ROBINSON
HELICOPTER COMPANY

EASA
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EASA Operational Suitability Data (OSD)
Flight Crew Data

R44

RTR 465

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Contents

Abbreviations / Acronyms

AC	Alternating Current
AMC	Acceptable Means of Compliance
ATR	Additional Type Rating
CPD	Common Procedure Document
DAU	Data Acquisition Unit
DC	Direct Current (electrical)
EASA	European Aviation Safety Agency
EDU	Electronic Display Unit
FADEC	Full Authority Digital Engine Control
FFS	Full Flight Simulator
FSTD	Flight Simulation Training Device
FTO	Flight Training Organization
GA/TU	Go Around / Transition Up
IEM	Interpretative and Explanatory Material
IFR	Instrument Flight Rules
IR	Instrument Rating
ITR	Initial Type Rating
MDR	Master Difference Requirements
MET-H	Multi Engine Turbine (Helicopter)
MFD	Multifunction Flight Display
MGT	Measured gas (turbine) temperature
MTOM	Maximum Takeoff Mass
NAA	National Aviation Authority
N/A	Not Applicable
OAT	Outside Air Temperature
ODR	Operator Differences Requirements
OEI	One Engine Inoperative
OEB	Operational Evaluation Board
OPS	Flight Operations
OTD	Other Training Device
PFD	Primary Flight Display
PFL	Practice forced landing
PIC	Pilot in Command
POH	Pilot’s Operating Handbook
RFM	Rotorcraft Flight Manual
RPM	Revolution per Minute
SEP(H)	Single Engine Piston (Helicopter)
SET(H)	Single Engine Turbine (Helicopter)
SPH	Single-Pilot Helicopter
TRI	Type Rating Instructor
TRTC	Type Rating Training Course

TRTO	Type Rating Training Organization
VFR	Visual Flight Rules
VNE	Velocity Never Exceed
VTOL	Vertical Take Off & Landing

Part-ARA	Annex VI to Commission Regulation (EU) No 290/2012 of 30 March 2012 amending Regulation (EU) No 1178/2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (as amended)
Part-ARO	Annex II to Commission Regulation (EU) No 965/2012 of 05 Oct 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (as amended)
Part-CAT	Annex IV to Commission Regulation (EU) No 965/2012 of 05 Oct 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (as amended)
Part-FCL	Annex I to Commission Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (as amended)
Part-ORA	Annex VII to Commission Regulation (EU) No 290/2012 of 30 March 2012 amending Regulation (EU) No 1178/2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (as amended)
Part-ORO	Annex III to Commission Regulation (EU) No 965/2012 of 05 Oct 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (as amended)
Part-SPA	Annex V to Commission Regulation (EU) No 965/2012 of 05 Oct 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (as amended)

1. General

1.1. Introduction

Where references are made to requirements and where extracts of reference texts are provided, these are at the amendment state at the date of evaluation or publication of this document. Users should take account of subsequent amendments to any references, in particular concerning requirement for civil aviation aircrew and air operations.

Determinations made in this document are based on the evaluations of specific configurations of aircraft models, equipped in a given configuration and in accordance with current regulations and guidance.

Modifications and upgrades to the aircraft evaluated require additional OSD assessment for type designation, training / checking / currency, operational credits, and other elements within the scope of the OSD evaluations.

In accordance with Commission Regulation (EU) No 69/2014 of 27 Jan 2014, the Operational Suitability Data contained in this document are identified as follows:

[M]…….Mandatory Operational Suitability Data, bearing the status of rule (see GM No 3 to 21A.15(d))

[AMC]…Non-mandatory Operational Suitability Data, bearing the status of Acceptable Means of Compliance (see GM No 3 to 21A.15(d))

1.2. Purpose and applicability

Data is being submitted by Robinson Helicopter in accordance with point 21.A.21(e) of Annex I to COMMISSION REGULATION (EU) No 69/2014 of 27 January 2014 for the R44 helicopter.

This document:

- Provides a general description of the R44
- Updates the Type Rating List for the R44 helicopter type
- Defines minimum syllabus for type rating training
- Defines Training Areas of Specific Emphasis (TASE)
- Defines differences training

2. Description of the R44

2.1. General

The Robinson R44 is a two or four-place, single main rotor, single piston-engine helicopter constructed primarily of metal. The primary fuselage structure is composed of welded steel tubing and riveted aluminum sheet. The tail cone is a monocoque structure in which aluminum skins carry most primary loads. Fiberglass and thermoplastics are used in secondary cabin structure and in various ducts and fairings. The cabin doors are also constructed of fiberglass and thermoplastics.

There are two R44 models; the R44 and R44 II. The primary difference between models is the use of a carbureted piston engine in the model R44, and a fuel injected piston engine in the model R44 II. There are several differences in aircraft systems that result from the difference in engine model.

There are additional commercial names given to the R44 as summarized below:

Commercial Name	Model	Description
Raven or Raven I	R44	Basic Carbureted R44
Raven II	R44 II	Fuel Injected R44 with increased power and gross weight.
Clipper or Clipper I	R44	R44 with either pop-out or fixed floats
Clipper or Clipper II	R44 II	R44 II with either pop-out or fixed floats
Cadet	R44	2-seat version of R44, fixed floats optional.

Note: Previous versions of this document included commercial name R44 Astro (Original R44 with electric trim system). The Astro is no longer supported by the factory and all should be out of service and/or converted to hydraulic controls.

2.2. Landing Gear

The helicopter is equipped with a skid-type landing gear. A spring and yield skid type landing gear is used. Most hard landings will be absorbed elastically. However, in an extremely hard landing, the struts will hinge up and outward as the center crosstube yields to absorb the impact. Slight yielding of the aft crosstube is acceptable. However, yielding which allows the tail skid to be within 76 cm (30 inches) of the ground when the helicopter is sitting empty on level pavement requires crosstube replacement.

2.3. Rotor Systems

The main rotor has two all-metal blades mounted to the hub by coning hinges. The hub is mounted to the shaft by a teeter hinge. The coning and teeter hinges use self-lubricated

bearings. Droop stops for the main rotor blades provide a teeter hinge friction restraint which normally prevents the rotor from teetering while starting or stopping. Pitch change bearings for each blade are enclosed in a housing at the blade root. The housing is filled with oil and sealed with an elastomeric boot. Each blade has a thick stainless steel spar at the leading edge which is resistant to corrosion and erosion. The skins are bonded to the spar approximately one inch aft of the leading edge. Blades must be refinished if the paint erodes to bare metal at the skin-to-spar bond line. Bond may be damaged if bond line is exposed.

The tail rotor has two all-metal blades and a teetering hub with a fixed coning angle. The pitch change bearings have self-lubricated liners. The teeter hinge bearings either have self-lubricated liners or are elastomeric. The tail rotor blades are constructed with aluminum skins and root fittings.

2.4. Drive System

A vee-belt sheave is bolted directly to the engine output shaft. Vee-belts transmit power to the upper sheave which has an overrunning clutch contained in its hub. The inner shaft of the clutch transmits power forward to the main rotor and aft to the tail rotor. Flexible couplings are located at the main gearbox input and at each end of the long tail rotor drive shaft.

The main gearbox contains a single-stage spiral-bevel gear set which is splash lubricated. Cooling ducts under the gearbox are connected to the top of the engine cooling scroll. The main gearbox is supported by four rubber mounts.

The long tail rotor drive shaft has no support bearings but has a lightly-loaded damper bearing. The tail gearbox contains a splash-lubricated spiral-bevel gear set. The tail gearbox output shaft is stainless steel to prevent corrosion.

2.5. Rotor Brake

The rotor brake system is used to stop the rotation of the rotor. The rotor brake is mounted on the aft end of the main gearbox and actuated by a cable connected to a pull handle located on the cabin ceiling. The brake must be released before starting the engine. When the brake is engaged, the starter is disabled.

2.6. Power Plant

- For the model R44: One Lycoming model O-540-F1B5 six-cylinder, horizontally-opposed, overhead-valve, air-cooled, carbureted engine with a wet sump oil system powers the helicopter. The engine is equipped with a starter, alternator, shielded ignition, two magnetos, muffler, oil cooler, and induction air filter.

A direct drive, squirrel cage style cooling fan mounted to the engine output shaft supplies cooling air to the cylinders and oil cooler via a fiberglass and aluminum shroud.

Induction air enters through an opening on the right side of the aircraft and passes through a flexible duct to the carburetor air box. A second flexible duct passes heated air from an exhaust-mounted scoop to the air box. A sliding valve controlled by the carburetor heat control adjusts the mix of cool and heated air, which then flows through the radial-flow air filter and up into the carburetor.

- For the model R44 II: One Lycoming model IO-540-AE1A5 six-cylinder, horizontally-opposed, overhead-valve, air-cooled, fuel-injected engine with a wet sump oil system powers the helicopter. The engine is equipped with a starter, alternator, shielded ignition, two magnetos, muffler, two oil coolers, oil filter, and induction air filter.

  A direct drive, squirrel cage style cooling fan mounted to the engine output shaft supplies cooling air to the cylinders and oil coolers via a fiberglass and aluminum shroud.

  Induction air enters through an opening on the right side of the aircraft and passes through a radial-flow air filter within the air box. Air then passes along a flexible duct, through the fuel control, and into the engine. A spring-loaded door in the air box automatically opens to bypass the filter with sheltered engine compartment air should contamination occur. Some power loss can be expected in this condition.

2.7. Fuel system

- **For the model R44:**

The fuel system is gravity-flow (no fuel pumps) and includes main and auxiliary tanks, a shutoff valve control located between the front seats, and strainer (gascolator). The fuel tanks have flexible bladders in aluminum enclosures. Fuel tank air vents are located inside the mast fairing.

- **For the model R44 II:**

The fuel system includes main and auxiliary tanks, a shutoff valve control located between the front seats, a strainer (gascolator), an engine-driven pump, and an auxiliary (electric) pump. The fuel tanks have flexible bladders in aluminum enclosures. Fuel tank air vents are located inside the mast fairing. A fuel return line allows pump supply in excess of engine demand to return to the fuel tanks.

The auxiliary pump primes the engine for starting and runs in flight to provide fuel pump redundancy. The engine will function normally with either the engine-driven or auxiliary (electric) pump operating.

The ignition switch prime (momentary) position operates the auxiliary fuel pump for priming prior to engine start. After start, the pump runs continuously as long as the engine has oil pressure and the clutch switch is in the engage position.

A pressure switch on the gascolator illuminates the fuel filter caution light if the strainer becomes contaminated. The continued operation with an illuminated filter caution light may result in fuel starvation. A pressure switch downstream of the auxiliary fuel pump illuminates the aux fuel pump caution light if auxiliary pump output pressure is low. When the clutch switch is disengaged, the auxiliary pump is off and the aux fuel pump caution light should be illuminated. Proper mechanical fuel pump function is indicated by normal engine operation after engine start prior to clutch switch engagement and before shutdown while clutch switch is disengaged.

- **For both models:**

Plunger-style drain valves are provided for the gascolator and for each fuel tank sump. The gascolator is located on the lower right side of the firewall and is drained by pushing up on the plastic tube which extends below the belly. Valves for both tanks are located inside the right cowl door below the auxiliary tank. Fuel samples are taken by extending the plastic tubes clear of the aircraft and pushing on the plungers. On newer helicopters, a glass tube stowed inside the upper, aft cowl door is provided which may be used to catch the fuel samples. Fuel should be sampled from all three locations prior to the first flight of the day and after refueling to verify no contamination and correct grade.

The fuel gages are electrically operated by float-type transmitters in the tanks. When the gages read E the tanks are empty except for a small quantity of unusable fuel. The low fuel caution light is actuated by a separate electric sender located on the bottom of the main tank.

The auxiliary tank is interconnected with the main tank and is located somewhat higher so it will become empty first while fuel still remains in the main tank. The fuel shutoff valve controls flow from both tanks to the engine.

2.8. Hydraulic system

Hydraulically-boosted main rotor flight controls eliminate cyclic and collective feedback forces. The hydraulic system consists of a pump, three servos, a reservoir and interconnecting lines. The pump is mounted on and driven by the main gearbox. A servo is connected to each of the three push pull tubes that support the main rotor swash-plate. The reservoir is mounted on the steel tube frame behind the main gearbox to the aft end of the main gearbox and includes a filter, pressure relief valve, and pilot-controlled pressure shut-off valve.

The pressure shut-off valve is solenoid-actuated and controlled by the hydraulic switch on the pilot's cyclic. The switch should be left on during helicopter shutdown and start up except during the hydraulic system check.

2.9. Electrical Power

For the model R44, a 14-Volt DC electrical system was standard on earlier production helicopters, but has been replaced by a 28-Volt electrical system. For the model R44 II the 28-Volt DC electrical system is standard. The battery is located either in the engine compartment, under the left front seat, or beneath the instrument console.

The circuit breaker panel is on the ledge just forward of the left front seat. The battery switch controls the battery relay which disconnects the battery from the electrical system.

An alternator control unit protects the electrical system from overvoltage conditions. The ammeter indicates current to the battery ("-" indicates discharge) An ALT caution light or ammeter discharge indication in flight indicates low voltage and possible alternator failure.

Later aircraft have an avionics master switch which controls power to the avionics bus. This allows all avionics to be switched on and off by a single switch.

2.10. Instrument Panel

Standard primary instruments include an airspeed indicator, engine and rotor dual tachometer, altimeter, manifold pressure gage, and magnetic compass. Engine gages include an ammeter, oil pressure, oil temperature, cylinder head temperature, and fuel quantity for main and aux tanks. Also standard are a clock, a digital outside air temperature gage, and a collective–activated hourmeter which may be used for recording time in service. Views of typical instrument panels are given in the applicable POH.

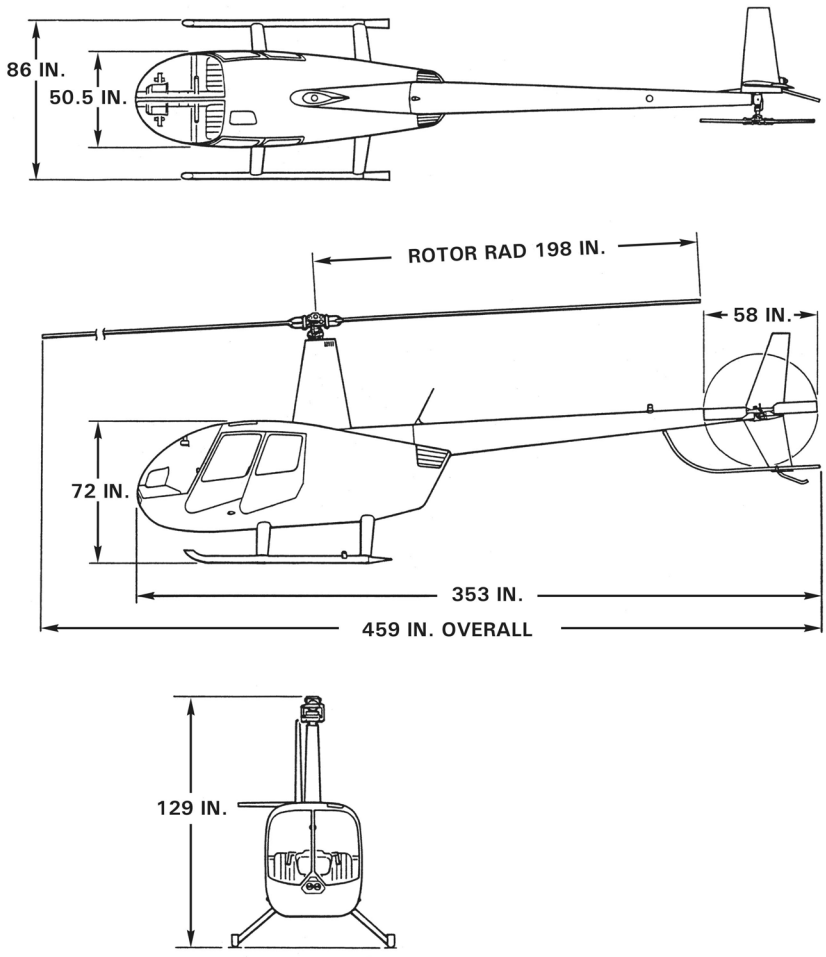
3. Aircraft Main Characteristics:

3.1. Summary

			R44		R44 II
			Cadet	Non-Cadet	
Dimensions	Fuselage	Length (maximum)	11659 mm (459 inches)		
		Width	1283mm (50.5 inches)		
		Height	3277 mm (129 inches)		
	Main rotor	Diameter	10058 mm (396 inches or 33 feet)		
	Tail rotor		147 mm (58 inches)		
Number of Main Rotor Blades			2		
Minimum Flight Crew	VFR		1		
	IFR		N/A		
Seating Capacity	Including Pilot Seats		2	4	
Engine(s)	Lycoming Model		O-540-F1B5		IO-540-AE1A5
	Max continuous power		185 BHP	205 BHP	205 BHP
	Takeoff (5-min) power		210 BHP	225 BHP	245 BHP
Fuel tanks	Tanks with bladders	Main usable	112 liters (29.5 US gallons)		
		Aux usable	64 liters (17.0 US gallons)		
		Combined usable	176 liters (46.5 US gallons)		
	Tanks without bladders	Main usable	116 liters (30.6 US gallons)		
		Aux usable	69 liters (18.3 US gallons)		
		Combined usable	185 liters (48.9 US gallons)		
Air Speed	Power ON	Absolute V_{NE}	120 KIAS	120 KIAS (130 KIAS below 998 kg)	
	Power OFF		100 KIAS		
	Recommended	Max Cruise	110 KIAS		
		Takeoff & Climb	60 KIAS		
		Max Climb Rate	55 KIAS		
		Max Range	100 KIAS*		
		Significant Turbulence	60 to 70 KIAS		
		Landing Approach	60 KIAS		
		Autorotation	60 to 70 KIAS*		
Rotor Speed	Power ON	Maximum	408 RPM		
	Power OFF	Minimum	360 RPM		
Maximum Operating	Density Altitude		14000 ft.		
Maximum gross weight			998 kg (2200 lb)	1089 kg (2400 lb)	1134 kg (2500 lb)

*Certain conditions may require lower airspeeds.
(Reading mode: column by column from the left to the right side →)

3.2. Exterior Dimensions



4. Operator Difference Requirement (ODR) Tables [M]

See Appendix 1

5. Optional Specific Equipment [AMC]

The following optional equipment installations require additional training:

- Fixed Floats
- Pop-out Floats
- Police Version
- ENG Version

Familiarization with optional equipment such as avionics and the autopilot should be made through self-study of manuals or online training material, as well as in-flight training.

6. Master Difference Requirement (MDR) Tables [M]

6.1. Difference Level Summary

Difference levels are summarized below for training, checking, and currency. This is a summary only and complete descriptions of difference levels for training, checking and currency are given in CS-FCD.

DIFFERENCE LEVEL TABLE

DIFFERENCE LEVEL	TRAINING	CHECKING	CURRENCY/ RECURRENT TRAINING
A	SELF INSTRUCTION	NOT APPLICABLE (OR INTEGRATED WITH NEXT PC)	NOT APPLICABLE
B	AIDED INSTRUCTION	TASK OR SYSTEM CHECK	SELF REVIEW
C	SYSTEMS DEVICES	PARTIAL CHECK USING DEVICE	DESIGNATED SYSTEM
D	MANEUVER DEVICES**	PARTIAL PC USING DEVICE*	DESIGNATED MANOEUVRE(S)
E	SIMULATOR C/D OR AIRCRAFT #	FULL PC USING SIMULATOR C/D OR AIRCRAFT*	AS PER REGULATIONS (TAKEOFFS & LANDINGS IN SIMULATOR C/D OR THE AIRCRAFT)

*IOE/SLF/LIFUS/line MAY BE REQUIRED ACCORDING TO REGULATIONS PC = PROFICIENCY CHECK

**FFS or aircraft may be used to accomplish specific manoeuvres

6.2. Training, Checking, and Recurrent Training difference requirements

AIRCRAFT TYPE		**FROM AIRCRAFT (base)**		
		R44	**R44 CADET**	**R44 II**
TO AIRCRAFT (candidate)	**R44**	n/a	A / A / A	A / A / A
	R44 CADET	A / A / A	n/a	A / A / A
	R44 II	A / A / A	A / A / A	n/a

7. Type Rating List and License Endorsement List [M]

7.1. Type Rating List

OSD updates the Type Rating List as follows:

- Type Rating List (Helicopters)

Manufacturer	Helicopter Model / Name	Differences	License Endorsement	Complex	OSD report
Robinson - SE Piston -	R44 R44 II		R44		X

8. Specification for Training

8.1. General

The Type Rating Training courses proposed by Robinson Manufacturer fulfilled the minimum requirements of EASA Air Crew Part-FCL. The assessment was based on the R44, Pilot Initial Type Rating Training syllabi.

The OSD defines pilot type rating training courses are divided into the following phases for approval in Approved Training Organizations (ATO) and also for operator specific training, provided the operator specific documentation is used throughout the course.

- Prerequisites for entry onto the specific course,
- Theoretical knowledge instruction syllabus and test summary,
- Helicopter flight training courses,
- Skill test.

8.2. Course pre-entry requirements

All candidates must fulfil the requirements of Part-FCL.725 for the issue of class and type ratings.

8.3. Licensing requirements

All students must fulfil the requirements of Part-FCL Appendix 9, Flight instruction and skill test.

The requirement of the issue of class and type rating for the R44 is defined as follows:

- for an Initial issue of a SEP(H), an approved flight instruction of at least:

Helicopter types	In Helicopter	In Helicopter and FSTD associated training Credits
SEP(H)	5h00	Using FFS level C/D: At least 2h00 helicopter and at least 6h00 total Using FTD level 2/3: At least 4h00 helicopter and at least 6h00 total

- for an additional issue of a SEP (H), an approved flight instruction of at least:

Helicopter types	In Helicopter	In Helicopter and FSTD associated training Credits
SEP(H) to SEP(H)	5h00	Using FFS level C/D: At least 2h00 helicopter and at least 6h00 total Using FTD level 2/3: At least 4h00 helicopter and at least 5h00 total

Note:

These requirements have to be considered as the bare minimum, additional training could be necessary depending on:

- Complexity of the aircraft type, handling characteristics, level of technology;
- Category of helicopter (SEP or SET helicopter, multi-engine turbine and multi pilot helicopter);
- Previous experience of the applicant.

8.4. Type Rating Training Program Summary

QUALIFICATION HELD	ITR	ATR
Single-Engine Piston→		√
Single-Engine Turbine →	√	
Multi-Engine Turbine →	√	
Total of theoretical knowledge instruction and test	9h00	7h30
Flight training	5h00	5h00

8.5. Theoretical knowledge syllabus and test summary [AMC]

Theoretical instruction should be provided in accordance with Part FCL Subpart H – Section 1 –FCL.725

The following sections present a summary of the material that an Initial and ~~A~~dditional Type Rating training program should consider. Training providers should ensure their type specific courses cover the pertinent material.

Initial and Additional Type Rating theoretical knowledge syllabus	ITR	ATR
Helicopter structure, engine, transmissions, electrical, fuel, rotors and equipment, normal and abnormal operation of the systems	4h00	3h30
Limitations (*)	0h30	0h30
Performance, flight planning and monitoring (*)	0h30	0h15
Weight and balance	0h30	0h15
Emergency procedures (*)	0h30	0h30
Awareness Training: low-G hazards (loss of control, mast bumping); and rotor RPM decay (energy management, blade stall).	1h00	1h00
Pilots pre-flight walk around, ground handling, equipment installation removal, pilots servicing (**)	1h00	0h30
Optional equipment	Additional	Additional
Total Theoretical Knowledge Syllabus	8h00	6h30
Theoretical examination session	1h00	1h00
TOTAL (HOURS)	9h00	7h30

Note:

(*) Theoretical instruction elements that can be covered during the ground training course and/or during flight training briefing phase.
(**) Instruction elements that can be covered during ground training course and/or during flight training briefing phase

8.6. Flight training course summary [AMC]

The following table indicates the minimum flight training required with and without regards to previous SEP experience. Each helicopter flight session could be extended or reduced at the discretion of the instructor, but the total minimum flight time is unchanged. Additional flight could be necessary at the discretion of the instructor if the trainee has not successfully demonstrated the ability to perform all maneuvers with a high degree of proficiency.

Type Rating Flight Training Syllabus	SEP ITR	ATR
Helicopter exterior visual inspection, cockpit inspection, starting procedures, pre-take off /landing procedures, taxiing, air taxiing, general handling, climbing/descending / turns, circuits.	1h15	1h15
Take off / landing various profiles including simulated maximum take-off mass, sloping ground / crosswind take off and landings.	1h15	1h15
Basic and advanced autorotations, recognition and recovery from low RPM, steep turns.	1h30	1h30
Abnormal & emergency procedures, hydraulics-off, governor-off, simulated instrument flight.	1h00	1h00
Total Flight Time	5h00	5h00
Skill Test	As required	As required

8.7. Training Areas of special emphasis (TASE) [M]

The following training procedures require special attention and should be read in conjunction with the R44 POH, Robinson Safety Notices(1) and the R22 Maneuver Manual found with the R22/R44 Flight Training Guide.

Training providers must comply with the following elements:

8.7.1. TASE / Training Methodology for Pilots and Instructors

- Liftoff
    - To avoid dynamic rollover, a two-step liftoff technique should always be used with just enough collective pulled to be light on the skids and equilibrium felt before the helicopter is then gently lifted into the air.
- Hovering
    - Hovering exercises should not be practiced close to the ground or obstacles, and maintaining a skid height of at least 1.5 m (5 feet) above the ground when practicing sideward or rearward flight.
- Autorotation / Autorotative landings
    - Autorotation training as detailed in Section 4 of the POH shall be conducted within gliding distance of a suitable landing area.
    - Autorotation training shall be performed with a trainee and an instructor only.
    - For the R44, when conditions conducive to carburetor icing are suspected, full carburetor heat must be applied prior to entry to an autorotation regardless of the carburetor air temperature gauge indication.
    - Practice autorotation entry
        - Collective lever should be lowered to the down stop and the throttle adjusted to give a small tachometer needle split. The throttle is then held fully closed to override the governor (inactive below 80%). To avoid inadvertent engine stoppage, the throttle should not be “chopped” and the engine must be recovered immediately if the engine is running roughly or the engine RPM continues to decrease.
        - To initiate the autorotation above 4000 ft in the R44, and 6000 ft in the R44 II, the throttle should be reduced slightly before lowering the collective to prevent engine overspeed.
        - Recommended airspeed of 60-70kts should be maintained with the RPM in the green.

- Power recovery procedure
  - At approximately 40ft AGL a cyclic flare should be commenced to reduce forward speed and rate of descent, and smoothly roll throttle full on to recover engine power.
  - At 8 feet AGL the aircraft should be levelled and collective applied to control descent.
- Autorotative landing
  - Practice autorotative landings to the ground should be performed in the same manner as a power recovery except the throttle should be kept closed throughout the maneuver. Always contact the ground heading straight ahead with skids level.
- Simulated Power Failure
  - Before simulating a power failure, it is critical that communication and understanding are established between instructor and student. To prevent the students from being surprised, they should be given a few minutes advance notice that a power failure will be simulated. The power failure should be loudly announced as the throttle is rolled off. The manifold pressure should be less than 21 inches and the throttle rolled off smoothly, never “chopped”.
- Simulated Hydraulic failure
  - A switch located on the top of the pilot's cyclic grip is used to simulate a loss of hydraulic system pressure. Use care not to switch hydraulics off inadvertently.
  - If switched off, hydraulics should always be re-engaged with a relaxed grip on the controls to prevent over-control. Avoid re-engaging hydraulics between hover and 100 ft AGL
  - Hydraulics-off hovering can be challenging. A landing site where a run-on landing can be made should be available.
- Low "G" Mast Bumping
  - Low-G cyclic pushovers are prohibited. Excessive rotor flapping can be caused by low-G Conditions leading to catastrophic rotor hub impact with mast, or blade impact with airframe.
  - Never attempt to demonstrate or experiment with low-G maneuvers regardless of pilot skill or experience level.
  - Avoid abrupt forward cyclic movements and initiate descent with collective.
  - In the event of inadvertent low-G condition, recover thrust by aft cyclic (to reload the disks) rather than lateral cyclic roll, then correct laterally.
  - Ensure smooth input on controls; not abrupt, full range, un-coordinated input.
  - Do not exceed 110 KIAS except in smooth air, and then only with caution. If turbulence is expected, reduce power and use a slower than normal cruise speed.(60-70 KIAS) Mast bumping is less likely at lower airspeeds. Firmly rest right forearm on right leg to prevent unintended control inputs. Allow aircraft to go with the turbulence then restore level flight with smooth, gentle control inputs.

- Low RPM Recognition and Recovery
  - Low RPM warning horn and light activates when RPM decays below 97%.
  - The recovery technique for low RPM condition is simultaneous lowering of the collective and rolling-on of the throttle.
  - In forward flight, aft cyclic may also be used to recover RPM
- Use of Carburetor Heat (R44 only)
  - When conditions conducive to carburetor icing are suspected, carburetor heat shall be applied. Carburetor ice can occur at OATs as high as 30°C. Even in generally dry air, local conditions such as a nearby body of water can be conducive to carburetor ice. When in doubt, assume conditions are conducive to carburetor ice and apply carburetor heat as required.
  - On aircraft equipped with the carb heat assist system, the control knob should be left unlatched unless it is obvious that conditions are not conducive to carburetor ice.
- Governor-off Flight
  - In normal operation, rotor speed is controlled through an engine governor. The governor senses engine RPM changes and applied corrective inputs to the throttle.
  - In the event of a governor failure, the pilot must monitor rotor speed and adjust the throttle as necessary to maintain the nominal rotor speed.
  - A “correlator” applies throttle changes to compensate for changes in collective control input and thereby reduces the amount of throttle adjustment necessary for the pilot to maintain the nominal rotor speed.
  - Note that governor-off flight is prohibited except for in-flight system malfunction or emergency procedures training.
- Initial Training Flights
  - Before allowing someone to manipulate the controls they should be fully briefed about the extreme sensitivity of the controls. They must be instructed to never make large or sudden control movement of the controls. The instructor must be prepared to instantly grip the controls should the student start to make a wrong move.
- High Winds or Turbulence Encounters
  - In accordance with Safety Notice SN-32, when encountering high winds or turbulence reduce power and fly at a slower than normal cruise speed (60-70 KIAS), avoid over control, and avoid flying on the downwind side of hills, ridges or tall buildings.

Notes: **[M]**

(1)An in-depth study of **all safety tips and safety notices** listed in the R44 and R44 II Pilot’s Operating Handbook is required.

9. Specification for Testing, Checking, Currency & Recent Experience

9.1. Skill test

As required by Part-FCL.725 (c).

9.2. Proficiency Checks

As required per FCL.740 and AMC FCL740(H)(a)(3)

9.3. Specification for Recent Experience

As required by Part FCL.060

9.4. Pre-Solo Requirement [M]

A person who does not hold a helicopter licence must have had a minimum of 20 hours of dual instruction in a Robinson R22 or R44 helicopter prior to operating it in solo flight. In addition, the person must obtain an endorsement from a flight instructor that the individual is proficient to solo a Robinson R44. This endorsement is valid for a period of 90 days. The dual instruction must include the following abnormal and emergency procedures flight training:

(i) Enhanced training in autorotation procedures,

(ii) RPM control without the use of the governor, and

(iii) Low rotor RPM recognition and recovery.

9.5. Flight Instructor Pre-Requites [M]

A flight instructor may provide instruction in a Robinson R44 only if that instructor--

(i) Has completed all of the training in paragraph 8.5;

(ii) Has the following minimum flight hours:

At least 200 flight hours in helicopters including --

At least 50 flight hours in the R22, R44, or a combination thereof; or

At least 50 flight hours in Robinson helicopters at least 15 of which are in the R44;

(iii) Has completed flight training in a Robinson R44 on the following abnormal and emergency procedures--

(a) Enhanced training in autorotation procedures;

(b) RPM control without the use of the governor; and

(c) Low rotor RPM recognition and recovery.

10. Specification for Flight Simulation Training Devices

No FSTD's exists at the time of publication of this document.

11. Appendices

Appendix 1: ODR tables

ODR Tables

Definitions used in the ODR Tables:
X = Flight Manual/Pilot's Operating Handbook and/or FM Supplement
AI = Aided Instruction
CBT = Computer Based Training
ICBT = Interactive Computer Based Training
FTD = Flight Training Device (Level 1 to 7)
FBS = Fixed Base Simulator (Level 5 to 7)
FFS = Full Flight Simulator (Level A, B, C, D)

OPERATOR DIFFERENCE REQUIRMENTS TABLE										
Difference Helicopter: R44 II Base Helicopter: R44				Compliance Method						
Design Feature	Remarks	Flight Characteristics	Procedures Change	Training				Chk/Curr		
				LVL A	LVL B	LVL C	LVL D	Chk	Curr	
Engine	Fuel injected engine replaces carbureted.	None	Minor: Starting procedures.	X				N/A	N/A	
Maximum Gross Weight	Increase from 1098 kg to 1134 kg	None	Minor: Weight & Balance	X				N/A	N/A	
Engine Power	Takeoff (5-min) increased from 225 hp to 245 hp	None	Minor: Limitations	X				N/A	N/A	
Difference Helicopter: R44 Cadet Base Helicopter: R44				Compliance Method						
Design Feature	Remarks	Flight Characteristics	Procedures Change	Training				Chk/Curr		
				LVL A	LVL B	LVL C	LVL D	Chk	Curr	
Maximum Gross Weight	Decrease from 1098 kg to 998 kg	None	Minor: Weight & Balance	X				N/A	N/A	
Engine Power	Max continuous decreased from 205 hp to 185 hp	None	Minor: Limitations	X				N/A	N/A	
	Takeoff (5-min) decreased from 225 hp to 210 hp	None	Minor: Limitations	X				N/A	N/A	