

中国民用航空总局

GENERAL ADMINISTRATION OF CIVIL AVIATION OF CHINA

编号/No.: VTC 0199E

修订/Rev.: 0

型号/Type: TAY 611-8C

批准人/Approved by: 周凯施

日期/Date: 2007-12-04

型号认可证数据单编号: VTC0199E

Validation Type Certificate Data Sheet No. VTC0199E

本数据单, 作为型号认可证编号: VTC0199E 的一部分, 规定了一些条件和限制, 在此条件和限制下, 获得本型号认可证的产品满足下述“CAAC 认可审定基础”段落给出的适航要求。

This data sheet which is a part of Validation Type Certificate No. VTC0199E prescribes conditions and limitations under which the product for which the Validation Type Certificate was issued meets the airworthiness requirements indicated in the paragraph “CAAC Validation Basis”.

德国 LBA 型号合格证 No.6327、数据单第 3 版, 批准日期: 2002 年 12 月 3 日

CAAC 型号认可证 VTC0199E 颁发日期: 2007 年 12 月 04 日。

Type Certificate No.6327, Data Sheet Issue 3, Approved by GER LBA on December 3rd, 2002

CAAC Validated Type Certificate Datasheet No. VTC0199E, date of issue: December 04, 2007.

型号合格证持有人: 罗尔斯-罗伊斯公司 (德国)

Type Certificate Holder: Rolls-Royce Deutschland Ltd & Co KG Eschenweg 11, Dahlewitz
15827 Blankenfelde-Mahlow
Germany

1.0 审定基础

1.0 Certification Basis

1.1.1 JAR-E 第 6 次修改, 1981 年 8 月 28 日生效; 针对 V1.10 列出的所有发动机控制系统的新部件及其相关附件审定基础为 JAR-E 第 10 次修改, 1999 年 8 月 15 日生效。TAY 611-8C 申请日期为: 2001 年 12 月 12 日。

1.1.1 JAR-E Change 6, effective 28th August 1981. JAR-E Change 10, effective 15th August 1999 for all new parts of the engine control system and its associated accessories as listed in V1.10. The reference application date for certification is 12th December 2001 for TAY 611-8C.

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| 1.1.2 特殊条件 | JAR-E790 (第 10 次修改) 吸雨和吸冰雹
JAR-E540 and E800 (第 11 次修改) 鸟击/吸入
JAR-E530(f) (第 10 次修正与 AMJ 20X-1)EEC 防火与过热保护 |
| 1.1.2 Special Condition | JAR-E790 at Change 10, Ingestion of Rain and Hail
JAR-E540 and E800 at Amendment 11, Bird Strike / Ingestion
JAR-E530(f) at Change 10 and AMJ 20X-1, EEC Fire & Overheat Protection |
| 1.1.3 决定符合 | JAR-E20 (第 10 次修改) 发动机构型与接口
JAR-E25 (第 10 次修改) 有关持续适航的指令 |
| 1.1.3 Elect to Comply | JAR-E, Change 10, E20 Engine Configuration and Interfaces
JAR-E, Change 10, E25 Instructions for Continued Airworthiness |
| 1.1.4 豁免 | JAR-E (第 6 次修改) C3-4, 第 24.1 段 发动机反推力校准 |
| 1.1.4 Exemption | JAR-E, Change 6, C3-4, Paragraph 24.1, Engine Calibration in Reverse Thrust |
| 1.1.5 等效安全条款: | JAR-E (第 6 次修改), C3-4, 第 6 段 150 小时持久试验
JAR-E (第 6 次修改), C3-4, 第 2.2.1 段和 JAR-E640(b)(1) (第 10 次修改) 静压试验 |
| | JAR-E (第 6 次修改), C3-4, 第 22 段 压气机与涡轮转子完整性试验 |
| 1.1.5 Equivalent Safety Finding: | JAR-E, Change 6, C3-4, Paragraph 6 150 hour Endurance Test
JAR-E, Change 6, C3-4, Paragraph 2.2.1
and JAR-E, Change 10, E640(b)(1) Static Pressure Tests
JAR-E, Change 6, C3-4, Paragraph 22, Compressor
and Turbine Rotor Integrity Tests |
| 1.1.6 环境标准: | ICAO 附件 16, 第 II 卷 (1993 年第 2 版)——排放和燃油排泄 |
| 1.1.6 Environmental Standards: | ICAO Annex 16 Vol. II second edition 1993 - Emission & Fuel Venting. |

1.2 CAAC 认可审定基础

CAAC 接受德国 GER LBA/欧洲 EASA 的审定基础为认可审定基础

1.2 CAAC Validation Basis

CAAC accepts GER LBA/EASA certification basis as validation basis

2.0 技术特点

2.0 TECHNICAL CHARACTERISTICS

2.1.1 设计标准 : Tay 611-8C 发动机的构型标准符合 DIS2226 第 2 版(或以后批准的版本)。

2.1.1 Design Standards: In accordance with DIS 2226 Issue 02 or later approved issues

2.1.2 特征描述: 外涵式涡扇发动机; 包括一单级低压风扇, 三级轴流中压压气机以及 12 级轴流高压压气机; 包含 10 个单管环型燃烧室; 两级轴流高压涡轮, 3 级轴流低压涡轮; FADEC 系统。

2.1.2 Description: By-pass turbo-fan engine consisting of one single stage low pressure (LP) fan with a three-stage axial flow intermediate pressure (IP) compressor, twelve stage axial flow high pressure (HP) compressor, turbo-annular combustion chamber with 10 flame tubes, two-stage axial flow high pressure (HP) turbine, three-stage axial flow low pressure (LP) turbine and a Full Authority Digital Engine Control (FADEC) system.

2.1.3 设备: Rolls-Royce 公司的 DNS73078 和 E-TR914/02 ISS01 报告或其以后批准的版本中列出了批准的设备

2.1.3 Equipment: Approved equipment is listed in the Rolls-Royce Reports DNS73078 and E-TR914/02 ISS01 or later approved issues.

2.1.4 尺寸:

总长 2407 毫米 (93.75 英寸)

总直径 1796 毫米 (70.72 英寸)

2.1.4 Dimensions:

Overall Length: 2407 mm (94.75 in)

Overall Diameter: 1796 mm (70.72 in)

2.1.5 净重: 1538 千克 (3390 磅)。

2.1.5 Dry Weight: 1538 kg (3390 lbs)

2.1.6 额定值: 起飞推力: 61.61 kN (13850 磅力)

最大持续推力: 55.25 kN (12420 磅力)

2.1.6 Ratings: Take-off Thrust: 61.61 kN (13850 lbf)

Maximum Continuous Thrust: 55.25 kN (12420 lbf)

2.1.7 控制系统: 发动机装备全权数字电子控制系统 (FADEC), EEC 的硬件和软件符合 TEEC2000-04-AD, 或以后批准的标准。

2.1.7 Control System: FADEC: EEC Hardware and Software P/N TEEC2000-04-AD, or later approved standards

2.1.8 液体: 批准的燃油、添加剂和滑油列在操作手册 F-TAY-6RR 中。

2.1.8 Fluids: Approved fuels, additives and oils are listed in the Operating Instructions F-TAY-6RR.

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2.1.9 附件驱动器:

附件	齿轮转速比 (高压转子)	旋转方向	静悬臂梁力矩 Nm (in.lb)	剪颈扭矩 Nm (in.lb)	连续扭矩 Nm (in.lb)
液压泵	0.26146	逆时针	15.8 (140)	339 (3000)	82.7 (732)
IDG	0.5088	顺时针	83.9 (743)	807 (7140)	74.5 (659)
起动机	1.0398	顺时针	17.3 (153)	337 (2981)	292.9 (2592)

旋转方向由面向相应的驱动器来确定

2.1.9 Accessory Drives: See below

Accessory	Gear Ratio (HP rotor)	Direction of Rotation	Static Overhang Moment Nm (in.lb)	Shear Neck Torque Value Nm (in.lb)	Continuous Torque Nm (in.lb)
Hydraulic Pump	0.26146	Counter Clockwise	15.8 (140)	339 (3000)	82.7 (732)
IDG	0.5088	Clockwise	83.9 (743)	807 (7140)	74.5 (659)
Starter	1.0398	Clockwise	17.3 (153)	337 (2981)	292.9 (2592)

The direction of rotation is given looking on to the appropriate gearbox drive facing.

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3.0 操作限制

3.0 OPERATING LIMITATIONS

3.1 Tay 611-8C 操作限制

3.1 Tay 611-8C OPERATING LIMITATIONS

3.1.1 温度限制

(1) 燃气温度限制:

涡轮燃气温度 (校准值):

- 地面启动 700°C (1292°F)
- 飞行中启动 780°C (1436°F)
- 起飞²⁾ 800°C (1472°F)
- 最大持续工况 715°C (1319°F)
- 最大超温工况 (20 秒) 820°C (1508°F)

(2) 燃油温度限制:

- 低压泵入口温度最低限 -40°C (-40°F)
- 低压泵入口温度最高限 54°C (129°F)
- 高压泵入口温度最高限 95°C (203°F) (130°C (266°F))

(3) 滑油温度限制:

- 启动最低限 -40°C (-40°F)
- 加速至起飞的最低限 -30°C (-22°F)
- 最高限 105°C (221°F)
(120°C (248°F))³⁾

3.1.1 Temperature Limitations

(1) Gas Temperatures

TGT (trimmed):

- Starting on ground 700°C (1292°F)
- Starting in flight 780°C (1436°F)
- Take-off²⁾ 800°C (1472°F)
- Maximum Continuous 715°C (1319°F)
- Maximum Over temperature (20 sec.) 820°C (1508°F)

(2) Fuel Temperatures:

- LP Pump Inlet, minimum -40°C (-40°F)
- LP Pump Inlet, maximum 54°C (129°F)
- HP Pump Inlet, maximum 95°C (203°F) (130°C (266°F))

(3) Oil Temperatures:

- Minimum for starting -40°C (-40°F)
- Minimum for acceleration -30°C (-22°F)
to Take-off
- Maximum 105°C (221°F)
(120°C (248°F))³⁾

3.1.2 许可转速:

100 %低压转子转速为 8393 转/分钟

100 %高压转子转速为 12484 转/分钟

3.1.2.1 起飞工况转速最大值²⁾:

-高压转子	12560 转/分钟(100.6%)
-低压转子	8015 转/分钟(95.5%)

3.1.2.2 持续工况转速最大值:

-高压转子	12172 转/分钟(97.5%)
-低压转子 P	8015 转/分钟 (95.5%)

3.1.2.3 转子最小速度:

-高压转子	6130 转/分钟(49.1%)
-飞行工况时的低压转子	1770 转/分钟(21.1%)
- 地面工况时的低压转子	1600 转/分钟(19.1%)

3.1.2.4 最大超转速度 (20 秒):

-高压转子	12684 转/分钟(101.6%)
-低压转子	8100 转/分钟(96.5%)

3.1.2.5 最大反推工况(30 sec)¹⁾ :

-低压转子转速	5457 转/分钟 (65.0%)
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1) 在高于 60 节的校准空速时 EEC 限制低压转子转速为 60%。在校准空速为 50 节至 60 节之间时 EEC 逐渐限制低压转子转速在 60%N1RT1(修正风扇转速)到 55%N1RT1 范围内。

2) 限制时间为 5 分钟。当一台发动机失效时, 此工况最长不能超过 10 分钟。

3) 降低转速所出现的瞬态超温现象不能超过 15 分钟。

3.1.2 Permissible Rotational Speeds:

100 % LP rpm equals 8393 revs min⁻¹

100 % HP rpm equals 12484 revs min⁻¹

3.1.2.1 Maximum for Take-Off²⁾

- HP	12560 revs min ⁻¹ (100.6%)
- LP	8015 revs min ⁻¹ (95.5%)

3.1.2.2 Maximum Continuous

- HP	12172 revs min ⁻¹ (97.5%)
- LP	8015 revs min ⁻¹ (95.5%)

3.1.2.3 Minimum Rotor Speeds

- HP	6130 revs min ⁻¹ (49.1%)
- LP in flight	1770 revs min ⁻¹ (21.1%)
- LP on the ground	1600 revs min ⁻¹ (19.1%)

3.1.2.4 Maximum Overspeed (20 sec)

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- HP	12684 revs min ⁻¹ (101.6%)
- LP	8100 revs min ⁻¹ (96.5%)

3.1.2.5 Maximum Reverse Thrust (30 sec)¹⁾

- LP	5457 revs min ⁻¹ (65,0%)
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1) A limit of 60% N1RT1 (corrected Fan speed) above 60knots calibrated air speed is controlled by the EEC. Between 60knots calibrated air speed and 50 knots calibrated air speed a ramped limit from 60% N1RT1 to 55% N1RT1 is controlled by the EEC.

2) Limited to 5 minutes and to maximum 10 minutes when one engine has failed.

3) During transient overshoot on reducing RPM for a period of not more than 15 minutes.

3.1.3 压力限制:

3.1.3.1 燃油压力在“安装手册”中规定。

3.1.3.2 不同的滑油压力:

起飞工况下的最小油压:	高于外界大气压 206.9 kPa (30.0 psig)
飞行前可接受的最小油压:	高于外界大气压的超出值在高压转子转速处于慢车至 70%N2 时为 117,2kPa (17psig), 之后随此转速增加到 100,6%N2 时而线性增至 200kPa (29psig)。
完成飞行可接受的最小油压:	高于外界大气压的超出值在高压转子转速为慢车至 76%N2 时为 110kPa (16psig), 之后随此转速增加到最大持续工况时而线性增至 172,4kPa (25psig)。

3.1.3 Pressure Limits:

3.1.3.1 Fuel Pressures are defined in the “Installation Brochure”.

3.1.3.2 Differential Oil Pressures:

Minimum for Take-Off:	206.9 kPa above ambient atmospheric pressure (30.0 psig)
Minimum for acceptance for flight:	Low idle to 70% HP rpm 117.2 kPa above ambient atmospheric pressure (17psig), linear to 200 kPa above ambient atmospheric pressure (29psig) at 100.6% HP rpm
Minimum to complete flight:	Low idle to 76% HP rpm 110 kPa above ambient atmospheric pressure (16psig), linear to 172.4 kPa above ambient atmospheric pressure (25psig) at Maximum Continuous.

3.1.4 滑油容量:

- 滑油系统名义总容量:	13.6 升(24 imp pts)
- 滑油箱名义总容量:	6.8 升(12 imp pts)
- 可用滑油量:	5.1 升(9 imp pts)
- 最大滑油消耗率:	0.355 升/小时 (0.625 imp pts/h)

3.1.4 Oil Capacities:

- Nominal total Oil System	13.6 litres (24 imp pts)
- Nominal Oil Tank Capacity	6.8 litres (12 imp pts)
- Usable Oil	5.1 litres (9 imp pts)
- Max. Oil Consumption	0.355 l/h (0.625 imp pts/h)

3.1.5 排气:

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下表提供了发动机运行在限制范围内时压气机在各个典型工况下可能的排气情况。

单一或组合输入客舱的空气最大允许量如下表所示:

Tay 611-8C	HP Comp.St.7 M7 √ T1 P1	HP Comp.St.12 M12 √ T1 P1	HP Comp.Total MT √ T1 P1	Fan Delivery MF √ T1 P1
起飞(正常操作)	0,46 (7.0)	N/A	N/A	0,69 (10.5)
最大持续工况以及以下 (正常操作)	0,46 (7.0)	0,45 (6.9)	0,66 (10.0)	0,69 (10.5)
起飞(一发失效)	0,60 (9.1)	0,25 (3.8)	0,85 (12.9)	0,69 (10.5)
最大持续工况以及以下 (一发失效)	0,60 (9.1)	0,73 (11.1)	1,33 (20.2)	0,69 (10.5)

T1 = 发动机进口总温 (K)

P1 = 发动机进口总压 kPa (psia)

M7 = 第 7 级排气质量流量 kg/s (lb/s)

M12 = 第 12 级排气质量流量 kg/s (lb/s)

MT = M7 + M12 kg/s (lb/s)

MF = 风扇起飞工况下质量流量 kg/s (lb/s)

3.1.5 Bleed Extraction:

The compressor air bleeds may be used in accordance with the table providing that this does not result in any operating limitations being exceeded.

Maximum air delivery for aircraft services shall be such that the individual or total non-dimensional bleed flows listed in Table 1 are not exceeded.

Tay 611-8C	HP Comp.St.7 M7 √ T1 P1	HP Comp.St.12 M12 √ T1 P1	HP Comp.Total MT √ T1 P1	Fan Delivery MF √ T1 P1
Take-off (Normal Operation)	0,46 (7.0)	N/A	N/A	0,69 (10.5)
Max. Continuous and below (Normal Operation)	0,46 (7.0)	0,45 (6.9)	0,66 (10.0)	0,69 (10.5)
Take-off (Single Engine Operation)	0,60 (9.1)	0,25 (3.8)	0,85 (12.9)	0,69 (10.5)
Max. Continuous and below (Single Engine Operation)	0,60 (9.1)	0,73 (11.1)	1,33 (20.2)	0,69 (10.5)

T1 = Total temperature at engine intake (K)

P1 = Total pressure at engine intake kPa (psia)

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M7 = Stage 7 bleed mass flow kg/s (lb/s)

M12 = Stage 12 bleed mass flow kg/s (lb/s)

MT = M7 + M12 kg/s (lb/s)

MF = Fan take-off mass flow kg/s (lb/s)

4.0 运行与服务手册:**4.0 Operating and Service Instructions:****4.1 Tay 611-8C 运行与服务手册:**

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|------------|-------------|
| 1. 安装手册: | O-TR0817/03 |
| 2. 操作说明手册: | F-TAY-6RR |
| 3. 维修手册: | M-TAY-6RR |
| 4. 发动机手册: | E-TAY-6RR |
| 5. 时限手册: | T-TAY-6RR |

4.1 Tay 611-8C Operating and Service Instructions:

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|----------------------------|-------------|
| 1. Installation Brochure: | O-TR0817/03 |
| 2. Operating Instructions: | F-TAY-6RR |
| 3. Maintenance Manual: | M-TAY-6RR |
| 4. Engine Manual: | E-TAY-6RR |
| 5. Time Limits Manual: | T-TAY-6RR |

5.0 注释:**5.0 Notes:****5.1 Tay 611-8C 注释:****5.1 Tay 611-8C Notes:**

1. 发动机通过生产、检查或修理后的性能必须满足 PLR19007—Tay611-8C 运行限制中规定的性能要求。

1. The performance of an engine that is despatched from production, overhaul or repair must be within the performance limitations stated within PLR19007 – Tay 611-8C Operating and Acceptance Limits.

2. 本发动机只有在左侧发动机安装了件号为 08ND78006-1 以及右侧发动机安装了件号为 08ND78006-2 的 Nordam 反推装置的情况下才允许在地面使用, 此项关于本发动机反推的批准并不意味着批准了反推装置本身。

2. The engine is approved for operation for ground use only with Nordam Thrust Reverser Part Numbers 08ND78006-1 for left hand installation and 08ND78006-2 for right hand installation. This approval for operation in Reverse Thrust does not imply approval of the Thrust Reversers themselves.

3. 在对飞机进行地面检查和飞机正在进行滑跑时, 反推装置必须限制慢车, 禁止用反推倒机。

3. For ground checks with the aircraft stationary and during taxiing the use of reverse thrust is limited to idle. Use of reverse thrust to power back is prohibited.

4. 操作手册记录了关于风的限制

4. Wind limitations are recorded in the Operating Instructions.

5. 当飞机在地面静止状态下要运转发动机时飞机必须使用停车刹车。

5. During static ground running the park brake must be used.

6. 当飞机在地面处于静止状态时, 发动机稳态运行不能停留在 60% - 72% N1(风扇转速)以及 62% - 70% N1RT1(修正风扇转速)转速区间内。任何时候, 发动机进行加速或减速要通过上述转速区间时不能超过 10 秒。此限制由 EEC 进行控制。

6. While the aircraft is static on the ground, stabilised engine operation in the band between 60% - 72% N1 (Fan speed) and 62% - 70% N1RT1 (corrected Fan speed) is prohibited. Any time for acceleration or deceleration through this band must not exceed 10 seconds. This limitation is controlled by the EEC.

7. 当一台发动机失效时, 本发动机允许在起飞工况下运行 10 分钟。

7. The engine is approved for 10 minutes take-off rating in case of one engine having failed or been shut down.

8. 本发动机的 EEC 软件的开发和认证满足 RTCA/DO-178B / EUROCAE ED-12B 的 A 级要求。

8. The EEC software has been developed and verified in accordance with RTCA/DO-178B / EUROCAE ED-12B level A

9. 在 2.1.6 中所示的静止推力额定值是本发动机在以下工况下得到的:

- 海平面标准大气压日间;

- 飞机系统引气为关闭状态;
- 附件齿轮箱驱动器为卸载状态;
- 罗-罗试验台进气道 P/No.: TA10
- 罗-罗喷管从属件 P/No.: JP5

燃气温度由安装在低压涡轮导向叶片的 9 对热电偶进行测量, 热电偶的校准符合 DHU113605 第 2 版或以后经批准的版本的要求。

9. The ratings shown under 2.1.6 are static ratings achieved at the following conditions:

- Sea level and ISA standard day conditions.
- Aircraft service bleeds closed.
- Auxiliary gearbox drives unloaded.
- Rolls-Royce Test Bed Production Air intake P/No.: TA10
- Rolls-Royce Slave Jet Pipe P/No.: JP5

Gas temperature measured by 9 pairs of thermocouples mounted in the LPI turbine NGVs trimmed in accordance with DHU113605 Issue 2 or later approved issues.

10. 在发动机手册公开发行人前发动机的检修只能由生产厂家进行

10. Engine Overhaul can only be undertaken by the Manufacturer until the Engine Manual has been published.

11. 将发动机安装在飞机上有关闪电防护和电磁兼容性的信息在安装手册中可以查到。

11. Aircraft Installation assumptions including information on Lightning Protection and Electro-Magnetic Compatibility are recorded in the in the Installation Brochure.

12. 有关 FADEC 系统操作发动机的工作限制包含在 O-TR0307/04 ISS01 报告中或在以后经批准的版本中。

12. Information on engine operating with FADEC system dispatch limitations is contained in report O-TR0307/04 ISS01 or later approved issues.

13. 以下控制系统组件的审定符合 JAR-E 的第 10 修订版。

部件描述	
高压压气机可调进口导向叶片执行机构	引气操纵执行机构
发动机电子控制器	燃油流量计
点火器	点火器导线
点火单元	磁性探测器
燃油流量计安装块	滑油起火监测热电偶
滑油容量传送器	永磁交流发电机(PMA)
低压转子 N1 转速探针	高压转子 N2 转速探针
高压燃油泵	远端滑油注入阀
电阻式温度监测器	压力传感器
燃油流量传送器	

13. The following Control System Parts are Certified in accordance with JAR-E Change 10.

Part Description	
HPC Variable Inlet Guide Vane Actuator	Handling Bleed Valve Actuator
Electronic Engine Controller	Fuel Metering Unit (FMU)
Igniter	Ignition Leads
Ignition Unit	Magnetic Chip Detectors
FMU Mounting Block	Oil Fire Detector Thermocouple
Oil Quantity Transmitter	Permanent Magnet Alternator(PMA)
N1 Speed Probe	N2 Speed Probe
HP Fuel Pump	Remote Oil Fill Valve
Resistance Temperature Detectors	Pressure Transducers
Fuel Flow Transmitter	

结束

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