Transport Canada Transports Canada

Advisory Circular

Subject: **Methodology for the Identification of the Aircraft Group Number**

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1.0 Introduction

(1) This Advisory Circular (AC) is provided for information and guidance purposes. It describes an example of an acceptable means, but not the only means, of demonstrating compliance with regulations and standards. This AC on its own does not change, create, amend or permit deviations from regulatory requirements, nor does it establish minimum standards.

1.1 Purpose

(1) The purpose of this document is to provide guidance on the identification of the Aircraft Group Number.

1.2 Applicability

(1) This document applies to all Canadian airport operators, manufacturers, suppliers, Transport Canada Civil Aviation (TCCA) Headquarters and regional personnel, and the aviation industry involved with the planning, design, and maintenance activities at Canadian aerodromes.

1.3 Description of changes

(1) The Appendices A and B, referring to the AGN flow methodology examples, have been revised to reflect the changes brought by the 1st amendment of TP 312 5th edition made effective January 15, 2020.

(2) The references regarding the characteristics of aircraft types have been updated in sections 2.3 and 4.1 to include the links to the latest version of the FAA database and to the Airport Planning Manuals from one more aircraft manufacturer.

2.0 References and requirements

2.1 Reference documents

(1) It is intended that the following reference materials be used in conjunction with this document:

- (a) Aeronautics Act (R.S.C., 1985, c. A-2)
- (b) Part III, Subpart 2 of the Canadian Aviation Regulations (CARs) — Airports;
- (c) Transport Canada Publication (TP) 312, Edition 05, 2020-01-15 — Aerodrome Standards and Recommended Practices.
- (d) Advisory Circular (AC) 302-018, Issue 01, 2014-11-27 — Grandfathering at Airports pursuant to CAR 302.07; and
- (e) Advisory Circular (AC) 302-020 Issue 01, 2015-07-31 — Mixed Operations at Airports.

2.2 Cancelled documents

(1) Not applicable.

(2) By default, it is understood that the publication of a new issue of a document automatically renders any earlier issues of the same document null and void.

2.3 Definitions and abbreviations

(1) The following **definitions** are used in this document:

(a) **Aircraft Approach Speed Category:** A grouping of aircraft based on a reference landing speed (V_{REF}), if specified, or if V_{REF} is not specified, 1.3 times stall speed (V_{SO}) at the maximum certificated landing weight. V_{REF}, $V_{SO,}$ and the maximum certificated landing weight are those values as established for the aircraft by the certification authority of the country of registry.

(i) **Category A:** Speed less than 91 knots. (Catégorie A)

(ii) **Category B:** Speed 91 knots or more but less than 121 knots. (Catégorie B)

(iii) **Category C:** Speed 121 knots or more but less than 141 knots. (Catégorie C)

(iv) **Category D:** Speed 141 knots or more but less than 166 knots. (Catégorie D)

(v) **Category E:** Speed 166 knots or more. (Catégorie E) (Catégories de vitesses d'approche)

Note: The FAA keeps up to date a database providing the essential characteristics of aircraft types in order to perform airport planning and design functions. In addition, the database includes the required aircraft approach speeds: http://www.faa.gov/airports/engineering/aircraft_char_database/

(b) **Outer Main gear span**: means the maximum width between the outer edges of the outer main landing gears, as stated by the aircraft manufacturer.

(c) **Tail height:** means the maximum height of the highest part of the aircraft, as stated by the aircraft manufacturer.

(d) **Wingspan:** means the maximum width of the aircraft between wing tips, as stated by the manufacturer.

(2) The following **abbreviations** are used in this document:

(a) **AGN:** Aircraft Group Number

(b) **AOM:** Airport Operator Manual

(c) **CAR:** *Canadian Aviation Regulation*

3.0 Background

(1) The introduction of TP312 5th edition is a change in the application concept of the “standards” affecting airport certification. This shift from the design-based concept under the previous editions of TP312 to an operational concept in TP312 5th aligns the certification standards to the actual (or planned) operation at site by linking the standards to specific aircraft characteristics, aerodrome operating visibility condition, and level of service (Precision, Non-Precision, Non-Instrument). It also complements the Canadian airspace design criteria under TP308 and other regulatory requirements currently stated in Parts VI and VII of the Canadian Aviation Regulations.

(2) This change to an operational concept requires airport operators to be more knowledgeable of the aircraft operations occurring (or planned for) at the airport whereas previous editions of TP312 were of a design based concept using primarily the runway length in a Code number system to link the standards applicable to the facility.

(3) With the introduction of TP 312 5th, all certified airport operators will be required to amend their Airport Operations Manual to include additional information in addition to submitting an update to the aeronautical publications regarding the certification level of the various parts of the certified aerodromes (airports). This is required so that aircrews may ascertain the aerodrome as being “…*suitable for the intended operation*” as currently required under 602.96 (2)(b) of the CAR. At this time, there is nothing in the Integrated Aeronautical Information Publications that informs the Aircraft Operator as to the certification level of the infrastructure provided at the airport. Only a

general statement is provided as to whether or not the facility is “Certified” or “Registered”. This general statement does not provide the Aircraft Operator adequate detail as to the suitability for each facility offered at an airport.

4.0 Aircraft Group Number

4.1 Aircraft Group Number

(1) The operational based concept under TP312 5th edition uses specific characteristic of the critical aircraft (current or planned) to link the respective standards. Each standard in TP312 5th directs the reader as to which of these characteristics is being called upon by the standard. These characteristics include:

(a) Wingspan (with consideration of the aircraft approach speed category);

(b) Outer main gear span; and

(c) Tail height.

4.2 Aircraft Characteristics – Sources of information

(1) Air operators serving (or planning to serve) the airport are excellent sources of information for the characteristics of the aircraft they are providing (or intending to provide) at the airport. Most of the information needed to identify the Aircraft Group Number(s) of the aircraft and is included in the approved Aircraft Flight Manuals.

(2) In addition, some aircraft manufacturers have provided a significant amount of information relating to the characteristics of their aircrafts on their websites such as the following:

(a) Airbus – airport operations:
https://aircraft.airbus.com/en/customer-care/fleet-wide-care/airport-operations-and-aircraft-characteristics

(b) Boeing - airport planning:
http://www.boeing.com/boeing/commercial/airports/plan_manuals.page

(c) Embraer – airport planning manual:
https://www.embraercommercialaviation.com/media-downloads/documents/#49-51-apm

(3) Also, ICAO has included a listing of common aircraft and their physical characteristics in the following publications:

(a) ICAO – Doc 9157 - Aerodrome Design Manual, Part 1. Runways; and

(b) ICAO – Doc 9157 - Aerodrome Design Manual, Part 2. Taxiways, Aprons and Holding Bays.

4.3 AGN Flow Methodology

(1) Previous versions of TP312 were of a design-based concept. Under this concept the critical aircraft and its relation to the airfield infrastructure elements was established through a Runway Code number and this number was related to the standards throughout the document.

(2) TP312 5th edition uses an operational concept in that the critical characteristic of the aircraft relating to the infrastructure element being discussed is identified for each and every airfield element.

Note: The outer main gear width is the aircraft characteristic relating to runway and taxiway widths, wingspan combined with approach speed relates to taxiway strip widths, runway strip and safety area widths.

(3) Under this concept, it is a reality that any given aircraft may have more than one AGN depending on the airfield element being addressed, due to physical aircraft characteristics (wingspan, outer main gear span), or approach speed influence.

(4) Once the AGN is identified for the element being addressed, this information needs to be included in the relevant sections of the AOM describing the physical characteristics of the maneuvering area. In addition, the AGN information must be forwarded to the AIS provider for publication in the CFS.

(5) Appendices A and B include examples of the flow/methodology to identify the AGN.

5.0 Information management

(1) Not applicable.

6.0 Document history

(1) AC 302-019, **Issue 01**, RDIMS 9914711 (E), 10192100 (F), dated 2015-07-31 – Methodology for the Identification of the Aircraft Group Number.

7.0 Contact us

For more information, please contact:
Flight Standards (AARTA)
E-mail: TC.FlightStandards-Normsvol.TC@tc.gc.ca

We invite suggestions for amendments to this document. Submit your comments to:
AART Documentation Services
E-mail: AARTDocServices-ServicesdocAART@tc.gc.ca

Original signed by Charles Lanning for

Stacey Mason
Director, Standards branch
Civil Aviation

Appendix A — AGN FLOW METHODOLOGY EXAMPLE 1

Note: The following is an example using the following tables from TP312 5th edition to identify the AGN relating to the minimum runway safety area width. It is to be noted that this example includes consideration for the approach airspeed of the aircraft.

(1) A Boeing 737-400 has the following characteristics as stated by the manufacturer:

(a) Wingspan - 28.9 m

(b) Outer main gear wheel span - 6.4 m

(c) Reference landing speed - 139 kt

(d) (Data provided for exercise purpose only.)

(2) **Question:** What is minimum runway safety area width for a Boeing 737-400?

(a) Determine the Aircraft approach speed category for the critical aircraft. Chapter 1 of TP312 5th edition contains the following definition:

Aircraft approach speed category. A grouping of aircraft based on a reference landing speed (V_{REF}), if specified, or if V_{REF} is not specified, 1.3 times stall speed (V_{SO}) at the maximum certificated landing weight. V_{REF}, V_{SO}, and the maximum certificated landing weight are those values as established for the aircraft by the certification authority of the country of registry.

- Category A: Speed less than 91 kt. *(Catégorie A)*
- Category B: Speed 91 kt or more but less than 121 kt. *(Catégorie B)*
- Category C: Speed 121 kt or more but less than 141 kt. *(Catégorie C)*
- Category D: Speed 141 kt or more but less than 166 kt. *(Catégorie D)*
- Category E: Speed 166 kt or more*. (Catégorie E) (Catégories de vitesses d'approche)*

(b) The Boeing 737-400 has a reference landing speed of 139 kts, as per definition, it is a Category C aircraft.

(c) Table 1-1 from TP312 5th edition will help determining the right AGN for the Boeing 737 400 in the Runway environment.

(i) Enter the airplane's wingspan in the corresponding line of the Column II.

(ii) The aircraft falls into AGN IIIA when referencing across Column I.

(iii) However, the Boeing 737-400 has a CAT C approach speed, so the associated note directs the use of AGN IIIB.

Table 1-1: Runway Environment	
Column I	Column II
Aircraft Group Number	**Wing Span**
I (for approach speed CAT C or D use AGN IIIB)	Less than 14.94 m
II (for approach speed CAT C or D use AGN IIIB)	14.94 m up to but not including 24.10 m
IIIA (for approach speed CAT C or D use AGN IIIB)	24.10 m up to but not including 36.00 m
IIIB (includes groups I - IIIA with C & D approach speeds)	24.10 m up to but not including 36.00 m
IV	36.00 m up to but not including 52.12 m
V	52.12 m up to but not including 65.23 m
VI	65.23 m up to but not including 79.86 m

Note: Table 1-1 includes consideration of the higher approach speeds that occur in the runway environment.

Example on use of the tables: An aircraft has a wingspan of 20 m, a gear span of 4.7 m and a reference landing speed (V_{REF}) of 129 kt. A standard references the use of Column II (wingspan) of Table 1-1 for its application. The aircraft falls into AGN II when referencing across the columns; however, the associated note directs the use of AGN IIIB due to the V_{REF} being in the C category. For Table 1-2, the AGN is read directly across from the column referenced in the appropriate standard.

(d) Determining the minimum runway safety area width

(i) Refer to Table 3.1.5.2

3.1.5.2 The runway safety area extends each side of the runway centreline and extended centreline within the strip, to the minimum distances specified in Table 3.1.5.2.

Table 3.1.5.2—Runway Safety Area Minimum distances of each side of centreline and extended centreline (in metres)							
Aircraft Group Number *Table 1-1 Column II*	I	II	IIIA	IIIB	IV	V	VI
Non-instrument	30	40	40	75	75	75	75
Non-precision	40	40	40	75	75	75	75
Precision	40	45	45	75	75	75	75

(3) The minimum runway safety area width for a Boeing 737-400 is **a minimum distance <u>of each side of the centreline</u> and extended centerline within the strip** of 75 meters for a non-instrument, a non-precision and a precision runway.

Therefore, the minimum width is 150 meters.

Appendix B — AGN FLOW METHODOLOGY EXAMPLE 2

Note: The following is an additional example using the following table from TP312 5th edition to identify the aircraft group number relating to the taxiway minimum separation distances. It is to be noted that this example is used for determining AGN for characteristics in the taxiway environment. An aircraft can have a different AGN regarding taxiway and runway environments.

(1) An Airbus 220-300 has the following characteristics as stated by the manufacture

(a) Wing Span (fuel loaded) – 35.1 m

(b) Tail Height – 11.8 m

(c) Reference landing speed – 136.4 kts

(d) (Data provided for exercise purpose only.)

(e) Reference document: Aircraft Characteristics Publication

(2) **Question:** What is the taxiway centreline to runway centreline minimum separation distances for a CAT II runway for an Airbus 220-300?

(a) Table 1-2 from TP312 5th edition will help determining the right AGN for the Airbus 220 300 in the Runway environment.

Table 1-2: Taxiway Environment

Column I	Column II	Column III
Aircraft Group Number	**Wing Span**	**Tail Height**
I	Less than 14.94 m	Less than 6.10 m
II	14.94 m up to but not including 24.10 m	6.10 m up to but not including 9.15 m
IIIA	24.10 m up to but not including 36.00 m	6.10 m up to but not including 9.15 m
IIIB	24.10 m up to but not including 36.00 m	9.15 m up to but not including 13.72 m
IV	36.00 m up to but not including 52.12 m	13.72 m up to but not including 18.30 m
V	52.12 m up to but not including 65.23 m	18.30 m up to but not including 20.12 m
VI	65.23 m up to but not including 79.86 m	20.12 m up to but not including 24.40 m

(i) Enter the airplane's Tail height in the corresponding line of the Column III.

(ii) Control the corresponding Wing span associated when referencing across Column II to verify if the technical data of the airplane fits in the range of measurements. (If the Airbus 220 300 had had a wingspan of 36.1 m, it would have fallen in AGN IV).

(iii) The aircraft falls into AGN IIIB when referencing across Column I.

(b) Find the taxiway centreline to runway centreline minimum separation distance for a CAT II runway for an Airbus 220-300 by looking at the corresponding row (CAT II) for an AGN IIIB.

Note: Pay close attention to the notes linked to the table as they can modify the minimums.

At sea level, the taxiway centreline to runway centreline minimum distance is 122.0 meters if all conditions depicted in notes (1) to (4) are respected.

Table 3.5.1.4—Taxiway Minimum Separation Distances (in metres)

AGN *Table 1-2 Column II*	I	II	IIIA	IIIB	IV	V	VI
NON-INSTRUMENT RUNWAY							
Taxiway centreline to runway centreline	37.5	52.0	58.0	93.0	101.0	107.5	115.0
Taxiway centreline to taxiway centreline	23.0	32.0	44.0	44.0	63.0	76.0	91.0
Taxiway centreline to object	15.5	20.0	26.0	26.0	37.0	43.5	51.0
NON-PRECISION RUNWAY							
Taxiway centreline to runway centreline	67.5	72.0	90.0	122.0	122.0	122.0	153.0
Taxiway centreline to taxiway centreline	23.0	32.0	44.0	44.0	63.0	76.0	91.0
Taxiway centreline to object	15.5	20.0	26.0	26.0	37.0	43.5	51.0
PRECISION RUNWAY at sea level (1),(2)							
Taxiway centreline to runway centreline	CAT						
	77.0	92.0	107.0	122.0	122.0	122.0	153.0
	CAT II or III						
	122.0	122.0	122.0	122.0	122.0	153.0	168.0
Taxiway centreline to taxiway centreline	23.0	32.0	44.0	44.0	63.0	76.0	91.0
Taxiway centreline to object	15.5	20.0	26.0	26.0	37.0	43.5	51.0

(1) The taxiway to runway centerline distances noted in Table 3.5.1.4 for precision runways are the minimum distances at sea level. Any increase in aerodrome elevation above sea level (ASL), or taxiway elevation versus runway elevation could increase the minimum distance required and needs to be reassessed so that no part of an aircraft (tail top, wing tip) on the taxiway infringes the obstacle free zone (OFZ) (including the inner transitional surfaces). This assessment would consider the aircraft as being on the edge of the taxiway nearest to the runway. See section 4.1.4—Inner Transitional Surface.

(2) In all cases, an aircraft and other mobile objects are to be clear of the OFZ. See Table 1-2, Column III for tail heights to be considered and section 4.1.4 for the inner transitional surface.

(3) The separation distances for taxiway to runway and taxiway to taxiway are based on the assumption of equivalent AGNs on each surface. Reduced separation distances may be possible for mixed operations using site specific, TCCA approved procedures supported by an aeronautical evaluation.

(4) The above separations are based on the assumption of taxiway widths being at the minimum required for the relevant AGN. Where a taxiway is wider than the minimum, additional separation will be required to account for an aircraft being at the edge of the operational taxiway surface. Consult with TCCA where these situations exist at the site.