

# STANDARD AIRCRAFT CHARACTERISTICS

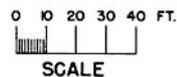
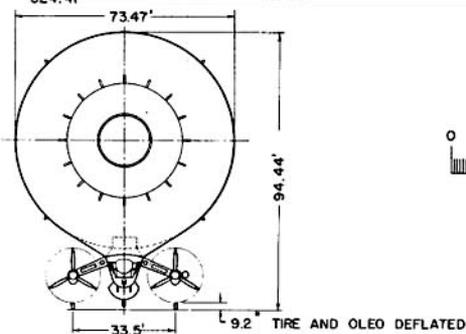
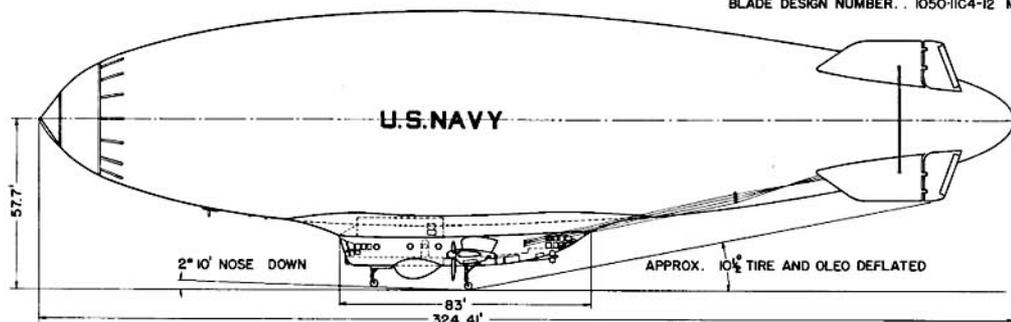
## ZPN-1

GOODYEAR

Standard Aircraft Characteristics NAVAER 1395A (REV. 1-49)

BUREAU OF AERONAUTICS  
NAVY DEPARTMENT

ENVELOPE VOLUME . . . . . 875,000 CU FT  
FINENESS RATIO . . . . . 4.37  
BALLONET VOLUME . . . . . 220,800 CU FT  
NUMBER OF BALLONETS . . . . . 3  
EMPENNAGE (TOTAL 4) . . . . . 3032 SQ FT  
PROPELLER . . . . . CURTISS ELECTRIC 3 BLADES  
BLADE DESIGN NUMBER . . . . . 1050-1104-12 MODIFIED



DESCRIPTIVE ARRANGEMENT

Standard Aircraft Characteristics NAVAR 1935F (REV. 1-49)

**POWER PLANT**

NO. & MODEL.....(2)R-1300-2  
 MFR.....W.A.C.  
 SUPCHG.....1 stage, 1 speed  
 GEAR BOX RATIO.....0.337  
 PROP. MFR.....CURTISS  
 PROP. DES NO.1050-11C4-12 MOD  
 NO. BLADES/DIA...3/18 ft 1 in

**RATINGS**

Bhp @ Rpm @ Alt

T.O. 800 2,600 0  
 MIL. 800 2,600 0-3500'  
 NORMAL 700 2,400 0-5000'

SPEC. No. N865

**ORDNANCE**

No ordnance provisions are incorporated at the present time.

**ACCOMMODATIONS**

CREW.....14

**MISSION AND DESCRIPTION**

The basic mission of the ZPN airship is anti-submarine warfare patrol in cooperation with other ASW air and surface craft. Electronic installations include sonar, MAD, radar, and radio equipment for detecting and tracking submarines in open ocean areas as well as coastal waters.

Equipment installed for in-flight refueling from surface vessels allows extended patrols of a week's duration or longer. The two engines are accessibly mounted inside the car for servicing in flight. The propellers are carried on outriggers, and are driven through cross-shafts and bevel gears.

A major departure in general configuration from conventional airship design is the incorporation of an "X" empennage arrangement.

A mixer control system with a conventional wheel and control column controls the ruddervators. The normal crew is fourteen.

**DEVELOPMENT**

Mock up.....February 1949  
 First flight.....June 1951

**DIMENSIONS**

GAS VOLUME.....875,000 cu ft  
 BALLONETS.....(3)220,800 cu ft  
 LENGTH.....324 ft 5 in  
 HEIGHT.....94 ft 5 in  
 WIDTH.....73 ft 6 in  
 MAX. DIA.....73 ft 6 in

**WEIGHTS**

LOADINGS	LBS
EMPTY.....	40,150
STATIC LIFT*	52,600
STATIC + MAXIMUM	
DYNAMIC LIFT.....	58,600

\*97% inflated at .062 lb/cu ft.

**FUEL AND OIL**

GAL	NO. TANKS	LOCATION
880	2	CAR-fixed
1275	5	CAR-slip
FUEL GRADE.....		91/96
FUEL SPEC.....		MIL-F-5572

**OIL**

40	1	CAR-fixed
40	8 cans	CAR-racks
OIL GRADE.....		1100
OIL SPEC.....		MIL-O-6082A

**ELECTRONICS**

TRANSMITTER.....AN/ART-13  
 RECEIVER.....(2)AN/ARR-11  
 MHF TRANSMITTER/REC..AN/ARC-2  
 VHF TRANSMITTER/REC..AN/ARC-1A  
 MARKER BEACON REC....AN/ARN-8  
 A.D.F.....AN/ARN-6  
 LORAN.....AN/APN-4  
 RADIO ALTIMETER.....AN/APN-1  
 IFF.....AN/APX-6  
 ECM.....AN-APR-9  
 SONOBUOY REC.....AN/ARR-31

(See NOTE page)

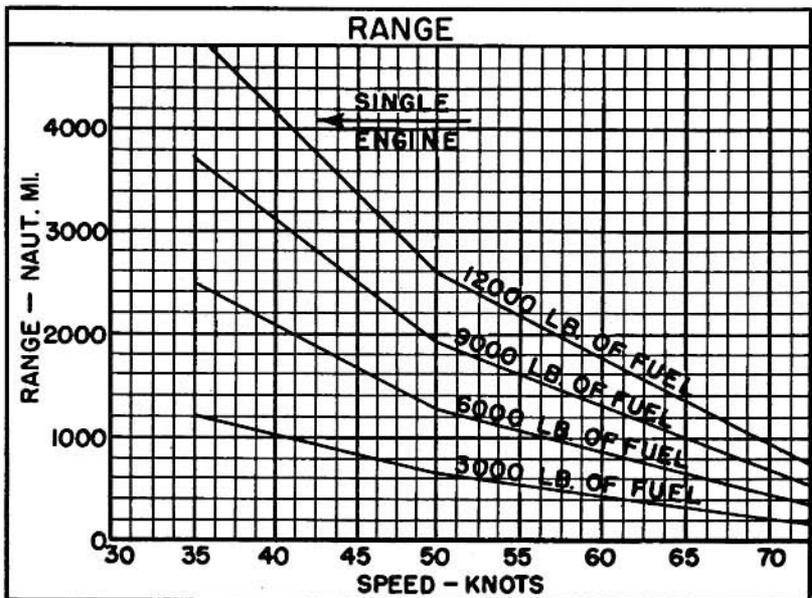
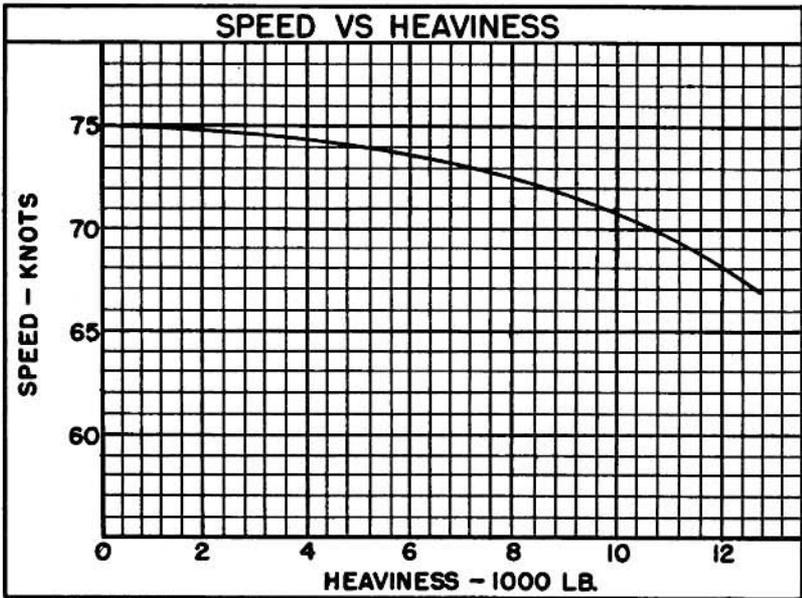
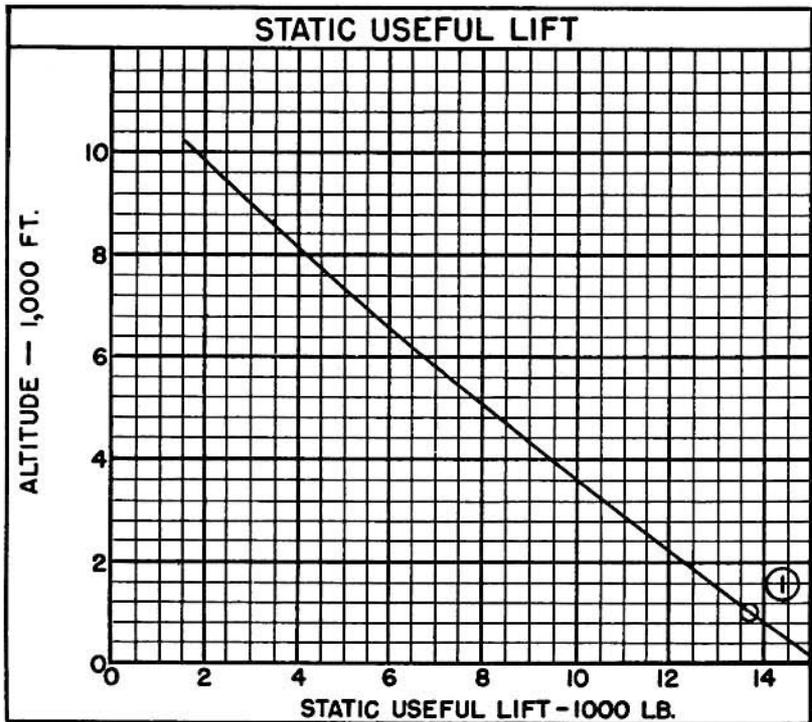
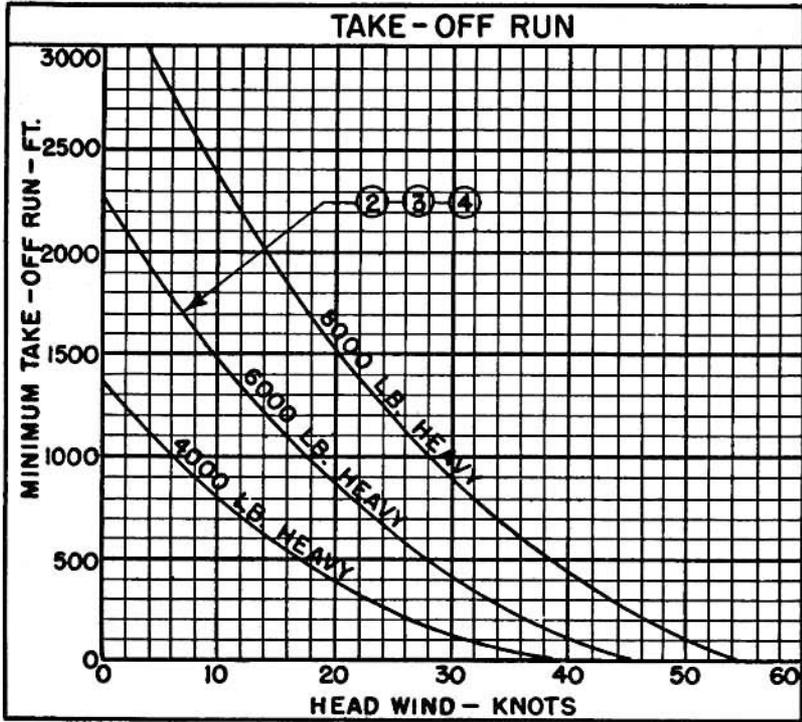


## PERFORMANCE SUMMARY

LOADING CONDITION	(1) ASW PATROL	(2) ASW PATROL	(3) FERRY	(4) HIGH ALTITUDE
TAKE-OFF WEIGHT lbs.	52,600	58,600	58,600	46,600
Fuel and Oil lbs.	7,000	13,000	13,600	3,000
Bombs lbs.	5,500	5,500	4,900	3,500
Useful Load lbs.	12,500	18,500	18,500	6,500
Static Heaviness lbs.	0	6,000	6,000	6,000
Max. Speed/Alt. kn./ft.	74/S.L.	72/S.L.	72/S.L.	75/9,500
Pressure Height ft.	1,000	1,000	1,000	9,500
Time to Pressure Height min.	.42	.42	.42	.40
Take-Off Run, Calm (50 Ft. Obstacle) ft.	400	1,860	1,860	1,860
Patrol Range/Vav n.mi./kn./alt.	1800/40/S.L.	3400/40/S.L.	3650/40/S.L.	1050/40/9500
Patrol Radius/Vav n.mi./kn./alt.	720/40/S.L.	1360/40/S.L.	1460/40/S.L.	420/40/9500
Endurance/Vav hr./kn./alt.	45/40/S.L.	85/40/S.L.	91.25/40/S.L.	26.25/40/9500
Useful Engine Fuel lbs.	6,120	11,520	12,120	2,700

## NOTES

- A. Performance is based on calculations and flight test of the ZPN-1 airship.
- B. Maximum speed refers to 100 percent normal rated power at sea level and full throttle, 2400 RPM at altitude.
- C. Pressure height is defined as the maximum altitude to which the airship can rise in the standard atmosphere in any given loading condition, without valving helium.
- D. Performance is based on inflation with helium lifting .062 lb/cu ft at sea level. Gas fullness at sea level is 97.1 percent for 1000 ft pressure height, and 75 percent for 9500 ft.
- E. Take-off run is based on sod runway, and includes allowance required to clear 50 ft obstacle.
- F. Range, radius, and endurance are based on engine specification fuel consumption data for single-engine operation increased by 5 percent.
- G. Radius is 40 percent of range.
- H. Range in heavy or light flight is based on average heaviness or lightness during flight.



# NOTES

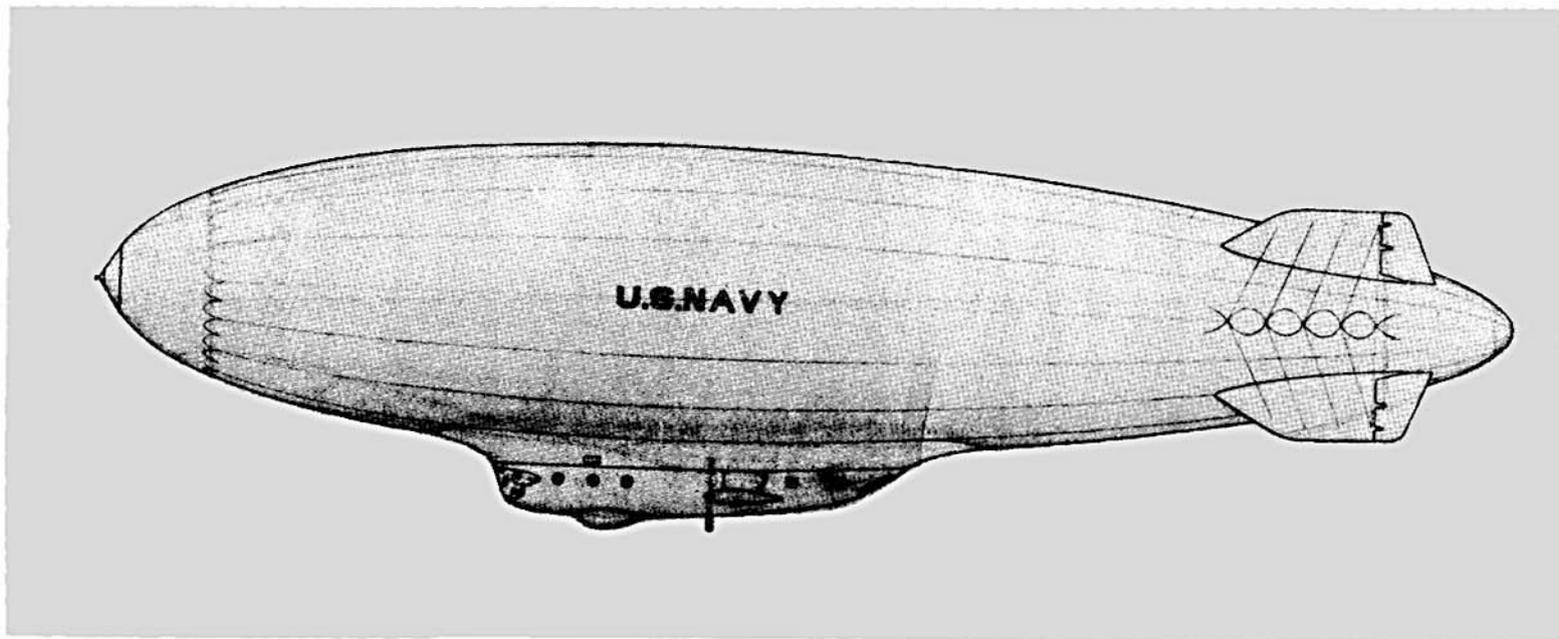
All figures for lift of the airship are based upon inflation with helium lifting .062 lb. per cu. ft. at sea level in the standard N.A.C.A. atmosphere.

The static lift in flight is independent of altitude and temperature so long as helium is not valved and there is no superheat (i.e. the air and gas are at equal temperatures).

The gross and usefull lifts of the fully inflated airship diminish with altitude in the standard atmosphere at the rate of approximately 3% of the gross lift per 1000 feet.

In the absence of superheat the lift of the fully inflated airship at a given altitude varies inversely as the air temperature at the rate of approximately 1% of the gross lift per 5° F.

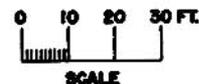
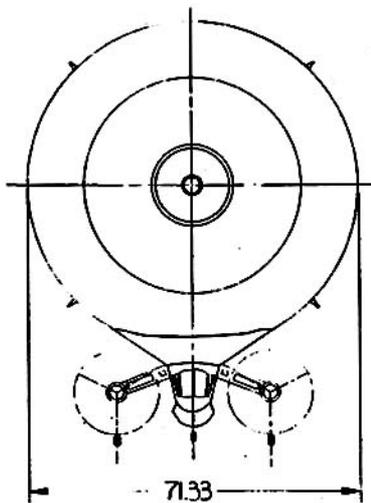
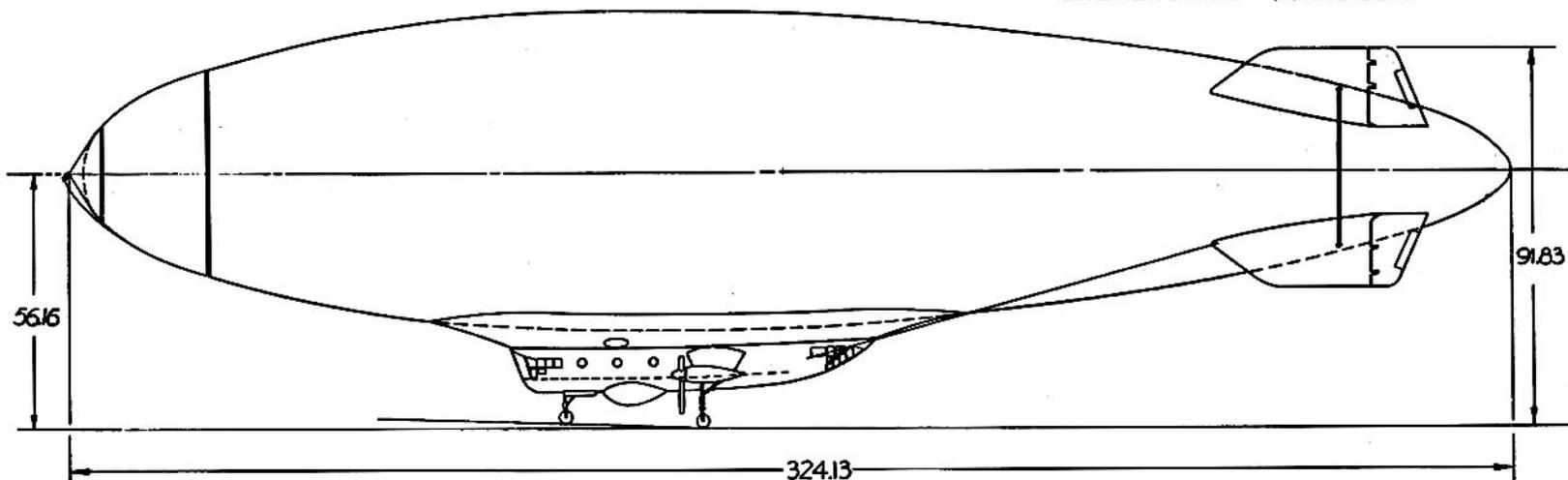
In all conditions of inflation, so long as gas is not valved, the lift varies directly with the superheat at approximately 1% per 5° F. The lift of the fully inflated airship is not, however, increased by rising gas temperature unless the altitude is reduced as necessary to avoid loss of gas by valving.



STANDARD AIRCRAFT CHARACTERISTICS  
ZPN

BUREAU OF AERONAUTICS  
NAVY DEPARTMENT

ENVELOPE VOLUME 825,000 CU. FT.  
FINENESS RATIO 4.5  
BALLONET VOLUME 213,900 CU. FT.  
NUMBER OF BALLONET (4)  
UPPER EMPENNAGE (2) 1042 SQ. FT.  
LOWER EMPENNAGE (2) 1042 SQ. FT.



DESCRIPTIVE ARRANGEMENT

**MISSION AND DESCRIPTION**

The mission of the ZPN airship is in cooperation with other ASW air and surface craft to detect and track fast submarines by sonar, MAD, radar and radio equipment in open ocean areas as well as coastal waters. A secondary task is to attack submarines with depth bombs or target seeking mines. In order to remain continuously at sea for periods of a week or more, provision is made for refueling from surface vessels, and the two engines are accessibly mounted inside the car for servicing in flight. The propellers are carried on outriggers and are driven through cross-shafts and bevel gears. The normal crew is 14.

**WEIGHTS**

Loadings Lbs.  
 EMPTY.....34,400  
 STAT. LIFT \*.....49,600  
 STAT. + MAX. DYN  
 LIFT.....55,600

\*97% inflated at .062 lb/cu.ft

All weights calculated.

**POWER PLANT**

NO. & MODEL.....(2) R-1300-2  
 MFR.....W.A.C.  
 SUPERCH.....1 stage, 1 speed  
 GEAR BOX RATIO.....0.31  
 PROP. MFR.....CURTISS  
 PROP. DES. NO.1050-1C4-12 MOD.  
 NO. BL./DIA.....3/18'-1"

**RATINGS**

	Bhp @	Rpm @	Alt.
T.O.	800	2600	3500'
NORM.	700	2400	5000'

SPEC. (not assigned)

**FUEL AND OIL**

GAL.	NO.	TANKS	LOCATION
880	2		CAR:fixed
200	1		CAR:slip
1000	4		CAR:aux.

FUEL GRADE.....91/98  
 FUEL SPEC.....AN-F-48

**OIL**

CAPACITY (GALS).....80  
 SPEC.....AN-O-8  
 GRADE.....1120

**ORDNANCE****BOMBS**

Type	Size	Location	No.
Mine	Mk.41	External	2

MAX. BOMB LOAD.....2400 Lbs.

**DIMENSIONS**

GAS VOLUME.....825,000 cu.ft.  
 BALLONETS.....213,900 cu.ft.  
 LENGTH.....324'-5"  
 HEIGHT.....91'-10"  
 WIDTH.....71'-4"  
 MAX. DIA.....71'-4"

**ELECTRONICS**

Receiver.....AN/ARC-5  
 HF Receiver.....AN/ARR-15  
 Marker Beacon Rec....AN/ARN-8  
 VHF Com.....AN/ARC-1A  
 Sonobouy Rec.....AN/ARR-26  
 Transmitter.....AN/ART-13  
 Auto. Dir. Find .....AN/ARN-7  
 Search Radar.....AN/APS-20  
 Loran.....AN/APN-4  
 Radar D.F.....AN/APA-17  
 IFF.....AN/APX-2



## PERFORMANCE SUMMARY

LOADING CONDITION		(1)	(2)	(3)	(4)
		ASW PATROL	ASW PATROL	FERRY	HIGH ALTITUDE
TAKE-OFF WEIGHT	Lbs	49,600	55,600	55,600	42,400
HEAVINESS	Lbs	0	6,000	6,000	4,000
SERVICE LOAD	Lbs	8,500	8,500	7,000	4,000
FUEL AND OIL	Lbs	6,700	12,700	14,200	4,000
MAX. SPEED	Kts	75	75	75	75
PRESSURE HEIGHT	ft.	1,000	1,000	1,000	9,400
TIME TO PRESS. HT.	min	.8	1.2	1.2	13.0
TAKE-OFF RUN, CALM	ft.	0	2,300	2,300	1,380
PATROL RANGE/SPEED	m.mi/kts	1475/50	2800/50	3130/50	1250/50
PARTOL RADIUS/SPEED	m.mi/kts	590/50	1120/50	1250/50	500/50
ENDURANCE/SPEED	Hrs./Kts	80/35	150/35	170/35	48/35

## NOTES

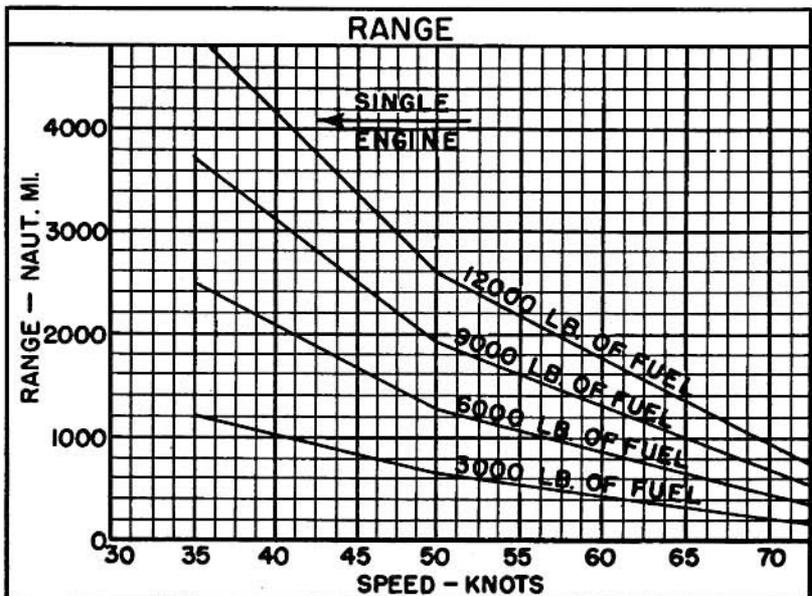
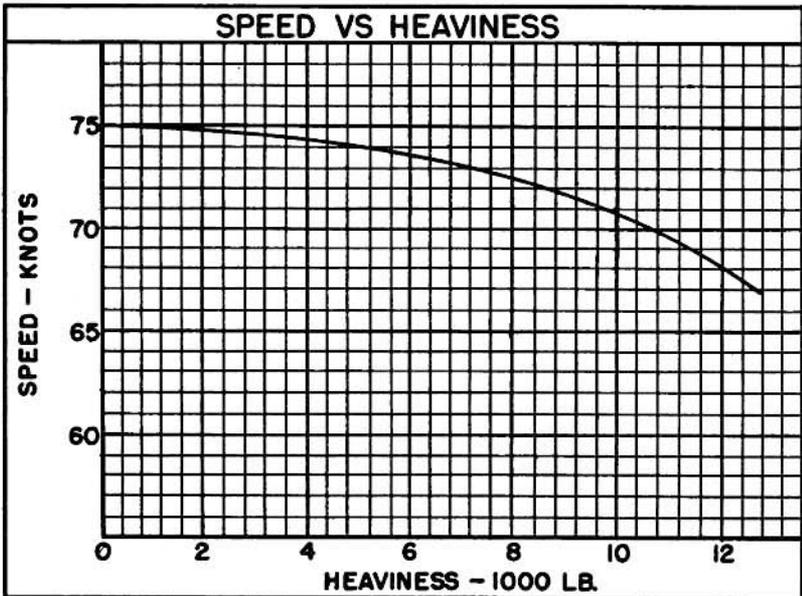
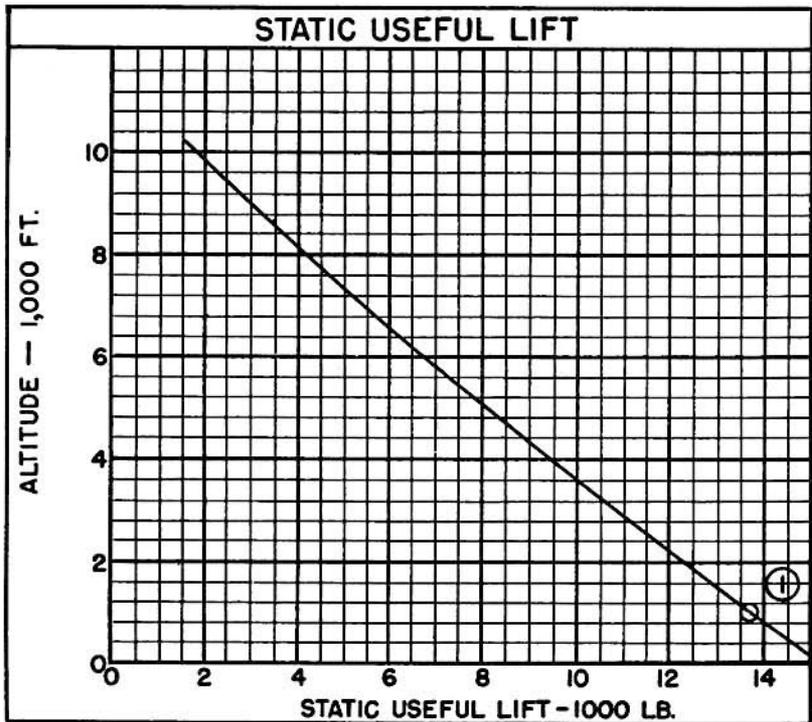
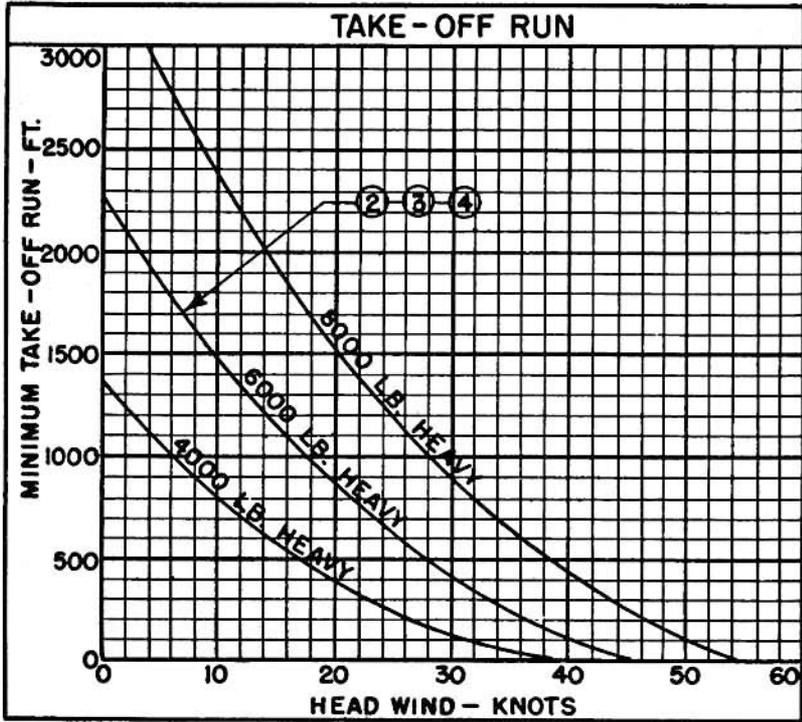
Performance is based on calculations.

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

Radius is 40% of range.

Performance is based on inflation with helium lifting .062 lb/cu. ft. at sea level. Gas fullness at sea level is 97.1% for 1000 ft. pressure height, and 75.2% for 9400 ft.

Pressure height is defined as the maximum altitude to which the airship can rise in the standard atmosphere in any given loading condition, without valving helium.



# NOTES

All figures for lift of the airship are based upon inflation with helium lifting .062 lb. per cu. ft. at sea level in the standard N.A.C.A. atmosphere.

The static lift in flight is independent of altitude and temperature so long as helium is not valved and there is no superheat (i.e. the air and gas are at equal temperatures).

The gross and usefull lifts of the fully inflated airship diminish with altitude in the standard atmosphere at the rate of approximately 3% of the gross lift per 1000 feet.

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In all conditions of inflation, so long as gas is not valved, the lift varies directly with the superheat at approximately 1% per 5° F. The lift of the fully inflated airship is not, however, increased by rising gas temperature unless the altitude is reduced as necessary to avoid loss of gas by valving.