CHECK FLIGHT CERTIFICATE

Lockheed Electra L188 **CFS 252 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	-120	-120	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, 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 checl 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

Lockheed Electra L188 **CFS 252 Issue 1**

Registration	
Flight Date	
Engine Powers	

INTRODUCTION

This schedule is applicable to the Electra aircraft (Allison 501-D13 engines, Aeroproducts or Hamilton Standard propellors). It is based on the assumption that everyday operation of the aeroplane serves as a continuous check on the functioning of all the normal services. On these check flights, however, the crew are expected generally to monitor the behaviour of all equipment and report any unserviceable items. In addition to completing all the required tests in this schedule any characteristics which are considered unsafe or undesirable must be recorded. Before each check flight this schedule should be checked against the current Flight Manual; if any discrepancies are found the Flight Manual is overriding: record any such changes.

The minimum crew for these flights should be increased by one observer to record the results. The tests should be carried out in the sequence as written; altitude guidance should be observed.

It is illegal to carry passengers on a check flight made under 'A' or 'B' Conditions except - for passengers performing duties in the aircraft in connection with the flight. It is strongly recommended for carrying out check flights and other tests entailing greater risk than normal flight that although it may be legal to carry passengers on a check flight with a Certificate of Airworthiness in force,

(1) it is preferable to use ballast, and
(2) the pilot in command should, before accepting any passenger on a check flight, inform them that the risk is greater than on an ordinary flight.

LOADING AND CALCULATION OF WEIGHT

Load to a weight of 95,000 to 105,000 lbs with a CG within Flight Manual limits.

CHECK FLIGHT SCHEDULE

1. PRE-START

1.1 Take-off Configuration Warning (TOCW) - if fitted

Advance both 1 and 2 power levers and check that the TOCW sounds at roughly 2/3 travel. SAT/UNSAT

2. BEFORE TAKE-OFF

2.1 Reverse Check

In a suitable clear area, carry out a reverse torque check and record the results below :

ENGINE	1	2	3	4	LIMITS
TIT					580-790°C
ISHP					615-1840
RPM					13365-14450
FUEL FLOW LB/HR					810-1490

ISHP should be within 200 SHP on all 4 engine SAT/UNSAT

2.2 Pitch Lock Check and Fuel Governor Check

With the wind less than 9 knots OR within ± 45° of the aircraft direction, carry out the following pitch lock and fuel governor check.

a) RPM switch - NORMAL (HIGH)
b) Temperature datum control switch - NORMAL
c) Prop. synch switch - SYNCH. OFF

FOR EACH ENGINE IN TURN:

i) Power levers - FLIGHT IDLE
ii) Temperature datum system switch - LOCKED
iii) Fuel governor check switch - HOLD IN TEST FOR 8 SECS
iv) Power lever - ADVANCE SLOWLY TOWARDS TAKE-OFF UNTIL NO FURTHER RPM INCREASES
v) RPM - RECORD

ENGINE	1	2	3	4	LIMIT
RPM					14330-14530

vi) POWER LEVER - MOVE FULLY FORWARD OR TO TIT LIMIT
vii) Check rpm steady and no significant reduction

viii) Retard power lever to achieve 13,820 rpm.

HP - RECORD

ENGINE	1	2	3	4	LIMITS
HP					MINIMUM OF 1200

(ix) Fuel governor check switch - NORMAL

(x) Power lever - ADVANCE until the propeller governs, then RETARD to flight idle. Reset as desired.

(xi) Temperature datum system switch - CONTROLLED

Overall result : SAT/UNSAT

Comments:

2.3 Synchroniser Check

With either engine 2 or 3 as master, set the power levers to achieve 800°C TIT.

RECORD:

ENGINE	1	2	3	4
RPM				

Retard the master power lever, reduce rpm and check that the other 3 engines follow. SAT/UNSAT

3. TAKE-OFF

Carry out a maximum power take-off. Record any unusual characteristics. SAT/UNSAT

Select a low cabin altitude.

4. PROPELLER FEATHERING (recommended altitude 5000 feet)

Pull No.1 engine oil tank shut-off valve circuit breaker.
At 160 knots, gear and flap up, feather number 1 engine (note time).

RECORD

TIME TO ROTATION STOP	secs
TIME TO FEATHER LIGHT OUT	secs
NTS INDICATIONS	SAT/UNSAT

5. CLIMB AFTER TAKE-OFF (3000 feet AGL to FL90)

Carry out a five minute climb clear of cloud and turbulence, on a constant heading.

Gear-up
Flaps - 78%
No. 1 engine - FEATHERED
Nos. 2, 3 AND 4 engines - MAX. TAKE-OFF POWER; 971°C TIT
COOLER FLAPS 2, 3 AND 4 = 40%; No. 1 FAIRED
AIRSPEED - V_2 (see Tables 1 AND 2) = KNOTS
Anti-ice - OFF
Altimeter - 1013 MB set
Condenser door (if fitted) OAT above ISA OPEN
OAT at or below ISA CLOSED
Pressurisation - NORMAL

RECORD:

FUEL CONTENTS				
FUEL TOTAL				
AIRCRAFT WEIGHT				

TIME	ALTITUDE	OAT
MINS	FEET	°C
0		
½		
1		
1½		
2		
*2½		
3		
3½		
4		
4½		
5		

TRIMS:	ELEV:	RUD:	AIL:
ASI's	CAPTAIN		
		COPILOT	

*ENGINES	2	3	4
TIT			
ISHP			
RPM			
FUEL FLOW			
OIL P-POWER			
OIL P-GEAR			
OIL TEMPERATURE			
OIL COOLER POSITION			

FUEL CONTENTS				
FUEL TOTAL				
AIRCRAFT WEIGHT				

WEATHER	
TURBULENCE	

6. EN-ROUTE CLIMB (3000 feet AGL to FL180

Carry out a five minute climb clear of cloud turbulence, on a constant heading.

Gear UP
Flaps UP
No.1 engine - FEATHERED
No.2, 3 and 4 engines - MAX. CONTINUOUS POWER; 932°C TIT
Oil cooler flaps - ALL FAIRED
Airspeed - 3 engined EN ROUTE CLIMB SPEED (see Table 3) = KNOTS
Anti-ice - OFF
Altimeter - 1013 mb set
Condenser door (if fitted) OAT above ISA OPEN
OAT at or below ISA CLOSED
Pressurisation - NORMAL

RECORD:

FUEL CONTENTS				
FUEL TOTAL				
AIRCRAFT WEIGHT				

TIME	ALTITUDE	OAT
MINS	FEET	°C
0		
½		
1		
1½		
2		
*2½		
3		
3½		
4		
4½		
5		

TRIMS:	ELEV:	RUD:	AIL:
ASI's	CAPTAIN		
		COPILOT	

*ENGINES	2	3	4
TIT			
ISHP			
RPM			
FUEL FLOW			
OIL P-POWER			
OIL P-GEAR			
OIL TEMPERATURE			
OIL COOLER POSITION			

FUEL CONTENTS				
FUEL TOTAL				
AIRCRAFT WEIGHT				

WEATHER	
TURBULENCE	

7. **RELIGHT** (after 15 minutes from shut-down)

At 160 knots, gear and flap up, relight No. 1 engine.

RECORD:

FEATHER BUTTON OPERATION	SAT/UNSAT
TIME TO STABILISE RPM	seconds
STABLE TIT	°C
STABLE ISHP	HP
COMMENTS	

Reset No. 1 engine oil tank shut off valve C/B

8. **PRESSURISATION**

With both compressors switched on at an aircraft altitude of 15000 feet.

RECORD:

MAXIMUM DIFFERENTIAL	INCHES Hg
CABIN ALTITUDE	feet

Switch off each compressor in turn.

RECORD:

OPERATING COMPRESSOR	1	2	Not above 10000 feet
ACHIEVED DIFFERENTIAL			
CABIN ALTITUDE			

9. **CABIN ALTITUDE WARNING**

At 15000 feet raise the cabin altitude until the warning occurs.

RECORD:

		Limits
CABIN ALTITUDE	feet	9500 ft.
AUDIO HORN	SAT/UNSAT	to
CWP RED LIGHT	SAT/UNSAT	10,500 ft.

10. CRUISE

At 20000 feet set up a level flight cruise with 847°C TIT set on all engines.

RECORD:

ENGINE	1	2	3	4
ISHP				
RPM				
FUEL FLOW LB/HR				
OIL P-POWER PSI				
OIL P-GEAR PSI				
OIL TEMP °C				
OIL COOLER POSN %				

OAT °C	ALTITUDE feet	IAS knots	
TRIMS	ELEV	AIL	RUD
BARBERS POLE INDICATION			(276-288 knots)

11. HIGH IAS

In the clean configuration, in smooth air between 8000 feet and 12000 feet increase speed progressively to Vmo +10 knots or high speed warning whichever occurs first.

RECORD:

ALTITUDE	FEET
IAS AT HIGH SPEED WARNING	KNOTS
CONTROLS OVER SMALL ANGLES	SAT/UNSAT

limits V_{MO} + 0 to +8

12. STALLING

RECORD:

Fuel Contents				
Fuel Total				
Aircraft Weight				

Not below 8000 feet carry out the following stalls and functioning checks. Scheduled trim speeds, warning and stall speeds are given in Table 4. Power should be set to 150 HP torque for all stalls and the aircraft trimmed to the trim speed with that power set, then speed reduced at about 1 knot/second.

A full stall is not required in the clean configuration - recover at stall warning.

RECORD:

	TRIM SPEED	TRIM POSITION	STALL WARNING SCHEDULED ACHIEVED	STALL SCHEDULED	SPEED ACHIEVED
FLAPS UP; GEAR UP					
FLAPS 78% GEAR UP					
FLAPS 100% GEAR DOWN					

Operation of gear warning horn and cancellation. SAT/ UNSAT

13. FUNCTIONING

With the aircraft initialy in the cruise configuration carry out the following functioning checks.

At 180 knots, time flaps from UP to 78%	secs
At 160 knots, time the gear down	secs
At 160 knots, time flaps from 78% to 100%	secs
At 160 knots, time flaps from 100% to 78%	secs
At 160 knots, time the gear UP	secs
At 180 knots, time flaps from 78% to UP	secs

14. FUEL DUMP (Above 10000 feet)

With flaps and gear UP, at about 175 knots and above 10,000 ft confirm fuel dump operation by observation of fuel from dump pipes or fuel decrease on the fuel gauges.

SAT/UNSAT

15. PROPELLER FEATHERING AND RESTARTING

At 160 knots, gear and flap up, feather and restart engines 2, 3 and 4 in turn, using the following drill:

With the synchroniser off, the following drill items (2) and (13) should be achieved with 90 seconds.

1. Pull oil tank shut off CB.
2. Pull EMERG shut down handle.
3. FUEL and IGN switch to OFF.
4. Power lever to MAX (BETA follow up).
5. Push in EMERG shut down handle.
6. Pull out feather button to obtain 2000 RPM for engine cooling.
7. When TEMP down to 200°C pull EMERG handle.
8. When PROP stops push in EMERG handle.
9. Power lever to 1" above idle.
10. FUEL and IGN switch to ON.
11. Press prime button.
12. Pull out feather button to unfeather and relight engine.
13. After light up release prime button.
14. After engine has started, check for pitch lock.
15. Reset oil shut off CB.

RECORD:

ENGINE	2	3	4
TIME TO ROTATION STOP	secs	secs	secs
PRIMER OPERATION	SAT/UNSAT	SAT/UNSAT	SAT/UNSAT
FEATHER BUTTON OPERATION	SAT/UNSAT	SAT/UNSAT	SAT/UNSAT
TIME TO STABILISED RPM	sec	sec	sec
STABLE TIT	°C	°C	°C
STABLE ISHP	HP	HP	HP

16. FUNCTIONING

16.1 Alternate Static

At 160 knots, trimmed in level flight, operate the alternate static switches and record the ASI and ALTIMETER changes.

	ASI	ALTIMETER		
CAPTAIN	knots	feet	Limits	± 3 knots
COPILOT	knots	feet	Limits	± 40 feet

16.2 Control Boost Off

At 160 knots, flaps and gear up, check flying controls with the following configurations :

No. 1 system only: pump 1 off SAT/UNSAT	Pump 1A off SAT/UNSAT
No. 2 system only: pump 2 off: SAT/UNSAT	Pump SPARE off SAT/UNSAT (if fitted)

Restore pumps to normal.

Select all flying control boost off
Check flying controls and indicator lights. SAT/UNSAT

Restore boost to Normal. (Do not re-engage above 203 knots)

16.3 Landing Gear Free Fall

At 160 knots, gear up, No. 1 hydraulic system off, carry out landing gear free fall, using either handle.

Time to landing gear greens _____ Secs

Restore hydraulic systems.

Retract gear on completion.

16.4 Anti-Ice

Wing and empannage. Select ON and confirm a temperature rise on each section in turn.

L Outboard	SAT/UNSAT
L Centre	SAT/UNSAT
L Inboard	SAT/UNSAT
L Stabiliser	SAT/UNSAT
FIN	SAT/UNSAT
R Stabiliser	SAT/UNSAT
R Inboard	SAT/UNSAT
R Centre	SAT/UNSAT
R Outboard	SAT/UNSAT

(if fitted)

Engine. Select engine anti-ice on turn.

RECORD:

ENGINE	1	2	3	4
SHP DROP				
LIGHT OPERATION	SAT/UNSAT	SAT/UNSAT	SAT/UNSAT	SAT/UNSAT
FF CHANGE	SAT/UNSAT	SAT/UNSAT	SAT/UNSAT	SAT/UNSAT

Propeller. Select each propeller anti-ice system in turn and record the currents.

PROPELLER	1	2	3	4	LIMITS
CUFFS					90 ± 10 AMPS
AFT SPINNER					67 ± 7 AMPS
SPINNER	1 & 4 :		2 & 3		75 - 103 AMPS

Select all ANTI-ICE systems as required on completion.

16.5 Pressurisation

At a suitable low differential confirm that the manual dump valve control will operate. SAT/ UNSAT

17. LANDING

Carry out a normal landing using full reverse :

Record any usual characteristics.

SAT/UNSAT

LOOKHEED ELECTRA CLIMB SPEEDS

For the climb after take-off use the greater value from Table 1 and Table 2.

TABLE 1 V_2 = 1.1 V_{MCA}: Flap 78%: knots IAS

	AMBIENT TEMPERATURES °C						
PRESSURE ALTITUDE	-10	-5	0	+5	+10	+15	20
SEA LEVEL	126	126	125	125	124	123	122
2000 FT	125	125	124	123	122	121	120
4000 FT	123	122	121	120	119	117	116
6000 FT	121	120	118	117	115	113	111
8000 FT	117	116	114	112	110	108	106
10000 FT	113	111	110	108	106	103	102

TABLE 2 V_2 = 1.15 V_S: Flap 78%: knots IAS

AIRCRAFT WEIGHT LBS	80000	85000	90000	95000	100000	105000	111000
V_2 KNOTS IAS	107	110	113	116	119	122	124

TABLE 3 Three Engined En-Route Climb Speed; Clean

AIRCRAFT WEIGHT LBS	EN-ROUTE CLIMB SPEED KNOTS IAS
70,000	136
75,000	140
80,000	145
85,000	149
90,000	153
95,000	157
100,000	161
105,000	164
110,000	168

TABLE 4 - LOCKHEED ELECTRA STALL SPEEDS

AIRCRAFT WEIGHT LBS	FLAP UP GEAR UP			FLAP 78 GEAR UP			FLAP 100 GEAR DOWN		
	TRIM	WARN	STALL	TRIM	WARN	STALL	TRIM	WARN	STALL
115000	178	143	127	155	121	111	150	113	107
110000	174	141	124	153	119	109	146	111	104
105000	171	138	122	150	177	107	143	109	102
100000	167	135	119	147	114	105	139	106	99
95000	162	132	116	143	111	102	136	104	97
90000	158	129	113	139	108	99	132	101	94
85000	154	125	110	134	106	96	130	99	92
80000	150	122	107	132	103	94	125	96	89
75000	146	119	104	127	100	91	122	93	87
70000	141	115	101	123	97	88	118	91	84