# TABLE OF CONTENTS

## SECTION 2

## LIMITATIONS

# SECTION 2

# LIMITATIONS

## 2.1 GENERAL

This section provides the "FAA Approved" operating limitations, instrument markings, color coding and basic placards necessary for the operation of the PA-31-350 Chieftain and its systems.

Limitations associated with those optional systems and equipment which require handbook supplements can be found in Section 9 (Supplements).

## 2.3 AIRSPEED LIMITATIONS

| SPEED | KCAS | KIAS |
|---|---|---|
| Never Exceed Speed ($V_{NE}$) - Do not exceed this speed in any operation. | 236 | 236 |
| Maximum Structural Cruising Speed ($V_{NO}$) - Do not exceed this speed except in smooth air and then only with caution. | 187 | 185 |
| Design Maneuvering Speed ($V_A$) - Do not make full or abrupt control movements above this speed. | 162 | 160 |
| Maximum Flaps Extended Speed ($V_{FE}$) - Do not exceed this speed with a given flap setting. | | |
| Flaps extended speeds | | |
| 15° flap | 160 | 162 |
| 25° flap | 160 | 162 |
| 40° flap | 130 | 132 |

| | KCAS | KIAS |
|---|---|---|
| Maximum Gear Extended Speed ($V_{LE}$) - Do not exceed this speed with landing gear extended. | 156 | 153 |
| Maximum Landing Gear Operating Speed ($V_{LO}$) - Do not extend or retract landing gear above this speed. | | |
| Extend | 156 | 153 |
| Retract | 130 | 128 |
| Air Minimum Control Speed ($V_{MCA}$) - Lowest airspeed at which airplane is controllable with one engine operating and takeoff flaps. | 78 | 76 |
| Stall Speed (full flaps, gear down, power off, 7000 lbs.) (See Section 5, Performance, for stall speeds at reduced weights.) | 74 | 74 |

**NOTE**

The maximum altitude loss during a single-engine stall, gear and flaps retracted is 600 feet. For a symmetrical power-off stall, gear and flaps retracted, maximum altitude loss is 500 feet. Altitude loss is less for other aircraft configurations.

Demonstrated Crosswind Velocity **20 KTS**

## 2.5 AIRSPEED INDICATOR MARKINGS

| MARKING | KIAS |
|---|---|
| Green Arc (Normal Operating Range) | 77 to 185 |
| Yellow Arc (Caution Range - Smooth Air) | 185 to 236 |
| White Arc (Flaps Extended Range) | 74 to 132 |
| Radial Red Line (Never Exceed - Smooth Air) | 236 |
| Radial Red Line (Minimum Control Speed - Single Engine) | 76 |
| Radial Blue Line (Best Rate of Climb Speed - Single Engine) | 106 |

## 2.7 POWER PLANT LIMITATIONS

| | |
|---|---|
| (a) Number of Engines | 2 |
| (b) Engine Manufacturer | Lycoming |
| (c) Engine Model Number | |
| (1) Left | TIO-540-J2BD |
| (2) Right | LTIO-540-J2BD |
| (d) Engine Operating Limits | |
| (1) Maximum Continuous Power | |
| (a) Maximum Horsepower | 350 |
| (b) Maximum Rotational Speed (RPM) | 2575 |
| (c) Maximum Manifold Pressure (Inches of Mercury) | |
| To 15,000 feet | 49.0 |
| 15,000 to 22,300 feet | 49.0 minus .64 per 1000 feet increase |
| 22,300 to 24,000 feet | 44.3 minus 2.2 per 1000 feet increase |
| (d) Maximum Cylinder Head Temperature | 500° F |
| (2) Maximum Normal Operating Power (Top of Tachometer and Manifold Pressure Gauge Green Arc) | |
| (a) Maximum Horsepower | 315 |
| (b) Maximum Rotational Speed | 2400 |
| (c) Maximum Manifold Pressure (Inches of Mercury) | |
| To 18,700 feet | 40.0 |
| 18,700 to 24,000 feet | 40.0 minus 1.7 per 1000 feet increase |
| (d) Maximum Cylinder Head Temperature | 475° F |
| (3) Maximum Oil Temperature | 245° F |
| (4) Maximum Exhaust Gas Temperature | 1650° F |

| | |
|---|---|
| (e) Oil Pressure | |
| Minimum (red line) | 25 PSI |
| Maximum (red line) | 100 PSI |
| (f) Fuel Pressure | |
| Normal Operating Range (green arc) | 34 PSI to 55 PSI |
| Minimum (red line) | 34 PSI |
| Maximum (red line) | 55 PSI |
| (g) Fuel Grade (AVGAS ONLY) | |
| (minimum octane) | 100/130 - Green |
| (h) Number of Propellers | 2 |
| (i) Propeller Manufacturer | Hartzell |
| (j) Propeller Hub Model | |
| (1) Left | HC-E3YR-2ATF |
| (2) Right | HC-E3YR-2ALTF |
| (k) Propeller Blade Model | |
| (1) Left | FC8468-6R |
| (2) Right | FJC8468-6R |
| (l) Propeller Diameter | |
| Maximum | 80 IN. |
| Minimum | 78 IN. |
| (m) Propeller Pitch Settings at 30 Inch Station | |
| Low Pitch Stop | 13.4° ± 0.1° |
| High Pitch Stop (Feathered) | 82° ± 1.0° |

## 2.9 POWER PLANT INSTRUMENT MARKINGS

| | |
|---|---|
| (a) Tachometer | |
| Green Arc (Normal Operating Range | 500 RPM to 2400 RPM |
| Radial Red Line (Maximum) | 2575 RPM |
| (b) Fuel Pressure | |
| Green Arc (Normal Operating Range) | 34 PSI to 55 PSI |
| Radial Red Line | |
| Minimum | 34 PSI |
| Maximum | 55 PSI |
| (c) Cylinder Head Temperature | |
| Green Arc (Normal Range) | 100°F to 475°F |
| Yellow Arc (Caution) | 475°F to 500°F |
| Radial Red Line (Never Exceed) | 500°F |
| (d) Oil Temperature | |
| Green Arc (Normal Operating Range) | 120°F to 245°F |
| Yellow Arc (Caution) | 50° to 120°F |
| Radial Red Line (Maximum) | 245°F |

| | |
|---|---|
| (e) Oil Pressure | |
| Green Arc (Normal Operating Range) | 60 PSI to 90 PSI |
| Yellow Arc (Caution) | 25 PSI to 60 PSI and 90 PSI to 100 PSI |
| Radial Red Line (Minimum) | 25 PSI |
| Radial Red Line (Maximum) | 100 PSI |
| (f) Exhaust Gas Temperature | |
| Green Arc (Normal Operating Range) | Zero or lower scale limit to 1650°F |
| Radial Red Line (Never Exceed) | 1650°F |
| (g) Manifold Pressure | |
| Radial Red Line (Never Exceed) | 49 IN. HG. |
| Green Arc (Normal Operating Range) | 18 IN. HG. to 40 IN. HG. |

## 2.11 WEIGHT LIMITS

| | |
|---|---|
| (a) Maximum Ramp Weight | 7045 LBS |
| (b) Maximum Takeoff Weight | 7000 LBS |
| (c) Maximum Landing Weight | 7000 LBS |
| (d) Maximum Weights in Baggage Compartments | |
| Forward (Nose) | 200 LBS |
| Aft | 200 LBS |
| Nacelle (per side) | 150 LBS |

NOTE

It is the responsibility of the airplane owner and the pilot to insure that the airplane is properly loaded. Maximum allowable takeoff and landing weight is 7000 lbs. Maximum allowable ramp weight is 7045 lbs. See Section 6 (Weight and Balance) for proper loading instructions.

## 2.12 FUEL LIMITATIONS

| | |
|---|---|
| (a) Fuel Capacity (U.S. gal.) (total) | 192 |
| (b) Usable Fuel (U.S. gal.) (total) | 182 |

## 2.13 CENTER OF GRAVITY LIMITS (GEAR EXTENDED)

| Weight Pounds | Forward Limit Inches Aft of Datum | Rearward Limit Inches Aft of Datum |
|---|---|---|
| 7045 (Max. Ramp Weight) | 126 | 135 |
| 7000 (Max. Takeoff Weight) | 126 | 135 |
| 6200 | 122 | 135 |
| 5200 or less | 120 | 135 |

NOTES

Straight line variation between the points given.

Datum line is located 137 inches ahead of the wing main spar centerline.

## 2.15 MANEUVER LIMITS

This is a normal category airplane. All intentional acrobatic maneuvers (including spins) are prohibited.

## 2.17 FLIGHT LOAD FACTOR LIMITS (MANEUVERS)

(a) Positive Load Factor (Maximum) at 7000 Lbs 3.51 G
(b) Negative Load Factor (Maximum) at 7000 Lbs -1.4 G

No Inverted Maneuvers Approved

## 2.19 COWL FLAPS LIMITATIONS

Cowl flaps are provided to allow control of engine tempertures. The cowl flaps should be open during ground operations and in climbs. In no case should the cylinder head temperature be allowed to exceed 500° F or the oil temperature to exceed 245° F.

## 2.21 MINIMUM CREW

The minimum crew for operating this airplane is one pilot unless the type of operation (air taxi, for example - see FAR's) requires a copilot.

## 2.23 MAXIMUM OPERATING ALTITUDE

24,000 feet

## 2.25 TYPES OF OPERATION LIMITS

The Federal Aviation Regulations make the operator of an aircraft responsible for insuring that sufficient and proper instruments and equipment are installed, operating, and calibrated for the type of flight being undertaken. These regulations (for example, see FAR 91.3(a), 91.25, 91.33, 91.97 and 91.170) also specify the minimum instruments and equipment which must be available for the various types of flight such as VFR, IFR, night, commercial, air taxi, high altitude, icing and so on. It is recommended that pilots of this aircraft make themselves familiar with these regulations in order to avoid violating them. While the regulations list minimum instruments and equipment, experienced pilots realize that the minimum practical instruments and equipment depends on the pilot's capability, weather, terrain, the flight plan, facilities to be used, whether flight is during daylight or night, at high or low altitude, for hire or not, in icing conditions or not, and so on. Pilots are cautioned to consider all factors in determining whether they have all the required equipment for making a particular flight.

When properly equipped this airplane may be flown day or night, VFR or IFR, and in known icing.

The certificating regulations of the FAA for this airplane require the manufacturer to specify in the Pilot's Operating Handbook the types of operation for which the airplane is equipped.

The equipment installed in this aircraft has been substantiated to 24,000 feet.

When this airplane was licensed it contained the properly installed equipment listed in the Equipment List and, therefore, was satisfactory for the types of operation indicated below by an asterisk.

(a)_____ Day VFR

(b)_____ Night VFR

(c)_____ Day and night IFR after adequate communication and navigation radio has been installed in an FAA approved manner.

(d)_____ Day and night IFR

(e)_____ Known icing after deicing and icing equipment listed on a following page for operation in known icing conditions has been installed in accordance with Piper drawings or in an FAA approved manner.

(f)_____ Known icing.

Operators are warned that if any of the equipment listed as having been installed at time of licensing is changed, not operating, or not properly maintained and calibrated, the airplane may not be properly equipped for all the conditions noted above. It is the responsibility of the pilot to determine whether the lack of a piece of equipment limits the conditions under which he may fly the airplane.

AIRCRAFT

_____ _____

REGISTRATION NO. SERIAL NO.

Owners desiring to make changes or additions to the equipment must have these modifications done in an FAA-approved manner. All PA-31-350 aircraft are licensed equipped for day and night VFR flight, and for IFR flight except when there may be insufficient communications or navigation radio equipment installed.

The performance, handling qualities and structure of the airplane are approved for instrument flight.

If an owner of an airplane which is approved for VFR flight only desires to extend his operations to IFR, he should have radio equipment installed in accordance with Piper-approved drawings or other FAA-approved data (or data approved by the aviation agency of the country of registration). The owner should insure that the radio equipment is adequate for the ground facilities to be used, is of sufficiently high quality and reliability, is properly functioning, adjusted and calibrated, and that it is compatible with previously installed equipment before authorizing it to be flown under instrument conditions.

This airplane is approved for day and night VFR and IFR flight when all of the following conditions have been met: the required equipment or FAA-approved equivalent is installed either originally by Piper or in an FAA-approved manner, is functioning properly, and is calibrated in accordance with Federal Aviation Regulations; and adequate radio communications and navigation equipment is installed in the same manner as indicated above.

If the airplane is approved for night IFR, but is not approved for flight in icing conditions when licensed, it will be necessary for an owner to add all the equipment listed in this section as required for flight in icing conditions if he desires to operate in icing conditions. If this equipment is properly installed in accordance with Piper-approved drawings and all the other equipment required for night IFR flight is installed in an FAA-approved manner, is adequate for the ground facilities to be used, is of sufficient quality, is functioning properly, and is calibrated in accordance with the FAR's, the airplane is approved for IFR flight in known icing conditions. If anti-icing and deicing equipment is not installed in accordance with Piper drawings, FAA approval or approval of the aviation agency of the country of registry must be obtained in order to legally conduct flight in icing conditions.

Flight through any icing conditions is prohibited if any of the anti-icing or deicing equipment is missing or not functioning.

Pilots are reminded that oxygen must be available to passengers and crew during high altitude flight and that special electronic equipment is required for flight above specified altitude.

FAR 135 places special requirements on air taxi and commercial operators.

In accordance with the FAR's, this airplane is not properly equipped for the condition of flight indicated if any of the equipment listed below is not properly installed, functioning, properly maintained and calibrated according to the FAR's. The pilot is responsible for assuring compliance with the latest ammendments to FAR 91 concerning required equipment.

(a) Day VFR
- (1) Airspeed indicator
- (2) Altimeter
- (3) Magnetic direction indicator
- (4) Tachometer - each engine
- (5) Oil pressure gauge - each engine
- (6) Stall warning indicator
- (7) Oil temperature gauge - each engine
- (8) Manifold pressure gauge - each engine
- (9) Fuel gauges
- (10) Fuel pressure indicator - each engine
- (11) Exhaust gas temperature gauge - each engine
- (12) Landing gear position indicator
- (13) Seat belts - each occupant
- (14) Emergency locator transmitter
- (15) Above 12,500 feet - transponder with automatic altitude reporting capability.
- (16) Starter - each engine

(b) Night VFR
- (1) All equipment required for Day VFR
- (2) Position lights
- (3) Strobe lights or rotating beacon
- (4) Alternator - each engine
- (5) Instrument lights
- (6) Landing light, if for hire

(c) Day IFR
(1) All equipment required for Day VFR
(2) Two-way radio for communication
(3) Suitable and adequate navigation radio equipment
(4) Gyroscopic rate of turn indicator
(5) Bank indicator
(6) Clock with sweep second hand
(7) Sensitive altimeter adjustable for barometric pressure
(8) Alternators - each engine
(9) Gyroscopic bank and pitch indicator
(10) Gyroscopic direction indicator
(11) Free air temperature indicator

(d) Night IFR
(1) All equipment required for Day and Night VFR
(2) All equipment required for Day IFR

(e) Flight in Positive Control Areas
(1) Transponder

(f) Known Icing
For flight in known icing conditions the following equipment must be installed in accordance with Piper drawings or in a FAA approved manner:
(1) All equipment required for Night IFR
(2) Pneumatic wing and empennage boots (including inboard wing boots)
(3) Electrothermal propeller boots
(4) Pilot side heated windshield
(5) Heated pitot
(6) Ice detection light
(7) Heated stall warning transmitter
(8) Non-icing heater air inlet
(9) Heater combustion air alternate source
(10) Forward heater
(11) Ice shields
(12) Prop control deicer boot
(13) 'A' - 'B' pneumatic system

The following equipment is required and is normally part of the standard airplane:

(1) Alternate static system
(2) Elevator balance boot
(3) Direct vision window

(g) Flight with Third and/or Fourth Seats in the Aft Facing Position

(1) When the third and/or fourth seats are installed in the aft facing position, 10 inch minimum height headrests must be installed.

## 2.27 NOISE LEVEL

The corrected Noise level of this aircraft is 78.9 dB(A) determined at the Maximum Normal Operating Power of 2400 RPM and 40.0 inches of manifold pressure.

No determination has been made by the Federal Aviation Administration that the noise levels of this airplane are or should be acceptable or unacceptable for operation at, into or out of, any airport.

The above statement not withstanding, the noise level stated above has been verified by and approved by the Federal Aviation Administration in noise level test flights conducted in accordance with FAR 36. "Noise Standards: Aircraft Type and Airworthiness Certification". The aircraft noise is in compliance with all FAR 36 noise standards applicable to this type.

THIS PAGE INTENTIONALLY LEFT BLANK

## 2.29 PLACARDS

On top right side of instrument panel:

THIS AIRCRAFT MUST BE OPERATED AS A NORMAL CATEGORY AIRPLANE IN COMPLIANCE WITH THE OPERATING LIMITATIONS STATED IN THE FORM OF PLACARDS, MARKINGS AND MANUALS. NO ACROBATIC MANEUVERS (INCLUDING SPINS) APPROVED.

FOR TYPES OF OPERATION SEE PILOT'S OPERATING HANDBOOK.

On top left side of instrument panel:

MINIMUM CONTROL SPEED 76 KIAS
MAXIMUM SP. LG - RET. 128 KIAS EXTEND 153 KIAS
DESIGN MANEUVERING SPEED 160 KIAS
SEE PILOT'S OPERATING HANDBOOK
FOR ADDITIONAL SPEEDS.

On floor between pilot and copilot seats:

EMERGENCY GEAR EXTENSION
REMOVE COVER
EXTENSION INSTRUCTIONS ON REVERSE SIDE

On underside of emergency gear extension door:

EMERGENCY GEAR EXTENSION

1. PLACE GEAR SELECTOR HANDLE IN DOWN POSITION.
2. PULL EMERGENCY PUMP HANDLE OUT AS FAR AS POSSIBLE.
3. PUMP HANDLE UP AND DOWN UNTIL ALL 3 GREEN LIGHTS COME ON. CONTINUE PUMPING UNTIL PRESSURE BUILDS UP AND SELECTOR HANDLE RETURNS TO NEUTRAL.

On fuel system console:

(a) On top of fuel system control console:

FIREWALL FUEL SHUT OFF
LEFT ENGINE
PUSH ON-PULL OFF

RIGHT ENGINE
PUSH ON-PULL OFF

(b) On center of fuel system control console:

CROSS FEED
ON
OFF

(c) On bottom of fuel system control console:

LEFT ENGINE RIGHT ENGINE
FUEL
SELECT
38 GAL OUTBD | OFF | 53 GAL INBD | 53 GAL INBD | OFF | 38 GAL OUTBD
OUTBD TANKS - LEVEL FLIGHT ONLY

On window post between the second and third window on the right side of cabin (S/N 31-8052001 thru 31-8352042):

EMERGENCY EXIT RELEASE
REMOVE COVER
PULL HANDLE DOWN
PUSH EMERGENCY
EXIT OUT

On window post between the second and third window on the right side of cabin (S/N 31-8452001 & up):

EMERGENCY EXIT RELEASE
REMOVE COVER
PULL HANDLE DOWN
PUSH EMERGENCY
EXIT OUT
AT BOTTOM

At top of emergency exit window on moulding:

EMERGENCY EXIT

At bottom of emergency exit window on moulding (S/N 31-8452001 & up):

PUSH HERE FOR EXIT

On rear bulkhead in rear baggage compartment and on forward baggage compartment door:

MAXIMUM BAGGAGE 200 LBS
SEE LOADING SCHEDULE

On the pilot's window moulding (when supplementary white anti-collision strobe lights are installed):

WARNING

TURN OFF ANTI-COLLISION LIGHTS
WHEN TAXIING IN VICINITY OF OTHER AIRCRAFT OR DURING FLIGHT THROUGH CLOUD, FOG OR HAZE. STANDARD POSITION LIGHTS TO BE TURNED ON FOR ALL NIGHT OPERATIONS.

On side trim panel adjacent to third and fourth passenger seats:

FOR OCCUPANCY OF AFT FACING SEAT
10" MIN. HT. HEADREST IS REQUIRED

On pilot's door window moulding (when pilot's door is installed):

OPEN DOOR CLOSED
CLOSE DOOR PRIOR TO STARTING ENGINES

THEFT LOCK
PULL TO UNLOCK
PRIOR TO FLIGHT

On left center of instrument panel (when windshield wiper is installed):

WINDSHIELD WIPER
DO NOT OPERATE
ABOVE 127 KIAS
OR ON DRY WINDSHIELD

On inside of nacelle locker doors:

BAGGAGE CAPACITY
150 LBS. MAX.
SEE LOADING SCHEDULE
DO NOT EXCEED
10 LBS./SQ. FT. FLOOR LOADING
OR 100 LBS. DIFF. BETWEEN LOCKERS

On pedestal adjacent engine controls (when air conditioning is installed):

AIR CONDITIONING OFF
FOR SINGLE ENGINE OPERATION

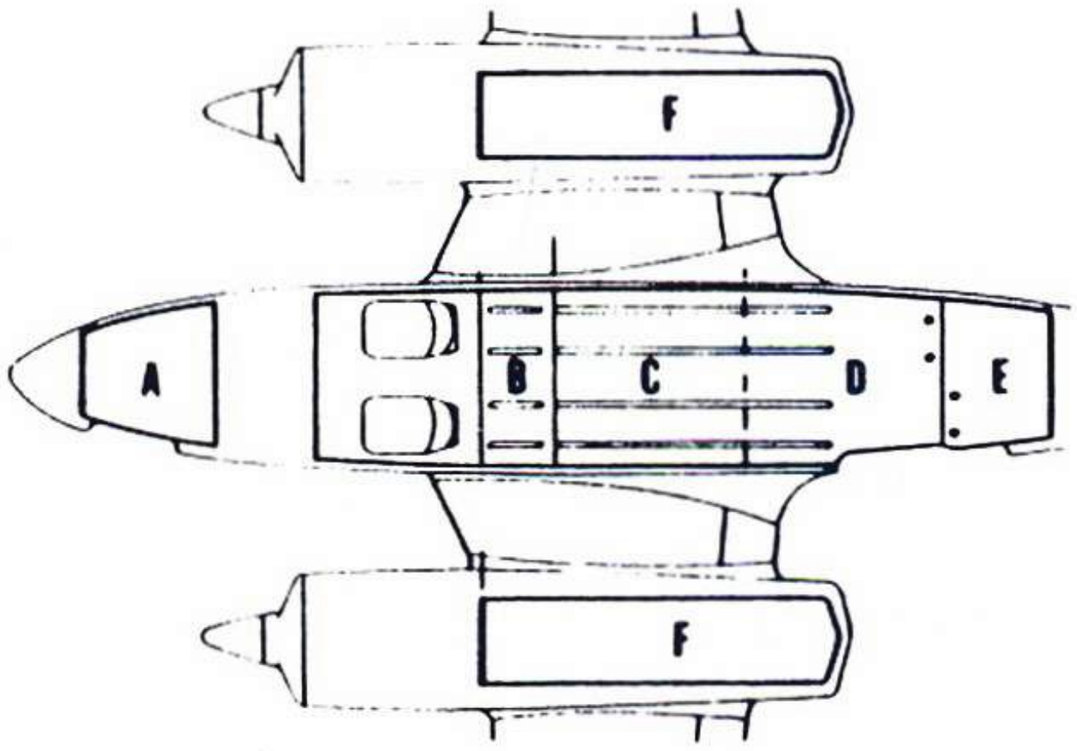
On each wing near fuel fillers (S/N 31-8352006 and up):

**AVGAS ONLY**

**GRADE 100LL**

**GRADE 100**

On top center of aft cabin panel (cargo loading placard):




**MAXIMUM CAPACITY**

| AREA | FLOOR LOAD LBS/SQ FT | ALLOWABLE LBS | |
|---|---|---|---|
| A | 100 | 200 | |
| B | 200 | 400 | 2000 TOTAL |
| C | 200 | 1800 | |
| D | 200 | 900 | |
| E | 100 | 200 | |
| F | 10 | 150 EACH | |

**MAXIMUM TIEDOWN CAPACITY**

| | |
|---|---|
| PER FOOT OF TRACK | 200 LBS |
| PER TRACK | 900 LBS |
| PER TIE DOWN RING | 200 LBS |

CARGO MUST BE LOADED WITHIN THE WEIGHT
AND BALANCE LIMITS OF THIS AIRCRAFT

# TABLE OF CONTENTS

# SECTION 3

# EMERGENCY PROCEDURES