

FLIGHT TRAINING GUIDE

CHAPTER 5



R66

PILOT QUALIFICATION SYLLABUS

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CHAPTER 5**R66 PILOT QUALIFICATION SYLLABUS****CONTENTS**

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ROBINSON HELICOPTER COMPANY
R66 PILOT QUALIFICATION SYLLABUS

COURSE OBJECTIVES

The objective of this course is to qualify a helicopter pilot to act as pilot in command in the Robinson R66 helicopter.

COURSE COMPLETION STANDARDS

This course will be complete when the pilot passes the end of course written examination with a score of at least 80% and has satisfactorily completed the end of course flight evaluation. Standards found in the appropriate FAA Private/Commercial Practical Test Standards or foreign agency equivalent shall be used to determine satisfactory flight proficiency.

COURSE PREREQUISITES

This course is intended for pilots who hold a rotorcraft—helicopter category/class rating on their pilot certificate.

COURSE CONTENT

There are no US regulatory requirements for R66 qualification. However, Robinson recommends at least five hours dual instruction or at least three hours if the student has at least 150 hours turbine helicopter experience and 150 hours Robinson helicopter experience. This course consists of six hours of ground training and five hours of flight training. Ground and flight lesson times may be adjusted by the instructor based on individual student needs. The flight and ground training can be accomplished concurrently. Specific maneuver techniques are located in the R66 Maneuver Guide.

INSTRUCTOR RECOMMENDATIONS

There are no US regulatory requirements for flight instructors to be able to teach this R66 Qualification Course. However, Robinson recommends instructors have at least 200 hours in helicopters, 50 of which must be in a Robinson helicopter and 25 of which must be in an R66 or at least 400 hours dual instruction given in helicopters with at least 5 hours R66 experience.

TURBINE ENGINE SPECIAL EMPHASIS AREAS

In cases where the student transitioning into the R66 has little or no turbine engine helicopter experience, the training should emphasize the following areas where there is a marked difference in the procedures and techniques between turbine and piston powerplants.

Engine Starting:

Engine starting is much more critical in a turbine engine. Extensive damage can result if excessive measured gas temperatures (MGT) are allowed to occur during the start process (hot start). Pilots need to be very familiar and focused on the proper starting procedure. Factors such as battery voltage, fuel introduction, MGT limitations, and time between start attempts must be fully understood.

Practice Autorotation Entry:

The throttle reduction during the entry into a practice autorotation in the R66 is different than the R22 and R44. In the R22/R44, the collective is lowered full down, then the throttle is rolled off. In an R66, this technique could cause a rotor overspeed. The proper technique in the R66 is to first roll the throttle off, then lower the collective.

Power Recovery Procedure:

Pilots transitioning into the turbine-powered helicopter need to understand the lag in the engine response when conducting the power recovery portion of the practice autorotation. Due to this inherent lag, the power recovery maneuver must be started at a significantly higher altitude than with the piston engine. Additionally, the R66 throttle must be rolled full on before the collective is raised.

STUDENT PROGRESS REPORT

Name _____

Ground Training

Lesson	Date Completed	Instructor Initials
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____

Flight Training

Lesson	Date Completed	Instructor Initials
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____

Written examination results _____ Course completion date _____

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GROUND TRAINING**LESSON 1**

1.5 Hour

OBJECTIVES

During this lesson the student will be introduced to the R66 systems and components.

LESSON CONTENT

1. Main rotor system
 - a. type
 - b. blade construction
 - c. tri-hinge design
2. Tail rotor system
 - a. type
 - b. blade construction
 - c. airfoil
3. Powerplant
 - a. engine type
 - b. turbine engine operation
 - c. horsepower ratings
 - i) normal rating
 - ii) max continuous
 - iii) 5 minute rating
 - d. engine instruments
 - i) measured gas temp (MGT)
 - ii) torque
 - iii) N1
 - iv) N2
 - e. engine anti-ice/cabin heat
 - f. engine monitoring unit (EMU)
4. Fuel system
 - a. quantity, type, color
 - b. fuel pump/filter
 - c. low fuel warning
 - d. bladder-type fuel tank
5. Electrical system
 - a. battery
 - b. starter generator
 - c. generator control unit
6. Hydraulic system
 - a. pump
 - b. servos
 - c. reservoir
7. Annunciator panel
8. Optional equipment as appropriate

COMPLETION STANDARDS

This lesson will be complete when the student has gained an understanding of the R66's systems.

INSTRUCTOR'S COMMENTS AND RECOMMENDATIONS:

GROUND TRAINING**LESSON 2**

2.0 Hours

OBJECTIVES

During this lesson the student will be introduced to the R66 Pilot Operating Handbook and become familiar with its contents.

LESSON CONTENT

1. General section
2. Limitations
3. Emergency procedures
4. Normal procedures
5. Performance
6. Weight & balance
7. Systems description
8. Handling and maintenance
9. Supplements (as appropriate)
10. Safety Information

COMPLETION STANDARDS

This lesson will be complete when the student has gained an understanding of the content and location of material in the R66 Pilot Operating Handbook. The student will be able to accurately calculate the aircraft weight & balance, determine proper performance parameters and become very familiar with the R66's limitations/emergency procedures

INSTRUCTOR'S COMMENTS AND RECOMMENDATIONS:

GROUND TRAINING**LESSON 3**

1.5 Hours

OBJECTIVES

During this lesson the student will review general subject areas that historical data have shown to be major contributors to helicopter accidents. These subject areas should be covered as appropriate to the student's experience level and planned operations.

LESSON CONTENT

1. Proper preflight planning
(Ref SNs 15, 26, and 43)
 - a. Thorough preflight inspection
 - b. Fuel/weather
 - c. Performance planning (hot/high/loading)
2. Avoiding hot starts
(Ref Section 4, R66 POH)
 - a. Causes
 - b. Recognition
 - c. Corrective action
3. Distractions
(Ref SNs 16, 34, 36, 41 & 44)
 - a. Continual scanning
 - b. High workload missions (photo flights)
 - c. Passengers
 - d. Avionics
 - e. Mobile phones
4. Low G and mast bumping
(Ref SNs 11, 20, 29 & 32)
 - a. Avoidance
 - b. Recognition
 - c. Recovery
5. Loss of outside visual reference
(Ref SNs 18, 19 & 26)
 - a. Seriousness of condition
 - b. Night flight (marginal weather, poorly lit terrain, over water)
 - c. Personal weather minimums
6. Vortex ring state
(Ref SNs 22 & 34)
 - a. Causes
 - b. Recognition
 - c. Vuichard/Traditional Recovery
7. Dynamic Rollover
(Ref SN 9)

COMPLETION STANDARDS

This lesson will be complete when the student understands the importance of these areas in preventing helicopter accidents.

INSTRUCTOR'S COMMENTS AND RECOMMENDATIONS:

GROUND TRAINING**LESSON 4**

0.5 Hour

OBJECTIVES

During this lesson the student will learn the proper R66 preflight procedure.

LESSON CONTENT

1. Use of checklist
2. Preflight procedures
3. Cautions

COMPLETION STANDARDS

This lesson will be complete when the student can properly preflight an R66.

INSTRUCTOR'S COMMENTS AND RECOMMENDATIONS:

GROUND TRAINING**LESSON 5**

0.5 Hour

OBJECTIVES

During this lesson the student will complete the R66 Qualification written examination.

LESSON CONTENT

1. Written examination
2. Test correction
3. Explanations

COMPLETION STANDARDS

This lesson and the ground training will be complete when the student scores 80% on the written examination.

INSTRUCTOR'S COMMENTS AND RECOMMENDATIONS:

NOTES:

FLIGHT TRAINING**LESSON 1**

1.0 Hour

OBJECTIVES

During this lesson the student will be introduced to the normal flight maneuvers in the R66. Touchdown autorotations will be at the discretion of the instructor considering the appropriate regulatory requirements.

LESSON CONTENT

1. Before engine starting
2. Engine starting
3. Engine run-up
4. Air work
 - a. Straight & level
 - b. Turns
 - c. Climbs/descents
5. Hovering maneuvers
 - a. Forward, rearward, sideward
 - b. Hovering turns
6. Takeoffs
 - a. To a hover
 - b. Normal takeoff
 - c. Maximum performance takeoff
7. Approaches
 - a. Normal approach
 - b. Steep approach
 - c. Shallow approach
8. Landings
 - a. From a hover
 - b. Slope landings
 - c. Running landings
9. Traffic patterns
10. Practice Autorotations
 - a. Straight in autorotations
 - i) Power recovery
 - ii) Touchdown
 - b. Hovering autorotations
11. Engine shutdown

COMPLETION STANDARDS

This lesson will be complete when the student has been introduced to the normal R66 flight maneuvers.

INSTRUCTOR'S COMMENTS AND RECOMMENDATIONS:

FLIGHT TRAINING**LESSON 2**

1.0 Hour

OBJECTIVES

During this lesson the student will be introduced to advanced autorotations, reacting to engine failures, vortex ring state recognition/recovery, and hydraulic off landings.

LESSON CONTENT

1. Review normal maneuvers from lesson 1
2. 180° autorotations
3. Maneuvering in autorotation (enhanced autorotation procedures)
 - a. Turns
 - b. Varying airspeed
 - c. Using pedals
4. Simulated engine failure (forced landing)
5. Vortex ring state
 - a. Causes
 - b. Recognition
 - c. Vuichard/traditional recovery
6. Hydraulic OFF approach and landing

COMPLETION STANDARDS

This lesson will be complete when the student is proficient at each of the flight tasks listed.

INSTRUCTOR'S COMMENTS AND RECOMMENDATIONS:

FLIGHT TRAINING**LESSON 3**

1.0 Hour

OBJECTIVES

This lesson will be a review of all maneuvers.

LESSON CONTENT

1. Review all maneuvers as necessary and provide additional instruction in areas where proficiency is lacking.

COMPLETION STANDARDS

This lesson will be complete when the student is proficient at all maneuvers in the R66.

INSTRUCTOR'S COMMENTS AND RECOMMENDATIONS:

FLIGHT TRAINING**LESSON 4**

1.0 Hour

OBJECTIVES

During this lesson the student will be introduced to off airport operations in the R66 and the importance of proper preflight planning.

LESSON CONTENT

1. Off airport operations
2. Proper preflight planning
(Ref SNs 15, 26 & 43)

COMPLETION STANDARDS

At the completion of this lesson the student will be proficient at off airport operations in the R66 and the importance of proper preflight planning.

INSTRUCTOR'S COMMENTS AND RECOMMENDATIONS:

FLIGHT TRAINING**LESSON 5**

1.0 Hour

OBJECTIVES

The object of this lesson is for the instructor to determine the student's ability to safely act as pilot in command in an R66. Use of the R66 Pilot Qualification Flight Checklist may be helpful to the instructor.

LESSON CONTENT

1. Normal maneuvers
2. Autorotations
3. Vortex ring state—Vuichard/Traditional Recovery
4. Hydraulics OFF landings

COMPLETION STANDARDS

At the completion of this lesson the student will demonstrate the ability to safely act as pilot in command in an R66. Standards found in the appropriate FAA Private/Commercial Practical Test Standards or foreign agency equivalent will be used to determine satisfactory flight proficiency.

INSTRUCTOR'S COMMENTS AND RECOMMENDATIONS:

NOTES:

R66 PILOT QUALIFICATION FLIGHT CHECKLIST

Pilot Name _____ Instructor _____ Date _____

- Awareness training if applicable
- Engine starting/run-up
- Air work
- Hovering Maneuvers
- Takeoffs:
 - To a hover
 - Normal Takeoff
 - Maximum performance takeoff
- Approaches:
 - Normal approach
 - Steep approach
 - Shallow approach
- Landings:
 - From a hover
 - Slope landing
 - Running Landing
 - Hydraulics OFF landing
- Autorotations—power recovery and/or touchdown:
 - Hovering autorotation
 - Straight-in
 - 180° Autorotation
 - Simulated engine failure
- Vortex ring state recovery:
 - Traditional
 - Vuichard
- Engine shut down

A recommended endorsement following completion of written examination and flight checklist is found at the end of Chapter 1 of this guide. It is the instructor's responsibility to insure satisfactory knowledge and proficiency prior to issuing the endorsement.

NOTES:

APPENDIX 1**R66 PILOT QUALIFICATION WRITTEN EXAMINATION**

In an effort to maximize the student's familiarity with the use of the Pilot's Operating Handbook in locating information, the POH may be used during the test. As changes to the POH occur, test questions may not be updated in a timely matter; consequently, a current POH will take precedence.

1. The R66's RR300 engine has a normal rating of 300 BHP but is derated to:
 - a. 210 BHP for maximum continuous power
 - b. 270 BHP five minute takeoff power
 - c. 250 BHP five minute takeoff power
 - d. 195 BHP for maximum continuous power

2. The maximum gross weight is:
 - a. 2000 lbs
 - b. 2200 lbs
 - c. 2600 lbs
 - d. 2700 lbs

3. The Vne above 2200 lbs is:
 - a. 140 KIAS
 - b. 100 KIAS
 - c. 130 KIAS
 - d. 115 KIAS

4. The Vne in autorotation is:
 - a. 100 KIAS
 - b. 120 KIAS
 - c. 130 KIAS
 - d. 115 KIAS

5. When operating at power above maximum continuous power (83% torque) the Vne is:
 - a. 120 KIAS
 - b. 130 KIAS
 - c. 110 KIAS
 - d. 65 KIAS

6. The maximum weight per seat is:
 - a. 240 lbs
 - b. 300 lbs
 - c. 260 lbs
 - d. There is no limit

7. The maximum MGT for starting is:
 - a. 927° C
 - b. 810° C
 - c. 782° C
 - d. 706° C

8. Low-G cyclic pushovers are:
 - a. Permitted at low airspeeds
 - b. Prohibited
 - c. Prohibited at weights above 2200 lbs
 - d. Permitted at all airspeeds

9. In a standard R66 configuration it is acceptable to solo from the right and left seats.
 - a. True
 - b. False

10. The torque limits are:
 - a. 83% continuous/100% 5 minute limit
 - b. 100% continuous/105% 5 minute limit
 - c. 90% continuous/110% 5 minute limit
 - d. 90% continuous/100% 5 minute limit

11. The R66 fuel usable capacity without the aux fuel tank installed is:
 - a. 73.6 US gallons (279 liters)
 - b. 50.1 US gallons (190 liters)
 - c. 45.6 US gallons (176 liters)
 - d. 65.2 US gallons (247 liters)

12. Maximum glide distance configuration is:
 - a. 55 KIAS/97% rotor RPM
 - b. 55 KIAS/90% rotor RPM
 - c. 90 KIAS/97% rotor RPM
 - d. 90 KIAS/90% rotor RPM

13. If a total loss of tail rotor thrust occurs, the pilot should:
 - a. Reduce power and perform a running landing
 - b. Immediately enter autorotation
 - c. Land as soon as practical
 - d. Continue normal flight

14. The low fuel warning light comes on when there is approximately _____ remaining:
 - a. One gallon/6 minutes
 - b. Two gallons/7 minutes
 - c. Five gallons/10 minutes
 - d. Four gallons/8 minutes

15. If the MR CHIP light comes on during flight and is accompanied by a grinding noise and an increase in vibration, the pilot should:
- Land as soon as practical
 - Land immediately
 - Continue flight
 - Pull MR circuit breaker and continue flight
16. If the fuel filter light illuminates accompanied by erratic engine operation, the pilot should:
- Land as soon as practical
 - Land immediately
 - Land at the nearest airport
 - Pull fuel filter circuit breaker
17. During starting the fuel cutoff knob should be pushed in at ___ N1:
- 5-10%
 - Above 15%
 - 20-25%
 - 25%
18. The low RPM warning light and horn comes on at:
- 90%
 - 95%
 - 97%
 - 100%
19. The Power Assurance Chart shows the:
- Max torque available
 - Max MGT available
 - Max MGT for a minimum specification engine to produce specified torque
 - Minimum MGT for a minimum specification engine to produce specified torque
20. Find the never exceed speed at 8000 feet pressure altitude/ + 20° C below 2200 lbs:
- 140 KIAS
 - 120 KIAS
 - 117 KIAS
 - 112 KIAS

Questions 21 and 22 require the use of the IGE/OGE Hover Ceiling vs. Gross Weight charts.

21. At a pressure altitude of 9000 ft, + 10° C, anti-ice and cabin heat off, find the maximum weight to hover IGE:
- 2550 lbs/1159 kg
 - 2600 lbs/1182 kg
 - 2650 lbs/1205 kg
 - 2700 lbs/1225 kg

22. At a pressure altitude of 10,000 ft, +0°C with engine anti-ice ON and cabin heat ON, find the maximum weight to hover OGE:
- 2250 lbs/1021 kg
 - 2650 lbs/1202 kg
 - 2450 lbs/1111 kg
 - 2700 lbs/1225 kg
23. Using the Climb Performance Chart, find the climb rate at 5000' PA, max continuous MGT (706° C), +10° C, 2700 lbs, anti-ice and cabin heat off:
- 1050 ft/min
 - 900 ft/min
 - 1200 ft/min
 - 1300 ft/min
24. The maximum baggage compartment weight is:
- 100 lbs/46 kg
 - 300 lbs/136 kg
 - 200 lbs/92 kg
 - 400 lbs/182 kg
25. If the Engine Monitoring Unit (EMU) detects an exceedance, when the EMU test button is depressed the EMU segment light will:
- Flash 4 times per second
 - Flash 1 time every 2 seconds
 - Flash 1 time every 4 seconds
 - Stay on until reset

R66 PILOT QUALIFICATION WRITTEN EXAMINATION**Answer Key**

1. b
2. d
3. c
4. a
5. d
6. b
7. a
8. b
9. b
10. a
11. a
12. d
13. b
14. c
15. b
16. b
17. b
18. b
19. c
20. d
21. d
22. a
23. a
24. b
25. a

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