

CHAPTER 2

OPERATING LIMITATIONS

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2. OPERATING LIMITATIONS

2.1. VALIDITY OF OPERATING LIMITATIONS

Approved operating limitations contained in Chapter 2 apply to the UTILITY (**U**) and NORMAL (**N**) category.

Possible changes of the operating limitations of Section 2, associated with the Optional System or Equipment are provided in Chapter 9 - SUPPLEMENTS.

2.2. AIRSPEED LIMITATIONS

Airspeed	Symbol	Category	Speed Values knots (km/h)		Note
			CAS	IAS	
Never Exceed Speed	V_{NE}	U	173 (320)	168 (311)	Never exceed this speed.
		N	173 (320)	168 (311)	
Maximal Structural Cruising Speed	V_{NO}	U	144 (266)	140 (259)	Do not exceed this speed with the exception of calm atmosphere and then only with caution.
		N	144 (266)	140 (259)	
Design Maneuvering Speed	V_A	U	124 (230)	121 (224)	If this speed is exceeded, do not apply full deflections of controls (rudder, elevator) and do not use abrupt motions.
		N	130 (241)	127 (236)	
Maximum Flaps Extended Speed	V_{FE}	U	105 (195)	103 (190)	Never exceed this speed with wing flaps in extended position.
		N	105 (195)	103 (190)	

CAUTION

DESIGN MANEUVERING SPEED V_A DECREASES WITH THE DECREASING WEIGHT AND VICE VERSA.

2.2.1. Airspeed Indicator Marking

Name of Instrument		Red radial line	Yellow arc	Green arc	White arc
Airspeed Indicator IAS	knots	168	140 ÷ 168	62 ÷ 140	54 ÷ 103
	km/h	(311)	(259 ÷ 311)	(115 ÷ 259)	(100 ÷ 190)
Markings reading		Limit values	Caution range	Normal operation range	Wing flaps extended
				Operating range	

CAUTION

COLOURED MARKINGS OF THE AIRSPEED INDICATOR ARE PROVIDED FOR RANGE OF SPEEDS IN **NORMAL** CATEGORY.

2.2. POWER SYSTEM**2.3.1. Engine and Propeller Speed Limitation**

Power setting engine	Speed [RPM]	Manifold pressure	Time limitation
Maximum Continuous	2400	Maximum	Unlimited

CAUTION

FOR SHORT-PERIOD, DURING THE MAX. 3 SEC. MAX. ENGINE SPEED EXCEEDING UP TO 2832 RPM IS PERMITTED.

EVERY EXCEEDING OF MAXIMUM PERMITTED SPEED (2575 RPM) MUST BE RECORDED IN THE ENGINE LOG BOOK AND PROCEDURES ACCORDING TO THE TEXTRON LYCOMING SERVICE BULLETIN No. 369 (the latest issue).

AT ENGINE GROUND CHECK LIMIT THE ENGINE RUN WITH FULL THROTTLE TO MINIMUM NECESSARY PERIOD ONLY.

2.3.2. Engine Limitations

The minimum and maximum values approved for engine operation given in the following table must not be exceeded.

Item	Unit	Value	
		Minimum	Maximum
Cylinder head temperature	°F	200	500
Oil temperature	°C	-	118
Oil pressure	kPa	170	790
	p.s.i.	25	115
Fuel pressure	kPa	96	310
	p.s.i.	14	45

NOTE

A minimum fuel pressure 83 kPa (12 p.s.i.) is allowed during engine idle run.

In case of continuous operation recommended the engine manufacturer, maintain the cylinder head temperature within the range of 200 ÷ 435 °F and the oil temperature within 74 ÷ 93 °C to reach the maximum engine life.

2.3.3. Fuel

Aviation gasoline min. 91/96 or 100/100 LL octane number (ASTM-D910).

CAUTION

USE ANY AUTOMOTIVE GAS IS PROHIBITED.

PERMANENT USE OF THE AVIATION GASOLINE WITH CONTENT OF TETRAETHYL LEAD (TEL) GREATER THAN 0,05% BY VOLUME (2 ml TEL/U.S.GAL) MAY CAUSE INCREASED SEDIMENTATION OF LEAD. THIS MUST BE CONSIDERED IN THE COURSE OF MAINTENANCE PROCEDURES.

NOTE

Spare kinds of fuel are described in the Service Instruction No. 1070 of engine manufacturer (latest applicable issue).

2.3.4. Oil

For the first 50 flight hours only mineral aviation oil of the viscosity class according to the table for the Lycoming IO-540-C4D5 engine should be used.

For further operation mineral, dispersant or synthetic aviation oils of viscosity class according to the table or equivalent oil types approved by the engine manufacturer may be used.

Table of recommended oils

Average outside air temperature		Recommended oil viscosity class SAE	
°C	°F	Mineral oils	Dispersant oils
above + 27	above + 80	60	60
above + 16	above + 60	50	40 or 50
- 1 to + 32	+ 30 to + 90	40	40
- 18 to + 21	0 to + 70	30	40, 30 or 20W40
under - 12	under + 10	20	30 or 20W30
Whole operation temperature range		-	15W50 or 20W50

NOTE

Synthetic and semisynthetic oils shall not be added and mixed with the other kinds of oil.

Low oil temperature may be particularly increased by installation of winterization screens in the front engine cowl.

The other supplementary information for using the oils is currently published in the Service Instruction No. 1014 (last issue) of engine manufacturer.

2.4. INSTRUMENT MARKINGS**2.4.1. Power Plant Instrument Markings**

Instrument name	Unit	Red radial line		Yellow arc	Green arc
		min.	max.		
Engine speed indicator	RPM	-	2400	-	600 ÷ 2400
Manifold pressure indicator	in.Hg	-	-	-	15 ÷ 29
Oil temperature indicator	°C	-	118	0 ÷ 60	60 ÷ 118
Cylinder head temperature indicator	°F	-	500	435 ÷ 500	200 ÷ 435
Fuel pressure indicator	kPa	96	310	-	96 ÷ 310
	p.s.i.	14	45	-	14 ÷ 45
Oil pressure indicator	kPa	170	790	170 ÷ 380 650 ÷ 790	380 ÷ 650
	p.s.i.	25	115	25 ÷ 55 95 ÷ 115	55 ÷ 95
Markings reading		Limit values		Caution range	Normal operating range

2.4.2. Other Instrument Markings

Instrument name	Unit	Red radial line		Yellow arc	Green arc
		min.	max.		
Accelerometer	-	- 1,76	4,4	-	-1,76 ÷ + 4,4
Nitrogen pressure indicator (main spar)	kPa	150	-	-	150 ÷ 250
	p.s.i.	22	-	-	22 ÷ 36
Fuel quantity indicator	l	0	-	0 ÷ 15	-
	US gal	0	-	0 ÷ 4	-
Gyro instruments vacuum indicator	In.Hg	-	-	-	4,5 ÷ 5,4

2.5. WEIGHT LIMITATIONS**2.5.1. Maximum Take-off and Landing Weight**

Category	Maximum take-off weight		Maximum landing weight	
	kg	(lb)	kg	(lb)
Utility (U)	1080	(2380)	1080	(2380)
Normal (N)	1350	(2976)	1280	(2822)

2.5.2. Maximum Permissible Variable Load

(1)	PILOT SEATS	2x100 kg	(2x220 lb)
(2)	REAR SEATS	2x100 kg	(2x220 lb)
(3)	TOTAL BAGGAGE COMPARTMENT	60 kg	(132 lb)
	- Upper baggage compartment	20 kg	(44 lb)
	- Lower baggage compartment L/R	30/30 kg	(66/66 lb)

CAUTION

IF ANY APPROVED ADDITIONAL EQUIPMENT (e.g. APPLIANCES, NAV SYSTEM, ELT, etc.), IS INSTALLED IN THE BAGGAGE COMPARTMENT, REDUCE THE BAGGAGE WEIGHT BY THE INSTALLED EQUIPMENT WEIGHT.

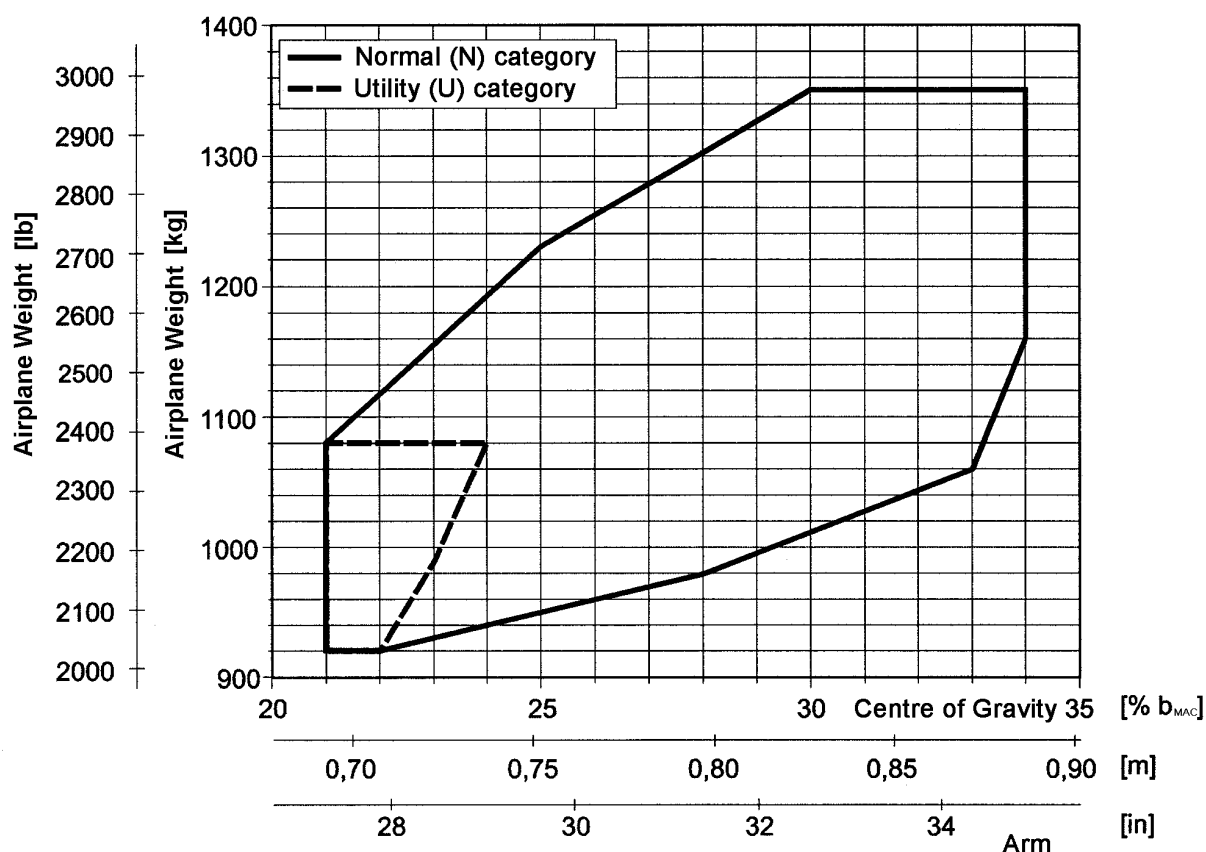
2.5.3. Basic Empty Weight (theoretical)

Category	Basic empty weight	
	kg	(lb)
Utility U	855 ± 3 %	(1885 ± 3 %)
Normal N	855 ± 3 %	(1885 ± 3 %)

CAUTION

BASIC EMPTY WEIGHT (ACTUAL) IS MENTIONED IN CHAPTER 6 IN THIS AFM.

2.6. CENTRE OF GRAVITY POSITION



2.7. FLIGHT MANEUVERS

2.7.1. Normal Category (N)

In the NORMAL (N) category (fuel in auxiliary tanks, baggage in the baggage compartment and/or occupants on the rear seats) only following maneuvers, stalls (except of whip stalls) are permitted:

No.	Maneuver	Recommended entry speed IAS	
		knots	km/h
1.	Steep turn (angle of bank max. 60°)	min. 119	min. 220
2.	Lazy eight (angle of bank max. 60°)	min. 119	min. 220
3.	Chandelle (angle of bank max. 60°)	min. 119	min. 220

Any other flight maneuvers in category NORMAL are PROHIBITED!

CAUTION

THE POSSIBLE BAGGAGE MUST BE SECURED AGAINST DISPLACEMENT.

2.7.2. Utility Category (U)

In the UTILITY (U) category the following flight maneuvers are permitted:

No.	Maneuver	Recommended entry speed IAS	
		knots	km/h
1.	Steep turn (angle of bank is more than 60°, max. 90°)	min. 108	min. 200
2.	Lazy eight (angle of bank is more than 60°, max. 90°)	min. 119	min. 220
3.	Chandelle (angle of bank is more than 60°, max. 90°)	min. 119	min. 220
4.	Spin	67	125

CAUTION

ABOVE MENTIONED ACROBATIC MANEUVRES MAY BE PERFORMED IN SOLO OR TWO OCCUPANTS, OPERATION IN ANY DESIRED SEQUENCE, COMBINATIONS AND ATTITUDES COMPLYING WITH FOLLOWING LIMITATIONS:

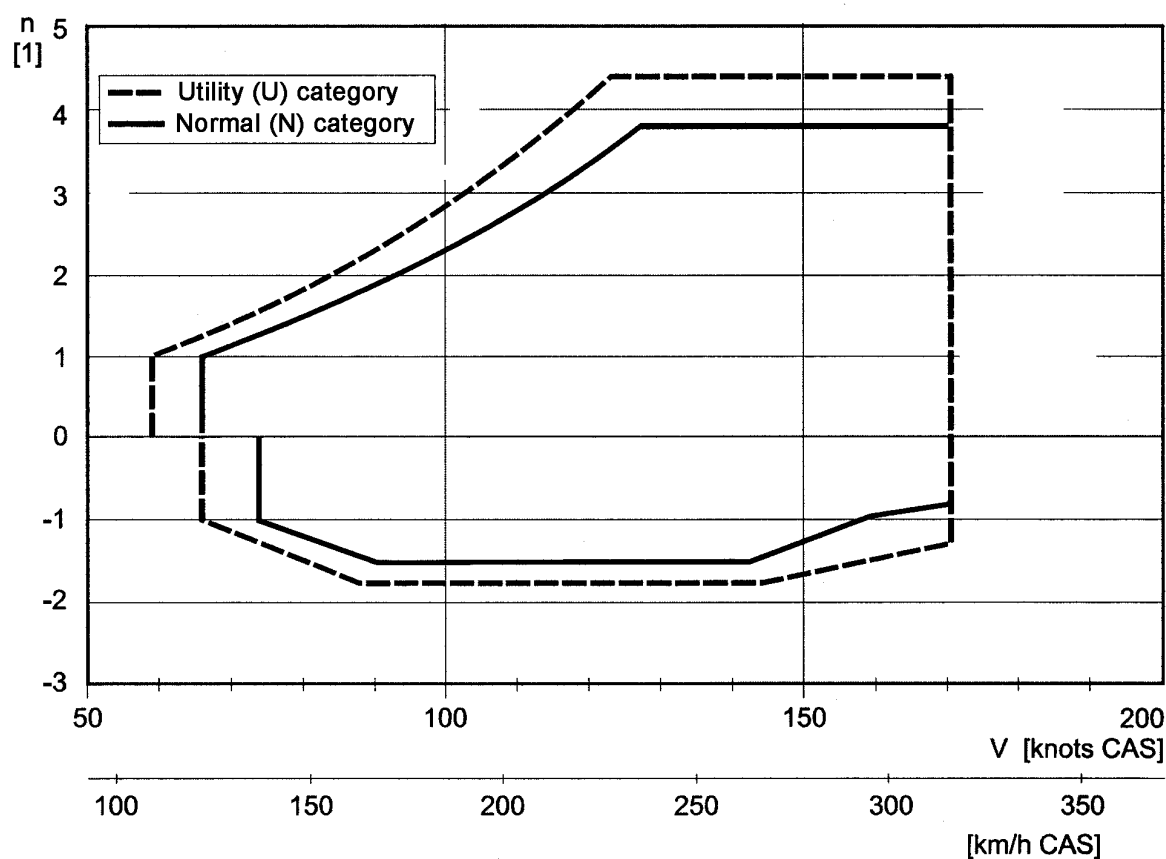
- (1) WEIGHT - PARAGRAPH 2.5. AND CENTER OF GRAVITY POSITION - PARAGRAPH 2.6. WITH UTILITY (U) CATEGORY.
- (2) POWER PLANT LIMITATIONS - PARAGRAPHS 2.3.1 AND 2.3.2.
- (3) AIRSPEED LIMITATIONS - PARAGRAPH 2.2., LOAD FACTOR AND FLIGHT LOAD FACTOR - PARAGRAPH 2.8.
- (4) INTENTIONAL SPINS WITH WING FLAPS EXTENDED ARE PROHIBITED!
- (5) INVERTED FLIGHTS AND INTENTIONAL MANEUVRES WITH THE NEGATIVE LOAD FACTORS ARE PROHIBITED!
- (6) SEATS AND SAFETY BELTS ARE ADAPTED FOR USE OF PARACHUTES.
- (7) FLIGHT MANEUVERS AT UTILITY (U) CATEGORY ARE PROHIBITED:
 - WITH FUEL IN AUXILIARY TANKS
 - WITH BAGGAGE ON BAGGAGE COMPARTMENT
 - WITH PERSONS ON THE REAR SEATS
 - WITH ANY LOOSE ITEMS ON BOARD
- (8) MAX. SIX-TURN SPIN IS PERMITTED FOR OPERATION IN UTILITY CATEGORY (U).

2.8. MAXIMUM LOAD FACTORS AND FLIGHT LOAD FACTOR ENVELOPE

2.8.1. Maximum Load Factors

Category	Load factor "g"	
	+	-
Utility (U)	4.4	1,76
Normal (N)	3.8	1,52

2.8.2. Flight Load Factor Envelope



2.9. MINIMUM CREW, MAXIMUM SEAT CAPACITY

Minimum airplane crew	one pilot
Maximum passenger seating capacity	three seats

2.10. KINDS OF OPERATION**2.10.1. General**

The airplane may be operated in following kinds of operation, when the appropriate equipment is installed and operable.

- VFR Day
- VFR Night
- IFR

FLIGHT INTO KNOWN ICING CONDIDIONS IS PROHIBITED!

2.10.2. Kinds of Operation Equipment List

The following equipment list (KOEL) identifies some systems and equipment, which must be installed and operable on airplane for the particular kind of operation.

This KOEL may not include all equipment (e.g. COMM/NAV etc.) required by the applicable Operating rules. Also the components obviously necessary for the airplane to be airworthy are not includes.

CAUTION

THE AIRPLANE MAY BE OPERATED IN DAY OR NIGHT VFR OR IFR CONDITION, EXCEPT FLIGHT INTO KNOWN ICING CONDITIONS, WHEN THE APPROPRIATE EQUIPMENT IS INSTALLED AND OPERABLE IN ACCORDANCE WITH REQUIREMENTS SPECIFIED BY THE RESPONSIBLE CIVIL AVIATION AUTHORITY.

SYSTEMS and/or COMPONENTS	VFR Day	VFR Night	IFR
ELECTRICAL POWER			
1. DC Generator	1	1	1
2. Battery	1	1	1
3. V-A Meter	1	1	1
4. Generator Annunciator	1	1	1
5. Turn-and-Bank Indicator Emergency Power Source	0	1	1
6. Turn-and-Bank Indicator Emergency Annunciator	0	1	1
FLIGHT CONTROLS			
1. Trim Position Indicator (Elevator, Rudder)	2	2	2
2. Stall Warning Horn	1	1	1
LIGHTS			
1. Cockpit and Instruments Lighting	0	1	1
2. Landing Light	0	1	1
3. Taxiing Light	0	1	1
4. Position Lights	0	3	3
5. Anti-collision Beacon	1	1	1
NAVIGATION INSTRUMENTS			
1. Airspeed Indicator	1	1	1
2. Sensitive Altimeter	1	1	2
3. Magnetic Compass	1	1	1
4. Turn-and-Bank Indicator	0	1	1
5. Slip/Skid Indicator	0	1	1
6. Attitude Gyro	0	0	1
7. Gyro Direction Indicator	0	0	1
8. Vertical Speed Indicator	0	1	1
9. Outside Air Temperature Indicator	0	0	1
10. Clock	1	1	1

SYSTEMS and/or COMPONENTS	VFR Day	VFR Night	IFR
ENGINE / FUEL SYSTEM INDICATOR			
1. Engine Speed Indicator	1	1	1
2. Oil Pressure Indicator	1	1	1
3. Oil Pressure Loss Annunciator	1	1	1
4. Oil Temperature Indicator	1	1	1
5. Fuel Pressure Indicator	1	1	1
6. Fuel Quantity Indicator (each Tank)	4	4	4
7. Fuel Low Level Annunciator(L/R)	2	2	2
8. Cylinder Head Temperature Indicator	1	1	1
9. Manifold Pressure Indicator	1	1	1
MISCELLANEOUS			
1. Static Pressure Probes Heating	0	0	1
2. Pitot Heating	0	0	1
3. Alternate Static Pressure Source	0	0	1
4. Fire Extinguisher	1	1	1

NOTE

Numbers given in individual columns indicate quantity of instruments installed on the airplane.

2.11. FUEL TANK CAPACITIES

Item	Category Utility U		Category Normal N	
	Litres	US gal.	Litres	US gal
Main tanks (L/R)	2 x 61	2 x 16,1	2 x 61	2 x 16,1
Auxiliary tanks (L/R)	-	-	2 x 51	2 x 13,4
TOTAL FUEL QUANTITY	122	32,2	224	59
Unusable fuel quantity	2 x 3	2 x 0,8	2 x 4	2 x 1
USABLE FUEL QUANTITY	116	30,6	216	57

CAUTION

THE TAKE-OFF IS PROHIBITED, IF LEAST ONE OF THE FUEL TANKS DOES NOT CONTAIN A MINIMAL OF 15 LITERS (4 US gal) OF FUEL. THE FUEL VALVE MUST BE SWITCHED TO THIS TANK BEFORE TAKING OFF.

TAKE-OFF IS PROHIBITED, IF THE FILLING DIFFERENCE BETWEEN THE TWO TANKS EXCEED THAN 15 LITERS (4 US gal).

For aircrafts up to S/N 0052 incl.:

WHEN THE ANNUNCIATOR LIGHTS **L FUEL LOW LEVEL** OR **R FUEL LOW LEVEL** ARE "ON", THERE IS AT LEAST 3 LITERS OF FUEL (0,8 US gal) IN PARTICULAR TANK (I.E. FOR APPROXIMATELY 4 MINUTES OF FLIGHT IN ECONOMICAL POWER SETTING).

For aircrafts from S/N 0053 incl.:

WHEN THE ANNUNCIATOR LIGHTS **L FUEL LOW LEVEL** OR **R FUEL LOW LEVEL** ARE "ON", THERE IS AT LEAST 8 LITERS OF FUEL (1,9 US gal) IN PARTICULAR TANK (I.E. FOR APPROXIMATELY 10 MINUTES OF FLIGHT IN ECONOMICAL POWER SETTING).

WHEN THE AUXILIARY TANK CONTAINS ANY FUEL, DO NOT OPEN THE MAIN TANK FILLING CAP. THERE IS A DANGER OF THE FUEL FLOW OUT OF GRAVITY FEEDING FROM THE AUXILIARY TANK

NOTE

The values in the table are nominal.

2.12. OIL QUANTITY IN SUMP

Oil quantity	litres	quarts
Maximum	11,4	12
Minimum	5,7	6

2.13. PERMISSIBLE OUTSIDE AIR TEMPERATURE

Operation of the aircraft is not limited by the outside air temperatures.

CAUTION

AT HIGH OUTSIDE TEMPERATURE, IT IS NECESSARY TO WATCH ENGINE AND FLIGHT INSTRUMENTS AND COUNT ON ENGINE POWER DECREASE IS NECESSARY.

Charts for determination of concrete aircraft performance are stated in Chapter 5 of this FM.

2.14. MAIN SPAR FLANGE MINIMUM NITROGEN PRESSURE

Permissible nitrogen pressure range in the main spar is minimal 150 kPa (22 p.s.i.).

WARNING

IN CASE OF NITROGEN PRESSURE DROP BELOW THE SPECIFIED MINIMUM LIMIT, THE AIRPLANE MUST BE IMMEDIATELY REJECTED FROM OPERATION AND FAULT REMOVED.

IN CASE OF NITROGEN PRESSURE DROP BELOW THE SPECIFIED MINIMUM LIMIT DURING THE FLIGHT, THE FLIGHT MUST BE INTERRUPTED BY PRECAUTIONARY LANDING ON THE NEAREST AIRPORT. DURING THE REMAINING FLIGHT AVOID HIGHER LOADINGS.

2.15. TAXIING

The wing flaps must be **RETRACTED** position during taxiing.

2.16. BRAKING

The maximum demonstrated speed for brakes application is 54 knots (100 km/h).

2.17. PLACARDS

The placards containing prohibitions, limitations and safety provisions only are included in this subsection.

2.17.1. **Placards Located in the Airplane Cockpit**

- 1) This placard is located in the cockpit in direct pilot's view.

THIS AIRPLANE MUST BE OPERATED IN COMPLIANCE WITH OPERATING LIMITATIONS STATED IN THE PLACARDS AND IN THE AIRPLANE FLIGHT MANUAL.			
EXCEPT AS MAY BE OTHERWISE INDICATED ON A PLACARD THE MARKINGS AND PLACARDS INSTALLED IN THIS AIRPLANE CONTAIN OPERATING LIMITATIONS WHICH MUST BE COMPLIED WITH WHEN OPERATING THIS AIRPLANE IN THE UTILITY CATEGORY. OTHER OPERATING LIMITATIONS WHICH MUST BE COMPLIED WITH WHEN OPERATING THIS AIRPLANE IN THIS CATEGORY OR IN THE NORMAL CATEGORY ARE CONTAINED IN THE AIRPLANE FLIGHT MANUAL.			
THE AIRPLANE MAY BE OPERATED IN FOLLOWING KINDS OF OPERATION, WHEN THE APPROPRIATE EQUIPMENT IS INSTALLED AND OPERABLE.			
1. VFR DAY 2. VFR NIGHT 3. IFR			
DESIGN MANEUVERING SPEED V_A IAS	121 knots	224 km/h	
FORTAKE-OFF WEIGHT	1080 kg	2380 lbs	
APPROVED UTILITY CATEGORY MANEUVERES AND RECOMMENDED ENTRY SPEEDS (IAS)			
		knots	km/h
STEEP TURN (ANGLE OF BANK >60°, max. 90°)	min	108	200
LAZY EIGHT (ANGLE OF BANK >60°, max. 90°)	min	119	220
CHANDELLE (ANGLE OF BANK >60°, max. 90°)	min	119	220
SPIN		67	125
INTENTIONAL SPINS WITH WING FLAPS EXTENDED ARE PROHIBITED.			
RECOVERY FROM SPINS:			
1. APPLY FULL RUDDER OPPOSITE TO THE DIRECTION OF ROTATION. 2. CONTROL STICK - PUSH.			
FLIGHT INTO KNOWN ICING CONDITIONS IS PROHIBITED.			
COLOURED RANGE MARKINGS ON AIRSPEED IND. APPLY FOR NORMAL CATEGORY			

- 2) This placard is located in direct pilot's view.

SMOKING PROHIBITED

- 3) This placard is located in direct pilot's view.

FLIGHT INTO KNOWN ICING CONDITIONS IS PROHIBITED

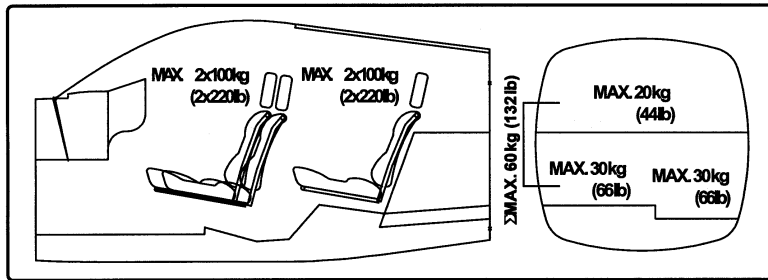
- 4) This placard is located in direct pilot's view.

**ACROBATICS WITH FUEL IN AUXILIARY
TANKS PROHIBITED**

- 5) This placard is located on the baggage shelf and on the baggage compartment.

**ACROBATICS PROHIBITED WITH ANYTHING
ON THIS SHELF**

- 6) This placard is located on the baggage compartment



- 7) These placards are located in direct pilot's view



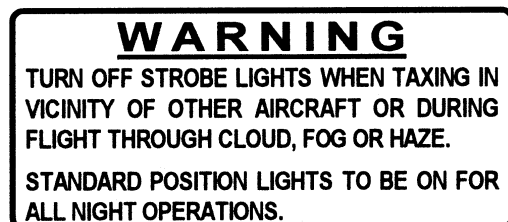
- 8) This placard is located on the central panel close to the switch panel



- (9) This placard is located on the instrument panel



- 10) This placard is located on the instrument panel, if strobe light installed



- 11) This placard is located on the instrument panel, if ELT is installed



- 12) This placard is located on the instrument panel, if not IFR approved GPS is installed

**GPS LIMITED TO VFR
USE ONLY**

- 13) This placard is located on the ignition switch (aircrafts from S/N 0067 incl.)

**DO NOT CRANK STARTER
FOR MORE THAN
10 SECONDS!**

2.17.2. Placards Located on the Airplane outside

- 1) These placards are located at the main tank filling caps

**CAUTION !
DON'T OPEN THE CAP WHEN
FUEL IN AUXILIARY TANKS**

**FUEL
100 LL
58 LITRES
15 U.S.GALS**

- 2) These placards are located at the auxiliary tank filling caps.

**CAUTION !
EMPTY FOR ACROBATICS**

**FUEL
100 LL
50 LITRES
13 U.S.GALS**

- 3) These placards are located on control areas and appropriate parts of airplane.

DON'T STEP HERE

DON'T PUSH HERE

- 4) These placards are located on airplane wing flaps. Delivered only as optional equipment.



INTENTIONALLY LEFT BLANK