ROBINSON
HELICOPTER COMPANY

EASA
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Flight Crew

R22

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Abbreviations / Acronyms

AMC	Acceptable Means of Compliance
ATR	Additional Type Rating
EASA	European Aviation Safety Agency
FFS	Full Flight Simulator
ITR	Initial Type Rating
MDR	Master Difference Requirements
N/A	Not Applicable
OAT	Outside Air Temperature
ODR	Operator Differences Requirements
OSD	Operational Suitability Data
POH	Pilot's Operating Handbook
RPM	Revolution per Minute
SEP	Single Engine Piston

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. Introduction

This document provides the requirements for pilot training, checking, and currency specific to the R22 type rating. The requirements herein apply only when the pilot is subject to EASA rules.

The operational suitability data addresses:

- Aircraft Type Designation and Pilot License Endorsement
- Pilot Initial Type Rating Training “minimum syllabus” (ITR)
- Additional Type Rating Training “minimum syllabus” (ATR)
- Training areas of special emphasis (TASE)

Where references are made to requirements and where extracts of reference texts are provided, these are at the amendment state at the date of 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.

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 (OSD), bearing the status of rule (see GM No 3 to 21A.15(d))

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

General information on the operation of the R22 is included in R22 Pilot’s Operating Handbook available on the Robinson web site www.robinsonheli.com.

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

There are several models of the R22 but there are sufficient similarities for flight training purposes that only two variants are defined for the purpose of Operator Difference Requirements. The models covered by this document are as follows:

Model Name	Commercial Name	ODR Reference	Engine	Description
R22	R22	Base	O-320-A2B or O-320-A2C	Original. 590 kg (1300 lb) max gross weight. Engine rated at 150 BHP, derated by RHC to 124 BHP.
	R22 HP		O-320-B2C	As above, but with engine rated at 160 BHP
R22 Alpha	R22 Alpha		O-320-B2C	621 kg (1370 lb) max gross weight. Engine rated at 160 BHP, derated by RHC to 124 BHP.
R22 Beta	R22 Beta		O-320-B2C	As above, but with added takeoff power rating of 131 BHP.
	R22 Beta II		O-360-J2A	As above but with engine derated by Lycoming to 145 BHP, derated by RHC to 124 BHP, 131 BHP takeoff.
R22 Mariner	R22 Mariner	Variant	O-320-B2C	Same as R22 Beta, but with fixed floats
	R22 Mariner II		O-360-J2A	Same as R22 Beta II, but with fixed floats

The ODR table is given in appendix 1.

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

3.1. Difference Level Summary

Difference levels are summarized in the table below for training, checking, and currency. This table is an extract 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

3.2. Training, Checking, and Recurrent Training difference requirements

	From Helicopter		
To Helicopter	Models	R22, R22 Alpha, R22 Beta	R22 Mariner
	R22, R22 Alpha, R22 Beta		A/B/B
	R22 Mariner	B/B/B	

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

4.1. Type Rating List

OSD updates the Class & Type Rating List as follows:

- Type Rating List (Helicopters)

Manufacturer	Helicopter Model / Name	Differences	License Endorsement	Complex	OSD FCD available	Remarks
Robinson - SE Piston -	R22 R22 Alpha R22 Beta R22 Mariner		R22		X	OSD FC Data available @ TC holder website: www.robinsonheli.com

5. Specification for Training

5.1. General

The Type Rating Training courses proposed by Robinson Helicopter Company fulfilled the minimum requirements of EASA Air Crew Part-FCL. The assessment was based on the R22, Pilot Initial Type Rating Training syllabi.

The OSD defined that 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.

5.2. Course pre-entry requirements

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

These Specifications for Training only apply to Type Ratings defined under Part-FCL, Subpart H. These specifications do not affect the LAPL requirements under Part-FCL Subpart B and there is no restriction on the use of the R22 for initial pilot training.

5.3. Licensing requirements

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

5.4. Type Rating Training Program Summary [AMC]

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

5.5. 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 Additional Type Rating training program should consider. Training providers should ensure their type specific courses cover the pertinent material. A

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

5.6. 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, governor-off, simulated instrument flight.	1h00	1h00
Total Flight Time	5h00	5h00
Skill Test	As required	As required

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

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

Training providers must comply with the following elements:

5.7.1. 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.
  - 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 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 1 inches and the throttle rolled off smoothly, never “chopped”.
- **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.
  - 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**
  - 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 R22 Pilot’s Operating Handbook is required.

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

6.1. Skill test

As required by FCL.725 (c)

6.2. Proficiency Checks

As required by FCL.740H

6.3. Specification for Recent Experience

As required by FCL.060

6.4. 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 R22. 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.

6.5. Flight Instructor Pre-Requites [M]

A flight instructor may provide instruction in a Robinson R22 only if that instructor--

(i) Has completed all of the training in paragraph 5.5

(ii) Has a minimum of 200 flight hours in helicopters, a minimum of 50 flight hours of which were in the Robinson R22 or R44,

(iii) Has completed flight training in a Robinson R22 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.

7. Optional Specific Equipment

Several instrument console layouts for the R22 exist, however all utilize standard analog gauges for the basic flight instruments. Familiarization with optional instruments and avionics equipment should be made through self-study of manuals or online training material.

8. Appendix

Appendix 1: ODR tables

ODR Tables

OPERATOR DIFFERENCE REQUIRMENTS TABLE						
Difference Helicopter: R22 Mariner Base Helicopter: R22, R22 Alpha, or R22 Beta				Compliance Method		
Design Feature	Remarks	Flight Characteristics	Procedures Change	Training	Checking	Currency
Float Landing Gear	Addition of fixed float landing gear.	Minor: Adverse roll characteristics. Operation on water.	Minor: Operation on water.	Level B: Aided Instruction	N/A	N/A
Difference Helicopter: R22 Beta with symmetric horizontal stabilizer* Base Helicopter: R22 Beta with asymmetric horizontal stabilizer				Compliance Method		
Design Feature	Remarks	Flight Characteristics	Procedures Change	Training	Checking	Currency
Horizontal stabilizer	Symmetric stabilizer mounted to lower tail cone forward of tail rotor replaces asymmetric stabilizer mounted at aft tail cone	None (Reduces right roll tendency in low-G (prohibited) flight conditions)	Minor: Pre-flight inspection	Level A: Self-instruction	N/A	N/A

*Level A training is also applicable for the R22 Beta with symmetric horizontal stabilizer as base helicopter and R22 Beta with asymmetric horizontal stabilizer as difference helicopter.