| ISO 9001: 2015 CERTIFIED | Civil Aviation Authority of Fiji<br>**Airworthiness Flight Test Report – Single Piston Engine Helicopter** | Form<br>**AW 109L** |
|---|---|---|

| **Single Piston Engine Helicopters** | | | | **Registration: DQ-** | |
|---|---|---|---|---|---|
| **Date:** | | **Crew:** | | **Engineer** | |
| **Performance** | Climb #1 | | | | |
| | **Engine # 1** | | | | |
| Average Weight | | | **Airfield:** | | |
| Average Temp. | | | **$^0$C** | **AUM Kg/Lbs*:** | |
| Average Altitude | | | **ft** | **Takeoff cg:** | |
| Speed | | | **KIAS** | **Performance:** | |
| Achieved Rate | | | **fpm** | | |
| Scheduled Rate | | | **fpm** | **SATISFACTORY*** | |
| Margin | | | **fpm** | **UNSATISFACTORY*** | |
| Permitted Margin -70 | | | **fpm** | **NOT APPLICABLE*** | |
| | | | | **** (delete as applicable)*** | |

Note: The provision of false information, or failure to disclose information, relevant to the grant of an aviation document constitutes an offence under Section 17A(5)(b) of the Civil Aviation Authority Act 1979, and Regulation 128 of the Air Navigation Regulations 1981. The applicant will be subject to prosecution as well as the revocation, suspension or cancellation, of their aviation document, or in the event of initial issue, the rejection of the application.

**ENGINEER'S DECLARATION**

I certify that all the Check Flight Test results are within the specified allowable tolerances, and that the achieved climb rate was above*/ below* scheduled. If below, complete box X:

| **Name:** | **Signed:** | **Date:** | **Licence No:** |
|---|---|---|---|
| | | | |

**Box X**: The climb rate was below scheduled but was accepted for the following reason:
**Note**: Aircraft with climb shortfalls more than 70 fpm must not be accepted.

| Airworthiness Check Flight Test Report (continued) | | DQ- | |
|---|---|---|---|
| **No.** | **Defect** | **-/R/FT** | **Action?** |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| **Conclusions and comments:** |
|---|
| |

Note: The provision of false information, or failure to disclose information, relevant to the grant of an aviation document constitutes an offence under Section 17A(5)(b) of the Civil Aviation Authority Act 1979, and Regulation 128 of the Air Navigation Regulations 1981. The applicant will be subject to prosecution as well as the revocation, suspension or cancellation, of their aviation document, or in the event of initial issue, the rejection of the application.

**PILOT-IN-COMMAND'S DECLARATION**

I CERTIFY that I have tested the above aircraft, in accordance with this Check Flight Test Schedule, and have detailed the deficiencies and unsatisfactory features above.

| **Name:** | **Signed:** | **Date:** | **Licence No.:** |
|---|---|---|---|
| | | | |

| **For CAAF Use only** | | | | |
|---|---|---|---|---|
| **Report Logged by:** | **Appointment:** | **Date:** | **Sign:** | **Comments:** |
| | **AA - AW** | **/ / 20** | | |
| **Report seen by:** | **AEI** | **/ / 20** | | |
| | **FOI - RW** | **/ / 20** | | |
| | **SAMEI** | **/ / 20** | | |
| | **SFOI - D** | **/ / 20** | | |

## General

Only CAAF personnel and pilots specifically accepted and briefed to carry out CAAF Airworthiness Check Flight Schedules Flight Tests may conduct the test.

| | |
|---|---|
| ***Crew**:* | Captain, co-pilot (if applicable), Flight engineer. |
| ***Airfield**:* | Departure airfield. |
| ***AUM**:* | The aircraft shall be loaded to maximum all up weight if possible, and record the weight at first engine start. Also delete Kg or Lbs as appropriate. *Take-off cg:* Actual C of G at lift-off. |
| ***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 rechecking 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 importance that CAAF 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. |

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

# GENERAL NOTES AND GUIDANCE.

1. **CAAF Check Flight Schedules (CFS)**

This scheduled is applicable to single engine helicopters under 2730kg (6000 lb) maximum weight, where a dedicated schedule for the type does not exist. It assumes that the everyday operation of the helicopter serves as a continuous check on the correct functioning of all normal services.

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. CAAF policy is that pilots who conduct Check Flight Schedules flight tests 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 flight test within the last 4 years. The Authority does not accept responsibility for the use of a CAAF CFS on a test flight not directly under their control.

## WARNING

1. Although it may be legal to carry passengers on a check flight test with a Certification of Airworthiness in force, it is strongly recommended, for Airworthiness Check Flight Schedules Flight Tests and other tests which entail a greater risk than normal flight, that:

a) If passengers are being carried for weight and balance purposes, it is preferable to use ballast; and

b) Before accepting any passengers on a check flight test the Pilot-in-Command must inform them that the risk is greater than on an ordinary flight; and

c) Adequately insured; “Aircraft Insurance” to ensure that the check flight is covered under their Insurance, including the carriage of passengers, and that any passengers are briefed on emergency procedures and use of safety equipment.

2. Under no circumstances are the limitations contained in the CAAF 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 Engineer 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. Dual controls should be removed if flying with an inexperienced Engineer observer.

2. **After the Flight Test**

All defects should be recorded on the Check Flight Certificate even if the necessary rectification action may seem trivial. These lists enable the CAAF to identify problems with other rotorcraft of a particular type and so initiate the necessary corrective actions.

The Check Flight results should be compared with the Flight Manual or others designated on the C of A, and special note should be made of any features that would make the rotorcraft dangerous or unsafe. Generally speaking these include, but are not limited to:

Inadequate climb performance;

a. Engine power assurance below scheduled minimum;

b. Engine power limiter set too high or too low;

c. Autorotation RPM too low;

d. Unreliability of seat locking;

e. Any other functional items that bring with them special risks for a particular helicopter, having due regard to the work for which the helicopter is certificated.

Where the observed performance of helicopter is outside the specified limits, the Operator should ensure that such inspections or repair work as are considered necessary to restore it to an acceptable level are carried out. A further Check Flight should be carried out as necessary.

3. **Interpretation of Results**

The data against which the results must be assessed shall be that contained in the Manual designated on the C of A of the helicopter.

4. **Performance Climb**

The achieved rate of climb is determined from the Check Flight results. A graph of the height climb must be plotted and the best line drawn through the points. This line is then used to calculate the average rate of climb. For some rotorcraft in certain conditions the height versus speed time graph should be a curve, i.e. rate of climb reduces with height. In these cases a tangent to the curve could be drawn at the mid-climb point and used to calculate the rate of climb. The achieved rate must be compared with the scheduled rate of climb extracted from the designated Manual, appropriate to the actual aircraft weight, the mean performance climb check altitude and the average outside air temperature at that altitude. The achieved and scheduled rate of climb must be recorded on the Check Flight Report.

5. Common causes of inadequate climb performance

Where the achieved climb performance is not at an acceptable level, the following checklist, which is not necessarily definitive, may be considered when seeking a remedy:

**a. General**

- Pilot out of practice;
- Weather: turbulence, waves, and temperature inversion.

**b. Instruments**

- Incorrect reading of IAS (it is easy to confuse, or to substitute, CAS for IAS, or knots for mph);
- Faulty ASI (e.g. leaks, blockages including water, instrument unserviceable);
- Faulty altimeter (including static system);
- Faulty Outside Air Temperature Indicator;
- Faulty torque meter or manifold pressure gauge (including calibration errors);
- Faulty gas generator tachometer or turbine inlet temperature gauge;
- Faulty rotor rpm gauge;
- Faulty fuel gauge.

**c. Weight**

- Unrecorded growth of empty weight;
- Miscalculation of check weight.

**d. Engine**

(1). Piston Engines:

Some causes of power loss with piston engines are given below:

- Air fuel ratio: Too rich mixture setting;
- Preheating of induction air through wrong setting of carburettor heat lever;
- Inability to achieve full throttle opening;

- Incorrect fuel delivery pressure, causing too rich a mixture;
- Lack of adequate cylinder compression, (e.g. spark plug seating);
- Incorrectly fitted exhaust system;
- Ignition timing;
- High engine temperatures;
- Carburettor ice accumulated during operation at part-throttle, failing to clear before operation at full throttle;
- Turbocharger inoperative.

6. **Autorotation check**

The primary purpose of the autorotation check is to ensure that the collective rigging is correct; i.e. the scheduled rotor rpm is achieved with the collective fully down and the needles split. The stabilised rotor rpm at a given altitude, weight and OAT must be compared with the scheduled data in the Flight Manual.

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

The crew are expected generally to monitor the behavior 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.

Should there be any query about the Flight Test and or its results, the Authority's Airworthiness Section, or the Flight Operations Inspector – Rotary Wing, must be consulted.

# AIRWORTHINESS CHECK FLIGHT SCHEDULE

1. Pre-Flight Information

| | | | |
|---|---|---|---|
| Aircraft Variant | | Engine Variant | |
| Registration | | Engine Nr | |
| Airframe Nr | | 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.

| | |
|---|---|
| Take-off Weight | |
| Fuel | |
| 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 | | |
| 4.2 | Doors & windows : Condition & operation Seats & harnesses | | |
| | Placards: Legibility & accuracy | | |
| 4.3 | Instrument marking : Legibility, general condition & accuracy of colour bands & marking (where fitted) | | |
| | ASI | | |
| | Rotor Tachometer | | |
| | Manifold Pressure | | |
| | Engine Tachometer | | |
| | Fuel Pressure | | |
| | EOP | | |
| | EOT | | |
| | Voltmeter | | |
| | Ammeter | | |
| | Other Instruments | | |
| 4.4 | Freedom, range of travel, friction of : | | |
| | Cyclic control | | |
| | Collective control | | |
| | Throttle | | |
| | Freedom, range of travel & adjustment of yaw control | | |

5. Starting

5.1 Carry out a normal engine/rotor start. Note:

| | Sat/Unsat | |
|---|---|---|
| Ease of starting | | |
| Clutch fully engaged | | Rrpm/% |

5.2 Magneto check Nominal engine rpm ____ Erpm/%

Manifold pressure ____ in

| | Observed Erpm Drop | Schedule |
|---|---|---|
| No. 1/LH Mag Deselected | | rpm |
| No. 2/RH Mag Deselected | | rpm |

5.3 Freewheel check

With engine governor deselected, close throttle rapidly to idle. Note freewheel disengagement

| Actual | Requirement |
|---|---|
| | |

Note rotor rpm at which Horn & Light operate.

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

5.4 Pre flight checks

| | Sat/Unsat | Remarks |
|---|---|---|
| Rotor response to small cyclic inputs | | |
| Pedal/Yaw response | | |
| Mixture control | | |
| Cyclic Trimmer | | |
| Carb Heat | | |
| Warning Systems | | |

5.5 With engine warm up completed and all temperatures stabilised note the following:

| | Obs |
|---|---|
| Manifold Pressure | |
| Engine Oil Pressure | |
| Engine Oil Press | |
| Carbs Air Temp | |
| Cylinder Head Temp | |
| Transmission Oil Temp | |
| Generator Charge Rate | |
| Fuel Press. Pump ON (if fitted) | |
| Pump OFF (if fitted) | |
| **Reselect fuel pump ON** | |

6. Hover Checks

Take off Time

6.1 Lift to a low hover and note satisfactory throttle correlator behavior.

Assess the Control response, control margin and vibration level during the following maneuvers: (see appendix 1 for test method)

| | | speed | remarks |
|---|---|---|---|
| Axial Turns | Left | | |
| | Right | | |
| Sidewards flight to 17kt(20mph) | Left | | |
| | Right | | |
| Rearwards flight to 17kt(20mph) | | | |

6.2 Collective Balance

Land and adjust collective friction to fully OFF. Lift to a hover and check any tendency for collective to throw pitch either on or off.
Land and reselect collective friction as required.

6.3 Hover Performance

In a stabilised 3 ft hover, record the following parameters

| | | |
|---|---|---|
| Press. Alt | | ft |
| OAT | | °C/°F |
| Wind | | kt |
| Fuel | | lb/kg |
| Manifold Press. | | in. |
| ERPM | | rpm/% |
| RRPM | | rpm/% |
| Carb Air Temp | | °C/°F |
| Engine Oil Temp | | °C/°F |
| Engine Oil Press | | psi/bar |
| Transmission Oil Temp | | °C/°F |

7. Performance. En-route climb

With the altimeter set to 1013mb (29.91in hg), climb at Maximum Continuous Power at the scheduled en-route climb speed for 3 minutes.

When a stable condition has been established on a steady heading with zero yaw, and in as calm conditions as possible,

Record the following:
Fuel at start of climb _____ Time at start of climb _____

| *Time* | *Alt* | *OAT (1)* | *IAS* | *Man Press* | *Eng Rpm(2)* | *CHT* | *Carb Air Temp* | *Trans Press* | *Eng Temp* | *Eng Press* |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | | |
| 0.30 | | | | | | | | | | |
| 1.00 | | | | | | | | | | |
| 1.30 | | | | | | | | | | |
| 2.00 | | | | | | | | | | |
| 2.30 | | | | | | | | | | |
| 3.00 | | | | | | | | | | |
| 3.30 | | | | | | | | | | |
| 4.00 | | | | | | | | | | |

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 |

(1) If the helicopter is not equipped with an OAT gauge, the variation of OAT with altitude must be determined from Met information.

(2) On some helicopter types, it is required to set a rotor rpm for the climb, rather than engine rpm. If this is the case, record rotor rpm in this column.

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

8. Autorotation

8.1 Perform a gentle entry to a steady autorotative descent at the recommended IAS with the collective lever fully down.

Note: Controllability on entry

8.2 Record when stabilised:

| P. Alt | OAT | IAS | Rrpm | Erpm | Fuel |
|---|---|---|---|---|---|
| | | | | | |

Note 1: It may be necessary to reduce the engine speed to achieve a full "needles split" autorotation.

Note 2: Do not exceed power-off rotor rpm limitations.

8.3 Carry out turns left & right in autorotation

8.4 Carry out a normal recovery from autorotation.

Note: Engine response & throttle correlation.

**NOTE**: Autorevs must be checked against the schedule where appropriate – see section 13 of this document.

9. Handling

9.1 Cruise

At normal cruise power, trim the helicopter for level flight and record:

| Note: | | | | | | |
|---|---|---|---|---|---|---|
| | P.Alt | | ft | Carb Air Temp | | °C/°F |
| | MAP | | in | Eng Oil Temp | | °C/°F |
| | OAT | | °C/°F | Eng Oil Press | | psi/bar |
| | AUW | | kg/lb | Trans Oil Temp | | °C/°F |
| | IAS | | kt/mph | Cyl Head Temp | | °C/°F |
| | Rrpm | | %/rpm | Fuel | | kg/lb |

Confirm no excessive mismatch between Engine and Rotor rpm indications.

9.2 Steep turns left & right (approx 45°)

Note: Vibration level

Control response

9.3 Hydraulic System (where fitted)

If servo flying controls are fitted, select MANUAL and check that control loads are not excessive, and control positions are normal in both straight and turning flight. Sat/Unsat

***Reselect servo controls ON***

9.4 Collective Balance

With collective friction fully OFF, check collective balance for any tendency to throw pitch either on or off.

9.5 Cyclic Trim (where relevant)

Confirm satisfactory cyclic trim operation (from each cyclic)

Confirm satisfactory control characteristics when using small cyclic displacements without re-trimming

9.6 Maximum speed test

9.6.1 At a safe altitude, increase speed progressively to $V_{NE}$ max. continuous power (observe placarded $V_{NE}$ limits)

Note:

| | | | | |
|---|---|---|---|---|
| P.Alt ft | | | MAP | in |
| OAT | | °C/°F | $V_{NE}$ | kt/mph |
| Fuel | | kg/lb | Rrpm | %/rpm |
| AUW | | kg/lb | | |

Carry out gentle turns left & right.

| | | |
|---|---|---|
| Note: | Vibration level | |
| | Control response | |

10. Functioning

Perform functioning tests of the following, where fitted, at appropriate stages of the flight.

| | Sat/Unsat | Remarks |
|---|---|---|
| Internal Lighting | | |
| External Lighting | | |
| Instrumentation ASI | | |
| Altimeter | | |
| VSI | | |
| Attitude Indicator | | |
| Turn & Slip | | |
| Compass | | |
| DI | | |
| Tachometer | | |
| Eng. Instruments | | |
| Fuel Gauging | | |
| Ammeter/Voltmeter | | |
| Heating & Ventilation | | |

11. Landing

Check for any tendency to lateral padding or ground resonance during a light touchdown.

Landing time

12. Shut down

12.1 Close the throttle and note stabilised engine idle rpm, before engine and rotor resynchronise.

12.2 Shut down the engine and note:

Satisfactory shut down using Fuel Shut Off Control.

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.

Where no scheduled climb performance is declared by the manufacturer, the rate of climb should be compared with that achieved during the previous C of A air test.

Should the helicopter fail to achieve the scheduled RoC, or if the RoC is significantly worse (more than 20fpm) than the previous result, this must be investigated and a reflight will be necessary.

| | | | | |
|---|---|---|---|---|
| | Achieved RoC | | fpm | |
| | Schedule RoC | | fpm | |
| or | Previous C of A | | fpm | Date |

13.2 Autorotation (see para 8)

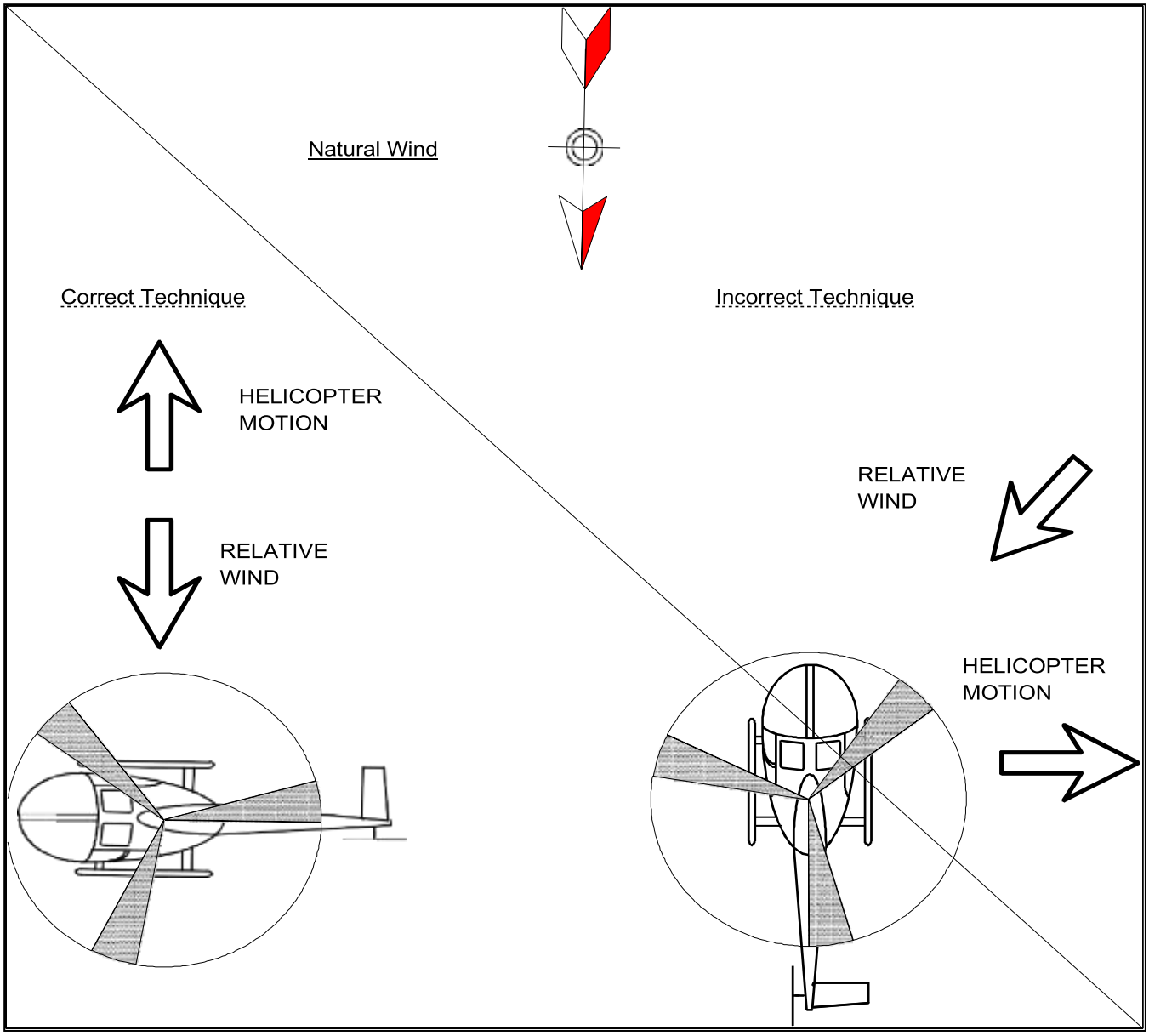
Where appropriate, use the chart in the flight manual to determine the minimum scheduled autorevs.

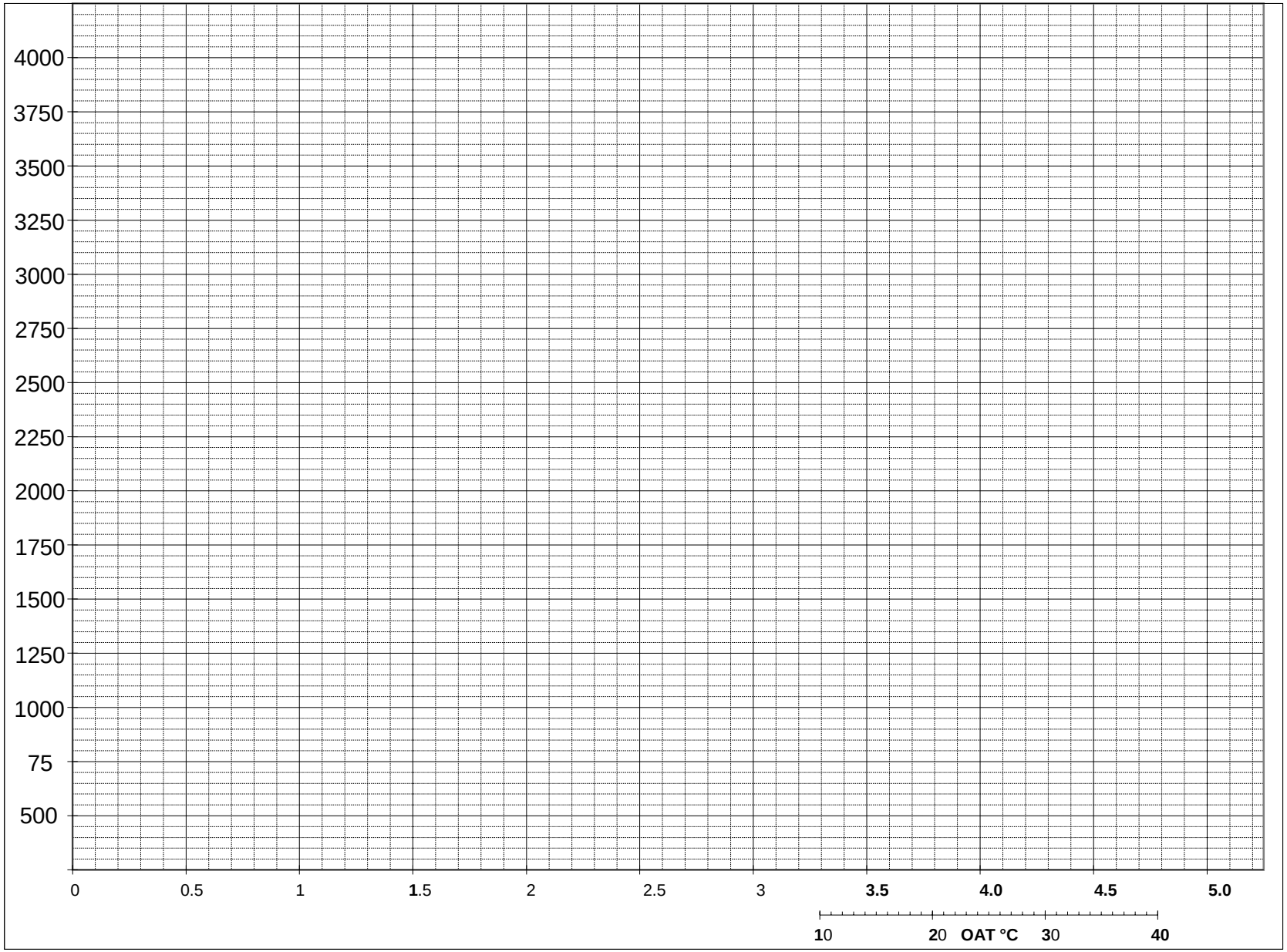
| | | |
|---|---|---|
| Achieved autorevs | | %/rpm |
| Schedule autorevs | | %/rpm |

# 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.






| | |
|---|---|
| **AIRCRAFT TYPE** | |
| **REGISTRATION** | |
| **DATE OF TEST** | |
| Mean Weight | |
| Mean Altitude | |
| Mean OAT | |
| **SCHEDULED ROC** | |
| Basic | **ft/min** |
| **Correction** | **ft/min** |
| **Correction** | **ft/min** |
| **Final SROC** | **ft/min** |
| **Observed ROC** | **ft/min** |
| Difference from Scheduled. **(Observed ROC minus Final SROC)** | **ft/min** |