# Aircraft Engine Characteristics Summary

**Manufacturer:** Pratt and Whitney Aircraft
**Engine Designation:** TF30-P-12,-12A

## General Description

The TF30-P-12 engine is an axial flow gas turbine engine with an annular burner having eight through flow combustion chambers, a nine stage low pressure compressor unit including a three stage fan, and a seven stage high pressure compressor unit. The low pressure compressor unit is connected by a through shaft to the three low pressure turbine wheels and the high pressure compressor unit is connected independently by a hollow shaft to the high pressure turbine wheel. The fan and compressor air inlets are common and both airflow is combined in a common afterburner and are discharged through a single variable area convergent jet nozzle. The engine is equipped with a blow-in-door ejector.

## Availability

- **Development Contract Awarded:** June 1966
- **Engine Mock-up Inspection:** None
- **Experimental Engine:** June 1967
- **Mock-up for Aircraft:** None
- **Installation Engine:** March 1968
- **Preliminary Flight Rating Test:** None
- **150 Hr. Endurance Tests "A" and "B":** May 1968

## Procurement

- **Final Price (FY 1968):** $732,386 (P-12)

## Status

In production

A total of twelve TF30-P-12 engines are to be built. A modified version of the TF30-P-12 is planned for the VF(2)-1 aircraft.

## Specific Features

- **Compressor:** Axial flow, twin spool
  - LP Rotor - 9 stages (includes 3 fan stages)
  - HP Rotor - 7 stages
- **Maximum Design Pressure Ratio (SLS):** Fan = 2.0:1
  - Overall = 17.5:1
- **Bypass Ratio:** 1.05:1
- **Maximum Airflow (SLS):** 240 lb/sec
- **Combustion Chamber:** 8 unit, can-annular, through flow
- **Turbine:** Axial flow, 4 stage
  - LP Rotor - 3 stages
  - HP Rotor - 1 stage
- **Turbine Cooling:** High pressure turbine blades and vanes air cooled
- **Maximum Allowable Turbine Inlet Temperature:** 2120°F

- **Exhaust Nozzle:** Convergent, variable area, with blow-in-door ejector
- **Ignition:** Two 4 joule exciters, engine driven alternator, two igniters, automatic relight
- **Power Control:** Hydromechanical main and A/B fuel controls
- **Fuel:** MIL-L-5625, Grade JP-4 or JP-5
- **Oil:** MIL-L-23699 or MIL-L-7808 (below -40°F)
- **Maximum Oil Consumption:** 0.2 gal/hr avg.
- **Accessory Drive Provisions:** Six
- **Thrust to Weight Ratio:** 5.0:1 (P-12A)

## Size & Weight

- **Length:** 241.4 inches
- **Maximum Diameter:** 50.7 inches
- **Maximum Radial Projection:** 31.0 inches
- **Dry Weight:** 4027 lbs. (P-12)
  - 3997 lbs. (P-12A)

## Utilization

- **F-111B Fighter Aircraft** (two P-12 engines) (USN)
- **FB-111 Bomber Aircraft** (two P-12A engines) (USAF)

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August 1968
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PERFORMANCE

GUARANTEED RATINGS AT STANDARD SEA LEVEL STATIC CONDITIONS

<table>
<thead>
<tr>
<th>RATING</th>
<th>THRUST (lb)</th>
<th>RPM</th>
<th>SFC (lb/hr/lb)</th>
<th>MEAS. GAS TEMP. (°F)</th>
<th>AIRFLOW (lb/sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum (45 min)</td>
<td>20,250</td>
<td>14,550/9,750</td>
<td>3.04</td>
<td>2070</td>
<td>260</td>
</tr>
<tr>
<td>Intermediate (Military)(45 min)</td>
<td>12,290</td>
<td>14,400/10,100</td>
<td>0.692</td>
<td>2070</td>
<td>247</td>
</tr>
<tr>
<td>Maximum Continuous (Normal)</td>
<td>10,750</td>
<td>14,150/9,650</td>
<td>0.634</td>
<td>1830</td>
<td>237</td>
</tr>
<tr>
<td>Dry Max. Continuous</td>
<td>9,575</td>
<td>13,900/9,220</td>
<td>0.605</td>
<td>1783</td>
<td>227</td>
</tr>
<tr>
<td>ISS Max. Continuous</td>
<td>8,080</td>
<td>13,400/8,700</td>
<td>0.577</td>
<td>1640</td>
<td>210</td>
</tr>
<tr>
<td>Idle</td>
<td>740 (Max)</td>
<td>5,900/7,900</td>
<td>980 1.2/hr</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GUARANTEED RATINGS AT STANDARD ALTITUDE CONDITIONS

<table>
<thead>
<tr>
<th>RATING</th>
<th>ALTITUDE (ft)</th>
<th>FLIGHT MACH NO.</th>
<th>THRUST (lb)</th>
<th>SFC (lb/hr/lb)</th>
<th>MEAS. GAS TEMP. (°F)</th>
<th>AIRFLOW (lb/sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum (45 min)</td>
<td>55,000</td>
<td>2.2</td>
<td>7,550</td>
<td>2.94</td>
<td>2070</td>
<td>118</td>
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<tr>
<td>Motorcycle (45 min)</td>
<td>30,000</td>
<td>1.2</td>
<td>13,250</td>
<td>2.70</td>
<td>2070</td>
<td>163</td>
</tr>
<tr>
<td>Intermediate (M11)(45 min)</td>
<td>36,089</td>
<td>0.7</td>
<td>2,685</td>
<td>0.963</td>
<td>1780</td>
<td>80.7</td>
</tr>
<tr>
<td>Cruise</td>
<td>30,000</td>
<td>0.7</td>
<td>2,970</td>
<td>0.876</td>
<td>1650</td>
<td>100.2</td>
</tr>
</tbody>
</table>

GUARANTEED OPERATING LIMITS

<table>
<thead>
<tr>
<th>ABSOLUTE ALTITUDE (FEET)</th>
<th>75,000 at 3.18 ram pressure ratio</th>
<th>MAXIMUM STARTING ALTITUDE JP-4</th>
<th>45,000 ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIMITING MACH NO. AT SEA LEVEL STD. CONDITIONS</td>
<td>0.90</td>
<td>MAXIMUM STARTING ALTITUDE JP-5</td>
<td>45,000 ft</td>
</tr>
</tbody>
</table>

ARDC MODEL ATMOSPHERE 1955
MS RAM EFFICIENCY

- Guarantee Points
- 36,089 ft (1.8 Mm) A/B
- 36,089 ft (1.8 Mm)
- Sea Level (0.9 Mm)
- 36,089 ft (0.9 Mm)
- Sea Level Static

NOTES
The TF30-P-12 and -12A are the same configuration except that the TF30-P-12 is equipped with a filter heater combination and the TF30-P-12A is equipped with a fuel filter only. In addition, an augmented wave-off feature, incorporated in TF30-P-12 engines, is deactivated on TF30-P-12A engines.

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