required in ammunition boxes to counteract effect of removal of 250 lb. (W_E) of equipment having a total moment change of 10,000 lb. in (M).

$$B_A = \frac{10{,}000 + (4.8 \times 250)}{40.8}$$

$$= 275 \text{ lb.}$$

SOLO FLYING

4. When the aircraft is flown with one pilot and with full droppable fuel tanks, 300 rounds ammunition (or 8 x 60 lb. head rocket projectiles) must be retained until the fuel transfer is complete. This restriction does not apply to the ferrying role.

TARE WEIGHT

5. Tare weight .. .. = 7,115 lb.
Position of its C.G. (undercarriage down) .. .. = 7.0 inches aft of datum.
Horizontal moment of tare weight about datum .. .. = 49,960 lb. in.

Note.—Retraction of the undercarriage causes an additional moment of 1,632 lb. in.

METHOD OF DETERMINING THE C.G. POSITION

4. (a) Table I of Appendix to this Section contains all the normally removable items of equipment and indicates for each item the

(i) weight (lb.);

(ii) position relative to the datum (in.);

(iii) resultant horizontal moment about the datum (lb. in.).

(b) To determine the C.G. position for any particular loading, make a list of all items of removable load as shown in Table I of Appendix to this Section.

(c) On the right-hand side of this list, draw three columns. By referring to Table I, the appropriate weight, position relative to the datum and moment about the datum can be entered alongside each item.

(d) Add the weights in the weight column to obtain the total weight of the loaded aircraft. Add the moments set out in the moment column to find the resultant moment of the loaded aircraft.

(e) Divide the resultant moment by the weight of the loaded aircraft. The answer gives the position of the centre of gravity relative to the datum.

(f) Refer to paragraph 2 of this Section to find whether the C.G. lies within the permissible limits. If it does not, items of load must be removed or repositioned until a satisfactory C.G. position is obtained.
(g) Additional checks should be made to make sure that satisfactory balance will be maintained under the following conditions of operation:—
(i) Progressive consumption of fuel;
(ii) Release of droppable fuel tanks.
(iii) Release of rocket projectiles.
(iv) Release of bombs.

ADJUSTING FOR LOAD CHANGE

5. Whenever an item of load is added or removed, its weight and moment should be added to or subtracted from the previously determined total. Addition or subtraction of moments must be made algebracically.

OPERATIONAL LOADS

6. Details of the following operational loads are given after Table I:—
(a) Table II — Pilot Training.
(b) Table III — Droppable Fuel Tanks.
(c) Table IV — Rocket Projectiles.
(d) Table V — Bombs.
(e) Table VI — One Pilot and Rocket Projectiles.
(f) Table VII — Droppable Fuel Tanks and Rocket Projectiles.

Reference: File Department of Air 9/84/24.

Attachment: Loading and C.G. Diagram R.A.A.F. Drawing No. A.12666 attached.

Table I (Mark 33)

GENERAL DETAILS OF LOADING

ITEM	Weight (lb.)	Arm (in.)	Moment (lb. in.)
REMOVABLE			
CREW (with parachute, dinghy (Type K,) water cushion and emergency oxygen set)			
Pilot (1)	227	–73·5	–16,685
Pilots (2)	454	–73·5	–33,369
ARMAMENT			
20 mm. guns (2) and accessories	232	–44·9	–10,417
Ammunition (300 rounds)	187·5	–36·0	–6,750
Gyro gunsights (Mk. 4E) (2)	21·4	–74·4	–1,592
Gyro gunsight recorders (2)	3	–74·4	–223
Gun camera (Type G.S.A.P.) and mounting	8·8	–158·3	–1,393
RADIO			
V.H.F. (TR. 1936)	27	–122·5	–3,308
~~Radio compass (AN/ARN. 6) or equivalent ballast~~ BALLAST FOR RADIO COMPASS	25	–122·5	–3,063
OXYGEN			
Charge for bottles (4)	9·4	–126·5	–1,189
MISCELLANEOUS			
Ladder	8·5	–27·5	–234
Crowbar	1	–48·6	–49
Tank cap tool	1	–147·5	–147
Control locks (RUDDER 0·7LB., ELEVATOR 1·6LB.).	2·3	–122·5	–282
First aid kit	3	–42·0	–126
Droppable fuel tanks (2)	150	10·8	1,620
BOMBS			
Light series carriers c/w adaptors (2)	59	0·0	0
Bomb carriers (2) and fairings	80	0·0	0
25 lb. practice bombs (8)	200	0·0	0
500 lb. bombs (2)	1,000	–3·25	–3,250
1,000 lb. bombs (2)	2,000	–2·7	–5,400
ROCKET PROJECTILES			
Rocket carriages (4)	42·5	19·8	842
25 lb. concrete head (8)	472	5·0	2,360
25 lb. A.P. shot No. 1 Mk. 1 (8)	488	5·2	2,538
60 lb. concrete head (8)	744	–5·7	–4,241
60 lb. SAP HE head (8)	760	–5·2	–3,952
*FUEL (at 8·1 lb./Imp. gal.)			
Wing tanks (234 Imp. gal.)	1,895	20·1	38,090
Fuselage tanks (96 Imp. gal.)	778	–15·6	–12,137
Droppable tanks (200 Imp. gal.)	1,620	9·5	15,390
TARE WEIGHT			
As at 31st October, 1955	7,115	7·0	49,960
Undercarriage retraction moment			1,632

Notes.—(a) The fixed portions of the following Vampire Modifications are incorporated in the above tare weight:—

R.A.A.F. Modification Nos. 63, 64, 65, 69, 75, 78, 80, 81, 82, 83, 84, 88, 89, 92, 95, 96, 97, 98, 99 100, 101, 102, 103, 104, 105, 108, 109, 110, 111, 114, 115, 116, 117, 118, 119, 120, 121, 124, 125, 128, 129, 130, 134, 135, 137, 138, 139, 141, 144, 145, 146, 148, 150, 164, 166, 168, 169.

(b) The specific gravity of the fuel varies according to the source of supply and ambient temperature. A nominal specific gravity of 0.81, i.e., 8.1 pounds weight per Imperial gallon is to be used in calculating aircraft loadings.

(c) It is stressed that irrespective of the fuel capacities stated in the relevant Australian Air Publications or marked on or near the tanks, it is the unit's responsibility to make sure that the exact quantity of fuel available for use is known to unit personnel.

(d) *It is important to note that, with Vampire (Mark 33) aircraft in normal flight attitudes, a certain amount of fuel is not available due to the wing tank outlets being above the bottom of the tanks. Therefore, all range and endurance calculations should be based on the worst case of 35 gallons of "lost" fuel giving a total available capacity of (330-35) which equals 295 gallons.

The actual usable fuel for different fore and aft attitudes is as follows:—

Datum: Horizontal	314 gallons
Datum: 5 deg. nose up (normal cruising)	312 gallons
Datum: 8 deg. nose up	295 gallons

Table II (Mark 33)

LOADING DETAILS FOR PILOT TRAINING

ITEM	Weight (lb.)	Arm (in.)	Moment (lb. in.)
CREW (with equipment)			
Pilots (2)	454	–73·5	–33,369
ARMAMENT			
20 mm. guns (2) and accessories	232	–44·9	–10,417
Ammunition (300 rounds)	187·5	–36·0	–6,750
Gyro gunsights (2)	21·4	–74·4	–1,592
Gyro gunsights recorders (2)	3	–74·4	–223
Gun camera	8·8	–158·3	–1,393
RADIO			
V.H.F.	27	–122·5	–3,308
Radio compass BALLAST	25	–122·5	–3,063
OXYGEN			
Charge for bottles (4)	9·4	–126·5	–1,189
MISCELLANEOUS			
Ladder	8·5	–27·5	–234
Crowbar	1	–48·6	–49
Tank cap tool	1	–147·5	–147
Control locks	2·3	–122·5	–282
First aid kit	3	–42·0	–126
FUEL (at 8·1 lb./gal.)			
Wing tanks (234 gal.)	1,895	20·1	38,090
Fuselage tanks (96 gal.)	778	–15·6	–12,137
TOTAL REMOVABLE	3,657		
TARE WEIGHT	7,115	7·0	49,960
TOTALS	10,772	1·3	~~13,371~~ 13,771

C.G. = 1·3 inches aft of the datum.

Table III (Mark 33)

LOADING DETAILS WHEN CARRYING DROPPABLE FUEL TANKS

ITEM	Weight (lb.)	Arm (in.)	Moment (lb. in.)
CREW (with equipment)			
Pilots (2)	454	–73·5	–33,369
ARMAMENT			
20 mm. guns (2) and accessories	232	–44·9	–10,417
Ammunition (300 rounds)	187·5	–36·0	–6,750
Gyro gunsights (2)	21·4	–74·4	–1,592
Gyro gunsights recorders (2)	3	–74·4	–223
Gun camera	8·8	–158·3	–1,393
RADIO			
V.H.F.	27	–122·5	–3,308
Radio compass BALLAST	25	–122·5	–3,063
OXYGEN			
Charge for bottles (4)	9·4	–126·5	–1,189
MISCELLANEOUS			
Ladder	8·5	–27·5	–234
Crowbar	1	–48·6	–49
Tank cap tool	1	–147·5	–147
Control locks	2·3	–122·5	–282
First aid kit	3	–42·0	–126
Droppable fuel tanks (2)	150	10·8	1,620
FUEL (at 8·1 lb./gal.)			
Wing tanks (234 gal.)	1,895	20·1	38,090
Fuselage tanks (96 gal.)	778	–15·6	–12,137
Droppable tanks (200 gal.)	1,620	9·5	15,390
TOTAL REMOVABLE	5,427		
TARE WEIGHT	7,115	7·0	49,960
TOTALS	12,542	2·5	30,781

C.G. = 2·5 inches aft of the datum.

Table IV (Mark 33)

LOADING DETAILS WHEN CARRYING ROCKET PROJECTILES

ITEM	Weight (lb.)	Arm (in.)	Moment (lb. in.)
CREW (with equipment)			
Pilots (2)	454	–73·5	–33,369
ARMAMENT			
20 mm. guns (4) and accessories	232	–44·9	–10,417
Ammunition (300 rounds)	187·5	–36·0	–6,750
Gyro gunsights (2)	21·4	–74·4	–1,592
Gyro gunsights recorders (2)	3	–74·4	–223
Gun camera	8·8	–158·3	–1,393
RADIO			
V.H.F.	27	–122·5	–3,308
Radio compass BALLAST	25	–122·5	–3,063
OXYGEN			
Charge for bottles (4)	9·4	–126·5	–1,189
MISCELLANEOUS			
Ladder	8·5	–27·5	–234
Crowbar	1	–48·6	–49
Tank cap tool	1	–147·5	–147
Control locks	2·3	–122·5	–282
First aid kit	3	–42·0	–126
ROCKET PROJECTILES			
Rocket carriages (4)	42·5	19·8	842
60 lb. SAP HE head (8)	760	–5·2	–3,952
FUEL (at 8·1 lb./gal.)			
Wing tanks (234 gal.)	1,895	20·1	38,090
Fuselage tank (96 gal.)	778	–15·6	–12,137
TOTAL REMOVABLE	4,459		
TARE WEIGHT	7,115	7·0	49,960
TOTALS	11,574	0·9	10,661

C.G. = 0·9 inch aft of the datum.

Table V (Mark 33)

LOADING DETAILS WHEN CARRYING BOMBS

ITEM	Weight (lb.)	Arm (in.)	Moment (lb. in.)
CREW (with equipment)			
Pilots (2)	454	–73·5	–33,369
ARMAMENT			
20 mm. guns (2) and accessories	232	–44·9	–10,417
Ammunition (300 rounds)	187·5	–36·0	–6,750
Gyro gunsights (2)	21·4	–74·4	–1,592
Gyro gunsights recorders (2)	3	–74·4	–223
Gun camera	8·8	–158·3	–1,393
RADIO			
V.H.F.	27	–122·5	–3,308
Radio compass BALLAST	25	–122·5	–3,063
OXYGEN			
Charges for bottles (4)	9·4	–126·5	–1,189
MISCELLANEOUS			
Ladder	8·5	–27·5	–234
Crowbar	1	–48·6	–49
Tank cap tool	1	–147·5	–147
Control locks	2·3	–122·5	–282
First aid kit	3	–42·0	–126
BOMBS			
Bomb carriers (2) and fairings	80	0·0	0
1,000 lb. bombs (2)	2,000	–2·7	–5,400
FUEL (at 8·1 lb./gal.)			
Wing tanks (234 gal.)	1,895	20·1	38,090
Fuselage tanks (96 gal.)	778	–15·6	–12,137
TOTAL REMOVABLE	5,737		
TARE WEIGHT	7,115	7·0	49,960
TOTALS	12,852	0·7	8,371

C.G. = 0·7 inch aft of the datum.

Table VI (Mark 33)

LOADING DETAILS WHEN CARRYING ONE PILOT AND ROCKET PROJECTILES

ITEM	Weight (lb.)	Arm (in.)	Moment (lb. in.)
CREW (with equipment)			
Pilot (1)	227	–73·5	–16,685
ARMAMENT			
20 mm. guns (4) and accessories	232	–44·9	–10,417
Ammunition (300 rounds)	187·5	–36·0	–6,750
Gyro gunsights (2)	21·4	–74·4	–1,592
Gyro gunsights recorders (2)	3	–74·4	–223
Gun camera	8·8	–158·3	–1,393
RADIO			
V.H.F.	27	–122·5	–3,308
Radio compass BALLAST.	25	–122·5	–3,063
OXYGEN			
Charge for bottles (2)	4·7	–126·5	–595
MISCELLANEOUS			
Ladder	8·5	–27·5	–234
Crowbar	1	–48·6	–49
Tank cap tool	1	–147·5	–147
Control locks	2·3	–122·5	–282
First aid kit	3	–42·0	–126
ROCKET PROJECTILES			
Rocket carriages (4)	42·5	19·8	842
60 lb. concrete head (8)	744	–5·7	–4,241
FUEL (at 8·1 lb./gal.)			
Wing tanks (234 gal.)	1,895	20·1	38,090
Fuselage tank (96 gal.)	778	–15·6	–12,137
TOTAL REMOVABLE	4,212		
TARE WEIGHT	7,115	7·0	49,960
TOTALS	11,327	2·4	27,650

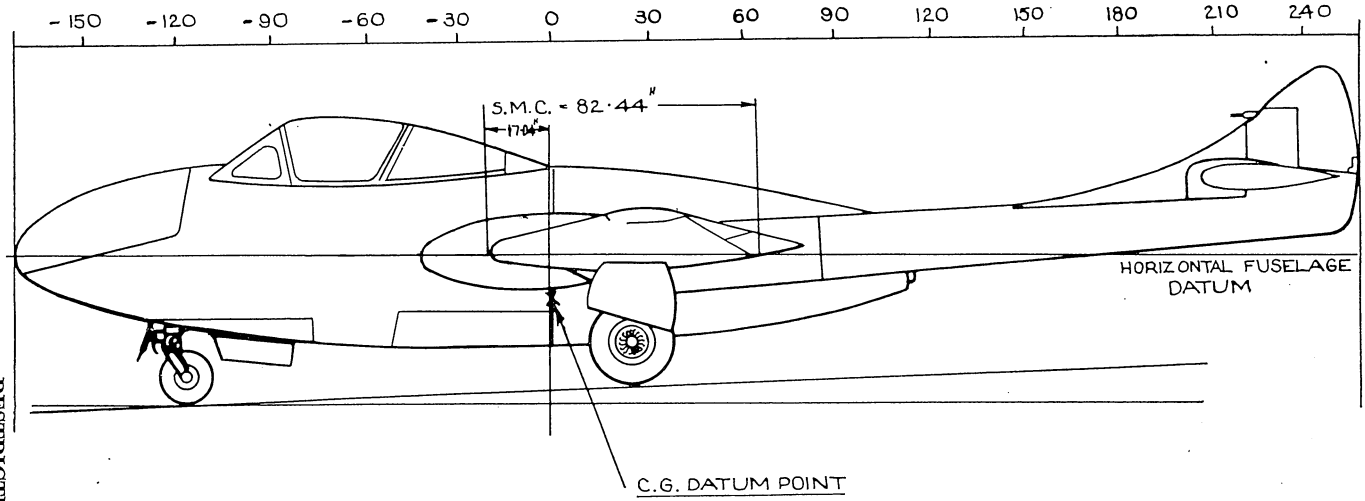
C.G. = 2·4 inches aft of the datum.

Table VII (Mark 33)

LOADING DETAILS WHEN CARRYING DROPPABLE FUEL TANKS AND ROCKET PROJECTILES

ITEM	Weight (lb.)	Arm (in.)	Moment (lb. in.)
CREW (with equipment)			
Pilots (2)	454	–73·5	–33,369
ARMAMENT			
20 mm. guns (2) and accessories	232	–44·9	–10,417
Ammunition (300 rounds)	187·5	–36·0	–6,750
Gyro gunsights (2)	21·4	–74·4	–1,592
Gyro gunsight recorders (2)	3	–74·4	–223
Gun camera	8·8	–158·3	–1,393
RADIO			
V.H.F.	27	–122·5	–3,308
Radio compass BALLAST	25	–122·5	–3,063
OXYGEN			
Charge for bottles (4)	9·4	–126·5	–1,189
MISCELLANEOUS			
Ladder	8·5	–27·5	–234
Crowbar	1	–48·6	–49
Tank cap tool	1	–147·5	–147
Control locks	2·3	–122·5	–282
First aid kit	3	–42·0	–126
Droppable fuel tanks (2)	150	10·8	1,620
ROCKET PROJECTILES			
Rocket carriages (4)	42·5	19·8	842
60 lb. SAP HE head (8)	760	–5·2	–3,952
FUEL (at 8·1 lb./gal.)			
Wing tanks (234 gal.)	1,895	20·1	38,090
Fuselage tank (96 gal.)	778	–15·6	–12,137
Droppable tanks (200 gal.)	1,620	9·5	15,390
TOTAL REMOVABLE	6,229		
TARE WEIGHT	7,115	7·0	49,960
TOTALS	13,344	2·1	27,671

C.G. = 2·1 inches aft of the datum.



C.G. LIMITS - FORWARD = - 2·82"
AFT = + 3·4" (NORMAL)
+ 3·9" (FERRYING)

VAMPIRE MARK 33
LOADING AND C.G. DIAGRAM

A. 12666

Australian Air Publication No 721:79
Volume 1, Part 5
(*2nd Edition, February,* 1956)

SECTION 4 (ISSUE 2)

VAMPIRE (MARK 35A)

WEIGHT SHEET SUMMARY

(*Issued with A/L* 3—*September,* 1959)

WEIGHT SHEET SUMMARY

VAMPIRE (MARK 35A)

GENERAL INSTRUCTIONS

1. The following general instructions govern the loading of Vampire (Mark 35A) aircraft:—

(a) TOTAL WEIGHT

The maximum permissible weight for take-off, straight flying and gentle turns (overload limit) .. .. = 13,610 lb

The maximum permissible weight for all forms of flying for aircraft clean or with eight RP .. .. = 11,860 lb

The maximum permissible weight for landing .. .. .. = 13,290 lb

(b) DATUM

The datum point of this aircraft is marked by a peg on the fuselage side under the port wing. The aircraft is rigged in flying position with the datum line horizontal by means of a jig stick and blocks on the nose floor.

THE LIMITING POSITIONS OF THE CENTRE OF GRAVITY

2. The maximum permissible *forward* position of the CG is 3.24 inches forward of the datum (undercarriage down).

The maximum permissible *aft* position of the CG in inches aft of the datum (undercarriage down) is as follows:—

Normal flying	=	4.4 inches
Ferrying	=	4.8 inches

Notes:—

(i) The aircraft is restricted to altitudes below 15,000 ft if the CG lies between 4.4 and 4.8 inches aft of the datum.

(ii) Retraction of the undercarriage moves the CG 0.12 inches further aft at 13,610 lb.

Expressed as percentages of the standard mean chord (SMC), these limits are:—

The forward limit	=	16.7% SMC
The aft limit — normal flying	=	26.0% SMC
ferrying	=	26.5% SMC

All moment arms are measured from the datum. Moment arms forward of the datum are considered negative (—) and those aft of the datum positive (+). To obtain the approximate percentage of SMC for horizontal balance, use the following equation:—

$$\frac{X + 17.04}{82.44} \times 100$$

where X = the distance (±) of the calculated centre of gravity from the datum.

TARE WEIGHT

3. Tare weight .. .. = 7,485 lb.
Position of its CG (undercarriage down) .. .. = 3.65 inches aft of the datum
Horizontal moment of tare weight about datum .. .. = 27,333 lb in.

Note.—Retraction of the undercarriage causes an additional moment of 1,632 lb in.

METHOD OF DETERMINING THE CG POSITION

4. (a) Table I of Appendix to this Section contains all the normally removable items of equipment and indicates for each item, the
(i) weight (lb);
(ii) position relative to the datum (in);
(iii) resultant horizontal moment about the datum (lb in);

(b) To determine the CG position for any particular loading make a list of all items of removable load as shown in Table I of Appendix to this Section.

(c) On the right hand side of this list, draw three columns. By referring to Table I, the appropriate weight, position relative to the datum and moment about the datum, can be entered alongside each item.

(d) Add the weights in the weight column to obtain the total weight of the loaded aircraft. Add the moments set out in the moments' column to find the resultant moment of the loaded aircraft.

(e) Divide the resultant moment by the total weight. The answer gives the position of the centre of gravity relative to the datum.

(f) Refer to paragraph (2) above to find whether the CG lies within the permissible limits. If it does not, items of load must be removed or repositioned until the desired CG position is obtained.

(g) Additional checks should be made to make sure that satisfactory balance will be maintained under the following conditions of operation:—
(i) Progressive consumption of fuel. (The first 28 gallons of fuel are consumed from the fuselage tank and this condition will give the most aft CG position provided the rest of the loading remains constant.)
(ii) Release of droppable tanks.
(iii) Release of rockets.
(iv) Release of bombs.

ADJUSTING FOR LOAD CHANGE

5. Whenever an item of load is added or removed, its weight and moment should be added to or subtracted from the previously determined total. Addition or subtraction of moments must be made algebraically.

OPERATIONAL LOADS

6. Details of the following operational loads are given after Table I:—

(a) Table II — Pilot training.
(b) Table III — Droppable tanks
(c) Table IV — Rockets.
(d) Table V — Bombs
(e) Table VI — One pilot and rockets.
(f) Table VII — Droppable tanks and rockets.
(g) Table VIII — One pilot, droppable tanks, nil ammunition.

Reference: File Department of Air 9/84/24 IV.

Attachment: Loading and CG Diagram RAAF Drawing No A13396 attached.

TABLE I (Mark 35A)

GENERAL DETAILS OF LOADING

ITEM	Weight (lb)	Arm (in)	Moment (lb in)
REMOVABLE			
CREW (ejection seat included in Tare Weight)			
Pilot (1)	170	−73·5	−12,495
Pilots (2)	340	−73·5	−24,990
ARMAMENT			
20 mm guns (2) and accessories	232	−44·9	−10,417
Ammunition (300 rounds)	187·5	−36·0	−6,750
Gyro gunsights (Mk 4E) (2)	16	−84·2	−1,347
Gyro gunsight recorder (Mk 3)	2·2	−84·2	−185
Gun camera (Type GSAP) and mounting	3	−156·0	−468
RADIO			
VHF (TR 1936)	27	−122·5	−3,308
Radio compass (AN/ARN 6)	35	−139·5	−4,883
OXYGEN			
Charge for bottles (4)	9·4	−126·5	−1,189
Emergency bottles (2)	8	−75·0	−600
MISCELLANEOUS			
Ladder	8·5	−27·5	−234
Crowbar	1	−70·0	−70
Tank cap tool	1	−27·7	−28
Control locks	2·3	−122·5	−282
First aid kit (Type AP3130)	3	−42·0	−126
BOMBS			
Light series carriers (Mk 12) and adaptors (2)	59	0·0	0
Bomb carriers (2) and fairings	80	0·0	0
11½ lb practice bombs (8)	92	0·0	0
25 lb practice bombs (8)	200	0·0	0
500 lb bombs (2)	1,000	−3·25	−3,250
1000 lb bombs (2)	2,000	−2·7	−5,400
ROCKETS			
Rocket projectors (Mk 8) (4)	42·5	19·8	842
25 lb concrete head (8)	472	5·0	2,360
25 lb AP shot No 1 Mk 1 (8)	488	5·2	2,538
60 lb concrete head (8)	744	−5·7	−4,241
60 lb SAP HE head (8)	760	−5·2	−3,952

TABLE 1 (*continued*)

ITEM	Weight (lb)	Arm (in)	Moment (lb in)
FUEL (at 8 lb/Imp gal):			
Wing tanks (234 Imp gals)	1,872	20·1	37,627
Fuselage tanks (96 Imp gals)	768	−15·6	−11,981
Droppable tanks (200 Imp gals)	1,600	9·5	15,200
Droppable tank installation	150	10·8	1,620
TARE WEIGHT			
As at 30th June, 1959	7,485	3·65	27,333
Undercarriage retraction moment			1,632

NOTES.–(a) The fixed portions of the following Vampire Modifications are incorporated in the above tare weight:—

RAAF Modification Nos:— 25, 63, 64, 65, 69, 70, 75, 77, 78, 80, 81, 82, 83, 84, 88, 89, 92, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 108, 109, 110, 111, 114, 115, 116, 117, 118, 119, 120, 121, 124, 125, 128, 129, 130, 134, 135, 136, 137, 138, 139, 140, 141, 144, 145, 148, 150, 155, 156, 158, 161, 162, 163, 164, 165, 166, 168, 169, 170, 172, 174, 176, 177, 178, 181, 182, 184, 185, 186, 187, 188, 190, 191, 192, 193, 194, 195, 196, 197, 198, 200, 204, 205, 207, 208, 209, 210, 211, 212, 215, 216, 217, 218, 224, 228, 230, 232, 233, 235, 236, 237, 241, 249, 255, 259, 260, 261, 262, 263, 277, 291.

(b) The specific gravity of the fuel varies according to the source of supply and ambient temperature. A nominal specific gravity of 0.8, ie, 8 pounds weight per Imperial gallon is to be used in calculating aircraft loadings.

(c) It is stressed that irrespective of the fuel capacities stated in the relevant Australian Air Publications or marked on or near the tanks, it is the unit's responsibility to make sure that the exact quantity of fuel available for use is known to unit personnel.

(d) It is important to note that with Vampire (Mark 35A) aircraft in normal flight attitudes, a certain amount of fuel is not available due to the wing tank outlets being above the bottoms of the tanks and, therefore, all range and endurance calculations should be based on the worst case of 35 gallons of "lost" fuel giving a total available capacity of 330 minus 35 which equals 295 gallons. The actual usable fuel for different fore and aft attitudes is as follows:—

Datum: Horizontal	314 gallons.
Datum: 5 deg nose up (normal cruising)	312 gallons.
Datum: 8 deg nose up	295 gallons.

TABLE II (Mark 35A)
LOADING DETAILS FOR PILOT TRAINING

ITEM	Weight (lb)	Arm (in)	Moment (lb in)
CREW			
Pilots (2)	340	–73·5	–24,990
ARMAMENT			
20 mm guns (2) and accessories	232	–44·9	–10,417
Ammunition (300 rounds)	187·5	–36·0	–6,750
Gyro gunsights (2)	16	–84·2	–1,347
Gyro gunsight recorder	2·2	–84·2	–185
Gun camera	3	–156·0	–468
RADIO			
VHF	27	–122·5	–3,308
Radio compass	35	–139·5	–4,883
OXYGEN			
Charges for bottles (4)	9·4	–126·5	–1,189
Emergency bottles (2)	8	–75·0	–600
MISCELLANEOUS			
Crowbar	1	–70·0	–70
Tank cap tool	1	–27·7	–28
First aid kit	3	–42·0	–126
FUEL (at 8 lb/gal)			
Wing tanks (234 gals)	1,872	20·1	37,627
Fuselage tanks (96 gals)	768	–15·6	–11,981
TOTAL REMOVABLE	3,505		
TARE WEIGHT	7,485	3·65	27,333
TOTALS	10,990	–0·1	–1,382

CG is 0·1 inch forward of the datum

TABLE III (Mark 35A)

LOADING DETAILS WHEN CARRYING DROPPABLE TANKS

ITEM	Weight (lb)	Arm (in)	Moment (lb in)
CREW			
Pilots (2)	340	-73·5	-24,990
ARMAMENT			
20 mm guns (2) and accessories	232	-44·9	-10,417
Ammunition (300 rounds)	187·5	-36·0	-6,750
Gyro gunsights (2)	16	-84·2	-1,347
Gyro gunsight recorder	2·2	-84·2	-185
Gun camera	3	-156·0	-468
RADIO			
VHF	27	-122·5	-3,308
Radio compass	35	-139·5	-4,883
OXYGEN			
Charge for bottles (4)	9·4	-126·5	-1,189
Emergency bottles (2)	8	-75·0	-600
MISCELLANEOUS			
Crowbar	1	-70·0	-70
Tank cap tool	1	-27·7	-28
First aid kit	3	-42·0	-126
FUEL (at 8 lb/gal)			
Wing tanks (234 gals)	1,872	20·1	37,627
Fuselage tanks (96 gals)	768	-15·6	-11,981
Droppable tanks (200 gals)	1,600	9·5	15,200
Droppable tank installation	150	10·8	1,620
TOTAL REMOVABLE	5,255		
TARE WEIGHT	7,485	3·65	27,333
TOTALS	12,740	1·2	15,438

CG is 1·2 inches aft of the datum

TABLE IV (Mark 35A)

LOADING DETAILS WHEN CARRYING ROCKETS

ITEM	Weight (lb)	Arm (in)	Moment (lb in)
CREW			
Pilots (2)	340	–73·5	–24,990
ARMAMENT			
20 mm guns (2) and accessories	232	–44·9	–10,417
Ammunition (300 rounds)	187·5	–36·0	–6,750
Gyro gunsights (2)	16	–84·2	–1,347
Gyro gunsight recorder	2·2	–84·2	–185
Gun camera	3	–156·0	–468
RADIO			
VHF	27	–122·5	–3,308
Radio compass	35	–139·5	–4,883
OXYGEN			
Charge for bottles (4)	9·4	–126·5	–1,189
Emergency bottles (2)	8	–75·0	–600
MISCELLANEOUS			
Crowbar	1	–70·0	–70
Tank cap tool	1	–27·7	–28
First aid kit	3	–42·0	–126
ROCKETS			
Rocket projectors (4)	42·5	19·8	842
60 lb SAP HE head (8)	760	–5·2	–3,952
FUEL (at 8 lb/gal)			
Wing tanks (234 gals)	1,872	20·1	37,627
Fuselage tanks (96 gals)	768	–15·6	–11,981
TOTAL REMOVABLE	4,308		
TARE WEIGHT	7,485	3·65	27,333
TOTALS	11,793	–0·4	–4,492

CG is 0·4 inch forward of the datum

TABLE V (Mark 35A)

LOADING DETAILS WHEN CARRYING BOMBS

ITEM	Weight (lb)	Arm (in)	Moment (lb in)
CREW			
Pilots (2)	340	−73·5	−24,990
ARMAMENT			
20 mm guns (2) and accessories	232	−44·9	−10,417
Ammunition (300 rounds)	187·5	−36·0	−6,750
Gyro gunsights (2)	16	−84·2	−1,347
Gyro gunsight recorder	2·2	−84·2	−185
Gun camera	3	−156·0	−468
RADIO			
VHF	27	−122·5	−3,308
Radio compass	35	−139·5	−4,883
OXYGEN			
Charge for bottles (4)	9·4	−126·5	−1,189
Emergency bottles (2)	8	−75·0	−600
MISCELLANEOUS			
Crowbar	1	−70·0	−70
Tank cap tool	1	−27·7	−28
First aid kit	3	−42·0	−126
BOMBS			
Bomb carriers (2) and fairings	80	0·0	0
1,000 lb bombs (2)	2,000	−2·7	−5,400
FUEL (at 8 lb/gal)			
Wing tanks (234 gals)	1,872	20·1	37,627
Fuselage tanks (96 gals)	768	−15·6	−11,981
TOTAL REMOVABLE	5,585		
TARE WEIGHT	7,485	3·65	27,333
TOTALS	13,070	−0·5	−6,782

CG is 0·5 inch forward of the datum

TABLE VI (Mark 35A)

LOADING DETAILS WHEN CARRYING ONE PILOT AND ROCKETS

ITEM	Weight (lb)	Arm (in)	Moment (lb in)
CREW			
Pilot (1)	170	-73·5	-12,495
ARMAMENT			
20 mm guns (2) and accessories	232	-44·9	-10,417
Ammunition (300 rounds)	187·5	-36·0	-6,750
Gyro gunsight recorder	16	-84·2	-1,347
Gun camera	2·2	-84·2	-185
	3	-156·0	-468
RADIO			
VHF	27	-122·5	-3,308
Radio compass	35	-139·5	-4,883
OXYGEN			
Charge for bottles (4)	9·4	-126·5	-1,189
Emergency bottles (2)	8	-75·0	-600
MISCELLANEOUS			
Crowbar	1	-70·0	-70
Tank cap tool	1	-27·7	-28
First aid kit	3	-42·0	-126
ROCKETS			
Rocket projectors (4)	42·5	19·8	842
60 lb SAP HE head (8)	760	-5·2	-3,952
FUEL (at 8 lb/gal)			
Wing tanks (234 gals)	1,872	20·1	37,627
Fuselage tanks (96 gals)	768	-15·6	-11,981
TOTAL REMOVABLE	4,138		
TARE WEIGHT	7,485	3·65	27,333
TOTALS	11,623	0·7	8,003

CG is 0·7 inch aft of the datum

TABLE VII (Mark 35A)

LOADING DETAILS WHEN CARRYING DROPPABLE TANKS AND ROCKETS

ITEM	Weight (lb)	Arm (in)	Moment (lb in)
CREW			
Pilots (2)	340	–73·5	–24,990
ARMAMENT			
20 mm guns (2) and accessories	232	–44·9	–10,417
Ammunition (300 rounds)	187·5	–36·0	–6,750
Gyro gunsights (2)	16	–84·2	–1,347
Gyro gunsight recorder	2·2	–84·2	–185
Gun camera	3	–156·0	–468
RADIO			
VHF	27	–122·5	–3,308
Radio compass	35	–139·5	–4,883
OXYGEN			
Charge for bottles (4)	9·4	–126·5	–1,189
Emergency bottles (2)	8	–75·0	–600
MISCELLANEOUS			
Crowbar	1	–70·0	–70
Tank cap tool	1	–27·7	–28
First aid kit	3	–42·0	–126
ROCKETS			
Rocket projectors (4)	42·5	19·8	842
60 lb SAP HE head (8)	760	–5·2	–3,952
FUEL (at 8 lb/gal)			
Wing tanks (234 gals)	1,872	20·1	37,627
Fuselage tanks (96 gals)	768	–15·6	–11,981
Droppable tanks (200 gals)	1,600	9·5	15,200
Droppable tank installation	150	10·8	1,620
TOTAL REMOVABLE	6,058		
TARE WEIGHT	7,485	3·65	27,333
TOTALS	13,543	0·9	12,328

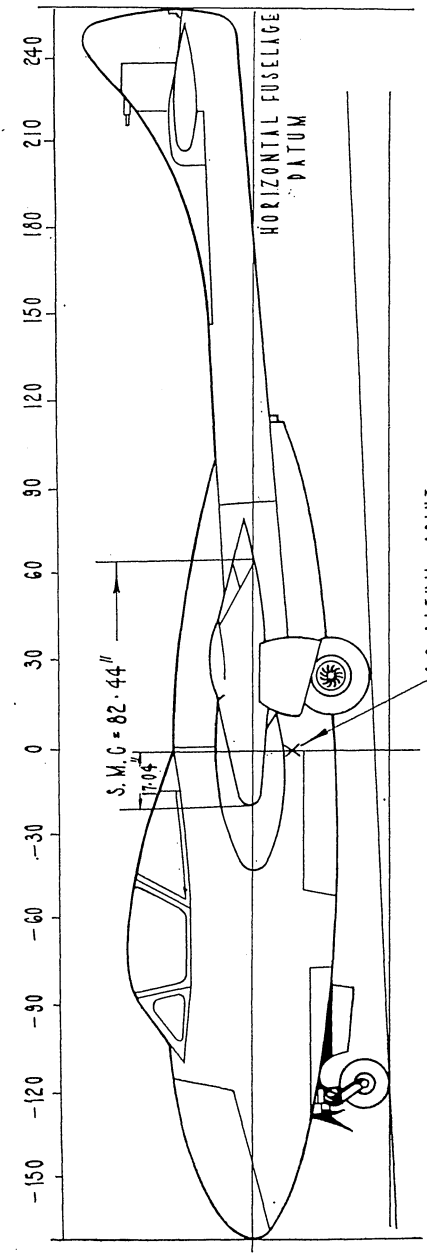
CG is 0·9 inch aft of the datum

TABLE VIII (Mark 35A)

LOADING DETAILS WHEN CARRYING ONE PILOT, DROPPABLE TANKS, NIL AMMUNITION

ITEM	Weight (lb)	Arm (in)	Moment (lb in)
CREW			
Pilot (1)	170	-73·5	-12,495
ARMAMENT			
20 mm guns (2) and accessories	232	-44·9	-10,417
Ammunition (nil)			
Gyro gunsights (2)	16	-84·2	-1,347
Gyro gunsight recorder	2·2	-84·2	-185
Gun camera	3	-156·0	-468
RADIO			
VHF	27	-122·5	-3,308
Radio compass	35	-139·5	-4,883
OXYGEN			
Charge for bottles (4)	9·4	-126·5	-1,189
Emergency bottles (2)	8	-75·0	-600
MISCELLANEOUS			
Crowbar	1	-70·0	-70
Tank cap tool	1	-27·7	-28
First aid kit	3	-42·0	-126
FUEL (at 8 lb/gal)			
Wing tanks (234 gals)	1,872	20·1	37,627
Fuselage tanks (96 gals)	768	-15·6	-11,981
Droppable tanks (200 glas)	1,600	9·5	15,200
Droppable tank installation	150	10·8	1,620
TOTAL REMOVABLE	4,898		
TARE WEIGHT	7,485	3·65	27,333
TOTALS	12,383	2·8	34,683

CG is 2·8 inches aft of the datum



C.G. LIMITS - FORWARD = - 3·24" (NORMAL)
AFT = + 4·4" (NORMAL)
+ 4·8" (FERRYING)

VAMPIRE MARKS 35 & 35A
LOADING AND C.G. DIAGRAM

A-13396

Australian Air Publication No 721:79
Volume 1, Part 5
(*2nd Edition, February,* 1956)

SECTION 5 (ISSUE 2)

VAMPIRE (MARK 35)

WEIGHT SHEET SUMMARY

(*Issued with A/L* 3—*September,* 1959)

AAP 721:79, Volume 1, Part 5, Section 5 (Issue 2)

VAMPIRE (MARK 35)

WEIGHT SHEET SUMMARY

GENERAL INSTRUCTIONS

1. The following general instructions govern the loading of Vampire (Mark 35) aircraft:—

(a) TOTAL WEIGHT

The maximum permissible weight for take-off, straight flying and gentle turns (overload limit) .. .. = 13,610 lb

The maximum permissible weight for all forms of flying for aircraft clean or with eight RP .. .. = 11,860 lb

The maximum permissible weight for landing .. .. .. = 13,290 lb

(b) DATUM

The datum point of this aircraft is marked by a peg on the fuselage side under the port wing. The aircraft is rigged in flying position with the datum line horizontal by means of a jig stick and blocks on the nose floor.

THE LIMITING POSITIONS OF THE CENTRE OF GRAVITY

2. The maximum permissible *forward* position of the CG is 3.24 inches forward of the datum (undercarriage down).

The maximum permissible *aft* position of the CG in inches aft of the datum (undercarriage down) is as follows:—

Normal flying	=	4.4 inches
Ferrying	=	4.8 inches

Notes.—

(i) The aircraft is restricted to altitudes below 15,000 ft if the CG lies between 4.4 and 4.8 inches aft of the datum.

(ii) Retraction of the undercarriage moves the CG 0.12 inches further aft at 13,610 lb.

Expressed as percentages of the standard mean chord (SMC) these limits are:—

The forward limit	=	16.7% SMC
The aft limit — normal flying	=	26.0% SMC
ferrying	=	26.5% SMC

All moment arms are measured from the datum. Moment arms forward of the datum are considered negative (—) and those aft of the datum positive (+). To obtain the approximate percentage of SMC for horizontal balance, use the following equation:—

$$\frac{X + 17.04}{82.44} \times 100$$

where X = the distance (±) of the calculated centre of gravity from the datum.

TARE WEIGHT

3. Tare weight .. .. = 7,380 lb.
Position of its CG (undercarriage down) .. .. = 4.4 inches aft of the datum
Horizontal moment of tare weight about datum .. .. = 32,450 lb in.

Note.—Retraction of the undercarriage causes an additional moment of 1,632 lb in.

METHOD OF DETERMINING THE CG POSITION

4. (a) Table I of Appendix to this Section contains all the normally removable items of equipment and indicates for each item, the
(i) weight (lb);
(ii) position relative to the datum (in);
(iii) resultant horizontal moment about the datum (lb in);
(b) To determine the CG position for any particular loading make a list of all items of removable load as shown in Table I of Appendix to this Section.
(c) On the right hand side of this list, draw three columns. By referring to Table I, the appropriate weight, position relative to the datum and moment about the datum, can be entered alongside each item.
(d) Add the weights in the weight column to obtain the total weight of the loaded aircraft. Add the moments set out in the moments' column to find the resultant moment of the loaded aircraft.
(e) Divide the resultant moment by the total weight. The answer gives the position of the centre of gravity relative to the datum.
(f) Refer to paragraph (2) above to find whether the CG lies within the permissible limits. If it does not, items of load must be removed or repositioned until the desired CG position is obtained.
(g) Additional checks should be made to make sure that satisfactory balance will be maintained under the following conditions of operation:—
(i) Progressive consumption of fuel. (The first 28 gallons of fuel are consumed from the fuselage tank and this condition will give the most aft CG position provided the rest of the loading remains constant.)
(ii) Release of droppable tanks.
(iii) Release of rockets.
(iv) Release of bombs.

ADJUSTING FOR LOAD CHANGE

5. Whenever an item of load is added or removed, its weight and moment should be added to or subtracted from the previously determined total. Addition or subtraction of moments must be made algebraically.

OPERATIONAL LOADS

6. Details of the following operational loads are given after Table I:—
(a) Table II — Pilot training.
(b) Table III — Droppable tanks
(c) Table IV — Rockets.
(d) Table V — Bombs
(e) Table VI — One pilot and rockets.
(f) Table VII — Droppable tanks and rockets.
(g) Table VIII — One pilot, droppable tanks, nil ammunition.

Reference: File Department of Air 9/84/24 IV.

Attachment: Loading and CG Diagram RAAF Drawing No A13396 attached.

TABLE I (Mark 35)

GENERAL DETAILS OF LOADING

ITEM	Weight (lb)	Arm (in)	Moment (lb in)
REMOVABLE			
CREW (ejection seat included in Tare Weight)			
Pilot (1)	170	-73·5	-12,495
Pilots (2)	340	-73·5	-24,990
ARMAMENT			
20 mm guns (2) and accessories	232	-44·9	-10,417
Ammunition (300 rounds)	187·5	-36·0	-6,750
Gyro gunsights (Mk 4E) (2)	16	-84·2	-1,347
Gyro gunsight recorder (Mk 3)	2·2	-84·2	-185
Gun camera (Type GSAP) and mounting	3	-156·0	-468
RADIO			
VHF (TR 1936)	27	-122·5	-3,308
Radio compass (AN/ARN 6)	35	-139·5	-4,883
OXYGEN			
Charge for bottles (4)	9·4	-126·5	-1,189
Emergency bottles (2)	8	-75·0	-600
MISCELLANEOUS			
Ladder	8·5	-27·5	-234
Crowbar	1	-70·0	-70
Tank cap tool	1	-27·7	-28
Control locks	2·3	-122·5	-282
First aid kit (Type AP 3130)	3	-42·0	-126
BOMBS			
Light series carriers (Mk 12) and adaptors (2)	59	0·0	0
Bomb carriers (2) and fairings	80	0·0	0
11½ lb practice bombs (8)	92	0·0	0
25 lb practice bombs (8)	200	0·0	0
500 lb bombs (2)	1,000	-3·25	-3,250
1,000 lb bombs (2)	2,000	-2·7	-5,400
ROCKETS			
Rocket projectors (Mk 8) (4)	42·5	19·8	842
25 lb concrete head (8)	472	5·0	2,360
25 lb AP shot No 1 Mk 1 (8)	488	5·2	2,538
60 lb concrete head (8)	744	-5·7	-4,241
60 lb SAP HE head (8)	760	-5·2	-3,952

TABLE 1 *(continued)*

ITEM	Weight (lb)	Arm (in)	Moment (lb in)
FUEL (at 8 lb Imp gal)			
Fuselage tanks (96 Imp gals)	768	−15·6	−11,981
Stub wing tanks (115 Imp gals)	920	26·8	24,656
Leading edge tanks (57 Imp gals)	456	−9·6	−4,378
No 3 tank (56 Imp gals)	448	25·2	11,290
No 4 tank (51 Imp gals)	408	25·2	10,282
Droppable tanks (200 Imp gals)	1,600	9·5	15,200
Droppable tank installation	150	10·8	1,620
TARE WEIGHT			
As at 30th June, 1959	7,380	4·4	32,450
Undercarriage retraction moment			1,632

NOTES.–(a) The fixed portions of the following Vampire Modifications are incorporated in the above tare weight:—

RAAF Modifications Nos:—63, 64, 65, 69, 75, 77, 78, 80, 82, 83, 84, 88, 89, 92, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 108, 109, 110, 114, 116, 119, 120, 121, 125, 128, 129, 130, 134, 136, 137, 138, 139, 140, 144, 145, 146, 148, 150, 155, 156, 158, 161, 163, 164, 165, 166, 168, 169, 170, 172, 174, 176, 177, 178, 181, 182, 184, 185, 186, 187, 188, 190, 191, 192, 193, 194, 195, 197, 198, 200, 201, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 215, 223, 224, 225, 227, 228, 230, 232, 233, 235, 236, 237, 241, 246, 247, 248, 249, 253, 254, 255, 258, 259, 260, 261, 262, 280, 285, 286, 287, 290, 291, 293, 297, 298, 299, 300, 301, 302, 306, 310, 313.

(b) The specific gravity of the fuel varies according to the source of supply and ambient temperature. A nominal specific gravity of 0.8, ie, 8 pounds weight per Imperial gallon is to be used in calculating aircraft loadings.

(c) It is stressed that irrespective of the fuel capacities stated in the relevant Australian Air Publications or marked on or near the tanks, it is the unit's responsibility to make sure that the exact quantity of fuel available for use is known to unit personnel.

TABLE II (Mark 35)

LOADING DETAILS FOR PILOT TRAINING

ITEM	Weight (lb)	Arm (in)	Moment (lb in)
CREW			
Pilots (2)	340	–73·5	–24,990
ARMAMENT			
20 mm guns (2) and accessories	232	–44·9	–10,417
Ammunition (300 rounds)	187·5	–36·0	–6,750
Gyro gunsights (2)	16	–84·2	–1,347
Gyro gunsight recorder	2·2	–84·2	–185
Gun camera	3	–156·0	–468
RADIO			
VHF	27	–122·5	–3,308
Radio compass	35	–139·5	–4,883
OXYGEN			
Charge for bottles (4)	9·4	–126·5	–1,189
Emergency bottles (2)	8	–75·0	–600
MISCELLANEOUS			
Crowbar	1	–70·0	–70
Tank cap tool	1	–27·7	–28
First aid kit	3	–42·0	–126
FUEL (at 8 lb/gal)			
Fuselage tanks (96 gals)	768	–15·6	–11,981
Stub wing tanks (115 gals)	920	26·8	24,656
Leading edge tanks (57 gals)	456	–9·6	–4,378
No 3 tank (56 gals)	448	25·2	11,290
No 4 tank (51 gals)	408	25·2	10,282
TOTAL REMOVABLE	3,865		
TARE WEIGHT	7,380	4·4	32,450
TOTALS	11,245	0·7	7,958

CG is 0·7 inch aft of the datum

TABLE III (Mark 35)

LOADING DETAILS WHEN CARRYING DROPPABLE TANKS

ITEM	Weight (lb)	Arm (in)	Mmoent (lb in)
CREW			
Pilots (2)	340	-73·5	-24,990
ARMAMENT			
20 mm guns (2) and accessories	232	-44·9	-10,417
Ammunition (300 rounds)	187·5	-36·0	-6,750
Gyro gunsights (2)	16	-84·2	-1,347
Gyro gunsight recorder	2·2	-84·2	-185
Gun camera	3	-156·0	-468
RADIO			
VHF	27	-122·5	-3,308
Radio compass	35	-139·5	-4,883
OXYGEN			
Charge for bottles (4)	9·4	-126·5	-1,189
Emergency bottles (2)	8	-75·0	-600
MISCELLANEOUS			
Crowbar	1	-70·0	-70
Tank cap tool	1	-27·7	-28
First aid kit	3	-42·0	-126
FUEL (at 8 lb/gal)			
Fuselage tanks (96 gals)	768	-15·6	-11,981
Stub wing tanks (115 gals)	920	26·8	24,656
Leading edge tanks (57 gals)	456	-9·6	-4,378
No 3 tank (56 gals)	448	25·2	11,290
No 4 tank (51 gals)	408	25·2	10,282
Droppable tanks (200 gals)	1,600	9·5	15,200
Droppable tank installation	150	10·8	1,620
TOTAL REMOVABLE	5,615		
TARE WEIGHT	7,380	4·4	32,450
TOTALS	12,995	1·9	24,778

CG is 1·9 inches aft of the datum

TABLE IV (Mark 35)

LOADING DETAILS WHEN CARRYING ROCKETS

ITEM	Weight (lb)	Arm (in)	Moment (lb in)
CREW			
Pilots (2)	340	–73·5	–24,990
ARMAMENT			
20 mm guns (2) and accessories	232	–44·9	–10,417
Ammunition (300 rounds)	187·5	–36·0	–6,750
Gyro gunsights (2)	16	–84·2	–1,347
Gyro gunsight recorder	2·2	–84·2	–185
Gun camera	3	–156·0	–468
RADIO			
VHF	27	–122·5	–3,308
Radio compass	35	–139·5	–4,883
OXYGEN			
Charge for bottles (4)	9·4	–126·5	–1,189
Emergency bottles (2)	8	–75·0	–600
MISCELLANEOUS			
Crowbar	1	–70·0	–70
Tank cap tool	1	–27·7	–28
First aid kit	3	–42·0	–126
ROCKETS			
Rocket projectors (4)	42·5	19·8	842
60 lb SAP HE head (8)	760	–5·2	–3,952
FUEL (at 8 lb/gal)			
Fuselage tanks (96 gals)	768	–15·6	–11,981
Stub wing tanks (115 gals)	920	26·8	24,656
Leading edge tanks (57 gals)	456	–9·6	–4,378
No 3 tank (56 gals)	448	25·2	11,290
No 4 tank (51 gals)	408	25·2	10,282
TOTAL REMOVABLE	4,668		
TARE WEIGHT	7,380	4·4	32,450
TOTALS	12,048	0·4	4,848

CG is 0·4 inch aft of the datum

TABLE V (Mark 35)

LOADING DETAILS WHEN CARRYING BOMBS

ITEM	Weight (lb)	Arm (in)	Moment (lb in)
CREW			
Pilots (2)	340	-73·5	-24,990
ARMAMENT			
20 mm guns (2) and accessories	232	-44·9	-10,417
Ammunition (300 rounds)	187·5	-36·0	-6,750
Gyro gunsights (2)	16	-84·2	-1,347
Gyro gunsight recorder	2·2	-84·2	-185
Gun camera	3	-156·0	-468
RADIO			
VHF	27	-122·5	-3,308
Radio compass	35	-139·5	-4,883
OXYGEN			
Charge for bottles (4)	9·4	-126·5	-1,189
Emergency bottles (2)	8	-75·0	-600
MISCELLANEOUS			
Crowbar	1	-70·0	-70
Tank cap tool	1	-27·7	-28
First aid kit	3	-42·0	-126
BOMBS			
Bomb carriers (2) and fairings	80	0·0	0
1,000 lb bombs (2)	2,000	-2·7	-5,400
FUEL (at 8 lb/gal)			
Fuselage tanks (96 gals)	768	-15·6	-11,918
Stub wing tanks (115 gals)	920	26·8	24,656
Leading edge tanks (57 gals)	456	-9·6	-4,378
No 3 tank (56 gals)	448	25·2	11,290
No 4 tank (51 gals)	408	25·2	10,282
TOTAL REMOVABLE	5,945		
TARE WEIGHT	7,380	4·4	32,450
TOTALS	13,325	0·2	2,558

CG is 0·2 inch aft of the datum

TABLE VI (Mark 35)

LOADING DETAILS WHEN CARRYING ONE PILOT AND ROCKETS

ITEM	Weight (lb)	Arm (in)	Moment (lb in)
CREW			
Pilot (1)	170	-73·5	-12,495
ARMAMENT			
20 mm guns (2) and accessories	232	-44·9	-10,417
Ammunition (300 rounds)	187·5	-36·0	-6,750
Gyro gunsights (2)	16	-84·2	-1,347
Gyro gunsight recorder	2·2	-84·2	-185
Gun camera	3	-156·0	-468
RADIO			
VHF	27	-122·5	-3,308
Radio compass	35	-139·5	-4,883
OXYGEN			
Charge for bottles (4)	9·4	-126·5	-1,189
Emergency bottles (2)	8	-75·0	-600
MISCELLANEOUS			
Crowbar	1	-70·0	-70
Tank cap tool	1	-27·7	-28
First aid kit	3	-42·0	-126
ROCKETS			
Rocket projectors (4)	42·5	19·8	842
60 lb SAP HE head (8)	760	-5·2	-3,952
FUEL (at 8 lb/gal)			
Fuselage tanks (96 gals)	768	-15·6	-11,981
Stub wing tanks (115 gals)	920	26·8	24,656
Leading edge tanks (57 gals)	456	-9·6	-4,378
No 3 tank (56 gals)	448	25·2	11,290
No 4 tank (51 gals)	408	25·2	10,282
TOTAL REMOVABLE	4,498		
TARE WEIGHT	7,380	4·4	32,450
TOTALS	11,878	1·5	17,343

CG is 1·5 inches aft of the datum

Table VII (Mark 35)

LOADING DETAILS WHEN CARRYING DROPPABLE TANKS

ITEM	Weight (lb)	Arm (in)	Moment (lb in)
CREW			
Pilots (2)	340	-73·5	-24,990
ARMAMENT			
20 mm guns (2) and accessories	232	-44·9	-10,417
Ammunition (300 rounds)	187·5	-36·0	-6,750
Gyro gunsights (2)	16	-84·2	-1,347
Gyro gunsight recorder	2·2	-84·2	-185
Gun camera	3	-156·0	-468
RADIO			
VHF	27	-122·5	-3,308
Radio compass	35	-139·5	-4,883
OXYGEN			
Charge for bottles (4)	9·4	-126·5	-1,189
Emergency bottles (2)	8	-75·0	-600
MISCELLANEOUS			
Crowbar	1	-70·0	-70
Tank cap tool	1	-27·7	-28
First aid kit	3	-42·0	-126
ROCKETS			
Rocket projectors (4)	42·5	19·8	842
60 lb SAP HE head (8)	760	-5·2	-3,952
FUEL (at 8 lb/gal)			
Fuselage tanks (96 gals)	768	-15·6	-11,981
Stub wing tanks (115 gals)	920	26·8	24,656
Leading edge tanks (57 gals)	456	-9·6	-4,378
No 3 tank (56 gals)	448	25·2	11,290
No 4 tank (51 gals)	408	25·2	10,282
Droppable tanks (200 gals)	1,600	9·5	15,200
Droppable tank installation	150	10·8	1,620
TOTAL REMOVABLE	6,418		
TARE WEIGHT	7,380	4·4	32,450
TOTALS	13,798	1·6	21,668

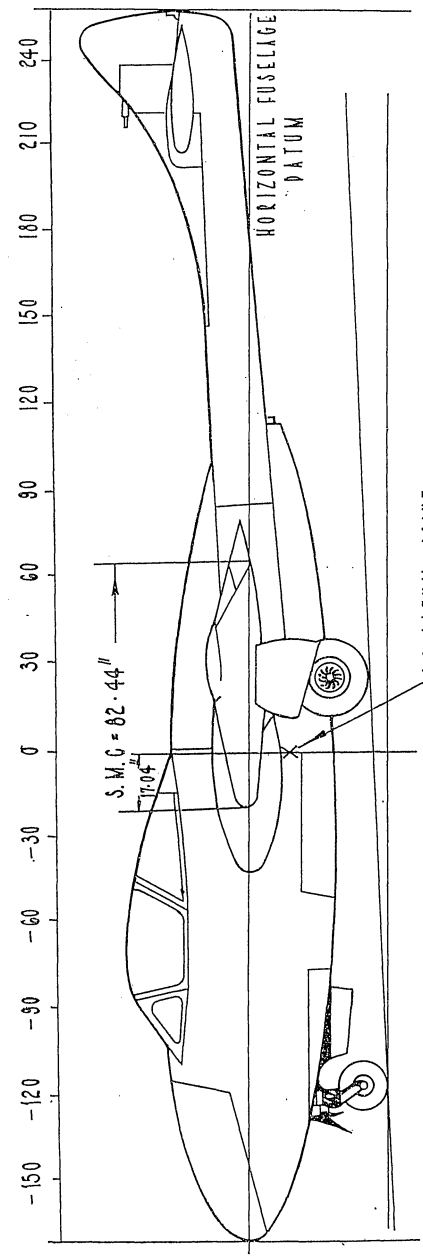
CG is 1·6 inches aft of the datum

TABLE VIII (Mark 35)

LOADING DETAILS WHEN CARRYING ONE PILOT,

ITEM	Weight (lb)	Arm (in)	Moment (lb in)
CREW			
Pilot (1)	170	-73·5	-12,495
ARMAMENT			
20 mm guns (2) and accessories	232	-44·9	-10,417
Ammunition (nil)			
Gyro gunsights (2)	16	-84·2	-1,347
Gyro gunsight recorder	2·2	-84·2	-185
Gun camera	3	-156·0	-468
RADIO			
VHF	27	-122·5	-3,308
Radio compass	35	-139·5	-4,883
OXYGEN			
Charge for bottles (4)	9·4	-126·5	-1,189
Emergency bottles (2)	8	-75·0	-600
MISCELLANEOUS			
Crowbar	1	-70·0	-70
Tank cap tool	1	-27·7	-28
First aid kit	3	-42·0	-126
FUEL (at 8 lb/gal)			
Fuselage tanks (96 gals)	768	-15·6	-11,981
Stub wing tanks (115 gals)	920	26·8	24,656
Leading edge tanks (57 gals)	456	-9·6	-4,378
No 3 tank (56 gals)	448	25·2	11,290
No 4 tank (51 gals)	408	25·2	10,282
Droppable tanks (200 gals)	1,600	9·5	15,200
Droppable tank installation	150	10·8	1,620
TOTAL REMOVABLE	5,258		
TARE WEIGHT	7,380	4·4	32,450
TOTALS	12,638	3·5	44,023

CG is 3·5 inches aft of the datum



C.G. LIMITS - FORWARD = - 3·24"
AFT + 4·4" (NORMAL)
+ 4·8" (FERRYING)

VAMPIRE MARKS 35 & 35A
LOADING AND CG DIAGRAM

A-1339G