

**SECTION 2  
LIMITATIONS  
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**SECTION 2  
LIMITATIONS**

**GENERAL**

This section includes operating limitations, instrument markings, and basic placards required for safe operation of the helicopter, its engine, and other standard systems. This helicopter is approved as a normal category rotorcraft under FAA Type Certificate No. H111NM as Model R44 II.

**COLOR CODE FOR INSTRUMENT MARKINGS**

Red	Operating limit. Edge of red line indicates limit. Pointer should not enter red during normal operation.
Red Cross-hatch	Power-off $V_{ne}$ .
Yellow	Precautionary or special operating procedure range.
Green	Normal operating range.

**AIRSPEED LIMITS**

**NEVER-EXCEED AIRSPEED ( $V_{ne}$ )**

2200 lb (998 kg) TOGW and below	130 KIAS
Over 2200 lb (998 kg) TOGW	120 KIAS
Autorotation	100 KIAS

For  $V_{ne}$  reductions with altitude and temperature, see placard on page 2-9.

**ADDITIONAL AIRSPEED LIMITS**

100 KIAS maximum at power above MCP.

100 KIAS maximum with any combination of cabin doors removed.

**ROTOR SPEED LIMITS**

	TACHOMETER READING	ACTUAL RPM
Power On		
Maximum	102%	408
Minimum*	101%	404
Power Off		
Maximum	108%	432
Minimum	90%	360

\*Transient operation below 101% permitted for emergency procedures training.

**POWERPLANT LIMITATIONS**

**ENGINE**

I One Lycoming Model IO-540-AE1A5

**OPERATING LIMITS**

Engine Maximum Speed 2718 RPM (102%)

Cylinder Head Max Temperature 500°F (260°C)

Oil Maximum Temperature 245°F (118°C)

**Oil Pressure**

    Minimum during idle 25 psi

    Minimum during flight 55 psi

    Maximum during flight 95 psi

    Maximum during start & warm up 115 psi

Oil Quantity, minimum for takeoff 7 qt (6.6 liters)

Manifold Pressure: See placard on page 2-9 for MAP schedule.

**WEIGHT LIMITS**

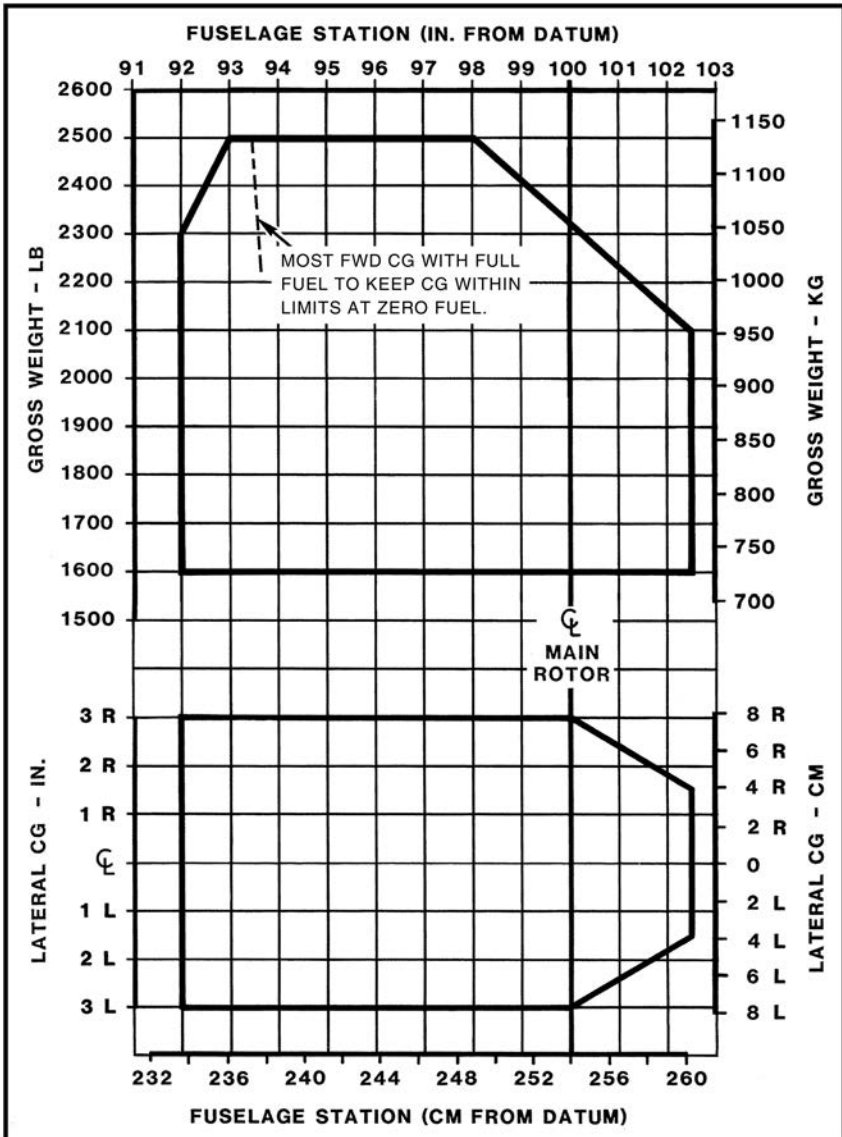
Maximum gross weight	2500 lb (1134 kg)
Minimum gross weight	1600 lb (726 kg)
Maximum per seat including baggage compartment	300 lb (136 kg)
Maximum in any baggage compartment	50 lb (23 kg)

**CENTER OF GRAVITY (CG) LIMITS**

See figure on page 2-4. Reference datum is 100 inches forward of main rotor shaft centerline.

***NOTE***

With all doors installed, a solo pilot weight of 150 lb (68 kg) or greater will ensure CG within limits. For lower pilot weight, compute weight and balance; removable ballast may be required to obtain CG at or forward of aft limit. (See Loading Instructions in Section 6.)



CENTER OF GRAVITY LIMITS

**FLIGHT AND MANEUVER LIMITATIONS**

Aerobatic flight prohibited.

***CAUTION***

Abrupt control inputs may produce high fatigue stresses and cause catastrophic failure of a critical component.

Low-G cyclic pushovers prohibited.

***CAUTION***

A pushover (forward cyclic maneuver) performed from level flight or following a pullup causes a low-G (near weightless) condition which can result in catastrophic loss of lateral control. To eliminate a low-G condition, immediately apply gentle aft cyclic. Should a right roll commence during a low-G condition, apply gentle aft cyclic to reload rotor before applying lateral cyclic to stop roll.

Flight prohibited with governor selected off, with exceptions for in-flight system malfunction or emergency procedures training.

Flight in known icing conditions prohibited.

Maximum operating density altitude 14,000 feet.

Maximum operating altitude 9000 feet AGL to allow landing within 5 minutes in case of fire.

Alternator, RPM governor, low rotor RPM warning system, OAT gage, and hydraulic control system must be operational for dispatch.

Minimum crew is one pilot in the right front seat. A flight instructor may act as pilot in command from the left front seat. Solo flight from right seat only.

Forward left seat belt must be buckled.

Operation up to 100 KIAS approved with any combination of cabin doors removed. All seat belts must be buckled and loose items in cabin must be properly secured during doors-off flight.

**KINDS OF OPERATION LIMITATIONS**

VFR day and night operations are approved.

VFR operation at night is permitted only when landing, navigation, instrument, and anti-collision lights are operational. Orientation during night flight must be maintained by visual reference to ground objects illuminated solely by lights on the ground or adequate celestial illumination.

Note: There may be additional requirements in countries outside the United States.

**FUEL LIMITATIONS**

**APPROVED FUEL GRADES**

<b>Grade</b>	<b>Color</b>	<b>Specification</b>
100	Green	ASTM D910
100LL	Blue	
100VLL	Blue	
B95/130	Amber	GOST 1012-72 Russian National Standard

**FUEL CAPACITY**

Total Capacity	Usable Capacity
US gallons (liters)	US gallons (liters)

**Tanks with bladders:**

Main tank	30.5 (115)	29.5 (112)
Auxiliary tank	17.2 (65)	17.0 (64)
Combined capacity	47.7 (180)	46.5 (176)

**Tanks without bladders:**

Main tank	31.6 (120)	30.6 (116)
Auxiliary tank	18.5 (70)	18.3 (69)
Combined capacity	50.1 (190)	48.9 (185)

Note: Per R44 Service Bulletin SB-78B, fuel tanks without bladders should no longer be in service.



**INSTRUMENT MARKINGS**

***NOTE***

Red lines offset so instrument pointer should not enter red. See color code on page 2-1.

**AIRSPPEED INDICATOR**

Green arc	0 to 110 KIAS
Yellow arc*	110 to 130 KIAS
Red cross-hatch	100 KIAS
Red line	130 KIAS

\*Earlier airspeed indicators without yellow arc must have the following placard adjacent:

**DO NOT EXCEED 110 KIAS EXCEPT IN SMOOTH AIR**

**ROTOR TACHOMETER**

Lower red line	90%
Green arc	90 to 108%
Upper red line	108%

**ENGINE TACHOMETER**

Lower red line	101%
Green arc	101 to 102%
Upper red line	102%

**OIL PRESSURE**

Lower red line	25 psi
Lower yellow arc	25 to 55 psi
Green arc	55 to 95 psi
Upper yellow arc	95 to 115 psi
Upper red line	115 psi

**OIL TEMPERATURE**

Green arc	75 to 245°F (24 to 118°C)
Red line	245°F (118°C)

**INSTRUMENT MARKINGS (cont'd)**

**CYLINDER HEAD TEMPERATURE**

Green arc	200 to 500°F (93 to 260°C)
Red line	500°F (260°C)

**MANIFOLD PRESSURE**

Green arc	15.0 to 23.3 in. Hg
Yellow arc	19.1 to 26.1 in. Hg
Red line	26.1 in. Hg

Yellow arc denotes variable MAP limits. See placard on page 2-9.

**PLACARDS**

In clear view and readable by pilot in flight:

LIMIT MANIFOLD PRESSURE - IN. HG								
MAXIMUM CONTINUOUS POWER								
PRESS ALT-FT	OAT - °C							
	-30	-20	-10	0	10	20	30	40
SL	21.5	21.8	22.1	22.4	22.6	22.9	23.1	23.3
2000	20.9	21.2	21.5	21.8	22.1	22.3	22.5	22.8
4000	20.4	20.7	21.0	21.3	21.5	21.8	22.0	22.2
6000	19.9	20.2	20.5	20.8	21.0	21.3	21.5	21.7
8000	19.5	19.8	20.1	20.3	20.6	20.8	21.0	21.3
10000	19.1	19.4	19.6	19.9	<b>FULL THROTTLE</b>			
12000								
<b>FOR MAX TAKEOFF POWER (5 MIN), ADD 2.8 IN.</b>								

NEVER EXCEED SPEED - KIAS								
2200 LB TOGW & BELOW								
PRESS ALT-FT	OAT - °C							
	-30	-20	-10	0	10	20	30	40
SL								
2000	130						127	123
4000					126	122	118	114
6000			126	122	117	113	108	103
8000	126	122	117	112	107	101	96	91
10000	117	112	106	101	95	90	85	
12000	107	101	95	89	<b>NO FLIGHT</b>			
14000	95	89						
<b>OVER 2200 LB TOGW, SUBTRACT 10 KIAS FOR AUTOROTATION, SUBTRACT 30 KIAS</b>								

**PLACARDS (cont'd)**

Near main fuel tank filler cap:

FUEL  
100 OCT MIN GRADE AVIATION GASOLINE

or

FUEL  
AVIATION GASOLINE – GRADE 100LL  
OR SEE PILOT’S HANDBOOK

Near aux fuel tank filler cap:

AUX FUEL  
100 OCT MIN GRADE AVIATION GASOLINE

or

AUX FUEL  
AVIATION GASOLINE – GRADE 100LL  
OR SEE PILOT’S HANDBOOK

Near fuel shut-off valve:

FUEL

On fuel shut-off valve:

ON OFF

Near main tank fuel gage:

For bladder style tank

29.5 US GAL

For aluminum (non-bladder) tank

30.6 US GAL

**PLACARDS (cont'd)**

Near aux tank fuel gage:

For bladder-style tank

AUX 17.0 US GAL

For aluminum (non-bladder) tank

AUX 18.3 US GAL

In clear view of pilot:

MINIMUM SOLO PILOT WEIGHT 150 LB  
(SEE PILOT'S HANDBOOK)

or

SEE PILOT'S HANDBOOK FOR SOLO PILOT  
WEIGHT LESS THAN 150 LB (68 KG)

THIS ROTORCRAFT APPROVED FOR  
DAY AND NIGHT VFR OPERATIONS

LOW-G PUSHOVERS PROHIBITED

On removable cyclic grip:

SOLO FROM RIGHT SEAT ONLY

On or near collective controls:

NO STOWAGE  
KEEP AREA CLEAR

In clear view of all occupants:

NO SMOKING

**PLACARDS (cont'd)**

Inside each baggage compartment:

**CAUTION**

DO NOT EXCEED ANY OF THE FOLLOWING:

- COMPARTMENT CAPACITY: 50 LB MAX
- COMBINED SEAT PLUS COMPARTMENT: 300 LB MAX
- ROTORCRAFT GROSS WEIGHT LIMIT

SEE ROTORCRAFT FLIGHT MANUAL FOR ADDITIONAL  
LOADING INSTRUCTIONS.