

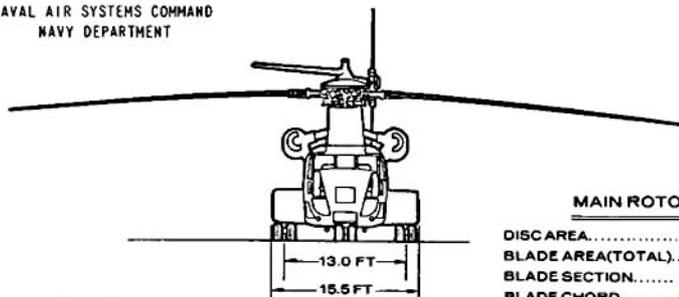


# STANDARD AIRCRAFT CHARACTERISTICS

CH-53D

SIKORSKY

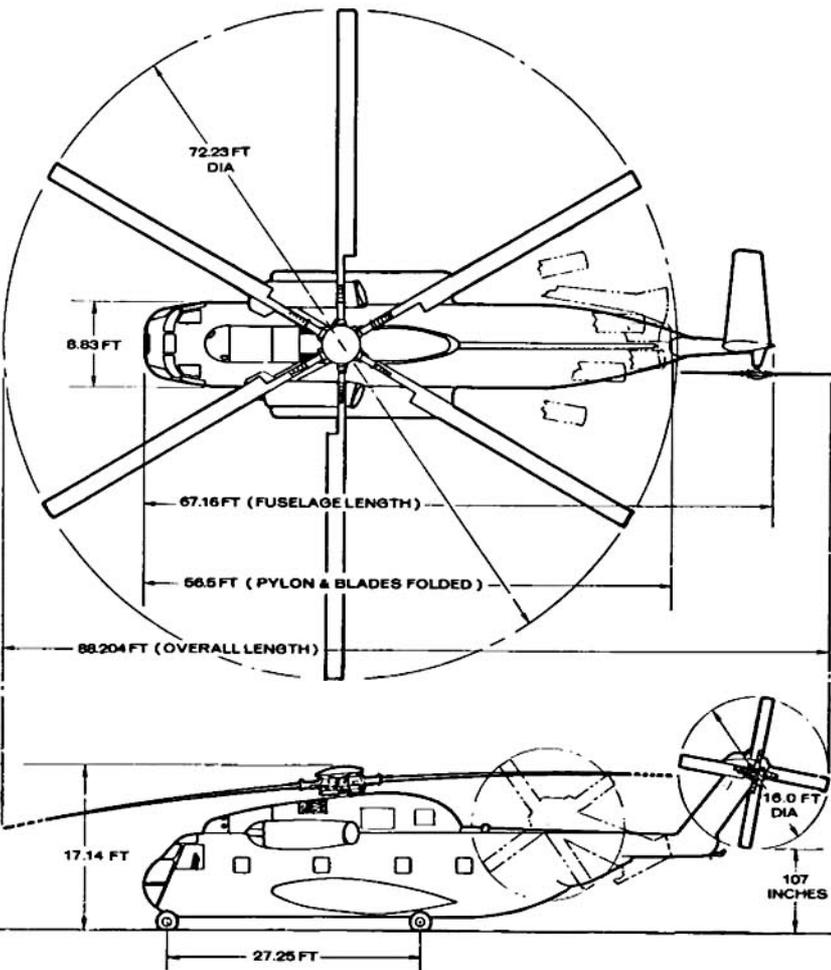
NAVAL AIR SYSTEMS COMMAND  
NAVY DEPARTMENT



0 5' 10'  
SCALE

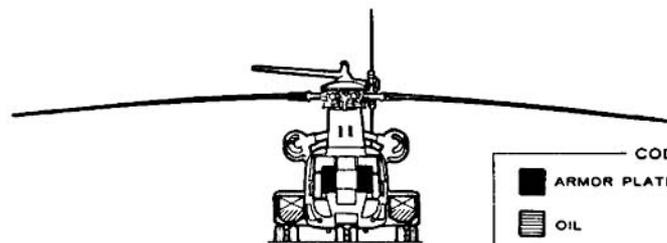
MAIN ROTOR DATA

DISC AREA..... 4098.135 SQFT  
BLADE AREA(TOTAL).... 374.952 SQ FT  
BLADE SECTION..... NACA.0011 MOD  
BLADE CHORD..... 26.0 INCH  
MAIN ROTOR GEAR RATIO..... 73.55:1



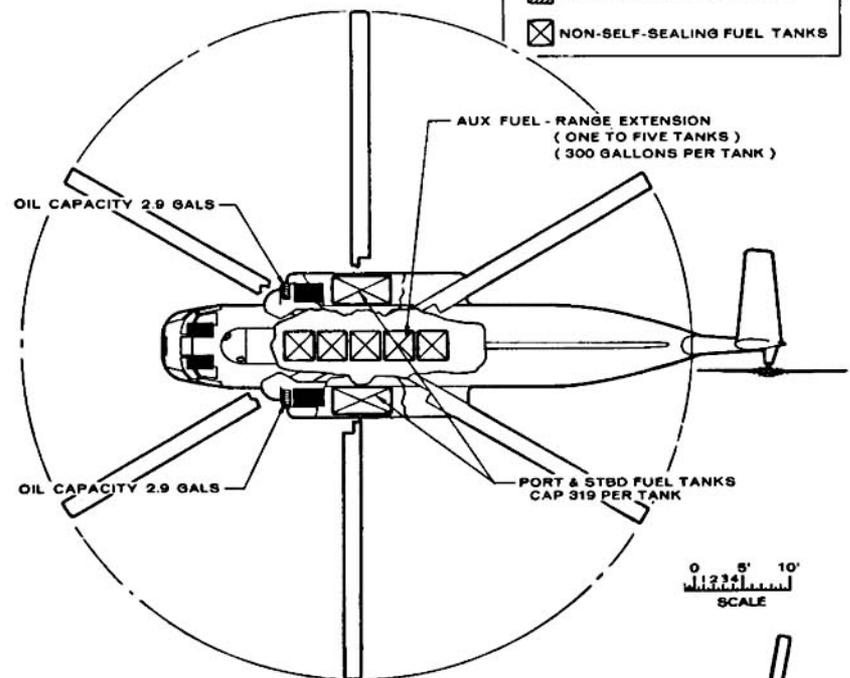
DESCRIPTIVE ARRANGEMENT

NAVAL AIR SYSTEMS COMMAND  
NAVY DEPARTMENT



CODE

- ARMOR PLATE
- ▨ OIL
- ▩ SELF-SEALING FUEL TANKS
- ⊠ NON-SELF-SEALING FUEL TANKS



0 5' 10'  
SCALE

ARMAMENT AND TANKAGE



## PERFORMANCE SUMMARY

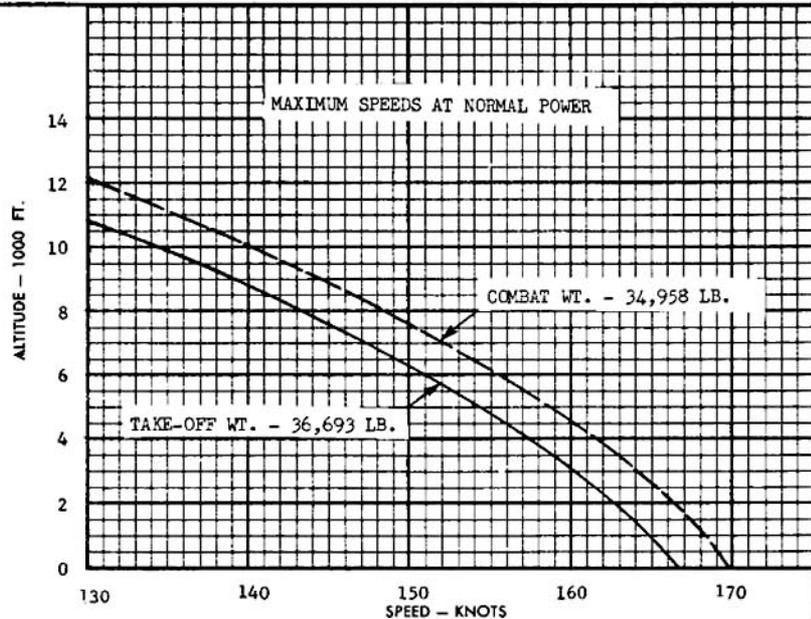
TAKE-OFF LOADING CONDITION		BASIC ASSAULT MISSION I	OVERLOAD ASSAULT MISSION II	COMBAT RANGE MISSION III	FERRY RANGE MISSION IV	RETRIEVAL (TROPICAL DAY)* MISSION V
TAKE-OFF WEIGHT	LB.	36693	41435	36693	41513	28693
FUEL	LB.	4338	4338	4338	14538	4338
PAYLOAD	LB.	8000/4000	12742/4000	8000/0	0/0	0/9289**
DISC LOADING	LB./SQ.FT.	8.95	10.11	8.95	10.23	7.00
VERTICAL RATE OF CLIMB AT S.L. (B/C)	FPM.	1590/1740	580/840	1590/1740	560/820	2110/2325
ABSOLUTE HOVERING CEILING (B/C)	FT.	6250/7200	1700/2900	6250/7200	1650/2850	7900/8900
MAX. RATE OF CLIMB AT S.L. (A/B)	FPM.	2180/2460	1845/2160	2180/2460	1855/2150	2320/2710
SERVICE CEILING (100 FPM.) (A)	FT.	16750	13350	16750	13300	17500
SPEED AT S.L. (A)	KN.	166	158	166	157	172
MAX. SPEED/ALTITUDE (A)	KN./FT.	166/S.L.	158/S.L.	166/S.L.	127/8000	169/3000
COMBAT RANGE	N.MI.	---	---	228	886	---
AVERAGE CRUISING SPEED	KN.	---	---	140	135	---
CRUISING ALTITUDE	FT.	---	---	0	8000	---
COMBAT RADIUS	N.MI.	100	95	---	---	106
AVERAGE CRUISING SPEED	KN.	150	150	---	---	138
Cruising altitude	FT.	0	0	---	---	3000
Total-mission time	HRS.	1.48	1.40	1.63	6.62	1.55

- NOTES: (A) Normal power  
 (B) Military power  
 (C) Maximum power  
 \* Tropical Day: 91.5°F. at 3000 ft. cruise altitude.  
 \*\* Inbound payload is carried externally ( $\Delta f = 35$  sq. ft.)

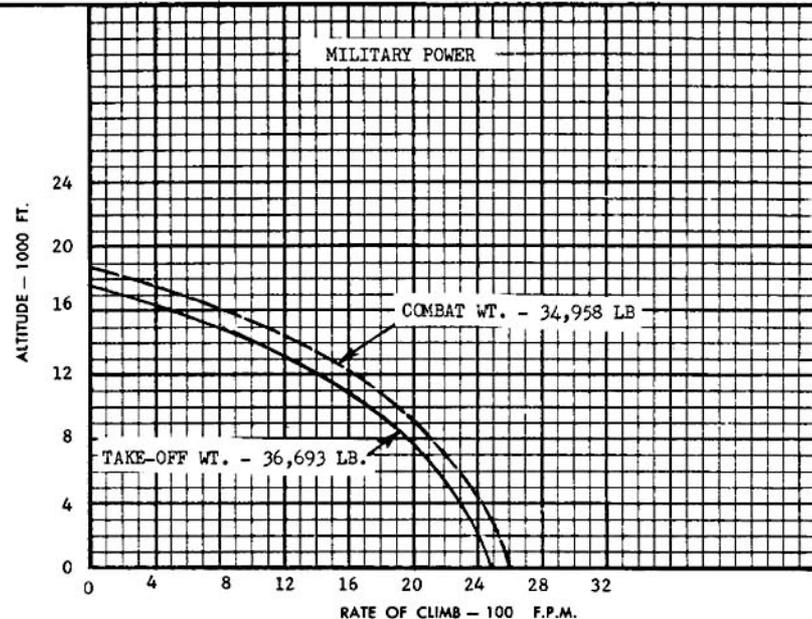
## Performance Basis:

- (1) ICAO Standard conditions (except Mission V), no wind, no ground effect.
- (2) Calculated data based on Navy flight tests on CH-53A helicopter.
- (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 engine specification values.
- (5) Transmission ratings are 7560 HP dual engine and 3780 HP single engine operation.
- (6) Aircraft red line airspeed is 170 knots LAS.
- (7) Weight data based on "Actual Weight and Balance Report", SER-65575 dated 10 March 1970.
- (8) Performance reference: Sikorsky Report, SER-65583, "Substantiating Data for Standard Aircraft Characteristics and Performance Charts for CH-53D Helicopter."

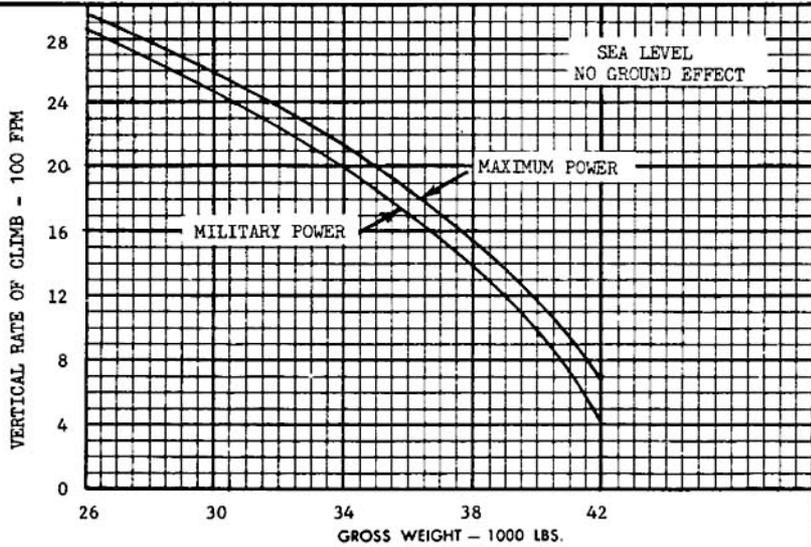
**SPEED**



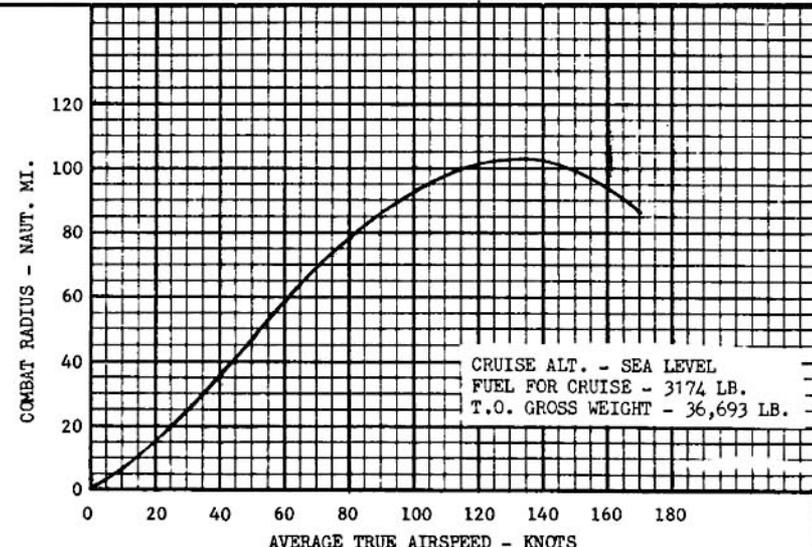
**CLIMB**



**CLIMB**



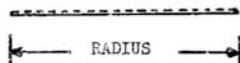
**COMBAT RADIUS**



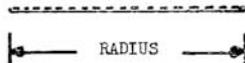
## NOTES

BASIC ASSAULT

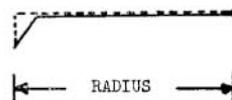
Warm-Up & Take-Off: 2 min. at S.L., NRP  
 Cruise Out: At 150 kts. air-speed at S.L. to remote base  
 Hover Over Remote Base: At S.L. out of ground effect, for 10 min.  
 Land At Remote Base: Discharge 8000 lbs. and accept 4000 lbs. for return  
 Warm-Up & Take-Off: 2 min. at S.L., NRP  
 Cruise Back: At 150 kts. air-speed at S.L.  
 Reserve: 10% of initial fuel load

OVERLOAD ASSAULT

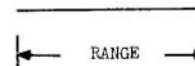
Warm-Up & Take-Off: 2 min. at S.L., NRP  
 Cruise Out: At 150 kts. air-speed at S.L. to remote base  
 Hover Over Remote Base: At S.L. out of ground effect for 10 min.  
 Land At Remote Base: Discharge 12,742 lbs. and accept 4000 lbs. for return  
 Warm-Up & Take-Off: 2 min. at S.L., NRP  
 Cruise Back: At 150 kts. air-speed at S.L.  
 Reserve: 10% of initial fuel load

DUD RETRIEVAL (TROPICAL DAY)

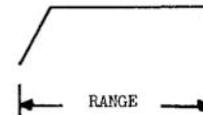
Warm-Up & Take-Off: 5 min. at S.L., 90°F, NRP  
 Climb: On course to 3000 ft. 91.5°F with Mil power  
 Cruise Out: At best range speeds to remote base  
 Hover Over Base: Out of ground effect, at 3000 ft., 91.5°F for 10 min. Pick up external maximum payload (O.G.E. hover,  $\Delta f = 35 \text{ ft}^2$ )  
 Cruise Back: At best range speeds 3000 ft., 91.5°F  
 Descend: To S.L. (no fuel used, no distance gained)  
 Reserve: 10% of initial fuel load

COMBAT RANGE

Warm-Up & Take-Off: 5 min. at S.L., NRP  
 Cruise Out: At S.L. at best range speeds until reserve fuel remains  
 Reserve: 10% of initial fuel load

FERRY RANGE

Warm-Up & Take-Off: 5 min. at S.L., NRP  
 Climb: On course to 8000 ft. with MIL power  
 Cruise Out: At best range speeds until reserve fuel remains  
 Descend: To S.L. (no fuel used, no distance gained)  
 Reserve: 10% of initial fuel load

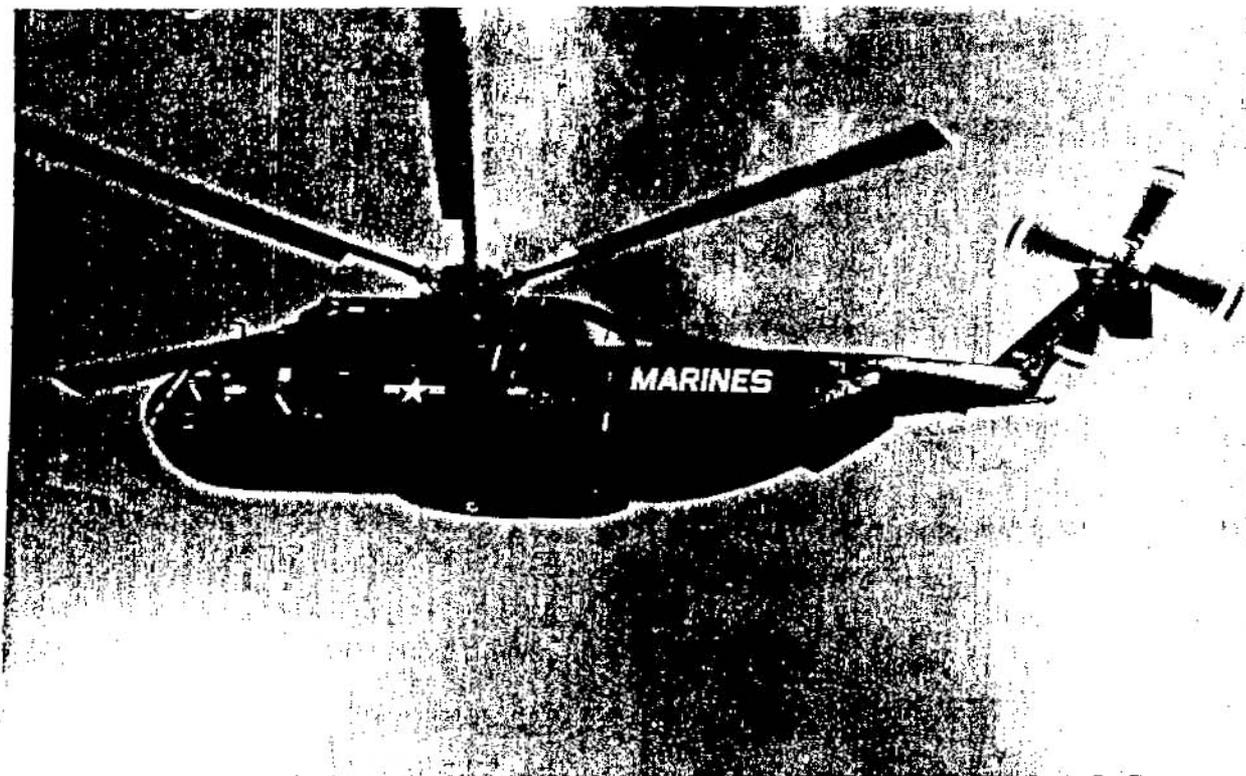


# Standard Aircraft Characteristics

## NAVY MODEL CH-53D AIRCRAFT

PUBLISHED BY DIRECTION OF THE  
COMMANDER OF THE NAVAL AIR SYSTEMS COMMAND

24 AUGUST 1981

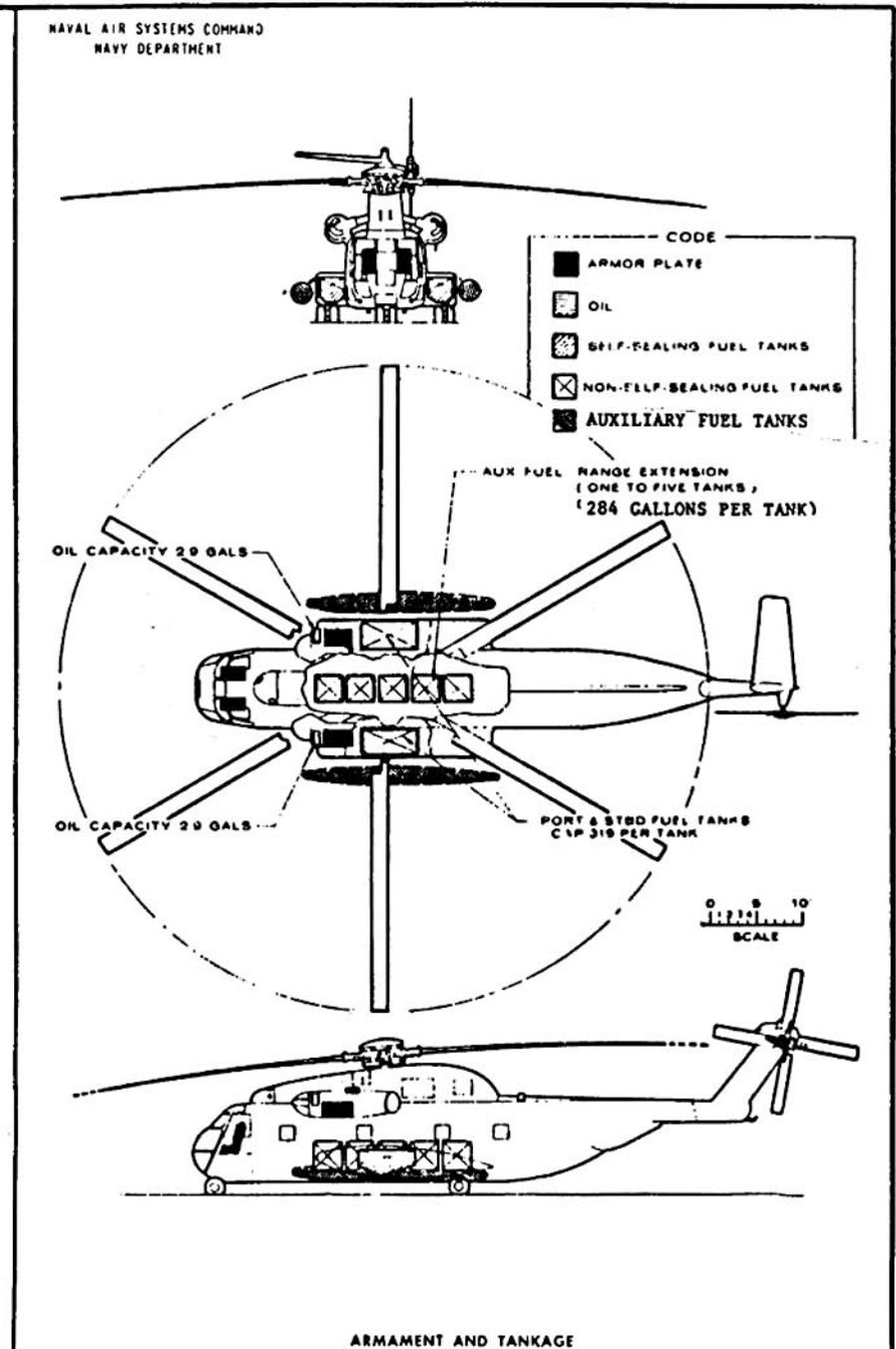
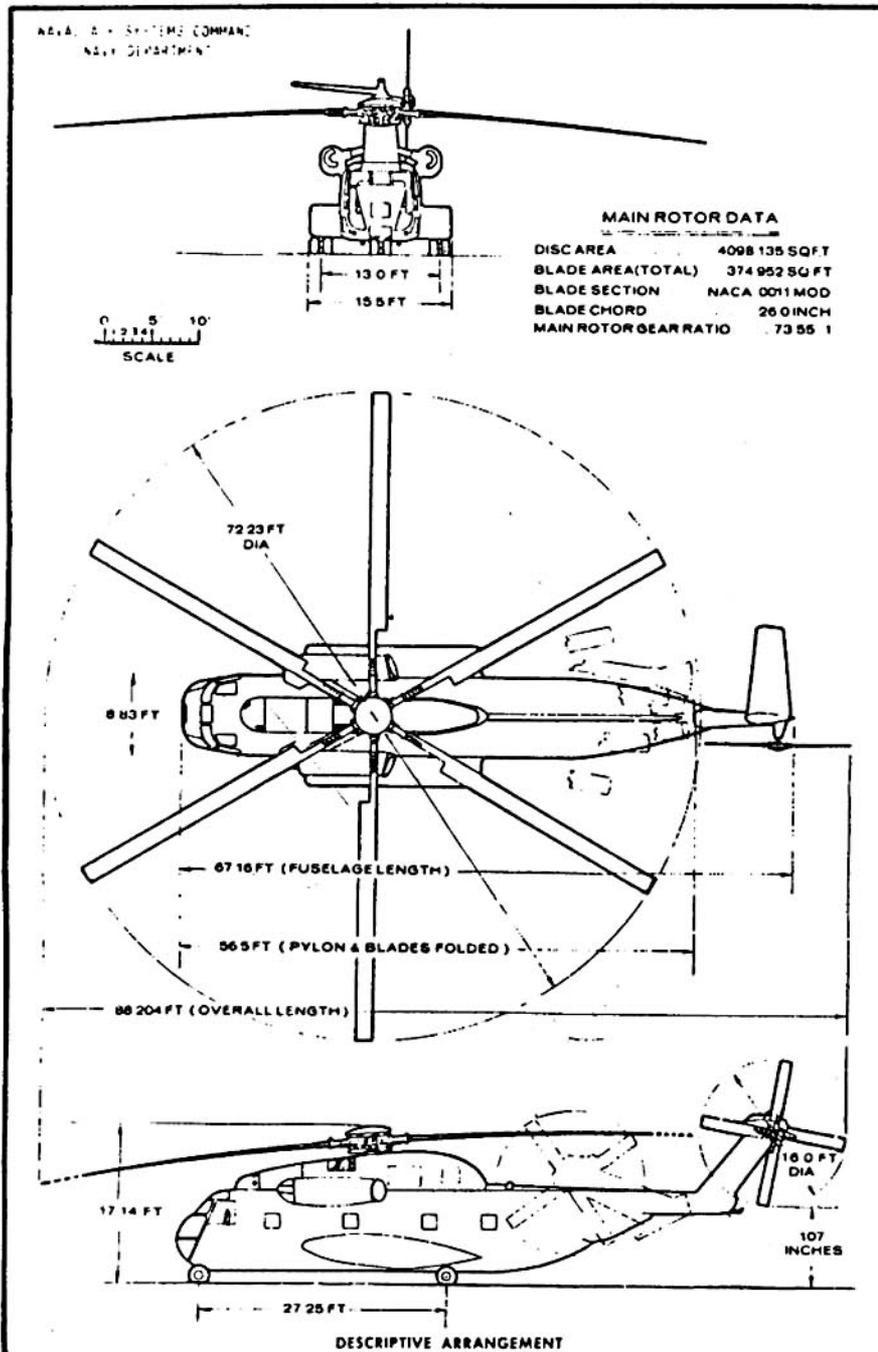


# STANDARD AIRCRAFT CHARACTERISTICS

**CH-53D**

**SEA STALLION**

**SIKORSKY AIRCRAFT**



POWER PLANT	MISSION AND DESCRIPTION	WEIGHTS																																				
<p>No. and Model: (2)T64-GE-413            Manufacturer: General Electric            Engine Spec. No.: E1159(19 March 1969)            Type: Axial            Length: 78.8 inches            Diameter: 23.8 inches            Gear Ratio (Eng/Rotor) 73.55 to 1</p> <p style="text-align: center;"><b>RATINGS</b></p> <table border="1"> <thead> <tr> <th>S. L. STATIC</th> <th>SHP</th> <th>RPM</th> <th>MIN.</th> </tr> </thead> <tbody> <tr> <td>Max.</td> <td>*3925</td> <td>13600</td> <td>10</td> </tr> <tr> <td>Military</td> <td>3695</td> <td>13600</td> <td>30</td> </tr> <tr> <td>Normal</td> <td>3230</td> <td>13600</td> <td>Cont.</td> </tr> </tbody> </table> <p>* See Note Performance Summary page for transmission ratings.</p>	S. L. STATIC	SHP	RPM	MIN.	Max.	*3925	13600	10	Military	3695	13600	30	Normal	3230	13600	Cont.	<p>Primarily designed as an assault transport, the helicopter is employed in the movement of cargo and equipment and in the transportation of troops. When appropriately equipped, it may be used in the recovery of downed aircraft and personnel, performing mine countermeasure missions.</p> <p>The twin turbine engine helicopter uses a single main rotor and a single anti-torque tail rotor. The blades are all metal construction. Main rotor blades are equipped with Sikorsky BIM<sup>R</sup> to eliminate mandatory blade retirement. Conventional helicopter controls are provided for both pilot and copilot. The mechanical controls are augmented by two parallel and independent hydraulic servo systems. An automatic flight control system (AFCS) is also provided. Landing gear is retractable. Main rotor blades and tail pylon fold for stowage aboard an aircraft carrier. To facilitate cargo loading, the aircraft is equipped with a hydraulically operated rear ramp, two cargo winches, roller conveyors, and tie-down facilities.</p>	<table border="1"> <thead> <tr> <th>LOADING</th> <th>POUNDS</th> <th>L.P.</th> </tr> </thead> <tbody> <tr> <td>Empty</td> <td>24170</td> <td></td> </tr> <tr> <td>Basic</td> <td>24453</td> <td></td> </tr> <tr> <td>Design</td> <td>33500</td> <td>3.0</td> </tr> <tr> <td>Design Alternate</td> <td>42000</td> <td>2.39</td> </tr> </tbody> </table>	LOADING	POUNDS	L.P.	Empty	24170		Basic	24453		Design	33500	3.0	Design Alternate	42000	2.39					
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<p>AN/ARC-51A Radio Set (UHF)            AN/ARN-52 Tacan Navigation Set            AN/APX-64 IFF Transponder Set            AN/ARC-94 Radio Set            AN/ARN-59 ADF            AN/ARC-54 or 131 Radio Set (VHF)            AN/AIC-14 Interphone System            AN/APN-154 Radar Beacon Set            AN/APN-171 Radar Altimeter            ID-351 or 387/ARN Course Indicator            ID-663A/U or B/U or C/U Bearing Distance                Heading Indicator            AN/ARA-25A Direction Finder</p>	<b>DEVELOPMENT</b>	<table border="1"> <thead> <tr> <th>LOCATION</th> <th>NO. TANKS</th> <th>GAL.</th> </tr> </thead> <tbody> <tr> <td>L. Sponson*</td> <td>1</td> <td>319</td> </tr> <tr> <td>R. Sponson*</td> <td>1</td> <td>319</td> </tr> <tr> <td>External tanks</td> <td>2</td> <td>1300</td> </tr> <tr> <td>Cabin**</td> <td>5</td> <td>1420</td> </tr> <tr> <td>Grade</td> <td>JP-4, JP-5, JP-8</td> <td></td> </tr> <tr> <td>Specification</td> <td>MIL-J-5624D</td> <td></td> </tr> <tr> <td colspan="3">*Bottom third self-sealing</td> </tr> <tr> <td colspan="3">**Aux. tanks for range extension; only one may be carried if external tanks carried.</td> </tr> <tr> <th colspan="3" style="text-align: center;"><b>OIL</b></th> </tr> <tr> <td>Nacelles</td> <td>2 (tot. 5.8)</td> <td></td> </tr> <tr> <td>Specification</td> <td>MIL-L-23699</td> <td></td> </tr> </tbody> </table>	LOCATION	NO. TANKS	GAL.	L. Sponson*	1	319	R. Sponson*	1	319	External tanks	2	1300	Cabin**	5	1420	Grade	JP-4, JP-5, JP-8		Specification	MIL-J-5624D		*Bottom third self-sealing			**Aux. tanks for range extension; only one may be carried if external tanks carried.			<b>OIL</b>			Nacelles	2 (tot. 5.8)		Specification	MIL-L-23699	
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	<b>DIMENSIONS</b>	<b>ACCOMMODATIONS</b>																																				
	<p>Main Rotor Dia. ----- 72'02.8"            Length (blades &amp; pylon folded) ----- 56'-6"            Height (blades &amp; pylon folded) ----- 17'-1.7"            No. of Blades, main ----- 6            Blade Area (each) ----- 62.5 sq. ft.            Disc Area ----- 4098.1 sq. ft.            Main Wheel Tread ----- 13'-0"            Max. Width (Main Blades and Pylon Folded) ----- 15'-6"</p>	<table border="1"> <tbody> <tr> <td>Crew (Normal)</td> <td>3</td> </tr> <tr> <td>Cargo (basic mission) -----</td> <td>8000 lb.</td> </tr> <tr> <td>or</td> <td></td> </tr> <tr> <td>Cargo -----</td> <td>12549 lb.</td> </tr> <tr> <td>or</td> <td></td> </tr> <tr> <td>Troops -----</td> <td>38</td> </tr> <tr> <td>or</td> <td></td> </tr> <tr> <td>Litters -----</td> <td>24</td> </tr> <tr> <td colspan="2">Cabin Size Clearance:</td> </tr> <tr> <td>Length -----</td> <td>30'-0"</td> </tr> <tr> <td>Height -----</td> <td>6'-6"</td> </tr> <tr> <td>Width -----</td> <td>7'-6"</td> </tr> </tbody> </table>	Crew (Normal)	3	Cargo (basic mission) -----	8000 lb.	or		Cargo -----	12549 lb.	or		Troops -----	38	or		Litters -----	24	Cabin Size Clearance:		Length -----	30'-0"	Height -----	6'-6"	Width -----	7'-6"												
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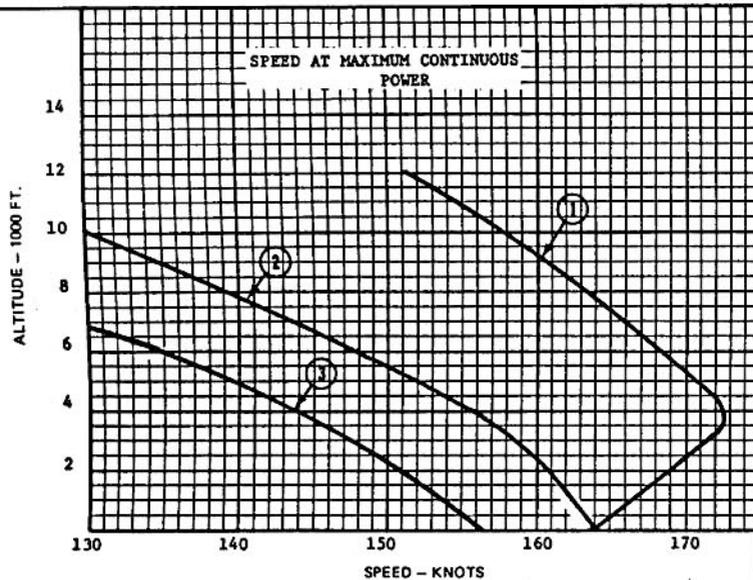
## PERFORMANCE SUMMARY

TAKE-OFF LOADING CONDITION		① CLEAN MISSION I	② BASIC ASSAULT MISSION II	③ CARGO DELIVERY MISSION III	④ RETRIEVAL MISSION IV	⑤ FERRY RANGE MISSION V
TAKE-OFF WEIGHT	lb.	29451	37451	42000	29451	42000
Fuel internal/external (JP-5)	lb./lb.	4338	4338	4338	4338	14978
Payload	lb.	0	8000/0	12549/0	0/13555 (A)	0
Disc loading	lb./sq. ft.	7.19	9.14	10.25	7.19	10.25
Vertical rate of climb at S.L. (B)	fpm.	4800	2388	1050	4800	1050
Absolute hovering ceiling (OGE) (B)	ft.	14100	6800	2800	14100	2800
Max. rate of climb at S.L. (C)	fpm.	2900	2500	2150	2900	2150
Service ceiling (C)	ft.	24500 (D)	21200 (D)	16500 (D)	24500 (D)	16500 (D)
Speed at S.L. (E)	kn.	164	164	156	164	156
Max speed/altitude (E)	kn./ft.	173/4000	164/SL	156/SL	173/4000	156/SL
O.E.I. Service ceiling (C)	ft.	16250 (D)	8500	4700	16250 (D)	4700
Min. speed (O.E.I.) (C)	kn.	16	36	48	16	48
Max. speed (O.E.I.) (C)	kn.	140	133	125	140	125
Combat radius	n. mi.	-	95.2	90.5	85	-
Mission time	hrs.	-	1.33	1.29	1.60	-
Average cruising speed	kn.	-	164	160	127	-
Cruising altitude	ft.	-	SL	SL	3000	-
Range	n. mi.	286	225	212.6	249	958
Average cruising speed	kn.	140	140	139	134	135
Cruising altitude	ft.	10000	SL	SL	3000	4000-10000
Maximum endurance (F)	hrs.	2.72	2.09	1.93	2.45	9.05
Endurance speed	kn.	75	75	80	68	86
Endurance altitude	ft.	10000	SL	SL	3000	4000-10000

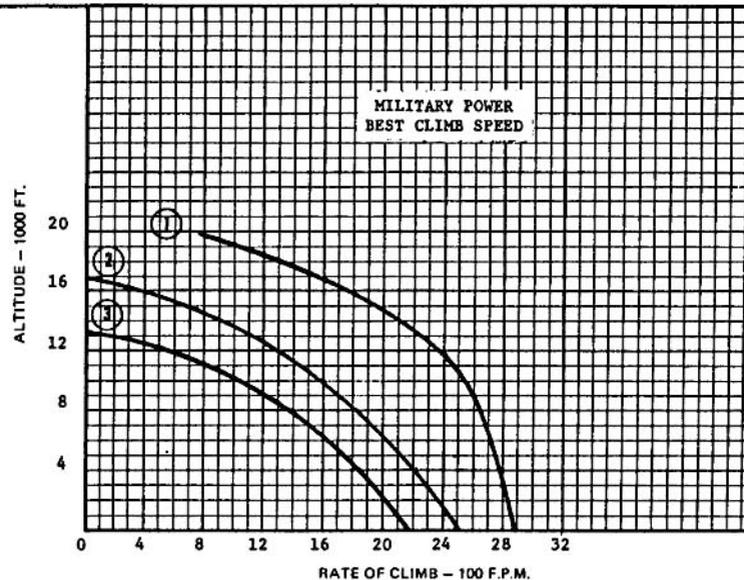
## NOTES

- (A) 35 Ft<sup>2</sup> external load on return leg  
 (B) Maximum power  
 (C) Mil power  
 (D) Oxygen equipment required above 10,000 Ft.  
 (E) At maximum continuous power  
 (F) Endurance times do not include engine start and take-off or climb  
 (G) All performance for Standard Day  
 (H) All fuel flows increased 5% above engine specification  
 (I) 30 min. transmission limit 7560 hp twin engine, 3780 hp single engine; continuous limit 6400 hp twin engine, 3200 hp single engine

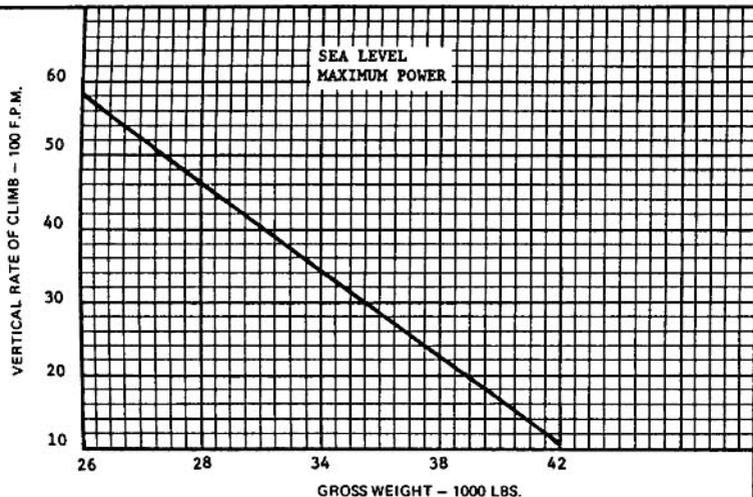
**SPEED**



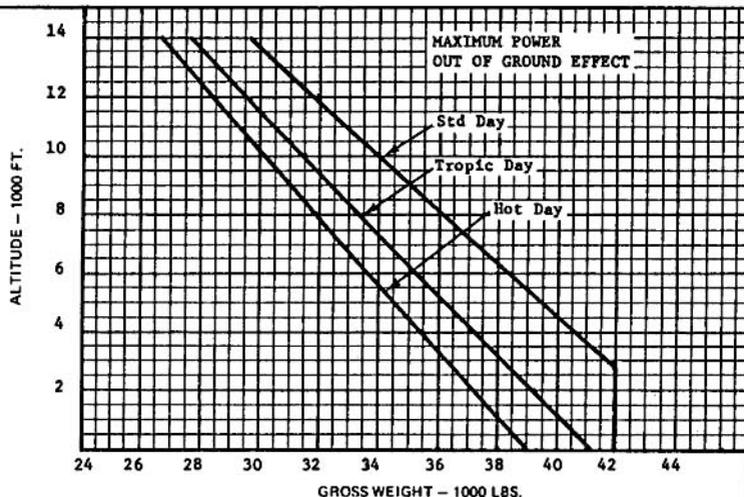
**CLIMB**



**VERTICAL RATE OF CLIMB**



**HOVER CEILING**



LOADING CONDITION COLUMN NUMBER

## NOTES

CLEAN

Engine Start & Take-Off:  
5 min. at S.L. MCP.  
Climb to optimum cruise altitude  
at Mil power.  
Cruise out at speed for best range  
at optimum cruise altitude.  
Reserve: 10% of initial fuel or fuel  
for 20 min. at best range speed at  
S.L., whichever is greater.

BASIC ASSAULT

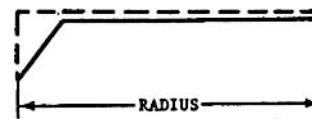
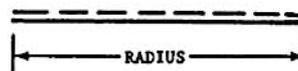
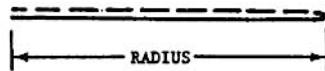
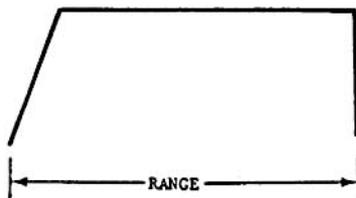
Engine Start & Take-Off:  
5 min. at S.L., MCP.  
Cruise Out: At MCP airspeed  
at S.L. to remote base.  
Land at Remote Base: Discharge  
8000 lbs.  
Engine Start & Take-Off:  
5 min. at S.L., MCP.  
Cruise Back: At MCP airspeed  
at S.L.  
Reserve: 10% of initial fuel  
or fuel for 20 min. at best  
range speed at S.L.,  
whichever is greater.

CARGO DELIVERY

Engine Start & Take-Off:  
5 min. at S.L., MCP.  
Cruise Out: At MCP air-  
speed at S.L. to remote  
base.  
Land At Remote Base:  
Discharge cargo.  
Engine Start & Take-Off:  
5 min. at S.L., MCP.  
Cruise Back: At MCP air-  
speed at S.L.  
Reserve: 10% of initial  
fuel load or fuel for  
20 min. at best range  
speed, whichever is  
greater.

DUD RETRIEVAL

Engine Start & Take-Off:  
5 min. at S.L., MCP.  
Climb: On course to 3000 ft.  
with Mil power.  
Cruise Out: At best range  
speeds to remote base.  
Hover Over Base: Out of ground  
effect, at 3000 ft., for  
10 min. Pick up external  
maximum payload (O.G.E. hover,  
 $f=35 \text{ ft}^2$ ).  
Cruise Back: At best range  
speed 3000 ft.  
Descend: To S.L. (no fuel  
used, no distance gained).  
Reserve: 10% of initial fuel  
load or fuel for 20 min. at  
best range speed, whichever  
is greater.

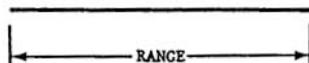


LOADING CONDITION COLUMN NUMBER

NOTES

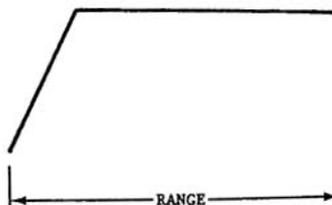
RANGE

Engine Start & Take-Off:  
 5 min. at S.L., MCP.  
 Climb on course to specified  
 Alt at Mil power.  
 Cruise Out: At specified  
 altitude at best range speed  
 until reserve fuel remains.  
 Descend: To S.L. (no fuel  
 used, no distance gained).  
 Reserve: 10% of initial fuel  
 load or fuel for 20 min. at  
 best range speed, whichever  
 is greater.



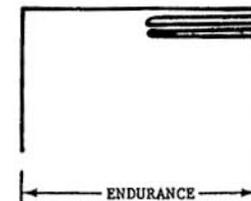
FERRY RANGE

Engine Start & Take-Off:  
 5 min at S.L., MCP.  
 Climb: On course to 8000 ft.  
 with Mil power.  
 Cruise Out: At best range speed  
 until reserve fuel remains.  
 Descend: To S.L. (no fuel used,  
 no distance gained).  
 Reserve: 10% of initial fuel  
 load or fuel for 20 min. at  
 best range speed, whichever  
 is greater.



ENDURANCE

Engine Start & Take-Off:  
 5 min at S.L., MCP.  
 Climb to specified  
 loiter altitude at  
 Mil power.  
 Loiter at speed for  
 best endurance at  
 specified altitude.  
 Reserve: 10% of initial  
 fuel or fuel for 20  
 min. at best range  
 speed, whichever is  
 greater.



○ LOADING CONDITION COLUMN NUMBER