

GFS - TIM of Aircraft and Helicopter

Time in mode for Helicopter

Table 1: Specifications and Times in mode of GFS Helicopter (for mixing height of 3000ft/914.4m)

Aircraft	Time in mode (min) ^[1]			
	Approach	Taxi-in	Taxi-out	Take off ^[2]
Eurocopter EC 155	5.50	5.00	5.00	3.00
Eurocopter Super Puma	5.50	5.00	5.00	3.00

Note:

[1] The time-in-mode of Approach and Take-off is made reference to FOCA's Guidance on the Determination of Helicopter Emissions when the cruising height is 3000 ft.

The time-in-mode is adjusted based on the mixing height of corresponding hour and cruising height of Hong Kong.

The time-in-mode of Taxi-in and Taxi-out is provided by GFS and verified by site survey

The time-in-mode is applicable to both 3RS and 2RS Scenario.

[2] 1-minute hovering time is added into take-off mode

Table 2: Correction of the Time-in-mode in relation to the Mixing Height

	3RS Scenario		2RS Scenario	
	Mixing Height > Cruising Height (min) ^[2]	Cruising Height > Mixing Height (min) ^[2]	Mixing Height > Cruising Height (min) ^[2]	Cruising Height > Mixing Height (min) ^[2]
Approach	5.50 x (152.4 / 914.4)	5.50 x (Mixing Height / 914.4)	5.50 x (152.4 / 914.4)	5.50 x (Mixing Height / 914.4)
Taxi-in	5.00	5.00	5.00	5.00
Taxi-out	5.00	5.00	5.00	5.00
Take off ^[3]	(3.00 x (152.4 / 914.4))+ 1	(3.00 x (Mixing Height / 914.4))+ 1	(3.00 x (152.4 / 914.4))+ 1	(3.00 x (Mixing Height / 914.4))+ 1
Cruising (Route 1) ^{[4][5][7]}	1.84	N/A	1.84	N/A
Cruising (Route 2) ^{[4][5][7]}	3.26	N/A	3.32	N/A
Cruising (Route 3) ^{[4][5][7]}	2.51	N/A	2.51	N/A
Cruising (Route 4) ^{[4][5][7]}	1.90	N/A	1.90	N/A
Cruising (Route 5) ^{[4][5][7]}	3.90	N/A	3.90	N/A
Cruising (Average) ^{[4][5][7]}	2.66	N/A	2.67	N/A

Note:

[3] The Cruising Height of Helicopter is 500ft (152.4m) provided by GFS

[4] 1-minute hovering time will be added into take-off mode

[5] The emission of cruising will be considered only if the mixing height is higher than the cruising height

[6] The cruising speed is 61.7 m/s provided by GFS and will be used for calculating the cruising time within 5 km assessment area.

[7] The cruising distances of different routes are provided in Appendix 5.3.5-3.

Time in mode for Aircraft

Table 3: Specifications and Times in mode of GFS Aircraft (for mixing height of 3000ft/914.4m) (3RS Scenario)

Aircraft	Runway Direction	Time in mode (min)				
		Approach ^[8]	Taxi-in ^[9]	Taxi-out ^[9]	Take off ^[10]	Climb out ^[8]
Bombardier Challenger 605	07	1.60	3.23	11.78	0.76	0.50
Bombardier Challenger 606	25	1.60	2.77	14.00	0.76	0.50
Diamond DA42BG	07	3.00	3.23	11.78	0.76	2.50
Diamond DA42BG	25	3.00	2.77	14.00	0.76	2.50

Note:

[8] The time-in-mode of Approach and Climb out are made reference to EDMS and FOCA Aircraft Piston Engine Emissions Summary Report when the mixing height is 3000 ft.

The time-in-mode will be adjusted based on the mixing height of corresponding hour of Hong Kong.

[9] The time-in-mode of Taxi-in and Taxi-out is based on the average value of TAAM model.

[10] Takeoff time is recorded from radar data and site survey results according to different aircraft size class

Table 4: Specifications and Times in mode of GFS Aircraft (for mixing height of 3000ft/914.4m) (2RS Scenario)

Aircraft	Runway Direction	Time in mode (min)				
		Approach ^[11]	Taxi-in ^[12]	Taxi-out ^[12]	Take off ^[13]	Climb out ^[11]
Bombardier Challenger 605	07	1.60	8.42	8.25	0.76	0.50
Bombardier Challenger 606	25	1.60	9.17	10.42	0.76	0.50
Diamond DA42BG	07	3.00	8.42	8.25	0.76	2.50
Diamond DA42BG	25	3.00	9.17	10.42	0.76	2.50

Note:

[11] The time-in-mode of Approach and Climb out are made reference to EDMS and FOCA Aircraft Piston Engine Emissions Summary Report when the mixing height is 3000 ft.

The time-in-mode will be adjusted based on the mixing height of corresponding hour of Hong Kong.

[12] The time-in-mode of Taxi-in and Taxi-out is based on the average value of TAAM model.

[13] Takeoff time is recorded from radar data and site survey results according to different aircraft size class

Table 5: Correction of the Time-in-mode in relation to the Mixing Height (3RS Scenario)

Mode	Time-in-mode (min)			
	Bombardier Challenger 605		Diamond DA42BG	
	Runway Direction = 07	Runway Direction = 25	Runway Direction = 07	Runway Direction = 25
Approach	1.60 x (Mixing Height / 914.4)	1.60 x (Mixing Height / 914.4)	3.00 x (Mixing Height / 914.4)	3.00 x (Mixing Height / 914.4)
Taxi-in	3.23	2.77	3.23	2.77
Taxi-out	14.00	14.00	11.78	14.00
Take off (Mixing Height > 300m)	0.76	0.76	0.76	0.76
Take off (Mixing Height < 300m)	0.76 x (Mixing Height / 300)	0.76 x (Mixing Height / 300)	0.76 x (Mixing Height / 300)	0.76 x (Mixing Height / 300)
Climb out (Mixing Height > 300m)	0.50 x ((Mixing Height - 300)/614.4)	0.50 x ((Mixing Height - 300)/614.4)	2.50 x ((Mixing Height - 300)/614.4)	2.50 x ((Mixing Height - 300)/614.4)
Climb out (Mixing Height < 300m)	0.00	0.00	0.00	0.00