

**SECTION 8  
HANDLING AND MAINTENANCE**

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## **SECTION 8**

### **HANDLING AND MAINTENANCE**

#### **GENERAL**

This section outlines procedures recommended for handling, servicing, and maintaining the R22 helicopter. Every owner should stay in close contact with a Robinson Service Center to obtain the latest service and maintenance information. Owners should also be registered with the factory to receive service bulletins, changes to this handbook, and other helpful information as it becomes available.

Federal Regulations place responsibility for maintenance of a helicopter on the owner and operator. The owner/operator must insure that all maintenance is performed by qualified mechanics and in accordance with the R22 Maintenance Manual (Instructions for Continued Airworthiness), Service Bulletins/Service Letters, and FAA Airworthiness Directives.

All limits, procedures, safety practices, time limits, servicing, and maintenance requirements contained in this handbook are considered mandatory.

Authorized Robinson Service Centers will have recommended modification, service, and operating procedures issued by the FAA and by Robinson Helicopter Company. This information will be useful in obtaining maximum utility and safety with the helicopter.

#### **REQUIRED DOCUMENTS**

The Airworthiness Certificate (FAA Form 8100-2) must be displayed in the aircraft at all times. The following additional documents must be carried in the aircraft:

1. Registration Certificate (FAA Form 8050-3)
2. Pilot's Operating Handbook
3. Current Weight and Balance

**REQUIRED DOCUMENTS (cont'd)**

The following documents should not be carried in the aircraft, but must be available for use by any mechanic or pilot servicing the aircraft:

1. Aircraft Logbook
2. Engine Logbook

***NOTE***

Required documents may vary in countries other than the United States.

**REQUIRED INSPECTIONS**

Federal Regulations require most civil aircraft of U.S. registry to undergo a complete inspection every twelve months. This annual inspection must be signed off by a mechanic with Inspection Authorization (IA). In addition to the annual inspection, the R22 Maintenance Manual requires a complete inspection after every 100 hours of operation.

The helicopter incorporates a number of fatigue life-limited components which must be retired at specified time intervals. A list of these components is contained in the Airworthiness Limitations section of the R22 Maintenance Manual and Instructions for Continued Airworthiness.

The R22 helicopter includes many unique features. Without special training, Airframe and Powerplant (A&P) mechanics are not qualified to perform the above inspections. These inspections must be performed only by properly rated personnel who have successfully completed a factory-approved maintenance course of instruction on the R22 helicopter.

**REQUIRED INSPECTIONS (cont'd)**

The factory occasionally publishes Service Bulletins and the Federal Aviation Administration (FAA) occasionally publishes Airworthiness Directives (ADs) that apply to specific groups of aircraft. They are mandatory changes or inspections which must be complied with within the time limit specified. Owners should periodically check with Robinson Service Centers to be sure that the latest Service Bulletins and ADs issued have been complied with.

**PREVENTIVE MAINTENANCE BY THE PILOT**

Part 43 of the Federal Aviation Regulations (FAR) allows a certified pilot who owns or operates an aircraft to obtain a maintenance manual and perform certain limited maintenance functions. These functions are defined in the above regulations, and, as they apply to the R22 helicopter, generally include the following:

1. Replace defective safety wire or cotter pins.
2. Replace bulbs, reflectors, and lenses of position and landing lights.
3. Replace, clean, or gap spark plugs.
4. Replace engine air filter.
5. Clean or refinish exterior of aircraft.
6. Replace wear shoes on landing gear skids.
7. Service or replace battery.
8. Change engine oil and filter.
9. Inspect chip detectors and add oil to tail rotor gearbox.
10. Remove or replace any cowling or inspection panels.
11. Remove and replace gascolator bowl.

Although the above work is allowed by law, it should only be performed by pilots confident that they are qualified to reliably complete the work. All work must be done in accordance with the maintenance manual.

**PREVENTIVE MAINTENANCE BY THE PILOT (cont'd)**

After completing the work, when required, the pilot must enter the following in the appropriate logbook:

1. Date work accomplished.
2. Description of work.
3. Total hours on aircraft.
4. Pilot certificate number.
5. Signature of pilot.

**ALTERATIONS TO AIRCRAFT**

The compactness and many unique design features of the R22 helicopter make any modification inadvisable. The dynamic characteristics and susceptibility to fatigue of the rotor, drive, and control systems make any modification to these systems extremely hazardous.

Also hazardous is installation of any electronic equipment or avionics not factory-approved and supplied. The compactness of the console and tunnel containing the controls and wire bundles makes installation of any additional wires likely to interfere with free control movement. The electronic tachometers and governor are affected by other electrical devices, and their reliability and accuracy are essential for safe operation of the helicopter. Installation of an electrical device not tested and approved by the factory could easily result in a hazardous condition.

Because of these potential hazards, Robinson Helicopter Company does not approve any modification or alteration other than those which are factory-supplied and installed by factory-trained personnel.

## **GROUND HANDLING**

For leveling, hoisting, or jacking, see appropriate sections of the maintenance manual.

The helicopter may be maneuvered on the ground using ground handling wheels. Recommended tire pressure is 60 psi (4 bar). Wheels must be removed for flight.

To attach wheels:

1. Hold handle and wheel with protruding spindle in its lowest position.
2. Insert spindle into support mounted on skid. Make sure spindle is all the way in.
3. Pull handle over center to raise helicopter and lock wheel in position.

### ***CAUTION***

When lowering helicopter, handle has a tendency to snap over.

Move the helicopter by holding the tail rotor gearbox and aft tailcone section. If additional help is needed, a second person may push on one of the aft vertical frame tubes or on the nose.

### ***CAUTION***

Do not move helicopter by gripping vertical fins, outboard part of horizontal stabilizer, tail rotor, tail skid, or tail rotor controls.

## **PARKING**

1. Place cyclic control in neutral and apply friction.
2. Put collective full down and apply friction.
3. Align rotor blades approximately fore and aft. Apply rotor brake. Use blade tie-downs in windy conditions.

### ***CAUTION***

If using rotor blade tie-downs, do not overtighten tie-down straps (5 lb max tension). Do not pull down on blades to teeter rotor. To lower a blade, push up on opposite blade.

4. During storm conditions, helicopter should be hangared or moved to a safe area.
5. If helicopter is hangared, turn fuel shutoff valve off.

## **CABIN DOORS**

Both cabin doors may be removed and installed by maintenance personnel or pilots. To remove a door, remove cotter pins in upper and lower hinges, then open and lift door off. To install doors, use reverse procedure. Adjust weight and balance as required when removing and installing doors.



## **ENGINE OIL**

Recommended maximum oil quantity is six quarts and minimum quantity for takeoff is four quarts as indicated on the oil dipstick.

The oil and filter should be changed at least every 50 hours or four months, whichever occurs first. If no oil filter is installed, change oil every 25 hours.

To change oil:

1. Ground run or fly helicopter to obtain normal operating temperature.
2. Remove left side skirts. If heater is installed, disconnect heater hose and blower motor ground wire and remove bolt securing blower motor to frame. Open quick drain on bottom of sump to drain oil into suitable container.
3. Cut safety wire from oil suction-screen cap located near centerline at accessory (magneto) end of sump. (Located on bottom of sump for O-320 engines.)
4. Remove, inspect, clean, and reinstall oil suction screen. Re-safety cap.
5. Cut safety wire (if installed) from oil filter and break loose using wrench or loosen pressure-screen housing bolts.
6. Place suitable container below and inboard of magneto to catch oil retained in filter or screen housing and remove filter or screen housing slowly to allow oil to drain into container. Do not allow oil to drain on magneto housing.
7. Cut filter open to inspect, or inspect and clean pressure screen.

**ENGINE OIL (cont'd)**

8. Install new filter per instructions printed on filter. Use only Champion CH48108, CH48108-1, Tempest AA48112, or Robinson B123-1 or -2 filter. Safety wire is not required on filter. Re-install pressure screen and housing. Torque pressure-screen housing bolts to 96 in.-lb.
9. Close quick drain and fill sump with 6 quarts of appropriate grade oil as recommended below.
10. Start helicopter. Verify oil pressure within 30 seconds. Ground run for a few minutes, shut down, and verify no leaks.
11. Check oil level on dipstick.
12. Reinstall side skirts. Reinstall heater blower motor and heater hose if helicopter has heater.
13. Make appropriate maintenance record entries.

The following grades of oil are recommended:

Average Ambient Air Temperature	Mineral Grades MIL-L-6082 or SAEJ1966 (Use first 50 hours)	Ashless Dispersant Grades MIL-L-22851 or SAEJ1899 (Use after first 50 hours)
All Temperatures	—	SAE15W50 or SAE20W50
Above 80°F	SAE60	SAE60
Above 60°F	SAE50	SAE40 or SAE50
30°F to 90°F	SAE40	SAE40
0°F to 70°F	SAE30	SAE30, SAE40, or SAE20W40
0°F to 90°F	SAE20W50	SAE20W50 or SAE15W50
Below 10°F	SEA20	SAE30 or SAE20W30

### **TAIL ROTOR GEARBOX OIL**

If oil is not visible in the sight gage with helicopter sitting level, oil must be added.

To add oil:

1. Cut safety wire (if installed) and remove filler/vent cap located on top of gearbox.
2. Use only Robinson part number A257-2 oil.
3. Fill very slowly to center of sight gage. **DO NOT** overfill. (Less than a teaspoon of oil is usually required.)
4. Reinstall filler/vent cap. Be sure metal gasket or rubber o-ring is in place. Torque to 100 in.-lb.
5. Safety wire as before. (Safety wire not required if cap is sealed with an o-ring.) Be sure safety wire applies tension in direction which would tighten cap.

### **FUEL**

Approved fuel grades and fuel capacity are given in Section 2.

A small quantity of fuel should be drained from the gascolator and from each tank using the quick drains prior to the first flight each day. Drain enough fuel to remove any water or dirt and check for approved fuel color. If fuel contamination is suspected, continue to drain fuel from gascolator and tank drains until all contamination is eliminated.

## **BATTERY**

The battery is located either in the engine compartment or beneath the instrument console. The battery is sealed and does not require fluid level checks.

A discharged battery is NOT AIRWORTHY because it will not have the reserve capacity to operate the electrical system should the charging system fail in flight.

Often, a 10 or 15 minute charge will improve battery condition enough to start the engine. If battery is located in the engine compartment, first connect positive charger cable to positive (battery side) battery relay terminal. Then, connect negative charger cable to battery ground strap or engine. If battery is located beneath the instrument console, remove console hold down screws (one each side), lift console, remove battery box cover, and connect charger cables directly to battery posts (connect positive cable first). Use extreme caution not to short to console sheet metal.

After charging, disconnect cables (disconnect negative cable first), secure console if opened, and attempt a normal start. If battery still has insufficient charge to start engine, service or replace battery before further flight.

## **CLEANING HELICOPTER**

### **CLEANING EXTERIOR INCLUDING ROTOR BLADES**

The helicopter should be washed with mild soap and water. Harsh abrasives, alkaline soaps, or detergents should not be used because they could scratch painted or plastic surfaces or could cause corrosion of metal. Cover areas where cleaning solution could cause damage. Use the following procedure:

1. Rinse away loose dirt and salt residue with water.
2. Apply cleaning solution with a soft cloth, sponge, or soft bristle brush.
3. To remove stubborn oil and grease, use a cloth dampened with aliphatic naphtha.
4. Rinse all surfaces thoroughly.
5. Apply carnauba wax to rotor blades and renew wax when water no longer beads on blade surface. Any good automotive wax may be used to preserve other painted surfaces. Soft cleaning cloths or a chamois should be used to prevent scratches when cleaning or polishing.

### ***CAUTION***

Never use high-pressure spray to clean helicopter. Never blow compressed air into main or tail rotor blade tip drain holes.

### **CLEANING WINDSHIELD AND WINDOWS**

1. Remove dirt, mud, and other loose particles from exterior surfaces with clean water.
2. Wash with mild soap and warm water or with aircraft plastic cleaner. Use a soft cloth or sponge in a straight back and forth motion. Do not rub harshly.
3. Remove oil and grease with a cloth moistened with isopropyl alcohol (rubbing alcohol) or aliphatic naphtha.

## **CLEANING HELICOPTER (cont'd)**

### **CLEANING WINDSHIELD AND WINDOWS (cont'd)**

#### ***CAUTION***

Do not use gasoline, other alcohols, benzene, carbon tetrachloride, thinner, acetone, or window (glass) cleaning sprays.

4. After cleaning plastic surfaces, apply a thin coat of hard polishing wax. Rub lightly with a soft cloth. Do not use a circular motion.
5. Scratches can be removed by rubbing with jeweler's rouge followed by hand polishing with commercial plastic polish. Use a figure eight motion when polishing.

### **CLEANING UPHOLSTERY AND SEATS**

1. Vacuum and brush, then wipe with damp cloth. Dry immediately.
2. Soiled upholstery, except leather, may be cleaned with a good upholstery cleaner suitable for the material. Follow manufacturer's instructions. Avoid soaking or harsh rubbing.

#### ***CAUTION***

If CO detector is installed, avoid use of solvents, detergents, or aerosol sprays near sensor. Tape off openings in top and bottom of sensor housing when cleaning cabin interior.

3. Leather should be cleaned with saddle soap or a mild hard soap and water.

### **CLEANING CARPETS**

Remove loose dirt with a whisk broom or vacuum. For soiled spots and stains, use nonflammable dry cleaning liquid.