



AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL - BRASIL

**TYPE CERTIFICATE DATA SHEET Nº EM-9609**

Type Certificate Holder:

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**USA**

EM-9609-03

Sheet 01

HONEYWELL

TFE731-20, -20AR,  
-20R, -20BR, -40, -40R,  
-60, -40AR, -50R

04 December 2008

Engines of models described herein conforming with this data sheet, which is part of Type Certificate No. 9609, meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Brazilian Aeronautical Regulations provided they are installed, operated, and maintained as prescribed by the approved manufacturer's manuals and other instructions.

**TYPE** Turbofan engine consisting of one single stage fan, four stage axial low pressure compressor, one stage centrifugal high pressure compressor, one stage high pressure turbine, annular and three stage low pressure turbine.

**I - MODEL** TFE731-20, -20AR, -20BR, -20R, -40

| <b>RATINGS</b>                | TFE731-20     | TFE731-20AR   | TFE731-20R | TFE731-20BR | TFE731-40     |
|-------------------------------|---------------|---------------|------------|-------------|---------------|
| Max. continuous, at sea level |               |               |            |             |               |
| Static Thrust, daN (lbf)      | 1 557 (3 500) | --            | --         | --          | 1 890 (4 250) |
| Takeoff (5 min), at sea level |               |               |            |             |               |
| Static Thrust, daN (lbf)      | 1 557 (3 500) | 1 623 (3 650) | --         | --          | 1 890 (4 250) |

|  |   | TFE731-20  | TFE731-20AR | TFE731-20R | TFE731-20BR   | TFE731-40   |    |
|--|---|--|-------------|------------|---------------|-------------|----|
| <b>SPEED LIMITS</b>                          | Max. Operating Speeds for Low Pressure Rotor (N1), rpm  |  |             |            |               |             |    |
|  | Maximum continuous                                      | 21 000   | --          | --         | --            | --          |    |
|  | Takeoff   | 21 000   | --          | --         | --            | --          |    |
|  | Max. transient (cont. overshoot)                        | 21 105   | --          | --         | --            | --          |    |
|  | Max. Operating Speeds for High Pressure Rotor (N2), rpm |  | --          | --         | --            | --          |    |
|  | Maximum continuous                                      | 31 485   | --          | --         | --            | --          |    |
|  | Takeoff   | 31 485   | --          | --         | --            | --          |    |
|  | Max. transient (cont. overshoot)                        | 31 957   | --          | --         | --            | --          |    |
|  | <b>TEMPERATURE LIMITS</b><br>(See Note 1)               | Maximum Interstage Turbine Temp. (ITT) Limits, °C (°F) |             |            |               |             |    |
|  |   | Maximum continuous                                     | 941 (1 726) | --         | --            | 991 (1 816) | -- |
| Takeoff (5 min)                              |   | 963 (1 766)  | --          | --         | 1 022 (1 871) | --          |    |
| Starting (Ground/Air)                        |   | 941 (1 726)  | --          | --         | 994 (1 822)   | --          |    |
| Maximum Oil Inlet Temperature Range, °C (°F) |   |  |             |            |               |             |    |
| Fan Gearbox Inlet (max.):                    |   |  |             |            |               |             |    |
| Sea level to 30 000 ft                       |   | 127 (260)  | --          | --         | --            | --          |    |
| Above 30 000 ft                              |   | 140 (284)  | --          | --         | --            | --          |    |
| Accessory Gearbox Inlet (max.):              |   |  |             |            |               |             |    |
| Sea level to 30 000 ft                       |   | 149 (300)  | --          | --         | --            | --          |    |
| Above 30 000 ft                              | 157 (315)   | --   | --          | --         | --            |             |    |
| <b>PRESSURE LIMITS</b>                       | Fuel pump inlet pressure, psig                          |  |             |            |               |             |    |
|  | Minimum (above true vapor pressure)                     | 5  | --          | --         | --            | --          |    |
|  | Maximum   | 50   | --          | --         | --            | --          |    |
|  | Oil pressure, psig                                      |  |             |            |               |             |    |
|  | Minimum   | 50   | --          | --         | --            | --          |    |
| Normal operating range                       | 65 to 80  | --   | --          | --         | --            |             |    |

Legend: "--" Same as preceding; "#" Not applicable.

| II - MODEL  |  | TFE731-40R, -60, -40AR, -50R |               |               |               |
|---|--|------------------------------|---------------|---------------|---------------|
| RATINGS   |  | TFE731-40R                   | TFE731-60     | TFE731-40AR   | TFE731-50R    |
| Max. continuous, at sea level                           |  |                              |               |               |               |
| Static Thrust, daN (lbf)                                |  | 1 890 (4 250)                | 2 013 (4 525) | 1 890 (4 250) | 2 224 (5 000) |
| Takeoff (5 min), at sea level                           |  |                              |               |               |               |
| Static Thrust, daN (lbf)                                |  | 1 985 (4 462)                | 2 224 (5 000) | 1 966 (4 420) | 2 224 (5 000) |
| SPEED LIMITS  |  |                              |               |               |               |
| Max. Operating Speeds for Low Pressure Rotor (N1), rpm  |  |                              |               |               |               |
| Maximum continuous                                      |  | 21 000                       | --            | --            | --            |
| Takeoff   |  | 21 000                       | --            | --            | --            |
| Max. transient (cont. overshoot)                        |  | 21 105                       | --            | --            | --            |
| Max. Operating Speeds for High Pressure Rotor (N2), rpm |  |                              |               |               |               |
| Maximum continuous                                      |  | 31 485                       | --            | --            | --            |
| Takeoff   |  | 31 485                       | --            | --            | 31 800        |
| Max. transient (cont. overshoot)                        |  | 31 957                       | --            | --            | 32 277        |
| TEMPERATURE LIMITS<br>(See Note 1)                      |  |                              |               |               |               |
| Maximum Interstage Turbine Temp. (ITT) Limits, °C (°F)  |  |                              |               |               |               |
| Maximum continuous                                      |  | 991 (1 816)                  | --            | --            | --            |
| Takeoff (5 min)   |  | 1 022 (1 871)                | --            | --            | --            |
| Starting (Ground/Air)                                   |  | 994 (1 822)                  | --            | --            | --            |
| Maximum Oil Inlet Temperature Range, °C (°F)            |  |                              |               |               |               |
| Fan Gearbox Inlet (max.):                               |  |                              |               |               |               |
| Sea level to 30 000 ft                                  |  | 127 (260)                    | --            | --            | --            |
| Above 30 000 ft   |  | 140 (284)                    | --            | --            | --            |
| Accessory Gearbox Inlet (max.):                         |  |                              |               |               |               |
| Sea level to 30 000 ft                                  |  | 149 (300)                    | --            | --            | --            |
| Above 30 000 ft   |  | 157 (315)                    | --            | --            | --            |

| PRESSURE LIMITS  | TFE731-40R   | TFE731-60 | TFE731-40AR | TFE731-50R |
|--|--|-----------|-------------|------------|
| Fuel pump inlet pressure, psig<br>Minimum (above true vapor pressure)<br>Maximum | 5<br>50  | --<br>--  | --<br>--    | --<br>--   |
| Oil pressure, psig<br>Minimum<br>Normal operating range                          | 50<br>65 to 80   | --<br>--  | --<br>--    | --<br>--   |
| <b>MAXIMUM ACCESSORY TEMPERATURE</b>   | The engine compartment shall be ventilated as necessary to keep the air temperature surrounding accessory components from exceeding the limits defined in the Installation Manual.   |           |             |            |
| <b>MAXIMUM WEIGHT</b>  | <ul style="list-style-type: none"> <li>- TFE731-20, -20AR, -20BR, -20R: 406 kg (895 lb)</li> <li>- TFE731-40, -40R, -40AR: 401 kg (885 lb)</li> <li>- TFE731-50R: 443 kg (978 lb)</li> <li>- TFE731-60: 449 kg (990 lb)</li> </ul>   |           |             |            |
|  | (Dry, including basic components and sensors required for engine operation and monitoring)   |           |             |            |
| <b>PRINCIPAL DIMENSIONS</b>  | Refer to Installation Drawing in approved Installation Manual for each specific engine model configuration.  |           |             |            |
| <b>C.G. LOCATION</b>   | Refer to Installation Drawing in approved Installation Manual for each specific engine model configuration.  |           |             |            |
| <b>FUEL</b>  | <p>Fuels conforming to Honeywell International Inc. Specifications EMS 53111 (Jet A Type), EMS 53112 (Jet A-1 and JP-8 Types), EMS 53113 (Jet B and JP-4 Types), and EMS 53116 (JP-5 Type). Refer to Engine Installation Manual for approved fuel types (See Note 10).</p> <p>Refer to Engine Installation Manual for approved fuel additives (See Note 10).</p> <p>Aviation Gasoline, ASTM D 910 Grade 80 or 100 LL, not in excess of 500 gallons per 100 hours of operation, may be used in emergencies.</p> |           |             |            |
| <b>IMPORT REQUIREMENTS</b>   | <p>Each engine imported separately and/or spare parts must be accompanied by an export airworthiness approvals issued by FAA (or a third country authority, in case of used engine imported from such country) attesting that the particular engine and/or parts were submitted for airworthiness authority inspection before delivery and are in conformity with the ANAC approved type design. The ANAC type design corresponds to the FAA approved type design, as stated in ANAC Report V.33-0600-03.</p>  |           |             |            |

| CERTIFICATION BASIS  |  | <u>Model</u>       | <u>Application</u>  | <u>Issued TC</u>    |
|--|--|--------------------|---------------------|---------------------|
| RBHA 33 (Brazilian Requirements for Aeronautical Certification), Which Endorses the FAR 33 effective 01 February 1965, As Amended by 33-1 through 33-14, dated 10 September 1990, with elected compliance to Amendment 15 dated 16 August 1993, <b>except for the following: 33-63 and 33-83 per Amendment 17 dated 05 July 1996, for fan rotor assembly, for the TFE731-50R engine model.</b> |  | TFE731-40 / -40R   | 07 Aug. 1996        | 13 Dec. 1996        |
|  |  | TFE731-20 / -20R   | 24 Nov. 1997        | 14 July 1998        |
|  |  | TFE731-60          | 20 Mar. 2000        | 05 Oct. 2000        |
|  |  | TFE731-20AR        | 25 May 2000         | 05 Oct. 2000        |
|  |  | TFE731-20BR        | 25 Mar. 2004        | 16 Nov. 2005        |
|  |  | <b>TFE731-40AR</b> | <b>11 Feb. 2008</b> | <b>04 Dec. 2008</b> |
|  |  | <b>TFE731-50R</b>  | <b>11 Feb. 2008</b> | <b>04 Dec. 2008</b> |

**NOTES:****NOTE 1**

The engine ratings for all models are based on dry sea level static ICAO standard atmospheric conditions. Dry inlet air. No accessory loads or air bleed. No anti-icing airflow. Interstage Turbine Gas Temperature (ITT) and rotor speed limits not exceeded.

Fan exhaust and turbine exhaust nozzles conforming to Honeywell Drawing SKP23202 for the TFE731-60; SKP23196 for the TFE731-20, -20AR, -20BR, -20R; SKP23199 for the TFE731-40 and -40R, **-40AR and SKP24973 for the TFE731-50R.**

Bellmouth inlet conforming to Honeywell Drawing 5837113 for the TFE731-60; SKP17308 for the TFE731-20, -20AR, -20BR, -20R; -40 and -40R, **-40AR and SKP23600 for the TFE731-50R.**

**NOTE 2**

Fan gearbox oil inlet temperature transient of 300°F (149°C) for a maximum of 2 minutes is permitted for all operational altitudes.

External engine components, maximum temperature (limiting temperature of specific components) are as specified in the applicable engine installation manual, See Note 10.

Operation at an engine fuel inlet temperature as high as 135°F (57°C) with a vapor volume to liquid volume ratio (V/L) equal to 0.45, and as low as -65°F (-54°C) with fuel at a viscosity of 12 centistokes or less during starting is approved.

**NOTE 3**

For compressor bleed airflow limits, refer to the applicable Engine Installation Manual (See Note 10).

**NOTE 4**

These engines meet ANAC/FAA requirements for turbine disk integrity and rotor blade containment.

**NOTE 5**

These engines meet ANAC/FAA requirements for operation in icing conditions within the envelope defined in RBHA/14 CFR Part 25, Appendix C.

**NOTE 6** Certain engine parts are life-limited. These limits are published in the Light Maintenance Manuals, Chapter 5, and referenced in the FAA approved Honeywell International Inc. Service Bulletin TFE731-72-5101.

**NOTE 7** Accessory Drive Provisions:

| Overhung   |  |                         | Accessory Note: (e)               | Weight              |     |       |                      |                  |
|--|--|-------------------------|-----------------------------------|---------------------|-----|-------|----------------------|------------------|
| Accessory Drive  | Drive Type Moment (one each) (lb.in)   | Internal Splice Config. | rpm and Rotation Facing Drive End | Max. Torque (lb.in) |     |       | Pounds-max. Note (b) | Overhung (lb-in) |
|  |  |                         |                                   | Tc                  | To  | Ts    |                      |                  |
| Starter or Starter Generator D2(2) Note(c)                                 | AND20002 Type XII-D modified as follows: rpm, torque accessory weight, and moment as shown | AND20002                | 12 602 Note (a) CW                | 200                 | 300 | 1 600 | 45                   | 400              |
| Aircraft Accessory D3(2)   | AND20002 Type XII-D modified as follows: rpm, torque accessory weight, and moment as shown | AND20002                | 12 602 Note (a) CW                | 200                 | 300 | 1 000 | 40                   | 400              |
| Aircraft Accessory D1(2) (for engines without motive flow fuel pump)       | AND20001 Type XI-B modified as follows: rpm, torque accessory weight, and moment as shown  | AND20001                | 6 300 Note (a) CW                 | 240                 | 360 | 1 650 | 15                   | 100              |
| Aircraft Accessory D1(2) (for engines with motive flow fuel pump) Note (d) | AND20001 Type XI-B modified as follows: rpm, torque accessory weight, and moment as shown  | AND20001                | 6 300 Note (a) CW                 | 100                 | 165 | 1 000 | 7                    | 18               |

CW = clockwise (looking aft); To = torque overload (5 min. per 4 hr. period); Tc = continuous torque ; Ts = static torque  
(2) = Accessory pads are identified by these symbols on the applicable installation drawings.

Notes:

- (a) Drive speeds are based on a maximum steady state HP rotor speed of 31 485 rpm.
- (b) Total weight of the aircraft accessories shall not exceed 95 pounds for engines without motive flow fuel pump: 85 pounds with motive flow fuel pump.
- (c) The estimated torsional spring constant for the starter generator drive is 7 000 pound.inches per radian.
- (d) Drive is located on engine auxiliary motive flow fuel pump.
- (e) Total combined accessory power extraction limits are specified in the applicable engine installation manual (See Note 10).

- NOTE 8** Variations in engine configuration and installation components are identified by a suffix to the basic model number on the engine nameplate, i.e. TFE731-60-XX, and an Engine Equipment List number. Certain features of these components are influenced by aircraft design considerations. In the Engine Equipment List, those items coded "E" are basic engine items and are controlled by RBHA/FAR 33. Items coded "A" have been demonstrated as compatible with the basic engine during engine certification testing. However, operation, functioning, and performance of these in a specific aircraft installation must be demonstrated during aircraft certification. Subsequent design control associated with these factors is the responsibility of the aircraft manufacturer.
- NOTE 9** Power setting, power checks and control of engine thrust output in all operations is to be based on Honeywell International Inc. engine charts referring to low pressure rotor speed (N1). Speed sensors are included in the engine assembly for this purpose.
- NOTE 10** For additional authorized operation and installation detailed information, refer to FAA approved sections of the applicable Engine Installation Manuals, as follows:  
IM-8300: TFE731-20, -20R, -20AR, -20BR  
IM-8010: TFE731-40, -40R, -40AR  
IM-8009: TFE731-60  
IM-8024: TFE731-50R
- NOTE 11** Service Bulletins, Overhaul and Maintenance Manuals, which are FAA-approved, are accepted by the ANAC and are considered ANAC-approved unless otherwise noted. These approvals pertain to the type design only.



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