PILOT'S OPERATING HANDBOOK AND FAA APPROVED AIRPLANE FLIGHT MANUAL

for the

Beechcraft®

Skipper 77

FAA APPROVED IN THE UTILITY CATEGORY BASED ON FAR 23, THIS DOCUMENT MUST BE CARRIED IN THE AIRPLANE AT ALL TIMES AND BE KEPT WITHIN REACH OF THE PILOT DURING ALL FLIGHT OPERATIONS.

THIS HANDBOOK INCLUDES THE MATERIAL REQUIRED TO BE FURNISHED TO THE PILOT BY FAR PART 23.

Mfr's Serial No. _____

Registration No. _____

FAA Approved by: Donald St Peter

fa W. H. SCHULTZ
BEECH AIRCRAFT CORPORATION
DOA CE-2

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Manufacturers Association

LOG OF REVISIONS

Page	Description
4-14	Shifted Material
4-15	Shifted Material
4-16	Revised "Noise Characteristics", and Shifted Material
4-17	Shifted Material
4-18	Added New Page and Shifted Material
8-2	Revised "Table of Contents"
8-46	Deleted "Landing Gear", Revised "Power Plant", and Shifted Material
8-47	Deleted "Instruments", Revised "Fuel System", and "Electrical System", and Shifted Material
8-48	Added "Wing Structure Inspection Schedule", and Shifted Material
8-49	Shifted Material
8-50	Shifted Material
8-51	Shifted Material
8-52	Deleted
8-53	Deleted

SKIPPER 77
Pilot's Operating Handbook
and
FAA Approved Airplane Flight Manual

A3 .....January, 1982

LOG OF REVISIONS

Page	Description
Title Page	Added Revision Date
Logo Page	New
Page A (A3)	New
2-16	Revised "Structural Life"
4-1	Revised "Table of Contents"
4-4	Revised "Cabin" and Shifted Material
4-5	Revised "Right Fuselage" and Shifted Material
4-6	Revised "Before Engine Starting" and Shifted Material
4-7	Revised "Starting Engine Using Auxiliary Power Unit"
4-8	Revised "Engine Starting" and Shifted Material
4-9	Revised "Engine Starting", "Before Taxi", and Shifted Material
4-10	Revised "Before Takeoff" and Shifted Material
4-11	Revised "Climb", "Cruise", and Shifted Material
4-12	Revised "Descent", "Before Landing", and Shifted Material
4-13	Revised "Balked Landing" and Shifted Material

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A3

SKIPPER 77
Pilot's Operating Handbook
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A2 .....August, 1980

LOG OF REVISIONS

Page	Description
Title Page	Added Revision Date
Page A (A2)	Updated
1-1	Revised "Table of Contents"
1-5	Revised "Use of Handbook"
1-6 and 1-7	Shifted Material
1-8	Revised "THREE-VIEW"
2-10	Revised "Electrical Power"
3-1	Revised "Table of Contents"
3-5	Revised "After Liftoff and in Flight"
3-6 and 3-7	Revised "Engine Fire in Flight"
3-8	Added "Starter Engaged Warning Light Illuminated"
3-9	Shifted Material
3-10	Updated
4-1	Revised "Table of Contents"
4-8 and 4-9	Revised "Engine Starting"
4-10	Revised "Before Take-off"
4-11	Shifted Material
6-11	Revised "Loading Instructions"
7-2	Revised "Table of Contents"
7-14	Shifted Material
7-15	Revised "Starter"
7-22	Added "Starter Engaged Warning Light" and Revised "External Power"
7-23 and 7-24	Shifted Material
8-11	Revised "External Power"
8-17	Revised "Tires"
8-19	Revised "Shimmy Damper"

10-1 Thru 10-67
Revised Safety Section
Dated March 1981.

A2

98-38307

A1 ..... September 1979

LOG OF REVISIONS

Page	Description
Title Page	Add Revision Date and Letter
Page A (A1)	Update
2-1	Revised "Table of Contents"
2-4	Add "Fuel Additives"
2-5 and 2-6	Shifted Information
4-1	Revised "Table of Contents"
4-15 and 4-16	Revised "Noise Characteristics"
4-17	Shifted Information
7-8	Revised "Flight Instruments"
8-39 and 8-40	Revised "Consumable Materials"
8-44	Revised "Lamp Replacement Guide"

A1

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Pilot's Operating Handbook
and
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A-Original Issue ..... March 1979

LOG OF REVISIONS

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Title Page	Original
"A" Page	Original
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9-1 and 9-2	Original
Supplements	See Log of Supplements
10-1 thru 10-30	Original

A

INTRODUCTION

The format and contents of this Pilot's Operating Handbook and FAA Approved Airplane Flight Manual conform to GAMA (General Aviation Manufacturers Association) Handbook Specification Number 1. Use of this specification by all manufacturers will provide the pilot with the same type of data in the same place in all handbooks.

In recent years, BEECHCRAFT handbooks contained most of the data now provided. However, the new handbooks contain more detailed data and some entirely new data.

For example, attention is called to Section X (SAFETY INFORMATION). While little of the information is new – and every pilot has been exposed to the fundamentals – BEECHCRAFT feels that it is highly important to have Safety Information in a condensed form in the hands of the pilots. The Safety Information should be read and studied. Periodic review will serve as a reminder of good piloting techniques.

BEECHCRAFT Skipper 77

Pilot's Operating Handbook
and
FAA Approved Airplane Flight Manual

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SECTION I
GENERAL

TABLE OF CONTENTS

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THANK YOU. . . .

for displaying confidence in us by selecting a BEECHCRAFT airplane. Our design engineers, assemblers, and inspectors have utilized their skills and years of experience to ensure that the new BEECHCRAFT meets the high standards of quality and performance for which BEECHCRAFT airplanes have become famous throughout the world.

IMPORTANT NOTICE

This handbook must be read carefully by the owner and the operator in order to become familiar with the operation of the airplane. Suggestions and recommendations have been made within it to aid in obtaining maximum performance without sacrificing economy. Be familiar with, and operate the airplane in accordance with, the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual, and/or placards which are located in the airplane.

As a further reminder, the owner and the operator must also be familiar with the Federal Aviation Regulations applicable to the operation and maintenance of the airplane, and FAR Part 91, General Operating and Flight Rules. Further, the airplane must be operated and maintained in accordance with FAA Airworthiness Directives which may be issued against it.

The Federal Aviation Regulations place the responsibility for the maintenance of the airplane on the owner and the operator, who must ensure that all maintenance is done by qualified mechanics in conformity with all airworthiness requirements established for the airplane.

All limits, procedures, safety practices, time limits, servicing, and maintenance requirements contained in this handbook are considered mandatory for continued airworthiness and to maintain the airplane in a condition equal to that of its original manufacture.

Authorized BEECHCRAFT Aero or Aviation Centers or International Distributors or Dealers can provide recommended modification, service, and operating procedures issued by both the FAA and Beech Aircraft Corporation, which are designed to provide maximum utility and safety from the airplane.

USE OF THE HANDBOOK

The Pilot's Operating Handbook is designed to facilitate maintaining the documents necessary for the safe and efficient operation of the airplane. The handbook has been prepared in loose leaf form for ease in maintenance and in a convenient size for storage. The handbook has been arranged with quick reference tabs imprinted with the title of each section and contains ten basic divisions:

Section I	General
Section II	Limitations
Section III	Emergency Procedures
Section IV	Normal Procedures
Section V	Performance
Section VI	Weight and Balance/Equipment List
Section VII	Systems Description
Section VIII	Handling, Servicing and Maintenance
Section IX	Supplements
Section X	Safety Information

NOTE

Due to the large variety of airplane configurations available through optional equipment, it should be noted that where information pertaining to optional equipment appears in the handbook, the optional equipment will not normally be designated as such. Due to custom design variations, the illustrations in this handbook will not be typical of every airplane.

Neither Service Publications, Reissues, nor Revisions are automatically provided to the holder of this handbook. For information on how to obtain "Revision Service" applicable to this handbook, consult a BEECHCRAFT Aero or Aviation Center or International Distributor or Dealer or refer to the latest revision of BEECHCRAFT Service Instructions No. 0250-010.

Beech Aircraft Corporation expressly reserves the right to supersede, cancel, and/or declare obsolete, without prior notice, any part, part number, kit, or publication referenced in this manual.

The owner/operator should always refer to all supplements, whether STC Supplements or Beech Supplements, for possible placards, limitations, normal, emergency and other operational procedures for proper operation of the airplane with optional equipment installed.

REVISING THE HANDBOOK

Immediately following the "Title Page" is the "Log of Revisions" page(s). The Log of Revisions pages are used for maintaining a listing of all effective pages in the handbook (except the SUPPLEMENTS Section), and as a record of revisions to these pages. In the lower right corner of the outlined portion of the Log of Revisions is a box containing a capital letter which denotes the issue or reissue of the handbook. This letter may be suffixed by a number which indicates the numerical revision. When a revision to any information in the handbook is made, a new Log of Revisions will be issued. All Log of Revisions pages must be retained in the handbook to provide a current record of material status until a reissue is made.

WARNING

When this handbook is used for airplane operational purposes, it is the pilot's responsibility to maintain it in current status.

AIRPLANE FLIGHT MANUAL SUPPLEMENTS REVISION RECORD

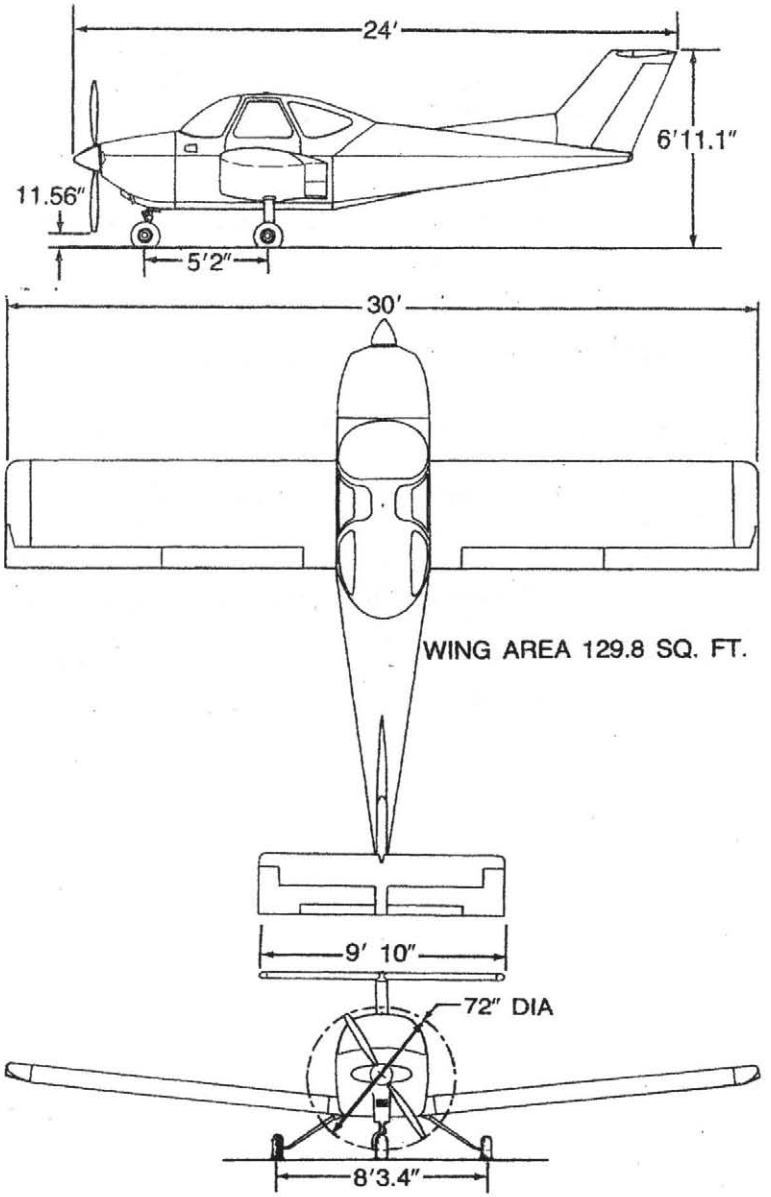
Section IX contains the FAA Approved Airplane Flight Manual Supplements headed by a "Log of Supplements" page. On the Log of Supplements page is a listing of the FAA Approved Supplemental Equipment available for installation on the airplane. When new supplements are received or existing supplements are revised, a new Log of Supplements page will replace the previous one, since it contains a listing of all previous approvals, plus the new approval. The supplemental material will be added to the grouping in accordance with the descriptive listing.

NOTE

Upon receipt of a new or revised supplement, compare the applicable Log of Supplements page just received with the existing Log of Supplements page in the Manual. Retain the Log of Supplements page having the latest date on the bottom of the page and discard the other Log of Supplements page.

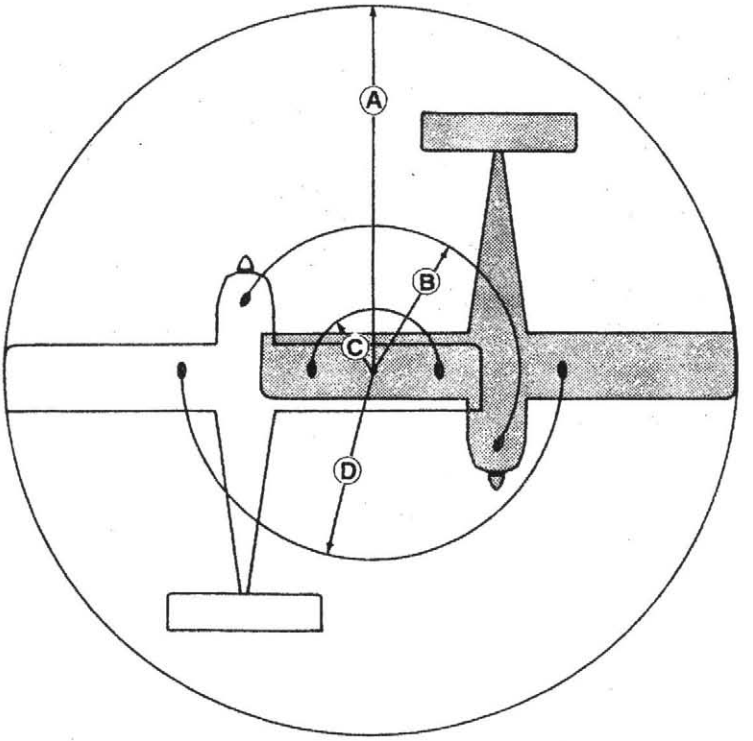
VENDOR-ISSUED STC SUPPLEMENTS

When a new airplane is delivered from the factory, the handbook will contain either an STC (Supplemental Type Certificate) Supplement or a Beech Flight Manual Supplement for all items requiring a supplement. If a new handbook is purchased at a later date for operation of the airplane, it is the responsibility of the owner/operator to see that all required STC Supplements (as well as weight and balance and other pertinent data) are retained for use in the new handbook.



THREE-VIEW

77-607-2



GROUND TURNING CLEARANCE

Ⓐ - RADIUS FOR WING TIP ..... 20′ 8″

Ⓑ - RADIUS FOR NOSE GEAR ..... 7′ 7½″

Ⓒ - RADIUS FOR INSIDE GEAR ..... 1′ 6″

Ⓓ - RADIUS FOR OUTSIDE GEAR ..... 9′ 10″

TURNING RADII ARE CALCULATED USING FULL STEERING, ONE BRAKE AND PARTIAL POWER

77-604-3

DESCRIPTIVE DATA

ENGINE

One Avco Lycoming engine model O-235-L2C. It is a normally aspirated, direct-drive, air-cooled, horizontally opposed, 4-cylinder, 115-horsepower-rated engine.

Take-off and Maximum
Continuous Power..... Full Throttle or 2700 rpm, whichever occurs first

PROPELLER

Sensenich fixed-pitch, two-blade, aluminum-alloy propeller 72CKS12-0-52.

FUEL

Total Capacity..... 30 Gallons*
Total Usable.....29 Gallons
*Value given is nominal.

APPROVED FUEL TYPES

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

OIL

OIL CAPACITY

Total..... 6 Quarts

APPROVED OIL TYPES

Engine oils must meet Avco Lycoming Specification No. 301E and be used in accordance with Avco Lycoming Service Instruction No. 1014E 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 or SAE 30
Below 10°F	SAE 20	SAE 30

MAXIMUM CERTIFICATED WEIGHTS

Maximum Ramp Weight..... 1680 lbs
Maximum Take-off Weight..... 1675 lbs
Maximum Landing Weight ..... 1675 lbs
Maximum Weight in Baggage Compartment..... 120 lbs

STANDARD AIRPLANE WEIGHTS

Standard Empty Weight..... 1100 lbs
Maximum Useful Load ..... 580 lbs

CABIN AND ENTRY DIMENSIONS

Cabin Width (maximum) ..... 3 ft 6¾ in
Cabin Length (maximum)..... 6 ft 4 in
Cabin Height (maximum) ..... 4 ft ¾ in
Cabin Door.....36 in x 37½ in
Door Sill Height.....6 in

BAGGAGE SPACE DIMENSIONS

Compartment Volume ..... 20.1 cu ft
Compartment Height (maximum) ..... 41¼ in
Compartment Width (maximum) ..... 42¾ in
Compartment Length (maximum) ..... 39 in

SPECIFIC LOADINGS

Wing Loading at Maximum Take-off Weight ..... 12.9 lbs/sq ft
Power Loading at Maximum Take-off Weight ..... 14.6 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.

AIRSPEED TERMINOLOGY

CAS	Calibrated Airspeed is the indicated speed of an airplane, corrected for position and instrument error. Calibrated airspeed is equal to true airspeed in standard atmosphere at sea level.
KCAS	Calibrated Airspeed expressed in knots.

GS	Ground Speed is the speed of an airplane relative to the ground.
IAS	Indicated Airspeed is the speed of an airplane as shown on the airspeed indicator. IAS values published in this handbook assume zero instrument error.
KIAS	Indicated Airspeed expressed in knots.
TAS	True Airspeed is the airspeed of an airplane relative to undisturbed air which is the CAS corrected for altitude, temperature, and compressibility.
V_a	Maneuvering Speed is the maximum speed at which application of full available aerodynamic control will not overstress the airplane.
V_f	Design Flap Speed is the highest speed permissible at which wing flaps may be actuated.
V_{fe}	Maximum Flap Extended Speed is the highest speed permissible with wing flaps in a prescribed extended position.
V_{ne}	Never Exceed Speed is the speed limit that may not be exceeded at any time.
V_{no}	Maximum Structural Cruising Speed is the speed that should not be exceeded except in smooth air and then only with caution.

V_S	Stalling Speed or the minimum steady flight speed at which the airplane is controllable.
V_{SO}	Stalling Speed or the minimum steady flight speed at which the airplane is controllable in the landing configuration.
V_X	Best Angle-of-Climb Speed is the airspeed which delivers the greatest gain of altitude in the shortest possible horizontal distance.
V_Y	Best Rate-of-Climb Speed is the airspeed which delivers the greatest gain in altitude in the shortest possible time.
Cruise Climb	Recommended Climb Speed for enroute climb.

METEOROLOGICAL TERMINOLOGY

ISA	International Standard Atmosphere in which: (1) The air is a dry perfect gas; (2) The temperature at sea level is 15° Celsius (59° Fahrenheit); (3) The pressure at sea level is 29.92 inches Hg (1013.2 millibars); (4) The temperature gradient from sea level to the altitude at which the temperature is -56.5 °C (-69.7 °F) is -0.00198 °C (-0.003566 °F) per foot and zero above that altitude.

OAT	Outside Air Temperature is the free air static temperature, obtained either from inflight temperature indications adjusted for instrument error and compressibility effects or ground meteorological sources.
Indicated Pressure Altitude	The number actually read from an altimeter when the barometric subscale has been set to 29.92 inches Hg (1013.2 millibars).
Pressure Altitude	Altitude measured from standard sea level pressure (29.92 in. Hg) by a pressure or barometric altimeter. It is the indicated pressure altitude corrected for position and instrument error. In this handbook, altimeter instrument errors are assumed to be zero. Position errors may be obtained from the Altimeter Correction graph.
Station Pressure	Actual atmospheric pressure at field elevation.
Wind	The wind velocities recorded as variables on the charts of this handbook are to be understood as the headwind or tailwind components of the reported winds.

POWER TERMINOLOGY

Take-off	Highest power rating to be used for takeoff.

Maximum Continuous	Highest power rating not limited by time.
Cruise Climb	Power recommended for cruise climb.

ENGINE CONTROLS AND INSTRUMENTS TERMINOLOGY

Throttle Control	Used to control power by introducing fuel-air mixture into the intake passages of the engine.
Mixture Control	This control is used to set fuel flow in all modes of operation and cuts off fuel completely for engine shut down.
Tachometer	Indicates the RPM of the engine/ propeller.

AIRPLANE PERFORMANCE AND FLIGHT PLANNING TERMINOLOGY

Climb Gradient	The ratio of the change in height during a portion of a climb, to the horizontal distance traversed in the same time interval.
Demonstrated Crosswind Velocity	The demonstrated crosswind velocity is the velocity of the crosswind component for which adequate control of the airplane during takeoff and landing was actually demonstrated during certification tests.
MEA	Minimum Enroute IFR Altitude.

Route Segment	A part of a route. Each end of that part is identified by: (1) a geographical location; or (2) a point at which a definite radio fix can be established.
GPH	U.S. Gallons per hour.

WEIGHT AND BALANCE TERMINOLOGY

Reference Datum	An imaginary vertical plane from which all horizontal distances are measured for balance purposes.
Fuselage Station	A location along the airplane fuselage usually given in terms of distance from the reference datum.
Arm	The horizontal distance from the reference datum to the center of gravity (CG) of an item.
Moment	The product of the weight of an item multiplied by its arm (Moment divided by a constant is used to simplify balance calculations by reducing the number of digits.)
Airplane Center of Gravity (CG)	The point at which an airplane would balance if suspended. It is the mass center of the airplane, or the theoretical point, at which the entire weight of the airplane is assumed to be concentrated.
CG Arm	The distance between the airplane CG and the reference datum.

CG Limits	The specified forward and aft points within which the CG must be located during takeoff, flight, and landing.
Usable Fuel	Weight of fuel aboard that is available to the engine for flight planning.
Unusable Fuel	Weight of fuel remaining in tanks and lines that may not be available to the engine and is the amount of fuel aboard corresponding to the zero point on the fuel quantity indicator.
Engine Oil	Weight of the total amount of oil contained in the engine, sump, filter, cooler and lines when engine dipstick indicates "full".
Basic Empty Weight	The weight of an empty airplane including listed equipment, hydraulic fluid, full engine oil and unusable fuel. Basic Empty Weight is the base to which the weight of usable fuel, occupants, and baggage is added.
Payload	Weight of occupants and baggage.
Useful Load	Difference between Ramp Weight and Basic Empty Weight.
Maximum Ramp Weight	Maximum weight approved for ground maneuvering. (It includes weight of start, taxi, and run-up fuel.)
Maximum Take-off Weight	Maximum weight approved for the start of the take-off run.

Maximum Landing Weight	Maximum weight approved for the landing touchdown.
Tare	The weight of chocks, blocks, stands, etc., used on the scales when weighing an airplane.
Leveling Location	The point or location which is used during the weighing process to level the airplane.

SECTION II
LIMITATIONS

TABLE OF CONTENTS

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The limitations included in this section have been approved by the Federal Aviation Administration and must be observed in the operation of this airplane.

AIRSPEED LIMITATIONS

SPEED	CAS KTS	IAS KTS	REMARKS
Never Exceed V_{NE}	143	143	Do Not Exceed This Speed in Any Operation.
Maximum Structural Cruising V_{NO}	119	119	Do Not Exceed This Speed Except in Smooth Air and Then Only With Caution.
Maneuvering V_A	109	109	Do Not Make Full or Abrupt Control Movements Above This Speed.
Maximum Flap Extension/Extended V_F and V_{FE}	90	90	Do Not Extend Flaps or Operate With Flaps Extended Above This Speed.

*AIRSPEED INDICATOR MARKINGS

MARKING	CAS VALUE OR RANGE KTS	IAS VALUE OR RANGE KTS	SIGNIFICANCE
White Arc	47-90	52-90	Full Flap Operating Range
Green Arc	49-119	54-119	Normal Operating Range
Yellow Arc	119-143	119-143	Operate With Caution, Only In Smooth Air
Red Radial	143	143	Maximum Speed For All Operations (Never Exceed)

*The airspeed indicator is marked in IAS values.

POWER PLANT LIMITATIONS

ENGINE

One Avco Lycoming engine model O-235-L2C.

Take-off and Maximum
Continuous Power..... Full Throttle or 2700 rpm, whichever occurs first.

OPERATING LIMITATIONS

Maximum Oil Temperature ..... 245 °F
Oil Pressure
Minimum Idle..... 25 psi
Maximum ..... 100 psi
Fuel Pressure
Minimum ..... 0.5 psi
Maximum ..... 8.0 psi

FUEL

Aviation gasoline grade 100 (green) or grade 100LL (blue).

FUEL ADDITIVES

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

OIL SPECIFICATIONS

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

PROPELLER

Sensenich fixed-pitch, two-bladed, aluminum-alloy propeller 72CKS12-0-52.
Diameter is 72 inches, 1" cutoff permitted.

POWER PLANT INSTRUMENT MARKINGS

TACHOMETER

Normal Operating Range (Green Arc)..... 1800 to 2700 rpm
Maximum (Red Radial) .....2700 rpm

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 (Red Radial) ..... 25 psi
Caution Range (Yellow Arc).....25 to 60 psi
Normal Operating Range
(Green Arc) .....60 to 90 psi
Maximum (Red Radial) ..... 100 psi

FUEL PRESSURE

Minimum (Red Radial) ..... 0.5 psi
Normal Operating Range
(Green Arc) .....3 to 8 psi
Maximum (Red Radial) ..... 8 psi

MISCELLANEOUS INSTRUMENT MARKINGS

INSTRUMENT PRESSURE

Operating Range
(Green Arc) ..... 4.3 to 5.9 in. Hg

FUEL QUANTITY

Yellow Arc..... E to ¼ Full

WEIGHT LIMITS

Maximum Ramp Weight..... 1680 lbs
Maximum Take-off Weight..... 1675 lbs
Maximum Landing Weight ..... 1675 lbs
Maximum Weight in
Baggage Compartment..... 120 lbs

CENTER-OF-GRAVITY LIMITS

Forward Limits: 85.0 inches aft of datum at 1470 lbs and under, then straight line variation to 85.8 inches aft of datum at a weight of 1675 lbs.

Aft Limit: 88.9 inches aft of datum at all weights.
MAC Leading Edge: 74.62 inches aft of datum.
MAC Length: 51.91 inches.

Reference Datum: 74.62 inches forward of wing leading edge.

MANEUVER LIMITS

This is a utility category airplane. No acrobatic maneuvers are approved except those listed below. Maximum slip duration is 30 seconds.

MANEUVER	MAXIMUM ENTRY SPEED
Chandelles	109 kts
Lazy Eights	109 kts
Steep Turns	109 kts
Stalls (Except Whip Stalls)	Slow Deceleration
Spins	Slow Deceleration

WARNING

Intentional spins prohibited with flaps extended.

FLIGHT LOAD FACTORS (1675 POUNDS)

Flight maneuvering load factors:

Flaps Up	+ 4.4, − 1.76 G
Flaps Down	+ 2.0 G

MINIMUM FLIGHT CREW

One (1) pilot

KINDS OF OPERATION

This airplane is approved for the following type operations when the required equipment is installed and operational as defined herein:

1. VFR day and night
2. IFR day and night
3. FAR 91 operations when all pertinent limitations and performance considerations are complied with.

WARNING

FLIGHT IN ICING CONDITIONS PROHIBITED.

REQUIRED EQUIPMENT FOR VARIOUS CONDITIONS OF FLIGHT

Federal Aviation Regulations (91.3(a), 91.24, 91.25, 91.32, 91.33, 91.52, 91.90, 91.97, 91.170) specify the minimum numbers and types of airplane instruments and equipment which must be installed and operable for various kinds of flight conditions. This includes VFR day, VFR night, IFR day, and IFR night.

Regulations also require that all airplanes be certified by the manufacturer for operations under various flight conditions. At certification, all required equipment must be in operating condition and should be maintained to assure continued airworthiness. If deviations from the installed equipment were not permitted, or if the operating rules did not provide for various flight conditions, the airplane could not be flown unless all equipment was operable. With appropriate limitations, the operation of every system or component installed in the airplane is not necessary, when remaining operative instruments and equipment provide for continued safe operation. Operation in accordance with limitations established to maintain airworthiness can permit continued or uninterrupted operation of the airplane.

For the sake of brevity, the Required Equipment Listing does not include obviously required items such as wings, rudder, flaps, engine, landing gear, etc. Also, the list does not include items which do not affect the airworthiness of the airplane such as entertainment systems, passenger convenience items, etc. However, it is important to note that ALL ITEMS WHICH ARE RELATED TO THE

AIRWORTHINESS OF THE AIRPLANE AND NOT INCLUDED ON THE LIST ARE AUTOMATICALLY REQUIRED TO BE OPERATIVE.

To enable the pilot to rapidly determine the FAA equipment requirements necessary for a flight into specific conditions, the following equipment requirements and exceptions are presented. It is the final responsibility of the pilot to determine whether the lack of, or inoperative status of a piece of equipment on the airplane, will limit the conditions under which the pilot may operate the airplane.

LEGEND

Numbers refer to quantities required to be operative for a specified condition.

(-) Indicates that the item may be inoperative for the specified condition.
(*) Refers to the REMARKS AND/OR EXCEPTIONS column for explicit information or reference.

SYSTEM and/or COMPONENT	VFR Day	VFR Night	IFR Day	IFR Night	Remarks and/or Exceptions
GENERAL					
OVERWATER FLIGHT	*	*	*	*	- *Per FAR 91.33
COMMUNICATIONS					
VHF communications system	*	*	*	*	- *Per FAR 91.33
ELECTRICAL POWER					
Battery	1	1	1	1	-
DC alternator	1	1	1	1	-
DC ammeter	1	1	1	1	-
Starter Engaged Warning Light (WA-130 and after)	1	1	1	1	- May be inoperative provided ammeter is operative and monitored.
Alternator-out overvoltage indicator light	1	1	1	1	-

Alternator-out undervoltage indicator light	1	1	1	1	-	
EQUIPMENT AND FURNISHINGS						
Seat belts and shoulder harnesses	1	1	1	1	-	Per Person or Per FAR 91.33
Emergency locator transmitter	1	1	1	1	-	Per FAR 91.52
FIRE PROTECTION						
Portable fire extinguisher	*	*	*	*	-	*Optional
FLIGHT CONTROLS						
Elevator trim tab indicator	1	1	1	1	-	May be inoperative provided that tab is visually checked in the neutral position prior to each takeoff and checked for full range of operation.

SYSTEM and/or COMPONENT	VFR Day	VFR Night	IFR Day	IFR Night	Remarks and/or Exceptions
Flap position indicator	1	1	1	1	- May be inoperative provided flap travel is visually inspected prior to takeoff.
Stall warning system	1	1	1	1	-
FUEL EQUIPMENT					
Engine driven fuel pump	1	1	1	1	-
Electrically driven fuel boost pump	1	1	1	1	-
Fuel quantity indicator	2	2	2	2	- One may be inoperative provided other side is operational and amount of fuel on board can be established to be adequate for the intended flight.

Fuel pressure indicator	1	1	1	1	-	
Low fuel quantity warning light	1	1	1	1	-	May be inoperative provided fuel quantity indicators are operative.
ICE AND RAIN PROTECTION						
Alternate static air source	1	1	1	1	-	
Pitot heater	-	-	1	1	-	
LIGHTS						
Cockpit and instrument lights	-	*	-	*	-	*Lights must be operative
Landing light	-	*	-	*	-	*Per FAR 91.33
Strobe light	*	2	*	2	-	*Optional
Position light	-	3	-	3	-	

SYSTEM and/or COMPONENT	VFR Day	VFR Night	IFR Day	IFR Night	Remarks and/or Exceptions
NAVIGATION INSTRUMENTS					
Altimeter	1	1	1	1	-
Airspeed indicator	1	1	1	1	-
Vertical speed indicator	-	-	-	-	-
Magnetic compass	1	1	1	1	-
Attitude indicator	-	-	1	1	-
Turn and slip indicator	-	-	1	1	-
Directional gyro	-	-	1	1	-
Clock	-	-	1	1	-
Transponder	*	*	*	*	- *Per FAR 91.24, 91.90, 91.97
Navigation equipment	-	-	*	*	- *Per FAR 91.33

PNEUMATIC					
Pressure system for instrument air	-	-	1	1	-
Pressure gage	-	-	1	1	-
ENGINE INDICATING INSTRUMENTS					
Engine tachometer indicator	1	1	1	1	-
ENGINE OIL INSTRUMENTS					
Oil pressure indicator	1	1	1	1	-
Oil temperature indicator	1	1	1	1	-

FUEL LIMITATIONS

TOTAL FUEL with left and right wing fuel systems full:

Capacity ..... 30 gallons*
Usable ..... 29 gallons

*Value given is nominal.

FUEL MANAGEMENT

Do not take off if either fuel quantity indicator indicates in the yellow arc.

Maximum slip duration is 30 seconds.

STRUCTURAL LIFE

The basic wing structure has a substantiated life of 12,000 flight hours provided the mandatory inspection and replacement requirements of chapter four of the BEECHCRAFT SKIPPER 77 MAINTENANCE MANUAL are complied with.

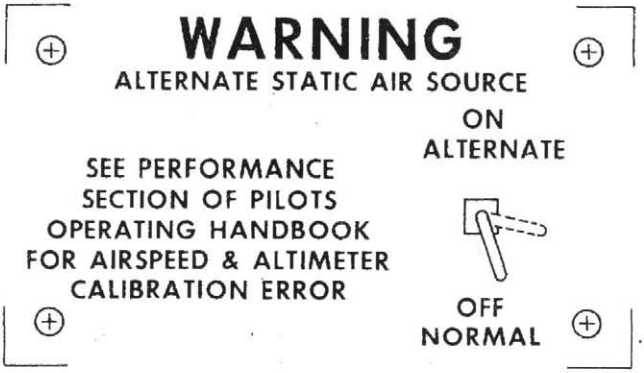
PLACARDS

On Fuel Selector:

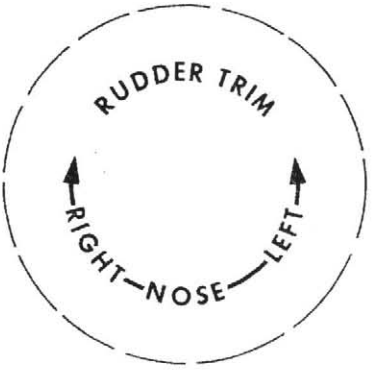
FUEL
ON
29 GALS USABLE

OFF

Lower Sidewall Adjacent to Pilot:



On Pedestal Between Front Seats:



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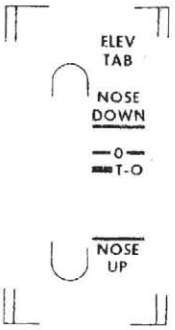


On Left Cabin Door:

OPERATION LIMITATIONS

THIS AIRPLANE MUST BE OPERATED AS A UTILITY CATEGORY AIRPLANE IN COMPLIANCE WITH THE OPERATING LIMITATIONS STATED IN THE FORM OF PLACARDS, MARKINGS AND MANUALS. MAXIMUM WEIGHT IS 1675 LBS. THIS AIRPLANE APPROVED FOR VFR, IFR, DAY AND NIGHT NON-ICING FLIGHT WHEN EQUIPPED IN ACCORDANCE WITH FAR 91 OR FAR 135.

FLIGHT MANEUVERING LOAD FACTOR FLAPS UP +4.4 –1.76
DOWN +2.0

WARNING – TURN OFF STROBE LIGHTS WHEN TAXIING IN VICINITY OF OTHER AIRCRAFT OR DURING FLIGHT THROUGH CLOUD, FOG OR HAZE.

AIRSPEEDS

NEVER EXCEED ---------- 143 KIAS

MAX. STRUCTURAL CRUISE ---------- 119 KIAS

MAX. MANEUVERING ---------- 109 KIAS

MAX. FULL DOWN FLAPS 30° ---------- 90 KIAS

NO ACROBATIC MANEUVERS APPROVED EXCEPT THOSE LISTED BELOW

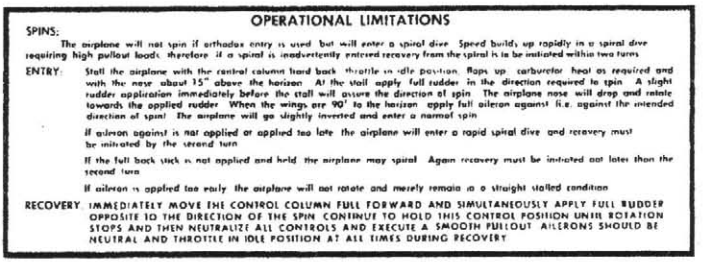
MANEUVER	MAXIMUM ENTRY SPEED
CHANDELLES	109 KIAS
LAZY EIGHTS	109 KIAS
STEEP TURNS	109 KIAS
STALLS (EXCEPT WHIP STALLS)	SLOW DECELERATION

NOTE: MAXIMUM ALTITUDE LOSS DURING STALL 300 FT

SPINS (FOR OPERATIONAL LIMITATIONS SEE PLACARD ABOVE)

INTENTIONAL SPINS PROHIBITED WITH FLAPS EXTENDED

On Left Cabin Door:



OPERATIONAL LIMITATIONS

SPINS: The airplane will not spin if orthodox entry is used, but will enter a spiral dive. Speed builds up rapidly in a spiral dive, requiring high pullout loads; therefore, if a spiral is inadvertently entered recovery from the spiral is to be initiated within two turns.

ENTRY: Stall the airplane with the control column hard back, throttle in idle position, flaps up, carburetor heat as required and with the nose about 15° above the horizon. At the stall, apply full rudder in the direction required to spin. A slight rudder application immediately before the stall will assure the direction of spin. The airplane nose will drop and rotate towards applied rudder. When the wings are 90° to the horizon, apply full aileron against (i.e. against the intended direction of spin). The airplane will go slightly inverted and enter a normal spin. If aileron against is not applied or applied too late, the airplane will enter a spiral dive, and recovery must be initiated by the second turn. If the full back stick is not applied and held, the airplane may spiral. Again recovery must be initiated not later than the second turn. If the aileron is applied too early, the airplane will not rotate and merely remain in a straight stalled condition.

RECOVERY: Immediately move the control column full forward and simultaneously apply full rudder opposite to the direction of the spin; continue to hold this control position until rotation stops and then neutralize all controls and execute a smooth pullout. Ailerons should be neutral and throttle in idle position at all times during recovery.

On Cabin Windows:

SHOULDER HARNESS
MUST BE WORN AT
ALL TIMES WHILE AT
PILOT POSITIONS

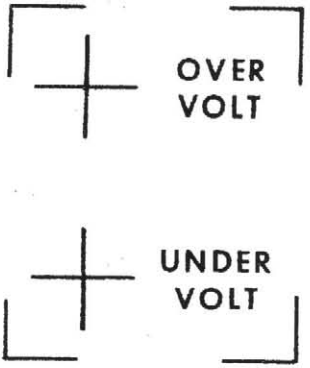
Adjacent to Flap Switch:

90 KTS MAX EXT

In Baggage Compartment:

BAGGAGE COMPARTMENT
LOAD IN ACCORDANCE WITH
WEIGHT AND BALANCE DATA
120 POUNDS MAX.

Left Side of Instrument Panel:



SECTION III
EMERGENCY PROCEDURES

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All airspeeds quoted in this section are indicated airspeeds (IAS) and assume zero instrument error.

EMERGENCY AIRSPEEDS

Emergency Descent ..... 143 kts
Maximum Glide ..... 63 kts
Approach - Engine Inoperative ..... 63 kts

The following information is presented to enable the pilot to form, in advance, a definite plan of action for coping with the most probable emergency situations which could occur in the operation of the airplane. Where practicable, the emergencies requiring immediate corrective action are treated in check list form for easy reference and familiarization. Other situations, in which more time is usually permitted to decide on and execute a plan of action, are discussed at some length.

WARNING

Stall warning horn is inoperative when the Battery and Alternator Switches are turned OFF.

ENGINE FAILURE

DURING TAKE-OFF GROUND ROLL

1. Throttle - CLOSED
2. Braking - MAXIMUM

NOTE

Conduct the following procedures immediately if it appears certain that the airplane will run off the runway. (Otherwise, conduct these procedures at the pilot's discretion.)

3. Fuel Selector Valve - OFF
4. Battery, Alternator, and Magneto/Start Switches - OFF

AFTER LIFTOFF AND IN FLIGHT

Landing straight ahead is usually advisable. If sufficient altitude is available for maneuvering, accomplish the following:

1. ESTABLISH MAXIMUM GLIDE (63 KTS)
2. Mixture - FULL RICH
3. Carburetor Heat - HOT
4. Fuel Boost Pump - CHECK ON
5. Fuel Selector Valve - CHECK ON
6. Magneto/Start Switch - CHECK LEFT and RIGHT, then BOTH

NOTE

The most probable cause of engine failure would be loss of fuel flow or improper functioning of the ignition system.

If no restart:

1. Throttle - CLOSED
2. Fuel Selector Valve - OFF
3. Mixture - IDLE CUT-OFF
4. Magneto/Start Switch - OFF
5. Alternator and Fuel Boost Pump Switches - OFF

When certain of reaching the selected landing site:

6. Airspeed - ESTABLISH 63 KNOTS
7. Flaps - DOWN
8. Battery Switch - OFF

ROUGH RUNNING ENGINE

1. Carburetor Heat - HOT
2. Mixture - FULL RICH, then LEAN for smooth operation
3. Magneto/Start Switch - CHECK LEFT and RIGHT, then BOTH

AIRSTART

1. Fuel Selector Valve - CHECK ON
2. Fuel Boost Pump - ON
3. Throttle - SET approximately ¼ travel
4. Mixture - FULL RICH
5. Magneto/Start Switch - START if engine is not windmilling

If engine starts:

6. Throttle - ADJUST to desired power
7. Mixture - LEAN for smooth operation

ELECTRICAL SMOKE OR FIRE

Action to be taken must consider existing conditions and equipment installed:

1. Battery and Alternator Switches - OFF

WARNING

Electrically driven flight instruments will become inoperative.

2. All Electrical Switches - OFF
3. Battery and Alternator Switches - ON
4. Essential Electrical Equipment - ON (Isolate defective equipment)

NOTE

To ensure fire is out and will not be aggravated by draft, pull OFF CABIN HEAT and CABIN VENT controls.

ENGINE FIRE (GROUND)

1. Mixture - IDLE CUT-OFF
2. Continue to crank engine (if starting)
3. Fuel Selector Valve - OFF
4. Magneto/Start Switch - OFF
5. Battery and Alternator Switches - OFF
6. Fire Extinguisher - USE TO EXTINGUISH FIRE

ENGINE FIRE IN FLIGHT

1. Mixture - IDLE CUT-OFF
2. Fuel Selector Valve - OFF
3. Magneto/Start Switch - OFF
4. Alternator Switch - OFF
5. Cabin Heat and Vent Controls - OFF
6. Do not attempt to restart engine

When certain of reaching the selected landing site:

7. Airspeed - ESTABLISH 63 KNOTS
8. Flaps - DOWN
9. Battery Switch - OFF

EMERGENCY DESCENT

1. Power - IDLE
2. Airspeed - 143 KTS
3. Carburetor Heat - FULL HOT or FULL COLD, AS REQUIRED

GLIDE

1. Flaps - UP
2. Airspeed - 63 KTS

Glide distance is approximately 1.3 nautical miles per 1000 feet above the terrain.

LANDING EMERGENCIES

LANDING WITHOUT POWER

When assured of reaching the landing site selected, and on final approach:

1. Airspeed - ESTABLISH 63 KTS
2. Flaps - DOWN
3. Mixture - IDLE CUT-OFF
4. Fuel Selector Valve - OFF
5. Magneto/Start Switch - OFF
6. Battery and Alternator Switches - OFF

SYSTEMS EMERGENCIES

ALTERNATOR-OUT PROCEDURE

A failure of the alternator will place the entire electrical operation of the airplane on the battery. Alternator failure will be indicated by the illumination of either the OVER VOLT or UNDER VOLT light, located on the left side of the instrument panel, and/or a discharging or fluctuating ammeter. When an alternator failure occurs in flight, turn the alternator switch to OFF. Turn off all nonessential electrical load to conserve the battery life.

STARTER ENGAGED WARNING LIGHT ILLUMINATED (If installed)

After engine start, should the starter relay remain engaged, the starter will remain energized and the starter engaged warning light will remain illuminated. Continuing to supply power to the starter will result in eventual loss of electrical power.

Illuminated On the Ground:

1. Battery and Alternator Switches - OFF
2. Do not take off

Illuminated In Flight After Air Start:

1. Perform action for COMPLETE LOSS OF ELECTRICAL POWER (see this section)
2. Land as soon as practical

ALTERNATE STATIC AIR SOURCE

THE ALTERNATE STATIC AIR SOURCE SHOULD BE USED FOR CONDITIONS WHERE THE NORMAL STATIC SOURCE HAS BEEN OBSTRUCTED. When the

airplane has been exposed to moisture and/or icing conditions (especially on the ground), the possibility of obstructed static ports should be considered. Partial obstruction will result in the rate-of-climb indication being sluggish during a climb or descent. Verification of suspected obstruction is possible by switching to the alternate system and noting a sudden sustained change in rate of climb. This may be accompanied by abnormal indicated airspeed and altitude changes beyond normal calibration differences.

Whenever any obstruction exists in the Normal Static Air System, or the Alternate Static Air System is desired for use:

1. Alternate Static Air Source - Switch to ON ALTERNATE (lower sidewall adjacent to pilot)
2. For Airspeed Calibration and Altimeter Correction, refer to PERFORMANCE Section.

NOTE

The alternate static air valve should remain in the OFF NORMAL position when system is not needed.

UNLATCHED DOOR IN FLIGHT

If the cabin door is not secured properly, it may come unlatched in flight. This usually occurs during or just after takeoff. The door will trail in a position approximately 3 inches open. A buffet may be encountered with the door open in flight. Return to the field in a normal manner. If practicable, during the landing flare-out, have a passenger hold the door to prevent it from swinging open.

COMPLETE LOSS OF ELECTRICAL POWER

The following procedure is recommended to restore the alternator to the line, without battery power available for initial excitation and stabilization.

1. Battery and Alternator Switches - OFF
2. All Electrical Switches - OFF
3. Battery Circuit Breaker - PULL OFF
4. Alternator Switch - ON
5. Determine if alternator is on line by observing engine instrument cluster operation.
6. Minimize all electrical loads. Select only that electrical equipment which is essential for safe flight.
7. LAND AS SOON AS PRACTICAL; HAVE THE COMPLETE ELECTRICAL SYSTEM CHECKED BEFORE THE NEXT FLIGHT.

CAUTION

Since the battery is off line when this procedure is used, large changes in electrical load should be minimized in order to reduce the possibility of damage to electrical components.

EMERGENCY EXIT

An emergency exit can be accomplished through either door.

SPINS

If a Spin is Entered Inadvertently:

Immediately move the control column full forward and simultaneously apply full rudder opposite to the direction of the spin; continue to hold this control position until rotation stops and then neutralize all controls and execute a smooth pullout. Ailerons should be neutral and throttle in idle position at all times during recovery.

SECTION IV
NORMAL PROCEDURES

TABLE OF CONTENTS

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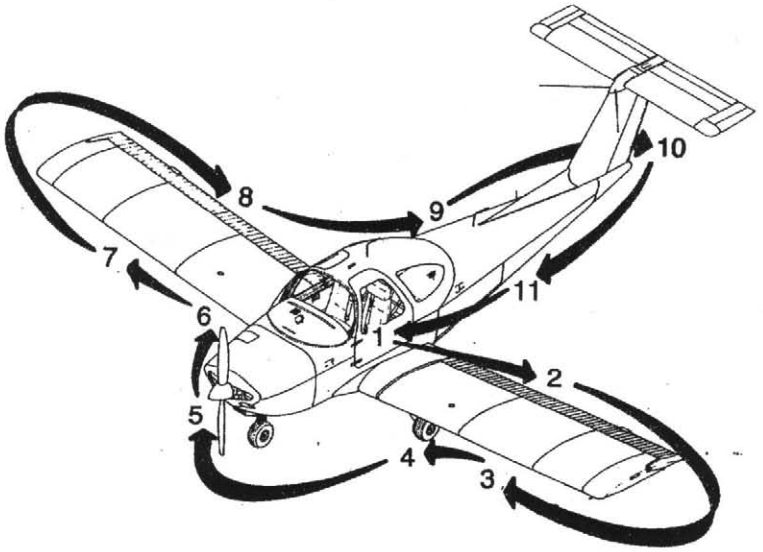
All airspeeds quoted in this section are indicated airspeeds (IAS) and assume zero instrument error.

AIRSPEEDS FOR SAFE OPERATION

Best Rate-of-Climb (V_Y)	68 kts
Best Angle-of-Climb (V_X)	61 kts
Balked Landing Climb (Flaps Down)	63 kts
Maximum Demonstrated Crosswind Component	15 kts
Maximum Turbulent Air Penetration Speed	109 kts
Take-off Speeds:	
Rotation	56 kts
50 Feet	60 kts
Landing Approach	63 kts

PREFLIGHT INSPECTION



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1. CABIN

a. Left Cabin Door - UNLOCK
b. Pilot's Operating Handbook - AVAILABLE
c. Control Lock - REMOVE
d. Parking Brake - SET
e. Magneto/Start Switch - OFF
f. Battery Switch - ON
g. Fuel Quantity Indicators - CHECK QUANTITY
h. Battery Switch - OFF
i. Flush-type Fuel Drain Tool - OBTAIN (refer to SYSTEMS DESCRIPTION section for information pertaining to flush-type fuel drains)

2. LEFT WING TRAILING EDGE

a. Flap - CHECK
b. Aileron - CHECK
c. Wing Tip - CHECK
d. Position and Strobe Light - CHECK

3. LEFT WING LEADING EDGE

a. Pitot Tube - CHECK (remove cover)
b. Stall Warning - CHECK for movement of vane
c. Fuel Tank - CHECK QUANTITY; Cap - SECURE
d. Tiedown and Chocks - REMOVE

4. LEFT LANDING GEAR

a. Tire, Wheel and Brake - CHECK
b. Fuel Sump - DRAIN (use fuel-drain tool)

5. NOSE SECTION

a. Propeller - CHECK
b. Induction Air Intake - CLEAR; Filter - CHECK condition and security of attachment

c. Landing Light - CHECK
d. Tire and Nose Gear - CHECK condition and inflation
e. Engine Oil - CHECK (operation with less than 4 quarts is not recommended); Cap - SECURE
f. Engine - CHECK GENERAL CONDITION
g. Access Door - SECURE
h. Fuel Strainer - DRAIN
i. Chocks - REMOVE

6. RIGHT LANDING GEAR

a. Tire, Wheel and Brake - CHECK
b. Fuel Sump - DRAIN (use fuel-drain tool)

7. RIGHT WING LEADING EDGE

a. Fuel Tank - CHECK QUANTITY; Cap - SECURE
b. Tiedown and Chocks - REMOVE

8. RIGHT WING TRAILING EDGE

a. Position and Strobe Light - CHECK
b. Wing Tip - CHECK
c. Aileron - CHECK
d. Flap - CHECK

9. RIGHT FUSELAGE

a. Right Cabin Door - UNLOCK
b. Static Pressure Button - UNOBSTRUCTED
c. Emergency Locator Transmitter - ARMED

10. EMPENNAGE

a. Control Surfaces - CHECK

b. Tiedown - REMOVE
c. Position Light - CHECK

11. LEFT FUSELAGE

a. Static Pressure Button - UNOBSTRUCTED
b. All Antennas - CHECK

NOTE

Check operation of lights if night flight is anticipated.

BEFORE ENGINE STARTING

1. Flush-type Fuel Drain Tool - STOW
2. Seats - POSITION AND LOCK
3. Seat Belts and Shoulder Harnesses - FASTEN
4. Parking Brake - SET
5. All Avionics - OFF
6. Circuit Breakers - IN
7. Flap Switch - UP
8. Fuel Selector - ON
9. Elevator Trim - SET TO TAKE-OFF RANGE
10. Rudder Trim - SET TO 0
11. Light Switches - AS REQUIRED
12. Battery and Alternator Switches - ON (if external power is used, turn Alternator Switch - OFF)
13. Alternator-out UNDER VOLT Light - CHECK ILLUMINATED
14. Alternator-out OVER VOLT Light - PRESS TO TEST
15. Low Fuel Quantity Warning Light - TEST LEFT, THEN RIGHT
16. Fuel Boost Pump - ON, CHECK 4-7 psi; THEN OFF
17. Fuel Quantity Indicators - CHECK QUANTITY

WARNING

Do not take off if either fuel quantity indicator indicates in yellow arc.

EXTERNAL POWER

CAUTION

The following precautions shall be observed while using external power for starting:

The airplane has a negative ground system. Connect the positive and negative leads of the external power cable to the corresponding positive and negative terminals of the auxiliary power source.

In order to prevent arcing, no power shall be supplied while the connection is being made.

Anytime the auxiliary power unit is ON, the Battery Switch shall be ON. This protects the voltage regulator and associated electrical equipment from voltage transients (power fluctuations).

Never use external power without a battery installed in the airplane.

STARTING ENGINE USING AUXILIARY POWER UNIT

1. Battery, Alternator, Electrical and Avionics Equipment - OFF
2. Auxiliary Power Unit - OFF and CONNECT
3. Auxiliary Power Unit - SET OUTPUT (13.5 to 14.25 volts)
4. Battery Switch - ON

5. Auxiliary Power Unit - ON
6. Engine - START using normal procedures
7. Auxiliary Power Unit - OFF (after engine has been started)
8. Auxiliary Power Unit - DISCONNECT
9. Alternator - ON

ENGINE STARTING

1. Mixture - FULL RICH
2. Carburetor Heat - FULL COLD
3. Throttle - SET ¼ TRAVEL
4. Fuel Boost Pump - ON
5. Magneto/Start Switch - BOTH and PUSH TO PRIME (for cold weather starts, prime 3 to 4 seconds before activating starter)
6. Magneto/Start Switch - START and PRIME (release to BOTH position when engine fires and continue to prime as required)

CAUTION

Do not pump throttle to start.

CAUTION

Maximum starter engage duty cycle is 30 seconds ON followed by a minimum of two minutes OFF.

Flooded Engine:

a. Mixture - IDLE CUT-OFF
b. Throttle - FULL FORWARD

c. Magneto/Start Switch - START (retard throttle to fast idle when engine fires)
d. Mixture - ADVANCE TO FULL RICH

7. Starter Engaged Warning Light (if installed) - CHECK; should be illuminated during start, and extinguished after start.

CAUTION

If the Starter Engaged Warning Light is inoperative (or not installed), ensure that the ammeter indication is less than 25% of full charge at 1000 to 1200 rpm within two minutes with no additional electrical equipment on. If not, turn off the Battery and Alternator switches and do not take off.

8. External Power (if used) - OFF and DISCONNECT
9. Engine Warm-up - 1000 to 1200 RPM
10. Oil Pressure - INDICATION WITHIN 30 SECONDS
11. Alternator Switch - CHECK ON
12. Alternator-out OVER VOLT/UNDER VOLT Lights - CHECK NOT ILLUMINATED

BEFORE TAXI

CAUTION

Never taxi with a flat shock strut.

1. Avionics - ON, AS REQUIRED
2. Lights - AS REQUIRED

NOTE

Turn strobe lights off when taxiing in the vicinity of other aircraft or when flying in fog or clouds.

3. Fuel Boost Pump - OFF (check fuel pressure indicator to verify operation of engine-driven pump)
4. Fuel Boost Pump - ON
5. Parking Brake - RELEASE
6. Brakes - RELEASE AND CHECK

BEFORE TAKEOFF

1. Parking Brake - SET
2. Seat Belts and Shoulder Harnesses - CHECK
3. Avionics - CHECK
4. Engine Instruments - CHECK
5. Flight Instruments - CHECK AND SET
6. Starter Engaged Warning Light (if installed) - CHECK (should not be illuminated). If light is not installed or is inoperative, the ammeter indication should be less than 25% of full charge at 1000 to 1200 rpm and should show some decrease from the initial indication.
7. Fuel Selector - CHECK ON
8. Throttle - 1800 RPM
9. Magnetos - CHECK (175 rpm maximum drop, within 50 rpm of each other)
10. Carburetor Heat - CHECK and set COLD for takeoff
11. Throttle - IDLE
12. Elevator Trim - SET TO TAKE-OFF RANGE
13. Rudder Trim - SET TO 0
14. Flaps - CHECK OPERATION, THEN UP

15. Controls - CHECK FREEDOM OF MOVEMENT AND PROPER DIRECTION
16. Mixture - FULL RICH (or as required by field elevation)
17. Doors - SECURE
18. Parking Brake - RELEASE
19. Engine Instruments - CHECK

TAKEOFF

Take-off Power .....Full Throttle

1. Power - SET take-off power and mixture before brake release
2. Airspeed - ROTATE AT 56 KIAS, ACCELERATE TO 60 KIAS
3. ESTABLISH DESIRED CLIMB SPEED when clear of obstacles

CLIMB

1. Throttle - FULL FORWARD
2. Mixture - LEAN TO MAXIMUM RPM
3. Engine Temperature - MONITOR

CRUISE

1. Throttle - SET as desired (Use tables in Performance Section)
2. Mixture - LEAN TO MAXIMUM RPM
3. Fuel Boost Pump - OFF

DESCENT

1. Altimeter - SET
2. Carburetor Heat - FULL HOT or FULL COLD, AS REQUIRED
3. Throttle - SET as desired (avoid prolonged idle settings)
4. Mixture - ENRICH FOR SMOOTH OPERATION
5. Windshield Defroster - AS REQUIRED

BEFORE LANDING

1. Seat Belts and Shoulder Harnesses - FASTENED
2. Fuel Selector - CHECK ON
3. Mixture - FULL RICH (or as required by field elevation)
4. Fuel Boost Pump - ON
5. Carburetor Heat - FULL HOT or FULL COLD, AS REQUIRED

NOTE

In the event of a go-around, carburetor heat shall be in the FULL COLD position after full throttle application.

6. Landing Light - AS REQUIRED

CAUTION

Do not use the landing light if Battery Switch is OFF, battery power is lost, or battery circuit breaker is open.

7. Wing Flaps - FULL DOWN (90 KTS MAXIMUM)
8. Airspeed - ESTABLISH NORMAL LANDING APPROACH SPEED (63 KTS)

BALKED LANDING

1. Throttle - FULL FORWARD
2. Carburetor Heat - FULL COLD
3. Airspeed - 63 KTS until clear of obstacles.
4. Flaps - UP, then TRIM TO BEST RATE-OF-CLIMB SPEED (68 KTS)

AFTER LANDING

1. Landing Light - AS REQUIRED
2. Flaps - UP
3. Elevator Trim Tab - SET TO TAKE-OFF RANGE
4. Rudder Trim - SET TO 0

SHUTDOWN

1. Parking Brake - SET
2. Fuel Boost Pump - OFF
3. Electrical and Avionics Equipment - OFF
4. Throttle - 1000 RPM
5. Mixture - IDLE CUT-OFF
6. Magneto/Start Switch - OFF, after engine stops
7. Battery and Alternator Switches - OFF
8. Control Lock - INSTALL
9. Wheel Chocks - INSTALL; Parking Brake - RELEASE

ENVIRONMENTAL SYSTEMS

HEATING AND VENTILATION

Refer to SYSTEMS DESCRIPTIONS Section for operation of heating and ventilation controls.

COLD WEATHER OPERATION

PREFLIGHT INSPECTION

All accumulations of ice, snow and frost must be removed from the wings, tail, control surfaces and hinges, propeller, windshield, and fuel vents. If such accumulations are not removed completely, the airplane shall not be flown. The deposits will not blow off in flight. While an adverse weight factor is clearly involved in the case of heavy deposits, it is less obvious that even slight accumulations will disturb or completely destroy the designed aerodynamic properties of the airfoils.

The normal preflight procedures should then be completed, with particular attention given to check control surfaces for complete freedom of movement.

ENGINE

Use engine oil in accordance with Consumable Materials in the HANDLING, SERVICING AND MAINTENANCE Section.

WARNING

Ascertain that Magneto/Start Switch is OFF before moving propeller by hand.

Always pull the propeller through by hand, opposite the direction of rotation, several times to clear the engine and "limber up" the cold, heavy oil before using the starter. This will also lessen the load on the battery if external power is not used.

Under very cold conditions, it may be necessary to preheat the engine prior to a start. Particular attention should be given to the oil cooler and engine sump to ensure proper preheat. A start with congealed oil in the system may produce an indication of normal pressure immediately after the start, but then the oil pressure may decrease when residual oil in the engine is pumped back with the congealed oil in the sump. If an engine heater capable of heating both the engine sump and cooler is not available, the oil should be drained while the engine is hot and stored in a warm area until the next flight.

If there is no oil pressure within the first 30 seconds of running, or if oil pressure drops after a few minutes of ground operation, shut down and check for broken oil lines, oil cooler leaks or the possibility of congealed oil.

NOTE

It is advisable to use external power for starting in cold weather.

During descent and landing, give special attention to engine temperature, since the engine will have a tendency toward overcooling.

TAXIING

Avoid taxiing through water, slush or muddy surfaces if possible. In cold weather, water, slush or mud, when

splashed onto control surface hinges may freeze, preventing free movement and resulting in structural damage.

NOISE CHARACTERISTICS

Approach to and departure from an airport should be made so as to avoid prolonged flight at low altitude near noise-sensitive areas. Avoidance of noise-sensitive areas, if practical, is preferable to overflight at relatively low altitudes.

For VFR operations over outdoor assemblies of persons, recreational and park areas, and other noise-sensitive areas, pilots should make every effort to fly not less than 2000 feet above the surface, weather permitting, even though flight at a lower level may be consistent with the provisions of government regulations.

NOTE

The preceding recommended procedures do not apply where they would conflict with Air Traffic Control clearances or instructions, or where, in the pilot's judgement, an altitude of less than 2000 feet is necessary to adequately exercise his duty to see and avoid other airplanes.

Flyover noise level established in compliance with FAR 36 is:

63.8 dB(A)

No determination has been made by the Federal Aviation Administration that the noise level of this airplane is or

Always pull the propeller through by hand, opposite the direction of rotation, several times to clear the engine and "limber up" the cold, heavy oil before using the starter. This will also lessen the load on the battery if external power is not used.

Under very cold conditions, it may be necessary to preheat the engine prior to a start. Particular attention should be given to the oil cooler and engine sump to ensure proper preheat. A start with congealed oil in the system may produce an indication of normal pressure immediately after the start, but then the oil pressure may decrease when residual oil in the engine is pumped back with the congealed oil in the sump. If an engine heater capable of heating both the engine sump and cooler is not available, the oil should be drained while the engine is hot and stored in a warm area until the next flight.

If there is no oil pressure within the first 30 seconds of running, or if oil pressure drops after a few minutes of ground operation, shut down and check for broken oil lines, oil cooler leaks or the possibility of congealed oil.

NOTE

It is advisable to use external power for starting in cold weather.

During descent and landing, give special attention to engine temperature, since the engine will have a tendency toward overcooling.

TAXIING

Avoid taxiing through water, slush or muddy surfaces if possible. In cold weather, water, slush or mud, when

splashed onto control surface hinges may freeze, preventing free movement and resulting in structural damage.

NOISE CHARACTERISTICS

Approach to and departure from an airport should be made so as to avoid prolonged flight at low altitude near noise-sensitive areas. Avoidance of noise-sensitive areas, if practical, is preferable to overflight at relatively low altitudes.

For VFR operations over outdoor assemblies of persons, recreational and park areas, and other noise-sensitive areas, pilots should make every effort to fly not less than 2000 feet above the surface, weather permitting, even though flight at a lower level may be consistent with the provisions of government regulations.

NOTE

The preceding recommended procedures do not apply where they would conflict with Air Traffic Control clearances or instructions, or where, in the pilot's judgement, an altitude of less than 2000 feet is necessary to adequately exercise his duty to see and avoid other airplanes.

Flyover noise level established in compliance with FAR 36 is:

63.8 dB(A)

No determination has been made by the Federal Aviation Administration that the noise level of this airplane is or

should be acceptable or unacceptable for operation at, into, or out of any airport.

SPINS

The airplane will not spin if orthodox entry is used, but will enter a spiral dive. Speed builds up rapidly in a spiral dive requiring high pullout loads; therefore, if a spiral is inadvertently entered, recovery from the spiral is to be initiated within two turns.

ENTRY

Stall the airplane with the control column hard back, throttle in idle position, flaps up, carburetor heat as required and with the nose about 15° above the horizon. At the stall, apply full rudder in the direction required to spin. A slight rudder application immediately before the stall will assure the direction of spin. The airplane nose will drop and rotate towards the applied rudder. When the wings are 90° to the horizon, apply full aileron against (i.e., against the intended direction of spin). The airplane will go slightly inverted and enter a normal spin.

If aileron against is not applied or applied too late, the airplane will enter a rapid spiral dive, and recovery must be initiated by the second turn.

If the full back control column is not applied and held, the airplane may spiral. Again recovery must be initiated not later than the second turn.

If aileron is applied too early, the airplane will not rotate and merely remain in a straight stalled condition.

RECOVERY

Recover from the spin by immediately moving the control column full forward and simultaneously applying full rudder opposite to the direction of the spin. Continue to hold this control position until rotation stops and then neutralize all controls and execute a smooth pullout. Ailerons should be neutral and throttle in idle position at all times during recovery.

WARNING

Intentional spins prohibited with flaps extended.

SECTION V
PERFORMANCE

TABLE OF CONTENTS

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INTRODUCTION TO PERFORMANCE AND FLIGHT PLANNING

All airspeeds quoted in this section are indicated airspeeds (IAS) except as noted and assume zero instrument error.

The graphs and tables in this section present performance information for takeoff, climb, landing and flight planning at various parameters of weight, power, altitude, and temperature. FAA approved performance information is included in this section. Examples are presented on all performance graphs. In addition, the calculations for flight time, block speed, and fuel required are presented using the conditions listed.

CONDITIONS:

At Denver:

Outside Air Temperature	15°C (59°F)
Field Elevation	5330 ft
Altimeter Setting	29.60 in. Hg
Wind	270° at 10 kts
Runway 26L length	10,010 ft

Route of Trip

*DEN-V4-GLD-V132-HUT-V73-ICT

For VFR Cruise at 9,500 feet

ROUTE SEGMENT	MAGNETIC COURSE	DIST NM	WIND 9500 FEET DIR/KTS	OAT 9500 FEET °C	ALT SETTING IN.HG
DEN-TXC	090°	72	010/20	-4	29.60
TXC-GLD	092°	73	010/20	-4	29.60
GLD-HUT	102°	194	220/10	-3	29.56
HUT-ICT	116°	28	220/10	1	29.56

*REFERENCE: Enroute Low Altitude Chart L-6

At Wichita:

Outside Air Temperature ..... 25°C (77°F)
Field Elevation ..... 1332 ft
Altimeter Setting ..... 29.56 in. Hg
Wind ..... 180° at 10 kts
Runway 19 Length ..... 7301 ft

To determine pressure altitude at origin and destination airports, add 100 feet to field elevation for each .1 in. Hg below 29.92, and subtract 100 feet from field elevation for each .1 in. Hg above 29.92.

Pressure Altitude at DEN:

29.92 - 29.60 = .32 in. Hg

The pressure altitude at DEN is 320 feet above the field elevation.

5330 + 320 = 5650 ft

Pressure Altitude at ICT:

29.92 − 29.56 = .36 in. Hg

The pressure altitude at ICT is 360 feet above the field elevation.

1332 + 360 = 1692 ft

NOTE

For flight planning, the difference between cruise altitude and cruise pressure altitude has been ignored.

Enter the Take-Off Distance - Hard Surface graph at 15°C, 5650 feet pressure altitude, 1675 pounds, and 9.5 knots headwind component.

Ground Roll	1060 ft
Total Distance over 50-ft Obstacle	1750 ft
Rotation Speed	56 knots
50-Foot Speed	60 knots

The following example assumes the airplane is loaded so that the take-off weight is 1675 pounds and the OAT at DEN is 15°C.

Enter the CRUISE PERFORMANCE table for 2500 RPM and 9500 feet:

ALTITUDE FEET	THROTTLE SETTING RPM	FUEL FLOW GPH	TAS KNOTS
9500	2500	5.7	95

Time and fuel used were calculated as follows:

$$\text{Time} = \frac{\text{Distance}}{\text{Ground Speed}}$$

Fuel Used = (Time) (Fuel Flow)

Results are:

ROUTE SEGMENT	DISTANCE NM	EST GROUND SPEED KNOTS	TIME AT CRUISE ALTITUDE HRS: MIN	FUEL USED FOR CRUISE GAL
DEN-TXC	60*	92	:39	3.7
TXC-GLD	73	92	:48	4.6
GLD-HUT	194	100	1:56	11.0
HUT-ICT	28	97	:17	1.6

*Distance required to climb has been subtracted from segment distance.

TIME - FUEL - DISTANCE

ITEM	TIME HRS: MINS	FUEL GAL	DISTANCE NM
Start, Taxi, Runup, and Takeoff	0:00	0.8	0
Climb	0:11	1.2	12
Cruise	3:40	20.9	355
Total	3:51	22.9	367

Total Flight Time: 3 hours, 51 minutes

Block Speed: 367 NM ÷ 3 hours, 51 minutes = 95.3 knots

Reserve Fuel (45 minutes at 2300 RPM, 9500 feet)

Enter the CRUISE PERFORMANCE table for 2300 RPM and obtain fuel flow at 9500 feet. Fuel flow is 4.8 GPH.

Reserve fuel = (45 min) (4.8 GPH) = 3.6 gallons

Total Fuel = (22.9 + 3.6) = 26.5 gallons

The estimated landing weight is determined by subtracting the fuel required for the trip from the ramp weight:

Assumed ramp weight = 1680 lbs

Estimated fuel from DEN to ICT = (26.5 gal) (6 lbs/gal) = 159 lbs

Estimated landing weight = 1680 − 159 = 1521 lbs

Enter the graph for Landing Distance - Hard Surface - Flaps Down (30°) at 25°C, 1332 feet pressure altitude, and 9.5 kts headwind component:

Ground Roll ..... 640 feet
Total Distance over 50-ft Obstacle ..... 1220 feet
Approach Speed ..... 63 knots

COMMENTS PERTINENT TO THE USE OF PERFORMANCE GRAPHS

1. The example, in addition to presenting an answer for a particular set of conditions, also presents the order in which the graphs should normally be used, i.e., if the first item in the example is OAT, then enter the graph at the known OAT.

2. The reference lines indicate where to begin following guide lines. Always project to the reference line first, then follow the guide lines to the next known item.

3. Indicated airspeeds (IAS) were obtained by using the Airspeed Calibration - Normal System.

4. The associated conditions define the specific conditions from which performance parameters have been determined. They are not intended to be used as instructions.

5. The full amount of usable fuel is available for all approved flight conditions.

6. Engine and component cooling has been demonstrated for temperatures up to 100°F at sea level with a 3.67°F per 1000 ft lapse rate. (ISA + 41°F).

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AIRSPEED CALIBRATION – NORMAL SYSTEM

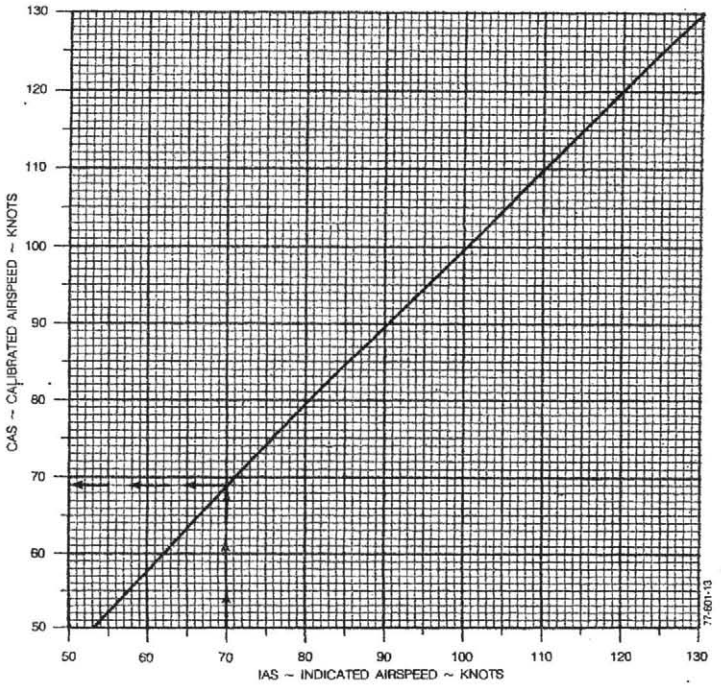
ALL FLAP POSITIONS

NOTE:

INDICATED AIRSPEED ASSUMES ZERO INSTRUMENT ERROR

EXAMPLE:

IAS	70 KTS
CAS	69 KTS



ALTIMETER CORRECTION – NORMAL SYSTEM

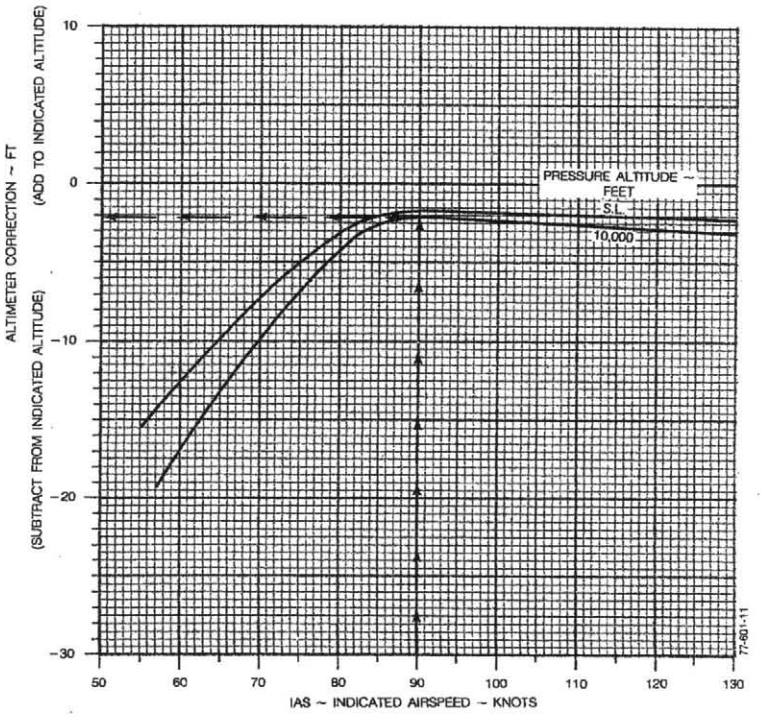
ALL FLAP POSITIONS

NOTE:

INDICATED AIRSPEED AND INDICATED ALTITUDE ASSUMES ZERO INSTRUMENT ERROR

EXAMPLE:

IAS	90 KTS
INDICATED PRESSURE ALTITUDE	10,000 FT
ALTIMETER CORRECTION	−2 FT
ACTUAL PRESSURE ALTITUDE	9998 FT



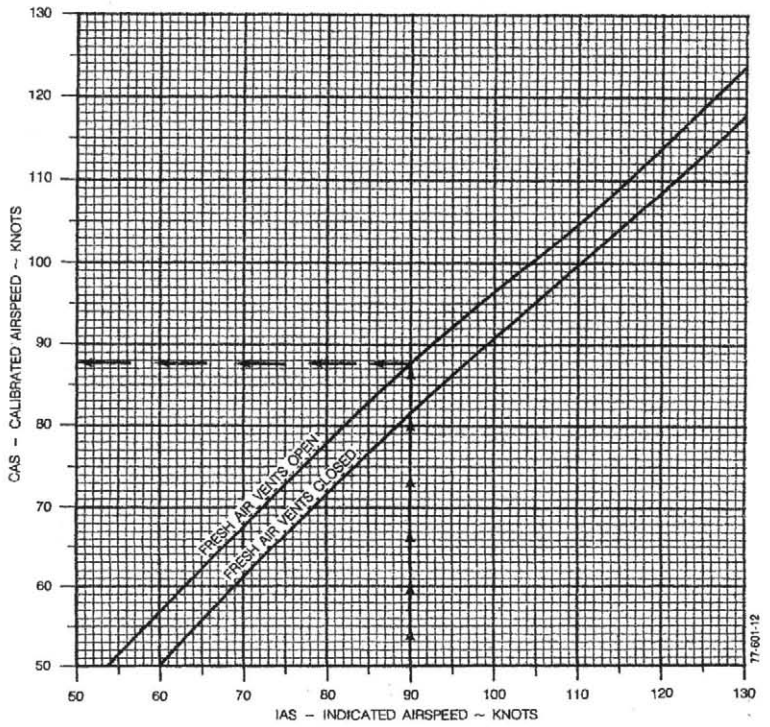
AIRSPEED CALIBRATION – ALTERNATE SYSTEM

NOTE:

INDICATED AIRSPEED ASSUMES ZERO INSTRUMENT ERROR.

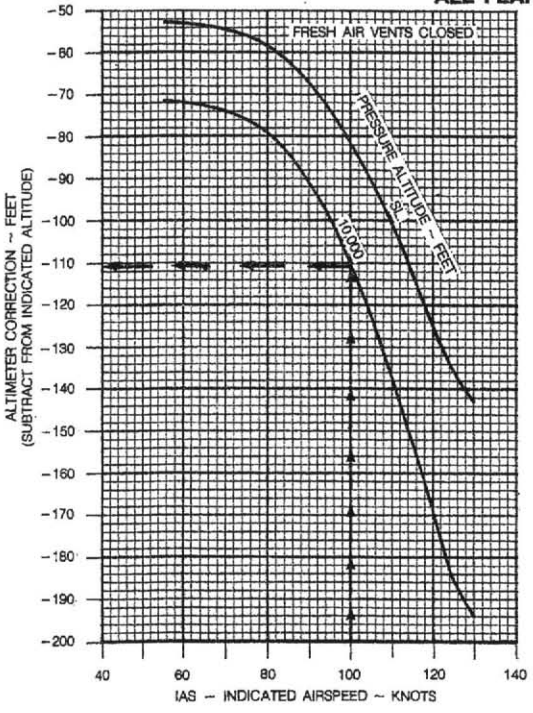
EXAMPLE:

IAS	90 KTS
FRESH AIR VENTS	OPEN
CAS	88 KTS



ALTIMETER CORRECTION – ALTERNATE SYSTEM

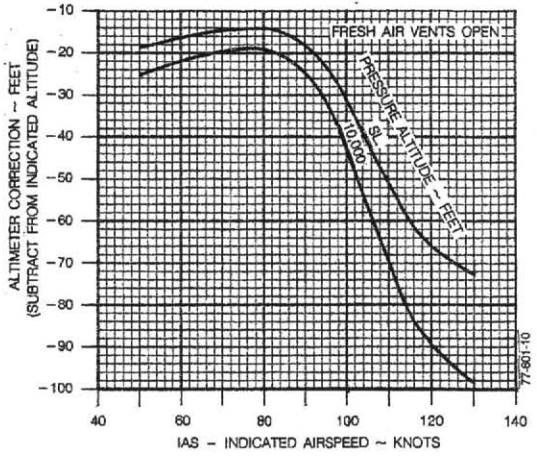
ALL FLAP POSITIONS



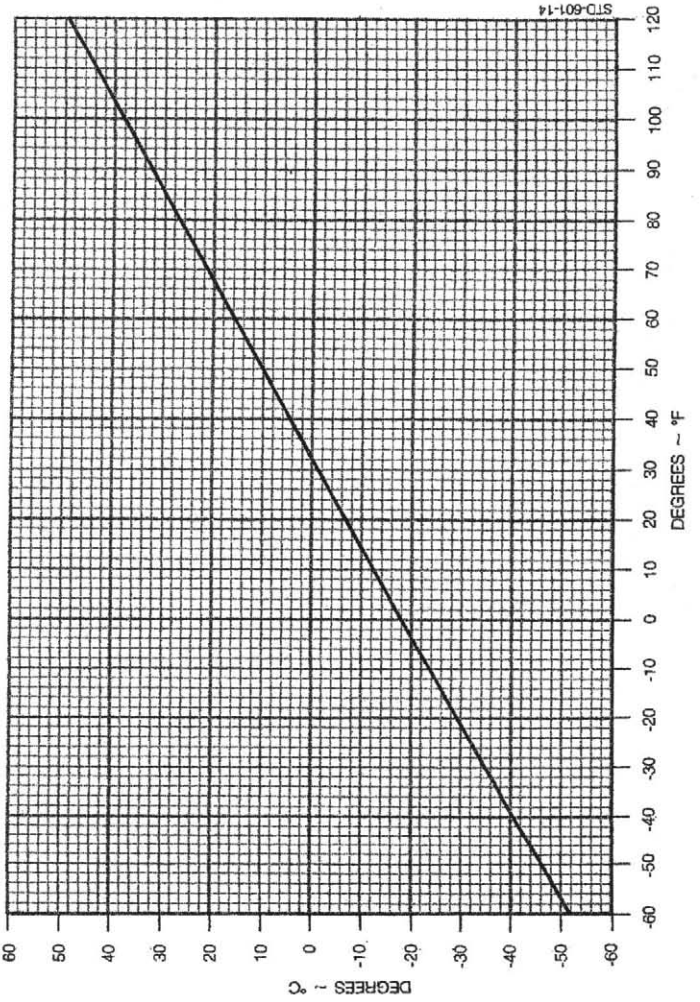
EXAMPLE:

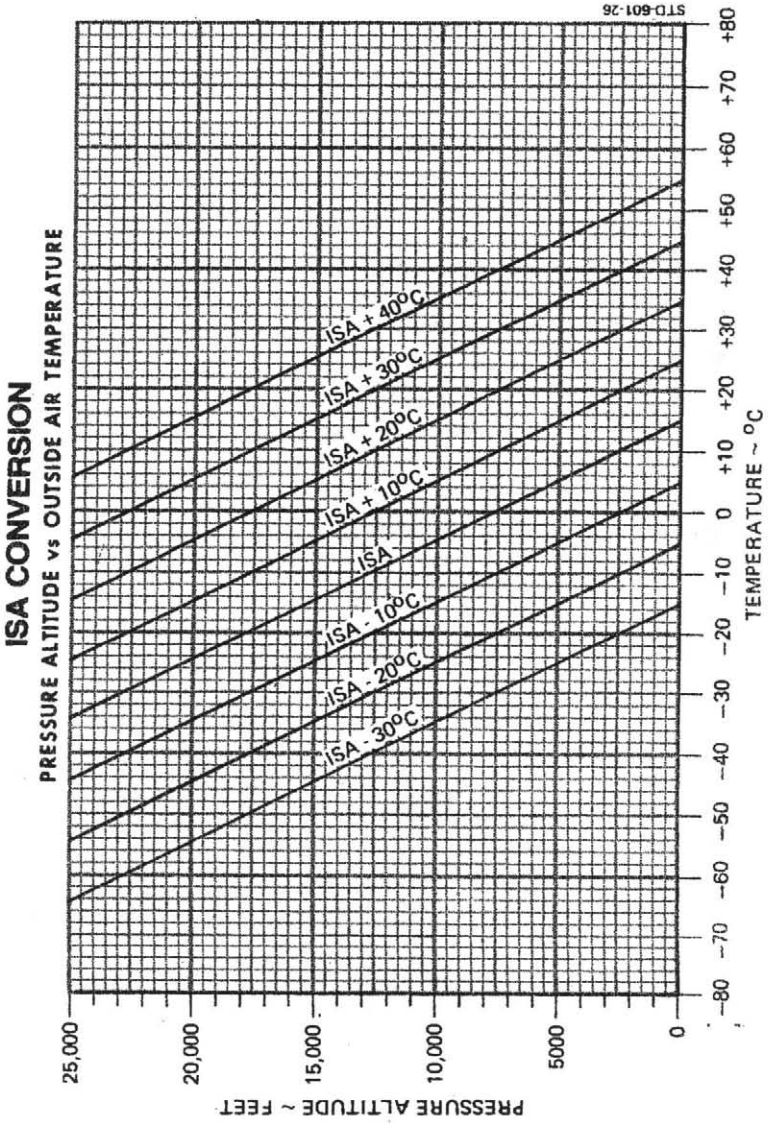
IAS	100 KTS
FRESH AIR VENTS	CLOSED
INDICATED PRESSURE ALTITUDE	10,000 FT
ALTIMETER CORRECTION	–111 FT
ACTUAL PRESSURE ALTITUDE	9889 FT

NOTE: INDICATED AIRSPEED AND INDICATED ALTITUDE ASSUME ZERO INSTRUMENT ERROR.



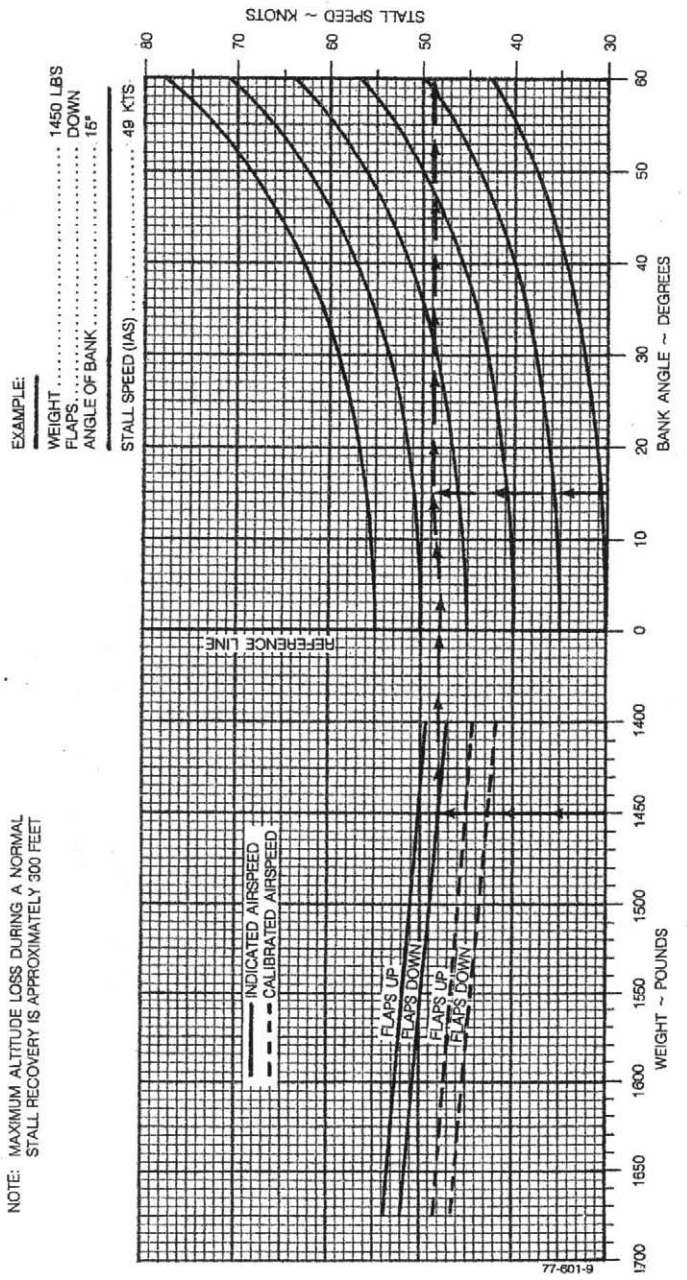
FAHRENHEIT TO CELSIUS TEMPERATURE CONVERSION




ISA CONVERSION
PRESSURE ALTITUDE vs OUTSIDE AIR TEMPERATURE
ISA + 40°C
ISA + 30°C
ISA + 20°C
ISA + 10°C
ISA
ISA - 10°C
ISA - 20°C
ISA - 30°C
25,000
20,000
15,000
10,000
5000
0
PRESSURE ALTITUDE ~ FEET
-80 -70 -60 -50 -40 -30 -20 -10 0 +10 +20 +30 +40 +50 +60 +70 +80
TEMPERATURE ~ °C
STD-601-26

STALL SPEEDS – POWER IDLE

NOTE: MAXIMUM ALTITUDE LOSS DURING A NORMAL STALL RECOVERY IS APPROXIMATELY 300 FEET

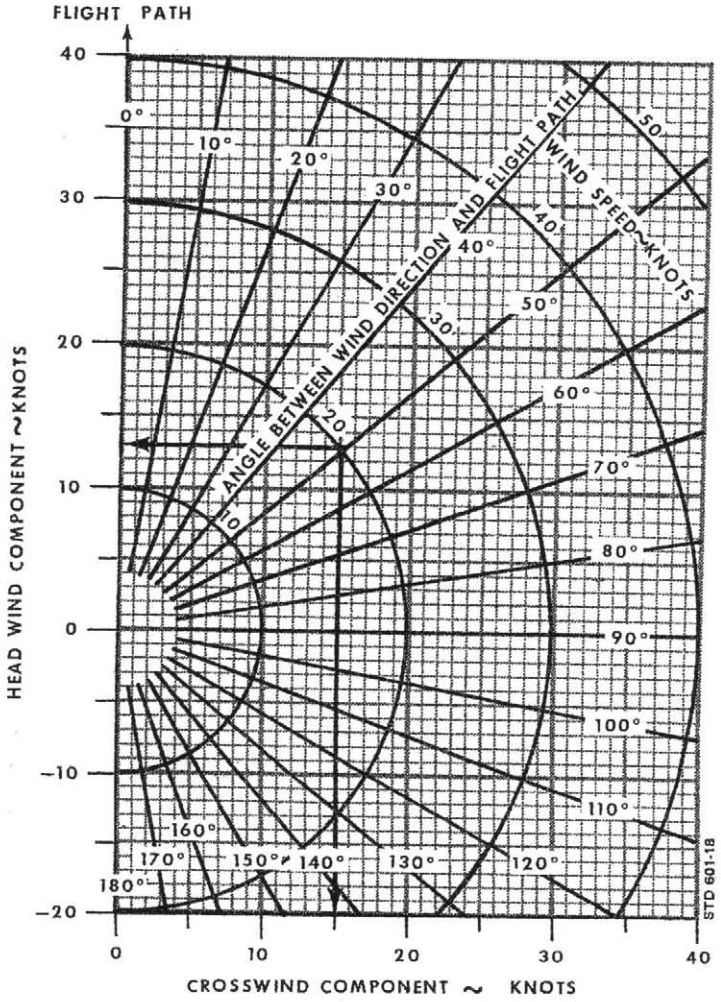


WIND COMPONENTS

Demonstrated Crosswind is 15 kts

EXAMPLE:

WIND SPEED	20 KTS
ANGLE BETWEEN WIND DIRECTION AND FLIGHT PATH	50°
HEADWIND COMPONENT	13 KTS
CROSSWIND COMPONENT	15 KTS



TAKE-OFF DISTANCE – HARD SURFACE

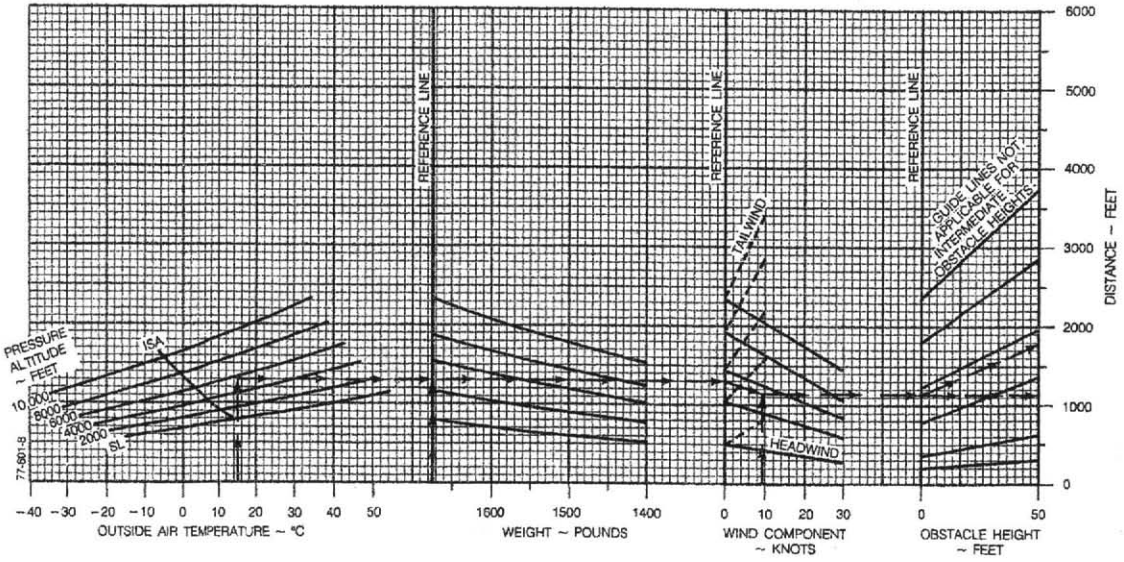
ASSOCIATED CONDITIONS:

POWER	FULL THROTTLE
MIXTURE	LEAN TO MAXIMUM RPM
FLAPS	UP (0°)
RUNWAY	LEVEL, DRY, HARD SURFACE

TAKEOFF SPEEDS (ALL WEIGHTS)	
ROTATION	56 KNOTS
50 FT	60 KNOTS

EXAMPLE:

OAT	15°C
PRESSURE ALTITUDE	5850 FT
TAKE-OFF WEIGHT	1675 LBS
HEADWIND COMPONENT	9.5 KTS
GROUND ROLL	1060 FT
TOTAL DISTANCE OVER 50 FT OBSTACLE	1750 FT



TAKE-OFF DISTANCE – GRASS SURFACE

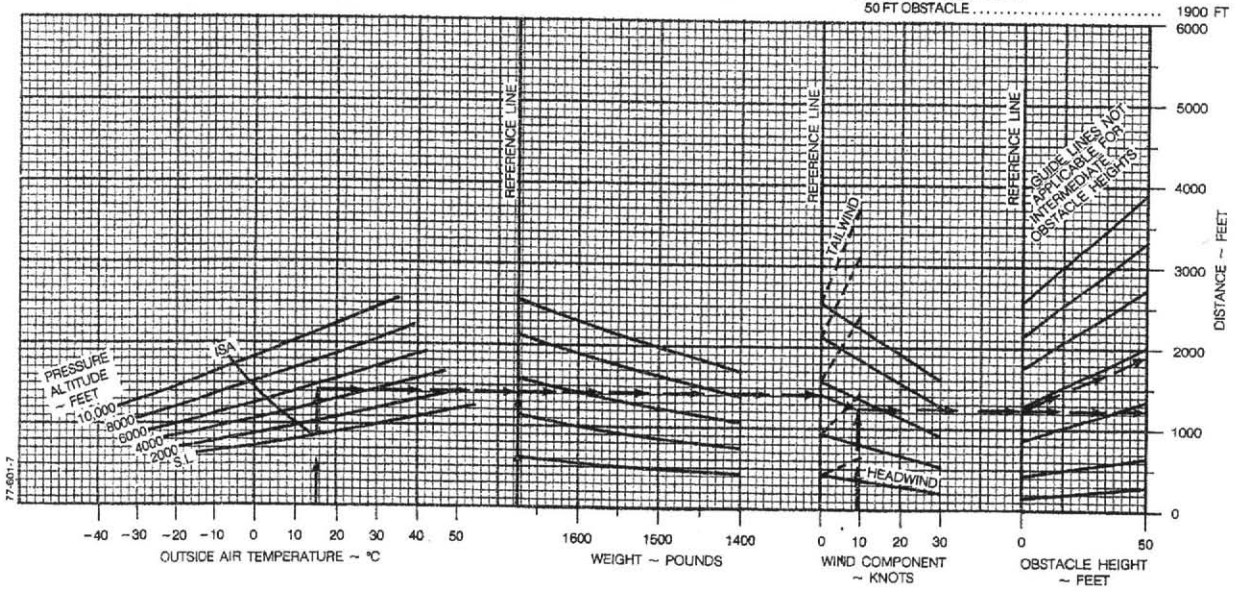
ASSOCIATED CONDITIONS:

POWER	FULL THROTTLE
MIXTURE	LEAN TO MAXIMUM RPM
FLAPS	UP (0°)
RUNWAY	LEVEL, DRY, SHORT GRASS SURFACE WITH FIRM SUBSOIL

TAKEOFF SPEEDS: (ALL WEIGHTS)	
ROTATION	56 KNOTS
50 FT	60 KNOTS

EXAMPLE:

OAT	15°C
PRESSURE ALTITUDE	5650 FT
TAKE-OFF WEIGHT	1675 LB
HEADWIND COMPONENT	9.5 KTS
GROUND ROLL	1240 FT
TOTAL DISTANCE OVER A 50 FT OBSTACLE	1900 FT



CLIMB

CLIMB SPEED - 65 KNOTS IAS (ALL WEIGHTS)

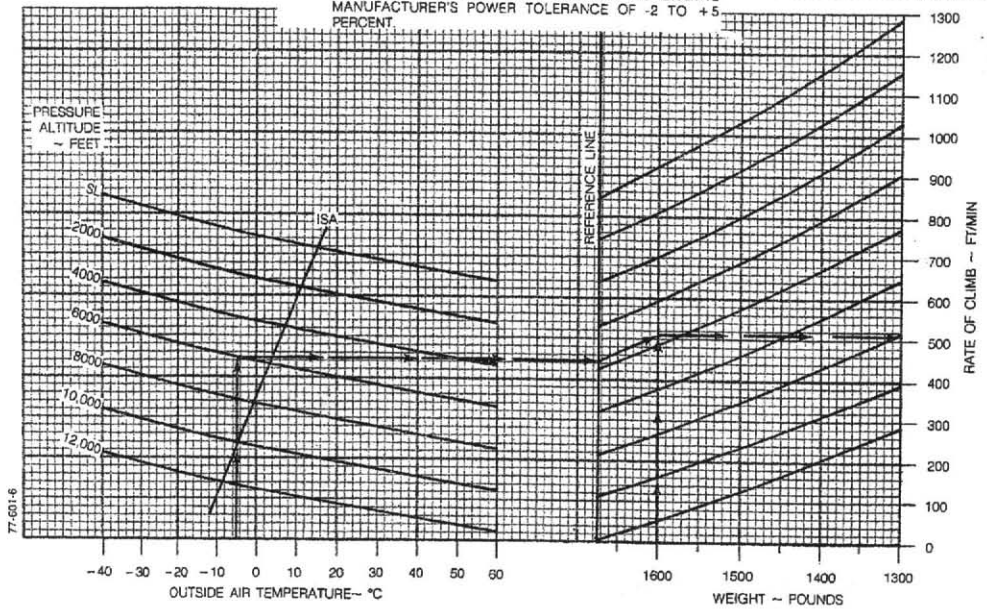
ASSOCIATED CONDITIONS:

POWER	FULL THROTTLE
MIXTURE	LEAN TO MAXIMUM RPM
FLAPS	UP (0°)

NOTE: CLIMB PERFORMANCE SHOWN IS BASED ON TYPE CERTIFICATED ENGINE POWER ADJUSTED FOR BEECHCRAFT INSTALLATION LOSSES. ACTUAL PERFORMANCE MAY VARY SUBJECT TO ENGINE MANUFACTURER'S POWER TOLERANCE OF -2 TO +5 PERCENT.

EXAMPLE:

OAT	-5°C
PRESSURE ALTITUDE	6000 FT
WEIGHT	1600 LBS
RATE OF CLIMB	512FT/MIN



TIME, FUEL, AND DISTANCE TO CLIMB

ASSOCIATED CONDITIONS:

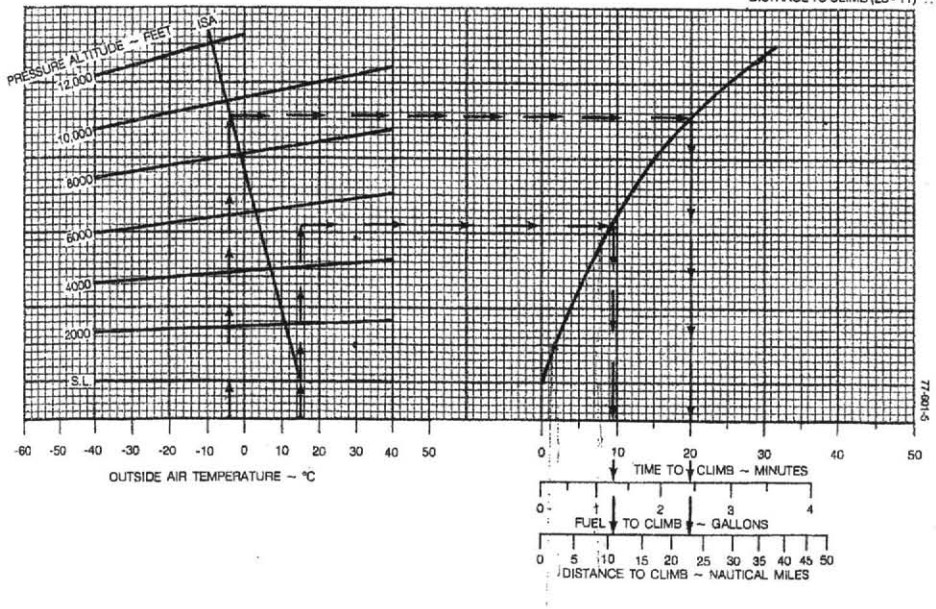
POWER	FULL THROTTLE
FUEL DENSITY	6.0 LBS/GAL
MIXTURE	LEAN TO MAXIMUM RPM
WEIGHT	1675 POUNDS

CLIMB SPEED 65 KNOTS

NOTE: CLIMB PERFORMANCE SHOWN IS BASED ON TYPE CERTIFICATED ENGINE POWER ADJUSTED FOR BEECHCRAFT INSTALLATION LOSSES. ACTUAL PERFORMANCE MAY VARY SUBJECT TO ENGINE MANUFACTURER'S POWER TOLERANCE OF -2 TO +5 PERCENT.

EXAMPLE:

OAT AT TAKE-OFF	15°C
OAT AT CRUISE	-4°C
AIRPORT PRESSURE ALTITUDE	5650 FT
CRUISE PRESSURE ALTITUDE	9500 FT
INITIAL CLIMB WEIGHT	1675 LBS
TIME TO CLIMB (20 - 9)	11 MIN
FUEL TO CLIMB (2.4 - 1.2)	1.2 GALS
DISTANCE TO CLIMB (23 - 11)	12 NM



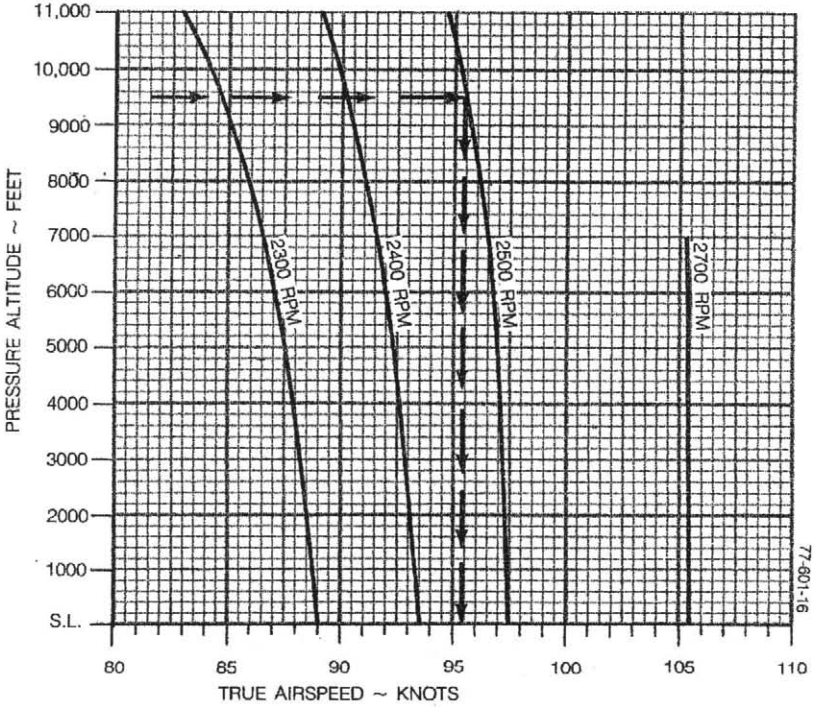
CRUISE SPEEDS

ASSOCIATED CONDITIONS:

AVERAGE CRUISE WEIGHT... ...1600 LBS
TEMPERATURE ..... STANDARD DAY (ISA)

EXAMPLE:

PRESSURE ALTITUDE.. 9500 FEET
POWER SETTING..... 2500 RPM
CRUISE SPEED..... 95.4 KNOTS



CRUISE PERFORMANCE*
STANDARD DAY
AVERAGE CRUISE WEIGHT = 1600 POUNDS

ALTITUDE FEET	THROTTLE SETTING RPM	FUEL FLOW GPH	IAS KNOTS	TAS KNOTS
2500	2700	8.0	101	105
	2500	6.4	94	97
	2400	5.7	90	93
	2300	5.2	85	88
3500	2700	7.8	100	105
	2500	6.3	92	97
	2400	5.7	88	93
	2300	5.2	84	88
4500	2700	7.7	99	105
	2500	6.3	91	97
	2400	5.6	87	93
	2300	5.1	82	88
5500	2700	7.6	97	105
	2500	6.2	89	97
	2400	5.5	85	92
	2300	5.0	81	87
6500	2700	7.4	96	105
	2500	6.1	88	97
	2400	5.4	84	92
	2300	5.0	79	87
7500	2500	6.0	86	96
	2400	5.3	82	91
	2300	4.9	77	86
8500	2500	5.8	85	96
	2400	5.3	80	91
	2300	4.9	76	85
9500	2500	5.7	83	95
	2400	5.2	79	90
	2300	4.8	74	85
10500	2500	5.6	81	95
	2400	5.1	77	90
	2300	4.7	72	84
11500	2500	5.5	80	94
	2400	5.0	75	89
	2300	4.7	70	82

*Cruise performance is based on best power mixture. Lean to maximum rpm for best performance.

RANGE PROFILE - 29 GALLONS

STANDARD DAY (ISA)

ASSOCIATED CONDITIONS:

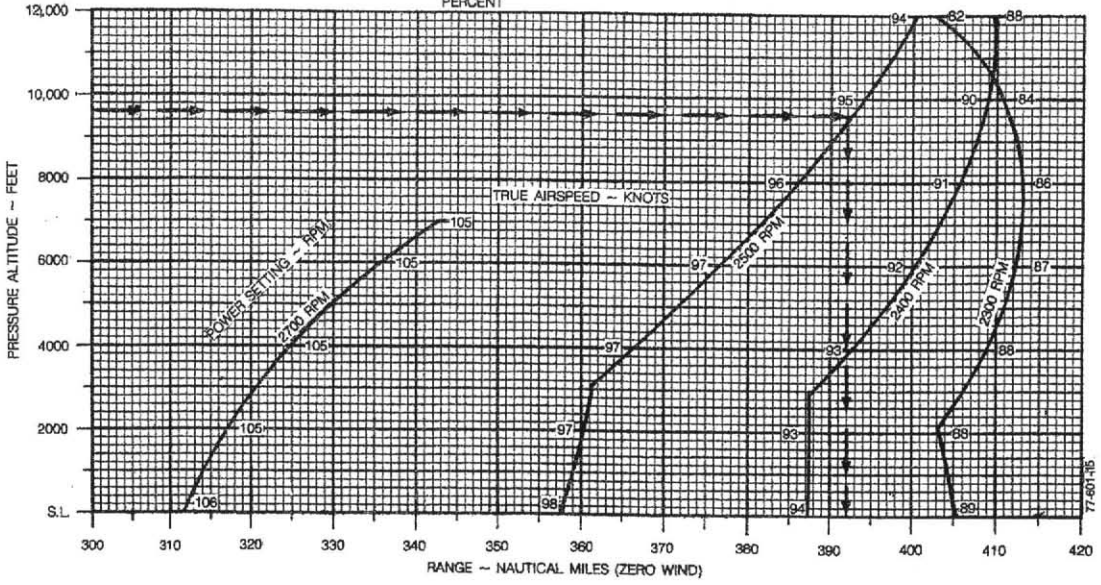
WEIGHT.....1680 POUNDS BEFORE ENGINE START
FUEL.....100 OCTANE AVIATION GASOLINE
MIXTURE....LEANED TO MAXIMUM RPM

NOTES:
1. RANGE INCLUDES START, TAXI, TAKE-OFF, AND CLIMB WITH 45 MINUTES RESERVE FUEL AT 2300 RPM
2. PERFORMANCE SHOWN IS BASED ON THE TYPE CERTIFICATED ENGINE POWER ADJUSTED FOR BEECHCRAFT INSTALLATION LOSSES. ACTUAL PERFORMANCE MAY VARY SUBJECT TO ENGINE MANUFACTURER'S POWER TOLERANCE OF -2 TO +5 PERCENT

EXAMPLE:

PRESSURE ALTITUDE.....9500 FEET
POWER SETTING.....2500 RPM

RANGE.....392 NM



ENDURANCE PROFILE - 29 GALLONS

STANDARD DAY (ISA)

ASSOCIATED CONDITIONS:

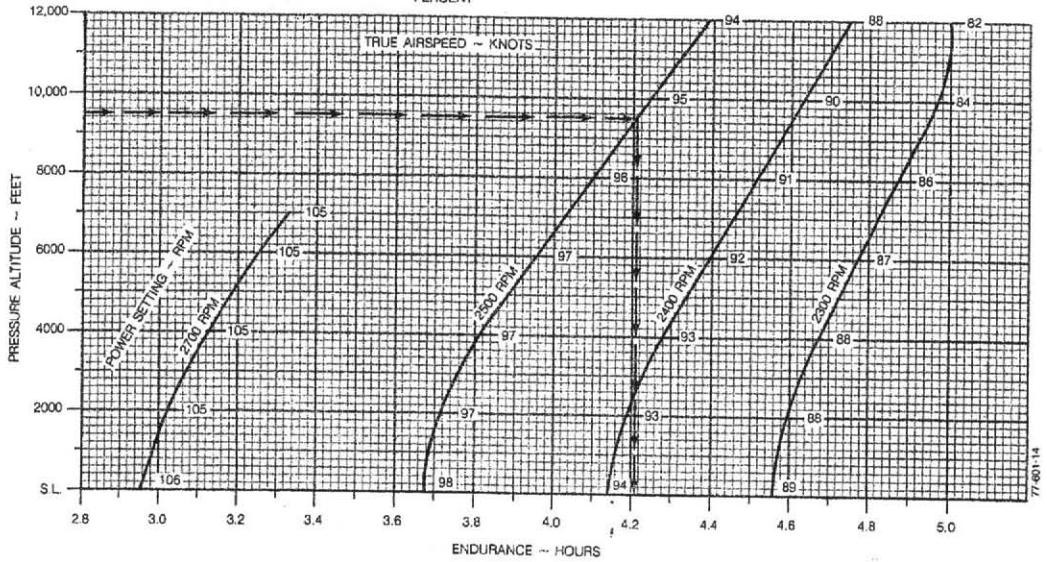
WEIGHT ..... 1680 POUNDS BEFORE ENGINE START
FUEL ..... 100 OCTANE AVIATION GASOLINE
MIXTURE ..... LEANED TO MAXIMUM RPM

NOTES:
1. ENDURANCE INCLUDES START, TAXI, TAKE OFF, AND CLIMB WITH 45 MINUTES RESERVE AT 2300 RPM
2. PERFORMANCE SHOWN IS BASED ON TYPE CERTIFICATED ENGINE POWER ADJUSTED FOR BEECHCRAFT INSTALLATION LOSSES. ACTUAL PERFORMANCE MAY VARY SUBJECT TO ENGINE MANUFACTURER'S POWER TOLERNACE OF -2 TO +5 PERCENT

EXAMPLE:

PRESSURE ALTITUDE ..... 9500 FT
POWER SETTING ..... 2500 RPM

ENDURANCE ..... 4.2 HOURS



LANDING DISTANCE - HARD SURFACE - FLAPS DOWN (30°)

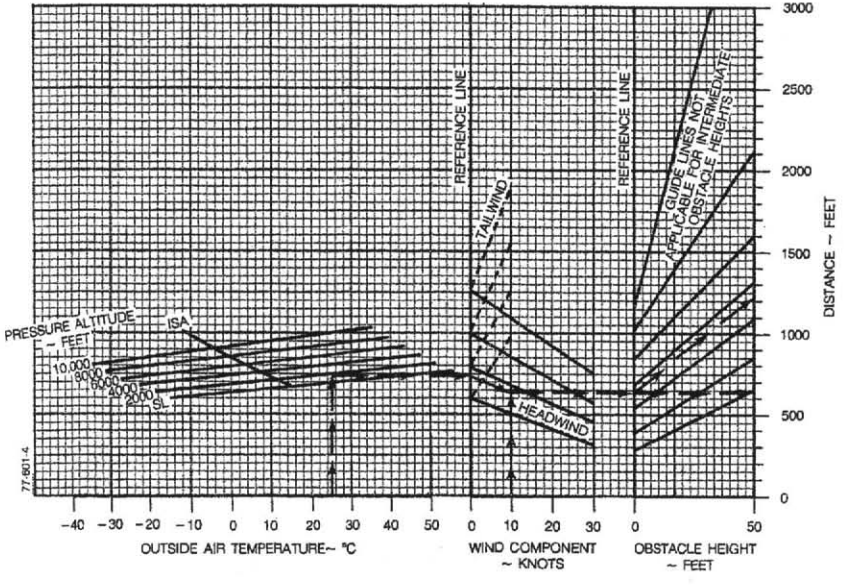
APPROACH SPEED: 63 KNOTS (ALL WEIGHTS)

ASSOCIATED CONDITIONS:

POWER	RETARD TO MAINTAIN 550 FT/MIN ON FINAL APPROACH
FLAPS	DOWN (30°)
RUNWAY	PAVED, LEVEL, DRY SURFACE
BRAKING	MAXIMUM
WEIGHT	1675 LBS

EXAMPLE:

OAT	25°C
PRESSURE ALTITUDE	1332 FT
HEADWIND COMPONENT	9.5 KTS
GROUND ROLL	640 FT
TOTAL OVER 50 FT OBSTACLE	1220 FT



LANDING DISTANCE - GRASS SURFACE - FLAPS DOWN (30°)

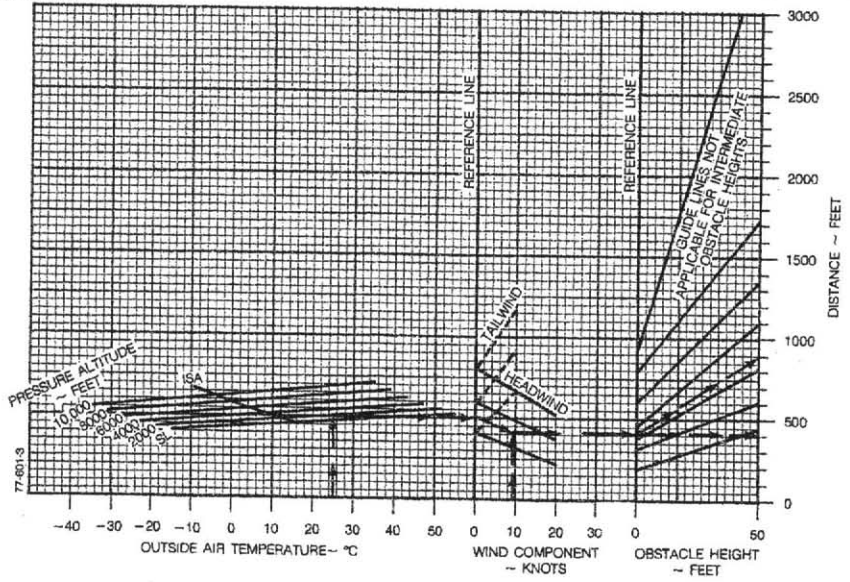
APPROACH SPEED: 63 KNOTS (ALL WEIGHTS)

ASSOCIATED CONDITIONS:

POWER	RETARD TO MAINTAIN 550 FT/MIN ON FINAL APPROACH
FLAPS	DOWN (30°)
RUNWAY	LEVEL, DRY, SHORT GRASS WITH FIRM SUBSOIL
BRAKING	MAXIMUM
WEIGHT	1675 LBS

EXAMPLE:

OAT	25°C
PRESSURE ALTITUDE	1332 FT
HEADWIND COMPONENT	9.5 KTS
GROUND ROLL	400 FT
TOTAL OVER 50 FT OBSTACLE	900 FT



SECTION VI
WEIGHT AND BALANCE/ EQUIPMENT LIST

TABLE OF CONTENTS

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AIRPLANE WEIGHING PROCEDURE

Periodic weighing of the airplane may be required to keep the basic empty weight current. Frequency of weighing is to be determined by the operator. All changes to the airplane affecting weight and/or balance are the responsibility of the airplane operator.

1. The airplane is weighed on the main and nose landing gear wheels. Reaction arms must be measured from the jig point location while the airplane is level on the scales.

2. Fuel is normally drained preparatory to a weighing from the regular drain ports while the airplane is in static ground attitude. When tanks are drained, 1.7 pounds of unusable fuel remains in the airplane at F.S. 84.9. The remainder of the unusable fuel to be added to a drained system is 6.0 pounds at F.S. 85.5. If the airplane is weighed with fuel tanks topped off full, the specific weight (pounds/gallon) should be determined by using a hydrometer. Compute usable fuel weight by multiplying measured specific weight by 29 gallons. Usable fuel moment is determined using an arm of 81.5.

3. Engine oil is to be at the full level as indicated by the dipstick. Total engine oil aboard when engine and systems are full is 12.4 pounds at F.S. 38.5.

4. To determine airplane configuration at time of weighing, installed equipment is checked against the airplane equipment list or superseding forms. All equipment must be in its proper place during weighing.

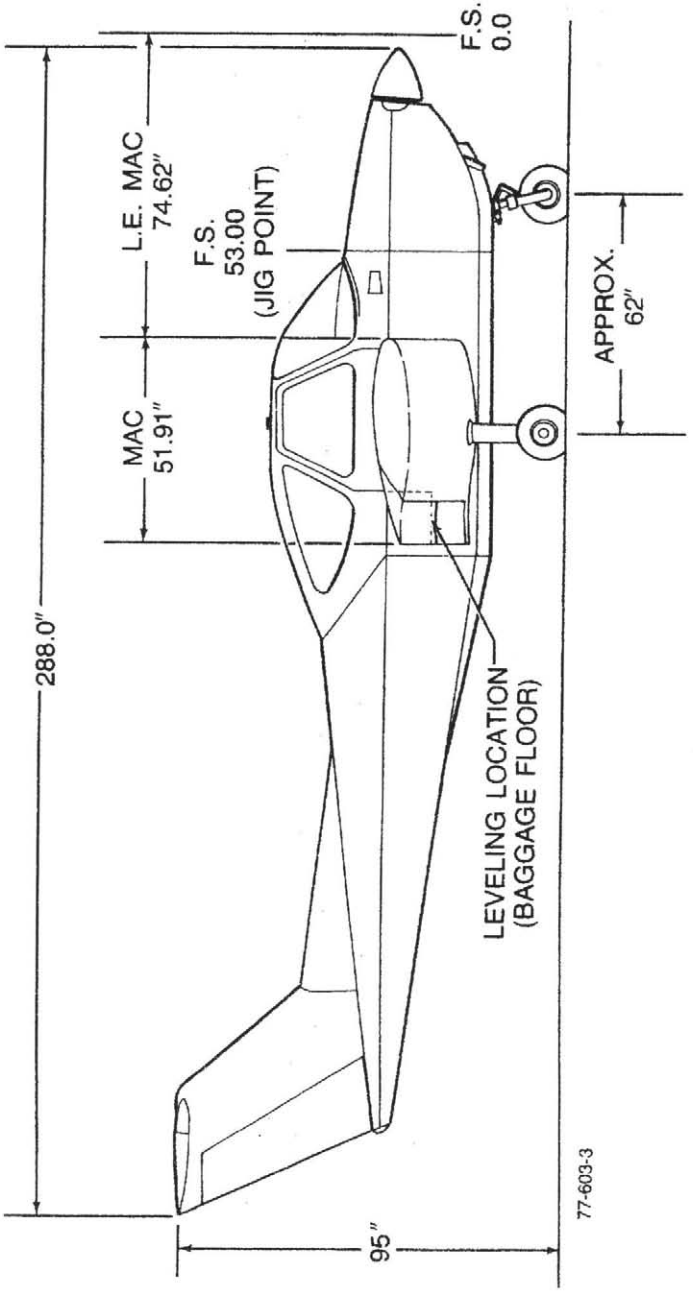
5. The airplane weighing is performed with control surfaces in neutral position and doors closed.

6. The airplane is placed on the scales in a near level attitude. Leveling is accomplished with a spirit level on the aft baggage compartment floor. Leveling can be accomplished by depressing or extending the nose gear shock strut.

7. Measurement of the reaction arms for a wheel weighing is made using the firewall at F.S. 53.0 for a jig point. While the airplane is level on the scales, linear measurements are taken from the reference (a plumb bob hanging from the side of the fuselage at the firewall) to the axle centerline of the main gear and then from the main wheel axle centerline to the nose gear axle centerline. The main wheel axle centerline is best located by stretching a string from one wheel to the other. All measurements are to be taken with the tape level with the floor and parallel to fuselage water lines. The location of the wheel reactions will be approximately at F.S. 101.24 for the main wheels and F.S. 39.28 for the nose wheel.

8. The basic empty weight and moment are determined on the Aircraft Basic Empty Weight and Balance form. Items weighed which are not part of the basic empty weight are subtracted, i.e. usable fuel. Unusable fuel and engine oil are added if not already in the airplane.

9. Weighing should be made in an enclosed area which is free from air currents. The scales used should be maintained and calibrated to acceptable standards.


F.S.
0.0
L.E. MAC
74.62"
F.S.
53.00
(JIG POINT)
MAC
51.91"
APPROX.
62"
288.0"
LEVELING LOCATION
(BAGGAGE FLOOR)
95"
77-603-3

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AIRCRAFT BASIC EMPTY WEIGHT AND BALANCE

SKIPPER 77 SER. NO._____ REG. NO. _____ DATE_____

STRUT POSITION	NOSE	MAIN
EXTENDED	38.55	101.12
COMPRESSED	39.90	101.33

PREPARED BY
*Company*_____
Signature _____

REACTION POINTS	SCALE READING	TARE	NET WEIGHT	ARM	MOMENT
LEFT MAIN					
RIGHT MAIN					
NOSE OR TAIL					
TOTAL (AS WEIGHED)					
Space below provided for additions and subtractions to as weighed condition.					
EMPTY WEIGHT					
ENGINE OIL			12.4	38.5	477
UNUSABLE FUEL			7.7	85.3	657
BASIC EMPTY WEIGHT					

77-601-1

NOTE

Each new airplane is delivered with a completed sample loading, basic empty weight and center of gravity, and equipment list, all pertinent to that specific airplane. It is the owner's responsibility to ensure that changes in equipment are reflected in a new weight and balance and in an addendum to the equipment list. There are many ways of doing this; it is suggested that a running tally of equipment changes and their effect on basic empty weight and c.g. is a suitable means for meeting both requirements.

The current equipment list and basic empty weight and c.g. information must be retained with the airplane when it changes ownership. Beech Aircraft Corporation cannot maintain this information; the current status is known only to the owner. If these papers become lost, the FAA will require that the airplane be re-weighed to establish the basic empty weight and c.g. and that an inventory of installed equipment be conducted to create a new equipment list.

It is recommended that duplicate copies of the Aircraft Basic Empty Weight and Balance form and the Equipment List be made and kept in an alternate location in the event the original handbook is misplaced.

WEIGHT AND BALANCE RECORD

SERIAL NO. _____ REGISTRATION NO. _____ PAGE NO. _____

DATE	ITEM NO.		DESCRIPTION OF ARTICLE OR CHANGE	WEIGHT CHANGE ADDED (+) OR REMOVED (-)			RUNNING BASIC EMPTY WEIGHT	
	IN	OUT		WT (LBS)	ARM (IN.)	MOM / 100	WT (LBS)	MOM / 100

WEIGHT AND BALANCE RECORD

SERIAL NO. _____ REGISTRATION NO. _____ PAGE NO. _____

DATE	ITEM NO.		DESCRIPTION OF ARTICLE OR CHANGE	WEIGHT CHANGE ADDED (+) OR REMOVED (-)			RUNNING BASIC EMPTY WEIGHT	
	IN	OUT		WT (LBS)	ARM (IN.)	MOM / 100	WT (LBS)	MOM / 100

LOADING INSTRUCTIONS

It is the responsibility of the airplane operator to ensure that the airplane is properly loaded. At the time of delivery, Beech Aircraft Corporation provides the necessary weight and balance data to compute individual loadings. All subsequent changes in airplane weight and balance are the responsibility of the airplane owner and/or operator.

The basic empty weight and moment of the airplane at the time of delivery are shown on the Aircraft Basic Empty Weight and Balance form. Useful load items which may be loaded into the airplane are shown on the Useful Load Weight and Moment tables. The minimum and maximum moments are shown on the Moment Limits vs Weight graph or table. These moments correspond to the forward and aft center of gravity flight limits for a particular weight. All moments are divided by 100 to simplify computations.

NOTE

The floor structure load limit is 100 pounds per square foot.

COMPUTING PROCEDURE

1. Record the Basic Empty Weight and Moment from the Aircraft 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, taxi, and runup to arrive at the SUB-TOTAL Take-off Condition.

6. Subtract the weight and moment of the FUEL TO DESTINATION from the SUB TOTAL Take-off Condition 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 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 Skipper 77 DATE 0/00/00
SERIAL NO. WA-00 REG. NO. NXXXXX

ITEM	WEIGHT	MOM/100
BASIC EMPTY CONDITION	1190	1023
OCCUPANT - LEFT	170	158
OCCUPANT - RIGHT	170	158
BAGGAGE	—	—
SUB TOTAL ZERO FUEL CONDITION	1530	1339
FUEL LOADING (25 gal.)	150	122
SUB TOTAL RAMP CONDITION	1680	1461
*LESS FUEL FOR START, TAXI AND RUNUP	-5	-4
SUB TOTAL TAKEOFF CONDITION	1675	1457
LESS FUEL TO DESTINATION	-120	-98
LANDING CONDITION	1555	1359

*Fuel for start, taxi, and runup is normally 5 pounds at an average moment/100 of 4.

WEIGHT AND BALANCE LOADING FORM

MODEL _____ DATE _____
SERIAL NO. _____ REG. NO. _____

ITEM	WEIGHT	MOM/100
BASIC EMPTY CONDITION OCCUPANT - LEFT OCCUPANT - RIGHT BAGGAGE		
SUB TOTAL ZERO FUEL CONDITION FUEL LOADING (gal.)		
SUB TOTAL RAMP CONDITION *LESS FUEL FOR START, TAXI AND RUNUP		
SUB TOTAL TAKEOFF CONDITION LESS FUEL TO DESTINATION		
LANDING CONDITION		

*Fuel for start, taxi, and runup is normally 5 pounds at an average moment/100 of 4.

USEFUL LOAD WEIGHTS AND MOMENTS

OCCUPANTS

WEIGHT (LBS)	FWD POSITION ARM = 89	AFT POSITION ARM = 97
	MOMENT/100 (LB-IN)	
100	89	97
110	98	107
120	107	116
130	116	126
140	125	136
150	134	146
160	142	155
170	151	165
180	160	175
190	169	184
200	178	194
210	187	204
220	196	213
230	205	223
240	214	233
250	223	243

USEFUL LOAD WEIGHTS AND MOMENTS

BAGGAGE*
ARM = 119

WEIGHT (LBS)	MOMENT/100 (LB-IN)
10	12
20	24
30	36
40	48
50	60
60	71
70	83
80	95
90	107
100	119
110	131
120	143

*Baggage shall be prevented from shifting by using the baggage net.

$$\frac{M}{\cancel{GG}} = \frac{W}{\cancel{M}}$$

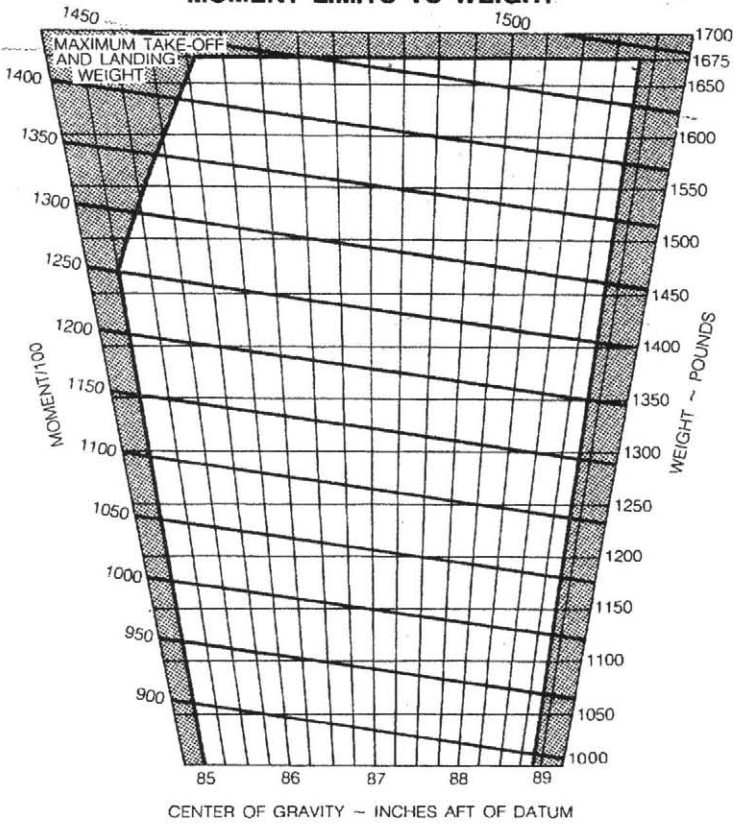
$$A = \frac{TM}{TW}$$

USEFUL LOAD WEIGHTS AND MOMENTS

USABLE FUEL (6.0 LB/GAL)
ARM = 81.5

GALLONS	WEIGHT (LBS)	MOMENT/100 (LB-IN)
5	30	24
10	60	49
15	90	73
20	120	98
25	150	122
29	174	142

MOMENT LIMITS VS WEIGHT



WEIGHT CONDITION	FWD C.G. LIMIT	AFT C.G. LIMIT
1675 POUNDS (MAX. TAKE-OFF/LANDING)	85.8	88.9
1470 POUNDS OR LESS	85.0	88.9

77-601-2

MOMENT LIMITS VS WEIGHT

WEIGHT (LBS)	MOMENT/100 (LB-IN)		WEIGHT (LBS)	MOMENT/100 (LB-IN)	
	MIN MOMENT	MAX MOMENT		MIN MOMENT	MAX MOMENT
1100	935	978	1400	1190	1245
1110	944	987	1410	1198	1253
1120	952	996	1420	1207	1262
1130	960	1005	1430	1216	1271
1140	969	1013	1440	1224	1280
1150	978	1022	1450	1232	1289
1160	986	1031	1460	1241	1298
1170	994	1040	1470	1250	1307
1180	1003	1049	1480	1259	1316
1190	1012	1058	1490	1268	1325
1200	1020	1067	1500	1277	1334
1210	1028	1076	1510	1286	1342
1220	1037	1085	1520	1295	1351
1230	1046	1093	1530	1304	1360
1240	1054	1102	1540	1313	1369
1250	1062	1111	1550	1322	1378
1260	1071	1120	1560	1331	1387
1270	1080	1129	1570	1341	1396
1280	1088	1138	1580	1350	1405
1290	1096	1147	1590	1359	1414
1300	1105	1156	1600	1368	1422
1310	1114	1165	1610	1377	1431
1320	1122	1173	1620	1387	1440
1330	1130	1182	1630	1396	1449
1340	1139	1191	1640	1405	1458
1350	1148	1200	1650	1414	1467
1360	1156	1209	1660	1423	1476
1370	1164	1218	1670	1433	1485
1380	1173	1227	1675	1437	1489
1390	1182	1236			

SECTION VII
SYSTEMS DESCRIPTION

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AIRFRAME

The BEECHCRAFT Skipper 77 is an all-metal, low-wing, single-engine monoplane with fixed tricycle landing gear. It utilizes fully cantilevered wings and a T-tail empennage. Entry and egress are through cabin doors (one on each side of the fuselage). A one-piece windshield and four cabin windows (one in each cabin door and one in each side of the aft cabin area) provide all-around visibility for the pilot.

SEATING ARRANGEMENTS

Two adjustable seats are installed in the cabin area. To adjust either of the seats, pull up the release handle on the inboard side of the seat and slide the seat forward or aft, as desired. Make certain the seat is locked securely in place after adjustment. The seat backs may be leaned forward to provide access to the baggage compartment.

FLIGHT CONTROLS

CONTROL SURFACES

The airplane is equipped with conventional ailerons and rudder. It utilizes a T-tail horizontal stabilizer and elevator, mounted at the extreme top of the vertical stabilizer.

OPERATING MECHANISMS

The airplane is equipped with conventional dual controls for the pilot and copilot. The ailerons and elevator are operated by conventional control wheels interconnected by a T-bar. The rudder pedals are interconnected by linkage below the floor. These systems are connected to the control surfaces through push-rod and cable-and-bellcrank systems. Rudder

and elevator trim are adjustable with controls mounted below the instrument panel. A position indicator for each of the trim systems is intergrated with its respective control.

TRIM CONTROLS

ELEVATOR TRIM

Manual control of the elevator trim is accomplished with a handwheel located below the instrument panel. Forward rotation of the handwheel trims the airplane's nose down, while aft rotation of the handwheel trims the airplane's nose up. An elevator trim tab position indicator is located adjacent to the trim control handwheel.

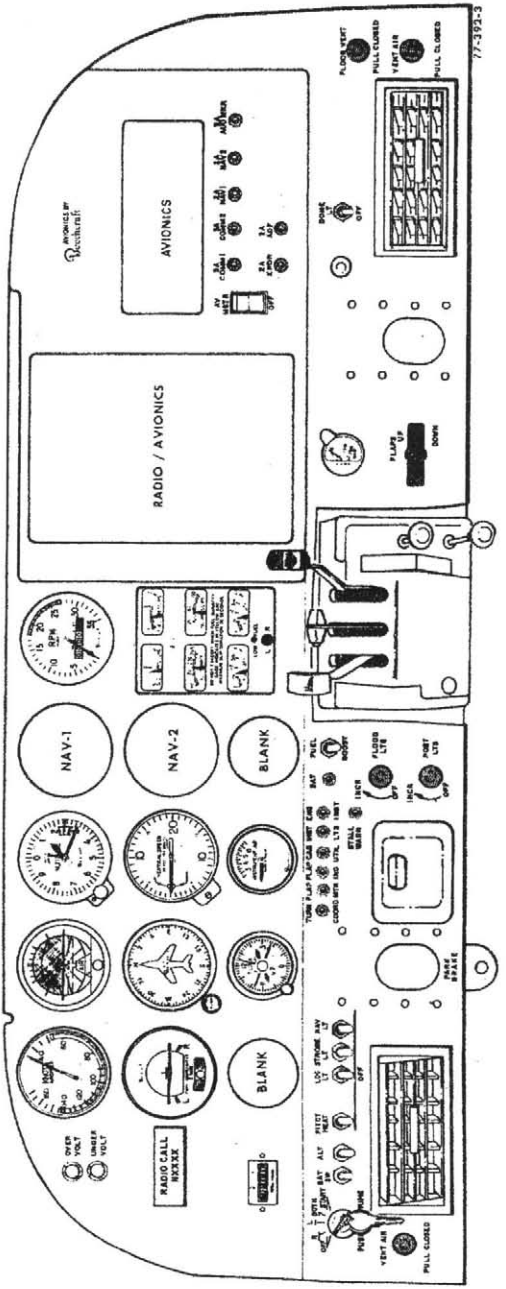
RUDDER TRIM

The rudder trim control, located on the lower center console, is provided to displace the rudder for trimming purposes. A rudder trim indicator is located adjacent to the rudder trim control.

INSTRUMENT PANEL

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

The lower left subpanel contains the switches for control of magneto/start and prime, alternator, battery, lights (navigation, instrument flood and post, strobe, and landing), circuit breakers, fuel boost pump, pilot's vent control and optional equipment.



TYPICAL INSTRUMENT PANEL

Located on the lower right subpanel are the flap switch, flap position indicator, cockpit dome light switch, copilot's vent control, and cabin floor vent control.

FLIGHT INSTRUMENTS

The flight instruments are located on the left side of the instrument panel directly in front of the pilot's seat. Available flight instrumentation includes attitude and directional gyros, airspeed, altimeter, turn coordinator, vertical speed, and gyro pressure. The magnetic compass is mounted above the instrument panel and the outside air temperature indicator is located in the upper center of the windshield. The clock is mounted on the left side of the instrument panel.

GROUND CONTROL

Steering is accomplished by the use of rudder pedals through a spring-loaded linkage connecting the nose gear to the rudder pedals. The nose gear maximum travel is 31° right or left, and a hydraulic shimmy damper on the nose gear yoke compensates for any tendency to shimmy. Smooth turning is accomplished by allowing the airplane to roll while depressing the appropriate rudder pedal. Sharper turns require light brake pressure on the depressed pedal.

The minimum wing-tip turning radius, using full steering, one brake, and partial power, is 20 feet, 8 inches.

WING FLAPS

The wing flaps are controlled by a three-position switch, placarded UP, OFF, and DOWN, located to the right of the power quadrant. The switch must be pulled out of a detent

before it can be repositioned. A flap position indicator, located adjacent to the flap switch, has markings for UP, 10°, 20°, and DN (30°).

Limit switches automatically interrupt power to the electric motor when the flaps reach the extremes of travel. Intermediate flap positions can be obtained by placing the three-position switch in the OFF position during flap extension or retraction.

LANDING GEAR

The fixed tricycle landing gear has provisions for steering through the nose wheel and braking through the main gear. The nose wheel is steerable through a spring-loaded linkage connected to the rudder pedals and has a maximum steerable travel of 10° ± 1° in either direction. A hydraulic damper on the nose wheel strut compensates for any tendency of the nose wheel to shimmy. The main gear, fabricated from spring steel, has hydraulic brake assemblies installed on each gear.

BRAKES

The dual hydraulic brakes are operated by depressing the toe portion of either the pilot's or copilot's rudder pedals.

The parking brakes push-pull control is located below the pilot's control wheel. To set the parking brakes, pull the control out and pump both toe pedals until solid resistance is felt. Push the control in to release the brakes.

The hydraulic brake fluid reservoir is located on the right side of the firewall and is accessible through the cowling access door. Fluid level is checked with the dipstick

attached to the reservoir cap. The brakes require no adjustment, since the pistons move outward to compensate for lining wear.

CAUTION

Install wheel chocks and release the parking brake if the airplane is to be left unattended. Changes in ambient temperatures can cause the brakes to release or exert excessive pressures.

BAGGAGE COMPARTMENT

A baggage area extends aft of the pilot and copilot seats to the aft bulkhead. Loading within the baggage area must be in accordance with the data in the WEIGHT & BALANCE Section. All baggage must be secured with the Beech-approved baggage net provided with each airplane.

WARNING

Do not carry hazardous material anywhere in the airplane.

Do not carry children in the baggage compartment.

SEATS, SEAT BELTS, AND SHOULDER HARNESSES

SEATS

To adjust either of the seats, pull up the release handle located on the inboard side of the seat and slide the seat

forward or aft, as desired. Make certain the seat is locked securely in place after adjustment. The seat backs may be leaned forward to provide access to the baggage area.

SEAT BELTS

Both seats are provided with seat belts having a lever-action, quick-release, metal buckle. The seat belt can be shortened or lengthened by allowing the excess belt to be pulled through the end of the buckle. Holding the buckle at a right angle to the belt releases the binding action, allowing the belt length to be adjusted.

SHOULDER HARNESSES

The shoulder harness is a standard installation for each seat. The spring loading at the inertia reel keeps the harness snug, but will allow normal movement during flight operations. The inertia reel is designed with a locking device that will secure the harness in the event of an impact action. The strap is worn over the shoulder and down across the body, where it is fastened by a metal loop to the seat belt buckle. The inertia reels are attached to the upper edge of the aft bulkhead. The inertia reels are covered with an escutcheon, and the straps run from the reels over the seats on the inboard side.

WARNING

The seat belt is independent of the shoulder harness; however, the shoulder harness may be used only when the seat belt is fastened.

DOORS AND EXITS

CABIN DOORS

The airplane has a conventional cabin door on each side of the fuselage adjacent to the seats. The doors are latched by an overhead latch (which latches both doors) and an individual latch in each door. Both latches must be released to open the cabin door. To close the cabin door from the inside, grasp the door strap and firmly pull the door closed. Rotate the overhead latch to the latched position. Press firmly outward at the upper and aft edges of the door. If any movement of the door is detected, completely open the door and close again following the above procedures. To open the door from the inside, release the overhead latch, grasp the cabin door release handle and pull until the door latch releases.

EMERGENCY EXIT

An emergency exit can be accomplished through either door.

CONTROL LOCK

A control lock is provided with the loose tools and accessories. When installed, it prevents movement of the control column.

To install the control lock:

1. Rotate the control wheel and move the control column so the holes in the left control column hanger and the control column will align to accept the pin.

2. Push the control column lock pin down through the hole in the control column hanger and into the hole in the control column assembly.

WARNING

Before starting engine, remove the control lock by reversing the above procedure.

ENGINE

The BEECHCRAFT Skipper 77 is powered by an Avco Lycoming O-235-L2C four-cylinder, direct-drive, horizontally opposed engine rated at 115 horsepower at 2700 rpm.

ENGINE CONTROLS

The control levers are grouped along the upper face of the power quadrant. Their knobs are shaped to government standard configuration so they can be identified by touch. The controls are centrally located for ease of operation from either the pilot's or copilot's seat. A controllable friction lever, located to the right of the control levers, is provided to prevent creeping of the control levers.

ENGINE INSTRUMENTS

Most of the engine instruments are located in the center of the instrument panel. This group includes left and right fuel quantity, oil temperature, oil pressure, fuel pressure, ammeter, and a low fuel quantity warning light.

The alternator-out annunciator lights are located on the left side of the instrument panel. The tachometer is located directly above the engine instruments.

ENGINE BREAK-IN INFORMATION

New engines have been carefully run-in by the engine manufacturer. However, the engine should be operated on straight mineral oil for a minimum of 50 hours or until oil consumption stabilizes. After the first 25 hours of operation, drain and replace the mineral oil. A change to an approved engine oil should be made after the break-in period. See Approved Engine Oils in Section VIII, HANDLING, SERVICING AND MAINTENANCE.

CAUTION

Do not use less than 2450 rpm cruise power until oil consumption stabilizes, to prevent glazing of the cylinder walls.

LUBRICATION SYSTEM

The engine oil system is a wet-sump type and has a 6-quart capacity. The oil level may be checked through the access door in the engine cowling. A calibrated dipstick attached to the filler cap indicates the oil level.

Oil operating temperatures are controlled by an automatic thermostat bypass control. The bypass control will limit oil flow through the oil cooler when operating temperatures are below normal, and will permit the oil to bypass the cooler if it should become blocked.

ENGINE ICE PROTECTION

The possibility of induction system icing is reduced by the carburetor air heat system.

CARBURETOR HEAT

The carburetor heat control is located adjacent to the throttle. The lever has two placarded positions: COLD - HOT. When the lever is in the COLD (forward) position,

unheated and filtered air enters the induction system. Placing the lever in the HOT (aft) position allows heated and unfiltered air to enter the induction system to alleviate the possibility of carburetor ice. Carburetor heat should be used in accordance with the procedures in Section IV, NORMAL PROCEDURES, and Section III, EMERGENCY PROCEDURES.

INDUCTION AIR

Induction air is available from filtered ram air or unfiltered carburetor heat air. Filtered ram air enters through a scoop in the lower cowling and flows directly through a filter into the carburetor air box. The air box incorporates a positive shut-off carburetor heat intake so that when carburetor heat is selected, induction air is drawn through a hose from the exhaust shroud.

STARTER

A magneto/start switch is located on the subpanel to the left of the pilot's control column and incorporates R (right), L (left), and BOTH magneto positions in addition to the OFF and START positions. After activation of the starter, the spring-loaded switch returns to the BOTH position when released. Also, the switch includes a PUSH TO PRIME position that activates the electric fuel priming function for the purpose of supplying additional fuel to the engine during starting.

The warning light placarded STARTER ENGAGED (WA-130 and after) is located directly above the pilot's control column on the left subpanel. The starter engaged warning light will illuminate whenever electrical power is being supplied to the starter. If the light remains illuminated after starting, the starter relay has remained engaged and loss of electrical power may result.

PROPELLER

A Sensenich 72CKS12-0-52 fixed-pitch, two-bladed aluminum alloy propeller with a metal spinner is installed as standard equipment. The propeller has a 72 inch diameter, 1" cutoff permitted.

FUEL SYSTEM

The airplane is equipped with an ON-OFF type fuel system, and is designed for operation on grade 100 (green) or 100LL (blue) aviation gasoline.

FUEL TANKS

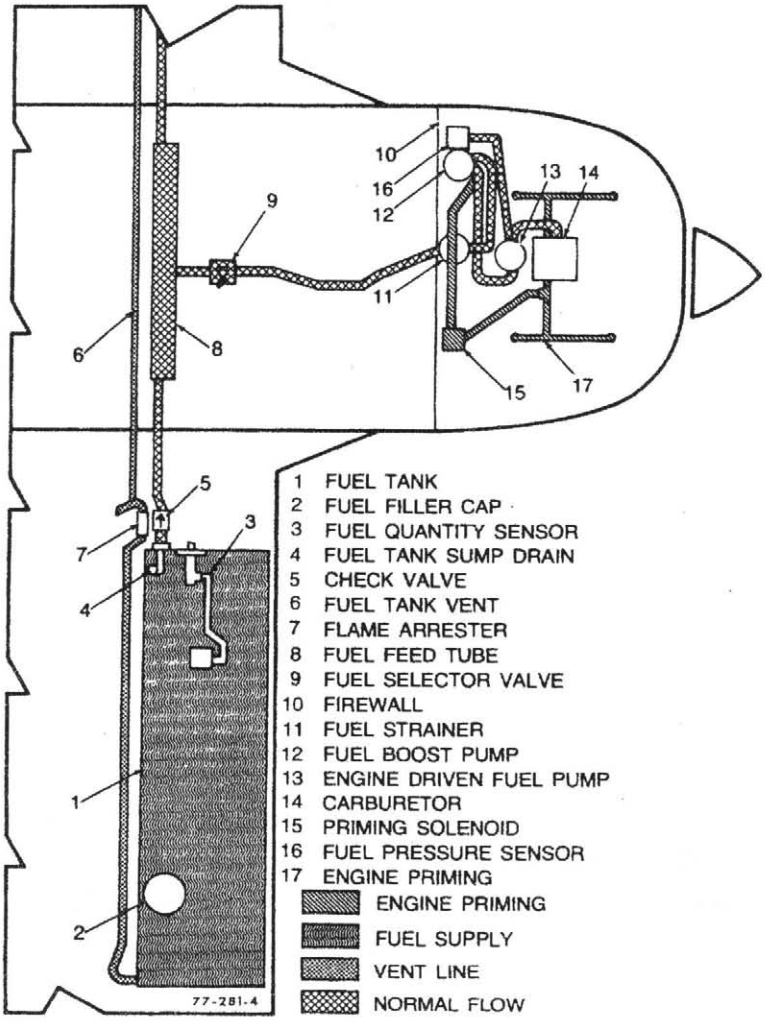
Fuel tanks are located in each wing and have a capacity of 15 gallons each for a total of 30 gallons (29 gallons usable). Each tank is serviced through a single filler located in the upper surface of each wing. Fuel is fed from the fuel tanks through a fuel selector valve in the center floorboard and then through a strainer to the engine-driven fuel pump.

FUEL QUANTITY INDICATORS

Fuel quantity is measured by float-operated sensors located in each wing tank system. These transmit electrical signals to the individual indicators, which indicate fuel remaining in each tank.

LOW FUEL QUANTITY WARNING LIGHT

An amber low fuel quantity warning light, located on the engine instrument cluster, will illuminate whenever total fuel remaining in either tank falls below approximately 2½ gallons. The low fuel quantity warning circuits can be tested by using the L-R TEST switch adjacent to the light.



FUEL SYSTEM SCHEMATIC

CAUTION

If the low fuel quantity warning light is inoperative, extra care should be taken in the area of fuel management.

FUEL DRAINS

The fuel system is drained at 3 locations: one under each wing just outboard of the fuselage, and a system low spot drain in the bottom of the fuel filter located on the lower forward firewall. The two wing fuel drains are flush-type valves and are actuated by using the fuel drain tool provided with the loose tools and accessories. Flush-type fuel drains are actuated by pushing in on the valve and then releasing when the desired amount of fuel has been drained. The drain valves can be locked open for the purpose of fuel off-loading or for totally draining the fuel system. Pushing in and turning counterclockwise will lock the drains in the open position. To close, turn clockwise and release.

FUEL BOOST PUMP

The electric fuel boost pump, controlled by an ON-OFF toggle switch located to the left of the engine power quadrant, provides pressure for starting, priming, and emergency operation. The fuel boost pump provides sufficient pressure for engine operation, should the engine-driven pump fail.

NOTE

The fuel boost pump must be ON for engine priming.

FUEL REQUIRED FOR FLIGHT

It is the pilot's responsibility to ascertain that the fuel quantity indicators are functioning and maintaining a reasonable degree of accuracy, and to be certain of ample fuel for each flight. Takeoff is prohibited if the fuel quantity indicators do not indicate above the yellow arc. The fuel filler caps should be removed and fuel quantity checked to give the pilot an indication of fuel on board. The airplane must be approximately level for visual inspection of each tank. Fuel should be added so that the amount of fuel will be not less than is required for takeoff. Plan for an ample margin of fuel for any flight.

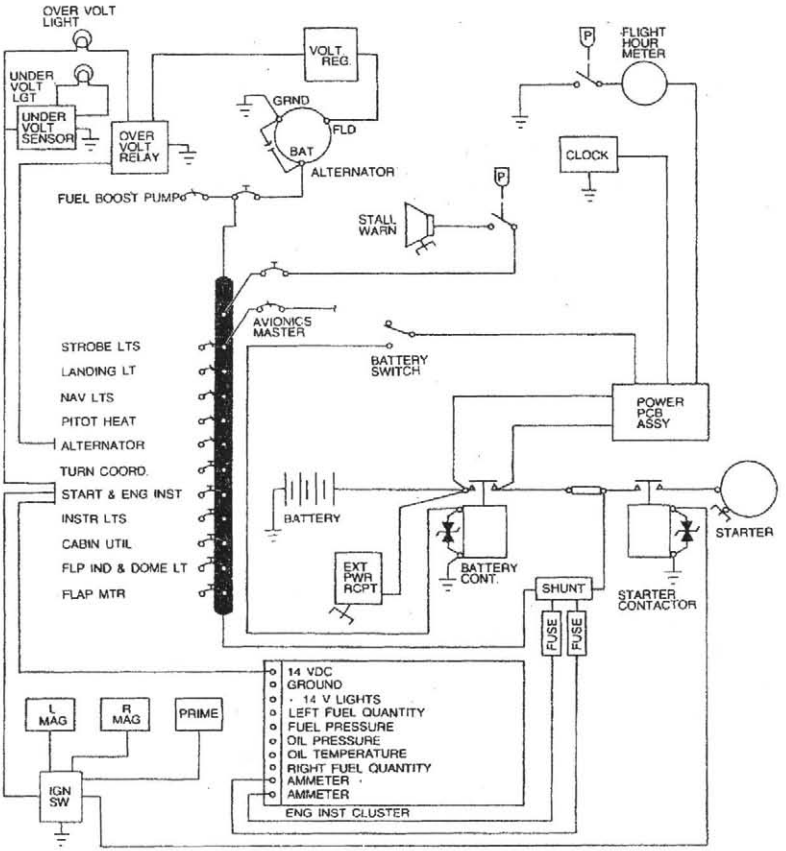
A minimum of 3¾ gallons of fuel is required in each wing tank before takeoff.

ELECTRICAL SYSTEM

The system circuitry is a single-wire, ground-return type, with the airplane structure used as the ground return. The alternator switch, battery switch, magneto/start/prime switch, and fuel boost pump switch are located on the left subpanel. This panel contains most of the electrical switches and circuit breakers. Each is placarded as to its function. The right subpanel contains the protective circuit breakers for the various avionics systems.

BATTERY

A 12-volt, 25-ampere-hour battery is located on the right forward side of the firewall. Battery servicing procedures are described in Section VIII, HANDLING, SERVICING AND MAINTENANCE.



ELECTRICAL SCHEMATIC

ALTERNATOR

A 60-ampere, 14-volt, belt-driven alternator is installed as standard equipment. The alternator maintains its full-rated 60-ampere output at cruise engine rpm, and uses a voltage regulator to adjust alternator output. The alternator field circuit breaker is incorporated in the alternator ON-OFF switch.

The alternator output is controlled by a voltage regulator to keep the battery in a fully charged condition. The ammeter should be monitored to ensure proper operation of the alternator. A zero reading, which is normal in cruising flight, indicates that the battery is fully charged and that the alternator output has been adjusted by the voltage regulator to balance the load required for the electrical equipment in use.

Should an alternator or voltage regulator failure occur, indicated by a heavily discharging or widely fluctuating ammeter indication and/or illumination of the OVER VOLT/UNDER VOLT light(s), turn the alternator switch OFF, and minimize electrical current consumption, since only battery power is available. Have the malfunction corrected before the next flight.

There are two alternator-out warning lights, placarded OVER VOLT and UNDER VOLT, located on the left side of the instrument panel. Anytime the alternator voltage is 13.25 volts or below, or the battery is turned ON with the alternator OFF, the UNDER VOLT light will illuminate. The OVER VOLT light will illuminate whenever the overvoltage relay is actuated. The overvoltage relay opens the alternator field, and the alternator output voltage will drop to zero. The alternator-out bulbs can be tested using their PRESS TO TEST feature.

STARTER

The starter is relay-controlled and is actuated by a rotary-type, momentary-on switch, incorporated in the magneto/start switch located on the left subpanel. To energize the starter circuit, hold the magneto/start switch in the START position.

STARTER ENGAGED WARNING LIGHT
(WA-130 and after)

The warning light placarded STARTER ENGAGED will illuminate whenever electrical power is being supplied to the starter. If the light remains illuminated after starting, the starter relay has remained engaged and loss of electrical power may result. The battery and alternator switches should be turned off if the light remains illuminated after starting. If the light does not illuminate during starting, the indicator system is inoperative and the ammeter should be monitored to ensure that the starter does not remain energized after starting.

EXTERNAL POWER

An optional external power receptacle is located just inside the cowling access door, located on the right side of the engine mount or on the fuselage just aft of the right flap. A negatively grounded external power source, which has a voltage of 13.5 to 14.25 vdc, may be used for ground checks or to assist in starting.

CAUTION

The power pin of the external power receptacle is connected directly to the battery and is, therefore, energized at all times. Exercise caution when connecting the external power cable to prevent shorting the battery to the airframe or arcing the clamps of the cable together.

When auxiliary power is desired, connect the clamps of the power cable to the external power source, ensuring proper polarity. Turn the battery, alternator, and all avionics equipment OFF. Insert the power cable plug into the receptacle, turn the battery switch ON, turn the external power unit ON, and start the engine using normal starting procedures.

NOTE

If the external power cable is not available, check polarity and connect the positive lead from the external power source to the positive battery terminal and the negative lead to the negative battery terminal.

LIGHTING SYSTEMS

INTERIOR LIGHTING

Lighting for the instrument panel is controlled by two rheostat switches located on the left subpanel. One switch, placarded FLOOD LTS, controls the intensity of the instrument panel flood lights. The other switch, placarded POST LTS, controls the intensity of all post lights installed, magnetic compass light, and any internally lit engine instruments. The cabin dome light is controlled by a switch located on the right subpanel.

EXTERIOR LIGHTING

The switches for the exterior lights are located on the left subpanel. Each circuit is protected by a circuit-breaker type switch.

The exterior lights consist of a landing light, a strobe light located on each wing tip, and navigation lights on the wing

tips and empennage. For longer battery and lamp life, use the landing light sparingly; avoid prolonged operation which could cause overheating of the light 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.

ENVIRONMENTAL SYSTEMS

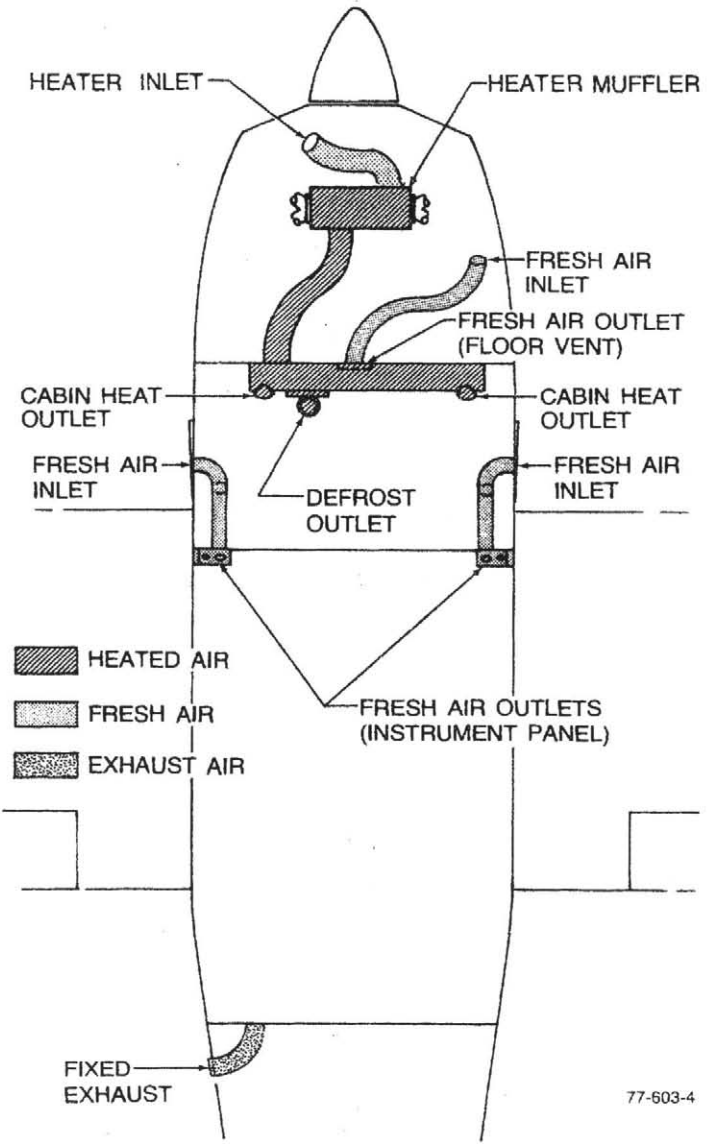
CABIN HEATING

A heater muffler on the exhaust assembly provides heated air to three outlets in the forward area of the cabin. Two outlets are located above and forward of each set of rudder pedals. The third outlet provides heated air for windshield defrosting.

In flight, ram air enters an intake on the left side of the nose, passes through the heater muffler, then into a heater box on the firewall. In the heater box, heated air is then ducted to the outlets in the cabin and/or the defroster outlet.

HEATER AND DEFROSTER OPERATION

The heater controls are located on the right side of the engine control quadrant. To obtain heated air to the cabin outlets, push in the CABIN HEAT control. To obtain heated air to defrost the windshield, push in the CABIN HEAT and DEFROST control.



ENVIRONMENTAL SCHEMATIC

CABIN VENTILATION

Fresh air for the cabin enters through three inlets; two scoop-type inlets immediately forward of the windshield on the sides of the fuselage, and a firewall inlet above and between the rudder pedals.

The scoop-type inlets supply fresh air to grill-type outlets located on the instrument panel. The volume of air through the outlets is controlled by the VENT AIR control adjacent to each outlet.

The firewall inlet supplies fresh air to a register between the rudder pedals that divides the flow of air to both sides of the cabin. The volume of air through the firewall outlet is controlled by the FLOOR VENT control located on the right side of the instrument panel.

EXHAUST VENT

A fixed exhaust vent is located in the aft cabin for flow-through ventilation.

PITOT AND STATIC SYSTEMS

PITOT SYSTEM

The pitot system provides a source of impact air for operation of the airspeed indicator. The pitot mast is located on the leading edge of the left wing.

PITOT HEAT

The optional heated pitot system has an electric heating element which is actuated by a switch on the left subpanel. The switch should be ON when flying in visible moisture. It

is not advisable to operate the pitot heating element on the ground except for testing or for short intervals of time to remove ice or snow.

STATIC AIR SYSTEM

Static air is taken from flush static ports located on each side of the aft fuselage. The static air is routed to the rate-of-climb indicator, altimeter, and airspeed indicator.

ALTERNATE STATIC AIR SYSTEM

The alternate static air system is designed to provide a source of static pressure to the instruments from inside the fuselage should the outside static air ports become blocked. An abnormal reading of the instruments supplied with static air could indicate a restriction in the outside static air ports. A lever on the lower sidewall adjacent to the pilot, is placarded OFF NORMAL - ON ALTERNATE. When it is desired or required to use this alternate source of static air, select the ON ALTERNATE position. To recognize the need and procedures for the use of alternate static air, refer to the EMERGENCY PROCEDURES Section. Airspeed Calibration and Altimeter Correction Graphs are in the PERFORMANCE Section.

PRESSURE SYSTEM

Instrument pressure is supplied by an engine-driven pressure pump. Pressure is controlled by an adjustable pressure regulator on the forward side of the firewall.

A gage located on the left side of the instrument panel indicates the system pressure in inches of mercury. The pressure should be maintained within the green arc for proper operation of the pressure operated instruments.

STALL WARNING

The stall warning system consists of a sensing vane installed on the leading edge of the left wing, a circuit breaker located on the left side of the instrument panel, and a stall warning horn located behind the right side of the instrument panel. The stall warning horn will sound a warning signal while there is time for the pilot to correct airplane attitude. The signal, effective at all flight attitudes, weights, and airspeeds, is intermittent at first, but will become steady as the airplane approaches a complete stall.

WARNING

With the battery and alternator switches in the OFF position, the stall warning system is inoperative.

EMERGENCY LOCATOR TRANSMITTER (ELT)

The Emergency Locator Transmitter (ELT) is located in the aft fuselage. The ELT transmits through an antenna located on the top of the aft fuselage. The ELT is controlled by a switch, placarded ON-OFF-ARM. The ARM position places the unit in the automatic mode so that it will transmit after activation by impact and continue transmitting until the ELT battery is drained or until the switch is moved to the OFF position. The ARM position should be selected whenever the unit is in the airplane. The ON position is used to

manually activate the transmitter. The OFF position should be selected while changing the ELT battery or to discontinue transmission after the unit has been activated. Access to the ON-OFF-ARM switch is through a spring-loaded access door located on the right side of the aft fuselage just aft of the cabin area.

A manual reset switch is located adjacent to the ON-OFF-ARM switch. To rearm the unit after it has been turned ON or after it has been activated, the reset switch should be depressed after the ON-OFF-ARM switch has been placed in the ARM position.

FIRE EXTINGUISHER

An optional portable fire extinguisher may be installed on the lower forward edge of the pilot's seat.

SECTION VIII
HANDLING, SERVICING AND MAINTENANCE

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

INTRODUCTION

The purpose of this section is to outline the requirements for maintaining the airplane in a condition equal to that of its original manufacture. This information sets the time frequency intervals at which the airplane should be taken to a BEECHCRAFT Aero or Aviation Center or International Distributor or Dealer for periodic servicing or preventive maintenance.

The Federal Aviation Regulations place the responsibility for the maintenance of this airplane on the owner and operator, who must ensure that all maintenance is done by qualified mechanics in conformity with all airworthiness requirements established for this airplane.

All limits, procedures, safety practices, time limits, servicing and maintenance requirements contained in this handbook are considered mandatory.

Authorized BEECHCRAFT Aero or Aviation Centers or International Distributors or Dealers can provide recommended modification, service and operating procedures issued by both the FAA and Beech Aircraft Corporation, designed to get maximum utility and safety from the airplane.

If a question should arise concerning the care of the airplane, it should be directed to Beech Aircraft Corporation, Liberal Division, Box 300, Liberal, Kansas 67901. Correspondence should contain the airplane serial number, which can be found on the manufacturer's placard, located on the right side of the fuselage adjacent to the inboard end of the flap. The placard is visible when the flaps are lowered.

PUBLICATIONS

The following publications are available through BEECHCRAFT Aero or Aviation Centers or International Distributors or Dealers:

1. Maintenance Manual
2. Parts Catalog
3. Wiring Diagram Manual
4. Continuous Care Inspection Guide
5. 100-hour Inspection Guide
6. Service Instructions

NOTE

Neither Service Publications, Reissues, nor Revisions are automatically provided to the holder of this handbook. For information on how to obtain "Revision Service" applicable to this handbook, consult a BEECHCRAFT Aero or Aviation Center or International Distributor or Dealer or refer to the latest revision of BEECHCRAFT Service Instructions No. 0250-010.

AIRPLANE INSPECTIONS PERIODS

1. FAA-required 100-hour and/or Annual Inspection
2. Continuous Care Inspection Guide
3. See "Recommended Servicing Schedule" and "Overhaul or Replacement Guide" for further inspection schedules.
4. Check the wing bolts for proper torque at the first 100-hour inspection and at the first 100-hour inspection after each reinstallation of the wing attach bolts.

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PREVENTIVE MAINTENANCE THAT MAY BE ACCOMPLISHED BY A CERTIFICATED PILOT

1. A certificated pilot may perform limited maintenance. Refer to FAR Part 43 for the items which may be accomplished. To ensure that proper procedures are followed, obtain a BEECHCRAFT Skipper 77 Maintenance Manual before performing preventive maintenance.

2. All other maintenance must be performed by properly licensed personnel.

NOTE

Pilots operating airplanes of other than U.S. registry should refer to the regulations of the country of certification for information on preventive maintenance that may be performed by a pilot.

ALTERATIONS OR REPAIRS TO AIRPLANE

The FAA should be contacted prior to any alterations to the airplane to ensure that the airworthiness of the airplane is not violated.

NOTE

Alterations and repairs to the airplane must be performed by properly licensed personnel.

GROUND HANDLING

The three-view drawing shows the minimum hangar clearances for a standard airplane. Additional allowances must be made for any special radio antennas.

CAUTION

To ensure adequate propeller clearance, always observe recommended shock strut servicing procedures and tire inflation pressures.

TOWING

CAUTION

Extreme care should be used when moving the airplane with power equipment. Avoid turning the nose gear in excess of 31°, to prevent damage to the nose gear steering yoke and/or linkage.

Never tow the airplane when control lock is installed.

One person can move the airplane on a smooth and level surface with the hand tow bar. Attach the tow bar to the nose landing gear tow bar fitting.

Where movement is restricted, two people can pivot the airplane on the main wheels. One person should push on

the wing leading edge or hold the wing tip, while the other operates the tow bar.

CAUTION

Do not exert force on the propeller or control surfaces. Do not place weight on the empennage to raise the nose wheel. Do not attempt to tow the airplane backward by the tail tie-down ring. Do not tow when the main gear is obstructed by mud or snow.

PARKING

The parking brake push-pull control is located beneath the pilot's control wheel. To set the parking brake, pull the control out and pump both toe pedals until solid resistance is felt. Push the control in to release the brakes.

NOTE

The parking brake should be left off and wheel chocks installed if the airplane is to remain unattended. Changes in ambient temperature can cause the brakes to release or to exert excessive pressures.

TIE-DOWN

It is advisable to nose the airplane into the wind. Three tie-down lugs are provided; one on the lower side of each wing, and a third at the rear of the fuselage.

1. Install the control lock.

2. Chock the main wheels fore and aft.

3. Using nylon line or chain of sufficient strength, secure the airplane at the three points provided. DO NOT OVERTIGHTEN the line at the rear of the fuselage. The nose may rise and produce lift due to the angle of attack of the wings.

4. Release the parking brake.

If extremely high winds are anticipated, a tail support can be installed at the rear tie-down lug, and a tie-down line attached to the nose gear.

JACKING

Raise the individual gear for wheel and tire removal with a scissors jack under the axle. Refer to the BEECHCRAFT Skipper 77 Maintenance Manual for proper procedures.

DO NOT enter the airplane while the airplane is on a wheel jack.

PROLONGED OUT-OF-SERVICE CARE

The storage procedures are intended to protect the airplane from deterioration while it is not in use. The primary objectives of these measures are to prevent corrosion and damage from exposure to the elements.

Flyable Storage - 7 to 30 Days - has been considered here. For more extended storage periods consult the Skipper 77 Maintenance Manual and the Avco Lycoming Engine Operator's Manual.

FLYABLE STORAGE - 7 TO 30 DAYS

MOORING

Place the airplane in a hangar. If the airplane cannot be placed in a hangar, tie down securely at the three tie-down points provided on the airplane. Do not use hemp or manila rope. It is recommended that a tail support be used to lightly compress the nose strut, which will reduce the wing angle of attack. Attach a tie-down line to the nose gear.

ENGINE PREPARATION FOR STORAGE

Engines in airplanes that are flown only occasionally tend to exhibit cylinder wall corrosion much more than engines that are flown frequently.

Check for correct oil level and add oil if necessary to bring level to the full mark.

Run engine at least five minutes at 1200 to 1500 rpm with oil temperature in the normal operating range.

FUEL TANKS

Fill fuel tanks to capacity to minimize fuel vapor.

FLIGHT CONTROL SURFACES

Lock flight control surfaces with the control lock.

GROUNDING

Static ground airplane securely and effectively.

PITOT TUBE

Install pitot tube cover.

DURING FLYABLE STORAGE

In a favorable atmospheric environment, the engine of an airplane that is flown intermittently can be adequately protected from corrosion by turning the engine over five revolutions by means of the propeller. This will dispel any beads of moisture that may have accumulated and spread the residual lubricating oil around the cylinder walls. This procedure should be repeated every five days, unless the airplane is flown.

WARNING

Before rotation of propeller blades, ascertain that the magneto/start switch is OFF, throttle is CLOSED, and mixture control is in the IDLE CUT-OFF position. Always stand in the clear while turning propeller.

Ground running the engine for brief periods of time is not a substitute for turning the engine over by hand; in fact, the practice of ground running will tend to aggravate rather than minimize corrosion formation in the engine.

After 30 days, the airplane should be flown for 30 minutes or a ground runup should be made long enough to produce an oil temperature within the lower green arc on the oil temperature indicator. Excessive ground runup should be avoided.

PREPARATION FOR SERVICE

Remove all covers, tape, and control lock. Clean the airplane and give it a thorough inspection, particularly the engine, landing gear, control surfaces and all openings.

Preflight the airplane thoroughly.

EXTERNAL POWER

To supply power for ground checks or to assist in starting, use only an external power source that is negatively grounded. The receptacle is located on the right side of the engine mount, just inside the cowling access door, or on the aft fuselage, just aft of the right flap.

CAUTION

The power pin of the external power receptacle is connected directly to the battery and is therefore energized at all times. Exercise caution when connecting the external power cable to prevent shorting the battery to the airframe or arcing the clamps of the cable together.

Observe the following precautions when connecting an external power source:

1. Remove the protective cover from the external power receptacle.

2. Use only an auxiliary power source that is negatively grounded which has a voltage of 13.5 to 14.25 vdc. If the polarity of the power source is unknown, determine the polarity with a voltmeter before connecting the unit to the airplane.

3. Before connecting an auxiliary power source, turn all radio and avionics equipment, the alternator switch, and the battery switch OFF.

4. Turn the auxiliary power source OFF prior to connecting the external power cable to the auxiliary power source. Connect the positive clamp of the cable to the positive terminal of the power source and the negative clamp to the negative terminal of the power source. (If a battery is used as the power source, connect the positive terminal of the cable to the positive terminal of the battery. Isolate the negative cable clamp.)

5. Insert the external power cable into the external power receptacle. Turn the battery switch and auxiliary power source ON. (If a battery is used as the power source, connect the negative cable clamp to the negative terminal of the battery.)

Observe the following precautions when disconnecting an external power source:

1. Turn the auxiliary power source OFF. (If a battery has been used for a power source, disconnect the negative clamp of the external power cable and isolate it.)

2. Remove the external power cable from the airplane receptacle. Replace the protective cover on the external power receptacle.

3. Disconnect the external power cable from the auxiliary power source.

4. Close and fasten access door.

SERVICING

FUEL SYSTEM

See CONSUMABLE MATERIALS for recommended fuel grades. The fuel system has a nominal capacity of 30 gallons (29 gallons usable). The fuel filler caps are located in the upper surface of each wing.

CAUTION

Connect a grounding cable from the fuel service unit to the airframe, and connect grounding cables from both the fuel service unit and the airplane to ground during fueling operations. This procedure reduces fire hazard.

To prevent damage to the fuel tanks, do not insert the fuel nozzle more than three inches into the filler neck. Secure the filler caps immediately after filling.

Open each of the fuel drains daily to remove any condensation from the system. The two tank sump flush fuel drains extend through the bottom of the wing skins. The system low spot drain is incorporated in the fuel strainer on the forward side of the firewall aft of the nose wheel.

The tank sump flush fuel drains are actuated, using the fuel drain tool provided with the loose tools, by pushing up on the valve with the tool and then releasing when the desired amount of fuel has been drained. These drain valves can be locked open for the purpose of fuel off-loading or for totally draining the fuel system. Pushing up and turning counterclockwise will lock the drain in the open position. To close, turn clockwise and release.

Inspection and cleaning of the fuel strainer should be considered of the utmost importance as a regular part of preventive maintenance. The following inspection and cleaning intervals are recommendations only, since the frequency will depend upon service conditions and fuel handling cleanliness. When operating in localities where there is an excessive amount of sand or dirt, the strainer should be inspected at more frequent intervals.

The screen in the fuel strainer at the system low spot should be removed and washed in fresh cleaning solvent at each 100-hour inspection.

After the fuel strainer has been reinstalled, the installation should be checked for leakage. Any fuel lines or fittings disconnected for maintenance purposes should be capped.

Frequently inspect the rubber seals on the fuel filler caps for condition. Replace the seals as required to prevent contamination of the fuel from precipitation.

OIL SYSTEM

CAUTION

Oil consumption tends to be higher during break-in periods on new engines. The oil level should be maintained between 5 and 6 quarts during this period.

Do not use less than 2450 rpm cruise power until oil consumption stabilizes, to prevent glazing of the cylinder walls.

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The Avco Lycoming O-235-L2C engine is equipped with a wet-sump, pressure-type oil system with an oil capacity of 6 quarts. Checking the oil level and/or adding oil to the system is accomplished through the access door on the right side of the engine cowling.

Under normal operating conditions, the oil should be changed after each 50 hours of engine operation. More frequent changes may be required under adverse operating conditions.

Inspection and cleaning of the engine oil suction and engine oil pressure screens should be accomplished every 50 hours of engine operation. On engines with the optional oil filter system installed, the oil filter replaces the oil pressure screen. (Refer to the BEECHCRAFT Skipper 77 Maintenance Manual.)

The engine manufacturer recommends the use of ashless dispersant oil after the oil consumption has stabilized. In order to promote faster ring seating and oil control, a straight mineral-type oil conforming to MIL-L-6082 may be used until the oil consumption has stabilized, not less than 50 hours of operation. After the oil consumption has stabilized, aviation grade ashless dispersant oil complying with MIL-L-22851 should be used.

RECOMMENDED OIL GRADES

AVERAGE AMBIENT AIR TEMPERATURE	MIL-L-6082 GRADES	MIL-L-22851 ASHLESS DISPERSANT GRADES
Above 60 °F	SAE 50	SAE 40 or 50
30 °F to 90 °F	SAE 40	SAE 40
0 °F to 70 °F	SAE 30	SAE 40 or 30
Below 10 °F	SAE 20	SAE 30

BATTERY

Access to the 12-volt lead-acid battery is through the access door on the right side of the engine cowling. Check the battery electrolyte level after each 25 hours of operation and add only distilled water as required.

NOTE

Do not fill the battery over one-half inch above the separators. Only lead-acid equipment shall be used when servicing lead-acid type batteries.

A systematic battery maintenance program should be established, carefully followed, and a log maintained of services performed. The battery must be kept clean and dry for peak performance. If foreign materials are present in sufficient quantities, the resultant deposits can form conductive paths that permit a rapid discharge of the battery. The battery should be serviced and cleaned after each 100 hours of operation or 30 days, whichever occurs

first, as outlined in the BEECHCRAFT Skipper 77 Maintenance Manual. Maintain clean, tight connections at all times.

Battery vents should be checked periodically for obstructions.

TIRES

The main wheel tires are 15 x 6.00 x 6, 4-ply rating, type VI tube type. The nose wheel tire is a 5.00 x 5, 4-ply rating, type III tube type. Inflate the main wheel tires to 31-34 psi and the nose wheel tire to 20-23 psi. Maintaining the recommended tire inflation will help to avoid damage from landing shock and contact with sharp stones and ruts, and will minimize tread wear. When inflating tires, inspect them visually for cracks, breaks, wear, or evidence of internal damage.

CAUTION

Beech Aircraft Corporation cannot recommend the use of recapped tires.

SHOCK STRUT

The nose gear shock strut is filled with compressed air and MIL-H-5606 hydraulic fluid. Service the shock strut as follows:

1. Remove the air valve cap and depress the valve core to release the air pressure.

WARNING

DO NOT unscrew the air valve assembly until all air pressure has been released. Otherwise, it may be blown off with considerable force, causing injury to personnel or property damage.

2. Remove the air valve assembly.

3. With the strut in the vertical position and approximately one-fourth inch from fully compressed, fill with MIL-H-5606 hydraulic fluid until the fluid overflows.

4. Cycle the strut (full extension to compressed) and refill as described in step "3". Repeat until fluid cannot be added to the strut in the compressed position.

NOTE

Cycling of the shock strut is necessary to expel any trapped air within the strut housing.

5. Install the air valve assembly.

6. With the airplane empty except for fuel and oil, inflate piston until 5.8-6.10 inches is exposed.

NOTE

It is recommended that the nose strut inflation dimension and the tire inflation pressures be carefully adhered to. Properly inflated tires and strut reduce the possibility of ground damage occuring to the propeller. Exercise caution when taxiing over rough surfaces.

7. The shock strut piston must be clean. Remove foreign material by wiping the strut with a cloth dampened with hydraulic fluid.

WARNING

NEVER FILL SHOCK STRUT WITH OXYGEN.

SHIMMY DAMPER

A hydraulic shimmy damper is mounted on the nose wheel strut yoke. Whenever this component develops an external leak or a skip in the damping action, see BEECHCRAFT Skipper 77 Maintenance Manual for shimmy damper servicing procedures.

BRAKES

Brake system servicing is limited primarily to maintaining the hydraulic fluid level in the reservoir. The brake fluid reservoir is located on the right forward side of the firewall, and is accessible through the access door on the right side of the engine cowling. Fill the reservoir with MIL-H-5606 hydraulic fluid to the FULL mark on the dipstick. Maintain the fluid level between the FULL and ADD marks. Do not overfill.

Since the pistons move to compensate for lining wear, the brakes require no adjustment. Complete information on brake, wheel, and tire maintenance is contained in the appropriate manual included in the loose tools and accessories.

INDUCTION AIR FILTER

The induction air filter should be removed, cleaned, and inspected each 50 hours of service. Replacement is

recommended at 300 hours for normal operation, and more frequently should conditions warrant.

1. Remove the lower cowling air scoop.
2. Remove the filter retaining screws.
3. Remove the filter.
4. Clean and service as described in the Skipper 77 Maintenance Manual.
5. Reinstall the filter, reversing the above procedures.

NOTE

When reinstalling the induction air filter, observe the direction of the air flow as marked on the filter.

INSTRUMENT AIR FILTER

The central filter for the instrument air system is a disposable unit and must be discarded and replaced at 300 to 500 hour intervals, or more often if conditions warrant.

1. The filter is located on the aft side of the firewall beneath the instrument panel on the pilot's side.
2. Remove the clamps at the inlet and outlet of the filter.
3. Remove the filter from the airplane.

4. Position the new filter (note direction of air flow), install the inlet and outlet hoses, and secure in place with clamps at the inlet and outlet of the filter.

PROPELLER BLADES

The daily preflight inspection should include a careful examination of the propeller blades for nicks and scratches. Each blade leading edge should receive particular attention.

It is very important that all nicks and scratches be smoothed out and polished. Any BEECHCRAFT Aero or Aviation Center or International Distributor or Dealer will answer questions concerning propeller blade repair.

WARNING

When working on the propeller, always make certain that the magneto/start switch is OFF and that the engine has cooled completely. WHEN MOVING THE PROPELLER, STAND IN THE CLEAR; there is always some danger of a cylinder firing when the propeller is moved.

MINOR MAINTENANCE

RUBBER SEALS

To prevent sticking of the rubber seals around the doors, the seals can be coated with Oakite 6 compound or powdered soapstone or equivalent.

ALTERNATOR

Since the alternator and electronic voltage regulator are designed for use on only one polarity system the following precautionary measures must be observed when working on the charging circuit, or serious damage to the electrical equipment will result:

1. When installing a battery, make certain that the ground polarity of the battery and the ground polarity of the alternator are the same.

2. When connecting a booster battery, be sure to connect the negative battery terminals together and the positive battery terminals together.

3. When using a battery charger, connect the positive lead of the charger to the positive battery terminal and the negative lead of the charger to the negative battery terminal.

4. Do not operate an alternator on open circuit. Be sure all circuit connections are secure.

5. Do not short across or ground any of the terminals on the alternator or electronic voltage regulator.

6. Do not attempt to polarize an alternator.

MAGNETOS

Ordinarily, the magnetos will require only occasional adjustment of the magnetos to engine timing. This work should be done by a BEECHCRAFT Aero or Aviation Center or International Distributor or Dealer.

WARNING

To be safe, treat the magnetos as hot whenever a switch lead is disconnected at any point; they do not have an internal automatic grounding device. The magnetos can be grounded by replacing the switch lead at the noise filter capacitor with a wire which is grounded to the engine case. Otherwise, all spark plug leads should be disconnected or the cable outlet plate on the rear of the magneto should be removed.

CLEANING

EXTERIOR PAINT FINISHES

In the standard configuration the BEECHCRAFT Skipper 77 is painted with a lacquer paint finish. Optional urethane paint finishes are available.

LACQUER PAINT FINISHES

Because wax seals the paint from the outside air, a new lacquer paint finish should not be waxed for a period of 90 days to allow the paint to cure. Wash uncured painted surfaces with only cold or lukewarm (never hot) water and a mild non-detergent soap. Any rubbing of the painted surface should be done gently and held to a minimum to avoid cracking the paint film.

CAUTION

When washing the airplane with mild soap and water, use special care to avoid washing away grease from any lubricated area. After washing with solvent, lubricate all lubrication points. Premature wear of lubricated surfaces may result if the above precautions are not taken.

Prior to cleaning, cover the wheels, making certain the brake discs are covered. Attach the pitot cover securely, and plug or mask off all other openings. Be particularly careful to mask off the static air buttons before washing or waxing.

After the paint cures, a thorough waxing will protect painted and unpainted metal surfaces from a variety of highly corrosive elements. Flush loose dirt away first with clear water, then wash the airplane with a mild soap and water. Harsh, abrasive, or alkaline soaps or detergents should never be used. Use a soft cleaning cloth or chamois to prevent scratches when cleaning and polishing. Any good grade automobile wax may be used to preserve painted surfaces. To remove stubborn oil and grease, use a soft cloth dampened with naphtha. After cleaning with naphtha, the surface should be polished or waxed.

URETHANE PAINT FINISHES

The same procedures should be followed for cleaning urethane paint finishes as for lacquer paint finishes; however, urethane paint finishes are fully cured at the time of delivery.

WINDSHIELD AND WINDOWS

CAUTION

Do not scratch windows when cleaning. Do not use an ice scraper to remove ice from windows.

A commercial cleaning compound made specifically for acrylic plastic windows may be used. When using a commercial cleaner, follow the instructions on the container.

If a commercial cleaner is not available, the following instructions should be followed:

Cleaning of the acrylic plastic windows should never be attempted when dry. Use only clean water (an open bucket of water can collect sand/debris which could scratch windows or windshields) and a mild soap for cleaning. Wash the windows with plenty of soap and water, using the palm of the hand to dislodge dirt and mud. Follow up with soapy water to remove grease or stains. Flush the surfaces with clean water and rub slightly with a grit-free soft cloth, chamois or sponge. Stubborn grease or oil deposits are readily removed with aliphatic naphtha or hexane. Rinse thoroughly with clear water.

CAUTION

Do not use thinner or aromatic abrasive cleaners to clean the windows as they will damage the surface of the plastic. Aliphatic naphtha and similar solvents are highly inflammable, and extreme care must be exercised when used.

ENGINE

Clean the engine with kerosene, solvent, or any standard engine cleaning fluid. Spray or brush the fluid over the engine, then wash off with water and allow to dry.

INTERIOR

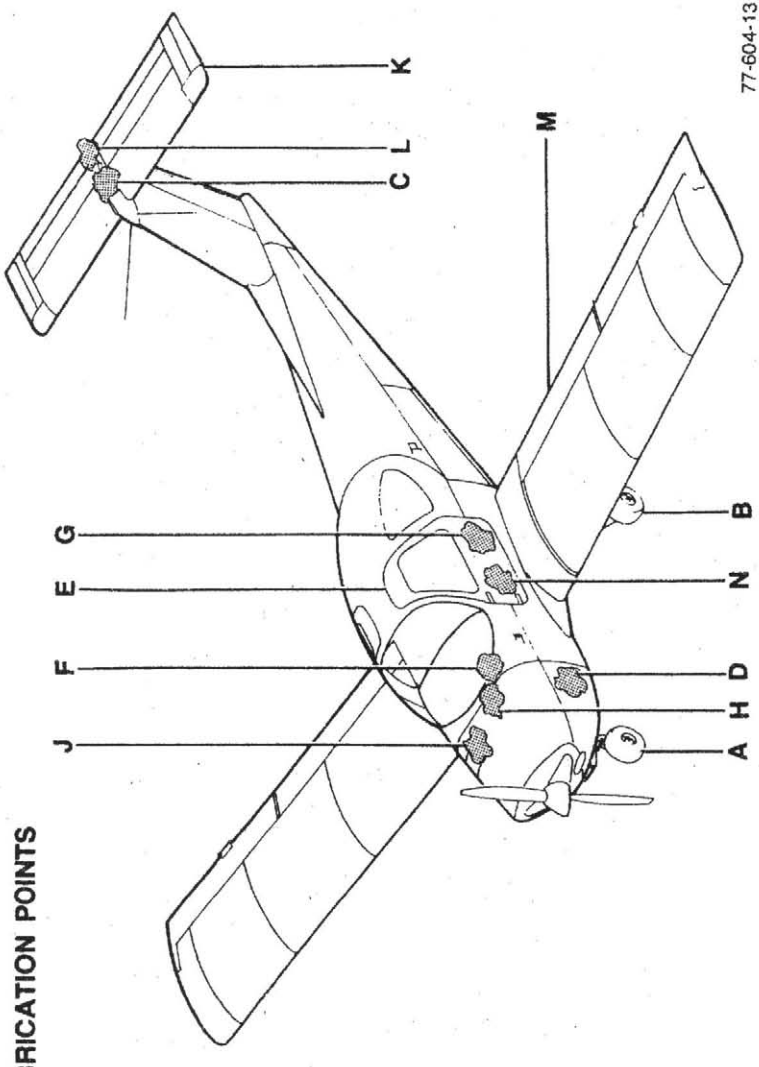
The seats, rugs, and upholstery panels should be vacuum-cleaned frequently. Do not use water to clean fabric surfaces. Commercial foam-type cleaners or shampoos can be used to clean carpets, fabrics, and upholstery; however, the instructions on the container should be followed carefully.

Proper care and cleaning of the interior cabin trim is of primary importance to maintain a desirable appearance. Washing the interior cabin trim with a detergent soap and water, and brush scrubbing with a soft bristle brush, will dislodge most dirt. Rinse with clean water and wipe dry. Alcohol may be used to remove foreign material that is alcohol soluble.

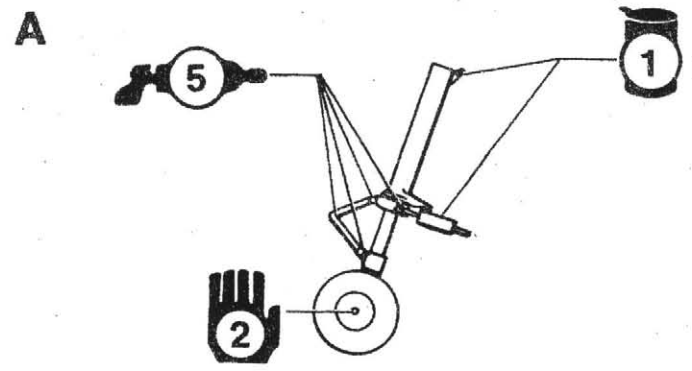
The plastic trim, instrument panel, and control knobs need only be wiped with a damp cloth. Oil and grease on these surfaces can be removed with a cloth moistened with isopropyl alcohol. Volatile solvents, such as gasoline, benzine, acetone, carbon tetrachloride, fire extinguisher fluid, anti-ice fluid, lacquer thinner, or glass cleaner should not be used. These materials will soften the plastic and may cause it to craze.

CAUTION

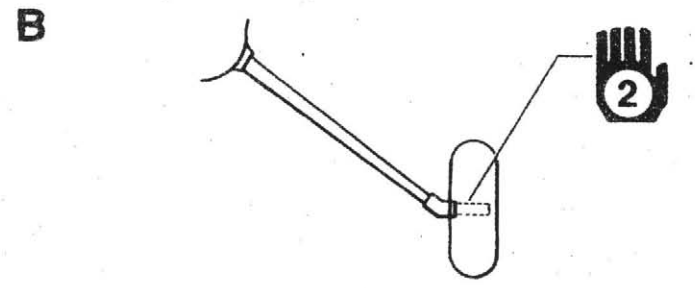
The interior cabin trim can be easily damaged if cleaned with methyl ethyl ketone (MEK), naphtha, Mufti standard solvent, gasoline, lacquer thinner or other types of thinners. Sharp edges or cuts on the ege of the interior cabin trim material may cause it to crack.



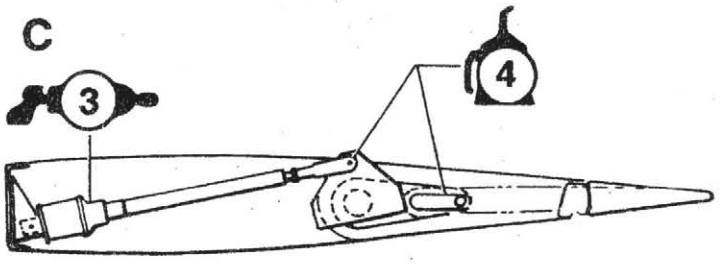
LUBRICATION POINTS



NOSE LANDING GEAR 77-604-3

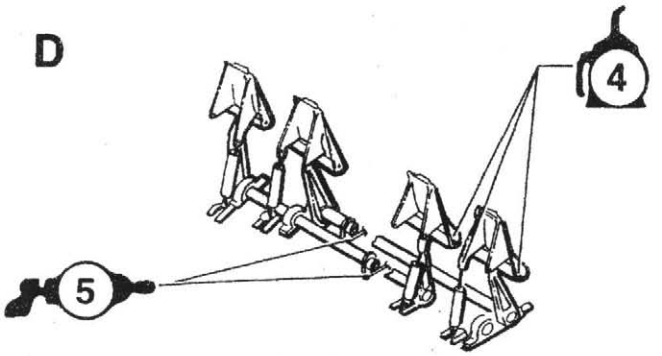


MAIN LANDING GEAR 77-604-4



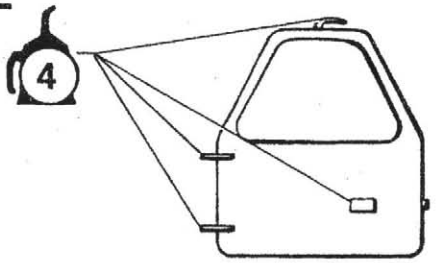
ELEVATOR TAB ACTUATOR 77-604-5

D



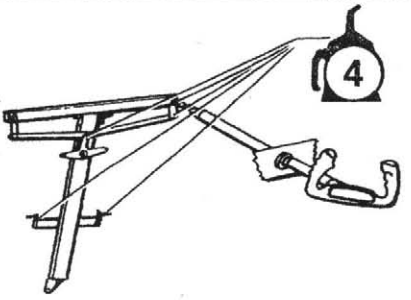
RUDDER PEDALS 77-604-6

E



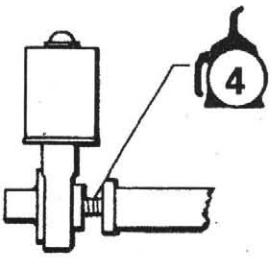
CABIN DOOR 77-604-7

F



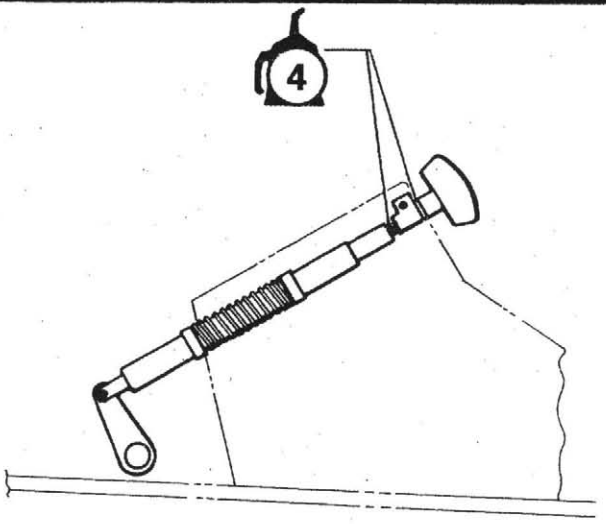
CONTROL COLUMN 77-604-8

G



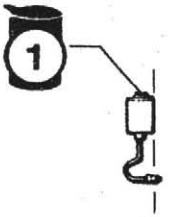
FLAP ACTUATOR 77-604-9

H



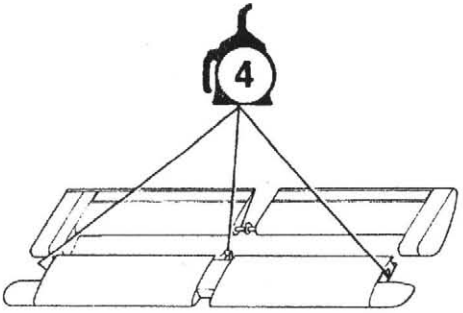
RUDDER TRIM ACTUATOR 77-604-10

J



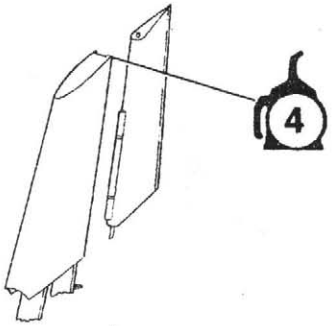
BRAKE SYSTEM RESERVOIR 77-604-11

K



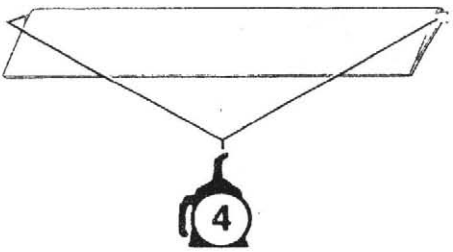
ELEVATOR 77-604-27

L



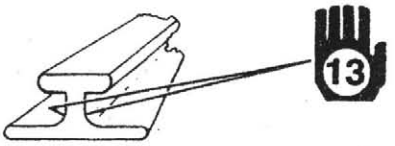
RUDDER 77-604-28

M



FLAP 77-604-29

N



SEAT TRACKS 77-604-30

HAND OR PACK

ZERK FITTING

FLUID CONTAINER

SQUIRT CAN

NOTE: Letters are keyed to the Service Schedule; Numbers refer to items in the Consumable Materials Chart.

77-604-12

50 Hrs Cont'd	Lube Outboard Elevator Hinges	Elevator (K)	(4)
	Lube Upper Rudder Hinge	Rudder (L)	(4)
100 Hrs	Clean Fuel Strainer	Remove engine cowl	Clean with solvent (8) and blow dry
	Clean, Test and Regap Spark Plugs	Remove engine cowl	Refer to Maintenance Manual
	Check Magneto Timing	Remove engine cowl	Refer to Maintenance Manual
	Check Emergency Locator Transmitter	Right side of aft fuselage	Refer to applicable FAR
	Clean Static Air Buttons	Aft fuselage	Clean with solvent (8) and wipe dry with a clean rag
	Drain Static Air Lines	Flight compartment left side panel, forward of door frame	–

INTER-VAL	ITEM	LOCATION (Letters refer to Lubrication Points Diagram)	MATERIALS (Numbers refer to Items in Consumable Materials)
100 Hrs Cont'd	Lube Electric Flap Actuator Torque Shaft	Under baggage compartment floorboards (G)	(4)
	Lube Cabin Door Hinges and Latch Mechanism	Left and right cabin doors (E)	(4)
	Lube Nose Landing Gear Wheel Bearings	Nose landing gear (A)	(2)
	Lube Main Landing Gear Wheel Bearings	Main landing gear (B)	(2)
	Lube Rudder Pedals and Linkage	Flight compartment (D)	(4,5)

100 Hrs (Cont'd)	Lube Control Column Linkage and Pivot Points	Forward of instrument panel (F)	(4)
	Lube Elevator Trim Tab Linkage	Empennage (C)	(4)
	Lube Rudder Trim Actuator Screw	Flight compartment (H)	(4)
	Lube Center Elevator Hinge	Elevator (K)	(4)
	Lube Flap Hinges	Flap (M)	(4)
300 Hrs	Replace Engine Induction Air Filter	Remove lower cowling air scoop	Refer to Maintenance Manual
300 to 500 Hrs	Replace Instrument Air Filter	Left side of aft firewall behind instrument panel	Refer to Maintenance Manual

INTER-VAL	ITEM	LOCATION (Letters refer to Lubrication Points Diagram)	MATERIALS (Numbers refer to Items in Consumable Materials)
500 Hrs	Lube Elevator Trim Tab Actuator	Empennage (C)	(3)
As Req.	Service Nose Landing Gear Shock Strut and Shimmy Damper	Nose landing gear (A)	(1) Refer to Maintenance Manual
	Lube Seat Tracks	Flight compartment (N)	(13)
	Service Brake Reservoir	Through access door on right side of engine cowling (J)	(1)

NOTES: 1. Any time the control surfaces are repainted or repaired, they must be rebalanced per Maintenance Manual.

2. Check the wing bolts for proper torque at the first 100-hour inspection and at the first 100-hour inspection after each reinstallation of the wing attach bolts.

CONSUMABLE MATERIALS

ITEM	*MATERIAL*	*SPECIFICATION*
1.	Hydraulic Fluid	MIL-H-5606
*2.	Lubricating Grease, General Purpose, Wide Temperature	MIL-G-81322
3.	Grease, Aircraft and Instruments, Gear and Actuator Screw	MIL-G-23827
4.	Lubricating Oil	SAE 10W30
5.	Grease, High and Low Temperature	Aero Lubriplate
6.	Lubricant, Powdered Graphite	MIL-G-6711
**7.	Engine Oil	MIL-L-22851 or MIL-L-6082
8.	Solvent	Federal Specification PD 680
9.	Engine Fuel	100 (green) or 100LL (blue) Grade
10.	Corrosion Preventive Compound	MIL-C-6529 (Anti-Corrode No. 205)
11.	Lubricant, Rubber Seal	Oakite 6 Compound
12.	Stick Paraffin	–
***13.	Engine Fuel Additive	ALCOR TCP Concentrate

* In extremely cold climates, use MIL-G-23827 grease in place of MIL-G-81322. (These greases are harmful to paint.)

** Ashless dispersant oil complying with MIL-L-22851 is recommended after the oil consumption has stabilized. A straight mineral oil conforming to MIL-L-6082 may be used until the oil consumption has stabilized.

*** Product of Alcor, Inc., San Antonio, Texas 78284

APPROVED ENGINE OILS

COMPANY	*BRAND NAME*
Delta Petroleum Co., Inc.	*Global Concentrate A
Enjay Chemical Company	*Paranox 160 and 165
Mobil Oil Corporation	*RT-451, RM-173E, RM-180E
Shell Oil Company	*Shell Concentrate A- Code 60068 *Aeroshell W120 *Aeroshell W80
Texaco Incorporated	*TX-6309 *Aircraft Engine Oil Premium AD120 *Aircraft Engine Oil Premium AD80
American Oil and Supply Co.	*PQ Aviation Lubricant 753
Chevron Oil Company	*Chevron Aero Oil Grade 120
Humble Oil and Refining Company	*Esso Aviation Oil E-120 *Enco Aviation Oil E-120 *Esso Aviation Oil A-100 *Enco Aviation Oil A-100 *Esso Aviation Oil A-80 *Enco Aviation Oil A-80
Standard Oil Company of California	*Chevron Aero Oil Grade 120

Castrol Oils, Canada, Ltd.	**Castrolaero 113, Grade 1065 **Castrolaero 117, Grade 1100
Champlin Oil and Refining Co.	**Grade 1065 **Grade 1100
Chevron Oil Company	**Chevron Aviation Oil 65 **Grade 1100
Continental Oil Company	**Conoco Aero Oil 1065 **Conoco Aero Oil 1100
Mobil Oil Corporation	**Avrex 101/1065 **101/1100
Phillips Petroleum Co.	**Phillips 66 Aviation Engine Oil, Grade 1065 **Phillips 66 Aviation Engine Oil, Grade 1100
Shell Oil Company	**Aeroshell Oil 65 **Aeroshell Oil 100

*Ashless Dispersant Oils Complying with MIL-L-22851

NOTE

Ashless dispersant oil complying with MIL-L-22851 is recommended after the oil consumption has stabilized.

**Straight Mineral Oils Complying with MIL-L-6082

NOTE

A straight mineral oil conforming to MIL-L-6082 may be used until the oil consumption has stabilized.

Vendors listed as meeting Federal and Military Specifications are provided as reference only and are not specifically recommended by Beech Aircraft Corporation. Any product conforming to the specification may be used.

LAMP REPLACEMENT GUIDE

LOCATION	*NUMBER*
Wing Navigation Lights	A-7512-12
Tail Light	1777
Landing Light	4313
Cabin Dome Light	93
Compass Light	330
Strobe Light, Wing	55-0221-3 (flashtube)
Overvoltage Light	330
Undervoltage Light	330
Instrument Flood Light	1816
Instrument Post Light	330
Low Fuel Quantity Warning Light	266

OVERHAUL OR REPLACEMENT GUIDE

The first overhaul or replacement should be performed not later than the required period. The condition of the item at the end of the first period can be used as a criterion for determining subsequent periods applicable to the individual airplane or fleet operation, provided the operator has an approved monitoring system.

The time periods for inspections noted in this handbook are based on average usage and average environmental conditions.

SPECIAL CONDITIONS CAUTIONARY NOTICE

Airplanes operated for Air Taxi or other than normal operation, and airplanes operated in humid tropics or cold and damp climates, etc., may need more frequent inspections for wear, corrosion and/or lack of lubrication. In these areas, periodic inspections should be performed until the operator can set his own inspection periods based on experience.

NOTE

The required periods do not constitute a guarantee that the item will reach the period without malfunction as the aforementioned factors cannot be controlled by the manufacturer.

NOTE

"On condition" items are to be overhauled or replaced when inspection or performance of these items reveal a potentially unsafe or unserviceable condition.

COMPONENT	OVERHAUL OR REPLACE

POWER PLANT

NOTE

A TBO (time between overhaul) recommendation is in no way to be construed as a warranty or engine life proration basis. The TBO recommendation is based on the projected time for most advantageous initial overhaul. The individual operator's experience may indicate a departure in either direction from the recommended TBO for the particular operation.

When an engine has been overhauled, or a new engine installed, it is recommended that low power settings NOT be used until oil consumption has stabilized. The average time for piston ring seating is approximately 50 hours. Refer to Lycoming Engine Operator's Manual.

Engine	Refer to latest edition Avco-Lycoming SI 1009.
Propeller	Refer to latest applicable Sensenich service information.
Dry air pressure pump	Every 1400 hours or on condition.

COMPONENT	OVERHAUL OR REPLACE
All hose	Hoses carrying flammable liquids; at engine overhaul or every 5 years, whichever occurs first.
FUEL SYSTEM	
All hose	Hoses carrying flammable liquids; at engine overhaul or 5 years, whichever occurs first.
ELECTRICAL SYSTEM	
Starter	At engine overhaul.
Alternator	At engine overhaul.
Battery (Emergency Locator Transmitter)	Per applicable regulations, or by date stamped on battery, whichever occurs first.

WING STRUCTURE INSPECTION SCHEDULE

The basic wing structure has a substantiated life of 12,000 flight hours provided the mandatory inspection and replacement requirements of chapter four of the BEECHCRAFT SKIPPER 77 MAINTENANCE MANUAL are complied with.

NOTE

Anytime the control surfaces are repaired or repainted, they must be rebalanced as described in the Maintenance Manual.

INSPECTIONS

The FAA requires that an airplane used for hire be inspected at each 100 hours of operation by qualified personnel. Airplanes which are not used for hire are required to have an inspection by qualified personnel on an annual basis.

Good operating practice requires that the airplane be preflighted prior to takeoff. Items found during preflight and engine run-up should be corrected on the basis of their importance to the safe operation of the airplane; however, in any event, early correction of items found is good preventive maintenance.

Although it is not a requirement that FAA qualified personnel change the oil and inspect the airplane, except at the 100-hour/annual inspection as noted above, it is recommended the airplane be given an inspection at the recommended oil

change period. Any unsatisfactory items should be corrected, either at that time or as soon as practical, depending on the nature of the item.

The inspection at the recommended oil change interval should include the following:

Operational Inspection

1. Alternator/voltage regulator functioning
2. Engine instruments
3. Flight instruments
4. Idle rpm and mixture
5. Engine controls operation
6. All lights
7. Avionics operation
8. Magneto check
9. Brake operation
10. Fuel selector operation
11. Heat and vent system operation
12. Starter operation
13. Electrical switches and circuit breakers
14. Power check 2275 to 2375 rpm static

Power Plant

1. Oil screens cleaned.
2. Induction air filter cleaned.
3. Check engine controls, wiring harness, and plumbing for clearance and security.
4. Check propeller for rock damage, and spinner and spinner bulkheads for cracks and security.
5. Check engine baffles and cowling for cracks and security.
6. Check exhaust system and air ducts for condition and security.
7. Check for indications of oil leaks, condition and security of engine accessories.
8. Check brake system reservoir.

Cabin and Aft Fuselage

1. Flight control operation through full travel and proper direction of travel.
2. Door operation.
3. Check interior furnishings and seat belts.
4. Check battery electrolyte level.

Exterior

1. Check flight control surfaces for condition and security.
2. Check tires, brake pucks and discs.
3. Check static ports, pitot mast and fuel vent lines for obstructions.
4. Check general condition of fuselage and wings.

SECTION IX
SUPPLEMENTS

NOTE

The supplemental data contained in this section is for equipment that was delivered on the airplane including optional equipment that was available, whether it was installed or not. Airplane Flight Manual Supplements for equipment for which the vendor obtained a Supplemental Type Certificate were included as loose equipment with the airplane at the time of delivery. These and other Airplane Flight Manual Supplements for other equipment that was installed after the airplane was delivered new from the factory should be placed in this Supplemental Data Section IX, of this Pilot's Operating Handbook and FAA Approved Airplane Flight Manual.

INTENTIONALLY LEFT BLANK

PILOT'S OPERATING HANDBOOK
and
FAA APPROVED AIRPLANE FLIGHT MANUAL

LOG OF SUPPLEMENTS

FAA Supplements must be in the airplane for flight operation when subject equipment is installed:

Supp. No.	Part Number	Subject	Rev. No.	Date

SECTION X

SAFETY INFORMATION

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INTRODUCTION

The best engineering and manufacturing craftsmanship have gone into the design and building of all BEECHCRAFTS. Like any other high performance airplane, they operate efficiently and safely only in the hands of a skilled pilot.

You must be thoroughly familiar with the contents of your operating manuals, placards, and check lists to insure safe utilization of your airplane. When the airplane was manufactured, it was equipped with one or more of the following: placards, Owners Manual, FAA Flight Manual, Pilots Operating Handbook and FAA Approved Flight Manual. For simplicity and convenience we will refer to all official manuals in various models as the "Information Manual". If the airplane has changed ownership, the Information Manual may have been misplaced or may not be current. If missing or out of date, replacement Information Manuals must be obtained from any BEECHCRAFT Aviation Center as soon as possible.

For your added protection and safety, we have developed this special publication of safety information to refresh owners' and pilots' knowledge of a number of safety subjects. These subjects must

be reviewed periodically and kept with the airplane, along with the Information Manual and other documents required for operation of the airplane.

Topics in this publication are dealt with in more detail in FAA Documents and other articles pertaining to the subject of safe flying. The safe pilot is familiar with this literature.

BEECHCRAFT airplanes are designed and built to provide owners and pilots with many years of safe and efficient transportation. By maintaining it properly and flying it prudently, you will realize its full potential.

WARNING

Because your aircraft is a high performance, high speed transportation vehicle, designed for operation in a three-dimensional environment, special safety precautions must be observed to reduce the risk of fatal or serious injuries to the pilot(s) and occupant(s).

It is mandatory that you fully understand the contents of this manual and the other operating and maintenance manuals which accompany the aircraft;

that FAA requirements for ratings, certifications and review be scrupulously complied with; and that you allow only persons who are properly licensed and rated, and thoroughly familiar with the contents of the Information Manual, to operate the aircraft. IMPROPER OPERATION OR MAINTENANCE OF AN AIRCRAFT, NO MATTER HOW WELL BUILT INITIALLY, CAN RESULT IN CONSIDERABLE DAMAGE OR TOTAL DESTRUCTION OF THE AIRCRAFT ALONG WITH SERIOUS OR FATAL INJURIES TO ALL OCCUPANTS.

. . . . .BEECH AIRCRAFT CORPORATION

GENERAL

As a pilot, you are responsible to yourself and to those who fly with you, to other pilots and their passengers, and to people on the ground, to fly wisely and safely.

The following material in this Safety Section covers several subjects in limited detail. Here are some condensed Do's and Don'ts.

DO'S

Be thoroughly familiar with your airplane, know its limitations and your own.

Be current in your airplane, or fly with a qualified instructor until you are current/proficient.

Pre-plan all aspects of your flight - including weather and adequate fuel reserves.

Use services available - Weather briefing, in-flight weather and Flight Service Station.

Carefully pre-flight your airplane.

Use the approved check list.

Have more than enough fuel for takeoff, plus the trip, and an adequate reserve.

Be sure your weight loading and C.G. are within limits.

Pilot(s) and passengers must use seat belts and shoulder harnesses at all times.

Be sure all loose articles and baggage are secured.

Check freedom of all controls during pre-flight inspection and before takeoff.

Maintain the prescribed airspeeds in takeoff, climb, descent and landing.

Avoid big airplane wake turbulence.

Preplan fuel and fuel tank management before the actual flight. Utilize auxiliary tanks only in level cruise flight. Take off and land on the fullest main tank.

Practice emergency procedures at safe altitudes and airspeeds, preferably with a qualified instructor pilot, until the required action is instinctive.

Keep your airplane in good mechanical condition.

Stay informed and alert; fly in a sensible manner.

DON'TS

Don't take off with frost, ice or snow on the airplane.

Don't take off with less than minimum recommended fuel, plus adequate reserves, and don't run the tank dry before switching.

Don't fly in a reckless, show-off, careless manner.

Don't fly into thunderstorms or severe weather.

Don't fly in possible icing conditions unless the airplane is approved and properly equipped.

Don't fly close to mountainous terrain.

Don't apply controls abruptly or with high forces that could exceed design loads of the airplane.

Don't fly into weather conditions that are beyond your ratings or current proficiency.

Don't attempt any take off or landing without using the check list.

Don't fly when physically or mentally exhausted or below par.

Don't trust to luck.

GENERAL SOURCES OF INFORMATION

There is a wealth of information available to the pilot created for the sole purpose of making your flying safer, easier and faster. Take advantage of this knowledge and be prepared for an emergency in the remote event that one should occur.

You, as a pilot, have responsibilities under government regulations. These are designed for your protection and the protection of your passengers. Compliance is mandatory.

RULES AND REGULATIONS

F.A.R. Part 91, General Operating and Flight Rules, is a document of law governing operation of aircraft and the owner's and pilot's responsibilities. This document covers such subjects as:

Responsibilities and authority of the pilot-in-command

Certificates required
Liquor and drugs
Flight plans
Pre-flight action
Fuel requirements
Flight rules
Maintenance, preventative maintenance, alterations, inspection, and maintenance records

These are only some of the topics covered. It is the owner's and pilot's responsibility to be thoroughly familiar with all items in F.A.R. Part 91 and to follow them.

AIRWORTHINESS DIRECTIVES

F.A.R. Part 39 specifies that no person may operate a product to which an airworthiness directive issued by the FAA applies, except in accordance with the requirements of that airworthiness directive.

AIRMAN INFORMATION, ADVISORIES, AND NOTICES - FAA AIRMAN'S INFORMATION MANUAL

AIRMAN'S INFORMATION MANUAL

The Airman's Information Manual (AIM) is designed

to provide airmen with basic flight information and ATC procedures for use in the national airspace system of the United States. It also contains items of interest to pilots concerning health and medical facts, factors affecting flight safety, a pilot/controller glossary of terms used in the Air Traffic Control System, information on safety, and accident and hazard reporting. It is revised at six-month intervals and can be purchased locally or from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

This document contains a wealth of pilot information. Among the subjects are:

Controlled Air Space
Services Available to Pilots
Radio Phraseology and Technique
Airport Operations
Clearances and Separations
Pre-flight
Departures - IFR
Enroute - IFR
Arrival - IFR
Emergency Procedures
Weather and Icing
Mountain Flying
Wake Turbulence - Vortices

Medical Facts for Pilots
Bird Hazards
Good Operating Practices
Airport Location Directory

All pilots must be thoroughly familiar with and use the information in the AIM.

ADVISORY INFORMATION

NOTAMS (Notices to Airmen) are documents that have information of a time-critical nature that would affect a pilot's decision to make a flight; for example, an airport closed, terminal radar out of service, enroute navigational aids out of service, etc.

Airmen can subscribe to services to obtain FAA NOTAMS and Airman Advisories, and these are also available at FAA Flight Service Stations.

FAA ADVISORY CIRCULARS

The FAA issues advisory circulars to inform the aviation public in a systematic way of non-regulatory material of interest. Advisory Circulars contain a wealth of information with which the prudent pilot should be familiar. A complete list of current FAA advisory circulars is published in Advisory Circular

AC00-2, which lists advisory circulars that are for sale, as well as those distributed free of charge by the FAA, and provides ordering information. Many advisory circulars which are for sale can be purchased locally in aviation bookstores or at FBO's. Some of the advisory circulars of interest to pilots are:

*	00-6A	Aviation Weather
	00-24	Thunderstorms
	00-30	Rules of Thumb for Avoiding or Minimizing Encounters with Clear Air Turbulence
*	00-45A	Aviation Weather Services
	00-46A	Aviation Safety Reporting Program
	00-50	Low Level Wind Shear
	20-5D	Plane Sense
	20-93	Flutter Due to Ice or Foreign Substance on or in Aircraft Control Surfaces
	20-105	Engine Power-Loss Accident Prevention
	39-7	Airworthiness Directives for General Aviation Aircraft
	43-12	Preventive Maintenance
	60-4	Pilot's Spatial Disorientation

	60-6A	Airplane Flight Manuals (AFM), Approved Manual Materials, Markings and Placards - Airplanes
	60-9	Induction Icing - Pilot Precautions and Procedures
	60-12	Availability of Industry-Developed Guidelines for the Conduct of the Biennial Flight Review
	60-13	The Accident Prevention Counselor Program
*	61-8D	Instrument Rating Written Test Guide
	61-9B	Pilot Transition Courses for Complex Single-Engine and Light, Twin Engine Airplanes
*	61-10A	Private and Commercial Pilots Refresher Courses
	61-12J	Student Pilot Guide
	61-19	Safety Hazard Associated with Simulated Instrument Flights
*	61-21	Flight Training Handbook
*	61-23A	Pilot's Handbook of Aeronautical Knowledge
*	61-27B	Instrument Flying Handbook
*	61-32B	Private Pilot - Airplane - Written Test Guide
*	61-34B	Federal Aviation Regulations Written Test Guide for Private, Commercial and Military Pilots

	61-47	Use of Approach Slope Indicators for Pilot Training
*	61-54A	Private Pilot Airplane - Flight Test Guide
*	61-55A	Commercial Pilot Airplane . . . Flight Test Guide
*	61-56A	Flight Test Guide - Instrument Pilot Airplane
*	61-58	Flight Instructor Practical Test Guide
	61-65	Part 61 (Revised) Certification Pilot and Flight Instructors
	61-67	Hazards Associated with Spins in Airplanes Prohibited from Intentional Spinning
*	61-70	Flight Instructor Instrument - Airplane - Written Test Guide
*	61-71A	Commercial Pilot Airplane Written Test Guide
*	61-72A	Flight Instructor - Airplane Written Test Guide
	61-84	Role of Preflight Preparation
*	67-2	Medical Handbook for Pilots
	90-23D	Wake Turbulence
	90-34	Accidents resulting from Wheelbarrowing in Tricycle Gear Equipped Aircraft

	90-42A	Traffic Advisory Practices at Non-tower airports
	90-43D	Operations Reservation for High-Density Traffic Airports
	90-48	Pilots' role in Collision Avoidance
	90-64	Automated Radar Terminal System (ARTS) III
	90-66	Recommended Standard Traffic Patterns for Airplane Operations at Uncontrolled Airports
	91-6A	Water, Slush and Snow on runway
	91-8A	Use of Oxygen by General Aviation Pilots/Passengers
	91-11B	Annual Inspection Reminder
	91-13C	Cold Weather Operation of Aircraft
	91-17	The use of View Limiting Devices on Aircraft
*	91-23A	Pilot's Weight and Balance Handbook
	91-24	Aircraft Hydroplaning or Aquaplaning on Wet Runways
	91-25A	Loss of Visual Cues During Low Visibility Landings
	91-28	Unexpected Opening of Cabin Doors

91-33	Use of Alternate Grades of Aviation Gasoline for Grade 80/87
91-35	Noise, Hearing Damage, and Fatigue in General Aviation Pilots
91-43	Unreliable Airspeed Indications
91-46	Gyroscopic Instruments - Good Operating Practices
91-51	Airplanes Deice and Anti-Ice Systems
103-4	Hazard Associated with Sublimation of Solid Carbon Dioxide (Dry Ice) Aboard Aircraft
150/ 5200-3A	Bird Hazards to Aircraft
210-1A	National Notice to Airmen System
210-5	Military Flying Activities

* Advisory Circulars that are for sale.

FAA GENERAL AVIATION NEWS

FAA General Aviation News is published by the FAA in the interest of flight safety. The magazine is designed to promote safety in the air by calling the attention of general aviation airmen to current technical, regulatory and procedural matters affecting the safe operation of aircraft. FAA General Aviation News is sold on subscription by the

Superintendent of Documents, Government Printing Office, Washington, D. C. 20402.

FAA ACCIDENT PREVENTION PROGRAM

The FAA assigns accident prevention specialists to each Flight Standards and General Aviation District Office to organize accident prevention program activities. In addition, there are over 3,000 volunteer airmen serving as accident prevention counselors, sharing their technical expertise and professional knowledge with the general aviation community. The FAA conducts seminars and workshops, and distributes invaluable safety information under this program.

Usually the airport manager, the FAA Flight Service Stations (FSS), or Fixed Base Operator (F.B.O.), will have a list of accident prevention counselors and their phone numbers available. All Flight Standards and General Aviation District Offices have a list of the counselors serving the district.

Before flying over unfamiliar territory, such as mountainous terrain or desert areas, it is advisable for transient pilots to consult with local counselors. They will be familiar with the more desirable routes, the wind and weather conditions, and the service and emergency landing areas that are available along

the way. They can also offer advice on the type of emergency equipment you should be carrying.

GENERAL INFORMATION ON SPECIFIC TOPICS

FLIGHT PLANNING

F.A.R. Part 91 requires that each pilot in command, before beginning a flight, familiarize himself with all available information concerning that flight.

Obtain a current and complete pre-flight briefing. This should consist of local, enroute and destination weather and enroute navaid information. Enroute terrain and obstructions, alternate airports, airport runways active, length of runways, and take-off and landing distances for the airplane for conditions expected should be known.

The prudent pilot will review his planned enroute track and stations and make a list for quick reference. It is strongly recommended a flight plan be filed with Flight Service Stations, even though the flight may be VFR. Also, advise Flight Service Stations of changes or delays of one hour or more and remember to close the flight plan at destination.

The pilot must be completely familiar with the performance of the airplane and performance data in the Information Manual. The resultant effect of temperature and pressure altitude must be taken into account in determining performance if not accounted for on the charts. An applicable FAA Approved Flight Manual, if one is provided, must be aboard the airplane at all times including the weight and balance forms and equipment list.

PASSENGER INFORMATION CARDS

Beech has available, for most current production airplanes, passenger information cards which contain important information on the proper use of restraint systems, oxygen masks, emergency exits and emergency bracing procedures. Passenger information cards may be obtained at any Beechcraft Aviation or Aero Center. A pilot should not only be familiar with the information contained in the cards himself, but should, prior to flight, always inform passengers of the information contained in the information cards. If a passenger information card is not available for your model of airplane, the pilot should orally brief the passengers on the proper use of restraint systems, doors and emergency exits, and other emergency procedures, as required by Part 91 of the FAR's.

INSPECTIONS - MAINTENANCE

In addition to maintenance inspections and pre-flight information required by F.A.R. Part 91, a complete pre-flight inspection is imperative. It is the responsibility of the owner and the operator to assure that the airplane is maintained in an airworthy condition and that proper maintenance records are kept.

Each airplane has a checklist for the pre-flight inspection which must be followed. USE THE CHECKLIST!

FLIGHT OPERATIONS

GENERAL

The pilot must be thoroughly familiar with all information published by the manufacturer concerning the airplane, and is required by law to operate the airplane in accordance with the FAA Approved Airplane Flight Manual and/or placards installed.

TURBULENT WEATHER

A complete and current weather briefing is a requirement for a safe trip.

Updating of weather information enroute is also essential. The wise pilot knows that weather conditions can change quickly, and treats weather forecasting as professional advice, rather than an absolute fact. He obtains all the advice he can, but stays alert to any sign or report of changing conditions.

Plan the flight to avoid areas of severe turbulence and thunderstorms. It is not always possible to detect individual storm areas or find the in-between clear areas.

Thunderstorms, squall lines and violent turbulence should be regarded as extremely dangerous and must be avoided. Hail and tornadic wind velocities can be encountered in thunderstorms that can destroy any airplane, just as tornadoes destroy nearly everything in their path on the ground.

Turboprop Engines - Thunderstorms also pose the possibility of a lightning strike on an aircraft. Any structure or equipment which shows evidence of a lightning strike, or of being subjected to a high current flow due to a strike, or is a suspected part of a lightning strike path through the aircraft, should be thoroughly inspected and any damage repaired prior to additional flight. The Pratt & Whitney or

AiResearch Engine Maintenance Manual and Hartzell Service Letter No. 104 include inspection and maintenance requirements for engines and propellers involved in lightning strike incidents.

A roll cloud ahead of a squall line or thunderstorm is visible evidence of violent turbulence; however, the absence of a roll cloud should not be interpreted as denoting that severe turbulence is not present.

Even though flight in severe turbulence must be avoided, flight in turbulent air may be encountered unexpectedly under certain conditions.

The following recommendations should be observed for airplane operation in turbulent air:

Flying through turbulent air presents two basic problems, the answer to both of which is proper airspeed. On one hand, if you maintain an excessive airspeed, you run the risk of structural damage or failure; on the other hand, if your airspeed is too low, you may stall.

If turbulence is encountered, reduce speed to the turbulent air penetration speed, if given, or to the maneuvering speed, which is listed in the Limitations Section of the Information Manual. These speeds give the best assurance of avoiding

excessive stress loads, and at the same time providing the proper margin against inadvertent stalls due to gusts.

Beware of overcontrolling in attempting to correct for changes in attitude; applying control pressure abruptly will build up G-forces rapidly and could cause structural damage or even failure. You should watch particularly your angle of bank, making turns as wide and shallow as possible. Be equally cautious in applying forward or back pressure to keep the nose level. Maintain straight and level attitude in either up or down drafts. Use trim sparingly to avoid being grossly out of trim as the vertical air columns change velocity and direction. If necessary to avoid excessive airspeeds, lower the landing gear.

FLIGHT IN ICING CONDITIONS

Every pilot of Beech airplanes (for that matter the pilot of any airplane) should be intimately acquainted with the FAA Approved National Weather Service definitions for ice intensity and accumulation which we have reprinted below:

INTENSITY	ICE ACCUMULATION
Trace	Ice becomes perceptible. Rate of accumulation slightly greater than rate

INTENSITY	ICE ACCUMULATION (Cont'd)
Trace (Cont'd)	of sublimation. It is not hazardous even though deicing/anti-icing equipment is not utilized, unless encountered for an extended period of time (over 1 hour).
Light	The rate of accumulation may create a problem if flight is prolonged in this environment (over 1 hour). Occasional use of deicing/anti-icing equipment removes/prevents accumulation. It does not present a problem if the deicing/anti-icing equipment is used.
Moderate	The rate of accumulation is such that even short encounters become potentially hazardous and use of deicing/anti-icing equipment or diversion is necessary.
Severe	The rate of accumulation is such that deicing/anti-icing equipment fails to reduce or control the hazard. Immediate diversion is necessary.

It is no longer unusual to find deicing and anti-icing equipment on a wide range of airplane sizes and

types. Since the capability of this equipment varies, it becomes the pilot's primary responsibility to understand limitations which restrict the use of his airplane in icing conditions and the conditions which may exceed the systems capacity.

Pilots and airplane owners must carefully review the Information Manual in order to ascertain the required operable equipment needed for flight in icing conditions. In addition, they must ascertain from the same sources the limits of approval or certification of their airplane for flight in icing conditions, and plan the flight accordingly, if icing conditions are known or forecast along the route.

Every owner and pilot of an airplane should understand that it is not uncommon to find aircraft equipped with less than the full complement of available systems and equipment. For example, props and pitot tube may be protected, but the aircraft might not have wing boots or tail boots. The reverse might be true. Windshield, pitot and airfoil surfaces might be protected, but the props might not be. Before undertaking any flight into areas where icing conditions might be suspected, inspect the aircraft and review the Information Manual to be certain that you are supported by the full complement of required IFR and deicing/anti-icing equipment.

Remember that regardless of its combination of deicing/anti-icing equipment, any aircraft not fully equipped and functional for IFR flight is not properly equipped for flight in icing conditions.

An airplane which is not approved or certificated for flight in icing conditions, not fully equipped, or which does not have all critical areas protected in the required manner by fully operational equipment must not be exposed to icing encounters of any intensity. When icing is detected, the pilot of such an aircraft must make an immediate diversion by flying out of the area of visible moisture or going to an altitude where icing is not encountered.

Some models of Beech airplanes were approved for flight in certain limited icing conditions under the FAA's Bureau of Flight Standards Release No. 434. Under this release, properly equipped airplanes are approved for flight in light to moderate icing conditions only. These aircraft are not approved for extended flight in moderate icing conditions or flights in any severe icing conditions. Flight in these conditions must be avoided.

Even airplanes fully equipped and certified for flight in the icing conditions described in Appendix C to FAR Part 25 must avoid flights into those conditions defined by the National Weather Service as

"Severe". The National Weather Service definition of "severe icing" describes that condition as: "the rate of accumulation is such that deicing/anti-icing equipment fails to reduce or control the hazard." No airplane equipped with any combination of deicing/anti-icing equipment can be expected to cope with such conditions. As competent pilots know, there appear to be no predictable limits for the severest weather conditions. For essentially the same reasons that airplanes, however designed or equipped for IFR flight, cannot be flown safely into conditions such as thunderstorms, tornados, hurricanes or other phenomena likely to produce severe turbulence, airplanes equipped for flight in icing conditions cannot be expected to cope with "severe" icing conditions as defined by the National Weather Service. The prudent pilot must remain alert to the possiblity that icing conditions may become "severe", and that his equipment will not cope with them. At the first indication that such condition may have been encountered or may lie ahead, he should immediately react by selecting the most expeditious and safe course for diversion.

Every pilot of a properly and fully-equipped Beech airplane who ventures into icing conditions must maintain the minimum speed (KIAS) for operation in icing conditions, which is set forth in the Normal Procedures Section of his Information Manual. If a

minimum speed for flight in icing conditions is not specified in the manual, the following indicated airspeeds must be maintained:

All Baron and Travel Air Models - 130 KIAS

All other Beechcraft twin-engine models - 140 KIAS

The pilot must remain aware of the fact that if he allows his airspeed to deteriorate below this minimum speed, he will increase the angle of attack of his airplane to the point where ice may build up on the under side of the wings aft of the area protected by the boots.

The fact or extent of ice build-up in unprotected areas will not be directly observable from the cockpit. Due to distortion of the wing airfoil, increased drag and reduced lift, stalling speeds will increase as ice accumulates on the airplane. For the same reasons, stall warning devices are not accurate and cannot be relied upon in icing conditions.

Even though the pilot maintains the prescribed minimum speed for operating in icing conditions, ice is still likely to build up on other unprotected areas (the fuselage and the unprotected wing leading edge inboard of the engine nacelle). Under some atmospheric conditions, it may even build up aft of

the boots despite the maintenance of the prescribed minimum speed. The effect of ice accumulation on any unprotected surface is aggravated by the length of exposure to the icing conditions. Ice buildup on unprotected surfaces will increase drag, add weight, reduce lift, and generally, adversely affect the aerodynamic characteristics and performance of the airplane. It can progress to the point where the airplane is no longer capable of flying. Therefore, the pilot operating even a fully-equipped airplane in sustained icing conditions must remain sensitive to any indication, such as observed ice accumulation, loss of airspeed, the need for increased power, reduced rate of climb, or sluggish response, that ice is accumulating on unprotected surfaces and that continued flight in these conditions is extremely hazardous, regardless of the performance of the deicing/anti-icing equipment.

Rapid cycling of the deice boots or cycling before at least one-quarter inch (1/4") of ice has accumulated (measured in the chordwise direction or forward from the leading edge), may cause the ice to grow outside the contour of the inflated boots and prevent ice removal.

For any owner or pilot whose use pattern for an aircraft exposes it to icing encounters, the following references are required reading for safe flying:

The aircraft's Information Manual, expecially the sections on Normal Procedures, Emergency Procedures, Systems, and Safety Information.

FAA Advisory Circular 91-51 - Airplane Deice and Anti-ice Systems.

Weather Flying, by Robert N. Buck.

Finally, the most important ingredients to safe flight in icing conditions - regardless of the aircraft or the combination of deicing/anti-icing equipment - are a complete and current weather briefing, sound pilot judgment, close attention to the rate and type of ice accumulations, and the knowledge that "severe icing" as defined by the National Weather Service is beyond the capability of modern aircraft and immediate diversion must be made. It is the inexperienced or uneducated pilot who presses on "regardless", hoping that steadily worsening conditions will improve, only to find himself flying an airplane which has become so loaded with ice

that he can no longer maintain altitude. At this point he has lost most, if not all, of his safety options, including perhaps a 180 degree turn to retreat along the course already traveled. The responsible and well-informed pilot recognizes the limitations of weather conditions, his airplane and its systems and reacts promptly; he lives to fly again.

MOUNTAIN FLYING

Pilots flying in mountainous areas should inform themselves of all aspects of mountain flying, including the effects of topographic features on weather conditions. Many good articles have been published, and a synopsis of mountain flying operations is included in the FAA Airman's Information Manual, Part 1.

Avoid flight at low altitudes over mountainous terrain, particularly near the lee slopes. If the wind velocity near the level of the ridge is in excess of 25 knots and approximately perpendicular to the ridge, mountain wave conditions are likely over and near the lee slopes. If the wind velocity at the level of the ridge exceeds 50 knots, a strong mountain wave is probable with extreme up and down drafts and severe turbulence. The worst turbulence will be encountered in and below the rotor zone, which is

usually 8 to 10 miles downwind from the ridge. This zone is sometimes characterized by the presence of "roll clouds" if sufficient moisture is present; altocumulus standing lenticular clouds are also visible signs that a mountain wave exists, but their presence is likewise dependent on moisture. Mountain wave turbulence can, of course, occur in dry air and the absence of such clouds should not be taken as any assurance that mountain wave turbulence will not be encountered. A mountain wave downdraft may exceed the climb capability of your airplane. Avoid mountain wave downdrafts.

VFR - LOW CEILINGS

If you are not instrument rated, do not attempt "VFR on Top" or "Special VFR" flight or clearances. Being caught above a solid cloud layer when an emergency descent is required (or at destination) is an extremely hazardous position for the VFR pilot. Accepting a clearance out of certain airport control zones with no minimum ceiling and one-mile visibility as permitted with "Special VFR" is a foolish practice for the VFR pilot.

Avoid areas of low ceilings and restricted visibility unless you are instrument rated and proficient and have an instrument equipped airplane. Then proceed with caution and with planned alternates.

VFR AT NIGHT

When flying VFR at night, in addition to the altitude appropriate for the direction of flight, pilots should maintain a safe minimum altitude as dictated by terrain, obstacles such as TV towers, or communities in the area flown. This is especially true in mountainous terrain, where there is usually very little ground reference. Minimum clearance is 2,000 feet above the highest obstacle enroute. Do not depend on your ability to see obstacles in time to miss them. Flight on dark nights over sparsely populated country can be the same as IFR, and must be avoided by inexperienced or non-IFR rated pilots.

VERTIGO - DISORIENTATION

Disorientation can occur in a variety of ways. During flight, inner ear balancing mechanisms are subjected to varied forces not normally experienced on the ground. This, combined with loss of outside visual reference, can cause vertigo. False interpretations (illusions) result, and may confuse the pilot's conception of the altitude and position of his airplane.

Under VFR conditions, the visual sense, using the horizon as a reference, can override the illusions. Under low visibility conditions (night, fog, clouds,

haze, etc.) the illusions predominate. Only through awareness of these illusions, and proficiency in instrument flight procedures, can an airplane be operated safety in a low visibility environment.

Flying in fog, dense haze or dust, cloud banks, or very low visibility, with strobe lights or rotating beacons turned on can contribute to vertigo. They should be turned off in these conditions, particularly at night.

All pilots should check the weather and use good judgment in planning flights. The VFR pilot should use extra caution in avoiding low visibility conditions.

Motion sickness often precedes or accompanies disorientation and may further jeopardize the flight.

Disorientation in low visibility conditions is not limited to VFR pilots. Although IFR pilots are trained to look at their instruments to gain an artificial visual reference as a replacement for the loss of a visual horizon, they do not always do so. This can happen when the pilot's physical condition will not permit him to concentrate on his instruments; when the pilot is not proficient in flying instrument conditions in the airplane he is flying; or, when the pilot's work load of flying by reference to

his instruments is augmented by such factors as turbulence. Even an instrument rated pilot encountering instrument conditions, intentional or unintentional, should ask himself whether or not he is sufficiently alert and proficient in the airplane he is flying, to fly under low visibility conditions and the turbulence anticipated or encountered. If any doubt exists, the flight should not be made or it should be discontinued as soon as possible.

The result of vertigo is loss of control of the airplane. If the loss of control is sustained it will result in an excessive speed accident. Excessive speed accidents occur in one of two manners, either as an inflight airframe separation or as a high speed ground impact; and they are fatal accidents in either case. All airplanes are subject to this form of accident.

For years, Beech Information Manuals have contained instructions that the landing gear should be extended in any circumstance in which the pilot encounters IFR conditions which approach the limits of his capability or his ratings. Lowering the gear in IFR conditions or flight into heavy or severe turbulence, tends to stabilize the aircraft, assists in maintaining proper airspeed, and will substantially reduce the possibility of reaching excessive

airspeeds with catastrophic consequences, even where loss of control is experienced.

Excessive speed accidents occur at airspeeds greatly in excess of two operating limitations which are specified in the manuals: Maximum maneuvering speed and the "red line" or "never exceed" speed. Such speed limits are set to protect the structure of an airplane. For example, control surfaces are designed to be used to their fullest extent only below a certain speed - maximum maneuvering speed. As a result, the control surfaces should never be suddenly or fully deflected above maximum maneuvering speed. Turbulence penetration should not be performed above that speed. The accidents we are discussing here occur at airspeeds greatly in excess of these limitations. No airplane should ever be flown beyond its FAA approved operating limitations.

FLIGHT OF MULTI-ENGINE AIRPLANES WITH ONE ENGINE INOPERATIVE.

The major difference between flying a twin-engine and single-engine airplane is knowing how to manage the flight if one engine loses power for any reason. Safe flight with one engine out requires an

understanding of the basic aerodynamics involved - as well as proficiency in engine out procedures.

Loss of power from one engine affects both climb performance and controllability of any light twin. Climb performance depends on an excess of power over that required for level flight. Loss of power from one engine obviously represents a 50% loss of horsepower but, in virtually all light twins, climb performance is reduced by at least 80%. A study of the charts in your Information Manual will confirm this fact.

Single engine climb performance depends on four factors:

Airspeed	too little, or too much, will decrease climb performance.
Drag	gear, flaps, cowl flaps, prop, and speed.
Power	amount available in excess of that needed for level flight.
Weight	passengers, baggage, and fuel load greatly affect climb performance.

Loss of power on one engine creates yaw due to

asymmetrical thrust. Yaw forces must be balanced with the rudder. Loss of power on one engine also reduces prop wash over the wing. In addition, yaw affects the lift distribution over the wing causing a roll toward the "dead" engine. These roll forces may be balanced by banking slightly (up to 5°) into the operating engine.

Airspeed is the key to safe single engine operations. For most light twins there is an:

	Symbol
- airspeed below which directional control cannot be maintained	Vmca
- airspeed below which an intentional engine cut should never be made	Vsse
- airspeed that will give the best single engine rate-of-climb (or the slowest loss of altitude)	Vyse
- airspeed that will give the steepest angle-of-climb with one engine-out	Vxse

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MINIMUM CONTROL SPEED AIRBORNE (Vmca)

Vmca is designated by the red radial on the airspeed indicator and indicates the minimum control speed, airborne at sea level. Vmca is determined by FAA regulations as the minimum airspeed at which it is possible to recover directional control of the airplane within 20 degrees heading change, and thereafter maintain straight flight, with not more than 5 degrees of bank if one engine fails suddenly with:

- Take-off power on both engines,
- Rearmost allowable center of gravity,
- Flaps in takeoff position,
- Landing gear retracted,
- Propeller windmilling in takeoff pitch configuration (or feathered if automatically featherable).

However, sudden engine failures rarely occur with all of the factors listed above, and therefore, the actual Vmca under any particular situation may be a little slower than the red radial on the airspeed

indicator. Most airplanes will not maintain level flight at speeds at or near Vmca. Consequently, it is not advisable to fly at speeds approaching Vmca, except in training situations or during flight tests. Adhering to the practice of never flying at or below the published Vmc speed for your aircraft will virtually eliminate loss of directional control as a problem in the event of engine failure.

INTENTIONAL ONE-ENGINE INOPERATIVE SPEED (Vsse)

Vsse is specified by the airplane manufacturer and is the minimum speed at which to perform intentional engine cuts. Use of Vsse is intended to reduce the accident potential from loss of control after engine cuts at or near minimum control speed. Vmca demonstrations are necessary in training, but should only be made at a safe altitude above the terrain and with the power reduction on one engine made at or above Vsse.

BEST SINGLE ENGINE RATE-OF-CLIMB SPEED (Vyse)

Vyse is designated by the blue radial on the airspeed indicator. Vyse delivers the greatest gain in altitude

in the shortest possible time, and is based on the following criteria:

- critical engine inoperative, and its propeller in the minimum drag position.
- operating engine set at not more than maximum continuous power.
- landing gear retracted.
- wing flaps in the most favorable (i.e., best lift/drag ratio position).
- cowl flaps as required for engine cooling.
- aircraft flown at recommended bank angle.

Drag caused by a windmilling propeller, extending landing gear, or flaps in the landing position, will severely degrade or destroy single engine climb performance. Since engine climb performance varies widely with type of airplane, weight, temperature, altitude, and airplane configuration, the climb gradient (altitude gain or loss per mile) may be marginal - or even negative - under some conditions. Study the Information Manual for your specific airplane and know what performance to expect with one-engine out.

BEST SINGLE ENGINE ANGLE-OF-CLIMB AIRSPEED (Vxse)

Vxse is used only to clear obstructions during initial

climb-out as it gives the greatest altitude gain per unit of horizontal distance. It provides less engine cooling and requires more rudder control than Vyse.

SINGLE ENGINE SERVICING CEILING

The single engine service ceiling is the maximum altitude at which an airplane will climb, at a rate of at least 50 feet per minute in smooth air, with one engine feathered.

The single engine service ceiling chart should be used during flight planning to determine whether the airplane, as loaded, can maintain the Minimum Enroute Altitude (MEA) if IFR, or terrain clearance if VFR, following an engine failure.

BASIC SINGLE ENGINE PROCEDURES

Know and follow, to the letter, the single-engine emergency procedures specified in your Information Manual for your specific make and model airplane. However, the basic fundamentals of all the procedures are as follows:

- Maintain aircraft control and airspeed at all times. This is cardinal rule No. 1.
- Usually, apply maximum power to the operating engine. However, if the engine failure occurs at

a speed below Vmca, or during cruise or in a steep turn, you may elect to use only enough power to maintain a safe speed and altitude. If the failure occurs on final approach, use power only as necessary to complete the landing.

- Reduce drag to an absolute minimum.
- Secure the failed engine and related sub-systems.

The first three steps should be done promptly and from memory. The check list should then be consulted to be sure that the inoperative engine is secured properly and that the appropriate switches are placed in the correct position. The airplane must be banked about 5° into the live engine, with the "slip/skid" ball out of center toward the live engine, to achieve rated performance.

Another note of caution: Be sure to identify the dead engine, positively, before feathering it. Remember: First, identify the suspected engine (i.e., "Dead foot means dead engine"), second, verify with cautious throttle movement, then feather.

ENGINE FAILURE ON TAKE-OFF

If an engine fails before attaining lift-off speed, or below Vmca, the only proper action is to discontinue

the take-off. If the engine fails after lift-off with the landing gear still down, the take-off should still be discontinued if touch-down and roll-out on the remaining runway is still possible.

If you do find yourself in a position of not being able to climb, it is much better to pull the power on the good engine and land straight ahead than try to force a climb and lose control.

Your Information Manual contains charts that are used in calculating the runway length required to stop if the engine fails before reaching lift-off speed and also has charts showing single engine performance after lift-off.

Study your charts carefully. No airplane is capable of climbing out on one engine under all weight, pressure altitude, and temperature conditions. Know, before you take the actual runway, whether you can maintain control and climb-out if you lose an engine while the gear is still down. It may be necessary to off-load some weight, or wait for more favorable temperature or wind conditions.

WHEN TO FLY Vx, Vy, Vxse and Vyse

During normal two-engine operations, always fly Vy (Vx if necessary for obstacle clearance) on initial

climb-out. Then, accelerate to your cruise climb airspeed, which may be Vy plus 10 to 15 knots after you have obtained a safe altitude. Use of cruise climb airspeed will give you better engine cooling, increased inflight visibility and better fuel economy. However, at the first indication of an engine failure during climb-out, or while on approach, establish Vyse or Vxse, whichever is appropriate. (Consult your Information Manual for specifics).

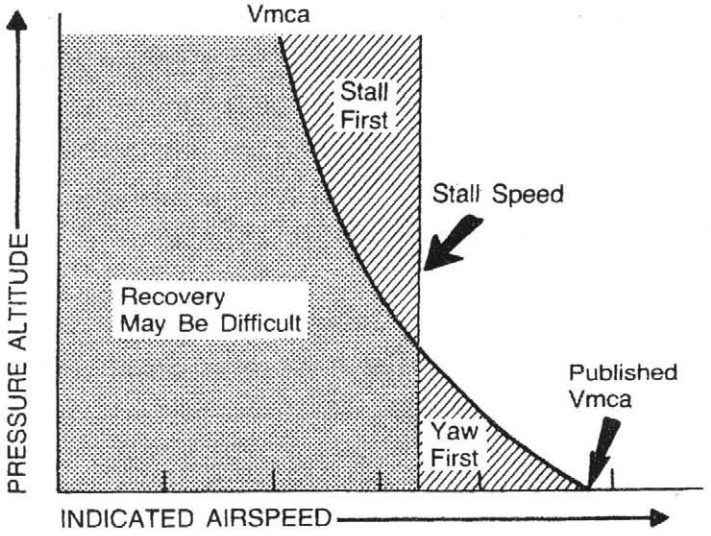
STALLS, SLOW FLIGHT AND TRAINING

The stall warning system must be kept operational at all times and must not be deactivated by interruption of circuits, circuit breakers, or fuses. Compliance with this requirement is especially important in all high performance single and multi-engine airplanes during engine-out practice, or stall demonstrations, because the stall speed is critical in all low speed operations of high-performance airplanes.

Training should be accomplished under the supervision of a qualified instructor-pilot; with careful reference to the applicable sections of the FAA Flight Test Guide and FAA Pilot Transition Courses for Complex Single Engine and Light Twin Engine Airplanes (AC61-9B). In particular, observe carefully the warnings in the flight test guides.

The single engine stall speed of a twin engine aircraft is generally slightly below the power off (engines idle) stall speed, for a given weight condition. Single engine stalls in multi-engine airplanes are not recommended. Single engine stalls have never been required by the FAA regulations for multi-engine flight tests, and should not be practiced in high performance airplanes by other than qualified engineering test pilots.

Engine out minimum control speed demonstrations in multi-engine airplanes should be conducted in



Relationship Between Stall Speed And Vmca For Aircraft With Normally Aspirated Engines.

STD-601-38

strict accordance with the warning of the FAA Flight Test Guide. Engine out minimum control speed generally decreases with altitude, while the single engine stall speed remains approximately constant, for normally aspirated engines. No such demonstration should be attempted when the density altitude and temperature are such that the engine out minimum control speed is known, or discovered to be, close to the stalling speed. Loss of directional or lateral control, just as a stall occurs, is potentially hazardous.

Vsse, the airspeed below which an engine should not be intentionally rendered inoperative for practice purposes, was established because of the apparent practice of some pilots, instructors, and examiners, of intentionally rendering an engine inoperative at a time when the airplane is being operated at a speed close to, or below the power idle stall speed. Unless the pilot takes immediate and proper corrective action under such circumstances, it is possible to enter an inadvertent spin.

It is recognized that flight below Vsse with one engine inoperative, or simulated inoperative, may be required for conditions such as practice demonstration of Vmca for multi-engine pilot certification. Refer to the procedure set forth in the Information Manual for your aircraft. This

procedure calls for simulating one engine inoperative by reducing the power lever (throttle) on one engine to idle while operating at an airspeed above Vsse. Power on the other engine is set at maximum, then airspeed is reduced at approximately one knot per second until either Vmca or stall warning is obtained. During this transition, rudder should be used to maintain directional control, and ailerons should be used to maintain a 5° bank toward the operative engine. At the first sign of either Vmca or stall warning (which may be evidenced by inability to maintain longitudinal, lateral or directional control, aerodynamic stall buffet, or stall warning horn sound), recovery must be initiated immediately by reducing power to idle on operative engine and lowering the nose to regain Vsse. Resume normal flight. This entire procedure should be used at a safe altitude of at least 5,000 feet above the ground in clear air only.

If stall warning is detected prior to the first sign of Vmca, an engine-out minimum control speed demonstration cannot be accomplished under the existing density altitude and gross weight conditions and should not be attempted.

SPINS

A major cause of fatal accidents in general aviation

aircraft is a stall and spin. Stall demonstrations and practice are a means for a pilot to acquire the skills to recognize when a stall is about to occur and to recover as soon as the first signs of a stall are evident. If a stall does not occur - A spin cannot occur. It is important to remember however, that a stall can occur in any flight attitude, at any airspeed, if controls are misused.

Unless your aircraft has been specifically certificated in the aerobatic category and specifically tested for spin recovery characteristics, it is placarded against intentional spins. The pilot of an airplane placarded against intentional spins should assume that the airplane may become uncontrollable in a spin, since its performance characteristics beyond certain limits specified in the FAA regulations may not have been tested and are unknown. This is why aircraft are placarded against intentional spins, and this is why stall avoidance is your protection against an inadvertent spin.

Pilots are taught that intentional spins are entered by deliberately inducing a yawing movement with the controls as the aircraft is stalled. Inadvertent spins result from the same combination - stall plus yaw. That is why it is important to use coordinated controls and to recover at the first indication of a stall when practicing stalls.

In any twin engine airplane, fundamental aerodynamics dictate that if the airplane is allowed to become fully stalled while one engine is providing lift-producing thrust the yawing movement which can induce a spin will be present. Consequently, it is important to immediately reduce power on the operating engine, lower the nose to reduce the angle of attack, and increase the airspeed to recover from the stall. In any twin engine aircraft, if application of stall recovery controls is delayed a rapid rolling and yawing motion may develop, even against full aileron and rudder, resulting in the airplane becoming inverted during the onset of a spinning motion. Once the airplane has been permitted to progress beyond the stall and is allowed to reach the rapid rolling and yawing condition, the pilot must then immediately initiate the generally accepted spin recovery procedure for multi-engine airplanes, which is as follows:

> Immediately move the control column full forward, apply full rudder opposite to the direction of the spin and reduce power on both engines to idle. These three actions should be done as near simultaneously as possible; then continue to hold this control position until rotation stops and then neutralize all controls and execute a

smooth pullout. Ailerons should be neutral during recovery. THE LONGER THE PILOT DELAYS BEFORE TAKING PROPER CORRECTIVE ACTION, THE MORE DIFFICULT RECOVERY WILL BECOME.

Always remember that extra alertness and pilot techniques are required for slow flight maneuvers, including the practice or demonstration of stalls or Vmca. In addition to the foregoing mandatory procedures, always:

1. Be certain that the center of gravity of the airplane is as far forward as possible. Forward C.G. aids stall recovery, spin avoidance and spin recovery. An aft C.G. can create a tendency for a spin to flatten out, which delays recovery.
2. Whenever a student pilot will be required to practice slow flight or single-engine maneuvers, be certain that the qualified instructor pilot has a full set of operable controls in front of him. FAA regulations prohibit flight instruction without full dual controls.
3. Conduct any maneuvers which could possibly result in a spin at altitudes in excess of five thousand (5,000) feet above ground level in clear air only.

4. Remember that an airplane, at or near traffic pattern and approach altitudes, cannot recover from a spin, or perhaps even a stall, before impact with the ground. For twin engine aircraft, when descending to traffic altitude and during pattern entry and all other flight operations, maintain speed no lower than Vsse. On final approach maintain at least the airspeed shown in the flight manual. Should a go-around be required, do not apply more power than necessary until the airplane has accelerated to Vsse. Recognize that under some conditions of weight, density altitude, and aircraft configuration, a twin engine aircraft cannot climb or accelerate on a single engine. Hence a single engine go-around is impossible and the aircraft is committed to a landing. Plan your approach accordingly.
5. Remember that if an airplane flown under instrument conditions is permitted to stall or enter a spin, the pilot, without reference to the horizon, is certain to become disoriented. He may be unable to recognize a stall, spin entry, or the spin condition and he may be unable to determine even the direction of the rotation.
6. Finally, never forget that stall avoidance is your best protection against an inadvertent spin. MAINTAIN YOUR AIRSPEED.

DESCENT

In piston-powered airplanes, whether single or twin engines, supercharged or normally aspirated, it is necessary to avoid prolonged descents with low power, as this produces two problems: (1) Excessively cool cylinder head temperatures which cause premature engine wear, and (2) excessively rich mixtures due to idle enrichment (and altitude) which causes soot and lead deposits on the spark plugs (fouling). The second of these is the more serious consideration; the engine may not respond to the throttle when it is desired to discontinue the descent.

Both problems are amenable to one solution: maintain adequate power to keep cylinder head temperatures in the "green" range during descent, and lean to best power mixture (that is, progressively enrich the mixture from cruise only slightly as altitude decreases). This procedure will lengthen the descent, of course, and requires some advance planning.

If it is necessary to make a prolonged descent at or near idle, as in practicing forced landings, at least avoid the problem of fouled spark plugs by frequently advancing the throttle until the engine runs smoothly, and maintain an appropriate mixture

setting with altitude. (Refer to pre-landing check list.)

VORTICES - WAKE TURBULENCE

Every airplane generates wakes of turbulence while in flight. Part of this is from the propeller or jet engine, and part from the wing tip vortices. The larger and heavier the airplane, the more pronounced and turbulent the wakes will be. Wing tip vortices from large, heavy airplanes are very severe at close range, degenerating with time, wind, and space. These are rolling in nature, from each wing tip. In tests, vortex velocities of 133 knots have been recorded.

Encountering the rolling effect of wing tip vortices within two minutes after passage of large airplanes is most hazardous to light airplanes. This roll effect can exceed the maximum counter roll obtainable in a light airplane.

The turbulent areas may remain for as long as three minutes or more, depending on wind conditions, and may extend several miles beyond the airplane. Plan to fly slightly above and to the windward side of the other airplanes. Because of the wide variety of conditions that can be encountered, there is no set rule to follow to avoid wake turbulence in all

situations. However, the Airman's Information Manual, and to a greater extent Advisory Circular 90-23, Aircraft Wake Turbulence, provides a thorough discussion of the factors you should be aware of when wake turbulence may be encountered.

TAKEOFF AND LANDING CONDITIONS

When taking off on runways covered with water or freezing slush, the landing gear should remain extended for approximately ten seconds longer than normal, allowing the wheels to spin and dissipate the freezing moisture. The landing gear should then be cycled up, then down, wait approximately five seconds and then retract again.

Caution must be exercised to insure that the entire operation is performed below Maximum Landing Gear Operating Airspeed.

Use caution when landing on runways that are covered by water or slush which cause hydroplaning (aquaplaning), a phenomenon that renders braking and steering ineffective because of the lack of sufficient surface friction. Snow and ice covered runways are also hazardous. The pilot should also be alert to the possibility of the brakes freezing.

Use caution when taking off or landing during gusty wind conditions. Also be aware of the special wind conditions caused by buildings or other obstructions located near the runway in a crosswind pattern.

MEDICAL FACTS FOR PILOTS

GENERAL

When the pilot enters the airplane, he becomes an integral part of the man-machine system. He is just as essential to a successful flight as the control surfaces. To ignore the pilot in pre-flight planning would be as senseless as failing to inspect the integrity of the control surfaces or any other vital part of the machine. The pilot himself has the responsibility for determining his reliability prior to entering the airplane for flight. When piloting an airplane, an individual should be free of conditions which are harmful to alertness, ability to make correct decisions, and rapid reaction time.

FATIGUE

Fatigue generally slows reaction times and causes errors due to inattention. In addition to the most common cause of fatigue; insufficient rest and loss of sleep, the pressures of business, financial

worries, and family problems can be important contributing factors. If you are tired, don't fly.

HYPOXIA

Hypoxia, in simple terms, is a lack of sufficient oxygen to keep the brain and other body tissues functioning properly. There is a wide individual variation in susceptibility to hypoxia. In addition to progressively insufficient oxygen at higher altitudes, anything interfering with the blood's ability to carry oxygen can contribute to hypoxia (anemias, carbon monoxide, and certain drugs). Also, alcohol and various drugs decrease the brain's tolerance to hypoxia.

Your body has no built-in alarm system to let you know when you are not getting enough oxygen. It is impossible to predict when or where hypoxia will occur during a given flight, or how it will manifest itself. Some of the common symptoms of hypoxia are increased breathing rate, a light-headed or dizzy sensation, tingling or warm sensation, sweating, reduced visual field, sleepiness, blue coloring of skin, fingernails, and lips, and behavior changes. A particularly dangerous feature of hypoxia is an increased sense of well-being, called euphoria. It obscures a person's ability and desire to be critical of himself, slows reaction time, and impairs thinking

ability. Consequently, an hypoxic individual commonly believes things are getting progressively better while he nears total collapse.

The symptoms are slow but progressive, insidious in onset, and are most marked at altitudes starting above ten thousand feet. Night vision, however, can be impaired starting at an altitude of 5,000 feet. Persons who have recently overindulged in alcohol, who are moderate to heavy smokers, or who take certain drugs, may be more susceptible to hypoxia. Susceptibility may also vary in the same individual from day to day or even morning to evening. Use oxygen on flights above 10,000 feet and at any time when symptoms appear.

Depending upon altitude, an hypoxic individual has a limited time to make decisions and perform useful acts, even though he may remain conscious for a longer period. If pressurization equipment fails at certain altitudes the pilot and passengers have only a certain amount of time to get an oxygen mask on before they exceed their time of useful consciousness. The time of useful consciousness is approximately 3-5 minutes at 25,000 feet of altitude in the average individual and diminishes markedly as altitude increases. At 30,000 feet altitude, for

example, the time of useful consciousness is approximately 1 to 2 minutes. Therefore, in the event of depressurization, oxygen masks should be obtained and used immediately.

Should symptoms occur that cannot definitely be identified as either hypoxia or hyperventilation, try three or four deep breaths of oxygen. The symptoms should improve markedly if the condition was hypoxia (recovery from hypoxia is rapid).

HYPERVENTILATION

Hyperventilation, or overbreathing, is a disturbance of respiration that may occur in individuals as a result of emotional tension or anxiety. Under conditions of emotional stress, fright, or pain, breathing rate may increase, causing increased lung ventilation, although the carbon dioxide output of the body cells does not increase. As a result, carbon dioxide is "washed out" of the blood. The most common symptoms of hyperventilation are: dizziness; hot and cold sensations; tingling of the hands, legs and feet; tetany; nausea; sleepiness; and finally, unconsciousness. If the symptoms persist, discontinue use of oxygen and consciously slow your breathing rate until symptoms clear, and then resume normal breathing rate. Normal breathing can be aided by talking aloud.

ALCOHOL

Common sense and scientific evidence dictate that you must not fly as a crew member while under the influence of alcohol. Alcohol, even in small amounts, produces, among other things, a dulling of critical judgment; a decreased sense of responsibility; diminished skill reactions and coordination; decreased speed and strength of muscular reflexes (even after one ounce of alcohol); decreases in efficiency of eye movements during reading (after one ounce of alcohol); increased frequency of errors (after one ounce of alcohol); constriction of visual fields; decreased ability to see under dim illuminations; loss of efficiency of sense of touch; decrease of memory and reasoning ability; increased susceptibility to fatigue and decreased attention span; decreased relevance of response; increased self confidence with decreased insight into immediate capabilities.

Tests have shown that pilots commit major errors of judgment and procedure at blood alcohol levels substantially less than the minimum legal levels of intoxication for most states. These tests further show a continuation of impairment from alcohol up to as many as 14 hours after consumption, with no appreciable diminution of impairment. The body metabolizes ingested alcohol at a rate of about one-

third of an ounce per hour. Even after the body completely destroys a moderate amount of alcohol, a pilot can still be severely impaired for many hours by hangover.

The effects of alcohol on the body are magnified at altitudes, as 2 oz. of alcohol at 18,000 feet produce the same adverse effects as 6 oz. at sea level. In other words, "the higher you get, the higher you get".

Because of the slow destruction of alcohol by the body, a pilot may still be under influence eight hours after drinking a moderate amount of alcohol. Therefore, an excellent rule is to allow at least 12 to 24 hours between "bottle and throttle", depending on the amount of alcoholic beverage consumed.

DRUGS

Self-medication or taking medicine in any form when you are flying can be extremely hazardous. Even simple home or over-the-counter remedies and drugs such as aspirin, antihistamines, cold tablets, cough mixtures, laxatives, tranquilizers, and appetite suppressors, may seriously impair the judgment and coordination needed while flying. The safest rule is to take no medicine before or while flying, except

after consultation with your Aviation Medical Examiner.

SCUBA DIVING

Flying shortly after any prolonged scuba diving could be dangerous. Under the increased pressure of the water, excess nitrogen is absorbed into your system. If sufficient time has not elapsed prior to takeoff for your system to rid itself of this excess gas, you may experience the bends at altitudes even under 10,000 feet, where most light planes fly.

CARBON MONOXIDE AND NIGHT VISION

The presence of carbon monoxide results in hypoxia which will affect night vision in the same manner and extent as hypoxia from high altitudes. Even small levels of carbon monoxide have the same effect as an altitude increase of 8,000 to 10,000 feet. Smoking several cigarettes can result in a carbon monoxide saturation sufficient to effect visual sensitivity equal to an increase of 8,000 feet altitude.

ADDITIONAL INFORMATION

In addition to the coverage of subjects in this

section, the National Transportation Safety Board and the Federal Aviation Administration periodically issue, in greater detail, general aviation pamphlets concerning aviation safety. FAA Regional Offices also publish material under the FAA General Aviation Accident Prevention Program. These can be obtained at FAA Offices, Weather Stations, Flight Service Stations or Airport Facilities, and are very good sources of information and are highly recommended for study. Some of these are titled:

Airman's Information Manual
12 Golden Rules for Pilots
Weather or Not
Disorientation
Plane Sense
Weather Info Guide for Pilots
Wake Turbulence
Don't Trust to Luck, Trust to Safety
Rain, Fog, Snow
Thunderstorm - TRW
Icing
Pilot's Weather Briefing Guide
Thunderstorms Don't Flirt . . . Skirt 'em
IFR-VFR - Either Way Disorientation Can be Fatal
IFR Pilot Exam-O-Grams
VFR Pilot Exam-O-Grams
Flying Light Twins Safely

Tips on Engine Operation in Small General Aviation Aircraft
Estimating Inflight Visibility
Is the Aircraft Ready for Flight
Tips on Mountain Flying
Tips on Desert Flying
Always Leave Yourself An Out
Safety Guide for Private Aircraft Owners
Tips on How to Use the Flight Planner
Tips on the Use of Ailerons and Rudder
Some Hard Facts About Soft Landings
Propeller Operation and Care
Torque "What it Means to the Pilot"
Weight and Balance. An Important Safety Consideration for Pilots

SPECIAL CONDITIONS

MAINTENANCE

Airplanes operated for Air Taxi or other than normal operation, and airplanes operated in humid tropics, or cold and damp climates, etc., may need more frequent inspections for wear, corrosion and/or lack of lubrication. In these areas, periodic inspections should be performed until the operator can set his own inspection periods based on experience.

NOTE

The required periods do not constitute a guarantee that the item will reach the period without malfunction, as the aforementioned factors cannot be controlled by the manufacturer.

Corrosion, and its effects, must be treated at the earliest possible opportunity. A clean, dry surface is virtually immune to corrosion. Make sure that all drain holes remain unobstructed. Protective films and sealants help to keep corrosive agents from contacting metallic surfaces. Corrosion inspections should be made most frequently under high-corrosion-risk operating conditions, such as in areas of excessive airborne salt concentrations (e.g., near the sea) and in high-humidity areas (e.g., tropical regions).