

R22/R44 Pilot leaflet

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1 Notes

R22, R44 can handle turbulence very well if the pilot allows it to do so. Do not over control it in gust wind or turbulence.

- Aerobatic flight prohibited.
- Low-G cyclic pushovers prohibited.

A pushover (forward cyclic maneuver) performed from level flight or following a pull-up 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 the roll.

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

1.1 R22

Surface winds limit: 25 knots, including gusts.

Surface wind gust spreads limit: 15 knots.

Continued flight in moderate, severe, or extreme turbulence is prohibited.

Adjust forward airspeed to 60 – 71 KIAS (0.7 Vne) upon inadvertently encountering moderate, severe, or extreme turbulence.

Moderate turbulence is turbulence that causes:

1. changes in altitude or attitude
2. variations in indicated airspeed
3. aircraft occupants to feel definite strains against seat belts

Ground handling by 1 person pulling down on tail rotor gear box, this lifts front skids off ground; then push/pull it. DO NOT push/pull tail fin.

If you have helper, they should push nose (backward movement) or vertical steel tube at the back of the engine (forward), not recommend to pull this tube because end of skid may injure your foot.

When in flight, do not exert too much force to the control knobs, its easy to damage them with too much force.

1.2 R44

1.3 Limitations and performance

Max operating density altitude 14,000 ft.

Fuel consumption approx: 8 gal/hr (R22), 15 gal/hr (R44).

Vne up to 3000 ft density altitude:

R22: 102 KIAS

R44: < 2200 lb TOGW → 130 KIAS,

> 2200 lb TOGW → 120 KIAS,

Power > MCP / any door removed / Autorotation → 100 KIAS

Power off Vne → 100 KIAS

> 3000 ft, see placards.

	R22	R44	
Takeoff & climbs	60	60	KIAS
Max rate of climb (V_y)	53	55	KIAS
Max range	83	100	KIAS
Landing approach	60	60	KIAS
Autorotation	65	70	KIAS

R22

Max glide 75 KIAS, rotor RPM 90%
(↑ RPM to 97% min when autorotating < 500ft AGL)

Best glide ratio 4:1, 1 Kt/1500ft

Example based on some rough numbers for the R22:

At 53 knots you can fly ~4 hrs at 7.5 gph..... 212 nm

At 83 knots you can fly ~3.5 hrs at 8.5 gph.... 292 nm

At 95 knots you can fly ~3.0 hrs at 10 gph.... 285 nm

So if you're trying to cover a long leg and fuel is tight, fly 83 knots. If you're doing some aerial work over a race, game, crime scene, etc fly 53 knots. If you're trying to get somewhere fast with plenty of fuel on board, fly at MCP.

R44

Max glide 90 KIAS, rotor RPM 90%
(↑ RPM to 97% min when autorotating < 500ft AGL)

Best glide ratio 4.7:1, 1 Kt/1300ft

Min rate of descent 55 KIAS, rotor RPM 90%
min rate of descent is 1350 fpm,
glide ratio 4:1

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 U.S. Only day VFR is allowed in HK.

Typical performance:

	R22		R44	
	Knots	MAP	Knots	MAP
S&L	60	18"		
S&L	80	20"		

1.4 Engine

BHP Brake Horsepower is the actual power output of the engine.

CHT limit: 500°F

Oil Pressure

idle	inflight		start & warm up
Min.	Min.	Max.	Max.
25	55	95	115 psi

Cooling system: Direct-drive squirrel-cage blower

Upper Sheave to Drive Line: Sprag type overrunning clutch

1.4.1 R22

Min oil for takeoff: 4 qt (HKAC req 5-6 qt)

It is a Lycoming O-360 (O-320) Carbureted, 4 cylinders, Horizontally opposed, Air cooled, Normally aspirate, Direct drive (c4hand).

Displacement: 361.0 (319.8) cubic inches

Normal rating:

Standard	HP, α , β	β II
0-320-A2B/A2C 150 BHP @ 2700 rpm	0-320-B2C 160 BHP @ 2700 rpm	0-360-J2A 145 BHP (derated) @ 2700 rpm

RPM Shown by the Tachometer as a % of 2550 engine RPM or 510 M/R RPM.

Maximum continuous rating: 124 BHP at 2652 RPM (104% 530rpm on tachometer)

5 minute takeoff rating for β and β II only: 131 BHP at 2652 RPM

Engine to Upper Sheave: 2 double Vee-belts with .8536:1 speed reducing ratio

Drive Line to M/R: Spiral-bevel gears with 11:47 speed reducing ratio

Drive Line to T/R: Spiral-bevel gears with 3:2 speed increasing ratio

Approved Fuel Grades:

80/87 grade aviation fuel for 0-320-A2B/A2C only (Standard R22)

91/96 grade aviation fuel

100LL grade aviation fuel

100/130 grade aviation fuel for 0-320-B2C & 0-360-J2A (HP, α , β & β II)

Fuel Capacity:

Main tank total: 19.8 gal(75 L), usable: 19.2 gal(73 L)

Aux tank total: 10.9 gal(41 L), usable: 10.5 gal(40 L)

1.4.2 R44

Min oil for takeoff: 7 qt

It is a Lycoming IO-540-AE1A5 Fuel injected, 6 cylinders, Horizontally opposed, Air cooled, Normally aspirate, Direct drive (f6hand).

Displacement: 541.5 cubic inches

Normal rating:

RPM Shown by the Tachometer as a % of 2665 engine RPM or 400 M/R RPM.

Maximum continuous rating: 205 BHP at 2718 RPM (102% 408rpm on tachometer)

5 minute takeoff rating for Clipper II: 245 BHP at 2718 RPM

Engine to Upper Sheave: 4 double Vee-belts with .778:1 speed reducing ratio

Drive Line to M/R: Spiral-bevel gears with 11:57 speed reducing ratio

Drive Line to T/R: Spiral-bevel gears with 31:27 speed increasing ratio

Approved Fuel Grades:

100LL grade aviation fuel

100/130 grade aviation fuel

Fuel Capacity:

Main tank total: 31.6 gal(120 L), usable: 30.6 gal(116 L)

Aux tank total: 18.5 gal(70 L), usable: 18.3 gal(69 L)

1.5 Rotor

Main rotor is a Semi-rigid rotor which allows for cone, flap and feather. Underslung means blades swing under the pivot point

1.5.1 R22

Rotor speed limit: 101-104% power on, 90-110% power off.

		Noise	Tip speed
510rpm	M/R	L freq.	672 fps
2550rpm	Engine	M freq.	(at 100% rpm)
3265rpm	T/R	H freq.	599 fps

Main rotor: 2 blades (*dia.* 25'2"), rigid inplane, free to teeter and cone (articulation), constant 7.2" blade chord with -8° blade twist.

Tail rotor: 2 blades (*dia.* 3'6"), rigid inplane, free to teeter (articulation), precone 1°11', constant 4" blade chord with 0° blade twist.

1.5.2 R44

Rotor speed limit: 101-102% power on, 90-108% power off.

		Noise	Tip speed
408rpm	M/R	L freq.	705 fps
2718rpm	Engine	M freq.	(at 102% rpm)
2428rpm	T/R	H freq.	614 fps

Main rotor: 2 blades (*dia.* 33"), rigid inplane, free to teeter and cone (articulation), 10" inboard blade chord / 10.6" outboard blade chord with -6° blade twist.

Tail rotor: 2 blades (*dia.* 4'10"), rigid inplane, free to teeter (articulation), precone 1°11', constant 5.1" blade chord with 0° blade twist.

1.6 W&B

Max in any baggage compartment 50 lb

1.6.1 R22

Gross wt.:

- max. 1370 lb due to the skid cross bar strength.
- min. 920 lb, lighter than this, RPM too low for autorotation
- per seat max (including baggage compartment) 240 lb
- min solo pilot + baggage wt with all doors installed is 130 lbs (59 kg) with standard fuel / 135 lbs (61 kg) with aux fuel; unless a W&B computation shows CG is within limits. Ballast may be required.

1.6.2 R44

Gross wt.:

- max. 2500 lb (water landings for any reason other than actual emergency are prohibited at > 2400 lb)
- min. 1600 lb
- per seat max (including baggage compartment) 300 lb
- min solo pilot + forward baggage wt with all doors installed is 150 lbs (68 kg) unless a W&B computation shows CG is within limits. Ballast may be required.

1.7 Pre-flight check

Beware of metal particles / crack.

Remove any temporary covers, accumulations of frost, ice, or snow. Check maintenance records for airworthy. Check general condition: verify no leaks, discoloration due to heat, dents, chafing, galling, nicks, corrosion, or

cracks, no fretting at seams where parts are joined together. Fretting of aluminum parts produces a fine black powder while fretting of steel parts produces a reddish brown or black residue.

Cowl Door; master switch On; Oil pressure / alternator / governor (/ aux fuel pump for R44) lights On; warning light test; check fuel quantity from gages; master switch Off.

Aux fuel tank, quantity check, tank and fuel lines no leaks, fuel filler cap tight; gearbox oil full, no leaks; (R44: hydraulic fluid full, no leaks;) rotor brake, actuation normal; flex coupling, no cracks, nuts tight; yoke flanges, no cracks; gearbox Telatemp Normal; (R44: hydraulic Telatemp Normal;) sprag clutch, no leaks; static source, clear; control rod ends, free without looseness; steel tube frame, no cracks; all fasteners, tight; T/R control, no interference; cowl door, latched.

Engine right side: carb air ducts, secure; carb heat scoop, secure; engine sheet metal, no cracks; electrical terminals, tight; fuel line, no leaks; oil cooler door, check; oil lines, no leaks or chafing; exhaust system, no cracks; engine general condition, check; v-belt condition, check; v-belt slack, check; sprag clutch, no leaks; upper bearing, no leaks; telatemp – upper bearing, normal; lower sheave groove wear, smooth & uniform; flex coupling, no cracks & nuts tight; yoke flanges, no cracks; steel tube frame, no cracks; tail rotor control, no interference.

Engine Rear: cooling fan nut, pin in line with marks; cooling fan, no cracks; fan scroll, no cracks; telatemp – lower bearing, normal; lower bearing, no leaks.

Empennage: tail surfaces, no cracks; fasteners, tight; position light, check; tail rotor guard, no cracks.

Tail Rotor: gearbox telatemp, normal; gearbox, oil visible & no leaks; blades, clean and no damage/cracks; rod ends, free without looseness; pitch link jam nuts, tight; teeter bearings, check condition; teeter bearing bolt, does not rotate; control bellcrank, free without looseness;

Tailcone: rivets, tight; skins, no cracks or dents; strobe light condition, check; antenna, check; attachment bolts, tight.

Engine Left Side: engine oil, 4-6 qt; oil filter (if installed), secure & no leaks; fuel lines, no leaks; throttle linkage, operable; battery and relay (if located here), secure; alternator belt tension, check; steel tube frame, no cracks; engine sheet metal, no cracks; exhaust system, no cracks; engine general condition, check;

Main fuel tank: quantity, check; filler cap, tight; leakage, none; drain, sample. gascolator drain, sample. aux fuel drain, sample.

Main Rotor: * Do not pull rotor blades down as damage may occur. To lower one blade, push opposite blade up. verify erosion on lower surface of blades has not exposed skin-to-spar bond line; blades, clean and no damage/cracks; pitch change boots, no leaks; main hinge bolts, cotter pins installed; all rod ends, free without looseness; pitch link jam nuts, tight; pitch link safety wire, secure; all fasteners, tight; swashplate scissors, no excessive looseness. * Be sure rotor blades are approximately level to avoid possible tailcone strike.

Fuselage left side: baggage compartment, check; removable controls, secure if installed; collective control, clear; seat belt, check condition and fastened; door, unlocked and latched; door hinge safety pin, installed; landing gear, check; ground handling wheel, removed; position light, check;

Nose Section: pitot tube, clear; windshield condition and cleanliness, check; fresh air vent, clear; landing lights, check.

Fuselage right side: landing gear, check; ground handling wheel, removed; position light, check; door hinge safety pin, installed; baggage compartment, check.

Cabin Interior: loose articles, removed or stowed; seat belt, check condition; instruments / switches / controls, check condition; clock, functioning.

* For helicopters with removable controls, remove left seat

controls if person in that seat is not a rated helicopter pilot.

* When flying solo, fill left baggage compartment to capacity before using right compartment. Avoid placing objects in compartments which could injure occupant if seat collapses during a hard landing.

* Shorter pilots may require cushion to obtain full travel of all controls. When using cushion, verify aft cyclic travel is not restricted.

- max operating altitude 9000 ft AGL to allow landing within 5 minutes in case of fire.
- Alternator, RPM governor, low rotor RPM warning system, OAT gage must be operational for flight.
- Solo flight from right seat only.
- Left seat (forward left seat for R44) belt must be buckled.
- No loose items allowed in cabin during doors-off flight.
- Fill baggage compartments under unoccupied seats to capacity before using baggage compartments under occupied seats. Avoid placing objects in compartment which could injure occupant if seat collapses during a hard landing.
- Don't stow lightweight objects in rear baggage compartments during doors-off flight unless rear seats are occupied. Doors-off flight may cause rear seat bottoms to lift and items could be blown out.

1.7.1 R22

Doors-off operation approved with either or both doors removed.

1.7.2 R44

Hydraulic control system must be operational for flight. Doors-off operation up to 100 KIAS approved with any or all doors removed.

1.8 Passenger briefing

- The hazardous about helicopter, every moment, pay attention to the pilot.
- Pilot is busy on flying, radio, ..., may not have time to talk to the pax.
- The trip detail, flight plan. Use of seat belt, life jacket.
- Warn pax to secure loose objects and to keep head & arms inside cabin to avoid high velocity airstream.
- R44: ensure all doors are unlocked before flight to allow rescue or exit in an emergency.

1.9 Internal check

Starting from LHS:

- seat belts fastened
- fuel shut-off valve on
- circuit breakers in
- cyclic/collective friction off
- cyclic, collective, pedals full travel free
- throttle full travel free
- collective full down & friction on
- cyclic neutral & friction on
- pedals neutral
- rotor brake disengaged
- map light off
- landing light off
- governor on
- carb heat off
- mixture full rich (not for R44)
- mixture guard installed
- primer (if installed) down & locked
- strobe light on
- clutch disengaged
- altimeter set

1.10 Starting engine and run-up

R22

Procedure	If failed, see section
<hr/>	
Prime 2 – 3 strokes (up to 10)	
throttle closed	
Master switch on	
area, clear	
Crank Starter (< 15 sec.)	4.1
check starter light	OFF
Alt ON	
check Alt light	OFF
check ammeter	
Clutch ON	
start timer for blade	

R44

Procedure	If failed, see section
<hr/>	
Throttle closed	
Master switch on	
area, clear	
Mixture, full rich	
start timer for ignition	
Ignition switch → Prime, 3–5 sec., then Both	
Pull off Mixture	
wait 30 sec.	
Starter engaged until fire (< 7 sec.)	??
Mixture, SLOWLY push to full rich	
check starter light	OFF
mixture guard installed	
Alt ON	
check Alt light	OFF
check ammeter	
Clutch ON	

Procedure	If failed, see section
set engine RPM, 50 – 60% blades turning < 5 seconds check oil pressure in 30 sec, > 25 psi avionics & headsets ON tune HI tune Artificial Horizon if needed wait Clutch light OFF	4.2
↑ RPM to 75% wait CHT & oil Temp, oil pressure in green Mag. drop at 75% RPM, 7% max in 2 sec Carb heat check (R22) Needles split check Door closed & latched, seat belt ON Note the MAP limit Friction OFF, 2 feet on pedals, governor on Hydraulic check (R44) use small cyc inputs; with hyd off, should be 1/2" of freeplay before stiffness; with hyd on, free with no feedback or uncommanded motion. RPM to 80%, take over by governor Low RPM check (lift collective slightly & reduce RPM, horn/light at 97%) Check all warning lights OFF Radio call if needed, set Alti, squawk code	4.5

* R22: Avoid continuous operation at rotor speed of 60 – 70% to minimize tail resonance.

During run-up and shutdown, pilot should uncover right ear, open right door, and listen for unusual bearing noise. Failing bearings will produce an audible whine or growl well before final failure.

如果好耐冇飛 Solo, 要小心：架機離地後可能會後移、後傾。尤其係一架你從未飛過的機。

1.11 Takeoff

- R22: Verify governor on, RPM stabilized at 102 – 104%.
R44: Verify governor and hyd on, RPM stabilized at 101 – 102%.
- Clear area. Slowly raise collective until aircraft is light on skids. Reposition cyclic as required for equilibrium, then gently lift aircraft into hover.
- Check gages in green, lower nose, and accelerate to climb speed following profile shown by H-V diagram.
 - R22: if RPM drops below 102%, lower collective.
 - R44: if RPM drops below 101%, lower collective.

1.12 Shutdown

R22: collective down, ↓ RPM to 75%, friction ON, carb heat OFF
R44: collective down, ↓ RPM to 65%, friction ON
Cyclic and pedals neutral, friction ON
wait 2 minutes & CHT < 250
radio OFF
throttle close
clutch OFF
wait 30 seconds
pull idle cut-off
mixture guard on (R22)
Alt and starter OFF (only HKAC required)
wait 30 seconds
can apply rotor brake
wait clutch light off, M/R stopped
starter OFF, master switch OFF
if ELT is installed, set VHF transceiver to 121.5MHz to check its not been activated accidentally
Note: rotor brake should be left engaged after shutdown to disable starter buttons and reduce possibility of unintentional starter engagement.

2 Others

Low RPM warning system and governor are inoperative with master battery and alternator switches both off. If a light causes excessive glare at night, bulb may be unscrewed or circuit breaker pulled to eliminate glare during landing.

When BRAKE light on, you cannot start the engine. LOW FUEL warning in R22 indicates 5 minutes fuel (at cruise power) remains; in R44 is 10 minutes.

3 Accident rate

Before 1992:

Collisions - wire, etc.	32%
Low-r.p.m. rotor stall	22%
Weather	14%
Low-G mast bumping	9%

In 1982: 6 fatal/100,000 hrs (high fatal rate in general aviation)

In 1992: 1.2 fatal/100,000 hrs (low fatal rate in general aviation)

Avoid accidents by:

- Stay above 500 AGL
- Avoid over pitching Collective
- Add throttle and lower collective must be done simultaneously to recover from low-r.p.m.
- Airspeed > 60 Kts
- No over control in Turbulence
- No abrupt control input
- Low-G, gentle apt cyclic
- Keep flying > 30 Kts until < 300 ft/min *rate of descent*

4 Emergency

4.1 Fail to startup

If starter motor doesn't run:

- Check to make sure brake is off
- Check to make sure clutch is off

If starter motor run:

- Forgot to put in full mixture
- Check if landing light is on (which can load down the battery)
- Over prime, see 4.3; under prime, see 4.4

After several unsuccessful crank attempt, wait a few minutes.

4.6 Emergency Procedures

	Cause	Symptom	Procedures
Power failure	Engine failure	low RPM horn noisy left yaw ↓ oil pressure ↓ engine RPM	> 8 ft: ↓ coll, keep rpm, enter normal autorotation glide 65Kts (70Kts for R44), use col to keep RPM in green select landing sport, try landing into wind if unable to restart, turn off unnecessary switches and shut off fuel at 40ft AGL, flare ↓ decent ↓ speed; at 8ft AGL, fwd cyclic; ↑ col before touchdown
	Drive system failure	low RPM horn noisy, vibration left or right yaw ↑ engine RPM ↓ rotor RPM	< 8 ft: R pedal to prevent yawing allow helicopter to settle ↑ col before touchdown Ditching (power off): same as above until touch water, left lateral cyclic, seat belt off, quit when blade stopped. Ditching (power on): same as above until above water, unlatch door, pax exit, fly to safe dist from pax, Master&Alt OFF, throttle → overtravel spring, level + full col as heli contact water, left lateral cyclic, seat belt off, quit when blade stopped.
Loss T/R fwd flight		right yaw	immediately enter auto, > 70 KIAS if practical, select landing site, throttle to overtravel spring, autorotation landing. Note: when suitable landing site is N/A, the vertical fin may permit limited controlled flight at very low power settings and airspeeds > 70 KIAS; however, prior to reducing airspeed, re-enter full autorotation.
Loss T/R (hover)		right yaw	immediately roll throttle to overtravel spring, allow heli to settle; ↑ col just before touchdown to cushion landing.
Engine fire	1. Cranking – Continue and attempt to start which would suck flames and excess fuel through carburetor into engine. 2. If engine starts, run at 50-60% RPM (60-70% RPM for R44) for a short time, shut down, and inspect for damage. 3. If engine fails to start, shut off fuel and master battery switch. 4. Extinguish fire with fire extinguisher, wool blanket, or dirt. 5. Inspect for damage.		

4.2 Oil pressure too low during start

If oil pressure < 25 psi 30 seconds after engine start, shut-down engine immediately.

4.3 Over prime

Intermittent firing / puffs of black smoke from exhaust during start attempt indicated over primed, flooded engine. Remedy action: $\frac{1}{4}$ " throttle, mixture idle cut-off, crank the engine; after engine started, mixture full rich, throttle close to reduce RPM to 55%.

4.4 Under prime

Under prime engine will not fire, it is likely in cold conditions (due to low oil viscosity, battery may lose $\frac{1}{2}$ capacity, fuel will not vaporise readily, sparking plugs may ice in extreme cold). More priming, external power, pre-heat of engine may be needed.

4.5 Magneto problem

No drop in magneto check can means: the other magneto is not working; the magneto switch does not ground the magneto under test. Dropping > 7% in 2 seconds may indicate fouled spark plugs or faulty magneto.

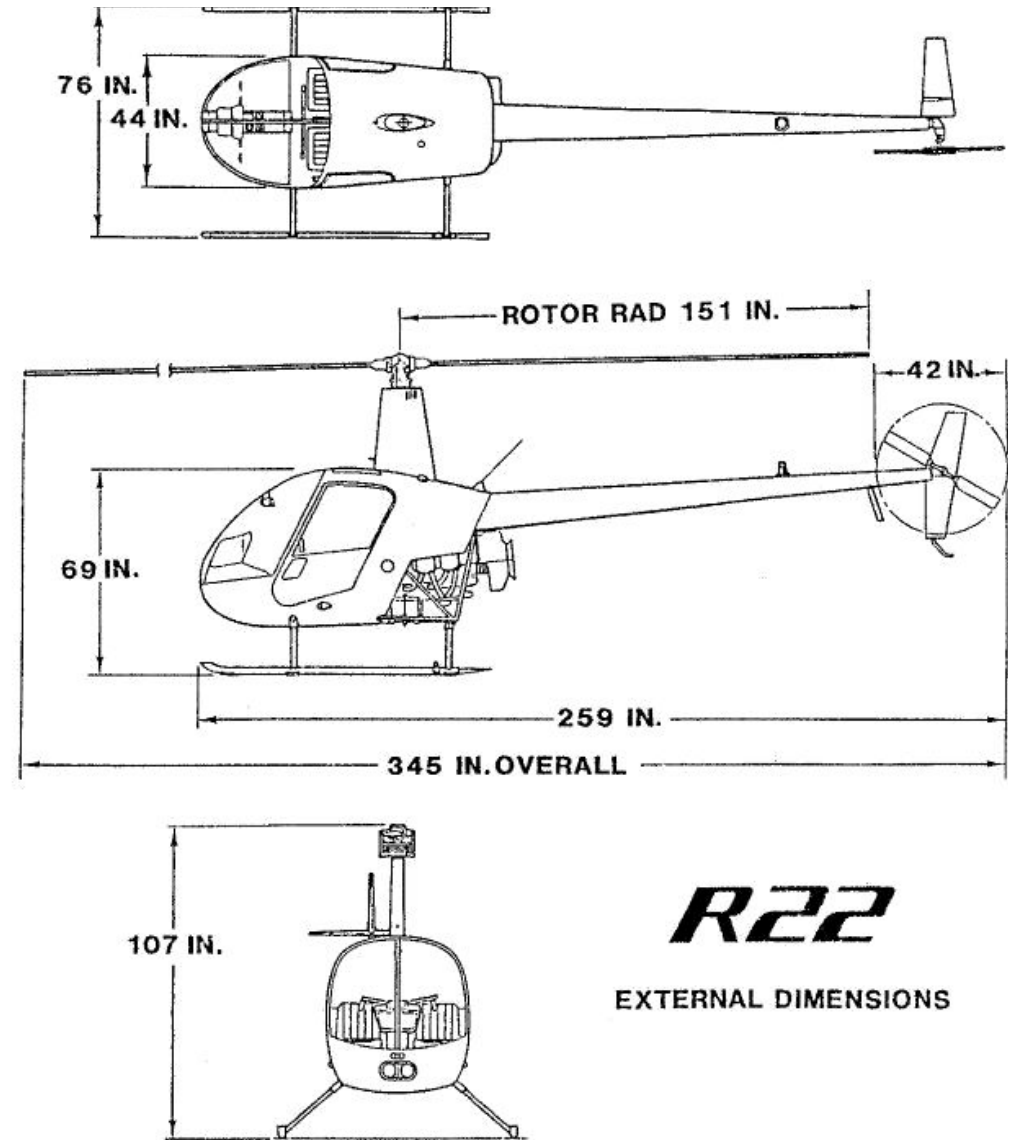
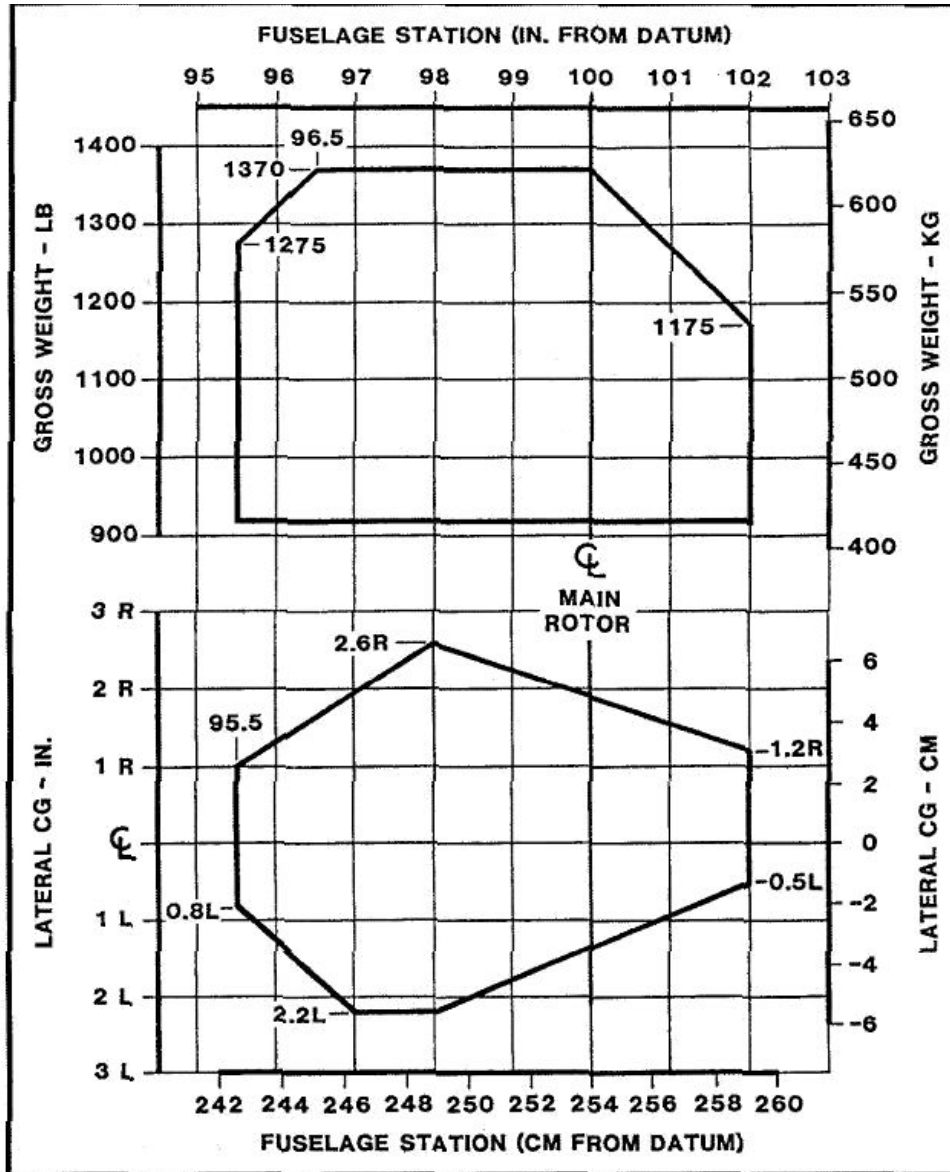
	Procedures
Fire in flight	Enter auto, select landing site; cabin heat OFF; cabin vent ON; Mayday call; master switch OFF; if engine running, normal landing, shut off fuel valve; if engine stopped, shut off fuel valve, autorotation landing.
Elect fire in flight	Enter auto, select landing site; cabin heat OFF; cabin vent ON; Mayday call; master&Alt switch OFF; land immediately; extinguish fire; inspect for damage. ¹
Low RPM horn	↑ throttle, lower collective
Tachometer failure	If 1 tach failed, use remaining tach to monitor RPM. If it is not clear which tach failed or if both tachs failed, allow governor to control RPM and land as soon as practical. Note: each tach, the governor, and the low RPM warning horn are on separate circuits. Either the battery or the alternator can independently supply power to the tachs. A special circuit allows the battery to supply power to the tachs even if the master battery switch is off.
Governor failure	Grip throttle firmly to override the governor, then switch governor off. Complete flight using manual throttle control.
Oil light	Indicates loss of engine power or oil pressure. Check engine tach for power loss. Check oil pressure gage and, if pressure loss is confirmed, land immediately. Continued operation without oil pressure will cause serious engine damage and engine failure may occur.
MR/TR temp/chip	If light is accompanied by any indication of problem like noise, vibration, or temperature ↑, land immediately; if not, land as soon as practical.
Clutch light	Never take off before the light goes out. The clutch light may come on momentarily during run-up or during flight to retension the belts as they warm-up and stretch slightly. If the light flickers or comes on in flight and does not go out within 7 or 8 seconds, pull the CLUTCH circuit breaker, reduce power, land immediately. Be prepared to enter autorotation.
ALT light	Indicates low voltage and possible alternator failure. Turn off nonessential electrical equipment and switch ALT off and back on after 1 sec to reset overvoltage relay. If light stays on, land as soon as practical. Continued flight without functioning alternator can result in loss of electronic tachometer, producing a hazardous flight condition.
Starter-on light	Indicates starter motor is engaged. If light does not go out when ignition switch is released from start position, immediately pull mixture to idle cut-off and turn master switch off. Have starter motor serviced.
CO light	Open nose and door vents and shut off heater. If hovering, land or transition to forward flight. If symptoms of CO poisoning (headache, drowsiness, dizziness) accompany light, land immediately.
R44	
Hydraulic	Verify HYD switch ON; if not restored, switch it to OFF; land as soon as practical.
Aux fuel pump	Indicates low aux fuel pump pressure. If no other indication of a problem, land as soon as practical. If accompanied by erratic engine operations, land immediately.
Fuel filter	Indicates fuel strainer contamination. If no other indication of a problem, land as soon as practical. If accompanied by aux fuel pump warning or erratic engine operations, land immediately.

¹Low RPM warning & governor are inoperative with master battery + alt sw both off.

Item	Weight (lb)	Longitudinal CG, inches	Lat CG, inches (+ = right side)
Pilot and baggage under right seat		78.0*	+ 10.7
Passenger and baggage under left seat		78.0*	- 9.3
Main fuel		108.6	- 11.0
Aux fuel (optional)		103.8	+ 11.2
Doors	5.2 each	77.5	± 21.0
Removable Cyclic	0.8	68.0	- 8.0
Removable Collective	1.1	80.7	- 19.5
Removable Pedals (both pedals)	0.8	46.5	- 9.5

Item	Arm (Inches from Datum)	Sample Helicopter		Your Helicopter	
		Weight (lb)	Moment (in-lb)	Weight (lb)	Moment (in-lb)
Basic empty weight as equipped (Includes unusable fuel and full oil)	104.0	850	88,400		
Remove pilot door	77.5	-5.2	-403		
Pilot, passenger, and baggage	78.0	342	26,676		
Total weight and balance with zero usable fuel	96.6	1187	114,673		
Usable main tank fuel at 6 lbs/gal.	108.6	115	12,489		
Usable aux tank fuel at 6 lbs/gal.	103.8	63	6,539		
Total weight and balance with take-off fuel	97.9	1365	133,701		

CG limits, datum line is 100 inches forward of main rotor shaft centerline.



Item	Weight	Longitudinal CG inches	Lat.CG,inches (+= right side)
Pilot (Right Forward seat)		49.5 *	+ 12.2
Left Forward Passenger		49.5 *	- 10.4
Baggage under forward seats		44.0	±11.5
Aft passengers and baggage under aft seats.		79.5	±12.2
Main fuel		106.0	_ 13.5
Aux fuel.		102.0	+13.0
Forward doors	7.5 each	49.4	± 24.0
Aft doors	7.0 each	75.4	±23.0
Removable cyclic	0.6	35.8	_ 8.0
Removable collective	0.8	47.0	_21.0
Removable pedals.(both pedals)	0.8	16.8	_9.5

* If backrest cushion is used, subtract thickness of compressed cushion.

Item	Arm (Inches from Datum)	Sample Helicopter		Your Helicopter	
		Weight (lb)	Moment (in-lb)	Weight (lb)	Moment (in-lb)
Basic empty weight as equipped (includes unusable fuel and full oil)		1510	160,815		
Pilot door removed	49.4	-7.5	-371		
Pilot and forward passenger	49.5	340	16,830		
Forward baggage	44.0	20	880		
Aft passengers and baggage	79.5	336	26,712		
Total weight and balance with zero usable fuel	93.2	2198.5	204,866		
Usable main tank fuel at 6 lbs/gal.	106.0	184	19,504		
Usable aux tank fuel at 6 lbs/gal.	102.0	110	11,220		
Total weight and balance with take-off fuel	94.5	2492.5	235,590		

B-KMA, SN 12415, basic weight 1570.3 lb, moment 168,069 in/lb, long CG 107" (date: 080723)

CG limits, datum line is 100 inches forward of main rotor shaft centerline.

