

U.S. DEPARTMENT OF TRANSPORTATION  FEDERAL AVIATION ADMINISTRATION  TYPE CERTIFICATE DATA SHEET NO. E33NE	TCDS NUMBER E33NE  ALFA ROMEO AVIO S.p.A.  Revision 2  DATE: July 1, 2010 MODELS:  CT7-6 AF CT7-6A AF
---	---

Engines of models described herein conforming with this data sheet (which is part of Type Certificate Number E33NE) 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: ALFA ROMEO AVIO S.p.A. under license of  
 80038 POMIGLIANO D'ARCO (NA) GE AIRCRAFT ENGINES  
 ITALIA 1000 Western Avenue  
 Lynn, MA 01910 (USA)

I. MODELS	CT7-6 AF	CT7-6A AF		
TYPE	Axial flow, free turbine turboshaft. Five stage axial/single stage centrifugal compressor. Annular combustion chamber. Two stage gas generator turbine. Two stage power turbine.			
RATINGS (see NOTES 5 and 11)				
Maximum continuous at sea level:				
Equivalent Shaft hp.	---	---		
Shaft hp.	1,718	--		
Thrust, lb.	---	---		
Output, r.p.m.	20,463	--		
Normal takeoff (5 min.) at sea level:				
Equivalent Shaft hp.	---	---		
Thrust, lb.	2,000	--		
Output, r.p.m.	20,463	--		
Maximum takeoff (5 min.) at sea level:				
Shaft hp.	---	---		
Output, r.p.m.	---	---		
30 Minute helicopter at sea level:				
Shaft hp.	2,000	--		
Output, r.p.m.	20,463	--		
2 1/2 Minute helicopter at sea level:				
Shaft hp.	2,000	--		
Output, r.p.m.	20,463	--		

★

PAGE	1	2	3	4	5	6	7
REV.	2	1		2			1

LEGEND: "--" INDICATES "SAME AS PRECEDING MODEL"  
 "---" INDICATES "NOT APPLICABLE"

I. MODELS (cont.)	CT7-6 AF	CT7-6A AF		
FUEL CONTROL	Hamilton Standard JFC-78-4			
Boost Pump	Lear Siegler - Romec No. RR53150			
FUEL (See Note 12)	Fuel conforming to GE Aircraft Engines Jet Fuel Specification No. D50TF2, current revision. See SEI-694 Operating Instructions for specific fuels approved per the subject specification.			
OIL	Oil conforming to GE Aircraft Engines Specification No. D50TF1, current revision. See SEI-694 Operating Instructions for specific oils approved per the subject specification.			
PRINCIPAL DIMENSIONS:				
Length, in.	47	--		
Maximum diameter, in.	25	--		
WEIGHT (DRY):				
Basic engine, pounds (includes all essential accessories)	485	--		
C.G. LOCATION:				
Aft of front mount centerline, in.	13.76	--		
Above engine horizontal centerline, in.	1.25	--		
Left of vertical centerline, in.	.49	--		
IGNITION SYSTEM	Simmonds Precision dual ignition unit P/N 44525 with integral junction box assembly and two ignitor plugs, GE Aircraft Engines P/N 5044T67.			

## NOTES

## CERTIFICATION BASIS:

1 through 20

- a.) FAR 21.29 "Issue of type certificate: import products".
- b.) FAR 33, effective February 1, 1965, as amended by 33-1, 33-2, 33-3, 33-4, and 33-5; and Special Conditions No. 33-76-NE-2.  
Date of Type Certificate application: October 12, 1989.  
Date Type Certificate issued: February 22, 1990.
- c.) FAA/RAI Letter of Agreement, signed August 8, 1989, for CT7-6 AF and CT7-6A AF engine models (see NOTE 19).
- d.) The type certificate was issued in validation of RAI certification to RAI requirements.

The aviation authority for Italy, Ente Nazionale per l'Aviazione Civile (ENAC) (formerly Registro Aeronautico Italiano), originally type certificated this engine. The FAA validated this product under U.S. Type Certificate Number E33NE. Effective September 28, 2003, the European Aviation Safety Agency (EASA) began oversight of this product on behalf of Italy.

## TYPE CERTIFICATE

## LIMITATIONS:

Type certificates issued by FAA to Alfa Romeo Avio under FAR 21.29, and issued by RAI shall not be transferable. These Type Certificates shall be limited to CT7-6 AF and CT7-6A AF engine models and new models may not be added unless approved by GE and FAA and supported by suitable revisions to the FAA/RAI Letter of Agreement and GE/Alfa Romeo Avio license agreement revisions. Type Certificates issued by FAA and RAI to Alfa Romeo Avio for identified "AF" engine models shall terminate with the termination of the GE/Alfa Romeo Avio license agreement.

## IMPORT REQUIREMENTS:

To be considered eligible for installation on U.S. registered aircraft, each new engine to be exported to the United States with ENAC or EASA airworthiness approval shall have a Joint Aviation Authorities (JAA) or EASA Form 1, Authorized Release Certificate. The JAA or EASA Form 1 should state that the engine conforms to the type design approved under the U.S. Type Certificate E33NE, is in a condition for safe operation and has undergone a final operational check.

<b>NOTES</b>
--------------

NOTE 1. Maximum permissible gas generator operating speeds (rpm) are as follows:

2 1/2 Minute helicopter rating	46,060
30 Minute helicopter rating	45,900
Normal takeoff	45,900
Maximum takeoff	---
Maximum continuous	45,420
Transient (12 seconds)	47,440
APU (prop brake on)	---

Output operating speeds (rpm) are as follows:

Max governing	21,000
Min governing	18,200
Max continuous	21,000

NOTE 2. Maximum permissible temperatures are as follows:

Power Turbine Inlet (T4.5/ITT)\*

2 1/2 Minute helicopter rating	964°C (1767°F)
30 Minute helicopter rating	948°C (1738°F)
Normal takeoff	948°C (1738°F)
Maximum takeoff	---
Maximum continuous	899°C (1650°F)
Maximum transient (12 seconds)	992°C (1818°F)
Starting	948°C (1738°F)
Oil inlet	150°C (302°F)

\*The power turbine inlet gas temperature is measured by seven (7) thermocouples mounted in the power turbine casing. Refer to Maintenance Manual SEI-695 for inspection requirements when limits are exceeded.

NOTE 3. Fuel and oil pressure limits are as follows:

Fuel: At engine boost pump inlet: Minimum fuel pressure during starting shall be no lower than atmospheric pressure (or tank pressure, whichever is higher) minus 2.8 psi. For other operation excluding starts, the minimum pressure shall be 1.0 psi above true vapor pressure of the fuel with a vapor/liquid ratio less than or equal to 1.0. Maximum fuel pressure is 50 psi above absolute ambient atmospheric pressure.

Oil: At ground idle: 20 psig minimum  
Operating range: 30-100 psig.

NOTE 4. Accessory drive provisions:

<u>Drive</u>	<u>Type</u>	<u>Rotation Facing Engine Pad</u>	<u>Speed</u>	<u>Maximum Torque (in.- lb.)</u>	
				<u>Continuous</u>	<u>Static</u>
Starter	MS3326-2 (1)	CW	.64979 (2)	336	900 (3)/1000 (4)

CW Clockwise

- (1) Modified
- (2) Ratio to gas generator speed
- (3) 3 second maximum duration
- (4) Maximum axial impact force, lbs.

- NOTE 5. Engine ratings are based on calibrated test stand performance under the following conditions:
- Static sea level standard conditions of 59°F and 29.92 inches Hg.  
 Air inlet, GE Aircraft Engine P/N 1076662-486, and shaft shield, GE Aircraft Engines P/N 1076662-592.  
 No external air bleed for aircraft accessories.  
 Exhaust configuration as defined by GE Aircraft Engines P/N 1076662-524.  
 No anti-icing airflow.  
 Engine Performance Deck No. 88245 is the prime source of engine performance data throughout the flight envelope.
- NOTE 6. Maximum permissible customer air bleed extraction is 6.5 percent.
- NOTE 7. Power Turbine Operating Range
- The nominal power turbine rating speed is 20,463 rpm. The engine control system provides for power turbine speed governing within the following limits:
- |                           |        |
|---------------------------|--------|
| Min governing speed (rpm) | 18,200 |
| Max governing speed (rpm) | 21,000 |
- NOTE 8. Power Turbine Shaft Torque Limits (ft. - lbs.) are as follows:
- |                        |     |
|------------------------|-----|
| Transient (12 seconds) | 700 |
| 30 Minute              | 547 |
| Continuous             | 488 |
- NOTE 9. The engine models meet FAA requirements for operation in icing conditions. At temperature minus 4°F and below engine gas generator speed must be maintained at or above the physical speed defined on Figure A-5 SEI-693 Installation Manual.
- NOTE 10. Maximum permissible overspeeds are as follows:
- |               |                           |
|---------------|---------------------------|
| Gas generator | 47,440 rpm for 12 seconds |
| Power turbine | 25,300 rpm for 12 seconds |
- When any of these limits are exceeded, the engine must be inspected per Maintenance Manual SEI-695.
- NOTE 11. Below 59°F the sea level static power limit will vary as follows:
- |   |   |
|---|---|
| <u>Rating</u>                                       |   |
| 2 1/2 Minute helicopter                             | Increases linearly to 2,173 SHP at -65°F                            |
| Normal and Maximum Takeoff and 30 Minute helicopter | Increases linearly to 2,131 SHP at -36°F; then flat rated to -65°F. |
| Maximum continuous                                  | Increases linearly to 1,901 SHP at -43°F; then flat rated to -65°   |
- The ratings referred to herein and the limitations on the usage of these ratings are defined in the applicable FAR's.
- NOTE 12. The following optional additive may be used in approved fuels:
- Philips PFA-55-MB or anti-icing additives to specification MIL-I-27686E at a concentration not in excess of 0.15% by volume.
- NOTE 13. Life limits, established for critical rotating components, are published in GE Aircraft Engines CT7Turbohaft Engine Maintenance Manual SEI-695 Chapter 5.

NOTE 14. Recommended maintenance inspection intervals are published in Service Bulletin No. (CT7-TS) 72-9.

NOTE 15. The following engine components meet and/or provide means to satisfy the indicated requirements of FAR Part 29, Amendment 13.

<u>Components</u>	<u>Requirements</u>
(1) Fuel Filter	29.997 (a), (b), (c), (d) *29.1305 (a) (17)
(2) Oil Tank	29.1011(a) 29.1013 (a) 29.1013 (b) (1) (3) 29.1013 (c) (1) (2) (3) 29.1013 (d) (1) (2) 29.1013 (e) 29.1015 (a) (b) 29.1189 (a) (2) *29.1305 (a) (7)
(3) Oil Filter	29.1019 (a) (1) (2) (4) *29.1019 (a) (3) (5) *29.1305 (a) (18)
(4) Inlet Particle Separator Blower	29.1461 (b) (c)
(5) Ventilation	29.831 (b)

\* Means to satisfy requirements provided by the engine.

NOTE 16. The temperature value and/or nacelle airflow requirements specified in Paragraph A-8 of Installation Manual SEI-693 must be observed when installing the engine. Compliance with Special Condition 33-76-NE-2 concerning ignition of leaking oil is obtained only when these limits are met.

NOTE 17. The CT7-6 AF and CT7-6A AF incorporate the following general characteristics:

Identical to GE Aircraft Engines CT7-6/-6A engine models. Similar to GE Aircraft Engines CT7-9B/-9C engine models, except for GE Aircraft Engines CT7-2 turboshaft engine model family inlet and exhaust frames. Those GE Aircraft Engines engine models have been type certificated by FAA, ref. T.C. No. E8NE.

NOTE. 18 The engine models meet the fuel venting and smoke requirements of SFAR 27, effective February 1, 1974, as amended by Amendments SFAR 27-1 through SFAR 27-5 and superseded by FAR 34.

NOTE. 19 Implications from FAA/RAI Letter of Agreement, signed August 8, 1989, for FAA validation of RAI Type Certificate for CT7-6 AF/-6A AF engine models and for their continued airworthiness are as follows:

Engines, modules, and parts produced by Alfa Romeo Avio and Fiat Aviazione under license agreement with GE Aircraft Engines, titled "Manufacturing License and Technical Assistance Agreement", dated June 13, 1980, and as amended, shall be identified by the suffix "AF" appearing on the engine or module data plate and following the part number. "AF" engines, modules, and parts shall use identification marking procedures in accordance with GE/FAA approved standard practices under RAI surveillance.

All parts and modules produced by Alfa Romeo Avio/Fiat Aviazione for inclusion in GE engines, not bearing the suffix "AF" following the part number and on the module data plate, must be produced under GE/FAA approved supplier procedures, including Material Review Board actions in accordance with FAR Part 21, Subpart G. These parts are considered to be interchangeable with parts and modules manufactured by GE.

Modules and parts identified by the "AF" suffix are restricted to use in "AF" engines and prohibited from use in GE produced engines.

Engines, modules, and parts identified by the "AF" suffix must be in accordance with the design build standard defined for FAA-certificated GE CT7-6/06A engine models under FAA T.C. E8NE. Alfa Romeo Avio shall not introduce any design changes, including Material Review Board actions, unless defined by GE and approved by FAA.

Parts and modules produced by Alfa Romeo Avio identified by suffix "AF" will use GE process changes, source control, assembly, including Material Review Board actions, and test procedures defined by GE and utilizing RAI surveillance.

RAI shall ensure the incorporation, in "AF" identified engines, of GE developed, FAA approved, service difficulty corrective action. Mutual FAA/RAI reporting of service difficulty events shall apply under FAR 21.3 "Reporting of failures, malfunctions, and defects".

## NOTE 19 Continued

FAA may issue airworthiness directives applicable to CT7-6 AF and CT7-6A AF engine models certified under FAR 21.29, "Issue of type certificate; import products", with RAI taking equivalent airworthiness action.

Equivalent service bulletins and other service literature shall be issued by Alfa Romeo Avio, applicable to "AF" identified engines, based on technical content and compliance schedules contained in GE issued service literature and FAA approved service bulletins.

RAI shall surveil "AF" identified engine repair activity in accordance with the "AF" engine manual. New repairs which restore engine parts to within engine manual limits shall be developed with GE technical engineering support and approved by the FAA prior to incorporation in "AF" engines under RAI surveillance.

## NOTE 20

Each of the documents listed below must state that it is approved by the European Aviation Safety Agency (EASA) or, for approvals made before September 28, 2003 by Ente Nazionale per l'Aviazione Civile (ENAC) or Registro Aeronautico Italiano (RAI). Any such documents including those approved under a delegated authority, are accepted by the FAA and are considered FAA approved.

- Service bulletins,
- Structural repair manuals,
- Vendor manuals,
- Aircraft flight manuals, and
- Overhaul and maintenance manuals.

These approvals pertain to the type design only.

END