CHECK FLIGHT CERTIFICATE

Aerospatiale AS355F, F1 and F2 **Allison 250-C20F**	**CFS 269 Issue 1**	Registration:

Date:	Crew:	Observer:

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*

*(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.

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 airtests 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 an airtest 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.

Registration		Test Date	

1. INTRODUCTION

This schedule is applicable to Aerospatiale AS355F, F1 and F2 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. Although it may be legal to carry passengers on a test flight with a Certification of Airworthiness in force, it is strongly recommended, for Airworthiness Flight Tests 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 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. Consideration should be given to removing the dual controls if flying with an inexperienced observer.

Should there be any query about the Flight Test 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.

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1. Pre-Flight Information

Aircraft Variant	Aerospatiale AS355F, F1, F2	Engine	Allison 250-C20F

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 2000kg 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 levers including idle gates		

4.5 Apply the rotor brake

Confirm fuel flow levers cannot be moved from the shut off position		

Release the rotor brake and move both fuel flow control levers to the flight gate

Confirm rotor brake cannot be applied		

Move both fuel flow control levers to the shut off position

4.6 If a standby horizon is installed, switch ON

Confirm Horizon powered and erecting		

4.7 Select main battery ON

Note:

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

4.8 Complete pre-start checks as per FM

5. <u>Starting</u>

5.1 During engine start, note and record :

	Eng 1	Eng 2	
Residual T4			°C
Max T4			°C
Ng at start of Rotor rotation			%

5.2 With both engines running, Fuel Flow Levers fully forward, confirm horn is selected on.

Gradually reduce N_R and confirm horn sounds at 360 rpm.		

Return both fuel flow levers to the flight position.

5.3 With Fuel Flow levers fully forward and collective down, check

Correct disc response to ***small*** cyclic inputs		
All indications in normal range		
All warning lights extinguished		
Correct functioning of engine trimmer		

5.4 Switch off booster pumps.
Confirm engines continue to run satisfactorily

Switch booster pumps ON

5.5 Check heating valve thus:

Bring Eng 2 Fuel Flow control lever to the idle position. Note positive freewheel split.

Open heater valve and note positive T_4 rise on Eng 1

Close heater valve and note positive T_4 drop

Open the Anti-ice valve and note positive T_4 rise

Close the Anti-ice valve and note positive T_4 drop.

	Freewheel	Heater	Anti-ice
Eng 1			

Repeat for Eng 2, with Eng 1 at idle

	Freewheel	Heater	Anti-ice
Eng 2			

5.6 Hydraulic tests
Confirm collective down **and locked**

WARNING **With hydraulics deselected, pedal inputs may cause the collective to move and release the collective lock. Monitor the collective throughout this test and ensure that collective does not unlock and move.**

Isolate yaw hydraulics by means of collective lever switch. Confirm:

Pedal loads increased, but acceptable (F/F1)		
No immediate increase in pedal loads(F2)		

Note: If immediate pedal load increase is experienced on the F2, the serviceability of the accumulator must be checked

On F2 aircraft, discharge the accumulator by means of the ACCU pushbutton.

Confirm pedal loads increased, but acceptable		

Restore HYD pressure and accumulator

5.7 Autopilot:

Perform a full pre-flight check of the following where relevant

Autopilot		
Autotrim		
Monitor		

5.8 Check for correct functioning :

- Intercomm		
- Radio		
- Cockpit lighting		

5.9 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	Carry out gentle hover manoeuvres with SAS/AFCS disengaged.		

	MGB Oil	
6.4	Following the hover tests record the following	Temp	Press

7. Single engine en-route climbs

7.1 No. 1 Engine

With the altimeter set to 1013mb (29.91in hg), bring the fuel flow control lever of Eng 2 back to achieve N_f split of at least 10rpm

Note: It may be necessary to trim the N_F of Eng 1 to maximum to assure an N_F split.
Carry out a climb for 4 min at single engine maximum continuous power.
The climb should be carried out in stable, non turbulent conditions away from cloud.

Associated conditions:

Do not exceed any of the following:

IAS	55kt/63MPH
N_G	105%
T_4	810°C
Tq	100%
Bleeds	OFF (unless specifically required)

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									
3.30									
4.00									

Fuel at end of climb [ ]

Return Eng 2 to FLIGHT. Rematch engines as required.

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.

7.2 No. 2 Engine

With the altimeter set to 1013mb (29.91in hg), bring the fuel flow control lever of Eng 1 back to achieve N_F split of at least 10rpm

Note: It may be necessary to trim the N_F of Eng 2 to maximum to assure an N_F split.
Carry out a climb for 4 min at single engine maximum continuous power.
The climb should be carried out in stable, non turbulent conditions away from cloud.

Associated conditions:

Do not exceed any of the following:

IAS	55kt/63MPH
N_G	105%
T_4	810°C
Tq	100%
Bleeds	OFF (unless specifically required)

When a stable condition has been established on a steady heading, slip String centred, 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									
3.30									
4.00									

Fuel at end of climb [ ]

Return Eng 2 to FLIGHT. Rematch engines as required.

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. Cruise Checks

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

8.1 In Flight Engine Condition Check

Trim the aircraft in a cruise at max. continuous power

Confirm heater, demister and engine anti-ice are deselected

Maintaining constant collective, increase the power on each engine in turn by means of the engine trimmer until either the trimmer reaches the end of its travel, or the first OEI limitation is achieved.
Do not exceed:

Tq	100%
T_4	810°C
N_g	105%

Allow to stabilise and record data below

Eng	***P. Alt***	***OAT***	***Tq***	***T_4***	***N_g***	***Nr***
1						
2						

Reselect heater, demister and engine anti-ice as required

Rematch engines as required

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

8.2 Cruise

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

8.2.1 Stabilised level flight.

Note:

P. Alt	OAT	IAS

Vibration level	
Control response	

8.2.2 Steep turns left & right (approx 45°)

Note:

Vibration level	
Control response	

8.3 Standby Static

Close all windows and vents, and select bleeds OFF. Trim in level flight at MCP and record:

	Norm	Stby
P1 Alt		
P1 ASI		

Compare the altitude and IAS errors with the placard and record in Section 13.

Ensure static selector is returned to NORMAL

8.4 Maximum speed test

8.4.1 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

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

Note:		
	Vibration level	
	Control response	

8.5 Hydraulic System

Reduce airspeed to 70 kt and deselect Yaw servo hydraulics by means of the collective switch.

Note:	Pedal loads acceptable.	

Reselect hydraulics

9. Autorotation

Note: It will be necessary to reduce aircraft weight to less than 2000kg (4409lb) for the check of rotor rpm in autorotation (see Appendix 3)

9.1 Perform a gentle entry to a steady autorotative descent at 65 kt. Do not exceed power-off rotor rpm limitation (425rpm)

9.2 Carry out 30° banked turns left & right in autorotation

9.3 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

	rpm

10. 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

11. Electrical System Checks

With aircraft on ground, collective down and locked, and both engines running in FLIGHT

11.1 VFR Electric System

a) Deselect EXT PWR/BATT and Direct Batt
Confirm V MAIN LH & RH = 28v approx

b) Deselect Gen LH & RH
Note: GEN LH caution illuminates, then all cautions extinguish

c) Reselect EXT PWR/BATT and Direct Battery
Reselect GEN LH and reset Caution extinguished
Press Bus SHED
Confirm Shed Bus isolated (e.g. booster pumps)

d) Press BUS TRANS
BUS TRANS lamp illuminated

Shed Bus reenergized

e) Reselect GEN RH and reset. Caution extinguished
Deselect BUS SHED
Deselect BUS TRANS

Confirm all caution lights extinguished

f) Press EMERGENCY CUT OUT

Confirm N_R and T_4 indications remain operative
Deselect EMERGENCY CUT OUT
Confirm all systems functional

11.2 IFR Electric System

a) Deselect GEN LH
Confirm Mission Bus is shed, where applicable

Deselect LH EXT PWR BATT
Confirm LH GEN and BATT caution lamps illuminate
Depress LH Bus Shed
Confirm V MAIN LH = 0
V MAIN RH = 28 approx
Confirm dual power supply consumers remain available e.g. Torquemeters
Reset Gen LH, LH PWR BATT and LH Bus Shed
Reset Mission Bus, if applicable

b) Deselect GEN RH and RH EXT PWR BATT
Confirm Mission Bus is shed, where applicable

Deselect RH EXT PWR BATT
Confirm RH GEN and BATT caution lamps illuminate
Depress RH Bus Shed

Note: The LH GEN caution may illuminate at this stage.

Confirm V MAIN LH = 28v approx
V MAIN RH = 0
Confirm dual power supply consumers remain available e.g. Torquemeters
Reset Gen RH, RH PWR BATT and RH Bus Shed
Reset Mission Bus, if applicable

With Gen LH and RH on line:

c) Depress LH and RH Bus Shed
Confirm PP13 (e.g. Eng 1N_F) and PP14 (e.g. Eng 2 N_F) are shed.
Depress EMERG CUTOUT
Confirm Direct Battery consumers remain supplied (e.g. T_4)
Reset Direct Battery
Reset LH and RH Bus Shed

AC Power

Deselect LH Inverter
Confirm automatic transfer to RH Inverter

Reset LH inverter and deselect RH Inverter
Confirm automatic transfer to LH Inverter

Reset RH Inverter

12. Shut down

Shut down the engines 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 and the results recorded on the front sheet.

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.

Eng 1	Sat/Unsat
Eng 2	Sat/Unsat

13.3 Standby Static Source (see para 8.3)

If the aircraft is equipped with a standby static source, record the information below:

	NORM	STBY	Correction (placard)
ALT			-120ft
IAS			-15kt

13.4 Autorotation (see Appendix 3)

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

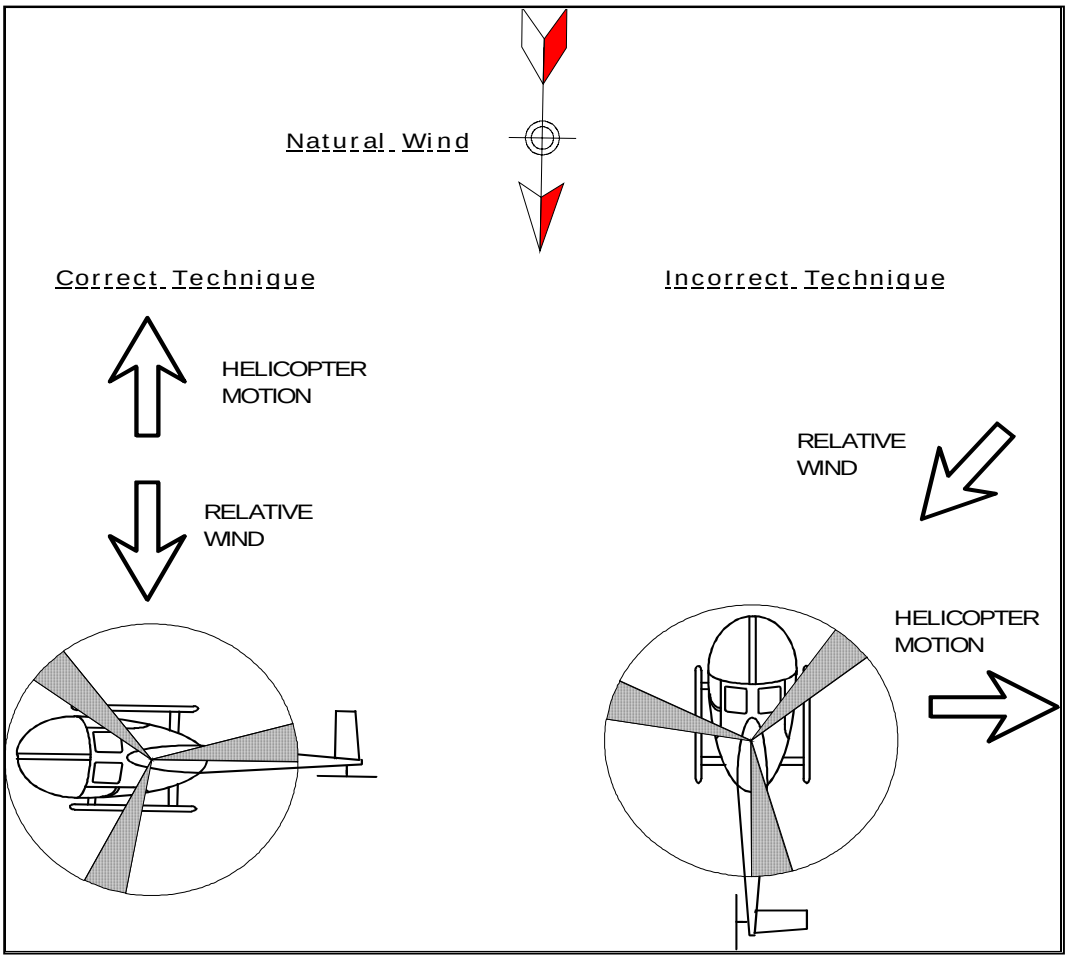
Achieved autorevs		%	
Schedule autorevs		%	Tolerance =0/+10rpm

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 120kt, 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
With feet close to but removed from the pedals, turn heading bug 90° right

Confirm aircraft turns onto new heading ±1°

Repeat for a 90° left heading change

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°

Confirm that during the above manoeuvres, no pedal drift occurs

A2.3 Co-ordinated turns

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 120kt approx, engage ALT mode at less than 1000fpm V/S
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.
Confirm excess deviation annunciation on Monitor panel at approx. 120ft error.

Release cyclic and allow aircraft to recover to datum.

A2.5 V/S Mode

At 120kt approx, set VSI index to zero and engage V/S mode

Select a rate of climb of 500fpm and confirm aircraft stabilises in the climb. Adjust power as necessary to maintain IAS approx 100 –120kt.

Change VSI index to demand a rate of descent of 500 fpm.
Confirm aircraft follows the command and stabilises in the descent. Adjust power to maintain IAS approx 100 – 120kt

When stabilised, engage ALT mode.
Confirm aircraft stabilises at the altitude of selection with minimal undershoot

A2.6 IAS Hold

At 120kt 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

Confirm altitude is maintained within ± 50ft

Override IAS hold by fwd cyclic input.

Confirm excess deviation annunciation on Monitor panel at approx. 15kt error.

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

Release cyclic and allow aircraft to recover to datum.

A2.7 Beep trim

Confirm satisfactory functioning of P_1 & P_2 cyclic beep trim

A2.8 Fly Through

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

A2.9 Go around

Confirm Rad Alt is tracking correctly in the normal operating range.

Engage AUTOPILOT and trim the aircraft at 100kt, 300fpm RoD

Trim the aircraft into a 20° banked turn.

When stabilised, press GA
Confirm the aircraft rolls wings level and reverts to IAS mode with a commanded airspeed of 75kt.

A2.10 ILS

If possible, an ILS approach should be performed.

Appendix 3

Rotor rpm in Autorotation

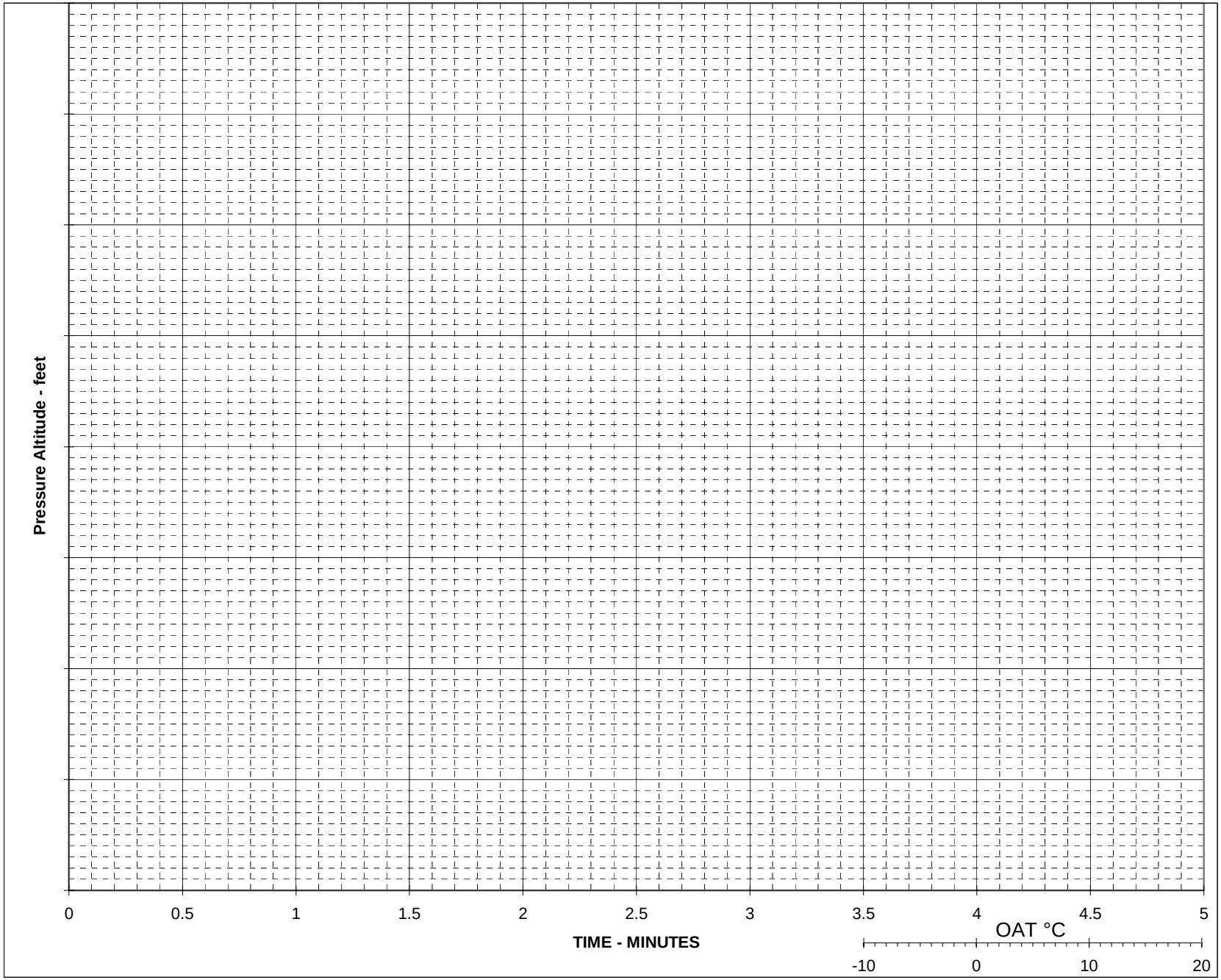
This test will normally be performed as a separate flight. The aircraft weight must be less than 2000kg

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

DO NOT EXCEED POWER-OFF ROTOR RPM LIMITATIONS (425rpm)

P. Alt	OAT	IAS	N_R	Fuel	AUW
Ft	ºC	Kt	rpm	Kg	kg

NOTE: Autorevs must be checked against the schedule and the results recorded in section 13 of this document



AIRCRAFT TYPE
REGISTRATION
DATE OF TEST

Mean Altitude		
No 1	_____	ft
No 2		ft
Mean OAT		
No 1	_____	°C
No 2		°C
Mean Weight		
No 1	_____	lb/fg
No 2		lb/kg
Corrected Weight		
No 1	_____	lb/fg
No 2		lb/kg
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