CHECK FLIGHT CERTIFICATE

Embraer Bandeirante EMB 110 P1/P2/K1 (TWO PT6A-27) **CFS 181 Issue 1**

Date:	Crew:	Observer:	Registration:

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	-70	-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 Handbook for Airworthiness Flight Testing.

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 Handbook for Airworthiness Flight Testing.

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 test flight not directly under their control.

CHECK FLIGHT SCHEDULE

Embraer Bandeirante EMB110 P1/P2/K1 (TWO PT6A-27) **CFS 181 Issue 1**

Registration	
Flight Date	

1. INTRODUCTION

This schedule is applicable to the Embraer 110P1, 110P2 and 110K1 aircraft. It is based on the assumption that everyday operation of the aeroplane serves as a continuous check on the functioning of all normal services. On this test flight, however, 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 data contained in this schedule is correct at the time of issue, but might not be in agreement with subsequent Pilot's Operating Handbook amendments. In case of conflict the current Pilot's Operating Handbook is overriding, and the CAA should be informed of any such conflict.

The minimum crew for this test flight is one pilot and one flight observer to record the results of the tests.

Commanders are reminded that it is illegal to carry passengers on a test flight without a valid Certificate of Airworthiness, 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 Certificate of Airworthiness in force, the pilot in command should, before accepting any passengers on an Check Flight, inform them that the risk is greater than on an ordinary flight.

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

Operator/Maintenance Organisation		
Aerodrome		
Altitude	Temperature	QNH/QFE
Registration		
Flight Date		
Pilots		
Observer		

2. LOADING

The aircraft is to be loaded with full fuel and any necessary ballast to achieve at take-off a weight not less than 5000 kg. (11,000 lb) and a c.g. between 10% and 15% MAC (6.45 m to 6.6 m aft of datum).

Record:	Take-off weight (actual)	kg/1b
	CG Position (actual)	%SMC

The weight and c.g. must remain within the Flight Manual limitations at all times.

3. PRE-FLIGHT INFORMATION

Record: - total airframe hours

Engine	Left	Right
Serial Number		
Hours run since new		
Hours run since overhaul		

4. GROUND TESTS

Check all flying controls and trimmers for full travel, freedom of movement and correct functioning.		SAT/UNSAT
Check engine and propeller controls for travel freedom of movement and correct functioning including reverse and autofeather.		SAT/UNSAT

5. TAXYING

Parking brake (including lock and release).		SAT/UNSAT
Brakes (including freedom from binding and normal ability to hold aircraft at high engine power.		SAT/UNSAT
Taxying (including nosewheel steering/differential braking).		SAT/UNSAT

6. TAKE-OFF

Carry out a normal take-off.Note any unusual characteristics		SAT/UNSAT

7. ENGINE-OUT EN-ROUTE CLIMB PERFORMANCE

Recommended FL40 (limits 3000' AGL to FL100)

7.1 Shut down the No. 1 engine at 140 KIAS. Time to feather _____ secs

7.2 Carry out an engine-out en-route climb for 5 minutes clear of cloud and turbulence, with:

Flaps up, gear up
No. 1 engine inoperative, propeller feathered
No. 2 engine at maximum continuous power
Inertial separation OFF
Air conditioning VENT
115 KIAS
Altimeter set to 1013 mb. (29.92 in. Hg)

Record the altitude, ASI and T_2 every ½ minute and after about 3 minutes the operative engine instrument readings.

Time (minutes)	Altitude (ft.)	IAS (knots)	T2 (^oC)	Fuel Gone (1b/kg.)
0				
½				
1				
1½				
2				
2½				
3				
3½				
4				
4½				
5				

TRIMMER SETTINGS

RUDDER			
AILERON		WEATHER CONDITIONS	
ELEVATOR			

Torque Pressure	ITT (T5)	Gas Generator RPM N_G	Propeller RPM N_H	Fuel Flow	Oil Temperature	Oil Pressure
lb.ft.	^oC	%	%		^oC	psi

7.3 Restart No. 1 engine at 120 KIAS using the Starter and **record:-**

Time to relight [secs.] Max. T_5 [^oC]

8. CRUISE

Recommended FL60 (limits FL50 to FL100)

With a typical high cruise power, trim the aircraft accurately in level flight and record the following:-

8.1 Indicated altitude [ft.] IAS [kt.] T_2 [^oC]

8.2 Trimmer settings: Rudder [ ] Aileron [ ] Elevator [ ]

8.3

Engine No.	Torque Pressure	T_5	N_G RPM	NH RPM	Fuel Flow	Oil Temperature	Oil Pressure
1	1b.ft.	^oC	%	%		^oC	psi
2	1b.ft.	^oC	%	%		^oC	psi

8.4

Flying Control	Break-out Load	Centring	Backlash	Weight	Response
Rudder					
Aileron					
Elevator					

8.5

Trimmers	Friction	Backlash	Response
Rudder			
Aileron			
Elevator			

9. MAXIMUM SPEED CHECK

From the trimmed condition of 8 increase speed to V_{MO} = 230 KIAS and check:-

Control forces and aircraft response to small control movements [ ]

Engines and propellers for any abnormal behaviour [ ]

10. STALLS INCLUDING FLAP AND GEAR OPERATIONS

Recommended FL60 (limits FL100 to 5000' AGL)

For each stall the aircraft is to be trimmed in the prescribed configuration with power off (100% N_H) at speed 1.5 times the scheduled stalling speed (see table on page 10). From this trimmed condition the rate of speed reduction should be controlled smoothly at as close as possible to 1 knot per second. There is virtually no nose down pitching motion at the stall and it will be necessary to continue the speed reduction until full back stick is reached in order to achieve the scheduled stall speeds.

10.1 Stall the aircraft with flaps up, gear up and power off.

Aircraft Weight	Trim Speed KIAS	Elevator Trim	Stall Warning Speed KIAS	Stalling Speed KIAS		Behaviour at Stall
				Scheduled	Achieved	
lb/ kg.						

10.2 Time the flaps from up to 25% at 130 KIAS secs.

10.3 Stall the aircraft, flaps 25%, gear up, and power off.

Aircraft Weight	Trim Speed KIAS	Elevator Trim	Stall Warning Speed KIAS	Stalling Speed KIAS		Behaviour at Stall
				Scheduled	Achieved	
lb/ kg.						

10.4 Time the flaps from 25% to 100% at 130 KIAS. secs.

10.5 Time the gear down at 130 KIAS. secs.

10.6 Stall the aircraft, flaps 100%, gear down and power off.

Aircraft Weight	Trim Speed KIAS	Elevator Trim	Stall Warning Speed KIAS	Stalling Speed KIAS		Behaviour at Stall
				Scheduled	Achieved	
lb/ kg.						

10.7 Time the flaps from 100% to 25% at 130 KIAS. secs.

10.8 Time the gear up at 130 KIAS. secs.

10.9 Time the flaps from 25% to up at 130 KIAS. secs.

11. No. 2 ENGINE SHUT DOWN AND RELIGHT

Any convenient FL but not below 3000' AGL

Shut down the No. 2 engine at 140 KIAS and **record:-**

Time to feather _____ secs.

After about 2 minutes re-start the No.2 engine at 140 KIAS and **record:-**

Time to relight _____ secs. Max. T_5 _____ ^oC

12. EMERGENCY GEAR LOWERING

Any convenient height

Below 145 KIAS, with hydraulic booster pump OFF:

- select the normal/emergency hydraulic changeover cock to EMERGENCY
- select the landing gear DOWN
- operate emergency hand pump to lower gear
- IMMEDIATELY all three gear green lights have illuminated, cease pumping and return the hydraulic changeover cock to NORMAL
- check hydraulic pressure returns to normal
- select gear UP and check normal operation.

13. APPROACH AND LANDING

Carry out a normal approach and landing with full flap using the scheduled approach speed.

Record any unusual characteristics

After landing, check reverse thrust on both engines and check for symmetrical operation.

14. AFTER LANDING

14.1 Check all placards for presence, accuracy and legibility.

14.2 Climb performance evaluation. Plot the altitude and T_2 recorded during the climb against time. Determine the mean achieved rate of climb and evaluate the scheduled gross rate of climb from the Pilot's Operating Handbook, Section 5-19.

Mean altitude during climb	ft
Mean T_2 during climb	^oC
Mean OAT (see page 5-13 of POH)	^oC
Mean aircraft weight during climb	1b/kg.
Scheduled rate of climb	ft/min.
Achieved rate of climb	ft.min.
Δ rate of climb	ft/min.

14.3 Record all findings on the Flight Check Certificate at the front of this document.

STALL SPEEDS

The table below gives the scheduled stalling speeds and trim speeds for the stall checks in Section 10.

Aircraft Weight		Flaps 0% gear up		Flaps 25% gear up		Flaps 100% gear down	
kg.	lb.	Trim KIAS	Stall KIAS	Trim KIAS	Stall KIAS	Trim KIAS	Stall KIAS
5600	12350	117	91	113	86	93	72
5500	12130	116	90	112	86	93	71
5400	11900	115	90	111	85	92	70
5300	11680	114	89	110	84	91	70
5200	11460	113	88	109	83	90	69
5100	11240	112	87	108	82	89	69
5000	11020	111	86	107	81	88	68
4900	10800	110	85	106	80	87	68
4800	10580	109	84	105	79	86	67
4700	10360	108	84	104	79	86	66
4600	10140	107	83	103	78	85	65
4500	9920	106	82	102	77	84	65
4400	9700	104	81	100	76	83	64
4300	9480	103	80	99	75	82	63
4200	9260	102	79	98	74	81	62
4100	9040	101	78	97	73	80	62
4000	8820	100	77	96	72	79	61

Tolerances: The achieved speeds should be within +3 to –5 knots of the above scheduled speeds.

STALL WARNING SPEED

The achieved stall warning speeds should be between 5 knots and 15 knots above the scheduled stalling speed.