



DINAC

DIRECCIÓN NACIONAL DE AERONÁUTICA CIVIL

**SUBDIRECCIÓN DE NORMAS DE VUELO
GERENCIA DE LICENCIAS AL PERSONAL AERONÁUTICO**

BANCO DE FIGURAS

LICENCIA DE PILOTO COMERCIAL-AVIÓN

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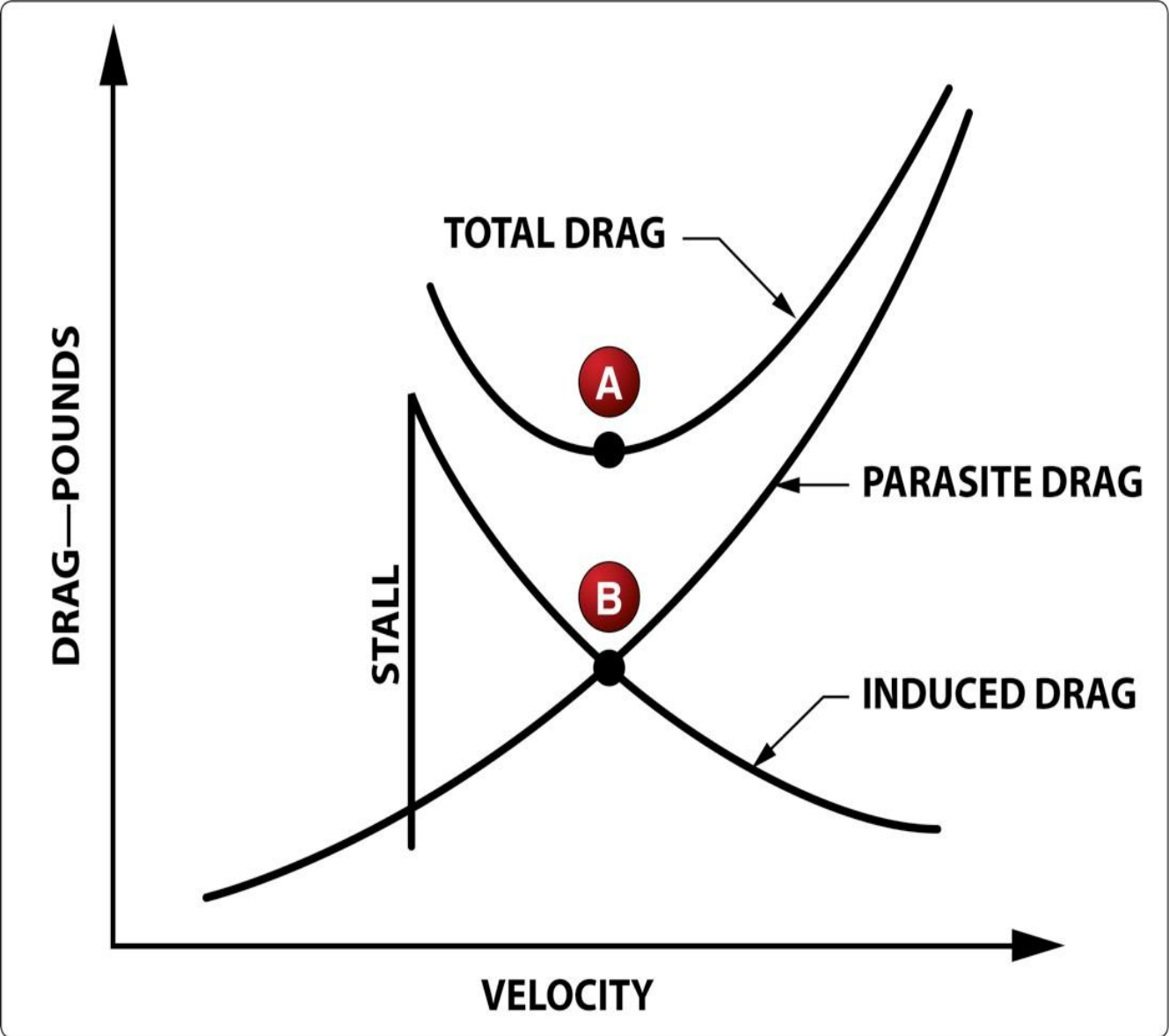


Figure 1. Drag vs. Velocity

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GROSS WEIGHT 2,750 LB		ANGLE OF BANK			
		LEVEL	30°	45°	60°
POWER		GEAR AND FLAPS UP			
ON	MPH	62	67	74	88
	KTS	54	58	64	76
OFF	MPH	75	81	89	106
	KTS	65	70	77	92
		GEAR AND FLAPS DOWN			
ON	MPH	54	58	64	76
	KTS	47	50	56	66
OFF	MPH	66	71	78	93
	KTS	57	62	68	81

Figure 2. Stall Speeds

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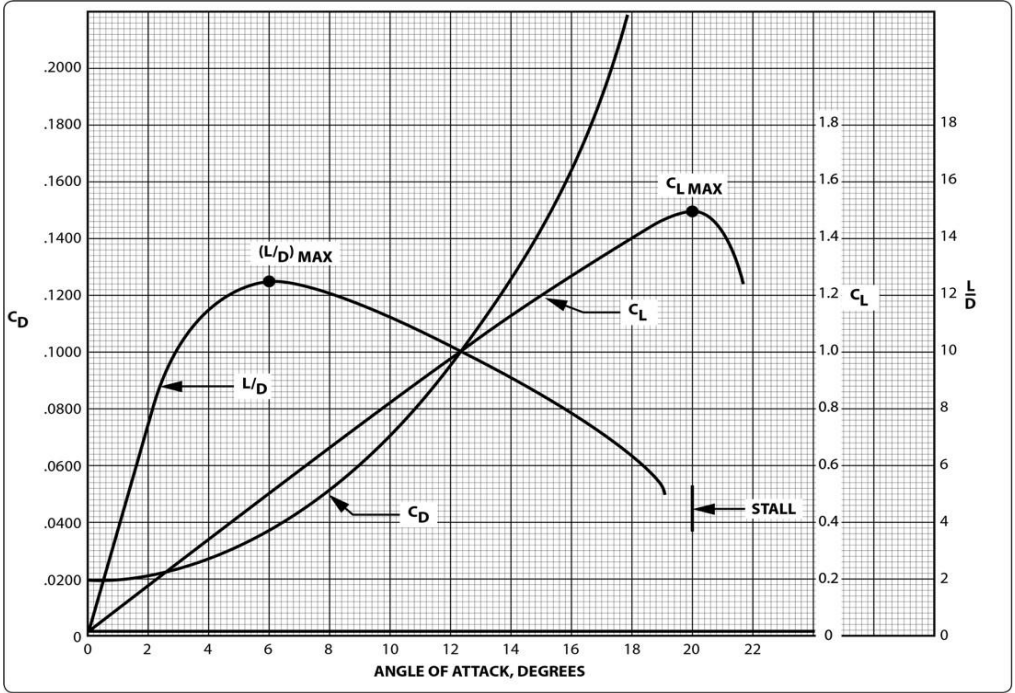


Figure 3. Angle of Attack vs. Lift ©ASA

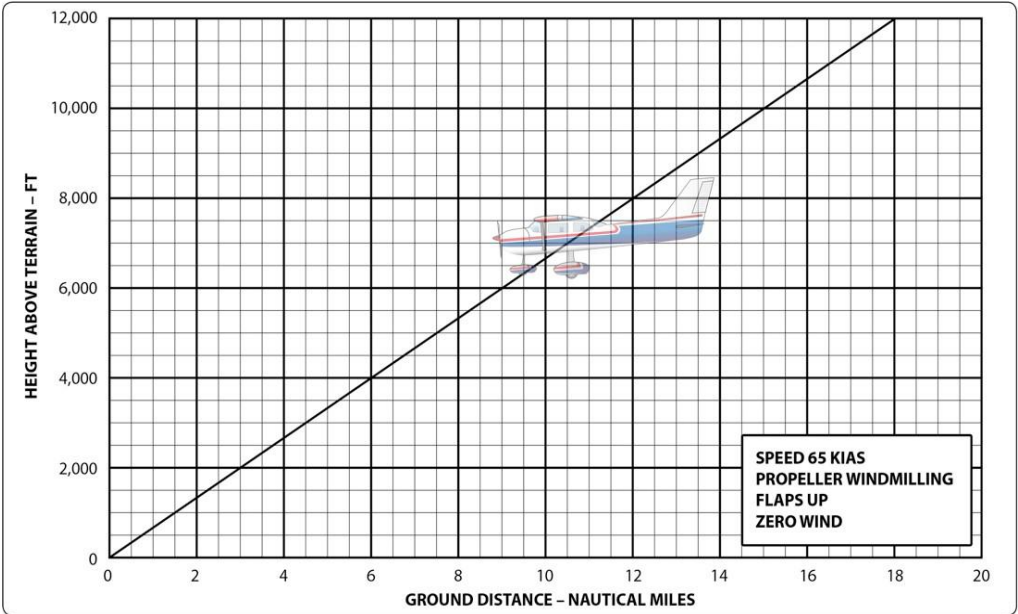


Figure 3A. Maximum Glide Distance ©ASA

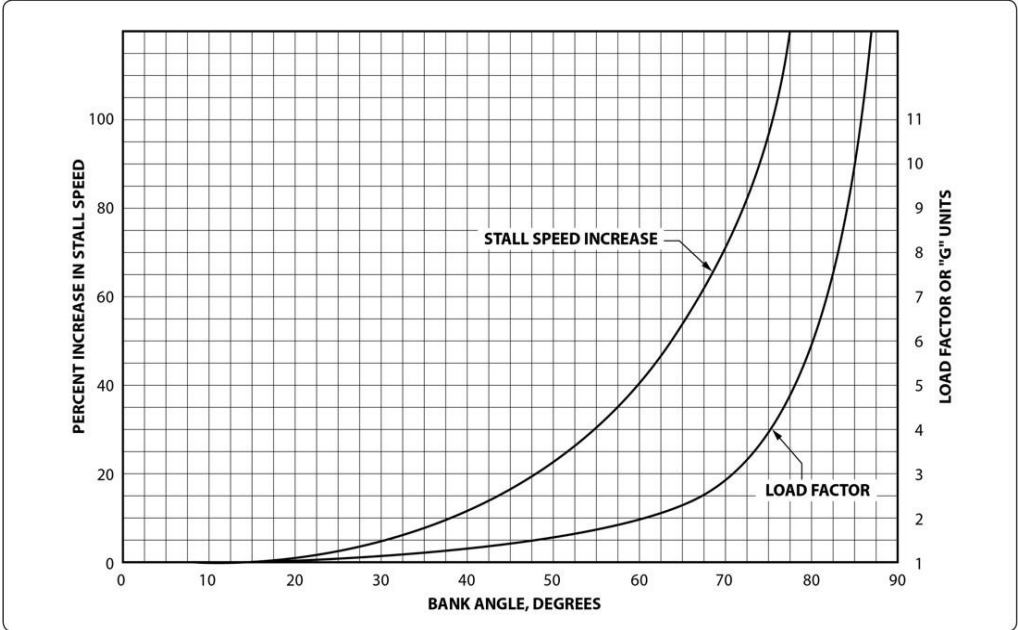


Figure 4. Stall Speed vs. Load Factor ©ASA

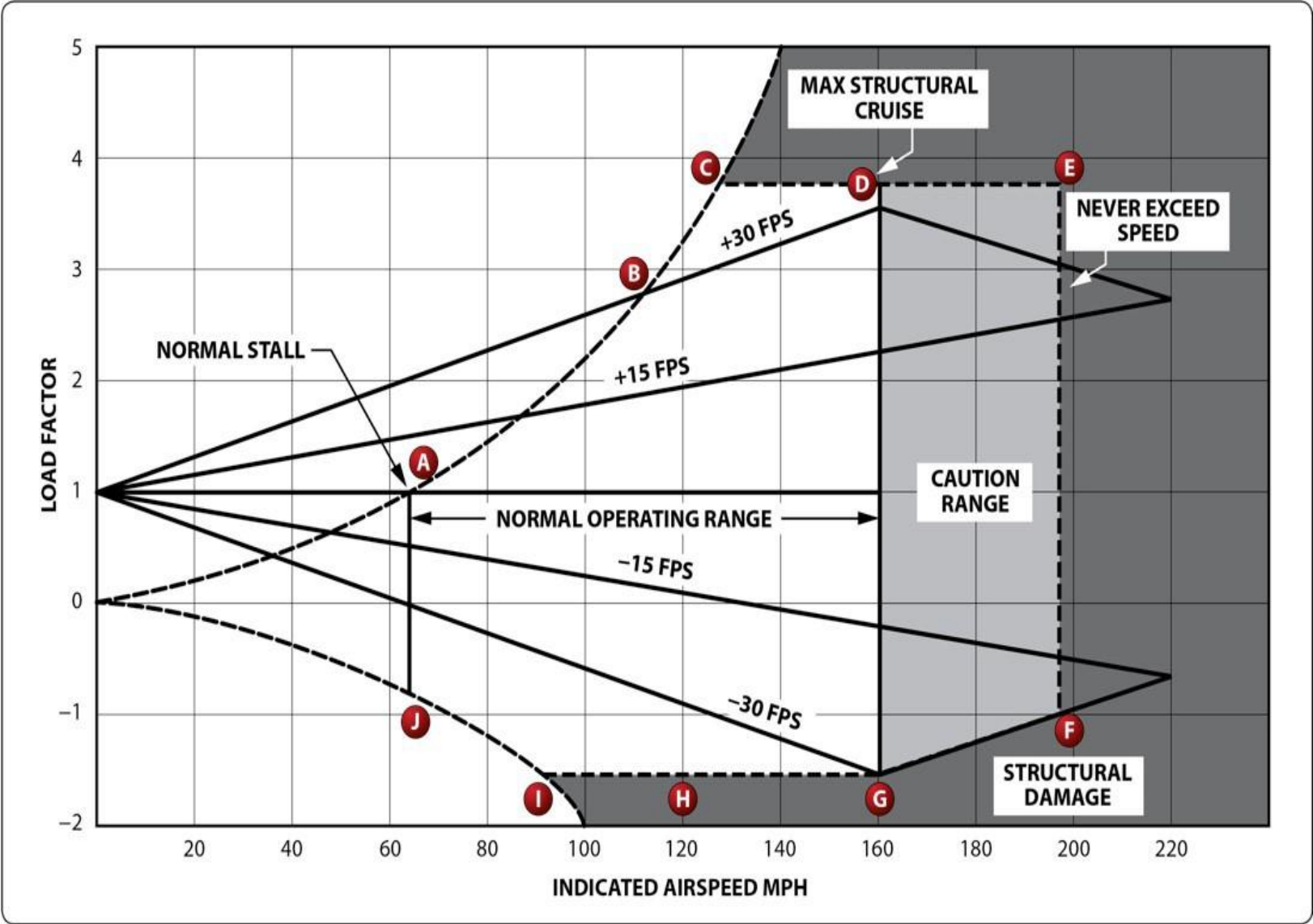


Figure 5. Velocity vs. Load Factor

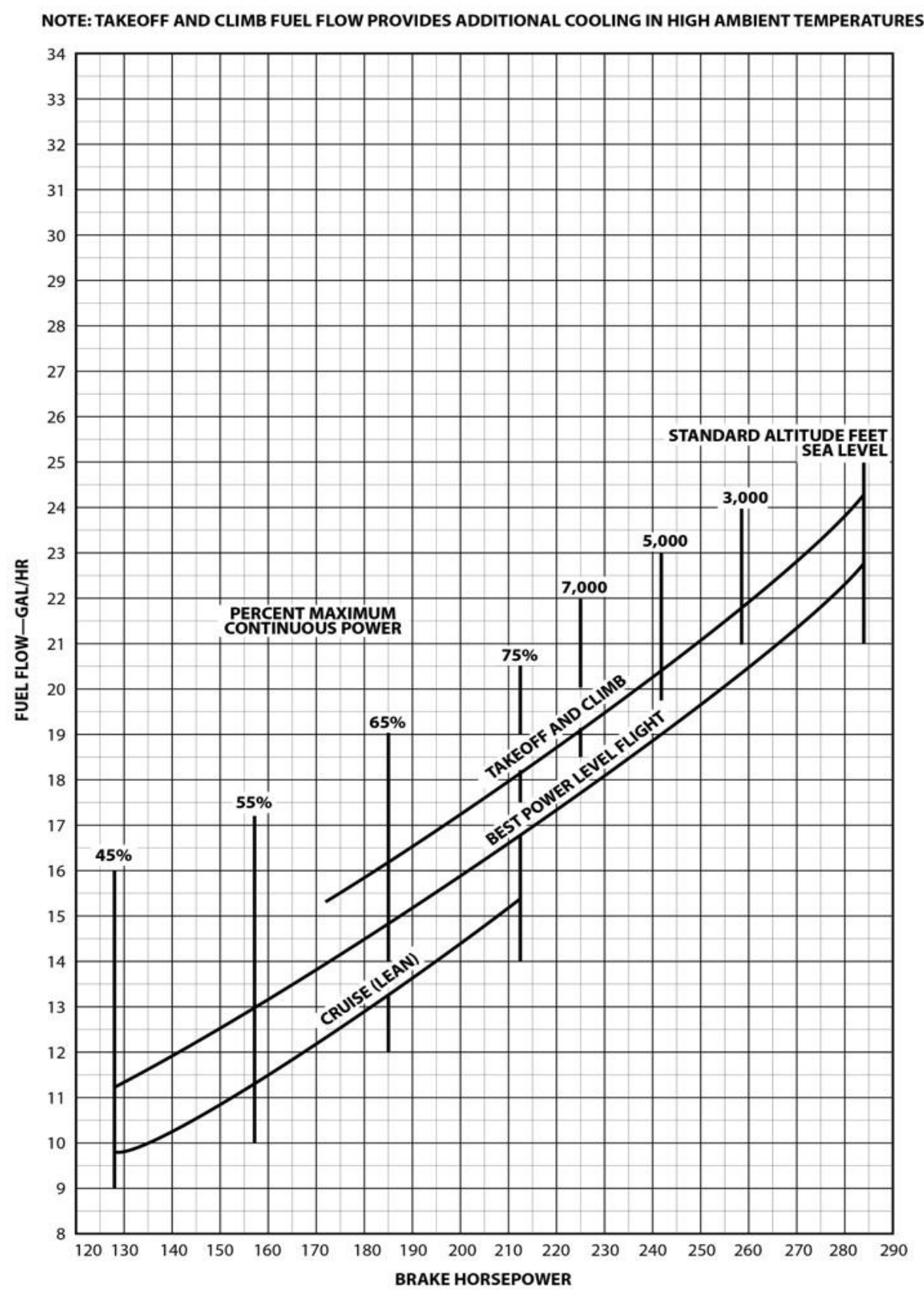


Figure 8. Fuel Consumption vs. Brake Horsepower

NORMAL CLIMB—100 KIAS

CONDITIONS:
FLAPS UP
GEAR UP
2,550 RPM
25 INCHES MP OR FULL THROTTLE
COWL FLAPS OPEN
STANDARD TEMPERATURE

MIXTURE SETTING	
PRESS ALT	PPH
S.L. to 4,000	108
8,000	96
12,000	84

- NOTES:
1. INCREASE TIME, FUEL, AND DISTANCE BY 10% FOR EACH 10 °C ABOVE STANDARD TEMPERATURE.
 2. ADD 12 POUNDS OF FUEL FOR ENGINE START, TAXI, AND TAKEOFF ALLOWANCE.
 3. DISTANCES SHOWN ARE BASED ON ZERO WIND.

WEIGHT (LB)	PRESS ALT (FT)	RATE OF CLIMB (FPM)	FROM SEA LEVEL		
			TIME (MIN)	FUEL USED (LB)	DISTANCE (NM)
3,800	S.L.	580	0	0	0
	2,000	580	3	6	6
	4,000	570	7	12	12
	6,000	470	11	19	19
	8,000	365	16	27	28
	10,000	265	22	37	40
	12,000	165	32	51	59
3,500	S.L.	685	0	0	0
	2,000	685	3	5	5
	4,000	675	6	11	10
	6,000	565	9	16	16
	8,000	455	13	23	23
	10,000	350	18	31	33
	12,000	240	25	41	46
3,200	S.L.	800	0	0	0
	2,000	800	2	4	4
	4,000	795	5	9	8
	6,000	675	8	14	13
	8,000	560	11	19	19
	10,000	445	15	25	27
	12,000	325	20	33	37

Figure 9. Fuel, Time, and Distance to Climb

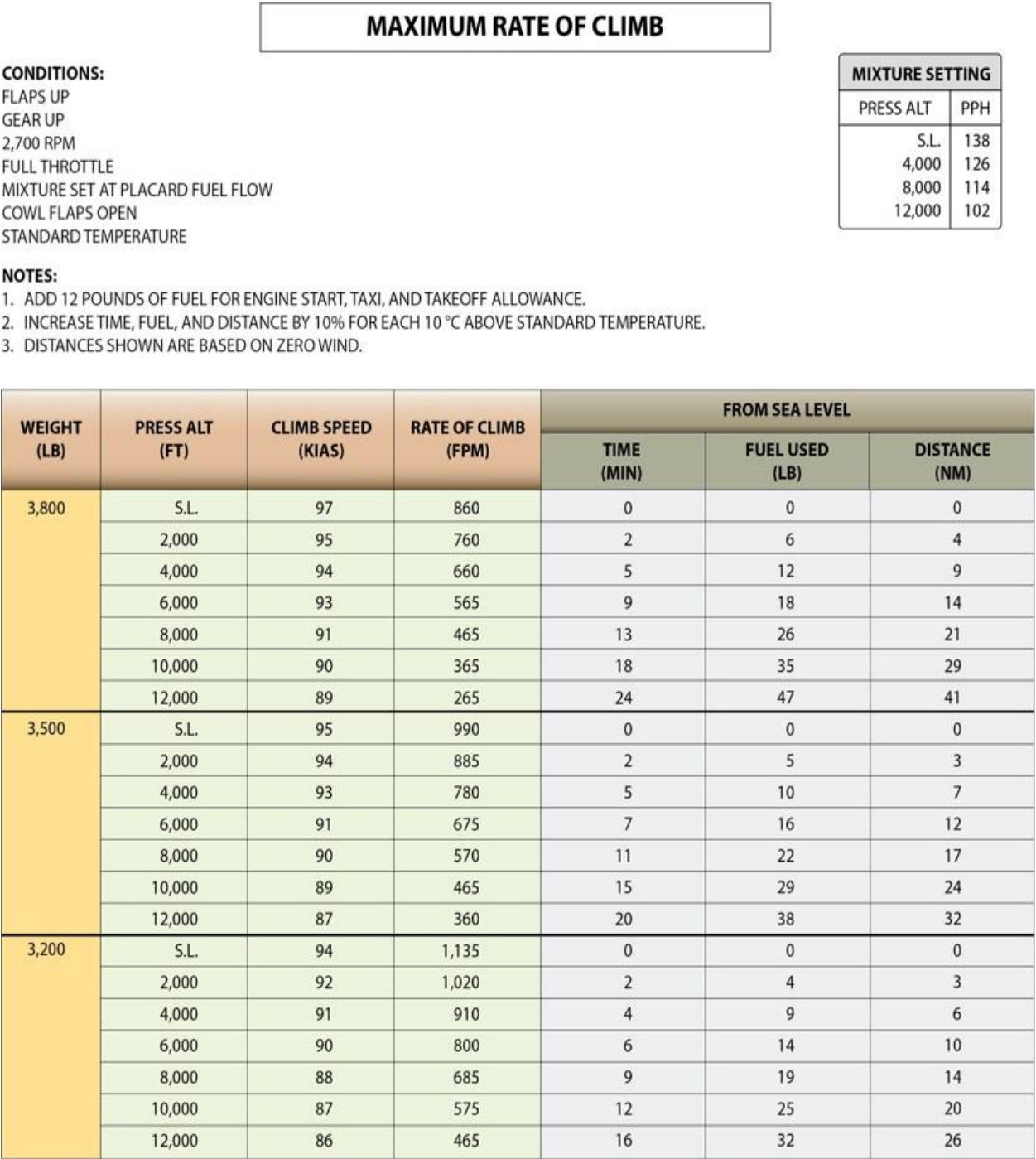


Figure 10. Fuel, Time, and Distance to Climb

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GROSS WEIGHT – 2,300 LB
STANDARD CONDITIONS
ZERO WIND LEAN MIXTURE

NOTE: MAXIMUM CRUISE IS NORMALLY LIMITED TO 75% POWER.

ALT.	RPM	% BHP	TAS MPH	GAL/ HOUR	38 GAL (NO RESERVE)		48 GAL (NO RESERVE)	
					ENDR (HOURS)	RANGE (MILES)	ENDR (HOURS)	RANGE (MILES)
2,500	2,700	86	134	9.7	3.9	525	4.9	660
	2,600	79	129	8.6	4.4	570	5.6	720
	2,500	72	123	7.8	4.9	600	6.2	760
	2,400	65	117	7.2	5.3	620	6.7	780
	2,300	58	111	6.7	5.7	630	7.2	795
	2,200	52	103	6.3	6.1	625	7.7	790
5,000	2,700	82	134	9.0	4.2	565	5.3	710
	2,600	75	128	8.1	4.7	600	5.9	760
	2,500	68	122	7.4	5.1	625	6.4	790
	2,400	61	116	6.9	5.5	635	6.9	805
	2,300	55	108	6.5	5.9	635	7.4	805
	2,200	49	100	6.0	6.3	630	7.9	795
7,500	2,700	78	133	8.4	4.5	600	5.7	755
	2,600	71	127	7.7	4.9	625	6.2	790
	2,500	64	121	7.1	5.3	645	6.7	810
	2,400	58	113	6.7	5.7	645	7.2	820
	2,300	52	105	6.2	6.1	640	7.7	810
10,000	2,650	70	129	7.6	5.0	640	6.3	810
	2,600	67	125	7.3	5.2	650	6.5	820
	2,500	61	118	6.9	5.5	655	7.0	830
	2,400	55	110	6.4	5.9	650	7.5	825
	2,300	49	100	6.0	6.3	635	8.0	800

Figure 11. Cruise and Range Performance

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PRESSURE ALTITUDE – 18,000 FEET

CONDITIONS:
4,000 POUNDS
RECOMMENDED LEAN MIXTURE
COWL FLAPS CLOSED

NOTES:
FOR BEST FUEL ECONOMY AT 70% POWER OR LESS, OPERATE AT 6
PPH LEANER THAN SHOWN IN THIS CHART OR AT PEAK EGT.

		20 °C BELOW STANDARD TEMPERATURE –41 °C			STANDARD TEMPERATURE –21 °C			20 °C ABOVE STANDARD TEMP –1 °C		
RPM	MP	% BHP	KTAS	PPH	% BHP	KTAS	PPH	% BHP	KTAS	PPH
2,500	30	---	---	---	81	188	106	76	185	100
	28	80	184	105	76	182	99	71	178	93
	26	75	178	99	71	176	93	67	172	88
	24	70	171	91	66	168	86	62	164	81
	22	63	162	84	60	159	79	56	155	75
2,400	30	81	185	107	77	183	101	72	180	94
	28	76	179	100	72	177	94	67	173	88
	26	71	172	93	67	170	88	63	166	83
	24	66	165	87	62	163	82	58	159	77
	22	61	158	80	57	155	76	54	150	72
2,300	30	79	182	103	74	180	97	70	176	91
	28	74	176	97	70	174	91	65	170	86
	26	69	170	91	65	167	86	61	163	81
	24	64	162	84	60	159	79	56	155	75
	22	58	154	77	55	150	73	51	145	65
2,200	26	66	166	87	62	163	82	58	159	77
	24	61	158	80	57	154	76	54	150	72
	22	55	148	73	51	144	69	48	138	66
	20	49	136	66	46	131	63	43	124	59

Figure 12. Cruise Performance

MAXIMUM RATE OF CLIMB

CONDITIONS:
FLAPS UP
GEAR UP
2,600 RPM
COWL FLAPS OPEN
STANDARD TEMPERATURE

- NOTES:
- 1. ADD 16 POUNDS OF FUEL FOR ENGINE START, TAXI, AND TAKEOFF ALLOWANCE.
 - 2. INCREASE TIME, FUEL, AND DISTANCE BY 10% FOR EACH 10 °C ABOVE STANDARD TEMPERATURE.
 - 3. DISTANCES SHOWN ARE BASED ON ZERO WIND.

MIXTURE SETTING		
PRESS ALT	MP	PPH
S.L. TO 17,000	35	162
18,000	34	156
20,000	32	144
22,000	30	132
24,000	28	120

WEIGHT (LB)	PRESS ALT (FT)	CLIMB SPEED (KIAS)	RATE OF CLIMB (FPM)	FROM SEA LEVEL		
				TIME (MIN)	FUEL USED (LB)	DISTANCE (NM)
4,000	S.L.	100	930	0	0	0
	4,000	100	890	4	12	7
	8,000	100	845	9	24	16
	12,000	100	790	14	38	25
	16,000	100	720	19	52	36
	20,000	99	515	26	69	50
	24,000	97	270	37	92	74
3,700	S.L.	99	1,060	0	0	0
	4,000	99	1,020	4	10	6
	8,000	99	975	8	21	13
	12,000	99	915	12	33	21
	16,000	99	845	17	45	30
	20,000	97	630	22	59	42
	24,000	95	370	30	77	60
3,400	S.L.	97	1,205	0	0	0
	4,000	97	1,165	3	9	5
	8,000	97	1,120	7	19	12
	12,000	97	1,060	11	29	18
	16,000	97	985	15	39	26
	20,000	96	760	19	51	36
	24,000	94	485	26	65	50

Figure 13. Fuel, Time, and Distance to Climb

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NORMAL CLIMB – 110 KIAS

CONDITIONS:

FLAPS UP
GEAR UP
2,500 RPM
30 INCHES HG
120 PPH FUEL FLOW
COWL FLAPS OPEN
STANDARD TEMPERATURE

NOTES:

- 1. ADD 16 POUNDS OF FUEL FOR ENGINE START, TAXI, AND TAKEOFF ALLOWANCE.
- 2. INCREASE TIME, FUEL, AND DISTANCE BY 10% FOR EACH 7 3C ABOVE STANDARD TEMPERATURE.
- 3. DISTANCES SHOWN ARE BASED ON ZERO WIND.

WEIGHT (LB)	PRESS ALT (FT)	RATE OF CLIMB (FPM)	FROM SEA LEVEL		
			TIME (MIN)	FUEL USED (LB)	DISTANCE (NM)
4,000	S.L.	605	0	0	0
	4,000	570	7	14	13
	8,000	530	14	28	27
	12,000	485	22	44	43
	16,000	430	31	62	63
	20,000	365	41	82	87
3,700	S.L.	700	0	0	0
	4,000	665	6	12	11
	8,000	625	12	24	23
	12,000	580	19	37	37
	16,000	525	26	52	53
	20,000	460	34	68	72
3,400	S.L.	810	0	0	0
	4,000	775	5	10	9
	8,000	735	10	21	20
	12,000	690	16	32	31
	16,000	635	22	44	45
	20,000	565	29	57	61

Figure 14. Fuel, Time, and Distance to Climb

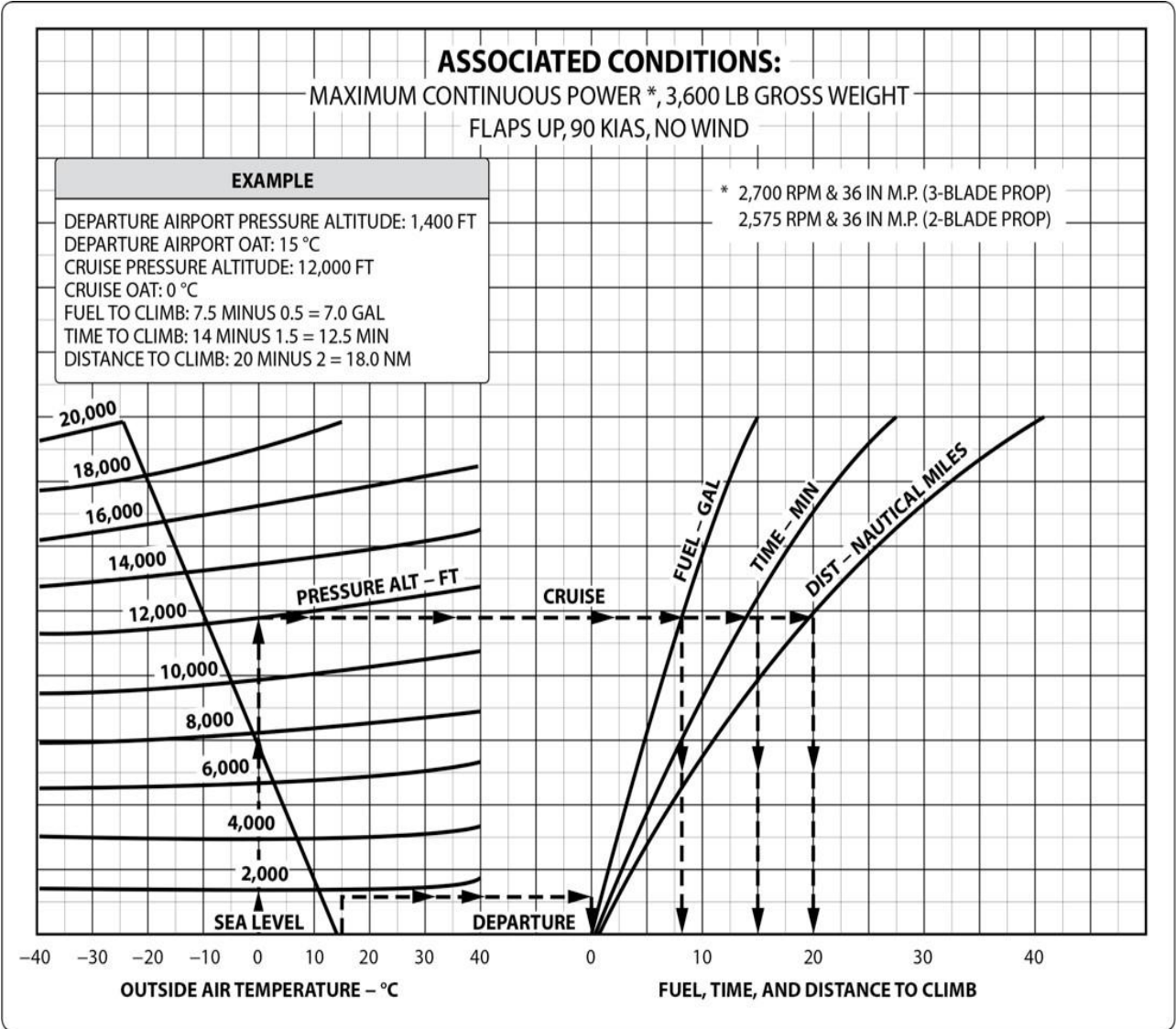


Figure 15. Fuel, Time, and Distance to Climb

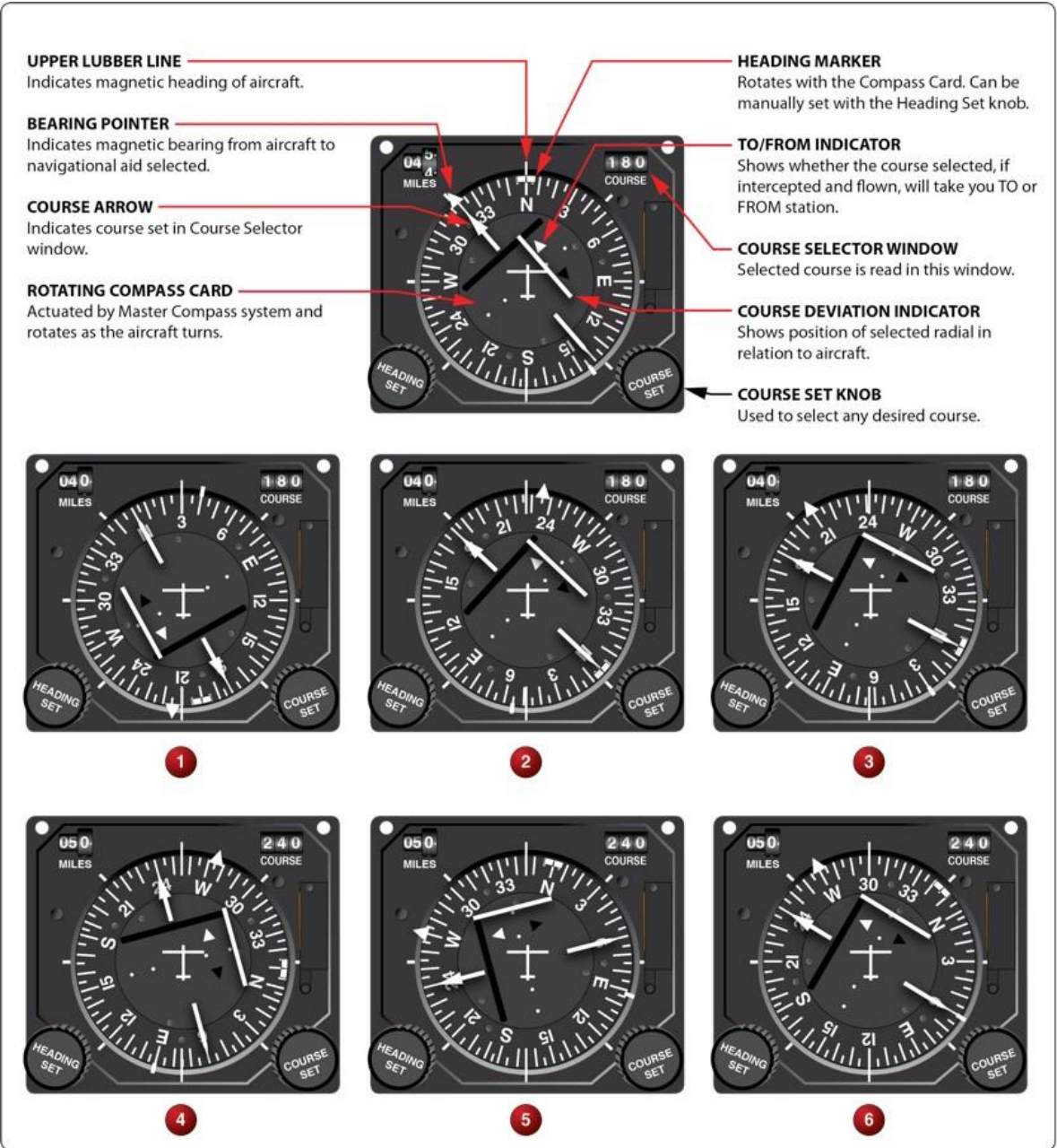


Figure 17. Horizontal Situation Indicator (HSI)

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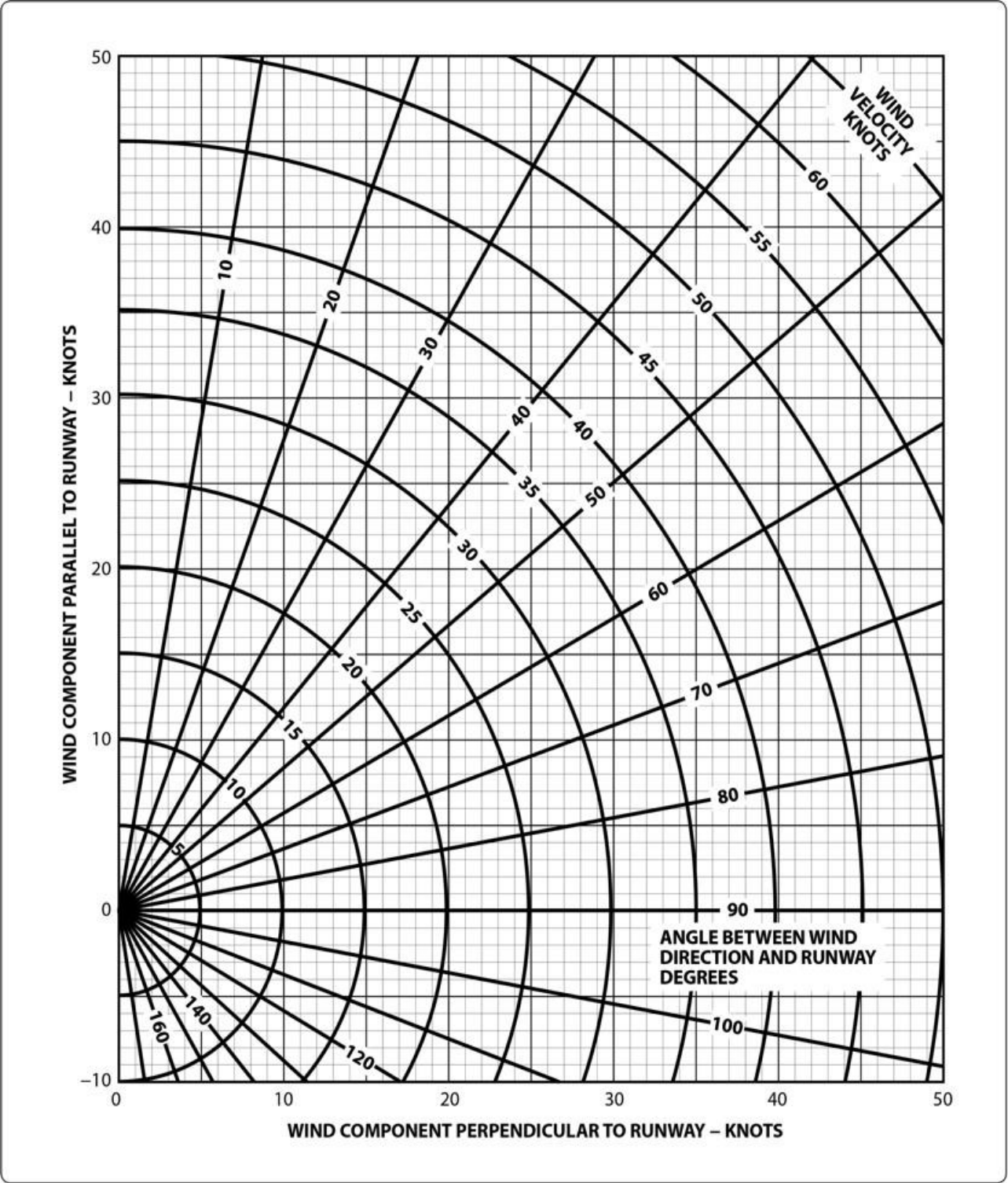


Figure 31. Wind Component Chart

ASSOCIATED CONDITIONS:

POWER TAKEOFF POWER
SET BEFORE
BRAKE RELEASE
FLAPS 20°
RUNWAY PAVED, LEVEL, DRY SURFACE
TAKEOFF SPEED IAS AS TABULATED

NOTE: GROUND ROLL IS APPROX 73% OF TOTAL TAKEOFF
DISTANCE OVER A 50 FT OBSTACLE

EXAMPLE:

OAT 75 °F
PRESSURE ALTITUDE 4,000 FT
TAKEOFF WEIGHT 3,100 LB
HEADWIND 20 KNOTS
TOTAL TAKEOFF DISTANCE
OVER A 50 FT OBSTACLE 1,350 FT
GROUND ROLL (73% OF 1,350) 986 FT
IAS TAKEOFF SPEED
LIFT-OFF 74 MPH
AT 50 FT 74 MPH

WEIGHT (LB)	IAS TAKEOFF SPEED (ASSUMES ZERO INSTR ERROR)			
	LIFT-OFF		50 FEET	
	MPH	KNOTS	MPH	KNOTS
3,400	77	67	77	67
3,200	75	65	75	65
3,000	72	63	72	63
2,800	69	60	69	60
2,600	66	57	66	57
2,400	63	55	63	55

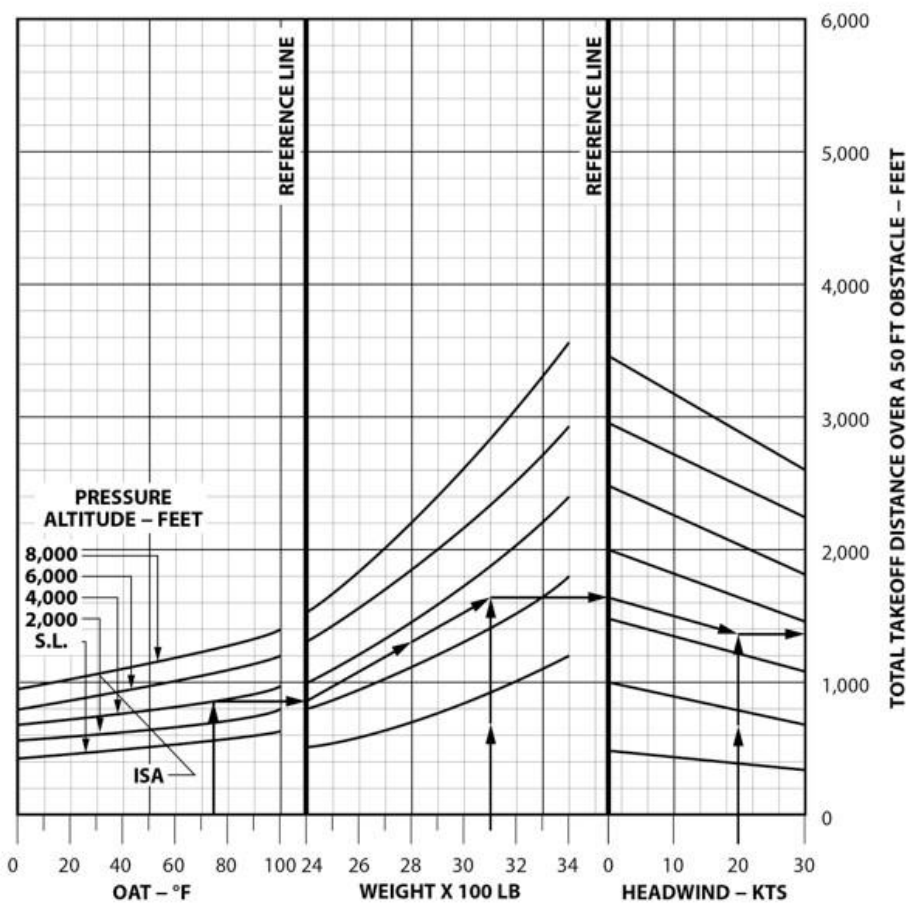


Figure 32. Obstacle Take-off Chart

CONDITIONS:
3,800 POUNDS
RECOMMENDED LEAN MIXTURE
COWL FLAPS CLOSED

		20 °C BELOW STANDARD TEMPERATURE -17 °C			STANDARD TEMPERATURE 3 °C			20 °C ABOVE STANDARD TEMPERATURE 23 °C		
RPM	MP	% BHP	KTAS	PPH	% BHP	KTAS	PPH	% BHP	KTAS	PPH
2,550	24	---	---	---	78	173	97	75	174	94
	23	76	167	96	74	169	92	71	171	89
	22	72	164	90	69	166	87	67	167	84
	21	68	160	85	65	162	82	63	163	80
2,500	24	78	169	98	75	171	95	73	172	91
	23	74	166	93	71	167	90	69	169	87
	22	70	162	88	67	164	85	65	165	82
	21	66	158	83	63	160	80	61	160	77
2,400	24	73	165	91	70	166	88	68	167	85
	23	69	161	87	67	163	84	64	164	81
	22	65	158	82	63	159	79	61	160	77
	21	61	154	77	59	155	75	57	155	73
2,300	24	68	161	86	66	162	83	64	163	80
	23	65	158	82	62	159	79	60	159	76
	22	61	154	77	59	155	75	57	155	72
	21	57	150	73	55	150	71	53	150	68
2,200	24	63	156	80	61	157	77	59	158	75
	23	60	152	76	58	153	73	56	154	71
	22	57	149	72	54	149	70	53	149	67
	21	53	144	68	51	144	66	49	143	64
	20	50	139	64	48	138	62	46	137	60
	19	46	133	60	44	132	58	43	131	57

Figure 34. Cruise Performance Chart ©ASA

ASSOCIATED CONDITIONS:

POWER AS REQUIRED TO MAINTAIN 800 FT/MIN
DESCENT ON APPROACH
FLAPS DOWN
RUNWAY PAVED, LEVEL, DRY SURFACE
APPROACH SPEED IAS AS TABULATED

NOTE: GROUND ROLL IS APPROX 53% OF TOTAL LANDING
DISTANCE OVER A 50 FT OBSTACLE.

EXAMPLE:

OAT 75 °F
PRESSURE ALTITUDE 4,000 FT
LANDING WEIGHT 3,200 LB
HEADWIND 10 KNOTS
TOTAL LANDING DISTANCE
OVER A 50 FT OBSTACLE 1,475 FT
GROUND ROLL (53% OF 1,475) 782 FT
IAS TAKEOFF SPEED 87 MPH IAS

WEIGHT (LB)	IAS APPROACH SPEED (ASSUMES ZERO INSTR ERROR)	
	MPH	KNOTS
3,400	90	78
3,200	87	76
3,000	84	73
2,800	81	70
2,600	78	68
2,400	75	65

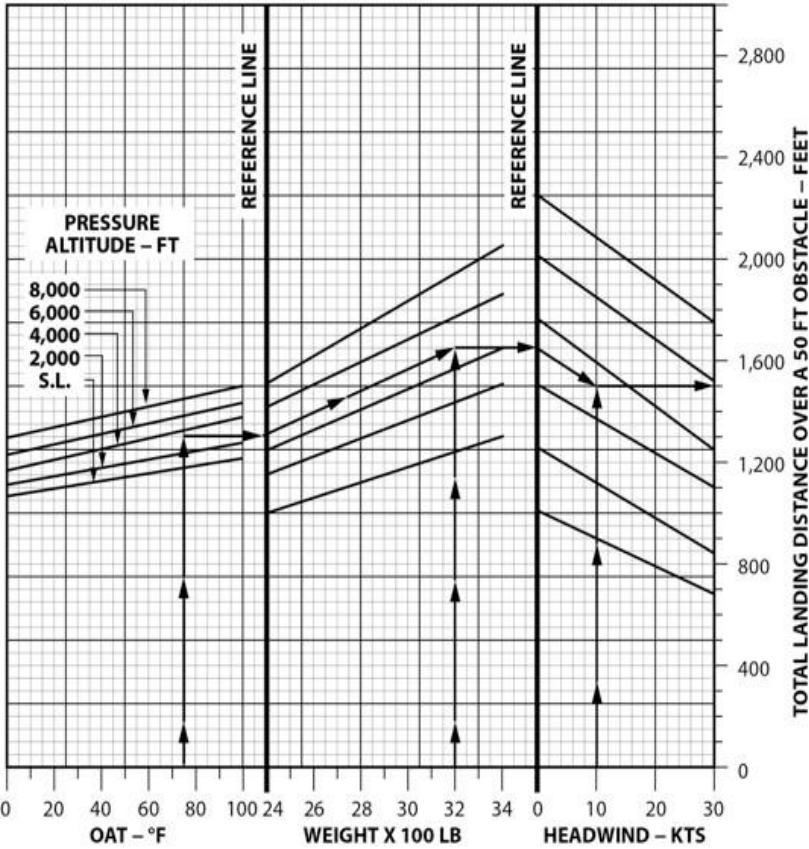


Figure 35. Normal Landing Chart

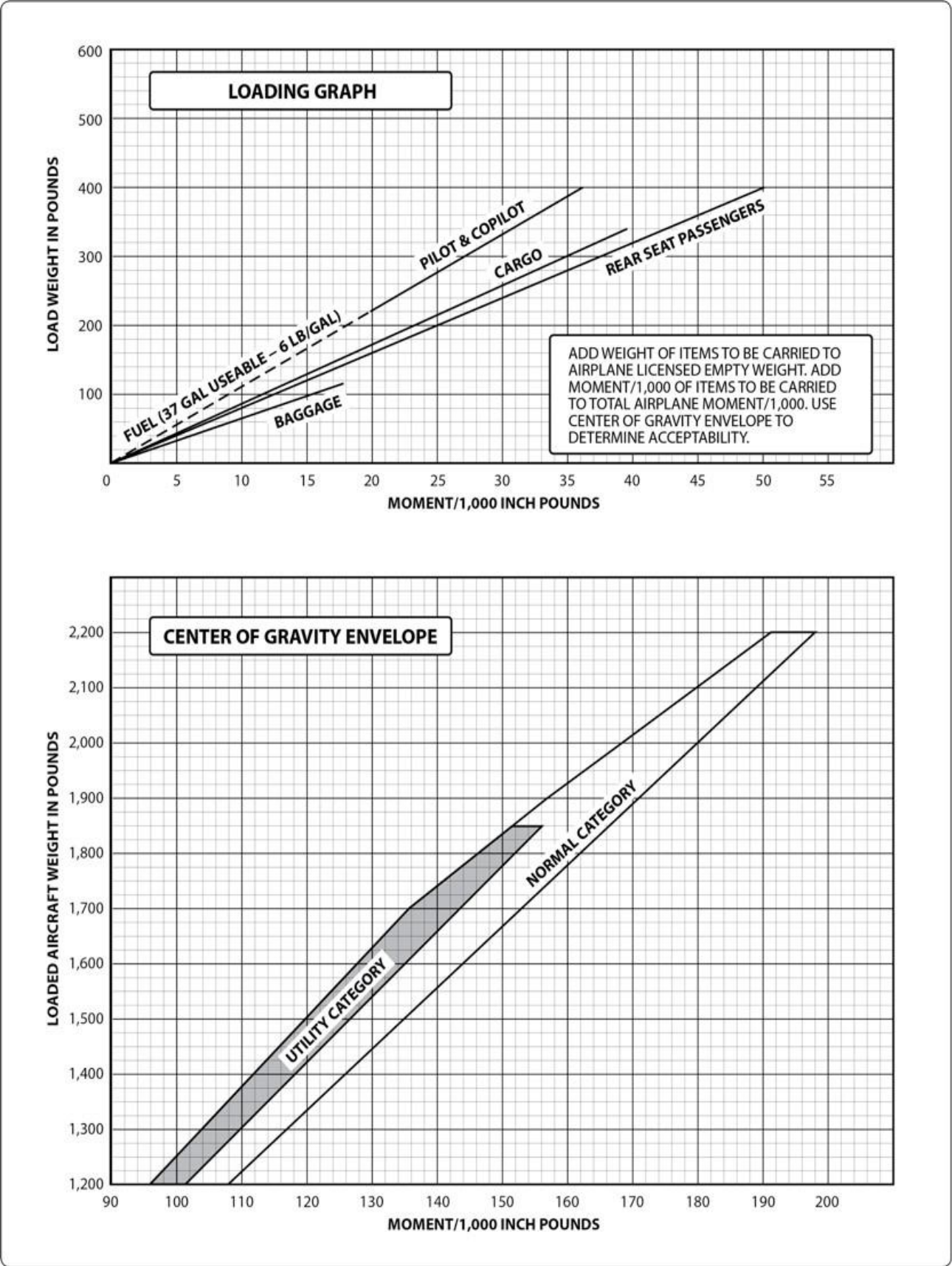


Figure 38. Loading Graph and Center of Gravity Envelope

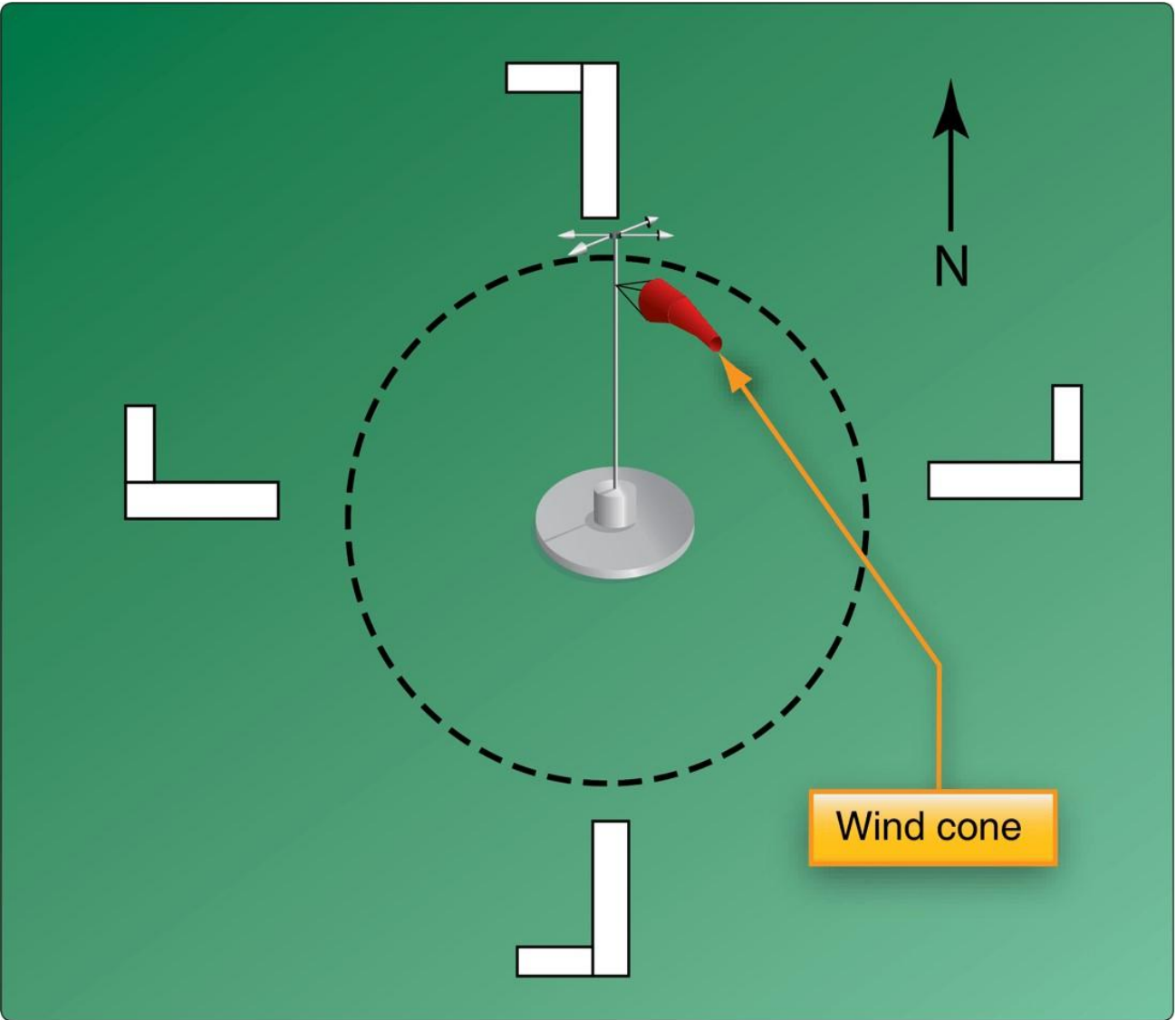


Figure 50. Wind Sock Airport Landing Indicator

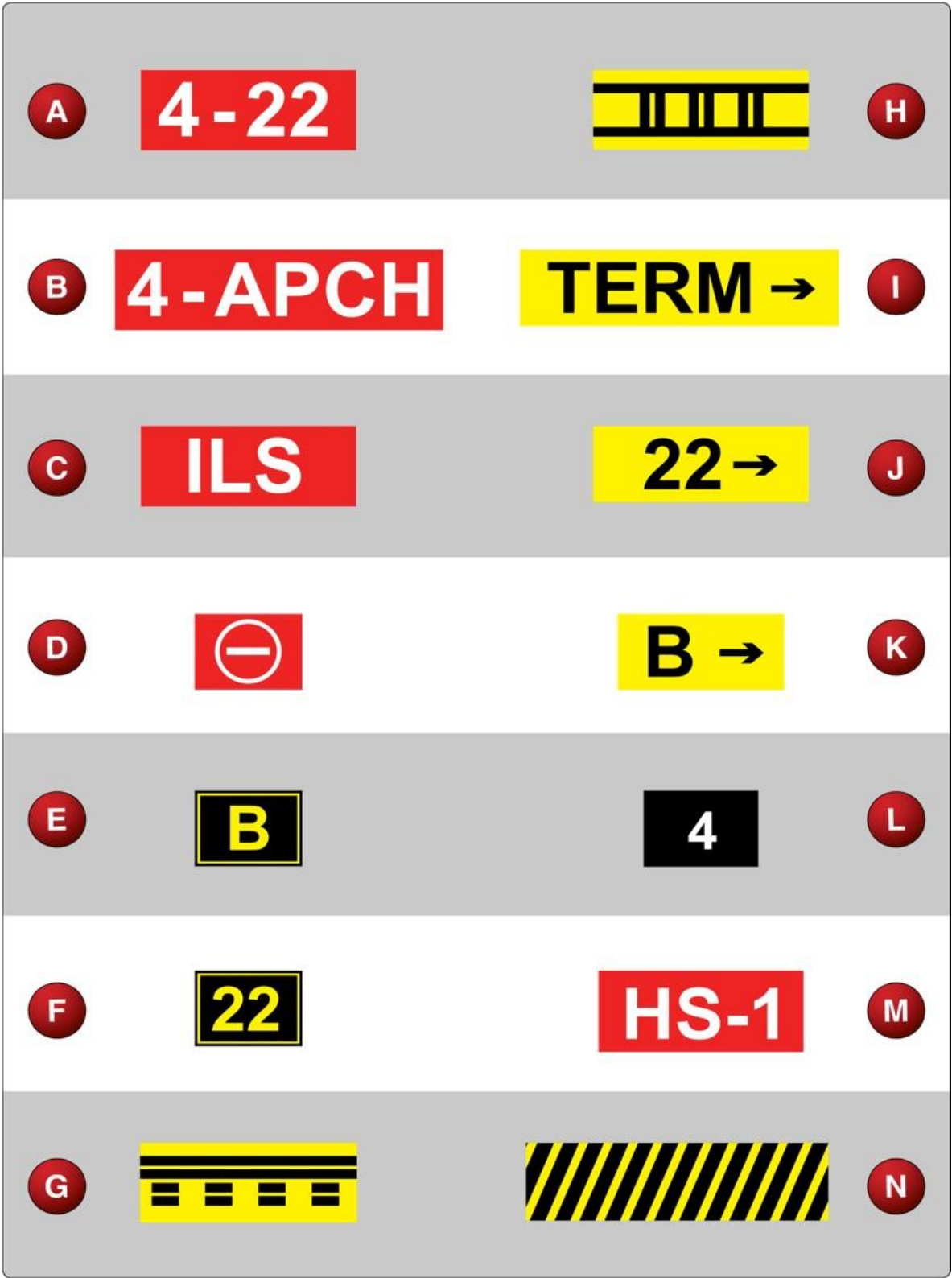


Figure 51. Airport Signs

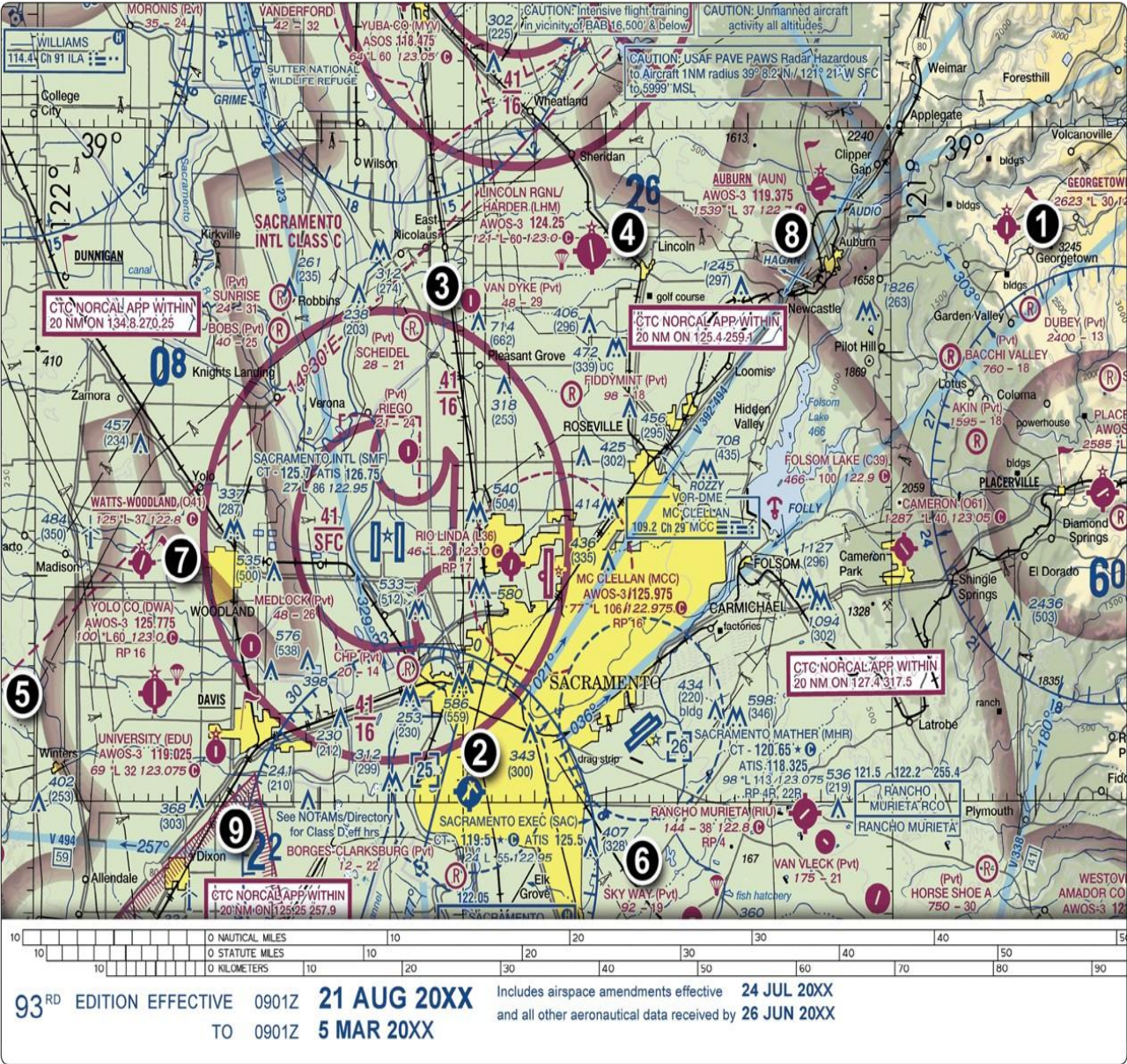


Figure 52. Sectional Chart Excerpt
NOTE: Chart is not to scale and should not be used for navigation. Use associated scale.

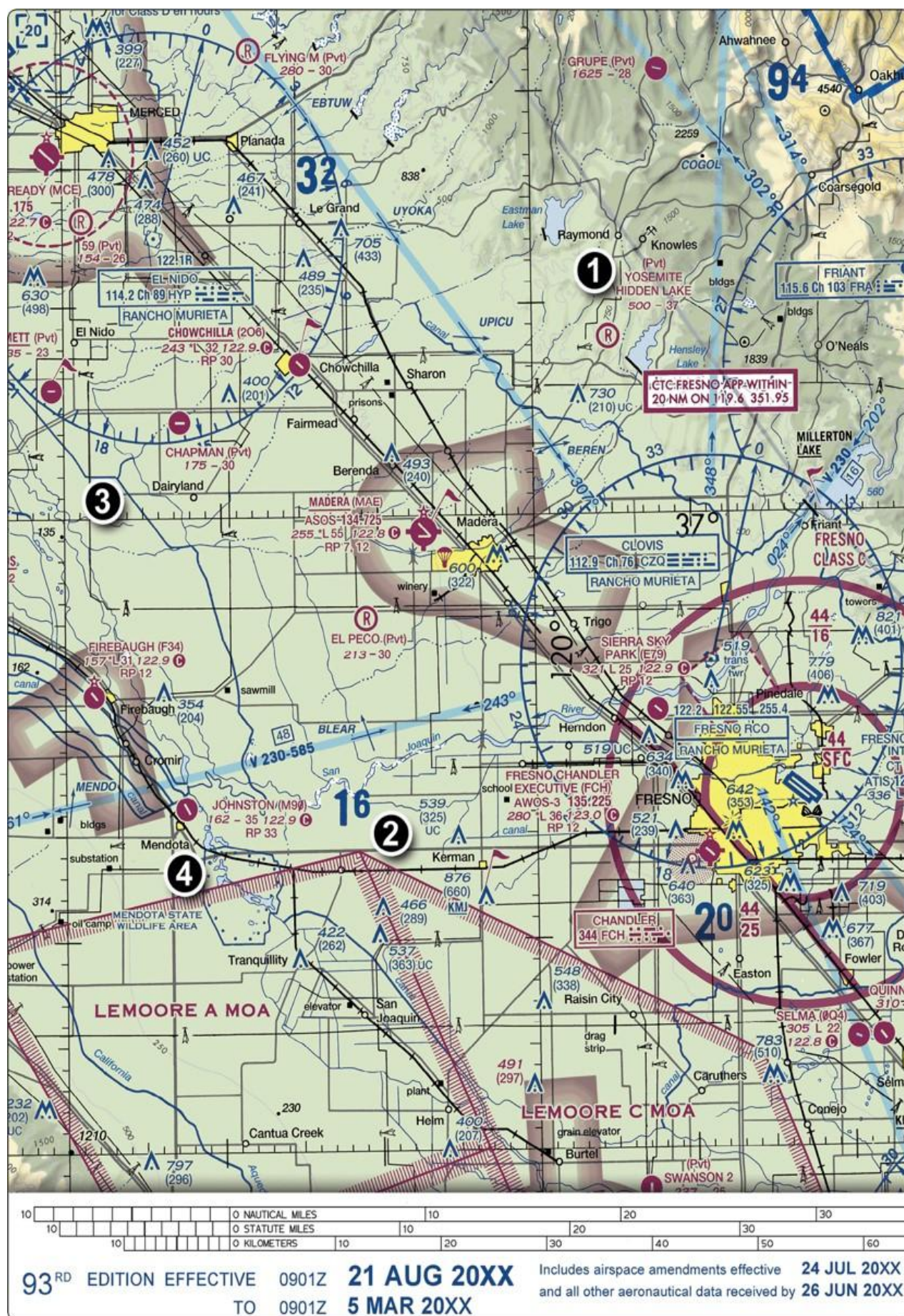


Figure 53. Sectional Chart Excerpt

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NOTE: Chart is not to scale and should not be used for navigation. Use associated scale.



Figure 54. Sectional Chart Excerpt
NOTE: Chart is not to scale and should not be used for navigation. Use associated scale.

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Figure 57. Sign

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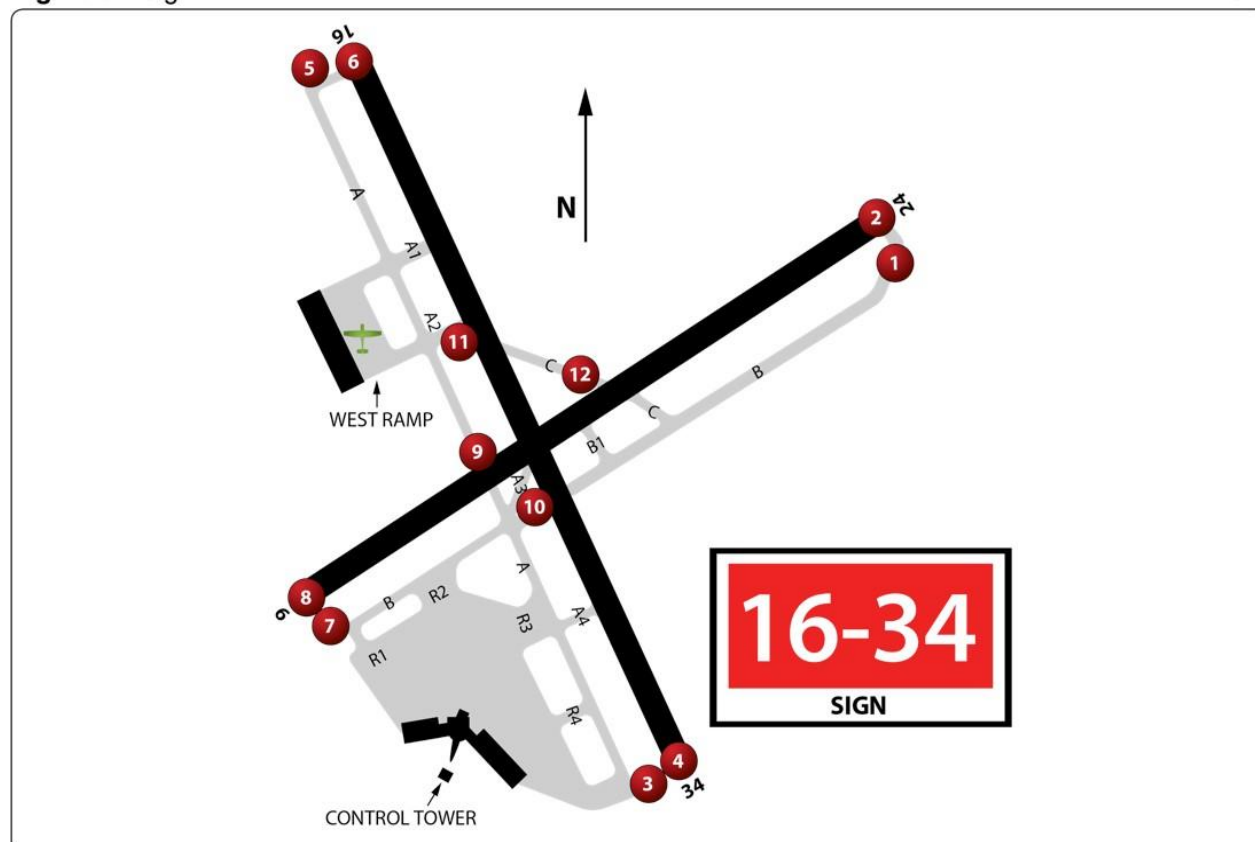


Figure 58. Airport Diagram and Sign

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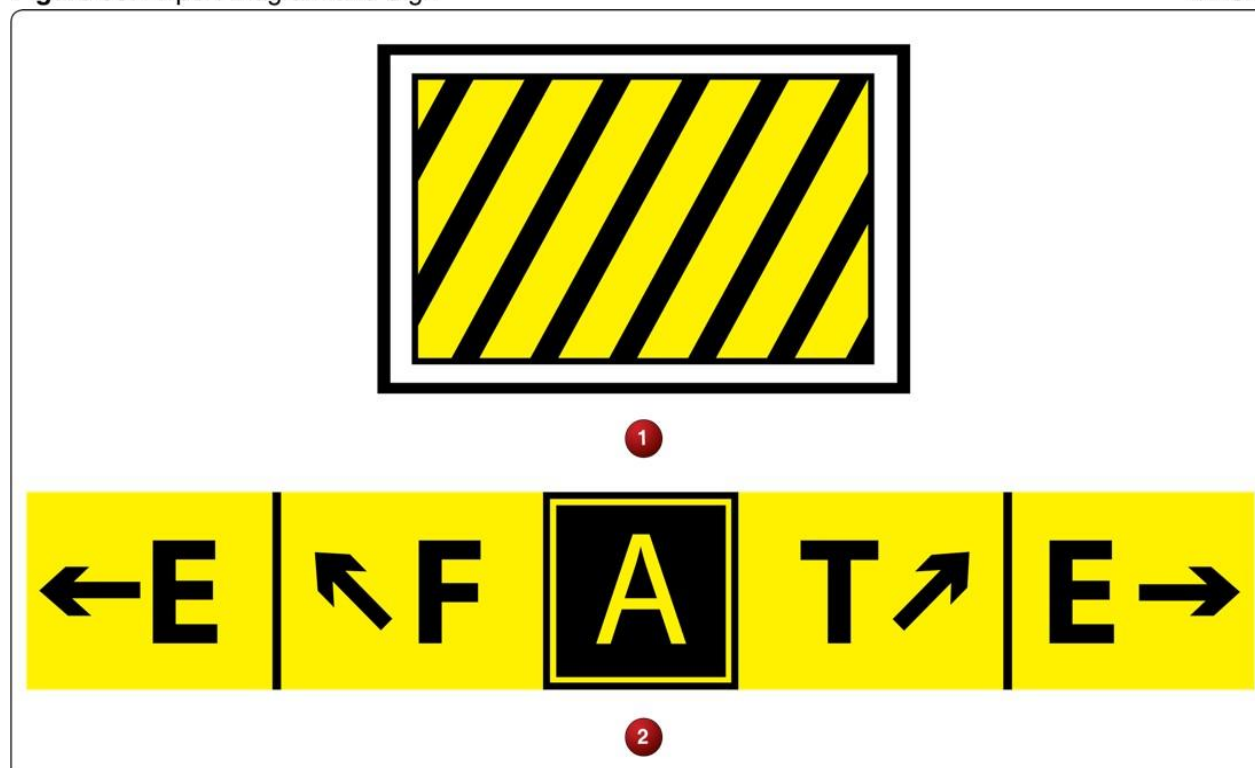


Figure 60. Two Signs

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Figure 61. Sign

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Figure 64. Sign

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