Standard Aircraft Characteristics

NAVY MODEL

MH-53E

AIRCRAFT

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NOVEMBER 1984
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NAVAIR 00-110AH53-5 DTD FEBRUARY 1978

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STANDARD AIRCRAFT CHARACTERISTICS

MH-53E PROTOTYPE

SIKORSKY AIRCRAFT

NOTE:
ALL INQUIRIES CONCERNING DATA IN THIS CHART SHOULD BE DIRECTED TO NAVAIR, CODE 53012
**POWER PLANT**

- **No. and Model:** (3) T64-GE-416
- **Manufacturer:** General Electric
- **Type:** Axial
- **Length:** 78.8 inches
- **Diameter:** 23.8 inches
- **Gear Ratio (Eng/Rotor):** 7.5 8 to 1
- **See note on Performance Summary page for transmission ratings.**

**RATINGS**

<table>
<thead>
<tr>
<th>S.L. Static</th>
<th>SHP</th>
<th>RPM</th>
<th>MIN.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum</td>
<td>4300</td>
<td>14280</td>
<td>10</td>
</tr>
<tr>
<td>Intermediate</td>
<td>4145</td>
<td>14280</td>
<td>30</td>
</tr>
<tr>
<td>Max. Contin.</td>
<td>3696</td>
<td>14280</td>
<td>Contin.</td>
</tr>
</tbody>
</table>

**MISSION AND DESCRIPTION**

The principal mission of the MH-53E is to conduct mine countermeasures independently or in conjunction with surface forces. As secondary missions, the aircraft can be equipped to perform high speed transport of passengers or internal/external cargo from ship-to-ship or ship-to-shore.

The MH-53E is derived from the OH-53E transport helicopter currently in service. Features which distinguish the MH-53E are larger sponsors to accommodate increased fuel capacity, fixed towing gear, and external aft facing mirrors. The helicopter is equipped for main rotor blade and tail pylon folding, a hydraulically operated rear loading ramp door for wheeled vehicles and pallet loads, emergency water alighting capability, and rotor blade trim to reduce blade maintenance and assure mission reliability. The three T64-GE-416 engines are equipped with Engine Air Particle Separators (EAPS). Air to air refueling probe is incorporated to provide the means of replenishing fuel supply for extended range.

**ELECTRONICS**

- AN/APX-72: IFF Transponder Set
- AN/AIC-14A: Interphone System
- AN/APN-171(V): Radar Altimeter
- AN/ARC-159(V): Radio Set
- AN/AON-119(V): Navigational Set (TACAN)
- AN/ARC-156(V): VHF/AM/FM Radio Set
- AN/APN-80A: Direction Finder Set
- AN/AON-50: Direction Finder Group
- AN/ARC-94: Radio Set
- AN/APN-154: Radar Beacon Set
- AN/APN-217: Radar Navigation Set (Doppler)
- AN/ARL-92: Navigation System
- AN/ALO-160(NX-2): Acoustic Minesweep Gear
- AN/ALO-166(NX-1): Countermeasures Set
- Mark 204: Acoustic Minesweep Gear
- A/A4GO-30: Heading Attitude Reference System

**DEVELOPMENT**

- **First Flight-Large Sponsor Mock-up:** April 1982
- **First Flight-Production Prototype:** Sept. 1983

**WEIGHTS**

- **LOADING:**
  - Empty: 36,147 Lbs.
  - Basic: 36,193 Lbs.
  - Combat (Basic Mission): 53,331 Lbs.
  - Design Alt. (Internal Load): 69,750 Lbs.
  - Design Alt. (External Load): 73,500 Lbs.

(E) - Estimated

**FUEL AND OIL**

**FUEL**

- **LOCATION**
  - L. SPOON (FWD)*: (1) INTERNAL, FIXED
  - R. SPOON (FWD)*: (1) INTERNAL, FIXED
  - L. SPOON (AFT)*: (1) INTERNAL, FIXED
  - R. SPOON (AFT)*: (1) INTERNAL, FIXED
  - CABIN**: (4) INTERNAL, REMOVABLE

- **TOTAL: 4336 GALLONS**

- **Grade:** JP-4, JP-5, JP-8, 1-2
- **Specification:** MIL-F-83433A-2
- **Self Sealing and Crushworthy**
- **Max Airfield For Range Extension**

**OIL**

- **ENGINES:** 3
- **TOTAL: 8.7 GALS**
- **SPECIFICATION:** MIL-L-23699

**DIMENSIONS**

- **MAIN ROTOR**
  - DIAMETER: 79' 0''
  - DISC AREA: 4001.7 sq. ft.
  - BLADE AREA (EACH): 95.4 sq. ft.
  - NO. OF BLADES: 7

- **LENGTH:** 99' 1/2''
- **BLADES AND PYLON FOLDED:** 60' 6''

- **HEIGHT:** 29' 5''
- **BLADES AND PYLON FOLDED:** 18' 7''

- **WIDTH:** 27' 7''
- **TREAD:** 13' 0''

**ACCOMMODATIONS**

- **Crew (Normal):** 3
- **Cargo Hook Capacity:** 36,000 Lbs.
- **Utility Hoist:** 600 Lbs.
- **Troop Capacity:** 55
- **Cabin Size Clearance:**
  - Length: 30' 0''
  - Width: 6' 6''
  - Height: 7' 6''
- **Cabin Volume:** 1462.5 Cu. Ft.
- **Maximum Floor Loading:** 300 PSF
# PERFORMANCE SUMMARY

## TAKE-OFF LOADING CONDITION

<table>
<thead>
<tr>
<th></th>
<th>CLEAN</th>
<th>BASIC</th>
<th>EXTERNAL CARGO</th>
<th>TROOP TRANSPORT</th>
<th>FERRY RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TAKING-OFF WEIGHT</strong></td>
<td>lb.</td>
<td>lb.</td>
<td>lb.</td>
<td>lb.</td>
<td>lb.</td>
</tr>
<tr>
<td></td>
<td>58703</td>
<td>62035</td>
<td>73500</td>
<td>69750</td>
<td>68792</td>
</tr>
<tr>
<td><strong>Fuel internal/external (JP-5)</strong></td>
<td>lb./lb.</td>
<td>lb./lb.</td>
<td>lb./lb.</td>
<td>lb./lb.</td>
<td>lb./lb.</td>
</tr>
<tr>
<td></td>
<td>21760/0</td>
<td>21760/0</td>
<td>5840/0</td>
<td>20132/0</td>
<td>29485/0</td>
</tr>
<tr>
<td><strong>Payload (out/back)</strong></td>
<td>lb.</td>
<td>lb.</td>
<td>lb.</td>
<td>lb.</td>
<td>lb.</td>
</tr>
<tr>
<td></td>
<td>0/0</td>
<td>0/0</td>
<td>30445/0</td>
<td>12375/0</td>
<td>0/0</td>
</tr>
<tr>
<td><strong>Disc loading</strong></td>
<td>lb./sq. ft</td>
<td>lb./sq. ft</td>
<td>lb./sq. ft</td>
<td>lb./sq. ft</td>
<td>lb./sq. ft</td>
</tr>
<tr>
<td></td>
<td>11.98</td>
<td>12.65</td>
<td>14.99</td>
<td>14.23</td>
<td>14.03</td>
</tr>
<tr>
<td><strong>Vertical rate of climb at S.L.</strong></td>
<td>fpm.</td>
<td>fpm.</td>
<td>fpm.</td>
<td>fpm.</td>
<td>fpm.</td>
</tr>
<tr>
<td></td>
<td>720/222</td>
<td>0/1700</td>
<td>0/0</td>
<td>0/150</td>
<td>0/330</td>
</tr>
<tr>
<td><strong>Absolute hovering ceiling (OGE)</strong></td>
<td>ft.</td>
<td>ft.</td>
<td>ft.</td>
<td>ft.</td>
<td>ft.</td>
</tr>
<tr>
<td></td>
<td>7900</td>
<td>6400</td>
<td>-</td>
<td>800</td>
<td>2000</td>
</tr>
<tr>
<td><strong>Max. rate of climb at S.L.</strong></td>
<td>fpm.</td>
<td>fpm.</td>
<td>fpm.</td>
<td>fpm.</td>
<td>fpm.</td>
</tr>
<tr>
<td></td>
<td>2630</td>
<td>2715</td>
<td>1630</td>
<td>2140</td>
<td>2180</td>
</tr>
<tr>
<td><strong>Service ceiling</strong></td>
<td>(100 fpm)</td>
<td>ft.</td>
<td>ft.</td>
<td>ft.</td>
<td>ft.</td>
</tr>
<tr>
<td></td>
<td>15,900</td>
<td>14,400</td>
<td>2630</td>
<td>11,000</td>
<td>11,450</td>
</tr>
<tr>
<td><strong>Speed at S.L.</strong></td>
<td>a,e,f</td>
<td>a,e,f</td>
<td>a,e,f</td>
<td>a,e,f</td>
<td>a,e,f</td>
</tr>
<tr>
<td></td>
<td>5191</td>
<td>4991</td>
<td>119</td>
<td>164</td>
<td>165</td>
</tr>
<tr>
<td><strong>Max speed/altitude</strong></td>
<td>a,e,f</td>
<td>a,e,f</td>
<td>a,e,f</td>
<td>a,e,f</td>
<td>a,e,f</td>
</tr>
<tr>
<td></td>
<td>151.5/2000</td>
<td>150/2000</td>
<td>119/0</td>
<td>144/0</td>
<td>145/0</td>
</tr>
<tr>
<td><strong>O.E.I. Service ceiling</strong></td>
<td>(g)</td>
<td>ft.</td>
<td>ft.</td>
<td>ft.</td>
<td>ft.</td>
</tr>
<tr>
<td></td>
<td>10,550</td>
<td>9000</td>
<td>1600</td>
<td>5650</td>
<td>6050</td>
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<tr>
<td><strong>Min. speed (O.E.I.) at S.L.</strong></td>
<td>(g)</td>
<td>kn.</td>
<td>kn.</td>
<td>kn.</td>
<td>kn.</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>30</td>
<td>50</td>
<td>44</td>
<td>43</td>
</tr>
<tr>
<td><strong>Max. speed (O.E.I.) at S.L.</strong></td>
<td>(g)</td>
<td>kn.</td>
<td>kn.</td>
<td>kn.</td>
<td>kn.</td>
</tr>
<tr>
<td></td>
<td>138</td>
<td>136</td>
<td>100</td>
<td>126</td>
<td>128</td>
</tr>
<tr>
<td><strong>Combat radius</strong></td>
<td>n. mi.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>378.6</td>
<td>12.5</td>
<td>50</td>
<td>267.3</td>
<td>---</td>
</tr>
<tr>
<td><strong>Mission time</strong></td>
<td>hrs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.7</td>
<td>4.73</td>
<td>0.96</td>
<td>3.53</td>
<td>---</td>
</tr>
<tr>
<td><strong>Cruising altitude</strong></td>
<td>ft.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10,000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>---</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>n. mi.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>763</td>
<td>-</td>
<td>92.9</td>
<td>577.8</td>
<td>951</td>
</tr>
<tr>
<td><strong>Average cruising speed</strong></td>
<td>kn.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>134</td>
<td>-</td>
<td>120</td>
<td>136</td>
<td>134</td>
</tr>
<tr>
<td><strong>Cruising altitude</strong></td>
<td>ft.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10,000</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>10,000</td>
</tr>
<tr>
<td><strong>Maximum endurance</strong></td>
<td>(b)</td>
<td>hrs.</td>
<td>hrs.</td>
<td>hrs.</td>
<td>hrs.</td>
</tr>
<tr>
<td></td>
<td>7.5</td>
<td>-</td>
<td>0.99</td>
<td>6.09</td>
<td>9.07</td>
</tr>
<tr>
<td><strong>Endurance speed</strong></td>
<td>kn.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>94</td>
<td>-</td>
<td>75</td>
<td>87</td>
<td></td>
</tr>
<tr>
<td><strong>Endurance altitude</strong></td>
<td>ft.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10,000</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>10,000</td>
</tr>
</tbody>
</table>

## NOTES

**NOTES:**

(a) Maximum continuous transmission rating.
(b) Take-off transmission rating.
(c) Maximum power, three engines operating.
(d) Maximum continuous power, three engines operating.
(e) Aircraft redline at speed is 170 knots [A.S.]
(f) Airspeed dependent on external load stability.
(g) Intermediate power, one engine inoperative, at takeoff gross weight.
(h) Time does not include climb to endurance altitude.

## PERFORMANCE BASIS:

(1) Estimated.
(2) ICAO standard conditions, no wind.
(3) Range and radius based on General Electric specification fuel consumption data using fuel grade JP-5.
(4) Fuel consumption data are increased 5% above specification values.
(5) Transmission ratings are 9600 HP maximum continuous and 11570 HP takeoff.
SPEED

maximum speed at maximum
continuous power

CLIMB

intermediate power

note: climb power limited
to 110% torque for gross
weights below 60000 lb.

VERTICAL RATE OF CLIMB

maximum power
sea level standard

HOVER CEILING

maximum power
hot day
tropical day
standard day
CLEAN MISSION

Engine start, taxi, take-off and accelerate, 5 min at static S.L., Max Contin. Power.
Climb: On course at S.L., Intermediate Power, to altitude for best range, not to exceed 10,000 ft.
Cruise Out: At speed for best range, at altitude for best range, not to exceed 10,000 ft.
Hover: 5 min at Hover Ceiling, not to exceed 10,000 ft out of ground effect.
Cruise Back: At speed for best range, at altitude for best range, not to exceed 10,000 ft.
Descend: To sea level (no fuel used, no distance gained).
Reserve: 10% of initial fuel or fuel for 20 min. at speed for best range at sea level, whichever is greater.

BASIC MISSION

Engine start, taxi, take-off and accelerate, 5 min at static S.L., Max Contin. Power.
Hover: 5 min out of ground effect at S.L., AMCM gear hook-up.
Tow AMCM Equipment: 12.5 nautical miles to station at V1 (without exceeding Max. Contin. Power).
Minesweep on Station: At V1
Tow AMCM Equipment: 12.5 nautical miles back to base at V1 (without exceeding Max. Contin. Power).
Hover: 5 min. out of ground effect at S.L., AMCM gear disengaged.
Approach and Land: 10 min. at speed for best range, sea level.
Reserve: Fuel for 20 min. at speed for best range, sea level.

EXTERNAL CARGO

Engine start, taxi, take-off and accelerate, 5 min at static S.L., Max Contin. Power.
Cruise Out: At 120 knots at S.L., 50 nautical miles with external payload (T_{\text{max}} = 70 \text{ r}^2).
Hover: 5 min. out of ground effect at S.L., with payload. Hover at 30 ft wheel height.
Release Payload.
Hover: 5 min out of ground effect at S.L.
Cruise Back: At speed for best range at S.L., 50 nautical miles without payload.
Reserve: 10% of initial fuel, or, fuel for 20 min. at speed for best range at S.L., whichever is greater.

TROOP TRANSPORT

Engine start, taxi, take-off and accelerate, 5 min at static S.L., Max Contin. Power.
Cruise Out: At maximum contin. power at sea level.
Land and Unload Troops: 2 min. at static S.L., Max Contin. Power.
Offload troops weight.
Cruise Back: At maximum contin. power at sea level.
Reserve: 10% of initial fuel, or, fuel for 20 min. at speed for best range at S.L., whichever is greater.
FERRY RANGE

Engine start, taxi, take-off and accelerate, 3 min at static S.L., Max. Contin. Power.
Climb: On course at BROC, Intermediate Power, to altitude for best range, not to exceed 10,000 ft.
Cruise: At speed for best range, at altitude for best range, not to exceed 10,000 ft.
Descend: To sea level (no fuel used, no distance gained).
Reserve: 10% of initial fuel or fuel for 30 min at speed for best range at sea level whichever is greater.

RANGE

Engine start, taxi, take-off and accelerate, 3 min at static S.L., Max. Contin. Power.
Climb: On course at BROC, Intermediate Power, to specified cruising altitude.
Cruise Out: At speed for best range at specified altitude.
Descend: To sea level (no fuel used, no distance gained).
Reserve: 10% of initial fuel or fuel for 20 min at speed for best range at sea level, whichever is greater.

ENDURANCE

Engine start, taxi, take-off and accelerate, 3 min at static S.L., Max. Contin. Power.
Climb: On course at BROC, Intermediate Power, to specified loiter altitude.
Loiter: At best loiter speed at specified altitude.
Descend: To sea level (no fuel used, no distance gained).
Reserve: 10% of initial fuel or fuel for 20 min at speed for best range at sea level, whichever is greater.