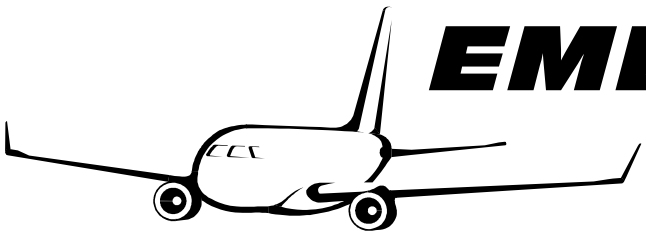


EMBRAER 175

EMBRAER S.A - P.O. BOX 8050
12227-901 SAO JOSE DOS CAMPOS - S.P.
BRAZIL
PHONE: + + 55 12 3927-7517
FAX: + + 55 12 3927-7546
http://www.embraer.com
e-mail: distrib@embraer.com.br

AIRPORT PLANNING MANUAL

APM-2259
28 JUNE 2005
REVISION 12 - 09 OCTOBER 2015

EMBRAER S.A.
AV. BRIGADEIRO FARIA LIMA, 2.170 - CAIXA POSTAL 8050 - TELEFONE (55) 12 39277517
FAX (55) 12 39277546 - CEP 12.227-901 - SÃO JOSÉ DOS CAMPOS - SÃO PAULO - BRASIL
e-mail: distrib@embraer.com.br - http://www.embraer.com

TO: HOLDERS OF PUBLICATION No. **APM-2259 - ″AIRPORT PLANNING MANUAL″**.

FRONT MATTER - REVISION No. 12 DATED OCTOBER 09/2015

Pages which have been added, revised, or deleted by the current revision are indicated by an asterisk, on the List of Effective Pages.

This issue incorporates all preceding Temporary Revisions (if any).

Modifications introduced by this revision are all editorial in nature, with no technical implications, they not being therefore highlighted and no substantiation source being presented herein.

HIGHLIGHTS

RECORD OF REVISIONS

The user must update the Record of Revisions when a revision is put into the manual.

REV No.	ISSUE DATE	DATE INSERTED	BY

REV No.	ISSUE DATE	DATE INSERTED	BY

RETAIN THIS RECORD IN THE FRONT OF MANUAL OR CHAPTER.
ON RECEIPT OF REVISIONS, INSERT REVISED PAGES IN THE MANUAL, AND ENTER REVISION NUMBER, DATE INSERTED AND INITIALS.

RECORD OF TEMPORARY REVISIONS

Temporary Rev. No.	Page Number	Issued Date	By	Date Removed	By

TEMPORARY REVISION STATUS REPORT

This list is intended to show the operator which temporary revisions are applicable to his fleet.
The list consists of the temporary revision number, the related issue date, the incorporation date, and the affected subject.

S* INDICATES TR HAS BEEN SUPERSEDED BY THE TR REFERRED TO.

EFFECTIVITY: ALL

TR STATUS REPORT

LIST OF SERVICE BULLETINS

This list is intended to let the operator know which Service Bulletins are incorporated to the APM.

The list consists of the Service Bulletin numbers and the respective revisions (if applicable), the affected section (s) (APM Section Number), information on whether the Service Bulletin affects the manual, the aircraft (Effectivity) affected by the Service Bulletins and the incorporation date.

A revision bar is placed on the left margin of the list whenever data are inserted or revised.

NOTE: The effectivity is indicated by means of two numerical groups separated by a dash. The first group presented in the effectivity column corresponds to the last digits of the lowest aircraft designation number to indicate the beginning of the effectivity, and the second group corresponds to the last digits of the highest aircraft designation number to indicate the end of the effectivity.

SERVICE BULLETIN NUMBER	APM SECTION NUMBER	INCORPORATION DATE	EFFECTIVITY
SB 170-00-0016/01	07-2	Oct 09/2015	170:00171-00171, 00176-00176, 00181-00181, 00186-00188, 00192-00192, 00195-00195, 00197-00198, 00201-00201, 00203-00203, 00205-00205, 00207-00207, 00209-00210, 00213-00214, 00218-00219, 00221-00222, 00225-00226, 00229-00229, 00233-00233, 00235-00240, 00242-00270, 00273-00273
SB 170-57-0058/00	02-2	Oct 07/2014	170:00376-00390, 00392-00393
SB 170-57-0058/00	04-2	Oct 07/2014	170:00376-00390, 00392-00393

Pages revised or added by the current revision are indicated by an asterisk (*). Pages deleted by the current revision are indicated by * (del). Pages deleted by the previous revision are indicated by (del).

EFFECTIVITY: ALL

LIST OF EFFECTIVE PAGES

Pages revised or added by the current revision are indicated by an asterisk (*). Pages deleted by the current revision are indicated by * (del). Pages deleted by the previous revision are indicated by (del).

EFFECTIVITY: ALL

TABLE OF CONTENTS

SECTION 6 - OPERATING CONDITIONS

SECTION 7 - PAVEMENT DATA

SECTION 8 - POSSIBLE EMBRAER 175 DERIVATIVE AIRCRAFT

SECTION 9 - SCALED DRAWINGS

LIST OF TABLES

LIST OF FIGURES

1. SCOPE

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.

1.2. INTRODUCTION

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 1.1 - APM Arrangement

ARRANGEMENTS	CONTENTS
Manual Front Matter	Title Page
	Costumer Comment Form
	Highlights
	Record of Revision Sheet
	Temporary Revision Sheet
	List of Service Bulletins
	List of Effective Pages
	Table of Contents
	List of Tables
	List of Figures
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, the 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.

- List of Service Bulletins: Lists the Service Bulletins, including all issued revisions, which affect the manual as well as the affected section(s) (APM Section Number), the aircraft affected by the Service Bulletin, and the date of incorporation of the SB in the manual.
- Temporary Revision Sheet: Lists the temporary revision numbers, page number, issue date, person responsible for the insertion and insertion date.
- List of Effective Pages: Lists all sections and their list of effective pages with the latest issue dates.
- Queries concerning any printed material, including purchasing, copying, shipping and handling, complaints, or compliments may be addressed to:
  Technical Publications Distribution:
  Embraer S.A.
  Attention of: Technical Publications Department
  P.O. BOX 8050
  CEP. 12.227-901- São José dos Campos - SP - Brazil
  Phone: (55 12) 3927-7517
  FAX: (55 12) 3927-7546
  http://www.embraer.com
  e-mail: distrib@embraer.com.br
- For support regarding technical information contained in non-operational publication, please contact:
  Routine Issues: Contact Embraer Customer Support Service
  AOG Issues: Contact Embraer AOG group directly
- For Digital Technical Publications support:
  cdrom.support@embraer.com.br

1.2.1. 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.

1.3. ABBREVIATIONS

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

Table 1.2 - 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

Table 1.2 - List of Acronyms and Abbreviations used in the APM

ACRONYMS AND ABBREVIATIONS	DESCRIPTION
APM	Airport Planning Manual
APU	Auxiliary Power Unit
AR	Advanced Range
ATTCS	Automatic Takeoff-Thrust Control-System
BOW	Basic Operating Weight
CBR	California Bearing Ratio
ECS	Environmental Control System
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FWD	Forward
GEAE	General Electric Aircraft Engines
ICAO	International Civil Aviation Organization
ISA	International Standard Atmosphere
JAR	Joint Aviation Requirements
LCN	Load Classification Number
LH	Left-Hand
LR	Long Range
MLW	Maximum Landing Weight
MRW	Maximum Ramp Weight
MTOW	Maximum Takeoff Weight
MZFW	Maximum Zero Fuel Weight
N	Newton
RBHA	Requisitos Brasileiros de Homologação Aeronáutica
RH	Right-Hand
STD	Standard
dBA	A-Weighted Decibel
ft	Foot
ft^2	Square Foot
ft^3	Cubic Foot
gal.	Gallon
in	Inch
in^2	Square Inch
inHg	Inch of Mercury
kPa	Kilopascal
kg	Kilogram
lb	Pound
lb/in^3	Pound per Cubic Inch
lbf	Pound Force
m	Meter
m^2	Square Meter
m^3	Cubic Meter
min	Minute
psi	Pounds per Square Inch

2. AIRCRAFT DESCRIPTION

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 37500 kg (82673 lb)
- The LR aircraft model - MTOW 38790 kg (85517 lb)
- The AR aircraft model - MTOW 40370 kg (89000 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

DESIGN WEIGHTS[1]	AIRCRAFT MODELS		
	STD	LR	AR
MRW	37660 kg (83026 lb)	38950 kg (85870 lb)	40530 kg (89353 lb)
MTOW	37500 kg (82673 lb)	38790 kg (85517 lb)	40370 kg (89000 lb)
MLW	34000 kg (74957 lb)		34100 kg (75177 lb)
BOW [2]	21500 kg (47399 lb)		22500 kg (49604 lb)
MZFW	31700 kg (69886 lb)		32000 kg (70548 lb)
Maximum Payload [2]	10200 kg (22487 lb)		
Maximum Seating Capacity	84 passengers	80 passengers	86 passengers
Maximum Cargo Volume [3]	17.12 m^3 (604.59 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.)

2.2. GENERAL AIRCRAFT DIMENSIONS

2.2.1. External Dimensions - On aircraft with winglet or Pre-Mod SB 0170-57-0058

- Span over winglets - 26.00 m (85 ft 4 in.)
- Height (maximum) - 9.86 m (32 ft 4 in.)
- Overall length - 31.68 m (103 ft 11 in.)

2.2.2. External Dimensions - On aircraft with extended wingtip or Post-Mod SB 0170-57-0058

- Span over wingtips - 28.65 m (93 ft 11 in.)
- Height (maximum) - 9.86 m (32 ft 4 in.)

- Overall length - 31.68 m (103 ft 11 in.)

2.2.3. Wing

- Reference area - 72.72 m^2 (783 ft^2)
- Reference aspect ratio - 8.6

2.2.4. Fuselage

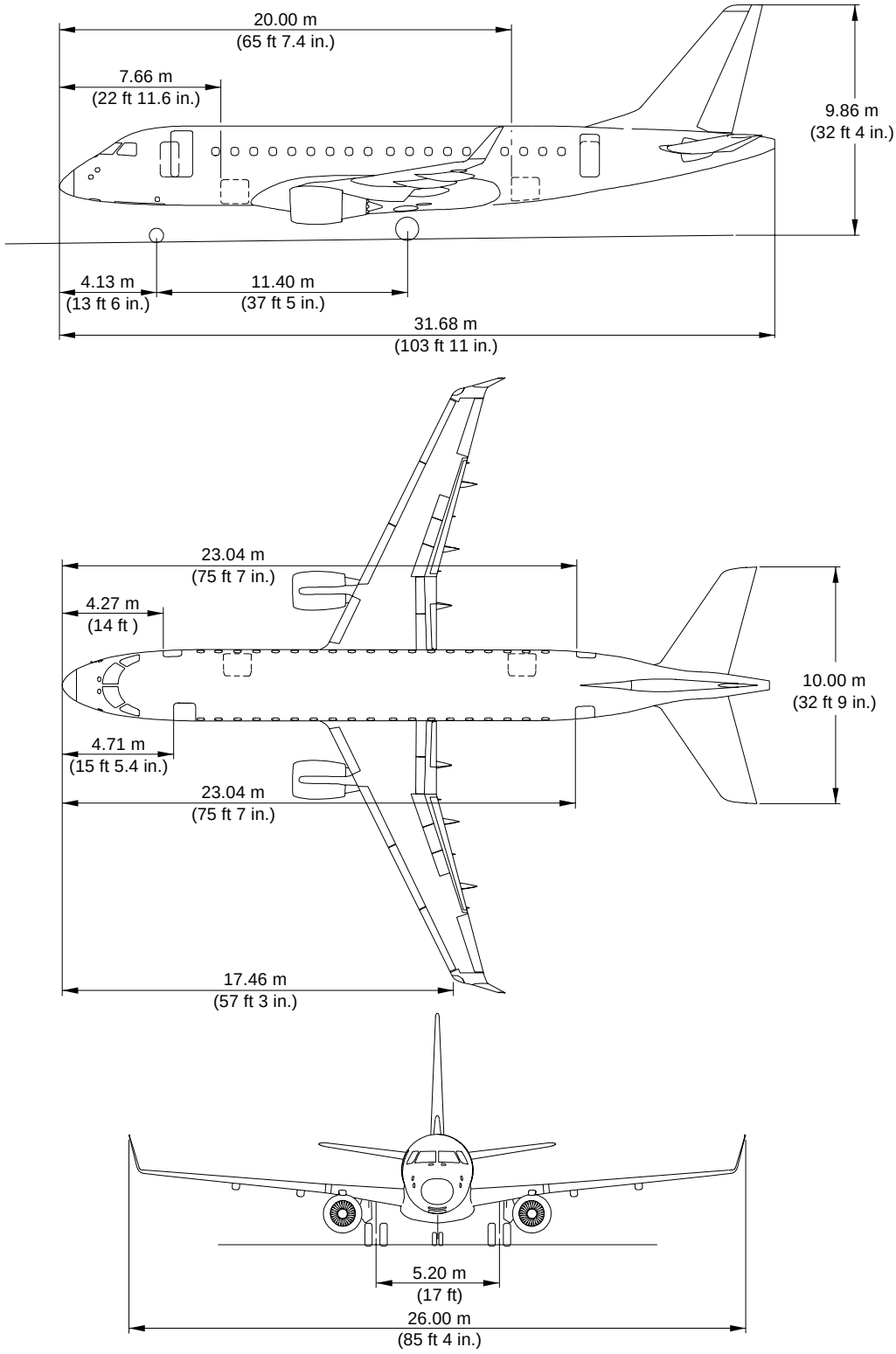
- Total Length - 31.68 m (103 ft 11 in.)
- Length of pressurized section - 24.52 m (80 ft 5 in.)

2.2.5. Horizontal Tail

- Span - 10.00 m (32 ft 9 in.)
- Area - 23.25 m^2 (250 ft^2 37 in^2)

2.2.6. Vertical Tail

- Reference area - 16.20 m^2 (174 ft^2 55 in^2)

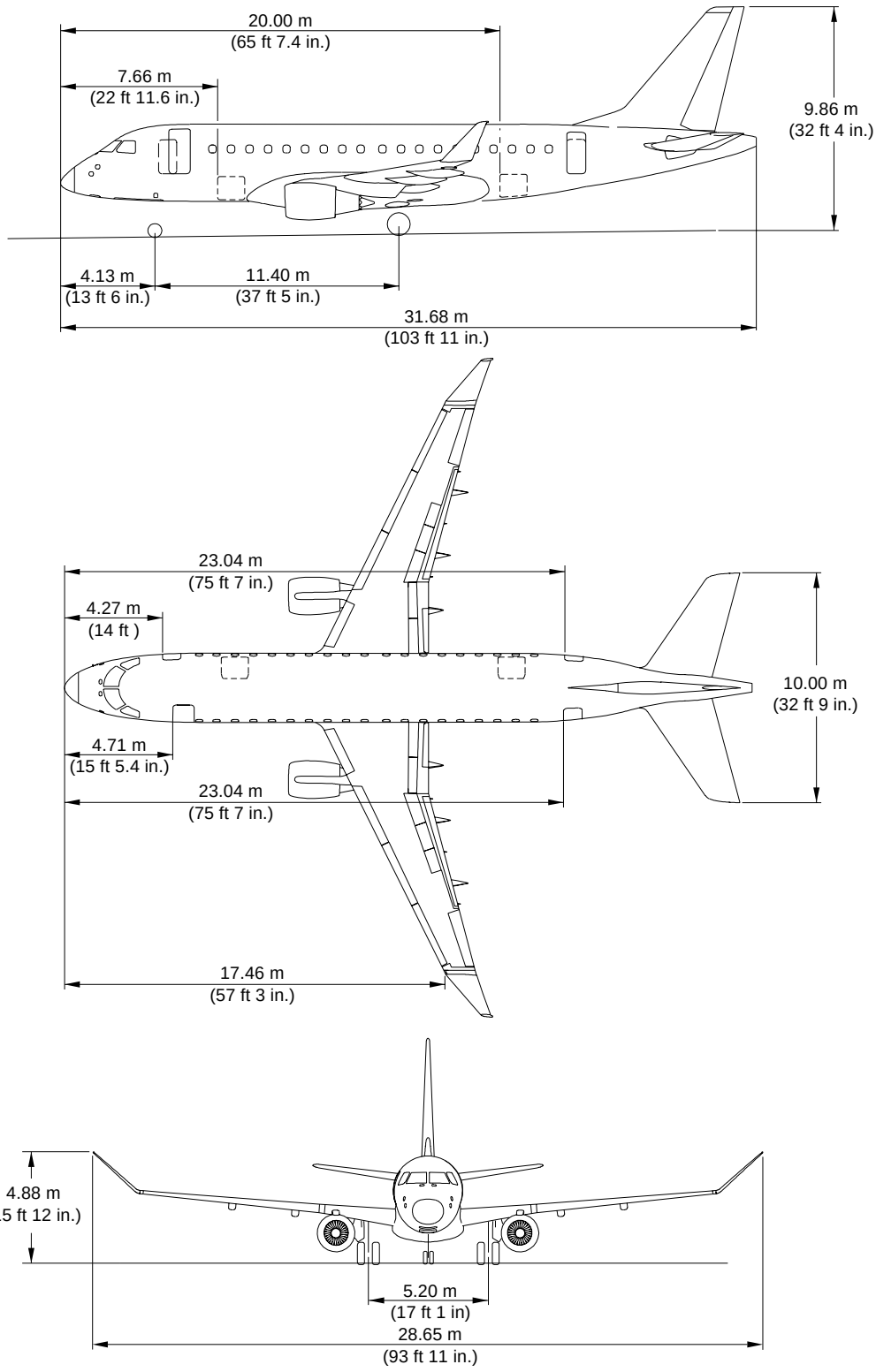


EM170APM020016C.DGN

General Aircraft Dimensions
Figure 2.1

EFFECTIVITY: ON ACFT WITH WINGLET OR PRE-MOD SB 170-57-0058

w-apm2259



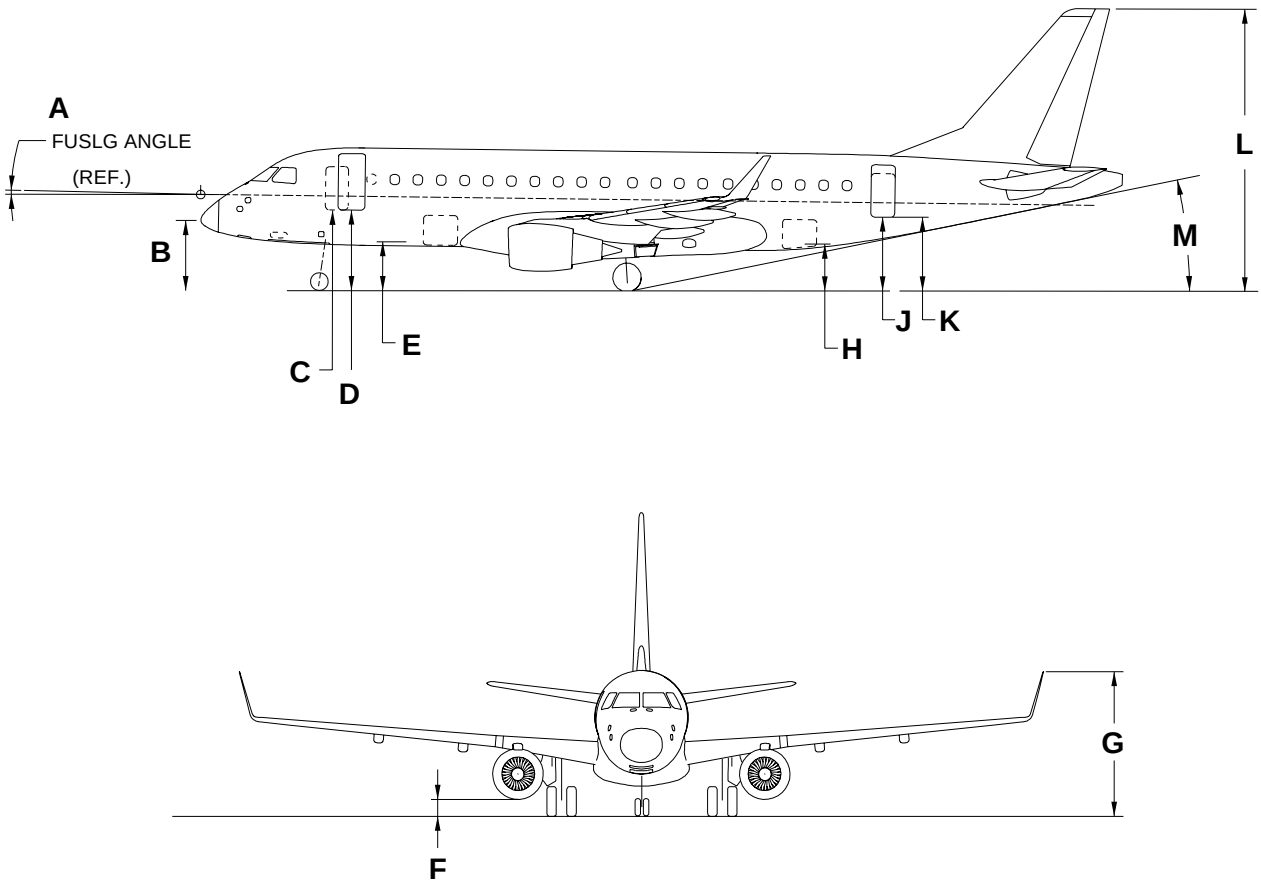
EM170APM020025C.DGN

General Aircraft Dimensions
Figure 2.2

EFFECTIVITY: ON ACFT WITH ENHANCED WINGTIP OR POST-MOD SB 170-57-0058

w-apm2259

2.3. GROUND CLEARANCES



Ground Clearances
Figure 2.3

Table 2.2 - Ground Clearance - STD Aircraft Model

EFFECTIVITY: EMBRAER 175 STD ACFT MODEL

WEIGHT	CG (%MAC)	FUS ANGLE (DEG) (A)	NOSE (B)	FOR-WARD SERVICE DOOR (C)	FOR-WARD PASSEN-GER DOOR (D)	FOR-WARD CARGO DOOR (E)	NACELLE (F)	WINGLET (G)	AFT CARGO DOOR (H)	AFT SERVICE DOOR (J)	AFT PASSEN-GER DOOR (K)	VERTI-CAL TAIL (L)	TAIL SKID ANGU-LAR CLEAR-ANCE (DEG) (M)
37660 kg 83026 lb	10.1	0.4	2.14 m 7 ft	2.54 m 8 ft 4 in.	2.54 m 8 ft 4 in.	1.46 m 4 ft 9 in.	0.47 m 1 ft 7 in.	4.48 m 14 ft 8 in.	1.45 m 4 ft9 in.	2.42 m 7 ft 11 in.	2.42 m 7 ft 11 in.	9.61 m 31 ft 6 in.	11.7
37660 kg 83026 lb	25.6	0.6	2.20 m 7 ft 3 in.	2.58 m 8 ft 6 in.	2.58 m 8 ft 6 in.	1.48 m 4 ft 10 in.	0.47 m 1 ft 7 in.	4.45 m 14 ft 7in.	1.42 m 4 ft 8 in.	2.38 m 7 ft 10 in.	2.38 m 7 ft 10 in.	9.54 m 31 ft 4 in.	11.4
37500 kg 82673 lb	10.1	0.4	2.14 m 7 ft	2.54 m 8 ft 4 in.	2.54 m 8 ft 4 in.	1.46 m 4 ft9 in.	0.47 m 1 ft 7 in.	4.48 m 14 ft 8 in.	1.45 m 4 ft9 in.	2.42 m 7 ft 11 in.	2.42 m 7 ft 11 in.	9.61 m 31 ft 6 in.	11.7
37500 kg 82673 lb	25.6	0.6	2.20 m 7 ft 3 in.	2.58 m 8 ft 6 in.	2.58 m 8 ft 6 in.	1.48 m 4 ft 10 in.	0.47 m 1 ft 7 in.	4.46 m 14 ft 8 in.	1.42 m 4 ft 8 in.	2.38 m 7 ft 10 in.	2.38 m 7 ft 10 in.	9.54 m 31 ft 4 in.	11.4
34000 kg 74957 lb	7.0	0.3	2.14 m 7 ft	2.55 m 8 ft 4 in.	2.55 m 8 ft 4 in.	1.47 m 4 ft 10 in.	0.48 m 1 ft 7 in.	4.50 m 14 ft9 in.	1.47 m 4 ft 10 in.	2.45 m 8 ft	2.45 m 8 ft	9.65 m 31 ft 8 in.	11.9
34000 kg 74957 lb	27.0	0.6	2.21 m 7 ft 3 in.	2.60 m 8 ft 6 in.	2.59 m 8 ft 6 in.	1.50 m 4 ft 11 in.	0.49 m 1 ft 7 in.	4.47 m 14 ft 8 in.	1.44 m 4 ft9 in.	2.39 m 7 ft10 in.	2.39 m 7 ft10 in.	9.56 m 31 ft 4 in.	11.5
31700 kg 69886 lb	7.1	0.3	2.14 m 7 ft	2.55 m 8 ft 4 in.	2.55 m 8 ft 4 in.	1.48 m 4 ft 10 in.	0.49 m 1 ft 7 in.	4.52 m 14 ft 10 in.	1.49 m 4 ft11 in.	2.46 m 8 ft 1 in.	2.46 m 8 ft 1 in.	9.67 m 31 ft9 in.	11.9
31700 kg 69886 lb	27.0	0.6	2.22 m 7 ft 3 in.	2.60 m 8 ft 6 in.	2.60 m 8 ft 6 in.	1.51 m 4 ft 11 in.	0.50 m 1 ft 8 in.	4.49 m 14 ft 9 in.	1.45 m 4 ft9 in.	2.41 m 7 ft 11 in.	2.41 m 7 ft 11 in.	9.57 m 31 ft 5 in.	11.6
27500 kg 60627 lb	27.0	0.5	2.23 m 7 ft 4 in.	2.62 m 8 ft 7 in.	2.61 m 8 ft 7 in.	1.53 m 5 ft	0.52 m 1 ft8 in.	4.52 m 14 ft 10 in.	1.48 m 4 ft 10 in.	2.44 m 8 ft	2.44 m 8 ft	9.61 m 31 ft 6 in.	11.7
22500 kg 49604 lb	7.0	0.1	2.16 m 7 ft 1 in.	2.59 m 8 ft 6 in.	2.59 m 8 ft 6 in.	1.52 m 5 ft	0.55 m 1 ft 10 in.	4.60 m 15 ft1 in.	1.58 m 5 ft 2 in.	2.56 m 8 ft5 in.	2.56 m 8 ft5 in.	9.79 m 32 ft 1 in.	12.4
22500 kg 49604 lb	21.0	0.32	2.21 m 7 ft 3 in.	2.62 m 8 ft 7 in.	2.62 m 8 ft 7 in.	1.54 m 5 ft 11 in.	0.55 m 1 ft 10 in.	4.58 m 15 ft	1.54 m 5 ft 1 in.	2.52 m 8 ft3 in.	2.52 m 8 ft3 in.	9.72 m 31 ft 11 in.	12.1
22500 kg 49604 lb	27.0	0.5	2.25 m 7 ft 5 in.	2.64 m 8 ft 8 in.	2.64 m 8 ft 8 in.	1.55 m 5 ft 1 in.	0.56 m 1 ft 10 in.	4.56 m 14 ft11 in.	1.53 m 5 ft	2.59 m 8 ft 6 in.	2.59 m 8 ft 6 in.	9.68 m 31 ft9 in.	12.0

Table 2.3 - Ground Clearance - LR Aircraft Model

EFFECTIVITY: EMBRAER 175 LR ACFT MODEL

WEIGHT	CG (%MAC)	FUS ANGLE (DEG) (A)	NOSE (B)	FOR-WARD SERVICE DOOR (C)	FOR-WARD PASSEN-GER DOOR (D)	FOR-WARD CARGO DOOR (E)	NACELLE (F)	WINGLET (G)	AFT CARGO DOOR (H)	AFT SERVICE DOOR (J)	AFT PASSEN-GER DOOR (K)	VERTI-CAL TAIL (L)	TAIL SKID ANGU-LAR CLEAR-ANCE (DEG) (M)
38950 kg 85870 lb	11.2	0.4	2.15 m 7 ft1 in.	2.54 m 8 ft 4 in.	2.54 m 8 ft 4 in.	1.46 m 4 ft 9 in.	0.46 m 1 ft 6 in.	4.47 m 14 ft 8 in.	1.44 m 4 ft9 in.	2.41 m 7 ft 11 in.	2.41 m 7 ft 11 in.	9.59 m 31 ft 6 in.	11.6
38950 kg 85870 lb	25.1	0.6	2.19 m 7 ft 2 in.	2.58 m 8 ft 6 in.	2.57 m 8 ft 5 in.	1.48 m 4 ft 10 in.	0.47 m 1 ft 7 in.	4.45 m 14 ft 7in.	1.41 m 4 ft 8 in.	2.37 m 7 ft 9 in.	2.37 m 7 ft 9 in.	9.53 m 31 ft 3 in.	11.4
38790 kg 85517 lb	11.2	0.4	2.15 m 7 ft1 in.	2.55 m 8 ft 4 in.	2.54 m 8 ft 4 in.	1.46 m 4 ft9 in.	0.46 m 1 ft 6 in.	4.47 m 14 ft 8 in.	1.44 m 4 ft9 in.	2.41 m 7 ft 11 in.	2.41 m 7 ft 11 in.	9.59 m 31 ft 6 in.	11.7
38790 kg 85517 lb	25.1	0.6	2.19 m 7 ft 2 in.	2.58 m 8 ft 6 in.	2.57 m 8 ft 5 in.	1.48 m 4 ft 10 in.	0.47 m 1 ft 7 in.	4.45 m 14 ft 7 in.	1.41 m 4 ft 8 in.	2.37 m 7 ft9 in.	2.37 m 7 ft 9 in.	9.53 m 31 ft 3 in.	11.4
34000 kg 74957 lb	7.0	0.3	2.14 m 7 ft	2.55 m 8 ft 4 in.	2.55 m 8 ft 4 in.	1.47 m 4 ft 10 in.	0.48 m 1 ft 7 in.	4.50 m 14 ft9 in.	1.47 m 4 ft 10 in.	2.45 m 8 ft	2.45 m 8 ft	9.65 m 31 ft 8 in.	11.9
34000 kg 74957 lb	27.0	0.6	2.21 m 7 ft 3 in.	2.60 m 8 ft 6 in.	2.59 m 8 ft 6 in.	1.50 m 4 ft 11 in.	0.49 m 1 ft 7 in.	4.47 m 14 ft 8 in.	1.44 m 4 ft9 in.	2.39 m 7 ft10 in.	2.39 m 7 ft10 in.	9.56 m 31 ft 4 in.	11.5
31700 kg 69886 lb	7.1	0.3	2.14 m 7 ft	2.55 m 8 ft 4 in.	2.55 m 8 ft 4 in.	1.48 m 4 ft 10 in.	0.49 m 1 ft 7 in.	4.52 m 14 ft 10 in.	1.49 m 4 ft11 in.	2.46 m 8 ft 1 in.	2.46 m 8 ft 1 in.	9.67 m 31 ft9 in.	11.9
31700 kg 69886 lb	27.0	0.6	2.22 m 7 ft 3 in.	2.60 m 8 ft 6 in.	2.60 m 8 ft 6 in.	1.51 m 4 ft 11 in.	0.50 m 1 ft 8 in.	4.49 m 14 ft 9 in.	1.45 m 4 ft9 in.	2.41 m 7 ft 11 in.	2.41 m 7 ft 11 in.	9.57 m 31 ft 5 in.	11.6
27500 kg 60627 lb	27.0	0.5	2.23 m 7 ft 4 in.	2.62 m 8 ft 7 in.	2.61 m 8 ft 7 in.	1.53 m 5 ft	0.52 m 1 ft8 in.	4.52 m 14 ft 10 in.	1.48 m 4 ft 10 in.	2.44 m 8 ft	2.44 m 8 ft	9.61 m 31 ft 6 in.	11.7
22500 kg 49604 lb	7.0	0.1	2.16 m 7 ft 1 in.	2.59 m 8 ft 6 in.	2.59 m 8 ft 6 in.	1.52 m 5 ft	0.55 m 1 ft 10 in.	4.60 m 15 ft1 in.	1.58 m 5 ft 2 in.	2.56 m 8 ft5 in.	2.56 m 8 ft5 in.	9.79 m 32 ft 1 in.	12.4
22500 kg 49604 lb	21.0	0.32	2.21 m 7 ft 3 in.	2.62 m 8 ft 7 in.	2.62 m 8 ft 7 in.	1.54 m 5 ft 11 in.	0.55 m 1 ft 10 in.	4.58 m 15 ft	1.54 m 5 ft 1 in.	2.52 m 8 ft3 in.	2.52 m 8 ft3 in.	9.72 m 31 ft 11 in.	12.1
22500 kg 49604 lb	27.0	0.5	2.25 m 7 ft 5 in.	2.64 m 8 ft 8 in.	2.64 m 8 ft 8 in.	1.55 m 5 ft 1 in.	0.56 m 1 ft 10 in.	4.56 m 14 ft11 in.	1.53 m 5 ft	2.59 m 8 ft 6 in.	2.59 m 8 ft 6 in.	9.68 m 31 ft9 in.	12.0

Table 2.4 - Ground Clearance - AR Aircraft Model

WEIGHT	CG (%MAC)	FUS ANGLE (DEG) (A)	NOSE (B)	FOR-WARD SERVICE DOOR (C)	FOR-WARD PASSEN-GER DOOR (D)	FOR-WARD CARGO DOOR (E)	NACELLE (F)	WINGLET TIP (G)	AFT CARGO DOOR (H)	AFT SERVICE DOOR (J)	AFT PASSEN-GER DOOR (K)	VERTI-CAL TAIL (L)	TAIL SKID ANGU-LAR CLEAR-ANCE (DEG) (M)
40530 kg 89385 lb	17.6	0.4	2.14 m 7 ft1 in.	2.54 m 8 ft 4 in.	2.54 m 8 ft 4 in.	1.46 m 4 ft 9 in.	0.48 m 1 ft 6 in.	4.50 m 14 ft 8 in.	1.46 m 4 ft9 in.	2.44 m 7 ft 11 in.	2.44 m 7 ft 11 in.	9.64 m 31 ft 6 in.	11.8
40530 kg 89353 lb	27.5	0.6	2.19 m 7 ft 2 in.	2.58 m 8 ft 6 in.	2.57 m 8 ft 5 in.	1.48 m 4 ft 10 in.	0.47 m 1 ft 7 in.	4.44 m 14 ft 7in.	1.44 m 4 ft 8 in.	2.40 m 7 ft 9 in.	2.40 m 7 ft 9 in.	9.57 m 31 ft 3 in.	11.6
40370 kg 89000 lb	17.6	0.4	2.14 m 7 ft1 in.	2.55 m 8 ft 4 in.	2.54 m 8 ft 4 in.	1.46 m 4 ft9 in.	0.48 m 1 ft 6 in.	4.450 m 14 ft 8 in.	1.47 m 4 ft9 in.	2.44 m 7 ft 11 in.	2.44 m 7 ft 11 in.	9.63 m 31 ft 6 in.	11.8
40370 kg 89000 lb	27.5	0.6	2.19 m 7 ft 2 in.	2.58 m 8 ft 6 in.	2.57 m 8 ft 5 in.	1.48 m 4 ft 10 in.	0.47 m 1 ft 7 in.	4.44 m 14 ft 7 in.	1.44 m 4 ft 8 in.	2.40 m 7 ft9 in.	2.40 m 7 ft 9 in.	9.57 m 31 ft 3 in.	11.6
34100 kg 75177 lb	12.1	0.3	2.13 m 7 ft	2.55 m 8 ft 4 in.	2.55 m 8 ft 4 in.	1.47 m 4 ft 10 in.	0. 49 m 1 ft 7 in.	4.53 m 14 ft9 in.	1.50 m 4 ft 10 in.	2.48 m 8 ft	2.48 m 8 ft	9.70 m 31 ft 8 in.	12
34100 kg 75177 lb	30	0.6	2.21 m 7 ft 3 in.	2.60 m 8 ft 6 in.	2.59 m 8 ft 6 in.	1.50 m 4 ft 11 in.	0.49 m 1 ft 7 in.	4.46 m 14 ft 8 in.	1.46 m 4 ft9 in.	2.43 m 7 ft10 in.	2.42 m 7 ft10 in.	9.60 m 31 ft 4 in.	11.7
32000 kg 70548 lb	12.1	0.3	2.14 m 7 ft	2.55 m 8 ft 4 in.	2.55 m 8 ft 4 in.	1.48 m 4 ft 10 in.	0.50 m 1 ft 7 in.	4.54 m 14 ft 10 in.	1.52 m 4 ft11 in.	2.50 m 8 ft 1 in.	2.50 m 8 ft 1 in.	9.72 m 31 ft 9 in.	12.1
32000 kg 70548lb	30	0.6	2.21 m 7 ft 3 in.	2.60 m 8 ft 6 in.	2.60 m 8 ft 6 in.	1.51 m 4 ft 11 in.	0.51 m 1 ft 8 in.	4.51 m 14 ft 9 in.	1.48 m 4 ft9 in.	2.4 m 7 ft 11 in.	2.44 m 7 ft 11 in.	9.62 m 31 ft 5 in.	11.8
22500 kg 49604 lb	20.0	0.32	2.16 m 7 ft 3 in.	2.59 m 8 ft 7 in.	2.59 m 8 ft 7 in.	1.53 m 5 ft 11 in.	0.56 m 1 ft 10 in.	4.63 m 15 ft	1.60 m 5 ft 1 in.	2.59 m 8 ft3 in.	2.59 m 8 ft3 in.	9.84 m 31 ft 11 in.	12.6
22500 kg 49604 lb	26.0	0.5	2.21 m 7 ft 5 in.	2.62 m 8 ft 8 in.	2.62 m 8 ft 8 in.	1.55 m 5 ft 1 in.	0.56 m 1 ft 10 in.	4.60 m 14 ft11 in.	1.57 m 5 ft	2.55 m 8 ft 6 in.	2.55 m 8 ft 6 in.	9.76 m 31 ft 9 in.	12.3

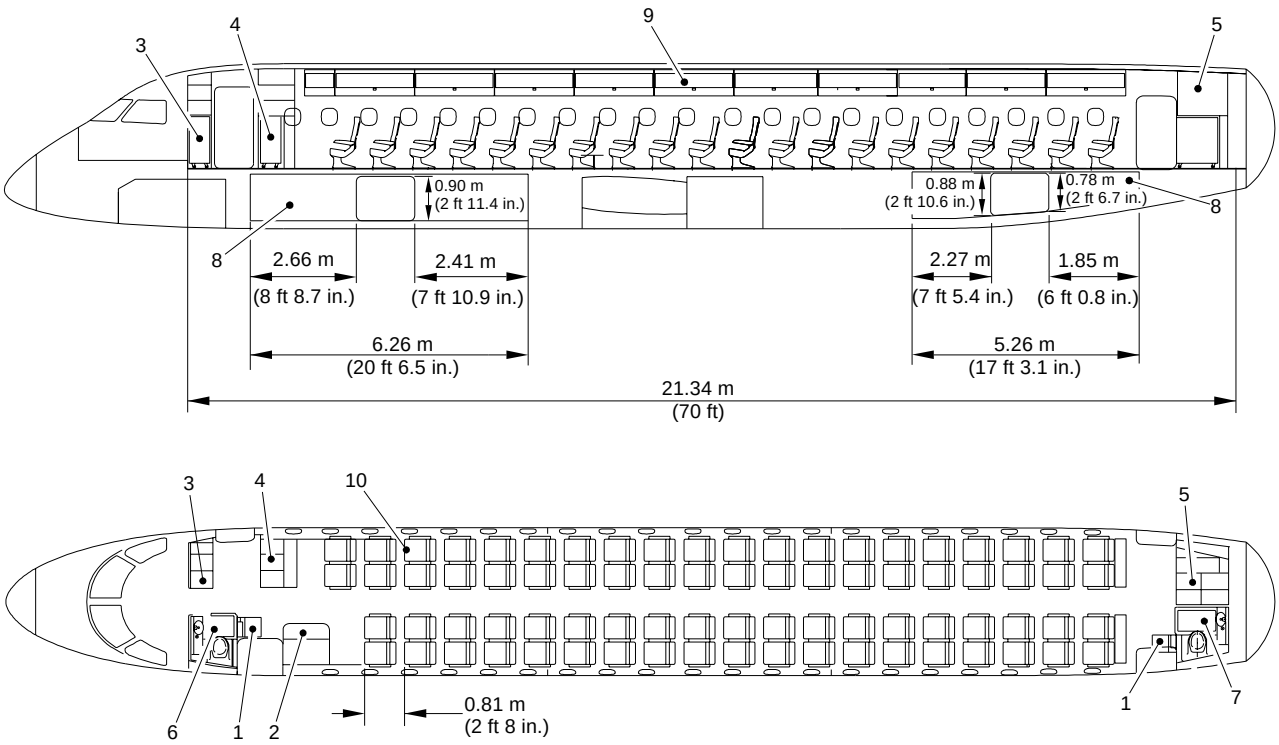
2.4. INTERIOR ARRANGEMENT

The interior arrangement provides accommodation for two pilots, one observer, two flight attendants, and 78 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 78 passengers in 19 double seats on the LH side, and 20 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.)



1 − FLIGHT ATTENDANT SEAT
2 − WARDROBE
3 − FWD RH G1 GALLEY
4 − FWD RH G2 GALLEY
5 − AFT RH GALLEY
6 − FWD LAVATORY
7 − AFT LAVATORY
8 − CARGO COMPARTMENT
9 − OVERHEAD BIN
10 − PASSENGER SEAT

CARGO/BAGGAGE VOLUME	
CARGO COMPARTMENT	17.12 m^3(604.59 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)

EM170APM020018D.DGN

Typical Interior Arrangements
Figure 2.4

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]	1500 kg (3307 lb)	9.92 m^3 (350.32 ft^3)
AFT	1150 kg (2535 lb)	7.2 m^3 (254.27 ft^3)
Total	2650 kg (5842 lb)	17.12 m^3 (604.59 ft^3)

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

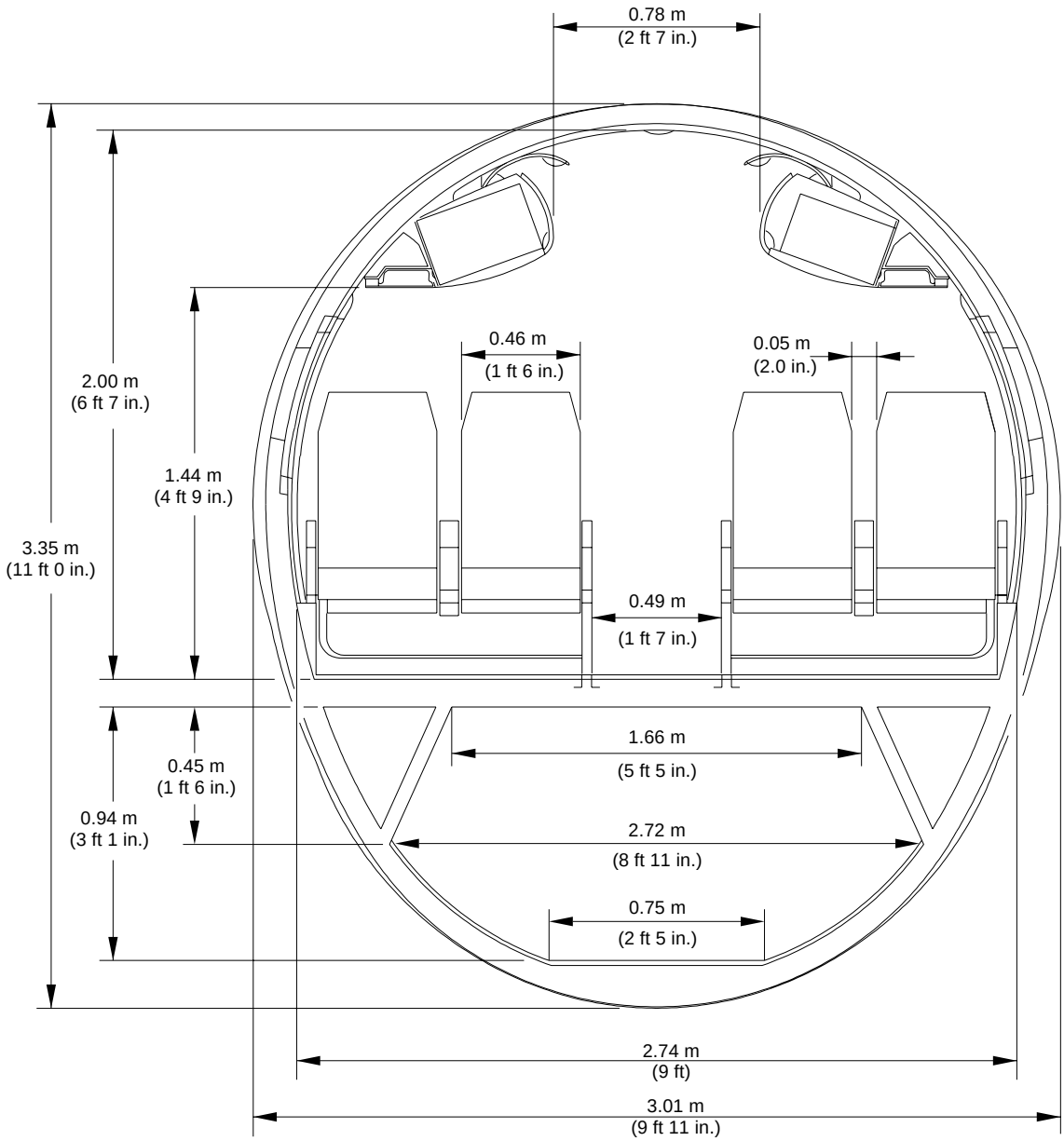
The cargo compartments are provided with the following features:

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

2.4.3. Cockpit

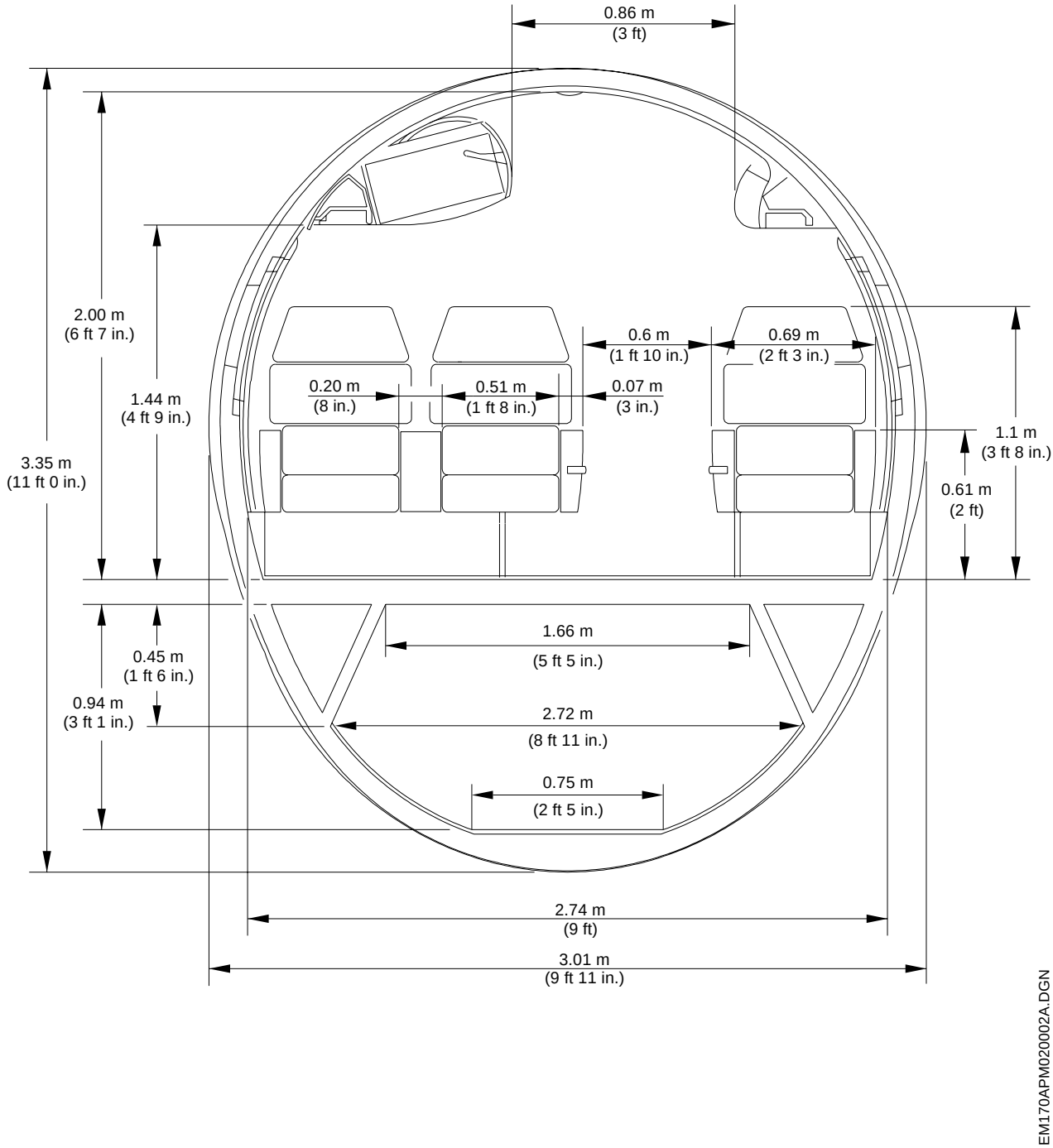
The cockpit is acoustically and thermally insulated for appearance and durability. It follows the worldwide trend of rounded edges to avoid harm to the flight crew.
The cockpit is separated from the passenger cabin by a bulkhead provided with a lockable door. The cockpit door has a locking system, which 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



EM170APM020001A.DGN

Economy Class Passenger Cabin Cross-Section
Figure 2.5

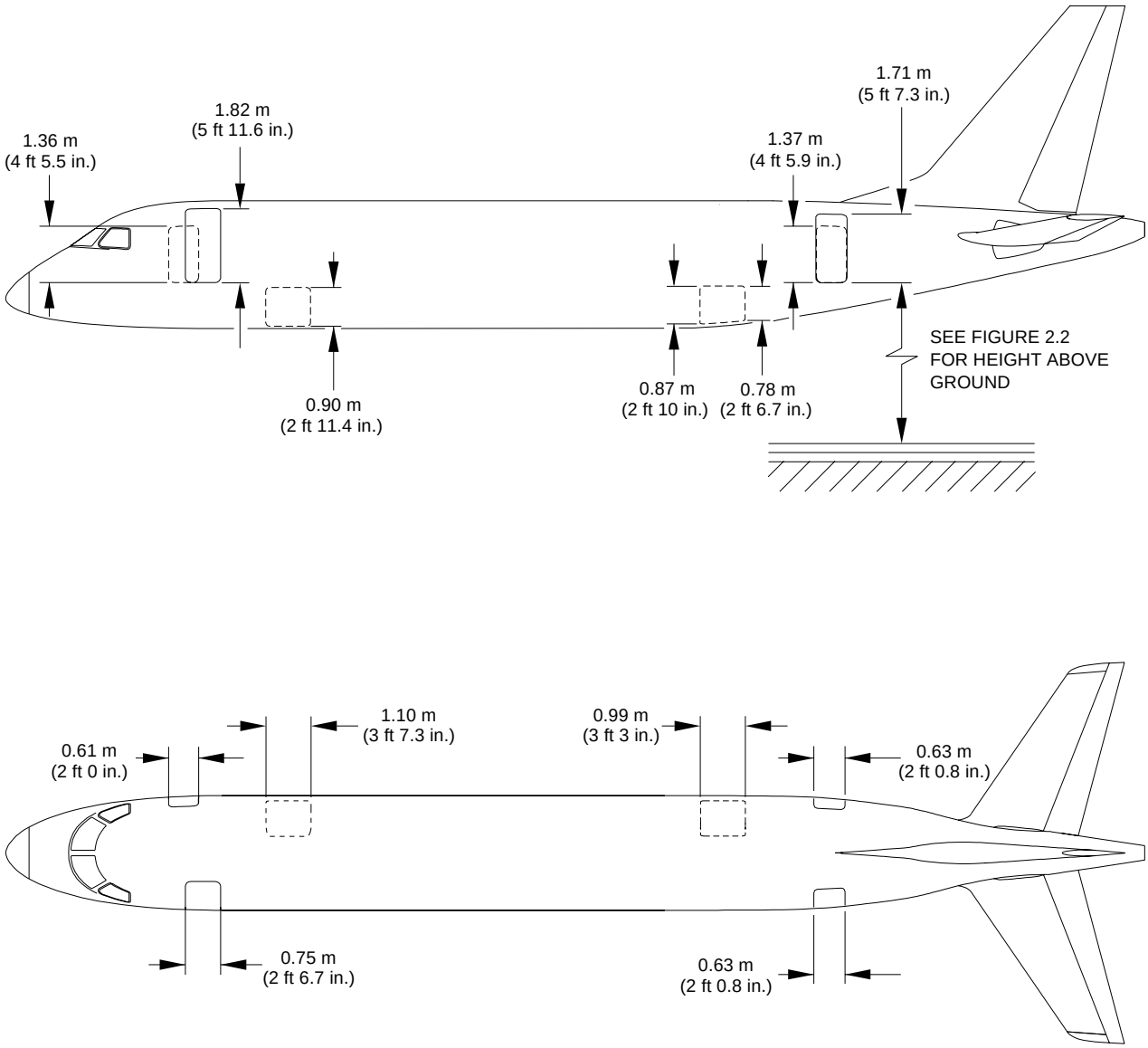


First Class Passenger Cabin Cross-Section
Figure 2.6

2.6. LOWER COMPARTMENT CONTAINERS

Not applicable

2.7. DOOR CLEARANCES



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

Door Dimensions
Figure 2.7

3. AIRCRAFT PERFORMANCE

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 To = 15 °C (288.15 K)
   Standard Pressure Po = 101.3 kPa (29.92 inHg)
   Standard Density ρo = 0.002377 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:

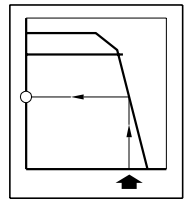
- CF34 - 8E5 and CF34 - 8E5A1 engine models;
- Aircraft carrying passengers at 100 kg (220 lb) each one;
- Flight level 350, that represents the cruising altitude equal to 10668 m (35000 ft);
- Atmosphere according to ISA or ISA + 10 °C conditions;
- MTOW.

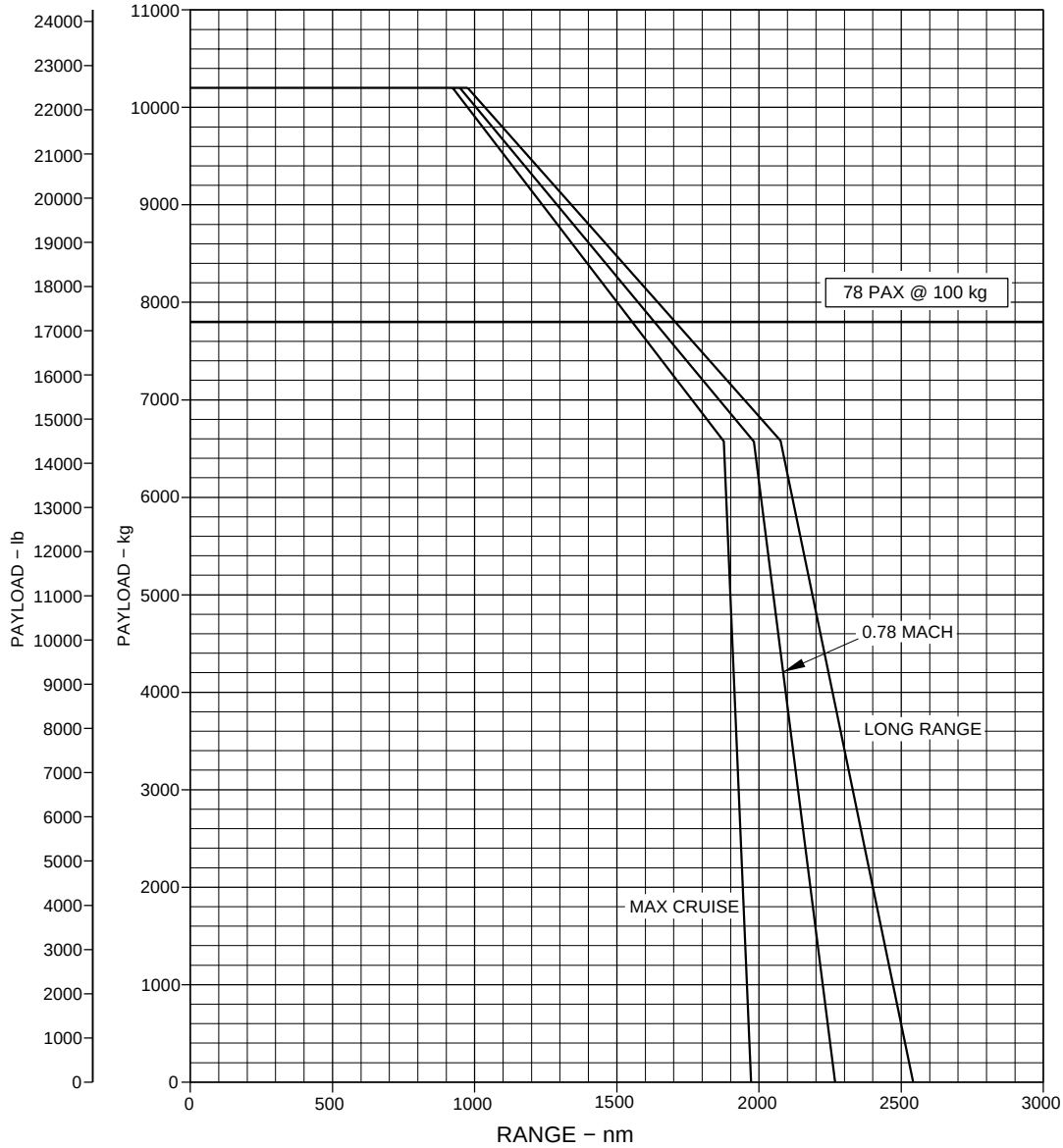
PAYLOAD VS RANGE

CF34 − 8E5A1 & − 8E5 ENGINES
FLIGHT LEVEL 350
ISA

RESERVE : 100 nm ALTERNATE + 45 min FLIGHT

MTOW = 37500 kg (82673 lb)





NOTES:

MAX TAKEOFF WEIGHT - - - - - - - - - - - - - - - - - 37500 kg (82673 lb)
MAX ZERO FUEL WEIGHT - - - - - - - - - - - - - - - 31700 kg (69887 lb)
BASIC OPERATING WEIGHT - - - - - - - - - - - - - 21500 kg (47399 lb)
MAX USABLE FUEL - - - - - - - - - - - - - - - - - - - 9428 kg (20785 lb)

EM170APM030071B.DGN

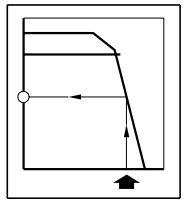
Payload x Range - ISA Conditions
Figure 3.1

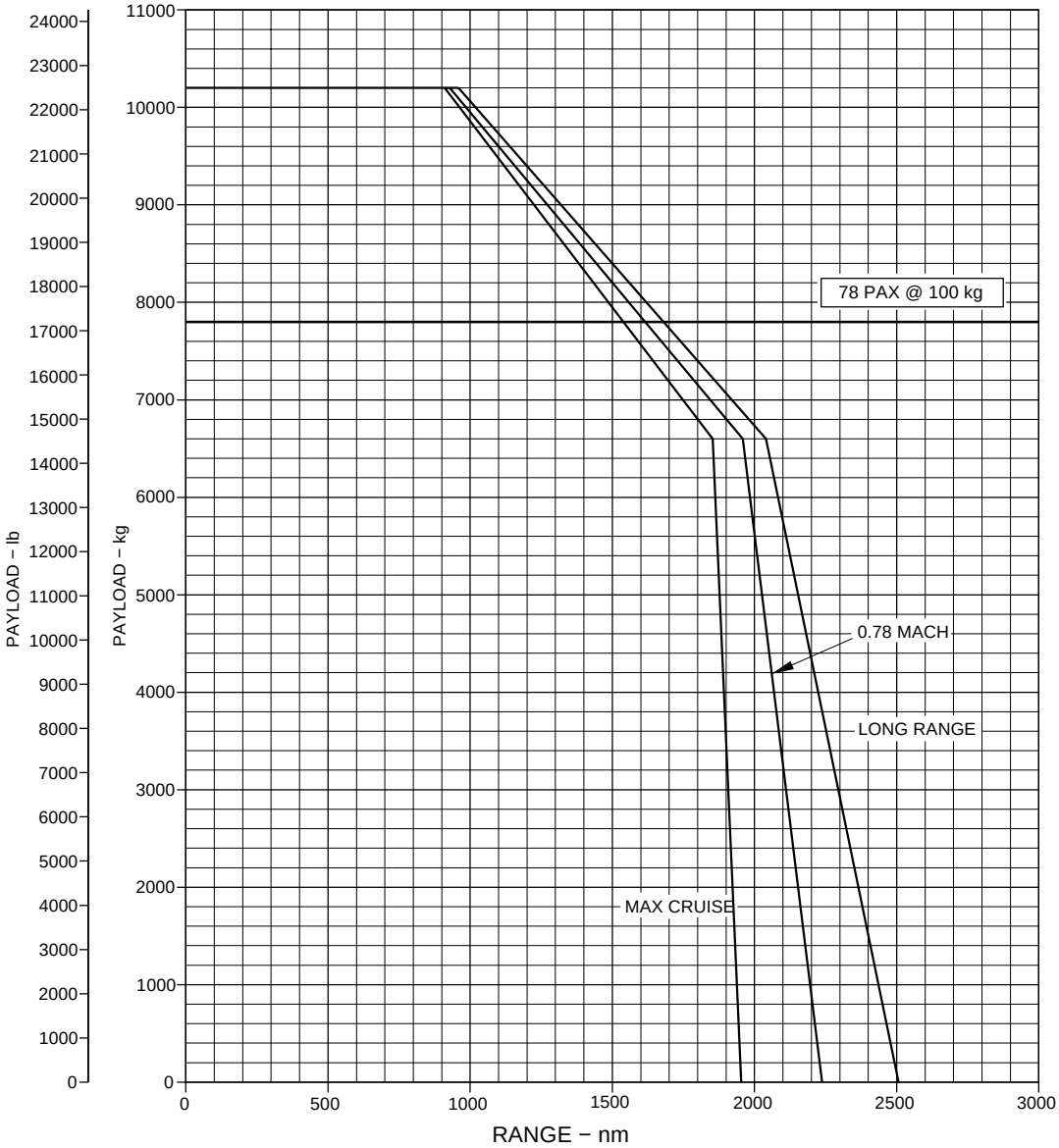
PAYLOAD VS RANGE

CF34 − 8E5A1 & − 8E5 ENGINES
FLIGHT LEVEL 350
ISA + 10°C

RESERVE : 100 nm ALTERNATE + 45 min FLIGHT

MTOW = 37500 kg (82673 lb)





NOTES:

MAX TAKEOFF WEIGHT - - - - - - - - - - - - - - - - - 37500 kg (82673 lb)
MAX ZERO FUEL WEIGHT - - - - - - - - - - - - - - - 31700 kg (69887 lb)
BASIC OPERATING WEIGHT - - - - - - - - - - - - - 21500 kg (47399 lb)
MAX USABLE FUEL - - - - - - - - - - - - - - - - - - - 9428 kg (20785 lb)

EM170APM030070B.DGN

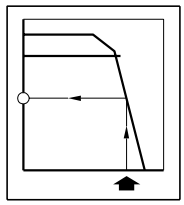
Payload x Range - ISA + 10 °C Conditions
Figure 3.2

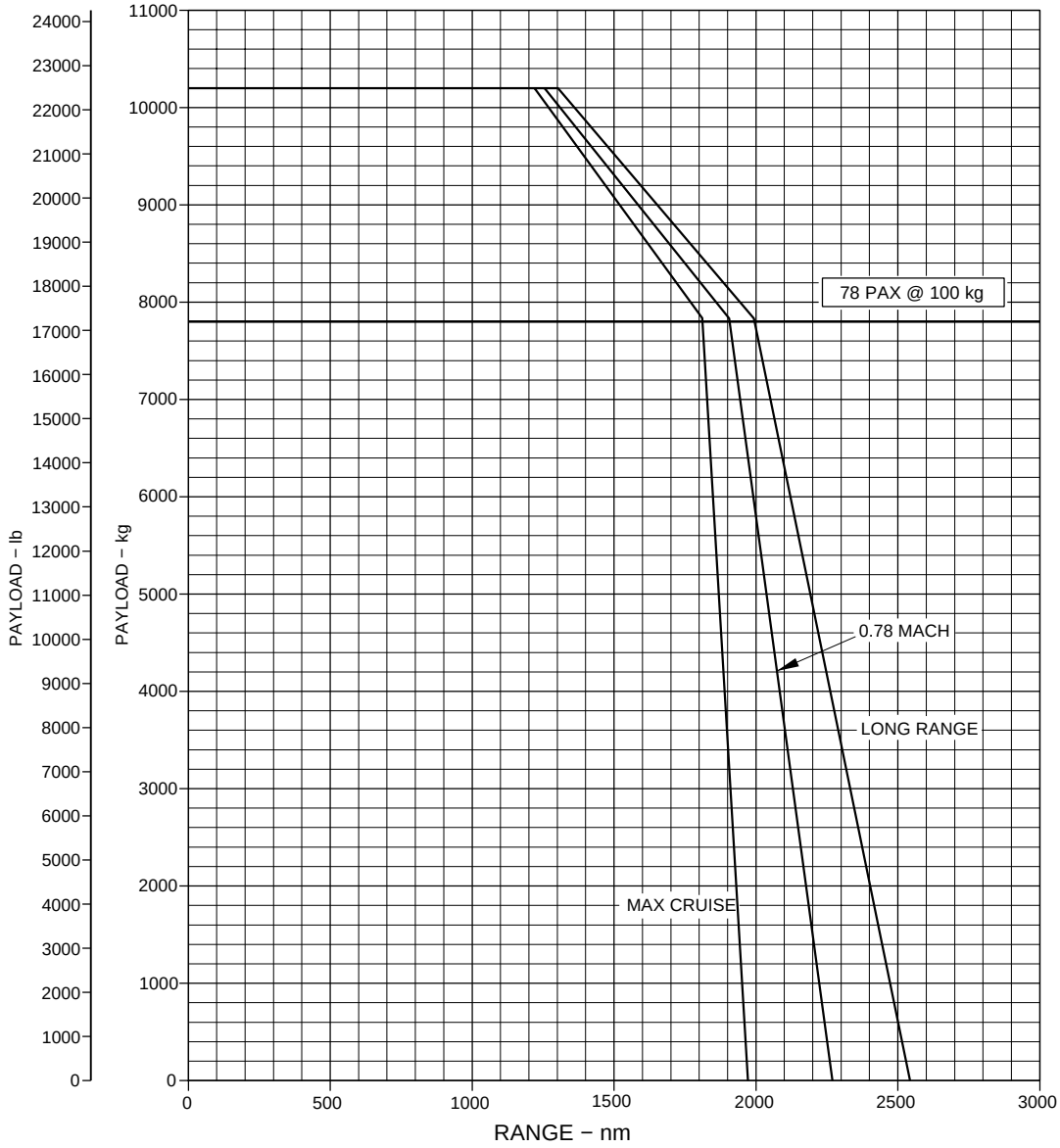
PAYLOAD VS RANGE

CF34 − 8E5A1 & − 8E5 ENGINES
FLIGHT LEVEL 350
ISA

RESERVE : 100 nm ALTERNATE + 45 min FLIGHT

MTOW = 38790 kg (85517 lb)





EM170APM030068B.DGN

NOTES:

MAX TAKEOFF WEIGHT	38790 kg (85517 lb)
MAX ZERO FUEL WEIGHT	31700 kg (69887 lb)
BASIC OPERATING WEIGHT	21500 kg (47399 lb)
MAX USABLE FUEL	9428 kg (20785 lb)

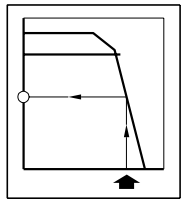
Payload x Range - ISA Conditions
Figure 3.3

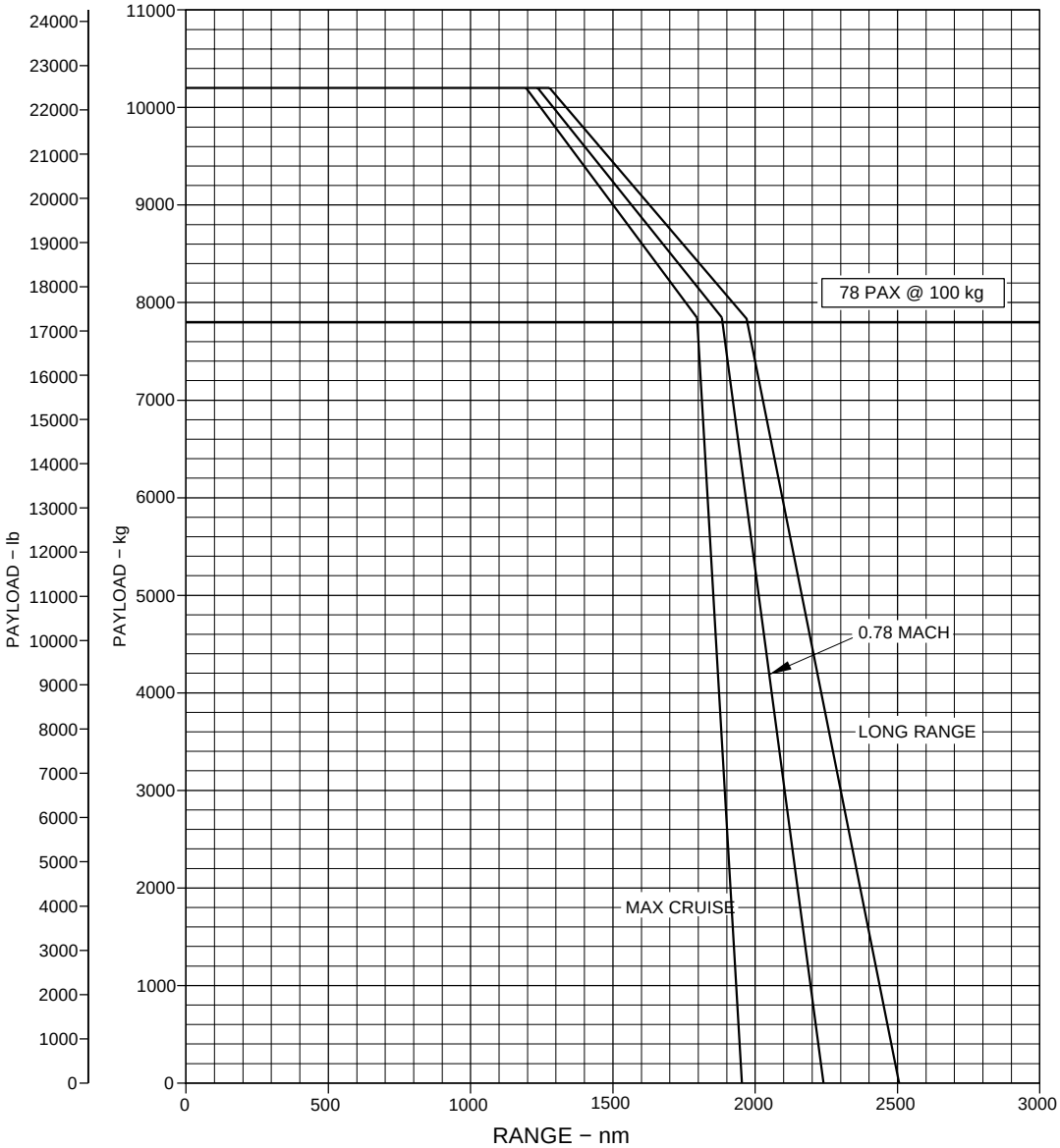
PAYLOAD VS RANGE

CF34 − 8E5A1 & − 8E5 ENGINES
FLIGHT LEVEL 350
ISA + 10°C

RESERVE : 100 nm ALTERNATE + 45 min FLIGHT

MTOW = 38790 kg (85517 lb)





EM170APM030069B.DGN

NOTES:

MAX TAKEOFF WEIGHT - - - - - - - - - - - - - - - - - 38790 kg (85517 lb)
MAX ZERO FUEL WEIGHT - - - - - - - - - - - - - - - 31700 kg (69887 lb)
BASIC OPERATING WEIGHT - - - - - - - - - - - - - 21500 kg (47399 lb)
MAX USABLE FUEL - - - - - - - - - - - - - - - - - - - 9428 kg (20785 lb)

Payload x Range - ISA + 10 °C Conditions
Figure 3.4

3.3. TAKEOFF FIELD LENGTHS

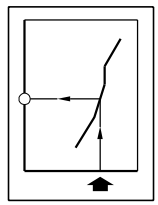
The takeoff performance is based on the requirements of JAR 25, Change 14, plus amendment 25/96/1. The takeoff field length charts provide data about the maximum takeoff weights, for compliance with the operating regulations relating to takeoff field lengths.
Data are presented according to the following associated conditions:

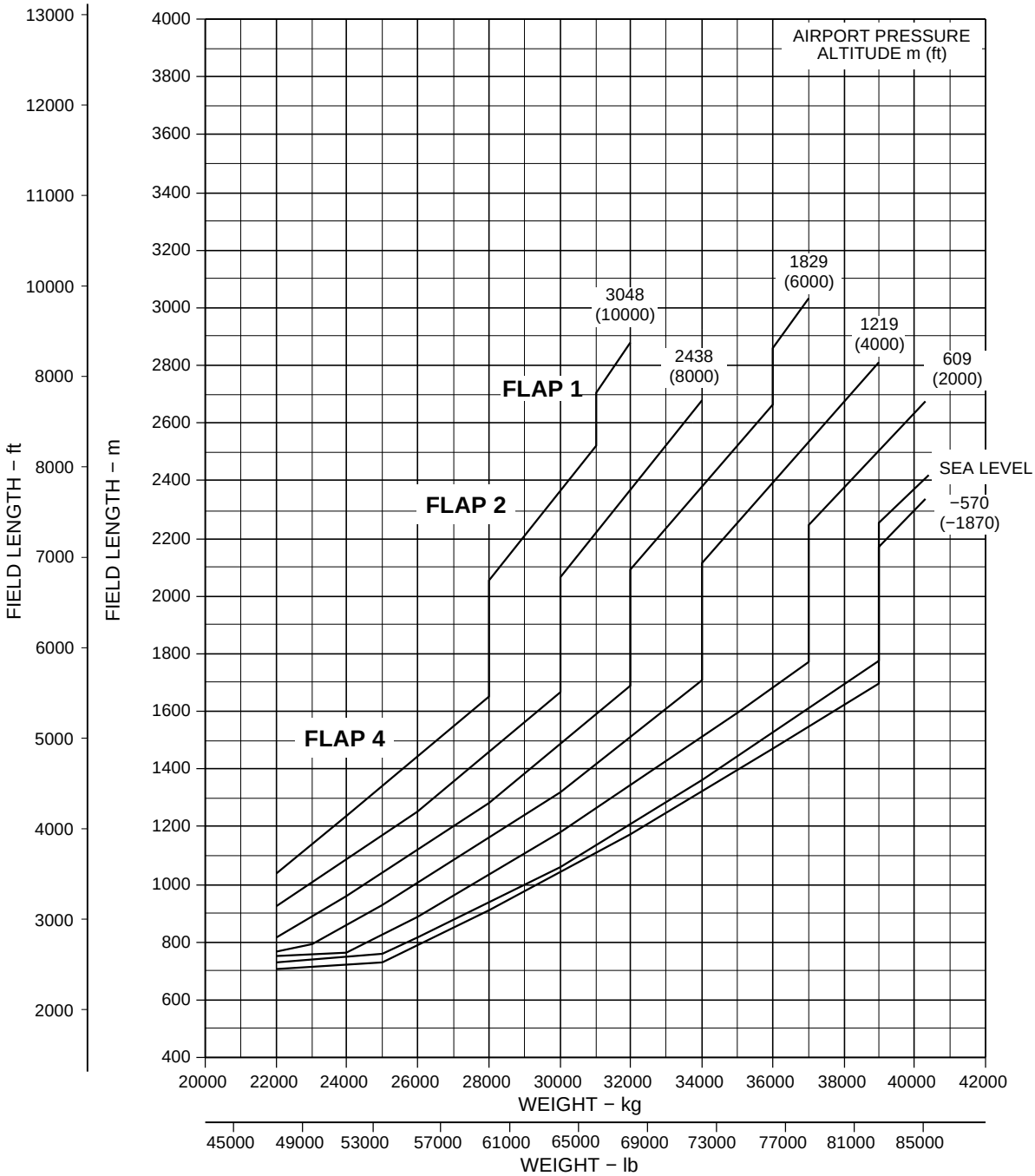
- CF34 - 8E5 and CF34 - 8E5A1 engine models;
- Takeoff Mode: 1;
- ATTCS positioning: ON and OFF;
- Flaps setting position: 1, 2 and 4;
- Pavement conditions: dry, hard paved and level runway surface with no obstacles;
- Zero wind and atmosphere according to ISA or ISA + 15 °C conditions;
- Pack OFF: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

TAKEOFF FIELD LENGTH

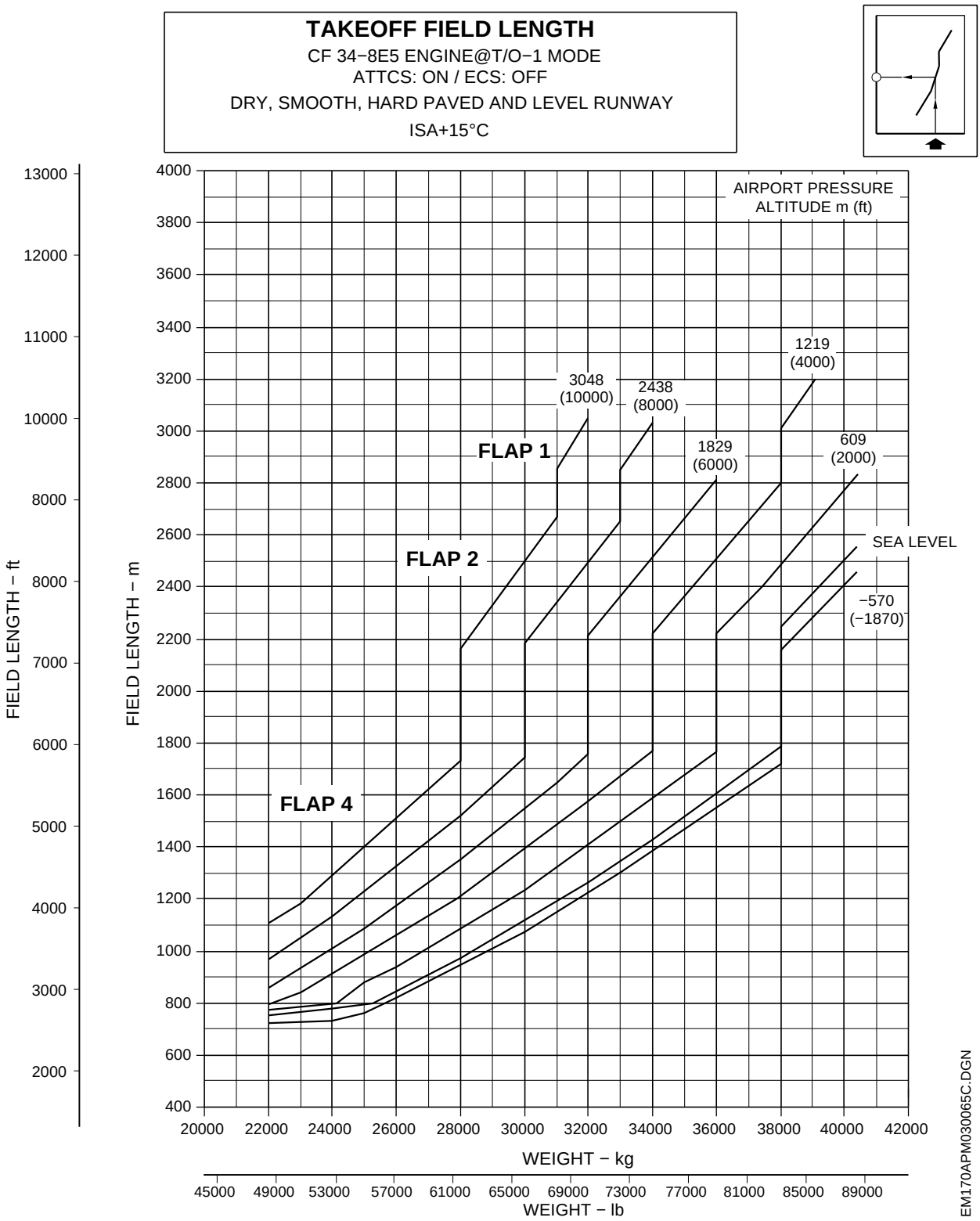
CF 34−8E5 ENGINE@T/O−1 MODE
ATTCS: ON / ECS: OFF

DRY, SMOOTH, HARD PAVED AND LEVEL RUNWAY
ISA



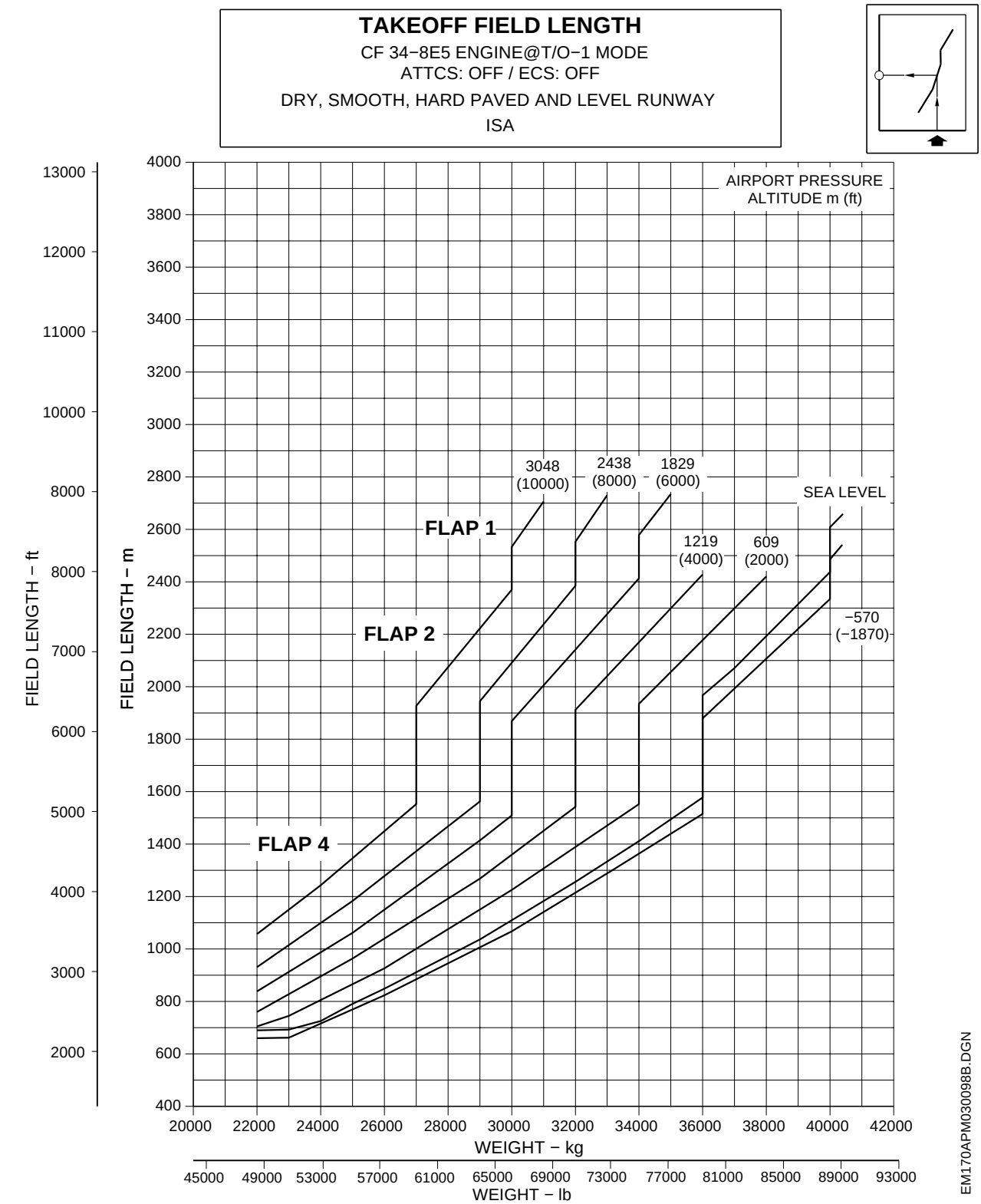


Takeoff Field Lengths - ISA Conditions
Figure 3.5

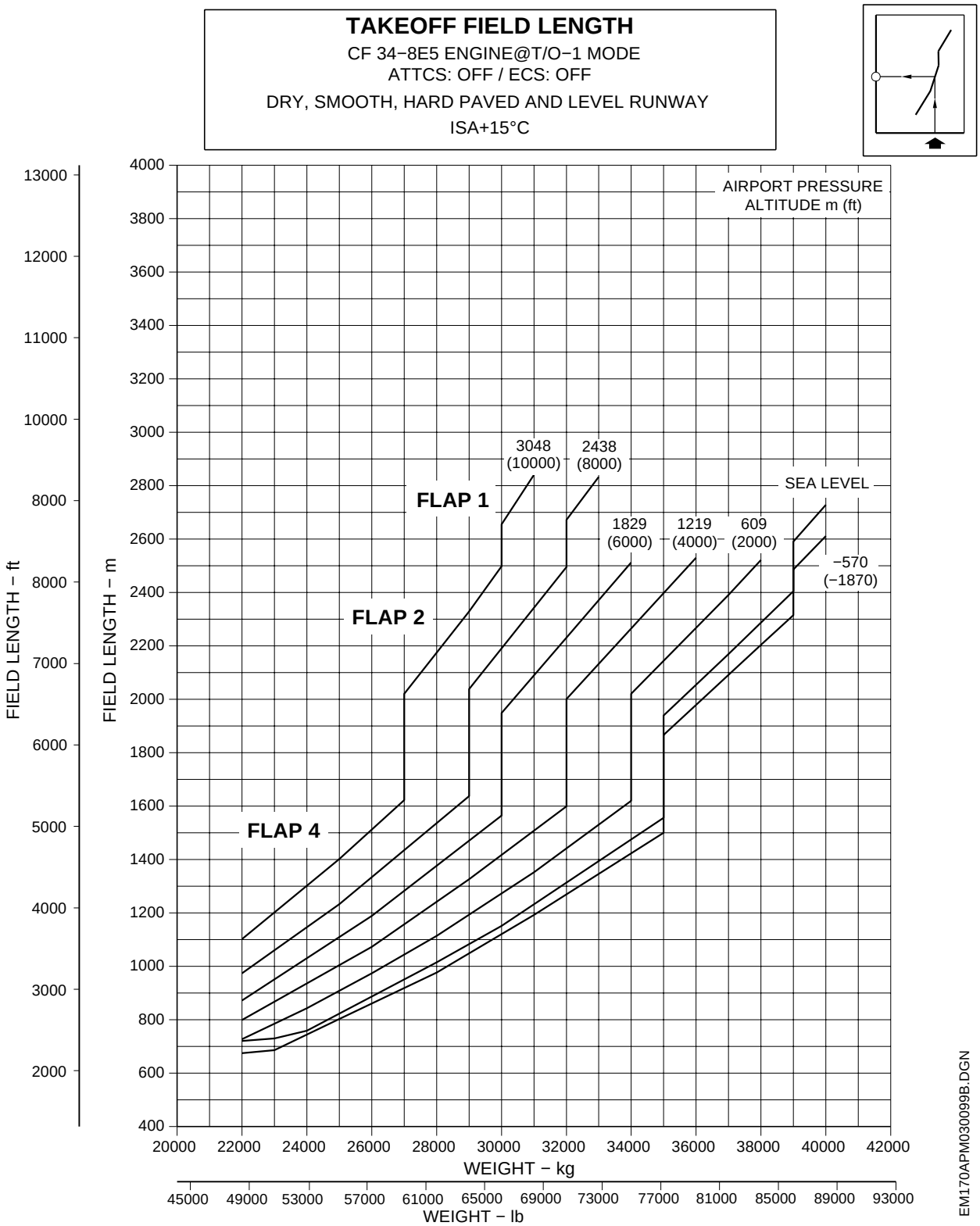


Takeoff Field Lengths - ISA + 15 °C Conditions
Figure 3.6

EFFECTIVITY: ALL



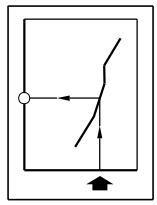
Takeoff Field Lengths - ISA Conditions
Figure 3.7

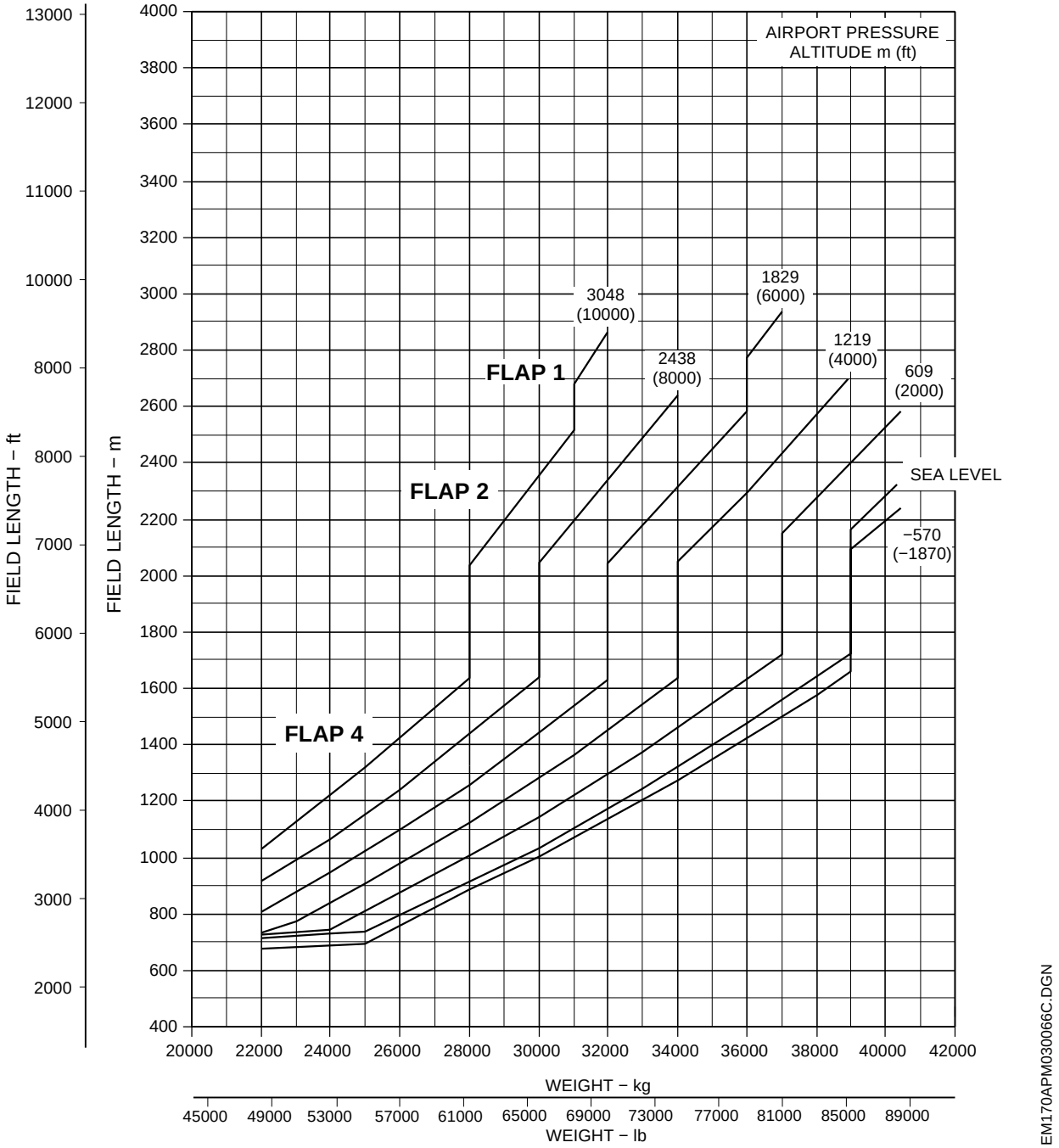


Takeoff Field Lengths - ISA + 15 °C Conditions
Figure 3.8

TAKEOFF FIELD LENGTH

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

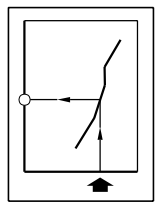


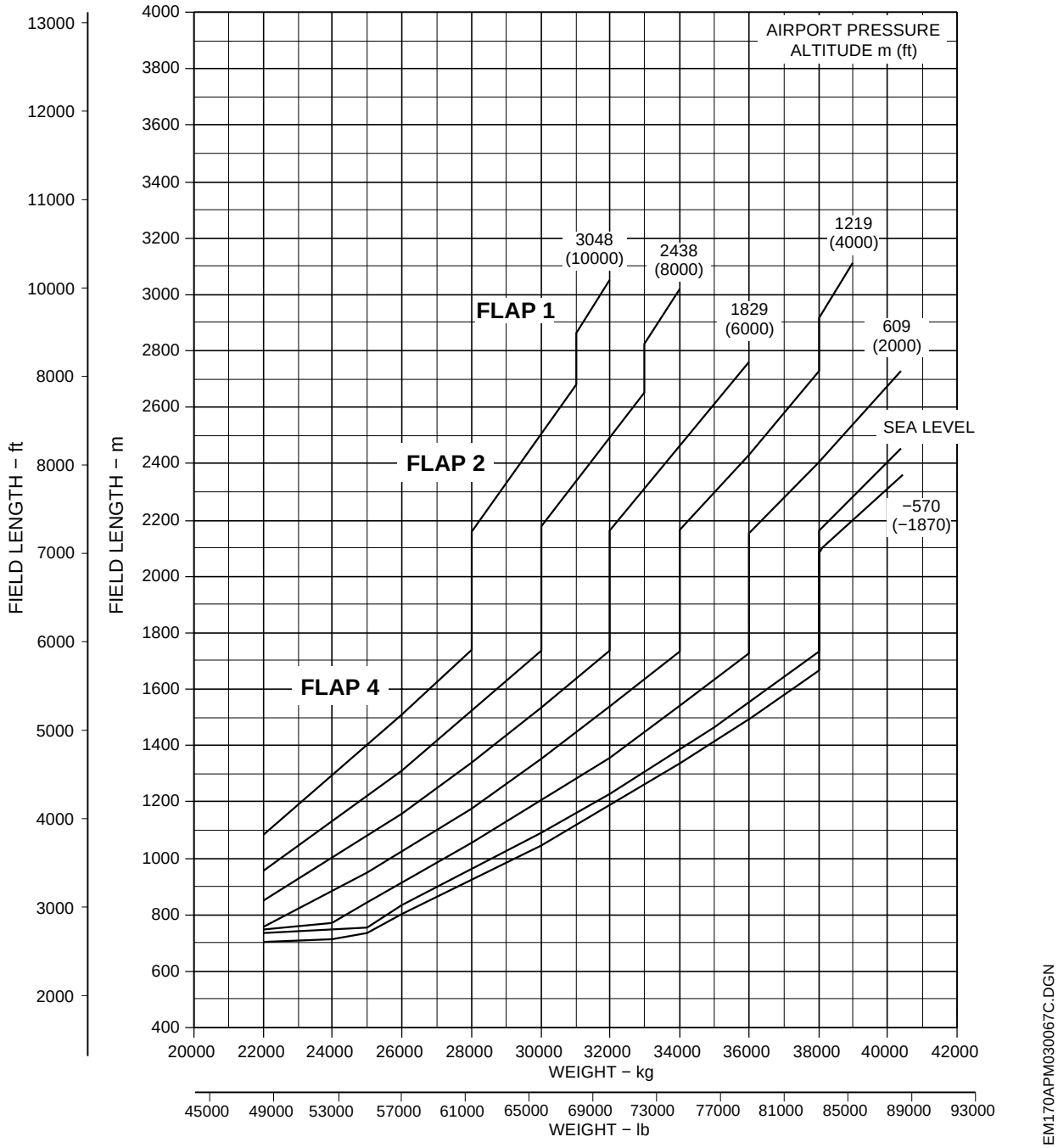


Takeoff Field Lengths - ISA Conditions
Figure 3.9

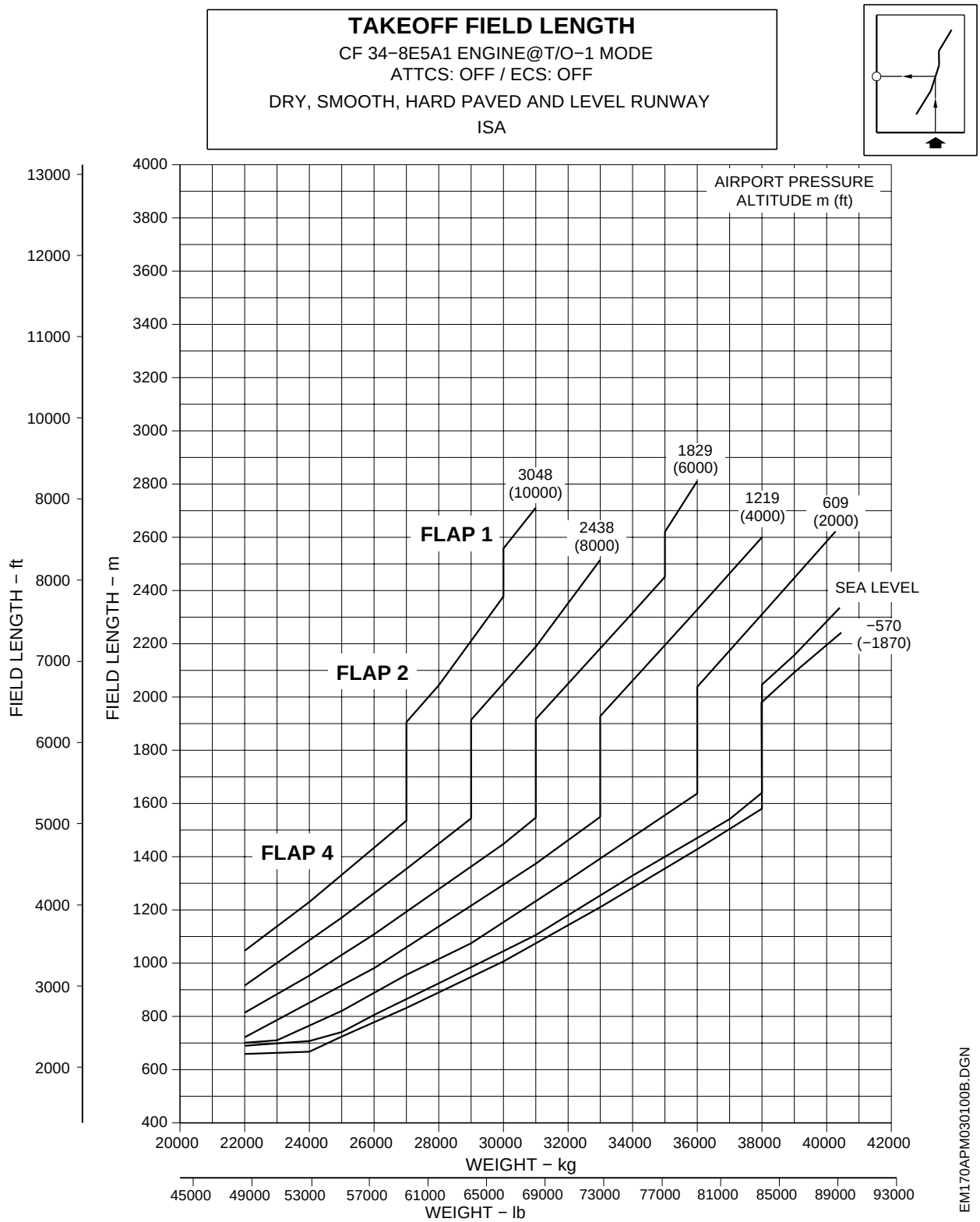
TAKEOFF FIELD LENGTH

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

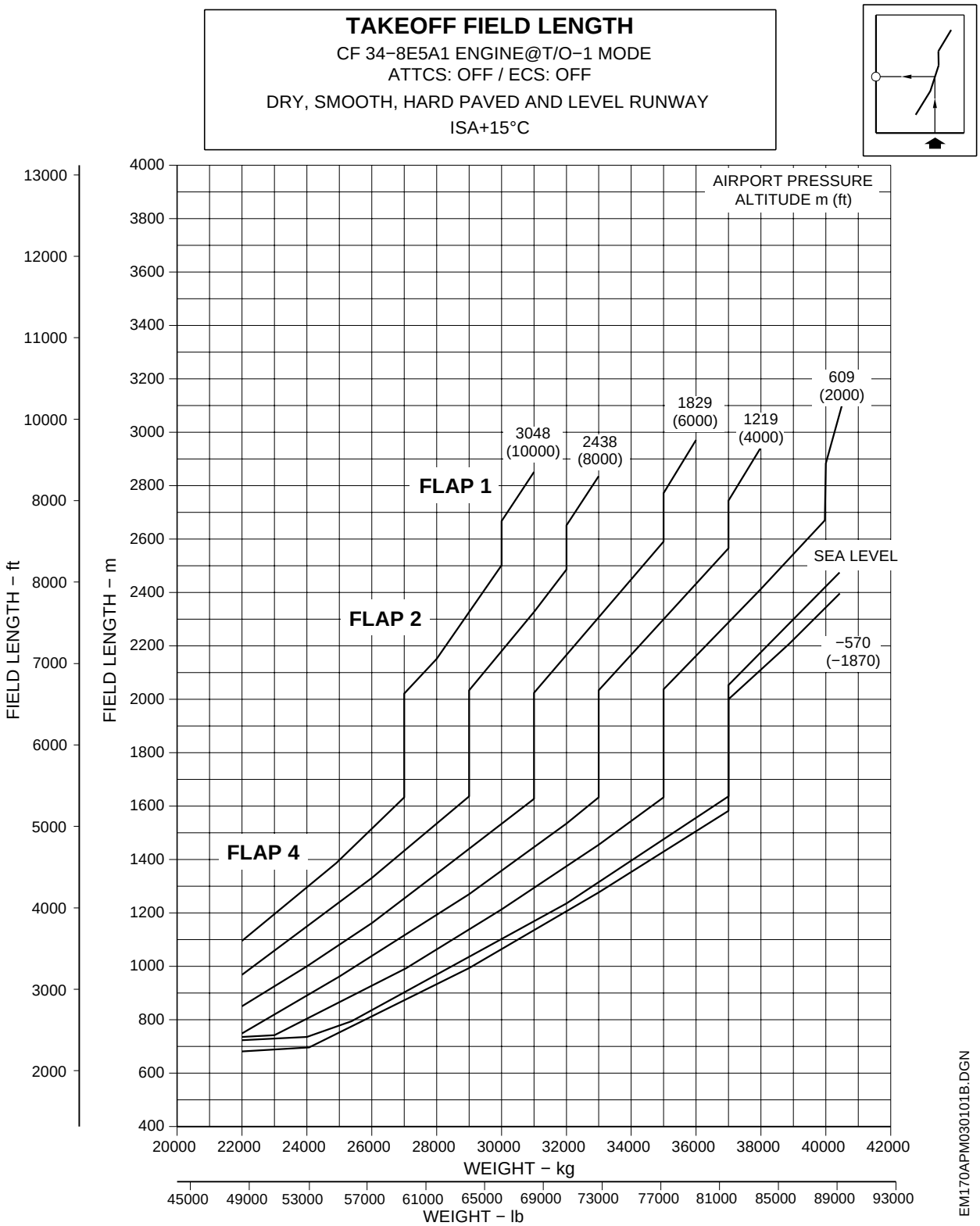




Takeoff Field Lengths - ISA + 15 °C Conditions
Figure 3.10



Takeoff Field Lengths - ISA Conditions
Figure 3.11

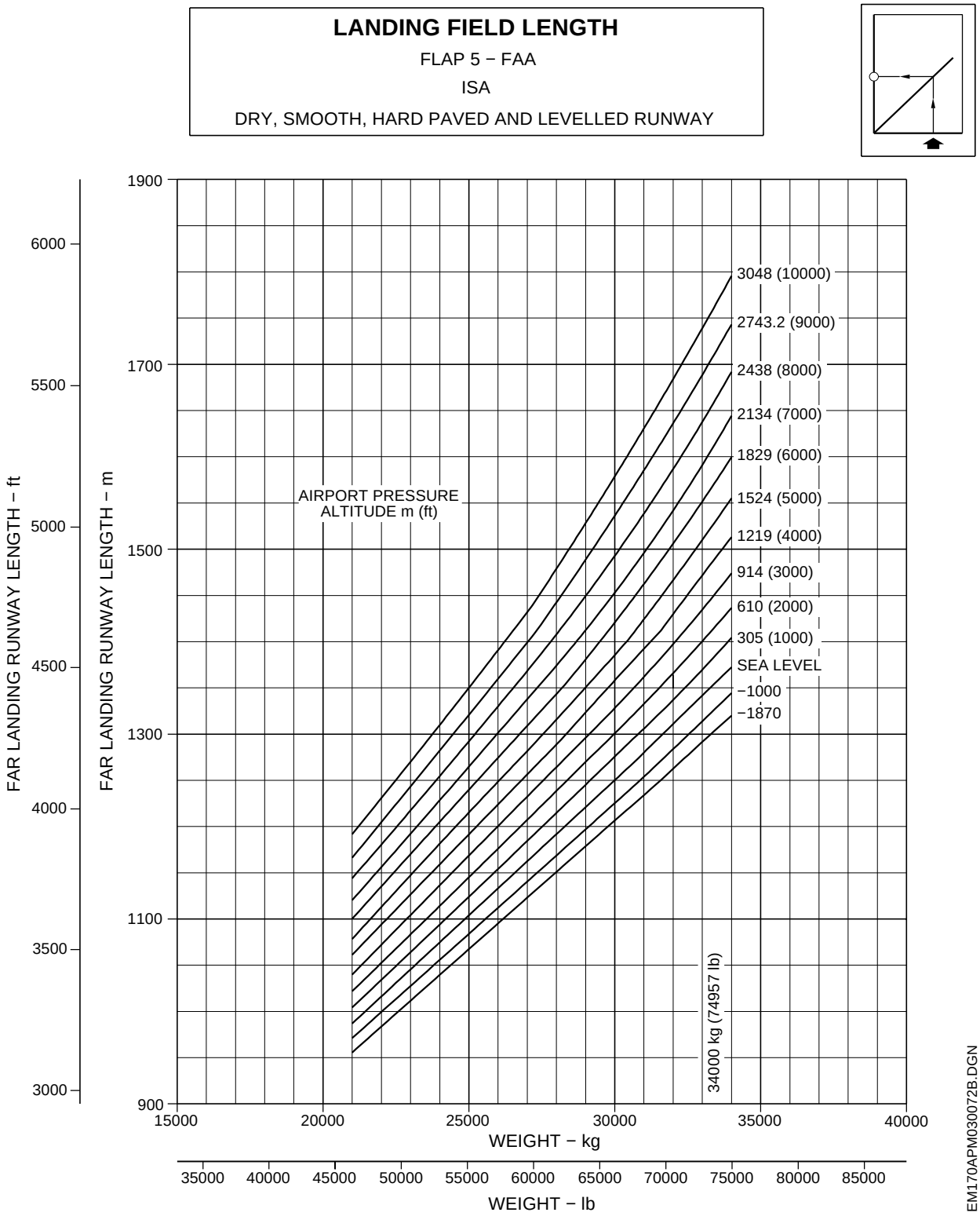


Takeoff Field Lengths - ISA + 15 °C Conditions
Figure 3.12

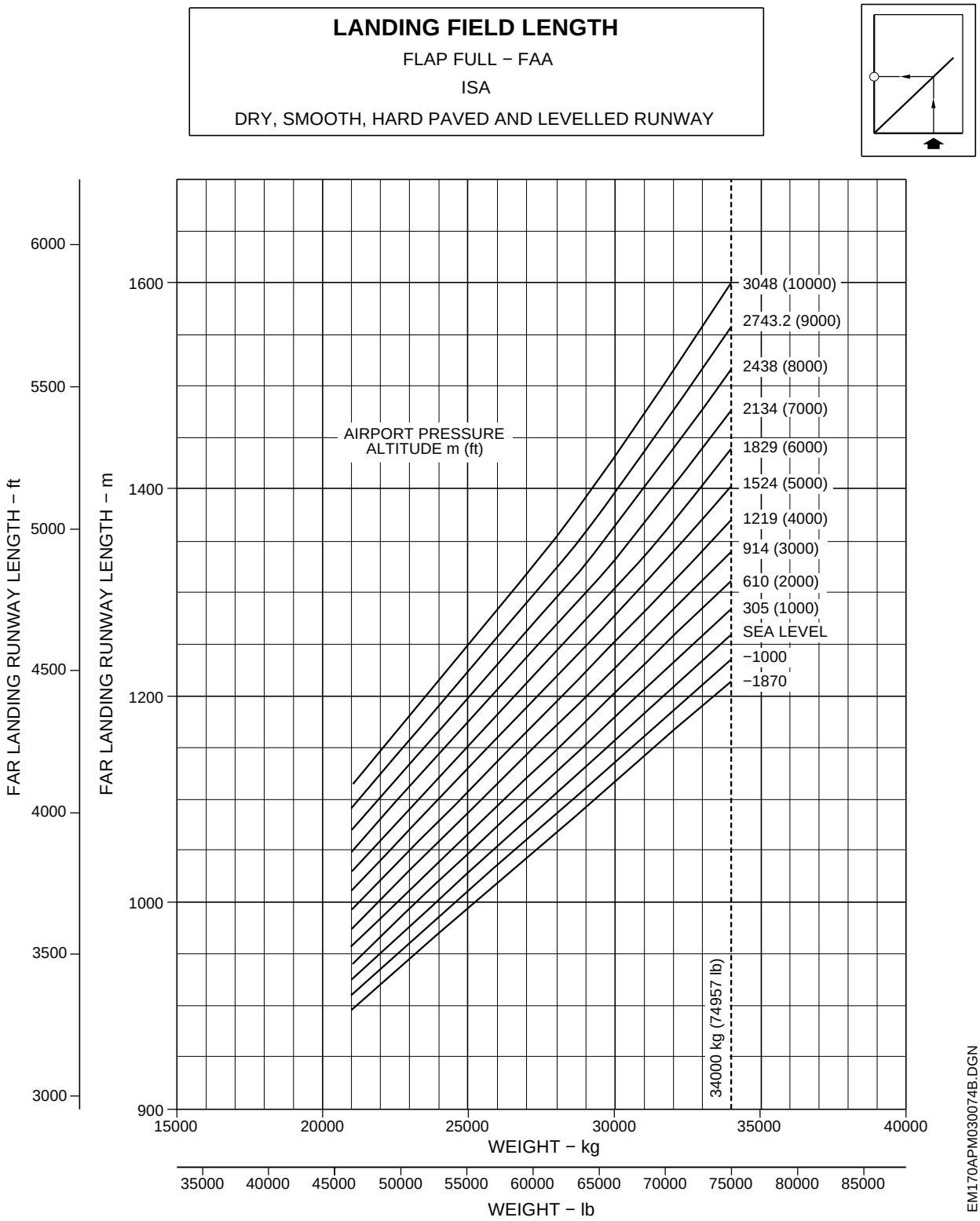
3.4. LANDING FIELD LENGTHS

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:

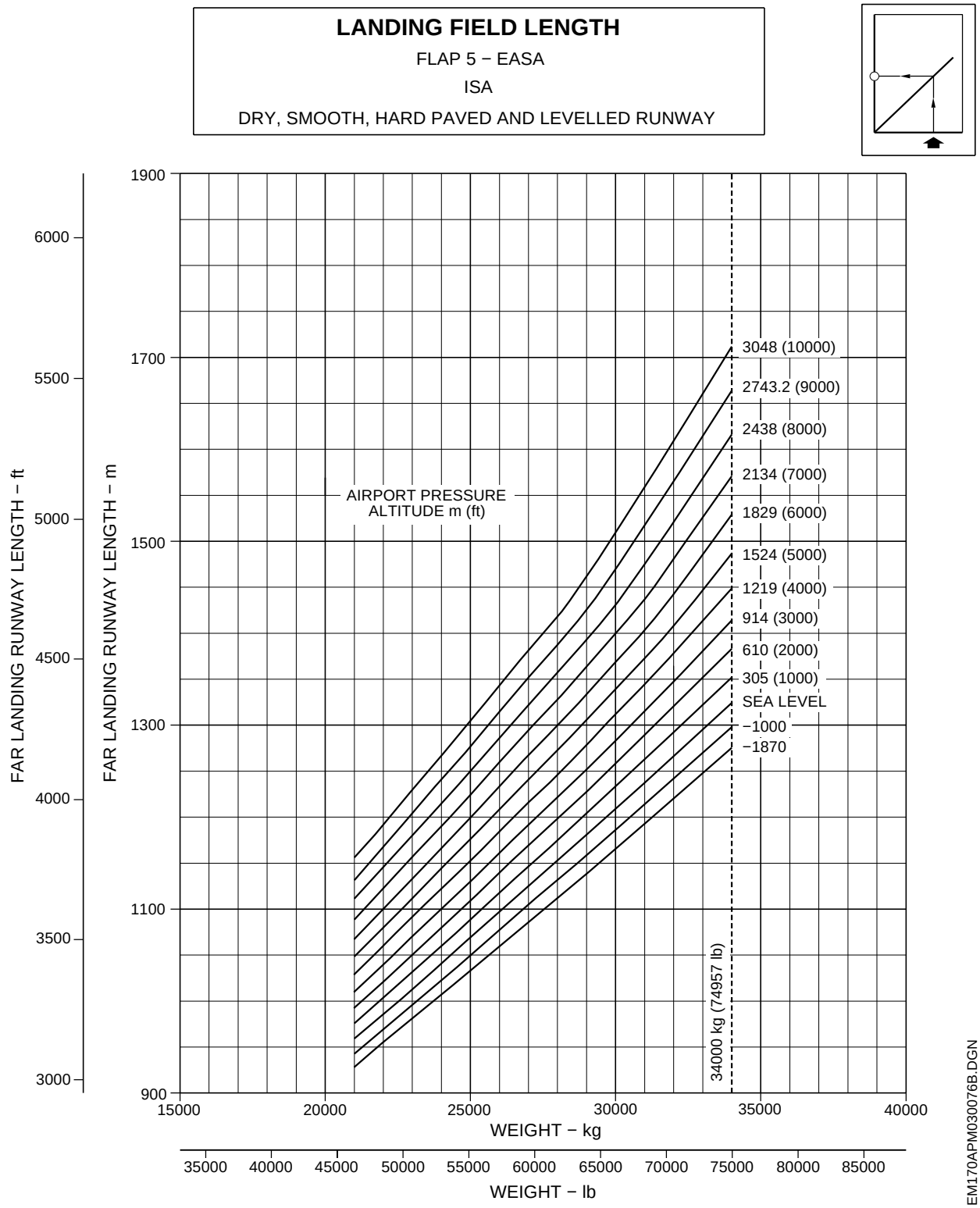
- Landing gear: down;
- Flaps setting position: 5 and full;
- Pavement conditions: dry, hard paved and level runway surface with no obstacles;
- Zero wind and atmosphere according to ISA conditions;
- Pack OFF: No engine bleed extraction for air conditioning packs was considered in the takeoff and landing 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.



Landing Field Lengths - Flaps 5
Figure 3.13



Landing Field Lengths - Flaps Full
Figure 3.14



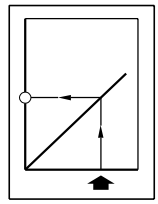
Landing Field Lengths - Flaps 5
Figure 3.15

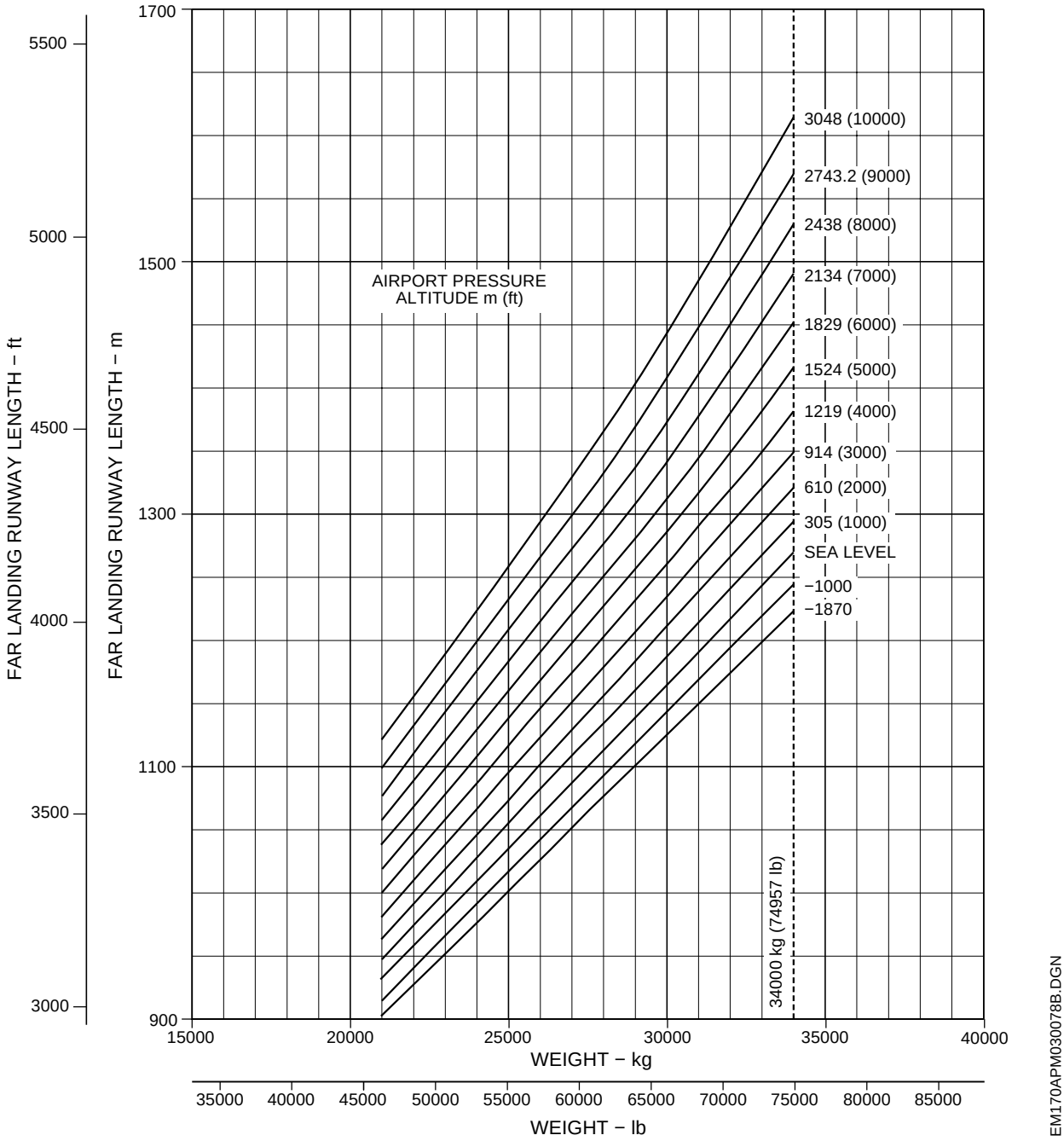
LANDING FIELD LENGTH

FLAP FULL − EASA

ISA

DRY, SMOOTH, HARD PAVED AND LEVELLED RUNWAY





Landing Field Lengths - Flaps Full
Figure 3.16

4. GROUND MANEUVERING

4.1. GENERAL INFORMATION

This section provides the aircraft turning capability and maneuvering characteristics. To facilitate the presentation, 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.

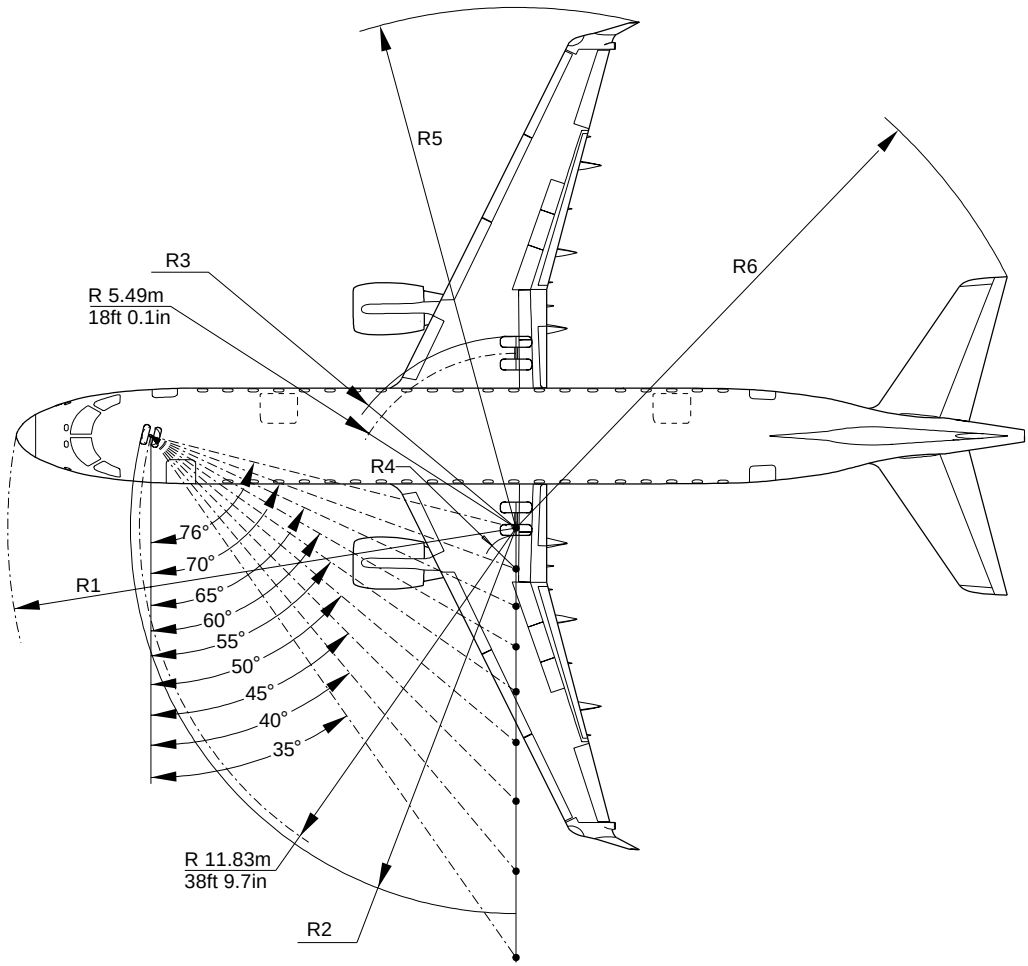
This section is presented as follows:

- 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 degrees turn.



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.

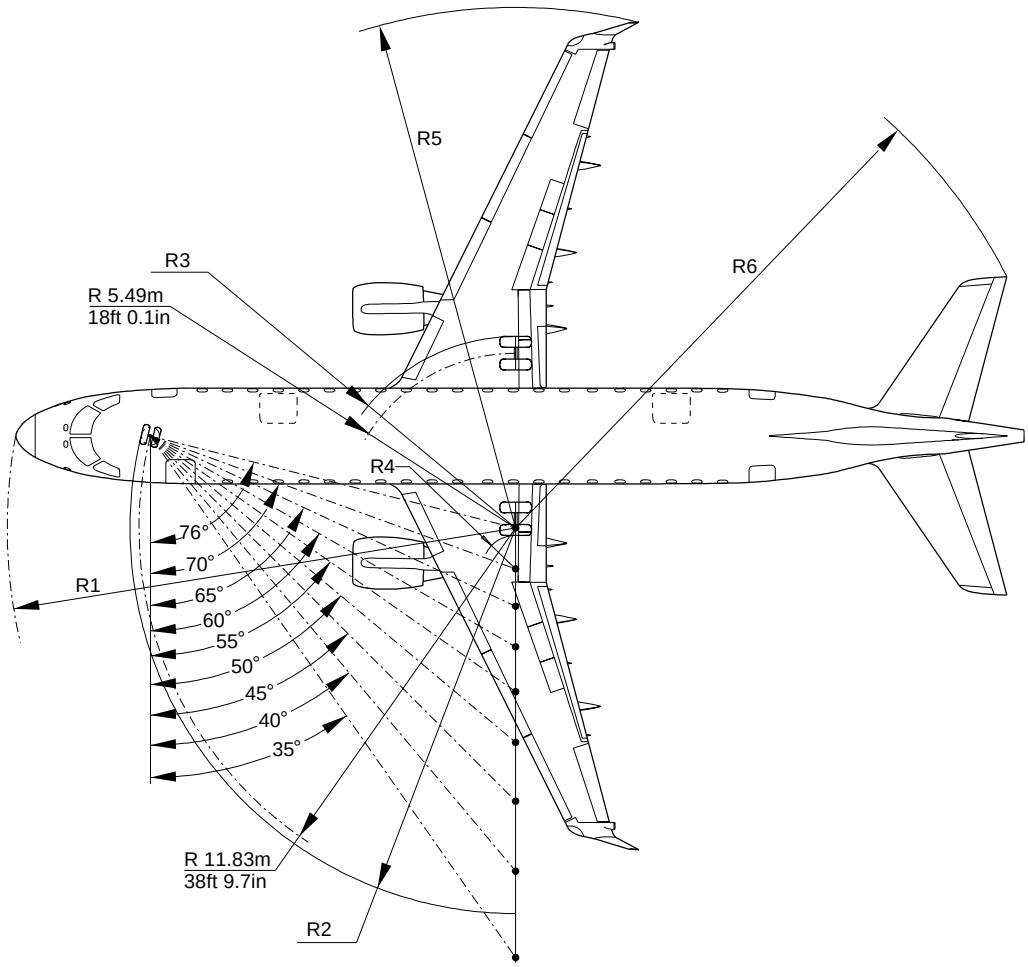
STEERING STEEL	NOSE		NOSE LANDING GEAR		OUTBOARD GEAR		INBOARD GEAR		RIGHT WINGLET		RIGHT TAILTIP	
	R1		R2		R3		R4		R5		R6	
35°	22.70m	74ft 5.7in	20.29m	66ft 6.8in	19.51m	64ft 0.1in	13.26m	43ft 6.2in	29.64m	97ft 3in	26.38m	86ft 6.5in
40°	20.83m	68ft 4in	18.13m	59ft 6in	16.80m	55ft 1.3in	10.55m	34ft 7.4in	26.95m	88ft 5in	24.23m	79ft 6in
45°	19.45m	63ft 9.9in	16.51m	54ft 2in	14.60m	47ft 11in	8.35m	27ft 4.8in	24.78m	81ft 3.5in	22.58m	74ft 1in
50°	18.43m	60ft 5.4in	15.26m	50ft 1in	12.75m	41ft 10in	6.50m	21ft 4in	22.96m	75ft 3.8in	21.27m	69ft 9.3in
55°	17.65m	57ft 11in	14.29m	46ft 11in	11.16m	36ft 7in	4.91m	16ft 1.3in	21.38m	70ft 2in	20.21m	66ft 3.5in
60°	17.05m	55ft 11in	13.53m	44ft 4.8in	9.75m	32ft 0in	3.50m	11ft 5.8in	20.00m	65ft 7.4in	19.33m	63ft 4.9in
65°	16.60m	54ft 5.4in	12.94m	42ft 5.4in	8.47m	27ft 9.6in	2.23m	7ft 3.7in	18.75m	61ft 6.3in	18.59m	61ft 0in
70°	16.26m	53ft 4in	12.49m	41ft 0in	7.30m	23ft 11in	1.05m	3ft 5.5in	17.61m	57ft 9.1in	17.96m	58ft 11in
76°	15.8m	51ft 10in	12.12m	39ft 9in	6.01m	19ft 8.7in	0.23m	0ft 9.2in	16.58m	54ft 7.6in	17.45m	57ft 2.8in

EM170APM040021D.DGN

Turning Radii - No Slip Angle
Figure 4.1

EFFECTIVITY: ON ACFT WITH WINGLET OR PRE-MOD SB 170-57-0058

w-apm2259



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.

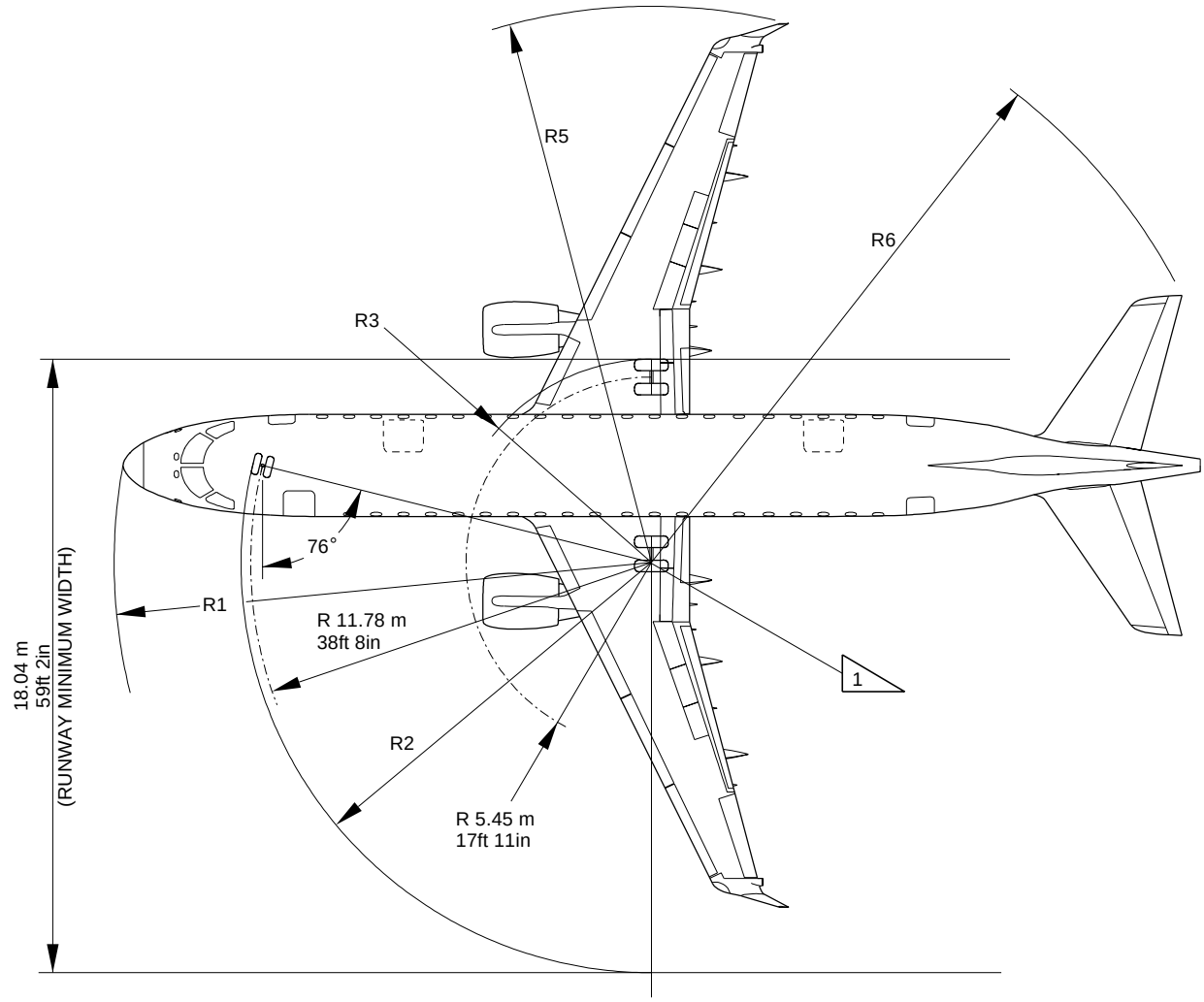
STEERING STEEL	NOSE		NOSE LANDING GEAR		OUTBOARD GEAR		INBOARD GEAR		RIGHT WINGTIP		RIGHT TAILTIP	
	R1		R2		R3		R4		R5		R6	
35°	22.70m	74ft 5.7in	20.29m	66ft 6.8in	19.51m	64ft 0.1in	13.26m	43ft 6.2in	30.94m	97ft 3in	26.38m	86ft 6.5in
40°	20.83m	68ft 4in	18.13m	59ft 6in	16.80m	55ft 1.3in	10.55m	34ft 7.4in	28.25m	88ft 5in	24.23m	79ft 6in
45°	19.45m	63ft 9.9in	16.51m	54ft 2in	14.60m	47ft 11in	8.35m	27ft 4.8in	26.07m	81ft 3.5in	22.58m	74ft 1in
50°	18.43m	60ft 5.4in	15.26m	50ft 1in	12.75m	41ft 10in	6.50m	21ft 4in	24.24m	75ft 3.8in	21.27m	69ft 9.3in
55°	17.65m	57ft 11in	14.29m	46ft 11in	11.16m	36ft 7in	4.91m	16ft 1.3in	22.67m	70ft 2in	20.21m	66ft 3.5in
60°	17.05m	55ft 11in	13.53m	44ft 4.8in	9.75m	32ft 0in	3.50m	11ft 5.8in	21.28m	65ft 7.4in	19.33m	63ft 4.9in
65°	16.60m	54ft 5.4in	12.94m	42ft 5.4in	8.47m	27ft 9.6in	2.23m	7ft 3.7in	20.03m	61ft 6.3in	18.59m	61ft 0in
70°	16.26m	53ft 4in	12.49m	41ft 0in	7.30m	23ft 11in	1.05m	3ft 5.5in	18.88m	57ft 9.1in	17.96m	58ft 11in
76°	15.8m	51ft 10in	12.12m	39ft 9in	6.01m	19ft 8.7in	0.23m	0ft 9.2in	17.62m	54ft 7.6in	17.45m	57ft 2.8in

EM170APM040023A.DGN

Turning Radii - No Slip Angle
Figure 4.2

EFFECTIVITY: ON ACFT WITH ENHANCED WINGTIP OR POST-MOD SB 170-57-0058

4.3. MINIMUM TURNING RADII



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

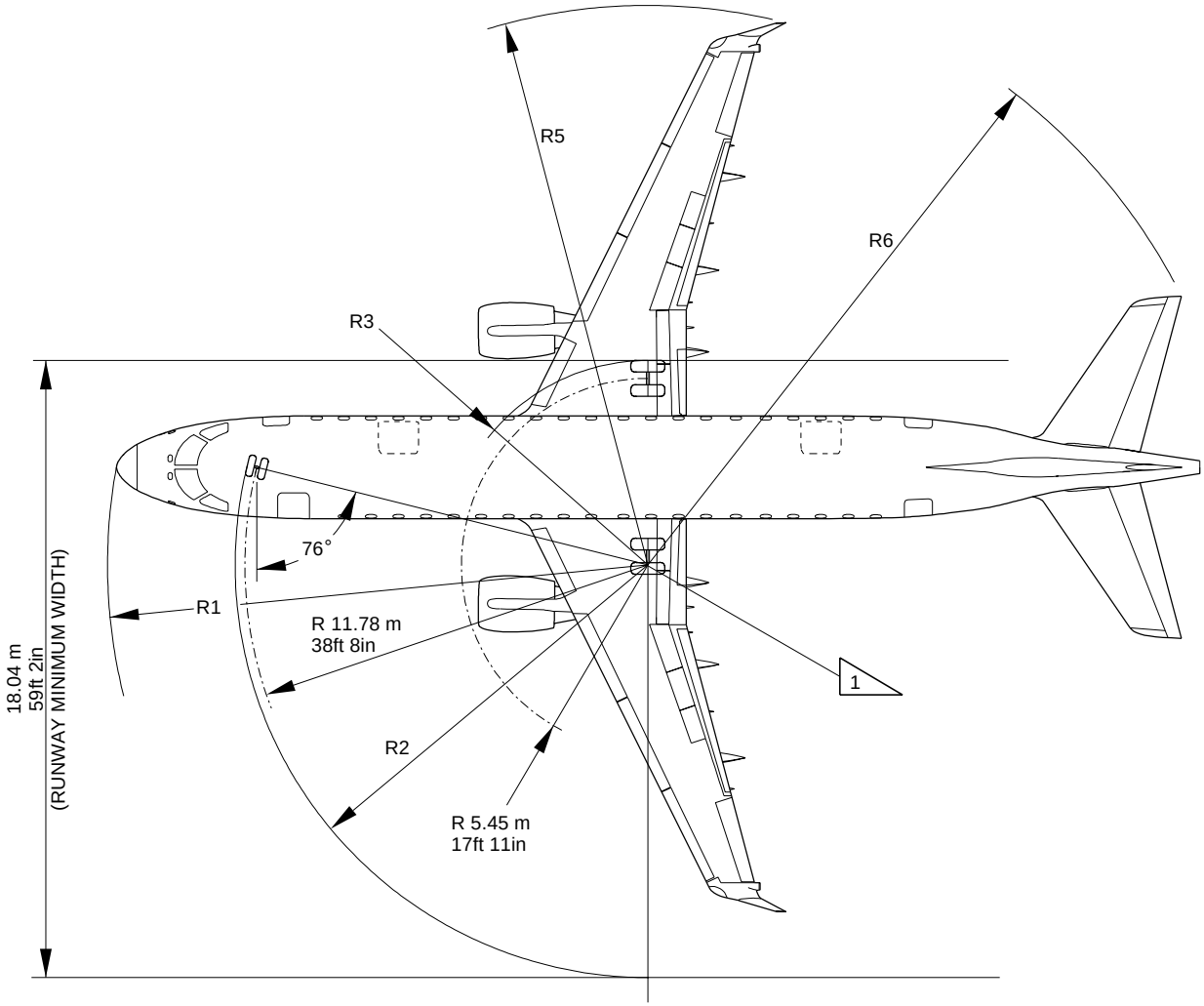
STEERING ANGLE	NOSE		NOSE LANDING GEAR		OUTBOARD GEAR		RIGHT WINGLET		RIGHT TAILTIP	
	R1		R2		R3		R5		R6	
76°	15.8m	51ft 10in	12.07m	39ft 7in	5.97m	19ft 7in	16.58m	54ft 4.7in	17.45m	57ft 2.8in

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

EM170APM040022E.DGN

Minimum Turning Radius
Figure 4.3

EFFECTIVITY: ON ACFT WITH WINGLET OR PRE-MOD SB 170-57-0058



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 WINGTIP		RIGHT TAILTIP	
	R1		R2		R3		R5		R6	
76°	15.8m	51ft 10in	12.07m	39ft 7in	5.97m	19ft 7in	17.62m	57ft 9.5in	17.45m	57ft 2.8in

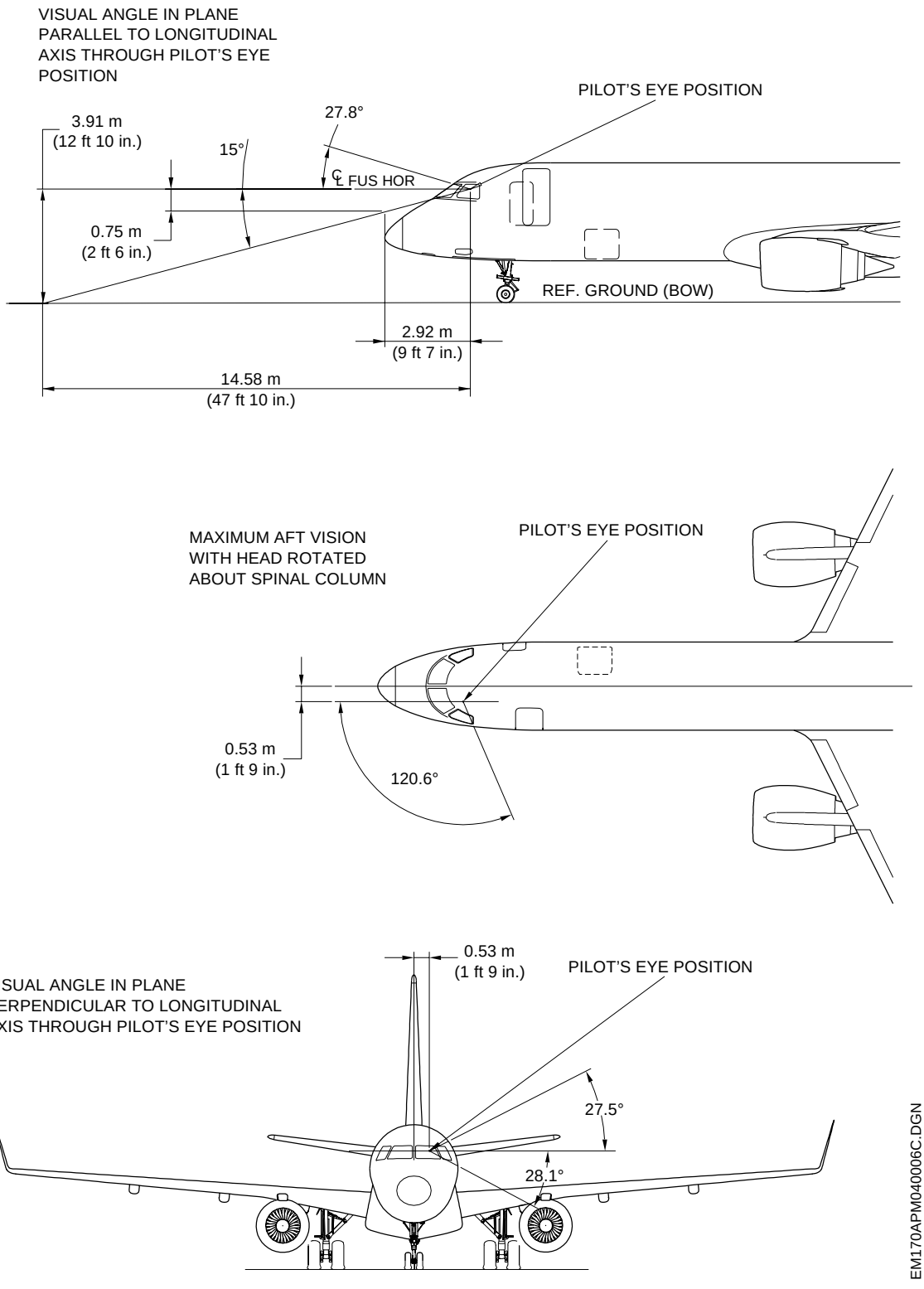
1 THEORETICAL CENTER OF TURN FOR MINIMUN RADIUS.
SHOWS CONTINUOUS TURNING WITH ENGINE THRUST AS REQUIRED.
NO DIFFERENTIAL BRAKING.

EM170APM040024B.DGN

Minimum Turning Radius
Figure 4.4

EFFECTIVITY: ON ACFT WITH ENHANCED WINGTIP OR POST-MOD SB 170-57-0058

4.4. VISIBILITY FROM COCKPIT



Visibility from Cockpit in Static Position
Figure 4.5

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 175STD and 175LR is 3C.

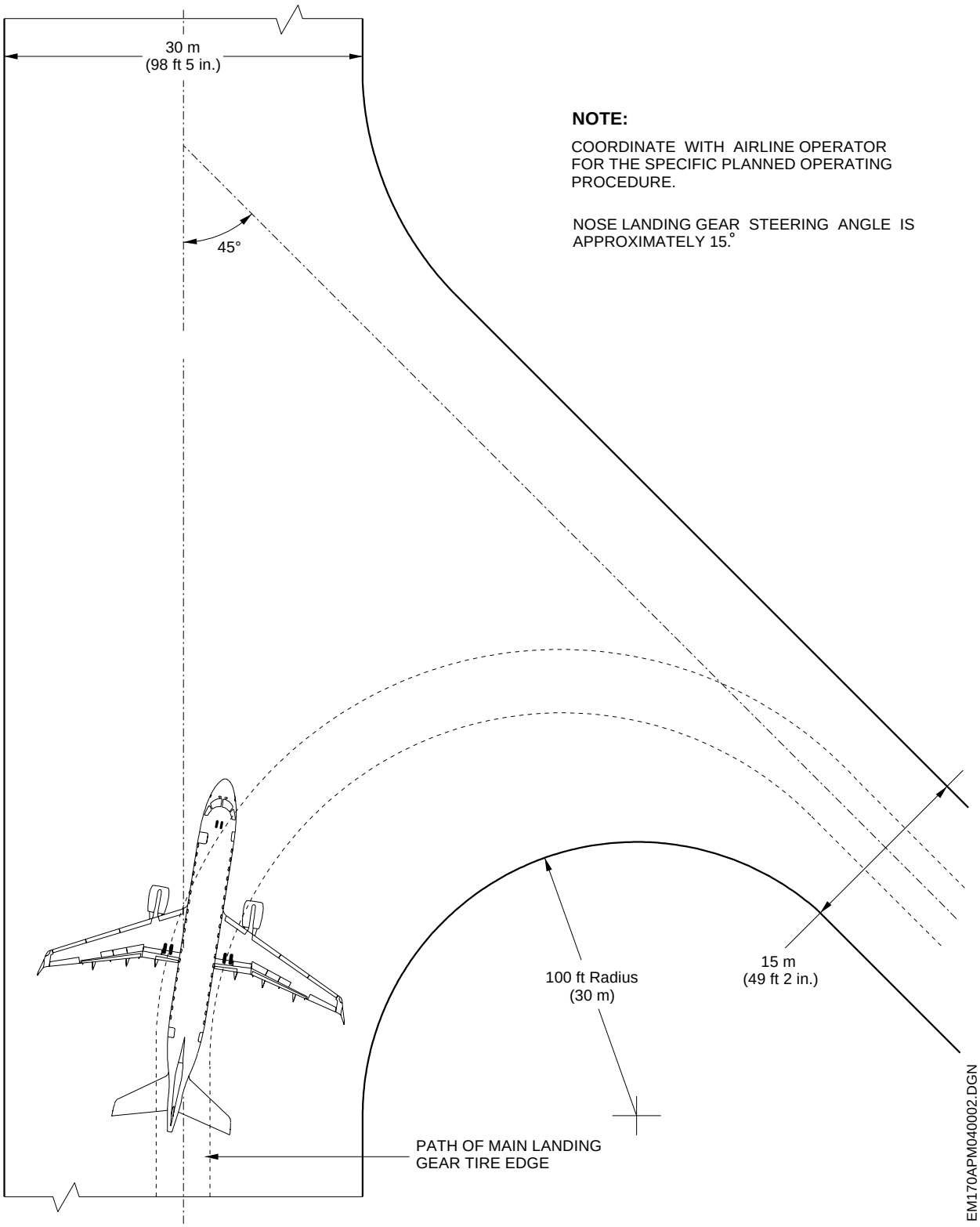
NOTE:

- 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:

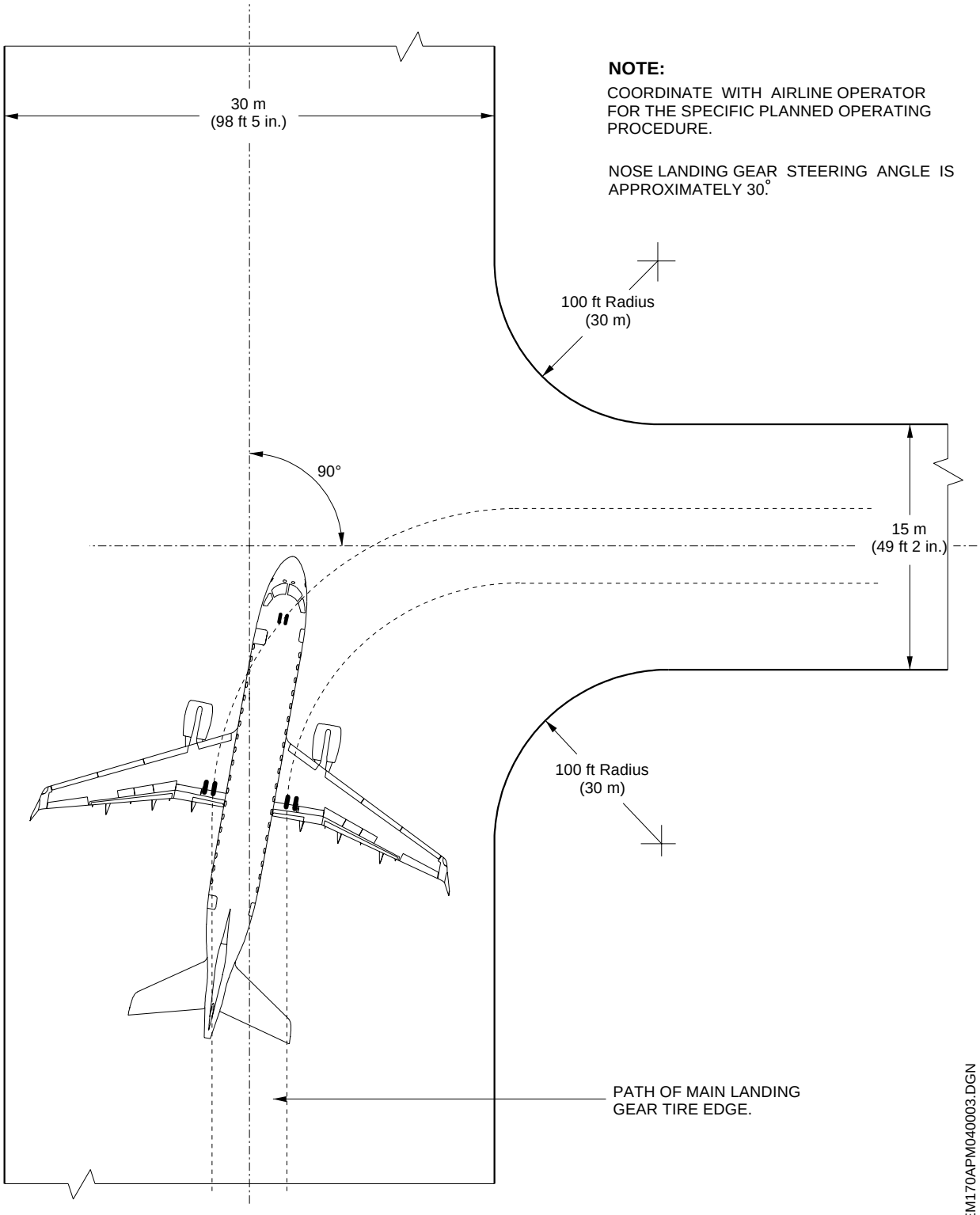
- The width of a runway should not be less than 30 m (98 ft 5 in).
- The width of a taxiway should not be less than 15 m (49 ft 2 in).
- The design of the curve in a taxiway should be such that, when the cockpit remains over the taxiway center line marking, the clearance distance between the outer main 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).

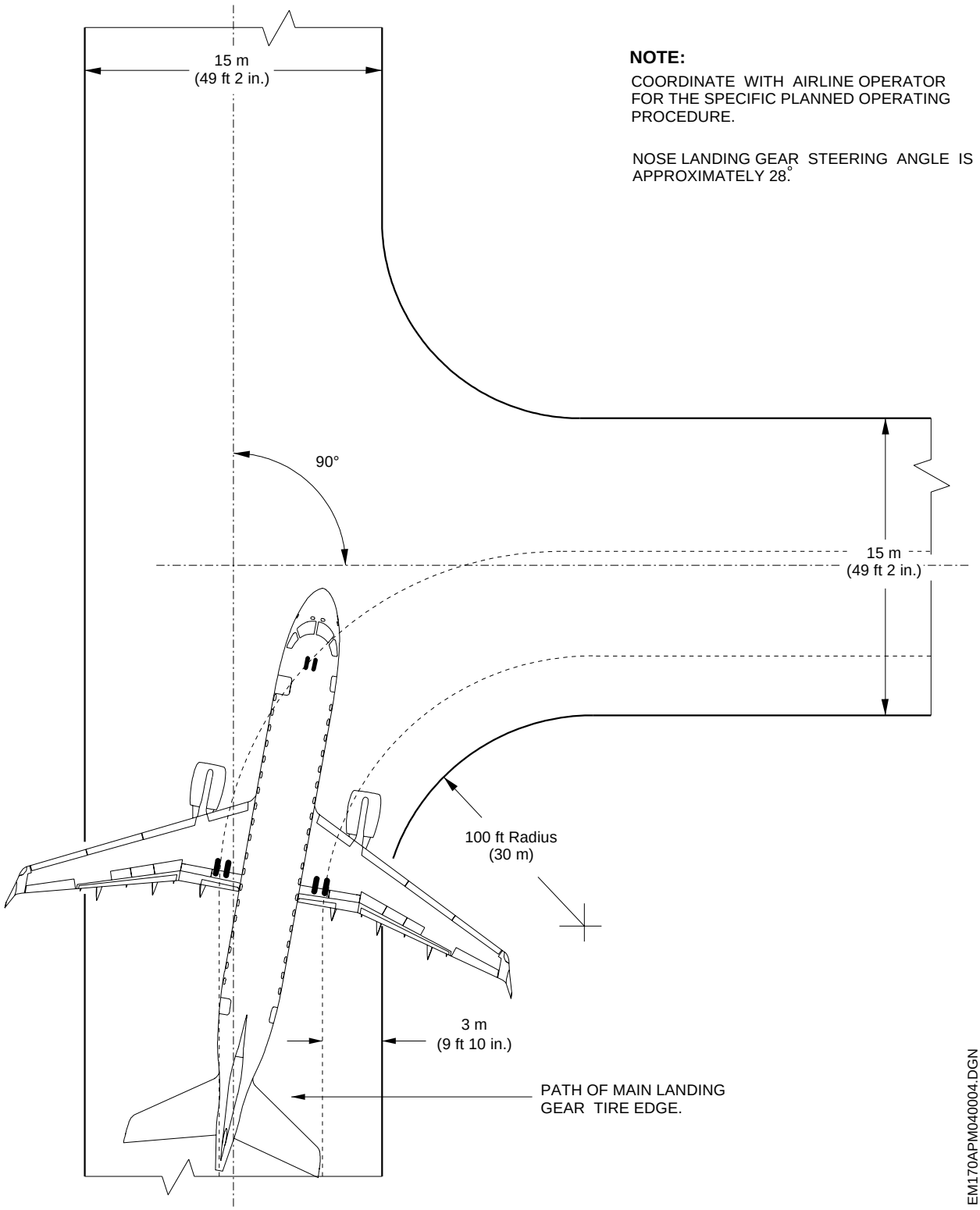


More than 90° Turn - Runway to Taxiway
Figure 4.6

EFFECTIVITY: ALL



90° Turn - Runway to Taxiway
Figure 4.7



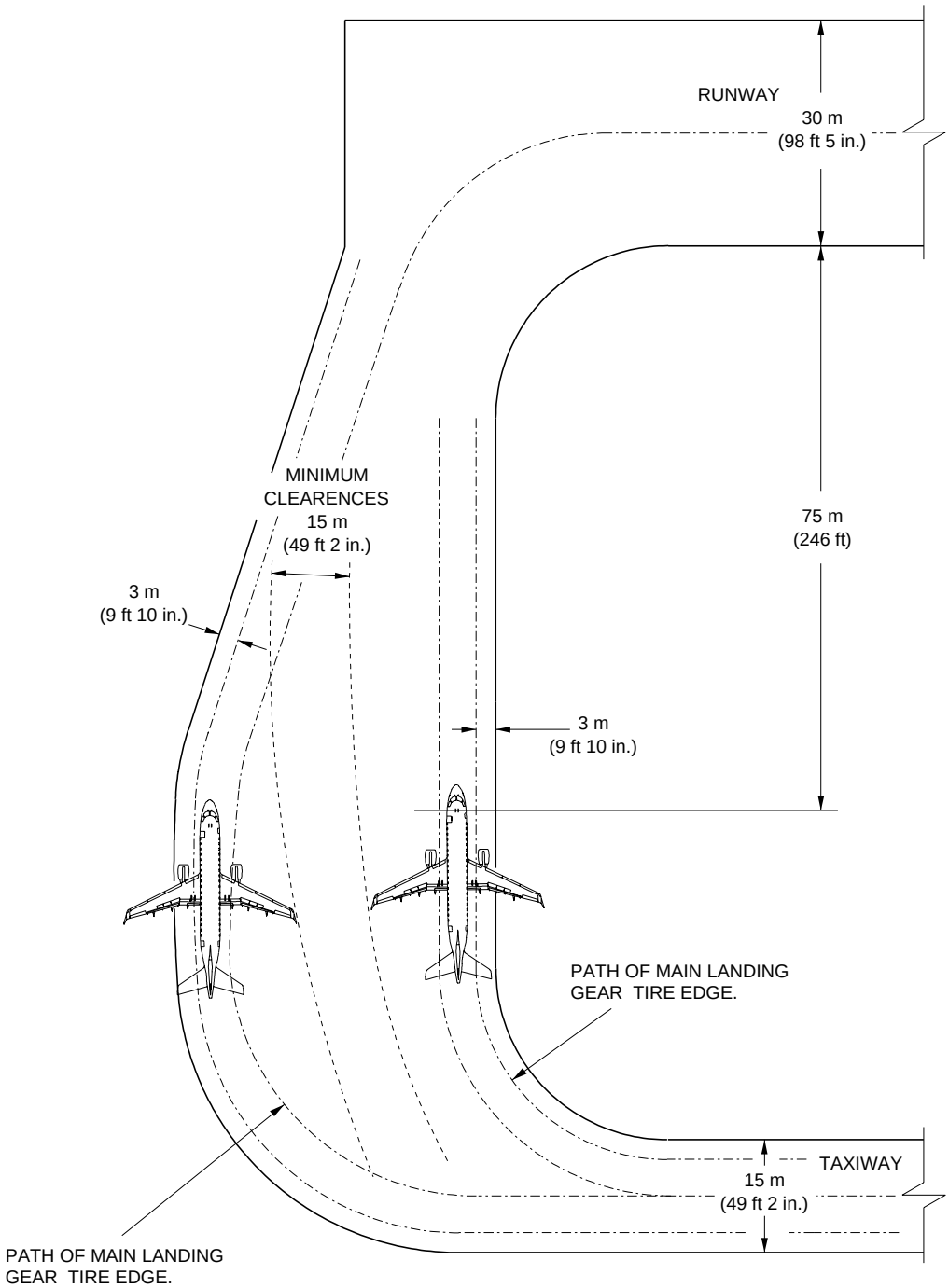
NOTE:

COORDINATE WITH AIRLINE OPERATOR FOR THE SPECIFIC PLANNED OPERATING PROCEDURE.

NOSE LANDING GEAR STEERING ANGLE IS APPROXIMATELY 28°.

90° Turn - Taxiway to Taxiway
Figure 4.8

4.6. RUNWAY HOLDING BAY



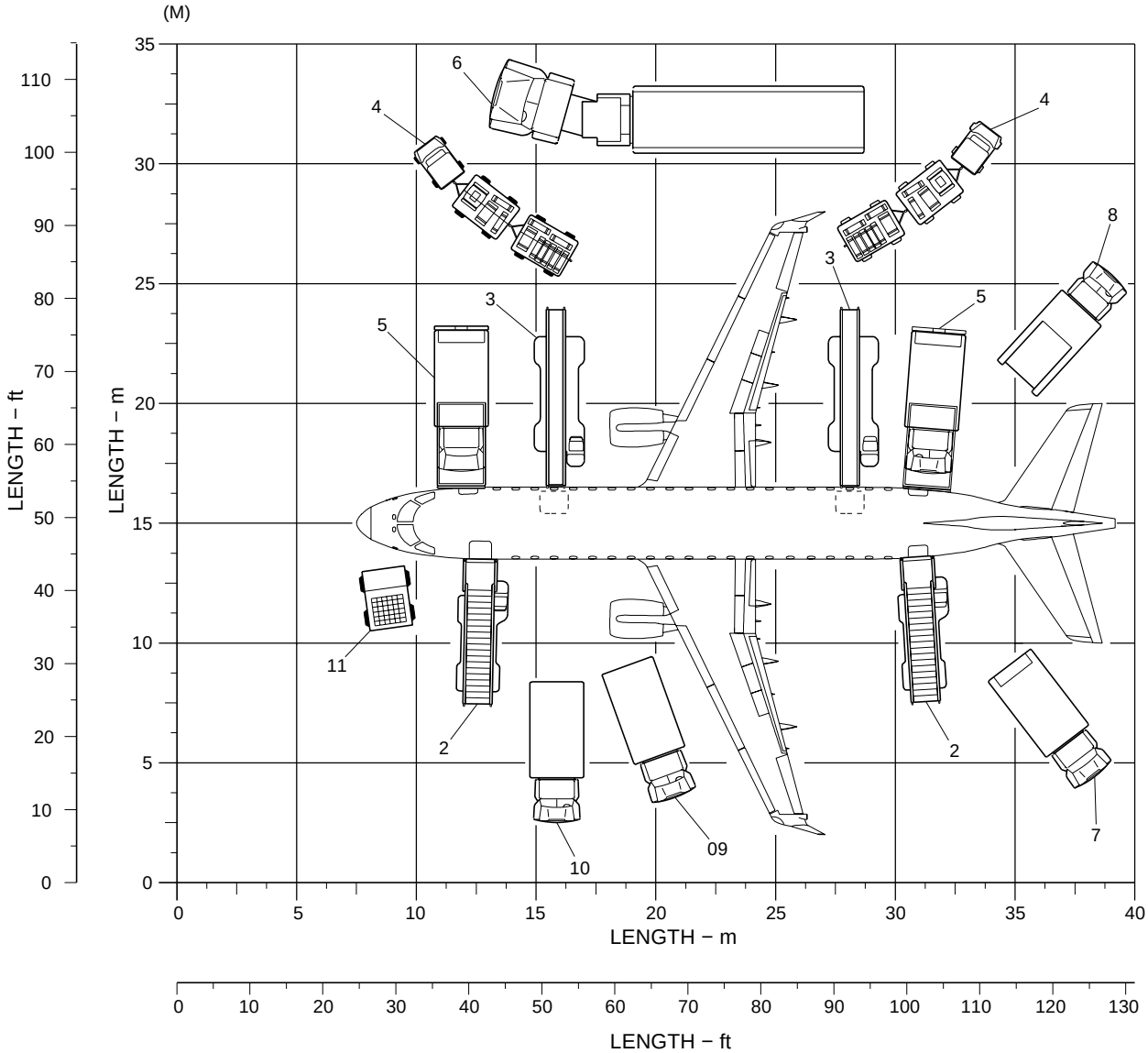
Runway Holding Bay
Figure 4.9

5. TERMINAL SERVICING

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.

5.1. AIRCRAFT SERVICING ARRANGEMENT

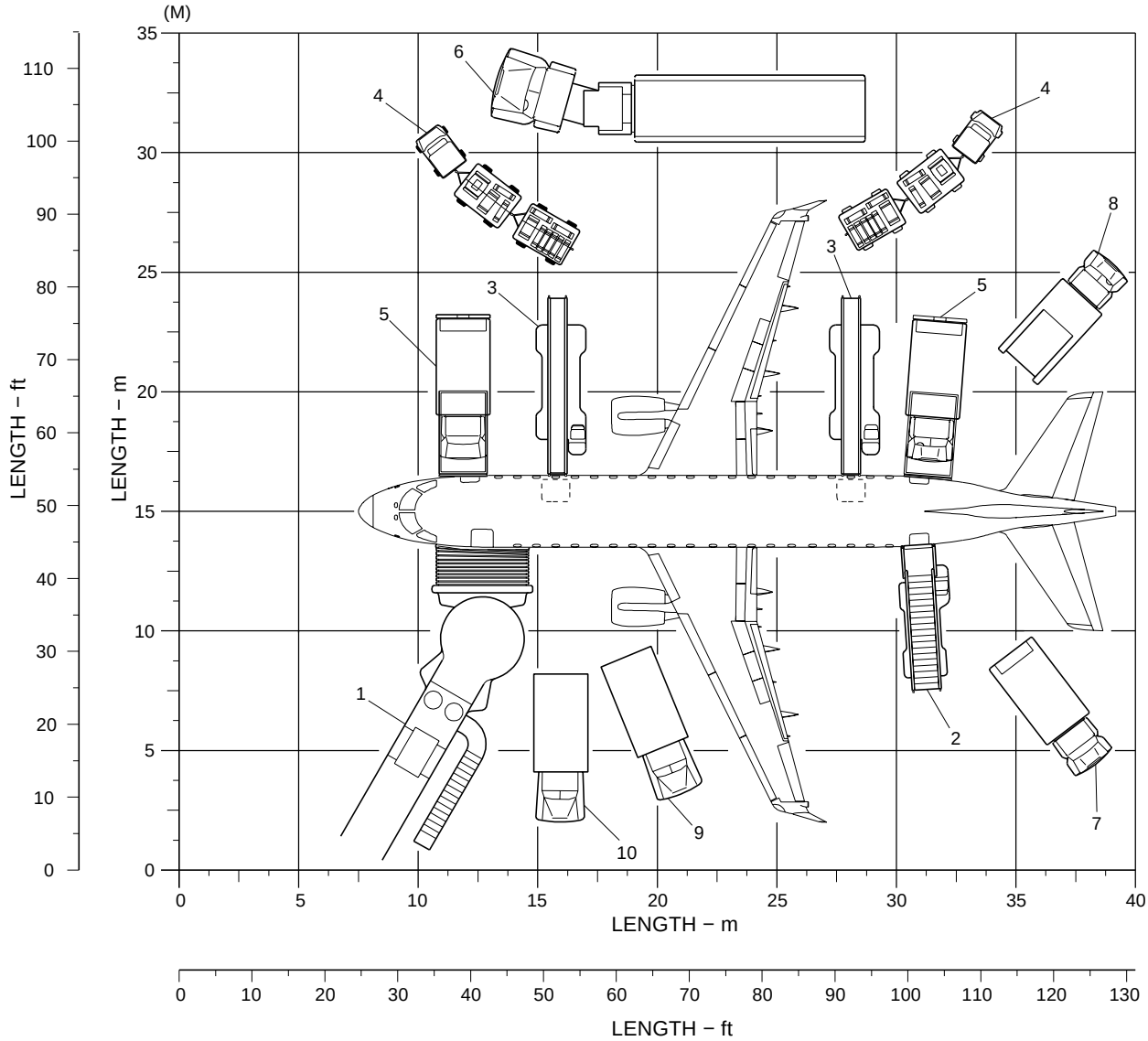


SERVICING ARRANGEMENT

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

EM170APM050019A.DGN

Aircraft Servicing Arrangement With Passenger Stairs
Figure 5.1



SERVICING ARRANGEMENT

01 − PASSENGER BRIDGE.
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.

EM170APM050020A.DGN

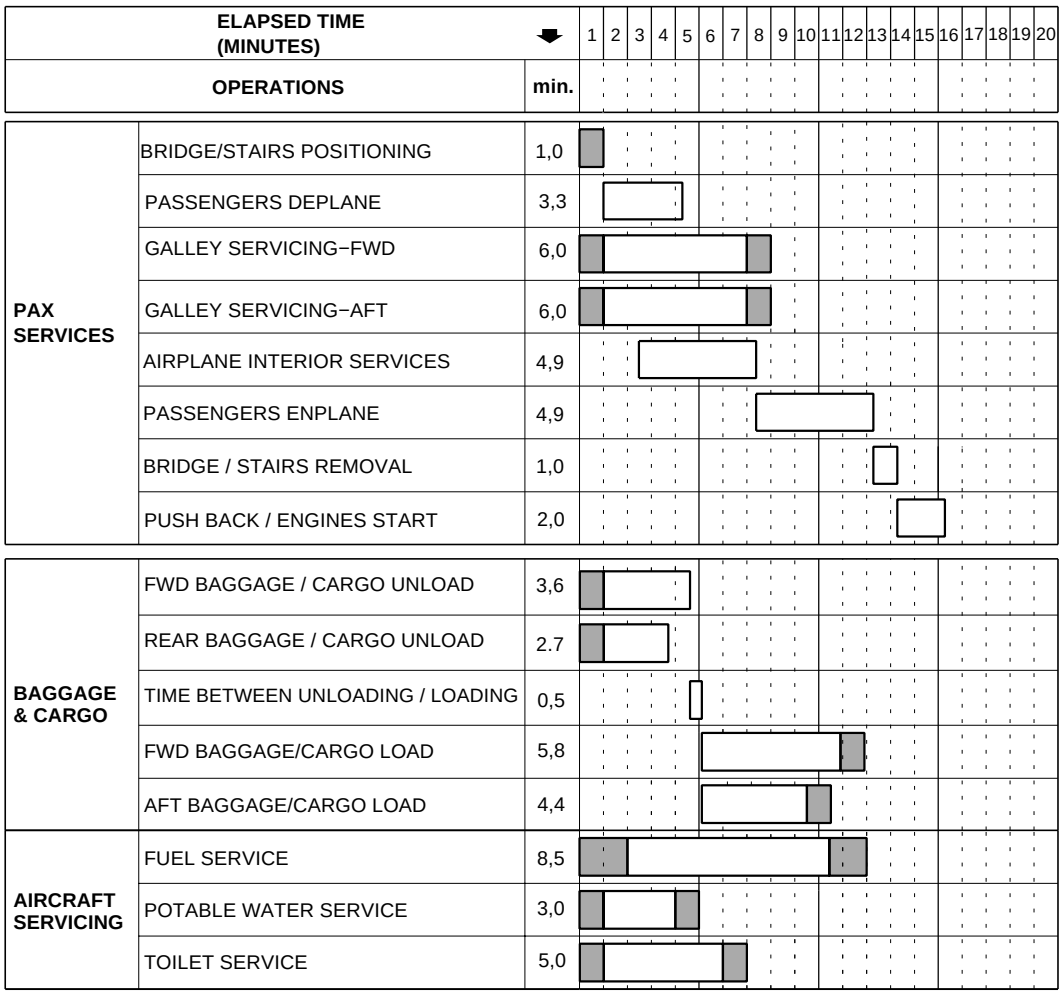
Aircraft Servicing Arrangement With Passenger Bridge
Figure 5.2

5.2. 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.



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.

EM170APM050021B.DGN

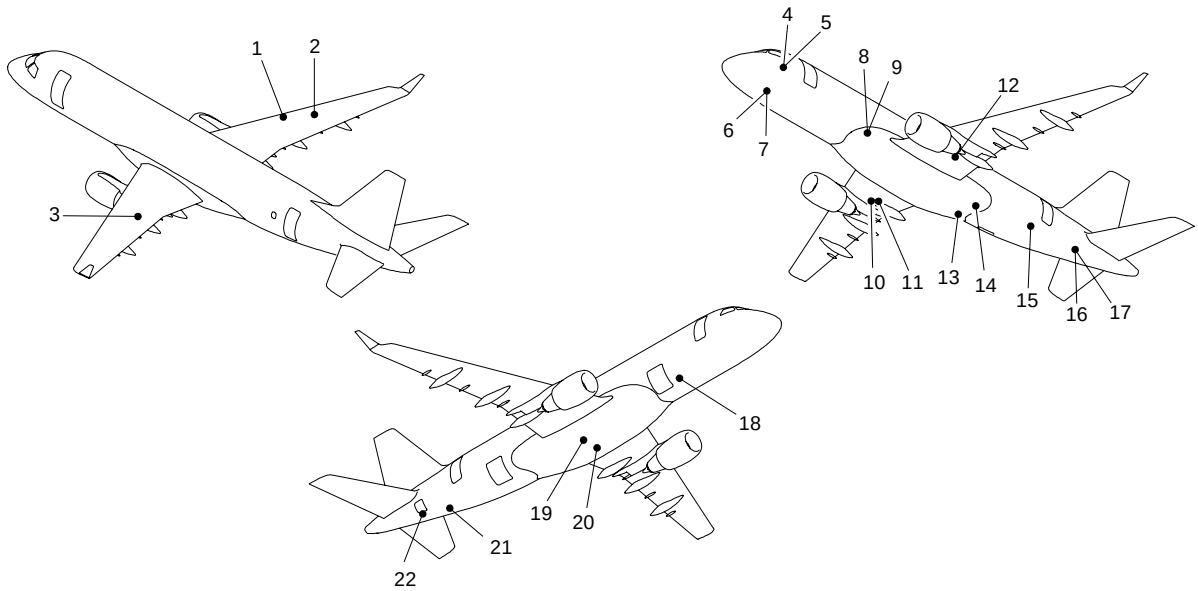
Air Terminal Operation - Turnaround Station
Figure 5.3

EFFECTIVITY: ALL

5.3. TERMINAL OPERATIONS - EN ROUTE STATION

Not Applicable

5.4. GROUND SERVICING CONNECTIONS



ITEM	DESCRIPTION	COORD. X (mm)	COORD. Y (mm)	COORD. Z (mm)	HEIGHT ABOVE GROUND (mm)
1	PRESSURE REFUELING PANEL	14329.47	5702.96	−623.30	2473.41
2	GRAVITY REFUELING PORT (RH)	15627.69	7413.99	−243.75	2852.56
3	GRAVITY REFUELING PORT (LH)	15627.69	−7413.99	−243.75	2852.56
4	EXTERNAL POWER SUPPLY 115 VAC	4146.90	−810.70	−1339.53	1760.30
5	FORWARD RAMP HEADSET	4164.44	−936.13	−1262.71	1837.12
6	STEERING SWITCH DISENGAGE	4136.97	−951.46	−1279.29	1820.55
7	WHEEL JACK POINT − NLG	4125.94	0.00	−2849.07	250.76
8	AIR COND. GROUND CONNECTION	11325.52	80.00	−1979.71	1117.93
9	ENGINE AIR STARTING (LOW PRESSURE UNIT)	11617.00	4.28	−2010.20	1087.34
10	GROUNDING POINT (ELECTRICAL)	15430.30	2560.25	−1343.60	1752.78
11	WHEEL JACK POINT− MLG (RH)	15318.29	2600.00	−2683.95	412.46
12	WHEEL JACK POINT− MLG (LH)	15318.29	−2600.00	−2683.95	412.46
13	HYD. SYS # 1 SERVICE PANEL	17398.37	−808.01	−1602.04	1493.73
14	HYD. SYS # 2 SERVICE PANEL	17398.37	808.01	−1602.04	1493.73
15	WATER SERVICING PANEL	23302.83	−329.37	−1178.74	1915.22
16	EXTERNAL POWER SUPPLY 28 VDC	25862.65	−471.73	−605.30	2487.87
17	AFT RAMP HEADSET	26003.26	−449.47	−585.54	2507.59
18	OXYGEN SERVICING PANEL / BOTTLE	7400.34	1159.87	−961.05	2137.79
19	FUEL TANK DRAIN VALVE (RH)	14191.00	398.47	−1413.71	1683.05
20	FUEL TANK DRAIN VALVE (LH)	14191.00	−398.47	−1413.71	1683.05
21	WASTE SERVICING PANEL	24225.01	349.20	−991.80	2101.87
22	HYD. SYS # 3 SERVICE PANEL	25839.86	519.15	−590.09	2503.09

NOTE:

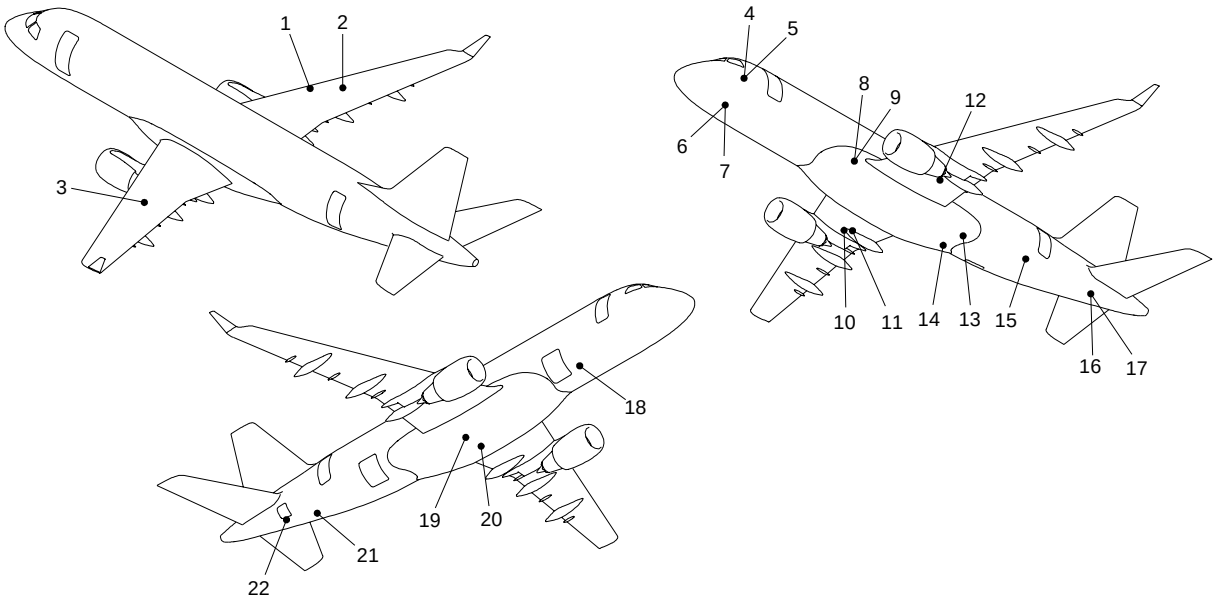
THE GROUND CLEARANCES IN THE TABLE REFER TO THE AIRCRAFT WITH THE MINIMUM OPERATING WEIGHT (MOW) = 22500 kg (CG FWD 7.0% CMA)

EM170APM050022C.DGN

Ground Servicing Connections
Figure 5.4

EFFECTIVITY: ALL

w-apm2259



ITEM	DESCRIPTION	COORD. X (mm)	COORD. Y (mm)	COORD. Z (mm)	HEIGHT ABOVE GROUND (mm)
1	PRESSURE REFUELING PANEL	14329.47	5702.96	−623.30	2466.01
2	GRAVITY REFUELING PORT (RH)	15627.69	7413.99	−243.75	2835.89
3	GRAVITY REFUELING PORT (LH)	15627.69	−7413.99	−243.75	2835.89
4	EXTERNAL POWER SUPPLY 115 VAC	4146.90	−810.70	−1339.53	1825.54
5	FORWARD RAMP HEADSET	4164.44	−936.13	−1262.71	1902.23
6	STEERING SWITCH DISENGAGE	4136.97	−951.46	−1279.29	1885.86
7	WHEEL JACK POINT − NLG	4116.74	0.00	−2914.51	250.82
8	AIR COND. GROUND CONNECTION	11325.52	80.00	−1979.71	1131.99
9	ENGINE AIR STARTING (LOW PRESSURE UNIT)	11617.00	4.28	−2010.20	1099.32
10	GROUNDING POINT (ELECTRICAL)	15430.30	2560.25	−1343.60	1737.54
11	WHEEL JACK POINT− MLG (RH)	15317.37	2600.00	−2667.98	414.03
12	WHEEL JACK POINT− MLG (LH)	15317.37	−2600.00	−2667.98	414.03
13	HYD. SYS # 1 SERVICE PANEL	17398.37	−808.01	−1602.04	1464.46
14	HYD. SYS # 2 SERVICE PANEL	17398.37	808.01	−1602.04	1464.46
15	WATER SERVICING PANEL	23302.83	−329.37	−1178.74	1843.83
16	EXTERNAL POWER SUPPLY 28 VDC	25862.65	−471.73	−605.30	2398.21
17	AFT RAMP HEADSET	26003.26	−449.47	−585.54	2416.93
18	OXYGEN SERVICING PANEL / BOTTLE	7400.34	1159.87	−961.05	2178.82
19	FUEL TANK DRAIN VALVE (RH)	14191.00	398.47	−1413.71	1676.65
20	FUEL TANK DRAIN VALVE (LH)	14191.00	−398.47	−1413.71	1676.65
21	WASTE SERVICING PANEL	24225.01	349.20	−991.80	2023.91
22	HYD. SYS # 3 SERVICE PANEL	25839.86	519.15	−590.09	2413.60

NOTE:

THE GROUND CLEARANCES IN THE TABLE REFER TO THE AIRCRAFT WITH THE MINIMUM OPERATING WEIGHT (MOW) = 22500 kg (CG REAR 27.0% CMA)

EM170APM050023A.DGN

Ground Servicing Connections
Figure 5.5

EFFECTIVITY: ALL

w-apm2259

5.5. ENGINE STARTING PNEUMATIC REQUIREMENTS

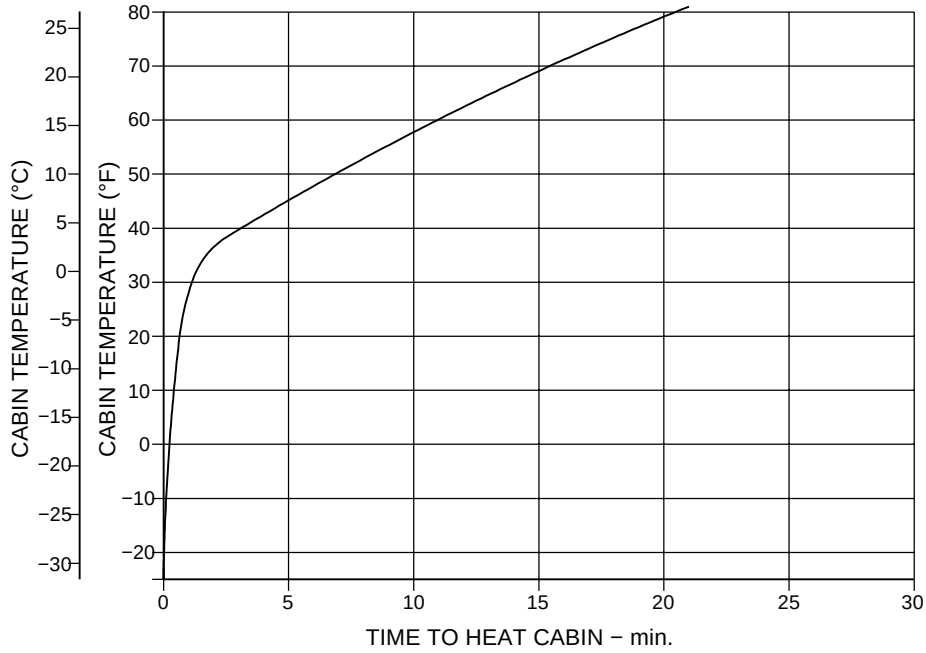
TABLE 1 − PNEUMATIC ENGINE START REQUIREMENTS

Altitude ft	Ambient Temp °F	Minimum Pressure psia	Minimum Temp °F	Minimum Flow lb/min
SL	−40	48.0	349	95.1
SL	59	43.7	443	82.0
SL	120	40.7	505	73.7
9000	−40	37.7	350	74.5
9000	23	30.0	409	57.3
9000	86	28.9	474	53.4
13,000	−40	36.0	352	71.3
13,000	12	27.2	399	52.2
13,000	71	26.7	458	49.6
15,000	−40	32.9	352	66.6
15,000	5	25.3	392	49.0
15,000	59	24.4	446	46.1

EM170APM050030A.DGN

Engine Starting Pneumatic Requirements
Figure 5.6

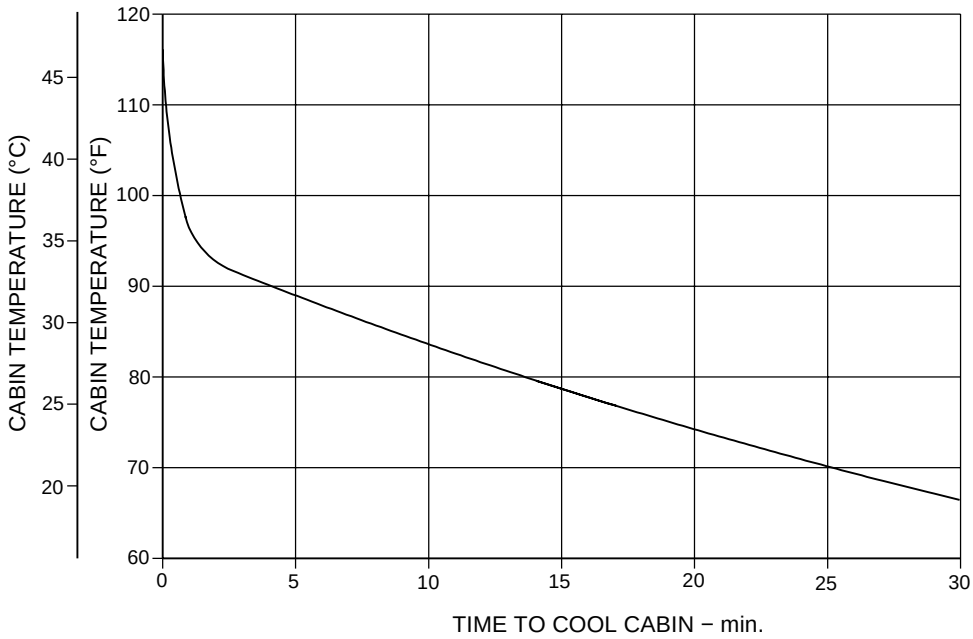
5.6. GROUND PNEUMATIC POWER REQUIREMENTS



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)

EM170APM050007B.DGN

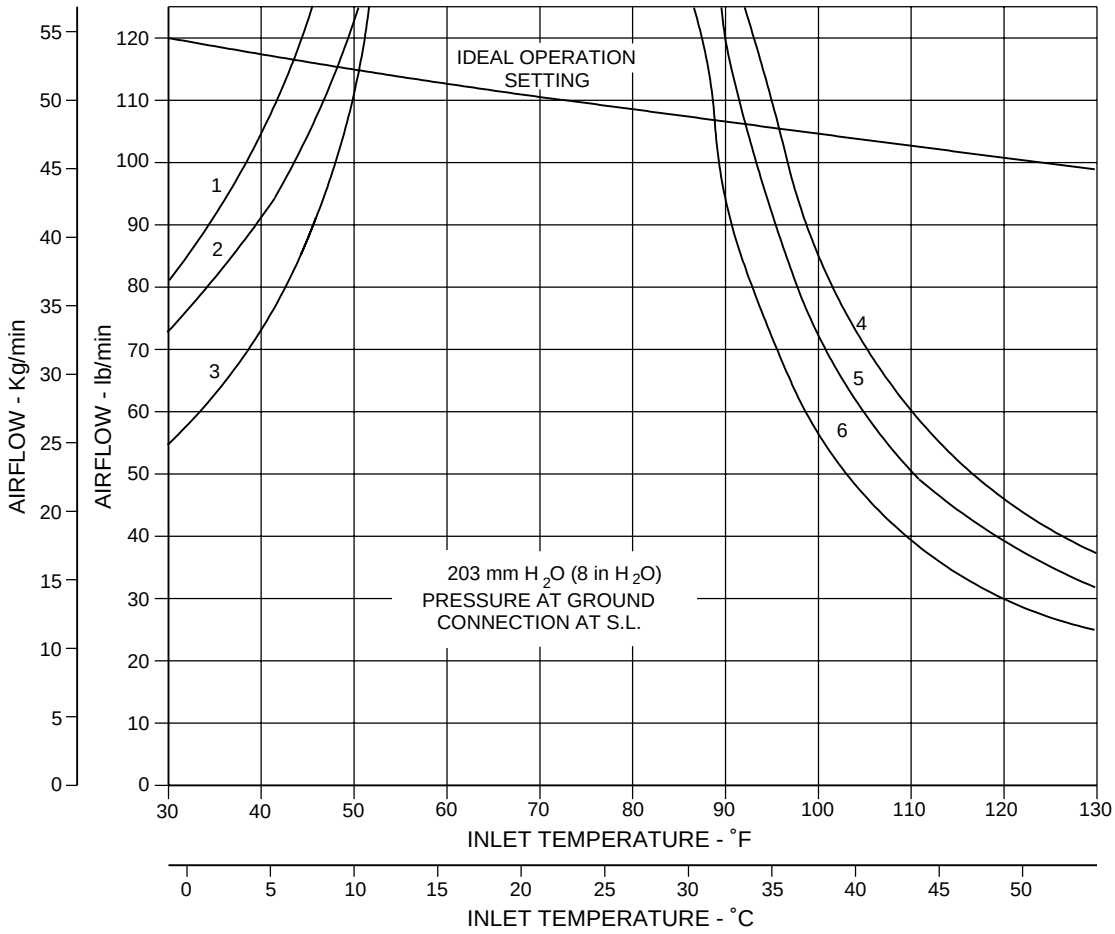
Ground Pneumatic Power Requirements
Figure 5.7

5.7. 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 within a given time.
- 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.

PRE - CONDITIONED AIRFLOW REQUIREMENTS

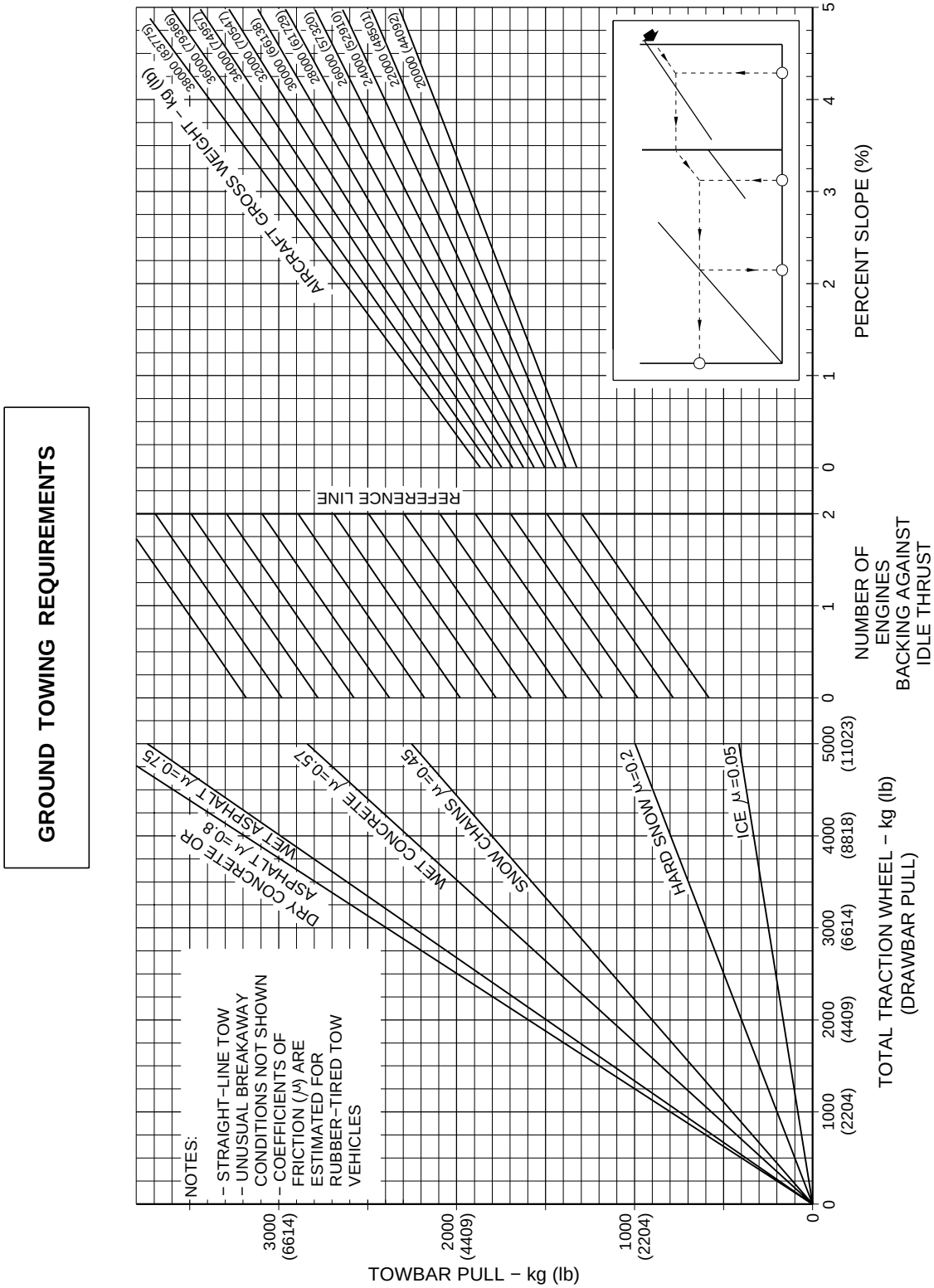


CONDITIONS	AMBIENT TEMP		EXT LOAD (BTU/h)	ELECTRICAL LOAD (BTU/h)	OCCUPANTS	CABIN TEMP	
	(˚C)	(˚F)				(˚C)	(˚F)
1	39	103	20952	12500	75	24	75
2	39	103	20952	12500	75	27	80
3	39	103	0	12500	4	21	70
4	-40	-40	0	0	4	24	75
5	-29	-20	0	0	4	24	75
6	-18	0	0	0	4	24	75

EM170APM050008.DGN

Preconditioned Airflow Requirements
Figure 5.8

5.8. GROUND TOWING REQUIREMENTS



Ground Towing Requirements
Figure 5.9

EFFECTIVITY: ALL

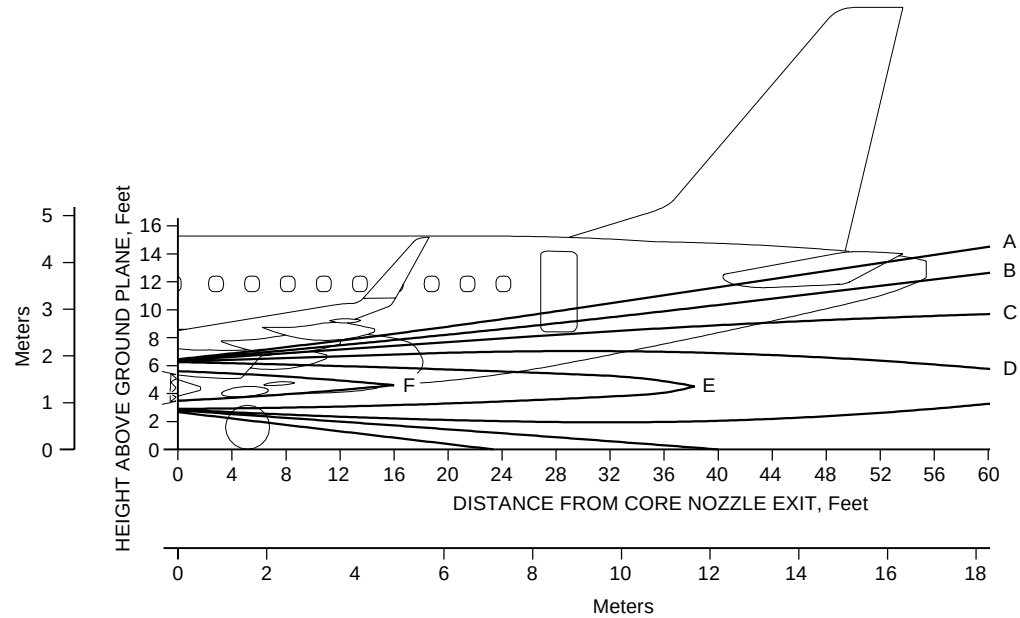
6. OPERATING CONDITIONS

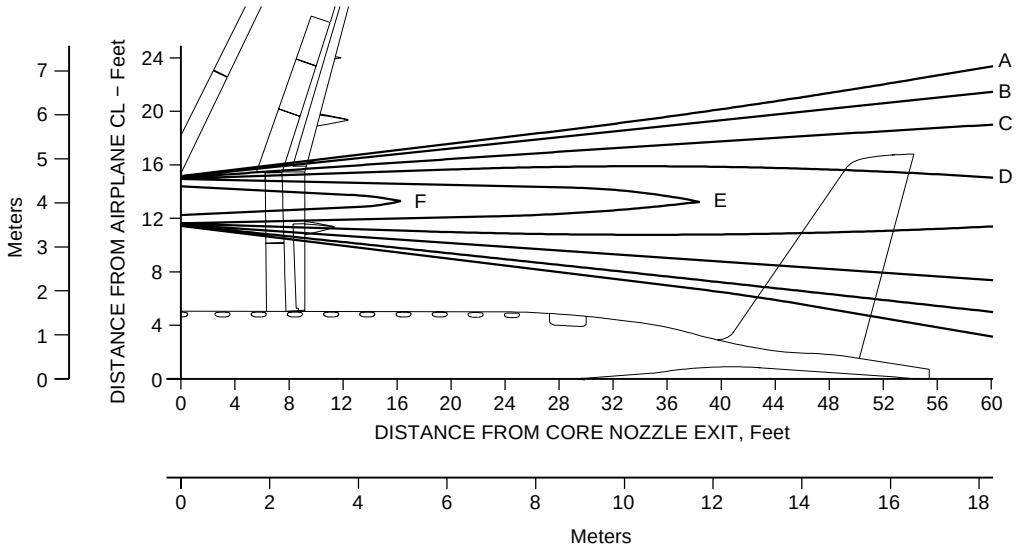
This section provides the following information:

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

6.1. ENGINE EXHAUST VELOCITIES AND TEMPERATURES

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





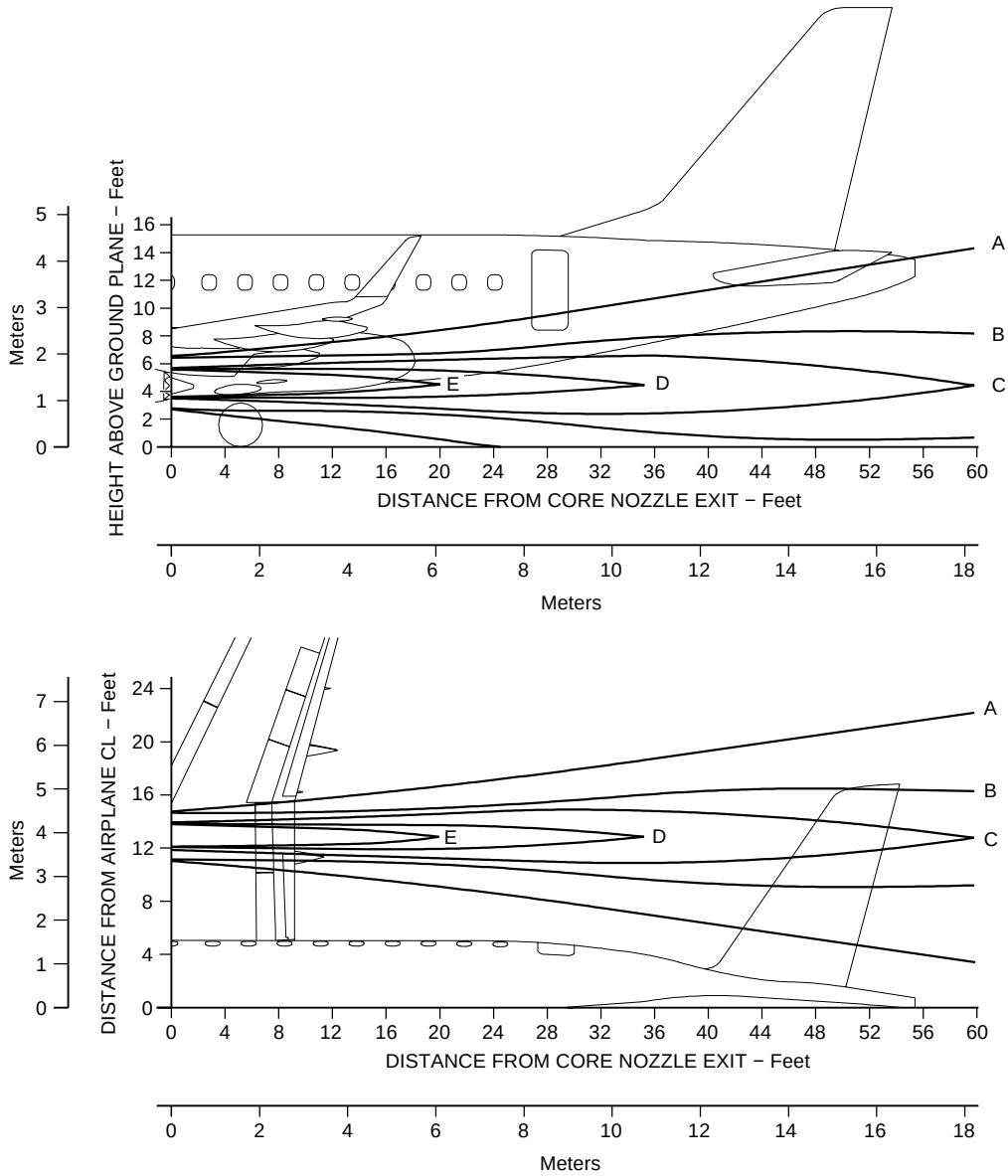
VELOCITY m/s (ft/s) MAX = 482.5 (1583)	
A	15.2 (50)
B	30.5 (100)
C	60.9 (200)
D	121.9 (400)
E	243.8 (800)
F	457.2 (1500)

EM170MFEP010005.DGN

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

Jet Wake Velocity Profile - Takeoff Power
Figure 6.1

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



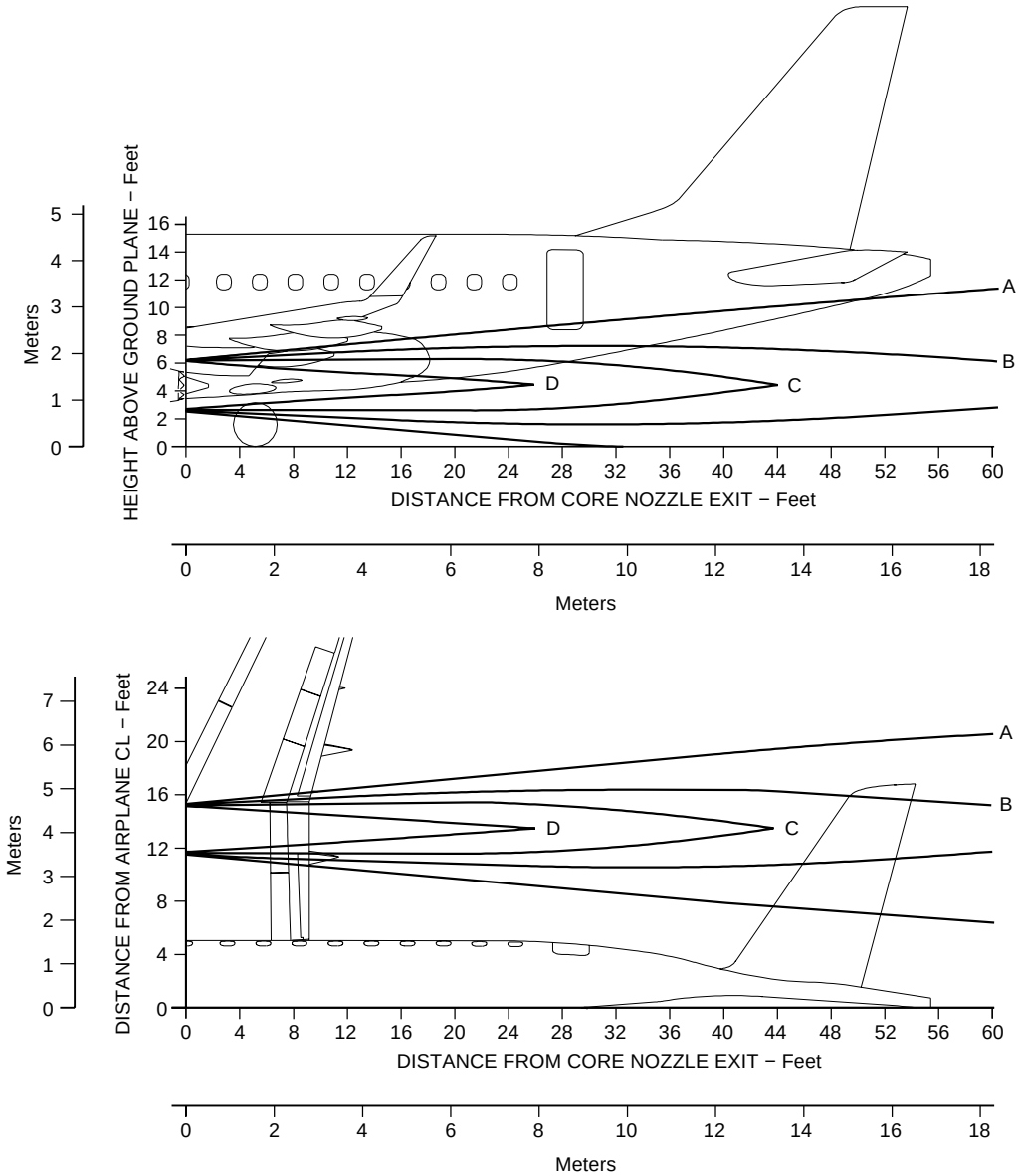
TOTAL TEMPERATURE MAX = 689°C (1273°F)		
	°C	°F
A	38	100
B	66	150
C	93	200
D	204	400
E	582	900

NOTE:
EXHAUST TEMPERATURE CONTOURS INCLUDE WORST CASE 20 kn HEADWIND.

EM170MFEP010006.DGN

Jet Wake Temperature Profile - Takeoff Power
Figure 6.2

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



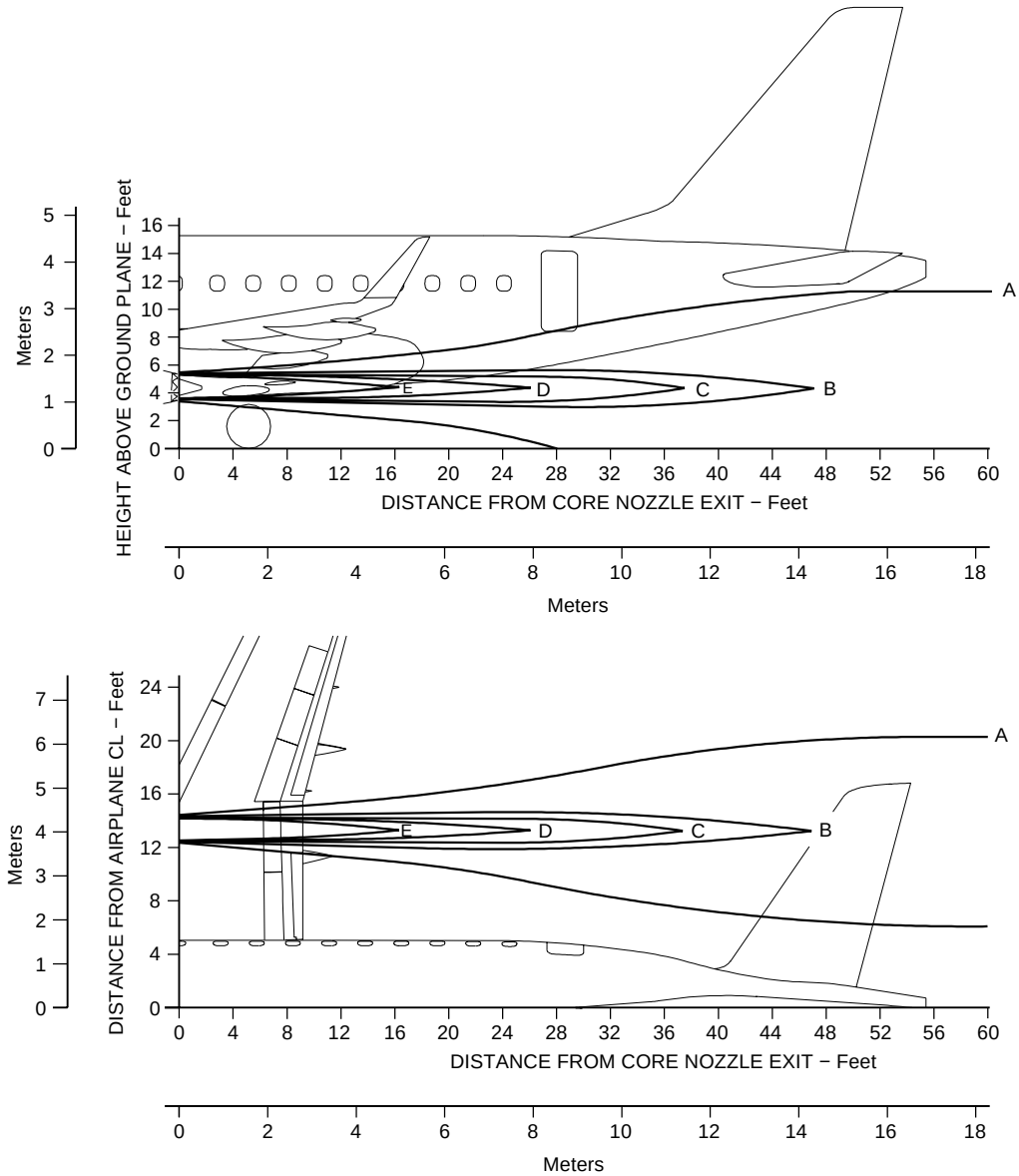
VELOCITY m/s (ft/s) MAX = 89.0 (292)		
A	15.2	(50)
B	30.5	(100)
C	45.7	(150)
D	76.2	(250)

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

EM170MFEP010007.DGN

Jet Wake Velocity Profile - Ground Idle
Figure 6.3

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

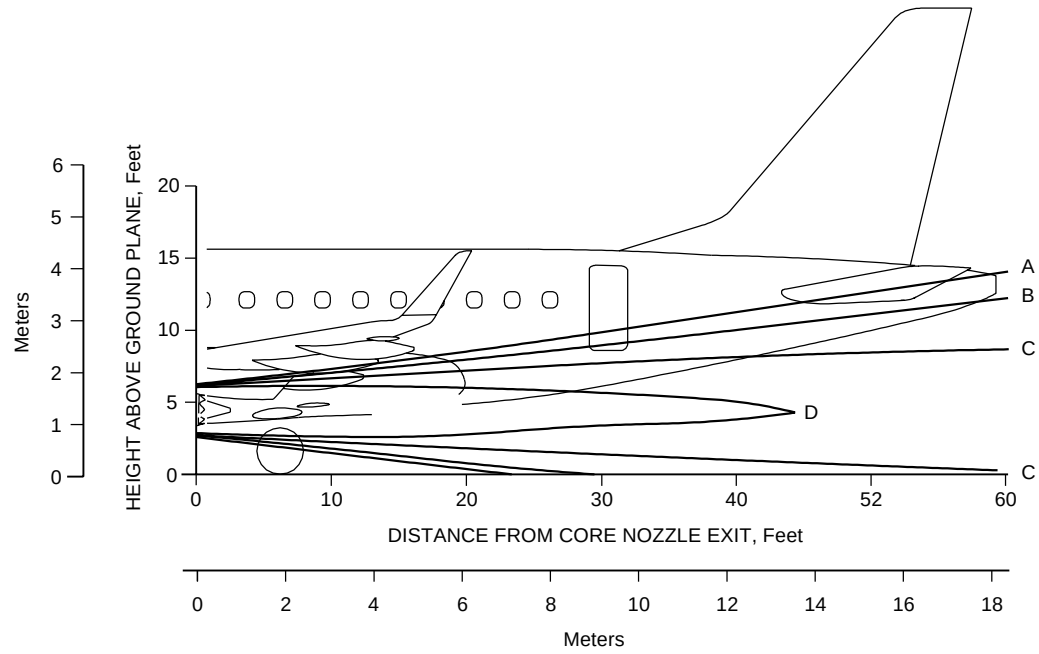


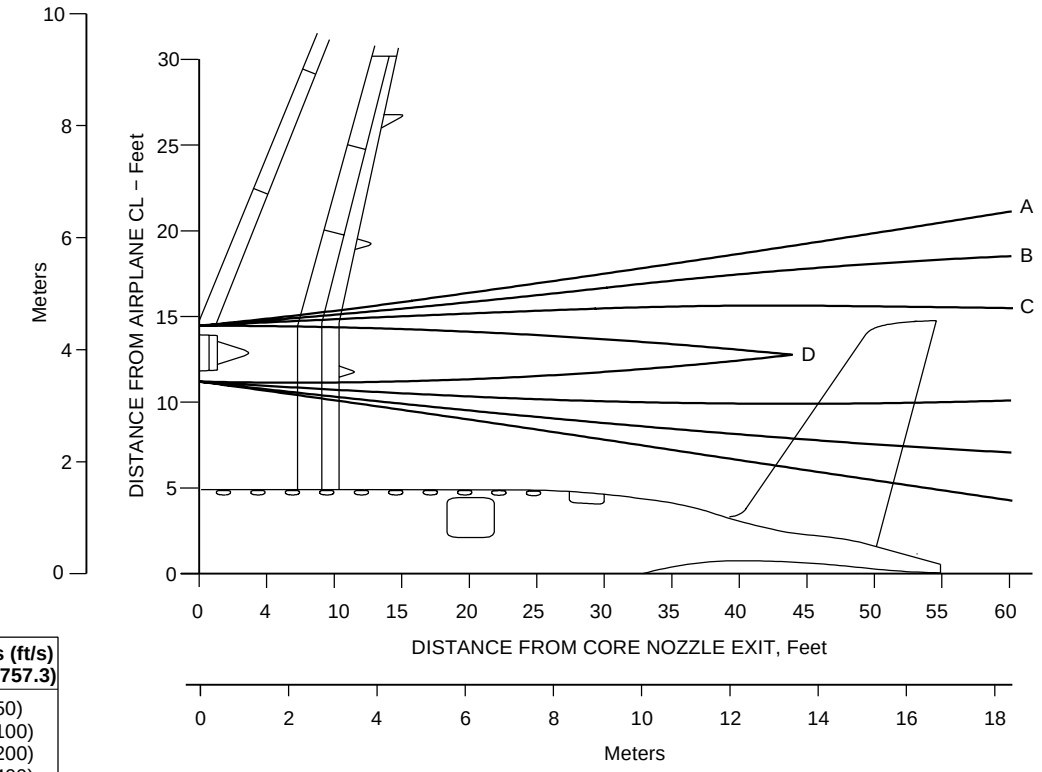
TOTAL TEMPERATURE MAX = 519°C (966°F)		
	°C	°F
A	38	100
B	66	150
C	93	200
D	204	400
E	582	900

NOTE:
EXHAUST TEMPERATURE CONTOURS INCLUDE WORST CASE 20 kn HEADWIND.

EM170MFEP010008.DGN

Jet Wake Temperature Profile - Ground Idle
Figure 6.4



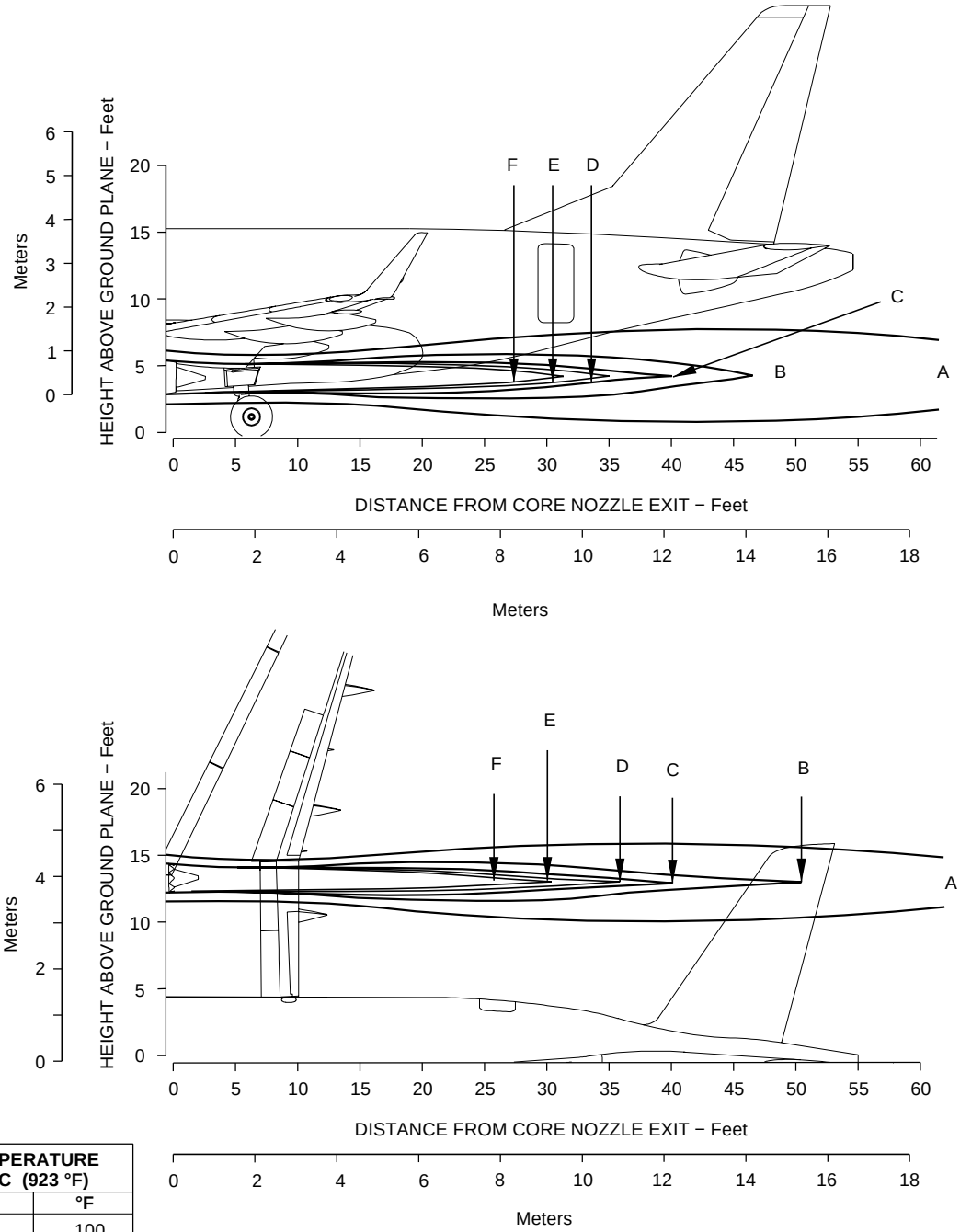


VELOCITY m/s (ft/s) MAX = 230.8 (757.3)		
A	15.2	(50)
B	30.5	(100)
C	60.9	(200)
D	121.9	(400)

EM170APM060006A.DGN

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

Jet Wake Velocity Profile - Breakaway Power
Figure 6.5



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

EM170APM060007A.DGN

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

Jet Wake Temperature Profile - Breakaway Power
Figure 6.6

6.2. 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.

6.2.1. External Certification Noise Levels

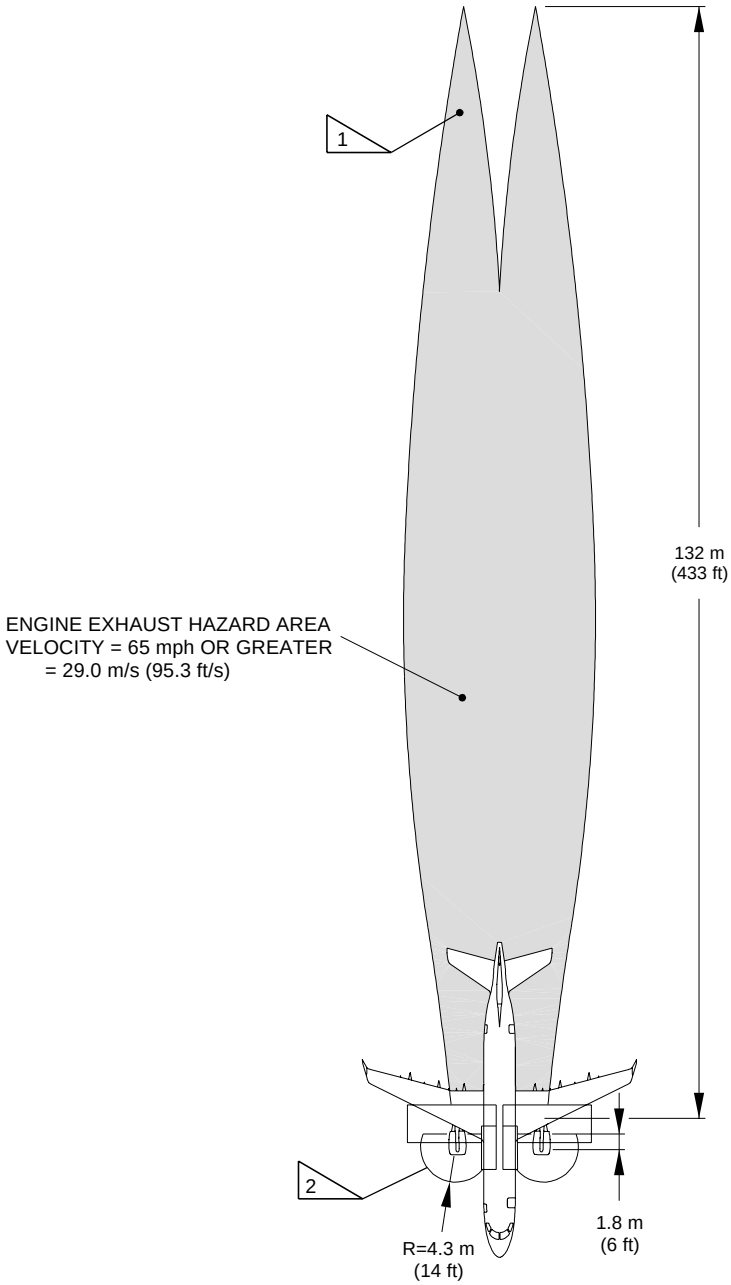
The aircraft comply with the Stage 3 / Chapter 3 noise limits set forth in 14 CFR Part 36, ICAO Annex 16, Volume 1, Chapter 3, Amendment 7 and CTA RBHA 36.

6.2.2. 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.

6.3. HAZARD AREAS

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



NOTE:

NO ACCESS TO ENGINE ACCESSORIES AT TAKEOFF POWER.

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

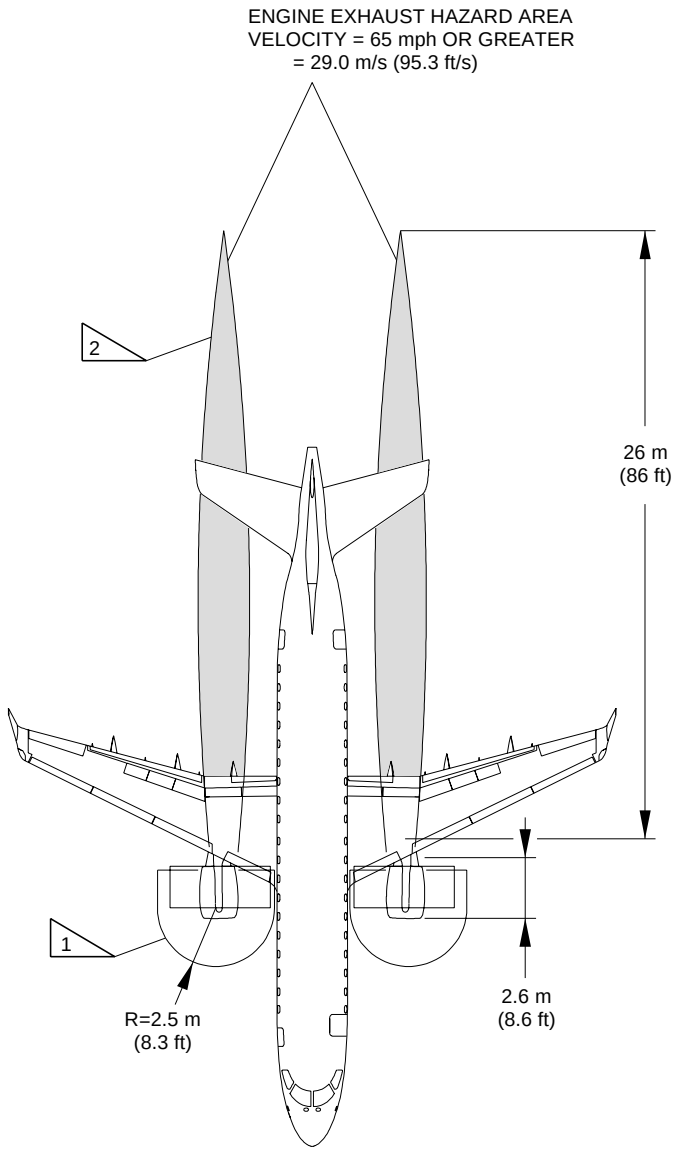
2 INLET HAZARD AREA − CONDITION: 20 kn HEADWIND/CROSSWIND BASED ON 12.2 m/s (40 ft/s) CRITICAL VELOCITY WITH 0.9 m (3 ft) CONTINGENCY FACTOR.

EM170MFEP010001A.DGN

Hazard Areas - Takeoff Power
Figure 6.7

EFFECTIVITY: ALL

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.

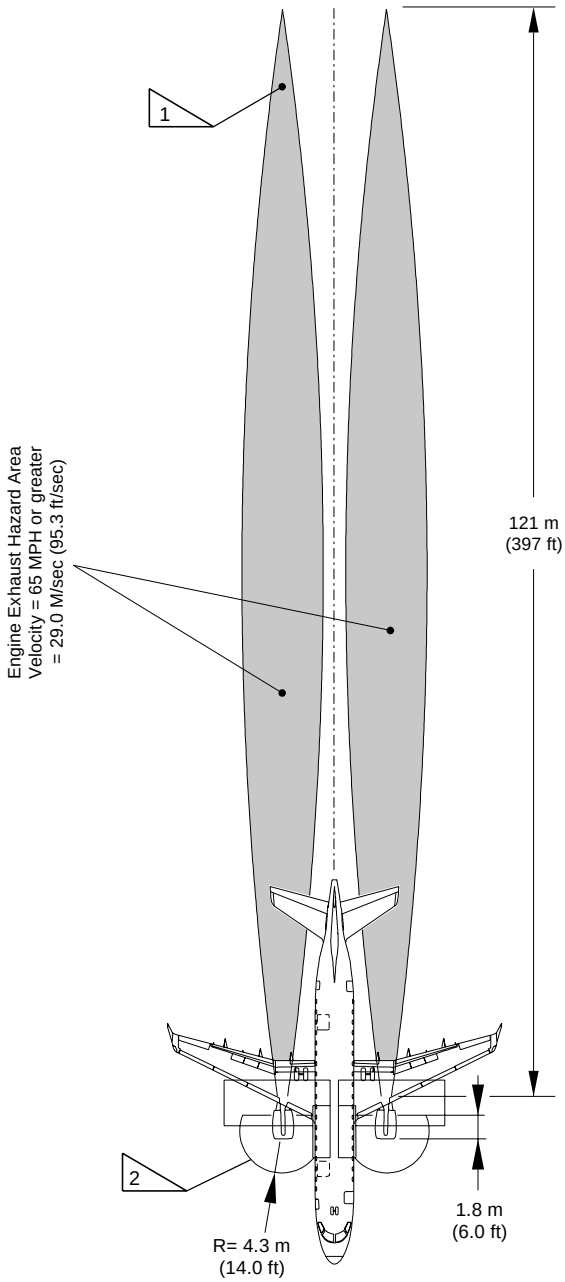
EM170MFEP010002A.DGN

Hazard Areas - Ground Idle
Figure 6.8

EFFECTIVITY: ALL

w-apm2259

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



NOTE:

NO ACCESS TO ENGINE ACCESSORIES AT BREAKAWAY POWER.

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

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

EM170APM060011A.DGN

Hazard Areas - Breakaway Power
Figure 6.9

EFFECTIVITY: ALL

w-apm2259

7. PAVEMENT DATA

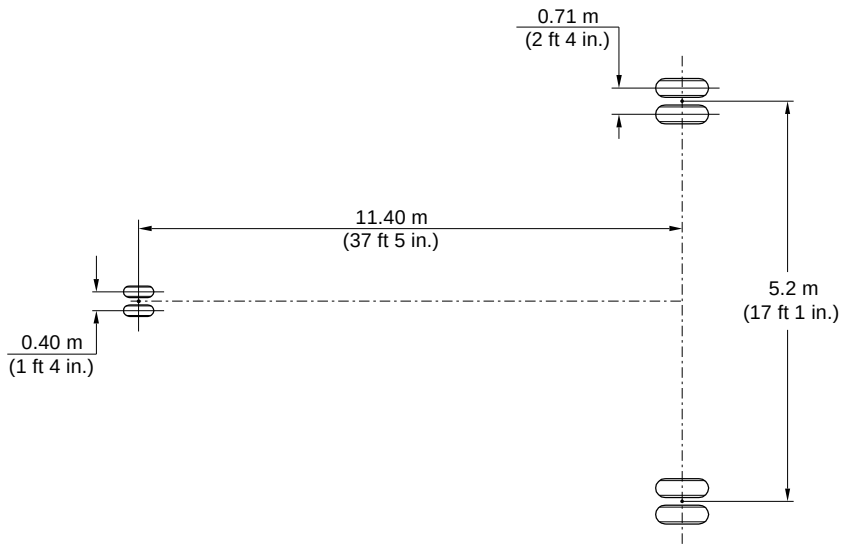
7.1. GENERAL INFORMATION

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

	AIRCRAFT MODELS	
	STD	**LR**
MAXIMUM RAMP WEIGHT	37660 kg (83026 lb)	38950 kg (85870 lb)
NOSE GEAR TIRE SIZE	24 x 7.7	
NOSE GEAR TIRE PRESSURE	7.17 − 0 / + 0.7 kg/cm ² (102 − 0 / +10 psi)	
MAIN GEAR TIRE SIZE	H38 x 13−18	
MAIN GEAR TIRE PRESSURE	9.56 − 0 / + 0.7 kg/cm ² (136 − 0 / +10 psi)	



EM170APM070042A.DGN

Footprint
Figure 7.1

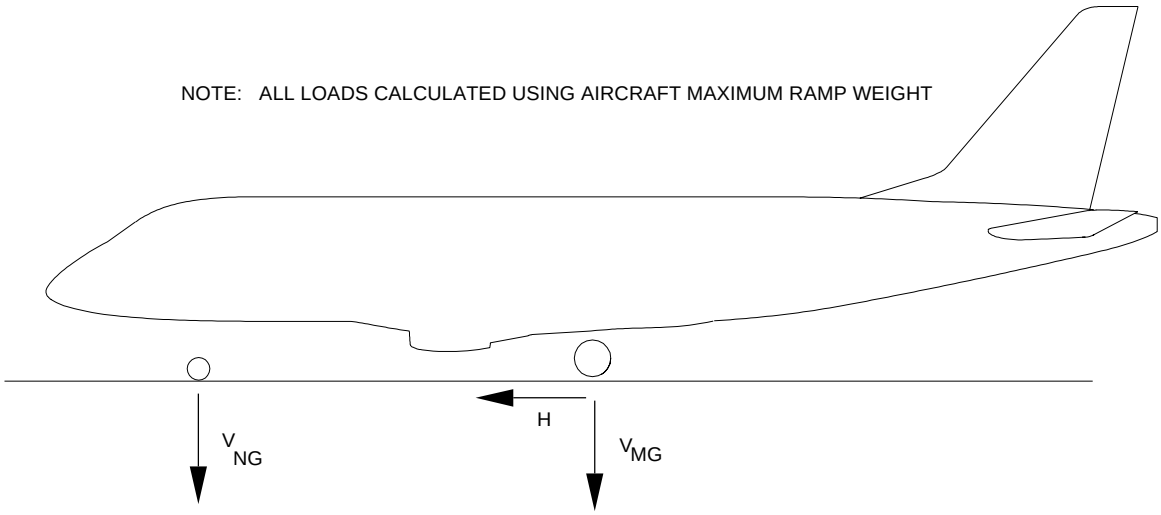
7.3. MAXIMUM PAVEMENT LOADS

LEGEND: V_{NG} = MAXIMUM VERTICAL NOSE GEAR GROUND LOAD AT MOST FORWARD C.G.

V_{MG} = MAXIMUM VERTICAL MAIN GEAR GROUND LOAD AT MOST AFT C.G.

H = MAXIMUM HORIZONTAL GROUND LOAD FROM BRAKING

NOTE: ALL LOADS CALCULATED USING AIRCRAFT MAXIMUM RAMP WEIGHT



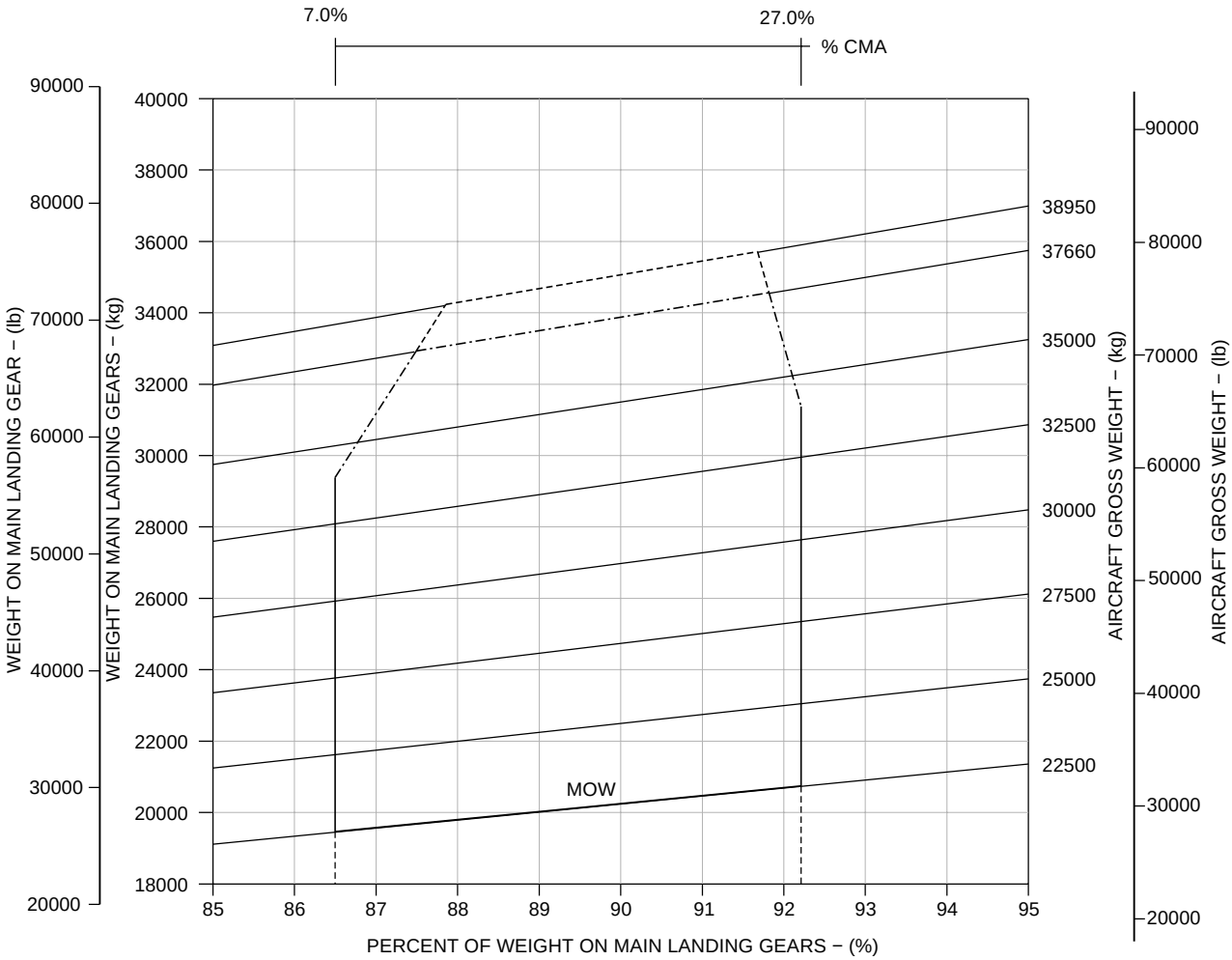
MODEL	MAXIMUM RAMP WEIGHT	V_{NG}		V_{MG} (PER STRUT)	H (PER STRUT)	
		STATIC AT MOST FORWARD C.G.	STEADY BRAKING WITH DECELERATION OF 3,0 m/sec^2	STATIC AT MOST AFT C.G.	STEADY BRAKING WITH DECELERATION OF 3,0 m/sec^2	INSTANTANEOUS BRAKING (FRICTION COEF. OF 0.8)
LR	38950 kg (85870 lb)	4768 kgf (10432 lbf)	6896 kgf (15203 lbf)	18509 kgf (40805 lbf)	5397 kgf (11898 lbf)	12737 kgf (28080 lbf)
STD	37660 kg (83026 lb)	4732 kgf (10432 lbf)	6787 kgf (14963 lbf)	17922 kgf (39511 lbf)	5225 kgf (11519 lbf)	12328 kgf (27179 lbf)

EM170APM070043A.DGN

Maximum Pavement Loads
Figure 7.2

EFFECTIVITY: ALL

7.4. LANDING GEAR LOADING ON PAVEMENT

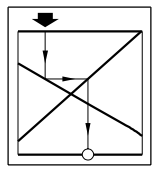


Landing Gear Loading on Pavement
Figure 7.3

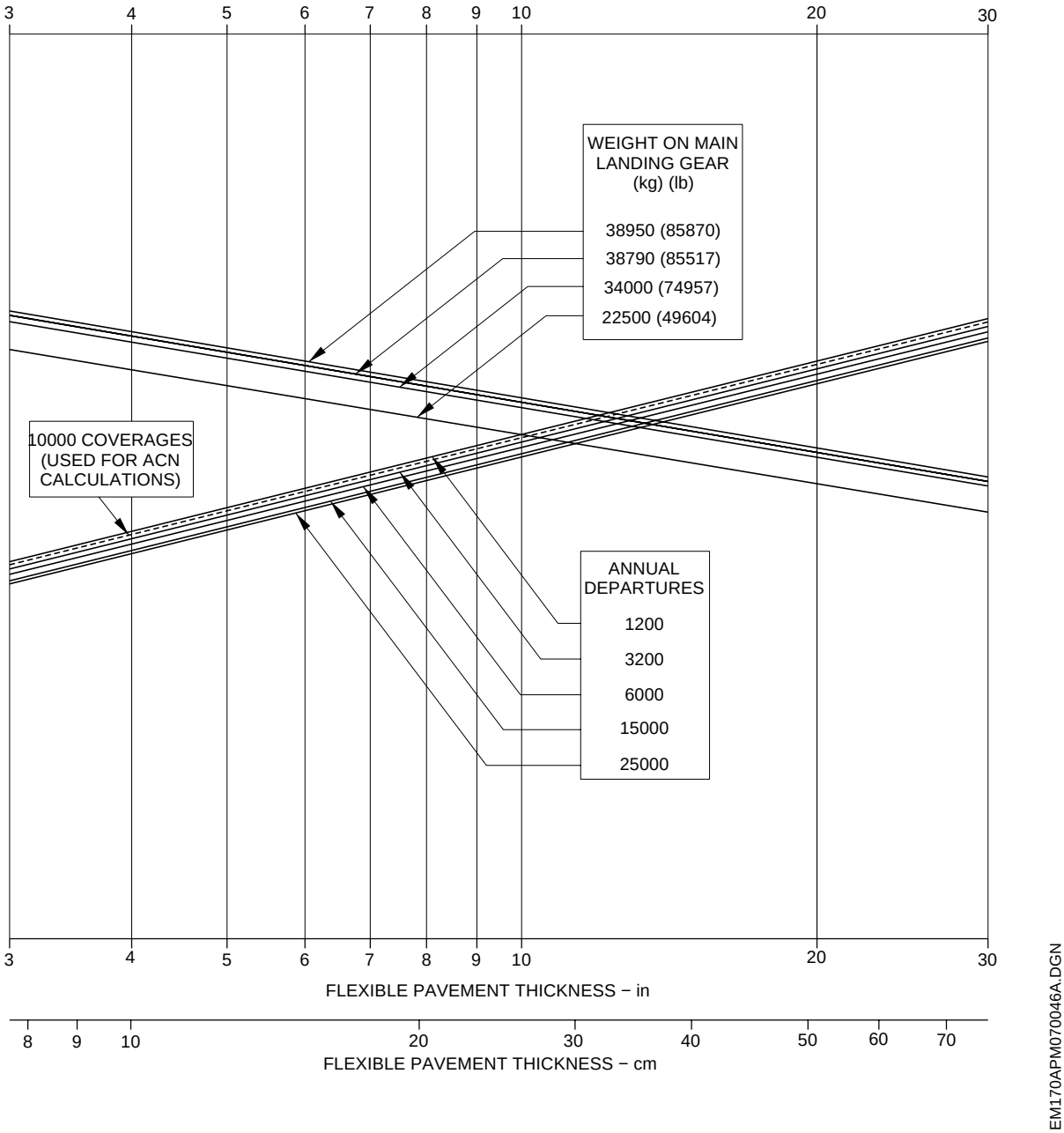
7.5. FLEXIBLE PAVEMENT REQUIREMENTS, U.S. CORPS OF ENGINEERS DESIGN METHOD

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.

SUBGRADE STRENGHT − CBR MODEL



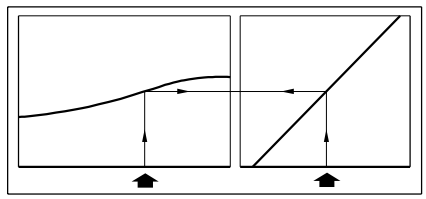
NOTES:
- TIRE SIZE: H38 x 13−18 18 PR
- TIRE PRESSURE: 9.56 kgf/cm² (136 psi)



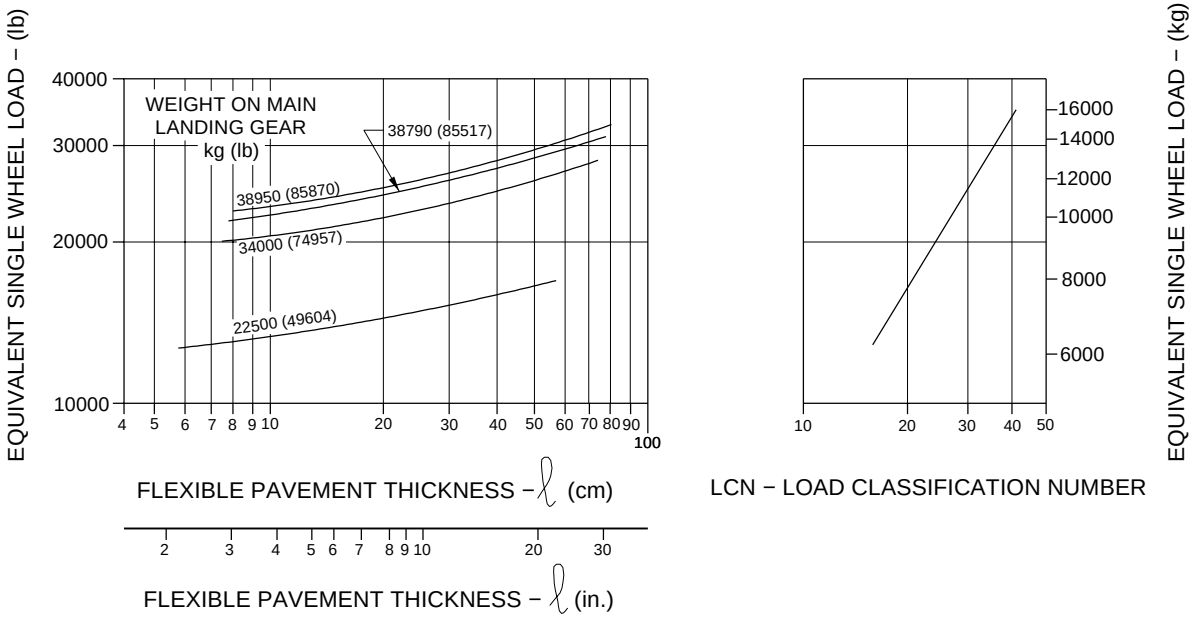
Flexible Pavement Requirements - US Army Corps of Engineers Design Method
Figure 7.4

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.



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



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

EM170APM070048A.DGN

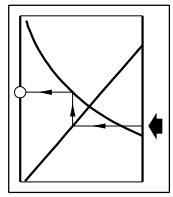
Flexible Pavement Requirements - LCN Method
Figure 7.5

7.7. RIGID PAVEMENT REQUIREMENTS, PORTLAND CEMENT ASSOCIATION DESIGN METHOD

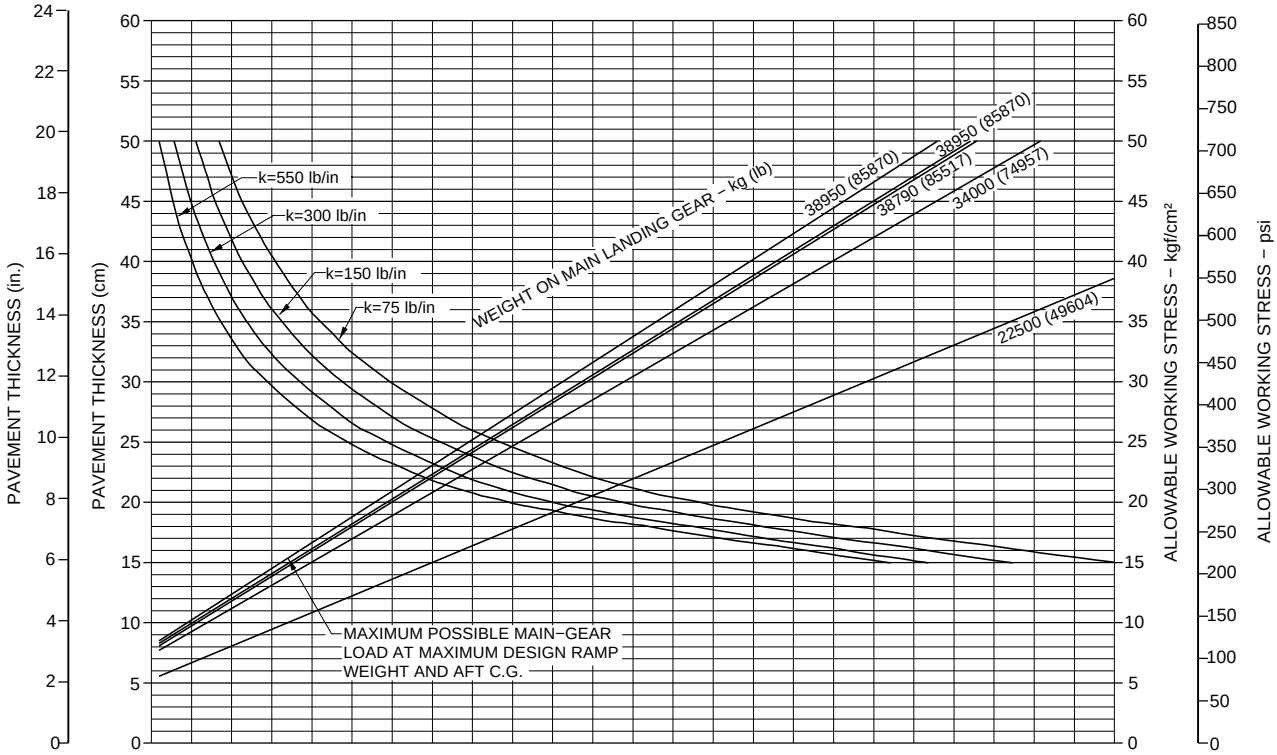
This method has a chart that has been prepared with the use of the Westergaard Equation in general accordance with the procedures outlined in the 1955 edition of “Design of Concrete Airport Pavement” published by the Portland Cement Association, 33 W. Grand Ave., Chicago 10, Illinois, but modified to 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.

RIGID PAVEMENT REQUIREMENTS



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



EM170APM070050A.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".

Rigid Pavement Requirements - Portland Cement Association Design Method
Figure 7.6

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.

RADIUS OF RELATIVE STIFFNESS (ℓ)
VALUES IN INCHES

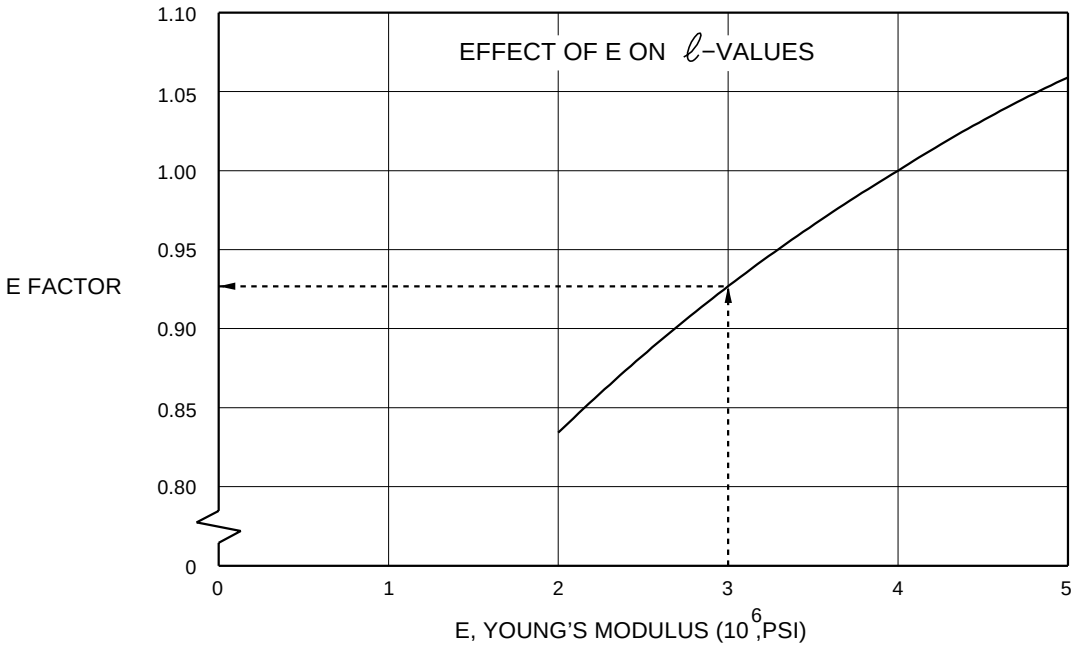
$$\ell = \sqrt[4]{\frac{Ed^3}{12(1-\mu^2)k}} = 24.1652 \sqrt[4]{\frac{d^3}{k}}$$

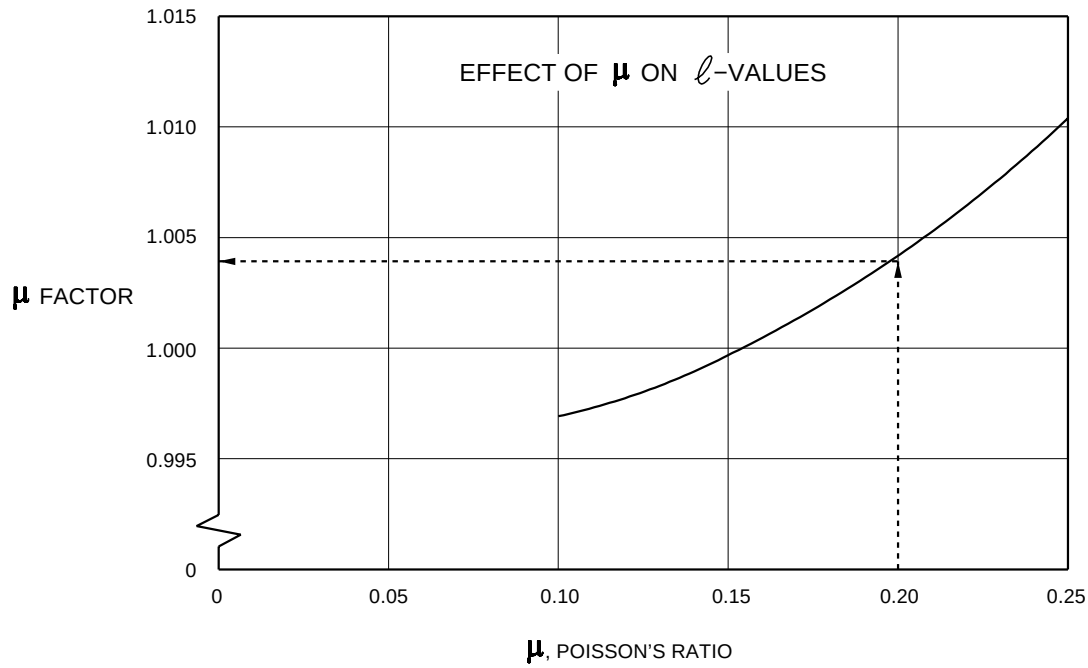
WHERE: E = YOUNG'S MODULUS = 4×10^6 psi
k = SUBGRADE MODULUS, lb/in^3
d = RIGID−PAVEMENT THICKNESS. in.
μ = POISSON'S RATIO = 0.15

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

EM170APM070007.DGN

Radius of Relative Stiffness
Figure 7.7

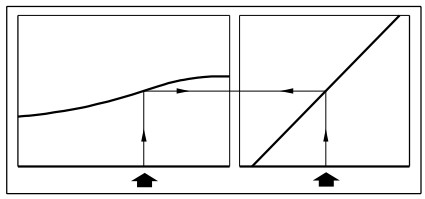




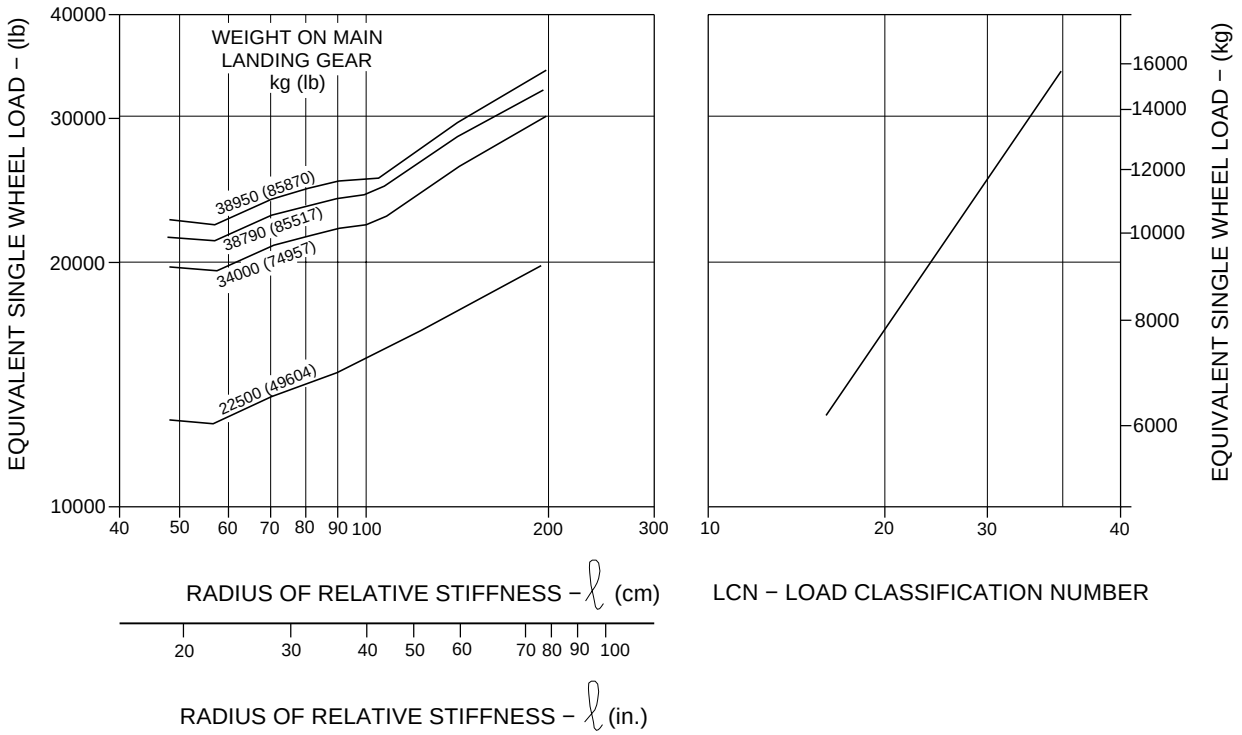
NOTE: BOTH CURVES ON THIS PAGE ARE USED TO ADJUST THE ℓ–VALUES.

EM170APM070008.DGN

Radius of Relative Stiffness (other values)
Figure 7.8



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



NOTES:

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

EM170APM070052A.DGN

Rigid Pavement Requirements - LCN Method
Figure 7.9

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 1.5 Mpa (217 psi)	U – Using aircraft
	C – Low	Y – to 1.0 Mpa (145 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/m^3 (550 lb/in^3).

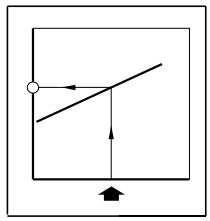
B. Medium Strength - k = 80 MN/m^3 (300 lb/in^3).

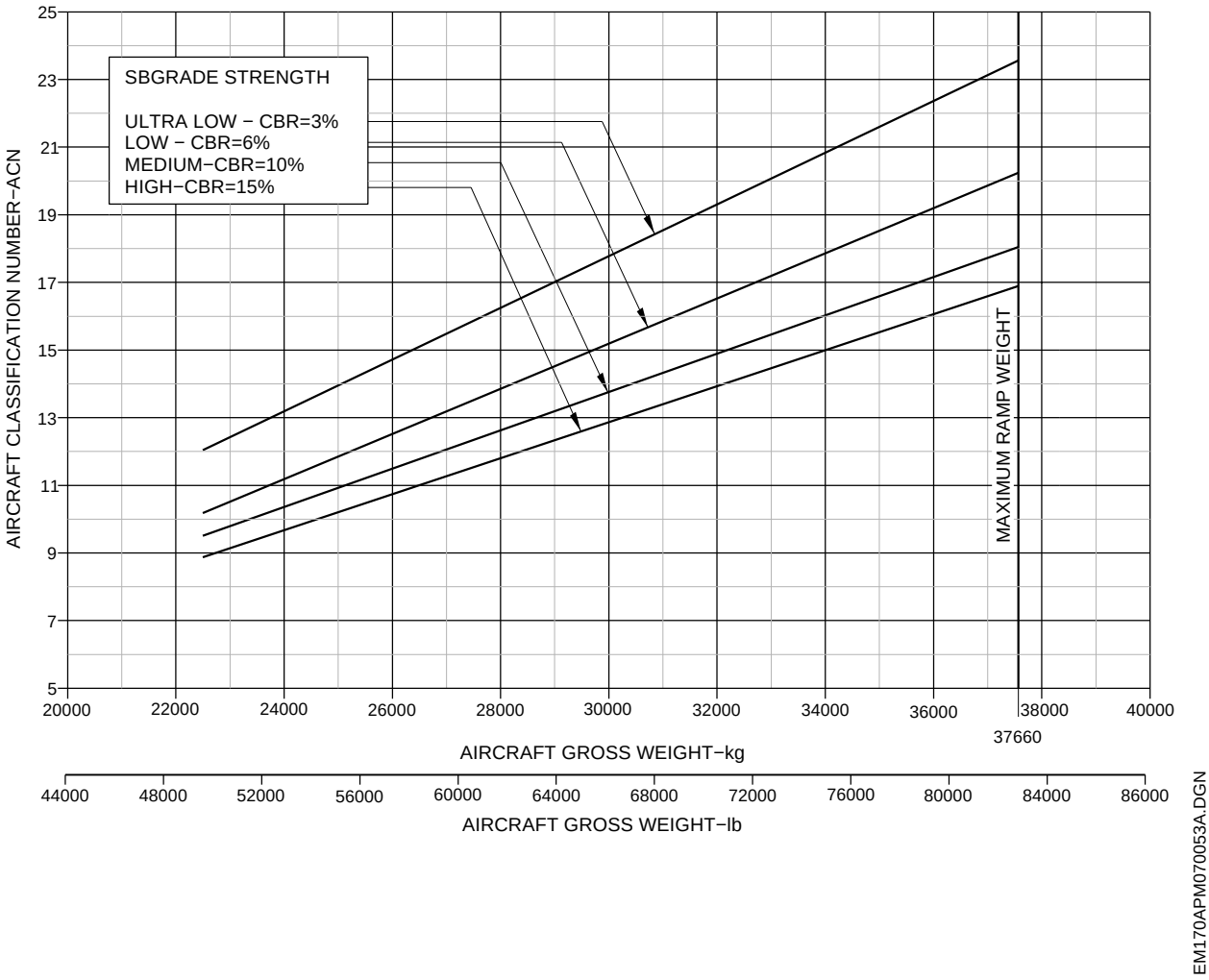
C. Low Strength - k = 40 MN/m^3 (150 lb/in^3).

D. Ultra Low Strength - k = 20 MN/m^3 (75 lb/in^3).

FLEXIBLE PAVEMENT SUBGRADE

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

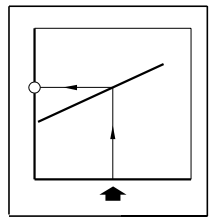


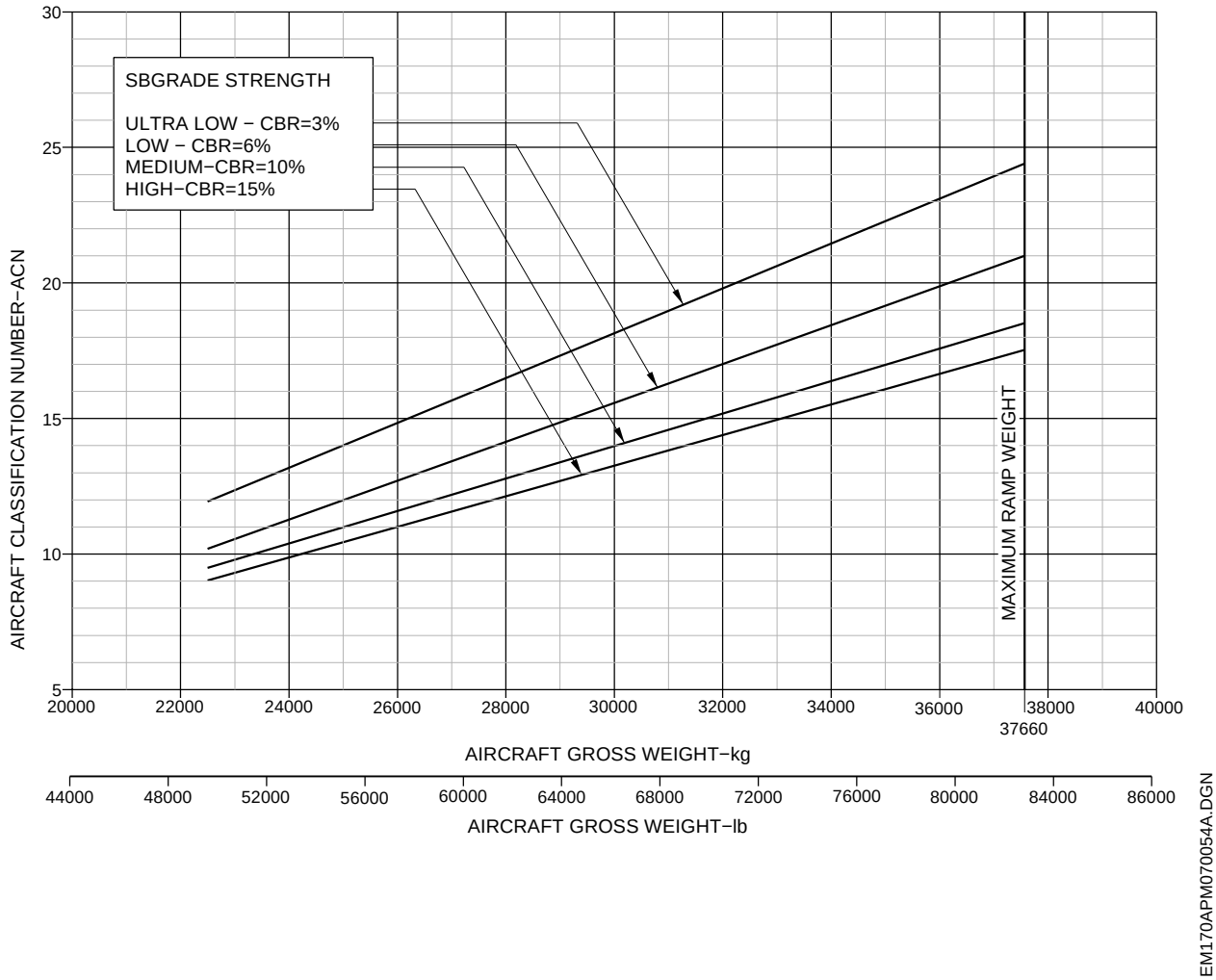


ACN For Flexible Pavement
Figure 7.10

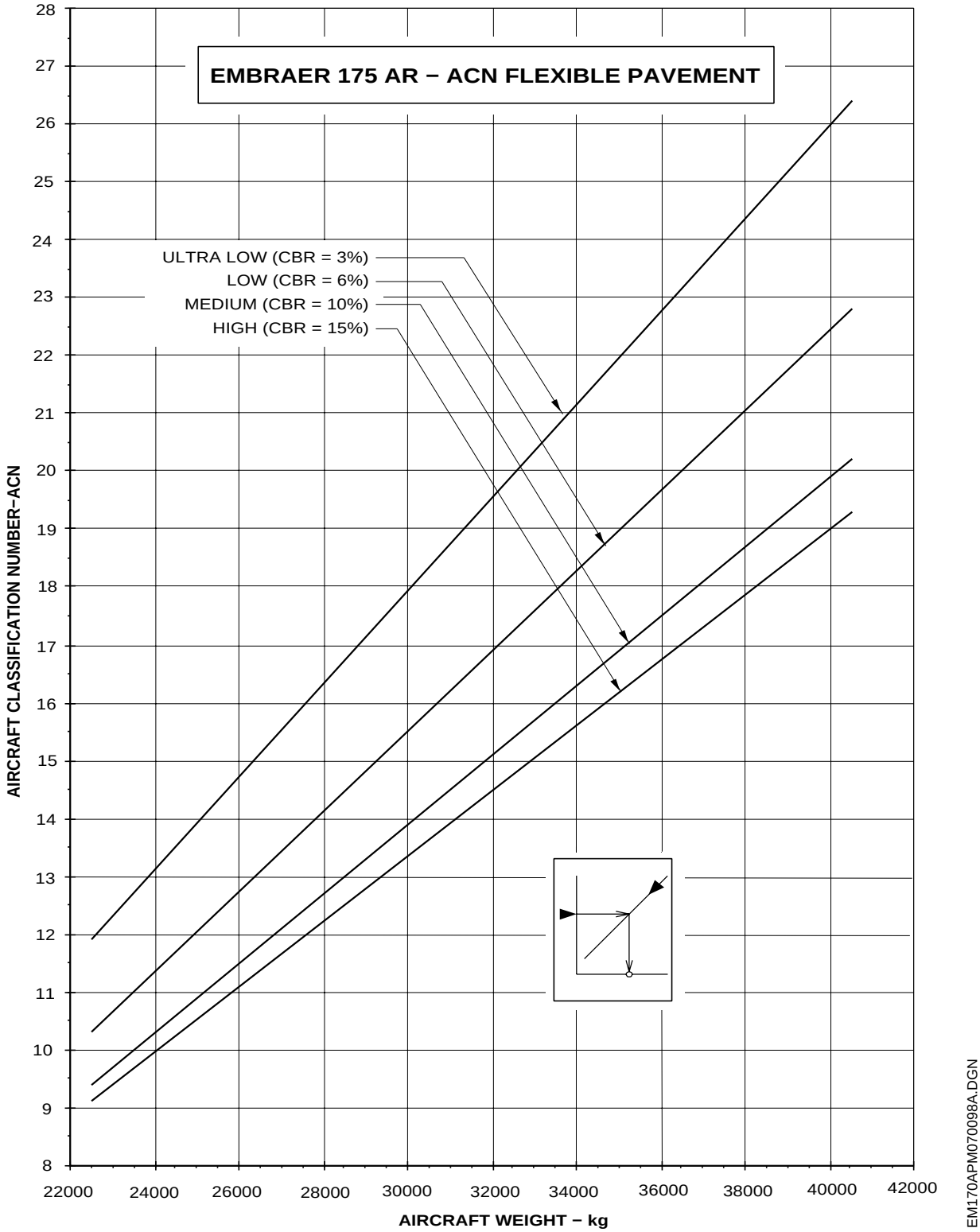
FLEXIBLE PAVEMENT SUBGRADE

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





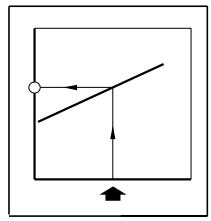
ACN For Flexible Pavement
Figure 7.11

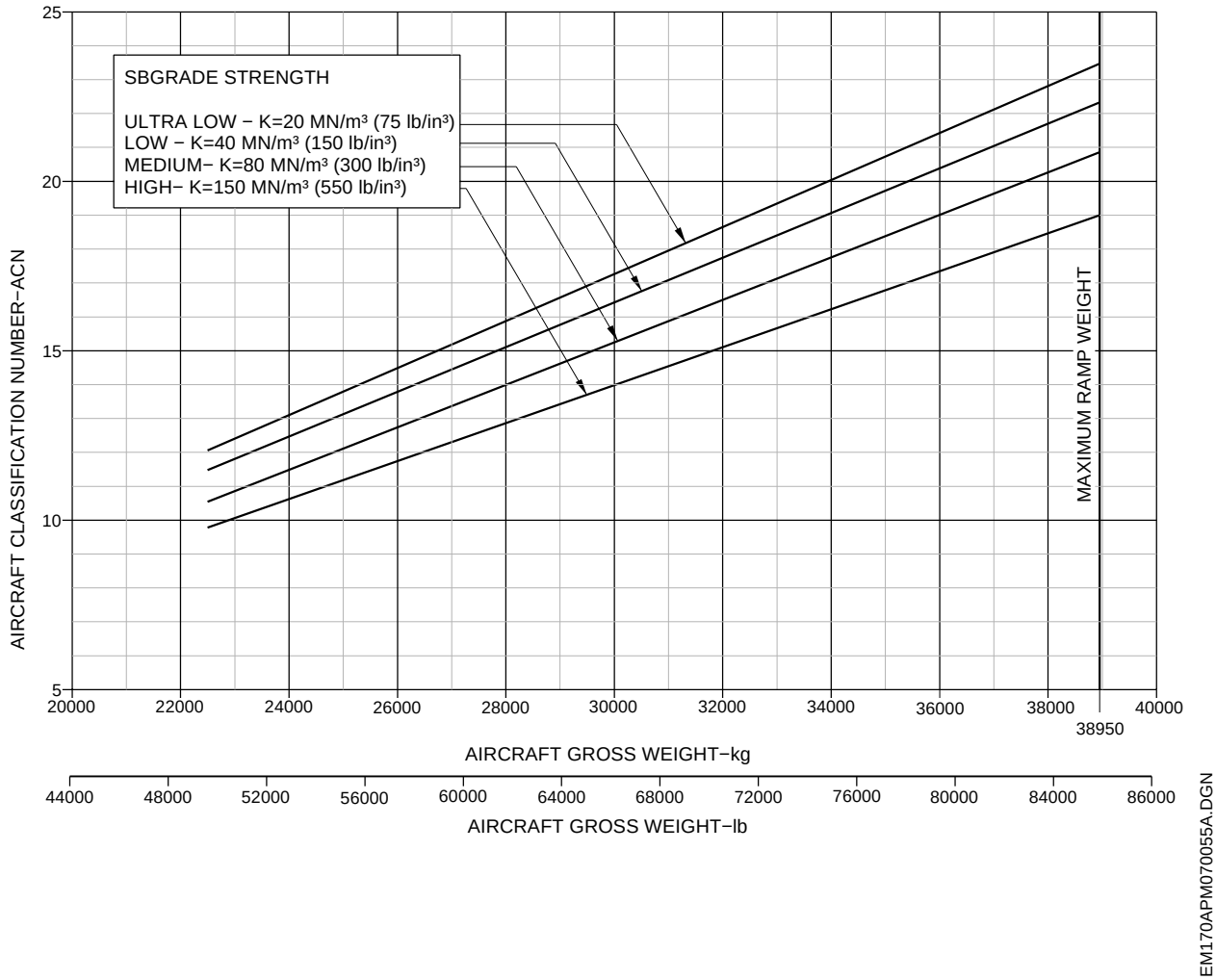


ACN For Flexible Pavement
Figure 7.12

RIGID PAVEMENT SUBGRADE

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

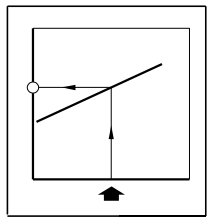


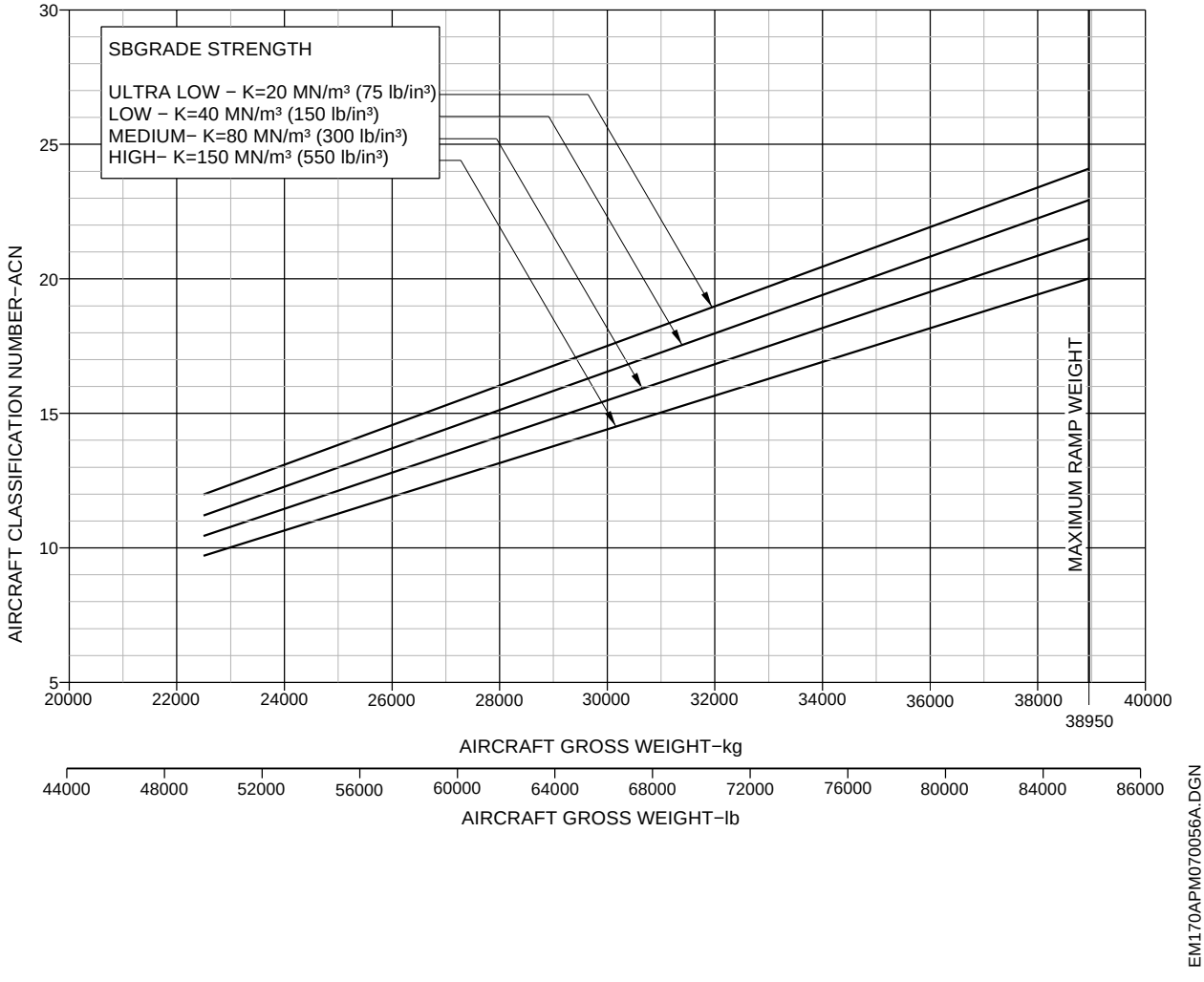


ACN For Rigid Pavement
Figure 7.13

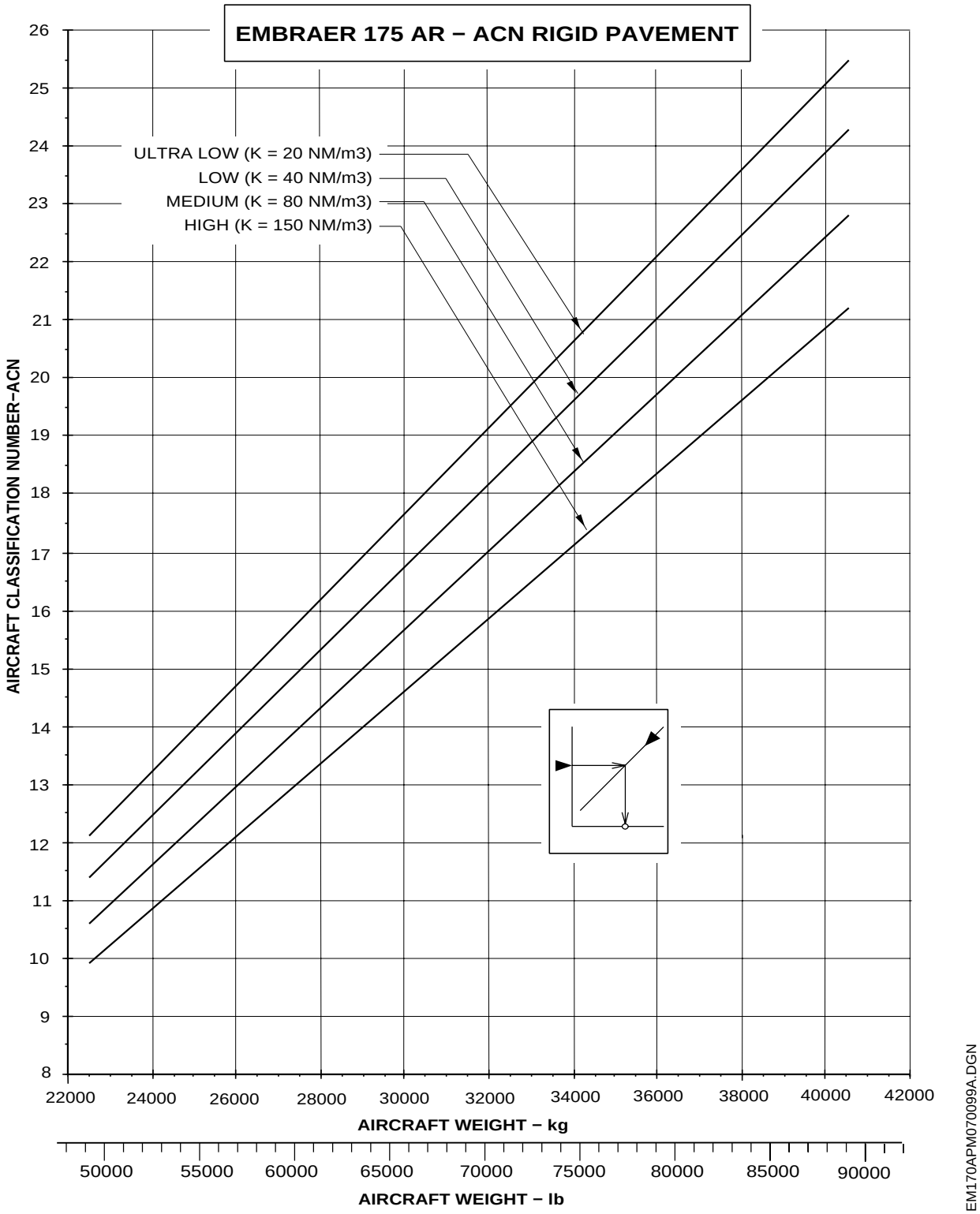
RIGID PAVEMENT SUBGRADE

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





ACN For Rigid Pavement
Figure 7.14



ACN For Rigid Pavement
Figure 7.15

8. POSSIBLE EMBRAER 175 DERIVATIVE AIRCRAFT

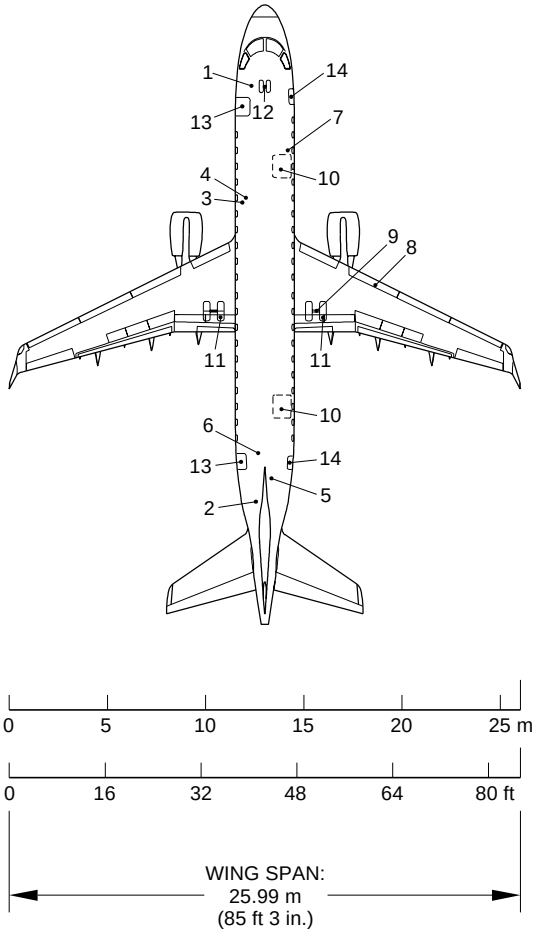
8.1. NOT APPLICABLE

9. SCALED DRAWINGS

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



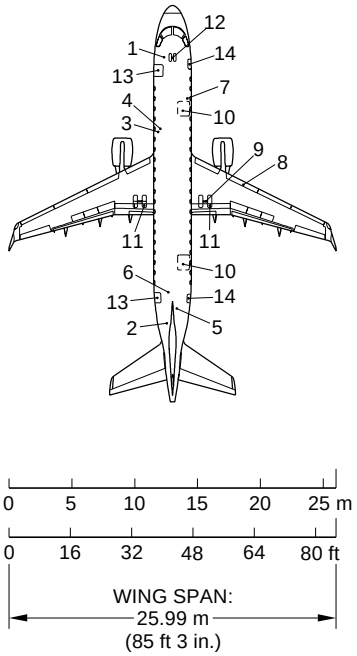
ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	EXTERNAL POWER SUPPLY 115 VAC	8	PRESSURE REFUELING / DEFUELING
2	EXTERNAL POWER SUPPLY 28 VDC	9	GROUNDING POINT (RIGHT MLG)
3	ENGINE AIR STARTING	10	CARGO DOOR
4	AIR CONDITIONING LOW PRESSURE	11	MAIN LANDING GEAR
5	WASTE SERVICING PANEL	12	NOSE LANDING GEAR
6	POTABLE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

EM170APM090016A.DGN

Scale: 1 Inch Equals 32 Feet
Figure 9.1

EFFECTIVITY: ALL

w-apm2259



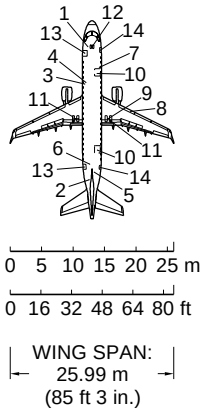
ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	EXTERNAL POWER SUPPLY 115 VAC	8	PRESSURE REFUELING / DEFUELING
2	EXTERNAL POWER SUPPLY 28 VDC	9	GROUNDING POINT (RIGHT MLG)
3	ENGINE AIR STARTING	10	CARGO DOOR
4	AIR CONDITIONING LOW PRESSURE	11	MAIN LANDING GEAR
5	WASTE SERVICING PANEL	12	NOSE LANDING GEAR
6	POTABLE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

EM170APM090017A.DGN

Scale: 1 Inch Equals 50 Feet
Figure 9.2

EFFECTIVITY: ALL

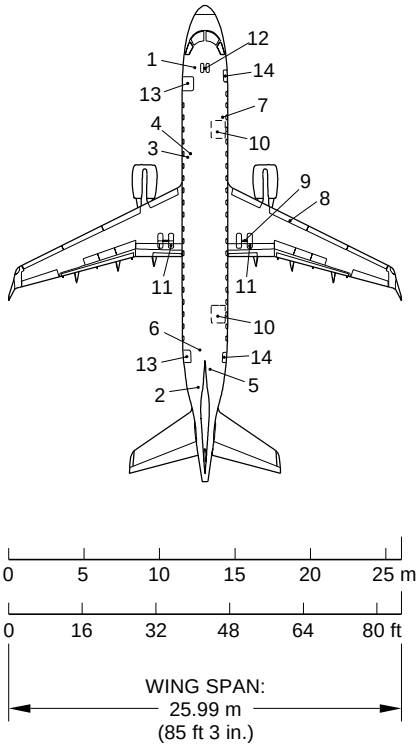
w-apm2259



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

EM170APM090018A.DGN

Scale: 1 Inch Equals 100 Feet
Figure 9.3



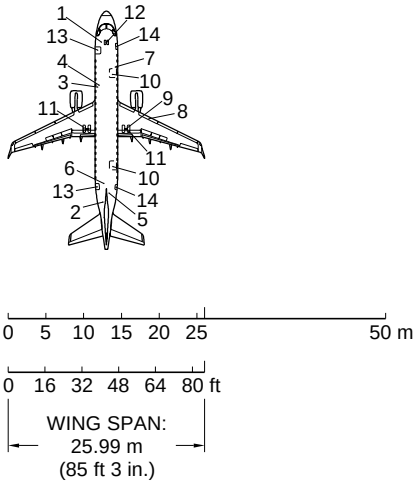
ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	EXTERNAL POWER SUPPLY 115 VAC	8	PRESSURE REFUELING / DEFUELING
2	EXTERNAL POWER SUPPLY 28 VDC	9	GROUNDING POINT (RIGHT MLG)
3	ENGINE AIR STARTING	10	CARGO DOOR
4	AIR CONDITIONING LOW PRESSURE	11	MAIN LANDING GEAR
5	WASTE SERVICING PANEL	12	NOSE LANDING GEAR
6	POTABLE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

EM170APM090019A.DGN

Scale: 1 to 500
Figure 9.4

EFFECTIVITY: ALL

w-apm2259



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

EM170APM090020A.DGN

Scale: 1 to 1000
Figure 9.5