European Aviation Safety Agency

EASA

TYPE-CERTIFICATE DATA SHEET

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Issue : 01
Date : 04 August 2008
Type : Light Helicopter Turbine Engine Company (LHTEC)
CTS800 series engines

Variants
CTS800-4N

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I. General

1. Type/Variants:

CTS800 / CTS800-4N

2. Type Certificate Holder:

Light Helicopter Turbine Engine Company (LHTEC)
2001 South Tibbs Avenue
Indianapolis, IN 46241
USA

3. Manufacturer:

Light Helicopter Turbine Engine Company (LHTEC)

4. EASA Certification Application Date:

CTS800-4N : 5 July 2006

5. Certification Reference Date:

25 June 1999

6. EASA Certification Date:

CTS800-4N : 04 August 2008

II. Certification Basis

1. State of Design Certification Basis:

See FAA TCDS TE2CH

2. EASA Certification Basis:

2.1 Airworthiness Standards:

CS-E initial issue effective 24 Oct. 2003

2.2 Special Conditions:

None

2.3 Equivalent Safety Findings:

None

2.4 Deviations:

None

2.5 Environmental Protection Requirements:

ICAO Annex 16 Volume II, second edition, including Amendment 5, effective 24 November 2005, as applicable to turboshaft engines

III.Technical Characteristics

1. Type Design Definition:

The Type Design Definition is in accordance with the following LHTEC Engine Assembly Drawings. The Type Design Definition includes essential engine accessories, but excludes the starter-generator.

CTS800-4N	LH70120-01

2. Description:

The CTS800-4N is a free turbine turboshaft engine with two spool modular design; inlet particle separator (IPS) with scavenge blower; two stage centrifugal compressor, annular reverse-flow combustor; two stage gas generator turbine; two stage power turbine; dual channel aircraft mounted full authority digital engine control; self-contained lubrication and electrical systems; top mounted accessory gearbox; reduction gearbox.

3. Equipment:

Engine equipment is specified by the applicable Type Design Definition

4. Dimensions:

	Overall Length mm	Overall Width mm	Overall Height mm
CTS800-4N	1222	600	729

5. Dry Weight:

	Weight kg
CTS800-4N	185.1

6. Ratings:

Ratings	kW
30 Second OEI	1208
2 Minute OEI	1108
Continuous OEI	1014
Takeoff (5mn)	1014
Maximum continuous	955

The engine ratings are based on:

- Dynamometer operation corrected to U.S. standard atmosphere, sea level static conditions.
- Static sea level standard conditions at 15°C and 101.3 kPa.
- Fuel with a lower heating value of 43000 kJ/kg.
- No customer bleed extraction
- No anti-ice air.
- No external accessory loads.
- 100 percent inlet total pressure recovery.
- Reference exhaust duct discharging to ambient static pressure
- Reference compressor vent loss.

7. Control System:

The engine includes a full authority digital electronic control (FADEC) system, which features dual chanel electronic control in the form of two electronic control units (ECUs).

8. Fluids (Fuel, Oil, additives):

Fuels:

- MIL-DTL-5624, Grades JP-4 and JP-5
- MIL-DTL-83133C, Grade JP-8
- ASTM D-1655, Jet A or Jet A1, or Jet B.

See Note 3: emergency fuels and additives

Oil:

MIL-PRF-7808J(1) and MIL-PRF-23699D except that MIL-PRF-23699D operation is not permitted at oil temperature below that temperature corresponding to an oil kinematic viscosity of 0.013 m^2/sec.

See Installation Design Manual: LHA6552-31

9. Aircraft Accessory Drives:

Designation	Rotation direction Facing pad	Drive Pad	Max Continuous Torque	Max Static Torque	Overhung Static Moment
		(rpm) (**)	**(Nm)**	**(Nm)**	**(Nm)**
Starter Generator (*)	Clockwise	11956	8.7 (****)	81.4 (***)	103

(*) Driven by Gas Generator Turbine
(**) Drive speed based on 100% gas generator speed or 43797 rpm
(***) Maximum torque at starter pad from zero to starter cutoff speed.
(****) Power extraction limited in accordance with load limits defined in the installation design manual LHTEC document LHA6552-31.

10. Maximum Permissible Air Bleed Extraction:

The maximum available airflow for customer bleed is in accordance with the limits defined in the installation design manual LHA6552-31.

IV. Operating Limitations:

1. Temperature Limits

1.1 Turbine Gas Temperature (°C)

Ratings	°C
30-Second OEI	1007
2-Minute OEI	953
Continuous OEI	905
Take off	905
Maximum continuous	878
Starting	850

Temperature is compensated Power Turbine Inlet temperature (PTIT)

1.2 Fuel temperature

Refer to Installation Design Manual LHA6552-31.

1.3 Oil temperature (°C)

- Minimum
  - -54°C MIL-PRF-7808.
  - -40 °C MIL-PRF-23699
- Maximum steady state: 130 °C.
- Maximum Transient (5 min): 149 °C.

2. Pressure Limits

2.1 Fuel pressure

Refer to applicable installation design manual for details (LHA6552-31)

2.2 Oil pressure (kPa)

Oil pressure limits	Minimum kPa	Maximum kPa
Start Up (*)	0	1590
Normal steady state	262	414
10 second transient limit (**)	35	NA

(*)
- -40°C with MIL-PRF-23699 Oil
- -54°C with MIL-PRF-7808 Oil

Maximum oil pressure during starting and initial operation, predicated on a 0.013 m^2/sec oil viscosity, shall not persist for more than 2.5 minutes.
Maximum oil pressure during starting and initial operation shall not persist for more than 60 seconds (except as noted in (**) below).
Mixing of oils that conform to different oil specifications is prohibited.

(**) Minimum oil pressure may not persist for more than 10 seconds

3. Maximum / Minimum Permissible Rotor Speeds

3-1. Gas generator speed :

Power rating	Gas Generator speed rpm
30 second OEI	46995
2- minute OEI	45812
Continuous OEI	44794
Takeoff (5 minutes)	44794
Maximum continuous	44120
Transient permissible	47397

With 100% Gas Generator speed = 43796 rpm

3-2. Engine output speed :

Power rating	Engine Output speed rpm
30 second OEI	6402
2- minute OEI	6402
Continuous OEI	6850
Takeoff (5 minutes)	6850
Maximum continuous	6850
Transient permissible	7170

With 100% Engine Output speed = 6402 rpm
CTS800-4N engine has a reduction output gearbox with a gear ratio = 3.593:1

4. Torque Limits (Nm)

Power rating	Output shaft torque limit Nm
30 second OEI	1791
2- minute OEI	1649
Continuous OEI	1478
Takeoff (5 minutes)	1478
Maximum continuous	1373

5. Installation Assumptions:

Refer to Installation Design Manual reference LHA6552-31 for details.

6. Time Limited Dispatch:

There is no Time Limited Dispatch for the ECUs of this engine.

V. Operating and Service Instructions:

Installation Design Manual	LHA6552-31
Engine Line Maintenance Manual Document	T800-4N-20
Engine Operating Manual	LHA6552-26B

VI. Notes:

1. **Ingestion of foreign matter:**
   This engine meets the requirement of foreign object ingestion without the use of an aircraft inlet protection system.

2. **ECUs**
   The software contained in the ECUs have been designed, developed, documented and tested in accordance with the provisions of the the Level A of RTCA/DO 178B, December 1992.

3. Fuels

Emergency fuels may be used for a time period of six hours from sea level to 6 Km (19686 ft) altitude throughout a range of idle to 90 percent maximum power provided fuel remains below 0.012 m^2/sec viscosity. Emergency fuels are fuels conforming to VV-F-800 grades DF-1 and DF-2. Use of emergency fuels will require additional maintenance actions as specified in the Engine Line Maintenance Manual, T800-4N-20.

Icing inhibitors required for engine operation in ambiant temperature at or below 0°C.

For fuels not containing ice inhibitors, refer to FAA Type certificate N° TE2CH.

4. Life limited parts

Life limits for critical rotating components are published in the Airworthiness Limitations section of the Engine Line Maintenance Manual Document N° T800-4N-20

5. LHTEC

Light Helicopter Turbine Engine Company (LHTEC) is a partnership comprised of the Rolls Royce Corporation (formely Allison) of Indianapolis, Indiana, and Honeywell International (formely Allied Signal) of Phoenix, Arizona.
