

EMBRAER 170

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AIRPORT PLANNING MANUAL

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APM - 1346
08 DECEMBER 2003
REVISION 25 - 23 JUNE 2023



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Revision Status: U - Unchanged, R - Revised, N - New, D - Deleted

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RECORD OF REVISIONS

This list is intended to show the Operator the cumulative issued revisions to his manual. The list consists of the revision number and the respective issuance date.

REV NO.	ISSUE DATE
1	Dec 08/03
2	Jun 18/04
3	Dec 18/04
4	Jul 01/05
5	Jan 09/06
6	Jun 29/06
7	Dec 18/06
8	May 11/07
9	Oct 22/07
10	Oct 07/08
11	Oct 07/10
12	Oct 06/11
13	Oct 31/12
14	Feb 18/13
15	Oct 07/13
16	Oct 07/14
17	Oct 09/15
18	May 25/18
19	Aug 09/19
20	Sep 27/19
21	May 22/20
22	Nov 26/21
23	May 27/22
24	May 30/22
25	Jun 23/23



HIGHLIGHTS

Content which have been added, revised or deleted by the current revision are indicated on the "Table of Contents".

**INTRODUCTION**1. Applicability*EFFECTIVITY: EMBRAER 170 SERIES ACFT*

The table below provides a cross-reference between the commercial and certification designations of the aircraft:

Table 1 - AIRCRAFT DESIGNATIONS

AIRCRAFT COMMERCIAL DESIGNATION	AIRCRAFT CERTIFICATION DESIGNATION
EMBRAER 170 STD	ERJ 170-100 STD
EMBRAER 170 SE	ERJ 170-100 SE
EMBRAER 170 SU	ERJ 170-100 SU
EMBRAER 170 LR	ERJ 170-100 LR
EMBRAER 170 AR	ERJ 170-100 AR

2. General

The APM has been prepared in accordance with NAS 3601.

It provides aircraft characteristics for general airport planning, airport operators, airlines, and engineering consultant organizations.

The APM is arranged as shown in the table below:

Table 2 - APM Arrangement

ARRANGEMENTS	CONTENTS
Manual Front Matter	Title Page
	Highlights
	Record of Revision Sheet
	Table of Contents
	Introduction
Section	Scope
	Aircraft Description
	Aircraft Performance
	Ground Maneuvering
	Terminal Servicing
	Operating Conditions
	Pavement Data
	Possible Derivative Aircraft
Scaled Drawings	

The front matter for the whole manual contains:

- Title Page: Shows the manufacturer's masthead, identification of the manual, initial issue date, and revision number and date.
- Highlights: Advises the operator on the revised pages.



- Record of Revisions Sheet: Lists the successive revision numbers, issue date, insertion date and incorporators initials, which must be kept current by the operator.
- Table of Contents: Lists content with the latest issue dates and provides information to let the reader to quickly and accurately locate the material sought.
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A. Revisions

Embraer may revise this manual periodically as required to update information or provide information not available at the time of printing.

Revised data may result from Embraer approved aircraft modifications and new available options. Changes to the text are indicated by a black bar in the page left-side margin beside the revised, added, or deleted material.

Relocated or rearranged text or illustrations will be indicated by a black bar beside the page number.

3. Abbreviations

This list gives all the abbreviations, acronyms and measurement units used in this manual with their definitions.

Table 3 - List of Acronyms and Abbreviations used in the APM

ACRONYMS AND ABBREVIATIONS	DESCRIPTION
°C	Degree Celsius
°F	Degree Fahrenheit
ℓ	Liter
ACN	Aircraft Classification Number
AFM	Airplane Flight Manual
AOM	Airplane Operations Manual
APU	Auxiliary Power Unit
ATTCS	Automatic Takeoff-Thrust Control-System
BOW	Basic Operating Weight
CBR	California Bearing Ratio
dBA	A-Weighted Decibel



(Continued)

Table 3 - List of Acronyms and Abbreviations used in the APM

ACRONYMS AND ABBREVIATIONS	DESCRIPTION
ECS	Environmental Control System
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
ft	Foot
ft ²	Square Foot
ft ³	Cubic Foot
FWD	Forward
gal.	Gallon
GEAE	General Electric Aircraft Engines
ICAO	International Civil Aviation Organization
in	Inch
in ²	Square Inch
inHg	Inch of Mercury
ISA	International Standard Atmosphere
JAR	Joint Aviation Requirements
kg	Kilogram
kPa	Kilopascal
lb	Pound
lb/in ³	Pound per Cubic Inch
lbf	Pound Force
LCN	Load Classification Number
LH	Left-Hand
LR	Long Range
m	Meter
m ²	Square Meter
m ³	Cubic Meter
min	Minute
MLW	Maximum Landing Weight
MRW	Maximum Ramp Weight
MTOW	Maximum Takeoff Weight
MZFW	Maximum Zero Fuel Weight
N	Newton
psi	Pounds per Square Inch
RBHA	Requisitos Brasileiros de Homologação Aeronáutica
RH	Right-Hand
STD	Standard

**1. SCOPE**

EFFECTIVITY: ALL

1.1. PURPOSE

This document provides airplane characteristics for general airport planning. Since the operational practices vary among the airlines, specific data should be coordinated with the using airlines before the facility design is made.

EMBRAER should be contacted for any additional information required.



2. AIRCRAFT DESCRIPTION

EFFECTIVITY: ALL

2.1. AIRCRAFT CHARACTERISTICS

The aircraft is:

- Predominantly metallic;
- Low winged;
- Conventional tailed;
- Monoplane;
- Retractable tricycle-type with twin-wheeled landing-gear.

There are two high bypass ratio turbofan GEAE CF34–8E with 63.2 kN (14200 lbf) maximum takeoff thrust (sea level, static and ISA + 15 °C) installed under the wings.

The aircraft has two versions, with different ranges as a function of the difference between the MTOWs:

- The STD aircraft model - MTOW 35990 kg (79344 lb)
- The LR, SU or SE aircraft models - MTOW 37200 kg (82012 lb)

2.1.1. Definitions**MRW**

It is the maximum allowed aircraft weight for taxiing or maneuvering on the ground.

MLW

It is the maximum allowed weight with which the aircraft can normally be landed.

MTOW

It is the maximum allowed total loaded aircraft weight at the start of the takeoff run.

BOW

It is the weight of the structure, powerplant, instruments, flight controls, hydraulic, electronic, electrical, air conditioning, oxygen, anti-icing and pressurization systems, interior furnishings, portable and emergency equipment and other items of equipment that are an integral part of the aircraft configuration. It also includes unusable fuel, total engine and APU oil, total hydraulic fluid, toilet fluid and water, potable water, crew and crew baggage, navigation kit (manuals, charts), catering (beverages and food) and removable service equipment for the galley.

MZFW

It is the maximum allowed weight without usable fuel in the tanks.

Maximum Payload

It is the difference between the MZFW and the BOW.

Maximum Seating Capacity

It is the maximum number of passengers specifically certified or anticipated for certification.

**Maximum Cargo Volume**

It is the maximum space available for cargo.

Usable Fuel

Fuel available for the aircraft propulsion.

Table 2.1 - Aircraft General Characteristics

Effectivity: ON ACFT 170:00001-00006 00030-00044 00048-00058 00060-00065 OR PRE-MOD SB 170-53-0080

DESIGN WEIGHTS ^[1]	AIRCRAFT MODELS	
	STD	LR, SU or SE
MRW	36150 kg (79697 lb)	37360 kg (82365 lb)
MTOW	35990 kg (79344 lb)	37200 kg (82012 lb)
MLW	32800 kg (72311 lb)	
BOW ^[2]	20700 kg (45636 lb)	
MZFW	29600 kg (65257 lb)	
Maximum Payload ^[2]	9100 kg (20062 lb)	
MOW - Minimum Operating Weight	21800 kg (48060 lb)	
Maximum Seating Capacity	78 passengers	70 passengers (SE) 76 passengers (SU) 78 passengers (LR)
Maximum Cargo Volume ^[3]	14.39 m ³ (508.18 ft ³)	
Usable Fuel ^[4]	9428 kg (20785 lb)	
	11625 ℓ (3071 gal.)	

[1] Applicable for standard models. For further information, refer to AFM and AOM.

[2] Standard configuration (weights may vary according to optional equipment installed or interior layouts).

[3] Standard configuration (volume may vary according to optional equipment installed).

[4] Adopted fuel density of 0.811 kg/ℓ (6.77 lb/gal.).

Table 2.2 - Aircraft General Characteristics

Effectivity: ON ACFT 170:00008-00011 00030-00044 00048-99999 OR POST-MOD SB 170-53-0080

DESIGN WEIGHTS ^[1]	AIRCRAFT MODELS	
	STD	LR, SU or SE
MRW	36150 kg (79697 lb)	37360 kg (82365 lb)
MTOW	35990 kg (79344 lb)	37200 kg (82012 lb)

[1] Applicable for standard models. For further information, refer to AFM and AOM.

[2] Standard configuration (weights may vary according to optional equipment installed or interior layouts).

[4] Adopted fuel density of 0.811 kg/ℓ (6.77 lb/gal.).



Table 2.2 - Aircraft General Characteristics (Continued)

Effectivity: ON ACFT 170:00008-00011 00030-00044 00048-99999 OR POST-MOD SB 170-53-0080

DESIGN WEIGHTS ^[1]	AIRCRAFT MODELS	
	STD	LR, SU or SE
MLW ^[5]	32800 kg (72311 lb)	
BOW ^[2]	20700 kg (45636 lb)	
MZFW	30140 kg (66447 lb)	
Maximum Payload ^[2]	9640 kg (21252 lb)	
MOW - Minimum Operating Weight	21800 kg (48060 lb)	
Maximum Seating Capacity	78 passengers	70 passengers (SE) 76 passengers (SU) 78 passengers (LR)
Maximum Cargo Volume ^[3]	14.39 m ³ (508.18 ft ³)	
Usable Fuel ^[4]	9428 kg (20785 lb)	
	11625 ℓ (3071 gal.)	

[1] Applicable for standard models. For further information, refer to AFM and AOM.
 [2] Standard configuration (weights may vary according to optional equipment installed or interior layouts).
 [3] Standard configuration (volume may vary according to optional equipment installed).
 [4] Adopted fuel density of 0.811 kg/ℓ (6.77 lb/gal.).
 [5] For aircraft POST-MOD. S.B. 170-00-0003, consider MLW = 33300 kg (73414 lb).

2.2. GENERAL AIRCRAFT DIMENSIONS

2.2.1. External Dimensions

- Span over winglets - 26.00 m (85 ft 4 in.)
- Height (maximum) - 9.85 m (32 ft 3 in.)
- Overall length - 29.90 m (98 ft 1 in.)

2.2.2. Wing

- Reference area - 72.72 m² (783 ft²)
- Reference aspect ratio - 8.6

2.2.3. Fuselage

- Total Length - 29.90 m (98 ft 1 in.)
- Length of pressurized section - 22.74 m (74 ft 7 in.)

2.2.4. Horizontal Tail

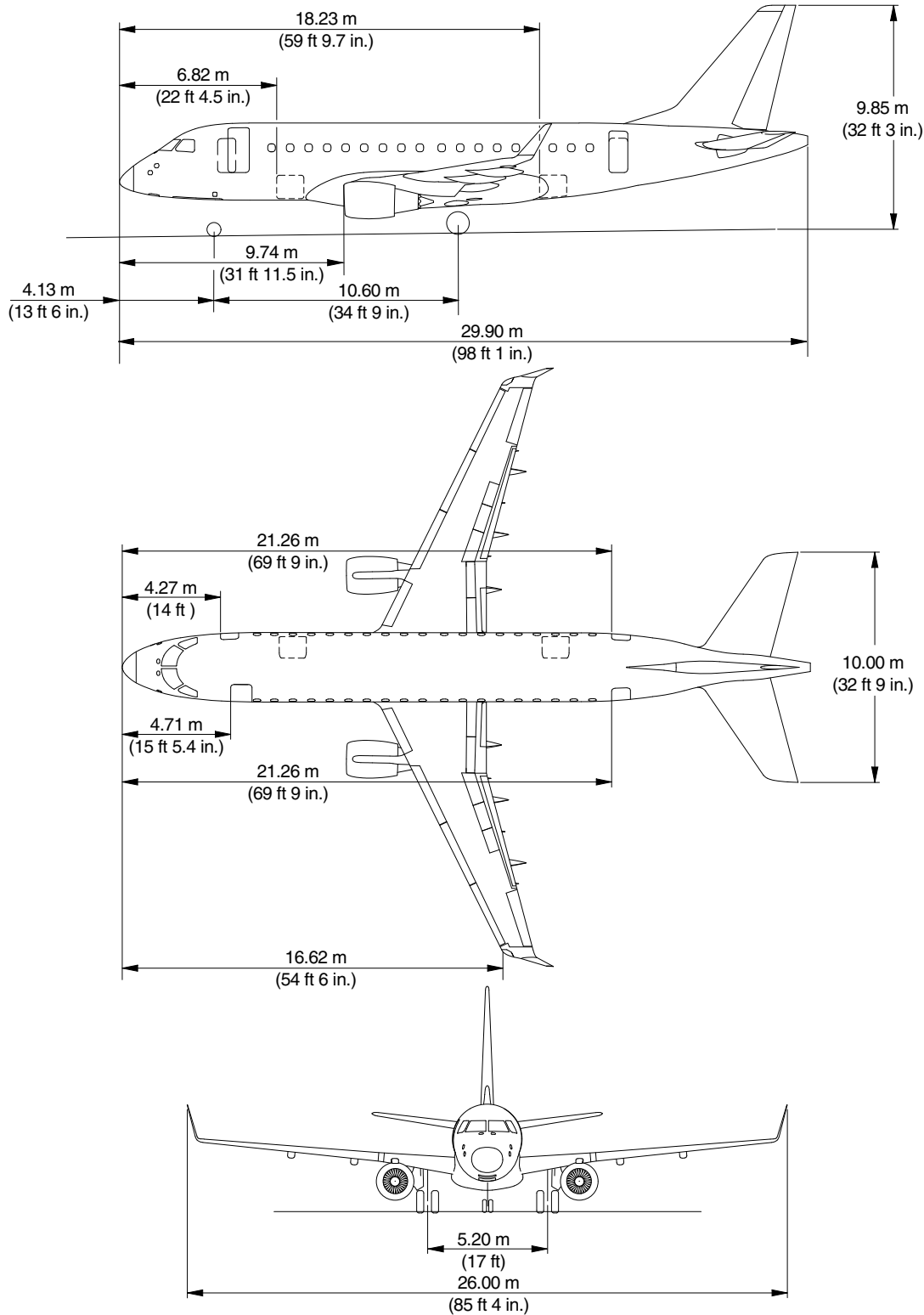
- Span - 10.00 m (32 ft 9 in)
- Area - 23.25 m² (250 ft² 37 in²)

2.2.5. Vertical Tail

- Reference area - 16.20 m² (174 ft² 55 in²)



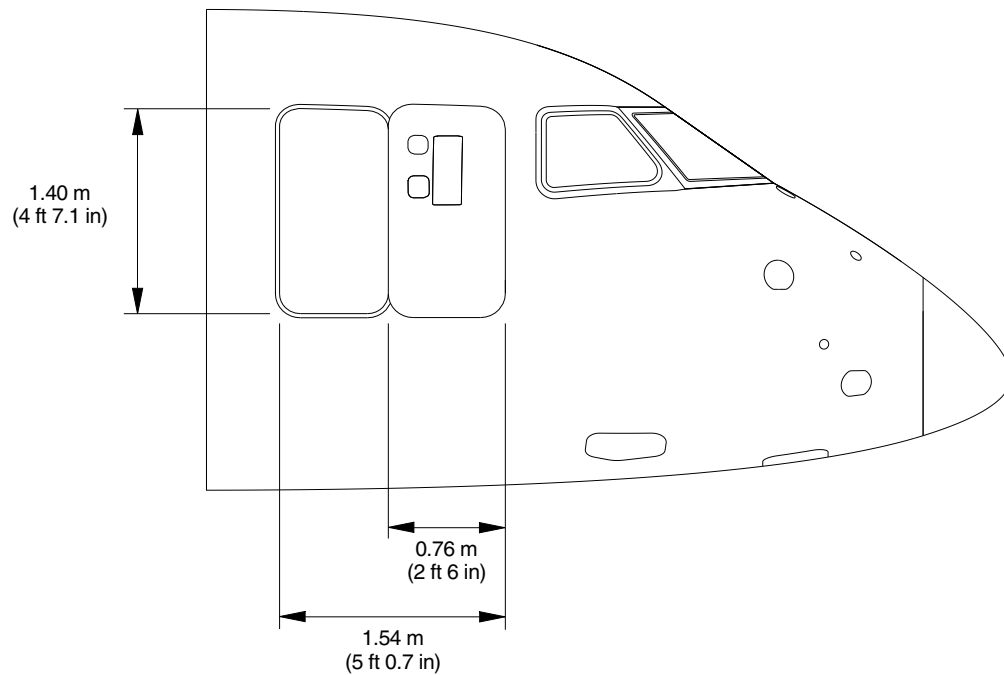
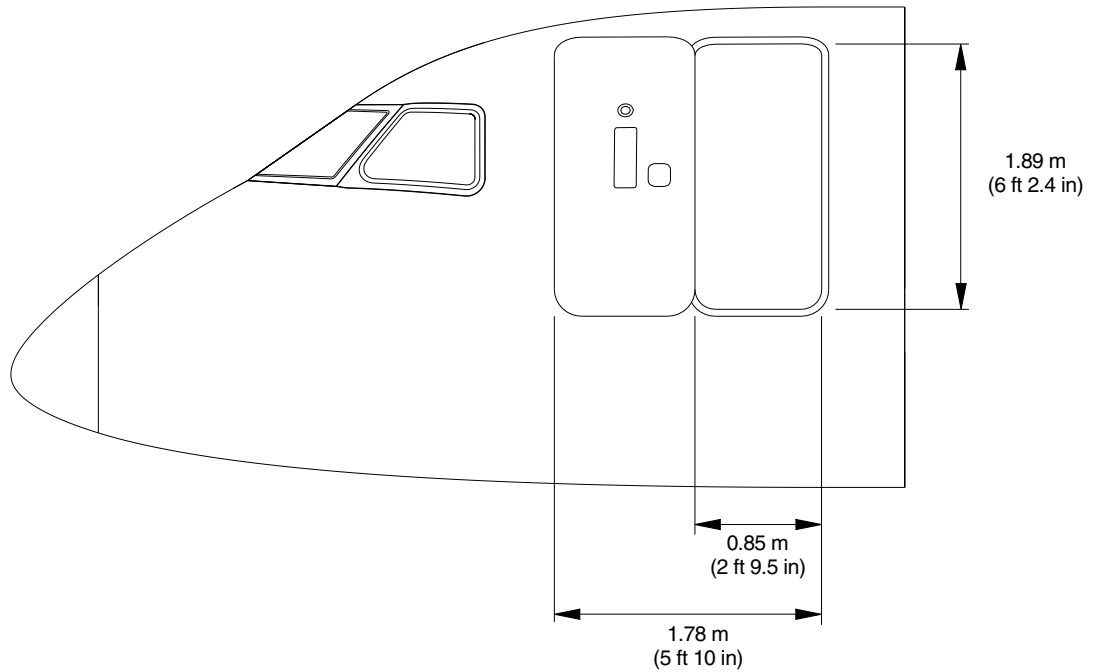
EFFECTIVITY: ALL
General Aircraft Dimensions
Figure 2.1



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EFFECTIVITY: ALL
Passenger and Service Doors Dimensions
Figure 2.2 - Sheet 1



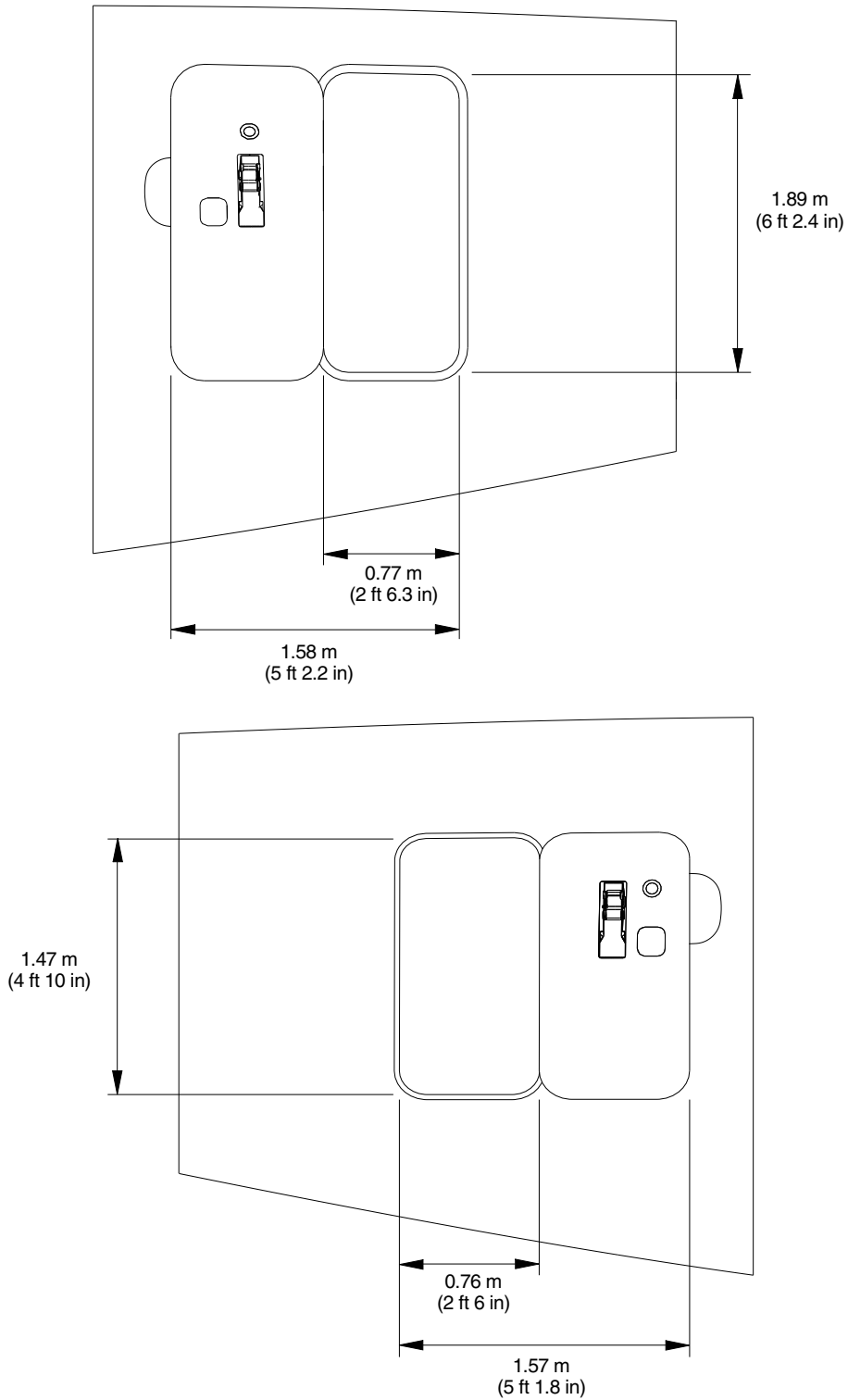
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EFFECTIVITY: ALL

Passenger and Service Doors Dimensions

Figure 2.2 - Sheet 2



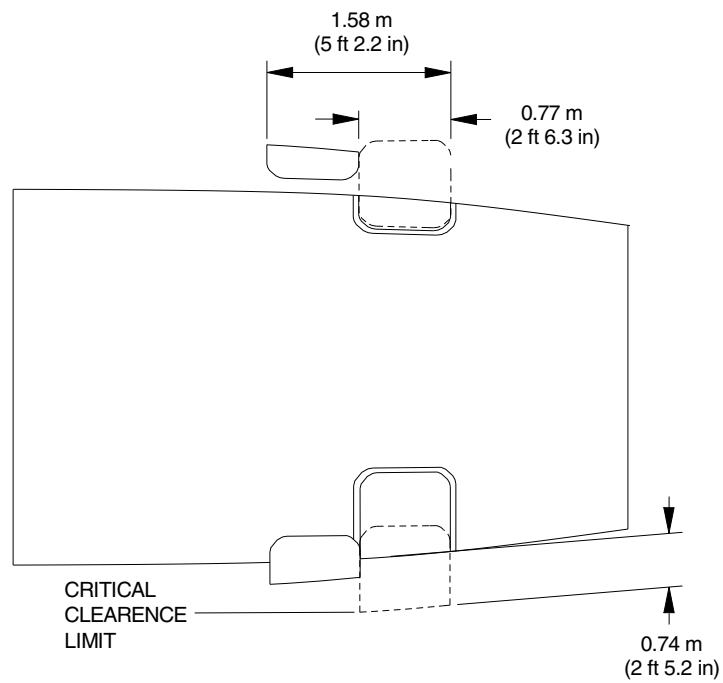
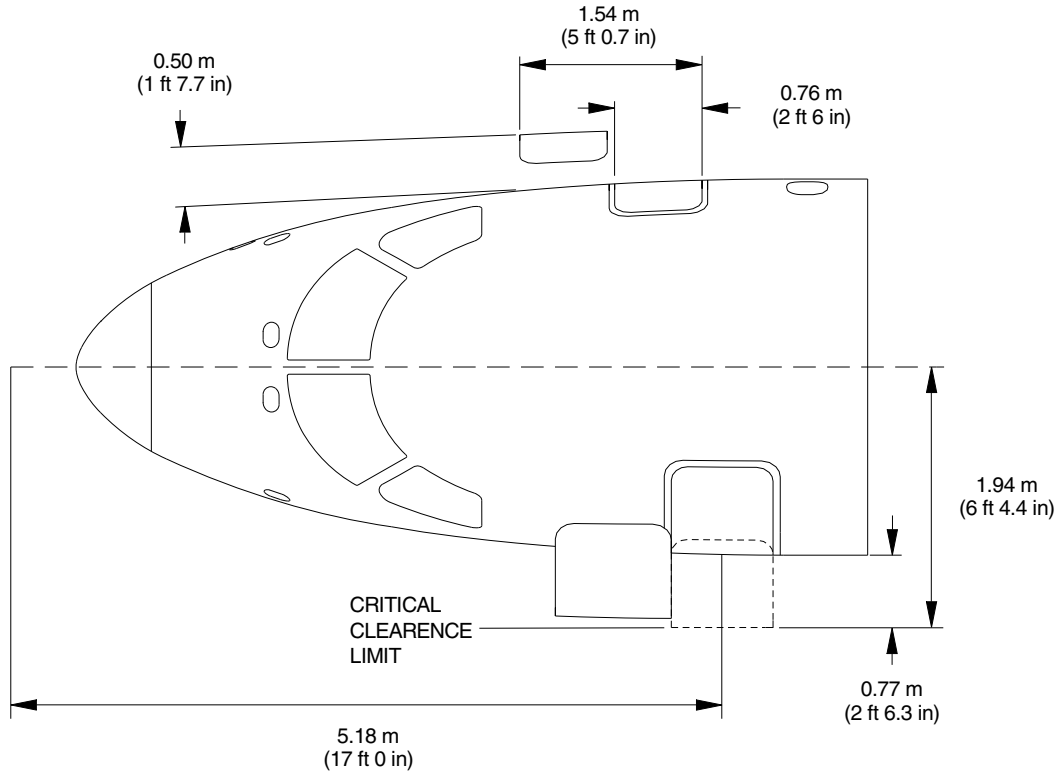
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EFFECTIVITY: ALL

Passenger and Service Doors Dimensions

Figure 2.2 - Sheet 3



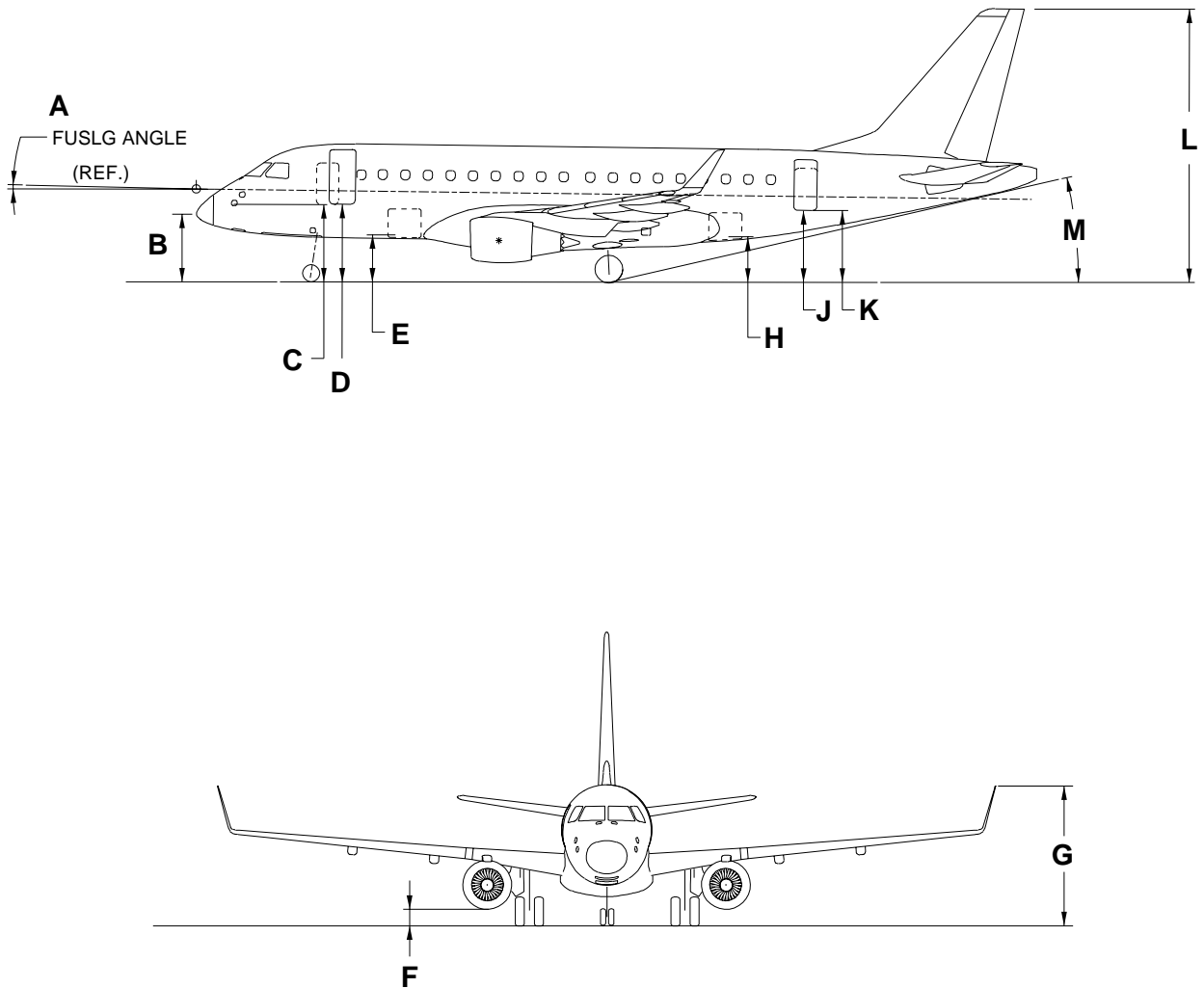
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2.3. **GROUND CLEARANCES**



EFFECTIVITY: ALL
Ground Clearances
Figure 2.3



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Table 2.3 - Ground Clearance - STD Aircraft Model

WEIGHT	CG (%MAC)	FUS ANGLE (DEG) (A)	NOSE (B)	FORWARD SERVICE DOOR (C)	FORWARD PASSENGER DOOR (D)	FORWARD CARGO DOOR (E)	NACELLE (F)	WINGLETT (G)	AFT CARGO DOOR (H)	AFT SERVICE DOOR (J)	AFT PASSENGER DOOR (K)	VERTICAL TAIL (L)	TAIL SKID ANGLE CLEARANCE (DEG) (M)
36150 kg 79697 lb	10	0.3	2.13 m 7 ft	2.54 m 8 ft 4 in.	2.54 m 8 ft 4 in.	1.47 m 4 ft 10 in.	0.48 m 1 ft 6 in.	4.50 m 14 ft 9 in.	1.48 m 4 ft 10 in.	2.45 m 8 ft	2.45 m 8 ft	9.65 m 31 ft 8 in.	12.6
36150 kg 79697 lb	27	0.6	2.20 m 7 ft 2 in.	2.58 m 8 ft 5 in.	2.58 m 8 ft 5 in.	1.49 m 4 ft 11 in.	0.49 m 1 ft 7 in.	4.47 m 14 ft 8 in.	1.45 m 4 ft 9 in.	2.41 m 7 ft 10 in.	2.41 m 7 ft 10 in.	9.57 m 31 ft 5 in.	12.3
35990 kg 79344 lb	9.8	0.3	2.13 m 7 ft	2.54 m 8 ft 4 in.	2.54 m 8 ft 4 in.	1.47 m 4 ft 10 in.	0.48 m 1 ft 6 in.	4.50 m 14 ft 9 in.	1.48 m 4 ft 10 in.	2.45 m 8 ft	2.45 m 8 ft	9.65 m 31 ft 8 in.	12.7
35990 kg 79344 lb	27	0.6	2.20 m 7 ft 2 in.	2.58 m 8 ft 5 in.	2.58 m 8 ft 5 in.	1.49 m 4 ft 11 in.	0.49 m 1 ft 7 in.	4.47 m 14 ft 8 in.	1.45 m 4 ft 9 in.	2.41 m 7 ft 10 in.	2.41 m 7 ft 10 in.	9.57 m 31 ft 5 in.	12.3
32800 kg 72311 lb	7	0.2	2.13 m 7 ft	2.55 m 8 ft 4 in.	2.54 m 8 ft 4 in.	1.48 m 4 ft 11 in.	0.49 m 1 ft 7 in.	4.53 m 14 ft 10 in.	1.50 m 4 ft 11 in.	2.48 m 8 ft 2 in.	2.48 m 8 ft 2 in.	9.69 m 31 ft 9 in.	12.8
32800 kg 72311 lb	27	0.6	2.20 m 7 ft 2 in.	2.59 m 8 ft 6 in.	2.59 m 8 ft 6 in.	1.50 m 4 ft 11 in.	0.50 m 1 ft 6 in.	4.49 m 14 ft 9 in.	1.47 m 4 ft 10 in.	2.43 m 8 ft	2.43 m 8 ft	9.60 m 31 ft 6 in.	12.4
29600 kg 65257 lb	7	0.2	2.13 m 7 ft	2.55 m 8 ft 4 in.	2.55 m 8 ft 4 in.	1.49 m 4 ft 11 in.	0.51 m 1 ft 8 in.	4.55 m 14 ft 11 in.	1.52 m 4 ft 11 in.	2.50 m 8 ft 2 in.	2.50 m 8 ft 2 in.	9.72 m 31 ft 10 in.	12.9
29600 kg 65257 lb	27	0.5	2.21 m 7 ft 3 in.	2.60 m 8 ft 6 in.	2.60 m 8 ft 6 in.	1.52 m 4 ft 11 in.	0.52 m 1 ft 8 in.	4.51 m 14 ft 9 in.	1.49 m 4 ft 10 in.	2.45 m 8 ft 1 in.	2.45 m 8 ft 1 in.	9.62 m 31 ft 7 in.	12.5
21800 kg 48061 lb	7	0	2.15 m 7 ft 1 in.	2.58 m 8 ft 6 in.	2.58 m 8 ft 6 in.	1.52 m 4 ft 11 in.	0.56 m 1 ft 10 in.	4.62 m 15 ft 2 in.	1.60 m 5 ft 3 in.	2.59 m 8 ft 6 in.	2.59 m 8 ft 6 in.	9.83 m 32 ft 3 in.	13.4
21800 kg 48061 lb	27	0.4	2.24 m 7 ft 5 in.	2.64 m 8 ft 8 in.	2.63 m 8 ft 7 in.	1.56 m 5 ft 1 in.	0.57 m 1 ft 10 in.	4.58 m 15 ft	1.55 m 5 ft 1 in.	2.52 m 8 ft 3 in.	2.52 m 8 ft 3 in.	9.71 m 31 ft 10 in.	12.9



Table 2.4 - Ground Clearance - LR, SU or SE Aircraft Models

WEIGHT	CG (%MAC)	FUS ANGLE (DEG) (A)	NOSE (B)	FORWARD SERVICE DOOR (C)	FORWARD PASSENGER DOOR (D)	FORWARD CARGO DOOR (E)	NACELLE (F)	WINGLET (G)	AFT CARGO DOOR (H)	AFT SERVICE DOOR (J)	AFT PASSENGER DOOR (K)	VERTICAL TAIL (L)	TAIL SKID ANGLE CLEARANCE (DEG) (M)
37360 kg 82365 lb	11.8	0.4	2.14 m 7 ft	2.54 m 8 ft 4 in	2.54 m 8 ft 4 in	1.47 m 4 ft 10 in	0.48 m 1 ft 6 in	4.49 m 14 ft 10 in	1.47 m 4 ft 10 in	2.44 m 8 ft	2.44 m 8 ft	9.63 m 31 ft 7 in	12.6
37360 kg 82362 lb	27	0.6	2.19 m 7 ft 2 in.	2.58 m 8 ft 5 in.	2.57 m 8 ft 5 in.	1.49 m 4 ft 11 in.	0.48 m 1 ft 6 in.	4.47 m 14 ft 8 in.	1.44 m 4 ft 9 in.	2.40 m 7 ft 10 in.	2.40 m 7 ft 10 in.	9.56 m 31 ft 4 in.	12.3
37200 kg 82011 lb	11.8	0.4	2.14 m 7 ft	2.54 m 8 ft 4 in.	2.54 m 8 ft 4 in.	1.47 m 4 ft 10 in.	0.48 m 1 ft 6 in.	4.49 m 14 ft 10 in.	1.47 m 4 ft 10 in.	2.44 m 8 ft	2.44 m 8 ft	9.64 m 31 ft 8 in.	12.6
37200 kg 82011 lb	27	0.6	2.19 m 7 ft 2 in.	2.58 m 8 ft 5 in.	2.57 m 8 ft 5 in.	1.49 m 4 ft 11 in.	0.48 m 1 ft 6 in.	4.47 m 14 ft 8 in.	1.44 m 4 ft 9 in.	2.40 m 7 ft 10 in.	2.40 m 7 ft 10 in.	9.56 m 31 ft 4 in.	12.3
32800 kg 72311 lb	7	0.2	2.13 m 7 ft	2.55 m 8 ft 4 in.	2.54 m 8 ft 4 in.	1.48 m 4 ft 11 in.	0.49 m 1 ft 7 in.	4.53 m 14 ft 10 in.	1.50 m 4 ft 11 in.	2.48 m 8 ft 2 in.	2.48 m 8 ft 2 in.	9.69 m 31 ft 9 in.	12.8
32800 kg 72311 lb	27	0.6	2.20 m 7 ft 2 in.	2.59 m 8 ft 6 in.	2.59 m 8 ft 6 in.	1.50 m 4 ft 11 in.	0.50 m 1 ft 6 in.	4.49 m 14 ft 9 in.	1.47 m 4 ft 10 in.	2.43 m 8 ft	2.43 m 8 ft	9.60 m 31 ft 6 in.	12.4
29600 kg 65257 lb	7	0.2	2.13 m 7 ft	2.55 m 8 ft 4 in.	2.55 m 8 ft 4 in.	1.49 m 4 ft 11 in.	0.51 m 1 ft 8 in.	4.55 m 14 ft 11 in.	1.52 m 4 ft 11 in.	2.50 m 8 ft 2 in.	2.50 m 8 ft 2 in.	9.72 m 31 ft 10 in.	12.9
29600 kg 65257 lb	27	0.5	2.21 m 7 ft 3 in.	2.60 m 8 ft 6 in.	2.60 m 8 ft 6 in.	1.52 m 4 ft 11 in.	0.52 m 1 ft 8 in.	4.51 m 14 ft 9 in.	1.49 m 4 ft 10 in.	2.45 m 8 ft 1 in.	2.45 m 8 ft 1 in.	9.62 m 31 ft 7 in.	12.5
21800 kg 48061 lb	7	0	2.15 m 7 ft 1 in.	2.58 m 8 ft 6 in.	2.58 m 8 ft 6 in.	1.52 m 4 ft 11 in.	0.56 m 1 ft 10 in.	4.62 m 15 ft 2 in.	1.60 m 5 ft 3 in.	2.59 m 8 ft 6 in.	2.59 m 8 ft 6 in.	9.83 m 32 ft 3 in.	13.4
21800 kg 48061 lb	27	0.4	2.24 m 7 ft 5 in.	2.64 m 8 ft 8 in.	2.63 m 8 ft 7 in.	1.56 m 5 ft 1 in.	0.57 m 1 ft 10 in.	4.58 m 15 ft	1.55 m 5 ft 1 in.	2.52 m 8 ft 3 in.	2.52 m 8 ft 3 in.	9.71 m 31 ft 10 in.	12.9



2.4. **INTERIOR ARRANGEMENT**

The interior arrangement provides accommodation for two pilots, one observer, two flight attendants, and 70 passengers in 32 in pitch standard configuration. One additional flight attendant seat is available as an option.

2.4.1. Passenger Cabin

The passenger cabin accommodates 70 passengers in 17 double seats on the LH side, and 18 double seats on the RH side.

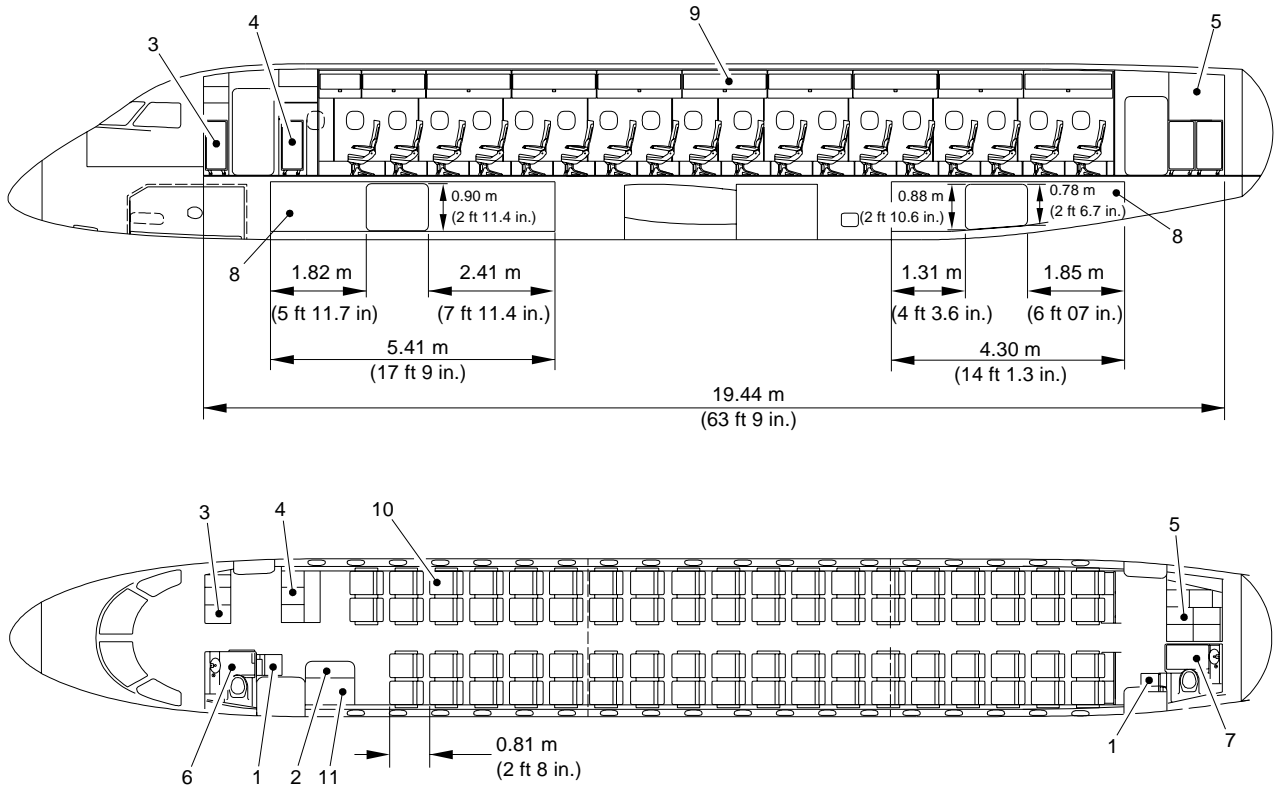
As an option, the passenger cabin can be provided with double first-class seats on the RH side and single first-class seats on the LH side.

The main dimensions of the passenger cabin are presented below:

- Height - 2.00 m (6 ft 7 in.)
- Width - 2.74 m (9 ft)
- Aisle width - 0.49 m (1 ft 7 in.)
- Pitch - 0.82 m (32 in.)



EFFECTIVITY: ALL
Typical Interior Arrangements
Figure 2.4



- | | |
|---------------------------|-----------------------|
| 1 – FLIGHT ATTENDANT SEAT | 7 – AFT LAVATORY |
| 2 – WARDROBE | 8 – CARGO COMPARTMENT |
| 3 – FWD RH G1 GALLEY | 9 – OVERHEAD BIN |
| 4 – FWD RH G2 GALLEY | 10 – PASSENGER SEAT |
| 5 – AFT RH GALLEY | 11 – AIRSTAIR STOWAGE |
| 6 – FWD LAVATORY | |

CARGO/BAGGAGE VOLUME	
CARGO COMPARTMENT	14.39 m ³ (508.18 ft ³)
OVERHEAD BIN	0.06 m ³ /pax (2.0 ft ³ /pax)
UNDERSEAT VOLUME	0.04 m ³ /pax (1.4 ft ³ /pax)

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2.4.2. Cargo Compartments

Two cargo compartments located underfloor are available, one forward of the wing, and the other aft of the wing.

The cargo compartments comply with the FAR-25/JAR-25/RBHA-25 "class C" compartment classification.

The table below contains the capacity of the cargo compartment:

Table 2.5 - Capacity of the Cargo Compartment

CARGO COMPARTMENT	LOADING	VOLUME
FWD ^[1]	1370 kg (3020 lb)	7.90 m ³ (279.00 ft ³)
AFT	1030 kg (2270 lb)	5.10 m ³ (180.10 ft ³)
Total	2400 kg (5290 lb)	13.00 m ³ (459.10 ft ³)

[1] Standard configuration (loading and volume may vary according to optional equipment installed).

The cargo compartments are provided with the following features:

- Optional vertical nets;
- Door net at each cargo door.

2.4.3. Cockpit

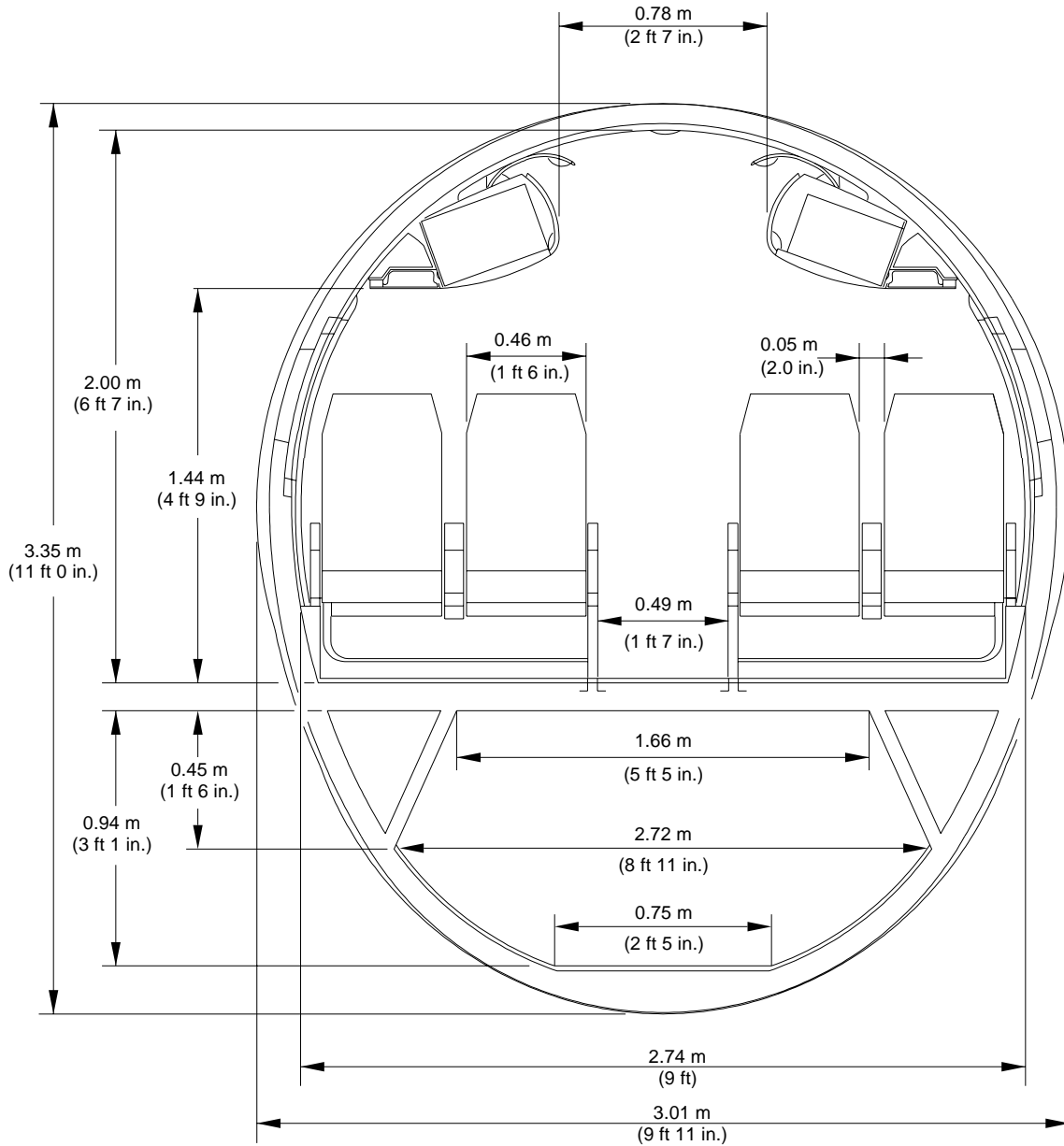
The cockpit is acoustically and thermally insulated for appearance and durability. It follows the worldwide trend of rounded edges to avoid harm to the flight crew.

The cockpit is separated from the passenger cabin by a bulkhead provided with a lockable door. The cockpit door has a locking system, which can only be opened from the cockpit side, a peep hole and an escape mechanism on the cockpit side.

2.5. **PASSENGER CABIN CROSS SECTION**



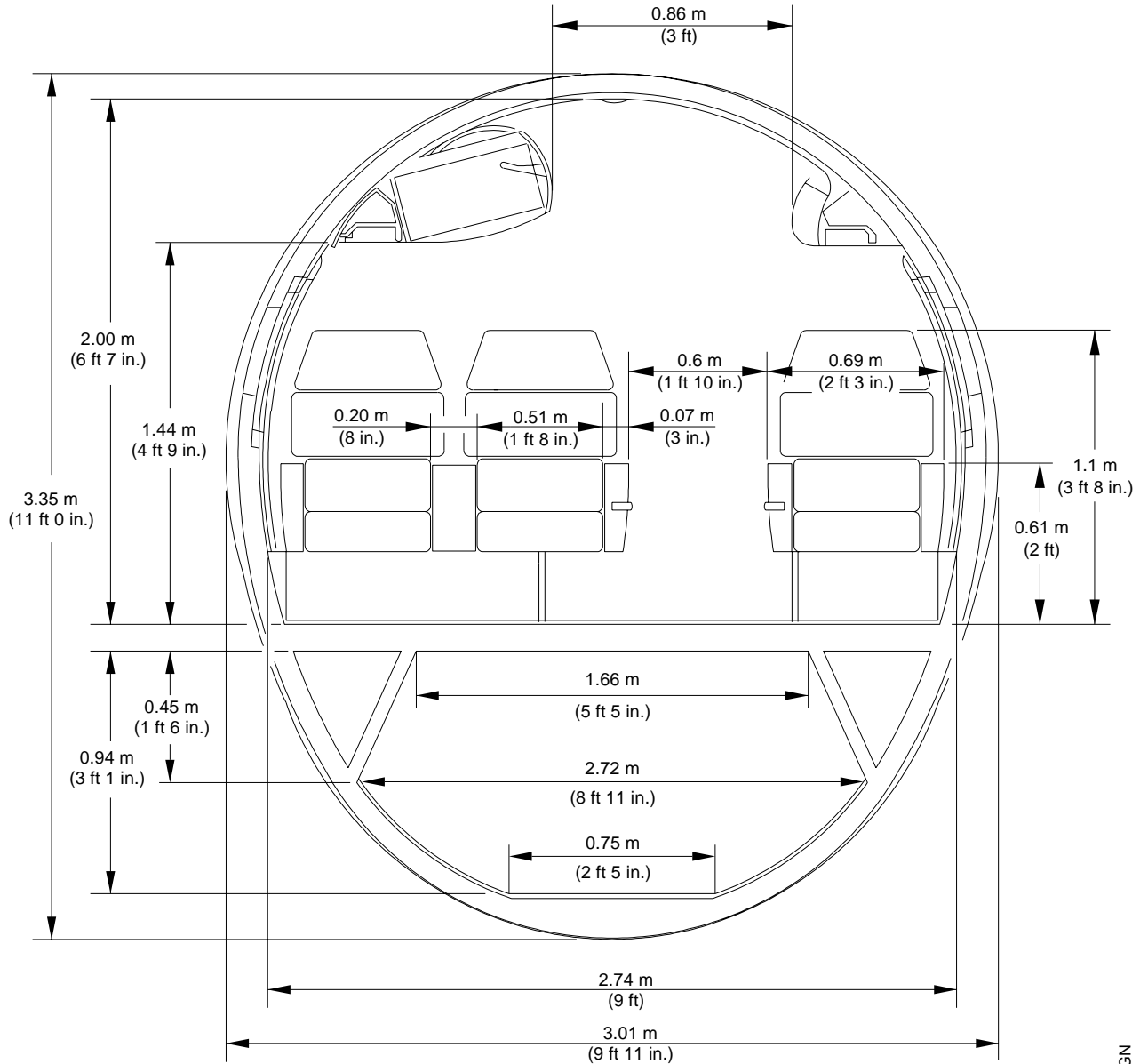
EFFECTIVITY: ALL
Economy Class Passenger Cabin Cross-Section
Figure 2.5



EM170APM020001A.DGN



EFFECTIVITY: ALL
First Class Passenger Cabin Cross-Section
Figure 2.6



EM170APM020002A.DGN



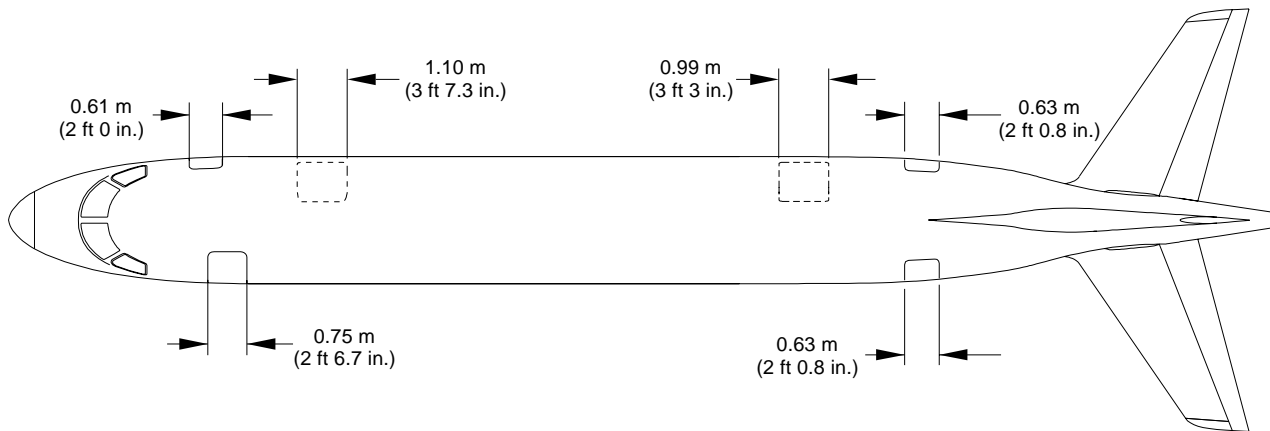
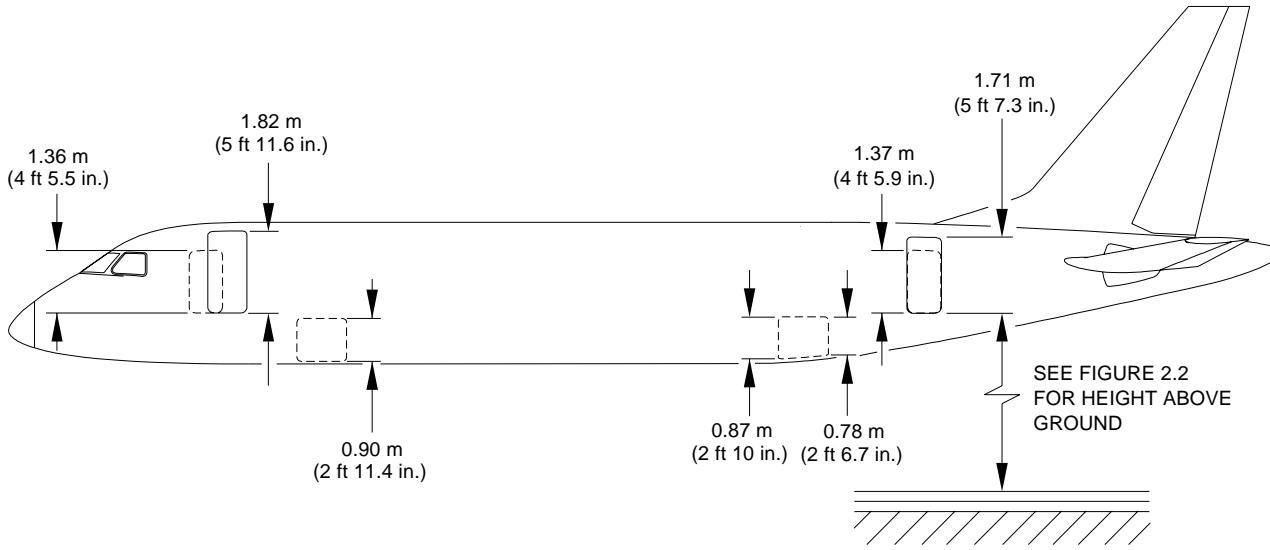
2.6. **LOWER COMPARTMENT CONTAINERS**

Not applicable

2.7. **DOOR CLEARANCES**



EFFECTIVITY: ALL
Door Dimensions
Figure 2.7



NOTE: FOR DIMENSIONS OF ALL DOORS, CONSIDER THAT AIRCRAFT IS IN OPERATION, THAT IS, EQUIPPED WITH DOOR LININGS AND DOOR SURROUNDS.

EM170APM020008C.DGN

**3. AIRCRAFT PERFORMANCE***EFFECTIVITY: ALL***3.1. GENERAL INFORMATION**

The performance of the aircraft and engine depends on the generation of forces by the interaction between the aircraft or engine, and the air mass through which it flies. The atmosphere has a pronounced effect on the temperature, pressure and density of the air.

The ICAO establishes standard basics for estimating and comparing aircraft and engine performance. Some ICAO standard basics are shown below:

1. Sea level standard day:
 Standard Temperature $T_0 = 15\text{ }^\circ\text{C}$ (288.15 K)
 Standard Pressure $P_0 = 101.3\text{ kPa}$ (29.92 inHg)
 Standard Density $\rho_0 = 0.002377\text{ slug per cubic feet}$
2. ISA

Table 3.1 - ISA

ALTITUDE		TEMPERATURE	
m	ft	°C	°F
0	0	15.0	59.0
305	1000	13.0	55.4
610	2000	11.0	51.9
915	3000	9.1	48.3
1220	4000	7.1	44.7
1524	5000	5.1	41.2
3049	10000	-4.8	23.3
4573	15000	-14.7	5.5
6098	20000	-24.6	-12.3
7622	25000	-34.5	-30.2
9146	30000	-44.4	-48.0
11003	36089	-56.5	-69.7
12195	40000	-56.5	-69.7

NOTE: The performance data shown in this section must not be used for operations.

NOTE: For further information about performance, refer to AOM and AFM.

Tire speed limits are not applicable to this specific aircraft.

This section provides the following information:

- The payload x range charts
- The takeoff field length charts
- The landing field length charts



NOTE: For other charts containing payload x ranges, takeoff field lengths and/or landing field lengths with conditions different from those presented in this section, Embraer should be contacted so that these charts can be obtained.

3.2. **PAYLOAD X RANGE**

The payload x range charts are based on the following conditions;

- CF34 - 8E5 and CF34 - 8E5A1 engine models;
- Aircraft carrying passengers at 100 kg (220 lb) each one;
- Flight level 350, that represents the cruising altitude equal to 10668 m (35000 ft);
- Atmosphere according to ISA or ISA + 10 °C conditions;
- MTOW.

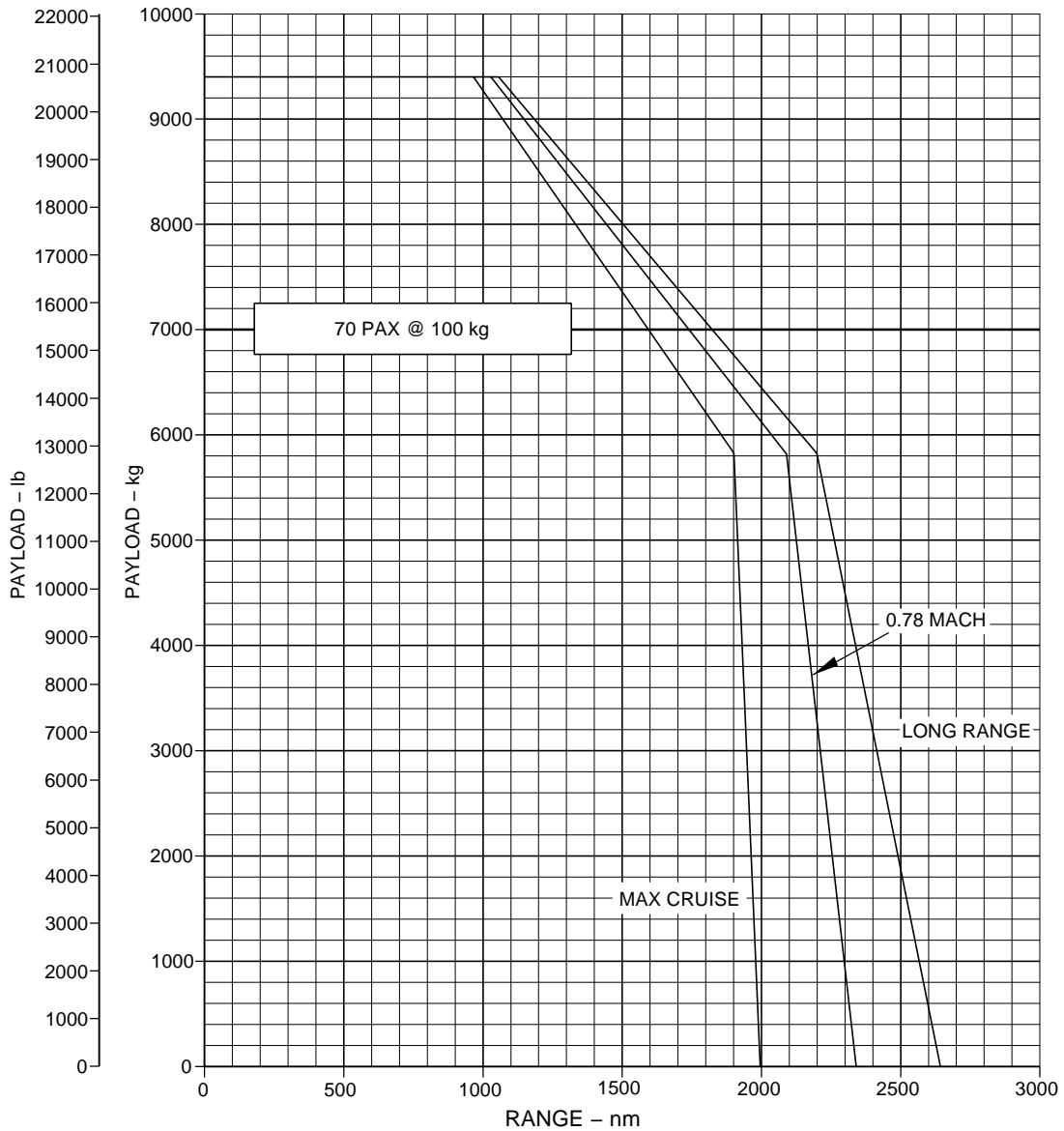
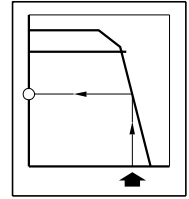


EFFECTIVITY: EMBRAER 170 STD ACFT MODEL

Payload x Range - ISA Conditions

Figure 3.1

PAYLOAD VS RANGE
 CF34 – 8E5A1 & – 8E5 ENGINES
 FLIGHT LEVEL 350
 ISA
 RESERVE : 100 nm ALTERNATE + 45 min FLIGHT
 MTOW = 35990 kg (79344 lb)



NOTES:

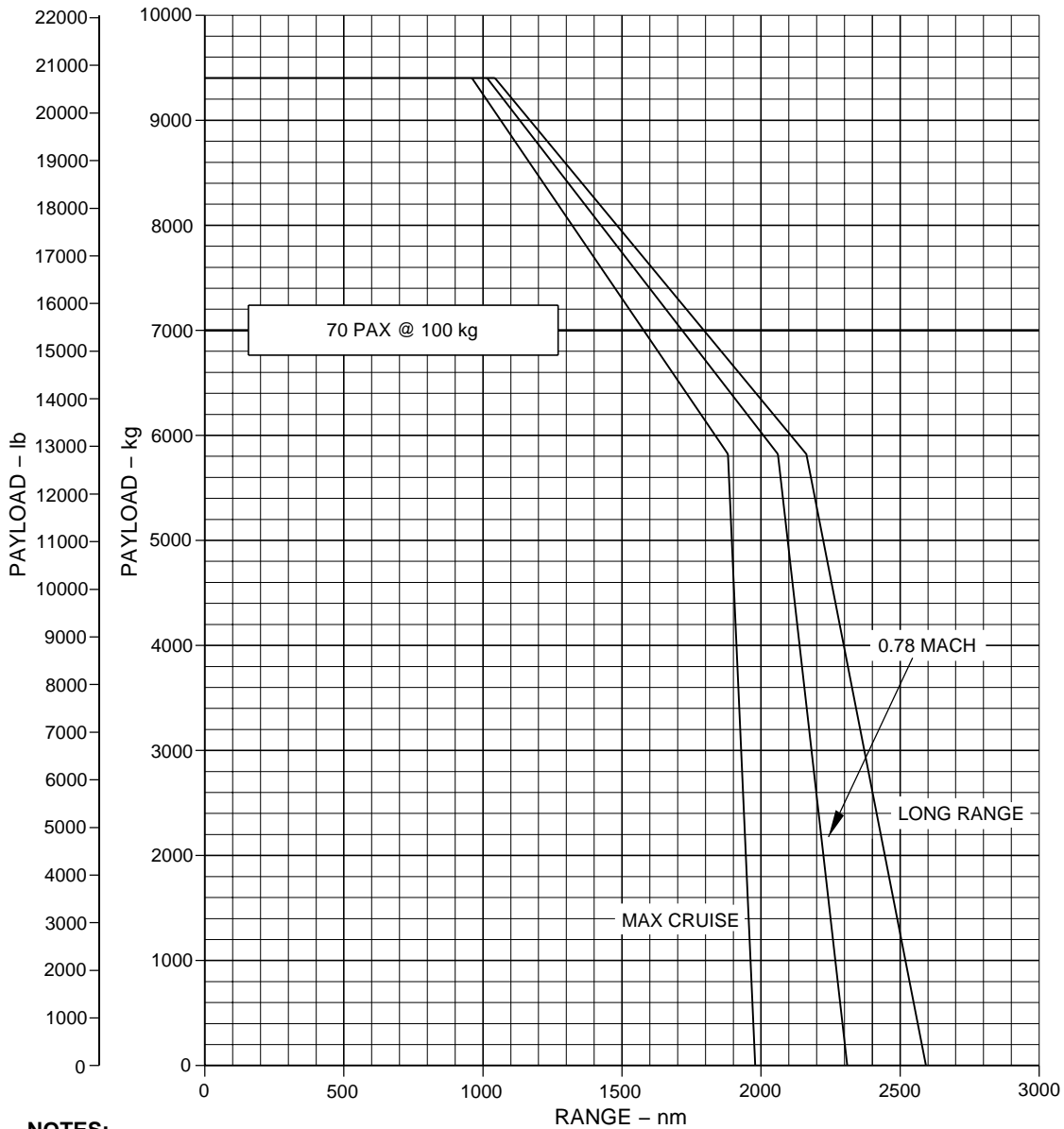
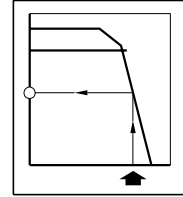
- MAX TAKEOFF WEIGHT - - - - - 35990 kg (79344 lb)
- MAX ZERO FUEL WEIGHT - - - - - 30140 kg (66447 lb)
- BASIC OPERATING WEIGHT - - - - - 20736 kg (45715 lb)
- MAX USABLE FUEL - - - - - 9428 Kg (20785 lb)

EM170APM030003D.DGN



EFFECTIVITY: EMBRAER 170 STD ACFT MODEL
Payload x Range - ISA + 10 °C Conditions
Figure 3.2

PAYLOAD VS RANGE
 CF34 – 8E5A1 & – 8E5 ENGINES
 FLIGHT LEVEL 350
 ISA + 10°C
 RESERVE : 100 nm ALTERNATE + 45 min FLIGHT
 MTOW = 35990 kg (79344 lb)



NOTES:

- MAX TAKEOFF WEIGHT - - - - - 35990 kg (79344 lb)
- MAX ZERO FUEL WEIGHT - - - - - 30140 kg (66447 lb)
- BASIC OPERATING WEIGHT - - - - - 20736 kg (45715 lb)
- MAX USABLE FUEL - - - - - 9428 Kg (20785 lb)

EM170APM030004D.DGN

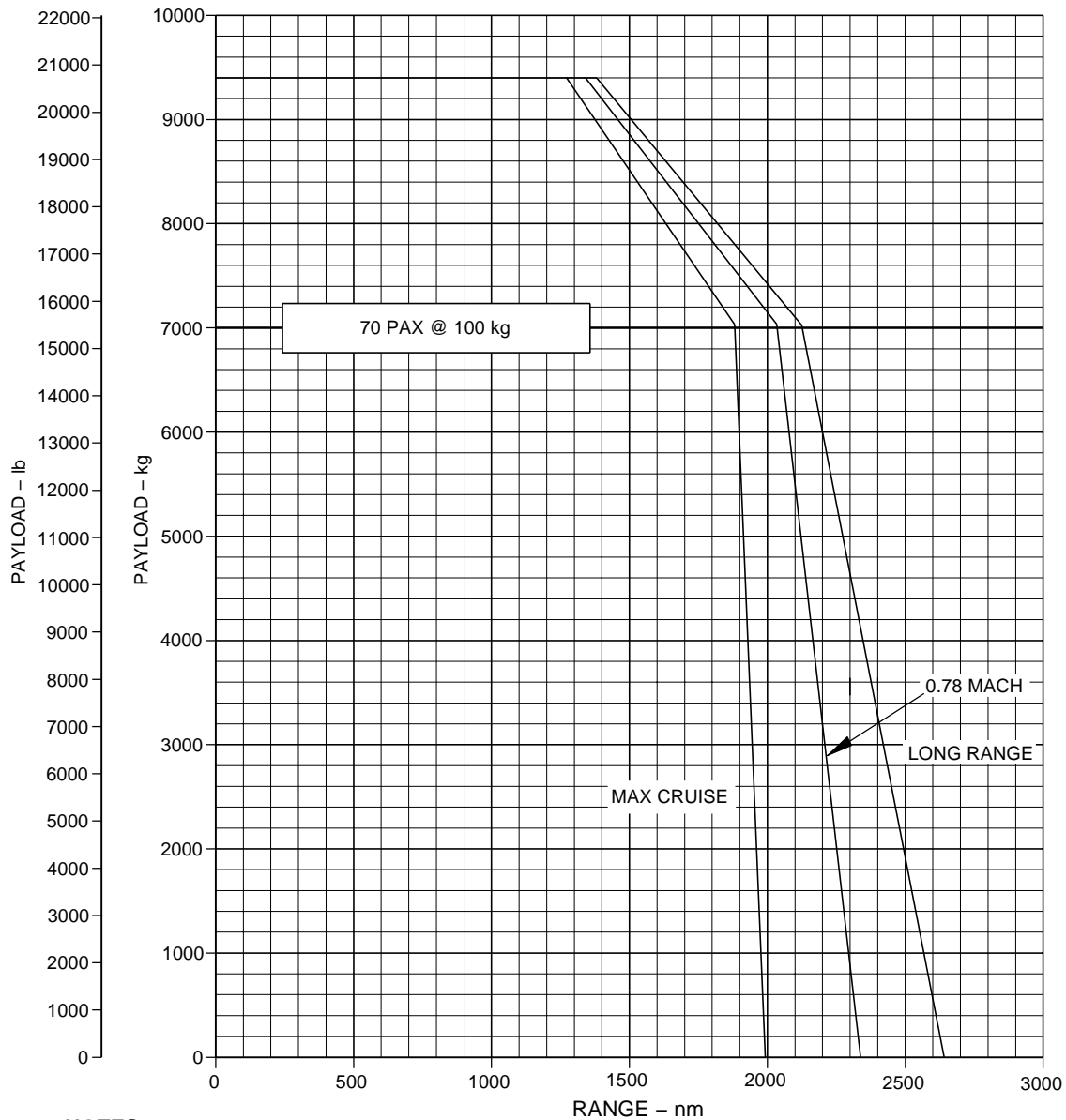
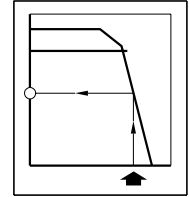


EFFECTIVITY: EMBRAER 170 LR ACFT MODEL

Payload x Range - ISA Conditions

Figure 3.3

PAYLOAD VS RANGE
 CF34 – 8E5A1 & – 8E5 ENGINES
 FLIGHT LEVEL 350
 ISA
 RESERVE : 100 nm ALTERNATE + 45 min FLIGHT
 MTOW = 37200 kg (82012 lb)



NOTES:

- MAX TAKEOFF WEIGHT - - - - - 37200 kg (82012 lb)
- MAX ZERO FUEL WEIGHT - - - - - 30140 kg (66447 lb)
- BASIC OPERATING WEIGHT - - - - - 20736 kg (45715 lb)
- MAX USABLE FUEL - - - - - 9428 Kg (20785 lb)

EM170APM030002D.DGN

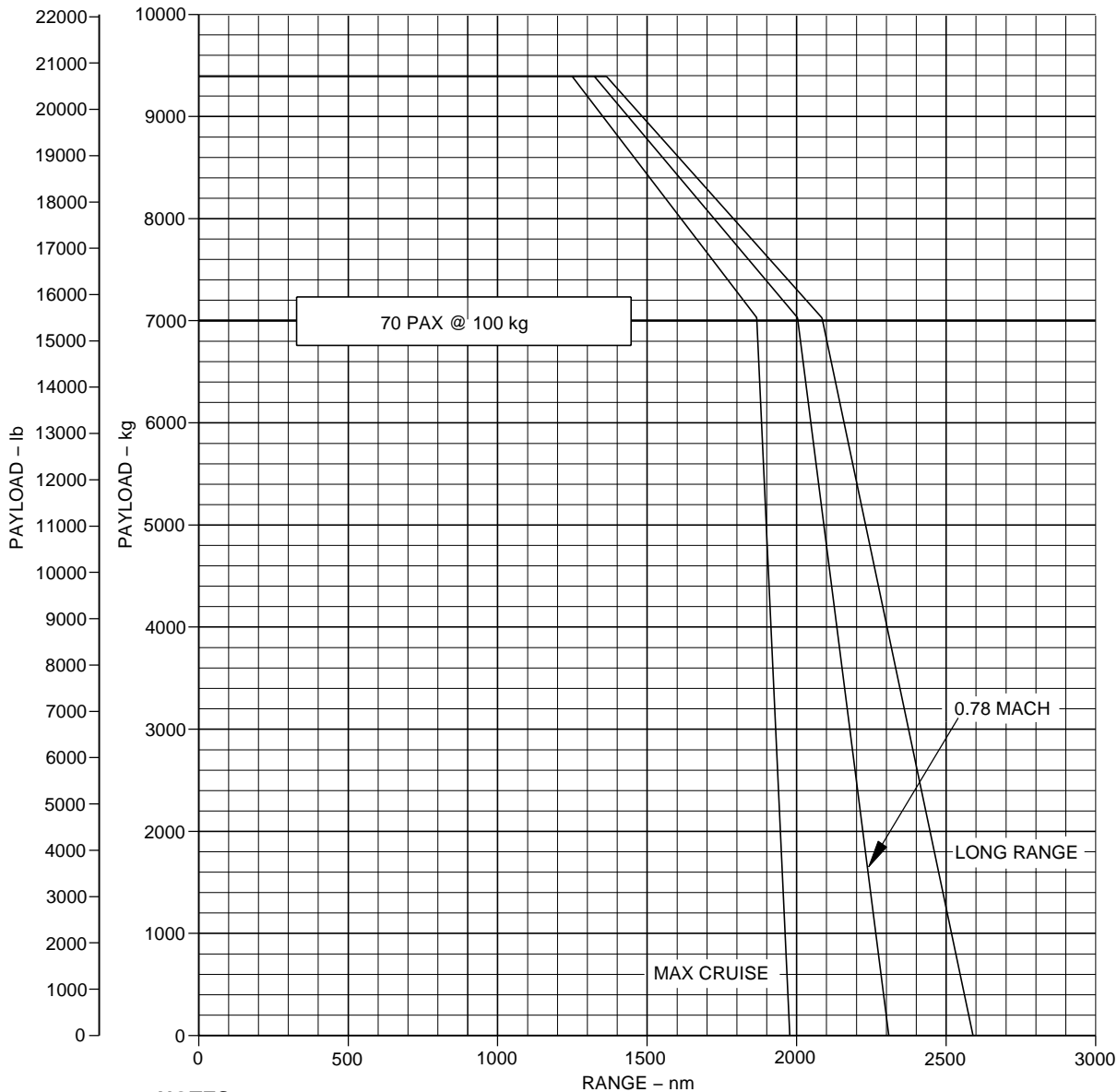
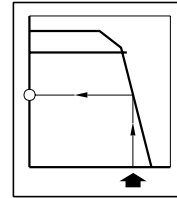


EFFECTIVITY: EMBRAER 170 LR ACFT MODEL

Payload x Range - ISA + 10 °C Conditions

Figure 3.4

PAYLOAD VS RANGE
 CF34 – 8E5A1 & – 8E5 ENGINES
 FLIGHT LEVEL 350
 ISA + 10°C
 RESERVE : 100 nm ALTERNATE + 45 min FLIGHT
 MTOW = 37200 kg (82012 lb)



NOTES:

- MAX TAKEOFF WEIGHT - - - - - 37200 kg (82012 lb)
- MAX ZERO FUEL WEIGHT - - - - - 30140 kg (66447 lb)
- BASIC OPERATING WEIGHT - - - - - 20736 kg (45715 lb)
- MAX USABLE FUEL - - - - - 9428 Kg (20785 lb)

EM170APM030001C.DGN



3.3. **TAKEOFF FIELD LENGTHS**

The takeoff performance is based on the requirements of JAR 25, Change 14, plus amendment 25/96/1.

The takeoff field length charts provide data about the maximum takeoff weights, for compliance with the operating regulations relating to takeoff field lengths.

Data are presented according to the following associated conditions:

- CF34 - 8E5 and CF34 - 8E5A1 engine models;
- Takeoff Mode: 1;
- ATTCS positioning: ON and OFF;
- Flaps setting position: 1, 2 and 4;
- Pavement conditions: dry, hard paved and level runway surface with no obstacles;
- Zero wind and atmosphere according to ISA or ISA + 15 °C conditions;
- Pack OFF: No engine bleed extraction for air conditioning packs was considered in the takeoff and landing charts.

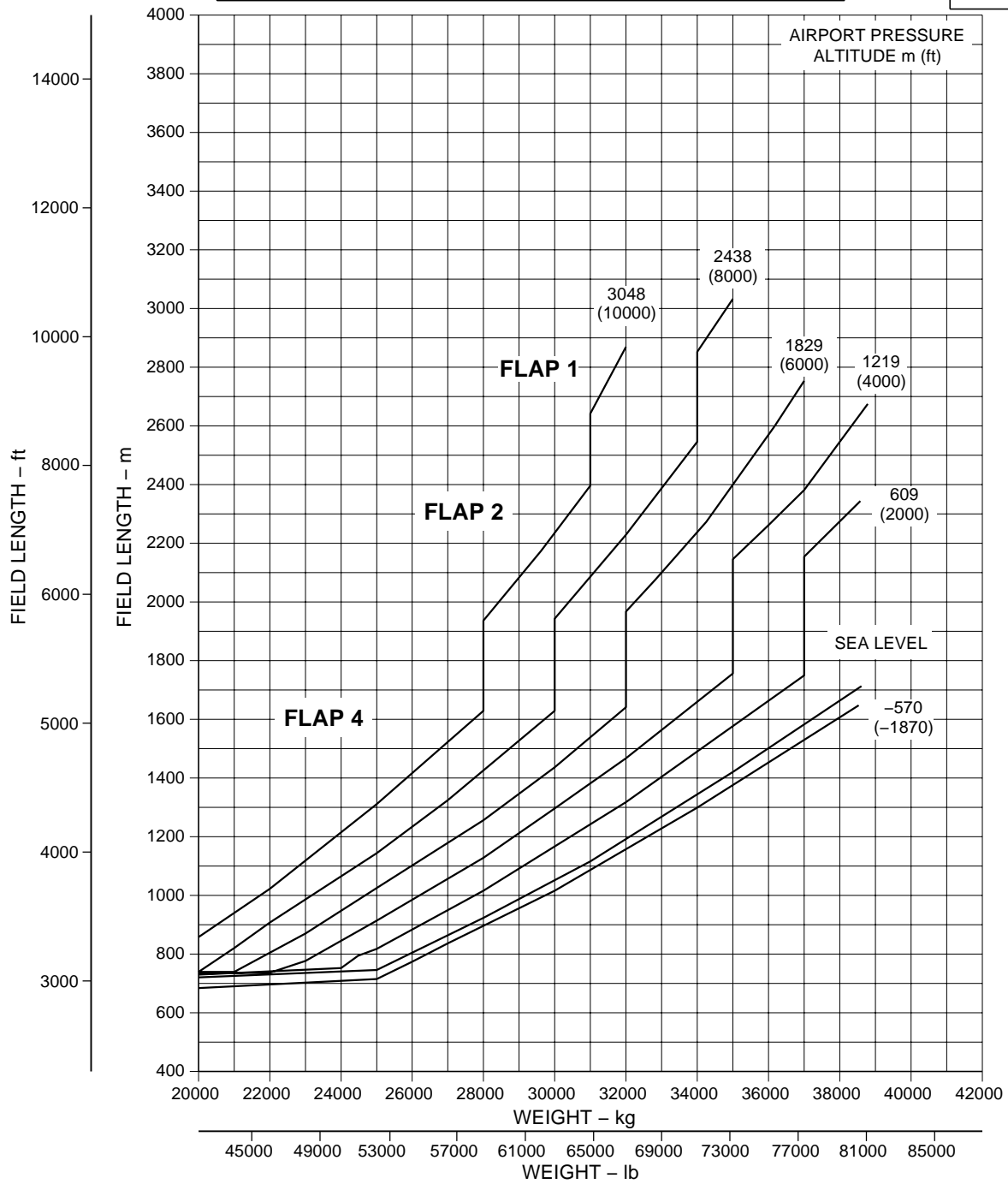
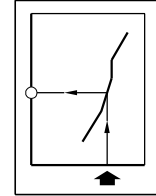


EFFECTIVITY: ALL

Takeoff Field Lengths - ISA Conditions

Figure 3.5

TAKEOFF FIELD LENGTH
 CF 34-8E5 ENGINE @T/O-1 MODE
 ATTCS: ON / ECS: OFF
 DRY, SMOOTH, HARD PAVED AND LEVEL RUNWAY
 ISA



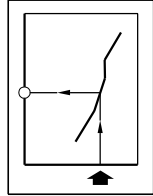
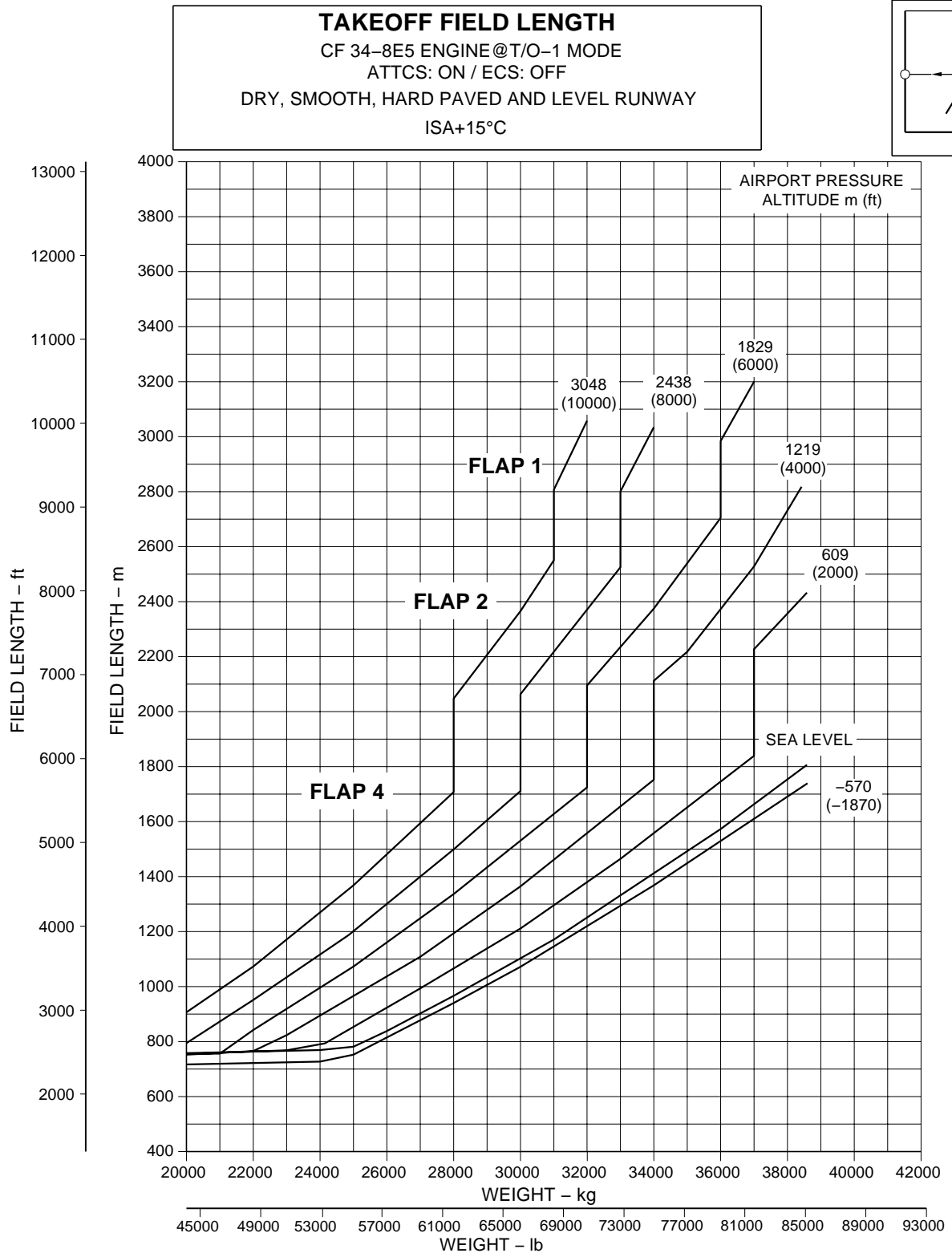
EM170APM030009H.DGN



EFFECTIVITY: ALL

Takeoff Field Lengths - ISA + 15 °C Conditions

Figure 3.6



EM170APM0300131.DGN

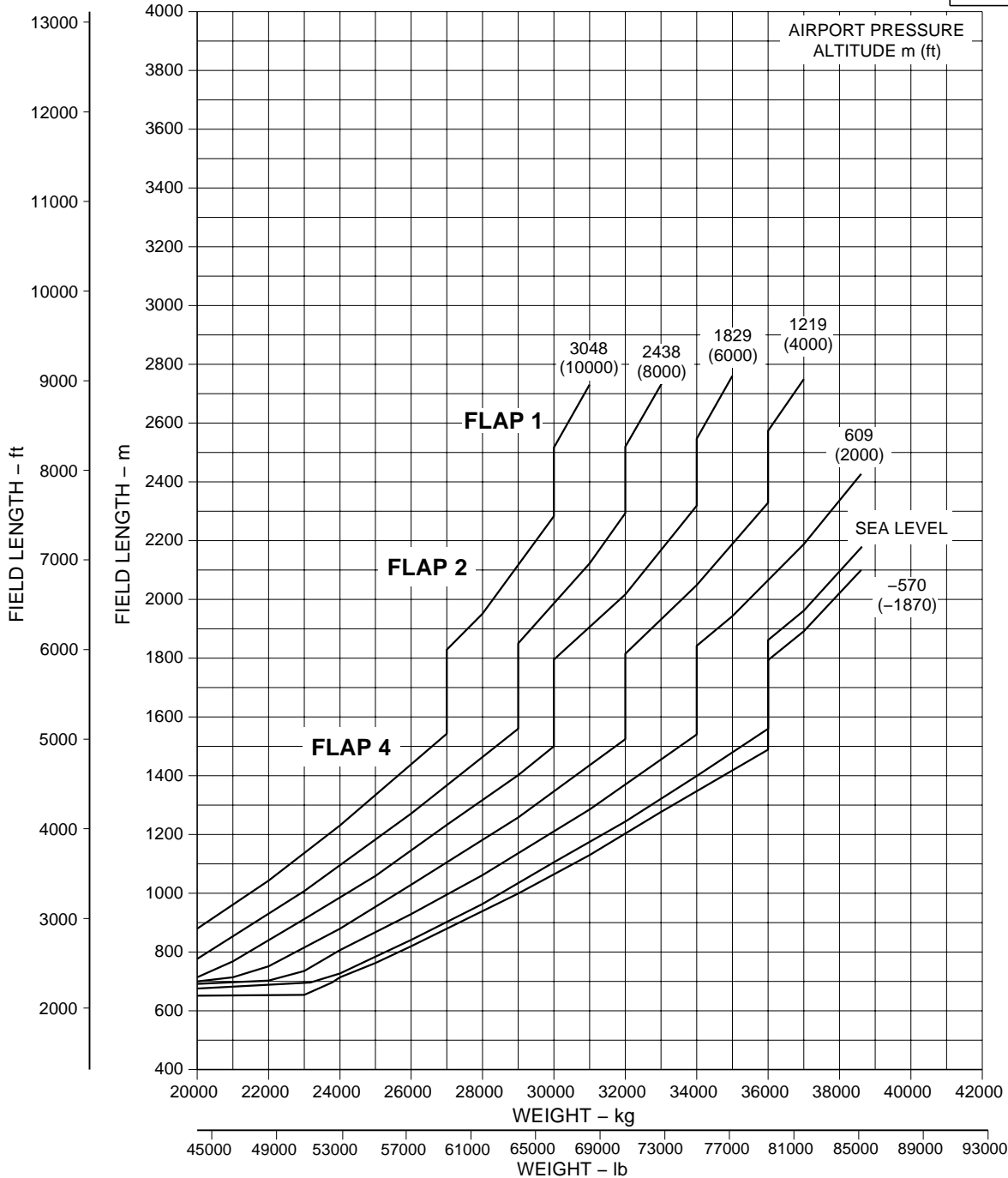
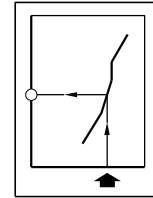


EFFECTIVITY: ALL

Takeoff Field Lengths - ISA Conditions

Figure 3.7

TAKEOFF FIELD LENGTH
 CF 34-8E5 ENGINE @ T/O-1 MODE
 ATTCS: OFF / ECS: OFF
 DRY, SMOOTH, HARD PAVED AND LEVEL RUNWAY
 ISA



EM170APM030094B.DGN

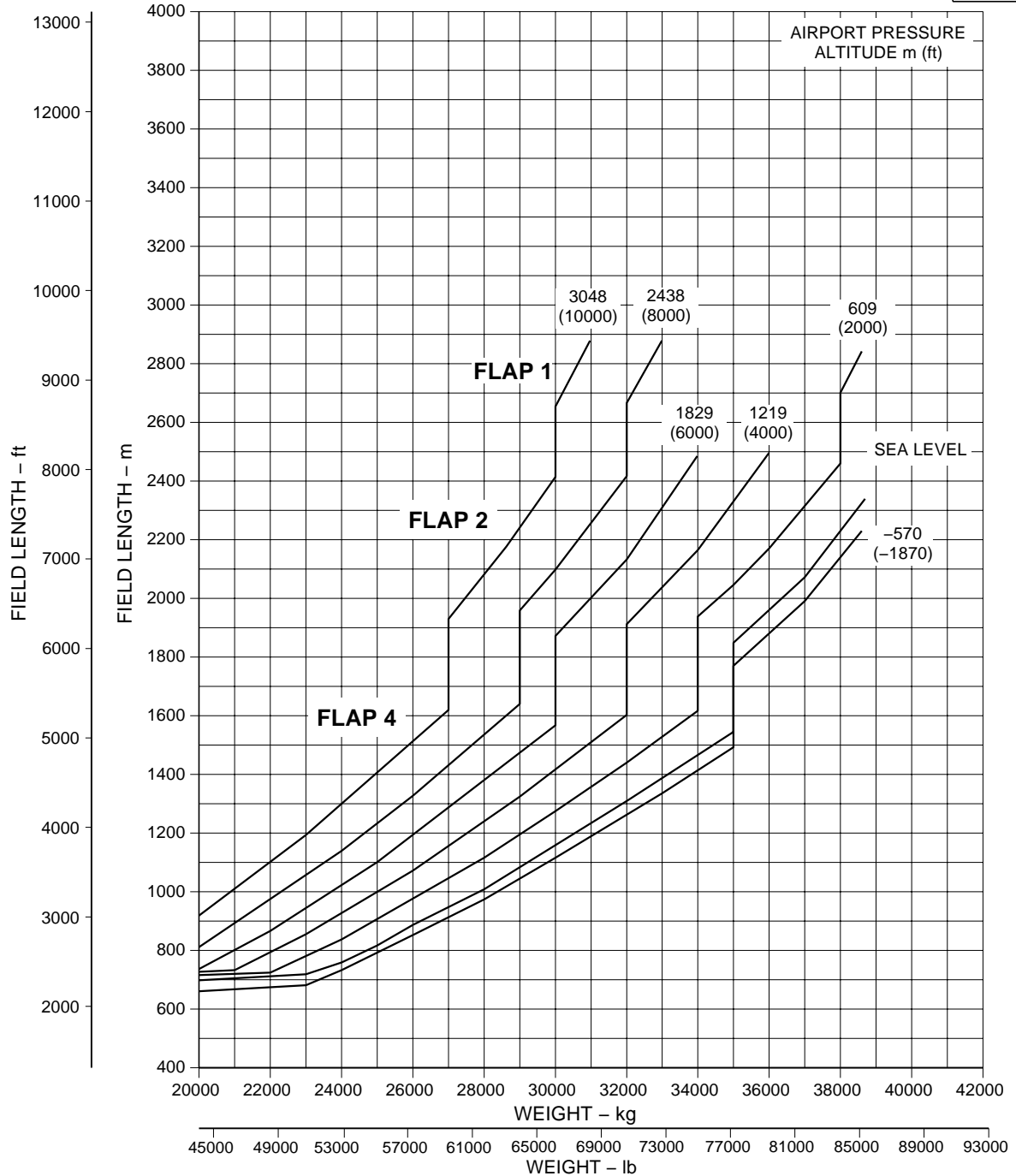
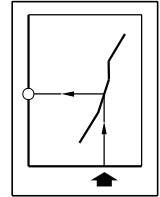


EFFECTIVITY: ALL

Takeoff Field Lengths - ISA + 15 °C Conditions

Figure 3.8

TAKEOFF FIELD LENGTH
 CF 34-8E5 ENGINE @ T/O-1 MODE
 ATTCS: OFF / ECS: OFF
 DRY, SMOOTH, HARD PAVED AND LEVEL RUNWAY
 ISA+15°C



EM170APM030095B.DGN

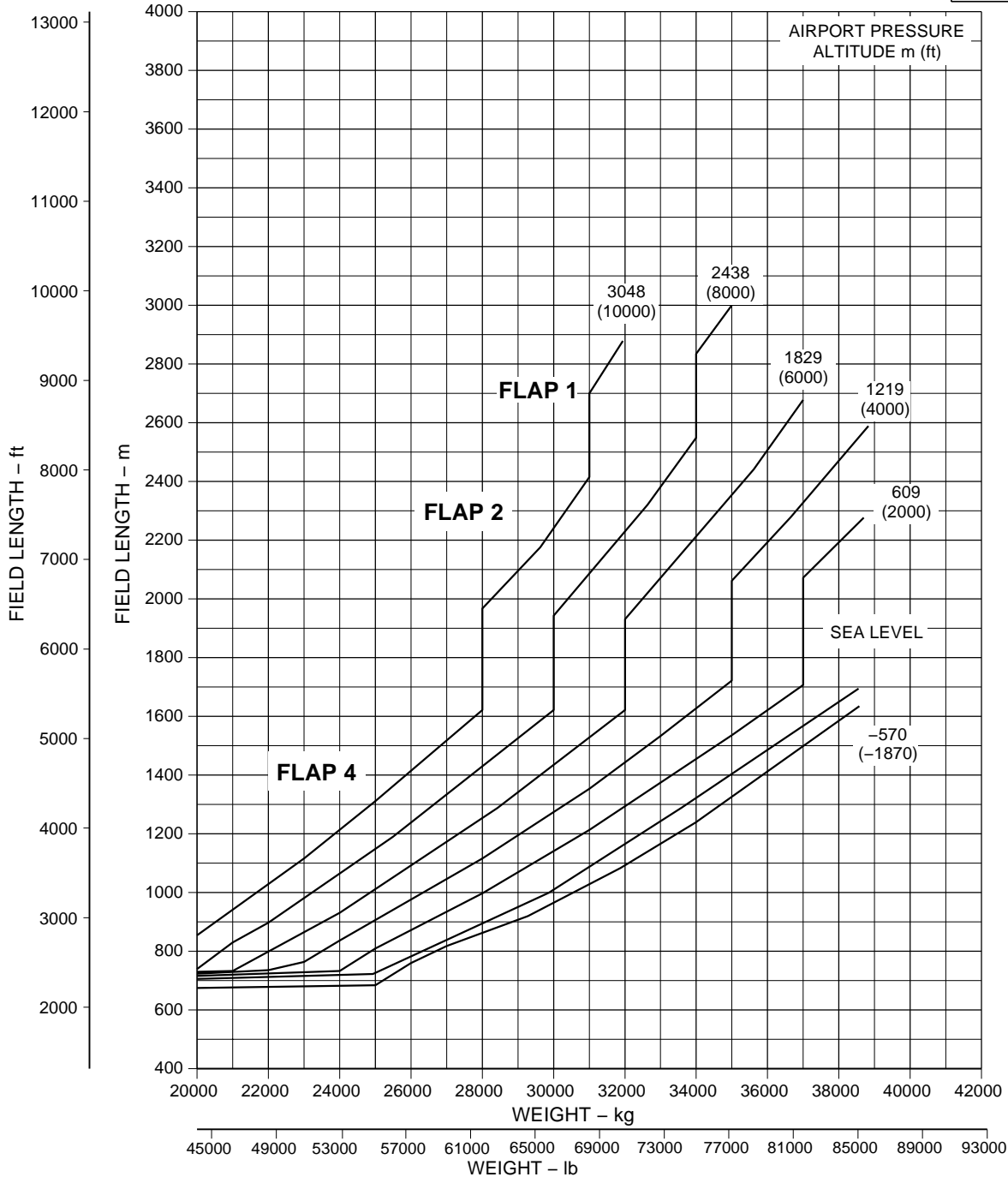
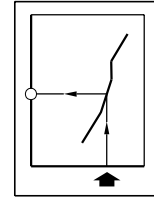


EFFECTIVITY: ALL

Takeoff Field Lengths - ISA Conditions

Figure 3.9

TAKEOFF FIELD LENGTH
 CF 34-8E5A1 ENGINE @T/O-1 MODE
 ATTCS: ON / ECS: OFF
 DRY, SMOOTH, HARD PAVED AND LEVEL RUNWAY
 ISA



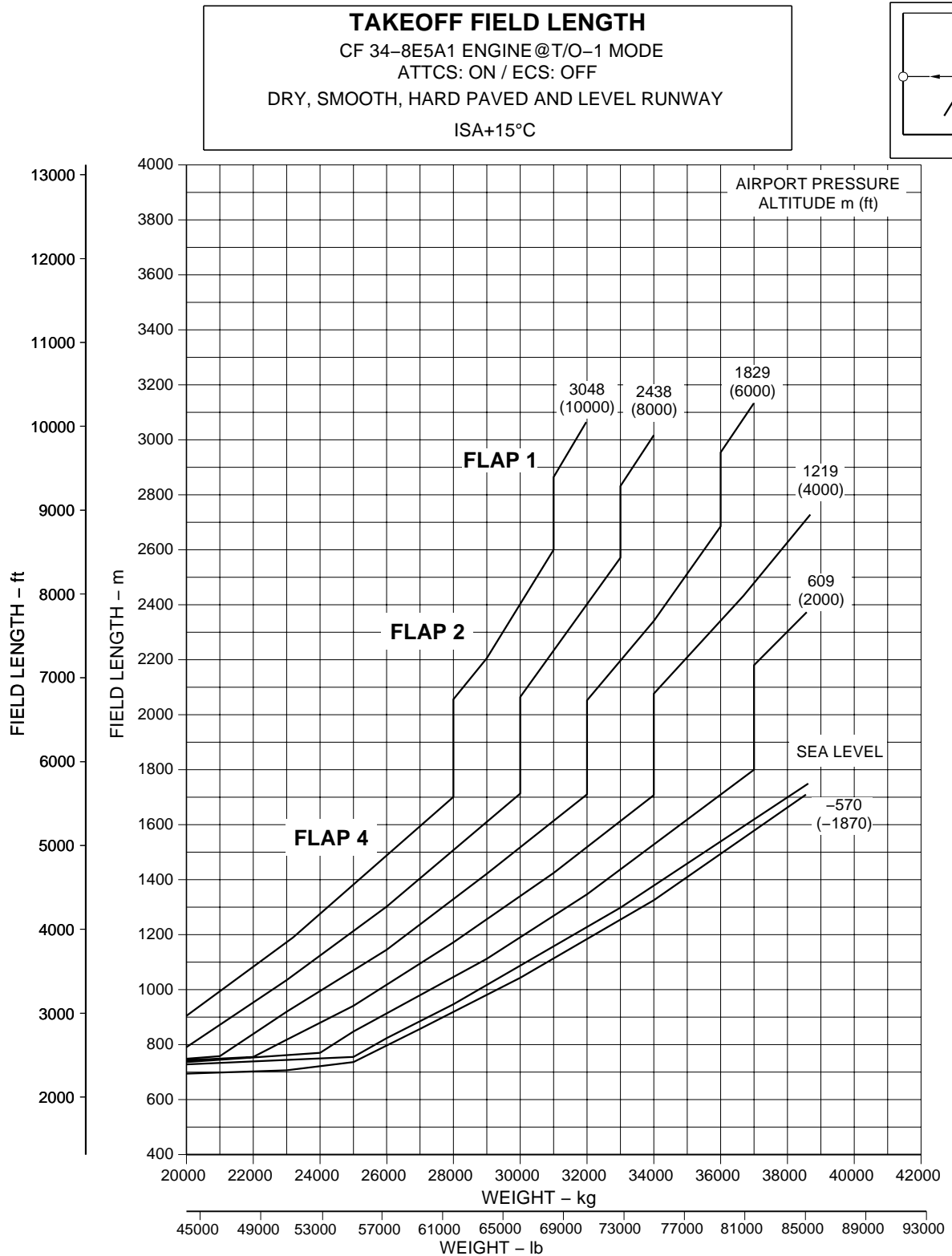
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EFFECTIVITY: ALL

Takeoff Field Lengths - ISA + 15 °C Conditions

Figure 3.10



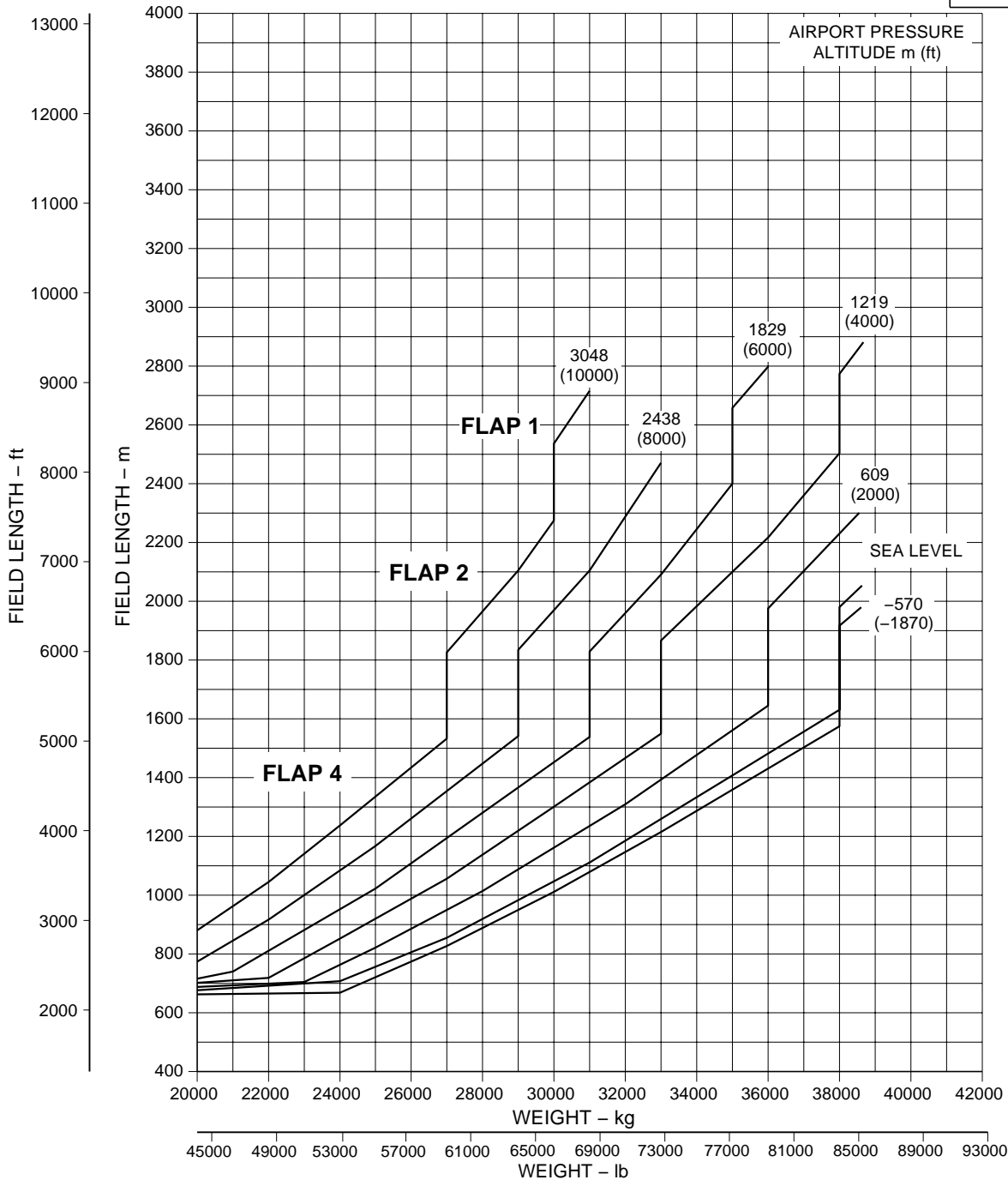
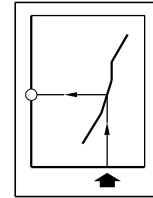


EFFECTIVITY: ALL

Takeoff Field Lengths - ISA Conditions

Figure 3.11

TAKEOFF FIELD LENGTH
 CF 34-8E5A1 ENGINE @T/O-1 MODE
 ATTCS: OFF / ECS: OFF
 DRY, SMOOTH, HARD PAVED AND LEVEL RUNWAY
 ISA



EM170APM030096B.DGN

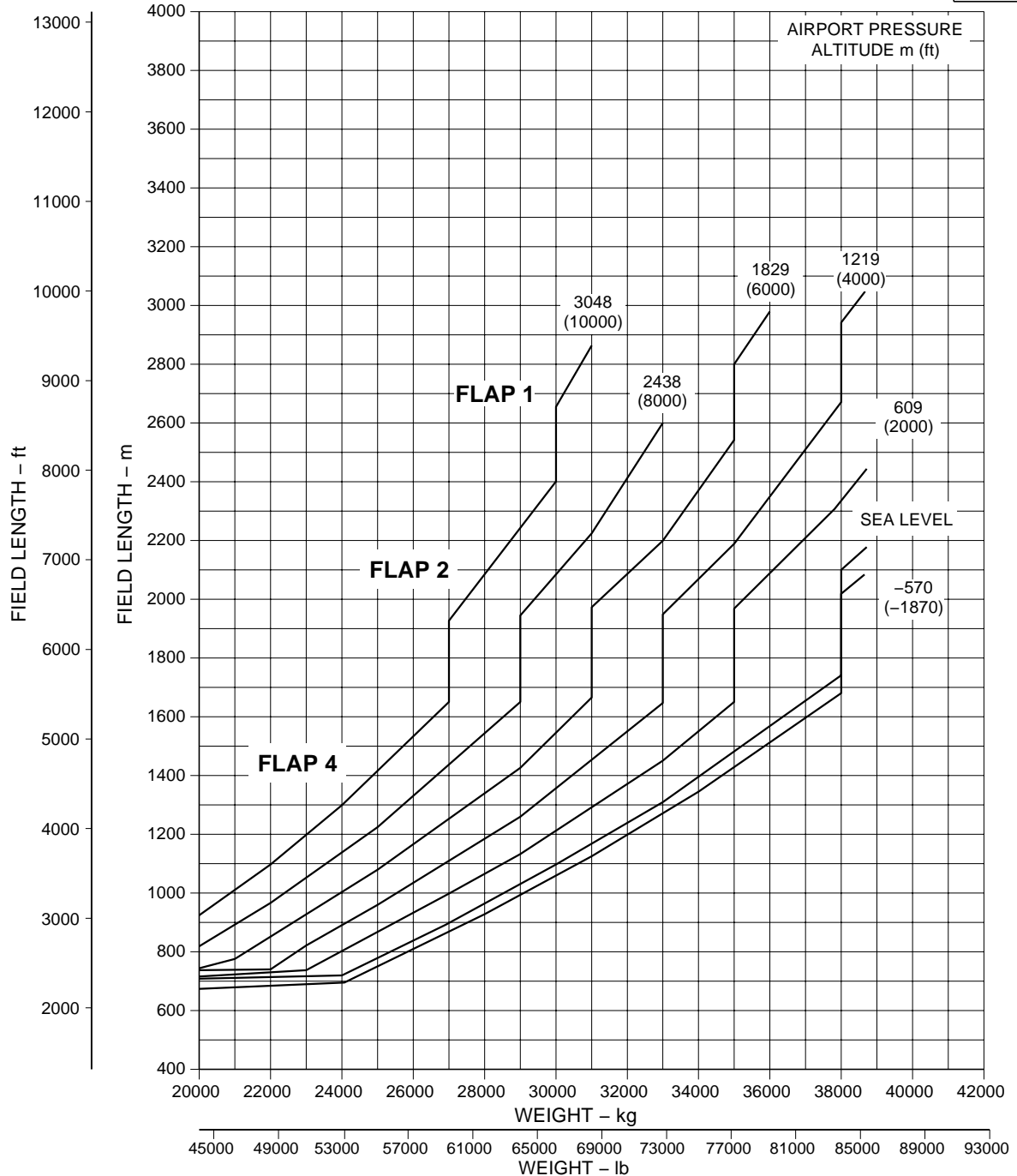
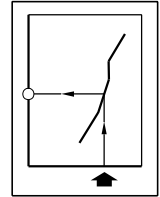


EFFECTIVITY: ALL

Takeoff Field Lengths - ISA + 15 °C Conditions

Figure 3.12

TAKEOFF FIELD LENGTH
 CF 34-8E5A1 ENGINE @T/O-1 MODE
 ATTCS: OFF / ECS: OFF
 DRY, SMOOTH, HARD PAVED AND LEVEL RUNWAY
 ISA+15°C



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3.4. LANDING FIELD LENGTHS

The landing field length charts provide data about the maximum landing weights, for compliance with the operating regulations relating to landing field lengths.

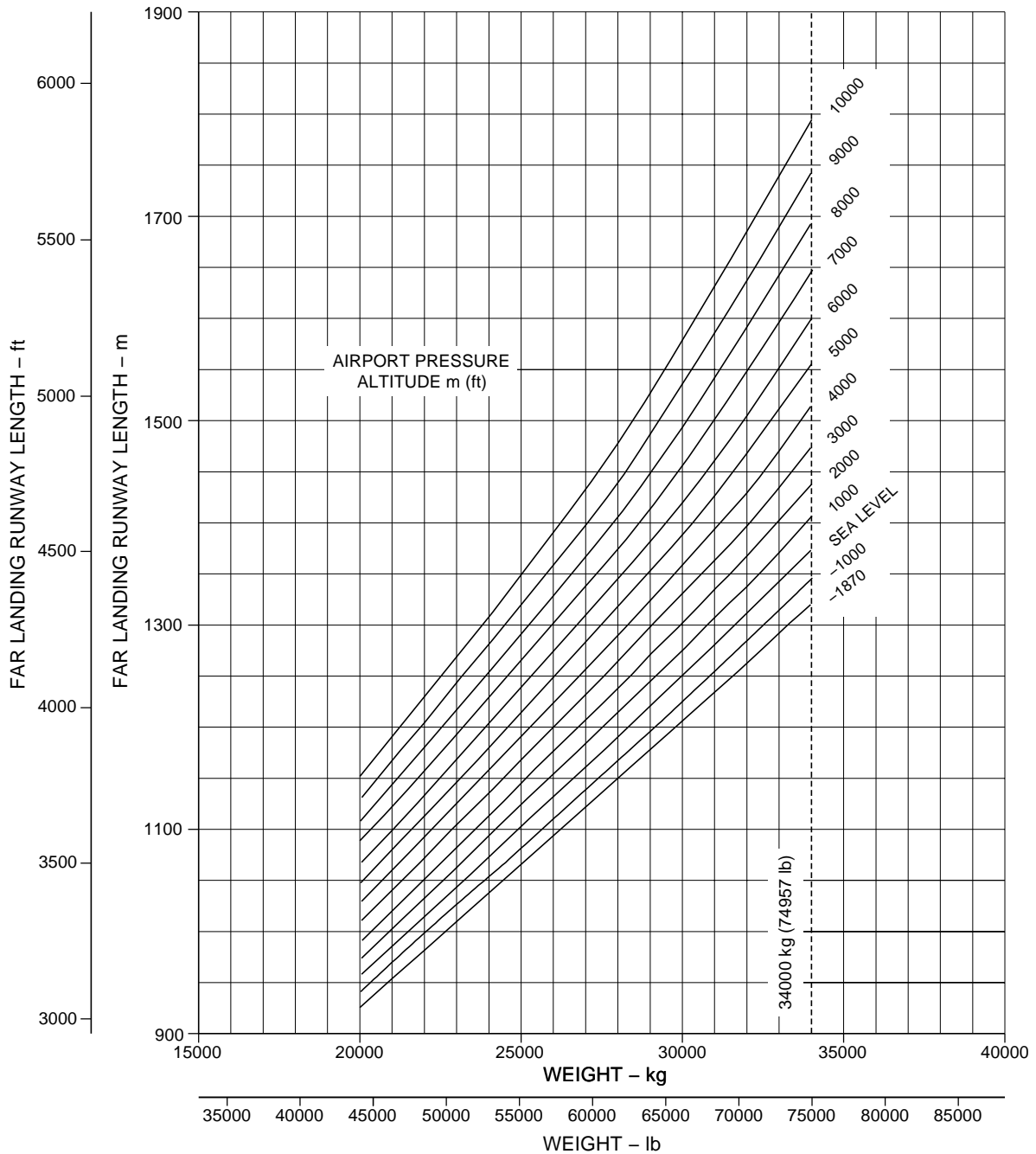
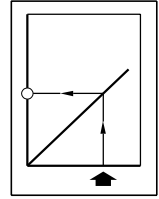
Data are presented according to the following associated conditions:

- Landing gear: down;
- Flaps setting position: 5 and full;
- Pavement conditions: dry, hard paved and level runway surface with no obstacles;
- Zero wind and atmosphere according to ISA conditions;
- Pack OFF: No engine bleed extraction for air conditioning packs was considered in the takeoff and landing charts;
- For EASA Certification, Landing Field Lengths are factored as per EU OPS 1.515 (a) (1) - Landing;
- For FAA Certification, Landing Field Lengths are factored as per FAR Part 121, Paragraph 121.195 (b) - Airplanes.



EFFECTIVITY: FAA-CERTIFIED ACFT
Landing Field Lengths - Flaps 5
Figure 3.13

LANDING FIELD LENGTH
FLAP 5
DRY, SMOOTH, HARD PAVED AND LEVELLED RUNWAY

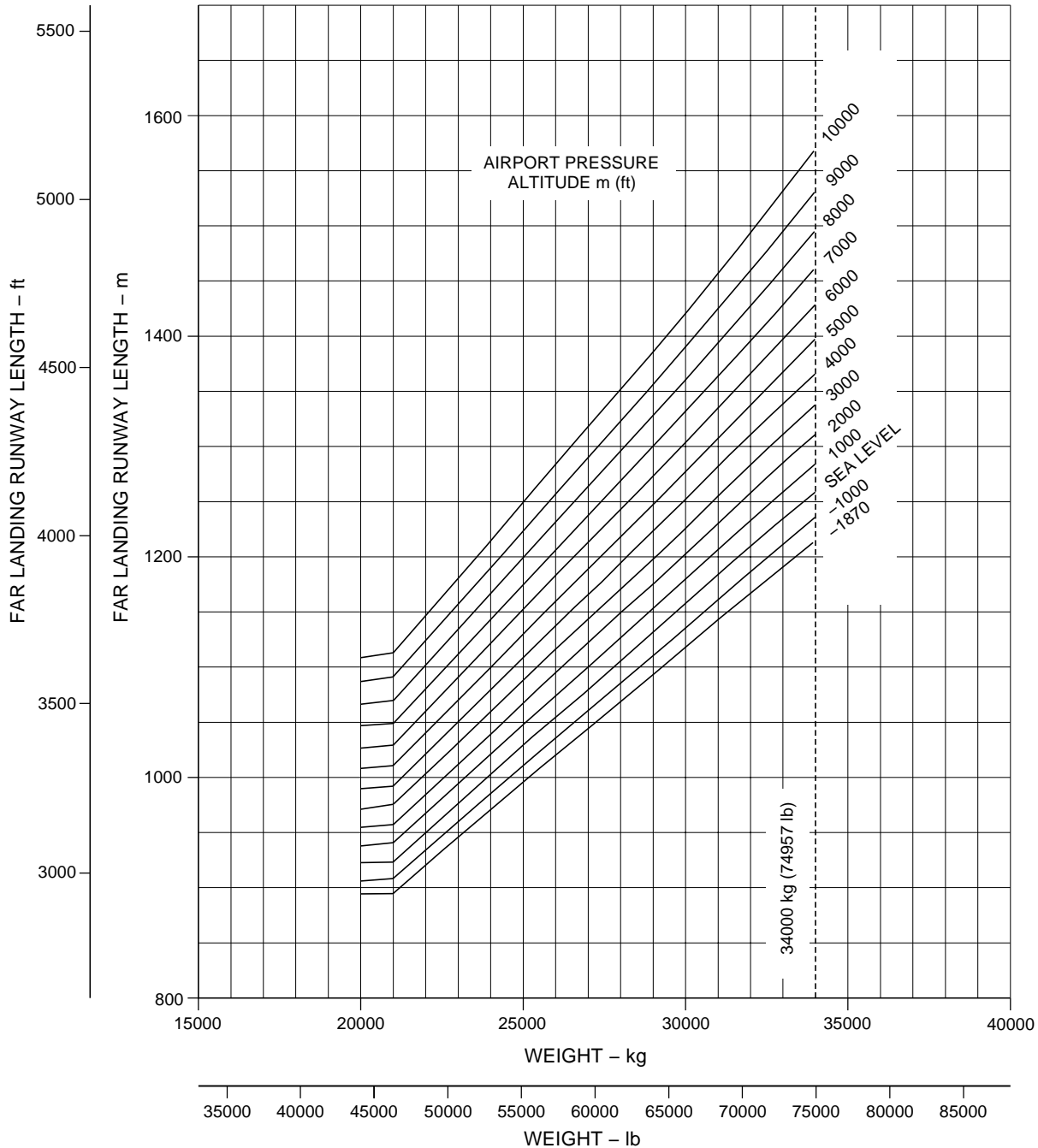
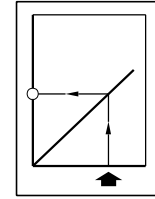


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EFFECTIVITY: FAA-CERTIFIED ACFT
Landing Field Lengths - Flaps Full
Figure 3.14

LANDING FIELD LENGTH
FLAPS FULL
DRY, SMOOTH, HARD PAVED AND LEVELLED RUNWAY

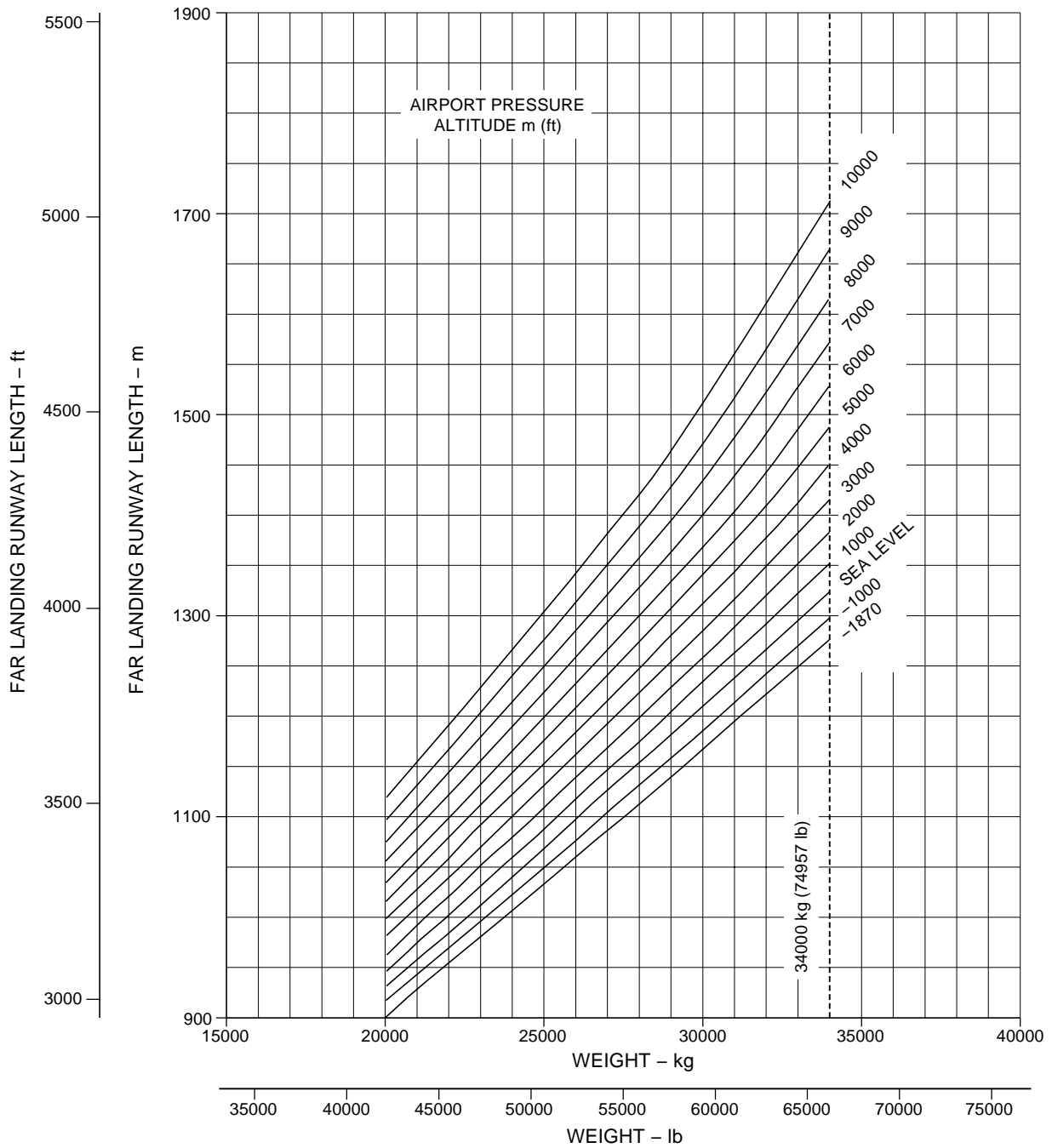
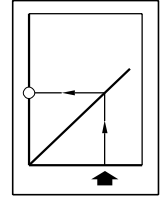


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EFFECTIVITY: EASA-CERTIFIED ACFT
Landing Field Lengths - Flaps 5
Figure 3.15

LANDING FIELD LENGTH
FLAP 5
DRY, SMOOTH, HARD PAVED AND LEVELLED RUNWAY

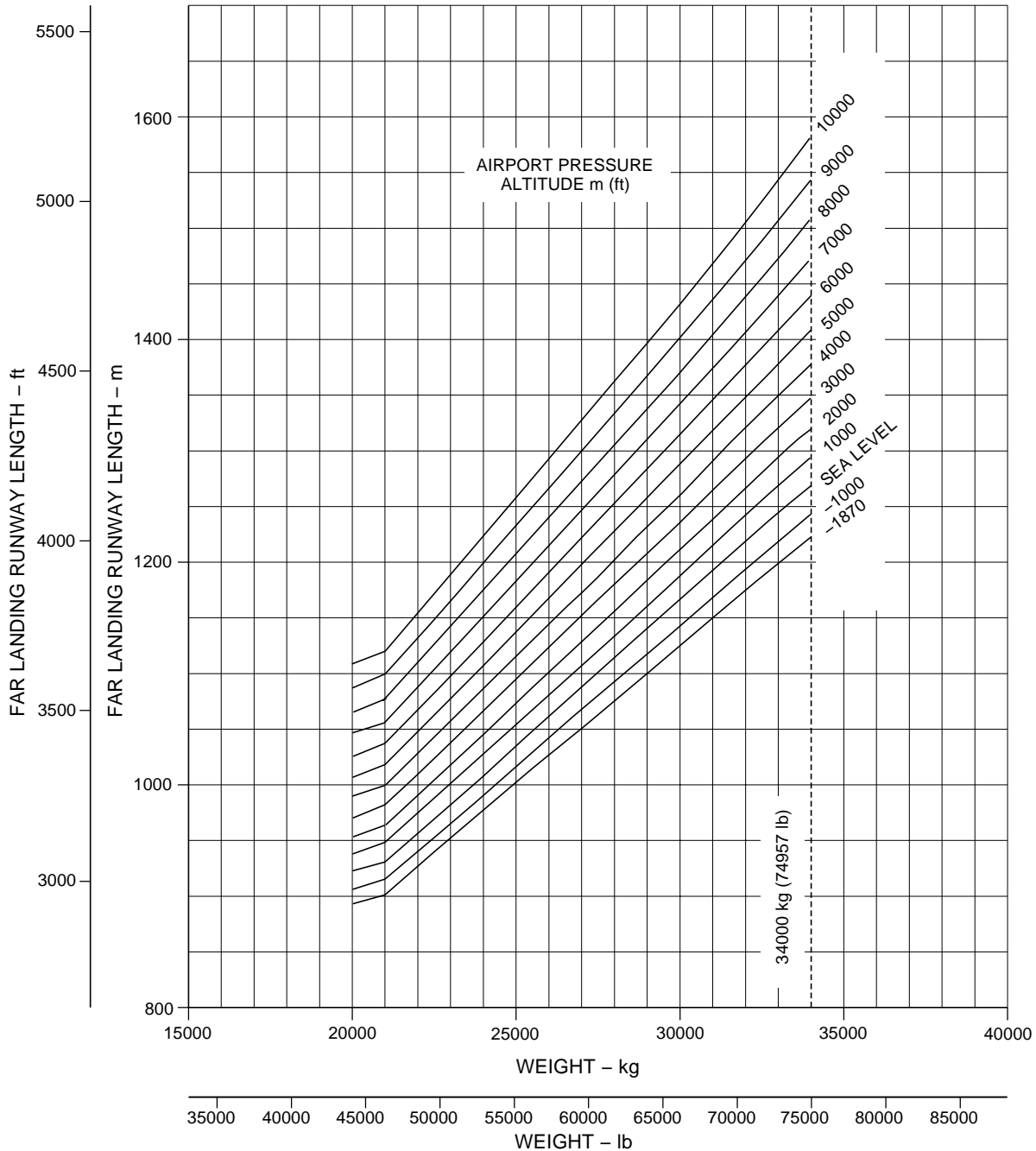
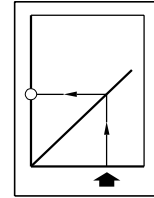


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EFFECTIVITY: EASA-CERTIFIED ACFT
Landing Field Lengths - Flaps Full
Figure 3.16

LANDING FIELD LENGTH
FLAPS FULL
DRY, SMOOTH, HARD PAVED AND LEVELLED RUNWAY



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4. GROUND MANEUVERING*EFFECTIVITY: ALL***4.1. GENERAL INFORMATION**

This section provides the aircraft turning capability and maneuvering characteristics. To facilitate the presentation, the data have been determined from theoretical limits imposed by the geometry of the aircraft.

As such, they reflect the turning capability of the aircraft in favorable operating circumstances. These data should be used only as a guideline for the method of determining such parameters and for the maneuvering characteristics of the aircraft.

In the ground operating mode, varying airline practices may demand that more conservative turning procedures be adopted, to avoid excessive tire wear and reduce possible maintenance problems.

Variations from standard aircraft operating patterns may be necessary to satisfy physical constraints within the maneuvering area, such as adverse grades, limited area, or high risk of jet blast damage. For these reasons, the ground maneuvering requirements should be coordinated with the airline before the layout is planned.

This section is presented as follows:

- The turning radii for nose landing gear steering angles.
- The pilot's visibility from the cockpit and the limits of ambinocular vision through the windows. Ambinocular vision is defined as the total field of vision seen by both eyes at the same time.
- The performance of the aircraft on runway-to-taxiway, taxiway-to-taxiway and runway holding bay dimensions.

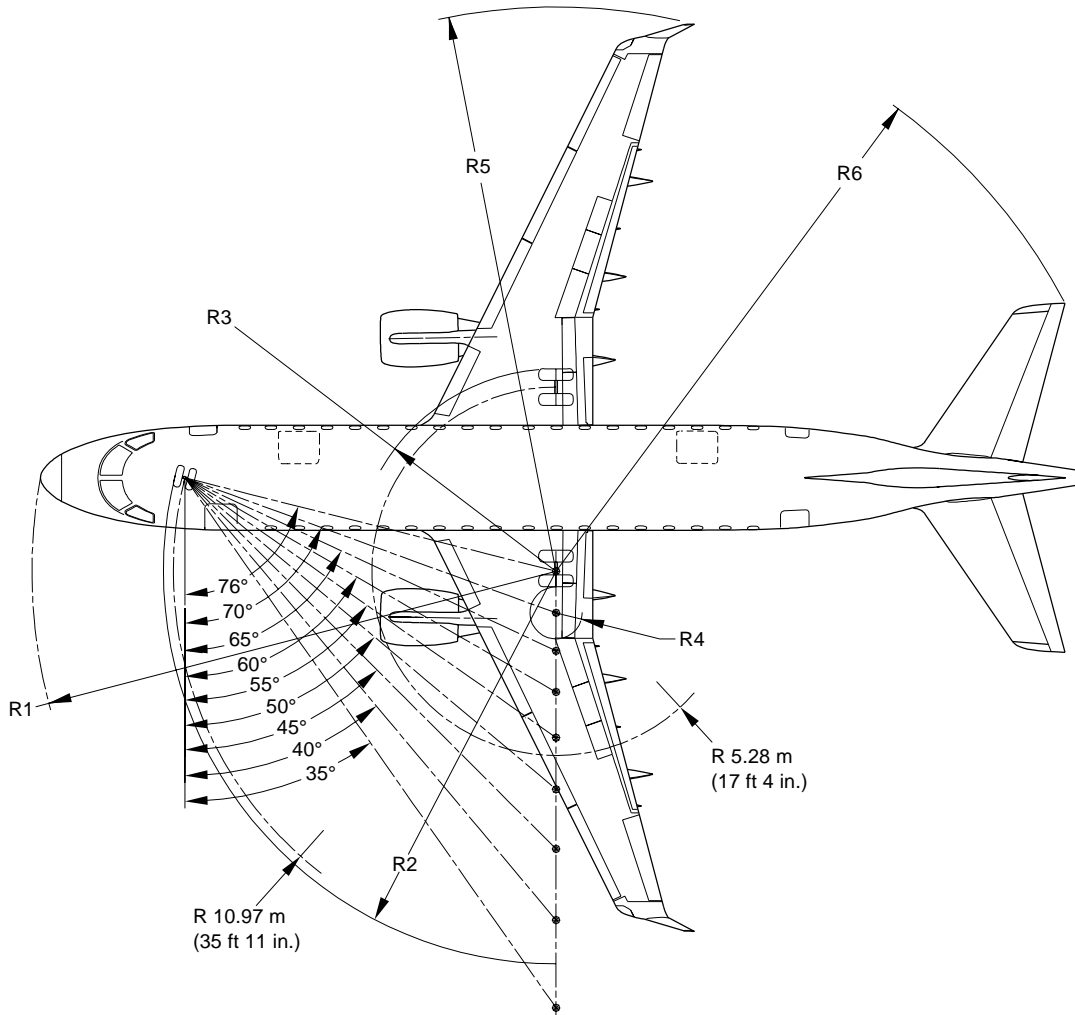
4.2. TURNING RADII

This subsection presents the following information:

- The turning radii for various nose landing gear steering angles. The minimum turning radius is determined, considering the maximum nose landing gear steering angle as 76 degrees left and right.
- Data on the minimum width of the pavement for a 180° turn.



EFFECTIVITY: ALL
Turning Radii - No Slip Angle
Figure 4.1



NOTE:
DATA PRESENTED IS BASED ON THEORETICAL CALCULATIONS.
ACTUAL OPERATING DATA MAY BE GREATER THAN SHOWN SINCE
TIRE SLIPPAGE IS NOT CONSIDERED IN THESE CALCULATIONS.

STEERING STEEL	NOSE		NOSE LANDING GEAR		OUTBOARD GEAR		INBOARD GEAR		RIGHT WINGLET		RIGHT TAILTIP	
	R1		R2		R3		R4		R5		R6	
35°	21.19 m	69 ft 6 in.	18.76 m	61 ft 6 in.	18.31 m	60 ft 1 in.	12.06 m	39 ft 7 in.	28.45 m	93 ft 5 in.	24.91 m	81 ft 9 in.
40°	19.47 m	63 ft 10 in.	16.78 m	55 ft 0 in.	15.80 m	51 ft 10 in.	9.55 m	31 ft 4 in.	25.98 m	85 ft 3 in.	22.92 m	75 ft 2 in.
45°	18.21 m	59 ft 9 in.	15.28 m	50 ft 2 in.	13.76 m	45 ft 2 in.	7.51 m	24 ft 8 in.	23.96 m	78 ft 7 in.	21.38 m	70 ft 2 in.
50°	17.26 m	56 ft 8 in.	14.14 m	46 ft 5 in.	12.05 m	39 ft 6 in.	5.80 m	19 ft 0 in.	22.28 m	73 ft 1 in.	20.17 m	66 ft 2 in.
55°	16.55 m	54 ft 3 in.	13.25 m	43 ft 6 in.	10.57 m	34 ft 8 in.	4.32 m	14 ft 2 in.	20.83 m	68 ft 4 in.	19.18 m	62 ft 11 in.
60°	16.00 m	52 ft 6 in.	12.55 m	41 ft 2 in.	9.26 m	30 ft 5 in.	3.02 m	9 ft 11 in.	19.54 m	64 ft 1 in.	18.35 m	60 ft 3 in.
65°	15.58 m	51 ft 2 in.	12.01 m	39 ft 5 in.	8.08 m	26 ft 6 in.	1.84 m	6 ft 0 in.	18.39 m	60 ft 4 in.	17.66 m	57 ft 11 in.
70°	15.28 m	50 ft 1 in.	11.60 m	38 ft 1 in.	6.99 m	22 ft 11 in.	0.75 m	2 ft 5 in.	17.33 m	56 ft 10 in.	17.07 m	56 ft 0 in.
76°	15.02 m	49 ft 3 in.	11.25 m	36 ft 11 in.	5.80 m	19 ft 0 in.	0.445 m	1 ft 5.5 in.	16.17 m	53 ft 1 in.	16.48 m	54 ft 1 in.

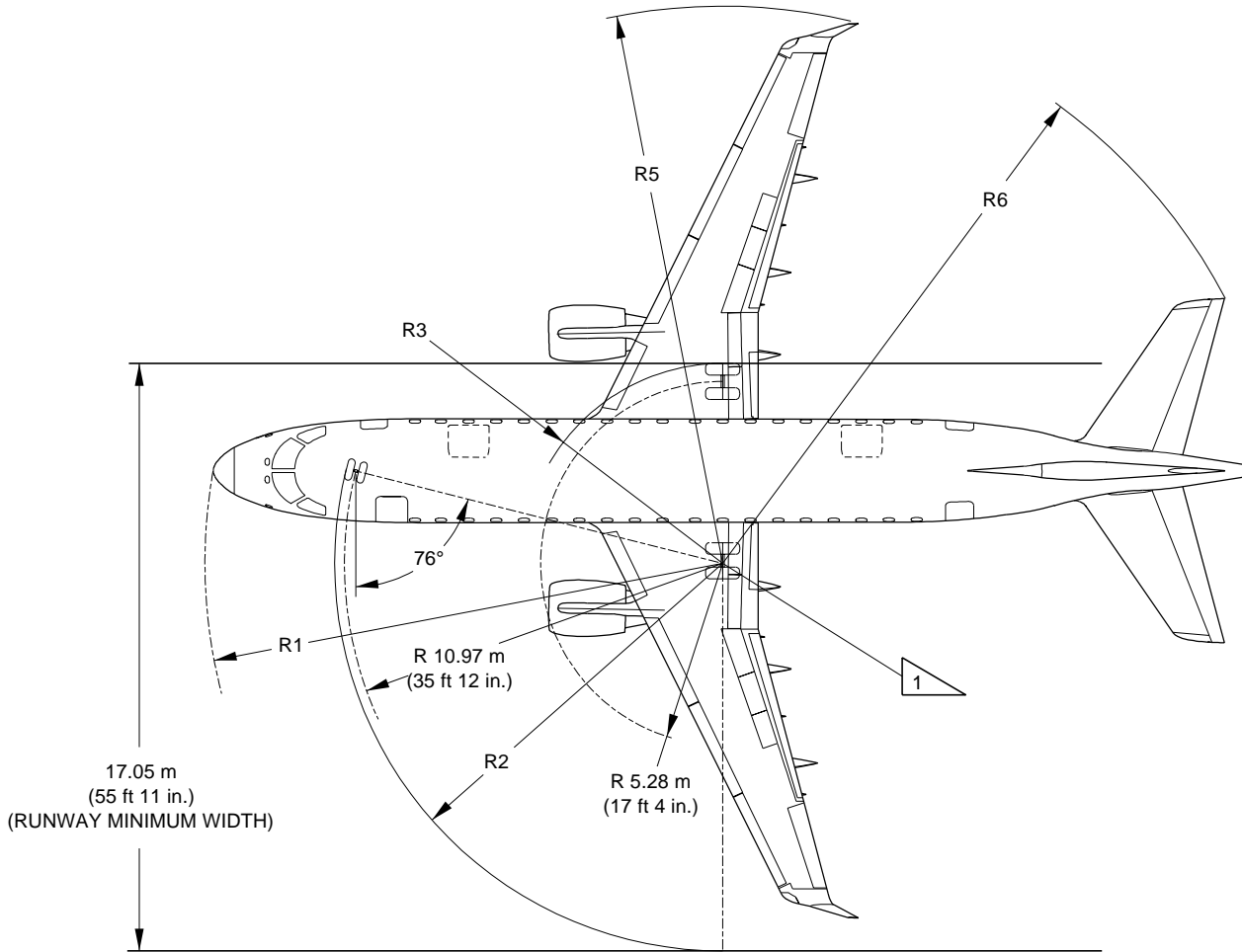
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4.3. **MINIMUM TURNING RADII**



EFFECTIVITY: ALL
Minimum Turning Radius
Figure 4.2



NOTE:
ACTUAL OPERATING DATA MAY BE GREATER THAN VALUES SHOWN
SINCE TIRE SLIPPAGE IS NOT CONSIDERED IN THESE CALCULATIONS.

STEERING ANGLE	NOSE		NOSE LANDING GEAR		OUTBOARD GEAR		RIGHT WINGLET		RIGHT TAILTIP	
	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
76°	15.02 m	49 ft 3 in.	11.25 m	36 ft 11 in.	5.80 m	19 ft 0 in.	16.17 m	53 ft 1 in.	16.48 m	54 ft 1 in.

1 THEORETICAL CENTER OF TURN FOR MINIMUM RADIUS.
SHOWS CONTINUOUS TURNING WITH ENGINE THRUST AS REQUIRED.
NO DIFFERENTIAL BRAKING.

EM170APM040001A.DGN



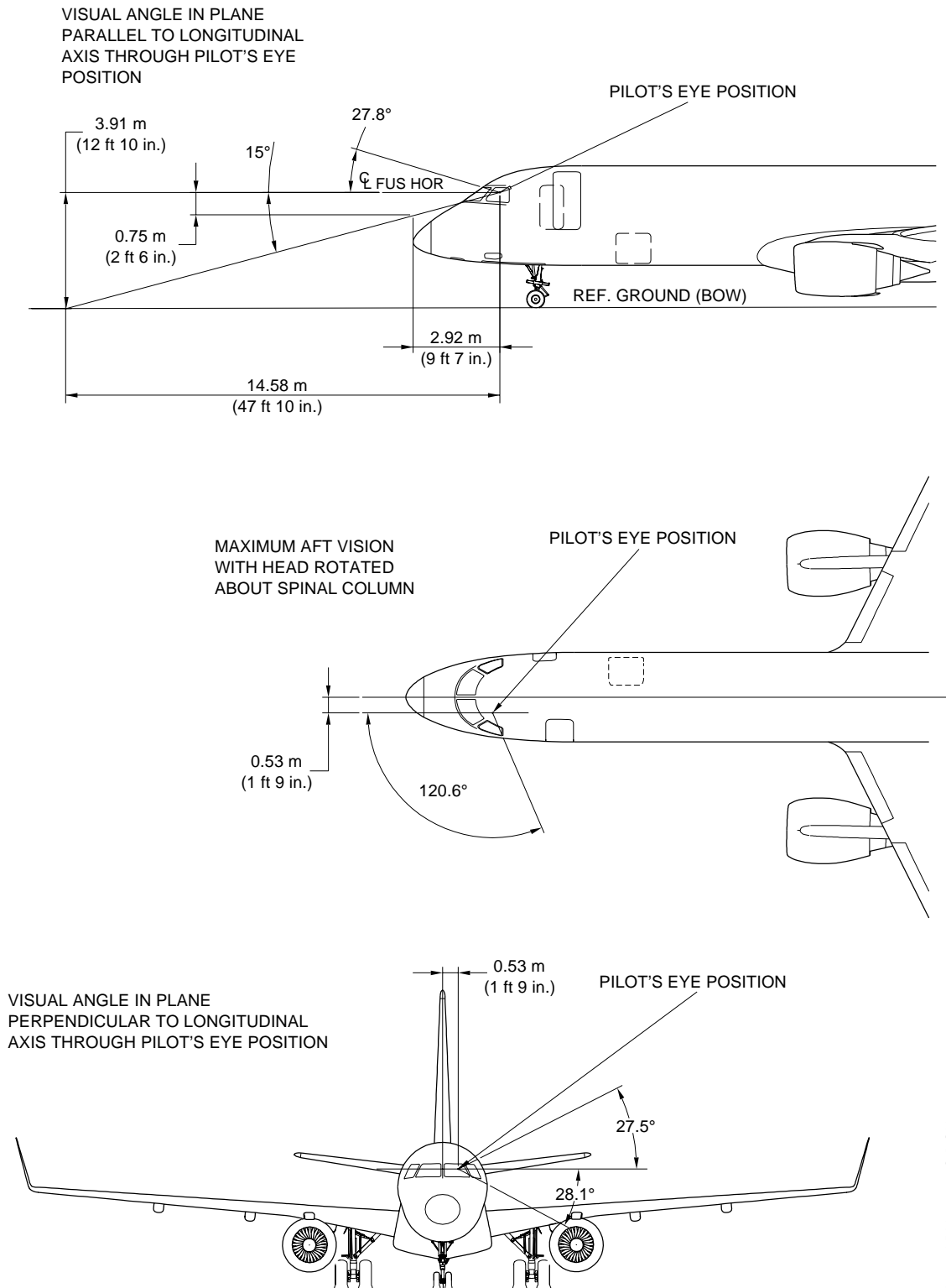
4.4. **VISIBILITY FROM COCKPIT**



EFFECTIVITY: ALL

Visibility from Cockpit in Static Position

Figure 4.3



EM170APM040006C.DGN

**4.5. RUNWAY AND TAXIWAY DIMENSIONS**

To determine the minimum dimensions for runway and taxiway where the aircraft can be operated, the reference code of the aircraft must be determined.

The reference code of a specific aircraft is obtained in accordance with the Aerodrome Design and Operations - Volume 1, by the ICAO.

The code is composed of two elements which are related to the aircraft performance characteristics and dimensions:

- Element 1 is a number based on the aircraft reference field length.
- Element 2 is a letter based on the aircraft wingspan and outer main landing gear wheel span.

The table below shows the reference codes:

Table 4.1 - Reference Codes

CODE ELEMENT 1		CODE ELEMENT 2		
CODE NUMBER	AIRCRAFT REFERENCE FIELD LENGTH	CODE LETTER	WING SPAN	OUTER MAIN LANDING GEAR WHEEL SPAN
1	Less than 800 m (2624 ft 8 in)	A	Up to 15 m (49 ft 3 in)	Up to 4.5 m (14 ft 9 in)
2	800 m (2624 ft 8 in) up to 1200 m (3937 ft)	B	15 m (49 ft 3 in) to 24 m (78 ft 9 in)	4.5 m (14 ft 9 in) to 6 m (19 ft 8 in)
3	1200 m (3937 ft) up to 1800 m (5905 ft 6 in)	C	24 m (78 ft 9 in) to 36 m (118 ft 1 in)	6 m (19 ft 8 in) to 9 m (29 ft 6 in)
4	1800 m (5905 ft 6 in) and over	D	36 m (118 ft 1 in) to 52 m (170 ft 7 in)	9 m (29 ft 6 in) to 14 m (45 ft 11 in)
—	—	E	52 m (170 ft 7 in) to 65 m (213 ft 3 in)	9 m (29 ft 6 in) to 14 m (45 ft 11 in)

In accordance with the table, the reference code for the EMBRAER 170STD and 170LR is 3C.

- NOTE:**
- Classification considering CF34-8E5A1 engines.
 - This classification may change depending on aircraft engine model and takeoff weight.

With the reference code it is possible to obtain the limits of the runway and taxiway where the aircraft can be operated. For reference code 3C the limits are:

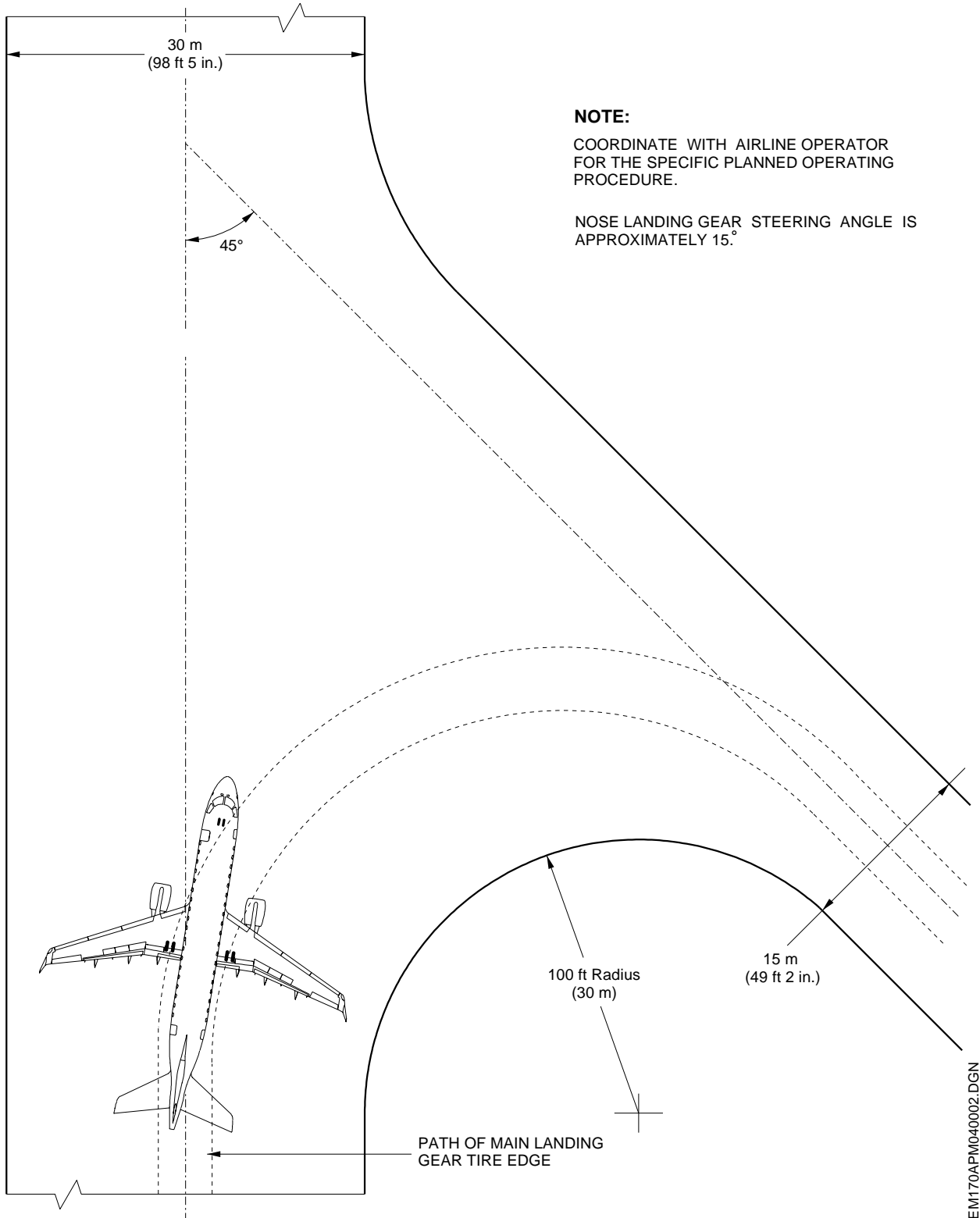
- The width of a runway should not be less than 30 m (98 ft 5 in).
- The width of a taxiway should not be less than 15 m (49 ft 2 in).
- The design of the curve in a taxiway should be such that, when the cockpit remains over the taxiway center line marking, the clearance distance between the outer main landing gear wheels of the aircraft and the edge of the taxiway should not be less than 3 m (9 ft 10 in).
- The clearance between a parked aircraft and one moving along the taxiway in a holding bay should not be less than 15 m (49 ft 3 in).



EFFECTIVITY: ALL

More than 90° Turn - Runway to Taxiway

Figure 4.4



NOTE:

COORDINATE WITH AIRLINE OPERATOR FOR THE SPECIFIC PLANNED OPERATING PROCEDURE.

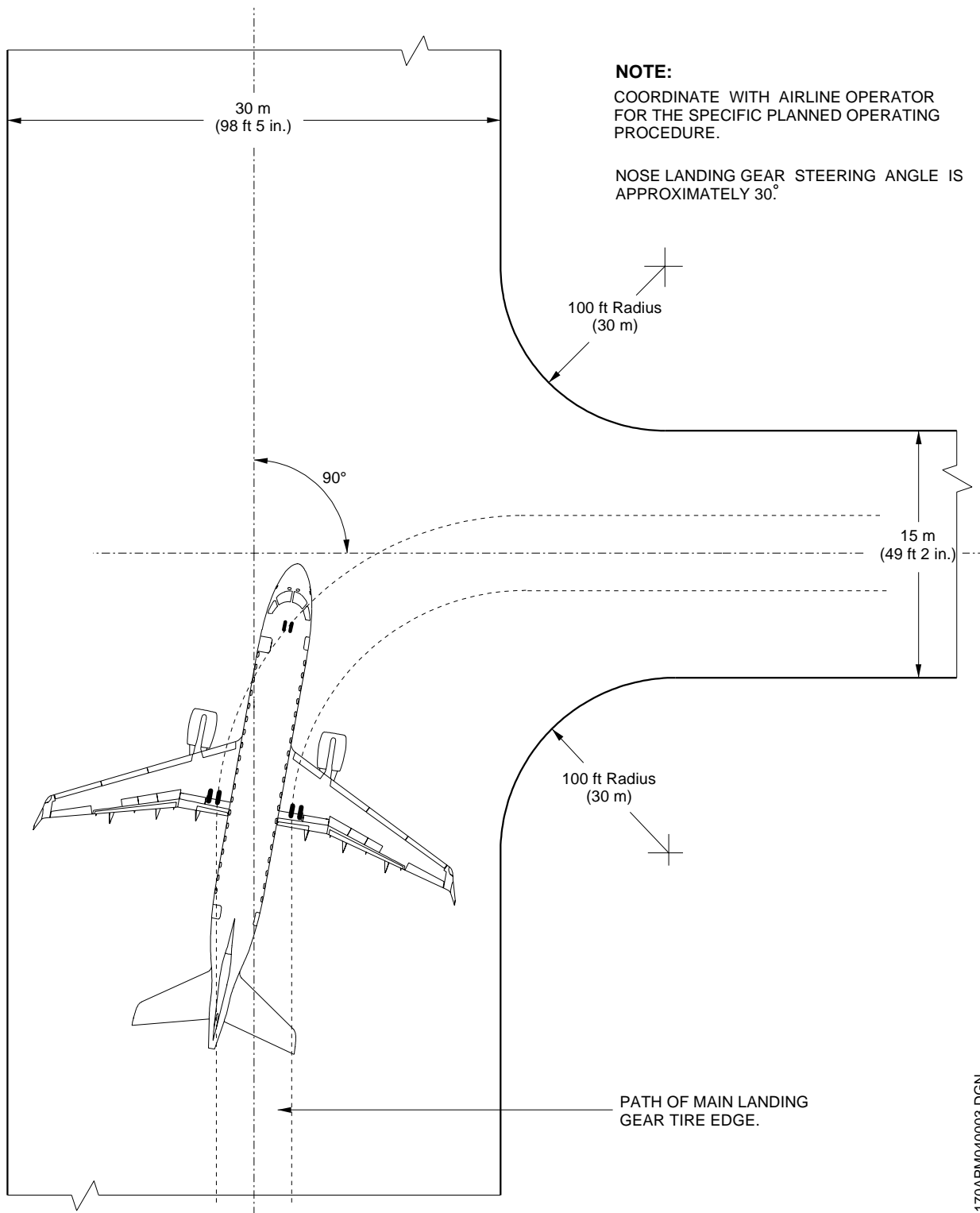
NOSE LANDING GEAR STEERING ANGLE IS APPROXIMATELY 15°.



EFFECTIVITY: ALL

90° Turn - Runway to Taxiway

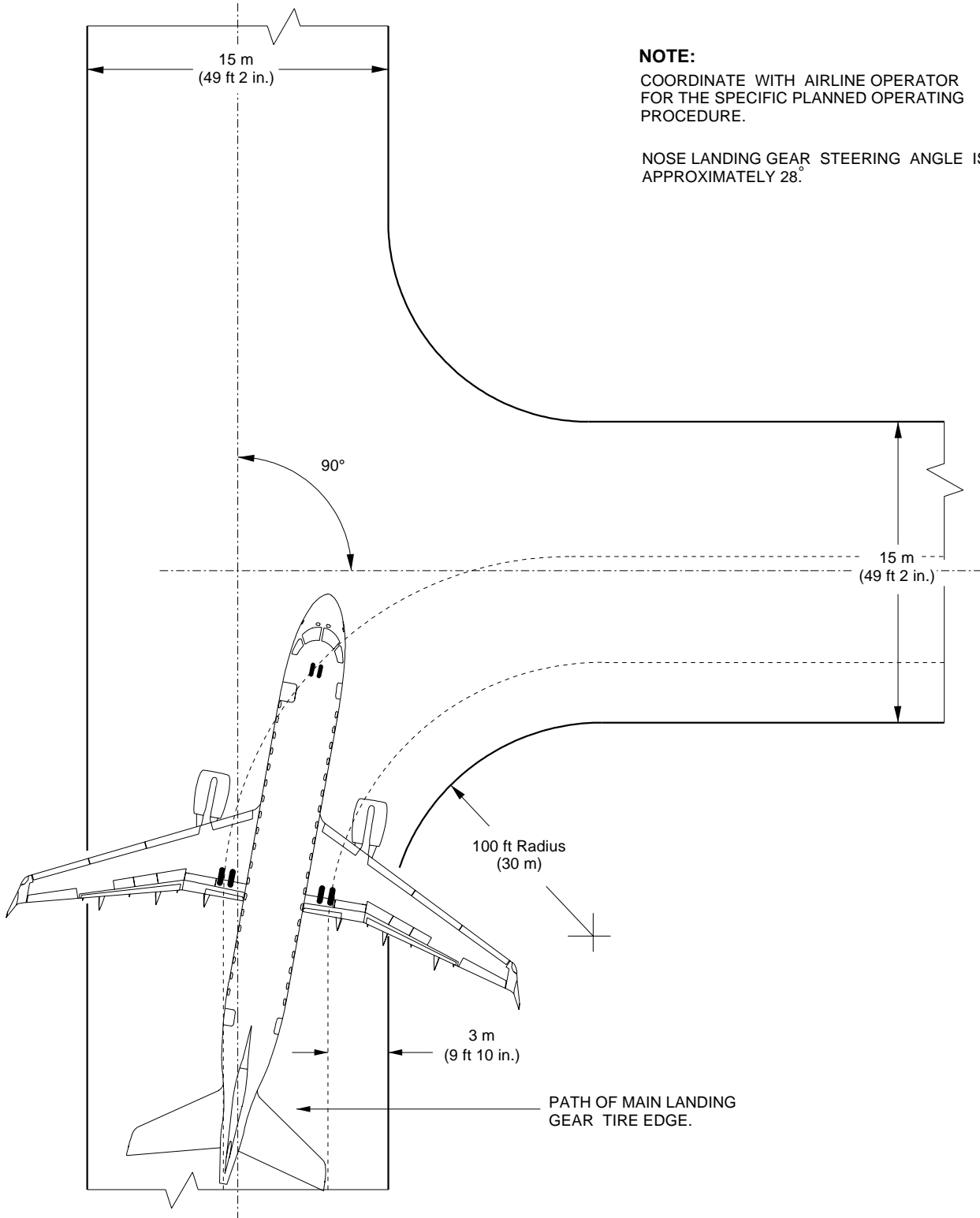
Figure 4.5



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EFFECTIVITY: ALL
90° Turn - Taxiway to Taxiway
Figure 4.6



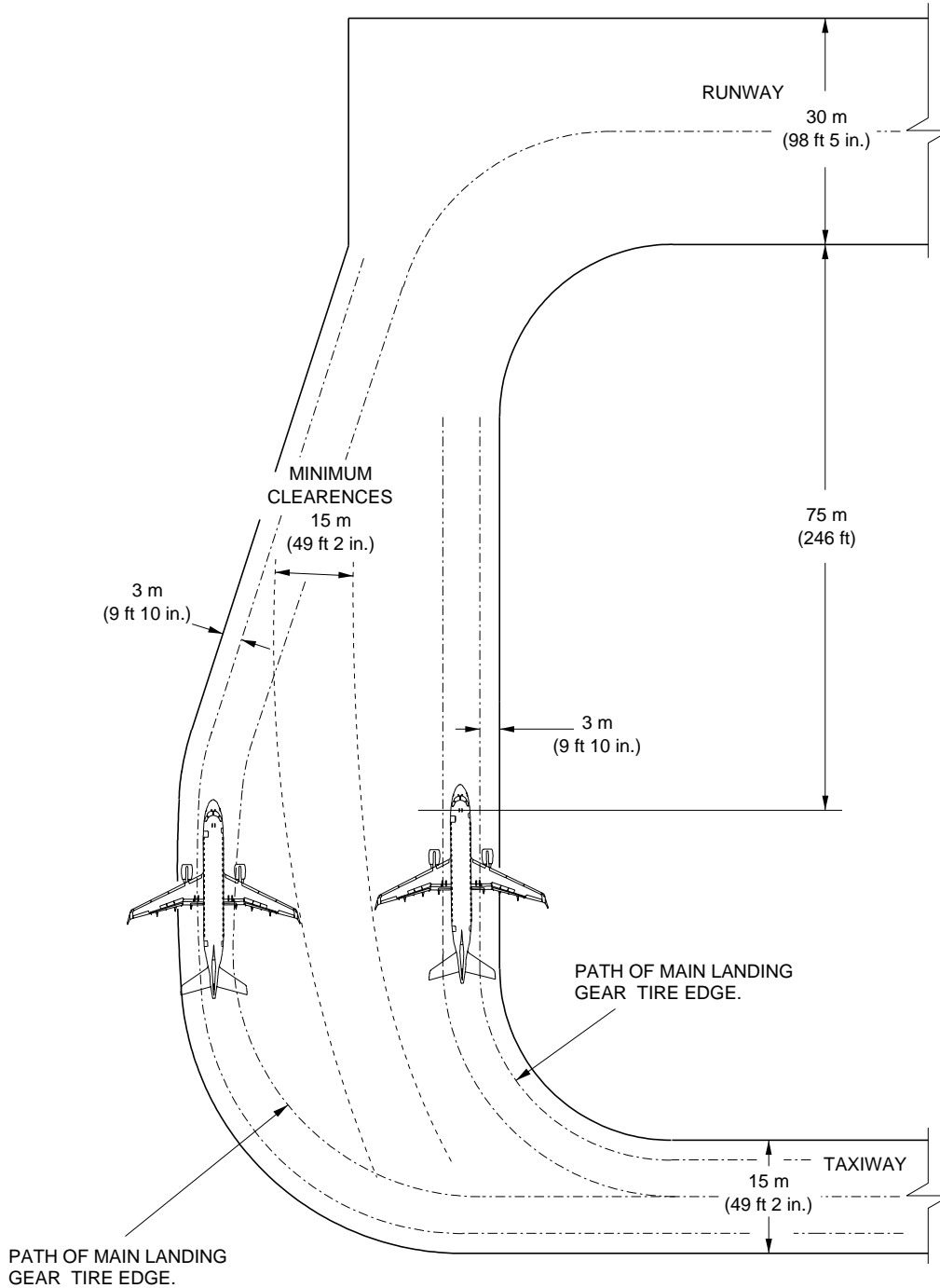
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4.6. **RUNWAY HOLDING BAY**



EFFECTIVITY: ALL
Runway Holding Bay
Figure 4.7



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**5. TERMINAL SERVICING***EFFECTIVITY: ALL***5.1. GENERAL**

During turnaround at the air terminal, certain services must be performed on the aircraft, usually within a given time to meet flight schedules. This section shows service vehicle arrangements, schedules, locations of servicing points, and typical servicing requirements. The data presented herein reflect ideal conditions for a single aircraft. Servicing requirements may vary according to the aircraft condition and airline operational (servicing) procedures.

This section provides the following information:

- The typical arrangements of equipment during turnaround;
- The typical turnaround servicing time at an air terminal;
- The locations of ground servicing connections in graphic and tabular forms;
- The typical sea level air pressure and flow requirements for starting the engine;
- The air conditioning requirements;
- The ground towing requirements for various towing conditions. Towbar pull and total traction wheel load may be determined by considering aircraft weight, pavement slope, coefficient of friction, and engine idle thrust.

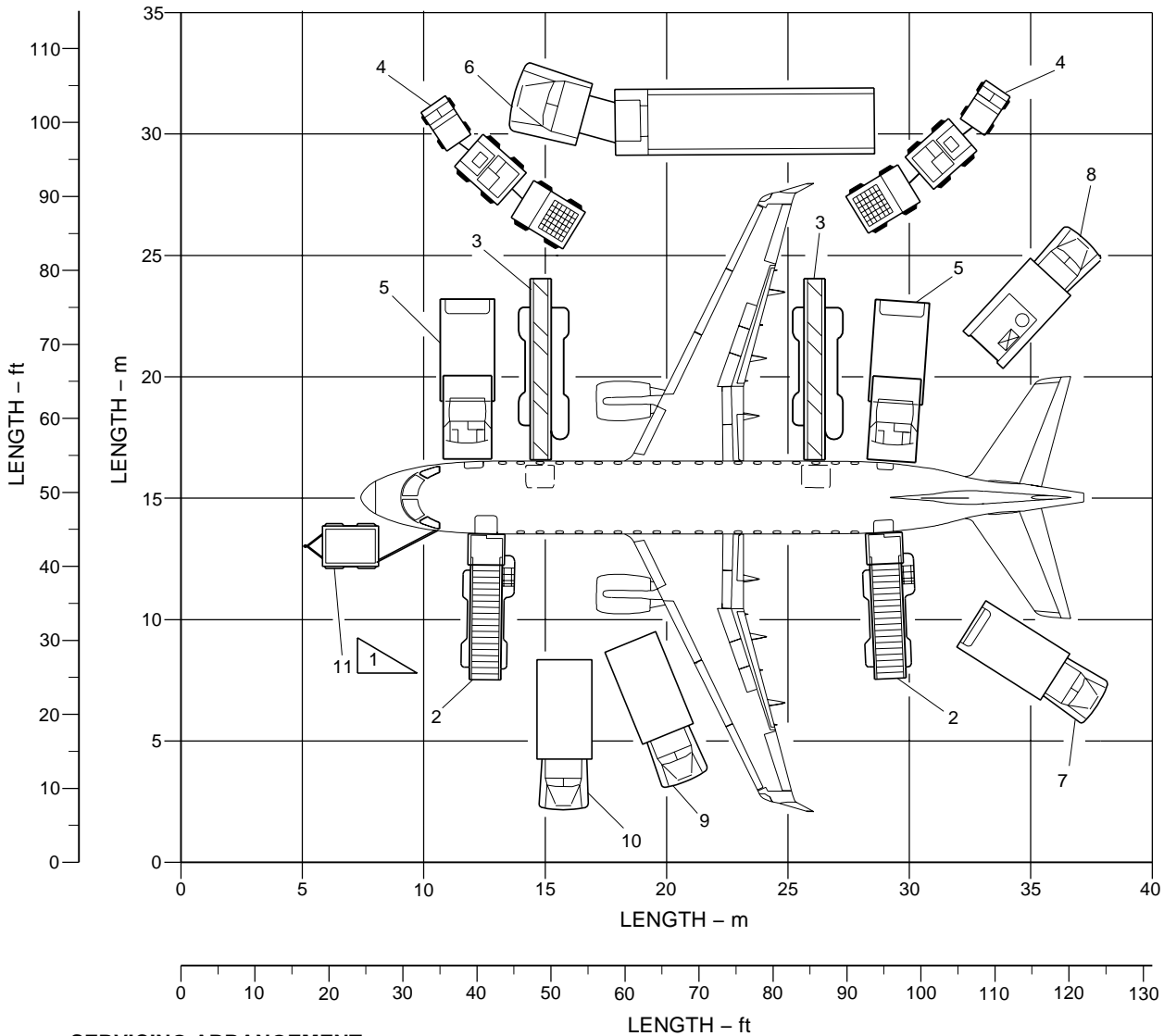
5.2. AIRCRAFT SERVICING ARRANGEMENT



EFFECTIVITY: ALL

Aircraft Servicing Arrangement With Passenger Stairs

Figure 5.1



SERVICING ARRANGEMENT

- 02 – PASSENGER STAIRS
- 03 – CARGO LOADER
- 04 – BAGGAGE / CARGO TROLLEY AND TUG
- 05 – GALLEY SERVICE VEHICLE
- 06 – FUEL SERVICE
- 07 – POTABLE WATER
- 08 – LAVATORY SERVICE VEHICLE
- 09 – AIR CONDITIONING UNIT
- 10 – PNEUMATIC STARTER
- 11 – GROUND POWER UNIT



THE GPU CAN BE MOVED TO BETTER POSITION CONSIDERING THE GROUND CONNECTION AND THE CABLE EXTENSION.

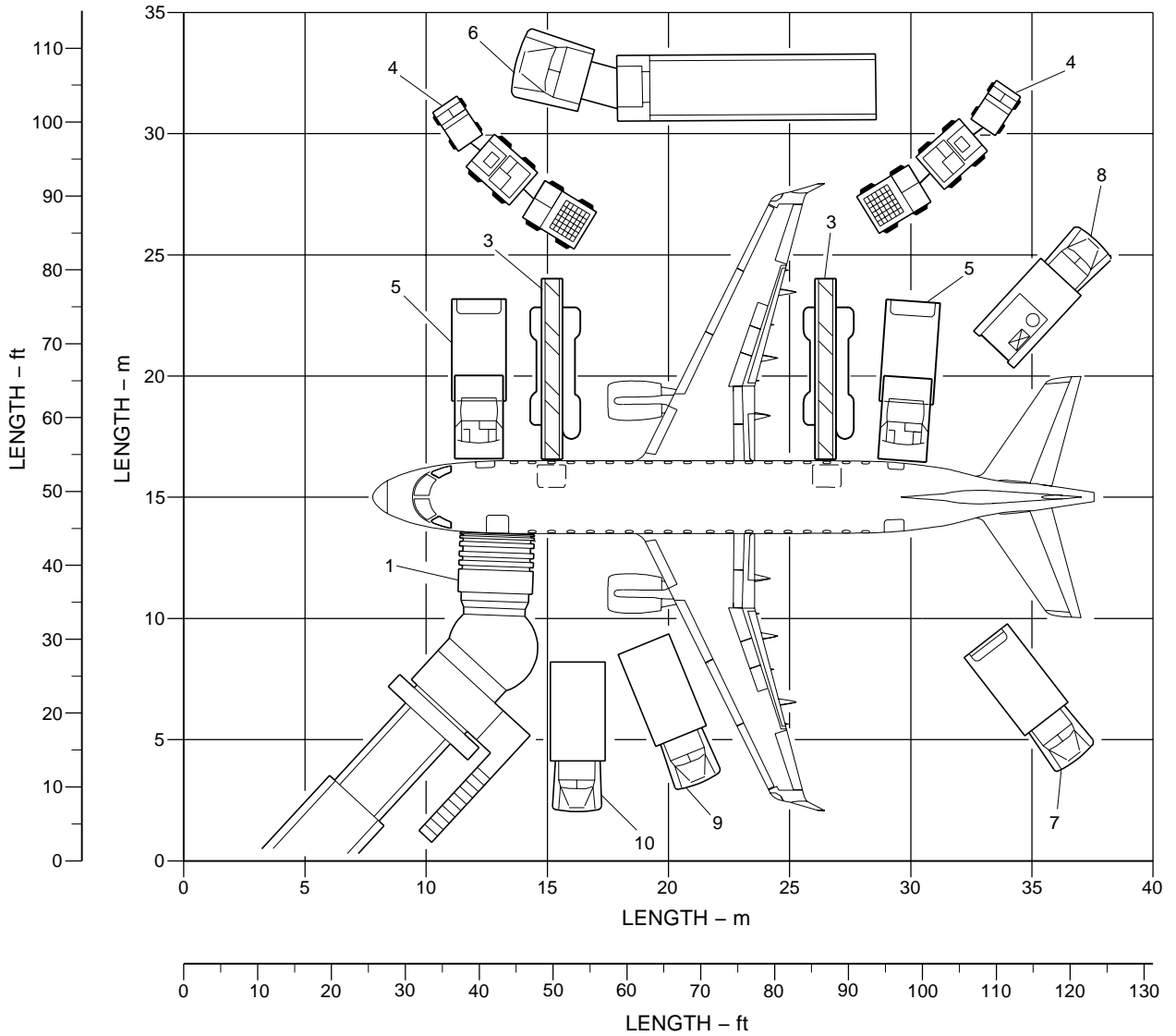
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EFFECTIVITY: ALL

Aircraft Servicing Arrangement With Passenger Bridge

Figure 5.2



SERVICING ARRANGEMENT

- 01 – PASSENGER BRIDGE
- 03 – CARGO LOADER
- 04 – BAGGAGE / CARGO TROLLEY AND TUG
- 05 – GALLEY SERVICE VEHICLE
- 06 – FUEL SERVICE
- 07 – POTABLE WATER
- 08 – LAVATORY SERVICE VEHICLE
- 09 – AIR CONDITIONING UNIT
- 10 – PNEUMATIC STARTER

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5.3. TERMINAL OPERATIONS - TURNAROUND STATION

This section presents the typical turnaround servicing time at an air terminal. The chart gives typical schedules for servicing the aircraft within a given time.

The time of each service in the chart was calculated taking the following into consideration:

- Load factor - 100%;
- Passenger deplane - 24 pax/min;
- Passenger enplane - 16 pax/min;
- Baggages checked per passenger - 1,2;
- Refuel (fuel quantity) - 80%;
- Flow - 290 gpm;
- Potable water - 70% to be refilled (56 ℓ);
- Galley service FWD and aft sequence - in parallel;
- Toilet type - vacuum;
- Baggages unloading/loading FWD/aft sequence - in parallel;
- Only FWD passenger door to be used to deplane and enplane passengers.

Servicing times could be rearranged to suit availability of personnel, aircraft configuration, and degree of servicing required.

The data illustrates the general scope and tasks involving airport terminal operations. Airline particular practices and operating experience will result in different sequences and intervals.



EFFECTIVITY: ALL

Air Terminal Operation - Turnaround Station

Figure 5.3

ELAPSED TIME (MINUTES)		↓	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
OPERATIONS		min.																				
PAX SERVICES	BRIDGE/STAIRS POSITIONING	1,0	█																			
	PASSENGERS DEPLANE	2,9		▢																		
	GALLEY SERVICING-FWD	6,0	█	▢							█											
	GALLEY SERVICING-AFT	6,0	█	▢							█											
	AIRPLANE INTERIOR SERVICES	4,4		▢																		
	PASSENGERS ENPLANE	4,4										▢										
	BRIDGE / STAIRS REMOVAL	1,0																			▢	
	PUSH BACK / ENGINES START	2,0																				▢
BAGGAGE & CARGO	FWD BAGGAGE / CARGO UNLOAD	3,4	█	▢																		
	REAR BAGGAGE / CARGO UNLOAD	2,2	█	▢																		
	TIME BETWEEN UNLOADING / LOADING	0,5																				
	FWD BAGGAGE/CARGO LOAD	5,5																				
	AFT BAGGAGE/CARGO LOAD	3,7																				
AIRCRAFT SERVICING	FUEL SERVICE	8,5	█	▢																		
	POTABLE WATER SERVICE	3,0	█	▢																		
	TOILET SERVICE	5,0	█	▢																		

LEGEND:

█ TRUCK POSITIONING/REMOVAL/SETTINGS

NOTE:

THIS DATA ILLUSTRATES THE GENERAL SCOPE AND TASKS INVOLVING AIRPORT TERMINAL OPERATIONS. AIRLINE PARTICULAR PRACTICES AND OPERATING EXPERIENCE WILL RESULT IN DIFFERENT SEQUENCES AND INTERVALS.

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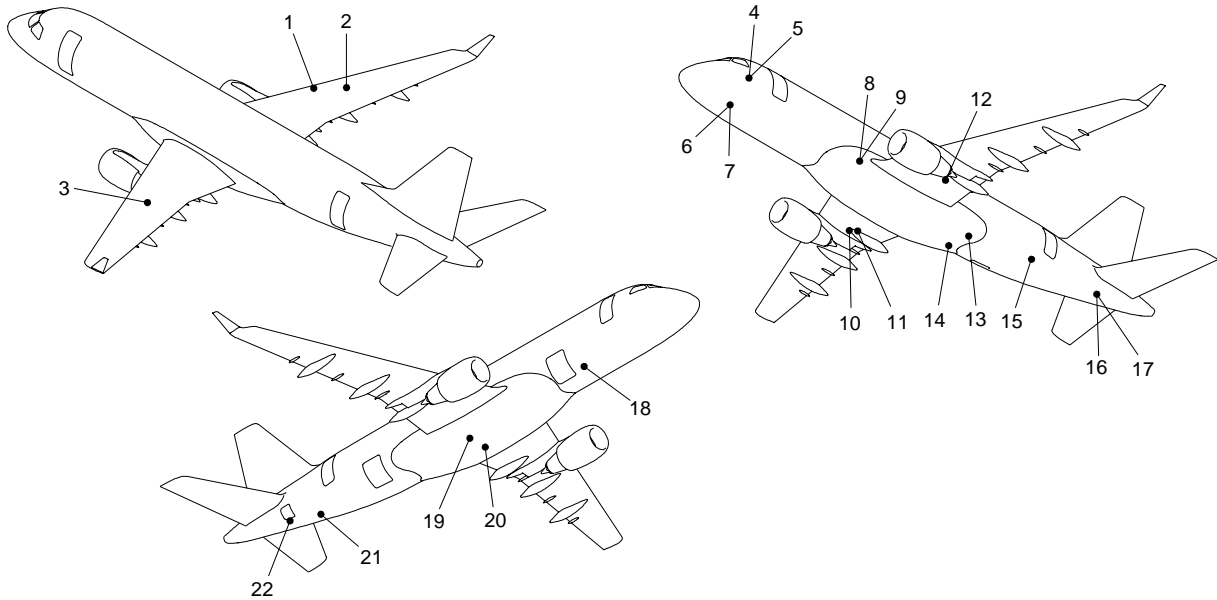
5.4. **TERMINAL OPERATIONS - EN ROUTE STATION**

Not Applicable

5.5. **GROUND SERVICING CONNECTIONS**



EFFECTIVITY: ALL
Ground Servicing Connections
Figure 5.4



ITEM	DESCRIPTION	COORD. X (mm)	COORD. Y (mm)	COORD. Z (mm)	HEIGHT ABOVE GROUND (mm)
1	PRESSURE REFUELING PANEL	13491.27	5702.96	-623.30	2469.26
2	GRAVITY REFUELING PORT (RH)	14789.49	7413.99	-243.75	2848.49
3	GRAVITY REFUELING PORT (LH)	14789.49	-7413.99	-243.75	2848.49
4	EXTERNAL POWER SUPPLY 115 VAC	4146.90	-810.70	-1339.53	1755.33
5	FORWARD RAMP HEADSET	4164.44	-936.13	-1262.71	1832.15
6	STEERING SWITCH DISENGAGE	4136.97	-951.46	-1279.29	1815.58
7	WHEEL JACK POINT - NLG	4121.90	0.00	-2877.81	217.06
8	AIR COND. GROUND CONNECTION	10487.32	80.00	-1979.71	1113.60
9	ENGINE AIR STARTING (LOW PRESSURE UNIT)	10778.80	4.28	-2010.20	1083.03
10	GROUNDING POINT (ELECTRICAL)	14592.10	2560.25	-1343.60	1748.70
11	WHEEL JACK POINT- MLG (RH)	14476.67	2600.00	-2679.11	413.20
12	WHEEL JACK POINT- MLG (LH)	14476.67	-2600.00	-2679.11	413.20
13	HYD. SYS # 1 SERVICE PANEL	16560.17	-808.01	-1602.04	1489.76
14	HYD. SYS # 2 SERVICE PANEL	16560.17	808.01	-1602.04	1489.76
15	WATER SERVICING PANEL	21524.83	-329.37	-1178.74	1911.84
16	EXTERNAL POWER SUPPLY 28 VDC	24084.65	-471.73	-605.30	2484.65
17	AFT RAMP HEADSET	24225.26	-449.47	-585.54	2504.39
18	OXYGEN SERVICING PANEL / BOTTLE	6562.14	1159.87	-961.05	2133.22
19	FUEL TANK DRAIN VALVE (RH)	13352.80	398.47	-1413.71	1678.89
20	FUEL TANK DRAIN VALVE (LH)	13352.80	-398.47	-1413.71	1678.89
21	WASTE SERVICING PANEL	22447.01	349.20	-991.80	2098.55
22	HYD. SYS # 3 SERVICE PANEL	24061.86	519.15	-590.09	2499.87

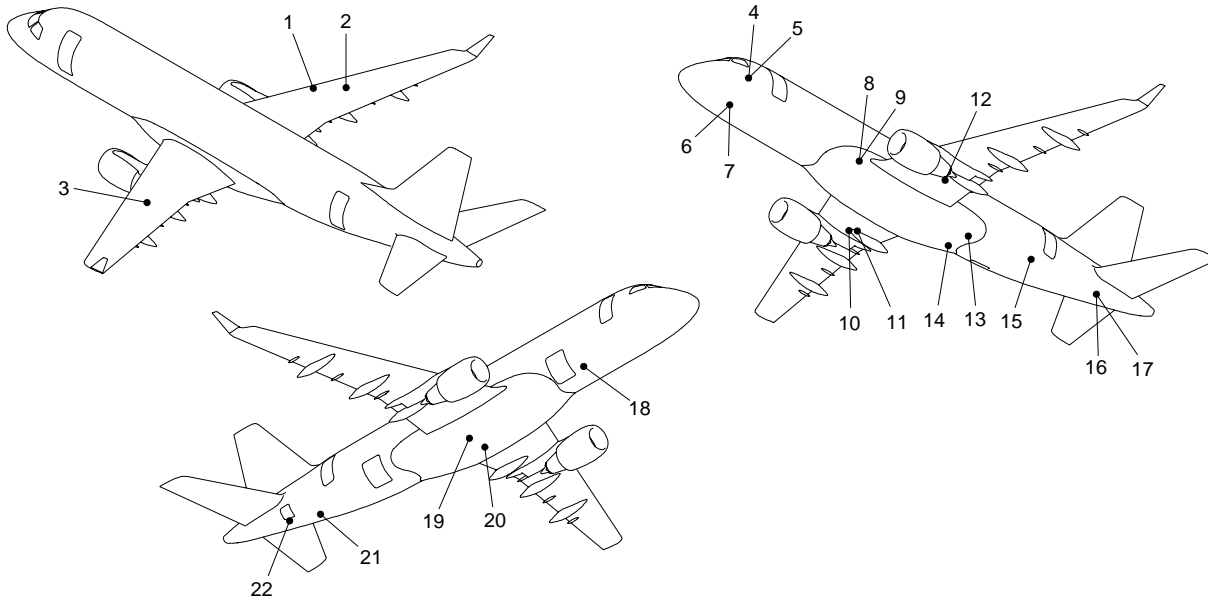
NOTE:

THE GROUND CLEARANCES IN THE TABLE REFER TO THE AIRCRAFT WITH THE MINIMUM OPERATING WEIGHT (MOW) = 21800 kg (CG FWD 7.0% CMA)

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EFFECTIVITY: ALL
Ground Servicing Connections
Figure 5.5



ITEM	DESCRIPTION	COORD. X (mm)	COORD. Y (mm)	COORD. Z (mm)	HEIGHT ABOVE GROUND (mm)
1	PRESSURE REFUELING PANEL	13491.27	5702.96	-623.30	2461.54
2	GRAVITY REFUELING PORT (RH)	14789.49	7413.99	-243.75	2830.76
3	GRAVITY REFUELING PORT (LH)	14789.49	-7413.99	-243.75	2830.76
4	EXTERNAL POWER SUPPLY 115 VAC	4146.90	-810.70	-1339.53	1819.58
5	FORWARD RAMP HEADSET	4164.44	-936.13	-1262.71	1896.25
6	STEERING SWITCH DISENGAGE	4136.97	-951.46	-1279.29	1879.90
7	WHEEL JACK POINT - NLG	4112.77	0.00	-2942.27	217.16
8	AIR COND. GROUND CONNECTION	10487.32	80.00	-1979.71	1129.04
9	ENGINE AIR STARTING (LOW PRESSURE UNIT)	10778.80	4.28	-2010.20	1096.23
10	GROUNDING POINT (ELECTRICAL)	14592.10	2560.25	-1343.60	1732.52
11	WHEEL JACK POINT- MLG (RH)	14475.49	2600.00	-2662.17	414.90
12	WHEEL JACK POINT- MLG (LH)	14475.49	-2600.00	-2662.17	414.90
13	HYD. SYS # 1 SERVICE PANEL	16560.17	-808.01	-1602.04	1458.44
14	HYD. SYS # 2 SERVICE PANEL	16560.17	808.01	-1602.04	1458.44
15	WATER SERVICING PANEL	21524.83	-329.37	-1178.74	1842.28
16	EXTERNAL POWER SUPPLY 28 VDC	24084.65	-471.73	-605.30	2395.36
17	AFT RAMP HEADSET	24225.26	-449.47	-585.54	2414.01
18	OXYGEN SERVICING PANEL / BOTTLE	6562.14	1159.87	-961.05	2178.86
19	FUEL TANK DRAIN VALVE (RH)	13352.80	398.47	-1413.71	1672.25
20	FUEL TANK DRAIN VALVE (LH)	13352.80	-398.47	-1413.71	1672.25
21	WASTE SERVICING PANEL	22447.01	349.20	-991.80	2021.88
22	HYD. SYS # 3 SERVICE PANEL	24061.86	519.15	-590.09	2410.75

NOTE:
THE GROUND CLEARANCES IN THE TABLE REFER TO THE AIRCRAFT WITH THE MINIMUM OPERATING WEIGHT (MOW) = 21800 kg (CG REAR 27.0% CMA)

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5.6. **ENGINE STARTING PNEUMATIC REQUIREMENTS**



EFFECTIVITY: ALL

Engine Starting Pneumatic Requirements

Figure 5.6

TABLE 1 – PNEUMATIC ENGINE START REQUIREMENTS

Altitude ft	Ambient Temp °C	(°F)	Minimum Pressure psia	Minimum Flow lb/min
SL	-40	(-40)	48.0	95.1
SL	15	(59)	43.7	82.0
SL	49	(120)	40.7	73.7
9000	-40	(-40)	37.7	74.5
9000	- 5	(23)	30.0	57.3
9000	13	(86)	28.9	53.4
13,000	-40	(-40)	36.0	71.3
13,000	-11	(12)	27.2	52.2
13,000	21.7	(71)	26.7	49.6
15,000	-40	(-40)	32.9	66.6
15,000	-15	(5)	25.3	49.0
15,000	15	(59)	24.4	46.1

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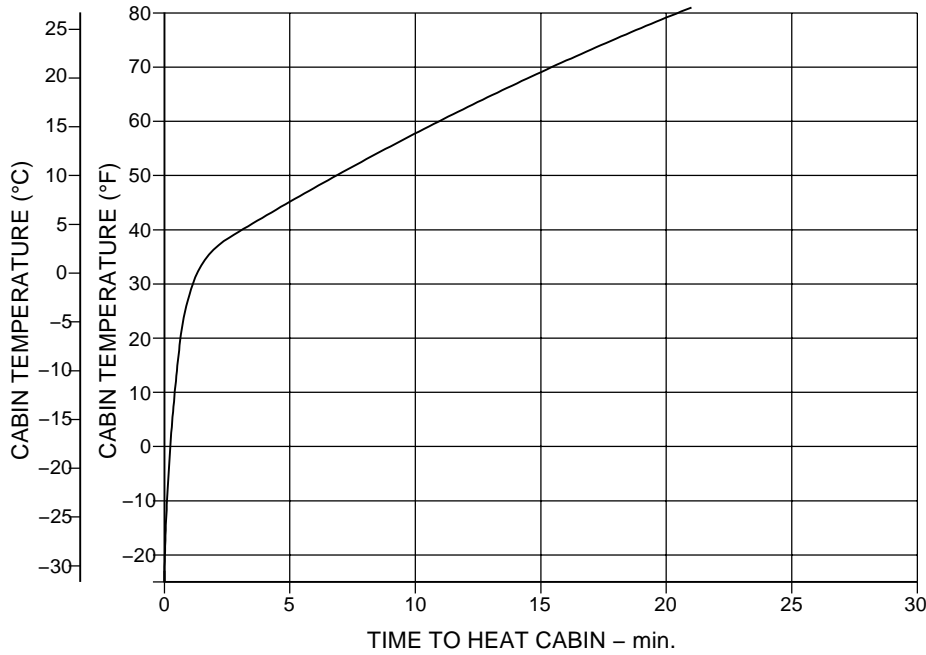
5.7. **GROUND PNEUMATIC POWER REQUIREMENTS**



EFFECTIVITY: ALL

Ground Pneumatic Power Requirements

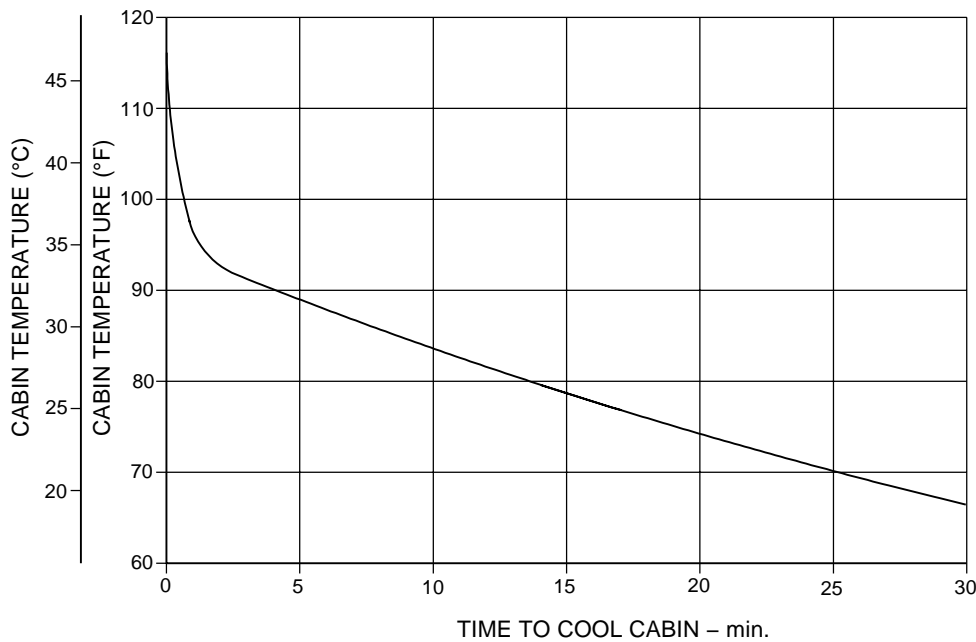
Figure 5.7



HEATING

Initial cabin temp: -32°C (-25°F)
 Outside air temp: -40°C (-40°F)
 Relative Humidity: 0%
 No crew or passengers
 No other heat load

Bleed air from APU:
 87 kg/min. (192.0 lb/min.)
 452 kPa (65.5 psia)
 2 operating packs (ECS)



COOLING

Initial cabin temp: 47°C (116°F)
 Outside air temp: 40°C (104°F)
 Relative Humidity: 40%
 No crew or passengers
 No other heat load

Bleed air from APU:
 56 kg/min. (122.9 lb/min.)
 413 kPa (59.9 psia)
 2 operating packs (ECS)

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**5.8. PRECONDITIONED AIRFLOW REQUIREMENTS**

This subsection presents the following information:

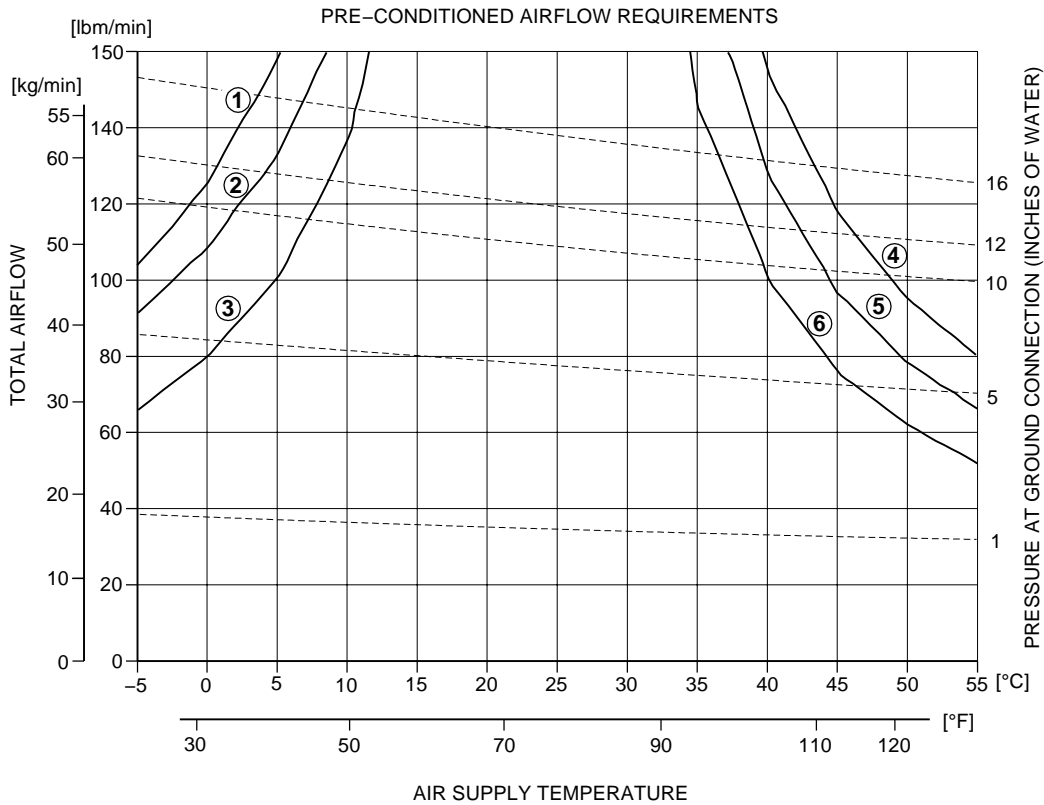
- The air conditioning requirements for heating and cooling using ground conditioned air. The curves show airflow requirements to heat or cool the aircraft at ambient conditions for the period of time that will be necessary.
- The air conditioning heating and cooling requirements to maintain a constant cabin air temperature using low-pressure conditioned air. This conditioned air is supplied through a ground air connection directly to the passenger cabin, bypassing the air cycle machines.



EFFECTIVITY: ALL

Preconditioned Airflow Requirements

Figure 5.8



LEGEND:

- ① CABIN AT 24°C (74°F), 97 OCCUPANTS, BRIGHT DAY (SOLAR IRRADIATION), 39°C (103°F) DAY.
- ② SAME AS 1 EXCEPT CABIN 27°C (81°F)
- ③ SAME AS 1 EXCEPT CABIN 24°C (74°F), NO CABIN OCCUPANTS, FOUR CREWS MEMBERS ONLY.
- ④ CABIN AT 24°C (74°F), NO CABIN OCCUPANTS, FOUR CREW MEMBERS ONLY, OVERCAST DAY (NO SOLAR IRRADIATION), -40°C (-40°F) DAY.
- ⑤ SAME AS 4 EXCEPT -29°C (-20°F) DAY.
- ⑥ SAME AS 4 EXCEPT -18°C (-0°F) DAY.

NOTES:

- MAXIMUM ALLOWABLE TEMPERATURE 88°C (190°F) (UPPER LIMIT DURING PULL UP OPERATION).
- MAXIMUM ALLOWABLE PRESSURE AT GROUND CONNECTION 203mmH2O (8 INCHES OF WATER).

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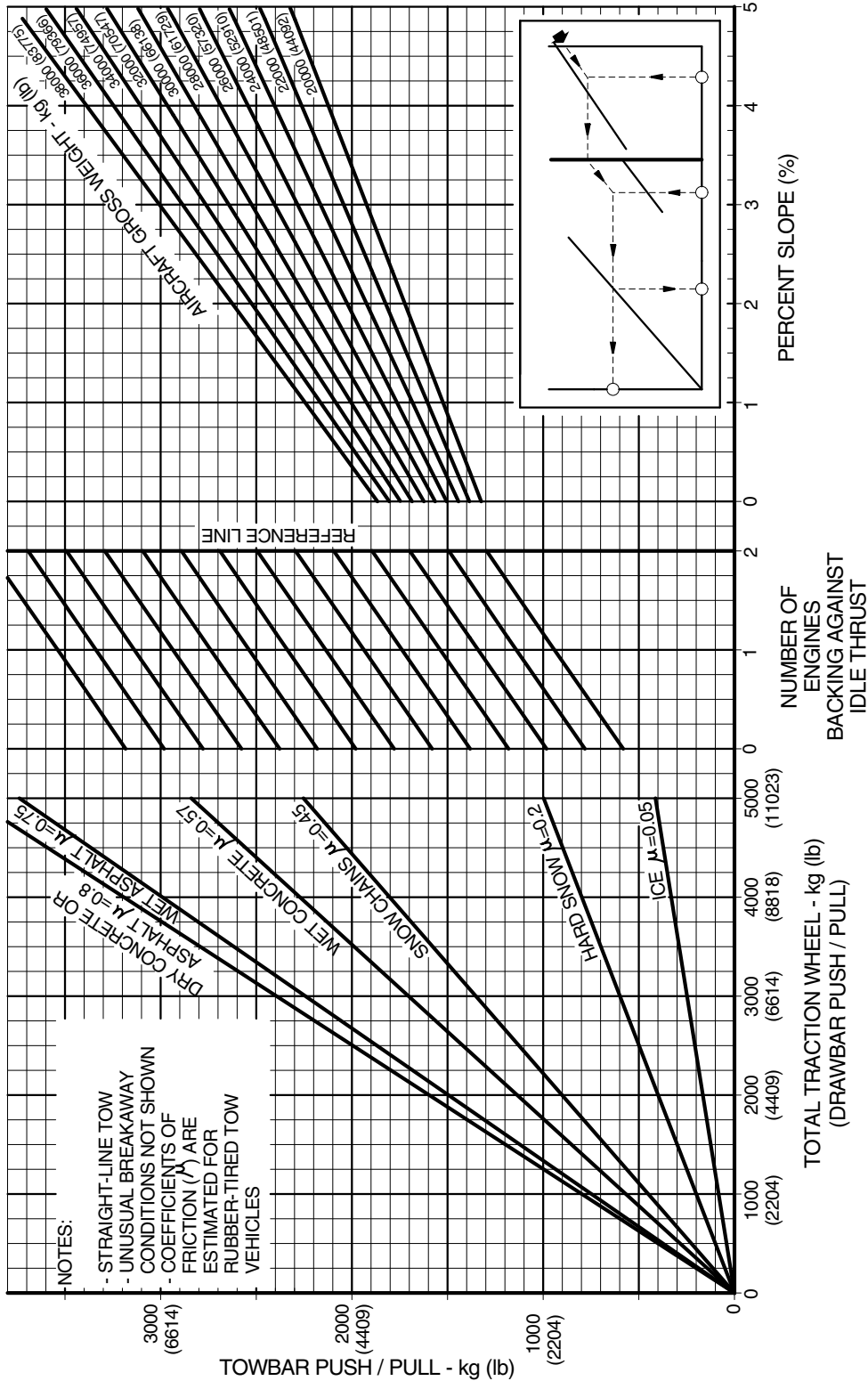


5.9. **GROUND TOWING REQUIREMENTS**



EFFECTIVITY: ALL
Ground Towing Requirements
Figure 5.9

GROUND PUSHBACK / TOWING REQUIREMENTS



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**6. OPERATING CONDITIONS***EFFECTIVITY: ALL***6.1. GENERAL**

This section provides the following information:

- The jet engine exhaust velocities and temperatures.
- The airport and community noise levels.
- The hazard areas.

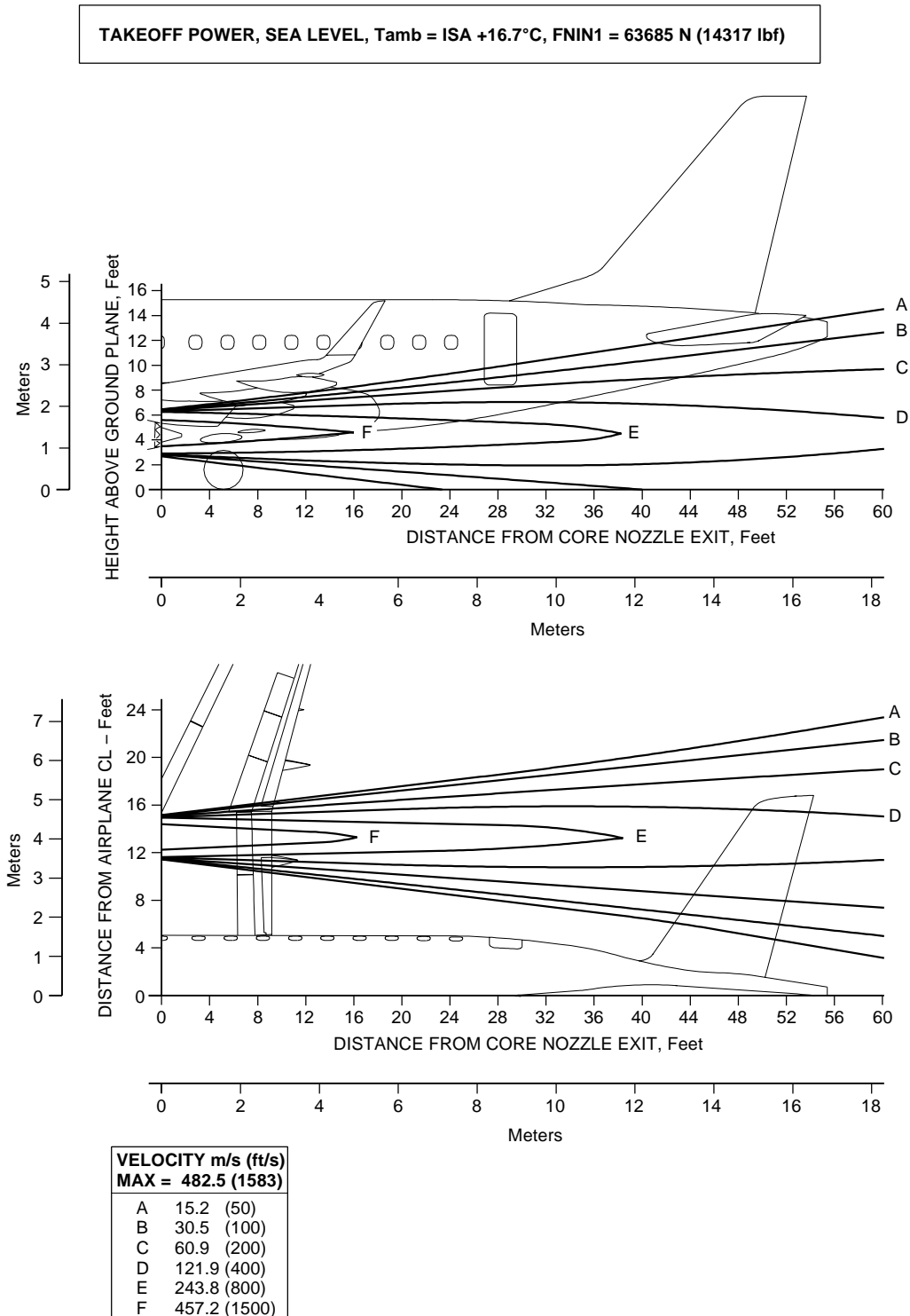
6.2. ENGINE EXHAUST VELOCITIES AND TEMPERATURES



EFFECTIVITY: ALL

Jet Wake Velocity Profile - Takeoff Power

Figure 6.1



NOTE:

EXHAUST VELOCITY CONTOURS INCLUDE WORST CASE 20 kn HEADWIND WITH GROUND EFFECTS.

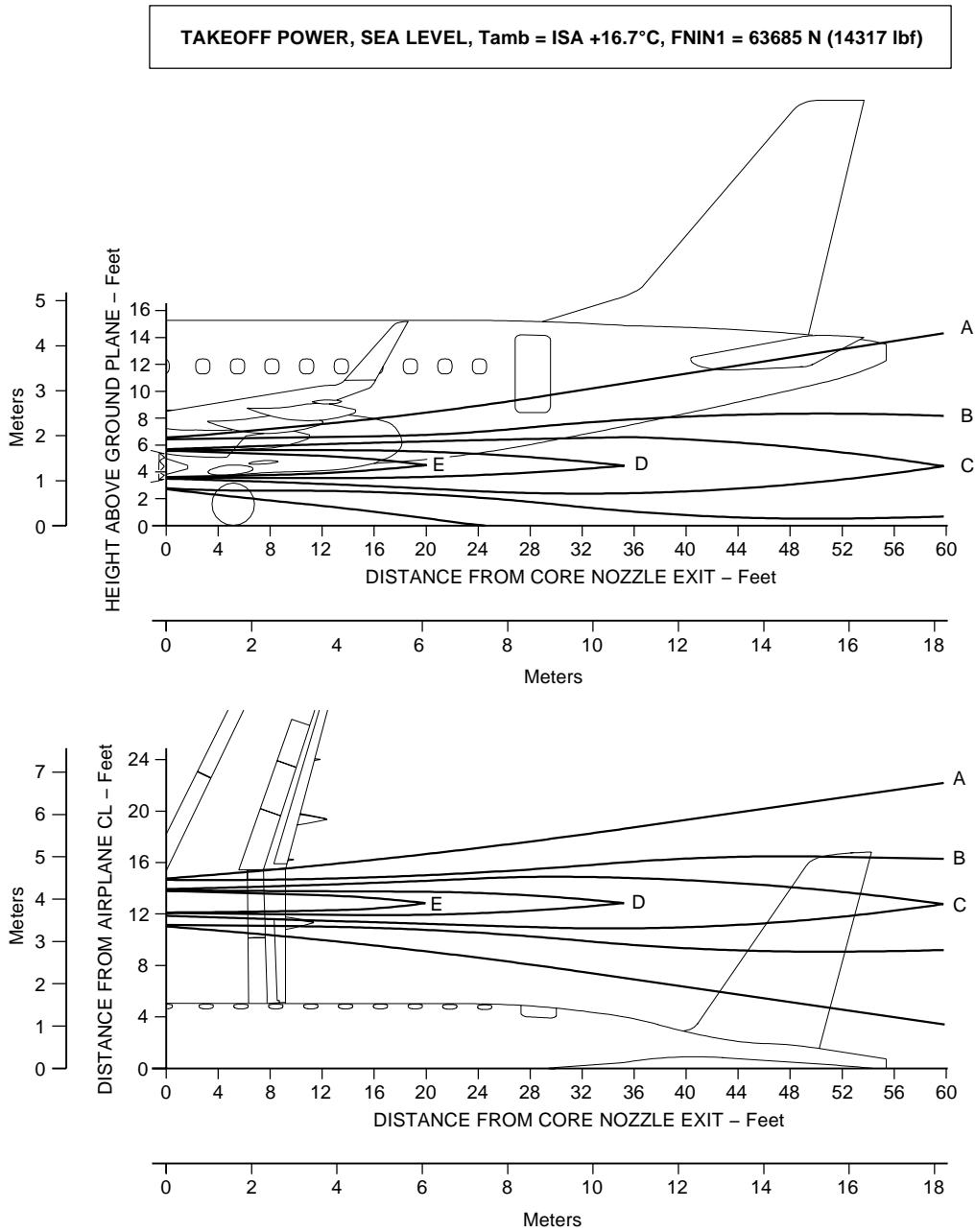
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EFFECTIVITY: ALL

Jet Wake Temperature Profile - Takeoff Power

Figure 6.2



TOTAL TEMPERATURE MAX = 689°C (1273°F)		
	°C	°F
A	38	100
B	66	150
C	93	200
D	204	400
E	582	900

NOTE:

EXHAUST TEMPERATURE CONTOURS INCLUDE WORST CASE 20 kn HEADWIND.

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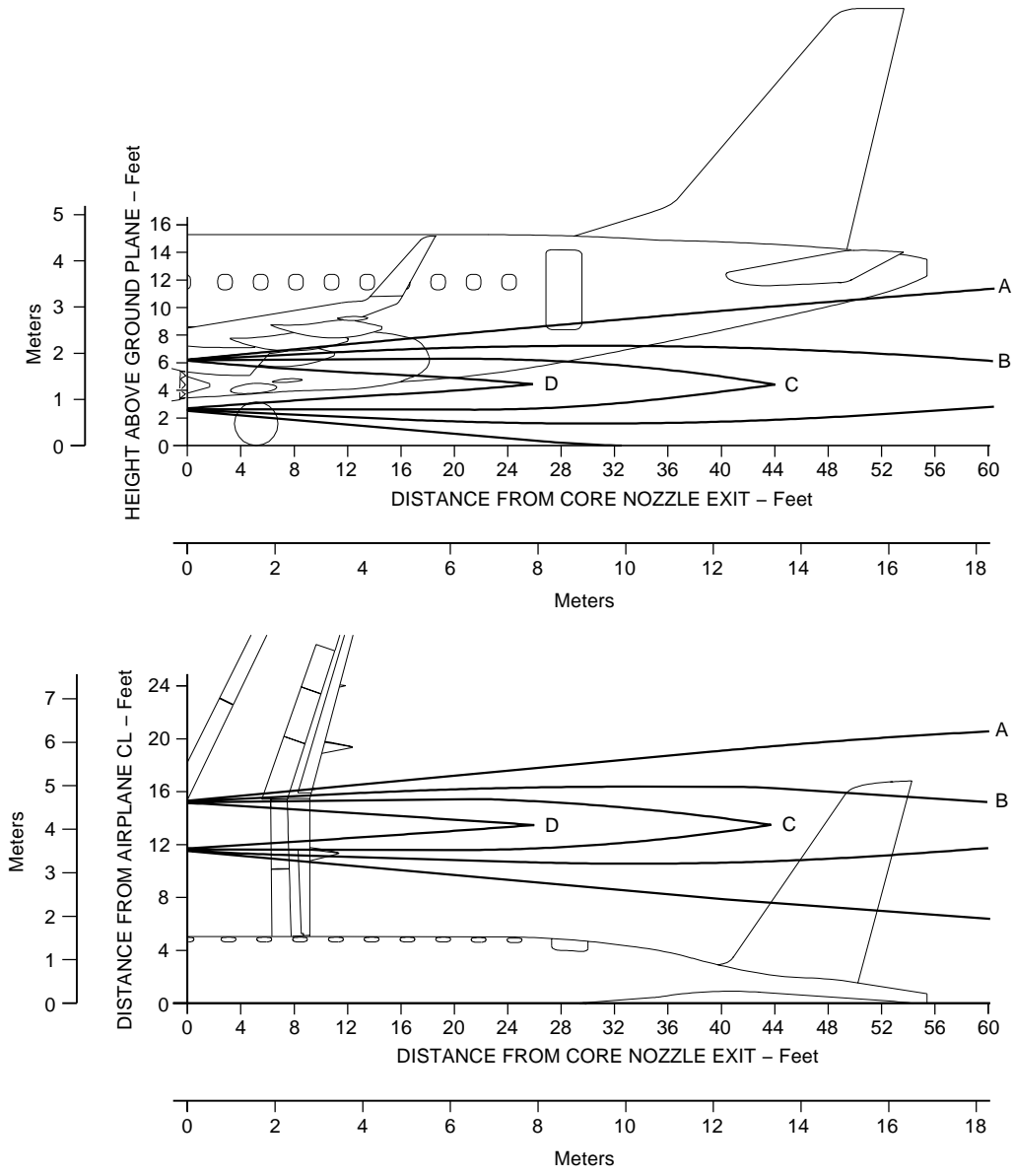


EFFECTIVITY: ALL

Jet Wake Velocity Profile - Ground Idle

Figure 6.3

GROUND IDLE, SEA LEVEL, Tamb = ISA +16.7°C, FNIN1 = 3785 N (851 lbf)



VELOCITY m/s (ft/s)	
MAX = 89.0 (292)	
A	15.2 (50)
B	30.5 (100)
C	45.7 (150)
D	76.2 (250)

NOTE:
EXHAUST VELOCITY CONTOURS INCLUDE WORST CASE 20 kn HEADWIND WITH GROUND EFFECTS.

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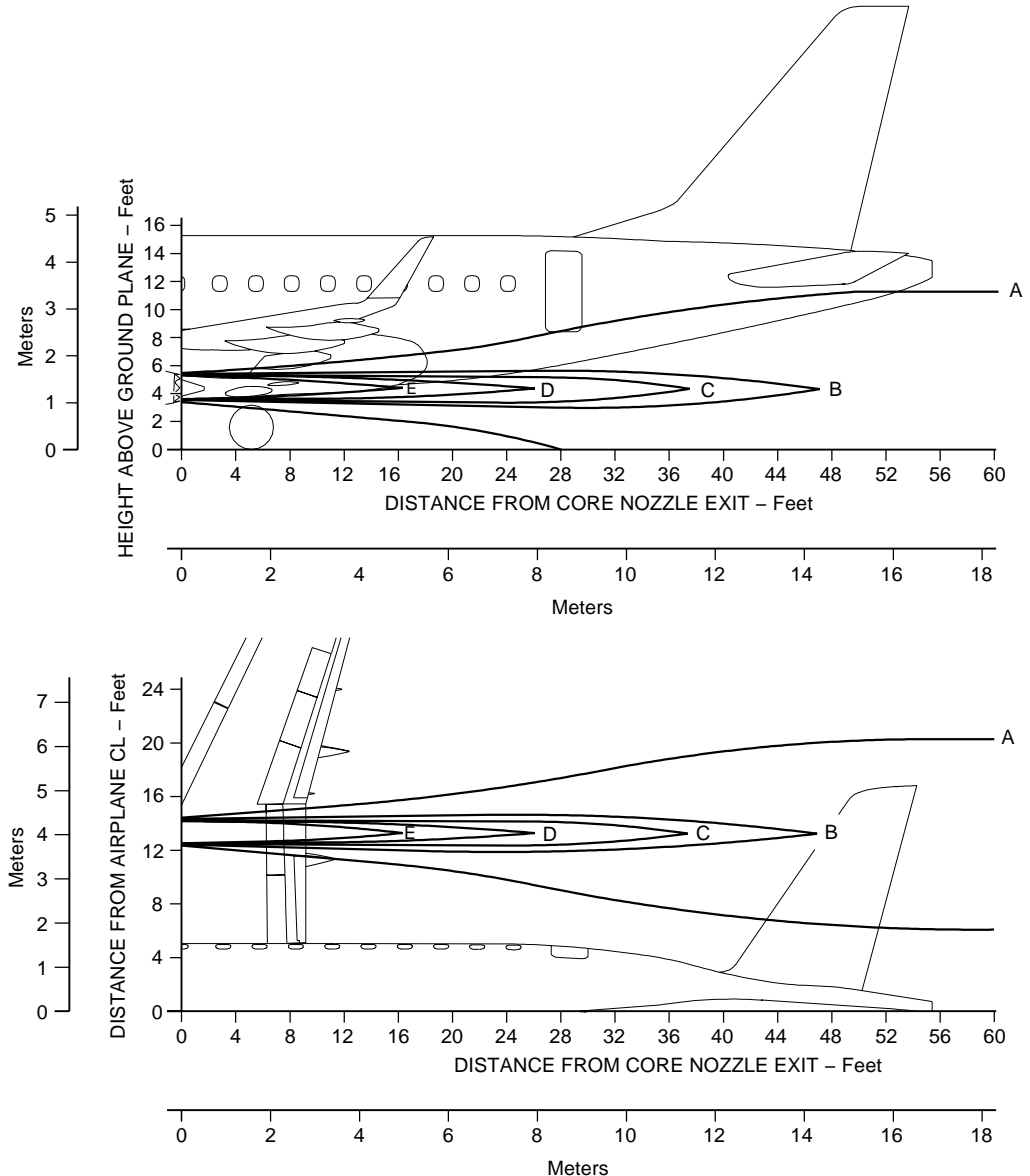


EFFECTIVITY: ALL

Jet Wake Temperature Profile - Ground Idle

Figure 6.4

GROUND IDLE, SEA LEVEL, Tamb = ISA +16.7°C, FNIN1 = 3785 N (851 lbf)



TOTAL TEMPERATURE MAX = 519°C (966°F)		
	°C	°F
A	38	100
B	66	150
C	93	200
D	204	400
E	582	900

NOTE:

EXHAUST TEMPERATURE CONTOURS INCLUDE WORST CASE 20 kn HEADWIND.

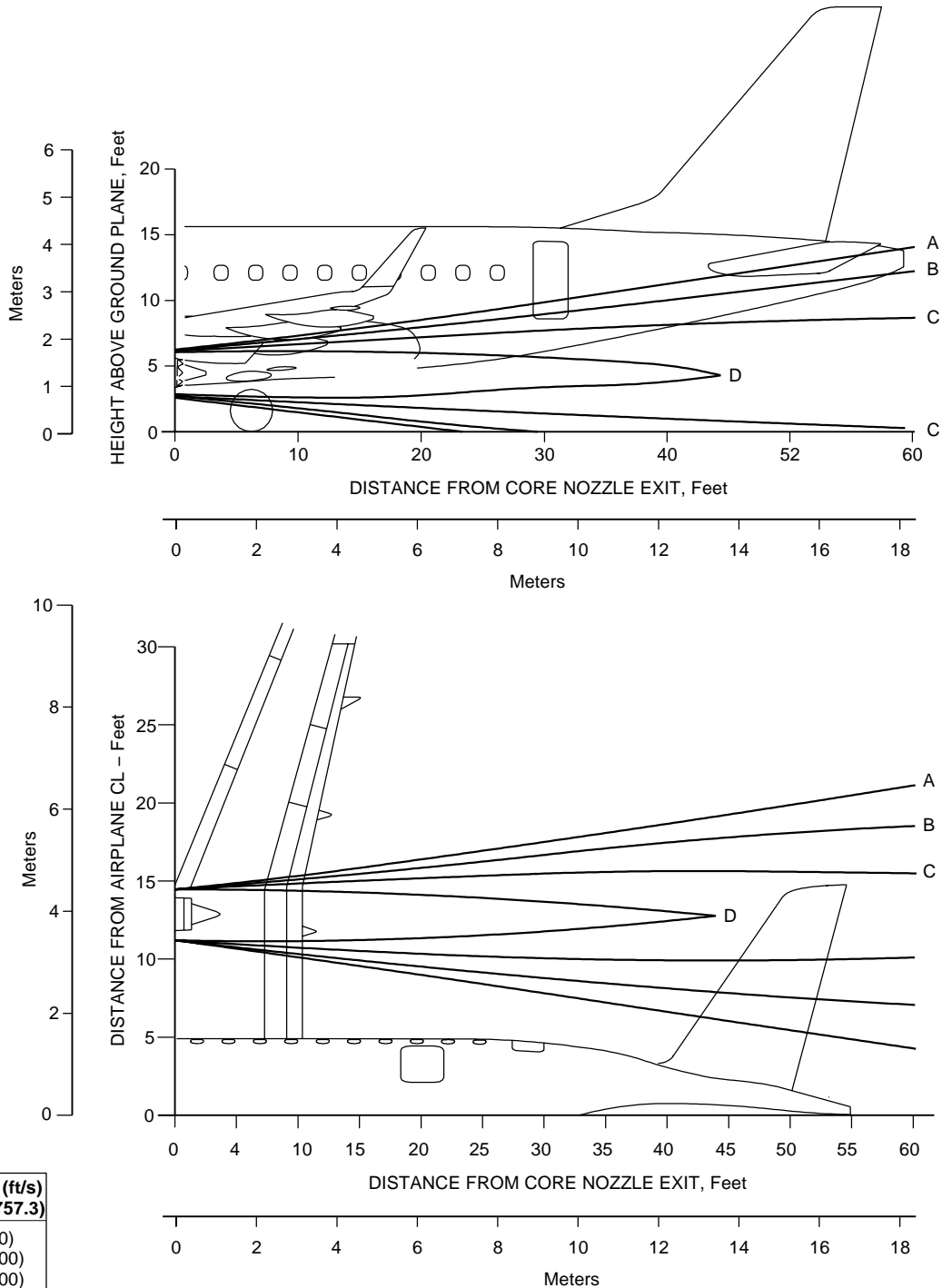
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EFFECTIVITY: ALL

Jet Wake Velocity Profile - Breakaway Power

Figure 6.5



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NOTE:

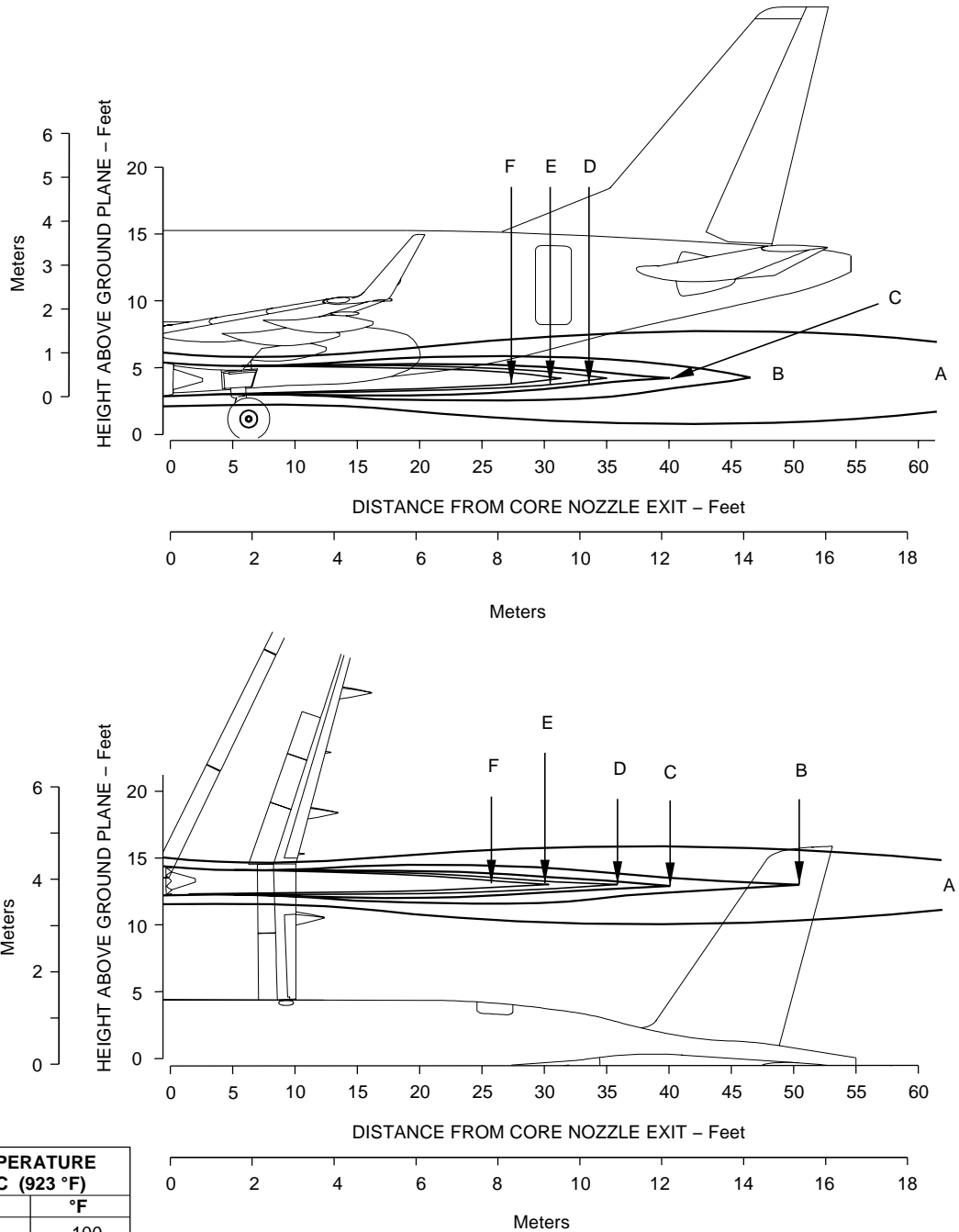
EXHAUST VELOCITY CONTOURS INCLUDE WORST CASE 20 kn HEADWIND WITH GROUND EFFECTS.



EFFECTIVITY: ALL

Jet Wake Temperature Profile - Breakaway Power

Figure 6.6



TOTAL TEMPERATURE MAX = 495 °C (923 °F)		
	°C	°F
A	38	100
B	66	150
C	93	200
D	121	250
E	149	300
F	177	350

NOTE:

EXHAUST TEMPERATURE CONTOURS INCLUDE WORST CASE 20 kn HEADWIND WITH GROUND EFFECTS.

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6.3. AIRPORT AND COMMUNITY NOISE

Aircraft noise is a major concern for the airport and community planner. The airport is a basic element in the community's transportation system and, thus, is vital to its growth. However, the airport must also be a good neighbor, and this can only be accomplished with proper planning. Since aircraft noise extends beyond the boundaries of the airport, it is vital to consider the noise impact on the surrounding communities.

Many means have been devised to provide the planner with a tool to estimate the impact of airport operations. Too often they oversimplify noise to the point where the results become erroneous. Noise is not a simple matter; therefore, there are no simple answers.

The cumulative noise contour is an effective tool. However, care must be exercised to ensure that the contours, used correctly, estimate the noise resulting from aircraft operations conducted at an airport.

The size and shape of the single-event contours, which are inputs into the cumulative noise contours, are dependent upon numerous factors. They include operational factors (aircraft weight, engine power setting, airport altitude), atmospheric conditions (wind, temperature, relative humidity, surface condition), and terrain.

6.3.1. External Certification Noise Levels

The aircraft comply with the Stage 3 / Chapter 3 noise limits set forth in 14 CFR Part 36, ICAO Annex 16, Volume 1, Chapter 3, Amendment 7 and CTA RBHA 36.

6.3.2. Ramp Noise Levels

The ramp noise will not exceed 80 dBA (maximum) and 77 dBA (average) on the rectangular perimeter of 20 m (65 ft 7 in) from the aircraft centerline, nose and tail, 90 dBA on the service positions and 80 dBA on the passenger entrance positions resulting from operation of the APU (if fitted), ECS, equipment cooling fans and vent fans, in any combination.

6.4. HAZARD AREAS

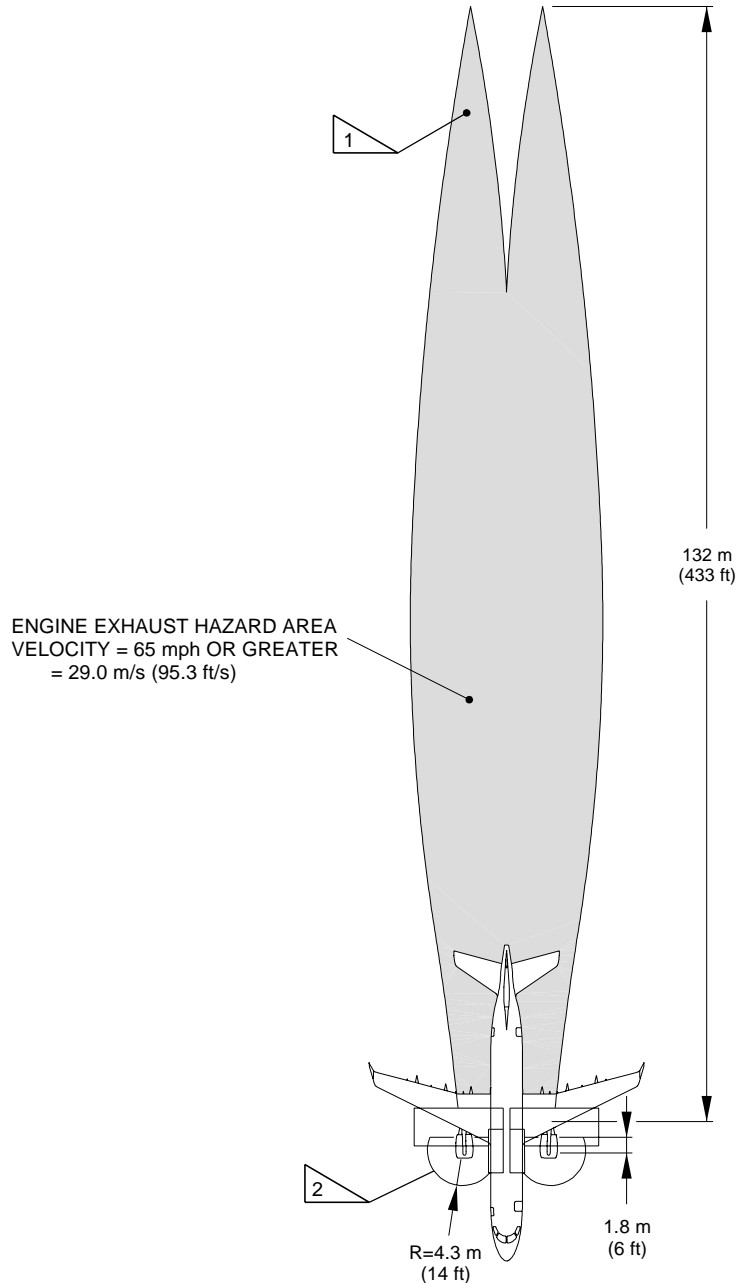


EFFECTIVITY: ALL

Hazard Areas - Takeoff Power

Figure 6.7

TAKEOFF POWER, SEA LEVEL, Tamb = ISA +16.7° C, FNIN1 = 63685 N (14317 lbf)



NOTE:

NO ACCESS TO ENGINE ACCESSORIES AT TAKEOFF POWER.



EXHAUST HAZARD AREA – CONDITION: 20 kn HEADWIND WITH GROUND EFFECTS.



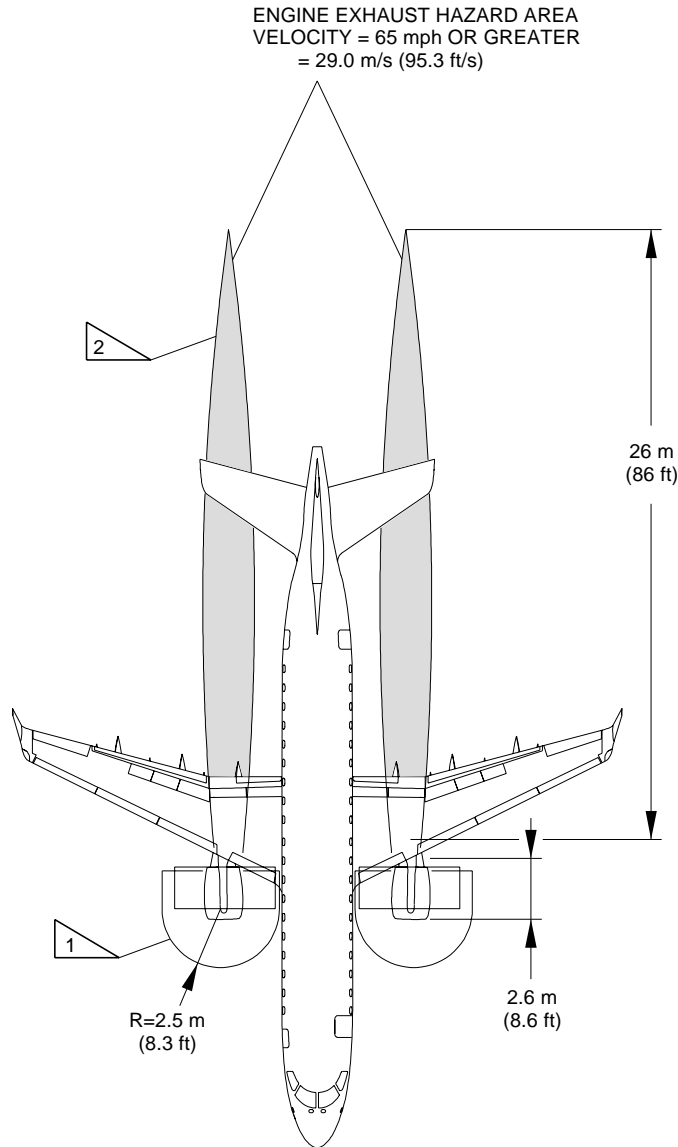
INLET HAZARD AREA – CONDITION: 20 kn HEADWIND/CROSSWIND BASED ON 12.2 m/s (40 ft/s) CRITICAL VELOCITY WITH 0.9 m (3 ft) CONTINGENCY FACTOR.

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EFFECTIVITY: ALL
Hazard Areas - Ground Idle
Figure 6.8

GROUND IDLE, SEA LEVEL, Tamb = ISA+16.7° C, FNIN1 = 3785 N (851 lbf)



1 INLET HAZARD AREA – CONDITION: 20 kn HEADWIND/CROSSWIND/TAILWIND BASED ON 12.2 m/s (40 ft/s) CRITICAL VELOCITY WITH 0.9 m (3 ft) CONTINGENCY FACTOR.

2 EXHAUST HAZARD AREA – CONDITION: 20 kn HEADWIND WITH GROUND EFFECTS.

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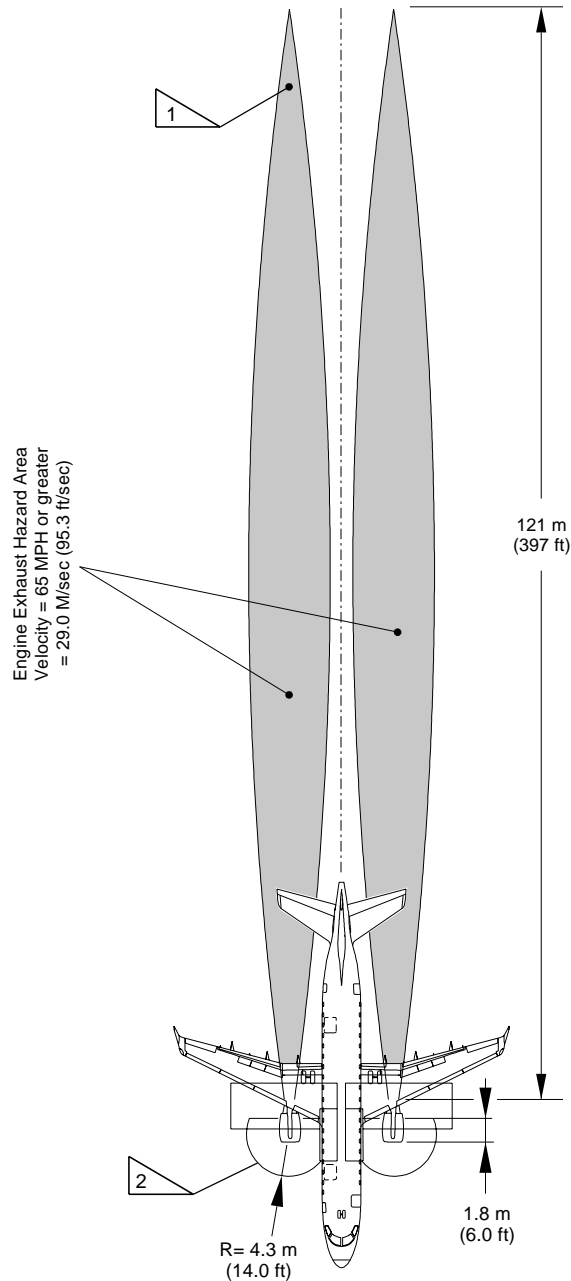


EFFECTIVITY: ALL

Hazard Areas - Breakaway Power

Figure 6.9

BREAKAWAY POWER, SEA LEVEL, Tamb = ISA +16.7° C, FNIN1 = 2328 DAN (5233 lbf)



NOTE:

NO ACCESS TO ENGINE ACCESSORIES AT BREAKAWAY POWER.



EXHAUST HAZARD AREA – CONDITION: 20 knot HEADWIND WITH GROUND EFFECTS.



INLET HAZARD AREA – CONDITION: 20 knot HEADWIND/CROSSWIND BASED ON 40 ft/sec CRITICAL VELOCITY WITH 0.9 m (3 ft) CONTINGENCY FACTOR.

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7. PAVEMENT DATA*EFFECTIVITY: ALL***7.1. GENERAL INFORMATION**

Pavement is defined as a structure consisting of one or more layers of processed materials.

The primary function of a pavement is to distribute concentrated loads so that the supporting capacity of the subgrade soil is not exceeded. The subgrade soil is defined as the material on which the pavement rests, whether embankment or excavation.

Several methods for design of airport pavements have been developed that differ considerably in their approach.

The design methods are derived from observation of pavements in service or experimental pavements. Thus, the reliability of any method is proportional to the amount of experimental verification behind the method, and all methods require a considerable amount of common sense and judgment on the part of the engineer who applies them.

A brief description of the following pavement charts will be helpful in their use for airport planning. Each aircraft configuration is depicted with a minimum range of five loads imposed on the main landing gear to aid in the interpolation between the discrete values shown. The tire pressure used for the aircraft charts will produce the recommended tire deflection with the aircraft loaded to its maximum ramp weight and with center of gravity position. The tire pressure, where specifically designated in tables and charts, are values obtained under loaded conditions as certified for commercial use.

This section is presented as follows:

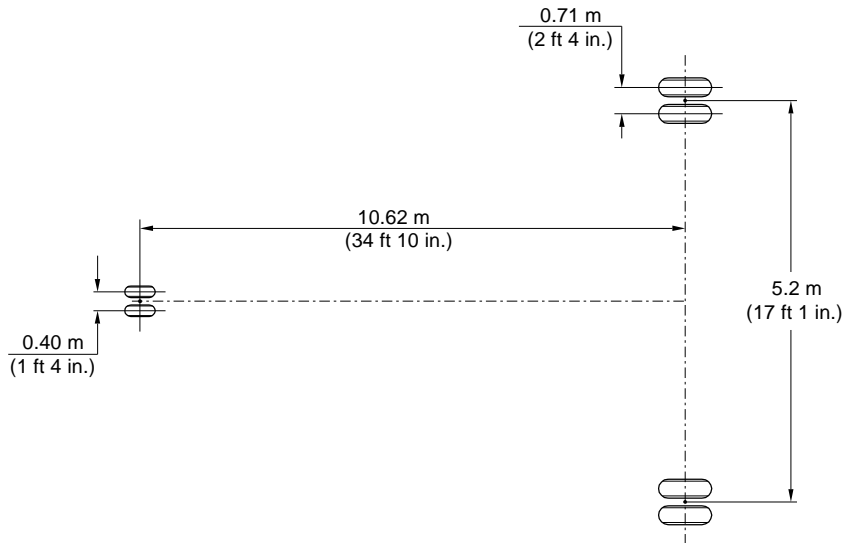
- The basic data on the landing gear footprint configuration, maximum design ramp loads, and tire sizes and pressures.
- The maximum pavement loads for certain critical conditions at the tire-ground interfaces.
- A chart in order to determine the loads throughout the stability limits of the aircraft at rest on the pavement. Pavement requirements for commercial aircraft are customarily derived from the static analysis of loads imposed on the main landing gear struts. These main landing gear loads are used to enter the pavement design charts which follow, interpolating load values where necessary.
- The flexible pavement curves prepared in accordance with the US Army Corps of Engineers Design Method and the LCN Method.
- The rigid pavement design curves in accordance with the Portland Cement Association Design Method and the LCN Method.
- The aircraft ACN values for flexible and rigid pavements.

7.2. FOOTPRINT



EFFECTIVITY: ALL
Footprint
Figure 7.1

	AIRCRAFT MODELS	
	STD	LR, SU OR SE
MAXIMUM RAMP WEIGHT	36150 kg (79697 lb)	37360 kg (82365 lb)
NOSE GEAR TIRE SIZE	24 x 7.7	
NOSE GEAR TIRE PRESSURE	7.24 ± 0.21 kg/cm ² (103 ± 3 psi)	
MAIN GEAR TIRE SIZE	H38 x 13-18	
MAIN GEAR TIRE PRESSURE	8.86 ± 0.7 kg/cm ² (126 ± 10 psi)	9.14 ± 0.7 kg/cm ² (130 ± 10 psi)



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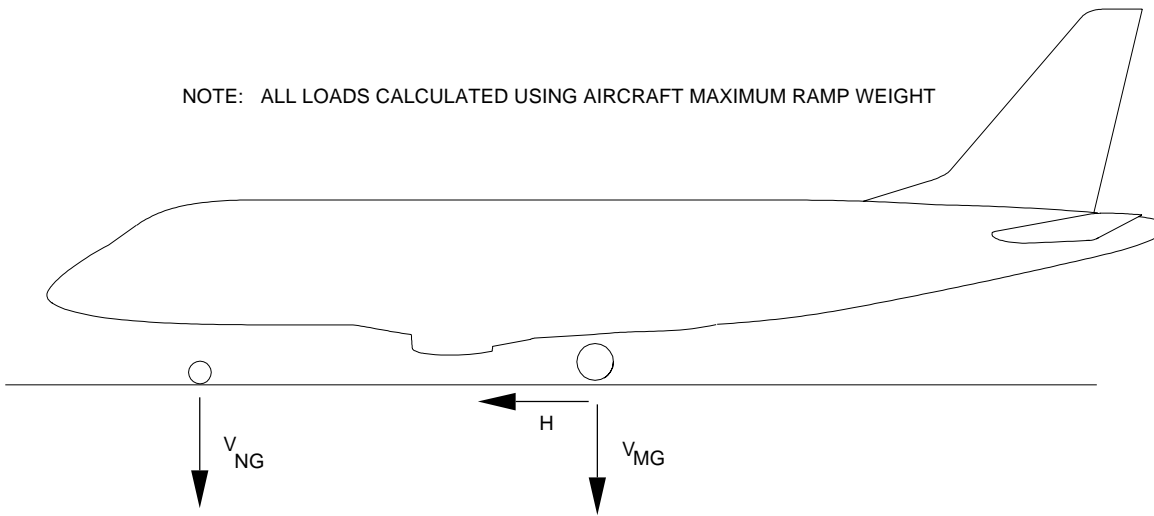
7.3. **MAXIMUM PAVEMENT LOADS**



EFFECTIVITY: ALL
Maximum Pavement Loads
Figure 7.2

LEGEND: V_{NG} =MAXIMUM VERTICAL NOSE GEAR GROUND LOAD AT MOST FORWARD C.G.
 V_{MG} =MAXIMUM VERTICAL MAIN GEAR GROUND LOAD AT MOST FORWARD C.G.
 H =MAXIMUM HORIZONTAL GROUND LOAD FROM BRAKING

NOTE: ALL LOADS CALCULATED USING AIRCRAFT MAXIMUM RAMP WEIGHT



MODEL	MAXIMUM RAMP WEIGHT	V_{NG}		V_{MG} (PER STRUT)	H (PER STRUT)	
		STATIC AT MOST FORWARD C.G.	STEADY BRAKING WITH DECELERATION OF 3,0 m/sec ²		STATIC AT MOST AFT C.G.	STEADY BRAKING WITH DECELERATION OF 3,0 m/sec ²
LR, SU OR SE	37360 kg (82365 lb)	4888 kg (10776 lb)	6994 kg (15419 lb)	17546 kg (38682 lb)	5090 kg (11221 lb)	11870 kg (26169 lb)
STD	36150 kg (79697 lb)	4922 kg (10851 lb)	6961 kg (15346 lb)	16976 kg (37426 lb)	4924 kg (10855 lb)	11480 kg (25309 lb)

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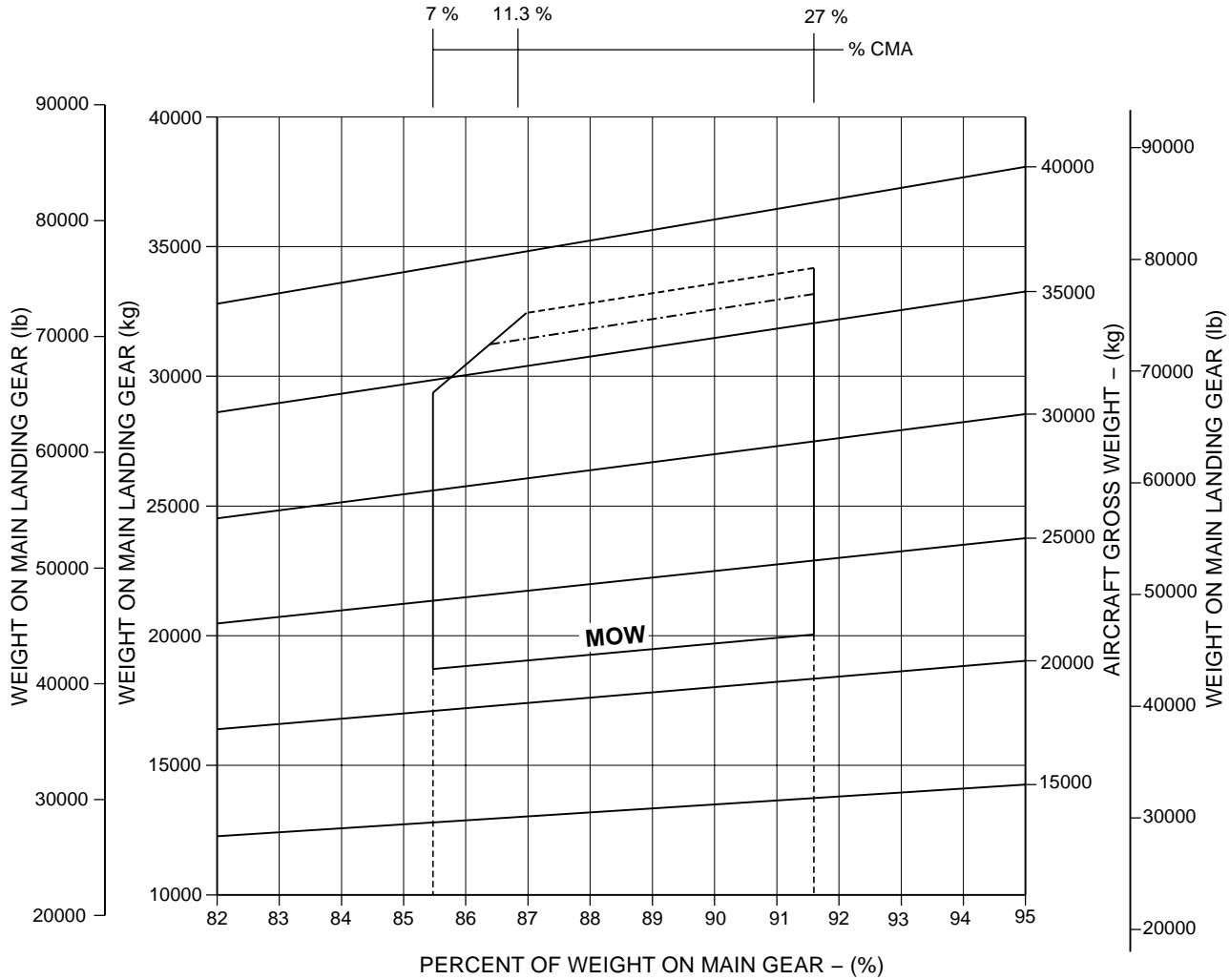
7.4. **LANDING GEAR LOADING ON PAVEMENT**



EFFECTIVITY: ALL

Landing Gear Loading on Pavement

Figure 7.3



LEGEND

- LR, SU OR SE AIRCRAFT MODELS
- STD AIRCRAFT MODEL

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**7.5. FLEXIBLE PAVEMENT REQUIREMENTS, U.S. CORPS OF ENGINEERS DESIGN METHOD**

The flexible pavement curves are based on the procedures set forth in Instruction Report No. S-77-1, "Procedures for Development of CBR Design Curves", dated June 1977, and modified according to the methods described in FAA Advisory Circular 150/5320-6D, "Airport Pavement Design and Evaluation", dated July 7, 1995. Instruction Report No. S-77-1 was prepared by the US Army Corps of Engineers Waterways Experiment Station, Soils and Pavements Laboratory, Vicksburg, Mississippi. The line showing 10,000 coverages is used to calculate ACN.



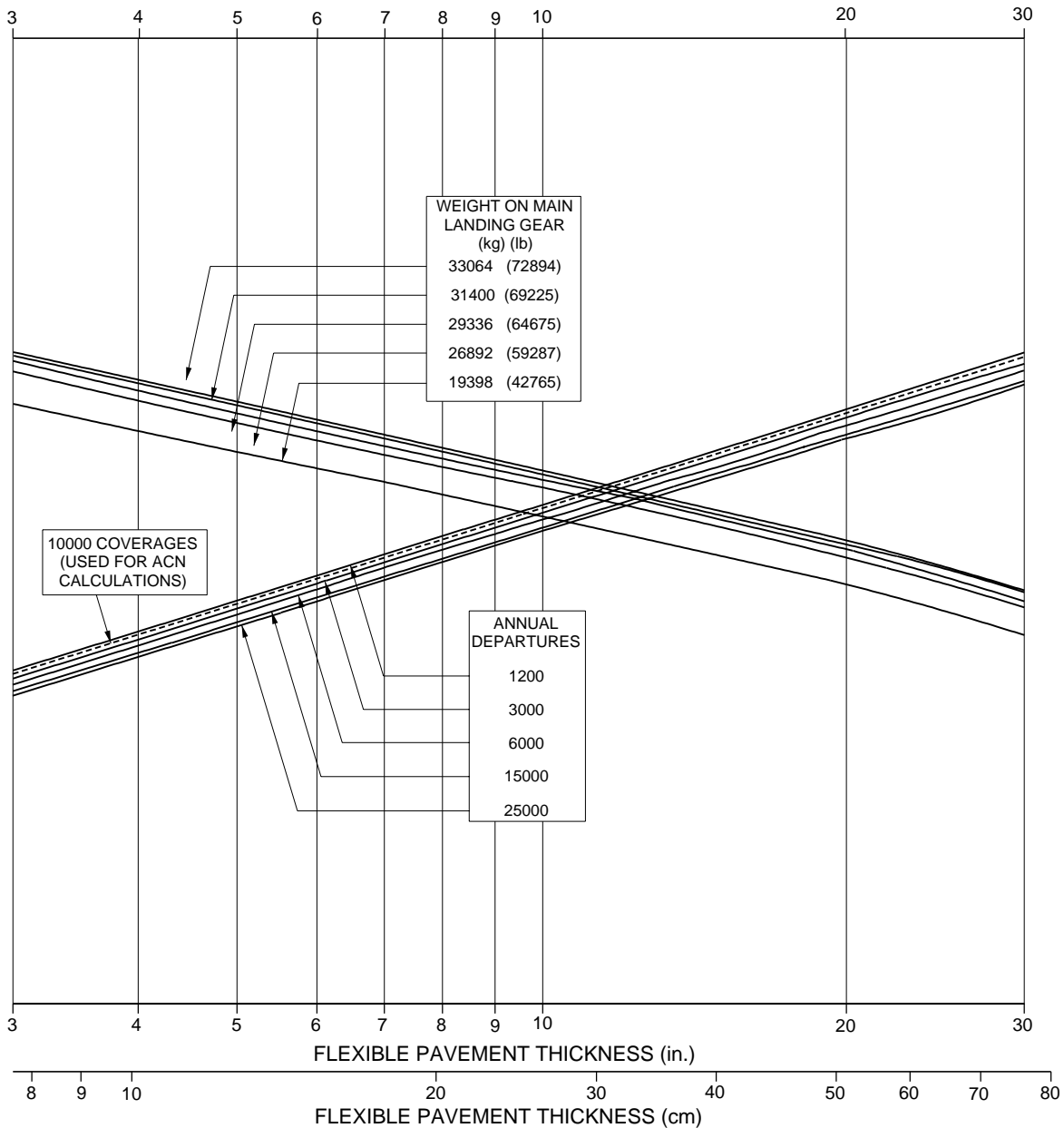
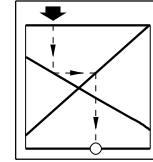
EFFECTIVITY: EMBRAER 170 STD ACFT MODEL

Flexible Pavement Requirements - US Army Corps of Engineers Design Method

Figure 7.4

NOTES: H 38x13-18 TIRE SIZE - TIRES PRESSURE AT 8.86 kgf/cm² (126 psi)

SUBGRADE STRENGTH - CBR



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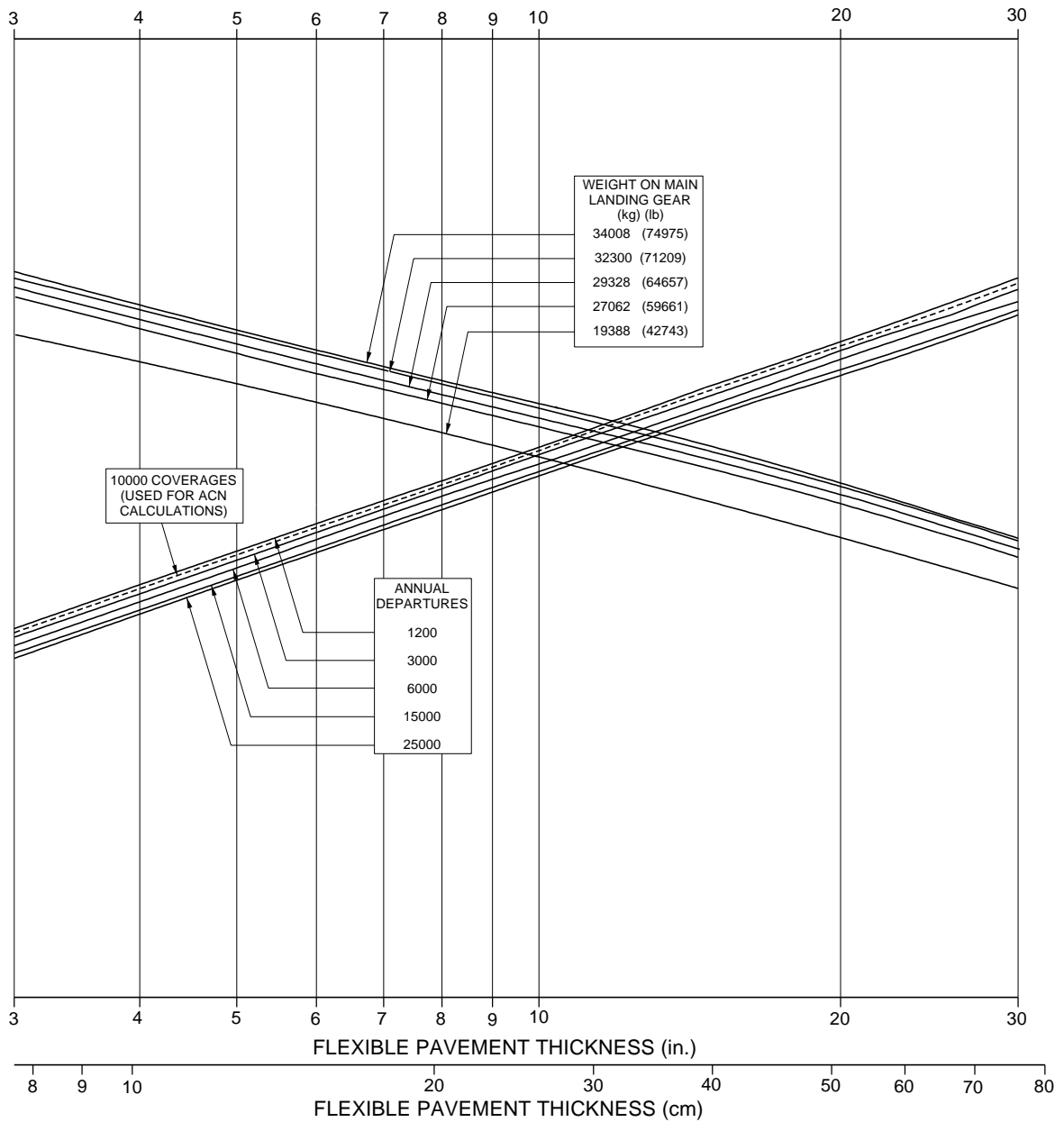
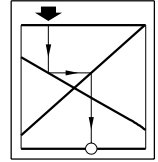
EFFECTIVITY: EMBRAER 170 LR OR SU OR SE ACFT MODEL

Flexible Pavement Requirements - US Army Corps of Engineers Design Method

Figure 7.5

NOTES: H38 X 13-18 TIRE SIZE - TIRES PRESSURE AT 9.14 kgf/cm² (130 psi)

SUBGRADE STRENGTH - CBR



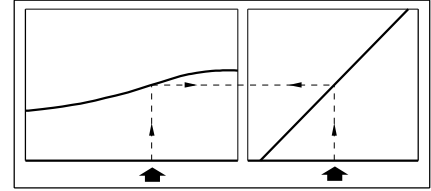
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**7.6. FLEXIBLE PAVEMENT REQUIREMENTS, LCN METHOD**

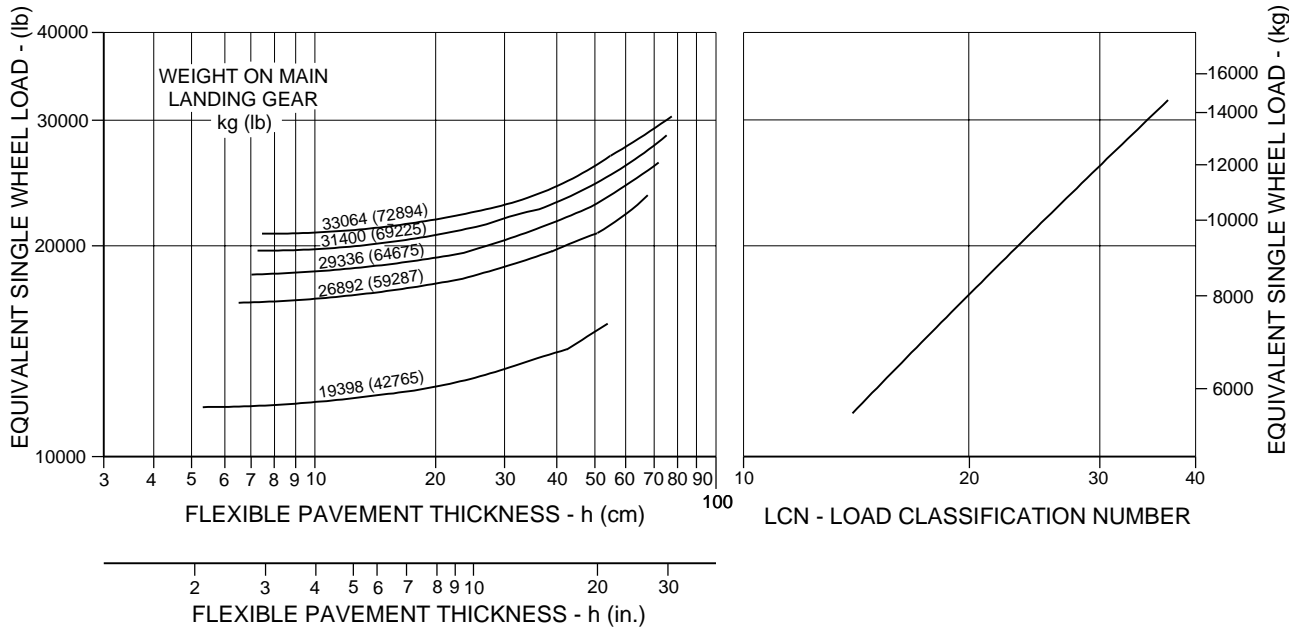
The LCN method presents curves for flexible pavements. They have been built using procedures and curves in the ICAO Aerodrome Design Manual, Part 3 - Pavements, Document 9157-AN/901, 1983. The same chart includes the data of equivalent single-wheel load versus pavement thickness.



EFFECTIVITY: EMBRAER 170 STD ACFT MODEL
Flexible Pavement Requirements - LCN Method
Figure 7.6



TIRES H38x13-18 AT 8.86 kg/cm² (126 psi)



NOTES:
EQUIVALENT SINGLE WHEEL LOADS
ARE DERIVED BY METHODS SHOWN
IN ICAO AERODROME MANUAL.
PART 2, PAR. 4.1.3

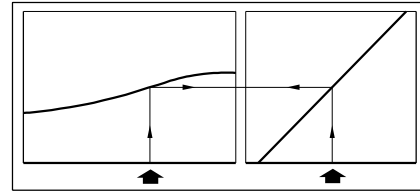
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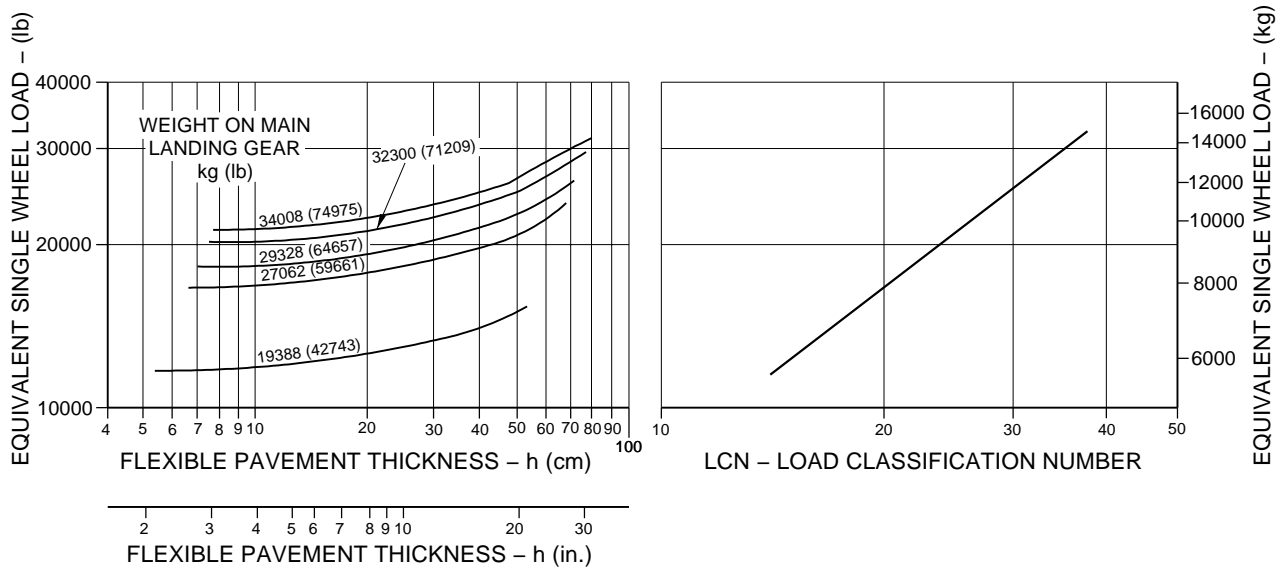
EFFECTIVITY: EMBRAER 170 LR OR SU OR SE ACFT MODEL

Flexible Pavement Requirements - LCN Method

Figure 7.7



TIRES H38x13-18 AT 9.14 kg/cm² (130 psi)



NOTES:

EQUIVALENT SINGLE WHEEL LOADS ARE DERIVED BY METHODS SHOWN IN ICAO AERODROME MANUAL. PART 2, PAR. 4.1.3

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7.7. RIGID PAVEMENT REQUIREMENTS, PORTLAND CEMENT ASSOCIATION DESIGN METHOD

This method has a chart that has been prepared with the use of the Westergaard Equation in general accordance with the procedures outlined in the 1955 edition of "Design of Concrete Airport Pavement" published by the Portland Cement Association, 33 W. Grand Ave., Chicago 10, Illinois, but modified to the new format described in the 1968 Portland Cement Association publication, "Computer Program for Concrete Airport Pavement Design" by Robert G. Packard. The following procedure is used to develop rigid pavement design curves such as those shown in the chart:

- Once the scale for the pavement thickness to the left and the scale for allowable working stress to the right have been established, an arbitrary load line is drawn representing the main landing gear maximum weight to be shown.
- All values of the subgrade modulus (k-values) are then plotted.
- Additional load lines for the incremental values of weight on the main landing gear are then established on the basis of the curve for $k=300$, already established.

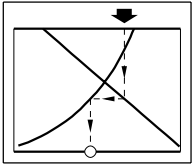


EFFECTIVITY: EMBRAER 170 STD ACFT MODEL

Rigid Pavement Requirements - Portland Cement Association Design Method

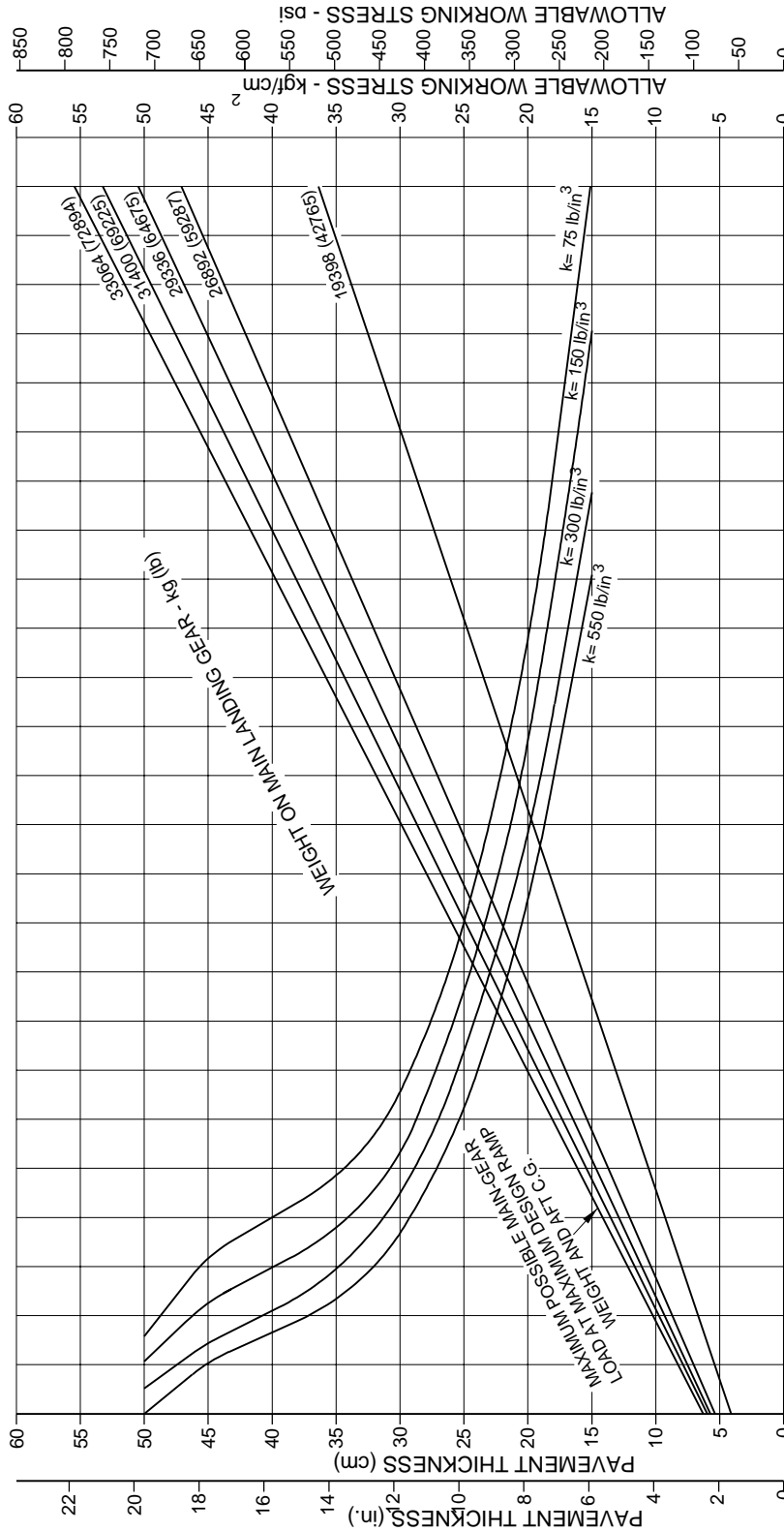
Figure 7.8

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RIGID PAVEMENT REQUIREMENTS

- NOTES:**
- TIRES H38 x 13-18
 - TIRE PRESSURE 8.86 kgf/cm² (126 psi) (UNLOADED)



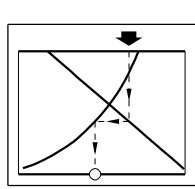
NOTE: THE VALUES OBTAINED BY USING THE MAXIMUM LOAD REFERENCE LINE AND ANY VALUE OF "K" ARE EXACT. FOR LOADS LESS THAN MAXIMUM, THE CURVES ARE EXACT FOR K=300 BUT DEVIATE SLIGHTLY FOR OTHER VALUES OF "K".



EFFECTIVITY: EMBRAER 170 LR OR SU OR SE ACFT MODEL

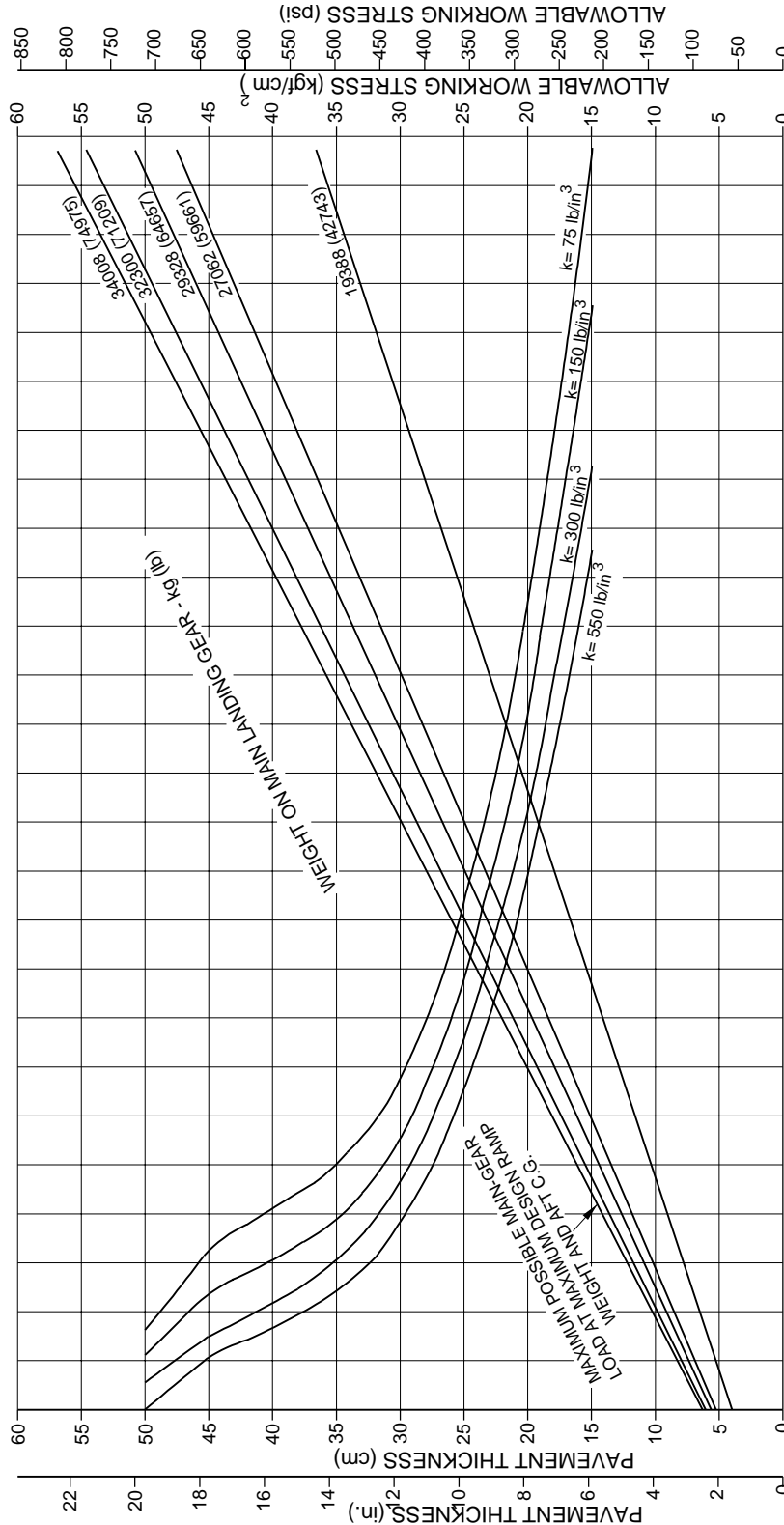
Rigid Pavement Requirements - Portland Cement Association Design Method

Figure 7.9



RIGID PAVEMENT REQUIREMENTS

- NOTES:**
- TIRES H38 x 13-18
 - TIRE PRESSURE 9.14 kgf/cm² (130 psi) (UNLOADED)



EM170APM070010.DGN

NOTE: THE VALUES OBTAINED BY USING THE MAXIMUM LOAD REFERENCE LINE AND ANY VALUE OF "K" ARE EXACT. FOR LOADS LESS THAN MAXIMUM, THE CURVES ARE EXACT FOR K=300 BUT DEVIATE SLIGHTLY FOR OTHER VALUES OF "K".



7.8. RIGID PAVEMENT REQUIREMENTS, LCN METHOD

This LCN Method presents curves for rigid pavements. They have been built using procedures and curves in ICAO Aerodrome Design Manual, Part 3 - Pavements, Document 9157-AN/901, 1983. The same chart includes the data of equivalent single-wheel load versus radius of relative stiffness.

To determine the aircraft weight that can be accommodated on a particular rigid airport pavement, both the LCN of the pavement and the radius of relative stiffness must be known.

The radius of relative stiffness values is obtained from a table. This table presents the radius of relative stiffness values based on Young's modulus (E) of 4,000,000 psi and Poisson's ratio (μ) of 0.15.

For convenience in finding this radius based on other values of E and μ , the curves are included. For example, to find an RRS value based on an E of 3,000,000 psi, the "E" factor of 0.931 is multiplied by the RRS value found in figure 7.6.3. The effect of the variations of μ on the RRS value is treated in a similar manner.



EFFECTIVITY: ALL
Radius of Relative Stiffness
Figure 7.10

RADIUS OF RELATIVE STIFFNESS (ℓ)
VALUES IN INCHES

$$\ell = \sqrt[4]{\frac{Ed^3}{12(1-\mu^2)k}} = 24.1652 \sqrt[4]{\frac{d^3}{k}}$$

WHERE: E = YOUNG'S MODULUS = 4 x 10⁶ psi
k = SUBGRADE MODULUS, lb/in.³
d = RIGID-PAVEMENT THICKNESS. in.
μ = POISSON'S RATIO = 0.15

d(in)	k=75	k=100	k=150	k=200	k=250	k=300	k=350	k=400	k=500	k=550
6.0	31.48	29.30	26.47	24.63	23.30	22.26	21.42	20.72	19.59	19.13
6.5	33.43	31.11	28.11	26.16	24.74	23.64	22.74	22.00	20.80	20.31
7.0	35.34	32.89	29.72	27.65	26.15	24.99	24.04	23.25	21.99	21.47
7.5	37.22	34.63	31.29	29.12	27.54	26.32	25.32	24.49	23.16	22.61
8.0	39.06	36.35	32.85	30.57	28.91	27.62	26.58	25.70	24.31	23.74
8.5	40.88	38.04	34.37	31.99	30.25	28.91	27.81	26.90	25.44	24.84
9.0	42.67	39.71	35.88	33.39	31.58	30.17	29.03	28.08	26.55	25.93
9.5	44.43	41.35	37.36	34.77	32.89	31.42	30.23	29.24	27.65	27.00
10.0	46.18	42.97	38.83	36.14	34.17	32.65	31.42	30.39	28.74	28.06
10.5	47.90	44.57	40.28	37.48	35.45	33.87	32.59	31.52	29.81	29.11
11.0	49.60	46.16	41.71	38.81	36.71	35.07	33.75	32.64	30.87	30.14
11.5	51.28	47.72	43.12	40.13	37.95	36.26	34.89	33.74	31.91	31.16
12.0	52.94	49.27	44.52	41.43	39.18	37.44	36.02	34.84	32.95	32.17
12.5	54.59	50.80	45.90	42.72	40.40	38.60	37.14	35.92	33.97	33.17
13.0	56.22	52.32	47.27	43.99	41.61	39.75	38.25	36.99	34.99	34.16
13.5	57.83	53.82	48.63	45.26	42.80	40.89	39.35	38.06	35.99	35.14
14.0	59.43	55.31	49.98	46.51	43.98	42.02	40.44	39.11	36.99	36.12
14.5	61.02	56.78	51.31	47.75	45.16	43.15	41.51	40.15	37.97	37.08
15.0	62.59	58.25	52.63	48.98	46.32	44.26	42.58	41.19	38.95	38.03
15.5	64.15	59.70	53.94	50.20	47.47	45.36	43.64	42.21	39.92	38.98
16.0	65.69	61.13	55.24	51.41	48.62	46.45	44.70	43.23	40.88	39.92
16.5	67.23	62.56	56.53	52.61	49.75	47.54	45.74	44.24	41.84	40.85
17.0	68.75	63.98	57.81	53.80	50.88	48.61	46.77	45.24	42.78	41.78
17.5	70.26	65.38	59.08	54.98	52.00	49.68	47.80	46.23	43.72	42.70
18.0	71.76	66.78	60.34	56.15	53.11	50.74	48.82	47.22	44.66	43.61
18.5	73.25	68.17	61.60	57.32	54.21	51.80	49.84	48.20	45.59	44.51
19.0	74.73	69.54	62.84	58.48	55.31	52.84	50.84	49.17	46.51	45.41
19.5	76.20	70.91	64.08	59.63	56.39	53.88	51.84	50.14	47.42	46.30
20.0	77.66	72.27	65.30	60.77	57.47	54.91	52.84	51.10	48.33	47.19
20.5	79.11	73.62	66.52	61.91	58.55	55.94	53.83	52.06	49.23	48.07
21.0	80.55	74.96	67.74	63.04	59.62	56.96	54.81	53.01	50.13	48.95
21.5	81.99	76.30	68.94	64.16	60.68	57.97	55.78	53.95	51.02	49.82
22.0	83.41	77.63	70.14	65.28	61.73	58.98	56.75	54.89	51.91	50.69
22.5	84.83	78.95	71.34	66.38	62.78	59.99	57.72	55.82	52.79	51.55
23.0	86.24	80.26	72.52	67.49	63.83	60.98	58.68	56.75	53.67	52.41
23.5	87.64	81.56	73.70	68.59	64.86	61.97	59.63	57.67	54.54	53.26
24.0	89.04	82.86	74.87	69.68	65.90	62.96	60.58	58.59	55.41	54.11
24.5	90.43	84.15	76.04	70.76	66.92	63.94	61.52	59.50	56.28	54.95
25.0	91.81	85.44	77.20	71.84	67.95	64.92	62.46	60.41	57.14	55.79

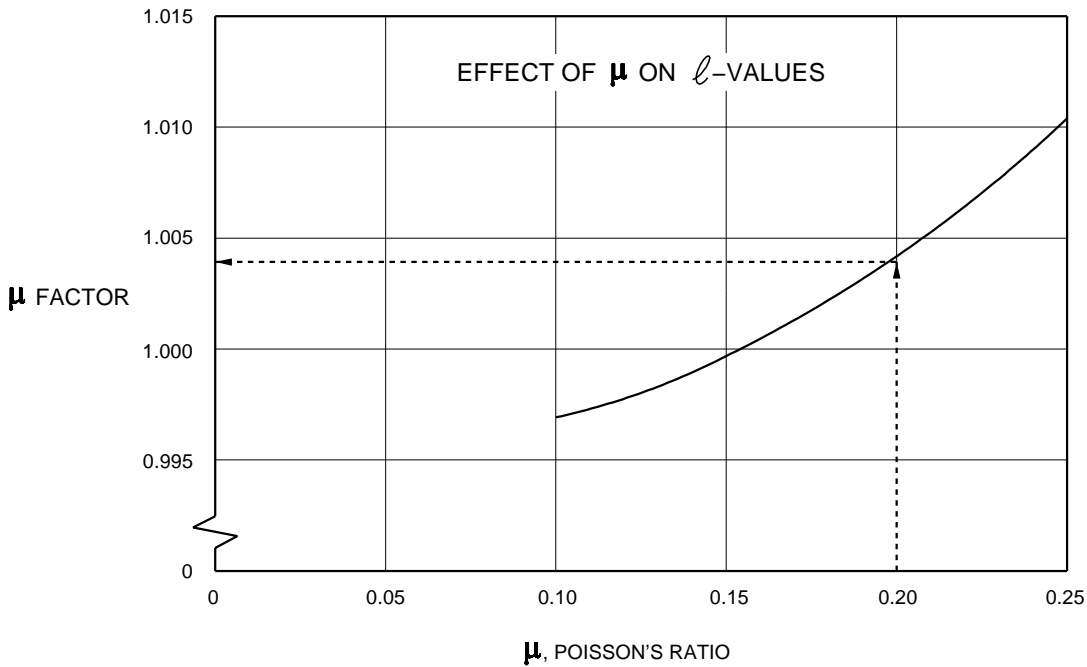
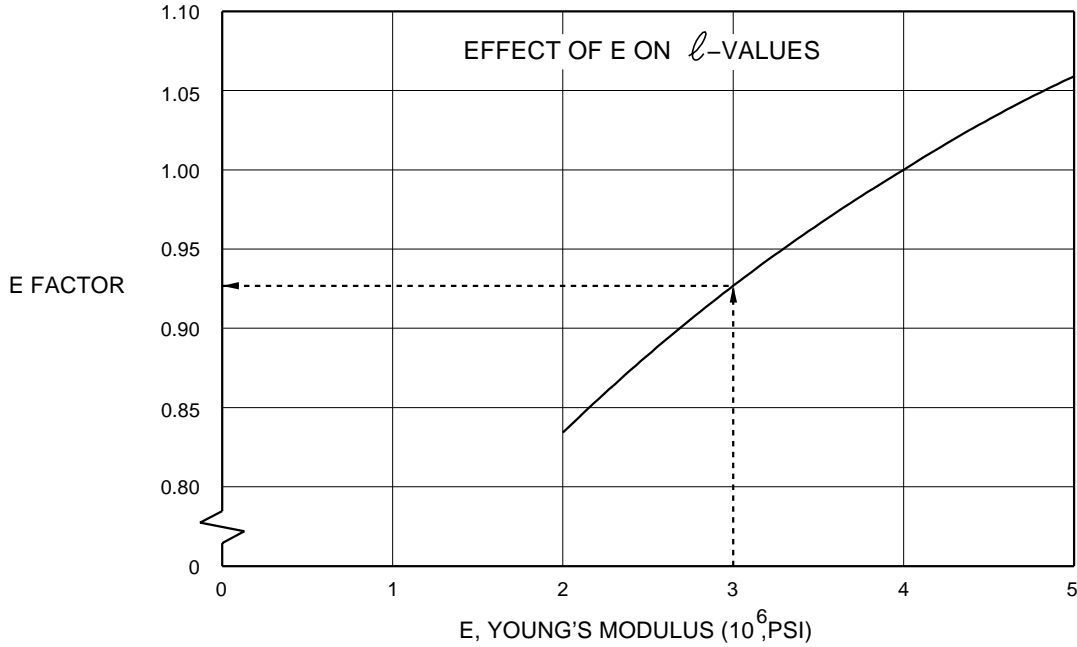
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EFFECTIVITY: ALL

Radius of Relative Stiffness (other values)

Figure 7.11

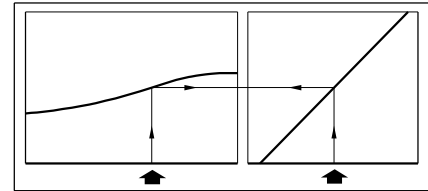


NOTE: BOTH CURVES ON THIS PAGE ARE USED TO ADJUST THE l -VALUES.

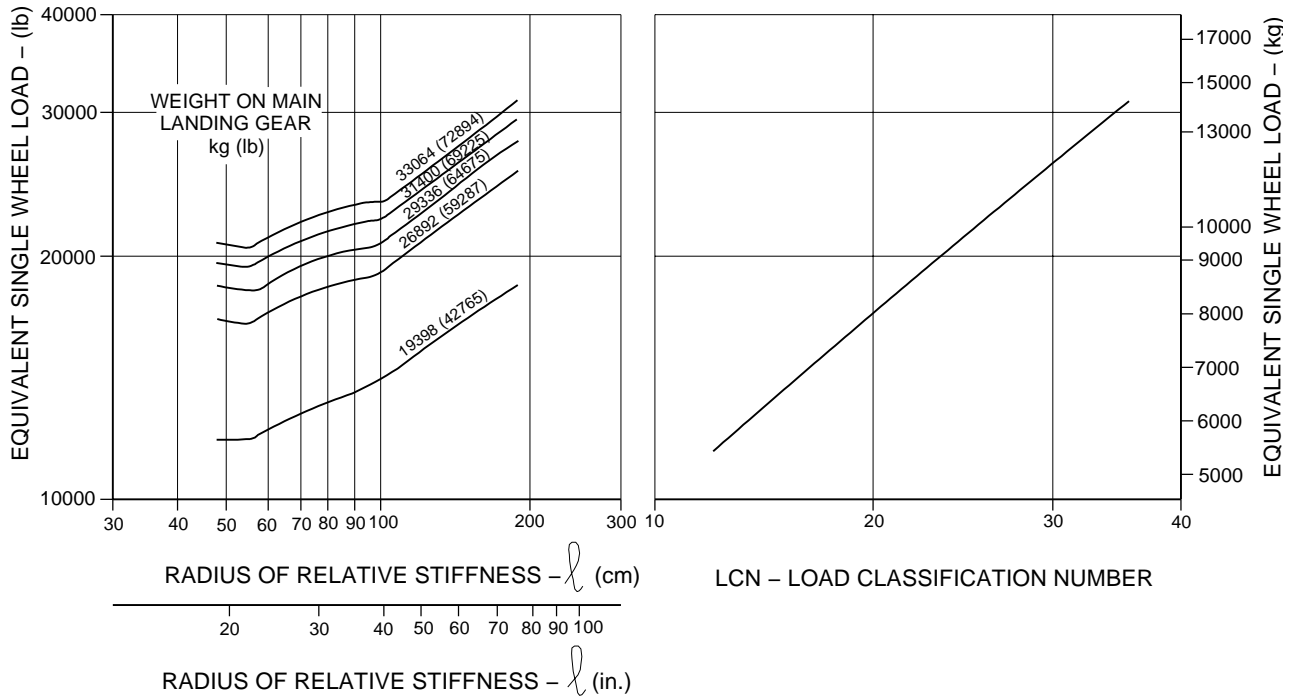
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EFFECTIVITY: EMBRAER 170 STD ACFT MODEL
Rigid Pavement Requirements - LCN Method
Figure 7.12



TIRES H38x13-18 AT 8.86 kg/cm² (126 psi)

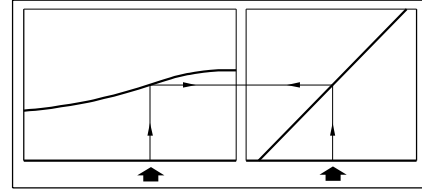


NOTES:
EQUIVALENT SINGLE WHEEL LOADS
ARE DERIVED BY METHODS SHOWN
IN ICAO AERODROME MANUAL.
PART 2, PAR. 4.1.3

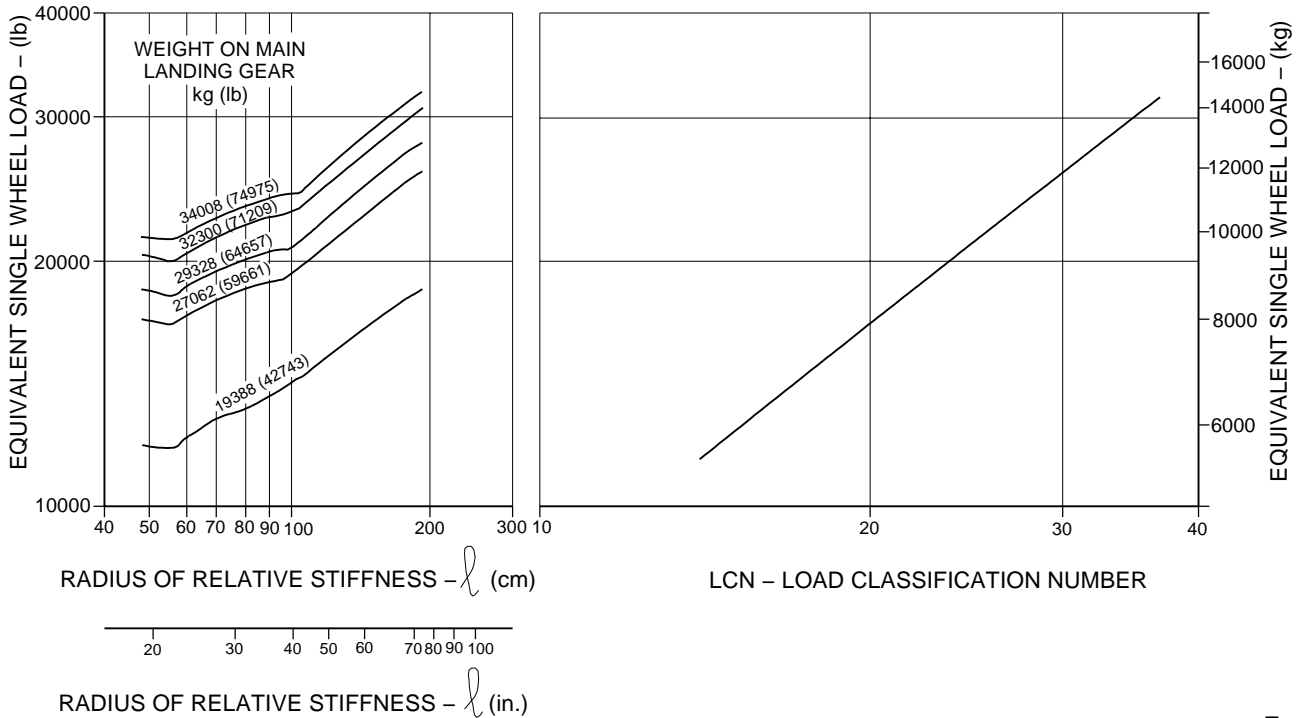
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EFFECTIVITY: EMBRAER 170 LR OR SU OR SE ACFT MODEL
Rigid Pavement Requirements - LCN Method
Figure 7.13



TIRES H38x13-18 AT 9.14 kg/cm² (130 psi)



NOTES:

EQUIVALENT SINGLE WHEEL LOADS ARE DERIVED BY METHODS SHOWN IN ICAO AERODROME MANUAL. PART 2, PAR. 4.1.3

EM170APM070011A.DGN



7.9. ACN - PCN SYSTEM - FLEXIBLE AND RIGID PAVEMENTS

The ACN/PCN system as referenced in Amendment 35 to ICAO Annex 14, "Aerodromes", provides a standardized international aircraft/pavement rating system.

The PCN is an index rating of the mass that according to evaluation can be borne by the pavement when applied by a standard single wheel. The ACN is established for the particular pavement type and subgrade category of the rated pavement, as well as for the particular aircraft mass and characteristics.

An aircraft shall have an ACN equal to or less than the PCN to operate without restriction on the pavement.

The method of pavement evaluation is left up to the airport, and the results of such evaluation are presented as follows:

Table 7.1 - Pavement Evaluation

PAVEMENT TYPE	SUBGRADE CATEGORY	TIRE PRESSURE CATEGORY	METHOD
R – Rigid	A – High	W – No Limit	T – Technical
F – Flexible	B – Medium	X – to 1.75 Mpa (254 psi)	U – Using aircraft
	C – Low	Y – to 1.25 Mpa (181 psi)	
	D – Ultra Low	Z – to 0.5 Mpa (73 psi)	
Report example: PCN 80/R/B/X/T, where:			
80 = PCN			
R = Pavement Type: Rigid			
B = Subgrade Category: Medium			
X = Tire Pressure Category: Medium (limited to 1.5 Mpa)			
T = Evaluation Method: Technical			

The flexible pavements have four subgrade categories:

- A. High Strength - CBR 15.
- B. Medium Strength - CBR 10.
- C. Low Strength - CBR 6.
- D. Ultra Low Strength - CBR 3.

The rigid pavements have four subgrade categories:

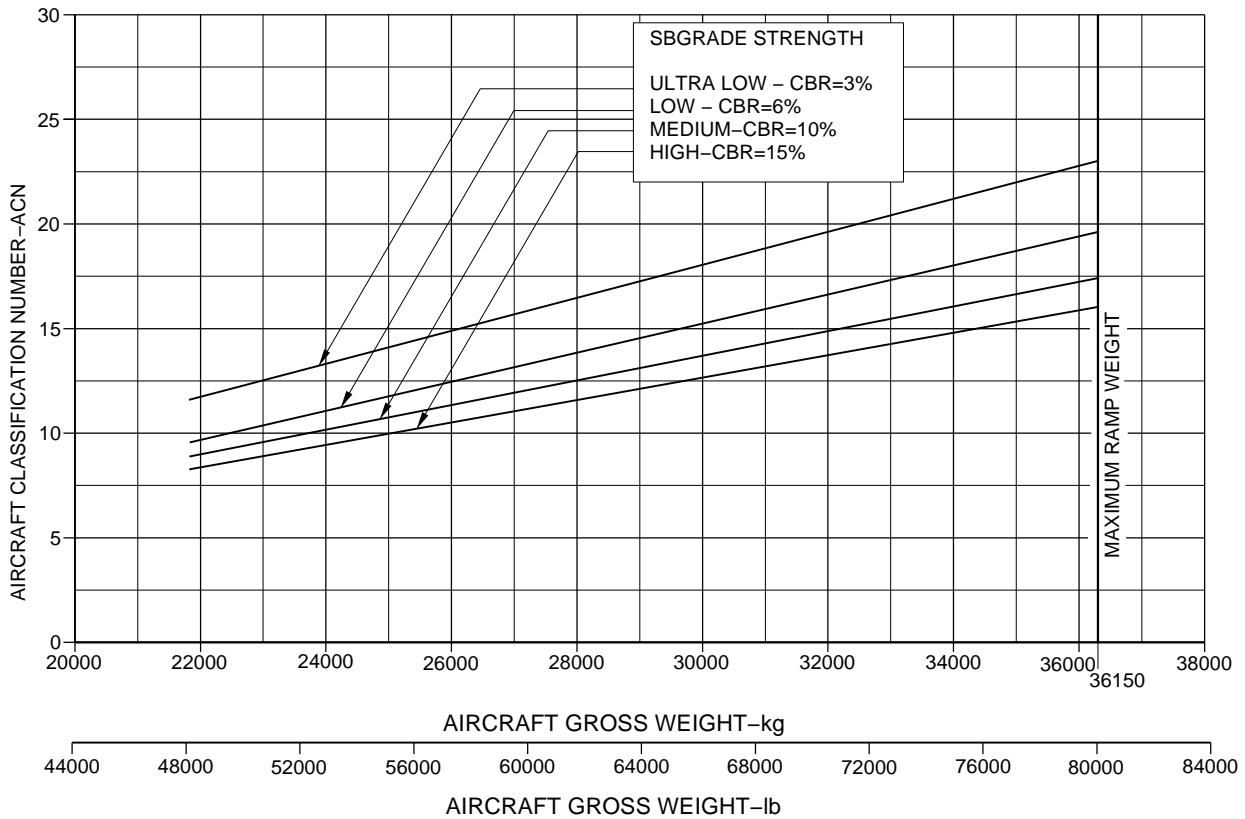
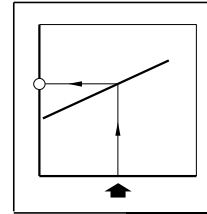
- A. High Strength - Subgrade k = 150 MN/m³ (550 lb/in³).
- B. Medium Strength - k = 80 MN/m³ (300 lb/in³).
- C. Low Strength - k = 40 MN/m³ (150 lb/in³).
- D. Ultra Low Strength - k = 20 MN/m³ (75 lb/in³).



EFFECTIVITY: EMBRAER 170 STD ACFT MODEL
ACN For Flexible Pavement
Figure 7.14

FLEXIBLE PAVEMENT SUBGRADE

- NOTES:
- H38 x 13-18 TIRE SIZE
 - TIRE PRESSURE 8.86 kgf/cm² (126 psi) (UNLOADED)



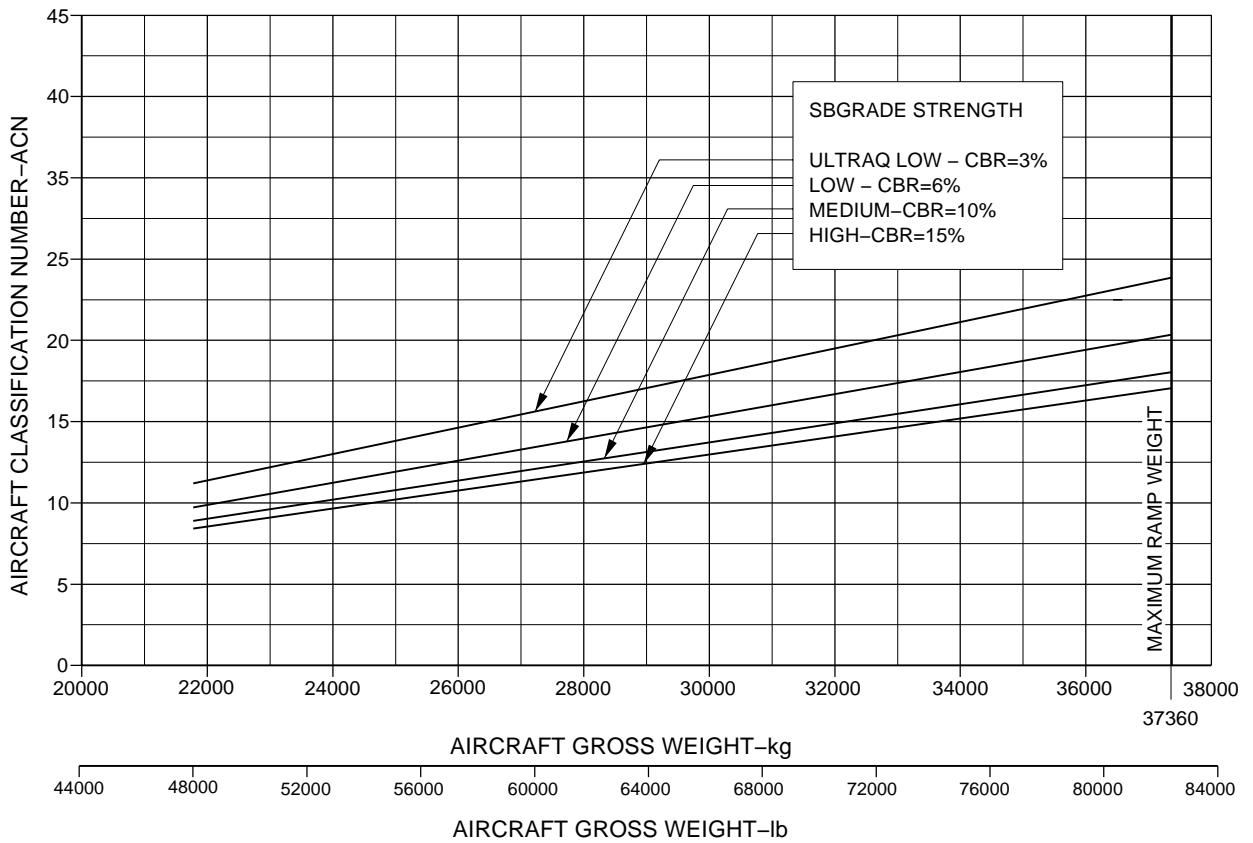
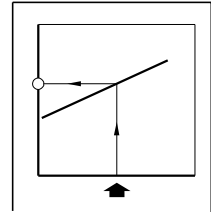
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EFFECTIVITY: EMBRAER 170 LR OR SU OR SE ACFT MODEL
ACN For Flexible Pavement
Figure 7.15

FLEXIBLE PAVEMENT SUBGRADE

- NOTES:**
- H38 x 13-18 TIRE SIZE
 - TIRE PRESSURE 9.14 kgf/cm² (130 psi) (UNLOADED)



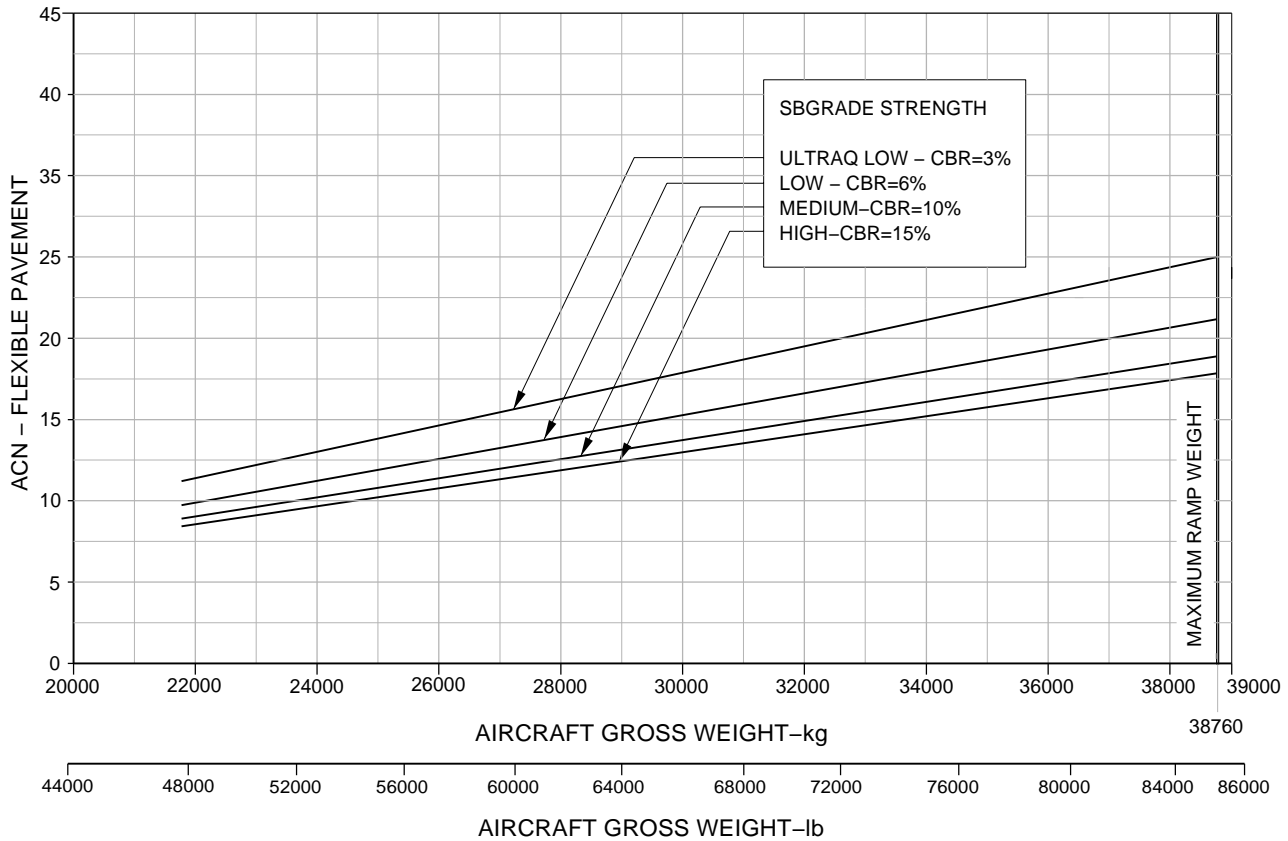
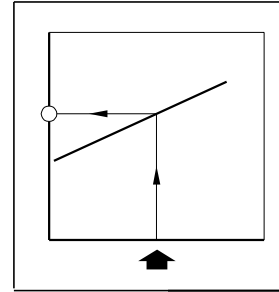
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EFFECTIVITY: EMBRAER 170 AR ACFT MODEL
ACN For Flexible Pavement
Figure 7.16

FLEXIBLE PAVEMENT SUBGRADE

- NOTES:**
- H38 x 13-18 TIRE SIZE
 - TIRE PRESSURE 9.56 kgf/cm² (136 psi) (UNLOADED)



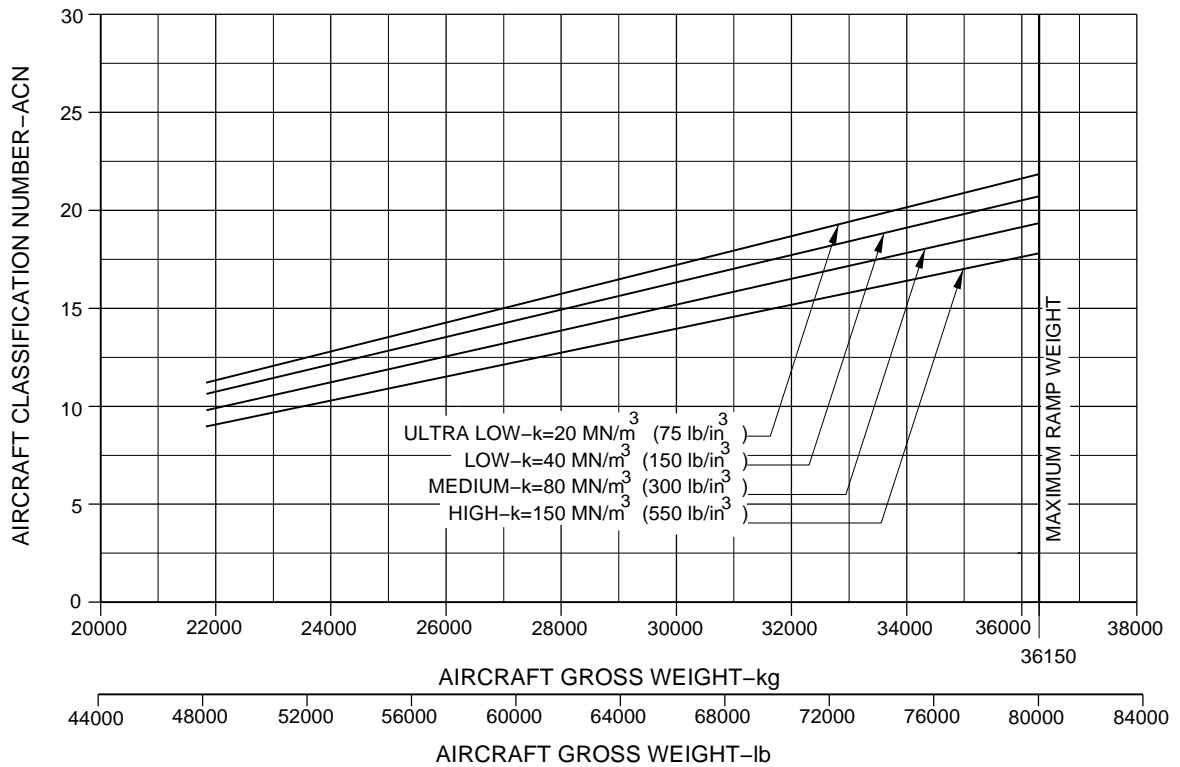
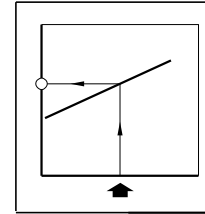
EM170APM070096A.DGN



EFFECTIVITY: EMBRAER 170 STD ACFT MODEL
ACN For Rigid Pavement
Figure 7.17

RIGID PAVEMENT SUBGRADES

- NOTES: ● H38 x 13-18 TIRE SIZE
● TIRE PRESSURE 8.86 kgf/cm² (126 psi) (UNLOADED)



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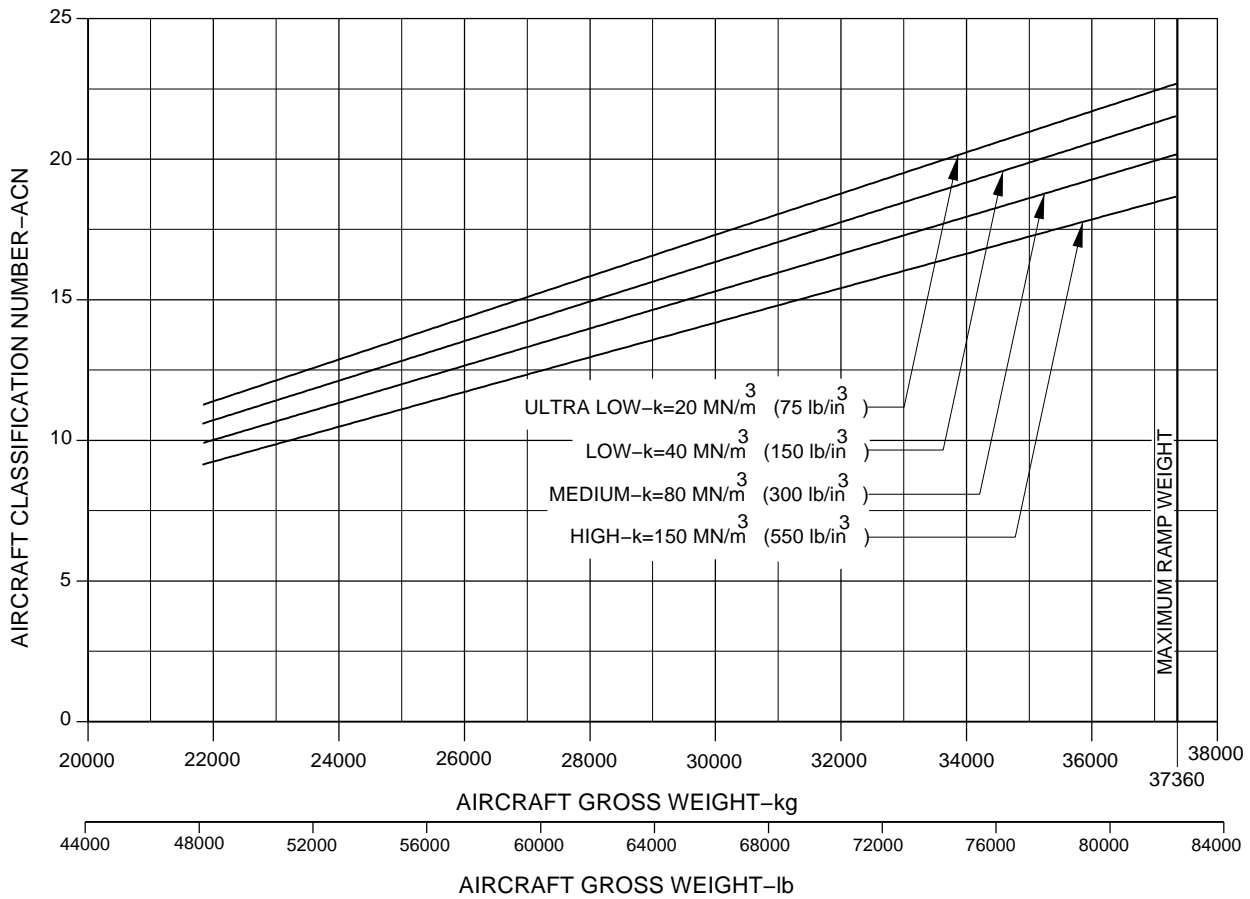
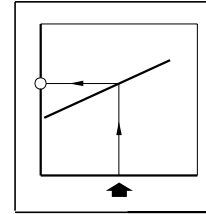
EFFECTIVITY: EMBRAER 170 LR OR SU OR SE ACFT MODEL

ACN For Rigid Pavement

Figure 7.18

RIGID PAVEMENT SUBGRADES

- NOTES:
- H38 x 13-18 TIRE SIZE
 - TIRE PRESSURE 9.14 kgf/cm² (130 psi) (UNLOADED)



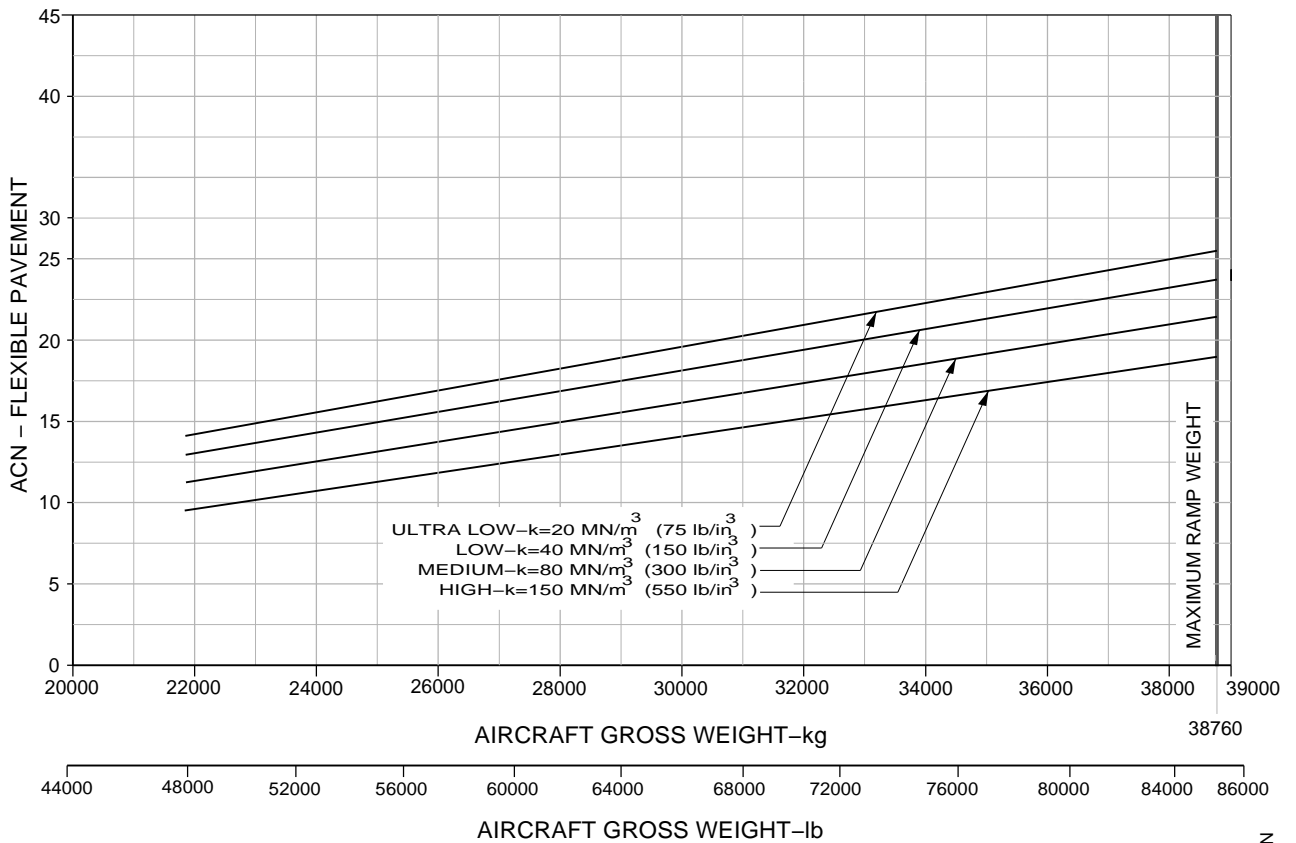
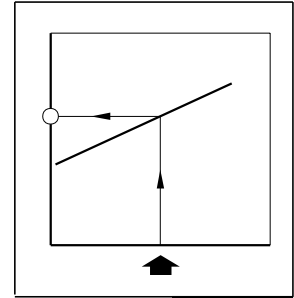
EM170APM070003A.DGN



EFFECTIVITY: EMBRAER 170 AR ACFT MODEL
ACN For Rigid Pavement
Figure 7.19

RIGID PAVEMENT SUBGRADES

- NOTES:
- H38 x 13-18 TIRE SIZE
 - TIRE PRESSURE 9.56 kgf/cm² (136 psi) (UNLOADED)



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8. **POSSIBLE EMBRAER 170 DERIVATIVE AIRCRAFT**

EFFECTIVITY: ALL

8.1. **NOT APPLICABLE**

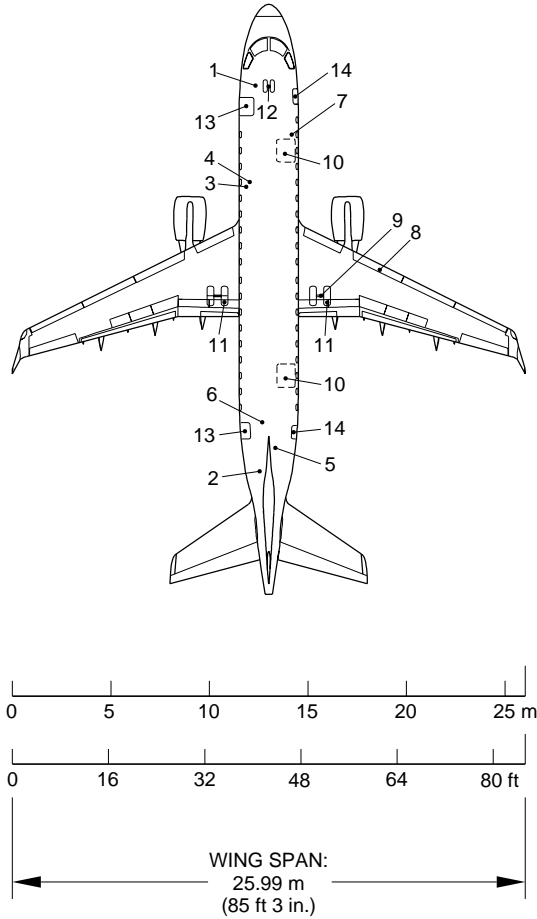
**9. SCALED DRAWINGS***EFFECTIVITY: ALL***9.1. GENERAL**

This section provides plan views to the following scales:

- English/American Customary Weights and Measures
 - 1 inch = 32 feet
 - 1 inch = 50 feet
 - 1 inch = 100 feet
- Metric
 - 1:500
 - 1:1000



EFFECTIVITY: ALL
Scale: 1 Inch Equals 32 Feet
Figure 9.1



ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	EXTERNAL POWER SUPPLY 115 VAC	8	PRESSURE REFUELING / DEFUELING
2	EXTERNAL POWER SUPPLY 28 VDC	9	GROUNDING POINT (RIGHT MLG)
3	ENGINE AIR STARTING	10	CARGO DOOR
4	AIR CONDITIONING LOW PRESSURE	11	MAIN LANDING GEAR
5	WASTE SERVICING PANEL	12	NOSE LANDING GEAR
6	POTABLE WATER SERVICING PANEL	13	PASSENGER DOOR
7	OXYGEN REFILL / REPLACE BOTTLE	14	SERVICE DOOR

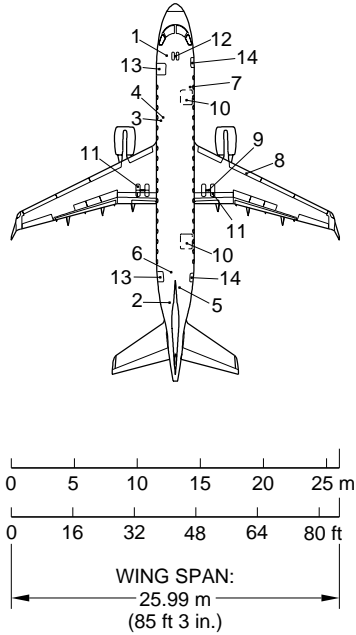
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EFFECTIVITY: ALL

Scale: 1 Inch Equals 50 Feet

Figure 9.2

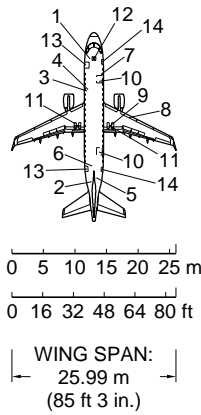


ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	EXTERNAL POWER SUPPLY 115 VAC	8	PRESSURE REFUELING / DEFUELING
2	EXTERNAL POWER SUPPLY 28 VDC	9	GROUNDING POINT (RIGHT MLG)
3	ENGINE AIR STARTING	10	CARGO DOOR
4	AIR CONDITIONING LOW PRESSURE	11	MAIN LANDING GEAR
5	WASTE SERVICING PANEL	12	NOSE LANDING GEAR
6	POTABLE WATER SERVICING PANEL	13	PASSENGER DOOR
7	OXYGEN REFILL / REPLACE BOTTLE	14	SERVICE DOOR

EM170APM090002.DGN



EFFECTIVITY: ALL
 Scale: 1 Inch Equals 100 Feet
 Figure 9.3



ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	EXTERNAL POWER SUPPLY 115 VAC	8	PRESSURE REFUELING / DEFUELING
2	EXTERNAL POWER SUPPLY 28 VDC	9	GROUNDING POINT (RIGHT MLG)
3	ENGINE AIR STARTING	10	CARGO DOOR
4	AIR CONDITIONING LOW PRESSURE	11	MAIN LANDING GEAR
5	WASTE SERVICING PANEL	12	NOSE LANDING GEAR
6	POTABLE WATER SERVICING PANEL	13	PASSENGER DOOR
7	OXYGEN REFILL / REPLACE BOTTLE	14	SERVICE DOOR

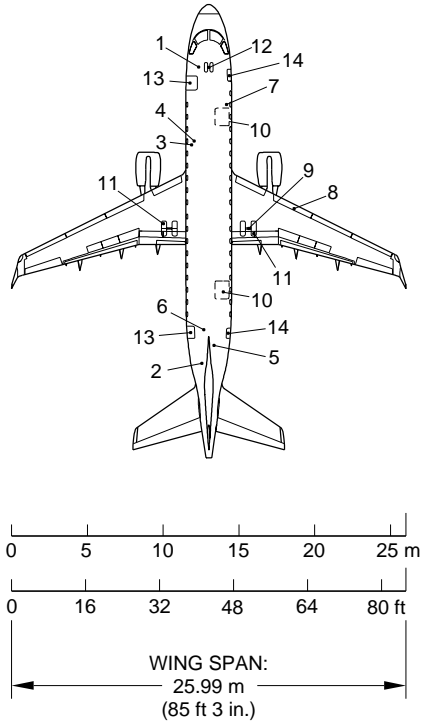
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EFFECTIVITY: ALL

Scale: 1 to 500

Figure 9.4

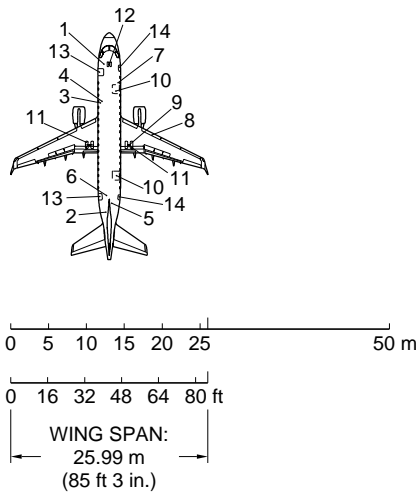


ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	EXTERNAL POWER SUPPLY 115 VAC	8	PRESSURE REFUELING / DEFUELING
2	EXTERNAL POWER SUPPLY 28 VDC	9	GROUNDING POINT (RIGHT MLG)
3	ENGINE AIR STARTING	10	CARGO DOOR
4	AIR CONDITIONING LOW PRESSURE	11	MAIN LANDING GEAR
5	WASTE SERVICING PANEL	12	NOSE LANDING GEAR
6	POTABLE WATER SERVICING PANEL	13	PASSENGER DOOR
7	OXYGEN REFILL / REPLACE BOTTLE	14	SERVICE DOOR

EM170APM090004.DGN



EFFECTIVITY: ALL
 Scale: 1 to 1000
 Figure 9.5



ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	EXTERNAL POWER SUPPLY 115 VAC	8	PRESSURE REFUELING / DEFUELING
2	EXTERNAL POWER SUPPLY 28 VDC	9	GROUNDING POINT (RIGHT MLG)
3	ENGINE AIR STARTING	10	CARGO DOOR
4	AIR CONDITIONING LOW PRESSURE	11	MAIN LANDING GEAR
5	WASTE SERVICING PANEL	12	NOSE LANDING GEAR
6	POTABLE WATER SERVICING PANEL	13	PASSENGER DOOR
7	OXYGEN REFILL / REPLACE BOTTLE	14	SERVICE DOOR

EM170APM090005.DGN