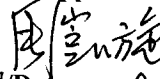


VTC0054E

型号认可证数据单
THE VALIDATION DATA SHEET

编号/No.: VTC0054E
版次/Revision: 1
型号/Type:
GE90-76B, GE90-90B, GE90-113B
GE90-77B, GE90-115B
GE90-85B, GE90-110B1

批准人/Approved by:


日期/Date: 2008.12.30

本数据单是型号认可证（编号 VTC0054E）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的状态和限制。

This data sheet, which is a part of Validation Type Certificate (No: VTC0054E), prescribes conditions and limitations under which the product for which the Type Certificate was issued meets the airworthiness requirements of the Chinese Civil Aviation Regulation.

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	No. VTC0054, 版次 1 2008 年 12 月 30 日	No. E00049EN 和数据单第 13 版, 批准日期: 2007 年 3 月 8 日
历史 History	No. VTC054, 版次 0 1995 年 12 月 26 日	No. E00049EN 和数据单第 1 版
	No. VTC65, 版次 0 1997 年 1 月 6 日	No. E00049EN 和数据单第 4 版

型号合格证持有人:

TYPE CERTIFICATE (TC) HOLDER: General Electric Company
GE Aircraft Engines
1 Neumann Way
Cincinnati, OH 45215-6310
I. MODELS GE90-76B GE90

1. 型号 MODELS	GE90-76B	GE90-77B	GE90-85B	GE90-90B
形式 TYPE	双转子、轴流式、高涵道比涡轮风扇、两极高压涡轮驱动十级高压压气机、六级低压涡轮驱动单级风扇和 3 级低压压气机 Dual rotor, axial flow, high bypass ratio turbofan. The 10-stage high pressure compressor is driven by a 2-stage high pressure turbine. The single stage fan and 3-stage low pressure compressor are driven by a 6-stage low pressure turbine.			
额定功率 RATINGS				
海平面最大持续静态推力, 磅 Maximum continuous at sea level, static thrust, lb	75,430	75,430	81,230	90,580
海平面起飞静态推力(5 分钟, 见注释 13), 磅 Takeoff (5 min. see NOTE 16) at sea level, static thrust, lb	81,070	81,700	88,870	94,000
平台功率环境温度 Flat rating ambient temperature	91°F/32.8°C 77°F/25°C	-- --	86°F/30°C --	-- --
起飞 Takeoff 最大持续 Maximum continuous				
部件 COMPONENTS (GE P/Ns)				
液压机械控制组件 Hydro-mechanical Control Unit	1693M75 1851M65	-- -- --	-- -- --	-- -- --
全数字发动机控制 Full Authority Digital Engine Control (FADEC) 硬件和软件 Hardware (H/W) & Software (S/W)	1838M16	---	---	---
硬件 Hardware (H/W) (See NOTE 21)	1959M87 1838M16	-- --	-- --	-- --
软件 Software (S/W) (See NOTE 21)	1838M99	--	--	--
配置型号箱 (见备注 10) Configuration Type Box (See NOTE 10)	320-837-701-0 320-839-501-0 320-892-101-0 320-892-201-0 320-846-701-0 320-892-601-0 320-915-201-0 320-921-501-0	--- -- --- -- -- -- -- --	--- -- --- -- -- -- -- --	--- -- --- -- -- -- -- --
FADEC 配置插头 FADEC Rating Plug	320-833-701-0	320-833-901-0	320-833-801-0 320-834-201-0	320-834-001-0
主油泵 Main Fuel Pump	1689M10	--- -- --	--- -- --	--- -- --
点火系统 IGNITION SYSTEM 两个点或组件 Two ignition units GE P/N 两个点火插头 Two ignitor plugs GE P/N	9238M66 1754M84	-- --	-- --	-- --

主要尺寸 PRINCIPAL DIMENSIONS (in)

长度(风扇转子到喷嘴中央) Length (Fan spinner to nozzle centerbody)

宽度(最大包容) Width (maximum envelope)

高度(最大包容) Height (maximum envelope)

重量(净)/WEIGHT (DRY)

包括制造商说明中列出的基本发动机, 附件和可选设备

Includes basic engine, basic engine accessories, and optional equipment as listed in the manufacturer's engine specifications.

重心位置 CENTER OF GRAVITY LOCATIONS (in) (Engine only)

站位 Station (axial)

水线 Waterline

耙线 Buttline

286.9	--	--	--
152.4	--	--	--
155.6	--	--	--
17,400	--	--	--
227.5±1.5	--	--	--
99.9±0.5	--	--	--
100.4±0.5	- -	--	--
	-		

III. 型号 MODELS	GE90-110B1	GE90-113B	GE90-115B	
形式 TYPE	双转子、轴流式、高涵道比涡轮风扇、两极高压涡轮驱动九级高压压气机、六级低压涡轮驱动单级风扇和4级低压压气机 Dual rotor, axial flow, high bypass ratio turbofan. The nine-stage high pressure compressor is driven by a 2-stage high pressure turbine. The single stage fan and four stage low pressure compressor are driven by a 6-stage low pressure turbine			
部件 COMPONENTS (GE P/Ns)				
液压机械控制组件 Hydro-mechanical Control Unit	1962M80			
全数字发动机控制 Full Authority Digital Engine Control (FADEC)	1962M67			
硬件 Hardware (H/W) (See NOTE 21)	2041M27			
软件 Software (S/W) (See NOTE 21)	390-850-001-0			
配置型号箱 Configuration Type Box	390-801-011-0	390-802-001-0	390-800-001-0	
FADEC 配置插头 FADEC Rating Plug	390-803-001-0	390-804-001-0	390-805-001-0	
G01	390-803-011-0		390-805-011-0	
G02	390-803-021-0		390-805-021-0	
G03				
G04				
主油泵 Main Fuel Pump	2042M69			
点火系统 IGNITION SYSTEM				
两个点火组件 Two ignition units GE P/N	9238M66			
两个点火插头 Two ignitor plugs GE P/N	1754M84			
主要尺寸 PRINCIPAL DIMENSIONS (in)				
长度(风扇转子到喷嘴中央) Length (Fan spinner to nozzle centerbody)	286.67	-	-	
宽度(最大包容) Width (maximum envelope)	148.38			
高度(最大包容) Height (maximum envelope)	154.56			
重量(净)/WEIGHT (DRY)				
包括制造商说明中列出的基本发动机, 附件和可选设备	19316			
Includes basic engine, basic engine accessories, and optional equipment as listed in the manufacturer's engine specifications				

重心位置 CENTER OF GRAVITY LOCATIONS (in)
(Engine only)

站位 Station (axial)

水线 Waterline

耙线 Buttline

219.2±1.5	--	--	
100.14±0.5	--	--	
100.28±0.5	- -	- -	

IV. 型号 MODELS

ALL

燃油 FUEL

批准的燃油符合 GE 规范 D50TF2.

Approved fuels must conform to GE Specification D50TF2. Certain fuels such as those produced to PRC Specification RP3 meet the requirements of D50TF2 by means of the Specification. The engine will operate with a mixture of fuels or additives conforming to GE Specification D50TF2..

滑油 OIL

类型 II 符合 GE90 规范 D50TF1, 或最新版本 GE90 服务通告 79-001 审批过的滑油牌号

Type 2 oils conforming to GE 90 Specification D50TF1 or the latest revisions are authorized. For approved brand of oils refer to GE90 Service Bulletin 79-001.

审定基础 CERTIFICATION BASIS
(-76B/-77B/-85B/-90B)

1965 年 2 月 1 日生效的联邦法规汇编 14 集第 33 部的 1 到 15 修正案和专用条件 SC-33-ANE-08-NE。

14 Code of Federal Regulations (CFR), Part 33, effective February 1, 1965, including Amendments 33-1 through 33-15 inclusive and Special Condition Number SC-33-ANE-08-NE.

审定基础 CERTIFICATION BASIS
(-110B1, -113B, -115B)

1965 年 2 月 1 日生效的联邦法规汇编 14 集第 33 部的 1 到 20 修正案, 2003 年 1 月 15 日发布的专用条件 SC-33-ANE-08-NE 和 33.73(b), 第 No. 7953 号豁免令

14 Code of Federal Regulations (CFR), Part 33, effective February 1, 1965, including Amendments 33-1 through 33-20, Special Condition SC-33-ANE-08-NE, and Exemption to §33.73(b), No. 7953 dated January 15, 2003

型号审定 TYPE CERTIFICATE E00049EN

型号 MODELS	申请日期 APPLICATION DATE	发布/修正 ISSUED/AMENDED
GE90-76B	DEC 16, 1991	FEB 2, 1995
GE90-85B	DEC 16, 1991	FEB 2, 1995
GE90-90B	AUG 10, 1994	JUL 2, 1996
GE90-77B	NOV 20, 1995	JUL 2, 1996
GE90-113B	JUN 27, 2000	JUL 30, 2003
GE90-115B	JUN 27, 2000	JUL 30, 2003
GE90-110B1	JAN 9, 2002	JUL 30, 2003

Note:

生产基础 PRODUCTION BASIS

GE90-76B/-77B/-85B/-90B/-110B1/-113B/-115B 生产许可 No.108

GE90-76B/-77B/-85B/-90B/-110B1/-113B/-115B Production Certificate No. 108

备注 NOTES

备注 1 NOTE 1.	最大发动机转子速度 MAXIMUM PERMISSIBLE ENGINE 转子速度 ROTOR SPEEDS			
		GE90-76B	GE90-77B/-85B/-90B	GE90-110B1, -113B, 115B
	低压转子 Low pressure rotor (N1)	2,465 RPM (109.0 percent)*	2,465 RPM (109.0 percent)*	2602 rpm (110.5percent)***
	高压转子 High pressure rotor (N2)	10,705 RPM (114.7 percent)**	10,918 RPM (117 percent)**	11292 RPM (121percent)**
	*100% N1 转子速度为 2261.50RMP *100 percent N1 is 2261.5 RPM			
	** 100% N2 转子速度为 9332.0RMP ** 100 percent N2 is 9332.0 RPM			
	*** 100% N1 转子速度为 2355.0RMP *** 100 percent N1 is 2355.0 RPM			
备注 2 NOTE 2.	最大允许温度 MAXIMUM PERMISSIBLE TEMPERATURES			
	指示涡轮排气 ⁴ Indicated turbine exhaust 气体温度 gas temperature (T49)	GE90-76B (see NOTE 10)		GE90-77B/-85B/-90B
	Takeoff (5 minute see NOTE 16) 起飞 (5 分钟, 见备注 16)	1787°F (975°C)*		1885°F (1030°C)
	Maximum Continuous 最大持续	1697°F (925°C)		1859°F (1015°C)
	Ground starts (manual or auto) 地面启动 (手动或自动)	1382°F (750°C) --		1382°F (750°C)
	Inflight starts (manual or auto) 空中启动 (手动或自动)	1517°F (825°C) --		--
	* 60 seconds maximum transient 60 秒最大瞬时	1796°F (980°C)		--
	滑油温度极限 Oil temperature limits			
	持续 Continuous	255°F (124°C)		
	瞬时 Transient	275°F (135°C)		
	指示涡轮排气 ⁴ Indicated turbine exhaust 气体温度 gas temperature (T49)			GE90-110B1/ -113B/ -115B
	起飞 Takeoff (5 minute see NOTE 16)			1994°F (1090°C)***
	最大持续 Maximum Continuous			1922°F (1050°C)
	地面启动 (手动或自动) Ground starts (manual or auto)			1382°F (750°C)
	空中启动 (手动或自动) Inflight starts (manual or auto)			1517°F (825°C)
	滑油温度极限 Oil temperature limits			
	持续 Continuous	270°F (132°C)		
	瞬时 Transient	290°F (143°C)		

备注 3
NOTE 3.

燃油和滑油压力限制

FUEL AND OIL PRESSURE LIMITS

燃油压力限制在发动机泵进口

FUEL PRESSURE LIMITS AT THE ENGINE PUMP INLET

The limit is from minimum fuel pressures of not less than the greater of true vapor pressure plus 7.0 psi or ambient plus 7.0 psi to a maximum of 70 psig.

滑油压力限制

OIL PRESSURE LIMITS

低压 LOW PRESSURE

限值值为 10.0 psid (69 kPa diff.) (见备注 14)

The limit is 10.0 psid (69 kPa diff.). (See NOTE 14)

备注 4
NOTE 4.

驱动附件规范 ACCESSORY DRIVE PROVISIONS

GE90-76B/-77B/-85B/-90B

DRIVE PAD 驱动座	Rotation Facing Gearbox Pad 面对齿轮箱座的 转动方向	Gear Ratio To Core Speed 与核心机的齿 速比	Horsepower Continuous Pad Rating HP (KW) 连续转动马力(千 瓦)	Shear Torque in-lb (N-m) 剪切扭矩 磅-寸 (牛-米)	Maximum Overhung Moment in-lb (N-m) 最大悬挂重量 矩 磅-寸(牛-米)
整体发电机 IDG (120 KVA)	CCW (*) 逆时针	0.7947	243 (181.3)	10000 - 10500 (1130 - 1187)	2000 (226.0)
液压泵 Hydraulic Pump	CCW	0.3783	85 (63.5)	4250 - 4850 (480 - 548)	230 (26.0)
恒速装置 VSCF/PMG 发电机 Generator (20/30 KVA)	CCW	2.4126	58 (43.3)	3500 - 4500** (395 - 508)**	400 (45.2)
IDG 过载保护 IDG Overload Limits	每 1000 小时中, 功率超过 304 马力 (226.8 千瓦), 最多 5 分钟 304 HP (226.8 KVA) for 5 minutes per 1000 hours of operation 每 1000 小时中, 功率超过 406 马力 (302.9 千瓦), 最多 5 秒 406 HP (302.9 KVA) for 5 seconds per 1000 hours of operation 功率超过 500 马力 (373.0 千瓦), 会出现电气故障 500 HP (373.0 KVA) electrical fault				
VSCF/PMG 过载限度 VSCF/PMG Overload limits	每 1000 小时中, 功率超过 87 马力 (64.9 千瓦), 最多 5 分钟 87 HP (64.9 KVA) for 5 minutes per 1000 hours of operation 每 1000 小时中, 功率超过 116 马力 (86.5 千瓦), 最多 5 秒 116 HP (86.5 KVA) for 5 seconds per 1000 hours of operation 功率超过 128 马力 (95.5 千瓦), 会出现电气故障 128 HP (95.5 KVA) electrical fault				
	100%核心机转速对应 9332 转 / 分钟 100 percent core speed is 9,332 RPM (*) 逆时针 Counter Clockwise (**)剪切扭矩裕度与运营商要求相关, 具体的扭矩裕度请咨询GE 航空发动机 Shear torque capability is a function of operator requirements. Consult GE Aircraft Engines for installed capability.				

GE90-110B1/-113B/-115B

DRIVE PAD 驱动座	Rotation Facing Gearbox Pad 面对齿轮箱座的 转动方向	Gear Ratio To Core Speed 与核心机的齿 速比	Horsepower Continuous Pad Rating HP (KW) 连续转动马力(千 瓦)	Shear Torque in-lb (N-m) 剪切扭矩 磅-寸 (牛-米)	Maximum Overhung Moment in-lb (N-m) 最大悬挂重量 矩 磅-寸(牛-米)
整体发电机 IDG (120 KVA)	CCW (*)	0.7947	243 (181.3)	10500 max (1187 max)	2000 (226.0)
液压泵 Hydraulic Pump	CCW	0.3783	85 (63.5)	4250 - 4850 (480 - 548)	230 (26.0)
恒速装置 VSCF/PMG 发电机 Generator (20/30 KVA)	CCW	2.4126	58 (43.3)	1250 max (141.2 max)	400 (45.2)
IDG 过载限度 IDG Overload Limits	每 1000 小时中, 功率超过 304 马力 (226.8 千瓦), 最多 5 分钟 304 HP (226.8 KVA) for 5 minutes per 1000 hours of operation 每 1000 小时中, 功率超过 406 马力 (302.9 千瓦), 最多 5 秒 406 HP (302.9 KVA) for 5 seconds per 1000 hours of operation 功率超过 500 马力 (373.0 千瓦), 会出现电气故障 500 HP (373.0 KVA) electrical fault				
VSCF/PMG 过载限度 VSCF/PMG Overload limits	每 1000 小时中, 功率超过 87 马力 (64.9 千瓦), 最多 5 分钟 87 HP (64.9 KVA) for 5 minutes per 1000 hours of operation 每 1000 小时中, 功率超过 116 马力 (86.5 千瓦), 最多 5 秒 116 HP (86.5 KVA) for 5 seconds per 1000 hours of operation 功率超过 128 马力 (95.5 千瓦), 会出现电气故障 128 HP (95.5 KVA) electrical fault				
	100%核心机转速对应 9332 转 / 分钟 100 percent core speed is 9,332 RPM (*) 逆时针 Counter Clockwise				

- NOTE 5. 发动机额定推力是在标定车台上, 在下列测试条件下获得的
Engine ratings are based on calibrated test stand performance under the following conditions:
1. 海平面标准大气, 压力 14.696 psia, 温度 59°F
Sea level static, standard pressure (14.696 psia), 59°F
 2. 没有空调引气或者其它功率消耗
No customer bleed or customer horsepower extraction
 3. 理想状态的进气管道, 100%冲压恢复
Ideal inlet, 100% ram recovery
 4. 飞机整流罩
Production aircraft flight cowlings
 5. 在役仪表
Production instrumentation
- 燃油热值低于 18400 BTU/#
Fuel lower heating value of 18400 BTU/#

- NOTE 6. 空气引气的最大容许值
MAXIMUM PERMISSIBLE AIR BLEED EXTRACTION

允许引气限制(百分比)
Allowable Bleed Limits (Percent)

GE90-76B/-77B/-85B/-90B

Stage 4 4 级	Stage 5 5 级	Stage 9 9 级	Maximum Allowable 最大容许值
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低于 23%NIK
Below 23 Percent NIK
23 to 31 Percent NIK
31 to 57.4 Percent NIK
57.4 to 80 Percent NIK
80 to 96.8 Percent NIK
Above 96.8 Percent NIK

7.8	1.8	13.6	15.4
7.6	1.6	12.8	14.4
7.4	1.3	12.6	13.9
7.2	1.3	12.6	13.9
7.0	1.3	6.5	8.3
6.5	1.3	6.5	7.8

GE90-110B1/-113B/-115B

低于 27%NIK
Below 27 Percent NIK
At 51 Percent NIK
At 80 Percent NIK
At 88 Percent NIK
At 93 Percent NIK today
Above 93 Percent NIK

Stage 4 4 级	Stage 7 7 级	Stage 9 9 级	Total 合计
7.6	1.5	11.2	12.7
7.6	1.5	11.5	13.0
7.6	1.5	12.0	13.5
7.6	1.5	11.0	12.5
7.6	1.5	8.0	9.1
7.6	1.5	7.3	9.1

备注 7

NOTE 7.

燃油 Fuel

批准的燃油必须满足 GE D50TF2 规范的要求。有些燃油例如按照 PRC 的 RP3 规范生产的也是满足 D50TF2 规范的。对于使用混合燃油或者有添加剂的燃油都必须满足 GE D50TF2 规范的要求
Approved fuels must conform to GE Specification D50TF2. Certain fuels such as those produced to PRC Specification RP3 meet the requirements of D50TF2 by means of the Specification. The engine will operate with a mixture of fuels or additives conforming to GE Specification D50TF2.

备注 8

NOTE 8.

重要转动部件的寿命极限:

GE90-76B/-77B/-85B/-90B 的寿命件定义在 GE90, GEK 100700 发动机手册中的第 5 章

GE90-110B1/-113B/-115B 的寿命件定义在 GE90-100, GEK 109993 发动机手册中的第 5 章

Life limits established for critical rotating components for:

GE90-76B/-77B/-85B/-90B/ are published in Chapter 5 of the GE90 Engine Manual, GEK 100700

GE90-110B1/-113B/-115B are published in Chapter 5 of the GE90-100 Engine Manual, GEK 109993

备注 9

NOTE 9.

功率设定,功率测试和发动机推力控制都是以风扇转速(N1)为基准的,转速传感器安装在发动机上。

Power setting, power checks, and control of engine thrust output in all operations are based on Fan Speed (N1). Speed sensors are included in the engine assembly for this purpose.

备注 10

NOTE 10.

对于安装件号为 320-839-501-0 构型配置盒的 GE90-76B 发动机,必须执行 HP/LP 硬件改装相关的 GE 服务通告 72-169。FADEC 系统引入了 30 °C 的调整,相应的指示的 EGT 红线值是 975°C (起飞), 980°C (起飞,最多 60 秒),和 965°C (最大连续)

GE90-76B engines with configuration type box number 320-839-501-0 must incorporate the HP/LP turbine hardware and associated changes per General Electric GE90 Service Bulletin 72-169. The FADEC incorporates a 30°C shunt. The corresponding indicated EGT limits are 975°C (take-off), 980°C (take-off with 60 second max. transient), and 965°C (max. continuous).

备注 11
NOTE 11. 在结冰条件下的发动机地面运转, 必须遵循如下的程序:
For ground operation in icing conditions, the following procedures must be observed:

GE90-76B/-77B/-85B/-90B

在结冰条件下的发动机地面运转(包括飞机滑回和滑出), 必须迅速将发动机加速到N1大于50%, 允许间隔不超过15分钟。参看GE90 操作手册GEK

During ground operations (including taxi-in and taxi-out) in icing conditions, the engine must be run up momentarily to a minimum of 50 percent N1 at intervals not to exceed 15 minutes. See GE90 Operating Instructions Manual GEK 100703.

GE90-110B1/-113B/-115B

在结冰条件下的发动机地面运转(包括飞机滑回和滑出), 必须迅速将发动机加速到N1大于50%, 允许间隔不超过60分钟。参看GE90-100 操作手册GEK 109994。

提示: 在结冰条件下, 发动机加速时间会有所差异, 参看GE90-100安装手册GEK 109995

During ground operations (including taxi-in and taxi-out) in icing conditions, the engine must be run up momentarily to a minimum of 50 percent N1 at intervals not to exceed 60 minutes. See GE90-100 Operating Instructions Manual GEK 109994. Note: For possible variations in engine acceleration times in icing conditions see the GE90-100 Installation Manual GEK 109995.

备注 12
NOTE 12.

对于安装件号为320-892-101-0或320-892-201-0的构型配置盒的所有GE90发动机, 必须执行GE服务通告77-008进行PT25防冰罩延伸的改装, 同时执行GE服务通告73-040, 安装FADEC软件1853M99P06 (版本 9.1.9.7)及以后版本

All GE90 engines with configuration type box part numbers 320-892-101-0 or 320-892-201-0 must incorporate the PT25 extended wedge ice shield per GE90 Service Bulletin 77-008 and must incorporate FADEC software P/N 1853M99P06 (version 9.1.9.7) or later, per GE90 Service Bulletin 73-040.

对于安装件号为320-837-701-0, 320-839-501-0, 320-892-101-0, 320-892-201-0, 320-846-701-0, 320-892-601-0和320-915-201-0的构型配置盒的所有GE90发动机, 在结冰条件下飞行时, 允许最小的N2的转速为6066转/分钟

All GE90 engines with configuration type box part numbers 320-837-701-0, 320-839-501-0, 320-892-101-0, 320-892-201-0, 320-846-701-0, 320-892-601-0, and 320-915-201-0, have a minimum permissible N2 RPM of 6066 RPM for in-flight during icing conditions.

对于安装件号为320-921-501-0的构型配置盒的所有GE90发动机, 在结冰条件下飞行时, 允许最小的N2的转速为6310转/分钟

All GE90 engines with configuration type box part numbers 320-921-501-0 have a minimum permissible N2 RPM of 6310 RPM for in-flight during icing conditions.

对于安装件号为390-850-001-0的所有GE90发动机在结冰条件下飞行时, 允许最小的N1的转速为730转/分钟
All GE90 engines with configuration type box part numbers 390-850-001-0 have a minimum permissible N1 RPM of 730 RPM for in-flight during icing conditions.

备注 13
NOTE 13.

在针对§ 33.68的验证中, 感应系统的结冰验证对应安装GE90-110B1/-113B/-115B的 B777-200LR/300ER 飞机。对于这些发动机型号安装在其它的飞机机型上, 需要单独地对§ 33.68符合性进行评估

Demonstration of compliance to §33.68, Induction System Icing is installation specific to the B777-200LR/300ER airplane for the GE90-110B1/-113B/-115B model engines. Installation of these model engines on different airplane models or type will require a separate evaluation and finding of compliance to §33.68.

备注 14
NOTE 14.

仅在负过载使用时, 滑油压力允许低于10 psid (69.0 kPa 压差), 最长15秒

During "negative-G" operation only, it is permissible to operate below minimum oil pressure of 10 psid (69.0 kPa diff) for a maximum of 15 seconds.

参看GE90 操作手册GEK 100703, 对 GE90-76B/-77B/-85B/-90B

See GE90 Operating Instructions, GEK 100703, for GE90-76B/-77B/-85B/-90B

参看GE90-100 操作手册GEK109993 对 GE90-110B1/-113B/-115B.

See GE90-100 Operating Instructions GEK 109994, for GE90-110B1/-113B/-115B.

备注 15
NOTE 15.

这些型号具有以下总体特性

THESE MODELS INCORPORATE THE FOLLOWING GENERAL CHARACTERISTICS

发动机型号 ENGINE MODEL	特性 CHARACTERISTICS
GE90-76B	基本型 Basic Model
GE90-77B	除了改进 HPT/LPT 气流通道和提高额定起飞功率其他同 GE90-76B，相应的推力堵头 改变 Same as GE90-76B except improved HPT/LPT flowpath and higher takeoff thrust rating. Corresponding Rating Plug changes.
GE90-85B	提高了额定起飞功率其他同 GE90-76B，相应的推力堵头 改变 Same as GE90-76B except higher takeoff thrust rating. Corresponding Rating Plug changes.
GE90-90B	提高了额定起飞功率其他同 GE90-77B，相应的推力堵头 改变 Same as GE90-77B except higher takeoff thrust rating. Corresponding Rating Plug changes.
GE90-110B1	与基本型的差异在于FAN, LPC, HPC, HPT和LPT，提高了转速和温度极限，对应的额定起飞推力更高，相应的推力堵头改变参看注解22 Differs primarily from basic model in FAN, LPC, HPC, HPT and LPT hardware, higher takeoff thrust rating with increased speed, and temperature limitations. Corresponding rating plug changes. See Note 22.
GE90-113B	除了更高的推力等级，其它同GE90-110B1，相应的推力堵头改变 Same as GE90-110B1 except higher thrust ratings. Corresponding Rating Plug changes
GE90-115B	除了更高的推力等级，其它同GE90-113B，相应的推力堵头改变 Same as GE90-113B except higher thrust ratings. Corresponding Rating Plug changes.

备注 16
NOTE 16.

在应急情况下，起飞时限可由正常的5分钟延长到10分钟。

The normal 5 minute takeoff time limit may be extended to 10 minutes for engine out contingency.

备注 17
NOTE 17.

限时放行标准

TIME LIMITED DISPATCH CRITERIA

对发动机控制系统的放行和维护标准:

对GE90-76B/-77B/-85B/-90B，参看GE 文件GEK 103084 和GE90发动机手册的适航限制部分GEK 100700，其
对不同构型所具备的最大使用间隔有定义

Criteria pertaining to the dispatch and maintenance requirements for the engine control systems are specified in: For the GE90-76B/-77B/-85B/-90B General Electric Document GEK 103084 and the airworthiness limitation section of the GE90 Engine Manual, GEK 100700, which defines the various configurations and maximum operating intervals.

对GE90-110B1/-113B/-115B，在GE90-100的发动机手册GEK 109993的适航限制部分有明确定义

For the GE90-110B1/-113B/-115B the requirements are defined in the Airworthiness Limitations section of the GE90-100 Engine Manual GEK 109993

备注 18
NOTE 18.

从风扇叶片的根部区到内环气流通道，叶片的复合材料是不能修理的。对于风扇叶片的金属部分、防腐涂层
或者耐磨垫有缺陷导致叶片不可用时，需要询问GE来进行处置

Repair of fan blade composite material in the root section of the fan blade up to the inner annulus flow path line is not permitted. Fan Blades with non-serviceable conditions existing on metallic components, erosion coating, or wear pads of the fan blade should be referred to General Electric for disposition.

- 备注 19
NOTE 19. 发动机满足34部要求的烟气排放标准。在1999年12月31号后生产的以下发动机型号满足14CFR Part 34(1990年09月10日生效), 包括修订本34-1 到 34-3: GE90-76B, GE90-77B, GE90-85B, GE90-90B, GE90-110B1, GE90-113B, GE90-115B
The engines meet the smoke and gaseous emission requirements of Part 34. The following engine models manufactured after December 31, 1999 comply with 14CFR Part 34, effective September 10, 1990, including amendments 34-1 through 34-3: GE90-76B, GE90-77B, GE90-85B, GE90-90B, GE90-110B1, GE90-113B, GE90-115B.
- 备注 20
NOTE 20. 预留“Reserved”
- 备注 21
NOTE 21. 最初 FADEC 件号是硬件和软件共同的件号。现在硬件和软件都有单独的件号, 发动机安装的 FADEC 的可以通过组合号或者硬件和软件号来识别
The FADEC unit P/N originally defined both hardware and software. The hardware and software are now defined by separate P/N, the engine should be equipped with a FADEC defined either by the combined P/N or by the hardware and the software P/Ns.
- 备注 22
NOTE 22. 对GE90-110B1/-113B/-115B 发动机, 在2002年8月26日在华盛顿或得了§21.19(a) 的豁免, 该豁免许可GE航空在满足如下条件和限制时, 可以通过修订型号证书来No.E00049EN来增加新的发动机型号而不用重新申请新的型号证书:
An exemption to §21.19(a) was granted and issued in Washington, D.C. on August 26, 2002, for the GE90-110B1/-113B/-115B engine models. This exemption allowed GEAE to amend Type Certificate No. E00049EN to add these models rather than apply for a new type certificate for those engines, subject to the following conditions:
1. 如同新的型号证书, GE航空必须遵循§21.17
GEAE must comply with §21.17 as if it was a new type certificate.
 2. GE航空必须遵循§33.76, 进行大量的鸟击测试
GEAE must conduct a large flocking bird test as part of compliance with §33.76, Bird Ingestion.
 3. GE航空必须遵循§33.90(初始维护检查), 进行发动机测试
GEAE must include an engine test to demonstrate compliance to § 33.90, Initial Maintenance Inspection.
 4. 安装GE90-110B1/-113B/- 115B发动机飞机必须满足所有适用的针对新型号发动机认证的适航标准, 包括适用飞机的特殊条件
An applicant installing the GE90-110B1/-113B/-115B engine models into an aircraft must comply with all of the applicable airworthiness standards for a new type certificated engine, including applicable aircraft special conditions.
- NOTE 23 在§ 33.73(b)的验证中, 功率或推力响应针对的是安装GE90-110B1/-113B/-115B发动机的B777-200LR/300ER 飞机。若将这些发动机安装在其它飞机机型上, 将要求按照§ 33.73(b)进行单独的评估和验证。
Demonstration of compliance to §33.73(b), Power or Thrust Response to installation specific to the B777-200LR/300ER airplane for the GE90-110B1/-113B/-115B model engines. Installation of these model engines on different airplane models or type will require a separate evaluation and finding of compliance to §33.73(b).