

型号合格证数据单

编号: TC0017A

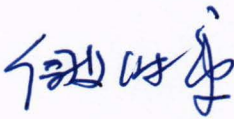
版次: 5

型别: Z11 (AC301)

Z11MB1 (AC301A)

Z11M-100 (AC311)

AC311A

批准人: 

日期: 2016 年 08 月 15 日

本数据单型号合格证/型号设计批准书（编号：TC0017A）的组成部分，它规定了符合中国民用航空规章有关适航要求所颁发此型号合格证/设计批准书的产品的状态和限制。

型号合格证或设计批准书持有人：  
中国直升机设计研究所  
中国江西省景德镇市航空路 6-8 号  
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|     |    |    |    |    |    |    |    |   |   |    |    |
|-----|----|----|----|----|----|----|----|---|---|----|----|
| 版次  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5 | 5 | 5  | 5  |
| 有效页 | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8 | 9 | 10 | 11 |
| 版次  | 5  | 5  | 5  | 5  | 5  | 5  | 5  |   |   |    |    |
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## 一、产品型别和批准日期

| 型别               | 类别  | 批准日期             |
|------------------|-----|------------------|
| Z11 (AC301)      | 正常类 | 2001 年 4 月 12 日  |
| Z11MB1 (AC301A)  | 正常类 | 2003 年 12 月 23 日 |
| Z11M-100 (AC311) | 正常类 | 2012 年 5 月 8 日   |
| AC311A           | 正常类 | 2016 年 8 月 15 日  |

## 二、合格审定基础和生产依据

## 1. 型号合格审定基础

I、Z11 (AC301) 型直升机, 1993 年 3 月 3 日申请, 2001 年 4 月 12 日批准

Z11MB1 (AC301A) 型直升机, 2002 年 4 月 10 日申请, 2003 年 12 月 23 日批准

(1) CCAR-27 (1988.4.21 生效), 以下例外:

27.361 采用了 FAR 27.361 (Amdt 27-23); 27.395 和 27.501 采用了 FAR 27.395 和 27.501 (Amdt 27-26)。

27.2 (a) 采用 CCAR-27-R1 (2002.8.1 生效)

采用了修正案为 27-23 的 FAR 27.954 和 27.1027、修正案为 27-26 的 FAR 27.351 和 27.427, 和修正案为 27-27 的 27.427。

(2) 噪声审定标准为 FAR-36 (Amdt 36-21)。

(3) 等效安全: §27.775、§27.1322 (b)、§27.1505 (c)。

II、Z11M-100 (AC311) 型直升机, 2009 年 9 月 27 日申请, 2012 年 5 月 8 日批准

CCAR-27 (1988.4.21 生效), 以下除外:

CCAR-27-R1 (2002.8.1 生效) 修订的以下条款: CCAR27.2 (a), 27.65 (b), 27.175, 27.307 (a), 27.351, 27.361, 27.427, 27.501, 27.602, 27.610 (d), 27.613 (b) (e), 27.629, 27.663 (a), 27.775, 27.783 (b), 27.805, 27.807 (a) (b), 27.853 (a) (c), 27.861, 27.901, 27.903 (a) (c), 27.955 (a), 27.1027, 27.1091 (d), 27.1141 (c), 27.1143, 27.1163 (b), 27.1187, 27.1193 (f), 27.1303, 27.1305, 27.1337 (e)。

(1) 噪声审定标准为 CCAR-36-R1 (2007.4.15 生效)。

(2) 专用条件: 高能电磁辐射 (HIRF)。

(3) 等效安全: CCAR-27.1545、27.1549。

### III、AC311A 直升机, 2013 年 3 月 29 日申请, 2016 年 08 月 15 日批准

(1) CCAR-27 (1988.4.21 生效), 以下除外:

CCAR-27-R1 (2002.8.1 生效) 修订的以下条款: CCAR27.2 (a), 27.65 (b), 27.175, 27.307 (a), 27.351, 27.361, 27.427, 27.501, 27.602, 27.610 (d), 27.613 (b) (e), 27.629, 27.663 (a), 27.674, 27.775, 27.783 (b), 27.805, 27.807 (a) (b), 27.853 (a) (c), 27.861, 27.901, 27.903 (a) (c), 27.955 (a), 27.1027, 27.1091 (d), 27.1141 (c), 27.1143, 27.1151, 27.1163 (b), 27.1185 (d), 27.1187, 27.1193 (f), 27.1303, 27.1305, 27.1337 (e), 27.1457, 27.1459。

(2) 噪声审定标准为 CCAR-36-R1 (2007.4.15 生效)。

(3) 专用条件

高强辐射场 (HIRF)                      编号: SC-27-01 (颁发日期: 2015-11-13)。

(4) 等效安全

空速指示数字化方式的等效安全                      见问题纪要 EE-002

CCAR-27.1545

## 2. 生产依据

(1) Z11 (AC301)、Z11MB1 (AC301A)、Z11M-100 (AC311)、AC311A 型直升机的生产许可证编号: PC019A。

(2) AC311A 型直升机仅依据型号合格证生产

## 三、技术特征和使用限制

### I、Z11 (AC301) 型直升机, 2001 年 4 月 12 日批准

(1) 发动机                      1 台 WZ-8D 型涡轮轴发动机 (型号合格证编号: TC0016E)

-燃油                      3 号喷气燃料 (GB6537-2006)

-发动机滑油                      MOBIL JET OIL II (MIL-L-23699)

(2) 发动机工作限制

-燃气发生器转速 Ng:

最大起飞（5 分钟） 100.8%

最大连续 98%

最大瞬时（小于 20 秒钟） 105.5%

-燃气温度  $T_4$ :

发动机起动时最大值 795°C

发动机起动时最大瞬时值（小于 10s） 865°C

起飞时的最大值 845°C

最大连续状态时 795°C

-关于包括燃油添加剂、转速和温度的其它限制见飞行手册。

(3) 主减速器功率限制

限制功率: 440 千瓦

(4) 旋翼限制

最小（有动力） 375 转/分钟

最大（有动力） 394 转/分钟

最小（无动力） 320 转/分钟

最大（无动力） 430 转/分钟

低转速音响警告 360 转/分钟

高转速音响警告 400 转/分钟

(5) 空速限制（校正空速）

-最大  $V_{NE}$ （有动力）=267.9 千米/小时，在零压力高度

-最大  $V_{NE}$ （无动力）=216.4 千米/小时，在零压力高度

-在较高高度时，高度每升高 1000 米,速度减小 18 千米/小时。

-寒冷气候时，外界气温低于-30°C时，有动力  $V_{NE}$  减小 19 千米/小时。

-其它速度限制见飞行手册（编号：Z11-RFM-1）的第 2 章。

(6) 重心限制

-纵向重心限制

重心前限: 3.17 米(适用于 1265 千克至 2000 千克), 3.20 米(2200 千克), 2000 千克至 2200 千克之间线性变化。

重心后限: 在 2200 千克时, 3.43 米; 在 1265 千克时, 3.496 米;

2200 千克至 1265 千克之间线性变化。

- 横向重心限制
  - 重心左限： 0.18 米
  - 重心右限： 0.14 米
- (7) 空机重心范围 无
- (8) 测量基准 纵向基准位于桨毂中心前 3.4 米  
横向基准为直升机机身纵向对称面
- (9) 水平措施 按水平测量图（Z11-0012-0）进行纵向和横向测量
- (10) 最大重量 2200 千克
- (11) 最少机组成员 1 名飞行员
- (12) 最大乘员数 6 名（含飞行员）
- (13) 最大行李重量
  - 左行李舱： 120 千克
  - 右行李舱： 100 千克
  - 后行李舱： 80 千克
- (14) 燃油容量
  - 最大燃油容量： 535 升
  - 不可用燃油容量： 3 升
- (15) 滑油容量
  - 主减系统滑油容量： 6.5 升（MOBIL JET OIL II）
  - 尾减系统滑油容量： 0.33 升（MOBIL JET OIL II）
  - 发动机系统滑油容量： 6.2 升
- (16) 最大使用高度 5000 米（压力高度）
- (17) 操纵面运动范围
  - 总距：  $-0.34^{\circ} \sim +13.74^{\circ}$
  - 纵向：  $-10.92^{\circ} \sim +14.53^{\circ}$
  - 横向：  $-5.70^{\circ} \sim +7.50^{\circ}$
  - 航向：  $-6.60^{\circ} \sim +21.10^{\circ}$

（注：垂向以向上为正方向，纵向以向前为正方向，横、航向以向右为正方向）

向)

(18) 制造人序列号 Z11-036、Z11-046、Z11-047 及其之后的序列号

(19) 设备 适用的适航规章 (见审定基础) 中规定的基本设备必须安装在直升机上

## II、Z11MB1 (AC301A) 型直升机, 2003 年 12 月 23 日批准

## (1) 发动机

-型别: ARRIEL 2B1A (型号认可证编号: VTC0190E)

-装机数量: 1 台

-制造人: TURBOMECA

## (2) 燃油

-国内牌号

燃油: 3 号喷气燃料 (GB6537-2006)

-国外牌号

## 技术条件符合最新更改单最新标准

| 燃油型号     | 北大西洋<br>公约组织<br>符号 | 技术条件提供更改单或现行标记 |                       |                  | 防冰添加剂 |
|----------|--------------------|----------------|-----------------------|------------------|-------|
|          |                    | 法国             | 美国                    | 英国               |       |
| 50 航空煤油  | F34                | AIR3405<br>F34 | MIL-T-83 133<br>JP8   | D.Eng.RD<br>2453 | 有     |
| 50 航空煤油  | F35                | AIR3405<br>F35 | ASTM-D-1655<br>Jet A1 | D.Eng.RD<br>2494 | 无     |
| 航空煤油     | —                  | —              | ASTM-D-1655<br>Jet A  | —                | 无     |
| 高闪点油 JP5 | F44                | AIR3404<br>F44 | MIL-T-5624<br>JP5     | D.Eng.RD<br>2452 | 有     |
| 航空煤油     | —                  | —              | GOST<br>10227         | —                | 无     |

## (3) 发动机滑油

| 滑油类型                                                                     | 北约编号  | 技术规格     |               | 推荐的滑油牌号                                                                                                                                         |
|--------------------------------------------------------------------------|-------|----------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                          |       | 法国       | 美国            |                                                                                                                                                 |
| 合成油在 98.9℃时,<br>运动粘度为<br>$5 \times 10^{-6} \text{m}^2/\text{s}$          | 0-156 |          | MIL-PRF-23699 | Aero Shell Turbine Oil 560<br>· EXXON Turbo Oil 2197<br>· BP TURBO OIL 2197<br>· MOBIL Jet Oil 254<br>· MOBIL Jet Oil 291<br>· MOBIL Jet Oil II |
| 合成油在 98.9℃时,<br>运动粘度为 $3 \sim 5$<br>$\times 10^{-6} \text{m}^2/\text{s}$ | 0-148 |          | MIL-PRF-7808  | · CASTROL 325<br>· EXXON TURBO OIL 2389<br>· BP TURBO OIL 2389                                                                                  |
|                                                                          | 0-150 | AIR 3514 |               | · TURBO NYCOIL 13B                                                                                                                              |

## (4) 发动机工作限制

-燃气发生器转速  $N_g$ :

|                 |         |
|-----------------|---------|
| 最大起飞 (5 分钟)     | 100.94% |
| 最大连续            | 96.94%  |
| 最大瞬时 (小于 20 秒钟) | 102.3%  |

-燃气温度  $T_4$ :

|                      |      |
|----------------------|------|
| 发动机起动时最大值            | 750℃ |
| 发动机起动时最大瞬时值 (小于 10s) | 865℃ |
| 起飞时的最大值              | 915℃ |
| 最大连续状态时              | 849℃ |
| 起动后最大瞬时状态 (小于 20 秒钟) | 941℃ |

-关于包括燃油添加剂、转速和温度的其它限制见飞行手册。

## (5) 主减速器功率限制

限制功率: 440 千瓦

## (6) 旋翼限制

|          |            |
|----------|------------|
| 有动力 (自动) | 386±1 转/分钟 |
|          | 393±1 转/分钟 |

- |         |                                       |
|---------|---------------------------------------|
| 有动力（手动） | 386 <sup>+8</sup> <sub>-11</sub> 转/分钟 |
| 最小（无动力） | 320 转/分钟                              |
| 最大（无动力） | 430 转/分钟                              |
| 低转速音响警告 | 360 转/分钟                              |
| 高转速音响警告 | 400 转/分钟                              |
- (7) 空速限制（校正空速）
- 有动力飞行时  $V_{NE}$
- 零压力高度时， $V_{NE}$  值为 267.9km/h；
- 高度每增高 1000m， $V_{NE}$  速度减小 18km/h；
- 外界气温低于-30℃时， $V_{NE}$  减小 19km/h。
- 无动力飞行时  $V_{NE}$
- 零压力高度时， $V_{NE}$  值为 216.4km/h；
- 高度每增高 1000m， $V_{NE}$  减小 18km/h；
- 外界气温低于-20℃时， $V_{NE}$  减小 37km/h，不得低于 120km/h。
- 其它速度限制见飞行手册（编号：Z11MB1-RFM-1）的第 2 章。
- (8) 重心限制
- 纵向重心限制
- 重心前限：3.17 米（适用于 1295 千克至 2000 千克），3.20 米（2200 千克），2000 千克至 2200 千克之间线性变化。
- 重心后限：在 2200 千克时，3.43 米；在 1295 千克时，3.493 米；2200 千克至 1295 千克之间线性变化。
- 横向重心限制
- 重心左限：0.18 米
- 重心右限：0.14 米
- (9) 空机重心范围      无
- (10) 基准      纵向基准位于桨毂中心前 3.4 米
- 横向基准为直升机机身纵向对称面
- (11) 水平措施      按水平测量图（Z11-0012-0）进行纵向和横向测水平。
- (12) 最大重量      2200 千克

- (13) 最少机组成员 1 名飞行员
- (14) 最大乘员数 6 名（含飞行员）
- (15) 最大行李重量
- 左行李舱： 120 千克
- 右行李舱： 100 千克
- 后行李舱： 80 千克
- (16) 燃油容量
- 最大燃油容量： 535 升
- 不可用燃油容量： 3 升
- (17) 滑油容量
- 主减系统滑油容量： 6.5 升（MOBIL JET OIL II）
- 尾减系统滑油容量： 0.33 升（MOBIL JET OIL II）
- 发动机系统滑油容量： 6.2 升
- (18) 最大使用高度 5500 米（压力高度）
- (19) 操纵面运动范围
- 总距：  $-0.34^{\circ} \sim +13.74^{\circ}$
- 纵向：  $-10.92^{\circ} \sim +14.53^{\circ}$
- 横向：  $-5.70^{\circ} \sim +7.50^{\circ}$
- 航向：  $-6.60^{\circ} \sim +21.10^{\circ}$
- （注：垂向以向上为正方向，纵向以向前为正方向，横、航向以向右为正方向）
- (20) 制造人序列号 Z11MB1-00 及其之后的序列号
- (21) 设备 适用的适航规章（见审定基础）中规定的基本设备必须安装在直升机上

### III、Z11M-100（AC311）型直升机，2012 年 5 月 8 日批准

#### (1) 发动机

型别： LTS101-700D-2 （型号认可证编号：VTC0250E）

装机数量： 一台

制造人： HONEYWELL

#### (2) 发动机限制

|      | 燃气发生器转速 (Ng) | 燃气温度 (T <sub>4</sub> ) |
|------|--------------|------------------------|
| 最大瞬时 | 107.2%       | 944℃                   |
| 最大起飞 | 106.6%       | 923℃                   |
| 最大连续 | 104.8%       | 890℃                   |

## (3) 旋翼转速

-有动力时

地面低桨距时 380±5 转/分钟

稳定飞行时 386<sup>+8</sup><sub>-11</sub> 转/分钟

-无动力时

最大转速 430 转/分钟

最小转速 320 转/分钟

## (4) 主减速器功率限制 440 千瓦

## (5) 燃油和燃油容量

燃油： 3 号喷气燃料 (GB6537-2006)

最大燃油容量： 535 升

不可用燃油容量： 3 升

## (6) 滑油和滑油容量

-滑油：

发动机滑油牌号：“MOBIL JET OIL 254” 或 “BP TURBO OIL 2197”

传动系统滑油牌号：MOBIL JET OIL II

尾减系统滑油牌号：MOBIL JET OIL II

-滑油容量：

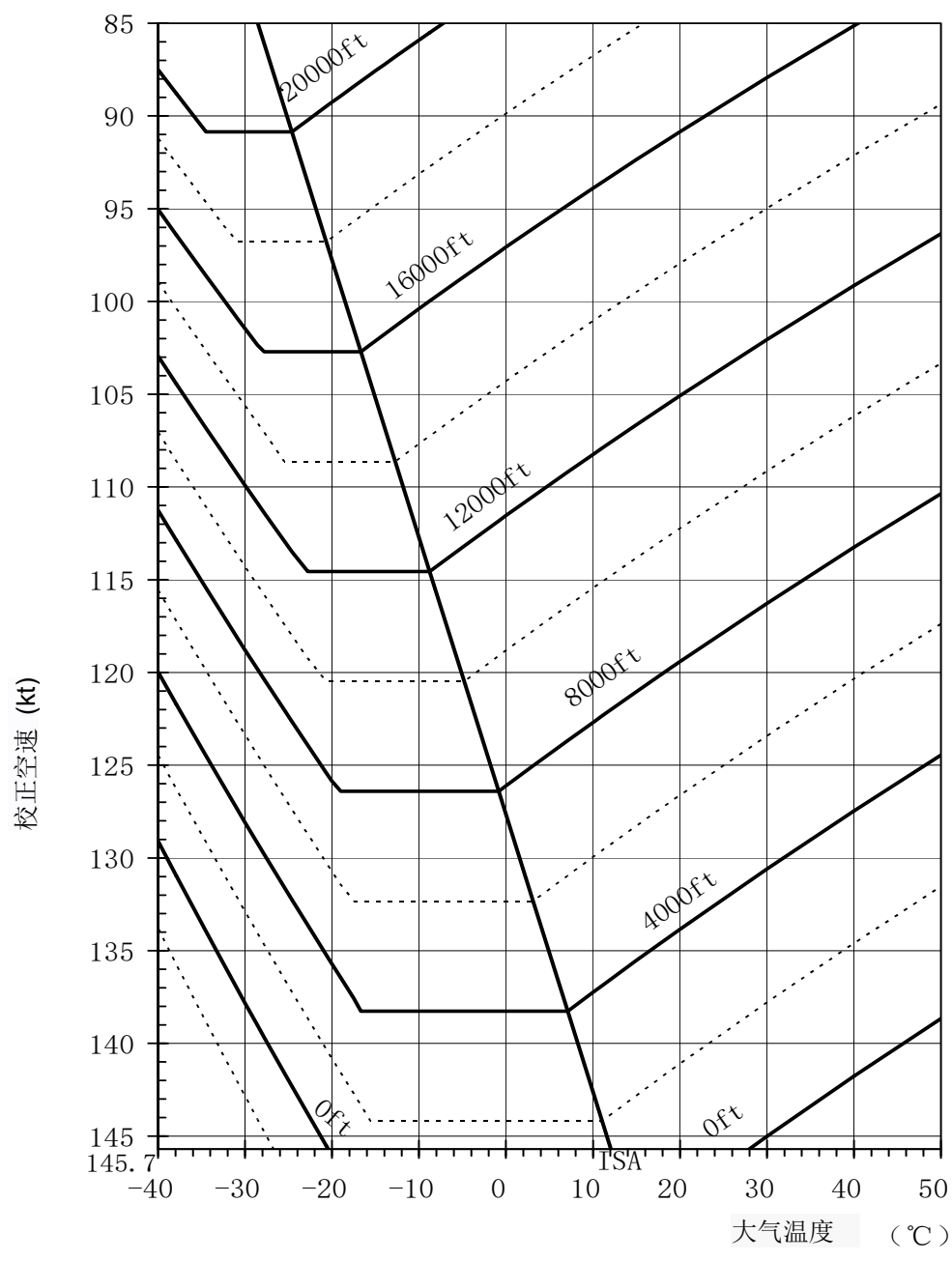
主减系统滑油容量： 6.5 升

尾减系统滑油容量： 0.33 升

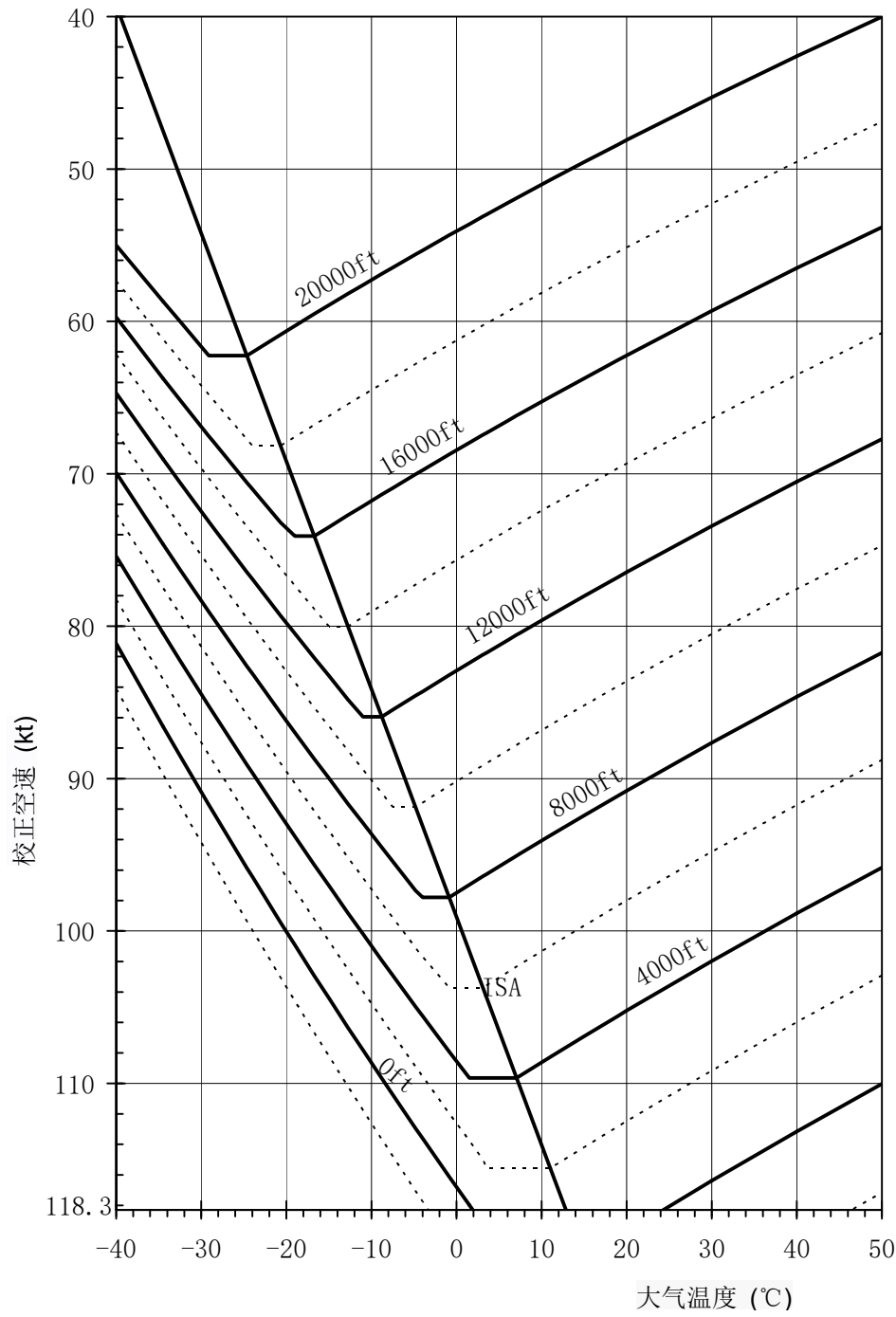
发动机滑油容量： 6.2 升

## (7) 空速限制

-有动力飞行时 V<sub>NE</sub> (校正空速)：零密度高度时，V<sub>NE</sub> 值为 145.7kts (270 千米/小时)；-无动力飞行时 V<sub>NE</sub> (校正空速)：零密度高度时，V<sub>NE</sub> 值为 118.3kts (219 千米/小时)；-其它条件下的 V<sub>NE</sub> 见飞行手册 (编号：JZ-AC311-02-1, JZ-AC311-02-2) 的第 2 章。



有动力飞行  $V_{NE}$



无动力飞行  $V_{NE}$

- (8) 最大使用高度                      19685 英尺 /6000 米（压力高度）
- (9) 重心范围
- 纵向重心限制

重心前限：3.170 米

重心后限：3.349 米

-横向重心限制

重心左限：0.18 米

重心右限：0.14 米

(10) 空机重心范围 无

(11) 最大重量 2200 千克

(12) 测量基准

-纵向基准位于桨毂中心前 3.40 米

-横向基准为直升机机身纵向对称面

(13) 水平测量措施

按照《直 11M-100 型机水平测量与检查技术条件》(TN B082G5001C01) 进行纵向和横向测水平。

(14) 最小飞行机组 一名驾驶员，在右侧座位。

(15) 座位数量 6 座（含正副驾驶员座椅）。

(16) 操纵面运动范围

总距：  $-0.34^{\circ} \sim +13.74^{\circ}$

纵向：  $-10.92^{\circ} \sim +14.53^{\circ}$

横向：  $-5.70^{\circ} \sim +7.50^{\circ}$

航向：  $-6.60^{\circ} \sim +21.10^{\circ}$

（注：垂向以向上为正方向，纵向以向前为正方向，横、航向以向右为正方向）

(17) 制造人序列号

Z11M-100-001、Z11M-100-003、Z11M-100-007 及其之后的序列号。

(18) 设备

适用的适航规章（见审定基础）所要求的基本设备必须安装在航空器上以满足型号合格审定的要求。

#### IV AC311A 型直升机，2016 年 08 月 15 日批准

(1) 发动机

型别： ARRIEL 2B1A （型号认可证编号：VTC0190E）

装机数量： 一台

制造人： TURBOMECA

(2) 发动机限制

## 海平面标准大气条件下

|      | 燃气发生器转速 (Ng) | 燃气温度 (T <sub>45</sub> ) |
|------|--------------|-------------------------|
| 最大瞬时 | 101.94%      | 941℃                    |
| 最大起飞 | 100.94%      | 915℃                    |
| 最大连续 | 96.94%       | 849℃                    |

## (3) 旋翼转速

-有动力时

地面低桨距时 380±5 转/分钟

稳定飞行时 386<sup>+8</sup><sub>-11</sub> 转/分钟

-无动力时

最大转速 430 转/分钟

最小转速 320 转/分钟

## (4) 主减速器功率限制 440 千瓦

## (5) 燃油和燃油容量

燃油： 3 号喷气燃料 (GB6537-2006)

最大燃油容量： 535 升

不可用燃油容量： 3 升

## (6) 滑油和滑油容量

-滑油：

发动机滑油牌号：“MOBIL JET OIL II”、“MOBIL JET OIL 254”或“BP TURBO OIL 2197”

主减速系统滑油牌号：MOBIL JET OIL II

尾减系统滑油牌号：MOBIL JET OIL II

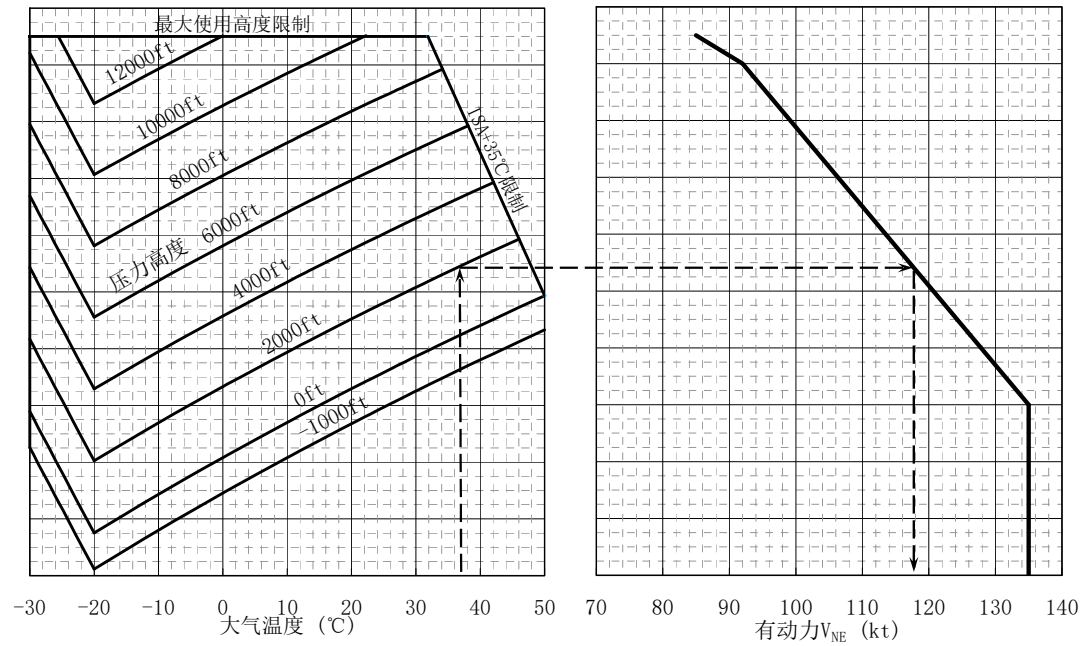
-滑油容量：

主减系统滑油容量： 6.5 升

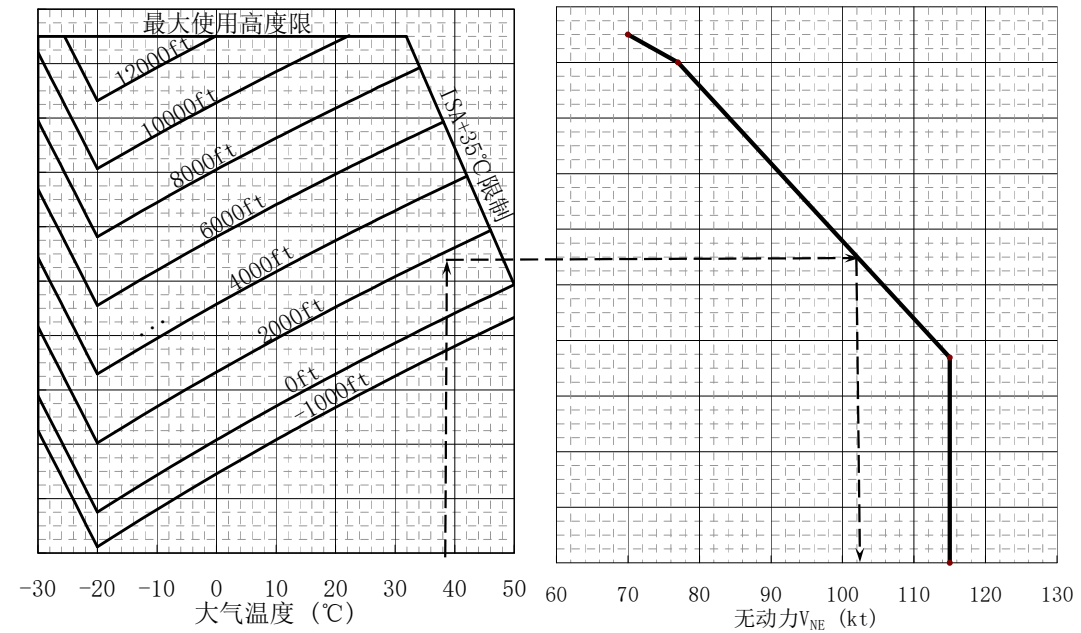
尾减系统滑油容量： 0.33 升

发动机滑油容量： 6.2 升

## (7) 空速限制



有动力飞行  $V_{NE}$  （指示空速）

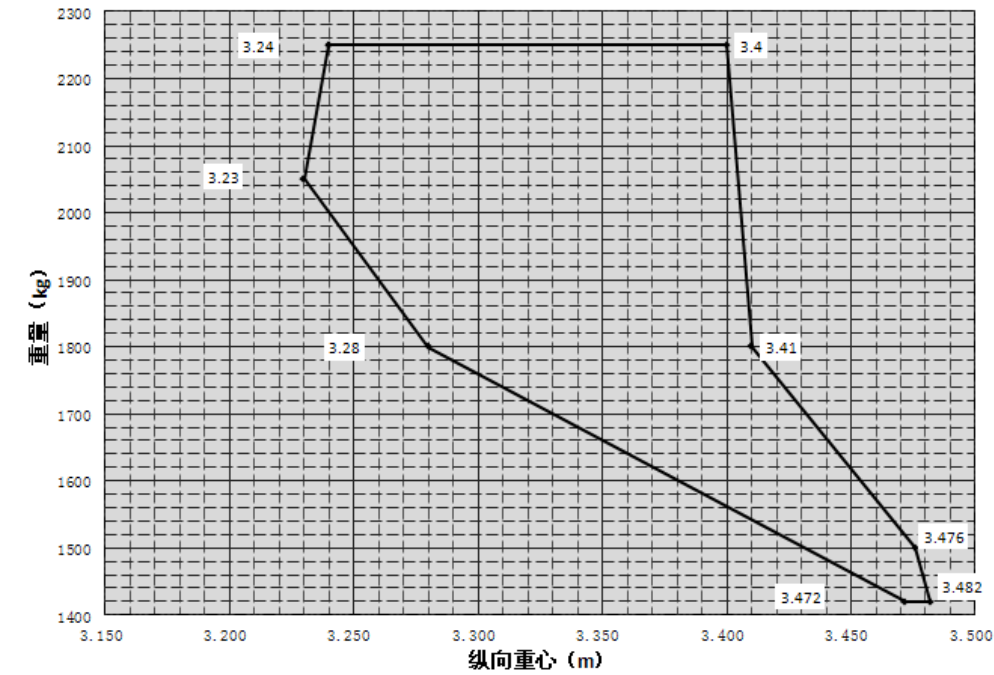


无动力飞行  $V_{NE}$  （指示空速）

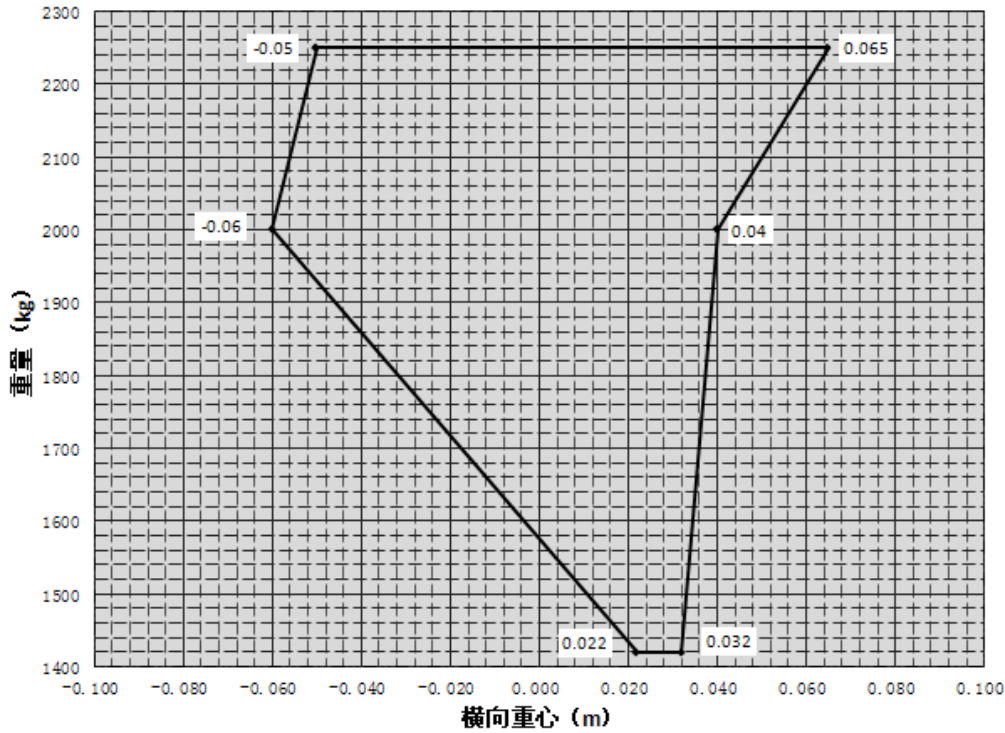
其它速度限制见飞行手册（编号：JZ-AC311A-02）的第2章。

- (8) 最大使用高度 13000 英尺（密度高度）
- (9) 重心范围

-纵向重心限制



-横向重心限制



- (10) 空机重心范围 无
- (11) 最大重量 2250 千克
- (12) 测量基准

-纵向基准位于桨毂中心前 3.40 米

-横向基准为直升机机身纵向对称面

(13) 水平测量措施

按照《AC311A 型机水平测量与检查技术条件》(TN BF082G5002C01A) 进行纵向和横向测水平。

(14) 最小飞行机组 一名驾驶员, 在右侧座位。

(15) 座位数量 6 座 (含正副驾驶员座椅)。

(16) 操纵面运动范围

总距:  $-0.34^{\circ} \sim +13.74^{\circ}$

纵向:  $-10.92^{\circ} \sim +14.53^{\circ}$

横向:  $-5.70^{\circ} \sim +7.50^{\circ}$

航向:  $-6.60^{\circ} \sim +21.10^{\circ}$

(注: 垂向以向上为正方向, 纵向以向前为正方向, 横、航向以向右为正方向)

(17) 制造人序列号 002、1001 及其之后的序列号。

(18) 设备

适用的适航规章 (见审定基础) 所要求的基本设备必须安装在航空器上以满足型号合格审定的要求。

#### 四、批准的技术资料

##### I、飞行手册

《直 11 型直升机飞行手册》(Z11-RFM-1)

《直 11MB1 型直升机飞行手册》(Z11MB1-RFM-1)

《AC311 直升机飞行手册》(适用于全静压系统 A) (JZ-AC311-02-1, A 版或后续版次)

《AC311 直升机飞行手册》(适用于全静压系统 B) (JZ-AC311-02-2, A 版或后续版次)

《AC311A 直升机飞行手册》(JZ-AC311A-02, A 版或后续版次)

##### II、持续适航文件

《直 11 型机适航性限制》(Z11-RMMP-AL-1)

《直 11MB1 型机适航性限制》(Z11MB1-RMMP-AL-1)

《AC311 直升机维护手册-适航性限制》(相应维修手册编号: JZ-AC311-04, A 版或后续版次)

《AC311A 直升机适航性限制》(编号: JZ-AC311A-30-ALS, A 版或后续版次)

注释 1 在初始适航审定时, 对每架直升机必须提供现行的重量平衡报告, 该重量平衡报告中含有该直升机空机重量所装设备的清单。

注释 2 经 CAAC 批准的直升机飞行手册、适用的运营规章或审定基础要求的标牌必须安装在飞机上。

注释 3 Z11 型民用直升机的制造必须符合《直 11 民用直升机图样目录》(Z11M-HZ-1,E 版或后续版次)和《直 11 型机机载设备和零部件合格审定清单》(Z11-HZ-HM16,G 版或后续版次); Z11MB1 型直升机的制造必须符合《直 11MB1 型直升机图样目录》(Z11MB1-HZ-7,B 版或后续版次)和《直 11MB1 型机机载设备和零部件合格审定清单》(Z11MB1-HZ-5,C 版或后续版次); Z11M-100 型机(AC311)的生产制造必须符合《直 11M-100 型机图样目录》(DVLB007G7005C01,F 版或后续版次)和《直 11M-100 型机机载设备和零部件合格审定清单》(DVLB001G7001C01,H 版或后续版次); AC311A 型机的生产制造必须符合《AC311A 直升机构型清单目录》(DVLBF007G7011C01,G 版或后续版次)、《AC311A 直升机机载设备和零部件合格审定清单》(DVLBF000G7007C01,C 版或后续版次)和《AC311A 直升机全机机载软件清单》(DVLBF000G7015C01,F 版或后续版次)。

注释 4 AC311A 的持续适航文件在首架直升机交付或颁发标准适航证之前(以先到为准)必须是完备的。

- 结束 -

# TYPE CERTIFICATE DATA SHEET

No:TC0017A

Revision:5

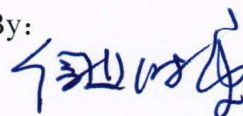
Model: Z11 (AC301)

Z11MB1 (AC301A)

Z11M-100 (AC311)

AC311A

Approved By:



Date: Aug. 15, 2016

This data sheet, which is part of Type Certificate/Type Design Approval (No.TC0017A), prescribes condition and limitation under which the product for which the Type Certificate Type Design Approval was issued meets the airworthiness requirements of the Chinese Civil Aviation Regulation.

Type Certificate or Type Design Approval Holder:

CHINA HELICOPTER RESEARCH AND DEVELOPMENT  
INSTITUTE (CHRD)  
NO.6-8, HANGKONG ROAD, JINGDEZHEN, JIANGXI  
PROVINCE, CHINA  
POST CODE: 333001

|                |    |    |    |    |    |    |    |    |    |    |    |
|----------------|----|----|----|----|----|----|----|----|----|----|----|
| Revision       | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  |
| Effective Page | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 |
| Revision       | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  |    |    |
| Effective Page | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |    |    |

## 1. THE PRODUCT MODEL AND APPROVAL DATE

| Model            | Category | Approval Date |
|------------------|----------|---------------|
| Z11 (AC301)      | Normal   | Apr 12, 2001  |
| Z11MB1 (AC301A)  | Normal   | Dec 23, 2003  |
| Z11M-100 (AC311) | Normal   | May 8, 2012   |
| AC311A           | Normal   | Aug 15, 2016  |

## 2. CERTIFICATION BASIS AND PRODUCTION BASIS

## 2.1 CERTIFICATION BASIS

2.1.1 Z11 (AC301), Application submitted on Mar 3, 1993 and Approved on Apr 12, 2001

Z11MB1 (AC301A), Application submitted on Apr 10, 2002 and Approved on Dec 23, 2003

(1) CCAR-27 (Effective on Apr 21, 1988), except as follows:

27.361 adopts FAR 27.361 at Amdt 27-23, 27.395 and 27.501 adopt FAR 27.395 and 27.501 at Amdt 27-26.

27.2(a) adopts CCAR-27-R1 (Effective on Aug 1, 2002)

FAR 27.954 and 27.1027 at Amdt 27-23, FAR 27.351 and 27.427 at Amdt 27-26, and 27.427 at Amdt 27-27 are adopted.

(2) Certification standard for noise is FAR-36 (Amdt 36-21).

(3) Equivalent Level of Safety : §27.775、§27.1322(b)、§27.1505(c).

2.1.2 Z11M-100(AC311), Application submitted on Sept 27, 2009 and Approved on May 8, 2012

CCAR-27 (Effective on Apr 21, 1988), except as follows:

CCAR27.2(a), 27.65(b), 27.175, 27.307(a), 27.351, 27.361, 27.427, 27.501, 27.602, 27.610(d), 27.613(b)(e), 27.629, 27.663(a), 27.775, 27.783(b), 27.805, 27.807(a)(b), 27.853(a)(c), 27.861, 27.901, 27.903(a)(c), 27.955(a), 27.1027, 27.1091(d), 27.1141(c), 27.1143, 27.1163(b), 27.1187, 27.1193(f), 27.1303, 27.1305, 27.1337(e) as amended by CCAR-27-R1 (Effective on Aug 1, 2002).

(1) Certification standard for noise is CCAR-36-R1 (Effective on Apr 15,

2007).

(2) Specified condition: High-intensity Radiated Fields (HIRF).

(3) Equivalent level of safety: CCAR-27.1545、 27.1549.

2.1.3 AC311A, Application submitted on Mar 29, 2013 and Approved on August 15, 2016

(1) CCAR-27(Effective on Apr 21,1988), except as follows:

CCAR27.2(a), 27.65(b), 27.175, 27.307(a), 27.351, 27.361, 27.427, 27.501, 27.602, 27.610(d), 27.613(b)(e), 27.629, 27.663(a) , 27.674, 27.775, 27.783(b), 27.805, 27.807(a)(b), 27.853(a)(c), 27.861, 27.901, 27.903(a)(c), 27.955(a), 27.1027, 27.1091(d), 27.1141(c), 27.1143, 27.1151, 27.1163(b), 27.1185(d), 27.1187, 27.1193(f), 27.1303, 27.1305, 27.1337(e), 27.1457, 27.1459 as amended by CCAR-27-R1(Effective on Aug 1, 2002).

(2) Certification standard for noise is CCAR-36-R1 (Effective on Apr 15, 2007).

(3) Special Condition

High-intensity Radiated Fields (HIRF) No.: SC-27-01

(Issued on Nov 13, 2015)

(4) ELOS for Digital Airspeed Indication See Issue Paper EE-002

Equivalent level of safety: CCAR-27.1545.

## 2.2 PRODUCTION BASIS

(1) Z11 (AC301), Z11MB1 (AC301A), Z11M-100 (AC311)

Production Certificate: PC019A.

(2) AC311A production under TC only

## 3. TECHNICAL CHARACTERISTICS AND OPERATIONAL LIMITATIONS

3.1 Z11 (AC301), Approved on Apr 12, 2001

(1) Engine One WZ-8D turbine engine (TC No.: TC0016E)

Fuel No.3 jet fuel (GB6537-2006)

Engine Oil MOBIL JET OIL II (MIL-L-23699)

(2) Engine operation limits

## Gas generator speed:

|                                          |        |
|------------------------------------------|--------|
| Maximum takeoff (5 minutes)              | 100.8% |
| Maximum continuous                       | 98%    |
| Maximum transient (less than 20 seconds) | 105.5% |

## Exhaust gas temperature (EGT)

|                                                         |       |
|---------------------------------------------------------|-------|
| Maximum during engine starting                          | 795°C |
| Maximum transient during engine starting(Less than 10s) | 865°C |
| Maximum during Takeoff                                  | 845°C |
| Maximum continuous                                      | 795°C |

For the other limitations of fuel additive, rotation speed and temperature, refer to flight manual.

## (3) MGB power limit

Limited power: 440kw.

## (4) Rotor limits

|                          |         |
|--------------------------|---------|
| Minimum (power on)       | 375 RPM |
| Maximum (power on)       | 394 RPM |
| Minimum (power off)      | 320 RPM |
| Maximum (power off)      | 430 RPM |
| Low speed aural warning  | 360 RPM |
| High speed aural warning | 400 RPM |

## (5) Airspeed limits (calibrated airspeed)

- Maximum  $V_{NE}$  (power on) = 267.9km/h, at zero pressure altitude
- Maximum  $V_{NE}$  (power off) = 216.4km/h, at zero pressure altitude
- At higher altitude,  $V_{NE}$  decreases 18km/h for each 1000m increment of altitude.
- At the cold weather,  $V_{NE}$  (Power on) decreases 19km/h while the OAT is less than -30°C.
- For the other airspeed limitations, refer to the Chapter 2 of the Flight Manual (Z11-RFM-1).

## (6) C.G. limits

- Longitudinal C.G. limit

Forward limit: 3.17m (applicable for 1265kg to 2000kg), 3.20m (2200kg),  
linear variation between 2000kg and 2200kg.

Afterward limit: 3.43m (2200kg); 3.496m (1265kg); linear variation  
between 2200kg and 1265kg.

- Lateral C.G. limit

Left limit: 0.18m

Right limit: 0.14m

(7) Empty weight C.G. range None

(8) Measurement datum Longitudinal: 3.4m in forward of main rotor hub center  
Lateral: vertical plane passing longitudinally through  
helicopter fuselage

(9) Leveling means Level longitudinally and laterally according to the  
leveling measurement drawing (Z11-0012-0)

(10) Maximum weight 2200kg

(11) Minimum crew One pilot

(12) Maximum passengers 6 (including the pilot)

(13) Maximum baggage weight

Left baggage compartment: 120kg

Right baggage compartment: 100kg

Rear baggage compartment: 80kg

(14) Fuel capacity

Maximum fuel capacity: 535 liter

Unusable fuel capacity: 3 liter

(15) Oil capacity

MGB oil capacity: 6.5 liter (MOBIL JET OIL II)

TGB oil capacity: 0.33 liter (MOBIL JET OIL II)

Engine oil capacity: 6.2 liter

(16) Maximum operating altitude 5000m (pressure altitude)

(17) Operation movement range

Collective pitch:  $-0.34^{\circ} \sim +13.74^{\circ}$   
 Longitudinal:  $-10.92^{\circ} \sim +14.53^{\circ}$   
 Lateral:  $-5.70^{\circ} \sim +7.50^{\circ}$   
 Directional:  $-6.60^{\circ} \sim +21.10^{\circ}$

(Note: Up is the positive direction on the vertical directions; right is the positive direction on the lateral directions; forward is the positive direction on the longitudinal directions.)

(18) Manufacturer serial number Z11-036、Z11-046、Z11-047 and its subsequent serial number

(19) Equipment The basic required equipments as prescribed in the applicable airworthiness regulations (refer to Certification Basis) must be installed in the helicopter.

### 3.2 Z11MB1 (AC301A), Approved on Dec.23, 2003

(1) Engine

- Type: ARRIEL 2B1A (VTC No.: VTC0190E)  
 -Numbers: One engine  
 -Manufacturer: TURBOMECA

(2) Fuel

- China Fuel Type  
     Fuel : No.3 jet fuel (GB6537-2006)  
 - Foreign Fuel Type

| Technical condition complies with updated change order and updated standard |      |                                                          |                       |                  |                      |
|-----------------------------------------------------------------------------|------|----------------------------------------------------------|-----------------------|------------------|----------------------|
| Fuel Type                                                                   | NATO | Technical condition provide change order or current sign |                       |                  | Water proof additive |
|                                                                             |      | France                                                   | U.S.A                 | U.K              |                      |
| Aviation kerosene<br>(AVTUR-FS11)JP8                                        | F34  | AIR3405<br>F34                                           | MIL-T-83 133<br>JP8   | D.Eng.RD<br>2453 | yes                  |
| Aviation kerosene<br>(AVTUR)JP1                                             | F35  | AIR3405<br>F35                                           | ASTM-D-1655<br>Jet A1 | D.Eng.RD<br>2494 | none                 |

|                               |     |                |                      |                  |      |
|-------------------------------|-----|----------------|----------------------|------------------|------|
| Aviation kerosene             | —   | —              | ASTM-D-1655<br>Jet A | —                | none |
| High-flash oil<br>(AVCATFS11) | F44 | AIR3404<br>F44 | MIL-T-5624<br>JP5    | D.Eng.RD<br>2452 | yes  |
| Aviation kerosene<br>TS1, RT  | —   | —              | GOST<br>10227        | —                | none |

## (3) Engine oil

| Oil type                                                                                                                      | NATO  | Specification |               | Recommended grade                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------|-------|---------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                               |       | France        | U.S.A         |                                                                                                                                             |
| When resultant oil<br>temperature is at<br>98.9°C, motion<br>viscosity is $5 \times 10^{-6} \text{ m}^2/\text{s}$             | 0-156 |               | MIL-PRF-23699 | ·Aero Shell Turbine Oil 560<br>·EXXON Turbo Oil 2197<br>·BP TURBO OIL 2197<br>·MOBIL Jet Oil 254<br>·MOBIL Jet Oil 291<br>·MOBIL Jet Oil II |
| When resultant oil<br>temperature is at<br>98.9°C, motion<br>viscosity is $3 \sim 5$<br>$\times 10^{-6} \text{ m}^2/\text{s}$ | 0-148 |               | MIL-PRF-7808  | ·CASTROL 325<br>·EXXON TURBO OIL 2389<br>·BP TURBO OIL 2389                                                                                 |
|                                                                                                                               | 0-150 | AIR 3514      |               | ·TURBO NYCOIL 13B                                                                                                                           |

## (4) Engine operation limits

## - Gas generator speed:

|                                          |         |
|------------------------------------------|---------|
| Maximum takeoff (5 minutes)              | 100.94% |
| Maximum continuous                       | 96.94%  |
| Maximum transient (less than 20 seconds) | 102.3%  |

## - Exhaust gas temperature (EGT)

|                                                         |       |
|---------------------------------------------------------|-------|
| Maximum during engine starting                          | 750°C |
| Maximum transient during engine starting                | 865°C |
| Maximum during Takeoff                                  | 915°C |
| Maximum continuous                                      | 849°C |
| Maximum transient after starting (less than 20 seconds) | 941°C |

- For the other limitations of fuel additive, rotation speed and temperature, refer to flight manual.

(5) MGB power limits

Limited power: 440kw.

(6) Rotor limits

|                          |                                      |
|--------------------------|--------------------------------------|
| Power on (automatic)     | 386±1 RPM                            |
|                          | 393±1 RPM                            |
| Power on (manual)        | 386 <sup>+8</sup> <sub>-11</sub> RPM |
| Minimum (power off)      | 320 RPM                              |
| Maximum (power off)      | 430 RPM                              |
| Low speed aural warning  | 360 RPM                              |
| High speed aural warning | 400 RPM                              |

(7) Airspeed limits (calibrated airspeed)

- V<sub>NE</sub> (power on )

V<sub>NE</sub> is 267.9km/h, at zero pressure altitude;

The V<sub>NE</sub> decreases 18km/h for each altitude increment 1000m.

V<sub>NE</sub> decreases 19km/h while the ambient temperature is less than -30°C.

- V<sub>NE</sub> (power off)

V<sub>NE</sub> is 216.4km/h, at zero pressure altitude;

The V<sub>NE</sub> decreases 18km/h for each altitude increment 1000m.

V<sub>NE</sub> decreases 37km/h (must not be less than 120km/h) while the ambient temperature is less than -30°C.

-For the other Airspeed limitations, refer to the Chapter 2 of the Flight Manual (Z11MB1-RFM-1).

(8) C.G. limits

- Longitudinal C.G. limit

Forward limit: 3.17m (applicable for 1295kg to 2000kg), 3.20m (2200kg), linear variation between 2000kg and 2200kg.

Afterward limit: 3.43m (2200kg); 3.496m (1295kg); linear variation

between 2200kg and 1295kg.

- Lateral C.G. limit

Left limit: 0.18m

Right limit: 0.14m

- (9) Empty weight C.G. range      None
- (10) Datum      Longitudinal: 3.4m in forward of main rotor hub center  
Lateral: vertical plane passing longitudinally through helicopter fuselage
- (11) Leveling means      Level longitudinally and laterally according to the leveling measurement drawing (Z11-0012-0)
- (12) Maximum weight      2200kg
- (13) Minimum crew      One pilot
- (14) Maximum passengers      6 passengers (including the pilots)
- (15) Maximum baggage weight  
Left baggage compartment: 120kg  
Right baggage compartment: 100kg  
Rear baggage compartment: 80kg
- (16) Fuel capacity  
Maximum fuel capacity: 535 liter  
Unusable fuel capacity: 3 liter
- (17) Oil capacity  
MGB oil capacity: 6.5 liter (MOBIL JET OIL II)  
TGB oil capacity: 0.33 liter (MOBIL JET OIL II)  
Engine oil capacity: 6.2 liter
- (18) Maximum operating altitude      5500m (pressure altitude)
- (19) Operation movement range  
Collective pitch:  $-0.34^{\circ} \sim +13.74^{\circ}$   
Longitudinal:  $-10.92^{\circ} \sim +14.53^{\circ}$   
Lateral:  $-5.70^{\circ} \sim +7.50^{\circ}$

Directional:  $-6.60^{\circ} \sim +21.10^{\circ}$

(Note: Up is the positive direction on the vertical directions; right is the positive direction on the lateral directions; forward is the positive direction on the longitudinal directions.)

(20) Manufacturer serial number Z11MB1-00 and its subsequent serial number

(21) Equipment The basic required equipments as prescribed in the applicable airworthiness regulations (refer to Certification Basis) must be installed in the helicopter.

### 3.3 Z11M-100(AC311), Approved on May 8, 2012

#### (1) Engine

Type: LTS101-700D-2(VTC No.:VTC0250E)

Numbers: One engine

Manufacturer: HONEYWELL

#### (2) Engine limits

|                         | Gas generator speed (Ng) | Exhaust gas temperature (T <sub>4</sub> ) |
|-------------------------|--------------------------|-------------------------------------------|
| Maximum transient (30s) | 107.2%                   | 944°C                                     |
| Maximum takeoff (5min)  | 106.6%                   | 923°C                                     |
| Maximum continuous      | 104.8%                   | 890°C                                     |

#### (3) Rotor speed

- With power on

Low pitch on ground  $380 \pm 5$  r/min

Steady flight  $386^{+8}_{-11}$  r/min

- With power off

Maximum speed 430 r/min

Minimum speed 320 r/min

(4) MGB power limit 440kw.

#### (5) Fuel and fuel capacity

Fuel : No.3 jet fuel (GB6537-2006)

Maximum fuel capacity: 535L

Unusable fuel capacity: 3L

#### (6) Oil and oil capacity

- Oil:

Engine oil type: “MOBIL JET OIL 254” or “BP TURBO OIL 2197”

Oil type for transmission system: Mobil Jet Oil II

Oil spec for TGB: Mobil Jet Oil II

-Oil capacity:

MGB oil capacity: 6.5L

TGB oil capacity: 0.33 L

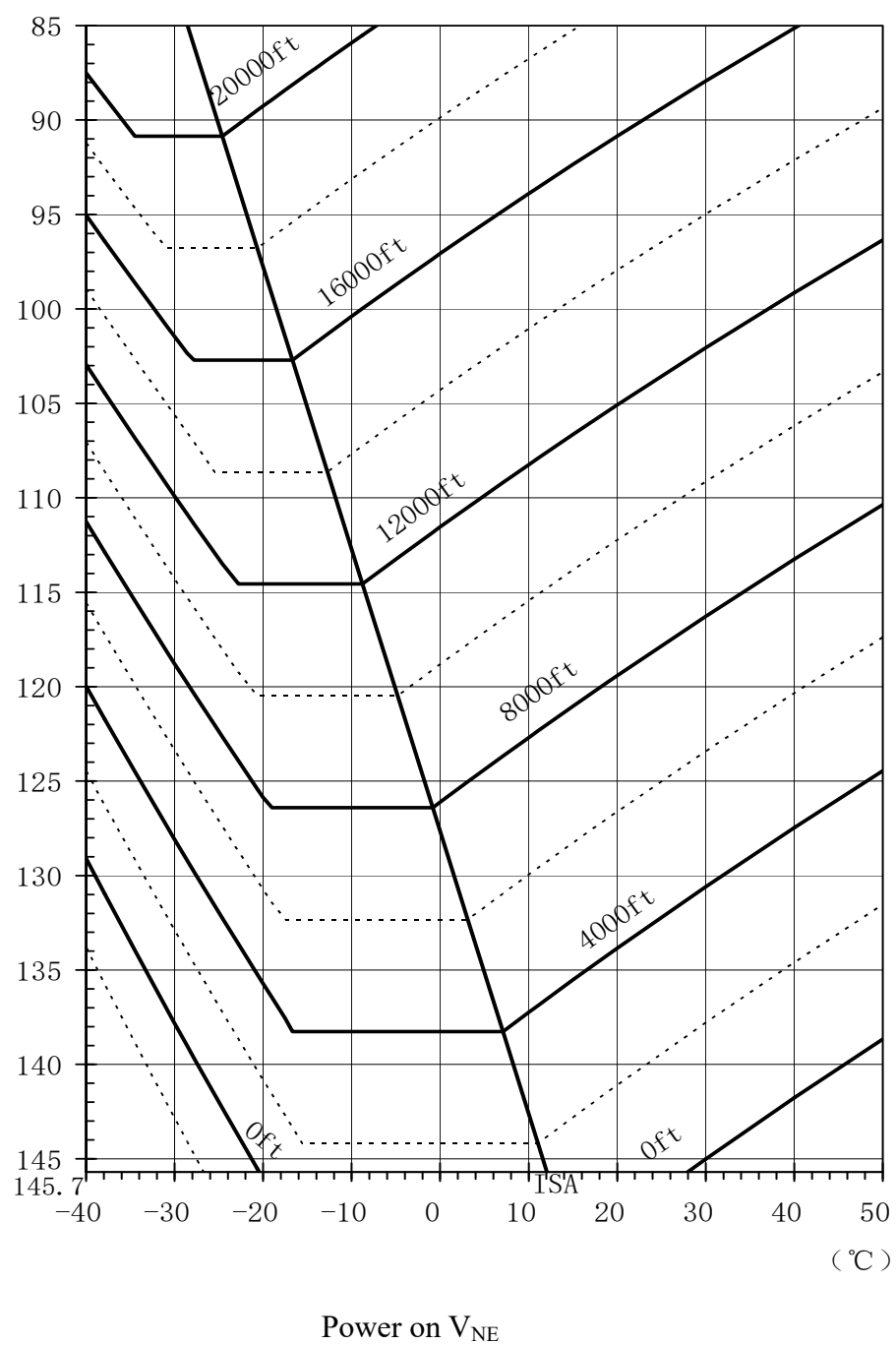
Engine oil capacity: 6.2 L

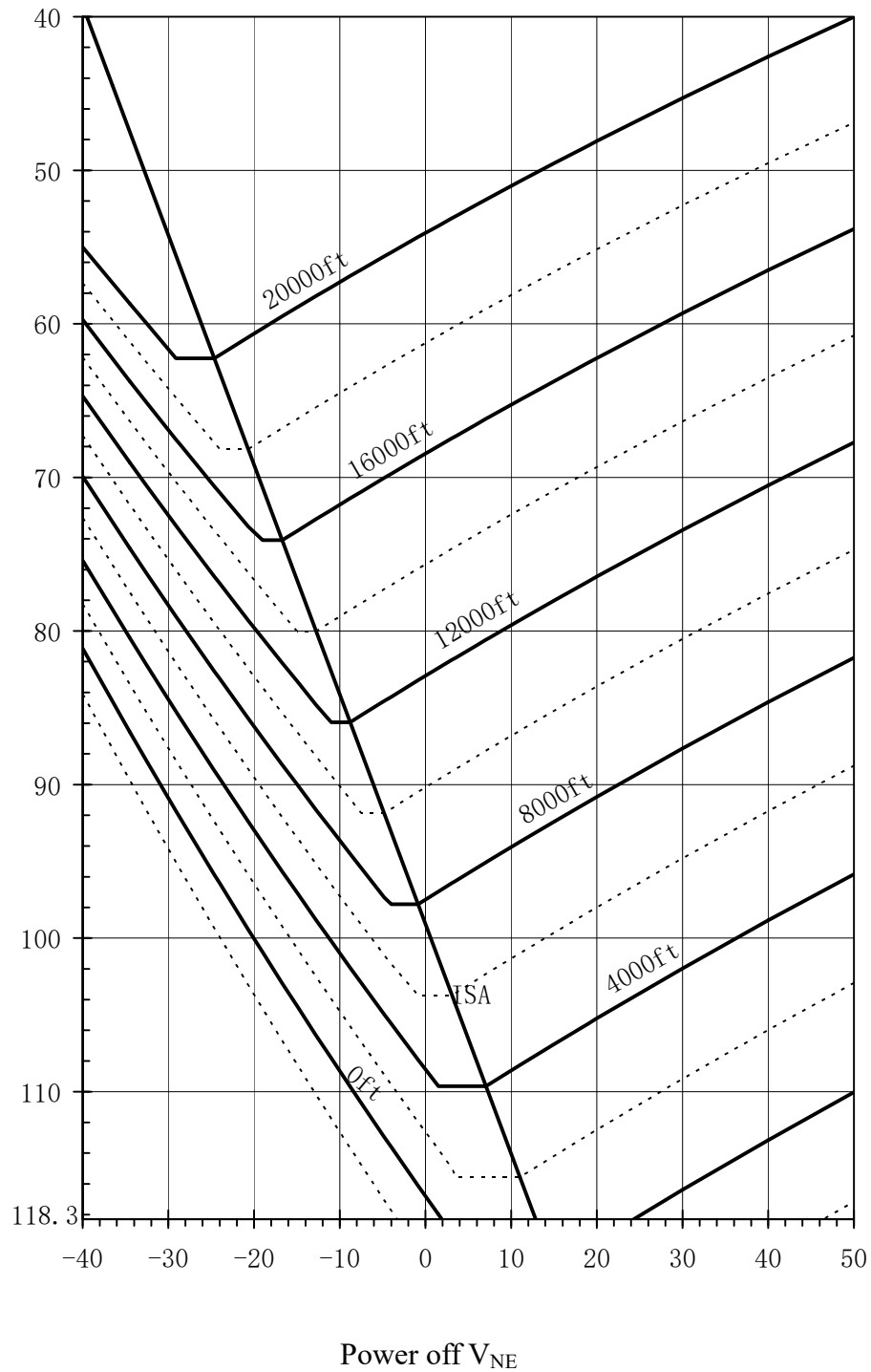
(7) Airspeed limits

- $V_{NE}$  (calibrated airspeed) with power on:  $V_{NE}$  is 145.7kts (270km/h), at zero density altitude;

- $V_{NE}$  (calibrated airspeed) with power off:  $V_{NE}$  is 118.3kts (219km/h), at zero density altitude;

-For the  $V_{NE}$  under other conditions, refer to the Chapter 2 of the Flight Manual (JZ-AC311-02-1, JZ-AC311-02-2).





(8) Maximum operating altitude 19685ft /6000m (pressure altitude)

(9) C.G range

- Longitudinal C.G limit

Forward limit: 3.170m

Afterward limit: 3.349m

- Lateral C.G limit

Left limit: 0.18 m

Right limit: 0.14 m

(10) Empty weight C.G range none

(11) Maximum weight 2200kg

(12) Measurement datum

-Longitudinal: 3.4m in forward of main rotor hub center

-Lateral: vertical plane passing longitudinally through helicopter fuselage

(13) Leveling means

Level longitudinally and laterally according to the leveling measurement and inspection technical condition of Z11M-100 (TN B082G5001C01)

(14) Minimum crew One pilot, on the right seat

(15) Seats number Six (including the seats for pilot and co-pilot)

(16) Operation movement range

Collective pitch:  $-0.34^{\circ} \sim +13.74^{\circ}$

Longitudinal:  $-10.92^{\circ} \sim +14.53^{\circ}$

Lateral:  $-5.70^{\circ} \sim +7.50^{\circ}$

Directional:  $-6.60^{\circ} \sim +21.10^{\circ}$

(Note: Up is the positive direction on the vertical directions; right is the positive direction on the lateral directions; forward is the positive direction on the longitudinal directions.)

(17) Manufacture serial number Z11M-100-001、Z11M-100-003、Z11M-100-007  
and its subsequent serial number.

(18) Equipment

The basic required equipments as prescribed in the applicable airworthiness regulations (refer to Certification Basis) must be installed in the aircraft to meet the requirements of type certification.

### 3.4 AC311A, Approved on August 15, 2016

(1) Engine

Type: ARRIEL 2B1A (VTC No.:VTC0190E)

Numbers: One engine

Manufacturer: TURBOMECA

(2) Engine limits

## At ISA, Sea Level

|                         | Gas generator speed<br>(Ng) | Gas temperature at gas generate<br>turbine outlet (T <sub>4</sub> ) |
|-------------------------|-----------------------------|---------------------------------------------------------------------|
| Maximum transient (20s) | 101.94%                     | 941 °C                                                              |
| Maximum takeoff (5min)  | 100.94%                     | 915 °C                                                              |
| Maximum continuous      | 96.94%                      | 849 °C                                                              |

## (3) Rotor speed

## - With power on

Low pitch on ground 380±5r/min

Steady flight 386<sup>+8</sup><sub>-11</sub> r/min

## - With power off

Maximum speed 430r/min

Minimum speed 320r/min

## (4) MGB power limit 440kw.

## (5) Fuel and fuel capacity

Fuel : No.3 jet fuel (GB6537-2006)

Maximum fuel capacity: 535L

Unusable fuel capacity: 3L

## (6) Oil and oil capacity

## - Oil:

Engine oil type: “Mobil Jet Oil II”, “MOBIL JET OIL 254” or “BP TURBO OIL 2197”

Oil type for MGB: Mobil Jet Oil II

Oil spec for TGB: Mobil Jet Oil II

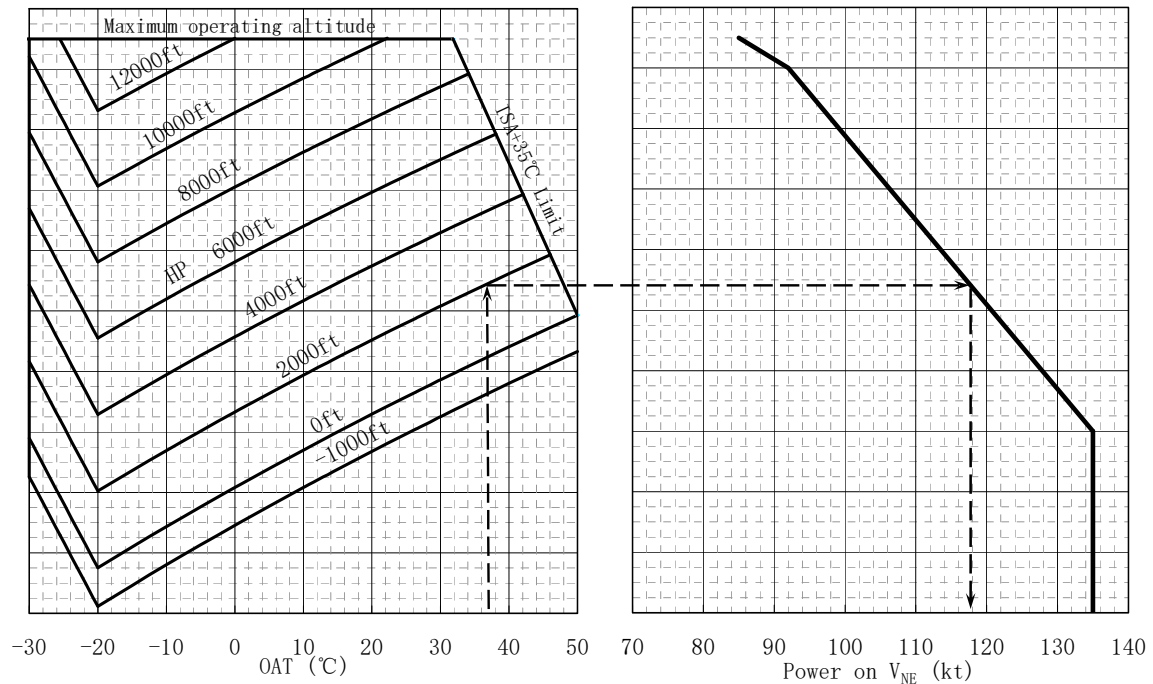
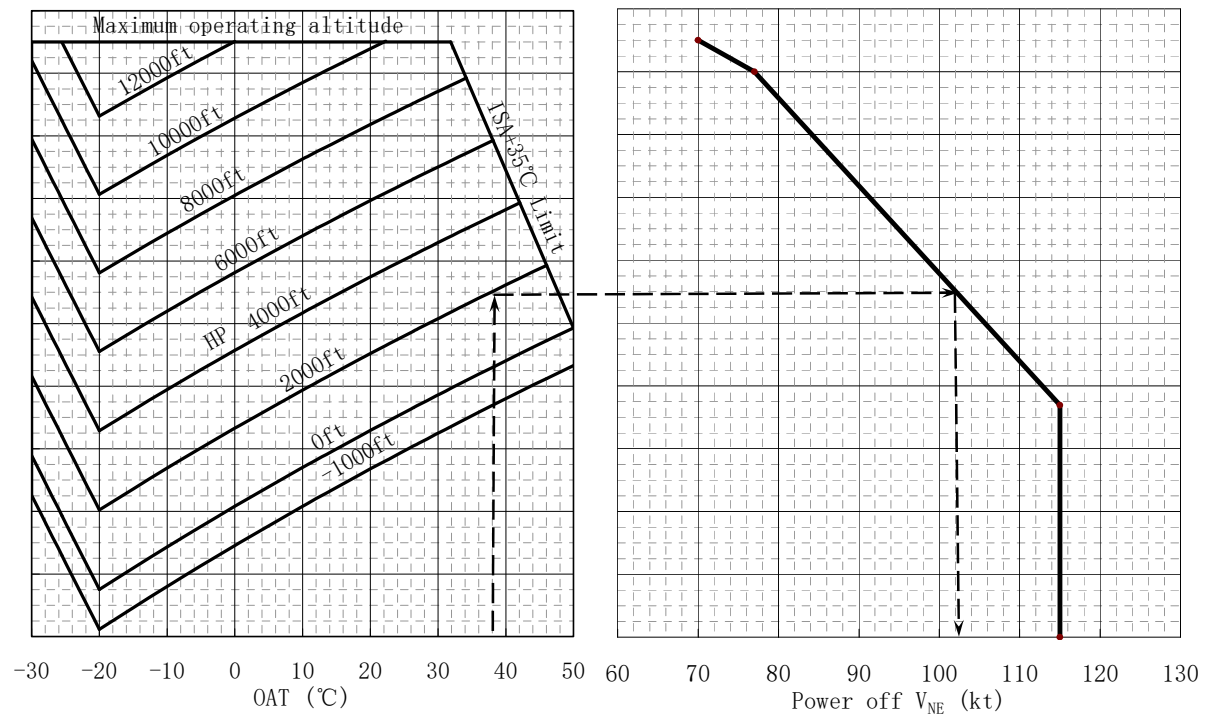
## -Oil capacity:

MGB oil capacity: 6.5L

TGB oil capacity: 0.33 L

Engine oil capacity: 6.2 L

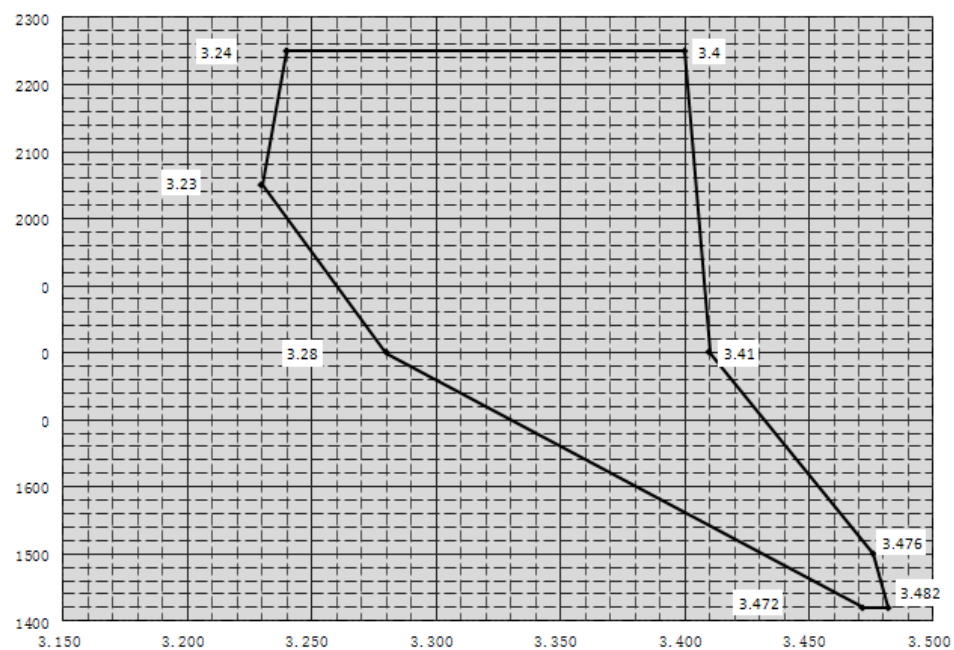
## (7) Airspeed limits

Power on  $V_{NE}$  (Indicated Airspeed)Power off  $V_{NE}$  (Indicated Airspeed)

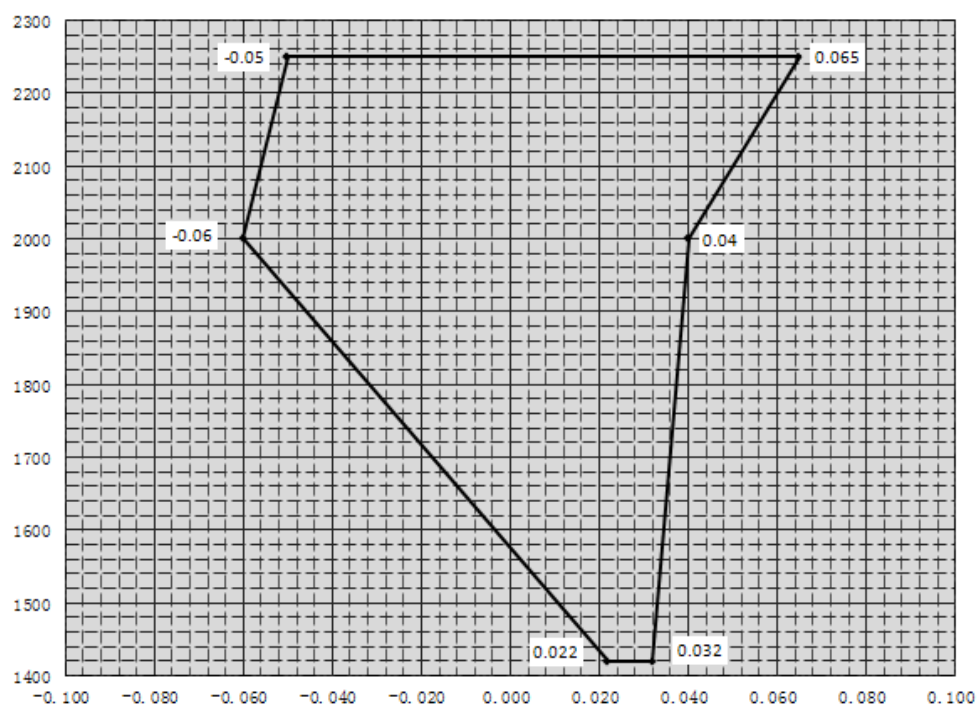
For the other Airspeed limitations, refer to the Chapter 2 of the Flight Manual (JZ-AC311A-02).

- (8) Maximum operating altitude 13000ft (density altitude)
- (9) C.G range

## - Longitudinal C.G limit



## - Lateral C.G limit



- (10) Empty weight C.G range      none
- (11) Maximum weight              2250kg
- (12) Measurement datum

-Longitudinal: 3.4m in forward of main rotor hub center

-Lateral: vertical plane passing longitudinally through helicopter fuselage

(13) Leveling means

Level longitudinally and laterally according to the leveling measurement and inspection technical condition of AC311A (TN BF082G5002C01A)

(14) Minimum crew One pilot, on the right seat

(15) Seats number Six (including the seats for pilot and co-pilot)

(16) Operation movement range

Collective pitch:  $-0.34^{\circ} \sim +13.74^{\circ}$

Longitudinal:  $-10.92^{\circ} \sim +14.53^{\circ}$

Lateral:  $-5.70^{\circ} \sim +7.50^{\circ}$

Directional:  $-6.60^{\circ} \sim +21.10^{\circ}$

(Note: Up is the positive direction on the vertical directions; right is the positive direction on the lateral directions; forward is the positive direction on the longitudinal directions.)

(17) Manufacture serial number 002、1001 and its subsequent serial number.

(18) Equipment

The basic required equipment as prescribed in the applicable airworthiness regulations (refer to Certification Basis) must be installed in the aircraft to meet the requirements of type certification.

#### 4. APPROVED TECHNICAL DOCUMENTS

##### 4.1 Flight Manual

Z11 Flight Manual (Z11-RFM-1)

Z11MB1 Flight Manual (Z11MB1-RFM-1)

AC311 Flight Manual(Pitot-Static System A)(JZ-AC311-02-1, Rev. A or its subsequent revision)

AC311 Flight Manual (Pitot-Static System B) (JZ-AC311-02-2, Rev. A or its subsequent revision)

AC311A Flight Manual (JZ-AC311A-02, Rev. A or its subsequent revision)

## II 、 Continued Airworthiness Documents

Z11 Airworthiness Limitations (Z11-RMMP-AL-1)

Z11MB1 Airworthiness Limitations (Z11MB1-RMMP-AL-1)

AC311 Maintenance Manual-airworthiness limitations (corresponding Maintenance Manual number: JZ-AC311-04, Rev. A or its subsequent revision)

AC311A Airworthiness Limitations (JZ-AC311A-30-ALS, Rev. A or its subsequent revision)

Note 1 A current Weight and Balance Report must be provided for each helicopter at the time of initial airworthiness certification, and the report shall include the list of equipment installed on the empty helicopter.

Note 2 All placards required by either the CAAC approved RFM, the applicable operating rules, or the Certification Basis must be installed in the helicopter.

Note 3 The manufacturing of Z11 civil helicopter must conform to “Z11 Civil Helicopter Drawing list” (Z11M-HZ-1 ,Rev. E or its subsequent revision) and “Z11 airborne equipment and part certification list” (Z11-HZ-HM16, Rev. G or its subsequent revision); the manufacturing of Z11MB1 must conform to “Z11MB1 Helicopter Drawing List”(Z11MB1-HZ-7, Rev. B or its subsequent revision) and “Z11MB1 airborne equipment and part certification list” (Z11MB1-HZ-5, Rev.C or its subsequent revision); the manufacturing of Z11M-100 (AC311) must conform to “Z11M-100 Helicopter Drawing List” (DVLB007G7005C01, Rev. F or its subsequent revision) and “Z11M-100 Airborne Equipment and Part Certification List” (DVLB001G7001C01 Rev.H or its subsequent revision); the manufacturing of AC311A must conform to “AC311A Configuration List” (DVLBF007G7011C01, Rev. G or its subsequent revision), “AC311A Airborne Equipment and Part Certification List” (DVLBF000G7007C01, Rev. C or its subsequent revision) and “AC311A Airborne Software List” (DVLBF000G7015C01, Rev. F or its subsequent revision).

Note 4 The Instruction of Continuous Airworthiness(ICA)of AC311A must be completed before the delivery of first helicopter or the issuing of standard airworthiness

certificate (whichever comes first).

- THE END -