Operations Manual

OM - C

Route

eaa Aviation Academy GmbH
Wilhelm-Spazier-Straße 2a
5020 Salzburg
Austria / Europe

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1 Performance

All operations of aeroplanes shall be conducted in accordance with ACAA regulations and the appropriate Pilot Operating Handbook.

Reference: OM A - Responsibility of the pilot-in-command
NCO.GEN.105 - Pilot-in-command responsibilities and authority

1.1 Preparations of flight

The Pilot-in-command exercises the final authority as to the operation of the aeroplane.

The Pilot-in-command shall take all measures required to ensure that standard operating procedures and other instructions or regulations as laid down by the ATO and the Authority are complied with during preparation and conduct of each flight.

1.2 Take-off

The Pilot-in-command shall ensure that the take-off mass does not exceed the maximum take-off mass specified in the Pilot Operating Handbook for the pressure altitude and the ambient temperature at the aerodrome at which the take-off is to be made.

The Pilot-in-command shall ensure that the un-factored take-off distance, as specified in the Pilot Operating Handbook does not exceed:
– When multiplied by a factor of 1.25, the take-off run available; or
– When stopway and/or clearway is available, the following:
o The take-off run available;
o When multiplied by a factor of 1.15, the take-off distance available; and
o When multiplied by a factor of 1.3, the accelerate-stop distance available.

When showing compliance with paragraph above, an operator shall take account of the following:
– The mass of the aeroplane at the commencement of the take-off run;
– The pressure altitude at the aerodrome;
– The ambient temperature at the aerodrome;
– The runway surface condition and the type of runway surface (Take-Off Performance Correction Factors);
– The runway slope in the direction of take-off (See Runway Slope); and
– Not more than 50% of the reported head-wind component or not less than 150% of the reported tail-wind component.

1.3 Takeoff – Runway Slope

Unless otherwise specified in the Aeroplane Flight Manual, or other performance or operating manuals from the manufacturers, the take-off distance should be increased by 5% for each 1% of upslope except that correction factors for runways with slopes in excess of 2% require the acceptance of the Authority.

1.4 Take-Off Performance Correction Factors

Unless otherwise specified in the Pilot Operating Handbook or other performance or operating manuals from the manufacturers, the variables affecting the take-off performance and the associated factors to be applied to the Pilot Operating Handbook data are shown in the table below. They should be applied in addition to the factor (x 1.25) as prescribed in Take off.

Surface type	Condition	Factor
Grass (on firm soil) up to 13 cm long	Dry	1.20
	Wet	1.30
Paved	Wet	1.00

Note: The soil is firm when there are wheel impressions but no rutting.

1.5 En-route multi engine aeroplane

The Pilot-in-command shall ensure that the aeroplane is capable of continuing flight the at or above the relevant minimum altitudes in VMC conditions expected for the flight, in the event of the failure of one engine, with the remaining engines operating within the maximum continuous power conditions specified.

1.6 En-route single engine aeroplane

The Pilot-in-command shall ensure that the aeroplane is capable of reaching a place at which a safe forced landing can be made in VMC conditions expected for the flight, and in the event of engine failure.

Landing dry runway

The Pilot-in-command shall ensure that the landing mass of the aeroplane at the estimated time of landing allows a full stop landing from 50 ft above the threshold within 70% of the landing distance available at the destination aerodrome and at any alternate aerodrome.

When showing compliance with sub-paragraph above, an operator shall take account of the following:

- The altitude at the aerodrome;
- Not more than 50% of the head-wind component or not less than 150% of the tail-wind component.
- The runway surface condition and the type of runway surface (See Landing Distance Correction Factors);
- The runway slope in the direction of landing (Runway Slope)

1.7 Landing – Wet and Contaminated Runways

The Pilot-in-command shall ensure that when the appropriate weather reports or forecasts, or a combination thereof, indicate that the runway at the estimated time of arrival may be wet, the landing distance available is equal to or exceeds the required landing distance, determined in accordance with Landing dry runway, multiplied by a factor of 1.15.

1.8 Landing - Runway Slope

Unless otherwise specified in the Pilot Operating Handbook, or other performance or operating manuals from the manufacturers, the landing distance should be increased by 5% for each 1% of down-slope except that correction factors for runways with slopes in excess of 2% require the acceptance of the Authority.

1.9 Landing Distance Correction Factors

Unless otherwise specified in the Pilot Operating Handbook, or other performance or operating manuals (from the manufacturers), the variable affecting the landing performance and the associated factor that should be applied to the Pilot Operating Handbook data is shown in the table below. It should be applied in addition to the operational factors as prescribed in Landing dry runway.

Surface type	Factor
Grass (on firm soil) up to 20 cm long	1.15

2 Flight Planning

2.1 General

Before commencing a flight, students and instuctors shall ascertain by every reasonable means available that the ground facilities including communication facilities and navigation aids available and directly required on such flight, for the safe operation of the aircraft, are adequate for the type of operation under which the flight is to

be conducted. For flight planning,the ATO uses an Operational Flight Plan (OFP). The pilot in command shall fill the OFP sheet with all relevant flight details.

Reference: NCO.OP.135(a) Flight preparation

2.2 Minimum Flight Altitudes

Except when necessary for take-off or landing aeroplanes shall not be operated below the minimum altitudes described in the following paragraphs for VFR and IFR flights.

Reference: SERA.3110 – cruising levels; SERA 5005 – Visual flight rules; SERA 5015 Instrument flight rules

2.2.1 VFR Flights

VFR operations shall not be conducted below 500 ft above the ground or water, or 500 ft above the highest obstacle within a radius of 150 meters from the aircraft unless authorised by the appropriate authority, except for the purpose of take-off and landing.

When flying over congested areas of cities, towns or settlements or over an open-air assembly of persons, VFR flights shall not be conducted below 1000 ft above the highest obstacle within a radius of 600 meters from the aeroplane.

Except where otherwise indicated in air traffic control clearances or specified by the competent authority, VFR flights in level cruising flight when operated above 900 m (3 000 ft) from the ground or water, or a higher datum as specified by the competent authority, shall be conducted at a cruising level.

Reference: SERA 5005 (f) (g) – Visual flight rules

For operations in classified ATS airspace, VFR flights must be conducted in accordance with the following table for Minimum Visibility for VFR Operations: *

Altitude band	Airspace class	Flight visibility	Distance from cloud
At and above 3 050 m (10 000 ft) AMSL	A (**) B C D E F G	8 km	1 500 m horizontally 300 m (1 000 ft) vertically
Below 3 050 m (10 000 ft) AMSL and above 900 m (3 000 ft) AMSL, or above 300 m (1 000 ft) above terrain, whichever is the higher	A (**) B C D E F G	5 km	1 500 m horizontally 300 m (1 000 ft) vertically
At and below 900 m (3 000 ft) AMSL, or 300 m (1 000 ft) above terrain, whichever is the higher	A (**) B C D E	5 km	1 500 m horizontally 300 m (1 000 ft) vertically
	F G	5 km **	Clear of cloud and with the surface in sight

(*) When the height of the transition altitude is lower than 3 050 m (10 000 ft) AMSL, FL 100 shall be used in lieu of 10 000 ft.

(**) The VMC minima in Class A airspace are included for guidance to pilots and do not imply acceptance of VFR flights in Class A airspace.

(***) When so prescribed by the competent authority:

light visibilities reduced to not less than 1 500 m may be permitted for flights operating:

(1) at speeds of 140 kts IAS or less to give adequate opportunity to observe other traffic or any obstacles in time to avoid collision; or

(2) in circumstances in which the probability of encounters with other traffic would normally be low, e.g. in areas of low volume traffic and for aerial work at low levels.

Reference: SERA.5001 VMC visibility and distance from cloud minima

2.2.2 IFR Flights minimum level

IFR operations shall not be conducted at a level, which is below the minimum flight altitude established by the Authority whose territory, is over flown, or where no such minimum flight altitude has been established:

- Over high terrain or mountainous areas, at a level which is at least 2000 ft (600 m) above the highest obstacle within a radius at 8 km from the estimated position of the aeroplane; or
- Elsewhere, at a level, that is at least 1000 ft (300 m) above, the highest obstacle located within a radius of 8 km from the estimated position of the aeroplane.

Reference: SERA.5015 Instrument flight rules (IFR) (b)

2.3 Fuel Planning

Based on the appropriate consumption, figures for the stage of flight as contained in the POH for the specific type. Fuel on board at the start of each flight must be sufficient for the planned operation and reserves to cover deviations from the planned operation. The fuel policy is based on the planning criteria listed in the following paragraphs taking into account the anticipated mass expected meteorological conditions and any Air Traffic Services procedures or restrictions.

2.3.1 Taxi Fuel

Taxi fuel shall not be less than the amount expected to be used prior to take-off. For planning purposes, the standard amount of fuel is included to cover engine start and ground manoeuvres until start of take-off run can be found in POH.

2.3.2 Trip Fuel - IFR

Trip fuel shall include:

- Fuel for take-off and climb from aerodrome elevation to initial cruising level/altitude, taking into account the expected departure routing;
- Fuel from top of climb to top of descent, including any step climb/descent.
- Fuel from top of descent to the point where the approach is initiated, taking into account the expected arrival procedure; and
- Fuel for approach and landing at the destination aerodrome.

2.3.3 Contingency fuel - IFR

Usually a minimum of 5 % of the trip fuel shall be taken into account.

Reference: NCO.OP.125 (b) - Fuel and oil supply

2.3.4 Fuel Reserve – IFR

Alternate Fuel
Alternate fuel shall be sufficient for: – A missed approach from the applicable MDA/DH at the destination aerodrome to missed approach altitude, taking into account the complete missed approach procedure; – A climb from missed approach altitude to cruising level/altitude. – The cruise from top of climb to top of descent, – Executing an approach and landing at the destination alternate aerodrome

Final Reserve
Final reserve fuel shall be sufficient for 45 minutes of cruise in the planed cruise altitude of alternate aerodrome.

Extra Fuel
On all flights extra fuel is recommended. It is the responsibility of the Pilot-in-command to decide the amount of extra fuel if any.

Reference: NCO.OP.125. (a)(2) - Fuel and oil supply — aeroplanes

2.3.5 Trip Fuel - VFR

Trip fuel shall include:

- Fuel for take-off and climb from aerodrome elevation to initial cruising level/altitude, taking into account the expected departure routing;
- Fuel from top of climb to top of descent, including any step climb/descent.
- Fuel from top of descent to the point where the approach is initiated, taking into account the expected arrival procedure; and
- Fuel for approach and landing at the destination aerodrome.

2.3.6 Contingency fuel - VFR

Usually a minimum of 5 % of the trip fuel shall be taken into account.

Reference: NCO.OP.125 (b) - Fuel and oil supply

2.3.7 Fuel Reserve VFR

The pilot-in-command shall only commence a flight if the aeroplane carries sufficient fuel for the following:

Training Area / Route	Fuel Reserve
Traffic Pattern Training	30 min
Cross country flight – Day	30 min
Cross country flight – Night	45 min

Reference: NCO.OP.125 (a)(1) - Fuel and oil supply — aeroplanes

2.4 Oil

The engine oil contents must be sufficient to cover the same elements as those for the fuel. Before flight, the Pilot-in-command shall ensure that the engine oil contents have been checked and serviced in accordance with the manufacturer's recommendations, and between flights, that no excess oil consumption has taken place.

Reference: NCO.OP.125 - Fuel and oil supply — aeroplanes

3 Loading

3.1 General

During any phase of operation, the loading, mass and centre of gravity of the aeroplane shall comply with the limitations specified in the AFM or the Operations Manual if more restrictive.

Reference: NCO.POL.100 – Operating limitation

The main objectives of the load control system are the following:

Ascertain that the load is such that the take-off mass of the aeroplane does not exceed:

- The maximum certified take-off mass and the zero fuel limits shown in the POH; and
- The mass at which performance requirements can be met for the flight concerned.

Ensure that the distribution of the load is such that:

- The structural loading limitations are not exceeded, including the load per running metre; and
- The limitations on location of the centre of gravity of the loaded aeroplane, as laid down in the relevant POH, are satisfied.

Ascertain that the storage of the load is such that:

- It is secure and can not shift or break loose;
- It can not damage the aeroplane or otherwise endanger its operation; and
- Ensure that the number of persons on board does not exceed the maximum allowed for the aeroplane concerned.

Ensure that the load and its distribution on board is correctly recorded on the appropriate documents.

When calculating masses for fuel, crew members and passengers the standard values listed below shall be used, except in the case when the actual mass of fuel, crew and/or passengers is known.

3.2 Standard mass values for fuel

When entering the mass figures for the take-off fuel and trip fuel the correct specific gravity should be used to convert the volume into the mass value. As this is often not practicable, the following typical specific gravity values may be used provided no other values are published in the relevant POH:

- AVGAS 100LL 0,719 kg/litre
- JET A-1 0,796 kg/litre

3.3 Standard Mass Values

3.3.1 Crew

Mass to be used for instructor and a student can either be an actual weight, or standard weight for crew members, see table below:

Crew position	Standard mass including hand baggage
Flight crew	85 kg or 170 lbs

3.3.2 Passengers

When computing the mass of passengers and baggage the following standard mass values are used:

Passengers seats	1-5	6-9
Male	104 kg	96 kg
Female	86 kg	78 kg
Children	35 kg	35 kg

The standard masses indicated above include hand baggage and the mass of any infant carried on a lap. Infants occupying a passenger seat shall be considered as children when computing the mass of passengers.

3.3.3 Baggage

On flights where no hand baggage is carried in the cabin or where hand baggage is accounted for separately, 6 kg may be deducted from the above male and female masses. Articles such as an overcoat, an umbrella, a small handbag or purse, reading material or a small camera are not considered as hand baggage for the purpose of this sub-paragraph.

4 Weather Minima

4.1 General

Studens and Instructors shall be familiar with all available meteorological information appropriate to the intended flight. Preparation for a flight away from the vicinity of the place of departure, and for every flight under IFR, shall include:

- a study of available current weather reports and forecasts; and
- the planning of an alternative course of action to provide for the eventuality that the flight cannot be completed as planned, because of weather conditions.

Pilots preparing for any flight should carefully consider the prevailing and expected weather conditions in order to determine whether the route can be flown safely or not. This preliminary weather check is normally accomplished by referencing the weather information available in the Briefing Room.

The briefing room weather information must not be considered official. The required official briefing may be obtained from meteorological office.

In conjunction with weather checks, Notices to Airmen (NOTAMS) and Pilot Reports (PIREPS) should be checked.

Reference: NCO.OP.135(b)

4.2 Flight planing in accordance with Visual Flight Rules (VFR)

4.2.1 Wind and Visibility Limitations

Solo fights and S/PIC flights may not be dispatched when weather conditions are below those, set in the following table.

Minimum visibility	Minimum required ceiling
Visibility equal or greater than 10 km	Traffic Pattern Alt+300 ft, or 2000ft above highest Obstacle en-route
Maximum wind on airfield	
Student pilots up to PPL stage	20 kts
Student pilots up to CPL	30 kts
Maximum x wind component	
Student pilots up to PPL stage	12 kts
Student pilots up to CPL	18 kts
Maximum winds below 6000´	
Student pilots up to PPL stage	35 kts
Student pilots up to CPL	50 kts

Note: For aircraft rentals use CPL wind limitations.

No solo flights may be dispatched regardless of weather conditions at the base of operations, if weather forecast for that area is to go below basic VFR minimums within the contemplated time of the flight plus 1 hour.

4.2.2 Special VFR

No flight may be planned to operate in special VFR condition, except for training purposes with a Flight Instructor within the control zone of LOWS.

4.2.3 Dual Flights

Dual flights may not be dispatched when weather conditions are outside those set in the following table.

Minimum ceiling and visibility	Visibility equal or greater than 5 km Minimum required ceiling 1000 feet
Maximum wind on airfield	35 kts
Maximum x wind component	20 kts
Maximum winds aloft below 6000´	50 kts

4.2.4 Night Operations

During hours of night no dual or solo flight may be dispatched when weather conditions are outside those set in the following table.

Maximum wind on airfield	25 kts
Maximum x wind component	15 kts
Maximum winds below 6000´	45 kts
Minimum visibility	8 km
Minimum ceiling when operating within 15 NM from lighted aerodrome.	Ceiling at least 2000 feet above highest obstacle in the area of operation, as measured by Met office.
Minimum ceiling when operating between lighted aerodromes which lie 30 NM apart.	Ceiling at least 2000 feet above highest obstacle in the area of operation, as measured by Met office.
All other flights outside the area described above	Ceiling at least 2000 feet above highest obstacle in the area of operation and cloud cover 4/8 or less, as measured by Met office.

4.2.5 En-route operating minima for VFR flights or VFR portions of a flight

Except operating as a special VFR flight, VFR flights shall be conducted so that the aeroplane is flown in conditions of visibility and distance from clouds equal to or greater than those specified in SERA.5001 VMC visibility and distance from cloud minima.

4.3 Flight planning in accordance with instrument flight rules (IFR)

Planning minima for destination aerodromes
An aerodrome shall not be selected as a destination aerodrome unless the appropriate weather reports or forecasts, or any combination thereof, indicating that, during a period commencing 1 hour before and ending 1 hour after the expected time of arrival at the aerodrome, the weather conditions will be at or above: RVR/Visibility in accordance with published landing minima; and For non-precision approach or circling approach, the ceiling must be at or above MDH.

Planning Minima for Destination Alternate Aerodromes	
For IFR flights, students and instructors shall specify at least one weather-permissible destination alternate aerodrome in the flight plan, unless: • the available current meteorological information indicates that, for the period from 1 hour before until 1 hour after the estimated time of arrival, or from the actual time of departure to 1 hour after the estimated time of arrival, whichever is the shorter period, the approach and landing may be made under visual meteorological conditions (VMC); or • the place of intended landing is isolated and: o an instrument approach procedure is prescribed for the aerodrome of intended landing; and o available current meteorological information indicates that the following meteorological conditions will exist from 2 hours before to 2 hours after the estimated time of arrival: – a cloud base of at least 300 m (1 000 ft) above the minimum associated with the instrument approach procedure; and – visibility of at least 5,5 km or of 4 km more than the minimum associated with the procedure.	
Planning Minima	
Any required alternate(s) shall be specified in the operational flight plan. An aerodrome shall not be selected as a destination alternate aerodrome unless the appropriate weather reports or forecasts, or any combination thereof, indicate that, during a period commencing 1 hour before and ending 1 hour after the expected time of arrival at the aerodrome, the weather conditions will be at or above the planning minima in accordance with the following table:	
Type of approach	**Planning Minima**
CAT I	Non-precision (Notes 1 & 2)
Non-precision	Non-precision (Notes 1 & 2) plus 200 ft/1000 m
Circling	Circling
Note 1: RVR Note 2: The ceiling must be at or above MDH	

4.4 Operating Minima

Take off minima
Single engine aeroplanes
Departure weather minima at an aerodrome shall not be lower than Category I minimum plus 800 feet, or the applicable higher non-precision approach minima plus 800 feet, for that aerodrome. Minimum RVR/Visibility for take-off is 1500 meters.
Multi engine aeroplanes
Departure weather minima at an aerodrome shall no be lower than Category I minimum or the applicable higher non precision approach minima for that aerodrome. Minimum RVR/Visibility for take off is 1200 meters.

Reference: AMC1 NCO.OP.110 Aerodrome operating minima

Approach lighting systems	
Class of lighting facility	Length, configuration and intensity of approach lights
FALS	CAT I lighting system (HIALS ≥ 720 m) distance coded centreline, Barrette centreline
IALS	Simple approach lighting system (HIALS 420 – 719 m) single source, Barrette
BALS	Any other approach lighting system (HIALS, MIALS or ALS 210 – 419 m)
NALS	Any other approach lighting system (HIALS, MIALS or ALS < 210 m) or no approach lights
Note: HIALS: high intensity approach lighting system; MIALS: medium intensity approach lighting system; ALS: approach lighting system.	

Reference: GM4 NCO.OP.110 (f) Aerodrome operating minima

Non-precision Approach
Minimum Descent Height
The minimum descent height on a Non-precision approach shall never be lower than either the Obstacle Clearance Height (OCH) (or Obstruction Clearance Limit (OCL)) for the Category of aeroplane,the system minimum specified in table below or the minimum MDH specified n the AFM, if stated.
Visual Reference
A pilot may not continue an approach below MDA/MDH unless at least one of the following visual references for the intended runway is distinctly visible and identifiable to the pilot: – Elements of the approach light system; – The threshold; – The threshold markings; – The threshold lights; – The threshold identification lights; – The visual glide slope indicator; – The touchdown zone or touchdown zone markings; – The touchdown zone lights; – Runway edge lights; or – Other visual references accepted by the Authority.
Night operations
For night operations at least runway edge, threshold and runway end lights must be on.

Reverence: NCC.OP.111(b) Aerodrome operating minima — NPA, APV, CAT I operations
NCO.OP.210 Commencement and continuation of approach
AMC1 NCO.OP.210 Commencement and continuation of approach

Precision Approach - Category I Operations
A Category I operation is a Precision instrument approach and landing using ILS with a decision height (DH) not lower than 200 ft and with a runway visual range (RVR) not less than 550 meters.
Decision Height
The decision height (DH) to be used for a Category I precision approach shall not be lower than the highest of: – The minimum height to which the approach aid can be used without the required visual reference; – The OCH/OCL for the category of aeroplane; – The puplished approach procedure DH were applicable; – The system minimum specified in Table below; or – The minimum decision height specified in the Aeroplane Flight Manual (AFM), if stated;
Visual Reference
A pilot may not continue an approach below the Category I decision height, determined in accordance with sub-paragraph (Decision height) above, unless at least one of the following visual references for the intended runway is distinctly visible and identifiable to the pilot: – Elements of the approach light system; – The threshold; – The threshold markings; – The threshold lights; – The threshold identification lights; – The visual glide slope indicator; – The touchdown zone or touchdown zone markings; – The touchdown zone lights; – Runway edge lights; or – Other visual references accepted by the Authority.
Night Operations
For night operations at least runway edge, threshold and runway end lights must be on.

Reverence: NCC.OP.111(b) Aerodrome operating minima — NPA, APV, CAT I operations
NCO.OP.210 Commencement and continuation of approach
AMC1 NCO.OP.210 Commencement and continuation of approach

Visual Approach		
When either part or all of an instrument approach procedure is not completed and the approach is executed in visual reference to terrain under the control of an air traffic control facility. The minimum RVR for a visual approach shall be at least 800m.		
Conversion of Reported Meteorological Visibility to RVR		
The following table may be used to convert reported meteorological visibility into RVR values.		
Lighting elements in operation	RVR = Reported Meteorological Visibility x	
	Day	Night
HI approach and runway lighting	1,5	2,0
Any type of lighting installation other than above	1,0	1,5
No lighting	1,0	Not applicable
Conversion of meteorological visibility into RVR values is not allowed when calculating take-off minima.		

Reference: AMC2 NCO.OP.110 Aerodrome operating minima
GM5 NCO.OP.110 Aerodrome operating minima

Visual Manoeuvring (Circling)		
Visual manoeuvring (circling) is the term used to describe the visual phase of an instrument approach required to position an aeroplane for landing on a runway which is not suitably located for a straight-in-approach. The lowest minima to be used for circling are:		
Visibility and MDH for Circling		
Aeroplane category A		
MDH	400 feet	Circling with prescribed tracks is an accepted procedure within the meaning of this paragraph.
Minimum meteorological visibility	1500 meters	

Reference: NCO.OP.112 Aerodrome operating minima — circling operations with aeroplanes

System Minima	
Facility	Lowest DH / MDH (ft)
Instrument landing system (ILS)	200
Global navigation satellite system (GNSS)/Satellite-based augmentation system (SBAS) (Lateral precision with vertical guidance approach (LPV))	200
GNSS (Lateral Navigation (LNAV))	250
GNSS/Baro-vertical navigation (VNAV) (LNAV/VNAV)	250
Localiser (LOC) with or without distance measuring equipment (DME)	250
Surveillance radar approach (SRA) (terminating at ½ NM)	250
SRA (terminating at 1 NM)	300
SRA (terminating at 2 NM or more)	350
VHF omnidirectional radio range (VOR)	300
VOR/DME	250
Non-directional beacon (NDB)	350
NDB/DME	300
VHF direction finder (VDF)	350

Reference: NCO.OP.111(a) 4 Aerodrome operating minima

Required runway visual range (RVR) – Converted meteorological visibility (CMV)				
The minimum RVR / CMV depends on the DH / MDH and on the facilities available as indicated in the following table:				
DH / MDH in ft	Class of lighting facility an Values in meters for RVR / CMV			
	FALS	**IALS**	**BALS**	**NALS**
200 - 210	550	750	1000	1200
211 - 220	550	800	1000	1200
221 - 230	550	800	1000	1200
231 – 240	550	800	1000	1200
241 – 250	550	800	1000	1300
251 – 260	600	800	1100	1300
261 – 280	600	900	1100	1300
281 – 300	650	900	1200	1400
301 – 320	700	1000	1200	1400
321 – 340	800	1100	1300	1500
341 – 360	900	1200	1400	1600
361 – 380	1000	1300	1500	1700
381 – 400	1100	1400	1600	1800
401 – 420	1200	1500	1700	1900
421 – 440	1300	1600	1800	2000
441 – 460	1400	1700	1900	2100
461 – 480	1500	1800	2000	2200
481 – 500	1500	1800	2100	2300
501 – 520	1600	1900	2100	2400
521 – 540	1700	2000	2200	2400
541 – 560	1800	2100	2300	2500
561 – 580	1900	2200	2400	2600
581 – 600	2000	2300	2500	2700
601 – 620	2100	2400	2600	2800
621 – 640	2200	2500	2700	2900
641 – 660	2300	2600	2800	3000
661 – 680	2400	2700	2900	3100
681 – 700	2500	2800	3000	3200
701 – 720	2600	2900	3100	3300
721 – 740	2700	3000	3200	3400
741 – 760	2700	3000	3300	3500
761 – 800	2900	3200	3400	3600
801 – 850	3100	3400	3600	3800
851 – 900	3300	3600	3800	4000
901 – 950	3600	3900	4100	4300
951 – 1000	3800	4100	4300	4500
1001 - 1100	4100	4400	4600	4900
1101 - 1200	4600	4900	5000	5000
1201 and above	5000	5000	5000	5000

Reference: GM4 NCO.OP.110 (a) Aerodrome operating minima

5 Training Routes and Areas

5.1 Local Operations

5.1.1 General

This section contains procedures for operations in the Salzburg area, the local practice area, and authorised local practice airports. Salzburg airport is defined as home airport for all flights.

5.1.2 Local Airports

A local airport is defined as an airport within a 50 NM range from Salzburg airport. All airports falling under this category are listed in the table below with their respective airport classification.

Airport	ICAO Code	Category	Remarks
Salzburg	LOWS	B	High Speed Traffic
Zell am See	LOWZ	A	Asphalt
St. Johann	LOIJ	A	Asphalt
Ried Kirchheim	LOLK	A	Asphalt
Schärding	LOLS	A	Asphalt
Mauterndorf	LOSM	B	Gravel / Grass

5.1.3 Local Practice Area

The organisation considers the whole airspace outside of the Salzburg CTR / CTA as a local practice area. When operating within the local practice area pilots are reminded to monitor Salzburg tower (118.10 MHz), unless another frequency is needed for communications with Flight Operations or other traffic.

Additional all pilots must be aware of possible intense arriving/departing traffic in and out of Salzburg CTR.

5.2 Cross Country Routes

Listed below are some cross-country routes that are authorised for use on solo and dual cross country flights conducted under EU-FCL approved curriculum. Routes may be flown in the direction indicated, or in the opposite direction. Routes can also be connected. One leg of an authorised route may be selected is a very short flight is required. However, care must be taken when selecting a route to insure it meets the minimum requirements of the flight course lesson being flown.

Cross country routes for		
PPL	NIGHT	CPL
Salzburg - Schärding - Linz - Salzburg	Salzburg - Linz - Salzburg	Salzburg – Portoroz - Salzburg
Salzburg - Niederöblarn - Schärding-Salzburg	Salzburg - Wien - Salzburg	Salzburg - Pula - Salzburg
Salzburg – St.Johann - Innsbruck - Salzburg		
Salzburg - Bad Vöslau - Punitz - Salzburg		
Salzburg - Lienz - Klagenfurt - Salzburg		
Salzburg – Zell am See - Innsbruck - Salzburg		
Salzburg - Innsbruck - Hohenems – Salzburg		
Salzburg - Graz - Punitz - Salzburg		

Note: New destinations may authoriezed by CFI.

5.3 Cross Country Airports

The ATO has established three different aerodrome categories, named categories A, B and C, for the purpose facilitating the preparation and planning for each training flight. The same categorisation applies to the rental of aeroplanes.

Category A aerodrome
Category A aerodromes are unrestricted to both solo and dual flights. No special briefings are required before operating to such an aerodrome.
Category B aerodrome
Category B aerodromes could be an aerodrome which does not satisfy the category A aerodrome requirements or requires extra considerations due to: – Non-standard approach aids or approach procedures; – Unusual local meteorological characteristics; – Surface type i.e. soft gravel or grass; – Any other relevant considerations including obstructions, physical layout, traffic density, etc. Prior to operating to category B aerodromes, the student pilot and flight instructor shall undergo a special briefing i.e. check NOTAM for aerodrome condition, take special care when checking the actual and forecasted weather, go through the arrival procedures, etc. Solo flights shall not be conducted on to that aerodrome until the student pilot has either been there on a dual flight or landed on an aerodrome with similar characteristics.
Category C aerodrome
Category C aerodromes may only be uses on dual flights. After a special briefing, as described for category B aerodrome. No solo flights may be planed to that aerodrome, except for the purpose of over flying the aerodrome.

5.3.1 List of Categorised Aerodromes

The following list of aerodromes describes the category for each aerodrome and any special remarks. Aerodromes not listed below may not be used for any aeroplane.

Airport	ICAO Code	Category	Remarks
Austrian Airports			
Salzburg	LOWS	B	2750x45 Concrete
Linz	LOWL	B	3000x60 Asphalt
Innsbruck	LOWI	B	2000x45 Asphalt
Graz	LOWG	B	3000x45 Concrete
Klagenfurt	LOWK	B	2720x45 Concrete
Wien	LOWW	B	
Austrian Aerodromes			
Kirchheim	LOLK	A	743x18 Asphalt
Schärding	LOLS	A	800x21 Asphalt
Gmunden	LOLU	A	550x18 Asphalt
Wels	LOLW	A	1390x30 Asphalt
Zell am See	LOWZ	A	660x18 Asphalt
Niederöblarn	LOGO	A	730x30 Asphalt
Trieben	LOGI	A	785x18 Asphalt
Mauterndorf	LOSM	B	820x25 Grass
Seitenstetten	LOLT	A	830x25 Grass
Krems	LOAG	A	742x18 Asphalt
St. Johann	LOIJ	A	750x18 Asphalt
Aerodromes abroad			
Eggenfelden	EDME	B	1300x23 Asphalt
Vilshofen	EDMV	A	1257x20 Asphalt
Portoroz	LJPZ	A	1200x30 Asphalt
Pula	LDPL	B	2950x45 Asphalt
Trieste	LIPQ	B	3000x45 Asphalt
San Nicolo	LIPV	A	1060x25 Grass

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6 Navigation Procedures

It is the general policy that all flights shall be planned and conducted along airways, air routes, RNAV routes and advisory routes. When this is not possible or when it leads to excessive operational penalties, all factors such as communications, air traffic services, navigational facilities, weather, etc. must be carefully considered before selecting a different routing.

Optimum use of radio aids is essential to good navigation. When a radio aid is manually selected the other pilot must be informed of the selection and whether the radio aid is identified. Liaison between pilots is vital.

Radio navigation receivers shall be referred to as relevant to the aeroplane type, e.g. “No. 1 ADF identified”, “Salzburg identified on No. 2 VOR”, and “ILS identified”. Any manually selected radio aids must be identified before they are used. For any instrument approach both pilots must identify the primary radio aids to be used. On all approaches optimum use shall be made of all available radio aids. It is vital to ensure the appropriate positioning of the ADF/VOR selectors for both pilots’ RMIs/RDMIs and that the correct VOR radial or ILS front course is selected.

Where any procedure requires the use of the marker receiver, both pilots shall be able to hear them through the overhead speaker.

6.1 Selection and Monitoring of Radio Aids

Cross Monitoring Possible
When cross monitoring of radio aids is possible, i.e. the ability to use one radio aid to cross check the information from another when multiple aids are available such as ILS with NDB/VOR etc. All radio aids are to be identified by at least one pilot and both pilots shall identify the primary radio aid.
No Cross Monitoring Possible
When one radio aid alone is used both pilots must identify it and the call sign monitored or re-identified as follows:
ILS
The call sign must be re-identified: – When the aeroplane is established on the localiser; – Whenever warming flags have appeared and cleared; and – Whenever indications are in doubt. Note: Presence of an ILS call sign does not confirm the integrity of the glide slope signal.
VOR
The call sign must be re-identified: – When established on the inbound radial or when on final approach; – Whenever warming flags have appeared and cleared including passing an indicated overhead; and – Whenever indications are in doubt.

No Cross Monitoring Possible
When one radio aid alone is used both pilots must identify it and the call sign monitored or re-identified as follows:
NDB

The call sign shall be monitored by one of the operating pilots throughout the approach, and missed approach when relevant.

- Operational Precautions when using NDB.

  Continuous monitoring of NDB signals during departure, en-route and approach may determine to what extent an unstable bearing can be referred to static noise or static bursts or other interfering signals. A positive NDB overhead check should imply continuous monitoring of the NDB signals and observation of ADF needle reversal within the ETO time frame.

- NDB Approach

  Only one NDB in the Terminal Area: When approaching the NDB serving the terminal area both ADFs (if installed) shall be turned to that station and continuous monitoring of the NDB signals maintained on one of the ADFs. Before initiation of the final approach a positive overhead check must be accomplished. A final approach shall not be initiated unless a normal overhead check and ADF needle reversal is observed.

- More than one NDB in the Terminal Area

  When two or more NDB facilities are used for the published approach procedure a continuous monitoring of the NDB signal from the station being used for navigation and positive overhead checks shall be accomplished during the initial and final approach segments. A final approach shall not be initiated unless a normal overhead check and ADF needle reversal is observed.

- Selection of No. 1 or No. 2 ADF (if installed)

  Prior to take-off, No. 2 ADF should be tuned to a suitable radio aid for tracking or monitoring the departure and No. 1 ADF to a radio aid usable for approach should an immediate return become necessary. When two ADFs are required for the departure the sequential use of ADFs shall be at the Pilot-in-command discretion.

During NDB approaches and other non-precision or precision approaches where published approach procedures are based on the use of more than one NDB. The final approach course should be tracked or monitored using ADF No. 1 whereas No. 2 ADF (if installed) should be tuned to other stations suitable for the approach and, when relevant, the missed approach.

7 Altimeter Setting Procedures

7.1 General

The procedures herein describe the method intended for use in providing adequate vertical separation and terrain clearance during all phases of flight.

Where reference is made to “Standard” altimeter setting the barometric subscale is set to 1013 hPa or 29.92” Hg.

Since the altimeter subscales are designed to accommodate whole millibar/hectopascal settings only, no attempt must be made to apply a setting to the half hectopascals, but the figure as received from ATC must, if necessary, be rounded down to the nearest whole hectopascal and this setting applied. Unless this is done it will not be possible to crosscheck as and when appropriate.

Care should be taken to ensure that the altimeter setting as heard from ATC is properly understood. Common errors in communication are omission of the decimal e.g. saying “niner niner five” but meaning 999.5 rather than 995.0 hPa. Giving the setting in inches Hg. in such a way, it can be confused with hectopascals, e.g. saying “niner niner five”, but meaning 29.95” Hg rather than 995.0 hPa.

7.2 Verbal Crosschecks

Operating procedures require certain verbal altimeter crosschecks to be made. It is particularly important that these should be by challenge and response, i.e. the questioner should challenge: “Altimeters and receive a response “One Zero One Three (or “Standard One Zero One Three) Through One Five Zero Now”. Or while on the ground during pre-flight checks “Niner Eight Niner, Twenty Feet” and during flight when referenced to QNH “Niner Eight Niner, Six Thousand Two Hundred Now”. Following the response from the other pilot, the challenger shall cross check the values with his altimeter and respond “Niner Eight Niner; Six Thousand Three Hundred; Checked”.

7.3 Altimeter Settings in Use

The QNH and the standard setting of 1013.2 hPa are the altimeter settings normally used in civil aviation.

The QNH is the pressure at aerodrome level converted to mean sea level using the standard atmosphere values. If this pressure value is set on the sub-scale, the altimeter will indicate the airfield elevation after landing. It should be realised that at altitudes higher (or lower) than the elevation of the aerodrome for which the QNH is valid, the altimeter does not indicate correctly, except when the atmosphere below the aeroplane conforms to standard atmosphere conditions. The QNH is normally used for take-off or landing for the determination of terrain clearance and to establish and maintain vertical separation.

The 1013.2 hPa setting is the pressure at mean sea level in the standard atmosphere. If this pressure value is set on the sub-scale, the altimeter may be used to indicate flight levels. This setting is recommended by ICAO for use by en-route traffic above the transition altitude, in order to establish and maintain vertical separation.

7.4 QNH Procedures

The QNH is used for take-off and landing, for terrain clearance purposes and for vertical separation of aeroplanes. In flight the pilot must compare the true altitude of his aeroplanes with the elevation of ground obstacles. In order to convert (corrected) indicated altitude to true altitude, a further correction for temperature must be applied.

Sufficient QNH reporting stations are available in those regions where they are required. Details concerning the transfer of one QNH setting to another are given in the Route Manuals.

Pilots should recognise the problems connected with the transition of one QNH setting to another. A large change of altitude is necessary when large differences in successive QNH settings prevail. Prior to landing the pilot must always obtain the QNH for the airfield concerned.

7.5 Standard Altimeter Setting Procedure

7.5.1 Principle of Operation

The standard altimeter setting procedure is based on the principle that the transition from en route standard altimeter setting (1013.2 hPa) to a landing altimeter setting (QNH) takes place during descent and from a take-off QNH to an en route standard setting (1013.2 hPa) during climb. This concept enables aeroplanes operating well above critical terrain to operate along continuous isobaric surfaces, without the necessity for frequent altimeter adjustments, which often necessitate large altitude adjustments and upset previously established vertical separation.

However, the procedure requires adequate precautions in determining usable, i.e. safe flight levels over high terrain.

ATC ensures that the lowest flight level in use will provide at least 1000-ft terrain clearance.

- All flights operating level at or above the transition level shall be flown at flight levels and maintain vertical separation by reference to an altimeter set to 1013.2 hPa.
- All flights operating level at or below the transition altitude shall be flown at altitudes and maintain vertical separation by reference to an altimeter set to the QNH valid for the aerodrome or area concerned.
- All flights passing through the transition layer shall have their altimeter set to 1013.2 hPa when climbing, and to the QNH valid for the aerodrome or area concerned when descending. Level flight in the transition layer is normally not allowed.

7.5.2 Transition Altitude

A transition altitude shall be specified for each aerodrome by the State in which the aerodrome is situated and shall be published and depicted on instrument approach charts.

The height of the transition altitude shall be as low as operationally possible but never less than 1500 ft above aerodrome elevation.

From the above it is evident that a transition altitude always has a fixed value.

7.5.3 Transition Level

The transition level has no fixed value but varies with the QNH value of the aerodrome or area concerned. It is periodically established by ATS and passed to aeroplanes in routine approach and landing or take-off instructions.

7.5.4 Transition Layer

The transition layer, being the airspace between the transition altitude and the transition level has no fixed thickness. The thickness varies with the QNH value of the aerodrome or area concerned.

The transition layer shall normally occupy an area in the vicinity of an aerodrome only.

Note: Although no longer required under the ICAO procedures, certain States prescribe a minimum thickness of 1000 ft for the transition layer. In that case the application of the standard altimeter setting procedure automatically provides for at least 1000 ft vertical separation between aeroplanes flying on QNH (at or below the transition altitude) and aeroplanes flying on 1013.2 hPa (at or above the transition altitude). Where States do not prescribe a minimum thickness for the transition layer; the minimum required vertical separation of 1000 ft is obtained by instructing aeroplanes concerned to maintain specific flight levels or altitudes ensuring such separation.

7.5.5 Altimeter Setting Changes

Take-off and initial climb is executed on the valid aerodrome QNH. While passing through the transition altitude the altimeter is set to the standard setting of 1013.2 hPa.

7.5.6 Descent and landing

Descent is executed on the standard setting 1013.2 hPa until:

- Reaching the transition level.
- Instructed by ATC.

Further descent and landing is executed on the valid aerodrome QNH.

Note: In cases where more than one aerodrome are in close proximity, ATC procedures may involve the use of a common QNH setting for control purpose aerodrome QNH values would then be used only for take-off, initial climb, approach and landing.

7.5.7 Checking of Terrain Clearance

The cruising flight level/altitude shall always be equal to or higher than the basic minimum safe enroute altitude. When selecting cruising levels the following factors shall be taken into account:

(1 hPa = 30 ft; 10°C below ISA = 4% altitude)

Example		
FL 160 OAT -30°C	MEA 12000 ft	QNH 977 hPa
Step 1: Temperature Correction		
ISA FL 160 = -17°C		
OAT FL 160 = -30°C		
ISA Deviation = -13°C = ca 5% alt.		
12000 + 5% = 12600		
Step 2: QNH Correction		
1013 - 977 = 36 hPa		
12600 + (36x30) = 13680		
Lowest usable Flight Level is FL 140. FL 160 is acceptable.		

7.5.8 Altimeter pre-flight checks

During cockpit preparation before engine start the setting mechanisms may be checked by making an arbitrary alteration, e.g. 10 hPa, and noting that the altimeter readings alter by an appropriate amount (in the example above by 300 ft).

Before engine start and during take-off both primary and standby altimeters shall be set to local QNH and the readings checked to be within the prescribed POH limitations. Any deviation noted from the desired indication during pre-flight cockpit check, which is within the tolerances specified in the POH, shall be ignored during flight, and no adjustment of the indication shall be made at any stage of the flight.

When engaging automatic flight after take-off, pilots must ensure that the controlling altimeter's subscale for autopilot altitude control corresponds to the clearance issued, i.e. the controlling subscale must be set to QNH when cleared to an altitude and 1013 hPa when cleared to a FL.

7.5.9 Altimeters - Take-Off and Departure

On passing the Transition Altitude (TA) during climb both primary altimeters shall be set to 1013 hPa. The Pilot-in-command may, at his discretion, after clearance to a Flight Level has been received, require both primary altimeters to be set to 1013 hPa before TL has been passed. The standby altimeter should be set to 1013 hPa as a procedure in preparation for the after take-off checklist. Verbal crosschecks shall be complied with.

7.5.10 Altimeters - Cruise and En-route Climb

All altimeters shall be set to standard setting above transition altitude and verbal checking.

7.5.11 Altimeters - Descent and Approach

During initial descent both pilots' altimeters will remain at Standard setting. Standby altimeters as installed should normally remain at standard setting but may at the Pilot-in-command's discretion be referenced to QNH at this stage of flight.

When cleared by ATC to leave a flight level and descent to an altitude below the Transition Level (TL), and provided no passing FL checks are required, all altimeters shall be set to QNH and cross-checked for agreement.

7.5.12 Altimeters - Missed Approach

Both pilots' altimeters remain on

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