

U.S. DEPARTMENT OF TRANSPORTATION  FEDERAL AVIATION ADMINISTRATION  TYPE CERTIFICATE DATA SHEET NO. E00054EN	TCDS NUMBER E00054EN REVISION: 10  DATE: October 19, 2016 Safran Helicopter Engines, S.A.  MODELS:  ARRIEL 2S1 ARRIEL 2S2 ARRIEL 2B ARRIEL 2B1 ARRIEL 2C ARRIEL 2C1 ARRIEL 2C2 ARRIEL 2D ARRIEL 2E
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Engines of models described herein conforming with this data sheet (which is part of Type Certificate Number E00054EN) and other approved data on file with the Federal Aviation Administration, meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Federal Aviation Regulations, provided they are installed, operated, and maintained as prescribed by the approved manufacturer's manuals and other approved instructions.

TYPE CERTIFICATE (TC) HOLDER      Safran Helicopter Engines, S.A.  
 (formerly Turbomeca, S.A.)  
 64511 Bordes - Cedex  
 France

<b>I. MODELS</b>	<b>ARRIEL 2S1, 2S2, 2B, 2B1, 2C, 2C1, 2C2, 2D, 2E</b>				
<b>TYPE:</b>	Turboshaft engine consisting of an axial air intake, an axial compressor and a centrifugal compressor driven by a single stage turbine, a combustion chamber, and a single stage power turbine driving a reduction gearbox located at the rear. An accessory drive gearbox, driven by the gas generator, is located at the front.				
<b>RATINGS:</b>					
SHP (KW) (See Note 8)	<b>ARRIEL 2S1</b>	<b>ARRIEL 2S2</b>	<b>ARRIEL 2B</b>	<b>ARRIEL 2B1</b>	
30 second OEI	985 (735)	1048 (771)	---	---	
2 minute OEI	889 (663)	950 (699)	---	---	
Continuous OEI	857 (639)	896 (659)	---	---	
Takeoff (5 minutes)	817 (601)	817 (601)	747 (557)	747 (557)	
Maximum continuous	794 (592)	817 (601)	728 (543)	728 (543)	
30-minute (See NOTE 23)	817 (601)	817 (601)	---	---	
	<b>ARRIEL 2C</b>	<b>ARRIEL 2C1</b>	<b>ARRIEL 2C2</b>	<b>ARRIEL 2D</b>	<b>ARRIEL 2E</b>
30 second OEI	944 (704)	962 (718)	1006 (750)	---	800 (753)
2 minute OEI	851 (635)	865 (646)	956 (713)	---	775 (630)
Continuous OEI	818 (610)	838 (616)	858 (640)	---	710 (490)
Takeoff (5 minutes)	722 (531)	790 (581)	821 (612)	802 (598)	667 (445)
Maximum continuous	722 (531)	--	821 (612)	802 (598)	575 (360)
30-minute (See NOTE 23)	---	---	821 (612)	802 (598)	667 (445)
<b>FUEL/OIL/ADDITIVES:</b>	REFER TO INSTALLATION MANUAL				
<b>PRINCIPAL DIMENSIONS:</b>					
INCHES (M)	<b>ARRIEL 2S1</b>	<b>ARRIEL 2S2</b>	<b>ARRIEL 2B</b>	<b>ARRIEL 2B1</b>	
Length	60.6 (1.539)	60.6 (1.539)	46.5 (1.181)	44.88 (1.140)	
Width	19.8 (0.504)	19.6 (0.497)	19.6 (0.498)	19.33 (0.491)	
Height	28.1 (0.715)	28.1 (0.715)	24.3 (0.616)	24.25 (0.616)	

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PAGE	1	2	3	4	5	6	7	8	9	10	11	12
REV.	10	10	9	9	9	9	9	9	9	9	9	9

LEGEND: "- -" INDICATES "SAME AS PRECEDING MODEL"  
 "---" INDICATES "DOES NOT APPLY"  
 NOTICE: SIGNIFICANT CHANGES ARE BLACK-LINED IN THE LEFT MARGIN

**PRINCIPAL DIMENSIONS: (continued)**

INCHES (M)	ARRIEL 2C	ARRIEL 2C1	ARRIEL 2C2	ARRIEL 2D	ARRIEL 2E
Length	46.5 (1.181)	39.9 (1.015)	39.9 (1.015)	46.34 (1.177)	46.54 (1.182)
Width	19.6 (0.498)	19.6 (0.498)	19.6 (0.498)	19.68 (0.500)	19.99 (0.508)
Height	24.25 (0.616)	22.6 (0.576)	22.6 (0.576)	24.25 (0.616)	24.25 (0.616)

**CENTER OF GRAVITY:** REFER TO INSTALLATION MANUAL

**MAXIMUM DRY WEIGHT:** Refer to engine manual for definition of dry weight

LBS. (KG)	ARRIEL 2S1	ARRIEL 2S2	ARRIEL 2B	ARRIEL 2B1	
	289 (131.2)	289 (131)	295 (134.0)	291.5 (132.2)	
	ARRIEL 2C	ARRIEL 2C1	ARRIEL 2C2	ARRIEL 2D	ARRIEL 2E
	289 (131.0)	285 (129.2)	290 (131.5)	293 (132.9)	307 (139.2)

**DRIVE SHAFT TYPE:** REFER TO INSTALLATION MANUAL

**IGNITION:** Low tension, high energy system, including:  
 1 high-energy (H.E.) ignition unit  
 2 ignition cables  
 2 igniter plugs

**STARTING:** The automatic starting sequence is ensured by the Engine Electronic Control Unit. For detail, see Installation Manual.

**CERTIFICATION BASIS:** Title 14 of the Code of Federal Regulations Section 21.29 and Part 33, Amendments 33-1 through 33-14; and for Arriel 2S1 and Arriel 2C Special Condition No. SC-33-ANE-05 published on April 15, 1996. For Arriel 2C2 and Arriel 2S2, Part 33, Amendments 1 through 14, § 33.28, Amendment 15, Special Conditions 33-ANE-05 and 33-001-SC published June 19, 1998. For Arriel 2D and 2E, Part 33, Amendments 33-1 through 33-15 and Special Condition No. 33-009-SC, published May 27, 2011.

MODEL	APPLICATION DATE	TYPE CERTIFICATE ISSUED / AMENDED	TYPE CERTIFICATE CANCELLED
ARRIEL 2S1	02/25/94	06/10/96	
ARRIEL 2B	04/28/97	05/06/98	
ARRIEL 2C	04/28/97	05/06/98	
ARRIEL 2C1	11/27/97	09/24/99	
ARRIEL 2B1	12/13/98	12/1/00	
ARRIEL 2C2	09/12/99	01/10/03	
ARRIEL 2S2	03/9/04	12/13/05	
ARRIEL 2D	8/26/10	07/12/11	
ARRIEL 2E	03/04/13	05/14/14	

The aviation authority for France, the Direction Generale de L'Aviation Civile (DGAC), originally type certificated this engine. The FAA validated this product under U.S. Type Certificate Number E00054EN. Effective September 28, 2003, the European Aviation Safety Agency (EASA) began oversight of this product on behalf of France.

**PRODUCTION BASIS:** ARRIEL 2S1 and 2S2: Production Certificate Number 5SW. Produced by Turbomeca USA in the United States under license agreement from Safran Helicopter Engines S.A., France.

ARRIEL 2S1 and 2S2: Engine modules, and parts thereof, produced by Safran Helicopter Engines S.A., France, conforming to this type certificate are fully interchangeable with ARRIEL 2S1 and 2S2 engine modules, and parts thereof, produced under Production Certificate Number 5SW.

Engines manufactured under Production Certificate Number 5SW shall have the suffix "TEC" added to the engine serial number and shall be included in the required identification data as specified by 14CFR Section 45.

**IMPORT  
REQUIREMENTS:**

To be considered eligible for installation on U.S. registered aircraft, each new engine to be exported to the United States with the DGAC or EASA airworthiness approval shall have a Joint Aviation Authorities (JAA) or EASA Form 1, Authorized Release Certificate. The JAA or EASA Form 1 should state that the engine conforms to the type design approved under the U.S. Type Certificate E00054EN is in a condition for safe operation and has undergone a final operational check.

**NOTES**

**NOTE 1.**

**MAXIMUM PERMISSIBLE ENGINE SPEEDS / RPM**

<b>A. GAS GENERATOR SPEED (N1)</b>					
	<b>ARRIEL 2S1</b>	<b>ARRIEL 2S2</b>	<b>ARRIEL 2B</b>	<b>ARRIEL 2B1</b>	
30 second OEI rating	55156	55178	---	---	
2 minute OEI rating	53386	53348	---	---	
Continuous OEI rating	52756	52776	---	---	
Takeoff rating	52756	53089	52756	52756	
Maximum continuous rating	51616	51959	50672	50672	
30-minute rating	52756	53089	---	---	
Maximum inadvertent over speed (<20 sec)	53312 **	53661 **	53312	--	
** all engines operating					
	<b>ARRIEL 2C</b>	<b>ARRIEL 2C1</b>	<b>ARRIEL 2C2</b>	<b>ARRIEL 2D</b>	<b>ARRIEL 2E</b>
30 second OEI rating	55051	54986	55265	---	55186
2 minute OEI rating	53192	53126	53275	---	54480
Continuous OEI rating	52571	52506	52764	---	53102
Takeoff rating	52660	52776	53079	53086	52518
Maximum continuous rating	51520	51637	51922	52050	51572
30-minute rating	---	---	53079	53086	52518
Maximum inadvertent over speed (<20 sec)	53312	--	--	53568	53102 **
** all engines operating					
For variation of these limits with outside air temperature (OAT), refer to Installation Manual. For required action if limits are exceeded, refer to Maintenance Manual. 100% = 52,110 rpm					
<b>B. POWER SHAFT SPEED (N2)</b>					
	<b>ARRIEL 2S1</b>	<b>ARRIEL 2S2</b>	<b>ARRIEL 2B</b>	<b>ARRIEL 2B1</b>	
Minimum stabilized power on	35381	--	--	--	
Minimum stabilized power off	35381	--	33230	--	
Minimum transient (<20 sec)	26584	--	--	--	
Maximum inadvertent overspeed (<20 sec) power on	42613	43719	42613	--	
Maximum inadvertent overspeed (<20 sec) power off	47305	--	--	--	
Maximum stabilized	42418	--	--	--	
	<b>ARRIEL 2C</b>	<b>ARRIEL 2C1</b>	<b>ARRIEL 2C2</b>	<b>ARRIEL 2D</b>	<b>ARRIEL 2E</b>
Minimum stabilized power on	35381	--	--	35437	35437
Minimum stabilized power off	33230	--	--	33284	--
Minimum transient (<20 sec)	26584	--	--	26627	--
Maximum inadvertent overspeed (<20 sec) power on	42613	--	--	42613	46598
Maximum inadvertent overspeed (<20 sec) power off	47305	--	--	46598	46598
Maximum stabilized	42418	--	--	42477	42418
If limits are exceeded, refer to Maintenance Manual. 100% N2 = 39,095 rpm for all Models except Arriel 2D and 2E 100% N2 = 39,158 rpm for Arriel 2D and 2E					

**NOTE 2.****MAXIMUM PERMISSIBLE TEMPERATURE**

<b>A. EXHAUST GAS T45, Measured with 8 thermocouples on gas generator turbine diffuser (Degrees °C)</b>					
	<b>ARRIEL 2S1</b>	<b>ARRIEL 2S2</b>	<b>ARRIEL 2B</b>	<b>ARRIEL 2B1</b>	
30 second OEI rating	1000	996	---	---	
2 minute OEI rating	941	944	---	---	
Continuous OEI rating	912	926	---	---	
Takeoff rating	912	930	915	915	
30 minute rating	912	930	---	---	
Max. continuous rating	877	893	849	849	
Starting (<10 seconds)	865	840	865	--	
Starting (unlimited)	750	--	--	--	
Maximum inadvertent Overtemperature (<20 sec)	---	---	941	--	

<b>A. EXHAUST GAS T45, Measured with 8 thermocouples on gas generator turbine diffuser (Degrees °C)</b>					
	<b>ARRIEL 2C</b>	<b>ARRIEL 2C1</b>	<b>ARRIEL 2C2</b>	<b>ARRIEL 2D</b>	<b>ARRIEL 2E</b>
30 second OEI rating	1000	--	996	---	1020
2 minute OEI rating	941	--	944	---	1001
Continuous OEI rating	912	--	926	---	959
Takeoff rating	912	--	929	962	932
30 minute rating	---	---	929	962	932
Max. continuous rating	877	--	891	918	915
Starting (<10 seconds)	865	--	840	840	840
Starting (unlimited)	750	--	--	750	760
Maximum inadvertent overtemperature (<20 sec)	---	---	---	994	959**
**All engines operating					
If limits are exceeded, refer to Maintenance Manual for required action.					

**NOTE 2. (continued)**

<b>B. OIL, Measured at engine inlet</b>	
Minimum oil temperature for engine starting:	-30°C for oil with a kinematic viscosity of $5.4 \times 10^{-5}$ ft <sup>2</sup> /sec. -45 °C for oil with a kinematic viscosity of $3.2$ to $4.2 \times 10^{-5}$ ft <sup>2</sup> /sec for 2B and 2B1. -50°C for oil with a kinematic viscosity of $3.2$ to $4.2 \times 10^{-5}$ ft <sup>2</sup> /sec for all other models.
Minimum oil temperature for power-up:	0°C for oil with a kinematic viscosity of $5.4 \times 10^{-5}$ ft <sup>2</sup> /sec. -10°C for oil with a kinematic viscosity of $3.2$ to $4.2 \times 10^{-5}$ ft <sup>2</sup> /sec.
Maximum oil temperature for all Models except Arriel 2D and 2E:	115°C
Maximum oil temperature for Arriel 2D and 2E (measured at a different location from other Models)	117°C
<b>C. FUEL, Measured at engine inlet</b>	
1. Maximum temperature: REFER TO INSTALLATION MANUAL	
2. Minimum temperature: REFER TO INSTALLATION MANUAL	
3. For 2S1, 2B, 2B1, 2C, 2C1, 2D and 2E: Use of anti-icing additive for fuel temperature <-20°C For 2C2 and 2S2: Use of anti-icing additive for fuel temperature <-30°C	
4. Starting: REFER TO INSTALLATION MANUAL	

**NOTE 3**

**POWER TURBINE UNIT TORQUE LIMITS / FOOT - POUND (daNm)**

	<b>ARRIEL 2S1</b>	<b>ARRIEL 2S2</b>	<b>ARRIEL 2B</b>	<b>ARRIEL 2B1</b>	
30 second OEI rating	887 (120.3)	--	---	---	
2 minute OEI rating	835 (113.2)	--	---	---	
Continuous OEI rating	756 (102.5)	--	---	---	
Takeoff	682 (92.5)	--	673 (91.3)	673 (91.3)	
Maximum continuous	682 (92.5)	--	673 (91.3)	673 (91.3)	
Max. inadvertent over-torque (≤ 20 sec)	1055 (143)	--	975 (132.2)	975 (132.2)	
30-minute rating	682 (92.5)	--	---	---	
	<b>ARRIEL 2C</b>	<b>ARRIEL 2C1</b>	<b>ARRIEL 2C2</b>	<b>ARRIEL 2D</b>	<b>ARRIEL 2E</b>
30 second OEI rating	861 (116.8)	875 (118.7)	880 (119.3)	---	883(119.8)
2 minute OEI rating	791 (107.3)	796 (107.9)	856 (116.0)	---	740(100.3)
Continuous OEI rating	760 (103)	749 (101.55)	751 (101.8)	---	575(78.0)
Takeoff	682 (92.5)	--	718 (97.3)	708 (96.0)	522(70.8)
Maximum continuous	682 (92.5)	--	718 (97.3)	708 (96.0)	423(57.3)
Max. inadvertent over-torque (≤ 20 sec)	--	--	975 (132.2)	989 (134.2)	883(119.8)
30-minute rating			718 (97.3)	708 (96.0)	522(70.8)

**NOTE 4.**

**FUEL AND OIL PRESSURE LIMITS**

<p><b>A. FUEL PRESSURE</b>, at engine inlet</p> <p>A. Minimum fuel pressure</p> <p>1. Normal operation, excluding starting phase, the minimum (absolute) pressure is defined for all models except Arriel2D and 2E, by the highest of the following conditions:</p> <ul style="list-style-type: none"> <li>2.9 PSIA (20kPa)</li> <li>35% of atmospheric pressure,</li> <li>1 PSI (7 kPa) above the vapor pressure of the fuel used,</li> <li>Fuel pressure corresponding to a vapor volume over Liquid volume ratio of 0.30</li> </ul> <p>For Arriel 2D and 2E: Refer to Installation / Operating Manual</p> <p>2. During the starting phase or at relight, fuel pressure (relative) must not be less than:</p> <ul style="list-style-type: none"> <li>+3.6 PSIG (25 kPa) for the 2S1</li> <li>+2.9 PSIG (20 kPa) for the 2S2</li> <li>+3.6 PSIG (25 kPa) for the 2B, 2B1, 2C, 2C1, 2C2, 2D and 2E.</li> </ul> <p>B. Maximum fuel pressure:</p> <ul style="list-style-type: none"> <li>Less than or equal to 21.8 PSIG (150 kPa) (relative pressure) in all operating phases, for all Models except Arriel 2D and 2E.</li> <li>Less than or equal to 26.1 PSIG (180kPa) (relative pressure), in all operating phases, for Arriel 2D and 2E.</li> </ul>
<p><b>B. OIL PRESSURE</b>,</p> <p>1. Minimum Oil Pressure (relative):</p> <ul style="list-style-type: none"> <li>For 2S1, 2B, 2B1, 2C and 2C1: 16.0 PSIG (110 kPa)</li> <li>For 2C2 and 2S2: 24.7 PSIG (170 kPa)</li> <li>For 2D and 2E: Refer to Installation / Operating Manual</li> </ul> <p>2. Maximum Oil Pressure (relative):</p> <ul style="list-style-type: none"> <li>For 2S1, 2S2, 2B, 2B1, 2C, 2C1 and 2C2: 87.0 PSIG (600 kPa)</li> <li>For 2D and 2E: Refer to Installation / Operating Manual</li> </ul>

**NOTE 5.****MAXIMUM PERMISSIBLE AIR BLEED FROM CENTRIFUGAL COMPRESSOR PLENUM**

Maximum air mass flow at Takeoff and Max. Continuous: 0.22 lb/sec for all Models except Arriel 2D and 2E

Maximum air mass flow at Takeoff, Max. Continuous and 30-minutes rating: 0.33 lb/sec for Arriel 2D and 2E

Power loss due to air bleed: For further details, see Installation and Operating Manual.

**NOTE 6.****AIR INTAKE REQUIREMENTS**

The ARRIEL engines have not been tested to evaluate the effects of foreign object ingestion other than rain water. Foreign object ingestion characteristics of airframe air inlet and engine combination are to be evaluated prior to approval of the engine installation, for all remaining foreign objects.

The ARRIEL engines do not have anti-icing provisions and have not been tested to evaluate the effects of icing conditions. Anti-icing characteristics of airframe, air inlet, and engine combination are to be evaluated prior to approval of the engine installation.

The ARRIEL 2S1 engine meets the requirements of § 33.68(a) and (b) when installed with Sikorsky S76C+ helicopter air intake assembly Part Number (P/N) 76300-07761-101.

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. A protective grid, as defined in the Installation and Operating Manual shall be installed to limit the ingestion of foreign matter in the engine.

The Arriel 2B, 2B1 and 2D are not approved for operation in icing conditions with Eurocopter AS 350 B3 / EC 130 sand filter P/N 704 A 41 650 010.

The ARRIEL 2S2 engine meets the requirements of § 33.68(a) and (b) when installed with Sikorsky S76C++ helicopter air intake assembly P/N 041277880, barrier filter P/N 76302-07800, inlet bellmouth P/N 76304-07009-049 and heated duct P/N 0401277880.

The Arriel 2B and 2D engines meet the requirements of § 33.68(a) and (b) when installed with Eurocopter AS 350 B3 helicopter air intake P/N 350.A.54.1080.04 and protection screen P/N 350.A.58.1607.03. The engines are not approved for operation in icing conditions with Eurocopter AS 350 B3 sand filter P/N 704.A.41.650.010.

The Arriel 2B1 and 2D engines meet the requirements of § 33.68(a) and (b) when installed with Eurocopter EC 130 helicopter air intake P/N 350.A.54.1080.04 and protection screen 350.A.58.1607.03. The engines are not approved for operation in icing conditions with Eurocopter EC 130 sand filter P/N 704.A.41.650.010.

The Arriel 2C and 2C1 engines meet the requirements of § 33.68(a)(b) when installed with Eurocopter AS 365 N3 helicopter air intake ducts consisting of P/N 365.A.24.0110.04/05 (MGB section, left/right sides respectively) and P/N 365.A.54.5022.01 (engine compartment section, both sides), along with protection screen P/N 365.A.24.1067.02/03 (left/right sides respectively).

The Arriel 2E engines meet the requirements of § 33.68(a) and (b) when installed with the following Aircraft air intake and inlet Part Numbers (P/N):

- Intake protection outer LH assy P/N 117-602351
- Intake protection inside RH assy P/N 117-602401
- Intake protection inside LH assy P/N 117-602371
- Intake protection outer RH assy P/N 117-602421
- Air inlet LH P/N D710M1010801
- Air inlet RH P/N D710M2010801

For further details, see Installation and Operating Manual.

The 2B, 2B1, and 2D installation are approved for single-engine application only. The 2C, 2C1, 2C2, 2S1, 2S2, and 2E engine models are restricted to multi-engine helicopter applications.

**NOTE 7.****ACCESSORY DRIVE PROVISIONS**

Designation	Direction* Of Rotation	Rotation Speed rpm	Maximum Torque in Overload (in-lb)	Maximum Static Overhang (in-lb)	Fuse Shaft Breakaway Torque (in-lb)	Maximum Permanent Shaft Power(SHP)	
						Twin engine	OEI situation
Starter-generator	CW	11330	443	221	841	10.1	10.1
2S1						4.7	10.1
2S2						4.7	6.7
2C/2C1						6.7	6.7
2C2						16.1 (1)	16.1 (1)
2E						10.1 (single engine)	
2B/2B1						12.1 (single engine)	
2D		456					
Oil cooling fan output drive:	CCW	12253	89	133	885	2.0	2.0
2S1/2S2							
2C2	CCW	11452	89	133	885	2.0	2.0
For Accessories:							
Oil pump pack	CW	11883					
HP fuel pump							
LP fuel pump	CCW	11883					
Control system Alternator	CCW	12180					
*CW: clockwise; CCW: counterclockwise. The rotation direction of the power drives for the accessories is indicated considering the power drive seen from the outside. The rotation direction of the engine rotors is indicated with respect to viewing the engine from its rear end. For further details see Installation Manual.							
(1) For Arriel 2E, refer to the Installation and Operating Manual for detailed power shaft extraction in case of failure							
Oil cooling fan output drive is available on 2S1 and 2C2 only.							

**NOTE 8.****ENGINE RATINGS**

Engine ratings are based on calibrated test rig with performance under the following conditions:

Static, sea level standard conditions (59 F, 29.92" Hg)

No airbleed, no accessory power extraction

6,409 RPM output shaft drive speed for 2S1 and 2S2

6,000 RPM output shaft drive speed for 2B/2B1, 2C, 2C2, 2D, and 2E

Fuel load heat value = 18,545 BTU/lb

The ratings given above are minimum final test performance of production and overhaul engines in accordance with engine acceptance test specification:

No. 0.292.02.941.0 for 2S1

No. 0.292.02.945.0 for 2B

No. 0.292.02.949.0 for 2B1

No. 0.292.02.944.0 for 2C

No. 0.292.02.948.0 for 2C1

No. 0.292.02952.0 for 2C2

No. 0.292.02953.0 for 2S2

No. AA049722 for 2D

No. AA043433 for 2E

Use the exhaust pipe specified below with calibrated test bed air intake No. 6.528.12.500.0 for 2S1, 2B, 2B1, 2C, and 2C1 and No. 6.528.12.501.0 for 2C2, 2S2, 2D and 2E.

Exhaust pipe No. 0.292.81.500.0 is part of the engine definition (primary exhaust pipe), and is common to the 2S1, 2B, 2B1, 2C, and 2C1.

Exhaust pipe No. 0.292.81.502.0 is part of the engine definition (primary exhaust pipe), and is common to the 2S2 and 2C2.

Exhaust pipe No. 0.292.81.047.0 is part of the Arriel 2D engine definition (primary exhaust pipe)

Exhaust pipe No. 0.292.81.053.0 is part of the Arriel 2E engine definition (primary exhaust pipe)

- NOTE 9. FUEL SUPPLY REQUIREMENTS**  
The ARRIEL 2S1, 2S2, 2B, 2B1, 2C, 2C1, 2C2, 2D and 2E have a fuel filter supplied with the engine.  
Use of anti-icing additive for fuel temperature: < -20 °C for Arriel 2B, 2B1, 2C, 2D, 2E, 2C1, and 2S1.  
< 30 °C for Arriel 2C2 and 2S2
- NOTE 10. OIL SYSTEM:** Refer to Installation Manual.
- NOTE 11. ENGINE MONITORING TRANSMITTERS:** Refer to Installation Manual.
- NOTE 12. CONTROL SYSTEM:**  
Single channel electronic engine control system with manual backup for 2S1, 2B, and 2C.  
Dual channel electronic engine control system with optional auxiliary backup control for 2B1, 2C1, 2C2 and 2S2.  
Dual channel electronic engine control system with auxiliary back-up control for 2D.  
Dual channel electronic engine control system for 2E.
- NOTE 13. ENGINE FIRE DETECTOR**  
The ARRIEL 2S1 and 2S2 have no fire detectors installed on the engine.  
  
The Arriel 2B, 2B1, 2C, 2C1 and 2C2 feature mounting and wiring for installation of three fire detectors. Fire detectors are not part of the engine definition.  
  
The Arriel 2D feature mounting and wiring for installation of three fire detectors. Fire detectors are part of the engine definition.  
The Arriel 2E feature mounting and wiring for installation of one fire detector. Fire detector is part of the engine definition.
- NOTE 14.** Refer to Installation Manual for approved oil specifications.
- NOTE 15.** Refer to Installation Manual for approved fuel and additive specification.
- NOTE 16.** Life-limited components are listed in EASA-approved Airworthiness Limitations Section (Chapter 5) of the engine Maintenance Manual.
- NOTE 17.** Permissible overhaul and inspection intervals are listed in EASA- approved Airworthiness Limitations Section (Chapter 5) of the engine Maintenance Manual.
- NOTE 18. MANUALS REQUIRED BY § 33.5**

	<b>Performance Manual No.</b>	<b>Installation Manual No.</b>	<b>Operation Manual No.</b>	<b>Maintenance Manual No.</b>	<b>Repair Manual No.</b>
<b>ARRIEL 2S1</b>	X 292 L0 001 9	X 292 L0 001 1	See Note 19	X 292 L0 301 2	X 292 L0 500 2
<b>ARRIEL 2B</b>	X 292 M5 001 9	X 292 M0 001 2	See Note 19	X 292 M5 450 2	---
<b>ARRIEL 2B1</b>	X 292 N5 002 9	X 292 N5 001 9	See Note 19	X 292 N5 450 2	---
<b>ARRIEL 2C</b>	X 292 M1 001 9	X 292 M1 001 2	See Note 19	X 292 M1 450 2	---
<b>ARRIEL 2C1</b>	X 292 N4 002 9	X 292 N4 001 2	See Note 19	X 292 N4 450 2	---
<b>ARRIEL 2C2</b>	X 292 N6 002 9	X 292 N6 404 1	See Note 19	X 292 N6 450 2	---
<b>ARRIEL 2S2</b>	X 292 P5 001 9	X 292 P5 001 2	See Note 19	X 292 P5 451 2	X 292 P5 550 2
<b>ARRIEL 2D</b>	AA049088	X 292 R1 001 2	See Note 19	X 292 R1 450 2	X 292 R1 500 2
<b>ARRIEL 2E</b>	AA056554	X 292 R2 001 2	See Note 19	X 292 R2 300 2	X 292 R2 500 2

- NOTE 19.** The Operation Manual is contained within Chapter 15 of the Installation Manual.
- NOTE 20.** DELETED.

**NOTE 21.**

Each of the documents listed below must state that it is approved by the European Aviation Safety Agency (EASA) or, for approvals made before September 28, 2003 by the Direction Generale de L'Aviation Civile (DGAC). Any such documents including those approved under a delegated authority, are accepted by the FAA and are considered FAA accepted.

- Service bulletins,
- Structural repair manuals,
- Vendor manuals,
- Aircraft flight manuals, and
- Overhaul and maintenance manuals.

These approvals pertain to the type design only.

**NOTE 22.**

The Models shown on this TCDS have the following general characteristics:

MODELS	CHARACTERISTICS
ARRIEL 2S1	Base Model
ARRIEL 2B	Similar to ARRIEL 2S1. The rating structure is simplified for single engine application: Takeoff and Maximum Continuous ratings only. The main differences are the mounts, provision for the tail rotor drive, and the deletion of the oil cooler fan drive on the reduction gearbox.
ARRIEL 2B1	Similar to ARRIEL 2B. The main difference is the dual channel electronic engine control system.
ARRIEL 2C	Similar to ARRIEL 2S1. The main differences are the mounts and the deletion of the oil cooler fan drive on the reduction gearbox.
ARRIEL 2C1	Similar to ARRIEL 2C. The main difference is the dual channel electronic engine control system.
ARRIEL 2C2	Similar to engine ARRIEL 2C1, main differences being the increased power ratings, (thermal and torque) the HIP/SARM rating (similar to 2S1), new HPT material and new axial compressor wheel.
ARRIEL 2S2	Similar to the ARRIEL 2S1. The main differences are a control system with a dual channel FADEC with mechanical back-up, increased power ratings and new HPT blade material and new axial compressor wheel (similar to 2C2).
ARRIEL 2D	Similar to the ARRIEL 2C2. The main differences are: it is a single-engine application that has a 30-minute Take-off Power Rating, new dual channel electronic control system, new power turbine rear bearing support with new containment ring, new power turbine blade profile, and engine mounts identical to those of the Arriel 2B/2B1.
ARRIEL 2E	Similar to the ARRIEL 2D. The main differences are: it is a dual-engine interface of the power transmission shaft with the helicopter, mounting system adapted to helicopter interface, blade material of the gas generator turbine, drain system, and hydro mechanical unit.

**NOTE 23.**

Operators who use the 30-minute power rating must comply with the airworthiness limitations (if any) as specified in the ARRIEL 2S1 Maintenance Manual X 292 L0 301 2, Volume 1, Chapter 0; , ARRIEL 2C2 Maintenance Manual X 292 L0 301 2, Volume 1, Chapter 0; ARRIEL 2S2 Maintenance Manual X 292 P5 451 2, Volume 1, Chapter 0; ARRIEL 2D Maintenance Manual X 292 R1 450 2, and ARRIEL 2E Maintenance Manual X 292 R2 300 2.

**NOTE 24****DISPATCH LIMITATIONS:**

ARRIEL 2B, 2B1, 2C, 2C1, 2C2 and 2S2: All engine systems and equipment must be functional prior to aircraft take-off. Any engine system or equipment malfunction, which occurs during flight, must be repaired prior to the next flight.

ARRIEL 2S1: The engine is approved to operate with certain faults present in the control system, based on satisfaction of Part 33 requirements and appropriate control system reliability requirements. Criteria pertaining to the dispatch and maintenance requirements for the engine control system are specified in the Installation Manual. The airframe manufacturers may use different nomenclature in adapting these fault categories to the aircraft maintenance and display systems; however, the maximum operating intervals are restricted as defined in the Installation Manual.

Arriel 2D and 2E: An Engine Dispatch Configuration analysis has been performed and is referenced in the Installation Manual.

**NOTE 25**

The engine is approved for the following engine models for a maximum exhaust gas overtemperature for inadvertent use due to abnormal operation for periods up to 20 seconds without requiring rejection of the engine from service or maintenance action other than to correct the cause. The cause of the overtemperature must be investigated and corrected. Follow procedure defined in Maintenance Manual.

Arriel 2B maximum inadvertent exhaust gas overtemperature of 941°C

Arriel 2D maximum inadvertent exhaust gas overtemperature of 994°C

Arriel 2E maximum inadvertent exhaust gas overtemperature of 959°C all engines operating

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