A220

Master

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APP

BD500-3AB48-22000-00
Issue No. 025

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Manufacturer:

AIRBUS

Airbus Canada Limited Partnership
Customer Services
13100 Henri-Fabre Blvd., Mirabel, Quebec
Canada J7N 3C6

Applicable to: All

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Highlights

Issue 025

The listed changes are introduced in Issue 025, dated 2020-02-20, of this publication.

Data module code	Reason for change
BD500-A-J00-00-00-11AAA-030A-A	Changed Data Module To change the table values.

Applicable to: All

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Technical Publications Comment form

AIRBUS A220

TO: **MCR FOCAL, TECHNICAL PUBLICATIONS AIRBUS CANADA LIMITED PARTNERSHIP 13100, BOULEVARD HENRI-FABRE MIRABEL, QUEBEC, CANADA, J7N 3C6 E-MAIL ADDRESS: A220_UCFocal@abc.airbus**	**Name of airline:** **A220 reference #:** **Date:** dd-mmm-yyyy

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Publication information

*Aircraft type:		*Aircraft model:	*Publication Module Code (PMC):
*Publication title/Issue:	*Media Type: ☐ Paper ☐ Web	*Data Module Code (DMC):	*DMC issue date:
Data module title:		Originator's reference number:	

*Comments:

Reason for change:

Reference data provided: ☐ Yes ☐ No Description:

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Change record

Check in the following record that all earlier changes has been incorporated.

Issue	Incorporated Date	by (signature)	Issue	Incorporated Date	by (signature)
001	Jul 29/2014	Initial issue	020	Jun 20/2019	Signature on file
002	Dec 19/2014	BCSG	020-01	Sep 05/2019	Signature on file
003	Sep 15/2015	BCSG	021	Sep 19/2019	Signature on file
004	Sep 24/2015	BCSG	021-01	Oct 31/2019	Signature on file
005	Mar 08/2016	BCSG	021-02	Nov 07/2019	Signature on file
006	Apr 20/2016	BCSG	022	Nov 14/2019	Signature on file
007	May 20/2016	BCSG	022-01	Dec 12/2019	Signature on file
008	Nov 17/2016	BCSG	023	Dec 19/2019	Signature on file
009	May 11/2017	Not released	024	Jan 16/2020	Signature on file
010	May 18/2017	BCSG	024-01	Feb 06/2020	Signature on file
011	Jun 15/2017	BCSG	025	Feb 20/2020	Signature on file
012	Oct 12/2017	BCSG	000		
013	Jan 25/2018	BCSG	000		
014	Feb 15/2018	BCSG	000		
014-01	Jun 07/2018	BCSG	000		
015	Jun 14/2018	BCSG	000		
015-01	Jul 26/2018	BCSG	000		
016	Aug 16/2018	BCSG	000		
016-01	Aug 23/2018	BCSG	000		
017	Sep 20/2018	BCSG	000		
017-01	Oct 04/2018	BCSG	000		
018	Oct 18/2018	BCSG	000		
018-01	Feb 21/2019	BCSG	000		
019	Mar 14/2019	BCSG	000		
019-01	May 30/2019	BCSG	000		

Applicable to: All

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List of effective data modules

The listed documents are included in Issue 025, dated 2020-02-20, of this publication.

C = Changed data module
N = New data module

Document title	Data module code		Issue date	No. of pages	Applicable to
Airport Planning Publication (APP) - Introduction	BD500-A-J00-00-00-20AAA-018A-A		2019-11-06	3	All
Aircraft description - Technical data	BD500-A-J00-00-00-12AAA-030A-A		2019-08-27	34	All
Aircraft performance - Technical data	BD500-A-J00-00-00-13AAA-030A-A		2015-09-01	14	All
Ground maneuvering - Technical data	BD500-A-J00-00-00-19AAA-030A-A		2019-10-22		All
Terminal servicing - Technical data	BD500-A-J00-00-00-18AAA-030A-A		2020-01-08	41	All
Operating conditions - Technical data	BD500-A-J00-00-00-17AAA-030A-A		2019-12-03	12	All
Pavement data - Technical data	BD500-A-J00-00-00-11AAA-030A-A	C	2020-01-27	34	All
Derivative aircraft - Technical data	BD500-A-J00-00-00-22AAA-030A-A		2019-10-22	1	All
Scaled drawings - Technical data	BD500-A-J00-00-00-21AAA-030A-A		2019-10-22	2	All

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The listed documents are included in Issue 025, dated 2020-02-20, of this publication.

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List of terms

Maximum cargo volume	The maximum space available for cargo.
Maximum design Landing Weight (MLW)	Maximum weight for landing as limited by aircraft strength and airworthiness requirement.
Maximum design Take-Off Weight (MTOW)	Maximum weight for take off as limited by aircraft strength and airworthiness requirements. This includes weight of fuel for taxi and run-up.
Maximum design Taxi Weight (MTW)	Maximum weight at which an aircraft can move safely on the ground. This includes the fuel for these displacements and the takeoff run.
Maximum design Zero Fuel Weight (MZFW)	Maximum weight permitted before usable fuel and other usable agents must be loaded in defined sections of the aircraft, as limited by strength and airworthiness requirements.
Maximum seating capacity	The maximum number of passengers permitted based on certification requirements.
Operational Weight Empty (OWE)	Weight of structure, power plant, furnishings, systems, unusable fuel and other items of equipment that are a necessary part of a particular aircraft configuration. Also included are certain standard items, personnel, equipment and supplies necessary for full operations, but does not include usable fuel or payload.
Usable fuel	Fuel available for aircraft propulsion and the Auxiliary Power Unit (APU).

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Airport Planning Publication (APP) - Introduction

Applicability: Model: CS100

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List of tables

References

Table 1 References

Data Module/Technical Publication	Title
None	

Description

1 Scope of the publication

The Airport Planning Publication (APP), prepared by Airbus, contains general data on the airport facilities, ramp, and runway areas necessary to operate the Airbus commercial aircraft model BD-500-1A10 (A220-100).

Since operational practices vary among airlines, specific data should be coordinated with the user airlines prior to facility design. For additional information, please contact Airbus.

The content of this publication will change as options and aircraft changes occur. Make sure that you refer to the latest release of this publication.

If there is a difference between the data contained in this publication and that given by the local regulatory authority, the data from the local regulatory authority must be obeyed.

2 Publication organization

This publication is divided into eight sections:

- Aircraft description
- Aircraft performance
- Ground maneuvering

- Terminal servicing
- Operating conditions
- Pavement data
- Derivative aircraft
- Scaled drawings

3 Dimensions and weight

Linear dimensions given in this publication are in inches. The metric equivalents are given in parentheses ( ).

Weight measures is given in pound (lb) with the metric equivalent in parentheses ( ).

4 Correspondence

The publications change request form is available online and is used to request technical changes to rectify any errors, omissions, or procedural inconsistencies (if applicable), etc. using the Airbus Navigator Interactive Electronic Technical Publication (IETP) application.

5 Translation of publication

If all or part of this publication is translated, the official version is the English language version by Airbus.

6 Standard term definitions

Maximum design Taxi Weight (MTW)	Maximum weight at which an aircraft can move safely on the ground. This includes the fuel for these displacements and the takeoff run.
Maximum design Landing Weight (MLW)	Maximum weight for landing as limited by aircraft strength and airworthiness requirement.
Maximum design Take-Off Weight (MTOW)	Maximum weight for take off as limited by aircraft strength and airworthiness requirements. This includes weight of fuel for taxi and run-up.
Operational Weight Empty (OWE)	Weight of structure, power plant, furnishings, systems, unusable fuel and other items of equipment that are a necessary part of a particular aircraft configuration. Also included are certain standard items, personnel, equipment and supplies necessary for full operations, but does not include usable fuel or payload.
Maximum design Zero Fuel Weight (MZFW)	Maximum weight permitted before usable fuel and other usable agents must be loaded in defined sections of the aircraft, as limited by strength and airworthiness requirements.
Maximum cargo volume	The maximum space available for cargo.

Maximum seating capacity	The maximum number of passengers permitted based on certification requirements.
Usable fuel	Fuel available for aircraft propulsion and the Auxiliary Power Unit (APU).

7 Acronyms

The first time an acronym is used it will be defined, and all subsequent uses will be in blue. When you mouse over the acronym the definition will appear. Acronyms are not plural in this publication.

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Aircraft description - Technical data

Applicability: Model: CS100

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References

Table 1 References

Data Module/Technical Publication	Title
None	

Description

1 Aircraft characteristics

1.1 Introduction

This data module contains general data about the Airbus model BD-500-1A10 (A220-100) characteristics. The structural weight limits, such as maximum ramp weight, and zero fuel weight are dependent on configuration. Refer to each aircraft's specified Weight and Balance Manual (WBM) BD500-3AB48-22100-00 and weight and balance report for structural limits and other weight information.

Refer to Table 2 for the aircraft characteristics.

Refer to Table 3 for the system fluid capacities.

Refer to Table 4 for the service fluid capacities.

1.2 Aircraft characteristics

Table 2 Aircraft characteristics

Description	A220-100
Engines	2 Pure Power™ PW1519G[1]
Mode	Passenger
Standard seating capacity	120
Maximum Ramp Weight (MRW)	135,000 lb (61 235 kg)

Description	A220-100
Maximum Take-Off Weight (MTOW)	134,000 lb (60 781 kg)
Maximum Landing Weight (MLW)	115,500 lb (52 390 kg)
Maximum Zero Fuel Weight (MZFW)	111,000 lb (50 349 kg)
Maximum fuel tank capacity	5,756 US gal (21 805 L)
Unusable fuel	220.5 lb (100 kg)
Maximum cargo volume - Overhead bins	280 ft³ (7,93 m³)
1 Optional engine models: PW1521G and PW1524G	

1.3 System fluid capacities

Table 3 System fluid capacities

Description	Volume	Weight
Engine fluids calculated with 7.7 lb/US gal (0,920 kg/L)		
Engines oil tank at 60 °F	12.9 US gal (49,0 L)	99 lb (44,9 kg)
Lines and internal engine oil	3.3 US gal (12,6 L)	26 lb (11,8 kg)
Total	16.2 US gal (61,6 L)	125 lb (56,7 kg)
APU fluids calculated with 7.98 lb/US gal (0.956 kg/L)		
APU	2.78 US gal (10.52 L)	22.1 lb (10.02 kg)
Hydraulic fluids at 77 °F (25 °C) low density 8.43 lb/US gal (1,01 kg/L)		
System 1 reservoir	4.98 US gal (18.85 L)	41.98 lb (19.04 kg)
System 2 reservoir	4.33 US gal (16.39 L)	36.50 lb (16.55 kg)
System 3 reservoir	4.33 US gal (16.39 L)	36.50 lb (16.55 kg)
Total	13.64 US gal (51.63 L)	114.98 lb (52.15 kg)
Hydraulic fluids at 77 °F (25 °C) high density 8.86 lb/US gal (1,06 kg/L)		
System 1 reservoir	4.98 US gal (18.85 L)	44.12 lb (20.01 kg)
System 2 reservoir	4.33 US gal (16.39 L)	38.36 lb (17.40 kg)
System 3 reservoir	4.33 US gal (16.39 L)	38.36 lb (17.40 kg)
Total	13.64 US gal (51.63 L)	120.84 lb (54.81 kg)

1.4 Service fluid capacities

Table 4 Service fluid capacities

Description	Volume	Weight
Potable water at 60 °F (15,5 °C)		
Galley/Lavatory tank	42.0 US gal (159,0 L)	350.5 lb (159.0 kg)
Chemical toilet fluid at 60 °F (15,5 °C)		
Waste tank	38 US gal (143.84 L)	316.54 lb (143.58 kg)

2 Aircraft dimensions

2.1 General aircraft dimensions

This section contains general data about the aircraft dimensions.

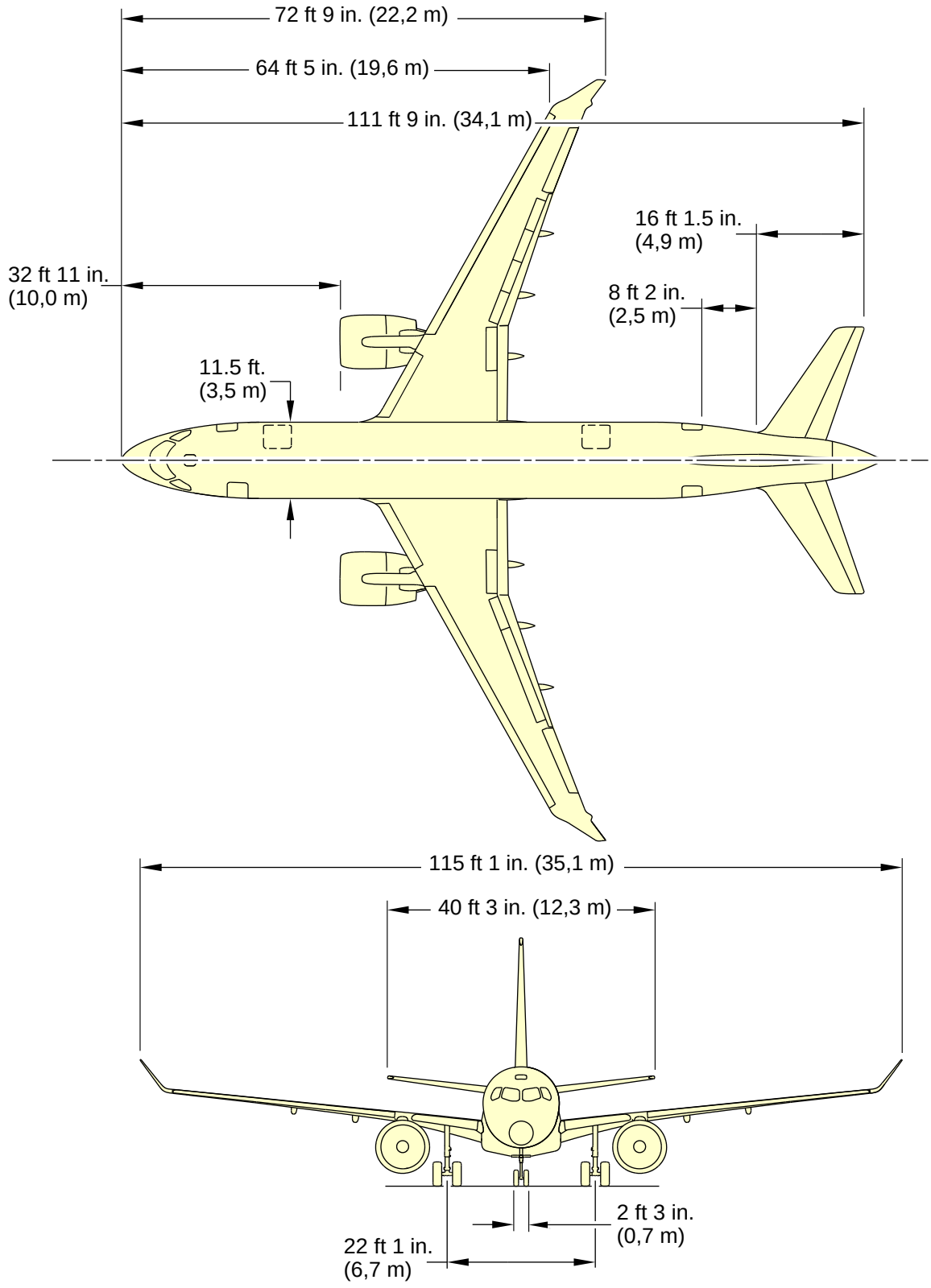

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Figure 1 General aircraft dimensions - (Sheet 1 of 2)

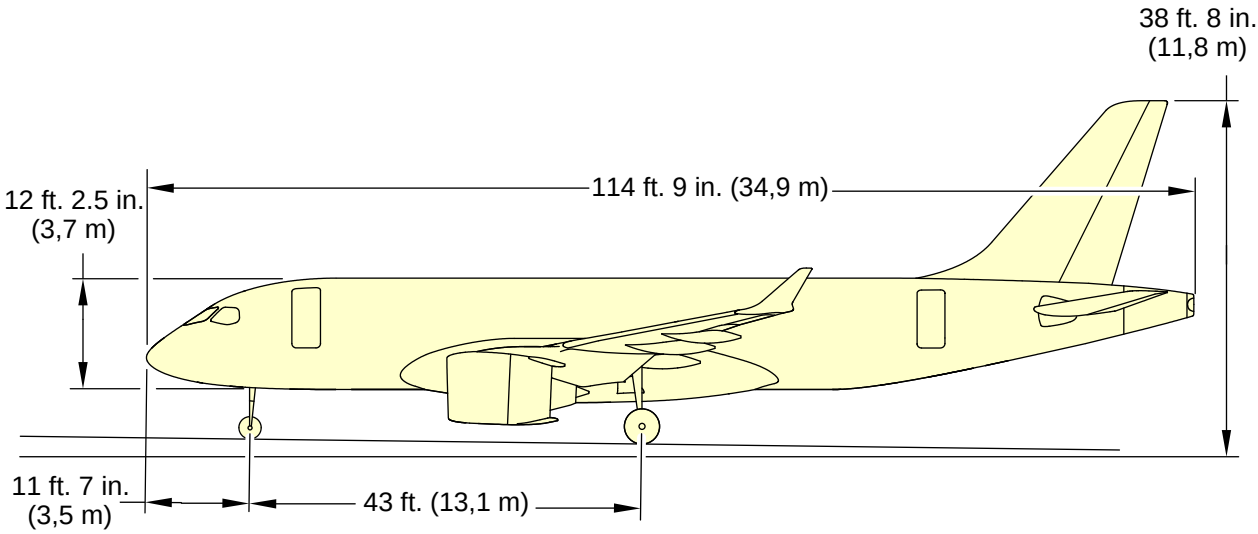

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Figure 1 General aircraft dimensions - (Sheet 2 of 2)

2.2 General aircraft area

Table 5 General aircraft area

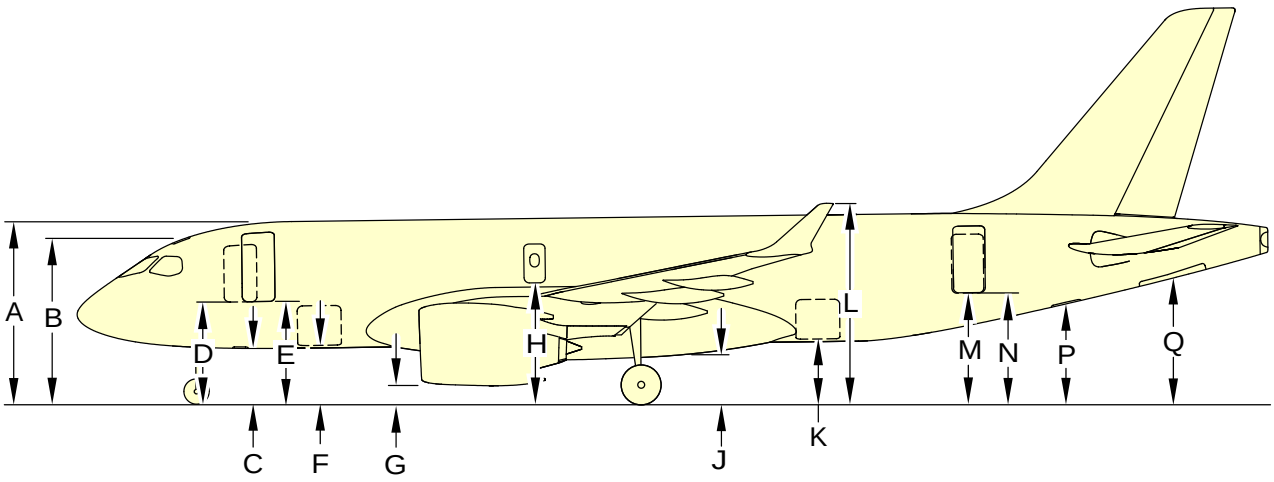
Description	A220-100
ESDU wing area (including ailerons, flaps, spoilers and area within the fuselage)	1209 ft² (112.3 m²)
Total horizontal stabilizer area (horizontal tail area and elevator area)	395 ft² (36.6 m²)
Total vertical stabilizer area (vertical tail area and rudder area)	304 ft² (28.2 m²)

3 Ground clearances

This section gives the height of various points of the aircraft, above the ground.

Dimensions in the tables are approximate and will vary with tire type, weight and balance and other special conditions.

3.1 Ground clearances



Dimensions	Minimum	Maximum
A	17 ft 5 in.(5,3 m)	17 ft 10 in.(5,4 m)
B	15 ft 8 in.(4,8 m)	16 ft 2 in.(4,9 m)
C	5 ft 3 in.(1,6 m)	5 ft 8 in.(1,7 m)
D	9 ft 9 in.(3,0 m)	10 ft 2 in.(3,1 m)
E	9 ft 9 in.(3,0 m)	10 ft 2 in.(3,1 m)
F	5 ft 6 in.(1,7 m)	5 ft11in.1,8 m)
G	1 ft 7 in.(0,5 m)	2 ft 0 in.(0,6 m)
H	11 ft 6 in.(3,5 m)	11 ft 11 in.(3,5 m)
J	4 ft 8 in.(1,4 m)	5 ft 1 in.(1,5 m)
K	6 ft 1 in.(1,8 m)	6 ft 7 in.(2,0 m)
L	19 ft 1 in.(5,8 m)	19 ft 18 in.(6,0 m)
M	10 ft 6 in.(3,2 m)	11 ft 2 in.(3,4 m)
N	10 ft 6 in.(3,2 m)	11 ft 2 in.(3,4 m)
P	9 ft 0 in.(2,8 m)	10 ft 1 in.(3,1 m)
Q	11 ft 8 in.(3,6 m)	12 ft 7 in.(3,8 m)

NOTES

Vertical clearances shown are the greatest possible variations in attitude due to the variation of aircraft weight and center of gravity.

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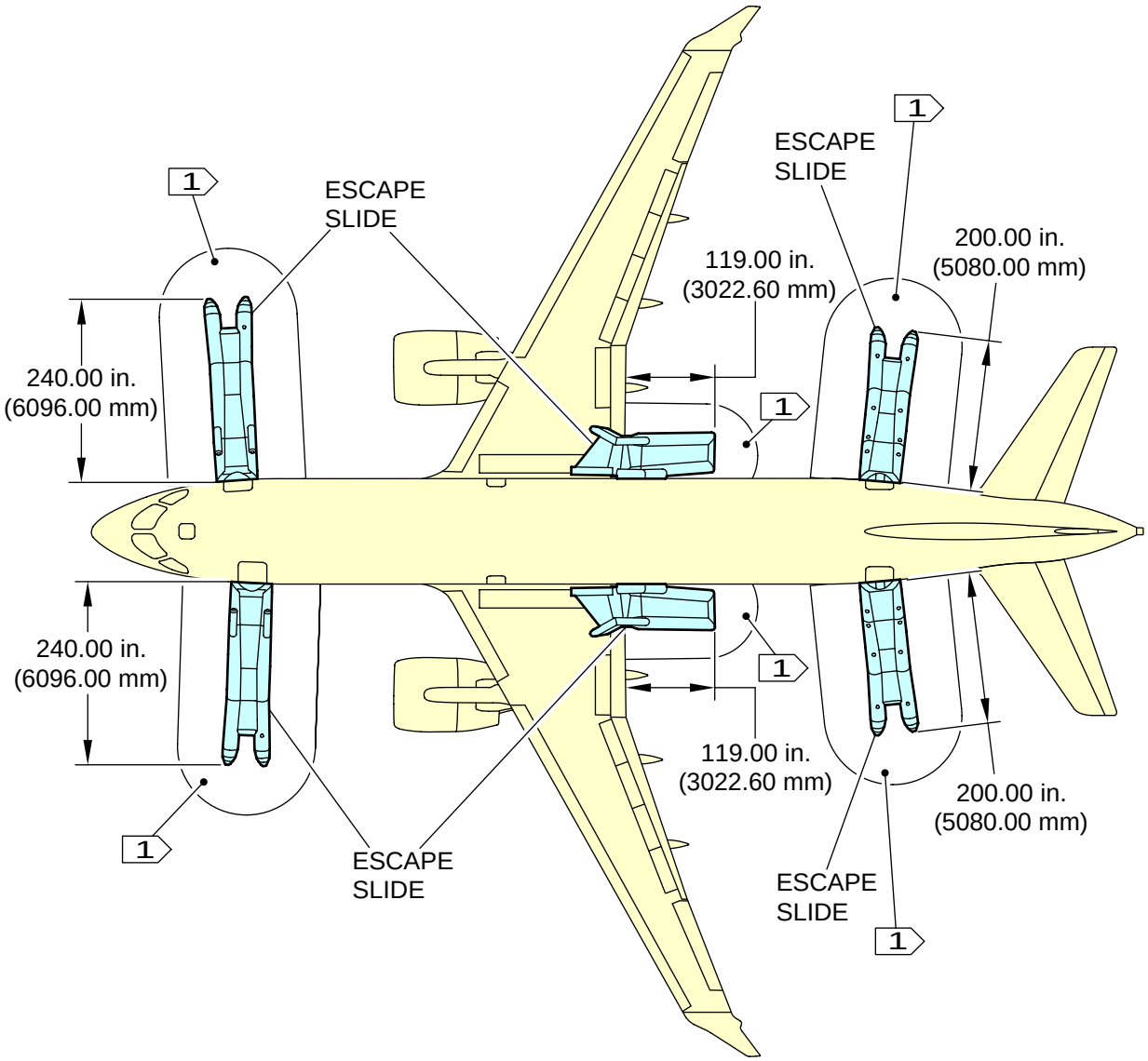
Figure 2 Ground clearances

3.2 Ground clearances for evacuation slides

This section gives ground clearances for evacuation slides. Refer to Table 6 and Fig. 3.

Table 6 Ground clearances for evacuation slides

Description	Dimensions
Forward Passenger Door (FPD) Slide	240 in. (6096 mm)
Forward Service Door (FSD) Slide	240 in. (6096 mm)
Aft Passenger Door (APD) Slide	200 in. (5080 mm)
Aft Service Door (ASD) Slide	200 in. (5080 mm)
Overwing Emergency Exit Door (OWEED) Slides (Left & Right sides)	119 in. (3022.60 mm)



NOTE

1 Emergency evacuation ground area.

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Figure 3 Ground clearances for evacuation slides

4 Layout of passenger compartment accommodation

The passenger compartment includes the galley area, lavatory, and passenger seating area. The galleys and utility areas are isolated from the passenger area by partitions and curtains. Refer to Fig. 4.

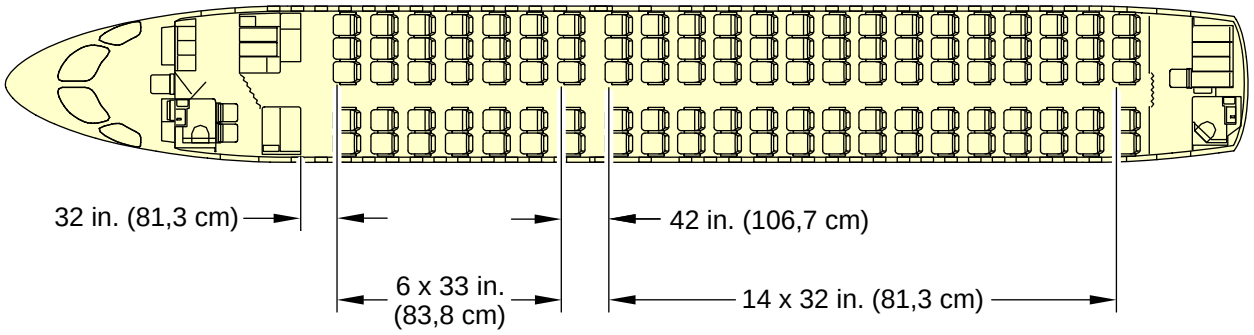

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Figure 4 Layout Of Passenger Accommodation (LOPA)

5 Passenger cross-section

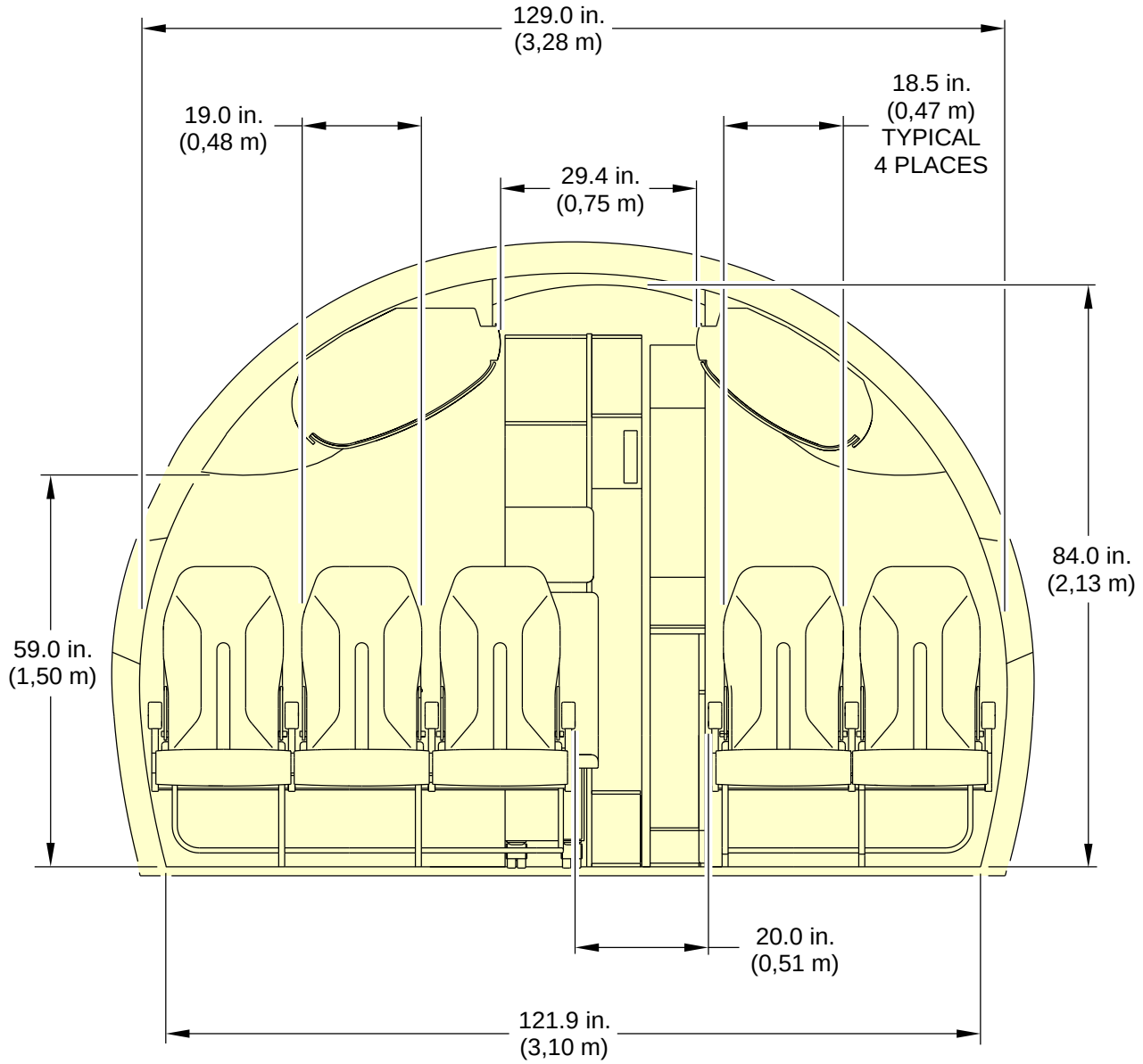

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Figure 5 Passenger cross-section (economy class)

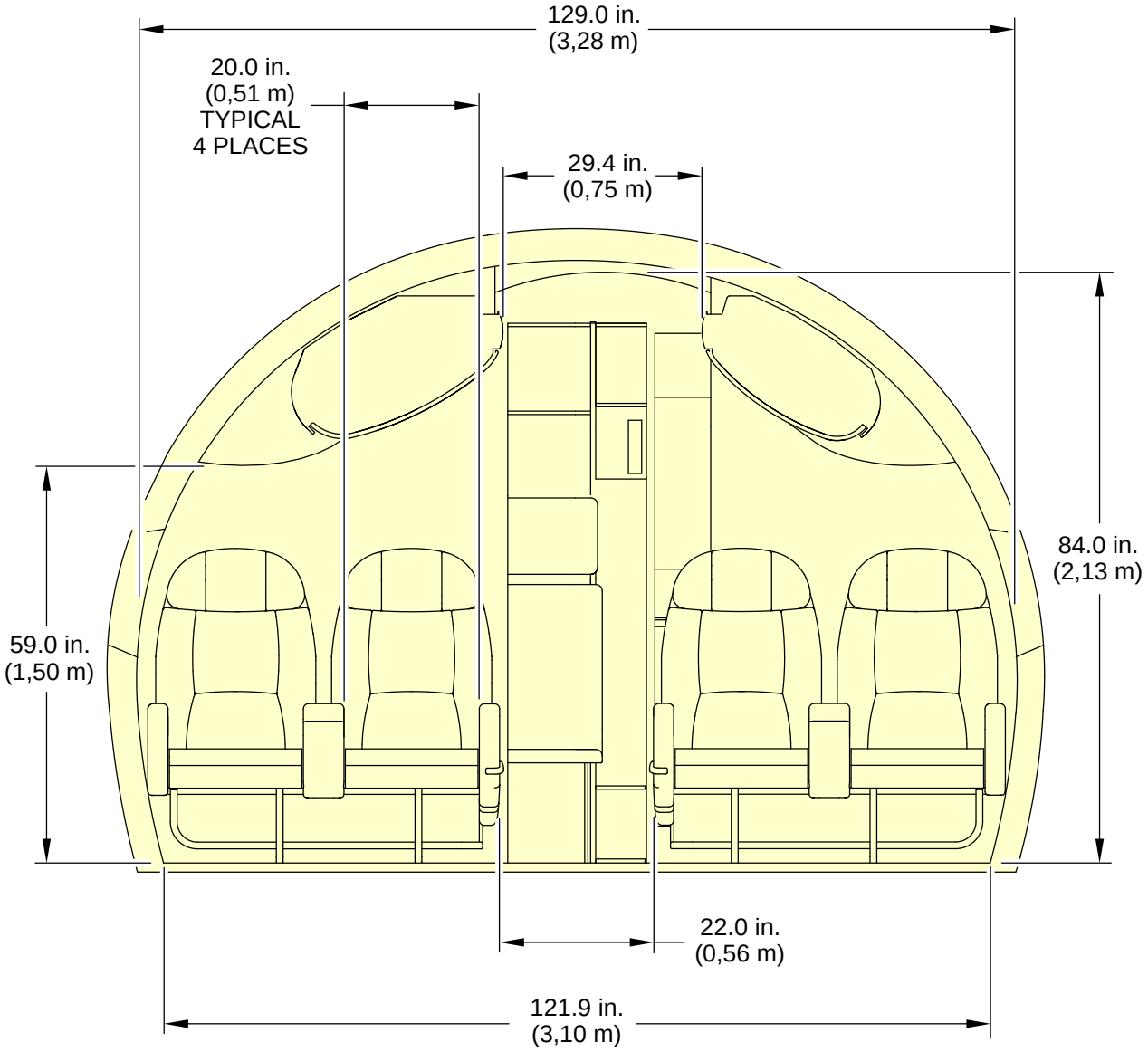

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Figure 6 Passenger cross-section (optional business class)

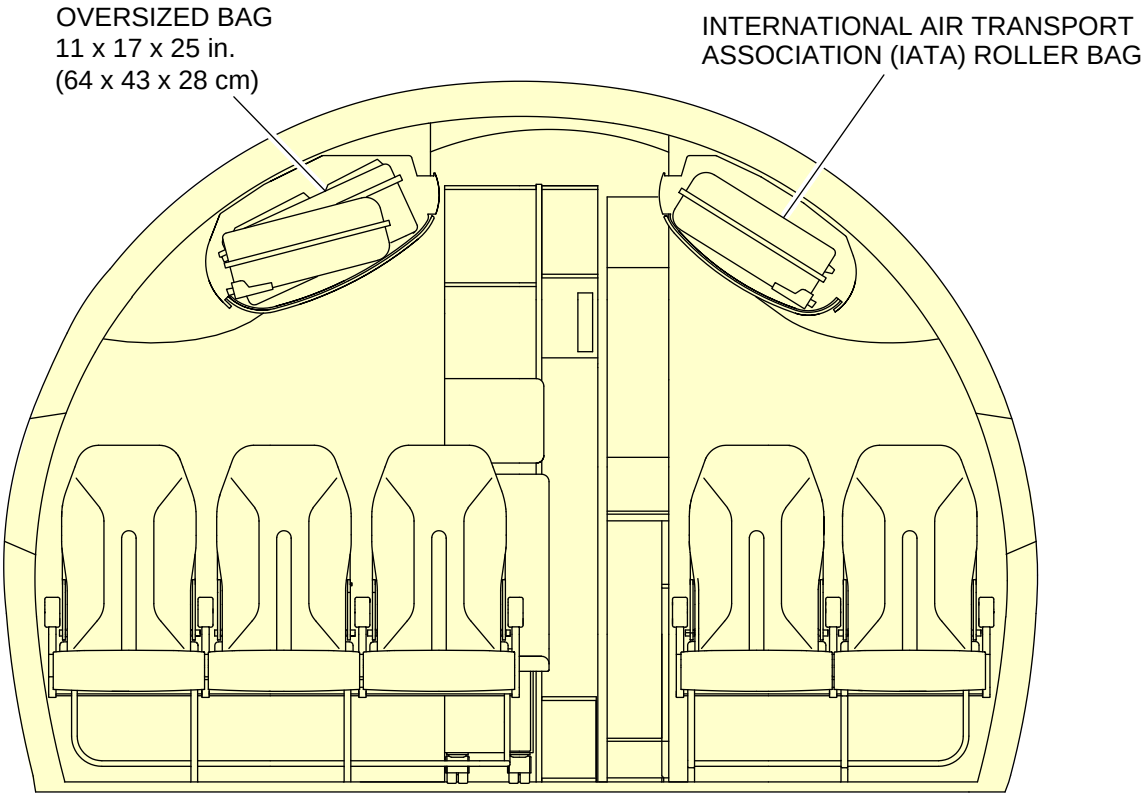

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Figure 7 Overhead stowage bins

6 Cargo compartment

Two under-floor cargo compartments are provided, each with a dedicated outward-opening access door. The forward compartment is positioned between the forward equipment compartment and the Environmental Control System (ECS) distribution bay. The aft compartment is positioned between the mid equipment compartment and the water system bay. Refer to Fig. 8.

Both compartments are furnished with heavy duty floor panels and sidewall linings and are sealed to meet the requirements of a Class C compartment. Decompression and ventilation panels are provided as well. The compartment linings also incorporate provisions for compartment lighting, smoke detector, and fire extinguish.

The combined maximum weight loading of the cargo compartment is 8,290 lb (3 760 kg).

6.1 Cargo door nets

Protective nets are provided at the door area of each cargo compartment to prevent baggage from fouling the door due to in-flight shifting of the loads. Refer to Fig. 9.

6.2 Volumes – Cargo compartment

The estimated volume of the cargo compartments is based on geometric volume and accounts for the unusable area in the vicinity of the cargo doors. Table 7 lists the estimated wet volume of the cargo compartments.

Table 7 Cargo compartment volumes

Description	A220-100
Cargo compartments (wet total)	839 ft³ (23.7 m³)
Fwd cargo compartment	365 ft³ (10.3 m³)
Aft cargo compartment	474 ft³ (13.4 m³)

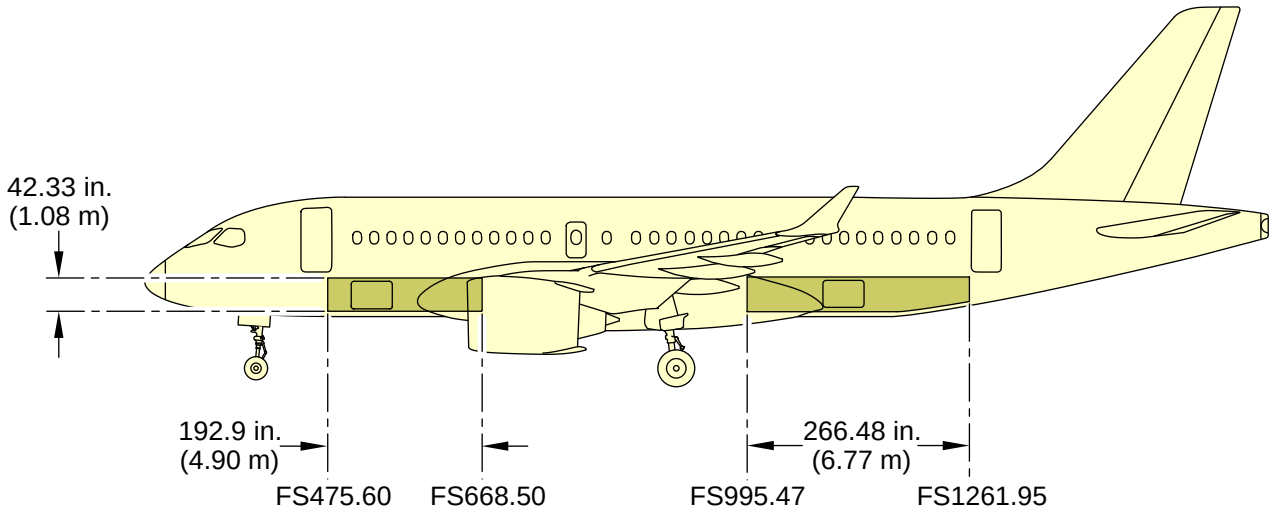

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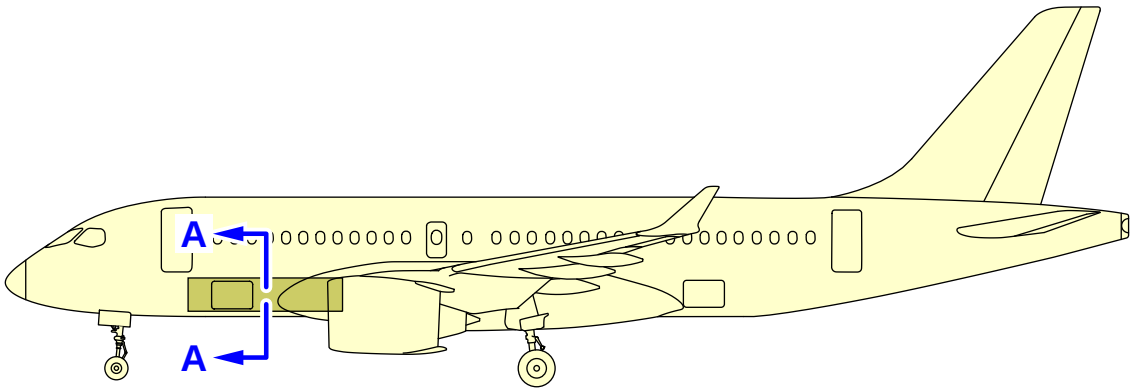
Figure 8 Aircraft cargo side view - (Sheet 1 of 3)



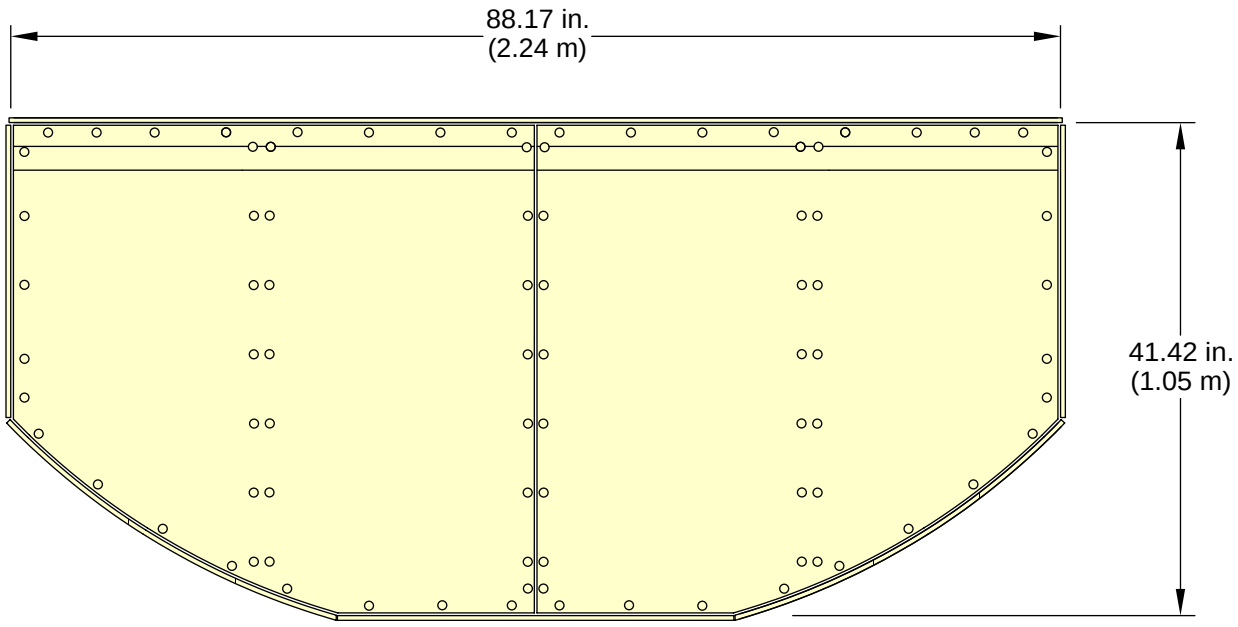


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Figure 8 Aircraft cargo side view - (Sheet 2 of 3)

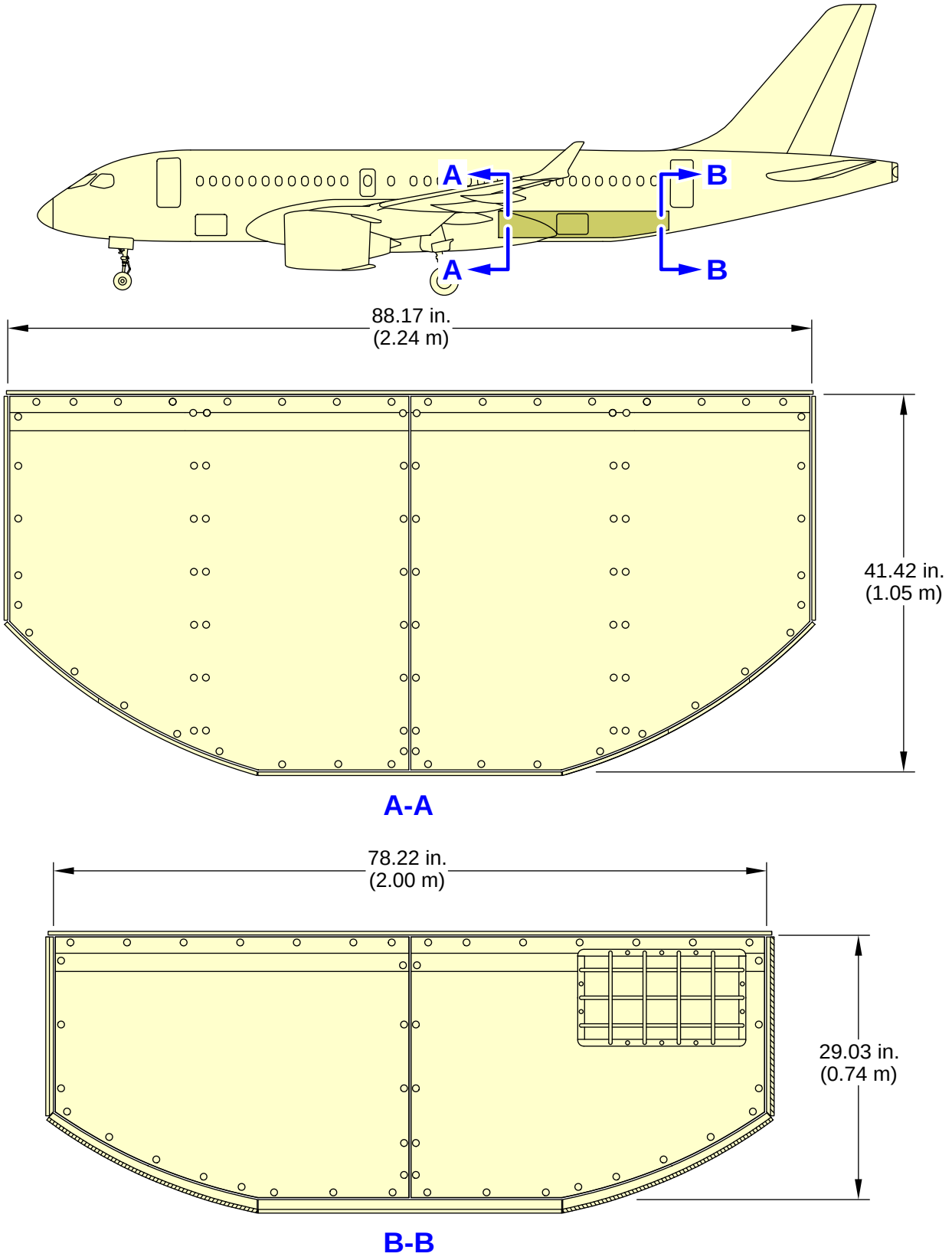

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Figure 8 Aircraft cargo side view - (Sheet 3 of 3)

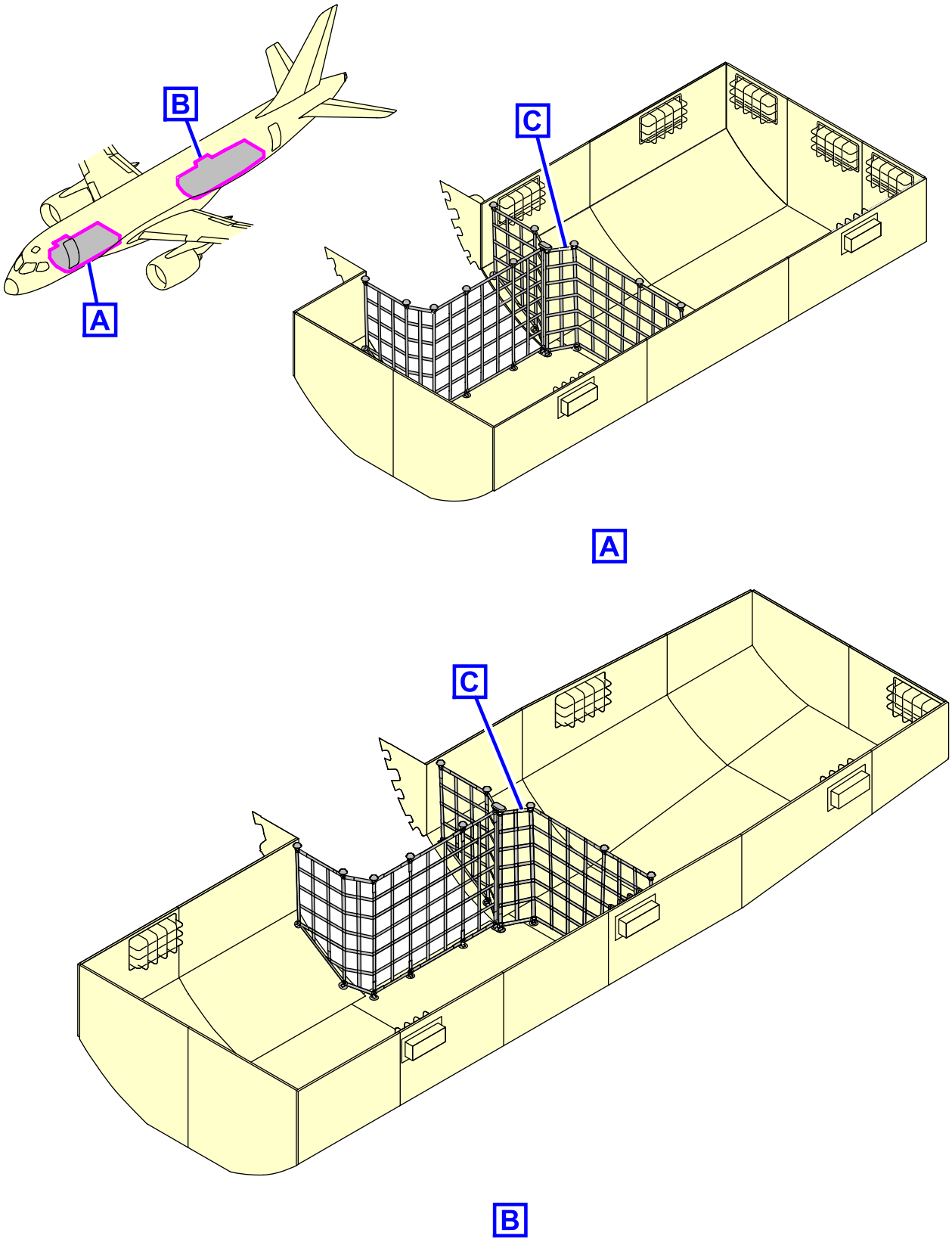

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Figure 9 Cargo nets - (Sheet 1 of 2)

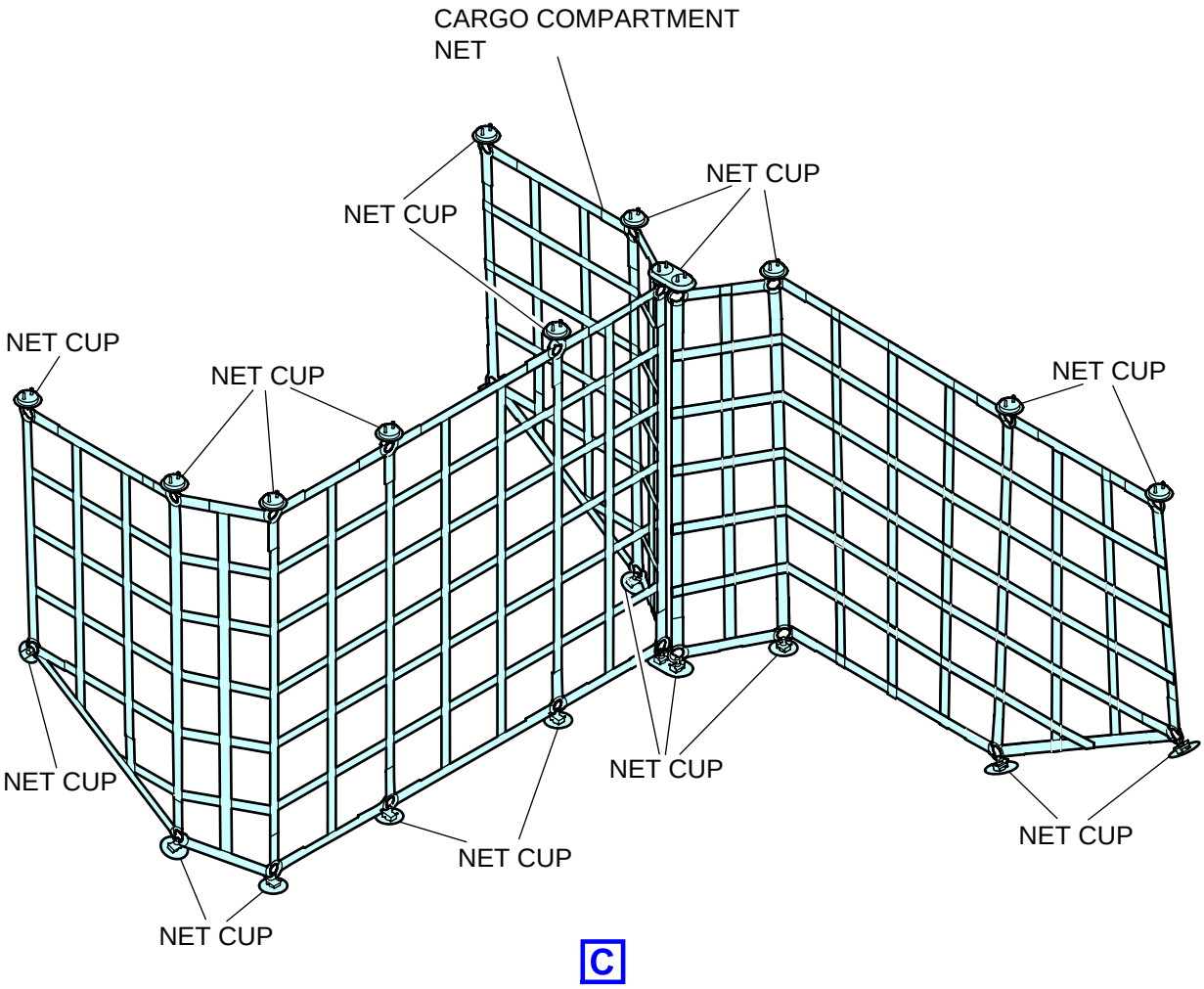

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Figure 9 Cargo nets - (Sheet 2 of 2)

7 Door clearances and clear opening dimensions

A general description of the doors is as follows:

7.1 Passenger/Crew

Two semi-plug type doors on the left side of the aircraft provide access for passengers and crew. Door 1L is considered the primary entrance while door 2L provides a secondary entrance available for passenger loading/unloading as well as ground servicing.

Each door is classified as a type C floor level exit. Due to the sill height, every door incorporates an emergency evacuation slide system. In addition each one translates outwards from closed position, supported by a hinged arm to rest in open position.

Every door is operable from the exterior and interior of the aircraft and features an inspection window to allow verification of the outside conditions from the interior. The exterior operating handle has a linear motion and is interconnected to a vent flap system to provide pressure equalization between the aircraft and the ambient air prior to be opened.

Each door is fully lined and insulated to meet thermal and noise performance requirements.

For Passenger/Crew doors distance from the nose, refer to Fig. 11Fig. 12. For aft passenger door opening and clearances, refer to Fig. 13.

7.2 Emergency exit

The over-wing emergency exits are type III semi-plug type doors.

The exits are provided with an operating handle with removable cover and are fitted with a standard sized passenger compartment window. Each door is fully lined and insulated to meet thermal and noise performance requirements.

The door rotates upwards from the closed position, supported by a hinged arm to rest in open position. The door opening sequence is automatically supported by the energy stored in its own mechanism.

For emergency access to the passenger compartment, the doors may be opened from an exterior handle.

Due to the exit path height from the ground, an off-wing evacuation slide system is provided.

For over-wing emergency exits distance from the nose, refer to Fig. 11. For doors dimensions, refer to Table 8.

7.3 Flight compartment emergency exit

The flight compartment is outfitted with a single, inward-opening overhead escape hatch.

7.4 Cargo doors

Access doors are provided to allow cargo compartment loading and unloading.

The semi-plug forward and aft cargo doors are identical components, each hinged along the top edge of its frame.

Each door incorporates an exterior lock/unlock handle with linear motion that is interconnected to a vent flap system and provide pressure equalization between the aircraft and the ambient air prior to be opened.

An electrical actuation system with a switch panel, installed on the fuselage near each door, is provided to open and close the door.

Each door is fully lined and insulated to meet thermal and noise performance requirements.

For cargo doors distance from the nose, refer to Fig. 11. For doors dimensions, refer to Table 8. For forward cargo door opening and clearances, refer to Fig. 14. For aft cargo door opening and clearances, refer to Fig. 15.

7.5 Service doors

Two semi-plug type doors are provided on the right side of the aircraft to provide access for the forward (door 1R) and aft (door 2R) galley service areas.

Each door is classified as a type C floor level exit. Due to the sill height, each door incorporates an emergency evacuation slide system.

Each door translates outwards from the closed position, supported by a hinged arm and stabilizing system, to rest parallel to the fuselage in the open position.

Each door is operable from the exterior and interior of the aircraft and features an inspection window to allow verification of the outside conditions from the interior. The exterior operating handle has a linear motion and is interconnected to a vent flap system to provide pressure equalization between the aircraft and the ambient air prior to be opened.

Each door is fully lined and insulated to meet thermal and noise performance requirements.

For service doors distance from the nose, refer to Fig. 11. For service doors dimensions, refer to Table 8. For forward service door opening and clearances, refer to Fig. 16. For aft service door opening and clearances, refer to Fig. 17.

7.6 Forward avionics bay door

A plug-type door is provided in the forward fuselage to gain access to the pressurized forward equipment compartment. The door is fitted with a stowable operating handle.

For forward equipment compartment door distance from the nose, refer to Fig. 11. For dimensions, refer to Table 8.

7.7 Mid avionics bay door

A plug-type door is provided in the mid fuselage to gain access to the pressurized mid equipment compartment. The door is fitted with a stowable operating handle.

For mid equipment compartment door distance from the nose, refer to Fig. 11. For dimensions, refer to Table 8.

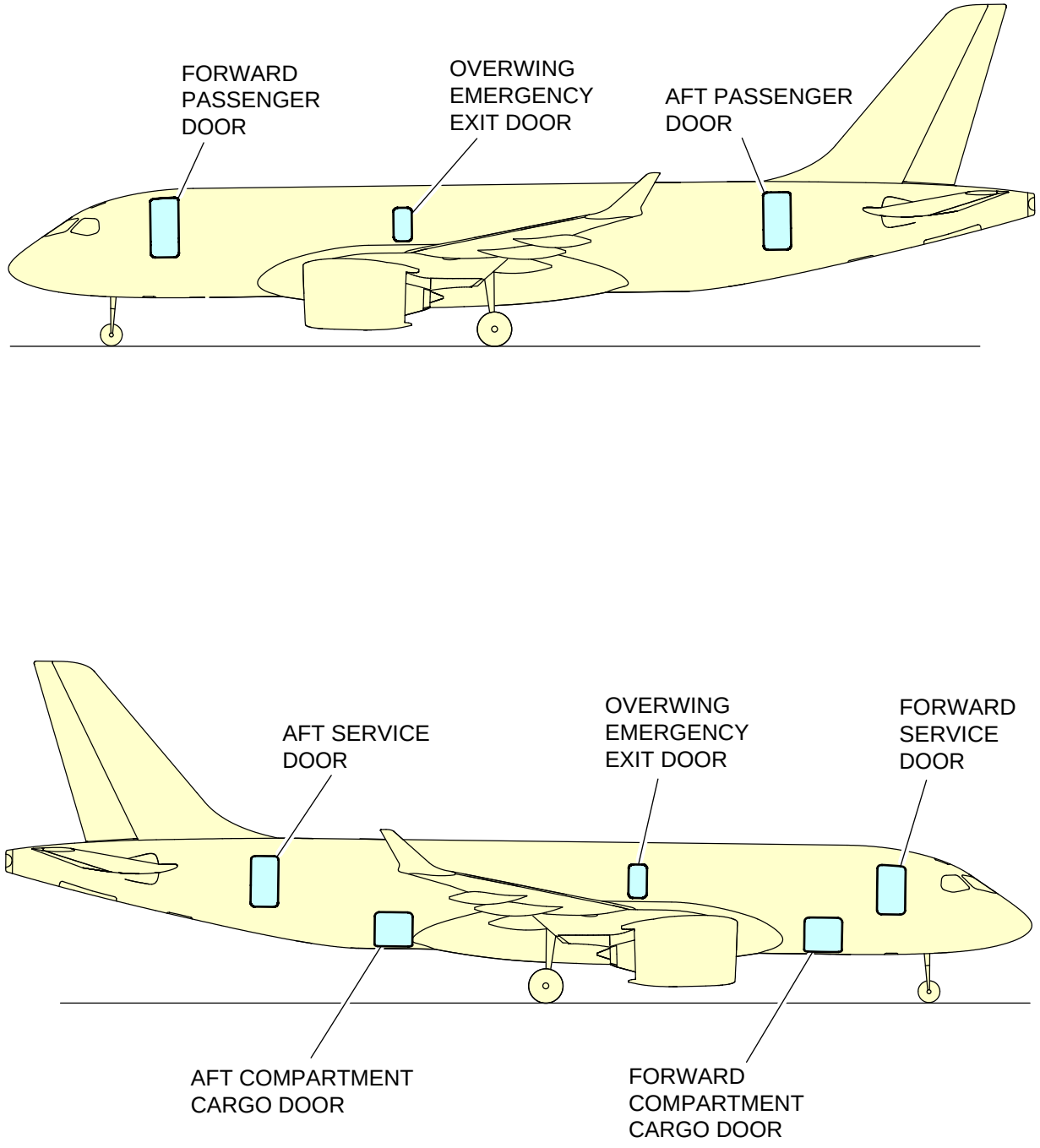
7.8 Aft equipment bay door

A door is provided in the aft fuselage to gain access to the unpressurized aft equipment compartment.

For aft equipment compartment door distance from the nose, refer to Fig. 11. For dimensions, refer to Table 8.

7.9 Doors identification

This section shows a general overview of the doors



ICN-BD500-A-J000000-A-3AB48-23216-A-001-01

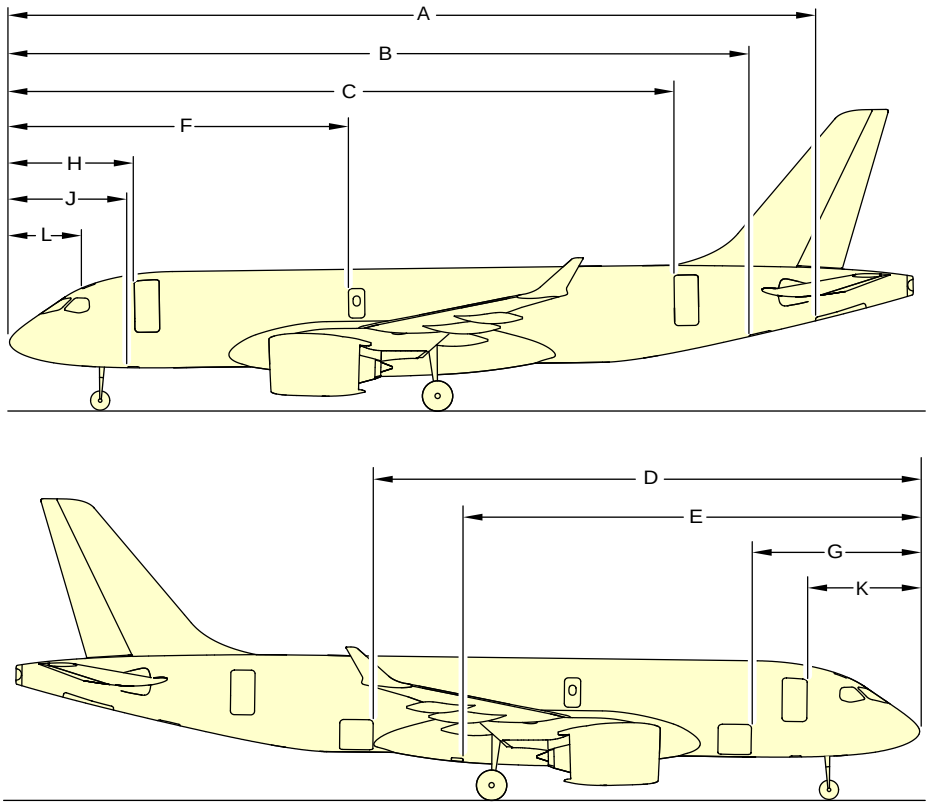
Figure 10 General door location

7.10 Access and exit doors dimensions

Table 8 Access and exit doors dimensions

Door	Height	Width
Main entrance door - Type C exit (door 1L)	6 ft 3 in. (1,9 m)	2 ft 6 in. (0,8 m)
Service door - Type C exit (door 1R)	5 ft 0 in. (1,5 m)	2 ft 6 in. (0,8 m)
Aft entrance door - Type C exit (door 2L)	6 ft 0 in. (1,8 m)	2 ft 6 in. (0,8 m)
Service door - Type C exit (door 2R)	5 ft 0 in. (1,5 m)	2 ft 6 in. (0,8 m)
Forward avionics bay door	2 ft 8 in. (0,81 m)	3 ft 8 in. (1,1 m)
Mid avionics bay door	2 ft 8 in. (0,81 m)	3 ft 8 in. (1,1 m)
Aft equipment bay door	3 ft 6 in. (1,08 m)	1 ft 11 in. (0,6 m)
Forward cargo compartment door	2 ft 8 in. (0,81 m)	3 ft 8 in. (1,1 m)
Aft cargo compartment door	2 ft 8 in. (0,81 m)	3 ft 8 in. (1,1 m)
Over-wing emergency exit	3 ft 6 in. (1,08 m)	1 ft 11 in. (0,59 m)
Flight compartment emergency exit	22 in. (0,559 m)	20 in. (0,508 m)

7.11 Door distance from nose



Dimensions	CS100
A	102 ft 4 in. (31,2 m)
B	93 ft 10 in. (28,6 m)
C	84 ft 4 in. (25,7 m)
D	69 ft 4 in. (21,1 m)
E	58 ft 0 in. (17,7 m)
F	43 ft 0 in. (13,11 m)
G	21 ft 4 in. (6,5 m)
H	15 ft 10 in. (4,8 m)
J	15 ft 0 in. (4,6 m)
K	14 ft 3 in. (4,3 m)
L	9 ft 2 in. (2,8 m)

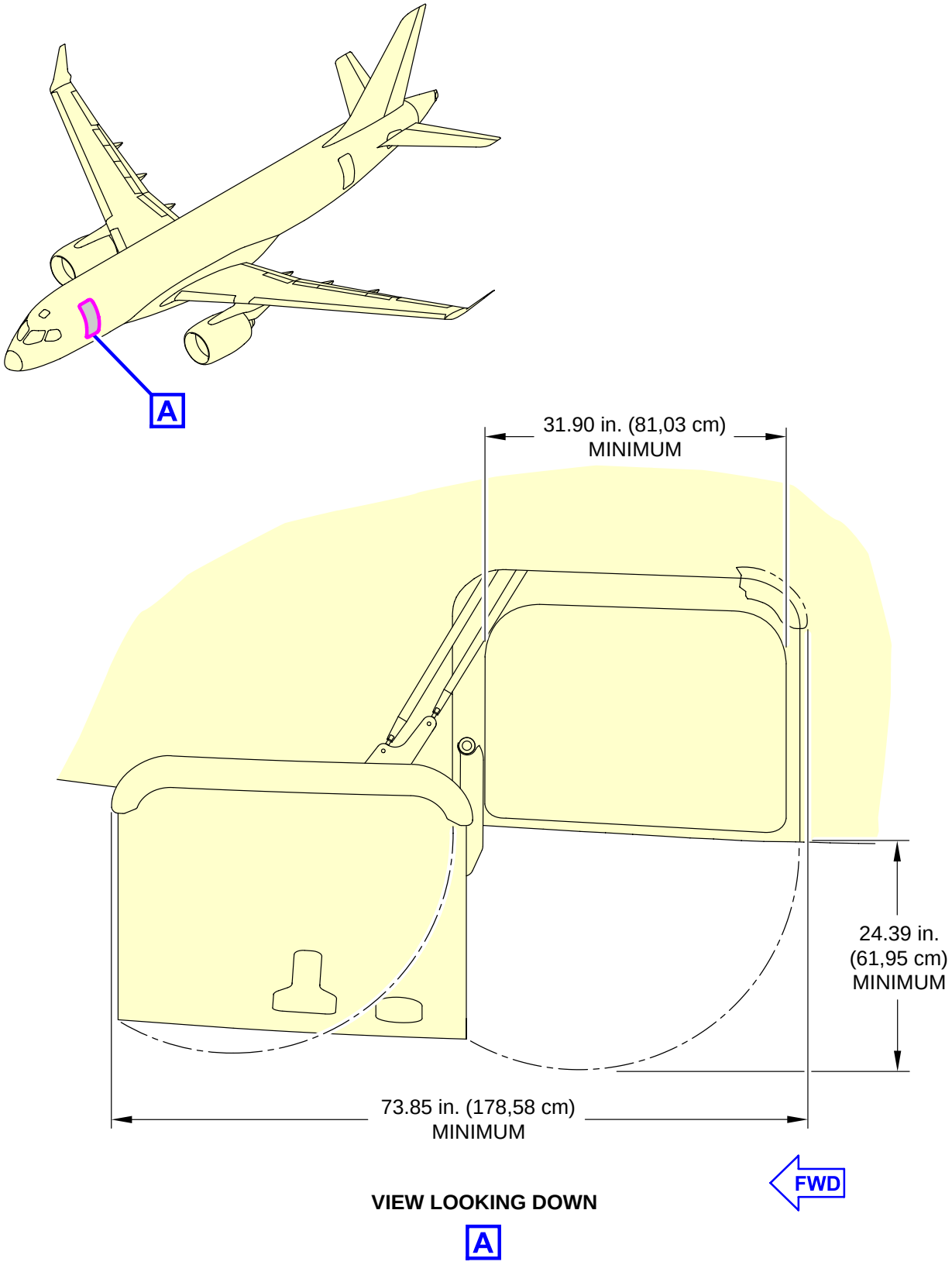
NOTES

The values shown are the greatest possible variations in attitude due to the variation of aircraft weight and gravity.

ICN-BD500-A-J000000-A-3AB48-21712-A-001-01

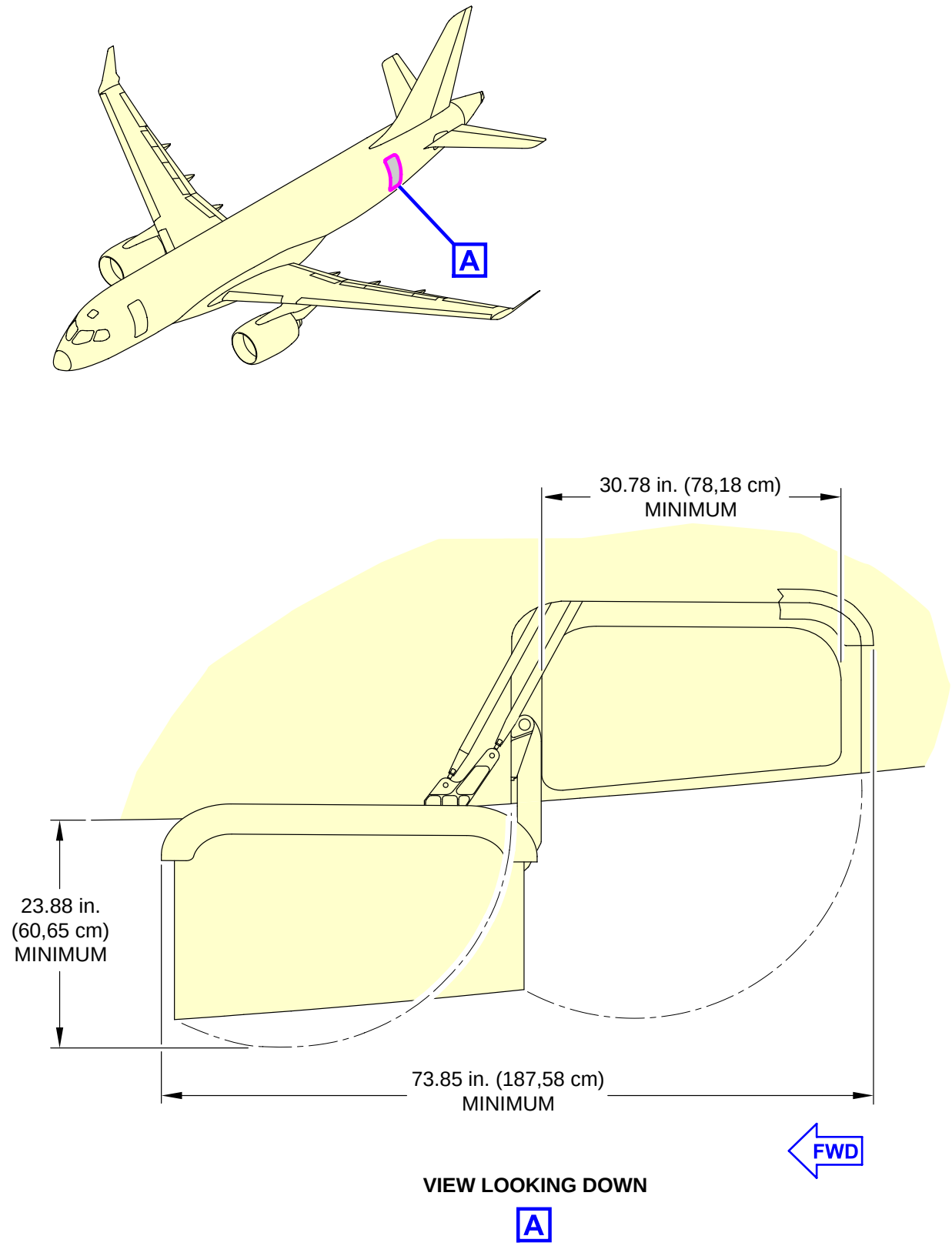
Figure 11 Door distance from nose

7.12 Door opening and clearance



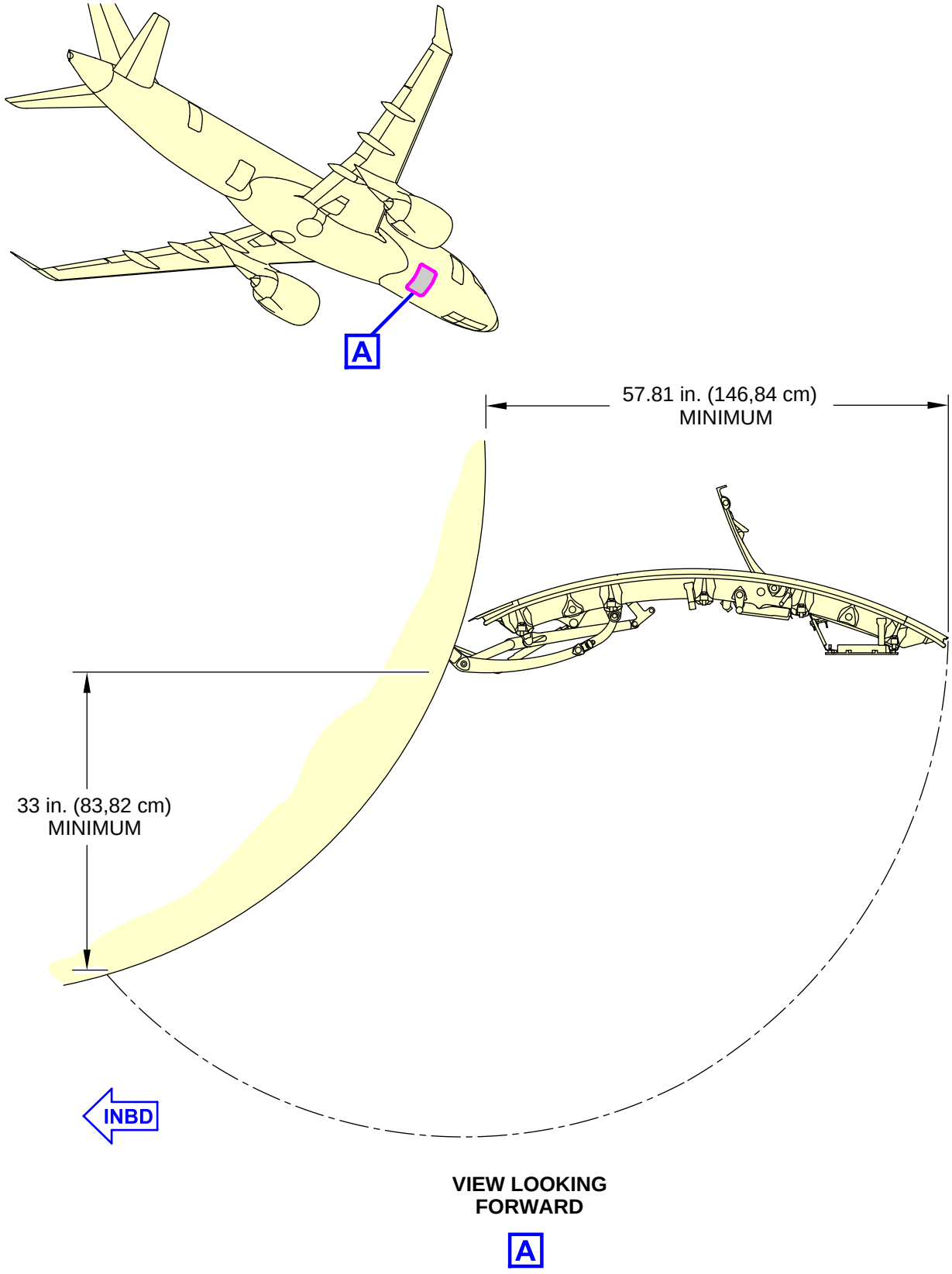
ICN-BD500-A-J061100-A-3AB48-00103-A-003-01

Figure 12 Forward passenger door opening and clearances



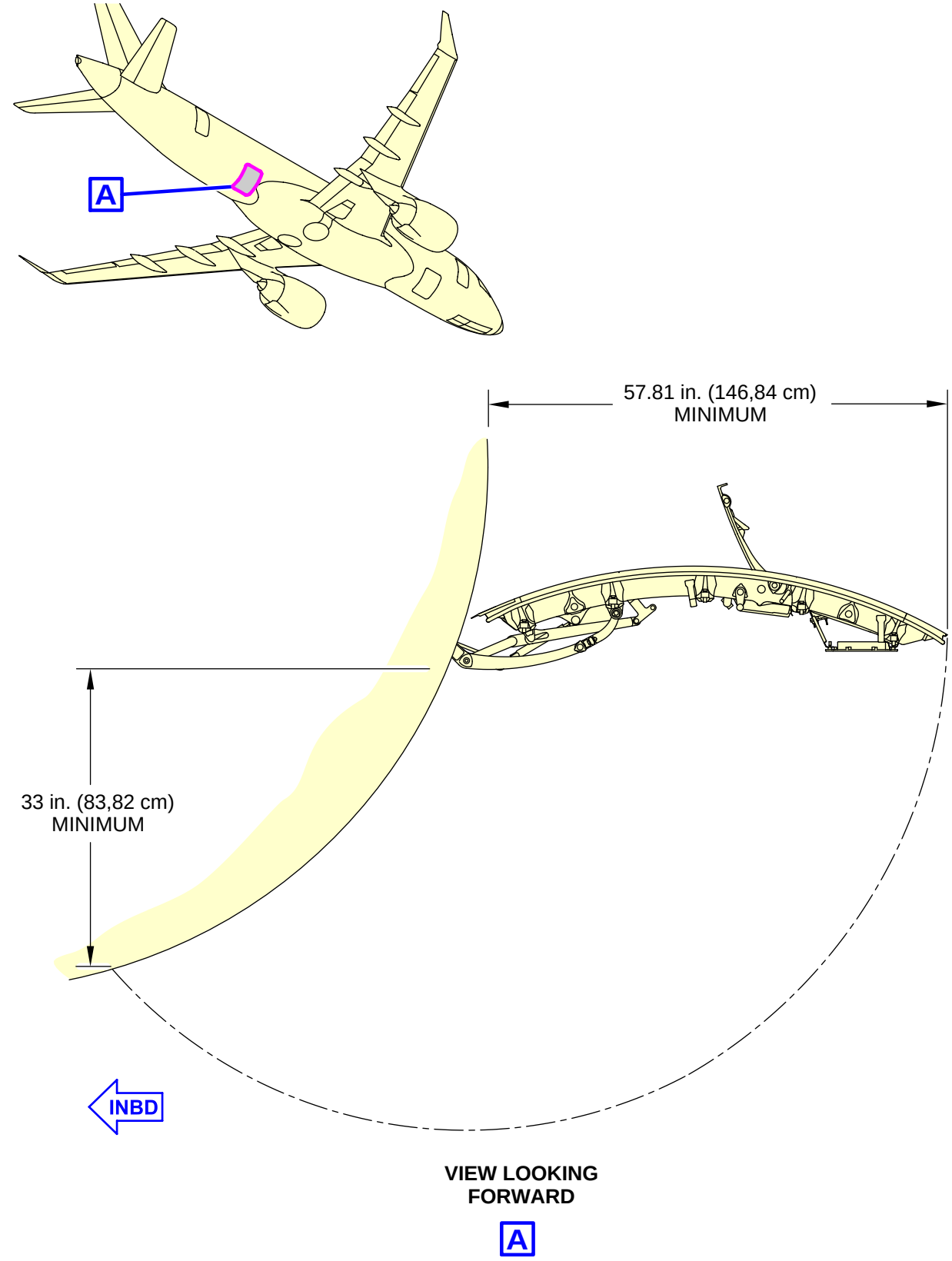
ICN-BD500-A-J061100-A-3AB48-00104-A-003-01

Figure 13 Aft passenger door opening and clearances



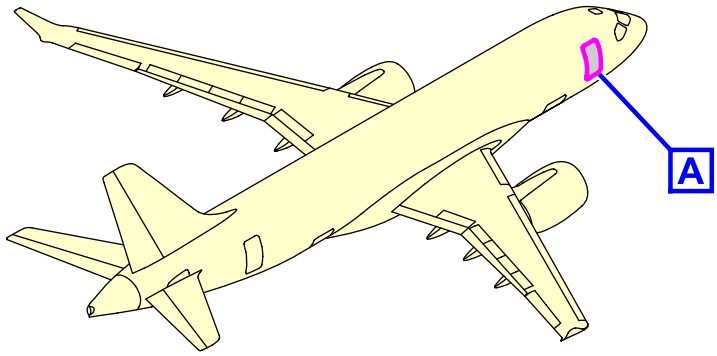
ICN-BD500-A-J061100-A-3AB48-00102-A-002-01

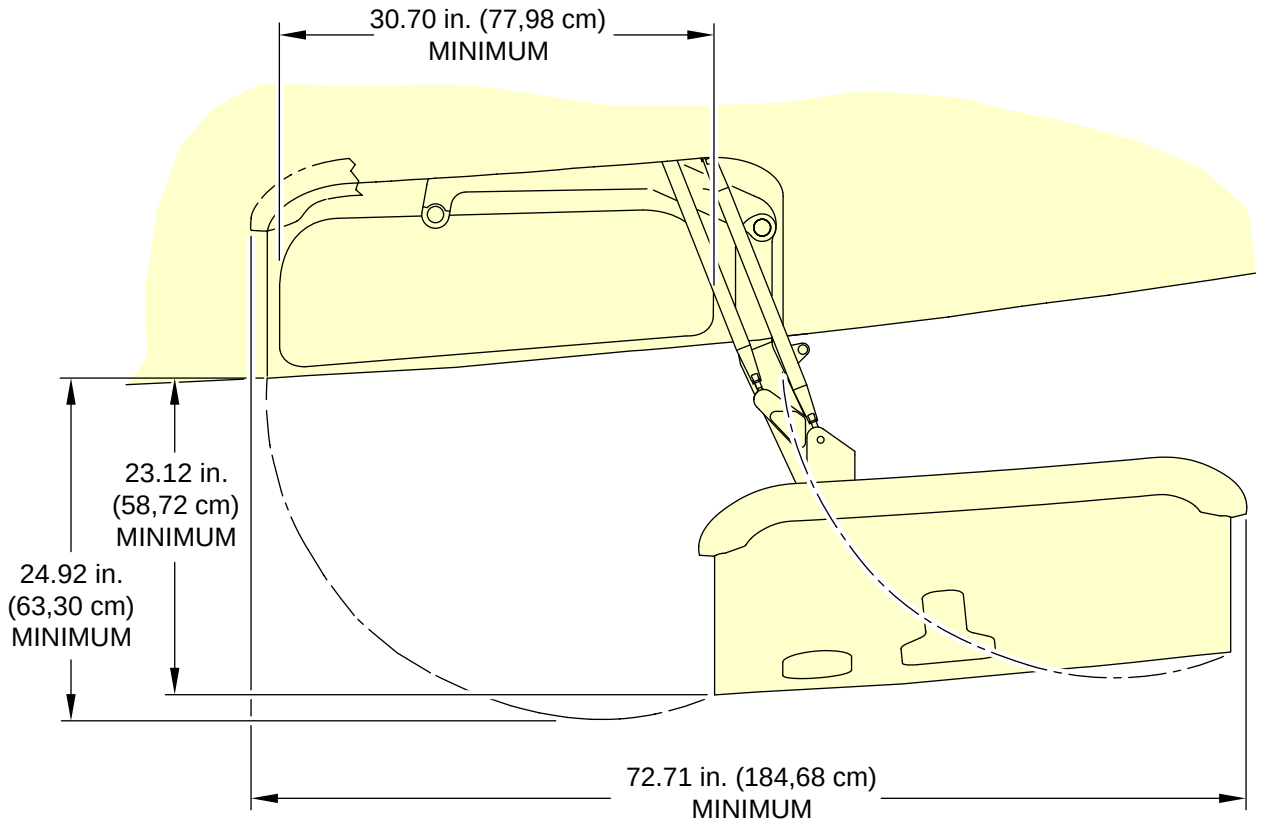
Figure 14 Forward cargo compartment door opening and clearances



ICN-BD500-A-J061100-A-3AB48-00101-A-002-01

Figure 15 Aft cargo compartment door opening and clearances



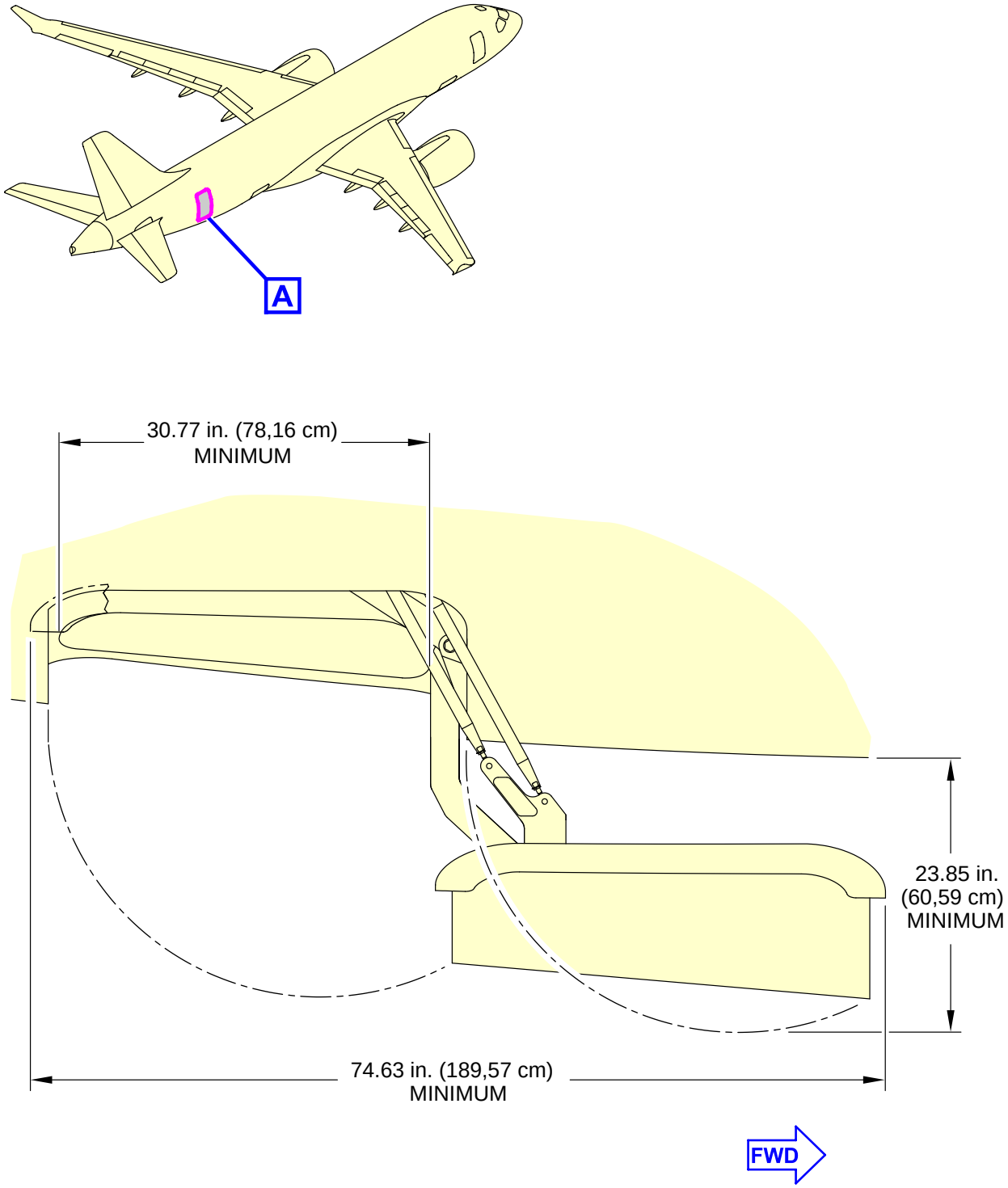


VIEW LOOKING DOWN

A

ICN-BD500-A-J061100-A-3AB48-00106-A-002-01

Figure 16 Forward service door opening and clearance



ICN-BD500-A-J061100-A-3AB48-00105-A-002-01

Figure 17 Aft service door opening and clearances

A220

Aircraft performance - Technical data

Applicability: Model: CS100

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References

Table 1 References

Data Module/Technical Publication	Title
None	

Description

1 Introduction

This data module gives data about:

- Payload/Range
- Takeoff field length requirements
- Landing field length requirements
- Landing reference speed

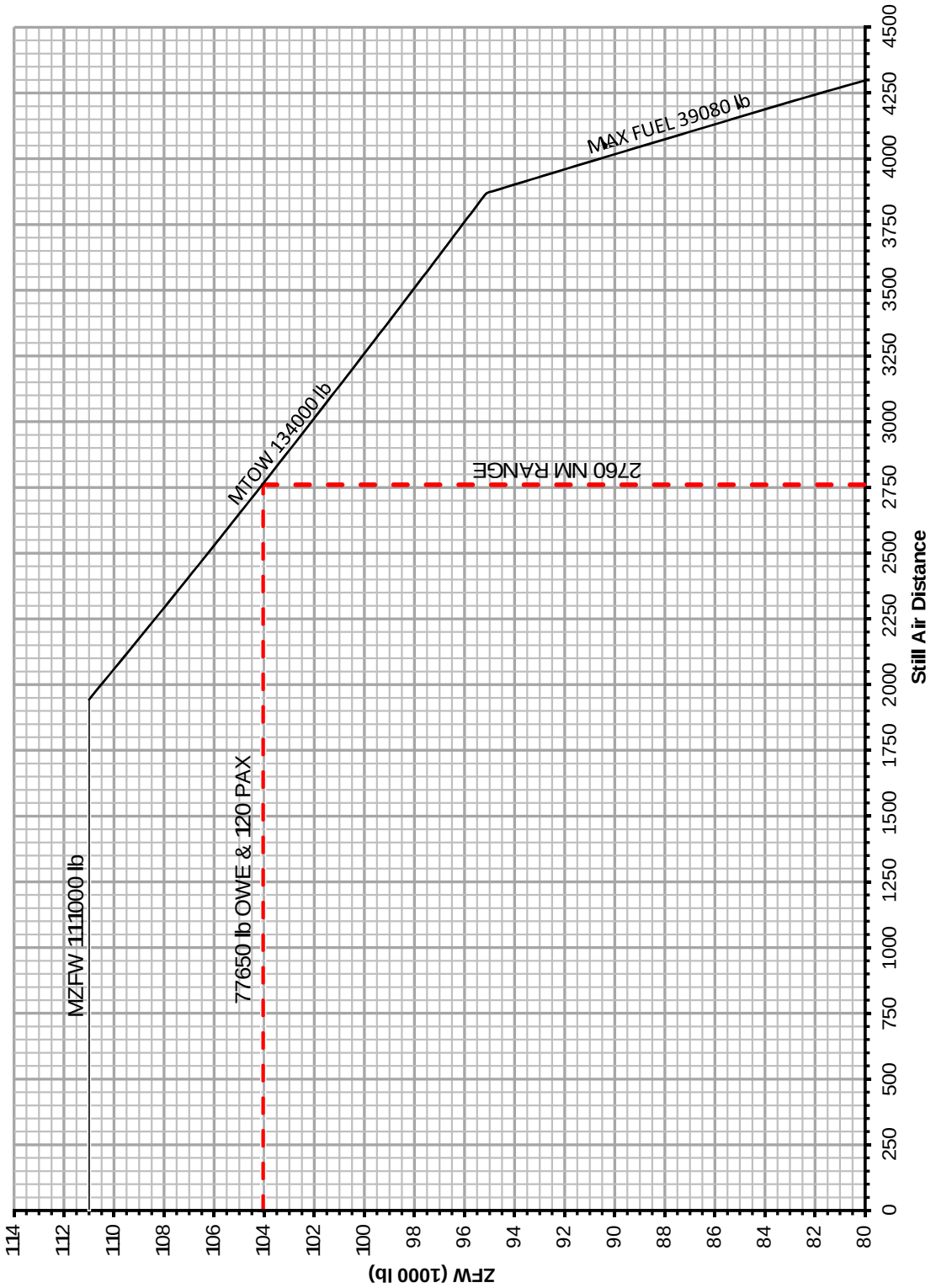
The table below provides standard day temperature for pressure altitudes.

Table 2 Standard day temperature chart

Altitude		Standard day temperature	
Feet (ft.)	Meters (m)	ºF	ºC
0	0	59	15
2000	610	51.9	11
4000	1220	44.7	7.1
6000	1830	37.6	3.1
8000	2440	30.5	-0.8
10000	3050	23.3	-4.8

2 Payload/Range

This section gives information about the payload/range at ISA conditions.



ICN-BD500-A-J000000-A-3AB48-23899-A-002-01

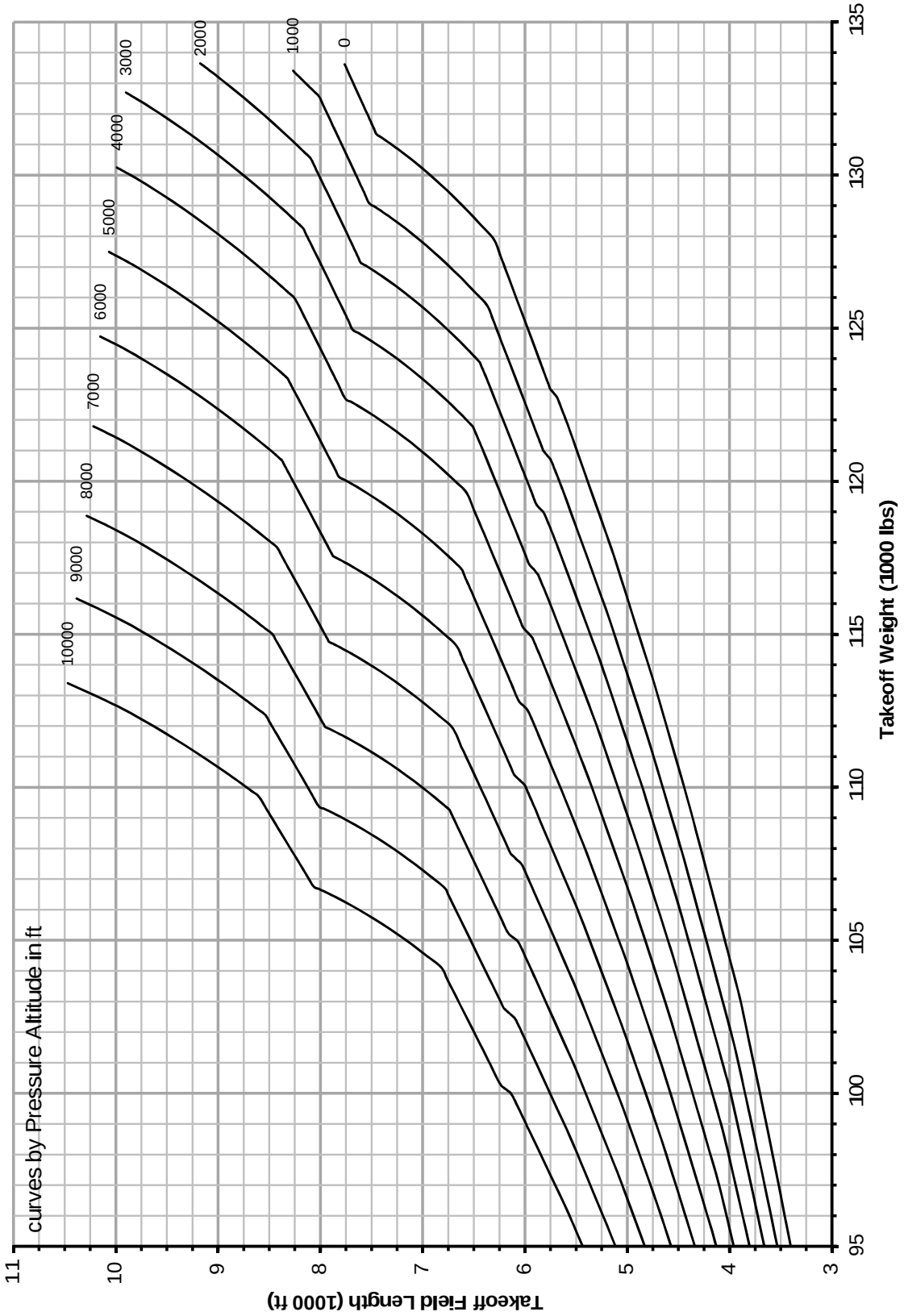
Figure 1 Zero Fuel Weight (ZFW) vs Range ISA

3 Takeoff field length requirements

For more information about aircraft performance, refer to the Aircraft Flight Manual (AFM) BD500–3AB48–22200-00.

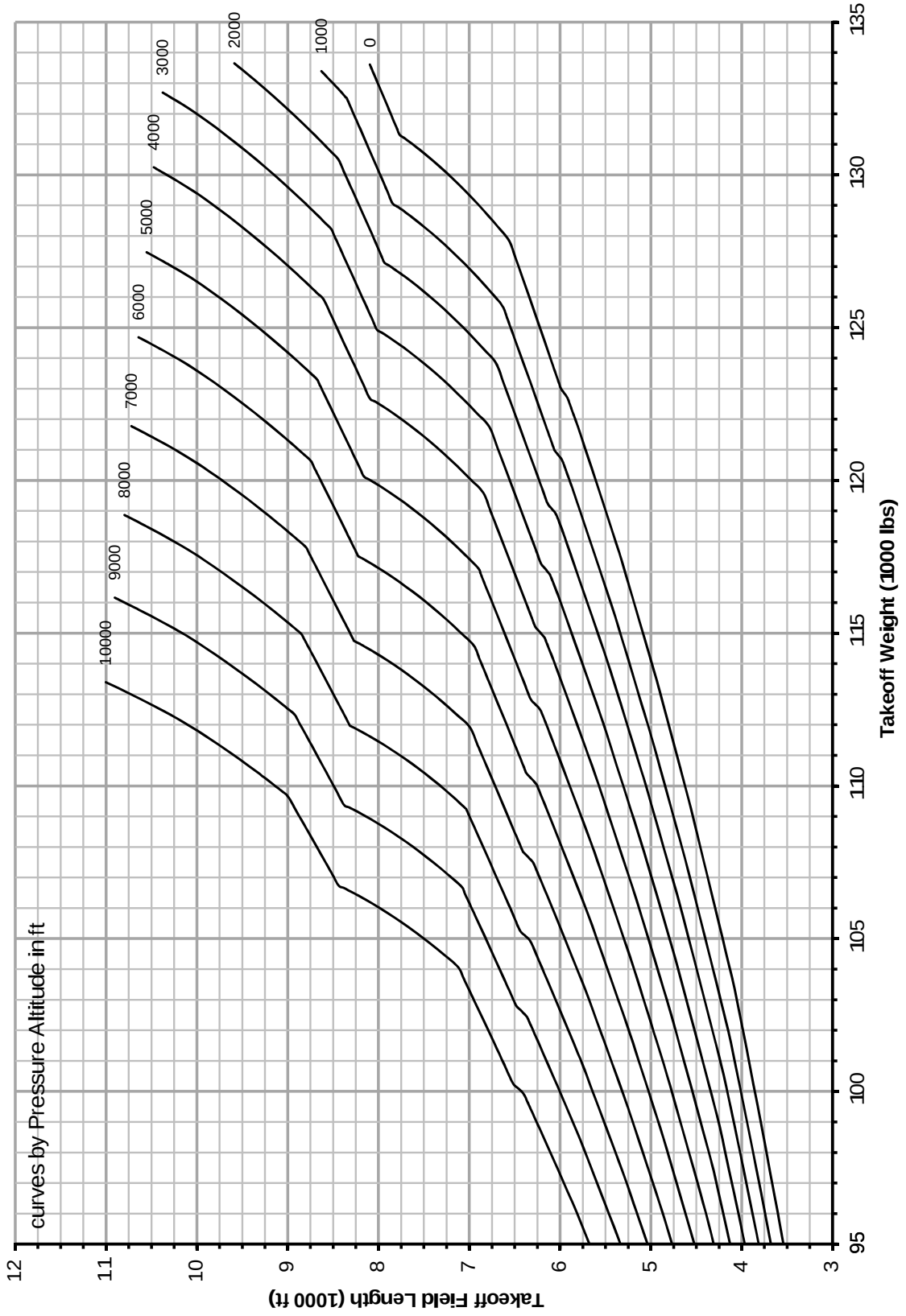
For aircraft performance and field length requirements refer to:

- Fig. 2 for the takeoff field length ISA - PW1519G.
- Fig. 3 for the takeoff field length ISA +15°C - PW1519G.
- Fig. 4 for the takeoff field length ISA - PW1521G.
- Fig. 5 for the takeoff field length ISA +15°C - PW1521G.
- Fig. 6 for the takeoff field length ISA - PW1524G.
- Fig. 7 for the takeoff field length ISA +15°C - PW1524G.



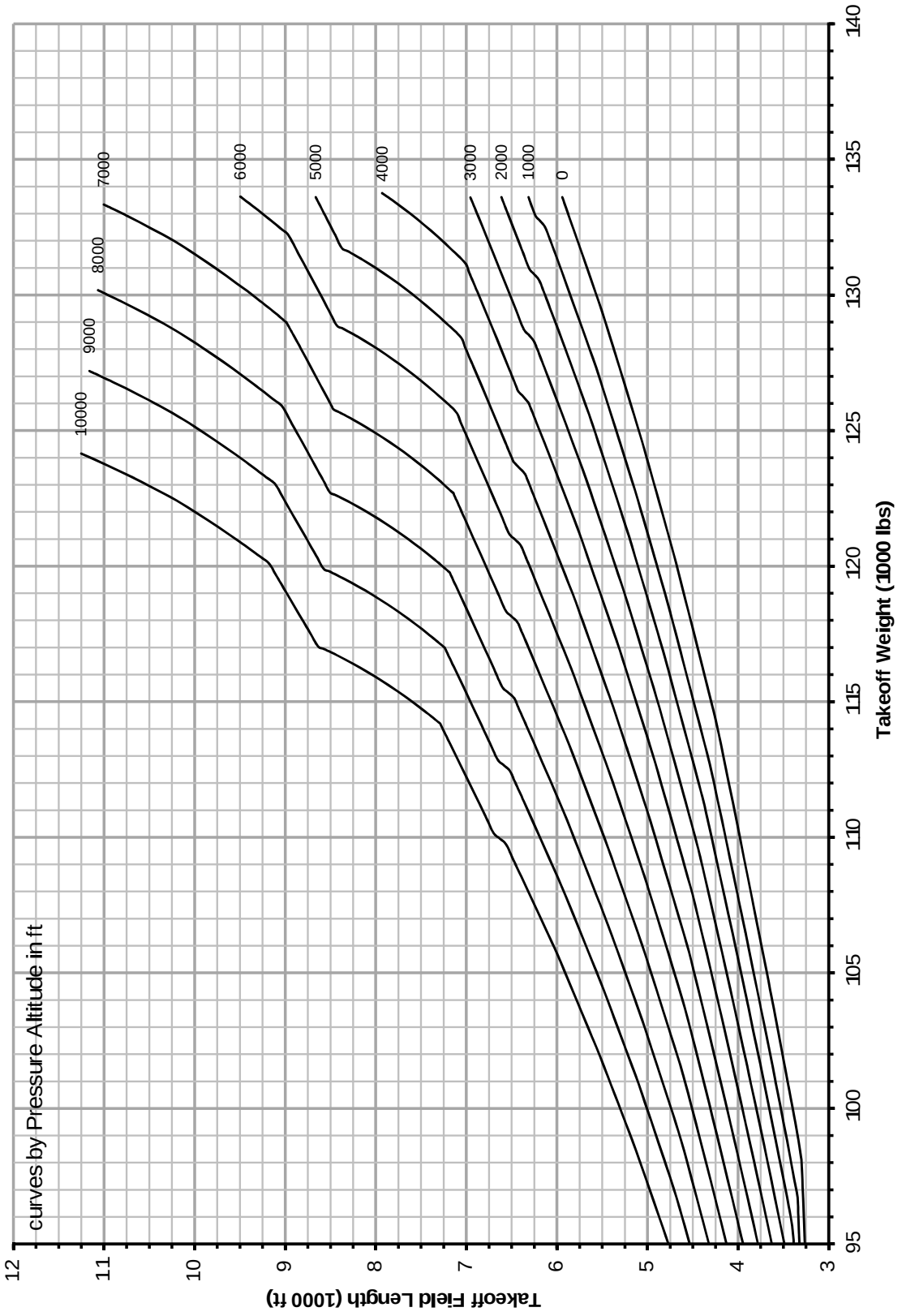
ICN-BD500-A-J000000-A-3AB48-01753-A-002-01

Figure 2 Takeoff field length - ISA - PW1519G



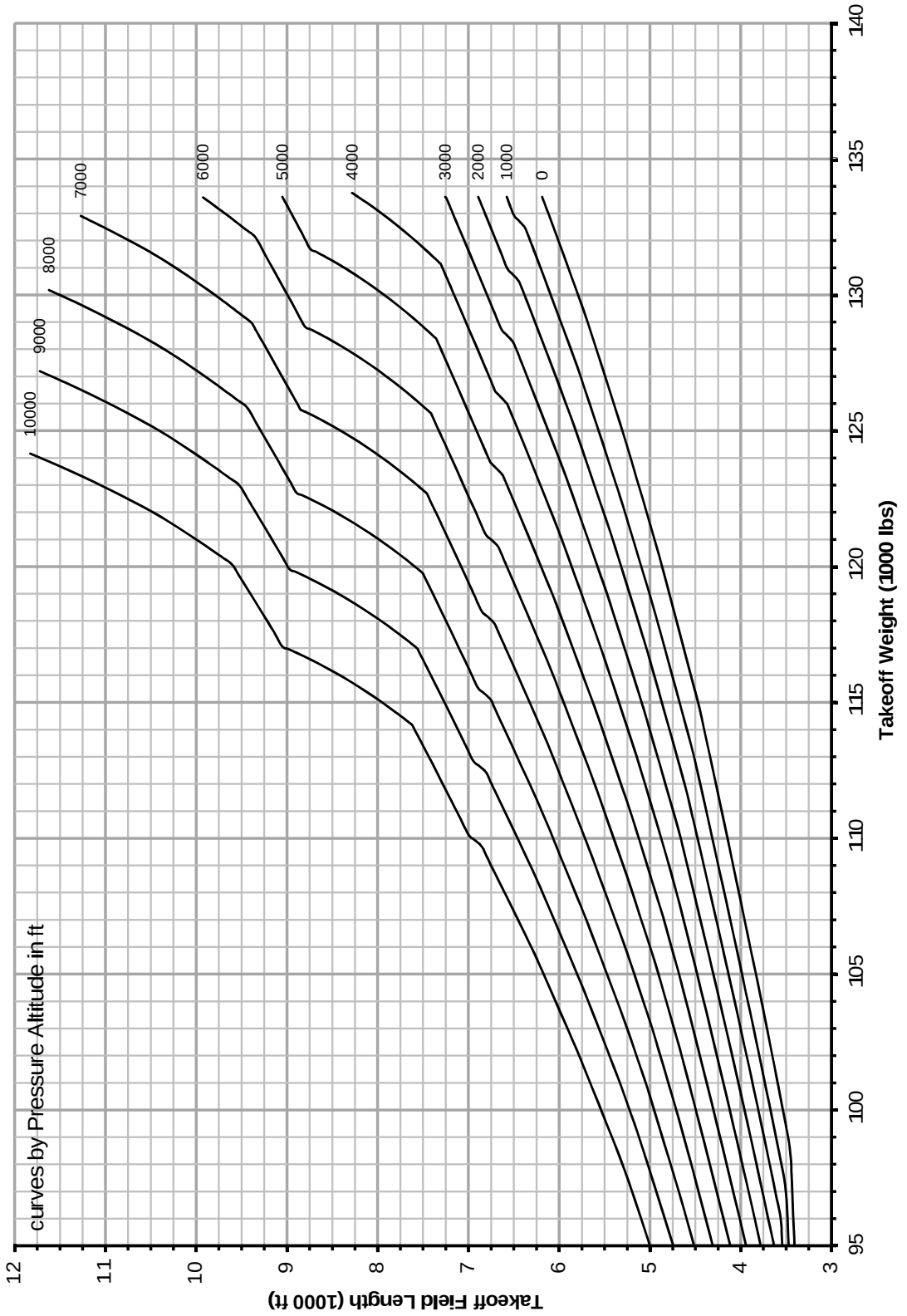
ICN-BD500-A-J000000-A-3AB48-01754-A-002-01

Figure 3 Takeoff field length ISA +15°C - PW1519G



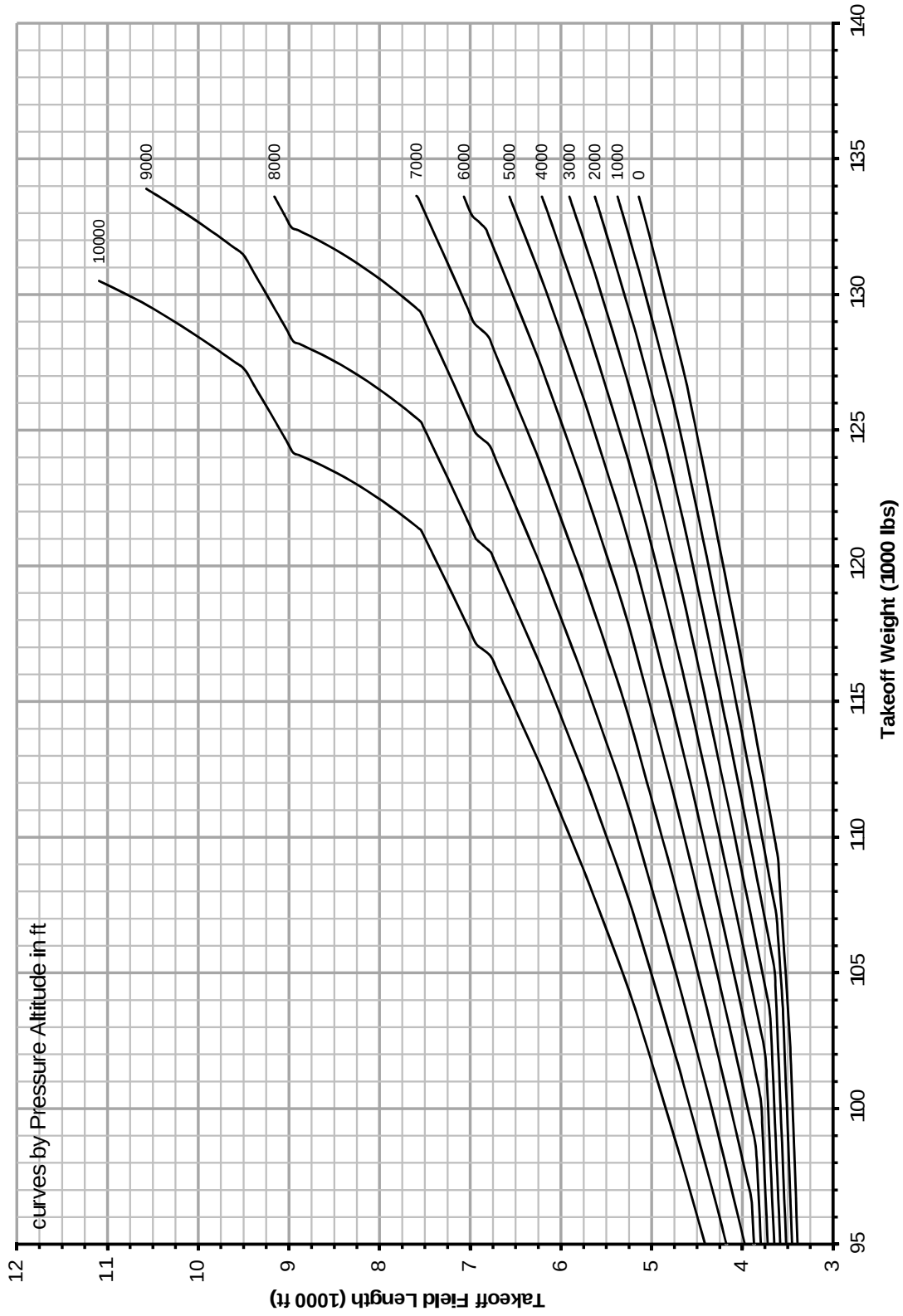
ICN-BD500-A-J000000-A-3AB48-29045-A-001-01

Figure 4 Takeoff field length ISA - PW1521G



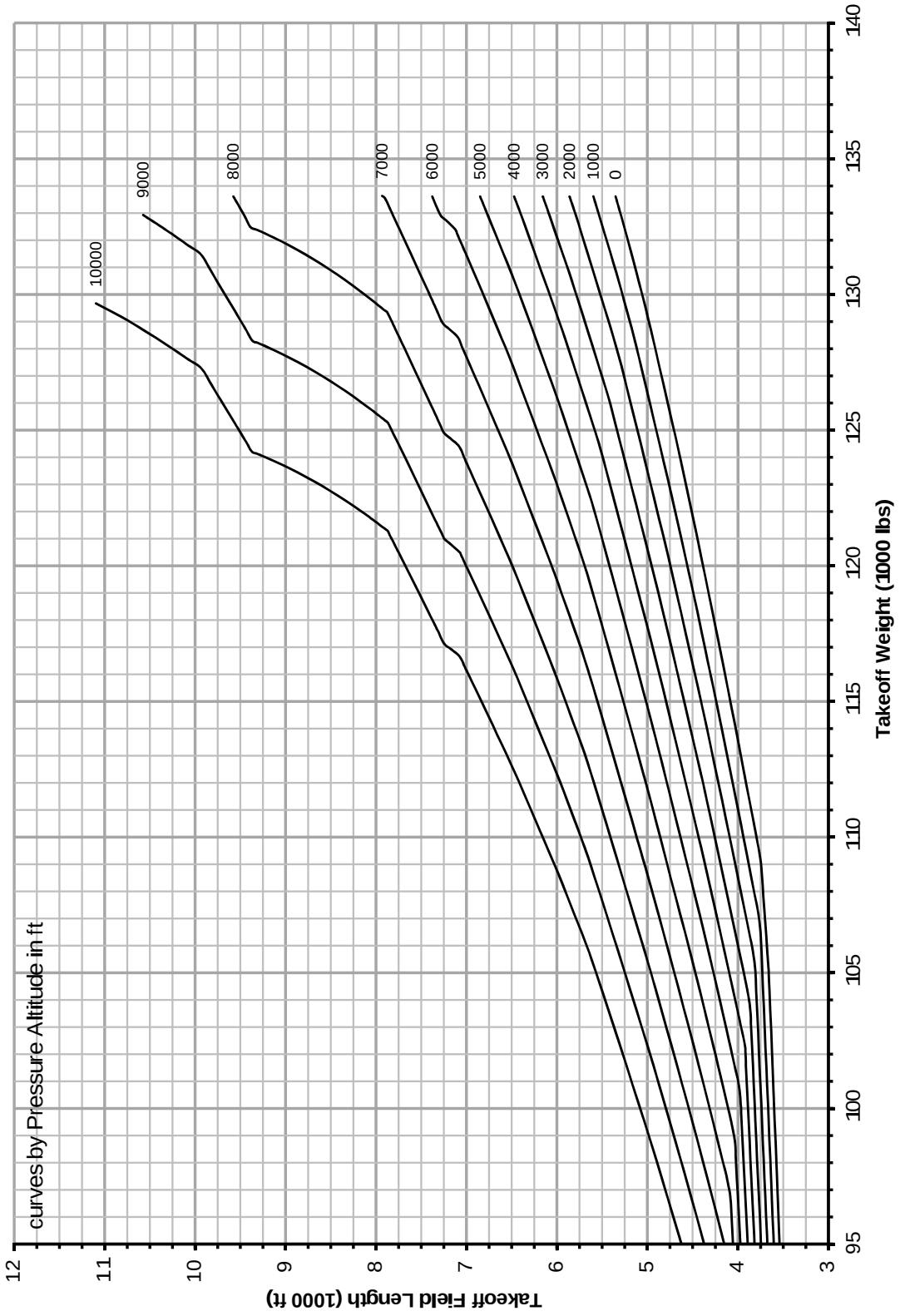
ICN-BD500-A-J000000-A-3AB48-29046-A-001-01

Figure 5 Takeoff field length ISA +15°C - PW1521G



ICN-BD500-A-J000000-A-3AB48-29047-A-001-01

Figure 6 Takeoff field length ISA - PW1524G



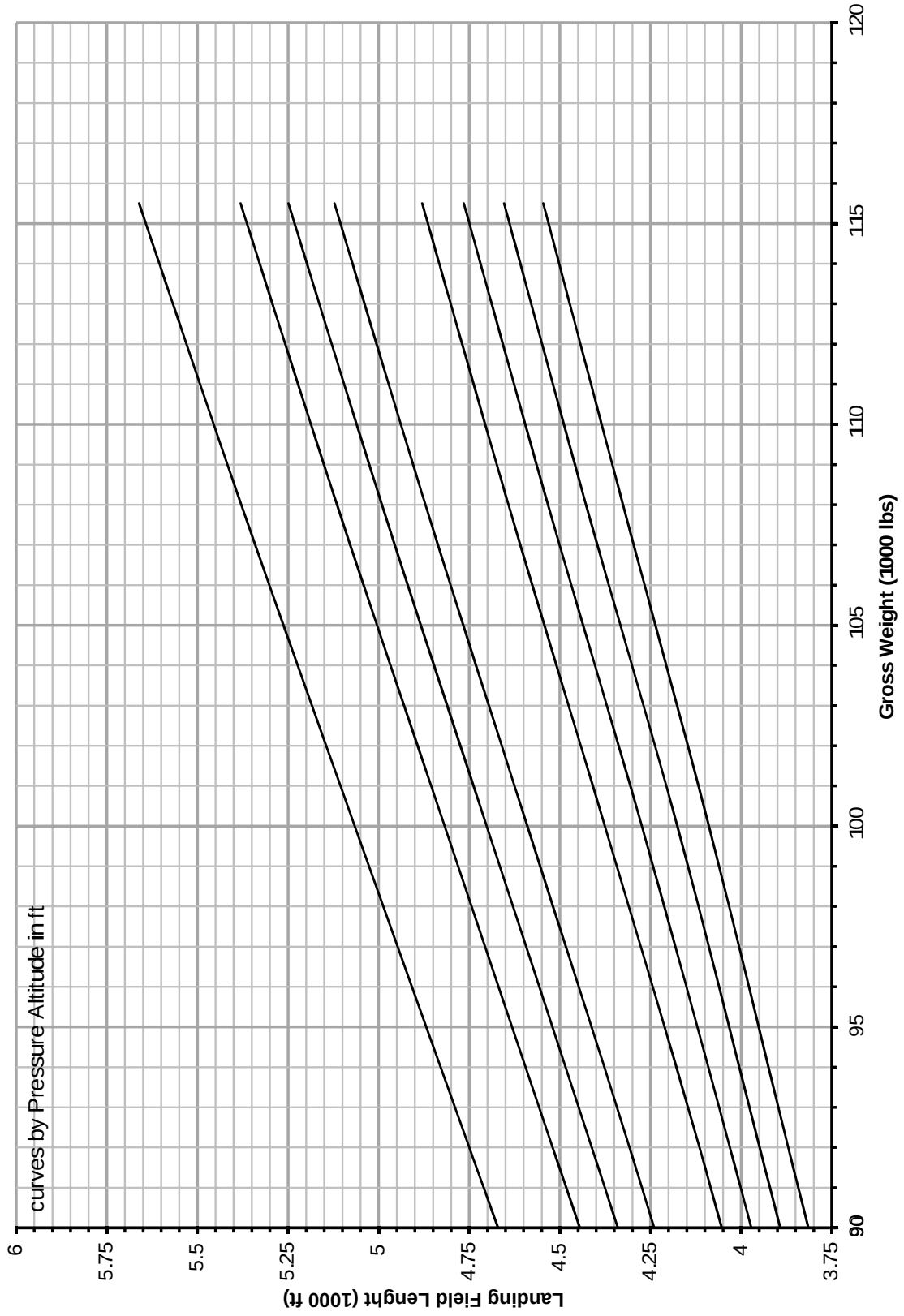
ICN-BD500-A-J000000-A-3AB48-29048-A-001-01

Figure 7 Takeoff field length ISA +15°C - PW1524G

4 Landing field length requirements

For more information about landing field, refer to the AFM BD500-3AB48-22200-00.

For landing field length requirements refer to Fig. 8.

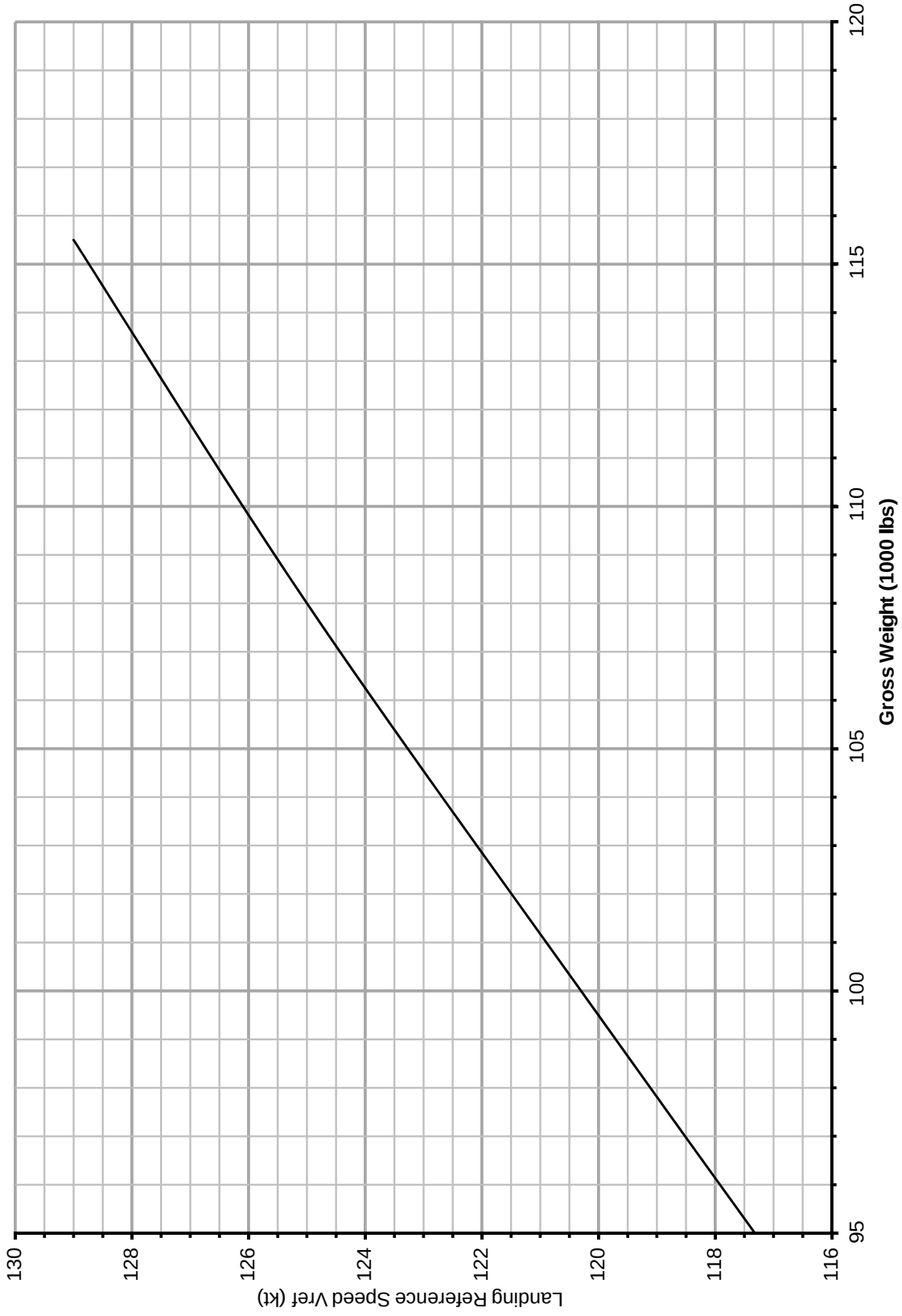


ICN-BD500-A-J000000-A-3AB48-01757-A-002-01

Figure 8 Landing field length - Dry runway

5 Landing reference speed

This section gives information about the landing reference speed.



ICN-BD500-A-J000000-A-3AB48-23901-A-002-01

Figure 9 Landing reference speed

Ground maneuvering - Technical data

Applicability: Model: CS100

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Table 1 References

Data Module/Technical Publication	Title
None	

Description

1 Turning radii

1.1 Introduction

This data module contains data about the aircraft turning capability and maneuvering characteristics on the ground. The data is based on aircraft performance in good conditions of operation.

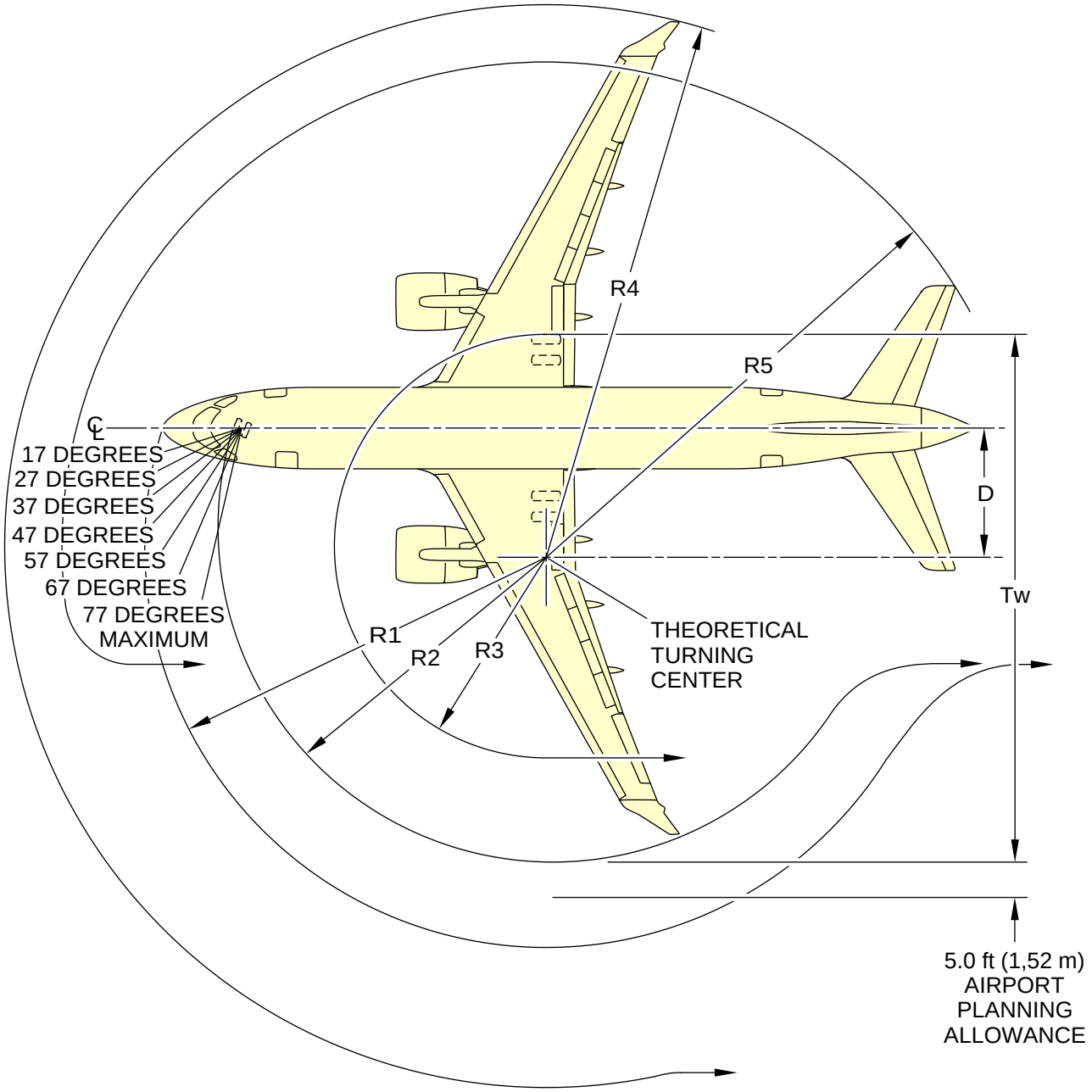
Thus, the values must be considered theoretical and used only as an aid. Refer to Table 2 for the values to use with Fig. 1 for the turn radii with 3 degree slip angle.

1.2 Landing gear turning radii, including minimum turning radii

Table 2 A220-100 turning radii for various nose wheel angles

Turning angle (in degrees) with 3 degree tire slip	Turning center to aircraft center line (D)	Nose tip (R1)	Nose gear outside face (R2)	Main gear outside face (R3)	Wing tip (R4)	Empennage tip (R5)	Minimum theoretical pavement width for 180 degrees turn (Tw= R2+R3)
17	1686.8 in. (42844.72 mm)	1807.5 in. (45910.50 mm)	1776.3 in. (45118.02 mm)	1845.6 in. (46878.24 mm)	2385.4 in. (60589.16 mm)	2046.7 in. (51986.18 mm)	3621.9 in. (91996.26 mm)
27	1012.1 in. (25707.34 mm)	1202.7 in. (30548.58 mm)	1148.4 in. (29169.36 mm)	1171 in. (29743.40 mm)	1715 in. (43561 mm)	1430.1 in. (36324.54 mm)	2319.4 in (58912.76 mm)
37	684.4 in. (17383.76 mm)	943.6 in (23967.44 mm)	869.3 in. (22080.22 mm)	843.2 in. (21417.28 mm)	1390.8 in. (35326.32 mm)	1154.2 in. (29316.68 mm)	1712.6 in. (43500.04 mm)
47	480.9 in. (12214.86 mm)	808.3 in (20530.82 mm)	717.6 in. (18227.04 mm)	639.8 in. (16250.92 mm)	1190.6 in. (30241.24 mm)	998.9 in. (25372.06 mm)	1357.3 in. (34475.42 mm)
57	334.9 in. (8506.46 mm)	730.9 in. (18564.86 mm)	627.9 in. (15948.66 mm)	493.2 in. (12527.28 mm)	1047.6 in. (26609.04 mm)	899.3 in. (22842.22 mm)	1121.1 in. (28475.94 mm)
67	218.9 in. (5560.06 mm)	685.5 in. (17411.70 mm)	572.7 in. (14546.58 mm)	377.8 in. (9596.12 mm)	934.7 in. (23741.38 mm)	830.1 in. (21084.54 mm)	950.4 in. (24140.16 mm)
77	119.1 in. (3025.14 mm)	660.4 in. (16774.16 mm)	541.7 in. (13759.18 mm)	277.9 in. (7058.66 mm)	838.2 in. (21290.28 mm)	779.4 in. (19796.76 mm)	819.6 in. (20817.84 mm)

Intentionally left blank



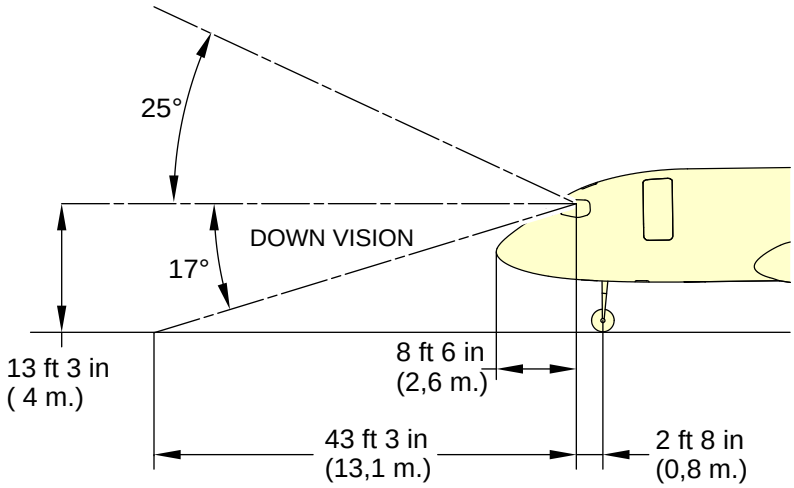
ICN-BD500-A-J092001-A-3AB48-00068-A-001-01

Figure 1 Turn radii

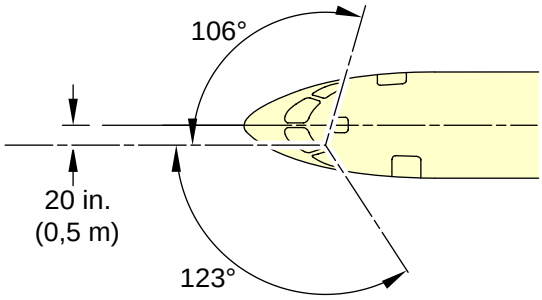
2 Visibility from cockpit in static position

This section contains data about the visibility from cockpit in static position.

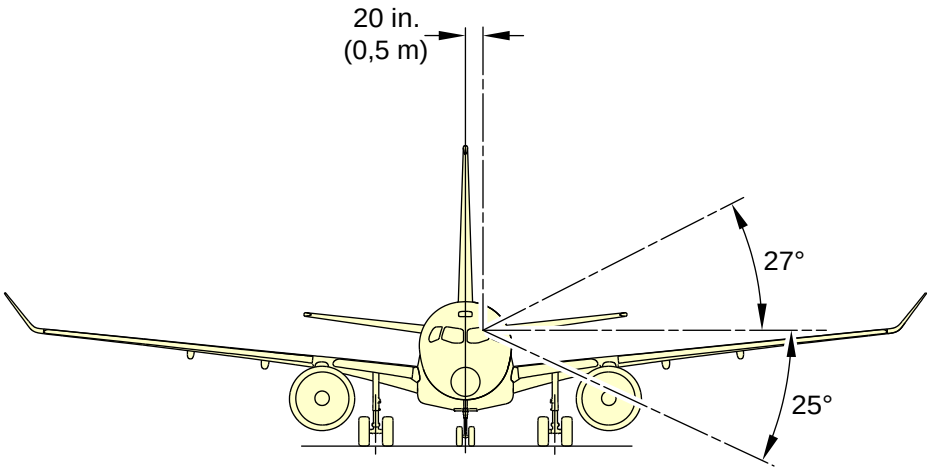
To see the diagram, refer to Fig. 2.



VISUAL ANGLES IN VERTICAL PLANE THROUGH PILOT'S EYE POSITION



VISUAL ANGLES IN HORIZONTAL PLANE THROUGH PILOT'S EYE POSITION



VISUAL ANGLE IN A PLANE PERPEDNDICULAR TO LONGITUDINAL AXIS THROUGH PILOT'S EYE POSITION

NOTES

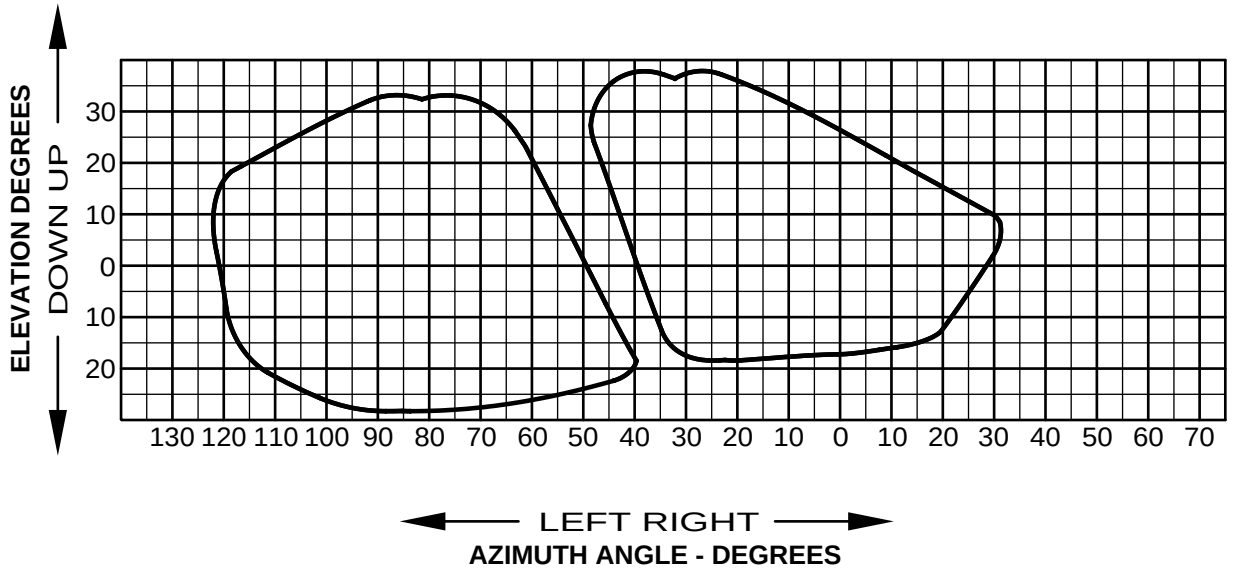
1. Not to be used for landing approach visibility.
2. Not scale.

ICN-BD500-A-J000000-A-3AB48-22579-A-001-01

Figure 2 Visibility from cockpit in static position

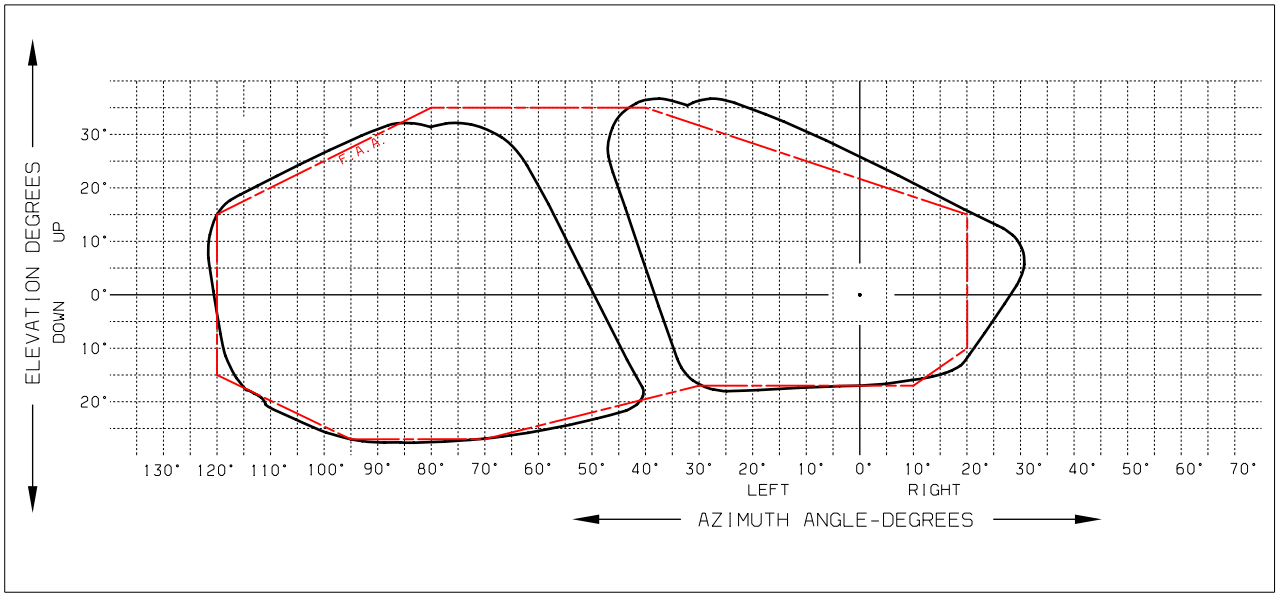
2.1 Clear areas of vision

To see the diagram, refer to Fig. 3 and Fig. 4.



ICN-BD500-A-J092001-A-3AB48-00119-A-001-01

Figure 3 Clear areas of vision



ICN-BD500-A-J000000-A-3AB48-45615-A-001-01

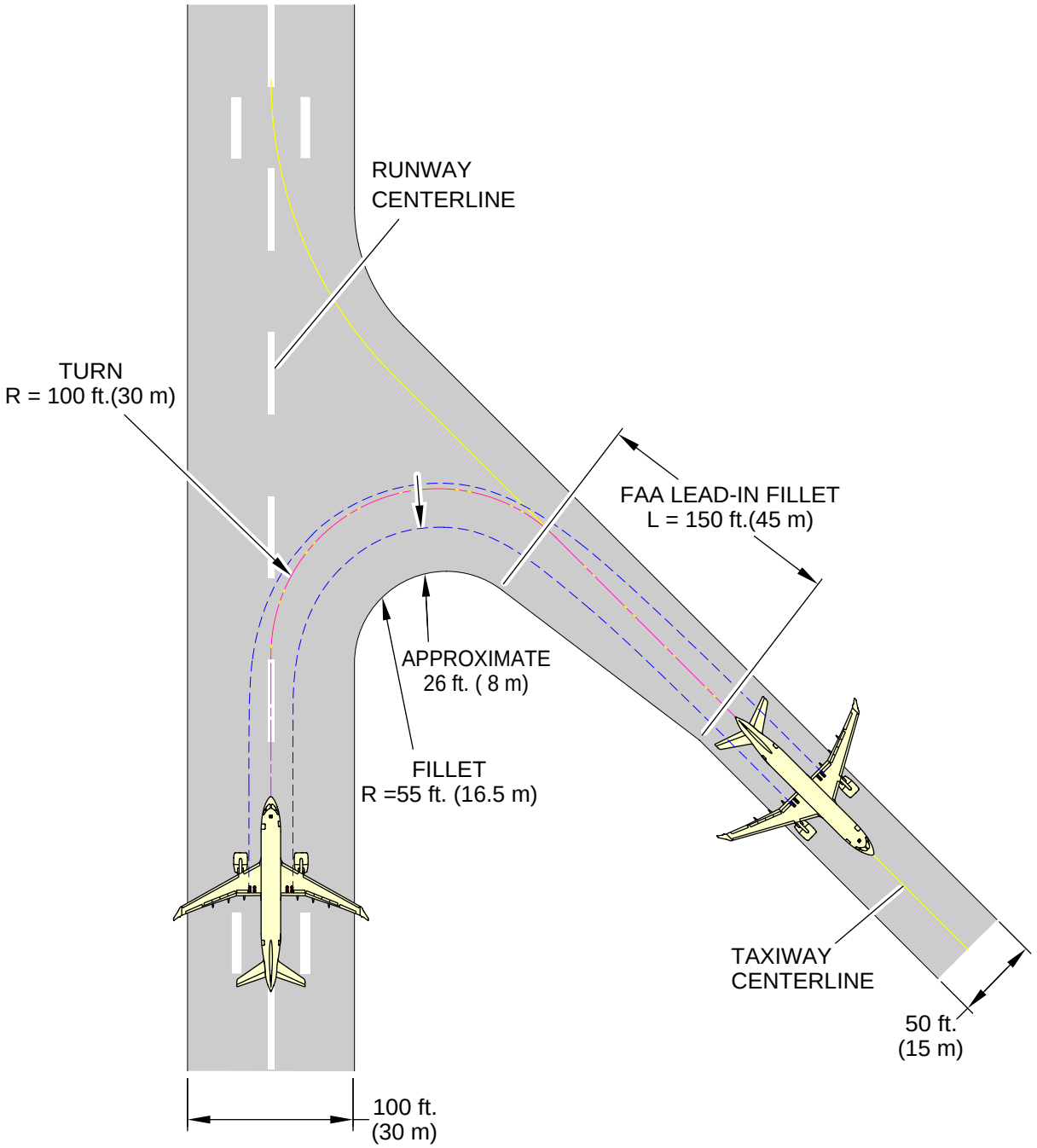
Figure 4 A220 Clear areas of vision

3 Runways and taxiways turn paths

This section contains data about the runways and taxiways turn paths.

3.1 More than 90° turn - Runway to taxiway - Cockpit over centerline method

To see the diagram, refer to Fig. 5.



LEGEND

Nose gear.
Main gear.

NOTE

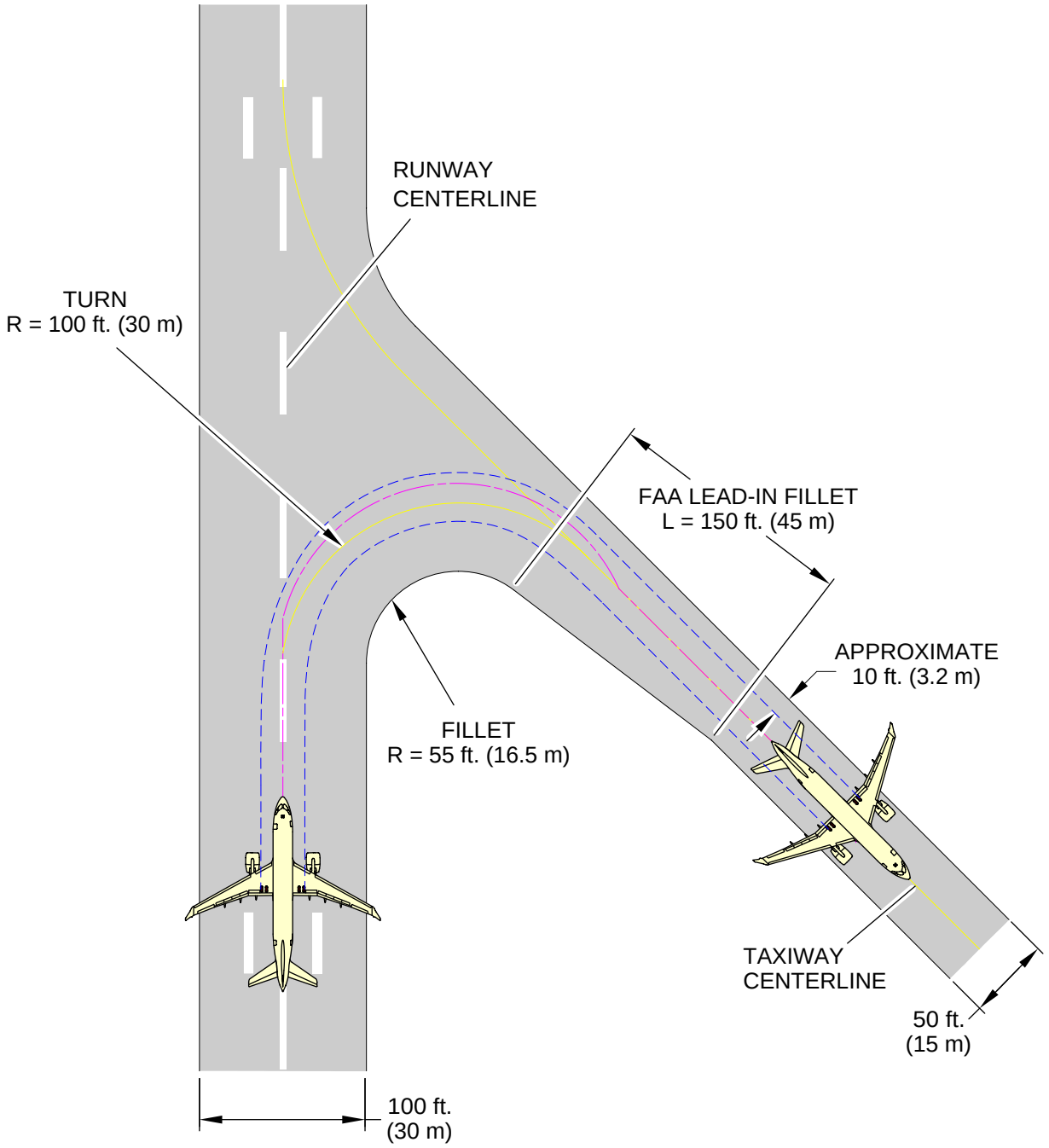
Coordinate with airline operator for the specific planned operating procedure.

ICN-BD500-A-J000000-A-3AB48-22068-A-001-01

Figure 5 More than 90° turn - Runway to taxiway - Cockpit over centerline method

3.2 More than 90° turn - Runway to taxiway - Oversteering method

To see the diagram, refer to Fig. 6.



LEGEND

Nose gear.
Main gear.

NOTE

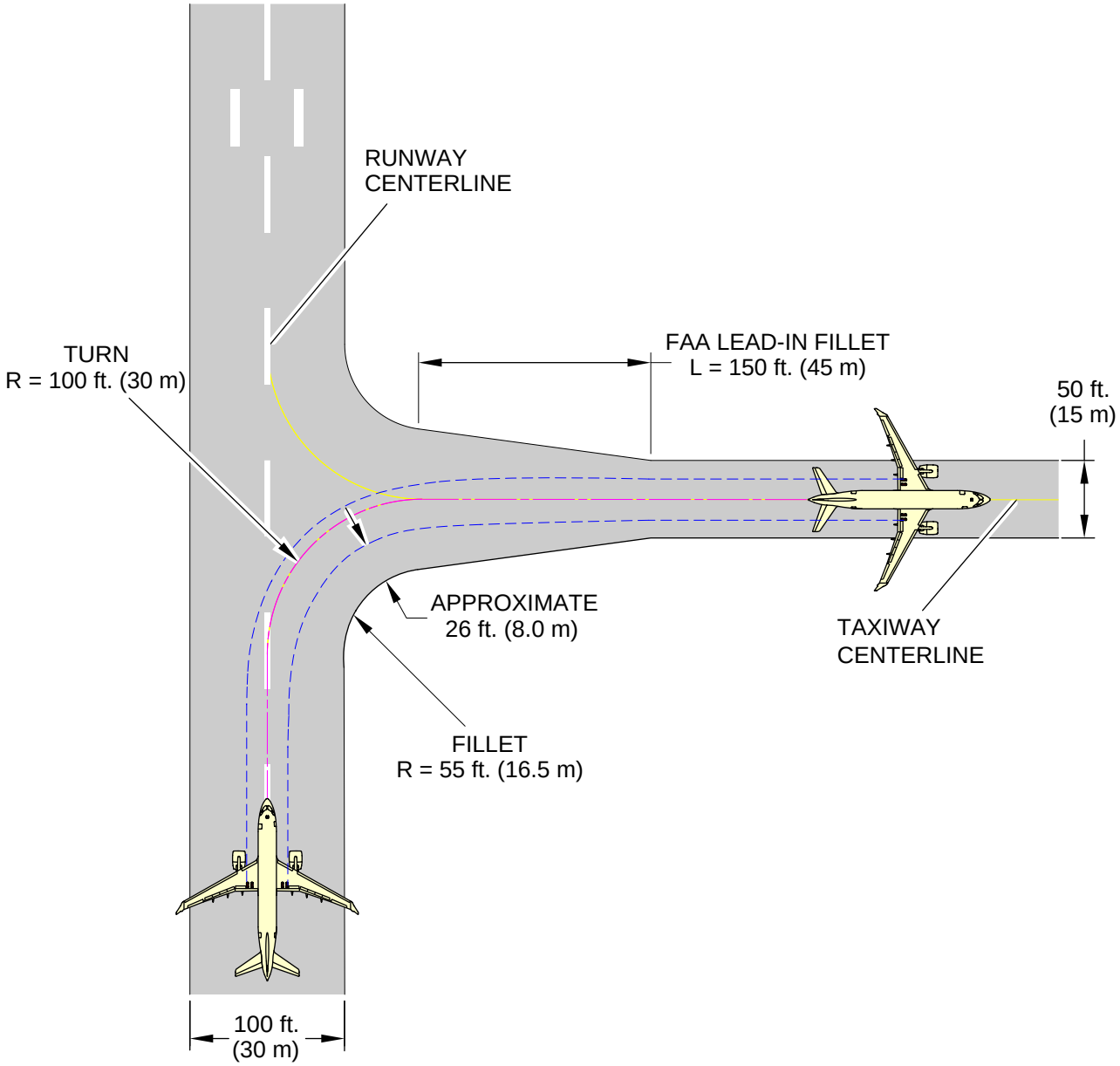
Coordinate with airline operator for the specific planned operating procedure.

ICN-BD500-A-J000000-A-3AB48-22553-A-001-01

Figure 6 More than 90° turn - Runway to taxiway - Oversteering method

3.3 90° turn - Runway to taxiway - Cockpit over centerline method

To see the diagram, refer to Fig. 7.



LEGEND

Nose gear.
Main gear.

NOTE

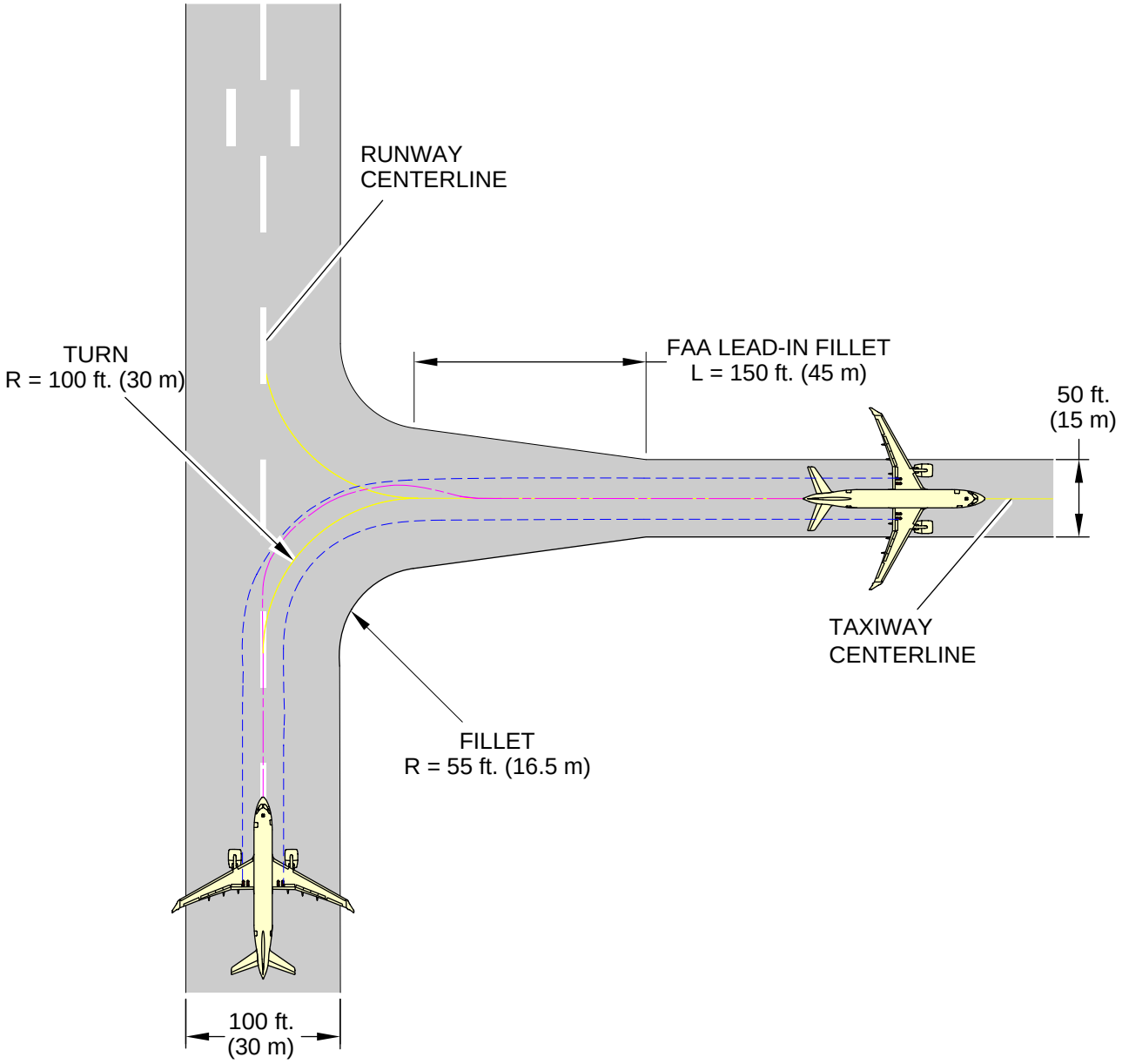
Coordinate with airline operator for the specific planned operating procedure.

ICN-BD500-A-J000000-A-3AB48-22065-A-001-01

Figure 7 90° turn - Runway to taxiway - Cockpit over centerline method

3.4 90° turn - Runway to taxiway - Oversteering method

To see the diagram, refer to Fig. 8.



LEGEND

Nose gear.
Main gear.

NOTE

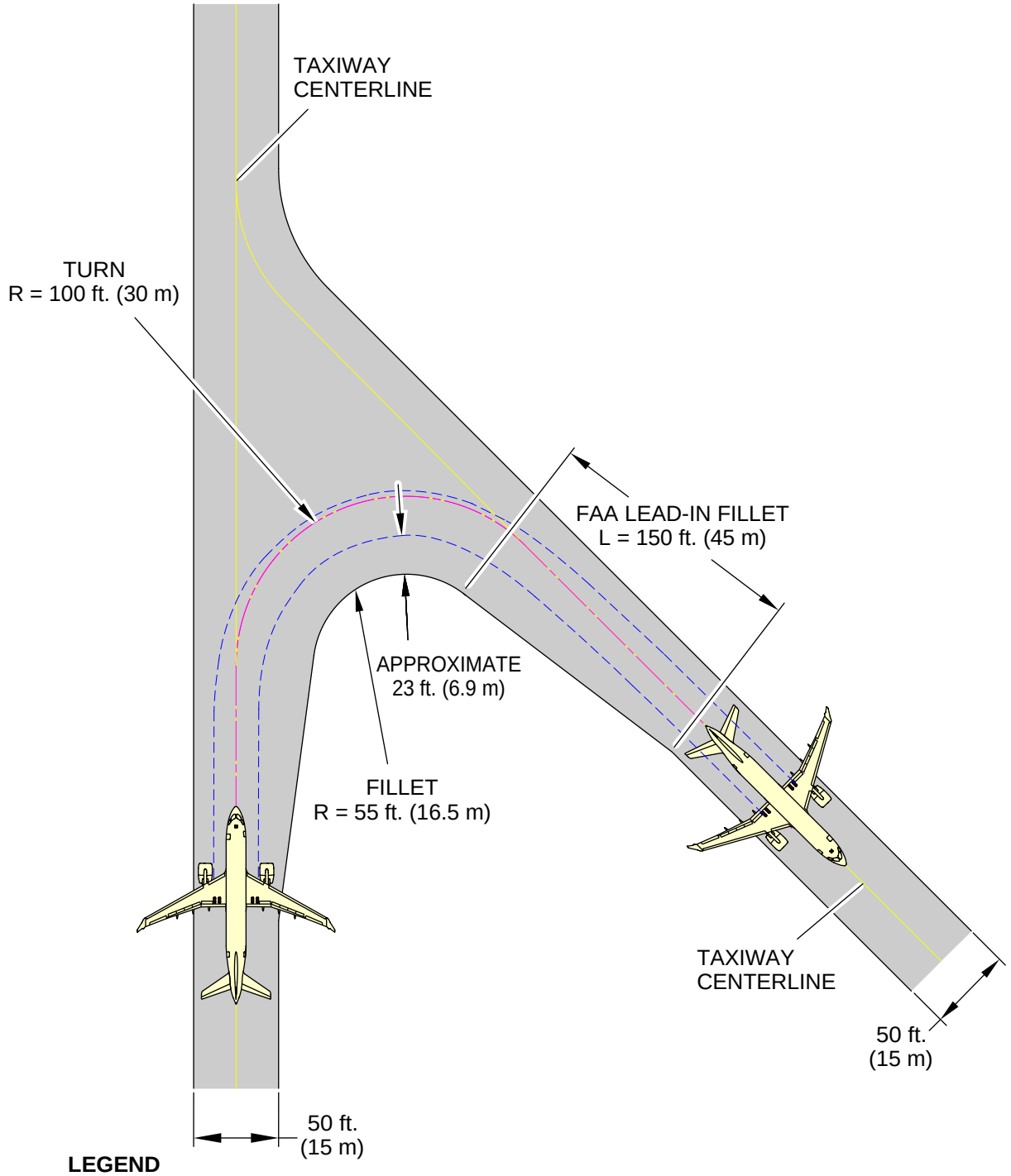
Coordinate with airline operator for the specific planned operating procedure.

ICN-BD500-A-J000000-A-3AB48-22555-A-001-01

Figure 8 90° turn - Runway to taxiway - Oversteering method

3.5 More than 90° turn - Taxiway to taxiway - Cockpit over centerline method

To see the diagram, refer to Fig. 9.



LEGEND

Nose gear.
Main gear.

NOTE

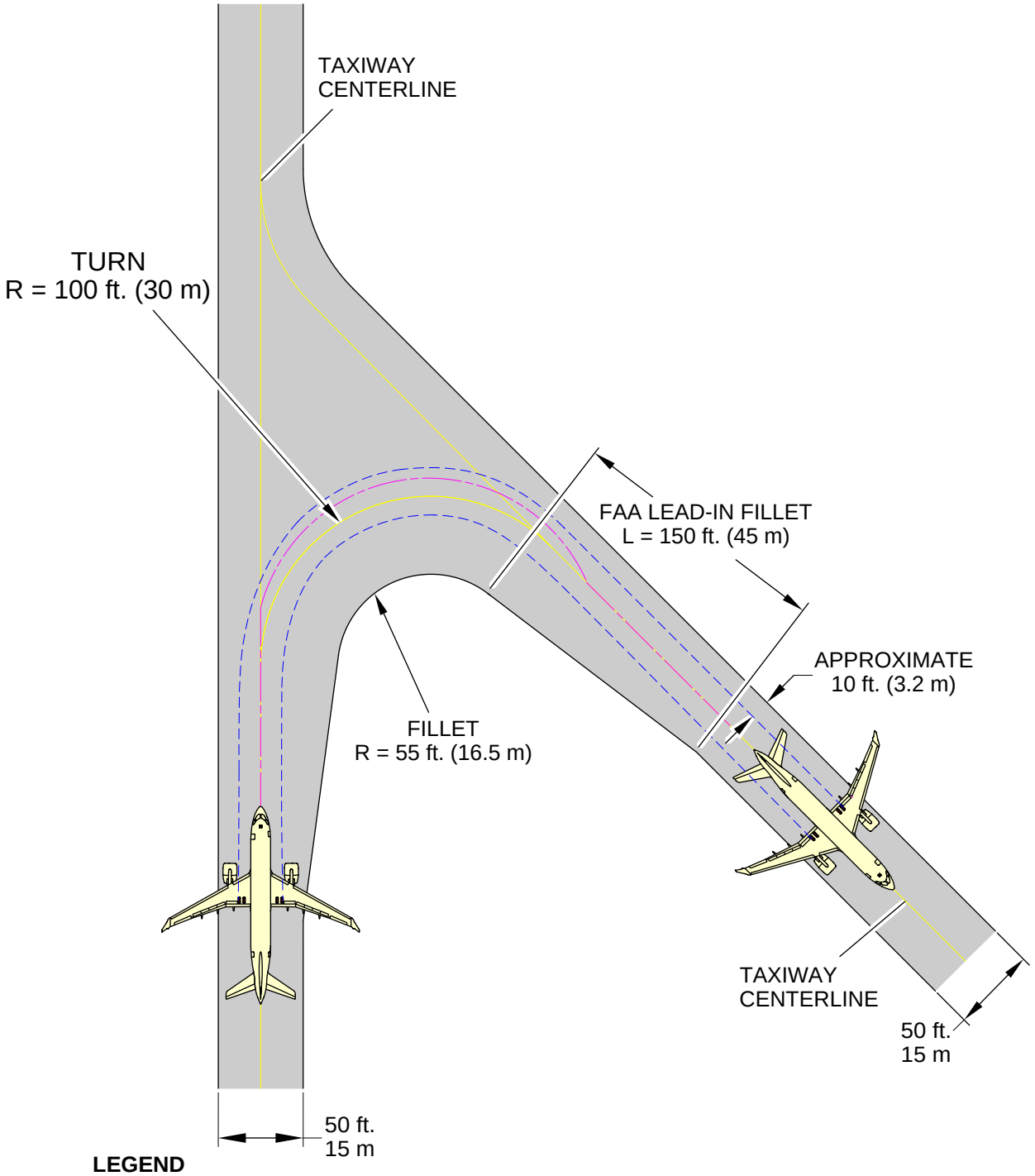
Coordinate with airline operator for the specific planned operating procedure.

ICN-BD500-A-J000000-A-3AB48-22069-A-001-01

Figure 9 More than 90° turn - Taxiway to taxiway - Cockpit over centerline method

3.6 More than 90° turn - Taxiway to taxiway - Oversteering method

To see the diagram, refer to Fig. 10.



LEGEND

Nose gear.
Main gear.

NOTE

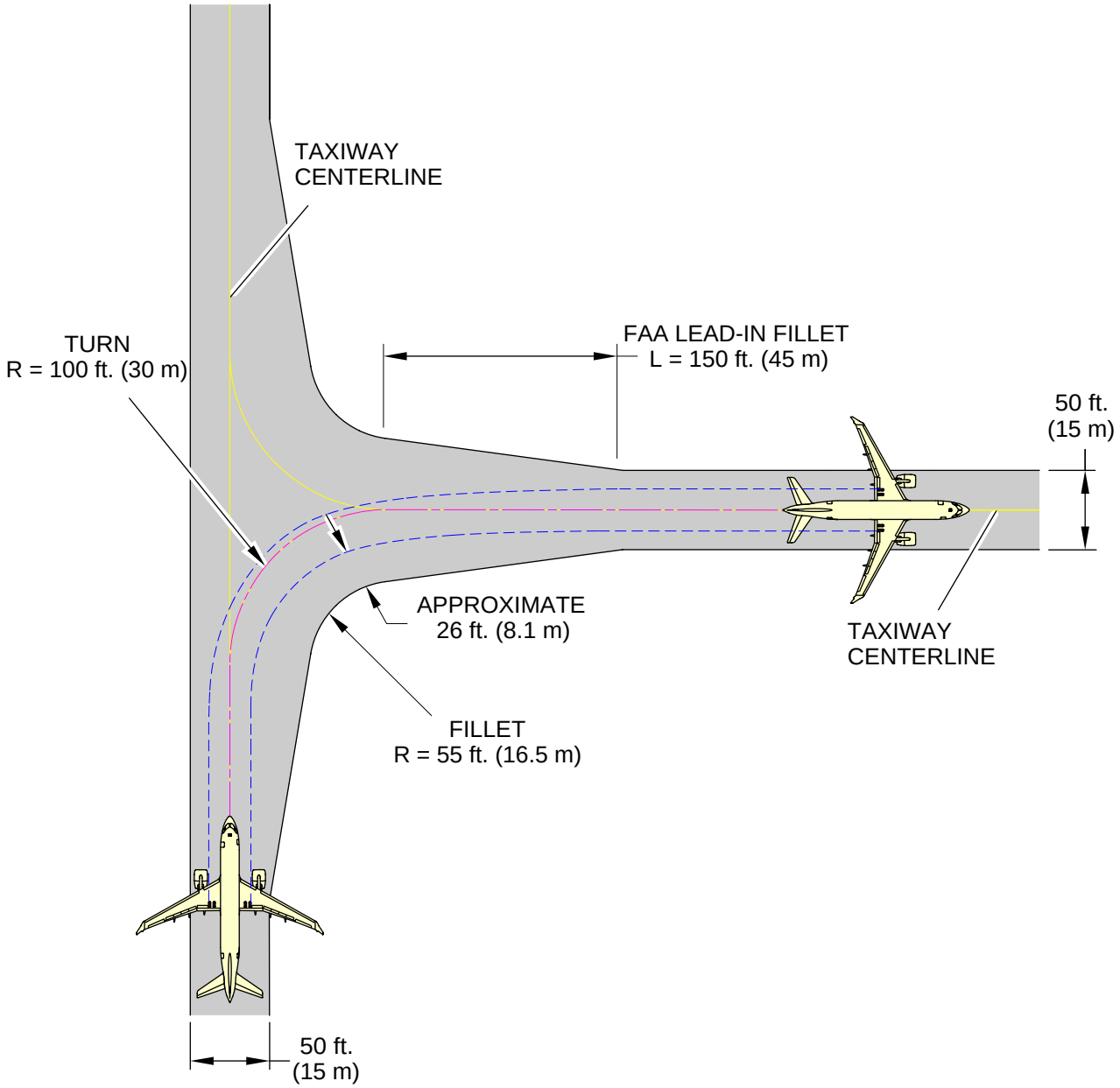
Coordinate with airline operator for the specific planned operating procedure.

ICN-BD500-A-J000000-A-3AB48-22552-A-001-01

Figure 10 More than 90° turn - Taxiway to taxiway - Oversteering method

3.7 90° turn - Taxiway to taxiway - Cockpit over centerline method

To see the diagram, refer to Fig. 11.



LEGEND

Nose gear.
Main gear.

NOTE

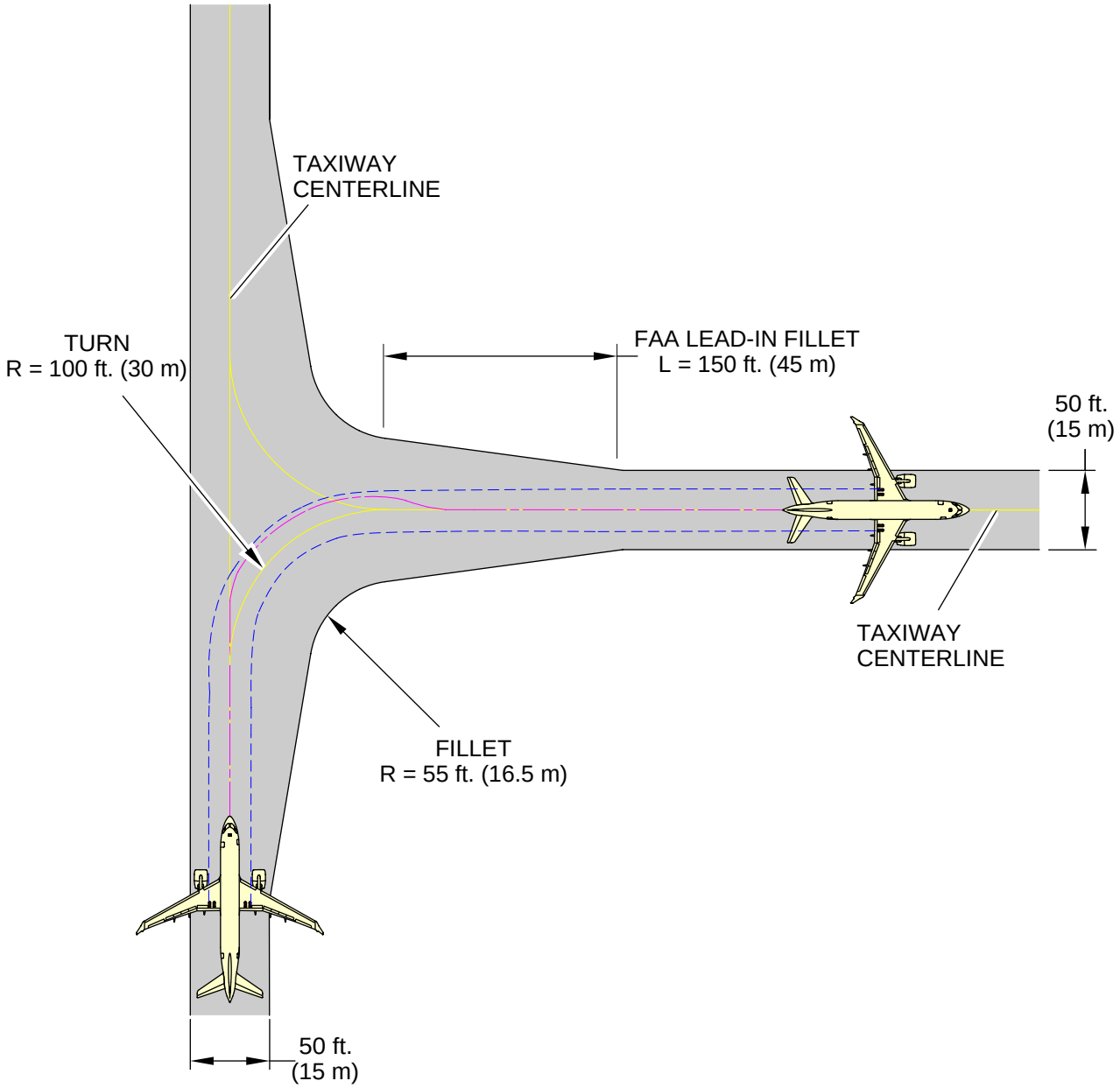
Coordinate with airline operator for the specific planned operating procedure.

ICN-BD500-A-J000000-A-3AB48-22066-A-001-01

Figure 11 90° turn - Taxiway to taxiway - Cockpit over centerline method

3.8 90° turn - Taxiway to taxiway - Oversteering method

To see the diagram, refer to Fig. 12



LEGEND

Nose gear.
Main gear.

NOTE

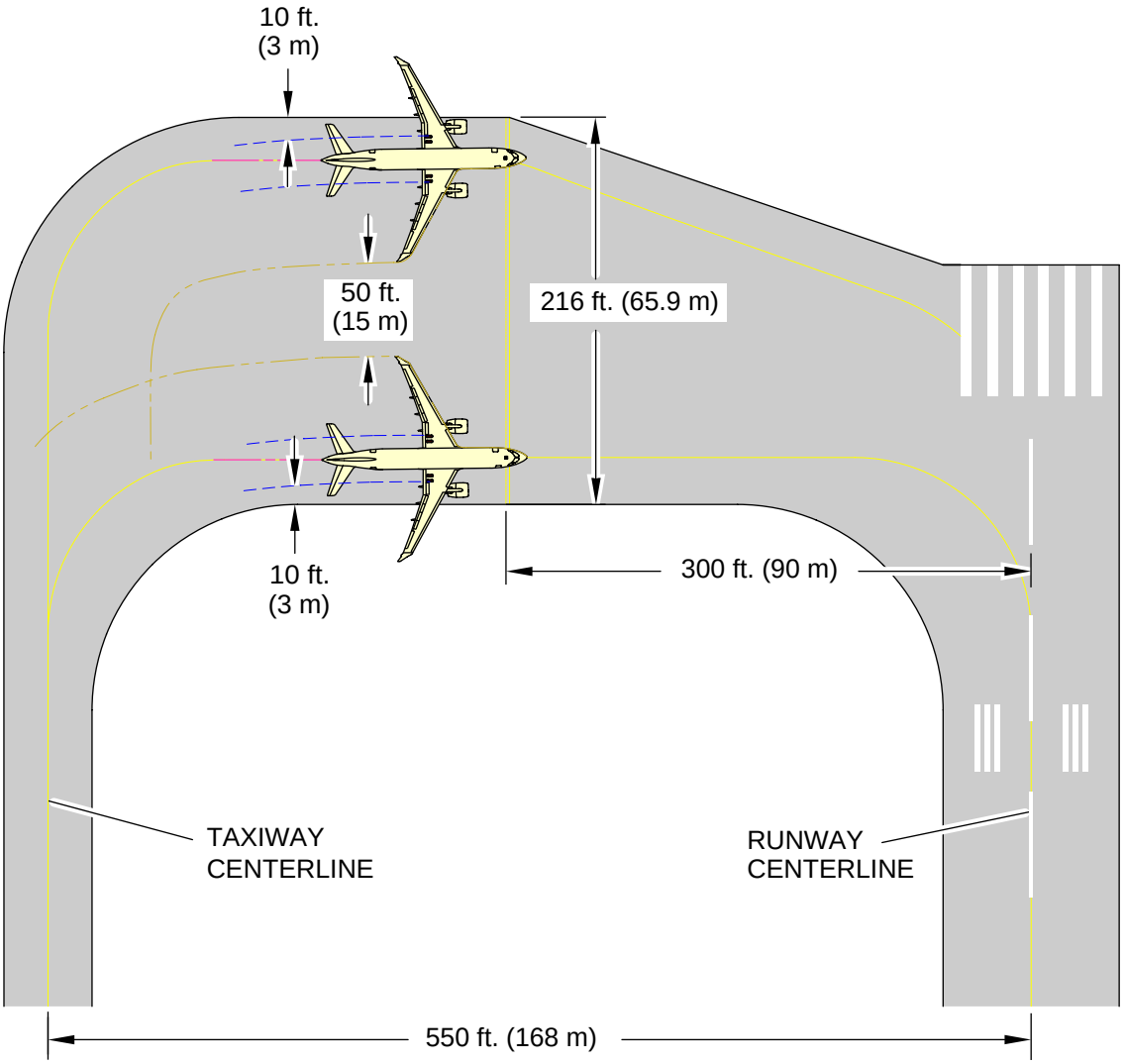
Coordinate with airline operator for the specific planned operating procedure.

ICN-BD500-A-J000000-A-3AB48-22554-A-001-01

Figure 12 90° turn - Taxiway to taxiway - Oversteering method

3.9 Runway holding bay (Apron)

To see the diagram, refer to Fig. 13.



LEGEND

Nose gear.
Main gear.

NOTE

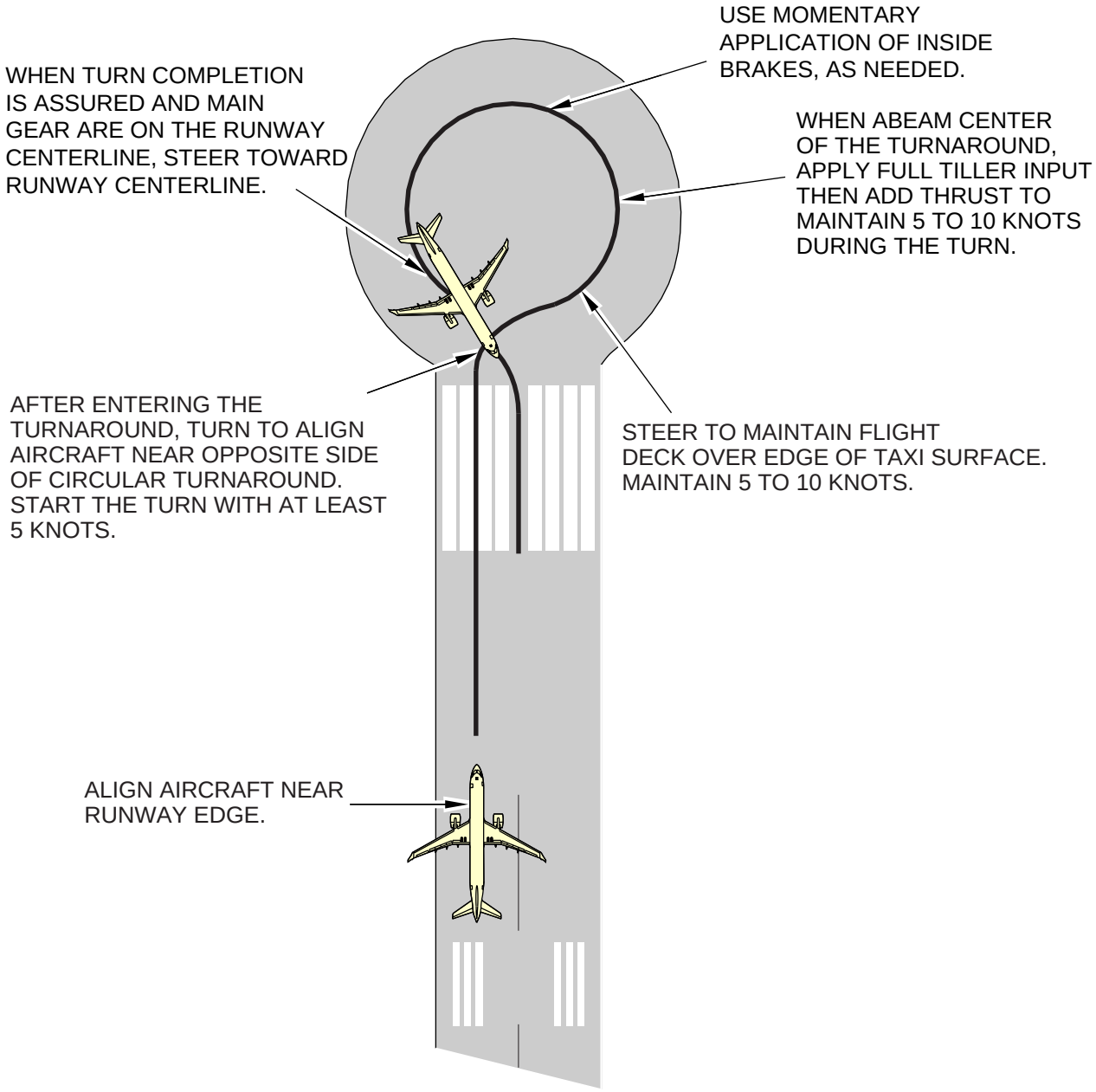
Coordinate with airline operator for the specific planned operating procedure.

ICN-BD500-A-J000000-A-3AB48-22067-A-001-01

Figure 13 Runway holding bay (Apron)

3.10 Hammerhead Turnaround

To see the diagrams, refer to Fig. 14 and Fig. 15.

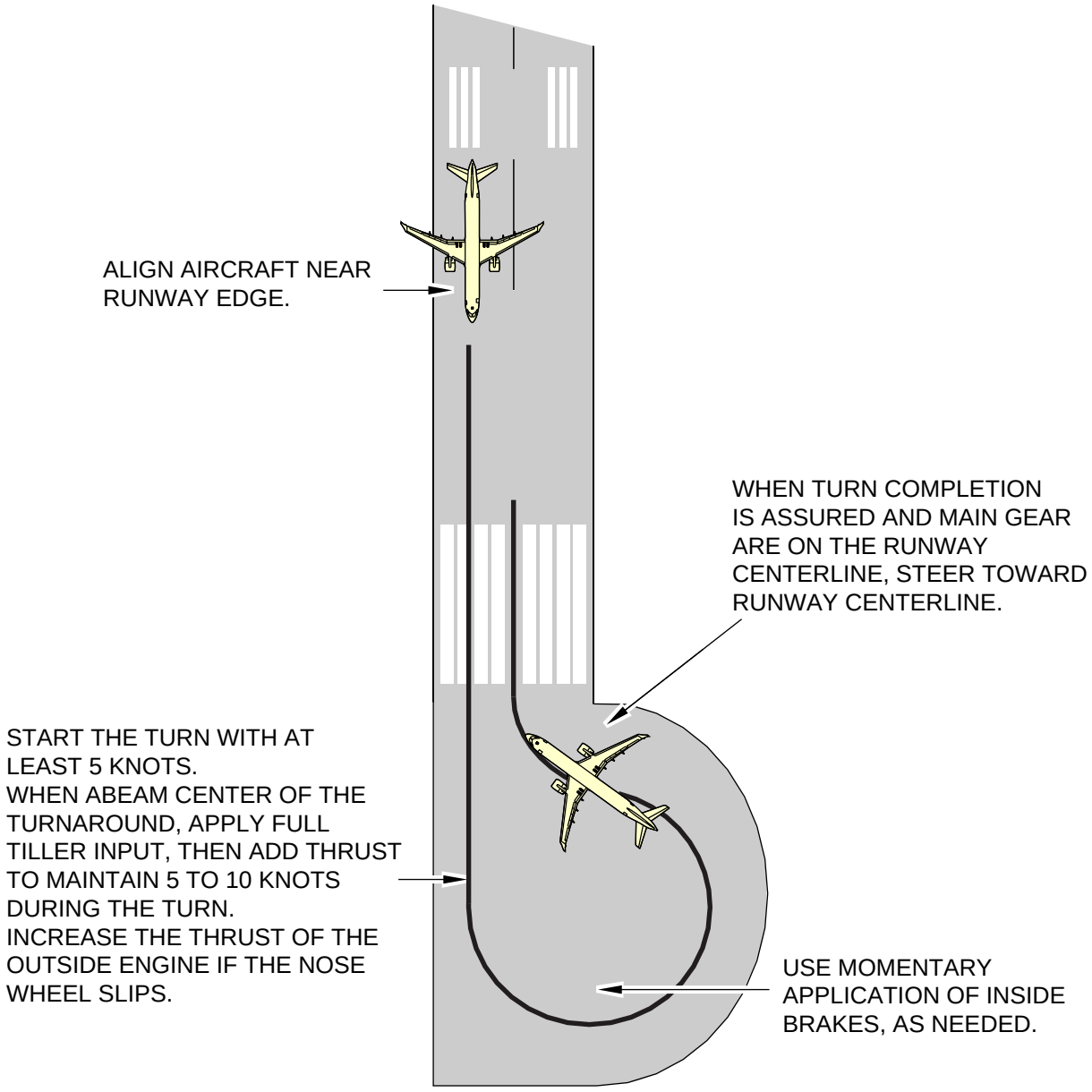


NOTE

Follow turnaround steering guidance cues if available.

ICN-BD500-A-J000000-A-3AB48-45728-A-001-01

Figure 14 Techniques when using a Hammerhead Turnaround



NOTE

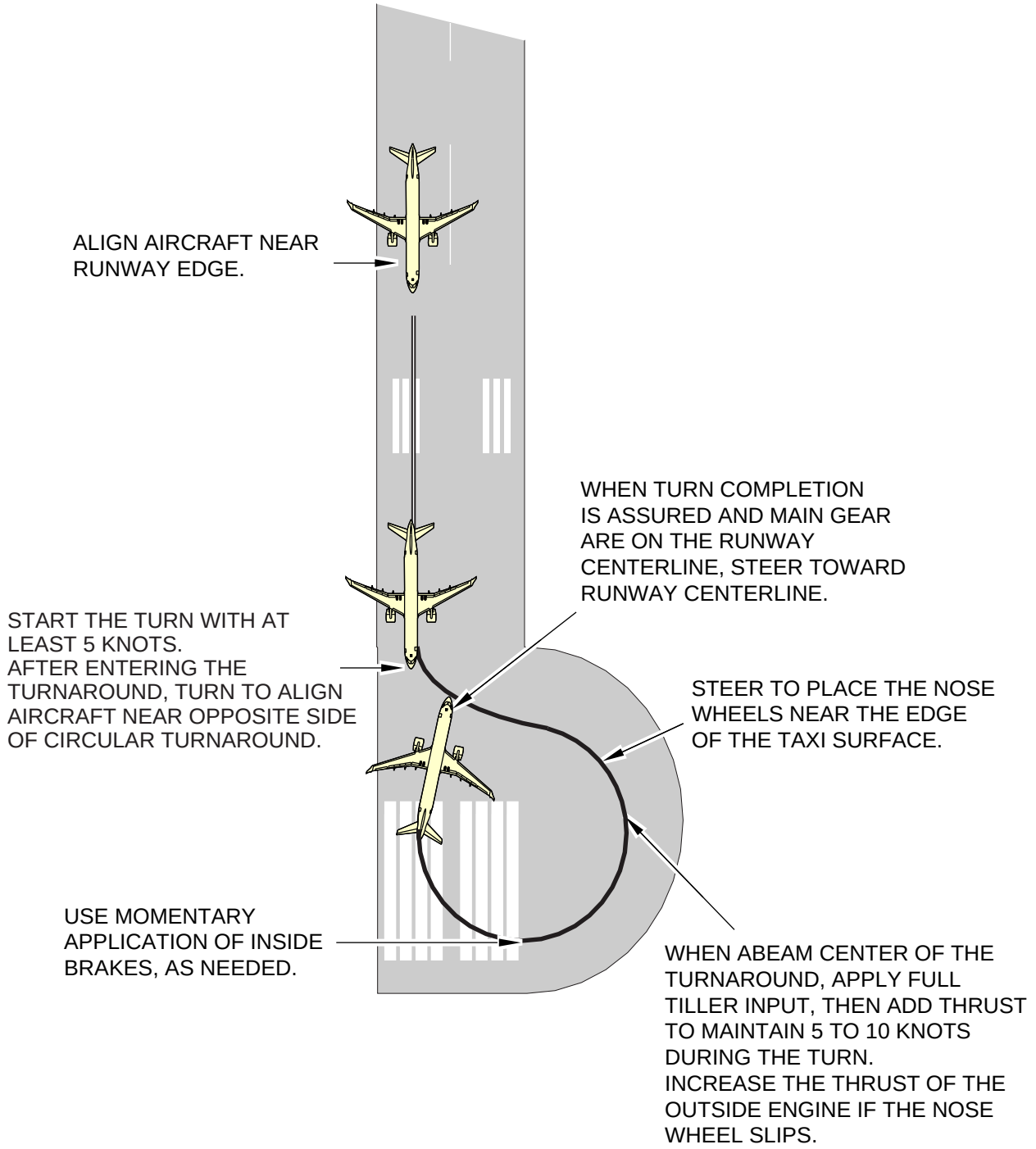
Follow turnaround steering guidance cues if available.

ICN-BD500-A-J000000-A-3AB48-45729-A-001-01

Figure 15 Techniques when using a Hammerhead Turnaround

3.11 180 Degree (Pivot) Turns in Less than 147.6 feet (45 m)

To see the diagram, refer to Fig. 16.



NOTE

Follow turnaround steering guidance cues if available.

ICN-BD500-A-J000000-A-3AB48-45730-A-001-01

Figure 16 180 Degree (Pivot) Turns in Less than 147.6 feet / 45 m

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A220

Terminal servicing - Technical data

Applicability: Model: CS100

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List of tables

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References

Table 1 References

Data Module/Technical Publication	Title
None	

Description

1 Introduction

This data module contains data related to the preparation of an aircraft for flight from a terminal. This data is provided to show the general types of tasks involved in terminal operations. Each airline has different operating conditions and practices, which can result in changes in the operating procedures and time intervals to do the tasks specified. Because of this, requirements for ground operations should be approved with the specified airline(s) before ramp planning is started. This section presents the following topics:

- Aircraft servicing arrangement
- Terminal operations
- Ground servicing connections
- Ground electrical power requirements
- Ground pneumatic power requirements – Engine starting
- Preconditioned airflow requirements – Air conditioning
- Ground towing requirements.

Note

All applicable procedures and limitations are provided in the Aircraft Maintenance Publication (AMP) BD500-3AB48-10200-00.

1.1 Aircraft servicing arrangement

Refer to Fig. 1 for the aircraft servicing arrangement.

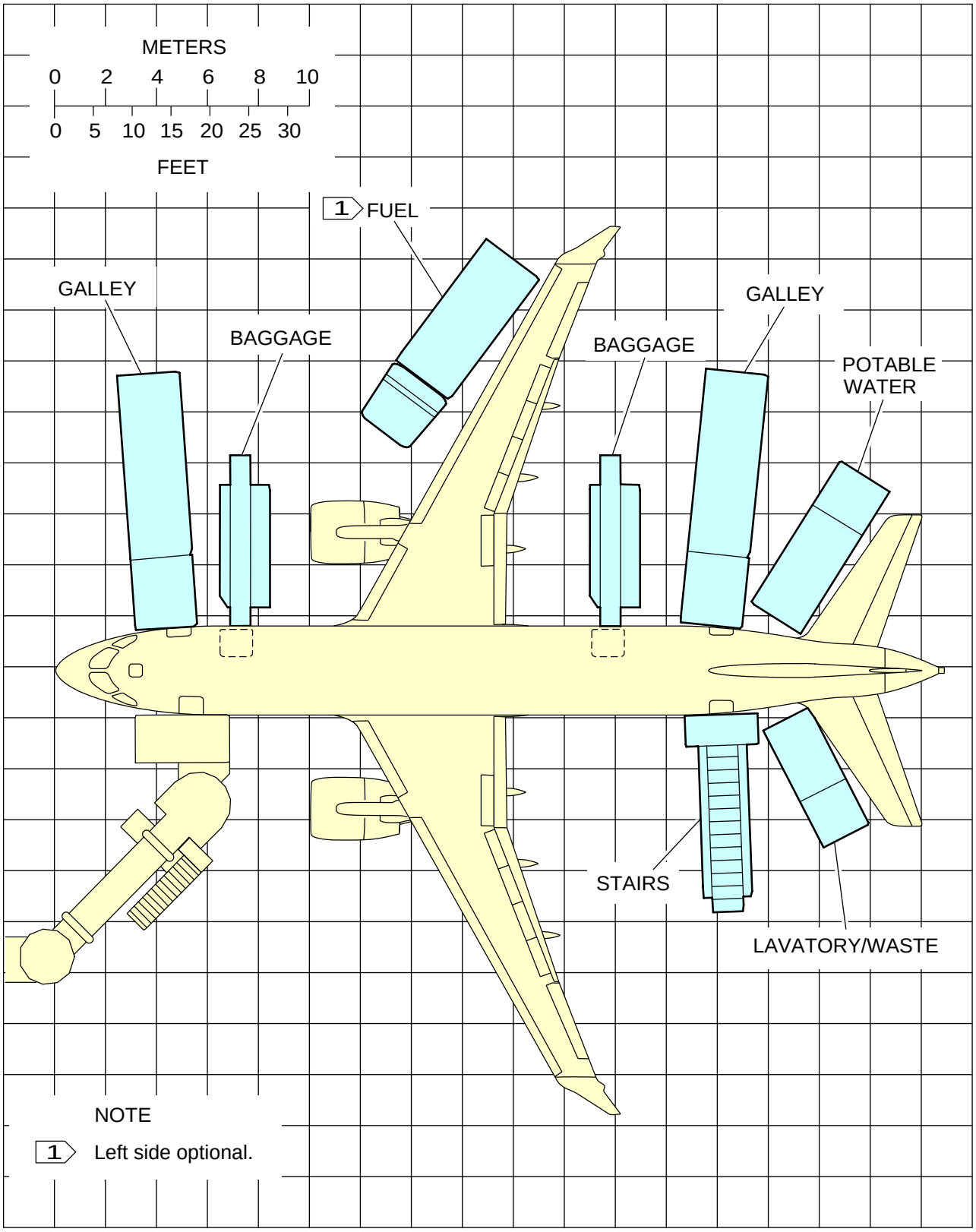

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Figure 1 Aircraft servicing arrangement

1.2 Terminal operations

Refer to Fig. 2 for the turnaround station operations.

The turnaround time analysis is based on the following parameters:

- 100% Pax/baggage exchange
- 94 passengers (85% load factor) / 1 class / 1 door
- 2 Galley service trucks
- Water/Waste servicing is sequential
- Cabin servicing during available time
- Passenger deplane rate is 18 per minute per door
- Passenger boarding rate is 12 per minute per door
- 2 bulk-loading belt-loaders
- 45 bags forward, 67 bags aft (1.2 x 4 ft^3 (1.2 X 0.11 m^3) per passenger)
- Bag loading/unloading rates are 10 and 15 bags per minute
- Fuel loaded via one refuel/defuel adapter
- Refuel adapter rate at 50 psi (344.74 kPa) is as follows:

  1 When refueling tree (3) tanks simultaneously (the center tank and two wing tanks), the refuel rate is 260 gpm (984 L/min).

  2 When refueling two (2) wing tanks, the refuel rate is 140 gpm (530 L/min).

  3 When refueling the center tank only, the refuel rate is 140 gpm (530 L/min).

- Mission range is 1200 NM (2222.4 km)
- Refueling performed while deplaning/boarding.

Note

All equipment is assumed to function properly and weather condition to be normal. This data is provided to illustrate the general scope and type of operations involved in a terminal gate environment. Varying operating practices and circumstances may result in different task sequences and durations.

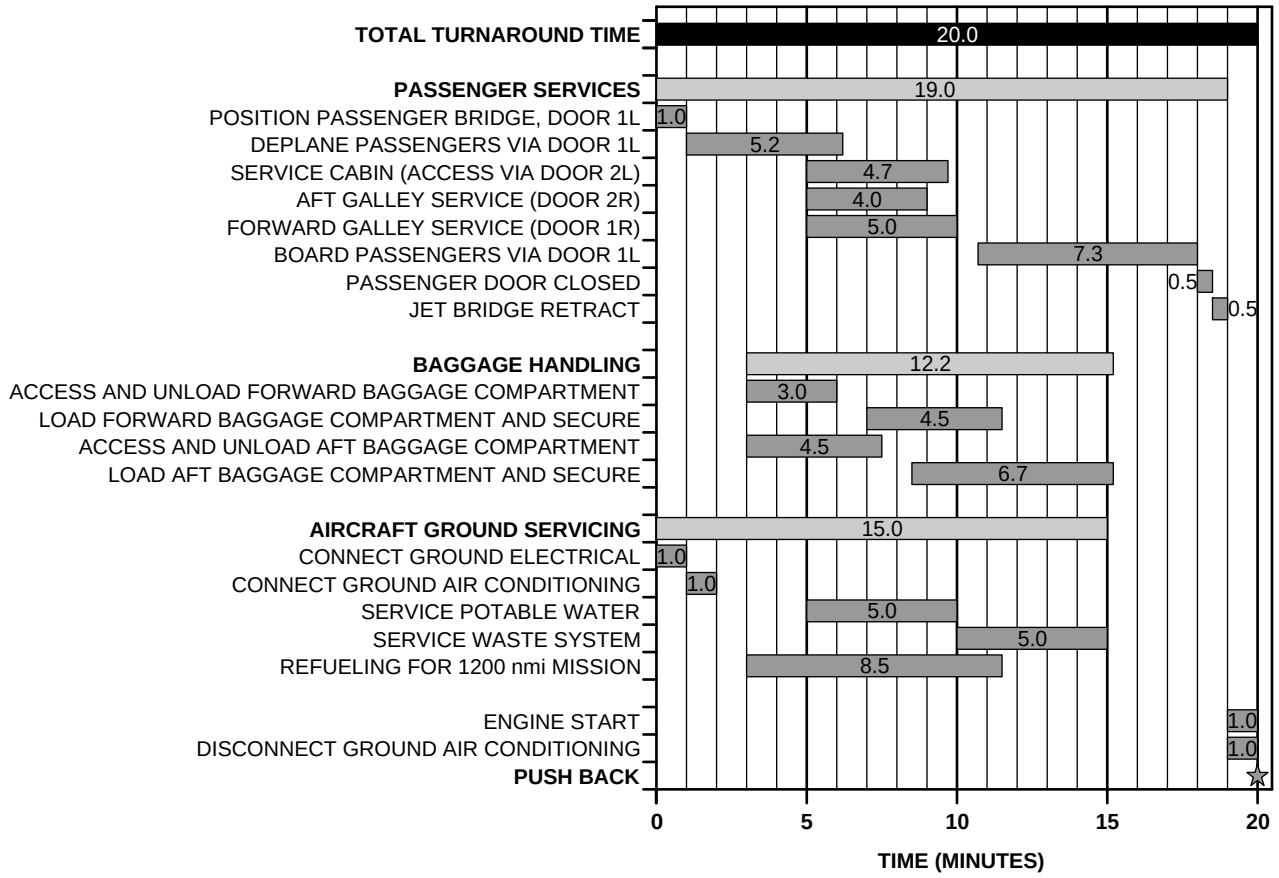

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Figure 2 Turnaround time analysis

1.3 Ground servicing connections

Refer to Fig. 3 for the ground servicing connection points. For servicing procedures, refer to the AMP.

All servicing points are designed and positioned to consider accessibility and compatibility with industry standard vehicles and other Ground Support Equipment (GSE). All applicable procedures and limitations are provided in the AMP.

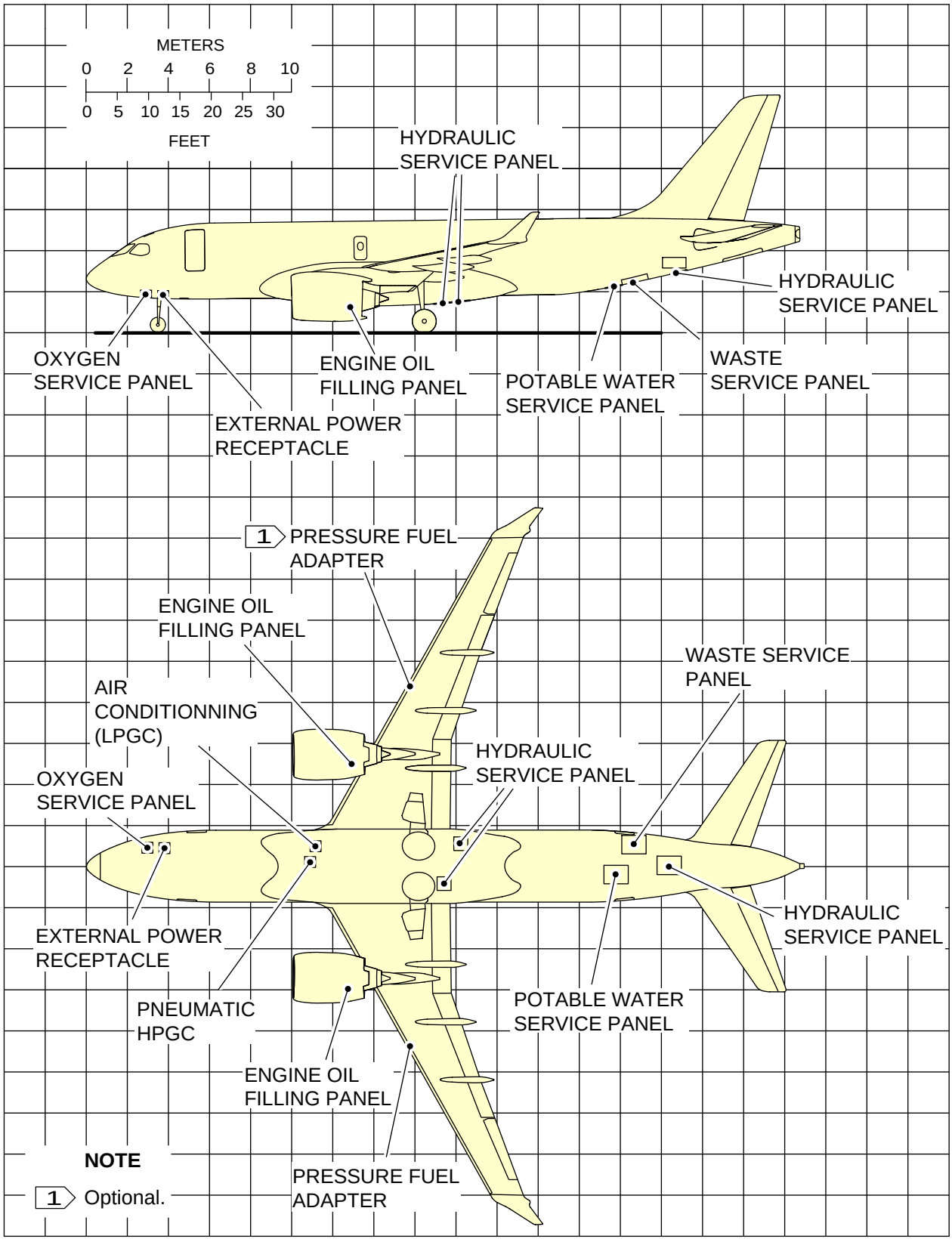

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Figure 3 Ground servicing connections

Table 2 Hydraulic system

Access	Aft of nose ft (m)	Position from aircraft Centerline		Mean height from ground ft (m)
		RH side ft (m)	LH side ft (m)	
System # 1 Access door 195CB	60.96 (18.58)	-	3.93 (8.20)	5.82 (1.77)
System # 2 Access door 195AB	58.543 (17.84)	2.795 (0.85)	-	5.57 (1.70)
System # 3 Aft equipment bay door	95.12 (28.99)	On centerline of the aircraft		8.77 (2.67)

Note

All distances are approximate.

All height from ground distances are approximate and will vary with aircraft configuration and loading conditions.

Technical specifications

- Nominal pressure: 3000 psi (206.84 bar)
- Fitting connectors
  - Fitting dimension: Draining: 4 in. (10.16 cm)
  - Fitting dimension: Rinsing: 1 in. (2.54 cm)

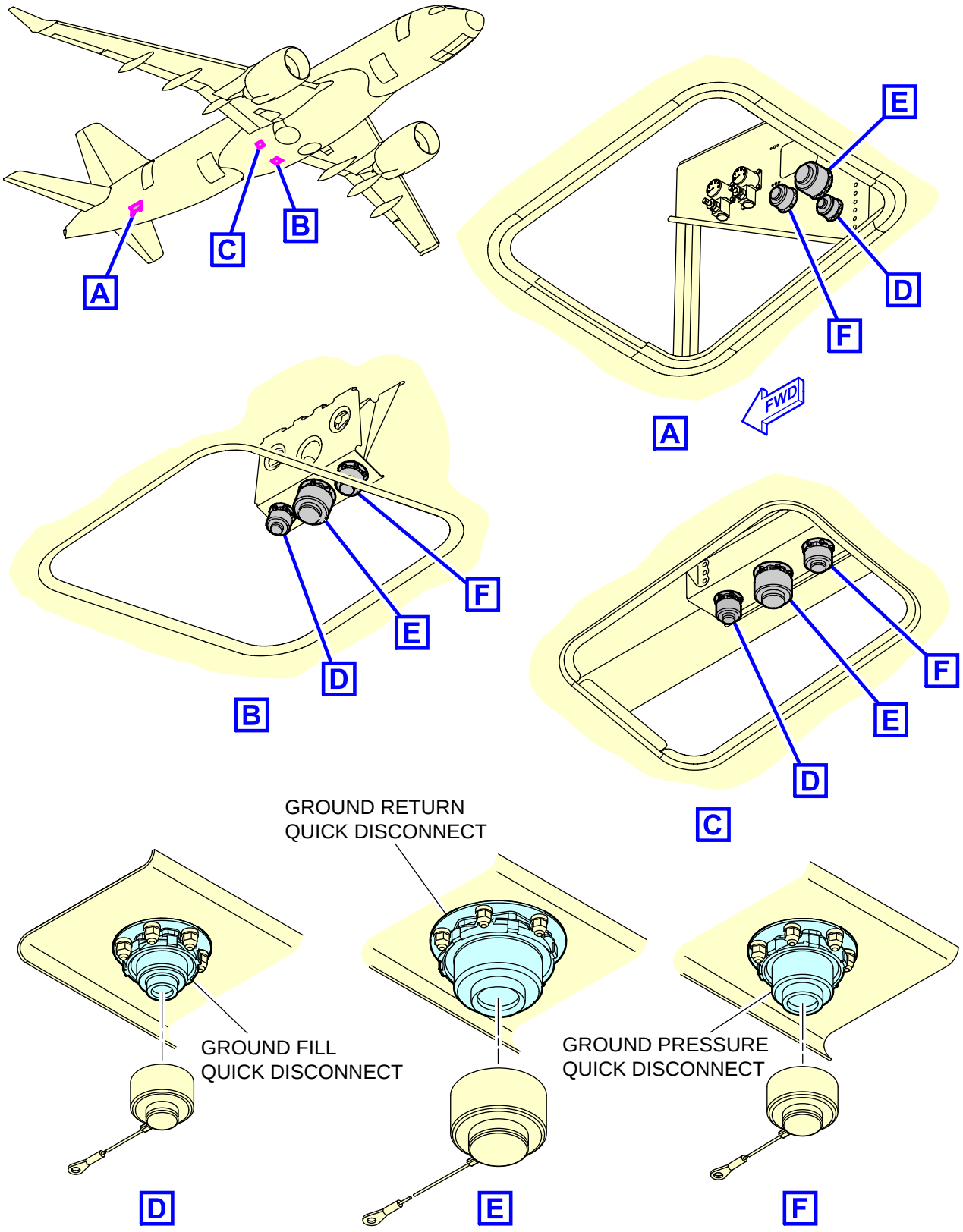

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Figure 4 Ground servicing system

Table 3 Hydraulic system - Accumulator charging

Access	Aft of nose ft (m)	Position from aircraft Centerline		Mean height from ground ft (m)
		RH side ft (m)	LH side ft (m)	
Aft equipment bay door	95.12 (28.99)	On centerline of the aircraft		8.77 (2.67)

Note

All distances are approximate.

All height from ground distances are approximate and will vary with aircraft configuration and loading conditions.

Technical specifications

- Operating pressure: 3000 psig (206.84 bar)
- Accumulator pressure gauge range: 0 to 5000 psig (344.74 bar)
- Gauge accuracy: ±75 psig (5.17 bar)

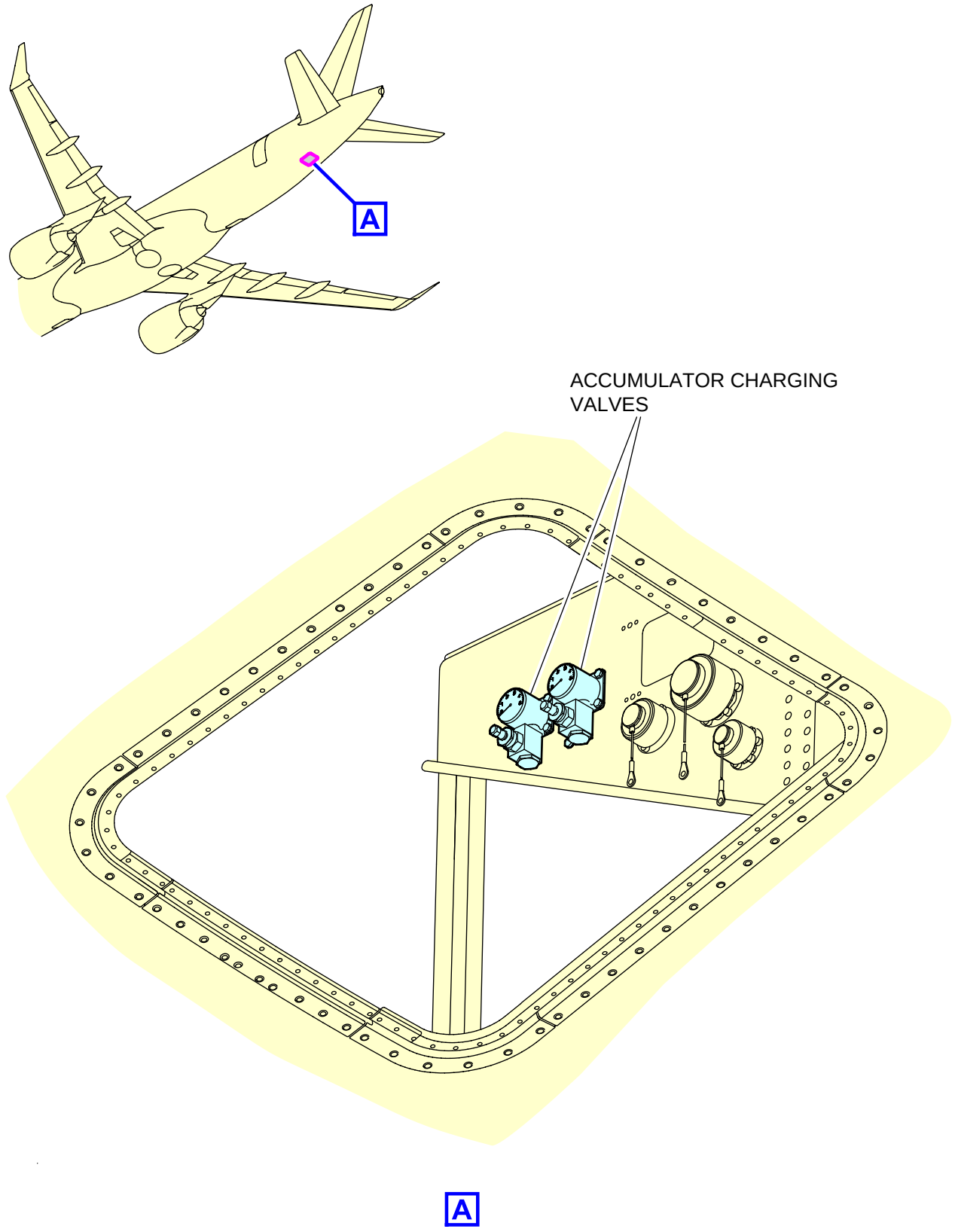

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Figure 5 Accumulator charging valves

Table 4 Waste system

Access	Aft of nose ft (m)	Position from aircraft Centerline		Mean height from ground ft (m)
		RH side ft (m)	LH side ft (m)	
Access door 146BR	86.80 (26.46)	-	1.21 (0.37)	7.14 (2.18)

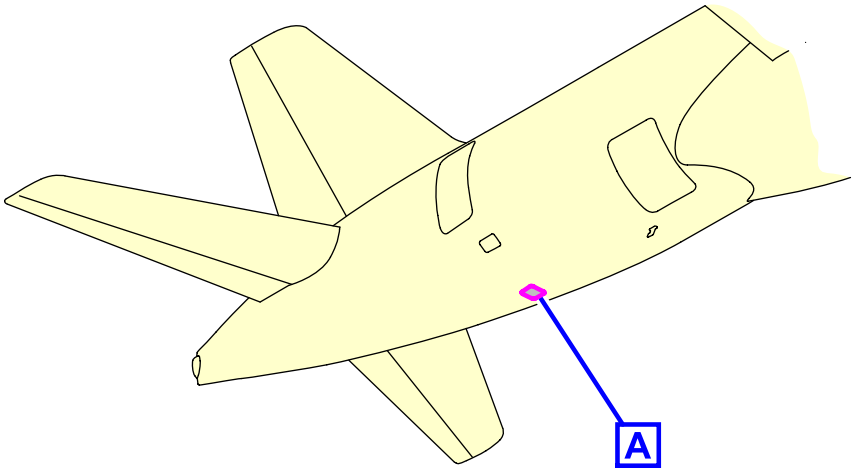
Note

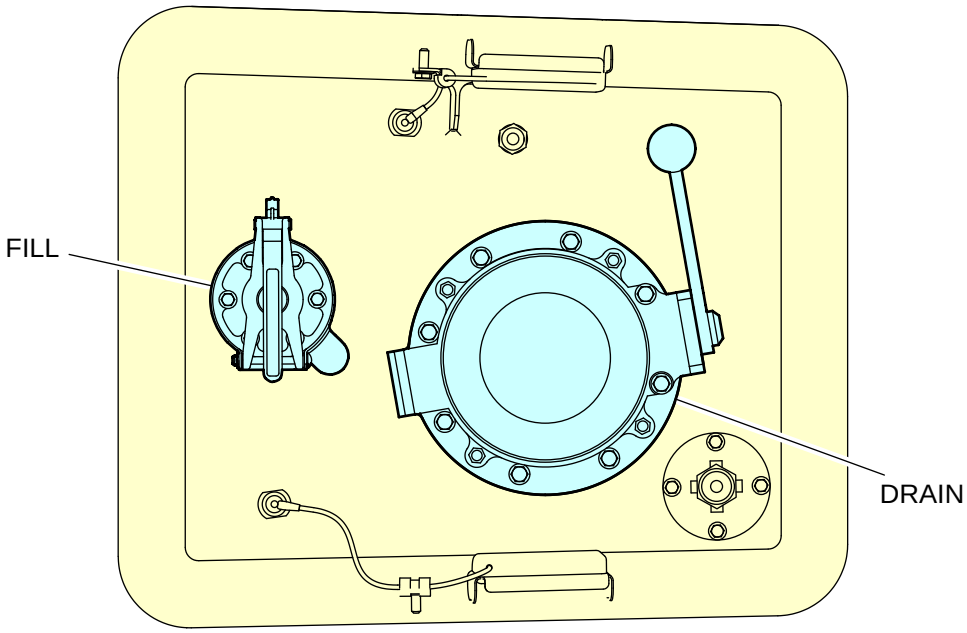
All distances are approximate.

All height from ground distances are approximate and will vary with aircraft configuration and loading conditions.

Technical specifications

- Usable volume: 38 U.S. gal (143.85 L)
- Fitting connectors
  - Fitting dimension: Draining: 4 in. (10.16 cm)
  - Fitting dimension: Rinsing: 1 in. (2.54 cm)





WASTE ACCESS PANEL

A

ICN-BD500-A-J000000-A-3AB48-22008-A-001-01

Figure 6 Waste system access panel

Table 5 Potable water system

Access	Aft of nose ft (m)	Position from aircraft Centerline		Mean height from ground ft (m)
		RH side ft (m)	LH side ft (m)	
Access door 146CR	84.75 (25.83)	3.661 (1.11)	-	7.75 (2.36)

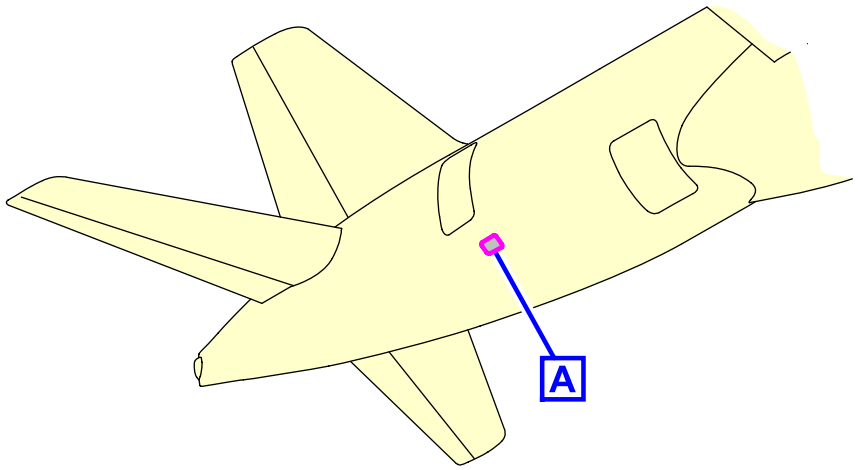
Note

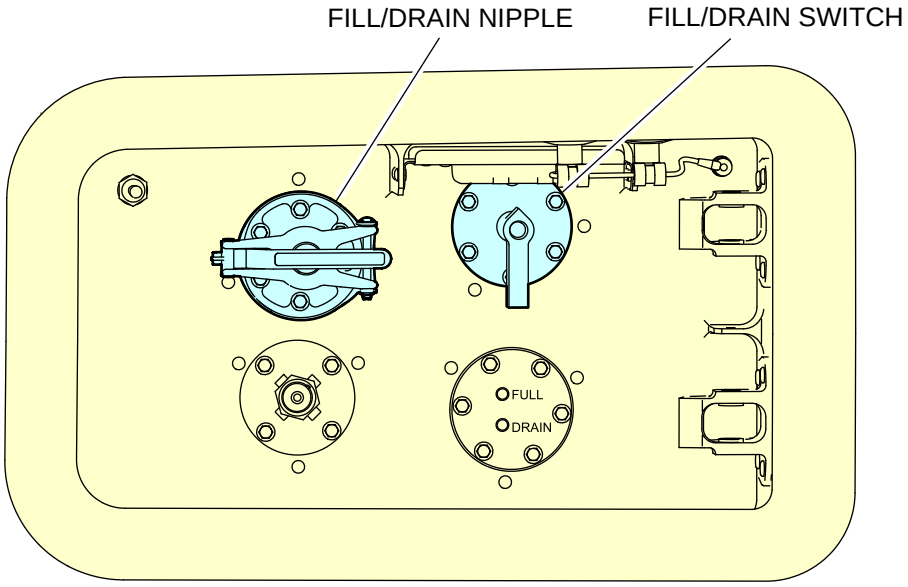
All distances are approximate.

All height from ground distances are approximate and will vary with aircraft configuration and loading conditions.

Technical specifications

- Usable volume: 42 U.S. gal (158.99 L)
- Fitting dimension: Filling/Draining: 3/4 in. (1.905 cm)





POTABLE WATER SERVICE PANEL

A

ICN-BD500-A-J000000-A-3AB48-22007-A-001-01

Figure 7 Potable water system service panel

Table 6 Pneumatic system

Access	Aft of nose ft (m)	Position from aircraft Centerline		Mean height from ground ft (m)
		RH side ft (m)	LH side ft (m)	
Low Pressure Ground Connection (LPGC) Access door 191BB	37.76 (11.51)	-	4.33 (1.32)	5.30 (1.61)
High Pressure Ground Connection (HPGC) Access door 191AB	37.38 (11.39)	-	1.30 (0.40)	4.62 (1.41)

Note

All distances are approximate.

All height from ground distances are approximate and will vary with aircraft configuration and loading conditions.

Technical specifications

- **LPGC Spec**
  - Discharge pressure range: 0.7 to 1.0 psig maximum (0.05 to 0.07 bar maximum)
  - Temp range: 41 to 122 °F maximum (5 to 50 °C maximum)
  - Max airflow: 125 lb/min
  - Fitting dimension: 8 in. (20.32 cm)
  - LP Ground Cart Standard pneumatic connection per ISO 1034 or MS 33562
- **HPGC Spec**
  - Bleed pressure range: 30 to 45 psig maximum (2.07 to 3.10 bar maximum)
  - Bleed temperature range: 338 to 450 °F (170 to 232 °C)
  - Airflow range: 100 to 140 lb/min
  - Fitting dimension: 3 in. (7.62 cm)
  - HP Ground Cart Standard pneumatic connection per ISO 2026 or MS 33740

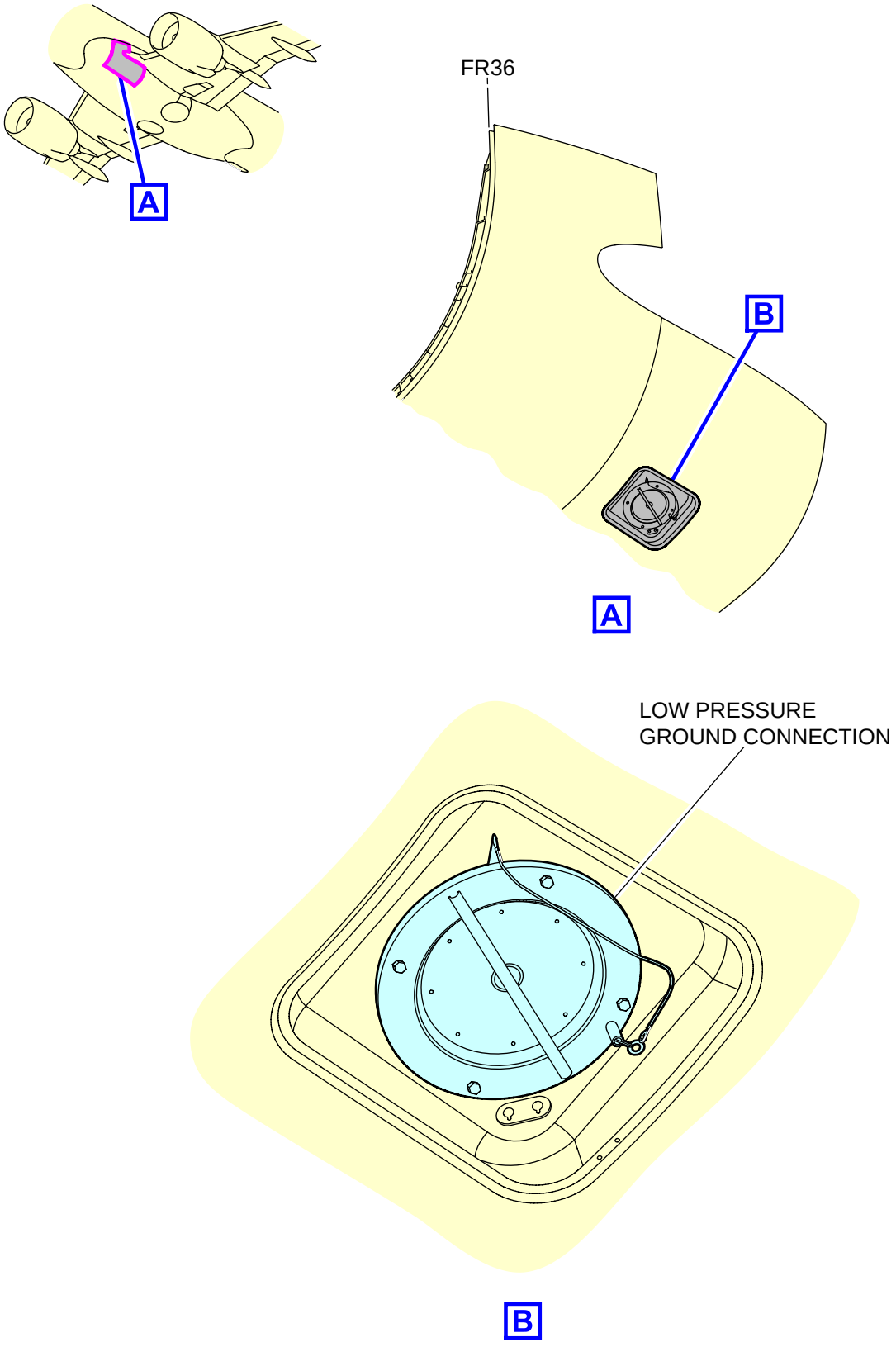


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Figure 8 Low pressure ground system

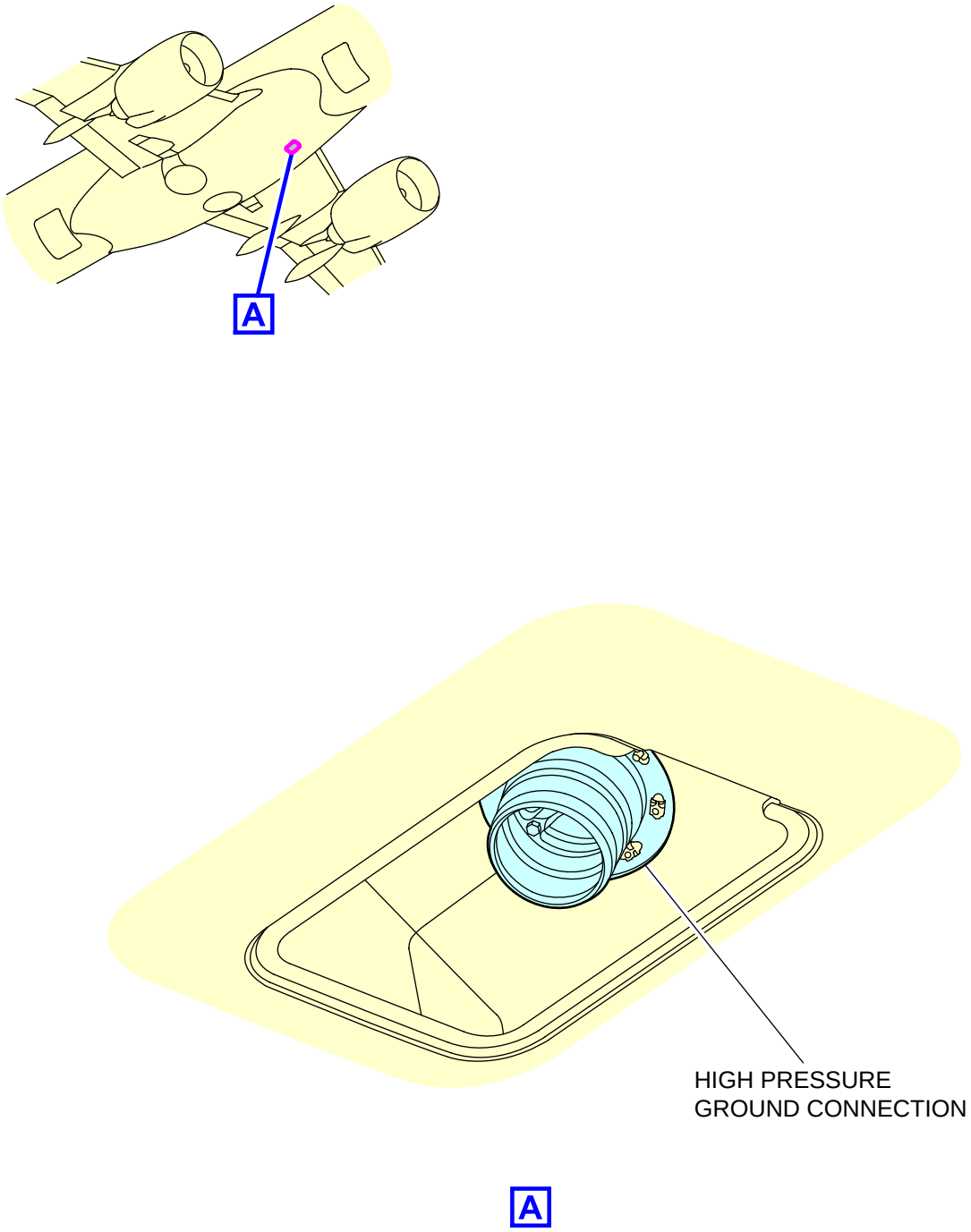

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Figure 9 High pressure ground system

Table 7 Electrical System

Access	Aft of nose ft (m)	Position from aircraft Centerline		Mean height from ground ft (m)
		RH side ft (m)	LH side ft (m)	
Access door 115DL	11.71 (3.57)	-	2.68 (0.82)	6.37 (1.94)

Note

All distances are approximate.

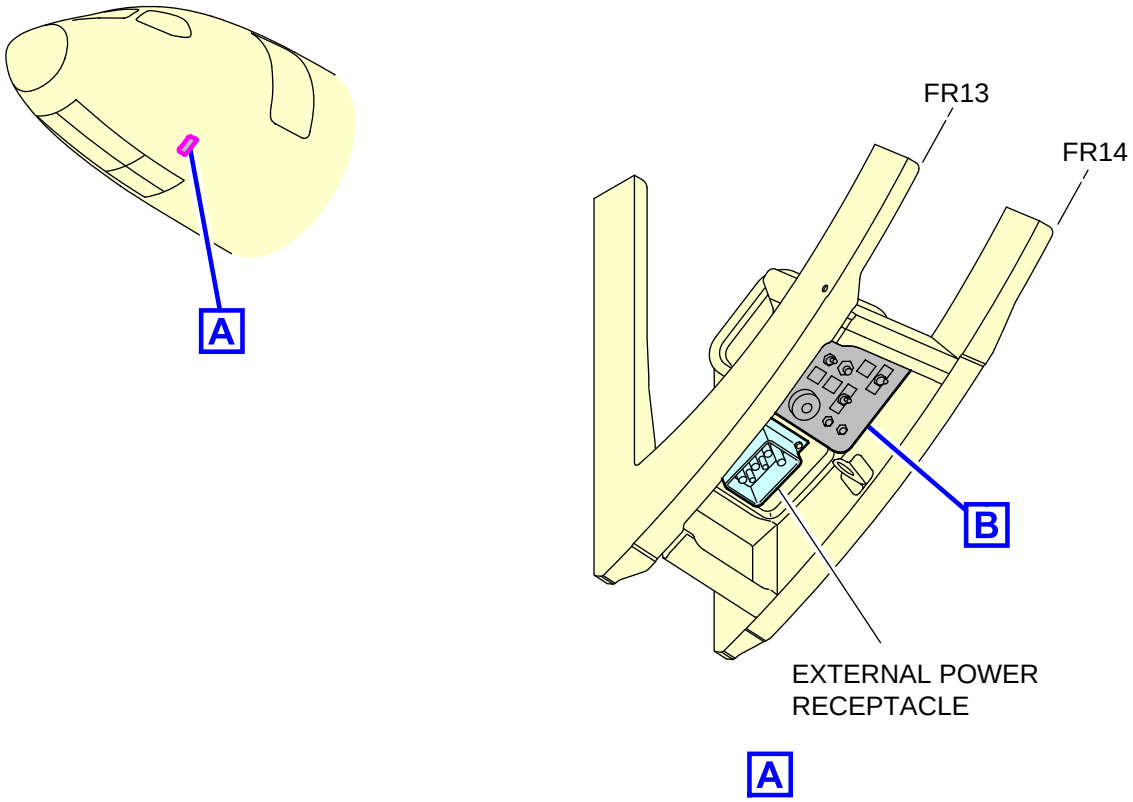
All height from ground distances are approximate and will vary with aircraft configuration and loading conditions.

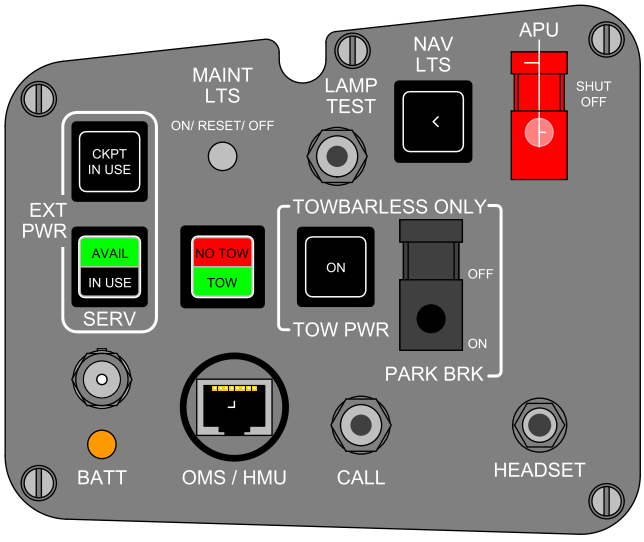
Technical specifications

- Power supply: 115 V Alternating Current (AC) External Power Receptacle

Note

For more specification about the electrical system, refer to Para. 1.4.





ELECTRICAL/TOWING SERVICE PANEL

B

ICN-BD500-A-J000000-A-3AB48-22070-A-001-01

Figure 10 Electrical service panel

Table 8 Oxygen system

Access	Aft of nose ft (m)	Position from aircraft Centerline		Mean height from ground ft (m)
		RH side ft (m)	LH side ft (m)	
Access door 115CL	10.20 (3.11)	-	2.60 (0.79)	6.44 (1.96)

Note

All distances are approximate.

All height from ground distances are approximate and will vary with aircraft configuration and loading conditions.

Technical specifications

- Nominal working pressure: 1850 psig (128 bar)
- Capacity: 77 ft³ (2180 L)

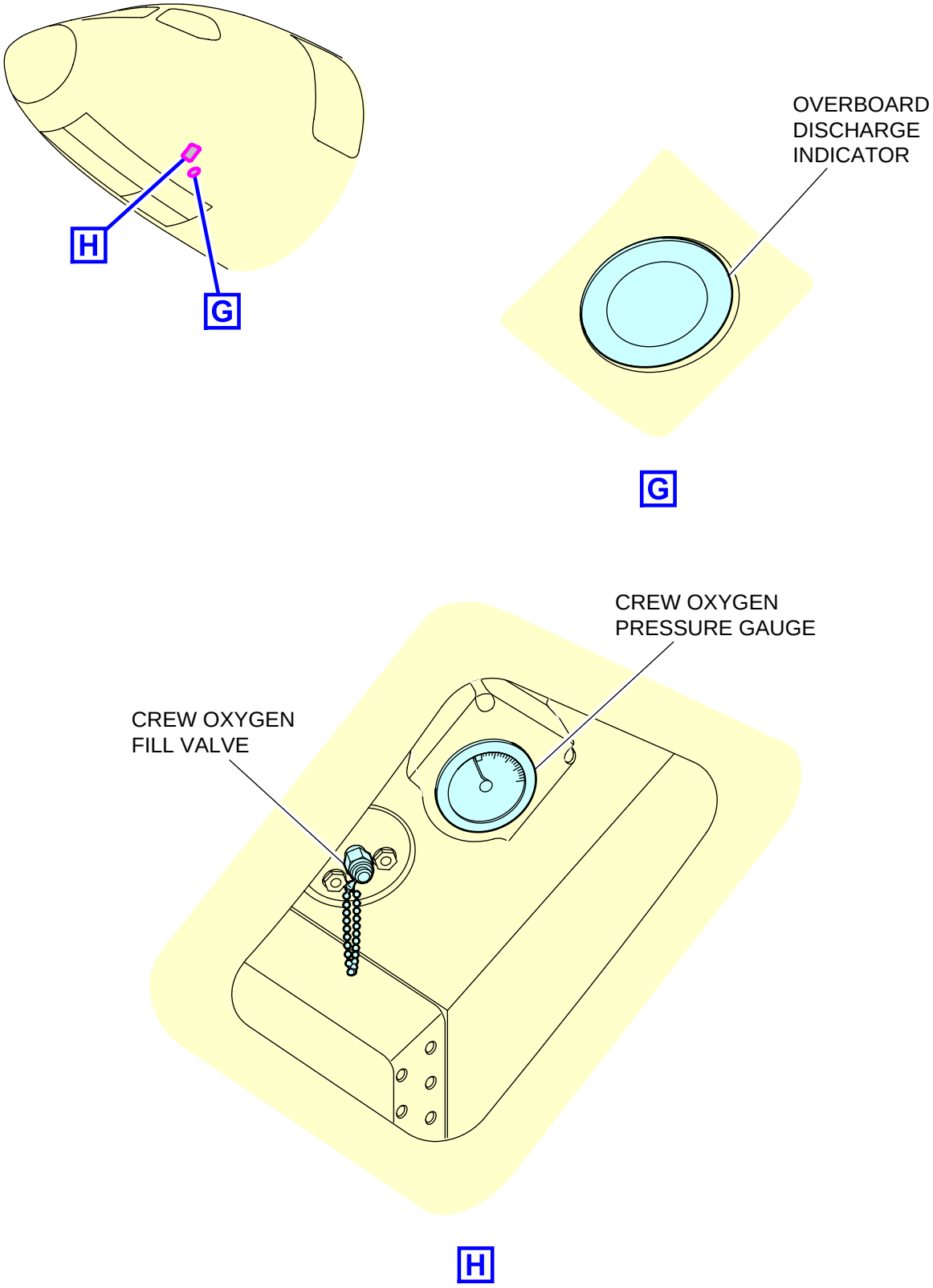


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Figure 11 Crew oxygen system

Table 9 Grounding points

Access	Aft of nose ft (m)	Position from aircraft Centerline RH side ft (m)	Mean height from ground ft (m)	LH side ft (m)
Nose Landing Gear (NLG) leg	11.73 (3.58)	On aircraft centerline	5.00 (1.51)	
Left Main Landing Gear (MLG) leg	53.23 (16.23)	-	10.75 (3.27)	2.85 (0.87)
Right MLG leg	53.23 (16.23)	10.75 (3.27)	-	2.85 (0.87)
Right MLG leg LH Refuel/Defuel Access door 621FB (Optional)	53.23 (16.23) 51.32 (15.64)	10.75 (3.27) -	- 27.31 (8.32)	2.85 (0.87) 10.93 (3.33)
RH Refuel/Defuel Access door 521FB Fig. 13	51.32 (15.64)	27.31 (8.32)	-	10.93 (3.33)

Note

All distances are approximate.

All height from ground distances are approximate and will vary with aircraft configuration and loading conditions.

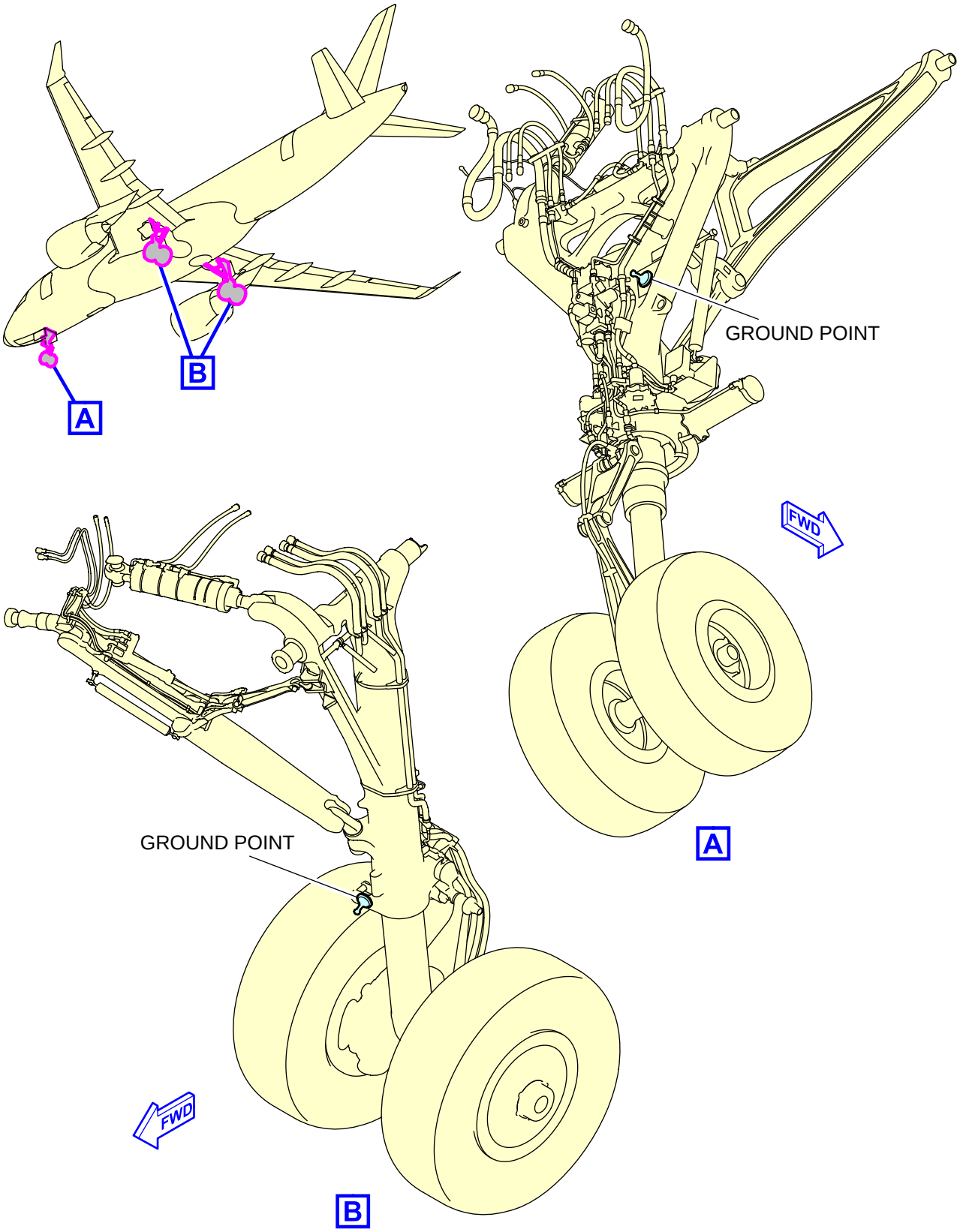

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Figure 12 Landing gears grounding points

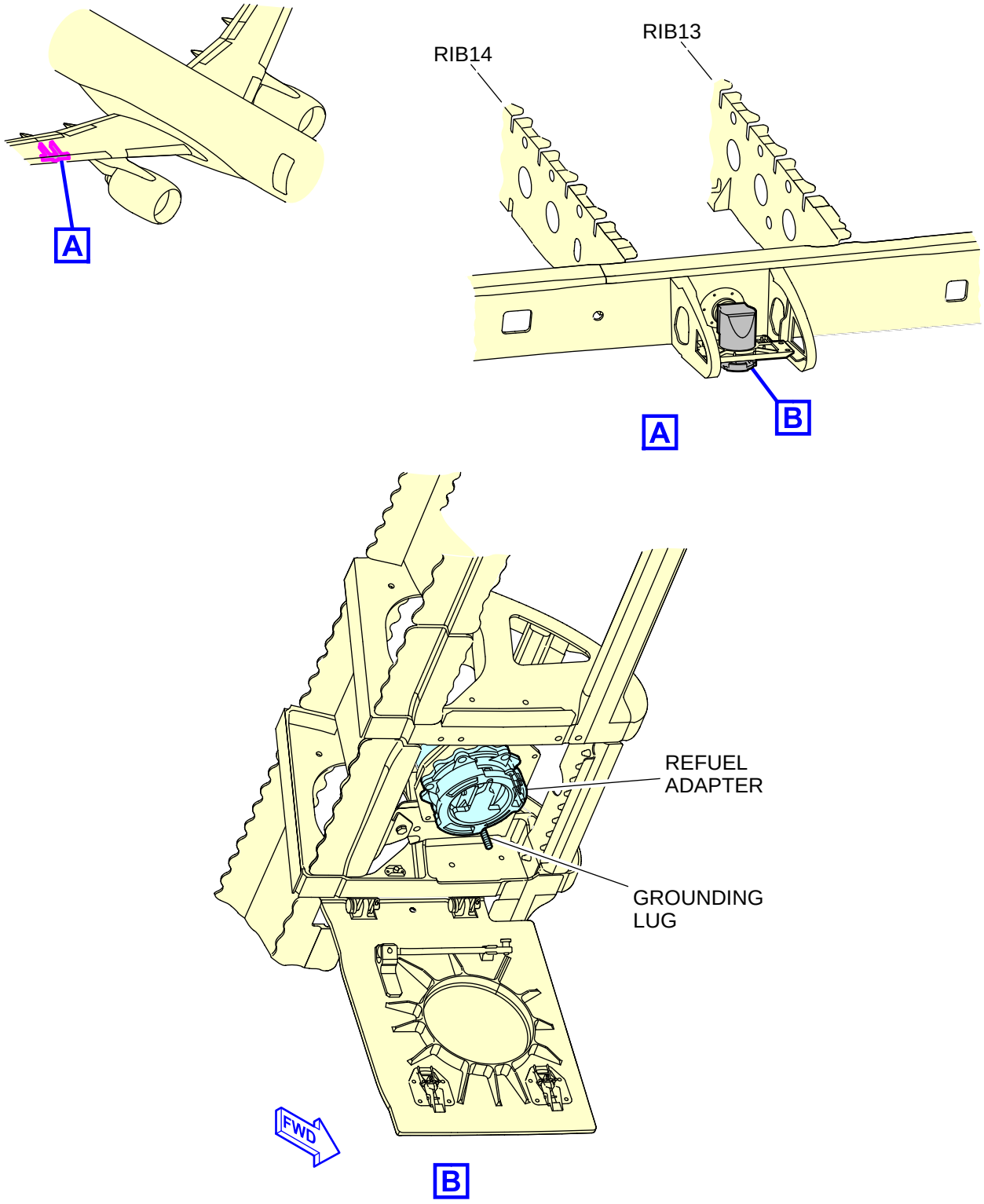
Table 10 Fuel system Refuel/Defuel adapter

Access	Aft of nose ft (m)	Position from aircraft Centerline		Mean height from ground ft (m)
		RH side ft (m)	LH side ft (m)	
LH Refuel/Defuel Access door 621FB (Optional)	51.32 (15.64)	-	27.31 (8.32)	10.93 (3.33)
RH Refuel/Defuel Access door 521FB	51.32 (15.64)	27.31 (8.32)	-	10.93 (3.33)

Note

All distances are approximate.

All height from ground distances are approximate and will vary with aircraft configuration and loading conditions.



NOTES

1. Refuel adapter is optional on the left side.

ICN-BD500-A-J000000-A-3AB48-22099-A-002-01

Figure 13 Refuel adapter and grounding point

Table 11 Fuel system control panel

Access	Aft of nose ft (m)	Position from aircraft Centerline		Mean height from ground ft (m)
		RH side ft (m)	LH side ft (m)	
Access door 192AB	35.76 (10.9)	4.98 (1.52)	-	6.12 (1.86)

Note

All distances are approximate.

All height from ground distances are approximate and will vary with aircraft configuration and loading conditions.

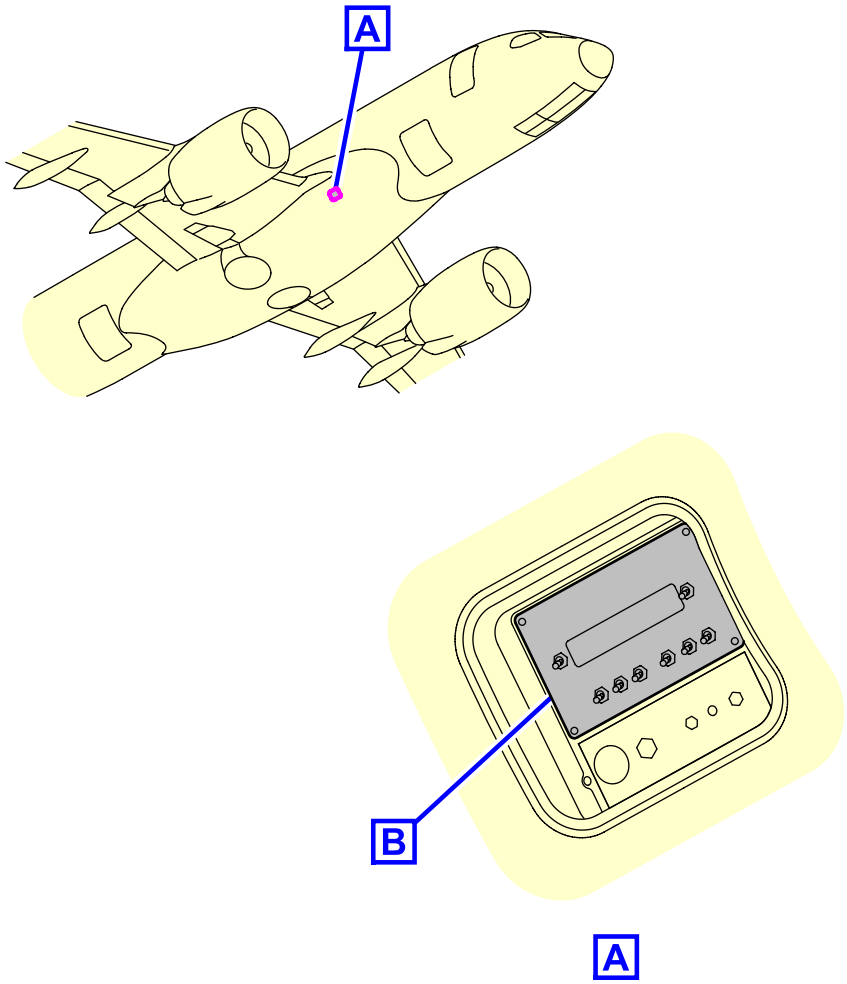


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Figure 14 Refuel/Defuel system

Table 12 Oil system

Access	Aft of nose ft (m)	Position from aircraft Centerline		Mean height from ground ft (m)
		RH side ft (m)	LH side ft (m)	
Engine Oil Filling Cap Access door (LH) 475CR (RH) 485CR	35.76 (10.9)	19.60 (5.97)	16.16 (4.93)	5.50 (1.68)

Note

All distances are approximate.

All height from ground distances are approximate and will vary with aircraft configuration and loading conditions.

Technical specifications

- Oil tank capacity: 6.8 U.S. gal (25.7 L)

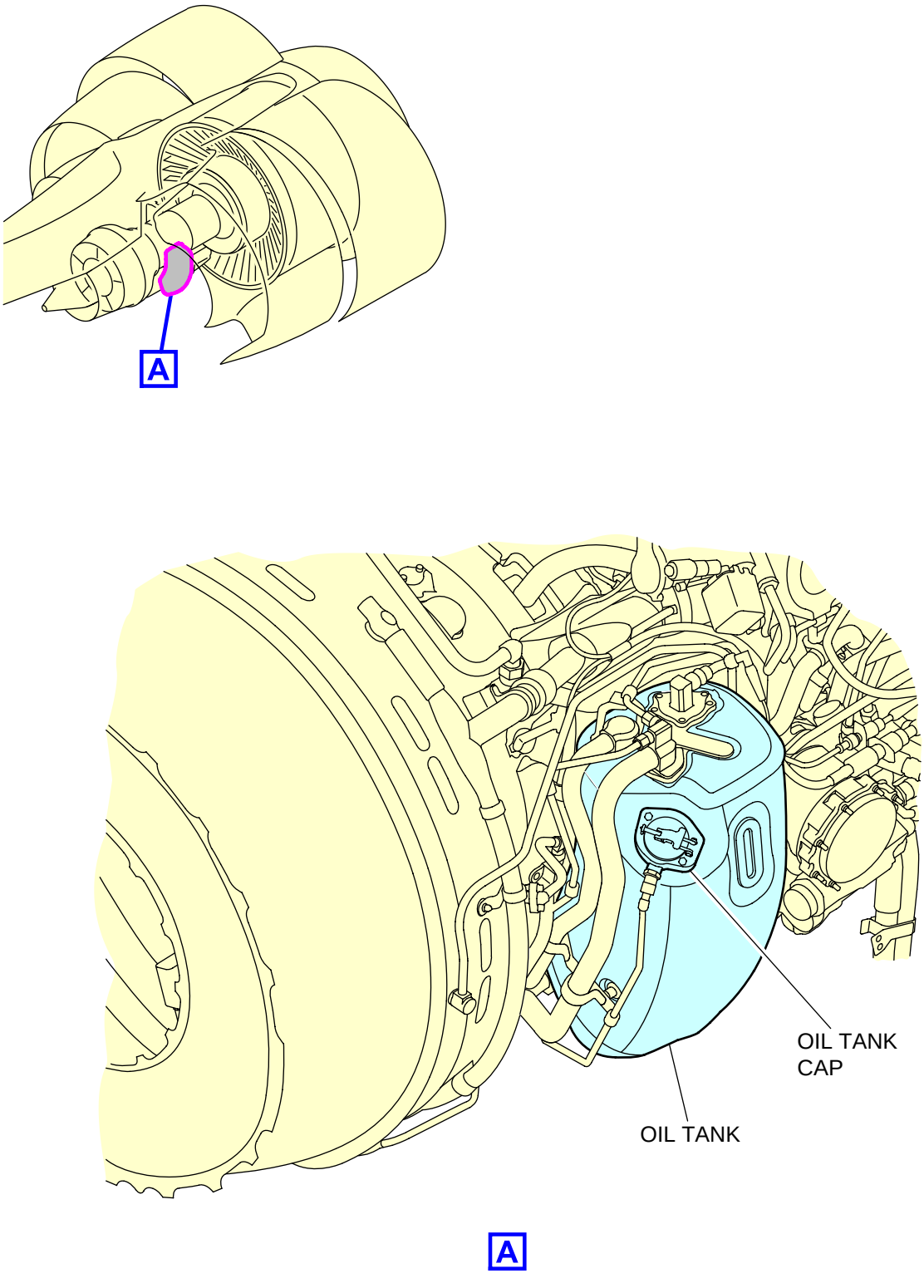

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Figure 15 Oil storage system

1.4 Ground electrical power requirements

The external power system is used to connect AC electrical power from a ground cart. There are no provisions to connect DC power from an external ground cart. External AC can be used to power the complete AC distribution system or only those buses that provide power to the passenger compartment.

Note

It is recommended to use ground cart standard 75 KVA and higher. Using ground cart 60 KVA standard can lead to the EICAS nuisance messages.

Refer to Table 13 for the external AC power requirements data.

Refer to Table 14 for the external power quality limitations data.

Refer to Table 15 for overcurrent protection ampere versus time delay.

Refer to Table 16 for overvoltage protection versus time delay.

Table 13 External AC power requirements

Voltage	Frequency
115 ±5 V	400 ±15 Hz

Table 14 External power quality limitations

Parameter	Setting limit	Response time
Overcurrent	Table 15	
Overvoltage (highest phase)	Table 16	
Redundant Overvoltage (highest phase)	130 ±3.3 V	0.75 ±0.055 sec
Undervoltage	107 ±2.0 V (lowest phase) or 108.5 ±2.0 V (3-phase average)	4.5 ±0.5 sec
Overfrequency	418 ±2 Hz	4.5 ±0.5 sec
Underfrequency	382 ±2 Hz	4 ±0.5 sec
Phase sequence	A-B-C	0.1 sec
Open sequence	Lowest phase 15 ±5 A and other phase greater than 30 ±5 A	2.0 ±0.5 sec

Table 15 Overcurrent protection ampere versus time delay

Current (A)	Time (s)
230 ±12	300
336 ±12	11.75
337 ±12	11.05

Current (A)	Time (s)
346 ±12	9.4
355 ±12	8.2
370 ±12	6.75
380 ±12	6.1

Table 16 Overvoltage protection versus time delay

Voltage (V)	Time (s)
123	0.6
124	0.5
132	0.3
141	0.14
146	0.1
151	0.05

1.5 Engine starting pneumatic power requirements

The ground air supply requirements for engine starting are shown in Table 17.

Conditions:

- Time allowed during start (to starter cutout) is 90 seconds
- Time-to-IDLE on ground is 45 seconds minimum
- No bleed air extraction is permitted during start sequence

Table 17 Ground pneumatic power requirements – Engine starting

ATS requirements	Inlet Pressure	Airflow
ISA day	45 psig 45 psia	150 lb/min 68.04 kg/min

1.6 Ground pneumatic power requirements

1.6.1 Heating

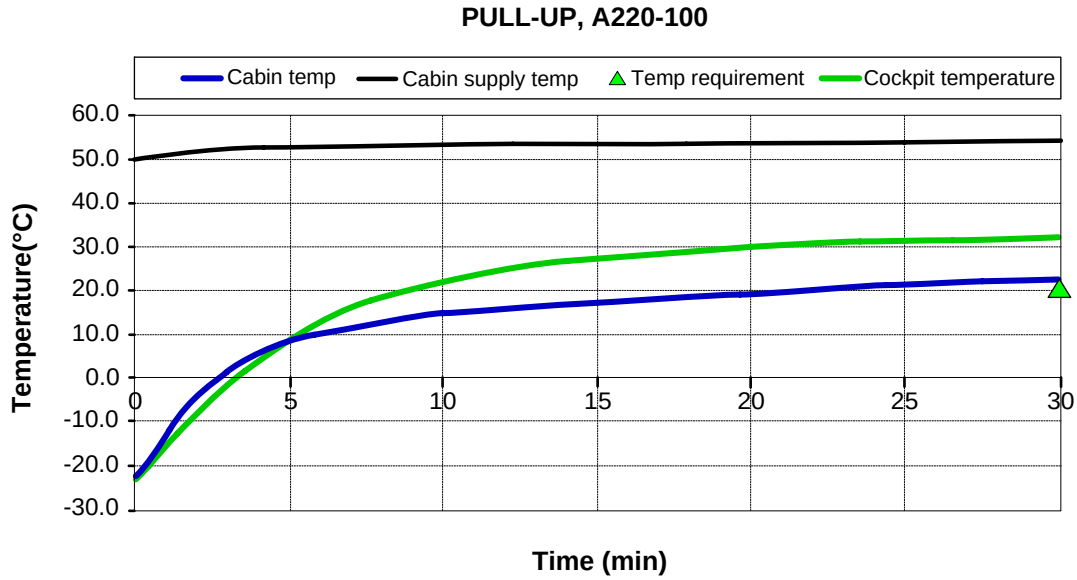
This section provides the ground pneumatic power requirements for heating the cabin with specific conditions.

Refer to Fig. 16 for heating pull-up graphic.

Table 18 Ground air supply requirements for heating (Pull up)

Requirements	Pressure	Airflow	Temperature
To heat cabin to 69.8 °F (21 °C) in 30 minutes	31 psig	203 lb/min	280 ºF

Requirements	Pressure	Airflow	Temperature
Conditions - Outside air temperature: -40 °F (-40 °C) - Initial cabin and cockpit temperature: -9.4 °F (-23 °C) - Cockpit, FWD & AFT CABIN Temp Selector: Full Hot (86 °F (30 °C)) - Recirculation fan: On - Trim air: On - No passenger	(45.7 psia)	(92.1 kg/min)	(138 ºC)



ICN-BD500-A-J000000-A-3AB48-22378-A-002-01

Figure 16 Ground pneumatic requirements - Heating

Table 19 Ground air supply requirements for heating at a steady state

Requirements	Pressure	Airflow	Temperature
Conditions - Outside air temperature: -40 °F (-40 °C) - Steady state Cockpit & Cabin temperature: 75.2 °F (24 °C) - Cockpit, FWD & AFT CABIN Temp Selector: Mid selection (75.2 °F (24 °C)) - Recirculation fan: On - Trim air: On - 15 passengers	25.4 psig (40.1 psia)	166 lb/min (73.3 kg/min)	253 ºF (123 ºC)

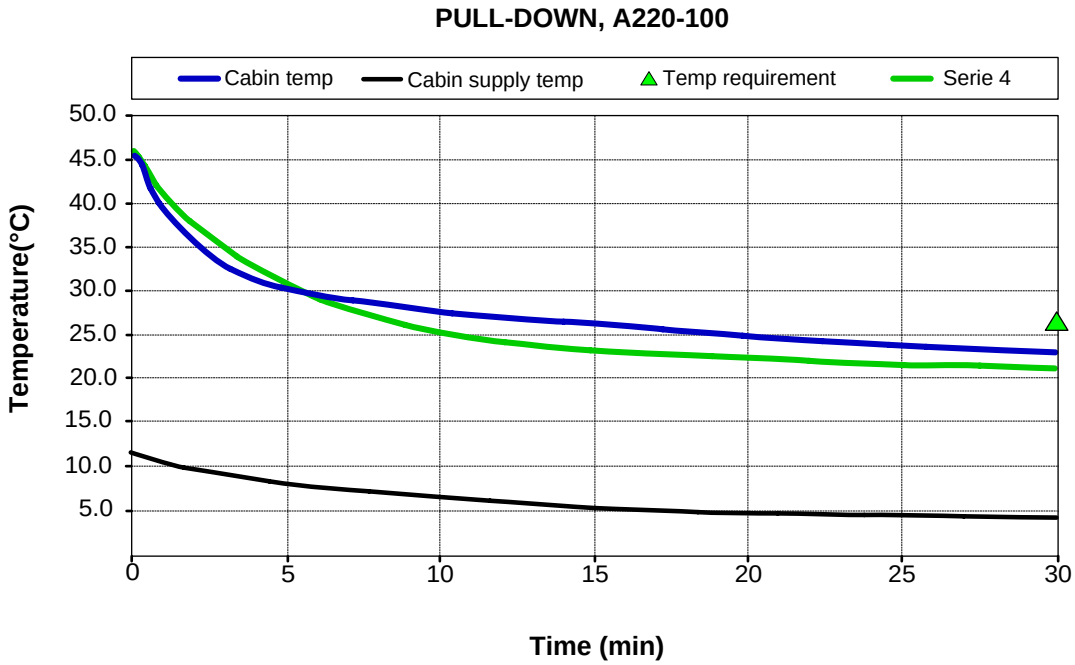
1.6.2 Cooling

This section provides the ground pneumatic power requirements for cooling the cabin with specific conditions.

Refer to Fig. 17 for the cooling pull-down graphic.

Table 20 Ground air supply requirements for cooling (Pull down)

Requirements	**Pressure**	**Airflow**	**Temperature**
To cool cabin to 80.6 °F (27 °C) in 30 minutes Conditions - Outside air temperature: 104 °F (40 C) - Initial cabin and cockpit temperature: 114.8 °F (46 °C) - Cockpit, FWD & AFT CABIN Temp Selector: Full Cold (64.4 °F (18 °C)) - Recirculation fan: On - Trim air: On - No passenger	38 psig (52.7 psia)	140 lb/min (63.5 kg/min)	437 ºF (225 ºC)



ICN-BD500-A-J000000-A-3AB48-22379-A-002-01

Figure 17 Ground pneumatic requirements - Cooling

Table 21 Ground air supply requirements for cooling at a steady state

Requirements	Pressure	Airflow	Temperature
Conditions - Outside air temperature: 104 °F (40 °C) - Steady state Cockpit & Cabin temperature: 75.2 °F (24 °C) - Cockpit, FWD & AFT CABIN Temp Selector: Mid selection (75.2 °F (24 °C)) - Recirculation fan: On - Trim air: On - 130 passengers	31 psig (45.7 psia)	203 lb/min (92.1 kg/min)	280 ºF (138 ºC)

1.7 Preconditioned airflow requirements

The ground air supply requirements for air conditioning and airflow requirements are shown in Table 22 for the LPGC.

Table 22 Preconditioned airflow requirements

Requirements	**Pressure**	**Airflow**	**Temperature**
To cool cabin to 75.2 °F (24 °C) Conditions - Outside air temperature is 104 °F (40 °C) - Recirculation fan is on - 130 passenger	0.6 psig (15.2 psia) (4.1 kPa)	125 lb/min (54.4 kg/min)	41 ºF (5 ºC)
To heat cabin to 75.2 °F (24 °C) Conditions - Outside air temperature is -40 °F (-40 °C) - Recirculation fan is on - 15 passenger	0.6 psig (15.2 psia) (4.1 kPa)	125 lb/min (54.4 kg/min)	104 ºF (40 ºC)

1.8 Ground towing requirements

The aircraft is designed for towing and pushing with a tractor and tow bar as well as with selected tow bar-less ground handling vehicles.

For towing and pushing operations, controls are provided to accommodate the following conditions:

- Aircraft not powered (see note below):
  A control panel is provided on the left side of the aircraft by the nose NLG. A push-button on the control panel can be toggled to engage power to begin the towing sequence (Navigation lights are lit automatically). The parking brake can be deactivated by way of a switch located on this panel. Annunciation lights on the NLG indicate when the parking brake is deactivated and the aircraft is ready for towing.

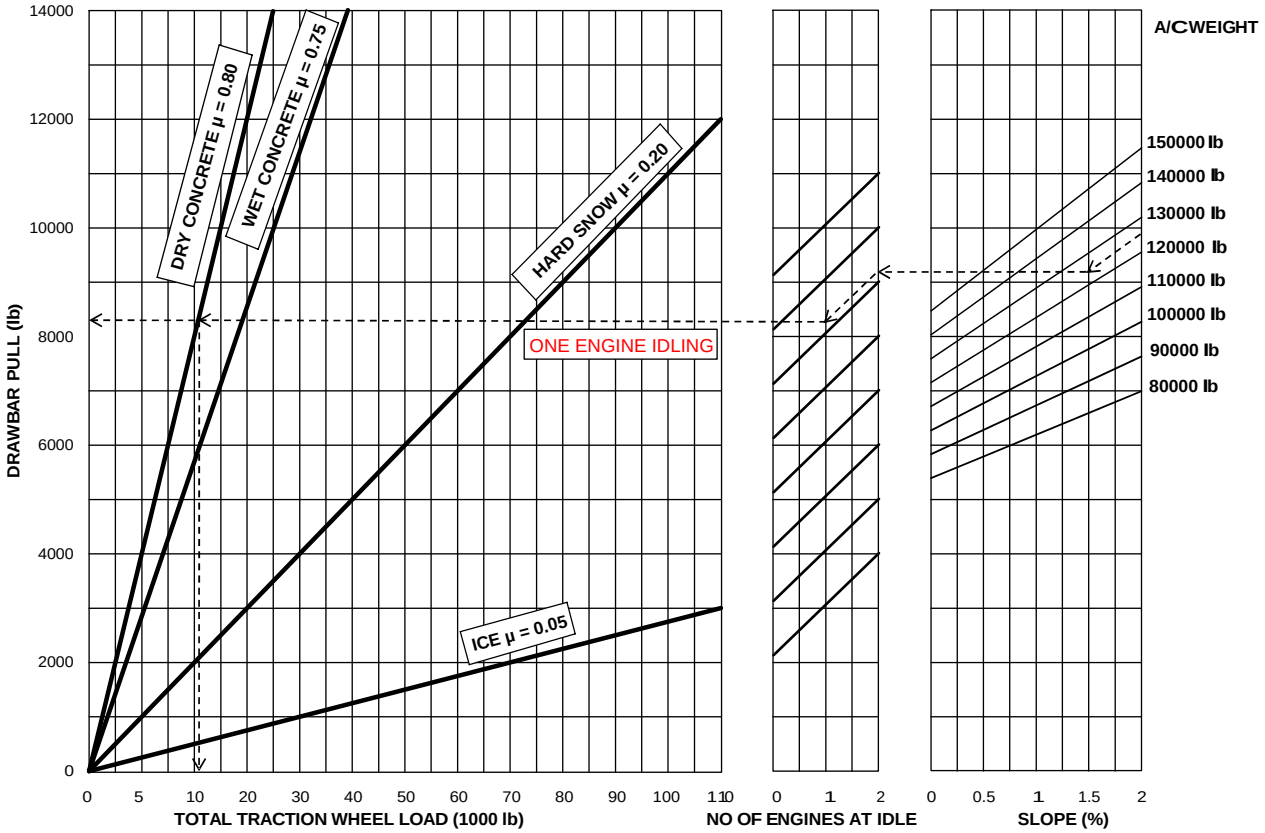
Note

Availability of the controls to facilitate towing the aircraft with the flight deck vacant does not constitute an approval to conduct such operations.

- Aircraft powered, and flight deck occupied:
  Two separate controls, one to deactivate the nose wheel steering, and one to deactivate the parking brake, are located in both the flight deck and on the control panel located in the vicinity of the nose landing gear. Headset jacks are provided on this control panel to allow for communication between personnel on the flight deck and on the ground. Annunciation lights on the control panel indicate when the aircraft is ready for towing.

With the torque links connected, towing up to ±130 degrees nose wheel angle is possible.

The ground towing requirements are described in the illustration below.

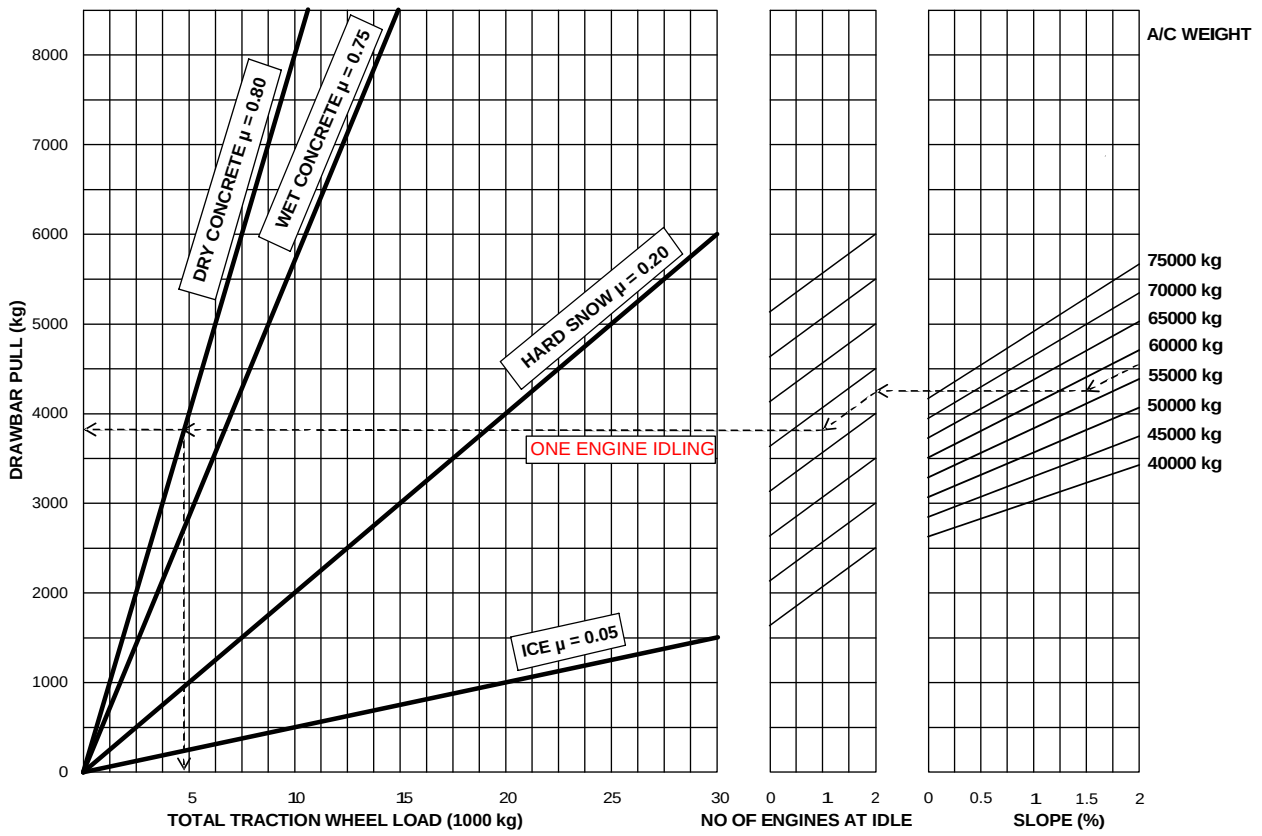


NOTES

1. Unusual breakaway conditions not reflected.
2. Estimated for rubber - tired tow vehicles.
3. Coefficient of friction (μ) approximate.
4. Example: At an aircraft gross weight of 125000lbs (56699 Kg), an uphill slope of 1.5%, with one engine ON and with a dry concrete surface, the corresponding draw bar pull or push required is 8000 ll (35.6 kN) and the total tractor weight of approximately 10 500 lbs (4762 Kg).

ICN-BD500-A-J000000-A-3AB48-22839-A-001-01

Figure 18 Ground towing requirements (imperial unit)



NOTES

1. Unusual breakaway conditions not reflected.
2. Estimated for rubber - tired tow vehicles.
3. Coefficient of friction (μ) approximate.
4. Example: At an aircraft gross weight of 125000lbs (56699 Kg), an uphill slope of 1.5%, with one engine ON and with a dry concrete surface, the corresponding draw bar pull or push required is 8000 lb (35.6 kN) and the total tractor weight of approximately 10 500 lbs (4762 Kg).

ICN-BD500-A-J000000-A-3AB48-22840-A-001-01

Figure 19 Ground towing requirements (metric unit)

For more information related to towing, refer to the AMP.

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A220

Operating conditions - Technical data

Applicability: Model: CS100

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Table 1 References

Data Module/Technical Publication	Title
BD500-A-J71-00-00-00AAA-012A-A	Power plant - General warnings and cautions and related safety data

Description

1 Introduction

This data module gives data on the engine noise levels and the intake and exhaust dangerous areas during normal operations. This section is divided into the subsections that follow:

- Engine dangerous areas
- Engine exhaust velocities and temperatures
- Auxiliary Power Unit (APU)
- Engine noise levels

Aircraft operating conditions and noise are important to airport and community planners. While an airport is a major element in a community transportation system and is vital to it's growth, it must be a good neighbor. This can only be accomplished with proper planning. Because aircraft noise extends beyond the boundaries of the airport, it is vital to consider the impact on surroundings communities.

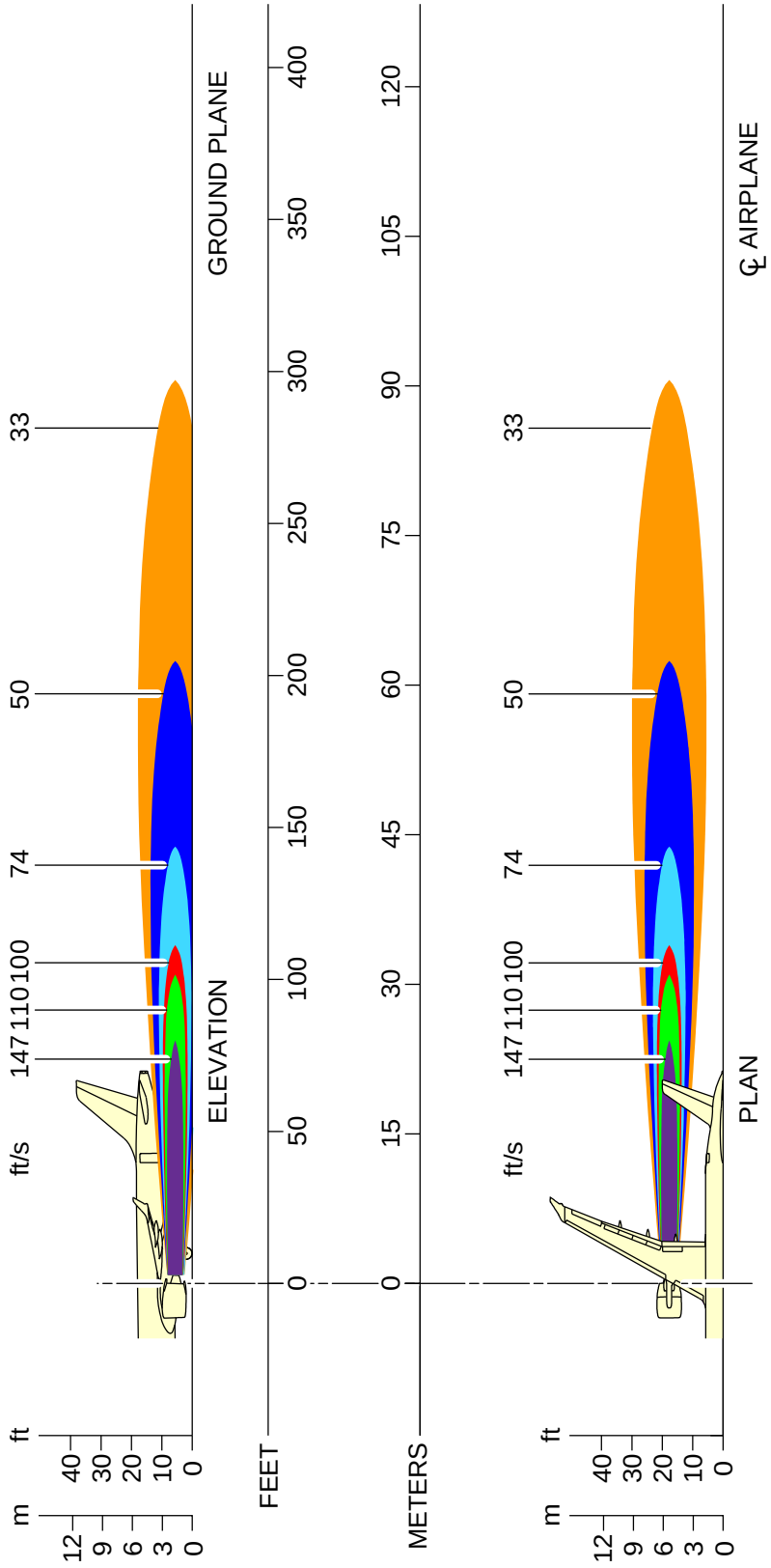
2 Engine dangerous areas

This section contains information about the danger areas of engines during a ground run up. Refer to BD500-A-J71-00-00-00AAA-012A-A for danger areas of engines.

3 Engine exhaust velocities and temperatures

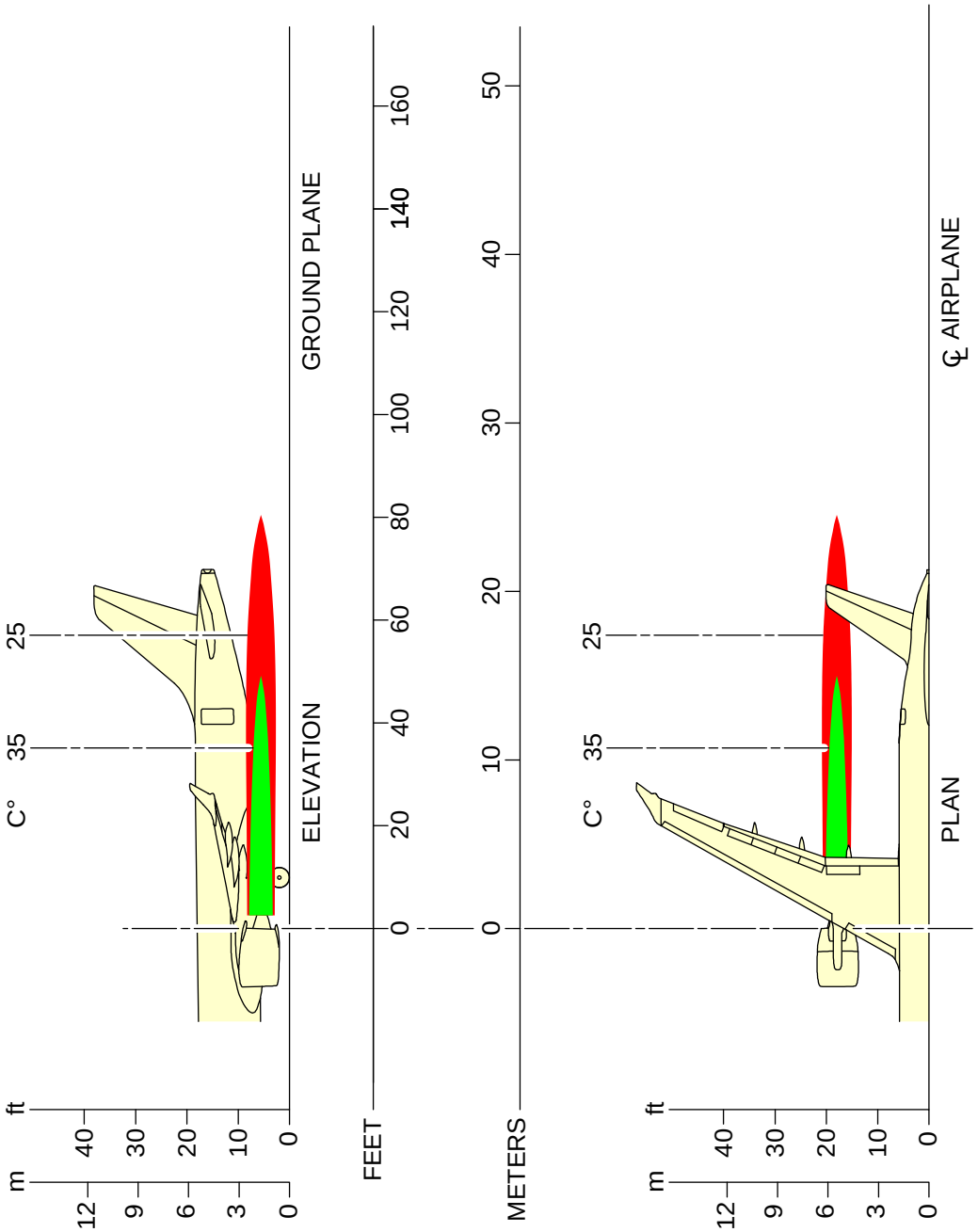
This section shows the estimated engine exhaust plume velocity and temperature profiles during idle, breakaway, and maximum takeoff conditions.

The exhaust plume profiles are provided from the engine nozzle exit plane, assuming sea level, static, ISA condition, without any wind and bleed extraction. They do not take into account an engine-to-engine variation or engine deterioration and do not account for interaction with the fuselage, ground or other engine plume. Refer to Fig. 1 thru Fig. 6.



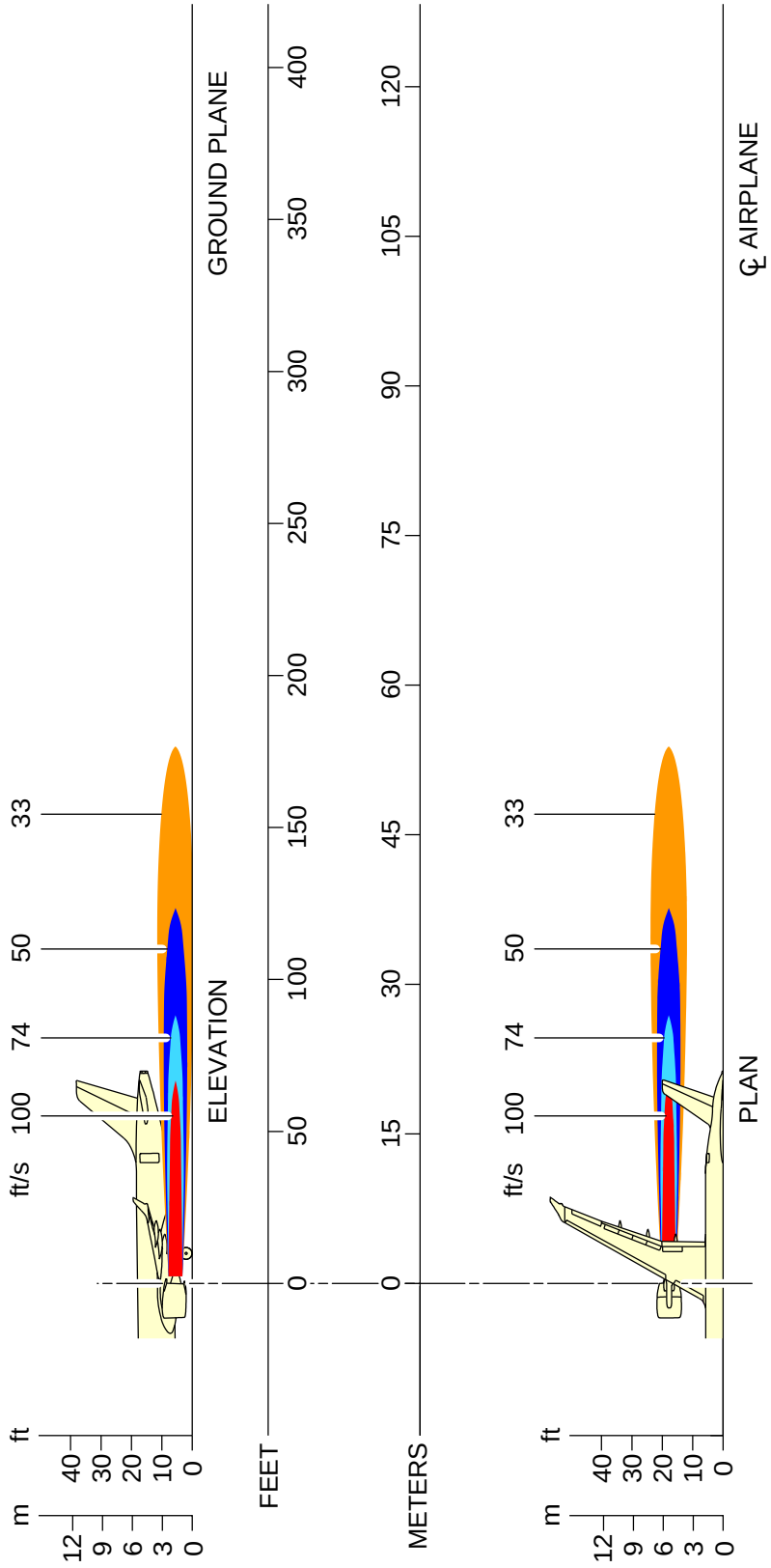
ICN-BD500-A-J000000-A-3AB48-27915-A-001-01

Figure 1 Exhaust plume velocity profile / A220-100 Break-away thrust 2970 lbf



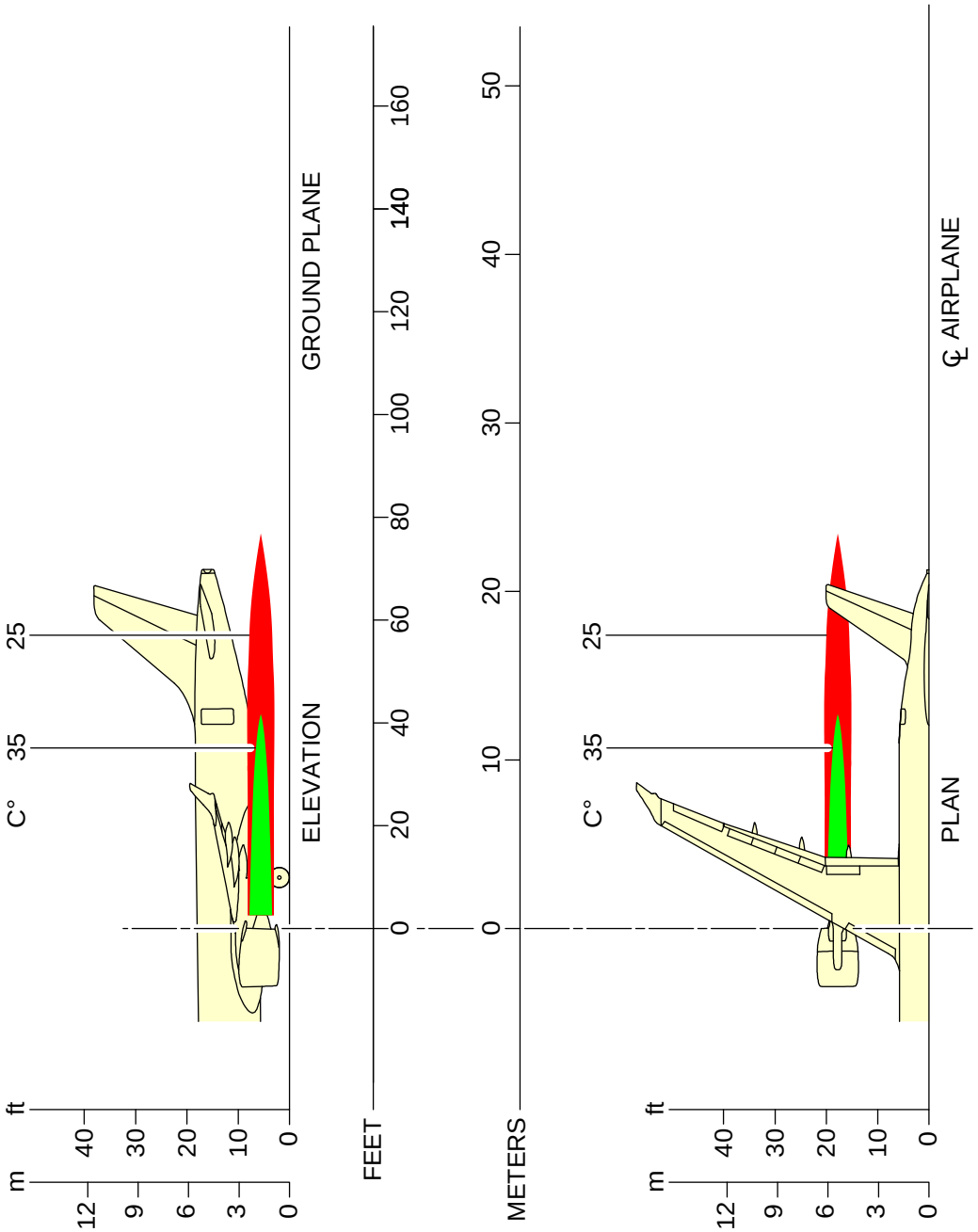
ICN-BD500-A-J000000-A-3AB48-27917-A-001-01

Figure 2 Exhaust plume temperature profile / A220-100 Break-away thrust 2970 lbf



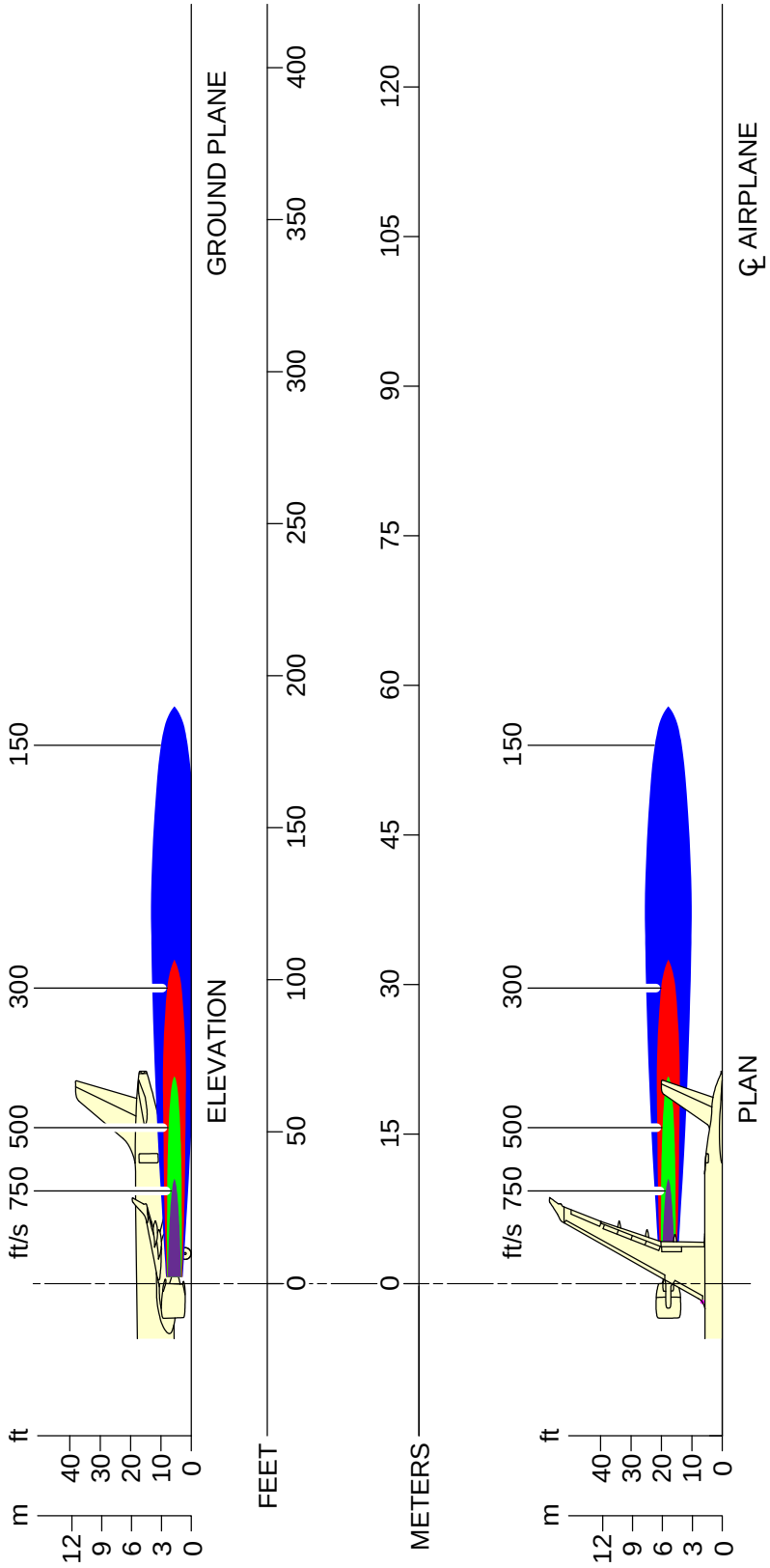
ICN-BD500-A-J000000-A-3AB48-27919-A-001-01

Figure 3 Exhaust plume velocity profile / Ground idle



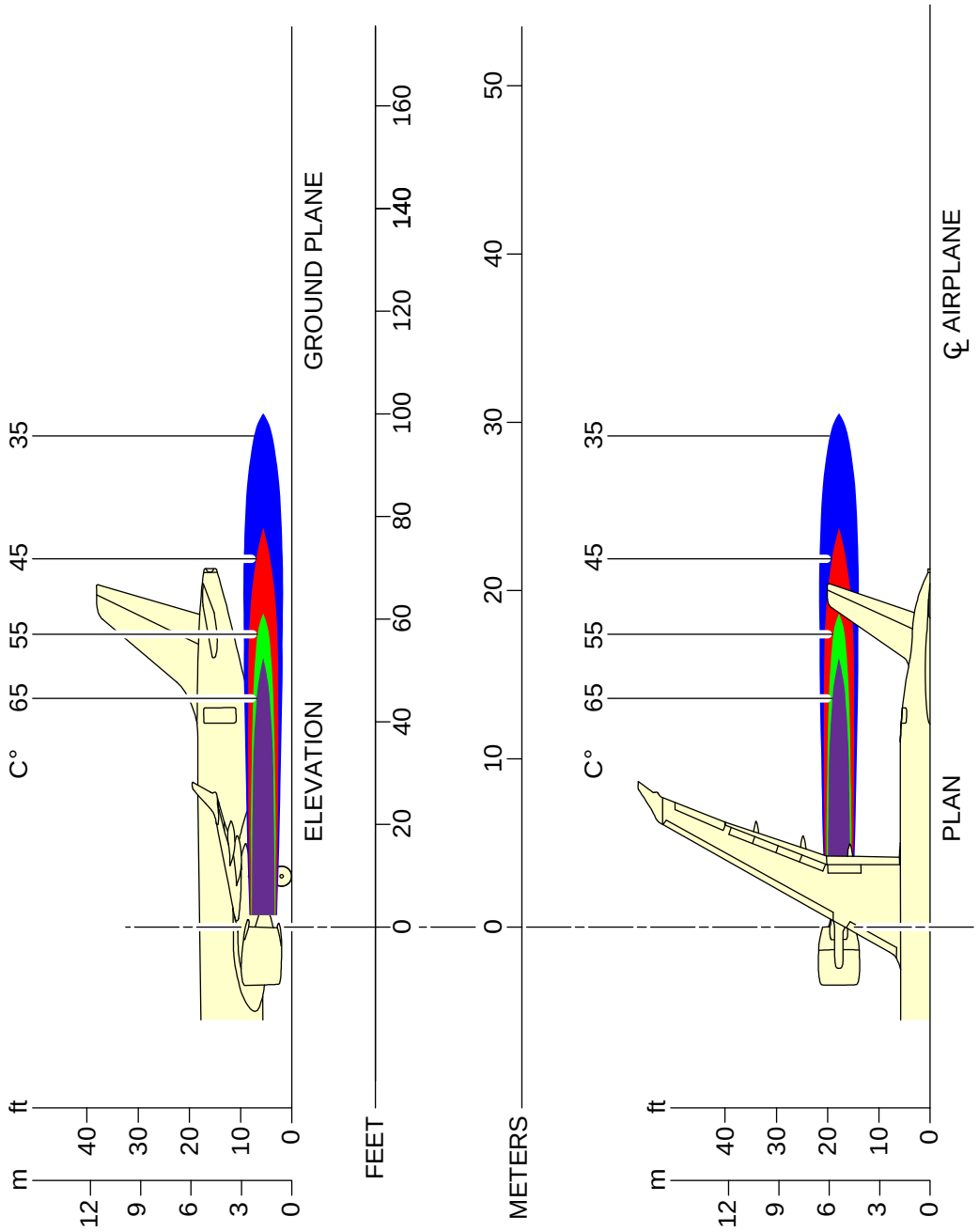
ICN-BD500-A-J000000-A-3AB48-27920-A-001-01

Figure 4 Exhaust plume temperature profile / Ground idle



ICN-BD500-A-J000000-A-3AB48-27921-A-001-01

Figure 5 Exhaust plume velocity profile / Maximum take-off at sea level static

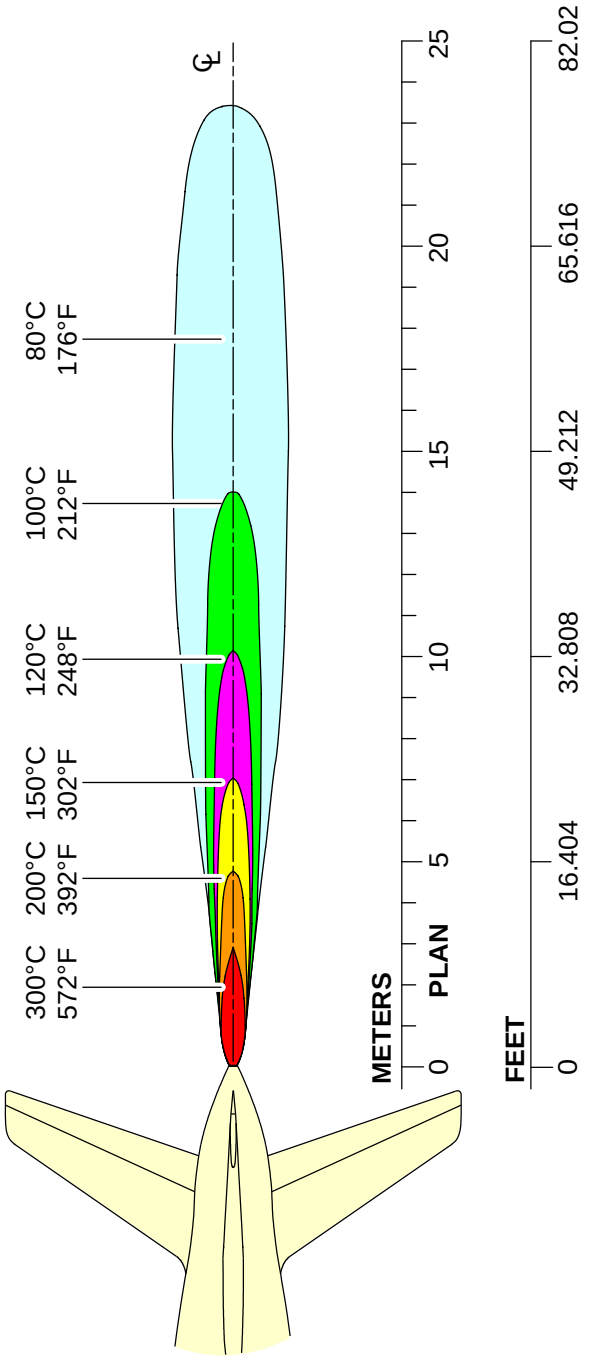


ICN-BD500-A-J000000-A-3AB48-27922-A-001-01

Figure 6 Exhaust plume temperature profile / Maximum take-off at sea level static

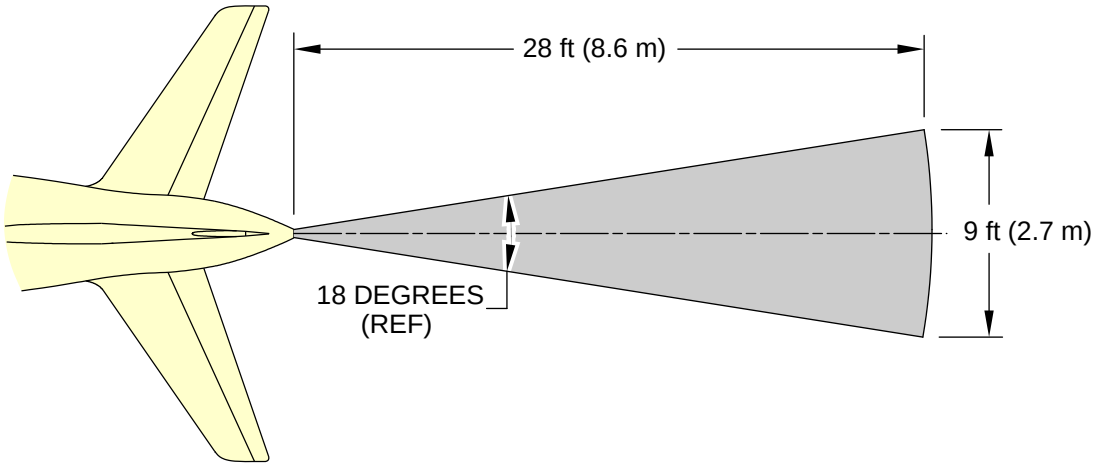
4 Auxiliary Power Unit (APU)

This section contains information about the danger areas of the APU when operated on the ground. Refer to Fig. 7 and Fig. 8 for danger areas and the exhaust plume temperature of the APU.



ICN-BD500-A-J000000-A-3AB48-47400-A-001-01

Figure 7 APU exhaust plume temperature



ICN-BD500-A-J000000-A-3AB48-47401-A-001-01

Figure 8 APU danger areas

5 Engine noise levels

The community noise levels must agree with FAR 36 Stage 3, ICAO Annex 16, Chapter 4, Chapter 516.

Refer to Table 2 for the demonstrated Effective Perceived Noise levels (EPNdB), limits, and the relative difference (margin of compliance) for the engines.

Table 2 Engine noise levels

Engine <option code>	Weights		Measure-ment Points			Margins (EPNdB)	Margin Require-ment (EPNdB)
	MTOW <option code>	MLW <option code>	Description	Noise Limit (EPNdB)	Measured Level (EPNdB)		
PW1524G <72210003>	134,000 lb (60,781 kg) <13000170>	115,500 lb (52,390 kg) <1300270>	Approach	99.9	91.9	8.0	0
			Lateral	96.0	87.9	8.1	0
			Flyover	90.4	79.0	11.4	0
			Sum of smallest two individual margins:			16.1	2
			Sum of all individual margins:			27.5	10

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Pavement data - Technical data

Applicability: Model: CS100

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Table 1 References

Data Module/Technical Publication	Title
None	

Description

1 Introduction

This data module contains data related to the pavement design specifications, including aircraft footprints, pavement loading during standard operations, and aircraft/pavement rating systems. Also given are the flotation classification for different weights, fixed tire pressure, and aft Center of Gravity (CG), with the Aircraft Classification Number (ACN) methods.

This section is divided into the subsections that follow:

- ACN
- Landing gear footprint
- Maximum pavement load
- Landing gear loading on pavement

Note

Runway strength data shown in this publication is derived from available information and is a realistic estimate of capability at an average level of activity. It is not intended as a maximum allowable weight or as an operating limitation. Many airport pavements are capable of supporting limited operations with gross weights in excess of published figures. Permissible operating weight, insofar as runway strengths are concerned, are a matter of agreement between the owner and user.

For more information about the Pavement Classification Number (PCN), please contact the concerned airport authority.

1.1 Aircraft Classification Number (ACN) / Pavement Classification Number (PCN) Introduction

1.1.1 Aircraft Classification Number (ACN)

The ACN value is a number which expresses the relative structural effect of an aircraft on different pavement types for specified standard subgrade strengths in terms of a standard single wheel load.

An aircraft will have eight (8) ACN numbers for any given aircraft weight and tire pressure: four (4) for flexible pavement and four (4) for rigid pavement.

1.1.2 Pavement Classification Number (PCN)

The PCN value is a number which expresses the relative load carrying capacity of a pavement in terms of a standard single wheel load.

An airport determined and published PCN can be compared with an aircraft's ACN. An aircraft that has an ACN equal to or less than the PCN of a given pavement can operate without restriction on the pavement. (Ref. International Civil Aviation Organization (ICAO) State Letter AN411.1.17−8019. Ref. US FAA Advisory Circular 150153355 15/06/83).

For example, if the published airport PCN is 52/R/B/Y/T, it means that the aircraft ACN must be less than 52 for rigid pavement type, with medium subgrade strenght, and the tire pressure of the aircraft must be less than 145 psi (1.0 MPa). The PCN also shows that the value was arrived at through a technical review.

Table 2 Airport method to show Pavement Classification Number (PCN).

Pavement type	Pavement type	Tire pressure category psi (MPa)	Evaluation
R = Rigid F = Flexible	A = High B = Medium C = Low D = Ultra Low	W = No limit X = To 254 (1.75) Y = To 181 (1.25) Z = To 73 (0.5)	T = Technical U = Using aircraft

Table 3 Subgrade strength categories

Subgrade categories	Flexible pavement		Rigid pavement	
	Characterization	CBR range	Characterization	k-Value Range
A	CBR 15	Above 13	k = 150MN/m3 (550 pci)	Above 120MN/m3 (442pci)
B	CBR 10	From 8 to 13	k = 80MN/m3 (300 pci)	From 60 to 120 MN/m3 (221 to 442pci)
C	CBR 6	From 4 to 8	k = 80MN/m3 (300 pci)	From 25 to 60 MN/m3 (92 to 221pci)
D	CBR 3	Below 4	k=20MN/m3 (75pci)	Below 25 MN/m3 (92pci)

1.1.3 Load Classification Number (LCN)

The Load Classification Number (LCN) is a method of flotation analysis by the ICAO.

An aircraft will have two (2) LCN numbers for any given aircraft weight and tire pressure: one (1) for rigid pavement usually concrete and second (2) for flexible pavement usually layered asphalt.

2 Aircraft Classification Number (ACN) results for most aft C.G. position

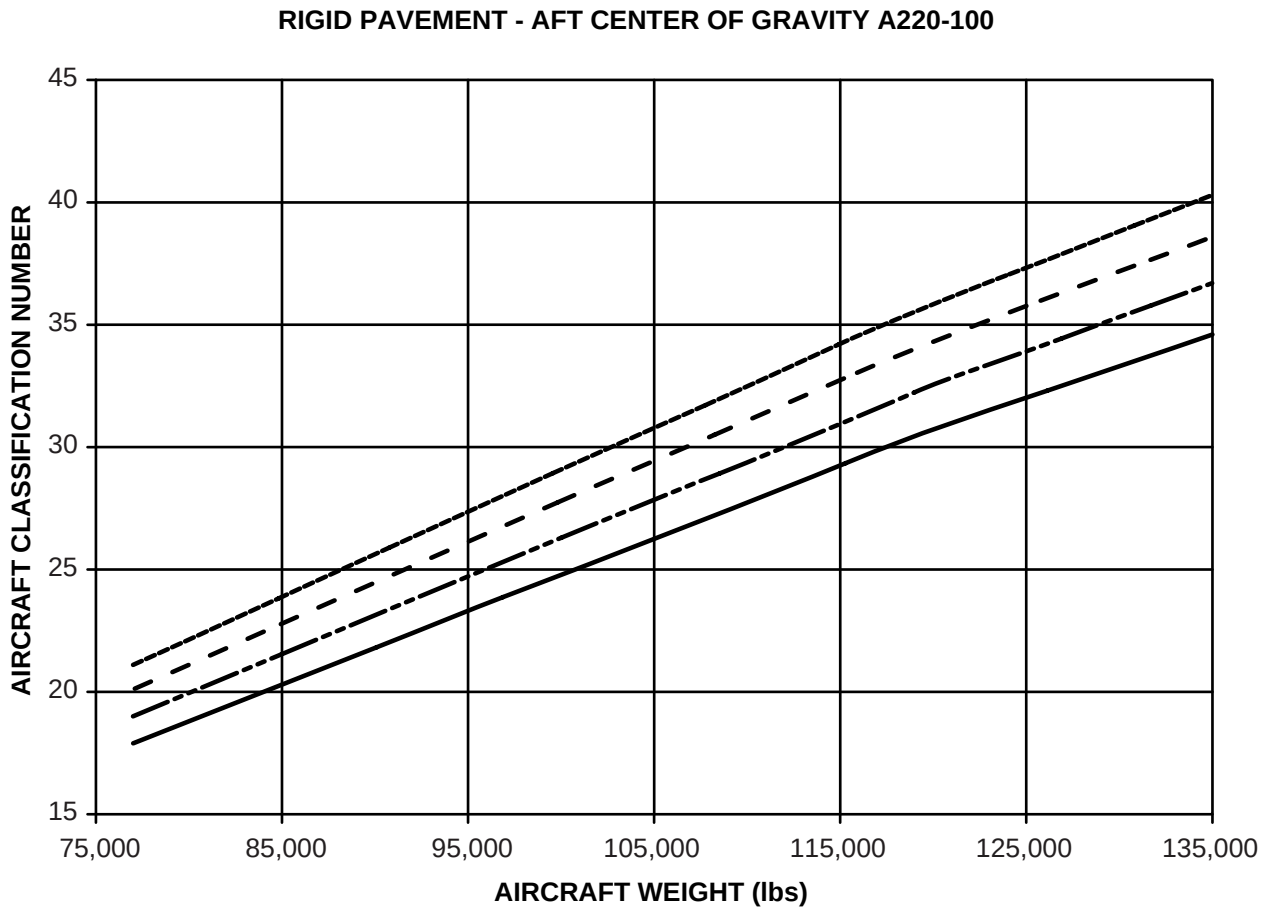
Refer to Table 4 for tabular format and Fig. 1 for graphical format for the ACN results for rigid pavement and Table 5 for tabular format and Fig. 2 for graphical format for the ACN results for flexible pavement.

Table 4 Aircraft Classification Number (ACN) RESULTS FOR MOST AFT C.G. RIGID PAVEMENT

A/C Gross Weight (lb)	A/C Gross Weight (Kg)	MLG Load (lb)	MLG Load (Kg)	ACN High Strength K=150 MN/m3	ACN Medium Strength K=80 MN/m3	ACN Low Strength K=40 MN/m3	ACN Ultra-Low Strength K=20 MN/m3
135000	61234	124744	56509	34.6	36.7	38.6	40.3
134000	60781	123945	56147	34.3	36.4	38.3	40.0
133000	60327	123147	55786	34.1	36.1	38.0	39.7
132000	59874	122348	55424	33.8	35.9	37.7	39.4
131000	59420	121550	55062	33.6	35.6	37.5	39.1
130000	58967	120752	54701	33.3	35.3	37.2	38.8
129000	58513	119953	54339	33.1	35.0	36.9	38.5
128000	58059	119155	53977	32.8	34.8	36.6	38.2
127000	57606	118357	53616	32.5	34.5	36.3	37.9
126000	57152	117558	53254	32.3	34.2	36.0	37.6
125000	56699	116760	52892	32.0	33.9	35.8	37.3
124000	56245	115962	52531	31.8	33.6	35.5	37.0
123000	55791	115163	52169	31.5	33.4	35.2	36.7
122000	55338	114365	51807	31.2	33.1	34.9	36.4
121000	54884	113567	51446	31.0	32.8	34.6	36.1
120000	54431	112768	51084	30.7	32.5	34.3	35.8
119500	54204	112369	50903	30.6	32.4	34.2	35.7
119000	5397	111899	50690	30.5	32.2	34.0	35.5
118000	53523	110958	50264	30.2	31.9	33.7	35.2
117000	53070	110018	49838	29.9	31.6	33.4	34.9
116000	52616	109077	49412	29.6	31.3	33.1	34.6
115500	52389	108607	49199	29.4	31.1	32.9	34.4
115000	52163	108136	48986	29.2	30.9	32.7	34.2
114000	51709	107195	48559	28.9	30.6	32.4	33.9
113000	51255	106255	48134	28.6	30.3	32.1	33.5

A/C Gross Weight (lb)	A/C Gross Weight (Kg)	MLG Load (lb)	MLG Load (Kg)	ACN High Strength K=150 MN/m3	ACN Medium Strength K=80 MN/m3	ACN Low Strength K=40 MN/m3	ACN Ultra-Low Strength K=20 MN/m3
112000	50802	105314	47707	28.3	30.0	31.7	33.2
111000	50348	104373	47281	28.0	29.7	31.4	32.8
110000	49895	103432	46855	27.7	29.4	31.1	32.5
109000	49441	102491	46428	27.4	29.1	30.7	32.1
108000	48987	101551	46003	27.1	28.8	30.4	31.8
107000	48534	100610	45576	26.8	28.5	30.1	31.5
106000	48080	99669	45150	26.5	28.2	29.8	31.1
105000	47627	98728	44724	26.3	27.8	29.4	30.8
104000	47173	97787	44298	26.0	27.5	29.1	30.4
103000	46720	96847	43872	25.7	27.2	28.8	30.1
102000	46266	95906	43445	25.4	26.9	28.5	29.8
101000	45812	94965	43019	25.1	26.6	28.1	29.4
100000	45359	94024	42593	24.8	26.3	27.8	29.1
99000	44905	93020	42138	24.5	26.0	27.5	28.8
98000	44452	92017	41684	24.2	25.7	27.1	28.4
97000	43998	91013	41229	23.9	25.3	26.8	28.1
96000	43544	90009	40774	23.6	25.0	26.5	27.7
95000	43091	89005	40319	23.3	24.7	26.1	27.4
94000	42637	88001	39864	23.0	24.4	25.8	27.0
93000	42184	86998	39410	22.7	24.1	25.5	26.7
92000	41730	85994	38955	22.4	23.8	25.1	26.3
91000	41276	84990	38500	22.1	23.4	24.8	26.0
90000	40823	83986	38046	21.8	23.1	24.5	25.6
89000	40369	82983	37591	21.5	22.8	24.1	25.3
88000	39916	81979	37136	21.2	22.5	23.8	24.9
87000	39462	80975	36682	20.9	22.2	23.4	24.6

A/C Gross Weight (lb)	A/C Gross Weight (Kg)	MLG Load (lb)	MLG Load (Kg)	ACN High Strength K=150 MN/ m3	ACN Medium Strength K=80 MN/ m3	ACN Low Strength K=40 MN/ m3	ACN Ultra-Low Strength K=20 MN/ m3
86000	39008	79971	36227	20.6	21.9	23.1	24.2
85000	38555	78967	35772	20.3	21.5	22.8	23.9
84000	38101	77964	35318	20.0	21.2	22.4	23.5
83000	37648	76960	34863	19.7	20.9	22.1	23.2
82000	37194	75956	34408	19.4	20.6	21.8	22.8
81000	36740	74952	33953	19.1	20.3	21.4	22.5
80000	36287	73949	33499	18.8	20.0	21.1	22.1
79000	35833	72945	33044	18.5	19.6	20.8	21.8
78000	35380	71941	32589	18.2	19.3	20.4	21.4
77000	34926	70937	32134	17.9	19.0	20.1	21.1



LEGEND

- Ultra low strength k=20 mn/m³.
- Low strength k=40 mn/m³.
- Medium strength k=80 mn/m³.
- High strength k=150 mn/m³.

ICN-BD500-A-J000000-C-3AB48-57663-A-002-01

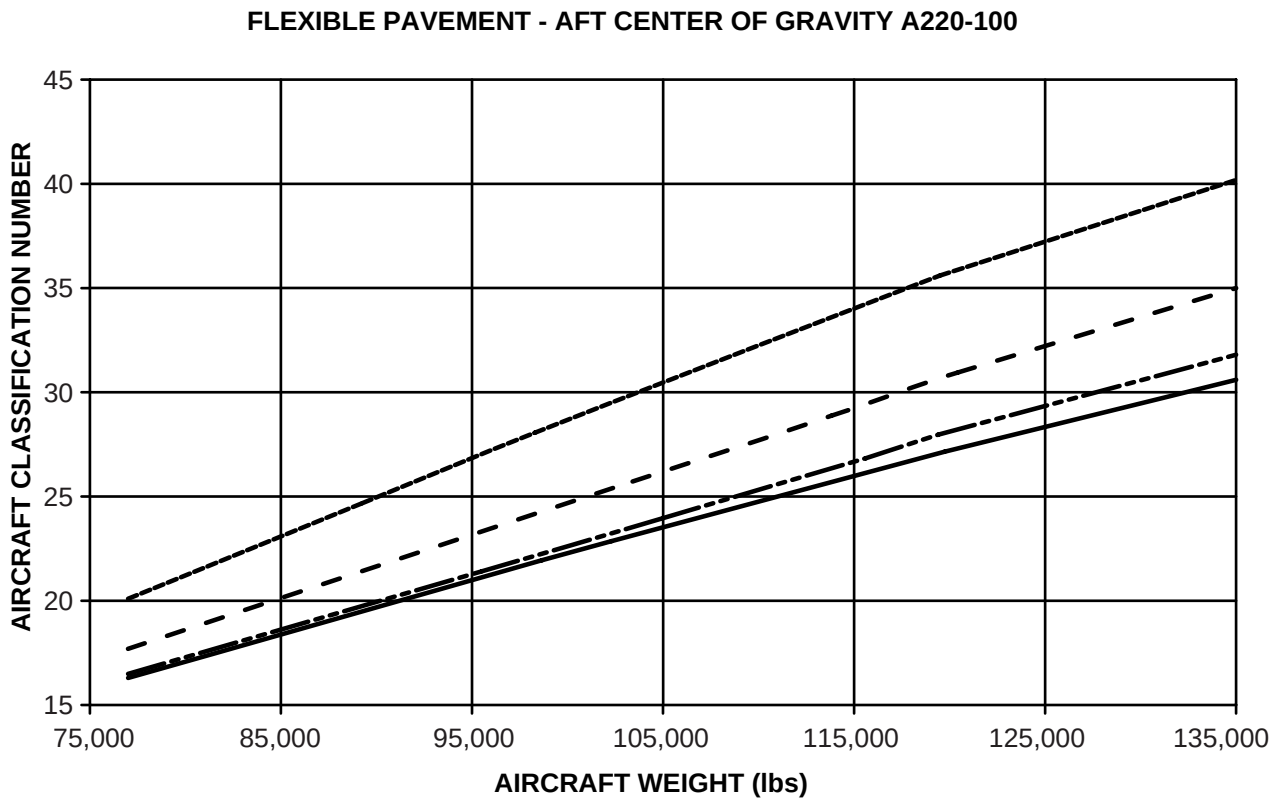
Figure 1 ACN results - Rigid pavement

Table 5 Aircraft Classification Number (ACN) RESULTS FOR MOST AFT C.G. FLEXIBLE PAVEMENT

A/C Gross Weight (lb)	A/C Gross Weight (kg)	MLG Load (lb)	MLG Load (kg)	ACN High Strength CBR=15	ACN Medium Strength CBR=10	ACN Low Strength CBR=6	ACN Ultra-Low Strength CBR=3
135000	61234	124744	56509	30.6	31.8	35.0	40.2
134000	60781	123945	56147	30.4	31.6	34.7	39.9
133000	60327	123147	55786	30.1	31.3	34.4	39.6
132000	59874	122348	55424	29.9	31.1	34.2	39.3
131000	59420	121550	55062	29.7	30.8	33.9	39.0
130000	58967	120752	54701	29.5	30.6	33.6	38.7
129000	58513	119953	54339	29.2	30.3	33.3	38.4
128000	58059	119155	53977	29.0	30.1	33.1	38.1
127000	57606	118357	53616	28.8	29.8	32.8	37.8
126000	57152	117558	53254	28.6	29.6	32.5	37.5
125000	56699	116760	52892	28.3	29.3	32.2	37.2
124000	56245	115962	52531	28.1	29.1	31.9	36.9
123000	55791	115163	52169	27.9	28.9	31.7	36.6
122000	55338	114365	51807	27.7	28.6	31.4	36.3
121000	54884	113567	51446	27.4	28.4	31.1	36.0
120000	54431	112768	51084	27.2	28.1	30.8	35.7
119500	54204	112369	50903	27.1	28.0	30.7	35.6
119000	5397	111899	50690	27.0	27.9	30.5	35.4
118000	53523	110958	50264	26.7	27.6	30.2	35.1
117000	53070	110018	49838	26.5	27.3	29.9	34.7
116000	52616	109077	49412	26.2	27.0	29.6	34.4
115500	52389	108607	49199	26.1	26.8	29.4	34.2
115000	52163	108136	48986	26.0	26.7	29.2	34.0
114000	51709	107195	48559	25.7	26.4	28.9	33.7
113000	51255	106255	48134	25.5	26.1	28.6	33.3
112000	50802	105314	47707	25.2	25.9	28.3	33.0

A/C Gross Weight (lb)	A/C Gross Weight (kg)	MLG Load (lb)	MLG Load (kg)	ACN High Strength CBR=15	ACN Medium Strength CBR=10	ACN Low Strength CBR=6	ACN Ultra-Low Strength CBR=3
111000	50348	104373	47281	25.0	25.6	28.0	32.6
110000	49895	103432	46855	24.8	25.3	27.7	32.2
109000	49441	102491	46428	24.5	25.1	27.4	31.9
108000	48987	101551	46003	24.3	24.8	27.1	31.5
107000	48534	100610	45576	24.0	24.5	26.8	31.2
106000	48080	99669	45150	23.8	24.2	26.5	30.8
105000	47627	98728	44724	23.5	24.0	26.2	30.5
104000	47173	97787	44298	23.3	23.7	25.9	30.1
103000	46720	96847	43872	23.0	23.4	25.6	29.8
102000	46266	95906	43445	22.8	23.1	25.3	29.4
101000	45812	94965	43019	22.5	22.9	25.0	29.1
100000	45359	94024	42593	22.3	22.6	24.7	28.7
99000	44905	93020	42138	22.0	22.3	24.4	28.3
98000	44452	92017	41684	21.8	22.1	24.1	28.0
97000	43998	91013	41229	21.5	21.8	23.8	27.6
96000	43544	90009	40774	21.3	21.5	23.5	27.2
95000	43091	89005	40319	21.0	21.3	23.2	26.8
94000	42637	88001	39864	20.7	21.0	22.9	26.5
93000	42184	86998	39410	20.5	20.7	22.6	26.1
92000	41730	85994	38955	20.2	20.5	22.3	25.7
91000	41276	84990	38500	20.0	20.2	22.0	25.3
90000	40823	83986	38046	19.7	19.9	21.7	25.0
89000	40369	82983	37591	19.4	19.7	21.4	24.6
88000	39916	81979	37136	19.2	19.4	21.0	24.2
87000	39462	80975	36682	18.9	19.2	20.7	23.8
86000	39008	79971	36227	18.6	18.9	20.4	23.5

A/C Gross Weight (lb)	A/C Gross Weight (kg)	MLG Load (lb)	MLG Load (kg)	ACN High Strength CBR=15	ACN Medium Strength CBR=10	ACN Low Strength CBR=6	ACN Ultra-Low Strength CBR=3
85000	38555	78967	35772	18.4	18.6	20.1	23.1
84000	38101	77964	35318	18.1	18.4	19.8	22.7
83000	37648	76960	34863	17.9	18.1	19.5	22.3
82000	37194	75956	34408	17.6	17.8	19.2	22.0
81000	36740	74952	33953	17.3	17.6	18.9	21.6
80000	36287	73949	33499	17.1	17.3	18.6	21.2
79000	35833	72945	33044	16.8	17.0	18.3	20.8
78000	35380	71941	32589	16.6	16.8	18.0	20.5
77000	34926	70937	32134	16.3	16.5	17.7	20.1



LEGEND

- Ultra low strength california bearing ratio=3.
- Low strength california bearing ratio=6.
- Medium strength california bearing ratio=10.
- High strength california bearing ratio=15.

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Figure 2 ACN results - Flexible pavement

3 Aircraft Classification Number (ACN) results for most forward C.G. positions

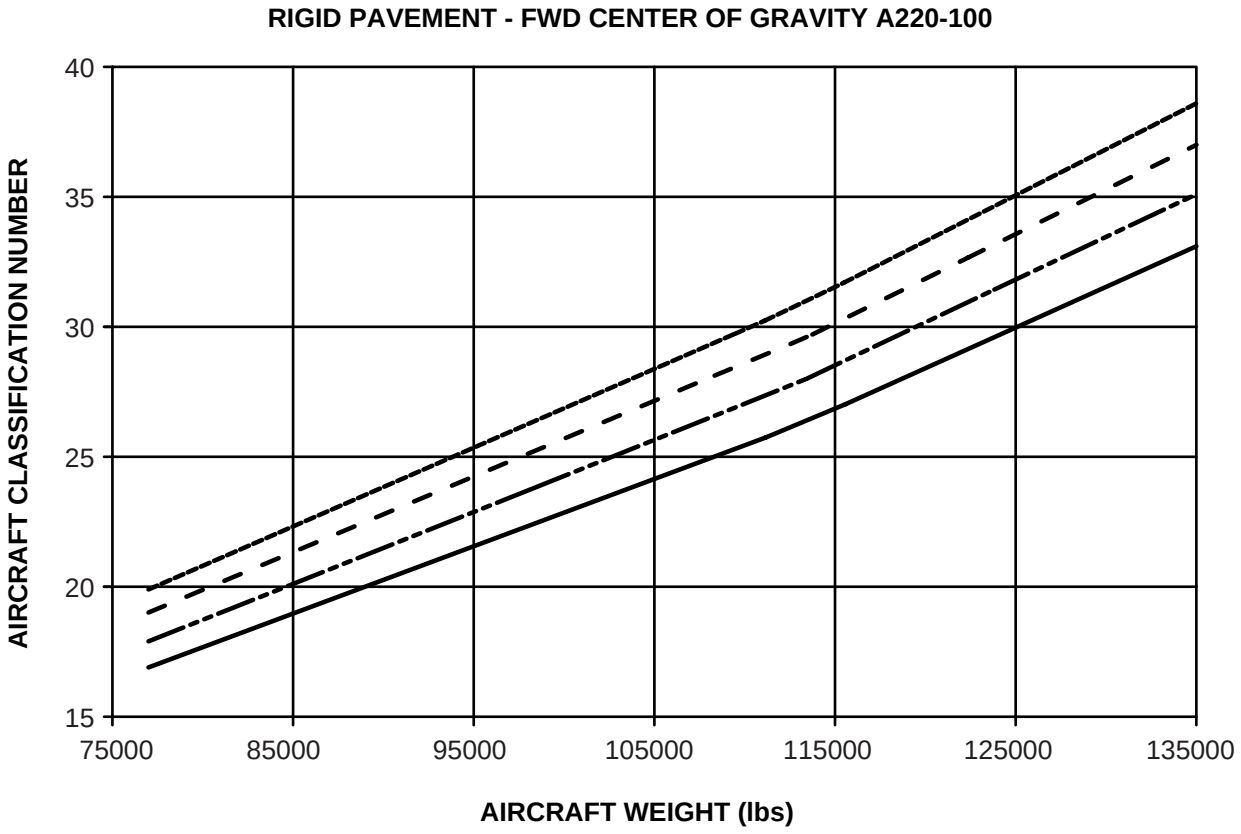
Refer to Table 6 for tabular format and Fig. 3 for graphical format for the ACN results for rigid pavement and Table 7 for tabular format and Fig. 4 for graphical format for the ACN results for flexible pavement.

Table 6 Aircraft Classification Number (ACN) RESULTS FOR MOST FWD C.G. RIGID PAVEMENT

A/C Gross Weight (lb)	A/C Gross Weight (Kg)	MLG Load (lb)	MLG Load (kg)	ACN High Strength K=150 MN/m3	ACN Medium Strength K=80 MN/m3	ACN Low Strength K=40 MN/m3	ACN Ultra-Low Strength K=20 MN/m3
135000	61234	120274	54484	33.1	35.1	37.0	38.6
134000	60781	119296	54041	32.8	34.8	36.7	38.2
133000	60327	118318	53598	32.5	34.4	36.3	37.9
132000	59874	117341	53155	32.2	34.1	36.0	37.5
131000	59420	116363	52712	31.8	33.8	35.6	37.2
130000	58967	115385	52269	31.5	33.5	35.3	36.8
129000	58513	114408	51827	31.2	33.1	34.9	36.5
128000	58059	113430	51384	30.9	32.8	34.6	36.1
127000	57606	112452	50941	30.6	32.5	34.3	35.8
126000	57152	111475	50498	30.3	32.1	33.9	35.4
125000	56699	110497	50055	30.0	31.8	33.6	35.1
124000	56245	109519	49612	29.7	31.5	33.2	34.7
123000	55791	108542	49170	29.3	31.2	32.9	34.4
122000	55338	107564	48726	29.0	30.8	32.5	34.0
121000	54884	106586	48283	28.7	30.5	32.2	33.6
120000	54431	105609	47841	28.4	30.2	31.8	33.3
119000	54204	104631	47398	28.1	29.8	31.5	32.9
118000	5397	103653	46955	27.8	29.5	31.2	32.6
117000	53523	102676	46512	27.5	29.2	30.8	32.2
116000	53070	101698	46069	27.2	28.9	30.5	31.9
115500	52616	101209	45848	27.0	28.7	30.3	31.7

A/C Gross Weight (lb)	A/C Gross Weight (Kg)	MLG Load (lb)	MLG Load (kg)	ACN High Strength K=150 MN/m3	ACN Medium Strength K=80 MN/m3	ACN Low Strength K=40 MN/m3	ACN Ultra-Low Strength K=20 MN/m3
115000	52389	100731	45631	26.9	28.5	30.1	31.5
114000	52163	99774	45198	26.6	28.2	29.8	31.2
113425	51709	99224	44948	26.4	28.0	29.6	31.0
113000	51255	98852	44780	26.3	27.9	29.5	30.9
112000	50802	97975	44383	26.0	27.6	29.2	30.5
111000	50348	97099	43986	25.7	27.3	28.9	30.2
110000	49895	96227	43591	25.4	27.0	28.6	29.9
109000	49441	95355	43196	25.2	26.7	28.3	29.6
108000	48987	94483	42801	24.9	26.5	28.0	29.3
107000	48534	93612	42406	24.7	26.2	27.7	29.0
106000	48080	92740	42011	24.4	25.9	27.4	28.7
105000	47627	91868	41616	24.1	25.6	27.2	28.4
104000	47173	90996	41221	23.9	25.4	26.9	28.1
103000	46720	90124	40826	23.6	25.1	26.6	27.8
102000	46266	89252	40431	23.4	24.8	26.3	27.5
101000	45812	88380	40036	23.1	24.5	26.0	27.2
100000	45359	87508	39641	22.9	24.3	25.7	26.9
99000	44905	86636	39246	22.6	24.0	25.4	26.6
98000	44452	85764	38851	22.3	23.7	25.1	26.3
97000	43998	84892	38456	22.1	23.4	24.8	26.0
96000	43544	84020	38061	21.8	23.2	24.5	25.7
95000	43091	83148	37666	21.6	22.9	24.2	25.4
94000	42637	82276	37271	21.3	22.6	24.0	25.1
93000	42184	81405	36876	21.0	22.3	23.7	24.7
92000	41730	80533	36481	20.8	22.0	23.4	24.4
91000	41276	79661	36086	20.5	21.8	23.1	24.1

A/C Gross Weight (lb)	A/C Gross Weight (Kg)	MLG Load (lb)	MLG Load (kg)	ACN High Strength K=150 MN/ m3	ACN Medium Strength K=80 MN/ m3	ACN Low Strength K=40 MN/ m3	ACN Ultra-Low Strength K=20 MN/ m3
90000	40823	78789	35691	20.3	21.5	22.8	23.8
89000	40369	77917	35296	20.0	21.2	22.5	23.5
88000	39916	77045	34901	19.7	20.9	22.2	23.2
87000	39462	76173	34506	19.5	20.7	21.9	22.9
86000	39008	75301	34111	19.2	20.4	21.6	22.6
85000	38555	74429	33716	19.0	20.1	21.3	22.3
84000	38101	73557	33321	18.7	19.8	21.0	22.0
83000	37648	72685	32926	18.5	19.6	20.7	21.7
82000	37194	71813	32531	18.2	19.3	20.5	21.4
81000	36740	70941	32136	17.9	19.0	20.2	21.1
80000	36287	70069	31741	17.7	18.7	19.9	20.8
79000	35833	69198	31347	17.4	18.5	19.6	20.5
78000	35380	68326	30952	17.2	18.2	19.3	20.2
77000	34926	67454	30557	16.9	17.9	19.0	19.9



LEGEND

- Ultra low strength k=20 mn/m³.
- Low strength k=40 mn/m³.
- Medium strength k=80 mn/m³.
- High strength k=150 mn/m³.

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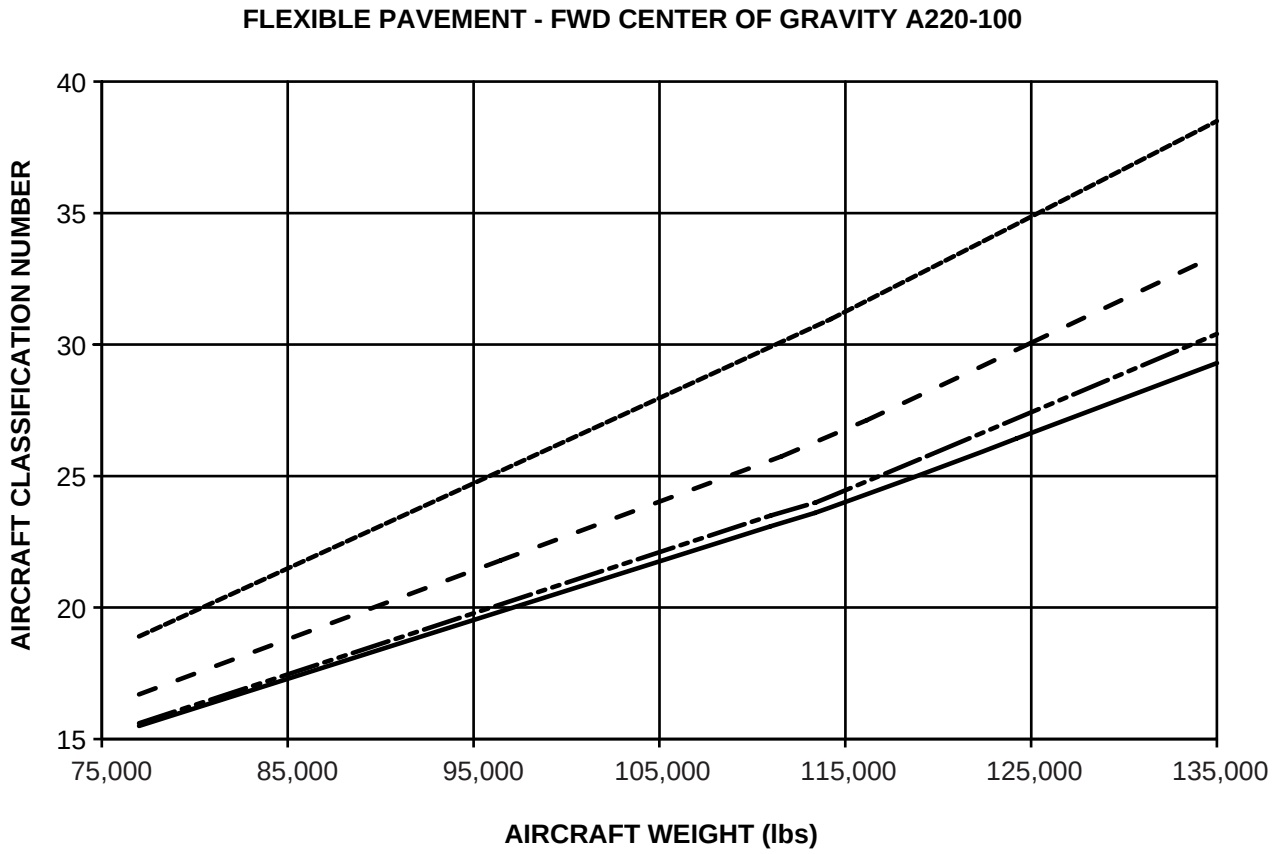
Figure 3 ACN results - Rigid pavement

Table 7 Aircraft Classification Number (ACN) RESULTS FOR MOST FWD C.G. FLEXIBLE PAVEMENT

A/C Gross Weight (lb)	A/C Gross Weight (Kg)	MLG Load (lb)	MLG Load (kg)	ACN High Strength CBR=15	ACN Medium Strength CBR=10	ACN Low Strength CBR=6	ACN Ultra-Low Strength CBR=3
135000	61234	120274	54484	29.3	30.4	33.4	38.5
134000	60781	119296	54041	29.0	30.1	33.1	38.1
133000	60327	118318	53598	28.8	29.8	32.7	37.8
132000	59874	117341	53155	28.5	29.5	32.4	37.4
131000	59420	116363	52712	28.2	29.2	32.1	37.0
130000	58967	115385	52269	28.0	28.9	31.7	36.7
129000	58513	114408	51827	27.7	28.6	31.4	36.3
128000	58059	113430	51384	27.4	28.3	31.1	36.0
127000	57606	112452	50941	27.2	28.0	30.7	35.6
126000	57152	111475	50498	26.9	27.7	30.4	35.2
125000	56699	110497	50055	26.6	27.4	30.1	34.9
124000	56245	109519	49612	26.4	27.1	29.7	34.5
123000	55791	108542	49170	26.1	26.8	29.4	34.1
122000	55338	107564	48726	25.8	26.5	29.1	33.8
121000	54884	106586	48283	25.6	26.2	28.7	33.4
120000	54431	105609	47841	25.3	25.9	28.4	33.0
119000	54204	104631	47398	25.0	25.6	28.1	32.7
118000	5397	103653	46955	24.8	25.3	27.7	32.3
117000	53523	102676	46512	24.5	25.0	27.4	31.9
116000	53070	101698	46069	24.2	24.7	27.1	31.6
115500	52616	101209	45848	24.1	24.6	26.9	31.4
115000	52389	100731	45631	24.0	24.5	26.8	31.2
114000	52163	99774	45198	23.7	24.2	26.5	30.9
113425	51709	99224	44948	23.6	24.0	26.3	30.7
113000	51255	98852	44780	23.5	23.9	26.2	30.6
112000	50802	97975	44383	23.3	23.7	25.9	30.2

A/C Gross Weight (lb)	A/C Gross Weight (Kg)	MLG Load (lb)	MLG Load (kg)	ACN High Strength CBR=15	ACN Medium Strength CBR=10	ACN Low Strength CBR=6	ACN Ultra-Low Strength CBR=3
111000	50348	97099	43986	23.1	23.5	25.6	29.9
110000	49895	96227	43591	22.9	23.3	25.3	29.6
109000	49441	95355	43196	22.7	23.0	25.1	29.3
108000	48987	94483	42801	22.4	22.8	24.8	28.9
107000	48534	93612	42406	22.2	22.6	24.6	28.6
106000	48080	92740	42011	22.0	22.3	24.3	28.3
105000	47627	91868	41616	21.8	22.1	24.0	28.0
104000	47173	90996	41221	21.5	21.9	23.8	27.6
103000	46720	90124	40826	21.3	21.6	23.5	27.3
102000	46266	89252	40431	21.1	21.4	23.2	27.0
101000	45812	88380	40036	20.9	21.2	23.0	26.7
100000	45359	87508	39641	20.6	20.9	22.7	26.3
99000	44905	86636	39246	20.4	20.7	22.5	26.0
98000	44452	85764	38851	20.2	20.5	22.2	25.7
97000	43998	84892	38456	20.0	20.2	21.9	25.4
96000	43544	84020	38061	19.7	20.0	21.7	25.0
95000	43091	83148	37666	19.5	19.8	21.4	24.7
94000	42637	82276	37271	19.3	19.6	21.2	24.4
93000	42184	81405	36876	19.1	19.3	20.9	24.1
92000	41730	80533	36481	18.9	19.1	20.6	23.8
91000	41276	79661	36086	18.6	18.9	20.4	23.4
90000	40823	78789	35691	18.4	18.6	20.1	23.1
89000	40369	77917	35296	18.2	18.4	19.8	22.8
88000	39916	77045	34901	18.0	18.2	19.6	22.5
87000	39462	76173	34506	17.7	17.9	19.3	22.1
86000	39008	75301	34111	17.5	17.7	19.1	21.8

A/C Gross Weight (lb)	A/C Gross Weight (Kg)	MLG Load (lb)	MLG Load (kg)	ACN High Strength CBR=15	ACN Medium Strength CBR=10	ACN Low Strength CBR=6	ACN Ultra-Low Strength CBR=3
85000	38555	74429	33716	17.3	17.5	18.8	21.5
84000	38101	73557	33321	17.1	17.2	18.5	21.2
83000	37648	72685	32926	16.8	17.0	18.3	20.8
82000	37194	71813	32531	16.6	16.8	18.0	20.5
81000	36740	70941	32136	16.4	16.5	17.7	20.2
80000	36287	70069	31741	16.2	16.3	17.5	19.9
79000	35833	69198	31347	15.9	16.1	17.2	19.5
78000	35380	68326	30952	15.7	15.8	17.0	19.2
77000	34926	67454	30557	15.5	15.6	16.7	18.9



LEGEND

- Ultra low strength california bearing ratio=3.
- Low strength california bearing ratio=6.
- Medium strength california bearing ratio=10.
- High strength california bearing ratio=15.

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Figure 4 ACN results - Flexible pavement

4 Load Classification Number (LCN) results for most aft C.G. positions

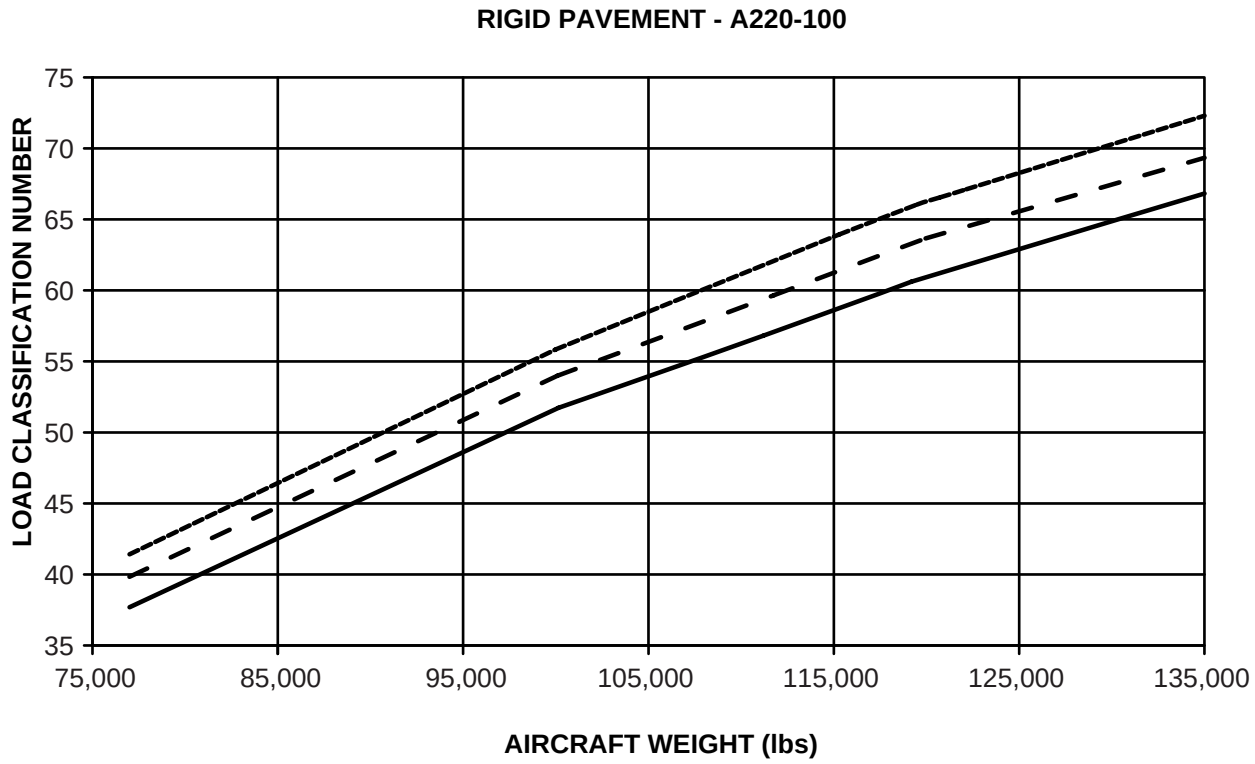
Refer to Table 8 for tabular format and Fig. 5 for graphical format for the LCN results for rigid pavement and Table 9 for tabular format and Fig. 6 for graphical format for the LCN results for flexible pavement.

Table 8 Load Classification Number (LCN) RESULTS FOR MOST AFT C.G. RIGID PAVEMENT

Aircraft Weight (lbs)	Aircraft Weight (Kg)	Tire Pressure (psi)	L = 30 inches		L = 40 inches		L = 50 inches	
			ESWL	LCN	ESWL	LCN	ESWL	LCN
135000	61234	195	41517	67	43615	69	46084	72
134000	60781	195	41224	66	43311	69	45748	72
133000	60327	195	40930	66	43008	69	45412	71
132000	59874	195	40636	66	42704	68	45076	71
131000	59420	195	40343	65	42401	68	44740	71
130000	58967	195	40049	65	42097	67	44403	70
129000	58513	195	39755	64	41794	67	44067	70
128000	58059	195	39462	64	41490	67	43731	69
127000	57606	195	39168	64	41187	66	43395	69
126000	57152	195	38874	63	40883	66	43059	69
125000	56699	195	38581	63	40580	66	42723	68
124000	56245	195	38287	63	40276	65	42387	68
123000	55791	195	37993	62	39973	65	42050	67
122000	55338	195	37699	62	39669	64	41714	67
121000	54884	195	37406	61	39366	64	41378	67
119500	54204	195	36965	61	38910	63	40874	66
118000	53523	195	36454	60	38381	63	40292	65
117000	53070	195	36113	60	38028	62	39904	65
115500	52389	195	35602	59	37498	61	39321	64
114000	51709	195	35096	58	36971	61	38745	63
113000	51255	195	34759	58	36621	60	38360	63
112000	50802	195	34422	57	36270	60	37976	62

Aircraft Weight (lbs)	Aircraft Weight (Kg)	Tire Pressure (psi)	L = 30 inches		L = 40 inches		L = 50 inches	
			ESWL	LCN	ESWL	LCN	ESWL	LCN
111000	50348	195	34085	57	35919	59	37592	62
109000	49441	195	33428	56	35224	58	36841	61
108000	48987	195	33100	55	34877	58	36466	60
107000	48534	195	32771	55	34530	57	36090	60
106000	48080	195	32442	54	34183	57	35715	59
105000	47627	195	32114	54	33836	56	35340	58
104000	47173	195	31785	53	33489	56	34964	58
103000	46720	195	31457	53	33142	55	34589	57
102000	46266	195	31128	53	32795	55	34214	57
101000	45812	195	30799	52	32448	54	33838	56
100000	45359	195	30471	52	32101	54	33463	56
99000	44905	195	30129	51	31740	53	33081	55
98000	44452	195	29787	50	31379	53	32699	55
97000	43998	195	29445	50	31018	52	32317	54
96000	43544	195	29103	49	30657	51	31934	53
95000	43091	195	28761	49	30296	51	31552	53
94000	42637	195	28419	48	29935	50	31170	52
93000	42184	195	28077	47	29574	50	30788	51
92000	41730	195	27734	47	29213	49	30406	51
91000	41276	195	27392	46	28852	48	30024	50
90000	40823	195	27050	46	28491	48	29642	50
89000	40369	195	26708	45	28130	47	29260	49
88000	39916	195	26366	44	27769	47	28878	48
87000	39462	195	26024	44	27408	46	28496	48
86000	39008	195	25682	43	27047	45	28113	47
85000	38555	195	25340	43	26686	45	27731	46
84000	38101	195	24998	42	26325	44	27349	46

Aircraft Weight (lbs)	Aircraft Weight (Kg)	Tire Pressure (psi)	L = 30 inches		L = 40 inches		L = 50 inches	
			ESWL	LCN	ESWL	LCN	ESWL	LCN
83000	37648	195	24656	41	25964	44	26967	45
82000	37194	195	24314	41	25603	43	26585	45
81000	36740	195	23972	40	25242	42	26203	44
80000	36287	195	23630	40	24881	42	25821	43
79000	35833	195	23288	39	24520	41	25439	43
78000	35380	195	22946	38	24159	40	25057	42
77000	34926	195	22604	38	23798	40	24675	41



LEGEND

------ Radius of relative stiffness L=50.00 in. (1270.00 mm).

— — Radius of relative stiffness L=40.00 in. (1016.00 mm).

——— Radius of relative stiffness L=30.00 in. (762.00 mm).

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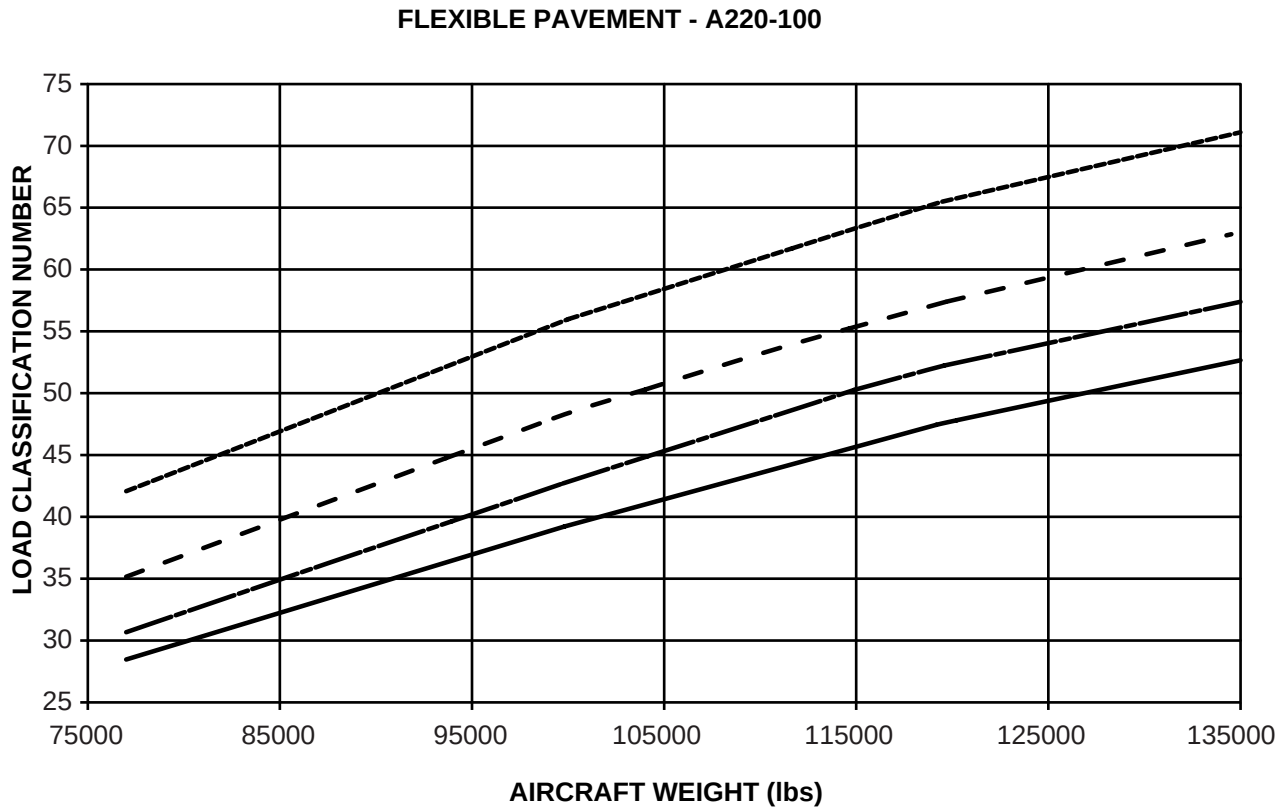
Figure 5 LCN results - Rigid pavement

Table 9 Load Classification Number (LCN) RESULTS FOR MOST AFT C.G. FLEXIBLE PAVEMENT

Aircraft Weight (lbs)	Aircraft Weight (Kg)	Tire Pres-sure (psi)	Pavement Thickness 10 inches		Pavement Thickness 15 inches		Pavement Thickness 20 inches		Pavement Thickness 30 inches	
			ESWL	LCN	ESWL	LCN	ESWL	LCN	ESWL	LCN
135000	**61234**	**195**	**31186**	**53**	**34565**	**57**	**38593**	**63**	**45080**	**71**
134000	60781	195	30986	52	34326	57	38330	63	44779	71
133000	60327	195	30787	52	34087	57	38067	62	44478	70
132000	59874	195	30587	52	33849	56	37804	62	44177	70
131000	59420	195	30388	51	33610	56	37541	62	43876	70
130000	58967	195	30188	51	33371	56	37279	61	43575	69
129000	58513	195	29988	51	33132	55	37016	61	43273	69
128000	58059	195	29789	50	32894	55	36753	60	42972	69
127000	57606	195	29589	50	32655	55	36490	60	42671	68
126000	57152	195	29390	50	32416	54	36227	60	42370	68
125000	56699	195	29190	49	32178	54	35964	59	42069	67
124000	56245	195	28990	49	31939	54	35701	59	41768	67
123000	55791	195	28791	49	31700	53	35438	59	41467	67
122000	55338	195	28591	48	31462	53	35175	58	41166	66
121000	54884	195	28392	48	31223	53	34912	58	40865	66
119500	54204	195	28092	48	30865	52	34518	57	40413	65
118000	53523	195	27740	47	30446	52	34057	57	39884	65
117000	53070	195	27504	47	30167	51	33749	56	39530	64
115500	52389	195	27152	46	29749	51	33288	56	39001	64
114000	51709	195	26799	45	29332	50	32828	55	38472	63
113000	51255	195	26564	45	29055	49	32521	55	38120	62
112000	50802	195	26328	44	28777	49	32214	54	37768	62
111000	50348	195	26093	44	28499	48	31908	54	37415	61
109000	49441	195	25623	43	27948	47	31298	53	36714	60
108000	48987	195	25388	43	27672	47	30994	52	36363	60

Aircraft Weight (lbs)	Aircraft Weight (Kg)	Tire Pres-sure (psi)	Pavement Thickness 10 inches		Pavement Thickness 15 inches		Pavement Thickness 20 inches		Pavement Thickness 30 inches	
			ESWL	LCN	ESWL	LCN	ESWL	LCN	ESWL	LCN
135000	**61234**	**195**	**31186**	**53**	**34565**	**57**	**38593**	**63**	**45080**	**71**
107000	48534	195	25152	42	27397	46	30689	52	36012	59
106000	48080	195	24917	42	27121	46	30384	51	35661	59
105000	47627	195	24682	41	26846	45	30080	51	35311	58
104000	47173	195	24447	41	26570	45	29775	50	34960	58
103000	46720	195	24212	41	26294	44	29471	50	34609	57
102000	46266	195	23976	40	26019	44	29166	49	34258	57
101000	45812	195	23741	40	25743	43	28861	49	33907	56
100000	45359	195	23506	39	25468	43	28557	48	33557	56
99000	44905	195	23255	39	25179	42	28237	48	33187	55
98000	44452	195	23004	38	24891	42	27917	47	32816	55
97000	43998	195	22753	38	24603	41	27597	47	32446	54
96000	43544	195	22502	37	24315	41	27277	46	32076	54
95000	43091	195	22251	37	24026	40	26957	46	31706	53
94000	42637	195	22000	36	23738	40	26638	45	31336	52
93000	42184	195	21749	36	23450	39	26318	44	30965	52
92000	41730	195	21498	36	23161	39	25998	44	30595	51
91000	41276	195	21248	35	22873	38	25678	43	30225	51
90000	40823	195	20997	35	22585	38	25358	43	29855	50
89000	40369	195	20746	34	22296	37	25038	42	29485	49
88000	39916	195	20495	34	22008	36	24718	41	29114	49
87000	39462	195	20244	33	21720	36	24399	41	28744	48
86000	39008	195	19993	33	21432	35	24079	40	28374	48
85000	38555	195	19742	32	21143	35	23759	40	28004	47
84000	38101	195	19491	32	20855	34	23439	39	27634	46
83000	37648	195	19240	31	20567	34	23119	39	27264	46

Aircraft Weight (lbs)	Aircraft Weight (Kg)	Tire Pres-sure (psi)	Pavement Thickness 10 inches		Pavement Thickness 15 inches		Pavement Thickness 20 inches		Pavement Thickness 30 inches	
			ESWL	LCN	ESWL	LCN	ESWL	LCN	ESWL	LCN
135000	**61234**	**195**	**31186**	**53**	**34565**	**57**	**38593**	**63**	**45080**	**71**
82000	37194	195	18989	31	20278	33	22799	38	26893	45
81000	36740	195	18738	30	19990	33	22479	37	26523	44
80000	36287	195	18487	30	19702	32	22160	37	26153	44
79000	35833	195	18236	29	19414	32	21840	36	25783	43
78000	35380	195	17985	29	19125	31	21520	36	25413	43
77000	34926	195	17734	28	18837	31	21200	35	25042	42



LEGEND

- Radius of relative stiffness L=30.00 in. (762.00 mm).
- Radius of relative stiffness L=20.00 in. (508.00 mm).
- Radius of relative stiffness L=15.00 in. (381.00 mm).
- Radius of relative stiffness L=10.00 in. (254.00 mm).

ICN-BD500-A-J000000-C-3AB48-57668-A-002-01

Figure 6 LCN results - Flexible pavement

5 Required Pavement Thickness

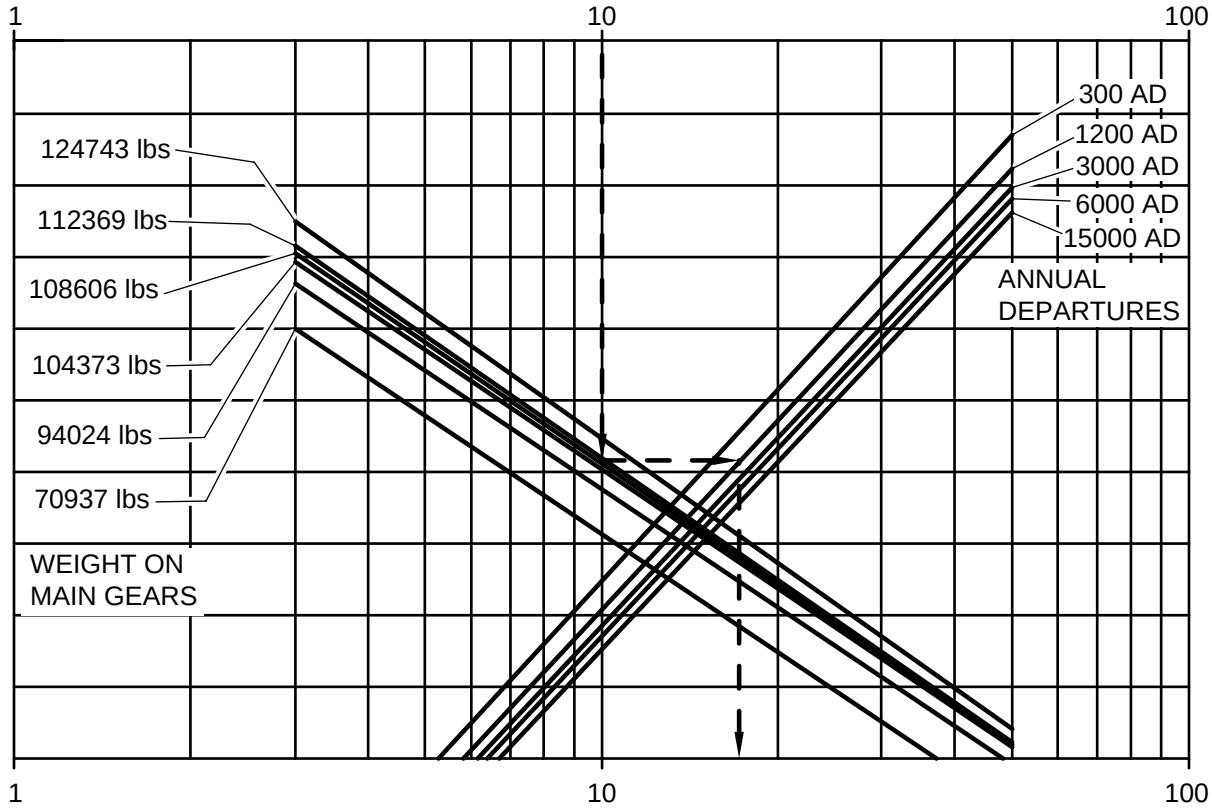
An essential parameter to calculate the PCN is the required pavement thickness.Fig. 7 and Fig. 8. provide a graphical way to determine the required rigid or flexible pavement thickness based on the pavement strength, aircraft load applied to the pavement, and the annual departure rate. Normally, each airport calculates the PCN based on the different aircraft types which operate to and from that airport considering the number of annual departure for each aircraft type. Using the graphs in this section, one can conclude on the impact of annual departure on required pavement thickness. This material gives the user another mean to evaluate the considered airport for operating the A220 more realistically based on more realistic number of annual departure.

Note

Number of annual departure starts from 300 (close to 1 flight per day). In fact, this gives the reader a better idea about required pavement thickness on those small airports that might not have a very high usage rate.

A220-100, AFT CENTER OF GRAVITY, REQUIRED FLEXIBLE PAVEMENT THICKNESS

SUBGRADE STRENGTH - CALIFORNIA BEARING RATIO



FLEXIBLE PAVEMENT THICKNESS (in.)

ICN-BD500-A-J000000-C-3AB48-57669-A-002-01

Figure 7 Flexible pavement required thickness

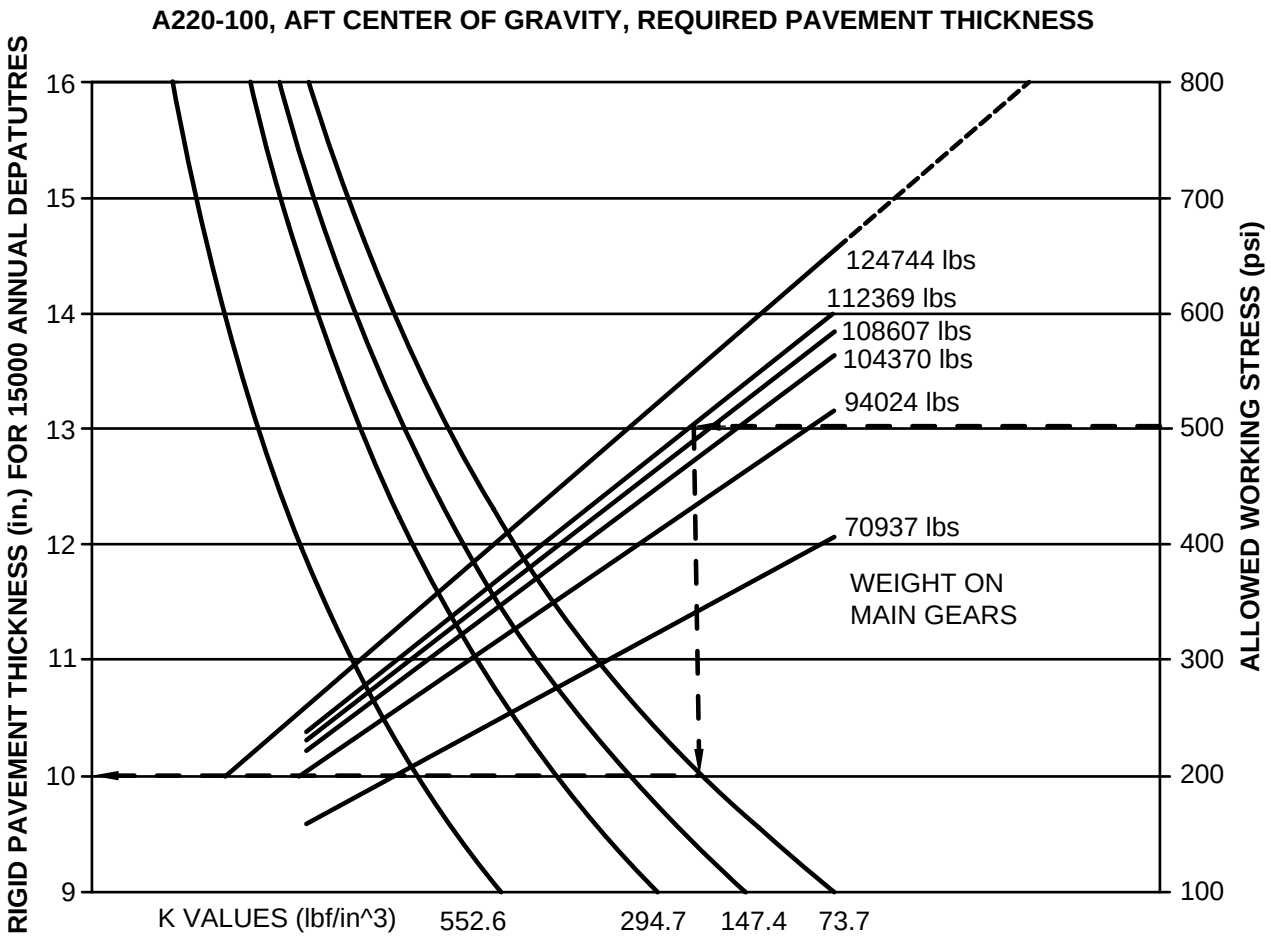


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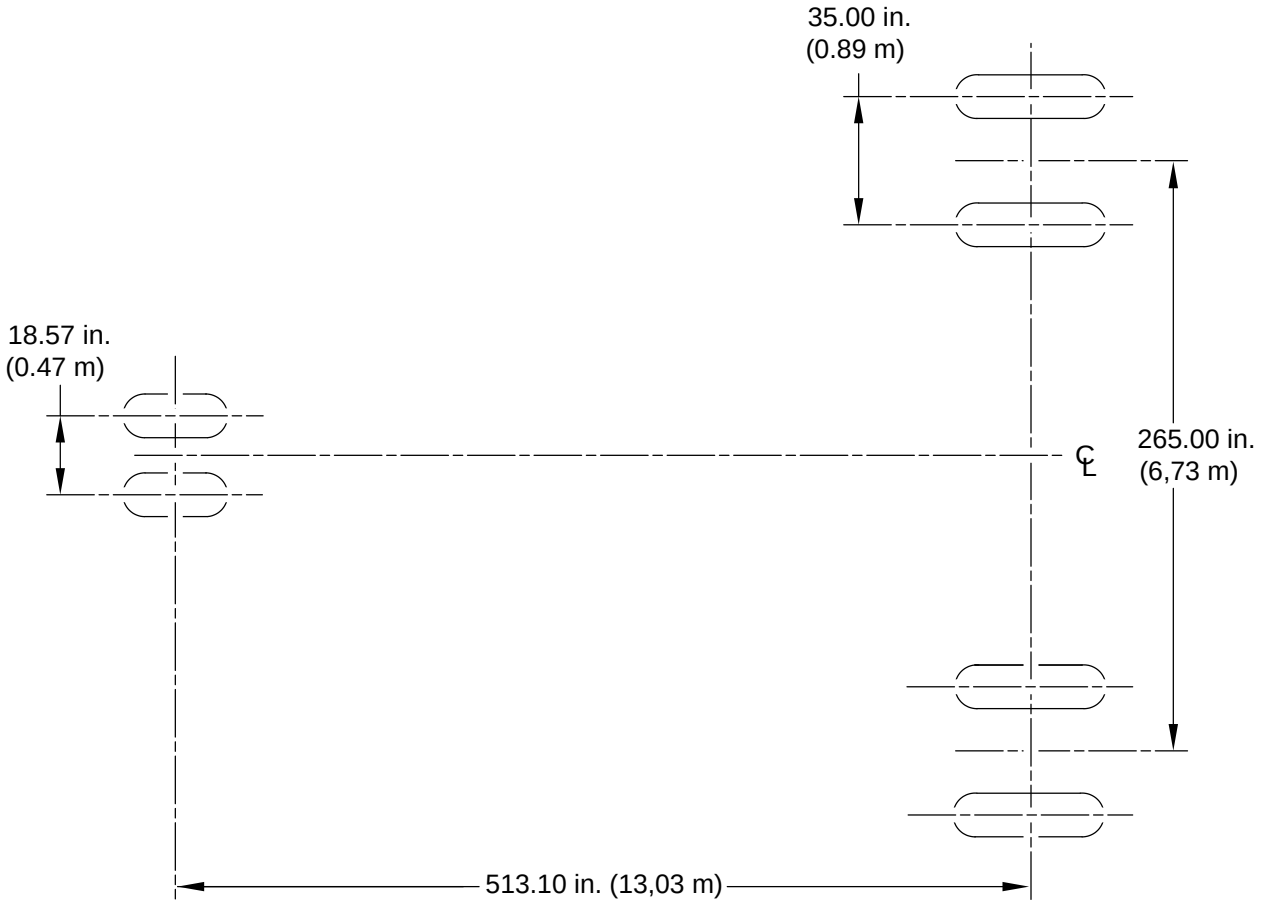
Figure 8 Rigid pavement required thickness

6 Landing gear footprint

Refer to Fig. 9 for the landing gear footprint.

Table 10 Landing gear footprint

Aircraft (A/C) code	A-B-C-D-E-F-G-H-I-J-K-L-M-N
Percentage of weight on main gear group	Refer to section 4
Nose gear tire size	27 x 8.5 R12 16 PR
Nose gear tire pressure	146 PSIG (10 Bar)
Main gear tire size	H42 x 15.0 R21 26 PR
Main gear tire pressure	189 PSIG (13.0 Bar)



NOTE

Not to scale.

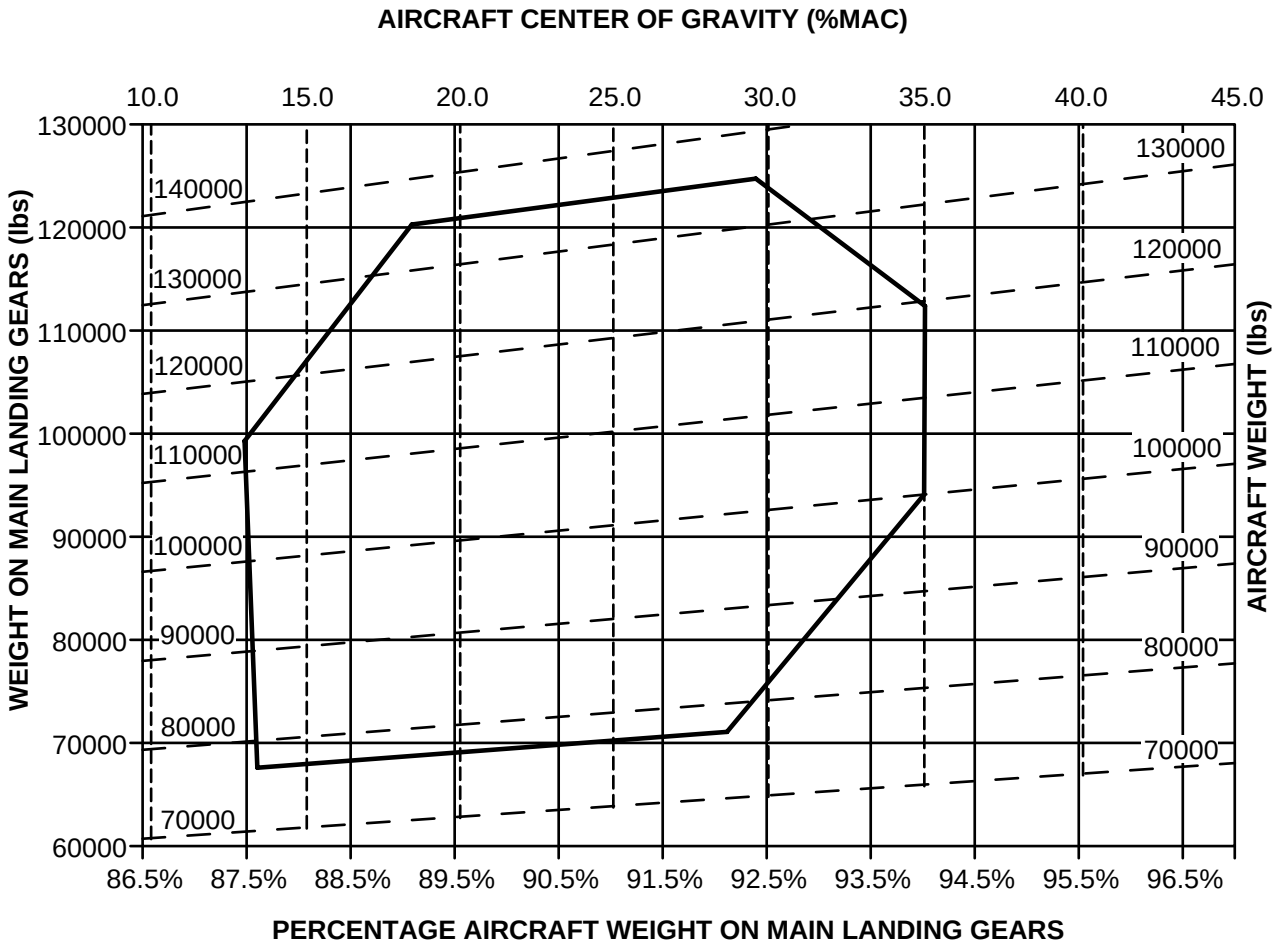
ICN-BD500-A-J000000-A-3AB48-21628-A-002-01

Figure 9 Landing gear footprint

7 Maximum pavement loads

The maximum pavement load is given at aircraft CG,weight on Main Landing Gear (MLG) and aircraft weight.

Refer to Fig. 10 for graphical format.



LEGEND

– – – – Aircraft center of gravity.

— — Aircraft weight.

——— A220-100 ground center of gravity envelope.

ICN-BD500-A-J000000-C-3AB48-58656-A-001-01

Figure 10 Maximum Pavement Load

A220

Derivative aircraft - Technical data

Applicability: Model: CS100

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List of tables

References

Table 1 References

Data Module/Technical Publication	Title
None	

Description

This section will be updated if new derivatives of the BD-500-1A10 (A220-100) model are manufactured.

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A220

Scaled drawings - Technical data

Applicability: Model: CS100

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References

Table 1 References

Data Module/Technical Publication	Title
None	

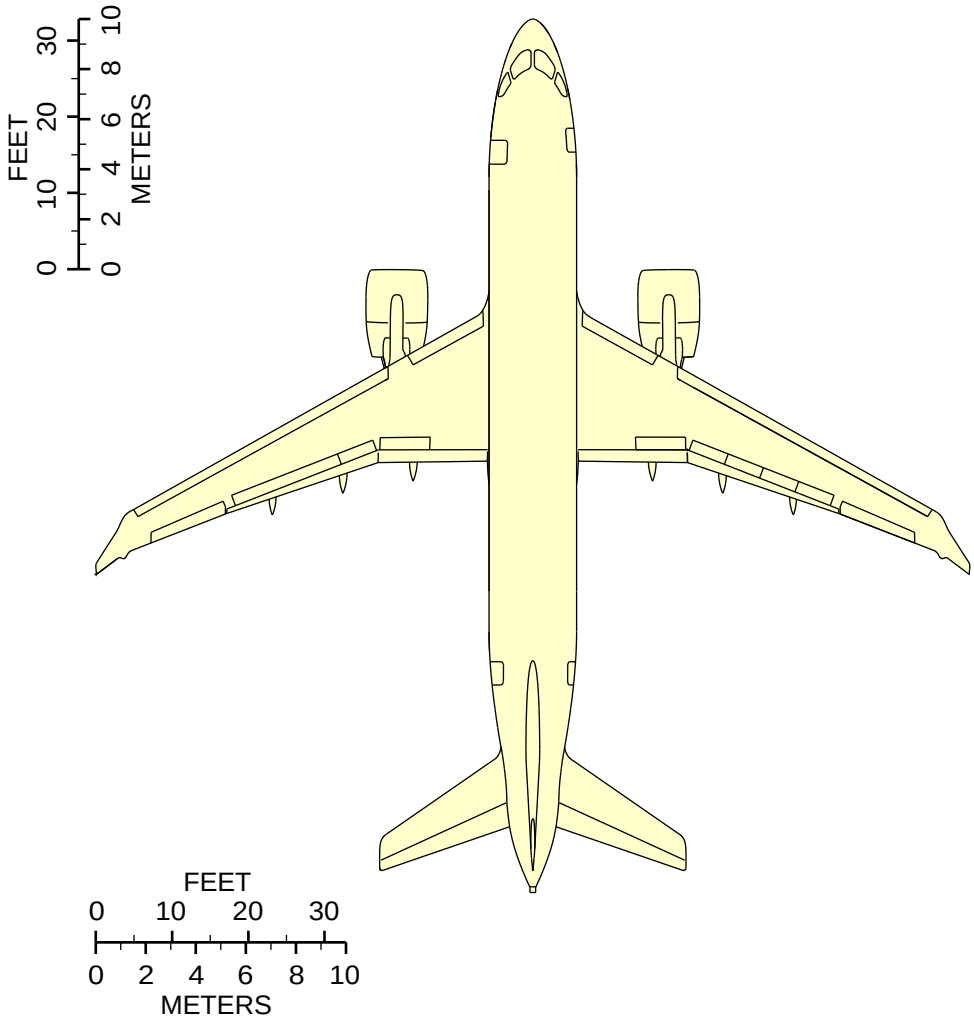
Description

1 Introduction

This data module contains the scaled drawings for the Airbus A220 BD500–1A10 (A220-100).

It can be used to plan and to verify runway, ramp, and maintenance facility layouts.

Refer to Fig. 1 for the scaled drawing.



NOTES

1. Scale: 1 in. = 25 ft (1 cm = 3 m)
2. When printing this illustration, make sure to adjust for proper scaling.

ICN-BD500-A-J000000-A-3AB48-23312-A-001-01

Figure 1 Scaled drawing