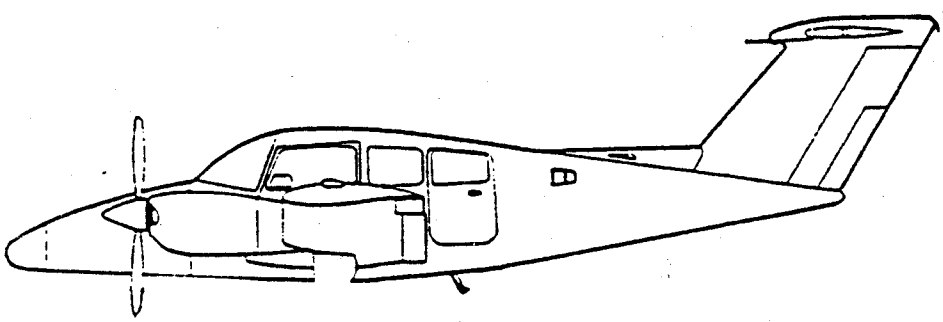
BRITISH AEROSPACE FLIGHT TRAINING
(Australia) *Adelaide*

BEECHCRAFT
Duchess 76



FOR TRAINING PURPOSES ONLY

HANDLING NOTES

(PILOTS OPERATING HANDBOOK)

FUEL

Aviation Gasoline, grade 100 (green) or grade 100 LL (blue).

Total Capacity . . . . . 103 gallons
Total Usable . . . . . 100 gallons

OIL

Engine oils must meet Avco Lycoming Specification No. 301F and be used in accordance with Avco Lycoming Service Instructions No. 1014J or subsequent revisions. Refer to HANDLING, SERVICING, AND MAINTENANCE section for a list of oils meeting this specification.

Average Ambient Air Temperature	MIL-L-6082 Grades	MIL-L-22851 Ashless Dispersant Grades
Above 60°F	SAE 50	SAE 40 or SAE 50
30° to 90°F	SAE 40	SAE 40
0° to 70°F	SAE 30	SAE 40, SAE 30 or SAE 20W40
Below 10°F	SAE 20	SAE 30 or SAE 20W30

Oil Capacity .....8 quarts each engine

MAXIMUM CERTIFICATED WEIGHTS

Maximum Ramp Weight . . . . . 3916 lbs
Maximum Take-off Weight . . . . . 3900 lbs
Maximum Landing Weight . . . . . 3900 lbs
Maximum Zero Fuel Weight . . . . . 3500 lbs
Maximum Weight in Baggage Compartment . . . 200 lbs

STANDARD AIRPLANE WEIGHTS

Standard Empty Weight	2446 lbs
Maximum Useful Load	1470 lbs

CABIN AND ENTRY DIMENSIONS

Cabin Width (maximum)	3 ft 8 in.
Cabin Length (maximum)	7 ft 11 in.
Cabin Height (maximum)	4 ft
Cabin Door	36 in. x 38 in.
Door Sill Height	2 in.

BAGGAGE SPACE AND ENTRY DIMENSIONS

Compartment Volume	19.5 cu ft
Compartment Width (nominal)	38 in.
Compartment Length (nominal)	26 in.
Compartment Height (nominal)	37 in.
Door Width (minimum)	22 in.
Door Height (minimum)	33 in.

SPECIFIC LOADINGS

Wing Loading at Maximum Take-off Weight	21.5 lbs/sq ft
Power Loading at Maximum Take-off Weight	10.8 lbs/hp

SYMBOLS, ABBREVIATIONS, AND TERMINOLOGY

The following Abbreviations and Terminologies have been listed for convenience and ready interpretation where used within this handbook. Whenever possible, they have been categorized for ready reference.

The limitations included in this section have been approved by the Federal Aviation Administration.

The following limitations in this section must be observed in the operation of this airplane.

AIRSPEED LIMITATIONS

SPEED	CAS KTS	IAS KTS	REMARKS
Never Exceed V_{NE}	194	194	Do Not Exceed This Speed in Any Operation.
Maximum Structural Cruising V_{NO}	154	154	Do Not Exceed This Speed Except in Smooth Air and Then Only With Caution.
Maneuvering V_A	132	132	Do Not Make Full or Abrupt Control Movements Above This Speed.
Maximum Flap Extension/Extended V_F and V_{FE} (Full Down 35°)	110	110	Do Not Extend Flaps or Operate With Flaps Extended Above This Speed.
Maximum Landing Gear Extended V_{LE}	140	140	Do Not Exceed This Speed With Landing Gear Extended.
Maximum Landing Gear Operating V_{LO}			Do Not Extend or Retract Landing Gear Above This Speed.
Extension	140	140	
Retraction	113	112	
Air Minimum Control V_{MCA}	67	65	Minimum Speed for Directional Controllability After Sudden Loss of Engine.

*AIRSPEED INDICATOR MARKINGS

MARK-ING	CAS VALUE OR RANGE KTS	IAS VALUE OR RANGE KTS	SIGNIFICANCE
White Arc	58-110	60-110	Full Flap Operating Range
Blue Radial	86	85	Single-Engine Best Rate-of-Climb
Red Radial	67	65	Minimum Single-Engine Control (VMCA)
Green Arc	68-154	70-154	Normal Operating Range
Yellow Arc	154-194	154-194	Operate With Caution, Only In Smooth Air
Red Radial	194	194	Maximum Speed For All Operations (Never Exceed)

*The airspeed indicator is marked in IAS values.

POWER PLANT LIMITATIONS

ENGINES

Two Avco Lycoming engines installed; one O-360-A1G6D (clockwise rotating) located on the left wing, and one LO-360-A1G6D (counterclockwise rotating) located on the right wing. The engines are four-cylinder, direct-drive, horizontally opposed, and each rated at 180 horsepower at 2700 rpm.

Take-off and Maximum
Continuous Power..... Full Throttle, 2700 RPM
Maximum Oil Temperature ..... 245°F
Maximum Cylinder Head Temperature ..... 500°F

Minimum Oil Pressure (Idle)..... 25 psi
Maximum Oil Pressure..... 100 psi
Minimum Fuel Pressure..... 0.5 psi
Maximum Fuel Pressure..... 8.0 psi

FUEL

Aviation Gasoline, grade 100 (green) or grade 100 LL (blue).

FUEL ADDITIVES

ALCOR TCP Concentrate, mixed according to the instructions provided by Alcor, Inc.

OIL

Engine oils must meet Avco Lycoming Specification No. 301F and be used in accordance with Avco Lycoming Service Instruction No. 1014J or subsequent revisions. Refer to the Approved Engine Oils, Section VIII, SERVICING.

PROPELLERS

Two Hartzell, constant-speed, full-feathering, two-blade propellers: the left engine (clockwise rotating) has an HC-M2YR-2CEUF hub with FC 7666A blades and C2285-3P spinner; the right engine (counterclockwise rotating) incorporates an HC-M2YR-2CLEUF hub with FJC 7666A blades and a C2285-3LP spinner.

Pitch settings at the 30-inch station: Low, 12.1° ± .1°;
High, 17° to 20°; Feathered, 81° ± 1°.
Diameter is 76 inches, with cut-off permitted to 74.0 inches.

POWER PLANT INSTRUMENT MARKINGS

Oil Temperature
Caution Range (Yellow Arc).....60 to 120°F
Normal Operating Range (Green Arc).....120 to 245°F
Maximum (Red Radial) ..... 245°F

Oil Pressure
Minimum Idle (Red Radial)..... 25 psi
Caution Range (Yellow Arc).....25 to 60 psi
Normal Operating Range (Green Arc).....60 to 100 psi
Maximum (Red Radial) ..... 100 psi

Manifold Pressure
Normal Operating Range (Green Arc)..... 15 to 29.6 in. Hg

Tachometer
Normal Operating Range
(Green Arc) .....2000 to 2700 rpm
Maximum (Red Radial) .....2700 rpm

Fuel Pressure
Minimum (Red Radial) ..... 0.5 psi
Normal Operating Range (Green Arc).....0.5 to 8.0 psi
Maximum (Red Radial) ..... 8.0 psi

Cylinder Head Temperature
Normal Operating Range (Green Arc).....200 to 500°F
Maximum (Red Radial) ..... 500°F

MISCELLANEOUS INSTRUMENT MARKINGS

Instrument Pressure
Normal Operating Range (Green Arc)..... 4.3 to 5.9 in. Hg
Red Button Source Failure Indicators

Fuel Quantity
Yellow Arc.....E to 9 Gallons

WEIGHT LIMITS

Maximum Ramp Weight..... 3916 lbs 8633.
Maximum Take-off Weight..... 3900 lbs 8598.
Maximum Landing Weight..... 3900 lbs 8598-3
Zero Fuel Weight..... 3500 lbs 1587.5
Maximum Baggage Compartment Load..... 200 lbs 440.9

CENTER OF GRAVITY (Landing Gear Extended)

Forward Limits: 106.6 inches aft of datum at 3250 lbs and under, then straight line variation to 110.6 inches aft of datum at a weight of 3900 lbs.

Aft Limit: 117.5 inches aft of datum at all weights.
Reference Datum: 129.37 inches forward of the center of wing spar jack points.

MAC Leading Edge: 99.08 inches aft of datum.

MAC Length: 57.65 inches.

MANEUVERS

This is a normal category airplane. Acrobatic maneuvers, including spins, are prohibited.

Maximum slip duration..... 30 seconds

TAKE-OFF DISTANCE

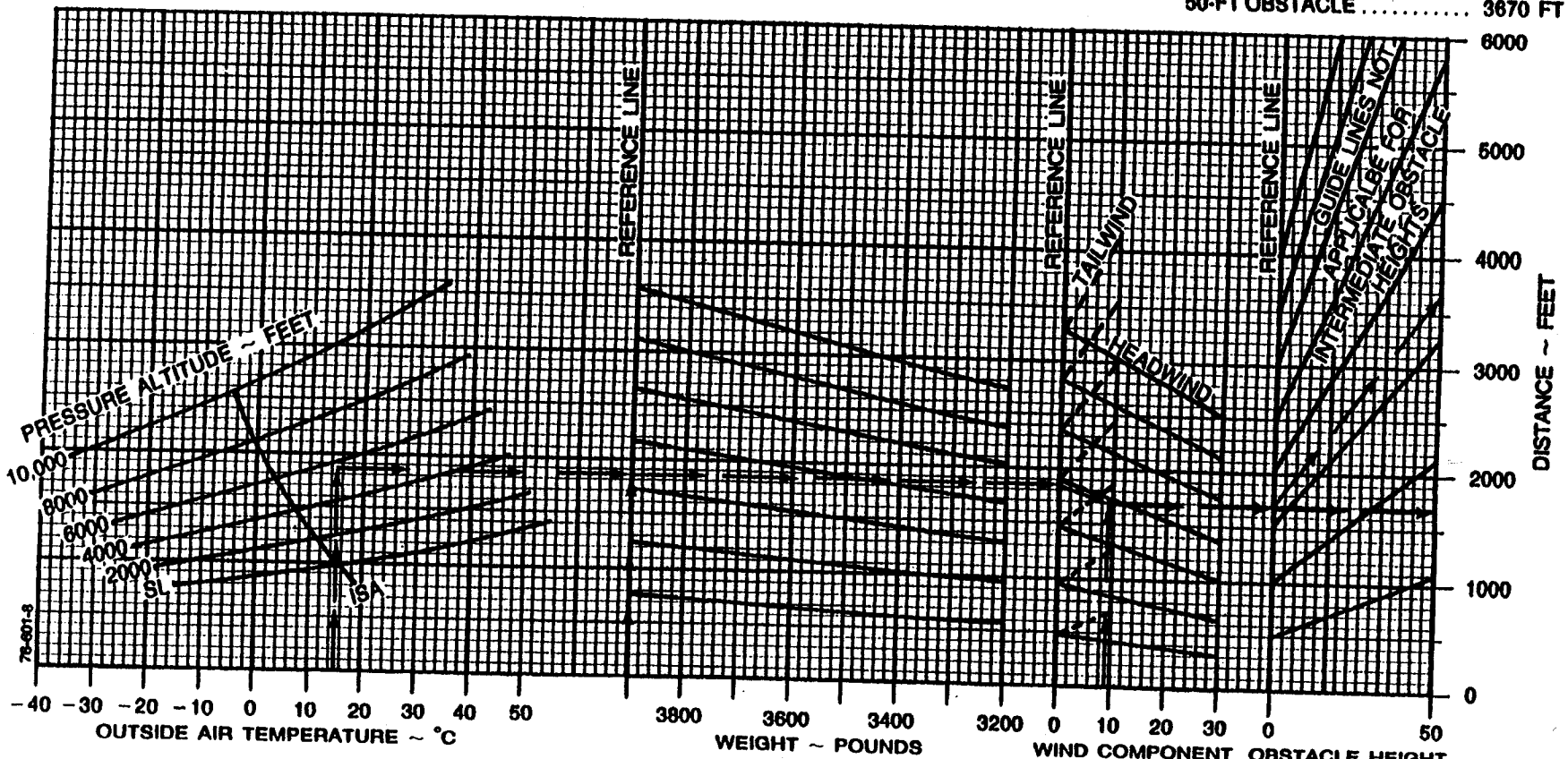
ASSOCIATED CONDITIONS:

POWER	TAKE-OFF POWER AT 2700 RPM SET BEFORE BRAKE RELEASE
MIXTURE	FULL RICH (ABOVE 5000 FT LEAN TO 75°-100°F ON RICH SIDE OF PEAK EGT)
FLAPS	UP
LANDING GEAR	RETRACT AFTER POSITIVE CLIMB ESTABLISHED
RUNWAY	PAVED, LEVEL, DRY SURFACE
COWL FLAPS	OPEN

TAKE-OFF SPEEDS (ALL WEIGHTS)	
LIFT-OFF	71 KNOTS
50 FEET	80 KNOTS

EXAMPLE:

OAT	15°C
PRESSURE ALTITUDE	5650 FT
TAKE-OFF WEIGHT	3900 LBS
HEADWIND COMPONENT	9.5 KTS
GROUND ROLL	1680 FT
TOTAL DISTANCE OVER 50-FT OBSTACLE	3670 FT



TAKE-OFF DISTANCE - GRASS SURFACE

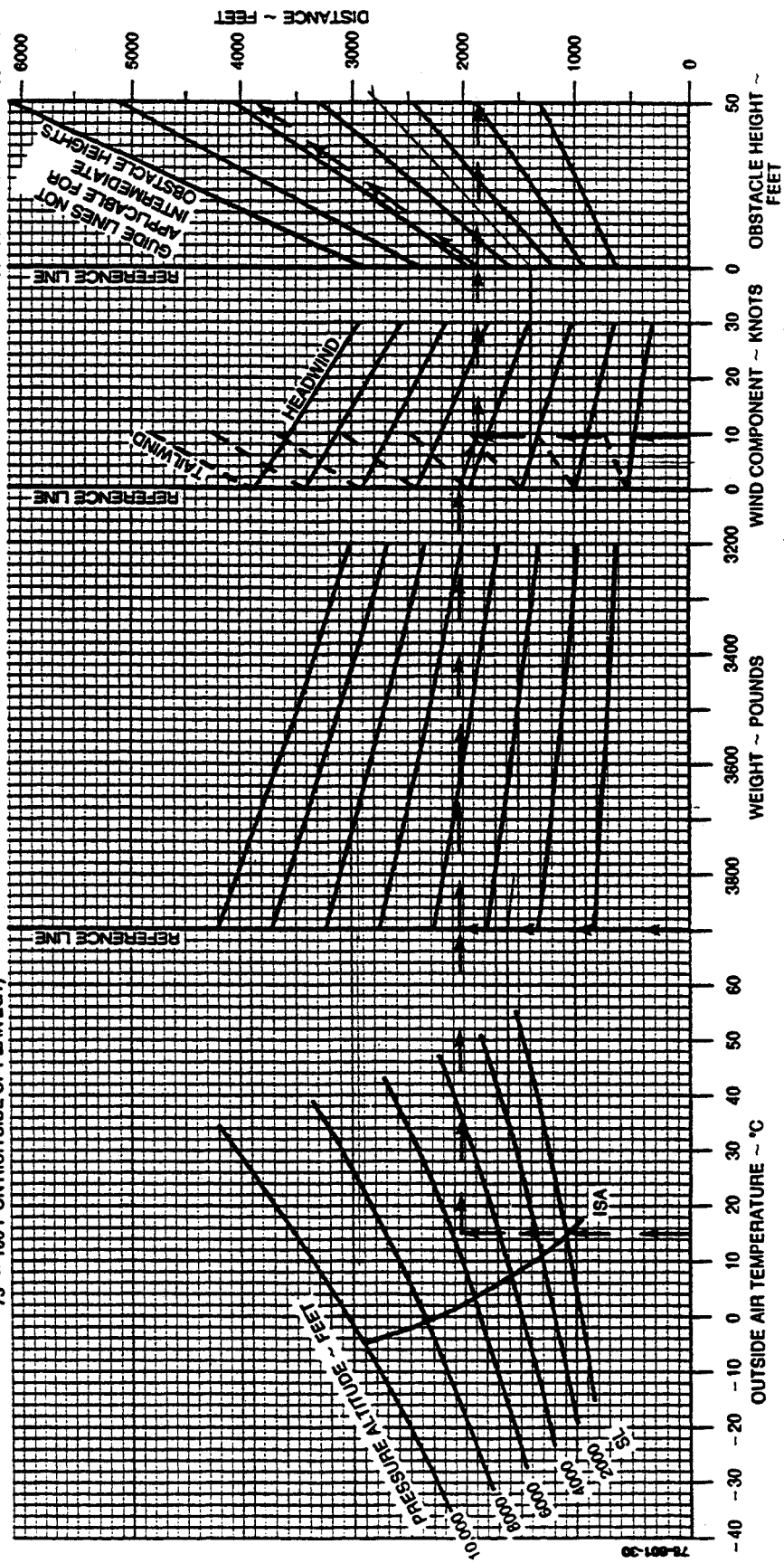
ASSOCIATED CONDITIONS:

POWER	TAKE-OFF AT 2700 RPM SET BEFORE BRAKE RELEASE
FLAPS	UP
LANDING GEAR	RETRACT AFTER POSITIVE CLIMB ESTABLISHED
RUNWAY	SHORT, DRY GRASS, LEVEL SURFACE
COWL FLAPS	OPEN
MIXTURE	FULL RICH (ABOVE 5000 FT LEAN TO 75° – 100°F ON RICH SIDE OF PEAK EGT)

TAKE-OFF SPEEDS (ALL WEIGHTS)	
LIFT-OFF	71 KNOTS
50 FEET	80 KNOTS

EXAMPLE:

OAT	15°C
PRESSURE ALTITUDE	5650 FT
TAKE-OFF WEIGHT	3900 LBS
HEADWIND COMPONENT	9.5 KTS
GROUND ROLL	1850 FT
TOTAL DISTANCE OVER 50 FT OBSTACLE	3850 FT
TAKE-OFF SPEED: AT LIFT-OFF	71 KTS
AT 50 FT	80 KTS



ACCELERATE - STOP DISTANCE

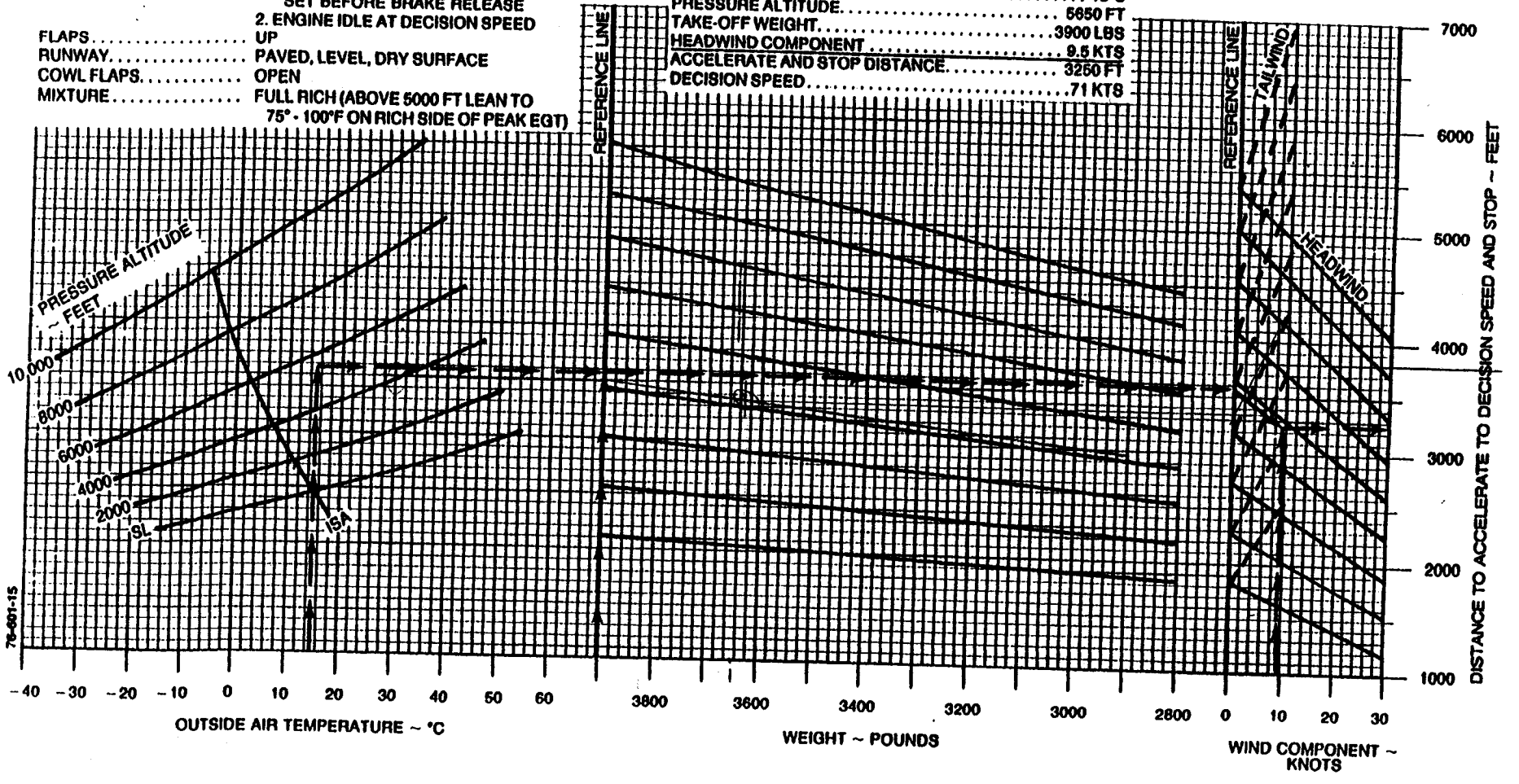
DECISION SPEED 71 KNOTS (ALL WEIGHTS)

ASSOCIATED CONDITIONS:

POWER	1. TAKE-OFF POWER AT 2700 RPM SET BEFORE BRAKE RELEASE 2. ENGINE IDLE AT DECISION SPEED
FLAPS	UP
RUNWAY	PAVED, LEVEL, DRY SURFACE
COWL FLAPS	OPEN
MIXTURE	FULL RICH (ABOVE 5000 FT LEAN TO 75° - 100°F ON RICH SIDE OF PEAK EGT)

EXAMPLE:

OAT	15°C
PRESSURE ALTITUDE	5650 FT
TAKE-OFF WEIGHT	3900 LBS
HEADWIND COMPONENT	9.5 KTS
ACCELERATE AND STOP DISTANCE	3250 FT
DECISION SPEED	71 KTS



ACCELERATE-GO DISTANCE

ASSOCIATED CONDITIONS:

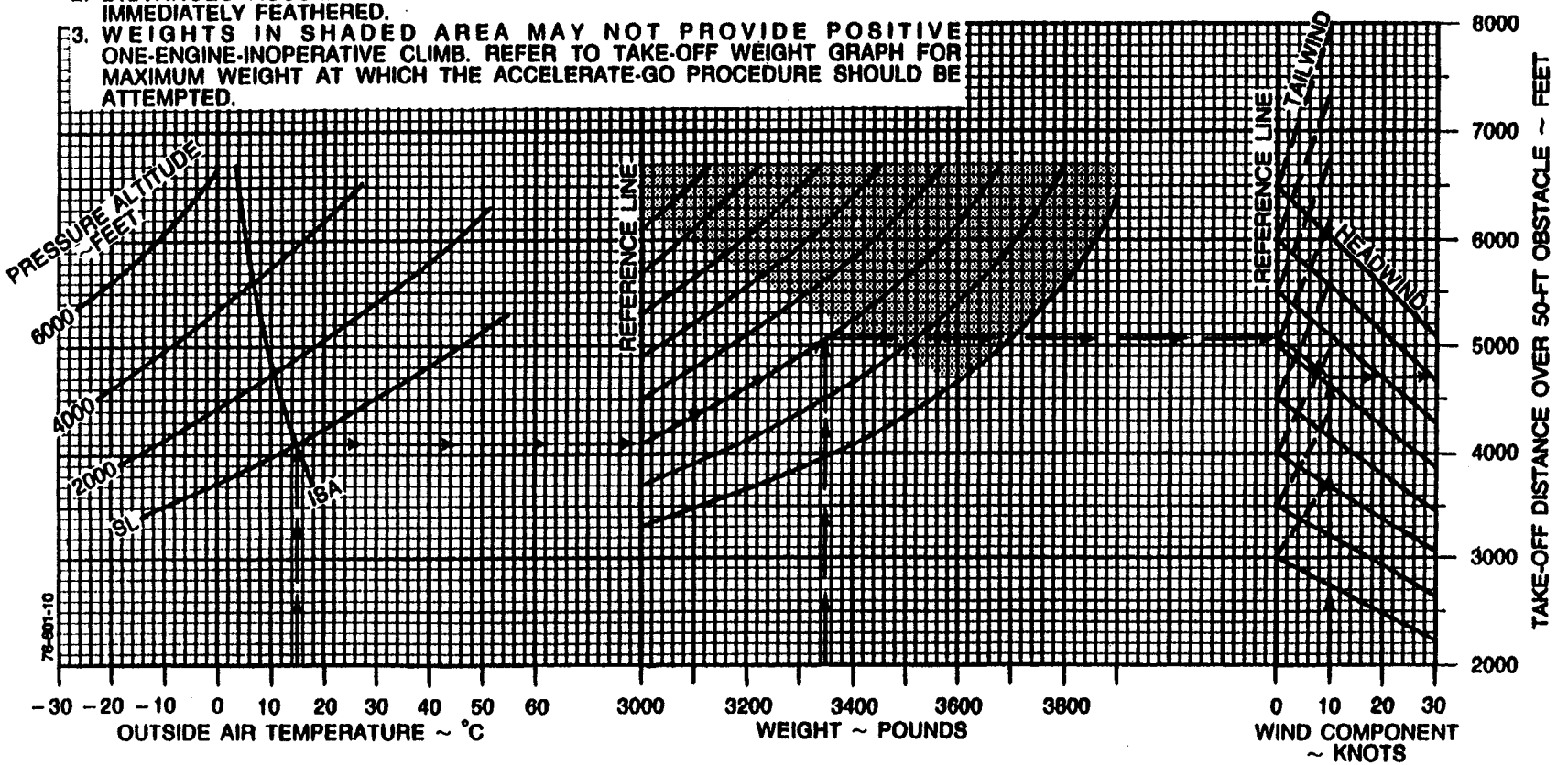
POWER	TAKE-OFF POWER AT 2700 RPM. SET BEFORE BRAKE RELEASE.
FLAPS	UP
LANDING GEAR	RETRACT AFTER LIFT-OFF.
RUNWAY	PAVED, LEVEL, DRY SURFACE.
COWL FLAPS	OPEN
MIXTURE	FULL RICH (ABOVE 5000 FT, SET TO 75-100°F ON RICH SIDE OF PEAK EGT)

TAKE-OFF SPEEDS (ALL WEIGHTS)	
LIFT-OFF	71 KNOTS
50 FT	80 KNOTS

EXAMPLE:

OAT	15°C
PRESSURE ALTITUDE	SL
TAKE-OFF WEIGHT	3350 LBS
HEADWIND COMPONENT	10 KTS
TOTAL DISTANCE OVER 50-FT OBSTACLE	4700 FT
GROUND ROLL	940 FT

NOTE:
1. GROUND ROLL DISTANCE IS 20% OF TAKE-OFF DISTANCE OVER 50-FT OBSTACLE.
2. DISTANCES ASSUME AN ENGINE FAILURE AT LIFT-OFF AND PROPELLER IMMEDIATELY FEATHERED.
3. WEIGHTS IN SHADED AREA MAY NOT PROVIDE POSITIVE ONE-ENGINE-INOPERATIVE CLIMB. REFER TO TAKE-OFF WEIGHT GRAPH FOR MAXIMUM WEIGHT AT WHICH THE ACCELERATE-GO PROCEDURE SHOULD BE ATTEMPTED.



RANGE PROFILE – 100 GALLONS

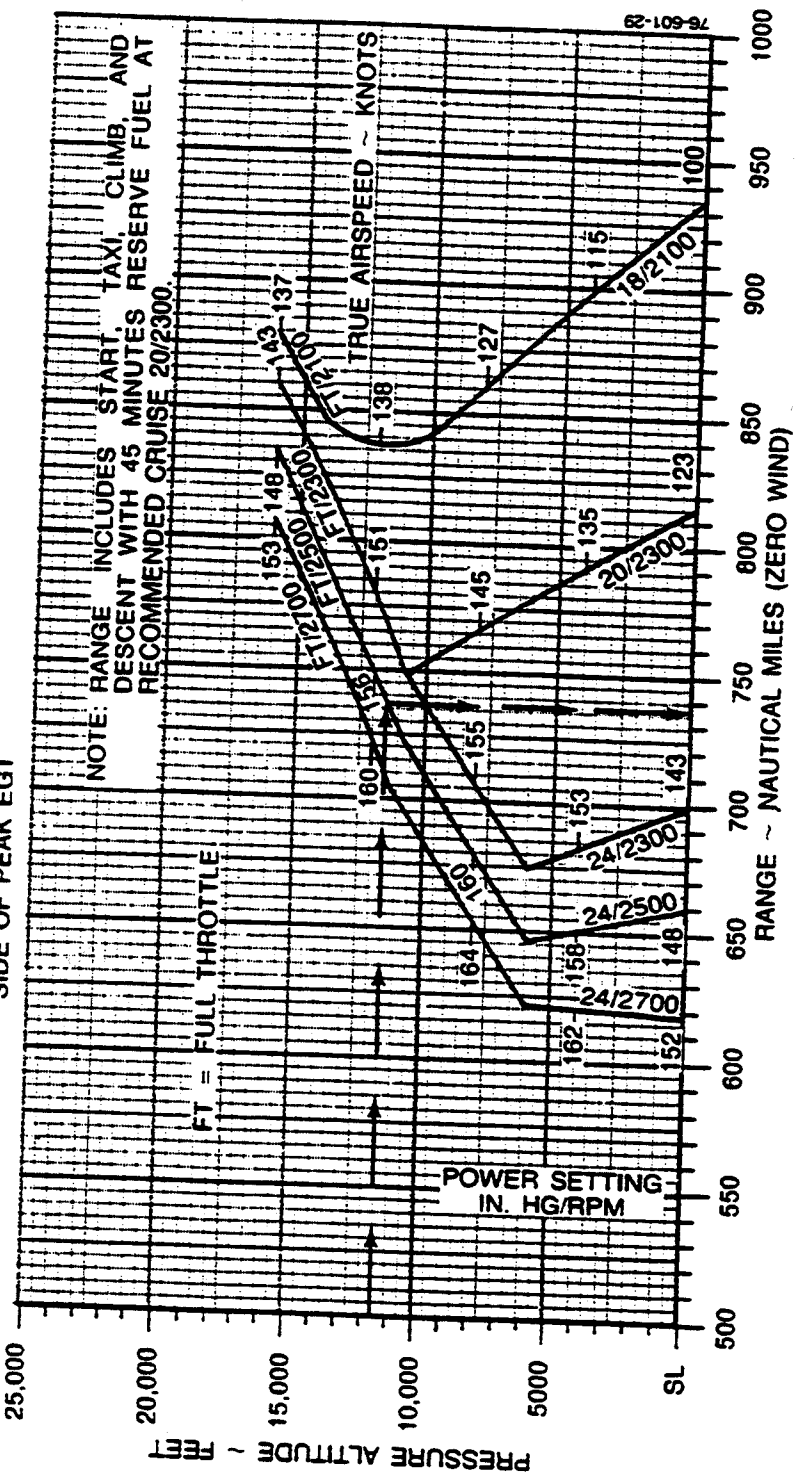
STANDARD DAY (ISA)

ASSOCIATED CONDITIONS:

WEIGHT	3916 LBS BEFORE ENGINE START
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	100 US GAL (600 LBS)
COWL FLAPS	CLOSED
MIXTURE	LEANED TO 25°-50°F ON RICH SIDE OF PEAK EGT

EXAMPLE:

PRESSURE ALTITUDE	11,500 FT
POWER SETTING	FT/2500 RPM
RANGE	737 NM



ENDURANCE PROFILE - 100 GALLONS

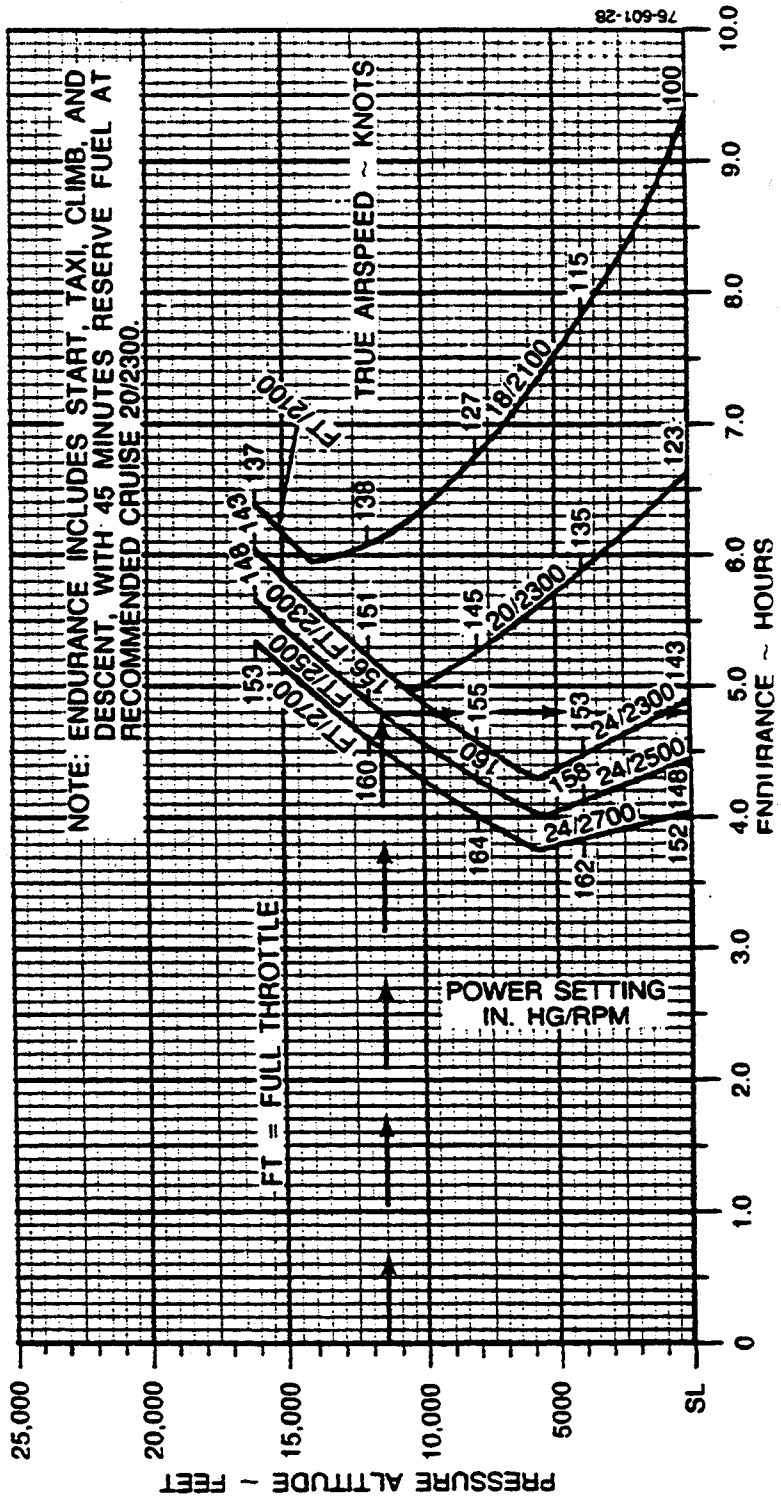
STANDARD DAY (ISA)

ASSOCIATED CONDITIONS:

WEIGHT	3916 LBS BEFORE ENGINE START
FUEL	AVIATION GASOLINE
FUEL DENSITY	6.0 LBS/GAL
INITIAL FUEL LOADING	100 US GAL (600 LBS)
COWL FLAPS	CLOSED
MIXTURE	LEANED TO 25°-50°F ON RICH SIDE OF PEAK EGT

EXAMPLE:

PRESSURE ALTITUDE	11,500 FT
POWER SETTING	FT/2500
ENDURANCE	4.8 HRS



TIME, FUEL, AND DISTANCE TO DESCEND

DESCENT SPEED - 170 KNOTS

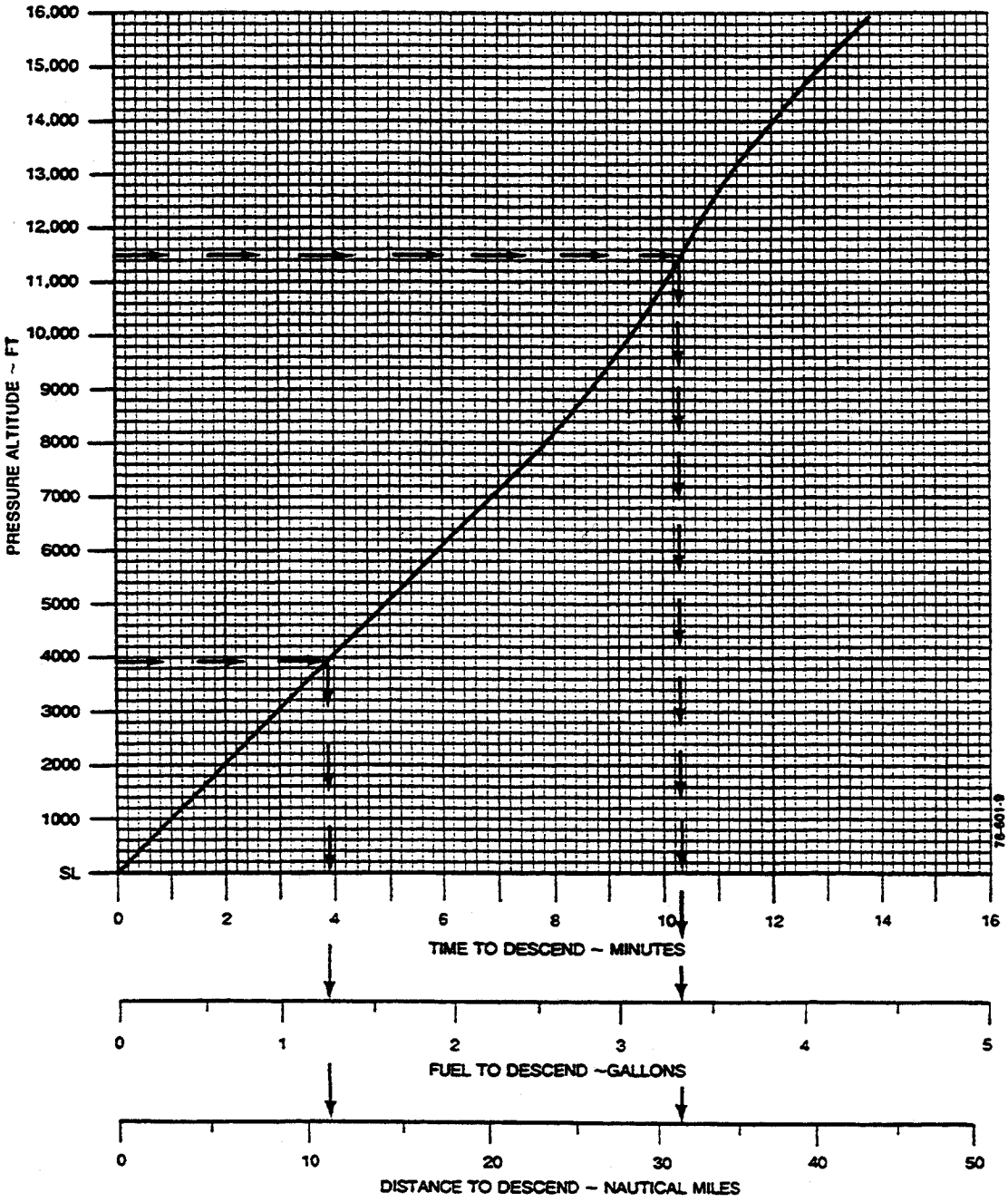
ASSOCIATED CONDITIONS:

POWER..... AS REQUIRED TO MAINTAIN 1000 FT/MIN RATE OF DESCENT
LANDING GEAR .... UP
FLAPS..... UP
MIXTURE..... FULL RICH (ABOVE 5000 FT LEAN TO 75° - 100°F ON RICH SIDE OF PEAK EGT)

EXAMPLE:

INITIAL ALTITUDE.....11,500 FT
FINAL ALTITUDE.....3965 FT

TIME TO DESCEND.....10 – 4 = 6 MINUTES
FUEL TO DESCEND .....3.4 – 1.3 = 2.1 GAL
DISTANCE TO DESCEND .... 32 – 11 = 21NM



LANDING DISTANCE - FLAPS DOWN (DN)

APPROACH SPEED 76 KNOTS (ALL WEIGHTS)

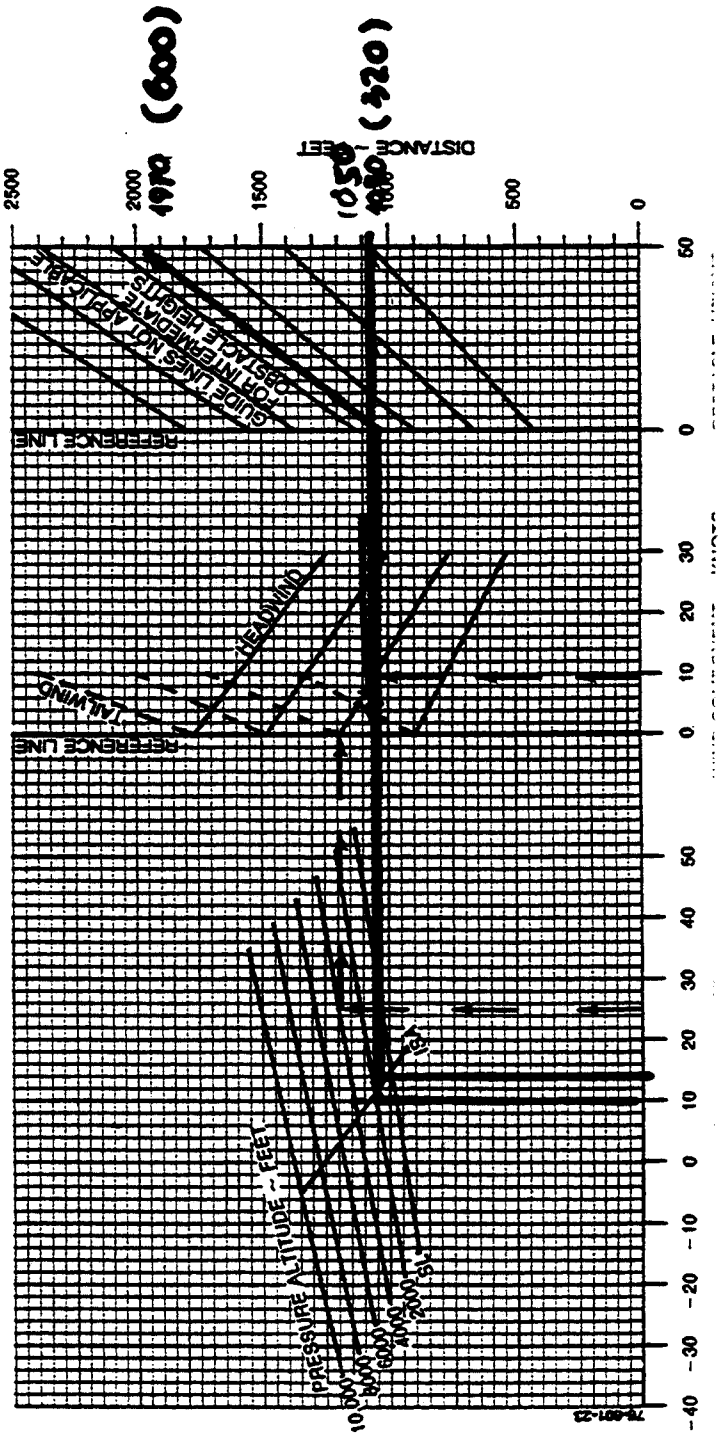
ASSOCIATED CONDITIONS:

POWER . . . . . RETARD TO MAINTAIN 600 FT/MIN ON FINAL APPROACH
FLAPS . . . . . DOWN (DN)
LANDING GEAR . . . . . DOWN
RUNWAY . . . . . PAVED, LEVEL, DRY SURFACE
APPROACH SPEED . . 76 KNOTS IAS
BRAKING . . . . . MAXIMUM

EXAMPLE:

OAT . . . . . 25°C
PRESSURE ALTITUDE . . . . . 3965 FT
HEADWIND COMPONENT . . . . . 9.5 KTS

GROUND ROLL . . . . . 1050 FT
TOTAL OVER 50 FT OBSTACLE . . . . . 1970 FT
APPROACH SPEED . . . . . 76 KTS



LANDING DISTANCE - FLAPS UP

APPROACH SPEED 87 KNOTS (ALL WEIGHTS)

ASSOCIATED CONDITIONS:

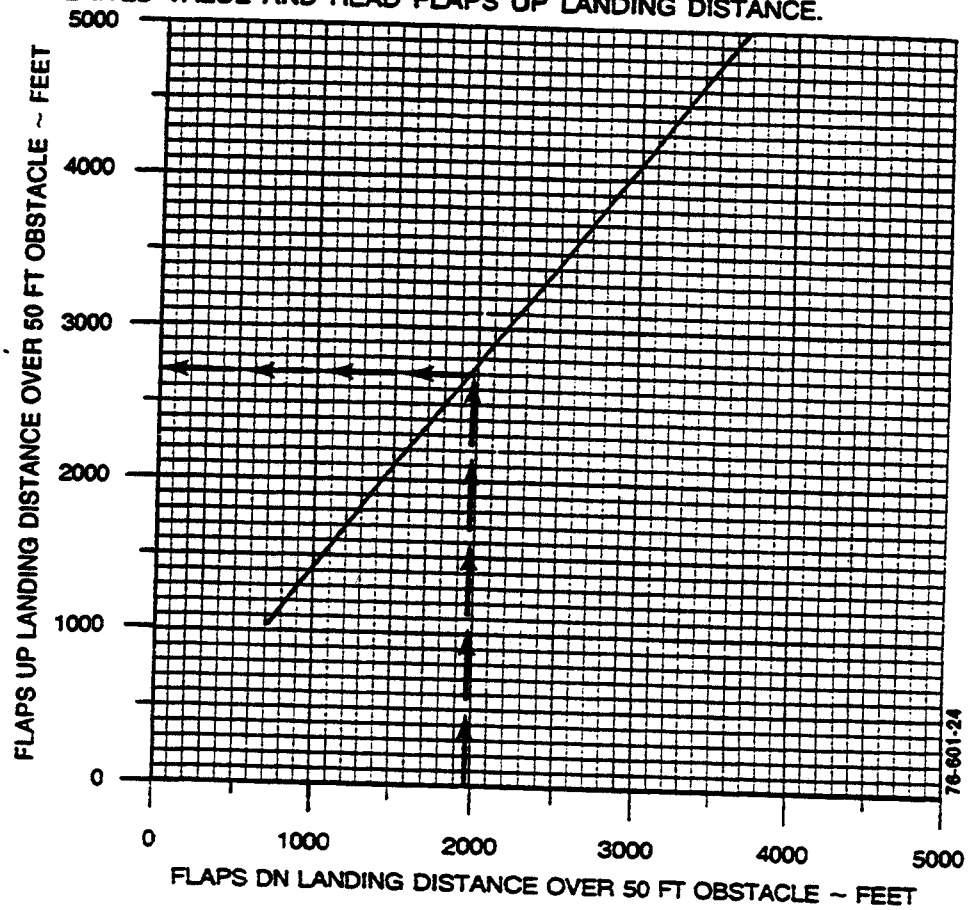
POWER	RETARD TO MAINTAIN 600 FT/MIN ON FINAL APPROACH
FLAPS	UP
LANDING GEAR	DOWN
RUNWAY	PAVED, LEVEL, DRY SURFACE
APPROACH SPEED	87 KNOTS IAS
BRAKING	MAXIMUM

EXAMPLE:

FLAPS DN LANDING DISTANCE OVER 50 FT OBSTACLE	1970 FT
FLAPS UP LANDING DISTANCE OVER 50 FT OBSTACLE	2700 FT
APPROACH SPEED	87 KTS

NOTE: 1. LANDING WITH FLAPS FULL DOWN IS NORMAL PROCEDURE. USE THIS GRAPH WHEN IT IS NECESSARY TO LAND WITH FLAPS UP.

2. TO DETERMINE FLAPS UP LANDING DISTANCE, READ FROM THE LANDING DISTANCE - FLAPS DOWN GRAPH, THE LANDING DISTANCE APPROPRIATE TO OAT, ALTITUDE, WIND, AND 50 FT OBSTACLE. ENTER THIS GRAPH WITH DERIVED VALUE AND READ FLAPS UP LANDING DISTANCE.



LANDING DISTANCE - GRASS SURFACE - FLAPS DOWN (DN)

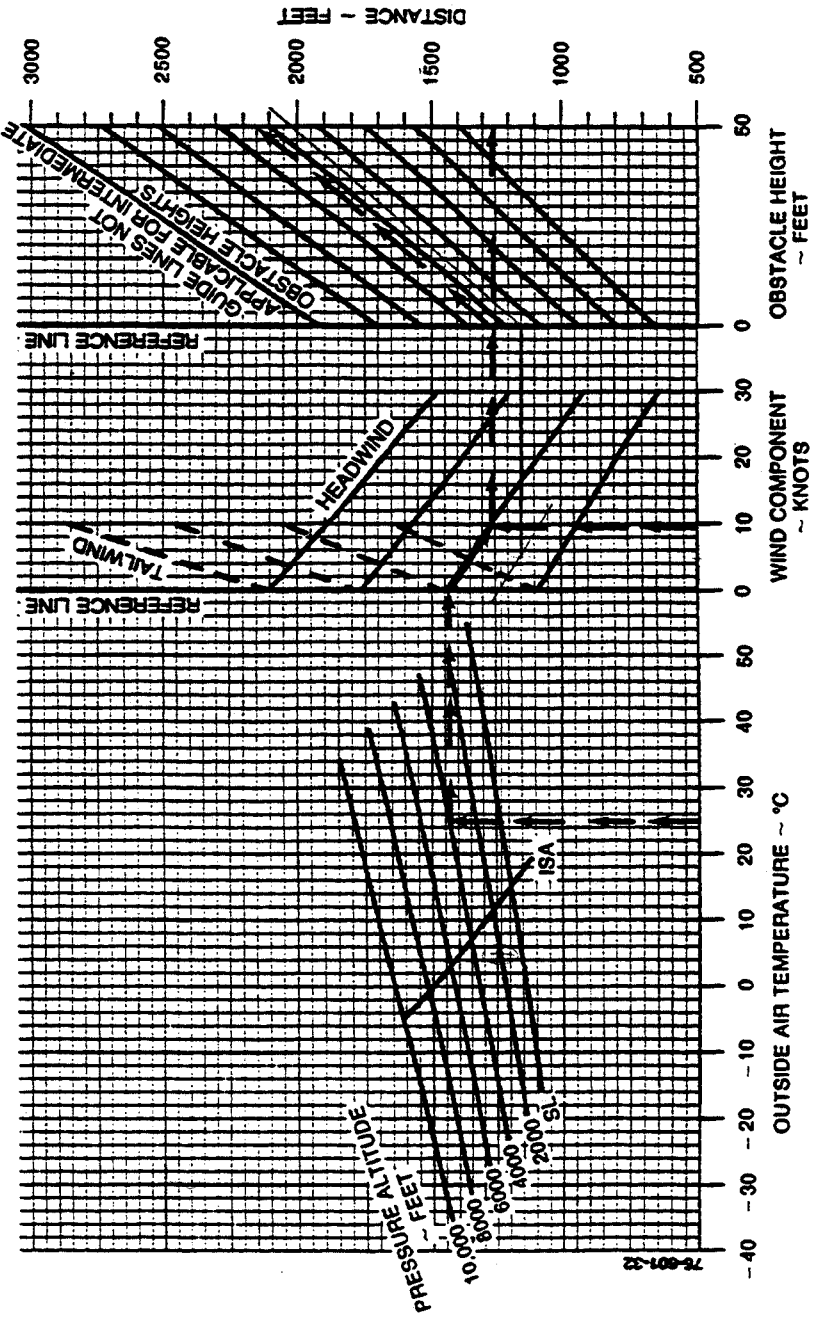
APPROACH SPEED 76 KTS (ALL WEIGHTS)

ASSOCIATED CONDITIONS:

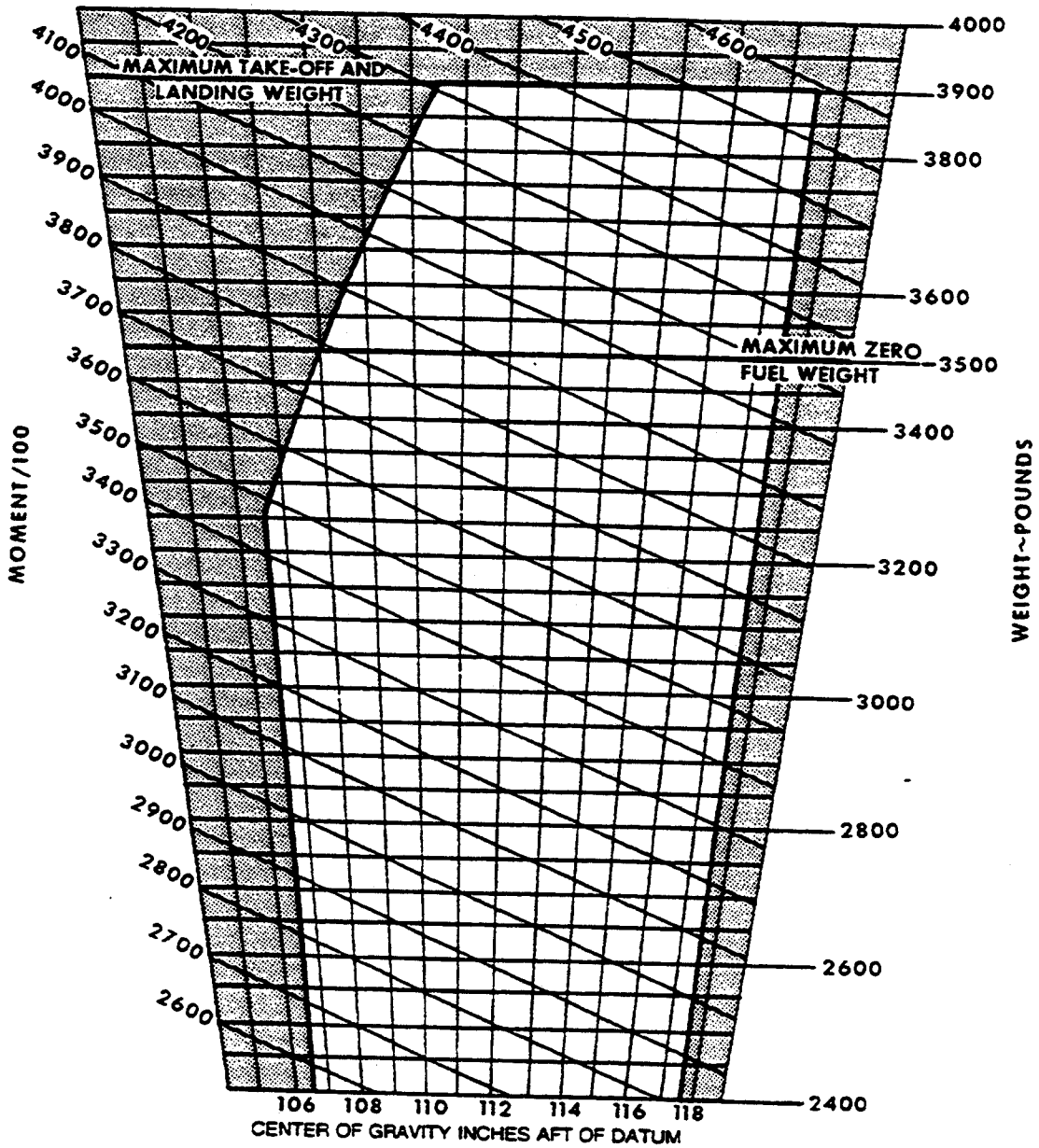
POWER.....RETARD TO MAINTAIN 600 FT/MIN ON FINAL APPROACH
FLAPS.....DOWN (DN)
LANDING GEAR..DOWN
RUNWAY.....SHORT, DRY, GRASS
APPROACH SPEED.....76 KTS
BRAKING.....MAXIMUM

EXAMPLE:

OAT	25°C
PRESSURE ALTITUDE	3985 FT
HEADWIND COMPONENT	9.5 KTS
GROUND ROLL	1250 FT
TOTAL OVER 50 FT OBSTACLE	2150 FT
APPROACH SPEED	76 KTS



MOMENT LIMITS VS WEIGHT



ENVELOPE BASED ON THE FOLLOWING WEIGHT AND CENTER OF GRAVITY LIMIT DATA (LANDING GEAR DOWN)

WEIGHT CONDITION	FWD C. G. LIMIT	AFT C. G. LIMIT
3900 POUNDS (MAX. TAKE-OFF/LANDING)	110.6	117.5
3250 POUNDS OR LESS	106.6	117.5

76-601-6

MOMENT LIMITS vs WEIGHT

WEIGHT POUNDS	MOMENT/100		WEIGHT POUNDS	MOMENT/100	
	FWD LIMIT	AFT LIMIT		FWD LIMIT	AFT LIMIT
2300	2452	2703	3125	3331	3672
2325	2479	2732	3150	3358	3701
2350	2505	2761	3175	3385	3731
2375	2532	2791	3200	3411	3760
2400	2558	2820			
2425	2585	2849	3225	3438	3789
2450	2612	2879	3250	3465	3819
2475	2638	2908	3275	3496	3848
2500	2665	2938	3300	3528	3878
2525	2692	2967	3325	3560	3907
2550	2718	2996	3350	3592	3936
2575	2745	3026	3375	3624	3966
2600	2772	3055	3400	3656	3995
2625	2798	3084	3425	3688	4024
2650	2825	3114	3450	3720	4054
2675	2852	3143	3475	3753	4083
2700	2878	3173	3500	3785	4113
2725	2905	3202	3525	3817	4142
2750	2932	3231	3550	3850	4171
2775	2958	3261	3575	3882	4201
2800	2985	3290	3600	3915	4230
2825	3012	3319	3625	3948	4259
2850	3038	3349	3650	3981	4289
2875	3065	3378	3675	4014	4318
2900	3091	3408	3700	4047	4348
2925	3118	3437	3725	4080	4377
2950	3145	3466	3750	4113	4406
2975	3171	3496	3775	4146	4436
3000	3198	3525	3800	4179	4465
3025	3225	3554	3825	4213	4494
3050	3251	3584	3850	4246	4524
3075	3278	3613	3875	4280	4553
3100	3305	3643	3900	4313	4583

COMPUTING PROCEDURE

1. Record the Basic Empty Weight and Moment from the Basic Empty Weight and Balance form (or from the latest superseding form) under the Basic Empty Condition block. The moment must be divided by 100 to correspond to Useful Load Weights and Moments tables.

2. Record the weight and corresponding moment from the appropriate table of each of the useful load items (except fuel) to be carried in the airplane.

3. Total the weight column and moment column. The SUB-TOTALS are the ZERO FUEL CONDITION.

4. Determine the weight and corresponding moment for the total fuel loading to be used. Add the Total Fuel Loading Condition to Zero Fuel Condition to obtain the SUB-TOTAL Ramp Condition.

5. Subtract the fuel to be used for start and taxi to arrive at the SUB-TOTAL Take-off Condition.

6. Subtract the weight and moment of the FUEL TO DESTINATION from the take-off weight and moment. (Determine the weight and moment of this fuel by subtracting the amount on board at landing from the amount on board at takeoff.) The Zero Fuel Condition, the Take-off Condition and the Landing Condition moment must all be within the minimum and maximum moments shown on the Moment Limits vs Weight graph or table for that weight. If the total moment is less than the minimum moment allowed, useful load items must be shifted aft or forward load items reduced. If the total moment is greater than the maximum moment allowed, useful load items must be shifted forward or aft load items reduced. If the quantity or location of load items is changed, the calculations must be revised and the moments rechecked.

The following Sample Loading chart is presented to depict the sample method of computing a load. Weights used DO NOT reflect an actual airplane loading.

WEIGHT AND BALANCE LOADING FORM

MODEL *DUCHESS 76* DATE *0/0/00*
SERIAL NO. *ME-00* REG. NO. *NXXXXX*

ITEM	WEIGHT	MOM/100
1. BASIC EMPTY CONDITION	*2543*	*2775*
2. FRONT SEAT OCCUPANTS	*340*	*380*
3. 3rd & 4th SEAT OCCUPANTS OR BENCH SEAT OCCUPANTS	*340*	*490*
4.	–	–
5. AFT BAGGAGE	*93*	*155*
6. **SUB TOTAL** ZERO FUEL CONDITION (3500 LBS MAX.)	*3316*	*3800*
7. FUEL LOADING (100 gal.)	*600*	*702*
8. **SUB TOTAL** RAMP CONDITION	*3916*	*4502*
9. *LESS FUEL FOR START, TAXI, AND TAKEOFF	*–16*	*–19*
10. **SUB TOTAL** TAKE-OFF CONDITION	*3900*	*4483*
11. LESS FUEL TO DESTINATION (80 gal.)	*–480*	*–562*
12. **LANDING CONDITION**	*3420*	*3921*

*Fuel for start, taxi, and takeoff is normally 16 lbs at an average mom/100 of 19.

WEIGHT AND BALANCE LOADING FORM

MODEL *DUCHESS 76* DATE _____
SERIAL NO. _____ REG. NO. _____

ITEM	WEIGHT	MOM/100
1. BASIC EMPTY CONDITION		
2. FRONT SEAT OCCUPANTS		
3. 3rd & 4th SEAT OCCUPANTS OR BENCH SEAT OCCUPANTS		
4.		
5. AFT BAGGAGE		
6. **SUB TOTAL** ZERO FUEL CONDITION (3500 LBS MAX.)		
7. FUEL LOADING (gal.)		
8. **SUB TOTAL** RAMP CONDITION		
9. *LESS FUEL FOR START, TAXI, AND TAKEOFF		
10. **SUB TOTAL** TAKE-OFF CONDITION		
11. LESS FUEL TO DESTINATION		
12. **LANDING CONDITION**		

*Fuel for start, taxi, and takeoff is normally 16 lbs at an average mom/100 of 19.

USEFUL LOAD WEIGHTS AND MOMENTS

OCCUPANTS

WEIGHT	FRONT SEATS				3RD AND 4TH SEATS	
	*FWD POS.		*AFT POS.		STD. BENCH	OPTIONAL
	††ARM **104	†ARM **105	ARM **112		ARM **142	ARM **144
	MOMENT/100					
120	125	126	134		170	173
130	135	137	146		185	187
140	146	147	157		199	202
150	156	158	168		213	216
160	166	168	179		227	230
170	177	179	190		241	245
180	187	189	202		256	259
190	198	200	213		270	274
200	208	210	224		284	288
210	218	220	235		298	302
220	228	231	246		312	317
230	239	241	258		327	331
240	250	252	269		341	346
250	260	262	280		355	360

† Effective ME-1 thru ME-20
†† Effective ME-21 and after
* Reclining seat with back in full-up position
** Values computed from a C.G. criterion based on a 170 pound male. Differences in physical characteristics can cause variation in center of gravity location.

USEFUL LOAD WEIGHTS AND MOMENTS

BAGGAGE
ARM 167

WEIGHT	MOMENT / 100
10	17
20	33
30	50
40	67
50	84
60	100
70	117
80	134
90	150
100	167
110	184
120	200
130	217
140	234
150	251
160	267
170	284
180	301
190	317
200	334

USEFUL LOAD WEIGHTS AND MOMENTS
USABLE FUEL
ARM 117.0

GALLONS	WEIGHT LBS	MOMENT 100
10	60	70
20	120	140
30	180	211
40	240	281
50	300	351
60	360	421
70	420	491
80	480	562
90	540	632
100	600	702

RUDDER PEDALS

The standard installation provides a set of rudder pedals for both the pilot and copilot. The main landing gear wheel brakes are operated by applying toe pressure to either set of rudder pedals.

TRIM CONTROLS

Trim tabs on the rudder and elevator are adjustable with the controls that are mounted on the lower center console. The trim tabs and controls are connected through closed cable systems. Mechanical position indicators for each of the trim tabs are integrated with their respective controls. Elevator trim is accomplished through either the electric or manual pitch trim system.

MANUAL ELEVATOR TRIM

The manual elevator trim is actuated by a handwheel located between the pilot seats. An elevator tab position indicator is located adjacent to the trim control handwheel. Forward rotation of wheel trims the airplane nose down, aft rotation trims nose up.

ELECTRIC ELEVATOR TRIM

The electric elevator trim system is controlled by the ON-OFF circuit-breaker-type switch located on the left subpanel and a thumb switch located on the pilot's control wheel. The ON-OFF switch must be in the ON position to operate the system. The thumb switch is depressed and moved forward for nose down, aft for nose up, and when released, returns to the center OFF position. When the system is not being electrically actuated, the manual trim control wheel may be used.

An emergency release button, incorporated in the system, is located on the left handle grip of the pilot's control wheel. This button can be quickly depressed to deactivate the system in case of a malfunction in the system. The system will remain deactivated only while the button is being held in the depressed position.

AILERON TRIM

The aileron trim control, located on the lower center console, is provided to displace the ailerons for trimming purposes. Displacement is maintained by cable loads imposed by the trimmer.

INSTRUMENT PANEL

The standard instrument panel consists of flight, navigation, and engine instruments on the left, and an avionics section on the right.

The lower left subpanel contains the switches for control of the battery and alternators, magneto/start and prime, lights, environmental, and optional equipment. Also contained on the left subpanel are the auxiliary fuel pump switches, instrument air gage, landing gear control switch and gear indicator lights.

Located on the lower right subpanel are the rheostat switches for the instrument flood and post lights, parking brake control knob, flap switch, and flap position indicator. All of the circuit breakers, that are associated with the various placarded systems, are also located on the lower right subpanel.

LIGHTING SYSTEMS

INTERIOR LIGHTING

Lighting for the instrument panel is controlled by two rheostat switches located on the copilot's subpanel to the right of the control console. One switch, placarded INSTR FLOOD, controls the intensity of the overhead instrument flood light and the overhead map light. The other switch, placarded POST LIGHTS, adjusts the intensity of all post lights installed, magnetic compass light, and the internally lit engine instruments. The cabin dome light is controlled by the switch located adjacent to the light.

EXTERIOR LIGHTING

The switches for all exterior lights are located on the lower portion of the pilot's subpanel. Each circuit is protected by a circuit-breaker-type switch.

The exterior lights consist of a landing light on the outboard leading-edge portion of the left wing, a taxi light on the outboard leading-edge portion of each wing, navigation lights on the wing tips and empennage, and a strobe light located on each wing tip. For longer battery and lamp life, use the landing light and the taxi lights sparingly; avoid prolonged operation which could cause overheating during ground maneuvering.

NOTE

Particularly at night, reflections from anti-collision lights on clouds, dense haze, or dust can produce optical illusions and intense vertigo. Such lights, when installed, should be turned off before entering an overcast; their use may not be advisable under instrument or limited VFR conditions.

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ENVIRONMENTAL SYSTEMS

CABIN HEATING

A 45,000 Btu-per-hour combustion air heater, located on the right side in the nose compartment, provides heated air for cabin warming and windshield defrosting. The heater system consists of a combustion air heater, three-position control switch, three push-pull control knobs, heater circuit breaker, manual reset limit (overheat) switch, combustion air blower, ventilation air blower, and a duct thermostat.

Fuel for the combustion heater is routed from the right wing fuel system, through a solenoid valve, to the heater fuel pump located under the heater, and into the combustion chamber of the heater. Fuel consumption of the heater is approximately ⅔ gallons per hour and should be considered during flight planning.

NOTE

The fuel solenoid is energized only if the duct thermostat, which controls the heater, requires a higher temperature.

Three outlets are located in the cabin to distribute the heated air into the cabin. One outlet is located on the lower forward cabin bulkhead and provides heated air for the pilot and copilot compartment. The second outlet is located between the pilot and copilot seats and faces aft, to provide heated air to the aft cabin area. The defrost duct is routed from the heater to the windshield outlet for windshield defrosting.

The manual reset limit (overheat) switch (inaccessible during flight), located on the heater, shuts off the heat system in case the discharge temperature reaches 300° F.

CAUTION

The entire system should be inspected and the malfunction determined and corrected before re-setting the overheat switch.

HEATER OPERATION

1. The three-position switch on the pilot's subpanel, placarded HEATER - ON, BLOWER ONLY, OFF, must be in the ON position to place the heating system in operation.

2. The push-pull knob on the left sidewall, placarded DE-FROST - PULL ON, controls the amount of air required for windshield defrosting.

3. The push-pull knob, located below the defrost knob, placarded CABIN AIR - PULL OFF, controls the amount of air entering the cabin from the heater. Pulling the knob more than approximately one-half closed deactivates the heater in order to prevent heater overtemp.

NOTE

For maximum heat, the CABIN AIR control can be pulled partially out to reduce the volume of incoming cold air and permitting the heater to raise the temperature of the admitted air. However, if the CABIN AIR control is pulled out more than halfway, the heater will not operate.

4. The push-pull knob, located below the cabin air control, placarded CABIN TEMP - PULL TO INCREASE, controls the temperature of the air entering the cabin. Pulling aft on the knob increases the temperature at which the duct thermostat switch opens (controlling the heater).

CABIN VENTILATION

In flight, to provide unheated air through the same outlets used for heating, push the CABIN AIR and CABIN TEMP controls forward. The air intake for this system is located on the right side of the nose compartment.

For ventilation through these same outlets during ground operation, push the CABIN AIR control forward and place the three-position switch, on the pilot's subpanel, in the BLOWER ONLY position. The BLOWER ONLY position is for ground operation only and will shut off the blower when the landing gear is retracted.

Fresh ram air is also provided through an outlet located on each side of the instrument panel. Fresh air for these outlets enters the two vents located immediately forward of the windshield. Rotation of the outlets controls the flow of air.

OVERHEAD FRESH AIR OUTLETS

Fresh air from the intake on the left side of the dorsal fin is ducted to the individual outlets located above each seat. The volume of air at each outlet can be regulated by rotating the outlet. Each outlet can be positioned to direct the flow of air as desired. An optional fresh air blower for this system is located in the aft fuselage. The blower is controlled by the

circuit breaker switch on the pilot's subpanel placarded CABIN AIR BLOWER. The blower is designed for ground operation and climb-out and should be turned off during cruise.

EXHAUST VENT

A fixed cabin exhaust vent is located on the left side of the aft fuselage and provides for flow-through ventilation.

PITOT AND STATIC SYSTEMS

The pitot and static systems provide a source of impact and static air for the operation of the flight instruments.

PITOT SYSTEM

A standard pitot tube for the pilot's flight instruments is located on the outboard portion of the left wing leading edge. The optional pitot tube (ME-44 and after) for the copilot's flight instruments is located on the outboard portion of the right wing leading edge.

PITOT HEAT

A heating element is installed in the pitot mast and is controlled by the rocker-type switch located on the pilot's subpanel. The switch is placarded PITOT HEAT - ON, and should remain off during ground operations except for testing or for short intervals of time to remove ice or snow from the mast. One switch controls the heating elements in both pitot masts.