

**COMANDO DA AERONÁUTICA
DEPARTAMENTO DE PESQUISAS E DESENVOLVIMENTO
CENTRO TÉCNICO AEROESPACIAL**

TYPE CERTIFICATE DATA SHEET Nº EM-9608

Type Certificate Holder:

ROLLS-ROYCE CORPORATION
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USA

EM-9608-07
Sheet 01
ROLLS-ROYCE
A E 3007A, AE 3007A1
AE 3007A1/1, AE 300A1/2
AE 3007C, AE 3007A1/3,
AE 3007A1P, AE3007A3,
AE 3007A1E, AE 3007C1
August 2002

Engines of models described herein conforming with this data sheet, which is part of Type Certificate No. 9608, meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Brazilian Aeronautical Regulations provided they are installed, operated, and maintained as prescribed by the approved manufacturer's manuals and other instructions.

MODELS AE 3007A, AE 3007A1, AE 3007A1/1, AE 3007A1/2 and AE 3007A1/3 (See Note11)

TYPE Direct drive turbofan engine, modular design, single stage fan, 14 stage axial compressor, annular combustor, 2-stage gas generator turbine, 3-stage low pressure turbine, bottom mounted accessory gearbox, two single channel full authority digital electronic controls.

RATINGS	See Note 1	AE 3007A	AE 3007A1	AE 3007A1/1	AE 3007A1/2	AE 3007A1/3
Takeoff (5 min.):						
Static thrust, daN (lbf)		3 372 (7 580)	--	--	--	--
Fan shaft speed, rpm		7 750	7 903	7 716	7 823	7 903
Gas generator speed, rpm		15 452	16 013	15 603	15 842	16 013

RATINGS						
(cont.)	Maximum continuous:	AE 3007A	AE 3007A1	AE 3007A1/1	AE 3007A1/2	AE 3007A1/3
	Static thrust, daN (lbf)	3 034 (6 820)	--	--	--	--
	Fan shaft speed, rpm	7 441	7 613	7 404	7 548	7 613
	Gas generator speed, rpm	15 204	15 778	15 366	15 619	15 778
FAN SHAFT ROTATION	(aft looking fwd)	CC	--	--	--	--
	CC – Counter-Clockwise					
TEMPERATURE LIMITS		See Note 2	--	--	--	--
PRESSURE LIMITS		See Note 4	--	--	--	--
PRINCIPAL DIMENSIONS OF BASIC ENGINE	Length (overall), cm (in)	292.30 (115.08)	--	--	--	--
	Width (max), cm (in)	117.19 (46.14)	--	--	--	--
	Height (max), cm (in)	141.47 (55.70)	--	--	--	--
CG LOCATION⁽¹⁾	Engine station, cm (in)	238.5 (93.9)	--	--	--	--
(dry, no aircraft accessories)	Butt line, cm (in)	253.8 (99.9)	--	--	--	--
	Water line, cm (in)	248.2 (97.7)	--	--	--	--
	(1) C.G. Reference: Station 100.00 (Engine Axial Station) = Compressor case aft splitline; Butt Line 100.00 = Engine Horizontal Centerline (+ upward); Water Line 100.00 = Engine Vertical Centerline (+ to the right, ALF).					
WEIGHT (Dry)	kg (lb)	752 (1 657)	--	--	--	--
ENGINE CONTROL SYSTEM	TRW Full Authority Digital Electronic Control (FADEC) – Qty 2. TRW Fuel Pump & Metering Unit (FPMU) – Qty 1. TRW Compressor Variable Geometry (CVG) actuator – Qty 1.					
FUEL TYPE	Kerosene, commercial turbine fuel conforming to MIL-T-5624, Grade JP-4 and JP-5; MIL-T-83133, Grade JP-8; ASTM D1655, Jet A/A-1 and Jet B; GOST 10227-86 TS-1 and RT; Chinese specification GB6537-94 RP-3.					

LUBRICATION OIL Synthetic oil conforming to MIL-PRF-23699F and subsequent or MIL-PRF-7808L (below -40°C (-40°F)) and subsequent.

IGNITION SYSTEM BF Goodrich Aerospace, Engine Electrical Systems Division dual capacitance discharge, high energy type exciters, dual igniter plugs.

MODELS (See Note 11) AE 3007A1P, AE 3007A3, AE 3007A1E, AE3007C and AE 3007C1

TYPE Direct drive turbofan engine, modular design, single stage fan, 14 stage axial compressor, annular combustor, 2-stage gas generator turbine, 3-stage low pressure turbine, bottom mounted accessory gearbox, two single channel full authority digital electronic controls.

RATINGS	See Note 1	AE 3007A1P	AE 3007A3	AE 3007A1E	AE 3007C	AE 3007C1
	Takeoff (5 min.):					
	Static thrust, daN (lbf)	3 709 (8 338)	3 203 (7 201)	3 957 (8 895)	2 865 (6 442)	3 008 (6 764)
	Fan shaft speed, rpm	8 059	7 600	8 248	7 376	7 518
	Gas generator speed, rpm	15 953	15 329	16 128	15 388	15 452
	Maximum continuous:					
	Static thrust, daN (lbf)	3 034 (6 820)	--	3245 (7 297)	2 865 (6 442)	3 008 (6 764)
	Fan shaft speed, rpm	7 613	7 430	7 801	7 376	7 518
	Gas generator speed, rpm	15 778	15 191	15 926	15 388	15 452

FAN SHAFT ROTATION (aft looking fwd) CC -- -- -- --
CC – Counter-Clockwise

TEMPERATURE LIMITS See Note 2 -- -- -- --

PRESSURE LIMITS See Note 4 -- -- -- --

		AE 3007A1P	AE 3007A3	AE 3007A1E	AE 3007C	AE 3007C1
PRINCIPAL DIMENSIONS OF BASIC ENGINE						
	Length (overall), cm (in)	292.30 (115.08)	--	--	--	--
	Width (max), cm (in)	117.19 (46.14)	--	--	--	--
	Height (max), cm (in)	141.47 (55.70)	--	--	--	--
CG LOCATION⁽¹⁾						
(dry, no aircraft accessories)	Engine station, cm (in)	238.5 (93.9)	--	238.3 (93.82)	237.7 (93.58)	--
	Butt line, cm (in)	253.8 (99.9)	--	253.7 (99.87)	253.7 (99.87)	--
	Water line, cm (in)	248.2 (97.7)	--	248.0 (97.65)	248.2 (97.71)	--
⁽¹⁾ C.G. Reference: Station 100.00 (Engine Axial Station) = Compressor case aft splitline; Butt Line 100.00 = Engine Horizontal Centerline (+ upward); Water Line 100.00 = Engine Vertical Centerline (+ to the right, ALF).						
WEIGHT (Dry)	kg (lb)	752 (1 657)	--	--	732 (1 614)	734 (1 617)
ENGINE CONTROL SYSTEM	TRW Full Authority Digital Electronic Control (FADEC) – Qty 2. TRW Fuel Pump & Metering Unit (FPMU) – Qty 1. TRW Compressor Variable Geometry (CVG) actuator – Qty 1.					
FUEL TYPE	Kerosene, commercial turbine fuel conforming to MIL-T-5624, Grade JP-4 and JP-5; MIL-T-83133, Grade JP-8; ASTM D1655, Jet A/A-1 and Jet B; GOST 10227-86 TS-1 and RT; Chinese specification GB6537-94 RP-3.					
LUBRICATION OIL	Synthetic oil conforming to MIL-PRF-23699F and subsequent or MIL-PRF-7808L (below –40°C (–40°F)) and subsequent.					
IGNITION SYSTEM	BF Goodrich Aerospace, Engine Electrical Systems Division dual capacitance discharge, high energy type exciters, dual igniter plugs. “--” indicates “same as previous model” “#” indicates “does not apply”					

IMPORT REQUIREMENTS Each engine imported separately and/or spare parts must be accompanied by an export airworthiness approval issued by FAA (or a third country authority, in case of used engine imported from such country) attesting that the particular engine and/or parts were submitted to the governmental quality control before delivery and are in conformity with the CTA approved type design.

CERTIFICATION BASIS

RBHA 33, which endorses the US FAR 33 effective 01 February 1965, Amendments 33-1 through 33-14 (for AE 3007C Series) or 33-1 through 33-15 (for AE 3007A Series).		Application	Issued TC
	AE 3007A	12 May 1994	29 Nov. 1996
	AE 3007A1	26 Nov. 1997	12 Nov. 1998
	AE 3007A1/1	09 Mar. 1998	17 Apr. 1998
	AE 3007A1/2	20 Apr. 1998	19 Jun. 1998
	AE 3007A1/3	29 Mar. 1999	08 Jun. 1999
	AE 3007A1P	20 Jan. 1999	24 Aug. 1999
	AE 3007A3	20 Oct. 1997	27 Sep. 1999
	AE 3007A1E	14 Feb. 2002	26 Aug. 2002
	AE 3007C	22 Apr. 1998	12 Nov. 1998
AE 3007C1	10 Jul. 2002	26 Aug. 2002	

RBHA 34, which endorses the US FAR 34 effective 10 September 1990, Amendments 34-1 through 34-3.

PRODUCTION BASIS Production Certificate No. 310

NOTES

NOTE 1 The following criteria apply to AE 3007 Series engine ratings:

1. Sea level static, 760 mm Hg (29.92 in Hg)
2. 100% inlet pressure recovery
3. Exhaust nozzle area (A9) of 0.432 m² (670.1 in²)
4. Zero percent relative humidity
5. No inlet air distortion
6. No customer bleed extraction
7. No anti-ice airflow
8. No external power extraction

NOTE 1 9. Flat rated out to ambient temperature break points as follows:

(cont.)		30°C (ISA+15°C) 86°F (ISA+27°F)	34°C (ISA+19°C) 93°F (ISA+34°F)	38°C (ISA+23°C) 100°F (ISA+41°F)	45°C (ISA+30°C) 113°F (ISA+54°F)
	AE 3007C, AE 3007A, AE 3007A1/1, AE 3007A3, AE 3007C1	Takeoff Max con	#	#	#
	AE 3007A1/2	#	#	Takeoff Max con	#
	AE 3007A1, AE 3007A1/3	#	#	#	Takeoff Max con
	AE 3007A1P	#	Takeoff Max con	#	#
	AE 3007A1E	#	Takeoff	#	Max con

“--” indicates “same as previous model”
 “#” indicates “does not apply”

NOTE 2 Temperature limits, °C (°F)

	AE 3007C	AE 3007A	AE 3007A1/1	AE 3007A1/2	AE 3007A1
Measured interstage turbine temperature (ITT):					
Takeoff, 5 min	888 (1 630)	921 (1 690)	--	948 (1 738)	--
Maximum continuous	850 (1 562)	871 (1 600)	874 (1 605)	901 (1 653)	--
Starting	800 (1472)	--	--	--	--
Oil inlet temperature:					
Maximum	127 (260)	--	--	--	--
Min, MIL-PRF-23699F	- 40 (-40)	--	--	--	--
Min, MIL-PRF-7808L	- 54 (-65)	--	--	--	--
Minimum needed to increase N2 above 83%	#	40 (104)	--	--	--
Fuel pump inlet temperature:					
Minimum	-54 (-65), or that temperature corresponding to a fuel viscosity of 12 centistokes, whichever is higher.				

**NOTE 2
(cont.)**

	AE 3007C	AE 3007A	AE 3007A1/1	AE 3007A1/2	AE 3007A1
Maximum, steady state Installation Design Manual reference for environmental operating restrictions and maximum external engine component temperatures	57 (135) CSP 34011	-- CSP 34021	-- CSP 34073	-- CSP 34074	-- CSP 34070
Measured interstage turbine temperature (ITT):	AE 3007A1/3	AE 3007A1P	AE 3007A3	AE 3007C1	AE 3007A1E
Takeoff, 90 sec ⁽²⁾	#	#	#	#	994 (1 821)
Takeoff, 5 min	948 (1 738)	--	--	907 (1 665)	970 (1 778)
Maximum continuous	901 (1 653)	--	--	857 (1 575)	937 (1 718)
Starting	800 (1 472)	--	--	--	--
Oil inlet temperature:					
Maximum	127 (260)	--	--	--	--
Min, MIL-PRF-23699F	- 40 (-40)	--	--	--	--
Min, MIL-PRF-7808L	- 54 (-65)	--	--	--	--
Minimum needed to increase N2 above 83%	40 (104)	--	--	#	40 (104)
Fuel pump inlet temperature:					
Minimum	-54 (-65), or that temperature corresponding to a fuel viscosity of 12 centistokes, whichever is higher.				
Maximum, steady state Installation Design Manual reference for environmental operating restrictions and maximum external engine component temperatures	57 (135) CSP 34075	-- CSP 34077	-- CSP 34076	-- CSP 34011	-- CSP 34095

⁽²⁾ Allowance for a momentary ITT overshoot during the application of takeoff power due to the difference in rate of thermal growth of the turbine rotor and the turbine case

NOTE 3 Maximum allowable rotor speeds, rpm:

	AE 3007C, AE 3007C1	AE 3007A, AE 3007A1/1, AE 3007A1/2, AE 3007A1, AE 3007A1/3, AE 3007A1P, AE 3007A3,	AE 3007A1E
Low pressure turbine	8700	--	--
High pressure turbine	16123	16 270	16 470

NOTE 4 Oil and fuel inlet pressure limits, kPa (psig):

	AE 3007C Series	AE 3007A Series
Minimum, below 88% N2 (N2 < 14000 rpm)	234 (34)	--
Minimum, at or above 88% N2 (N2 ≥ 14000 rpm)	331 (48)	--
Maximum, no time limit	655 (95) ⁽³⁾	--
Maximum, limited to 5 min	#	662 – 793 (96 – 115)
Maximum, limited to 2 min	662 – 1 069 (96 – 155) ⁽⁴⁾	800 – 1 069 (116 – 155) ⁽⁵⁾
Fuel pump inlet pressure limits for Jet A, Jet A-1/JP-5 and Jet B/JP-4:		
Minimum – refer to Section 1 of these Installation Design Manuals:	CSP 34011	CSP 34021 (AE 3007A) CSP 34073 (AE 3007A1/1) CSP 34074 (AE 3007A1/2) CSP 34070 (AE 3007A1) CSP 34075 (AE 3007A1/3) CSP 34077 (AE 3007A1P) CSP 34076 (AE 3007A3) CSP 34095 (AE 3007A1E)
Maximum	379 (55)	--

⁽³⁾ With oil temperature > 21°C (70°F)

⁽⁴⁾ Compliance with Service Bulletin AE 3007C-79-029 or equivalent is required.

⁽⁵⁾ Compliance with Service Bulletin AE 3007A-79-025 or equivalent is required.

NOTE 5 Accessory Drive Provisions:

Accessory	Direction of Rotation	Speed Ratio	Normal Load ⁽⁶⁾ kW (hp)	Cyclic Overload Load ⁽⁶⁾ kW (hp)	Failure Overload Load ⁽⁶⁾ kW (hp)	Max. Shear Torque (in.lb)	Max. Overhung Moment (in.lb)
Generator 1	C, FLA	0.745	17.5 (23.5)	32.4 (43.5)	32.4 (43.5)	180.8 (1 600)	33.9 (300)
Generator 2	C, FLA	0.745	17.5 (23.5)	32.4 (43.5)	32.4 (43.5)	180.8 (1 600)	33.9 (300)
Hydraulic pump	C, FLA	0.473	9.7 (13.0)	27.8 (37.3)	31.3 (42)	207.9 (1 840)	18.1 (160)

C – Clockwise
FLA – Forward Looking – Aft

⁽⁶⁾The maximum total accessory horsepower extraction for all thrust settings and flight conditions is 44.74 kW (60 hp). An overload limit of 59.66 kW (80 hp) is permitted for a period of 5 minutes at all thrust settings and all flight conditions below 13 716 m (45 000 ft). Cyclic overload defined as 5 min / 1 hour of operation. Failure overload defined as 1 min / 10 000 hours of operation.

NOTE 6 Maximum engine bleed flow, percent of core airflow.

	AE 3007C, AE 3007C1	AE 3007A	AE 3007A1/1, AE 3007A1/2, AE 3007A1, AE 3007A1/3, AE 3007A1P, AE 3007A3	AE 3007A1E
8 th stage	7.0%	#	#	#
9 th stage	#	8.5%	7.9%	6.9%
14 th stage	12.0%	10.5%	9.3%	9.6%
8 th + 14 th stages	17.5%	#	#	#
9 th + 14 th stages	#	18.0%	16.5%	16.0%
Fan bypass	#	40.8 kg/mim (90 lbm/min)	--	--

NOTE 7 Mandatory replacement times (life limits) established for critical components and mandatory airworthiness inspections are published in Chapter 5 of the following Maintenance Manuals: AE 3007A Series - CSP 34022 and AE 3007C Series - CSP 34012.

NOTE 8 The accessory gearbox mounted accessories provided as part of the engine include:

Permanent Magnetic Alternator (PMA)

Fuel Pump & Metering Unit (FPMU)

Oil Pump

Engine accessory gearbox mounting pads are provided for aircraft generators (2), starter, and the aircraft system hydraulic pump.

NOTE 9 Aircraft mounted engine control equipment consists of Qty. 2 FADEC assembly units as defined in the following Electrical System Assembly Drawings:

AE 3007C	23057202 revision CW and later
AE 3007A	23054002 revision DM and later
AE 3007A1/1	23070002 revision AD and later
AE 3007A1/2	23070443 revision H and later
AE 3007A1	23070991 revision E and later
AE 3007A1/3	23070402
AE 3007A1P	23070401
AE 3007A3	23070412
AE 3007C1	23074408
AE 3007A1E	23074862

For P/N 23066394 FADECs, the following restrictions apply:

(a) Do not attempt a takeoff with corrected fan speed below 73.56% (6 400 rpm).

(b) Data from aircraft Air Data Computer (ADC) must be continuously available to the engine for compliance with 14 CFR 33.77(b).

ADC data must be provided from sources that are physically, electrically, and pneumatically isolated.

NOTE 10 The FAA-approved time limits that AE 3007C Series and AE 3007A Series engines may operate with control system faults present are defined by the Mandatory Inspections, Systems Description Section (05-13-00) and the Time Limits, System Description Section (05-14-00) of the Maintenance Manuals listed below. Installation requirements are included in the Installation Design Manual listed below.

	AE 3007C Series	AE 3007A Series
Maintenance Manual	CSP 34012	CSP 34022
Installation Design Manual	CSP 34011	#

NOTE 11 AE 3007A Series and AE 3007C Series engines are direct drive turbofans of modular design which feature:

- A single stage fan connected to a three-stage low pressure turbine.
- A 14-stage axial compressor with variable vanes (including inlet guide vanes) for the first six stages, an annular combustor, and a two-stage high pressure turbine.
- A full-length composite outer duct.
- Fore and aft mounting provisions, which allow either underwing pylon or aft fuselage mounting.

The following table highlights differences between models:

	AE 3007C Series P/N 23060567 (Type III)	AE 3007A Series P/N 23061623 (Type IV)
Fan blades	8 th stage	9 th stage
High pressure compressor bleed	No	Yes
Fan bypass bleed	Rotatable position	Fixed position
Rear mount support ring	No	Yes
Fuel flow meter, Rolls-Royce supplied		

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