

**DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION**

TE2CH  
Revision 5

LHTEC  
CTS800-0  
CTS800-4N  
CTS800-4A

July 5, 2012

**TYPE CERTIFICATE DATA SHEET NO. TE2CH**

Engines of models described herein conforming to this data sheet (which is part of Type Certificate No. TE2CH) and other approved data on file with the Federal Aviation Administration, meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Federal Aviation Regulations, provided they are installed, operated, and maintained as prescribed by the approved manufacturer's manuals and other approved instructions.

TYPE CERTIFICATE (TC) HOLDER: Light Helicopter Turbine Engine Company (LHTEC)  
(See NOTE 12) 2001 South Tibbs Avenue  
Indianapolis, IN 46241

Models CTS800-0, CTS800-4N, CTS800-4A

Type

Free turbine turboshaft engine; fully metric 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 full authority digital engine control; self-contained lubrication and electrical systems; top mounted accessory gearbox. (See NOTE 13)

Ratings (See NOTE 3)

	CTS800-0	CTS800-4N	CTS800-4A
<b>30-Second OEI</b>			
Power kW(SHP)	N/A	1208 (1621)	1221 (1637)
Gas Generator Speed (RPM)	N/A	46681	46634
Output Shaft Speed (RPM)	N/A	6402	23000
Measured Gas Temperature °C (°F) *	N/A	978 (1794)	976 (1789)
<b>2-Minute OEI</b>			
Power kW(SHP)	N/A	1108 (1487)	1119 (1501)
Gas Generator Speed (RPM)	N/A	45556	45511
Output Shaft Speed (RPM)	N/A	6402	23000
Measured Gas Temperature °C (°F) *	N/A	928 (1704)	926 (1699)
<b>2-1/2 Minute OEI</b>			
Power kW(SHP)	1058 (1419)	N/A	N/A
Gas Generator Speed (RPM)	45329	N/A	N/A
Output Shaft Speed (RPM)	23000	N/A	N/A
Measured Gas Temperature °C (°F) *	899 (1650)	N/A	N/A

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Ratings (See NOTE 3) (Continued)

	CTS800-0	CTS800-4N	CTS800-4A
Continuous OEI			
Power kW (SHP)	1014 (1361)	1014 (1361)	1024 (1373)
Gas Generator Speed (RPM)	44896	44576	44527
Output Shaft Speed (RPM)	23000	6402	23000
Measured Gas Temperature °C (°F) *	879 (1615)	885 (1626)	883 (1621)
Takeoff (5 min)			
Power kW (SHP)	1014 (1361)	1014 (1361)	1024 (1373)
Gas Generator Speed (RPM)	44896	44576	44527
Output Shaft Speed (RPM)	23000	6402	23000
Measured Gas Temperature °C (°F) *	879 (1615)	885 (1626)	883 (1621)
Maximum Continuous			
Power kW (SHP)	944 (1266)	955 (1281)	963 (1292)
Gas Generator Speed (RPM)	44304	43983	43935
Output Shaft Speed (RPM)	23000	6402	23000
Measured Gas Temperature °C (°F) *	852 (1567)	861 (1582)	858 (1577)

\* For the CTS800-4N and CTS800-4A, this value is compensated Power Turbine Inlet Temperature (PTIT)

Output Shaft Gear Ratio (CTS800-0, CTS800-4A) 1:1

Output Shaft Gear Ratio (CTS800-4N) 3.593:1

Reduction Gearbox (with shared lubrication system) included in the CTS800-4N configuration

## Principal Dimensions of Basic Engine

Refer to installation drawing provided in installation design manual for dimensions and center of gravity locations. (See NOTE 10)

## Weight (maximum)

Dry Weight Kg (lb) CTS800-0 142.9 (315)

Dry Weight Kg (lb) CTS800-4N 185.1 (408)

Dry Weight Kg (lb) CTS800-4A 170.1 (375)

## Fuels

Refer to the engine operating manual for approved fuel types, limitations on their use, and approved fuel additives. (See NOTE 10)

## Lubricating Oils

Refer to the engine operating manual for approved oil types and limitations on their use. (See NOTE 10)

Oil Tank Volume (CTS800-0): 3.4 liter (0.9 gal)

Oil Tank Volume (CTS800-4N, CTS800-4A): 3.2 liter (0.83 gal)

**Certification Basis (CTS800-0)**

14 CFR part 33 dated June 3, 1964, as amended by 33-1 through 33-14 inclusive. Original application for Type Certificate dated May 27, 1987. Type Certificate No. TE2CH issued for the Model CTS800-0 engine on September 10, 1993.

**Certification Basis (CTS800-4N)**

14 CFR part 33 dated June 3, 1964, as amended by 33-1 through 33-18 inclusive. Original application for amended Type Certificate dated May 24, 1996. Type Certificate No. TE2CH amended to include Model CTS800-4N engine on December 18, 2003.

**Certification Basis (CTS800-4A)**

14 CFR part 33 dated June 3, 1964, as amended by 33-1 through 33-18 inclusive. Original application for amended Type Certificate dated February 16, 2009. Type Certificate No. TE2CH amended to include Model CTS800-4A engine on April 11, 2012.

**Production Basis**

None. (See NOTE 12)

**NOTE 1**

<b><u>Temperature Limits</u></b>	<b><u>CTS800-0</u></b>	<b><u>CTS800-4N, CTS800-4A</u></b>
Maximum Measured Gas Temperature, °C (°F) *		
30-Second OEI	N/A	1007 (1844)
2- Minute OEI	N/A	953 (1747)
2-1/2 minute OEI	909 (1668)	N/A
Continuous OEI	889 (1632)	905 (1661)
Takeoff	899 (1632)	905 (1661)
Maximum Continuous	862 (1584)	878 (1612)
Starting	850 (1562)	CTS800-4A: 850 (1562) CTS800-4N: Refer to operating manual (See NOTE 10)
Oil Inlet Temperatures, °C (°F)		
Maximum Steady State	130 (266)	130 (266)
Maximum Transient (5 min)	149 (300)	149 (300)
Minimum Starting	-54 (-65) MIL-PRF-7808 -40 (-40) MIL-PRF-23699	-54 (-65) MIL-PRF-7808 -40 (-40) MIL-PRF-23699
Minimum Steady State	49 (120)	49 (120)
Engine External Components Surface Temperature Limits	Refer to Installation Design Manual (See NOTE 10)	Refer to Installation Design Manual (See NOTE 10)

Fuel Pump Inlet Temperature

Refer to Installation Design Manual (See NOTE 10)

Refer to Installation Design Manual (See NOTE 10)

\* For the CTS800-4N and CTS800-4A this value is compensated Power Turbine Inlet Temperature (PTIT)

## NOTE 2

## Fuel and Oil Pressure Limits

Fuel Inlet Pressure Limits - refer to applicable installation design manual for details. (See NOTE 10)

Oil Pressure Limits kPa (psig)	CTS800-0		CTS800-0		CTS800-4N, CTS800-4A		CTS800-4N, CTS800-4A	
	Minimum kPa	(psig)	Maximum kPa	(psig)	Minimum kPa	(psig)	Maximum kPa	(psig)
Start Up *	0	(0)	1590	(230)	0	(0)	1590	(230)
Normal Steady State:								
Below 35,000 RPM Gas Generator Speed (Ng)	138	(20)	317	(46)	N/A		N/A	
Above 35,000 RPM (Ng)	262	(38)	317	(46)	262	(38)	414	(60)
30 Second Transient Limit **	35	(5)	N/A		35	(5) (CTS800-4A)	N/A	
10 Second Transient Limit ***	N/A		N/A		35	(5) (CTS800-4N)	N/A	

\* -40°C (-40°F) with MIL-PRF-23699 Oil  
 -54°C (-65°F) with MIL-PRF-7808 Oil

Maximum oil pressure during starting and initial operation, predicated on a 0.013 m<sup>2</sup>/sec (13,000 centistokes) oil viscosity, shall not persist for more than 2.5 minutes.

Minimum 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.

\*\* Operation in the time limited (shaded) area of the attitude envelope of engine operating manual. (See NOTE 10)

\*\*\* Minimum oil pressure may not persist for more than 10 seconds for the CTS800-4N.

## NOTE 3

The Engine Ratings are based on:

- (a) Dynamometer operation corrected to U.S. standard atmosphere, sea level static conditions
- (b) Static sea level standard conditions at 59° F and 29.92 in Hg (101.325 millibars)
- (c) Fuel with a lower heating value of 18,500 BTU per lb.
- (d) No customer bleed extraction
- (e) No anti-ice airflow
- (f) No external accessory loads
- (g) 100 percent inlet total pressure recovery
- (h) Reference exhaust duct discharging to ambient static pressure
- (i) Reference compressor vent loss.
- (j) Dry inlet air.

## NOTE 3 (Continued)

The specified engine power ratings do not represent the flat ratings resulting from application of the output shaft torque limits (See NOTE 4). The engine installation design manual contains flat rating curves versus ambient temperature that incorporate torque, speed, and PTIT limits, and/or refers to the applicable engine performance computer program documentation. (See NOTE 10)

## NOTE 4

## Output Shaft Torque Limits

	<b>CTS800-0</b>	<b>CTS800-4N</b>	<b>CTS800-4A</b>
30- Second OEI	N/A	1791 N-m (1321 lb-ft)	499 N-m (368 lb-ft)
2- Minute OEI	N/A	1649 N-m (1216 lb-ft)	459 N-m (339 lb-ft)
2-1/2 minute OEI	439 N-m (324 lb-ft)	N/A	N/A
Continuous OEI	424 N-m (313 lb-ft)	1478 N-m (1090 lb-ft)	411 N-m (303 lb-ft)
Takeoff	424 N-m (313 lb-ft)	1478 N-m (1090 lb-ft)	411 N-m (303 lb-ft)
Maximum Continuous	395 N-m (291 lb-ft)	1373 N-m (1012 lb-ft)	381 N-m (281 lb-ft)

## NOTE 5

## Accessory Drive Provisions

Drive	Type of Drive	Rotation Facing Pad	Ratio to Rotor	Drive Pad RPM**	Max Continuous Torque N-m (lb-in)	Max Static Torque N-m (lb-in)	Overhung Static Moment N-m (lb-in)
Starter/Generator*	Metric	CW	0.273	11956	8.7 (77.4) ****	81.4 (720)***	18.4 (161) for CTS800-0 103 (928) for CTS800-4N 103 (928) for CTS800-4A

\*Driven by Gas Generator Turbine

\*\*Drive speed based on 100% gas generator speed or 43,796 RPM

\*\*\*Maximum torque at starter pad from zero to starter cutoff speed

\*\*\*\* Power extraction limited in accordance with load limits defined in the engine operating manual. (See NOTE 10)

## NOTE 6

## Maximum Allowable Speeds

	Gas Generator Speed RPM (%)*	Power Turbine Speed RPM (%)**	Gas Generator Speed RPM (%)*	Engine Output Speed RPM (%)***
	<b>CTS800-0</b>	<b>CTS800-0</b>	<b>CTS800-4N</b>	<b>CTS800-4N</b>
30-Second OEI	N/A	N/A	46,995 (107.3)	6,402(100.0)
2-Minute OEI	N/A	N/A	45,812 (104.6)	6,402(100.0)
2.5 Minute OEI	45,461 (103.8)	24,150 (105.0)	N/A	N/A
Continuous OEI	44,992 (102.7)	24,150 (105.0)	44,794 (102.3)	6,754 (105.5)
Takeoff (5 Min)	44,992 (102.7)	24,150 (105.0)	44,794 (102.3)	6,754 (105.5)
Max. Continuous	44,992 (102.7)	24,150 (105.0)	44,120 (100.7)	6,754 (105.5)
Max Permissible (5 sec transient)	46,026 (105.1)	24,840 (108.0)	47,397 (108.2)	7,170 (112.0)

NOTE 6 Maximum Allowable Speeds (continued)

	Gas Generator Speed RPM (%)*	Power Turbine Speed RPM (%)**
	CTS800-4A	CTS800-4A
30-Second OEI	46,995 (107.3)	23,575 (102.5)
2-Minute OEI	45,812 (104.6)	23,575 (102.5)
2.5 Minute OEI	N/A	N/A
Continuous OEI	44,794 (102.3)	23,575 (102.5)
Takeoff (5 Min)	44,794 (102.3)	23,575 (102.5)
Max. Continuous	44,120 (100.7)	23,575 (102.5)
Max Permissible (5 second transient)	47,397 (108.2)	25,760 (112.0)

\* 100% Gas Generator Speed = 43,796 RPM

\*\* 100% Power Turbine Speed = 23,000 RPM

\*\*\* 100% Engine Output Speed (at Reduction Gearbox) = 6,402 RPM

NOTE 7 Maximum available customer bleed air is in accordance with the limits defined in the installation design manual. (See NOTE 10)

NOTE 8 Life limits for critical rotating components are published in the Airworthiness Limitations section of the following documents:

Engine Maintenance Manual Document No. 72-09-12 (CTS800-0)

Engine Line Maintenance Manual Document No. T800-4N-20 (CTS800-4N)

Engine Line Maintenance Manual Document No. T800-4A-20 (CTS800-4A)

NOTE 9 These engines meet the requirements of 14 CFR part 33.77 Amendment 10 (Foreign Object Ingestion) without the use of an aircraft inlet protection system.

NOTE 10 For additional performance, authorized operation and detailed installation information, refer to the following manuals:

Model	Installation Design Manual	Operating Manual
CTS800-0	LHA2002-31.1	LHA6002-26
CTS800-4N	LHA6552-31	LHA6552-26
CTS800-4A	LHA6607-31	LHA6607-26

NOTE 11 Instructions for continued airworthiness (ICA) for the CTS800-0 engine were incomplete at time of type certification as provided for in 14 CFR part 33.4. The engine will be eligible for entry into service when the ICA are complete and accepted.

NOTE 12 Light Helicopter Turbine Engine Company (LHTEC) is a partnership comprised of the Rolls-Royce Corporation (formerly Allison) of Indianapolis, Indiana, and Honeywell International Inc. (formerly AlliedSignal), of Phoenix, Arizona. LHTEC is the Type Certificate holder. LHTEC does not hold a FAA Production Certificate or other FAA production approval for the CTS800 engine models.

NOTE 13 The CTS800-0 is the initial type certified model with one dual channel control unit mounted on the engine. The CTS800-4N is similar to the CTS800-0 except for the addition of 30-second OEI and 2-minute OEI ratings, incorporation of a reduction gearbox, and two separate redundant engine control units that are airframe-mounted. The CTS800-4A is similar to the CTS800-4N except with no reduction gearbox and rated performance changes associated with the reduction gearbox removal.

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