

CHECK FLIGHT CERTIFICATE



SIKORSKY S76B

CFS 261 Issue 1

Date:	Crew:	Observer:	Registration:
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Performance	Climb #1	Climb #2	
Average Weight			
Average Altitude			ft
Average Temp.			°C
Speed			KIAS
Achieved Rate			fpm
Scheduled Rate			fpm
Margin			fpm
Permitted Margin	-20	-20	fpm

Airfield:
Start Weight Kg/Lbs*:
Takeoff cg:
Performance: SATIS/UNSATIS/NOT APPLICABLE* <i>(delete as applicable)*</i>

Defects

No.	Defect	-/R/FT	Action?

(use a continuation sheet as necessary)

Conclusions/Comments

I CERTIFY that I have tested the above aircraft and have detailed the deficiencies and unsatisfactory features above. Those items annotated R or FT must be dealt with as shown in the notes on the reverse side.

Name:	Signed:	Date:	Licence No.:
For CAA Use only	Report Logged by:	Date:	Report No.:

NOTES

General

Only CAA personnel or pilots specifically briefed to carry out CAA check flights may conduct the test.

General notes on test conduct can be found in the CAA Check Flight Handbook.

This sheet replaces any check flight certificate given in the schedule.

Registration: If the aircraft is not on the UK register, add the manufacturers serial number and expected UK registration (if known).

Crew: Captain, Co-Pilot, Flight Engineer (where applicable).

Airfield: Departure airfield.

Start Weight: Actual all up weight at first engine start. Also delete Kg or Lbs as appropriate.

Takeoff cg: Actual cg at lift-off, preferably as a % of the Mean Aerodynamic Chord.

Performance

A full description of climb analysis is given in the CAA Check Flight Handbook.

Climb#1/Climb#2: Enter in these columns data from the first and second climbs.

Average Weight: The aircraft all up weight at the midpoint of the measured climb.

Average Altitude: The altitude at which the line drawn to average the measured points passes through at the mid time.

Average Temp: The temperature at which the line drawn to average the measured points passes through at the mid time.

Speed: The target climb speed (Indicated Airspeed.)

Achieved Rate: The climb rate as given by the slope of the line drawn to average the measured altitude points in feet per minute.

Scheduled Rate: The expected gross rate of climb read from the appropriate graph in the Flight Manual with any adjustments for configuration differences. For large aircraft, the basic gross data are normally to be found in a separate supplement labelled 'Additional Flight Test Data'.

Margin: The difference between the Scheduled and Achieved rates of climb (negative if achieved is lower than scheduled).

Defects

Enter all defects from the flight. All defects must also be entered in the Technical Log. Procedural items entered in the Technical Log (such as re-stowing oxygen masks) need not be entered here. Items affecting flight safety which were known before the flight, whether or not they were deferred should be entered. In the latter case, the defect should be annotated accordingly after the details.

No.: The first column is to allow the items to be numbered.

Defect: Enter details of the defect.

-/R/FT: Classify each defect according to its impact on safety, regardless of whether it can be deferred according to the MEL. Any deferrals should be dealt with in the normal way in the Technical Log. Items requiring rectification (or deferral under the MEL) before further flight for hire or reward or before the issue of the CofA should be marked 'R'. Additionally, items that require re-checking in-flight following rectification (such as inadequate climb performance) should be marked 'FT'. Items requiring both should be marked 'R/FT'.

Action?: This column should be left blank unless further information is required from the engineers or the item is considered to be of sufficient import that CAA action is considered necessary, then the person/department/agency from whom further action is required should be noted in this column. Annotate accordingly if an MOR or similar report is to be raised.

Conclusions/Comments

Any conclusions, notes or comments useful for tracking defects may be entered.

Name: Only the pilot who carried out the test may sign this sheet.

CAA Check Flight Schedules

All CAA Check Flight Schedules (CFSs) are prepared based on a design standard which, before September 2003, was the UK Type Certificate. Following the creation of EASA there may be different design standards in service within the European Union (EU) - this may include modifications approved in any EU country.

It is the responsibility of the flight crew to ensure that the exercises and limitations in the CFS are correct for the aircraft under test.

The prime source of information will be the aircraft flight manual and in the event of conflict the flight manual should be taken as overriding.

CAA policy is that pilots who conduct check flights on behalf of the Authority must be acceptable to the Authority, must have been briefed on techniques and safety considerations before carrying out the tests in these schedules and must have carried out a check flight within the last 4 years.

The CAA does not accept responsibility for the use of a CAA CFS on a test flight not directly under their control.

CHECK FLIGHT SCHEDULE



**SIKORSKY S76B
PRATT AND WHITNEY PT6B-36A/B ENGINES**

CFS 261 Issue 1

Registration	
Flight Date	

1. INTRODUCTION

This schedule is applicable only to the Sikorsky S76B Helicopter with PT6B-36A/B engines. It is based on the assumption that the every day operation of the helicopter serves as a continuous check on the functioning of all normal services.

The Check Flight must be carried out by an experienced pilot acceptable to the Airworthiness Division of the CAA in accordance with this schedule and the general guidance given in the CAA Check Flight Handbook. The crew are expected generally to monitor the behaviour of all equipment and report any unserviceable items. In addition to completing all the tests in this schedule any characteristics which are considered to be unsafe or undesirable must be recorded.

The minimum crew for this flight is to be increased by a flight observer.

WARNING

1. It is illegal to carry passengers on a test flight made under "A" or "B" conditions except passengers performing duties in the aircraft in connection with the flight. Although it may be legal to carry passengers on a test flight with a Certification of Airworthiness in force it is strongly recommended, for Check Flights and other tests entailing greater risk than normal flight, that:
 - 1) It is preferable to use ballast, and
 - 2) Before accepting any passengers on a test flight the pilot in command should inform them that the risk is greater than on an ordinary flight.
2. Under no circumstances are the limitations contained in the CAA approved Flight Manual to be exceeded.
3. If a clipboard or kneeboard is used to record the results there is a possibility of fouling the controls especially the duals, if fitted. To reduce this possibility, the pilot must have briefed the observer on the need to ensure that the clipboard is well clear of the controls especially during manoeuvres requiring large control deflections such as low speed envelope and autorotation. The pilot should monitor the position of the clipboard during the flight to ensure that it is not in a potentially hazardous position. Whenever possible, flexible, rather than rigid, clipboards should be used.

Should there be any query about the Check Flight or its results, the local CAA Surveyor or the Helicopter Flight Test Section at Airworthiness Division, Flight Department, Aviation House, Gatwick, must be consulted.

It is permissible for this Schedule to be completed on separate flights and dates provided the loading for each flight is clearly stated. All defects from all flights must be recorded on the Check Flight Certificate even if rectification work has been carried out between flights.

It is recommended that the tests are made in the sequence given. The results are to be written in ink in the spaces provided.

Operator/Maintenance Organisation		Registration	
Aerodrome		Flight Date	
		Pilot	
		Co-pilot	
		Observer	
Weather			
Aerodrome altitude		QFE/QNH	
Wind velocity/direction		Ground Temp	
Take-off time(s)		Landing Time(s)	

2. LOADING

The aircraft is to be loaded to a weight limit of 11,700 or to the highest AUW as is practicable. A lower weight to comply with the Operator's company policy is also permitted. The CG should be approximately in the neutral position.

NOTE: The autorotation RPM check has to be carried out at a low weight (approximately 9000 lbs) in order to stay within the power off limits. To facilitate this it is permissible to carry out paragraph 18 on a separate flight/date and without an observer if desired.

Take-off weight (actual)	
Fuel contents	
C.G. position	

3. PRE-FLIGHT INFORMATION

Aircraft Serial No.	
Total airframe hours	

	No.1	No.2
Engine Serial No.		
Hours run since new		
Hours run since overhaul		

4. **PRE-FLIGHT CHECKS**

- 4.1 Carry out the normal external inspection (check pitot and static heat, see 4.3 below)
- Doors and transparencies: Condition and Operation
- Seats and harnesses
- Placarding: Legibility and accuracy
- Instruments: Legibility and accuracy of:
- colour bands
- markings
General condition:
- Check altimeters within ± 50 ft for the same pressure setting.
- Adjust pedals to full aft position. Alternatively press pedals rapidly to determine if adjusters slip on either side.
- CWP and warning lights: all bulbs working, markings clearly visible.

4.2 External Power/DC Primary Busses

- a) With battery switch(es)-ON, external DC power connected and - OFF, check that the BUS TIE OPEN caution light is - ON. For aircraft fitted with the optional dual inverter system (except Sperry Helipilot installations) it should be possible to switch an inverter ON. Switch inverter(s) off.
- b) Place the EXT POWER switch-ON. The BUS TIE OPEN caution light should go off and the BATT OFF (and AUX BATT OFF on dual battery installations) caution light(s) should go on.

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4.3 Pitot heat:-

- a) With the battery switch ON and external DC power on, pull the PLT PITOT HTR PWR and CPLT PITOT HTR PWR circuit breakers. Turn the pilot and co-pilot heat switches ON. PLT PITOT HTR and CPLT PITOT HTR caution lights should be ON.
- b) Reset the circuit breakers. PLT and CPLT PITOT HTR caution lights should go out. Check the pitot tubes. They should be warm. Also check heated static vents on Sperry DAFCS equipped aircraft. WARNING: The pitot tubes may get very hot.
- c) Turn pilot and co pilot pitot heat OFF

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4.4 Engine Failure Warning System

a) #1 and #2 ENG OUT warning lights - ON.

b) Engine out ground test switch (side of console) - hold at TEST. Alternating tone will be heard. To reset tone, press #1 then #2 ENG OUT light on pilot's side.
Warning lights will remain on. (If capsules have been previously pressed, no tone will be heard). If tone resets when only one capsule has been pressed this indicates a fault.

c) Cycle battery and external power off and on to reset engine failure warning system

d) Repeat check using #2 then #1 ENG OUT light on pilot's side to reset tone.

PILOT

#1/#2	#2/#1

e) Repeat on co-pilot's side.

CO-PILOT

#1/#2	#2/#1

4.5 Fire Extinguisher System

a) FIRE-TEST-EXT switch - OPEN. Red WARN light - ON.

b) Pull both T-handles back 1 inch.

c) FIRE EXT switch - MAIN, then RESERVE. Check that green TEST light goes - ON in each position. Release switch.

d) FIRE-TEST-EXT switch - SHORT. Red WARN light and green TEST light - ON.

e) FIRE EXT switch - MAIN, then RESERVE. Check that green TEST light stays - ON in each position.

f) Both T-handles - Full Forward.

g) FIRE-TEST-EXT switch - NORM

h) Check red WARN light and green TEST light - OFF

4.6 Fire Detector System

EXT power ON

a) Fire detector test switch - FWD. FIRE warning lights and T-handle lights should light and continuous tone should be heard.

b) Press #1 then #2 FIRE warning light capsules to reset tone. If tone resets when only one capsule has been pressed this indicates a fault.

#1/#2

c) Repeat a) to b) with fire detector test switch - AFT/BAG, resetting as required. Press capsules in order shown.

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#2/#1

d) Repeat on co-pilot's side.

i) FWD

#1/#2

ii) AFT/BAG

#2/#1

4.7 Flotation System Test

Perform if not carried out on a regular basis operational.

Before carrying out the Flight Manual check the serviceability of the test switch must be determined as follows:

a) With external power connected, pull out all 6 float circuit breakers, 2 float control and 4 float power, put test switch to 'TEST' position. No lights should indicate.

b) Reset and pull each POWER CB in turn, as each one is reset, the float test red light should illuminate. If any float POWER CB fails to illuminate the red light, discontinue the testing and investigate.

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c) If each float POWER CB correctly lights the red test light in turn, when reset, with the others pulled, then the test switch is serviceable.

d) Reset CB's. (Leave switch in 'TEST' position) Carry out Flight Manual checks (Part 1, Section II).

Reset 'TEST' switch to NORM.

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4.8 Fuel Levers:

Move No.1 and No.2 fuel levers to OFF, DIR, PRIME, and XFEED. Check for binding, detents, and alignment with markings.

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4.9 Engine Levers/T-Handles

- a) Move the No.1 engine lever from OFF to FLY and check that a positive stop is achieved at the FLY position. Press the trigger and move the engine lever to the full forward (MANUAL) position. Move the engine lever aft and check for a positive stop at the IDLE/START position. Press the trigger and move the engine lever to OFF. The engine lever should move freely throughout its entire range. Repeat check with the No.2 engine lever.

- b) FIRE-TEST – EXT Switch - OPEN

Place the engine levers in the FLY position and fuel levers in CROSSFEED. Pull each fire T-handle fully back. There should be no evidence of binding and all levers must reach their OFF position. Reset the T-handles.

FIRE-TEST-EXT Switch-NORM, Lights OFF

4.10 Rotor Brake

Apply the rotor brake. Check rotor brake pressure from 200 to 300 psi and the ROTOR BRAKE caution light on. Also check the pressure relief valve by attempting to pump the pressure above 300 psi. Release the rotor brake. Check rotor brake pressure at zero and the ROTOR BRAKE caution light off.

4.11 Engine Starters

- a) Set these conditions:

No.1 and No.2 engine levers - IDLE/START
 No.1 and No.2 Fuel levers - OFF
 ROTOR BRAKE - ON
 MASTER START switch - OFF

- b) Press the No.1 engine starter button. The No.1 engine starter should not engage. Repeat check for No.2 eng.

Reset engine levers to OFF.

4.12 PLA and CLP rigging

- a) With engine lever OFF, check 200 series maintenance codes on T5 indicator. Value should be less than 203.
 b) With engine lever in IDLE, codes should be 215; +2. -4
 c) With engine lever in FLY, codes should be 255 ± 3.
 d) With collective full down, check 500 series codes. Value should be less than or equal to 503.

ENG 1	
CH A	CH B

ENG 2	
A	B

Re-configure engine and fuel levers.

Satisfactory completion of pre-start checks.

5. **ENGINE START/ROTOR ENGAGEMENT**

Rotor brake should be ON for both starts

Satisfactory control of T5 during automatic start

ROTOR ENGAGEMENT

Hydraulic power (approx. 3000 psi) available before 10% NR.

Fuel totaliser set (if fitted)

Eng 1	Eng 2

No 1	No 2

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6. **POST START CHECKS**

6.1 Engine Maintenance Test

Hold the No.1 engine maintenance test switch in Channel A for at least 10 seconds and note an "0" is displayed in the No. 1 T5 digital display.

Repeat check holding this switch in Channel B.

Repeat check on Channels A and B with the No.2 engine maintenance test switch.

CH A	CH B

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6.2 Servo Interlock Check

At 65% to 70% NR place pilot's SERVO switch to No.1 OFF, co-pilot's NO.2 OFF. #1 SERVO SYSTEM caution light should remain ON, no transfer should occur. Re-centre co-pilot's switch, and place pilot's in NO.2 OFF. #2 SERVO SYSTEM caution light should go ON. Place co-pilot's SERVO switch to NO.1 OFF. No transfer should occur. Re-centre co-pilot's switch.

Repeat check with co-pilot's switch leading.

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6.3 Torque/T5 Matching

a) Select TORQUE with Nr at 107% flat pitch. Check engine torques remain matched within 2%.

b) Select T₅. Check engine temperatures match with a five degree maximum difference within 10 seconds.

c) Select TORQUE.

6.4 EAPS

a) EAPS switch - ON. Immediately pull out No.1 ENG EAPS circuit breaker on DC essential panel circuit breaker panel. Check:

b) #1 EAPS FAIL caution light should go on about 10 to 15 seconds after pulling circuit breaker.

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- c) Push in No.1 ENG EAPS circuit breaker, EAPS switch OFF.
- d) Repeat with No.2 EAPS.

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Reset circuit breaker.

Satisfactory completion of pre-taxy checks.

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7. TAXIING CHECKS

Taxy time

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- 7.1 Satisfactory operation of parking brake.

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- 7.2 During taxi, depress both pilots' brakes and ensure that the aircraft comes to a smooth controlled stop with no indication of binding or swerving.

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Repeat this check using the co-pilots' brakes.

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Turns:

Perform a ground taxi turn to the right by depressing the right pedal. Increase to a tight turn.

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There should be no indications of binding in the pedals. (Do not depress the brakes during this check).

Repeat the check in a ground taxi turn to the left.

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8. POWER ASSURANCE CHECK

Carry out power assurance checks IAW Flight Manual, Part 1, Section IV.

ENG	PRESS ALT	OAT	EAPS	TORQUE	T5 OBS	N1 OBS	NR
1							
2							

PLACARD		ADJUSTED	
T5	N1	T5	N1

(-36B engine based on T5 only)

LIMIT		MARGIN	
T5	N1	T5	N1

(Margins to be recorded in Post Flight Action, Section 21).

9. HOVER CHECKS

- 9.1 In torque match mode establish a low hover and check torques matched within 2%.

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(If ambient conditions necessitate T₅ mode note T₅ match).

Take-off time.

9.2 While in a stable hover, turn off collective trim. Add left pedal, collective should not drop. Add right pedal, collective should not climb.

Reset collective trim ON.

10. LOW SPEED ENVELOPE

10.1 AFCS engaged. See Appendix 1 for test method. Assess the vibration level, control response and position (adequate control margin) during the following manoeuvres. The tests should be flown at the Flight Manual sideways/rearwards airspeed limits (35 knots up to 8500 ft DA) unless this would result in a groundspeed in excess of 20 kts.

Do not exceed 20 kt estimated groundspeed.

- a) Turns on the spot.
- b) Sideways flight left and right
- c) Rearwards flight

10.2 Disengage AFCS and carry out gentle hover manoeuvres (it is not necessary to fly sideways/rearwards up to the speeds flown in b) and c) above).

Re-engage AFCS, note smooth re-engagement

10.3 Hover Augmentation Mode (if equipped).

Check collective trim is ON.

Check correct operation of hover augmentation mode and radio altimeter hold.

Manoeuvre the helicopter using the 4-way cyclic switch.

11. SINGLE ENGINE CLIMB PERFORMANCE

Carry out a climb on each engine in turn for 4 minutes on a straight course. Climbs should be carried out in stable, non turbulent conditions away from cloud. Do not start to record until established in the climb on condition.

Associated Conditions

- Altimeter - set to 1013 mb
- Landing gear - retracted.
- Speed - V_{BROC} (74 KIAS - 1 knot per 1000 ft PA)
- All air bleeds - off
- EAPS - off
- Off line engine- zero torque, positive N_2 split
- Engine power - FAA maximum continuous (Single Engine) (see Note 3)
- Torque 100%
- N_1 100%
- T_5 776°C
- N_R 107%

NOTE 1: Torque/engine parameters not to exceed values shown above during climb.

NOTE 2: The climb performance must be analysed and compared with the scheduled performance, see Section 21.1 of this Schedule.

NOTE 3: Use of torque above 100% is not permitted by the Flight Manual except for emergency conditions. Therefore climb performance at CAA intermediate contingency power cannot be carried out. OEI climb performance data exists for the FAA maximum continuous (single engine) rating which is within the permitted torque/T₅ limits and is used as the basis for the Airworthiness Flight Test climbs.

This rating is solely for flight test purposes and must not be confused with the power levels used for the Group A procedures in the CAA Flight Manual.

11.1 Single Engine Climb Performance

ENGINE No 1

Conditions

Torque 100%
 N₁ 100%
 T₅ 776°C
 N_R 107%

Time	Alt	OAT	IAS	Torque	N ₁	T ₅	N _R	Engine Oil Temp Press	Fuel Flow	Fuel
0										
0.30										
1.00										
1.30										
2.00										
2.30										
3.00										
3.30										
4.00										

After the climb, obtain an accurate OAT by flying at approximately mid-climb altitude at V_{broc} in level flight for 1 min. to allow OAT to stabilise

Alt	
OAT	

11.2 Single Engine Climb Performance

ENGINE No 2

Conditions

Torque 100%

N₁ 100%

T₅ 776°C

N_R 107%

Time	Alt	OAT	IAS	Torque	N ₁	T ₅	N _R	Engine Oil Temp Press		Fuel Flow	Fuel
0											
0.30											
1.00											
1.30											
2.00											
2.30											
3.00											
3.30											
4.00											

After the climb, obtain an accurate OAT by flying at approximately mid-climb altitude at V_{broc} in level flight for 1 min. to allow OAT to stabilise

Alt	
OAT	

12. **AUTOROTATION HANDLING**

See Paragraph 18 for measurement of rotor rpm in autorotation.

Carry out a gentle entry to autorotation at 75 kts.

Check handling/vibration levels in turns left and right to 30° AOB in autorotation.

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13. **ENGINE RESPONSE/LIMIT CHECKS**

13.1 Single Engine

While in level flight at 80 KIAS, slowly retard the No.2 engine lever to IDLE. Check that the No.1 engine

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N_2/N_r initially decreases to about 104% but increases to about 107% when the No.2 engine lever nears IDLE. Intervene by reducing collective if #1 engine reaches transient dual engine torque limit (105% for 10 sec). Both ENG OUT lights should remain extinguished.

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Advance the No.2 engine lever to FLY. Repeat check for the No.2 engine.

(Note. This check can be carried out in conjunction with the climb performance if desired).

13.2 Dual Engine

At 80 KIAS increase collective gradually to 816° T_5 , 100% N_1 , or 101% torque, whichever occurs first.

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Droop the rotor 2% with collective and check for constant engine parameters. Depending upon ambients, expect to encounter torque limiting at lower altitudes, T_5 limits at intermediate altitudes, and N_1 limits at higher altitudes. (Note transient torque of 105% is permitted for 10 sec).

13.3 Rapid Engine Acceleration

Match torques at 70% and note approximate collective position. With engine levers in FLY position in a stabilised descent at approximately 75 KIAS with approximately 5% torque set (do **not** re-match), increase collective to give about 70% torque in 2 to 3 seconds.

Check there is no tendency for surge and satisfactory engine response.

Note 1

Care must be taken not to increase collective too quickly; carry out practice collective pulls at a slow rate first and progressively increase rate. Increase collective to the approximate position noted at 70% matched torques.

Note 2 : Do not reduce below N_R limit (91%)

Engine response/surge

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Transient NR droop %

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14. **HANDLING CHECKS**

Ensure Landing Gear Up.

14.1 Cruise

14.1.1 At normal cruise power note the following in stabilised conditions:

	PRESS ALT	IAS	OAT	ENGINE	N1	T5	TORQUE
PILOT				1			
CO-PILOT				2			
STANDBY							

FUEL WEIGHT VIBRATION LEVEL

If the aircraft is fitted with the optional alternate static system, check that the altimeter error at 120 KIAS is in accordance with the FM supplement (window closed).

If vibration level is high, note frequency and axis.

Altimeters. Check for proper operation and agreement.
e.g. no excessive lag, smooth movement.

ASI's should agree to within ± 5 knots.

Check VSI's for correct operation.

14.1.2 At normal cruise power carry out turns left and right (30° AOB). Note control response and vibration level.

14.2 Maximum Speed ***Ensure Landing Gear Up.***

Determine Vne from placard before next test.

Without exceeding placarded VNE apply maximum continuous power and stabilise at maximum obtainable speed in level flight.

Vibration level.

If vibration level is high, note frequency and axis.

At Vne carry out gentle turns (up to 20° AOB) left and right.

Note:-

Vibration level.

Control response.

15 AFCS CHECKS

The following checks are for Sperry DAFCS equipped aircraft. If Phase II/III or Sperry Helipilot is fitted use appendix 2 or 3 after completing 15.1 to 15.4.

- 15.1 Trim out at approximately 135 kts. Record any bias in any one trim axis that makes it difficult to fly hands off.

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- 15.2 At approximately 120 KIAS with both channels engaged check the aircraft returns to its original attitude, with a maximum of one slight overshoot, after the following disturbances:-

Note: Phase III equipped aircraft automatically engage airspeed hold when the cyclic is moved against longitudinal trim force, this can result in a significant overshoot of attitude datum as the autopilot regains original airspeed. To avoid this, select cyclic trim from AUTO to ON.

i) Pitch

- a) Without re-trimming alter pitch attitude by 5° nose up in less than 2 seconds then release cyclic. (Note this is a 5° change of attitude not 5° nose up absolute).

- b) Repeat nose down.

ii) Roll

- a) Alter roll attitude by 10° left in less than 2 seconds then release cyclic.

- b) Repeat 10° right.

iii) Yaw

Note satisfactory yaw channel functioning during i) and ii).

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15.3 Repeat 15.2 with only one channel engaged.

i) Pitch Channel 1

a) 5° nose up.

b) 5° nose down

ii) Roll Channel 1

a) 10° left

b) 10° right

iii) Yaw Channel 1

Note satisfactory functioning.

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i) Pitch Channel 2

a) 5° nose up.

b) 5° nose down

ii) Roll Channel 2

a) 10° left

b) 10° right

iii) Yaw Channel 2

Note satisfactory functioning.

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Re-engage Channel 1

15.4 During the flight test check that when making 30° bank turns without using the trim release or cyclic trimmer, the fly through capability is retained (control forces do not continue to increase during the manoeuvre).

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15.5 ALTITUDE HOLD (2 CUE MODE)

i) At a normal cruise speed check altitude is held ± 50 ft.

ii) With heading hold also engaged gently reduce torque by about 20%. Check altitude is held within 100 ft of datum and then returning to datum ± 50 ft

iii) a) From level flight at 120 KIAS, engage VS mode and select a rate of climb of 500 fpm. When rate of climb has stabilised, engage ALT mode and check altitude returns to level at engagement after maximum of 100 ft overswing.

b) Repeat with a 500 fpm rate of descent.

15.6 AIRSPEED HOLD (2 CUE)

i) a) Disengage ALT and engage IAS. From trimmed level flight at 120 KIAS with fixed collective and heading hold, move cyclic aft against trim and establish approximately 100 KIAS. Release and check that the aircraft smoothly returns to the trimmed condition ± 5 kts.

b) Repeat with forward cyclic to 140 KIAS (do not exceed V_{NE}).

15.7 HEADING HOLD (2 CUE)

i) Check correct operation of heading hold during flight at normal cruise speed.

ii) At 120 KIAS in level flight with feet off the pedals slowly increase and decrease collective to give a $\pm 20\%$ torque change, check heading maintained.

15.8 3 CUE MODE

At 130 KIAS engage IAS/VS/HDG modes and set a rate of descent of 500 ft/min. When stabilised engage ALT mode (IAS/ALT/HDG), check altitude overshoot 100 ft of datum and then returns to datum ± 50 ft.

Using the HSI bug alter heading by 90° . (IAS/ALT/HDG mode), check normal operation.

15.9 ALTITUDE PRESELECT (3 CUE)

i) At 120 KIAS select an altitude approximately 1200 ft higher or lower than current altitude and ARM. Initiate the change of altitude using VS mode set to 1000 ft.min (provided torque/engine limits are not exceeded). Note operation of ALT PRE mode recording any overswing.

Altitude alert light illuminates (if installed) 1000 ft before selected altitude.

ii) a) After stabilising at selected altitude increase collective to increase altitude. Alert light should illuminate at 250 ft deviation and tone should also be heard (if fitted).

b) Repeat a) with 250 ft reduction in altitude.

15.10 4-WAY CYCLIC SWITCH

Deselect any flight director modes.

- i) At 120 KIAS check correct operation of fore/aft movement of cyclic switch in attitude mode (approximately 2°/second).
- ii) Repeat with lateral movement:
 - a) Release switch below a roll angle of 6° from level - check aircraft returns to wings level attitude.
 - b) Check that above 6° the roll attitude is maintained.

15.11 4-WAY COLLECTIVE SWITCH

Engage IAS/ALT/HDG, feet off pedals.

- i) At cruise speed check ball centres with lateral movement.

15.12 SAS MODE

At a typical cruise speed check operation in SAS mode during straight flight and turns.

15.13 AFCS OUT

At 120 KIAS disengage the AFCS. Carry out turns, climbs and descents. Check smooth disengagement/re-engagement.

15.14 ILS (Optional test)

Carry out a coupled ILS (3 cue) at 120 KIAS. Check correct operation of auto level and go-around mode.

15.15 GO-AROUND MODE

- a) Align the heading bug with present heading.
- b) Set up 120 KIAS, 700 fpm descent (IAS/VS mode).
- c) Engage HDG mode.
- d) Rotate heading bug left or right 90° to establish 20° to 25° bank angle.
- e) Engage GA mode when bank angle is 20° to 25°.
- f) Check GA disengages HDG, commands wings level (and then constant heading) at 75 KIAS or more at 700 to 750 fpm climb.
- g) Re-engage HDG, rotate heading bug left or right 30° and check new heading is acquired.

16. **PITCH BIAS ACTUATOR (IF FITTED)**

a) Place the AFCS indicator selector knob in the PBA position. Establish level flight at 120 KIAS. Note that both indicator needles are in the same positions and approximately centred.

b) Smoothly lower the collective. Note that the command (CH 2) needle moves aft (right) followed by the actuator (CH 1) needle. Aircraft pitch attitude should remain constant.

c) Raise the collective and note forward (left) movement of the command and actuator needles. Pitch attitude should remain constant.

Note: If pitch attitude is seen to vary significantly during this check pull BIAS ACTR circuit breaker and repeat tests, similar collective lever movements should then produce a more marked attitude change indicating that the PBA was controlling pitch attitude.

17. **FUNCTIONING**

17.1 Heating and Ventilation

Check that the heating can be satisfactorily controlled and that the ventilation is adequate.

17.2 Landing Gear

With gear up, check operation of the landing gear up tone and warning light at 65 ± 7 KIAS and by using the Rad Alt decision height bug if this system is installed.

At 130 KIAS record

Extension time

Retraction time

Maximum time 15 seconds

18. **AUTOROTATION RPM**

After reducing weight to approximately 9000 lbs carry out a steady autorotative descent at 80 kts with the collective lever fully down and gear up. Record the following when stabilised.

NOTE 1: Do not exceed power off rpm limits (115).

NOTE 2: Density altitude will need to be 2000 ft or less at 9000 lbs.

<i>PRESS ALT</i>	<i>OAT</i>	<i>N_R</i>	<i>FUEL</i>	<i>WEIGHT</i>

Satisfactory needle split. (It may be necessary to slightly retard the engine levers to achieve this).

--

19. **LANDING**

Time

--

19.1 Confirm no tendency to resonance during a smooth landing with a gentle collective lowering.

--

NOTE Should any divergent oscillations be noted, lift off immediately and carry out a normal landing, consider repositioning the helicopter.

19.2 Cabin Address System

Operate cabin address system and ensure it functions adequately for use in directing an emergency evacuation.

--

19.3 Emergency Load Shed

AC generator on line.

Switch off both DC generators and check that both DC GEN and BUS TIE lights illuminate. Switch from NORMAL to SHED and check essential services maintained by battery.

--

Switch both DC generators back on.

19.4 Retard each engine in turn to idle stop.

N1 at ground idle 49.8% ± 0.1%

T5 at ground idle

ENG.1

ENG.2

ENG.1	ENG.2

19.5 Internal and External Lighting

Internal

Flight Instrument Lights

Secondary lights (glare shield)

Lower console lights

Standby compass and OAT lights

Cockpit floodlight

Wander light and cabin dome lights

External

Anti-collision lights

Position lights

Search light

Landing light

Strobe lights

19.6 Emergency Radio/Intercom Systems

The S-76B can be fitted with different intercom systems; carry out the check for the appropriate system: *If some of the following tests do not apply, a test must be devised to at least ensure the functioning of the pilot's emergency radio transmit/receive.* Note that it may also be necessary to pull CB PS SIGN PLT ICS. These tests cannot be carried out on internal battery.

i) **Andrea System**

Check the function of the auxiliary ICS system as follows:-

- a) Pull CB ICS Co-pilot on DC Ess Bus.

Check Co-pilot station box is inoperative.

Check pilot station box continues to operate.

Select AUX TALK on Co-pilot station box, ensure proper operation is restored.

Reset CB ICS Co-pilot on DC Ess Bus, select NORM TALK on Co-pilot station box.

- b) Pull CB ICS Pilot on DC Ess Bus.

Check Pilot station box is inoperative.

Check Co-pilot station box continues to operate.

Select AUX TALK on Pilot station box, ensure proper operation is restored.

Reset CB ICS Pilot on DC Ess Bus, select NORM TALK on Co-pilot station box.

- c) Select AUX LISTEN on Pilot station box, check:-

- Radio receivers can be heard one at a time as selected with priority left to right if more than one is selected.

--

- Volume control from receiver only.
- Pilot intercom tels (headset earpiece) are inoperative.
- Transmit function operates.

Select Pilot station box to NORM LISTEN.

- d) Repeat with AUX LISTEN on Co-pilots station box (note that co-pilot intercom tels are then inoperative).

--

ii) **Honeywell AV850 Audio System**

- a) Pull CB Pilots ICS on DC ESS Bus

Check Pilot station box continues to operate.

Check Co-pilot station box continues to operate.

Select EMERG on Pilot's station box.

No.2 COMM only should be operative (Tx/Rx) to pilot. All other audio inoperative.

Deselect EMERG and reset CB.

--

- b) Pull CB Co-pilots ICS on DC ESS Bus.

Check Co-pilot station box is inoperative.

Check Pilot station box continues to operate.

Select EMERG on Co-pilot's station box

No.1 COMM only should be operative (Tx/Rx) to co-pilot. All other audio inoperative.

Deselect EMERG.

--

- c) Unplug Pilot's headset and plug into centre pedestal EMERG ICS socket and select EMERG on NORM/EMERG pedestal switch.

No.2 COMM should be operative (Tx/Rx), by pilot only, with foot switch regardless of station box selections, no other audio available.

Pull CB Pilots RMU on No.2 PRI DC Bus.

--

Select EMERG at CDU (Clearance Delivery Unit) and check No.2 COMM is operative as controlled by CDU.

Return headset to normal jack, all switches to normal and reset CB.

iii) **Baker 1045 Audio System**

a) Pull CB Pilots ICS on No.2 PRI DC Bus.

Check Pilot's and Co-pilot's intercomm and audio operative.

Pull CB Pilots ICS on DC ESS Bus.

Check Pilot's audio inoperative.

Check Co-pilot's audio continues to operate.

Select EMERG on Pilot's station box

Check COMM 1 and 2 in turn for correct operation (Tx/Rx) by pilot.

Reset CB's

Pull CB Co-Pilots ICS on DC ESS Bus.

Check Co-pilot's audio inoperative.

Select EMERG on Co-pilot's station box.

Check COMM 1 and 2 in turn for correct operation (Tx/Rx) by co-pilot.

Unplug pilot's headset and plug into centre pedestal EMERG ICS socket and select EMERG on NORM/EMERG pedestal switch.

No.2 COMM should be operative (Tx/Rx), by pilot only, with foot switch regardless of station box selections, no other audio available.

b) For aircraft fitted with Honeywell radios:
Pull CB Pilots RMU No.2 PRI Bus. CDU (Clearance Delivery Unit) should continue to control No.2 COMM.

Return headset to normal socket.
Return all switches to normal. Reset all CB's.

20. **SHUTDOWN**

20.1 T-handle Checks

Complete Pre Shutdown Checks

- a) Check both DC generators ON, the Fire Extinguisher Test switch OPEN, and both engine levers at IDLE. Select heater ON. MASTER START ON **Autopilot OFF**

- b) **CAUTION**

If an internal engine fire occurs as indicated by a rapid increase in T_5 , immediately pull engine lever fully OFF and engage starter to minimise high T_5 and put out fire.

If a bay or baggage fire is indicated, the Extinguisher Test switch must be re-selected to NORM.

For this test the weight on wheels switch must be inhibited in order for the engine out caption to be triggered. Pull the No. 1 T-handle back one inch, observe the No.1 DC GEN Caution Light goes ON, continue pulling the No.1 T-handle back fully to shutdown the No.1 engine. Shutdown should be immediate when T-handle is fully aft. Auto shut down of heater should occur. Engine out caption as N_1 goes below 48%.

- c) Apply rotor brake at 45% NR, check for smooth operation and normal characteristics.

- d) Repeat check (b) for the No.2 T-handle.

Reset T-handles forward after shutdown.
Reset extinguisher test switch to NORM.

- e) With both engines shutdown have ground personnel inspect for leaks or other discrepancies.

Fuel quantity

Totaliser reading The totaliser reading should agree to within 5% of the actual amount consumed.

21. **POST FLIGHT ACTION**

21.1 Performance Climb

Plot out the data on the analysis sheet (Appendix 4) and determine the achieved rate of climb for each engine. The scheduled performance must be obtained from Appendix 5 and compared with the achieved performance. The results should then be recorded on the front page.

21.2 Autorotation RPM

Determine the scheduled rotor speed in autorotation and compare with the achieved value.

Actual NR - Scheduled NR =

21.3 Engine Power Assurance

Determine power margin from Section 2 and 6 of the Flight Manual.

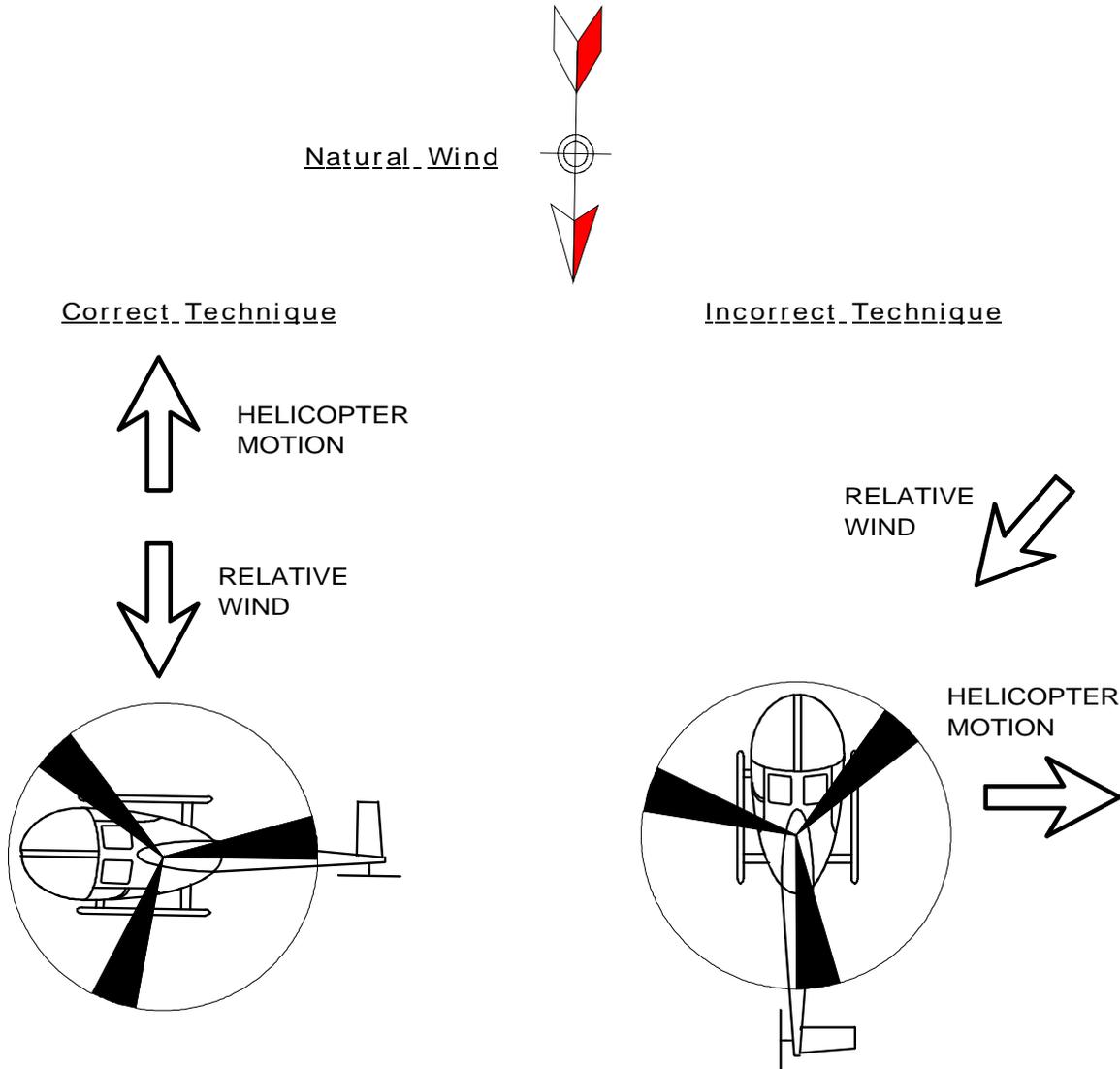
-36B engine T5 margin only measured.

	<i>MARGIN</i>	
<i>ENGINE</i>	<i>T5</i>	<i>N1</i>
1		
2		

SIDEWAYS AND REARWARDS FLIGHT

For the sideways flight tests the helicopter should be rotated so that the natural wind is on the side of the aircraft and then gently accelerated into the wind and stabilised. The mean natural wind speed should be added to the estimated ground speed to give the required relative air speed.

For rearwards flight the helicopter should be lined up tail into wind and gently accelerated rearwards to achieve the required relative air speed.



ADDITIONAL CHECKS FOR HAMILTON STANDARD PHASE III AP

1. AIRSPEED HOLD

- i) a) From trimmed level flight at 120 KIAS with fixed collective and heading hold, move cyclic aft against trim and establish approximately 100 KIAS. Release cyclic and check that the aircraft smoothly returns to the trimmed condition ± 5 kts.
- b) Repeat with forward cyclic to 140 KIAS (do not exceed V_{NE}).
- ii) Check A/S light extinguishes below 45 KIAS (use cyclic beeper trim).

2. HEADING HOLD

- i) Check correct operation of heading hold during flight at normal cruise speed.
- ii) At 120 KIAS in level flight with feet off the pedals slowly increase and decrease collective to give $\pm 5\%$ torque change, check heading maintained.

3. TURN CO-ORDINATION

- i) At 120 KIAS level flight, feet lightly on pedals carry out turns left and right at 30° angle of bank. The slip ball may go as much as $\frac{1}{2}$ ball width but should be centred when established in the turn.
- ii) Check turn co-ordination inoperative below 60 KIAS.

4. AUTO SHUTDOWN

Check that switching off a pitch channel when manoeuvring in pitch results in an AUTO SHUTDOWN light.

Repeat in roll.

ADDITIONAL CHECKS FOR SPERRY HELIPILOT

1. ALTITUDE HOLD

- i) At a normal cruise speed check altitude is held ± 50 ft.
- ii) With heading hold also engaged gently reduce torque by about 20%. Check altitude is held within 100 ft of datum and then returning to datum ± 50 ft.
- iii) a) Engage VS mode and select a rate of climb of 500 fpm at 120 KIAS. When rate of climb has stabilised engage ALT mode and check altitude returns to level at engagement after maximum of 100 ft overswing.
- b) Repeat with a 500 fpm rate of descent.

2. AIRSPEED HOLD

- i) a) From trimmed level flight at 120 KIAS with fixed collective and heading hold, move cyclic aft against trim and establish approximately 110 KIAS. Release cyclic and check that the aircraft smoothly returns to the trimmed condition ± 5 kts.
- b) Repeat with forward cyclic to 130 KIAS (do not exceed V_{NE}).

3. HEADING HOLD

- i) Check correct operation of heading hold during flight at normal cruise speed.
- ii) At 120 KIAS in level flight with feet off the pedals slowly increase and decrease collective to give a $\pm 10\%$ torque change, check heading maintained.

4. SAS MODE

At a typical cruise speed check operation in SAS mode during straight flight and turns.

5. ILS (Optional)

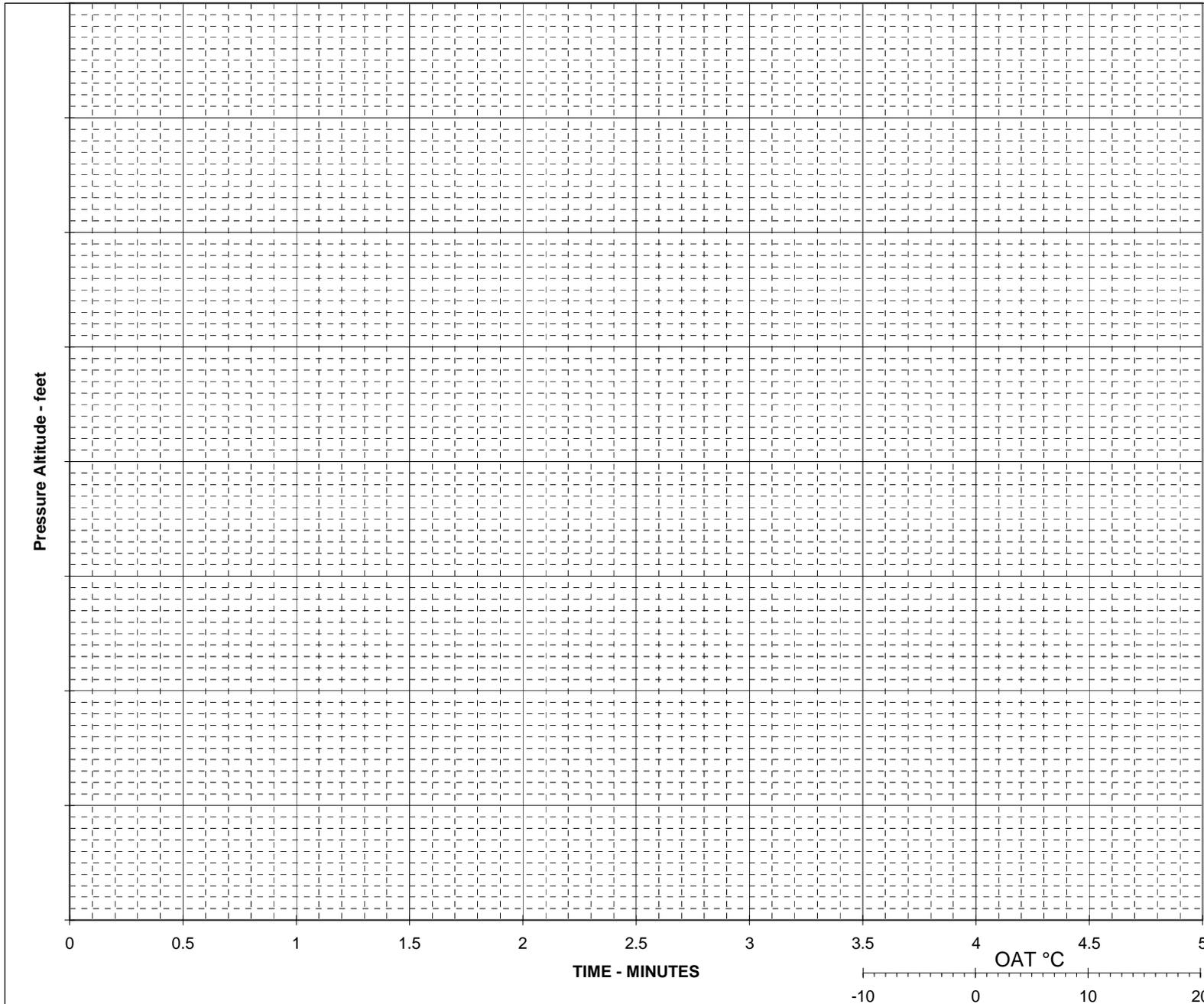
Carry out a coupled ILS at 120 KIAS. Check correct operation of auto level and go-around mode.

6. Go-Around Mode

- a) Align the heading bug with present heading.
- b) Set up 130 KIAS, 500 fpm descent (IAS mode).
- c) Engage HDG mode.
- d) Rotate heading bug left or right 90° to establish 20° to 25° bank angle.
- e) Engage GA mode when bank angle is 20° to 25°.
- f) Check GA commands wings level (and then constant heading) and 750 fpm climb.
- g) Rotate heading bug left or right 30° and check new heading is acquired.

Performance Climb Analysis Sheet

Appendix 4



<u>AIRCRAFT TYPE</u>
<u>REGISTRATION</u>
<u>DATE OF TEST</u>

Mean Weight	
No 1 _____	Kg
No 2 _____	Kg

Mean Altitude	
No 1 _____	feet
No 2 _____	feet

Mean OAT	
No 1 _____	°C
No 2 _____	°C

ACHIEVED ROC	
No 1 _____	ft/min
No 2 _____	ft/min

SCHEDULED ROC	
No 1 _____	ft/min
No 2 _____	ft/min

DELTA ROC	
No 1 _____	ft/min
No 2 _____	ft/min

APPENDIX 5

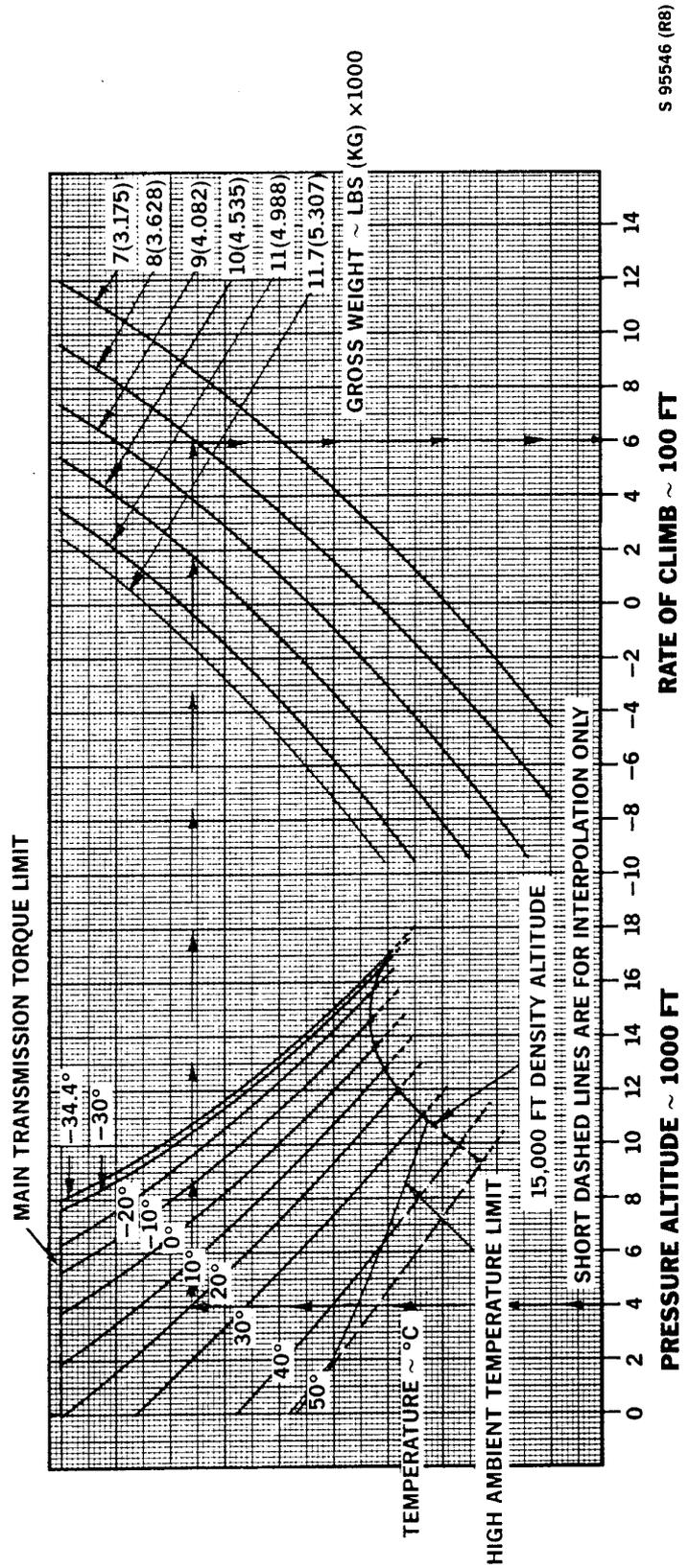
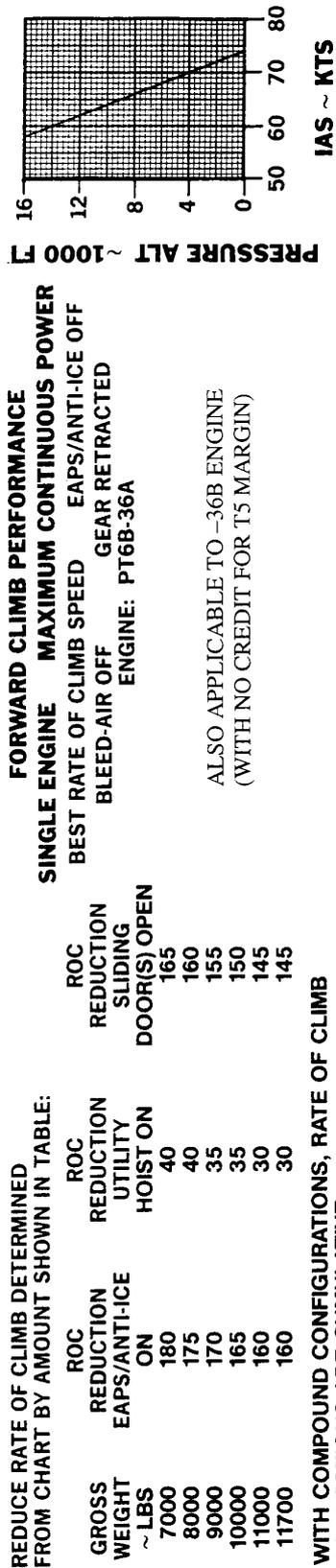


Figure 4-16. Forward Climb Performance - Single Engine, Maximum Continuous Power, PT6B-36A Engines

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