



## **OPERATIONAL EVALUATION REPORT**

### **AIRBUS HELICOPTERS DEUTSCHLAND GMBH**

#### **EC 135 / TWIN ENGINE FAMILY**

**(EC 135 P1, P2, P2+, P3, T1, T2, T2+, T3)**

#### **GRUPO DE AVALIAÇÃO DE AERONAVES – GAA**

BRAZILIAN AIRCRAFT EVALUATION GROUP

AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL

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# Approval

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# 1 General

## 1.1 Evaluation Team

### 1.1.1. First issue team members

Name	Task	Organization
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## 1.2 Acronyms

- AEO – All Engines Operative
- AFCS – Automatic Flight Control System (Autopilot)
- ATO – Approved Training Organization
- CDS – Cockpit Display System
- CPDS – Central Panel Display System
- EASA – European Aviation Safety Agency
- EFIS – Electronic Flight Instrument System
- FADEC – Full Authority Digital Engine Control
- FCDS – Flight Control Display System (digital flight instruments)
- FLI – First Limit Indicator
- FLM – Flight Manual
- FSTD – Flight Simulator Training Device
- GA – Go-Around
- GAA – Grupo de Avaliação de Aeronaves (Brazilian Aircraft Evaluation Group)
- IBF – Inlet Barrier Filter
- ICP – Instrument Control Panel
- IFR – Instrument Flight Rules
- IR – Instrument Rating
- IAC – Instrução de Aviação Civil (Civil Aviation Instruction)
- INSPAC – Inspetor de Aviação Civil (Civil Aviation Inspector)
- LBA – Luftfahrt-Bundesamt (German Aviation Authority)
- MDR – Master Difference Requirements
- MEGHAS – Thales Avionics Suite
- MEL – Minimum Equipment List
- MET – Multi Engine Turbine
- MMEL – Master Minimum Equipment List
- ODR – Operator Differences Requirements
- OEI – One Engine Inoperative
- OSD – Operational Suitability Data
- PIC – Pilot In Command
- POI – Principal Operations Inspector
- PPL – Private Pilot License
- P&W – Pratt & Withney (engines)
- RBAC – Regulamento Brasileiro de Aviação Civil
- RBHA – Regulamento Brasileiro de Homologação Aeronáutica
- TM – Turbomeca (engines)
- VFR – Visual Flight Rules

## 2 Introduction

### 2.1 Background

The evaluation was conducted by documentation analysis using the information provided by the manufacturer and the determinations of the Operational Suitability Data (OSD) – Flight Crew – Revision 1, issued by the European Aviation Safety Agency (EASA) on September 10<sup>th</sup>, 2015.

In case more detailed information is required, refer to the OSD mentioned above.

### 2.2 Objective

This report presents ANAC collection of results obtained from the operational evaluation of the aircrafts from the EC 135 family, EC 135 P1, P2, P2+, T1, T2, T2+ and T3.

### 2.3 Metodology

The documental analysis methodology used on this report implies that the GAA team did not get involved in any flight of the aircraft nor in any kind of training session.

Except for rating definition and some references to the Brazilian regulation - RBAC, all the technical data presented in this report are entirely based on the OSD approved by EASA.

### 2.4 Purpose

The purpose of this report is to:

- a. Provide a general description of all EC 135 Family;
- b. Define the Pilot Rating assigned for the aircraft from the EC 135 Family;
- c. Provide the Master Differences Requirements (MDR) for crews requiring differences qualification for mixed-fleet-flying; and
- d. Provide recommendations for training, checking and currency applicable to flight crew for the aircraft from the EC 135 family.



Nevertheless, the ANAC GAA does encourage POI 's, Managers, INSPAC 's and all the other staff from ANAC who will be involved with the operation of some helicopter from the EC135 family in Brazil to carry a deeper analysis before any operational authorization be given.

## **2.5 Applicability**

This report is applicable to:

- a. Brazilian operators of any of the aircraft from the EC 135 family who operate under the RBHA 91 and the RBAC 135 rules;
- b. Approved Training Organizations certified under Brazilian Regulations;
- c. Civil Aviation Inspectors (INSPAC) related to safety oversight of any of the aircraft from the EC 135 family;
- d. ANAC Principal Operations Inspectors (POIs) of operators of any of the aircraft from the EC 135 family.

## **2.6 Cancellation**

Not applicable.

## 3 General Description of EC 135 Family

### 3.1 Cockpit Versions

Two major cockpit versions are possible:

- **CDS** (Cockpit Display System) installed **up to SN 168 and for EC 135 P1 and T1 only**, a digital engine and systems information combined with analogue flight instruments (or optional EFIS)
- **CPDS** (Central Panel Display System) installed **SN 169 and up**, a multifunction screen display combined with analogue flight instruments (or optional FCDS – “MEGHAS”)

PS: When the manufacturer changed its name from Eurocopter Group to Airbus Helicopters in 2014 the trade names of some products were changed (applied by 1 January 2016) to reflect this. Therefore, the following equivalence must be used in this report:

Previous trade name	New trade name
EC 135 T3/P3	H135

### 3.2 Engine Versions

Depending on the designators on the FLM, respective engine versions are installed:

- EC 135 P1 equipped with Pratt & Whitney PW 206 B engines
- EC 135 P2 equipped with Pratt & Whitney PW 206 B2 engines
- EC 135 P2+ equipped with Pratt & Whitney PW 206 B2 engines
- EC 135 P3 equipped with Pratt & Whitney PW 206 B3 engines
- EC135 T1 equipped with Turbomeca ARRIUS 2B1, 2B1A or 2B1A - 1engines
- EC135 T2 equipped with Turbomeca ARRIUS 2B2 engines
- EC135 T2+ equipped with Turbomeca ARRIUS 2B2 engines

- EC135 T3 equipped with Turbomeca ARRIUS 2B2 engines

For Version P1 and T1 the general maximum take-off mass is 2720 kg.

With OPT 9-1-3 installed (enlarged control range) the MTOM is 2835 kg.

With OPT 9-2-19 (external cargo hook) both versions (P1 and T1) have a MTOM of 2900 kg.

For Version P2 and T2 the general maximum take-off mass is 2835 kg.

With OPT 9-2-19 (external cargo hook) both versions (P2 and T2) have a MTOM of 2900 kg.

For engine versions P2+ and T2+ the general maximum take-off mass is 2910 kg

With OPT 9-2-19 (external cargo hook) both versions (P2+ and T2+) have a MTOM of 2910 kg.

### 3.3 Flight Instrumentation

EC135 variants may be equipped with analogue flight instruments called

- **Analogue Cockpit** (or the Thales Avionics Suite)
- **MEGHAS** (including CPDS combined with FCDS and AFCS or Garmin 500h flight instrumentations)

During the evaluation it was decided that the design and training differences between the two possible flight instrumentations should be considered essentially as the same variant.

## 4 Helicopters Main Characteristics

### 4.1 Sum up of main characteristics of EC 135 Family

Variants			P1 CDS CPDS	P2	P2+	P3	T1 CDS CPDS	T2	T2 +	T3
Dimensions	Fuse- lage	Length	10,20 m	identical	identical	identical	identical	identical	identical	identical
		Width	1,56 m	Identical	identical	identical	identical	identical	identical	identical
		Height	3,51 m	identical	identical	identical	identical	identical	identical	identical
	Main Rotor	Diameter	10,20 m	identical	identical	10,40m	identical	identical	identical	10,40m
	Fene- stron		1,00 m	identical	identical	identical	identical	identical	identical	identical
Engines			Pratt & Whitney 206 B	Pratt & Whitney 206 B2	identical to P2	Pratt & Whitney 206 B3	Turbo- meca ARRIUS 2B1 or 2B1A 2B1A-1	Turbo- meca ARRIUS 2B2	identical to T2	identical to T2I
Fuel tanks			till SN 249 544 kg Later SN 568 kg	568 kg	Identical to P2	Identical to P2	till SN 249 544 kg Later SN 568 kg	568 kg	Identical to T2	Identical to T2
Air Speed	PWR ON	Abso- lute VNE	155 kt	identical	identical	Identical	identical	identical	identical	identical
	PWR OFF		OEI = 110 kt AR = 90 kt	identical	identical	identical	identical	identical	identical	identical
Rotor Speed	Power ON	AEO	100% + 4% / - 5%	100% + 4% / - 3%	identical	100% +5,5% / -3%	100% + 4% / - 5%	100% + 4% / - 3%	identical	100% +5,5% / -3%
	Power OFF	AEI	100 % + 12% - 15%	identical	identical	identical	identical	identical	identical	identical
Maximum Operating		PA	20 000 ft	identical	identical	identical	identical	identical	identical	identical
MTOW with Internal load			2720 kg but with OPT 9.1-3 2835 kg	2835 kg	2910 kg but with OPT 9.1-8 2950 kg	2980kg	2720 kg but with OPT 9.1-3 2835 kg	2835 kg	2910 kg but with OPT 9.1-8 2950 kg	2980kg
MTOW with external load			2900 kg	2910 kg	identical	2980kg	2900 kg	2910 kg	identical	2980kg
CAT A ops	DA	Clear Heli- port	8 000 ft	12 000 ft	identical to P2	identical to P2	8 000 ft	12 000 ft	identical to T2	identical to T2
		VTOL ops	5 000 ft	8 000 ft	identical to P2	identical to P2	8 000 ft	identical	Identical to T2	Identical to T2

Table 1 - (reading mode: column by column from the left to the right side)

## 4.2 Exterior Dimensions

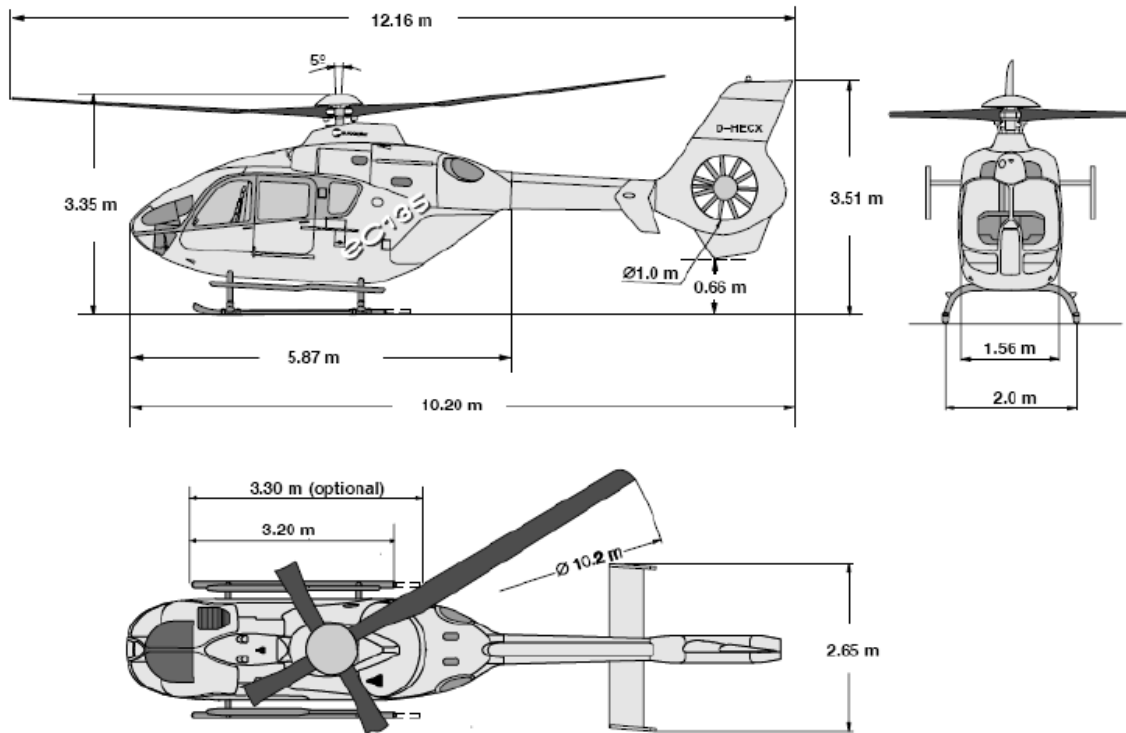


Figure 1 - Exterior dimensions EC 135 P1, P2, P2+, T1, T2, T2+

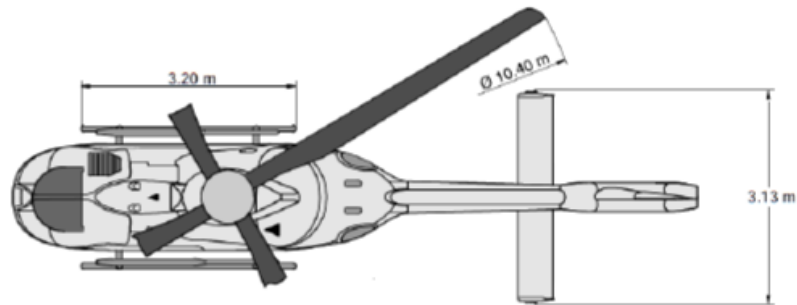


Figure 2 - Exterior dimensions EC 135 P3, T3

## 5 Pilot Rating

According to the RBAC 61 Amendment 06, all the EC135 family aircraft (P1, P2, P2+, P3, T1, T2, T2+, T3) require a multiengine helicopter class rating.

## 6 Master Difference Requirements (MDR)

The Master Difference Requirements matrix for the complete EC135 Family is shown in **Table 2**. These provisions are applied when there are differences between models which affect crew knowledge, skills, or abilities related to flight safety (e.g., Level A or greater differences) for training, checking and currency, respectively, according to IAC 121-1009.

		FROM HELICOPTER							
		P1 CDS/CPDS	P2	P2+	P3	T1 CDS/CPDS	T2	T2+	T3
TO HELICOPTER	P1 CDS/CPDS		A/A/A	A/A/A		D/D/D	D/D/D	D/D/D	
	P2	A/A/A		A/A/A		D/D/D	D/D/D	D/D/D	
	P2+	A/A/A	A/A/A			D/D/D	D/D/D	D/D/D	
	P3	D/D/D	D/D/D	D/D/D		D/D/D	D/D/D	D/D/D	A/A/A
	T1 CDS/CPDS	D/D/D	D/D/D	D/D/D			A/A/A	A/A/A	
	T2	D/D/D	D/D/D	D/D/D		A/A/A		A/A/A	
	T2+	D/D/D	D/D/D	D/D/D		A/A/A	A/A/A		
	T3	D/D/D	D/D/D	D/D/D	A/A/A	D/D/D	D/D/D	D/D/D	

**Table 2 - Master Difference Requirements**

Note:

These requirements are related to a standard EC135 with analogue instruments and do not include FCDS, AFCS or special NAV equipment like FMS. Such Systems are non-standard equipment but widely used and therefore (if applicable) taken into account in chapter 8 - Specification for Training, Checking and Currency.

Engine governing differences training related to FADEC operation and emergencies require a level “D” difference training, checking and currency:

The EC135 P1-CDS/CPDS, P2, P2+, P3, T1-CDS/CPDS, T2, T2+ and T3 are designated as variants of the “EC135 Family”.

## 7 Operator Difference Requirements (ODR)

To support the evaluation and the content of proposed minimum difference, additional and familiarization trainings, ODR tables have been developed and they can be directly requested to Airbus Helicopters.

However, these ODR tables are Airbus generic and therefore may not include items that are applicable to particular operators.

Each operator of a mixed fleet of aircrafts from the EC135 family shall produce its own ODR, as required by IAC 121-1009.



## 8 Specifications for Training, Checking and Currency

Specifications for training, checking and currency are detailed on OSD mentioned above.

The assessment is based on the EC135 Twin Engine Family Pilot Initial and Additional Type Rating Training syllabi, and as well the difference training between variants proposed by Airbus Helicopters Deutschland Training Academy approved by LBA Germany, and to training courses from other European ATOs' already approved by their national Authorities.

GAA recommends the pilot training syllabi to be divided into the following phases for approval in ATOs' and for air operators specific training, provided the air operator specific documentation is used throughout the course.

- Theoretical knowledge instruction and test summary
- Helicopter Flight training courses
- FSTD flight training courses (when available)
- Skill test

*Note: These recommendations 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;*
- *previous experience of the applicant; and*
- *availability and certifications of FSTDs.*

### 8.1 Airmen Minimum Experience for Initial Flight Training

#### 8.1.1 No previous experience on Multi-Engine Turbine (MET)

Candidates with no previous experience on Multi-Engine Turbine (MET) helicopter operation shall:

- Hold a valid Helicopter Pilot license;
- Hold a Single-Engine Piston / Turbine helicopter class rating;
- Have 70 Flight Hours as PIC;

- In case of a PPL(H) license holder, hold a Multi Engines Turbine pre-entry course;

### **8.1.2 Demonstrated Experience on Multi-Engine Turbine (MET)**

Candidates with demonstrated experience on Multi-Engine Turbine (MET) helicopter operation shall:

- Hold a valid Pilot license; and
- Hold a Multi-Engine Turbine Pilot Class or Type Rating.

### **8.1.3 Familiarization Training**

Candidates who wish to extent their rating to further variants of the same engine type, except EC 135 P3 and T3, must perform familiarization training as shown in chapter 6.

Familiarization training must emphasize the differences between the respective variants, e.g:

- Cockpit layout;
- Twist Grips;
- FADEC differences;
- Training mode;
- Overspeed protection system;
- FLM sections 2, 3, 4 5, 6 and section 9.1, if applicable.

## 8.2 Differences Training in between variants ( $\Delta 1$ to $\Delta 10$ )

		FROM HELICOPTER							
		P1 CDS/CPDS	P2	P2+	P3	T1 CDS/CPDS	T2	T2+	T3
TO HELICOPTER	P1 CDS/CPDS					$\Delta 4$	$\Delta 5$	$\Delta 6$	
	P2					$\Delta 4$	$\Delta 5$	$\Delta 6$	
	P2+					$\Delta 4$	$\Delta 5$	$\Delta 6$	
	P3	$\Delta 7$	$\Delta 7$	$\Delta 8$		$\Delta 7$	$\Delta 7$	$\Delta 8$	$\Delta 10$
	T1 CDS/CPDS	$\Delta 1$	$\Delta 2$	$\Delta 3$					
	T2	$\Delta 1$	$\Delta 2$	$\Delta 3$					
	T2+	$\Delta 1$	$\Delta 2$	$\Delta 3$					
	T3	$\Delta 7$	$\Delta 7$	$\Delta 8$	$\Delta 9$	$\Delta 7$	$\Delta 7$	$\Delta 8$	

**Table 3 - Difference training references**

- ( $\Delta 1$ ) From P1 CDS / CPDS to T1 CDS / CPDS, T2 or T2+
- ( $\Delta 2$ ) From P2 to T1 CDS / CPDS, T2 or T2+
- ( $\Delta 3$ ) From P2+ to T1 CDS / CPDS, T2 or T2+
- ( $\Delta 4$ ) From T1 CDS / CPDS to P1 CDS / CPDS, P2 or P2+
- ( $\Delta 5$ ) From T2 to P1 CDS / CPDS, P2 or P2+
- ( $\Delta 6$ ) From T2+ to P1 CDS / CPDS, P2 or P2+
- ( $\Delta 7$ ) From P1, P2, T1, T2 to T3 and P3
- ( $\Delta 8$ ) From P2+ or T2+ to T3 and P3
- ( $\Delta 9$ ) From P3 to T3
- ( $\Delta 10$ ) From T3 to P3

### 8.3 Initial & Difference training minimum syllabus summary

The training tables below summarize the minimum training hours required for VFR:

- Initial Training course (Table 4)
- Difference Training courses (Table 5, 6)

VFR Courses		No previous MET experience				Demonstrated MET experience			
Applying on		P1 CDS/CPDS, P2, P2+ or P3		T1 CDS/CPDS, T2, T2+ or T3		P1 CDS/CPDS, P2, P2+ or P3		T1 CDS/CPDS, T2, T2+ or T3	
Theoretical course (including theoretical exam)	Basic Helicopter	30h		30h		30h		30h	
Theoretical course (if applicable)	FCDS	5h		5h		5h		5h	
	AFCS	5h		5h		5h		5h	
	FMS/NAV	5h		5h		5h		5h	
FSTD/ SIM (as certified)		-	6h	-	6h	-	5h	-	5h
Helicopter		8h	4h	8h	4h	8h	3h	8h	3h
+ Skill test		required		required		required		required	

**Table 4 - Initial Training course VFR – I**

VFR Courses		Difference Courses					
FROM		$\Delta$ 1	$\Delta$ 2	$\Delta$ 3	$\Delta$ 4	$\Delta$ 5	$\Delta$ 6
		P1 CDS/CPDS, P2 or P2+			T1 CDS/CPDS, T2, T2+		
TO		T1 CDS/ CPDS	T2	T2+	P1 CDS/ CPDS	P2	P2+
Theoretical course (no exam)		3h			3h		
Theoretical course (if applicable)	FCDS	5h			5h		
	AFCS	5h			5h		
	FMS/NAV	5h			5h		
Helicopter		1h	1h	1h	1h	1h	1h
+ Skill test		N/A	N/A	N/A	N/A	N/A	N/A

**Table 5 – Difference Training Courses VFR – II**

VFR Courses		Difference Courses (continued)		
		$\Delta 7$	$\Delta 8$	$\Delta 9 / \Delta 10$
FROM		P1/T1 P2/T2	P2+/T2+	P3/T3 (*)
TO		P3/T3	P3/T3	P3/T3 (*)
Theoretical course (no exam)		3h	3h	3h
Theoretical course (if applicable)	FCDS	5h	1h	1h
	AFCS	5h	1h	1h
	FMS/NAV	5h	1h	1h
Helicopter		1,5h	1,5h	N/A
+ Skill test		N/A	N/A	N/A

**Table 6 – Difference Training courses VFR – III**

(\*) Pilots without any former experience on the other engine variant (P&W or TM) shall follow the requirements of  $\Delta 8$ .

## 8.4 Theoretical Knowledge Syllabus and Test Summary

### 8.4.1 Initial Training Course

The following sections present a summary of the material for an Initial Training Course.

Whilst based on the Airbus Helicopters Deutschland GmbH training programs, training providers should ensure their type specific courses cover the pertinent material.

Theoretical Knowledge Syllabus		P1 CDS/CPDS, P2, P2+ or P3		T1 CDS/CPDS, T2, T2+ or T3	
Helicopter structure, transmissions, rotors and equipment, normal and abnormal operation of the systems, analogue flight instruments		20h		20h	
Limitations (*)		1h		1h	
Performance, flight planning and monitoring		3h		3h	
Weight and balance, servicing		1h		1h	
Emergency procedures (**)		3h		3h	
Special requirements for helicopters fitted with (if applicable)	FCDS	N/A with analogue flight instruments	5h	N/A with analogue flight instruments	5h
	AFCS		5h		5h
	FMS/NAV		5h		5h
Optional equipment		In addition		In addition	
<b>Total Theoretical Knowledge Syllabus</b>		<b>28h</b>	<b>43h</b>	<b>28h</b>	<b>43h</b>
Theoretical examination session		2h	2h	2h	2h
<b>TOTAL</b>		<b>30h</b>	<b>45h</b>	<b>30h</b>	<b>45h</b>

**Table 7 - Initial training course theoretical knowledge syllabus**

(\*) basic FLM limitations, without optional equipment limitations

(\*\*) basic theoretical instruction elements are covered during the ground training course but all FLM Emergency procedures will be briefed during flight training briefing phase.

On completion of the theoretical knowledge training course for the basic helicopter, the trainee is assessed via a multiple-choice questionnaire covering the program for the basic helicopter. The threshold for passing is 75% of correct answers in the written examination on a range of multiple choice questions.

### 8.4.2 Initial Training Course EC135 variants (equipped with MEGHAS) for EC145 (BK117 C-2) qualified pilot

Theoretical Knowledge Syllabus for EC135 MEGHAS Cockpit		From EC145 (BK117 C-2)
Helicopter structure, transmissions, rotors and equipment, normal and abnormal operation of the systems		11,5h
Limitations		3h
Performance and flight planning		2h
Weight and balance		1h
Emergency procedures		3h
Special requirements for	FCDS	0h
	AFCS	0,5h
	FMS/ Garmin	0h
Optional equipment		In addition
<b>Total Theoretical Knowledge Syllabus</b>		<b>21h</b>
Theoretical examination		3h
<b>TOTAL</b>		<b>24h</b>

**Table 8 - Theoretical Knowledge Syllabus for EC135 MEGHAS Cockpit from EC145 (BK117 C-2)**

### 8.4.3 Initial Training Course EC135 MEGHAS for S365/EC155 qualified pilot (EC155 Variant only)

Theoretical Knowledge Syllabus for EC135 MEGHAS Cockpit		From EC155 Variant only
Helicopter structure, transmissions, rotors and equipment, normal and abnormal operation of the systems		20h
Limitations		1h
Performance and flight planning		3h
Weight and balance		1h
Emergency procedures		3h
Special requirements for	FCDS	1h
	AFCS	2h
	FMS/ Garmin	5h
Optional equipment		In addition
<b>Total Theoretical Knowledge Syllabus</b>		<b>36h</b>
Theoretical examination		3h
<b>TOTAL</b>		<b>39h</b>

**Table 9 - Theoretical Knowledge Syllabus for EC135 MEGHAS Cockpit from EC155 Variant**

#### 8.4.4 Difference training courses in between variants

Theoretical knowledge difference training in between variants		Δ 1	Δ 2	Δ 3	Δ 4	Δ 5	Δ 6
		P1 CDS / CPDS, P2 or P2+			T1 CDS / CPDS, T2 or T2+		
		T1 CDS CPDS	T2	T2+	P1 CDS CPDS	P2	P2+
Helicopter structure, transmissions, rotors and equipment, normal and abnormal operation of the systems, analogue flight instruments		1.5h	1.5h	1.5h	1.5h	1.5h	1.5h
Limitations (*)		--	--	--	--	--	--
Performance, flight planning and monitoring		0.5h	0.5h	0.5h	0.5h	0.5h	0.5h
Weight and balance, servicing		--	--	--	--	--	--
Emergency procedures (**)		1h	1h	1h	1h	1h	1h
Special requirements for helicopters fitted with; - if applicable -	FCDS	5h			5h		
	AFCS	5h			5h		
	FMS/NAV	5h			5h		
Optional equipment		In addition			In addition		
<b>TOTAL THEORETICAL KNOWLEDGE SYLLABUS</b>		<b>3h</b>	<b>3h</b>	<b>3h</b>	<b>3h</b>	<b>3h</b>	<b>3h</b>
Theoretical examination session		--	--	--	--	--	--
<b>TOTAL</b>		<b>3h</b>	<b>3h</b>	<b>3h</b>	<b>3h</b>	<b>3h</b>	<b>3h</b>

**Table 10 - Difference training courses in between variants – I**

(\*) basic FLM limitations, without optional equipment limitations

(\*\*) basic theoretical instruction elements are covered during the ground training course but all FLM Emergency procedures will be briefed during flight training briefing phase.



Theoretical knowledge difference training in between variants		Δ 7	Δ 8	Δ 9/ Δ 10
		P1/T1 P2/T2	P2+/T2+	P3/T3
		P3/T3	P3/T3	P3/T3
Helicopter structure, transmissions, rotors and equipment, normal and abnormal operation of the systems,		1.5h	1.5h	1.5h
Limitations (*)				
Performance, flight planning and monitoring		0.5h	0.5h	0.5h
Weight and balance, servicing				
Emergency procedures (**)		1h	1h	1h
Special requirements for helicopters fitted with:  (if applicable)	FCDS	5h	1h	1h
	AFCS	5h	1h	1h
	FMS/NAV	5h	1h	1h
Optional equipment		In addition		
<b>TOTAL THEORETICAL KNOWLEDGE SYLLABUS</b>		<b>3h</b>	<b>3h</b>	<b>3h</b>
Theoretical examination session		N/A	N/A	N/A
<b>TOTAL minimum</b>		<b>3h</b>	<b>3h</b>	<b>3h</b>

**Table 11 - Difference training courses in between variants – II**

(\*) basic FLM limitations, without optional equipment limitations

(\*\*) basic theoretical instruction elements are covered during the ground training course but all FLM Emergency procedures will be briefed during flight training briefing phase.

Note:

See 8.1.3 and 7 for the requirements of familiarization training.

## 8.5 Flight Training Course Summary (VFR)

### 8.5.1 Initial Training Course

Initial VFR Training Course	P1 CDS/CPDS, P2, P2+ or P3			T1 CDS/CPDS, T2, T2+ or T3		
	FSTD and Helicopter		Hel. only	FSTD and Helicopter		Hel. only
Helicopter & Flight Simulation Training Device (as certified)	FSTD (**)	H/C		FSTD (**)	H/C	
<b>Normal Procedures</b> Pre-flight, cockpit, engine start, shut down, hover manoeuvres (*)	1h	1h	1,5h	1h	1h	1,5h
Traffic circuits, normal and steep take-offs and landings						
Advanced flight manoeuvres like: characteristics of rigid rotors, quick stop, steep turn, max cruise and never exceed speed, HOGE						
Operational take-off/ landing like: slope and crosswind take-offs and landings						
<b>Emergency Procedures</b> OEI during cruise, landing and take-off	3h	1,5h	3,5h	3h	1,5h	3,5h
Autorotation from higher altitudes with demo of rotor characteristics and warnings						
Autorotation (*)						
Tail rotor failure/ tail rotor control failure FADEC failure (engine manual ops)						
<b>Flight with Max Gross Mass</b> Hover, limited power take-off and landing, steep take-offs and landings, OEI procedures	0,5h	--	0,5h	0,5h	--	0,5h
<b>Repetition</b> Normal and emergency procedures	0,75h	0,75h	1h	0,75h	0,75h	1h
<b>Additional equipment training</b> COM/NAV system, training mode ops, and FCDS (EFIS), AFCS (VFR ops)	0,75h	0,75h	1,5h	0,75h	0,75h	1,5h
<b>Total Flight Training</b>	10h		8h	10h		8h
<b>Skill Test</b>	required		required	required		required

**Table 12 - Initial VFR Training Course**

(\*) to be trained on helicopter only

(\*\*) for EC135/635 P3 + T3 use FFS (as certified) only

Note:

The flight training course corresponds to the basic aircraft certification, taking into account the type of license held and the experience of the candidate.

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.

Depending on the configuration of the helicopter used and on customer's request, additional flights may also be performed to enhance basic initial training (minimum syllabus).

### 8.5.2 Initial Training Course for pilots with demonstrated MET experience

Initial VFR Training Course (MET experience)	P1 CDS/CPDS, P2, P2+ or P3			T1 CDS/CPDS, T2, T2+ or T3		
	FSTD and Helicopter		Hel. only	FSTD and Helicopter		Hel. only
Helicopter & Flight Simulation Training Device (as certified)	FSTD (**)	H/C		FSTD (**)	H/C	
<b>Normal Procedures</b> Pre-flight, cockpit, engine start, shut down, hover manoeuvres (*)	0,75h	0,25h	1h	0,75h	0,25h	1h
Traffic circuits, normal and steep take-offs and landings						
Advanced flight manoeuvres like: characteristics of rigid rotors, quick stop, steep turn, max cruise and never exceed speed, HOGE						
Operational take-off/ landing like: slope and crosswind take-offs and landings						
<b>Emergency Procedures</b> OEI during cruise, landing and take-off	2h	1,5h	3,5h	2h	1,5h	3,5h
Autorotation from higher altitudes with demo of rotor characteristics and warnings						
Autorotation (*)						
Tail rotor failure/ tail rotor control failure FADEC failure (engine manual ops)						
<b>Flight with Max Gross Mass</b> Hover, limited power take-off and landing, steep take-offs and landings, OEI procedures	0,5h	--	0,5h	0,5h	--	0,5h
<b>Repetition</b> Normal and emergency procedures	0,75h	0,5h	1,25h	0,75h	0,5h	1,25h
<b>Additional equipment training</b> COM/NAV system, training mode ops, and FCDS (EFIS), AFCS (VFR ops)	1h	0,75h	1,75h	1h	0,75h	1,75h
<b>Total Flight Training</b>	8h		8h	8h		8h
<b>Skill Test</b>	required		required	required		required

**Table 13 - Initial VFR Training Course (MET experience)**

(\*) to be trained on helicopter only

(\*\*) for EC135 P3 + T3 use FFS (as certified) only

### 8.5.3 Initial Training Course EC135 MEGHAS for EC145 (BK117 C-2) qualified pilot

Initial VFR from EC145 (BK 117 C-2) to EC135 MEGHAS			
Helicopter & Flight Simulation Training Device (as certified)	FTD/FFS and Helicopter		Hel. only
	FTD/FFS	H/C	
Normal Procedures	0,75h	0,25h	1h
Emergency Procedures	1,75h	0,75h	2h
Max AUW Flight	--	0,5h	0,5h
Repetition	0,5h	0,5h	0,5h
Additional equipment training	0,75h	0,25h	1h
<b>Total Flight Training</b>	<b>6h</b>		<b>5h</b>
<b>Skill Test</b>	required		required

**Table 14 - VFR from EC 145 (BK 117 C-2) to EC 135 MEGHAS**

### 8.5.4 Initial Training Course EC135 MEGHAS for AS365/EC155 qualified pilot (EC155 Variant only)

Initial VFR from EC155 Variant only to EC135 MEGHAS			
Helicopter & Flight Simulation Training Device (as certified)	FSTD and Helicopter		Hel. only
	FSTD	H/C	
Normal Procedures	0,75h	0,25h	1h
Emergency Procedures	1,75h	0,75h	2h
Max AUW Flight	--	0,5h	0,5h
Repetition	0,5h	0,5h	0,5h
Additional equipment training	0,75h	0,25h	1h
<b>Total Flight Training</b>	<b>6h</b>		<b>5h</b>
<b>Skill Test</b>	required		required

**Table 15 - VFR from EC 155 Variant only to EC 135 MEGHAS**

### 8.5.5 CAT A Training procedures

For Operations in hostile and congested environment CAT A profiles, based on the section 9.1-1 of the respective FLM have to be used.

Such OPS requirements are an addition to the standard training course or may be taught as an individual course in addition to the initial training course:

CAT A procedures - VFR Training Course				
	P1 CDS/CPDS, P2, P2+ or P3		T1 CDS/CPDS, T2, T2+ or T3	
Helicopter & Flight Simulation Training Device (as certified)	FSTD	Hel. only	FSTD	Hel. only
<u>CAT A procedures</u> Take-off and landing. AEO and OEI procedures	2h	2h	2h	2h
<b>Total Flight Training</b>	<b>2h</b>	<b>2h</b>	<b>2h</b>	<b>2h</b>
<b>Skill Test</b>	Not required	Not required	Not required	Not required

**Table 16 - CAT A Procedures**

### 8.5.6 Difference Training

Difference Training										
FROM	Δ 1	Δ 2	Δ 3	Δ 7	Δ 8	Δ 4	Δ 5	Δ 6	Δ 7	Δ 8
	P1 CDS / CPDS, P2, P2+			P1, P2	P2+	T1 CDS / CPDS, T2, T2+			T1, T2	T2+
TO	T1 CDS CPDS	T2	T2+	P3/T3		P1 CDS CPDS	P2	P2+	P3/T3	
<b>Helicopter</b>	Helicopter and/or FSTD			Helicopter and FFS		Helicopter and/or FSTD			Helicopter and FFS	
<b>Normal Procedures</b> Pre-flight, cockpit, engine start, Shut down, hover characteristics (*)	0.25h			0.25h		0.25h			0.25h	
<b>Emergency Procedures</b> OEI during cruise, landing and takeoff, FADEC failure, autorotation (*)	0.75h			1.25h	0.75h	0.75h			1.25h	0.75h
Special requirements for helicopters fitted with; - if applicable -	FCDS	0.5h			0.5h					
	AFCS	0.5h			0.5h					
	FMS/ NAV	0.5h			0.5h					
<b>Total Flight Training</b>	1h			1.5h	1h	1h			1.5h	1h
<b>Skill Test</b>	Not required					Not required				

(\*) to be trained on helicopter only

The Difference Training for Δ 7 and Δ 8 is equal to the difference training Δ 1, 2 3.

In addition the emphasis during the difference training Δ 7 and Δ 8 must lay on the following:

- limits of the training mode
- different handling qualities for hover maneuvers
- different IBF if applicable and the Garmin GTN750

For Difference training, the previous experience of the applicant should be considered and the extent of the training should be based upon these minimum training syllabi.

Special requirements - if applicable - FCDS, AFCS and FMS/NAV training means: only for applicants which do not have previous experience with these systems. The additional time represents training for VFR operations only.

After completing the training on the aircraft considered, the accomplishment shall be recorded on the applicant's flight log and signed by the flight Instructor.

### 8.5.7 Instrument Rating Extension

IR Extension Courses	No previous MET experience				Demonstrated MET experience			
	P1 CDS/CPDS, P2, P2+ or P3		T1 CDS/CPDS, T2, T2+ or T3		P1 CDS/CPDS, P2, P2+ or P3		T1 CDS/CPDS, T2, T2+ or T3	
Applying on								
Theoretical course	8h		8h		8h		8h	
FSTD/ SIM (only FCDS/ AFCS cockpit)	-	3h	-	3h	-	3h	-	3h
Helicopter	5h	2h	5h	2h	5h	2h	5h	2h
<b>Total Flight Training</b>	5h		5h		5h		5h	
Skill test	required		required		required		required	

**Table 17 - IR Extension**

IR extension courses are detailed and based on Airbus Helicopters Deutschland Training Academy Syllabus.

### 8.5.8 EC135 MEGHAS for EC145 (BK117 C-2) IR Extension

IR Extension from EC145 (BK117 C-2) to EC135 MEGHAS		
FSTD (FTD or FFS – as qualified)	2.5h	
Helicopter		2.5h
Skill Test	required	required

**Table 18 - IR Extension from EC145 (BK117 C-2) to EC135 MEGHAS**

### 8.5.9 EC135/635 MEGHAS for AS365/EC155 Variant only IR Extension

IR Extension from EC155 to EC135 MEGHAS		
FSTD (FTD or FFS – as qualified)	2.0h	
Helicopter		2.0h
Skill Test	required	required

**Table 19 - IR Extension from EC155 Variant only to EC135 MEGHAS**



## 8.6 Training Area of Special Emphasis (TASE)

The following procedures for training should receive special attention during initial and recurrent training.

The correct use of:

- manual engine operations
- OEI TNG and limitations, WAT chart and correct take-off / landing profiles.

Furthermore for the **FCDS / AFCS** cockpit, while it is considered to have high level of automation, to pay particular attention to the correct use of:

- ICP (Instrument Control Panel);
- FCDS displays, settings and emergencies;
- AFCS operation, especially upper modes and limitations;
- VFR/IFR approach procedures and limitations; and
- GA procedures;

### For EC135 P1/T1:

- Cockpit layout
- OEI performance calculation and training
- Main rotor system and Fenestron®
- Mast Moment indication system
- Flight control system
- FADEC procedures with the use of original Twist Grips
- Use of FLI, if equipped
- Use of AFCS and FCDS, if installed

### For EC 135 P2/ T2:

- Cockpit layout

- Use of CPDS
- Main rotor system and Fenestron®
- Mast Moment indication system
- Flight control system
- OEI performance calculation and training
- FADEC procedures
- Use of CAT A switch
- Use of AFCS and FCDS, if installed

**For EC 135 P2+/ T2+:**

- Cockpit layout
- Use of CPDS
- Main rotor system and Fenestron®
- Mast Moment indication system
- Flight control system
- OEI performance calculation and training
- Use of training mode
- Use of High NR switch
- FADEC procedures
- Use of AFCS and FCDS, if installed

**For EC 135 P3/ T3:**

- Differences in dimensions
- Cockpit layout
- Use of CPDS
- Main rotor system and Fenestron®
- Mast Moment indication system

- Flight control system
- IBF system, if installed – standard on P3
- AEO performance
- OEI performance calculation and training
- Use of training mode
- Use of High NR switch
- FADEC procedures
- Use of AFCS and FCDS, if installed

#### **8.6.1 Training area of special emphasis (TASE) for differences training between EC135/635 variants**

##### **Δ 1 + Δ 2 + Δ 3:**

- Engine design
- Fuel control system
- FADEC control
- FADEC indications, cautions and warnings; Emergency procedures
- Performance calculations

##### **Δ 4 + Δ 5 + Δ 6:**

- Engine design
- Fuel control system
- FADEC control
- FADEC indications, cautions and warnings; Emergency procedures
- Performance calculations

##### **Δ 7 + Δ 8:**

- Engine design

- Fuel control system
- FADEC control, including NR law differences
- FADEC indications, cautions and warnings;
- Emergency procedures
- Performance calculations
- Hover characteristics
- CPDS differences
- AFCS improvements
- Autorotation
- CAT A procedures

**Δ 9 + Δ 10:**

- Engine design
- Fuel control system
- FADEC control, including NR law differences
- FADEC indications, cautions and warnings; Emergency procedures
- IBF (Δ 10 only)

## 8.7 Currency Requirements and Checking

Pilots who have not flown such variants / engine versions for more than 24 months should be refreshed on these differences according to the table shown under item 6.

## **9 Compliance to RBHA 91 and RBAC 135**

The manufacturer did not provide compliance Checklists with RBHA 91 and RBAC 135.

## 10 Technical Publications

### 10.1 Master Minimum Equipment List - MMEL

Brazilian operators shall use the MMEL approved by EASA as a basis for developing their MEL. This document is available at EASA website, through the link:

<https://easa.europa.eu/document-library/master-minimum-equipment-lists>

### 10.2 Flight Manual - FLM

Brazilian operators shall use the FLM approved by GGCP/SAR as a basis for developing their Operator Helicopter Operations Manual.