



## TYPE CERTIFICATE DATA SHEET Nº EM-2024T02

Type Certificate Holder:

**Safran Helicopter Engines**

64510 Bordes

France

EM-2024T02-00

Sheet 01

SAFRAN HELICOPTER  
ENGINES

ANETO-1K

21 March 2024

Engines of models described herein conforming with this data sheet, which is part of Type Certificate No. 2024T02, 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** ANETO-1K

**TYPE DESCRIPTION** The ANETO-1 engine model is two spool turboshaft engines of modular design, comprising a three stage axial and a single stage centrifugal compressor, a reverse flow annular combustion chamber, a two stage axial flow gas generator turbine and a two stage axial flow power turbine connected to a forward mounted output drive by a transmission shaft. Control is provided by a dual-channel FADEC. The accessory gearbox is driven by the gas generator. Starter is not part of the engine type definition. The ANETO-1K is fitted with an inlet particle separator.

<b>RATINGS</b>	Normal Power kW (hp)	ANETO-1K <sup>(2)</sup>
	Take-Off (5 min.)	1063 (1426) <sup>(1)</sup>
	30 min. AEO	1063 (1426) <sup>(1)</sup>
	Maximum Continuous	914 (1226) <sup>(1)</sup>
	Contingency Power kW (hp)	
	2 min 30 s OEI	1572/1489 <sup>(3)</sup> (2108/1997 <sup>(3)</sup> )
	Continuous OEI	1297 (1739)

(1) This power value is flat rated due to the Helicopter gearbox torque limitation integrated into the EECU. (All declared powers are limited by the first limit reached – either thermal or mechanical. The mechanical limit is the first torque limit reached, which may be either the engine mechanical limit or an EECU torque limit.)

**RATINGS** (2) The following conditions apply:

**CONT...**

- a. Aged engine
  - b. Engine equipped with a test bed exhaust pipe and test bed air intake Rated power levels (kW) calculated by measurement using the test bed air inlet bell mouth and the test bed exhaust pipe;
  - c. ISA conditions at sea level;
  - d. Static condition;
  - e. Uninstalled performance: No installation losses;
  - f. No temperature, pressure or flow angle distortion at air inlet;
  - g. No back pressure downstream the exhaust pipe;
  - h. No customer air bleed
  - i. No power taken off by accessories other than those required for normal operation of engine;
  - j. Nominal output rotational speed : 21,000 rpm;
  - k. Fuel Heating Value = 43 136 kJ/kg and
  - l. Humidity mixing ratio of 0.069 kg/kg dry air at sea level ISA condition
- (3) This power value is limited to 1572 kW for the first 30 second and to 1489 kW for the following 2 minutes due to the Helicopter gearbox torque limitation integrated into the EECU. Refer to installation and Operating Manual for further details.

<b>DIMENSIONS</b>	Overall Length	Overall Width	Overall Height
mm (in.)	1171 (46.1)	683 (26.9)	648 (25.5)

<b>WEIGHT DRY</b>	260.00 (573.20)
<b>Kg (lb.)</b>	Standard engine dry weight including EECU.

<b>FUEL TYPE AND FUEL ADDITIVES</b>	For list of fuels and fuel additives approved for use in each model consult the relevant Installation or Installation and Operating Manual.
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<b>OIL, LUBRICATION</b>	For list of oils approved for use in each model consult the relevant Installation or Installation and Operating Manual.
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#### AIRCRAFT ACCESSORY DRIVES

Starter						
Rotation direction	Rotation speed ratio to NG	Maximum Static overhung moment	Fuse shaft breakaway torque	Maximum Continuous shaft power (kW)		Maximum torque
				AEO	2 min 30 s OEI	
CW	0.3784	2.82 daN.m	13.6 daN.m	24.6	20	See IOM

CW = clockwise looking aft

IOM = Installation and Operating Manual

#### MAXIMUM PERMISSIBLE AIR BLEED EXTRACTION

Maximum air delivery for aircraft services = 3,3% of engine inlet air mass flow

Range of speed at which bleed may be used, refer to IOM

#### TEMPERATURE LIMITS, °C (°F)

##### Gas generator exhaust temperature (T46) limits:

Start-up	Re-light
See Installation and Operating Manual	
In-flight - Normal	
Take-off	918 (1684)
30 min AEO	918 (1684)
Maximum Continuous	893 (1639)
Maximum Transient	923 (1699)
Over-temperature	(20 sec. limit)*

\* Maximum non inadvertent transient

**TEMPERATURE LIMITS, °C (°F) Cont...**

	<b>In-flight - Contingency</b>
2 min 30 s OEI	984 (1803)**
Continuous OEI	918 (1684)

\*\* A non inadvertent transient (990 °C) has been validated over authorized limit for a period of 2.2 seconds over 2 min 30s OEI stabilized temperature.

**Fuel temperature:**

For Maximum temperature, Minimum temperature for engine starting and Use of anti-icing additive: Consult the relevant Installation or Installation and Operating Manual

**Oil Temperature:**

Minimum oil temperature for engine starting -40°C for oil with a 5x10<sup>-6</sup> m<sup>2</sup>/s kinematic viscosity  
-50°C for oil with a 3 x10<sup>-6</sup> m<sup>2</sup>/s kinematic viscosity

**For oil with a 5x10<sup>-6</sup> m<sup>2</sup>/s kinematic viscosity:**  
-10°C when the starting altitude is between -610m (-2,000ft) and 4572m (15,000ft),  
0°C when the starting altitude is above 4572m (15,000ft).  
**For oil with a 3 x10<sup>-6</sup> m<sup>2</sup>/s kinematic viscosity:**  
-20°C when the starting altitude is between -610m (-2,000ft) and 4572m (15,000ft),  
-10°C when the starting altitude is above 4572m (15,000ft).

Minimum oil temperature for power-up

Maximum oil temperature 130 (266)

For additional limitations related to oil temperature, consult the relevant Installation and Operating Manual

**PRESSURE LIMITS kPa (psi)****Oil pressure (gauge):**

Minimum

Maximum

Refer to Installation and Operating Manual

840 (121.8) †

† For maximum pressure in cold conditions, refer to the Installation and Operating Manual

**Fuel pressure:**

For Minimum and Maximum limits refer the Installation and Operating Manual

**MAXIMUM / MINIMUM PERMISSIBLE ROTOR SPEEDS****Gas generator speed (NG):**

100% NG	Ground Idle nominal speed	Maximum Transient Overspeed
36300 rpm	73% of corrected NG	37907 (20 sec limit for all engines operating only) <sup>(1)</sup>

† For maximum pressure in cold conditions, refer to the Installation and Operating Manual

## Maximum stabilised speed - Normal

Take-off	30 min AEO	Maximum Continuous
37807 rpm	37807 rpm	37628 rpm

## Maximum stabilised speed - Contingency

2 min 30 s OEI	Continuous OEI
38817 rpm <sup>(2)</sup>	37979 rpm

(1) A non-inadvertent transient (38,197 rpm) has been validated over authorized limit for a period of 2.2 seconds over the 20 sec transient limit.

(2) A non-inadvertent transient (39,209 rpm) has been validated over authorized limit for a period of 2.2 seconds over 2 min 30s OEI stabilized speed.

**MAXIMUM / MINIMUM PERMISSIBLE ROTOR SPEEDS *Cont.*****Power Turbine speed (NP):**

100% NP	Maximum Transient Inadvertent Overspeed (♥)	Minimum Transient	Minimum Speed (in Flight Mode)
21000 rpm	23667 rpm (112.7% 20sec limit)	17 850 rpm (85%)	18900 rpm (90%)

\* For maximum pressure in cold conditions, refer to the Installation and Operating Manual

## Maximum stabilised speed - Normal

Take-off	30 min AEO	Maximum Continuous
21987 rpm (104.7 %)	21987 rpm (104.7 %)	21987 rpm (104.7 %)

## Maximum stabilised speed - Contingency

2 min 30 s OEI	Continuos OEI
21987 rpm (104.7 %)	21987 rpm (104.7 %)

(♥) Maximum transient limit is to be considered as the maximum inadvertent exceedance over authorized limit for period up to 20 seconds. This occurrence does not require rejection of the engine from service or maintenance action (other than to correct the cause).

**TORQUE LIMITS** Maximum torque on engine output shaft during operation (Nm):

Take-off	Maximus Continuous	30 min AEO	2 min 30 s OEI	Continuous OEI
791	766	791	863	791

**IMPORT REQUIREMENTS**

Imported engines or spare parts must be accompanied by an EASA Export Airworthiness Approval, Ref.: EASA Form 1, Authorized Release Certificate, certifying that the engine is in compliance with the ANAC approved Type Design, defined by the Brazilian Type Certificate No. 2024T02, is in condition for safe operation and has undergone a final operational check.

Note 1- The original Export Airworthiness Approval should be sent with the engine or spare part and a copy remains with the issuing organization.

Note 2 - For each engine it is required a list of exceptions (if any) in respect to the ANAC approved Type Design, listed in the Export Airworthiness Approval above mentioned.

Note 3 - ANAC approved Type Design corresponds to the EASA approved Type Design, an EASA Export Airworthiness Approval indicating compliance with the EASA approved Type Design defined by the EASA Type Certificate No. E.009 is acceptable to establish compliance with the ANAC approved Type Design.

**CERTIFICATION BASIS** Brazilian Type Certificate No. 2024T02 is based on RBAC section 21.29; following paragraph 21.29(a)(1)(ii) this Type Certificate was issued in validation of the following European Union Aviation Safety Agency (EASA) Certification Standards, which was found to provide a level of safety equivalent to that provided by RBAC 33, Amendment 28 and RBAC 34, Amendment 05, both in force in Brazil on the EASA Certification Reference Date, 30 Dec. 2016:

**Airworthiness Standards:**

- CS-E Amendment 4, dated 12 March 2015 except JAR-E 640 (JAR-E change 9) for the Low Pressure Fuel Pump Unit, the High Pressure Fuel Pump/ Metering Unit, the IGV/VSV actuator and the Pressurizing Starting Electro Valve.

**Special Conditions (SC):**

- SC1 – Transient limits.
- SC2 – 30 minute All Engine Operating (AEO) rating.
- SC3 - Engine Mounts – Non-Declaration of Approved Life.

**Equivalent Safety Findings:**

- CS-E 750 Starting Test

**Emission Standards:**

- Fuel Venting: CS-34, Amendment 2, dated 12 January 2016 in accordance with ICAO Annex 16, Volume II, Amendment 8, as applicable from 25 January 2016.

<b>ANAC TYPE CERTIFICATION</b>	<u>Model</u>	<u>TC Application Date</u>	<u>TC Issued/Reissued</u>
	Aneto-1K	22 December 2023	21 March 2024

**STATE OF DESIGN AUTHORITY REFERENCE DOCUMENT** EASA TCDS no.: E.009, Issue 11, 06 May 2020

**NOTES:****NOTE 1** Operating and Service Instructions:

Installation and Operating Manual	Engine Base Maintenance Manual	Overhaul Manual
X 046 1K 001 2	X 046 1K 460 2	X 046 1K 500 2

For Service Letters & Service Bulletins refer to SB and SL directory.

**NOTE 2** The engine components subjected to a limited service life are specified in the Airworthiness Limitations Section of the relevant maintenance manuals. The EASA approved Airworthiness Limitations Section of the Instructions for Continued Airworthiness is published in the Engine Base Maintenance Manual document, chapter 5 "Airworthiness Limitations".

**NOTE 3** Dispatch Limitations:

The ANETO-1K engine is approved for Time Limited Dispatch in accordance with CS-E 1030. The maximum rectification period for each dispatchable state is specified in the Installation and Operating Manual.

For installed engines, consult the relevant Installation or Installation and operating Manual

**NOTE 4** ETOPS Capability

The engine is not approved for ETOPS capability in accordance with CS-E 1040.

**NOTE 5** The ANETO-1K EECU software meets the RTCA DO-178B /EUROCAE ED-12B, DAL A for EECU standards.

**NOTE 6** The electronic control unit must not be installed in a designated fire zone. The installation conditions are defined in the relevant Installation or Installation and Operating Manual.

**NOTE 7** The electronic control system of the ANETO-1K engines provides a "TRAINING" function for training crews in an engine failure situation. Refer to the Installation and Operating Manual for the characteristics of this function.

**NOTE 8** The ANETO-1K model has not shown compliance with CS-E 800(d). This is allowed by CS-E 800(f)(7), but the engine is only certified to be installed in a multi-engined Rotorcraft

**Change Record**

Revision	Application Date	Changes	TC Issue/Reissued
Rev. 00	22 December 2023	Original Issue	21 March 2024

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This TCDS is available at ANAC website:

<https://sistemas.anac.gov.br/certificacao/Produtos/EspecificacaoOrgE.asp>