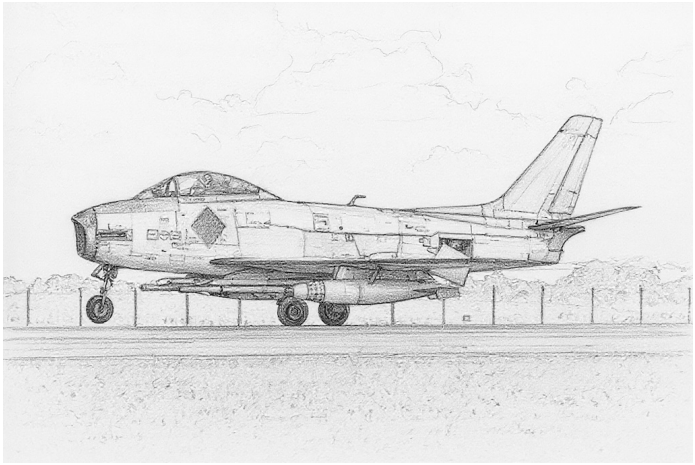
Chapter 1

Australian Aircraft

CAC Sabre



The Commonwealth Aircraft Corporation (CAC) Sabre is a day fighter and fighter-bomber derived from the North American F-86F Sabre with a lighter and more powerful Rolls-Royce Avon 20 engine replacing the General Electric J47 and two 30 mm ADEN cannons replacing the six .50 cal machine guns. Because of its engine, it is also known informally as the Avon Sabre.[1]

Versions

CAC Sabre Mk.30

The first version was the Mk.30. It had the early slatted wing from the A, E, and early F versions of the F-86.[2]

It served in the RAAF starting in 1954, replacing the Meteor F.8.

CAC Sabre Mk.31

The Mk.31 used the unslatted 6-3 wing from later F versions of the F-86, which gave better performance at higher speeds and altitudes, but was otherwise similar to the Mk.30. The Mk.31 was upgraded in 1960 with two additional weapon stations to allow it to carry missiles or bombs and fuel tanks simultaneously, like the Mk.32.[3]

The Mk.31 served in the RAAF from 1955 to 1971, when they were replaced by the Mirage III. All surviving Mk.30 aircraft were upgraded to the Mk.31 standard. The Mk.31 later served in the Malaysian and Indonesian air forces.

CAC Sabre Mk.32

The Mk.32 is a development of the Mk.31 with an Avon 26 engine, modifications to prevent surges when the guns were fired, and two additional weapon stations that allowed it to carry air-to-ground weapons and fuel tanks simultaneously, giving it a longer range when employed as a fighter-bomber. The Mk.32 competes with the Canadair Sabre 6 for the honor of being the very best day-fighter Sabre.[4]

The Mk.32 served in the RAAF from 1956 to 1971, when they were replaced by the Mirage III, and later in the Malaysian and Indonesian air forces.

Service

CAC Sabres served with the RAAF in the Malayan emergency, the Malaysian-Indonesian confrontation, and the Vietnam War in Thailand.

Armament and Stores

The CAC Sabres were armed with two 30 mm ADEN cannons each with 162 rounds.[5]

For additional endurance, all versions can carry 167 gallon (760L) fuel tanks on the outer station, and those with inner station can also carry 100 gallon (450L) on these.[6]

A typical air-to-air load would be two 167 gallon (760L) fuel tanks on the outer stations and, from 1960, two AIM-9Bs on the inner stations.

A typical air-to-ground load might be two 1000 lb bombs on the inner stations along with two 167 gallon tanks on the outer stations. Alternatively, the Mk.32 could carry twenty-four HVARs or Hispano Sura 80R rockets, with three carried one below the other on each of the eight rocket stations, but at the price of not being able to use external fuel tanks.[7]

For ferry flights, two 100 gallon (450L) fuel tanks could be carried on the inner stations and two 167 gallon (760L) fuel tanks to the outer ones.

In 1960, the RAAF adopted the AIM-9B IRM for both the Mk.31 and Mk.32.

ADCs

- CAC Sabre Mk.30
- CAC Sabre Mk.31
- CAC Sabre Mk.31 (1960 Upgrade)
- CAC Sabre Mk.32

See Also

- Canadair Sabre
- North American F-86 Sabre

Notes

1. **Sources.**
   - Curtis, “North American F-86 Sabre”, 2000, Crowood.
   - Farquhar, “A Brief History of the CAC Avon Sabre” (Wayback). Development and RAAF service.
   - Webster, “The F-86 Sabre Family Tree”, APJ 25. This has ADCs for the Mk.31 and Mk.32.
   - Wikipedia on the ADEN cannon.
   - Wikipedia on the CAC Sabre.
2. **Mk.30.** The ADC for the Mk.30 is derived from that for the Mk.31.

   Wing. Essentially, the Mk.30 is a Mk.31 with the earlier slatted wing (Curtis, Wikipedia). The Mk.31 has the unslatted 6-3 wing. This situation is similar to the F-86F, which also had versions with the early slatted and unslatted 6-3 wings. The minimum speeds and turn drags of the Mk.31 match those of the F-86F-25 with the unslatted 6-3 wing. Therefore, I have created an ADC for the Mk.30 by modifying that of the Mk.31 with the minimum speeds and turn drag of the F-86F-25 with the slatted wing. As the F-86A/E/F with the early slatted wing are HTD, I have made the Mk.30 HTD too.
3. **Mk.31.** The ADC for the Mk.31 is adapted from Webster’s in APJ 25.
4. **Mk.32.** The ADC for the Mk.32 is adapted from Webster’s in APJ 25.

   Fuel. Curtis states that the “wet wing” Mk.32s had an internal fuel capacity of 422 gallons (1899L) and with an additional 60 gallons (270L) in the wing leading edges. The additional fuel corresponds to about 23 fuel points.
5. **Guns.** Two 30 mm ADEN guns with 162 rounds per gun (Wikipedia). At 1200 rounds per minute, this is 4.0 shots.
6. **FTs.** Curtis (p. 114) states that the Mk.32 could carry 100 gallon (450L) and 167 gallon (760L) FTs (perhaps on the inner pylons). Farquhar states that the Mk.32 could carry 100 gallon FTs on the inner pylons and 167 gallon FTs on the outer ones. Wikipedia states they could carry 200 gallon (900L) FTs on the outer pylons, but this seems to be a confusion between US and Imperial gallons, since 167 Imperial gallons are about 200 US gallons. I am assuming the capacity of the outer station tanks is unchanged in these different versions.
7. **Load Limits.** Webster gives weight limits of 1000 lb for both the inner and outer stations. However, Farquhar states that the Mk.32 could carry a 200 US gallon (167 gallon) fuel tanks on the outer pylons, and these weigh about 1400 lb. Curtis also states that the Mk.32 could carry these tanks, but does not specify on which station.

   The early F-86s (A/E/F-1/F-10/F-15/F-20) have load limits of 1400 lb on their outer stations; the later F-86s have the same load limits on their outer stations and 1000 lb limits on the inner stations. I have adopted these limits.

   Wikipedia gives the load limits of the F-86F and Mk.32 as 5300 lb and states they can both carry two 1000 lb bombs and two 200 US gallon FTs, which would be a total of about 4800 lb. I have increased the total loads to 3000 lb for the Mk.30/31 and 5000 lb for the Mk.32.

   Farquhar states that eight or twenty-four HVARs could be carried.

Photo Credit

- CAC Sabre: Bidgee (CC BY-SA 3.0)

CAC Sabre Mk.30

Crew: Pilot

Power APs/DPs: ○

	CL	1/2	DT	Fuel
AB	—	—	—	—
M	1.5	1.5	1.0	1.0
N	0.0	0.0	0.0	0.5
I	1.0	1.0	2.0	0.0
SPBR	1.0	1.0	2.0	—

Cruise Spd. CL:	5.5	Restr. Arcs:	—
Climb Spd.:	3.5	Blind Arcs:	30–
Visibility:	5	Internal Fuel:	160
Size:	+0	AtA Refuel:	No
Vulnerability:	+0	Ejection Seat:	Std

Maneuver HFPs/DPs:

LR/DR	1.0	1.0
VR		0.0

Turn DPs:

	CL	1/2	DT
TT	0.0/0.0	1.0/1.0	1.0/1.0
HT	1.0/1.0	1.0/1.0	1.0/1.0
BT	1.0/2.0	2.0/3.0	2.0/3.0
ET	—	—	—

Automatic leading-edge slats. If speed ≤ 3.5, use higher drag.

Speeds and Ceilings

Alt. Band	Conf. Ceil.	CL 52	1/2 48	DT 42	Dive Speed
EH+	46+	3.0 – 6.0	3.0 – 5.0	—	6.5
VH	36–45	3.0 – 6.0	3.0 – 5.0	3.0 – 5.0	6.5
HI	26–35	2.5 – 6.0	3.0 – 5.5	3.0 – 5.0	7.0
MH	17–25	2.0 – 6.5	2.5 – 5.5	2.5 – 5.5	7.0
ML	8–16	1.5 – 6.5	2.0 – 6.0	2.5 – 5.5	7.5
LO	0–7	1.5 – 7.0	1.5 – 6.5	2.0 – 6.0	7.5

Climb Capabilities

CL AB	CL Oth	1/2 AB	1/2 Oth	DT AB	DT Oth	
—	0.5	—	0.5	—	—	EH+
—	1.0	—	1.0	—	0.5	VH
—	1.5	—	1.0	—	0.5	HI
—	1.5	—	1.5	—	1.0	MH
—	2.0	—	1.5	—	1.0	ML
—	2.0	—	2.0	—	1.5	LO

Radar:	APG-56
ECCM:	0
Arcs:	Limited
Search:	—
Track:	12–6
Lock-On:	6

ECM:	IFF
RWR:	—
DDS:	—
DJM:	—
AJM:	—
BJM:	—

Weapon Stations Diagram:

Guns:	Two 30 mm Aden
To Hit:	6/3/2
Ammunition:	4.0
Gunsight:	TT+0/HT+1/BT+2
Ranging:	RE
AtA/AtG:	6/6

Bomb System: Manual

Technology:

None

Load Point Limits: CL : 0–2; 1/2: 3–6; DT : 7+

Weight Limit: 3,000

Station	Limit	Allowed Loads
1 and 2	1,500	BB FT

Load Notes:

1. May use 167 gal (760L) FTs.

Notes:

1. The Commonwealth Aircraft Corporation (CAC) Sabre Mk.30 is a day fighter and fighter-bomber. It is also known as the Avon Sabre. The Mk.30 is derived from the North American F-86F Sabre, has the early slatted wing, and uses the more powerful and lighter Rolls-Royce Avon 20 engine instead of the General Electric J47.
2. High transonic drag (HTD).

VPs: 11/7/4/2

v2 0000000
0000-00-00T00:00:00

CAC Sabre Mk.31

Crew: Pilot

Power APs/DPs: ○

	CL	1/2	DT	Fuel
AB	—	—	—	—
M	1.5	1.5	1.0	1.0
N	0.0	0.0	0.0	0.5
I	1.0	1.0	2.0	0.0
SPBR	1.0	1.0	2.0	—

Cruise Spd. CL:	5.5	Restr. Arcs:	—
Climb Spd.:	3.5	Blind Arcs:	30–
Visibility:	5	Internal Fuel:	160
Size:	+0	AtA Refuel:	No
Vulnerability:	+0	Ejection Seat:	Std

Maneuver HFPs/DPs:

LR/DR	1.0	1.0
VR		0.0

Turn DPs:

	CL	1/2	DT
TT	0.0	1.0	1.0
HT	1.0	1.0	1.0
BT	2.0	3.0	3.0
ET	—	—	—

Speeds and Ceilings

Alt. Band	Conf. Ceil.	CL 52	1/2 48	DT 42	Dive Speed
EH+	46+	2.5 – 6.0	3.0 – 5.0	—	6.5
VH	36–45	2.5 – 6.0	2.5 – 5.0	3.0 – 5.0	6.5
HI	26–35	2.0 – 6.0	2.5 – 5.5	2.5 – 5.0	7.0
MH	17–25	2.0 – 6.5	2.5 – 5.5	2.5 – 5.5	7.0
ML	8–16	2.0 – 6.5	2.0 – 6.0	2.5 – 5.5	7.5
LO	0–7	1.5 – 7.0	1.5 – 6.5	2.0 – 6.0	7.5

Climb Capabilities

CL AB	CL Oth	1/2 AB	1/2 Oth	DT AB	DT Oth	
—	0.5	—	0.5	—	—	EH+
—	1.0	—	1.0	—	0.5	VH
—	1.5	—	1.0	—	0.5	HI
—	1.5	—	1.5	—	1.0	MH
—	2.0	—	1.5	—	1.0	ML
—	2.0	—	2.0	—	1.5	LO

Radar:	APG-56
ECCM:	0
Arcs:	Limited
Search:	—
Track:	12–6
Lock-On:	6

ECM:	IFF
RWR:	—
DDS:	—
DJM:	—
AJM:	—
BJM:	—

Weapon Stations Diagram:

Guns:	Two 30 mm Aden
To Hit:	6/3/2
Ammunition:	4.0
Gunsight:	TT+0/HT+1/BT+2
Ranging:	RE
AtA/AtG:	6/6

Bomb System: Manual

Technology:

None

Load Point Limits: CL : 0–2; 1/2: 3–6; DT : 7+

Weight Limit: 3,000

Station	Limit	Allowed Loads
1 and 2	1,500	BB FT

Load Notes:

1. May use 167 gal (760L) FTs.

Notes:

1. The Commonwealth Aircraft Corporation (CAC) Sabre Mk.31 is a day fighter and fighter-bomber derived from the F-86F Sabre. It is also known as the Avon Sabre. The Mk.31 a development of the Mk.30 and has the early slatted wing replaced by the unslatted 6-3 wing, but retains the Rolls-Royce Avon 20 engine. The original variant described here lacks IRMs, and has only two weapon stations.

VPs: 11/7/4/2

v2 0000000
0000-00-00T00:00:00

CAC Sabre Mk.31 (1960 Upgrade)

Crew: Pilot

Power APs/DPs: ○

	CL	1/2	DT	Fuel
AB	—	—	—	—
M	1.5	1.5	1.0	1.0
N	0.0	0.0	0.0	0.5
I	1.0	1.0	2.0	0.0
SPBR	1.0	1.0	2.0	—

Cruise Spd. CL:	5.5	Restr. Arcs:	—
Climb Spd.:	3.5	Blind Arcs:	30–
Visibility:	5	Internal Fuel:	160
Size:	+0	AtA Refuel:	No
Vulnerability:	+0	Ejection Seat:	Std

Maneuver HFPs/DPs:

LR/DR	1.0	1.0
VR		0.0

Turn DPs:

	CL	1/2	DT
TT	0.0	1.0	1.0
HT	1.0	1.0	1.0
BT	2.0	3.0	3.0
ET	—	—	—

Speeds and Ceilings

Alt. Band	Conf. Ceil.	CL 52	1/2 48	DT 42	Dive Speed
EH+	46+	2.5 – 6.0	3.0 – 5.0	—	6.5
VH	36–45	2.5 – 6.0	2.5 – 5.0	3.0 – 5.0	6.5
HI	26–35	2.0 – 6.0	2.5 – 5.5	2.5 – 5.0	7.0
MH	17–25	2.0 – 6.5	2.5 – 5.5	2.5 – 5.5	7.0
ML	8–16	2.0 – 6.5	2.0 – 6.0	2.5 – 5.5	7.5
LO	0–7	1.5 – 7.0	1.5 – 6.5	2.0 – 6.0	7.5

Climb Capabilities

CL AB	CL Oth	1/2 AB	1/2 Oth	DT AB	DT Oth	
—	0.5	—	0.5	—	—	EH+
—	1.0	—	1.0	—	0.5	VH
—	1.5	—	1.0	—	0.5	HI
—	1.5	—	1.5	—	1.0	MH
—	2.0	—	1.5	—	1.0	ML
—	2.0	—	2.0	—	1.5	LO

Radar:	APG-56
ECCM:	0
Arcs:	Limited
Search:	—
Track:	12–6
Lock-On:	6

ECM:	IFF
RWR:	—
DDS:	—
DJM:	—
AJM:	—
BJM:	—

Weapon Stations Diagram:

Guns:	Two 30 mm Aden
To Hit:	6/3/2
Ammunition:	4.0
Gunsight:	TT+0/HT+1/BT+2
Ranging:	RE
AtA/AtG:	6/6

Technology:

None

Bomb System: Manual

Load Point Limits: CL : 0–2; 1/2: 3–6; DT : 7+

Weight Limit: 5,000

Station	Limit	Allowed Loads
1 and 4	1,500	BB FT
2 and 3	1,000	BB FT IRM

Load Notes:

1. May use 167 gal (760L) FTs on stations 1 and 4 and 100 gal (450L) FTs on stations 2 and 3.
2. May use AIM-9B IRMs.

Notes:

1. The Commonwealth Aircraft Corporation (CAC) Sabre Mk.31 is a day fighter and fighter-bomber derived from the F-86F. It is also known as the Avon Sabre. The Mk.31 is a development of the Mk.30 and has the early slatted wing replaced by the unslatted 6-3 wing, but retains the Rolls-Royce Avon 20 engine. This 1960 upgrade variant is fitted with two additional weapon stations for IRMs or, when used as a fighter-bomber, bombs.

VPs: 11/7/4/2

v2 0000000
0000-00-00T00:00:00

CAC Sabre Mk.32

Crew: Pilot

Power APs/DPs: ○

	CL	1/2	DT	Fuel
AB	—	—	—	—
M	1.5	1.5	1.0	1.0
N	0.0	0.0	0.0	0.5
I	1.0	1.0	2.0	0.0
SPBR	1.0	1.0	2.0	—

Cruise Spd. CL:	5.5	Restr. Arcs:	—
Climb Spd.:	3.5	Blind Arcs:	30–
Visibility:	5	Internal Fuel:	183
Size:	+0	AtA Refuel:	No
Vulnerability:	+0	Ejection Seat:	Std

Maneuver HFPs/DPs:

LR/DR	1.0	1.0
VR		0.0

Turn DPs:

	CL	1/2	DT
TT	0.0	1.0	1.0
HT	1.0	1.0	1.0
BT	2.0	3.0	3.0
ET	—	—	—

Speeds and Ceilings

Alt. Band	Conf. Ceil.	CL 52	1/2 48	DT 42	Dive Speed
EH+	46+	2.5 – 6.0	3.0 – 5.0	—	6.5
VH	36–45	2.5 – 6.0	2.5 – 5.0	3.0 – 5.0	6.5
HI	26–35	2.0 – 6.0	2.5 – 5.5	2.5 – 5.0	7.0
MH	17–25	2.0 – 6.5	2.5 – 5.5	2.5 – 5.5	7.0
ML	8–16	2.0 – 6.5	2.0 – 6.0	2.5 – 5.5	7.5
LO	0–7	1.5 – 7.0	1.5 – 6.5	2.0 – 6.0	7.5

Climb Capabilities

CL AB	CL Oth	1/2 AB	1/2 Oth	DT AB	DT Oth	
—	0.5	—	0.5	—	—	EH+
—	1.0	—	1.0	—	0.5	VH
—	1.5	—	1.0	—	0.5	HI
—	1.5	—	1.5	—	1.0	MH
—	2.0	—	1.5	—	1.0	ML
—	2.0	—	2.0	—	1.5	LO

Radar:	APG-56
ECCM:	0
Arcs:	Limited
Search:	—
Track:	12–6
Lock-On:	6

ECM:	IFF
RWR:	—
DDS:	—
DJM:	—
AJM:	—
BJM:	—

Weapon Stations Diagram:

Guns:	Two 30 mm Aden
To Hit:	6/3/2
Ammunition:	4.0
Gunsight:	TT+0/HT+1/BT+2
Ranging:	RE
AtA/AtG:	6/6

Bomb System: Manual

Technology:

None

Load Point Limits: CL : 0–2; 1/2: 3–6; DT : 7+

Weight Limit: 5,000

Station	Limit	Allowed Loads
1 and 4	1,500	BB FT
2 and 3	1,000	BB FT IRM
5–8 and 9–12	280	RK

Load Notes:

1. Either stations 1 to 4 or stations 5 to 12 can be used.
2. May use 167 gal (760L) FTs on stations 1 and 4 and 100 gal (450L) FTs on stations 2 and 3.
3. From 1960, may use AIM-9B IRMs.
4. From 1962, stations 5 to 12 may each carry three SURA 80R RKs.

Notes:

1. The Commonwealth Aircraft Corporation (CAC) Sabre Mk.32 is a day fighter and fighter-bomber. It is also known as the Avon Sabre. The Mk.32 a development of the Mk.31 and has more powerful Rolls-Royce Avon 26 engine in place of the the Avon 20 engine, but retains the unslatted 6-3 wing.

VPs: 12/8/4/2

v2 0000000
0000-00-00T00:00:00