

CHECK FLIGHT CERTIFICATE



Agusta Westland AW 139

CFS 349 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* <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 flight test 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 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.

CHECK FLIGHT SCHEDULE



Agusta Westland AW 139
PWC PT6C-67C

CFS 349 issue 1

Registration

Test Dates

1. INTRODUCTION

This schedule is applicable only to the Agusta Westland AW139 helicopter. It is based on the assumption that the every day operation of the helicopter services as a continuous check on the functioning of all normal services.

The Flight Test must be carried out by an experienced pilot acceptable to the AW Division of the CAA in accordance with this schedule and the general guidance given in the CAA Handbook for Airworthiness Flight Testing. 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. Although it may be legal to carry passengers on a Check 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 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, Airworthiness Evaluation and Surveillance, 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 Flight Test 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 the spaces provided.

Operator/Maintenance Organisation	<input type="text"/>	Registration	<input type="text"/>
Aerodrome	<input type="text"/>	Flight Date	<input type="text"/>
		Pilot	<input type="text"/>
		Observer	<input type="text"/>
Weather	<input type="text"/>		
Aerodrome altitude	<input type="text"/>	QFE/QNH	<input type="text"/>
Wind velocity/direction	<input type="text"/>	Ground Temp	<input type="text"/>
Take-off time	<input type="text"/>	Landing Time	<input type="text"/>

2. LOADING

The aircraft is to be loaded with full fuel and any necessary ballast to achieve a take-off weight of 6400 Kg. The C.G. should be approximately in the neutral position.

Take-off weight (actual)	<input type="text"/>	Kg
Fuel contents	<input type="text"/>	
C.G. position	<input type="text"/>	mm aft of datum

3. PRE-FLIGHT INFORMATION

Aircraft model	<input type="text"/>
Constructors No.	<input type="text"/>
Total airframe hours	<input type="text"/>
Floats?	<input type="text"/>

Engine model	<input type="text"/>	
Serial number	<input type="text"/>	<input type="text"/>
Hours run since new	<input type="text"/>	<input type="text"/>
Hours run since overhaul	<input type="text"/>	<input type="text"/>

4. PRE-FLIGHT CHECKS

Carry out the normal external inspection.

Nav and anti-collision lights

Landing lights

Note emergency flotation cylinder pressure, if fitted.

Carry out the normal pre-flight inspection.

Doors and transparencies: Conditions and operation

Seats and harnesses

Placarding: Legibility and accuracy

Instruments: Legibility and accuracy of colour bands and markings. General condition.

Engine beep trim switches, in MANUAL mode motor No1 and No 2 levers through MIN to MAX positions. Leave in FLIGHT position.

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Freedom, range of travel, adjustment of flight control

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With battery switch on, check:

AWG. Press TEST for less than 6 seconds, check that all the voice alarms are *not* heard (only AURAL SYSTEM TEST).

Repeat with the TEST held for greater than 6 seconds, check the audio tone and voice alarms are all given (refer to RFM list)

LAMP TEST pusbutton, check all lamps functioning (refer to RFM list).

Engine Start:

Check rotor brake caution illuminates with brake on
Disengage rotor brake,caution light out

During engine start up (to IDLE), check and record:

Residual ITT

Maximum ITT

Eng 1	Eng 2

Both flight hydraulic systems, pressure available
immediately on rotor engagement.

Ground idle N2/Nr $65 \pm 1\%$

Fuel pump and XFEED checks (RFM Normal
Procedures)

Record fuel pump pressures:

No1		No 2	
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Before Take-off Checks complete ?

5. TAXIING CHECKS

Taxy time

5.1 Parking brake satisfactory

5.2 During taxi, depress pilot's brakes and insure that the
aircraft comes to a smooth controlled stop with no
indication of binding or swerving.

5.3 Turns :

a) Perform a ground taxi turn to the right by depressing the
right pedal. Increase to a tight turn. There should be no
indications of binding in the pedals.
(Do not depress the brakes during this check).

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

6. POWER ASSURANCE

Carry out an engine power check on each engine in turn in accordance with the **Flight Manual Section 4**.

Allow conditions to stabilise then record.

ENG	PRESS ALT	OAT	TORQUE	ITT	NG	Fuel Flow	N _R	CHART ITT	CHART NG	ΔITT	ΔNG
1											
2											

Take-off time

7. LOW SPEED ENVELOPE

7.1 Helipilot engaged in ATTD mode. 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 up to the Flight Manual limit (typically 45 kts in temperate conditions). If this would result in a groundspeed in excess of 20 kts, the speed may be restricted to avoid exceeding this value if desired.

a) Axial turns left and right

b) Sideways flight left and right

c) Rearwards flight

7.2 Disengage ATT and carry out gentle hover manoeuvres in SAS mode, repeat AFCS disengaged (it is not necessary to fly sideways/rearwards up to limit speeds).

Re-engage Helipilot/auto flight system, note smooth re-engagement.

8.1 CLIMB PERFORMANCE #1 Eng OEI TNG

OEI power ratings are not permitted for use for non emergency conditions, the Training Rating is used to simulate real OEI Maximum Continuous Power (140% torque). With the altimeter set to 1013 mb (29.91 in hg) climb at Training OEI 2.5 minute power at the scheduled en-route climb speed, landing gear retracted, for 3 minutes.

Set TQ LIM ON (TQ LIMITER advisory illuminated)	
Fly level at Vy, 80 KIAS	
Select OEI TNG switch to ENG #1 PFD: ENG #2 displays PI = 0 and Nf = 0 "OEI TNG" MFD: Shows normal AEO torque and Nf	
Increase power to 140% total torque	

Torque (total)	140%	Should not be a limiting parameter
(ITT	775°C)	
(Ng	102.4%)	
NR	100%	
IAS	80 Kts	

Time	Alt	OAT	IAS	Torque	ITT	Ng	NR	Engine Oil Temp Press Eng 1		Fuel
0										
0.30										
1.00										
1.30										
2.00										
2.30										
3.00										

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

Alt	
OAT	

Deselect OEI TNG

8.2 CLIMB PERFORMANCE #2 Eng OEI TNG

Repeat of 8.1 for check of # 2 training system.

Set TQ LIM ON (TQ LIMITER advisory illuminated)	
Fly level at Vy, 80 KIAS	
Select OEI TNG switch to ENG #2 PFD: ENG #1 displays PI = 0 and Nf = 0 "OEI TNG" MFD: Shows normal AEO torque and Nf	
Increase power to 140% total torque	

Torque (total)	140%	Should not be a limiting parameter
(ITT)	775°C)	
(Ng)	102.4%)	
NR	100%	
IAS	80 Kts	

Time	Alt	OAT	IAS	Torque	ITT	NG	NR	Engine Oil Temp Press Eng 2	Fuel
0									
0.30									
1.00									
1.30									
2.00									
2.30									
3.00									

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

Alt	
OAT	

Deselect OEI TNG

9. HANDLING

Note:-

It is permissible to carry out 9.3 (autorotation) before 9.1 and 9.2 if the helicopter is at high altitude after performing item 8.

9.1 Cruise

9.1.1 At a normal cruising speed and power, check and record the following items:

	<i>PRESS ALT</i>	<i>IAS</i>	<i>OAT</i>	<i>ENGINE</i>	<i>NG</i>	<i>ITT</i>	<i>TORQUE</i>
PILOT				1			
CO-PILOT				2			
STANDBY							

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

ASI's should agree to within ± 5 knots.

Check VSI's for correct operation.

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With windows, vents and heater/ECS off, select ALTERNATE static source. Note altitude and speed increase. Maximum permitted 200 ft.

Pilot's side
Co-pilot's side

Δ Alt	Δ Speed

9.1.2 At normal cruise power and speed carry out steep turns left and right.

Vibration level

Control response

9.2 Maximum Speed Test

9.2.1 Determine Vne from placard before next test.

Increase speed progressively to placarded V_{NE} using up to maximum continuous power.

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9.2.2 Carry out gentle turns (up to 20° left and right).

Note: Vibration level
 Control response

9.3 Autorotation

NOTE

Due to the possibility of apparent exceedance of the power-on limit due to a delay in changing from power-on to power-off limits, autorotation testing is optional depending on company policy.

9.3.1 Carry out a steady autorotative descent at 80 KIAS (maintain engine mode switches in FLIGHT position).

NOTE:

Do not exceed power off rotor rpm limitations (95 to 110%).

Carry out turns (up to 30° AOB) left and right in autorotation.

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9.4 Rapid Engine Acceleration

Set 60% torque (LD-SH switch in matched torque position) and note approximate collective position. Maintain engine mode switches in FLIGHT position and descend with at least 10% torque set at approximately 80 KIAS. Increase collective to give about 60% torque in not less than 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 60% matched torques.

NOTE 2

Do not reduce below N_R limit (95% transient).

Note: Engine response
 Transient droop $N_R\%$

10. AFCS CHECKS

10.1 At approximately 135 KIAS with AP1 + AP2 engaged check the aircraft returns to its original attitude, with a maximum of one slight overshoot, after the following disturbances:-

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).

10.2 Repeat 10.1 with only AP1 engaged.

Reduce airspeed to 130 KIAS.

(Note RFM limitation of 140 KIAS and 100 KIAS in climb)

i) Pitch

a) 5° nose up.

b) 5° nose down

ii) Roll

a) 10° left

b) 10° right

iii) Yaw

Note satisfactory functioning.

Re-engage AP2 and deselect AP1

i) Pitch

a) 5° nose up.

b) 5° nose down

ii) Roll

a) 10° left

b) 10° right

iii) Yaw

Note satisfactory functioning.

Re-engage AP1,

10.3 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).

10.4 ALTITUDE HOLD

i) At a normal cruise speed engage ALT hold,

ii) Check altitude is held ± 50 ft.

iii) With heading hold also engaged gently reduce torque by about 20% (by over-riding collective ~ do not use FTR or beep trim or altitude will re-datum). Note excess deviation threshold "Altitude, Altitude" (at 150 ft deviation). Release collective, check return to datum ± 50 ft.

iv) Use cyclic inputs to override ALT hold and check return to datum ± 50 ft.

v) a) 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.

10.5 AIRSPEED HOLD

- i) a) From trimmed level flight at 130 KIAS with fixed collective and heading hold engage and IAS mode, move cyclic aft against trim and establish approximately 120 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 airspeed trim rate (cyclic trimmer) is approx 3 Kts/sec.
- iii) Engage ALT mode and attempt to beep airspeed to V_{ne} , check that airspeed reference bug is $V_{ne} - 5$ KIAS, confirm this speed is not exceeded.

10.6 HEADING HOLD

In 4 AXIS (ALT, IAS, HDG modes) check correct operation of heading hold during flight at normal cruise

10.7 NAV COUPLING

At a typical cruise speed check tracking in NAV mode (LNAV typically).

10.8 ALTA Mode

Deselect all modes other than HDG (if required).

- i) a) At 120 KIAS select an altitude approx 1000 ft higher than current and engage ALTA. Note automatic engagement of IAS mode and 1000 fpm vertical speed.
- b) Alter vertical speed reference by both collective beep trim and collective FTR button. (NOTE: RFMS 67 states that above 1500 fpm the system may transition to ALT.)
- c) Confirm transition to ALT mode and IAS mode remains engaged.
- ii) Repeat for a descent of 1000 ft, 750 fpm vertical speed.

Power Limiting:

- ii) a) At 140 KIAS select an altitude approx 2000 ft higher than current and engage ALTA. Progressively increase vertical speed using collective beeper whilst monitoring the PI. Note PI limiting function activates and amber LIM displayed beside the collective cue. Maximum 97%.
- b) Continue increasing vertical speed reference, note airspeed will reduce to achieve the demanded vertical speed.

10.9 SAR MODES (If Fitted) (Supp 69)

NOTE

If a landing has been carried out since the initial takeoff the system will need to be re-initialised prior to the MOT test.

- i) a) Over suitable terrain/sea carry out Transition Down Mode (TD/H), check 80 KIAS achieved at 200 ft level flight. IAS and RHT Modes automatically engage. Confirm heading can be changed through collective 4 way switch.
- b) Continue transition down to hover (TD/H), check 50 ft at 0 kts groundspeed achieved. RHT and HOV modes engage automatically. Change reference hover height using collective FTR and collective beep (note audio tone). (Feet off pedals.)
- c) Change hover velocity vector reference using cyclic FTR and cyclic beep then set to zero by pressing the cyclic beep trim switch centre position.
- d) Check correct operation of Winchman Trim Mode (WTR), check pilot can override Hoist operator inputs. Confirm pushing the centre position resets the ground speed.
- e) Perform a transition up from the hover (GA pushbutton), note rate of climb of 200 fpm (groundspeed up to 25 kts) or 750 fpm (groundspeed 25 to 60 kts). At reference height of 200 ft RHT automatically engages and accelerates to 80 KIAS.
- ii) MOT Mode. Engage MOT mode in a suitable location (preferably with crosswind at engagement) and note correct functioning of system (see RFMS 69 description of PFD indications). The aircraft should be into wind at the FHAF.
- iii) Fly-Up. Beep hover height to 100 ft. Without using beep or FTR push down on collective to reduce height below the 80 ft safety height. Release collective, confirm Fly-Up is triggered ("Altitude Altitude" and HTLM caption) and safety height is regained.

10.10 SAS MODE

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

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10.11 AFCS OUT (AP1 and 2 Disengaged)

Note RFM limitation of 140 KIAS, 100 KIAS in turbulence

At 110 KIAS disengage both AP 1 and 2. Carry out turns, climbs and descents. Check smooth disengagement/re-engagement.

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10.12 Go-Around Mode

- a) Align the heading bug with present heading.
- b) Set up 110 to 120 KIAS (IAS mode), 500 fpm descent (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 commands wings level (and then constant heading) 1000 ft/min and speed at engagement held.

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g) Rotate heading bug left or right 30° and check new heading is acquired.

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10.13 ILS (Optional)

Carry out a coupled ILS at 110 to 120 KIAS in DCL mode. Check correct operation of speed reduction to 80 KIAS (at a height not below 200 ft). Check Autolevel mode initiation at 150 ft and level off at 50 ft.

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11. FUNCTIONING

11.1 Check the following items for satisfactory functioning:

Windscreen demisting system (including hot air)

Heater

11.2 Landing Gear

Caption and voice warning 'LANDING GEAR' below 150 ft with gear up.

At 120 KIAS record:

Time to lower

Time to raise

12. LANDING

12.1 If a hard surface is available, carry out running landing at up to 30 Kts groundspeed with nosewheel locked.

12.2 Confirm no tendency for lateral padding or 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.

Landing time.

13. SYSTEMS CHECKS

13.1 Electrical System Checks

a) **Single Generator Failure**

Switch off each generator in turn, 1(2) DC GEN caution light. NON ESS BUS 1 & 2 lost (e.g. co pilot cockpit vent, ECS cockpit and cabin)

b) **Double Generator Failure**

Switch off both generators, 1-2 DC GEN Warning NON ESS BUS 1 & 2 and MAIN BUS 2 lost but other Buses remain on line. Switch on BUS TIE, check MAIN BUS 2 restored (e.g. pilot cockpit vent, co-pilot MFD).

13.2 Intercom System (Audio Panel Failure)

Check that the pilot and co-pilot intercom systems function in back-up mode.
Check intercom and radio transmit still functions.

13.3 Engine Shutdown

Shutdown the engine.

If rotor brake is fitted check for satisfactory operation from 40%.

Cockpit lighting.

14. POST FLIGHT ACTION

14.1 Performance Climb

Plot out the data on the analysis sheet provided and determine the achieved rate of climb (RoC). The scheduled performance must be obtained from the flight manual (OEI Max Continuous power) and compared with the achieved performance.

Record the results on the front sheet.

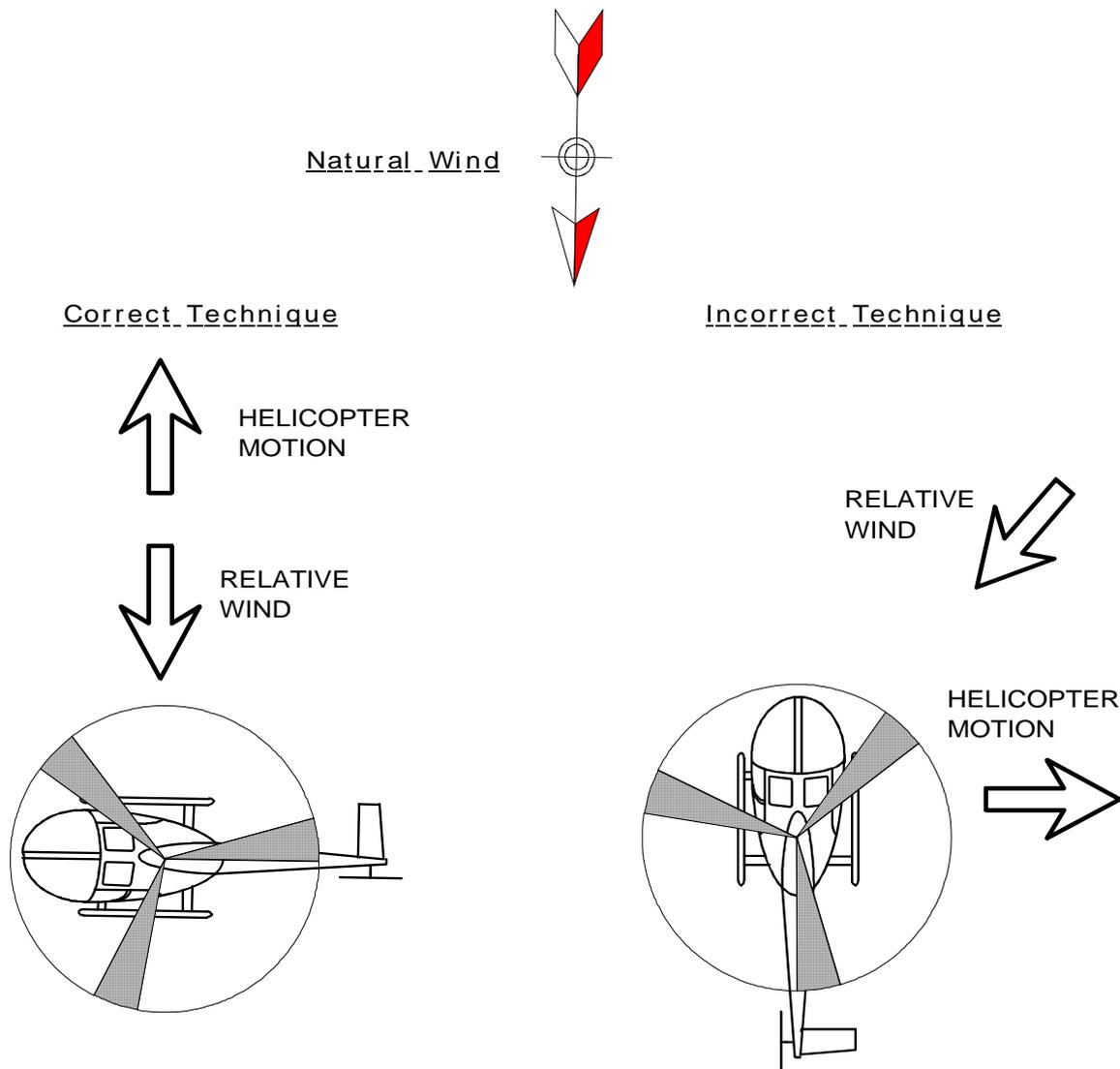
14.2 Power Assurance

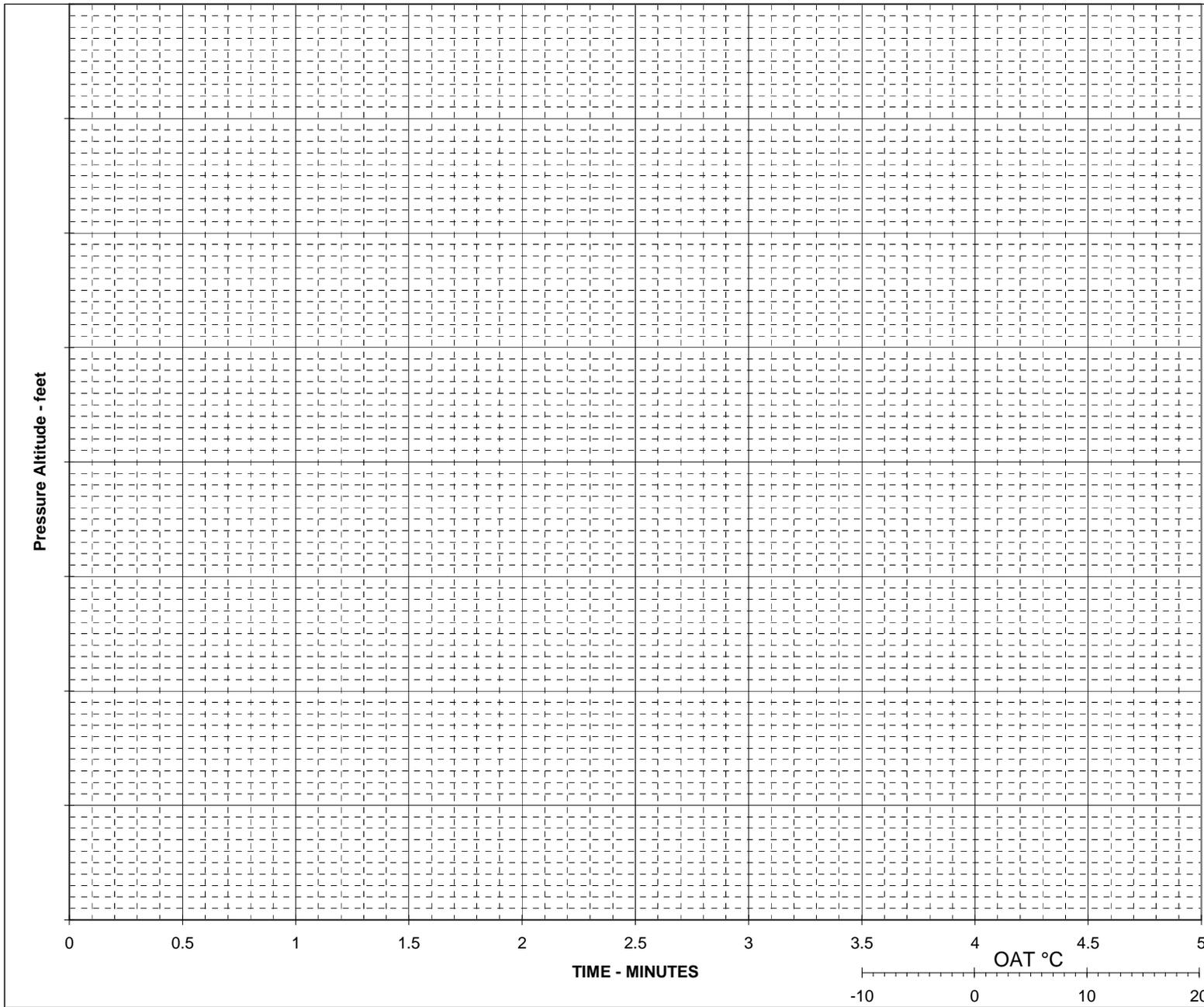
Use the Power Check Chart in the Flight Manual to determine the scheduled ITT and NG and record the values in section 6.

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.





<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