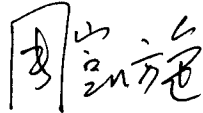


型号认可证数据单
TYPE VALIDATION CERTIFICATE DATA SHEET

编号/No: VTC123E
版次/Revision: 1
型号/Type:
TURBOMECA ARRIEL 1 系列发动机
TURBOMECA Arriel 1 engines
衍生型 Variants
Arriel 1S,1S1
Arriel 1D1
批准人/Approved By: 
日期/Date: 2008-7-11

本数据单是型号认可证(编号: VTC123E)的组成部分, 它规定了符合中国民用航空总局的适航要求所颁发此型号认可证的产品状态和限制。

This data sheet, which is part of Validation of Type Certificate (No: VTC123E), prescribes condition and limitation under which the product for which the type certificate was issued meets the airworthiness requirements of the Chinese Civil Aviation Regulation.

型号认可证持有人/Validation of Type Certificate Holder:
TURBOMECA, 64511 Bordes Cedex - France

有效页清单/List of effective pages:

页数/ Pages	1	2	3	4	5	6	7	8
版次/Revision	1	1	1	1	1	1	1	1

第1部分 概述/Section 1 GENERAL

1. CAAC认可数据单和型号合格证数据单/CAAC Validation Data Sheet and Type Certificate Data Sheet

	中国民用航空总局认可数据单号、版次和颁发日期 CAAC Validation Data Sheet Number, Revision and issuance date	型号合格证数据单号、版次和颁发日期 Type Certificate Data Sheet Number, Revision and issuance date
当前 Current	VTC123E、1、2008-7-11	E.073、01、04 August, 2006
历史 History	VTC123E、0、2007-10-9	E.073、01、04 August, 2006

2. 类别/Category: 航空发动机/aviation engine

Arriel 1S, 1S1适用于双发直升机, Arriel 1D1适用于单发直升机。

3. 认可当局/Validation Authority: 中国民用航空总局/CAAC

审定当局/Certifying Authority: 欧洲航空安全局/EASA

申请EASA审定日期/EASA Certification Application Date:

Arriel 1S	Arriel1S1	Arriel 1D1
1985年9月9日	1989年10月21日	1988年5月10日

EASA审定日期/EASA Certification Date:

Arriel 1S	Arriel1S1	Arriel 1D1
1987年5月6日	1989年10月21日	1988年7月19日

4. 型号合格证持有人/Type Certificate Holder: TURBOMECA

地址/Address: 64511 Bordes Cedex - France

5. 制造厂/Manufacturer: TURBOMECA

6. ETOPS: 不适用/NA

7. CAAC专用要求/CAAC Special Requirements:

明确中国3号喷气燃料使用条件。详见第2部分II.8. 油料（燃油/滑油/添加剂）。

Define the operation condition for the P.R.C. JET fuel No.3. See Section 2 II.8.Fluids (Fuel/Oil/Additives).

第2部分/Section 2

I 审定基础/Certification Basis

1.适航标准/Airworthiness Standards:

JAR-E 第一版及1957年6月5日的修正案, 包括按 FAR 33要求的直升机发动机额定值。

JAR-E issue 1 and amendments applicable on June 5 1974, including ratings as per FAR 33 for helicopter engines.

2.专用条件/Special Conditions (SC):

专用条件适用于具备自由涡轮的单发直升机。见前法国适航局SGAC文件, 参考1974年12月12日颁发的7525/DTA/SDT/MC。

Special requirement applicable to the single-engine helicopters versions to take the free wheel into account. See letter from SGAC, former French Airworthiness Authority, reference 7525/DTA/SDT/MC dated 12/12/1974.

3. CAAC 认可审定基础 / CAAC Validation Basis

CAAC接受EASA的审定基础为认可审定基础/CAAC accept EASA certification basis as validation basis

II 技术特性/Technical Characteristics

1.型号设计定型/Type Design Definition:

Arriel 1S: P/N 0 292 00 519 0

Arriel 1S1: P/N 0 292 00 525 0

Arriel 1D1: P/N 0 292 00 522 0

2.描述/Description:

ARRIEL 1型发动机是涡轮轴发动机, 包括轴流式进气道, 由两级涡轮驱动的一级轴流式压气机和一级离心式压气机, 一个燃烧室, 和驱动位于尾部减速齿轮组件的单级动力涡轮(自由涡轮)。位于前端的附件齿轮箱由燃气发生器驱动。安装和起动-发电机不作为发动机型号设计定义的一部分。

The Arriel 1 engine is a turboshaft engine consisting of an axial air intake, an axial compressor and a centrifugal compressor driven by a two-stage turbine, a combustion chamber, and a single stage power turbine(free turbine) driving a reduction gearbox located at the rear. A accessory drive gearbox, driven by the gas generator, is located at the front. Mounts and starter-generator are not part of the engine type definition.

3.设备/Equipment:

包含在型号设计定义中/Included in Type Design Definition

4.尺寸/Dimensions:

尺寸/Dimension	1S	1S1	1D1
长/Overall Length(m)	1.54	1.54	1.20
总高/Overall height(m)	0.79	0.79	0.61
宽/Width(m)	0.49	0.49	0.47

5.干重/Dry Weight:

Arriel 1S: 126.75 kg

Arriel 1S1: 130 kg

Arriel 1D1: 122 kg

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6. 额定值/Rating:

额定值/Rating	Arriel 1S	Arriel 1S1	Arriel 1D1
2-1/2min OEI	560*	598	NA
OEI Continuous**	544	598	NA
Take off	523	541	531*
Maximum Continuous	523	541	466

*尽管发动机能获得比认可更大的值，考虑相对于发动机安装的燃油流量限制，机械功率限制到上述指定的值。

The mechanical power is restricted to the values indicated above, taking into account the fuel flow limit corresponding to the engine installation, although the engine is capable of greater values which have also been validated.

**按照BCAR-C (JAR-E)，具有无限显示时间的中间可能额定值也已经被认可。

The intermediate contingency rating, with unlimited display time, according to BCAR-C (JAR-E) has also been validated.

注1: 下列条件定义了相应最小值的发动机额定值。

Note 1: Engine ratings correspond to minimum values defined under the following conditions.

- 静态，海平面标准条件（15℃，1013hpa）。/Static, sea level standard conditions (15℃，1013hpa)
- 装有校准试验台进气No6.202.81.719.0的发动机。/ engines equipped with calibrated test bed air intake No6.202.81.719.0
- 使用下列排气管/use of following exhaust pipe: 0.292.80.871.0
- 没有引气/no air bleed,
- 除了发动机运转必须的没有任何附件的功率提取/no power drawn by any accessories other than those required for engine operation.
- 燃油的最低热值/fuel Low Heat Value: 43136 kJ/kg
- 输出轴转速/output shaft rotation speed: 6057 rpm, Arriel 1S ; 6409 rpm, Arriel 1S1; 5976 rpm, Arriel 1D1.

注2: 对于Arriel 1D1/1S/1S1旧发动机，相对于最小功率额定值声明的额定值。

Note2: Ratings declared for Arriel 1D1/1S/1S1 correspond to the minimum power ratings for aged engines.

注3: 相关的安装/操作手册里提供了详细的性能曲线。

Note3: Detailed performance curves are provided in the relevant Installation/Operating Manuals.

7. 控制系统/Control System

Arriel 1发动机装有流体力学的燃油控制元件，包括一个相称的自由涡轮转速控制和一个相称的整体燃气发生器转速控制。

Arriel 1 engines are equipped with hydromechanical Fuel Control Units, including a proportional free turbine speed control and a proportional integral gas generator speed control.

参考安装/操作手册获取进一步的信息。

Refer to the Installation / Operating Manuals for further information.

8. 油料（燃油/滑油/添加剂）/Fluids (Fuel/Oil/Additives):

见安装手册/see Installation Manual

9. 航空器附件驱动/Aircraft Accessory Drives:

名称 Designation	面向起降台旋转方向 Rotation direction facing pad	旋转速度 Rotation speed (rpm)	最大稳定状态 Maximum steady state (kw)	过载时最大扭矩 Maximum Torque at overload (daN.m)	最大静悬吊力矩 Maximum static overhung moment (daN.m)
Arriel 1D1	CCW	NTL× 0.2929312182	13.5	3.99	1.5

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Arriel 1S,1S1	CCW	NTL× 0.2929312297	5	1	1.5
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注释Notes:

— CCW: 逆时针/counter clockwise,

— 从动力传动装置的外侧看指示附件传动装置的旋转方向/The rotation direction of the power drives for the accessories is indicated considering the power drive seen from the outside.

10. 最大允许的引气Maximum Permissible Air Bleed Extraction

对于直升机使用的P2引气，在标准海平面条件下的最大气流为：在起飞额定值时100g/s，为获取进一步详细信息，参见安装/操作手册。

P2 air bleed for helicopter use, Maximum flow rate at standard sea level conditions: 100g/s at Take-off rating. For further details, see Installation /Operating Manuals.

III 使用限制/Operational Limitations

1. 温度限制/Temperature limits:

1.1 涡轮燃气温度 (°C) Turbine Gas temperature (°C)

	Arriel variants		
	1D1	1S	1S1
Take off	845	845	845
Maximum continuous	795	845	845
30 minute OEI rating	N/A	845	868
2-1/2 minute OEI rating	N/A	885	885
Maximum overtemperature at starting	865	865	865
Transient(< 20s)	870*	920**	920**

* 允许在安装有数字电子VEMD (Vehicle 和发动机监视显示) 的直升机上。

Allowed on helicopters equipped with digital avionics VEMD (Vehicle and Engine Monitoring Display)

**仅仅当达到21/2秒 OEI 额定值 (最大偶然功率)，参见安装/操作手册

Only when reaching the 2 1/2min OEI rating (maximum contingency power), see Installation / Operating Manuals

1. 2 燃油温度/Fuel temperature

参考相关的安装/操作手册

Refer to relevant Installation / Operating Manuals

1. 3 滑油温度/Oil temperature

发动机启动时最低滑油温度：根据滑油规范，在-55℃和-40℃之间。参考安装/操作手册

Minimum oil temperature for engine starting: between -55℃ and -40℃, according to oil specification. Refer to Installation/Operating Manuals.

功率运用时最低滑油温度/Minimum for power application: -10℃ with 3 and 3.9 cts oils, 0℃ with 5 cts oil

最大工作温度/Maximum operating temperature: 115℃

2 压力限制 Pressure limits

2.1 燃油压力/fuel pressure

见安装/操作手册 See installation/Operating Manuals

2.2 滑油压力 (hpa) Oil pressure (hpa)

Arriel variants	
1S/1S1	1D1

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Minimal 70% > N1 > 85%	1300	1300
N1 ≥ 85%	1800	3000
Maximal	> 5000	> 5000

3 最大/最小转速/Maximum / Minimum Speeds:

3.1 燃气发生器转速/Gas generator speed (N1)

Variants Arriel	2-1/2minute OEI rating	30 minute OEI rating	Take-off rating	Maximum continuous rating	Transient (5 second limit)	Transient (20 second limit)
1D1	N/A	N/A	101.9*	98	107.5	103.1**
1S	102.7*	101*	100	100	N/A	105.35
1S1	102.7*	102.2*	100	100	N/A	105.35

* NG降低功率规则作为外界温度（及高度）函数

NG de-rating law as function of outside temperature (and altitude for: 1S, 1S1, 1D1)

**允许在安装有数字电子VEMD (Vehicle 和发动机监视显示) 的直升机上

对所有除Arriel 1S/1S1使用100%=51800rpm

对Arriel 1S 和1S1使用100%=52110rpm

Allowed on helicopters equipped with digital avionics VEMD (Vehicle and Engine Monitoring Display)

With 100%=51800rpm for all variants except 1S/1S1

With 100%=52110rpm for Arriel 1S and 1S1

注/Notes:

如果适用, NG限制变化作为环境温度和高度的函数, 参见相关的安装/运行手册

For the NG limit variation as function of ambient temperature and altitude if applicable, refer relevant Installation/Operating Manuals

最低转速/ Minimum speed: 67%。

3.2 功率涡轮转速 (N2) (%)

	Arriel Variants		
	1D1	1S	1S1
最大稳态/Maximum stabilized	108.5	108	102.07
最大瞬态/Maximum transient 5 sec	120.5	118.9	112.34
最小瞬态/Minimum transient 5 sec	86	84.8	80.2

注/Note: 100% 方式/means

Arriel 1D1的自由涡轮轴转速为41420rpm/ 41420 rpm for free turbine shafts of Arriel 1D1

Arriel 1S的自由涡轮轴转速为41981rpm/ 41981 rpm for free turbine shafts of Arriel 1S

Arriel 1S1的自由涡轮轴转速为44421rpm/ 44421 rpm for free turbine shafts of Arriel 1S1

4. 扭矩限制: Torque limits (m.daN)

	Arriel Variants		
	1D1	1S	1S1
Max at OEI 2 1/2 min	83	87.9	113
20 seconds	91.5	118.4	132.2

5. 安装保证/Installation Assumptions:见安装手册/see Installation Manual

6. 派遣限制/Dispatch Limitation:

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所有的设备和发动机系统在航空器起飞之前必须功能正常。飞行中发生失效的所有设备和发动机系统在下次起飞前应更换或修理。

All engine system and equipment must be functional prior to aircraft take-off. Any engine system or equipment the failure of which occur in flight shall be replaced or repair prior to commencement of next flight.

IV 操作和服务说明/Operational and Service Instructions

文件 Document	1S	1S1	1D1
安装图纸和手册/Installation Drawing and Manual	X 292 F9 0012		X 292 B0 002 2
操作手册/Operating Manual	包含在安装手册第5章内 included in the installation manual chapter 5		
性能手册/Performance Brochure	X 292 F9 900 9		X 292 B0 001 9
维护手册/Maintenance Manual	X 292 F9 452 2		X 292 H4 452 2
修理手册/repair Manual	X 292 87 500 2		
服务信函和服务通告/Service letters and Service Bulletins	参考SB和SL指南/Refer to SB and SL directory		

V 注释/Notes

注 1: 外物吸入:

Note 1: Ingestion of foreign matter:

发动机抵抗外物吸入的能力没有被完全评估[C4-4 18 and 19, C 4-6 19and 20], 除了雨, 发动机防止外物打击的保护由航空器上动力装置的安装保证。

The engine capability against ingestion of foreign matter has not been fully assessed [C4-4 18 and 19, C 4-6 19and 20]. The protection of the engine against strike / ingestion of foreign matter other than rain is to be ensured by the powerplant installation on the aircraft.

防冰保护: 在批准发动机安装在相关直升机之前, 应评估结冰条件下的运行特性。参考相关的安装手册。

Anti icing protection: the operating characteristics in icing conditions shall be evaluated before approval is given for the installation of the power plant on the helicopter concerned refer to the relevant Installation Manual.

注 2: 振动

Note 2: Vibrations:

测量振动的探测器位于燃气发生器后轴承/Measure took by probe located on gas generator rear bearing.

注 3: 由 Turbomeca, Bordes, France 和许可的 TURBOMECA ENGINE CORPORATION, Grand Prairie, Texas ,USA 生产 Arriel 1S 和 1S1 型发动机。

Note 3: The Arriel, 1S and 1S1 engines are manufactured by Turbomeca, Bordes, France and under license by TURBOMECA ENGINE CORPORATION, Grand Prairie, Texas ,USA.

a. 法国制造的发动机有一个识别牌, 符合法国规章的要求, 参考:

法国型号合格证 N° M5 或 EASA 型号合格证 N° E.073

DGAC(法国适航当局)生产合格证 N° F.R.036 或 EASA (欧洲航空安全局) 生产合格证 N° FR.21G.0036.

当出口时, 发动机可以以 EASA 名义颁发的适航标签 EASA FORM 1 或 EASA 签发的出口适航证来放行。

a. The engines manufactured in France have an identification plate which complies with France regulations and which refers to:

The French Type Certificate N° M5 or to the EASA Type Certificate N° E.073

The DGAC (French Airworthiness Authority)production certificate N° F.R.036 or EASA(European Aviation Safety Agency)production certificate N° FR.21G.0036.

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When exported, the engines may be delivered with an airworthiness label, EASA FORM 1, issued in the name of the EASA or with an Airworthiness certificate for Export signed by the EASA.

b. 美国生产的发动机有符合 FAR 45 的识别牌, 参考 FAA 生产许可证 N° 5 SW; 而且, 在识别牌上序号前加上了前缀“TEC”或“TM USA”。如这些发动机要进口到法国, 放行时必须具有由 FAA 代表签发的有效出口适航证。

The engines manufactured in the USA have an identification plate in compliance with FAR Part 45 referring to the FAA Production Certificate N° 5 SW; In addition, the prefix “TEC” or “TM USA” is added to the serial number indicated on this plate; for their importation into France, they shall be delivered with an Airworthiness Certificate valid for Export and signed by a representative of the FAA.

c. 美国制造的单元体可以组合到在型号合格证下生产的发动机里, 如果该单元体具有 FAA 适航标签, 8130-3 表, 且该表附在每一项目上或任何用作运送的形式。

The modules manufactured in the USA can be incorporated into engines manufactured under this type certificate provided they have an FAA airworthiness label, model 8130-3 established by the FAA and attached to each item or to any form used for their shipping.

----完/END----