

A36 & G36 POH/AFM Performance Correction Notes

An ABS Air Safety Foundation report



AIR SAFETY FOUNDATION

ABS has requested an answer from Hawker Beechcraft several times over the past few years: We have a question about the Performance section of the G36 and the 2002 revision to the A36 E-2111+ Pilot's Operating Handbooks. Each has a two-page "Required Corrections to Performance Graphs and Tables" section (see photos). When applied to results of performance calculations using the POH charts, these corrections at times significantly reduce the resulting performance expectation. None of the other Bonanza/Baron POHs include this type of information.

The POH's at least imply these corrections are required to compensate for nonstandard atmospheric conditions above sea level. Our confusion stems from the fact the performance charts and tables already include compensation for other than standard atmospheric conditions. The applicability section of the A36 version suggests it may result from power losses if the fuel injection system has been set up in accordance with current Continental Motors specifications and/or removal of the altitude compensating fuel pump from an A36 so equipped when new.

Why is it necessary to apply these additional, significant correction values

to the POH charts and tables? Is there a reason these corrections apply only to the post-1984 A36s and G36s, but not other models or the twin-engine airplanes? Is our speculation correct, that manual leaning does not provide the precise mixture control necessary to obtain charted performance, and/or that current TCM fuel flow recommendations result in less power than that assumed by the POH performance charts? If so, why would there also be an impact on cruise performance?

We look forward to learning from you, so we can teach these concepts properly and support the safe operation of Hawker Beechcraft airplanes.

A36

Raytheon Aircraft

Beech Bonanza A36 Section V

Except as noted, all airspeeds quoted in this section are indicated airspeeds (IAS) and assume zero instrument error.

INTRODUCTION TO PERFORMANCE

REQUIRED CORRECTIONS TO PERFORMANCE GRAPHS AND TABLES

- For the airplanes specified below, the performance obtained from the following graphs must be adjusted by the specified percentage or fixed amount at all altitudes above sea level. The resulting performance is approximate and will vary with airspeed, temperature, and other ambient conditions.
 - E-3100 and after, and-
 - Prior airplanes in compliance with S. B. 28-3052, or
 - Prior airplanes in compliance with TCM SID 97-3, or
 - Prior airplanes incorporating kit 36-9015 with s/n's 135 and after.

TAKE-OFF DISTANCE - FLAPS UP
TAKE-OFF DISTANCE - FLAPS APPROACH
-Increase Distance by 6%

CLIMB
-Decrease Rate-of-Climb by 75 FT/MIN

TIME, FUEL, AND DISTANCE TO CRUISE CLIMB
-Increase Time to Climb by 8%

RANGE PROFILES and ENDURANCE PROFILES

-Decrease Range and Endurance by:

SL to 4000 ft	0.5%
4000 to 8000 ft	1.0%

March, 2003

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Beech Bonanza A36 Section V

Raytheon Aircraft

8000 to 12,000 ft	2.0%
12,000 to 16,000 ft	4.0%

- After the previous corrections have been made, the following additional corrections must be made for all airplanes when the ambient temperature exceeds that for a standard (ISA) day. Linearly interpolate to obtain corrections for other ambient temperatures between ISA and ISA + 30°C.

GRAPHS/TABLES	ISA + 10°C	ISA + 20°C	ISA + 30°C
TAKE-OFF DISTANCE - FLAPS UP			
TAKE-OFF DISTANCE - FLAPS APPROACH			
Increase Take-Off Distance by:	8%	15%	23%
CLIMB			
Decrease Rate-of-Climb by:	90 fpm	180 fpm	270 fpm
TIME, FUEL, AND DISTANCE TO CRUISE CLIMB			
Increase Time to Climb by:	15%	30%	45%
CRUISE POWER SETTINGS			
Decrease cruise speeds by:	4 KIAS	7 KIAS	11 KIAS

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November, 2002

We now have an answer from Hawker Beechcraft: The "Required Corrections to Performance Graphs and Tables" result from two separate but similar performance issues.

The Note 1 corrections were required due to the replacement of TCM's engine-driven, altitude compensating fuel pump with a non-altitude compensating fuel pump. The richer mixture that results in the FULL RICH position accounts for the performance decrements given for the Take-Off Distance, Climb and Time, Fuel and Distance data. I'm not sure why the Range and Endurance Profile data were corrected since they're based on peak EGT rather than fuel flow, but the corrections are conservative.


The Note 2 corrections were required due to observed versus calcu-

lated performance issues raised by Production Flight Test for the A36 during QAI flight tests at higher than ISA conditions. QAI flight data for a number of A36 airplanes were used to develop the Note 2 corrections. As noted in Revision C of the A36 POH/AFM Performance Substantiation report, the root cause was not isolated (engine power table errors are suspected), but the effects were determined.

The G36 POH/AFM Performance section is the same as the A36 POH/AFM Performance section, so the A36 POH/AFM performance corrections were carried over into the G36 POH/AFM. The A36 changes date from March 2003, although the changes to the A36 Performance Substantiation report date from June 1997.

The practice of stacking corrections on top of corrections for aircraft

performance is considered undesirable by the Aircraft Performance engineers. The decision to use correction notes in lieu of new or revised performance charts and tables is a business decision made by the project engineer or program manager. Aircraft Performance would prefer new or revised charts over the correction notes.

Thank you to Hawker Beechcraft for clarifying these notes. Pilots of all IO-550-equipped airplanes without altitude compensating fuel pumps should consider Hawker Beechcraft's prediction of performance loss. This may also have implications for airplanes whose owners have followed the common practice of adjusting fuel flows to even higher values for cooling purposes. 

G36

Raytheon Aircraft Company
Model G36

Section 5
Performance

Except as noted, all airspeeds quoted in this section are indicated airspeeds (IAS) and assume zero instrument error.

INTRODUCTION TO PERFORMANCE

REQUIRED CORRECTIONS TO PERFORMANCE GRAPHS AND TABLES

1. The performance obtained from the following graphs must be adjusted by the specified percentage or fixed amount at all altitudes above sea level. The resulting performance is approximate and will vary with airspeed, temperature, and other ambient conditions.

TAKE-OFF DISTANCE - FLAPS UP

TAKE-OFF DISTANCE - FLAPS APPROACH

-Increase Distance by 6%

CLIMB

-Decrease Rate-of-Climb by 75 FT/MIN

TIME, FUEL, AND DISTANCE TO CRUISE CLIMB

-Increase Time to Climb by 8%

RANGE PROFILES and ENDURANCE PROFILES

-Decrease Range and Endurance by:

SL to 4000 ft	0.5%
4000 to 8000 ft.	1.0%
8000 to 12,000 ft	2.0%
12,000 to 16,000 ft.	4.0%

2. After the previous corrections have been made, the following additional corrections must be made for all airplanes when the ambient temperature exceeds that for a standard (ISA) day. Linearly interpolate to obtain corrections for other ambient temperatures between ISA and ISA + 30°C.

October, 2005

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Section 5
Performance

Raytheon Aircraft Company
Model G36

GRAPHS/TABLES	ISA + 10°C	ISA + 20°C	ISA + 30°C
TAKE-OFF DISTANCE - FLAPS UP			
TAKE-OFF DISTANCE - FLAPS APPROACH			
Increase Take-Off Distance by:	8%	15%	23%
CLIMB			
Decrease Rate-of-Climb by:	90 fpm	180 fpm	270 fpm
TIME, FUEL, AND DISTANCE TO CRUISE CLIMB			
Increase Time to Climb by:	15%	30%	45%
CRUISE POWER SETTINGS			
Decrease cruise speeds by:	4 KIAS	7 KIAS	11 KIAS

3. Using the power settings given in this section, with the air conditioner in operation, range and airspeed will decrease by approximately 5% due to the extension of the condenser to the flight extension position. This is to be taken into consideration during flight planning.

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October, 2005