**Civil Aviation Authority**
**United Kingdom**

# TYPE-CERTIFICATE DATA SHEET

## UK.TC.E.00148

for

ARRANO 1 Series Engines

Safran Helicopter Engines

64510 Bordes

France

| | |
|---|---|
| Model(s): | ARRANO 1A |
| Issue: | 01 |
| Date of issue: | 23 January 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 UKCAA **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.095 at Issue 03 dated 16 December 2020 and are therefore accepted by the UK under Article 15 of Annex 30 of the UK-EU Trade and Cooperation Agreement

## Section 2 Arrano 1 Series Engines

### I. General

#### 1. Type / Variant / Model

ARRANO 1 Series/ ARRANO 1A. This model is approved for use on multi-engine civil rotorcraft at the ratings and within the operating limitations specified below, subject to compliance with the powerplant installation requirements appropriate to approved installations.

#### 2. Type Certificate Holder

Safran Helicopter Engines
64510 Bordes
FRANCE

DOA-ref: EASA.21J.070

#### 3. Manufacturer

Safran Helicopter Engines

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

20 June 2012

#### 5. EASA Certification Date (Certifying Authority)

18 June 2019

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

Prior to 31 December 2020, application dates for type certification are covered by EASA type certification application dates, as per Section 4 above. New applications for UK CAA type validation received after 01 January 2021 will be recorded in this section.

At the current issue of this UK CAA TCDS, no new applications for type validation have been received since 01 January 2021.

#### 7. Date of Validation Approval at CAA (Validating Authority)

Prior to 31 December 2020, dates of type certification are covered by EASA type certification, as per Section 5 above.

UK CAA type validation dates after 01 January 2021 will be recorded in this section. At the current issue of this UK CAA TCDS, no ARRANO 1A UK CAA type validations have been completed since 01 January 2021.

### II. Certification Basis

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

30 December 2016

#### 2. State of Design Airworthiness Authority Type Certificate Data Sheet Number

EASA.E.095

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

Refer to TCDS EASA.E.095.

#### 4. UK CAA Certification Basis

##### 4.1 Airworthiness Standards

CS-E Amendment 4, effective 12 March 2015.

**4.2 Special Conditions**

Approval of a 30 minute power rating;

Operation in 'APU' mode;

Transient over-temperature, over-speed and over-torque limit approval.

**4.3 Equivalent Safety Findings (ESF)**

None

**4.4 Deviations**

None

**4.5 Environmental Protection Requirements**

CS-34.1 – Fuel Venting

## III. Technical Characteristics

### 1. Type Design Definition

| Model | Part Number |
|---|---|
| ARRANO 1A | P/N 0356000010 |

### 2. Description

The ARRANO 1 series turboshaft engines have an annular inlet integrating inlet guide vanes, a two-stage centrifugal compressor driven by a single-stage high pressure turbine, a reverse flow combustion chamber and a single-stage low pressure turbine (power turbine) driving a reduction gearbox located at the front of the engine and an exhaust pipe. The high pressure (gas generator) shaft drives the accessory gearbox. The engine is controlled by a Full Authority Digital Electronic Control (FADEC).

### 3. Equipment

The equipment necessary to operate the engine and that is not included in the Engine Type Design Definition is defined in the applicable Installation and Operating Manual.

### 4. Dimensions

| Model | Length (mm) | Height (mm) | Width (mm) |
|---|---|---|---|
| ARRANO 1A | 1219 | 817 | 623.2 |

### 5. Dry Weight

| | Weight (Completely equipped with EECU) (kg) |
|---|---|
| ARRANO 1A | 173.5 |

### 6. Ratings

6.1 All Engines Operative (kW)

| | Maximum Continuous | Take-off (5 minutes) | 30-minute AEO |
|---|---|---|---|
| ARRANO 1A (1)(2) | 738 | 851 | 851 |

6.2 One Engine Inoperative (kW)

| | Maximum Continuous | Take-off (5 minutes) | 30-minute AEO |
|---|---|---|---|
| ARRANO 1A (1)(2) | 924 | 1040 | 1094 |

(1) The performance values specified above are defined in the Installation and Operating Manual and correspond to minimum values at 109% N2.

(2) For detailed performance curves, refer to the applicable Installation and Operating Manual.

**7. Control System**

| | |
|---|---|
| ARRANO 1A | Dual channel electronic engine control system<br>Electronic Engine Control Unit (EECU) P/N 70QMA01000 or later approved standard (software standard included in the EECU P/N) |

**8. Fluids (Fuel, Oil, Additives)**

Refer to applicable Installation and Operating Manual.

**9. Aircraft Accessory Drives**

| | Rotation Direction | Rotation Speed | Maximum Torque in overload condition | Maximum Static Cantilever | Maximum unbalance (ISO 1940) | Shear Shaft maximum breakaway torque | Maximum continuous shaft power (1) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Idle, AEO and OEI Conditions | 2-min and 30-sec OEI |
| | | rpm | daN.m | daN.m | G | daN.m | kW | kW |
| Starter - Generator | CW | 11727 (100% N1) | 8 | 2.5 | 2.5 | 18 | 13 | 13 |

(1) Transient mechanical offtake is allowed up to 19 kW for 2 minutes and up to 25 kW for 5 seconds.

**10. Maximum Permissible Air Bleed Extraction**

The P3 air bleed extraction for helicopter use is limited by the section of the P3 extraction restrictor. The maximum possible extraction is 205 g/s and corresponds to Take-Off power at ISA Sea Level conditions.

Refer to the applicable Installation and 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 |
|---|---|---|
| ARRANO 1A | 800 $^{O}$C | 850 $^{O}$C |

In APU Mode

| | For an unlimited duration |
|---|---|
| ARRANO 1A | 665 $^{O}$C |

In flight, All Engine Operative

| | Take-off (5 minutes) | 30-minute AEO | Maximum Continuous | AEO transient (20 Seconds) |
|---|---|---|---|---|
| ARRANO 1A | 912 $^{O}$C | 912 $^{O}$C | 886 $^{O}$C | 934 $^{O}$C |

In flight, One Engine Operative

| | 30-second OEI | 2-minute OEI | Continuous OEI |
|---|---|---|---|
| ARRANO 1A | 991 $^{O}$C | 957 $^{O}$C | 914 $^{O}$C |

### 1.2 Fuel Temperature (Engine Inlet)

| | | Minimum fuel temperature Operating, starting and restart envelope | Maximum Fuel Temperature |
|---|---|---|---|
| ARRANO 1A (1)(2)(3)(4)(5)(6) | Normal Fuels | The highest temperature between -45$^{O}$C and freezing point temperarure defined for the applicable fuel standard | +57 $^{O}$C |

(1) Refer to the Installation and Operating Manual for detailed definition and limitations of normal fuels usage.

(2) Replacement fuels are authorized on ARRANO 1A engine. Refer to Installation and Operating Manual for detailed definition and limitations of replacement fuels usage.

(3) Emergency fuels are authorized on ARRANO 1A engine, except for APU mode. Refer to Installation and Operating Manual for detailed definition and limitations of emergency fuels usage.

(4) The minimum fuel temperature is subject, for certain fuels, to mandatory use of anti-icing additive for temperatures below -30°C. Refer to the Installation and Operating Manual for further details.

(5) List of authorized additives is defined in the Installation and Operating Manual.

(6) Climatic operating, starting, and restarting envelopes of normal, replacement and emergency fuels are defined in the Installation and Operating Manual.

### 1.3 Oil Temperature ($^{O}$C)

| | Minimum Oil Temperature for starting | Maximum Oil Temperature |
|---|---|---|
| ARRANO 1A(1) | -36$^{O}$C for 5 cSt<br>-45$^{O}$C for 3 cSt | 115 $^{O}$C |

(1) Refer to Installation and Operating Manual for detailed oil temperature limitations

## 2. Maximum / Minimum Permissible Rotor Speeds

### 2.1 Gas Generator Speeds (N1) (%)

100% N1 = 44 139 rpm

In-flight and APU mode minimum speeds:

| | Idle Mode(1) | IDLE with PT Locked | APU Mode | Flight Mode(2) |
|---|---|---|---|---|
| ARRANO 1A | 57% | 57% | 59.8% | 69.8% |

(1) This speeds corresponds to the minimum stabilized N1 speed in IDLE mode with N2 = 80%.

(2) This speeds corresponds to the minimum stabilized N1 speed in FLIGHT mode with N2 = 100%.

In-Flight Maximum Speeds, All Engine Operative:

| | Take-off (5 minutes) | 30-minute AEO | Maximum Continuous | AEO transient (20 Seconds) |
|---|---|---|---|---|
| ARRANO 1A | 104% | 104% | 103% | 105.50% |

In-flight Maximum Speeds, One Engine Inoperative:

| | 30-second OEI | 2-minute OEI | Continuous OEI |
|---|---|---|---|
| ARRANO 1A | 107.8% | 105.6% | 104.5% |

### 2.2 Power Turbine Speed (N2) (%)

100% N2 = 7939 rpm on the power drive.

In-flight minimum speeds:

| | Stabilised | Transient (20 Seconds) |
|---|---|---|
| ARRANO 1A | 90% | 70% |

Operation with turbine locked is only authorized in APU mode and for engine starting.

In-flight maximum speeds:

| | Stabilised |
|---|---|
| ARRANO 1A | 109% |

**Note:** A Maximum Inadvertent Overspeed of 115% has been certified for the ARRANO 1A model. This corresponds to the maximum N2 speed for which inadvertent occurrence of up to 20 seconds has been demonstrated not to require rejection of the engine from service or maintenance action (other than to correct the cause) according CS-E 830.

## 3. Torque Limits (m.daN)

Maximum torque, All Engine Operative:

| | Take-off (5 minutes)(1) | 30-minute AEO(1) | Maximum Continuous(1) | AEO transient (20 Seconds)(2) |
|---|---|---|---|---|
| ARRANO 1A | 940 N.m | 940 N.m | 816 N.m | 940 N.m |

Maximum torque, One Engine Inoperative:

| | 30-second OEI | 2-minute OEI | Continuous OEI |
|---|---|---|---|
| ARRANO 1A | 1327 N.m | 1176 N.m | 1033 N.m |

(1) For AEO ratings, torque values presented above correspond to the maximum torque validated for the engine.

(2) For OEI ratings and AEO transient 20s, engine torque values are limited by torque toppings sent by the helicopter on ARINC frame to the EECU in order to protect the helicopter main gearbox. Values presented above correspond to the maximum value of the torque topping range authorized by the EECU for each power rating. For further details refer to Installation and Operating Manual.

**4. Pressure Limits**

4.1 Oil pressure

Normal oil pressure for engine operation is between 400 kPa (relative pressure) and 900 kPa (relative pressure).

Minimum and Maximum levels warnings are functions of N1 and oil temperature.

4.2 Fuel pressure (Engine inlet)

Detailed information about fuel pressures depending on atmospheric conditions and fuel specifications are provided in the Installation and Operating Manual.

**5. Installation Assumptions**

Refer to Installation / Operating Manuals for details.

**6. Dispatch Limitations**

ARRANO 1A has been approved for Time Limited Dispatch. The maximum rectification period for each dispatchable state is specified in the Airworthiness Limitations Section of the Maintenance Manual. The TLD dispatchable fault configurations are defined in the Installation and Operating Manual.

## V. Operational and Service Instructions

The Operating and Service Instructions listed below are approved by the European Union Aviation Safety Agency under EASA Type Certificate EASA.E.095 in accordance with Commission Regulation (EU) 748/2012 as amended.

These instructions and any future revisions are either accepted under Article 13 of Annex 30 of the UK-EU Trade and Cooperation Agreement or subject to approval by Validation under Article 10 of Annex 30 of the UK-EU Trade and Cooperation Agreement, for use by UK operators.

The Type Certificate Holder should be contacted to verify the applicability of any Operational and Service Instructions within the UK.

| **Manuals** | Installation and Operating Manual | Performance Brochure |
|---|---|---|
| ARRANO 1A | X3561A0022 | X3561A0012 |

| Instructions for Continued Airworthiness | Maintenance Manual | Overhaul Manual | Maintenance Manual Trouble Shooting Book | Service Letters and Service Bulletins |
|---|---|---|---|---|
| ARRANO 1A | X3561A4602 | X3561A5002 | X3561A4612 | Refer to the SB and SL directory |

**VI. Notes**

1. ARRANO 1A engine is certified according to Airworthiness requirements of CS-E 780 for satisfactory operation in icing conditions only when installed in accordance with the Installation and Operating Manual.

2. ARRANO 1A is not certified for hail and bird ingestion.

3. Helicopter requirements for protection of ARRANO 1A against foreign object (including bird), water, snow, hail and ice ingestion are defined in the Installation and Operating Manual. The helicopter air intake design shall be such as to prevent instantaneous ingestion of ice, snow and water in excess of maximum quantities defined in the Installation and Operating Manual.

4. ARRANO 1A EECU shall be installed outside of a designated fire zone and outside of a zone that might lead to overheat conditions. Corresponding installation assumptions are defined in the Installation and Operating Manual.

5. ARRANO 1A EECU features an OEI TRAINING mode for training crews in the event of engine failure. Refer to the applicable Installation and Operating Manual for additional details.

6. The ARRANO 1A EECU software has been validated in accordance with the requirements of DO-178B guidelines for a level A software.

7. The operating / starting / relight envelopes of ARRANO 1A are provided in the Installation and Operating Manual.

8. Qualified environmental conditions of the ARRANO 1A EECU, including EMI and HIRF, are detailed in the Installation and Operating Manual.

9. ARRANO 1A is equipped with a power turbine overspeed shutdown device. Refer to the Installation and Operating Manual for additional details.

10. The EASA approved Airworthiness Limitations Section of the Instructions for Continued Airworthiness is published in the Engine Maintenance Manual and Overhaul Manual documents, chapter 5 “Airworthiness Limitations”.

11. ARRANO 1A engine has APU mode capability. Use conditions of APU mode are defined in Installation and Operating Manual.

## Section 3 Administration

### I. Acronyms and Abbreviations

| Acronym / Abbreviation | Definition |
|---|---|
| AEO | All Engines Operating |
| APU | Auxilliary Power Unit |
| ARINC | Aeronautical Radio Incorporated |
| BCAR | British Civil Aviation Regulation |
| CAA | Civil Aviation Authority |
| CCW | Counter Clock Wise |
| CS-E | Certification Specification for Engines |
| cSt | Centistokes |
| DOA | Design Organisation Approval |
| daN.m | decaNewton Meter |
| EU | European Union |
| EECU | Engine Electronic Control Unit |
| EMI | Electronmagnetic Interference |
| ESF | Equivalent Safety Finding |
| EASA | European Aviation Safety Agendy |
| FAR | Federal Aviation Regulation |
| FADEC | Full Authority Digital Engine Control |
| g/s | Grams per second |
| hPa | HectoPascal |
| JAR | Joint Airworthiness Regulation |
| HIRF | High Intensity Radiated Fields |
| ISA | International Standard Atmosphere |
| Kg | Kilogram |
| kJ | Kilojoule |
| kPa | Kilopascal |
| kW | Kilowatt |
| N.m | Newton Meters |
| $^{O}$C | Degrees Centigrade |
| OEI | One Engine Inoperative |
| P/N | Part Number |
| rpm | Revolutions per Minute |
| SB | Service Bulletin |
| TC | Type Certificate |
| TLD | Time Limited Dispatch |
| TCDS | Type Certificate Data Sheet |
| TCH | Type Certificate Holder |
| UK | United Kingdom |

## II. Type Certificate Holder Record

| TCH Record | Period |
|---|---|
| Safran Helicopter Engines<br>64510 Bordes<br>France | From 18 July 2016 |

## III. Amendment Record

| TCDS Issue No. | TCDS Issue Date | Changes | TC Issue and Date |
|---|---|---|---|
| 01 | 23 Jan 2026 | Initial Issue – Created in response to application for administrative validation, ref: UK.ADMIN.00180. | Issue 01<br>23 Jan 2026 |
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