



EASA Operational Suitability Data (OSD)

Flight Crew Data

480B

Enstrom Report 28-DO-377

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Revision Record

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Operational Evaluation Board

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Acronyms

AMC	Acceptable Means of Compliance
ATR	Additional Type Rating
EASA	European Aviation Safety Agency
FCD	Flight Crew Data
FCL	Flight Crew Licensing
FFS	Full Flight Simulator
FSTD	Flight Simulation Training Device
FTD	Flight Training Device
IFR	Instrument Flight Rules
ITR	Initial Type Rating
KIAS	Knots Indicated Air Speed
MDR	Master Difference Requirement
MTOM	Maximum Take-off Mass
MTOW	Maximum Take-off Weight
ODR	Operator Difference Requirement
OEB	Operational Evaluation Board
OSD	Operational Suitability Data
RPM	Revolution Per Minute
SEP	Single Engine Piston
SET	Single Engine Turbine
SPH	Single-Pilot Helicopter
SHP	Shaft Horsepower
TASE	Training Areas of Special Emphasis
TOT	Turbine Outlet Temperature
VFR	Visual Flight Rules
VNE	Velocity Never Exceed

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. Purpose and Applicability

Data is being submitted by Enstrom Helicopter Corporation to establish OSD FCD for the Enstrom 480B model.

2. Preamble

Where references are made to requirements and where extracts of reference text is 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 requirements for civil aviation aircrew and air operations.

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

Modifications and upgrades to the aircraft evaluated may 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))

3. General Description of Enstrom 480B

General

The Enstrom 480B is a five-place, single engine, turbine powered helicopter certified for day and night VFR flight that can be equipped for IFR flight. It is a conventional single main rotor/tail rotor configuration with energy absorbing skid landing gear. The main rotor is three-bladed, fully articulated and the tail rotor is a two bladed teetering design. The main and tail rotor blades are metal construction. The airframe comprises a fiberglass cabin with some aluminum structure, a welded steel tubular pylon which supports the cabin, landing gear, engine, transmission, and an aluminum semi-monocoque tailcone. The control system is a simple mechanical system with no hydraulics. The transmission is driven by the engine using a single "poly-v" belt with approximately a 2.33:1 reduction.

The engine is a Rolls-Royce 250-C20W turboshaft engine rated at 420 SHP. The 480B is transmission limited to 305 SHP Take-Off power and 277 SHP maximum continuous power. The 480B cabin is open with the pilot in command seat on the left. The right front seat can be located on either of two sets of seat tracks: on the outboard set of tracks, the aircraft is limited

to two or three place and dual controls can be installed; on the inboard set of tracks, the seat is farther forward and there is room to fold down a second row of seats for a total of five seats, but the second (dual) set of controls must be removed. The aircraft can also be operated with only the pilot seat, leaving the cabin open for cargo.

Fuselage

The fuselage is the forward section of the airframe extending from the nose to the forward end of the tailcone. The fuselage primarily consists of the keel assembly (two longitudinal beams with transverse bulkheads) which is attached to a welded steel tubular truss structure called the pylon. All of the major components of the aircraft are attached to the pylon. The keel assembly is the main supporting structure for the cabin and forward landing gear cross tube. The pylon forms the supporting structure for the cabin, fuel cells, transmission, engine, aft landing gear cross tube, and the tailcone. The cabin shell is of composite construction with reinforcing where necessary to add structural stiffness.

Tailcone

The tailcone is bolted to the aft end of the pylon. It is a tapered, semi-monocoque structure comprised of skins, bulkheads, longerons, and stringers. The tailcone supports the tail rotor, tail rotor transmission, horizontal and vertical stabilizers, and the tail rotor guard. It houses the tail rotor drive shaft and some electronic equipment.

Landing Gear

- a. Main Landing Gear: The main landing gear consists of two tubular aluminum skids attached to the airframe by means of the forward and aft cross tubes through four air-oil oleo struts. The struts cushion ground contact during landing and are part of the ground resonance prevention system. Drag struts give the gear stability and strength and prevent fore and aft movement during ground contact maneuvers. Replaceable hardened steel skid shoes are installed on each skid to resist skid wear on hard surfaces.
- b. Tail Rotor Guard: A tubular aluminum tail rotor guard is installed on the aft end of the tailcone. It acts as a warning to the pilot upon an inadvertent tail-low landing and aids in protecting the tail rotor from damage.
- c. Ground Handling Wheels: Each landing gear skid tube has provisions for installing ground handling wheel assemblies. Each assembly has a manually operated over-centering device to lift the skids clear of the ground. The ground handling wheels must be removed before flight.

Engine

The 480B helicopter is equipped with a Rolls-Royce 250-C20W free turbine, turboshaft engine rated at 420 SHP (313 kW). The takeoff rating (5 minute maximum) is 305 SHP (227 kW). The maximum continuous power is 227 SHP (206 kW).

Flight Controls

The flight controls comprise the three conventional primary systems: the collective, cyclic, and antitorque/directional controls. The flight control systems are not hydraulically boosted. The cyclic controls include an electric force trim system. The aircraft also has fixed horizontal and vertical stabilizers mounted on the tailcone to provide additional stability and attitude control during high speed flight.

Power Train

The power train includes the main rotor transmission, upper pulley, "H" - strut, drive belt, lower pulley, lower pulley drive shaft, overrunning clutch, power output drive shaft, tail rotor drive shaft, and the tail rotor gearbox.

Main Rotor

The main rotor assembly is a three bladed, high inertia, fully articulated rotor system.

Tail Rotor

The tail rotor assembly is a two bladed, wide cord, teetering, delta hinged rotor assembly.

Fuel System

The simple fuel system consists of two 45 gallon/170 liter bladder type fuel cells mounted either side of the main rotor transmission. The fuel bladders are filled with open cell foam panels which prevent the bladders from collapsing and prevent fuel sloshing as the aircraft attitude is changed. The fuel bladders have a total fuel capacity of 90 gallons/340 liters with a total of 1.7 gallons unusable fuel, 0.85 gallon/3.2 liter unusable fuel in each tank. Each bladder is housed in a composite fuel cell structure and is interconnected to the other bladder through a 2.0 inch/5.1 cm cross-feed line in the lower 1/3 of the fuel cell and a vent line. A main fuel feed line from the lowest point in each bladder interconnects through the main fuel shutoff valve in a "tee" to provide the fuel to the engine equally from each cell. The main fuel shutoff valve is manually operated from the cockpit. Each fuel cell is equipped with sump drains plus the system is equipped with a low point drain before the fuel enters the engine. The capacitance fuel quantity probe is mounted in the right hand fuel cell. The fuel filler cap is located in the top of the left hand fuel cell. The right hand cell is filled by cross-feeding action during gravity refueling.

Electrical System

The 480B helicopter is equipped with a 28-volt direct current electrical system. Electrical power is supplied by a 28-volt, direct current, 150 ampere*, engine driven starter-generator in conjunction with a 24-volt, lead acid battery. The aircraft may also be equipped with an optional NiCad battery. Control of the electrical system is provided by the MAIN GEN and BATT switches located at the top of the center pedestal panel. All circuits of the electrical system are protected by fuses, push-to-reset circuit breakers, or switch type circuit breakers. All circuits in the electrical system are single wire with common ground return. The negative terminals of the starter-generator and the battery are grounded to the helicopter pylon. The aircraft is also equipped with a non-resettable current limiter that protects the main bus in case of a direct short to ground. On aircraft S/N 5134 and subsequent, power is distributed from the main bus through a group of secondary buses; each one is also protected by a non-resettable current limiter. In the event of a complete electrical system failure, emergency electrical power, controlled by the N1-N2-NR-TOT switch, can be supplied to the gas producer tachometer (N1), dual tachometer (N2/NR), and TOT indicator.

* On aircraft prior to S/N 5134, the electrical system is limited to 110 amperes. On aircraft S/N 5134 and subsequent, the electrical system is limited to 150 amperes. Power output is monitored via the Volt-Ammeter Indicator.

Flight Instruments

The aircraft is equipped with an airspeed indicator, altimeter, outside air temperature indicator, and magnetic compass. The aircraft can be equipped with optional instruments to meet individual requirements.

Annunciator Panel

The annunciator panel is located on the instrument panel. It consists of caution lights and warning lights.

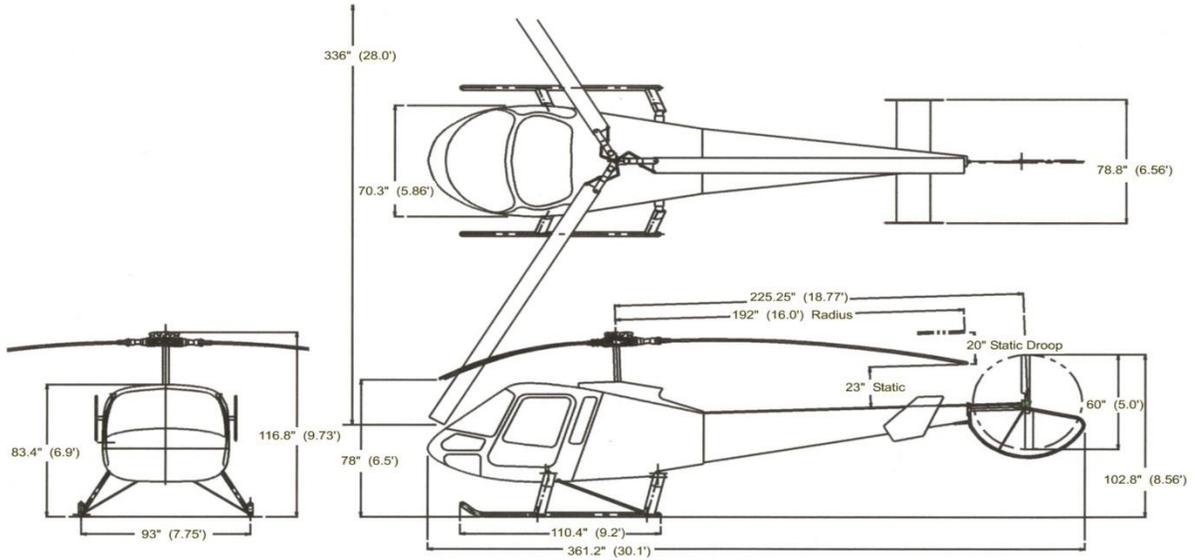
4. Helicopter Main Characteristics

4.1 Summary of Main Characteristics of the Enstrom 480B

			480B
Dimensions	Fuselage	Length	361.2 inches
		Width	70.3 inches
		Height	116.8 inches
	Main Rotor	Diameter	32 ft.
	Tail Rotor		60.5 inches
# of Main Rotor Blades			3
Minimum Flight Crew			1
Seating Capacity	Including Pilot Seats		5
Engine			Rolls-Royce 250-C20W
Fuel Cells	# of Cells		2
	Usable Capacity		90 Gal.
Air Speed	Power ON	Absolute V_{NE}	124 KIAS
	Power OFF ⁽¹⁾		85 knots
	Doors Off		No Restrictions
Rotor Speed	Power ON	Maximum	372 RPM
	Power OFF	Minimum	334 RPM
Max Approved Operating Altitude			13,000 ft. at 2850 lb.
MTOW with Internal Load			3000 lb.
MTOW with External Load			3000 lb.

(1) The autorotation V_{NE} limit is 85 knots or the power on V_{NE} limit, whichever is less.

4.2 Exterior Dimension of Enstrom 480B



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

The 480B is a new helicopter with no variants. No Operator Difference Requirement table has been produced.

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

The 480B is a new helicopter with no variants. No Master Difference Requirement table has been produced.

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

The 480B has been evaluated for aircraft categorization and license endorsement. It will be added to the EASA Type Rating & License Endorsement List – Helicopters as below:

Manufacturer	Helicopter Model/ Name	Differences	License Endorsement	Complex	OEB Report/ OSD FCD Available	Remarks
Enstrom -SE Turbine-	480B		ENF 480		X	engineering@enstromhelicopter.com

8. Specification for Training

8.1 Course Pre-Entry Requirements

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

8.2 Licensing Requirements

All students must fulfill the requirements of Part-FCL Appendix 9, Flight instruction and skill test. The AMC2 FCL.725(a) of the Part-FCL requires:

For an initial issue of a SET (H) under 3175 kg MTOM, an approved flight instruction of at least:

Helicopter types	In helicopter	In helicopter and FSTD associated training credits
SET (H) under 3175 kg MTOM	5 hrs	Using FFS C/D: At least 2 hrs helicopter and at least 6 hrs total Using FTD 2/3: At least 4 hrs helicopter and at least 6 hrs total

For an additional issue of a SPH, SET (H) CS 27, an approved flight instruction of at least:

Helicopter types	In helicopter	In helicopter and FSTD associated training credits
SET (H) to SET (H)	2 hrs	Using FFS C/D: At least 1 hr helicopter and at least 3 hrs total Using FTD 2/3: At least 1 hr helicopter and at least 4 hrs total

8.3 Initial and Additional Single Engine Turbine (SET) Type Rating

8.3.1 Initial SET Type Rating (ITR)

Candidates for the initial type rating must:

- Hold a valid helicopter pilot license
- Comply with the requirements set out in Part-FCL Subpart H – Section 1 and 3

8.3.2 Additional SET Type Rating (ATR)

Candidates for the additional type rating must:

- Hold a valid helicopter pilot license
- Hold a SET type rating
- Comply with the requirements set out in Part-FCL Subpart H – Section 1 and 3

8.4 Theoretical Knowledge Syllabus and Test Summary [AMC]

8.4.1 Initial and Additional Type Rating

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

The following section presents a summary of the material that an Initial and Additional Type Rating training program should consider.

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	12.0	12.0
Limitations		
Aircraft Systems and Operation		
Weight and Balance		
Performance, flight planning and monitoring		
Emergency procedures		
TOTAL THEORETICAL KNOWLEDGE SYLLABUS	12.0	12.0
Theoretical examination <ul style="list-style-type: none"> Knowledge Exam Review and Discussion 	1.0 As Required	1.0 As Required
TOTAL (HOURS)	13.0	13.0

8.5 Flight Training Course Summary [AMC]

8.5.1 Helicopter Flight Training Course

The following table indicates the minimum flight training required.

Helicopter Flight Training Course	ITR	ATR
1. Preflight, cockpit procedures, checklist and engine start, hover work, patterns, flight maneuvers, off-field operation maneuvers, confined area operations, quickstops	5.0	2.0
2. Emergency procedures, autorotations, tail rotor failures		
TOTAL FLIGHT TRAINING (HOURS)	5.0	2.0
SKILL TEST	Required	Required

8.6 Training Areas of Special Emphasis (TASE) [M]

Crew need to be well aware of starting procedures, related throttle manipulation, and shutdown procedures.

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

9.1 Skill Test

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

9.2 Proficiency Checks

As required by Part-FCL.740.H.

9.3 Specification for Recent Experience

As required by Part-FCL.060.

10. Specification for Flight Simulation Training Devices

No flight simulation training devices exist.

11. Appendix

Reference to TCDS.