



TYPE CERTIFICATE DATA SHEET Nº EM-9311

Type Certificate Holder:

TURBOMECA
64511 Bordes Cedex
France

EM-9311-01
Sheet 01
TURBOMECA
ARRIUS 1A
ARRIUS 1A1
22 June 2012

Engines models described herein conforming with this data sheet, which is part of Type Certificate Nº 9311, 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.

MODEL ARRIUS 1A; ARRIUS 1A1

TYPE Turboshaft engine; twin spool; single stage power turbine (free turbine); single stage centrifugal compressor; annular reverse flow combustion chamber; single gas generator turbine; reduction gearbox.

POWER RATINGS (see Note 1)	ARRIUS 1A	ARRIUS 1A1
Maximum continuous, kW (shp).	296 (397)	305 (409)
Take-off, kW (shp).	340 (456)	343 (460)
30 minute rating, kW (shp).	357 (479)	386 (518)
Continuous OEI, kW (shp).	#	#
2 ½ minute rating, kW (shp).	388 (520)	415 (556)

Legend: "--" same as the previous; "#" not applicable.

		ARRIUS 1A	ARRIUS 1A1
DIMENSIONS (Exhaust nozzles removed)	Length, cm (in)	79.3 (31.2)	--
	Height, cm (in)	58.6 (22.1)	--
	Width , cm (in)	43.6 (17.2)	--
CENTER OF GRAVITY	Refer to Installation Manual (see Note 12).		
WEIGHT	Dry (maximum), kg (lb)	102.7 (226.4)	--
	The weight includes standard equipment delivered with the engine but without exhaust nozzles.		
FUEL AND ADDITIVES	Approved fuels and additives conforming Installation Manual.		
FUEL CONTROL	Full Authority Digital Electronic Control system with manual backup mode.		
OIL LUBRICATION	Approved Oil specification conforming Installation Manual.		
OIL CAPACITY	Refer to Installation Manual.		
AIR BLEED	P3 air bleed from centrifugal compressor plenum.		
	Maximum air mass flow: 68 g/sec (0.15 lb/sec) at take-off rating under standard sea level conditions. For details, refer to Installation Manual.		
ROTATIONAL SPEED LIMITATIONS	See Note 2		
MAXIMUM EXHAUST GAS TEMPERATURE LIMITATIONS	See Note 3		
TORQUE LIMITATIONS	See Note 4		
FUEL AND OIL LIMITATIONS:	See Notes 6 and 7 for Temperatures and Pressures.		
ACCESSORY DRIVE LIMITATIONS:	See Note 5 for Speed Ratio and Torque Requirements.		

Legend: "--" same as the previous; "#" not applicable.

AIRWORTHINESS LIMITATIONS: See Note 11.

CERTIFICATION BASIS The Certification Basis for the engines is the RBAC 33, which endorses the 14 CFR 33 effective 01 February 1965, including amendments 33-1 through 33-12.

Model	Application date	Type Certification Date
ARRIUS 1A	17 June 1992	22 November 1993
ARRIUS 1A1	13 December 2011	22 June 2012

IMPORT REQUIREMENTS Each engine imported separately and/or spare parts must be accompanied by an Export Airworthiness Approval issued by EASA (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 ANAC approved Type Design.

NOTES :

- NOTE 1** Engine Ratings - The engine ratings are based on calibrated test rig under the following conditions:
- ICAO International Standard Atmosphere sea level, static conditions, no installation losses, no compressor air bleed, no external accessory loads.
 - Output shaft drive speed: 6 016 rpm.
 - Heating value of fuel: 18 550 BTU/lb.

NOTE 2 Rotational Speed Limitation Ratings:	ARRIUS 1A	ARRIUS 1A1
a. Maximum gas generator speed (Ng), rpm		
- Maximum continuous rating	53 285	53 397
- Take-off rating	54 685	54 375
- 30 minute rating	55 300	55 452
- 2 ½ minute rating	56 140	56 347
- Transient overspeed (5 sec. limit)	56 280	56 498
b. Power shaft speeds (%)		
- Maximum stabilized	104	--
- Maximum transient (5 sec.)	108	--

Legend: "--" same as the previous; "#" not applicable.

NOTE 2 (Cont.) Notes: - 100% gas generator speed equals 54 117 rpm; 100% power shaft speed equals 6 016 rpm.
 - During starting, operation within 70 to 85% range is limited to 20 seconds.
 - Refer to Installation Manual or Maintenance Manual for required action if limits are exceeded.

NOTE 3	Maximum Exhaust Gas (T45) Temperature Limits, °C (°F)	ARRIUS 1A	ARRIUS 1A1
	- Maximum continuous rating	765 (1 409)	749 (1 380)
	- Take-off rating	800 (1 472)	773 (1 423)
	- 30 minute rating	800 (1 472)	812 (1 494)
	- 2 ½ minute rating	870 (1 598)	886 (1 627)
	- Starting (unlimited)	765 (1 409)	--
	- Starting (limited to ≤ 5 sec.)	870 (1 598)	--

NOTE 4	Torque Limitations - Power Turbine Unit, Nm (lb.ft)		
	- Max., Maximum continuous	560 (413.0)	--
	- Max., Take-off	630 (464.7)	--
	- Max., 30 minute	630 (464.7)	--
	- Max., 2 ½ minute	680 (501.5)	--
	- Max., Transient (20 sec.)	770 (568.0)	--

NOTE 5 Accessory Drive Limitations

The following apply to the accessory gearbox drives, which are provided by the engine and included in the basic engine weight.

Drive	Sense of Rotation	Max. Steady State Power, kW (Shp)	Maximum Torque N.m (lb-in)	Maximum Overhang N.m (lb-in)
Starter / Generator	CW	4.8 (6.4)	25.0 (217)	25.0 (217)

Note: CW - clockwise (facing engine accessory pad).

NOTE 6 Fuel and Oil Temperature Limits

Fuel: Maximum operating: 50°C (122°F). When operating with restricted use-fuels is 25°C (77°F).

**NOTE 6
(Cont.)**

Oil: Maximum operating: 80°C (122°F) to 110°C (122°F), depending on altitude.
 Minimum for starting: between -50°C (-58°F) and -30°C (-22°F)
 Minimum for power application: between 0°C (32°F) and 10°C (50°F)

Refer to applicable Installation / Operating Manuals for further details.

NOTE 7

Fuel and Oil Pressure Limits:

Fuel: Refer to Installation Manual.

Oil: Maximum: 145.1 psig (10 bar) - Refer to Installation Manual or Maintenance Manual if limit is exceeded
 Minimum: 24.7 psig (1.7 bar) at N1 greater than 65%.

NOTE 8

FADEC box:

a. Installation conditions:

- The box shall be installed in the airframe outside the fire zone.
- Refer to Installation Manual for other installation conditions.

b. Lightning protection: refer to Installation Manual.

c. Electromagnetic interferences: tests carried out are specified in the Installation Manual.

d. Software: the software has been developed and tested and the corresponding documentation developed according to the recommendations of the documents RTCA DO 178A / EUROCAE ED-12A to level 1.

NOTE 9

The Arrius engines were not tested to evaluate the effects of foreign object ingestion. It is the airframer's responsibility to protect the engine from foreign object ingestion through the design of the aircraft air intake

NOTE 10

The Arrius 1A and 1A1 engine models do not have anti-icing provisions. The engines comply with engine airworthiness requirements during icing conditions when the helicopter air intake P/N 335 A543533 is installed.

NOTE 11

Certain engine parts are life-limited. These limits are published in the Maintenance Manual, Airworthiness Limitation Section.

NOTE 12

Approved documentation:

	ARRIUS 1A	ARRIUS 1A1
- Maintenance Manual	x319 D 6300 1	x319 U1 451 2
- Installation / Operating Manual	x319 D6 0012	x319 D6 0012
- Overhaul Manual	x319 H6 5002	x319 U1 500 2

NOTE 13 Overhaul, Installation / Operating and Maintenance Manuals, Service Bulletins, Structural Repair Manuals, Vendor and Aircraft Flight Manuals containing a statement that are approved by the EASA or DGAC – for approvals made before 28 Sept. 2003 – are accepted by the ANAC and are considered ANAC approved unless otherwise noted. These approvals pertain to the type design only.



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