Standard Aircraft Characteristics

ADV. F-89 SCORPION

BY AUTHORITY OF
COMMANDING GENERAL
WRIGHT AIR DEVELOPMENT CENTER
U.S. AIR FORCE

TWO XJ73-GE-5
GENERAL ELECTRIC

Northrop

3 DECEMBER 1951
**POWER PLANT**

No. & Model ........... *(2)XJ73-GE-5
Mfr .................. General Electric
Engine Spec No. ........... E-586b
Type .................. Axial
Length ................ 247"
Diameter ............ 38.5"
Weight (dry) ........ 4600 lb
Tail Pipe .............. Variable Area
Augmentation .......... Afterburning

*Installation of higher thrust Allison XT7-A-( ) engines being considered.

**ENGINE RATINGS**

S. L. S. - LB - RPM - MIN
Max: *12,660 - 7950 - 5
Mil: 8765 - 7950 - 30
Nor: 7110 - 7473 - Cont

*With afterburner operating

**DIMENSIONS**

Wing
Span .................. 59.2'
Incidence (root) ........ 1°30'
(tip) ............... 1°30'
Dihedral ............. 5°
Sweepback (LE) ........ 140°17'
Length ............... 58.7'
Height ................ 19.5'
Tread ................ 25.6'

**ARMAMENT**

Basic armament installation consists of 104 X 2.75" FFAR rockets located in the mid-wing nacelles. Alternate installations consists of the following:

No. Type Location
8 ........... 80 mm Nads ea
4 ........... T-110 Rocket Guns Wing, Nacelle
10 ........... 2.75" Rockets Wing, Nacelle
8 ........... MX-904 Missiles Wing, Nacelle
224 ........... 2.75" Rockets Wing, Nacelle
4 ........... 30 mm Fus, Nose
6 ........... 20 mm Fus, Nose
2 ........... T-110 Rocket Guns Fus, Nose

**WEIGHTS**

Loading ............. Lb L. F.
Empty ............. 33,255 (E)
Basic .............
Design ............. 47,674
Combat ............. 44,124
Max T. O. ........ 320
Max Land ...........

*For Basic Mission

**FUEL**

Location No. Tanks Gal.
Fus, fwd ........ 1 ........ 282
Fus, sump ........ 2 ........ 300
Fus, ctr ........ 1 ........ 336
Fus, aft ........ 1 ........ 282
Nac, fwd ........ 2 ........ 320
Nac, aft ........ 2 ........ 320
Total ........... 1845

Grade ............. JP-3

**OIL**

Capacity (gal) ........ 10
Grade ............. 1005

**ELECTRONICS**

UHF Command ........... AN/ARC-34
Marker Beacon ........... AN/ARN-12
Glide Path .......... AN/ARN-18
Omni-Direct, Range ... AN/ARN-14
IFF ................... AN/APX-6
Interphone ........... USAF Combat
Rocket Computer ........ AN/APA-64
Radar Set ............ AN/APG-40

**MISSION AND DESCRIPTION**

Navy Equivalent: None
Mfr's Model: N-81

The principal mission of the Adf F-89 is the interception and destruction of hostile aircraft under all-weather conditions.

The fuselage is of semi-monocoque all-metal stressed-skin construction incorporating cabin pressurization and air conditioning, ejection seats, anti-G suit provisions and a low pressure oxygen system.

The wing is aluminum alloy stressed-skin construction incorporating wing tip ailerons (rototip), split trailing edge flaps, hinged leading edge flaps and a split type aileron-speed brake combination in the outboard section. The complete horizontal tail surface (rototail) is movable, whereas the vertical tail surface is of the conventional stationary fin and movable rudder type.

This airplane carries a crew of two (pilot and radar operator) and is equipped with all-weather interception radar, fuel purging, instrument landing system, thermal anti-icing, hydraulic power operated flight controls and an automatic flight control system (Auto-Flight System).

Fuel, armament and main landing gear are contained in the nacelles located in the center section of each wing. An E-6 Fire Control System is utilized.

**DEVELOPMENT**

Development of the F-89 series.
Procurement directive for 12 aircraft.
First Prototype ................ Mar 53 (est)
Second Prototype ............. May 53 (est)
First Production ............. July 54 (est)
Delivery of 12 articles ....... Dec 54 (est)
# Loading and Performance—Typical Mission

<table>
<thead>
<tr>
<th>CONDITIONS</th>
<th>POINT INTERCEPT - MISSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAKE-OFF WEIGHT</td>
<td>(lb) 47,674</td>
</tr>
<tr>
<td>Fuel at 5.5 lb/gal (grade JP-3)</td>
<td>(lb) 11,960</td>
</tr>
<tr>
<td>Military load (Rockets)</td>
<td>(lb) 18.4</td>
</tr>
<tr>
<td>Wing loading (lb/sq ft)</td>
<td>73.2</td>
</tr>
<tr>
<td>Stall speed (power off, landing config)</td>
<td>(kn) 114</td>
</tr>
<tr>
<td>Take-off ground run at SL</td>
<td>(ft) 22.1</td>
</tr>
<tr>
<td>Take-off to clear 50 ft</td>
<td>(ft) 30.1</td>
</tr>
<tr>
<td>Rate of climb at SL (fpm)</td>
<td>20.100</td>
</tr>
<tr>
<td>Time: SL to 20,000 ft</td>
<td>(min) 2.9</td>
</tr>
<tr>
<td>Time: SL to 30,000 ft</td>
<td>(min) 4.8</td>
</tr>
<tr>
<td>Service Ceiling (100 fpm)</td>
<td>(ft) 47.400</td>
</tr>
<tr>
<td><strong>COMBAT RANGE</strong></td>
<td></td>
</tr>
<tr>
<td>Average speed (n, mi.)</td>
<td></td>
</tr>
<tr>
<td>Initial cruising altitude</td>
<td></td>
</tr>
<tr>
<td>Final cruising altitude</td>
<td></td>
</tr>
<tr>
<td>Total mission time</td>
<td></td>
</tr>
<tr>
<td><strong>COMBAT RADIUS</strong></td>
<td></td>
</tr>
<tr>
<td>Average speed (n, mi.)</td>
<td></td>
</tr>
<tr>
<td>Initial cruising altitude</td>
<td></td>
</tr>
<tr>
<td>Bombing altitude</td>
<td></td>
</tr>
<tr>
<td>Bomb run speed</td>
<td></td>
</tr>
<tr>
<td>Final cruising altitude</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL MISSION TIME</strong></td>
<td>(hr) 2.03</td>
</tr>
<tr>
<td>Intercept Altitude</td>
<td>(ft) 50,000</td>
</tr>
<tr>
<td><strong>COMBAT WEIGHT</strong></td>
<td></td>
</tr>
<tr>
<td>Combat altitude</td>
<td>(lb) 44.124</td>
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<tr>
<td>Combat altitude (ft)</td>
<td>50,000</td>
</tr>
<tr>
<td>Combat speed (kn)</td>
<td>495</td>
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<tr>
<td>Combat climb (fpm)</td>
<td>1400</td>
</tr>
<tr>
<td>Combat ceiling (500 fpm)</td>
<td>52,000</td>
</tr>
<tr>
<td>Service ceiling (100 fpm)</td>
<td>53,000</td>
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<tr>
<td>Max rate of climb at SL (fpm)</td>
<td>21,700</td>
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<td>Max speed at zero ft (kn)</td>
<td>620</td>
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<tr>
<td><strong>LANDING WEIGHT</strong></td>
<td>(lb) 35,640</td>
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<td>Ground roll at SL (ft)</td>
<td>2150</td>
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<td>Total from 50 ft (ft)</td>
<td>2800</td>
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**NOTES**

1. Max power mission only is presented.
3. Includes 1.5 minutes for take-off and accelerate to climb speed at S.L.
4. No basic cruising data are available and information for point interceptor

**PERFORMANCE BASIS**

(a) Data source: Based on contractors’ preliminary estimated data (Not substantiated by WADC)
(b) Performance is based on powers shown on page 6.
FORMULA: POINT-INTERCEPT MISSION I

Take-off and accelerate to best climb speed with maximum power, climb to 50,000 feet with maximum power, combat 5 minutes at 50,000 feet with maximum power, loiter at 35,000 feet at speeds for maximum endurance. Reserve is the fuel required to loiter 20 minutes at sea level at speeds for maximum endurance. Total mission time does not include time required to start engine, warm-up and taxi or reserve.

GENERAL NOTES:
(a) Engine ratings shown on page 3 are manufacturer's guaranteed ratings. Power values used in performance estimations are as follows:

<table>
<thead>
<tr>
<th>S.L.S.</th>
<th>XJ73-GE-5</th>
<th>RPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max</td>
<td>*13,950</td>
<td>100%</td>
</tr>
<tr>
<td>Mid</td>
<td>9034</td>
<td>100%</td>
</tr>
<tr>
<td>Nor</td>
<td>7330</td>
<td>94%</td>
</tr>
</tbody>
</table>

*With afterburner operating