# CHECK FLIGHT CERTIFICATE

**Aerospatiale AS350B, B1, B2, BA, BB** **CFS 264 Issue 1**
**Turbomeca Arriel 1B, 1D, 1D1**

| Date: | Crew: | Observer: | Registration: |
|---|---|---|---|

| **Performance** | Climb #1 | | |
|---|---|---|---|
| Average Weight | | | |
| Average Altitude | | | ft |
| Average Temp. | | | °C |
| Speed | | | KIAS |
| Achieved Rate | | | fpm |
| Scheduled Rate | | | fpm |
| Margin | | | fpm |
| Permitted Margin | -70 | | fpm |

Airfield:

Start Weight Kg/Lbs*:

Takeoff cg:

Performance:

SATIS/UNSATIS/NOT APPLICABLE*

*(delete as applicable)**

**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.

**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 the 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 check flight not directly under their control.

# CHECK FLIGHT SCHEDULE

**Aerospatiale AS350B, B1, B2, BA, BB** **CFS 264 Issue 1**
**Turbomeca Arriel 1B, 1D, 1D1**

| | |
|---|---|
| Registration | |
| Flight Date | |

## 1. INTRODUCTION

This schedule is applicable to Aerospatiale AS350B, B1, B2, BA, BB helicopters. It is based on the assumption that the every day operation of the helicopter serves as a continuous check on the correct 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.

**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:

a) It is preferable to use ballast, and

b) Before accepting any passengers on a check 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. Consideration should be given to removing the dual controls if flying with an inexperienced observer.

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

## 1. Pre-Flight Information

| | | | |
|---|---|---|---|
| Aircraft Variant | Aerospatiale AS350B, B1, B2, BA, BB | Engine | Arriel 1B, 1D, 1D1 |

| | | | |
|---|---|---|---|
| Registration | | Engine No | |
| Airframe No | | Hours total | |
| Airframe Hrs | | TSO | |
| Landing Gear | | | |
| Operator/Maint. Organisation | | | |
| Airfield | | | |

| | |
|---|---|
| Pilot(s) | |
| Observer | |

## 2. Loading

***Note:*** The helicopter shall be loaded to maximum all up weight if possible. Any ballast must be securely installed

In addition, it will be necessary to perform one flight at approx 1800kg to permit the measurement of rotor rpm in autorotation (see Appendix 3)

| | | |
|---|---|---|
| Take-off Weight | | Kg |
| Fuel | | Kg |
| CoG Position | | |

## 3. General Flight Information

| | | | | | |
|---|---|---|---|---|---|
| Airfield Press. Alt. | | ft | QFE/QNH | / | |
| Wind | / | | OAT | | °C |
| Weather | | | | | |

| | | | |
|---|---|---|---|
| Engine Start | | Land | |
| Take-Off | | Shut down | |

## 4. Pre-Start Checks

| | | Satis. | Remarks |
|---|---|---|---|
| **4.1** | Carry out the normal external inspection | | |
| | Check for correct functioning of external lighting | | |
| **4.2** | Doors & windows : Condition & operation | | |
| | Seats & harnesses | | |
| | Placards : Legibility & accuracy | | |

**4.3** Instrument marking: Confirm legibility, general condition & accuracy of colour bands and marking:

| | | |
|---|---|---|
| ASI | | |
| Torquemeter | | |
| Rotor/$N_2$ tachometer | | |
| EGT ($T_4$) | | |
| Engine Tachometer ($N_g$) | | |
| EOP | | |
| EOT | | |
| Voltmeter | | |
| Ammeter | | |
| Fuel Pressure | | |

**4.4** Freedom & range of travel of :

| | | |
|---|---|---|
| Collective control | | |
| Yaw control | | |
| Fuel Flow control lever/twistgrip including idle gates | | |

**4.5** Select battery ON

Note:

| | | |
|---|---|---|
| Battery Voltage | | |
| Test warning lamps | | |
| Correct warning lamps for Int. or Ext. start as appropriate | | |

**4.6** Complete pre-start checks as per FM

## 5. Starting

**5.1a** For aircraft with a fuel flow control lever, apply the rotor brake

| | | |
|---|---|---|
| Confirm fuel flow lever cannot be moved from the cut off position | | |

Release the rotor brake and move fuel flow control lever to the FLIGHT gate

| | | |
|---|---|---|
| Confirm rotor brake cannot be applied | | |

Move fuel flow control lever to the shut off position

**5.1b** For aircraft with a fuel flow twistgrip control, apply the rotor brake

| | | |
|---|---|---|
| Confirm engine start is inhibited | | |

Release the rotor brake and apply rotor brake safety

| | | |
|---|---|---|
| Confirm rotor brake cannot be applied | | |

Release rotor brake safety

**5.2** During engine start, note and record :

| | | |
|---|---|---|
| Residual T4 | | °C |
| Max T4 | | °C |
| Ng at start of Rotor rotation | | % |

**5.3** With, Fuel Flow Control in FLIGHT, confirm horn is selected on.

| | | |
|---|---|---|
| Gradually reduce $N_R$ and confirm horn sounds at 360 rpm. | | |

Return fuel flow control to the flight position.

**5.4** With Fuel Flow control in FLIGHT and collective down, check

| | | |
|---|---|---|
| Correct disc response to ***small*** cyclic inputs | | |
| All indications in normal range | | |
| All warning lights extinguished | | |

**5.5** Switch off booster pump(s) for 2 min.

| | | |
|---|---|---|
| Confirm engines continue to run satisfactorily | | |

Switch booster pumps ON

***WARNING*** **Take care to ensure that the collective remains locked throughout tests 5.6 and 5.7**

**5.6** Hydraulic Pressure Isolation

Isolate hydraulics by means of collective lever switch

| | | |
|---|---|---|
| Confirm cyclic loads increase but remain acceptable | | |

Restore hydraulic pressure

| | | |
|---|---|---|
| Confirm Horn sounds until HYD caption extinguishes (after not less than 2 sec, typically 2-3 sec) | | |

**5.7** Hydraulic Accumulator Test
Carry out a test of the hydraulic accumulator in accordance with FM procedures

| | | |
|---|---|---|
| Confirm satisfactory | | |

**5.8** Check heater and demister shut off thus:

Raise collective to increase $N_g/T_4$ as far as possible without becoming airborne

| | | |
|---|---|---|
| Select cabin heat ON. Note $T_4$ rise | | |
| Select cabin heat OFF. Note $T_4$ fall | | |
| Select Demist ON. Note $T_4$ rise | | |
| Select Demist OFF. Note $T_4$ fall | | |

**5.9** Autopilot:

If the aircraft is equipped with an autopilot carry out a full pre-flight check in accordance with FM procedures

**5.10** **Check for correct functioning :**

| | | |
|---|---|---|
| - Intercomm | | |
| - Radio | | |
| - Cockpit lighting (if possible) | | |

**5.11** Complete pre take-off checks as per FM

## 6. <u>Low Speed Envelope</u>

| | |
|---|---|
| Take off time | |

**6.1** Lift to a low hover, with autopilot engaged where appropriate, and assess the vibration level, control response and position (adequate control margin) during the following manoeuvres : (See Appendix 1 for test method)

| | | | |
|---|---|---|---|
| Axial turns | Right | | |
| | Left | | |

| | | |
|---|---|---|
| Sideways flight left & right up to an estimated 17 kt (20 mph) | | |
| Rearwards flight up to an estimated 17 kt (20 mph) | | |

| | | |
|---|---|---|
| **6.2** If an autopilot is installed, carry out limited hover manoeuvres with AP disengaged. | | |

| | Engine Oil | |
|---|---|---|
| **6.3** Following the hover tests record the following | Temp | Press |
| | | |

## 7. Maximum Continuous Power Climb

With the altimeter set to 1013mb (29.91in hg), perform a climb at maximum continuous power. The climb should be carried out in stable, non turbulent conditions away from cloud.

***Note:*** If the SFIM AP85 T31 2 axis VFR autopilot is installed, the climb **must** be conducted hands-on.

Associated conditions:
Do not exceed any of the following:

| Variant | AS350B/BA | AS350B1 | AS350B2 | AS350BB |
|---|---|---|---|---|
| $N_G$ | ** | 98% | Diff $N_G$ - 3.5% | 96.5% |
| $T_4$ | 775°C | 795ºC | 795ºC | 795ºC |
| Tq | 83% | 94% | 94% | 83% |
| IAS | 55kt/63MPH | | | |
| Bleeds | OFF (unless specifically required) | | | |

** Refer to placard/chart

When a stable condition has been established on a steady heading, sideslip string centered, and in as calm conditions as possible, record the following :

Fuel at start of climb

| | | | | | | | | Eng | |
|---|---|---|---|---|---|---|---|---|---|
| ***Time*** | ***Alt*** | ***OAT*** | ***IAS*** | ***Tq*** | ***$N_g$*** | ***$T_4$*** | ***$N_f$/Nr*** | ***Temp*** | ***Press*** |
| 0 | | | | | | | | | |
| 0.30 | | | | | | | | | |
| 1.00 | | | | | | | | | |
| 1.30 | | | | | | | | | |
| 2.00 | | | | | | | | | |
| 2.30 | | | | | | | | | |
| 3.00 | | | | | | | | | |

Fuel at end of climb

After the climb, obtain an accurate OAT by flying at approx mid-climb altitude at climb Speed for 1 min to allow OAT to stabilise.

| | | |
|---|---|---|
| Alt | | ft |
| OAT | | °C |

**NOTE** The climb performance must be analysed and compared with the schedule performance. See Section 13 of this document.

## 8. Max. Power Check

***NOTE:*** It may not be possible to achieve the Take-Off $N_G$ at a reasonable altitude. The test is to be performed following the performance climb at an altitude of not less than 5000ft.

Select all bleeds OFF

Reduce airspeed to 40kt.

Raise collective to achieve Take-Off $N_G$ rating. If the Torque limit is achieved without rotor droop before the $N_G$ limit is reached, the requirements have been adequately demonstrated.

**Limits to be observed:**

| | $N_G$ | Tq | $T_4$ |
|---|---|---|---|
| AS350B | Refer to placard | 83% | 810ºC |
| AS350B1 | 100.8% | 100% | 845ºC |
| AS350B2 | Diff $N_G$ = 0 | 100% | 845ºC |
| AS350BA | Refer to placard | 88% | 810ºC |
| AS350BB | 98.5% | 88% | 845ºC |

**Do not use transient torque limits.**

Record:

| ***P. Alt*** | ***OAT*** | ***Tq*** | ***$T_4$*** | ***$N_g$*** | ***Diff $N_G$*** | ***Nr*** |
|---|---|---|---|---|---|---|
| | | | | | | |

## 9. Autorotation

**Note:** See appendix 3 for the check of rotor rpm in autorotation

At an acceptable altitude, lower the collective to enter autorotation at 65 kt.

**9.1** Carry out 30° banked turns left & right in autorotation

| | |
|---|---|
| | |

**9.2** Carry out a rapid recovery from autorotation ($N_R$/$N_F$ needles just joined to 60% Torque in not less than 3 sec)

Note: Engine response & absence of surge

Transient rotor droop

| | |
|---|---|
| | |
| | % |

## 10. Cruise Checks

***NOTE:*** If the aircraft is equipped with the SFIM autopilot, refer to Appendix 2 for test procedures

**10.1** Engine Condition

With all engine bleeds OFF, establish level flight at maximum continuous power

**Note:** For AS350B, if $N_G$ is between 94.5 and 97%, reduce collective pitch to achieve an $N_G$ of 92%, then increase gently to 94.5%

Associated Conditions

| Variant | AS350B/BA | AS350B1 | AS350B2 | AS350BB |
|---|---|---|---|---|
| $N_G$ | ** | 98% | Diff $N_G$ -3.5% | 96.5% |
| $T_4$ | 775°C | 795ºC | 795ºC | 795ºC |
| Tq | 83% | 94% | 94% | 83% |

** Refer to placard/chart

Record the following when stabilised:

| ***P. Alt*** | ***OAT*** | ***Tq*** | ***$T_4$*** | ***$N_g$*** | ***Diff $N_G$*** | ***Nr*** |
|---|---|---|---|---|---|---|
| | | | | | | |

**NOTE** The engine condition data must be analysed and compared with the schedule. See Section 13 of this document.

**10.2** $N_G$ Test (AS350B2 only)

Press $N_G$ indicator test. Record Digital $N_G$ readout with analogue pointer at zero:

| | | |
|---|---|---|
| $N_G$ TEST indication | | % |
| P Alt | | Ft |
| OAT | | ºC |

**10.3** Cruise

At max. continuous power, check and record the following items :

10.3.1 Stabilised level flight.

Note:

| P. Alt | OAT | IAS |
|---|---|---|
| | | |

| | | |
|---|---|---|
| Vibration level | | |
| Control response | | |

10.3.2 Steep turns left & right (approx 45°)

| | | |
|---|---|---|
| Vibration level | | |
| Control response | | |
| Collective balance (zero friction) | | |

**Reset collective friction as required**

**10.4** Maximum speed test

10.4.1 Increase speed progressively to $V_{NE}$ using max. continuous power

| Note: | | | | | | |
|---|---|---|---|---|---|---|
| | P. Alt | | ft | AUW | | kg |
| | OAT | | °C | $V_{NE}$ (Placard) | | kt |
| | Fuel | | kg | Achieved IAS | | kt |

10.4.2 Carry out gentle turns (approx 10° AoB) left & right.

| | | |
|---|---|---|
| Vibration level | | |
| Control response | | |

**10.5** Hydraulic System

Reduce airspeed to 60 kt

***NOTE:*** **If the aircraft is equipped with an autopilot, it must be disengaged for this test.**

10.5.1 Deselect hydraulics by means of the HYD TEST button.

| | | |
|---|---|---|
| Confirm hydraulic assistance is maintained for at least 20 sec of gentle Manoeuvring | | |

***Reselect hydraulics***

10.5.2 Deselect hydraulics by means of the collective lever switch.

| | | |
|---|---|---|
| Confirm cyclic and collective control loads are acceptable | | |

***Reselect hydraulics***

**Re-engage Autopilot if relevant**

## 11. Landing

| | | |
|---|---|---|
| Confirm no tendency to lateral padding or ground resonance during a smooth touchdown with a slow gentle collective lowering | | |

***NOTE:*** Should any divergent oscillations be noted, lift off immediately, reposition the aircraft and carry out a normal landing.

Landing time

## 12. Shut down

| | | |
|---|---|---|
| Shut down the engine and confirm satisfactory rotor brake performance. | | |

## 13. Post-flight Action

### 13.1 Performance Climb (see para 7)

Plot the data on the analysis sheet provided and determine the achieved rate of climb. The scheduled performance must be obtained from the flight manual and compared with the achieved performance.

### 13.2 Engine Condition in Flight Check (see para 8.1)

Use the power check chart in the flight manual to analyse the engine condition.

| |
|---|
| Sat/Unsat |

### 13.3 Autorotation (see Appendix 3)

Use the chart in Section 8 of the Flight Manual to determine the minimum scheduled autorevs.

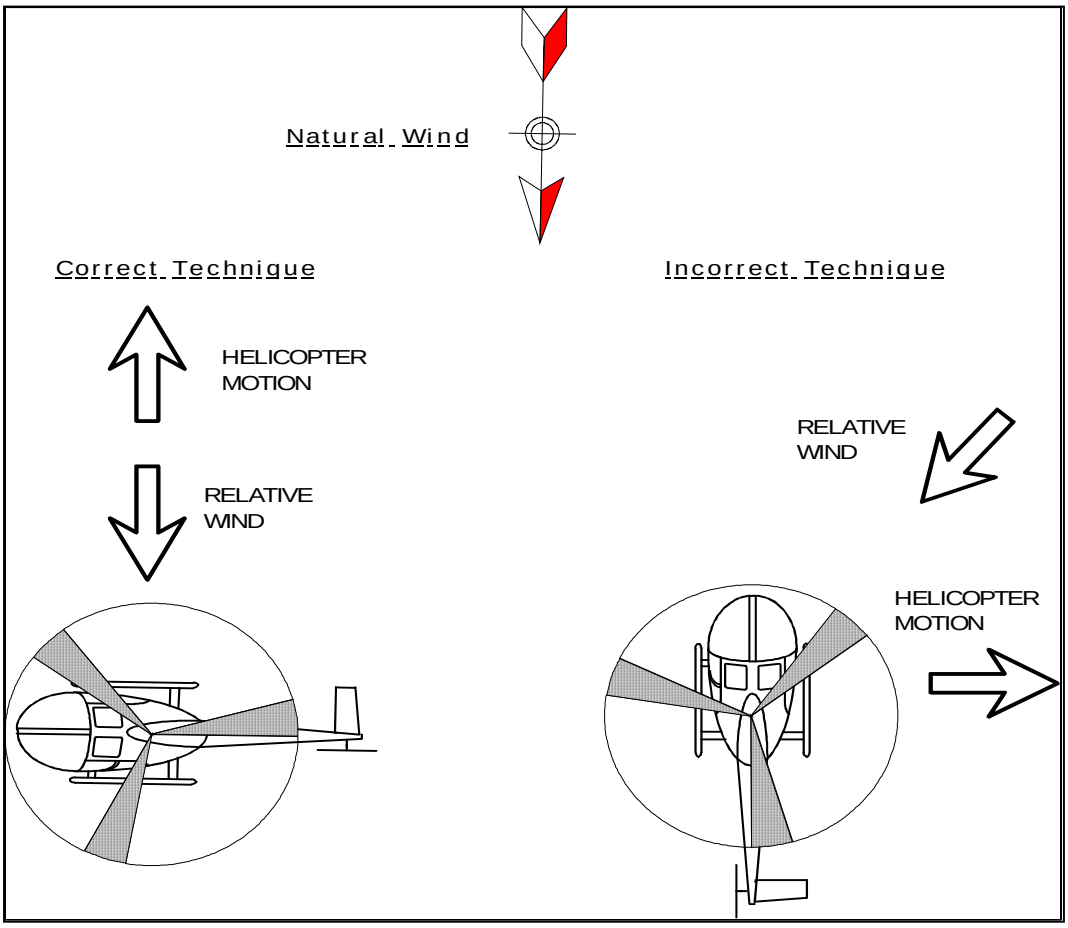
| | | | |
|---|---|---|---|
| Achieved autorevs | | % | |
| Schedule autorevs | | % | Tolerance =0/+10rpm |

## Appendix 1

## Sidewards & Rearwards Flight

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

For rearwards flight the helicopter should be aligned tail into wind and gently accelerated rearwards to achieve the required relative airspeed.



## Appendix 2

## Autopilot Checks

**A2.1** Cruise Checks

Basic Stabilisation

At approx 110kt, level flight, engage Autopilot

a) Without retrimming, displace the cyclic to alter pitch angle by 5° nose up. Release cyclic and check pitch attitude returns to datum ±1° with minimal overshoot.

b) Repeat a) for 5° nose-down.

c) Repeat a) for 10° left roll

d) Repeat a) for 10° right roll

**A2.2** Heading Hold

Turn heading bug to aircraft heading and engage HDG mode
Turn heading bug 90° right

Confirm aircraft turns onto new heading ±1°

Repeat for a 90° left heading change

**Note: On 2-axis autopilots, it will be necessary to maintain balance by means of pedal inputs**

Override heading hold to change aircraft heading by approx 30° by means of cyclic input.

Release cyclic and confirm aircraft returns to original heading ±1°

**A2.3** Co-ordinated turns (3-axis autopilots only)

Disengage heading hold. With feet close to but removed from the pedals, carry out 30° banked turns left and right

Confirm turns are balanced within 1 ball width

**A2.4** Altitude Hold

At 110kt approx, engage ALT mode
Confirm altitude is acquired and maintained within ± 50ft

Slowly reduce power by 10% Tq
Confirm altitude is maintained within ± 50ft

Slowly increase power by 10% Tq
Confirm altitude is maintained within ± 50ft

Override Alt hold by aft cyclic input.
Release cyclic and allow aircraft to recover to datum.

**A2.5** IAS Hold

At 110kt approx in level flight, engage IAS mode.
Confirm is airspeed is maintained within ± 5kt

Slowly reduce power by 10% Tq

Confirm is airspeed is maintained within ± 5kt

Slowly increase power to recover to level flight

Override IAS hold by fwd cyclic input.

***WARNING*** ***Do not exceed $V_{NE}$***

Release cyclic and allow aircraft to recover to datum.

**Disengage Airspeed Hold**

**A2.6** Beep trim

Confirm satisfactory functioning of $P_1$ & $P_2$ cyclic beep trim

**A2.7** Fly Through

Confirm satisfactory Fly-through when manoeuvring without using beep trim or force trim release

## Appendix 3

## Rotor rpm in Autorotation

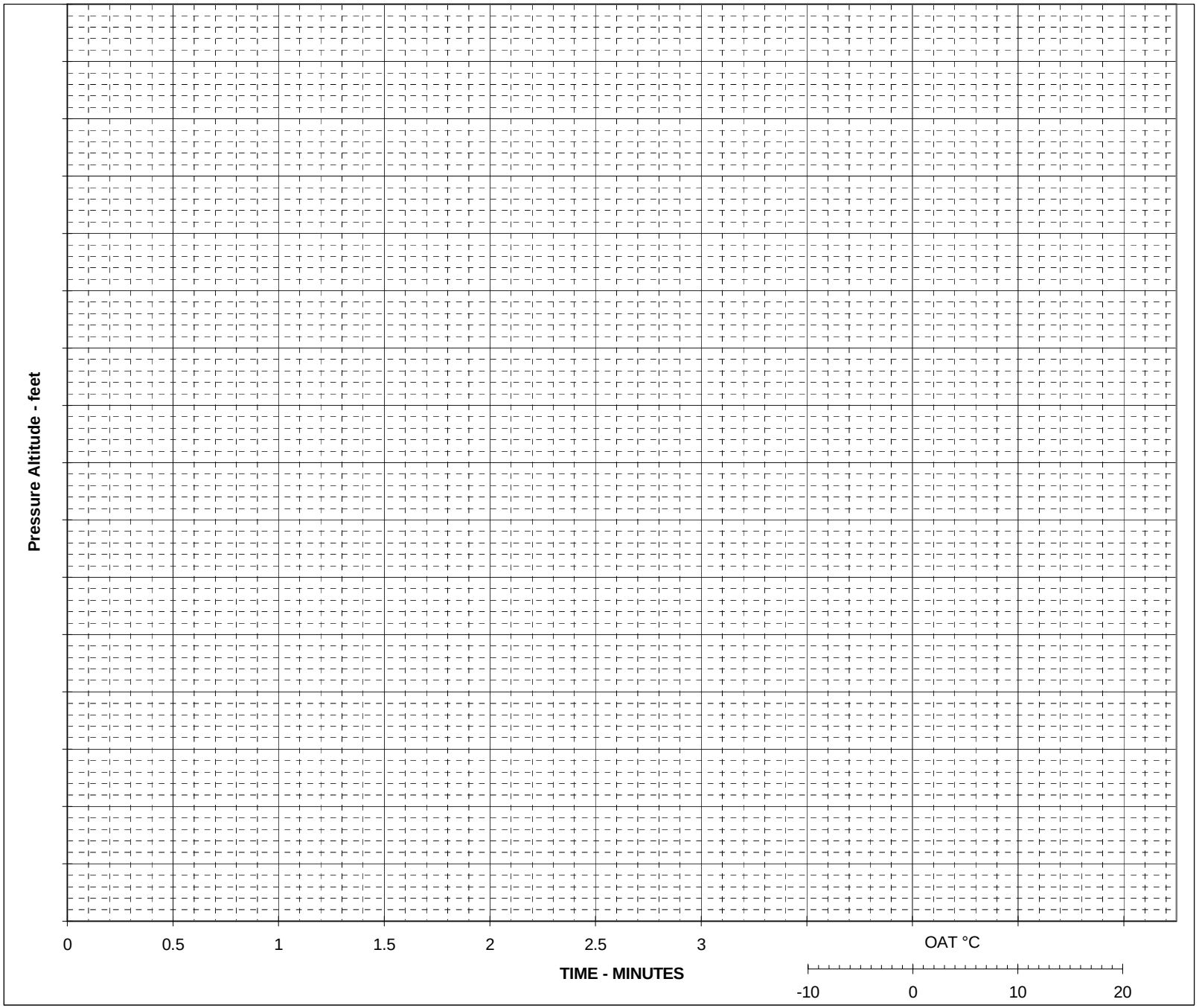
This test will normally be performed as a separate flight. The aircraft weight must be less than 1800kg

At an acceptable altitude, lower the collective to enter autorotation at 65 kt. Allow to stabilise with the collective fully lowered and record:

| P. Alt | OAT | IAS | $N_R$ | Fuel | AUW |
|---|---|---|---|---|---|
| Ft | $^oC$ | Kt | rpm | Kg | kg |
| | | | | | |

***DO NOT EXCEED POWER-OFF ROTOR RPM LIMITATIONS (430 rpm)***

***NOTE:*** Autorevs must be checked against the chart in Section 8 of the Flight Manual and the results recorded in section 13 of this document




AIRCRAFT TYPE

REGISTRATION

DATE OF TEST

Mean Weight

_____ lb

Mean Altitude

_____ feet

Mean OAT

_____ °C

SCHEDULED ROC

Basic _____ ft/min

Correction _____ ft/min
(if applicable)

Correction _____ ft/min
(if applicable)

Final SROC _____ ft/min

Observed ROC

_____ ft/min

Difference from Scheduled

_____ ft/min
(Observed ROC minus Final SROC)