

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

E8EU
Revision 4
TURBOMECA

ASTAZOU
XIV-C
XIV-C1
XVI-C1
XVI-F
XVI-F1

March 20, 2007

TYPE CERTIFICATE DATA SHEET E8EU

Engines of models described herein conforming with this data sheet (which is part of Type Certificate Number E8EU) 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 Holder TURBOMECA S.A.
64 511 Bordes Cedex
France

| Models | ASTAZOU | XIV-C, C1 | XVI-F1 | XVI-C1, F |
|--|---|-----------|--------|-----------|
| Type | <i>Turboprop two stage axial compressor, single stage centrifugal compressor, annular combustion chamber, and three turbine stages.</i> | | | |
| | 24.16476:1 propeller reduction ratio (1783 rpm) | | | |
| Maximum continuous | SHP | 776 | 786 | 786 |
| | ESHP | 825 | 839 | 839 |
| Output shaft speed | RPM | 1783 | 1783 | 1783 |
| Takeoff (5 minutes) | SHP | 776 | 839 | 912 |
| | ESHP | 825 | 894 | 968 |
| Output shaft speed | RPM | 1783 | 1783 | 1783 |
| Distilled water injection for Astazou XIV-C1 and XVI-C1 See NOTE 15. | | | | |

Propeller Shaft - Flange type according to A.R.P. 880 Spec.
8 holes of .589 to .599 in dia. on 4.250 in dia. circle, with two drive pins

Propeller - Hamilton Standards 23 LF
Direction rotation as viewed from the engine rear (exhaust) port:
Propeller : clockwise
Turbine and compressor spool : counter-clockwise

Fuel Control - (See NOTE 12)
Turbomeca integral constant speed governor with phase advance correction (includes fuel pump, fuel cock, starting and idling unit maximum thermal load limiter).

Fuel - For approved specifications refer to Turbomeca Operation Manual (See NOTE 16).

Oil - For approved specifications refer to Turbomeca Operation Manual (See NOTE 16).

| | | | | | |
|----------|---|---|---|---|---|
| Page No. | 1 | 2 | 3 | 4 | 5 |
| Rev. No. | 4 | 4 | 3 | 3 | 4 |

Principal Dimensions

Weight (dry) - lb -

| | |
|---------------------|--|
| AST. XIV-C | 418 |
| AST.XIV-C1 | 436 with integral turbine blades. 428 with separate turbine blades. |
| AST.XVI-C1, -F, -F1 | 452 with integral turbine blades. 443 with separate turbine blades. |

C.G. Location (dry weight) - in -
forward of engine attachments, on engine
centerline.

| | |
|---------------------|--|
| AST.XIV-C | 9.40 |
| AST.XIV-C1 | 8.54 with integral turbine blades. 9.20 with separate turbine blades. |
| AST.XVI-C1, -F, -F1 | 8.5 with integral turbine blades. 8.86 with separate turbine blades. |

Ignition System - High tension, low energy system, comprising:
 - double ignition oil type AIR Equipment 81 268
 - two TURBOMECA torch igniters P/N 0237.30 750.0

Certification Basis FAR 21.29 and FAR Part 33 effective February 1, 1965, including Amendments 33-1 through 33-3.
 Date of Application for Type Certificate: January 15, 1968.
 Type Certificate No. E8EU issued March 25, 1969.

The aviation authority for France, the Direction Generale de L'Aviation Civile (DGAC), originally type certificated this engine. The FAA validated this product under U.S. Type Certificate Number E8EU. Effective September 28, 2003, the European Aviation Safety Agency (EASA) began oversight of this product on behalf of France.

Import Requirements: To be considered eligible for installation on U.S. registered aircraft, each new engine to be exported to the United States with the DGAC 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 E8EU, is in a condition for safe operation and has undergone a final operational check.

NOTE 1. Temperature Limits (°C)

| | XIV-C, C1 | XVI-C1, -F, -F1 |
|---------------------------------|---|-----------------|
| A. Exhaust Gas Temperature (T4) | | |
| - Maximum continuous | 500 | 540 |
| - Takeoff (5 minutes) | 500 | 585 |
| (Transient) | 520 (3 sec.) | 595 (5 sec.) |
| - Reverse (1 minute) | 400 | 400 |
| - Starting (5 seconds) | 650 to 700 | 650 to 700 |
| - Normal | 610 | 610 |
| - Over temperature | 750 | 750 |
| B. Oil Temperature | | |
| - Minimum starting | - 30 with oils to MIL-L-7808, AIR 3513 -3514 -3515, D.ENG. RD.2490 - 20 with oils to MIL-L-23699 - 10 with oils to AIR 3517, D.ENG.RD.2487. | |
| - Minimum Takeoff | + 10. | |
| - Maximum (all operations) | + 85. | |
| C. Ambient Air Temperature | | |
| - Minimum | - 60 | -- |
| - Maximum | + 45 | -- |
| D. Engine Bay Temperature | | |
| - Minimum | - 20 | -- |
| - Maximum (Zone 1) | + 85 | -- |
| - Maximum (Zone 2) | + 125 | -- |

NOTE 2. Fuel and Oil Pressure Limits.

| | | | | |
|----|-------|------------------------------------|--------------|----|
| A. | Fuel: | At engine inlet for starting, psig | 2.9 to 11.5 | -- |
| | | At engine inlet (normal), psig | -2.9 to 17.0 | -- |
| B. | Oil: | Normal oil pressure, psig | 21 to 72 | -- |
| | | Minimum low pressure warning | 16 | -- |

NOTE 3. Ratings (Refer to performance diagrams, Operation Manual):

Engine ratings are based on following conditions:

- Minimum guaranteed power, static, sea level, ISA standard, atmospheric conditions; (i.e. 15°C, 29.92 "Hg)
- No air bleed
- No power off-take
- At constant nominal engine speed of 43,089 rpm.

These ratings are minimum acceptable final test bed performance of production and overhauled engines on "Froude"
- brake with calibrated TURBOMECA air inlet pipe Ref. 6.103.43.905.0 and short straight jet pipe with a circular 9.00 in Dia. outlet.

For engine rating at non-standard day conditions refer to Installation Manual.

Jet thrust is converted to equivalent shaft horsepower by dividing the thrust value in lb by a factor of 2.5.

$$\text{Equivalent shaft horsepower (ESHP)} = \frac{\text{Jet Thrust lb}}{2.5} + \text{SHP}$$

Nominal torque is at 789 SHP for Astazou XIV-C, -C1; 810 SHP for Astazou XVI-F1; and 938 SHP for Astazou XVI-C1, -F and corresponds to 100% torquemeter reading. Torque limit is 110%.

NOTE 4. Accessory Drive Provisions. The following accessory drives are provided on the engine:

| Drive for accessory or equipment | Accessory Manufacturer | Rotation Sense (1) | Reduction Ratio (RPM) (3) | Maximum Allowance Steady Power (HP) | Maximum Static Torque in. lb. | Moment due to the weight in. lb. |
|-----------------------------------|-----------------------------|--------------------|---------------------------|-------------------------------------|-------------------------------|----------------------------------|
| Starter - Generator (2) | Plessey - Labinal | CW | 1/5.58218 (7,719) | 10 | 880 | 220 |
| Alternating Current Generator (2) | Plessey - Ragonot | CW | 1/3.64178 (11,838) | 16 | 300 | 135 |
| Hydraulic Pump (2) | Vickers Sperry Rand or ABEX | CCW | 1/6.62884 (6,500) | 5.4 | 310 | 44 |
| Tachometer Transmitter | Jaeger | CW | 1/10.4051 (4,141) | .13 | 4.5 | 9 |

Remarks:

- (1) Rotation sense indicated is engine drive shaft sense, viewed from the pad external side, from the rear of the engine i.e. from rear of accessory drive plate.
CW = clockwise
CCW = counter clockwise
- (2) Accessory not delivered with the engine, not included in engine weight, (aircraft manufacturer's delivery).
- (3) RPM values shown are based on drive reduction ratio shown and nominal engine speed which is 43,089 RPM.

NOTE 5. Engine air bleed is orifice limited as follows:

- For aircraft services 0.440 lb/sec.
- For air intake anti-icing 0.110 lb/sec.

NOTE 6. This engine meets the FAA requirements for adequate turbine disk integrity and rotor blade containment and does not require external armoring.

NOTE 7. This engine includes an intake anti-icing system supplied by compressor bleed and has been certificated to FAR 33.67(c) requirements for operation in icing conditions.

NOTE 8. Permissible Engine Speeds, rpm:

| | <u>XIV-C, -C1</u> | <u>XVI-F1</u> | <u>XVI-C1, -F</u> |
|---|-------------------|---------------|-------------------|
| - Maximum for takeoff and max. continuous | 43,500 (99.7%) | -- | -- |
| - Maximum transient (20 sec.) | 44, 830 (102.7%) | -- | -- |
| - Minimum for continuous operation | 43,089 (98.7%) | -- | -- |

NOTE 9. Weight

The indicated dry weight includes all regulation and starting apparatus but excludes:

- starter generator, alternator, hydraulic pump,
- exhaust pipe
- oil cooler
- propeller

NOTE 10. Reserved.

NOTE 11. Life limited parts are listed in Chapter 17 of the Maintenance Manual.

NOTE 12. These engines have no provision for fuel filtering nor for fuel filter anti-icing.

- Fuel supply from the aircraft to the engine must be delivered to the engine through a 15 micron filter.
- Use of fuel anti-icing additives must be per Operation Manual Instructions.

NOTE 13. Oil System

Oil capacity should be checked by reading sight glasses on the outboard side of each engine because of wing dihedral.

Capacities (U.S. Gal.) are as follows:

| | |
|--|------|
| - Total tank | 3.83 |
| - At max. sight glass level | 2.10 |
| - At min. sight glass level | 1.45 |
| - Usable (based on sight glass readings) | 0.65 |
| - Maximum usable | 1.30 |

Maximum oil consumption: 0.130 U.S. Gal/Hr.

NOTE 14. Reserved

NOTE 15. Distilled Water Injection

ASTAZOU XIV-C1 and XVI-C1 have provision for distilled water injection at a fixed rate of 39.5 U.S. gal/hr in the air intake for partial takeoff power restoration when the engine operates at higher than standard O.A.T. and/or altitude. This water injection is limited to operation at OAT above +10°C and it does not change turbine entry temperature not the speed and torque limits applicable at takeoff without distilled water injection. Power recovery rate is indicated in the Operation Manual.

| | | |
|--------------------------|---------------------------|--------------------------------|
| NOTE 16. <u>Manuals:</u> | <u>ASTAZOU XIV-C, -C1</u> | <u>ASTAZOU XVI-C1, -F, -F1</u> |
| Installation Manual No. | 262 08 935 | 265 07 931 |
| Operation Manual No. | 261 03 938 | 265 63 936 |
| Maintenance Manual No. | 261 08 939 | 235 63 938 - 265 07 935 |
| Overhaul Manual No. | 235 56 931 | 265 07 937 |

NOTE 17. Description of engine variants:

The different engine variants subject of this Data Sheet are listed below with corresponding aircraft models:

| <u>TYPE</u> | <u>DESCRIPTION</u> | <u>AIRCRAFT</u> |
|------------------------|--|---|
| ASTAZOU XIV-C, -C1 | Basic type, used on | Handley Page 137, Jetstream Mk. I |
| ASTAZOU XVI-C1, and -F | Improved variants of Astazou XIV series | Scottish Aviation Ltd. Jetstream Mk. 200 |
| ASTAZOU XVI-F1 | Same as Astazou XVI-F but flat-rated to Astazou XIV-C1, power. | Handley Page 137 Jetstream Mk. 1 |

NOTE 18. Service Information:

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 Direction Generale de L'Aviation Civile (DGAC). 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.

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