

FEDERAL AVIATION AGENCY

E-305
Revision 5
NAPIER
Eland
503, 503A
504, 504A
507, 507A
508, 508A
May 9, 1962

TYPE CERTIFICATE DATA SHEET NO. E-305

Engines of models described herein conforming with this data sheet (which is a part of type certificate No. E-305) and other approved data on file with the Federal Aviation Agency, meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Civil Air Regulations provided they are installed, operated, and maintained as prescribed by the approved manufacturer's manuals and other approved instructions.

Manufacturer: D. Napier and Son, Limited
Aero Gas Turbine Division
Acton, Vale, London, W.3,
England

Models	Eland	<u>503, 503A</u>	<u>504, 504A</u>	<u>507, 507A</u>	<u>508, 508A</u>
Type	Turboprop	10 stage axial compressor 3 stage turbine 6 combustion chambers 10.97:1 propeller reduction gearing	--	--	--
Rating					
Max. continuous at sea level; equivalent shaft hp., shaft hp., jet thrust, turbine r.p.m.		2910-2670-625-12000	2835-2600-610-12000	3190-2930-670-12250	3110-2860-650-12250
Takeoff (5 min.) at sea level; equivalent shaft hp., shaft hp., jet thrust, turbine r.p.m. (See Note 5 for additional limits)		3500-3230-700-12500	3412-3150-680-12500	3500-3230-700-12500	3412-3150-680-12500
Propeller shaft type, SBAC No. 6					
Fuel control (includes torque and gas temperature limiters, and a fuel filter)		Napier metering unit ANE49825, Lucas fuel pump GBB 32/8-AZ or GBB 32/8-AZ, DeHavilland propeller con- trol PAY75400 or KAY753.	--	Napier metering unit ANE49825, Lucas fuel pump MGBB 32/8BM, DeHavilland propeller control PAY75401	--
Fuel		Aviation kerosene JP-1, JP-4 or JP-5; D.Eng.R.D. 2482 (or 2494), 2486 or 2488	--	--	--
Oil (no oil tank on engine)		ESSO Turbo oil 35 D.Eng. R.D. 2487	--	--	--
Principal dimensions:					
Length, Maximum overall, in.		116	--	--	--
Diameter, Maximum, in.		36	--	--	--
C.G. location - fwd of rear mount, in.		12	--	--	--
Weight (dry), lb.		1820	--	--	--
Ignition system		Dual, with 2 BTH type C20-TS/1 high tension units an 2 KLG type KM100 or KM100/2 or Lodge LN100 or LN100/2 igniter plugs.	--	--	--

"- -" indicates "same as preceding model"

"__" indicates "does not apply"

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Certification basis CAR 10. Engine Type Certificate No. 305 issued July 28, 1958; revised February 19, 1959 and August 22, 1960. Each individually imported engine must be accompanied by the pertinent Inspection Test Certificate and clearly labeled as "import" in accordance with CAR 10.30.

NOTE 1. Maximum permissible temperatures:

Turbine outlet (jet pipe) temperature:

	503, 503A, <u>504, 504A</u>	507, 507A <u>508, 508A</u>
Takeoff	1067°F (575°C)	1067°F (575°C)
Maximum continuous	1013°F (545°C)	1040°F (560°C)
Maximum during starts	1292°F (700°C)	1292°F (700°C)
Maximum transients	1067°F (575°C)	1067°F (575°C)

The maximum temperatures for all except starts are higher than above by 1.8°F (1°C) for each 3.6°F (2°C) variation higher from 41°F (5°C) of outside air temperature. At outside air temperature of 41°F (5°C) and below the maximum temperatures remain constant at the above values. Jet pipe No. N6763/2-6, E6163/0-6, E6563/0-6 or E6163/140-160 uses 3 thermocouples and the above limits apply. The start temperature limit may also be measured by one thermocouple in the turbine rear casing.

	503, 504, <u>507, 508</u>	503A, 504A <u>507A, 508A</u>	
Minimum ambient temperature for starting		no limit -40°F	(-40°C)
Oil inlet temperature	23°F to 212°F (-5°C to 100°C)	-22°F to 212°F (-30°C to 100°C)*	

*(This limit is subject to the incorporation of Modification N. EL 1079)

External engine component temperature:

Cooling air temperature, 212°F (100°C) max. for zone 1
and 330°F (170°C) max. for zone 2

NOTE 2. Fuel and oil pressure limits

- Fuel, at engine inlet, 5 p.s.i.a. minimum
- Fuel gauge pressure, 5 p.s.i.g. minimum
- Oil gauge pressure, 30 p.s.i. idle, 60-115 p.s.i. varying with r.p.m. above idle
- Oil pressure at engine inlet, -1 to + 2 1/4 p.s.i.

NOTE 3: The engine ratings are the guaranteed minimums and are based on static sea level conditions as follows:

- Compressor inlet air 59°F. and 29.92 in.Hg.
- Nose fairing, Napier N.4010/376 or R.5710/29.
- Jet nozzle and exhaust pipe, Napier No. 4163/140-160, N.5763/2-6, N.6163/0-6 or N.6563/0-6, depending on installation.
- No aircraft accessory loads.
- No compressor air bleed.
- Equivalent shaft hp. = $\frac{\text{Jet Thrust}}{2.6} + \text{shaft hp.}$
- Jet pipe temperature no higher than in NOTE 1.

NOTE 4. The following accessory drive provisions are incorporated:

Drive	Rotation (facing drive)	Speed Ratio to Turbine	Torque		Maximum Overhang (in.-lb.)
			Continuous (in.-lb.)	Static (in.-lb.)	
Accessory gearbox (180 hp. at T.O. r.p.m.)	Clockwise	.4:1	2300	7000	(Supported)
Tachometer	Clockwise	.25:1	3	470	10
Starter 503, 504, 507 & 508 Electric	Clockwise	.8:1	1140	2700 (Starter clutch Setting)	730
503A, 504A, 507A, 508A Air	Clockwise	.81:1	3000		131

- NOTE 5. Maximum air extraction for aircraft purposes is 1.2% of total airflow for fuel heating and 1.0% for inlet guide vane anti-icing, and 0.1% for generator cooling. The first two bleed uses are selective, but the generator cooling is used at all times. No additional air bleed is authorized.
- NOTE 6. Propellers to be used with this engine must have functioning characteristics compatible with the engine and its control system such as the deHavilland type P.D. 216/466.
- NOTE 7: Shaft horsepower may be allowed to rise to 3250 hp. for takeoff for all models and to 2780 hp. (503, 503A, 504, 504A) or 3045 hp. (507, 507A, 508, 508A) for maximum continuous under conditions of low air temperature and ram air. A maximum overload torque limiter is incorporated in the engine control system and is set at 3390 s.h.p. for all models.
- NOTE 8. This engine meets FAA requirements for, (a) adequate turbine disc integrity, rotor blade containment, armoring, and (b) operation in icing conditions.
- NOTE 9. Maximum overspeed limit is 13500 r.p.m. for 20 seconds. When either limit is exceeded the engine shall be overhauled.
- NOTE 10. The mixing of approved fuels is permitted without restriction. No adjustment of the engine is necessary and no loss of performance occurs.

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