

Beechcraft®

Musketeer®

23

(Serials M-2 thru M-554, except M-3)

Pilot's Operating Handbook and FAA Approved Airplane Flight Manual

FAA Approved in Normal and Utility Category based on CAR 3. 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 CAR 3.

Airplane Serial Number: M-529

Airplane Registration Number: N8741M

FAA Approved: [Signature]

A. C. Jackson
Beech Aircraft Corporation
DOA CE-2

This handbook supersedes all BEECH published owner's manuals, flight manuals, and check lists issued for this airplane with the exception of FAA Approved Airplane Flight Manual Supplements.

COPYRIGHT © BEECH 1994

P/N 169-590000-9
Issued: May, 1980

P/N 169-590000-9A2
Revised: July, 1994

Published By
Commercial Publications
BEECH AIRCRAFT CORPORATION
Wichita, Kansas 67201
U.S.A.

Beechcraft®
A Raytheon Company



Member of GAMA
General Aviation
Manufacturers Association

**MUSKETEER 23
(M-2 THRU M-554, EXCEPT M-3)
PILOT'S OPERATING HANDBOOK
AND**

FAA APPROVED AIRPLANE FLIGHT MANUAL

A2 Revision July, 1994

LOG OF REVISIONS

Page	Description
Title Page	Updated
Page A (A2)	New
10-1 thru 10-48	Revised Section X, Safety Information (May, 1994)
A2	



23 Musketeer
Pilot's Operating Handbook
and
FAA Approved
Airplane Flight Manual

INTRODUCTION

This Pilot's Operating Handbook and FAA Approved Airplane Flight Manual is in the format and contains data recommended in the GAMA (General Aviation Manufacturers Association) Handbook Specification Number 1. Use of this specification by all manufacturers will provide the pilot the same type data in the same place in all of the 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 basic fundamentals, BEECHCRAFT feels 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.

PILOT'S OPERATING HANDBOOK

and

FAA APPROVED AIRPLANE FLIGHT MANUAL

TABLE OF CONTENTS

SECTION 1	General
SECTION 2	Limitations
SECTION 3	Emergency Procedures
SECTION 4	Normal Procedures
SECTION 5	Performance
SECTION 6	Weight and Balance/Equipment List
SECTION 7	Systems Description
SECTION 8	Handling, Servicing and Maintenance
SECTION 9	Supplements
SECTION 10	Safety Information

SECTION I

GENERAL

TABLE OF CONTENTS

<i>SUBJECT</i>	<i>PAGE</i>
Important Notice	1-3
Use of the Handbook	1-4
Revising the Handbook	1-6
Supplements Revision Record	1-7
Vendor Issued STC Supplements	1-7
Airplane Three View	1-9
Ground Turning Clearance	1-10
Descriptive Data	
Engine	1-11
Propeller	1-11
Fuel	1-11
Oil Capacity	1-12
Maximum Certificated Weights	1-12
Cabin and Entry Dimensions	1-13
Baggage Space and Entry Dimensions	1-13
Specific Loadings	1-13
Symbols, Abbreviations and Terminology	
General Airspeed	1-14
Meteorological	1-16
Power	1-17
Engine Controls and Instruments	1-17
Airplane Performance and Flight Planning ..	1-18
Weight and Balance	1-18

INTENTIONALLY LEFT BLANK

BEECHCRAFT
Musketeer 23

Section I
General

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 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 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 operator of this airplane should 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 this airplane on the owner and the operator who should 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 for the continued

airworthiness of this airplane, in a condition equal to that of its original manufacture.

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

USE OF THE HANDBOOK

The Pilot's Operating Handbook is designed so that necessary documents may be maintained 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 1 General

Section 2 Limitations

Section 3 Emergency Procedures

Section 4 Normal Procedures

Section 5 Performance

Section 6 Weight and Balance/Equipment List

Section 7 Systems Description

Section 8 Handling, Servicing and Maintenance

Section 9 Supplements

Section 10 Safety Information

NOTE

Except as noted, all airspeeds quoted in this handbook are Indicated Airspeeds (IAS) and assume zero instrument error.

Due to the large variety of airplane configurations available through optional equipment, it should be noted that in describing and illustrating the handbook, optional equipment may not be designated as such in every case. Through variations provided by custom designing, 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 any 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 ANY PART, PART NUMBERS, KITS OR PUBLICATION THAT MAY BE REFERENCED IN THIS HANDBOOK WITHOUT PRIOR NOTICE.

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 Logs of Revisions 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 purpose it is the pilot's responsibility to maintain it in current status.

SUPPLEMENTS REVISION RECORD

Section IX contains supplements and a Log of Supplements page. On the "Log" page is a listing of the supplemental equipment available for installation on the BEECHCRAFT airplane.

Upon receipt of a new or revised supplement, compare the "Log" page just received with the existing "Log" page in the manual. Retain the "Log" page with the latest date on the bottom of the page (this log will usually have the greater number of entries) and discard the other log.

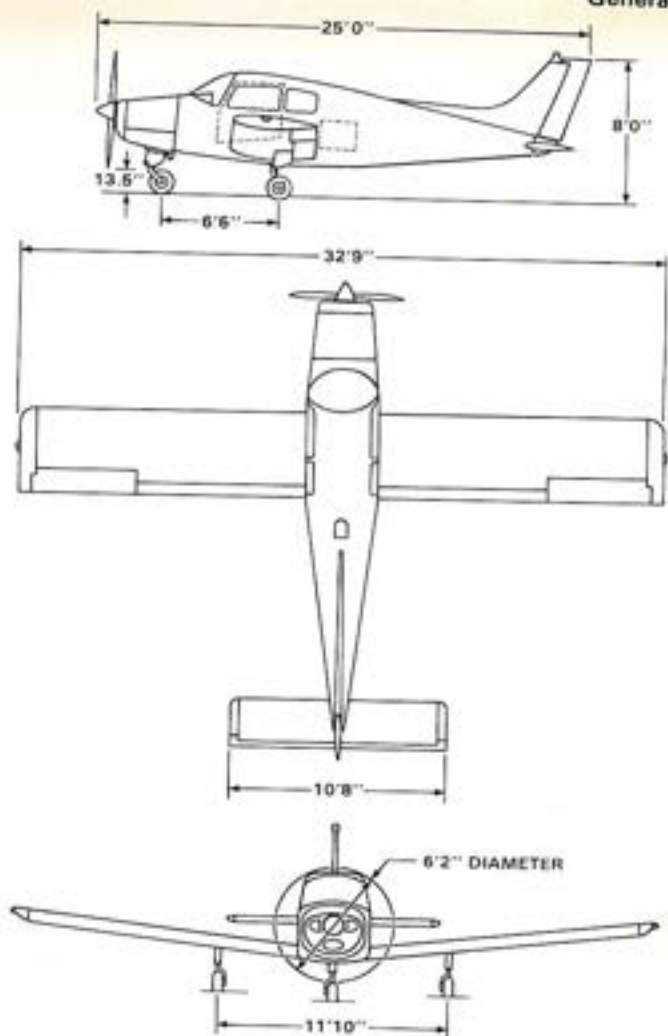
VENDOR-ISSUED STC SUPPLEMENTS

When a new airplane is delivered from the factory, the handbook delivered with it contains either an STC (Supplemental Type Certificate) Supplement or a Beech Flight Manual Supplement for every installed item requiring a supplement. If a new handbook for operation of the airplane is obtained at a later date, it is the responsibility of the owner/operator to ensure that all required STC Supplements (as well as weight and balance and other pertinent data) are transferred into the new handbook.

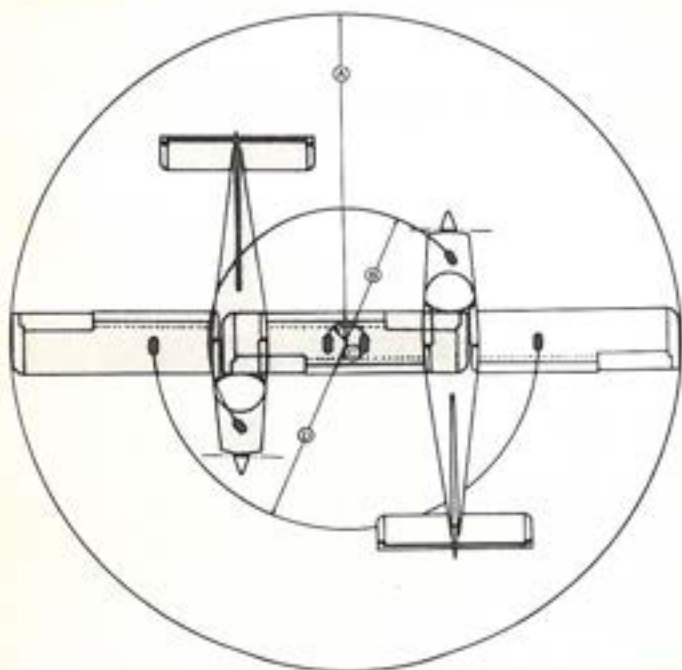
INTENTIONALLY LEFT BLANK

**BEECHCRAFT
Musketeer 23**

**Section I
General**



AIRPLANE THREE-VIEW



GROUND TURNING CLEARANCE

⊗ Radius for Wing Tip	23 ft. 11 in.
⊙ Radius for Nose Wheel	9 ft. 10 in.
⊙ Radius for Inside Gear	2 ft. 0 in.
⊙ Radius for Outside Gear	13 ft. 0 in.

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

DESCRIPTIVE DATA

ENGINE

Airplane is equipped with an Avco Lycoming O-320-D2B carbureted engine rated at 160 horsepower.

Take-off and Maximum

Continuous Power Full throttle or 2700 rpm
whichever occurs first.

Engine cooling has been demonstrated for a 100° F day.

PROPELLER

Flottorp FIC-7660-2 fixed-pitch, 74 inch diameter, two-blade propeller. Static rpm at maximum permissible throttle settings: Not over 2400 rpm and not under 2300 rpm. No cutoff permitted.

or

Sensenich M74DM-0-60 fixed-pitch, two-blade propeller. Maximum and minimum diameter limit of 74 in., no cutoff permitted.

NOTE

Other propellers are approved but not installed as original equipment. These are listed in the FAA Aircraft Specification A1CE.

FUEL

Aviation Gasoline 91/96 (blue) minimum grade or 100 (green) or 100LL (blue).

***59.8-gallon system**

(29.9 gallons each tank) *58.8 gallons usable

Each tank has provisions for partial filling to:

20 gallons each tank 38.8 gallons usable

After compliance with BEECHCRAFT S.I. No. 0624-281:

*59.8-gallon system
(29.9 gallons each tank) *52.2 gallons usable

Each tank has provisions for partial filling to:

20 gallons each tank 32.2 gallons usable

*Value given is nominal. Tank capacity will vary with temperature and manufacturing tolerances.

OIL CAPACITY

The oil capacity is 8 quarts.

APPROVED OIL TYPES

Avco Lycoming Specification Number 301E approves for use lubricating oils which conform to both MIL-L-6082B straight mineral type and MIL-L-22851 ashless dispersant lubricants for airplane engines. Refer to the Approved Engine Oils table in the HANDLING, SERVICING AND MAINTENANCE section for a list of approved products.

MAXIMUM CERTIFICATED WEIGHTS

NORMAL CATEGORY

Maximum Ramp Weight	2305 lbs
Maximum Take-Off Weight	2300 lbs
Maximum Landing Weight	2300 lbs

BEECHCRAFT
Musketeer 23

Section I
General

UTILITY CATEGORY

Maximum Ramp Weight	1965 or 2005 lbs
Maximum Take-Off Weight	1960 or 2000 lbs
Maximum Landing Weight	1960 or 2000 lbs

ALL CONFIGURATIONS

Maximum Zero Fuel Weight	No Structural Limit
Maximum Weight in Baggage Compartment	140 lbs

CABIN AND ENTRY DIMENSIONS

Length (maximum)	7 ft 11 in.
Height (maximum)	4 ft 0 in.
Width (maximum)	3 ft 5 in.
Cabin Door	36 in. wide by 38 in. high

BAGGAGE SPACE AND ENTRY DIMENSIONS

Compartment Volume	19.5 cu ft
Door Width (Minimum)	23.6 in.
Door Height (Minimum)	18.5 in.

SPECIFIC LOADINGS (2300 lbs.)

Wing Loading	15.86 lbs/sq ft
Power Loading	14.38 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.

GENERAL 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.
- 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.
- KCAS** Calibrated Airspeed expressed in "knots".
- CIAS** 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.

BEECHCRAFT
Musketeer 23

Section I
General

V_A 132 MPH
Maneuvering Speed is the maximum speed at which application of full available aerodynamic control will not overstress the airplane.

110 MPH
 V_{FE}
Maximum Flap Extended Speed is the highest speed permissible with wing flaps in a prescribed extended position.

171 MPH
 V_{NE}
Never Exceed Speed is the speed limit that may not be exceeded at any time.

151 MPH
 V_{NO} or V_C
Maximum Structural Cruising Speed is the speed that should not be exceeded except in smooth air and then only with caution.

90 MPH
 V_S
Stalling Speed or the minimum steady flight speed at which the airplane is controllable.

62 MPH
 V_{SO}
Stalling Speed or the minimum steady flight speed at which the airplane is controllable in the landing configuration.

V_X 84 MPH
Best Angle-of-Climb Speed is the airspeed which delivers the greatest gain of altitude in the shortest possible horizontal distance.

V_Y 89 MPH
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	<p>International Standard Atmosphere in which</p> <ol style="list-style-type: none">(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 in 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	<p>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.</p>
Indicated Pressure Altitude	<p>The number actually read from an altimeter when the barometric sub-scale has been set to 29.92 in Hg. (1013.2 millibars).</p>
Station Pressure	<p>Actual atmospheric pressure at field elevation.</p>
Wind	<p>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.</p>

**BEECHCRAFT
Musketeer 23**

**Section I
General**

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.
----------------------	--

POWER TERMINOLOGY

Take off and Maximum Continuous	Highest power rating not limited by time.
---------------------------------------	--

ENGINE CONTROLS AND INSTRUMENTS

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.
--------------------	--

Carburetor Heat Control	Controls heat to carburetor for prevention of ice.
----------------------------	--

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 take-off 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.
PPH	Pounds per hour.

WEIGHT AND BALANCE TERMINOLOGY

Reference Datum	An imaginary vertical plane from which all horizontal distances are measured for balance purposes.
Station	A location along the airplane fuselage usually given in terms of distance from the reference datum.

**BEECHCRAFT
Musketeer 23**

**Section I
General**

Arm	The horizontal distance from the reference datum to the center of gravity (C.G.) 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 (C.G.)	The point at which an airplane would balance if suspended. Its distance from the reference datum is found by dividing the total moment by the total weight of the airplane.
C.G. Arm	The arm obtained by adding the airplane's individual moments and dividing the sum by the total weight.
C.G. Limits	The extreme center of gravity locations within which the airplane must be operated at a given weight.
Usable Fuel	Fuel available for flight planning.
Unusable Fuel	Fuel remaining after a runout test has been completed in accordance with governmental regulations.
Standard Empty Weight	Weight of a standard airplane including unusable fuel, full operating fluids and full oil.
Basic Empty Weight	Standard empty weight plus optional equipment.

Section I
General

BEECHCRAFT
Musketeer 23

Payload	Weight of occupants, cargo and baggage.
Useful Load	Difference between take-off weight, or ramp weight if applicable, 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.
Zero Fuel Weight	Weight exclusive of usable fuel.
Tare	The weight of chocks, blocks, stands, etc., used on the scales when weighing an airplane.
Leveling Points	Those points which are used during the weighing process to level the airplane.
Jack Points	Points on the airplane identified by the manufacturer as suitable for supporting the airplane for weighing or other purposes.

SECTION II

LIMITATIONS

TABLE OF CONTENTS

<i>SUBJECT</i>	<i>PAGE</i>
Airspeed Limitations	2-3
Airspeed Indicator Markings	2-4
Power Plant Limitations	
Engine	2-4
Operating Limitations	2-5
Fuel Grades	2-5
Fuel Additives	2-5
Approved Oil Types	2-5
Propeller Specifications	2-6
Power Plant Instrument Markings	2-6
Oil Temperature	2-6
Oil Pressure	2-6
Fuel Pressure	2-6
Tachometer	2-6
Miscellaneous Instrument Markings	2-7
Instrument Air	2-7
Fuel Quantity	2-7
Weight Limits	2-7
Normal Category	2-7
Utility Category	2-7
Center of Gravity Limits	2-8
Normal Category	2-8
Utility Category	2-8
Reference Datum	2-8

TABLE OF CONTENTS (Continued)

<i>SUBJECT</i>	<i>PAGE</i>
Maneuver Limits	2-9
Normal Category (2300 Pounds)	2-9
Utility Category (1960 or 2000 Pounds)	2-9
Maneuver	2-9
Flight Load Factors	2-9
Normal Category (2300 Pounds)	2-9
Utility Category (1960 or 2000 Pounds)	2-9
Minimum Flight Crew	2-10
Kinds of Operation Limits	2-10
Required Equipment for Various	
Conditions of Flight	2-10
Legend	2-11
Fuel	2-17
Fuel Management	2-17
Placards	2-18

BEECHCRAFT
Musketeer 23

Section II
Limitations

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

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

AIRSPEED LIMITATIONS

SPEED	CAS		IAS		REMARKS
	KNOTS	MPH	KNOTS	MPH	
Never Exceed V_{NE}	149	171	149	171	Do not exceed this speed in any operation
Maximum Structural Cruising V_{NO} or V_C	131	151	131	151	Do not exceed this speed except in smooth air and then only with caution
Maneuvering V_A	115	132	115	132	Do not make full or abrupt control movements above this speed
Maximum Flap Extension/ Extended V_{FE}	96	110	96	110	Do not extend flaps or operate with flaps extended above this speed

***AIRSPEED INDICATOR MARKINGS**

MARK- ING	CAS		IAS		SIGNIF- ICANCE
	KTS	MPH	KTS	MPH	
White Arc	54-96	62-110	54-96	62-110	Full Flap Operating Range
Green Arc	62-131	71-151	62-131	71-151	Normal Operating Range
Yellow Arc	131-149	151-171	131-149	151-171	Operate With Caution, Only in Smooth Air
Red Line	149	171	149	171	Maximum Speed For All Operations

* The limits of the arcs on the airspeed indicator are marked in CAS values.

POWER PLANT LIMITATIONS

ENGINE

One Avco Lycoming engine model O-320-D2B engine rated at 160 hp.

Take-off and Maximum

Continuous Power Full throttle or 2700 rpm
whichever occurs first.

**BEECHCRAFT
Musketeer 23**

**Section II
Limitations**

OPERATING LIMITATIONS

Engine Speed	2700 rpm
*Oil Temperature	245°F
Oil Pressure	
Minimum	25 psi
Maximum	100 psi
Fuel Pressure	
Minimum	0.5 psi
Maximum	6.0 psi
Mixture - Set per leaning instructions on performance charts.	

*All temperatures are established for a 100°F day.

FUEL GRADES

Aviation Gasoline 91/96 (blue) minimum grade or 100 (green) or 100LL (blue).

FUEL ADDITIVES

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

APPROVED OIL TYPES

Avco Lycoming Specification Number 301E approves for use lubricating oils which conform to both MIL-L-6082B straight mineral type and MIL-L-22851 ashless dispersant lubricants for airplane engines. Refer to the Approved Engine Oils table in the HANDLING, SERVICING AND MAINTENANCE section for a list of approved products.

PROPELLER SPECIFICATIONS

Flottorp FIC-7660-2 fixed-pitch, 74 inch diameter, two-blade propeller. Static rpm at maximum permissible throttle settings: Not over 2400 rpm and not under 2300 rpm. No cutoff permitted.

or

Sensenich M74DM-0-60 fixed-pitch, two-blade propeller. Maximum and minimum diameter limit of 74 in., no cutoff permitted.

NOTE

Other propellers are approved but not installed as original equipment. These are listed in the FAA Aircraft Specification A1CE.

POWER PLANT INSTRUMENT MARKINGS

OIL TEMPERATURE

Caution (Yellow Arc) 60° to 120°F
Operating Range
(Green Arc) 120° to 245°F
Maximum (Red Line) 245°F

OIL PRESSURE

Minimum Pressure (Yellow Arc) 25 to 60 psi
Operating Range (Green Arc) 60 to 85 psi
Maximum Pressure (Red Line) 100 psi

FUEL PRESSURE

Operating Range (Green Arc) 0.5 to 6.0 psi

TACHOMETER

Engine Warm-up 800 to 1200 rpm
Normal Operating Range
(Green Arc) 2200 to 2700 rpm
Maximum RPM (Red Radial) 2700 rpm

MISCELLANEOUS INSTRUMENT MARKINGS

INSTRUMENT AIR

Operating Range (Green Arc) .. 3.75 to 5.25 in. Hg

FUEL QUANTITY

After compliance with BEECHCRAFT S.I. No. 0624-281

Yellow Band E to 3/8 full

WEIGHT LIMITS

NORMAL CATEGORY

Maximum Ramp Weight 2305 lbs

Maximum Take-off

and Landing Weight 2300 lbs

Zero Fuel Weight No structural Limitation

Maximum Baggage Compartment

Load 140 lbs

UTILITY CATEGORY

Maximum Ramp Weight 1965 or 2005 lbs

Maximum Take-off

and Landing Weight 1960 or 2000 lbs

Zero Fuel Weight No Structural Limitation

Maximum Baggage Compartment Load 140 lbs

CENTER OF GRAVITY LIMITS

NORMAL CATEGORY

Forward: 107.8 inches aft of datum to 1800 lbs with straight line variation to 113.0 inches at 2300 lbs.

Aft: 118.3 inches aft of datum at all weights.

UTILITY CATEGORY

Forward: 107.8 inches aft of datum to 1800 lbs with straight line variation to 109.9 inches aft of datum at 1960 or 2000 lbs.

Aft: 114.0 inches aft of datum at all weights.

REFERENCE DATUM

Datum is 103 inches forward of wing leading edge.

MAC length is 52.7 inches.

**BEECHCRAFT
Musketeer 23**

**Section II
Limitations**

MANEUVER LIMITS

This airplane is approved for 4 place in the Normal Category and for 2 place in the Utility Category. Maximum slip duration is 30 seconds.

NORMAL CATEGORY (2300 POUNDS)
No acrobatic maneuvers approved.

UTILITY CATEGORY (1960 or 2000 POUNDS)
No acrobatic maneuvers are approved except those listed below.

<i>MANEUVER</i>	<i>ENTRY SPEED (CAS)</i>
Chandelle	115 kts/132 mph
Steep Turn	115 kts/132 mph
Lazy Eight	115 kts/132 mph
Stall (Except Whip)	Use slow deceleration

FLIGHT LOAD FACTORS

NORMAL CATEGORY (2300 POUNDS)

Flight maneuvering load factors	
Flaps Up	+3.8, -1.9
Flaps Down	+1.9

UTILITY CATEGORY (1960 or 2000 POUNDS)

Flight maneuvering load factors	
Flaps Up	+4.4, -2.2
Flaps Down	+2.2

MINIMUM FLIGHT CREW

One (1) Pilot

KINDS OF OPERATION LIMITS

1. VFR day and night
2. IFR day and night

**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 certificated 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 the 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 temporarily.

**BEECHCRAFT
Musketeer 23**

**Section II
Limitations**

For the sake of brevity, the Required Equipment Listing does not include obviously required items such as wings, rudders, 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 AIR-WORTHINESS 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 his airplane, will limit the conditions under which he may operate the airplane.

WARNING

**FLIGHT IN KNOWN ICING CONDITIONS
PROHIBITED.**

LEGEND

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

(-) Indicates that the item may be inoperative for the specified condition.

(*) Refer to the REMARKS AND/OR EXCEPTIONS column for explicit information or reference.

SYSTEM and/or COMPONENT	VFR Day				Remarks and/or Exceptions
	VFR Night				
	IFR Day		IFR Night		
GENERAL					
Overwater flight	•	•	•	•	•Per FAR 91.33
COMMUNICATIONS					
VHF communications system	•	•	•	•	•Per FAR 91.33
ELECTRICAL POWER					
Battery	1	1	1	1	
DC generator	1	1	1	1	

**BEECHCRAFT
Musketeer 23**

**Section II
Limitations**

EQUIPMENT AND FURNISHING									
Seat belts and	1	1	1	1	1			- Per Person or Per FAR 91.33	
Shoulder harness	1	1	1	1	1			- Per FAR 91.52	
Emergency locator transmitter									
FIRE PROTECTION									
Portable fire extinguisher	*	*	*	*	*			.*Optional	
FLIGHT CONTROLS									
Stabilator trim tab indicator	1	1	1	1	1			- May be inoperative for ferry flight provided tabs are visually checked in the neutral position prior to takeoff and checked for full range of operation.	
Stall warning	1	1	1	1	1				

SYSTEM and/or COMPONENT	VFR Day				Remarks and/or Exceptions
	VFR Night		IFR Night		
	IFR Day	IFR Night	IFR Day	IFR Night	
FUEL EQUIPMENT					
Fuel boost pump	1	1	1	1	- 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.
Engine driven fuel pump	1	1	1	1	
Fuel quantity indicator	2	2	2	2	
Fuel pressure indicator	1	1	1	1	
ICE AND RAIN PROTECTION					
Emergency static air source	*	*	*	*	.*Optional
Pitot heater	*	*	1	1	.*Optional

**BEECHCRAFT
Musketeer 23**

**Section II
Limitations**

LIGHTS					
Cockpit and instrument lights	-	*	-	*	-*Lights must be operative.
Landing light	-	*	-	*	-*Per FAR 91.33
Rotating beacon	-	1	-	1	
Position light	-	3	-	3	
NAVIGATION INSTRUMENTS					
Altimeter	1	1	1	1	
Airspeed indicator	1	1	1	1	
Vertical speed	-	-	-	-	
Magnetic compass	1	1	1	1	
Attitude indicator	-	-	1	1	
Turn coordinator	-	-	1	1	
Directional gyro	-	-	1	1	
Clock	-	-	1	1	
Transponder	*	*	1	1	-*Per FAR 91.24, 91.90, 91.97
Navigation equipment	-	-	*	*	-*Per FAR 91.33

SYSTEM and/or COMPONENT	VFR Day				Remarks and / or Exceptions
	VFR Night		IFR Day		
VACUUM					
Vacuum system for Instrument air	-	1	1	1	
Vacuum gage	-	1	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

TOTAL FUEL with left and right wing fuel systems full:

Two *29.9-gallon tanks in wings with a total of *58.8 gallons usable.

After compliance with BEECHCRAFT S.I. No. 0624-281:

Two *29.9-gallon tanks in wings with a total of *52.2 gallons usable.

*Value given is nominal. Tank capacity will vary with temperature and manufacturing tolerances.

FUEL MANAGEMENT

Do not take off when the Fuel Quantity Gages indicate in the *Yellow Band or with less than 11 gallons in each main tank.

Maximum slip duration: 30 seconds

*Yellow band was installed by BEECHCRAFT S.I. No. 0624-281.

PLACARDS

On Left Side Panel (CAS):

THIS AIRPLANE MUST BE OPERATED IN COMPLIANCE WITH THE OPERATING LIMITATIONS STATED IN THE FORM OF PLACARDS, MARKINGS AND MANUALS.	
NORMAL CATEGORY	
MAXIMUM DESIGN WEIGHT	2300 LBS
REFER TO WEIGHT AND BALANCE DATA FOR LOADING INSTRUCTIONS	
FLIGHT MANEUVERING LOAD FACTOR	FLAPS UP 42.8 - 1.0 DOWN 41.9
MAXIMUM MANEUVERING SPEED	132 MPH
NO AEROBATIC MANEUVERS INCLUDING SPINS APPROVED	
UTILITY CATEGORY	
MAXIMUM DESIGN WEIGHT	1960 LBS
REFER TO WEIGHT AND BALANCE DATA FOR LOADING INSTRUCTIONS	
FLIGHT MANEUVERING LOAD FACTOR	FLAPS UP 44.4 - 2.2 DOWN 42.2
NO AEROBATIC MANEUVERS APPROVED EXCEPT THOSE LISTED BELOW:	
MANEUVER	MAXIMUM ENTRY SPEED
CHANDLLES	132 MPH
LAZY EIGHTS	132 MPH
STEEL TURNS	132 MPH
STALLS (EXCEPT WHIP STALLS)	SLOW DECELERATION

*Below Operational Limitations Placard on Left Side Panel
(after compliance with BEECHCRAFT S. B. No. 67-23):*

NOTE:	
⊕	MAXIMUM ALTITUDE LOSS DURING STALL 300 FT. ⊕

**BEECHCRAFT
Musketeer 23**

**Section II
Limitations**

On Left Side Panel (CAS):

THIS AIRPLANE MUST BE OPERATED IN COMPLIANCE WITH THE OPERATING LIMITATIONS STATED IN THE FORM OF PLACARDS, MARKINGS AND MANUALS	
NORMAL CATEGORY	
MAXIMUM DESIGN WEIGHT	2300 LBS.
REFER TO WEIGHT AND BALANCE DATA FOR LOADING INSTRUCTIONS	
FLIGHT MANEUVERING LOAD FACTOR	FLAPS UP 4.0 - 1.5 DOWN 4.0
MAXIMUM MANEUVERING SPEED	132 KPH
NO AEROBATIC MANEUVERS INCLUDING SPINS APPROVED	
UTILITY CATEGORY	
MAXIMUM DESIGN WEIGHT	2300 LBS.
REFER TO WEIGHT AND BALANCE DATA FOR LOADING INSTRUCTIONS	
FLIGHT MANEUVERING LOAD FACTOR	FLAPS UP 4.0 - 2.2 DOWN 4.0
NO AEROBATIC MANEUVERS APPROVED EXCEPT THOSE LISTED BELOW	
MANUEVER	MAXIMUM TURNING SPEED
CHANDLLES	132 KPH
LOFT FLIGHTS	132 KPH
STEEP TURNS	132 KPH
STALLS - PRECEPT SHIP STALLS	3000 DECELERATION
* SPINS FOR OPERATIONAL LIMITATIONS SEE PLACARD ON SUN VISOR	

* Remove per AD 74-23-09

On Left Side Panel (CAS):

THIS AIRPLANE MUST BE OPERATED IN COMPLIANCE WITH THE OPERATING LIMITATIONS STATED IN THE FORM OF PLACARDS, MARKINGS AND MANUALS	
NORMAL CATEGORY	
MAXIMUM DESIGN WEIGHT	2300 LBS.
REFER TO WEIGHT AND BALANCE DATA FOR LOADING INSTRUCTIONS	
FLIGHT MANEUVERING LOAD FACTOR	FLAPS UP 4.0 - 1.5 DOWN 4.0
MAXIMUM MANEUVERING SPEED	132 KPH
NO AEROBATIC MANEUVERS INCLUDING SPINS APPROVED	
UTILITY CATEGORY	
MAXIMUM DESIGN WEIGHT	2300 LBS.
REFER TO WEIGHT AND BALANCE DATA FOR LOADING INSTRUCTIONS	
FLIGHT MANEUVERING LOAD FACTOR	FLAPS UP 4.0 - 2.2 DOWN 4.0
NO AEROBATIC MANEUVERS APPROVED EXCEPT THOSE LISTED BELOW	
MANUEVER	MAXIMUM TURNING SPEED
CHANDLLES	132 KPH
LOFT FLIGHTS	132 KPH
STEEP TURNS	132 KPH
STALLS - PRECEPT SHIP STALLS	3000 DECELERATION
* SPINS FOR OPERATIONAL LIMITATIONS SEE PLACARD ON SUN VISOR	

* Remove per AD 74-23-09

PLACARDS (Cont'd)

On Upper Left Instrument Panel When Placard is Installed:

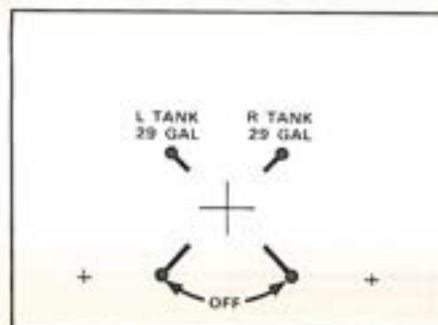
**RAISE FLAPS TO
INCREASE BRAKE EFFECTIVENESS**

On Flap Extension Handle (CAS):

FLAPS PULL TO EXTEND, MAX SPEED 110 MPH

RETRACTED	0°
FIRST NOTCH	15°
SECOND NOTCH	30°

On Fuel Selector Panel:



Raytheon Aircraft

Musketeer 23

Log of Temporary Changes to the

Pilot's Operating Handbook and

FAA Approved Airplane Flight Manual

P/N 169-590000-9

Changes to this Pilot's Operating Handbook and FAA Approved Airplane Flight Manual must be in the airplane for all flight operations.

Part Number	Subject	Date
169-590000-9TC1	Fuel Selector Placard Installation	8/26/97

Note: This page should be filed in the front of the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual immediately following the Title page. This page replaces any Log of Temporary Changes page dated prior to the date in the lower right corner of this page.

22



Faint, illegible text or markings within the rectangular area.

**Temporary Change
to the
Pilot's Operating Handbook
and
FAA Approved Airplane Flight Manual
P/N 169-590000-9TC1**

Publication Affected	23 Pilot's Operating Handbook and FAA Approved Airplane Flight Manual (P/N 169-590000-9, Issued May, 1980 or Subsequent)
Airplane Serial Numbers Affected	M-2 thru M-554, except M-3
Description of Change	The addition of a placard to the fuel selector to warn of the no-flow condition that exists between the fuel selector detents.
Filing Instructions	Insert this temporary change into the 23 Pilot's Operating Handbook and FAA Approved Airplane Flight Manual immediately following page 2-20 (Section II, LIMITATIONS) and retain until rescinded or replaced.

LIMITATIONS

PLACARDS

*Located On The Face Of The Fuel Selector Valve, For Those
Airplanes In Compliance With S.B. 2670:*

**WARNING - POSITION SELECTOR IN DETENTS ONLY - NO
FUEL FLOW TO ENGINE BETWEEN DETENTS**

Approved:

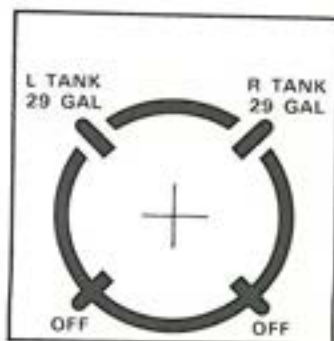


A.C. Jackson
Raytheon Aircraft Company
DOA CE-2

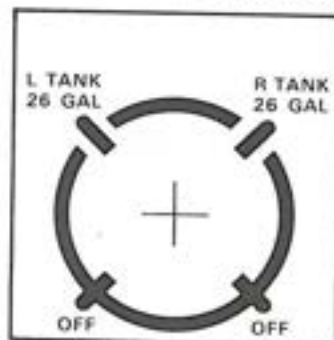
BEECHCRAFT
Musketeer 23

Section II
Limitations

On Fuel Selector Panel (after compliance with BEECHCRAFT S. I. No. 0838):



On Fuel Selector Panel (after compliance with BEECHCRAFT S. I. No. 0624-281 and S. I. No. 0838):



Adjacent to Engine Instrument Cluster (airplanes after compliance with BEECHCRAFT S. I. No. 0624-281):

DO NOT TAKE OFF WHEN FUEL QUANTITY GAUGE INDICATES IN YELLOW OR WITH LESS THAN 11 GALLONS IN EACH MAIN TANK. MAXIMUM SLIP DURATION IS 30 SECONDS.

PLACARDS (Cont'd)

On Fuel Selector Panel (after compliance with BEEHCRAFT S.I. No. 1095)



On Fuel Selector Panel (after compliance with BEEHCRAFT S.I. No. 0624-281 and S.I. No. 1095)



BEECHCRAFT
Musketeer 23

Section II
Limitations

On Lower Sidewall Adjacent to Pilot (when installed):



or



or



PLACARDS (Cont'd)

On Baggage Compartment Door:

BAGGAGE COMPARTMENT
140 POUNDS
MAXIMUM CAPACITY

On Baggage Compartment Door:

TO LEVEL AIRCRAFT - LEVEL
BAGGAGE COMPARTMENT FLOOR

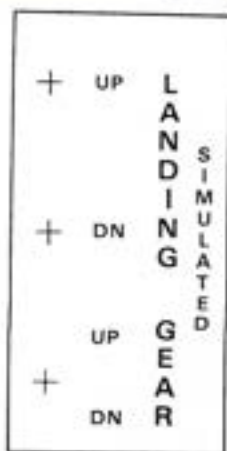
On Pedestal Between Front Seats:



BEECHCRAFT
Musketeer 23

Section II
Limitations

On Lower Left Instrument Panel (when installed):



INTENTIONALLY LEFT BLANK

SECTION III

EMERGENCY PROCEDURES

TABLE OF CONTENTS

<i>SUBJECT</i>	<i>PAGE</i>
Emergency Airspeeds	3-3
Engine Failure	
During Take-Off Ground Roll	3-4
After Liftoff and In Flight	3-4
If No Restart	3-5
Engine Discrepancy Checks	
Condition: Rough Running Engine	3-5
Condition: Loss of Engine Power	3-5
Airstart Procedure	3-6
Engine Fire	
In Flight	3-6
On the Ground	3-7
Emergency Descent	3-7
Maximum Glide Configuration	3-7
Landing Emergencies	
Landing Without Power	3-7
Systems Emergencies	3-8
Generator-Out Procedure	3-8
Emergency Static Air Source System	3-8
Unlatched Door in Flight	3-9
Spins	3-9
Recovery	3-9

INTENTIONALLY LEFT BLANK

All airspeeds quoted in this section are indicated airspeeds (IAS).

EMERGENCY AIRSPEEDS

Emergency Descent	131 kts/151 mph
Glide	78 kts/90 mph
Emergency Landing Approach	69 kts/79 mph

Stall warning horn is inoperative when MASTER switch is turned off.

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.

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. MASTER and FUEL BOOST switches - OFF
5. Magneto/Start Switch - OFF

AFTER LIFTOFF AND IN FLIGHT

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

1. Fuel Selector Valve - SELECT OTHER TANK (Check to feel detent and check visually)
2. Fuel Boost Pump - ON
3. Mixture - FULL RICH, then LEAN as required
4. Magnetos - 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. Establish maximum glide / 75 kts
2. Throttle - CLOSE
3. Fuel Selector Valve - OFF
4. Mixture - IDLE CUT-OFF
5. Magneto/Start Switch - OFF
6. MASTER and FUEL BOOST switches - OFF

When certain of reaching the selected landing site:

7. Airspeed - 69 kts/79 mph
8. Flaps - AS REQUIRED

ENGINE DISCREPANCY CHECKS

CONDITION: ROUGH RUNNING ENGINE

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

CONDITION: LOSS OF ENGINE POWER

1. Carburetor Heat - FULL HOT
2. Fuel Pressure Gage - CHECK

If fuel flow is abnormally low:

- a. Mixture - FULL RICH
 - b. Fuel Boost Pump - ON (Lean as required)
 - c. Fuel Boost Pump - OFF if performance does not improve in a few moments
3. Fuel Quantity Indicator - CHECK for fuel supply in tank being used

If tank being used is empty:

- a. Fuel Tank Selector Valve - SELECT OTHER FUEL TANK (feel for detent and check visually)
- b. Fuel Boost Pump - ON

AIR START PROCEDURE

1. Fuel Selector Valve - SELECT TANK MORE NEARLY FULL (check to feel detent and check visually)
2. Throttle - FULL FORWARD
3. Mixture - FULL RICH
4. Fuel Boost Pump - ON until power is regained, then OFF. (Leave on if engine driven fuel pump is inoperative.)
5. Throttle - ADJUST to desired power
6. Mixture - LEAN as required

ENGINE FIRE

IN FLIGHT

The ventilation controls must be closed to shut off all heating system outlets so that smoke and fumes will not enter the cabin. The control labeled CABIN AIR must be pulled out to close. The control labeled DEFROST must be pushed in to close. In the event of an engine fire, shut down the engine as follows and make a landing:

1. Fuel Selector Valve - OFF
2. Mixture - IDLE CUT-OFF
3. Throttle - CLOSE
4. Cabin Air Control - pull OFF
5. Defrost Valve - push OFF
6. MASTER switch - OFF
7. Magneto/Start Switch - OFF
8. Do not attempt to restart engine

ON THE GROUND

1. Fuel Selector Valve - OFF
2. Throttle - CLOSED
3. Mixture - IDLE CUT-OFF
4. MASTER and Magneto/Start Switches - OFF
5. Extinguish with Fire Extinguisher.

EMERGENCY DESCENT

1. Carburetor Heat - FULL HOT or FULL COLD, AS REQUIRED
2. Throttle - IDLE
3. Airspeed - ESTABLISH 131 kts/151 mph

MAXIMUM GLIDE CONFIGURATION

1. Flaps - UP
2. Airspeed - 78 kts/90 mph

Glide distance (Zero Wind Condition) is approximately 1.7 nautical miles (2 statute miles) per 1000 feet of altitude above the terrain.

LANDING EMERGENCIES

LANDING WITHOUT POWER

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

1. Airspeed - 69 kts/79 mph
2. Fuel Selector Valve - OFF
3. Mixture - IDLE CUT-OFF
4. Magneto/Start Switch - OFF
5. Flaps - AS REQUIRED
6. MASTER and FUEL BOOST Switches - OFF

SYSTEMS EMERGENCIES

GENERATOR-OUT PROCEDURE

A failure of the generator will place the entire electrical operation of the airplane on the battery. Generator failure will be indicated by a discharging or fluctuating ammeter. If this condition develops, turn off all nonessential electrical load to conserve the battery life.

EMERGENCY STATIC AIR SOURCE SYSTEM

THE EMERGENCY 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 obstructions 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 emergency 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 Emergency Static Air System is desired for use:

1. Emergency Static Air Source - Switch to ON - EMERGENCY. (Lower Sidewall Adjacent to Pilot)
2. For Airspeed Calibration and Altimeter Correction, refer to PERFORMANCE section.

CAUTION

Be certain the emergency static air valve is in the OFF - NORMAL position when system is not needed.

UNLATCHED DOOR IN FLIGHT

If the cabin door latch is not fully engaged it may come unlatched in flight. This may occur during or just after take-off. 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.

SPINS

WARNING

Intentional spins are prohibited.

RECOVERY

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.

INTENTIONALLY LEFT BLANK

SECTION IV

NORMAL PROCEDURES

TABLE OF CONTENTS

<i>SUBJECT</i>	<i>PAGE</i>
Airspeeds for Safe Operation	4-3
Preflight Inspection	4-4
Before Starting	4-6
External Power	4-6
Starting Engine Using Auxiliary Power Unit	4-7
Starting	4-7
After Starting, and Before Taxi	4-8
Before Takeoff	4-8
Takeoff	4-9
Climb	4-10
Cruise	4-10
Descent	4-10
Before Landing	4-11
Balked Landing	4-12
After Landing	4-12
Shutdown	4-12
Environmental Systems	4-12
Heating and Ventilation	4-12
Cold Weather Operation	4-13
Preflight Inspection	4-13
Engine	4-13
Icing Conditions	4-14
Engine Break-In Information	4-14

INTENTIONALLY LEFT BLANK

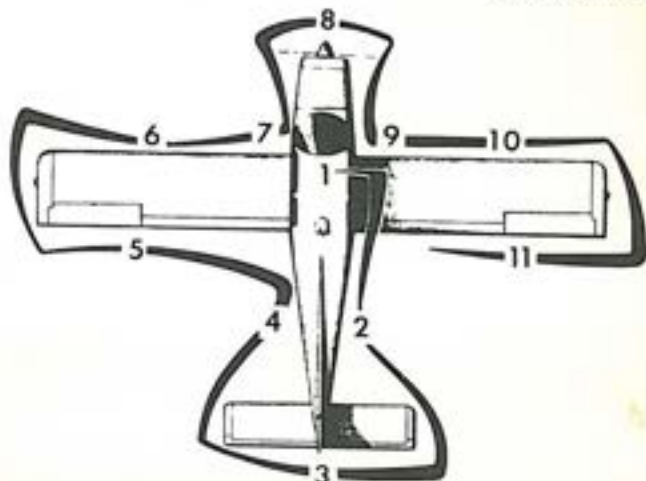
**BEECHCRAFT
Musketeer 23**

**Section IV
Normal Procedures**

All airspeeds quoted in this section are indicated airspeeds (IAS)

AIRSPEEDS FOR SAFE OPERATION

Take-off	
Lift-off	65 kts/75 mph
50 Ft.	73 kts/84 mph
Maximum Climb	
Best Rate (V_y)	75 kts/86 mph
Best Angle (V_x)	70 kts/81 mph
Cruise Climb	87 kts/100 mph
Maximum Turbulent Air Penetration	115 kts/132 mph
Balked Landing	64 kts/74 mph
Landing Approach	69 kts/79 mph
Maximum Demonstrated Crosswind	13 kts/15 mph



PREFLIGHT INSPECTION

Emergency Locator Transmitter - ARMED
Location may vary with individual airplanes

1. CABIN:

- a. Parking Brake - SET
- b. All Switches - OFF

2. RIGHT FUSELAGE:

- a. Baggage Door - CHECK
- b. Static Air Button - UNOBSTRUCTED

3. EMPENNAGE:

- a. Control Surfaces - CHECK
- b. Tie Down - REMOVE
- c. Position Light - CHECK

4. LEFT FUSELAGE:

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

5. LEFT WING TRAILING EDGE:

- a. Flap - CHECK
- b. Fuel Vent Line - UNOBSTRUCTED
- c. Aileron - CHECK
- d. Wing Tip - CHECK
- e. Position Light - CHECK

6. LEFT WING LEADING EDGE:

- a. Pitot Tube - CHECK, (Remove Cover)
- b. Landing Light - CHECK
- c. Tie Down and Chocks - REMOVE
- d. Stall Warning - CHECK for movement of vane
- e. Fuel Tank - CHECK QUANTITY; Filler Cap - SECURE.

7. LEFT LANDING GEAR:

- a. Tire and Brake - CHECK
- b. Fuel Sump - DRAIN

8. NOSE SECTION:

- a. Left Cowl - SECURE
- b. Induction Air Intake - CLEAR, Filter - CHECK for condition and security of attachment.
- c. Propeller - CHECK, General Condition, Nicks, etc.
- d. Tire and Nose Gear - CHECK
- e. Engine Oil - CHECK (See Servicing, Section 8) Cap and Dipstick - SECURE
- f. Right Cowl - SECURE
- g. Fuel Strainer - DRAIN
- h. Chocks - REMOVE

9. RIGHT LANDING GEAR:

- a. Fuel Sump - DRAIN
- b. Tire and Brake - CHECK

10. RIGHT WING LEADING EDGE:

- a. Fuel Tank - CHECK QUANTITY; Filler Cap - SECURE
- b. Tie Down and Chocks - REMOVE
- c. Wing Tip - CHECK
- d. Position Light - CHECK

11. RIGHT WING TRAILING EDGE:

- a. Aileron - CHECK
- b. Flap - CHECK
- c. Fuel Tank Vent Line - UNOBSTRUCTED

BEFORE STARTING

1. Seats - POSITION AND LOCK; Seat Backs - UPRIGHT
2. Seat Belts - FASTEN
3. Parking Brake - SET
4. All Avionics - OFF
5. Circuit Breakers - IN
6. Flaps - UP
7. Light Switches - AS REQUIRED
8. MASTER Switch - ON
9. Fuel Boost Pump Switch - ON (Check for operation, then OFF)
10. Fuel Selector - ROTATE thru 360° and check for freedom of movement.
11. Fuel Selector - SELECT FULLEST TANK (feel for detent and check visually)

WARNING

Do not take off if gages indicate in yellow arc on either gage (airplanes after compliance with BEECHCRAFT S.I. No. 0624-281).

EXTERNAL POWER

The following precautions shall be observed while using external power:

1. The MASTER switch shall be ON and all avionics and electrical switches OFF. This protects the voltage regulators and associated electrical equipment from voltage transients (power fluctuations):
2. 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.
3. In order to prevent arcing, no power shall be supplied while the connection is being made.

STARTING ENGINE USING AUXILIARY POWER UNIT

1. Electrical and Avionics Equipment - OFF
2. Auxiliary Power Unit - CONNECT
3. Auxiliary Power Unit - SET OUTPUT (13.75 to 14.25 volts)
4. Auxiliary Power Unit - ON
5. Engine - START using normal procedures
6. Auxiliary Power Unit - OFF (after engine has been started)
7. Auxiliary Power Unit - DISCONNECT

STARTING

1. Mixture - FULL RICH
2. Throttle - FAST IDLE position
3. Fuel Boost Pump - ON (cold weather starts, use 6 to 8 strokes of engine prime as required)

CAUTION

Starter cranking period should be limited to a maximum of 30 seconds, with at least 2 minutes between cranking periods.

4. Magneto/Start Switch - START position (release to BOTH position when engine fires)

CAUTION

DO NOT PUMP THROTTLE TO START

Flooded Engine:

- a. Mixture - IDLE CUT-OFF
- b. Throttle - FULL OPEN
- c. Starter - ENGAGE (retard throttle to fast idle when engine fires)
- d. Mixture - ADVANCE TO FULL RICH

5. External Power (if used) - OFF - DISCONNECT
6. Oil Pressure - IN YELLOW ARC WITHIN 30 SECONDS
7. Warm-up - 800 to 1200 RPM
8. Engine Instruments - CHECK
9. Fuel Boost Pump Switch - OFF (for test of engine driven pump)
10. Throttle - 1500 RPM
11. Ammeter - CHECK

CAUTION

Charge indication should begin to decrease within 2 minutes after engine start and should be within 1/4 scale of zero prior to takeoff. If not, an electrical difficulty is indicated, and the airplane should be shut down.

12. Throttle - IDLE

AFTER STARTING, AND BEFORE TAXI

1. Parking Brakes - RELEASE
2. Brakes - RELEASE AND CHECK
3. Avionics Equipment - ON, AS REQUIRED
4. Lights - AS REQUIRED

BEFORE TAKEOFF

1. Parking Brake - SET
2. Seat Belts and Shoulder Harnesses - CHECK

NOTE

All reclining seats must be in the upright position during take-off.

**BEECHCRAFT
Musketeer 23**

**Section IV
Normal Procedures**

3. Avionics - CHECK
4. Engine Instruments - CHECK
5. Flight Instruments - CHECK AND SET
6. Throttle - 1800 RPM
7. Magnetos - CHECK at 1800 rpm, maximum drop of 100 rpm on each magneto, variance between individual magnetos should not exceed 50 rpm.
8. Throttle - 1500 RPM
9. Ammeter - CHECK for stabilized indication within 1/4 scale of zero
10. Throttle - FAST IDLE
11. Stabilator Trim - TAKE-OFF RANGE
12. Flaps - CHECK UP
13. Controls - CHECK FREE and for proper direction of travel
14. Fuel Boost Pump - ON
15. Mixture - FULL RICH (or as required by field elevation) (tighten friction on push-pull type control)
16. Doors and Window - SECURE
17. Parking Brake - RELEASE
18. Instruments - CHECK (engine instruments in green range at the start of the takeoff run)

TAKEOFF

Takeoff Full Throttle

1. Power - SET takeoff power and mixture before brake release.
2. Airspeed - ACCELERATE to and maintain take-off speed.
3. Airspeed - ESTABLISH DESIRED CLIMB SPEED when clear of obstacles.

CLIMB

NOTE

Do not turn Fuel Boost Pump off during climb.

1. Throttle - FULL FORWARD
2. Temperature - MONITOR
3. Mixture - LEAN AS REQUIRED FOR SMOOTH OPERATION

CRUISE

1. Power - SET AS DESIRED (Use tables in PERFORMANCE Section)
2. Fuel Boost Pump - OFF
3. Mixture - LEAN AS REQUIRED (tighten friction on push-pull type control)

DESCENT

1. Altimeter - SET.
2. Carburetor Heat - WHEN REQUIRED.
3. Power - AS REQUIRED (avoid prolonged idle settings which may cause low cylinder head temperatures).
4. Mixture - ENRICH AS REQUIRED.

BEFORE LANDING

1. Seat Belts - SECURE.

NOTE

All reclining seats must be in the upright position during landing.

2. Fuel Selector Valve - SELECT TANK MORE NEARLY FULL (feel for detent and check visually).
3. Mixture - FULL RICH (or as required by field elevation) (tighten friction on push-pull type control)
4. Landing Light - AS REQUIRED
5. Flaps - DOWN (maximum extension speed, 96 kts/110 mph)

WARNING

The distance for a Flaps Up landing will be greater than for a Flaps Down landing.

6. Airspeed - ESTABLISH LANDING APPROACH SPEED
Flaps Down - 69 kts/79 mph
Flaps Up - 80 kts/92 mph
7. Carburetor Heat - FULL COLD OR FULL HOT AS REQUIRED

NOTE

Carburetor heat should be in the full COLD (IN) position before full throttle application in the event of a go-around.

8. Fuel Boost Pump - ON

BALKED LANDING

1. Carburetor Heat - FULL COLD
2. Power - FULL THROTTLE
3. Airspeed - 64 kts/74 mph until clear of obstacles, then trim to BEST RATE-OF-CLIMB
4. Flaps - UP

AFTER LANDING

1. Landing Light - AS REQUIRED
2. Flaps - UP
3. Trim Tab - SET TO 0°

SHUTDOWN

1. Parking Brakes - SET
2. Fuel Boost Pump - OFF
3. Electrical and Avionics Equipment - OFF
4. Throttle - CLOSE
5. Mixture - IDLE CUT-OFF
6. Magnetq/Start Switch - OFF, after engine stops
7. MASTER Switch - OFF
8. Install wheel chocks and release parking brakes if the airplane is to be left unattended.

ENVIRONMENTAL SYSTEMS

HEATING AND VENTILATION

Refer to the SYSTEMS DESCRIPTION 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, pitot tube, static ports, antennas, fuel cell filler caps, crankcase vents, 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 of flight controls 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 switch and battery master switch are 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.

During cold weather starts, use 6 to 8 strokes of engine primer, as required.

CAUTION

Do not pump throttle to start.

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 warm-up, monitor engine temperatures closely, since it is quite possible to exceed the cylinder head temperature limit in trying to bring up the oil temperature.

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

ICING CONDITIONS

Flight in Known Icing Conditions Prohibited.

ENGINE BREAK-IN INFORMATION

See Systems Description section

SECTION V

PERFORMANCE

TABLE OF CONTENTS

<i>SUBJECT</i>	<i>PAGE</i>
Introduction to Performance and	
Flight Planning	5-3
Conditions	5-3
Comments Pertinent to the Use of	
Performance Graphs	5-7
Airspeed Calibration - Normal System	5-8
Airspeed Calibration - Alternate System	5-9
Altimeter Correction - Normal System	5-10
Altimeter Correction - Alternate System	5-11
Power Off Stall Speeds	5-12
Wind Components	5-13
Take-Off Distance - Hard Surface	5-14
Normal Climb	5-15
Cruise Performance	5-16 - 5-17
Landing Distance - Hard Surface	5-18

INTENTIONALLY LEFT BLANK

BEECHCRAFT
Musketeer 23

Section V
Performance

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 flight planning at various parameters of weight, power, altitude and temperature. Examples have been presented on some performance charts. Calculations for flight time, block speed and fuel required for a sample VFR trip from Denver to Wichita are detailed below. All examples and calculations assume the following conditions:

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°	78	010/30	-5	29.60
TXC-GLD	092°	73	010/30	-5	29.60
GLD-HUT	102°	195	220/10	0	29.56
HUT-ICT	116°	28	220/10	9	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:

$$29.92 - 29.60 = .32 \text{ in. Hg}$$

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

$$5330 + 320 = 5650 \text{ ft}$$

Pressure Altitude at ICT:

$$29.92 - 29.56 = .36 \text{ in. Hg}$$

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

$$1332 + 360 = 1692 \text{ ft}$$

NOTE

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

**BEECHCRAFT
Musketeer 23**

**Section V
Performance**

Enter the CRUISE PERFORMANCE table for 73 percent maximum continuous power (or full throttle) at 9500 feet:

ALTITUDE FEET	THROTTLE SETTING RPM	FUEL FLOW GPH	TAS KNOTS
9500	2600	8.3	110

Time and fuel used were calculated as follows:

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

$$\text{Fuel Used} = (\text{Time}) (\text{Fuel Flow})$$

Results are:

ROUTE SEGMENT	DISTANCE NM	EST GROUND SPEED KNOTS	TIME AT CRUISE ALTITUDE HRS: MIN	FUEL USED FOR CRUISE GAL
DEN-TXC	78	107	0:44	6.1
TXC-GLD	73	108	0:41	5.6
GLD-HUT	195	113	1:44	14.3
HUT-ICT	28	112	0:15	2.1

TIME - FUEL - DISTANCE

ITEM	TIME HRS: MINS	FUEL GAL	DISTANCE NM
Start, Runup, Taxi and Take- off acceleration	0:00	0.9	0
Cruise	3:24	28.1	374
Total	3:24	29.0	374

Total Flight Time: 3 hours, 24 minutes

Block Speed: $374 \text{ NM} \div 3 \text{ hours, 24 minutes} = 110 \text{ knots}$

Reserve Fuel (45 minutes at 51% Maximum Continuous Power)

Enter the CRUISE POWER SETTINGS table for 51% MCP at 2300 RPM. The fuel flow at 51% MCP is 6.2 gallons per hour.

Reserve fuel = (45 min) (6.2 GPH) = 4.7 gallons

Total Fuel = $29.0 + 4.7 = 33.7$ gallons

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

Assumed ramp weight = 2300 lbs

Estimated fuel from DEN to ICT = (29.0 gal) (6 lbs/gal) = 174 lbs

Estimated landing weight = $2300 - 174 = 2126$ lbs

**COMMENTS PERTINENT TO THE USE OF
PERFORMANCE GRAPHS**

1. Indicated airspeeds (IAS) were obtained by using the AIRSPEED CALIBRATION NORMAL SYSTEM Table.
2. The associated conditions define the specific conditions from which performance parameters have been determined. They are not intended to be used as instructions, however, performance values determined from charts can only be achieved if specified conditions exist.
3. The full amount of usable fuel is available for all approved flight conditions.
4. Engine and component cooling has been demonstrated for temperatures up to 100°F at sea level with a 3.57°F per 1000 ft lapse rate. (ISA + 41°F)

AIRSPEED CALIBRATION - NORMAL SYSTEM

INDICATED AIRSPEED		CALIBRATED AIRSPEED			
KNOTS	MPH	FLAPS UP		FLAPS DOWN	
		KNOTS	MPH	KNOTS	MPH
50	58	54	62	52	60
55	63	57	65	56	64
60	69	61	70	60	69
65	75	65	75	64	74
70	81	70	80	69	79
75	86	74	85	73	84
80	92	79	91	77	89
85	98	84	97	83	95
90	104	90	103	88	101
95	109	94	108	92	106
100	115	99	114	98	113
105	121	104	120		
110	127	110	126		
115	132	115	132		
120	138	120	134		
125	144	125	144		
130	150	130	150		
135	155				
140	161				

23-KCI-1

**BEECHCRAFT
Musketeer 23**

**Section V
Performance**

AIRSPEED CALIBRATION - ALTERNATE SYSTEM

IAS (MPH)	STORM WINDOW CLOSED		STORM WINDOW OPEN	
	FLAPS UP	FLAPS DOWN	FLAPS UP	FLAPS DOWN
	IAS (MPH)	IAS (MPH)	IAS (MPH)	IAS (MPH)
70	75	74	80	79
80	86	84	90	89
90	96	94	111	99
100	107	105	121	109
110	117	115	132	119
120	127		142	
130	138		152	
140	148		162	
150	158			

B23-KCI-10

ALTIMETER CORRECTION - NORMAL SYSTEM

INDICATED AIRSPEED		ALTIMETER CORRECTION TO BE ADDED ~ FEET			
KNOTS	MPH	FLAPS UP		FLAPS DOWN	
		SL	10000 FT	SL	10000 FT
50	58	12	16	12	15
55	63	11	14	8	10
60	69	9	13	5	6
65	75	8	11	1	1
70	81	6	9	-2	-3
75	86	5	7	-5	-7
80	92	4	5	-9	-13
85	98	3	4	-13	-18
90	104	1	2	-17	-24
95	109	0	0	-21	-29
100	115	-2	-2		
105	121	-3	-4		
110	127	-4	-6		
115	132	-5	-7		
120	138	-7	-9		
125	144	-9	-12		

23-KCI-2

**BEECHCRAFT
Muskeeter 23**

**Section V
Performance**

ALTIMETER CORRECTION - ALTERNATE SYSTEM

IAS (MPH)	STORM WINDOW - CLOSED		STORM WINDOW - OPEN	
	FLAPS UP (FEET)	FLAPS DOWN (FEET)	FLAPS UP (FEET)	FLAPS DOWN (FEET)
70	20	20	45	40
80	30	25	60	50
90	40	30	70	60
100	50	35	85	70
110	60	40	95	80
120	70		110	
130	75		120	
140	85		135	
150			150	

B23-KC1-12

POWER OFF STALL SPEEDS

(WEIGHT 2300 LBS)

Maximum altitude loss during a normal stall recovery is approximately 300 ft.

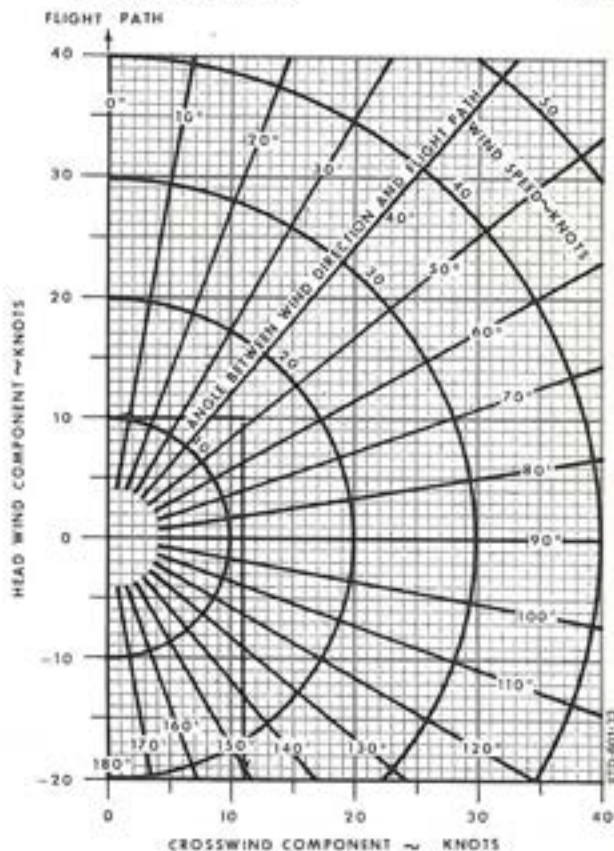
ANGLE OF BANK			
LEVEL	30°	45°	60°
FLAPS-UP			
70 mph 61 kts	77 mph 67 kts	84 mph 73 kts	100 mph 87 kts
FLAPS - DOWN (30°)			
62 mph 54 kts	70 mph 61 kts	76 mph 66 kts	88 mph 77 kts

WIND COMPONENTS

Demonstrated Crosswind is 13KTS/15MPH

EXAMPLE:

WIND SPEED	15 KTS
ANGLE BETWEEN WIND DIRECTION AND FLIGHT PATH	50°
HEADWIND COMPONENT	10 KTS
CROSSWIND COMPONENT	11 KTS



Section V Performance

BEECHCRAFT Musketeer 23

TAKE-OFF DISTANCE - HARD SURFACE

ASSOCIATED CONDITIONS

POWER FULL THROTTLE
SLANT LEAN TO MAXIMUM RPM, THEN ENRICHENGLY
FLARE UP
RUNWAY LEVEL, DRY, HARD SURFACE
WEIGHT 2395 LBS

TAKE OFF SPEED

LIFT OFF 73 MPH/65 KTS
AT 50 FT 88 MPH/75 KTS

WIND COMPONENT	SEA LEVEL				2000 FT				4000 FT				6000 FT				8000 FT			
	GROUND ROLL FEET	CLIMB FEET	TAKE OFF SPEED KTS	TAKE OFF SPEED MPH	GROUND ROLL FEET	CLIMB FEET	TAKE OFF SPEED KTS	TAKE OFF SPEED MPH	GROUND ROLL FEET	CLIMB FEET	TAKE OFF SPEED KTS	TAKE OFF SPEED MPH	GROUND ROLL FEET	CLIMB FEET	TAKE OFF SPEED KTS	TAKE OFF SPEED MPH	GROUND ROLL FEET	CLIMB FEET	TAKE OFF SPEED KTS	TAKE OFF SPEED MPH
0	25	8	853	192	18	8	845	190	15	8	837	188	14	8	829	186	13	8	821	184
	41	5	865	195	24	5	877	198	21	5	889	201	18	5	901	204	15	5	913	207
	58	15	932	212	42	15	944	215	36	15	956	218	30	15	968	221	24	15	980	224
	77	25	1021	232	61	25	1033	235	54	25	1045	238	46	25	1057	241	38	25	1069	244
	95	35	1098	250	79	35	1110	253	72	35	1122	256	64	35	1134	259	56	35	1146	262
10	25	8	853	192	18	8	845	190	15	8	837	188	14	8	829	186	13	8	821	184
	41	5	865	195	24	5	877	198	21	5	889	201	18	5	901	204	15	5	913	207
	58	15	932	212	42	15	944	215	36	15	956	218	30	15	968	221	24	15	980	224
	77	25	1021	232	61	25	1033	235	54	25	1045	238	46	25	1057	241	38	25	1069	244
	95	35	1098	250	79	35	1110	253	72	35	1122	256	64	35	1134	259	56	35	1146	262
20	25	8	853	192	18	8	845	190	15	8	837	188	14	8	829	186	13	8	821	184
	41	5	865	195	24	5	877	198	21	5	889	201	18	5	901	204	15	5	913	207
	58	15	932	212	42	15	944	215	36	15	956	218	30	15	968	221	24	15	980	224
	77	25	1021	232	61	25	1033	235	54	25	1045	238	46	25	1057	241	38	25	1069	244
	95	35	1098	250	79	35	1110	253	72	35	1122	256	64	35	1134	259	56	35	1146	262

33-4023

**BEECHCRAFT
Musketeer 23**

**Section V
Performance**

NORMAL CLIMB

ASSOCIATED CONDITIONS:

POWER FULL THROTTLE
FLAPS UP

EXAMPLE:

WEIGHT 2300 POUNDS
PRESSURE ALT 4000 FT
OAT 7°C
CLIMB SPEED 74 KTS/85 MPH
RATE OF CLIMB 530 FT/MIN

WEIGHT POUNDS	SEA LEVEL			4000 FEET			8000 FEET			12000 FEET		
	OAT °F	R/C FT/MIN	CLIMB SPEED KTS/MPH	OAT °F	R/C FT/MIN	CLIMB SPEED KTS/MPH	OAT °F	R/C FT/MIN	CLIMB SPEED KTS/MPH	OAT °F	R/C FT/MIN	CLIMB SPEED KTS/MPH
2300	59 15	710	75/86	45 7	530	74/85	30 -1	345	73/84	16 -9	165	71/82
2100	59 15	900	73/84	45 7	715	72/83	30 -1	525	71/82	16 -9	340	69/80
1900	59 15	1125	71/82	45 7	930	70/81	30 -1	725	69/80	16 -9	540	68/78

23-KC1-4

CRUISE PERFORMANCE
STANDARD DAY — 38.8 GALLONS

ALT.	RPM	% BPH	FF GPH	TAS KTS/MPH	ENDURANCE HOURS	RANGE NM/SM
2500	2500	75	9.0	109/126	3.7	405/466
	2350	63	7.6	100/115	4.4	442/508
	2200	53	6.4	90/104	5.2	473/544
3500	2525	75	9.0	110/126	3.7	406/467
	2400	65	7.8	103/118	4.3	438/504
	2250	55	6.7	93/107	5.0	462/531
4500	2550	75	9.0	110/127	3.7	408/469
	2400	63	7.6	101/116	4.4	442/508
	2250	53	6.4	91/105	5.2	473/544
5500	2600	77	9.2	113/130	3.7	405/466
	2450	65	7.8	103/119	4.3	439/505
	2300	55	6.7	94/108	5.0	463/532
6500	2600	75	9.0	113/130	3.7	414/476
	2450	63	7.6	102/118	4.4	444/511
	2300	54	6.5	94/108	5.1	471/542
7500	2600	73	8.8	112/129	3.8	418/481
	2450	62	7.5	102/117	4.4	444/511
	2300	53	6.4	93/107	5.1	473/544
8500	2600	71	8.5	111/128	4.0	425/489
	2450	60	7.2	101/116	4.6	451/519
	2300	52	6.3	92/106	5.2	473/544
9500	2600	69	8.3	110/127	4.1	436/501
	2450	59	7.1	101/116	4.7	463/533
	2300	51	6.2	92/106	5.3	484/557
10,500	2550	63	7.6	106/122	4.4	454/522
	2450	57	6.9	99/114	4.8	467/537
	2300	50	6.1	91/105	5.3	485/558

23-KC-5

**BEECHCRAFT
Musketeer 23**

**Section V
Performance**

**CRUISE PERFORMANCE
STANDARD DAY - 58.8 GALLONS**

ALT.	RPM	% BPH	FF GPH	TAS KTS/MPH	ENDURANCE HOURS	RANGE NM/SM
2500	2500	75	9.0	109/125	6.0	647/744
	2350	63	7.6	100/115	7.1	706/812
	2200	53	6.4	90/104	8.4	758/880
3500	2525	75	9.0	110/126	6.0	650/747
	2400	65	7.8	103/118	6.9	701/806
	2250	55	6.7	93/107	8.0	740/851
4500	2550	75	9.0	110/127	6.0	653/751
	2400	63	7.6	101/116	7.0	708/814
	2250	53	6.4	91/105	8.3	758/872
5500	2600	77	9.2	113/130	5.8	650/747
	2450	65	7.8	103/119	6.8	704/810
	2300	55	6.7	94/108	8.0	743/855
6500	2600	75	9.0	113/130	5.9	665/765
	2450	63	7.6	102/118	7.0	716/823
	2300	54	6.5	94/108	8.1	759/873
7500	2600	73	8.8	112/129	6.1	675/776
	2450	62	7.5	102/117	7.1	717/824
	2300	53	6.4	93/107	8.3	764/879
8500	2600	71	8.5	111/128	6.3	688/791
	2450	60	7.2	101/116	7.3	730/839
	2300	52	6.3	92/106	8.4	766/881
9500	2600	69	8.3	110/127	6.5	702/807
	2450	59	7.1	101/116	7.5	748/860
	2300	51	6.2	92/106	8.5	782/899
10,500	2550	63	7.6	106/122	6.7	734/844
	2450	57	6.9	99/114	7.7	754/867
	2300	50	6.1	91/105	8.6	784/902

23-KCI-6

LANDING DISTANCE - HARD SURFACE

ASSOCIATED CONDITIONS

POWER IDLE
MIXTURE RICH
FLAPS 30°
RUNWAY LEVEL, GRV, HARD SURFACE
WEIGHT 280 LBS

LANDING SPEEDS

75 AMPHIB KTS
AT 50 FT
TOUCHDOWN
85 AMPHIB KTS

BRAKE COMPONENT DOWN RUNWAY KNOTS	SEA LEVEL				3000 FT				4000 FT				5000 FT			
	QAT % TC	GROUND ROLL FEET	TOTAL OVER 50 FT OBSTACLE FEET	QAT % TC	GROUND ROLL FEET	TOTAL OVER 50 FT OBSTACLE FEET	QAT % TC	GROUND ROLL FEET	TOTAL OVER 50 FT OBSTACLE FEET	QAT % TC	GROUND ROLL FEET	TOTAL OVER 50 FT OBSTACLE FEET	QAT % TC	GROUND ROLL FEET	TOTAL OVER 50 FT OBSTACLE FEET	QAT % TC
0	73 5	836	9526	76 8	924	1030	8 13	1026	1822	2 17	1141	2018	4 21	1274	2020	17 21
	45 5	891	10515	24 0	987	1735	45 2	1137	2582	20 2	1234	3448	13 11	1389	2581	17 21
	58 15	848	13706	53 15	1057	1870	45 2	1137	2582	20 2	1234	3448	13 11	1389	2581	17 21
	77 25	1001	18002	80 25	1120	2382	63 17	1290	3791	54 23	1365	4428	49 26	1572	3791	17 21
	95 25	1058	18002	80 25	1192	2395	63 17	1320	3719	54 23	1402	4428	49 26	1572	3791	17 21
15	73 5	688	12902	76 8	763	1385	9 13	846	1628	7 17	957	1602	4 21	1073	1619	17 21
	45 5	728	13706	24 0	870	1870	27 2	918	1829	20 2	1025	1831	13 11	1157	2012	17 21
	58 15	787	1817	53 15	870	2474	45 2	1025	2474	20 2	1025	2474	13 11	1157	2474	17 21
	77 25	870	2474	80 25	918	2474	63 17	1025	2474	54 23	1025	2474	49 26	1157	2474	17 21
	95 25	870	2474	80 25	918	2474	63 17	1025	2474	54 23	1025	2474	49 26	1157	2474	17 21
30	73 5	548	992	76 8	670	1165	9 13	685	1224	2 17	772	1365	4 21	872	1527	17 21
	45 5	586	1256	24 0	666	1317	27 2	729	1351	20 2	834	1465	13 11	946	1642	17 21
	58 15	627	13706	53 15	706	1862	45 2	786	1902	20 2	860	1910	21 4	1000	1954	17 21
	77 25	871	2301	80 25	866	2301	63 17	914	2301	54 23	891	2301	49 26	970	2301	17 21
	95 25	871	2375	80 25	866	2375	63 17	914	2375	54 23	891	2375	49 26	970	2375	17 21

23 KCL

SECTION VI

WEIGHT AND BALANCE/ EQUIPMENT LIST

TABLE OF CONTENTS

<i>SUBJECT</i>	<i>PAGE</i>
Introduction to Weight and Balance	6-3
Weighing Instructions	6-4
Basic Empty Weight and Balance Form	6-7
Weight and Balance Record	6-9
Weight and Balance Responsibilities	6-11
Gross Weight Moment Limits Graph	6-12
Gross Weight Moment Limits	6-13
Computing Procedure	6-15
Sample Weight and Balance Loading Form ...	6-16
Weight and Balance Loading Form	6-17
Useful Load Weights and Moments	6-18
Occupants	6-18
Oil	6-19
Usable Fuel	6-19
Baggage	6-20
Equipment List	Provided For Each Airplane

INTENTIONALLY LEFT BLANK

INTRODUCTION TO WEIGHT AND BALANCE

The necessity for proper computation of the airplane's weight and balance cannot be overemphasized. In the basic design, it is planned that under normal loading the weight distribution of pilot, passengers, baggage, and fuel will balance the airplane for flight. Since these items are all variables, it is possible to concentrate weight in such a way as to make the airplane unsafe for flight. The factors which must be considered in the weight and balance of the airplane are the installation of equipment after the airplane has been weighed, trapped or unusable fuel, engine oil, usable fuel, pilot and passenger weights, and baggage or cargo.

In order to simplify the computation of the weight and balance, Beech Aircraft Corporation has devised a form called Basic Empty Weight and Balance. When the airplane is delivered from the factory it will first be weighed and the data recorded on this form. Provision has been made on the form for listing additions of items to be installed before the delivery or subtractions of items to be removed before delivery from the "as weighed" condition. This then represents the empty weight of the airplane.

When the airplane is first fueled, a certain amount of fuel is trapped in the fuel lines and cells which cannot be drained. Also in some regimes of flight there are certain amounts of fuel that cannot be used. The combination of these fuel amounts is classified as unusable fuel. Also, it has been found that all operators bring the oil level near full before each flight. Thus, these items are computed along with the empty weight, giving a Basic Empty Weight as a starting point to the pilot for each flight computation.

Once the Basic Empty Weight for a given airplane has been established, the pilot is then only concerned with the

variable items which will comprise his useful load. These items which are of a changing nature are: Pilot and Passengers (computed on an individual weight and the seat occupied), Baggage and/or Cargo (computed on weight and location within the airplane), and Usable Fuel (the remaining fuel after subtracting the unusable fuel from the measured fuel on board).

WEIGHING INSTRUCTIONS

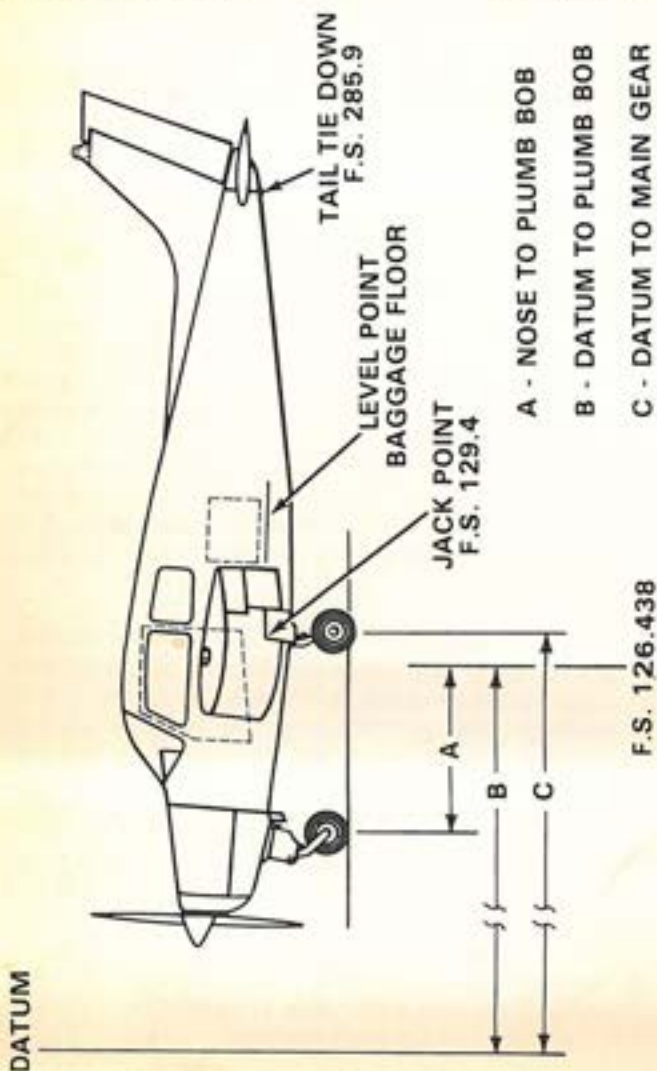
Periodic weighing of the airplane may be required to keep the Basic Empty Weight current. All changes to the airplane affecting weight and balance are the responsibility of the airplane's operator.

1. Provision for jack points are provided for weighing: two on the wing front spar at Fuselage Station 129.4 and one on the aft fuselage at Fuselage Station 285.9 (tail tie-down ring).
2. Fuel should be drained preparatory to weighing. Tanks are drained from the regular drain ports with the airplane in static ground attitude. The unusable fuel to be added to a Basic Empty Weight is: 6 lbs at Fuselage Station 125.0. 45.6 lbs (airplanes after compliance with Service Instructions No. 0624-281) at Fuselage Station 125.0.
3. Engine oil must be at the full level or completely drained. Total engine oil when full is 15 pounds at Fuselage Station 50.
4. To determine airplane configuration at time of weighing, installed equipment is checked against the airplane equipment list or superseding forms. All installed equipment must be in its proper place during weighing.

**BEECHCRAFT
Musketeer 23**

**Section VI
Wt and Bal/Equip List**

5. At the time of weighing, the airplane must be level both longitudinally and laterally. Longitudinally and laterally level attitude is determined with a level on the baggage compartment floor.
6. Measurement of the reaction arms for a wheel weighing is made using a steel measuring tape. Measurements are taken, with the airplane level on the scales, from the reference (a plumb bob dropped from the centerline of airplane at F.S. 126.438, forward screw in spar access cover, approximately 8 to 10 inches forward of centerline drain hole) to the axle centerline of the main gear and then to the nose wheel axle centerline. The main wheel axle centerline is best located by stretching a string across from one main wheel to the other. All measurements are to be taken with the tape level with the hangar floor and parallel to the fuselage centerline. The locations of the wheel reactions will be approximately at Fuselage Station 129.5 for main wheels and Fuselage Station 57.6 for the nose wheel.
7. Jack point weighings are accomplished by placing scales at the jack points specified in step 1 above. Since the center of gravity of the airplane is forward of Fuselage Station 129.4, the tail reaction of the airplane will be in an up direction. This can be measured on regular scales by placing ballast of approximately 200 pounds on the scales to which the aft weighing point is attached by cable of adjustable length. The up reaction will then be total ballast weight minus the scale reading and is entered in the weighing form as a negative quantity.
8. Weighing should always be made in an enclosed area which is free from air currents. The scales used should be properly calibrated and certified.



BEECHCRAFT
Musketeer 23

Section VI
Wt and Bal/Equip List

BASIC EMPTY WEIGHT AND BALANCE

MODEL _____ SER. NO. _____ REG. NO. _____ DATE _____
JACK POINT LOCATION _____ PREPARED BY _____
FORWARD 129.4 _____ Company _____
AFT _____ Signature _____

REACTION	SCALE READING	TARE	NET WEIGHT	ARM	MOMENT
WHEEL - JACK POINTS					
LEFT MAIN					
RIGHT MAIN					
NOSE OR TAIL					
TOTAL (AS WEIGHED)					
Space below provided for additions and subtractions to as weighed condition					
EMPTY WEIGHT (DRY)					
ENGINE OIL			15.0	50.0	750
UNUSABLE FUEL					
M-1 thru M-554 except M-3			6.0	125.0	750
Airplanes after compliance					
with S.I. No. 0624-281			45.6	125.0	5700
BASIC EMPTY WEIGHT					

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 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 reweighed to establish the 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 Basic Empty Weight and Balance sheet and the Equipment List be made and kept in an alternate location in the event the original handbook is misplaced.

BEECHCRAFT
Musketeer 23

Section VI
Wt and Bal/Equip List

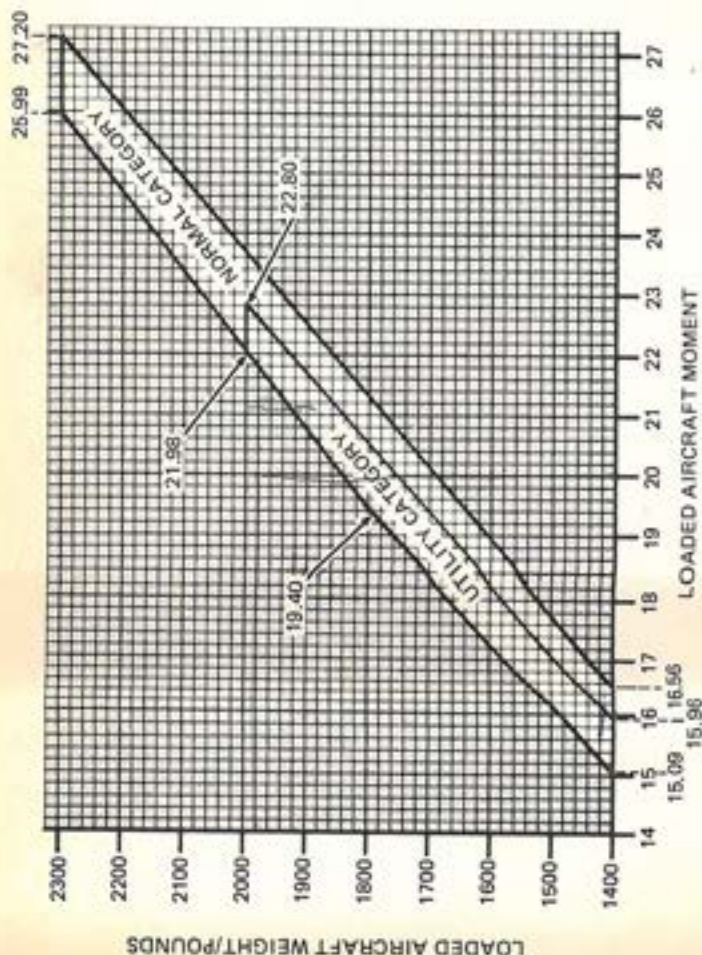
WEIGHT AND BALANCE RECORD

[illegible]

WEIGHT AND BALANCE RESPONSIBILITIES

The Basic Empty Weight and Moment of the airplane at the time of delivery are shown on the airplane Basic Empty Weight and Balance form. Useful load items which may be loaded into the airplane are shown on the Useful Load Weights and Moments tables. The minimum and maximum moments are shown on the Moment Limits vs Weight table and can also be plotted on the Moment Limits vs Weight graph as visual indication that the limit is within the operational envelope. These moments correspond to the forward and aft center-of-gravity flight limits for a particular weight. The airplane must be loaded in such a manner to keep the center-of-gravity within these limits.

GROSS WEIGHT MOMENT LIMITS GRAPH



BEECHCRAFT
Musketeer 23

Section VI
Wt and Bal/Equip List

GROSS WEIGHT MOMENT LIMITS
(NORMAL CATEGORY)

Gross Weight	Minimum Moment 100	Maximum Moment 100	Gross Weight	Minimum Moment 100	Maximum Moment 100	Gross Weight	Minimum Moment 100	Maximum Moment 100
1400	1509	1666	1800	1940	2129	2200	2463	2603
1410	1520	1666	1810	1953	2141	2210	2477	2614
1420	1531	1666	1820	1966	2153	2220	2490	2626
1430	1542	1666	1830	1978	2166	2230	2504	2638
1440	1552	1704	1840	1991	2177	2240	2517	2650
1450	1563	1715	1850	2004	2189	2250	2531	2662
1460	1574	1727	1860	2017	2200	2260	2544	2674
1470	1585	1739	1870	2029	2212	2270	2558	2685
1480	1595	1751	1880	2042	2224	2280	2572	2697
1490	1606	1763	1890	2055	2236	2290	2585	2709
						2300	2599	2721
1500	1617	1775	1900	2068	2248			
1510	1628	1786	1910	2081	2260			
1520	1639	1798	1920	2094	2271			
1530	1649	1810	1930	2107	2283			
1540	1660	1822	1940	2120	2295			
1550	1671	1834	1950	2133	2307			
1560	1682	1846	1960	2145	2319			
1570	1692	1857	1970	2158	2331			
1580	1703	1869	1980	2172	2342			
1590	1714	1881	1990	2185	2354			
1600	1725	1893	2000	2198	2366			
1610	1736	1905	2010	2211	2378			
1620	1746	1916	2020	2224	2390			
1630	1757	1928	2030	2237	2401			
1640	1768	1940	2040	2250	2413			
1650	1779	1952	2050	2263	2425			
1660	1789	1964	2060	2276	2437			
1670	1800	1976	2070	2290	2449			
1680	1811	1987	2080	2303	2461			
1690	1822	1999	2090	2316	2473			
1700	1833	2011	2100	2329	2484			
1710	1843	2023	2110	2343	2496			
1720	1854	2036	2120	2356	2508			
1730	1865	2047	2130	2369	2520			
1740	1876	2058	2140	2383	2532			
1750	1887	2070	2150	2396	2543			
1760	1897	2082	2160	2409	2555			
1770	1908	2094	2170	2423	2567			
1780	1919	2106	2180	2436	2579			
1790	1930	2118	2190	2450	2591			

The above weight and moment limits are based on the following weight and center of gravity limit data:

NORMAL CATEGORY

WEIGHT CONDITION

2300 lbs (max. take-off or landing)
1800 lbs or less

FRD CG LIMIT

113.0
107.8

AFT CG LIMIT

118.3
118.3

GROSS WEIGHT MOMENT LIMITS
(UTILITY CATEGORY)

Gross Weight	Minimum Moment 100	Maximum Moment 100	Gross Weight	Minimum Moment 100	Maximum Moment 100
1400	1509	1595	1700	1833	1938
1410	1520	1607	1710	1843	1949
1420	1531	1619	1720	1854	1961
1430	1542	1630	1730	1865	1972
1440	1552	1642	1740	1876	1984
1450	1563	1653	1750	1887	1995
1460	1574	1664	1760	1897	2006
1470	1585	1676	1770	1908	2018
1480	1595	1687	1780	1919	2029
1490	1606	1698	1790	1930	2041
1500	1617	1710	1800	1940	2052
1510	1628	1721	1810	1953	2063
1520	1639	1733	1820	1966	2075
1530	1649	1744	1830	1978	2086
1540	1660	1756	1840	1991	2098
1550	1671	1767	1850	2004	2109
1560	1682	1778	1860	2017	2120
1570	1692	1790	1870	2029	2132
1580	1703	1801	1880	2042	2143
1590	1714	1813	1890	2055	2155
1600	1725	1824	1900	2068	2166
1610	1736	1835	1910	2081	2177
1620	1746	1847	1920	2094	2189
1630	1757	1858	1930	2107	2200
1640	1768	1870	1940	2120	2212
1650	1779	1881	1950	2133	2223
1660	1789	1892	1960	2145	2234
1670	1800	1904	1970	2158	2246
1680	1811	1915	1980	2172	2257
1690	1822	1927	1990	2185	2269
			2000	2198	2280

The above weight and moment limits are based on the following weight and center of gravity limit data:

UTILITY CATEGORY

WEIGHT CONDITION

1960 or 2000 lbs (max. take-off
or landing)
1800 lbs or less

FWD CG LIMIT

109.9
107.8

AFT CG LIMIT

114.0
114.0

Weight / Balance & Equipment List Revision

Page 1 of 1

DLK Aviation, Inc. - DK78789J

2801 Cassia Lane Knoxville, GA 30144

770427-4954

WB ID #: 168

AC Tail #: N8743M

AC Model #: M529

AC Serial #: M529

AC Part #: E227

State, PG: LAWRENCEBURG, IN 47025

AC Make: BEECH

AC Model: 23

AC Serial #: M529

AC Part #: E227

WB Part #: E227

WB Date: Apr-28-2008

This Aircraft has been re-weighted using the following computations.

Reaction Point	Scale Reading	Tare	Net Weight	Arm / CG	Moment
Right Main	487.00	0.00	489.00	15.22	7441.38
Left Main	512.00	0.00	512.00	15.22	7794.24
Total Main	999.00	0.00	1001.00	15.22	15235.62
Nose / Tail	500.00	0.00	500.00	58.00	29000.00
Total as weighed			1501.00	107.68	154874.00
Engine 1			15.00	20.00	300.00
Engine 2			8.00	15.80	126.40
Unusable Fuel			8.00	15.80	126.40
Other 1					
Other 2					
Other 3					
Basic Empty Weight			1522.00	108.33	164874.00

RAFT GROSS WEIGHT = 2300.00 NEW USEFUL LOAD (computed) = 778.00

si / Part # Description of changes (LB / IN) Weight CG/Arm Moment
New data from weighing >> 1522.00 108.33 164874.00

ITEMS REMOVED

ITEMS INSTALLED

DATA >> NEW USEFUL LOAD = 778.00 1522.00 108.33 164874.00

FORM SCALES CALIBRATED: 0/52-2008

Michael Vondra

Volume : 100/1000000

100/1000000

COMPUTING PROCEDURE

1. Record the Basic Empty Weight and Moment from the Basic Empty Weight and Balance form (or from the latest superseding form) under the Basic Empty Condition block. The moment must be divided by 100 to correspond to Useful Load Weights and Moments tables.
2. Record the weight and corresponding moment from the appropriate table of each of the useful load items (except fuel) to be carried in the airplane.
3. Total the weight column and moment column. The SUB-TOTAL is the Zero Fuel Condition.
4. Determine the weight and corresponding moment for the fuel loading to be used. This fuel loading includes fuel for the flight, plus that required for start, taxi, and take-off. Add the Fuel to Zero Fuel Condition to obtain the SUB-TOTAL Ramp Condition.
5. Subtract the fuel to be used for start, taxi, and take-off to arrive at the SUB-TOTAL Take-off Condition.
6. Subtract the weight and moment of the fuel in the incremental sequence in which it is to be used from the take-off weight and moment. The Zero Fuel Condition, the Take-Off Condition, and the Landing Condition moment must be within the minimum and maximum moments shown on the Moment Limit vs Weight graph 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.

Section VI
Wt and Bal/Equip List

BEECHCRAFT
Musketeer 23

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

WEIGHT AND BALANCE LOADING FORM

MODEL 23 DATE _____

SERIAL NO. M-XXXX REG NO. NXXX

ITEM	WEIGHT	MOM/100
1. BASIC EMPTY CONDITION	1437	1594
2. FRONT SEAT OCCUPANTS	340	374
3. 3rd & 4th SEAT OCCUPANTS	140	199
4. BAGGAGE OR CARGO	45	64
5. SUB TOTAL ZERO FUEL CONDITION	1962	2231
6. FUEL LOADING (25 GAL)	192	225
7. SUB TOTAL RAMP CONDITION	2154	2456
8. *LESS FUEL FOR START, TAXI, AND TAKE-OFF	-5	-6
9. SUB TOTAL TAKE-OFF CONDITION	2149	2450
10. LESS FUEL TO DESTINATION (25 GAL)	-150	-176
11. LANDING CONDITION	1999	2284

*Fuel for start, taxi and take-off is normally 5 lbs at an average mom/100 of 6.

BEECHCRAFT
Musketeer 23

Section VI
Wt and Bal/Equip List

WEIGHT AND BALANCE LOADING FORM

MODEL _____ DATE _____

SERIAL NO. _____ REG NO. NXXX

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

*Fuel for start, taxi and take-off is normally 5 lbs at an average mom/100 of 6.

USEFUL LOAD WEIGHTS AND MOMENTS

OCCUPANTS

WEIGHT	*FRONT SEATS	3RD AND 4TH SEATS
	ARM **110	BENCH SEAT
		ARM **142
	MOM 100	MOM 100
120	132	170
130	143	185
140	154	199
150	165	213
160	176	227
170	187	241
180	198	256
190	209	270
200	220	284

*Reclining seat with back in full-up position.

**Values computed from a C.G. criterion based on a 170 pound male. Differences in physical characteristics can cause variation in center of gravity location.

USEFUL LOAD WEIGHTS AND MOMENTS

OIL
(Included in Basic Empty Weight)

ARM 50		
QUARTS	WEIGHT	MOMENT/100
8	15	7.5

USABLE FUEL

ARM 117		
GALLONS	WEIGHT	MOMENT/100
5	30	35
10	60	70
15	90	105
20	120	140
22	132	154
25	150	176
27	162	189
30	180	211
32	192	225
35	210	246
37	222	259
40	240	281
45	270	316
50	300	351
52	312	365
55	330	386
57	342	400
58	348	407

USEFUL LOAD WEIGHTS AND MOMENTS

BAGGAGE

ARM 167	
WEIGHT	<u>MOMENT</u> 100
10	17
20	33
30	50
40	67
50	84
60	100
70	117
80	134
90	150
100	167
110	184
120	200
130	217
140	234

SECTION VII

SYSTEMS DESCRIPTION

TABLE OF CONTENTS

<i>SUBJECT</i>	<i>PAGE</i>
Airframe	7-5
Seating Arrangements	7-5
Flight Controls	7-5
Control Surfaces	7-5
Control Column	7-5
Rudder Pedals	7-5
Stabilator Trim System	
Manual Trim	7-8
Illustration	7-6
Instrument Panel	7-8
Switches	7-8
Circuit Breakers	7-8
Flight Instruments	7-9
Ground Control	7-9
Wing Flaps	7-9
Manual	7-9
Landing Gear	7-10
Brakes	7-10
Baggage Compartment	7-11
Seats, Seat Belts, and Shoulder Harnesses	7-12
Seat Adjustments	7-12
Seat Belts	7-12

TABLE OF CONTENTS (Continued)

<i>SUBJECT</i>	<i>PAGE</i>
Doors and Exits	
Forward Cabin Doors	7-12
Aft Baggage Door	7-13
Engine	7-13
Engine Controls	7-13
Engine Instruments	7-13
Engine Break-in Information	7-14
Lubrication System	7-14
Starter	7-15
Propeller	7-15
Fuel System	7-15
Fuel Tanks	7-16
Fuel Drains	7-16
Fuel Quantity Indicators	7-16
Fuel Boost Pump	7-16
Fuel Tank Selection	7-17
Fuel Required for Flight	7-17
Fuel System Schematics	7-18
Electrical System	7-20
Battery	7-20
Generator	7-20
External Power Receptacle	7-21
Lighting Systems	7-22
Interior Lighting	7-22
Exterior Lighting	7-22
Environmental Systems	7-23
Cabin Heating	7-23
Ventilation	7-23
Exhaust Vent	7-23
Environmental Schematic	7-24

TABLE OF CONTENTS (Continued)

<i>SUBJECT</i>	<i>PAGE</i>
Pitot and Static Systems	7-25
Pitot System	7-25
Pitot Heat (Optional)	7-25
Normal Static Air System	7-25
Emergency Static Air System	7-25
Vacuum System	7-26
Stall Warning System	7-26

INTENTIONALLY LEFT BLANK

**BEECHCRAFT
Musketeer 23**

**Section VII
Systems Description**

AIRFRAME

The BEECHCRAFT Musketeer 23 is a four place, single-engine landplane with non-retractable landing gear and is powered by an Avco Lycoming four-cylinder, horizontally opposed engine with a fixed pitch propeller.

SEATING ARRANGEMENTS

In the standard configuration two adjustable seats and one fixed-bench seat are installed.

FLIGHT CONTROLS

CONTROL SURFACES

The control surfaces are operated with conventional cable systems terminating in bellcranks.

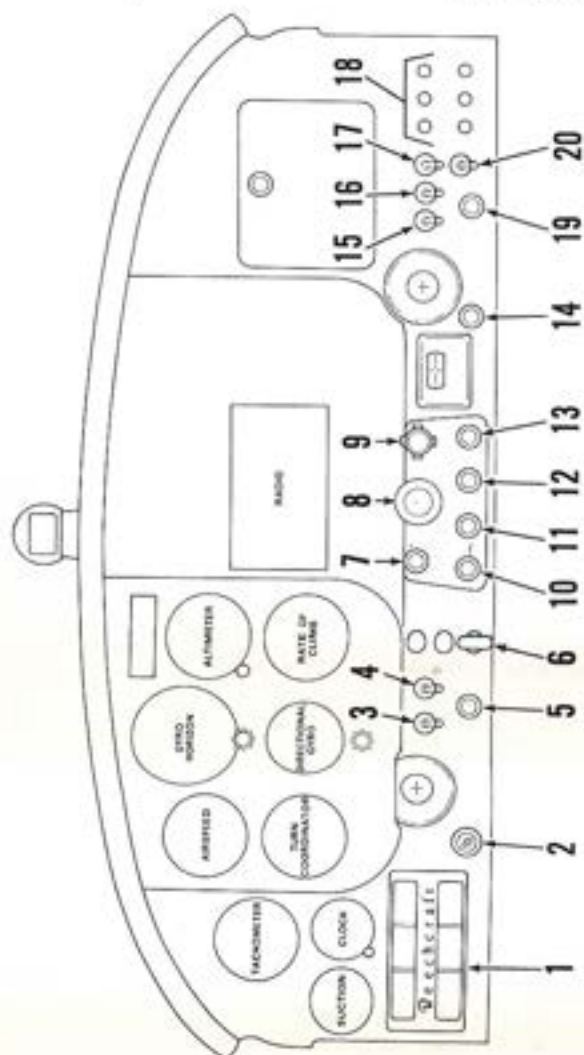
CONTROL COLUMN

A single control column/wheel is installed as standard equipment on the left side. The optional control column/wheel may be installed on the right side.

RUDDER PEDALS

The standard installation provides pedals for rudder control on the left side only. The optional installation provides a set of rudder pedals for each side.

TYPICAL INSTRUMENT PANEL



- | | |
|--|--------------------------------------|
| 1. Engine Instrument Cluster | 11. Cabin Heat |
| 2. Magneto/Start Switch | 12. Defrost |
| 3. Master Switch | 13. Cabin Air |
| 4. Fuel Boost Switch | 14. Cigarette Lighter |
| 5. Parking Brake Control | 15. Rotating Beacon |
| 6. Landing Gear Retract Switch
(simulated) and Lights | 16. Position Lights |
| 7. Primer | 17. Landing Lights |
| 8. Throttle | 18. Circuit Breakers |
| 9. Mixture | 19. Instrument Panel Lights Rheostat |
| 10. Carburetor Heat | 20. Pitot Heat |

STABILATOR TRIM SYSTEM

MANUAL TRIM

The manual stabilator trim is actuated by a handwheel located between the front seats. A stabilator tab position indicator is located adjacent to the trim control handwheel. Forward movement of the wheel trims the airplane's nose down, aft movement of the wheel trims the airplane's nose up.

INSTRUMENT PANEL

The standard instrument panel consists of flight and navigation instruments on the left, and an avionics section in the center. The switching panel and the engine gages are located on the lower left side of the instrument panel and the exterior light switches and circuit breaker grouping are on the lower right side of the instrument panel.

SWITCHES

The MASTER and FUEL BOOST switches are grouped on the subpanel to the right of the pilot's control column. The magneto/start switch is to the left of the pilot's control column. The landing light, navigation lights, rotating beacon and pitot heat switches are located on the lower right side of the instrument panel. The instrument light rheostat switch is directly below the exterior light switches.

CIRCUIT BREAKERS

The circuit breakers are located on the lower right side of the instrument panel.

FLIGHT INSTRUMENTS

The standard flight instruments are grouped on the main panel for the best presentation for the pilot. The magnetic compass is located above the instrument panel.

Ram air pressure for the airspeed indicator enters through the pitot tube under the left wing, static air pressure for the altimeter, vertical speed and airspeed indicator is supplied by a static port on each side of the fuselage, just aft of the cabin.

Instrument lights are turned on and dimmed by a rheostat switch located on the lower right side of the instrument panel.

GROUND CONTROL

Steering, if nose wheel steering is installed, 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 $40^{\circ} \pm 2^{\circ}$ right or left, and a hydraulic shimmy damper on the nose gear yoke compensates for any tendency to shimmy. Toe brakes may be used to aid in steering the airplane on the ground.

The minimum wing-tip turning radius using full steering, if installed, one brake and partial power is 23 feet 11 inches.

WING FLAPS

MANUAL

The three position flaps are operated by a manual lever located between the front seats. In addition to the full flap down position of 30° , an intermediate position is provided. As the handle is raised to lower the flaps, a definite detent and click of the thumb release button will be felt at the 15° flap extended position. Another detent will indi-

cate the 30° position. To retract the flaps, depress the thumb button and lower the handle to the floor. The thumb button does not need to be depressed, nor should it be, to lower the flaps.

CAUTION

Establish recovery altitude, recovery power, and airspeed before retracting flaps during slow flight, particularly during recoveries from approach configuration.

LANDING GEAR

The fixed tricycle landing gear, fabricated from magnesium castings and aluminum forgings, uses rubber disks for shock absorption.

The gears are identical except for the pivoting and optional steering provisions on the nose gear and the brake attachment points on the main gear.

The nose wheel is steerable, if nose wheel steering is installed, through a spring loaded linkage connected to the rudder pedals and has a maximum travel of $40^{\circ} \pm 2^{\circ}$ in either direction. A hydraulic damper on the nose wheel strut compensates for any tendency to shimmy. Toe brakes will aid in steering the airplane on the ground.

BRAKES

The brakes on the main landing gear wheels are operated by applying toe pressure to the rudder pedals. The parking brake push-pull control is located on the right side of the lower left subpanel. To set the parking brakes, depress the

pilot's toe pedals until firm and pull out on the parking brake knob, then release the toe pressure. Release the parking brake by depressing the pilot's toe pedals, then push in the parking brake knob. Check both wheels for free roll before applying take-off power.

BRAKES (available on airplanes in compliance with Beechcraft Service Letter 67-12)

The brakes on the main landing gear wheels are operated by applying toe pressure to the rudder pedals. The parking brake push-pull control is located on the right side of the lower left subpanel. To set the parking brakes, pull the control out and depress the pilot's toe pedals until firm. Push the control in to release the brakes.

NOTE

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

BAGGAGE COMPARTMENT

A 19.5 cubic-foot baggage space is located behind the rear seat. The baggage compartment is accessible in flight.

WARNING

Do not carry hazardous material anywhere in the airplane.

Do not carry children in the baggage compartment.

SEATS, SEAT BELTS, AND SHOULDER HARNESSSES

SEAT ADJUSTMENTS

To adjust either of the front seats pull up on the release knob below the left hand seat corner and slide the seat forward or aft, as desired. Make certain the seat is locked securely in place after adjustment. The angle of the pilot's and copilot's seat backs is adjustable. A set screw is located on the inboard side of both seat backs. Moving the seat back forward and turning the set screw in or out regulates the position of the seat back either backward or forward. Outboard armrests for the front seats are provided.

SEAT BELTS

All seats are provided with friction type seat belts.

DOOR AND EXITS

FORWARD CABIN DOOR

The airplane has a conventional cabin door on the right side of the fuselage adjacent to the forward seats. The outside cabin door handle is spring-loaded to fit into a recess in the door. The door may be locked with a key. To open the door from the outside, lift the handle from its recess and pull until the door opens. To close the cabin door from the inside, grasp the armrest attached to the door and firmly pull the door closed. Opening the storm window will alleviate pressure inside the cabin as the door is being closed. Press firmly outward at the aft edge of the door. If any movement of the door is detected, completely open the door and close again following the above instructions. To open the door from the inside, lift the door release handle and pull until the door latch releases.

**BEECHCRAFT
Musketeer 23**

**Section VII
Systems Description**

AFT BAGGAGE DOOR

A baggage door, aft of the cabin door on the right side of the fuselage, is provided for loading cargo into the aft cabin. To open the door from the outside, use the key provided to turn the cam lock.

ENGINE

The BEECHCRAFT Musketeer 23 is powered by a Lycoming O-320-D2B four-cylinder, horizontally opposed engine, rated at 160 horsepower at 2700 rpm.

Normal operating engine speed range is 2200 to 2700 rpm.

ENGINE CONTROLS

The engine controls are centrally located for ease of operation from either the left or right seats. The throttle on the control console is a push to open, pull to close type. The throttle may be locked by a clockwise motion of the knob. The mixture control (push in for rich, pull out for idle cut-off) is locked with a clockwise turn of the friction nut located on the forward side of the knob.

ENGINE INSTRUMENTS

The engine instrument cluster is located on the lower left side of the instrument panel and includes the left fuel quantity indicator, an ammeter, oil temperature, oil pressure, fuel pressure and the right fuel quantity indicator. The tachometer is located on the upper left of the instrument panel.

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. Refer to Lycoming Engine Operator's Manual.

NOTE

In order to promote proper ring seating, cruise power settings of 65% to 75% should be used until a total of 50 hours has accumulated or until oil consumption has stabilized. This recommendation is applicable to in-service engines following cylinder replacement or top-overhaul of one or more cylinders, as well as to new engines.

LUBRICATION SYSTEM

The engine oil system is the wet-sump type and has an 8-quart capacity. 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.

STARTER

The starter is relay-controlled and is actuated by a rotary type, momentary-on switch incorporated in the MagnetoStart switch. The magnetoStart switch, located on the subpanel to the left of the pilot's control column, incorporates R (right), L (left), and BOTH magneto positions in addition to the normal OFF and START positions. After activation of the starter, the spring loaded switch returns to the BOTH position when released.

PROPELLER

Flottorp FIC-7660-2 fixed-pitch, 74 inch diameter, two-blade propeller. Static rpm at maximum permissible throttle settings: Not over 2400 rpm and not under 2300 rpm. No cutoff permitted.

or

Sensenich M74DM-0-60 fixed-pitch, two-blade propeller. Maximum and minimum diameter limit of 74 in., no cutoff permitted.

NOTE

Other propellers are approved but not installed as original equipment. These are listed in the FAA Aircraft Specification A1CE.

FUEL SYSTEM

The airplane is designed for operation on 91/96 (Blue) grade aviation gasoline. In the event this grade is not available, 100 (Green) or 100LL (Blue) grade aviation gasolines may be used.

CAUTION

See Avco Lycoming Service Letter No. L185A or later revision for operation on alternate fuels.

FUEL TANKS

Fuel tanks located in each wing leading edge have a nominal capacity of 29.9 gallons. In the filler neck of each tank is a visual measuring tab which permits partial filling of the fuel system. When the fuel touches the bottom of the tab it indicates 20 gallons of fuel. The indicating system reads full at 20 gallons. The pilot must visually check the fuel level during preflight to ascertain desired level. Fuel is fed from the desired tank through a fuel selector valve in the center floorboard and then through a strainer to the engine-driven fuel pump.

FUEL DRAINS

Two tank sump drains extend through the bottom of the wing skins, near the fuselage. The system low spot drain is incorporated in the fuel strainer on the lower right side of the fuselage aft of the nose wheel. Sump drains provide a means to visually inspect the fuel for water or contaminants.

Refer to **HANDLING, SERVICING AND MAINTENANCE** Section for procedures describing how and when to use fuel tank sump drains.

FUEL QUANTITY INDICATORS

Fuel quantity is measured by a float operated sensor, located in each wing tank system. These transmit electrical signals that indicate fuel remaining in each tank. The indicators indicate full when 20 or more gallons are in each wing tank.

FUEL BOOST PUMP

The electric fuel boost pump is controlled by an ON-OFF switch. It provides pressure for starting and emergency operation.

FUEL TANK SELECTION

The fuel selector valve handle is located on the floorboards between the pilot and copilot seats. Takeoffs and landings should be made using the tank that is more nearly full.

NOTE

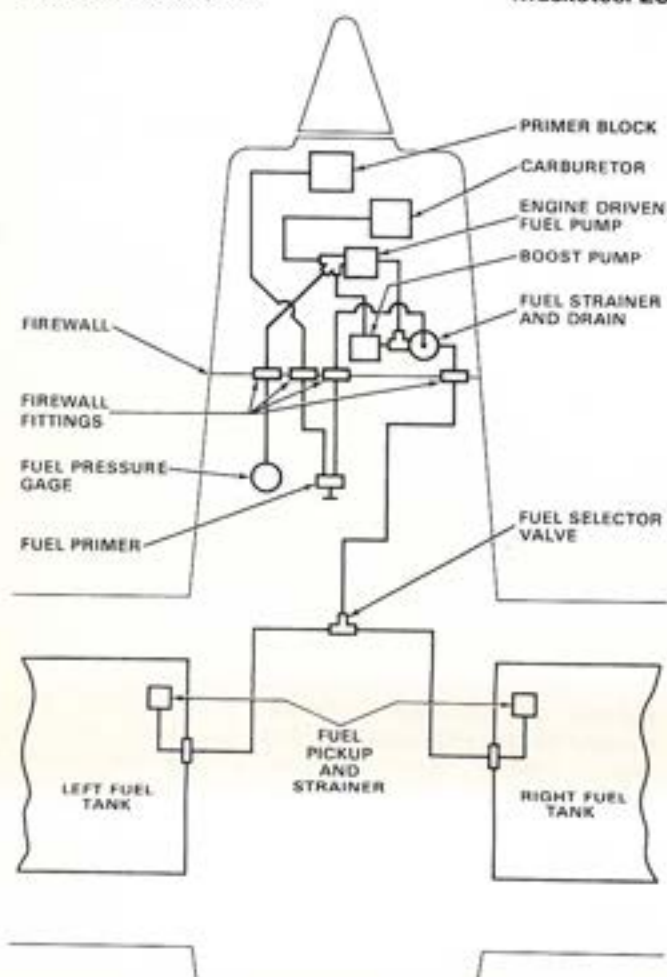
On airplanes which have complied with BEECHCRAFT S.I. No. 1095, a fuel selector stop has been added to the fuel selector valve guard. The fuel selector stop minimizes the possibility of inadvertently turning the fuel selector valve to the OFF detent position. The stop is a spring which must be depressed before the selector valve handle can be rotated to the OFF position.

If the engine stops because of insufficient fuel, refer to the EMERGENCY PROCEDURES Section for the Air Start procedures.

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 a flight. Takeoff is prohibited if the fuel quantity indicators do not indicate above the *yellow arc or with less than 11 gallons in each main tank. The 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 the 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.

*Only on airplanes complying with BEECHCRAFT S.I. No. 0624-281.

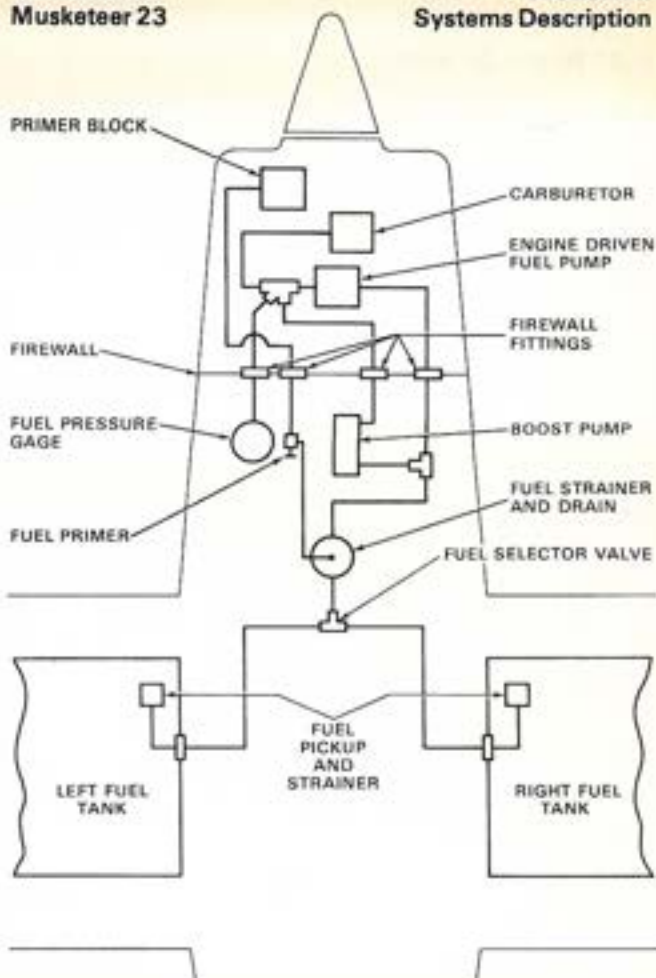


M-2 thru M-174 except M-3

FUEL SYSTEM SCHEMATIC

**BEECHCRAFT
Musketeer 23**

**Section VII
Systems Description**



M-175 thru M-554 or prior airplanes with BEECHCRAFT Kit No. 23-5 installed.

FUEL SYSTEM SCHEMATIC

ELECTRICAL SYSTEM

The system circuitry is the single-wire, ground-return type, with the airplane structure used as the ground return. The MASTER and magneto/start switches are located on the lower left side of the instrument panel. The circuit breaker panel, located on the lower right side of the instrument panel, contains the protective circuit-breakers for the various electrical systems.

BATTERY

A 12-volt battery is located in the aft fuselage. Battery servicing procedures are described in the HANDLING, SERVICING AND MAINTENANCE Section.

GENERATOR

Direct-current electric power is supplied by a 12-volt engine-driven generator of 35 ampere capacity, controlled by a voltage regulator which automatically adjusts generator output to its load, including recharging the battery.

The ammeter is of the conventional charge-discharge type, showing the rate of charge or discharge of the battery. A zero reading, which should be the normal condition in cruising flight, indicates that the battery is fully charged and the generator output has been adjusted by the regulator to balance the load of electrical equipment then in use.

EXTERNAL POWER RECEPTACLE

The external power receptacle is optional on this airplane. If installed, it is located on the right side of the fuselage aft of the wing. This airplane requires a 14V, DC, negative ground power unit.

CAUTION

The power pin for external power is connected directly to the battery and continually energized. The MASTER switch should be ON and all electrical and avionics switches must be OFF when connecting the ground power plug. Care should be taken to assure correct polarity (negative ground), prior to connecting and energizing the ground power unit.

LIGHTING SYSTEMS

INTERIOR LIGHTING

Lighting for the instrument panel engine instruments and compass is controlled by a rheostat switch located on the lower right side of the instrument panel. The cabin dome light is operated by an ON-OFF switch adjacent to the light.

EXTERIOR LIGHTING

The switches for all of the exterior lights are located on the right side of the instrument panel. Each circuit is protected by a circuit breaker switch, circuit breaker, or fuse. The exterior lights consist of navigation lights on the wing tips and rudder, a landing light on the left outboard wing and an upper and lower rotating beacon. The landing light can be used for approach and taxiing. For longer lamp life, use the landing light sparingly; avoid prolonged operation which could cause overheating during ground maneuvering.

NOTE

Particularly at night, reflections from rotating anti-collision lights or strobe 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

Air for warming the cabin and defrosting the windshield enters through an intake on the lower cowl forward bulkhead and passes through the heater and into a mixer box where it is blended with cold air to obtain the desired cabin temperature. Hot or cold air may enter the cabin through the firewall outlets. The knob marked CABIN AIR regulates the quantity of air entering the cabin through this firewall outlet. With the CABIN AIR knob in, pull out the CABIN HEAT knob for heated air and push it in for fresh air. There are 2 outlets for cabin heat distribution. Pull out the DEFROST knob for maximum defrost. Under extremely cold conditions, heating in the back seats can be improved by partially pulling the defrost knob.

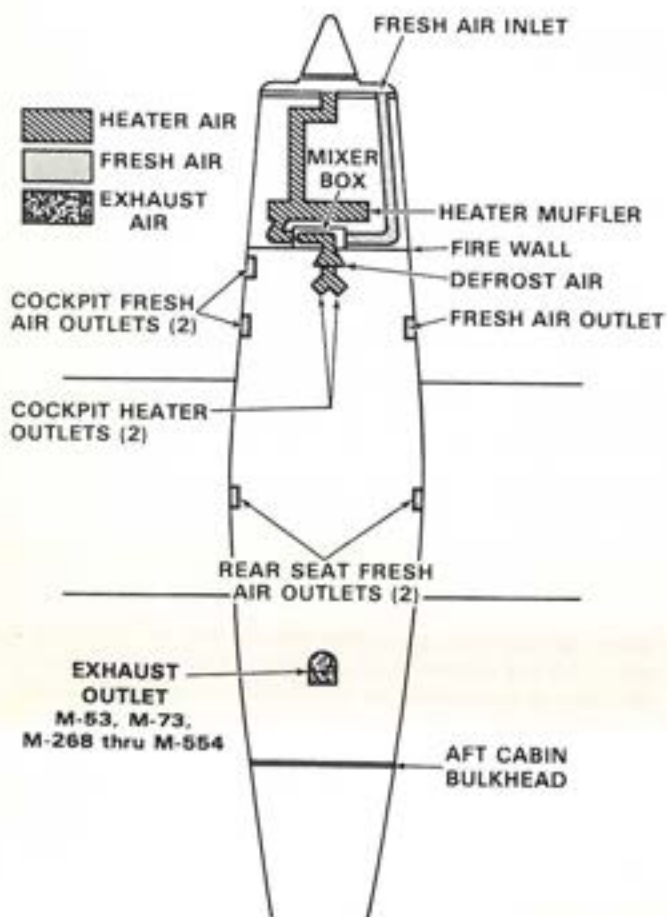
VENTILATION

Fresh cabin air is supplied by five manually operated, flap-type air scoops on the outside of the cabin. One is located to the left of the pilot's feet. The other four are near the seats for individual passenger adjustment. A knob allows control of the volume of air entering the scoop. Direction of air flow is controlled by a manually rotating deflector. During flight through inclement weather or for maximum noise suppression, the air scoops may be closed by operating the knob to the closed position.

EXHAUST VENT

(M-53, M-73, M-268 thru M-554)

An adjustable exhaust vent is located in the aft cabin for flow-through ventilation.



ENVIRONMENTAL SCHEMATIC

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 (OPTIONAL)

The pitot mast is provided with an electric heating element which is turned on and off with a switch on the instrument panel. 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.

NORMAL STATIC AIR SYSTEM

The normal static air system provides a source of static air to the flight instruments through a flush static fitting on each side of the aft fuselage. A union located inside a cover plate on the belly of the airplane provides a drain point to remove moisture from the system.

EMERGENCY STATIC AIR SYSTEM (OPTIONAL)

An alternate (emergency) static air source may be installed to provide air for instrument operation should the normal static ports become blocked. The alternate source is installed on the pilot's lower left sidewall. Turning the red handle to the ON EMERGENCY position allows cabin air into the system. Refer to EMERGENCY PROCEDURES section for proper use of the system. For Airspeed Calibration and Altimeter Correction, refer to PERFORMANCE section.

VACUUM SYSTEM

Vacuum for air-driven gyroscopic flight instruments and other air-driven equipment is supplied by an engine-driven vacuum pump. An adjustable relief valve controls suction by bleeding outside air into the vacuum pump.

A suction gage indicates system vacuum in inches of mercury. This instrument is located on the pilot's side of the instrument panel. The vacuum should be maintained within the green arc for proper operation of the air-driven instruments.

STALL WARNING SYSTEM

A stall warning horn located in the overhead speaker console is factory set to sound a warning 5 to 7 mph above a stall condition and continues steadily as the airplane approaches a complete stall. The stall warning horn, triggered by a sensing vane on the leading edge of the left wing, is equally effective in all flight configurations and at all weights.

WARNING

With the MASTER switch in the OFF position the stall warning horn is inoperative. Airplane certification requires the stall warning system to be on during flight except in emergency conditions as stated in Section III.

SECTION VIII

HANDLING, SERVICING AND MAINTENANCE

TABLE OF CONTENTS

<i>SUBJECT</i>	<i>PAGE</i>
Introduction	8-3
Publications	8-4
Airplane Inspection Periods	8-4
Preventive Maintenance That May Be Accomplished By A Certificated Pilot	8-5
Alterations or Repairs to Airplane	8-5
Ground Handling	8-6
Towing	8-6
Parking	8-7
Tie-Down	8-8
Jacking	8-8
Flyable Storage - 7 to 30 Days	8-9
Mooring	8-9
Fuel Cells	8-9
Grounding	8-9
Pitot Tube	8-9
Windshields and Windows	8-9
During Flyable Storage	8-9
Preparation for Service	8-10
Prolonged Out of Service Care	8-10
External Power	8-11
Checking Electrical Equipment	8-11
Servicing	8-12
Fuel System	8-12
Fuel Tank	8-12

TABLE OF CONTENTS (Continued)

SUBJECT	PAGE
Fuel Drains	8-12
Oil System	8-13
Recommended Oil Grades for Engines ...	8-14
Battery	8-14
Tires	8-15
Shimmy Damper	8-16
Brakes	8-16
Induction Air Filter	8-16
Vacuum System	8-17
Propeller Blades	8-17
Minor Maintenance	8-18
Rubber Seals	8-18
Generator	8-18
Magnetos	8-19
Cleaning	8-19
Exterior Painted Surfaces	8-19
Lacquer Paint Finishes	8-19
Urethane Paint Finishes	8-20
Windshields and Windows	8-21
Interior	8-21
Engine	8-22
Lubrication	8-22
Lubrication Points	8-23
Recommended Servicing Schedule	8-29
Consumable Materials	8-34
Approved Engine Oils	8-36
Bulb Replacement Guide	8-38
Overhaul or Replacement Schedule	8-39-8-43
Inspections	8-43
Operational Inspection	8-44
Power Plant	8-45
Cabin and Aft Fuselage	8-45
Exterior	8-45

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 of the airplane 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 and International Distributors or Dealers will have recommended modification, service, and operating procedures issued by both 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 may be found on the manufacturer's placard located on the left aft section of the fuselage beneath the stabilator.

PUBLICATIONS

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

1. Shop Manual
2. Parts Catalog
3. Service Instructions
4. Various Inspection Forms

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 any BEECHCRAFT Aero or Aviation Center or International Distributor or Dealer or refer to the latest revision of BEECHCRAFT Service Instructions No. 0250-010.

AIRPLANE INSPECTION PERIODS

1. FAA Required Annual Inspections.
2. BEECHCRAFT Recommended Inspection Guide.
3. Continuing Care Inspection Guide.
4. See "Recommended Servicing Schedule" and "Overhaul or Replacement Schedule" for further inspection schedules.

**PREVENTATIVE 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 proper procedures are followed, obtain a BEECHCRAFT Shop Manual for performing preventative maintenance.

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

NOTE

Pilots operating airplanes of other than U.S. registry should refer to the regulations of the registering authority for information concerning preventative maintenance that may be performed by pilots.

ALTERATIONS OR REPAIRS TO AIRPLANE

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

NOTE

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

GROUND HANDLING

The three-view drawing shows the minimum hangar clearances for a standard airplane. Allowances must be made for any special radio antennas and the possibility of an underinflated nose tire.

TOWING

CAUTION

Extreme care should be used when moving with power equipment to prevent damage to the nose gear housing assembly.

One person can move the airplane on a smooth and level surface, using the hand tow bar furnished with the loose equipment. Attach the tow bar to the tow lugs on the nose gear lower torque knee.

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 stabilator to raise the nose wheel. Do not attempt to tow the airplane backward by the tail tie-down ring.

PARKING

Original Installation

The parking brake push-pull control is located to the right of the pilot's control column. To set the parking brakes, depress the pilot's toe pedals until firm and pull out on the parking brake control, then release the toe pressure.

Release the parking brake by depressing the pilot's pedals with a hard, fast motion, then release the pressure slowly and check both wheels for free roll before applying take-off power.

PARKING

After compliance with BEECHCRAFT Service Letter 67-12

The parking brake push-pull control is located to the right of the pilot's control column. To set the parking brakes, pull out on the parking brake control and depress the pilot's toe pedals until firm.

Release the parking brake by pushing the parking brake control forward. Check both wheels for free roll before applying take-off power.

NOTE

The parking brake should be left off and wheel chocks installed if the airplane is to be left 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. Chock the main wheels, fore and aft.
2. Using nylon line or chain of sufficient strength, secure the airplane at the three points provided. **DO NOT OVER TIGHTEN**; if the line at the rear of the fuselage is excessively tight, the nose may rise and produce lift due to the angle of attack of the wings.
3. Release the parking brake.

If high winds are anticipated, a vertical tail post may 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 Shop Manual for proper procedures.

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

FLYABLE STORAGE - 7 TO 30 DAYS

MOORING

If the airplane cannot be placed in a hangar, tie down securely at the three points provided. Do not use hemp or manila rope. It is recommended a tail support be used to lightly compress the nose gear and reduce the angle of attack of the wings. Attach a line to the nose gear for additional tie-down.

FUEL CELLS

Fill to capacity to minimize fuel vapor.

GROUNDING

Static ground airplane securely and effectively.

PITOT TUBE

Install cover.

WINDSHIELD AND WINDOWS

Close window vent.

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. Unless the airplane is flown, repeat this procedure every five days.

WARNING

Be sure the ignition switch is "OFF", the throttle closed, and mixture control in the idle cut-off position before turning the propeller. Do not stand in the path of propeller blades. Also, 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 range. Excessive ground runup should be avoided.

PREPARATION FOR SERVICE

Remove all covers, clean the airplane, and give it a thorough inspection, particularly flaps and control openings.

Preflight the airplane.

PROLONGED OUT OF SERVICE CARE

The storage procedures listed 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.

If the airplane is to be stored longer than 30 days refer to the appropriate airplane shop manual and Avco Lycoming Service Letter L180 or subsequent.

EXTERNAL POWER

The following precautions shall be observed while using external power:

1. The MASTER switch shall be ON and all avionics and electrical switches OFF. This protects the voltage regulators and associated electrical equipment from voltage transients (power fluctuations):
2. 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.
3. In order to prevent arcing, no power shall be supplied while the connection is being made.

CHECKING ELECTRICAL EQUIPMENT

Connect an auxiliary power unit as outlined above. Ensure that the current is stabilized prior to making any electrical equipment or avionics check.

CAUTION

If the auxiliary power unit has poor voltage regulation or produces voltage transients the equipment connected to the unit may be damaged.

SERVICING

FUEL SYSTEM

FUEL TANKS

See Consumable Materials for recommended fuel grades.

CAUTION

See Avco Lycoming Service Letter No. L185A or later revision for operation on alternate fuels.

Two 29.9 gallon fuel tanks are located in the wings just outboard of the wing root. A visual measuring tab located below the tank filler neck facilitates a fuel load of 20 gallons when the fuel reaches the bottom of the tab. This partial filling of the fuel tanks allows an increase in the payload. The fuel indicators on the instrument panel will indicate full tanks even though each tank contains only 20 gallons of fuel.

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.

FUEL DRAINS

Open each of the fuel drain valves daily to remove any condensation from the system. The two tank sump drains extend through the bottom of the wing skins, near the fuselage.

The system low spot drain is incorporated in the fuel strainer on the lower right side of the fuselage aft of the nose wheel.

Inspection and cleaning of the fuel strainers 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 strainers should be inspected at more frequent intervals.

The screen in the fuel strainer at the system low spot on the bottom of the fuselage should be removed and washed in fresh cleaning solvent at each 100-hour inspection of the airplane. Ordinarily, the finger strainers in the fuel tank outlets should not require cleaning unless there is a definite indication of solid foreign material in the tanks, or the airplane has been stored for an extended period.

After the fuel strainers have been reinstalled, the installations should be checked for leakage. Any fuel lines or fittings disconnected for maintenance purposes should be capped.

Frequently inspect the O-rings on the fuel filler caps for condition. Replace as required to prevent contamination of the fuel from precipitation.

OIL SYSTEM

CAUTION

During break-in periods on new engines, oil consumption tends to be higher, therefore, maximum range flights should be avoided and oil level brought to full after each flight during this period.

Check engine oil quantity before each flight. 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. Use engine oil as indicated in Consumable Materials in this section. The engine oil sump capacity is eight quarts. The normal operating range is six to eight quarts.

RECOMMENDED OIL GRADES FOR ENGINES

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° F to 90° F	SAE 40	SAE 40
0° F to 70° F	SAE 30	SAE 40 or SAE 30
Below 10° F	SAE 20	SAE 30

BATTERY

A 12-volt, 25 amp-hour (35 amp-hour, optional), lead-acid battery, located directly aft of the cabin area may be reached by removing the rear panel.

Check the battery regularly for fluid level and add distilled water as required. Clean, tight connections should be maintained at all times. Battery vents should be checked periodically for obstructions and for proper protrusion (3 inches from top of chamfer to skin line). The intake vent is chamfered forward and the exhaust vent is chamfered aft.

**BEECHCRAFT
Musketeer 23**

**Section VIII
Handling, Serv - Maint**

External power should be used for checking airplane electrical systems to prevent excess battery power loss, and for starting the engine during cold weather when more power is needed for cranking. Charging batteries in the airplane is discouraged. If the battery is low and needs charging and servicing, it should be removed from the airplane and serviced and charged in the manner prescribed in the shop manual.

WARNING

Always connect charging cables at the battery terminals first, then to the charging unit, to avoid sparks near the battery fumes since explosion could occur.

TIRES

The airplane is equipped with tube type tires. Inflate the 15 x 6.00-6 main and nose gear tires to 40 psi and the 17.50 x 6.00-6 main and nose gear tires (on airplanes after compliance with BEECHCRAFT Service Letter 65-10) to 22 psi. Maintaining proper tire inflation will minimize tread wear and aid in preventing tire failure caused from running over sharp stones. When inflating tires, visually inspect them for cracks and breaks.

CAUTION

Beech Aircraft Corporation cannot recommend the use of recapped tires. Recapped tires have a tendency to swell as a result of the increased temperature generated during takeoff. Increased tire size can jeopardize proper function of the landing gear with the possibility of damage to the landing gear.

SHIMMY DAMPER

A hydraulic shimmy damper is mounted on the nose wheel strut adapter. Whenever this component develops an external leak or a skip in the damping action, it should be replaced.

BRAKES

Original Installation

The brake hydraulic fluid reservoir, an integral part of the master cylinders is located on the forward side of the rudder pedals. Refer to Consumable Materials in this section for hydraulic fluid specification.

BRAKES

On airplanes after compliance with BEECHCRAFT Service Letter 67-12

The brake hydraulic fluid reservoir is located on the fire-wall in the engine compartment. Refer to Consumable Materials in this section for hydraulic fluid specification.

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 kit.

INDUCTION AIR FILTER

This filter should be inspected for foreign matter at least once during each 50-hour operating period. In adverse climatic conditions, or if the airplane is stored, preflight inspection is recommended.

To remove and clean the filter:

1. Remove the filter retaining wing nuts and cover.
2. Remove the filter.
3. Clean and service as described in the manufacturer's instructions on the filter.
4. Reinstall the filter.
5. Reinstall the cover and retaining wing nuts. Tighten nuts to assure that the filter is secure and then resafety.

VACUUM SYSTEM

The foam rubber suction relief valve screen may be removed for cleaning by slipping it off the bottom of the valve. The screen may be cleaned with soap and water.

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. The BEECHCRAFT Aero or Aviation Center and International Distributors or Dealers will be glad to answer any questions concerning propeller blade repair.

WARNING

When servicing a propeller, always make certain the ignition switch is off and that the engine has cooled completely. **WHEN MOVING A PROPELLER, STAND IN THE CLEAR;** there is always some danger of a cylinder firing when a propeller is moved.

MINOR MAINTENANCE

RUBBER SEALS

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

GENERATOR

Since the generator and 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 generator 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 a generator on open circuit. Be sure all connections are secure.
5. Do not short across or ground any of the terminals on the generator or voltage regulator.
6. A generator should be polarized only by qualified personnel.

MAGNETOS

Ordinarily, the magnetos will require only occasional adjustment, lubrication, and breaker point replacement. 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 airplane 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 naptha. After cleaning with naptha, 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

Exercise extreme care to prevent scratches when cleaning the Plexiglas windshield and windows. Never wipe them when dry. Flush the surface with clean water or a mild soap solution, then rub lightly with a grit-free soft cloth, sponge, or chamois. Use trisodium phosphate completely dissolved in water to remove oil and grease film. To remove stubborn grease and oil deposits, use hexane, aliphatic naphtha, or methanol. Rinse with clean water; avoid prolonged rubbing.

CAUTION

Do not use gasoline, benzene, acetone, carbon tetrachloride, fire extinguisher fluid, deice fluid, or lacquer thinners on the windshield or windows, as these substances have a tendency to soften and craze the surface.

INTERIOR

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

Some plastic interior trim may be affected by ultra-violet rays from the sun over a period of time. The results of this exposure is a yellow stain that accumulates on the plastic.

It has been found that a commercial type scouring powder cleanser, used with a wet cloth, will successfully remove this stain without damaging the trim.

It must be noted that this type cleanser contains a high bleach content and should not be allowed to come in contact with any other interior material.

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.

LUBRICATION

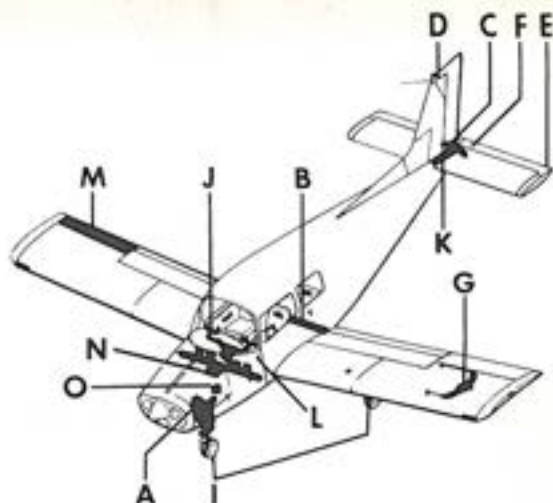
Proper lubrication is essential in keeping the airplane components in top condition. If this operation is performed thoroughly, general maintenance will be reduced and the service life of the airplane will be greatly increased.

The grease fittings or parts must be wiped clean to make sure that no dirt is carried into the part when lubricated. Apply lubricant sparingly, but with assurance that the bearing surfaces are adequately covered. Wipe off excess lubricant to prevent the accumulation of dust and foreign material.

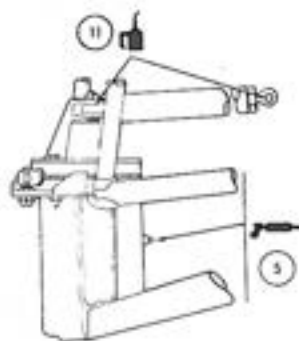
NOTE

Lubricate all pivotal points as shown on the Lubrication Diagram in the Shop Manual to ensure freedom of movement and proper functioning. More frequent lubrication may be required because of climate, or frequent usage of the airplane.

LUBRICATION POINTS

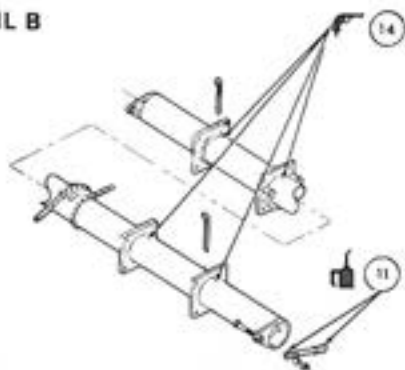


DETAIL A



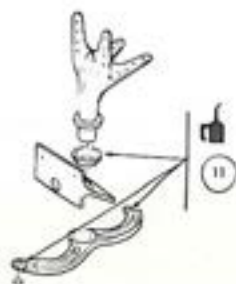
NOSE GEAR STEERING

DETAIL B



FLAP MECANISM

DETAIL C



RUDDER BELLCRANK

DETAIL D

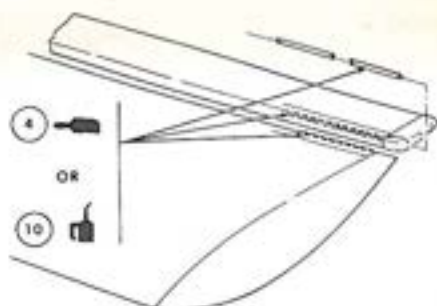


RUDDER HINGE

**BEECHCRAFT
Musketeer 23**

**Section VIII
Handling, Serv - Maint**

DETAIL E



ELEVATOR HINGE

DETAIL F



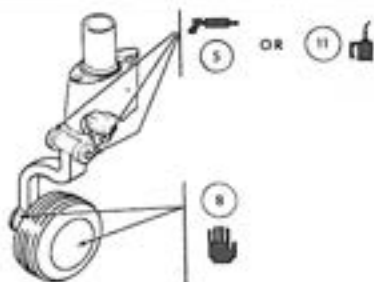
**STABILATOR HINGE
BRACKET**

DETAIL G



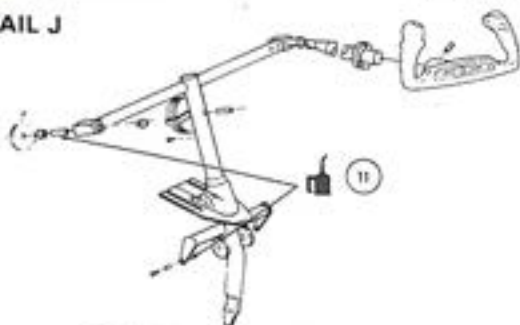
AILERON BELLCRANK

DETAIL I



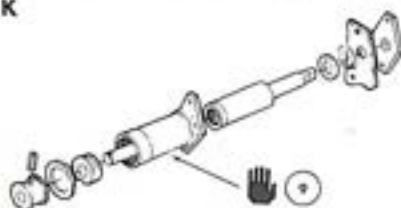
LANDING GEAR

DETAIL J



CONTROL COLUMN LINKAGE

DETAIL K



TRIM TAB ACTUATOR

DETAIL L



This screw must be completely tight to prevent binding.

LOOSEN NUT, REMOVE VALVE CONE, AND LUBRICATE CONE WITH VERY THIN COATING OF LUBRICANT.

NOTE: Airplanes having complied with BEECHCRAFT S.I. No. 0622-289 or S.I. No. 0838 need no lubrication.

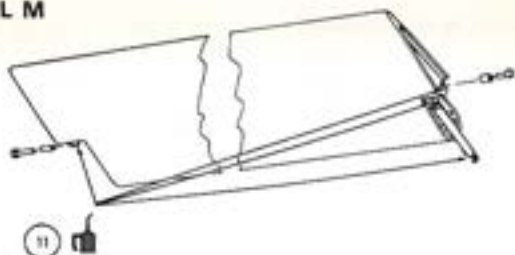
NOTE: DO NOT OVER LUBRICATE VALVE CONE APPLY MINIMUM AMOUNT OF LUBRICANT FOR COATING

FUEL SELECTOR VALVE

**BEECHCRAFT
Musketeer 23**

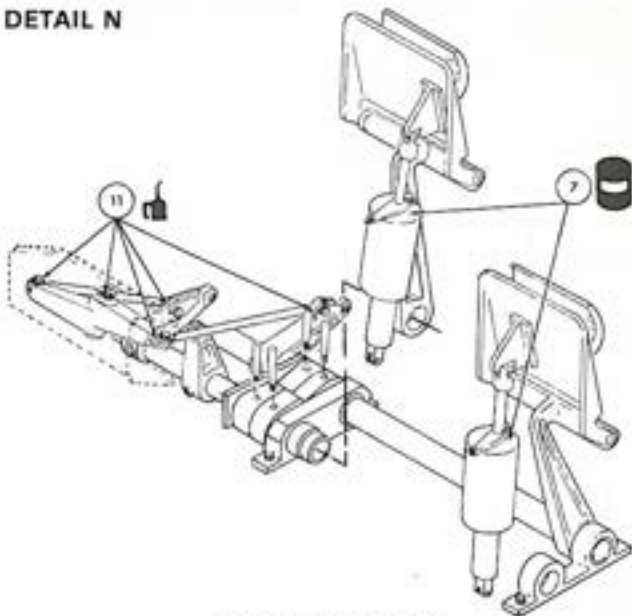
**Section VIII
Handling, Serv - Maint**

DETAIL M



AILERON HINGE AND ROD ENDS

DETAIL N



M-1 THRU M-554

BRAKE FLUID RESERVOIR

DETAIL N (Continued)



AIRPLANES AFTER
COMPLIANCE WITH
BEECHCRAFT SERVICE
LETTER 67-12

BRAKE FLUID RESERVOIR

DETAIL O



CARBURETOR MIXTURE CONTROL



SPRAY



GREASE GUN



HAND OR PACK



OIL CAN



BRUSH



HYDRAULIC FLUID

NOTE

Numbers refer to items in the consumable materials chart. Lubricate all plain bearing bushings as required or every 500 hours with SAE No. 30 oil. Apply SAE No. 20 oil to push-pull control housings as required. Lubricate flight control pulley bushings with SAE No. 30 oil every 1000 hours.

SAE 10w/30 oil is an acceptable replacement for SAE 20 or SAE 30 oil.

BEECHCRAFT
Musketeer 23Section VIII
Handling, Serv - Maint

RECOMMENDED SERVICING SCHEDULE

INTERVAL	ITEM	LOCATION (Letters refer to Lubrication Points Diagram)	LUBRICANT (Number refers to item on Consumable Materials)
Pre-flight	Check engine oil level Drain fuel tank drains Drain fuel system low spot Service fuel tanks	Upper left side of engine Inboard bottom of wings Bottom of fuselage Top of wings	1 - - 3
25 Hrs.	Check battery electrolyte Clean induction air filter Lubricate landing gear knee pins	Behind aft cabin bulkhead In lower forward cowl On landing gear (l)	See Shop Manual - 5 or 11
50 Hrs.	Change engine oil Clean oil screens	Lower side of engine Aft right side of accessory case and bottom of sump	1 2

RECOMMENDED SERVICING SCHEDULE

INTERVAL	ITEM	LOCATION (Letters refer to Lubrication Points Diagram)	LUBRICANT (Number refers to item on Consumable Materials)
100 Hrs.	Clean fuel system screens and strainers	Bottom of wings and fuselage	2
	Clean suction relief valve screen	Forward of firewall	-
	Lubricate wheel bearings	Landing gear (I)	8
	Lubricate nose gear rod end bearings	On top of nose gear (A)	11
	Lubricate nose gear swivel	On aft side of nose gear (A)	5
	Lubricate flap torque tubes	Under floorboards (B)	14
	Lubricate flap rod end bearings	Inboard end of flaps (B)	11
	Lubricate rudder bellcrank pivot points	Bottom of rudder (C)	11
	Lubricate rudder hinges	On rudder leading edge (D)	11

RECOMMENDED SERVICING SCHEDULE

INTERVAL	ITEM	LOCATION (Letters refer to Lubrication Points Diagram)	LUBRICANT (Number refers to item on Consumable Materials)
As Req.	Fuel selector valve Brake fluid reservoir	Center floorboard (L) On individual rudder pedal linkage or on firewall (see illus- tration N) In engine compartment	15 7 7 -
Per Ap- plicable FAR	Replace Emergency Locator Transmitter Battery	-	-

BEECHCRAFT **Musketeer 23**

Section VIII **Handling, Serv - Maint**

	Lubricate stabilator trim tab hinge and pin	On trailing edge of stabilator (E)	4, 10
	Lubricate stabilator hinge pivot point	In aft tail section (F)	11
	Lubricate aileron bellcrank	In wing forward of aileron (G)	11
	Lubricate aileron pivotal points and rod ends	Outboard trailing edge of wings (M)	11
	Replace gyro filters	Back of instrument	.
300 Hrs.	Replace induction air filter	In front nose cowl	.
500 Hrs.	Lubricate rudder pedal gears	Forward cabin floor (N)	11
1000 Hrs.	Lubricate control column pivot points	Behind instrument panel (J)	11
1200 Hrs.	Lubricate trim tab actuator	In aft tail section (K)	9

NOTE: Anytime the control surfaces are altered, repaired, or repainted, they must be rebalanced per the Shop Manual.

CONSUMABLE MATERIALS

ITEM	MATERIAL	SPECIFICATION
*1.	Engine Oil	MIL-L-22851
2.	Solvent	PD680
**3.	Fuel, Engine	91/96 (blue), 100 (green) or 100LL (blue) Grade
***4.	Lubricant, Powdered Graphite	MIL-C-6711
†5.	Grease (High & Low Temperature)	Aero Lubriplate
6.	Corrosion Preventive, Engine	MIL-C-6529
7.	Hydraulic Fluid	MIL-H-5606
††8.	Grease (General Purpose, Wide Temperature)	MIL-G-81322
††9.	Grease (High & Low Temperature)	MIL-G-23827
10.	Lubricating Oil (Low Temperature)	MIL-L-7870
11.	Lubricating Oil	SAE No. 20 or 10W/30
12.	Lubricating Oil	SAE No. 30 or 10W/30
†††13.	Lubricant, Rubber Seal	Oakite 6 Compound
††††14.	Lubricant, Silicone Spray	Krylon No. 1329 (or equivalent)
15.	Lubricant, Fluorosilicone	Corning FS-1292

**BEECHCRAFT
Musketeer 23**

**Section VIII
Handling, Serv - Maint**

ITEM	MATERIAL	SPECIFICATION
•16.	Engine Fuel Additive	Alcor TCP Concentrate

* Ashless dispersant oil complying with MIL-L-22851 is recommended after the oil consumption has stabilized or after the first 50 hours of operation. A straight mineral oil conforming to MIL-L-6082 may be used until the oil consumption has stabilized. Oil of seasonal viscosity, added to maintain the proper oil level during this break-in period, must comply with MIL-L-6082.

** If grade 91/96 (blue) fuel is not available, use 100 (green) or 100LL (blue).

*** Mix with quick-evaporating liquid naphtha and apply with a brush.

† Product of BRC Bearing Company, Wichita, Kansas.

†† In extremely cold climates, MIL-G-23827 grease should be used in place of MIL-G-81322 grease. Care should be exercised when using either MIL-G-81322 or MIL-G-23827 grease, as they contain a rust-preventing additive which is harmful to paint.

††† Product of Oakite Products, Inc., 50 Valley Road, Berkley Heights, NJ 07922.

†††† Product of Krylon Inc., Norristown, Pa.

• Alcor TCP Concentrate mixed according to the instructions provided by Alcor Inc., Alcor Inc. 10130 Jones-Maltsberger Road P.O. Box 32516 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 Co.	*Esso Aviation Oil E-120 *Enco Aviation Oil E-120 *Esso Aviation Oil A-100 *Enco Aviation Oil A-100 *Esso Aviation Oil E-80 *Enco Aviation Oil E-80
Standard Oil Company of California	*Chevron Aero Oil Grade 120

**BEECHCRAFT
Musketeer 23**

**Section VIII
Handling, Serv - Maint**

COMPANY	BRAND NAME
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 or after the first 50 hours of operation.

** 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. Oil of seasonal viscosity, added to maintain the proper oil level during this break-in period, must comply with MIL-L-6082.

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.

BULB REPLACEMENT GUIDE

LOCATION	NUMBER
Compass light	330
Dome light, cabin	89
Instrument flood light, overhead	89
Landing light, wing	4313
Navigation light, tail cone	1777
Navigation light, wing	1512
Rotating beacon	WRM-44K or WRM-1940
Engine instrument cluster	T53
*Landing gear position indicators	330
*If simulated retractable landing gear switch kit is installed.	

OVERHAUL OR REPLACEMENT SCHEDULE

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, providing the operator has an approved monitoring system.

The time periods for inspection 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 shown, as the aforementioned factors cannot be controlled by the manufacturer.

COMPONENT	OVERHAUL OR REPLACE
-----------	---------------------

LANDING GEAR

Brake Assembly	On Condition
Brake Lining	On Condition
Master Cylinder	On Condition
Parking Brake Valve	On Condition
All Hose	On Condition
Shimmy Damper	On Condition
Wheels and Tires	On Condition

POWER PLANT

NOTE

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.

Engine	1500 hours
Engine Controls	On Condition
Engine Vibration	Engine Change
Isolator Mounts	or on condition
Exhaust System	800 hours or on condition
Magnetos	At engine overhaul (Bendix)
Starter	Inspect at engine overhaul; overhaul or replace on condition

**BEECHCRAFT
Musketeer 23**

**Section VIII
Handling, Serv - Maint**

COMPONENT	OVERHAUL OR REPLACE
Generator	On Condition
Oil Cooler	On Condition (replace when contaminated)
Propeller	On Condition or 1000 hours
Engine Driven Fuel Pump	At engine overhaul or on condition
Cabin Heat Muff	Inspect every 100 hours
All Hose carrying flammable liquid	At engine overhaul or every 5 years. All other hoses on condition.
Gyro Filters	Every 100 hours or on condition
Vacuum Regulator Valve	On Condition
Vacuum Pump	500 hours or on condition

FUEL SYSTEM

Fuel Boost Pump	On condition
All Hose carrying flammable liquid	At engine overhaul or every 5 years
All Hose not carrying flammable liquid	On Condition
Fuel Selector Valve	Inspect every 100 hours; overhaul on condition
Fuel Cell Drain Valve	On Condition
Wing Fuel Quantity Transmitters	On Condition

COMPONENT

OVERHAUL OR REPLACE

INSTRUMENTS

Turn Coordinator	On Condition
Altimeter	Every 24 months per FAA Directive (Inspect and calibrate)
Directional Gyro	On Condition
Instrument Air	On Condition
Engine Indicator Units	On Condition
Airspeed Indicator	On Condition
Rate-of-Climb Indicator	On Condition
Fuel Quantity Indicator	On Condition
Fuel Pressure Indicator	On Condition
Tachometer	On Condition
Free Air Temperature Indicator	On Condition

ELECTRICAL SYSTEM

Battery Master Relay	On Condition
All other Relays	On Condition
Voltage Regulator	On Condition
Starter Relay	On Condition

FLAPS AND FLIGHT CONTROLS

Flight Controls	On Condition
Stabilator Tab Actuator	On Condition

Power Plant

1. Oil screens cleaned.
2. Induction air filter cleaned.
3. Check engine controls, wiring harness, and plumbing for clearance, security and condition.
4. Check propeller for rock damage, and spinner and spinner bulkheads for cracks and security; engine for oil leaks.
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(s).
9. Clean and gap spark plugs.

Cabin and Aft Fuselage

1. Flight control operation through full travel and proper direction of travel.
2. Storm window and door operation.
3. Check interior furnishings and seat belts.
4. Check battery water 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.

INTENTIONALLY LEFT BLANK

**BEECHCRAFT
Musketeer 23**

**Section VIII
Handling, Serv - Maint**

COMPONENT

OVERHAUL OR REPLACE

MISCELLANEOUS

Seat Belts	Inspect every 12 months, replace on condition
Hand Fire Extinguisher	Inspect every 12 months, recharge as necessary
Cabin Heating and Ventilating Ducts	On Condition, Inspect every 12 months
Transponder	Test and inspect every 24 months

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 preventative 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. Generator/voltage regulator functioning
2. Engine instruments
3. Flight instruments
4. Idle rpm and mixture
5. Engine controls operation
6. All lights
7. Radio operation
8. Magneto check
9. Brake operation
10. Tank selector operation
11. Heat and vent system operation
12. Starter operation
13. Electrical switches and circuit breakers
14. Power check 2300 to 2400 rpm static



SECTION IX

SUPPLEMENTS

NOTE

The supplemental data contained in this section is for equipment that was delivered on the airplane including standard optional equipment that was available, whether it was installed or not. 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 Supplements for other equipment that was installed after the airplane was delivered new from the factory should be placed in this SUPPLEMENTS Section of this Pilot's Operating Handbook and FAA Approved Airplane Flight Manual.

INTENTIONALLY LEFT BLANK

Section IX
Supplements

FAA Supplements must be in the airplane for flight operation when subject equipment is installed:				
Supp. No.	Part Number	Subject	Rev. No.	Date

INTENTIONALLY LEFT BLANK

Beechcraft
Single Engine (Piston)

SECTION X
SAFETY INFORMATION
TABLE OF CONTENTS

<i>SUBJECT</i>	<i>PAGE</i>
Introduction	10-3
General	10-5
Do's	10-5
Don'ts	10-6
Sources of Information	10-7
Pilot's Operating Handbook and FAA Approved Airplane Flight Manual	10-7
BEECHCRAFT Service Publications	10-8
Federal Aviation Regulations	10-10
Airworthiness Directives	10-10
Airman's Information Manual	10-10
Advisory Information	10-11
FAA Advisory Circulars	10-12
FAA General Aviation News	10-15
FAA Accident Prevention Program	10-15
Additional Information	10-16
General Information on Specific Topics	10-17
Maintenance	10-17
Hazards of Unapproved Modifications	10-19
Flight Planning	10-20
Passenger Information Cards	10-20
Stowage of Articles	10-21
Flight Operations	10-21
General	10-21
Preflight Inspection	10-21
Weight and Balance	10-22
Autopilots and Electric Trim Systems	10-23
Flutter	10-26
Turbulent Weather	10-27
Wind Shear	10-30
Weather Radar	10-30
Mountain Flying	10-32
VFR - Low Ceilings	10-33
VFR at Night	10-33
Vertigo - Disorientation	10-34

SECTION X
SAFETY INFORMATION
TABLE OF CONTENTS (Continued)

<i>SUBJECT</i>	<i>PAGE</i>
Stalls, Slow Flight and Training	10-36
Spins	10-36
Descent	10-38
Vortices - Wake Turbulence	10-39
Takeoff and Landing Conditions	10-40
Medical Facts for Pilots	10-40
General	10-40
Fatigue	10-41
Hypoxia	10-41
Hyperventilation	10-43
Alcohol	10-43
Drugs	10-45
Scuba Diving	10-45
Carbon Monoxide and Night Vision	10-45
Decompression Sickness	10-46
A Final Word	10-47

INTRODUCTION

Beech Aircraft Corporation has developed this special summary publication of safety information to refresh pilots' and owners' knowledge of safety related subjects. Topics in this publication are dealt with in more detail in FAA Advisory Circulars and other publications pertaining to the subject of safe flying.

The skilled pilot recognizes that safety consciousness is an integral - and never-ending - part of his or her job. Be thoroughly familiar with your airplane. Know its limitations and your own. Maintain your currency, or fly with a qualified instructor until you are current and proficient. Practice emergency procedures at safe altitudes and airspeeds, preferably with a qualified instructor pilot, until the required action can be accomplished without reference to the manual. Periodically review this safety information as part of your recurring training regimen.

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

..... Beech Aircraft Corporation

WARNING

Because your airplane 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 publication and the other operating and maintenance manuals which accompany the airplane; 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 Pilot's Operating Handbook and FAA Approved Airplane Flight Manual to operate the airplane.

IMPROPER OPERATION OR MAINTENANCE OF AN AIRPLANE, NO MATTER HOW WELL BUILT INITIALLY, CAN RESULT IN CONSIDERABLE DAMAGE OR TOTAL DESTRUCTION OF THE AIRPLANE, ALONG WITH SERIOUS OR FATAL INJURIES TO ALL OCCUPANTS.

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 Information publication 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. Practice until you are proficient.

Preplan all aspects of your flight - including a proper weather briefing and adequate fuel reserves.

Use services available - weather briefing, inflight weather and Flight Service Station.

Carefully preflight your airplane.

Use the approved checklist.

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

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

Use seatbelts and shoulder harnesses at all times.

Be sure all loose articles and baggage are secured.

Check freedom and proper direction of operation of all controls during preflight inspection.

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

Avoid wake turbulence (Vortices).

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, NEVER use auxiliary tanks for takeoff or landing.

Practice emergency procedures at safe altitudes and air-speeds, preferably with a qualified instructor pilot, until the required action can be accomplished without reference to the manual.

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, or careless manner.

Don't fly into thunderstorms or severe weather.

Don't fly in possible icing conditions.

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 fly when physically or mentally exhausted or below par.

Don't trust to luck.

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 more efficient. Take advantage of this knowledge and be prepared for an emergency in the event that one should occur.

PILOT'S OPERATING HANDBOOK AND FAA APPROVED AIRPLANE FLIGHT MANUAL

You must be thoroughly familiar with the contents of your operating manuals, placards, and check lists to ensure safe utilization of your airplane. When the airplane was manufactured, it was equipped with one or more of the following: placards, Owner's Manual, FAA Approved Airplane Flight Manual, FAA Approved Airplane Flight Manual Supplements, Pilot's Operating Handbook and FAA Approved Airplane Flight Manual. Beech has revised and reissued many of the early manuals for certain models of airplanes in GAMA Standard Format as Pilot's Operating Handbooks and FAA Approved Airplane Flight Manuals. For simplicity and convenience, all official manuals in various models are referred to as the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual. If the airplane has changed ownership, the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual may have been misplaced or may not be current. Replacement handbooks may be obtained from any BEECHCRAFT Authorized Outlet.

BEECHCRAFT SERVICE PUBLICATIONS

Beech Aircraft Corporation publishes a wide variety of manuals, service letters, service instructions, service bulletins, safety communiques and other publications for the various models of BEECHCRAFT airplanes. Information on how to obtain publications relating to your airplane is contained in BEECHCRAFT Service Bulletin number 2001, entitled "General - BEECHCRAFT Service Publications - What is Available and How to Obtain It."

Beech Aircraft Corporation automatically mails original issues and revisions of BEECHCRAFT Service Bulletins (Mandatory, Recommended and Optional), FAA Approved Airplane Flight Manual Supplements, reissues and revisions of FAA Approved Airplane Flight Manuals, Flight Handbooks, Owners Manuals, Pilot's Operating Manuals and Pilot's Operating Handbooks, and original issues and revisions of BEECHCRAFT Safety Communiques to BEECHCRAFT Owner addresses as listed by the FAA Aircraft Registration Branch List and the BEECHCRAFT International Owner Notification Service List. While this information is distributed by Beech Aircraft Corporation, Beech can not make changes in the name or address furnished by the FAA. The owner must contact the FAA regarding any changes to name or address. Their address is: FAA Aircraft Registration Branch (AAC250) P.O. Box 25082, Oklahoma City, OK 73125, Phone (405) 680-2131.

It is the responsibility of the FAA owner of record to ensure that any mailings from Beech are forwarded to the proper persons. Often the FAA registered owner is a bank or financing company or an individual not in possession of the airplane. Also, when an airplane is sold, there is a lag in processing the change in registration with the FAA. If you are a new owner, contact your BEECHCRAFT Authorized Outlet and ensure your manuals are up to date.

Beech Aircraft Corporation provides a subscription service which provides for direct factory mailing of BEECHCRAFT

publications applicable to a specific serial number airplane. Details concerning the fees and ordering information for this owner subscription service are contained in Service Bulletin number 2001.

For owners who choose not to apply for a Publications Revision Subscription Service, Beech provides a free Owner Notification Service by which owners are notified by post card of BEEHCRAFT manual reissues, revisions and supplements which are being issued applicable to the airplane owned. On receipt of such notification, the owner may obtain the publication through a BEEHCRAFT Authorized Outlet. This notification service is available when requested by the owner. This request may be made by using the owner notification request card furnished with the loose equipment of each airplane at the time of delivery, or by a letter requesting this service, referencing the specific airplane serial number owned. Write to:

Supervisor, Special Services
Dept. 52
Beech Aircraft Corporation
P.O. Box 85
Wichita, Kansas 67201-0085

From time to time Beech Aircraft Corporation issues BEEHCRAFT Safety Communiques dealing with the safe operation of a specific series of airplanes, or airplanes in general. It is recommended that each owner/operator maintain a current file of these publications. Back issues of BEEHCRAFT Safety Communiques may be obtained without charge by sending a request, including airplane model and serial number, to the Supervisor, Special Services, at the address listed above.

Airworthiness Directives (AD's) are not issued by the manufacturer. They are issued and available from the FAA.

FEDERAL AVIATION REGULATIONS

FAR Part 91, General Operating and Flight Rules, is a document of law governing operation of airplanes and the owner's and pilot's responsibilities. Some of the subjects covered are:

Responsibilities and authority of the pilot-in-command

Certificates required

Liquor and drugs

Flight plans

Preflight action

Fuel requirements

Flight rules

Maintenance, preventive maintenance, alterations, inspection and maintenance records

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

AIRWORTHINESS DIRECTIVES

FAR 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'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 in the Air Traffic Control

Deechcraft
Single Engine (Piston)

Section X
Safety Information

system, information on safety, and accident/hazard reporting. It is revised at six-month intervals and can be purchased 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 Airspace
Emergency Procedures
Services Available to Pilots
Weather and Icing
Radio Phraseology and Technique
Mountain Flying
Airport Operations
Wake Turbulence - Vortices
Clearances and Separations
Medical Facts for Pilots
Preflight
Bird Hazards
Departures - IFR
Good Operating Practices
En route - IFR
Airport Location Directory
Arrival - IFR

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, or enroute navigational aids out of service.

FAA ADVISORY CIRCULARS

The FAA issues Advisory Circulars to inform the aviation public in a systematic way of nonregulatory 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 AC 00-2, 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. These documents are subject to periodic revision. Be certain the Advisory Circular you are using is the latest revision available. Some of the Advisory Circulars of interest to pilots are:

- | | |
|--------|--|
| *00-6 | Aviation Weather |
| 00-24 | Thunderstorms |
| 00-30 | Rules of Thumb for Avoiding or Minimizing Encounters with Clear Air Turbulence |
| *00-45 | Aviation Weather Services |
| 00-46 | Aviation Safety Reporting Program |
| 20-5 | Plane Sense |
| 20-32 | Carbon Monoxide (CO) Contamination in Aircraft - Detection and Prevention |
| 20-35 | Tie-Down Sense |
| 20-43 | Aircraft Fuel Control |
| 20-105 | Engine Power-Loss Accident Prevention |
| 20-113 | Pilot Precautions and Procedures to be Taken in Preventing Aircraft Reciprocating Engine Induction System & Fuel System Icing Problems |
| 20-125 | Water in Aviation Fuel |
| 10-12 | |

May, 1994

Deechcraft
Single Engine (Piston)

Section X
Safety Information

- | | |
|--------|---|
| 21-4 | Special Flight Permits for Operation of Overweight Aircraft |
| 43-9 | Maintenance Records: General Aviation Aircraft |
| 43-12 | Preventive Maintenance |
| 60-4 | Pilot's Spatial Disorientation |
| 60-6 | Airplane Flight Manuals (AFM), Approved Manual Materials, Markings and Placards - Airplanes |
| 60-12 | Availability of Industry-Developed Guidelines for the Conduct of the Biennial Flight Review |
| 60-13 | The Accident Prevention Counselor Program |
| *61-9 | Pilot Transition Courses for Complex Single-Engine and Light Twin-Engine Airplanes |
| *61-21 | Flight Training Handbook |
| *61-23 | Pilot's Handbook of Aeronautical Knowledge |
| *61-27 | Instrument Flying Handbook |
| 61-67 | Hazards Associated with Spins in Airplanes Prohibited from Intentional Spinning. |
| 61-84 | Role of Preflight Preparation |
| *67-2 | Medical Handbook for Pilots |
| 90-23 | Aircraft Wake Turbulence |
| 90-42 | Traffic Advisory Practices at Nontower Airports |

Section X
Safety Information

Beechcraft
Single Engine (Piston)

- 90-48 Pilot's Role in Collision Avoidance
- 90-66 Recommended Standard Traffic Patterns for Airplane Operations at Uncontrolled Airports
- 90-85 Severe Weather Avoidance Plan (SWAP)
- 91-6 Water, Slush and Snow on the Runway
- 91-13 Cold Weather Operation of Aircraft
- *91-23 Pilot's Weight and Balance Handbook
- 91-26 Maintenance and Handling of Air Driven Gyroscopic Instruments
- 91-33 Use of Alternate Grades of Aviation Gasoline for Grade 80/87 and Use of Automotive Gasoline
- 91-35 Noise, Hearing Damage, and Fatigue in General Aviation Pilots
- 91-43 Unreliable Airspeed Indications
- 91-44 Operational and Maintenance Practices for Emergency Locator Transmitters and Receivers
- 91-46 Gyroscopic Instruments - Good Operating Practices
- 91-50 Importance of Transponder Operations and Altitude Reporting
- 91-51 Airplane Deice and Anti-ice Systems
- 91-59 Inspection and Care of General Aviation Aircraft Exhaust Systems
- 91-65 Use of Shoulder Harness in Passenger Seats

103-4 Hazards Associated with Sublimation of Solid Carbon Dioxide (Dry Ice) Aboard Aircraft

210-5A Military Flying Activities

*** 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 airplanes. 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 Station (FSS), or Fixed Base Operator (FBO), 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.

ADDITIONAL INFORMATION

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. Some of these are titled:

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
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

GENERAL INFORMATION ON SPECIFIC TOPICS

MAINTENANCE

Safety of flight begins with a well maintained airplane. Make it a habit to keep your airplane and all its equipment in airworthy condition. Keep a "squawk list" on board, and see that all discrepancies, however minor, are noted and promptly corrected.

Schedule your maintenance regularly, and have your airplane serviced by a reputable organization. Be suspicious of bargain prices for maintenance, repair and inspections.

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.

Use only genuine BEECHCRAFT or BEECHCRAFT approved parts obtained from BEECHCRAFT approved sources, in connection with the maintenance and repair of Beech airplanes.

Genuine BEECHCRAFT parts are produced and inspected under rigorous procedures to insure airworthiness and suitability for use in Beech airplane applications. Parts purchased from sources other than BEECHCRAFT, even though outwardly identical in appearance, may not have had

the required tests and inspections performed, may be different in fabrication techniques and materials, and may be dangerous when installed in an airplane.

Salvaged airplane parts, reworked parts obtained from non-BEECHCRAFT approved sources or parts, components, or structural assemblies, the service history of which is unknown or cannot be authenticated, may have been subjected to unacceptable stresses or temperatures or have other hidden damage not discernible through routine visual or usual nondestructive testing techniques. This may render the part, component, or structural assembly, even though originally manufactured by BEECHCRAFT, unsuitable and unsafe for airplane use.

BEECHCRAFT expressly disclaims any responsibility for malfunctions, failures, damage or injury caused by use of non-BEECHCRAFT parts.

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).

If you have purchased a used airplane, have your mechanic inspect the airplane registration records, logbooks and maintenance records carefully. An unexplained period of time for which the airplane has been out of service, or unexplained significant repairs may well indicate the airplane has been seriously damaged in a prior accident. Have your mechanics inspect a used airplane carefully. Take the time to ensure that you really know what you are buying when you buy a used airplane.

HAZARDS OF UNAPPROVED MODIFICATIONS

Many airplane modifications are approved under Supplemental Type Certificates (STC's). Before installing an STC on your airplane, check to make sure that the STC does not conflict with other STC's that have already been installed. Because approval of an STC is obtained by the individual STC holder based upon modification of the original type design, it is possible for STC's to interfere with each other when both are installed. Never install an unapproved modification of any type, however innocent the apparent modification may seem. Always obtain proper FAA approval.

Airplane owners and maintenance personnel are particularly cautioned not to make attachments to, or otherwise modify, seats from original certification without approval from the FAA Engineering and Manufacturing District Office having original certification responsibility for that make and model.

Any unapproved attachment or modification to seat structure may increase load factors and metal stress which could cause failure of seat structure at a lesser "G" force than exhibited for original certification.

Examples of unauthorized attachments found are drilling holes in seat tubing to attach fire extinguishers and drilling holes to attach approach plate book bins to seats.

FLIGHT PLANNING

FAR 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 preflight 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 takeoff 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 Pilot's Operating Handbook and FAA Approved Airplane Flight Manual. The resultant effect of temperature and pressure altitude must be taken into account in performance if not accounted for on the charts. An applicable FAA Approved Airplane Flight Manual must be aboard the airplane at all times and include 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 Authorized Outlet. A pilot should not only be familiar with the information contained in the cards, but should always, prior to flight, inform the passengers of the information contained in the information cards. 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.

STOWAGE OF ARTICLES

The space between the seat pan and the floor is utilized to provide space for seat displacement. If hard, solid objects are stored beneath seats, the energy absorbing feature is lost and severe spinal injuries can occur to occupants.

Prior to flight, pilots should insure that articles are not stowed beneath seats that would restrict seat pan energy absorption or penetrate the seat in event of a high vertical velocity accident.

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 placards installed.

PREFLIGHT INSPECTION

In addition to maintenance inspections and preflight information required by FAR Part 91, a complete, careful preflight inspection is imperative.

Each airplane has a checklist for the preflight inspection which must be followed. **USE THE CHECKLIST.**

WEIGHT AND BALANCE

Maintaining center of gravity within the approved envelope throughout the planned flight is an important safety consideration.

The airplane must be loaded so as not to exceed the weight and center of gravity (C.G.) limitations. Airplanes that are loaded above the maximum takeoff or landing weight limitations will have an overall lower level of performance compared to that shown in the Performance section of the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual. If loaded above maximum takeoff weight, takeoff distance and the landing distance will be longer than that shown in the Performance section; the stalling speed will be higher, rate of climb, the cruising speed, and the range of the airplane at any level of fuel will all be lower than shown in the Performance section.

If an airplane is loaded so that the C.G. is forward of the forward limit, it will require additional control movements for maneuvering the airplane with correspondingly higher control forces. The pilot may have difficulty during takeoff and landing because of the elevator control limits.

If an airplane is loaded aft of the aft C.G. limitation, the pilot will experience a lower level of stability. Airplane characteristics that indicate a lower stability level are; lower control forces, difficulty in trimming the airplane, lower control forces for maneuvering with attendant danger of structural overload, decayed stall characteristics, and a lower level of lateral-directional damping.

Ensure that all cargo and baggage is properly secured before takeoff. A sudden shift in balance at rotation can cause controllability problems.

AUTOPILOTS AND ELECTRIC TRIM SYSTEMS

Because there are several different models of autopilots and electric trim systems installed in Beech airplanes and different installations and switch positions are possible from airplane to airplane, it is essential that every owner/operator review his Airplane Flight Manual (AFM) Supplements and ensure that the supplements properly describe the autopilot and trim installations on his specific airplane. Each pilot, prior to flight, must be fully aware of the proper procedures for operation, and particularly disengagement, for the system as installed.

In addition to ensuring compliance with the autopilot manufacturer's maintenance requirements, all owners/operators should thoroughly familiarize themselves with the operation, function and procedures described in the Airplane Flight Manual Supplements. Ensure a full understanding of the methods of engagement and disengagement of the autopilot and trim systems.

Compare the descriptions and procedures contained in the Supplements to the actual installation in the airplane to ensure that the supplement accurately describes your installation. Test that all buttons, switches and circuit breakers function as described in the Supplements. If they do not function as described, have the system repaired by a qualified service agency. If field service advice or assistance is necessary, contact Beech Aircraft Corporation, Customer Support Department.

As stated in all AFM Supplements for autopilot systems and trim systems installed on Beech airplanes, the preflight check must be conducted before every flight. The preflight check assures not only that the systems and all of their features are operating properly, but also that the pilot, before flight, is familiar with the proper means of engagement and disengagement of the autopilot and trim system.

Autopilot Airplane Flight Manual Supplements caution against trying to override the autopilot system during flight without disengaging the autopilot because the autopilot will continue to trim the airplane and oppose the pilot's actions. This could result in a severely out of trim condition. This is a basic feature of all autopilots with electric trim follow-up.

Do not try to manually override the autopilot during flight.

IN CASE OF EMERGENCY, YOU CAN OVERPOWER THE AUTOPILOT TO CORRECT THE ATTITUDE, BUT THE AUTOPILOT AND ELECTRIC TRIM MUST THEN IMMEDIATELY BE DISENGAGED.

It is often difficult to distinguish an autopilot malfunction from an electric trim system malfunction. The safest course is to deactivate both. Do not re-engage either system until after you have safely landed. Then have the systems checked by a qualified service facility prior to further flight.

Depending upon the installation on your airplane, the following additional methods may be available to disengage the autopilot or electric trim in the event that the autopilot or electric trim does not disengage utilizing the disengage methods specified in the Supplements.

CAUTION

Transient control forces may occur when the autopilot is disengaged.

1. Turn off the autopilot master switch, if installed.
2. Pull the autopilot and trim circuit breaker(s) or turn off the autopilot switch breaker, if installed.
3. Turn off the RADIO MASTER SWITCH, if installed, and if the autopilot system and the trim system are wired through this switch.

CAUTION

Radios, including VHF COMM are also disconnected when the radio master switch is off.

4. Turn off the ELECTRIC MASTER SWITCH.

WARNING

Almost all electrically powered systems will be inoperative. Consult the AFM for further information.

5. Push the GA switch on throttle grip, if installed (depending upon the autopilot system).
6. Push TEST EACH FLT switch on the autopilot controller, if installed.

NOTE

After the autopilot is positively disengaged, it may be necessary to restore other electrical functions. Be sure when the master switches are turned on that the autopilot does not re-engage.

The above ways may or may not be available on your autopilot. It is essential that you read your airplane's AFM SUPPLEMENT for your autopilot system and check each function and operation on your system.

The engagement of the autopilot must be done in accordance with the instructions and procedures contained in the AFM SUPPLEMENT.

Particular attention must be paid to the autopilot settings prior to engagement. If you attempt to engage the autopilot when the airplane is out of trim, a large attitude change may occur.

IT IS ESSENTIAL THAT THE PROCEDURES SET FORTH IN THE APPROVED AFM SUPPLEMENTS FOR YOUR SPECIFIC INSTALLATION BE FOLLOWED BEFORE ENGAGING THE AUTOPILOT.

FLUTTER

Flutter is a phenomenon that can occur when an aerodynamic surface begins vibrating. The energy to sustain the vibration is derived from airflow over the surface. The amplitude of the vibration can (1) decrease, if airspeed is reduced; (2) remain constant, if airspeed is held constant and no failures occur; or (3) increase to the point of self-destruction, especially if airspeed is high and/or is allowed to increase. Flutter can lead to an in-flight break up of the airplane. Airplanes are designed so that flutter will not occur in the normal operating envelope of the airplane as long as the airplane is properly maintained. In the case of any airplane, decreasing the damping and stiffness of the structure or increasing the trailing edge weight of control surfaces will tend to cause flutter. If a combination of those factors is sufficient, flutter can occur within the normal operating envelope.

Owners and operators of airplanes have the primary responsibility for maintaining their airplanes. To fulfill that responsibility, it is imperative that all airplanes receive a thorough preflight inspection. Improper tension on the control cables or any other loose condition in the flight control system can also cause or contribute to flutter. Pilot's should pay particular attention to control surface attachment hardware including tab pushrod attachment during preflight inspection. Looseness of fixed surfaces or movement of control surfaces other than in the normal direction of travel should be

rectified before flight. Further, owners should take their airplanes to mechanics who have access to current technical publications and prior experience in properly maintaining that make and model of airplane. The owner should make certain that control cable tension inspections are performed as outlined in the applicable Beech Inspection Guide. Worn control surface attachment hardware must be replaced. Any repainting or repair of a moveable control surface will require a verification of the control surface balance before the airplane is returned to service. Control surface drain holes must be open to prevent freezing of accumulated moisture, which could create an increased trailing-edge-heavy control surface and flutter.

If an excessive vibration, particularly in the control column and rudder pedals, is encountered in flight, this may be the onset of flutter and the procedure to follow is:

1. IMMEDIATELY REDUCE AIRSPEED (lower the landing gear if necessary).
2. RESTRAIN THE CONTROLS OF THE AIRPLANE UNTIL THE VIBRATION CEASES.
3. FLY AT THE REDUCED AIRSPEED AND LAND AT THE NEAREST SUITABLE AIRPORT.
4. HAVE THE AIRPLANE INSPECTED FOR AIRFRAME DAMAGE, CONTROL SURFACE ATTACHING HARDWARE CONDITION/SECURITY, TRIM TAB FREE PLAY, PROPER CONTROL CABLE TENSION, AND CONTROL SURFACE BALANCE BY ANOTHER MECHANIC WHO IS FULLY QUALIFIED.

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 reported severe turbulence. It is not always possible to detect individual storm areas or find the in-between clear areas.

The National Weather Service classifies turbulence as follows:

Class of Turbulence	Effect
Extreme	Airplane is violently tossed about and is practically impossible to control. May cause structural damage.
Severe	Airplane may be momentarily out of control. Occupants are thrown violently against the belts and back into the seat. Unsecured objects are tossed about.
Moderate	Occupants require seat belts and occasionally are thrown against the belt. Unsecured objects move about.
Light	Occupants may be required to use seat belts, but objects in the airplane remain at rest.

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.

Thunderstorms also pose the possibility of a lightning strike on an airplane. 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 airplane should be thoroughly inspected and any damage repaired prior to additional flight.

A roll cloud ahead of a squall line or thunderstorm is visible evidence of extreme 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 Pilot's Operating Handbook and FAA Approved Airplane Flight Manual. These speeds give the best assurance of avoiding excessive stress loads, and at the same time provide the proper margin against inadvertent stalls due to gusts.

Beware of overcontrolling in an attempt 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 airplane 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.

WIND SHEAR

Wind shears are rapid, localized changes in wind direction, which can occur vertically as well as horizontally. Wind shear can be very dangerous to all airplanes, large and small, particularly on approach to landing when airspeeds are slow.

A horizontal wind shear is a sudden change in wind direction or speed that can, for example, transform a headwind into a tailwind, producing a sudden decrease in indicated airspeed because of the inertia of the airplane. A vertical wind shear, is a sudden updraft or downdraft. Microbursts are intense, highly localized severe downdrafts.

The prediction of wind shears is far from an exact science. Monitor your airspeed carefully when flying near storms, particularly on approach. Be mentally prepared to add power and go around at the first indication that a wind shear is being encountered.

WEATHER RADAR

Airborne weather avoidance radar is, as its name implies, for avoiding severe weather—not for penetrating it. Whether to fly into an area of radar echoes depends on echo intensity, spacing between the echoes, and the capabilities of you and your airplane. Remember that weather radar detects only precipitation drops; it does not detect turbulence. Therefore, the radar scope provides no assurance of avoiding turbulence. The radar scope also does not provide assurance of avoiding instrument weather due to clouds and fog. Your scope may be clear between intense echoes; this clear area does not necessarily mean you can fly between the storms and maintain visual sighting of them.

Thunderstorms build and dissipate rapidly. Therefore, do not attempt to plan a course between echoes using ground based radar. The best use of ground radar information is to isolate general areas and coverage of echoes. You must avoid individual storms from in-flight observations either by visual sighting or by airborne radar. It is better to avoid the whole thunderstorm area than to detour around individual storms unless they are scattered.

Remember that while hail always gives a radar echo, it may fall several miles from the nearest visible cloud and hazardous turbulence may extend to as much as 20 miles from the echo edge. Avoid intense or extreme level echoes by at least 20 miles; that is, such echoes should be separated by at least 40 miles before you fly between them. With weaker echoes you can reduce the distance by which you avoid them.

Above all, remember this: never regard any thunderstorm lightly. Even when radar observers report the echoes are of light intensity, avoiding thunderstorms is the best policy. The following are some do's and don'ts of thunderstorm avoidance:

1. Don't land or take off in the face of an approaching thunderstorm. A sudden gust front of low level turbulence could cause loss of control.
2. Don't attempt to fly under a thunderstorm even if you can see through to the other side. Turbulence and wind shear under the storm could be disastrous.
3. Don't fly without airborne radar into a cloud mass containing scattered embedded thunderstorms. Embedded thunderstorms usually can not be visually circumnavigated.
4. Don't trust visual appearance to be a reliable indicator of the turbulence inside a thunderstorm.

5. Do avoid by at least 20 miles any thunderstorm identified as severe or giving an intense radar echo. This is especially true under the anvil of a large cumulonimbus.
6. Do circumnavigate the entire area if the area has 6/10 or greater thunderstorm coverage.
7. Do remember that vivid and frequent lightning indicates the probability of a severe thunderstorm.
8. Do regard as extremely hazardous any thunderstorm with tops 35,000 feet or higher, whether the top is visually sighted or determined by radar.

If you cannot avoid penetrating a thunderstorm, the following are some do's BEFORE entering the storm:

9. Tighten your safety belt, put on your shoulder harness, and secure all loose objects.
10. Plan and hold your course to take you through the storm in minimum time.
11. To avoid the most critical icing, establish a penetration altitude below the freezing level or above the level of -15°C .
12. Verify that pitot heat is on and turn on carburetor heat or engine anti-ice. Icing can be rapid at any altitude and cause almost instantaneous power failure and/or loss of airspeed indication.

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 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 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 attitude 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 safely 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 in 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 Pilot's Operating Handbooks and FAA Approved Airplane Flight 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 airplane, 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, flight controls are designed to be used to their fullest extent only below the airplane's 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.

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 engine airplanes during simulated engine-out practice or stall demonstrations, because the stall speed is critical in all low-speed operation of airplanes.

Training should be accomplished under the supervision of a qualified instructor-pilot, with careful reference to the applicable sections of the FAA Practical Test Standards and FAA Pilot Transition Courses for Complex Single Engine and Light Twin Engine Airplanes (AC 61-9). In particular, observe carefully the warnings in the Practical Test Standards.

SPINS

A major cause of fatal accidents in general aviation airplanes is a 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 airplane 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 airplanes 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 moment with the controls as the airplane 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.

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

- 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 stabilize, which delays recovery.
- Whenever a student pilot will be required to practice slow flight, be certain that the qualified instructor pilot has a full set of operable controls available. FAA regulations prohibit flight instruction without full dual controls.

- 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.
- 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. On final approach maintain at least the airspeed shown in the flight manual.
- 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.
- Finally, never forget that stall avoidance is your best protection against an inadvertent spin. **MAINTAIN YOUR AIRSPEED.**

In airplanes not certificated for aerobatics, spins are prohibited. 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 position until rotation stops and then neutralize all controls and execute a smooth pullout. Ailerons should be neutral and the throttle in idle position at all times during recovery.

DESCENT

In single engine piston-powered airplanes, 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 temperature 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 distance. 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 behind the airplane. Plan to fly slightly above and to the windward side of 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, provide 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 retracted 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.

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 preflight 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 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 time 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, a 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, a hypoxic individual has a limited time to make decisions and perform useful acts, even though he may remain conscious for a longer period. The time of useful consciousness is approximately 3-5 minutes at 25,000 feet of altitude and diminishes markedly as altitude increases.

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).

Pilots who fly to altitudes that require or may require the use of supplemental oxygen should be thoroughly familiar with the operation of the airplane oxygen systems. A preflight inspection of the system should be performed, including proper fit of the mask. The passengers should be briefed on the proper use of their oxygen system before flight.

Pilots who wear beards should be careful to ensure that their beard is carefully trimmed so that it will not interfere with proper sealing of the oxygen masks. If you wear a beard or moustache, test the fit of your oxygen mask on the ground for proper sealing. Studies conducted by the military and oxygen equipment manufacturers conclude that oxygen masks do not seal over beards or heavy facial hair.

Federal Aviation Regulations related to the use of supplemental oxygen by flight crew and passengers must be adhered to if flight at higher altitudes is to be accomplished safely. Passengers with significant circulatory or lung disease may need to use supplemental oxygen at lower altitudes than specified by these regulations.

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, 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 judgement.
- 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.

Federal Aviation Regulations have been amended to reflect the FAA's growing concern with the effects of alcohol impairment. FAR 91 states:

"Alcohol or drugs.

(a) No person may act or attempt to act as a crew-member of a civil aircraft -

- (1) Within 8 hours after the consumption of any alcoholic beverage;
- (2) While under the influence of alcohol;
- (3) While using any drug that affects the person's faculties in any way contrary to safety; or
- (4) While having .04 percent by weight or more alcohol in the blood.

(b) Except in an emergency, no pilot of a civil aircraft may allow a person who appears to be intoxicated or who demonstrates by manner or physical indications that the individual is under the influence of drugs (except a medical patient under proper care) to be carried in that aircraft."

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, anti-histamines, 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 affect visual sensitivity equal to an increase of 8,000 feet altitude.

DECOMPRESSION SICKNESS

Pilots flying unpressurized airplanes at altitudes in excess of 10,000 feet should be alert for the symptoms of 'decompression sickness'. This phenomenon, while rare, can impair the pilot's ability to perform and in extreme cases, can result in the victim being rendered unconscious. Decompression sickness, also known as dysbarism and aviators "bends", is caused by nitrogen bubble formation in body tissue as the ambient air pressure is reduced by climbing to higher altitudes. The symptoms are pain in the joints, abdominal cramps, burning sensations in the skin, visual impairment and numbness. Some of these symptoms are similar to hypoxia. The only known remedy for decompression sickness is recompression, which can only be accomplished in an unpressurized airplane by descending. The pilot should immediately descend if it is suspected that this condition exists, since the effects will only worsen with continued exposure to the reduced pressure environment at altitude and could result, if uncorrected, in complete incapacitation. The possibility of decompression sickness can be greatly reduced by pre-breathing oxygen prior to flight and by commencing oxygen breathing well below the altitudes where it is legally mandatory.

A FINAL WORD

Airplanes are truly remarkable machines. They enable us to shrink distance and time, and to expand our business and personal horizons in ways that, not too many years ago, were virtually inconceivable. For many businesses, the general aviation airplane has become the indispensable tool of efficiency.

Advances in the mechanical reliability of the airplanes we fly have been equally impressive, as attested by the steadily declining statistics of accidents attributed to mechanical causes, at a time when the airframe, systems and power plants have grown infinitely more complex. The explosion in capability of avionics systems is even more remarkable. Radar, RNAV, LORAN, sophisticated autopilots and other devices which, just a few years ago, were too large and prohibitively expensive for general aviation size airplanes, are becoming increasingly commonplace in even the smallest airplanes.

It is thus that this Safety Information is directed to the pilot, for it is in the area of the skill and proficiency of you, the pilot, that the greatest gains in safe flying are to be made over the years to come. Intimate knowledge of your airplane, its capabilities and its limitations, and disciplined adherence to the procedures for your airplane's operation, will enable you to transform potential tragedy into an interesting hangar story when - as it inevitably will - the abnormal situation is presented.

Know your airplane's limitations, and your own. Never exceed either.

Safe flying,

BEECH AIRCRAFT CORPORATION

THIS PAGE INTENTIONALLY LEFT BLANK