STANDARD AIRCRAFT CHARACTERISTICS
F4D-1 "SKY RAY"

DOUGLAS
POWER PLANT
NO. & MODEL....(1) J57-P-2
MANUFACTURER....Pratt & Whitney
TYPE....2-Stage Axial Flow
LENGTH....24 ft.
DIAMETER....41 in.
AUGMENTATION....Afterburner

RATINGS
LBS. @ RPM @ ALT.
N1 N2 MIL. AB 14,800 6150 9550 S.S.L.
MIL. 9220 6150 9550 S.S.L.
NORM. 8000 5800 9550 S.S.L.
SPEC. NO. N-1668-A

MISSION AND DESCRIPTION
The primary mission of the F4D-1 airplane is the interception and destruction of enemy aircraft. The airplane is designed to operate from aircraft carriers or land bases.

The airplane is a tailless, low aspect ratio single-seat fighter. A single turbojet engine with afterburner is installed in the fuselage.

Automatic leading edge slats are provided as high lift devices for take-off and landing. Down wash controlled flap-operated speed-retarding brakes are located inboard on the wing.

Flight control is provided by means of power operated elevons which perform the functions of conventional elevators and ailerons. Electrically actuated trimming surfaces are provided for lateral and longitudinal trim.

DEVELOPMENT
Mock-up..................March 1949
First Flight..................May 1954
Service Use..................January 1955

WEIGHTS
LOADINGS LBS. L.F.
EMPTY..................15,225
BASIC..................15,450
DESIGN..................16,662.6.0
COMBAT..................18,687.5.3
MAX. T.O. (Field)......23,050.4.8
(Mot.)..................23,050.4.8
MAX. LANDING (Field)...19,050
(Arrest)..................19,050

All weights are calculated.

FUEL AND OIL
GALS. NO. TANKS LOCATION
640 2 Wing
300 2 External
FUEL GRADE...........JP-4
FUEL SPEC.............MIL-F-5624A

OIL
CAPACITY (GALS.)........3.5
SPEC.............MIL-L-7808

ORDNANCE
GUNS
NO. SIZE LOCATION RDS.
4 20mm Wings 280

FIRE CONTROL
Aero 107-1
(APG-30A Mks. 16 Mod. 5)

EXTERNAL LOAD
HOLDS NO. LOCATION MAX. CAP.
Aero 145 2 Wing 4-19 shot
or 0 2,750 rockets
2 Wing Fuel or
rockets
1 Fuselage New Pac

DIMENSIONS
WING
AREA..................557 Sq. Ft.
SPAN..................33'-6"
M.A.C. ..................18'-3.5"
Sweepback (1/4 Chord)....46.5°
LENGTH..................45'-2.5"
HEIGHT..................31'-6.5"
TRIM..................10'-1.5"

ELECTRONICS
UHF COMM.................AN/ARO-27A
NAV. REC..................AN/ARP-21
RADIO ALTM.............AN/ARP-22
IFF.....................AN/ARP-68
FIRE CONTROL ARR.......APG-30A
(U.S.A...........N-10)
UHF D.F..................AN/AR-25
NAV. REC..................AN/AR-14B
MARKER BEACON REC.......AN/AR-12
## PERFORMANCE SUMMARY

<table>
<thead>
<tr>
<th>Condition</th>
<th>(1) INTERCEPTOR 4 Rocket Packages</th>
<th>(4) GUNS Full Internal Fuel</th>
<th>(7) FERRY Rocket Packages 2-150 Gal. Ext. Tanks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TAKE-OFF WEIGHT</strong></td>
<td>1 lb.</td>
<td>20,250</td>
<td>20,250</td>
</tr>
<tr>
<td>Fuel (2-4)</td>
<td>1 lb.</td>
<td>4,100</td>
<td>4,100</td>
</tr>
<tr>
<td>Payload</td>
<td>1 lb.</td>
<td>504</td>
<td>504</td>
</tr>
<tr>
<td>Wing loading</td>
<td>12 sq.ft.</td>
<td>35.5</td>
<td>35.5</td>
</tr>
<tr>
<td>Stall speed - power-off</td>
<td>km/h</td>
<td>112,3</td>
<td>117.4</td>
</tr>
<tr>
<td>Take-off run at S.L. - calms (3)</td>
<td>ft.</td>
<td>1,180</td>
<td>1,205</td>
</tr>
<tr>
<td>Take-off run at S.L. 25 km. wind(3)</td>
<td>ft.</td>
<td>780</td>
<td>800</td>
</tr>
<tr>
<td>Take-off to clear 90 ft. - calms</td>
<td>ft.</td>
<td>-</td>
<td>906</td>
</tr>
<tr>
<td>Max speed/altitude (A)</td>
<td>km/ft.</td>
<td>558/35,000</td>
<td>558/35,000</td>
</tr>
<tr>
<td>Rate of climb at S.L. (B)</td>
<td>fpm (C)</td>
<td>18,400/5,100</td>
<td>21,600/5,100</td>
</tr>
<tr>
<td>Time: S.L. to 40,000 ft. (D)</td>
<td>mins</td>
<td>3.5</td>
<td>3.2</td>
</tr>
<tr>
<td>Time: S.L. to 50,000 ft. (E)</td>
<td>mins</td>
<td>5.2</td>
<td>5.0</td>
</tr>
<tr>
<td>Service ceiling (100 fps)</td>
<td>ft.</td>
<td>55600/44,500</td>
<td>55600/44,500</td>
</tr>
<tr>
<td>Combat range</td>
<td>km</td>
<td>516</td>
<td>516</td>
</tr>
<tr>
<td>Average cruising speed</td>
<td>km/h</td>
<td>518</td>
<td>512</td>
</tr>
<tr>
<td>Cruising altitude(s)</td>
<td>ft.</td>
<td>47000/15,500</td>
<td>47000/15,500</td>
</tr>
<tr>
<td>Combat radius</td>
<td>km</td>
<td>225</td>
<td>225</td>
</tr>
<tr>
<td>Average cruising speed</td>
<td>km/h</td>
<td>516</td>
<td>512</td>
</tr>
<tr>
<td>Total endurance (Point intercept)</td>
<td>mins</td>
<td>95</td>
<td>95</td>
</tr>
</tbody>
</table>

### COMBAT LOADING CONDITION

<table>
<thead>
<tr>
<th>Condition</th>
<th>(2) (3) (5) (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COMBAT WEIGHT</strong></td>
<td>18,876</td>
</tr>
<tr>
<td>Engine power</td>
<td>M1 4/A3 Military / M1 4/A3 Military</td>
</tr>
<tr>
<td>Fuel</td>
<td>2,496</td>
</tr>
<tr>
<td>Combat speed/combat altitude</td>
<td>565/50,000</td>
</tr>
<tr>
<td>Rate of climb/combat altitude</td>
<td>1,180/50,000</td>
</tr>
<tr>
<td>Combat ceiling (100 fps)</td>
<td>45,000</td>
</tr>
<tr>
<td>Rate of climb at S.L.</td>
<td>18,400/5,100</td>
</tr>
<tr>
<td>Max speed at S.L.</td>
<td>584</td>
</tr>
<tr>
<td>Max speed/altitude</td>
<td>642/1,150</td>
</tr>
</tbody>
</table>

### LANDING WEIGHT

<table>
<thead>
<tr>
<th>Condition</th>
<th>(1) (2) (3) (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LANDING WEIGHT</strong></td>
<td>18,633</td>
</tr>
<tr>
<td>Fuel</td>
<td>1,014</td>
</tr>
<tr>
<td>Stall speed - power-off</td>
<td>101.7</td>
</tr>
<tr>
<td>Stall speed - with approach power</td>
<td>97.4</td>
</tr>
</tbody>
</table>

**Reason for release:** Change to J57-P-2 engines.

**NOTES:**

- (A) Normal rated thrust.
- (B) Military rated thrust plus afterburning.
- (C) Military rated thrust.
- (D) Time to climb to service ceiling.
- (E) Restricted by engine structural limit.

F4D-1

1 FEBRUARY 1954
NOTES

Performance basis: Calculations

Range and radius are based on engine specification fuel consumption data increased by 5%.

Spotting: A total of 84 airplanes (singles folded) can be accommodated in a landing spot on the flight and hangar decks of a CVA-19 class carrier deck carrier.

Time to climb includes time for take-off and acceleration to climb speed.

INTERCEPTOR FIGHTER COMBAT RADIUS PROBLEM (AREA INTERCEPT)

WARNING: TAKE-OFF, ACCELERATE: 2 minutes at normal rated thrust.
CLIMB: To cruise ceiling at military rated thrust.
CRUISE-OUT: At speed for long range at cruise ceiling.
CLIMB: To 50,000 feet at military plus afterburner thrust.
COMBAT: At 50,000 feet for 5 minutes at military plus afterburner thrust.
CRUISE-BACK: At speed for long range at cruise ceiling.
RESERVE: 20 minutes at speed for maximum endurance at sea level plus 5% of initial fuel load.

CONBAT RADIUS = CLIMB + CRUISE-OUT + CRUISE BACK

45,200 FT.

50,000 FT.

43,400 FT.

INTERCEPTOR FIGHTER COMBAT ENDURANCE PROBLEM (POINT INTERCEPT)

WARNING: TAKE-OFF, ACCELERATE: 2 minutes at normal rated thrust, 1 minute at military plus afterburner thrust.
CLIMB: To 50,000 feet at military plus afterburner thrust.
COMBAT: At 50,000 feet for 5 minutes at military power plus afterburner.
DESKEND: To 35,000 feet (no fuel used, no distance gained).
LOITER: At 35,000 feet for 20 minutes at speed for maximum endurance.
DISBEND: To sea level (no fuel used, no distance gained).
RESERVE: 20 minutes at speed for maximum endurance at sea level.

LOADING CONDITION COLUMN NUMBER

F4D-1

DECLASSIFIED