737-700/800/900
(With Winglets)
Airplane Characteristics for
Airport Planning

Boeing Commercial Airplanes

D6-58325-5

737-700/800/900 (WITH WINGLETS) AIRPLANE CHARACTERISTICS
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1.1 Scope

1.2 Introduction

1.3 A Brief Description of the 737 Family of Airplanes

1.0 SCOPE AND INTRODUCTION

1.1 Scope

This document provides, in a standardized format, airplane characteristics data for general airport planning. Since operational practices vary among airlines, specific data should be coordinated with the using airlines prior to facility design. Boeing Commercial Airplanes should be contacted for any additional information required.

Content of the document reflects the results of a coordinated effort by representatives from the following organizations:

- Aerospace Industries Association
- Airports Council International - North America
- Air Transport Association of America
- International Air Transport Association

The airport planner may also want to consider the information presented in the "CTOL Transport Aircraft, Characteristics, Trends, and Growth Projections," available from the US AIA, 1250 Eye St., Washington DC 20005, for long-range planning needs. This document is updated periodically and represents the coordinated efforts of the following organizations regarding future aircraft growth trends:

- International Coordinating Council of Aerospace Industries Associations
- Airports Council International - North America
- Air Transport Association of America
- International Air Transport Association

1.2 Introduction

This document conforms to NAS 3601. It provides characteristics of the Boeing Model 737-700, -800, and -900 airplanes with winglets for airport planners and operators, airlines, architectural and engineering consultant organizations, and other interested industry agencies. Airplane changes and available options may alter model characteristics. The data presented herein reflect typical airplanes in each model category.

For additional information contact:

Boeing Commercial Airplanes
P.O. Box 3707
Seattle, Washington 98124-2207
U.S.A.

Attention: Manager, Airport Technology
Mail Stop 67-KR

1.3 A Brief Description of the 737 Family of Airplanes

The 737 is a twin-engine airplane designed to operate over short to medium ranges from sea level runways of less than 6,000 ft (1,830 m) in length.

Significant features of interest to airport planners are described below:

- Underwing-mounted engines provide eye-level assessability. Nearly all system maintenance may be performed at eye level.
- Optional airstairs allow operation at airports where no passengers loading bridges or stairs are available.
- Auxiliary power unit can supply energy for engine starting, air conditioning, and electrical power while the airplane is on the ground or in flight.
- Servicing connections allow single-station pressure fueling and overwing gravity fueling.
- All servicing of the 737 is accomplished with standard ground equipment.

737-100

The 737-100 is the standard short body version of the 737 family. It is 94 ft (28.63 m) long from nose to the tip of the horizontal stabilizer.

737-200

The 737-200 is an extended body version of the 737 family and is 100 ft 2 in (30.53 m) long. Two sections were added to the 737-100 fuselage; a 36-in section forward of the wing and a 40-in section aft of the wing. All other dimensions are the same as the 737-100.

Advanced 737-200

The advanced 737-200 is a high gross weight airplane that has significant improvements over the 737-200, which result in improved performance, e.g. longer range, greater payload, and shorter runway requirement. The advanced 737-200 has dimensions identical to the 737-200.

737-200C, Adv 737-200C

The convertible version differs from the passenger model in that it has an 86 by 134-in (2.18 by 3.40 m) main deck cargo door, increased floor strength, and additional seat tracks. Either of two cargo handling systems, the cargo (C) or quick change (QC) can be installed to allow conversion from a passenger configuration to a cargo or a mixed passenger/cargo configuration, and vice-versa.

737-200 Executive Airplane

The 737-200 and Adv 737-200 were also delivered with an executive interior. The interior comes in a variety of configurations depending on customer requirements. Some airplanes were delivered without any interior furnishings for customer installation of special interiors.

737-300

The 737-300 is a second-generation stretched version of the 737 family of airplanes and is 109 ft 7 in long. Two sections were added to the 737-200 fuselage; a 44-in section forward of the wing and a 60-in section aft of the wing. Wing and stabilizer spans are also increased. The 737-300 incorporates new aerodynamic and engine technologies in addition to the increased payload and range. The -300 can seat as many as 149 passengers in an all-economy configuration.

737-400

The 737-400 is 120 inches longer that the -300. Two sections were added to the -300 fuselage; a 72-in section forward of the wing and a 48-in section aft of the wing. The -400 can seat as many as 168 passengers in all-economy configuration.

737-500

The 737-500 is the shortened version of the 737-300. The -500 is 101 ft 9 in long and can seat up to 132 passengers in an all-economy configuration.

737-600

The 737-600, along with the 737-700, -800, and -900 is the latest derivative in the 737 family of airplanes. This airplane has the same fuselage as the 737-500 and fitted with new wing, stabilizer, and tail sections. This enables the airplane to fly over longer distances. The 737-600 is 102 ft 6 in long and can carry up to 130 passengers in an all-economy configuration.

737-700

The 737-700 has the same fuselage as the 737-300 and is fitted with the new wing, stabilizer, and tail sections. The 737-700 is 110 ft 4 in long and can carry up to 148 passengers in an all-economy configuration.

737-800

The 737-800 has a slightly longer fuselage than the 737-400 and is fitted with the new wing, stabilizer, and tail sections. The 737-800 is 129 ft 6 in long and can carry up to 184 passengers in an all-economy configuration.

737-900

The 737-900 is a derivative of the -800 and is 96 inches longer that the -800. Two sections were added to the -800 fuselage; a 54-in section forward of the wing and a 42-in section aft of the wing. The -900 can seat as many as 189 passengers in all-economy configuration.

737 BBJ

The Boeing Business Jet is a 737-700 airplane that is delivered without any interior furnishings. The customer installs specific interior configurations. This 737-700 model airplane is equipped with a 737-800 landing gear configuration and has weight and performance capabilities as the -800. One unique feature of the 737 BBJ is the addition of winglets to provide improved cruise performance capabilities.

737 BBJ2

The Boeing Business Jet Two is a 737-800 airplane that is delivered without any interior furnishings. The customer installs specific interior configurations. Like the 737 BBJ, the BBJ2 is equipped with winglets to provide improved cruise performance capabilities.

737-700, -800, -900 With Winglets

The 737-700, -800, and –900 airplanes can also be delivered with winglets. Interior configurations are similar to the base airplane models. Like the BBJ airplanes, the winglets provide improved cruise performance capabilities.

Engines

The 737-100 and -200 airplanes were equipped with JT8D-7 engines. The -9, -5, -17, and -17R engines reflect successive improvements in nose reduction, thrust, and maintenance costs. Other optional engines include the -9A, -15A, -17A, and -17AR.

The 737-300, -400, and -500 airplanes are equipped with new high bypass ratio engines (CFM56-3) that are economical to operate and maintain. These are quiet engines that meet FAR 36 Stage 3 and ICAO Annex 16 Chapter 3 noise standards. With these higher thrust engines and modified flight control surfaces, runway length requirement is reduced.

The 737-600, -700, -800, and -900 airplanes are equipped with advanced derivatives of the 737-300, -400, and -500 engines. These engines (CFM56-7) generate more thrust and exhibit noise characteristics that are below the current noise standards.

737 Gravel Runway Capability

The optional gravel runway capability allows the 737-200 to operate on remote unimproved runways. The gravel kit includes gravel deflectors for the nose and main gears, vortex dissipators for each engine nacelle, and special protective finishes. Low-pressure tires are also required for operation on low strength runways.

The special environment of the gravel runway dictates changes in operating procedures and techniques for maximum safety and economy. Boeing Commercial Airplanes and the FAA have specified procedural changes for operating the 737-200 on gravel runways. Organizations interested in operational details are referred to the using airline or to Boeing.

Passenger Cabin Interiors

Early 737s were equipped with hatrack-type overhead stowage. Later models were equipped with a "wide-body look" interior that incorporates stowage bins in the sidewall and ceiling panels to simulate a superjet interior. More recent configurations include carryall compartments and the advanced technology interior. These interiors provide more stowage above the passenger seats.

Integral Airstairs

Optional airstairs allow passenger loading and unloading at airports where there are no loading bridges or stairs. The forward airstairs are mounted under the cabin floor just below the forward entry door. The aft airstairs are mounted on a special aft entry door and are deployed when the door is opened. The aft airstairs option is available only on the 737-100 and 737-200 airplanes.

Auxiliary Fuel Tanks

Optional auxiliary fuel tanks installed in the lower cargo compartments, provide extra range capability. Although this option increases range, it decreases payload.

Document Page Applicability

Several configurations have been developed for the 737 family of airplanes to meet varied airline requirements. Configurations shown in this document are typical and individual airlines may have different combinations of options. The airline should be consulted for specific airplane configuration.

Document Applicability

Information on the 737-100, -200, 200C, Adv 737-200, and Adv 737-200C is contained in Document D6-58325, Revision D, 737 Airplane Characteristics for Airport Planning.

Information on the 737-300, -400, and -500 model airplanes is contained in Document D6-58325-2 Revision A, 737-300/400/500 Airplane Characteristics for Airport Planning.

Information on the 737-600, -700, -800, and -900 model airplanes is contained in Document D6-58325-3, 737-600/700/800/900 Airplane Characteristics for Airport Planning.

Information on the Boeing Business Jet airplanes is contained in Document D6-58325-4, 737-BBJ Airplane Characteristics for Airport Planning.

This document describes the characteristics for the 737-700, -800, and -900 airplanes with winglets. Data for the 737-900 with winglets are labeled "Preliminary" because this model is not currently available. These data should be used as reference only.

2.0 AIRPLANE DESCRIPTION

2.1 General Characteristics

2.2 General Dimensions

2.3 Ground Clearances

2.4 Interior Arrangements

2.5 Cabin Cross Sections

2.6 Lower Cargo Compartments

2.7 Door Clearances

2.0 AIRPLANE DESCRIPTION

2.1 General Characteristics

Maximum Design Taxi Weight (MTW). Maximum weight for ground maneuver as limited by aircraft strength and airworthiness requirements. (It includes weight of taxi and run-up fuel.)

Maximum Design Takeoff Weight (MTOW). Maximum weight for takeoff as limited by aircraft strength and airworthiness requirements. (This is the maximum weight at start of the takeoff run.)

Maximum Design Landing Weight (MLW). Maximum weight for landing as limited by aircraft strength and airworthiness requirements.

Maximum Design Zero Fuel Weight (MZFW). Maximum weight allowed before usable fuel and other specified usable agents must be loaded in defined sections of the aircraft as limited by strength and airworthiness requirements.

Operating Empty Weight (OEW). Weight of structure, powerplant, furnishing systems, unusable fuel and other unusable propulsion agents, and other items of equipment that are considered an integral part of a particular airplane configuration. Also included are certain standard items, personnel, equipment, and supplies necessary for full operations, excluding usable fuel and payload.

Maximum Payload. Maximum design zero fuel weight minus operational empty weight.

Maximum Seating Capacity. The maximum number of passengers specifically certificated or anticipated for certification.

Maximum Cargo Volume. The maximum space available for cargo.

Usable Fuel. Fuel available for aircraft propulsion.

CHARACTERISTICS	UNITS	737-700 WITH WINGLETS		
MAX DESIGN TAXI WEIGHT	POUNDS	133,500	153,500	155,000
	KILOGRAMS	60,555	69,627	70,307
MAX DESIGN TAKEOFF WEIGHT	POUNDS	133,000	153,000	154,500
	KILOGRAMS	60,328	69,400	70,080
MAX DESIGN LANDING WEIGHT	POUNDS	128,000	128,000	129,200
	KILOGRAMS	58,060	58,060	58,604
MAX DESIGN ZERO FUEL WEIGHT	POUNDS	120,500	120,500	121,700
	KILOGRAMS	54,658	54,658	55,202
OPERATING EMPTY WEIGHT (1)	POUNDS	83,000	83,000	83,000
	KILOGRAMS	37,648	37,648	37,648
MAX STRUCTURAL PAYLOAD	POUNDS	37,500	37,500	38,700
	KILOGRAMS	17,010	17,010	17,554
SEATING CAPACITY (1)	TWO-CLASS	128	128	128
	ALL-ECONOMY	148	148	148
MAX CARGO - LOWER DECK	CUBIC FEET	1002	1002	1002
	CUBIC METERS	28.4	28.4	28.4
USABLE FUEL	US GALLONS	6875	6875	6875
	LITERS	26,022	26,022	26,022
	POUNDS	46,063	46,063	46,063
	KILOGRAMS	20,894	20,894	20,894

NOTE: (1) OPERATING EMPTY WEIGHT FOR BASELINE MIXED CLASS CONFIGURATION. CONSULT WITH AIRLINE FOR SPECIFIC WEIGHTS AND CONFIGURATIONS.

2.1.1 GENERAL CHARACTERISTICS

MODEL 737-700 WITH WINGLETS

CHARACTERISTICS	UNITS	737-800 WITH WINGLETS		
MAX DESIGN TAXI WEIGHT	POUNDS	156,000	173,000	174,700
	KILOGRAMS	70,760	78,472	79,243
MAX DESIGN TAKEOFF WEIGHT	POUNDS	155,500	172,500	174,200
	KILOGRAMS	70,534	78,245	79,016
MAX DESIGN LANDING WEIGHT	POUNDS	144,000	144,000	146,300
	KILOGRAMS	65,317	65,317	66,361
MAX DESIGN ZERO FUEL WEIGHT	POUNDS	136,000	136,000	138,300
	KILOGRAMS	61,689	61,689	62,732
OPERATING EMPTY WEIGHT (1)	POUNDS	91,300	91,300	91,300
	KILOGRAMS	41,413	41,413	41,413
MAX STRUCTURAL PAYLOAD	POUNDS	44,700	44,700	47,000
	KILOGRAMS	20,276	20,276	21,319
SEATING CAPACITY (1)	TWO-CLASS	160	160	160
	ALL-ECONOMY	184	184	184
MAX CARGO - LOWER DECK	CUBIC FEET	1591	1591	1591
	CUBIC METERS	45.1	45.1	45.1
USABLE FUEL	US GALLONS	6875	6875	6875
	LITERS	26,022	26,022	26,022
	POUNDS	46,063	46,063	46,063
	KILOGRAMS	20,894	20,894	20,894

NOTE: (1) OPERATING EMPTY WEIGHT FOR BASELINE MIXED CLASS CONFIGURATION. CONSULT WITH AIRLINE FOR SPECIFIC WEIGHTS AND CONFIGURATIONS.

2.1.2 GENERAL CHARACTERISTICS

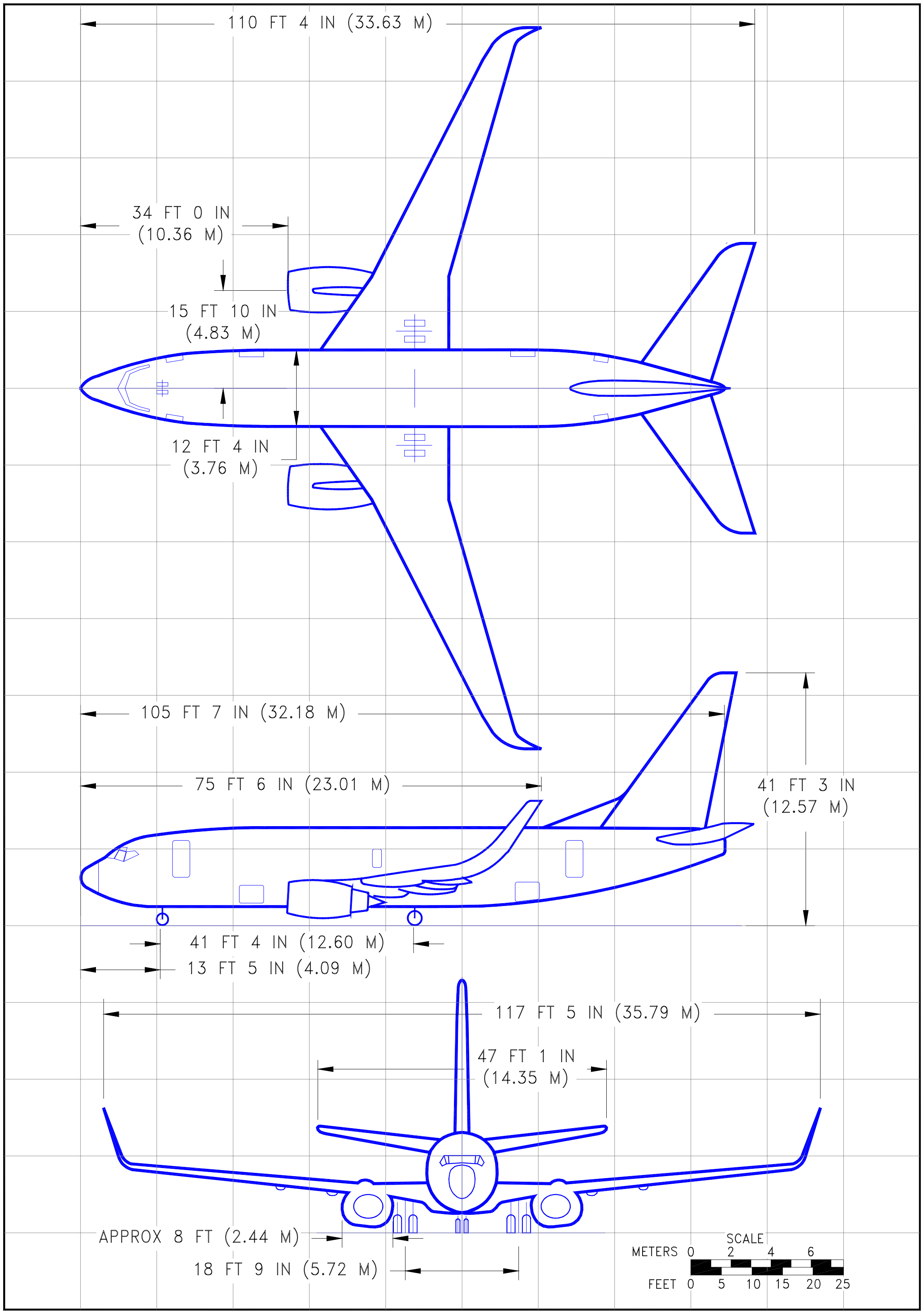
MODEL 737-800 WITH WINGLETS

CHARACTERISTICS	UNITS	737-900 WITH WINGLETS	
MAX DESIGN TAXI WEIGHT	POUNDS	164,500	174,700
	KILOGRAMS	74,616	79,243
MAX DESIGN TAKEOFF WEIGHT	POUNDS	164,000	174,200
	KILOGRAMS	74,389	79,016
MAX DESIGN LANDING WEIGHT	POUNDS	146,300	146,300
	KILOGRAMS	66,361	66,361
MAX DESIGN ZERO FUEL WEIGHT	POUNDS	138,300	140,300
	KILOGRAMS	62,732	63,639
OPERATING EMPTY WEIGHT (1)	POUNDS	94,580	94,580
	KILOGRAMS	42,901	42,901
MAX STRUCTURAL PAYLOAD	POUNDS	43,720	45,720
	KILOGRAMS	19,831	20,738
SEATING CAPACITY (1)	TWO-CLASS	177	177
	ALL-ECONOMY	189	189
MAX CARGO - LOWER DECK	CUBIC FEET	1,835	1,835
	CUBIC METERS	52.0	52.0
USABLE FUEL	US GALLONS	6875	6875
	LITERS	26,022	26,022
	POUNDS	46,063	46,063
	KILOGRAMS	20,894	20,894

NOTE: (1) OPERATING EMPTY WEIGHT FOR BASELINE MIXED CLASS CONFIGURATION. CONSULT WITH AIRLINE FOR SPECIFIC WEIGHTS AND CONFIGURATIONS.

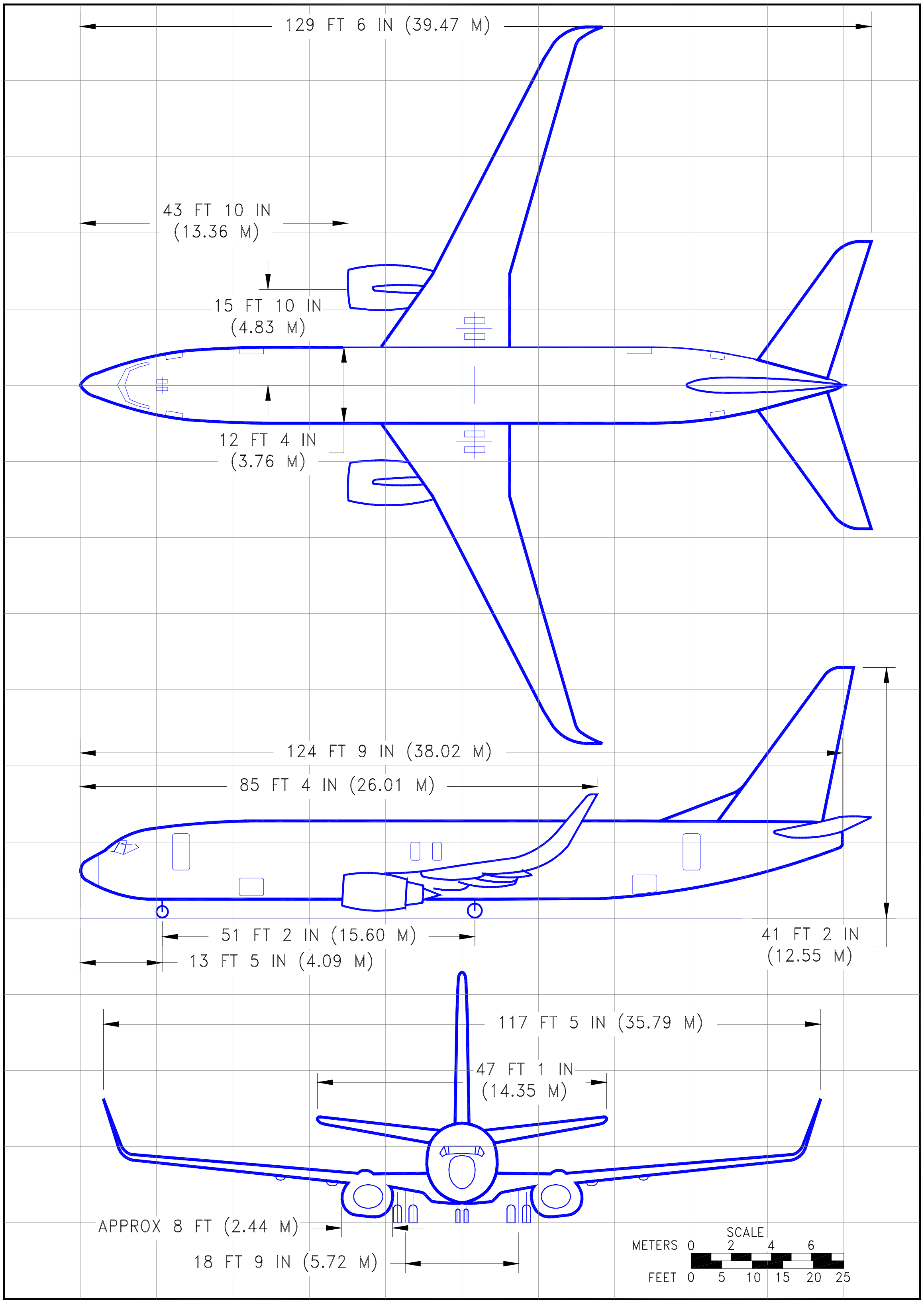
2.1.3 GENERAL CHARACTERISTICS

MODEL 737-900 WITH WINGLETS



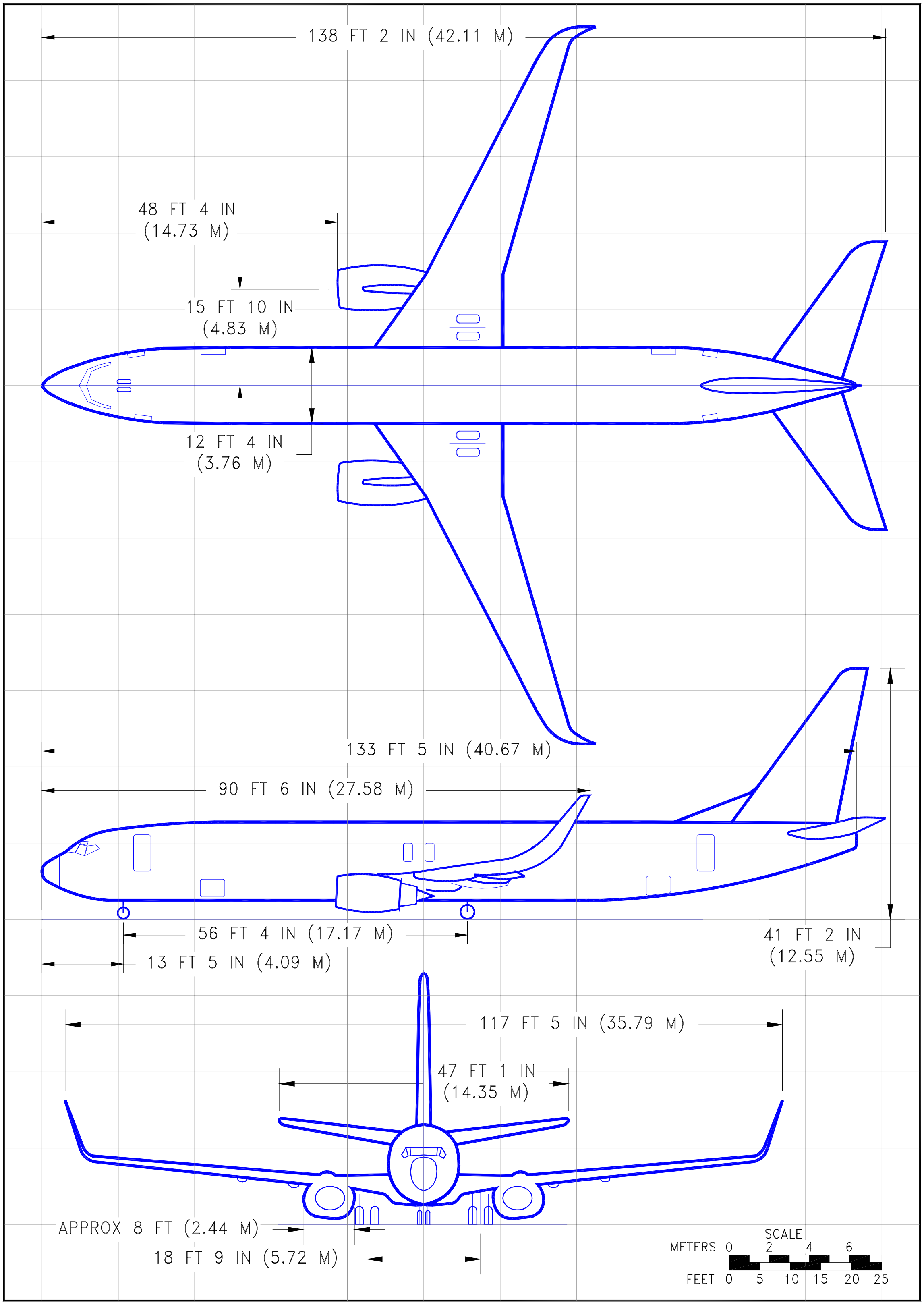
2.2.1 GENERAL DIMENSIONS

MODEL 737-700 WITH WINGLETS



2.2.2 GENERAL DIMENSIONS

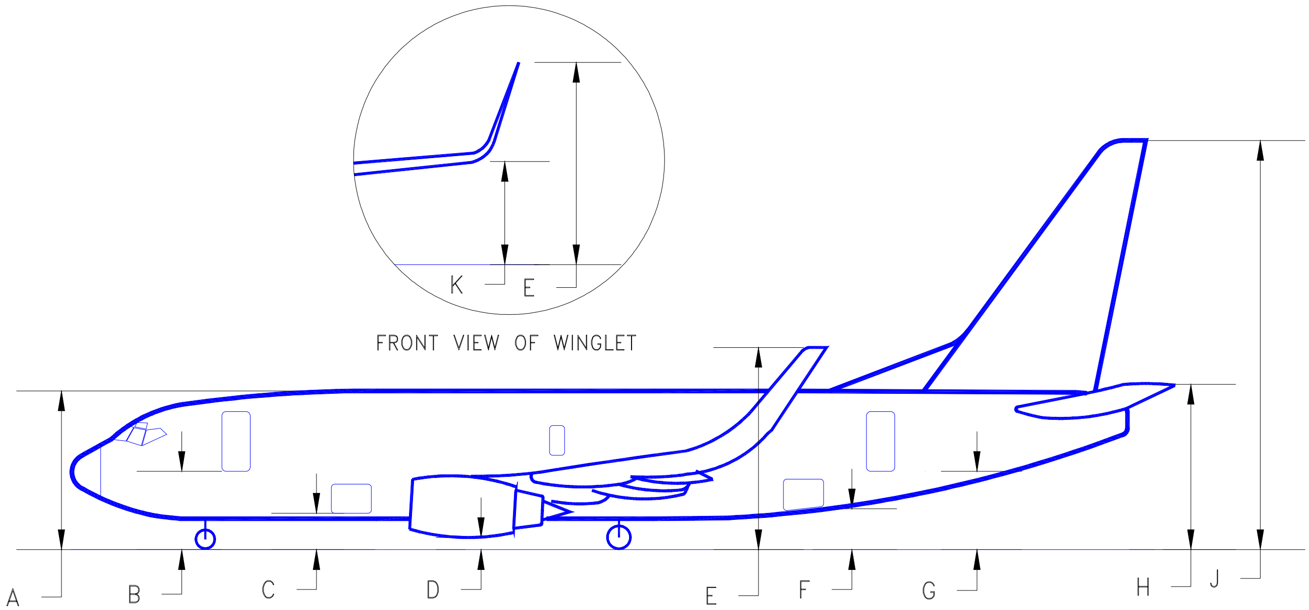
MODEL 737-800 WITH WINGLETS



2.2.3 GENERAL DIMENSIONS

MODEL 737-900 WITH WINGLETS

PRELIMINARY FOR -900 WITH WINGLETS



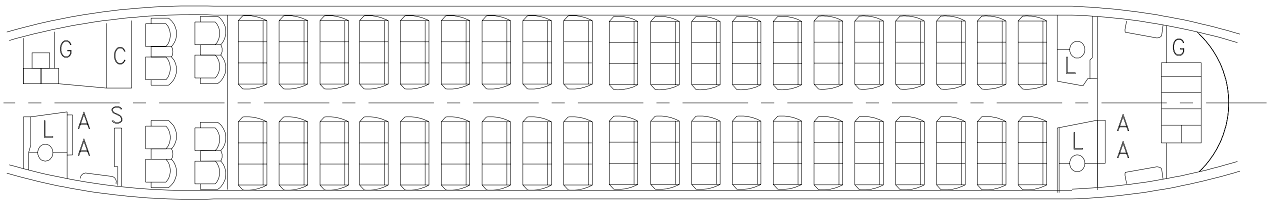
	DESCRIPTION	737-700 WITH WINGLETS				737-800 WITH WINGLETS				737-900 WITH WINGLETS			
		MAX (OEW)		MIN (MTW)		MAX (OEW)		MIN (MTW)		MAX (OEW)		MIN (MTW)	
		FT - IN	M	FT - IN	M	FT - IN	M	FT - IN	M	FT - IN	M	FT - IN	M
A	TOP OF FUSELAGE	18 - 3	5.56	17 - 9	5.41	18 - 1	5.49	17 - 1	5.20	18 - 4	5.59	17 - 10	5.41
B	ENTRY DOOR NO 1	9 - 0	2.74	8 - 6	2.59	9 - 5	2.88	8 - 6	2.59	9 - 0	2.74	8 - 6	2.59
C	FWD CARGO DOOR	4 - 9	1.45	4 - 3	1.30	5 - 0	1.52	4 - 9	1.44	4 - 9	1.45	4 - 3	1.30
D	ENGINE	2 - 0	0.61	1 - 6	0.46	2 - 0	0.60	1 - 6	0.47	2 - 1	0.64	1 - 7	0.48
E	WINGTIP	21 - 9	6.63	21 - 3	6.48	20 - 7	6.27	20 - 3	6.18	20 10	6.35	20 - 0	6.10
F	AFT CARGO DOOR	5 - 10	1.78	5 - 4	1.63	5 - 8	1.73	4 - 9	1.44	5 - 11	1.80	5 - 5	1.65
G	ENTRY DOOR NO 2	10 - 2	3.10	9 - 8	2.95	10 - 10	3.05	8 - 9	2.66	10 - 3	3.12	9 - 9	2.97
H	STABILIZER	18 - 5	5.61	17 - 11	5.46	18 - 5	5.61	16 - 7	5.05	18 - 7	5.66	18 - 1	5.51
J	VERTICAL TAIL	41 - 7	12.67	40 - 10	12.45	41 - 6	12.64	39 - 11	12.16	41 - 5	12.62	40 - 7	12.37
K	BOTTOM OF WINGLET (APPROX)	13 - 9	4.19	13 - 3	4.04	12 - 8	3.86	12 - 3	3.73	12 - 10	3.91	12 - 0	3.66

NOTES: CLEARANCES SHOWN ARE NOMINAL. ADD PLUS OR MINUS 3 INCHES TO ACCOUNT FOR VARIATIONS IN LOADING, OLEO AND TIRE PRESSURES, CENTER OF GRAVITY, ETC.

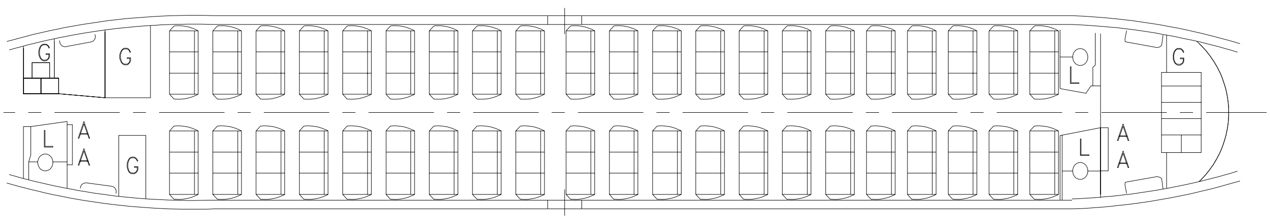
DURING ROUTINE SERVICING, THE AIRPLANE REMAINS RELATIVELY STABLE, PITCH AND ELEVATION CHANGES OCCURRING SLOWLY.

2.3 GROUND CLEARANCES

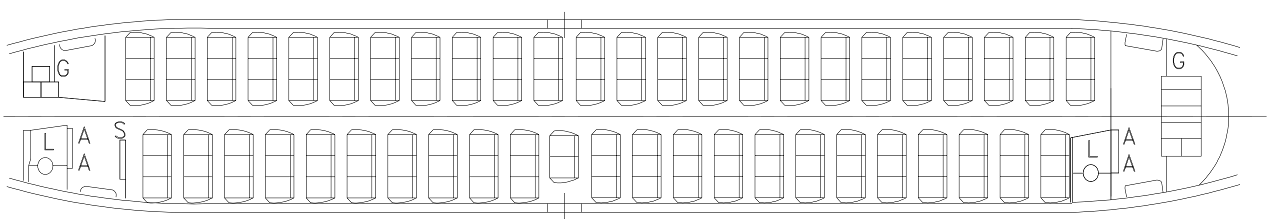
MODEL 737-700, -800, -900 WITH WINGLETS



MIXED CLASS
8 FIRST CLASS SEATS AT 36-IN PITCH
120 ECONOMY CLASS SEATS AT 32-IN PITCH



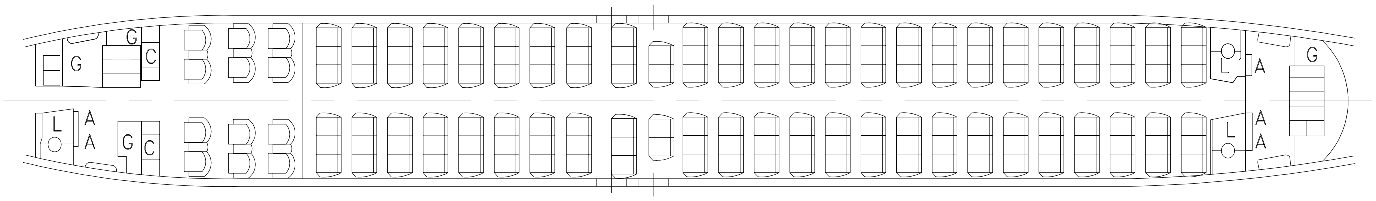
MIXED CLASS
90 BUSINESS CLASS SEATS AT 34-IN PITCH
36 ECONOMY CLASS SEATS AT 32-IN PITCH



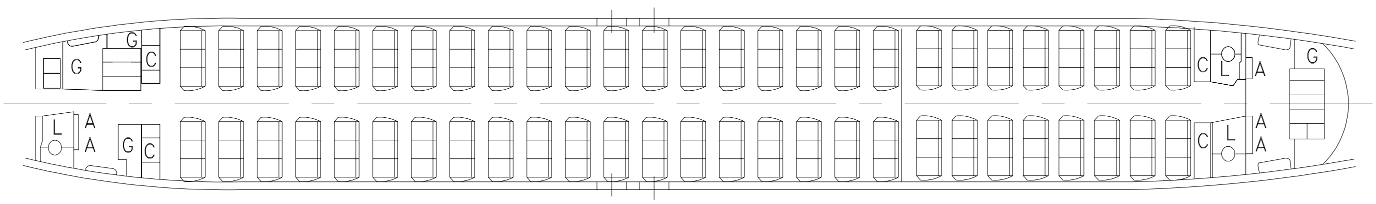
SINGLE CLASS
140 ECONOMY CLASS SEATS AT 32-IN PITCH (SHOWN)
OR 148 ECONOMY CLASS SEATS AT 30-IN PITCH

A ATTENDANT   C CLOSET   G GALLEY   L LAVATORY   S STOWAGE

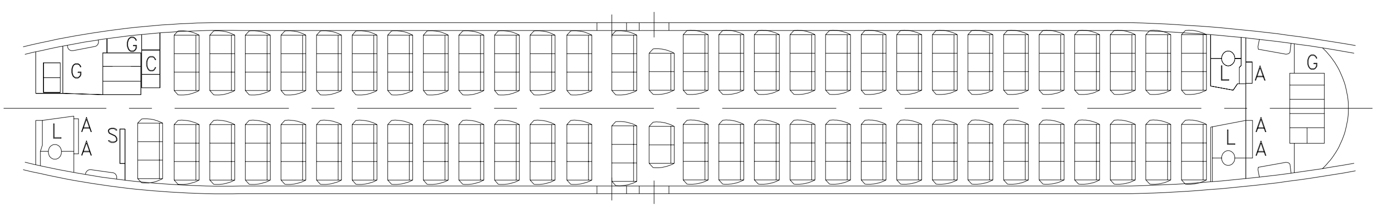
2.4.1 INTERIOR ARRANGEMENTS
MODEL 737-700 (WITH WINGLETS)



MIXED CLASS
12 FIRST CLASS SEATS AT 36-IN PITCH
148 ECONOMY CLASS SEATS AT 32-IN PITCH



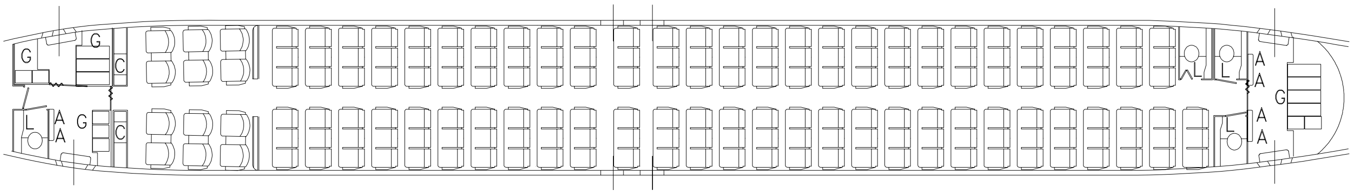
MIXED CLASS
108 BUSINESS CLASS SEATS AT 34-IN PITCH
54 ECONOMY CLASS SEATS AT 32-IN PITCH



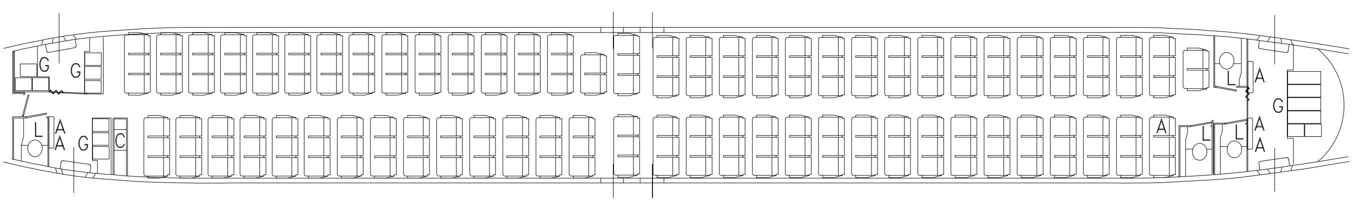
SINGLE CLASS
175 ECONOMY CLASS SEATS AT 32-IN PITCH (SHOWN)
OR 184 ECONOMY CLASS SEATS AT 30-IN PITCH

A ATTENDANT C CLOSET G GALLEY L LAVATORY S STOWAGE

2.4.2 INTERIOR ARRANGEMENTS
MODEL 737-800 (WITH WINGLETS)



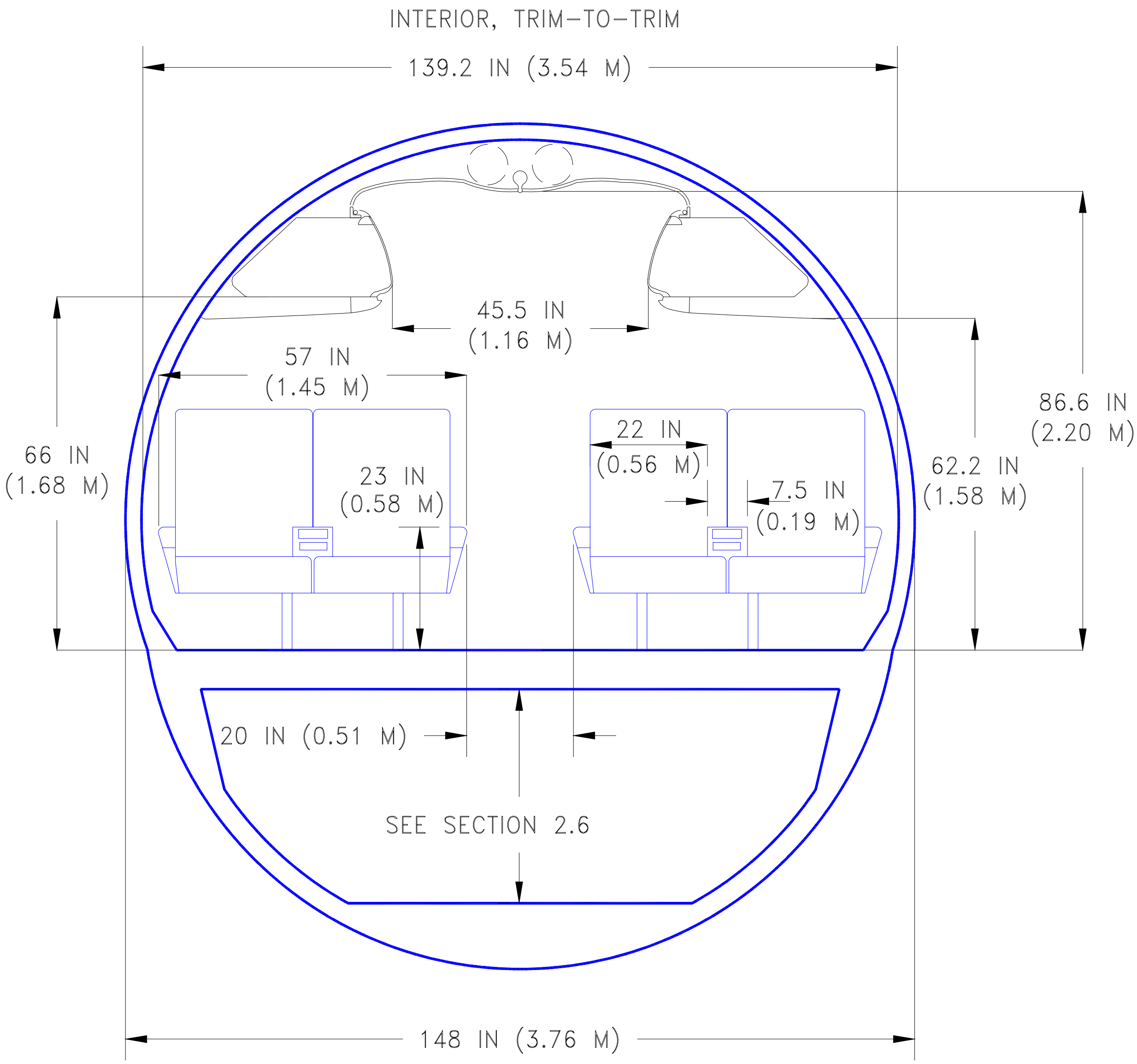
MIXED CLASS
12 FIRST CLASS SEATS AT 36-IN PITCH
165 ECONOMY CLASS SEATS AT 32-IN PITCH



SINGLE CLASS
177 ECONOMY CLASS SEATS AT 32-IN PITCH (SHOWN)
OR 189 ECONOMY CLASS SEATS AT 31-IN PITCH

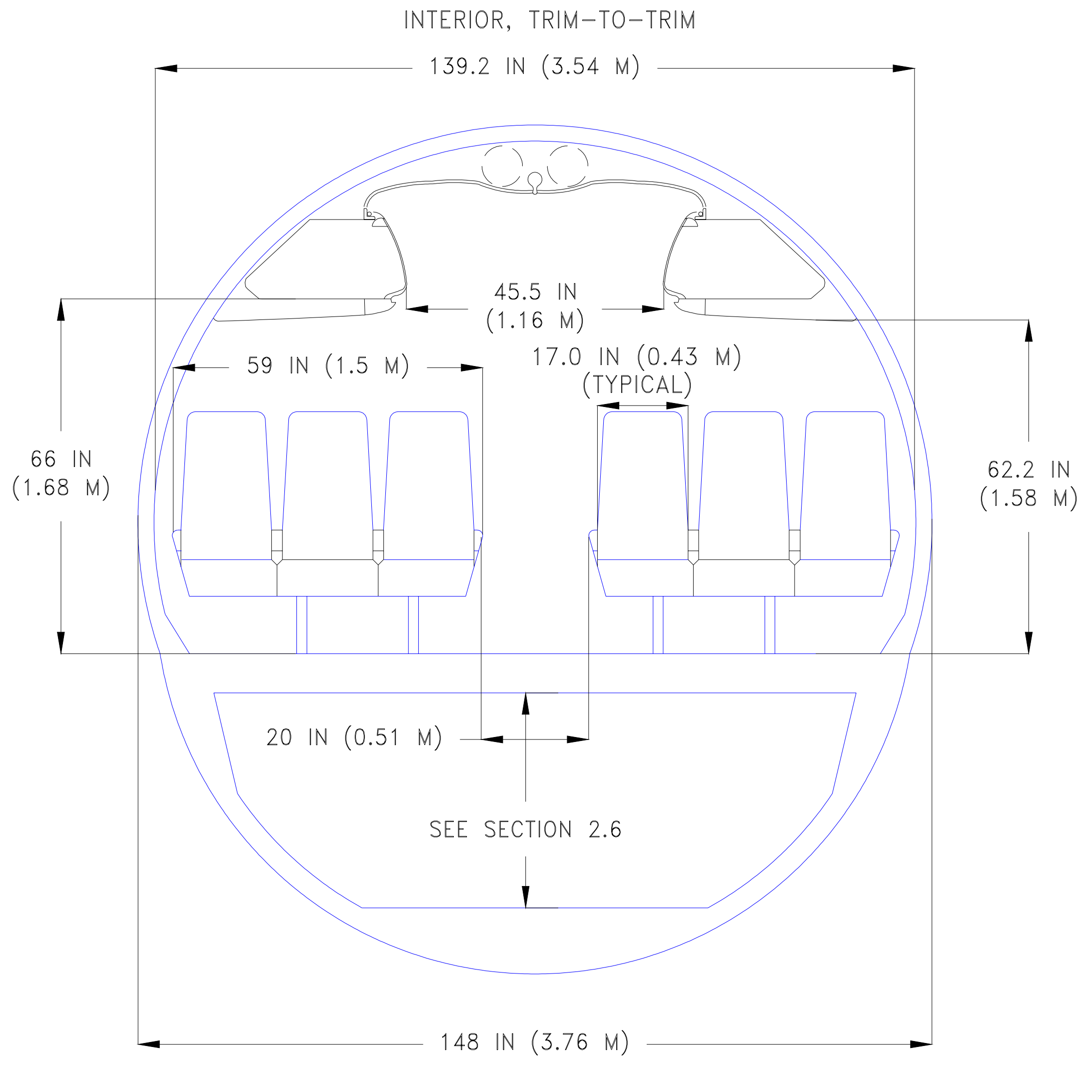
A ATTENDANT C CLOSET G GALLEY L LAVATORY

2.4.3 INTERIOR ARRANGEMENTS
MODEL 737-900 (WITH WINGLETS)



2.5.1 CABIN CROSS-SECTIONS - FOUR-ABREAST SEATING

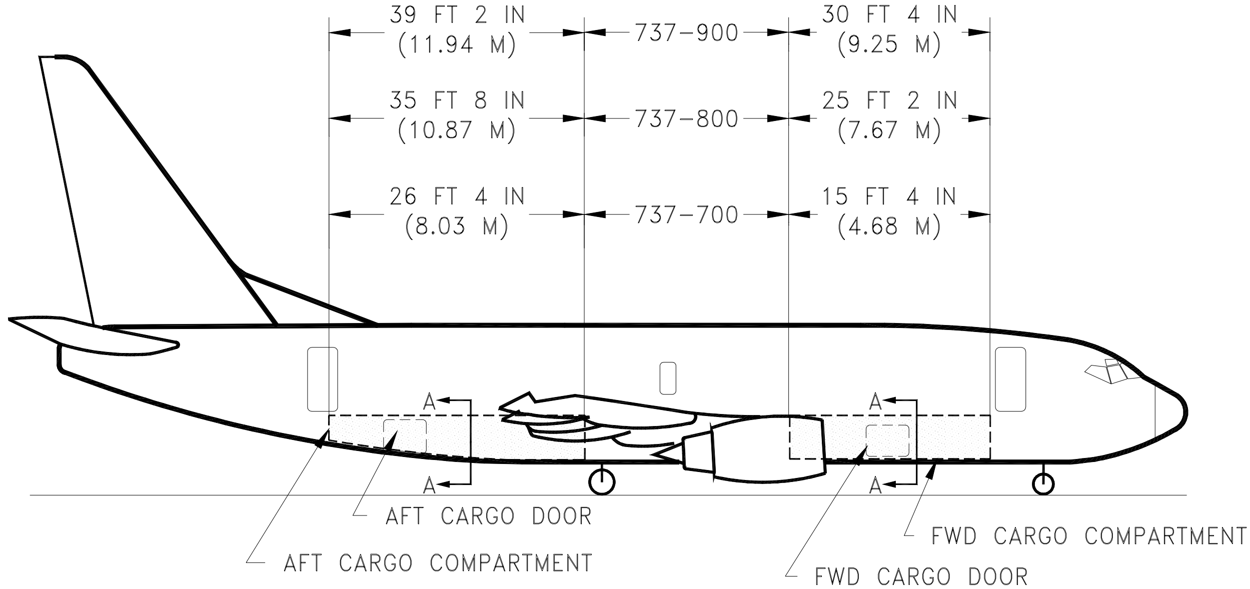
MODEL 737-700, -800, -900 (WITH WINGLETS)



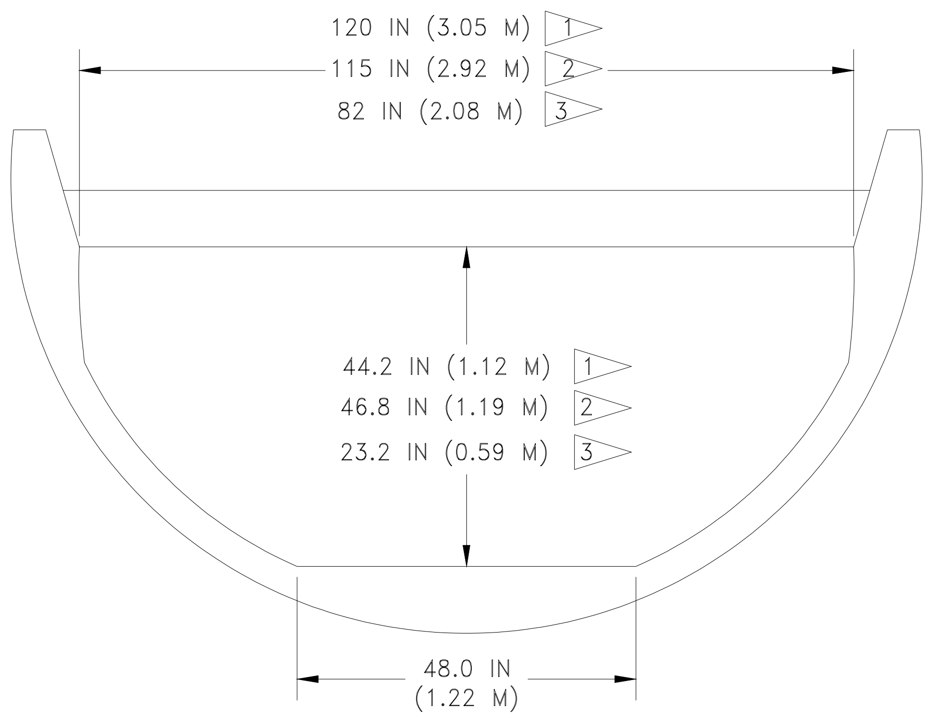
2.5.2 CABIN CROSS-SECTIONS - SIX-ABREAST SEATING

MODEL 737-700, -800, -900 (WITH WINGLETS)

PRELIMINARY FOR –900 WITH WINGLETS



RIGHT SIDE VIEW



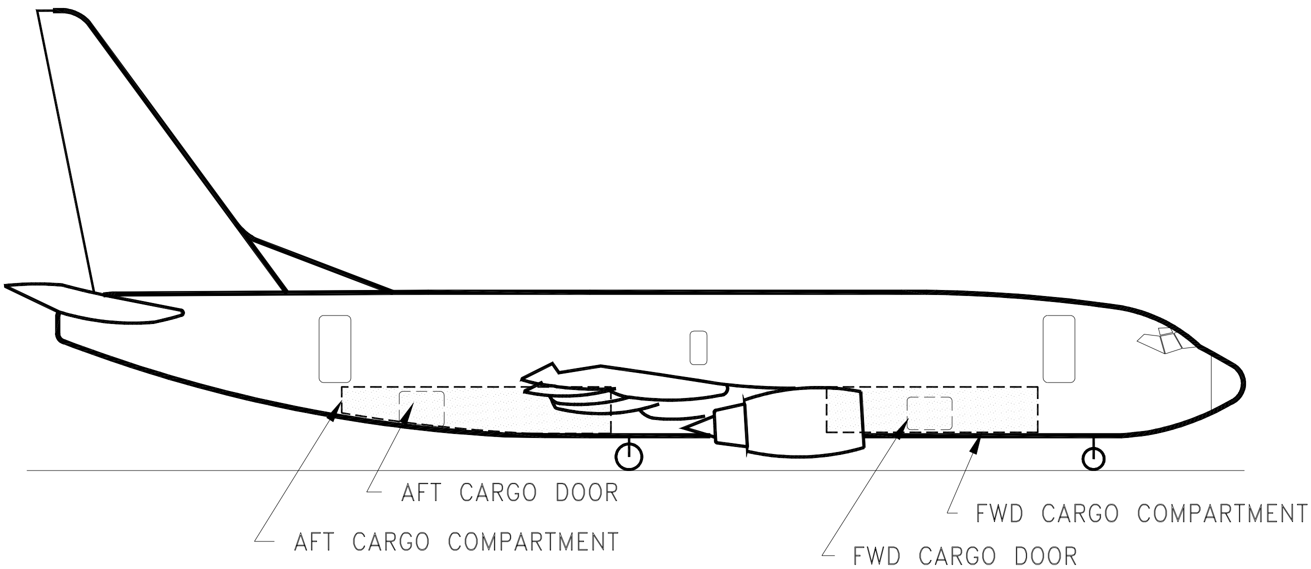
SECTION A–A

1 FWD CARGO COMPARTMENT
2 AFT CARGO COMPARTMENT, FWD BULKHEAD
3 AFT CARGO COMPARTMENT, AFT BULKHEAD

NOTE: ALL AIRPLANE MODELS WITH WINGLETS

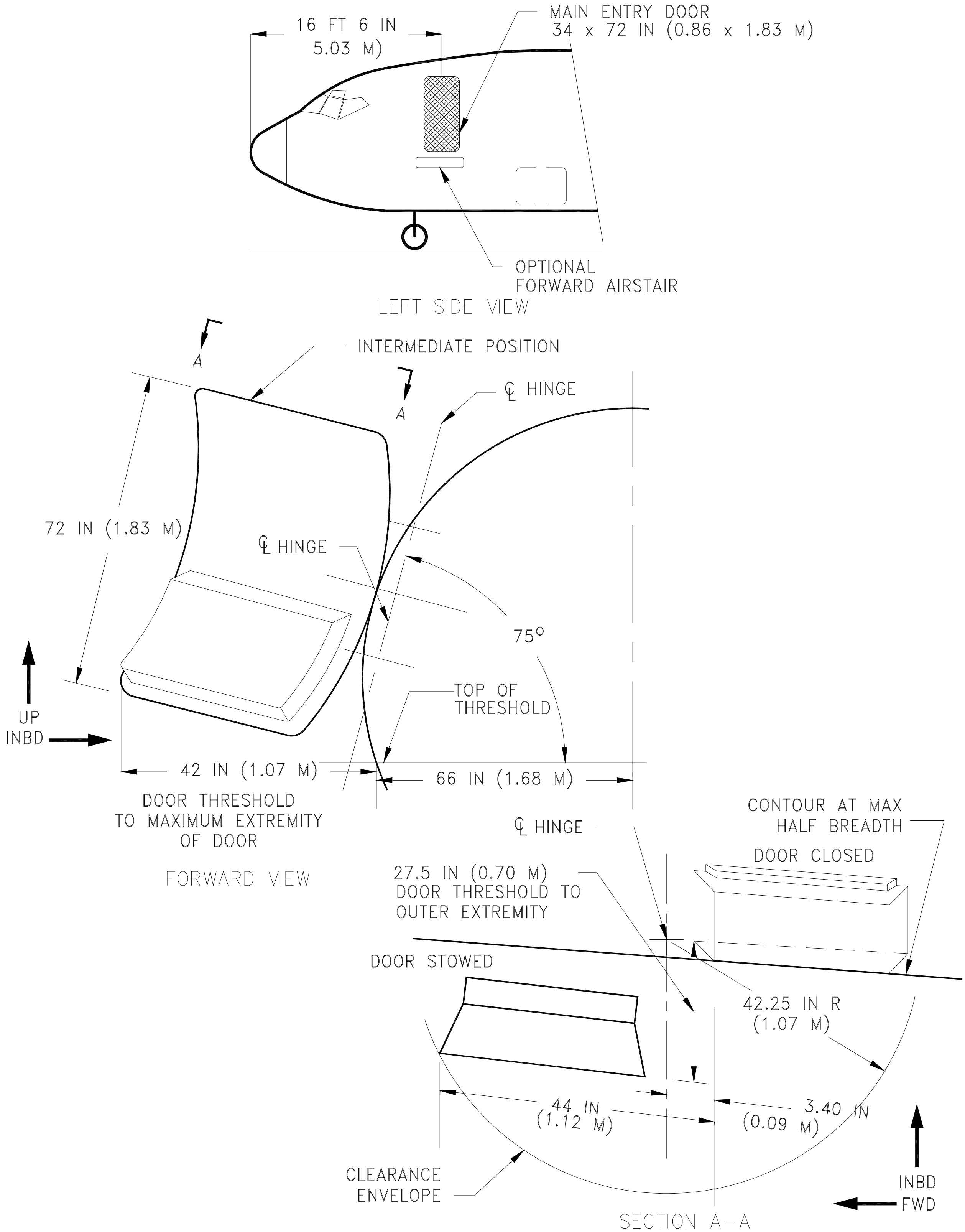
2.6.1 LOWER CARGO COMPARTMENTS - DIMENSIONS
MODEL 737-700, -800, -900 (WITH WINGLETS)

PRELIMINARY FOR –900 WITH WINGLETS

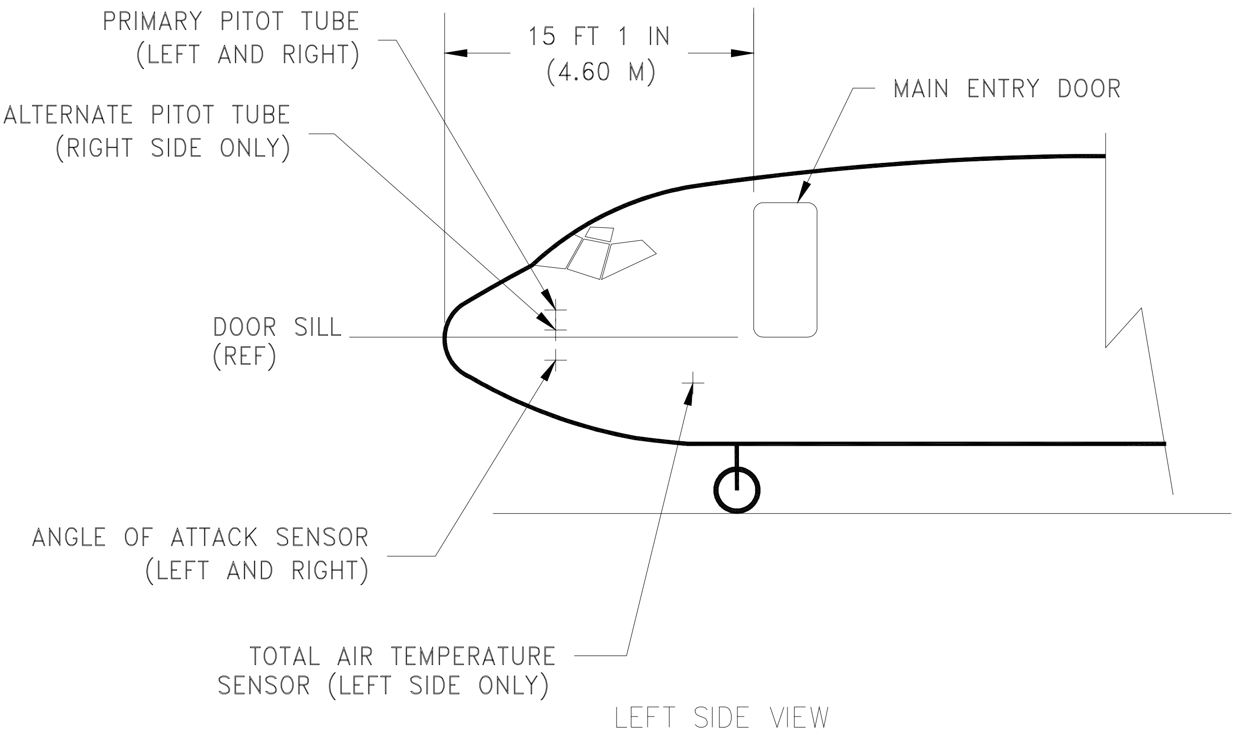


AIRPLANE MODEL	UNIT	FWD CARGO COMPARTMENT	AFT CARGO COMPARTMENT	TOTAL BULK CARGO CAPACITY
737-700	CUBIC FEET	406	596	1,002
	CUBIC METERS	11.5	16.9	28.4
737-800	CUBIC FEET	692	899	1591
	CUBIC METERS	19.6	25.5	45.1
737-900	CUBIC FEET	840	1,012	1,852
	CUBIC METERS	23.8	28.7	52.5

2.6.2 LOWER CARGO COMPARTMENTS - CAPACITIES
MODEL 737-700, -800, -900 (WITH WINGLETS)



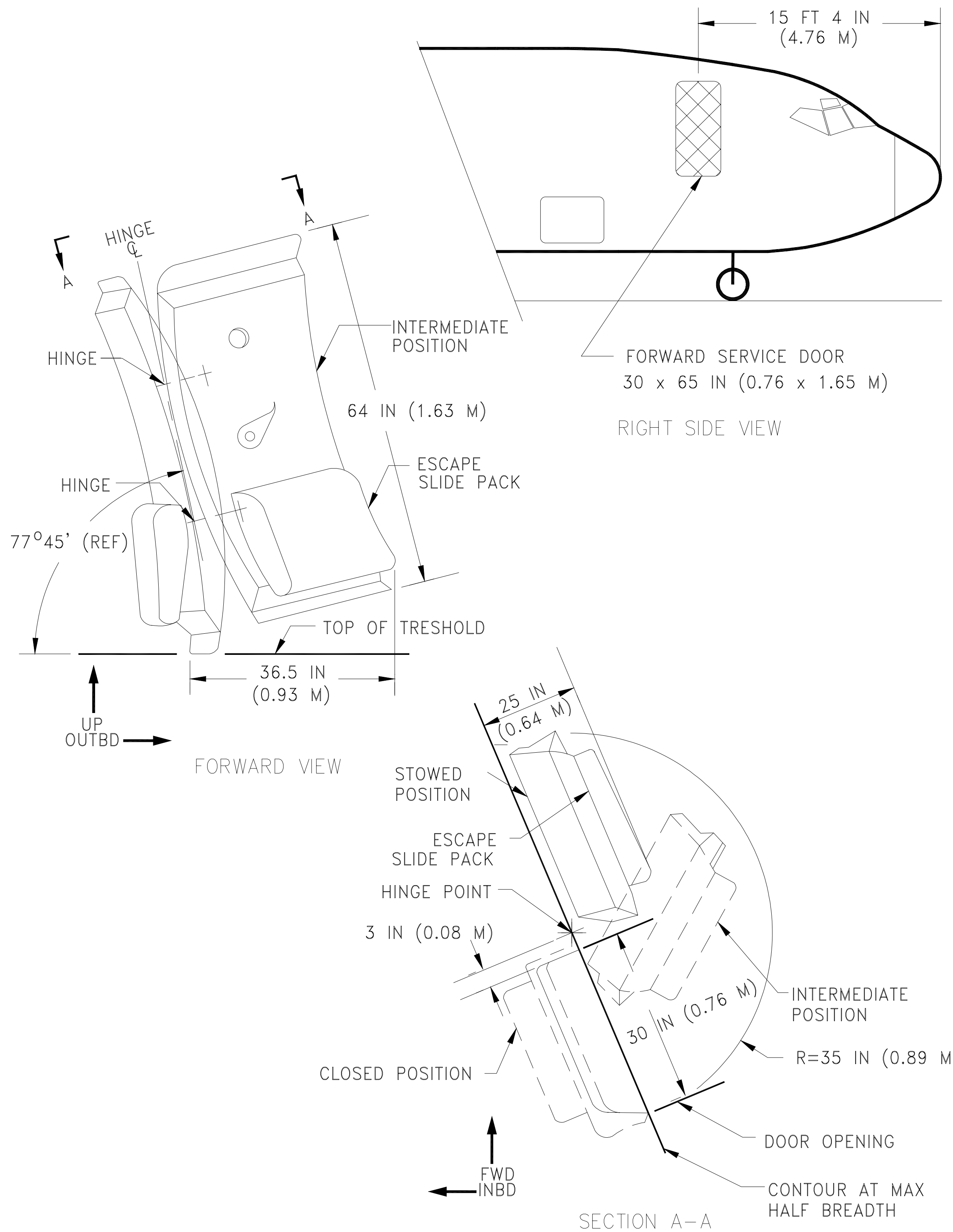
2.7.1 DOOR CLEARANCES - FORWARD MAIN ENTRY DOOR NO. 1
MODEL 737-700, -800, -900 (WITH WINGLETS)



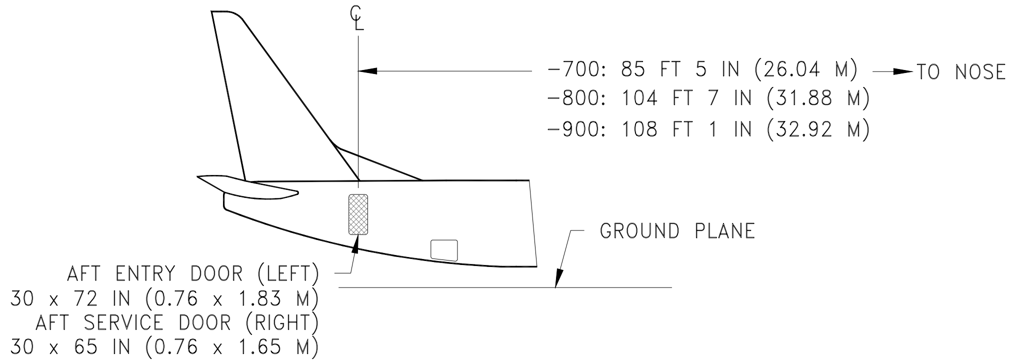
NAME OF SENSOR	DISTANCE AFT OF NOSE	DISTANCE ABOVE (+) OR BELOW (-) DOOR SILL REFERENCE LINE	PROTRUSION FROM AIRPLANE SKIN
PRIMARY PITOT-STATIC (L/R)	5 FT 3 IN (1.60 M)	+1 FT 3 IN (0.38 M)	6 IN (0.15 M)
ALTERNATE PITOT-STATIC (R)	5 FT 3 IN (1.60 M)	+ 3 IN (0.08 M)	6 IN (0.15 M)
ANGLE OF ATTACK (L/R)	5 FT 2 IN (1.57 M)	-5 IN (-0.13 M)	4 IN (0.10 M)
TOTAL AIR TEMPERATURE (L)	11 FT 6 IN (3.51 M)	+ 1 FT 6 IN (0.46 M)	4 IN (0.10 M)

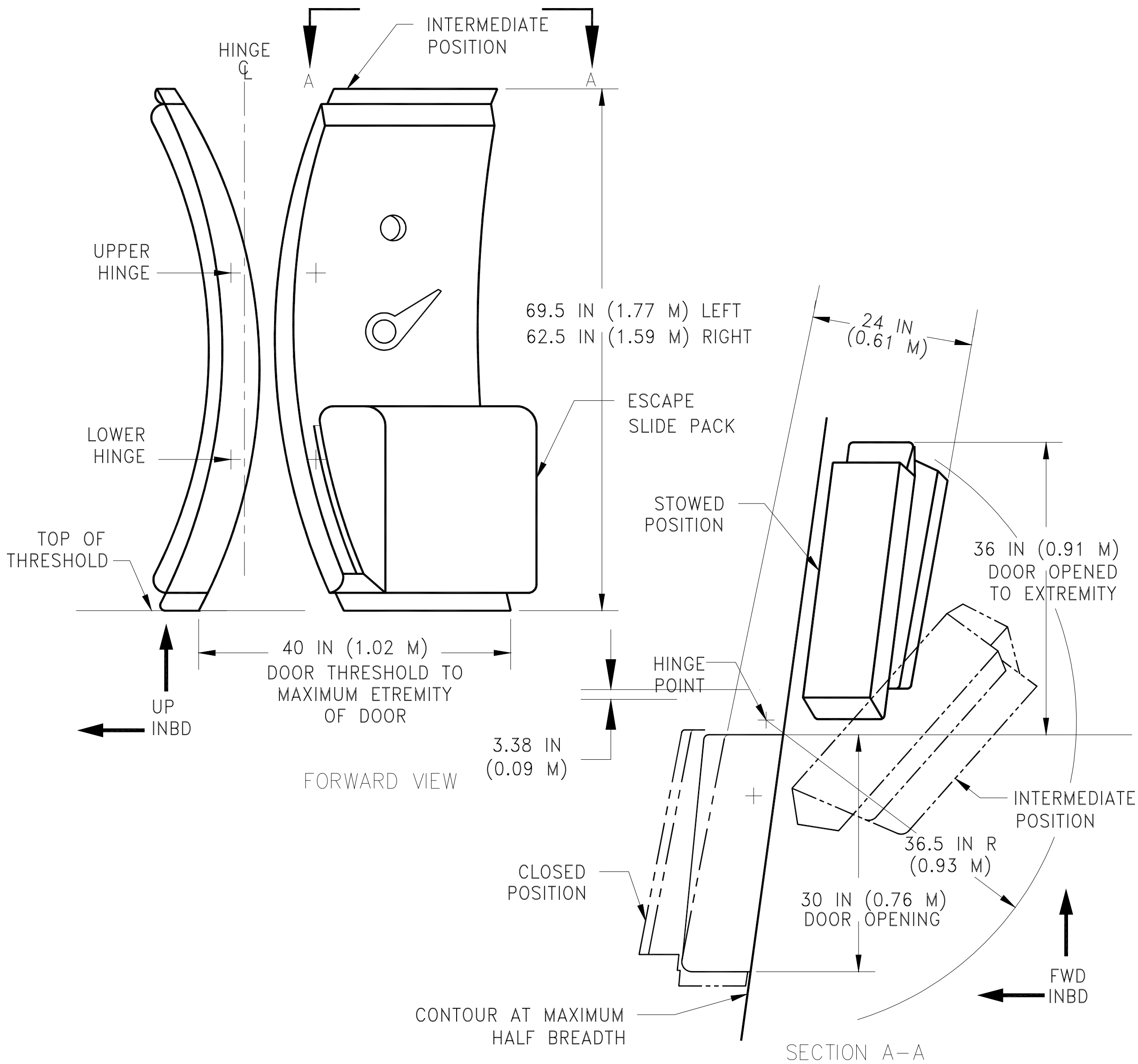
2.7.2 DOOR CLEARANCES - LOCATIONS OF SENSORS AND PROBES - FORWARD OF MAIN ENTRY DOOR NO 1

MODEL 737-700, -800, -900 (WITH WINGLETS)



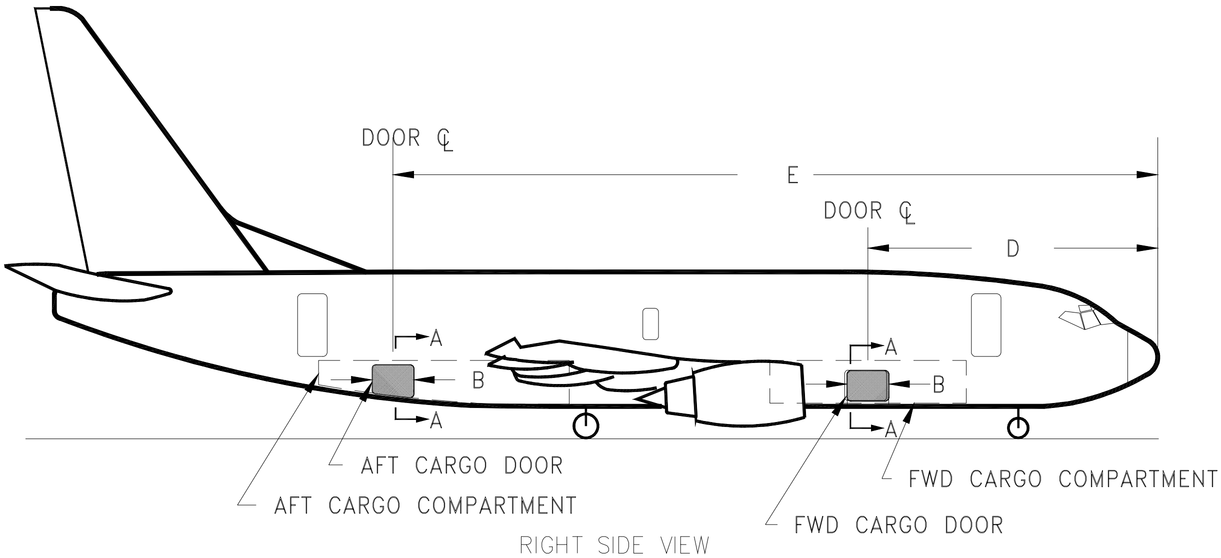
2.7.3 DOOR CLEARANCES - FORWARD SERVICE DOOR
MODEL 737-700, -800, -900 (WITH WINGLETS)

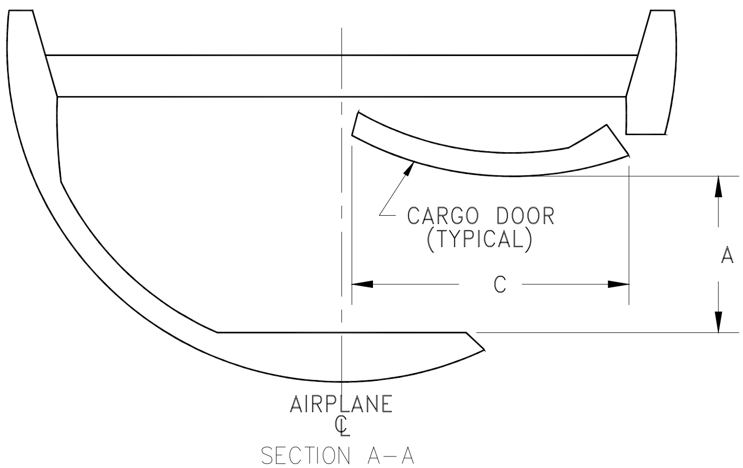




2.7.4 DOOR CLEARANCES - AFT SERVICE DOOR

MODEL 737-700, -800, -900 (WITH WINGLETS)





AIRPLANE MODEL	FORWARD CARGO DOOR			AFT CARGO DOOR		
	DOOR SIZE (C x B)	CLEAR OPENING (A x B)	DISTANCE FROM NOSE TO DOOR CL (D)	DOOR SIZE (C x B)	CLEAR OPENING (A x B)	DISTANCE FROM NOSE TO DOOR CL (E)
737-700	51 x 48 IN (1.30 x 1.22 M)	35 x 48 IN (0.89 x 1.22 M)	28 FT 0.25 IN (8.54 M)	48 x 48 IN (1.22 x 1.22 M)	33 x 48 IN (0.84 x 1.22 M)	72 FT 6.5 IN (22.11 M)
737-800	51 x 48 IN (1.30 x 1.22 M)	35 x 48 IN (0.89 x 1.22 M)	28 FT 0.25 IN (8.54 M)	48 x 48 IN (1.22 x 1.22 M)	33 x 48 IN (0.84 x 1.22 M)	91 FT 8.5 IN (27.95 M)
737-900	51 x 48 IN (1.30 x 1.22 M)	35 x 48 IN (0.89 x 1.22 M)	28 FT 0.25 IN (8.54 M)	48 x 48 IN (1.22 x 1.22 M)	33 x 48 IN (0.84 x 1.22 M)	100 FT 4.5 IN (30.59 M)

2.7.5 DOOR CLEARANCES - LOWER DECK CARGO COMPARTMENTS
MODEL 737-700, -800, -900 (WITH WINGLETS)

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3.0 AIRPLANE PERFORMANCE

3.0 AIRPLANE PERFORMANCE

3.1 General Information

The graphs in Section 3.2 provide information on operational empty weight (OEW) and payload, trip range, brake release gross weight, and fuel limits for airplane models with the different engine options. To use these graphs, if the trip range and zero fuel weight (OEW + payload) are known, the approximate brake release weight can be found, limited by fuel quantity.

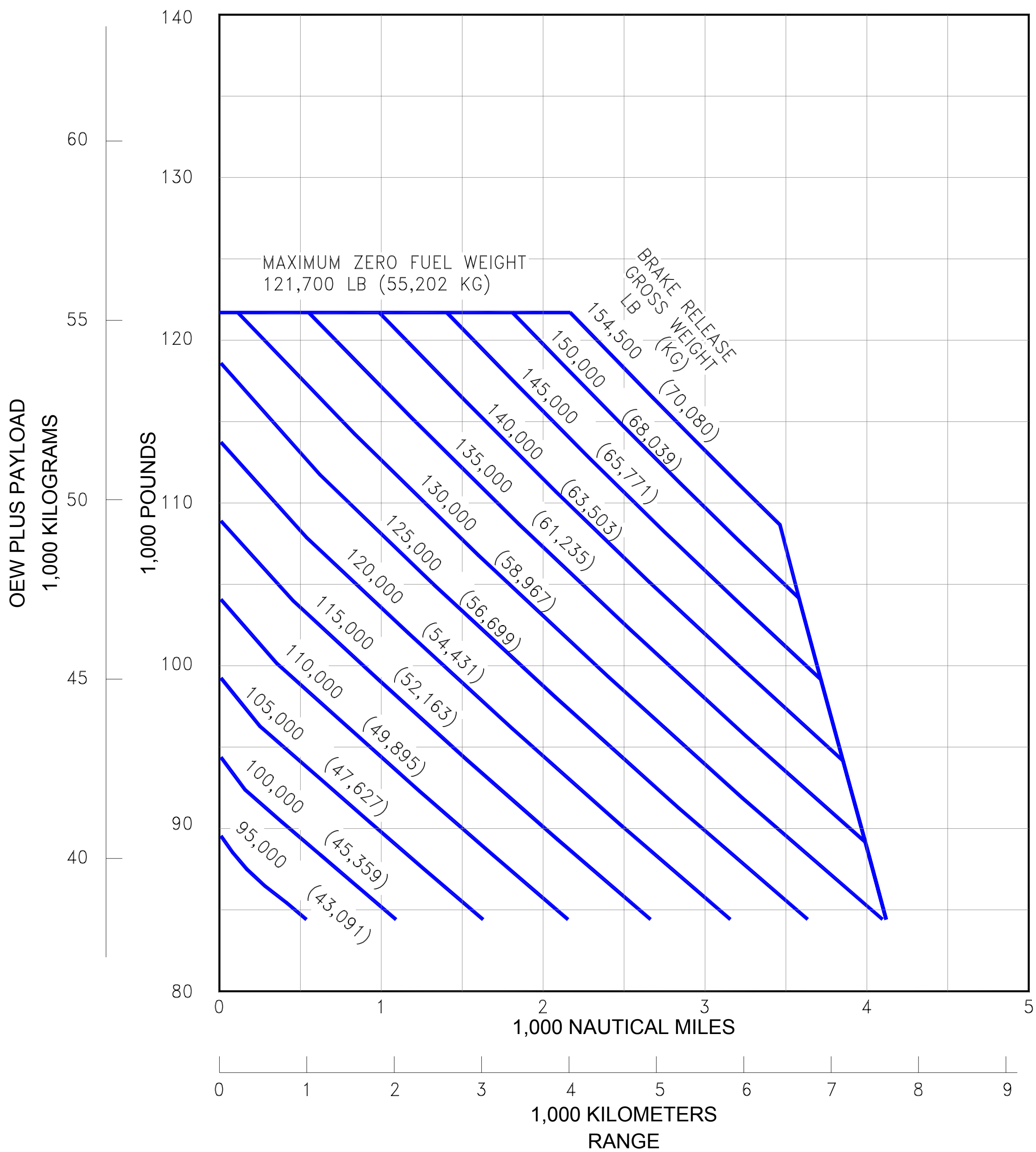
The graphs in Section 3.3 provide information on F.A.R. takeoff runway length requirements with the different engines at different pressure altitudes. Maximum takeoff weights shown on the graphs are the heaviest for the particular airplane models with the corresponding engines. Standard day temperatures for pressure altitudes shown on the F.A.R. takeoff graphs are given below:

PRESSURE ALTITUDE		STANDARD DAY TEMP	
FEET	METERS	^{o}F	^{o}C
0	0	59.0	15.00
2,000	610	51.9	11.04
4,000	1,219	44.7	7.06
6,000	1,829	37.6	3.11
8,000	2,438	30.5	-0.85

For airplanes which are governed by the European Joint Airworthiness Authorities (JAA), the wet runway performance is shown in accordance with JAR-OPS 1 Subpart F, with wet runways defined in Paragraph 1.480(a)(10). Skid-resistant runways (grooved or PFC treated) per FAA or ICAO specifications exhibit runway length requirements that remove some or all of the length penalties associated with smooth (non-grooved) runways. Under predominantly wet conditions, the wet runway performance characteristics may be used to determine runway length requirements, if it is longer than the dry runway performance requirements.

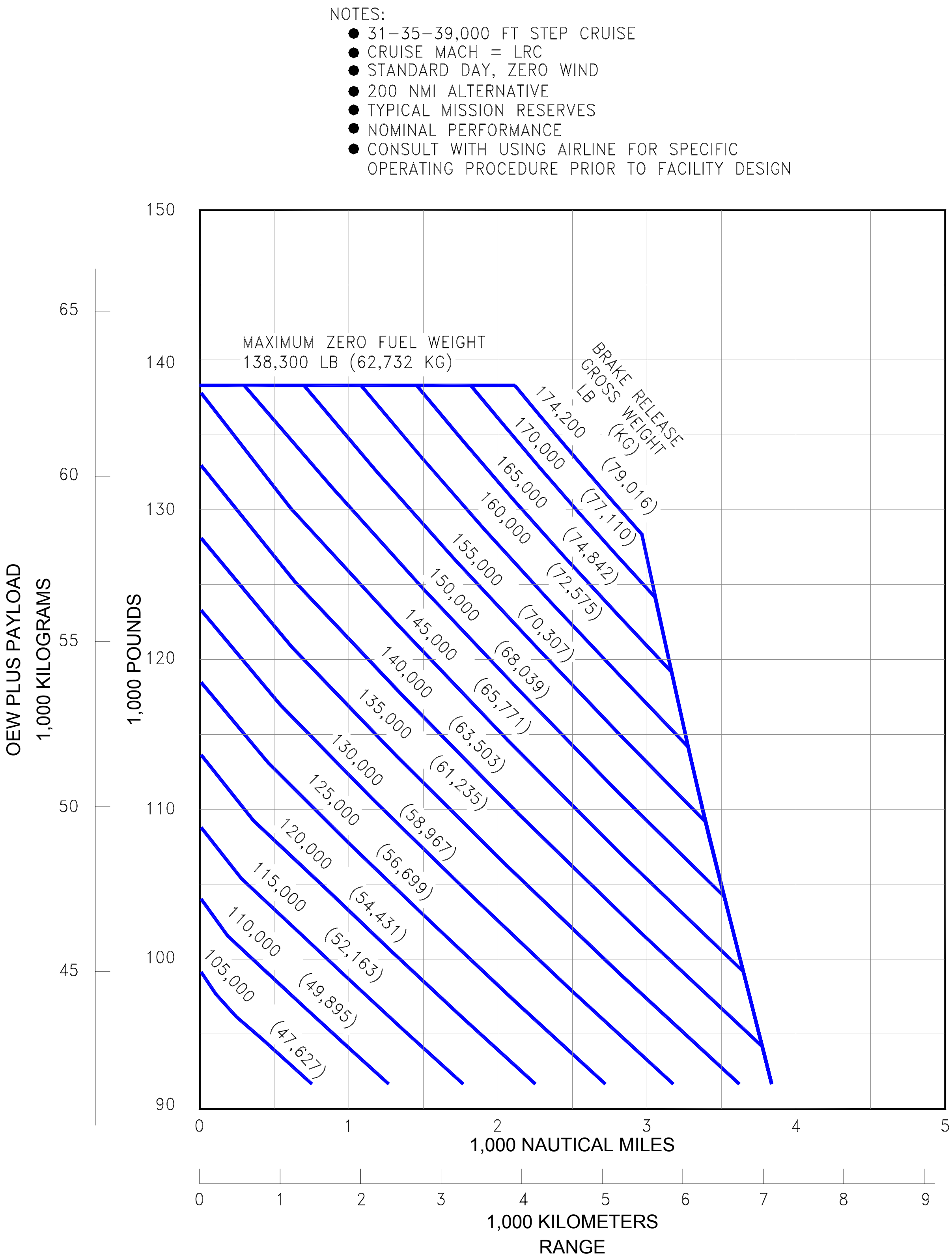
The graphs in Section 3.4 provide information on landing runway length requirements for different airplane weights and airport altitudes. The maximum landing weights shown are the heaviest for the particular airplane model.

NOTES:
- 31-35-39,000 FT STEP CRUISE
- CRUISE MACH = LRC
- STANDARD DAY, ZERO WIND
- 200 NMI ALTERNATIVE
- TYPICAL MISSION RESERVES
- NOMINAL PERFORMANCE
- CONSULT WITH USING AIRLINE FOR SPECIFIC OPERATING PROCEDURE PRIOR TO FACILITY DESIGN



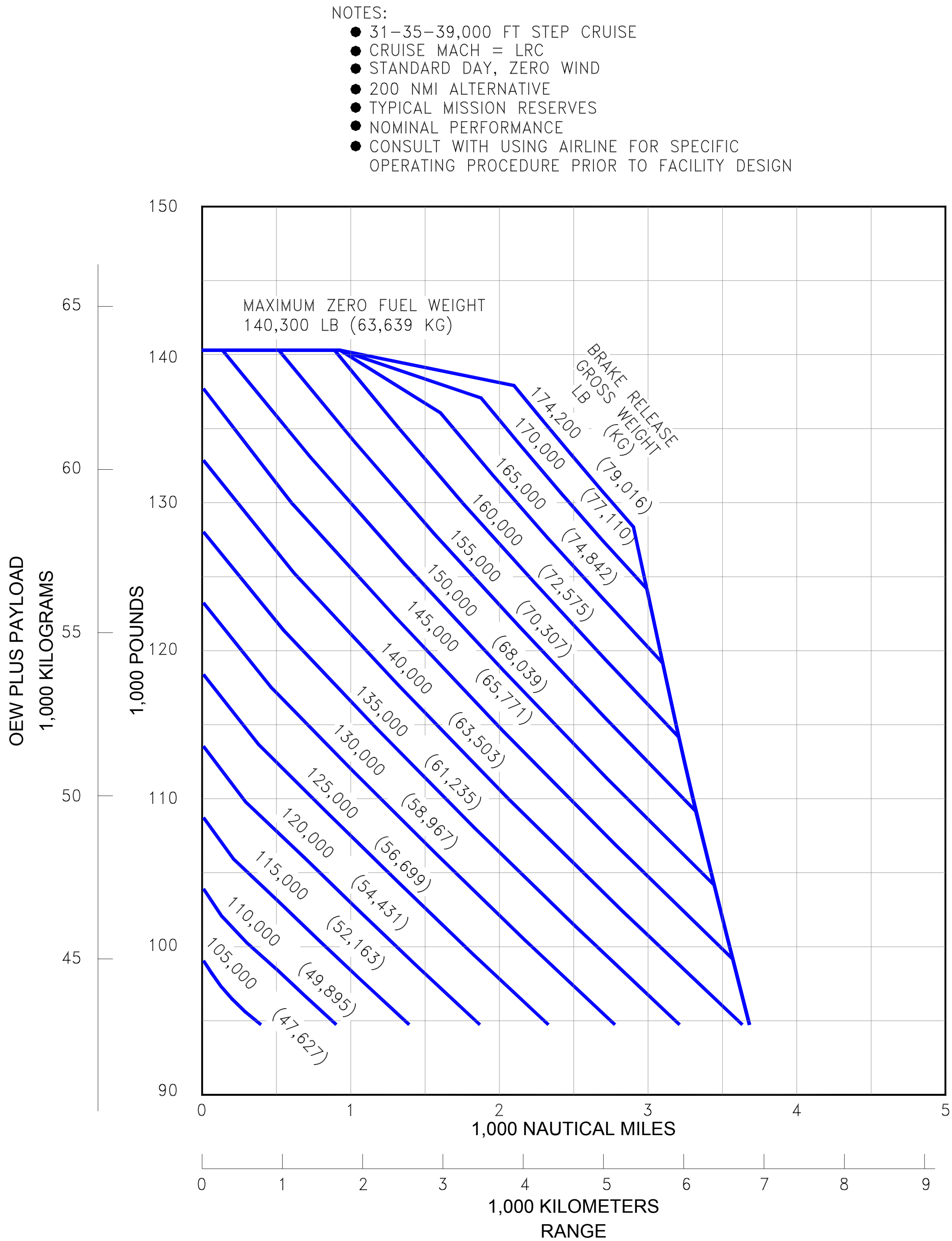
3.2.1 PAYLOAD/RANGE FOR LONG-RANGE CRUISE

MODEL 737-700 WITH WINGLETS



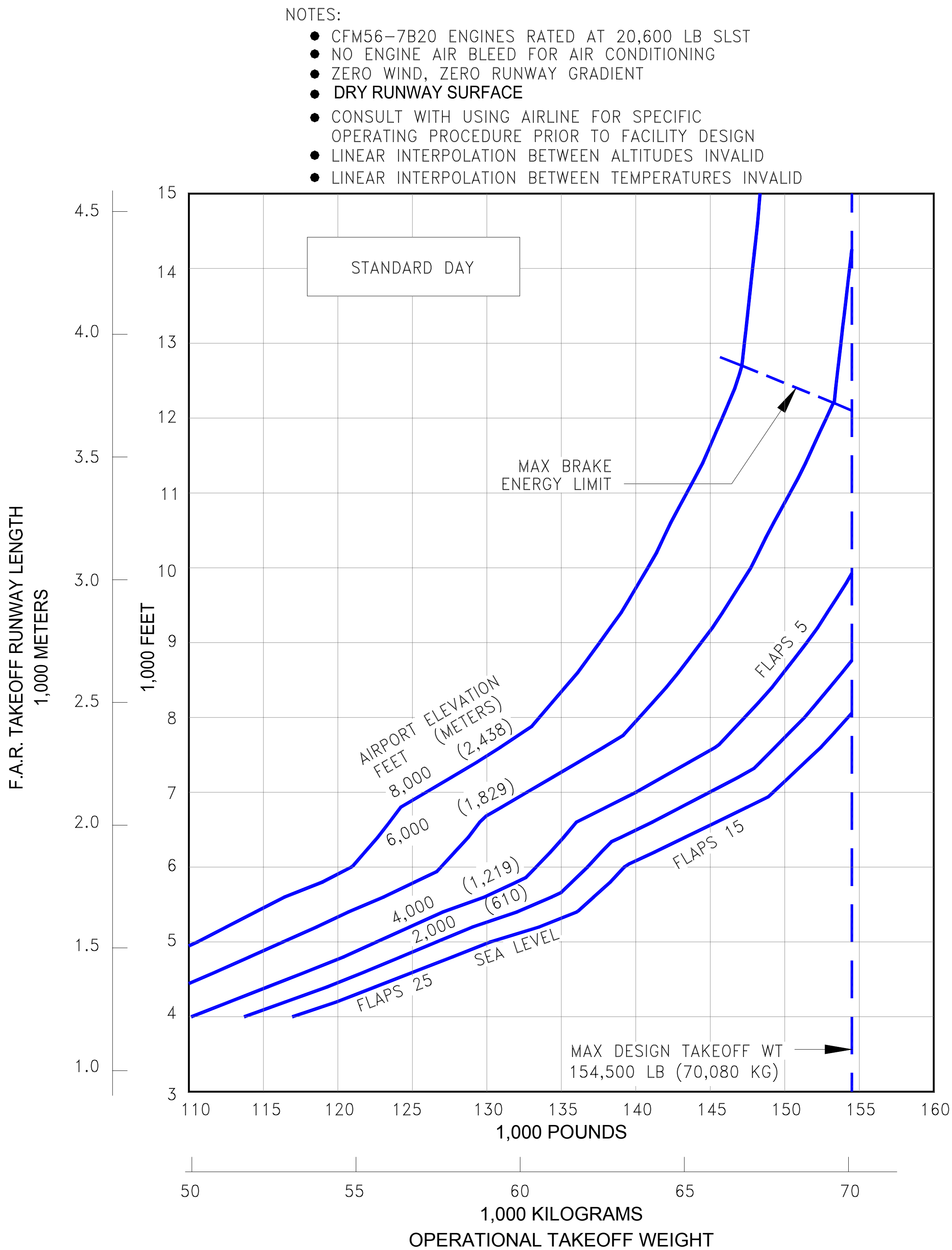
3.2.2 PAYLOAD/RANGE FOR LONG-RANGE CRUISE

MODEL 737-800 WITH WINGLETS



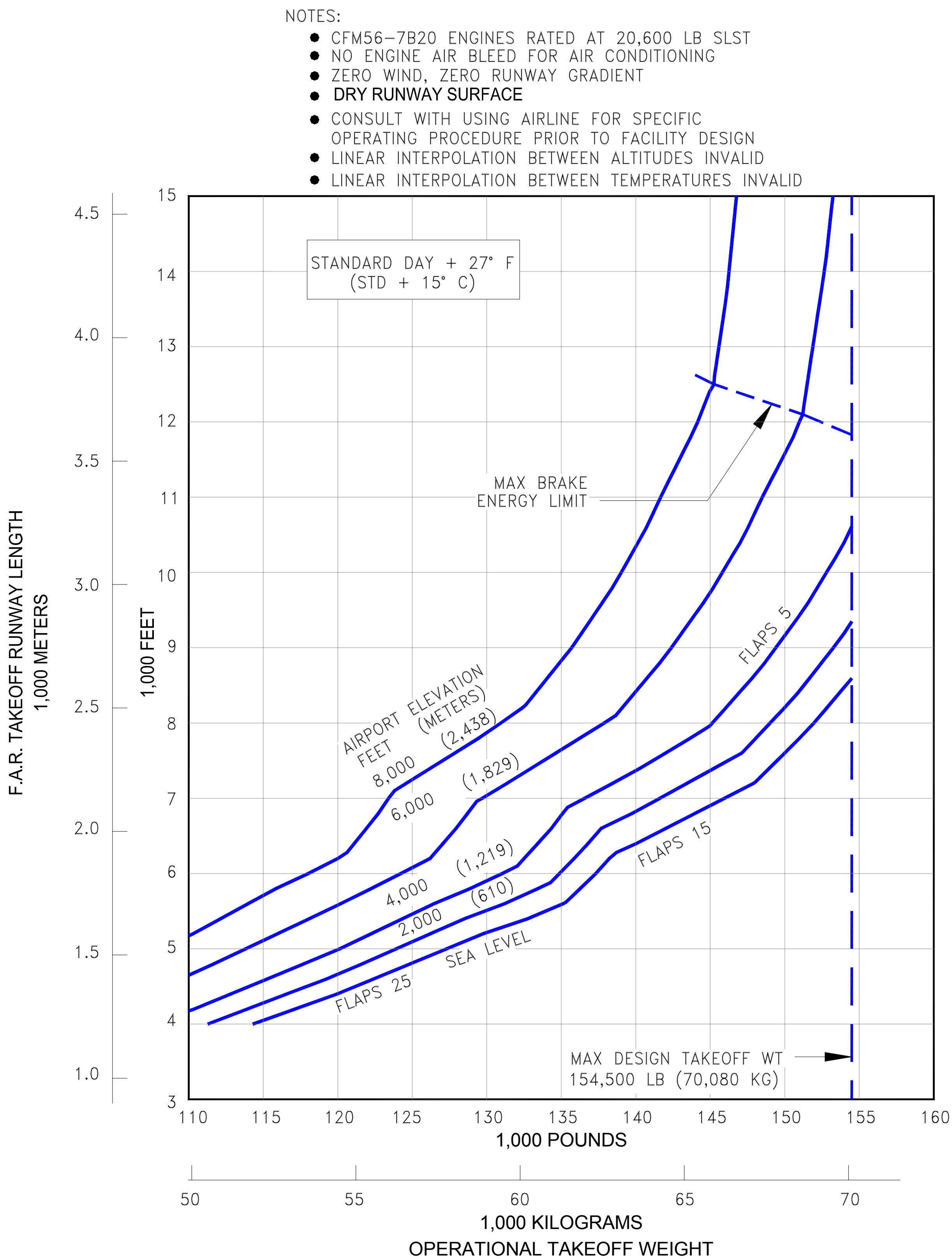
3.2.3 PAYLOAD/RANGE FOR LONG-RANGE CRUISE

MODEL 737-900 WITH WINGLETS



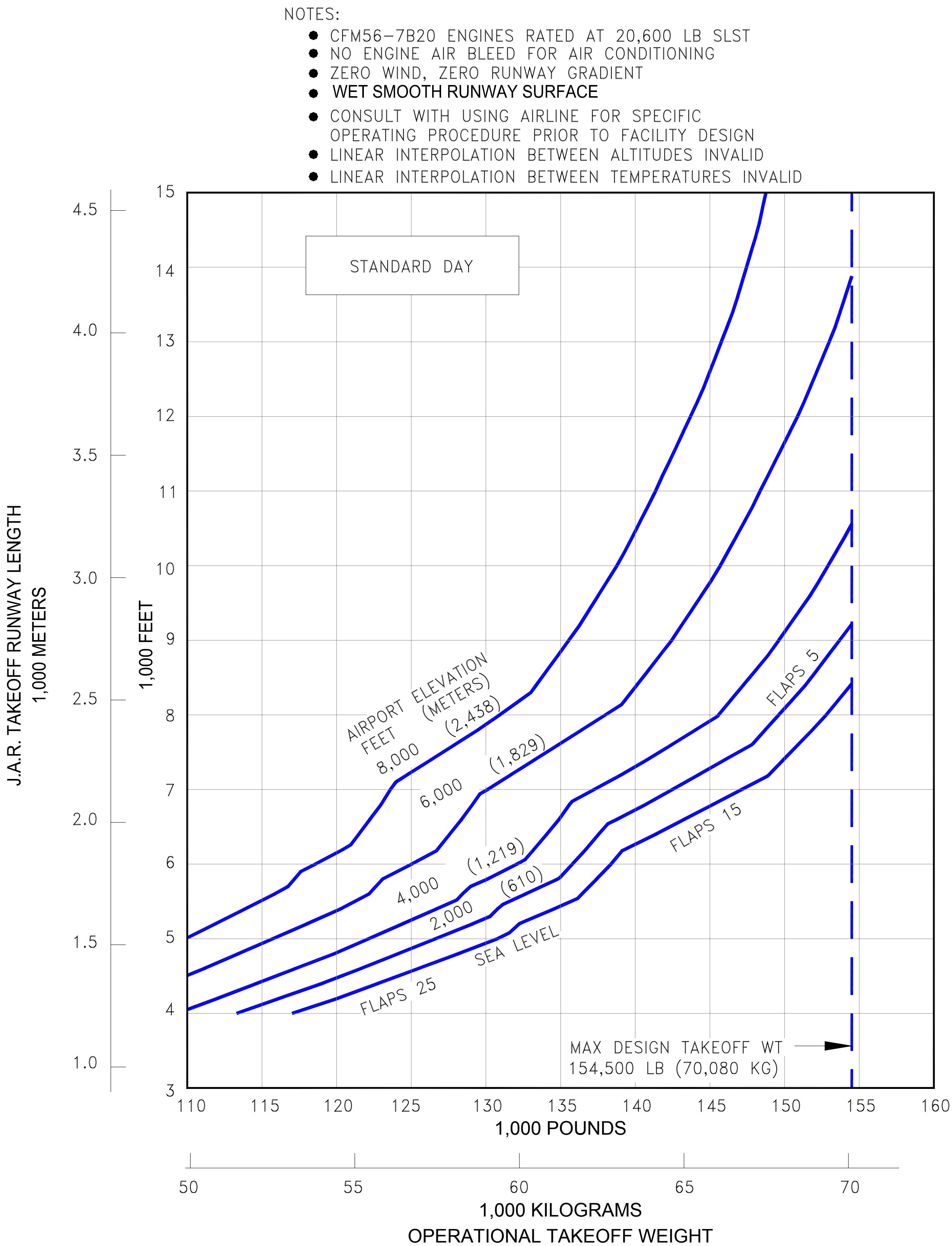
3.3.1 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, DRY RUNWAY

MODEL 737-700 WITH WINGLETS, (CFM56-7B20 ENGINES AT 20,600 LB SLST)



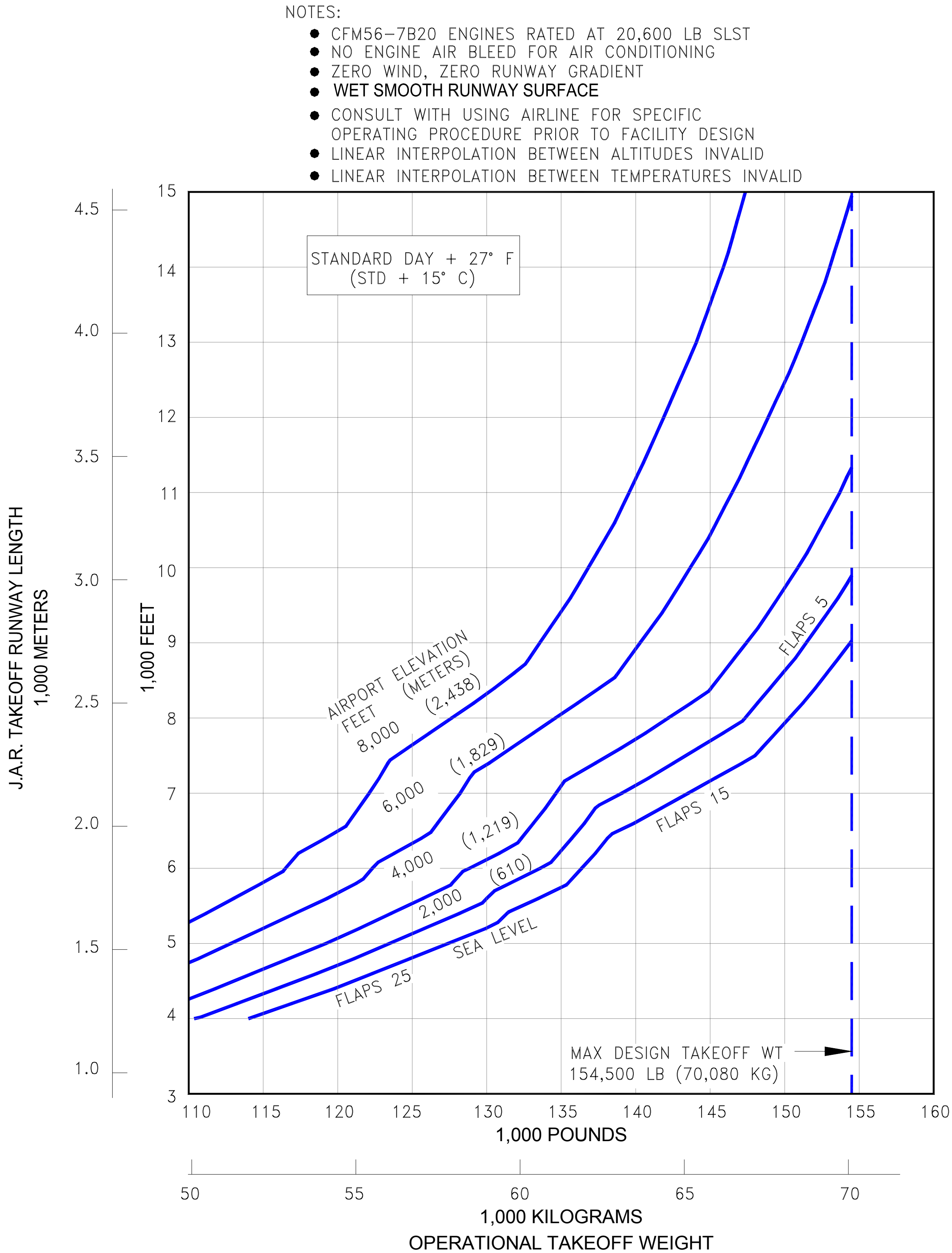
3.3.2 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY +27°F (STD + 15°C), DRY RUNWAY

MODEL 737-700 WITH WINGLETS, (CFM56-7B20 ENGINES AT 20,600 LB SLST)



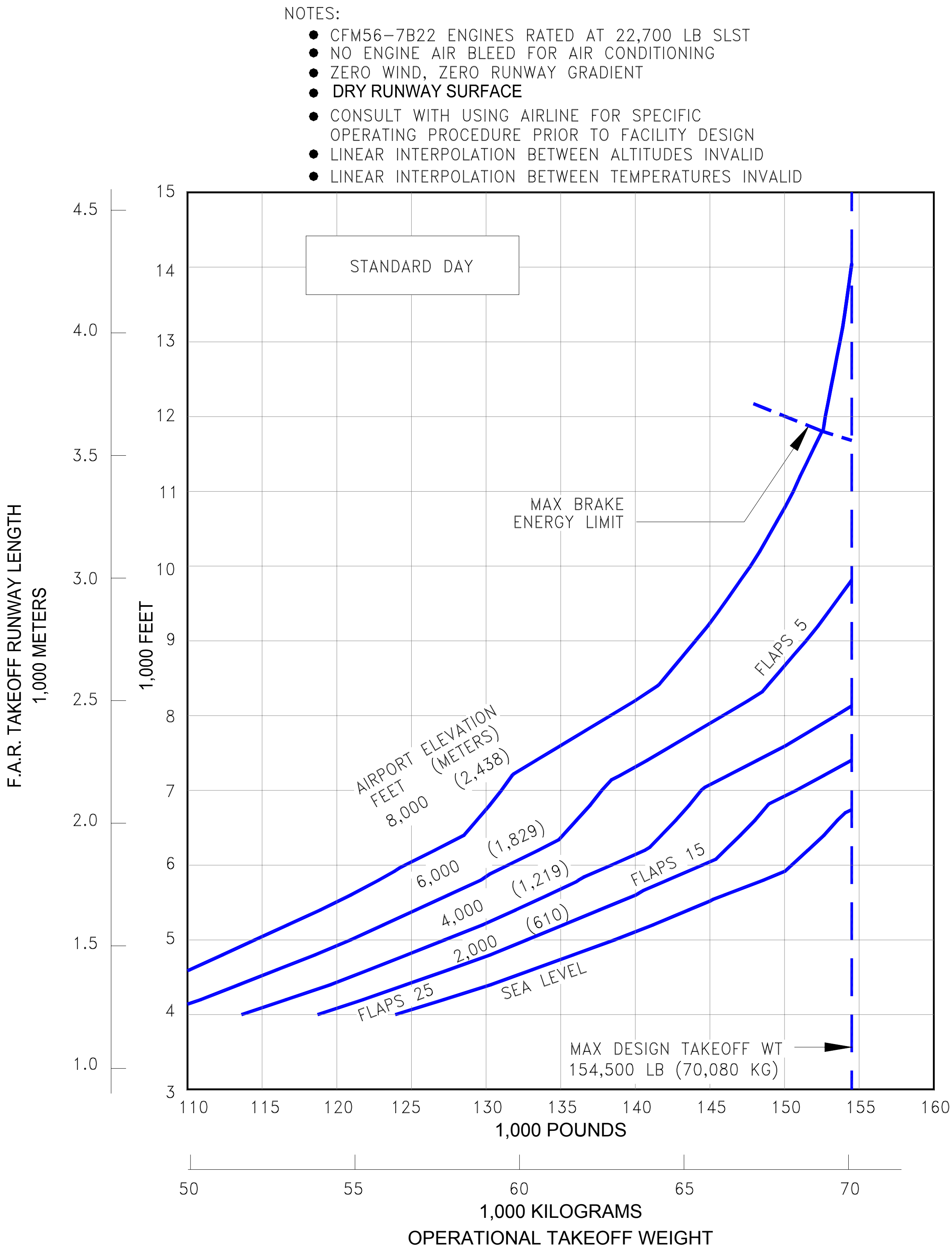
3.3.3 J.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, WET RUNWAY

MODEL 737-700 WITH WINGLETS, (CFM56-7B20 ENGINES AT 20,600 LB SLST)



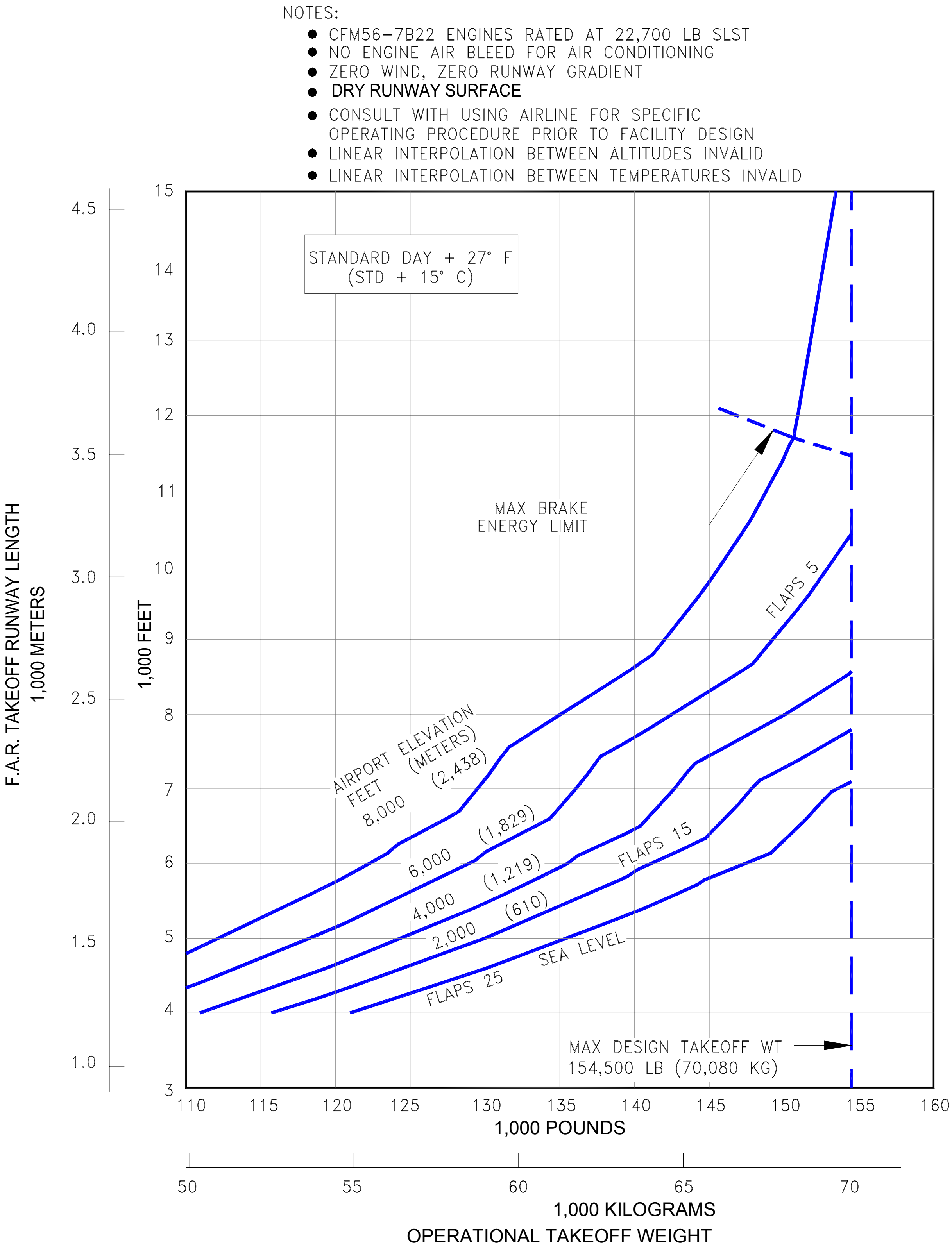
3.3.4 J.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY +27°F (STD + 15°C), WET RUNWAY

MODEL 737-700 WITH WINGLETS, (CFM56-7B20 ENGINES AT 20,600 LB SLST)



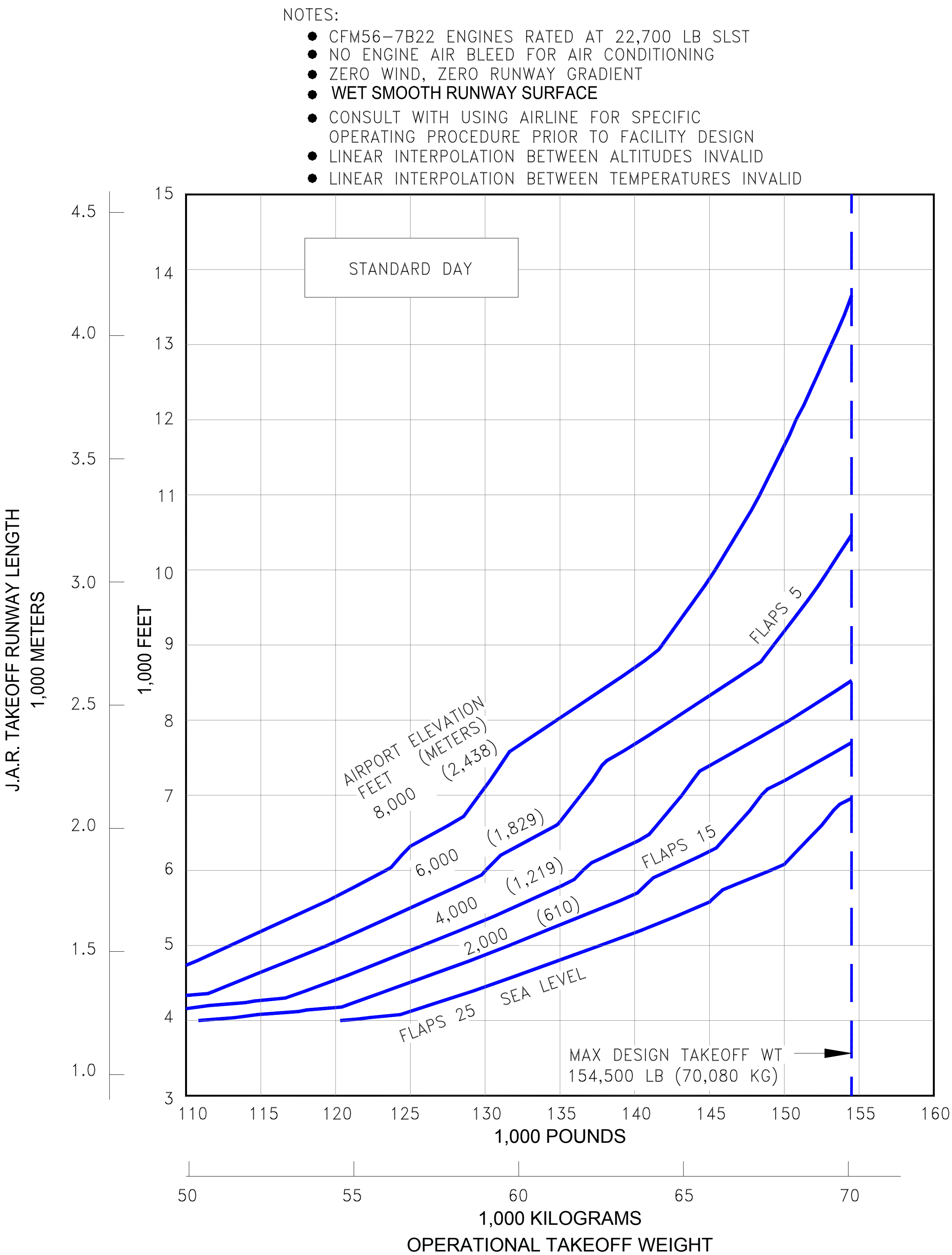
3.3.5 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, DRY RUNWAY

MODEL 737-700 WITH WINGLETS, (CFM56-7B22 ENGINES AT 22,700 LB SLST)



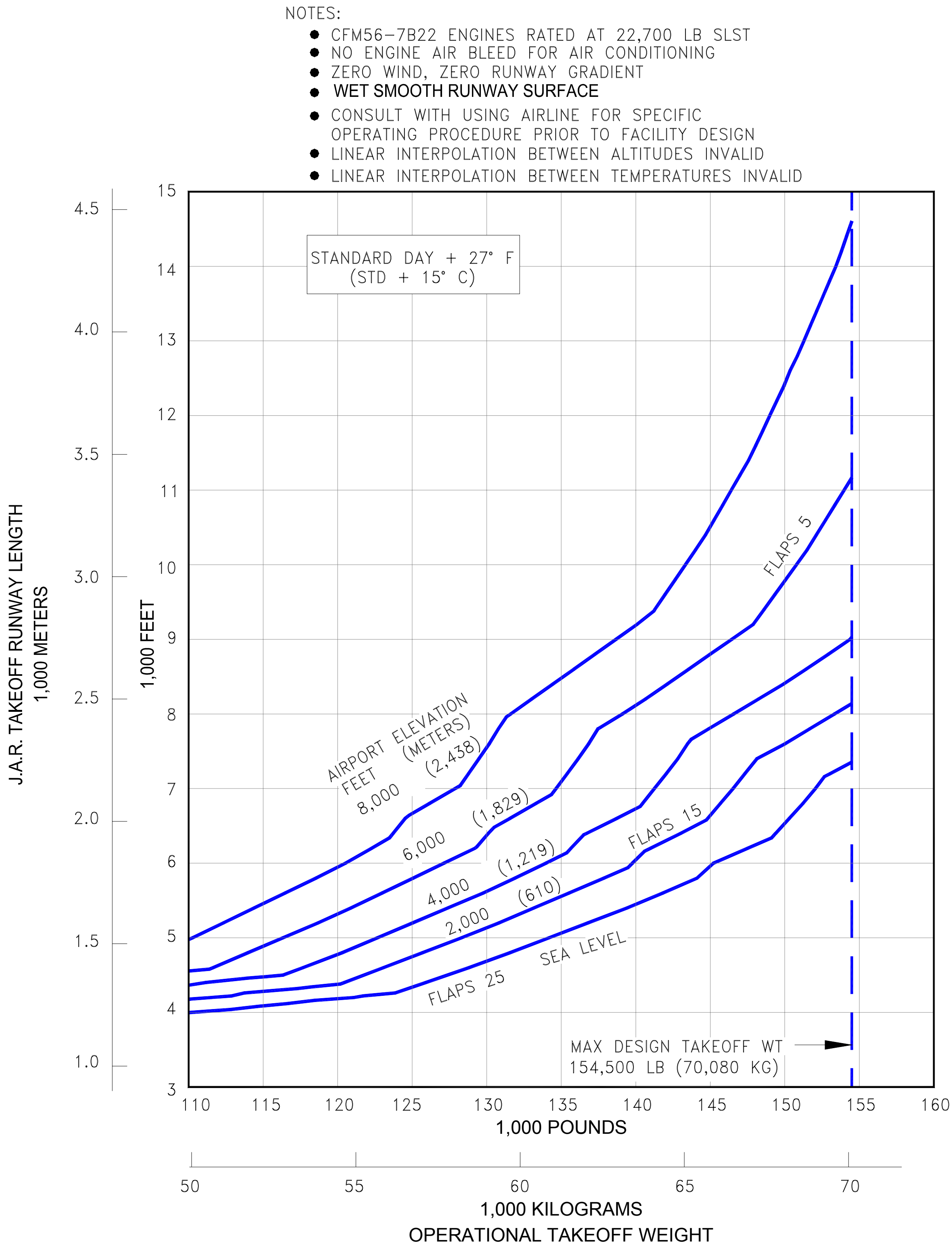
3.3.6 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY +27°F (STD + 15°C), DRY RUNWAY

MODEL 737-700 WITH WINGLETS, (CFM56-7B22 ENGINES AT 22,700 LB SLST)



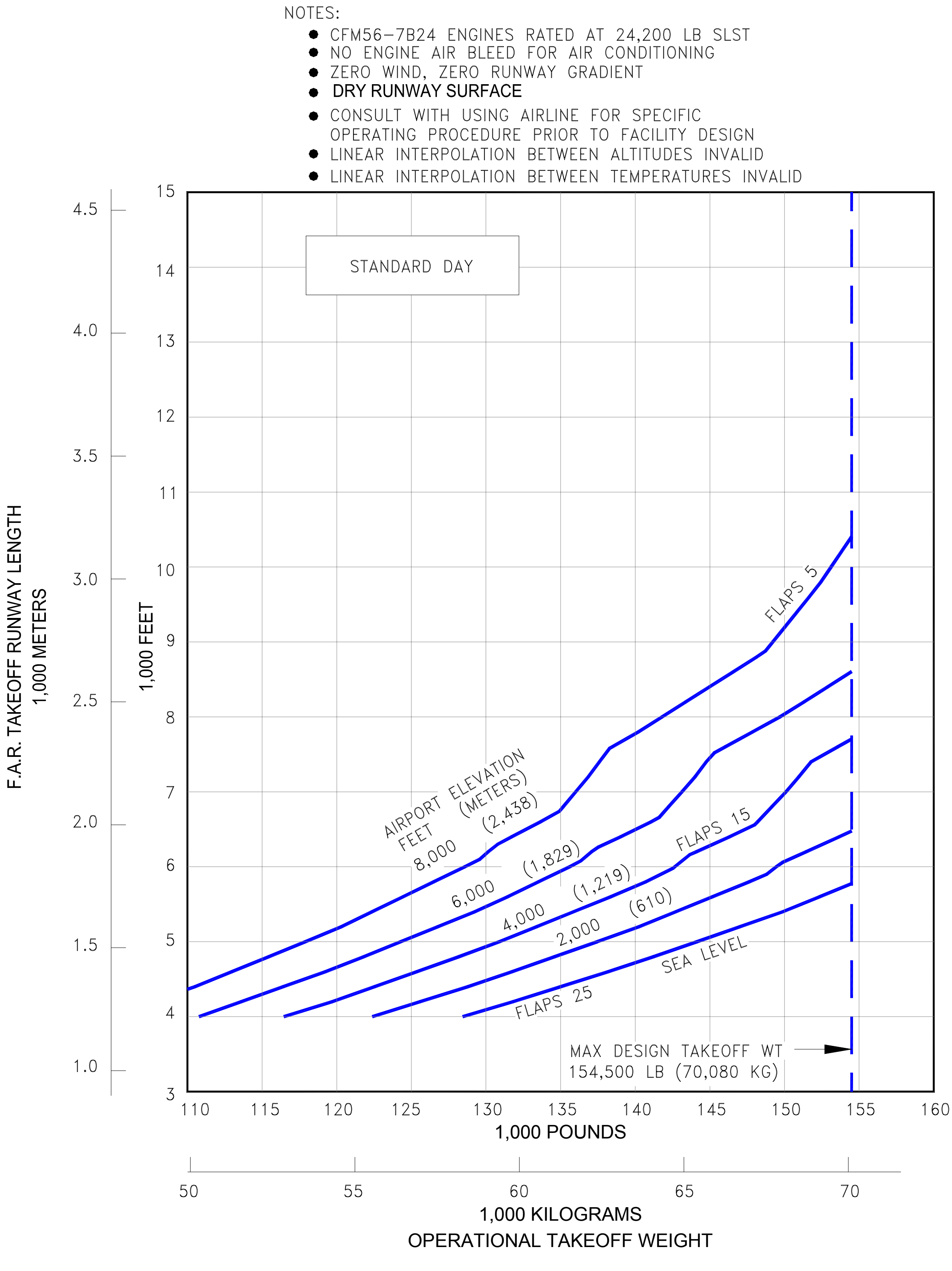
3.3.7 J.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, WET RUNWAY

MODEL 737-700 WITH WINGLETS, (CFM56-7B22 ENGINES AT 22,700 LB SLST)



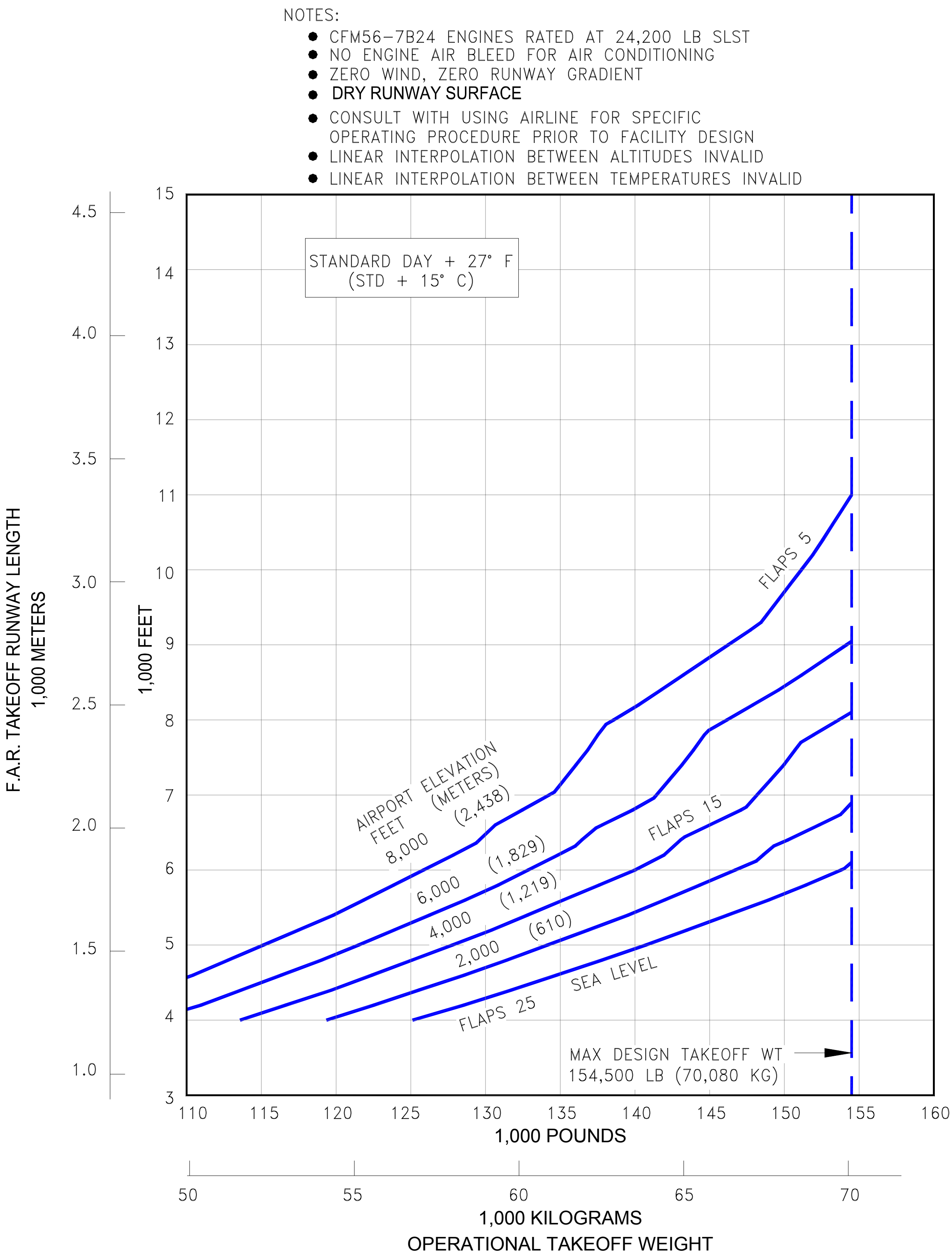
3.3.8 J.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY +27°F (STD + 15°C), WET RUNWAY

MODEL 737-700 WITH WINGLETS, (CFM56-7B22 ENGINES AT 22,700 LB SLST)



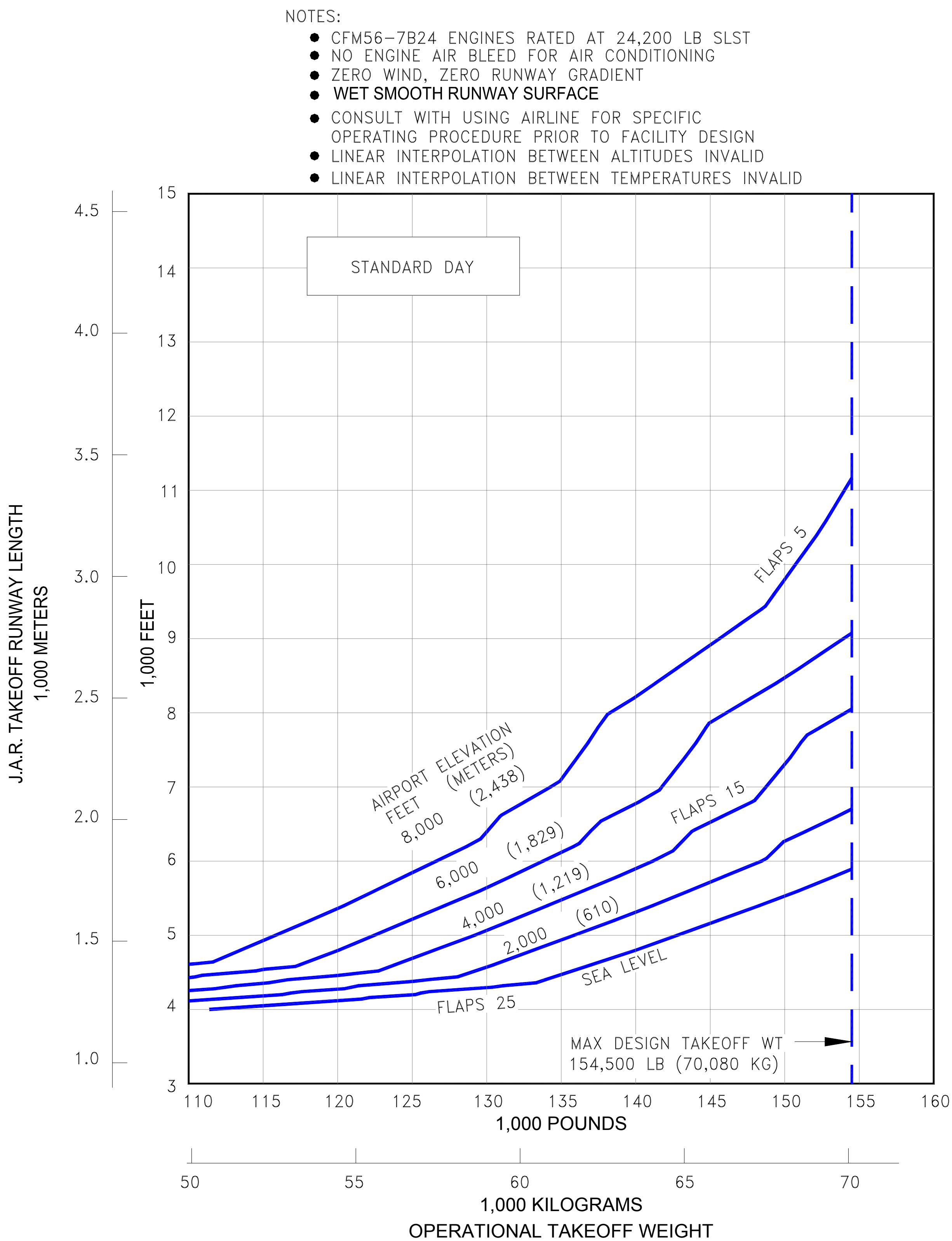
3.3.9 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, DRY RUNWAY

MODEL 737-700 WITH WINGLETS, (CFM56-7B24 ENGINES AT 24,200 LB SLST)



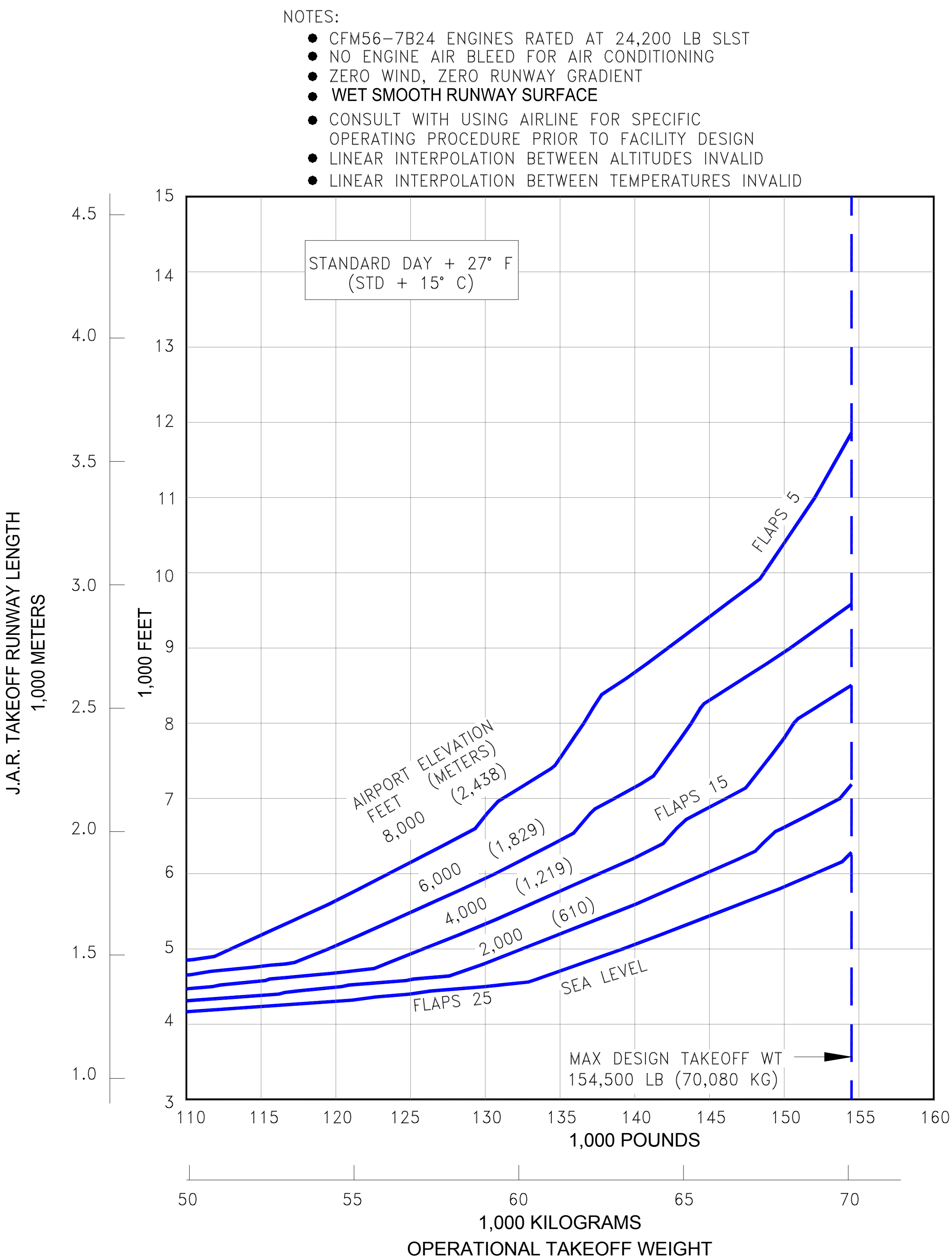
3.3.10 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY +27°F (STD + 15°C), DRY RUNWAY

MODEL 737-700 WITH WINGLETS, (CFM56-7B24 ENGINES AT 24,200 LB SLST)



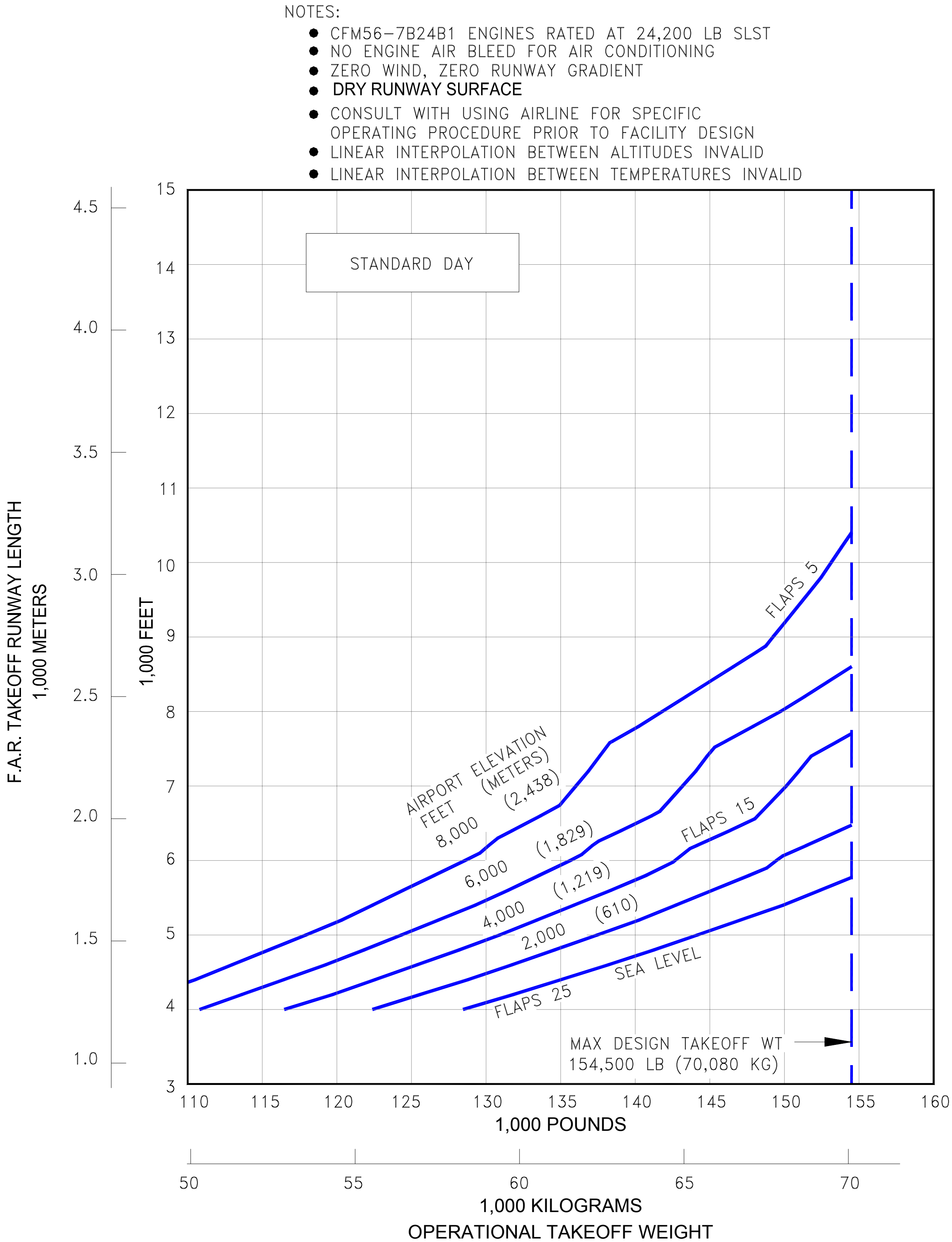
3.3.11 J.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, WET RUNWAY

MODEL 737-700 WITH WINGLETS, (CFM56-7B24 ENGINES AT 24,200 LB SLST)



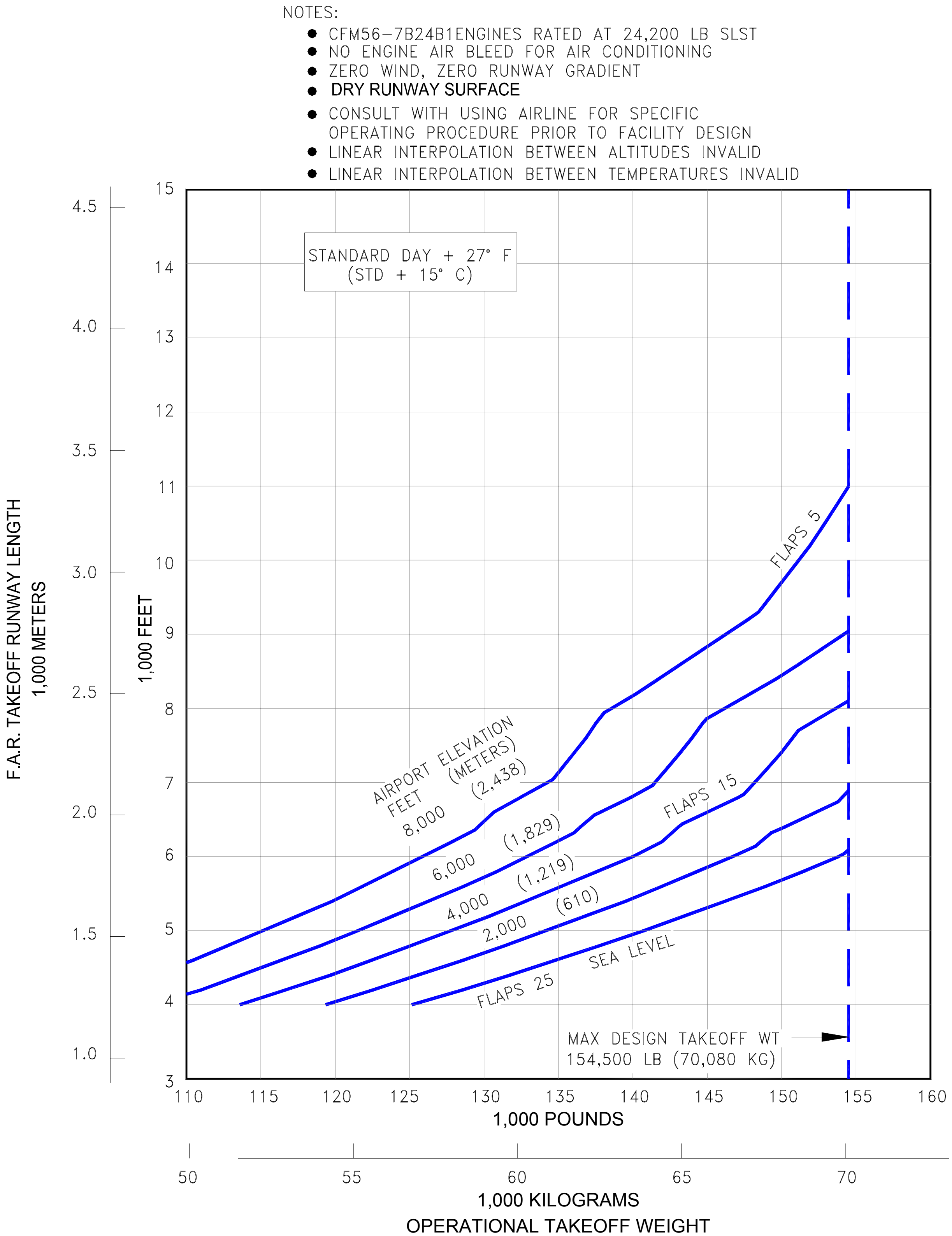
3.3.12 J.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY +27°F (STD + 15°C), WET RUNWAY

MODEL 737-700 WITH WINGLETS, (CFM56-7B24 ENGINES AT 24,200 LB SLST)



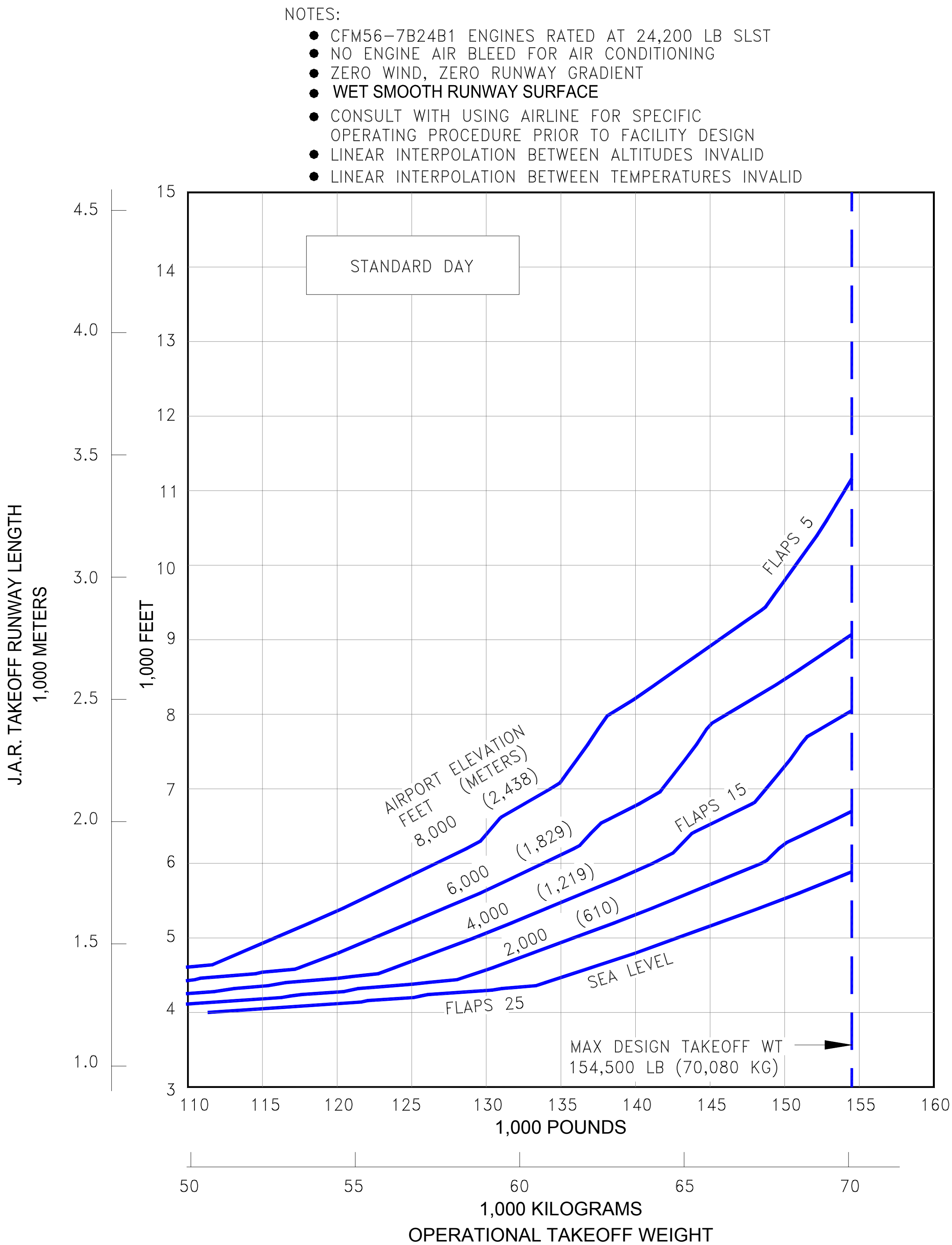
3.3.13 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, DRY RUNWAY

MODEL 737-700 WITH WINGLETS, (CFM56-7B24B1 ENGINES AT 24,200 LB SLST)



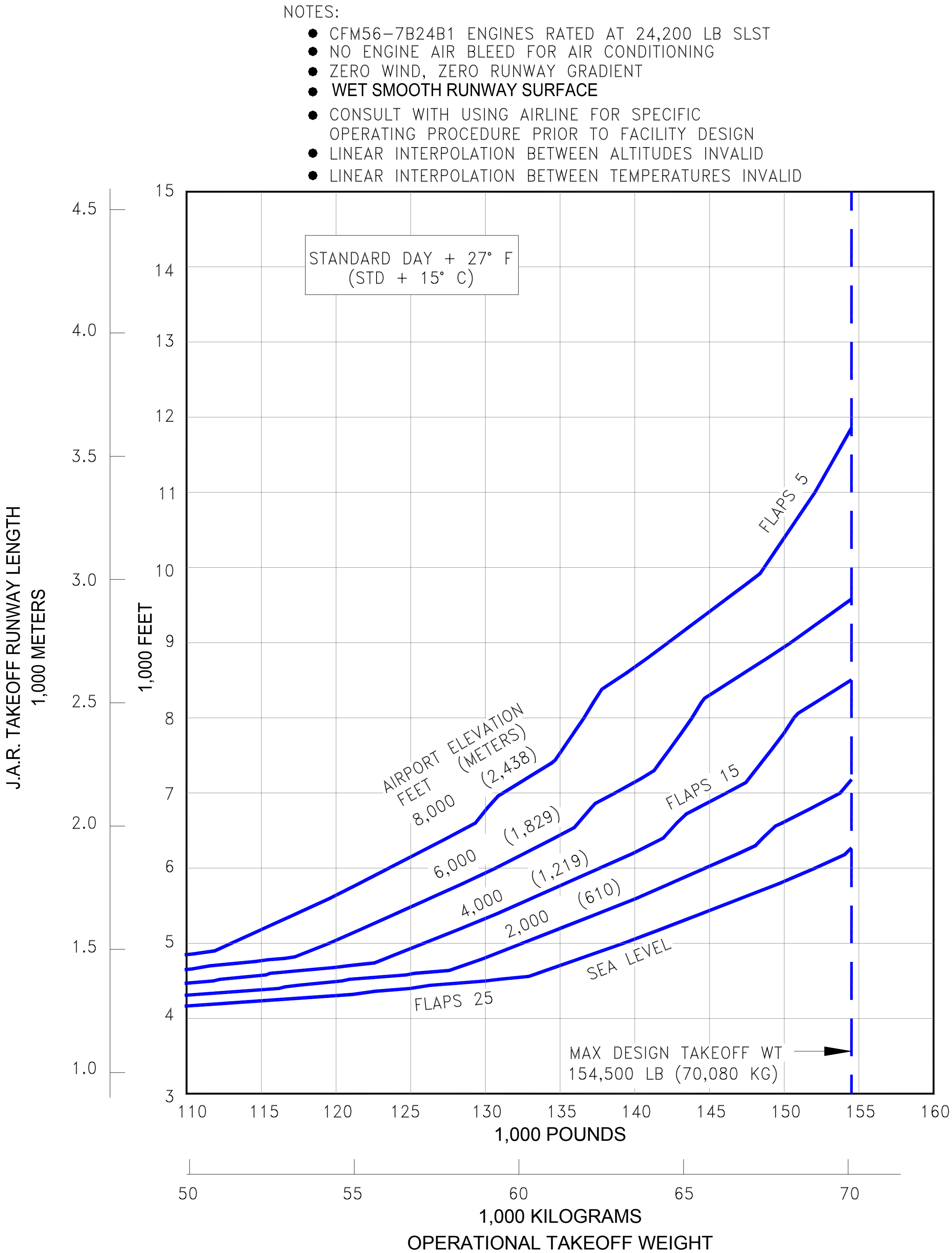
3.3.14 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY +27°F (STD + 15°C), DRY RUNWAY

MODEL 737-700 WITH WINGLETS, (CFM56-7B24B1 ENGINES AT 24,200 LB SLST)



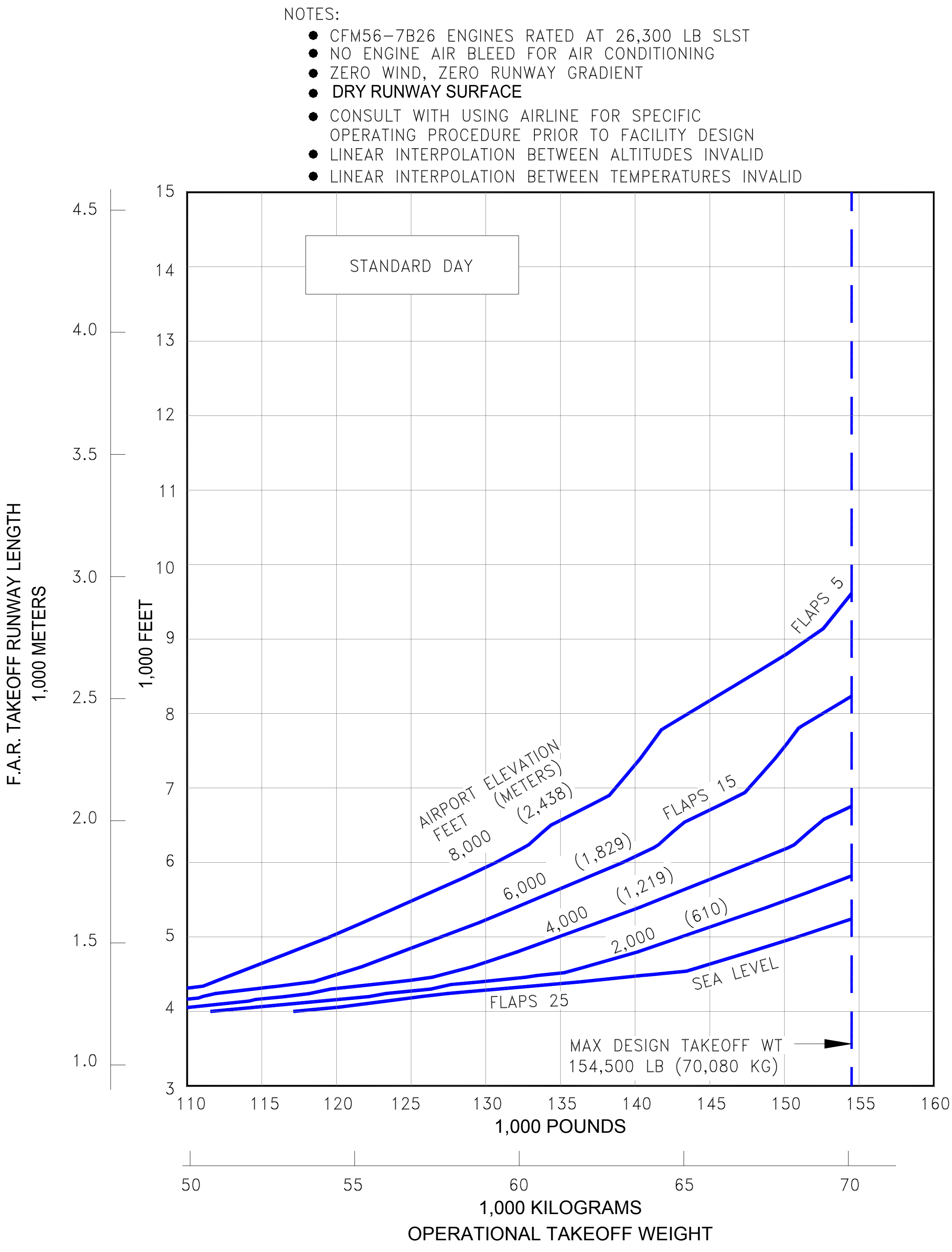
3.3.15 J.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, WET RUNWAY

MODEL 737-700 WITH WINGLETS, (CFM56-7B24B1 ENGINES AT 24,200 LB SLST)



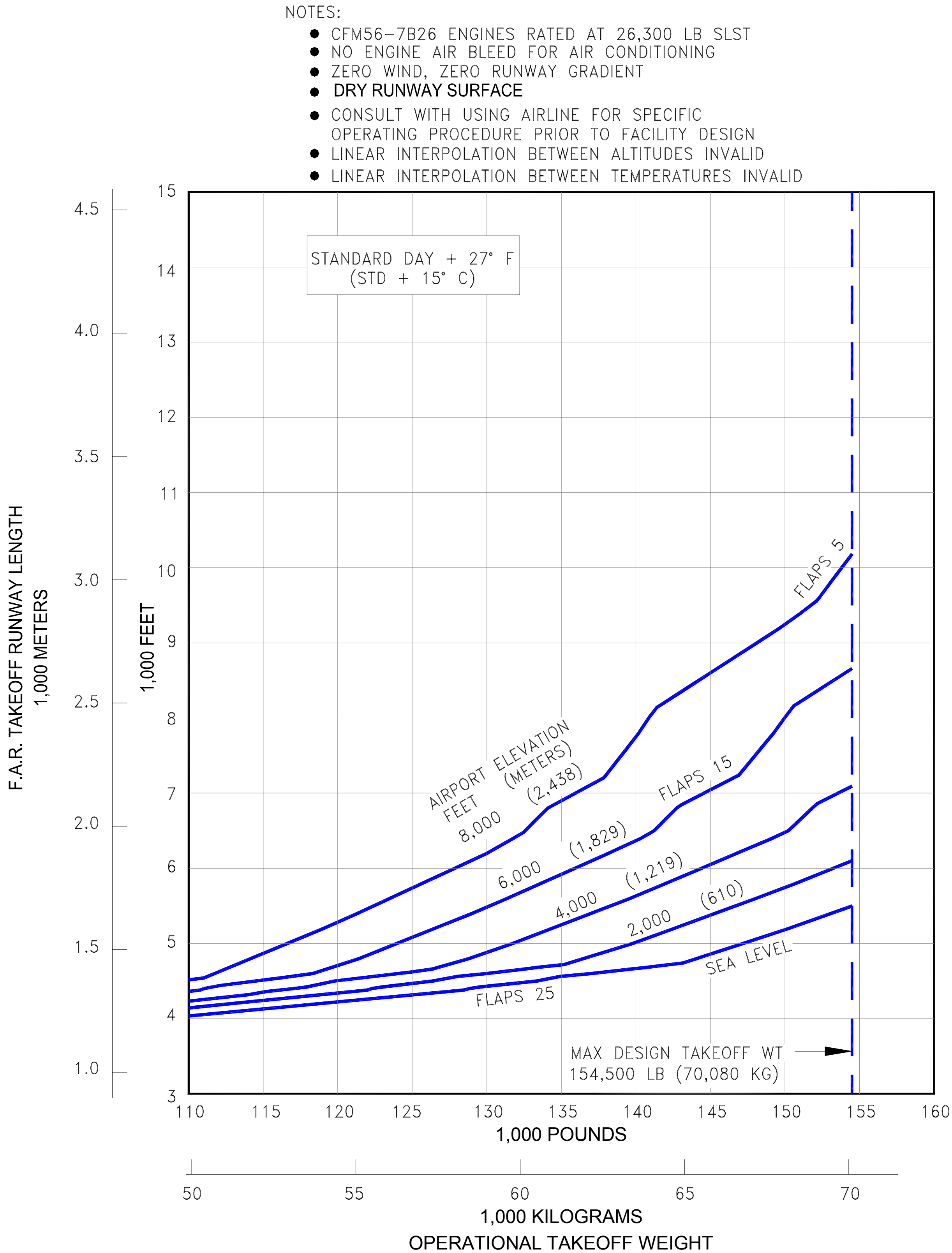
3.3.16 J.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY +27°F (STD + 15°C), WET RUNWAY

MODEL 737-700 WITH WINGLETS, (CFM56-7B24B1 ENGINES AT 24,200 LB SLST)



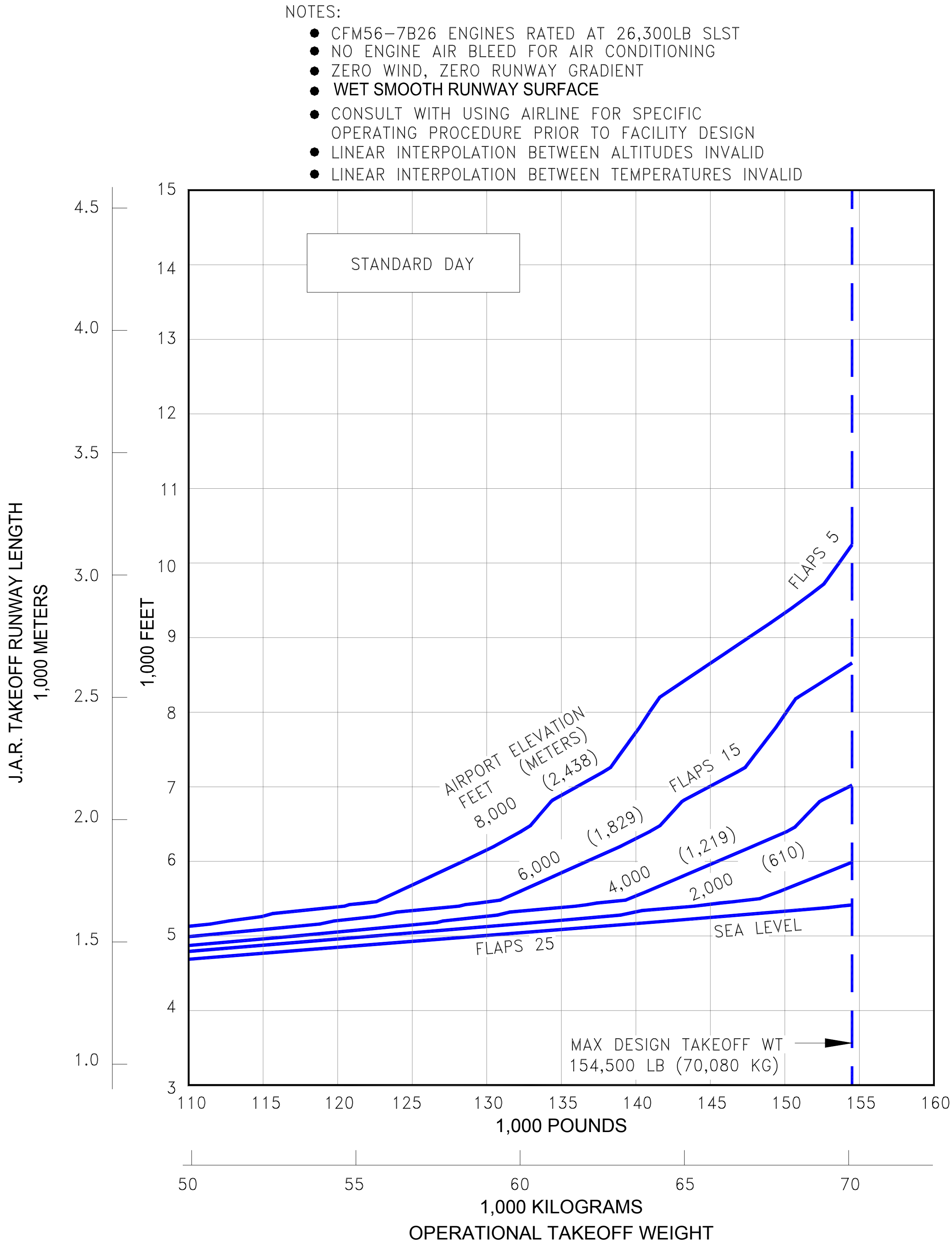
3.3.17 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, DRY RUNWAY

MODEL 737-700 WITH WINGLETS, (CFM56-7B26 ENGINES AT 26,300 LB SLST)



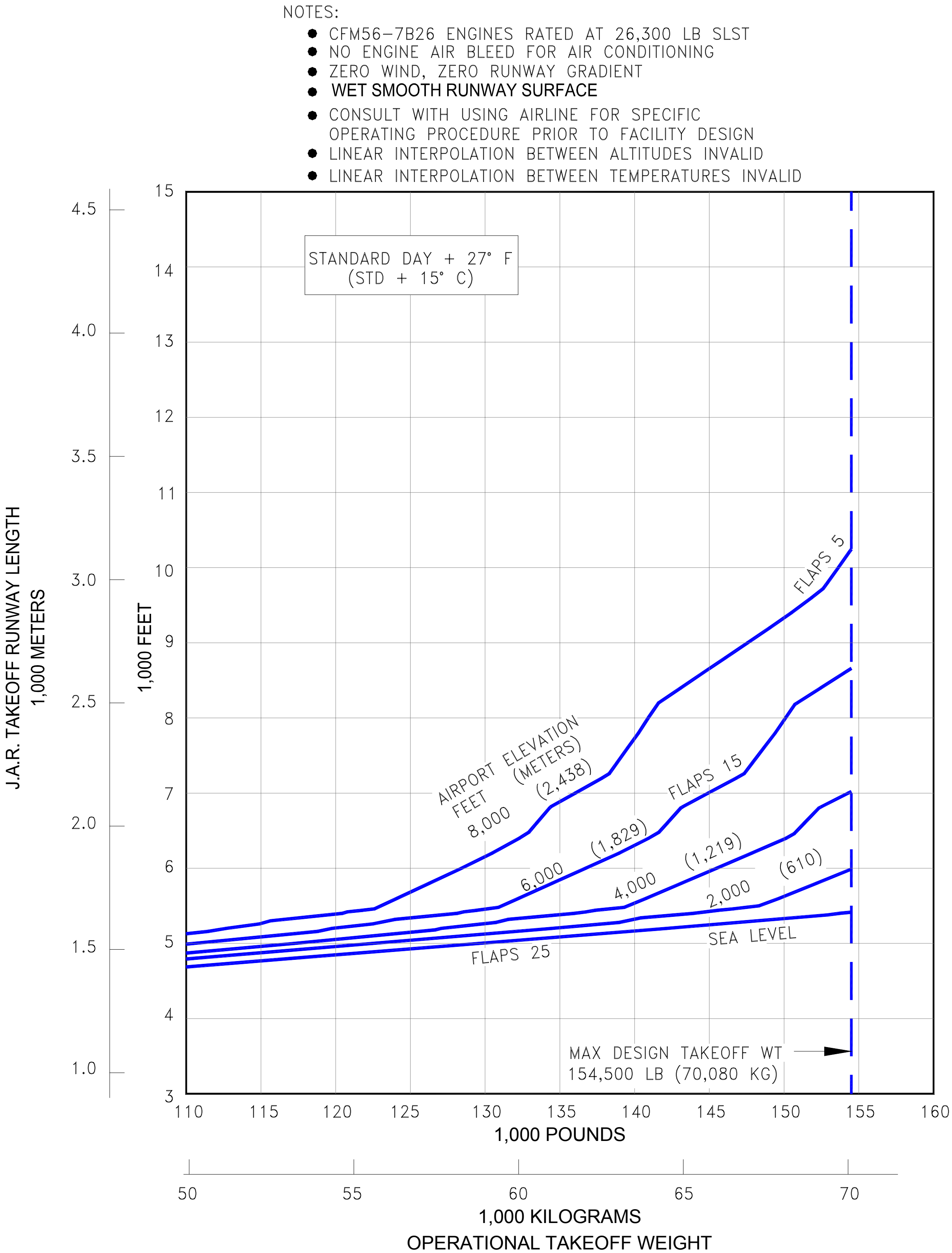
3.3.18 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY +27°F (STD + 15°C), DRY RUNWAY

MODEL 737-700 WITH WINGLETS, (CFM56-7B26 ENGINES AT 26,300 LB SLST)



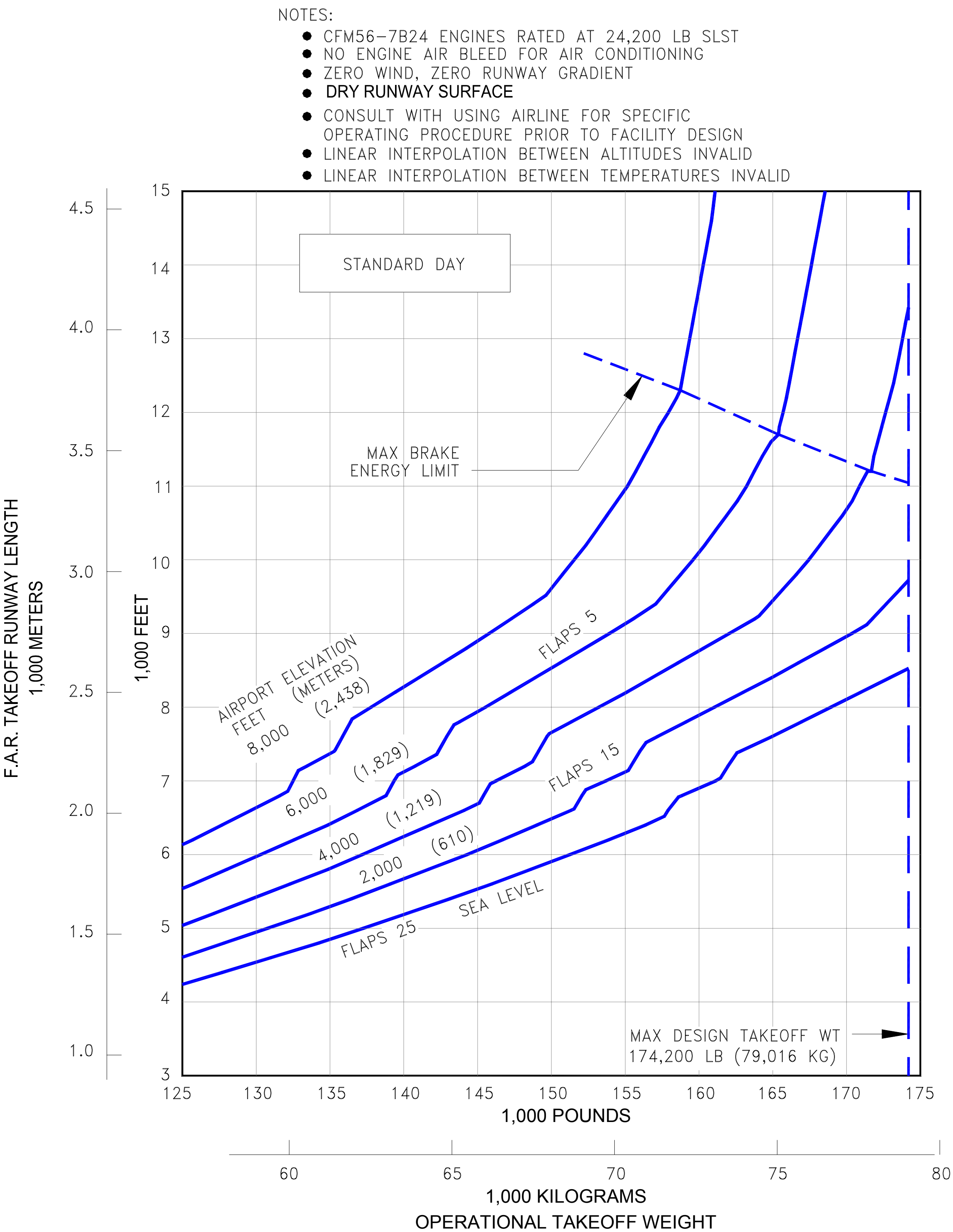
3.3.19 J.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, WET RUNWAY

MODEL 737-700 WITH WINGLETS, (CFM56-7B26 ENGINES AT 26,300 LB SLST)



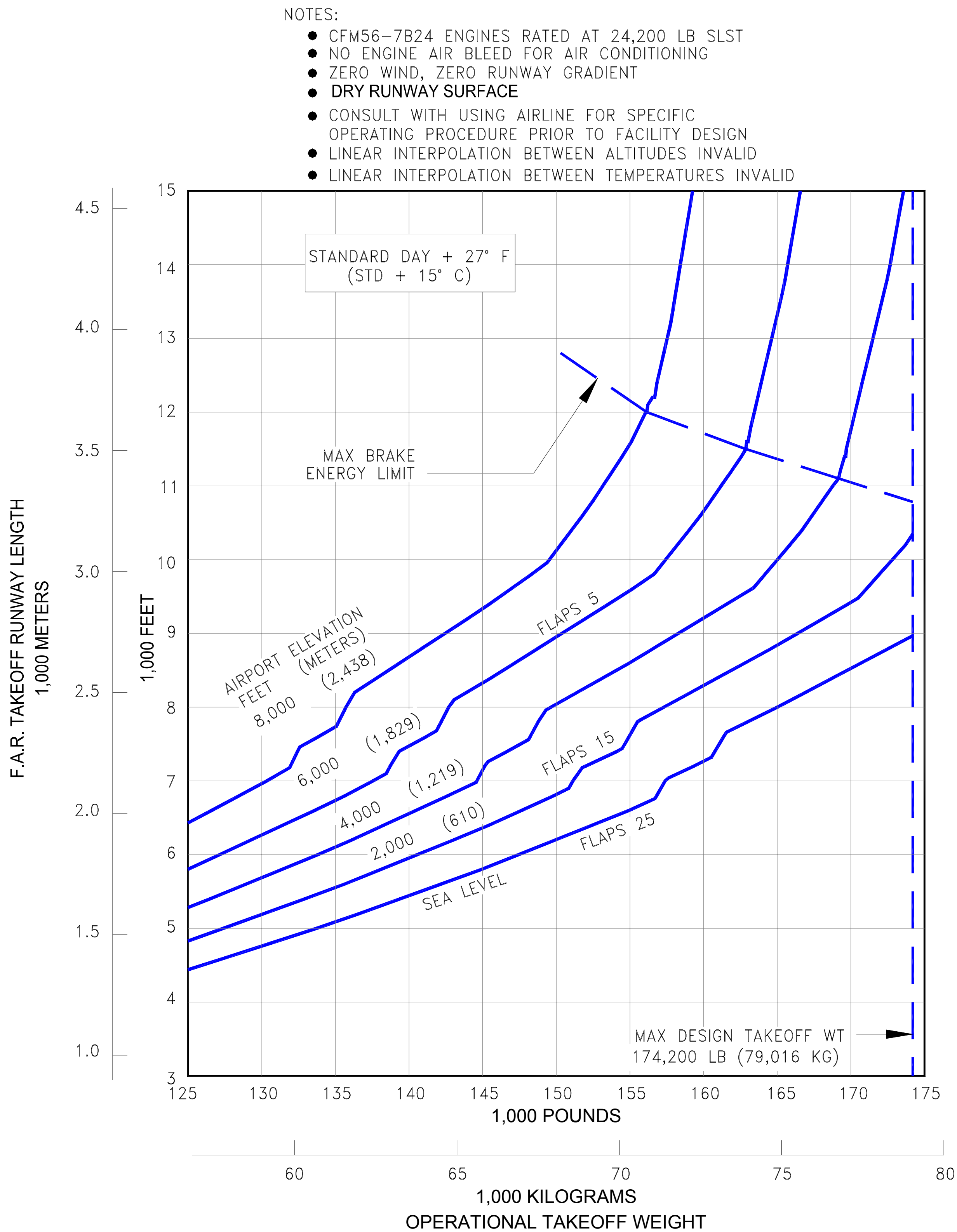
3.3.20 J.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY +27°F (STD + 15°C), WET RUNWAY

MODEL 737-700 WITH WINGLETS, , (CFM56-7B26 ENGINES AT 26,300 LB SLST)



3.3.21 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, DRY RUNWAY

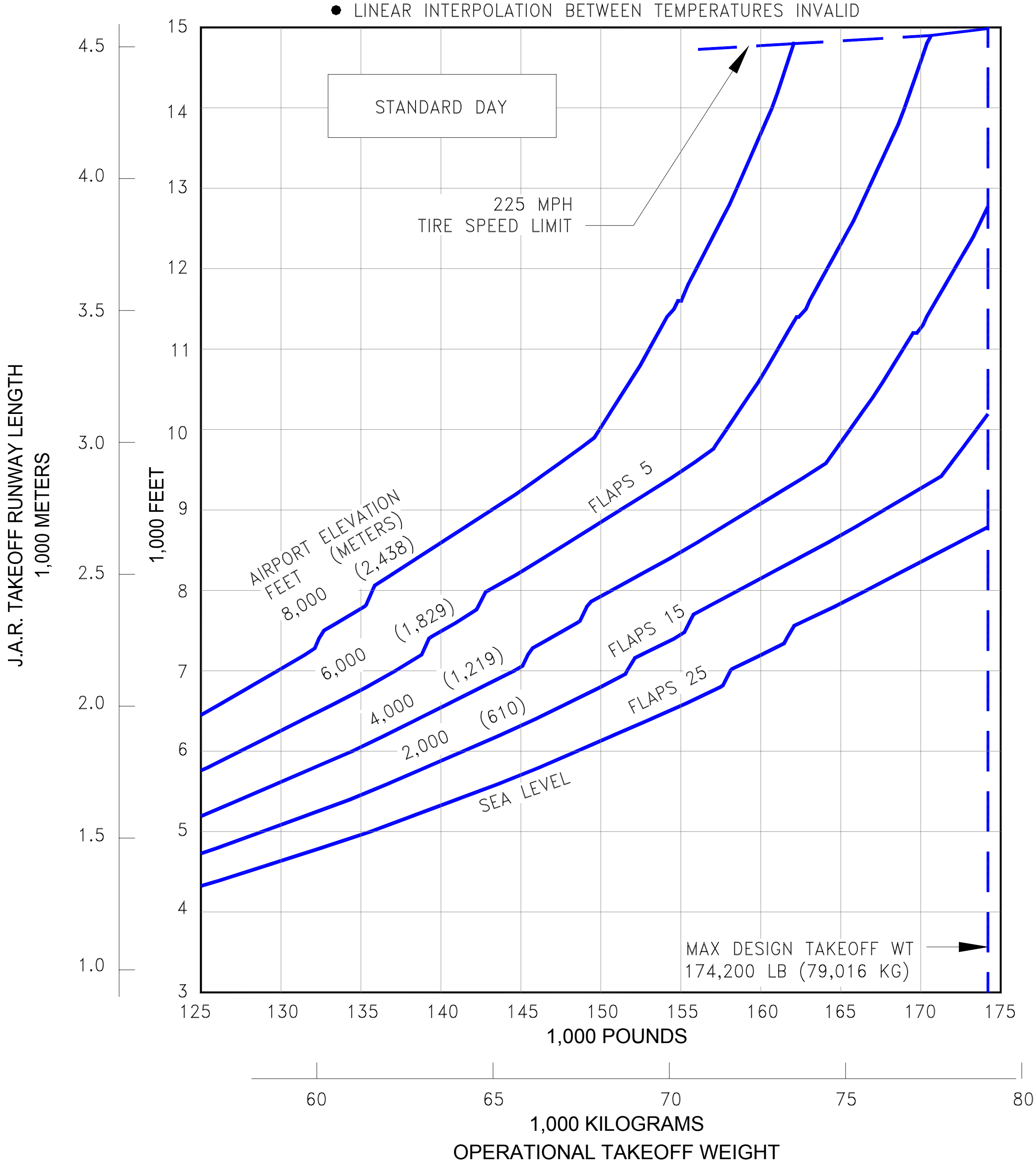
MODEL 737-800 WITH WINGLETS, (CFM56-7B24 ENGINES AT 24,200 LB SLST)



3.3.22 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY +27°F (STD + 15°C), DRY RUNWAY

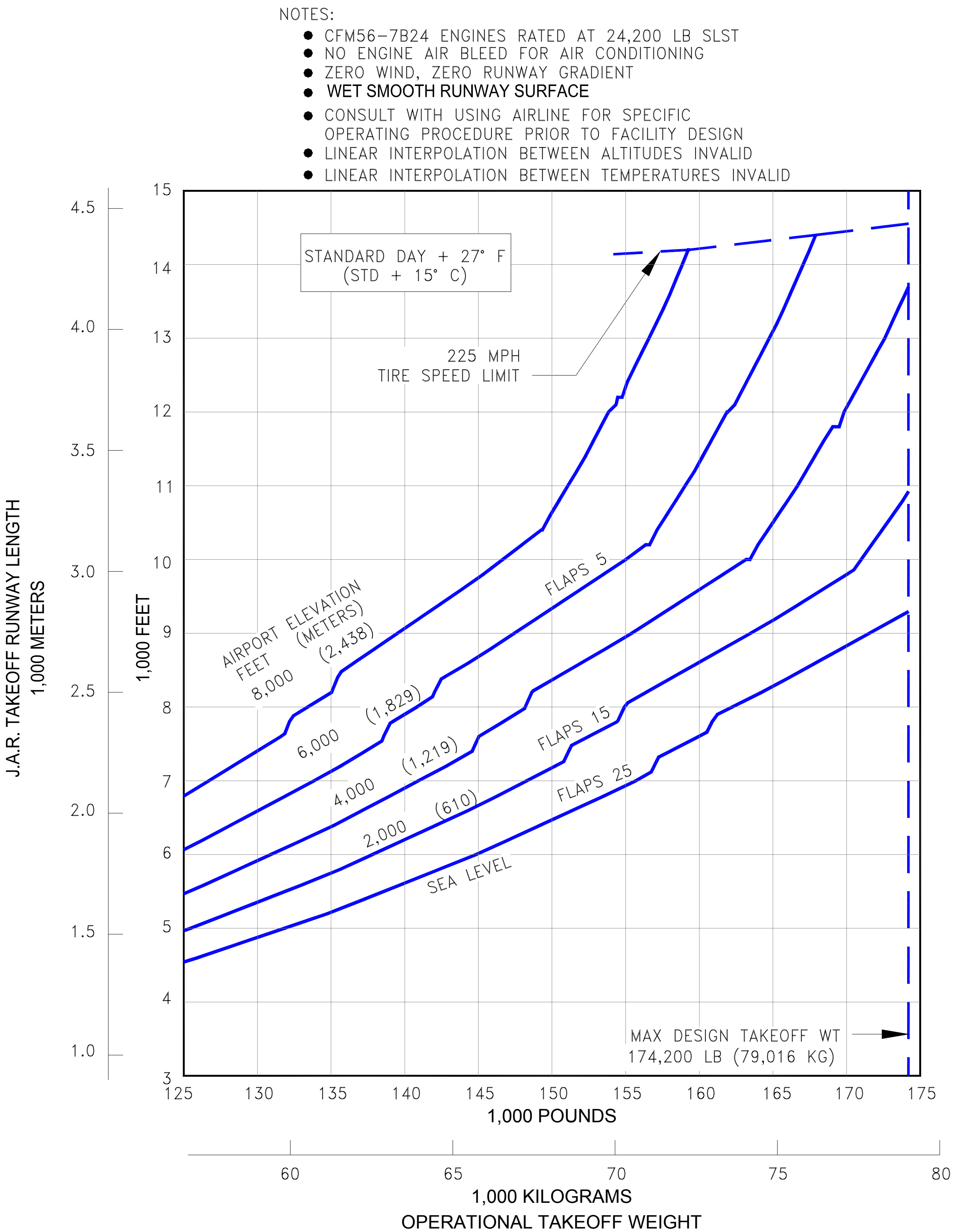
MODEL 737-800 WITH WINGLETS, (CFM56-7B24 ENGINES AT 24,200 LB SLST)

NOTES:
- CFM56-7B24 ENGINES RATED AT 24,200 LB SLST
- NO ENGINE AIR BLEED FOR AIR CONDITIONING
- ZERO WIND, ZERO RUNWAY GRADIENT
- WET SMOOTH RUNWAY SURFACE
- CONSULT WITH USING AIRLINE FOR SPECIFIC OPERATING PROCEDURE PRIOR TO FACILITY DESIGN
- LINEAR INTERPOLATION BETWEEN ALTITUDES INVALID
- LINEAR INTERPOLATION BETWEEN TEMPERATURES INVALID



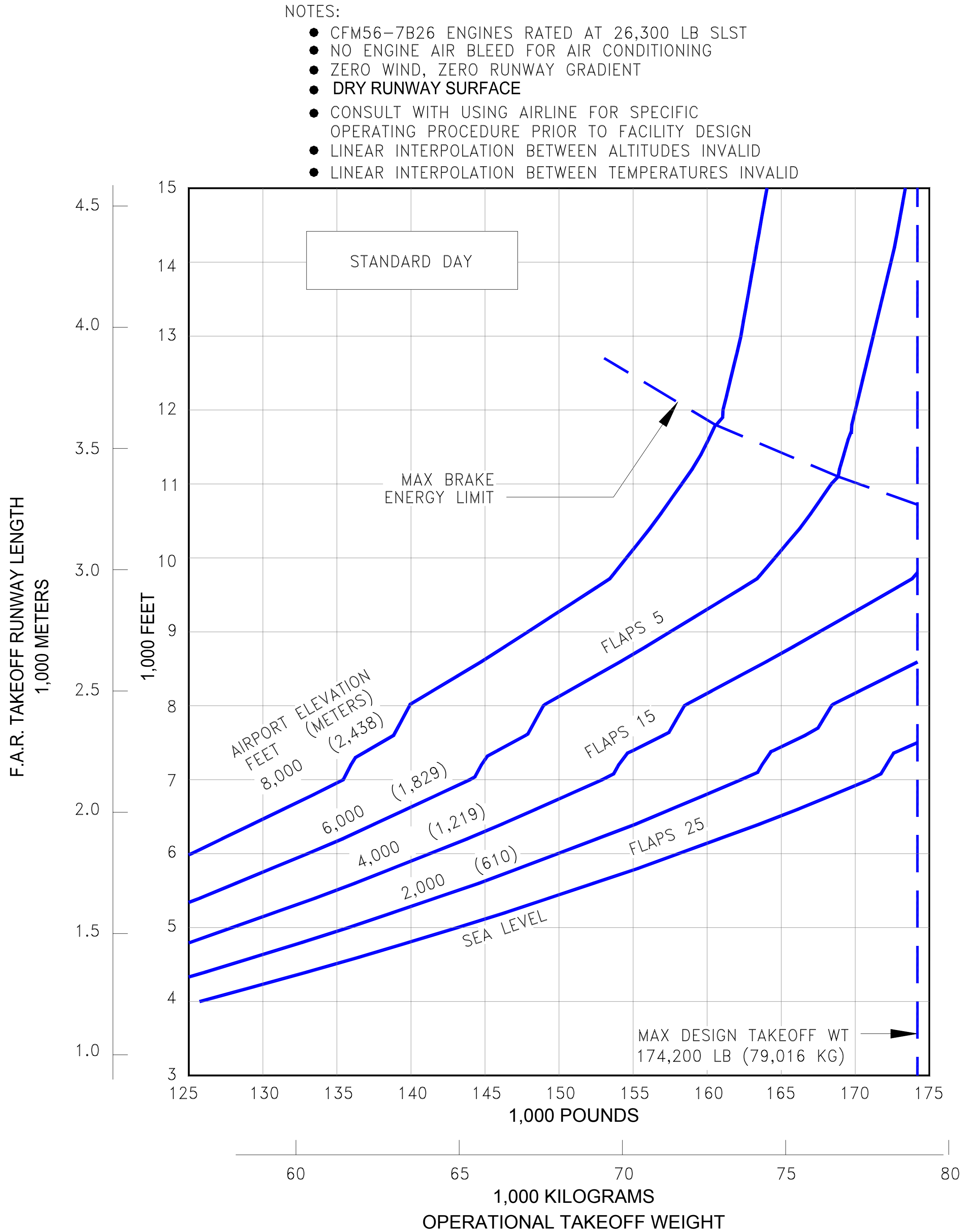
3.3.23 J.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, WET RUNWAY

MODEL 737-800 WITH WINGLETS, (CFM56-7B24 ENGINES AT 24,200 LB SLST)



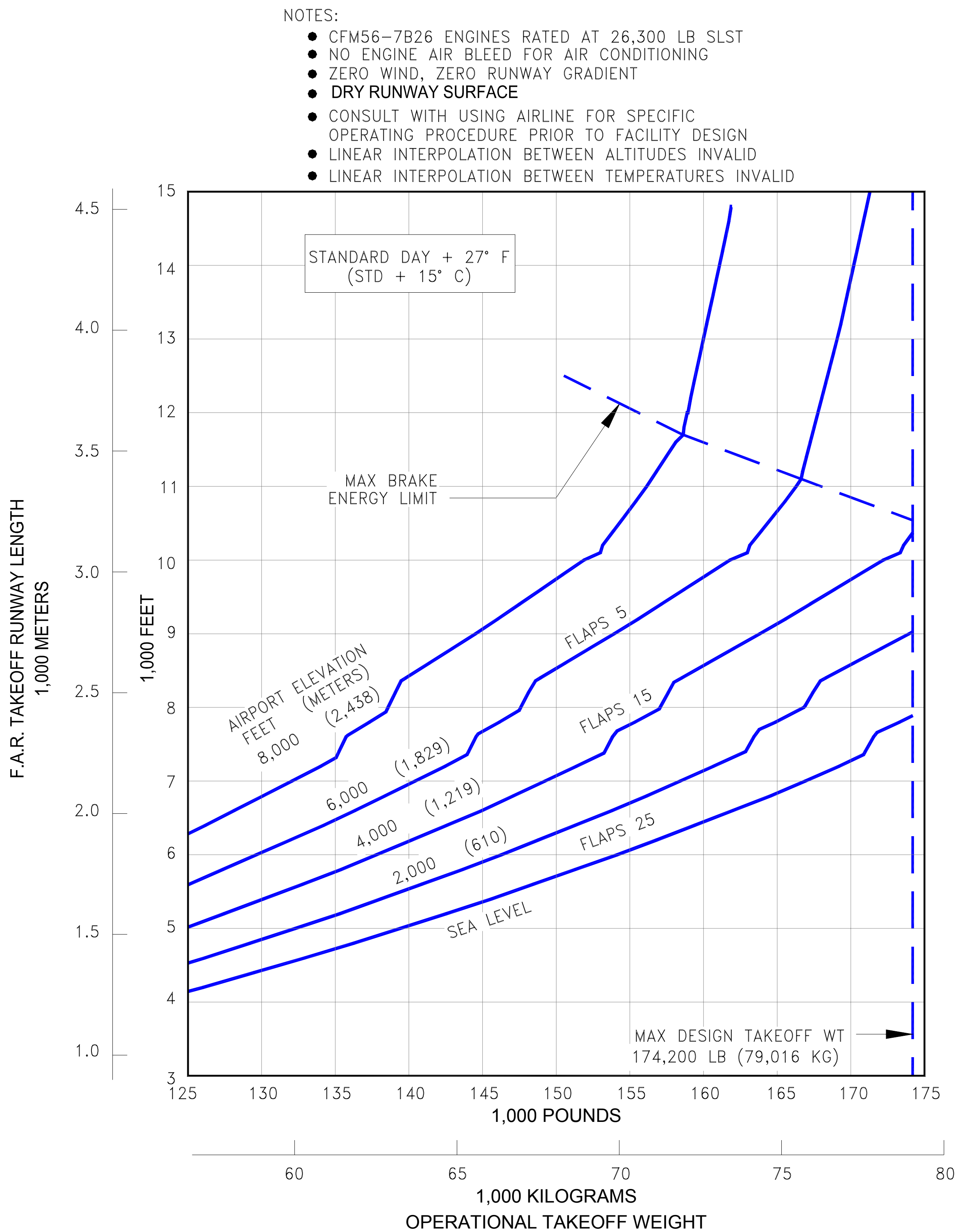
3.3.24 J.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY +27°F (STD + 15°C), WET RUNWAY

MODEL 737-800 WITH WINGLETS, (CFM56-7B24 ENGINES AT 24,200 LB SLST)



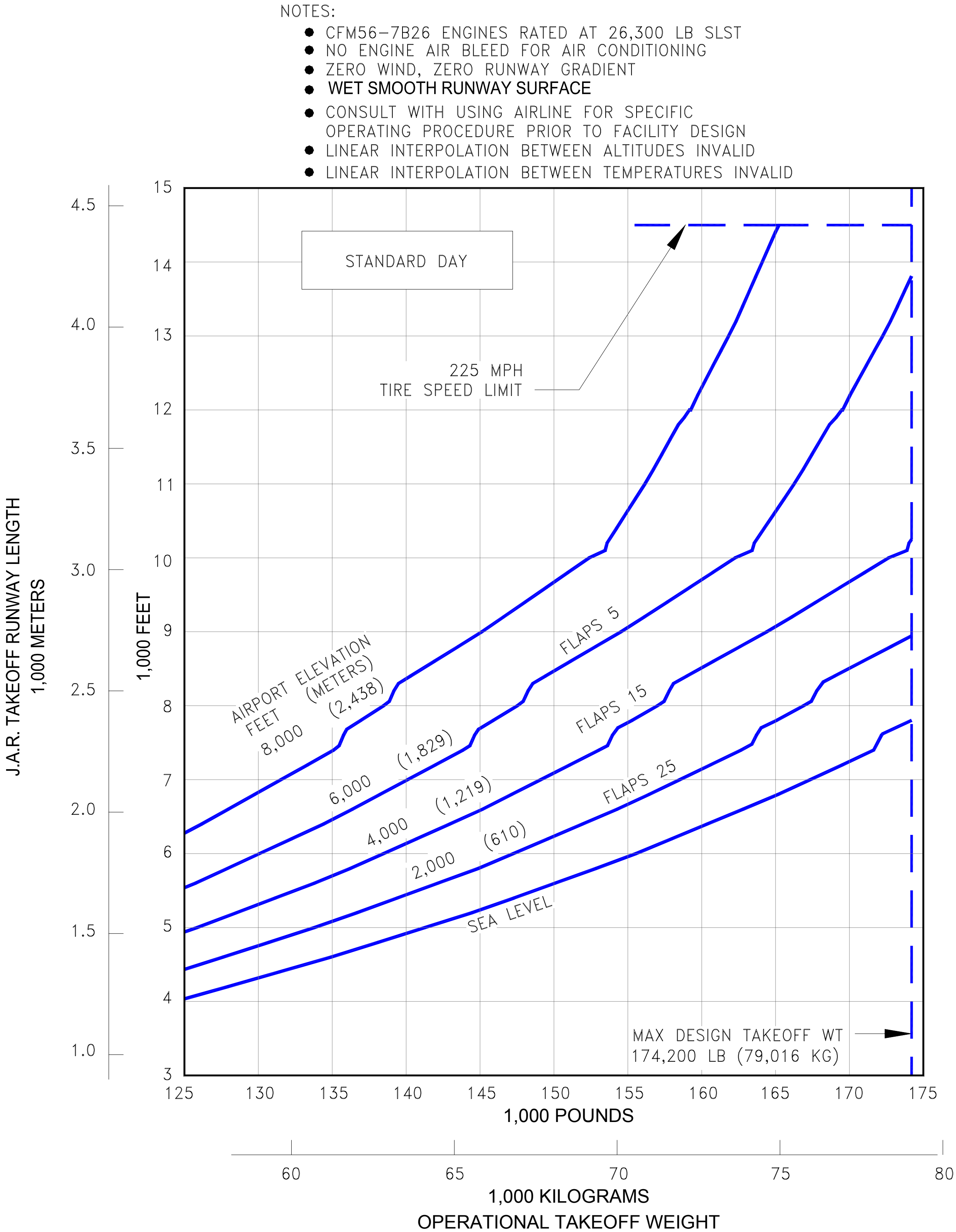
3.3.25 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, DRY RUNWAY

MODEL 737-800 WITH WINGLETS, (CFM56-7B26 ENGINES AT 26,300 LB SLST)



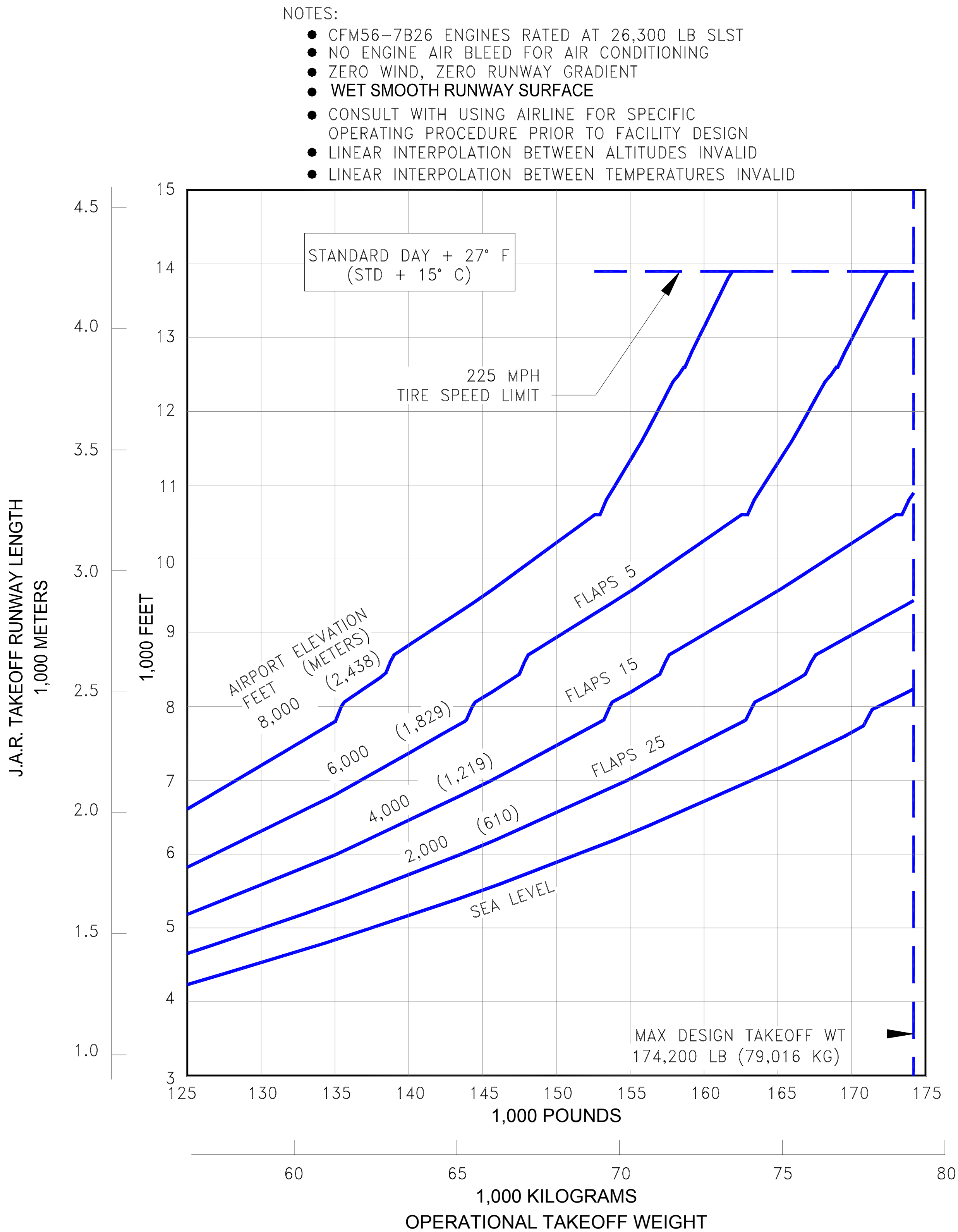
3.3.26 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY +27^{O}F (STD + 15^{O}C), DRY RUNWAY

MODEL 737-800 WITH WINGLETS, (CFM56-7B26 ENGINES AT 26,300 LB SLST)



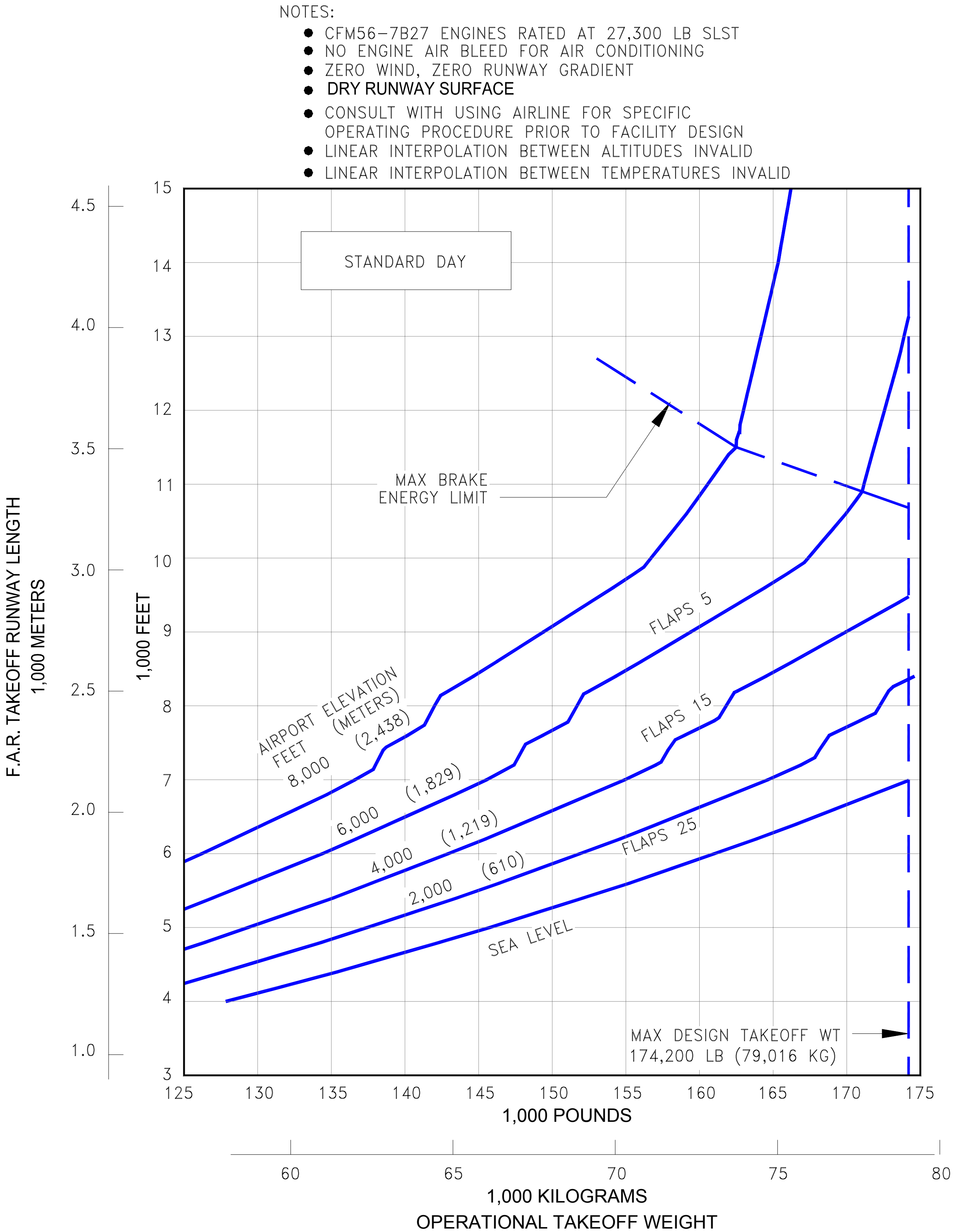
3.3.27 J.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, WET RUNWAY

MODEL 737-800 WITH WINGLETS, (CFM56-7B26 ENGINES AT 26,300 LB SLST)



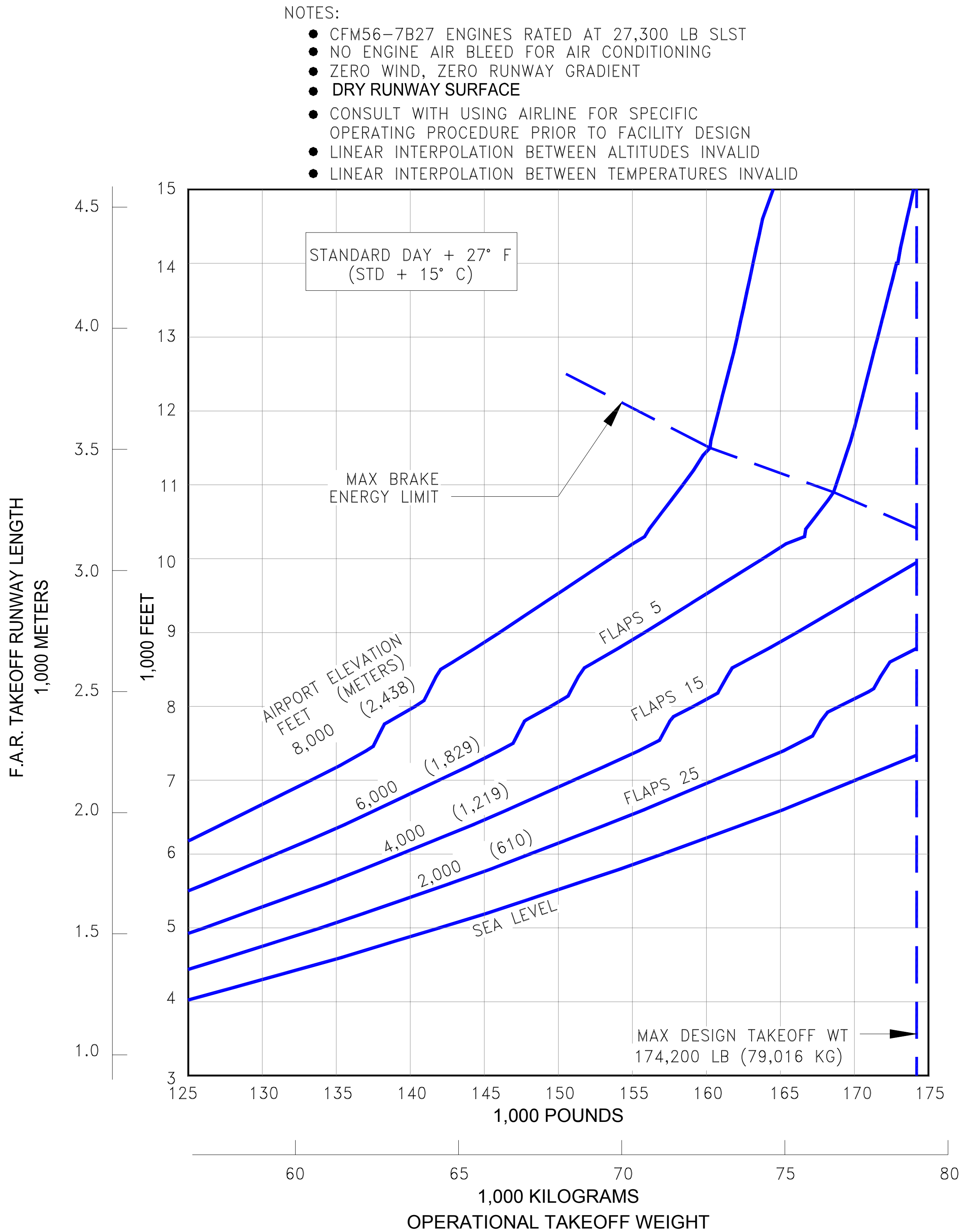
3.3.28 J.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY +27^{O}F (STD + 15^{O}C), WET RUNWAY

MODEL 737-800 WITH WINGLETS, (CFM56-7B26 ENGINES AT 26,300 LB SLST)



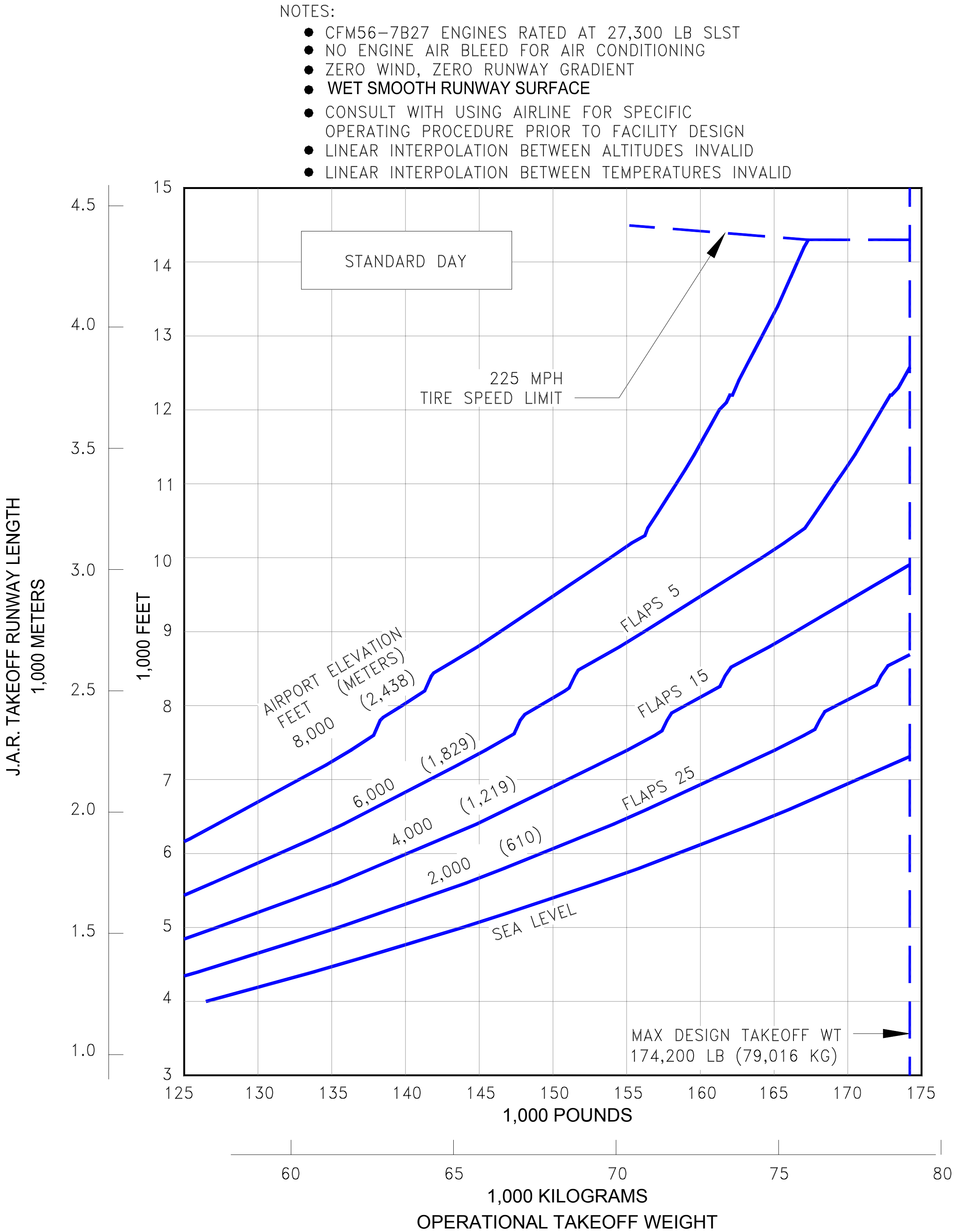
3.3.29 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, DRY RUNWAY

MODEL 737-800 WITH WINGLETS, (CFM56-7B27 ENGINES AT 27,300 LB SLST)



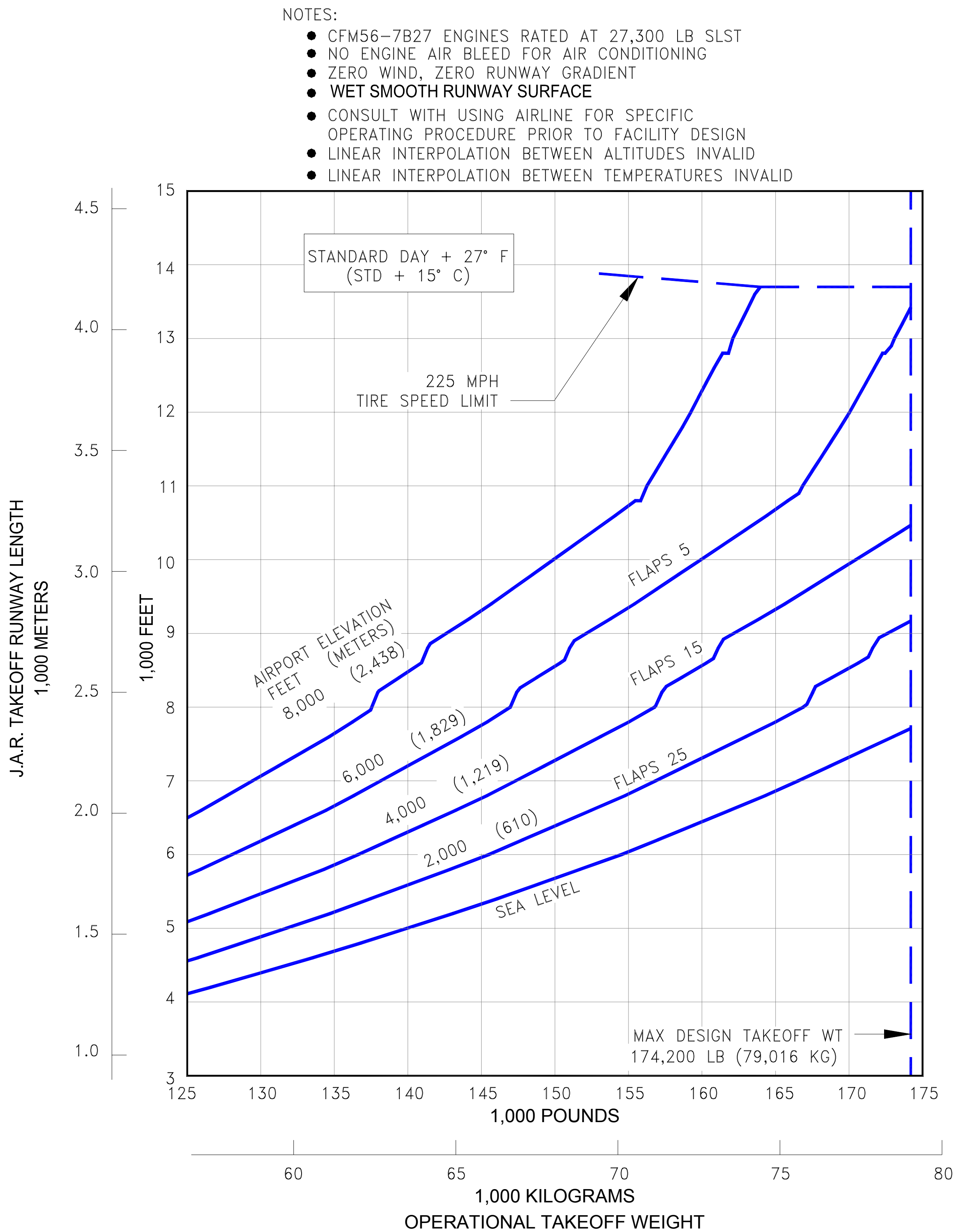
3.3.30 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY +27°F (STD + 15°C), DRY RUNWAY

MODEL 737-800 WITH WINGLETS, (CFM56-7B27 ENGINES AT 27,300 LB SLST)



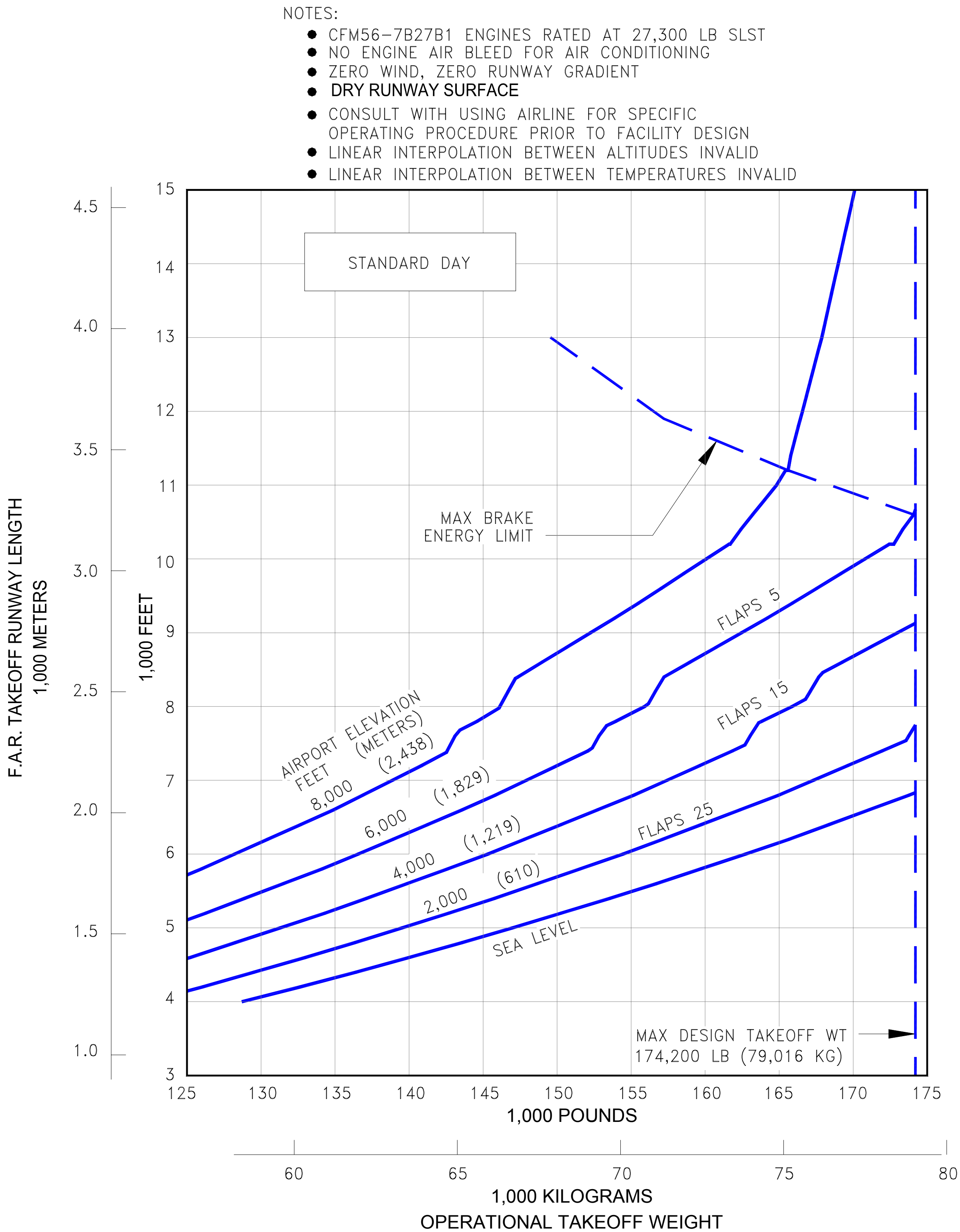
3.3.31 J.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, WET RUNWAY

MODEL 737-800 WITH WINGLETS, (CFM56-7B27 ENGINES AT 27,300 LB SLST)



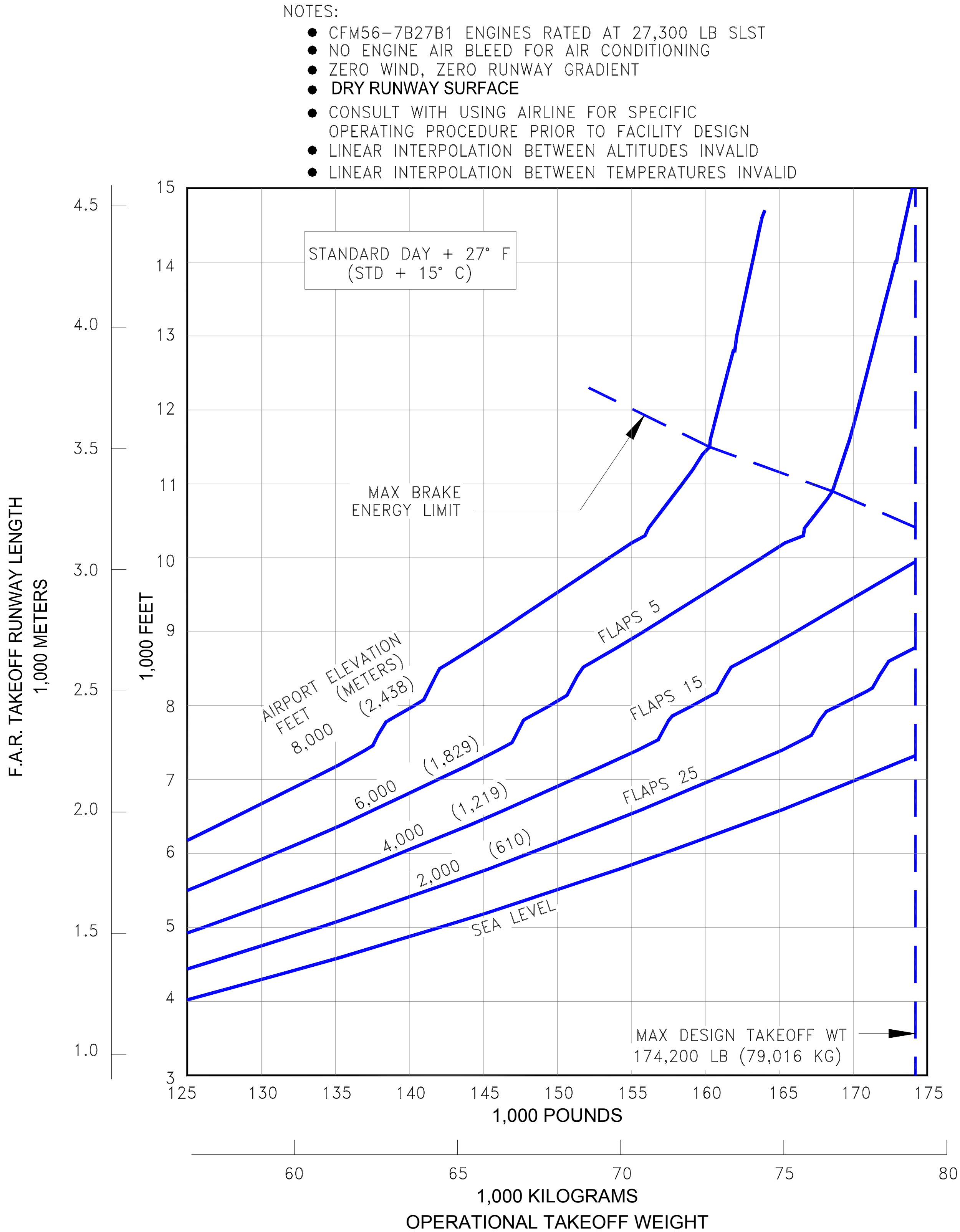
3.3.32 J.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY +27°F (STD + 15°C), WET RUNWAY

MODEL 737-800 WITH WINGLETS, (CFM56-7B27 ENGINES AT 27,300 LB SLST)



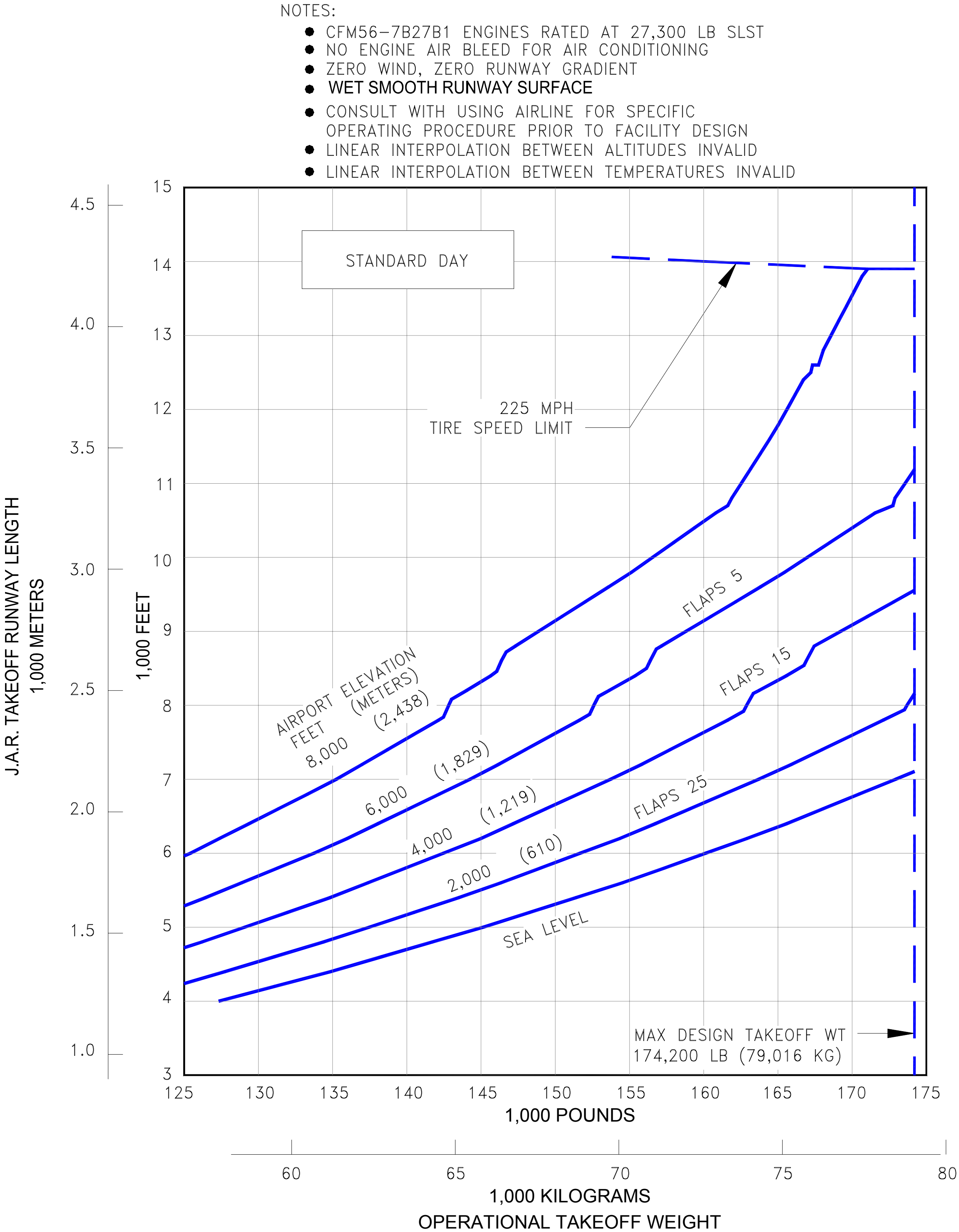
3.3.33 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, DRY RUNWAY

MODEL 737-800 WITH WINGLETS, (CFM56-7B27B1 ENGINES AT 27,300 LB SLST)



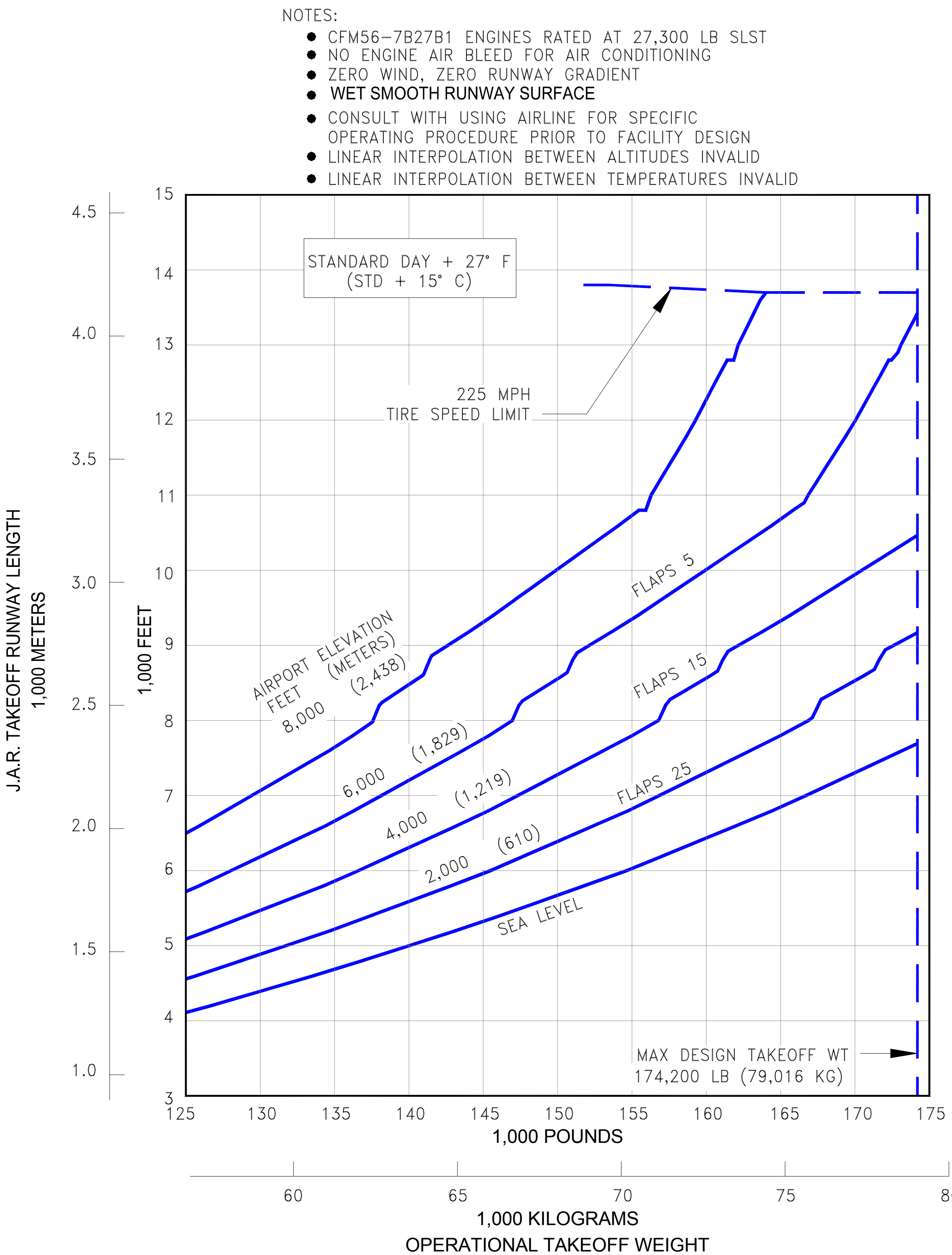
3.3.34 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY +27^{O}F (STD + 15^{O}C), DRY RUNWAY

MODEL 737-800 WITH WINGLETS, (CFM56-7B27B1 ENGINES AT 27,300 LB SLST)



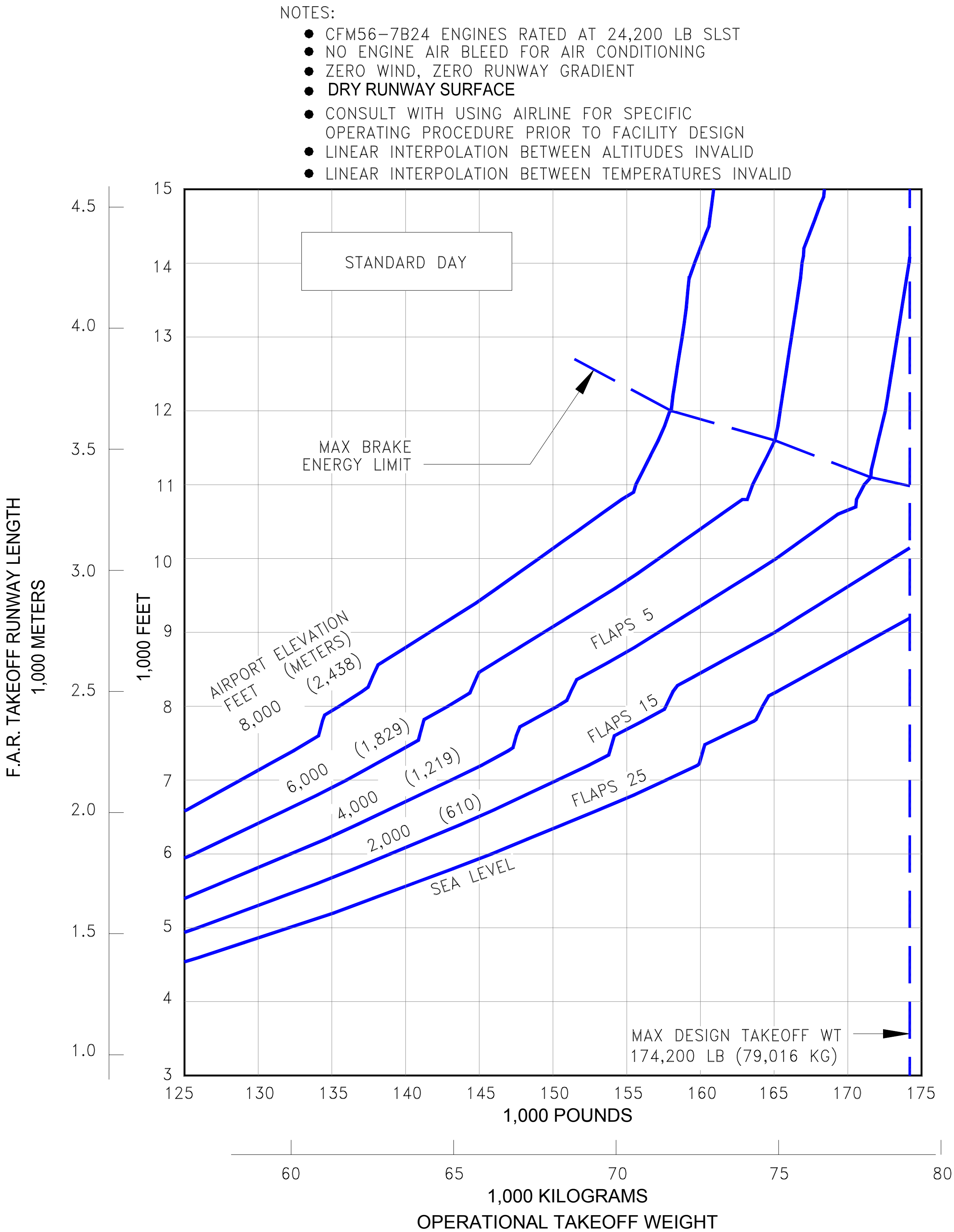
3.3.35 J.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, WET RUNWAY

MODEL 737-800 WITH WINGLETS, (CFM56-7B27B1 ENGINES AT 27,300 LB SLST)



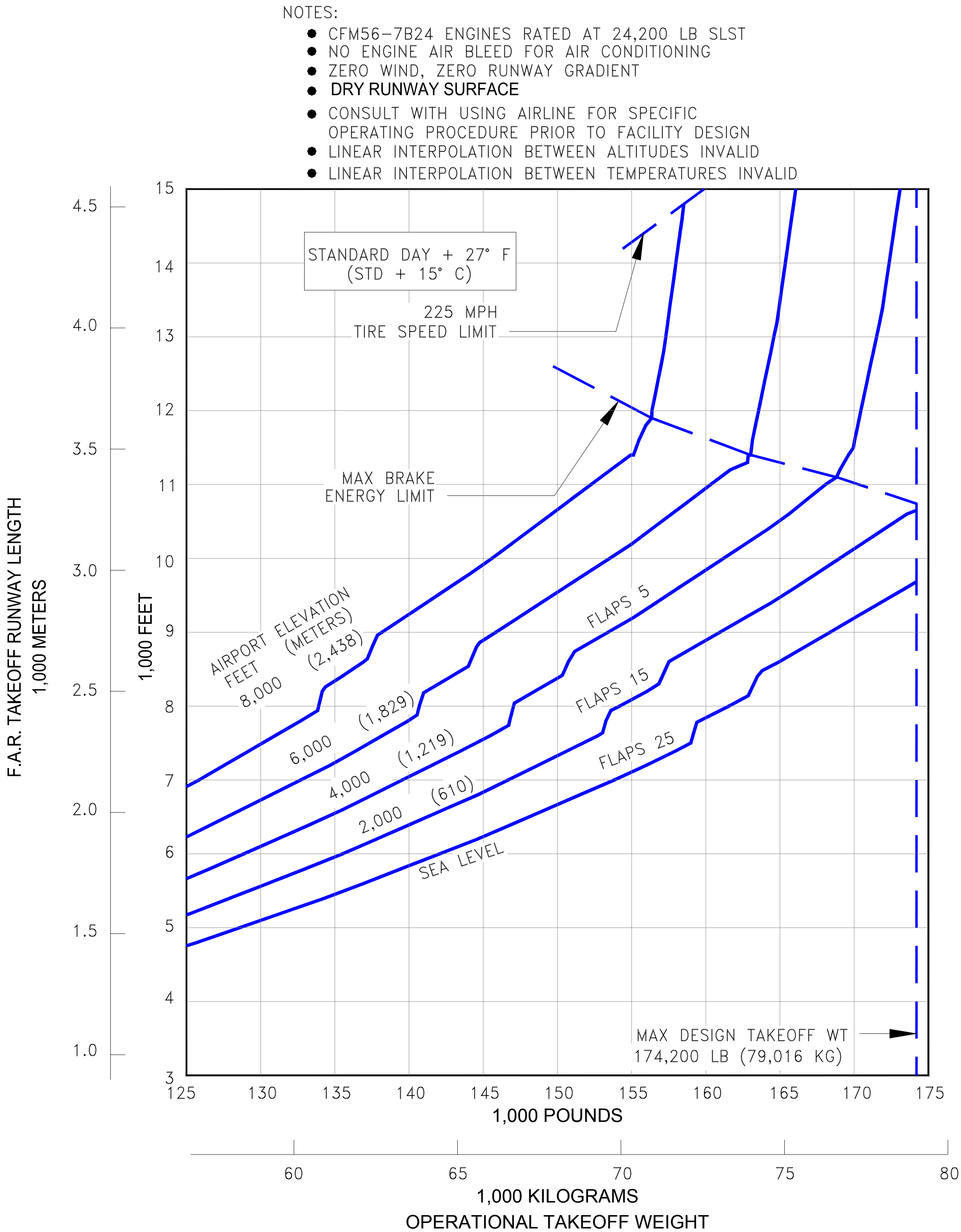
3.3.36 J.A.R. TAKEOFF RUNWAY LENTGTH REQUIREMENTS - STANDARD DAY +27^{O}F (STD + 15^{O}C), WET RUNWAY

MODEL 737-800 WITH WINGLETS, (CFM56-7B27B1 ENGINES AT 27,300 LB SLST)



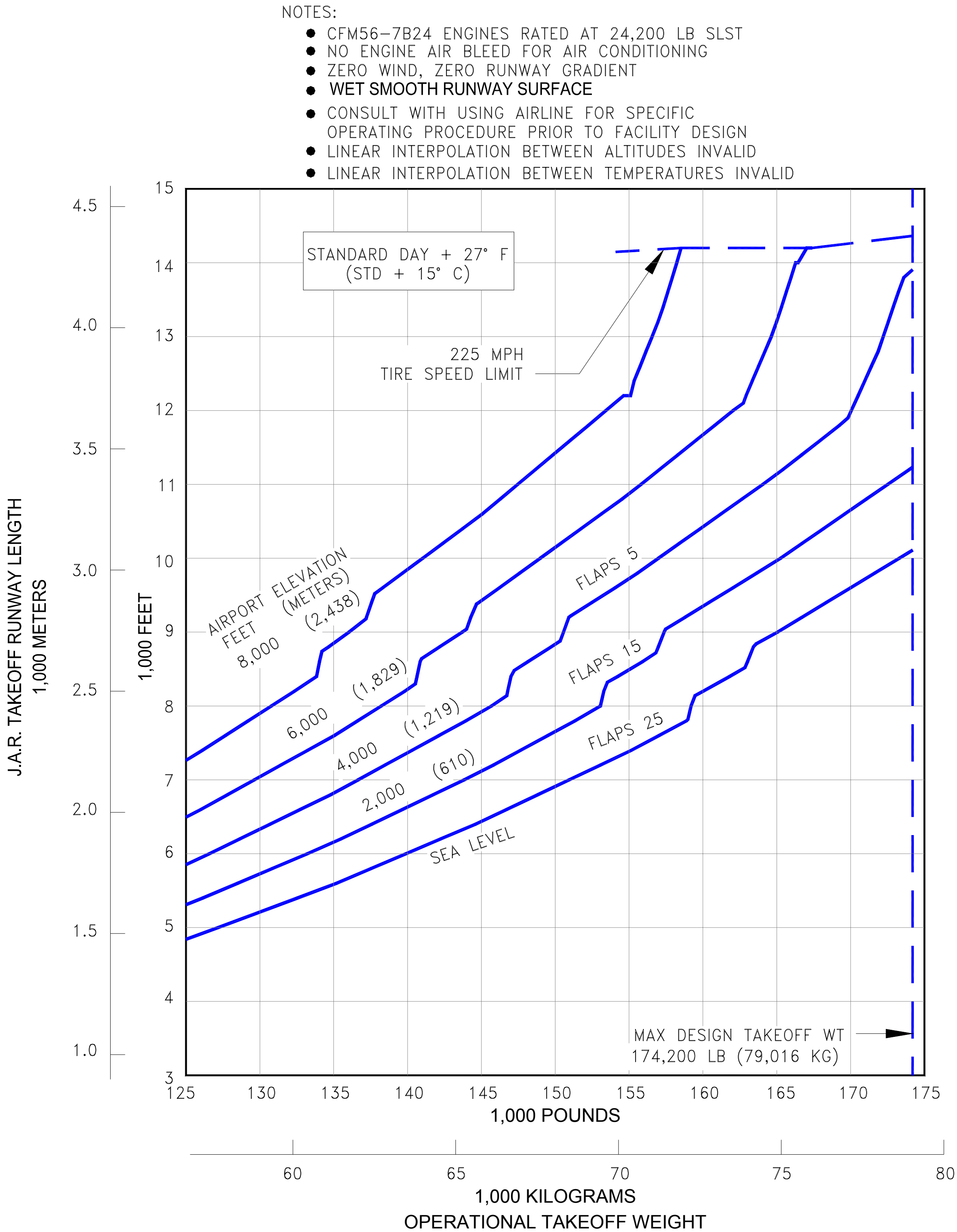
3.3.37 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, DRY RUNWAY

MODEL 737-900 WITH WINGLETS, (CFM56-7B-24 ENGINES AT 24,200 LB SLST)



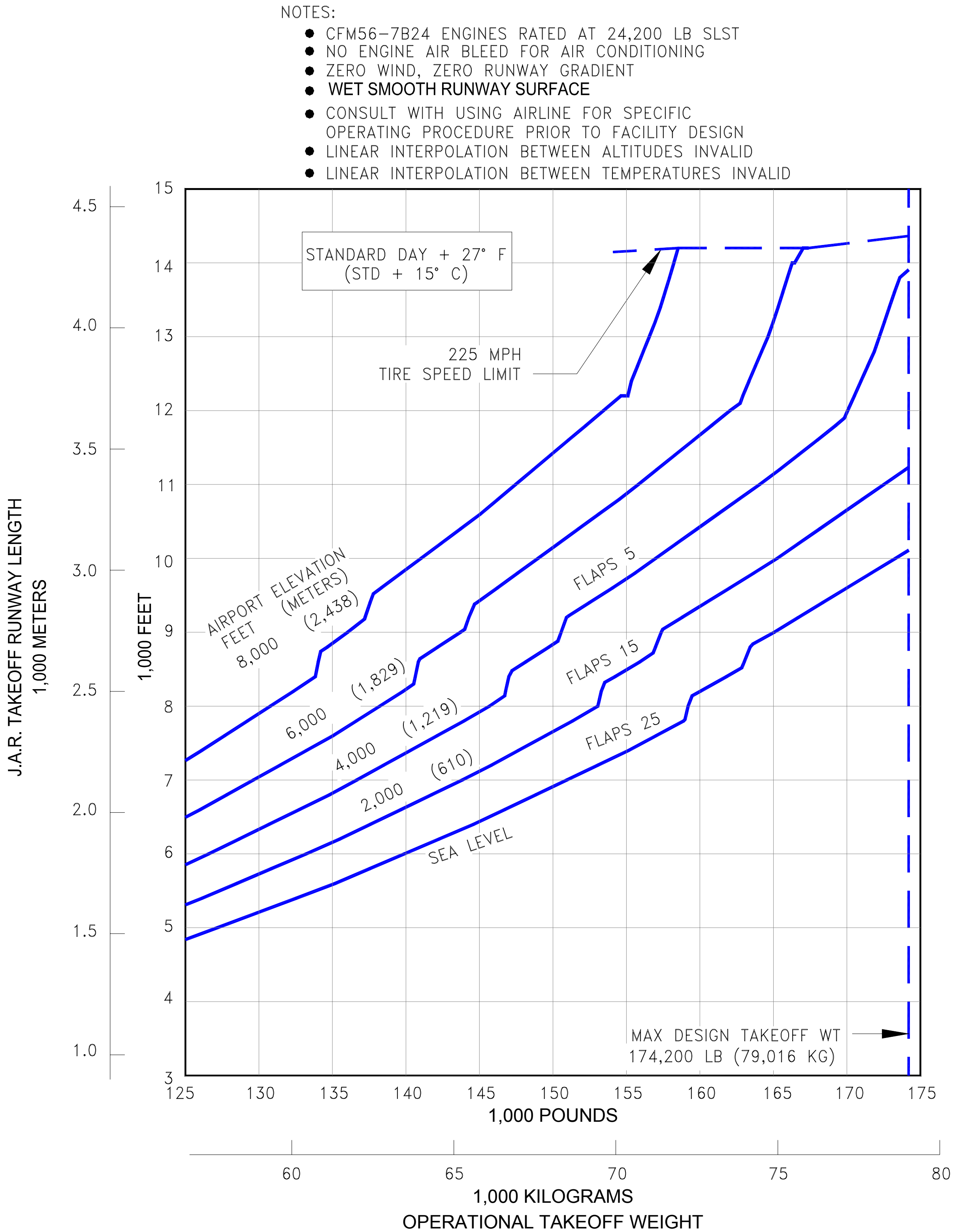
3.3.38 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY +27°F (STD + 15°C), DRY RUNWAY

MODEL 737-900 WITH WINGLETS, (CFM56-7B-24 ENGINES AT 24,200 LB SLST)



3.3.39 J.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, WET RUNWAY

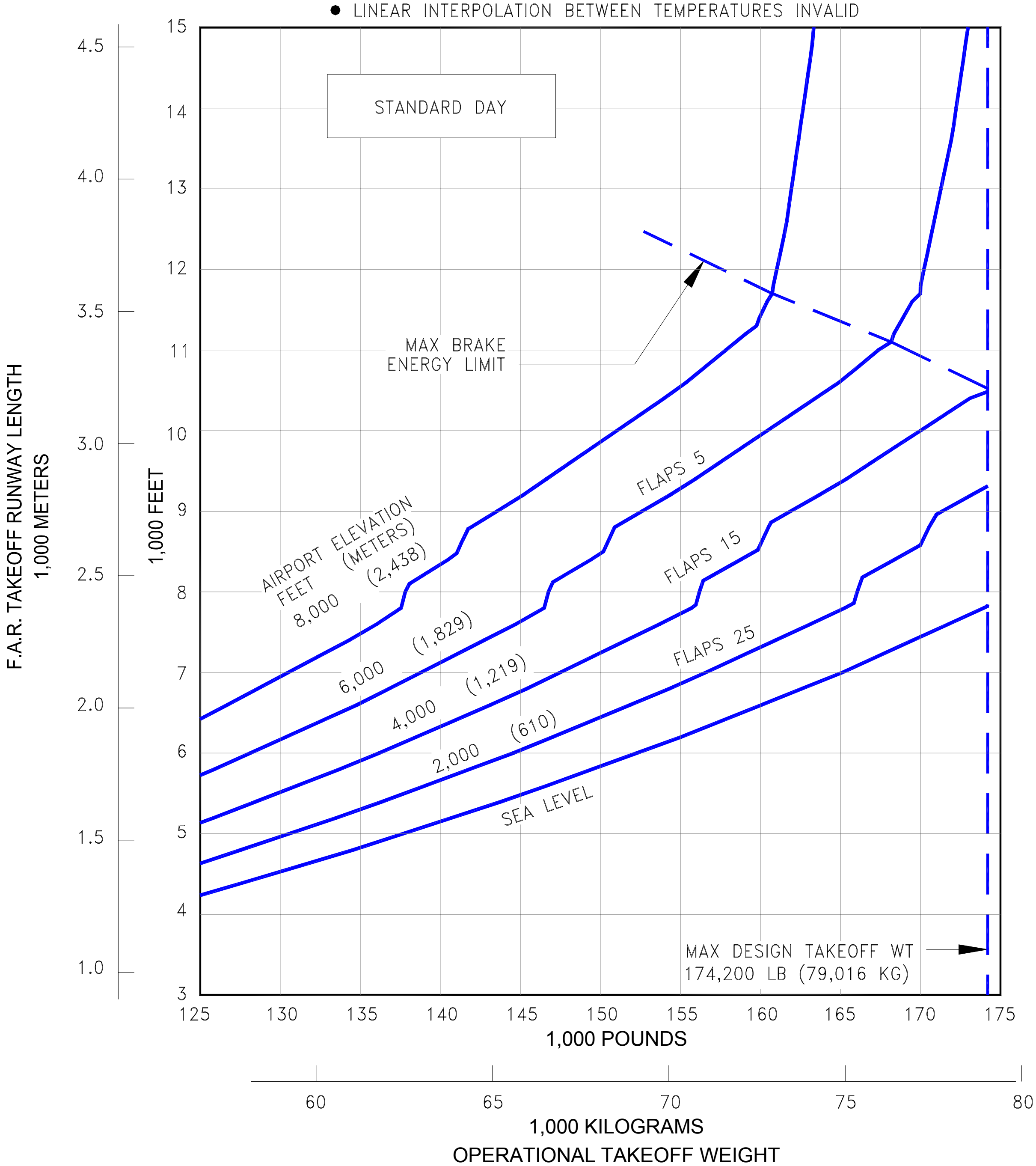
MODEL 737-900 WITH WINGLETS, (CFM56-7B-24 ENGINES AT 24,200 LB SLST)



3.3.40 J.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY +27°F (STD + 15°C), WET RUNWAY

MODEL 737-900 WITH WINGLETS, (CFM56-7B-24 ENGINES AT 24,200 LB SLST)

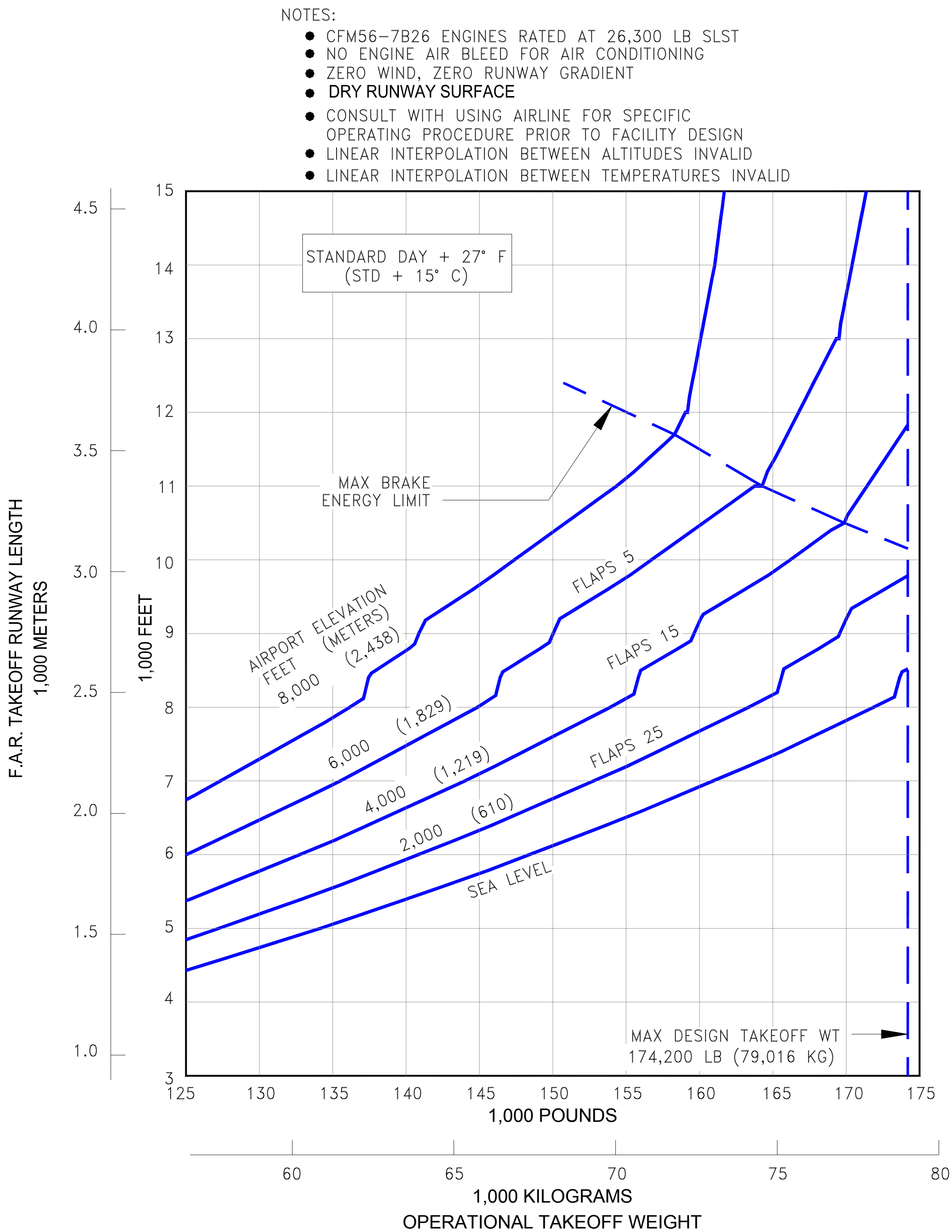
NOTES:
- CFM56–7B26 ENGINES RATED AT 26,300 LB SLST
- NO ENGINE AIR BLEED FOR AIR CONDITIONING
- ZERO WIND, ZERO RUNWAY GRADIENT
- DRY RUNWAY SURFACE
- CONSULT WITH USING AIRLINE FOR SPECIFIC OPERATING PROCEDURE PRIOR TO FACILITY DESIGN
- LINEAR INTERPOLATION BETWEEN ALTITUDES INVALID
- LINEAR INTERPOLATION BETWEEN TEMPERATURES INVALID



3.3.41 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, DRY RUNWAY

MODEL 737-900 WITH WINGLETS, (CFM56-7B26 ENGINES AT 26,300 LB SLST)

PRELIMINARY INFORMATION

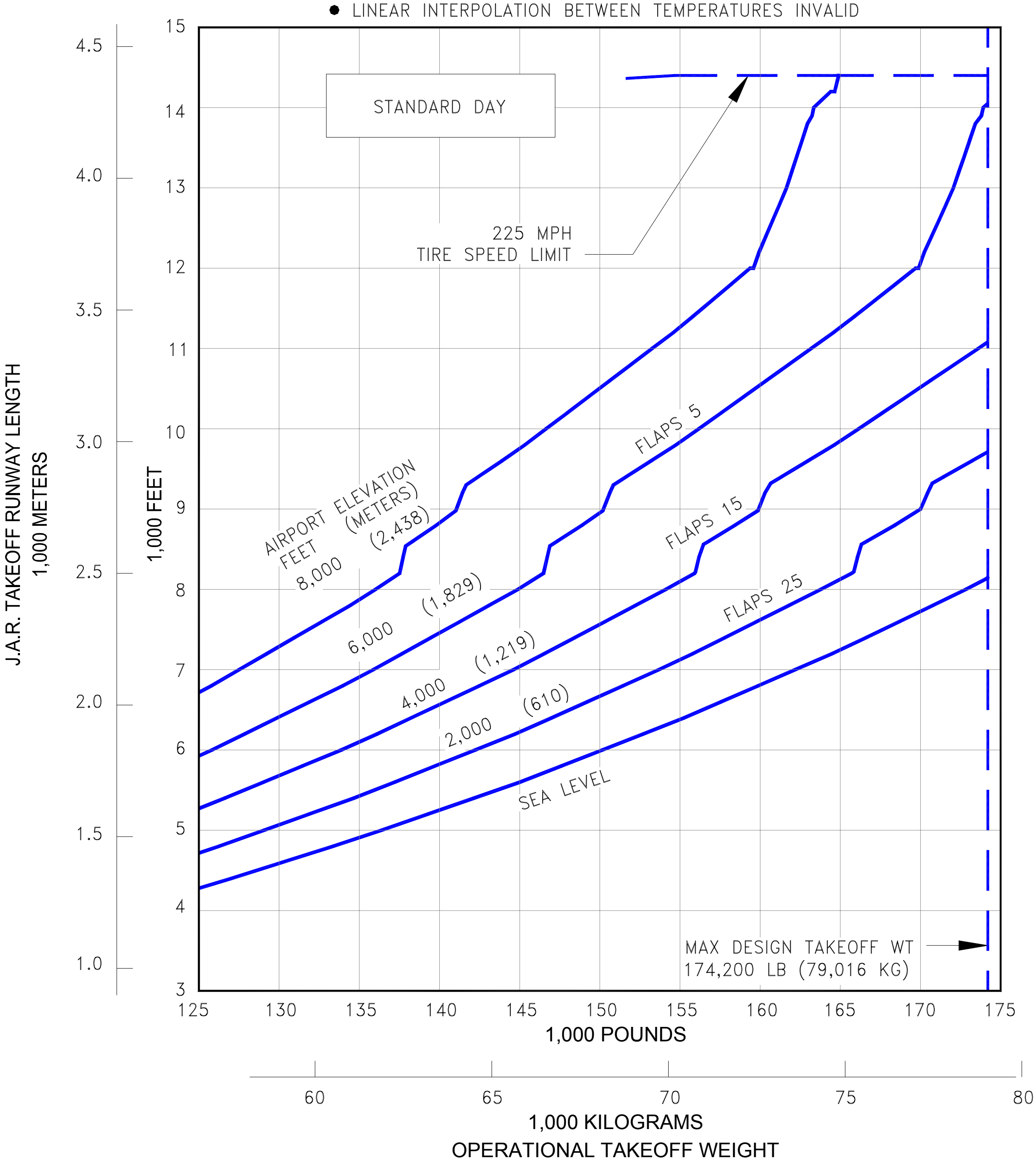


3.3.42 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY +27°F (STD + 15°C), DRY RUNWAY

MODEL 737-900 WITH WINGLETS, (CFM56-7B26 ENGINES AT 26,300 LB SLST)

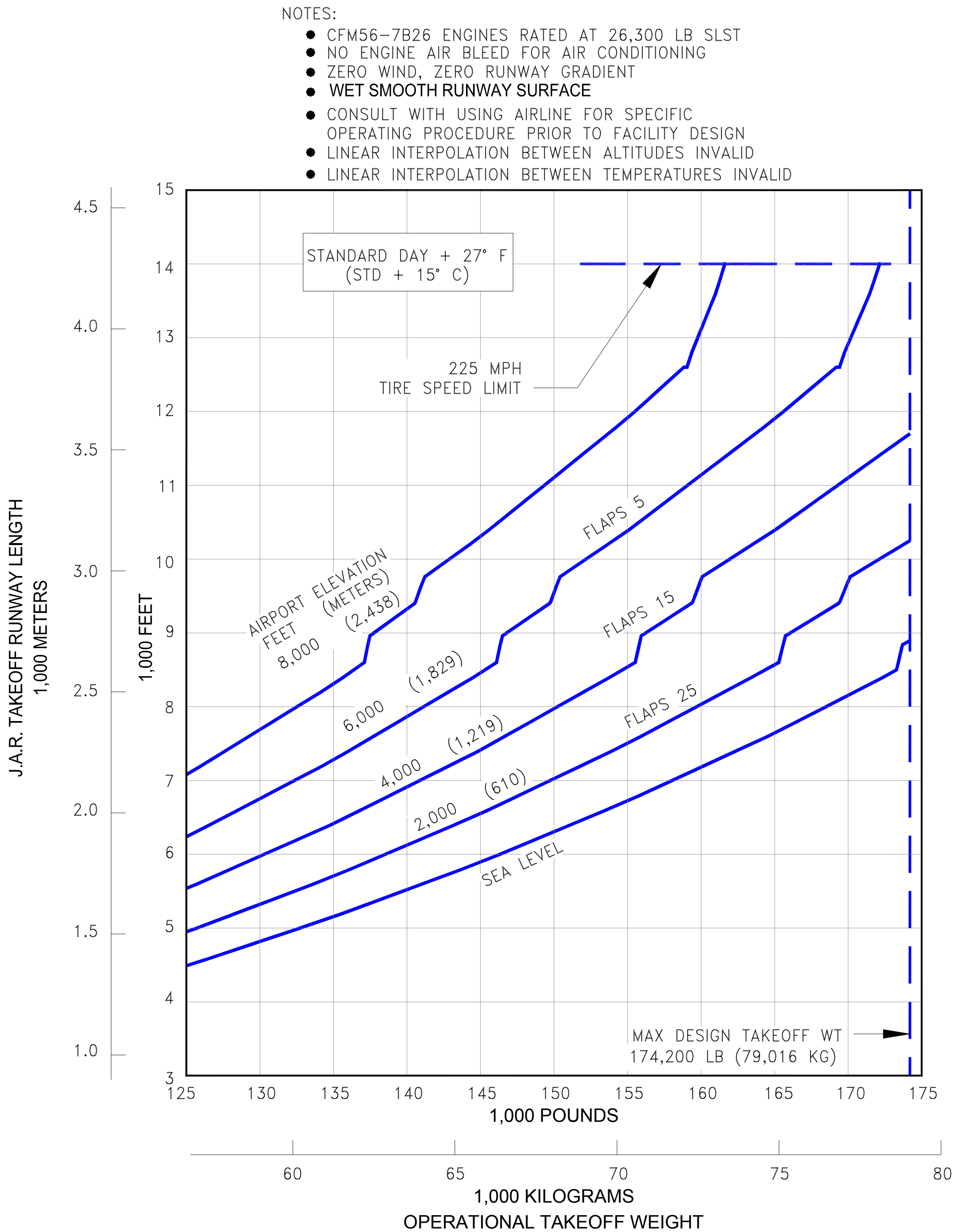
PRELIMINARY INFORMATION

NOTES:
- CFM56-7B26 ENGINES RATED AT 26,300 LB SLST
- NO ENGINE AIR BLEED FOR AIR CONDITIONING
- ZERO WIND, ZERO RUNWAY GRADIENT
- WET SMOOTH RUNWAY SURFACE
- CONSULT WITH USING AIRLINE FOR SPECIFIC OPERATING PROCEDURE PRIOR TO FACILITY DESIGN
- LINEAR INTERPOLATION BETWEEN ALTITUDES INVALID
- LINEAR INTERPOLATION BETWEEN TEMPERATURES INVALID



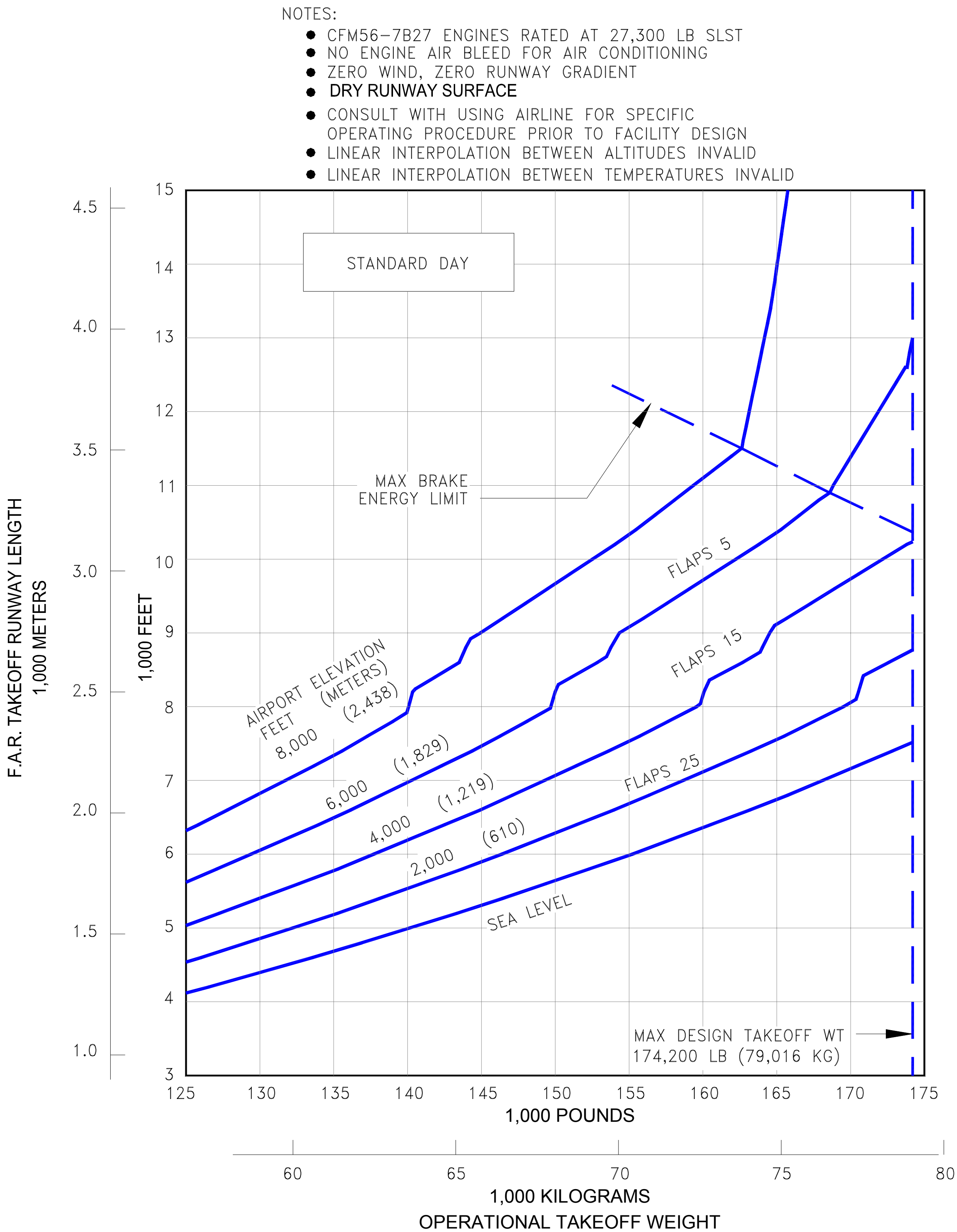
3.3.43 J.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, WET RUNWAY

MODEL 737-900 WITH WINGLETS, (CFM56-7B26 ENGINES AT 26,300 LB SLST)



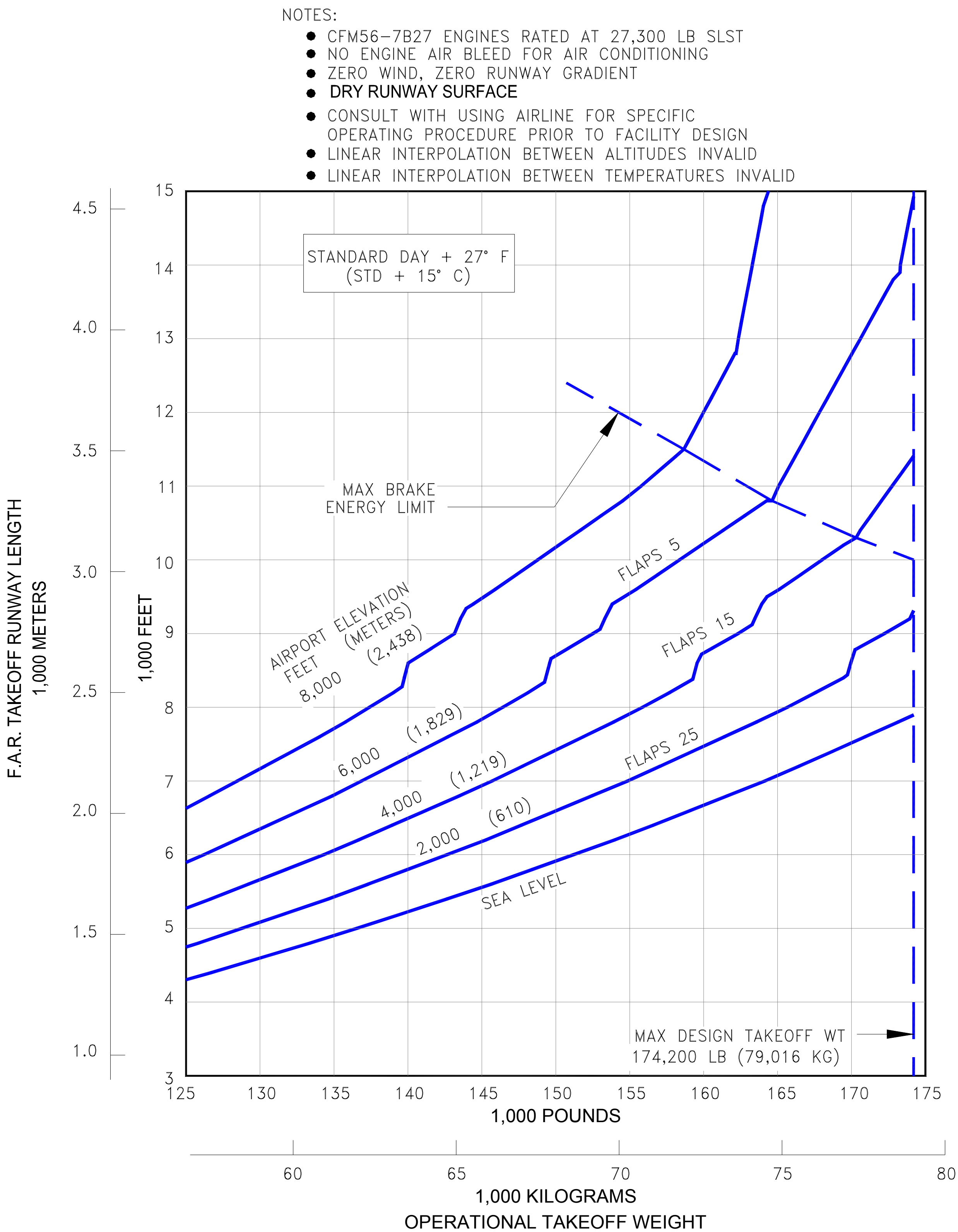
3.3.44 J.A.R. TAKEOFF RUNWAY LENTGTH REQUIREMENTS - STANDARD DAY +27°F (STD + 15°C), WET RUNWAY

MODEL 737-900 WITH WINGLETS, (CFM56-7B26 ENGINES AT 26,300 LB SLST)



3.3.45 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, DRY RUNWAY

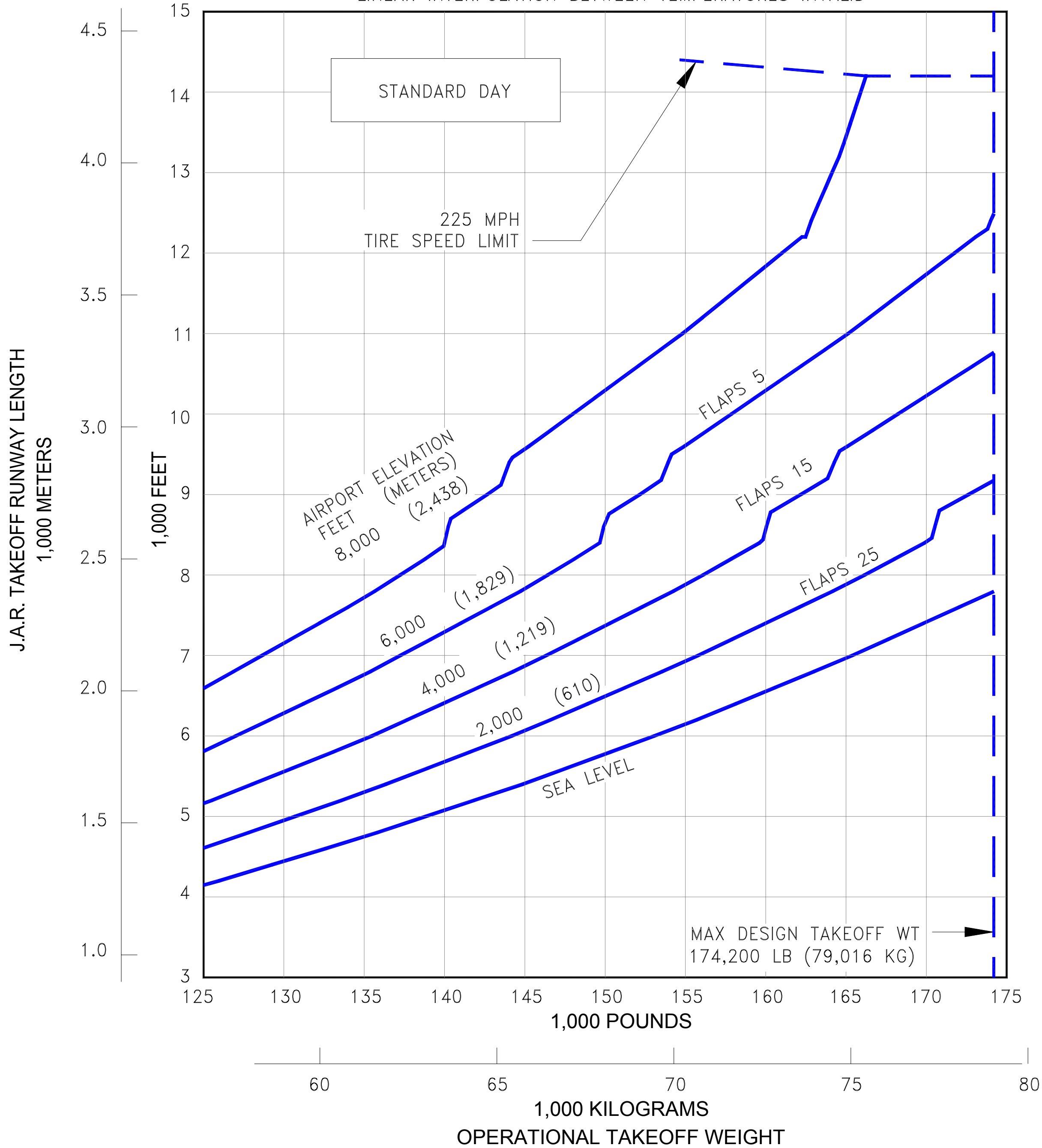
MODEL 737-900 WITH WINGLETS, (CFM56-7B27 ENGINES AT 27,300 LB SLST)



3.3.46 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY +27^{O}F (STD + 15^{O}C), DRY RUNWAY

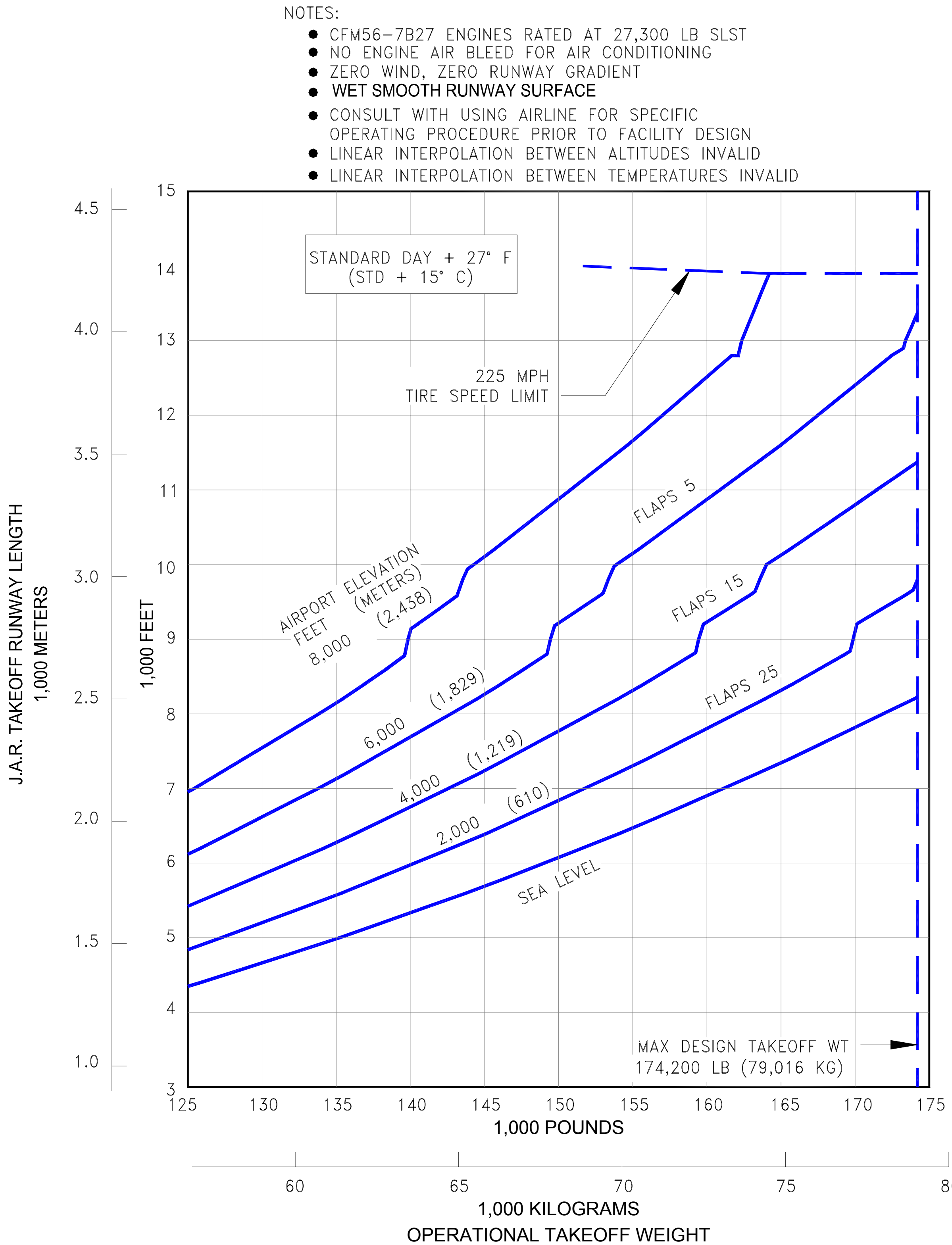
MODEL 737-900 WITH WINGLETS, (CFM56-7B27 ENGINES AT 27,300 LB SLST)

NOTES:
- CFM56-7B27 ENGINES RATED AT 27,300 LB SLST
- NO ENGINE AIR BLEED FOR AIR CONDITIONING
- ZERO WIND, ZERO RUNWAY GRADIENT
- WET SMOOTH RUNWAY SURFACE
- CONSULT WITH USING AIRLINE FOR SPECIFIC OPERATING PROCEDURE PRIOR TO FACILITY DESIGN
- LINEAR INTERPOLATION BETWEEN ALTITUDES INVALID
- LINEAR INTERPOLATION BETWEEN TEMPERATURES INVALID



3.3.47 J.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, WET RUNWAY

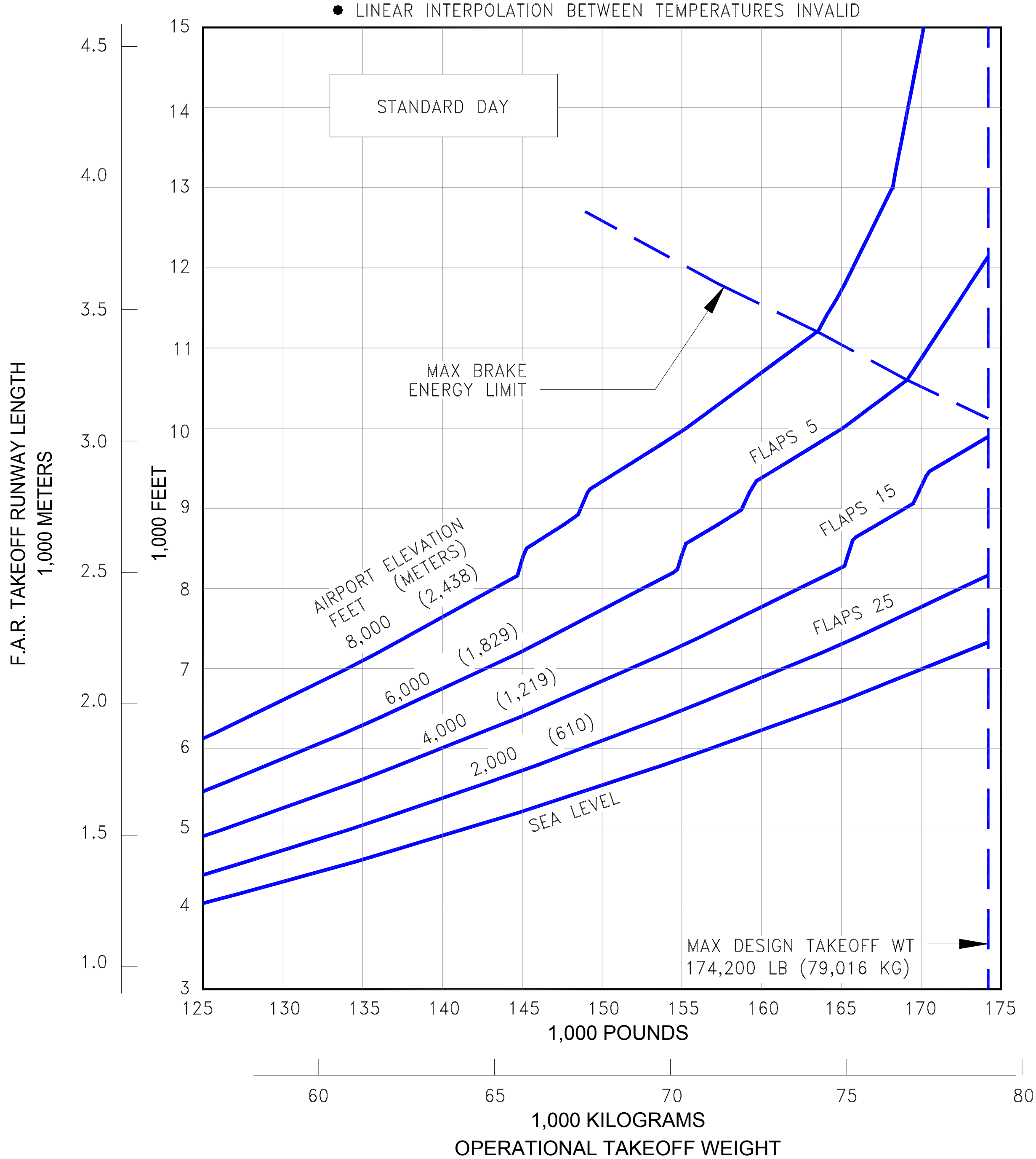
MODEL 737-900 WITH WINGLETS, (CFM56-7B27 ENGINES AT 27,300 LB SLST)



3.3.48 J.A.R. TAKEOFF RUNWAY LENTGTH REQUIREMENTS - STANDARD DAY +27°F (STD + 15°C), WET RUNWAY

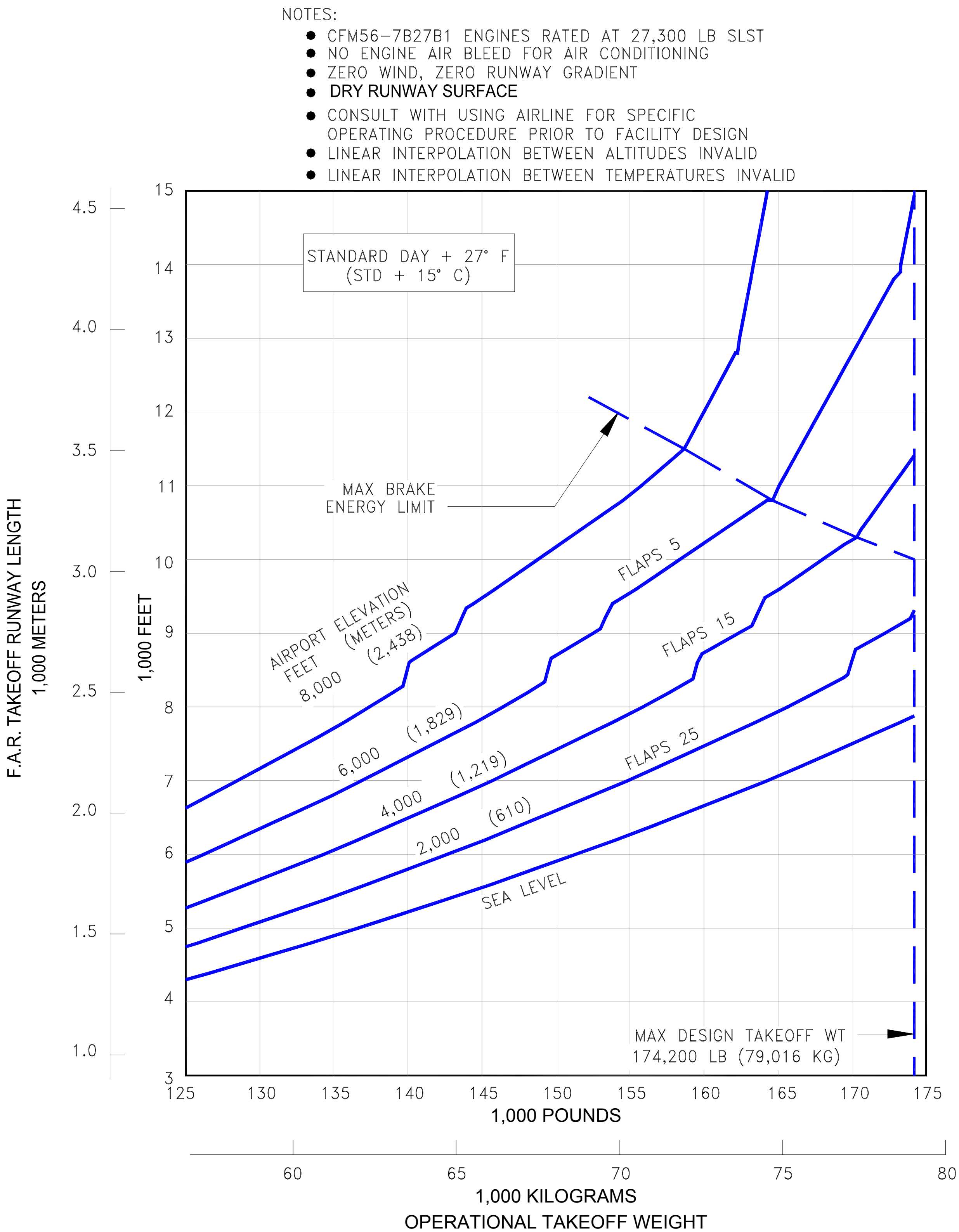
MODEL 737-900 WITH WINGLETS, (CFM56-7B27 ENGINES AT 27,300 LB SLST)

NOTES:
- CFM56-7B27B1 ENGINES RATED AT 27,300 LB SLST
- NO ENGINE AIR BLEED FOR AIR CONDITIONING
- ZERO WIND, ZERO RUNWAY GRADIENT
- DRY RUNWAY SURFACE
- CONSULT WITH USING AIRLINE FOR SPECIFIC OPERATING PROCEDURE PRIOR TO FACILITY DESIGN
- LINEAR INTERPOLATION BETWEEN ALTITUDES INVALID
- LINEAR INTERPOLATION BETWEEN TEMPERATURES INVALID



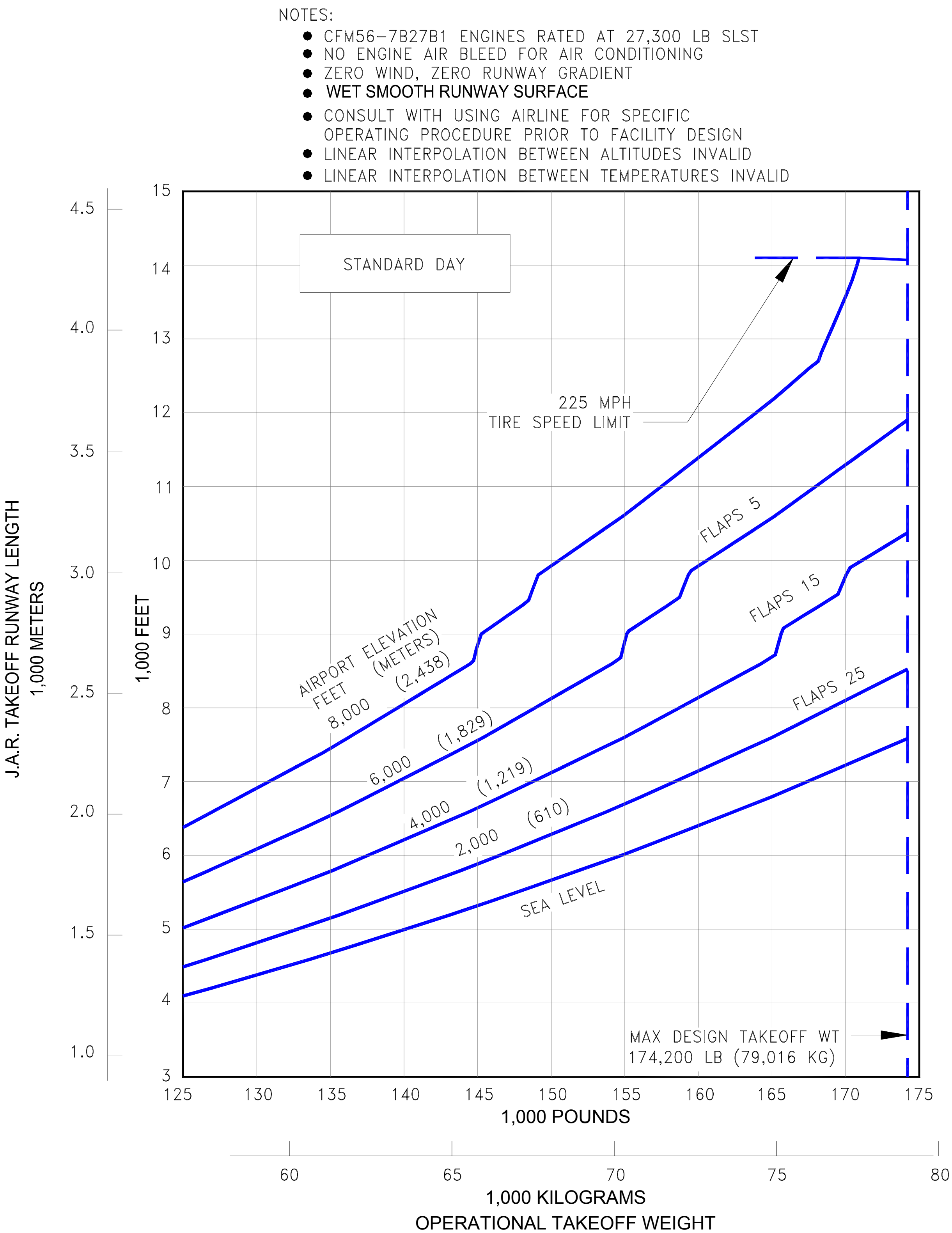
3.3.49 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, DRY RUNWAY

MODEL 737-900 WITH WINGLETS, (CFM56-7B27B1 ENGINES AT 27,300 LB SLST)



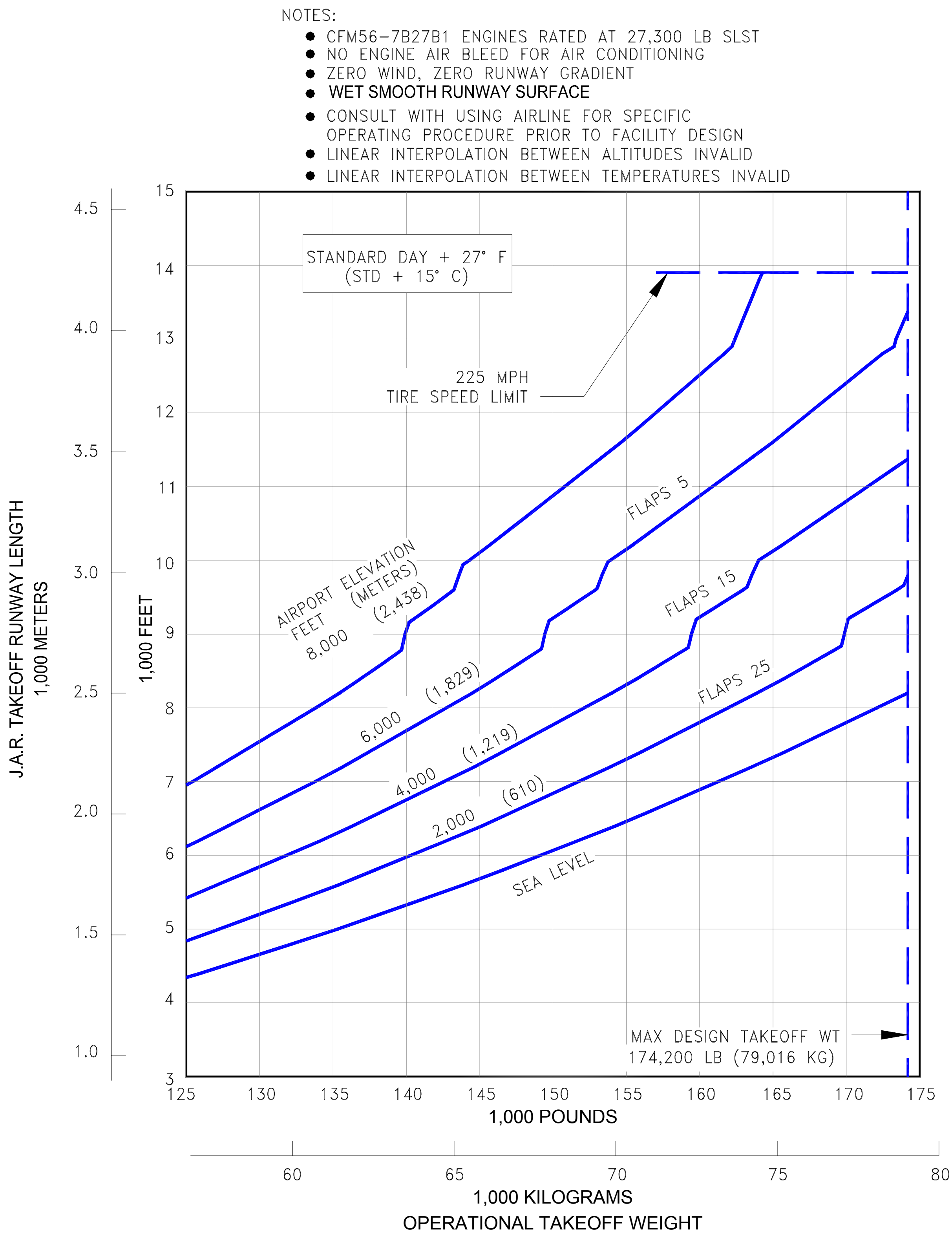
3.3.50 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY +27^{O}F (STD + 15^{O}C), DRY RUNWAY

MODEL 737-900 WITH WINGLETS, (CFM56-7B27B1 ENGINES AT 27,300 LB SLST)

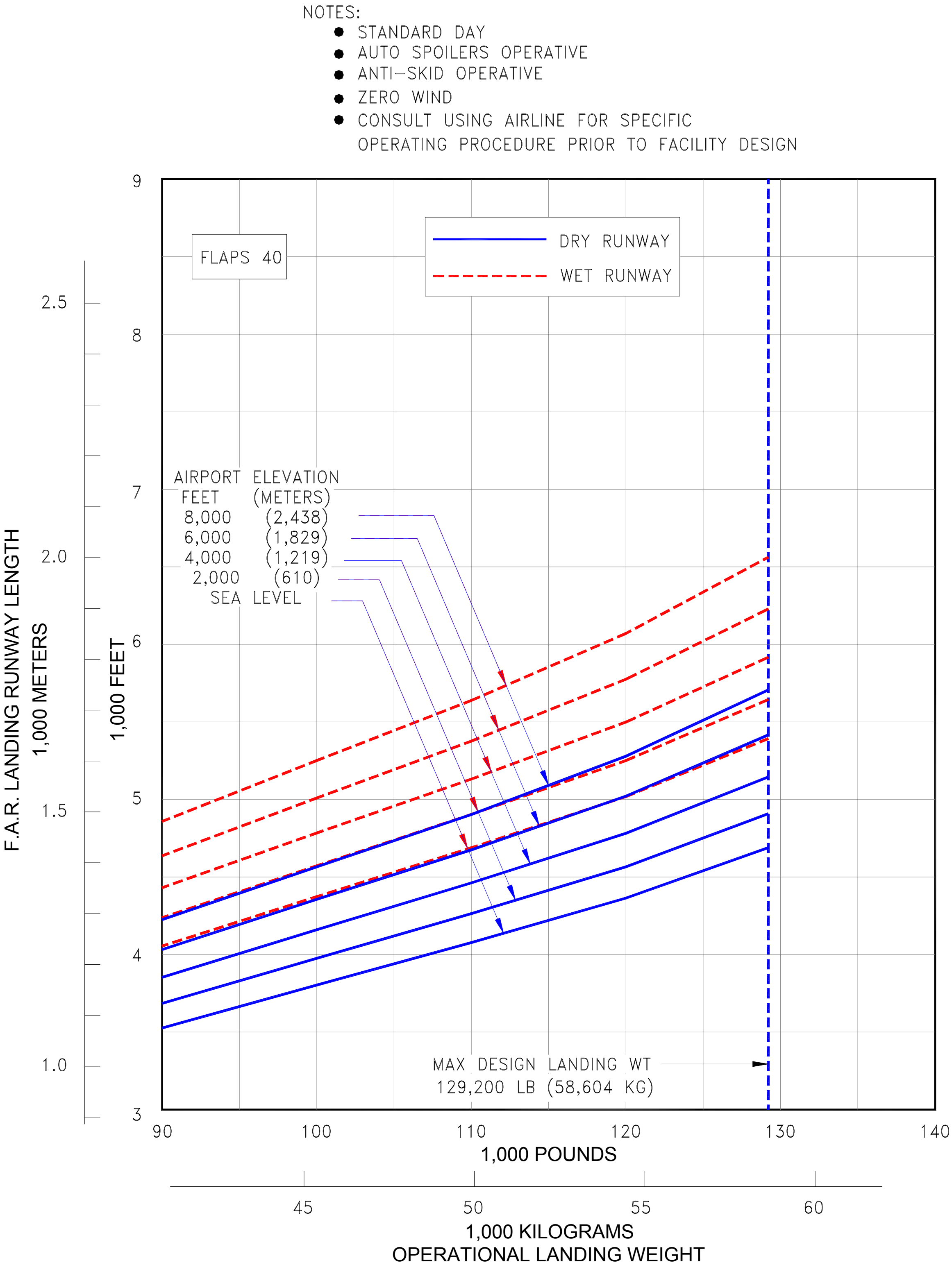


3.3.51 J.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY, WET RUNWAY

MODEL 737-900 WITH WINGLETS, (CFM56-7B27B1 ENGINES AT 27,300 LB SLST)

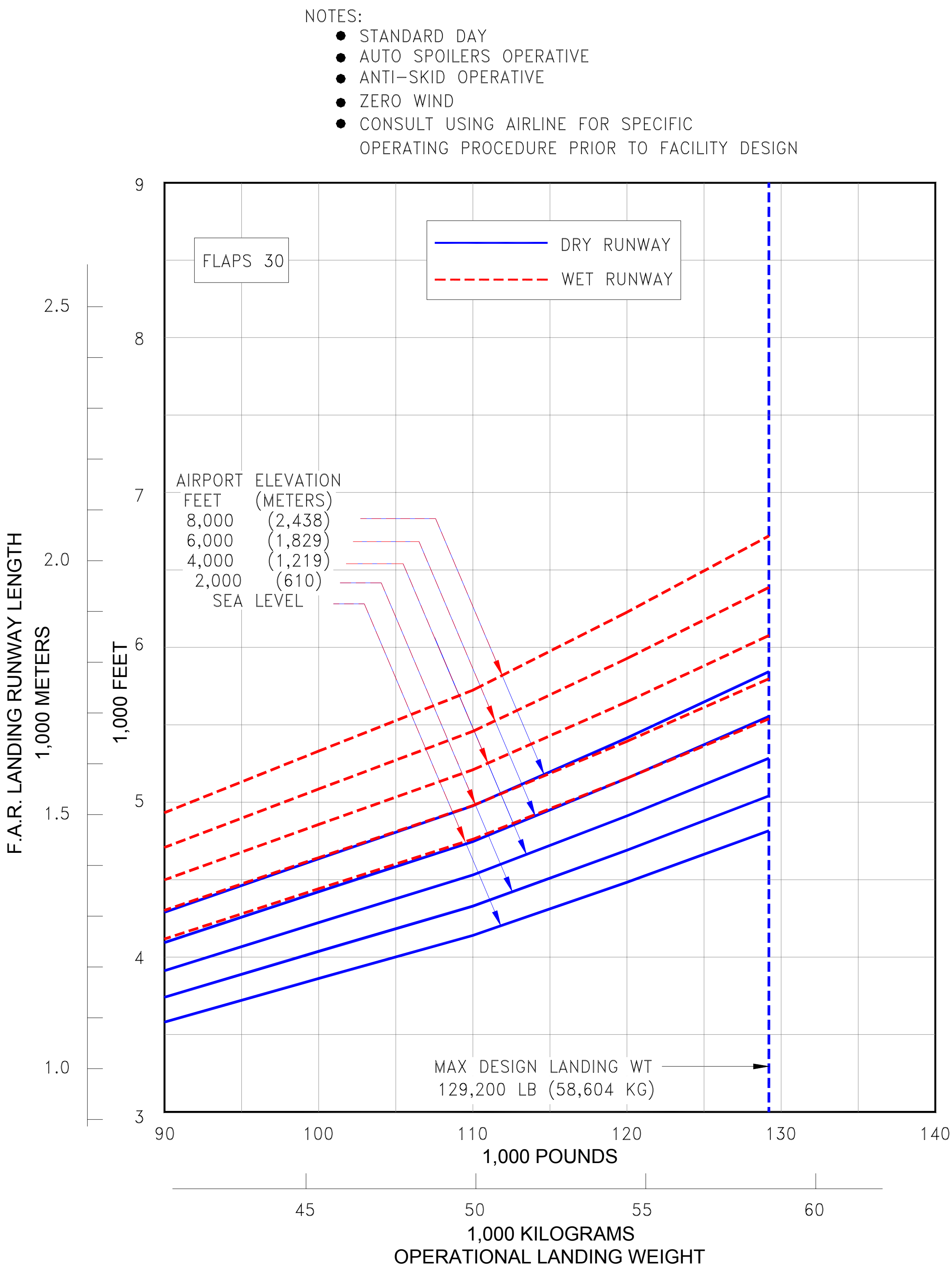


3.3.52 J.A.R. TAKEOFF RUNWAY LENTGTH REQUIREMENTS -
STANDARD DAY +27°F (STD + 15°C), WET RUNWAY
MODEL 737-900 WITH WINGLETS, (CFM56-7B27B1 ENGINES AT 27,300 LB SLST)



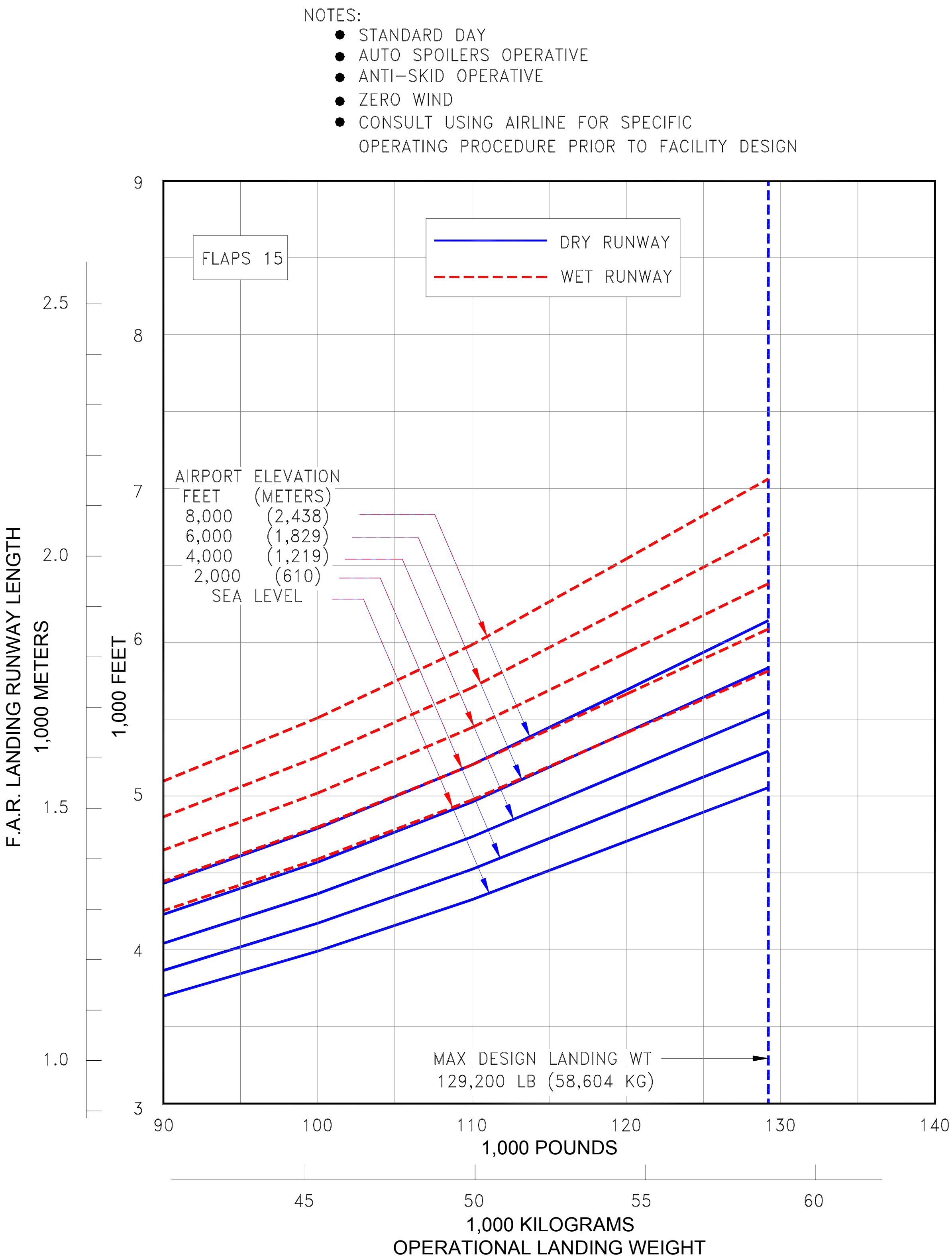
3.4.1 F.A.R. LANDING RUNWAY LENGTH REQUIREMENTS - FLAPS 40

MODEL 737-700 WITH WINGLETS



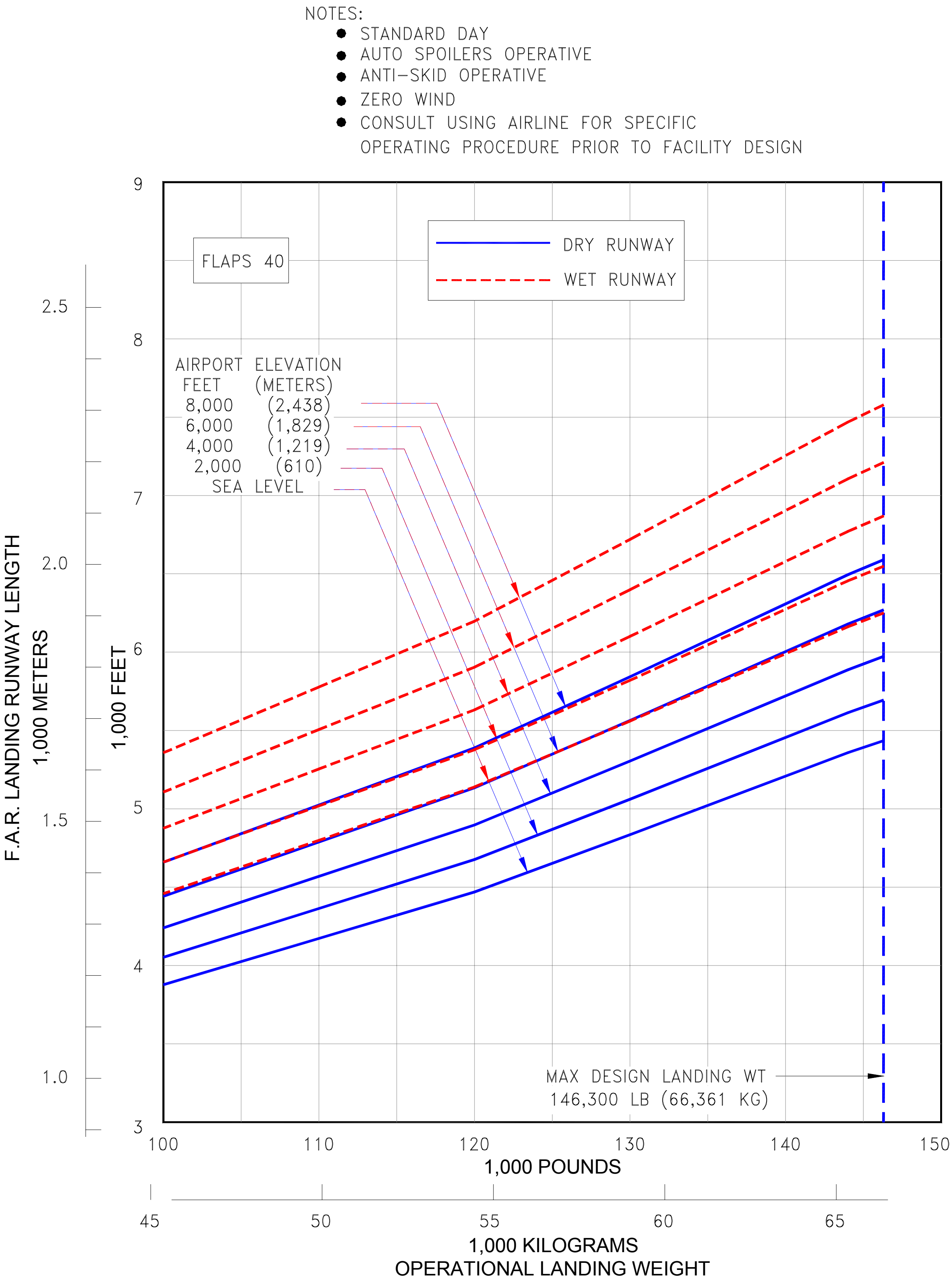
3.4.2 F.A.R. LANDING RUNWAY LENGTH REQUIREMENTS - FLAPS 30

MODEL 737-700 WITH WINGLETS



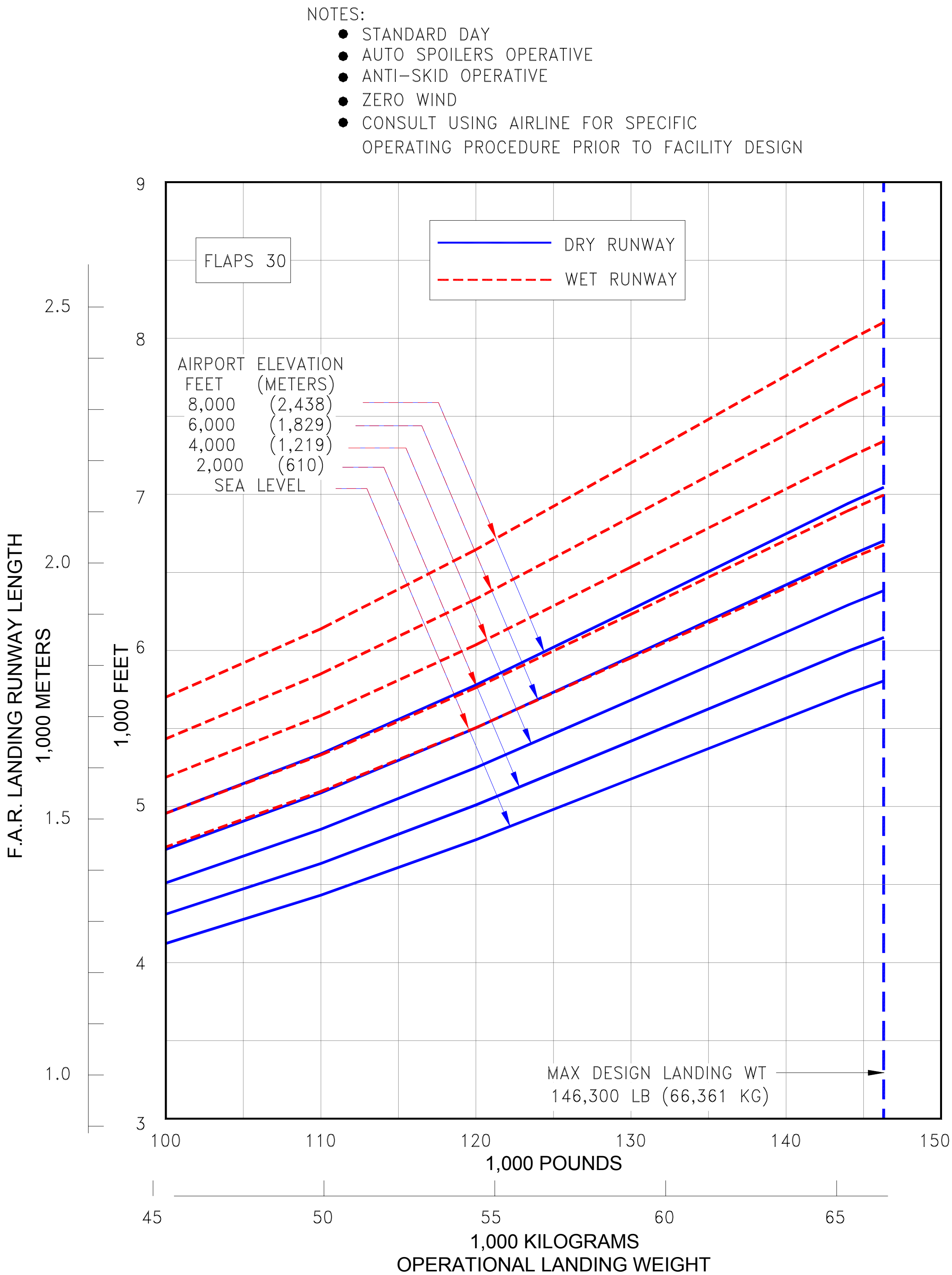
3.4.3 F.A.R. LANDING RUNWAY LENGTH REQUIREMENTS - FLAPS 15

MODEL 737-700 WITH WINGLETS



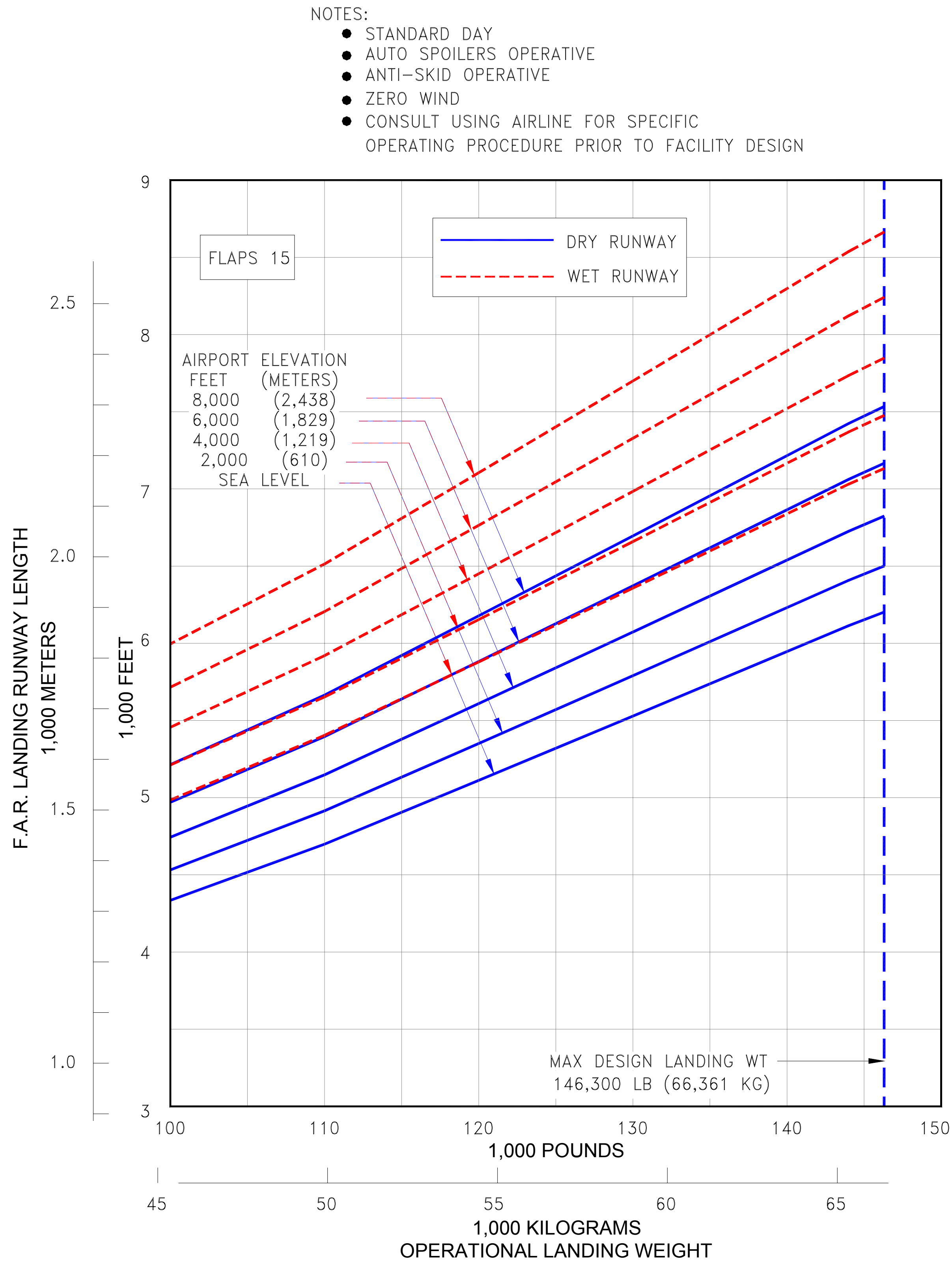
3.4.4 F.A.R. LANDING RUNWAY LENGTH REQUIREMENTS - FLAPS 40

MODEL 737-800 WITH WINGLETS



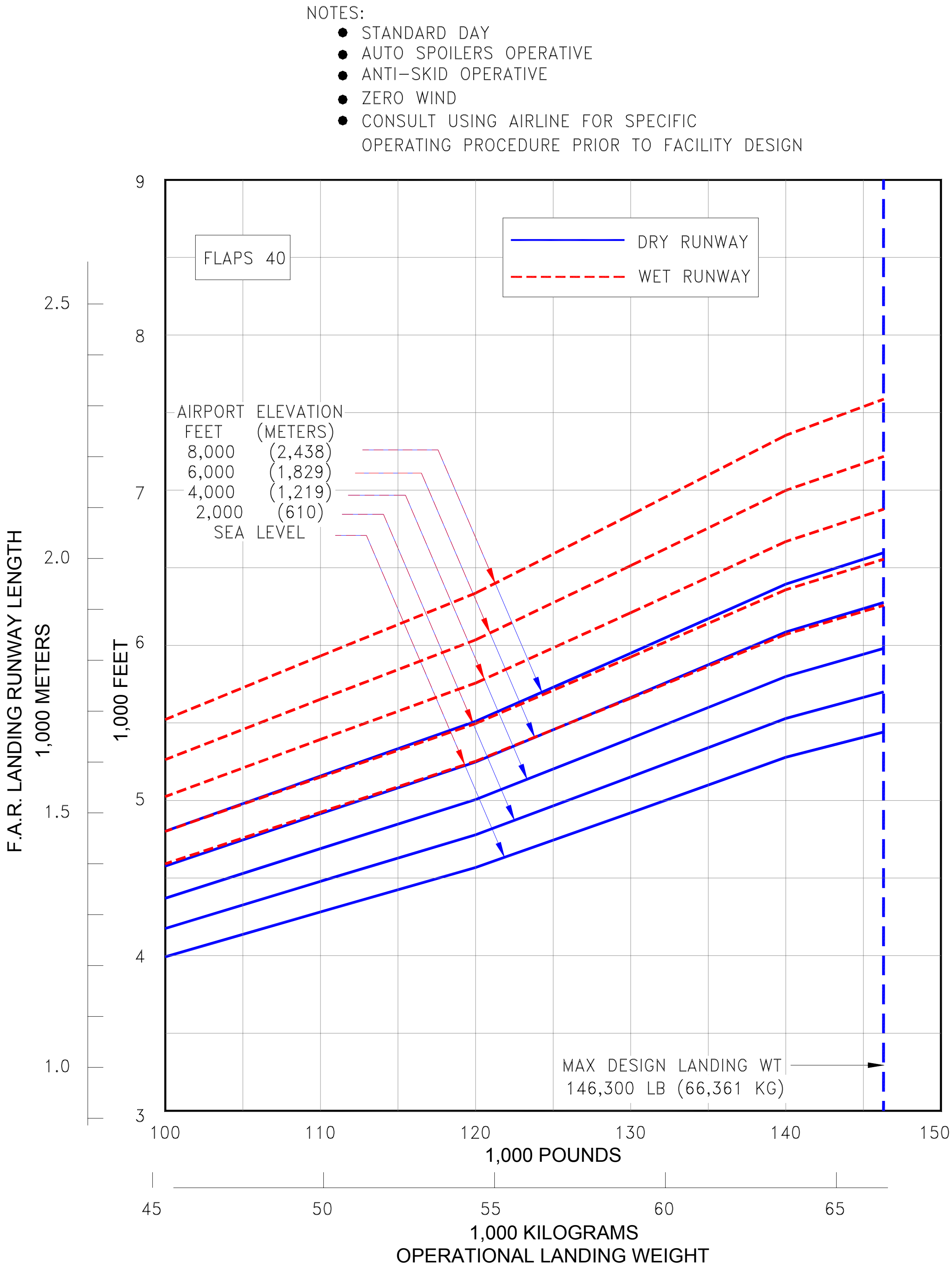
3.4.5 F.A.R. LANDING RUNWAY LENGTH REQUIREMENTS - FLAPS 30

MODEL 737-800 WITH WINGLETS



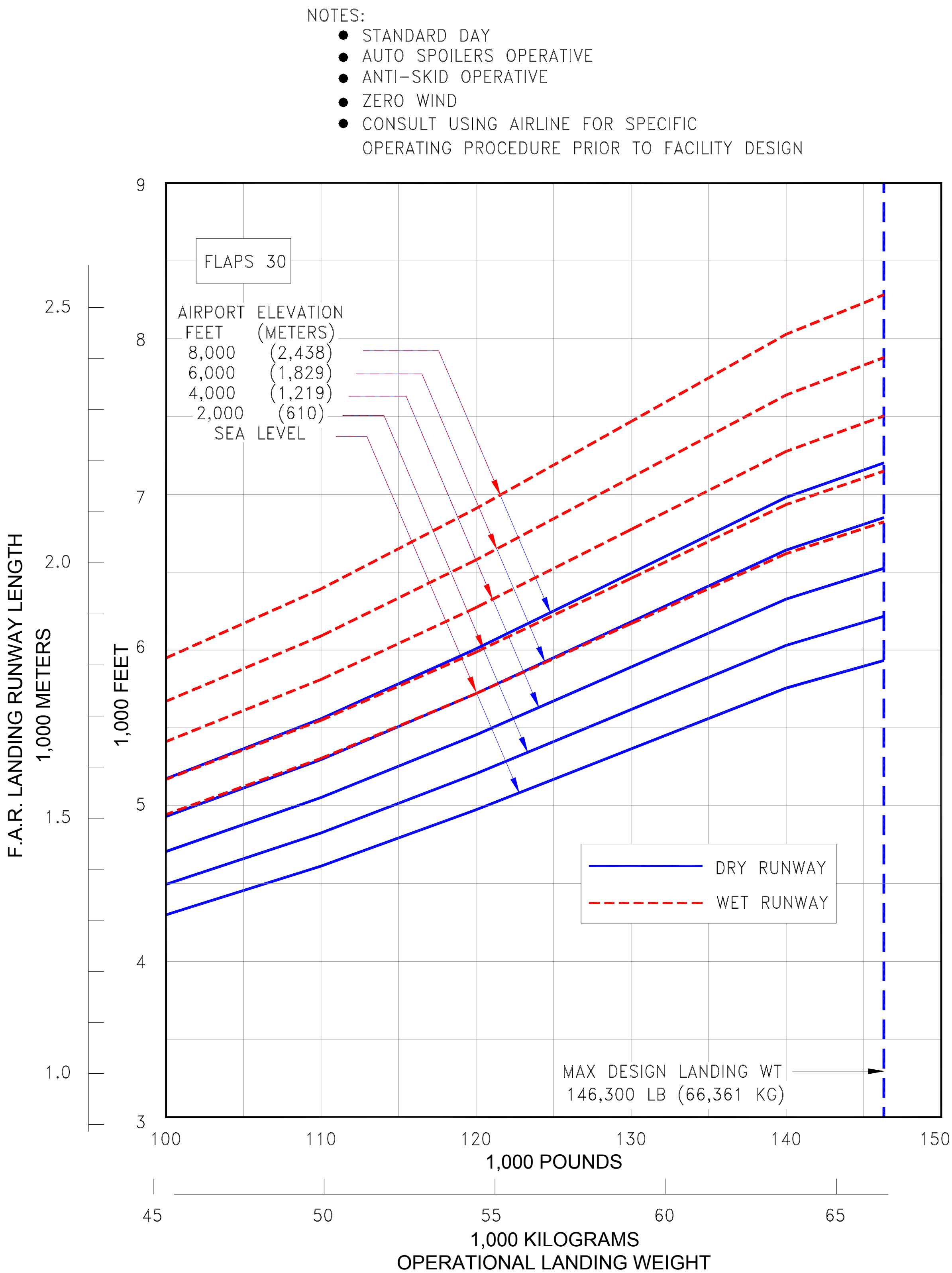
3.4.6 F.A.R. LANDING RUNWAY LENGTH REQUIREMENTS - FLAPS 15

MODEL 737-800 WITH WINGLETS



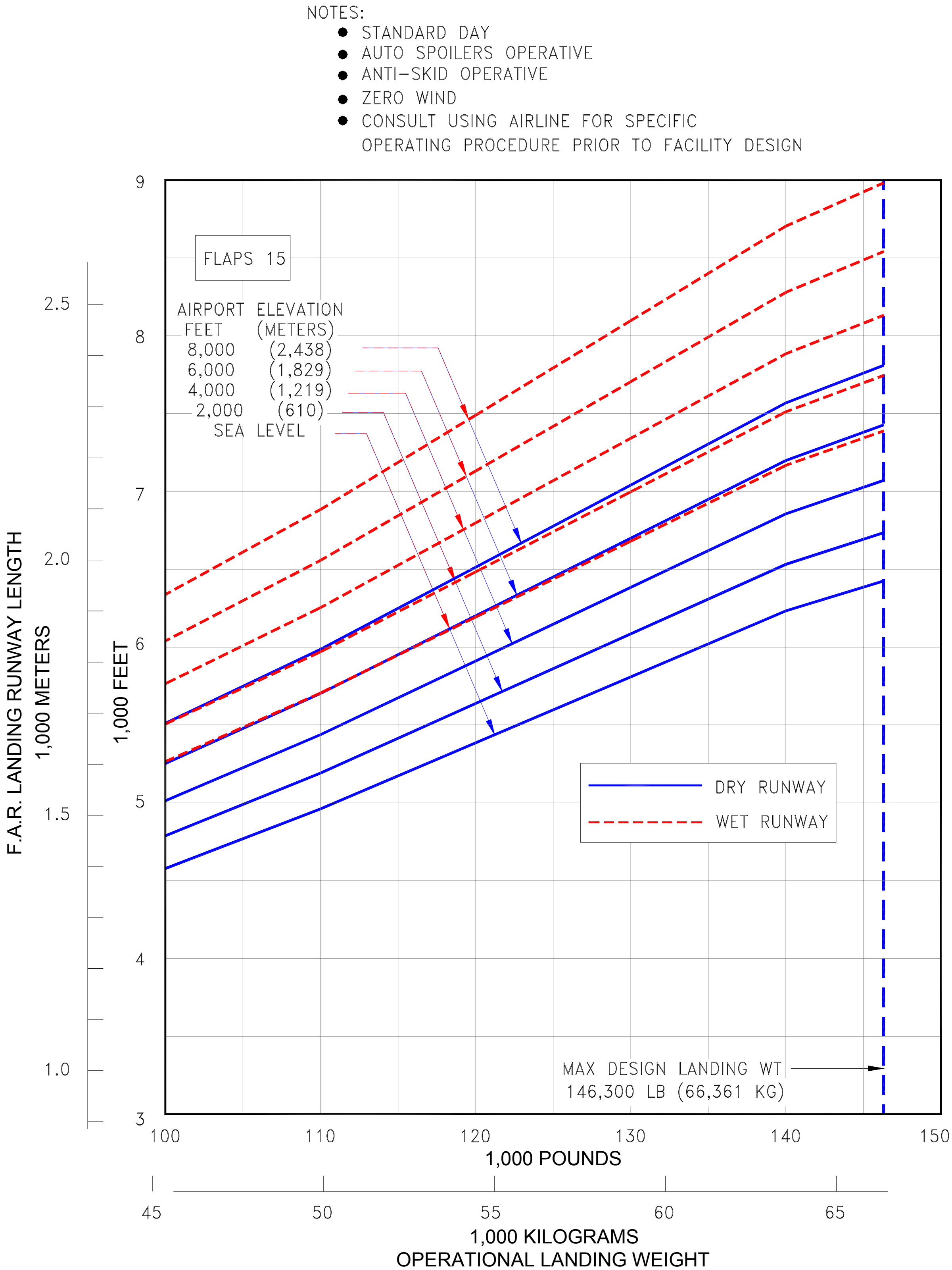
3.4.7 F.A.R. LANDING RUNWAY LENGTH REQUIREMENTS - FLAPS 40

MODEL 737-900 WITH WINGLETS



3.4.8 F.A.R. LANDING RUNWAY LENGTH REQUIREMENTS - FLAPS 30

MODEL 737-900 WITH WINGLETS



3.4.9 F.A.R. LANDING RUNWAY LENGTH REQUIREMENTS - FLAPS 15

MODEL 737-900 WITH WINGLETS

4.0 GROUND MANEUVERING

4.1 General Information

4.2 Turning Radii

4.3 Clearance Radii

4.4 Visibility From Cockpit in Static Position

4.5 Runway and Taxiway Turn Paths

4.6 Runway Holding Bay

4.0 GROUND MANEUVERING

4.1 General Information

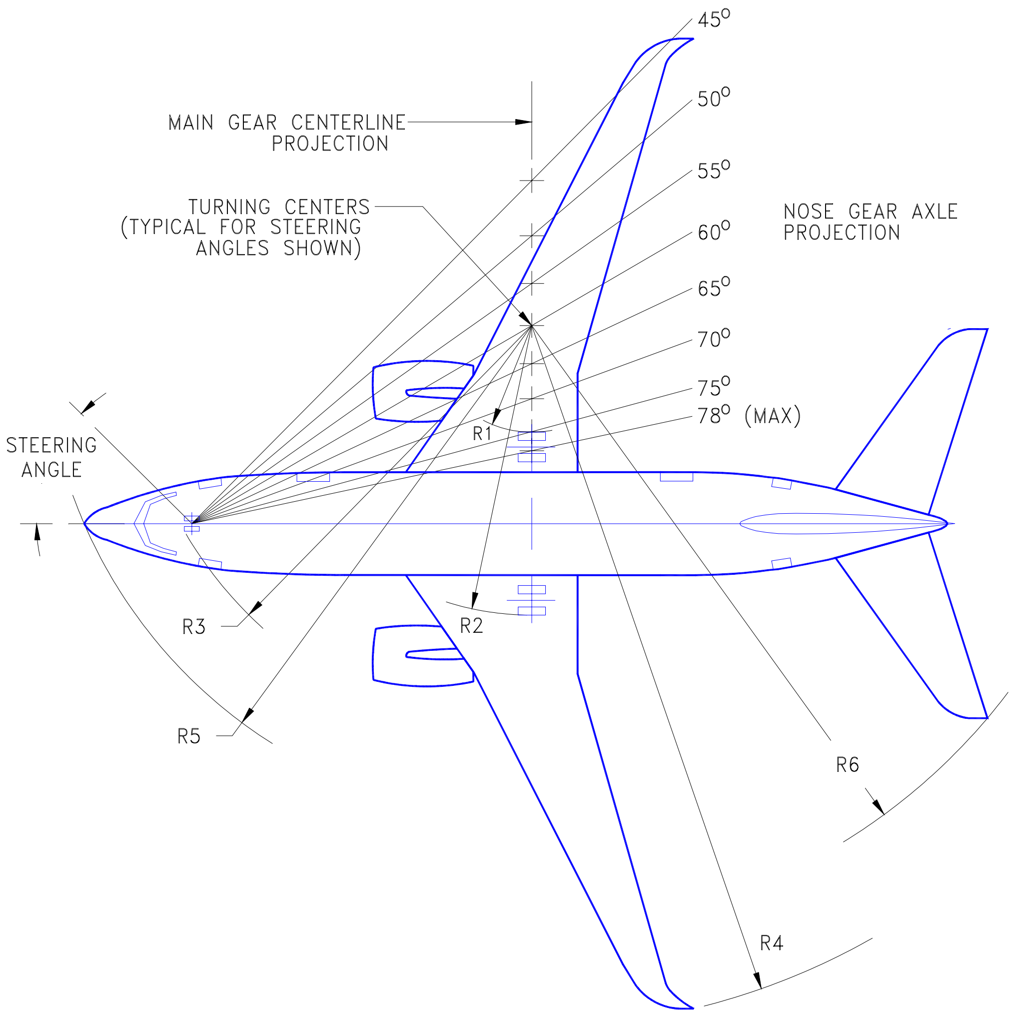
The 737 landing gear system is a conventional tricycle-type. The main gear consists of two dual wheel assemblies, one on each side of the fuselage. The nose gear is a dual-wheel assembly.

Sections 4.2 and 4.3 show turning radii for various nose gear steering angles. Radii for the main and nose gears are measured from the outside edge of the tire, rather than from the center of the wheel strut.

Section 4.4 shows the range of pilot's visibility from the cockpit within 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 runway-taxiway turns in Section 4.5 show a model 737-900 on a 100-ft (30-m) runway and 50-ft (15-m) taxiway system. Boeing 737 Series aircraft, including the 737-700/-800/-900 operate on 100-foot wide runways worldwide. However, the FAA recommends the runway width criteria for the 737-700/-800/-900 is 150 ft (45 m) due to its maximum certificated takeoff weight.

Section 4.6 shows minimum holding apron requirements for the 737-900. Holding aprons for larger aircraft should be adequate for the 737-900.



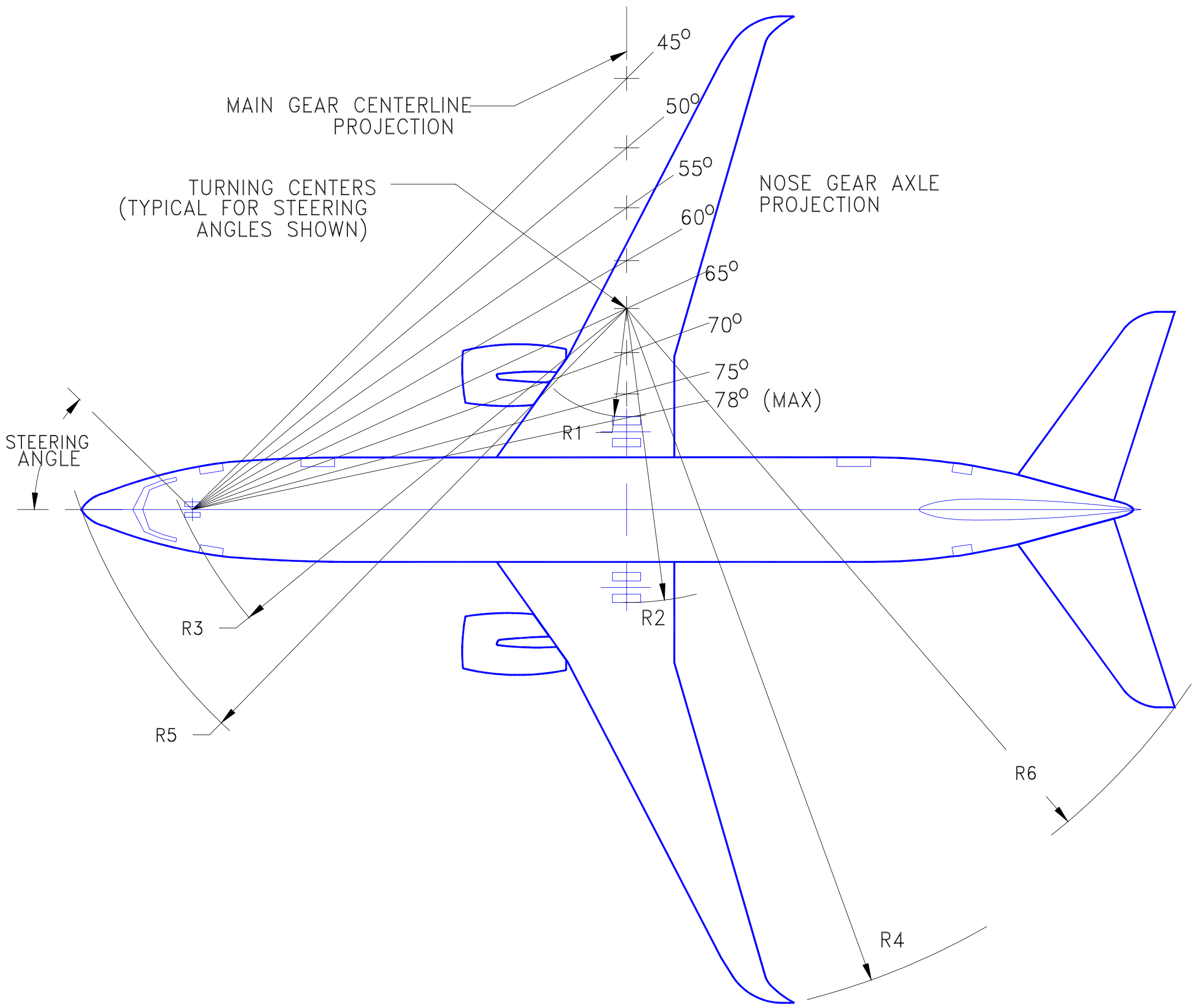
NOTES:

* ACTUAL OPERATING TURNING RADII MAY BE GREATER THAN SHOWN
* CONSULT WITH AIRLINE FOR SPECIFIC OPERATING PROCEDURE
* DIMENSIONS ROUNDED TO NEAREST 0.1 FOOT AND 0.1 METER.

STEERING ANGLE (DEGREES)	R1 INNER GEAR		R2 OUTER GEAR		R3 NOSE GEAR		R4 WING TIP		R5 NOSE		R6 TAIL	
	FT	M	FT	M	FT	M	FT	M	FT	M	FT	M
30	59.9	18.3	83.0	25.3	83.5	25.5	131.8	40.2	90.0	27.4	110.1	33.6
35	47.4	14.4	70.5	21.5	72.5	22.1	119.4	36.4	80.4	24.5	99.5	30.3
40	37.6	11.5	60.7	18.5	64.8	19.8	109.8	33.5	73.5	22.4	91.6	27.9
45	29.7	9.1	52.8	16.1	59.0	18.0	102.0	31.1	68.5	20.9	85.5	26.0
50	23.0	7.0	46.2	14.1	54.6	16.7	95.5	29.1	64.7	19.7	80.5	24.5
55	17.3	5.3	40.4	12.3	51.2	15.6	89.9	27.4	61.8	18.8	76.5	23.3
60	12.3	3.7	35.4	10.8	48.5	14.8	85.0	25.9	59.6	18.2	73.1	22.3
65	7.7	2.3	30.8	9.4	46.4	14.2	80.5	24.5	58.0	17.7	70.2	21.4
70	3.5	1.1	26.6	8.1	44.8	13.7	76.4	23.3	56.7	17.3	67.7	20.6
78 (MAX)	-2.8	-0.8	20.3	6.2	43.1	13.1	70.4	21.5	55.4	16.9	64.4	19.6

4.2.1 TURNING RADII - NO SLIP ANGLE

MODEL 737-700 WITH WINGLETS



NOTES:

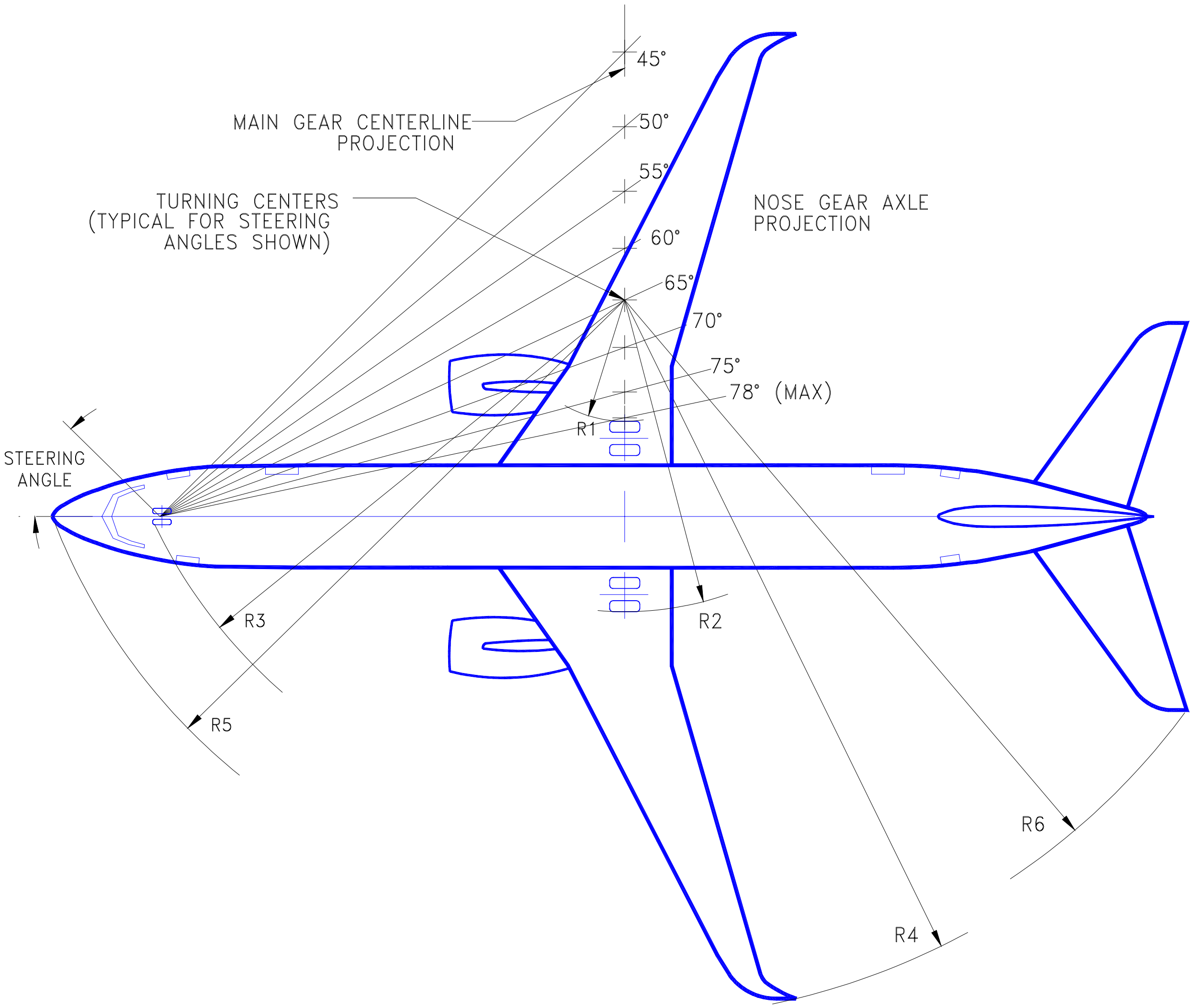
* ACTUAL OPERATING TURNING RADII MAY BE GREATER THAN SHOWN
* CONSULT WITH AIRLINE FOR SPECIFIC OPERATING PROCEDURE
* DIMENSIONS ROUNDED TO NEAREST 0.1 FOOT AND 0.1 METER.

STEERING ANGLE (DEGREES)	R1 INNER GEAR		R2 OUTER GEAR		R3 NOSE GEAR		R4 WING TIP		R5 NOSE		R6 TAIL	
	FT	M	FT	M	FT	M	FT	M	FT	M	FT	M
30	77.5	23.6	100.6	30.7	103.7	31.6	149.1	45.4	110.1	33.6	129.8	39.6
35	61.9	18.9	85.0	25.9	90.6	27.6	133.6	4.07	97.9	29.8	116.6	35.5
40	49.7	15.2	72.8	22.2	80.9	24.7	121.6	37.1	89.2	27.2	106.7	32.5
45	39.8	12.1	62.9	19.2	73.6	22.4	111.9	34.1	82.7	25.2	99.0	30.2
50	31.6	9.6	54.7	16.7	68.0	20.7	103.8	31.6	77.8	23.7	92.9	28.3
55	24.4	7.4	47.5	14.5	63.7	19.43	96.8	29.5	74.1	22.6	87.9	26.8
60	18.1	5.5	41.2	12.6	60.3	18.4	90.6	27.6	71.3	21.7	83.8	25.5
65	12.4	3.8	35.8	10.8	57.7	17.6	85.1	25.9	69.1	21.1	80.3	24.5
70	7.2	2.2	30.3	9.2	55.6	17.0	80.0	24.4	67.4	20.6	77.3	23.6
78 (MAX)	-0.6	-0.2	22.5	6.9	53.5	16.3	72.5	22.1	65.7	20.0	73.3	22.3

4.2.2 TURNING RADII - NO SLIP ANGLE

MODEL 737-800 WITH WINGLETS

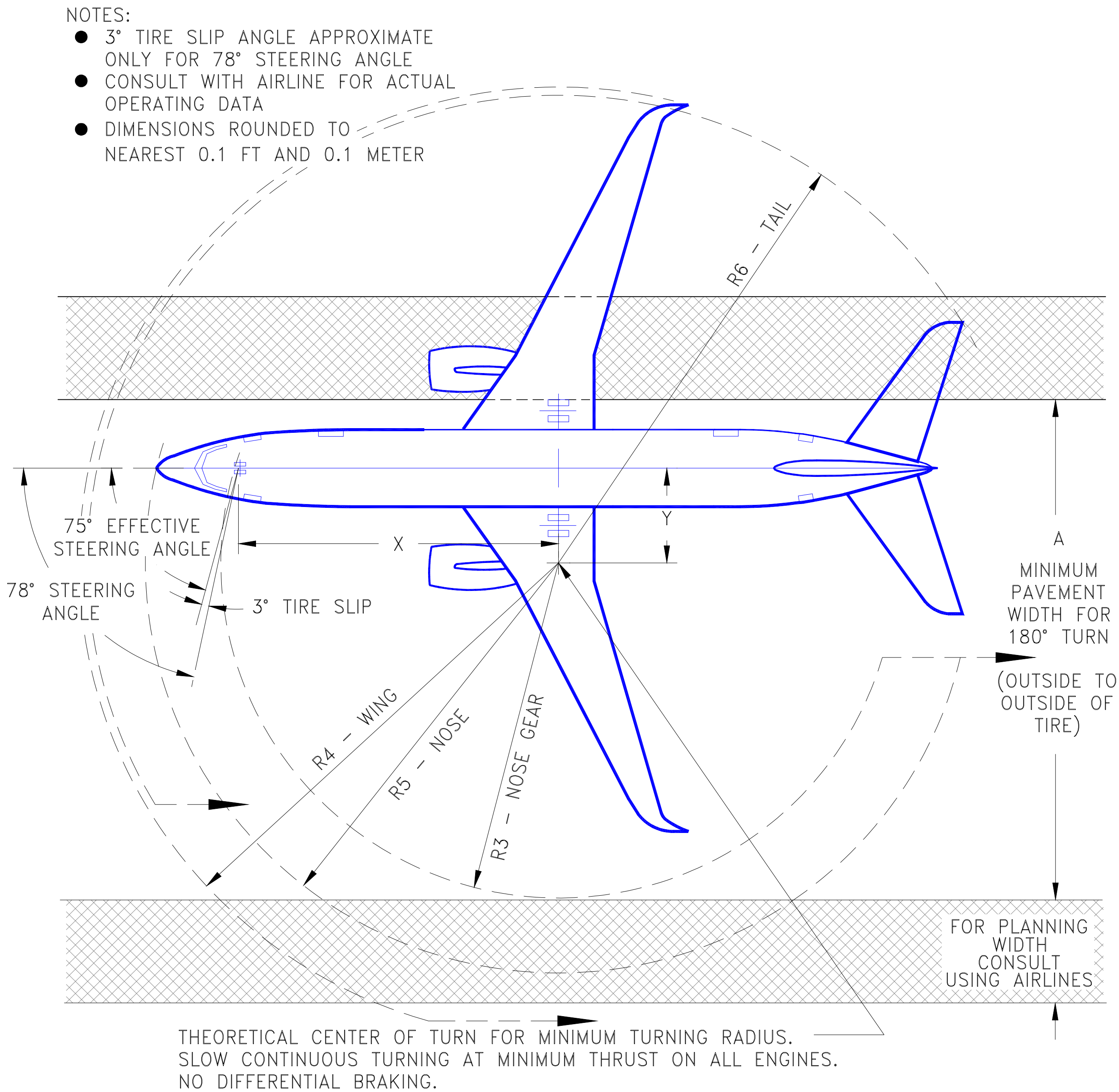
PRELIMINARY INFORMATION



NOTES:
* ACTUAL OPERATING TURNING RADII MAY BE GREATER THAN SHOWN
* CONSULT WITH AIRLINE FOR SPECIFIC OPERATING PROCEDURE

STEERING ANGLE (DEGREES)	R1 INNER GEAR		R2 OUTER GEAR		R3 NOSE GEAR		R4 WING TIP		R5 NOSE		R6 TAIL	
	FT	M	FT	M	FT	M	FT	M	FT	M	FT	M
30	86.0	26.2	109.1	33.2	113.5	34.6	157.6	48.0	119.9	36.5	138.8	42.3
35	68.9	21.0	92.0	28.0	99.1	30.2	140.6	42.9	106.4	32.4	124.1	37.8
40	55.5	16.9	78.6	24.0	88.5	27.0	127.5	38.8	96.7	29.5	113.2	34.5
45	44.7	13.6	67.8	20.7	80.6	24.6	118.8	35.6	89.6	27.3	104.8	31.9
50	35.7	10.9	58.8	17.9	74.4	22.7	107.9	32.9	84.2	25.7	98.0	29.9
55	27.9	8.9	51.0	15.5	69.7	21.2	100.2	30.6	80.1	24.4	92.5	28.2
60	21.0	6.4	44.1	13.4	66.0	20.1	93.5	28.5	76.9	23.4	88.0	26.9
65	14.7	4.5	37.8	11.5	63.1	19.2	87.4	26.6	74.5	22.7	84.1	25.6
70	8.9	2.7	32.0	9.8	60.9	18.6	81.8	24.9	72.6	22.1	80.8	24.6
78 (MAX)	0.4	0.1	23.5	7.2	58.5	17.8	73.6	22.4	70.7	21.5	76.5	23.4

4.2.3 TURNING RADII - NO SLIP ANGLE
MODEL 737-900 WITH WINGLETS



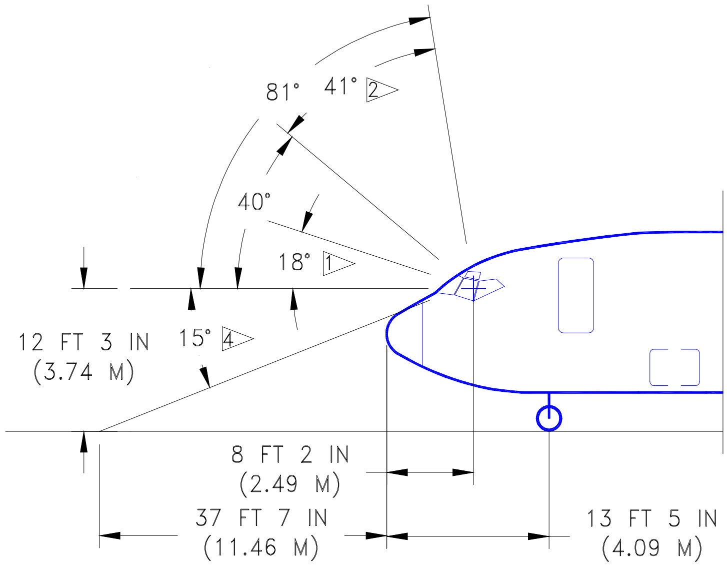
AIRPLANE MODEL	EFFECTIVE TURNING ANGLE (DEG)	X		Y		A		R3		R4		R5		R6	
		FT	M	FT	M	FT	M	FT	M	FT	M	FT	M	FT	M
737-700	75	41.3	12.6	11.1	3.4	66.7	20.3	44.1	13.3	72.6	22.1	55.9	17.0	65.5	20.0
737-800	75	51.2	15.6	13.7	4.2	79.6	24.1	54.4	16.4	75.2	22.9	65.9	20.1	74.9	22.8
737-900	75	56.3	17.2	15.1	4.6	86.2	26.2	59.6	18.1	76.6	23.3	71.3	21.7	78.0	23.8

4.3 MINIMUM TURNING RADII - 3° SLIP ANGLE

MODEL 737 -700, -800, -900 WITH WINGLETS

DRAWING NOT TO SCALE

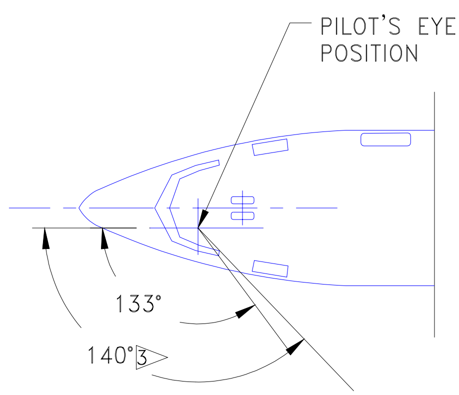
NOT TO BE USED FOR LANDING APPROACH VISIBILITY



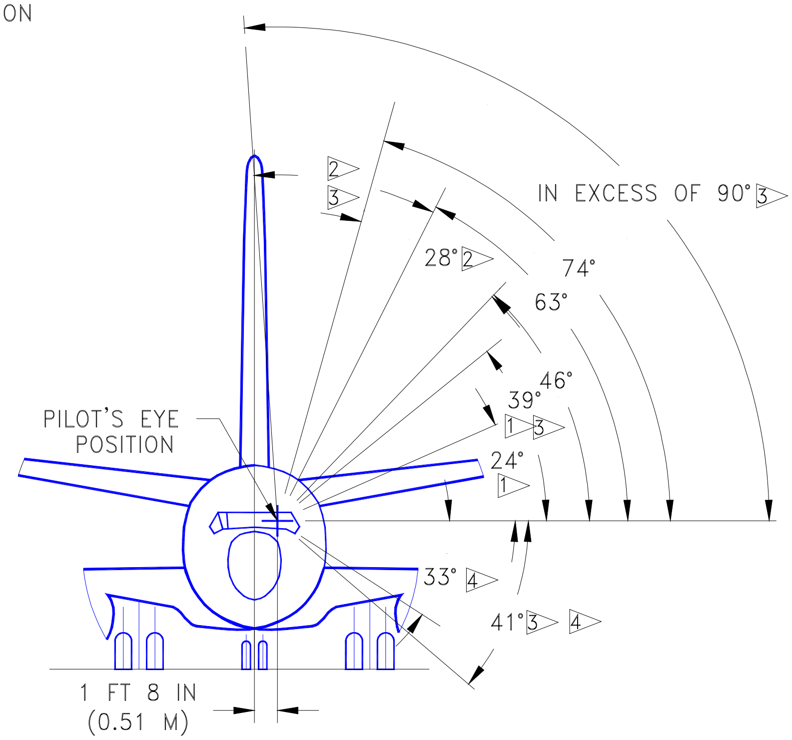
VISUAL ANGLES IN PLANE PARALLEL TO LONGITUDINAL AXIS THROUGH PILOT'S EYE POSITION

NOTES: HEAD ROTATED ABOUT POINT 3.3 IN (0.08 M) AFT OF PILOT'S EYE POSITION.

1. UPWARD VISION THROUGH MAIN WINDOW
2. VISION THROUGH EYEBROW WINDOW
3. WITH HEAD MOVED 5 IN (0.13 M) OUTBOARD
4. DOWNWARD VISION THROUGH MAIN WINDOW



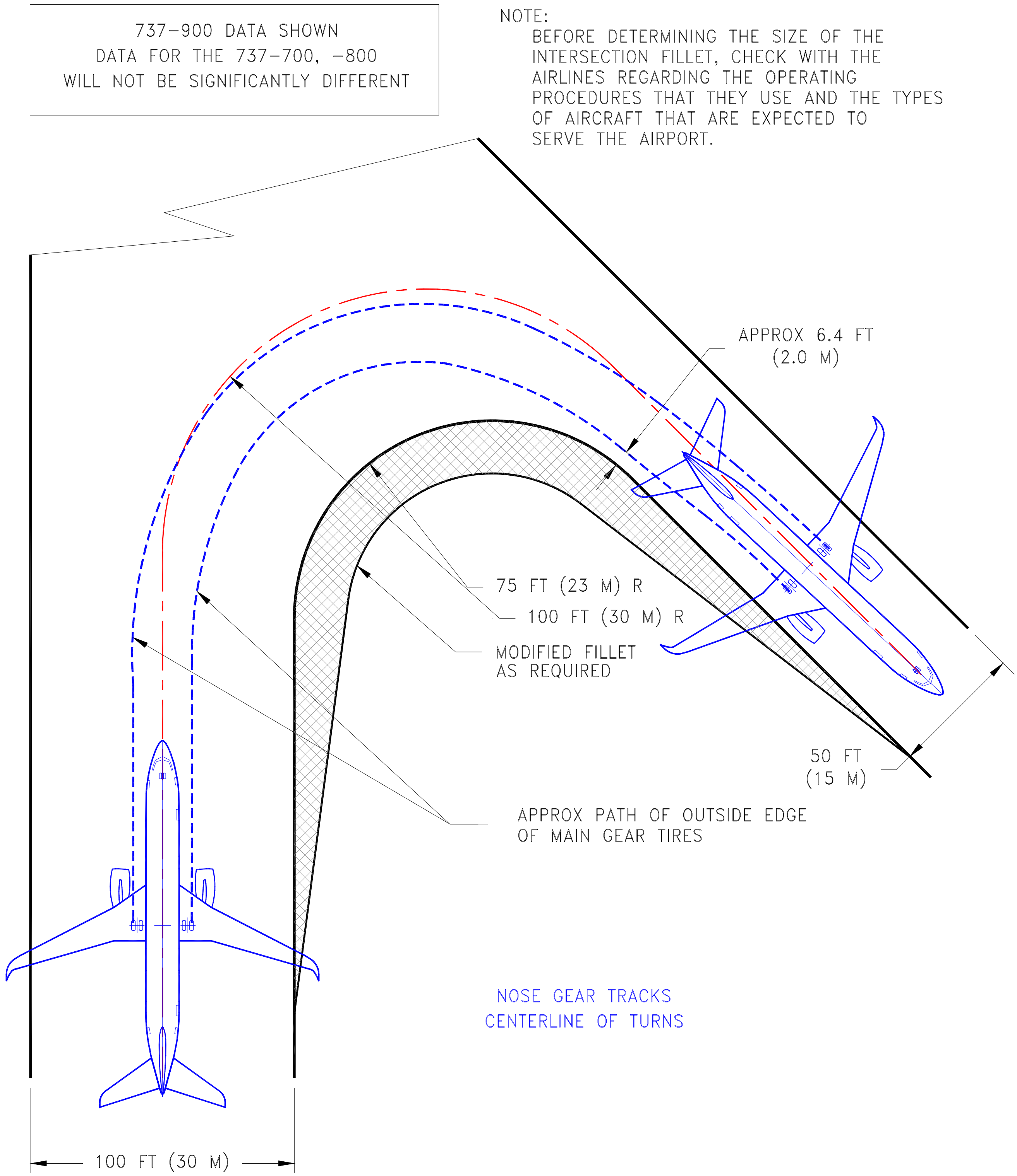
VISUAL ANGLES IN HORIZONTAL PLANE THROUGH PILOT'S EYE POSITION



VISUAL ANGLES IN PLANE PERPENDICULAR TO LONGITUDINAL AXIS THROUGH PILOT'S EYE POSITION

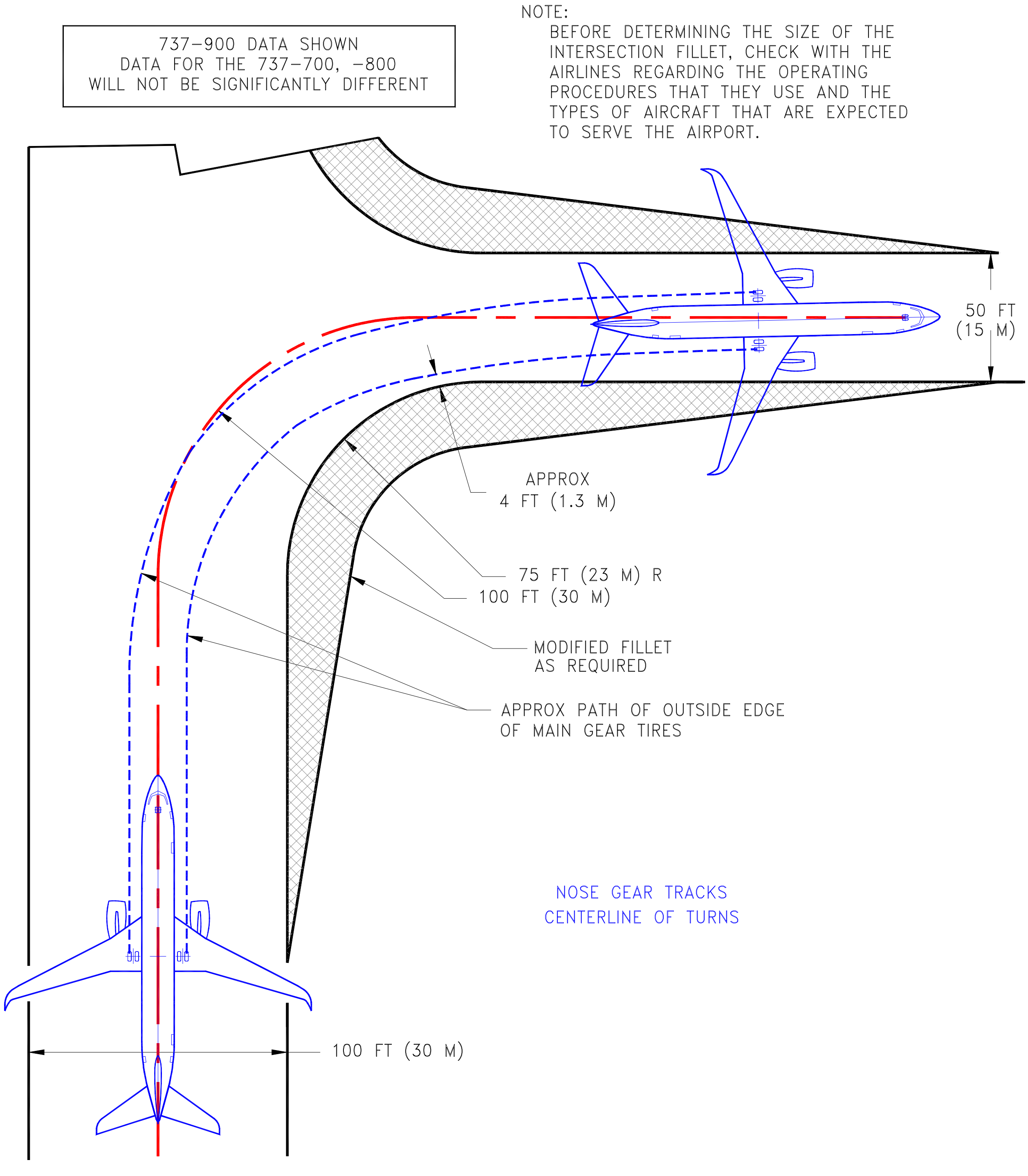
4.4 VISIBILITY FROM COCKPIT IN STATIC POSITION

MODEL 737 -700, -800, -900 (WITH WINGLETS)



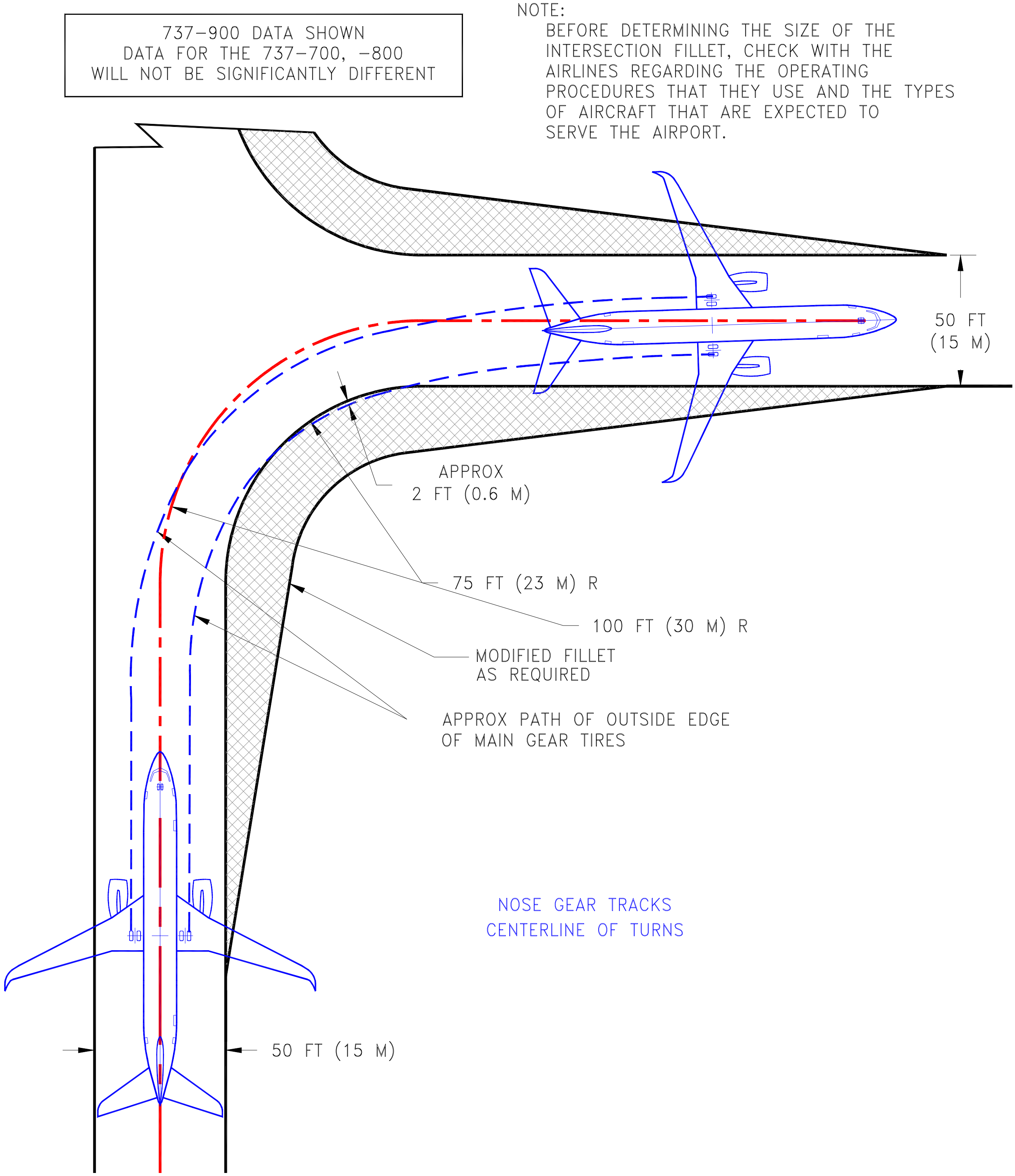
4.5.1 RUNWAY AND TAXIWAY TURN PATHS - RUNWAY-TO-TAXIWAY, MORE THAN 90 DEGREES, NOSE GEAR TRACKS CENTERLINE

MODEL 737-900 WITH WINGLETS



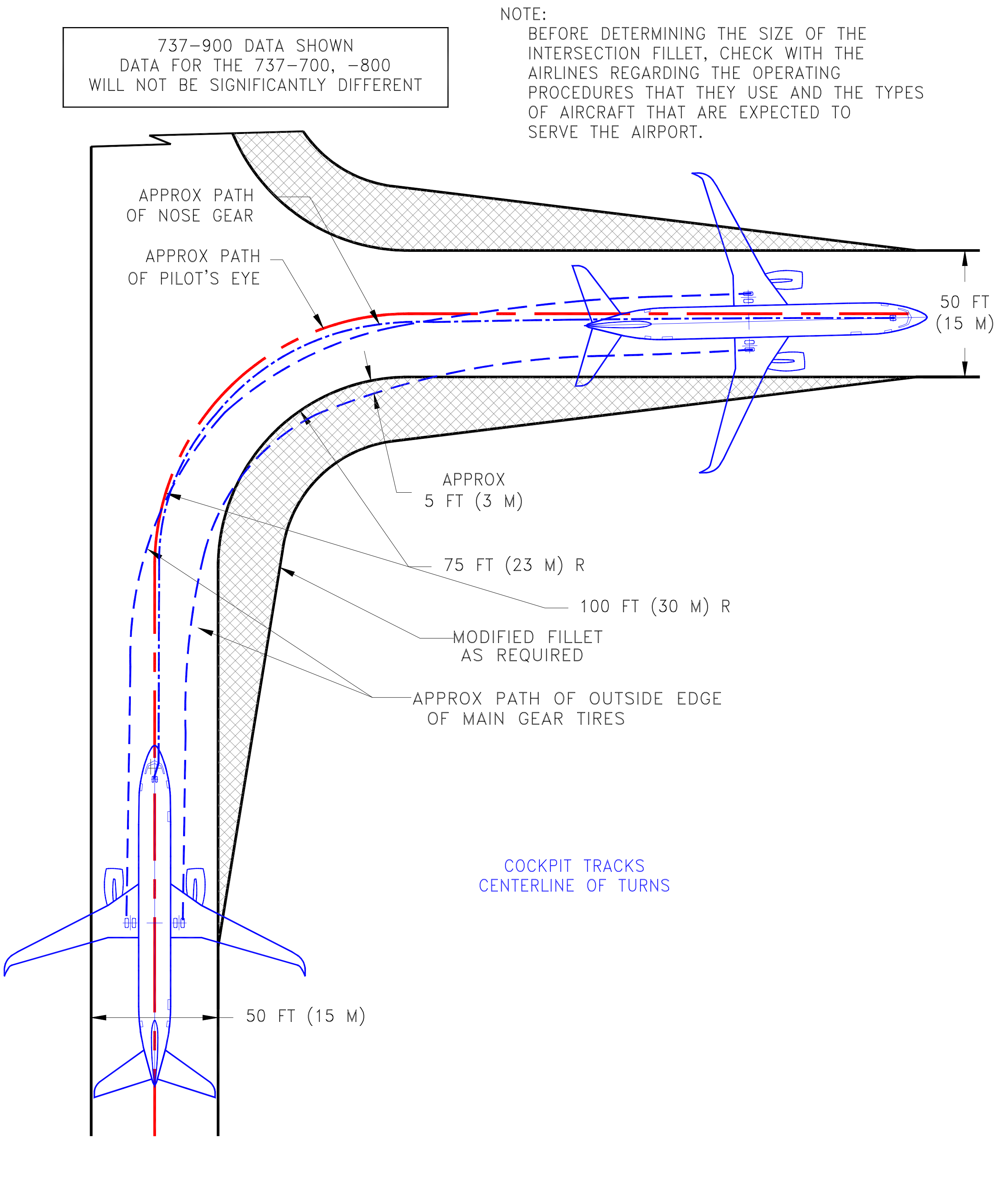
4.5.2 RUNWAY AND TAXIWAY TURN PATHS - RUNWAY-TO-TAXIWAY, 90 DEGREES, NOSE GEAR TRACKS CENTERLINE

MODEL 737-900 WITH WINGLETS



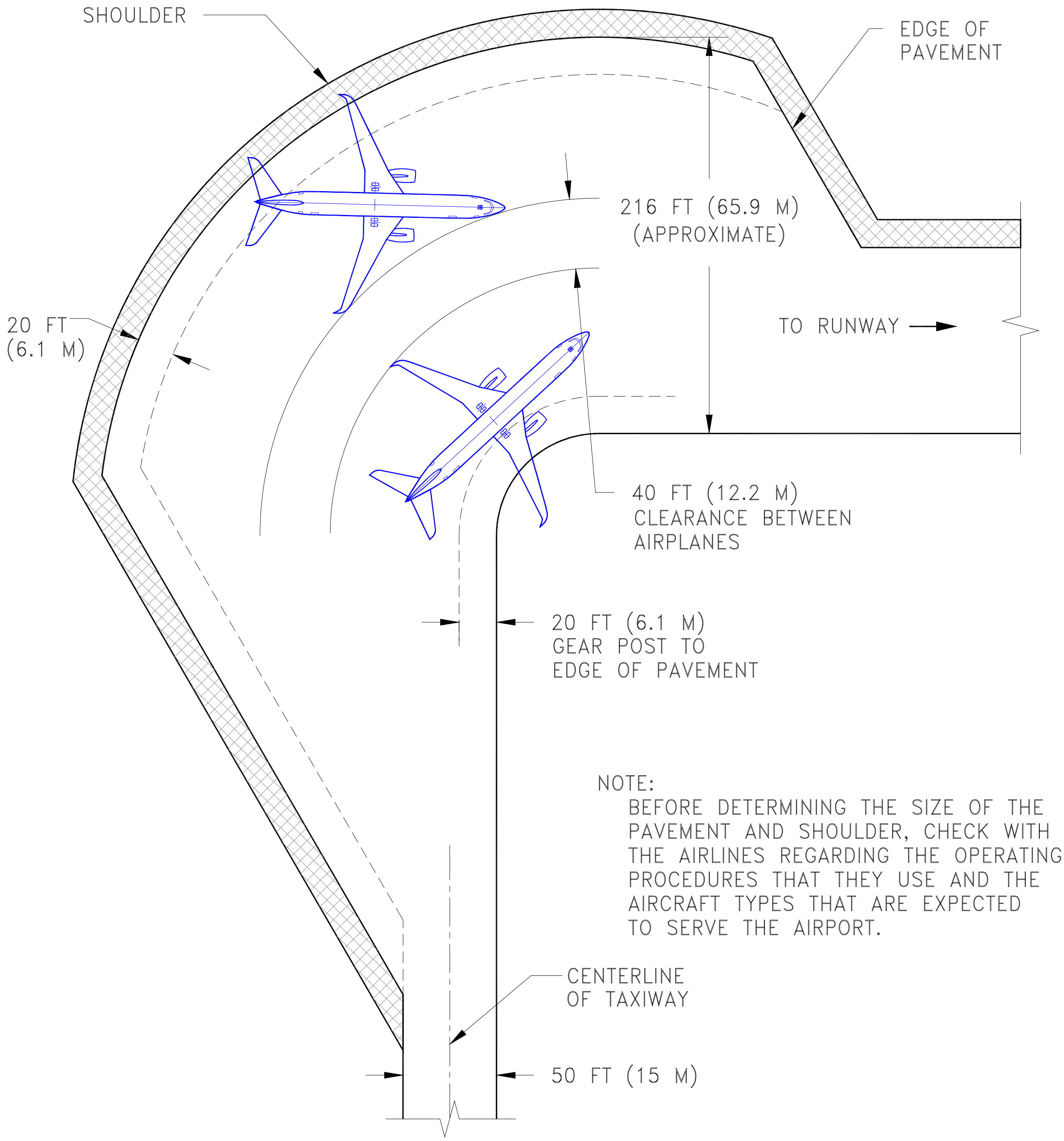
4.5.3 RUNWAY AND TAXIWAY TURN PATHS - TAXIWAY-TO-TAXIWAY, 90 DEGREES, NOSE GEAR TRACKS CENTERLINE

MODEL 737-900 WITH WINGLETS



4.5.4 RUNWAY AND TAXIWAY TURN PATHS - TAXIWAY-TO-TAXIWAY, 90 DEGREES, COCKPIT TRACKS CENTERLINE

MODEL 737-900 WITH WINGLETS



4.6 RUNWAY HOLDING BAY

MODEL 737-900 WITH WINGLETS

5.0 TERMINAL SERVICING

5.0 TERMINAL SERVICING

During turnaround at the 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 service points, and typical service requirements. The data presented in this section reflect ideal conditions for a single airplane. Service requirements may vary according to airplane condition and airline procedure.

Section 5.1 shows typical arrangements of ground support equipment during turnaround. As noted, if the auxiliary power unit (APU) is used, the electrical, air start, and air-conditioning service vehicles would not be required. Passenger loading bridges or portable passenger stairs could be used to load or unload passengers.

Sections 5.2 and 5.3 show typical service times at the terminal. These charts give typical schedules for performing service on the airplane within a given time. Service times could be rearranged to suit availability of personnel, airplane configuration, and degree of service required.

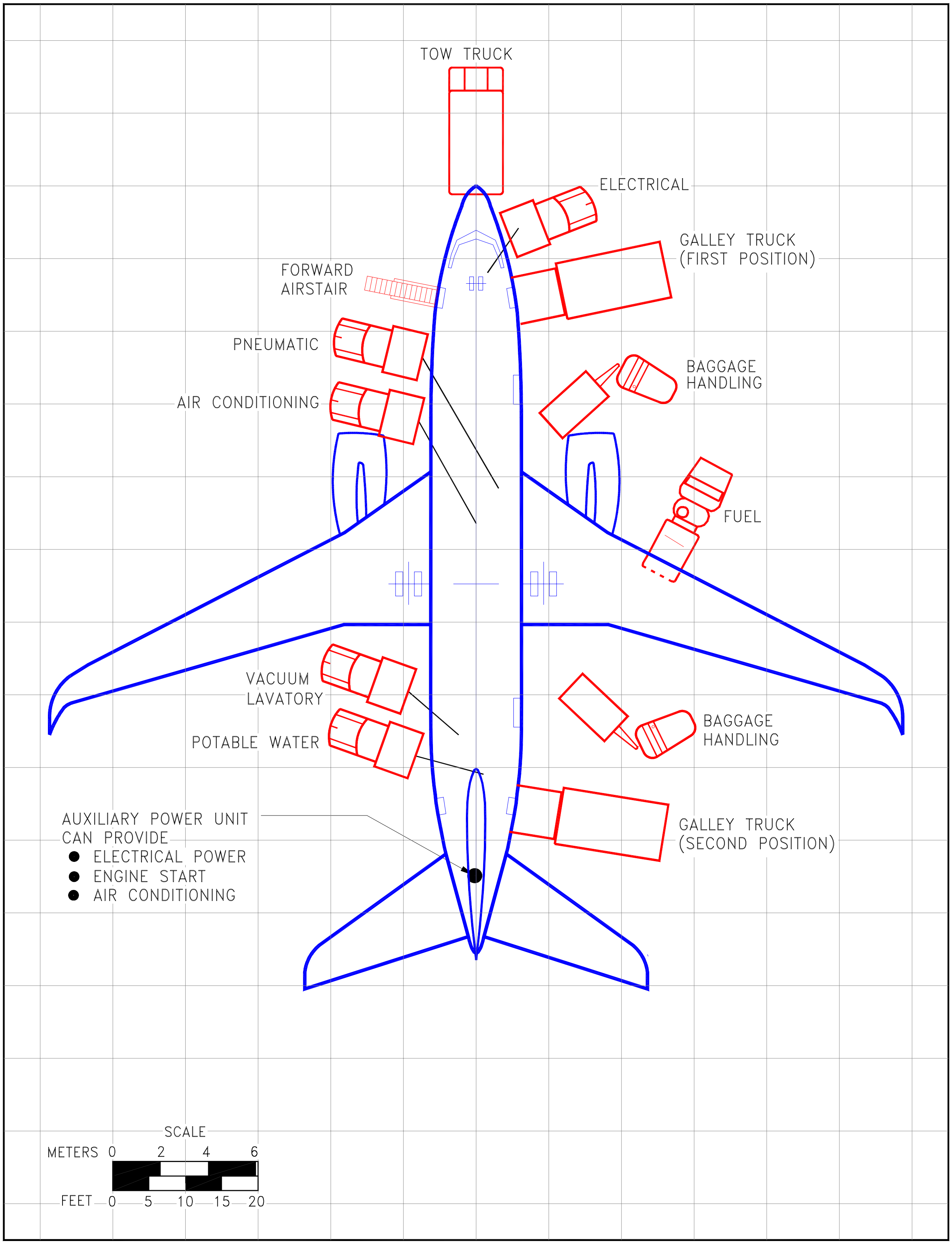
Section 5.4 shows the locations of ground service connections in graphic and in tabular forms. Typical capacities and service requirements are shown in the tables. Services with requirements that vary with conditions are described in subsequent sections.

Section 5.5 shows typical sea level air pressure and flow requirements for starting different engines. The curves are based on an engine start time of 90 seconds.

Section 5.6 shows pneumatic requirements for heating and cooling (air conditioning) using high pressure air to run the air cycle machine. The curves show airflow requirements to heat or cool the airplane within a given time and ambient conditions. Maximum allowable pressure and temperature for air cycle machine operation are 60 psia and 450^{O}F, respectively.

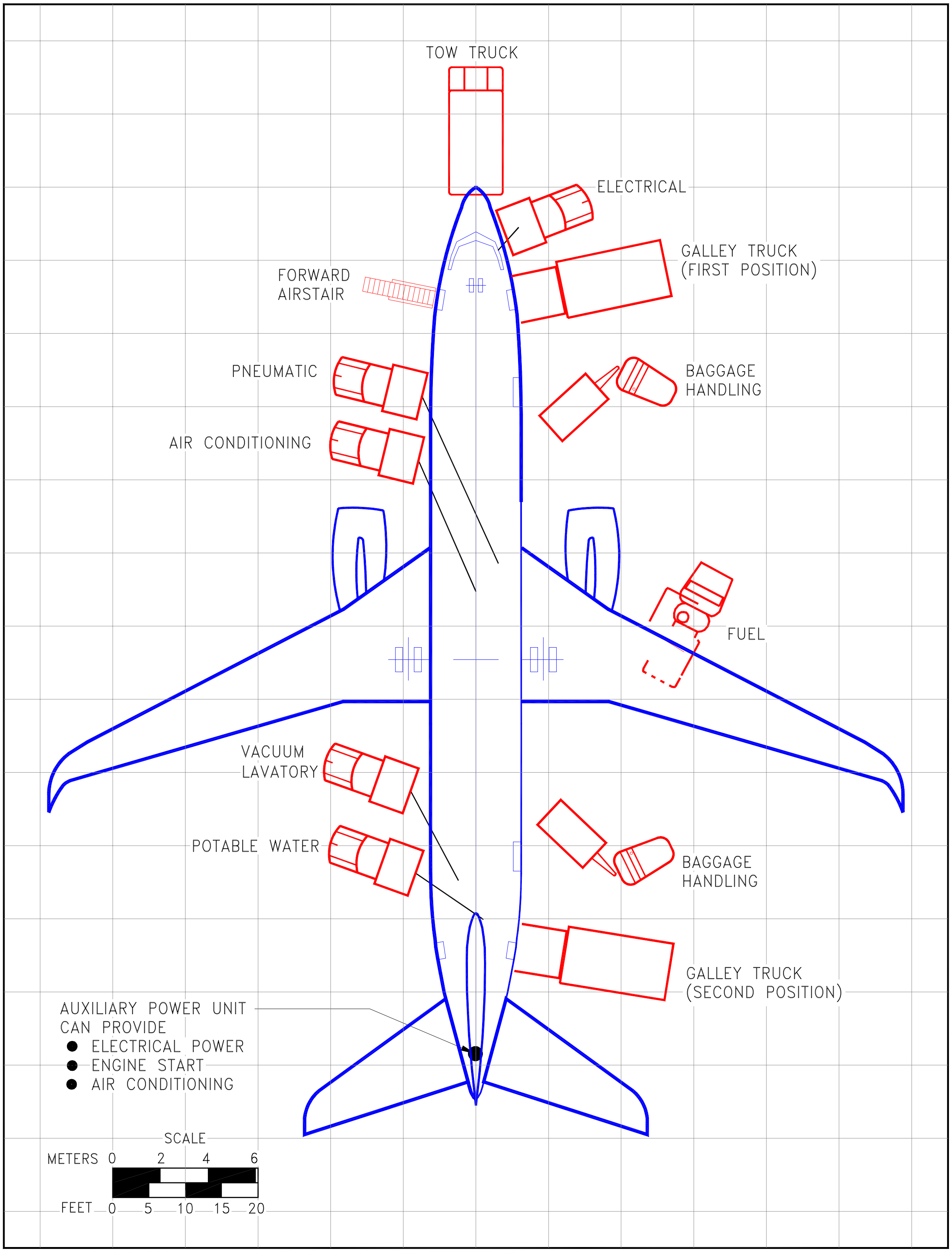
Section 5.7 shows pneumatic requirements for heating and cooling the airplane, using low pressure conditioned air. This conditioned air is supplied through an 8-in ground air connection (GAC) directly to the passenger cabin, bypassing the air cycle machines.

Section 5.8 shows ground towing requirements for various ground surface conditions.



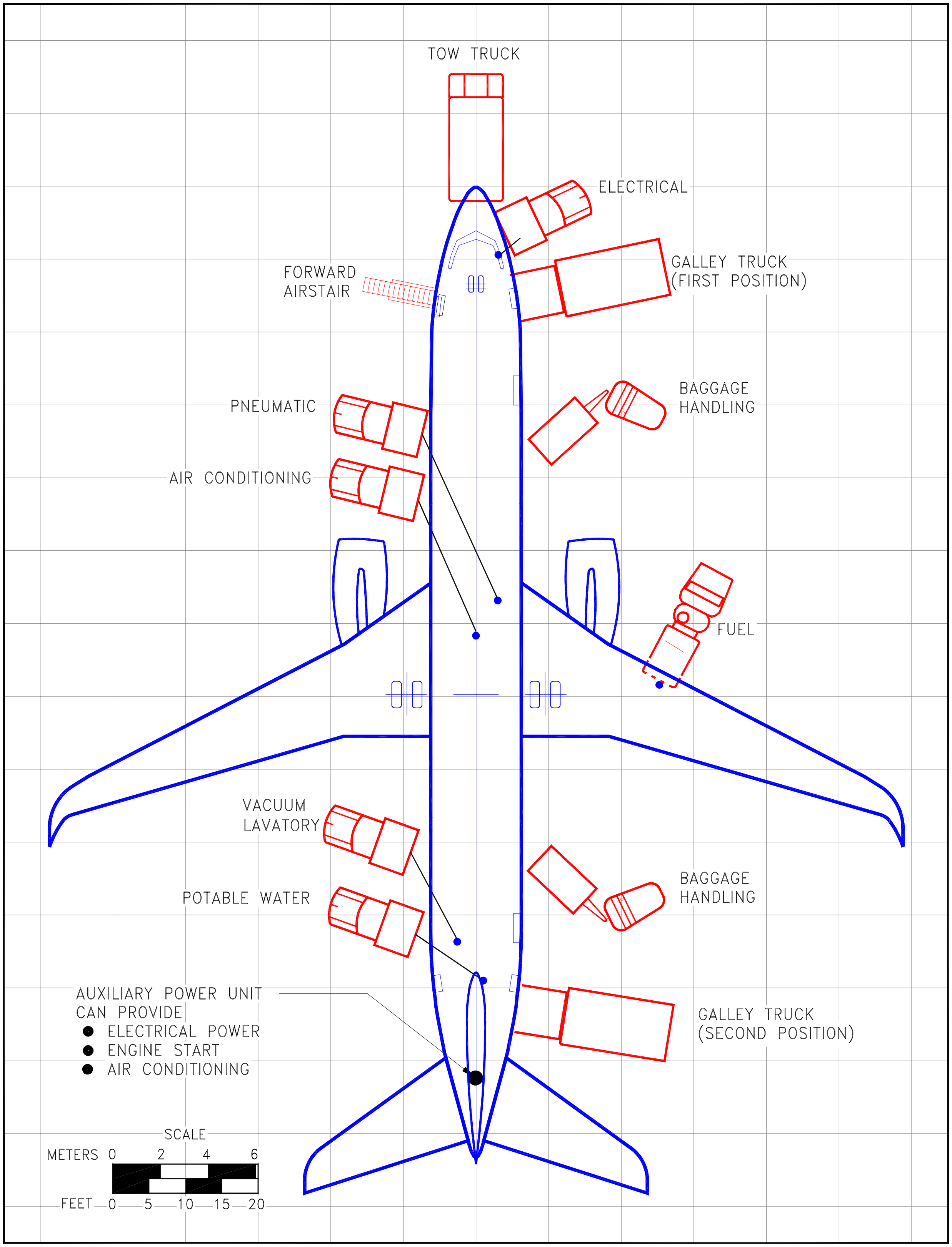
5.1.1 AIRPLANE SERVICING ARRANGEMENT - TYPICAL TURNAROUND

MODEL 737-700 WITH WINGLETS

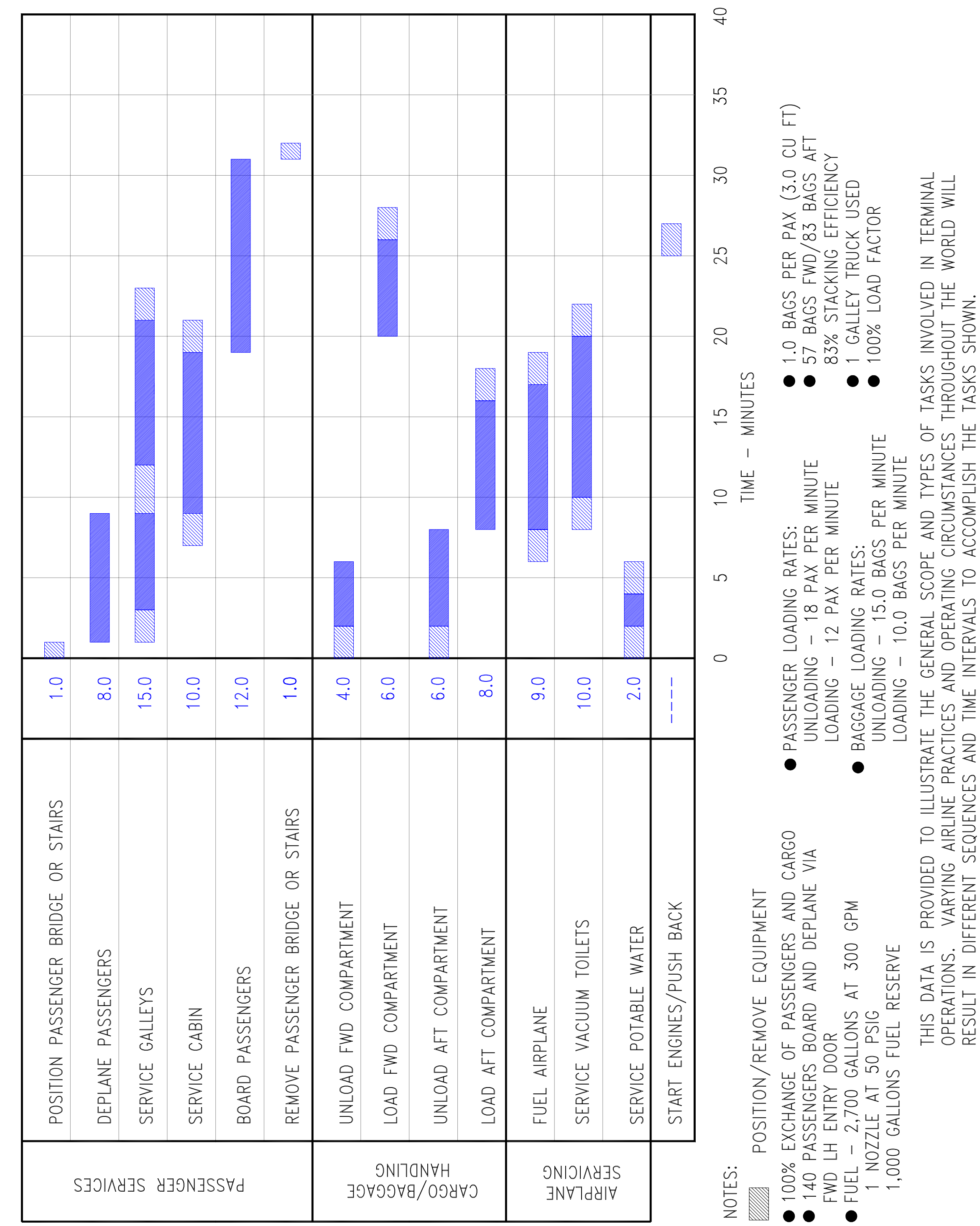


5.1.2. AIRPLANE SERVICING ARRANGEMENT - TYPICAL TURNAROUND

MODEL 737-800 WITH WINGLETS

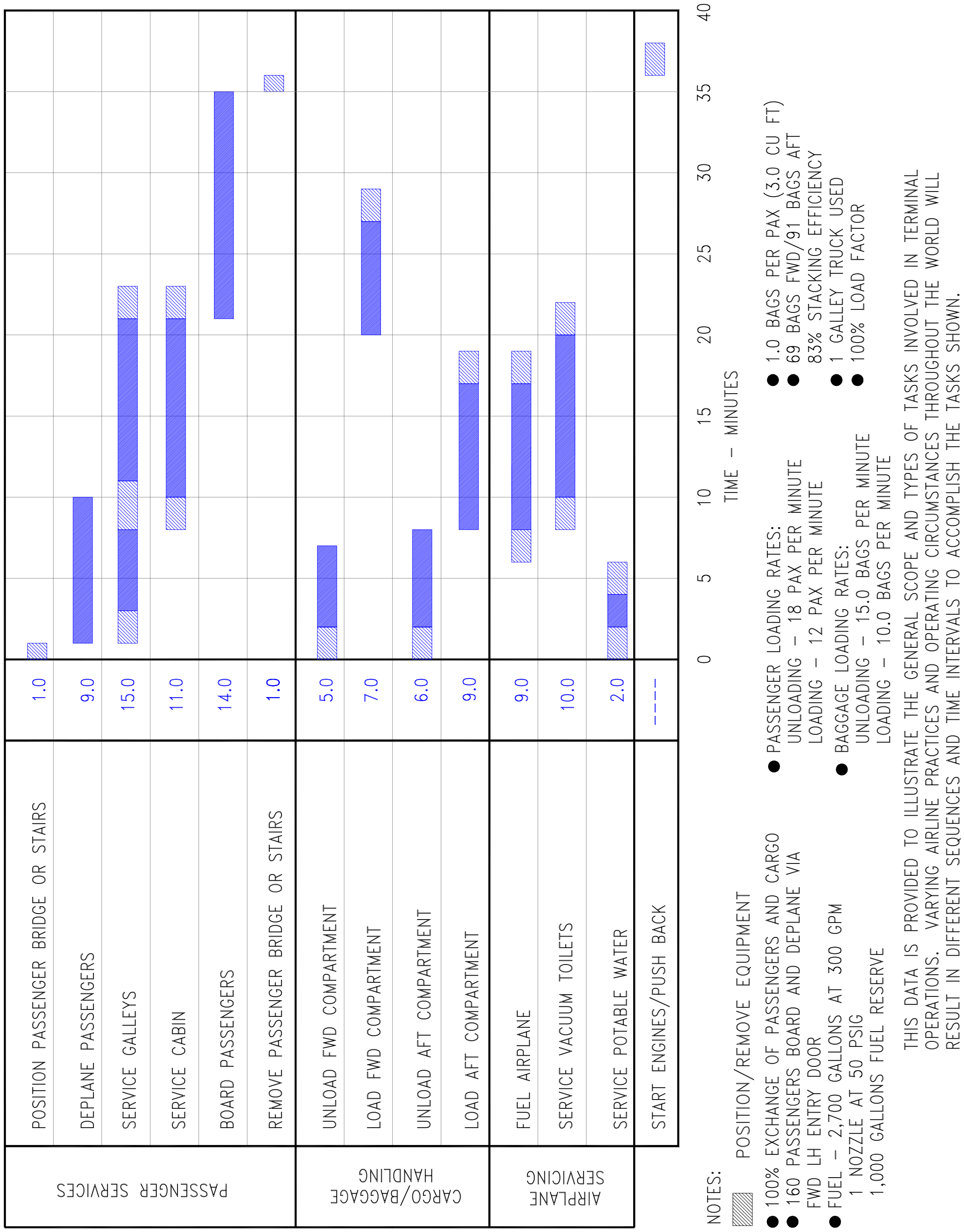


5.1.3. AIRPLANE SERVICING ARRANGEMENT - TYPICAL TURNAROUND
MODEL 737-900 WITH WINGLETS



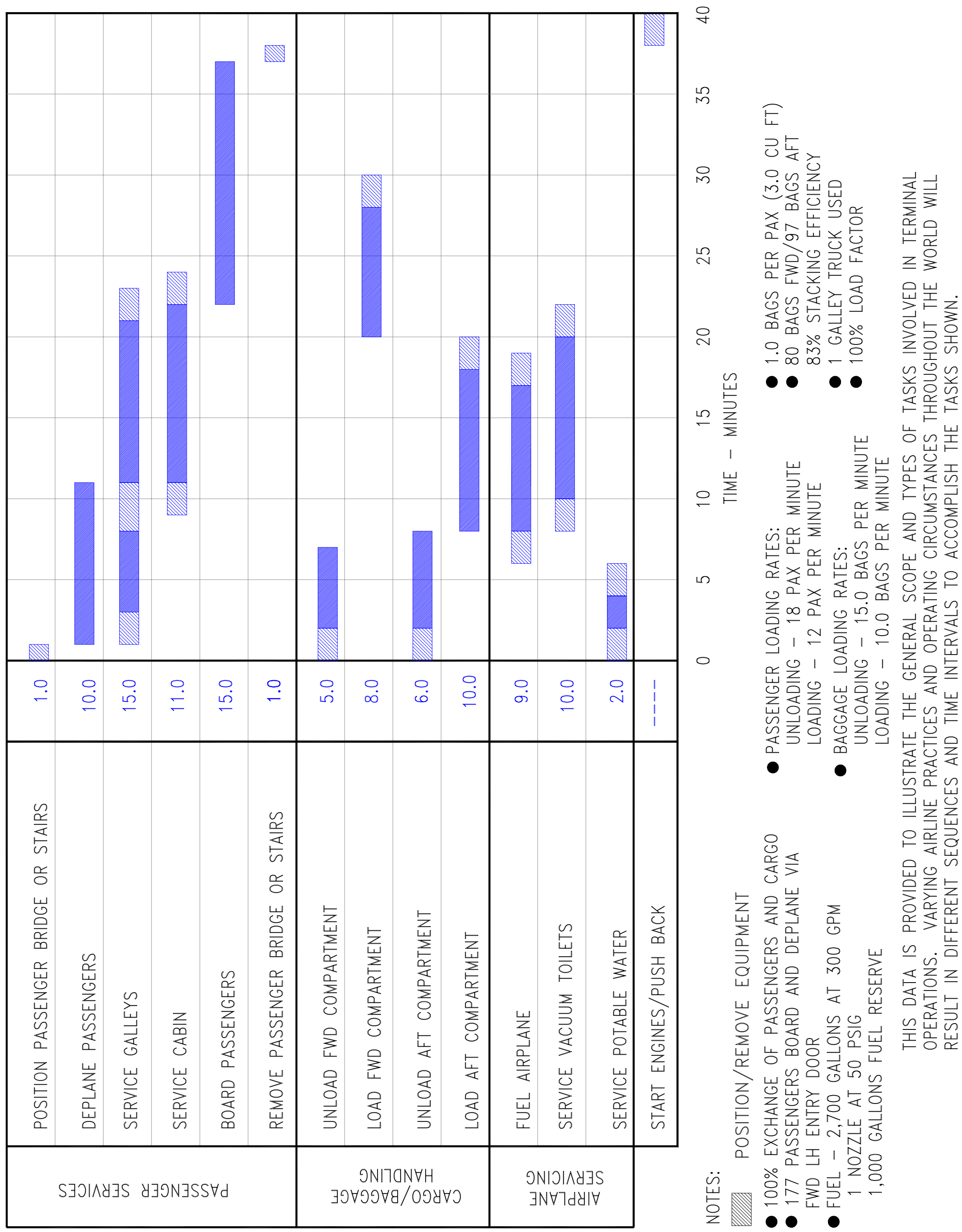
5.2.1 TERMINAL OPERATIONS - TURNAROUND STATION

MODEL 737-700 WITH WINGLETS



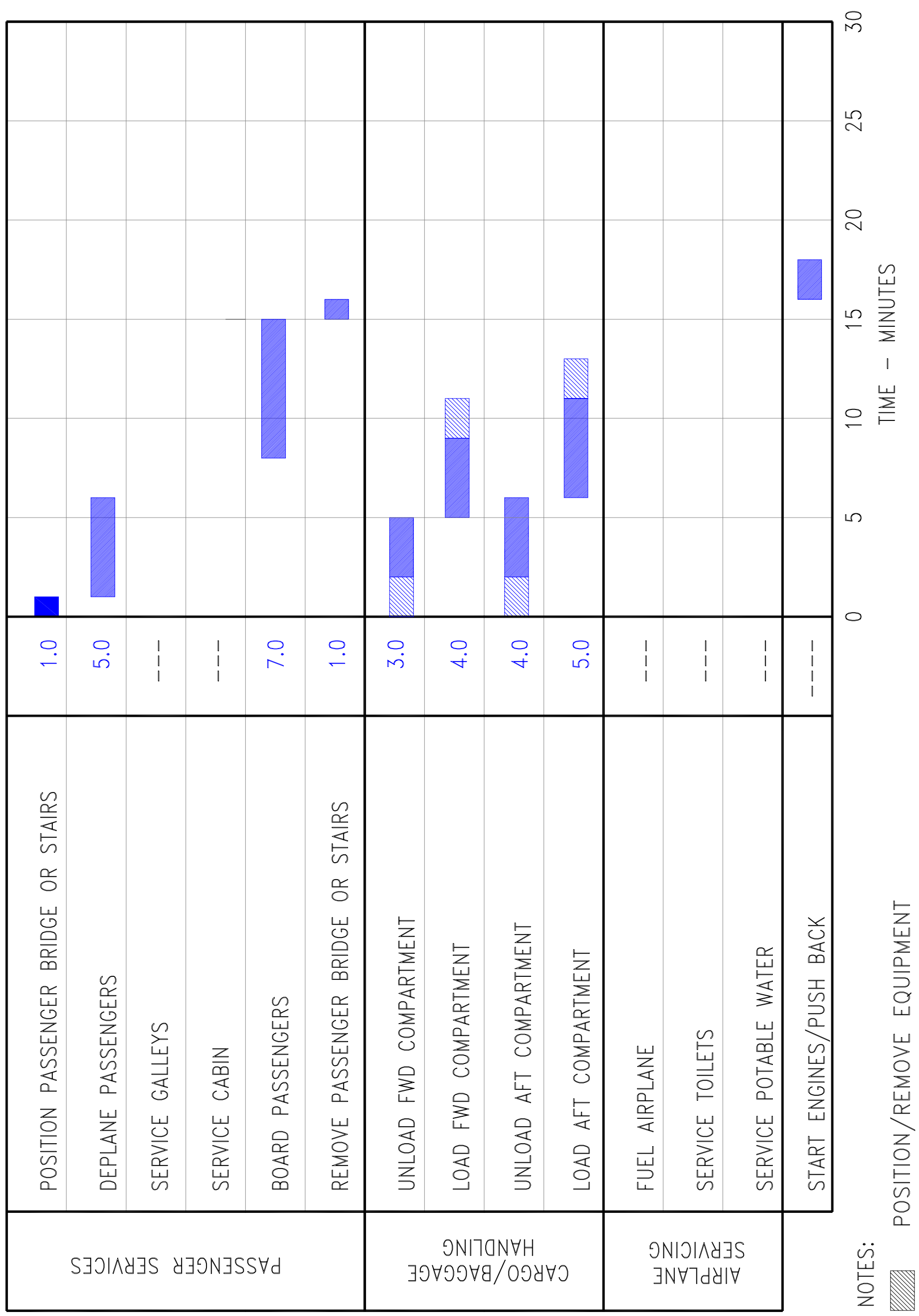
5.2.2 TERMINAL OPERATIONS - TURNAROUND STATION

MODEL 737 –800 WITH WINGLETS



5.2.3 TERMINAL OPERATIONS - TURNAROUND STATION

MODEL 737-900 WITH WINGLETS



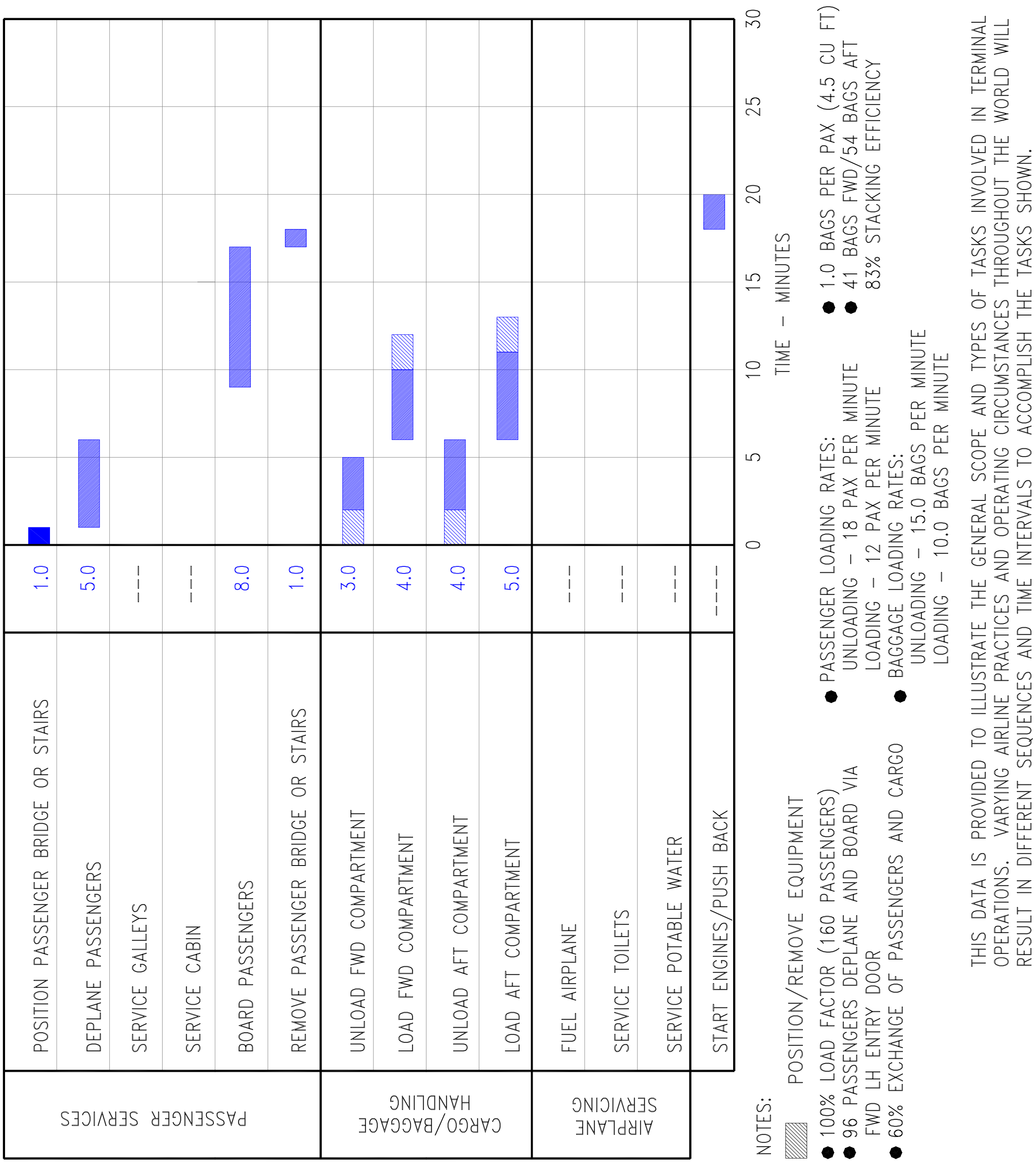
NOTES:

- POSITION/REMOVE EQUIPMENT
- 100% LOAD FACTOR (140 PASSENGERS)
- 84 PASSENGERS DEPLANE AND BOARD VIA FWD LH ENTRY DOOR
- 60% EXCHANGE OF PASSENGERS AND CARGO
- PASSENGER LOADING RATES:
  - UNLOADING - 18 PAX PER MINUTE
  - LOADING - 12 PAX PER MINUTE
- BAGGAGE LOADING RATES:
  - UNLOADING - 15.0 BAGS PER MINUTE
  - LOADING - 10.0 BAGS PER MINUTE
- 1.0 BAGS PER PAX (4.5 CU FT)
- 34 BAGS FWD/50 BAGS AFT
- 83% STACKING EFFICIENCY

THIS DATA IS PROVIDED TO ILLUSTRATE THE GENERAL SCOPE AND TYPES OF TASKS INVOLVED IN TERMINAL OPERATIONS. VARYING AIRLINE PRACTICES AND OPERATING CIRCUMSTANCES THROUGHOUT THE WORLD WILL RESULT IN DIFFERENT SEQUENCES AND TIME INTERVALS TO ACCOMPLISH THE TASKS SHOWN.

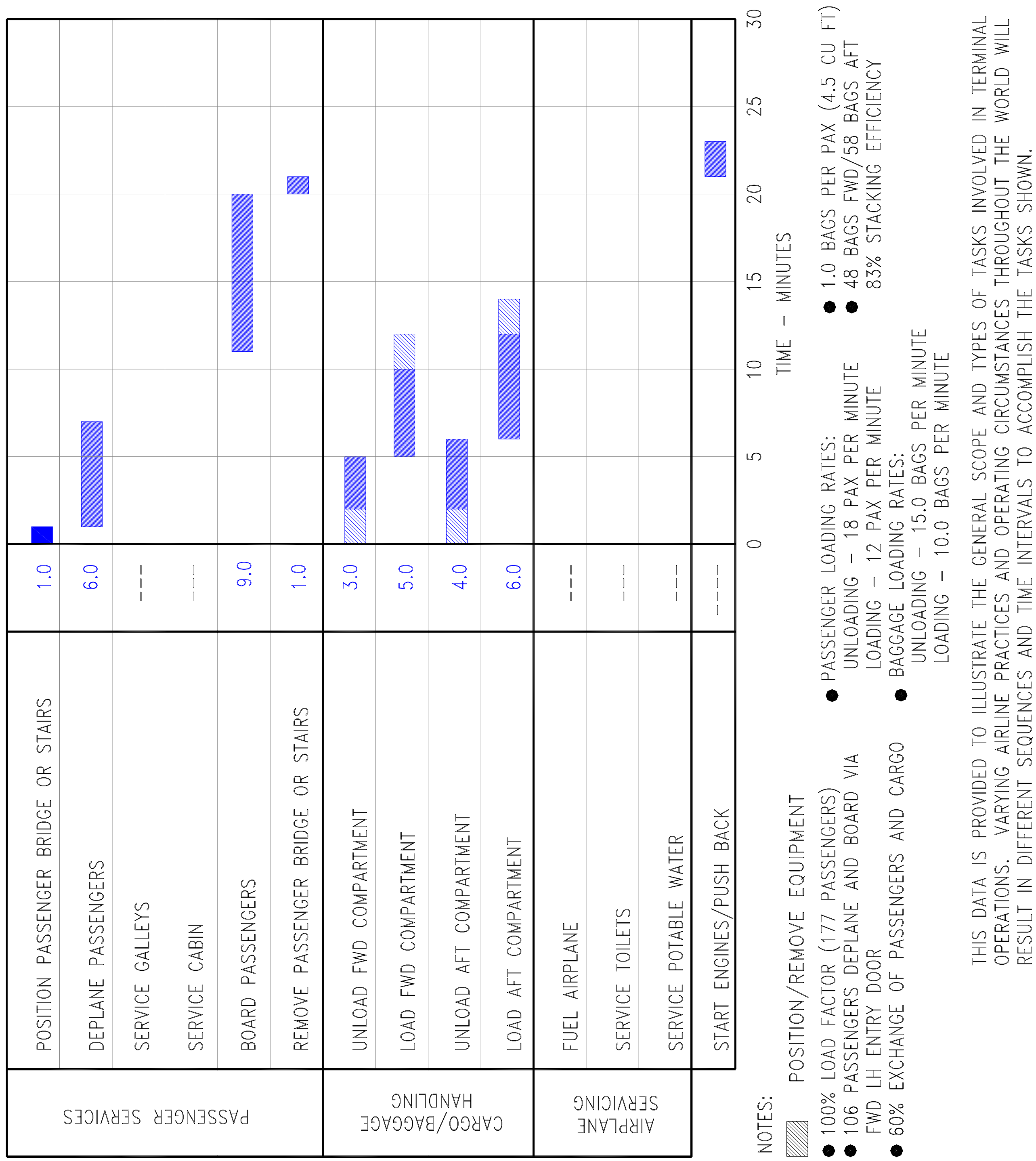
5.3.1 TERMINAL OPERATIONS - EN ROUTE STATION

MODEL 737-700 WITH WINGLETS



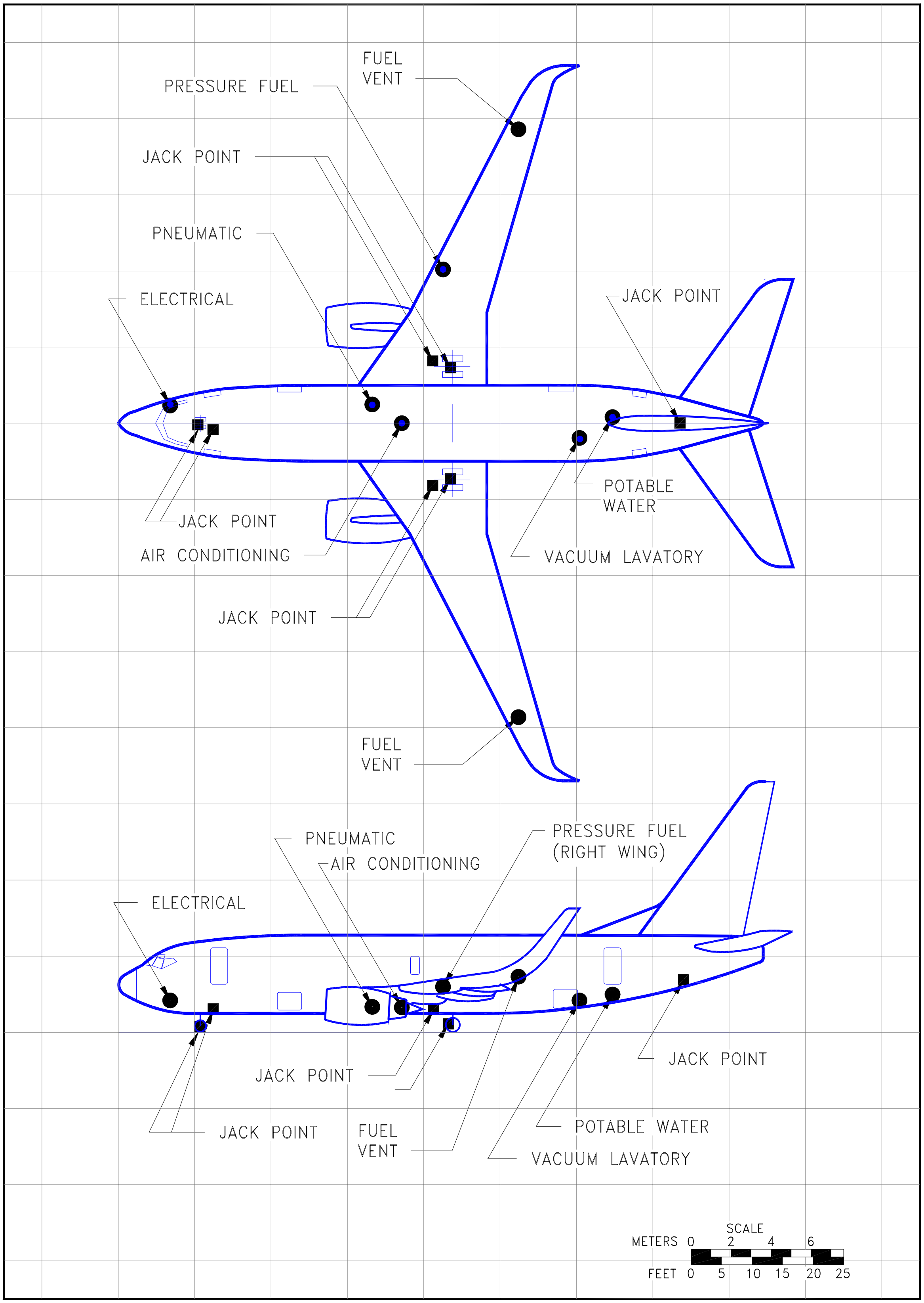
5.3.2 TERMINAL OPERATIONS - EN ROUTE STATION

MODEL 737-800 WITH WINGLETS



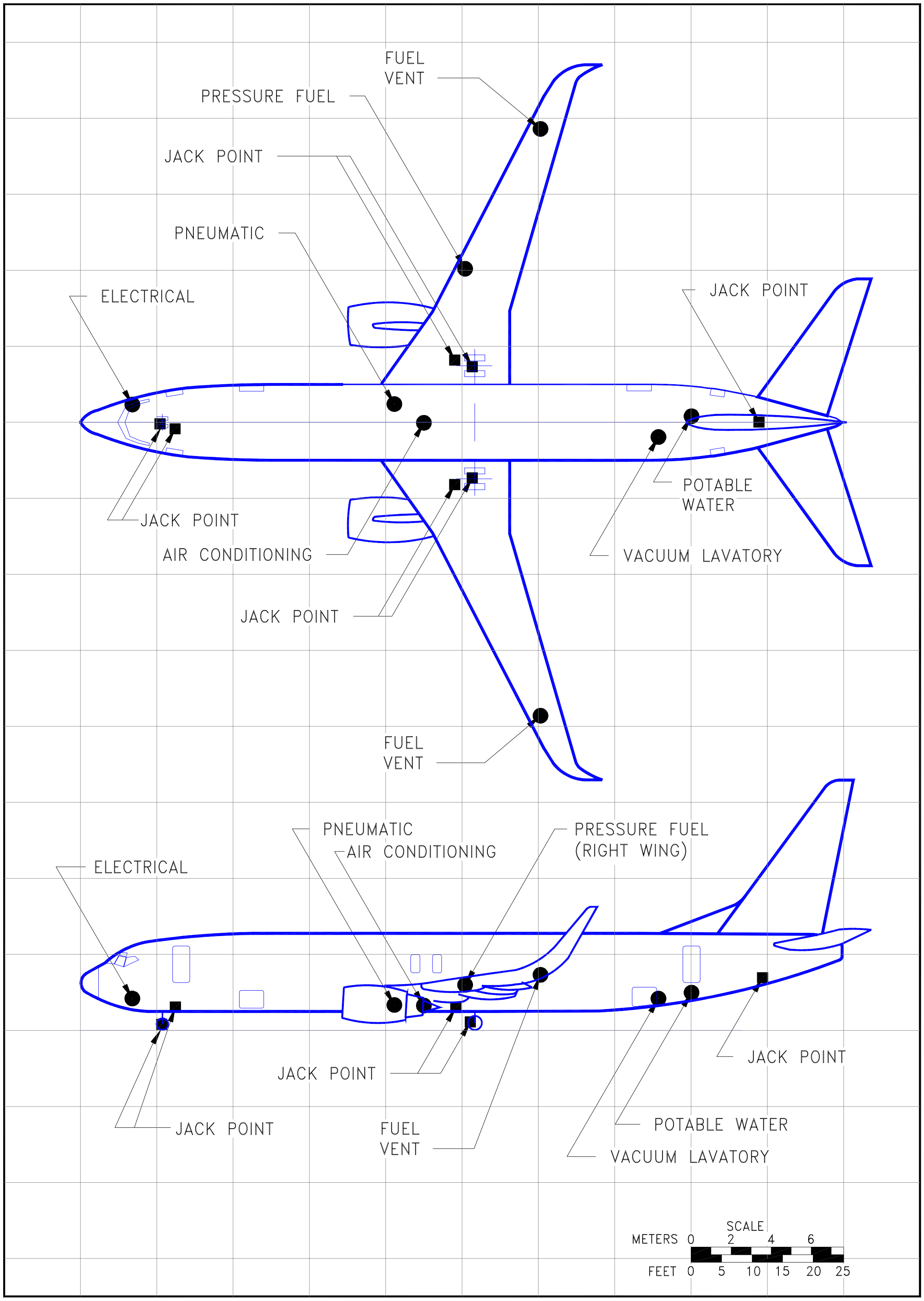
5.3.3 TERMINAL OPERATIONS - EN ROUTE STATION

MODEL 737-900 WITH WINGLETS



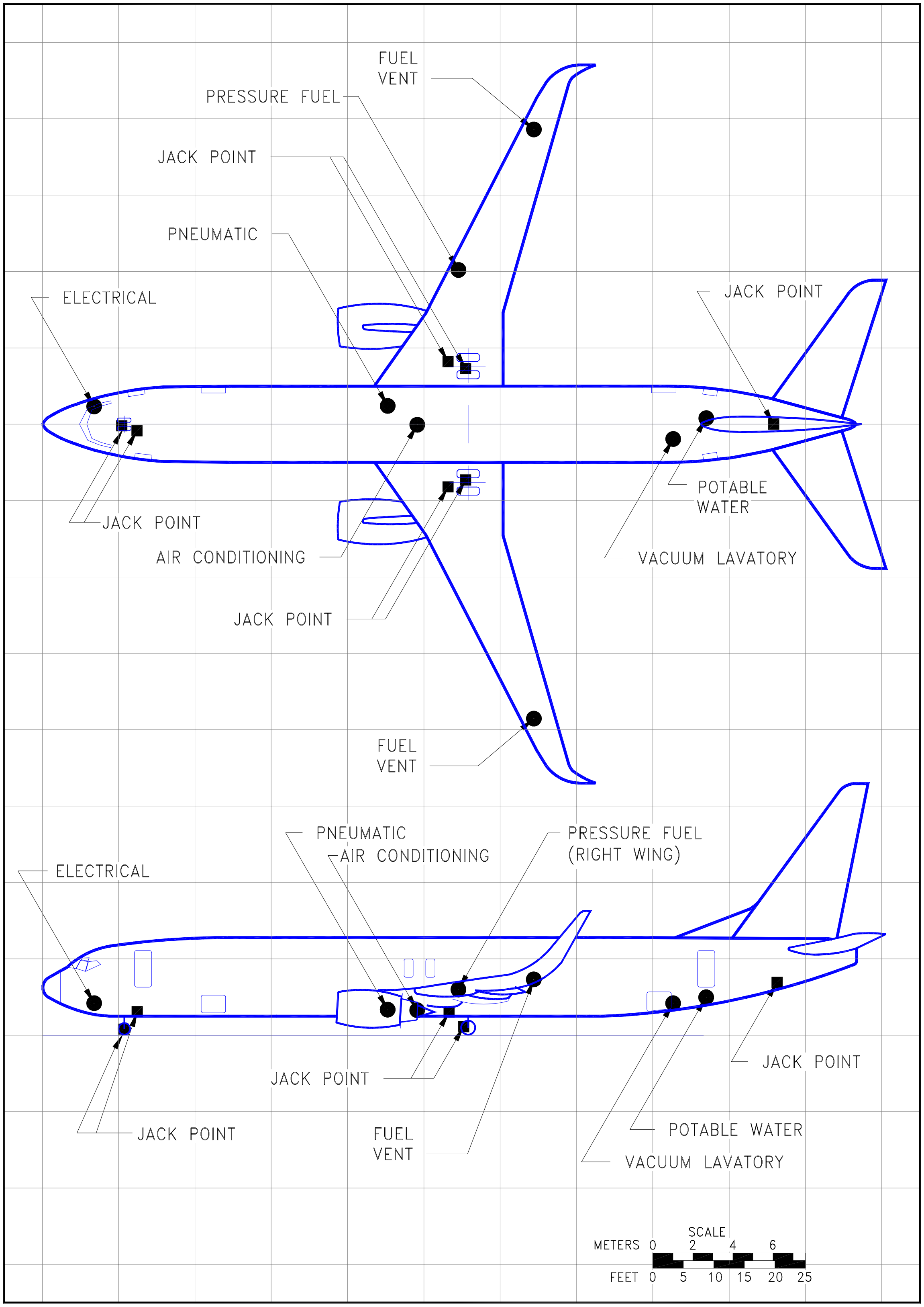
5.4.1 GROUND SERVICING CONNECTIONS

MODEL 737-700 WITH WINGLETS



5.4.2 GROUND SERVICING CONNECTIONS

MODEL 737-800 WITH WINGLETS

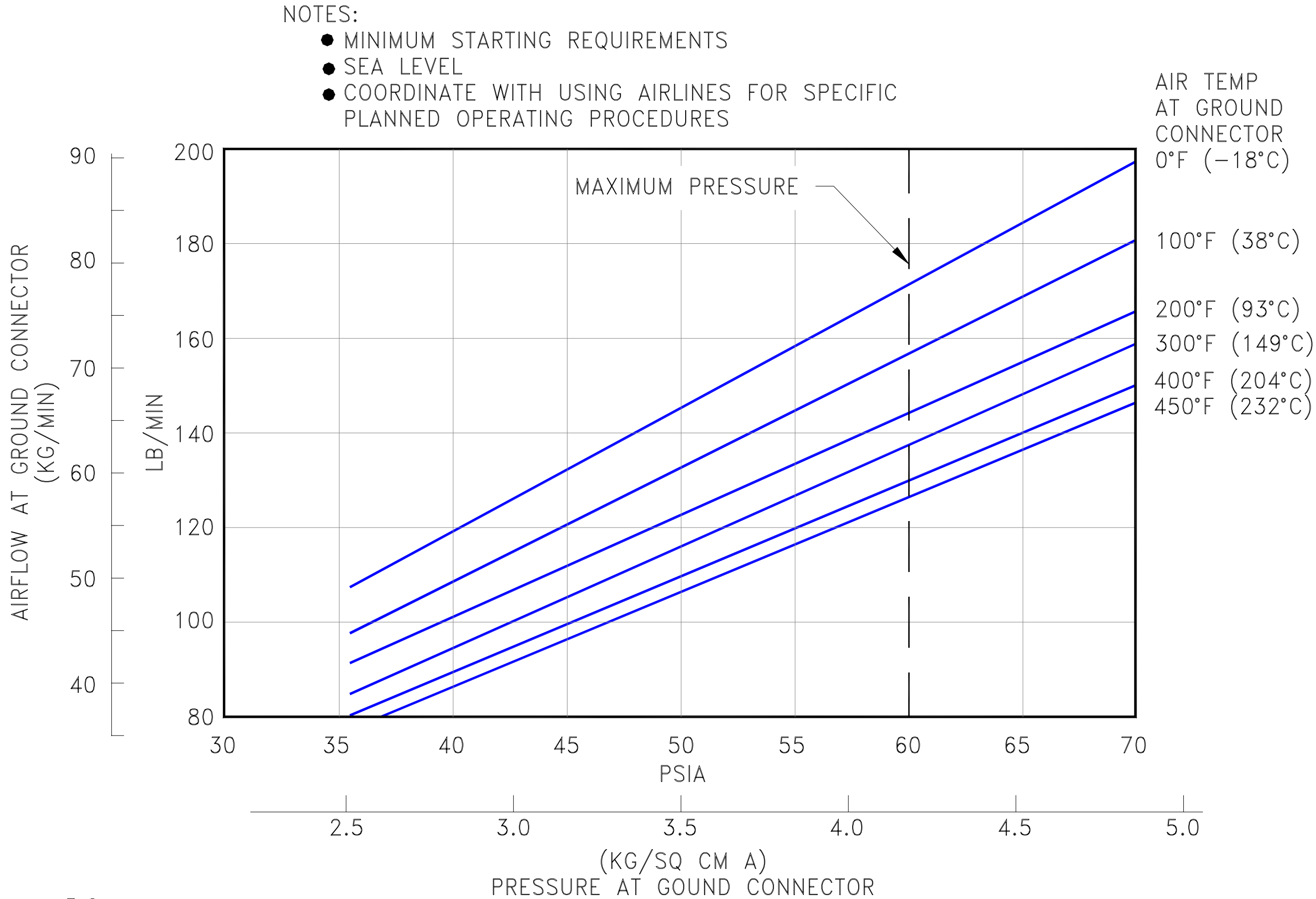


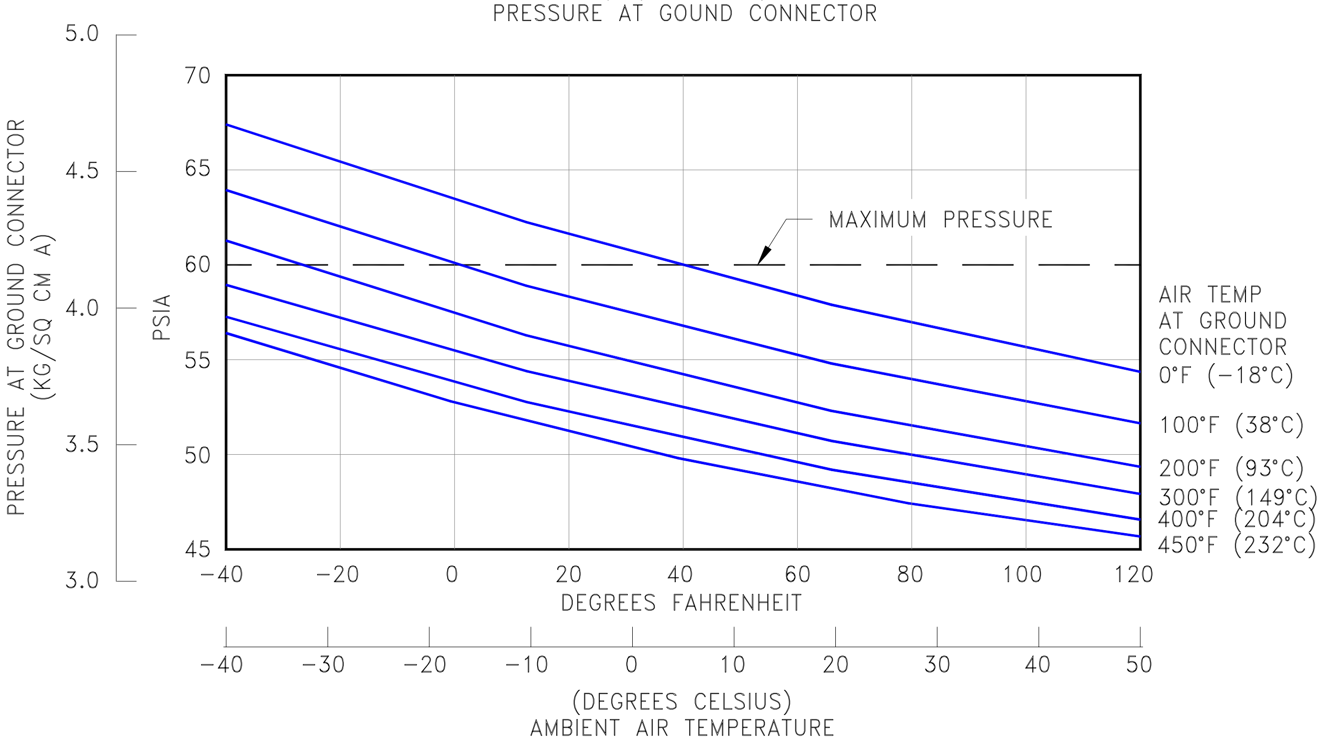
5.4.3 GROUND SERVICING CONNECTIONS
MODEL 737-900 WITH WINGLETS

SYSTEM	MODEL	DISTANCE AFT OF NOSE		DISTANCE FROM AIRPLANE CENTERLINE				MAX HEIGHT ABOVE GROUND	
				LH SIDE		RH SIDE			
		FT-IN	M	FT-IN	M	FT-IN	M	FT-IN	M
CONDITIONED AIR	737-700	39 - 9	12.1	0	0	0	0	4 - 3	1.3
ONE 8-IN (20.3 CM) PORT	737-800	49 - 7	15.1	0	0	0	0	4 - 3	1.3
	737-900	54 - 1	16.5	0	0	0	0	4 - 3	1.3
ELECTRICAL	737-700	8 - 6	2.6	-	-	3 - 1	0.9	7 - 3	2.2
ONE CONNECTION	737-800	8 - 6	2.6	-	-	3 - 1	0.9	7 - 5	2.3
60 KVA , 200/115 V AC 400 HZ, 3-PHASE EACH	737-900	8 - 6	2.6	-	-	3 - 1	0.9	7 - 4	2.2
FUEL	737-700	53 - 2	16.2	-	-	25 - 3	7.7	9 - 8	3.0
ONE UNDERWING PRESSURE	737-800	63 - 0	19.2	-	-	25 - 3	7.7	9 - 7	2.9
CONNECTOR ON RIGHT WING (SEE SEC 2.1 FOR CAPACITY)	737-900	67 - 6	20.6	-	-	25 - 3	7.7	9 - 7	2.9
FUEL VENT ON UNDERSIDE OF BOTH WINGTIPS	737-700	65 - 6	20.0	48 - 3	14.7	48 - 3	14.7	(1)	(1)
	737-800	75 - 4	22.0	48 - 3	14.7	48 - 3	14.7	(1)	(1)
	737-900	80 - 6	24.5	48 - 3	14.7	48 - 3	14.7	(1)	(1)
LAVATORY	737-700	75 - 7	23.1	2 - 7	0.8	-	-	6 - 3	1.9
ONE CONNECTION	737-800	94 - 9	28.9	2 - 7	0.8	-	-	6 - 3	1.9
VACUUM LAVATORY	737-900	102 - 9	31.3	2 - 7	0.8	-	-	6 - 3	1.9
PNEUMATIC	737-700	41 - 7	12.7	-	-	3 - 0	0.9	4 - 7	1.4
ONE 3-IN(7.6-CM) PORTS	737-800	51 - 5	15.7	-	-	3 - 0	0.9	4 - 7	1.4
	737-900	55 - 11	17.1	-	-	3 - 0	0.9	4 - 7	1.4
POTABLE WATER	737-700	80 - 11	24.7	-	-	1 - 0	0.3	6 - 10	2.1
ONE SERVICE CONNECTION	737-800	100 - 1	30.5	-	-	1 - 0	0.3	6 - 9	2.1
0.75-IN (1.9 CM)	737-900	108 - 1	33.9	-	-	1 - 0	0.3	6 - 8	2.0

NOTES: DISTANCES ROUNDED TO THE NEAREST INCH AND 0.1 METER.
(1) LOCATED ON UNDERSIDE OF WING

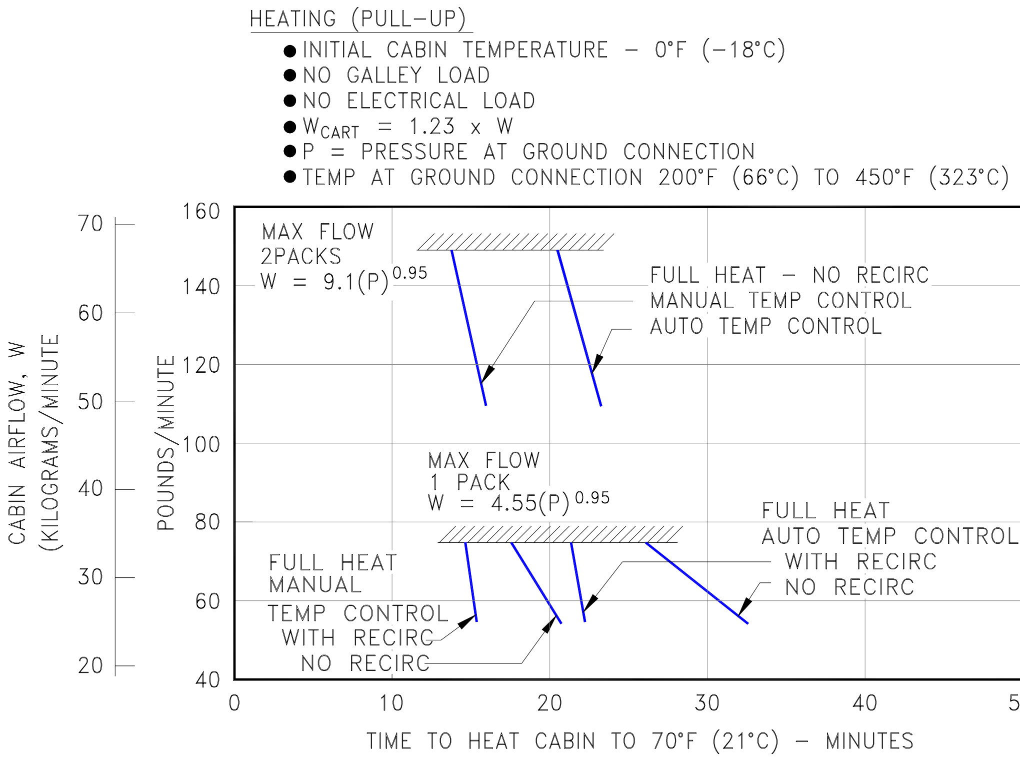
5.4.5 GROUND SERVICING CONNECTIONS AND CAPACITIES
MODEL 737-700, -800, -900 (WITH WINGLETS)

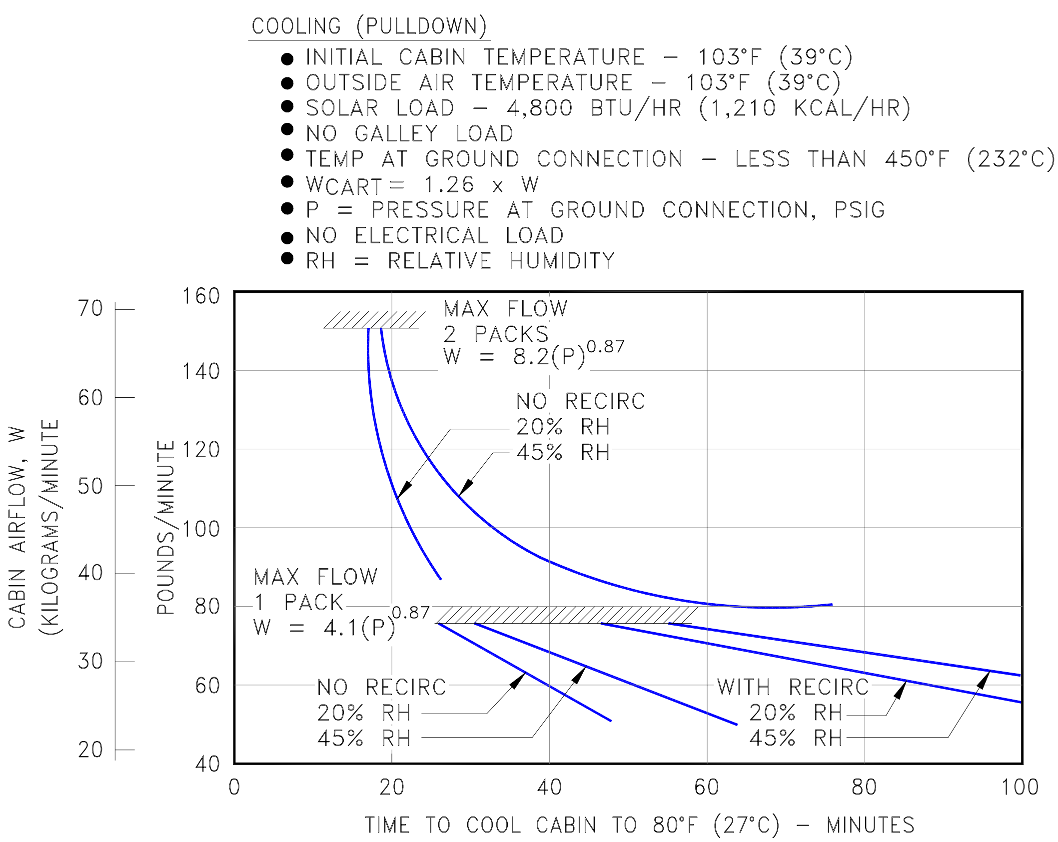




5.5. ENGINE START PNEUMATIC REQUIREMENTS - SEA LEVEL

MODEL 737 -700, -800, -900 (WITH WINGLETS)



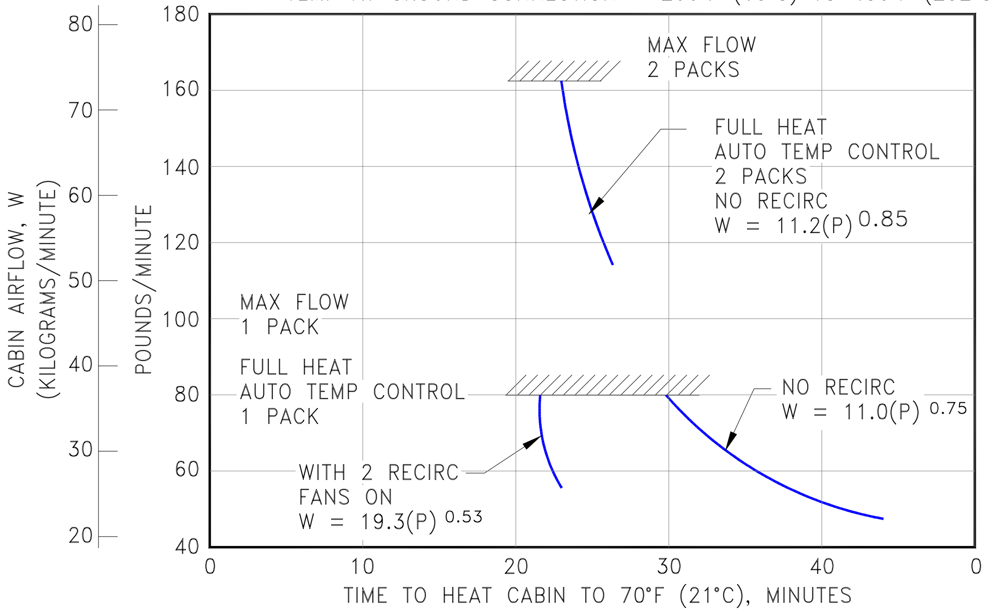


5.6.1 GROUND PNEUMATIC POWER REQUIREMENTS - HEATING/COOLING

MODEL 737 –700 WITH WINGLETS

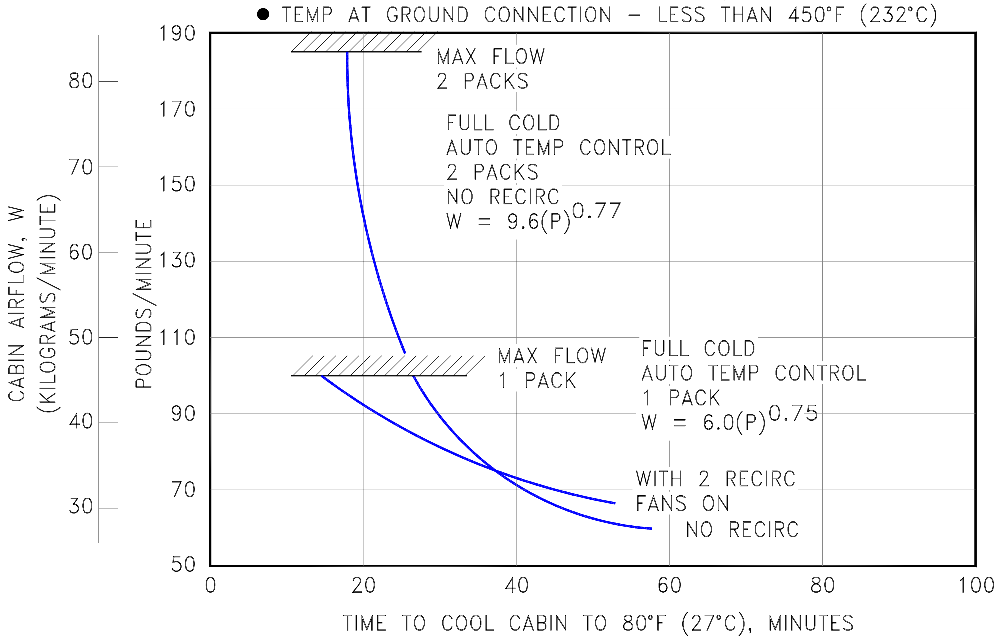
HEATING (PULL-UP)

- INITIAL CABIN TEMPERATURE – 0°F (–18°C)
- OUTSIDE AIR TEMPERATURE – 0°F (–18°C)
- NO GALLEY LOAD, NO ELECTRICAL LOAD
- W_{CART} = 1.14 x W
- P = PRESSURE AT GROUND CONNECTION
- TEMP AT GROUND CONNECTION – 200°F (65°C) TO 450°F (232°C)



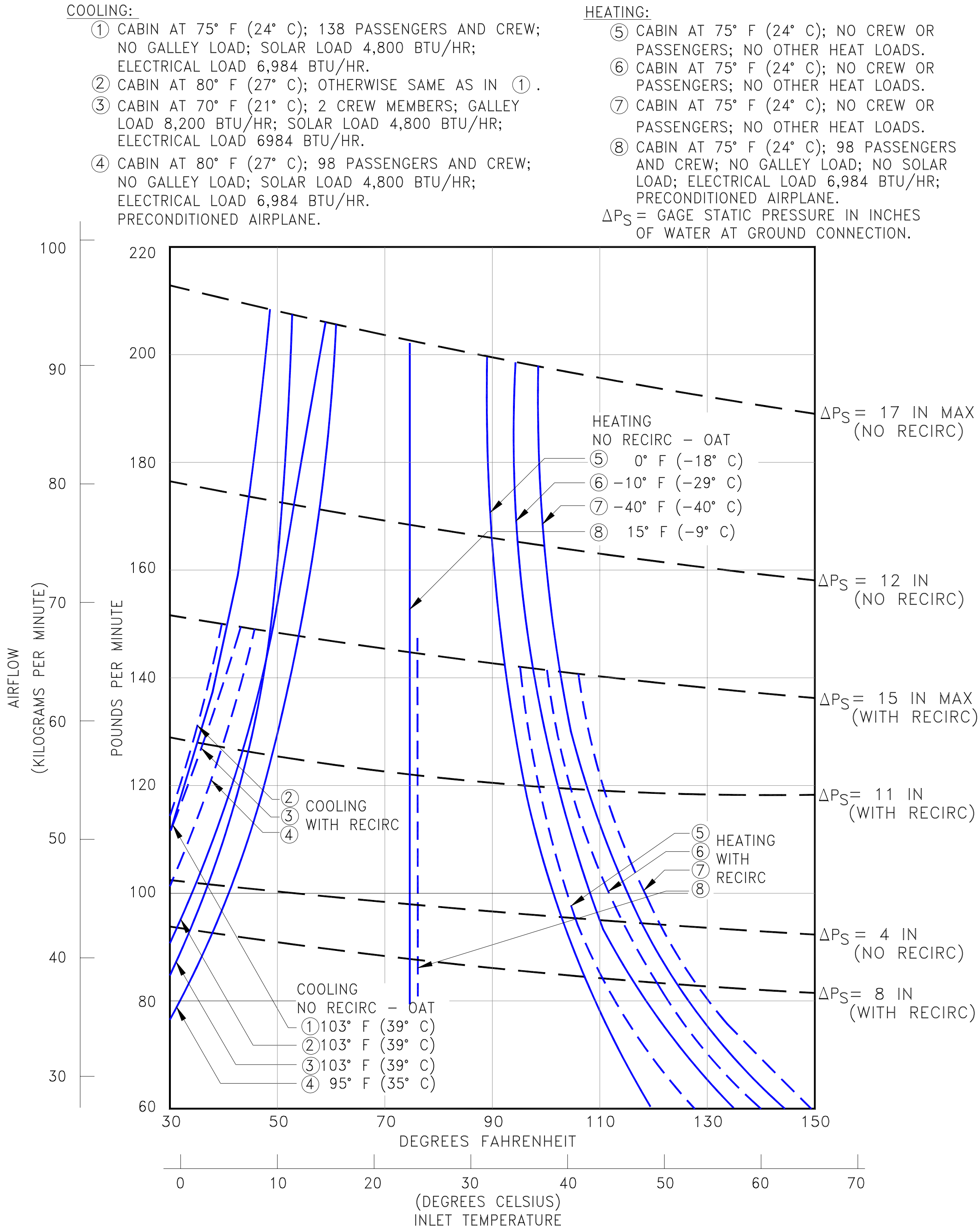
COOLING (PULL-DOWN)

- INITIAL CABIN TEMPERATURE – 103°F (39°C)
- OUTSIDE AIR TEMPERATURE – 103°F (39°C)
- SOLAR LOAD – 7,741 BTU/HR (1,951 KCAL/HR)
- NO GALLEY LOAD, NO ELECTRICAL LOAD
- W_{CART} = 11.7 x W
- P = PRESSURE AT GROUND CONNECTION, PSIG
- TEMP AT GROUND CONNECTION – LESS THAN 450°F (232°C)



5.6.2 GROUND PNEUMATIC POWER REQUIREMENTS - HEATING/COOLING

MODEL 737-800, -900 WITH WINGLETS



5.7.1 CONDITIONED AIR FLOW REQUIREMENTS

MODEL 737 –700 WITH WINGLETS

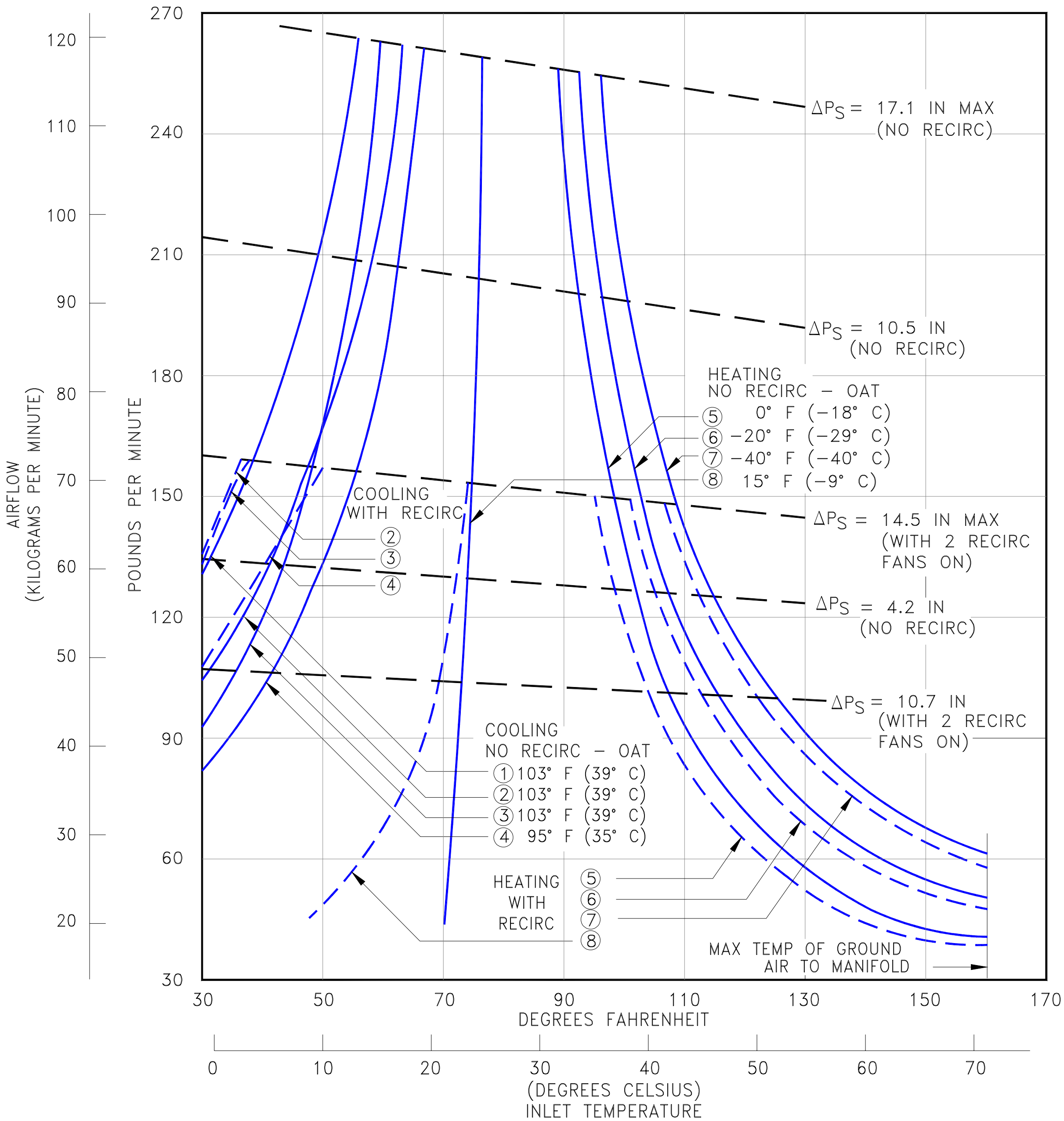
COOLING:

1. CABIN AT 75° F (24° C); 185 PASSENGERS AND CREW; NO GALLEY LOAD; SOLAR LOAD 7,741 BTU/HR; ELECTRICAL LOAD 10,955 BTU/HR.
2. CABIN AT 80° F (27° C); OTHERWISE SAME AS IN 1
3. CABIN AT 70° F (21° C); 2 CREW MEMBERS; GALLEY LOAD 8,200 BTU/HR; SOLAR LOAD 7,741 BTU/HR; ELECTRICAL LOAD 10,955 BTU/HR.
4. CABIN AT 80° F (27° C); 117 PASSENGERS AND CREW; NO GALLEY LOAD; SOLAR LOAD 7,741 BTU/HR; ELECTRICAL LOAD 10,955 BTU/HR; PRECONDITIONED AIRPLANE.

HEATING:

5. CABIN AT 75° F (24° C); NO CREW OR PASSENGERS; NO OTHER HEAT LOADS.
6. CABIN AT 75° F (24° C); NO CREW OR PASSENGERS; NO OTHER HEAT LOADS.
7. CABIN AT 75° F (24° C); NO CREW OR PASSENGERS; NO OTHER HEAT LOADS.
8. CABIN AT 75° F (24° C); 117 PASSENGERS AND CREW; NO GALLEY LOAD; NO SOLAR LOAD; ELECTRICAL LOAD 10,955 BTU/HR; PRECONDITIONED AIRPLANE.

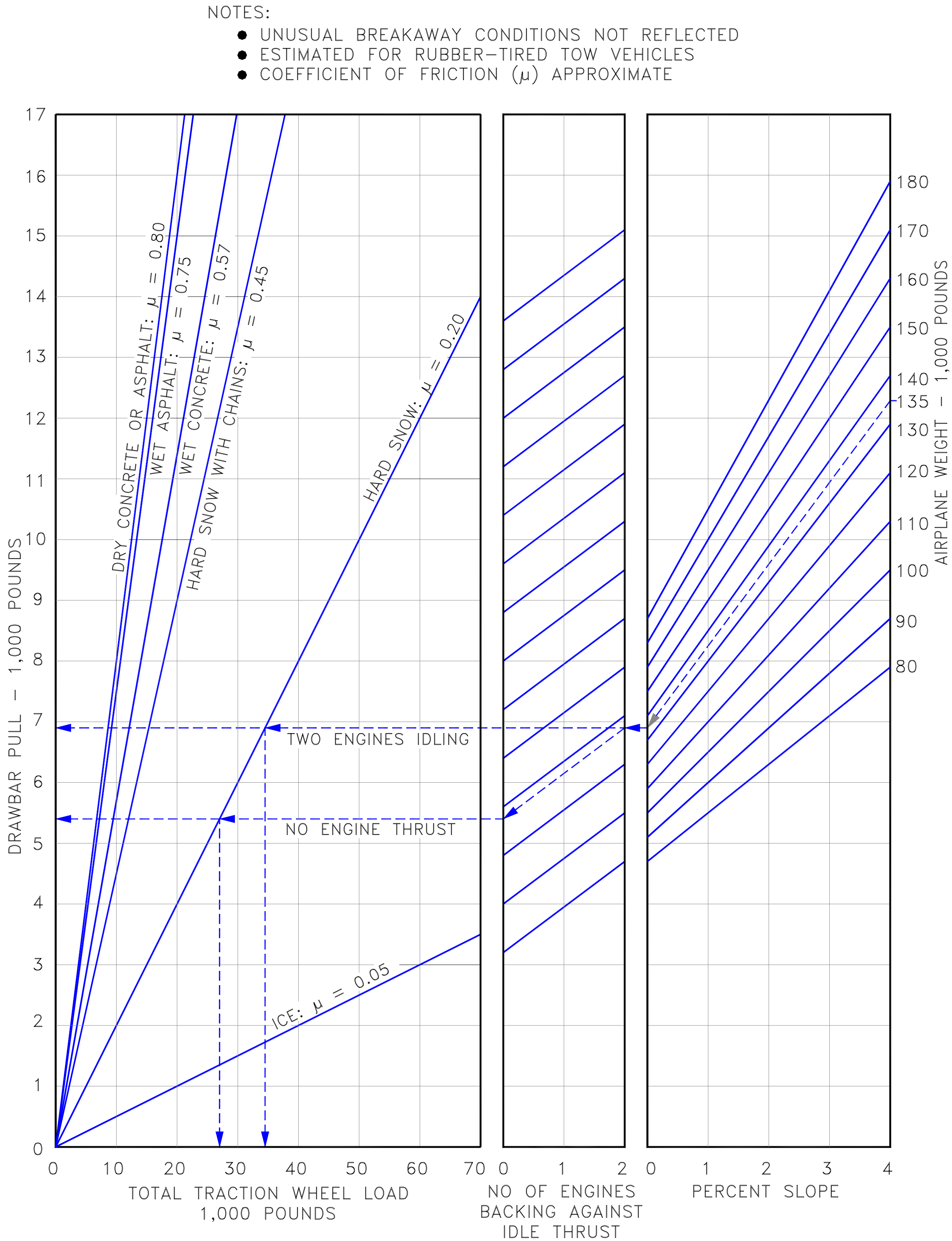
ΔP_S = GAGE STATIC PRESSURE IN INCHES OF WATER AT GROUND CONNECTION.



5.7.2 CONDITIONED AIR FLOW REQUIREMENTS

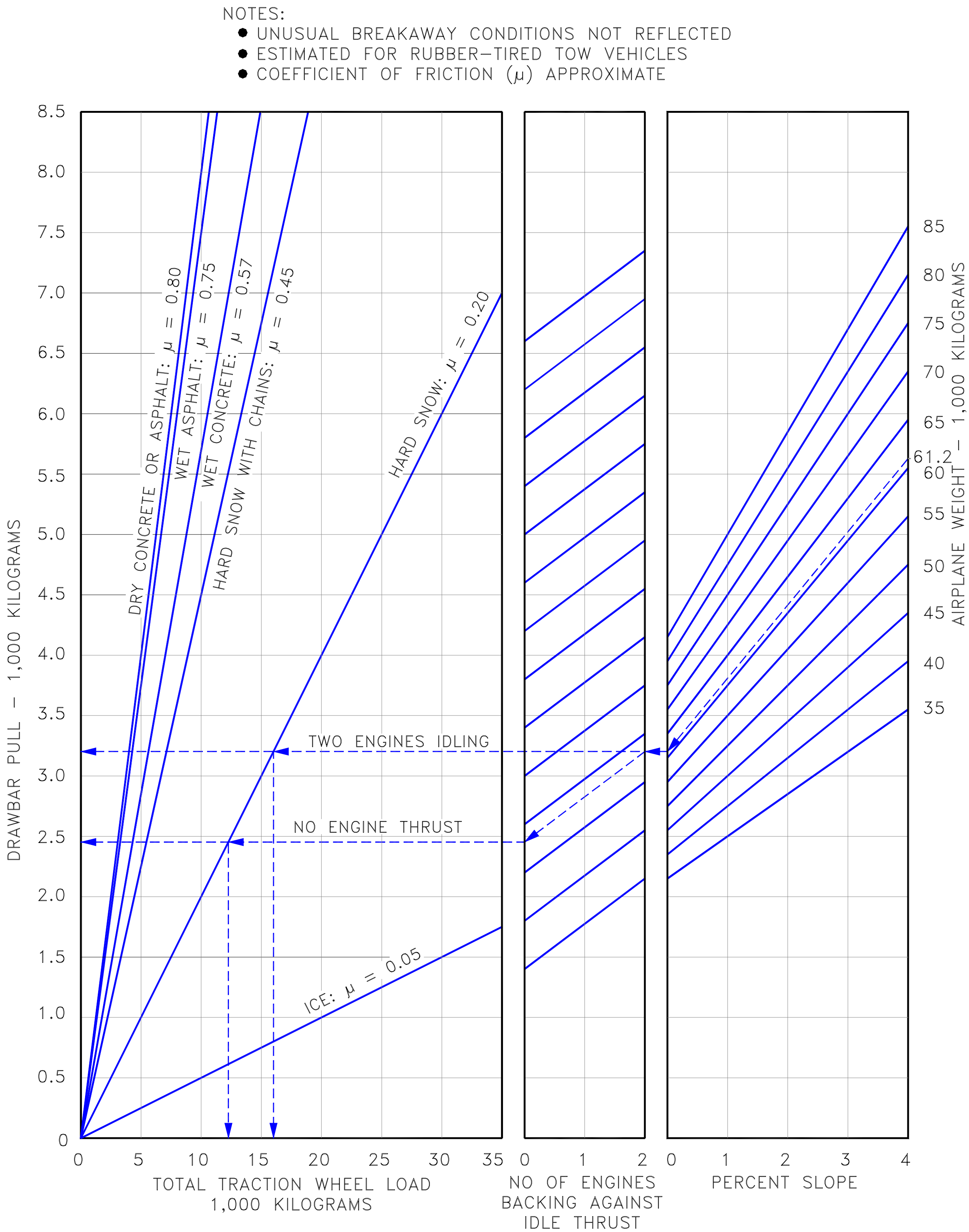
MODEL 737-800, -900 WITH WINGLETS

PRELIMINARY FOR –900 WITH WINGLETS



5.8.1 GROUND TOWING REQUIREMENTS - ENGLISH UNITS

MODEL 737 -700, -800, -900 (WITH WINGLETS)



5.8.2 GROUND TOWING REQUIREMENTS - METRIC UNITS

MODEL 737 -700, -800, -900 (WITH WINGLETS)

6.0 JET ENGINE WAKE AND NOISE DATA

6.1 Jet Engine Exhaust Velocities and Temperatures

6.2 Airport and Community Noise

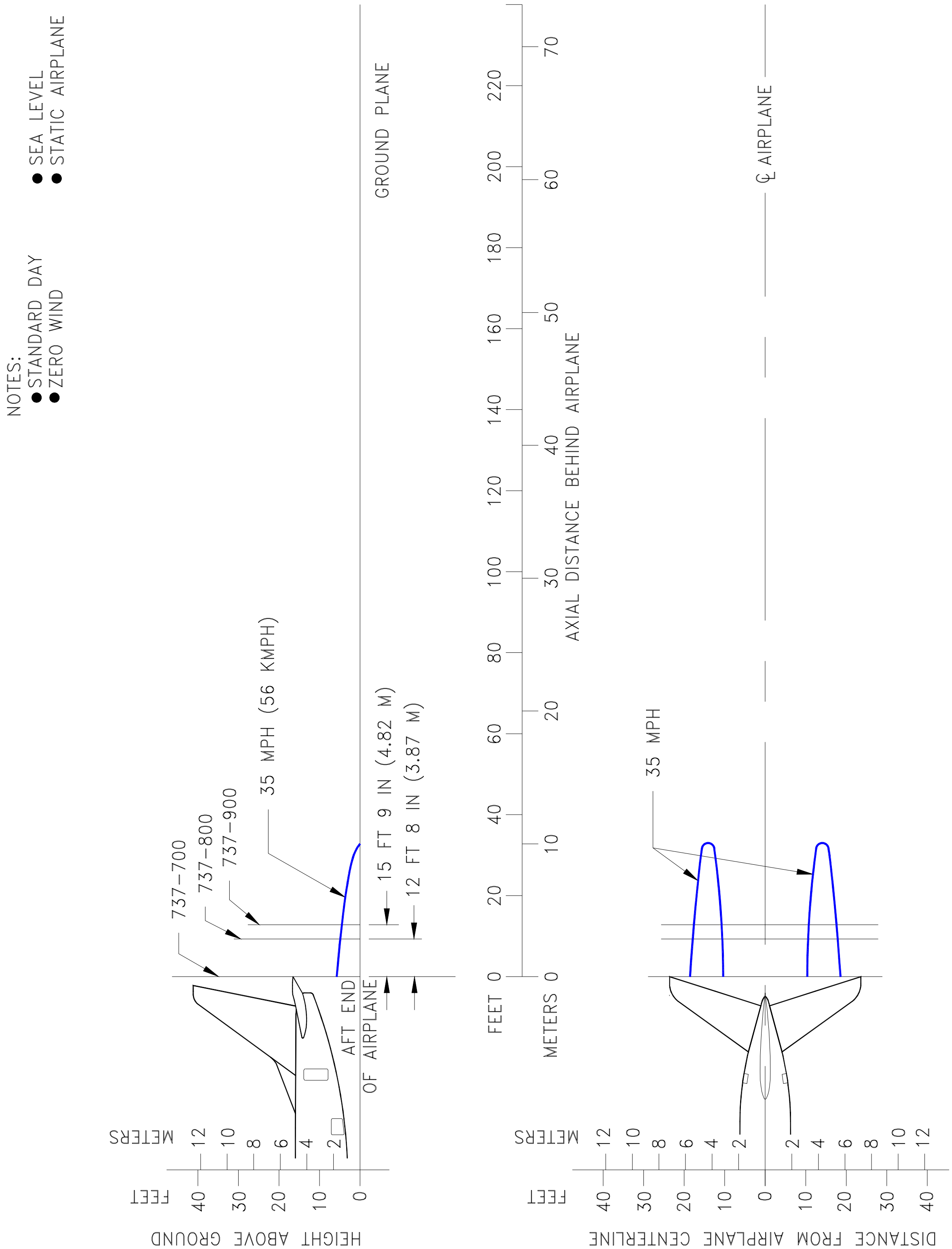
6.0 JET ENGINE WAKE AND NOISE DATA

6.1 Jet Engine Exhaust Velocities and Temperatures

This section shows exhaust velocity and temperature contours aft of the 737-700/-800/-900. The contours were calculated from a standard computer analysis using three-dimensional viscous flow equations with mixing of primary, fan, and free-stream flow. The presence of the ground plane is included in the calculations as well as engine tilt and toe-in. Mixing of flows from the engines is also calculated. The analysis does not include thermal buoyancy effects which tend to elevate the jet wake above the ground plane. The buoyancy effects are considered to be small relative to the exhaust velocity and therefore are not included.

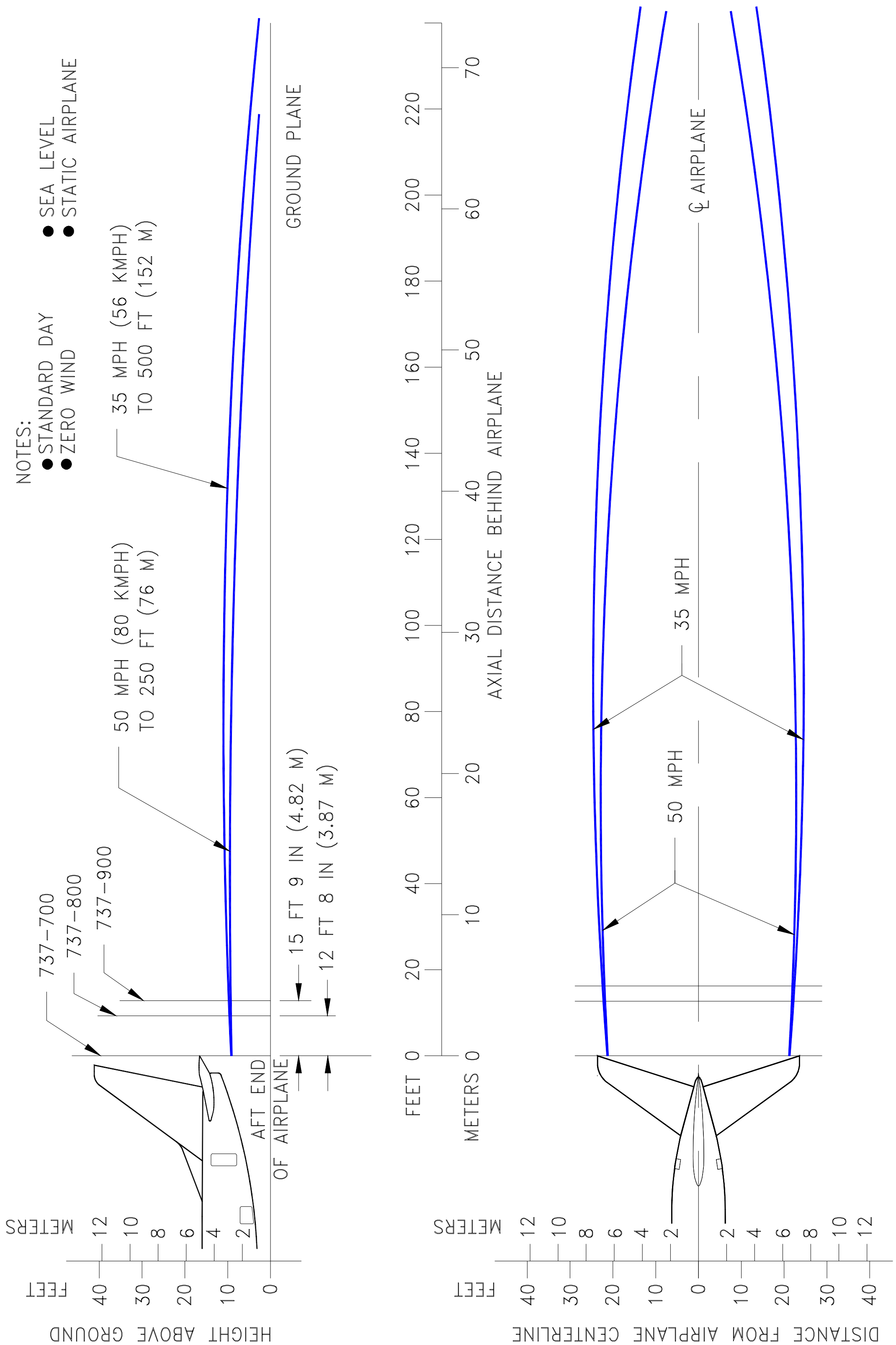
The graphs show jet wake velocity and temperature contours are valid for sea level, static, standard day conditions. The effect of wind on jet wakes was not included. There is evidence to show that a downwind or an upwind component does not simply add or subtract from the jet wake velocity, but rather carries the whole envelope in the direction of the wind. Crosswinds may carry the jet wake contour far to the side at large distances behind the airplane.

PRELIMINARY FOR -900 WITH WINGLETS



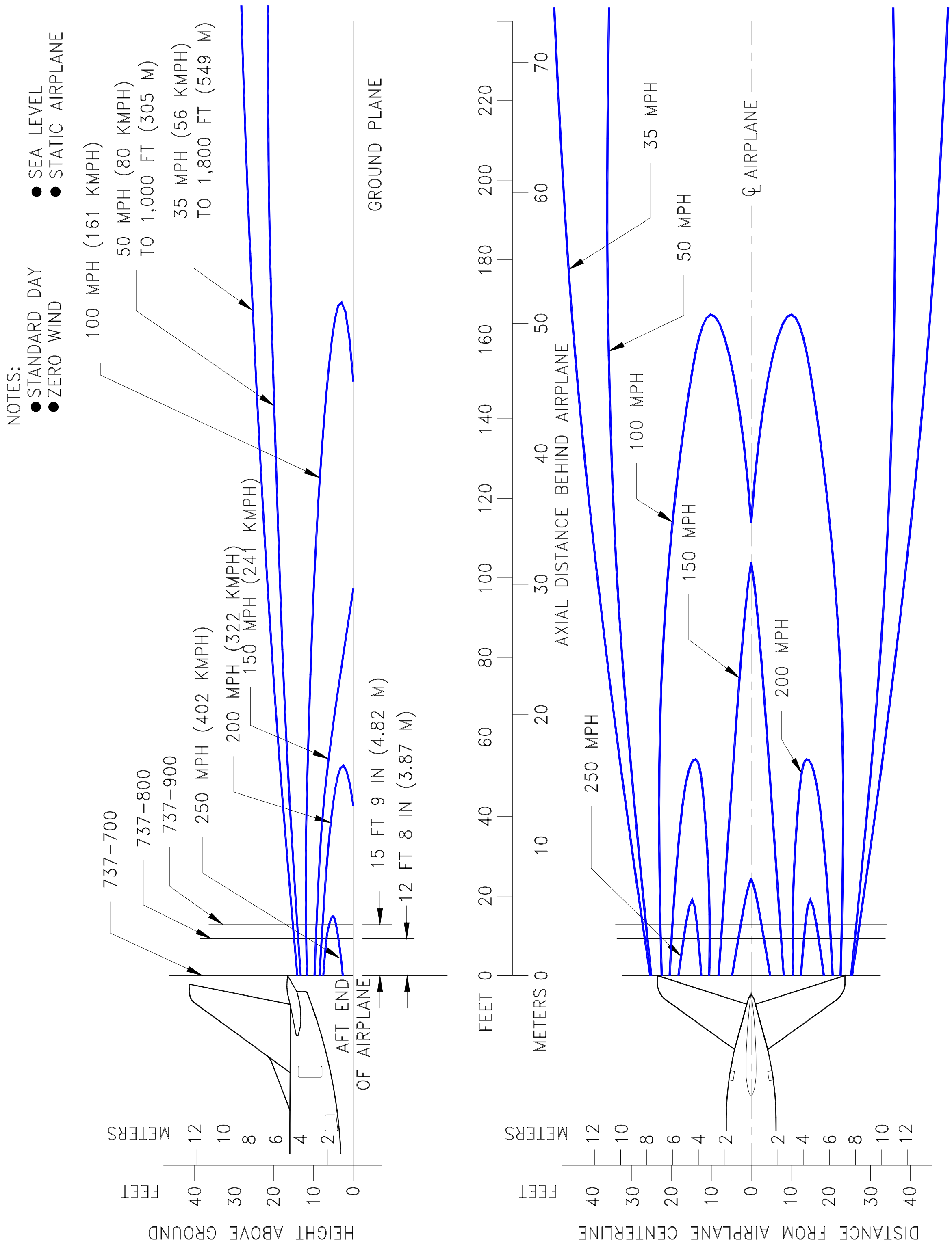
6.1.1 PREDICTED JET ENGINE EXHAUST VELOCITY CONTOURS - IDLE THRUST

MODEL 737-700, -800, -900 (WITH WINGLETS)



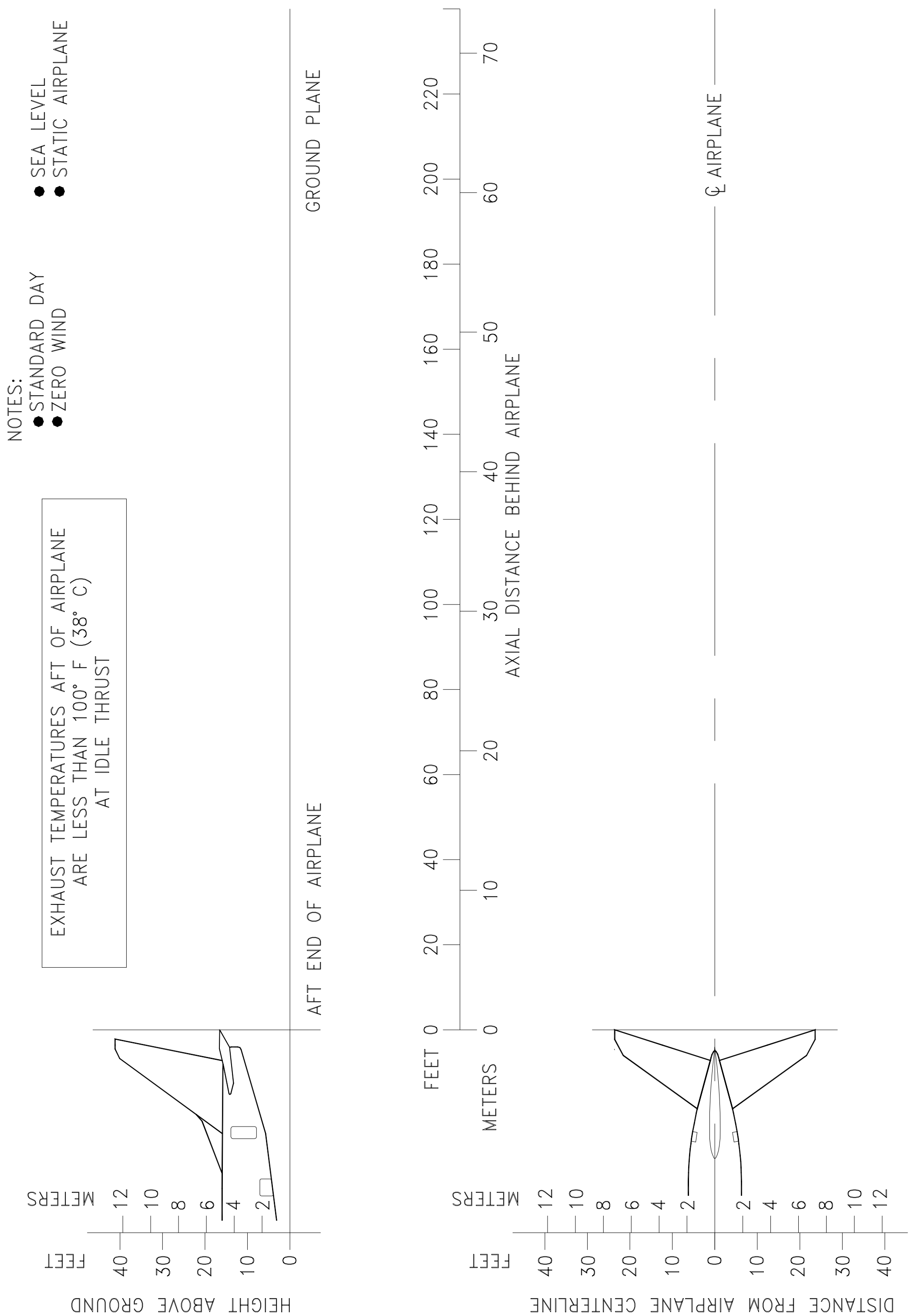
6.1.2 PREDICTED JET ENGINE EXHAUST VELOCITY CONTOURS - BREAKAWAY THRUST

MODEL 737-700, -800, -900 (WITH WINGLETS)



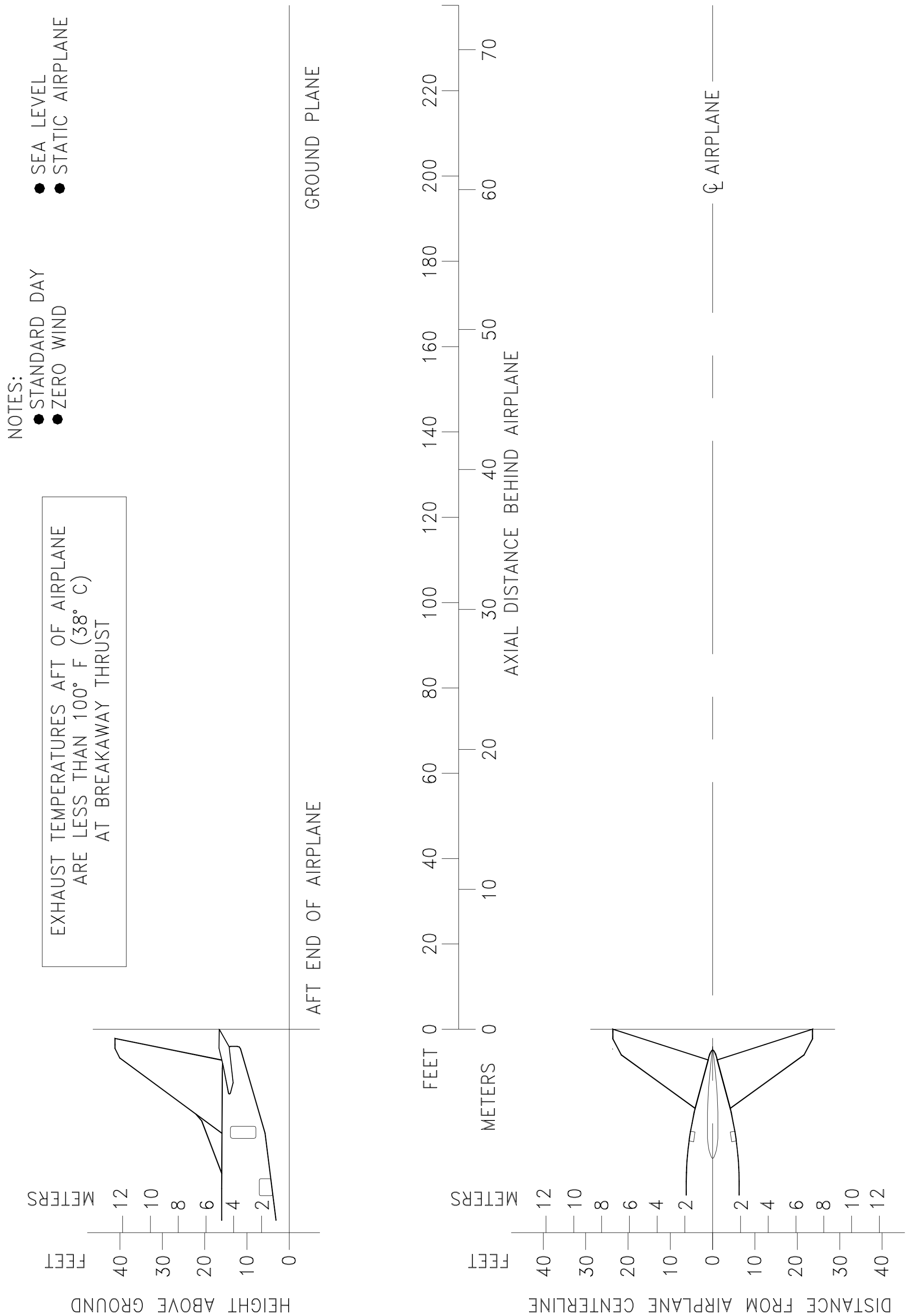
6.1.3 PREDICTED JET ENGINE EXHAUST VELOCITY CONTOURS - TAKEOFF THRUST

MODEL 737-700, -800, -900 (WITH WINGLETS)



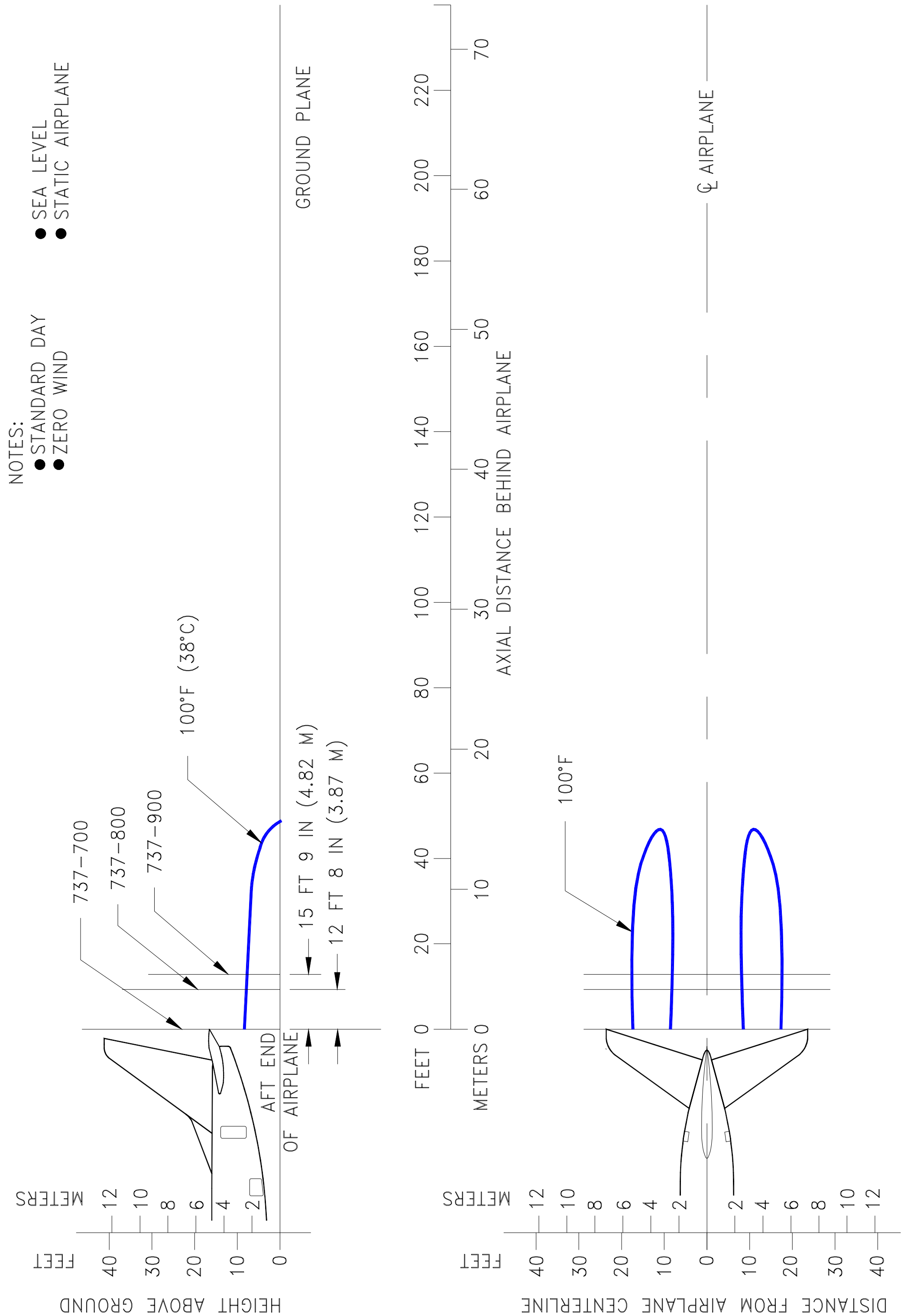
6.1.4 PREDICTED JET ENGINE EXHAUST TEMPERATURE CONTOURS - IDLE THRUST

MODEL 737-700, -800, -900 (WITH WINGLETS)



6.1.5 PREDICTED JET ENGINE EXHAUST TEMPERATURE CONTOURS - BREAKAWAY THRUST

MODEL 737-700, -800, -900 (WITH WINGLETS)



6.1.6 PREDICTED JET ENGINE EXHAUST TEMPERATURE CONTOURS - TAKEOFF THRUST

MODEL 737-700, -800, -900 (WITH WINGLETS)

6.2 Airport and Community Noise

Airport noise is of major concern to the airport and community planner. The airport is a major element in the community's transportation system and, as such, is vital to its growth. However, the airport must also be a good neighbor, and this can be accomplished only with proper planning. Since aircraft noise extends beyond the boundaries of the airport, it is vital to consider the impact on 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 subject; 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 the following:

1. Operational Factors

   (a) Aircraft Weight-Aircraft weight is dependent on distance to be traveled, en route winds, payload, and anticipated aircraft delay upon reaching the destination.

   (b) Engine Power Settings-The rates of ascent and descent and the noise levels emitted at the source are influenced by the power setting used.

   (c) Airport Altitude-Higher airport altitude will affect engine performance and thus can influence noise.

2. Atmospheric Conditions-Sound Propagation

(a) Wind-With stronger headwinds, the aircraft can take off and climb more rapidly relative to the ground. Also, winds can influence the distribution of noise in surrounding communities.

(b) Temperature and Relative Humidity-The absorption of noise in the atmosphere along the transmission path between the aircraft and the ground observer varies with both temperature and relative humidity.

3. Surface Condition-Shielding, Extra Ground Attenuation (EGA)

(a) Terrain-If the ground slopes down after takeoff or before landing, noise will be reduced since the aircraft will be at a higher altitude above ground. Additionally, hills, shrubs, trees, and large buildings can act as sound buffers.

All these factors can alter the shape and size of the contours appreciably. To demonstrate the effect of some of these factors, estimated noise level contours for two different operating conditions are shown below. These contours reflect a given noise level upon a ground level plane at runway elevation.

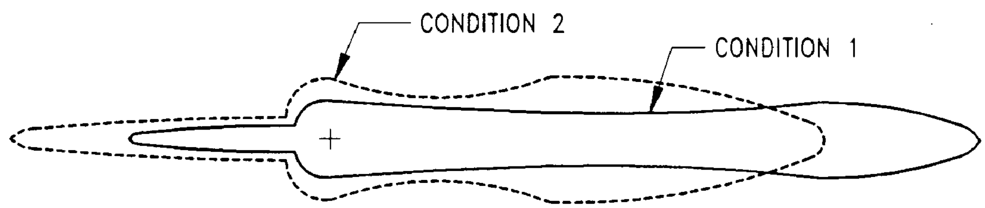
<u>Condition 1</u>

Landing

- Maximum Structural Landing Weight
- 10-knot Headwind
- 3° Approach
- 84 °F
- Humidity 15%

Takeoff

- Maximum Gross Takeoff Weight
- Zero Wind
- 84 °F
- Humidity 15%



Condition 2

Landing:

- 85% of Maximum Structural Landing Weight
- 10-knot Headwind
- 3° Approach
- 59 °F
- Humidity 70%

Takeoff:

- 80% of Maximum Gross Takeoff Weight
- 10-knot Headwind
- 59 °F
- Humidity 70%

As indicated from these data, the contour size varies substantially with operating and atmospheric conditions. Most aircraft operations are, of course, conducted at less than maximum gross weights because average flight distances are much shorter than maximum aircraft range capability and average load factors are less than 100%. Therefore, in developing cumulative contours for planning purposes, it is recommended that the airlines serving a particular city be contacted to provide operational information.

In addition, there are no universally accepted methods for developing aircraft noise contours or for relating the acceptability of specific zones to specific land uses. It is therefore expected that noise contour data for particular aircraft and the impact assessment methodology will be changing. To ensure that the best currently available information of this type is used in any planning study, it is recommended that it be obtained directly from the Office of Environmental Quality in the Federal Aviation Administration in Washington, D.C.

It should be noted that the contours shown herein are only for illustrating the impact of operating and atmospheric conditions and do not represent the single-event contour of the family of aircraft described in this document. It is expected that the cumulative contours will be developed as required by planners using the data and methodology applicable to their specific study.

7.0 PAVEMENT DATA

7.0 PAVEMENT DATA

7.1 General Information

A brief description of the pavement charts that follow will help in their use for airport planning. Each airplane configuration is depicted with a minimum range of five loads imposed on the main landing gear to aid in interpolation between the discrete values shown. All curves for any single chart represent data based on rated loads and tire pressures considered normal and acceptable by current aircraft tire manufacturer's standards. Tire pressures, where specifically designated on tables and charts, are at values obtained under loaded conditions as certificated for commercial use.

Section 7.2 presents basic data on the landing gear footprint configuration, maximum design taxi loads, and tire sizes and pressures.

Maximum pavement loads for certain critical conditions at the tire-to-ground interface are shown in Section 7.3, with the tires having equal loads on the struts.

Pavement requirements for commercial airplanes are customarily derived from the static analysis of loads imposed on the main landing gear struts. The charts in Section 7.4 are provided in order to determine these loads throughout the stability limits of the airplane at rest on the pavement. These main landing gear loads are used as the point of entry to the pavement design charts, interpolating load values where necessary.

The flexible pavement design curves (Section 7.5) are based on procedures set forth in Instruction Report No. S-77-1, "Procedures for Development of CBR Design Curves," dated June 1977, and as 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 U.S. Army Corps of Engineers Waterways Experiment Station, Soils and Pavements Laboratory, Vicksburg, Mississippi. The line showing 10,000 coverages is used to calculate Aircraft Classification Number (ACN).

The following procedure is used to develop the curves, such as shown in Section 7.5:

1. Having established the scale for pavement depth at the bottom and the scale for CBR at the top, an arbitrary line is drawn representing 5,000 annual departures.

2. Values of the aircraft gross weight are then plotted.

3. Additional annual departure lines are drawn based on the load lines of the aircraft gross weights already established.

4. An additional line representing 10,000 coverages (used to calculate the flexible pavement Aircraft Classification Number) is also placed.

All Load Classification Number (LCN) curves (Sections 7.6 and 7.8) have been developed from a computer program based on data provided in International Civil Aviation Organization (ICAO) document 9157-AN/901, Aerodrome Design Manual, Part 3, “Pavements”, Second Edition, 1983. LCN values are shown directly for parameters of weight on main landing gear, tire pressure, and radius of relative stiffness (ℓ) for rigid pavement or pavement thickness or depth factor (h) for flexible pavement.

Rigid pavement design curves (Section 7.7) have been prepared with the Westergaard equation in general accordance with the procedures outlined in the Design of Concrete Airport Pavement (1955 edition) by Robert G. Packard, published by the Portland Cement Association, 5420 Old Orchard Road, Skokie, Illinois 60077-1083. These curves are modified to the format described in the Portland Cement Association publication XP6705-2, Computer Program for Airport Pavement Design (Program PDILB), 1968, by Robert G. Packard.

The following procedure is used to develop the rigid pavement design curves shown in Section 7.7:

1. Having established the scale for pavement thickness to the left and the scale for allowable working stress to the right, an arbitrary load line is drawn representing the main landing gear maximum weight to be shown.

2. Values of the subgrade modulus (k) are then plotted.

3. Additional load lines for the incremental values of weight on the main landing gear are drawn on the basis of the curve for k = 300, already established.

The rigid pavement design curves (Section 7.9) have been developed based on methods used in the FAA Advisory Circular AC 150/5320-6D July 7, 1995. The following procedure is used to develop the curves, such as shown in Section 7.9:

1. Having established the scale for pavement flexure strength on the left and temporary scale for pavement thickness on the right, an arbitrary load line is drawn representing the main landing gear maximum weight to be shown at 5,000 coverages.

2. Values of the subgrade modulus (k) are then plotted.

3. Additional load lines for the incremental values of weight are then drawn on the basis of the subgrade modulus curves already established.

4. The permanent scale for the rigid-pavement thickness is then placed. Lines for other than 5,000 coverages are established based on the aircraft pass-to-coverage ratio.

The ACN/PCN system (Section 7.10) as referenced in ICAO Annex 14, "Aerodromes," 3rd Edition, July 1999, provides a standardized international airplane/pavement rating system replacing the various S, T, TT, LCN, AUW, ISWL, etc., rating systems used throughout the world. ACN is the Aircraft Classification Number and PCN is the Pavement Classification Number. An aircraft having an ACN equal to or less than the PCN can operate on the pavement subject to any limitation on the tire pressure. Numerically, the ACN is two times the derived single-wheel load expressed in thousands of kilograms, where the derived single wheel load is defined as the load on a single tire inflated to 181 psi (1.25 MPa) that would have the same pavement requirements as the aircraft. Computationally, the ACN/PCN system uses the PCA program PDILB for rigid pavements and S-77-1 for flexible pavements to calculate ACN values. The method of pavement evaluation is left up to the airport with the results of their evaluation presented as follows:

PCN	PAVEMENT TYPE	SUBGRADE CATEGORY	TIRE PRESSURE CATEGORY	EVALUATION METHOD
	R = Rigid	A = High	W = No Limit	T = Technical
	F = Flexible	B = Medium	X = To 217 psi (1.5 MPa)	U = Using Aircraft
		C = Low	Y = To 145 psi (1.0 MPa)	
		D = Ultra Low	Z = To 73 psi (0.5 MPa)	

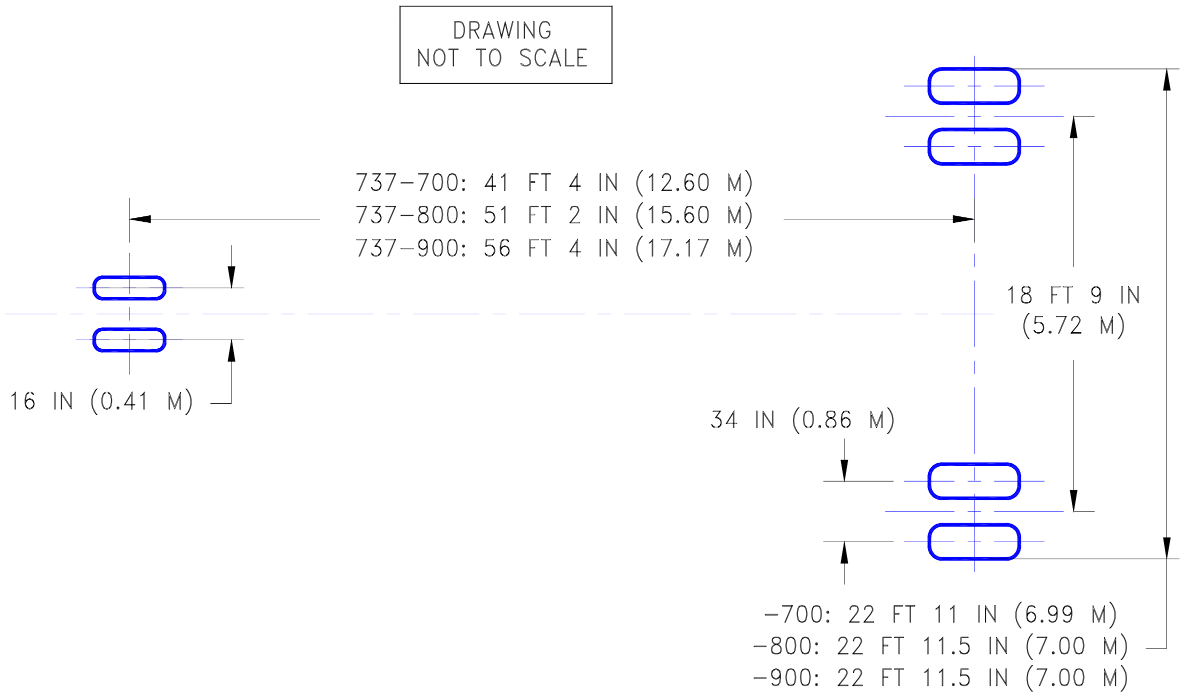
ACN values for flexible pavements are calculated for the following four subgrade categories:

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

ACN values for rigid pavements are calculated for the following four subgrade categories:

Code A - High Strength, k = 550 pci (150 MN/m^3)
Code B - Medium Strength, k = 300 pci (80 MN/m^3)
Code C - Low Strength, k = 150 pci (40 MN/m^3)
Code D - Ultra Low Strength, k = 75 pci (20 MN/m^3)

PRELIMINARY FOR -900 WITH WINGLETS



	UNITS	737-700	737-800	737-900
MAXIMUM DESIGN TAXI WEIGHT	LB	133,500 THRU 155,000	156,000 THRU 174,700	164,500 THRU 174,700
	KG	60,555 THRU 70,307	70,760 THRU 79,243	74,616 THRU 79,243
PERCENT OF WEIGHT ON MAIN GEAR		SEE SECTION 7.4		
NOSE GEAR TIRE SIZE	IN.	27 x 7.7 - 15 12 PR		27 x 7.75 - 15 12 PR
NOSE GEAR TIRE PRESSURE	PSI	205	185	185
	KG/CM^2	14.41	13.01	13.01
MAIN GEAR TIRE SIZE	IN.	H43.5 x 16.0 - 21 26 PR	H44.5 x 16.5 - 21 28 PR	H44.5 x 16.5 - 21 28 PR
MAIN GEAR TIRE PRESSURE	PSI	197THRU 205	204 THRU 205	204 THRU 205
	KG/CM^2	13.85 THRU 14.41	14.34 THRU 14.41	14.34 THRU 14.41

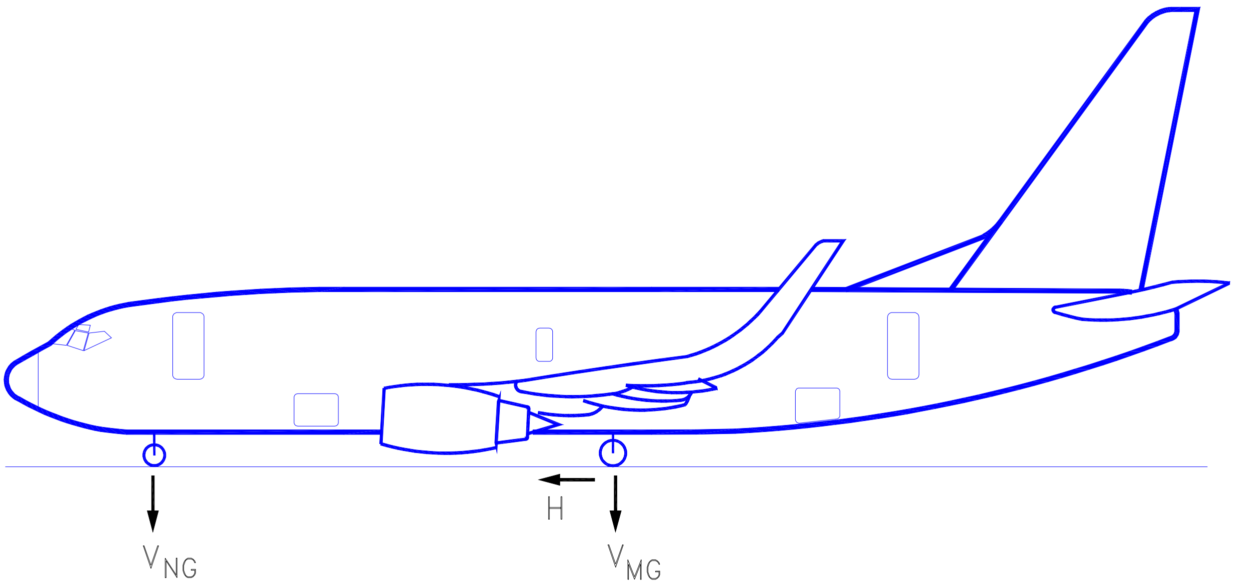
OPTIONAL TIRES

MAIN GEAR TIRE SIZE	IN.	H44.5 x 16.5 - 21 28PR	NOT AVAILABLE	NOT AVAILABLE
MAIN GEAR TIRE PRESSURE	PSI	179 THRU 205	NOT AVAILABLE	NOT AVAILABLE
	KG/CM^2	12.58 THRU 14.41	NOT AVAILABLE	NOT AVAILABLE

7.2 LANDING GEAR FOOTPRINT

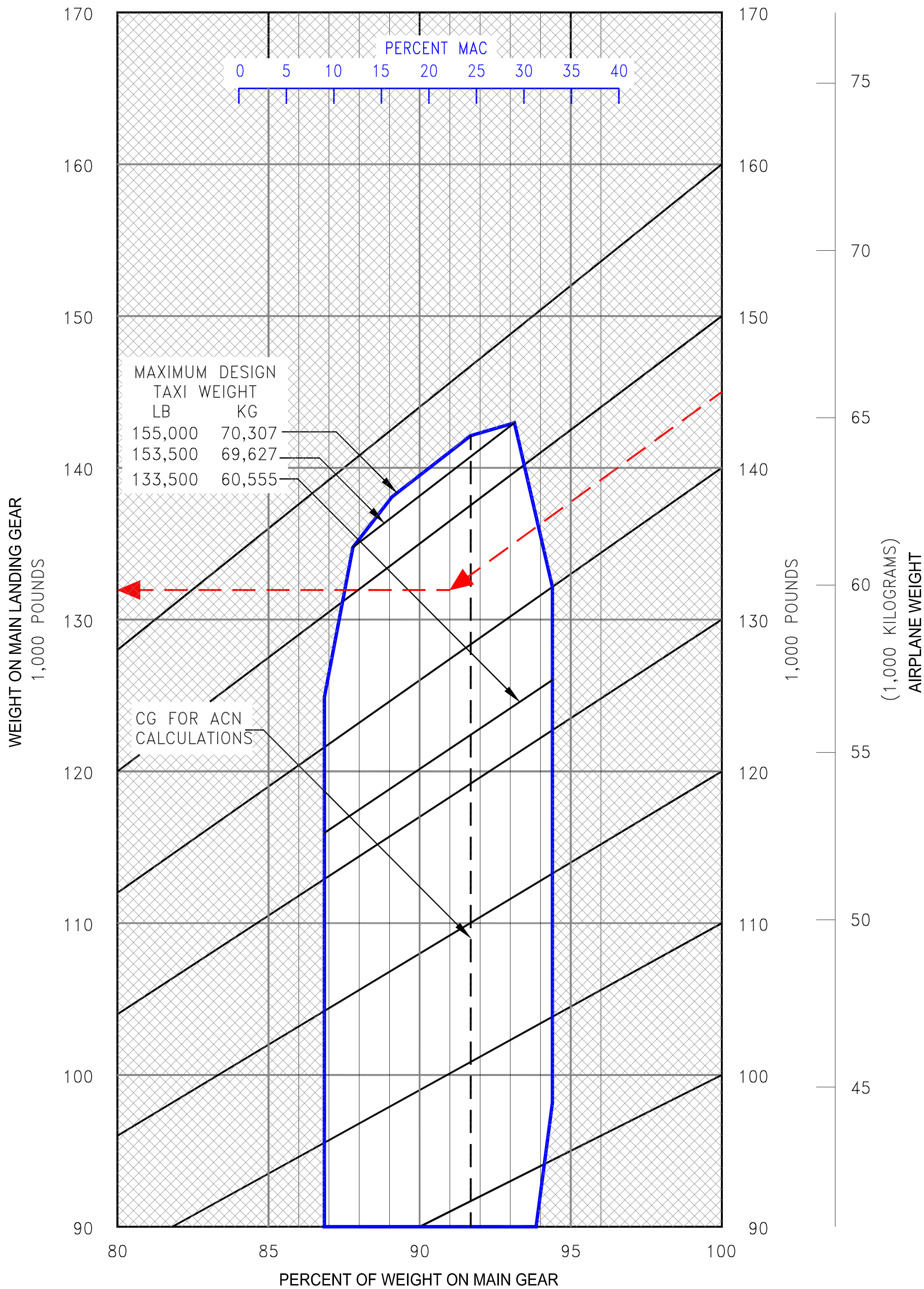
MODEL 737-700, -800, -900 (WITH WINGLETS)

V_{NG} = MAXIMUM VERTICAL NOSE GEAR GROUND LOAD AT MOST FORWARD CENTER OF GRAVITY
V_{MG} = MAXIMUM VERTICAL MAIN GEAR GROUND LOAD AT MOST AFT CENTER OF GRAVITY
H = MAXIMUM HORIZONTAL GROUND LOAD FROM BRAKING
NOTE: ALL LOADS CALCULATED USING AIRPLANE MAXIMUM DESIGN TAXI WEIGHT



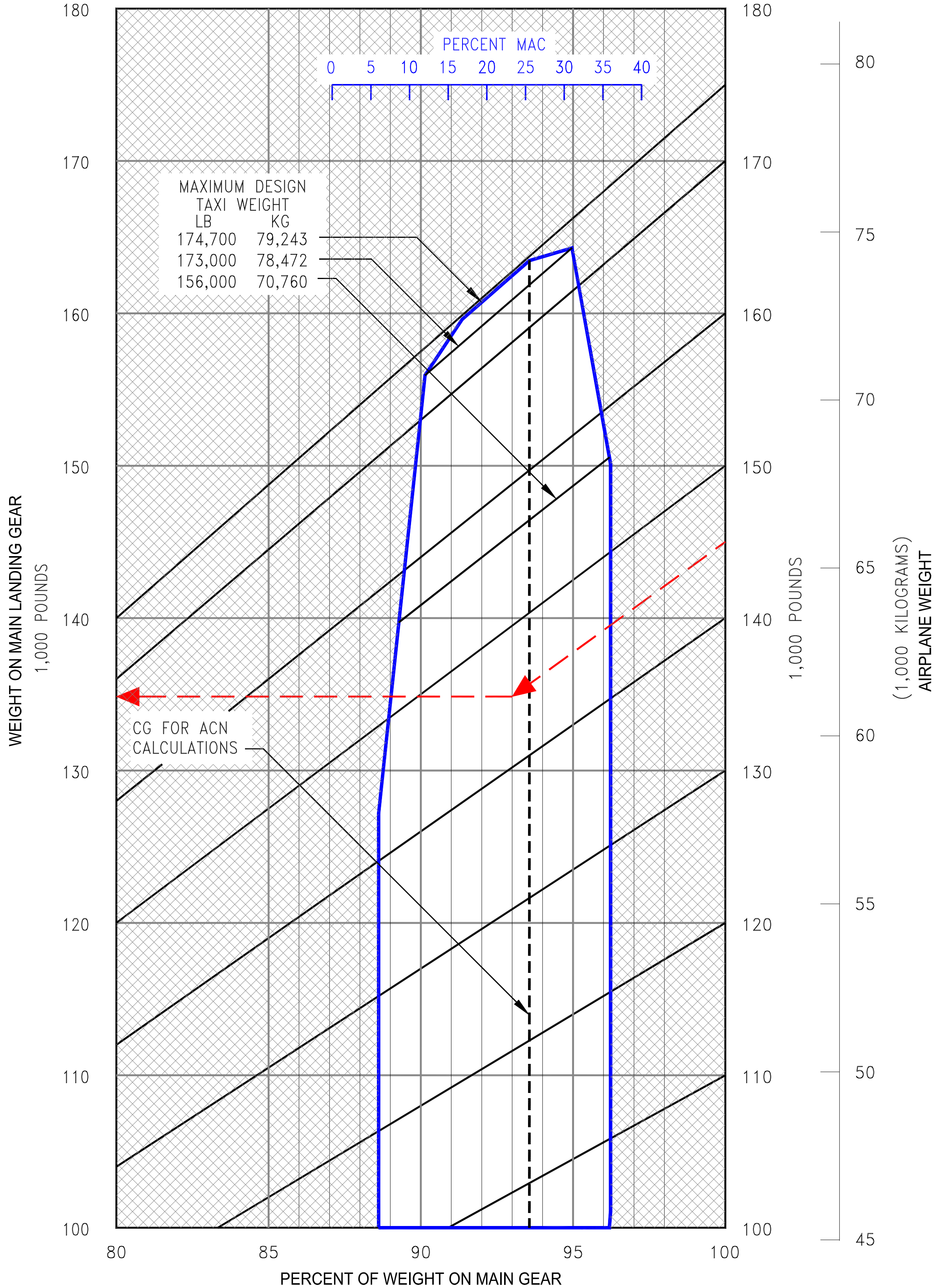
MODEL	UNITS	MAXIMUM DESIGN TAXI WEIGHT	V_{NG} STATIC AT MOST FWD C.G.	V_{NG} STATIC + BRAKING 10 FT/SEC^2 DECEL	V_{MG} PER STRUT AT MAX LOAD AT STATIC AFT C.G.	H PER STRUT STEADY BRAKING 10 FT/SEC^2 DECEL	H PER STRUT AT INSTANTANEOUS BRAKING (μ= 0.8)
737-700	LB	133,500	17,558	26,711	63,000	20,692	50,400
	KG	60,555	7,964	12,116	28,576	9,386	22,861
737-700	LB	153,500	18,740	29,265	71,482	23,792	57,185
	KG	69,627	8,500	13,274	32,424	10,792	25,939
737-700	LB	155,000	16,925	27,552	71,060	24,025	56,847
	KG	70,307	7,677	12,497	32,232	10,898	25,785
737-800	LB	156,000	16,770	25,510	75,062	24,180	60,050
	KG	70,760	7,607	11,571	34,048	10,968	27,238
737-800	LB	173,000	17,059	26,752	82,143	26,815	65,715
	KG	78,472	7,738	12,135	37,259	12,163	29,808
737-800	LB	174,700	15,100	24,886	81,730	27,078	65,384
	KG	79,243	6,849	11,288	37,059	12,282	29,658
737-900	LB	164,500	14,998	23,369	78,962	25,498	63,169
	KG	74,616	6,803	10,600	35,817	11,566	28,653
737-900	LB	174,700	14,155	23,045	81,743	27,078	65,394
	KG	79,243	6,421	10,453	37,078	12,282	29,662

7.3 MAXIMUM PAVEMENT LOADS
MODEL 737-700, -800, -900 (WITH WINGLETS)



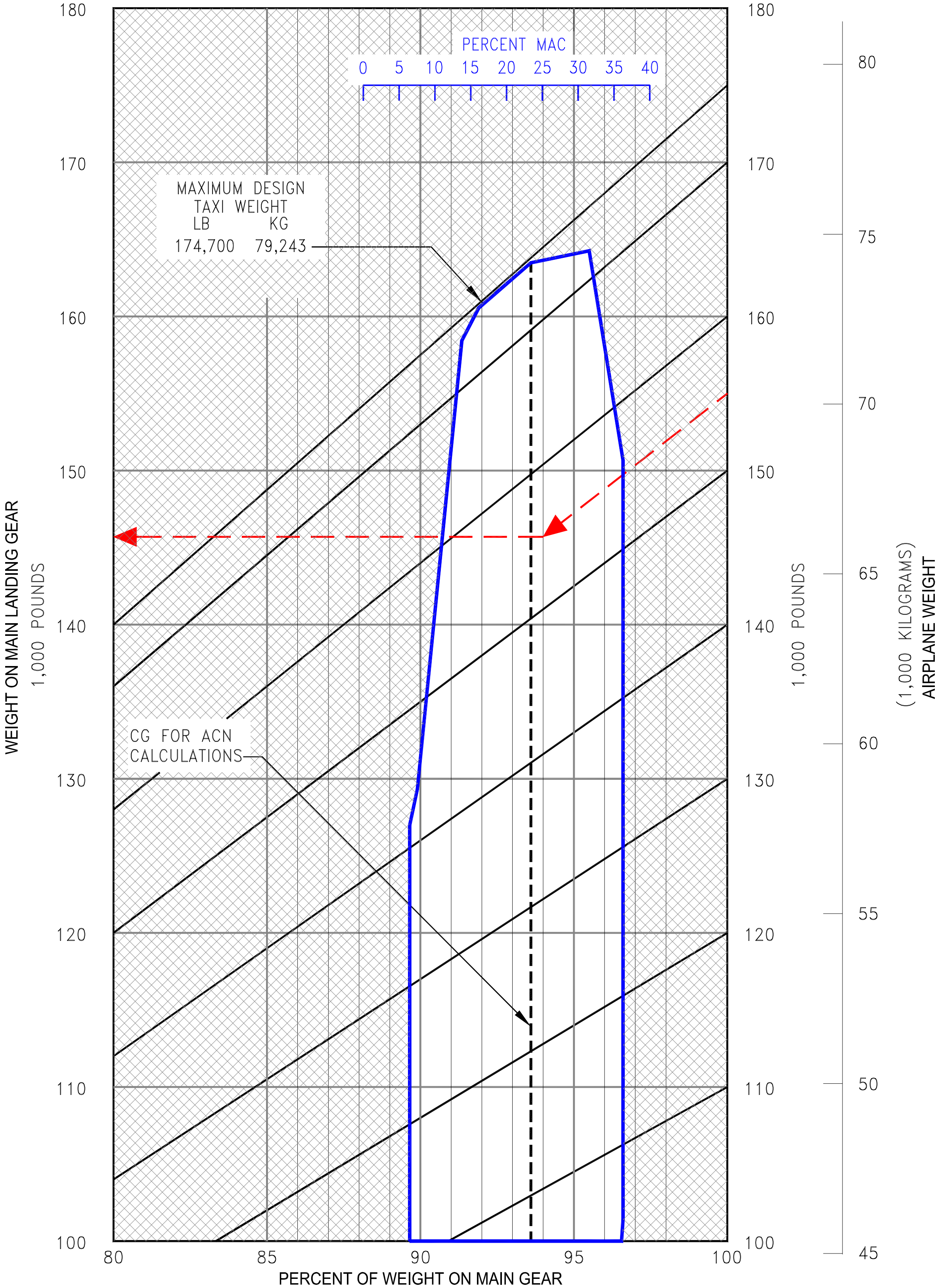
7.4.1 LANDING GEAR LOADING ON PAVEMENT

MODEL 737-700 (WITH WINGLETS)



7.4.2 LANDING GEAR LOADING ON PAVEMENT

MODEL 737-800 (WITH WINGLETS)



7.4.3 LANDING GEAR LOADING ON PAVEMENT

MODEL 737-900 (WITH WINGLETS)

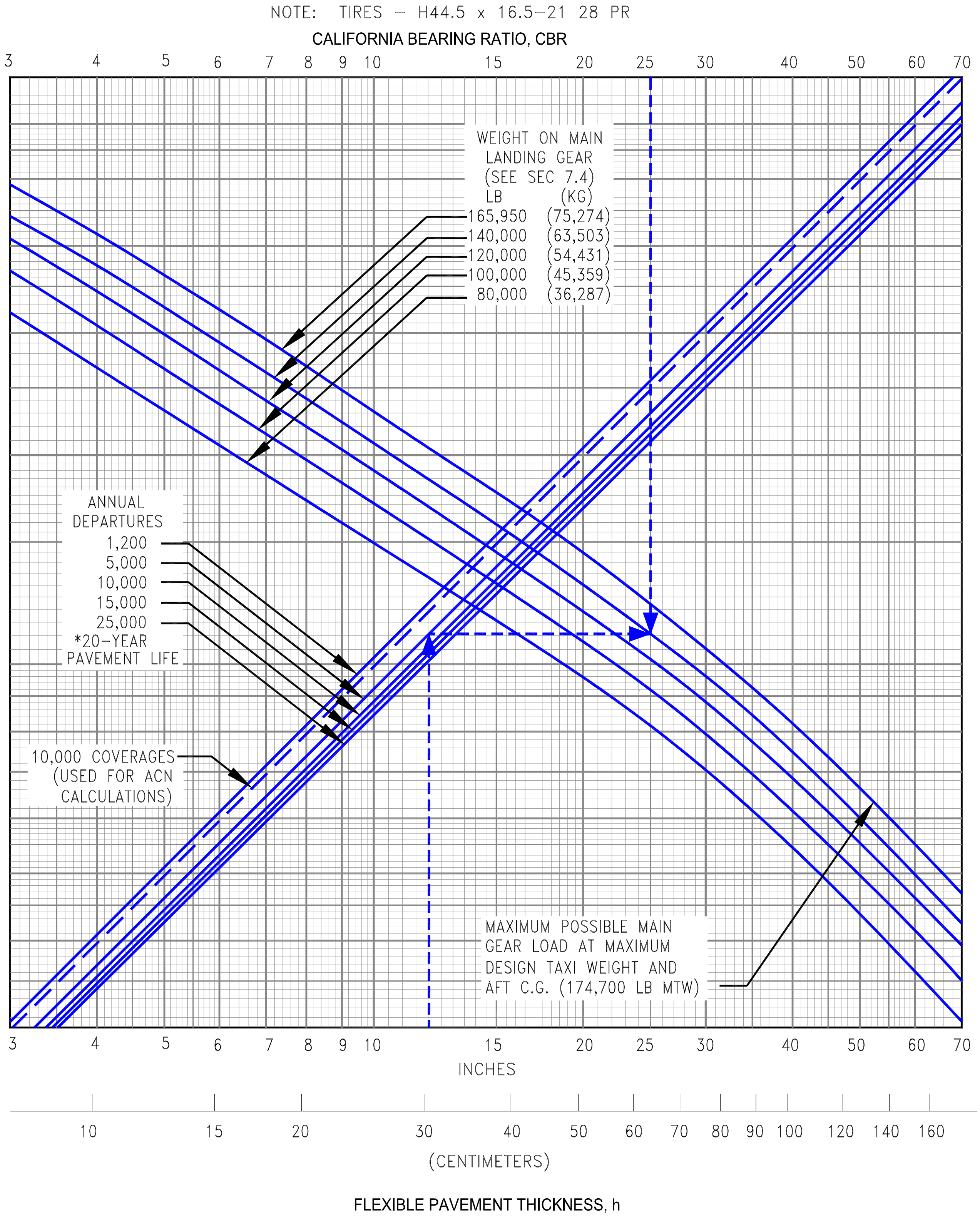
7.5 Flexible Pavement Requirements - U.S. Army Corps of Engineers Method (S-77-1) and FAA Design Method

The following flexible-pavement design chart presents the data of five incremental main-gear loads at the minimum tire pressure required at the maximum design taxi weight.

In the example shown, for a CBR of 25 and an annual departure level of 5,000, the required flexible pavement thickness for an airplane with a main gear loading of 140,000 pounds is 12.0 inches.

The line showing 10,000 coverages is used for ACN calculations (see Section 7.10).

The FAA design method uses a similar procedure using total airplane weight instead of weight on the main landing gears. The equivalent main gear loads for a given airplane weight could be calculated from Section 7.4.



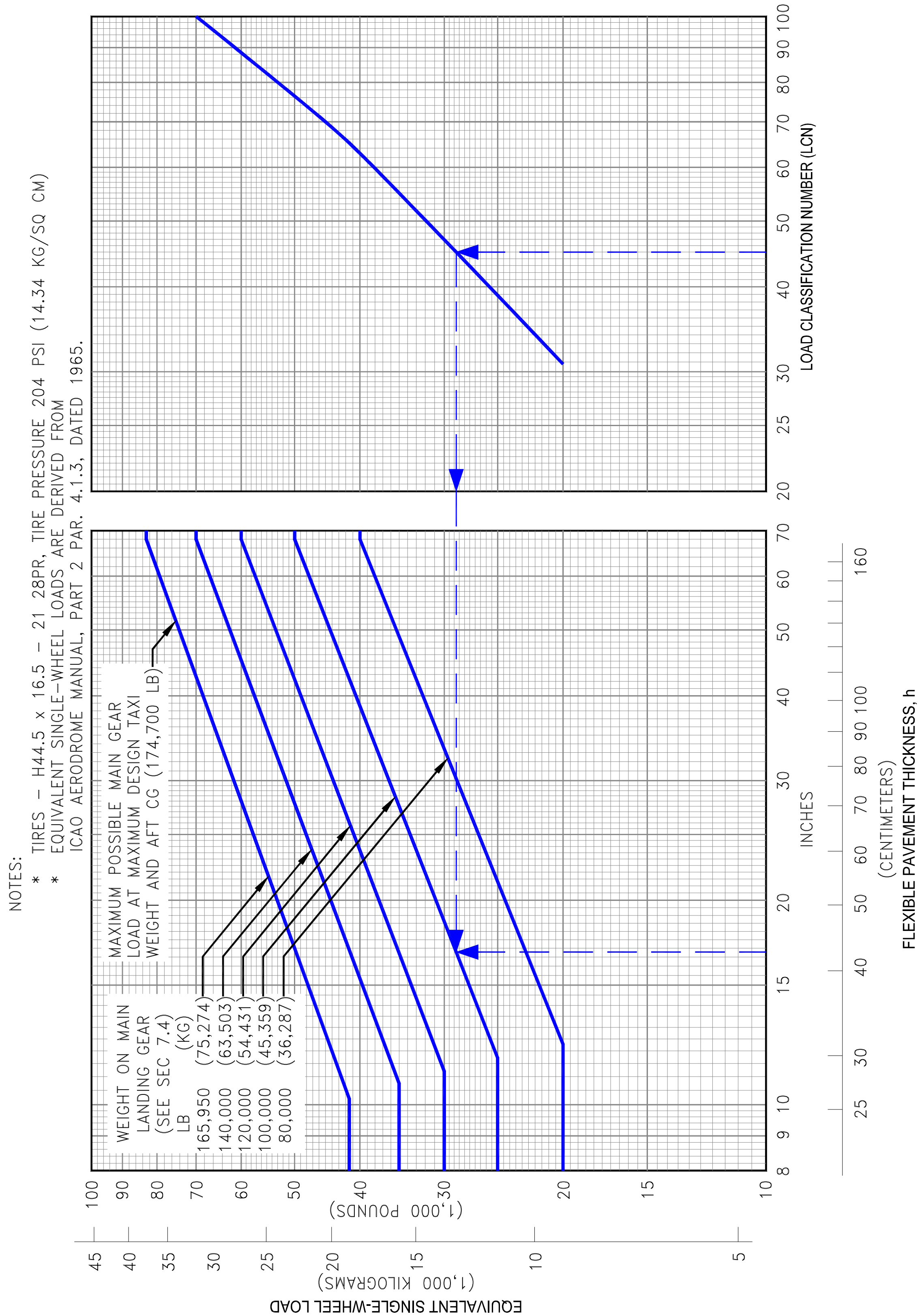
7.5 FLEXIBLE PAVEMENT REQUIREMENTS - U.S. ARMY CORPS OF ENGINEERS DESIGN METHOD (S-77-1) AND FAA DESIGN METHOD
MODEL 737-700, -800, -900 (WITH WINGLETS)

7.6 Flexible Pavement Requirements - LCN Method

To determine the airplane weight that can be accommodated on a particular flexible pavement, both the Load Classification Number (LCN) of the pavement and the thickness must be known.

In the example shown on the next page, flexible pavement thickness is shown at 16.8 in. with an LCN of 45. For these conditions, the apparent maximum allowable weight permissible on the main landing gear is 100,000 lb for an airplane with 204-psi main gear tires.

Note: If the resultant aircraft LCN is not more that 10% above the published pavement LCN, the bearing strength of the pavement can be considered sufficient for unlimited use by the airplane. The figure 10% has been chosen as representing the lowest degree of variation in LCN that is significant (reference: ICAO Aerodrome Manual, Part 2, "Aerodrome Physical Characteristics," Chapter 4, Paragraph 4.1.5.7v, 2nd Edition dated 1965).



7.6 FLEXIBLE PAVEMENT REQUIREMENTS - LCN METHOD

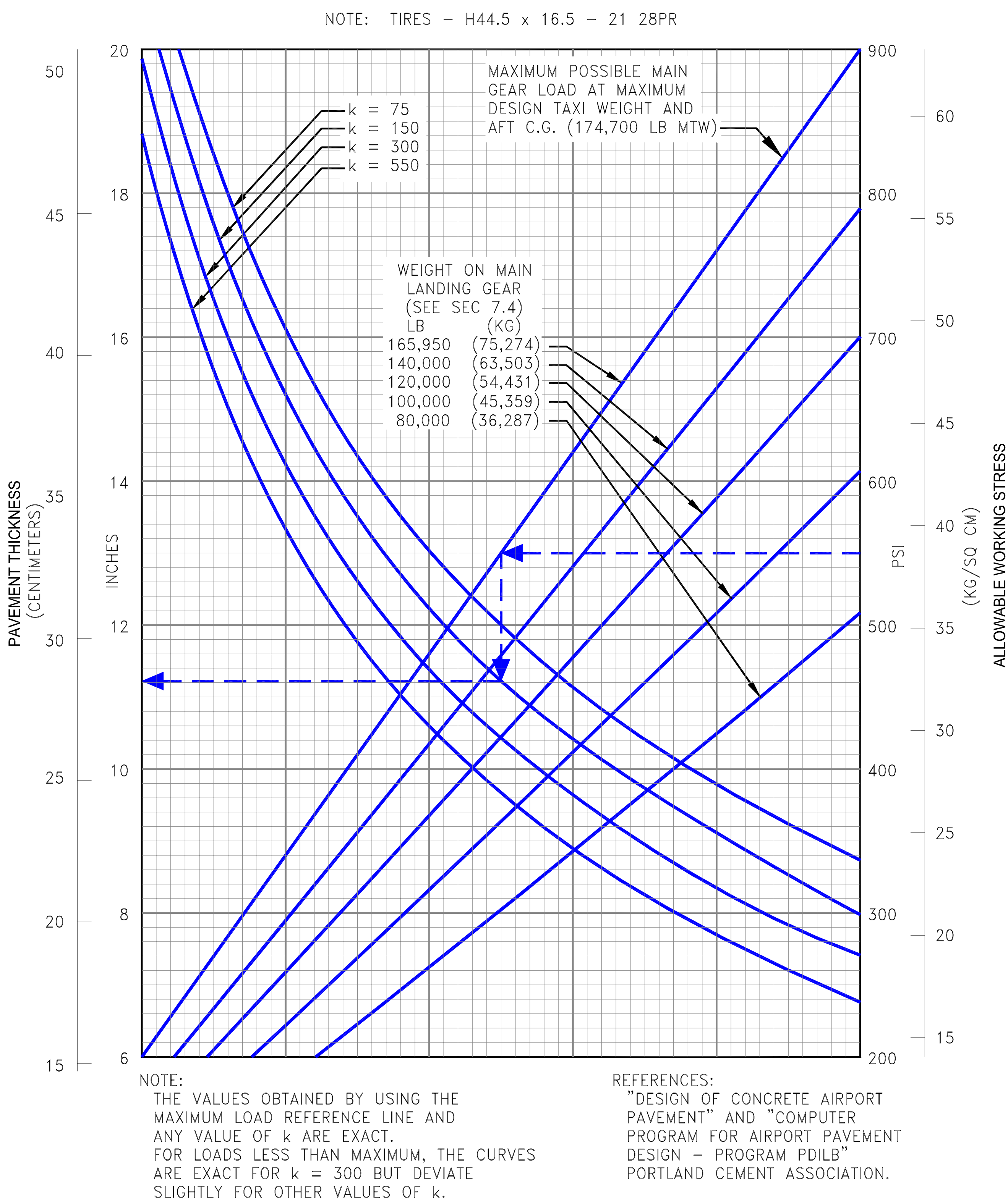
MODEL 737-700, -800, -900 (WITH WINGLETS)

7.7 Rigid Pavement Requirements - Portland Cement Association Design Method

The Portland Cement Association method of calculating rigid pavement requirements is based on the computerized version of "Design of Concrete Airport Pavement" (Portland Cement Association, 1965) as described in XP6705-2, "Computer Program for Airport Pavement Design" by Robert G. Packard, Portland Cement Association, 1968.

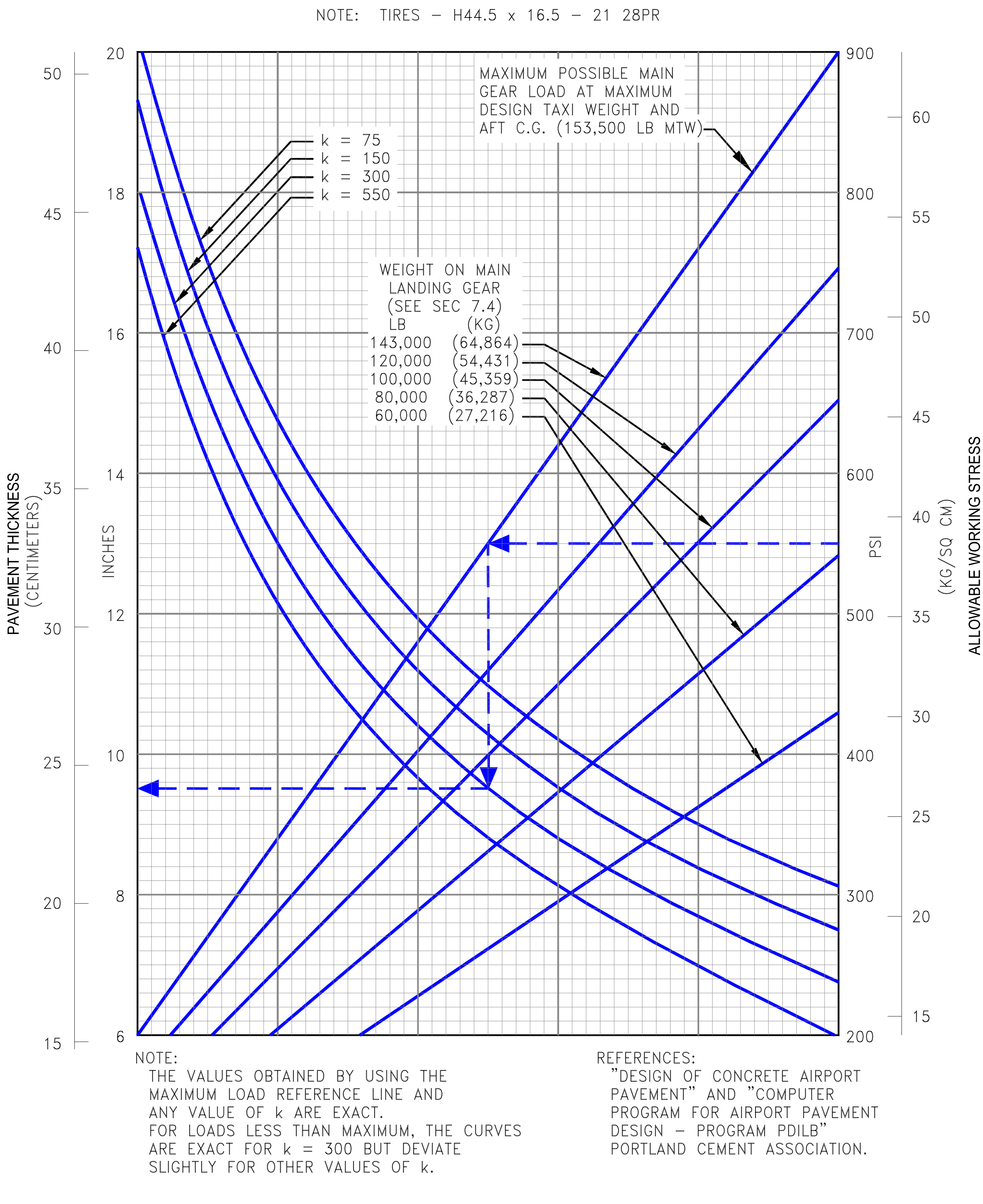
The following rigid pavement design chart presents the data for five incremental main gear loads at the minimum tire pressure required at the maximum design taxi weight.

In the example shown in Section 7.7.1, for an allowable working stress of 550 psi, a main gear load of 165,950 lb, and a subgrade strength (k) of 150, the required rigid pavement thickness is 11.2 in. In Section 7.7.2, for an allowable working stress of 550 psi, a main gear load of 143,000 lb, and a subgrade strength (k) of 300, the required pavement thickness is 9.5 in for an airplane with low-pressure tires.



7.7.1 RIGID PAVEMENT REQUIREMENTS - PORTLAND CEMENT ASSOCIATION DESIGN METHOD

MODEL 737-700, -800, -900 (WITH WINGLETS)



7.7.2 RIGID PAVEMENT REQUIREMENTS - PORTLAND CEMENT ASSOCIATION DESIGN METHOD

MODEL 737 -700 (WITH WINGLETS) (OPTIONAL TIRES)

7.8 Rigid Pavement Requirements - LCN Conversion

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

In the example shown in Section 7.8.2, for a rigid pavement with a radius of relative stiffness of 29 with an LCN of 55, the maximum allowable weight permissible on the main landing gear is 100,000 lb.

Note: If the resultant aircraft LCN is not more that 10% above the published pavement LCN, the bearing strength of the pavement can be considered sufficient for unlimited use by the airplane. The figure 10% has been chosen as representing the lowest degree of variation in LCN that is significant (reference: ICAO Aerodrome Manual, Part 2, "Aerodrome Physical Characteristics," Chapter 4, Paragraph 4.1.5.7v, 2nd Edition dated 1965).

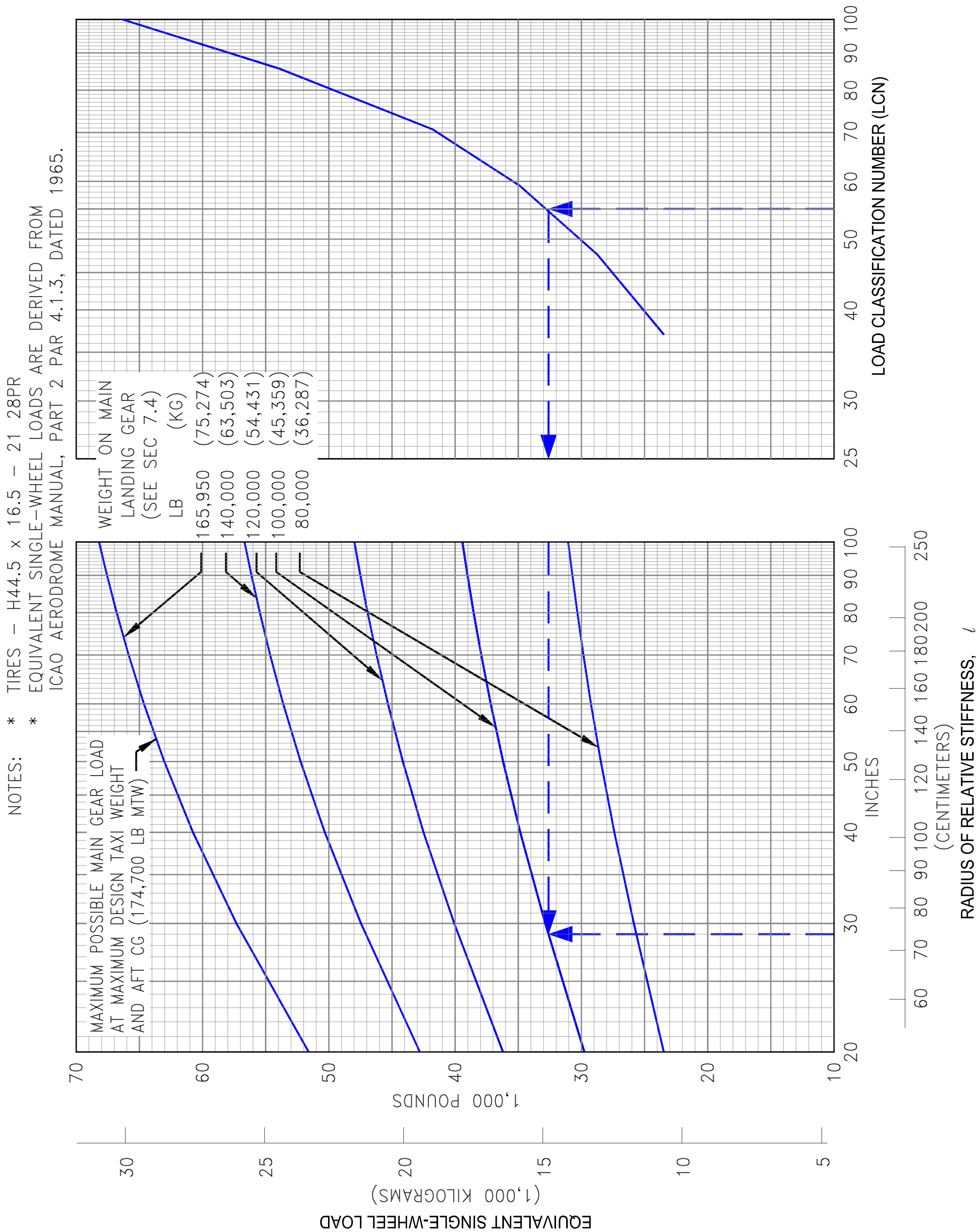
RADIUS OF RELATIVE STIFFNESS (ℓ)
VALUES IN INCHES

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

WHERE: E = YOUNG'S MODULUS OF ELASTICITY = 4 x 10^6 psi
k = SUBGRADE MODULUS, LB PER CU IN
d = RIGID PAVEMENT THICKNESS, IN
μ = POISSON'S RATIO = 0.15

d	k = 75	k = 100	k = 150	k = 200	k = 250	k = 300	k = 350	k = 400	k = 500	k = 550
6.0	31.48	29.29	26.47	24.63	23.30	22.26	21.42	20.71	19.59	19.13
6.5	33.42	31.10	28.11	26.16	24.74	23.63	22.74	21.99	20.80	20.31
7.0	35.33	32.88	29.71	27.65	26.15	24.99	24.04	23.25	21.99	21.47
7.5	37.21	34.63	31.29	29.12	27.54	26.31	25.32	24.49	23.16	22.61
8.0	39.06	36.35	32.84	30.56	28.91	27.62	26.57	25.70	24.31	23.73
8.5	40.87	38.04	34.37	31.99	30.25	28.90	27.81	26.90	25.44	24.84
9.0	42.66	39.70	35.88	33.39	31.57	30.17	29.03	28.07	26.55	25.93
9.5	44.43	41.35	37.36	34.77	32.88	31.42	30.23	29.24	27.65	27.00
10.0	46.17	42.97	38.83	36.13	34.17	32.65	31.41	30.38	28.73	28.06
10.5	47.89	44.57	40.27	37.48	35.44	33.87	32.58	31.52	29.81	29.10
11.0	49.59	46.15	41.70	38.81	36.70	35.07	33.74	32.63	30.86	30.14
11.5	51.27	47.72	43.12	40.12	37.95	36.26	34.89	33.74	31.91	31.16
12.0	52.94	49.26	44.51	41.43	39.18	37.43	36.02	34.83	32.94	32.17
12.5	54.58	50.80	45.90	42.71	40.40	38.60	37.14	35.92	33.97	33.17
13.0	56.21	52.31	47.27	43.99	41.60	39.75	38.25	36.99	34.98	34.16
13.5	57.83	53.81	48.63	45.25	42.80	40.89	39.34	38.05	35.99	35.14
14.0	59.43	55.30	49.97	46.50	43.98	42.02	40.43	39.10	36.98	36.11
14.5	61.01	56.78	51.30	47.74	45.15	43.14	41.51	40.15	37.97	37.07
15.0	62.58	58.24	52.62	48.97	46.32	44.25	42.58	41.18	38.95	38.03
15.5	64.14	59.69	53.93	50.19	47.47	45.35	43.64	42.21	39.92	38.98
16.0	65.69	61.13	55.23	51.40	48.61	46.45	44.69	43.22	40.88	39.92
16.5	67.22	62.55	56.52	52.60	49.75	47.53	45.73	44.23	41.83	40.85
17.0	68.74	63.97	57.80	53.79	50.87	48.61	46.77	45.23	42.78	41.77
17.5	70.25	65.38	59.07	54.97	51.99	49.68	47.80	46.23	43.72	42.69
18.0	71.75	66.77	60.34	56.15	53.10	50.74	48.82	47.22	44.65	43.60
19.0	74.72	69.54	62.83	58.47	55.30	52.84	50.84	49.17	46.50	45.41
20.0	77.65	72.26	65.30	60.77	57.47	54.91	52.83	51.10	48.33	47.19
21.0	80.55	74.96	67.73	63.03	59.61	56.95	54.80	53.00	50.13	48.95
22.0	83.41	77.62	70.14	65.27	61.73	58.98	56.75	54.88	51.91	50.68
23.0	86.23	80.25	72.51	67.48	63.82	60.98	58.67	56.74	53.67	52.40
24.0	89.03	82.85	74.86	69.67	65.89	62.95	60.57	58.58	55.41	54.10
25.0	91.80	85.43	77.19	71.84	67.94	64.91	62.46	60.41	57.13	55.78

7.8.1 RADIUS OF RELATIVE STIFFNESS
(REFERENCE: PORTLAND CEMENT ASSOCIATION)



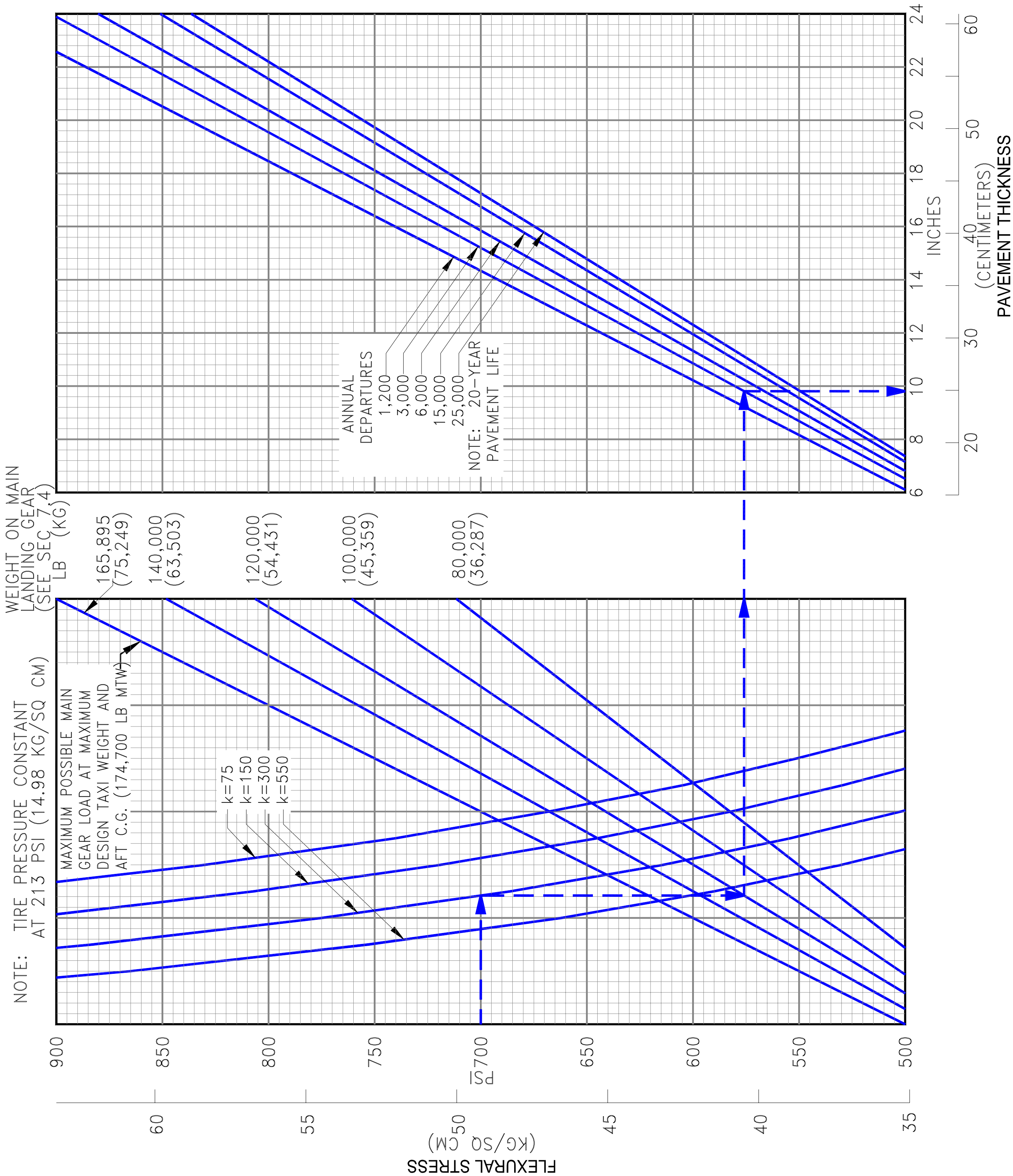
7.8.2 RIGID PAVEMENT REQUIREMENTS - LCN CONVERSION

MODEL 737-700, -800, -900 (WITH WINGLETS)

7.9 Rigid Pavement Requirements - FAA Design Method

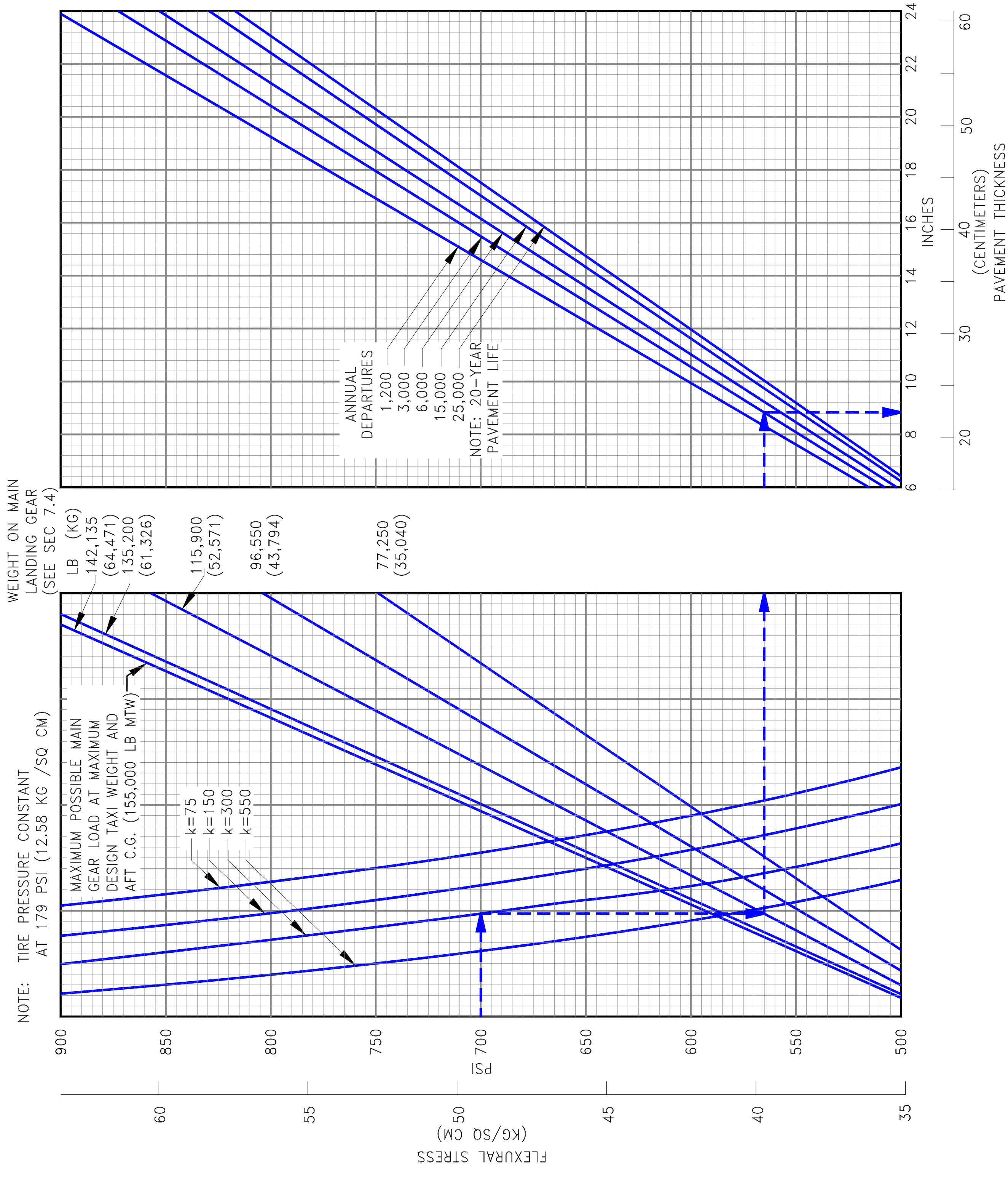
The following rigid pavement design charts present data on five incremental main gear loads at the minimum tire pressure required at the maximum design taxi weight.

In the example shown in 7.9.1, the pavement flexural stress is shown at 700 psi, the subgrade strength is shown at k = 300, and the annual departure level is 3,000. For these conditions, the required rigid pavement thickness for an airplane with main gear load of 120,000 pounds is 9.9 inches. In 7.9.2, with the same pavement conditions and departure level, the required rigid pavement thickness for a 737-700 airplane with a main gear load of 115,900 pounds and optional low-pressure tires, is 8.8 inches.



7.9.1 RIGID PAVEMENT REQUIREMENTS - FAA DESIGN METHOD

MODEL 737-700, -800, -900 (WITH WINGLETS)



7.9.2 RIGID PAVEMENT REQUIREMENTS - FAA DESIGN METHOD

MODEL 737-700 (WITH WINGLETS) (OPTIONAL TIRES)

7.10 ACN/PCN Reporting System: Flexible and Rigid Pavements

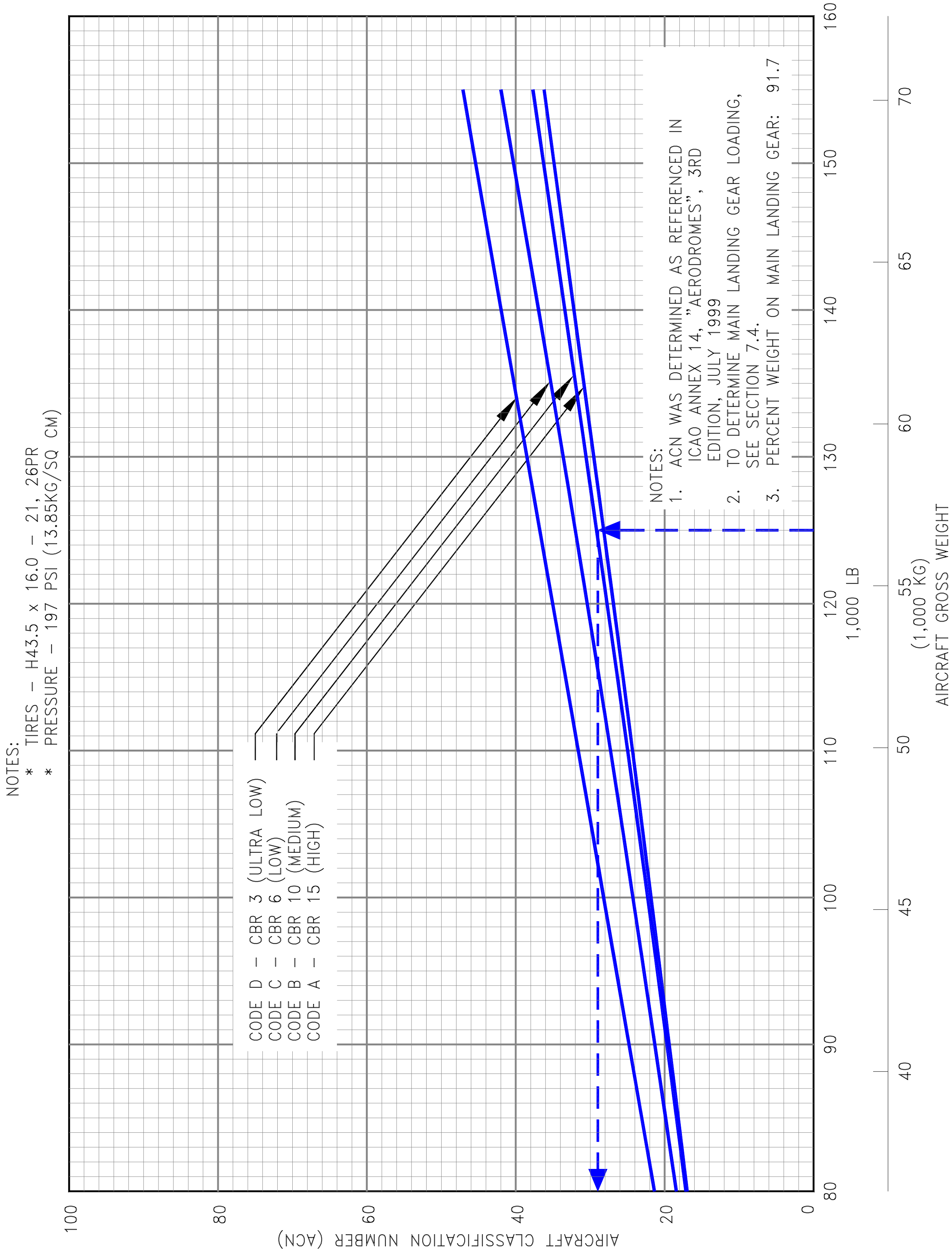
To determine the ACN of an aircraft on flexible or rigid pavement, both the aircraft gross weight and the subgrade strength category must be known. In the chart in Section 7.10.1, for an aircraft with gross weight of 125,000 lb and medium subgrade strength, the flexible pavement ACN is 29. In Section 7.10.5, for the same gross weight and subgrade strength, the rigid pavement ACN is 33.5.

Note: An aircraft with an ACN equal to or less that the reported PCN can operate on that pavement subject to any limitations on the tire pressure. (Ref. Amendment 38 to ICAO Annex 14, “Aerodromes”, 8th Edition, March 1983.)

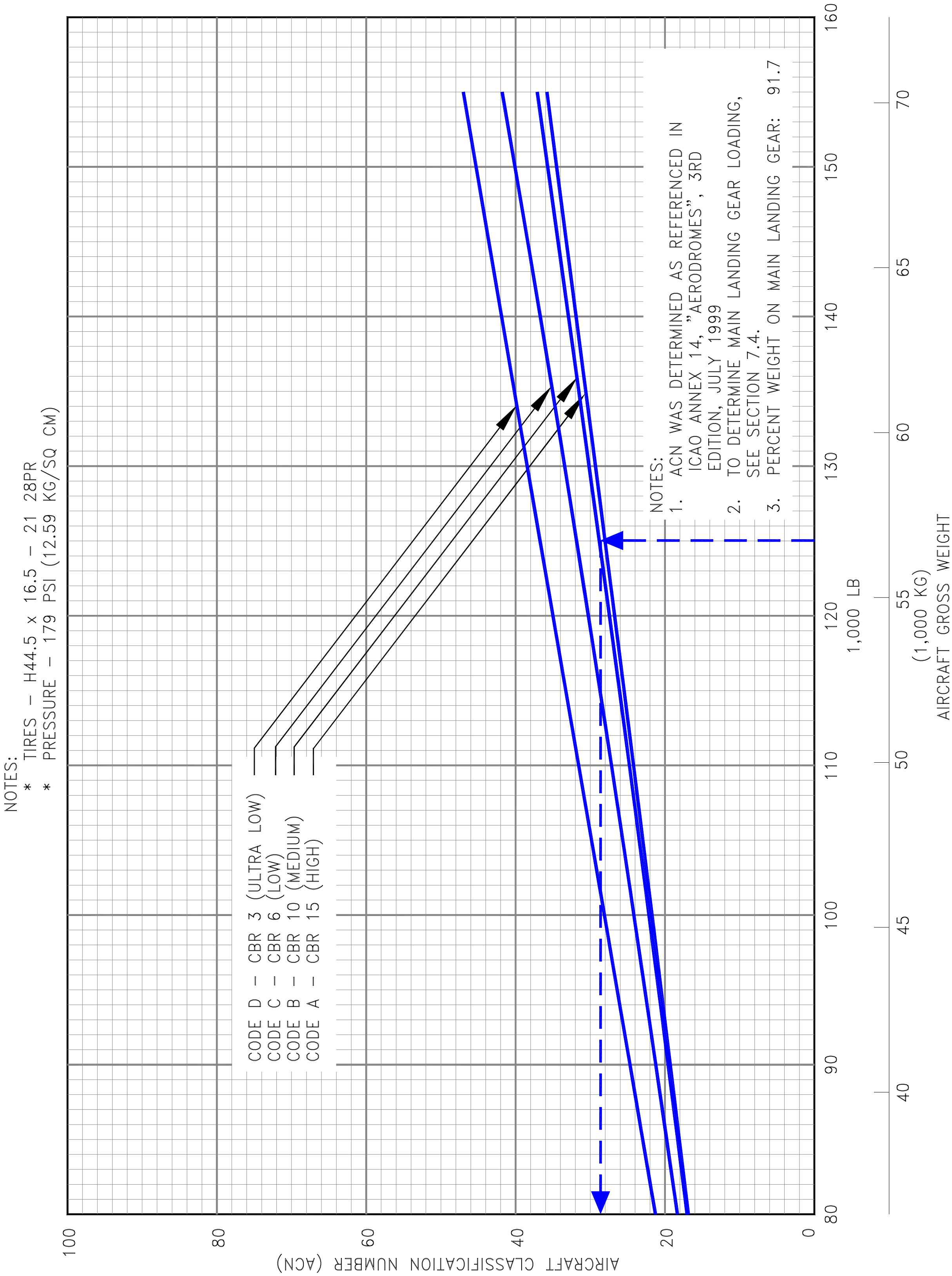
The following table provides ACN data in tabular format similar to the one used by ICAO in the “Aerodrome Design Manual Part 3, Pavements”. If the ACN for an intermediate weight between maximum taxi weight and the empty weight of the aircraft is required, Figures 7.10.1 through 7.10.12 should be consulted.

				ACN FOR RIGID PAVEMENT SUBGRADES – MN/m^3				ACN FOR FLEXIBLE PAVEMENT SUBGRADES – CBR			
AIRCRAFT MODEL	ALL-UP MASS/ OPERATING MASS EMPTY LB (KG)	LOAD ON ONE MAIN GEAR LEG (%)	TIRE PRESSURE PSI (MPa)	HIGH 150	MEDIUM 80	LOW 40	ULTRA LOW 20	HIGH 15	MEDIUM 10	LOW 6	ULTRA LOW 3
737-700	155,000 (70,307)	45.85	197 (1.36)	41	43	46	47	36	38	42	47
	83,000 (37,648)			19	20	22	23	18	18	19	22
737-700 (OPTIONAL TIRES)	155,000 (70,307)	45.85	179 (1.23)	40	42	45	47	36	37	42	47
	83,000 (37,648)			20	21	22	23	18	18	19	22
737-800	174,700 (79,243)	46.79	204 (1.41)	49	52	54	56	43	45	50	55
	91,300 (41,413)			23	24	25	27	20	21	22	26
737-900	174,700 (79,243)	46.79	204 (1.41)	49	52	54	56	43	45	50	55
	94,580 (42,901)			24	25	27	28	21	22	23	27

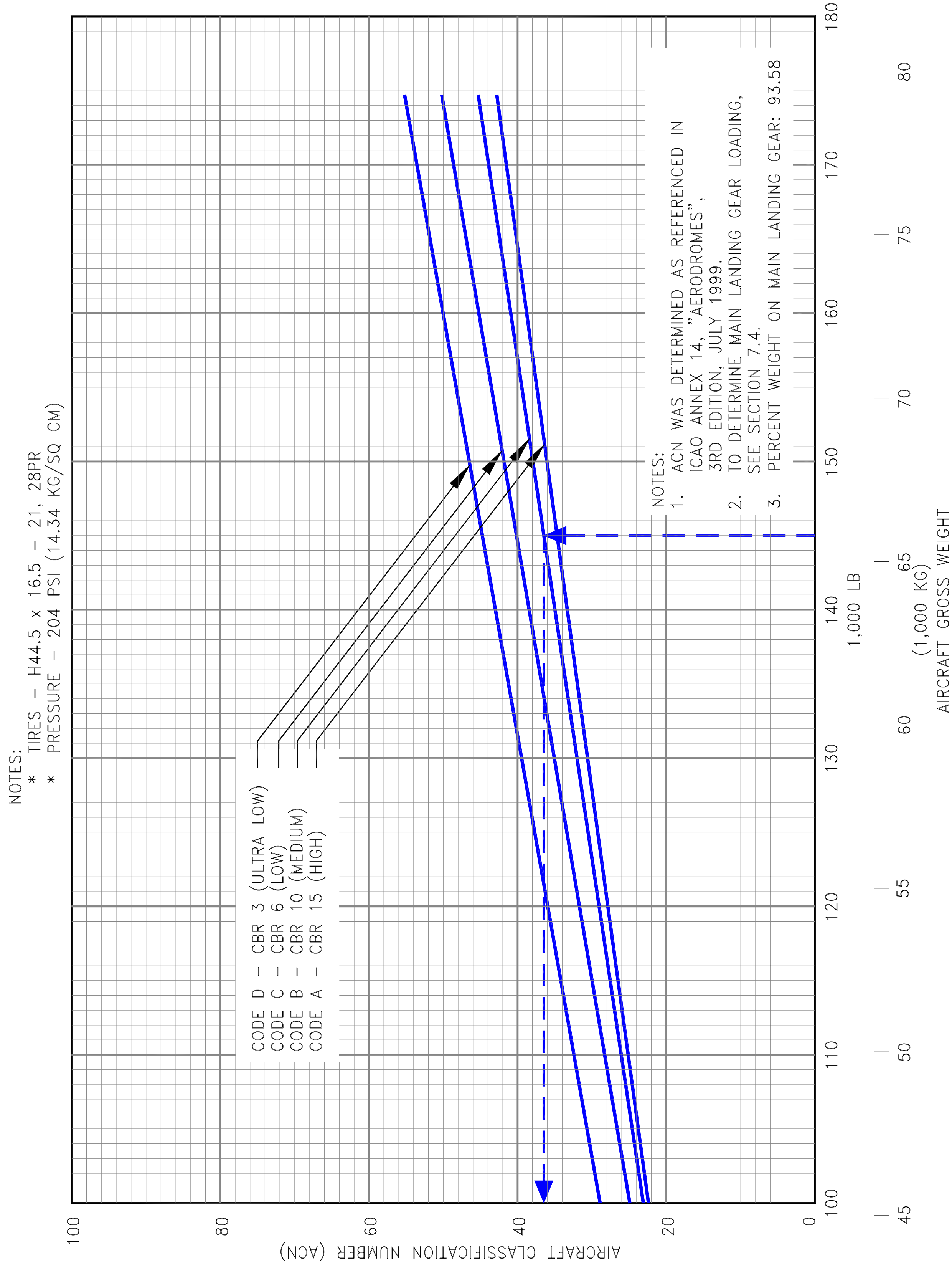
NOTE: ALL AIRPLANE MODELS WITH WINGLETS



7.10.1 AIRCRAFT CLASSIFICATION NUMBER - FLEXIBLE PAVEMENT
MODEL 737-700 (WITH WINGLETS)



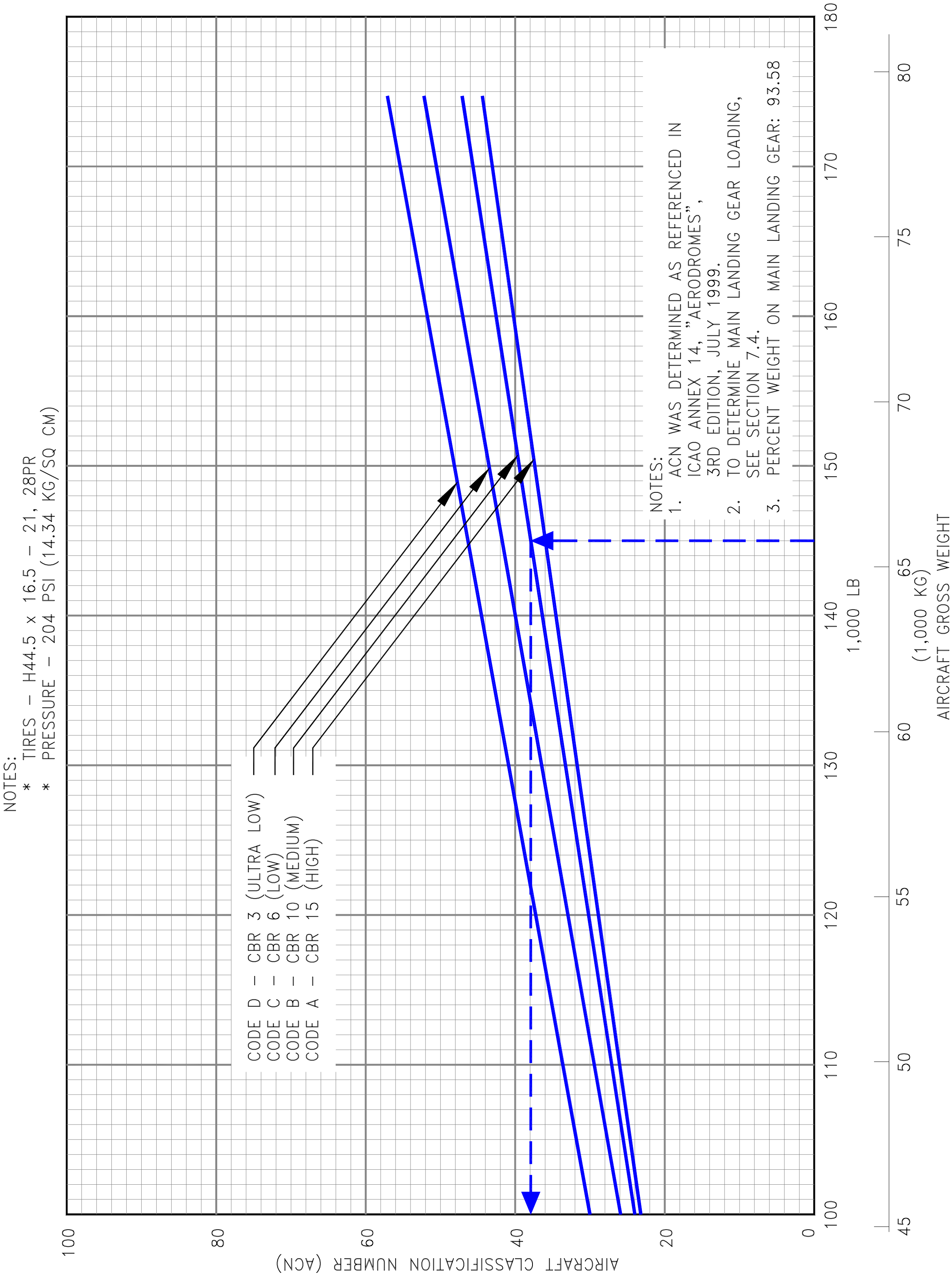
7.10.2 AIRCRAFT CLASSIFICATION NUMBER - FLEXIBLE PAVEMENT
MODEL 737-700 (WITH WINGLETS) (OPTIONAL TIRES)



7.10.3 AIRCRAFT CLASSIFICATION NUMBER - FLEXIBLE PAVEMENT

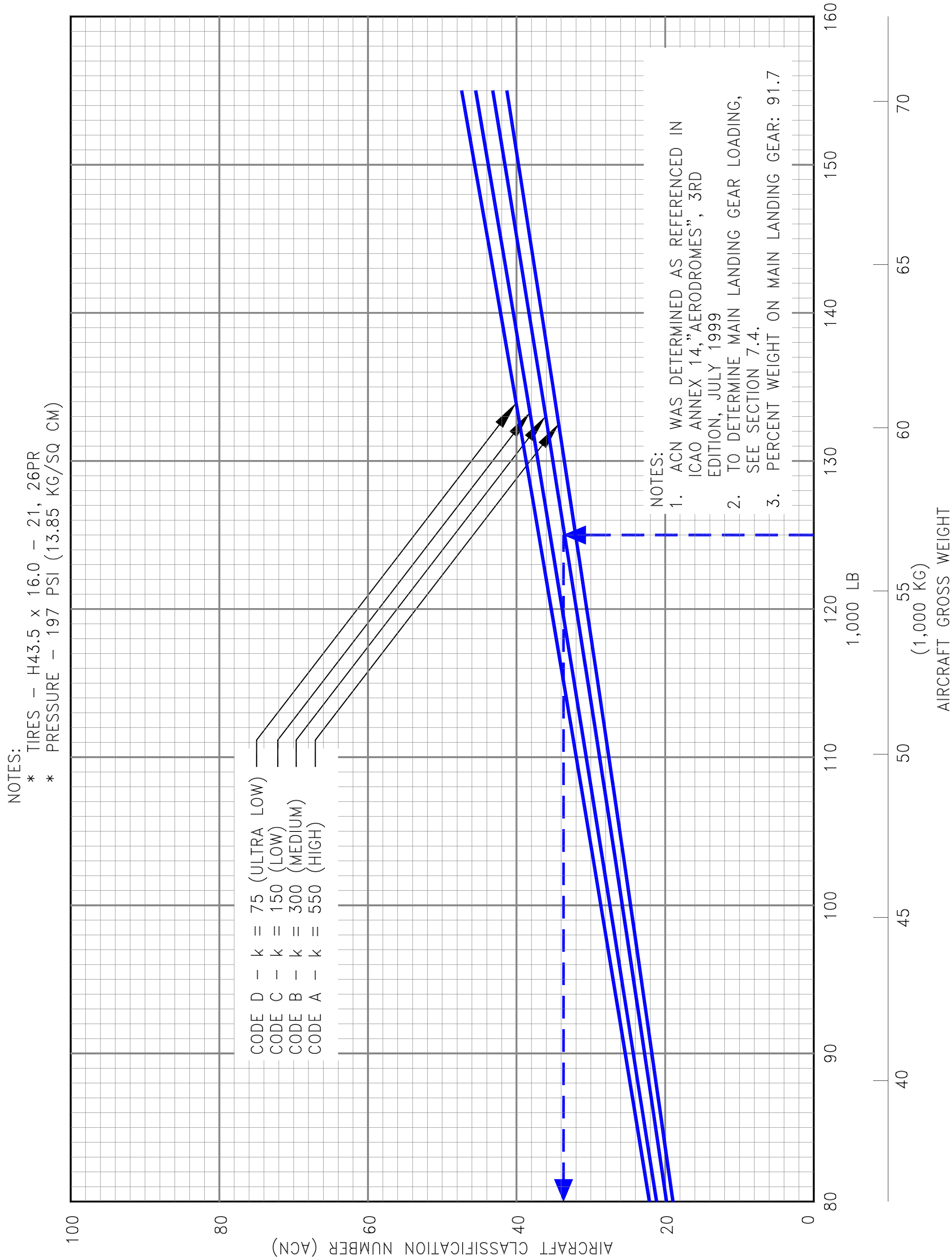
MODEL 737-800 (WITH WINGLETS)

PRELIMINARY INFORMATION



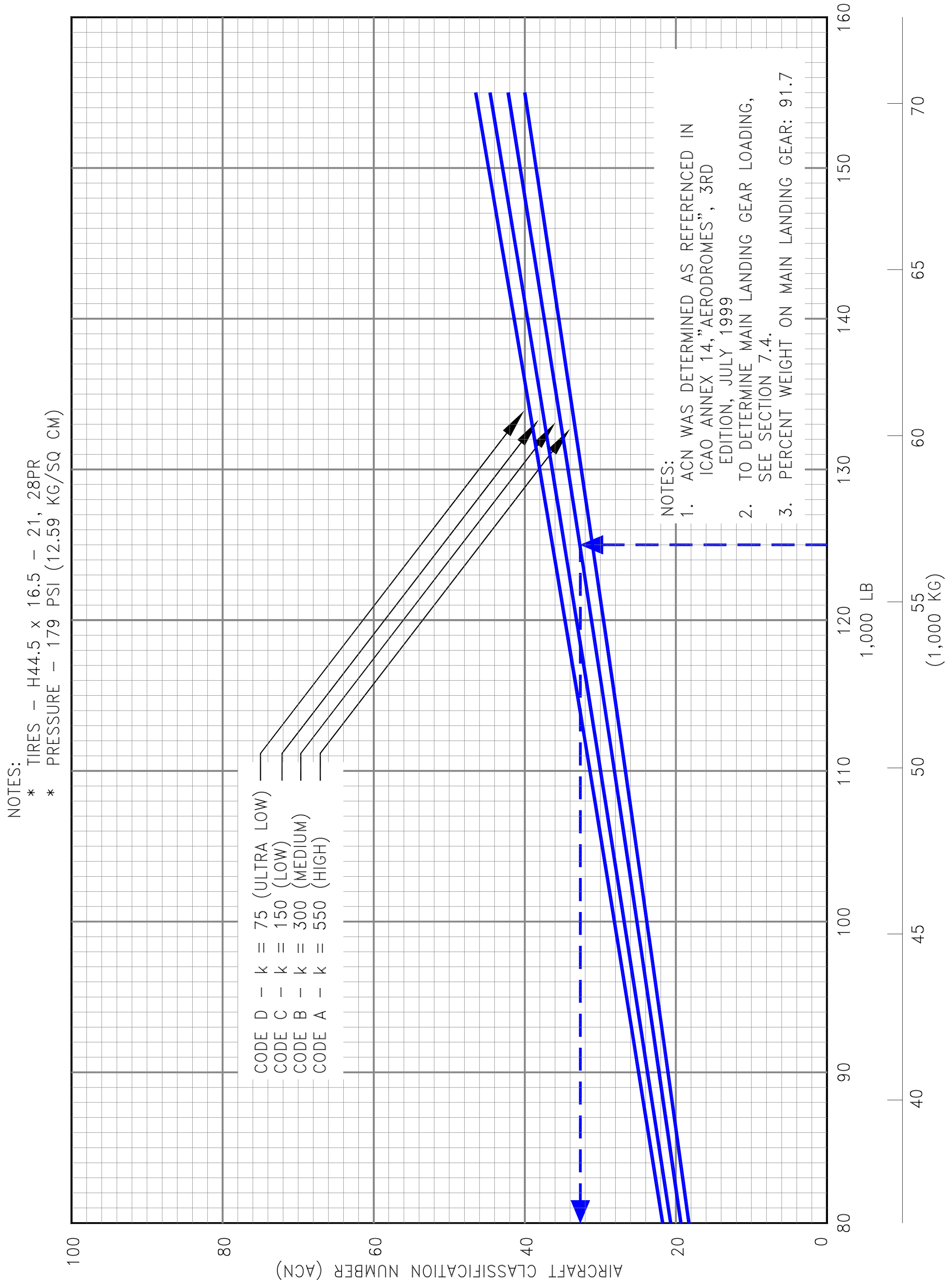
7.10.4 AIRCRAFT CLASSIFICATION NUMBER - FLEXIBLE PAVEMENT

MODEL 737-900 (WITH WINGLETS)



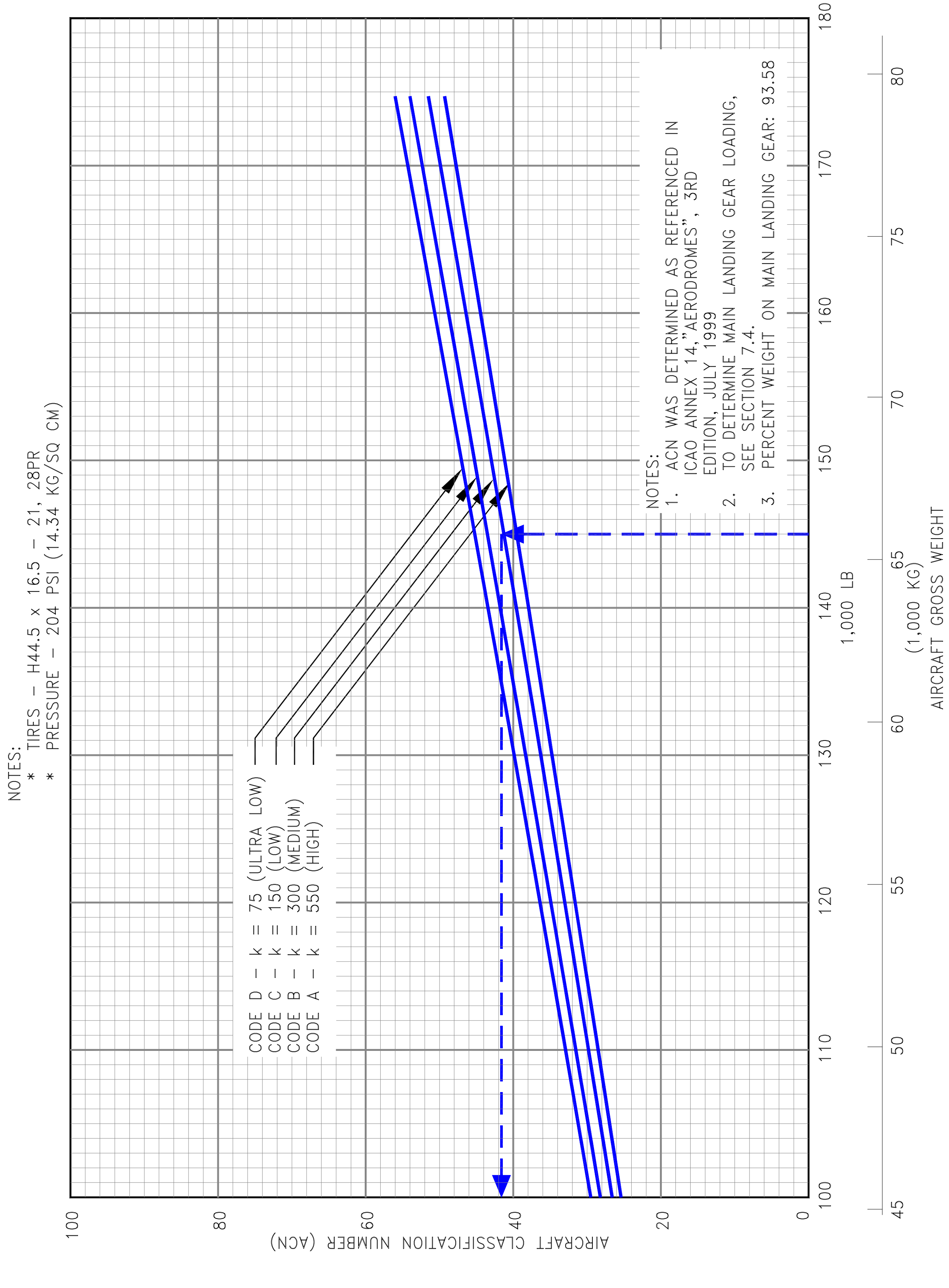
7.10.5 AIRCRAFT CLASSIFICATION NUMBER - RIGID PAVEMENT

MODEL 737-700 (WITH WINGLETS)



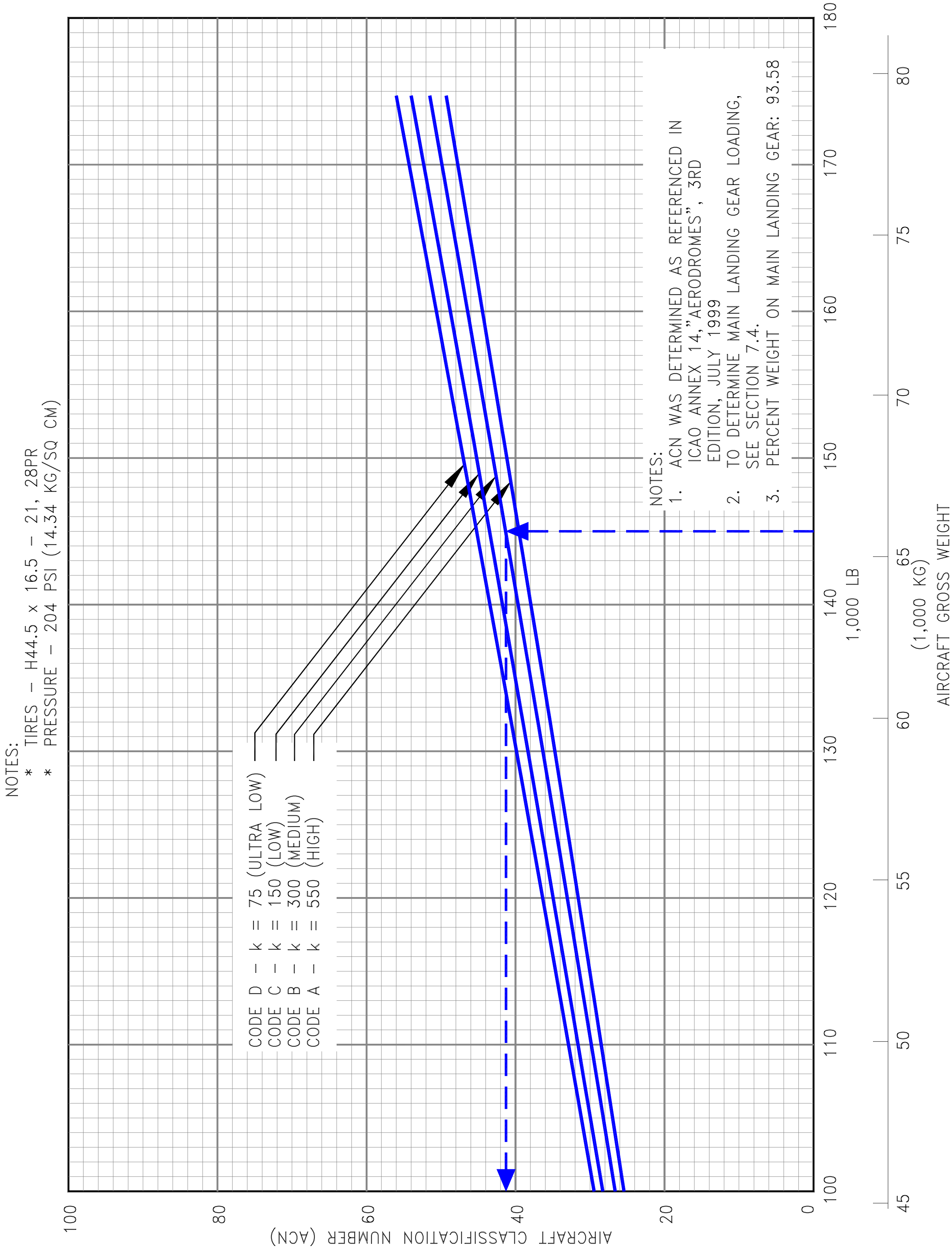
7.10.6 AIRCRAFT CLASSIFICATION NUMBER - RIGID PAVEMENT

MODEL 737-700 (WITH WINGLETS) (OPTIONAL TIRES)



7.10.7 AIRCRAFT CLASSIFICATION NUMBER - RIGID PAVEMENT
MODEL 737-800 (WITH WINGLETS)

PRELIMINARY INFORMATION



7.10.8 AIRCRAFT CLASSIFICATION NUMBER - RIGID PAVEMENT

MODEL 737-900 (WITH WINGLETS)

8.0 FUTURE 737 DERIVATIVE AIRPLANES

8.0 FUTURE 737 DERIVATIVE AIRPLANES

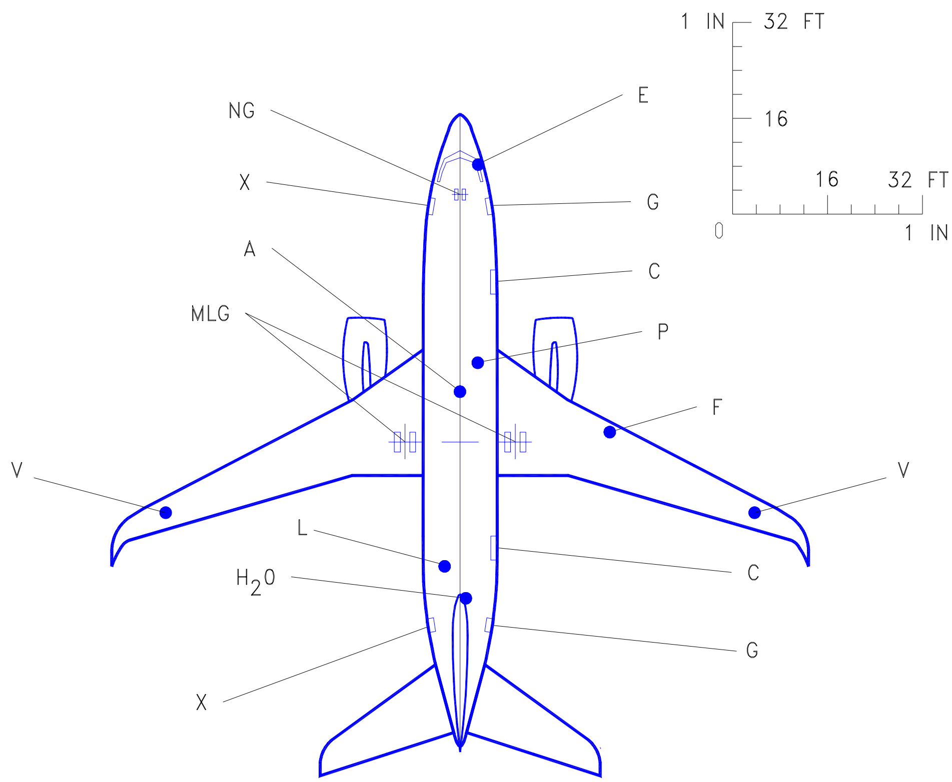
Development of these derivatives will depend on airline requirements. The impact of airline requirements on airport facilities will be a consideration in the configuration and design of these derivatives.

9.0 SCALED 737-700, -800, -900 DRAWINGS

9.0 SCALED DRAWINGS

The drawings in the following pages show airplane plan view drawings, drawn to approximate scale as noted. The drawings may not come out to exact scale when printed or copied from this document. Printing scale should be adjusted when attempting to reproduce these drawings. Three-view drawing files of the 737 airplane models, along with other Boeing airplane models, can be downloaded from the following website:

http://www.boeing.com/airports



LEGEND

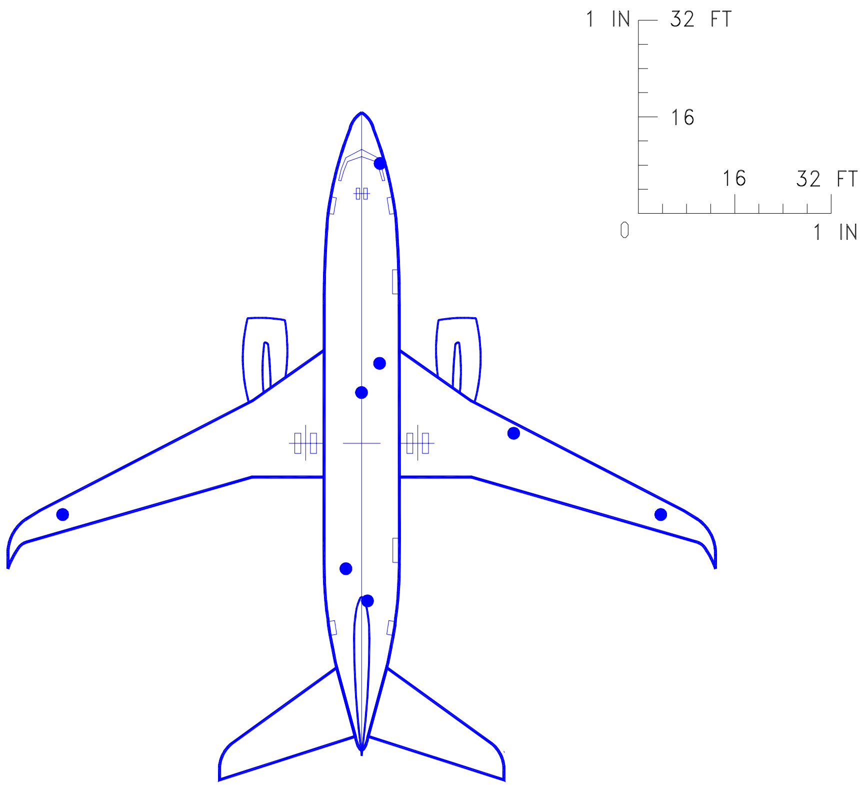
A	AIR CONDITIONING
C	CARGO DOOR
E	ELECTRICAL
F	FUEL
G	SERVICE DOOR
H_2O	POTABLE WATER
MLG	MAIN LANDING GEAR
NG	NOSE LANDING GEAR
P	PNEUMATIC (AIR START)
L	VACUUM LAVATORY SERVICE
V	FUEL VENT
X	PASSENGER DOOR

NOTE: FOR TURNING RADIUS DATA
SEE SECTIONS 4.2 AND 4.3

NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

9.1.1 SCALED DRAWING - 1 IN. = 32 FT

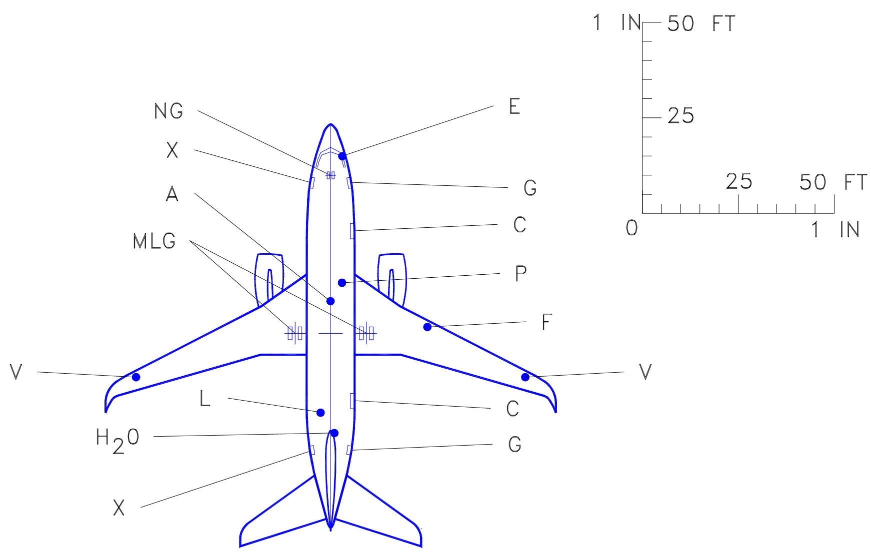
MODEL 737-700 WITH WINGLETS



NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

9.1.2 SCALED DRAWING - 1 IN. = 32 FT

MODEL 737-700 WITH WINGLETS



LEGEND

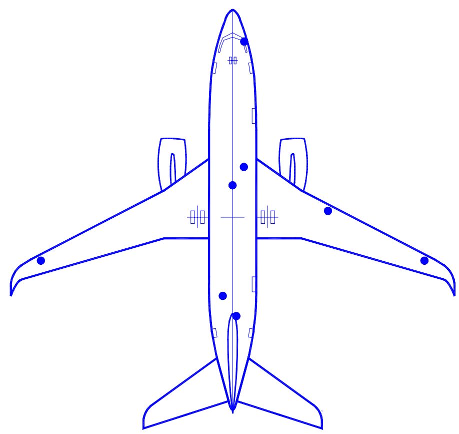
A AIR CONDITIONING
C CARGO DOOR
E ELECTRICAL
F FUEL
G SERVICE DOOR
H_2O POTABLE WATER
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P PNEUMATIC (AIR START)
L VACUUM LAVATORY SERVICE
V FUEL VENT
X PASSENGER DOOR

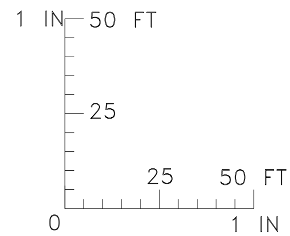
NOTE: FOR TURNING RADIUS DATA SEE SECTIONS 4.2 AND 4.3

NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

9.2.1 SCALED DRAWING - 1 IN. = 50 FT

MODEL 737-700 WITH WINGLETS

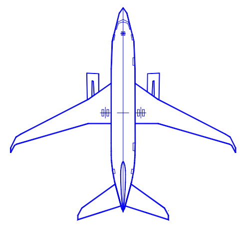


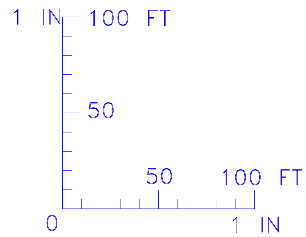


NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

9.2.2 SCALED DRAWING - 1 IN. = 50 FT

MODEL 737-700 WITH WINGLETS





NOTE:

SEE SEC 9.1.1 FOR LOCATIONS
OF SERVICE POINTS

LEGEND

A	AIR CONDITIONING
C	CARGO DOOR
E	ELECTRICAL
F	FUEL
G	SERVICE DOOR
H_2O	POTABLE WATER
MLG	MAIN LANDING GEAR
NG	NOSE LANDING GEAR
P	PNEUMATIC (AIR START)
L	VACUUM LAVATORY SERVICE
V	FUEL VENT
X	PASSENGER DOOR

NOTE: FOR TURNING RADIUS DATA
SEE SECTIONS 4.2 AND 4.3

NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

9.3 SCALED DRAWING - 1 IN = 100 FT

MODEL 737-700 WITH WINGLETS

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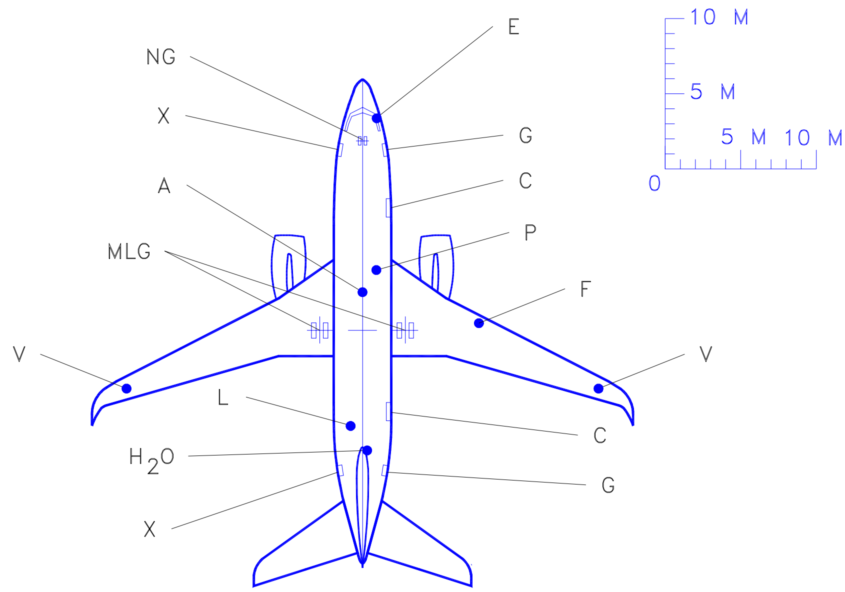


LEGEND

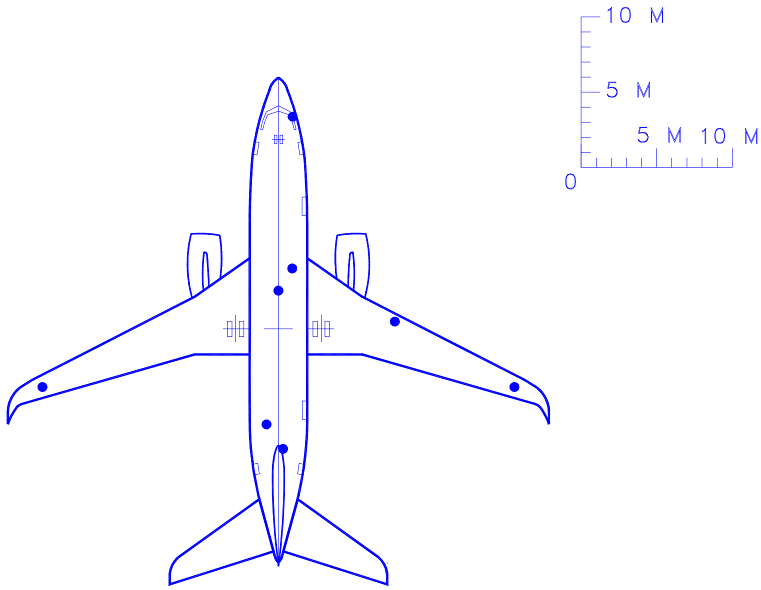
A	AIR CONDITIONING
C	CARGO DOOR
E	ELECTRICAL
F	FUEL
G	SERVICE DOOR
H_2O	POTABLE WATER
MLG	MAIN LANDING GEAR
NG	NOSE LANDING GEAR
P	PNEUMATIC (AIR START)
L	VACUUM LAVATORY SERVICE
V	FUEL VENT
X	PASSENGER DOOR

NOTE: FOR TURNING RADIUS DATA SEE SECTIONS 4.2 AND 4.3

NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

9.4.1 SCALED DRAWING - 1:500

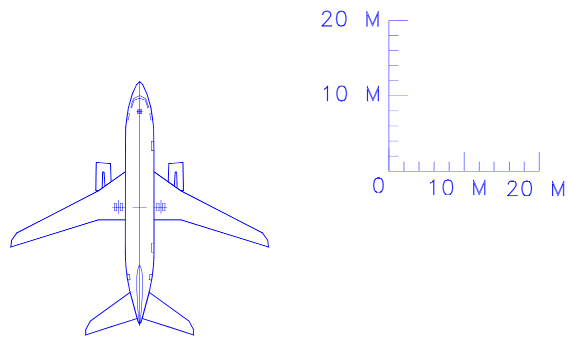
MODEL 737-700 WITH WINGLETS



NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

9.4.2 SCALED DRAWING - 1:500

MODEL 737-700 WITH WINGLETS



NOTE:

SEE SEC 9.1 FOR LOCATIONS
OF SERVICE POINTS

LEGEND

A	AIR CONDITIONING
C	CARGO DOOR
E	ELECTRICAL
F	FUEL
G	SERVICE DOOR
H_2O	POTABLE WATER
MLG	MAIN LANDING GEAR
NG	NOSE LANDING GEAR
P	PNEUMATIC (AIR START)
L	VACUUM LAVATORY SERVICE
V	FUEL VENT
X	PASSENGER DOOR

NOTE: FOR TURNING RADIUS DATA
SEE SECTIONS 4.2 AND 4.3

NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

9.5 SCALED DRAWING - 1:1000
MODEL 737-700 WITH WINGLETS

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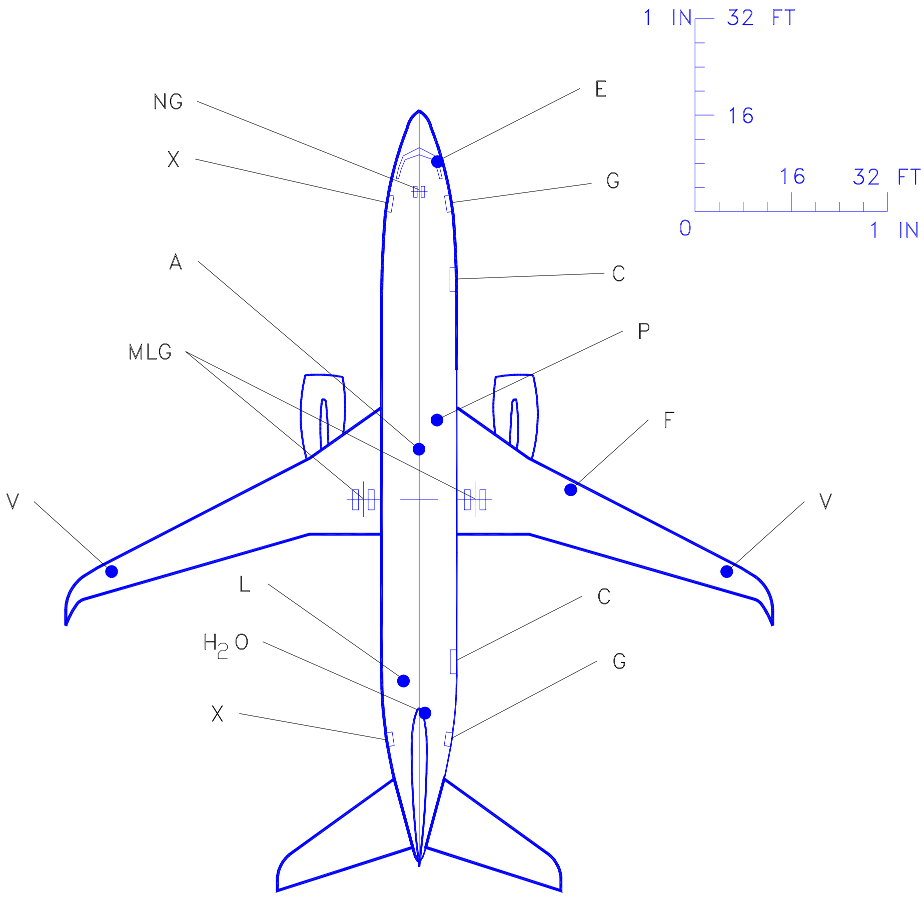


LEGEND

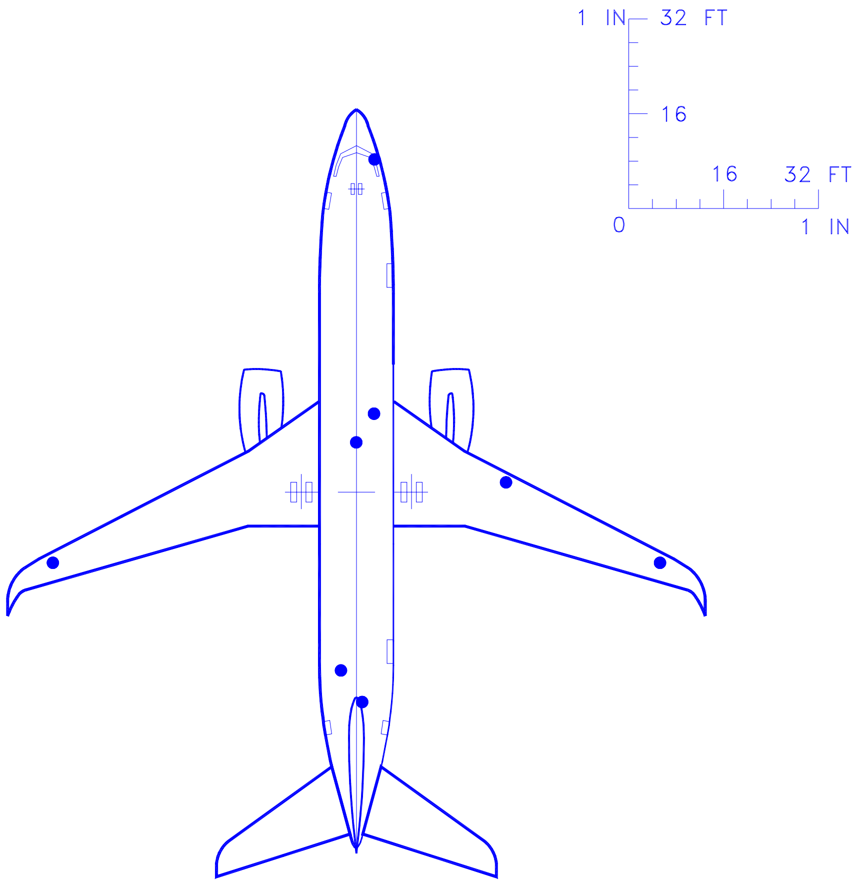
A	AIR CONDITIONING
C	CARGO DOOR
E	ELECTRICAL
F	FUEL
G	SERVICE DOOR
H_2O	POTABLE WATER
MLG	MAIN LANDING GEAR
NG	NOSE LANDING GEAR
P	PNEUMATIC (AIR START)
L	VACUUM LAVATORY SERVICE
V	FUEL VENT
X	PASSENGER DOOR

NOTE: FOR TURNING RADIUS DATA SEE SECTIONS 4.2 AND 4.3

NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

9.6.1 SCALED DRAWING - 1 IN. = 32 FT

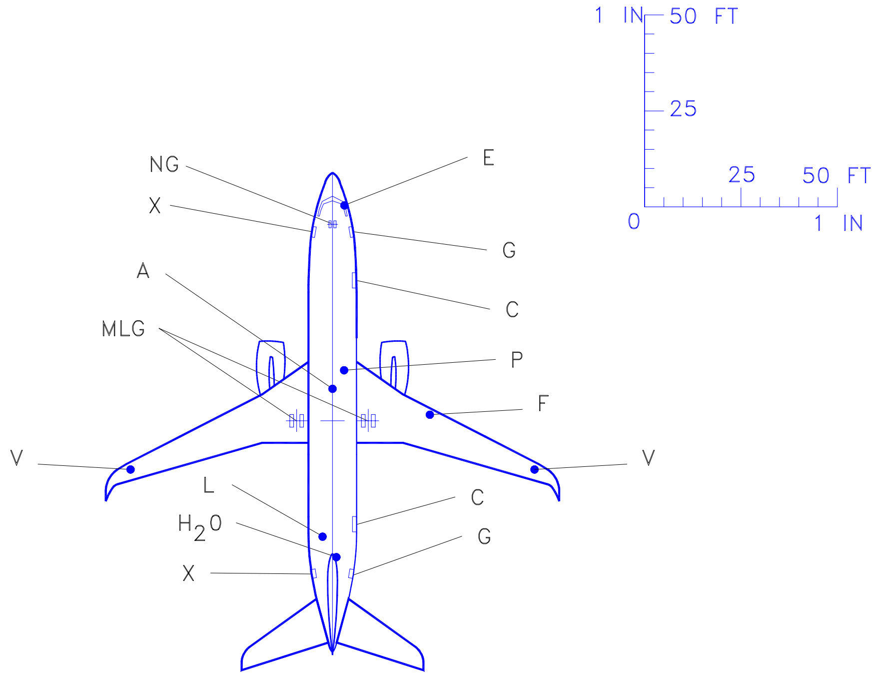
MODEL 737-800 WITH WINGLETS



NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

9.6.2 SCALED DRAWING - 1 IN. = 32 FT

MODEL 737-800 WITH WINGLETS



LEGEND

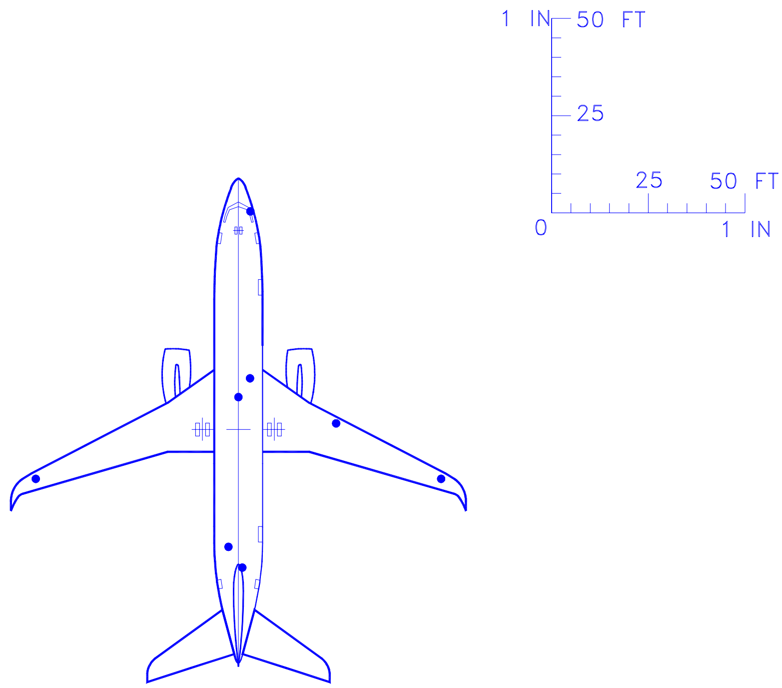
A	AIR CONDITIONING
C	CARGO DOOR
E	ELECTRICAL
F	FUEL
G	SERVICE DOOR
H_2O	POTABLE WATER
MLG	MAIN LANDING GEAR
NG	NOSE LANDING GEAR
P	PNEUMATIC (AIR START)
L	VACUUM LAVATORY SERVICE
V	FUEL VENT
X	PASSENGER DOOR

NOTE: FOR TURNING RADIUS DATA SEE SECTIONS 4.2 AND 4.3

NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

9.7.1 SCALED DRAWING - 1 IN. = 50 FT

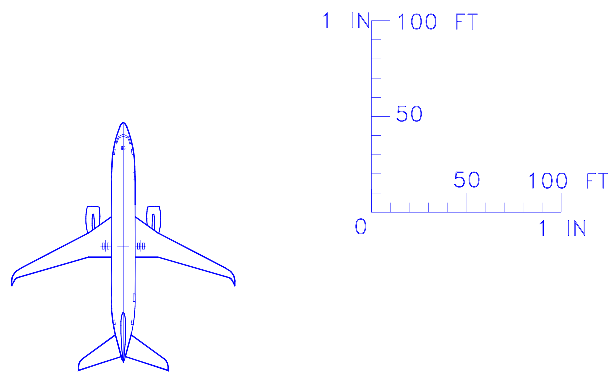
MODEL 737-800 WITH WINGLETS



NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

9.7.2 SCALED DRAWING - 1 IN. = 50 FT

MODEL 737-800 WITH WINGLETS



NOTE:

SEE SEC 9.6.1 FOR LOCATIONS
OF SERVICE POINTS

LEGEND

A AIR CONDITIONING
C CARGO DOOR
E ELECTRICAL
F FUEL
G SERVICE DOOR
H_2O POTABLE WATER
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P PNEUMATIC (AIR START)
L VACUUM LAVATORY SERVICE
V FUEL VENT
X PASSENGER DOOR

NOTE: FOR TURNING RADIUS DATA
SEE SECTIONS 4.2 AND 4.3

NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

9.8 SCALED DRAWING - 1 IN = 100 FT

MODEL 737-800 WITH WINGLETS

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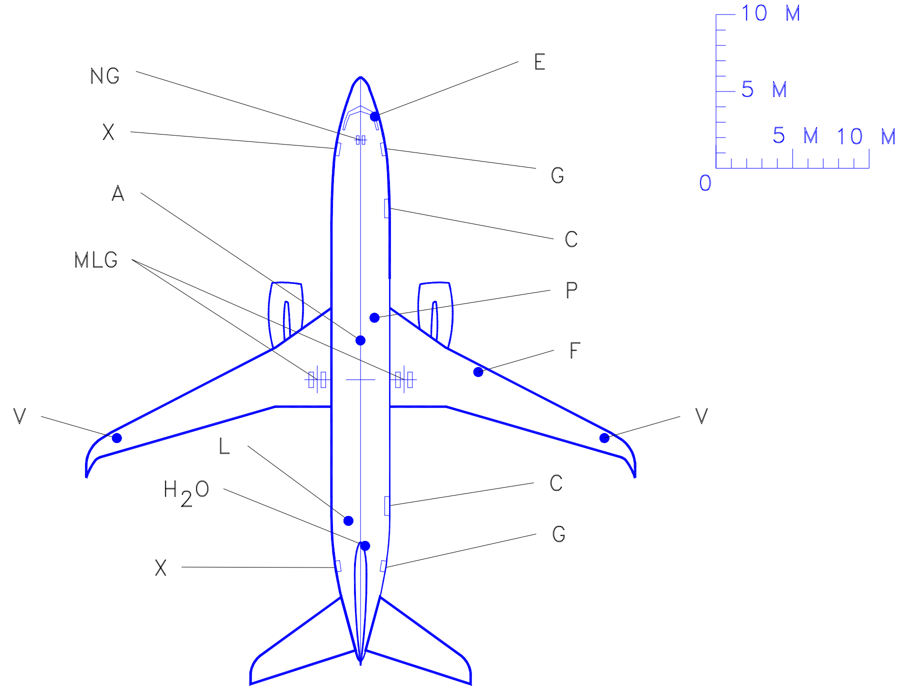


LEGEND

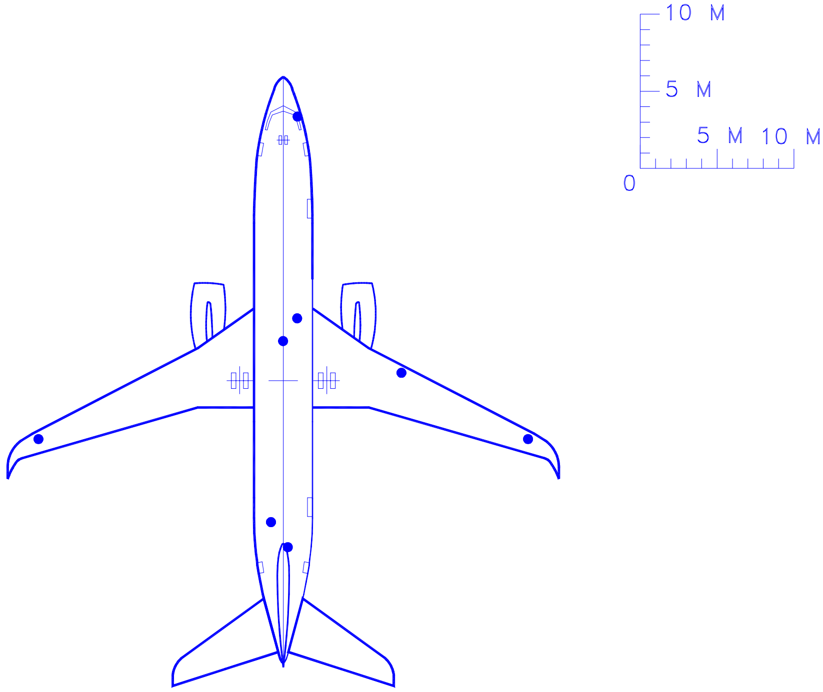
A	AIR CONDITIONING
C	CARGO DOOR
E	ELECTRICAL
F	FUEL
G	SERVICE DOOR
H_2O	POTABLE WATER
MLG	MAIN LANDING GEAR
NG	NOSE LANDING GEAR
P	PNEUMATIC (AIR START)
L	VACUUM LAVATORY SERVICE
V	FUEL VENT
X	PASSENGER DOOR

NOTE: FOR TURNING RADIUS DATA SEE SECTIONS 4.2 AND 4.3

NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

9.9.1 SCALED DRAWING - 1:500

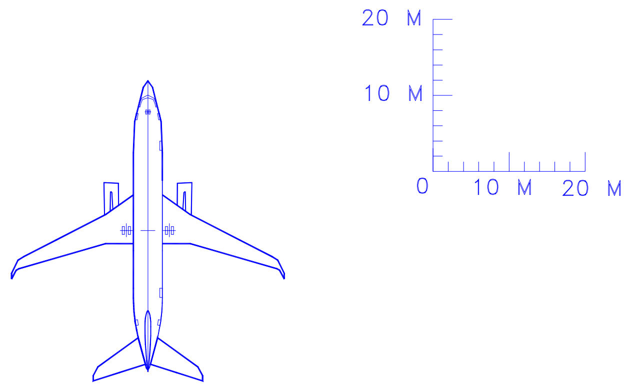
MODEL 737-800 WITH WINGLETS



NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

9.9.2 SCALED DRAWING - 1:500

MODEL 737-800 WITH WINGLETS



NOTE:

SEE SEC 9.6.1 FOR LOCATIONS
OF SERVICE POINTS

LEGEND

A	AIR CONDITIONING
C	CARGO DOOR
E	ELECTRICAL
F	FUEL
G	SERVICE DOOR
H_2O	POTABLE WATER
MLG	MAIN LANDING GEAR
NG	NOSE LANDING GEAR
P	PNEUMATIC (AIR START)
L	VACUUM LAVATORY SERVICE
V	FUEL VENT
X	PASSENGER DOOR

NOTE: FOR TURNING RADIUS DATA
SEE SECTIONS 4.2 AND 4.3

NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

9.10 SCALED DRAWING - 1:1000

MODEL 737-800 WITH WINGLETS

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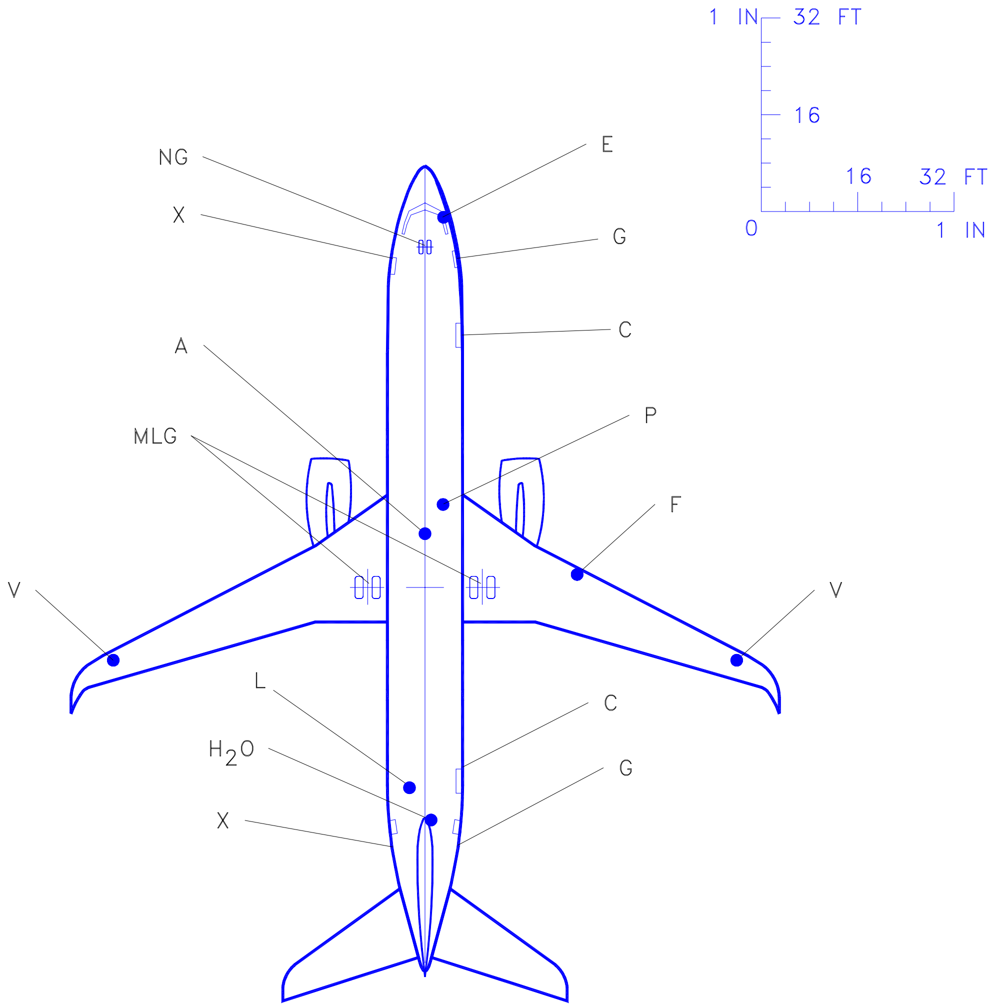


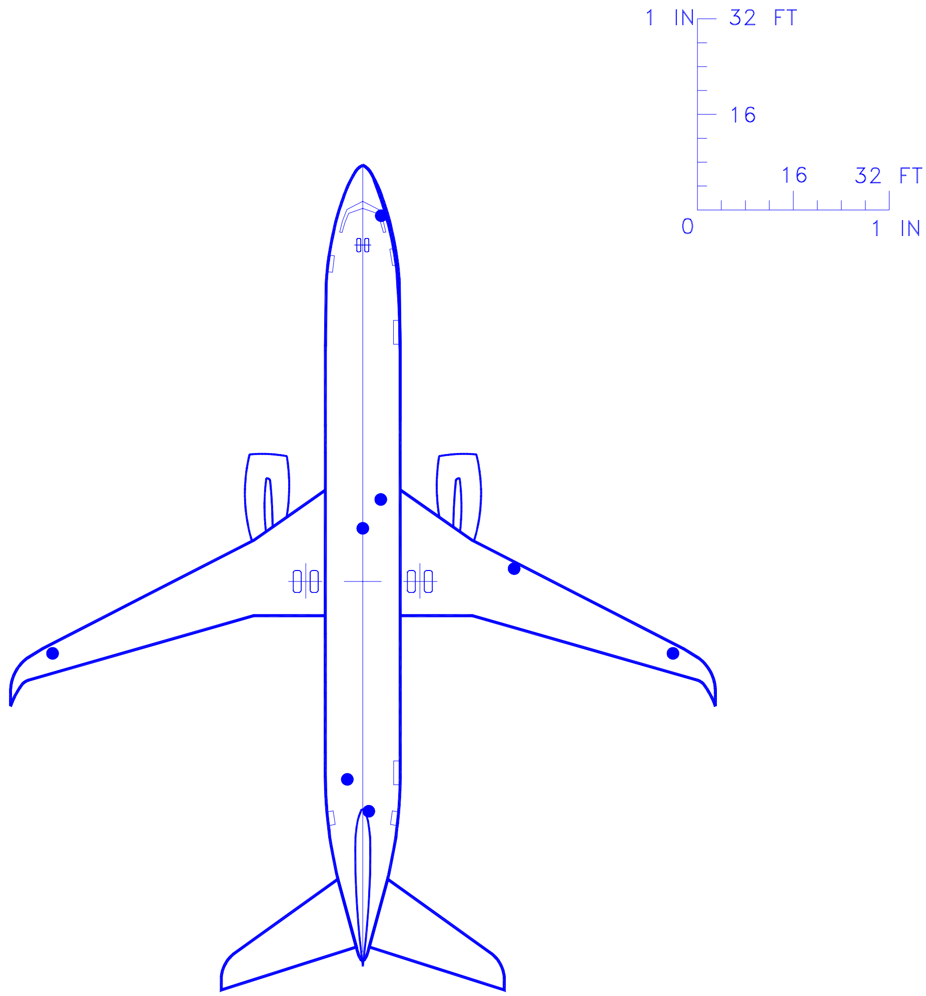
LEGEND

A AIR CONDITIONING
C CARGO DOOR
E ELECTRICAL
F FUEL
G SERVICE DOOR
H_2O POTABLE WATER
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P PNEUMATIC (AIR START)
L VACUUM LAVATORY SERVICE
V FUEL VENT
X PASSENGER DOOR

NOTE: FOR TURNING RADIUS DATA SEE SECTIONS 4.2 AND 4.3

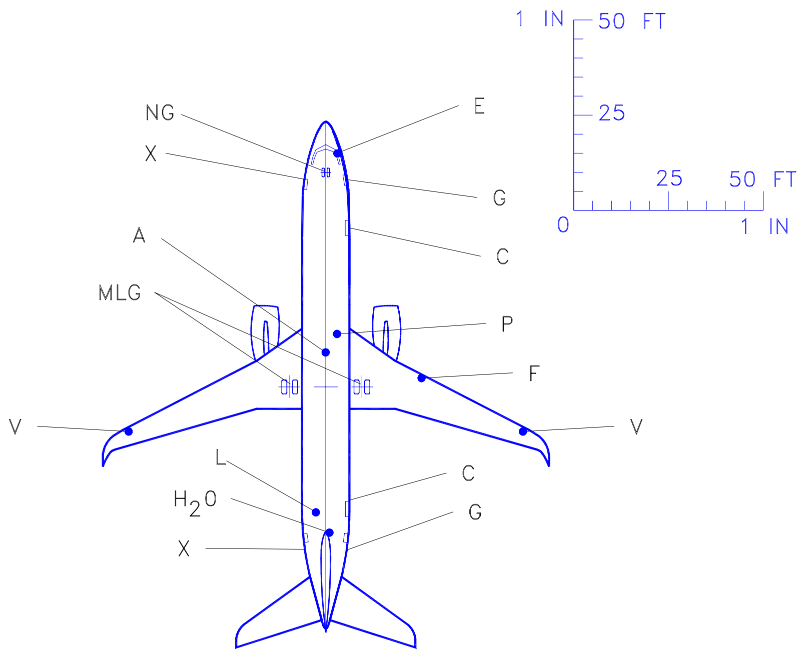
NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

9.11.1 SCALED DRAWING - 1 IN. = 32 FT
MODEL 737-900 WITH WINGLETS



NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

9.11.2 SCALED DRAWING - 1 IN. = 32 FT
MODEL 737-900 WITH WINGLETS



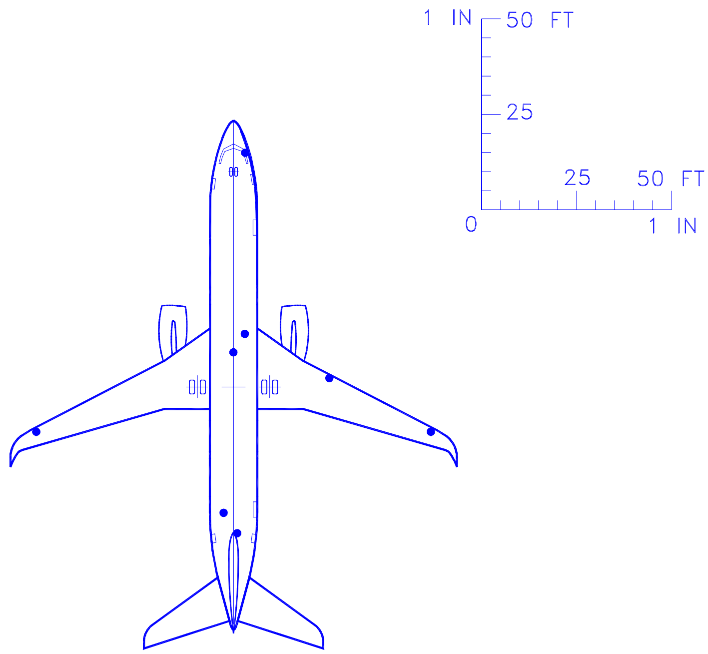
LEGEND

A	AIR CONDITIONING
C	CARGO DOOR
E	ELECTRICAL
F	FUEL
G	SERVICE DOOR
H_2O	POTABLE WATER
MLG	MAIN LANDING GEAR
NG	NOSE LANDING GEAR
P	PNEUMATIC (AIR START)
L	VACUUM LAVATORY SERVICE
V	FUEL VENT
X	PASSENGER DOOR

NOTE: FOR TURNING RADIUS DATA SEE SECTIONS 4.2 AND 4.3

NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

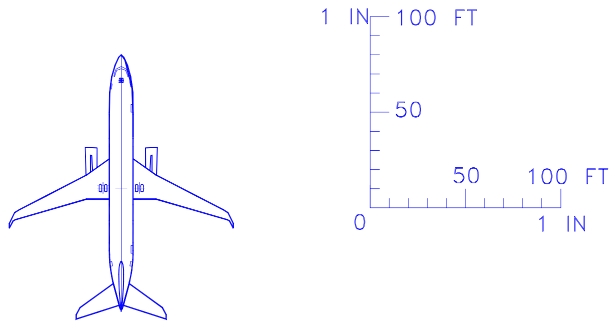
9.12.1 SCALED DRAWING - 1 IN. = 50 FT
MODEL 737-900 WITH WINGLETS



NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

9.12.2 SCALED DRAWING - 1 IN. = 50 FT

MODEL 737-900 WITH WINGLETS



NOTE:

SEE SEC 9.11.1 FOR LOCATIONS
OF SERVICE POINTS

LEGEND

A	AIR CONDITIONING
C	CARGO DOOR
E	ELECTRICAL
F	FUEL
G	SERVICE DOOR
H_2O	POTABLE WATER
MLG	MAIN LANDING GEAR
NG	NOSE LANDING GEAR
P	PNEUMATIC (AIR START)
L	VACUUM LAVATORY SERVICE
V	FUEL VENT
X	PASSENGER DOOR

NOTE: FOR TURNING RADIUS DATA
SEE SECTIONS 4.2 AND 4.3

NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

9.13 SCALED DRAWING - 1 IN = 100 FT

MODEL 737-900 WITH WINGLETS

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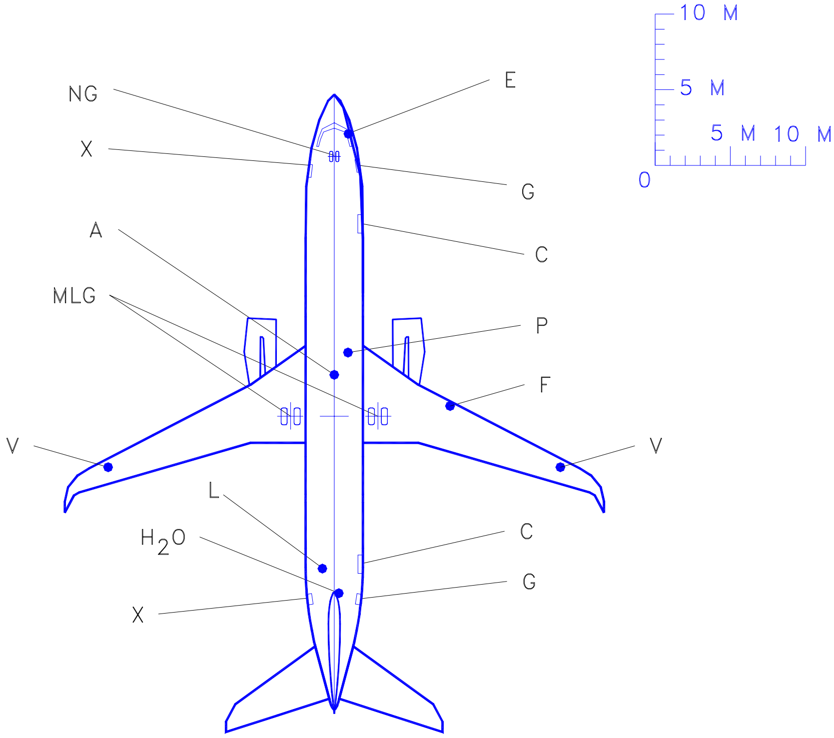


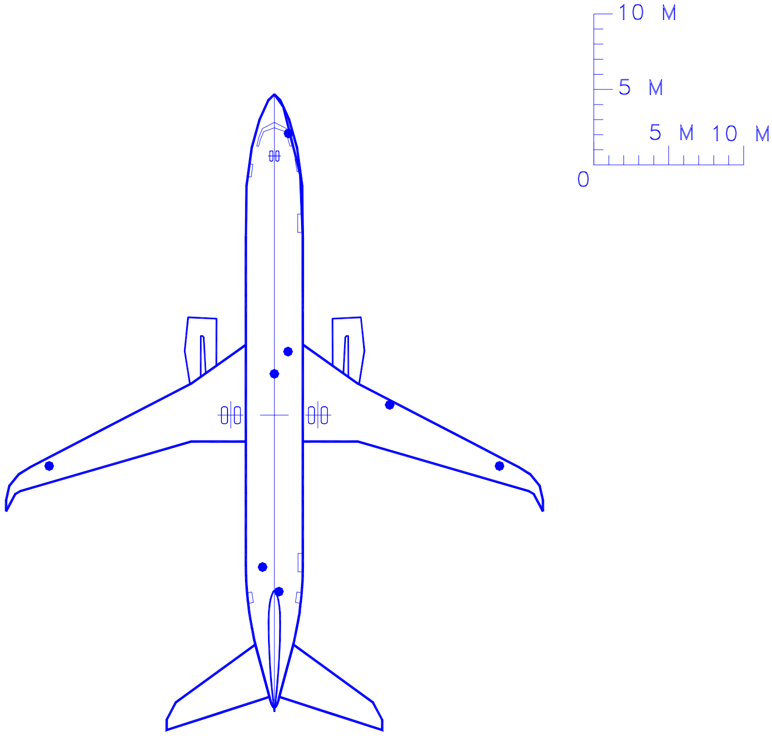
LEGEND

A AIR CONDITIONING
C CARGO DOOR
E ELECTRICAL
F FUEL
G SERVICE DOOR
H_2O POTABLE WATER
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P PNEUMATIC (AIR START)
L VACUUM LAVATORY SERVICE
V FUEL VENT
X PASSENGER DOOR

NOTE: FOR TURNING RADIUS DATA SEE SECTIONS 4.2 AND 4.3

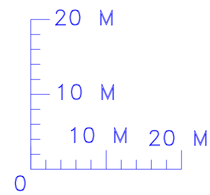
NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

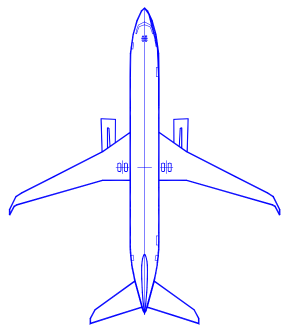
9.14.1 SCALED DRAWING - 1:500
MODEL 737-900 WITH WINGLETS



NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

9.14.2 SCALED DRAWING - 1:500
MODEL 737-900 WITH WINGLETS





NOTE:

SEE SEC 9.11.1 FOR LOCATIONS
OF SERVICE POINTS

LEGEND

A	AIR CONDITIONING
C	CARGO DOOR
E	ELECTRICAL
F	FUEL
G	SERVICE DOOR
H_2O	POTABLE WATER
MLG	MAIN LANDING GEAR
NG	NOSE LANDING GEAR
P	PNEUMATIC (AIR START)
L	VACUUM LAVATORY SERVICE
V	FUEL VENT
X	PASSENGER DOOR

NOTE: FOR TURNING RADIUS DATA
SEE SECTIONS 4.2 AND 4.3

NOTE: WHEN PRINTING THIS DRAWING, MAKE SURE TO ADJUST FOR PROPER SCALING

9.15 SCALED DRAWING - 1:1000

MODEL 737-900 WITH WINGLETS

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