
INTERIM AERODROME REQUIREMENTS FOR THE A380



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INTERIM AERODROME REQUIREMENTS FOR THE A380

1. INTRODUCTION

1.1 The Third Edition of Annex 14 Volume I, published in July 1999, defines the aerodrome facilities required for Code F operations. It specifies Code F as facilities to cater for aircraft with a wingspan of 65m and up to but not including 80m, and an outer main gear wheel span of 14m and up to but not including 16m.

1.2 The A380 aircraft is expected to commence commercial operations to New Zealand aerodromes in 2007 and Airbus has published preliminary information on this aircraft for aerodrome design purposes. This information confirms that the A380-800 will have a wingspan of 79.75m and an outer main gear wheel span of 14.34m and should, therefore, require Code F facilities.

1.3 However, Auckland and Christchurch international aerodromes have both been primarily designed to Code E standards and the ability to upgrade to Code F in the short term is perceived to be prohibitively costly and disruptive. Moreover, the methodology used by ICAO to determine the Code F requirements has been challenged, and Airbus has stated that the A380 aircraft has been designed specifically to operate from runways of Code E standard.

2. PURPOSE

2.1 The purpose of this paper is:

- (a) to outline the current ICAO Code F requirements; and
- (b) to notify aerodromes of the interim requirements proposed by the CAA for the introduction of A380 aircraft operations at currently certificated aerodromes where Code F facilities have yet to be provided.

2.2 Not all the criteria for the interim requirements are known but it has been decided to present this paper at this time to give aerodrome operators an indication of the criteria involved.

3. SCOPE

3.1 This paper applies to existing CAR Part 139 certificated aerodromes intending to handle aircraft operations requiring Code F facilities on aerodromes that do not comply fully with Code F requirements. It does not address any requirements that may apply to an aircraft operator of the A380 intending to use an aerodrome that does not fully comply with Code F requirements.

3.2 The interim requirements outlined in Section 5 apply only to the A380-800 aircraft type and are subject to certification of the aircraft for operations on a runway of Code E (minimum 45m) width. Other aircraft or A380 variants whose dimensions fall within Code F requirements and do not receive certification for operations on 45m wide runways will need to be assessed separately, or will require Code F facilities to be provided.

3.3 This paper does not apply to the aerodrome facilities required for operations of aircraft with a wingspan of 80m or greater, or with an outer main gear wheel span of 16m or greater.

4. SUMMARY OF ICAO CODE F REQUIREMENTS

Runways

4.1 The runway width should be not less than 60m. Runway shoulders are recommended and, if provided, should be at least 7.5m in width each side, giving an overall minimum width of 75m.

4.2 The Obstacle Free Zone (OFZ) shall extend to at least 77.5m either side of the runway centreline for a code 4 precision approach runway Category I, II, or III.

4.3 Precision approach Category I, II and III runway-holding positions should be located at least 107.5m from the runway centreline, increased as necessary to avoid interference with radio navigation aids.

Taxiways and Taxi-lanes

4.4 The minimum width of a taxiway should be 25m. The clearance between an outer main wheel of an aircraft and the taxiway edge should be at least 4.5m (the same as for Code E); however, Annex 14 advises that a greater clearance may permit higher taxiing speeds.

4.4 Taxiway shoulders and grading of the taxiway strip should be provided to give a minimum overall width of 60m.

4.6 The following minimum separations should apply:

- taxiway centreline – instrument code 4 runway centreline 190m
- taxiway centreline – non-instrument code 4 runway centreline 115m
- taxiway centreline – taxiway centreline 97.5m
- taxiway centreline – object (including taxiway strip) 57.5m
- aircraft stand taxi-lane centreline – object 50.5m

Aircraft Aprons and Stands

4.7 Annex 14 does not specify a minimum clearance between the outer main gear wheels and an apron edge, whether taxiing in a straight line or turning a corner. AC139-06 specifies a distance of 3.8m for Code E aircraft.

4.8 On aircraft stands, minimum stand clearances between the aircraft using a stand and any adjacent building, aircraft on another stand and other object for Code F are the same as Code E at 7.5m, and may be reduced when special circumstances so warrant.

Taxiing Guidance Signs

4.9 Annex 14 requirements for the location of taxiing guidance signs including runway exit signs are based on the code number of the runway.

4.10 The following distances shall apply:

- Perpendicular distance from defined taxiway pavement edge 11-21m
- Perpendicular distance from defined runway pavement edge 8-15m

5. INTERIM REQUIREMENTS FOR A380 AIRCRAFT OPERATIONS

5.1 Unless specified in the following interim proposals, ICAO Code F requirements as detailed above shall be provided.

Runways

5.2 A minimum 45m of runway pavement of full load bearing strength shall be provided together with inner shoulders of at least 7.5m of pavement of a load bearing strength that will permit occasional A380 aircraft incursion.

5.3 An additional minimum 7.5m of outer shoulder area that will provide protection from engine jet-blast and ingestion, and support for rescue and fire fighting equipment, should also be provided. The overall width of area provided shall therefore be not less than 75m.

5.4 Runway edge lights shall continue to be located along the edges of the area declared for use as the runway. For a 45m wide runway, the edge lights would generally be located at a distance of between 22.5m and 25.5m from the centre line. When an A380 is located on the runway centre line, the centre of the outer engines will be located either outside or directly over the line of lights. Aerodrome operators will need to determine if the existing light fittings will be able to withstand the expected jet blast of between 65 to 95m/sec^a. This will dictate whether the lights will be the elevated or flush type.

5.5 When an A380 aircraft is landing on the runway centreline, there will be in the order of 35m of lateral separation between the wing tip of the A380 and the nose of an aircraft (of any type/size) located at a non-precision runway-holding position at or near the runway threshold. This distance will be reduced proportionally if the A380 is not on the runway centreline and could reduce to less than 5m with the wheels of the landing aircraft still on or above the runway. The CAA considers that inadequate safety margins will exist with the use of non-precision runway-holding positions when an A380 aircraft is landing or taking-off on the same runway and hence, in this situation, aircraft and vehicles shall be held at least 90m from the runway centreline.

5.6 A simulation of the effect of an A380-sized aircraft on the performance of one type of instrument landing system (ILS) has been carried out by the UKCAA and has indicated that the ILS sensitive area might need to be enlarged to around 160m each side of the runway centreline. This simulation was predicated on a metal tail fin; however, it is understood that the A380 will have a tail fin made predominantly from composite materials, which may not exhibit the same interference characteristics as a metallic one. It is expected that operational trials will be conducted as soon as possible to verify this prediction, or determine an acceptable alternative. If a runway taxi-holding position has to be located further away from the runway centreline for A380 aircraft, the colour coding of taxiway centreline lighting may need to be extended accordingly. Appropriate mandatory taxi-guidance signs and markings will need to be provided if an additional runway taxi-holding position is provided solely for an A380 aircraft.

5.7 Discussion within the ICAO Obstacle Clearance Panel (OCP) on the required OFZ for Code F has been renewed; however, unless and until the OCP determines different criteria, aerodrome operators should expect to provide up to the ICAO Code F requirements published currently.

^a Common Agreement Document of the A380 Airport Compatibility Group, Version 2.1, December 2002

Taxiways and Taxi-lanes

5.8 Trials have been conducted at a number of aerodromes to determine the extent of deviation from the taxiway centreline when taxiing large aircraft. Even though it is normal for pilots to taxi an aircraft off the taxiway centreline to avoid the taxiway centreline lights, the initial results of the trials indicate that movement of an A380, on Code E width (23m) taxiways would be safe, albeit with the use of cameras and inherently reduced taxi speeds. Therefore, the minimum width of a taxiway shall be 23m and, where necessary, fillets shall be provided on curves to provide a minimum distance of 4.5m between the outer main wheel and the taxiway edge.

5.9 Taxiway centreline lighting shall be provided on all routes intended for use by A380 aircraft at night and in low visibility conditions. Taxiway centreline lighting may be augmented as necessary by blue taxiway edge lighting; however, blue taxiway edge lighting should not be considered as mitigation for a lack of taxiway width.

5.10 The graded area of the taxiway strip shall be a minimum of 60m in width and increased as necessary to give adequate jet-blast protection. The location of objects essential to the use of a taxiway system should be not less than 23m from the edge of a Code E taxiway or not less than 22m from the edge of a Code F taxiway. (See also 5.13)

5.11 For Auckland and Christchurch International aerodromes, it is not anticipated that any reduction in the taxiway separation distances would be required and therefore the following minimum separations shall apply:

- taxiway centreline – instrument code 4 runway centreline as per ICAO 190.0m
- taxiway centreline – non-instrument code 4 runway centreline as per ICAO 115.0m
- taxiway centreline – taxiway centreline as per ICAO 97.5m

Note: The distances above are based on two Code F aircraft operating simultaneously and may be reduced depending on the actual dimensions of the aircraft involved.

- taxiway centreline – object (including taxiway strip) as per ICAO 57.5m
- aircraft stand taxi-lane centreline – object as per ICAO 50.5m

Aircraft Aprons and Stands

5.12 Minimum clearance between the outer main gear wheels and the apron edge, whether taxiing in a straight line or turning a corner, shall not be less than that specified in AC139-06 for Code E aircraft of 3.8 metres.

5.13 Minimum stand clearances between the aircraft using a stand and any adjacent building, aircraft on another stand and other object shall be as specified for Code F in Annex 14 of 7.5m.

Taxiing Guidance Signs

5.14 The requirements for the location of taxiing guidance signs including runway exit signs are based on the code number of the runway and assume that the width of the associated taxiway or runway is as recommended, i.e. 25m for a Code F taxiway and 60m for a Code F runway.

5.15 Where the defined width of the runway is 45m and inner shoulders of 7.5m have been provided in accordance with 5.2, then the distance shall be taken from the edge of those shoulders.

5.16 Due to the location of the outboard engines on the A380, the maximum distance of 21m from the edge of the taxiway pavement is considered inadequate. The outer engine of the A380 is located approximately 5m further out than the B747 and the distance specified in Table 5-4 of Annex 14 should be increased accordingly.

5.17 As the distances shown in Table 5-4 assume that the associated taxiway and runway are as recommended and this may not always be the case, the distances specified below are given from the centre line of the taxiway or runway as applicable.

5.18 The following distances shall apply:

- Perpendicular distance from taxiway centre line 22.5 - 37.5m
- Perpendicular distance from runway centre line 38 - 45m

6. RESCUE AND FIRE FIGHTING SERVICE

6.1 In accordance with Annex 14 Volume I Chapter 9, Table 9-1 indicates that the Aerodrome Category (RFS) required for an A380-800 aircraft is Category 10 and the minimum usable amounts of extinguishing agents are defined in Table 9.2.

6.2 With the expected large increase in the potential number of occupants and the access/egress issues associated with the twin-deck fuselage, it is considered that aerodromes should provide the appropriate category of rescue fire based on the requirements of Annex 14 Chapter 9 Table 9-1.

6.3 Annex 14 Chapter 9.2.3 does allow for this category to be one less than the aerodrome category when the number of movements of the largest aircraft regularly using the aerodrome is less than 700 in the busiest 3 months of the year.

7. IMPLEMENTATION

7.1 The ICAO requirements for Code F facilities contained in this paper will be incorporated in the next amendment of AC139-06.

7.2 Subject to the condition outlined at paragraph 3.2, aerodromes intending to handle aircraft operations requiring Code F facilities may provide the reduced facilities specified in Section 5 for the operation of A380 aircraft; however, facilities meeting Code F requirements should be provided in full on all relevant parts of the movement area when new construction or major redevelopments of the movement area are undertaken in the future. When planning such construction or redevelopments, it may be prudent to consider the requirements of future aircraft types needing facilities in excess of Code F. Aerodrome operators should consult with the CAA at the project planning stage for any future development.

Summary of A380-800 requirements

Facility	ICAO Annex 14 Code F	Interim requirements
Runway width	60m	45m
Runway shoulder	7.5m	7.5m + 7.5m blast protection
Obstacle free zone	77.5m either side of centre line	77.5m either side of centre line
Runway holding positions	107.5m from centre line	107.5m from centre line
Taxiway width	25m	23m
Taxiway shoulder	17.5m	10.5 + 6m blast protection
Taxiway centre line to Code 4 instrument runway	190m	190m
Taxiway centre line to Code 4 non-instrument runway	115m	115m
Taxiway centre line to taxiway centre line	97.5m	97.5m
Taxiway centre line to object	57.5m	57.5m
Aircraft stand taxi-lane to object	50.5m	50.5m
Apron edge and outer main gear wheel		3.8m
Aircraft using stand and any other aircraft or object	7.5m	7.5m
Taxiing guidance sign to runway centre line	38 – 45m	38 – 45m
Taxiing guidance sign to taxiway centre line	22.5 – 32.5m	22.5 – 37.5m
Rescue fire category	ICAO Category 10	Category 9 where there are less than 700 movements of the A380 in the busiest consecutive 3 months of the year.