Standard Aircraft Characteristics

F-105 B - 20

THUNDERCHIEF
Republic

ONE J 75-P-19
PRATT & WHITNEY

F-105B-20

57WC 4984
Wing Area ............ 385 sq ft
Aspect Ratio ............ 3.10
M.A.C. ............ 137.76 in

Wing Section
(P2000-28, 80) - NACA 65A-005, 5
(tip) ............ NACA 65A-003, 7

Pressurized Area

NOTE: TOTAL INTERNAL FUEL EQUALS 1160 GAL OF WHICH 20 GAL OF USEABLE FUEL IS LOCATED IN THE FUEL LINES.

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Fuel (Gal)  Oil (Gal)

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REFUELING EQUIP.  ARMAMENT  PILOT  BOMB BAY  ENGINE

F-105B-20  CONFIDENTIAL
POWER PLANT
Nr & Model ..... (1) J75-P-19
Mfr \ ENGINE SPEC Nr. ..... Pratt & Whitney
A-2607C
Type ..... Two Spool Axial
Length ..... 259.3
Diameter ..... 43.0
Weight (dry) ..... 5950 lb
Tail Pipe, Two Position Convergent with Republic Ram Air Ejector
Augmentation, Afterburning
The F-105B-15 and some early-20 airplanes have J75-P-5 engines installed. The -5 engines with the improved fuel system will be modified to -19 engines.

ENGINE RATINGS
S, L, Static LB - RPM ↑ - MIN
Max: 24,500 - 6400/8830 - 5
Mil: 16,100 - 6440/8940 - 30
Nor: 14,300 - 6080/8700 - Cont
with afterburner operating
↑ First figure represents RPM of the low pressure spool while the second that of the high pressure spool.

DIMENSIONS
Wing
Span (root) ..... 34.9
Incidence (tip) ..... 0.0
Cathedral ..... 3°30'
Sweepback (25% chord) ..... 45°
Length ..... 63.1
Height ..... 19.7
Tread ..... 17.3

Mission and Description
Navy Equivalent: None
Mfr's Model: AP-63
The principal mission of the F-105B is that of a fighter bomber.

This airplane is a thin mid-wing swept wing aircraft with a low position maneuvering stabilizer, spoiler-aileron combination full span leading edge flaps, and 3/4 span trailing edge flaps. The fuselage incorporates a bomb bay capable of housing either a special store or an auxiliary fuel tank.

Other features include a supersonic, variable area wing root air inlet duct, cockpit pressurization, liquid oxygen system, hydraulic power-operated irreversible flight controls with artificial feel, large speed brakes located at the aft end of the fuselage, integrated automatic flight control system, "probe-drogue" in-flight refueling provisions, single point refueling, nose wheel steering, and a braking parachute.

The MA-8 FIRE Control System, consisting of the E-50 Sighting System in conjunction with the E-34 Radar Ranging System, E-30 Toss Bomb Computer and Time of Flight Computer is provided. The T-20 Release System is provided for use with the special stores.

Development
Basically the same as the F-105B-10 and -15 airplanes except for installation of the J75-P-19 engine in lieu of the -5 engine and changes in electronics equipment.

First flight (F-105B-10) Jun 57
First flight (F-105B-20) Jun 59
Production status In Production

WEIGHTS
Loading Lb L, F.
Empty ..... 25,855(A)
Basic ..... 26,322(A)
Design ..... 731322, 8.67(7,33)
Combat ..... 9870, 7.33(7,33)
Max T.O. ..... 14,50,000
Max Land. ..... 932,167
(A) Actual
↑ No store
↑ With store
↑ For basic mission
↑ Limited by structure
↑ Limited by rate of sink
Note: Load factors in ( ) are for supersonic maneuvers.

FUEL
Location Nr Tanks Gal
Fus: 7 ..... 1160
Fus, bomb bay ..... 1 ..... 390
Wgs, drop, ext ..... 2 ..... 500
Wgs, drop, ext ..... 1 ..... 450
Total ..... 2900
Grade ..... JP-4
Specification ..... MIL-F-5624A

OIL
Engine, integral: 1.1 (tot) 4.5
Specification: MIL-L-7808

ELECTRONICS
Comm-Ident-Navig Subsystem
UHF Command
Direction Finder
Marker Beacon
TACAN
Data Link
Transponder
Intercomm
Chaff Dispenser(2)
Radar Warning
Doppler Navigation
Fire Control System
Provisions only

ROCKETS

GUNS

DIMENSIONS

BOMBS

NR Type Size Rds ea Loc
1. M-61, 20mm, 1080, Fus

Special Stores
1. (MK-28) 1960

Max Bomb Load ..... 3000 lb

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CONFIDENTIAL
## Loading and Performance—Typical Mission

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Basic Mission</th>
<th>Design Mission</th>
<th>Ground Support</th>
<th>Ferry Range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Take-off Weight</strong> (lb)</td>
<td>46,998</td>
<td>46,998</td>
<td>49,566</td>
<td>48,822</td>
</tr>
<tr>
<td><strong>Fuel at 6.5 lb/gal (grade JP-4)</strong> (lb)</td>
<td>18,315</td>
<td>18,315</td>
<td>18,850</td>
<td>18,850</td>
</tr>
<tr>
<td><strong>Payload (Ammo)</strong> (lb)</td>
<td>724</td>
<td>724</td>
<td>724</td>
<td>724</td>
</tr>
<tr>
<td><strong>Payload (Bombs)</strong> (lb)</td>
<td>1960</td>
<td>1960</td>
<td>1598</td>
<td>1598</td>
</tr>
<tr>
<td><strong>Wing Loading</strong> (lb/sq ft)</td>
<td>177</td>
<td>177</td>
<td>182</td>
<td>182</td>
</tr>
<tr>
<td><strong>Stall Speed (power off)</strong> (kn)</td>
<td>5000</td>
<td>5000</td>
<td>5610</td>
<td>5610</td>
</tr>
<tr>
<td><strong>Take-off Ground Run at SL</strong> (ft)</td>
<td>6840</td>
<td>6840</td>
<td>7280</td>
<td>7280</td>
</tr>
<tr>
<td><strong>Take-off to Clear 50 ft</strong> (ft)</td>
<td>6840</td>
<td>6840</td>
<td>4120</td>
<td>4120</td>
</tr>
<tr>
<td><strong>Rate of Climb at SL</strong> (fpm)</td>
<td>46,657</td>
<td>46,657</td>
<td>6,45</td>
<td>6,45</td>
</tr>
<tr>
<td><strong>Time: SL to 20,000 ft</strong> (min)</td>
<td>14,2</td>
<td>14,2</td>
<td>12.0</td>
<td>12.0</td>
</tr>
<tr>
<td><strong>Time: SL to 30,000 ft</strong> (min)</td>
<td>20,100</td>
<td>20,100</td>
<td>30,100</td>
<td>30,100</td>
</tr>
<tr>
<td><strong>Service Ceiling (100 fpm)</strong> (ft)</td>
<td>37,700</td>
<td>37,700</td>
<td>31,600</td>
<td>31,600</td>
</tr>
<tr>
<td><strong>Combat Range</strong> (mi)</td>
<td>606(682)</td>
<td>735</td>
<td>832</td>
<td>832</td>
</tr>
<tr>
<td><strong>Combat Radius</strong> (mi)</td>
<td>503</td>
<td>503</td>
<td>492</td>
<td>492</td>
</tr>
<tr>
<td><strong>Average Cruise Speed</strong> (kn)</td>
<td>31,600</td>
<td>31,600</td>
<td>25,750</td>
<td>25,750</td>
</tr>
<tr>
<td><strong>Initial Cruising Altitude</strong> (ft)</td>
<td>40,250</td>
<td>40,250</td>
<td>40,700</td>
<td>40,700</td>
</tr>
<tr>
<td><strong>Final Cruising Altitude</strong> (ft)</td>
<td>2,45</td>
<td>2,45</td>
<td>3,30</td>
<td>3,30</td>
</tr>
<tr>
<td><strong>Total Mission Time</strong> (hr)</td>
<td>34,870</td>
<td>33,800(35,840)</td>
<td>34,590(36,453)</td>
<td>35,751</td>
</tr>
<tr>
<td><strong>Combat Altitude</strong> (ft)</td>
<td>5,1</td>
<td>S.L., (37,000)</td>
<td>S.L., (37,100)</td>
<td>S.L., (37,100)</td>
</tr>
<tr>
<td><strong>Combat Speed</strong> (fpm)</td>
<td>735</td>
<td>735</td>
<td>735</td>
<td>735</td>
</tr>
<tr>
<td><strong>Combat Climb</strong> (fpm)</td>
<td>36,400</td>
<td>37,500(7300)</td>
<td>36,600(6000)</td>
<td>34,400</td>
</tr>
<tr>
<td><strong>Combat Ceiling (300 fpm)</strong> (ft)</td>
<td>48,350</td>
<td>48,900(47,750)</td>
<td>48,500(46,600)</td>
<td>47,200</td>
</tr>
<tr>
<td><strong>Service Ceiling (100 fpm)</strong> (ft)</td>
<td>41,800</td>
<td>42,400(41,200)</td>
<td>42,000(39,800)</td>
<td>46,700</td>
</tr>
<tr>
<td><strong>Max Rate of Climb at SL</strong> (fpm)</td>
<td>36,400</td>
<td>37,500(35,300)</td>
<td>36,600(29,300)</td>
<td>34,400</td>
</tr>
<tr>
<td><strong>Max Speed at 35,000 ft</strong> (kn)</td>
<td>1195</td>
<td>1198(1139)</td>
<td>1198(995)</td>
<td>1192</td>
</tr>
<tr>
<td><strong>Basic Speed at S.L. ft</strong> (kn/ft)</td>
<td>735</td>
<td>735(735)</td>
<td>735(689)</td>
<td>735</td>
</tr>
</tbody>
</table>

**Landing Weight** (lb)
- **Ground Roll at SL** (ft) | 29,304 | 28,580 | 28,660 | 28,660 | 28,879 |
- **Ground Roll (auxiliary brake)** (ft) | 4130 | 4030 | 4040 | 4170 | 4060 |
- **Total from 50 ft** (ft) | 4130 | 4030 | 4040 | 4170 | 4060 |
- **Total from 50 ft (auxiliary brake)** (ft) | 4130 | 4030 | 4040 | 4170 | 4060 |

**NOTES**
- #1 Max power
- #2 Military power
- #3 Detailed descriptions of RADIUS and RANGE missions given on page 6
- #4 One MK-28 internal store
- #5 2 x 750 lb bombs external
- #6 2 x LAU-3/A rocket launchers (19 rockets ea)
- #7 With 20 ft dia braking parachute
- #8 Speed at end of 3 min afterburner run-in to target
- #9 Values in parenthesis indicate performance with store or ext bombs aboard.

**Performance Basis**
- (a) Data source: Estimated data based on F-105B Flight Test.
- (b) Performance is based on powers shown on page 3

**F-105B-20**
NOTES

FORMULA: Radius Mission I

Take-off with maximum power, climb on course with military power to initial cruise altitude, cruise at cruise climb altitudes at max range speeds, descend to sea level, expend store, combat for 5 minutes at military power, climb on course with military power to initial cruise home altitude, cruise to base at cruise climb altitudes at max range speeds. Range-free allowances include 5 minutes at normal power static and 1 minute at maximum power static at sea level for starting engine and take-off, 5 minutes combat at sea level with military power, and a reserve of 20 minutes loiter at sea level at speeds for maximum endurance plus 5% of usable fuel load.

FORMULA: Radius Missions II & III

Take-off with maximum power, climb on course with military power to initial cruise altitude, cruise at cruise climb altitudes at max range speeds, Climb on course with military power to cruise ceiling. At maximum power, fly for 3 minutes inbound to target prior to bomb release, drop external tanks (if any) and dive bomb, leave target at military power high speeds for 2 minutes at sea level, climb with military power to initial cruise home altitude, cruise to base at cruise climb altitudes at max range speeds. Range-free allowances include 5 minutes at normal power static and 1 minute at maximum power static at sea level for starting engine and take-off, dive bomb, and a reserve of 15 min. loiter at cruise altitude at speeds for maximum endurance plus fuel to allow for one instrument approach and visual go-around from airplane flare out attitude.

FORMULA: Radius Mission IV

Take-off with maximum power, climb on course with military power to initial cruise altitude, cruise at cruise climb altitudes at max range speeds, descend to sea level and loiter for 10 minutes at speeds for maximum endurance, expend rockets, combat for 10 minutes at military power, climb on course with military power to initial cruise home altitude, cruise to base at cruise climb altitudes at max range speeds. Range-free allowances include 5 min. at normal power static and 1 min. at max. power static at sea level for starting engine and take-off, 10 minutes loiter at sea level at speeds for maximum endurance, 10 minutes combat at sea level with military power, and a reserve of 20 minutes loiter at sea level at speeds for maximum endurance plus 5% of usable fuel load.

FORMULA: Range Mission V

Take-off with maximum power, climb on course with military power to initial cruise altitude, cruise at cruise climb altitudes at max range speeds to remote base. Range-free allowances include 5 minutes at normal power static plus 1 minute at maximum power static for starting engine and take-off, and a reserve of 20 minutes loiter at sea level at speeds for maximum endurance plus 5% of initial fuel load.

GENERAL NOTES

(a) Tanks and pylons are carried on all missions and dropped when empty unless otherwise specified.

(b) Cruise is performed along optimum cruise climb flight path.

REVISION BASIS:
Initial Issue

(20 MAY 59)