# Civil Aviation Authority
# United Kingdom

# TYPE-CERTIFICATE DATA SHEET

## UK.TC.E.00172

for

MAKILA 1 series engines

Type Certificate Holder
Safran Helicopter Engines
64510 Bordes
France

| | |
|---|---|
| Model(s): | MAKILA 1A<br>MAKILA 1A1<br>MAKILA 1A2 |
| Issue: | 01 |
| Date of issue: | 17 April 2026 |

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# Section 1 General (All Models)

## I. General

This Type-Certificate Data Sheet (TCDS) is the concise definition of the type-certificated product accepted and or approved by the CAA in the UK for the affected types and models.

This TCDS includes:

1. Details of the type design that affect the TCDS that have been approved or accepted by the CAA in the UK from 01 January 2021.

2. Details of the type design that affected the TCDS and were approved or accepted by EASA before 01 January 2021 and were incorporated into EASA TCDS EASA.E.072 at Issue 03 dated 09 March 2017 and are therefore accepted by the UK under Article 15 of Annex 30 of the UK-EU Trade and Cooperation Agreement.

## Section 2 MAKILA 1 series engines

### I. General

### 1. Type / Models:

MAKILA 1A, MAKILA 1A1, MAKILA 1A2. These variants are approved for use on multi-engined civil rotorcraft at the ratings and within the operating limitations specified below, subject to compliance with the powerplant installation requirements appropriate to approved installations.

Except where otherwise noted, data applies to all variants.

### 2. Type Certificate Holder

Safran Helicopter Engines
64510 Bordes
France

Until 18 July 2016 Turbomeca
After 18 July 2016 Safran Helicopter Engines

### 3. Manufacturer

Safran Helicopter Engines

Until 18 July 2016 Turbomeca
After 18 July 2016 Safran Helicopter Engines

### 4. Date of Application at EASA (Certificating Authority)

| | |
|---|---|
| MAKILA 1A | 12 September 1977 |
| MAKILA 1A1 | 18 November 1983 |
| MAKILA 1A2 | 31 January 1989 |

### 5. Type Certification date at EASA (Certificating Authority)

| | |
|---|---|
| MAKILA 1A | 27 February 1980 |
| MAKILA 1A1 | 18 October 1984 |
| MAKILA 1A2 | 06 June 1991 |

Notes:

1. The present data sheet cancels and replaces the data sheet “Fiche de caractéristiques moteur N° M10” issued by the French Direction Générale de l’Aviation Civile (DGAC).

2. EASA type certification of the MAKILA 1A, MAKILA 1A1 and MAKILA 1A2 variants is granted in accordance with Article 2a, paragraph 1(a) of Commission Regulation (EC) 1702/2003, as amended by Commission Regulation (EC) 375/2007, based on the DGAC France type certification of these variants.

### 6. Date of Application at CAA (Validating Authority)

| | |
|---|---|
| MAKILA 1A | 16 January 2026 |
| MAKILA 1A1 | 16 January 2026 |
| MAKILA 1A2 | 16 January 2026 |

**7. Type Certification date at CAA (Validating Authority)**

| | |
|---|---|
| MAKILA 1A | 17 April 2026 |
| MAKILA 1A1 | 17 April 2026 |
| MAKILA 1A2 | 17 April 2026 |

## II. Certification Basis

**1. Reference Date for determining the applicable airworthiness requirements.**

12 September 1977

**2. State of Design Airworthiness Authority Type Certification Data Sheet Number**

EASA TCDS EASA.E.072 Issue 05 and later approved issue.

**3. State of Design Airworthiness Authority Certification Basis**

Refer to EASA TCDS EASA.E.072

**4. UK CAA Certification Basis**

**4.1. Airworthiness Standards**

JAR-E Change 3, dated 22 March, 1977 (which incorporates by reference BCAR, Section C, Issue 10 dated March 22, 1977), plus BCAR amendments (Blue papers) 623, 678 and 679 dated October 21, 1977.

**4.2. Special Conditions**

| | |
|---|---|
| MAKILA 1A2 | SC1 – SC9: Special Conditions for approval of OEI ratings.<br>SC10: Assurance of power availability at OEI ratings |

**4.3. Equivalent Safety Findings**

None

**4.4. Deviations**

None

**5. Environmental Protection Requirements**

Fuel venting per CS-34, Original Issue, dated 17 October 2003 (ICAO Annex 16, Volume II, Amendment 5, dated 24 November 2005, Part II, Chapter 2)

## III. Technical Characteristic

**1. Type Design Definition**

| | |
|---|---|
| MAKILA 1A | P/N 0 298 00 504 0 |
| MAKILA 1A1 | P/N 0 298 00 506 0 |
| MAKILA 1A2 | P/N 0 298 00 511 0 |

**2. Description**

The MAKILA 1 engines consist of an annular air intake, a gas generator, a two stage axial power turbine, an exhaust pipe and rear power transmission off-take. The gas generator has a three stage axial compressor and a single stage centrifugal compressor, driven by a two stage axial turbine, and an annular

combustion chamber with centrifugal fuel injection. An accessory drive located at the front and driven by the gas generator powers the engine accessories.

## 3. Equipment

All equipment required for engine operation is included in the engine Type Design Definition. For additional details, refer to the applicable Installation Manual.

## 4. Dimensions

| | Length (mm) | Height (mm) | Width (not including exhaust pipe) (mm) |
|---|---|---|---|
| MAKILA 1A | 2117 | 673 | 498 |
| MAKILA 1A1 | 2117 | 673 | 498 |
| MAKILA 1A2 | 2117 | 673 | 498 |

## 5. Dry Weight

| | Weight (completely equipped) -0/+1 % (kg) |
|---|---|
| MAKILA 1A | 248 |
| MAKILA 1A1 | 246 |
| MAKILA 1A2 | 248 |

## 6. Ratings

### 6.1. All Engines Operative kW

| | Maximum Continuous | Take-off (5 minutes) |
|---|---|---|
| MAKILA 1A(1)(2) | 1130 | 1240 |
| MAKILA 1A1(1)(2) | 1185 | 1357 |
| MAKILA 1A2(1)(2) | 1236 | 1376 |

### 6.2. One Engine Inoperative kW

| | Continuous OEI | 30-minute OEI / Intermediate Contingency | 2½ - minute OEI | 2 – minute OEI | 30 – second OEI |
|---|---|---|---|---|---|
| MAKILA 1A(1)(2) | N/A | 1240 | 1310 | N/A | N/A |
| MAKILA 1A1(1)(3) | N/A | 1330 | 1400 | N/A | N/A |
| MAKILA 1A2(1)(3) | 1420 | N/A | N/A | 1467 | 1573 |

(1) The power values indicated in the table are defined under the following conditions:

- static, standard sea level conditions (15°C, 101.3 kPa);
- at the engine test bed with water brake system;
- with the air bleed ports closed;
- without accessory power extraction;
- with calibrated TURBOMECA air intake bellmouth P/N 6 202 88 704 0.

(2) The detailed performance curves are given in the applicable Operating Manual

(3) The detailed performance curves are given in the applicable Performance Brochure

## 7. Control System

| | |
|---|---|
| MAKILA 1A | Hybrid hydromechanical / analogue electronic |
| MAKILA 1A1 | Hybrid hydromechanical / analogue electronic |
| MAKILA 1A2 | Hybrid hydromechanical / digital electronic (DECU) |

## 8. Fluids (Fuel/Oil/Additives)

### 8.1. Fuel

For a list of fuels and fuel additives approved for use in each variant refer to the applicable Operating Manual.

### 8.2. Oil

For a list of oils approved for use in each variant refer to the applicable Operating Manual.

## 9. Aircraft Accessory Drives

None

## 10. Bleed Extraction

P2 air bleed extraction for helicopter use – maximum mass flow rate at sea level standard conditions:

- 160 g/s at maximum continuous rating
- 180 g/s at take-off rating and continuous OEI ratings

Refer to the applicable Operating Manual for further details.

## IV. Operating Limitations

### 1. Temperature limits

### 1.1. Gas generator exhaust temperature (T45) limits

On start-up:

| | For an Unlimited duration | Maximum Overtemperature (< 25 s) | Maximum Overtemperature (< 5 s) | Maximum Overtemperature ( < 2 s) |
|---|---|---|---|---|
| MAKILA 1A | 750°C | 770°C | 800°C | 810°C |
| MAKILA 1A1 | 750°C | 770°C | 800°C at Zp < 6000m<br>820°C at Zp ≥ 6000m | 810°C at Zp < 6000m<br>850°C at Zp ≥ 6000m |
| MAKILA 1A2 | 750°C | N/A | 800°C at Zp < 6100m<br>820°C at Zp ≥ 6100m | 810°C at Zp < 6100m<br>850°C at Zp ≥ 6100m |

In flight:

| | 2½ - minute OEI | Continuous OEI | 30-minute OEI / Intermediate Contingency | Take-off | Maximum Continuous |
|---|---|---|---|---|---|
| MAKILA 1A | 810°C | N/A | 785°C | 785°C | 735°C |
| MAKILA 1A1 | 830°C | N/A | 785°C | 795°C | 735°C |
| MAKILA 1A2 | N/A | 840°C | N/A | 825°C | 770°C |

### 1.2. Fuel temperature

Refer to the applicable Installation Manual

### 1.3. Oil temperature

Minimum oil temperature for power-up: refer to the applicable Operating Manual
Maximum oil temperature: 120°C

## 2. Maximum / Minimum Speeds

### 2.1. Gas generator speed (N1)

100% N1 = 33200 rpm

Maximum stabilised speed – All Engines Operative:

| | Take-off | Maximum Continuous |
|---|---|---|
| MAKILA 1A | 100% (33 200 rpm) | 98% (32 500 rpm) |
| MAKILA 1A1 | 100.45% (33 350 rpm) | 97.3% (32 300 rpm) |
| MAKILA 1A2 | 100.1% (33 220 rpm) | 97.4% (32 335 rpm) |

Maximum stabilised speed – One Engine Inoperative:

| | Continuous OEI | 30-minute OEI / Intermediate Contingency | 2½ - minute OEI | 2 – minute OEI | 30 – second OEI |
|---|---|---|---|---|---|
| MAKILA 1A | N/A | 100% (33 200 rpm) | 102.4% (34000 rpm) | N/A | N/A |
| MAKILA 1A1 | N/A | 100% (33 200 rpm) | 102.4% (34 000 rpm) | N/A | N/A |
| MAKILA 1A2 | 100.75% (33 450 rpm) | N/A | N/A | 101.8% (33 815 rpm) | 104.4% (34 650 rpm) |

Maximum transient (≤20s) overspeed – All Engines Operative:

| | |
|---|---|
| MAKILA 1A | N/A |
| MAKILA 1A1 | N/A |
| MAKILA 1A2 | 101.3% (33 625 rpm) |

Maximum transient (≤20s) overspeed – One Engine Inoperative:

| | |
|---|---|
| MAKILA 1A | 105% (34 900 rpm) |
| MAKILA 1A1 | 105% (34 900 rpm) |
| MAKILA 1A2 | N/A |

### 2.2. Power turbine speed (N2)

100% N2:

| | |
|---|---|
| MAKILA 1A | 22 850 rpm |
| MAKILA 1A1 | 22 850 rpm |
| MAKILA 1A2 | 22 962 rpm |

Maximum stabilised speed: 104% (all variants)

Maximum transient (≤20s) overspeed:

| | |
|---|---|
| MAKILA 1A | 117% |
| MAKILA 1A1 | 117% |
| MAKILA 1A2 | 117.9% |

The instructions to be followed if speed limits are exceeded are given in the Operating Manual.

**3. Torque Limits**

No operating limits are defined. The maximum transmitted torque is 750 Nm, corresponding to MAKILA 1A2 operation at rated 30-second OEI power.

**4. Torque Limits**

**4.1. Oil pressure**

Minimum oil pressure: 170 kPa gauge
Maximum oil pressure: 600 kPa gauge

**4.2. Fuel pressure**

Refer to the applicable Operating Manual

**5. Installation Assumptions**

Refer to the applicable Installation Manual

**6. Time Limited Dispatch**

The MAKILA 1 engines are not approved for time limited dispatch.

## V. Operational and Service Instructions

**Note:** In the table below, where two references separated by "/" are provided, the first one refers to the document in the French language and the second one to the document in the English language. In the event of a conflict, the French version shall take precedence.

| | Installation Manual | Operating Manual | Performance Brochure | Maintenance Manual | Overhaul Manual |
|---|---|---|---|---|---|
| MAKILA 1A | 298 00 930 / 298 00 931 | 298 01 930 / 298 01 933 | N/A | X 298 76 460 1 / X 298 76 460 2 | 298 01 935 |
| MAKILA 1A1 | X 298 E0 001 1 / X 298 E0 001 2 | 298 01 930 / 298 01 933 | X 298 E0 001 9 | X 298 E0 460 1 / X 298 E0 460 2 | 298 01 935 |
| MAKILA 1A2 | X 298 H2 001 1 / X 298 H2 001 2 | X 298 H2 101 1 / X 298 H2 101 2 | X 298 H2 202 9 | X 298 H2 400 1 / X 298 H2 400 2 | 298 01 935 |

For Service Letters and Service Bulletins, refer to the SB and SL directory.

## VI. Notes

1. The MAKILA 1 engines have not been subjected to icing tests nor to foreign object ingestion tests as defined in the Certification Specifications. The operating characteristics in ice-forming conditions and the level of protection against damage from ingestion of foreign objects must therefore be assessed prior to approval of the engine installation in any helicopter type.

2. The MAKILA 1A2 DECU must not be installed in a designated fire zone. Installation conditions are defined in the applicable Installation Manual.

3. The engine control unit provides, after modification for the MAKILA 1A and MAKILA 1A1, and without modification for the MAKILA 1A2, a TRAINING mode for training crews in the event of engine failure. Refer to the applicable Operating Manual for additional details of the TRAINING mode.

4. The MAKILA 1A2 DECU software has been validated in accordance with the requirements of RTCA/DO-178A, Level 1.

5. The starting and operating envelopes are provided in the applicable Operating Manual.

6. MAKILA 1A2 DECU EMI tests were performed as specified in MIL-STD-461B dated April 1, 1980, and in MIL-STD-462 Notice 2, for equipment classified in MIL-STD-461B as A1b. Validated EMI levels are specified in the Installation Manual. The DECU lightning tests were performed as specified in SAE standard AE4L 87-3, revision B. Validated lightning strike levels are specified in the applicable Installation Manual.

7. The engines are equipped with a free turbine overspeed shutdown device. The N2 shutdown limit is set at 120% for the MAKILA 1A and MAKILA 1A1, and 121.5% for the MAKILA 1A2.

8. Conversion from non-civil use. MAKILA 1 series engines originally assembled by Turbomeca may have been in service with military, customs, police or other operators not under the jurisdiction of a civil Authority. Before such engines can be converted to civil operation, their compliance with the European rules enabling issuance of an aircraft standard certificate of airworthiness must be checked. Their configuration, including design changes and repairs, does not necessarily conform to the type definition approved by EASA, and it is possible that in operation they have exceeded the limits approved by EASA. Before a standard certificate of airworthiness is issued to an aircraft in which such an engine is installed, an EASA Form 1 must be issued for the engine. This requires incorporation of TURBOMECA Mandatory Service Bulletin A298 72 0804, Version B (or any subsequent approved issue).

## Section 3 ADMINISTRATIVE

### I. Acronyms and Abbreviations

| Acronym / Abbreviation | Definition |
|---|---|
| N/A | Not Applicable |
| TIP | Technical Implementation Procedures |
| TC | Type Certificate |
| TCDS | Type Certificate Data Sheet |
| TCH | Type Certificate Holder |

### II. Type Certificate Holder Record

| TCH Record | Period |
|---|---|
| Turbomeca | Until 18 Jul 2016 |
| Safran Helicopter Engines<br>64510 Bordes<br>France<br>Design O Approval No.: EASA.21J.070 | After 18 Jul 2016 |

### III. Change Record

| TCDS Issue No. | TCDS Issue Date | Changes | TC Issue and Date |
|---|---|---|---|
| 1 | 17 Apr 2026 | Initial Issue<br><br>Section 1 is added to provide explanatory notes about the details of the type design that affect the TCDS, that have been approved or accepted by the CAA in the UK from 01 January 2021 and that the design changes accepted by EASA before 01 January 2021 were incorporated into EASA TCDS EASA.E.072 at Issue 03 dated 09 March 2017 and are therefore accepted by the UK under Article 15 of Annex 30 of the UK-EU Trade and Cooperation Agreement.<br><br>Accepted EASA Issue 04 which introduced a transient T45 limit of 770°C over a maximum period of 25 s at engine starting, which was approved by EASA as a Major (Non-Significant) change reference 10078324.<br><br>Accepted EASA Issue 05 which introduced a revised dry weight following the update of the Installation Manual which was approved by EASA as a Major (Non-Significant) change reference 10086030. | Issue 1<br>17 Apr 2026 |

– END –