
ENR 1.7 ALTIMETER SETTING PROCEDURES

1. INTRODUCTION

- 1.1 The Altimeter Setting Procedures in the Kuala Lumpur and Kota Kinabalu FIRs generally conform to ICAO practices.
- 1.2 In co-ordination with the ATS authorities of Malaysia, Singapore and Brunei, a common transition altitude of 11000 ft (3350 meters) and transition level of FL 130 has been established in the Kuala Lumpur, Kota Kinabalu and Singapore FIRs, except for an area of 10 NM centred at Mt. Kinabalu (in the Kota Kinabalu FIR) where the lowest safe altitude is 15000 ft (4570 meters) and the lowest safe level is FL 170.
- 1.3 The maximum variation in QNH values in the Kuala Lumpur, Kota Kinabalu and Singapore FIRs is not more than 10 hPa either side of 1013.2 hPa, therefore change of altimeter setting from QNH to 1013.2 represents an indicated change of not more than 300 ft on the altimeter. To simplify ATC procedures, a uniform transition level of FL 130 is established, thus providing a transition layer of 2000 ft, and ensuring at all times a 1000 ft vertical separation between aircraft.
- 1.4 Aircraft shall not flight plan to cruise at levels 115, 120 and 125 when operating in Kuala Lumpur and Kota Kinabalu FIRs.
- 1.5 Flight Level zero is located at the atmospheric pressure level of 1013.2 hPa (29.92 ins). Consecutive flight levels are separated by a pressure level corresponding to 500 ft in the Standard Atmosphere.

1.6 Area QNH Zones (AQZ)

A common Area QNH will be issued for all the Area QNH Zones defined below:-

- a) Kuala Lumpur AQZ - within the airspace in the Kuala Lumpur FIR.
- b) Kota Kinabalu AQZ - within the airspace in the Kota Kinabalu FIR.
- c) Singapore AQZ - within the airspace in the Singapore FIR.

1.7 Area QNH

- 1.7.1 Area QNH is the forecast value of the lowest mean sea level pressure within the AQZ, valid for a period of 6 hours.
- 1.7.2 Area QNH as defined above, is one of the types of meteorological data required for the determination of the lowest flight level which will ensure adequate terrain clearance at any location within the AQZ during the period of validity.
- 1.7.3 Amendments are issued by Met when the mean sea level pressure at any location in the AQZ is expected to fall below the current Area QNH by more than 2 hPa, and units responsible for the airspace in which the aircraft could be operating on Area QNH shall broadcast the amended value on all air/ground frequencies in use.

2. BASIC ALTIMETER SETTING PROCEDURES

2.1 Altimeter Setting Procedures

- 2.1.1 For flight at or below the transition altitude, the altimeter reference will be Local QNH/Area QNH. Flight will therefore be conducted in altitudes.
- 2.1.2 Change from Local QNH (set for departure) to the Area QNH will be made on leaving the TMA/CTR/ATZ after take-off.
- 2.1.3 From Area QNH to Local QNH will be made on entry at TMA/CTR/ATZ or on commencement of final approach to land.
- 2.1.4 Aircraft transiting through TMA/CTR/ATZ at or below the transition altitude will change to the local QNH on entering the TMA/CTR/ATZ boundaries and to Area QNH on leaving the boundaries.

- 2.1.5 Vertical displacement of aircraft climbing through the transition layer is expressed in terms of flight levels and when descending through the transition layer is expressed in terms of altitudes.
- 2.1.6 For flight at and above the transition level, the standard altimeter setting of 1013.2 hPa will be used.
- 2.1.7 Change from Local QNH/Area QNH to 1013.2 hPa will be made on climbing through the transition altitude.
- 2.1.8 Change from 1013.2 hPa to Local QNH/Area QNH will be made on descending through the transition level.
- 2.1.9 Cruising within the transition layer is not permitted unless specifically cleared by the Area Control Centre of that FIR.

2.1.10 Special Procedures for the Kuala Lumpur Terminal Area (TMA)

- 2.1.10.1 Aircraft arriving the KL International Airport, Sepang and the Sultan Abdul Aziz Shah (SAAS) Airport, Subang or aircraft transiting the Kuala Lumpur TMA will be given a common QNH setting when cleared to descend, or to transit the TMA below the transition level which is FL130. The common QNH setting will be the QNH for the KL International Airport, Sepang.
- 2.1.10.2 Aircraft landing at the Sultan Abdul Aziz Shah Airport (SAAS) will be provided with the SAAS airport Subang QNH by Lumpur Director/Approach when they have been cleared to final approach.
- 2.1.10.3 Aircraft departing the KL International Airport, Sepang and the Sultan Abdul Aziz Shah Airport, Subang will be provided with a common QNH that will be the QNH for the KL International Airport.

Note. *The QNH difference between the two airports will be negligible.*

2.2 Take-Off And Climb

- 2.2.1 Where ATIS is not available, a local QNH altimeter setting shall be made available together with the Area QNH to aircraft by Approach/ Aerodrome Control in the routine take-off and climb instructions.
- 2.2.2 A QFE altimeter setting will be made available on request but reports to ATC shall be made in altitudes.

2.3 Vertical Separation - En-Route

- 2.3.1 It is the pilot's responsibility to select a flight level/altitude which will give adequate terrain clearance using forecast pressure information.
- 2.3.2 For the purposes of en-route vertical separation, IFR and VFR flights within controlled airspace and flights in uncontrolled airspace of the Kuala Lumpur and Kota Kinabalu FIRs, reference should be made to the following:
- a) Semi-circular system of cruising levels within all controlled airspace (IFR flights);
(See Table A)
 - b) VFR flights - cruising levels within controlled airspace;
(See Table B)
 - c) Cruising levels in uncontrolled airspace;
(See Table C)

2.4 Approach And Landing

- 2.4.1 Where ATIS is not available, a Local QNH altimeter setting shall be made available in the routine approach and landing instruction.
- 2.4.2 A QFE altimeter setting will be made available on request but reports to ATC are to made in altitude.
- 2.4.3 Vertical displacement of aircraft during approach is effected by reference to flight levels until reaching the transition level below which vertical displacement is controlled by reference to altitude.
- 2.4.4 Change from Area QNH to Local QNH will be made on entry at TMA/CTR/ATZ or on commencement of final approach to land.

3. PROCEDURES APPLICABLE TO OPERATORS AND PILOTS

3.1 Flight Planning

3.1.1 The level(s) at which a flight is to be conducted shall be specified in a flight plan:-

- a) In terms of flight levels; if the flight is to be conducted at or above the transition level.
- b) In terms of flight altitudes; if the flight is to be conducted in the vicinity of an Aerodrome and at or below the transition altitude or en-route aircraft transiting at or below the transition altitude in the Kuala Lumpur and Kota Kinabalu FIRs.

Note 1: Short flights in the vicinity of an aerodrome may often be conducted only at altitudes at or below the transition altitude.

Note 2: Flight levels are specified in a plan by a number, and not in terms of feet as is the case of altitudes.

Note 3: No aircraft shall flight plan to cruise at levels 115, 120 and 125 when operating in the Kuala Lumpur and Kota Kinabalu FIRs.

4. SEMI-CIRCULAR SYSTEM OF CRUISING LEVELS WITHIN THE KUALA LUMPUR AND KOTA KINABALU FIRS

4.1 The pilot-in-command of an IFR flight at or above 3000 ft within controlled airspace and above FL 250 in uncontrolled airspace shall select a level corresponding to the appropriate magnetic track as indicated in Table A. The Quadrantal Rule as contained in Table C will continue to be used for all flights below FL 250 in uncontrolled airspace of the Kuala Lumpur and Kota Kinabalu FIRs.

4.2 FL 250 in uncontrolled airspace will be held vacant to serve as a buffer.

IFR Flights - Cruising Levels within the Kuala Lumpur and Kota Kinabalu FIRs.

TABLE A

Magnetic Track	From 000° through East to 179° (feet)	From 180° through West to 359° (feet)
Cruising Altitudes (Local QNH/Area QNH)	3 000	4 000
	5 000	6 000
	7 000	8 000
	9 000	10 000
	11 000	
Cruising Flight Levels (1013.2 HPa)	130	
	150	140
	170	160
	190	180
	210	200
	230	220
	250*	240
	270	260
	290	280
	310	300
	330	320
	350	340
	370	360
	390	380
	410	400
450	430	

Note.

- a) FL 115, 120 and 125 are not available for use as cruising within the transition layer is not permitted. FL 250 in uncontrolled airspace will be held vacant to serve as a buffer.
- b) To maintain a buffer of 1000 ft between aircraft operating within and outside controlled airspace, aircraft shall not operate closer than 500 ft vertically from the lower limit of controlled airspace.

- 4.3 The pilot-in-command of a VFR flight up to FL 150 within Controlled Airspace shall select a level corresponding to the appropriate magnetic track as indicated in Table B. VFR flights shall, however, be conducted subject to ATC approval and shall not be operated by day above FL 150 in all Controlled Airspace and Advisory Areas.

VFR Flights - Cruising Levels up to FL 150 within Controlled Airspace.

TABLE B

Magnetic Track	From 000° through East to 179° (feet)	From 180° through West to 359° (feet)
Cruising Altitudes (Local QNH/Area QNH)	1 500 3 500 5 500 7 500 9 500	2 500 4 500 6 500 8 500 10500
Cruising Flight Levels (1013.2 HPa)	135	145

Note.

- a) FL 115, 120 and 125 are not available for use as cruising within the transition layer is not permitted.
- b) To maintain a buffer of 1000 ft between aircraft operating within and outside of Controlled Airspace, aircraft shall not operate closer than 500 ft vertically from the lower limit of controlled airspace.

- 4.3.1 VFR flights shall NOT be operated by day above FL 150 within controlled airspace and advisory areas. Flights in uncontrolled airspace above FL 150 may be conducted under VFR.

5. QUADRANTAL CRUISING LEVELS IN UNCONTROLLED AIRSPACE OF KUALA LUMPUR AND KOTA KINABALU FIRS BELOW FL 250

- 5.1 The pilot-in-command of a VFR or IFR flight at or above 3000 ft outside controlled airspace and below FL 250 shall select a level corresponding to the appropriate magnetic track as indicated in the following Quadrantal Cruising Levels.

TABLE C

Magnetic Tracks	From 000° - 089° (feet)	From 090° - 179° (feet)	From 180° - 269° (feet)	From 270° - 359° (feet)
Cruising Altitudes (Local QNH/Area QNH)	3 000 5 000 7 000 9 000 11 000	3 500 5 500 7 500 9 500	4 000 6 000 8 000 10 000	4 500 6 500 8 500 10 500
Cruising Flight Level (1013.2 HPa)	130 150 170 190 210 230	135 155 175 195 215 235	140 160 180 200 220 240	145 165 185 205 225 245

Note.

- a) FL 115, 120 and 125 are not available for use as cruising within the transition layer is not permitted.
 b) To maintain a buffer of 1000 ft between aircraft operating within and outside of controlled airspace, aircraft shall not operate closer than 500 ft vertically from the lower limit of controlled airspace.

- 5.2 If compliance with VFR cannot be maintained at a quadrantal cruising level, the aircraft shall be flown at another quadrantal level where it is possible to comply with VFR.
- 5.3 The pilot-in-command shall ensure that the cruising level selected for an IFR flight is not below the lowest safe flight level applicable for the route to be flown.
- 5.4 Except when taking-off or landing, or with the approval of the appropriate authority, aircraft shall be flown at least 1000 ft above the highest obstacle within 5 NM of the estimated position of the aircraft in flight.

6. TRANSIT PROCEDURES

- 6.1 The procedures to be followed by aircraft when transiting between areas where the Quadrantal System of cruising levels is in use and those where the Semi-Circular System is applicable, are indicated below.

- 6.1.1 Transition from the Quadrantal System to the Semi-Circular System.

TRACK FLOWN	VFR FLIGHT	IFR FLIGHT
000° - 089°	Climb to next ODD + 500 ft level	Maintain ODD level
090° - 179°	Maintain ODD + 500 ft level	Descend to next ODD level
180° - 269°	Climb to next EVEN + 500 ft level	Maintain EVEN level
270° - 359°	Maintain EVEN + 500 ft level	Descend to next EVEN level

- 6.1.2 Transition from the Semi-Circular System to the Quadrantal System.

TRACK FLOWN	VFR FLIGHT	IFR FLIGHT
000° - 089°	Descend to next ODD level	Maintain ODD level
090° - 179°	Maintain ODD + 500 ft level	Climb to next ODD + 500 ft level
180° - 269°	Descend to next EVEN level	Maintain EVEN level
270° - 359°	Maintain EVEN + 500 ft level	Climb to next EVEN + 500 ft level

- Note.** The terms 'ODD + 500 ft' level and 'EVEN + 500 ft' level have been used to designate those series of levels where, below FL 290, flight levels ending with 75, 95, 115, etc and 65, 85, 105, etc respectively are prescribed.

7. CHANGING LEVELS

- 7.1 An aircraft may be required to change level at a time, place, or rate specified by ATC. The pilot-in-command must commence a change of level as soon as possible but not later than 1 minute after receiving that instruction from ATC, unless that instruction specifies a later time or place.

- Note.** A pilot may request ATC approval for a different rate of change of level or a different time or place for commencing change of level.

- 7.2 When required, the pilot-in-command may be instructed to reach an assigned level by a specified time or position. The pilot-in-command shall advise ATC immediately if he is doubtful whether the assigned level can be reached as instructed.

7.3 A pilot-in-command shall report:

- a) At the time of leaving a level for a newly assigned level;
- b) When leaving or passing through such other levels as may be specified by ATC; and
- c) On reaching an assigned level.

7.4 A pilot-in-command shall read back level clearances when requested to do so by ATC.