777-200/300

Airplane Characteristics for

Airport Planning

Boeing Commercial Airplanes

D6-58329

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1.0 SCOPE AND INTRODUCTION

1.1 Scope

1.2 Introduction

1.3 A Brief Description of the 777 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 American and World Organizations
- 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 777 family of airplanes 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 777 Family of Airplanes

777-200 Airplane

The 777-200 is a twin-engine airplane designed for medium to long range flights. It is powered by advanced high bypass ratio engines. Characteristics unique to the 777 include:

- Two-crew cockpit with digital avionics
- Circular cross-section
- Lightweight aluminum and composite alloys
- Structural carbon brakes
- Six-wheel main landing gears
- Main gear aft axle steering
- High bypass ratio engines
- Fly-by-wire system

777-300 Airplane

The 777-300 is a second-generation derivative of the 777-200. Two body sections are added to the fuselage to provide additional passenger seating and cargo capacity.

Main Gear Aft Axle Steering

The main gear axle steering is automatically engaged based on the nose gear steering angle. This allows for less tire scrubbing and easier maneuvering into gates with limited parking clearances.

High Bypass Ratio Engines

The 777 airplane is powered by two high bypass ratio engines. The following table shows the available engine options.

ENGINE MFR	MODEL	THRUST	MAX TAXI WEIGHT (LBS)	
			777-200	777-300
GENERAL ELECTRIC	GE 90-B3/-B4	74,500 LB	537,000	
	GE 90-B5	76,400 LB	537,000	
	GE 90-B1	84,100 LB	634,000	
	GE 90-B4	84,700 LB	634,000	
	GE 90-92B	90,500 LB		662,000
	GE 90-98B	98,000 LB		662,000
PRATT & WHITNEY	PW 4073/4073A	73,500 LB	537,000	
	PW 4077	77,200 LB	537,000	
	PW 4082	82,200 LB	634,000	
	PW 4084	84,600 LB	634,000	
	PW 4090	90,500 LB		662,000
	PW 4098	98,000 LB		662,000
ROLLS ROYCE	TRENT 870/871	71,200 LB	537,000	
	TRENT 877	74,900 LB	537,000	
	TRENT 882	82,200 LB	634,000	
	TRENT 884	84,300 LB	634,000	
	TRENT 890	90,000 LB		662,000
	TRENT 898	98,000 LB		662,000

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

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.)

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 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.

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	BASELINE AIRPLANE			HIGH GROSS WEIGHT OPTION		
MAX DESIGN TAXI WEIGHT	POUNDS	508,000	517,000	537,000	582,000	592,000	634,500
	KILOGRAMS	230,450	234,500	243,500	263,640	268,480	287,800
MAX DESIGN TAKEOFF WEIGHT	POUNDS	506,000	515,000	535,000	580,000	590,000	632,500
	KILOGRAMS	229,500	233,600	242,630	263,030	267,500	286,900
MAX DESIGN LANDING WEIGHT	POUNDS	441,000	445,000	445,000	460,000	460,000	460,000
	KILOGRAMS	200,050	201,800	201,800	208,700	208,700	208,700
MAX DESIGN ZERO FUEL WEIGHT	POUNDS	420,000	420,000	420,000	430,000	430,000	430,000
	KILOGRAMS	190,470	190,470	190,470	195,000	195,000	195,000
SPEC OPERATING EMPTY WEIGHT (1)	POUNDS	298,900	298,900	299,550	304,500	304,500	304,500
	KILOGRAMS	135,550	135,550	135,850	138,100	138,100	138,100
MAX STRUCTURAL PAYLOAD	POUNDS	121,100	121,100	120,450	125,550	125,550	125,550
	KILOGRAMS	54,920	54,920	54,620	56,940	56,940	56,940
SEATING CAPACITY (1)	TWO-CLASS	375 - 30 FIRST + 345 ECONOMY					
	THREE-CLASS	305 - 24 FIRST + 54 BUSINESS + 227 ECONOMY					
MAX CARGO - LOWER DECK	CUBIC FEET	5,656(2)	5,656(2)	5,656(2)	5,656(2)	5,656( )	5,656(2)
	CUBIC METERS	160.3 (2)	160.3 (2)	160.3 (2)	160.3 (2)	160.3 (2)	160.3 (2)
USABLE FUEL	US GALLONS	31,000	31,000	31,000	45,220	45,220	45,220
	LITERS	117,300	117,300	117,300	171,100	171,100	171,100
	POUNDS	207,700	207,700	207,700	302,270	302,270	302,270
	KILOGRAMS	94,240	94,240	94,240	137,460	137,460	137,460

NOTES: (1) SPEC WEIGHT FOR BASELINE CONFIGURATION OF 375 PASSENGERS.
CONSULT WITH AIRLINE FOR SPECIFIC WEIGHTS AND CONFIGURATIONS.

(2) FWD CARGO = 18 LD3'S AT 158 CU FT EACH.
AFT CARGO = 14 LD3'S AT 158 CU FT EACH.
BULK CARGO = 600 CU FT

2.1.1 GENERAL CHARACTERISTICS

MODEL 777-200 (GENERAL ELECTRIC ENGINES)

CHARACTERISTICS	UNITS	BASELINE AIRPLANE			HIGH GROSS WEIGHT OPTION		
MAX DESIGN TAXI WEIGHT	POUNDS	508,000	517,000	537,000	582,000	592,000	634,500
	KILOGRAMS	230,450	234,500	243,500	263,640	268,480	287,800
MAX DESIGN TAKEOFF WEIGHT	POUNDS	506,000	515,000	535,000	580,000	590,000	632,500
	KILOGRAMS	229,500	233,600	242,630	263,030	267,500	286,900
MAX DESIGN LANDING WEIGHT	POUNDS	441,000	445,000	445,000	450,000	455,000	455,000
	KILOGRAMS	200,050	201,800	201,800	204,080	206,350	206,350
MAX DESIGN ZERO FUEL WEIGHT	POUNDS	420,000	420,000	420,000	430,000	430,000	430,000
	KILOGRAMS	190,470	190,470	190,470	195,000	195,000	195,000
SPEC OPERATING EMPTY WEIGHT (1)	POUNDS	296,600	296,600	297,250	302,200	302,200	302,200
	KILOGRAMS	134,500	134,500	134,800	137,050	137,050	137,050
MAX STRUCTURAL PAYLOAD	POUNDS	123,400	123,400	122,750	127,800	127,800	127,800
	KILOGRAMS	55,970	55,970	55,670	57,980	57,980	57,980
SEATING CAPACITY (1)	TWO-CLASS	375 - 30 FIRST + 345 ECONOMY					
	THREE-CLASS	305 - 24 FIRST + 54 BUSINESS + 227 ECONOMY					
MAX CARGO - LOWER DECK	CUBIC FEET	5,656 (2)	5,656 (2)	5,656 (2)	5,656 (2)	5,656 (2)	5,656 (2)
	CUBIC METERS	160.3 (2)	160.3 (2)	160.3 (2)	160.3 (2)	160.3 (2)	160.3 (2)
USABLE FUEL	US GALLONS	31,000	31,000	31,000	45,220	45,220	45,220
	LITERS	117,300	117,300	117,300	171,100	171,100	171,100
	POUNDS	207,700	207,700	207,700	302,270	302,270	302,270
	KILOGRAMS	94,240	94,240	94,240	137,460	137,460	137,460

NOTES: (1) SPEC WEIGHT FOR BASELINE CONFIGURATION OF 375 PASSENGERS.
CONSULT WITH AIRLINE FOR SPECIFIC WEIGHTS AND CONFIGURATIONS.

(2) FWD CARGO = 18 LD3'S AT 158 CU FT EACH.
AFT CARGO = 14 LD3'S AT 158 CU FT EACH.
BULK CARGO = 600 CU FT

2.1.2 GENERAL CHARACTERISTICS

MODEL 777-200 (PRATT & WHITNEY ENGINES)

CHARACTERISTICS	UNITS	BASELINE AIRPLANE			HIGH GROSS WEIGHT OPTION		
MAX DESIGN TAXI WEIGHT	POUNDS	508,000	517,000	537,000	582,000	592,000	634,500
	KILOGRAMS	230,450	234,500	243,500	263,640	268,480	287,800
MAX DESIGN TAKEOFF WEIGHT	POUNDS	506,000	515,000	535,000	580,000	590,000	632,500
	KILOGRAMS	229,500	233,600	242,630	263,030	267,500	286,900
MAX DESIGN LANDING WEIGHT	POUNDS	441,000	445,000	445,000	450,000	455,000	455,000
	KILOGRAMS	200,050	201,800	201,800	204,080	206,350	206,350
MAX DESIGN ZERO FUEL WEIGHT	POUNDS	420,000	420,000	420,000	430,000	430,000	430,000
	KILOGRAMS	190,470	190,470	190,470	195,000	195,000	195,000
SPEC OPERATING EMPTY WEIGHT (1)	POUNDS	293,400	293,400	294,050	299,000	299,000	299,000
	KILOGRAMS	133,060	133,060	133,350	135,600	135,600	135,600
MAX STRUCTURAL PAYLOAD	POUNDS	126,600	126,600	125,950	131,000	131,000	131,000
	KILOGRAMS	57,410	57,410	57,120	59,430	59,430	59,430
SEATING CAPACITY (1)	TWO-CLASS	375 - 30 FIRST + 345 ECONOMY					
	THREE-CLASS	305 - 24 FIRST + 54 BUSINESS + 227 ECONOMY					
MAX CARGO - LOWER DECK	CUBIC FEET	5,656 (2)	5,656 (2)	5,656 (2)	5,656 (2)	5,656 (2)	5,656 (2)
	CUBIC METERS	160.3 (2)	160.3 (2)	160.3 (2)	160.3 (2)	160.3 (2)	160.3 (2)
USABLE FUEL	US GALLONS	31,000	31,000	31,000	45,220	45,220	45,220
	LITERS	117,300	117,300	117,300	171,100	171,100	171,100
	POUNDS	207,700	207,700	207,700	302,270	302,270	302,270
	KILOGRAMS	94,240	94,240	94,240	137,460	137,460	137,460

NOTES: (1) SPEC WEIGHT FOR BASELINE CONFIGURATION OF 375 PASSENGERS.
CONSULT WITH AIRLINE FOR SPECIFIC WEIGHTS AND CONFIGURATIONS.

(2) FWD CARGO = 18 LD3'S AT 158 CU FT EACH.
AFT CARGO = 14 LD3'S AT 158 CU FT EACH.
BULK CARGO =600 CU FT

2.1.3 GENERAL CHARACTERISTICS

MODEL 777-200 (ROLLS-ROYCE ENGINES)

CHARACTERISTICS	UNITS	BASELINE AIRPLANE			
MAX DESIGN TAXI WEIGHT	POUNDS	582,000	592,000	634,500	662,000
	KILOGRAMS	263,990	268,530	287,800	300,280
MAX DESIGN TAKEOFF WEIGHT	POUNDS	580,000	590,000	632,500	660,000
	KILOGRAMS	263,080	267,620	286,900	299,370
MAX DESIGN LANDING WEIGHT	POUNDS	524,000	524,000	524,000	524,000
	KILOGRAMS	237,680	237,680	237,680	237,680
MAX DESIGN ZERO FUEL WEIGHT	POUNDS	495,000	495,000	495,000	495,000
	KILOGRAMS	224,530	224,530	224,530	224,530
SPEC OPERATING EMPTY WEIGHT (1)	POUNDS	353,800	353,800	353,800	353,800
	KILOGRAMS	160,530	160,530	160,530	160,530
MAX STRUCTURAL PAYLOAD	POUNDS	141,200	141,200	141,200	141,200
	KILOGRAMS	64,000	64,000	64,000	64,000
SEATING CAPACITY (1)	TWO-CLASS	451 - 40 FIRST + 411 ECONOMY			
	THREE-CLASS	368 - 30 FIRST + 84 BUSINESS + 254 ECONOMY			
MAX CARGO - LOWER DECK	CUBIC FEET	7,552 (2)	7,552 (2)	7,552 (2)	7,552 (2)
	CUBIC METERS	213.9 (2)	213.9 (2)	213.9 (2)	213.9 (2)
USABLE FUEL	US GALLONS	44,700	44,700	44,700	44,700
	LITERS	169,210	169,210	169,210	169,210
	POUNDS	299,490	299,490	299,490	299,490
	KILOGRAMS	135,880	135,880	135,880	135,880

NOTES: (1) SPEC WEIGHT FOR BASELINE CONFIGURATION OF 451 PASSENGERS.
CONSULT WITH AIRLINE FOR SPECIFIC WEIGHTS AND CONFIGURATIONS.

(2) FWD CARGO = 24 LD3'S AT 158 CU FT EACH.
AFT CARGO = 20 LD3'S AT 158 CU FT EACH.
BULK CARGO = 600 CU FT

2.1.4 GENERAL CHARACTERISTICS
MODEL 777-300 (GENERAL ELECTRIC ENGINES)

CHARACTERISTICS	UNITS	BASELINE AIRPLANE			
MAX DESIGN TAXI WEIGHT	POUNDS	582,000	592,000	634,500	662,000
	KILOGRAMS	263,990	268,530	287,800	300,280
MAX DESIGN TAKEOFF WEIGHT	POUNDS	580,000	590,000	632,500	660,000
	KILOGRAMS	263,080	267,620	286,900	299,370
MAX DESIGN LANDING WEIGHT	POUNDS	524,000	524,000	524,000	524,000
	KILOGRAMS	237,680	237,680	237,680	237,680
MAX DESIGN ZERO FUEL WEIGHT	POUNDS	495,000	495,000	495,000	495,000
	KILOGRAMS	224,530	224,530	224,530	224,530
SPEC OPERATING EMPTY WEIGHT (1)	POUNDS	351,700	351,700	351,700	351,700
	KILOGRAMS	159,570	159,570	159,570	159,570
MAX STRUCTURAL PAYLOAD	POUNDS	143,300	143,300	143,300	143,300
	KILOGRAMS	64,960	64,960	64,960	64,960
SEATING CAPACITY (1)	TWO-CLASS	451 - 40 FIRST + 411 ECONOMY			
	THREE-CLASS	368 - 30 FIRST + 84 BUSINESS + 254 ECONOMY			
MAX CARGO - LOWER DECK	CUBIC FEET	7,552 (2)	7,552 (2)	7,552 (2)	7,552 (2)
	CUBIC METERS	213.9 (2)	213.9 (2)	213.9 (2)	213.9 (2)
USABLE FUEL	US GALLONS	44,700	44,700	44,700	44,700
	LITERS	169,210	169,210	169,210	169,210
	POUNDS	299,490	299,490	299,490	299,490
	KILOGRAMS	135,880	135,880	135,880	135,880

NOTES: (1) SPEC WEIGHT FOR BASELINE CONFIGURATION OF 451 PASSENGERS.
CONSULT WITH AIRLINE FOR SPECIFIC WEIGHTS AND CONFIGURATIONS.

(2) FWD CARGO = 24 LD3'S AT 158 CU FT EACH.
AFT CARGO = 20 LD3'S AT 158 CU FT EACH.
BULK CARGO = 600 CU FT

2.1.5 GENERAL CHARACTERISTICS

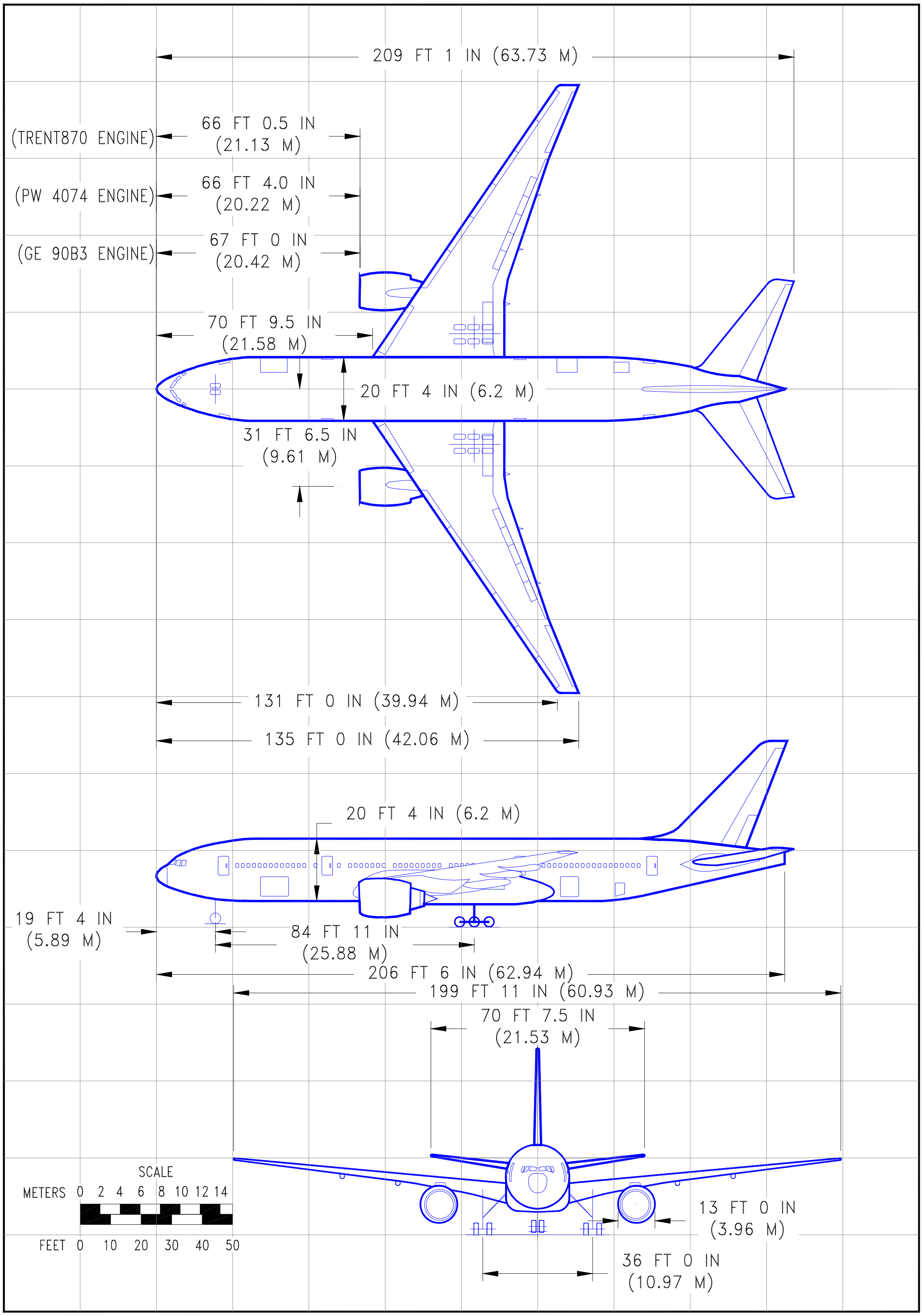
MODEL 777-300 (PRATT & WHITNEY ENGINES)

CHARACTERISTICS	UNITS	BASELINE AIRPLANE			
MAX DESIGN TAXI WEIGHT	POUNDS	582,000	592,000	634,500	662,000
	KILOGRAMS	263,990	268,530	287,800	300,280
MAX DESIGN TAKEOFF WEIGHT	POUNDS	580,000	590,000	632,500	660,000
	KILOGRAMS	263,080	267,620	286,900	299,370
MAX DESIGN LANDING WEIGHT	POUNDS	524,000	524,000	524,000	524,000
	KILOGRAMS	237,680	237,680	237,680	237,680
MAX DESIGN ZERO FUEL WEIGHT	POUNDS	495,000	495,000	495,000	495,000
	KILOGRAMS	224,530	224,530	224,530	224,530
SPEC OPERATING EMPTY WEIGHT (1)	POUNDS	347,800	347,800	347,800	347,800
	KILOGRAMS	157,800	157,800	157,800	157,800
MAX STRUCTURAL PAYLOAD	POUNDS	147,200	147,200	147,200	147,200
	KILOGRAMS	66,730	66,730	66,730	66,730
SEATING CAPACITY (1)	TWO-CLASS	451 - 40 FIRST + 411 ECONOMY			
	THREE-CLASS	368 - 30 FIRST + 84 BUSINESS + 254 ECONOMY			
MAX CARGO - LOWER DECK	CUBIC FEET	7,552 (2)	7,552 (2)	7,552 (2)	7,552 (2)
	CUBIC METERS	213.9 (2)	213.9 (2)	213.9 (2)	213.9 (2)
USABLE FUEL	US GALLONS	44,700	44,700	44,700	44,700
	LITERS	169,210	169,210	169,210	169,210
	POUNDS	299,490	299,490	299,490	299,490
	KILOGRAMS	135,880	135,880	135,880	135,880

NOTES: (1) SPEC WEIGHT FOR BASELINE CONFIGURATION OF 451 PASSENGERS.
CONSULT WITH AIRLINE FOR SPECIFIC WEIGHTS AND CONFIGURATIONS.

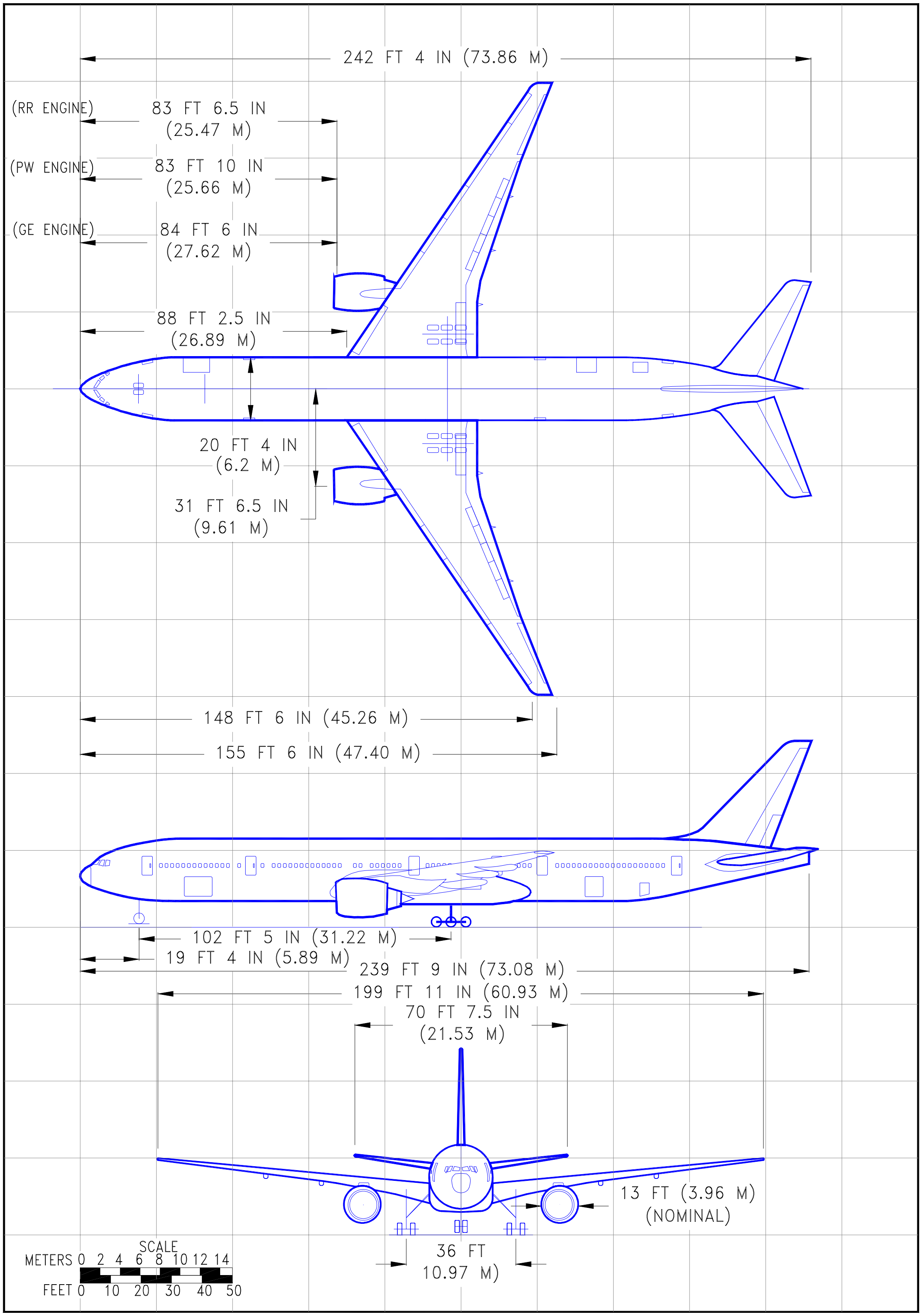
(2) FWD CARGO = 24 LD3'S AT 158 CU FT EACH.
AFT CARGO = 20 LD3'S AT 158 CU FT EACH.
BULK CARGO = 600 CU FT

2.1.6 GENERAL CHARACTERISTICS
MODEL 777-300 (ROLLS-ROYCE ENGINES)



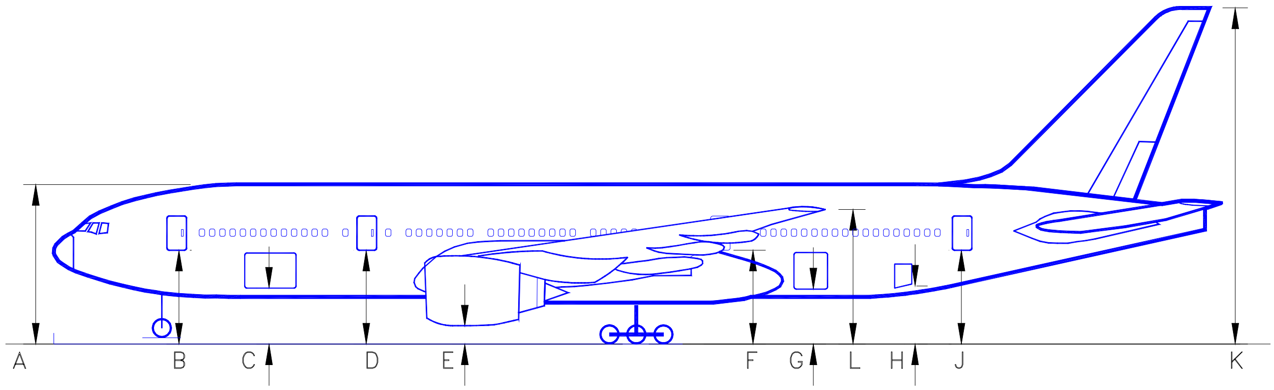
2.2.1 GENERAL DIMENSIONS

MODEL 777-200



2.2.2 GENERAL DIMENSIONS

MODEL 777-300



	MINIMUM*		MAXIMUM*	
	FEET - INCHES	METERS	FEET - INCHES	METERS
A	27 -6	8.39	28 - 6	8.68
B	15 - 5	4.71	16 - 5	5.00
C	9 - 3	2.81	10 - 0	3.05
D	16 - 0	4.88	16 - 7	5.07
E (PW)	3 - 2	0.96	3 - 5	1.04
E (GE)	2 - 10	0.85	3 - 1	0.93
E (RR)	3 - 7	1.09	3 - 10	1.17
F	16 - 10	5.14	17 - 4	5.28
G(LARGE DOOR)	10 - 7	3.23	11 - 2	3.41
G(SMALL DOOR)	10 - 6	3.22	11 - 2	3.40
H	10 - 7	3.23	11 - 5	3.48
J	17 - 4	5.28	18 - 2	5.54
K	60 - 5	18.42	61 - 6	18.76
L	23 - 6	7.16	24 - 6	7.49

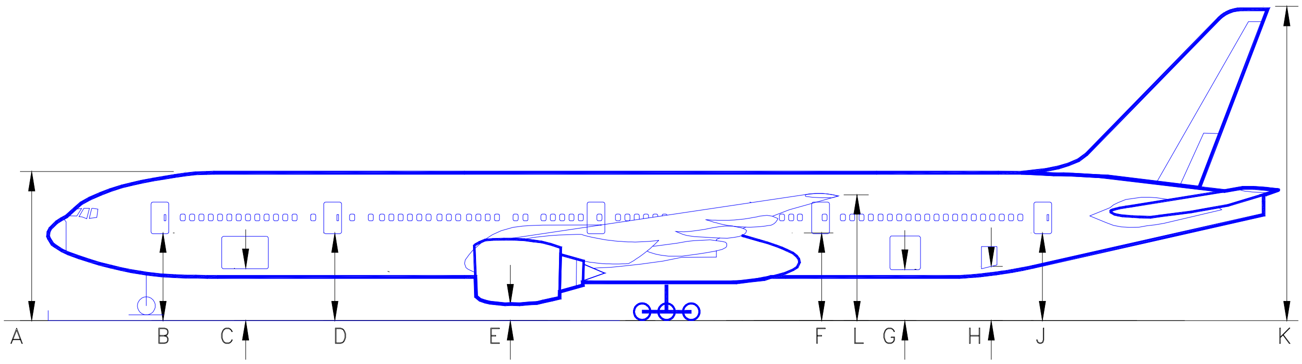
NOTES: VERTICAL CLEARANCES SHOWN OCCUR DURING MAXIMUM VARIATIONS OF AIRPLANE ATTITUDE. COMBINATIONS OF AIRPLANE LOADING AND UNLOADING ACTIVITIES THAT PRODUCE THE GREATEST POSSIBLE VARIATIONS IN ATTITUDE WERE USED TO ESTABLISH THE VARIATIONS SHOWN.

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

* NOMINAL DIMENSIONS

2.3.1 GROUND CLEARANCES

MODEL 777-200.



	MINIMUM*		MAXIMUM*	
	FEET - INCHES	METERS	FEET - INCHES	METERS
A	27 -6	8.39	28 - 6	8.68
B	15 - 5	4.71	16 - 5	5.00
C	9 - 3	2.81	10 - 0	3.05
D	16 - 0	4.88	16 - 7	5.07
E (PW)	3 - 2	0.96	3 - 5	1.04
E (GE)	2 - 10	0.85	3 - 1	0.93
E (RR)	3 - 7	1.09	3 - 10	1.17
F	16 - 10	5.14	17 - 4	5.28
G(LARGE DOOR)	10 - 7	3.23	11 - 2	3.41
G(SMALL DOOR)	10 - 6	3.22	11 - 2	3.40
H	10 - 7	3.23	11 - 5	3.48
J	17 - 4	5.28	18 - 2	5.54
K	60 - 5	18.42	61 - 6	18.76
L	23 - 6	7.16	24 - 6	7.49

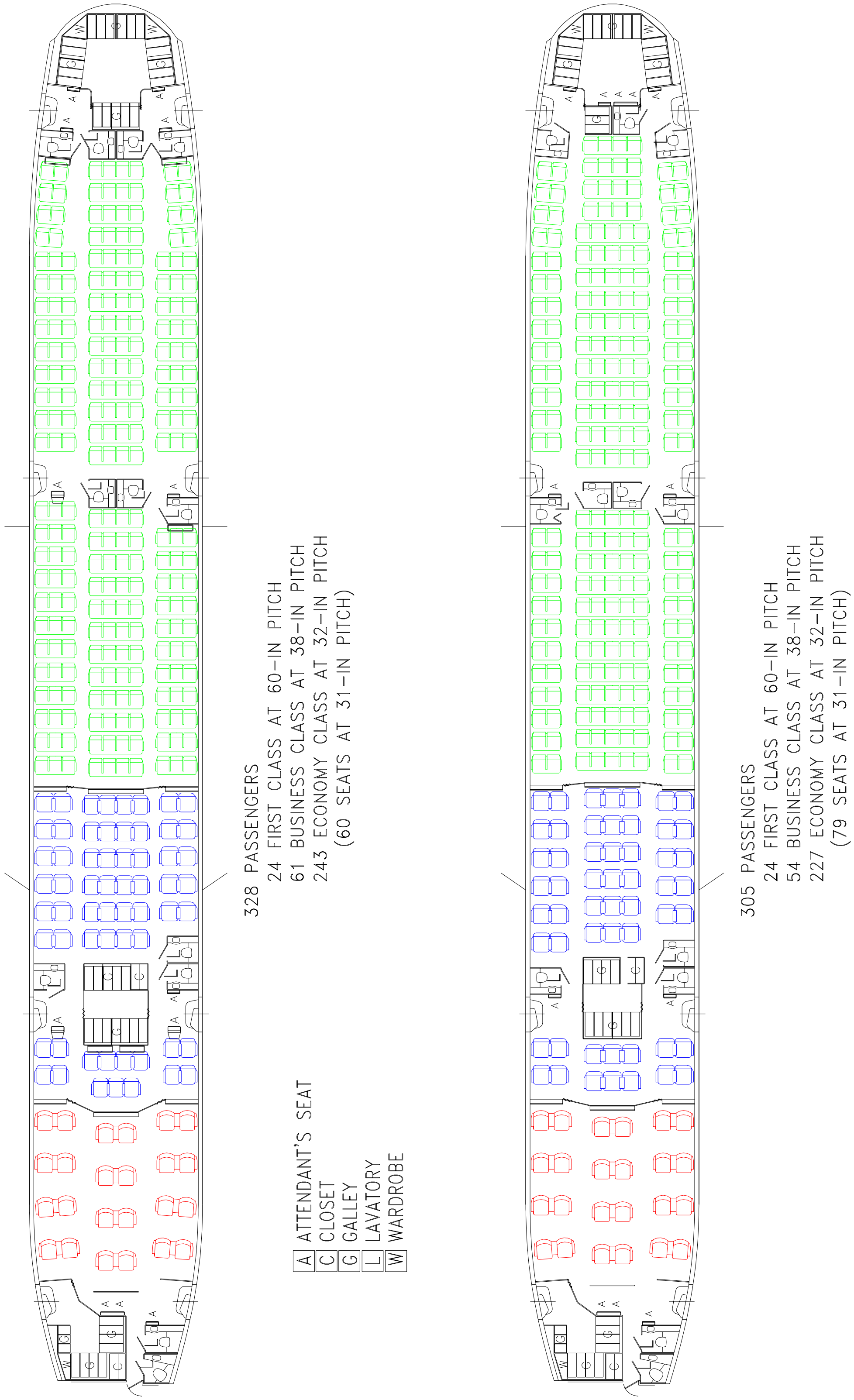
NOTES: VERTICAL CLEARANCES SHOWN OCCUR DURING MAXIMUM VARIATIONS OF AIRPLANE ATTITUDE. COMBINATIONS OF AIRPLANE LOADING AND UNLOADING ACTIVITIES THAT PRODUCE THE GREATEST POSSIBLE VARIATIONS IN ATTITUDE WERE USED TO ESTABLISH THE VARIATIONS SHOWN.

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

* NOMINAL DIMENSIONS

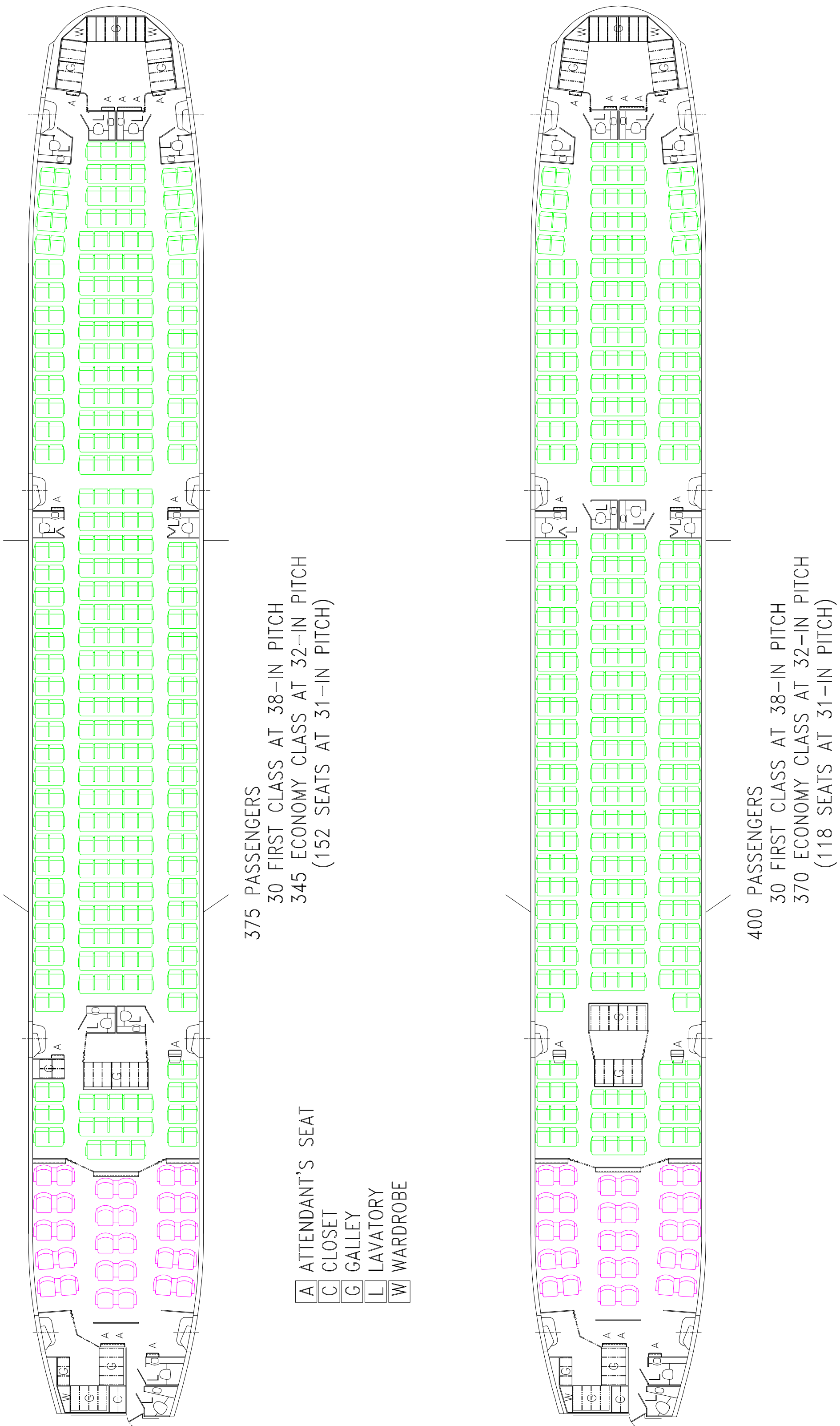
2.3.2 GROUND CLEARANCES

MODEL 777-300.



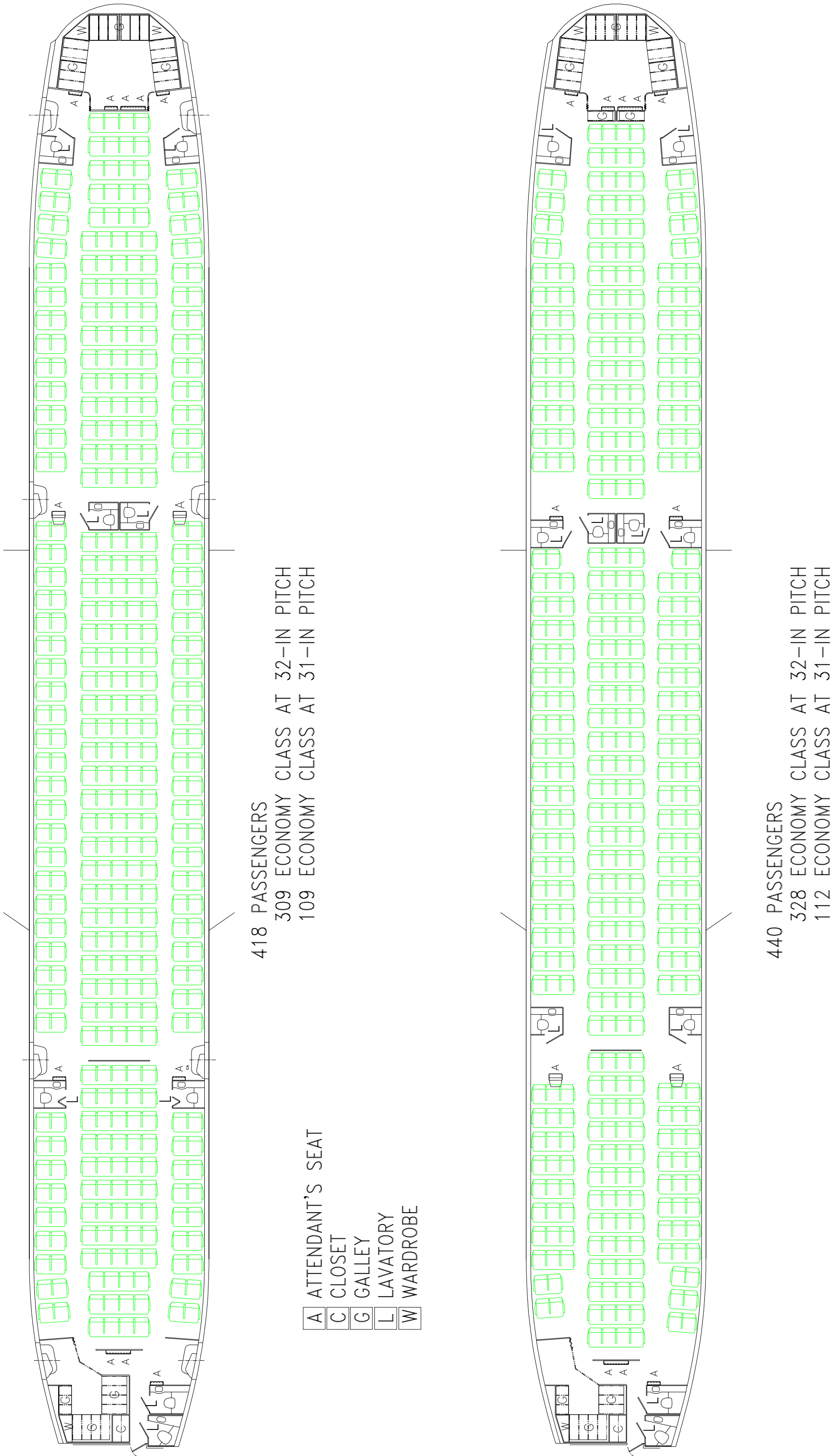
2.4.1 INTERIOR ARRANGEMENTS - TRI-CLASS CONFIGURATION

MODEL 777-200



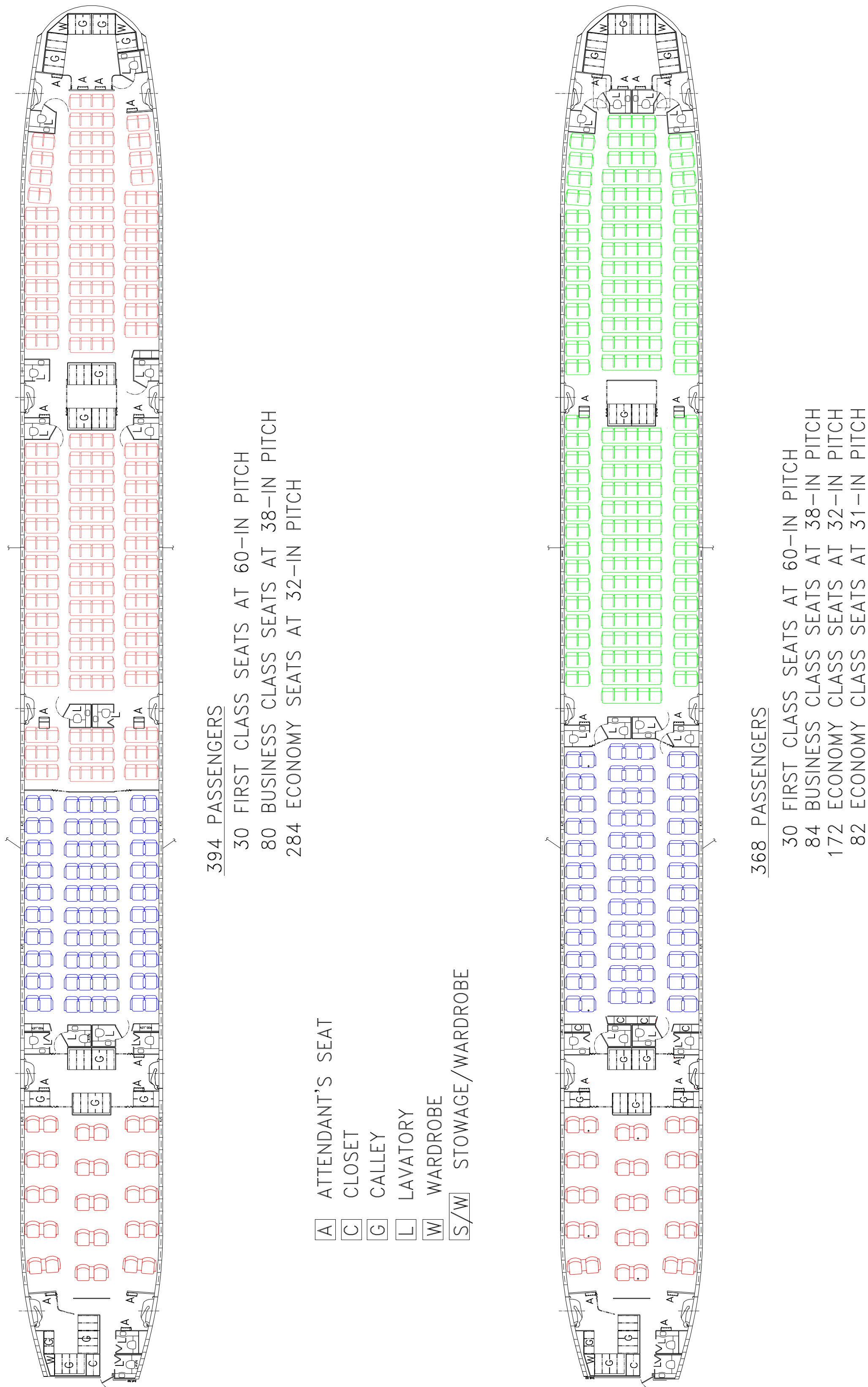
2.4.2 INTERIOR ARRANGEMENTS - TWO-CLASS CONFIGURATION

MODEL 777-200



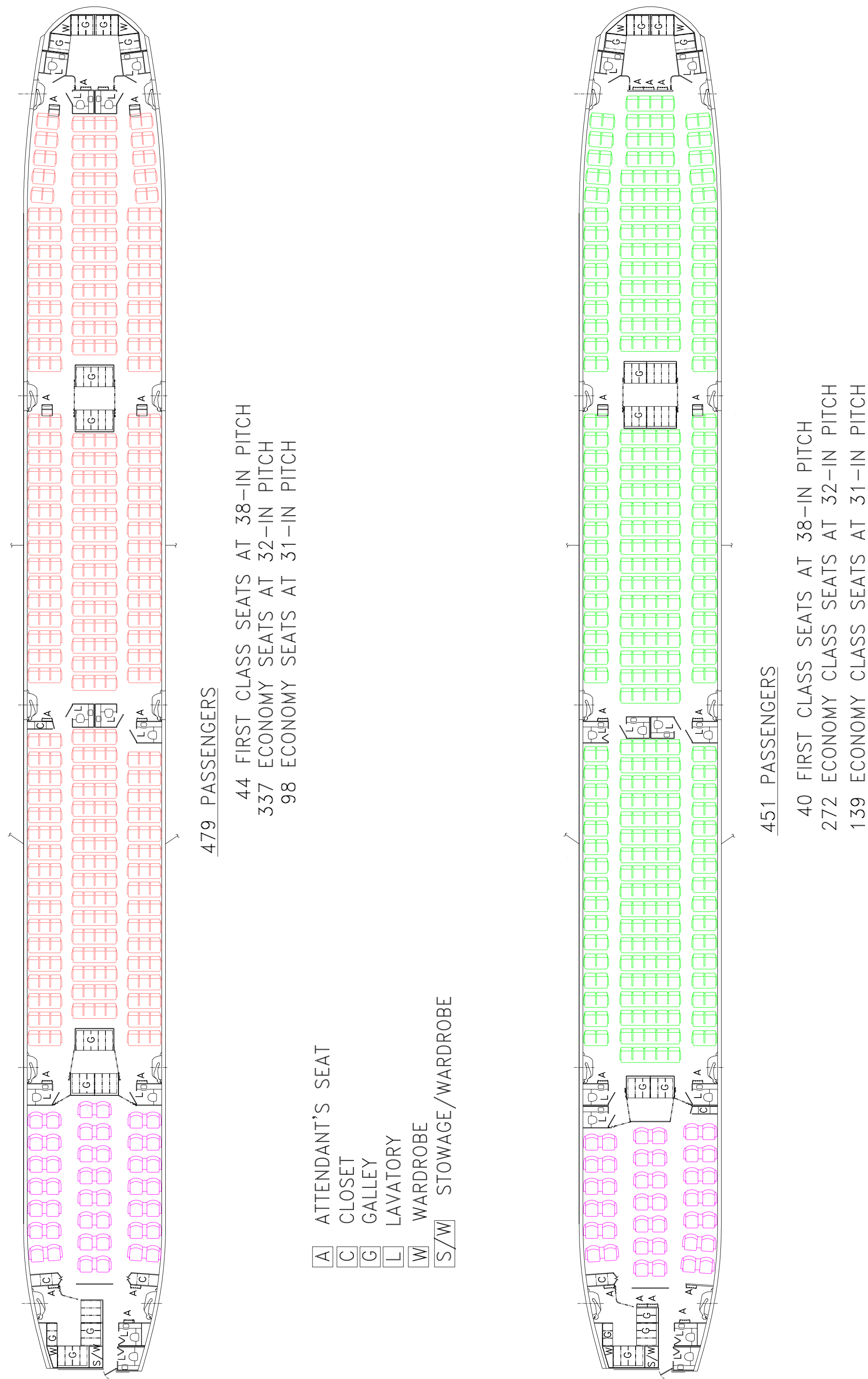
2.4.3 INTERIOR ARRANGEMENTS - ALL-ECONOMY CONFIGURATION

MODEL 777-200



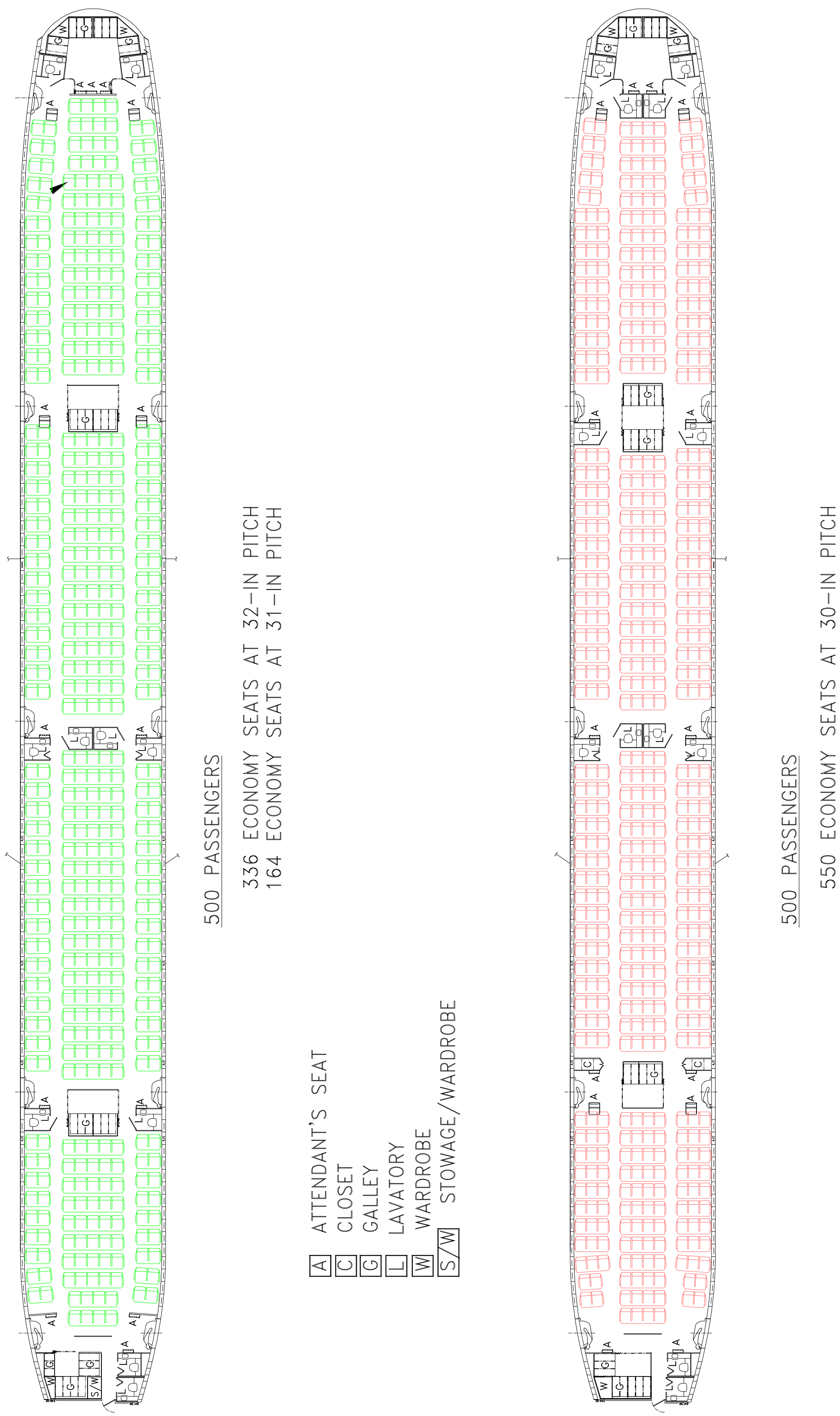
2.4.4 INTERIOR ARRANGEMENTS - TRI-CLASS CONFIGURATION

MODEL 777-300



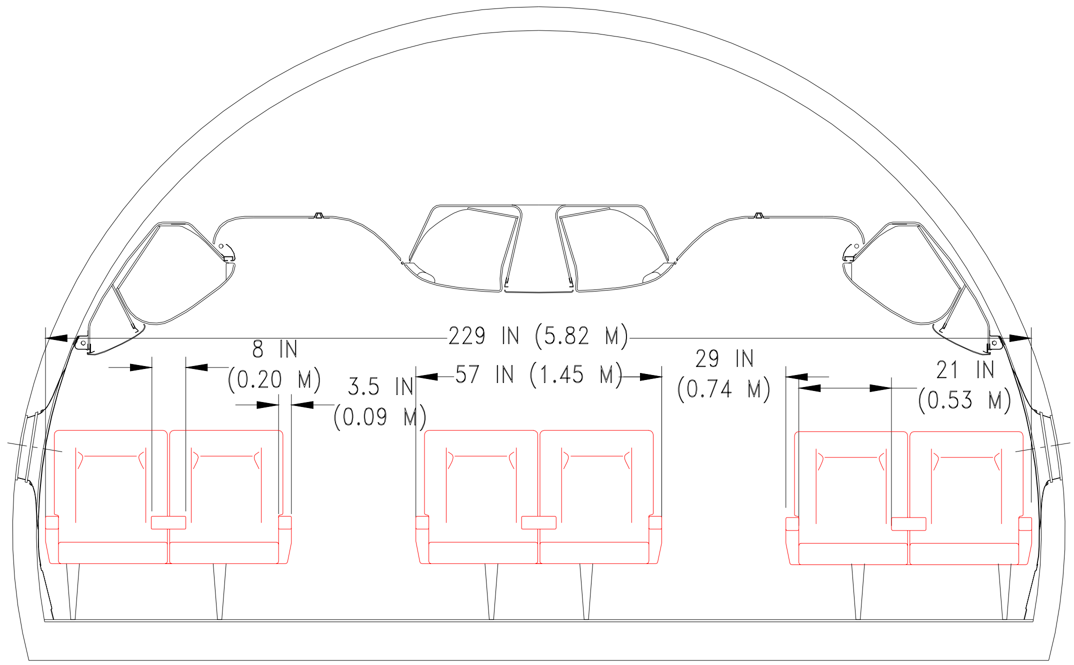
2.4.5 INTERIOR ARRANGEMENTS - TWO-CLASS CONFIGURATION

MODEL 777-300

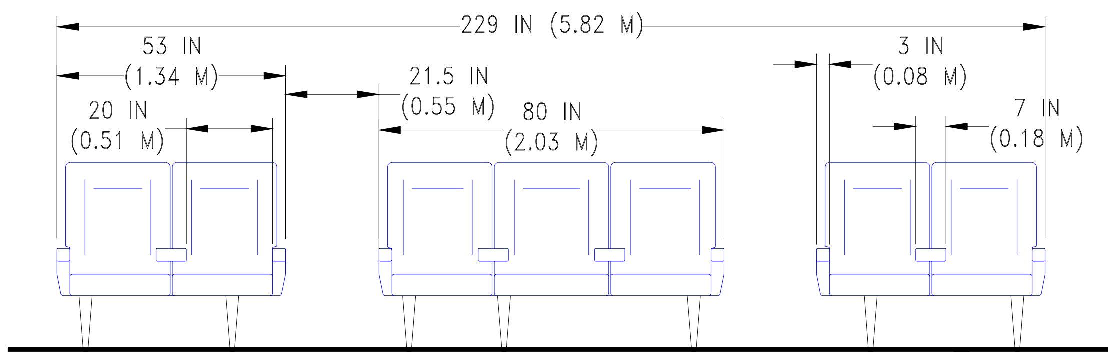


2.4.6 INTERIOR ARRANGEMENTS - ALL-ECONOMY CONFIGURATION

MODEL 777-300



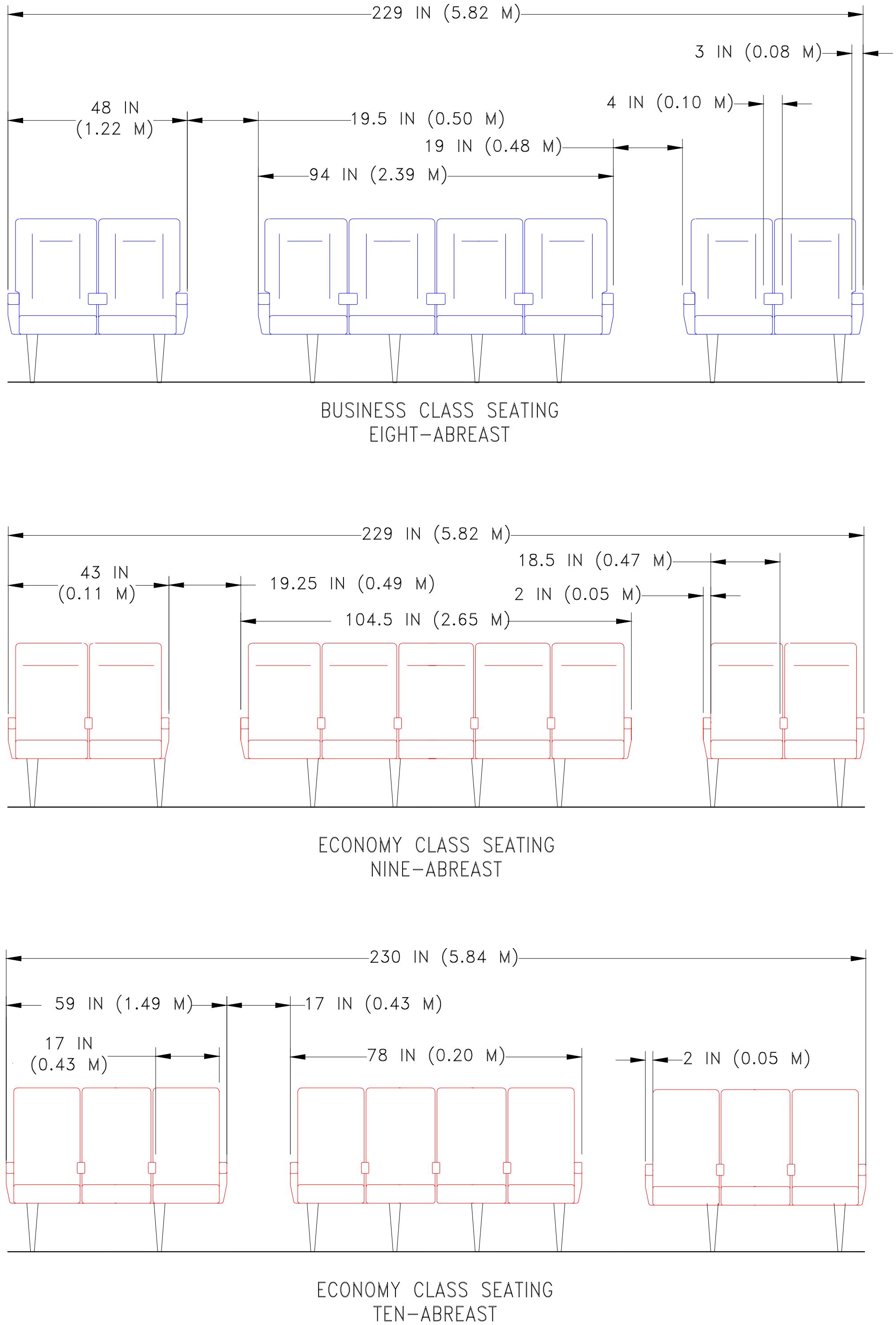
FIRST CLASS SEATING
SIX ABREAST



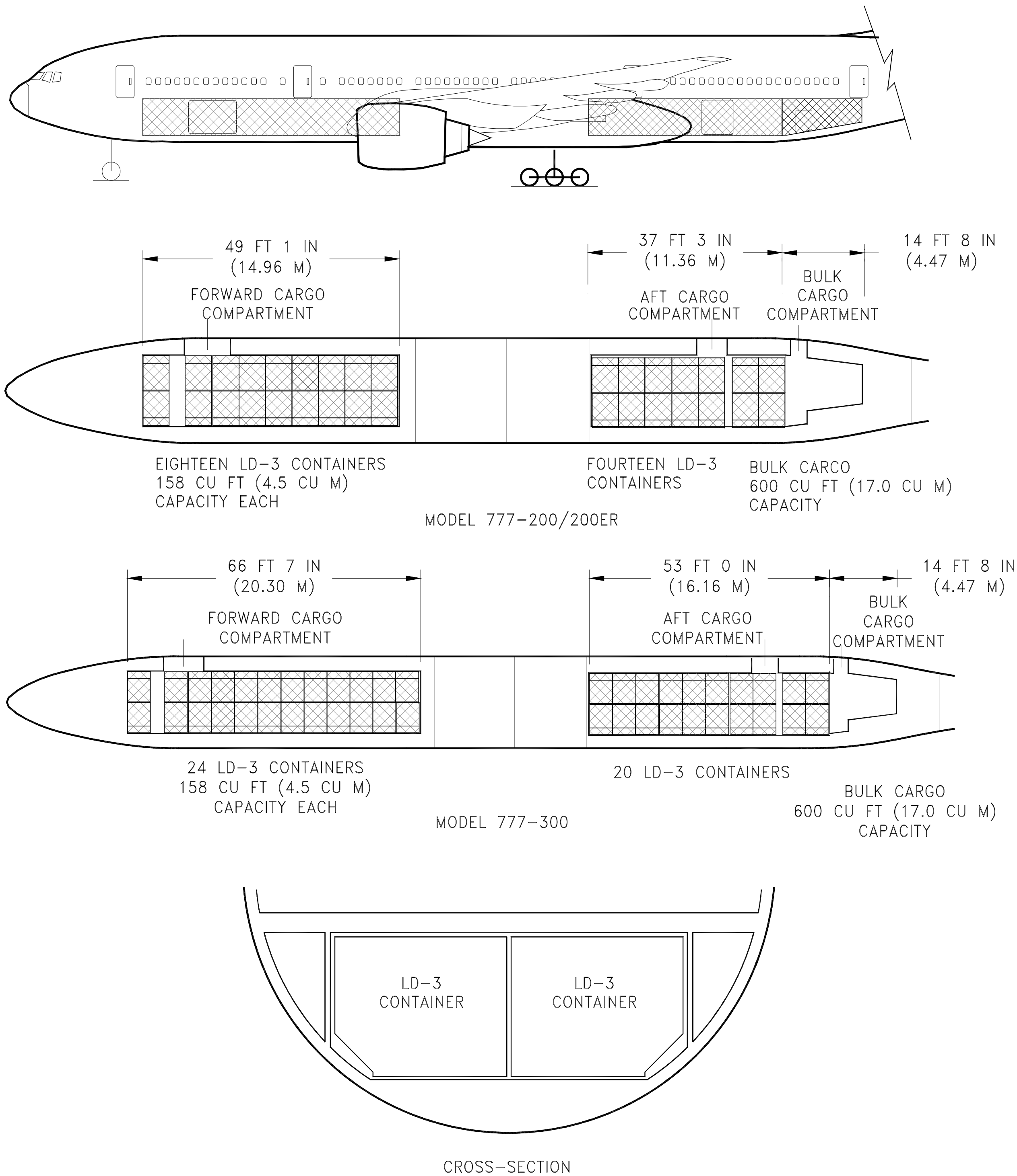
BUSINESS CLASS SEATING
SEVEN–ABREAST

2.5.1 CABIN CROSS-SECTIONS - FIRST AND BUSINESS CLASS SEATS

MODEL 777-200, -300

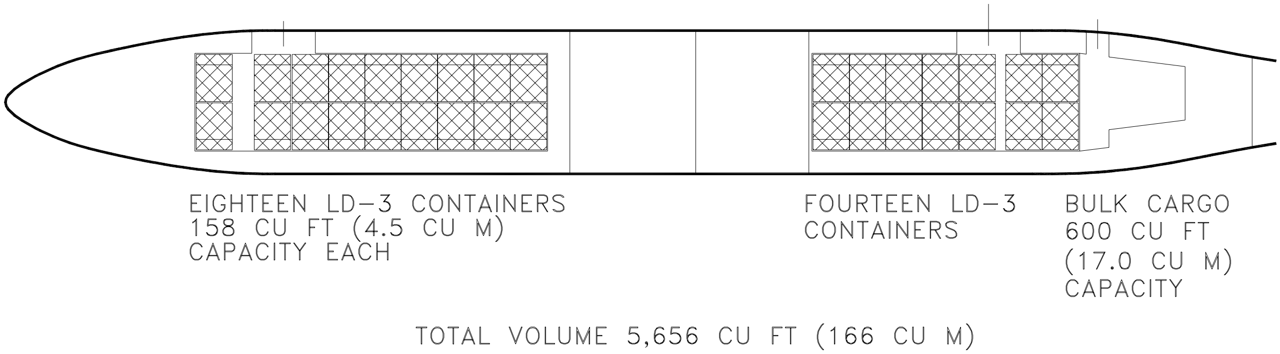


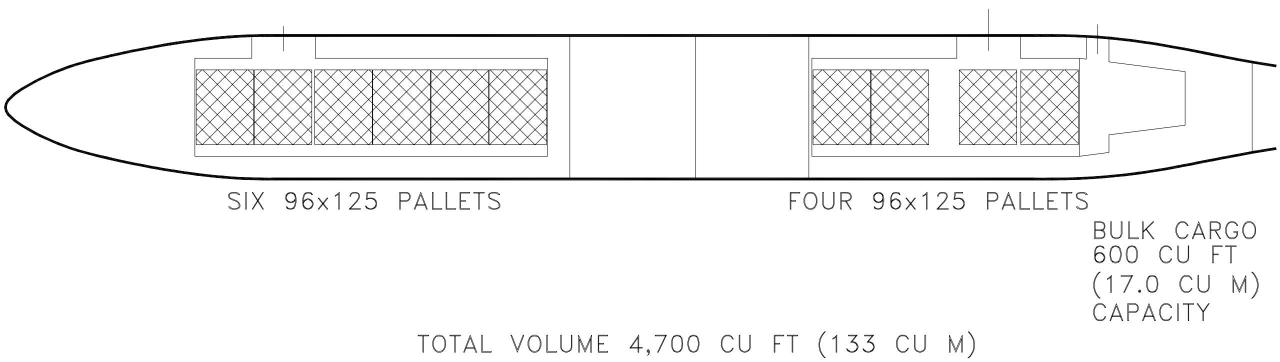
2.5.2 CABIN CROSS-SECTIONS - BUSINESS AND ECONOMY CLASS SEATS
MODEL 777-200, -300

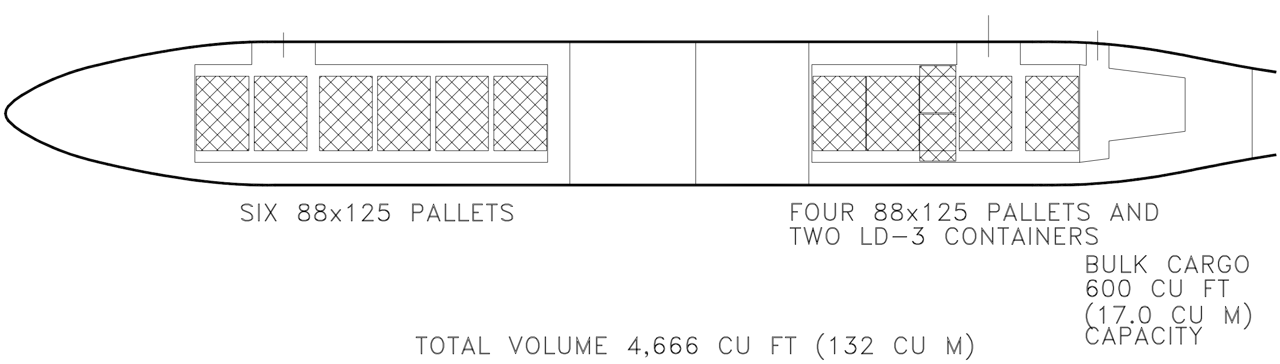


2.6.1 LOWER CARGO COMPARTMENTS - CONTAINERS AND BULK CARGO

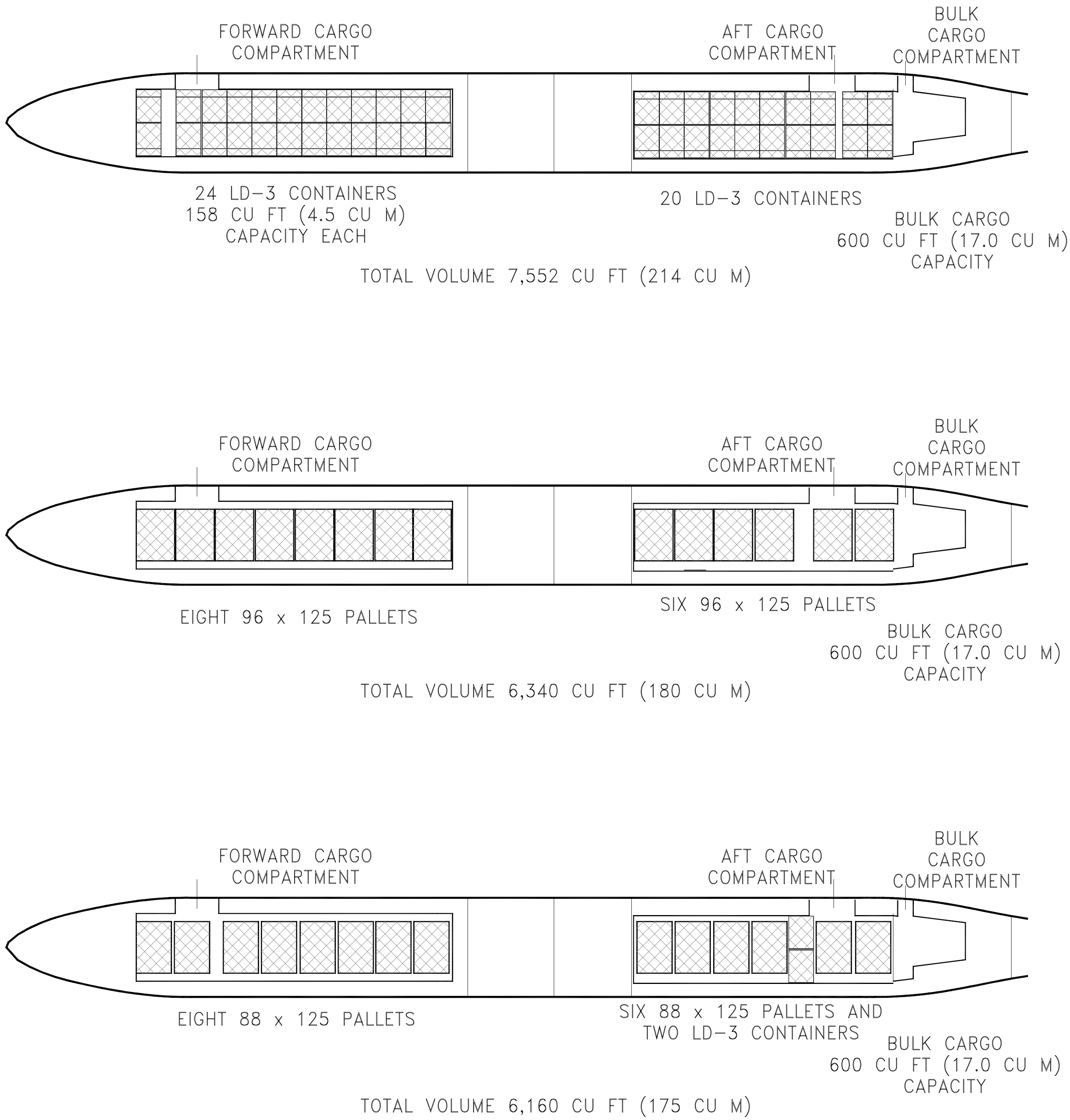
MODEL 777-200, -300



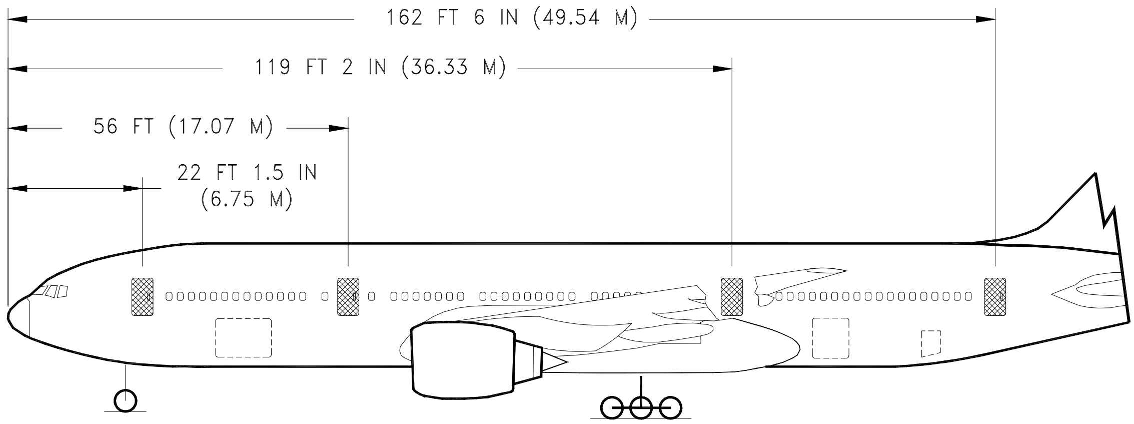




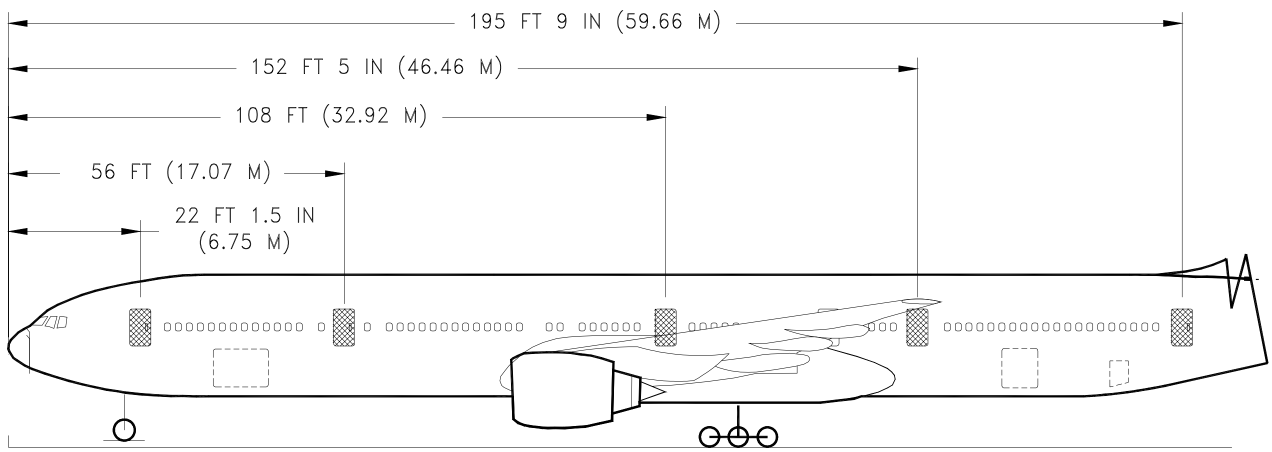
2.6.2 LOWER CARGO COMPARTMENTS - OPTIONAL AFT LARGE CARGO DOOR
MODEL 777-200



2.6.3 LOWER CARGO COMPARTMENTS - OPTIONAL AFT LARGE CARGO DOOR
MODEL 777-300



MODEL 777-200/200ER



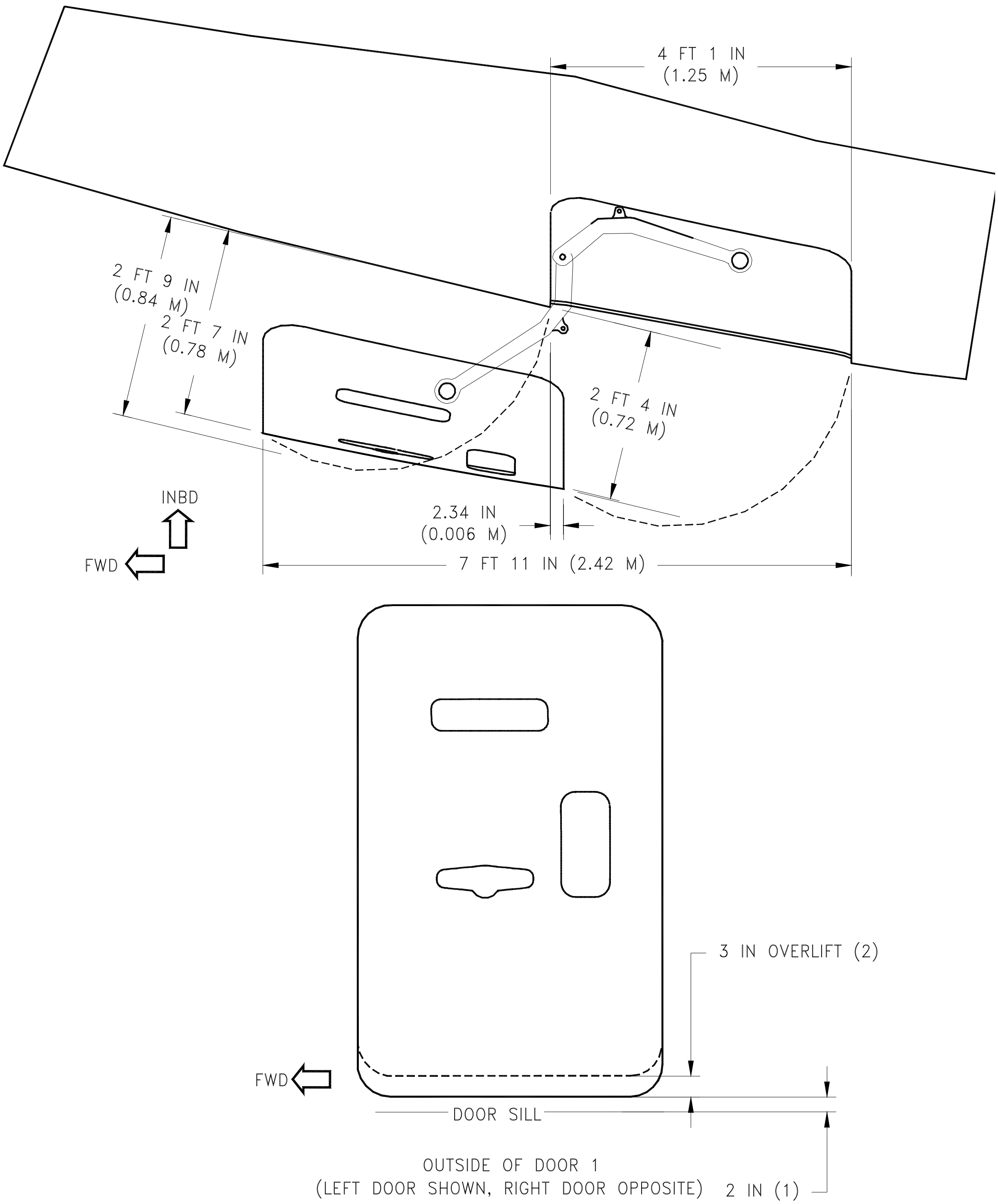
MODEL 777-300

NOTES:

1. MODEL 777-200/200ER – EIGHT PASSENGER DOORS, 4 ON EACH SIDE
   DOOR OPENING SIZE = 42 BY 74 IN (1.07 BY 1.88 M)
   DOOR SIZE = 42 BY 74 IN (1.07 BY 1.88 M)
2. MODEL 777-300 – TEN PASSENGER DOORS, 5 ON EACH SIDE
   DOOR OPENING AND SIZE SAME AS IN 777-200/200ER
3. DOORS ARE TRANSLATING TYPE A DOORS.
4. SEE SECTION 2.3 FOR DOOR SILL HEIGHTS

2.7.1 DOOR CLEARANCES - MAIN ENTRY DOOR LOCATIONS

MODEL 777-200, -300



OUTSIDE OF DOOR 1
(LEFT DOOR SHOWN, RIGHT DOOR OPPOSITE)

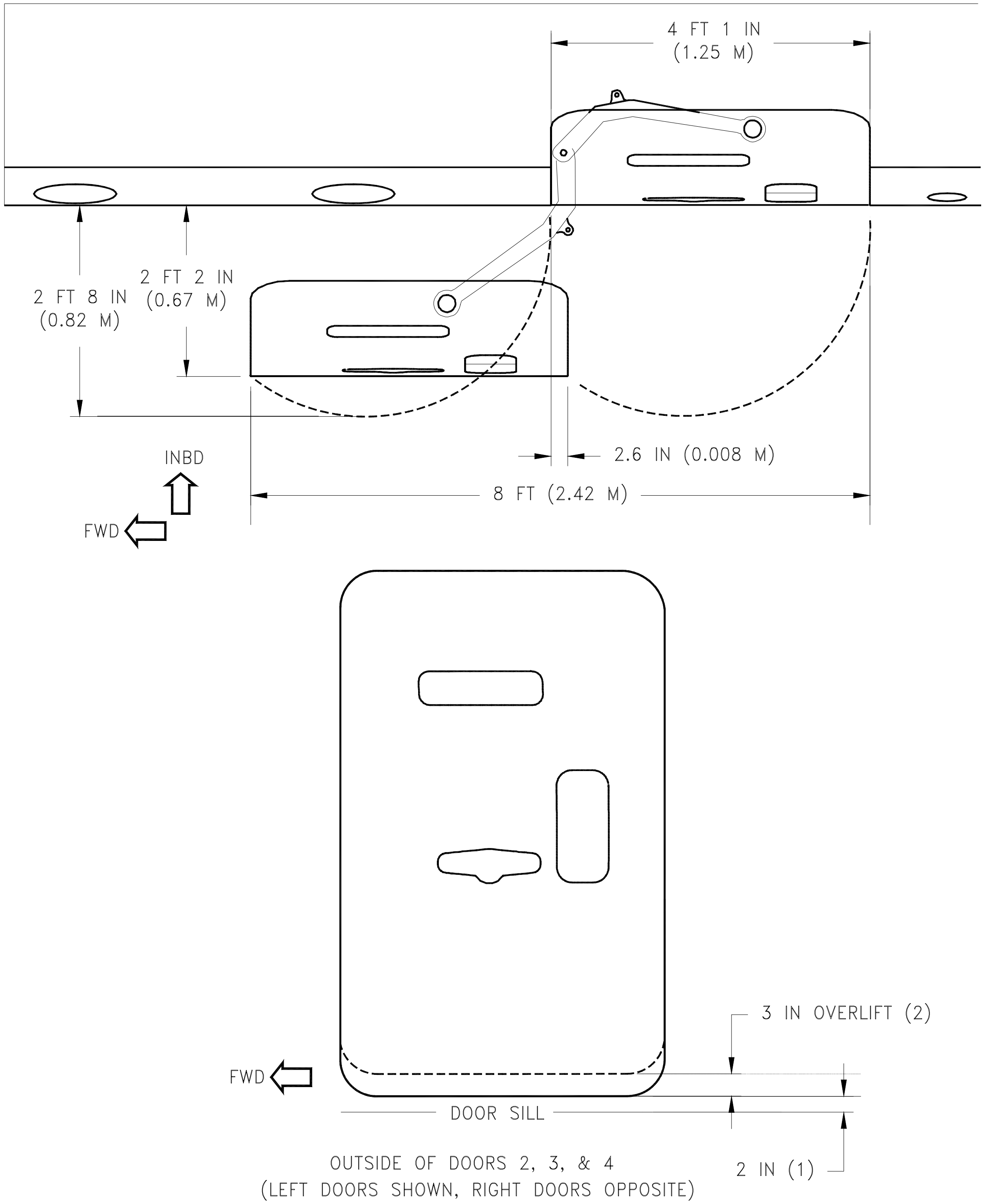
NOTES:

(1) DOOR MOVES UPWARD 2 IN. AND INWARD 0.4 IN. TO CLEAR STOPS BEFORE OPENING OUTWARD

(2) DOOR CAPABLE OF MOVING AN ADDITIONAL 3 IN VERTICALLY (OVERLIFT) TO PRECLUDE DAMAGE FROM CONTACT WITH LOADING BRIDGE

2.7.2 DOOR CLEARANCES - MAIN ENTRY DOOR NO 1

MODEL 777-200, -300



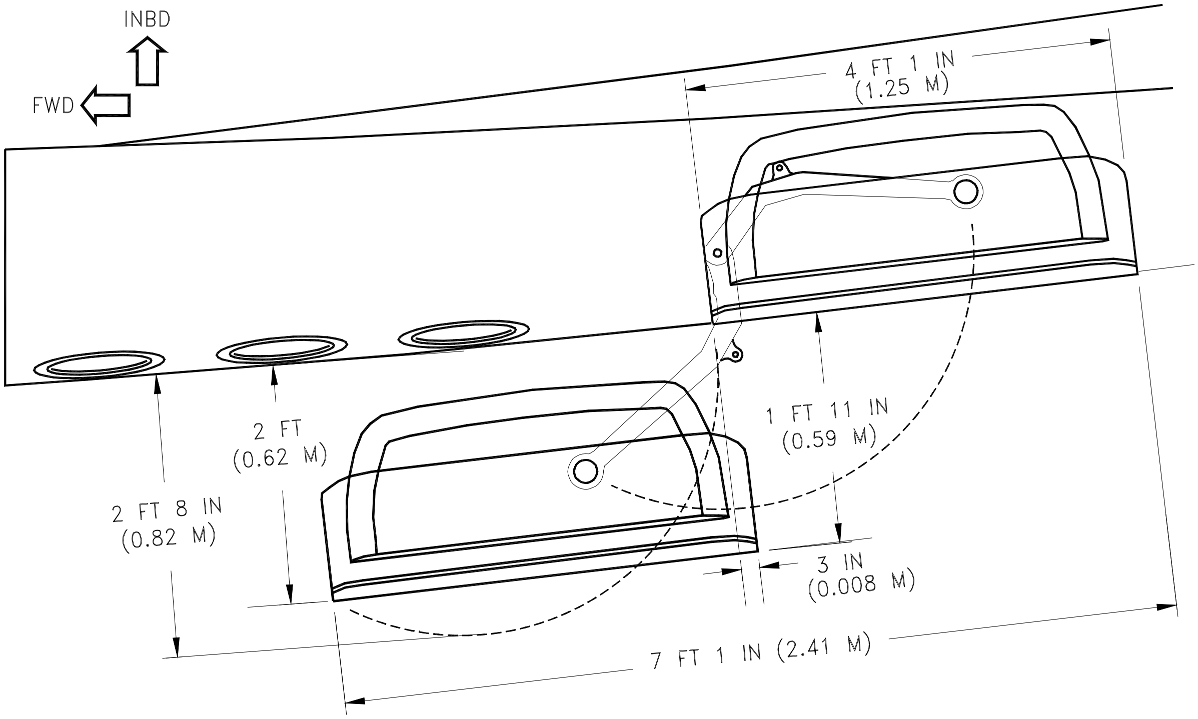
NOTES:

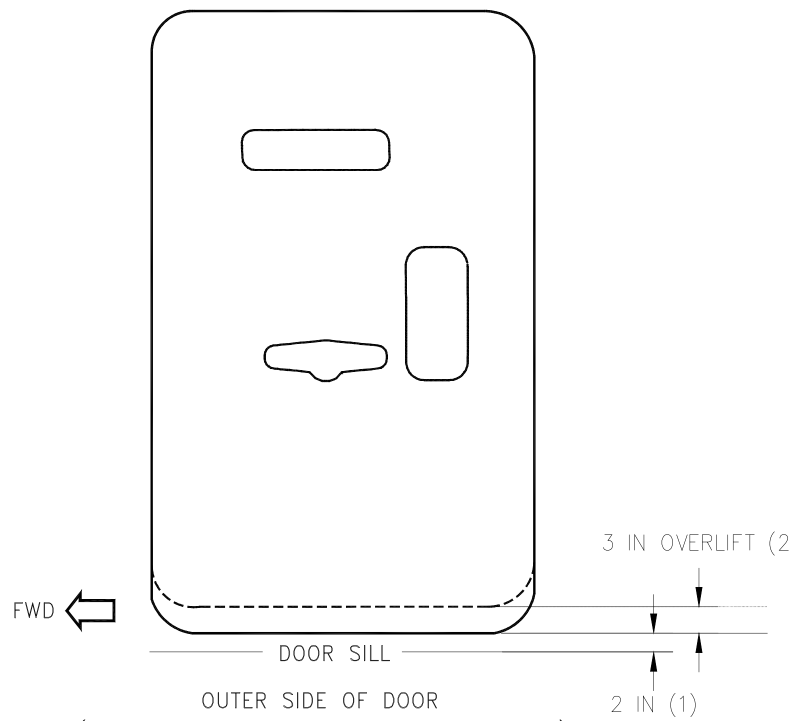
(1) DOOR MOVES UPWARD 2 IN. AND INWARD 0.4 IN TO CLEAR STOPS BEFORE OPENING OUTWARD

(2) DOOR CAPABLE OF MOVING AN ADDITIONAL 3 IN VERTICALLY (OVERLIFT) TO PRECLUDE DAMAGE FROM CONTACT WITH LOADING BRIDGE

2.7.3 DOOR CLEARANCES - MAIN ENTRY DOOR NO 2 , NO 3, AND NO 4

MODEL 777-200, -300





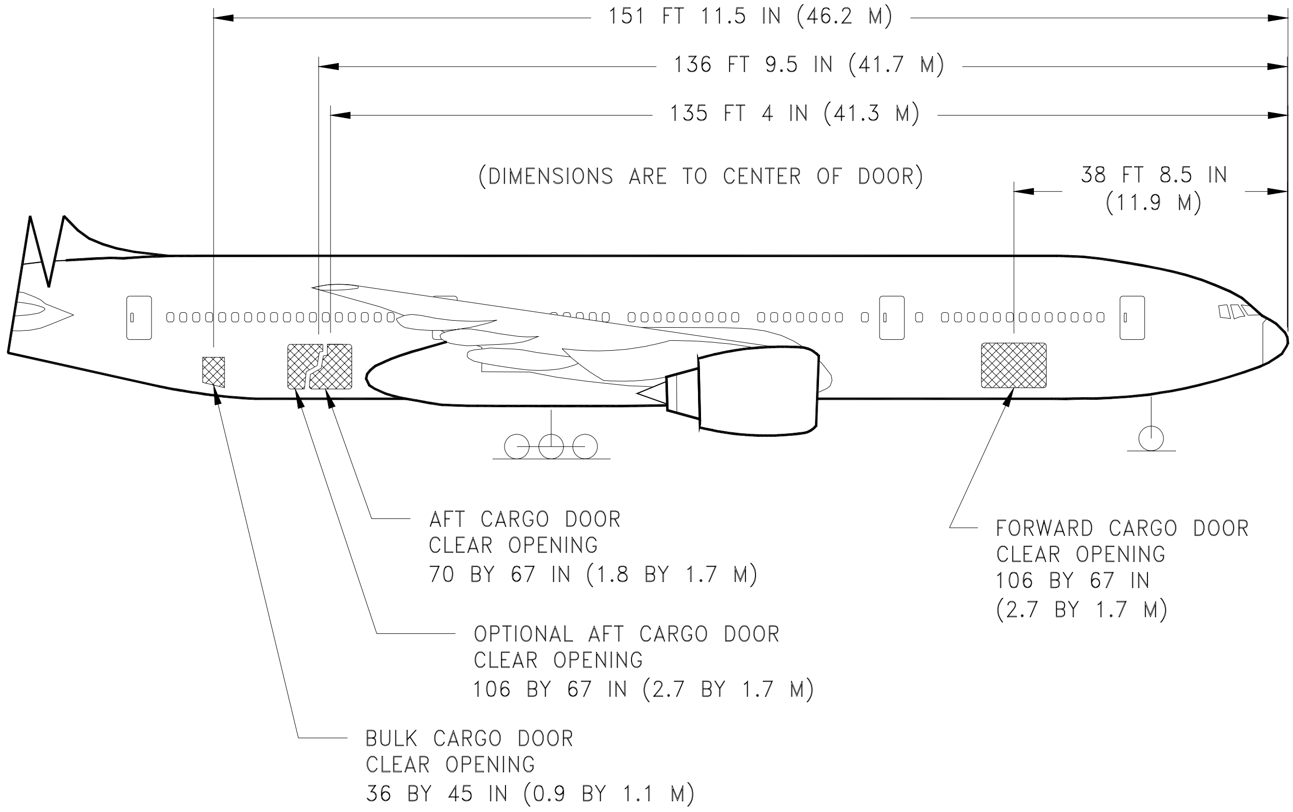
OUTER SIDE OF DOOR
(LEFT DOOR SHOWN, RIGHT DOOR OPPOSITE)

NOTES:

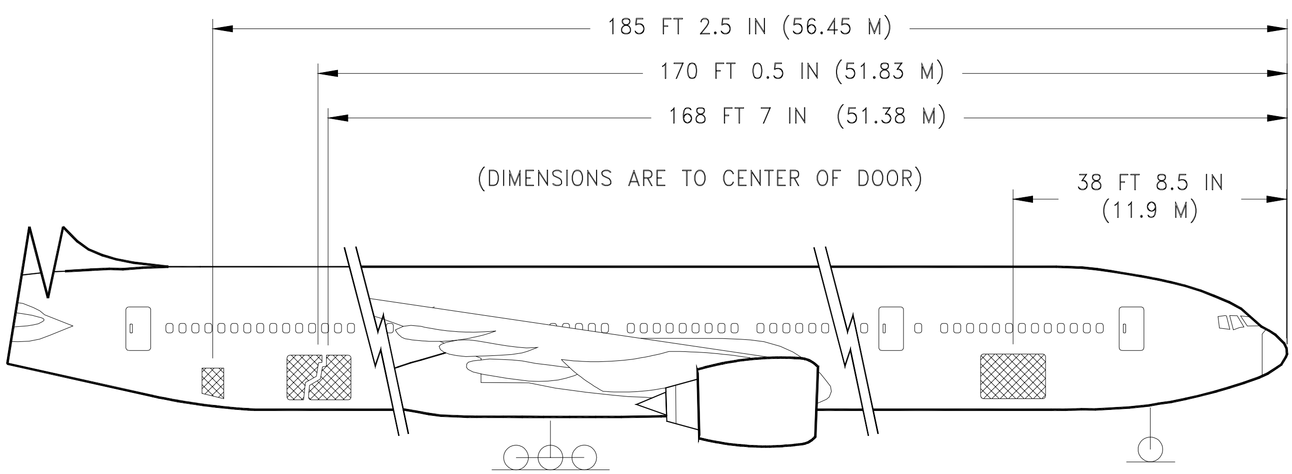
(1) DOOR MOVES UPWARD 2 IN. AND INWARD 0.4 IN. TO CLEAR STOPS BEFORE OPENING OUTWARD
(2) DOOR CAPABLE OF MOVING AN ADDITIONAL 3 IN VERTICALLY (OVERLIFT) TO PRECLUDE DAMAGE FROM CONTACT WITH LOADING BRIDGE
(3) DOOR NO 4 ON 777-200/200ER, DOOR NO 5 ON 777-300

2.7.4 DOOR CLEARANCES - MAIN ENTRY DOOR NO 4 OR NO 5

MODEL 777-200, -300



MODEL 777-200/-200ER'''

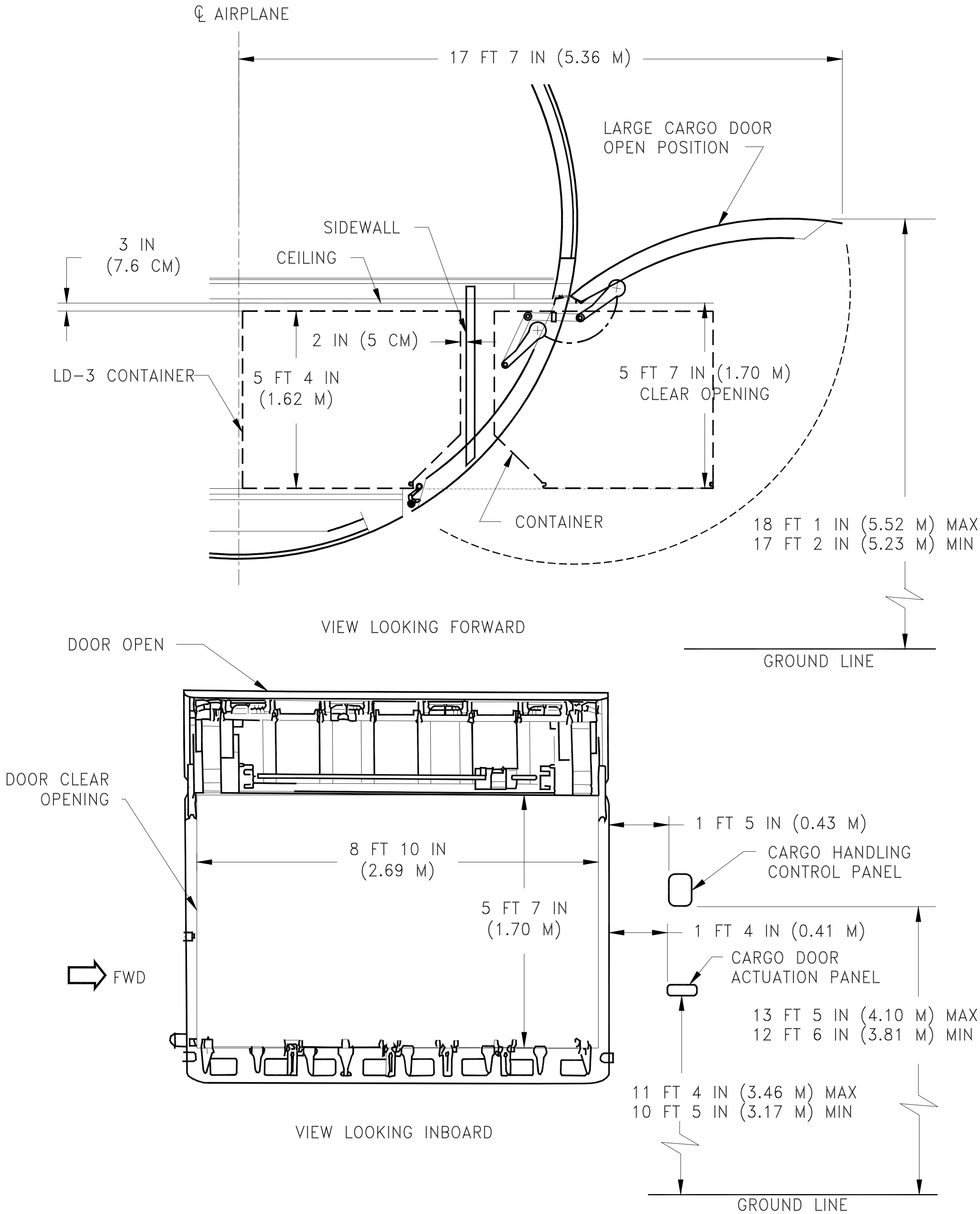


MODEL 777-300

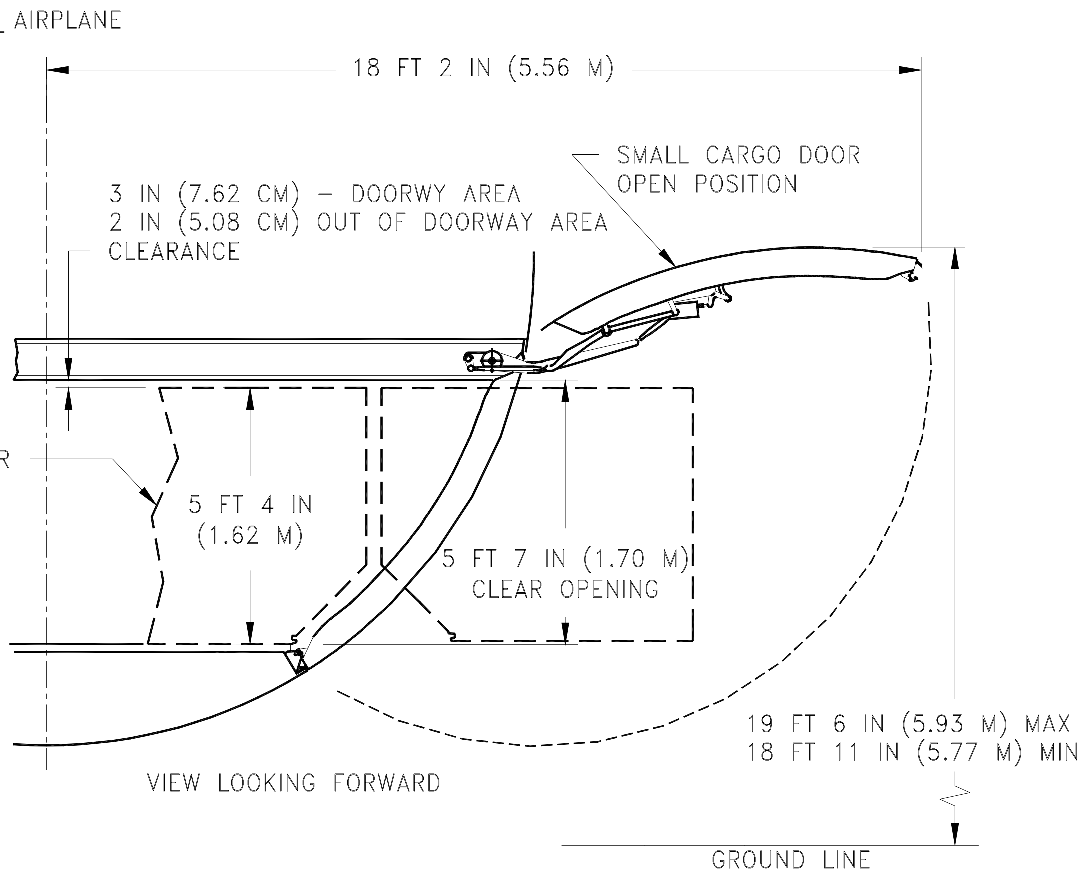
(NOTE: DOOR DIMENSIONS SAME AS FOR 777-200/200ER)

2.7.5 DOOR CLEARANCES - CARGO DOOR LOCATIONS

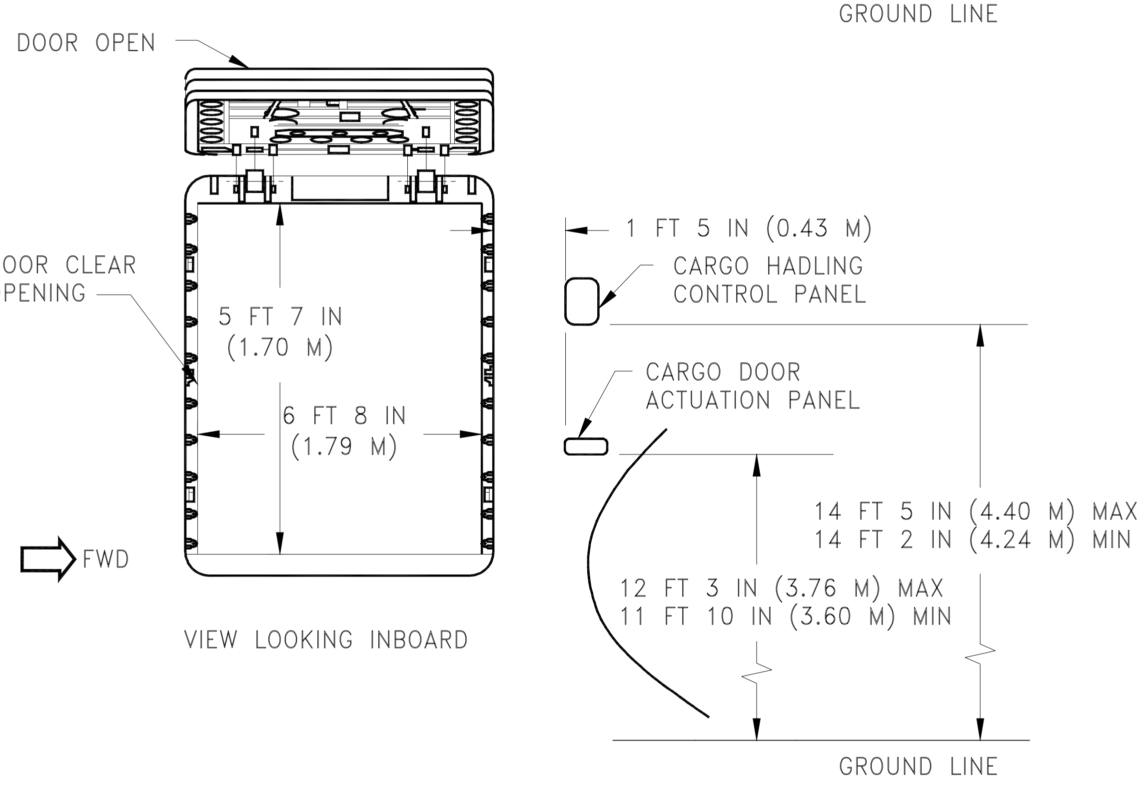
MODEL 777-300



2.7.6 DOOR CLEARANCES - FORWARD CARGO DOOR
MODEL 777-200, -300



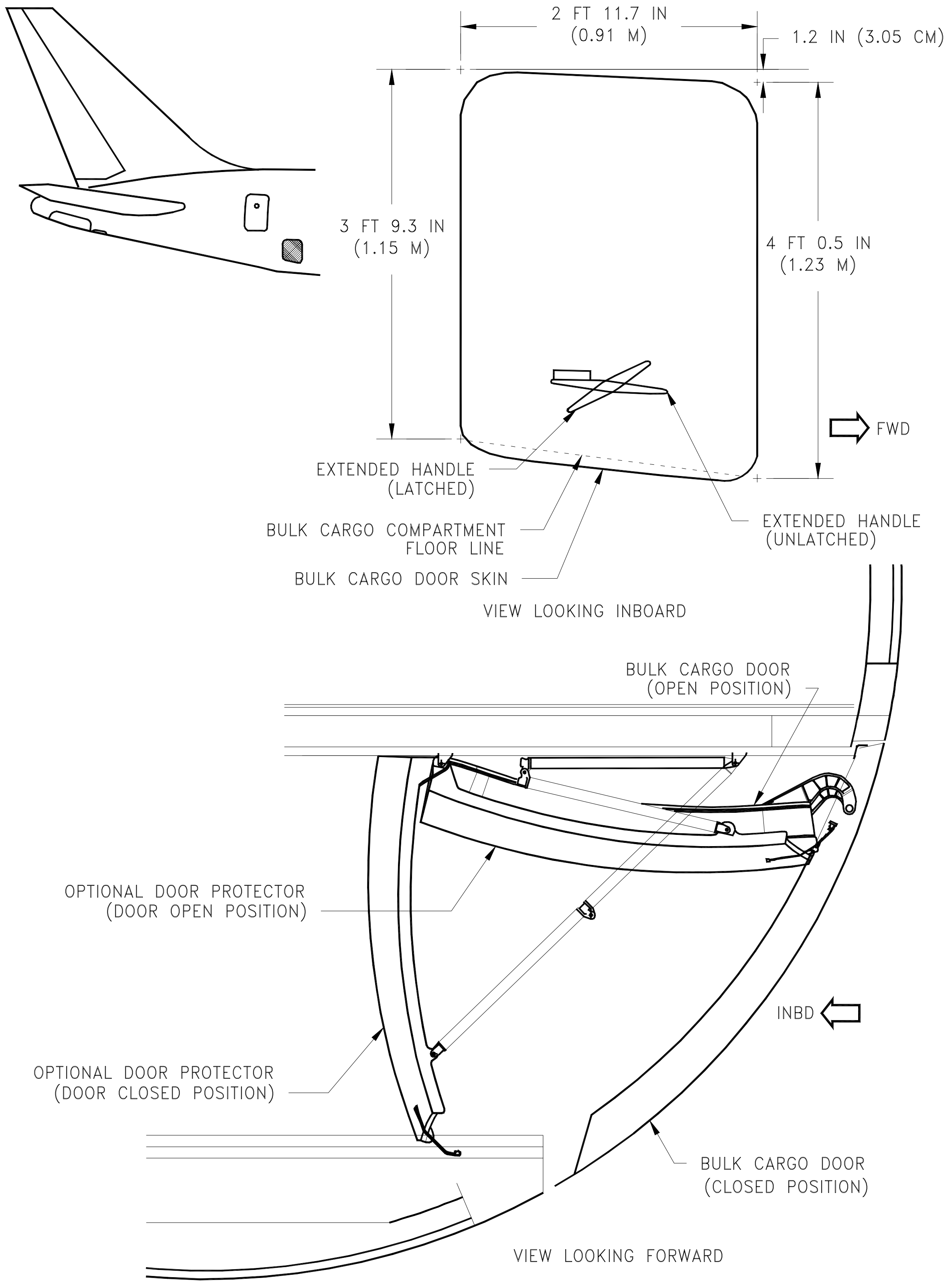
VIEW LOOKING FORWARD



VIEW LOOKING INBOARD

2.7.7 DOOR CLEARANCES - AFT CARGO DOOR

MODEL 777-200, -300



2.7.8 DOOR CLEARANCES - BULK CARGO DOOR

MODEL 777-200, -300

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3.0 AIRPLANE PERFORMANCE

3.1 General Information

3.2 Payload/Range for 0.84 Mach Cruise

3.3 F.A.R. Takeoff Runway Length Requirements

3.4 F.A.R. Landing Runway Length Requirements

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3.0 AIRPLANE PERFORMANCE

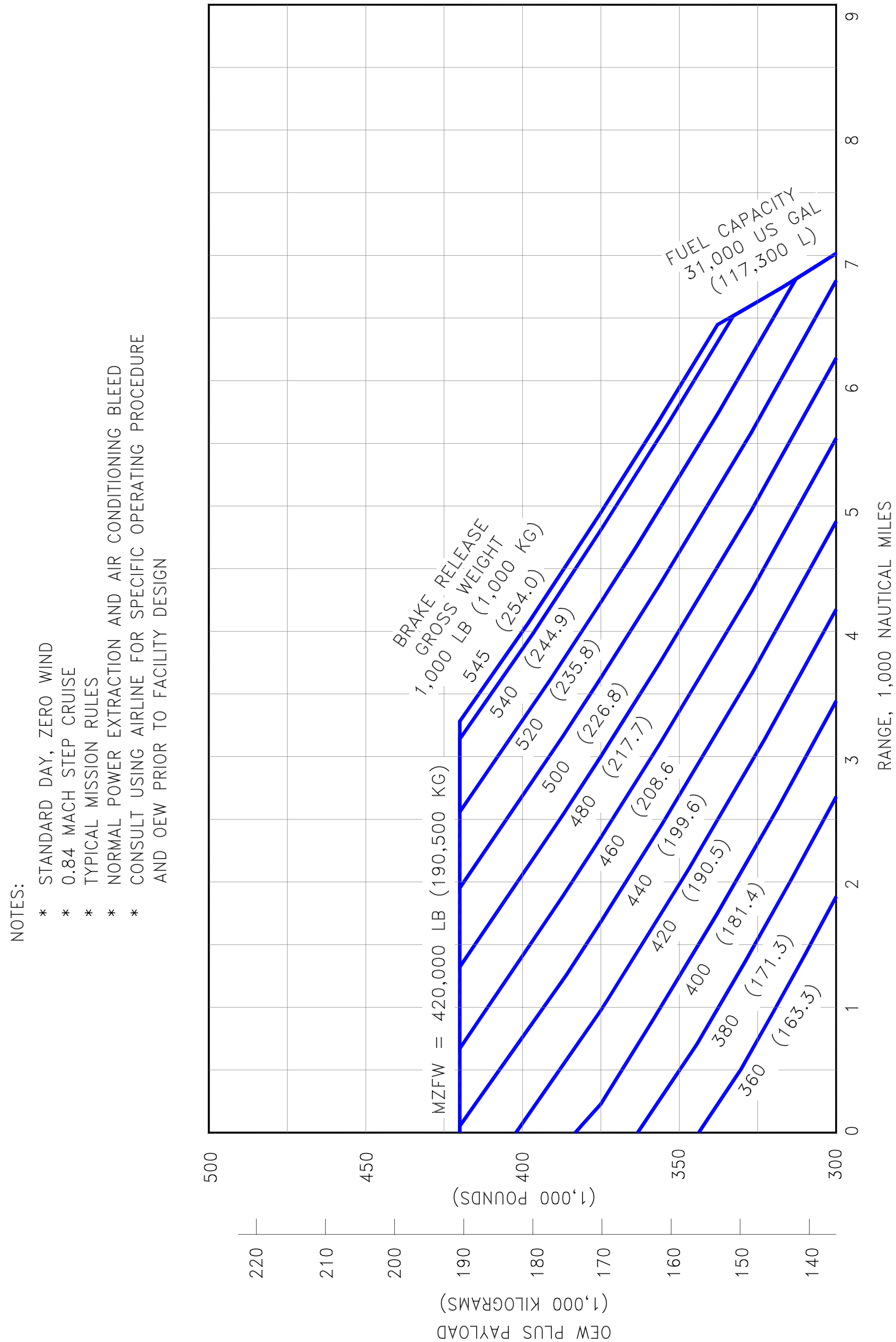
3.1 General Information

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.

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:

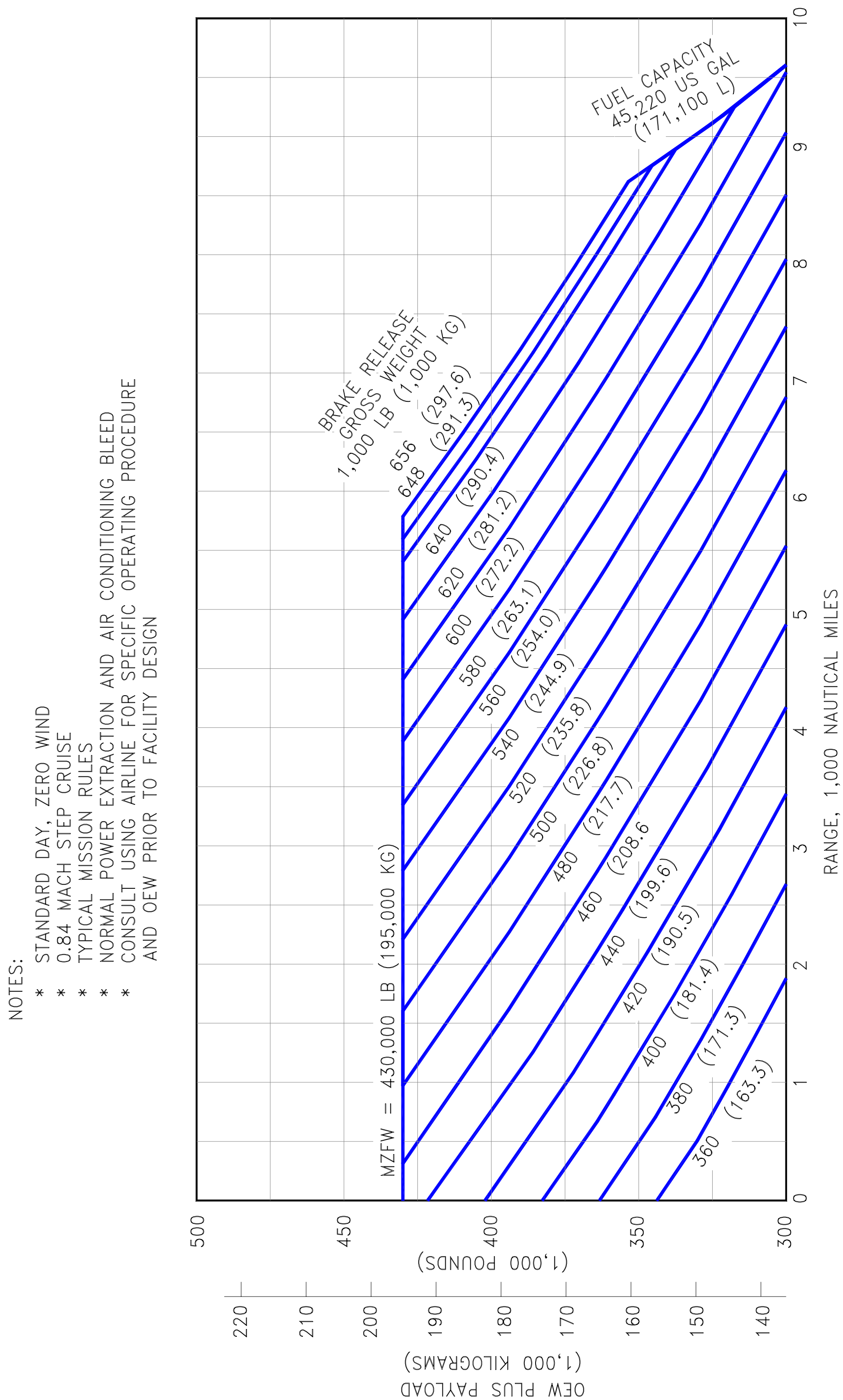
PRESSURE ALTITUDE		STANDARD DAY TEMP	
FEET	METERS	^{o}F	^{o}C
0	0	59.0	15.00
2,000	609	51.9	11.04
4,000	1,219	44.7	7.06
6,000	1,828	37.6	3.11
8,000	2,438	30.5	-0.85
9,000	2,743	26.9	-2.83

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.



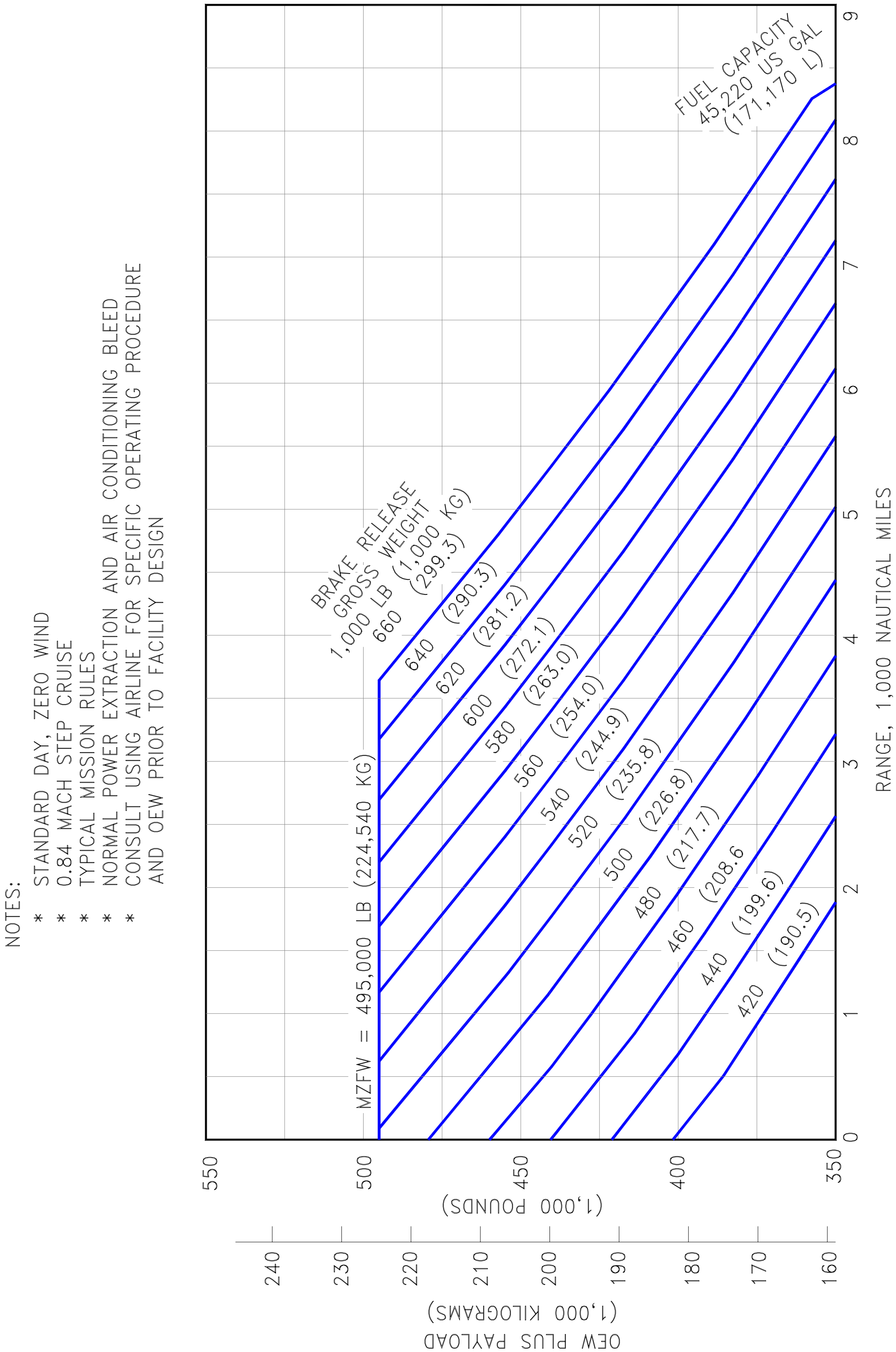
3.2.1 PAYLOAD/RANGE FOR 0.84 MACH CRUISE

MODEL 777-200 (BASELINE AIRPLANE)



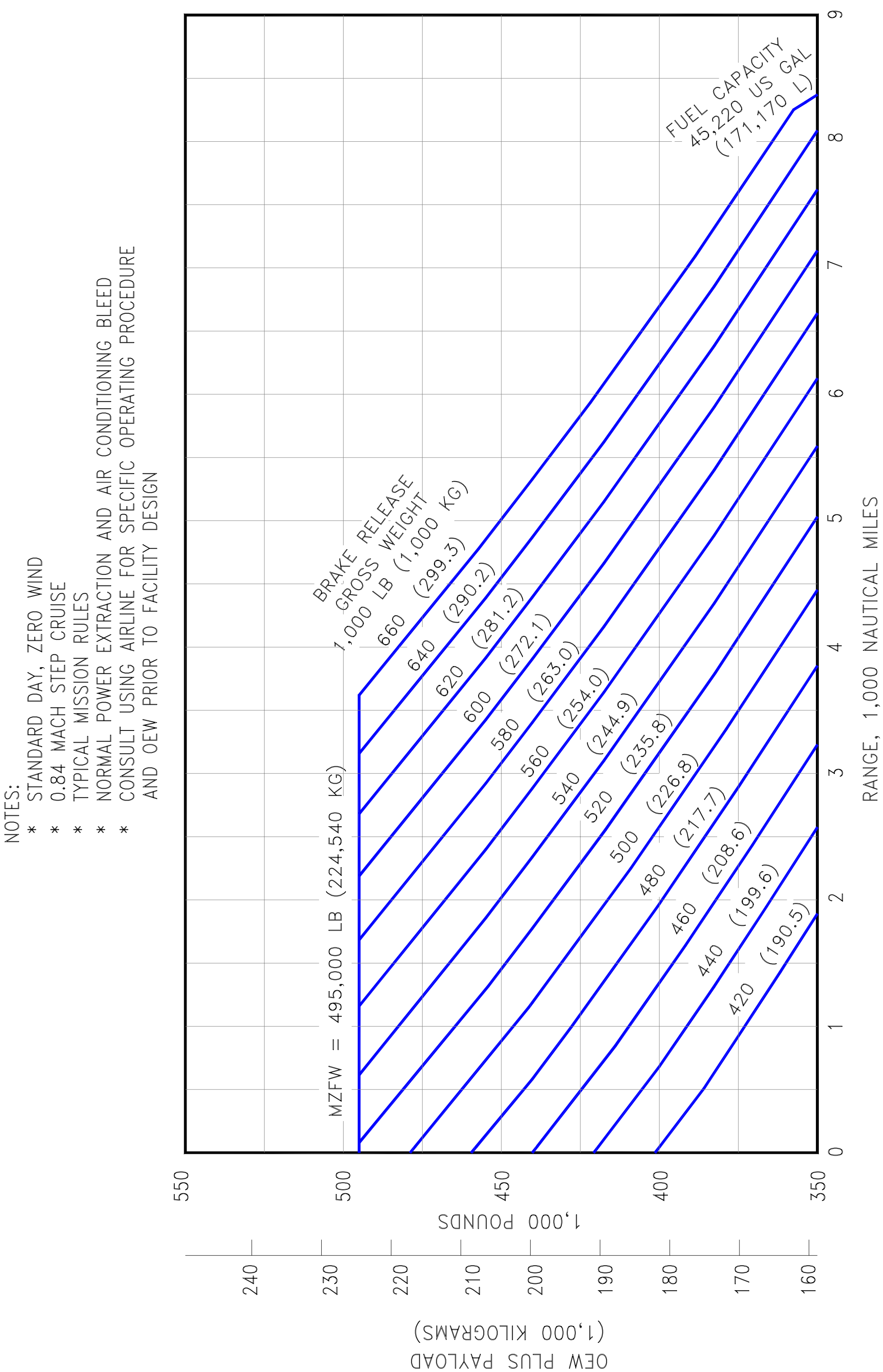
3.2.2 PAYLOAD/RANGE FOR 0.84 MACH CRUISE

MODEL 777-200 (HIGH GROSS WEIGHT AIRPLANE)



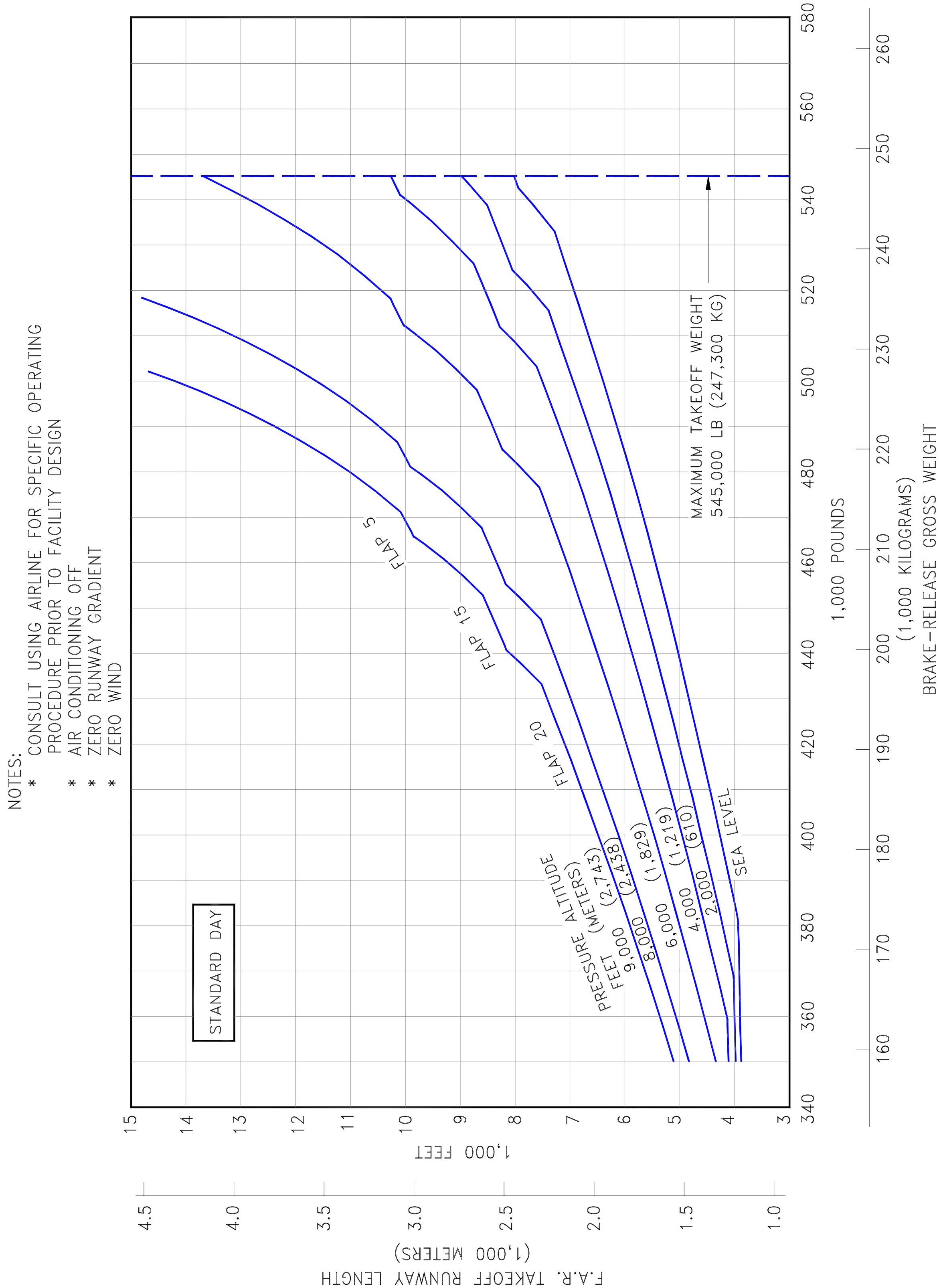
3.2.3 PAYLOAD/RANGE FOR 0.84 MACH CRUISE

MODEL 777-300 (TYPICAL 90K ENGINE)



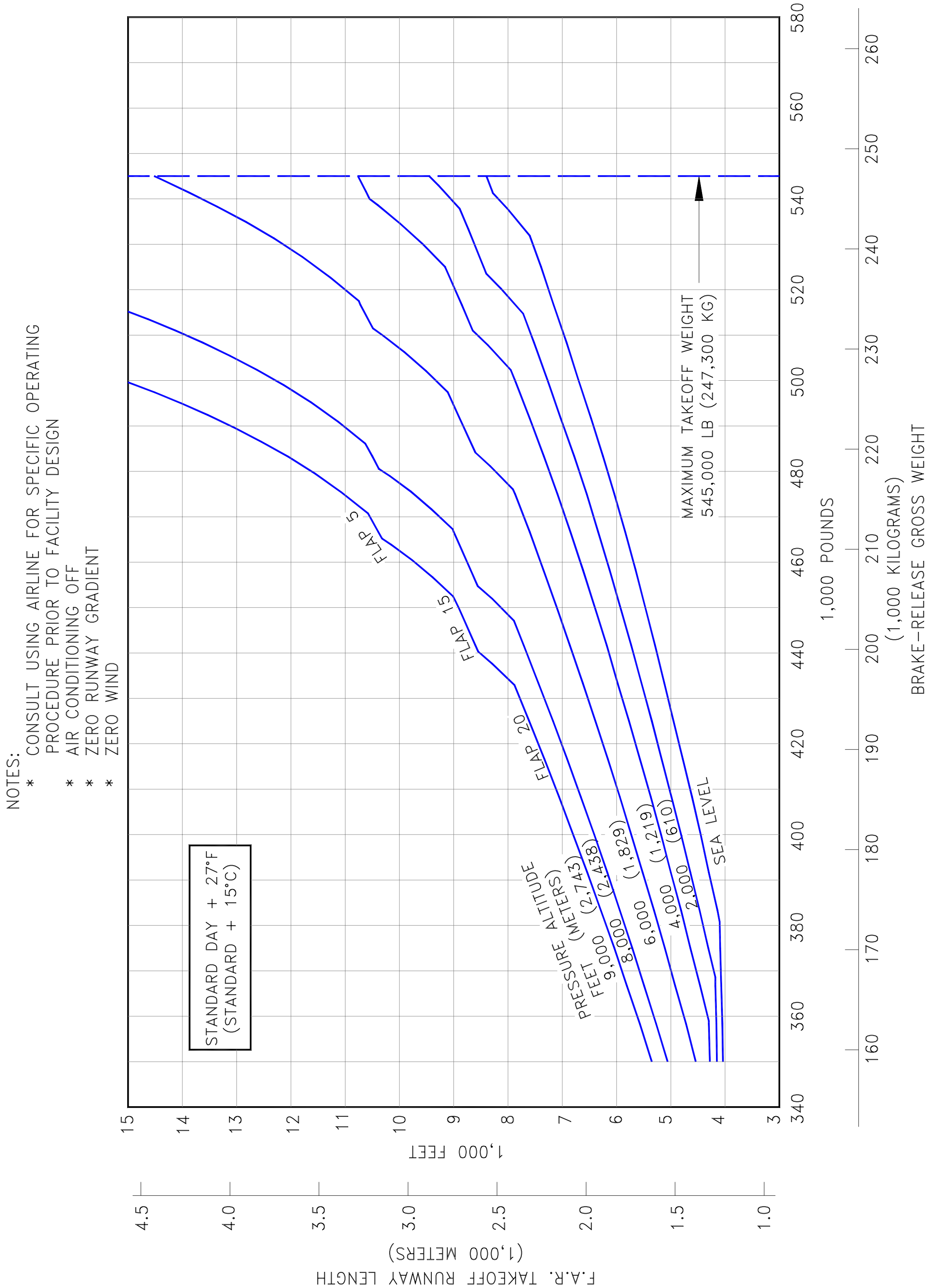
3.2.4 PAYLOAD/RANGE FOR 0.84 MACH CRUISE

MODEL 777-300 (TYPICAL 98K ENGINE)

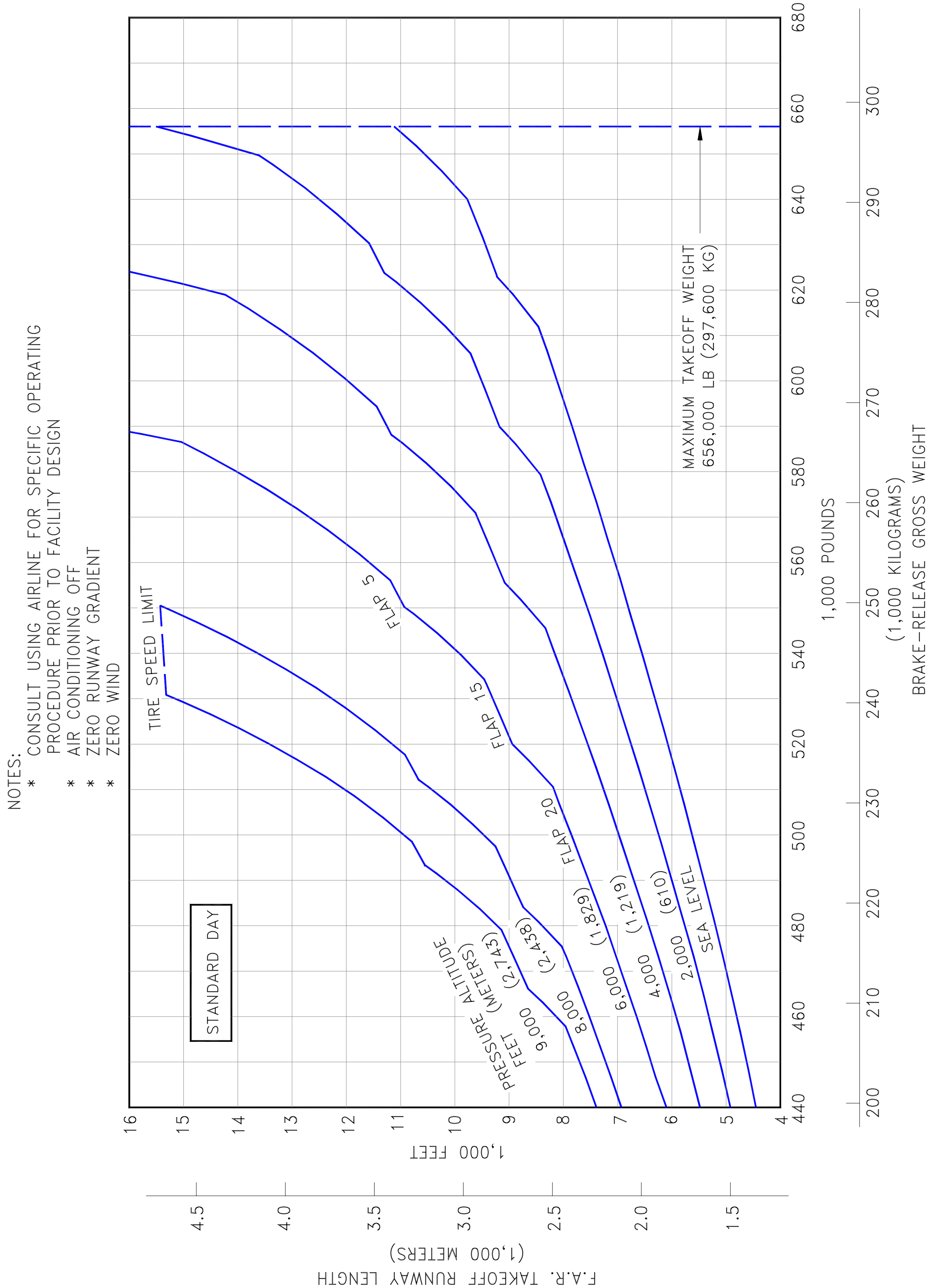


3.3.1 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY

MODEL 777-200 (BASELINE AIRPLANE)

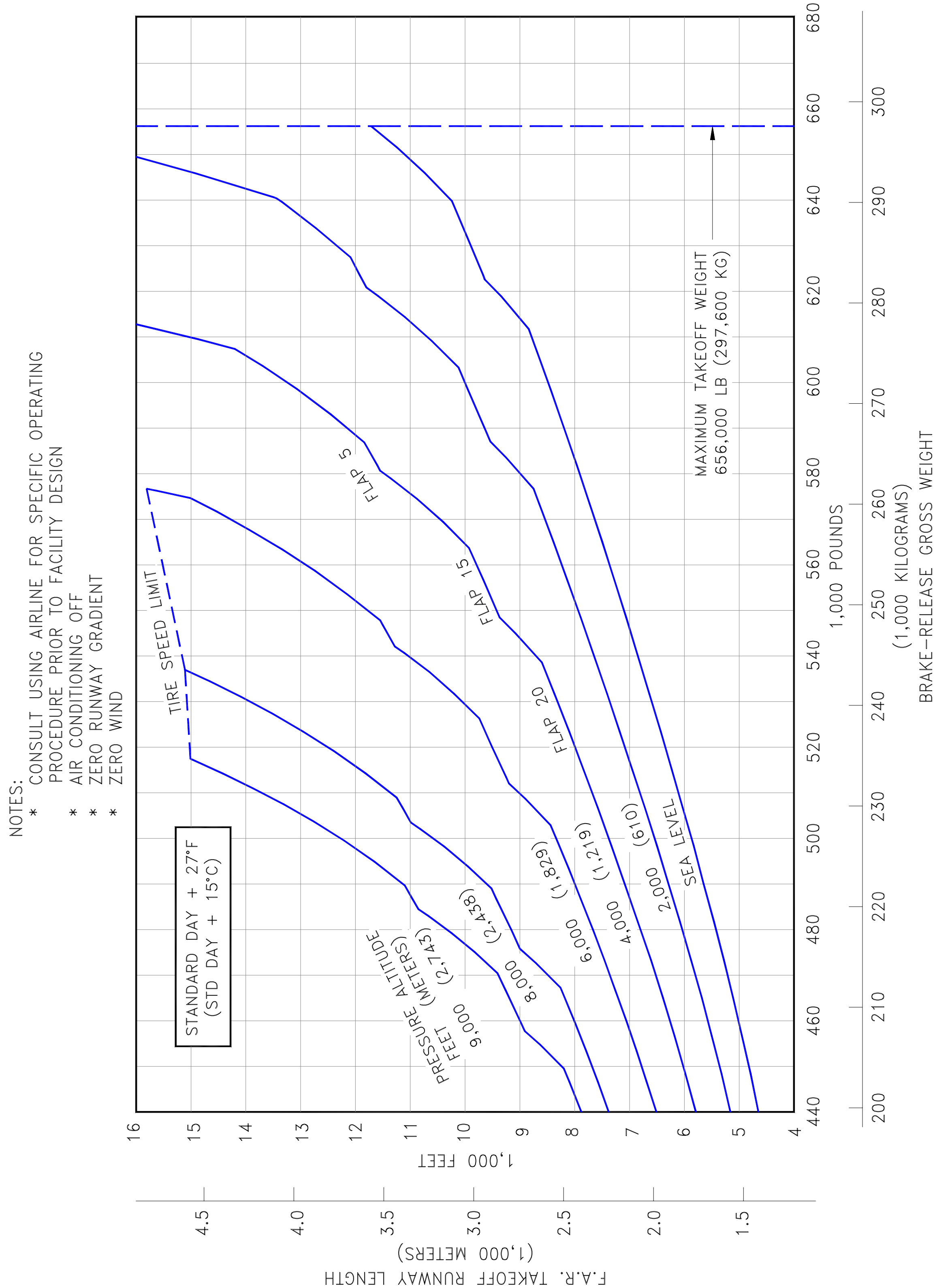


3.3.2 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS
STANDARD DAY +27^{O}F (STD + 15^{O}C)
MODEL 777-200 (BASELINE AIRPLANE)

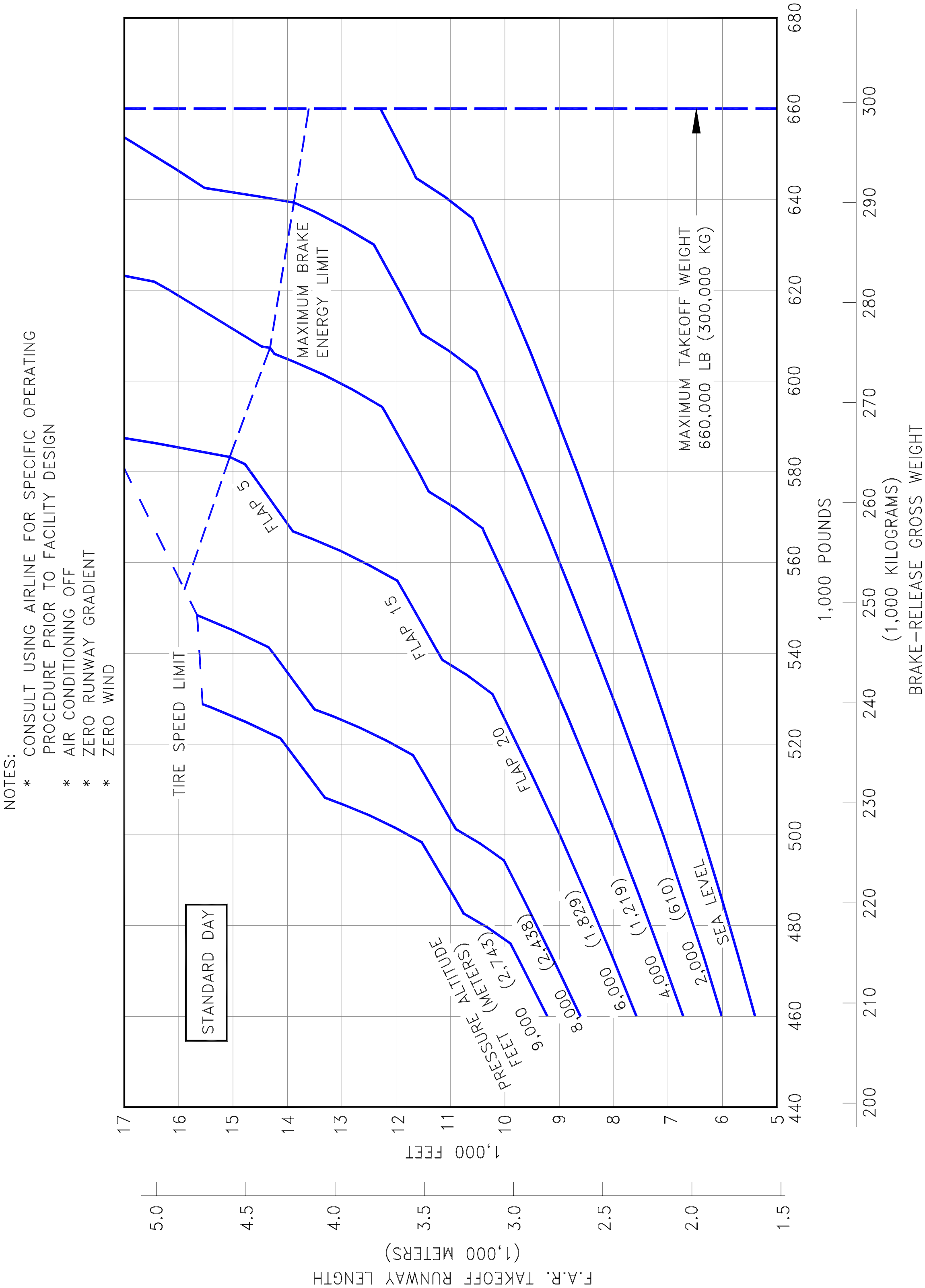


3.3.3 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY

MODEL 777-200 (HIGH GROSS WEIGHT AIRPLANE)

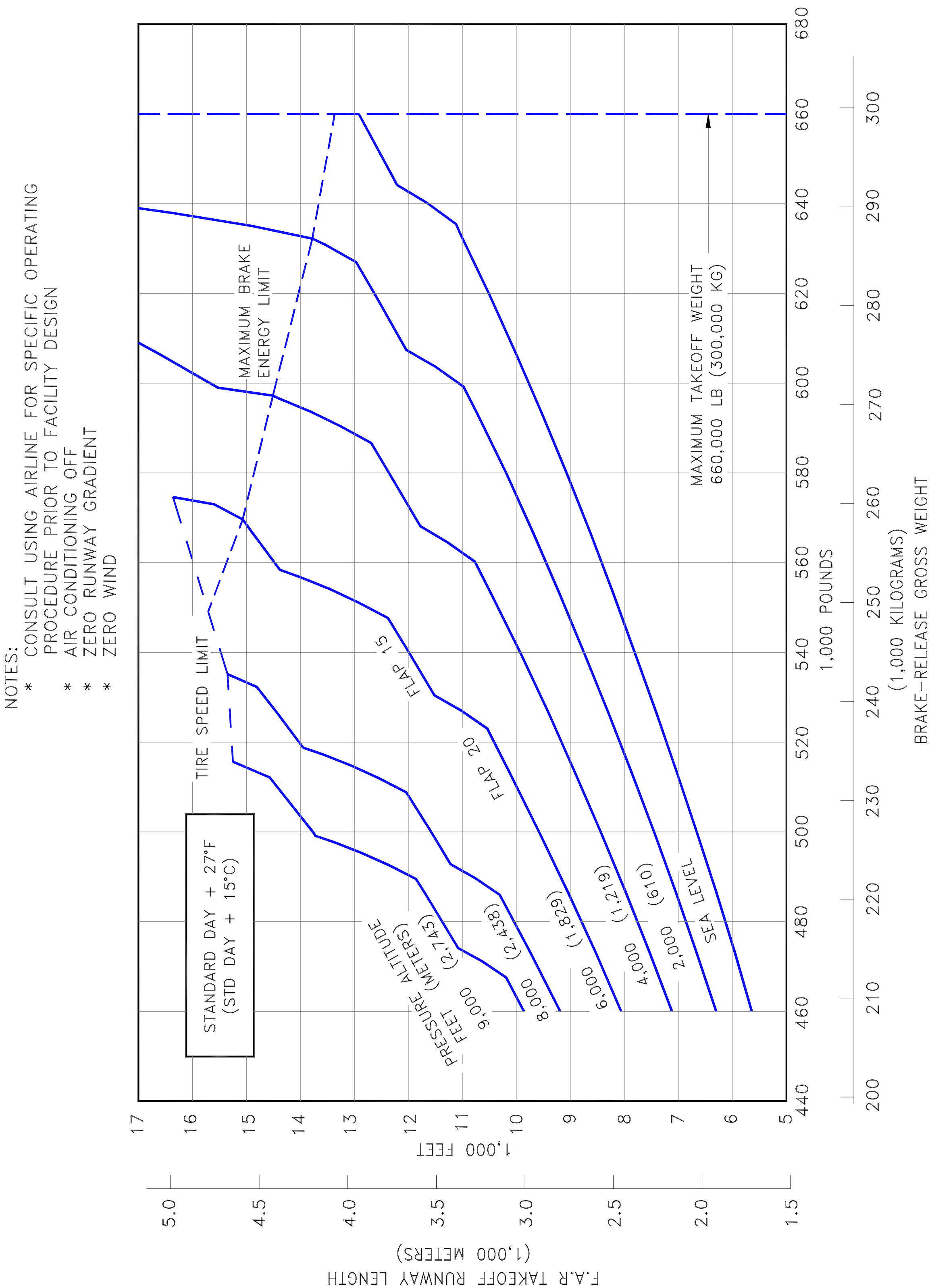


3.3.4 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS
STANDARD DAY +27°F (STD + 15°C)
MODEL 777-200 (HIGH GROSS WEIGHT AIRPLANE)



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

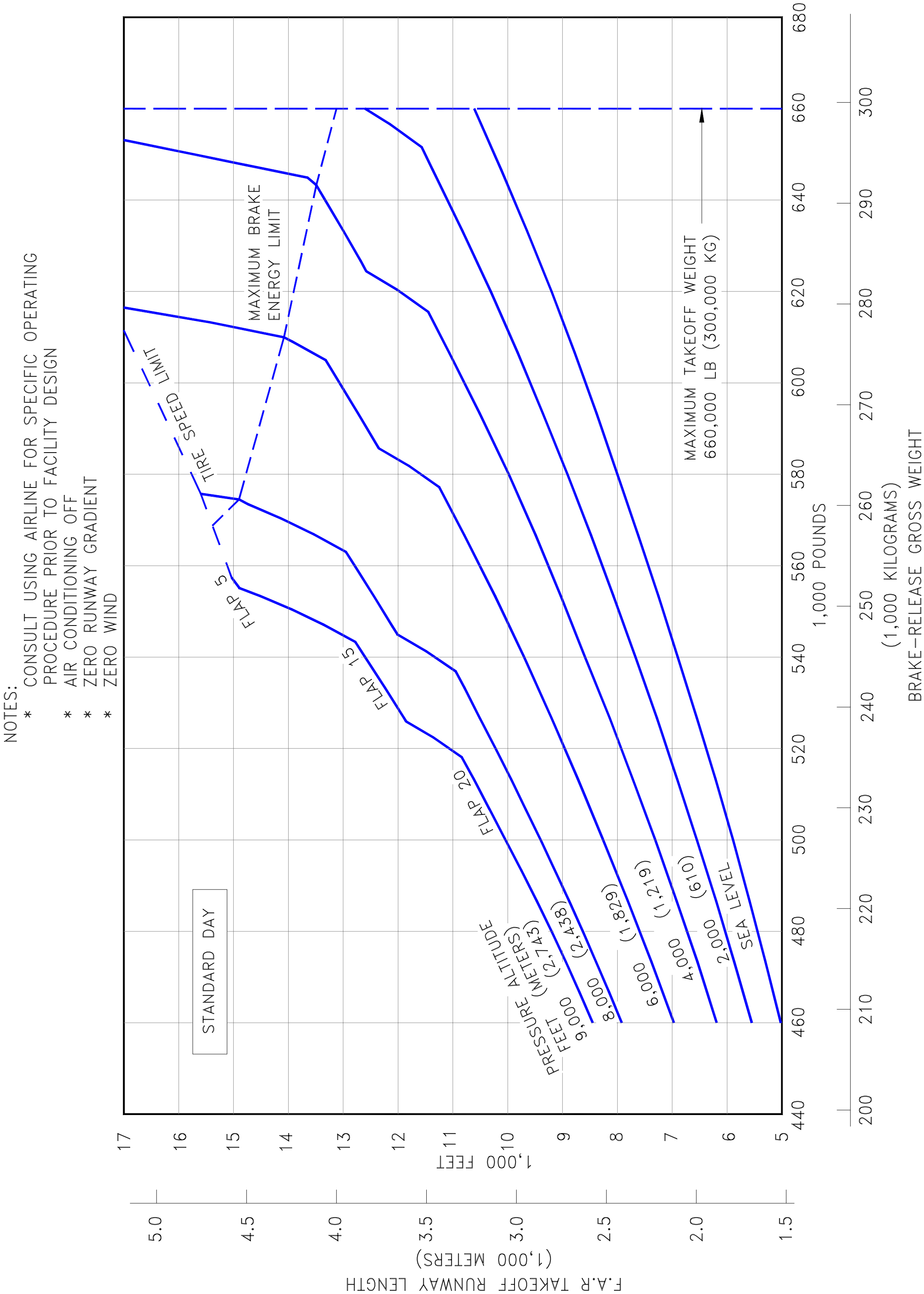
MODEL 777-300 (TYPICAL 90K ENGINE)



3.3.6 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS

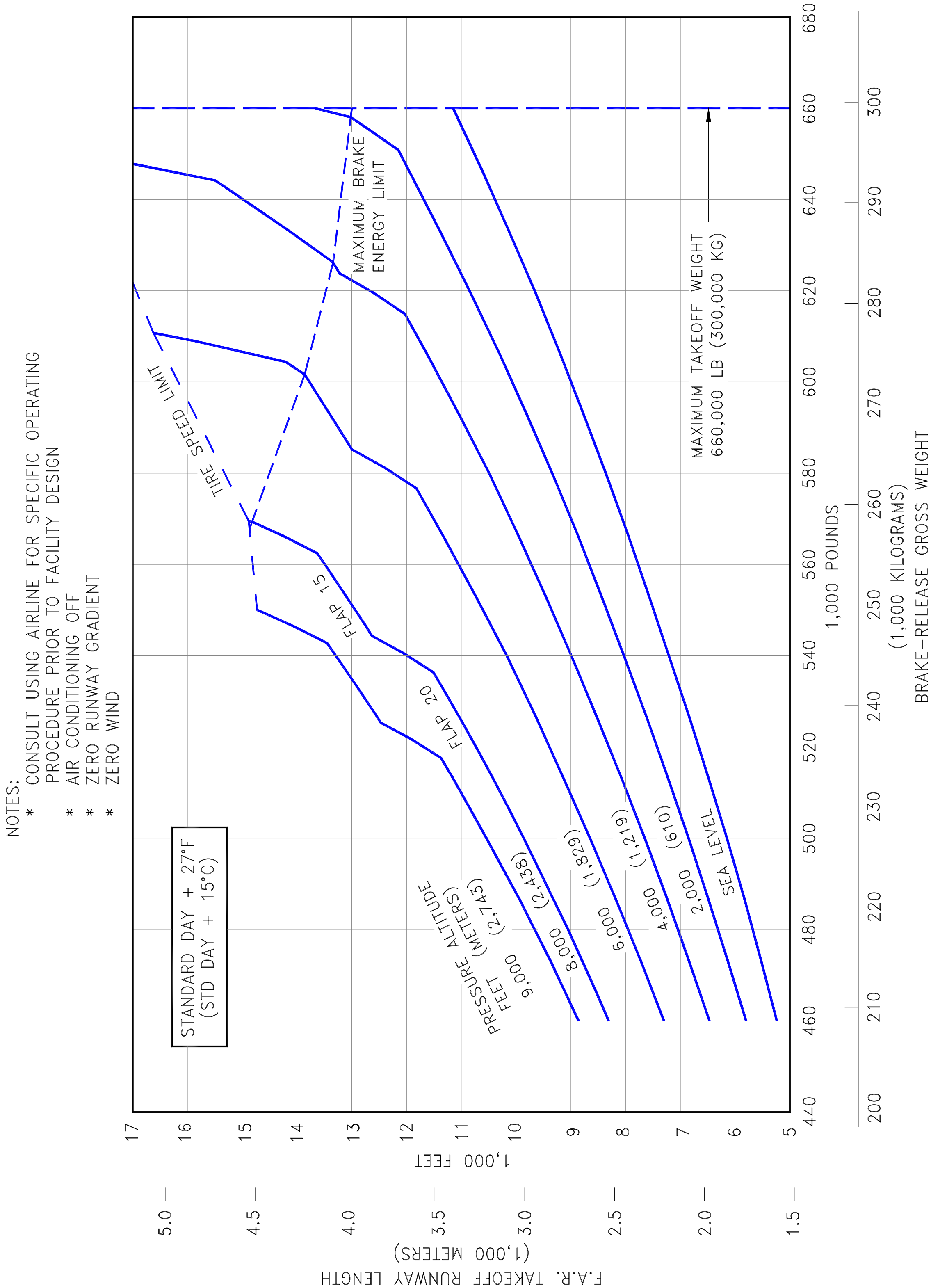
STANDARD DAY +27°F (STD + 15°C)

MODEL 777-300 (TYPICAL 90K ENGINE)



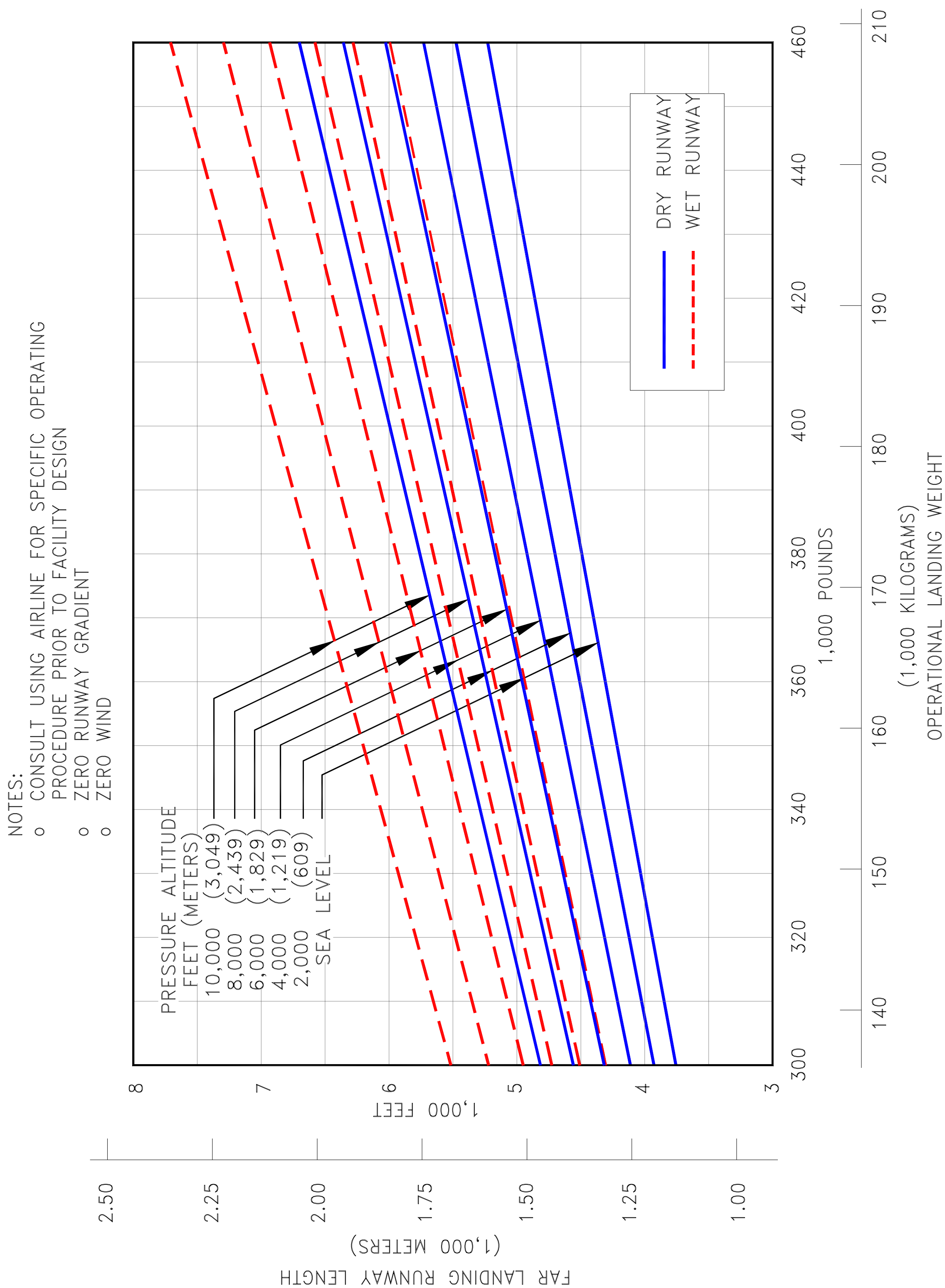
3.3.7 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS - STANDARD DAY

MODEL 777-300 (TYPICAL 98K ENGINE)



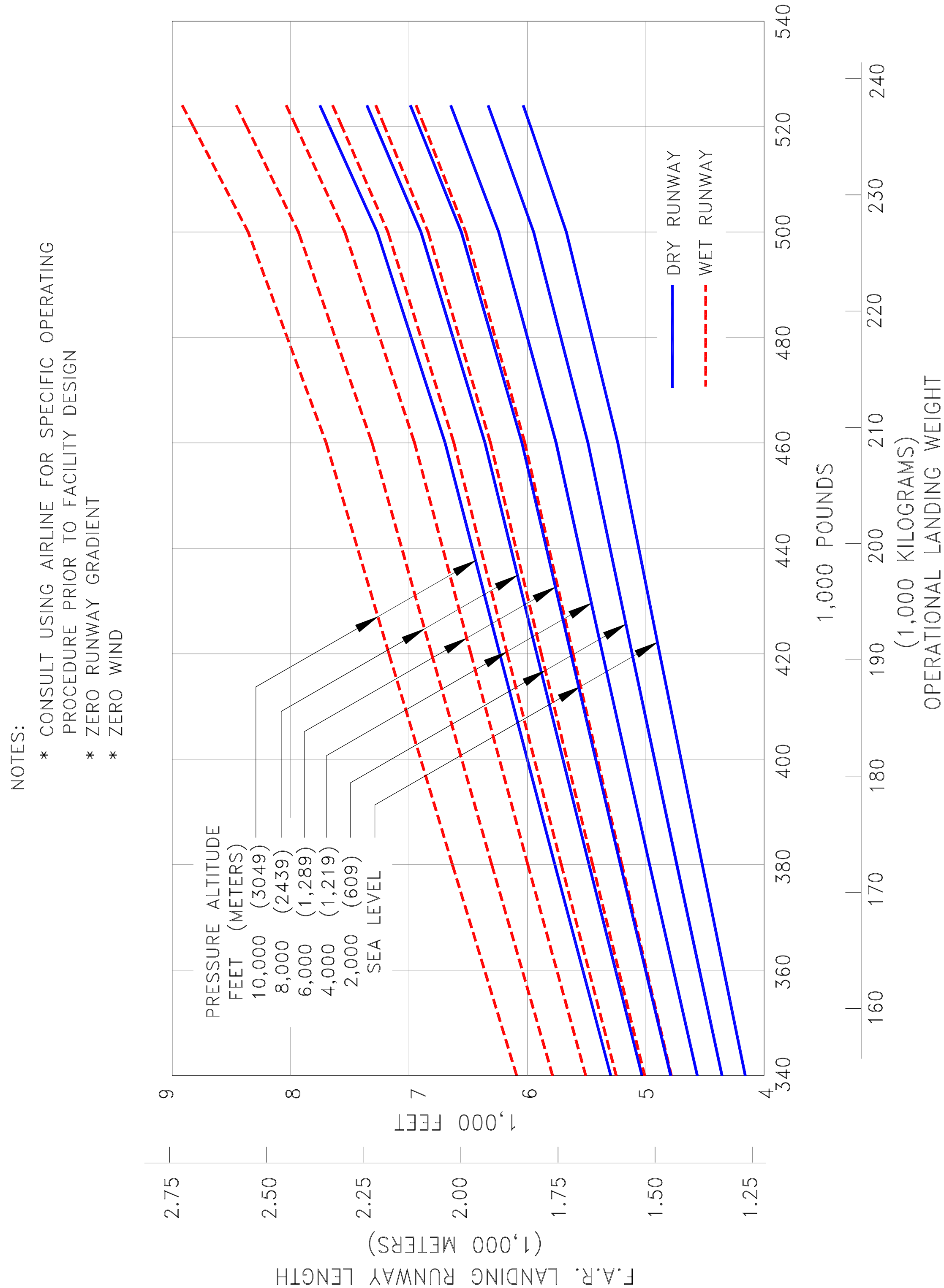
3.3.8 F.A.R. TAKEOFF RUNWAY LENGTH REQUIREMENTS
STANDARD DAY +27^{o}F (STD + 15^{o}C)

MODEL 777-300 (TYPICAL 98K ENGINE)



3.4.1 F.A.R. LANDING RUNWAY LENGTH REQUIREMENTS

MODEL 777-200



3.4.2 F.A.R. LANDING RUNWAY LENGTH REQUIREMENTS

MODEL 777-300

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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

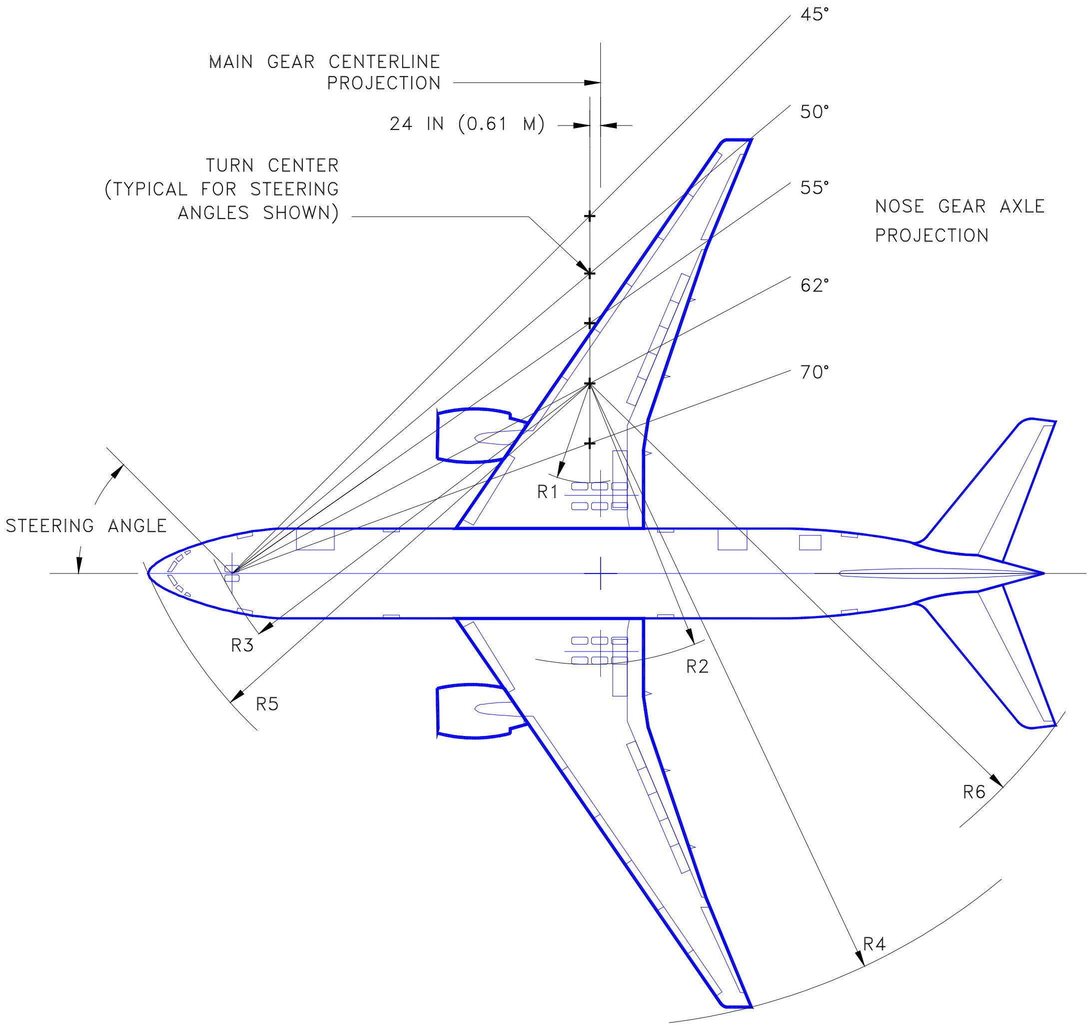
4.0 GROUND MANEUVERING

4.1 General Information

The 777 main landing gear consists of two main struts, each strut with six wheels. The steering system incorporates aft axle steering of the main landing gear in addition to the nose gear steering. The aft axle steering system is hydraulically actuated and programmed to provide steering ratios proportionate to the nose gear steering angles. During takeoff and landing, the aft axle steering system is centered, mechanically locked, and depressurized.

The turning radii and turning curves shown in this section are derived from airplane geometry. Other factors that could influence the geometry of the turn include:

1. Engine power settings
2. Center of gravity location
3. Airplane weight
4. Pavement surface conditions
5. Amount of differential braking
6. Ground speed

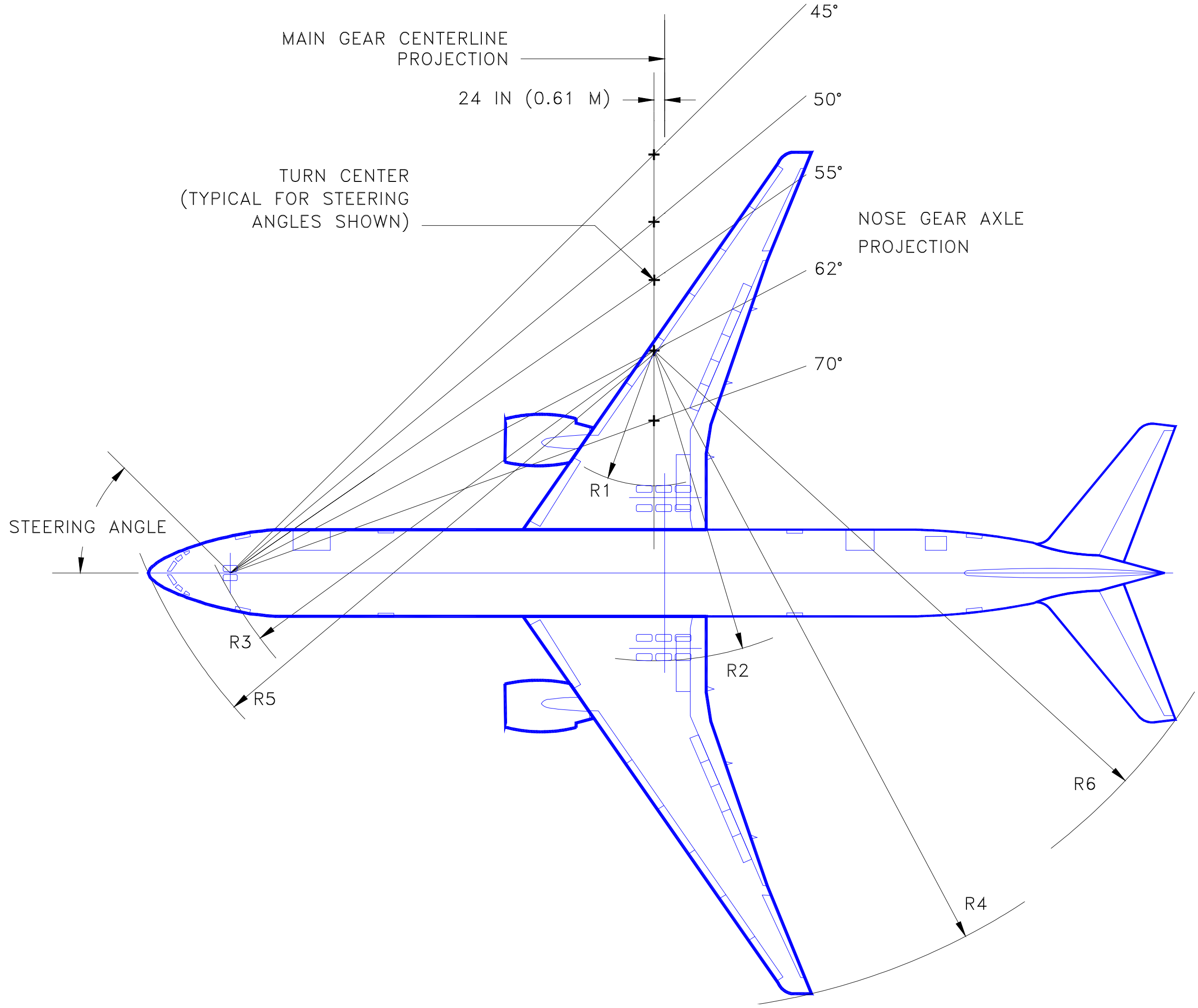


NOTES: *DATA SHOWN FOR AIRPLANE WITH AFT AXLE STEERING
*ACTUAL OPERATING TURNING RADII MAY BE GREATER THAN SHOWN.
* CONSULT WITH AIRLINE FOR SPECIFIC OPERATING PROCEDURE
* DIMENSIONS ROUNDED TO NEAREST FOOT AND 0.1 METER.

STEERING ANGLE	R1 INNER GEAR		R2 OUTER GEAR		R3 NOSE GEAR		R4 WING TIP		R5 NOSE		R6 TAIL	
(DEG)	FT	M	FT	M	FT	M	FT	M	FT	M	FT	M
30	123	37.5	165	50.3	168	51.3	247	75.3	177	53.8	209	63.6
35	98	29.7	140	42.6	147	44.8	222	67.6	157	47.8	187	57.1
40	78	23.7	120	36.6	131	40.0	202	61.7	142	43.4	171	52.2
45	62	18.9	104	31.7	120	36.4	187	56.9	132	40.2	159	48.5
50	49	14.8	91	27.7	111	33.7	174	52.9	124	37.7	150	45.6
55	37	11.2	79	24.1	103	31.5	162	49.5	118	35.8	142	43.2
60	27	8.1	69	21.0	98	29.9	152	46.5	113	34.4	135	41.2
65	17	5.3	60	18.2	94	28.6	143	43.7	109	33.3	130	39.5
70 (MAX)	9	2.7	51	15.6	90	27.6	135	41.2	107	32.5	125	38.1

4.2 TURNING RADII - NO SLIP ANGLE

MODEL 777-200

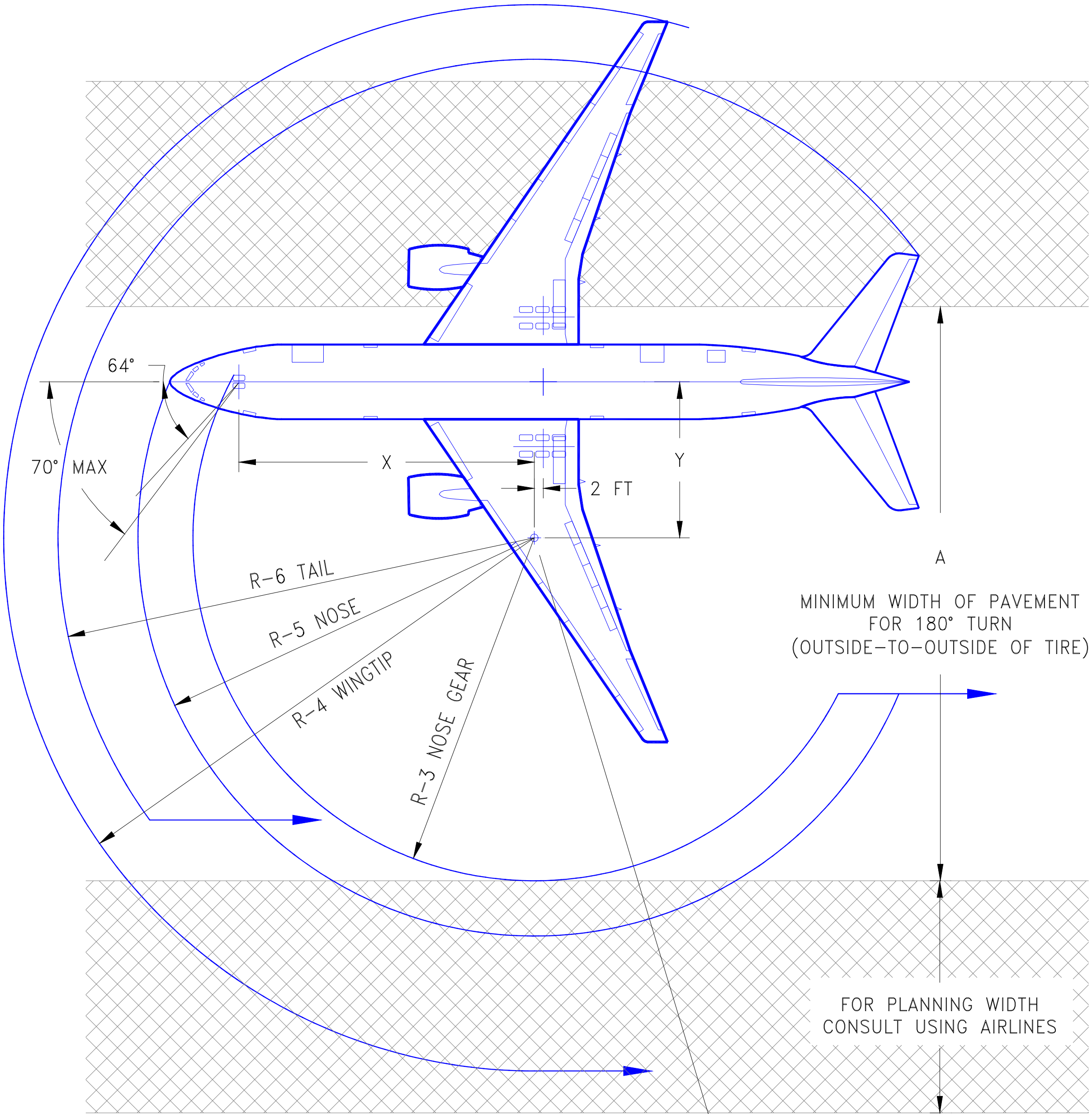


NOTES: *DATA SHOWN FOR AIRPLANE WITH AFT AXLE STEERING
*ACTUAL OPERATING TURNING RADII MAY BE GREATER THAN SHOWN.
* CONSULT WITH AIRLINE FOR SPECIFIC OPERATING PROCEDURE
* DIMENSIONS ROUNDED TO NEAREST FOOT AND 0.1 METER.

STEERING ANGLE	R1 INNER GEAR		R2 OUTER GEAR		R3 NOSE GEAR		R4 WING TIP		R5 NOSE		R6 TAIL	
(DEG)	FT	M	FT	M	FT	M	FT	M	FT	M	FT	M
30	153	46.6	195	59.4	203	61.8	276	84.2	211	64.3	243	73.9
35	122	37.3	165	50.1	177	53.9	246	75.0	188	56.9	217	66.1
40	99	30.0	141	42.9	158	48.2	223	67.8	169	51.6	198	60.2
45	79	24.2	122	37.0	144	43.9	204	62.0	156	47.6	183	55.7
50	63	19.2	105	32.1	133	40.5	188	57.2	146	44.6	171	52.2
55	49	15.0	91	27.9	125	37.9	174	53.0	139	42.3	162	49.3
60	37	11.2	79	24.1	118	35.9	162	49.4	133	40.5	154	47.0
65	26	7.8	68	20.7	113	34.3	151	46.0	129	39.2	148	45.0
70 (MAX)	15	4.7	58	17.6	109	33.1	132	43.0	125	38.1	142	43.3

4.3 TURNING RADII - NO SLIP ANGLE

MODEL 777-300



NOTES:

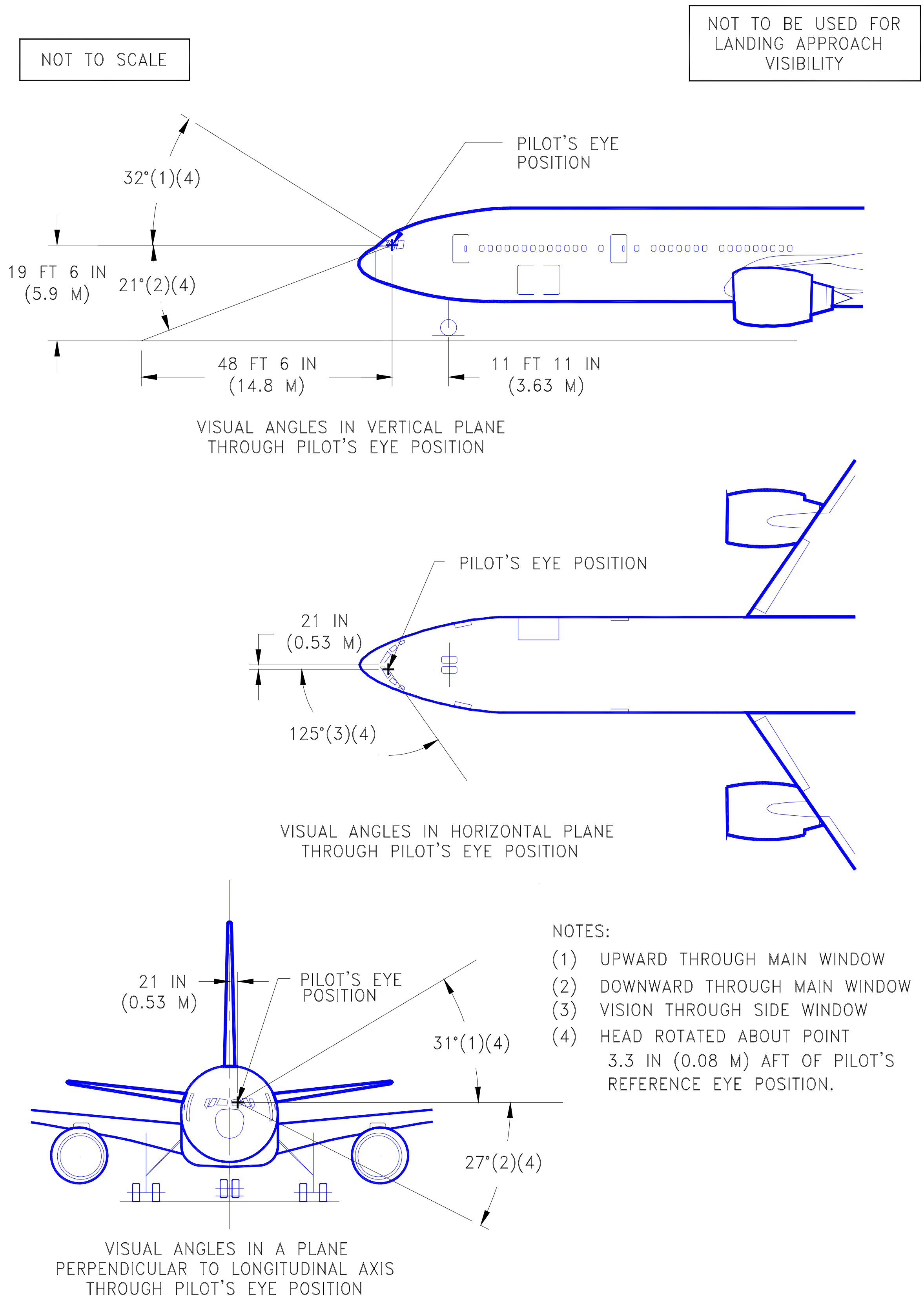
1. 6° TIRE SLIP ANGLE APPROXIMATE FOR 64° TURN ANGLE.
2. CONSULT USING AIRLINE FOR SPECIFIC OPERATING PROCEDURE.
3. DIMENSIONS ARE ROUNDED TO THE NEAREST 0.1 FOOT AND 0.1 METER.

THEORETICAL CENTER OF TURN FOR MINIMUM TURNING RADIUS.
SLOW CONTINUOUS TURN
DIFERENTIAL THRUST
NO DIFFERENTIAL BRAKING

AIRPLANE MODEL	EFFECTIVE STEERING ANGLE (DEG)	X		Y		A		R3		R4		R5		R6	
		FT	M	FT	M	FT	M	FT	M	FT	M	FT	M	FT	M
777-200	64	82.9	25.3	40.4	12.3	155.8	47.5	94.3	28.7	144.9	44.2	110.0	33.5	131.0	39.9
777-300	64	100.4	30.6	49.0	14.9	183.8	56.0	113.7	34.7	152.5	46.7	129.4	39.4	148.8	45.3

4.3 CLEARANCE RADII

MODEL 777-200, -300

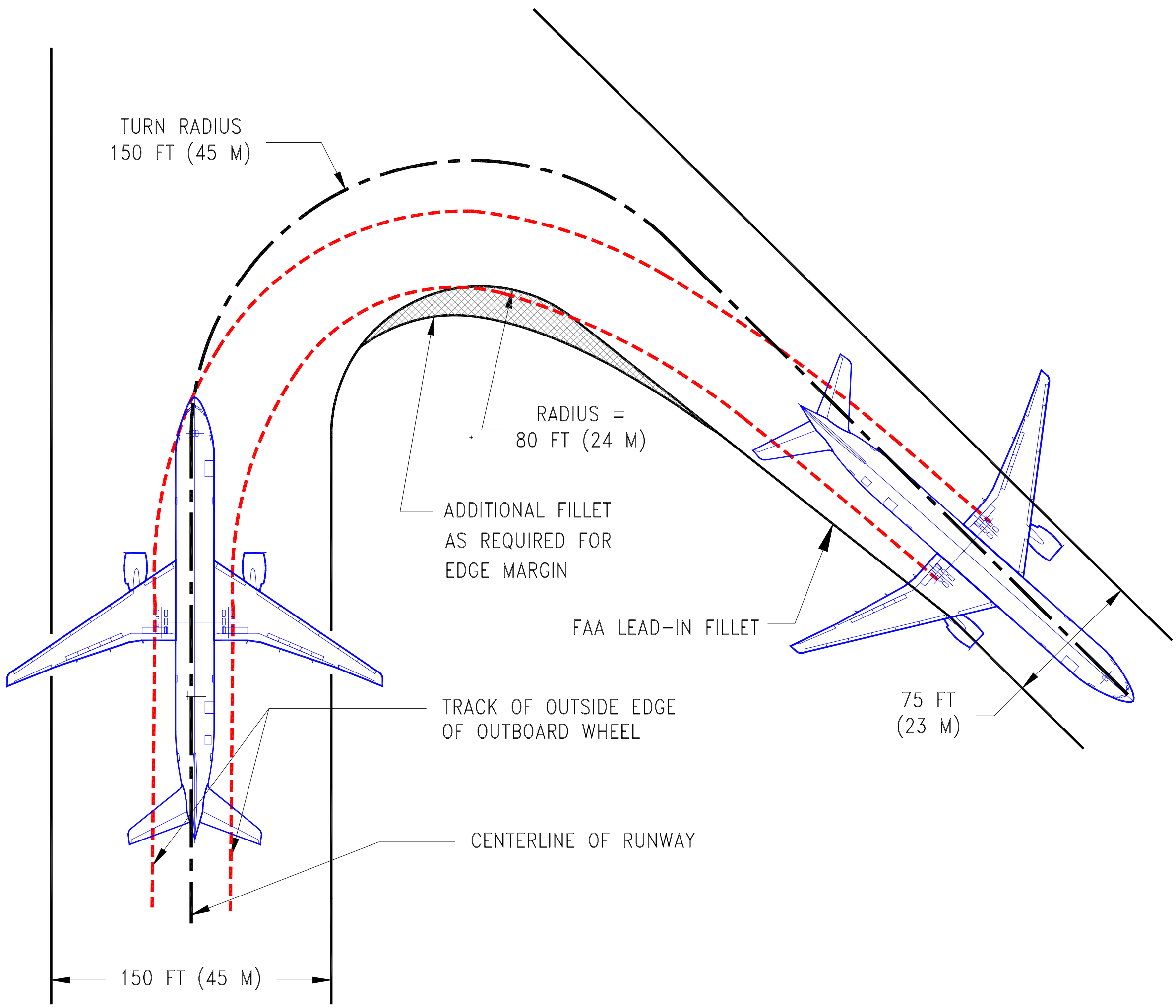


4.4 VISIBILITY FROM COCKPIT IN STATIC POSITION

MODEL 777-200, -300

NOTES:

- BEFORE DETERMINING THE SIZE OF THE INTERSECTION FILLET, CHECK WITH THE AIRLINES REGARDING THE OPERATING PROCEDURES THAT THEY USE AND THE AIRCRAFT TYPES THEY ARE EXPECTED TO USE AT THE AIRPORT
- 777-300 DATA SHOWN. 777-200 DATA WOULD BE LESS STRINGENT.

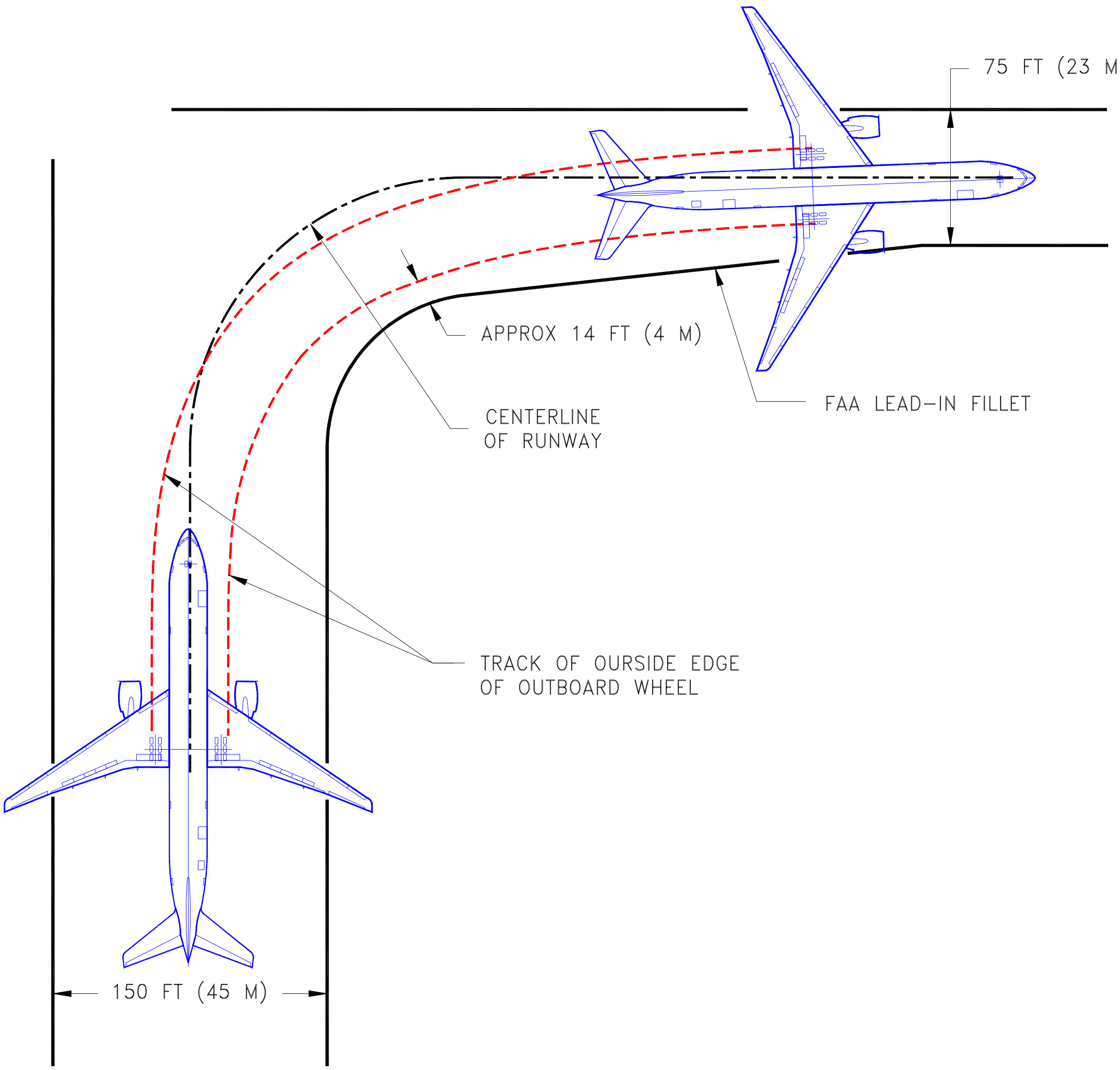


4.5.1 RUNWAY AND TAXIWAY TURNPATHS - RUNWAY-TO-TAXIWAY, MORE THAN 90 DEGREES

MODEL 777-200, -300

NOTES:

- BEFORE DETERMINING THE SIZE OF THE INTERSECTION FILLET, CHECK WITH THE AIRLINES REGARDING THE OPERATING PROCEDURES THAT THEY USE AND THE AIRCRAFT TYPES THEY ARE EXPECTED TO USE AT THE AIRPORT
- 777-300 DATA SHOWN. CALCULATED EDGE MARGIN FOR THE 777-200 WOULD BE APPROXIMATELY 20 FT (6 M) INSTEAD OF 14 FT AS SHOWN.

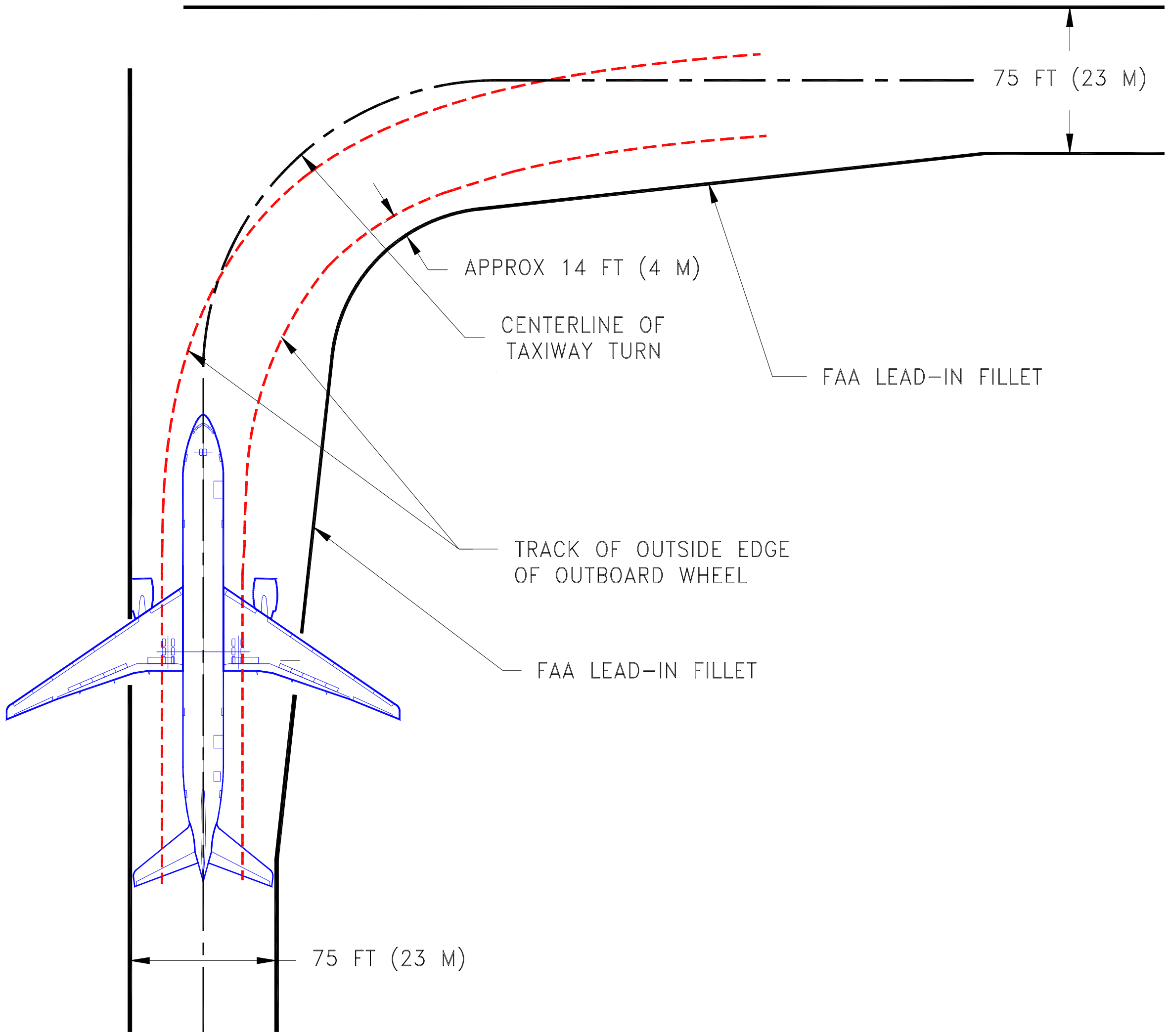


4.5.2 RUNWAY AND TAXIWAY TURNPATHS - RUNWAY-TO-TAXIWAY, 90 DEGREES

MODEL 777-200, -300

NOTES:

- BEFORE DETERMINING THE SIZE OF THE INTERSECTION FILLET, CHECK WITH THE AIRLINES REGARDING THE OPERATING PROCEDURES THAT THEY USE AND THE AIRCRAFT TYPES THEY ARE EXPECTED TO USE AT THE AIRPORT
- 777-300 DATA SHOWN. CALCULATED EDGE MARGIN FOR THE 777-200 WOULD BE APPROXIMATELY 22 FT (6.7 M) INSTEAD OF 14 FT AS SHOWN.

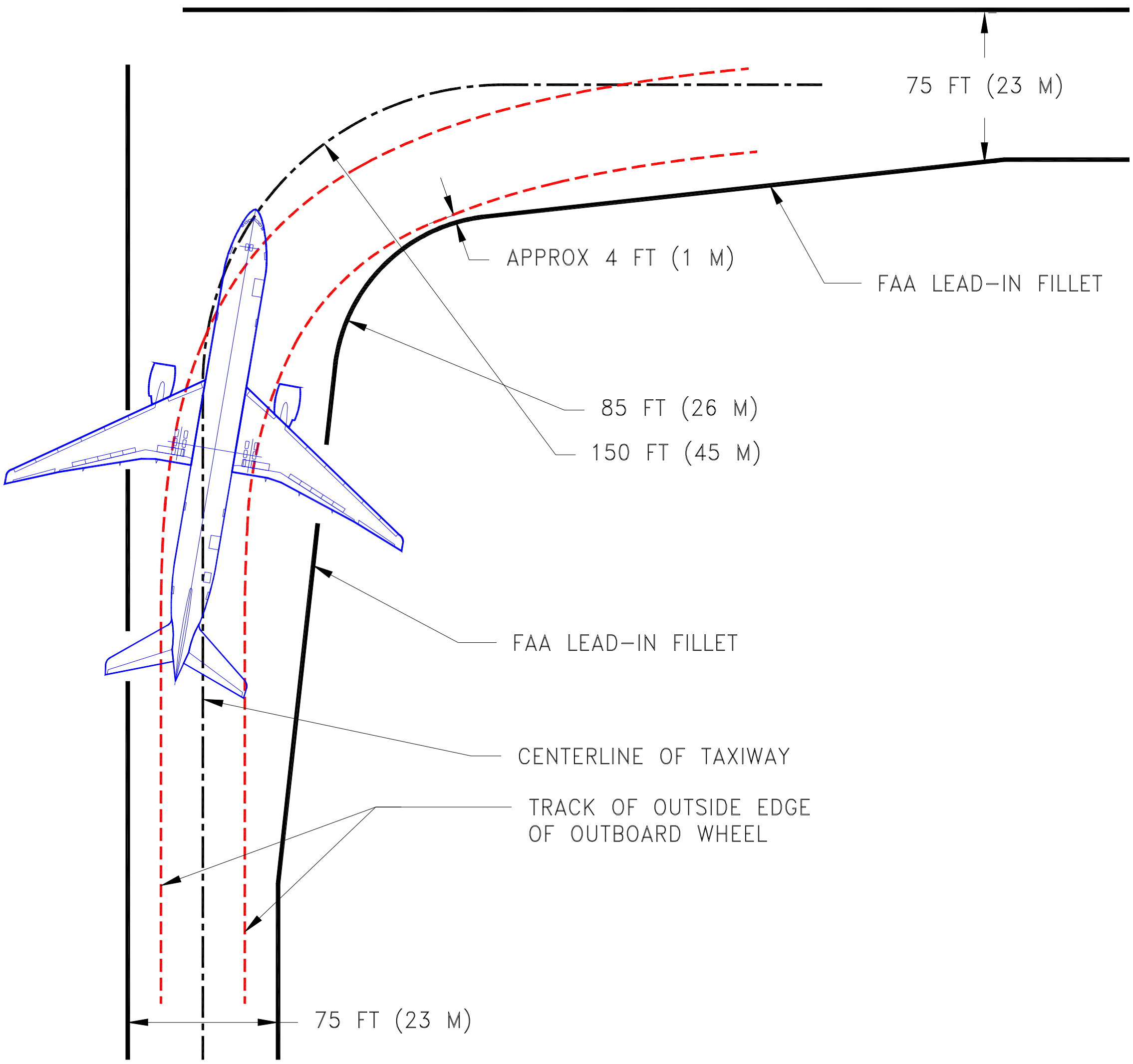


4.5.3 RUNWAY AND TAXIWAY TURNPATHS - TAXIWAY-TO-TAXIWAY, 90 DEGREES, NOSE GEAR TRACKS CENTERLINE

MODEL 777-200, -300

NOTES:

- BEFORE DETERMINING THE SIZE OF THE INTERSECTION FILLET, CHECK WITH THE AIRLINES REGARDING THE OPERATING PROCEDURES THAT THEY USE AND THE AIRCRAFT TYPES THEY ARE EXPECTED TO USE AT THE AIRPORT
- 777-300 DATA SHOWN. CALCULATED EDGE MARGIN FOR THE 777-200 WOULD BE APPROXIMATELY 17 FT (5.2 M) INSTEAD OF 4 FT AS SHOWN.

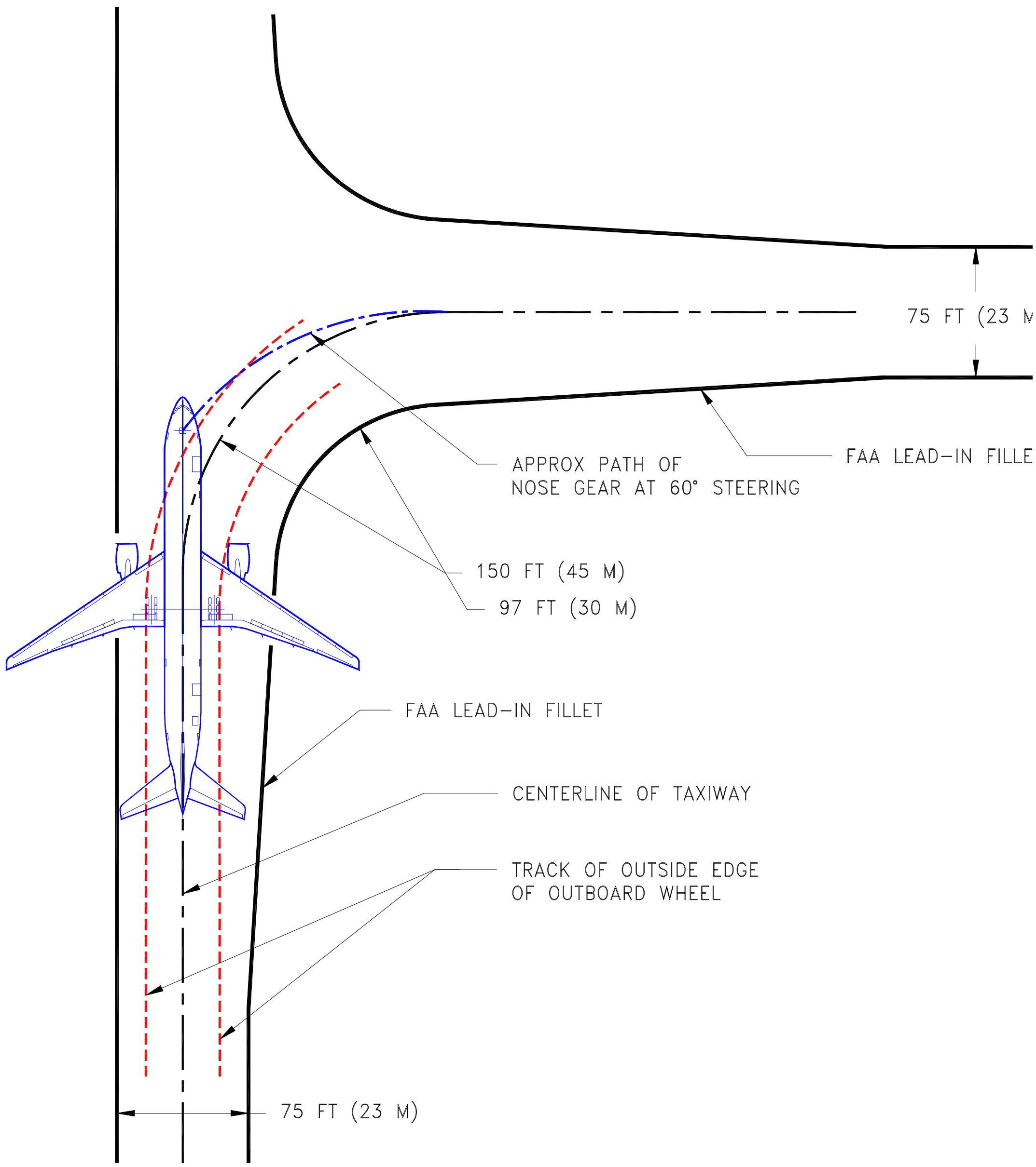


4.5.4 RUNWAY AND TAXIWAY TURNPATHS - TAXIWAY-TO-TAXIWAY, 90 DEGREES, COCKPIT TRACKS CENTERLINE

MODEL 777-200, -300

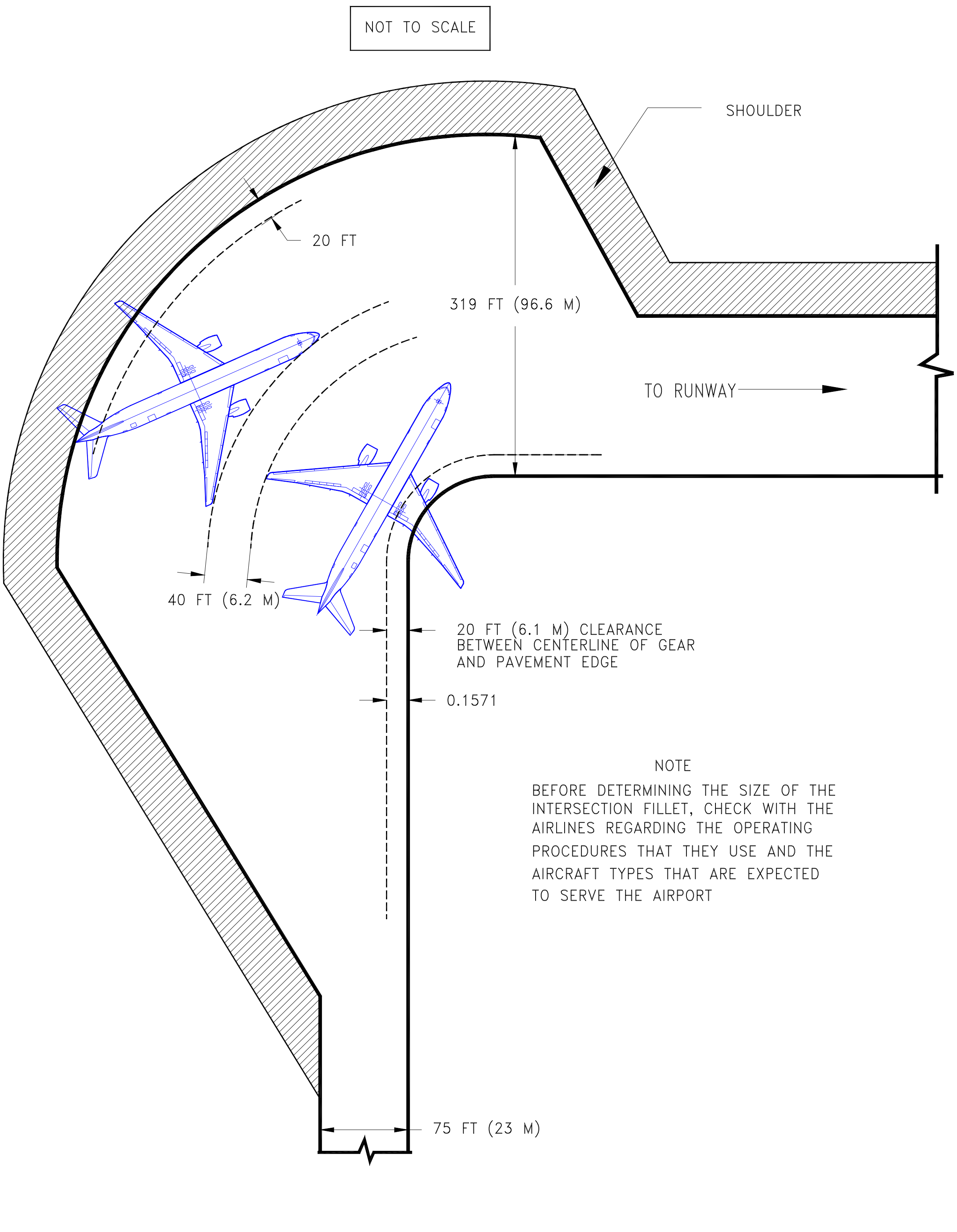
NOTES:

- BEFORE DETERMINING THE SIZE OF THE INTERSECTION FILLET, CHECK WITH THE AIRLINES REGARDING THE OPERATING PROCEDURES THAT THEY USE AND THE AIRCRAFT TYPES THEY ARE EXPECTED TO USE AT THE AIRPORT
- **777-300 DATA SHOWN. 777-200 DATA WOULD BE LESS STRINGENT**



4.5.5 RUNWAY AND TAXIWAY TURNPATHS - TAXIWAY-TO-TAXIWAY, 90 DEGREES, JUDGMENTAL OVERSTEERING

MODEL 777-200, -300



4.6 RUNWAY HOLDING BAY

MODEL 777-200, -300

5.0 TERMINAL SERVICING

5.1 Airplane Servicing Arrangement - Typical Turnaround

5.2 Terminal Operations - Turnaround Station

5.3 Terminal Operations - En Route Station

5.4 Ground Servicing Connections

5.5 Engine Starting Pneumatic Requirements

5.6 Ground Pneumatic Power Requirements

5.7 Conditioned Air Requirements

5.8 Ground Towing Requirements

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.

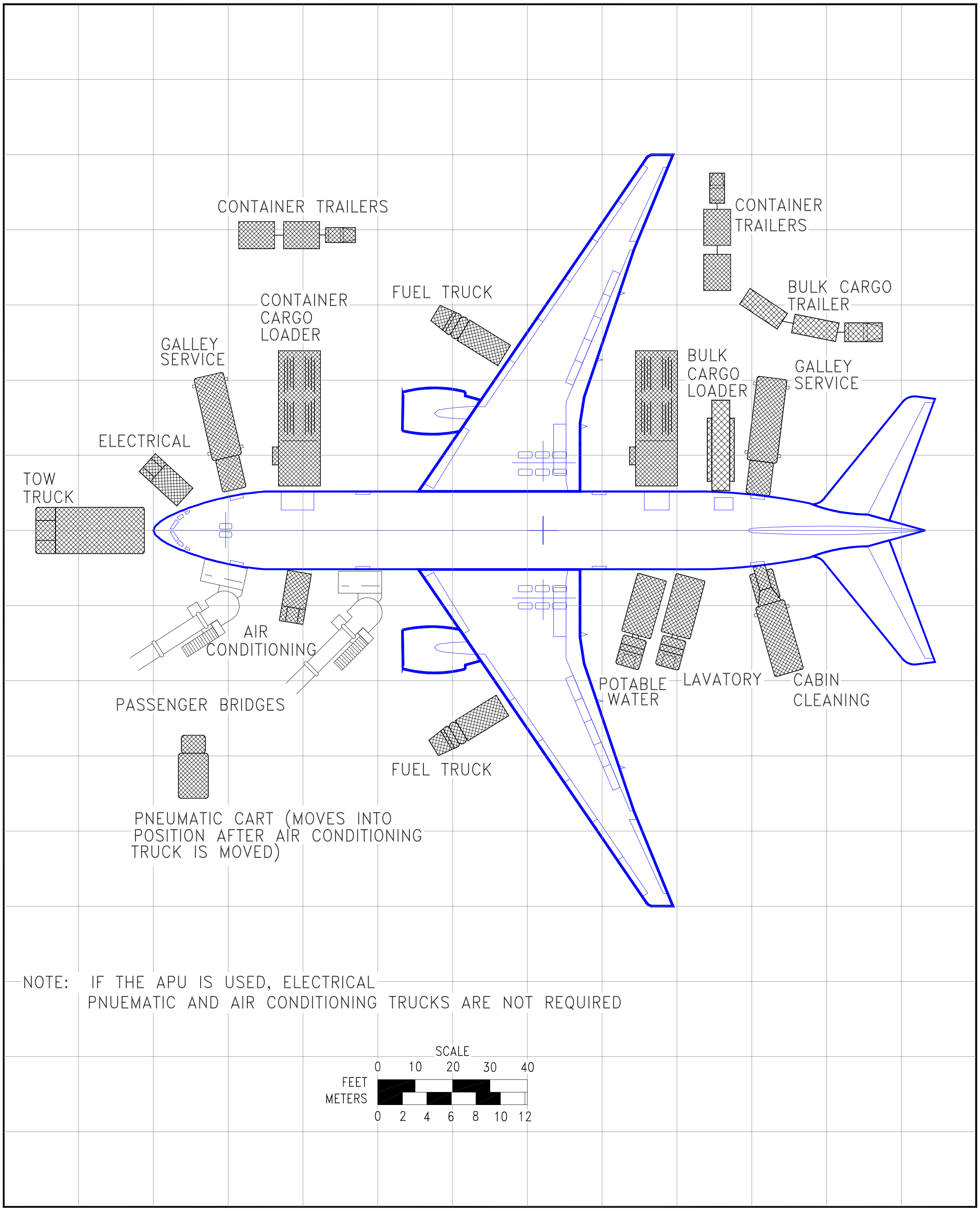
Section 5.4 shows the locations of ground service connections in graphic and in tabular forms. Typical capacities and service requirements are shown in the tables. Services with requirements that vary with conditions are described in subsequent sections.

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 air conditioning requirements for heating and cooling (pull-down and pull-up) using ground conditioned air. The curves show airflow requirements to heat or cool the airplane within a given time at ambient conditions.

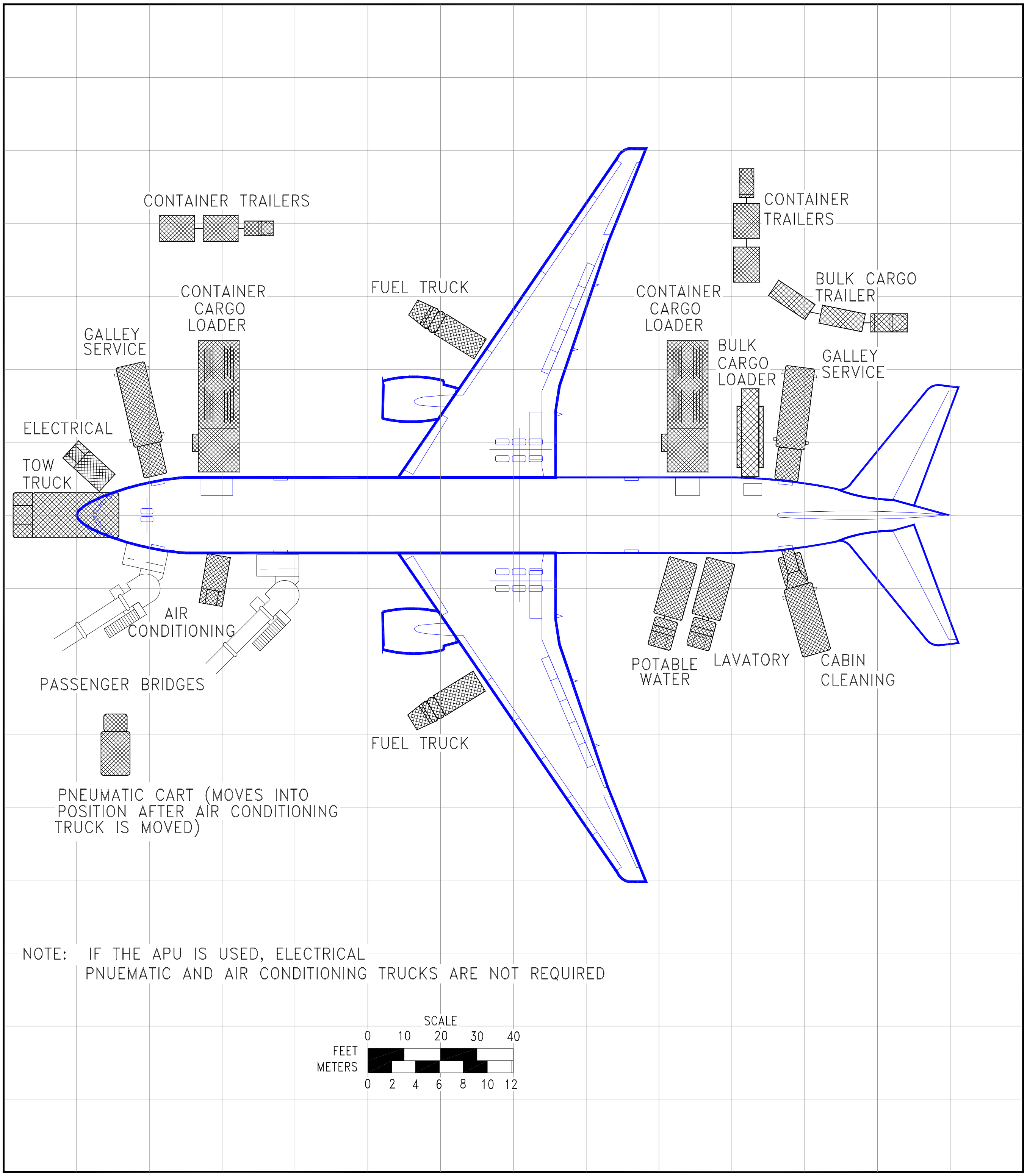
Section 5.7 shows air conditioning requirements for heating and cooling to maintain a constant cabin air temperature using low pressure conditioned air. This conditioned air is supplied through an 8-in ground air connection (GAC) directly to the passenger cabin, bypassing the air cycle machines.

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



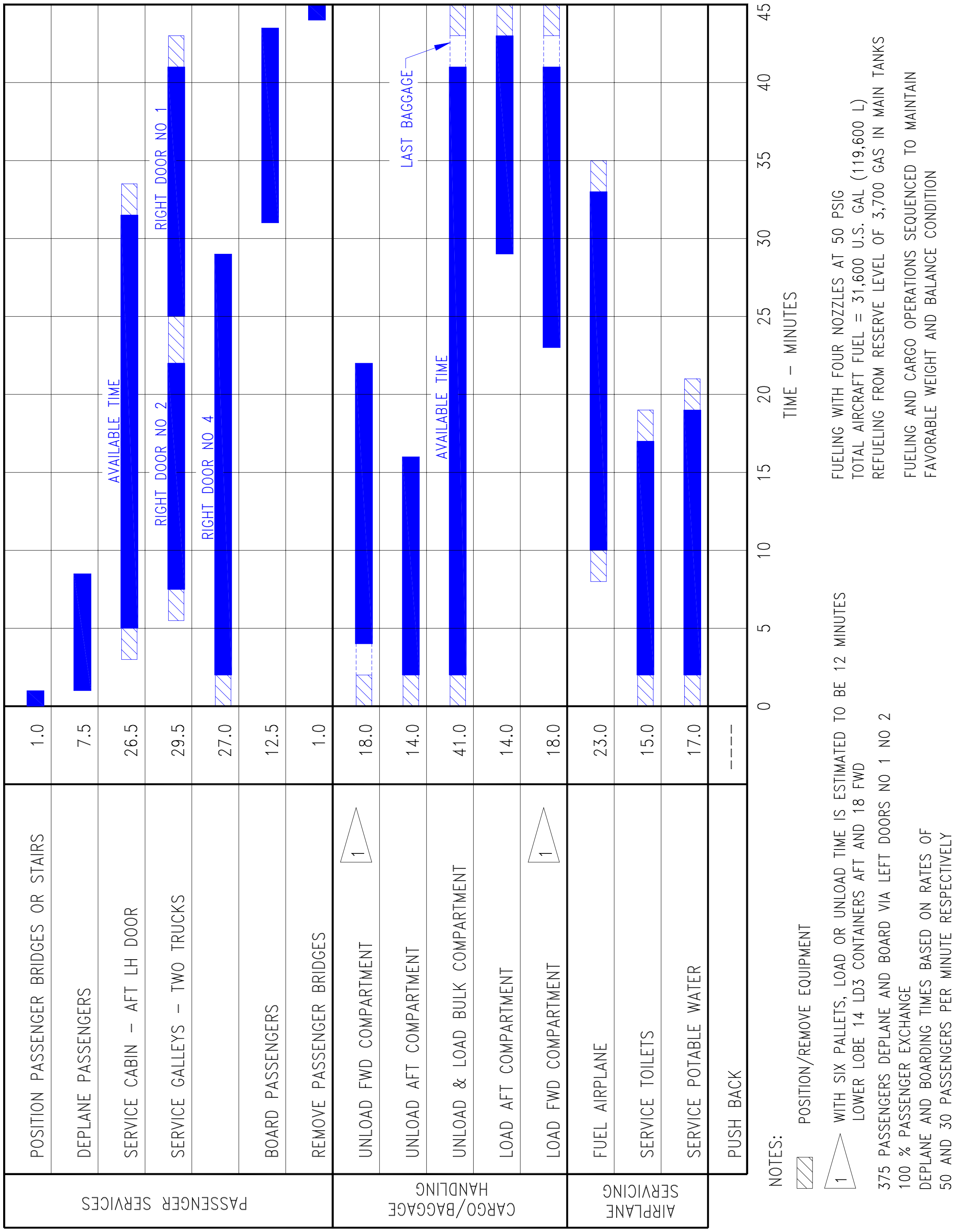
5.1.1 AIRPLANE SERVICING ARRANGEMENT - TYPICAL TURNAROUND

MODEL 777-200



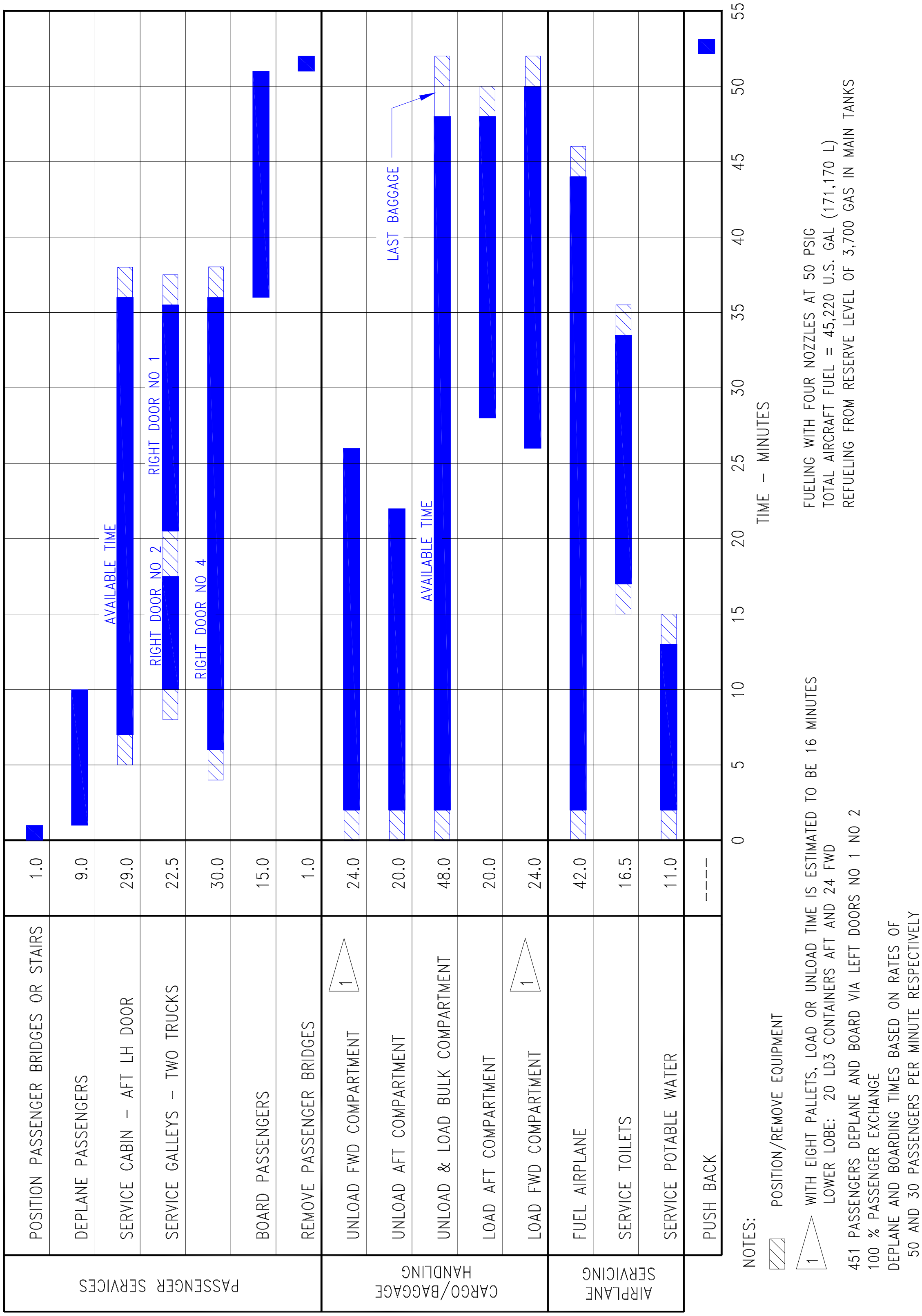
5.1.2 AIRPLANE SERVICING ARRANGEMENT - TYPICAL TURNAROUND

MODEL 777-300



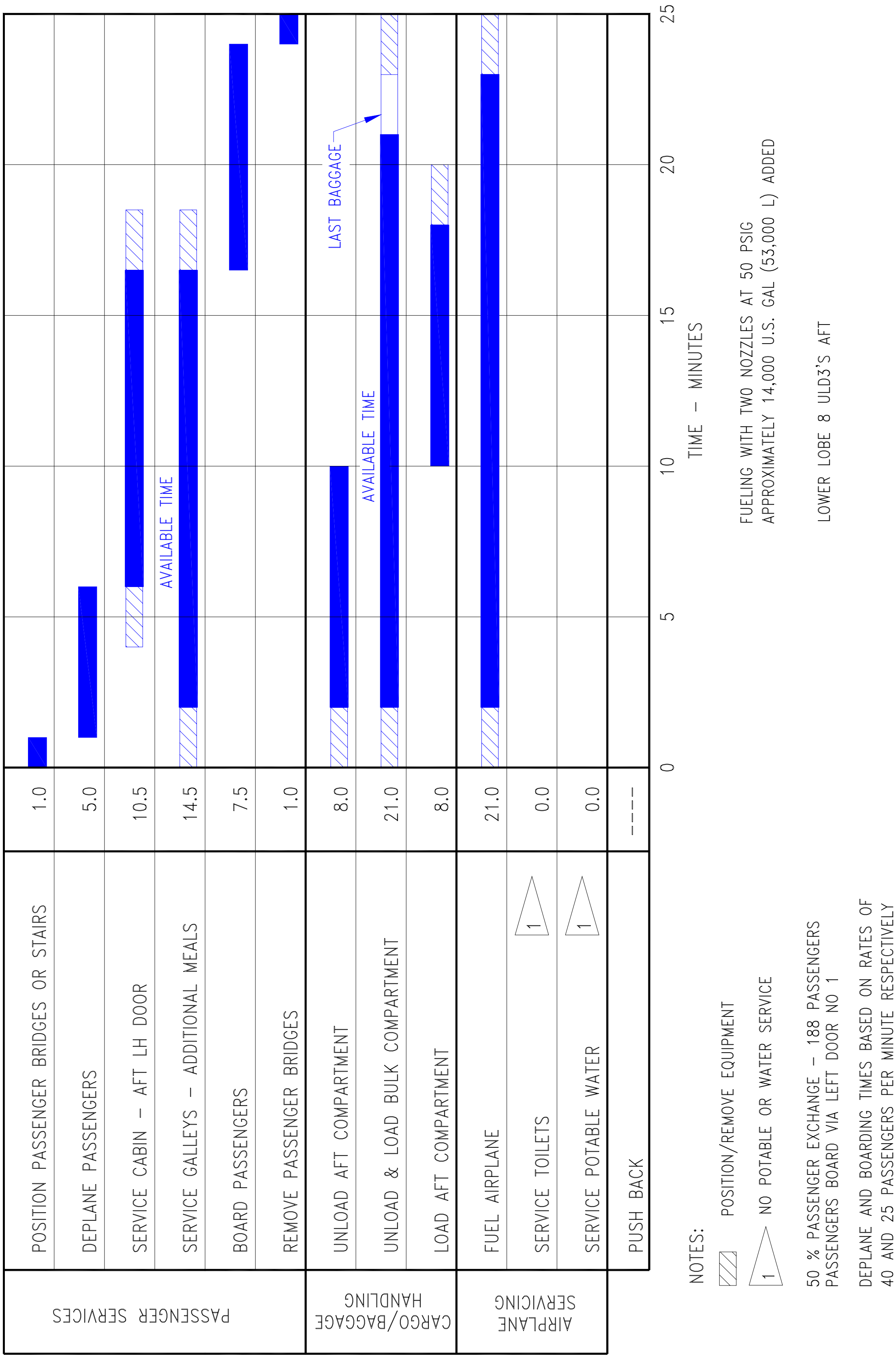
5.2.1 TERMINAL OPERATIONS - TURNAROUND STATION

MODEL 777-200



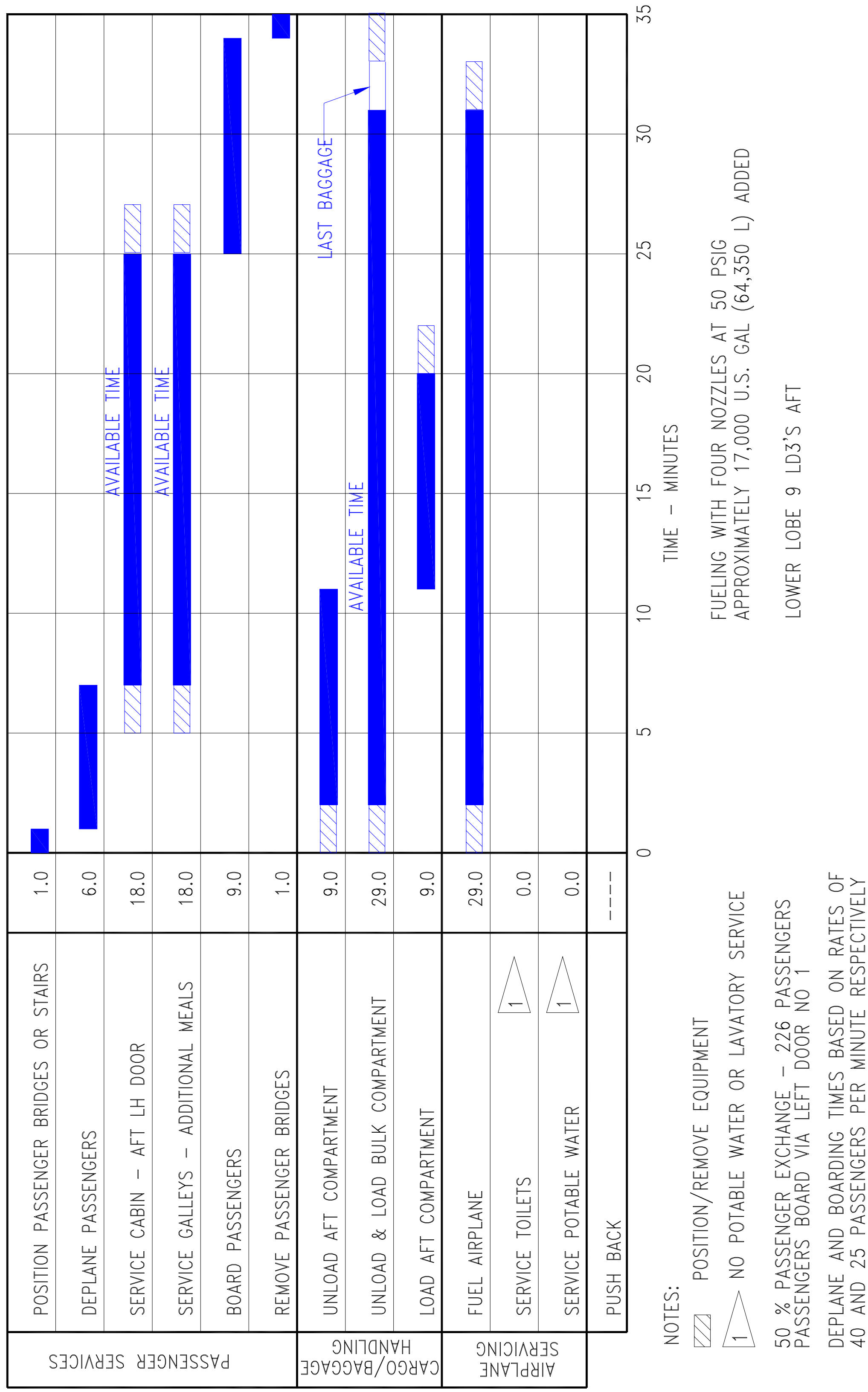
5.2.2. TERMINAL OPERATIONS - TURNAROUND STATION

MODEL 777-300



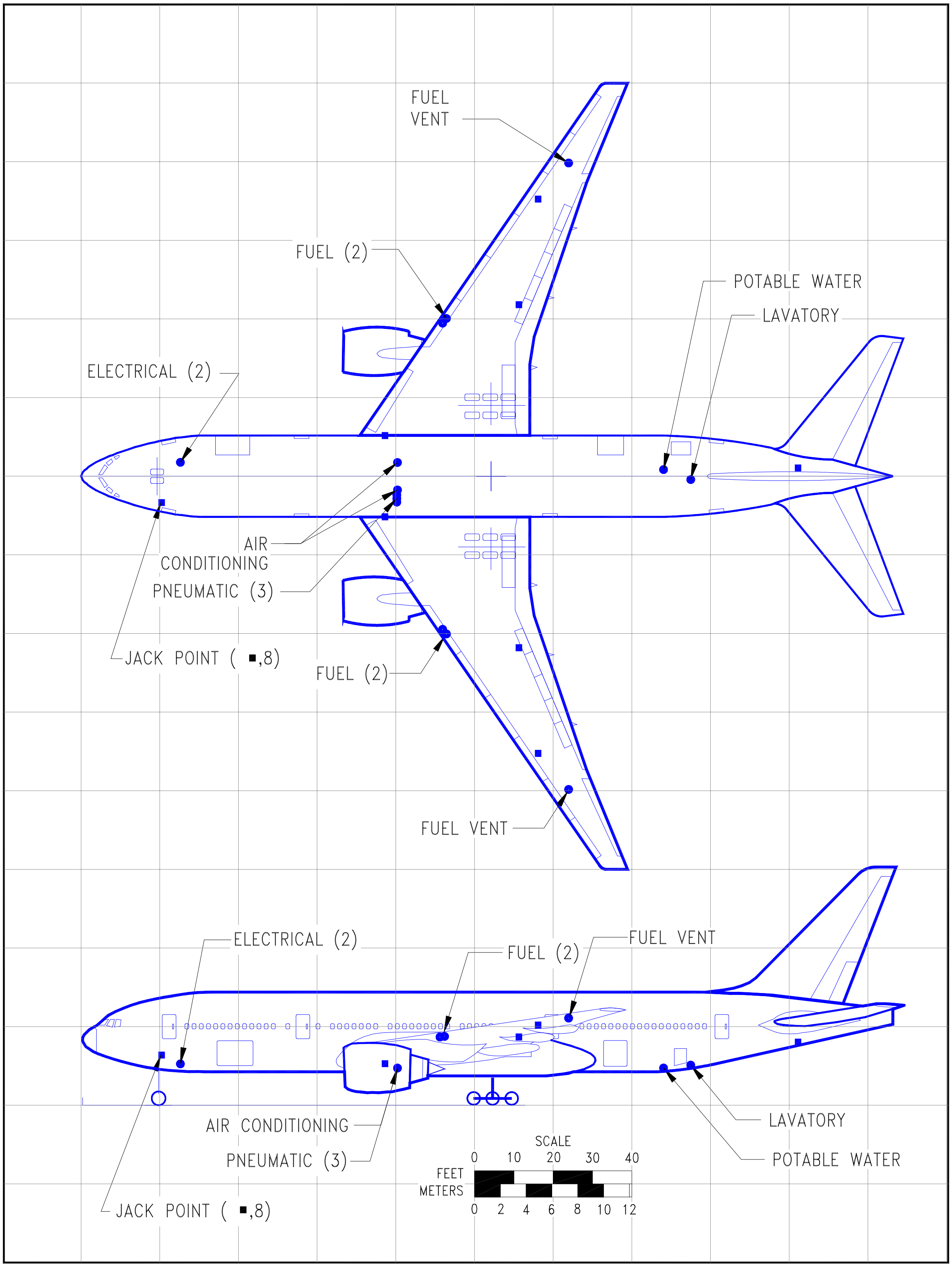
5.3.1 TERMINAL OPERATIONS - EN ROUTE STATION

MODEL 777-200

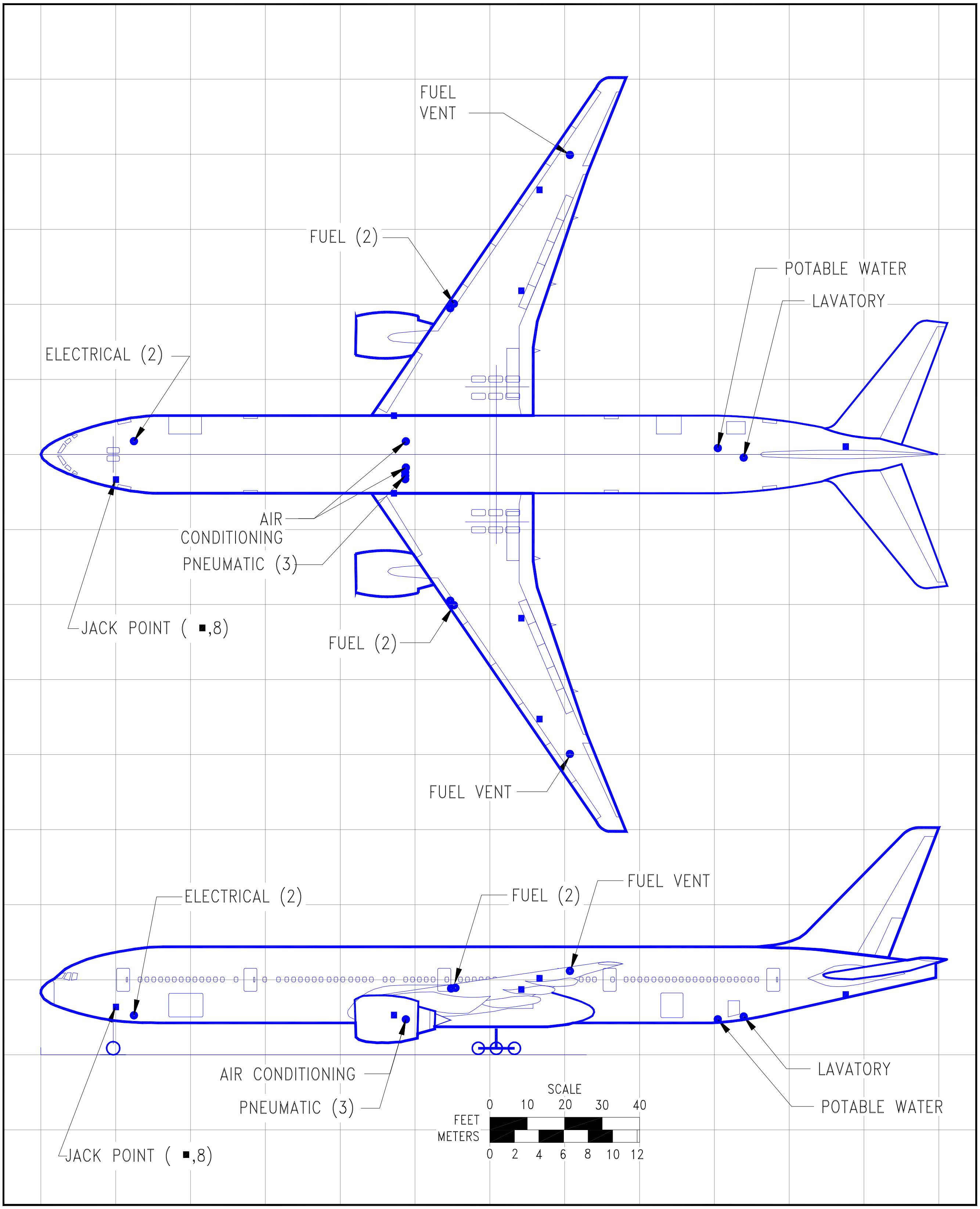


5.3.2 TERMINAL OPERATIONS - EN ROUTE STATION

MODEL 777-300



5.4 .1 GROUND SERVICING CONNECTIONS
MODEL 777-200



5.4.2 GROUND SERVICING CONNECTIONS

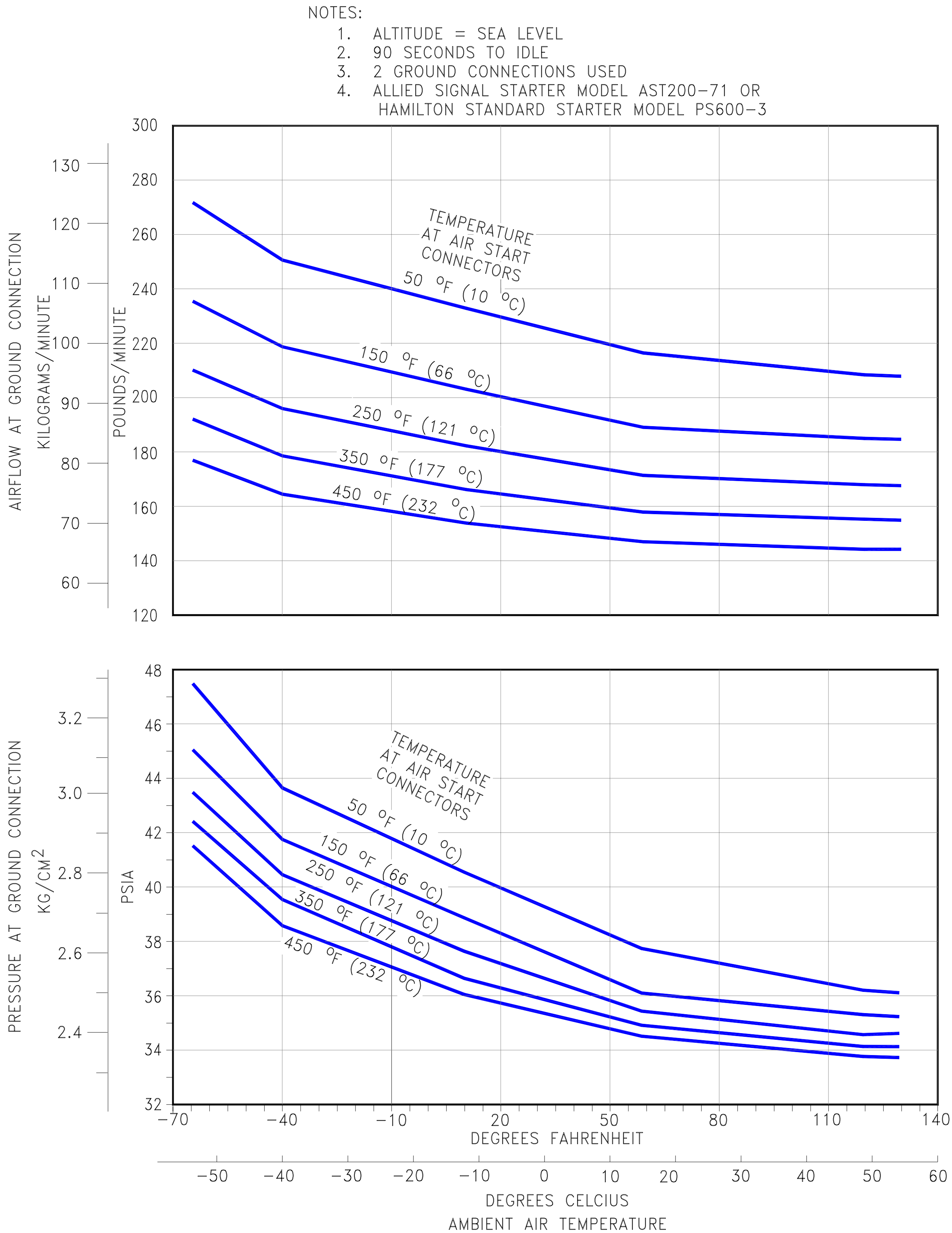
MODEL 777-300

SYSTEM	MODEL	DISTANCE AFT OF NOSE		DISTANCE FROM AIRPLANE CENTERLINE				MAX HEIGHT ABOVE GROUND	
				LH SIDE		RH SIDE			
		FT	M	FT	M	FT	M	FT	M
CONDITIONED AIR	777-200	80	24.4	3	1.1	3	1.1	8	2.4
TWO 8-IN (20.3 CM) PORTS	777-300	97	29.6	3	1.1	3	1.1	8	2.4
ELECTRICAL	777-200	23	7.1	-	-	4	1.2	9	2.8
TWO CONNECTIONS 90 KVA , 200/115 V AC 400 HZ, 3-PHASE EACH	777-300	23	7.1	-	-	4	1.2	9	2.8
FUEL	777-200	92	28.1	39	11.9	39	11.9	19	5.6
		94	28.5	41	12.5	41	12.5	19	5.6
TWO UNDERWING PRESSURE CONNECTORS ON EACH WING	777-300	110	33.5	39	11.9	39	11.9	19	5.6
		111	33.9	41	12.5	41	12.5	19	5.6
TANK CAPACITIES (BASIC 777-200) LEFT MAIN = 9,300 GAL (35,200 L) CENTER = 12,400 GAL (46,900 L) RIGHT MAIN = 9,300 GAL (35,200 L) TOTAL = 31,000 GAL (117,300 L) TANK CAPACITIES (HIGH GR. WT 777-200 AND ALL 777-300.) LEFT MAIN = 9,300 GAL (35,200 L) CENTER = 12,400 GAL (46,900 L) CTR WING =13,700 GAL (51,800 L) RIGHT MAIN = 9,300 GAL (35,200 L) TOTAL = 44,700 GAL (169,200 L)									
FUEL VENTS	777-200	125	38.1	80	24.4	80	24.4	22	6.7
	777-300	142	43.3	80	24.4	80	24.4	22	6.7
LAVATORY	777-200	155	47.1	1	0.3	-	-	11	3.3
ONE SERVICE CONNECTION	777-300	181	55.2	1	0.3	-	-	11	3.3
PNEUMATIC	777-200	80	24.4	5	1.5	-	-	8	2.4
		80	24.4	6	1.7	-	-	8	2.4
THREE 3-IN(7.6-CM) PORTS		80	24.4	7	2.0	-	-	8	2.4
	777-300	97	29.6	5	1.5	-	-	8	2.4
		97	29.6	6	1.7	-	-	8	2.4
		97	29.6	7	2.0	-	-	8	2.4
POTABLE WATER	777-200	29	8.8	4	1.3	-	-	9	2.8
		147	44.9	-	-	3	1.0	10	3.0
ONE SERVICE CONNECTION FWD LOCATION (OPTIONAL)	777-300	29	8.8	4	1.3	-	-	9	2.8
AFT LOCATION (BASIC)		181	55.1	-	-	3	1.0	10	3.0

NOTE: DISTANCES ROUNDED TO THE NEAREST FOOT AND 0.1 METER.

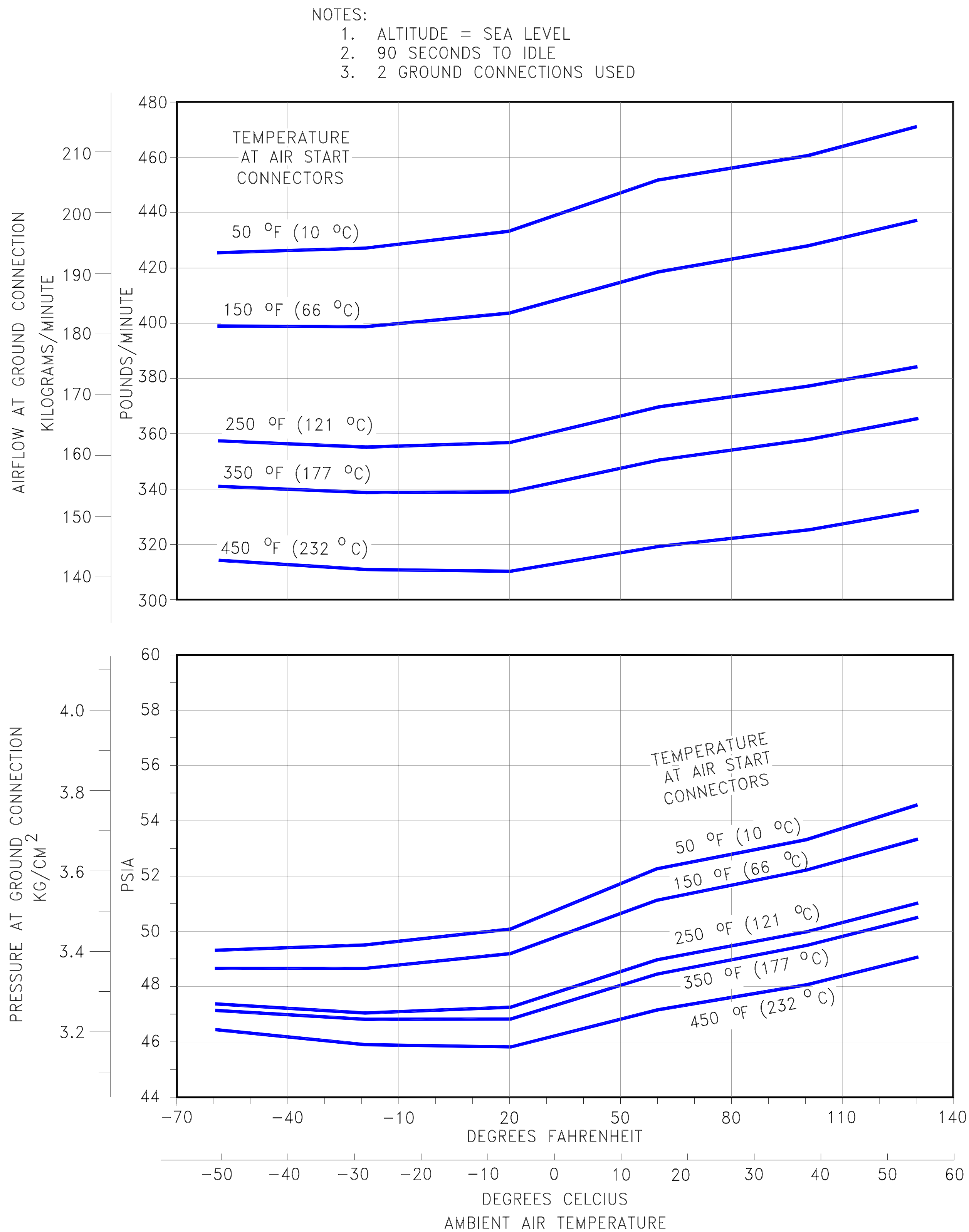
5.4.3 GROUND SERVICING CONNECTIONS AND CAPACITIES

MODEL 777-200, -300



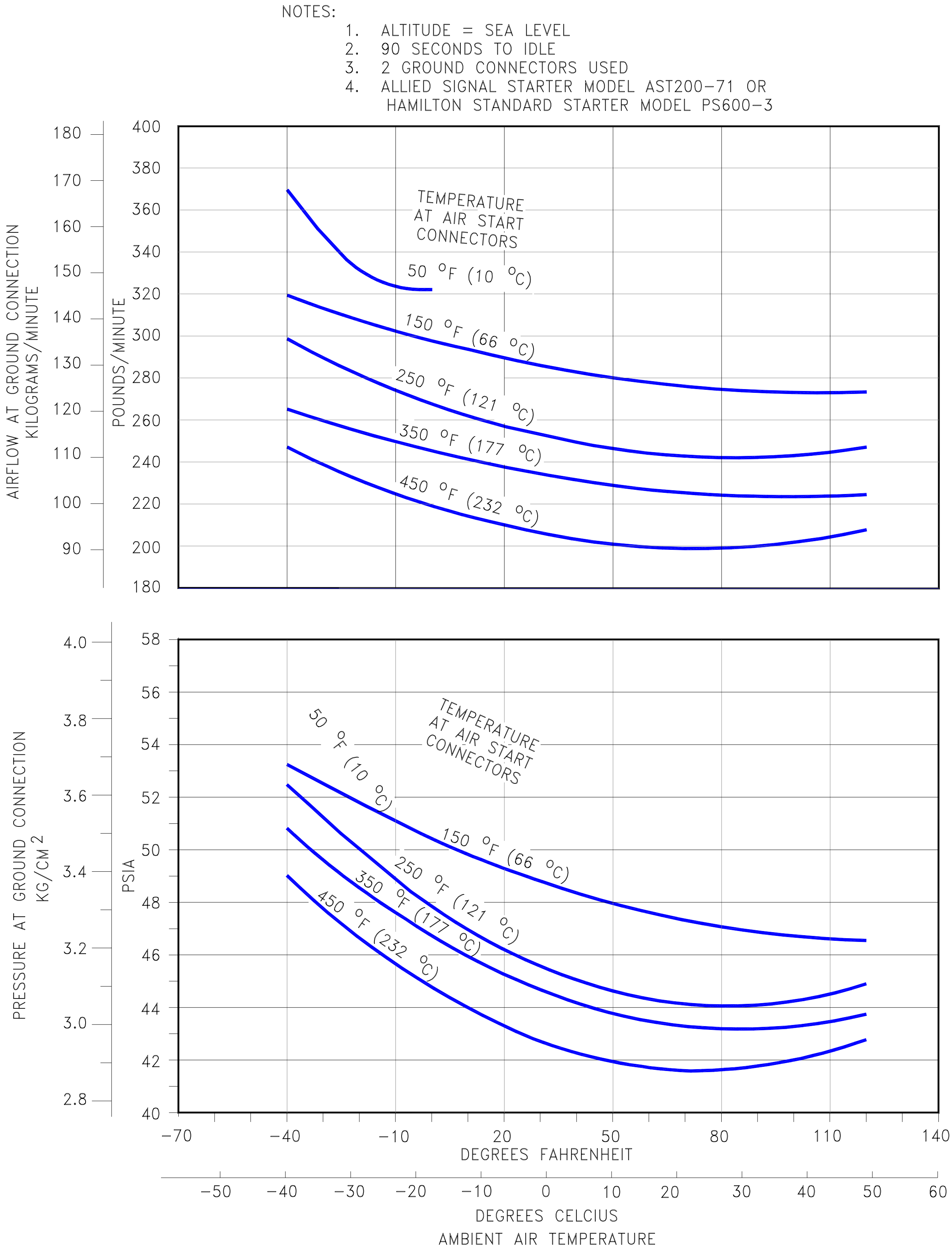
5.5.1 ENGINE START PNEUMATIC REQUIREMENTS - SEA LEVEL

MODEL 777-200, -300 (PRATT & WHITNEY ENGINES)



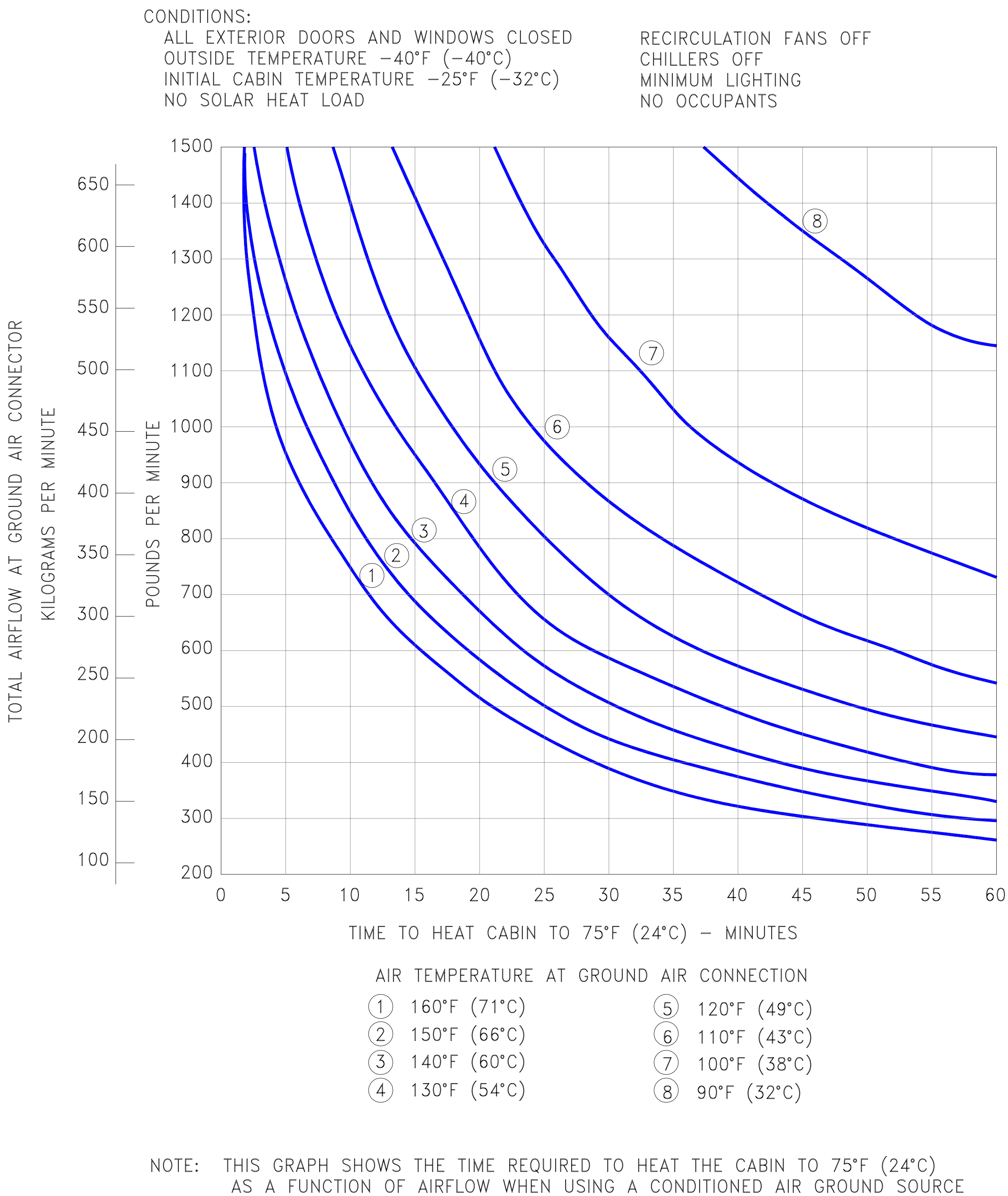
5.5.2 ENGINE START PNEUMATIC REQUIREMENTS - SEA LEVEL

MODEL 777-200, -300 (GENERAL ELECTRIC ENGINES)



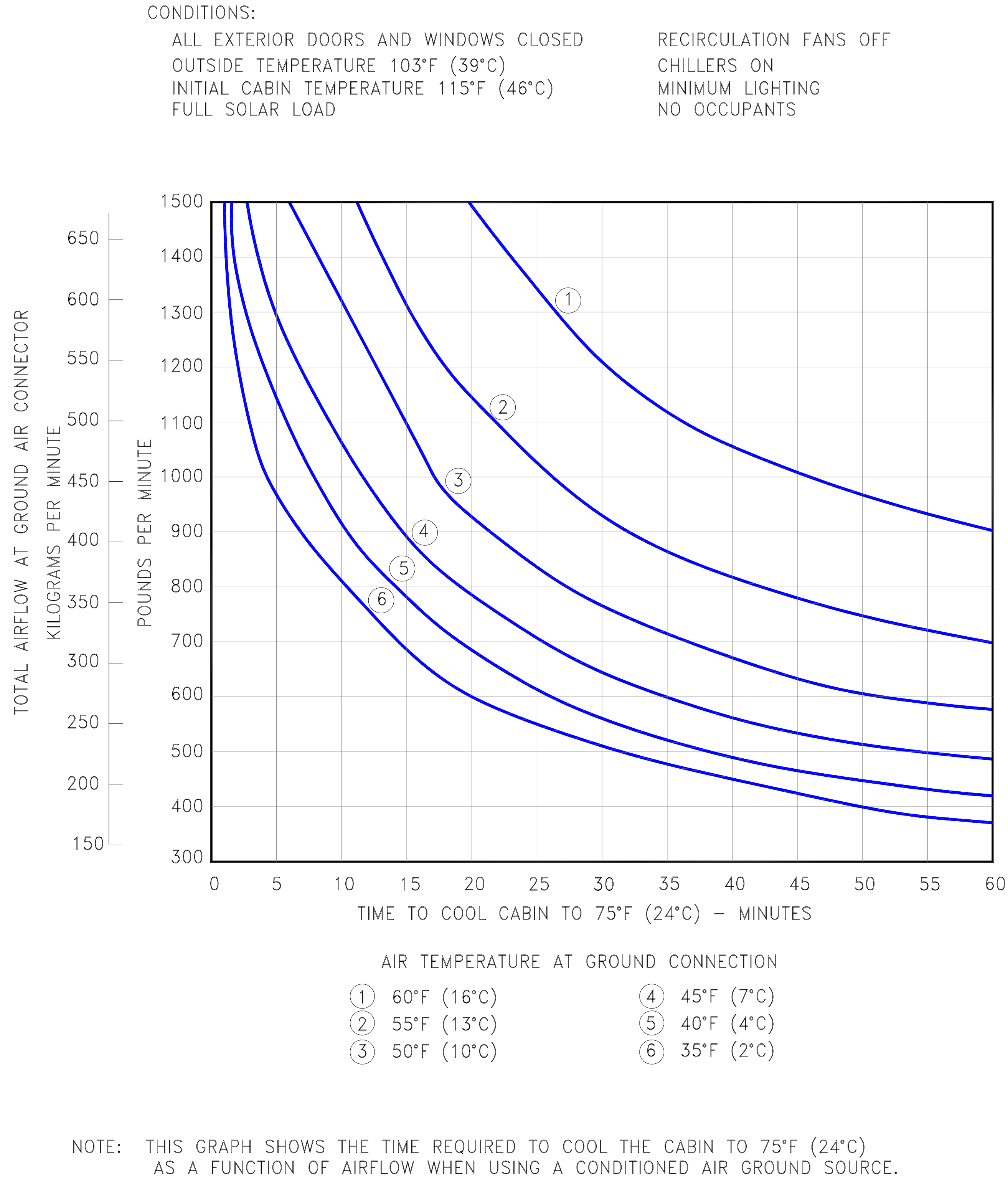
5.5.3 ENGINE START PNEUMATIC REQUIREMENTS - SEA LEVEL

MODEL 777-200 ,-300 (ROLLS-ROYCE ENGINES)



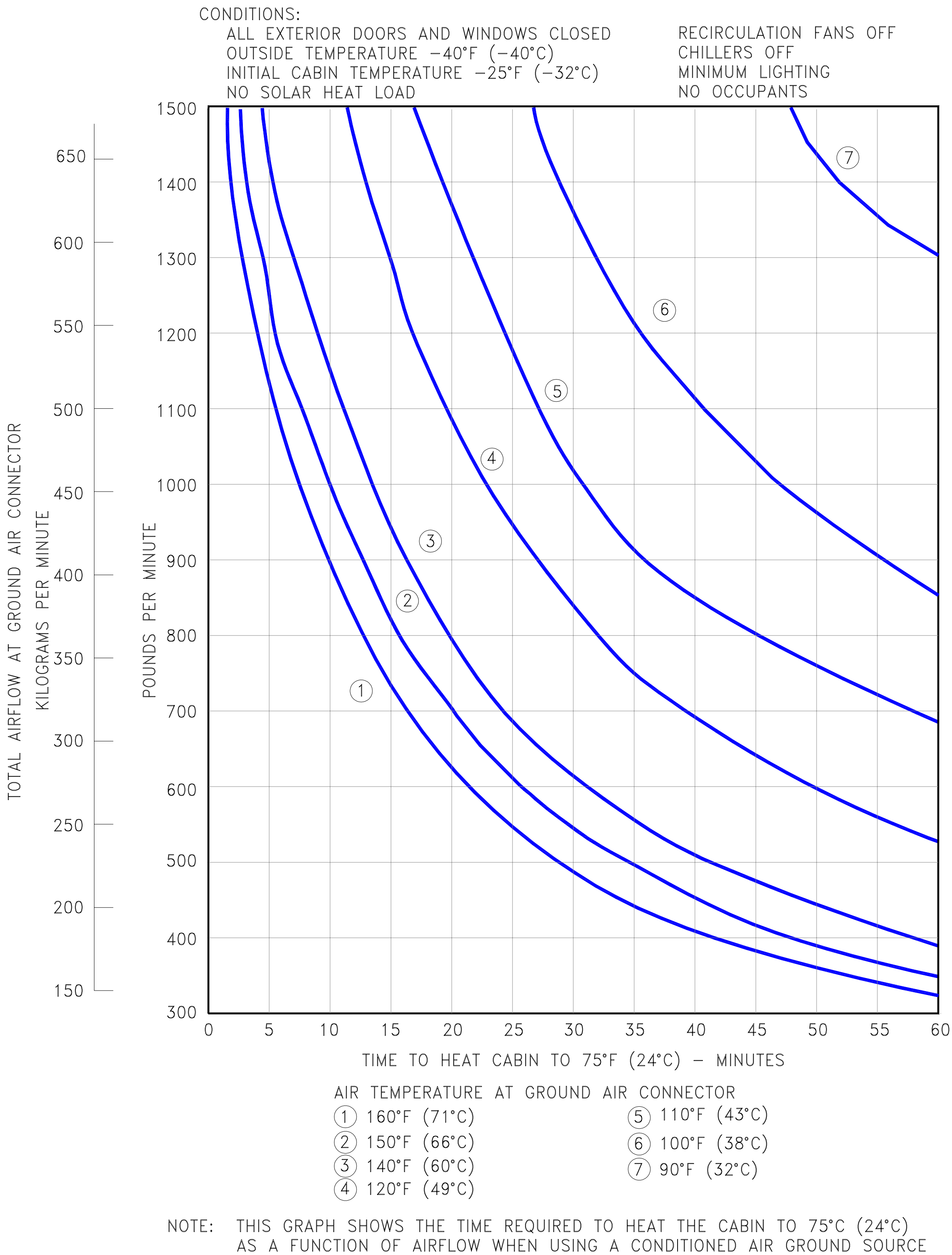
5.6.1 GROUND CONDITIONED AIR REQUIREMENTS - HEATING, PULL-UP

MODEL 777-200



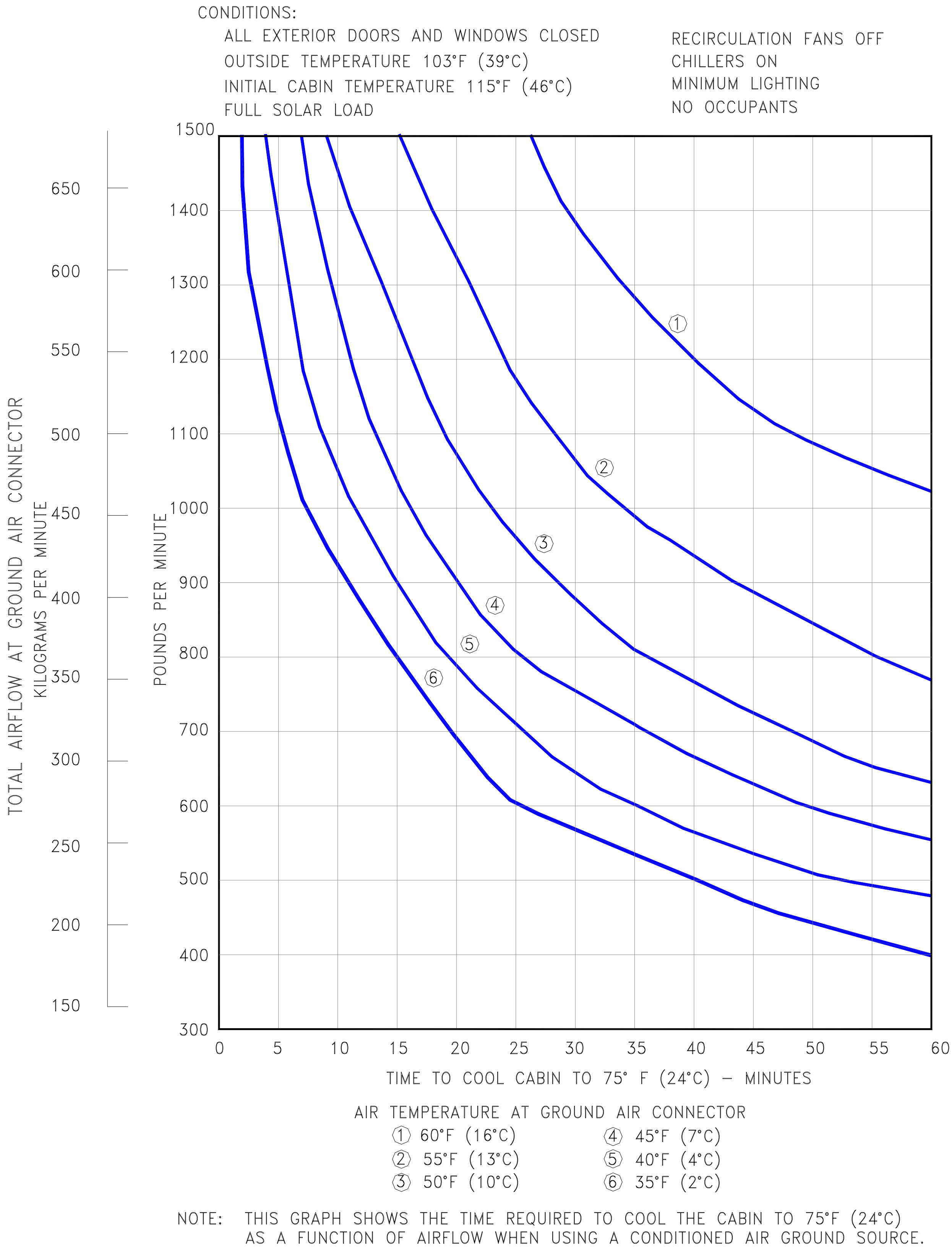
5.6.2 GROUND CONDITIONED AIR REQUIREMENTS - COOLING, PULL-DOWN

MODEL 777-200



5.6.3 GROUND CONDITIONED AIR REQUIREMENTS - HEATING, PULL-UP

MODEL 777-300



5.6.4 GROUND CONDITIONED AIR REQUIREMENTS - COOLING, PULL-DOWN

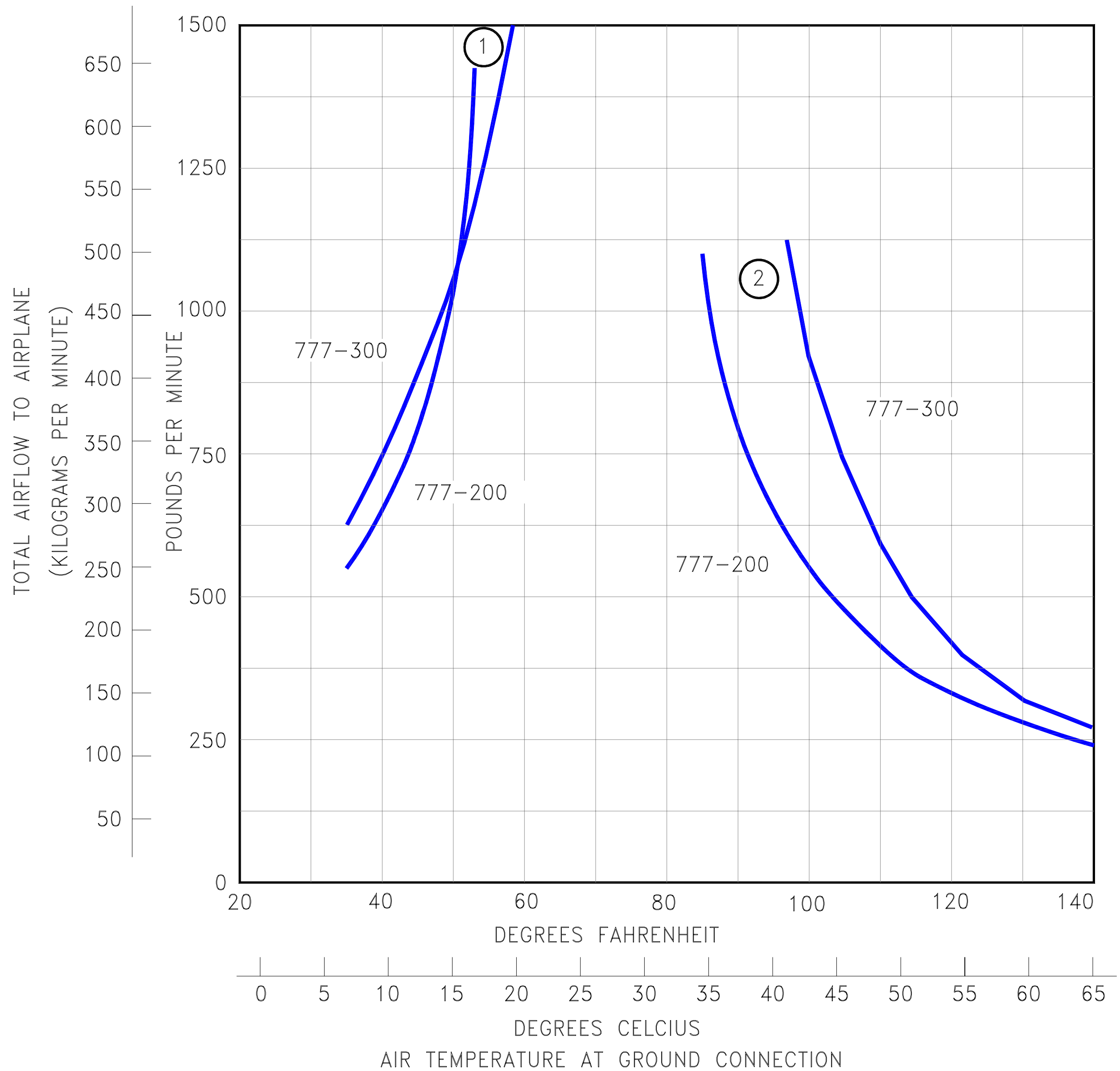
MODEL 777-300

CONDITIONS FOR LINE (1):

ALL EXTERIOR DOORS AND WINDOWS CLOSED
OUTSIDE TEMPERATURE 103° F (39° C)
FULL SOLAR AND ELECTRICAL HEAT LOADS
RECIRCULATING FANS OFF
CHILLERS ON
426 PASSENGERS (777-200)
505 PASSENGERS (777-300)
CABIN TEMPERATURE MAINTAINED AT
75° F (24° C)

CONDITIONS FOR LINE (2):

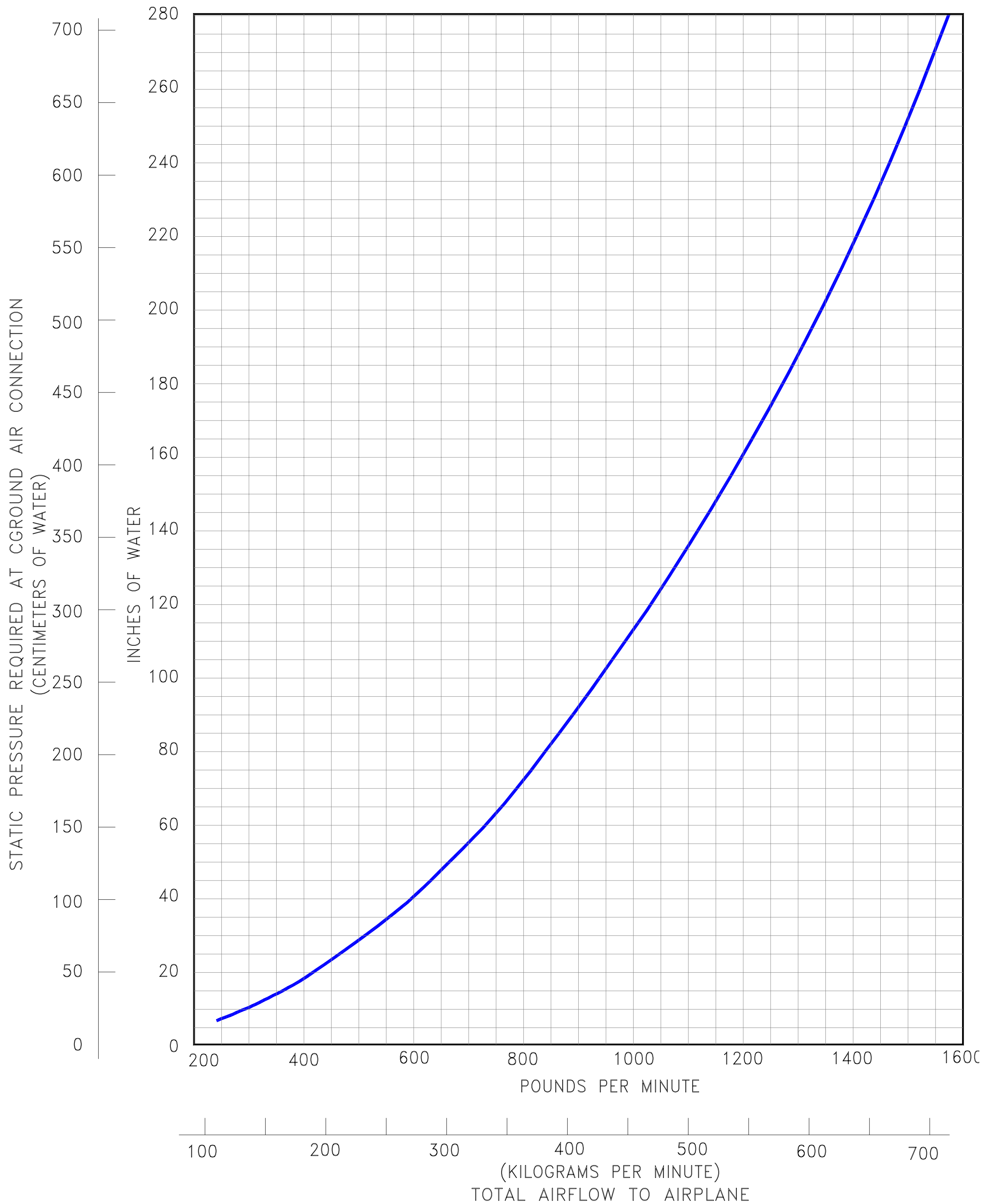
ALL EXTERIOR DOORS AND WINDOWS CLOSED
OUTSIDE TEMPERATURE -40° F (-40° C)
NO SOLAR AND ELECTRICAL HEAT LOADS
RECIRCULATING FANS OFF
CHILLERS OFF
NO PASSENGERS
CABIN TEMPERATURE MAINTAINED AT
75° F (24° C)



NOTE:
THIS GRAPH SHOWS REQUIRED AIR TEMPERATURES AT THE GROUND AIR CONNECTION IN ORDER TO MAINTAIN CABIN TEMPERATURE AT 75°F (24°C)

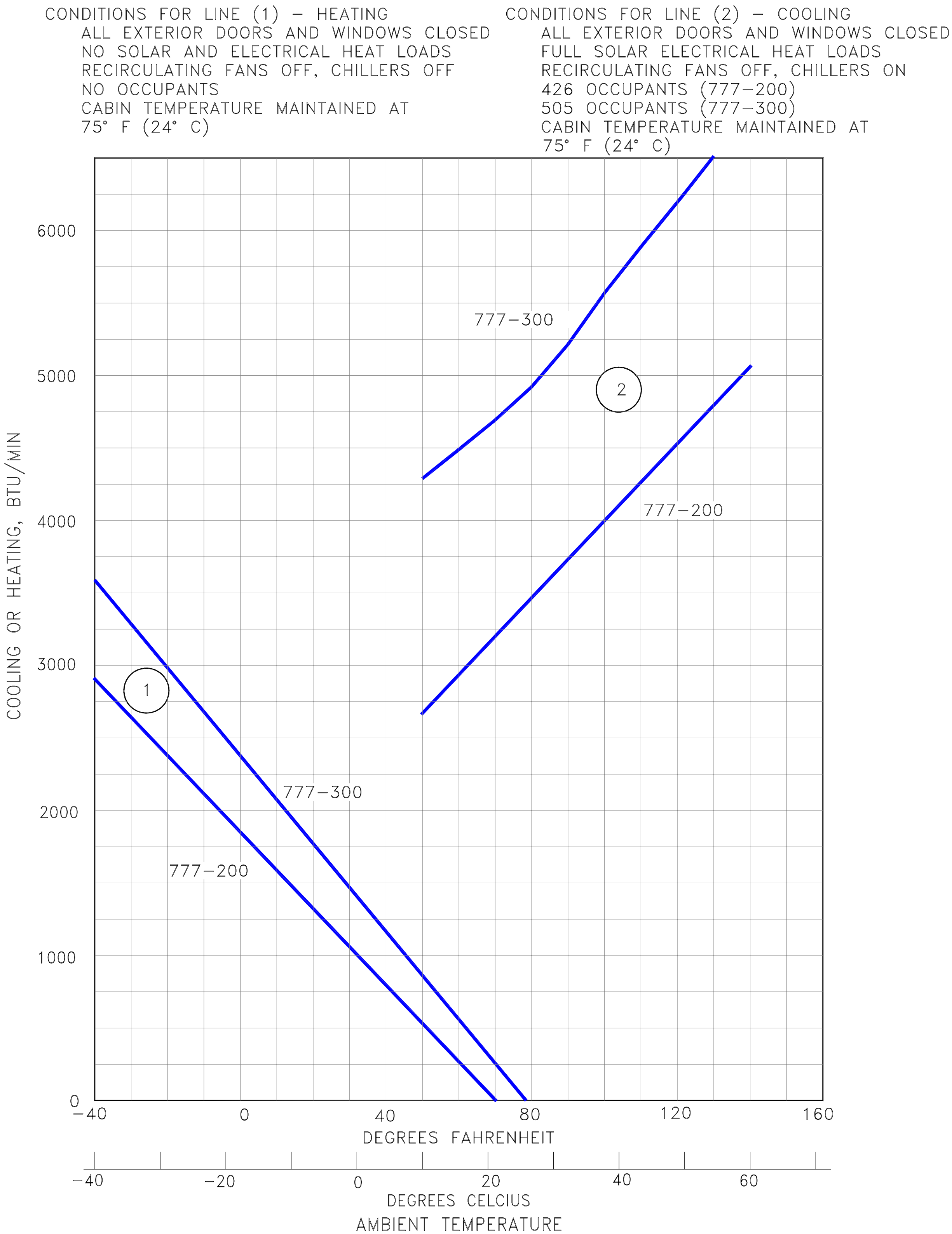
5.7.1 CONDITIONED AIR FLOW REQUIREMENTS - STEADY STATE AIRFLOW

MODEL 777-200, -300



5.7.2 AIR CONDITIONING GAGE PRESSURE REQUIREMENTS - STEADY STATE AIRFLOW

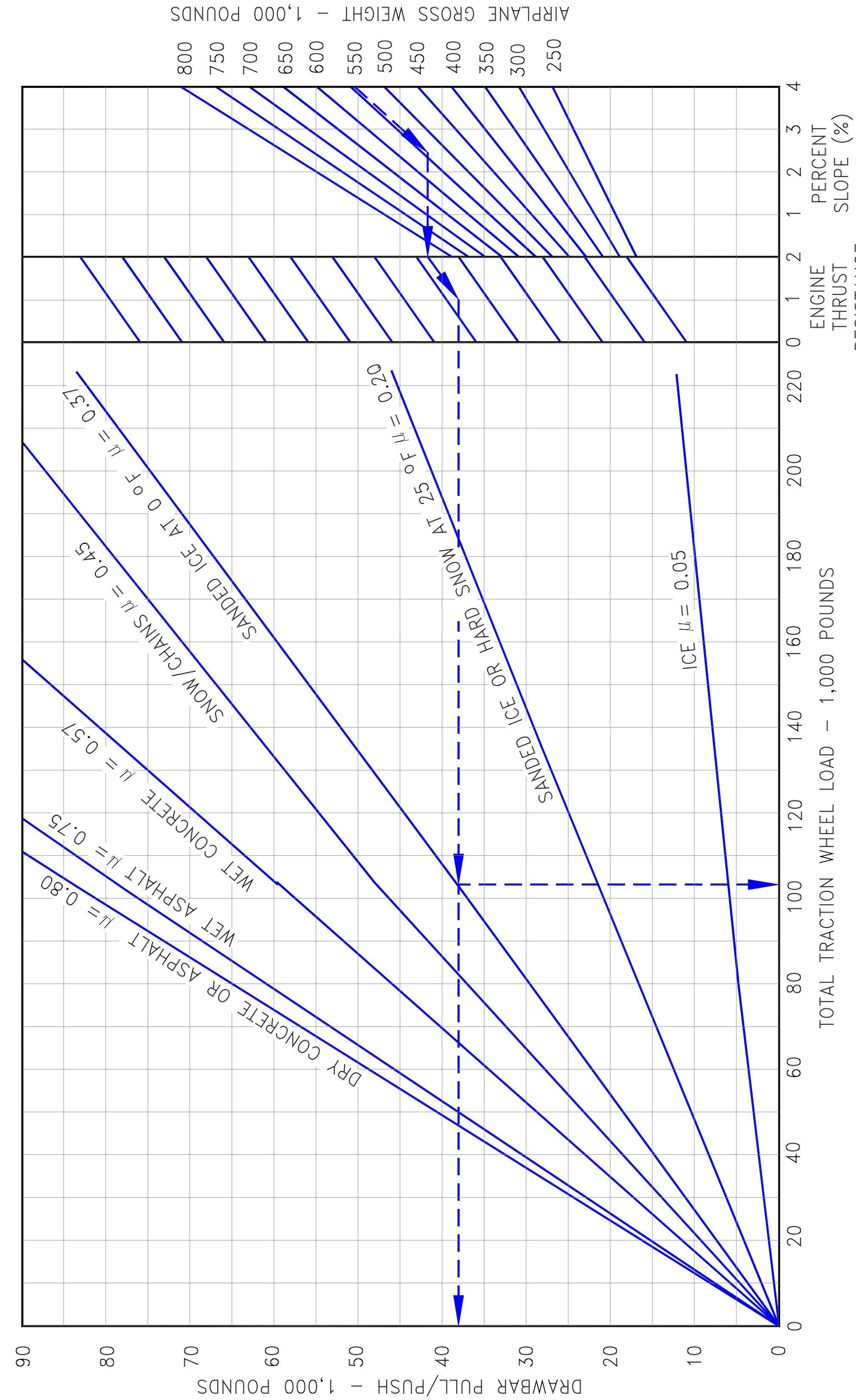
MODEL 777-200, -300



NOTE: THIS GRAPH SHOWS REQUIRED COOLING AND HEATING BTU'S AS A FUNCTION OF AMBIENT TEMPERATURE TO MAINTAIN CABIN TEMPERATURE AT 75°F (24°C)

5.7.3 CONDITIONED AIR FLOW REQUIREMENTS - STEADY STATE BTU'S

MODEL 777-200, -300

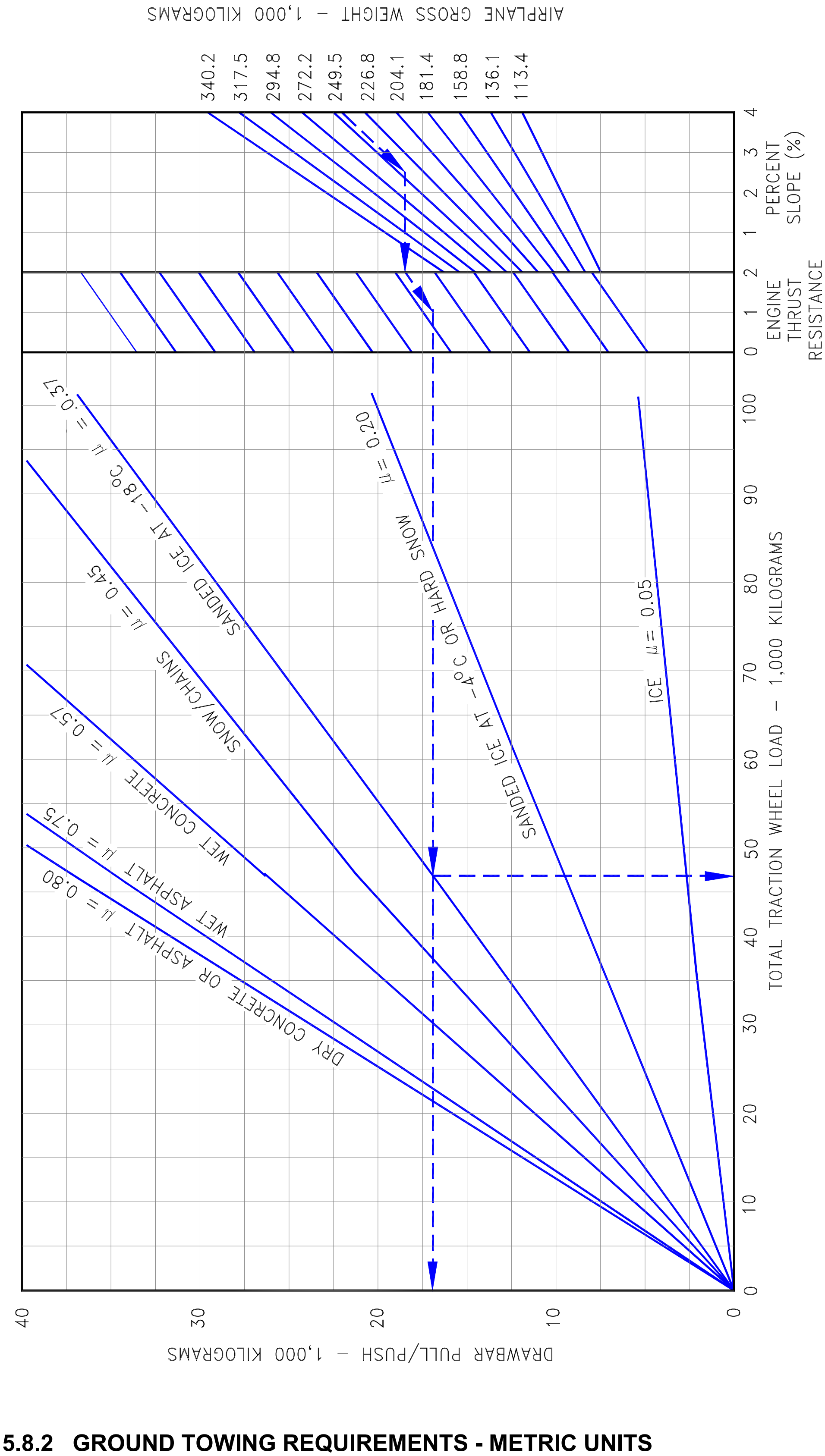


NOTES:

1. EXAMPLE – – – SHOWS A 777 WEIGHING 537,000 LB BEING PUSHED UP A 2.5° SLOPE ON SANDED ICE AT 0°F BACKING AGAINST ONE ENGINE AT IDLE THRUST. 38,385 LB OF DRAWBAR PUSH AND A WHEEL TRACTION LOAD OF 103,743 LB ARE REQUIRED FOR TOWING.
2. UNUSUAL BREAKAWAY CONDITIONS NOT SHOWN
3. STRAIGHT-LINE TOW
4. COEFFICIENTS OF FRICTION (μ) ARE ESTIMATED FOR RUBBER-TIRED VEHICLES

5.8.1 GROUND TOWING REQUIREMENTS - ENGLISH UNITS

MODEL 777-200, -300



NOTES:

1. EXAMPLE — — — SHOWS A 777 WEIGHING 243,500 KG BEING PUSHED UP A 2.5% SLOPE ON SANDED ICE AT 0°C BACKING AGAINST ONE ENGINE AT IDLE THRUST. 17,400 KG OF DRAWBAR PUSH AND A WHEEL TRACTION LOAD OF 47,100 KG ARE REQUIRED FOR TOWING.
2. UNUSUAL BREAKAWAY CONDITIONS NOT SHOWN
3. STRAIGHT-LINE TOW
4. COEFFICIENTS OF FRICTION (μ) ARE ESTIMATED FOR RUBBER-TIRED VEHICLES

5.8.2 GROUND TOWING REQUIREMENTS - METRIC UNITS

MODEL 777-200, -300

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6.0 JET ENGINE WAKE AND NOISE DATA

6.1 Jet Engine Exhaust Velocities and Temperatures

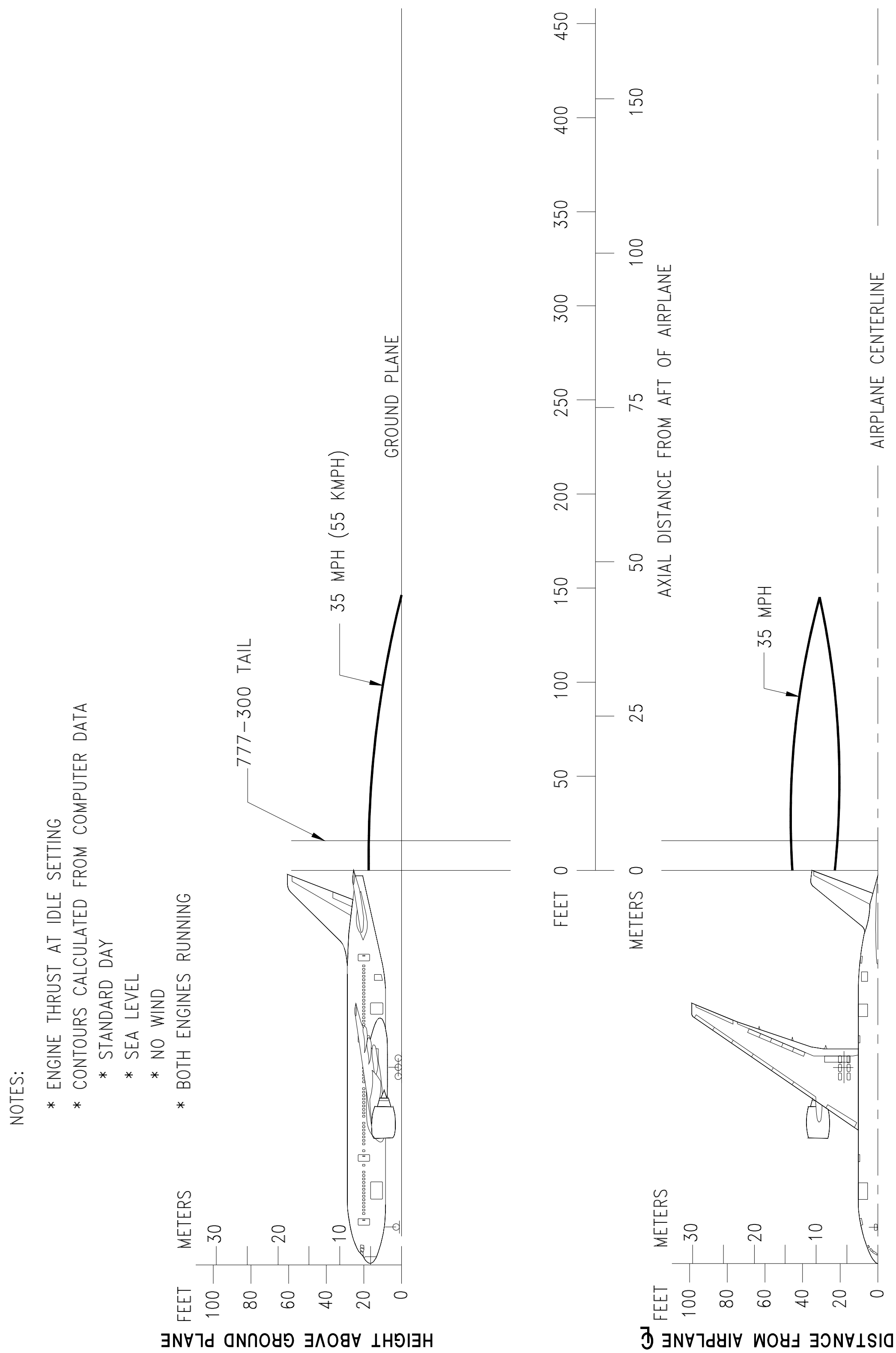
6.2 Airport and Community Noise

6.0 JET ENGINE WAKE AND NOISE DATA

6.1 Jet Engine Exhaust Velocities and Temperatures

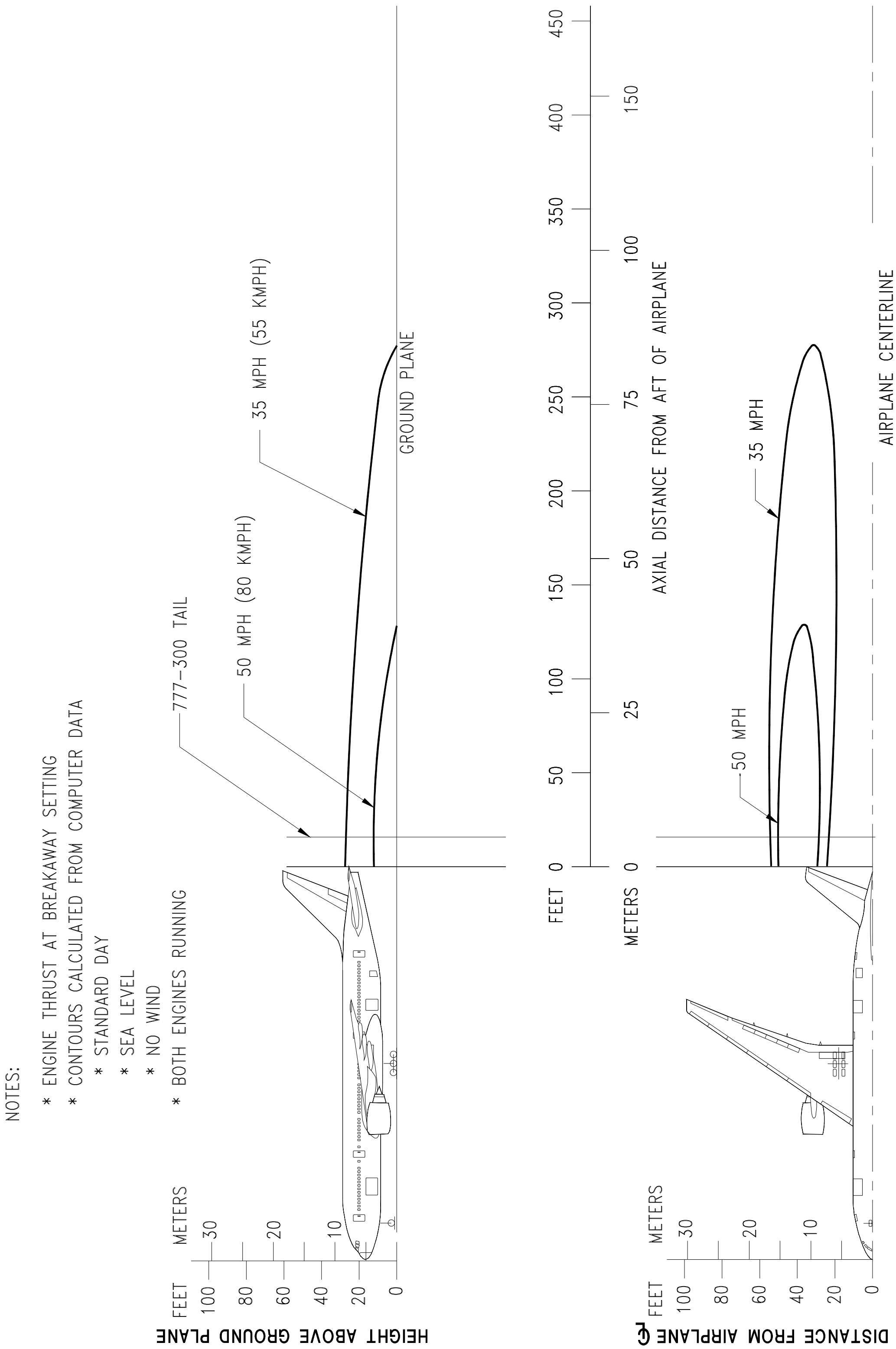
This section shows exhaust velocity and temperature contours aft of the 777-300. The contours were calculated from a standard computer analysis using three-dimensional viscous flow equations with mixing of primary, fan, and free-stream flow. The presence of the ground plane is included in the calculations 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 lateral velocity and therefore are not included.

The graphs show jet wake velocity and temperature contours for a representative engine . The results 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.



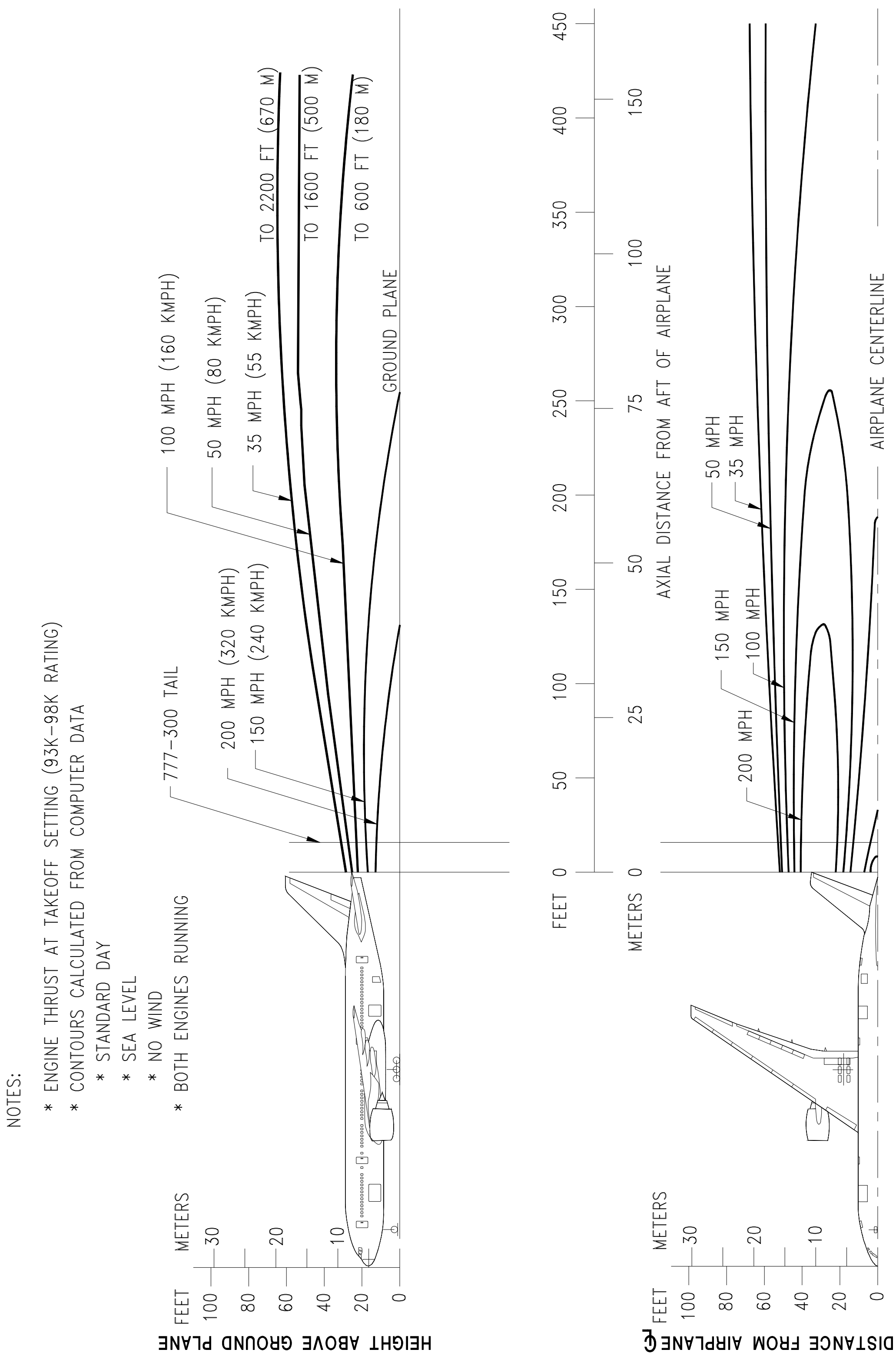
6.1.1 PREDICTED JET ENGINE EXHAUST VELOCITY CONTOURS - IDLE THRUST

MODEL 777-200,-300



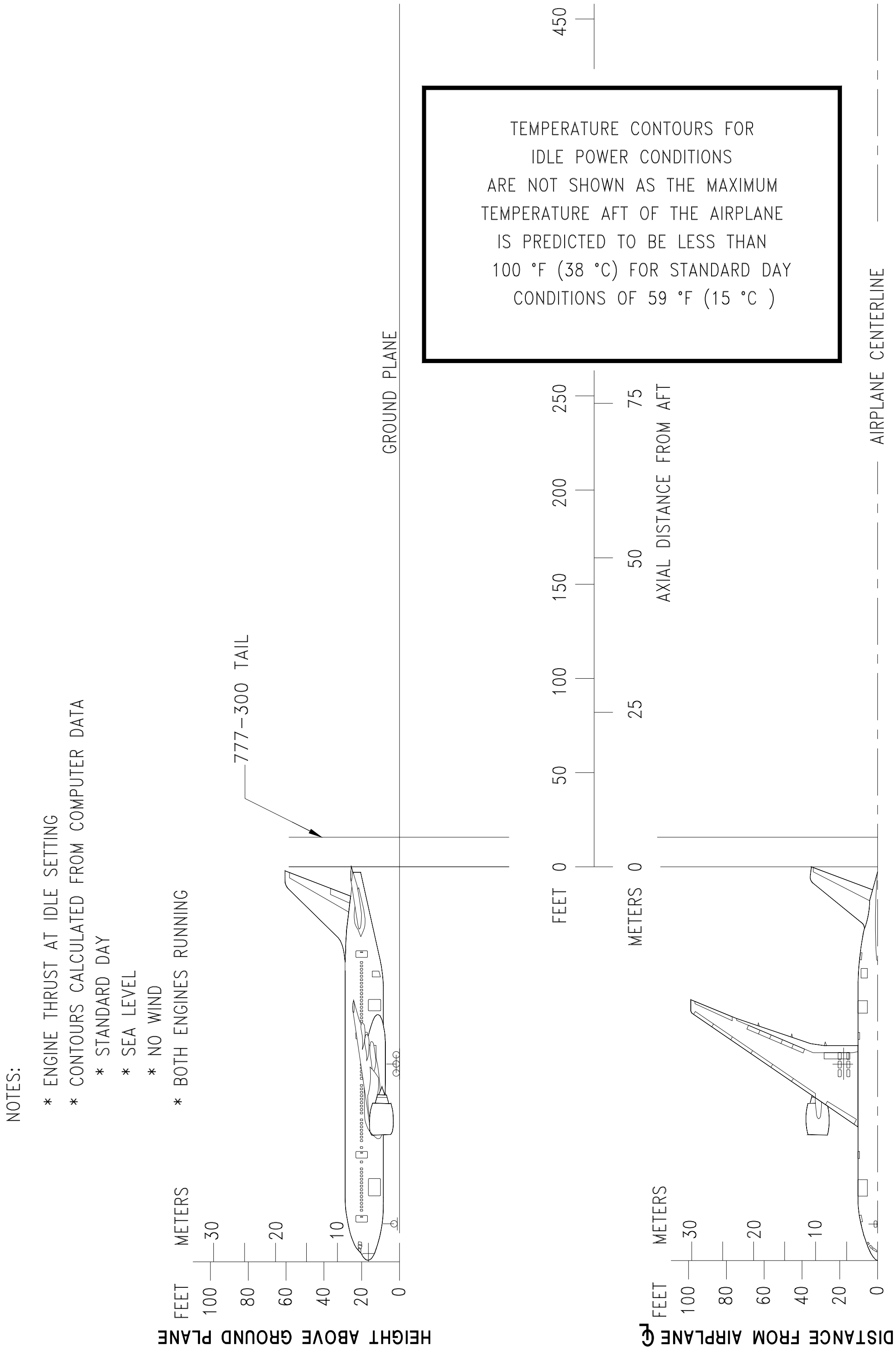
6.1.2 PREDICTED JET ENGINE EXHAUST VELOCITY CONTOURS - BREAKAWAY THRUST

MODEL 777-200, -300



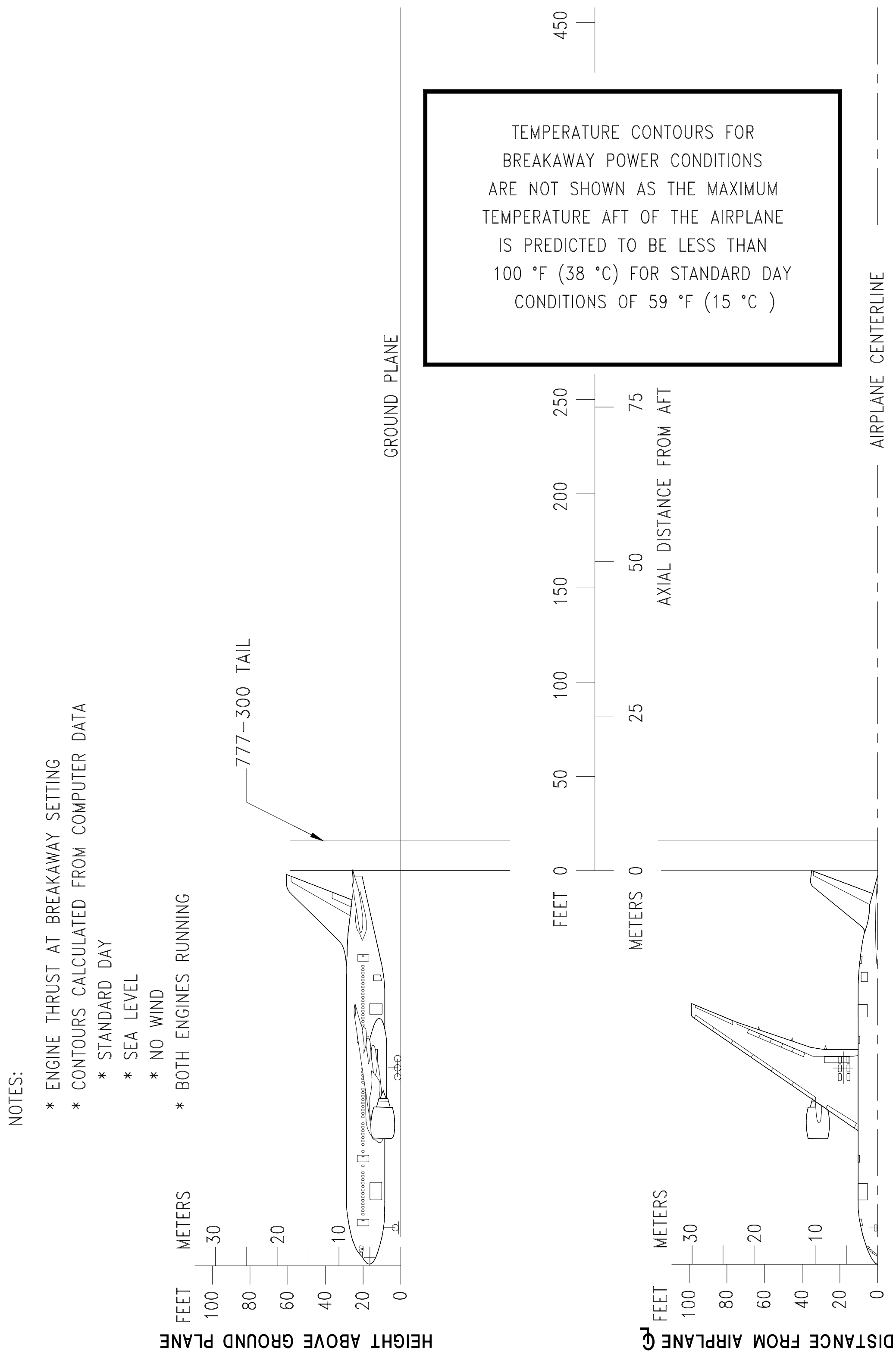
6.1.3 PREDICTED JET ENGINE EXHAUST VELOCITY CONTOURS - TAKEOFF THRUST

MODEL 777-200, -300



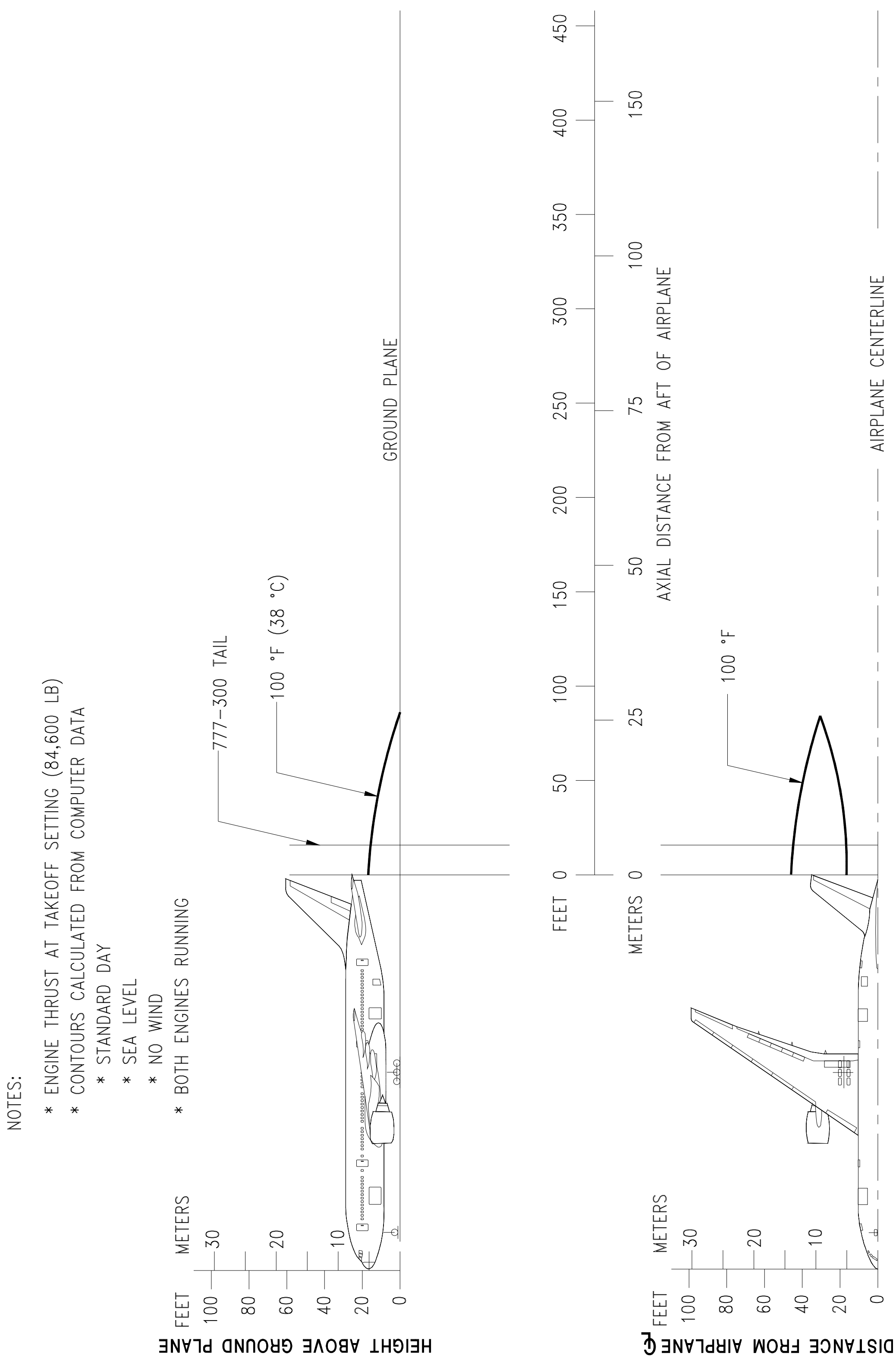
6.1.4 PREDICTED JET ENGINE EXHAUST TEMPERATURE CONTOURS - IDLE THRUST

MODEL 777-200, -300



6.1.5 PREDICTED JET ENGINE EXHAUST TEMPERATURE CONTOURS - BREAKAWAY THRUST

MODEL 777-200, -300



6.1.6 PREDICTED JET ENGINE EXHAUST TEMPERATURE CONTOURS - TAKEOFF THRUST

MODEL 777-200, -300

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.

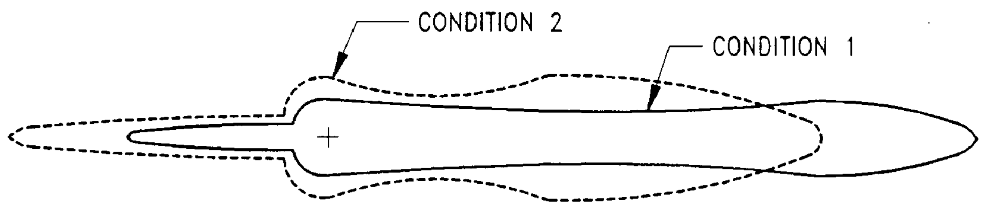
3. Surface Condition-Shielding, Extra Ground Attenuation (EGA)

(a) Terrain-If the ground slopes down after takeoff or up 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.

Condition 1

Landing	Takeoff
Maximum Structural Landing Weight	Maximum Gross Takeoff Weight
10-knot Headwind	Zero Wind
3^{o} Approach	84 ^{o}F
84 ^{o}F	Humidity 15%
Humidity 15%	



Condition 2

Landing:	Takeoff:
85% of Maximum Structural Landing Weight	80% of Maximum Gross Takeoff Weight
10-knot Headwind	10-knot Headwind
3^{o} Approach	59 ^{o}F
59 ^{o}F	Humidity 70%
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

7.1 General Information

7.2 Landing Gear Footprint

7.3 Maximum Pavement Loads

7.4 Landing Gear Loading on Pavement

7.5 Flexible Pavement Requirements - U.S. Army Corps of Engineers Method S-77-1

7.6 Flexible Pavement Requirements - LCN Conversion

7.7 Rigid Pavement Requirements - Portland Cement Association Design Method

7.8 Rigid Pavement Requirements - LCN Conversion

7.9 Rigid Pavement Requirements - FAA Method

7.10 ACN/PCN Reporting System - Flexible and Rigid Pavements

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 six 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 chart in Section 7.4 is 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. 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 the 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 6,000 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", First Edition, 1977. 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 American Concrete Pavement Association, 3800 North Wilke Road, Arlington Heights, Illinois 60004-1268. 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 ACN/PCN system (Section 7.9) as referenced in ICAO Annex 14, "Aerodromes," First Edition, July 1990, 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:

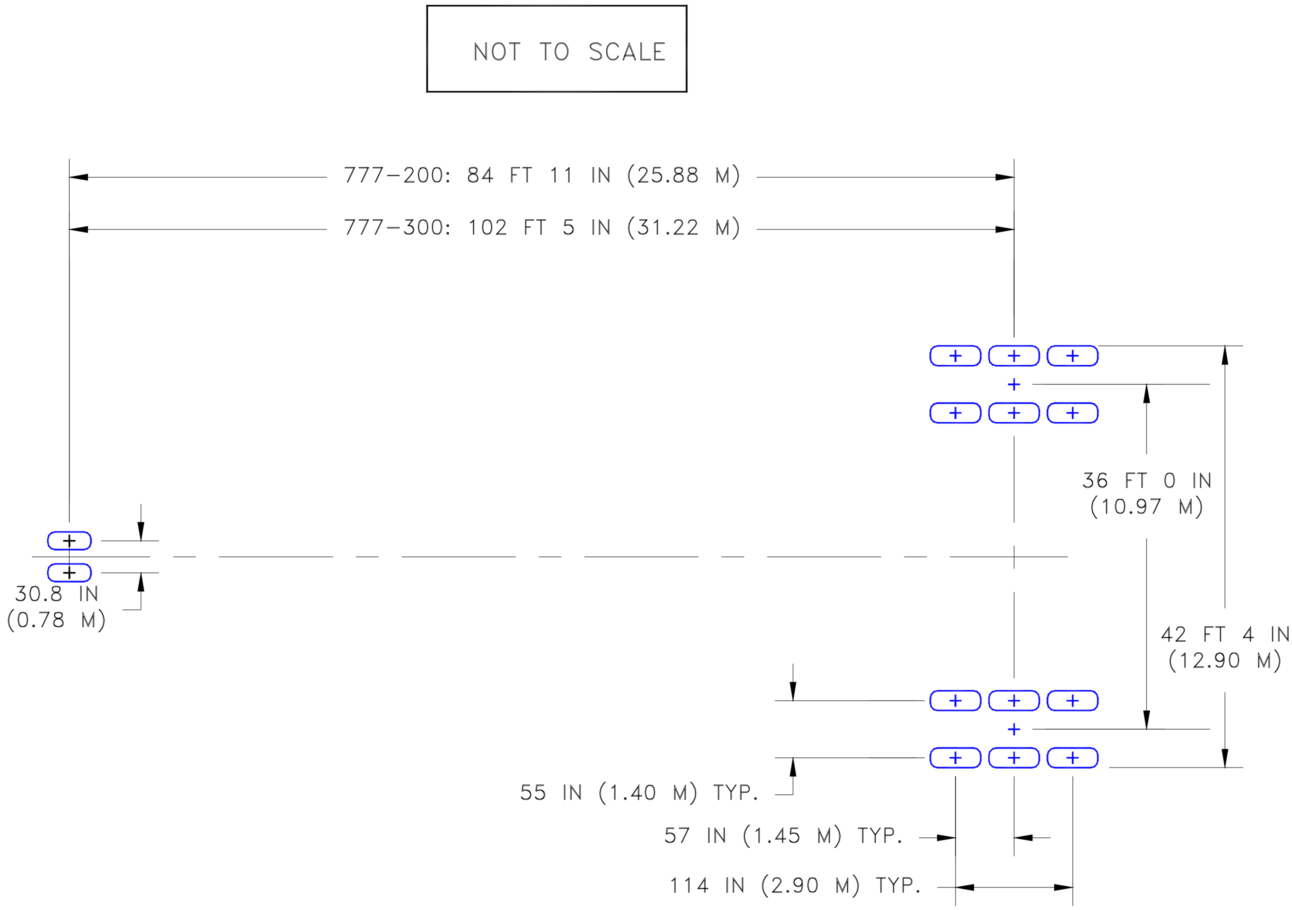
PCN	PAVEMENT TYPE	SUBGRADE CATEGORY	TIRE PRESSURE CATEGORY	EVALUATION METHOD
	R = Rigid F = Flexible	A = High B = Medium C = Low D = Ultra Low	W = No Limit X = To 217 psi (1.5 MPa) Y = To 145 psi (1.0 MPa) Z = To 73 psi (0.5 MPa)	T = Technical U = Using Aircraft

Section 7.9.1 shows the aircraft ACN values for flexible pavements. The four subgrade categories are:

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

Section 7.9.2 shows the aircraft ACN values for rigid pavements. The four subgrade categories are:

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)

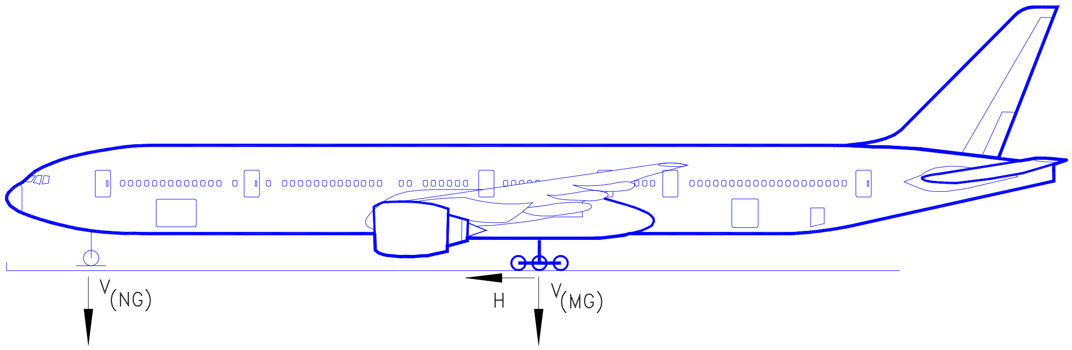


	UNITS	777-200						777-300
MAXIMUM DESIGN	LB	508,000	517,000	537,000	582,000	592,000	634,500	582,000 - 662,000
TAXI WEIGHT	KG	230,450	234,500	243,600	264,000	268,550	287,800	263,000 - 300,280
PERCENT OF WT ON MAIN GEAR		SEE SECTION 7.4						
NOSE GEAR TIRE SIZE	IN.	42 X 17 R 18, 26 PR						
NOSE GEAR	PSI	190	195	200	200	200	200	205
TIRE PRESSURE	KG/CM^2	13.36	13.71	14.06	14.06	14.06	14.06	14.41
MAIN GEAR TIRE SIZE	IN.	50 X 20 R 22, 26 PR		50 X 20 R 22, 32 PR				
MAIN GEAR	PSI	175	175	185	200	205	215	215
TIRE PRESSURE	KG/CM^2	12.30	12.30	13.01	14.06	14.41	15.12	15.12

7.2 LANDING GEAR FOOTPRINT

MODEL 777-200/-300

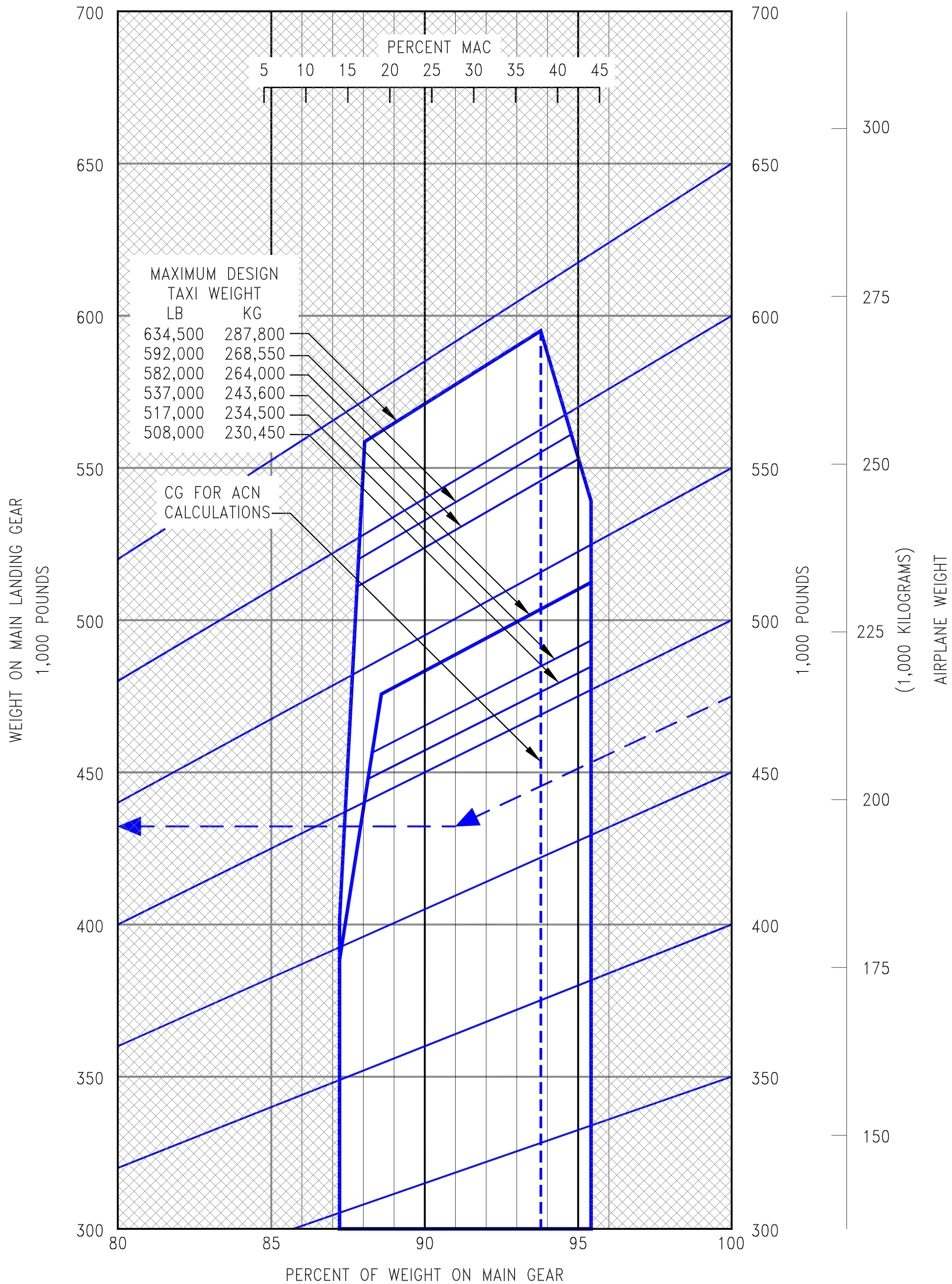
$V_{(NG)}$ = MAXIMUM VERTICAL NOSE GEAR GROUND LOAD AT MOST FORWARD CENTER OF GRAVITY
$V_{(MG)}$ = MAXIMUM VERTICAL MAIN GEAR GROUND LOAD AT MOST AFT CENTER OF GRAVITY
H = MAXIMUM HORIZONTAL GROUND LOAD FROM BRAKING



NOTE: ALL LOADS CALCULATED USING AIRPLANE MAXIMUM DESIGN TAXI WEIGHT

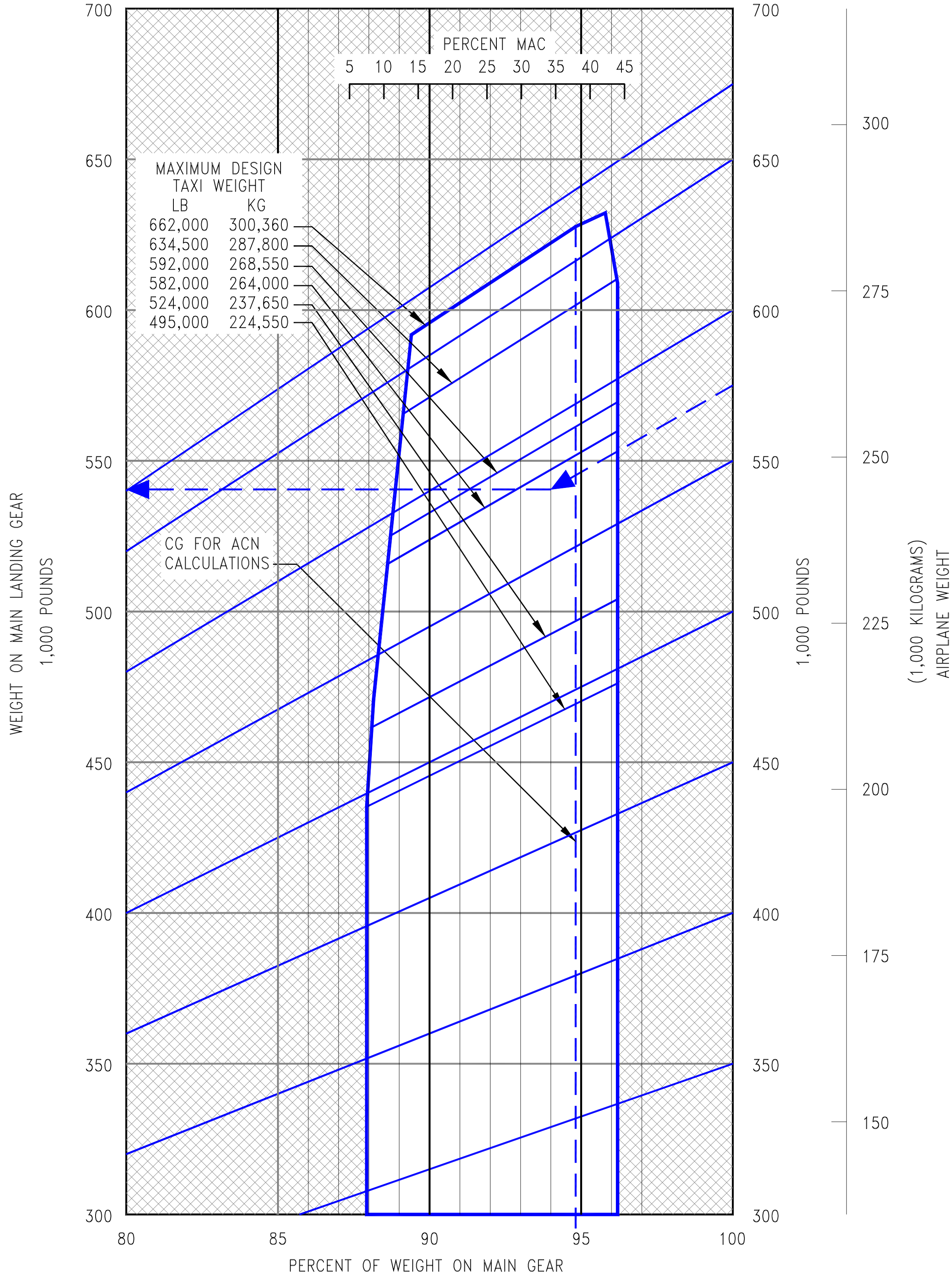
MODEL	UNITS	MAXIMUM DESIGN TAXI WEIGHT	$V_{(NG)}$ STATIC AT MOST FWD C.G.	$V_{(NG)}$ STATIC + BRAKING 10 FT/SEC^2 DECEL	$V_{(MG)}$ PER STRUT MAX LOAD AT STATIC AFT C.G.	H PER STRUT STEADY BRAKING 10 FT/SEC^2 DECEL	H PER STRUT AT INSTANTANEOUS BRAKING (u= 0.8)
777-200	LB	508,000	60,700	88,600	242,400	78,900	193,900
	KG	230,450	27,550	40,150	109,950	35,800	87,950
777-200	LB	517,000	61,800	90,100	246,700	80,300	197,300
	KG	234,500	28,050	40,900	111,900	36,400	89,500
777-200	LB	537,000	64,200	93,600	256,200	83,400	205,000
	KG	243,600	29,150	42,450	116,200	37,800	92,950
777-200	LB	582,000	70,700	102,600	276,400	90,400	221,100
	KG	264,000	32,050	46,550	125,350	41,000	100,300
777-200	LB	592,000	71,800	104,200	280,400	91,900	224,300
	KG	268,550	32,550	47,250	127,200	41,700	101,750
777-200	LB	634,500	75,900	110,600	297,500	98,500	238,000
	KG	287,800	34,400	50,150	134,950	44,700	107,950
777-300	LB	582,000	65,500	95,600	279,900	90,400	224,000
	KG	264,000	29,700	42,850	127,000	41,000	101,600
777-300	LB	592,000	66,500	96,800	284,800	91,900	227,800
	KG	268,550	30,150	43,550	129,150	41,700	103,350
777-300	LB	634,500	68,800	100,500	305,100	98,500	244,100
	KG	287,800	31,200	45,600	138,400	44,700	110,700
777-300	LB	662,000	70,200	103,300	313,900	102,800	251,100
	KG	300,300	31,850	46,800	142,350	46,650	113,900

7.3 MAXIMUM PAVEMENT LOADS
MODEL 777-200,-300



7.4.1 LANDING GEAR LOADING ON PAVEMENT

MODEL 777-200



7.4.2 LANDING GEAR LOADING ON PAVEMENT

MODEL 777-300

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

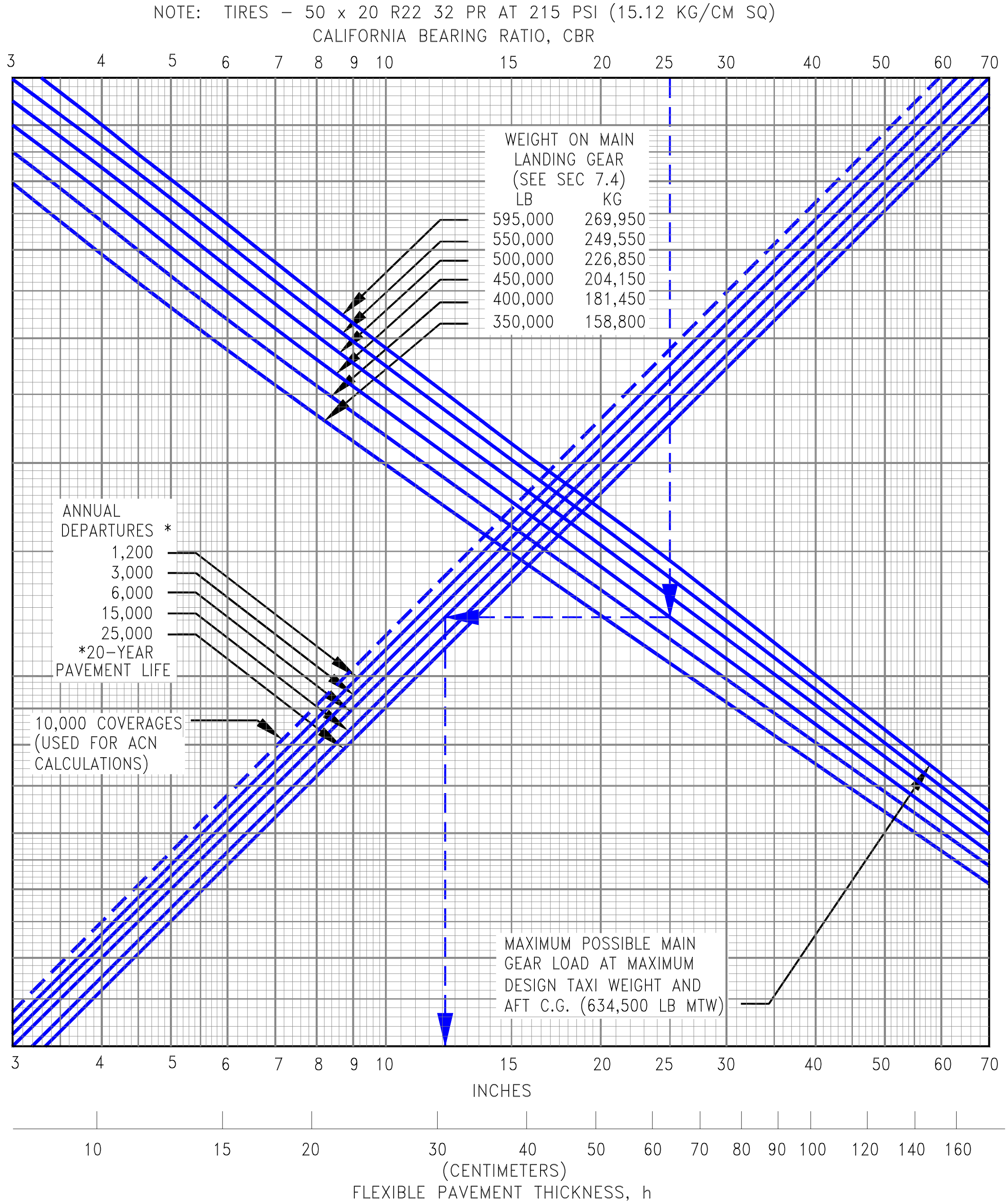
The following flexible-pavement design chart presents the data of six incremental main-gear loads at the minimum tire pressure required at the maximum design taxi weight.

In the example shown in Section 7.5.1, for a CBR of 25 and an annual departure level of 6,000, the required flexible pavement thickness for a 777-200 airplane with a main gear loading of 450,000 pounds is 12.1 inches. Likewise, the required flexible pavement thickness for the 777-300 under the same conditions, is also 12.1 inches as shown in Section 7.5.2.

The line showing 10,000 coverages is used for ACN calculations (see Section 7.9).

The FAA does not officially recognize the validity of the S77-1 flexible pavement design calculation for individual six-wheel gear aircraft. At the time this document (D6-58329) was printed, the FAA was recommending a multi-layer pavement thickness design method for the 777 airplane when considered as a component of the traffic mix. Consequently, the charts presented on the following two pages are provided as an estimate of the design thickness for general guidance purposes only.

THIS CHART IS AN ESTIMATE OF PAVEMENT REQUIREMENTS BASED ON THE S77-1 METHOD.
THICKNESSES DETERMINED HEREIN ARE NOT APPROVED BY THE FAA FOR PAVEMENT DESIGN.

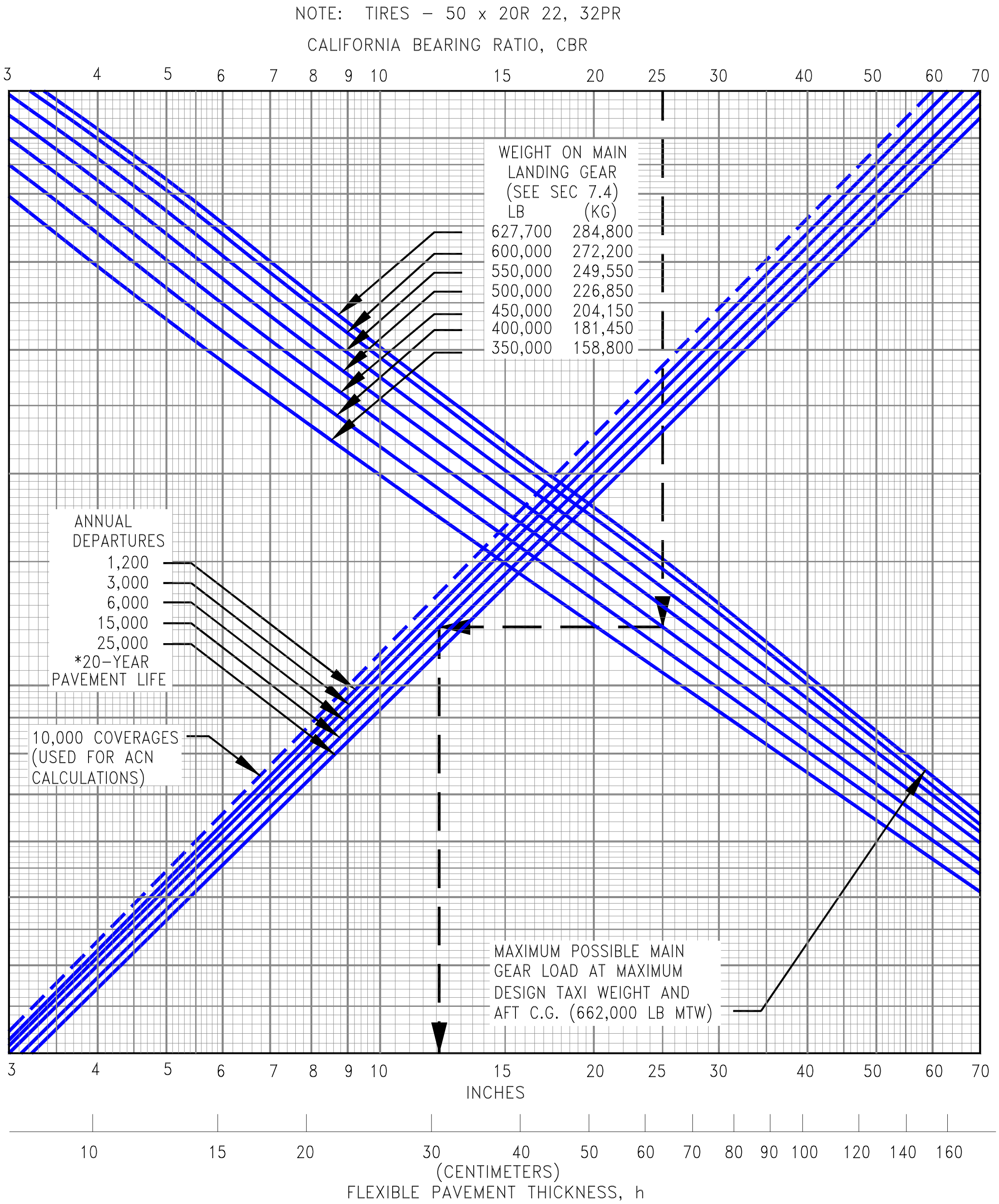


THIS CHART IS AN ESTIMATE OF PAVEMENT REQUIREMENTS BASED ON THE S77-1 METHOD.
THICKNESSES DETERMINED HEREIN ARE NOT APPROVED BY THE FAA FOR PAVEMENT DESIGN

7.5.1 FLEXIBLE PAVEMENT REQUIREMENTS - U.S. ARMY CORPS OF ENGINEERS DESIGN METHOD (S-77-1)

MODEL 777-200

THIS CHART IS AN ESTIMATE OF PAVEMENT REQUIREMENTS BASED ON THE S77-1 METHOD.
THICKNESSES DETERMINED HEREIN ARE NOT APPROVED BY THE FAA FOR PAVEMENT DESIGN.



THIS CHART IS AN ESTIMATE OF PAVEMENT REQUIREMENTS BASED ON THE S77-1 METHOD.
THICKNESSES DETERMINED HEREIN ARE NOT APPROVED BY THE FAA FOR PAVEMENT DESIGN

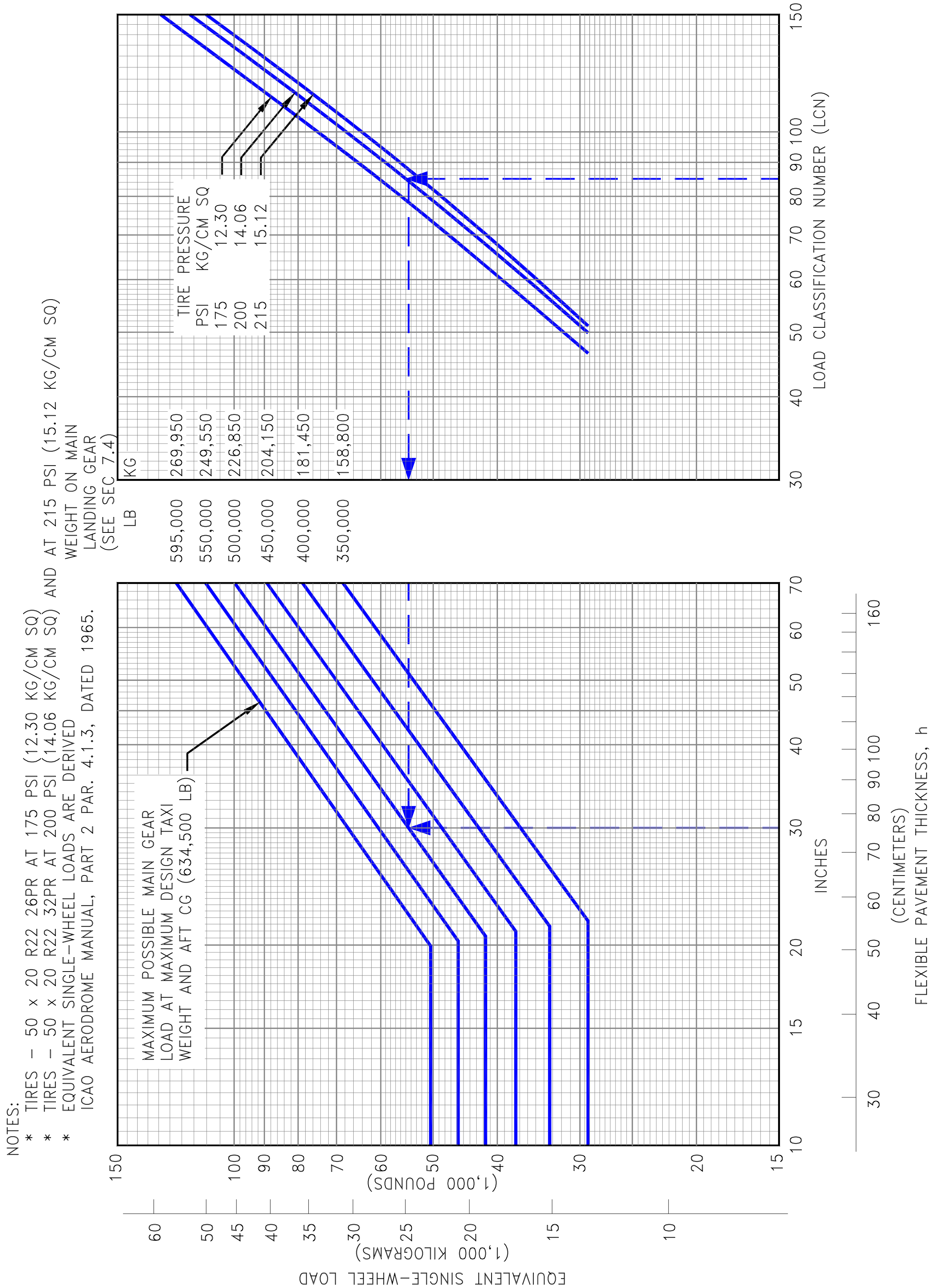
7.5.2 FLEXIBLE PAVEMENT REQUIREMENTS - U.S. ARMY CORPS OF ENGINEERS DESIGN METHOD (S-77-1)
MODEL 777-300

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.

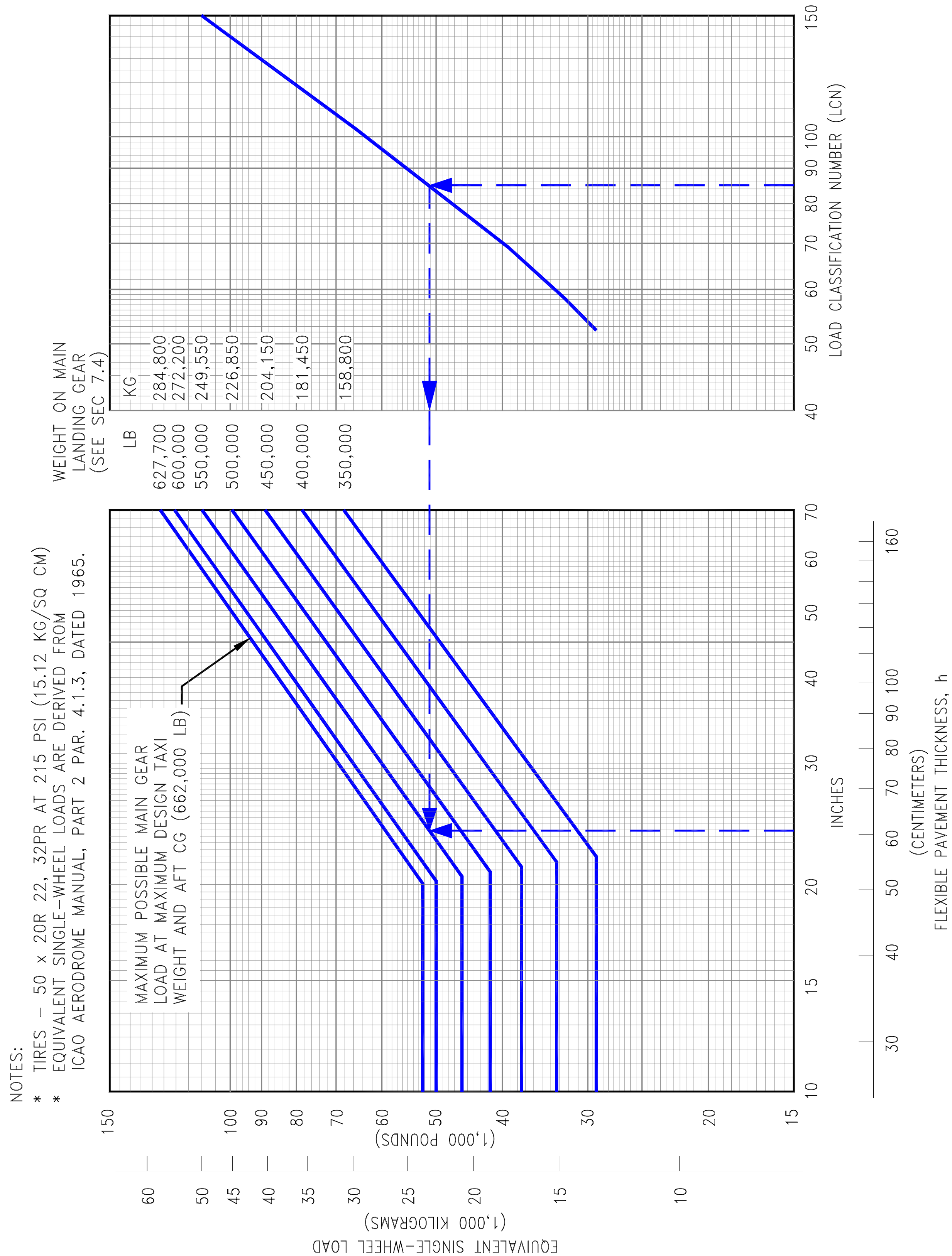
In the example shown in Section 7.6.1, flexible pavement thickness is shown at 30 inches with an LCN of 85. For these conditions, the maximum allowable weight on the main landing gear is 500,000 lb for a 777-200 airplane with 200-psi main gear tires. Likewise, in the example shown in Section 7.6.2, the flexible pavement thickness is shown at 24 inches and the LCN is 85. For these conditions, the maximum allowable weight on the main landing gear is 550,000 lb for a 777-300 airplane with 215-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).



7.6.1 FLEXIBLE PAVEMENT REQUIREMENTS - LCN METHOD

MODEL 777-200



7.6.2 FLEXIBLE PAVEMENT REQUIREMENTS - LCN METHOD

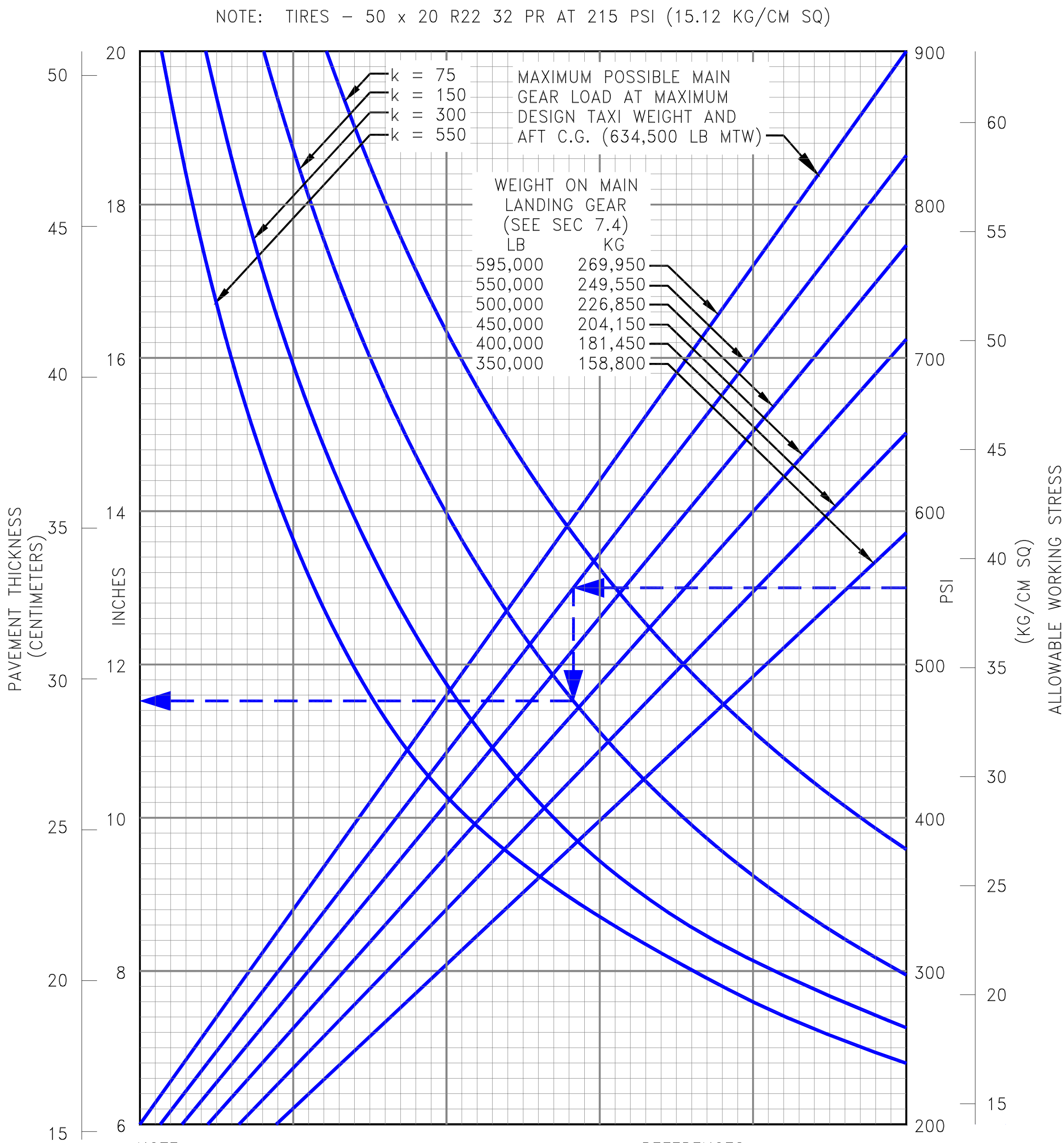
MODEL 777-300

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, 1955) 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 six 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, and a subgrade strength (k) of 150, the required rigid pavement thickness is 11.7 inches for a 777-200 airplane with a main gear load of 550,000 lb. Likewise, for the same pavement conditions, the required pavement thickness for a 777-300 airplane with a main gear load of 550,000 lb is 11.7 inches as shown in Section 7.7.2.



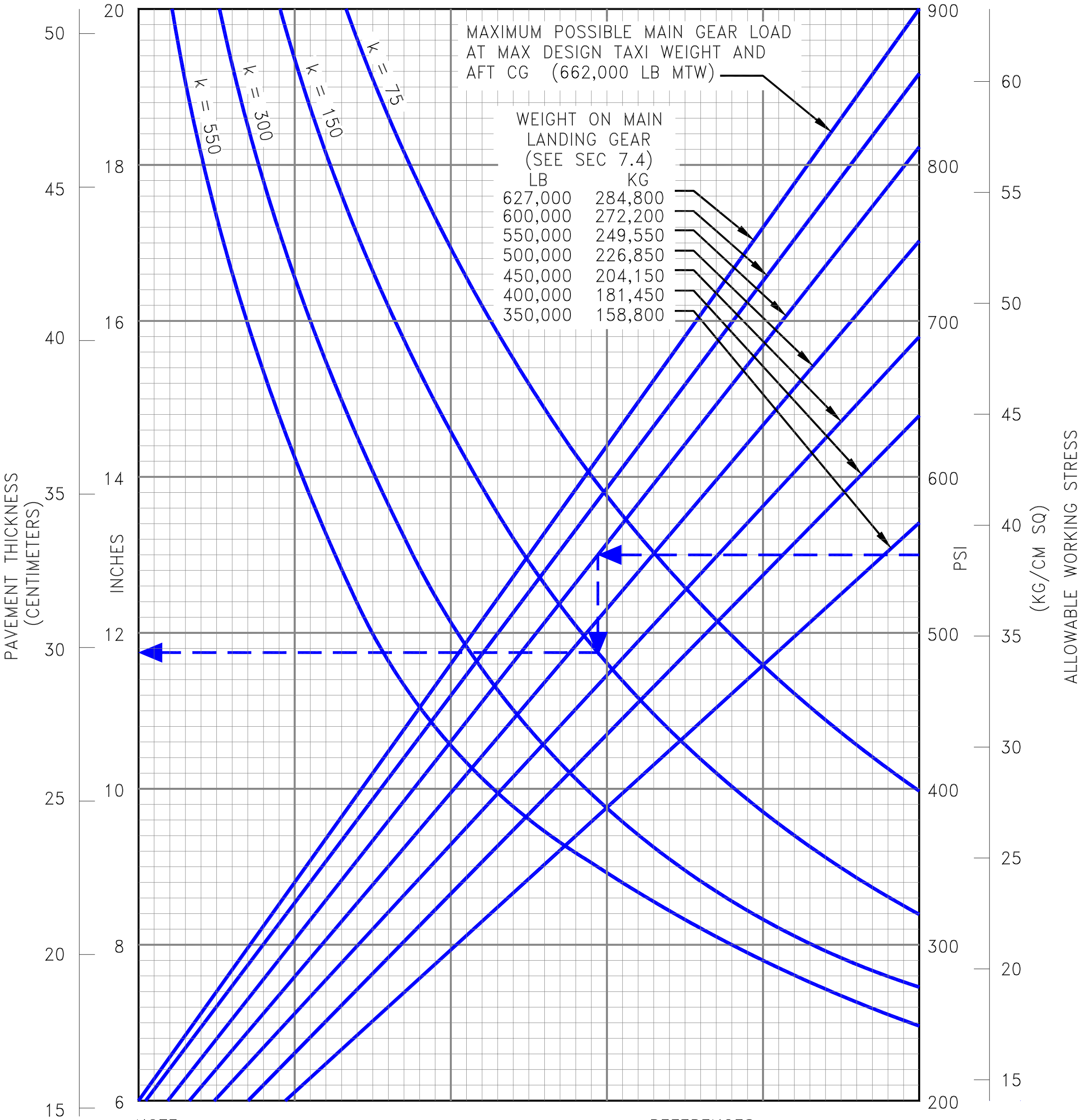
NOTE:
THE VALUES OBTAINED BY USING THE MAXIMUM LOAD REFERENCE LINE AND ANY VALUE OF k ARE EXACT.
FOR LOADS LESS THAN MAXIMUM, THE CURVES ARE EXACT FOR k = 300 BUT DEVIATE SLIGHTLY FOR OTHER VALUES OF k.

REFERENCES:
"DESIGN OF CONCRETE AIRPORT PAVEMENT" AND "COMPUTER PROGRAM FOR AIRPORT PAVEMENT DESIGN – PROGRAM PDILB" PORTLAND CEMENT ASSOCIATION.

7.7.1 RIGID PAVEMENT REQUIREMENTS - PORTLAND CEMENT ASSOCIATION DESIGN METHOD

MODEL 777-200

NOTE: TIRES – 50 x 20 R22 32 PR AT 215 PSI (15.12 KG/CM SQ)



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

REFERENCES:
"DESIGN OF CONCRETE AIRPORT PAVEMENT" AND "COMPUTER PROGRAM FOR AIRPORT PAVEMENT DESIGN – PROGRAM PDILB" PORTLAND CEMENT ASSOCIATION.

7.7.2 RIGID PAVEMENT REQUIREMENTS - PORTLAND CEMENT ASSOCIATION DESIGN METHOD

MODEL 777-300

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 (ℓ) 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 38 with an LCN of 87, the maximum allowable weight permissible on the main landing gear is 550,000 lb for an airplane with 215-psi main tires. Likewise, using these same conditions for the 777-300 yields a similar result as shown in Section 7.8.3.

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)

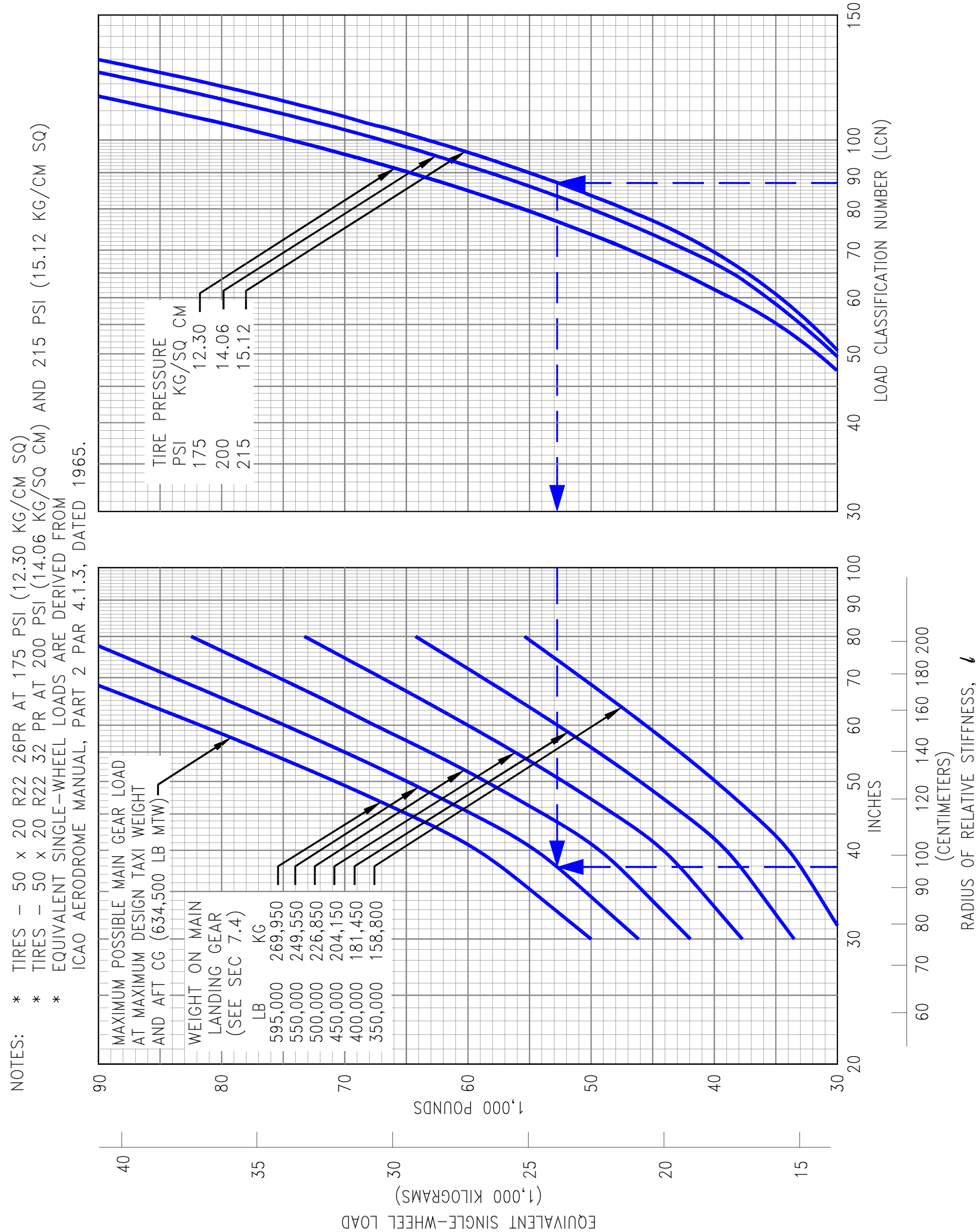
VALUES IN INCHES

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

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
μ

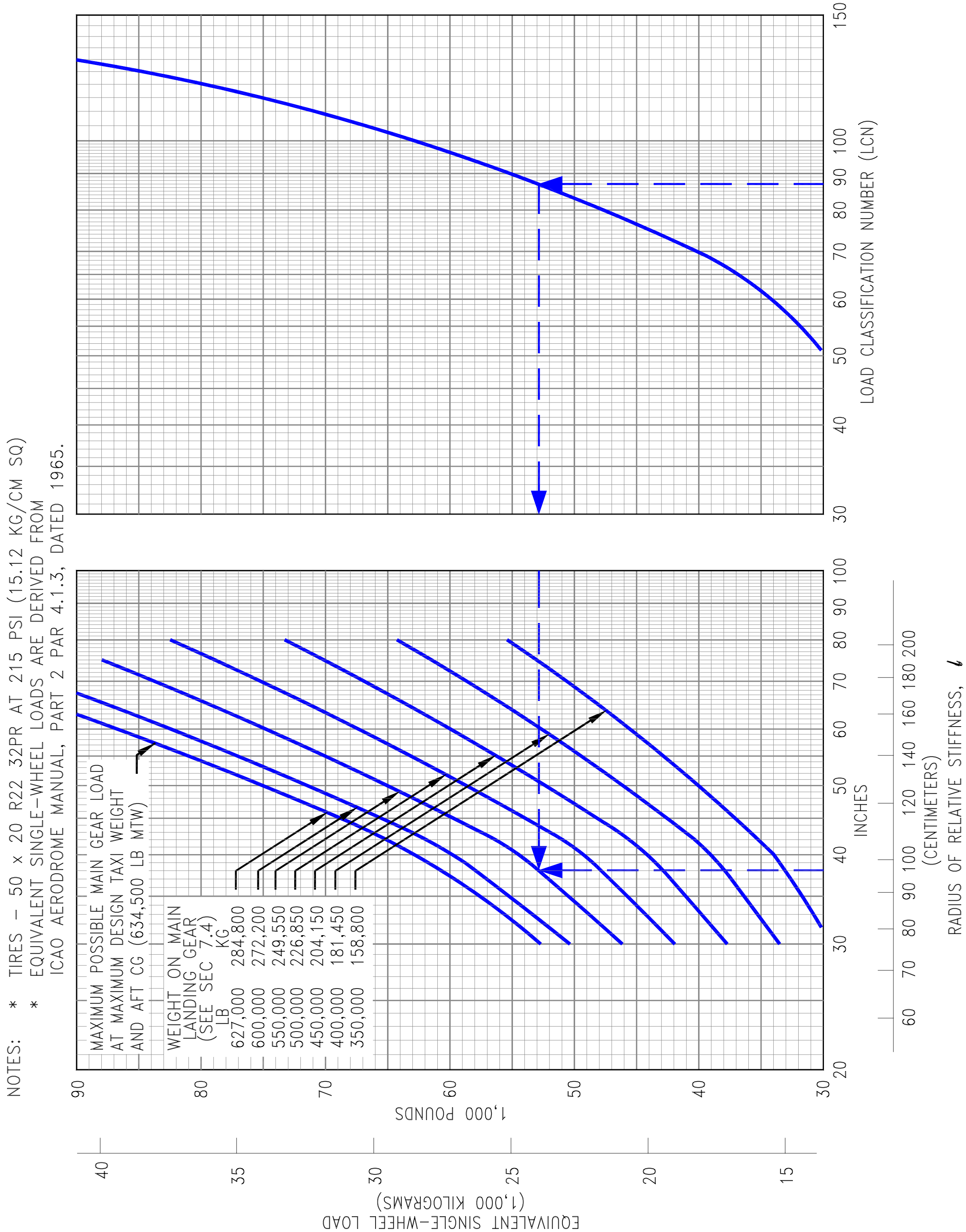
d	k = 75	k = 100	k = 150	k = 200	k = 250	k = 300	k = 350	k = 400	k = 500	k = 550
6.0	31.48	29.29	26.47	24.63	23.30	22.26	21.42	20.71	19.59	19.13
6.5	33.42	31.10	28.11	26.16	24.74	23.63	22.74	21.99	20.80	20.31
7.0	35.33	32.88	29.71	27.65	26.15	24.99	24.04	23.25	21.99	21.47
7.5	37.21	34.63	31.29	29.12	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 777-200

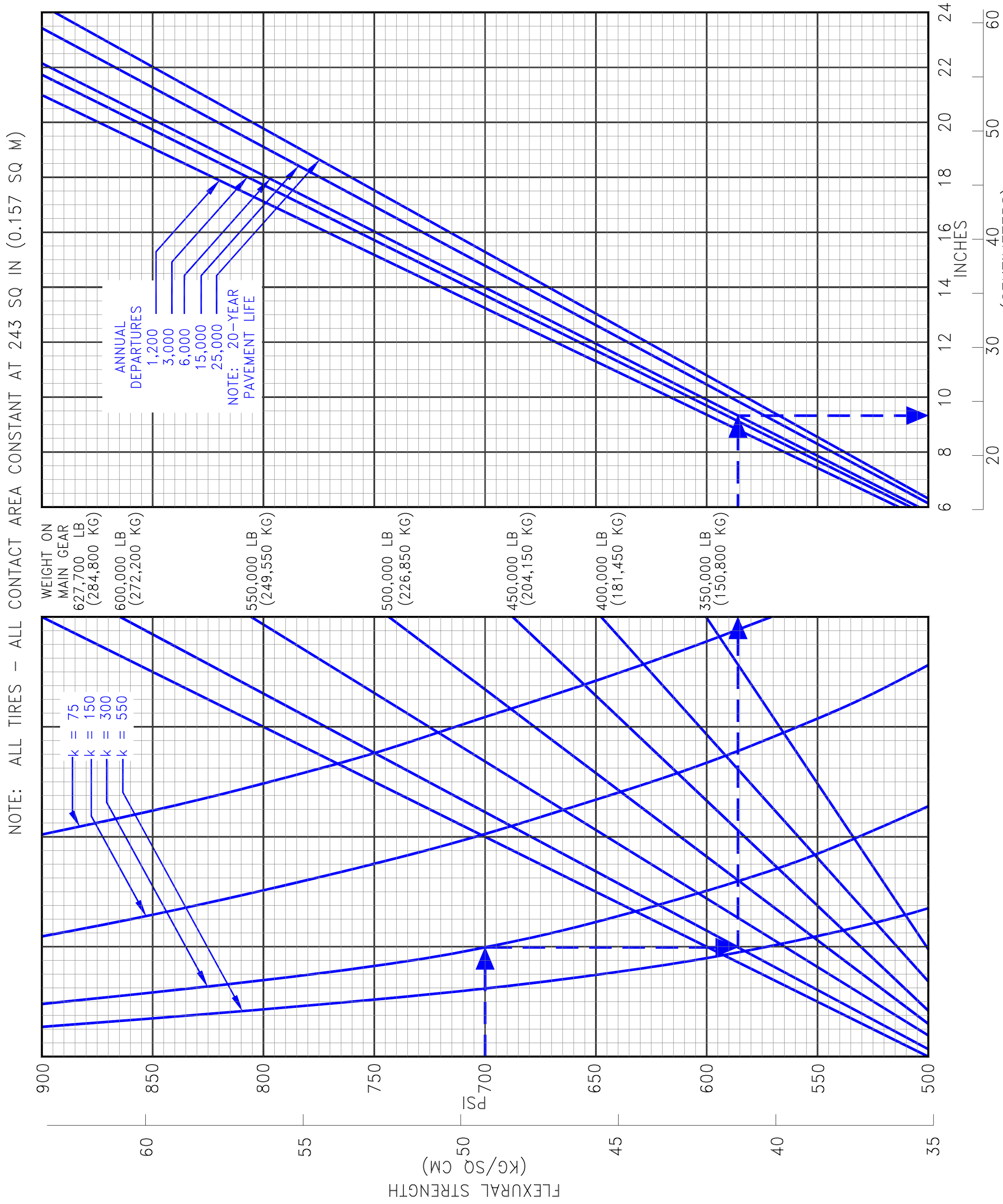


7.8.3 RIGID PAVEMENT REQUIREMENTS - LCN CONVERSION

MODEL 777-300

7.9 Rigid Pavement Requirements - FAA Design Method

The FAA does not officially recognize the validity of rigid pavement thickness design calculations for individual six-wheel gear aircraft. At the time this document (D6-58329) was printed, the FAA was recommending a multi-layer pavement thickness design method for the 777 airplane when considered as a component of the traffic mix. Consequently, the chart shown in Section 7.9.1 is provided as an estimate of the design thickness for general guidance purposes only. In the example shown, for a pavement flexural strength of 700 psi, a subgrade strength of k = 300, and an annual departure level of 6,000, the required pavement thickness for a 777-200 or 777-300 airplane with a main gear load of 600,00 lb is 9.4 inches



7.9.1 RIGID PAVEMENT REQUIREMENTS

MODEL 777-200, -300

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. The chart in Section 7.10.1 shows that for 777-200 aircraft with gross weight of 600,000 lb on a medium subgrade strength (Code B), the flexible pavement ACN is 50. In Section 7.10.3, for the same aircraft weight and medium subgrade strength (Code B), the rigid pavement ACN is 57.

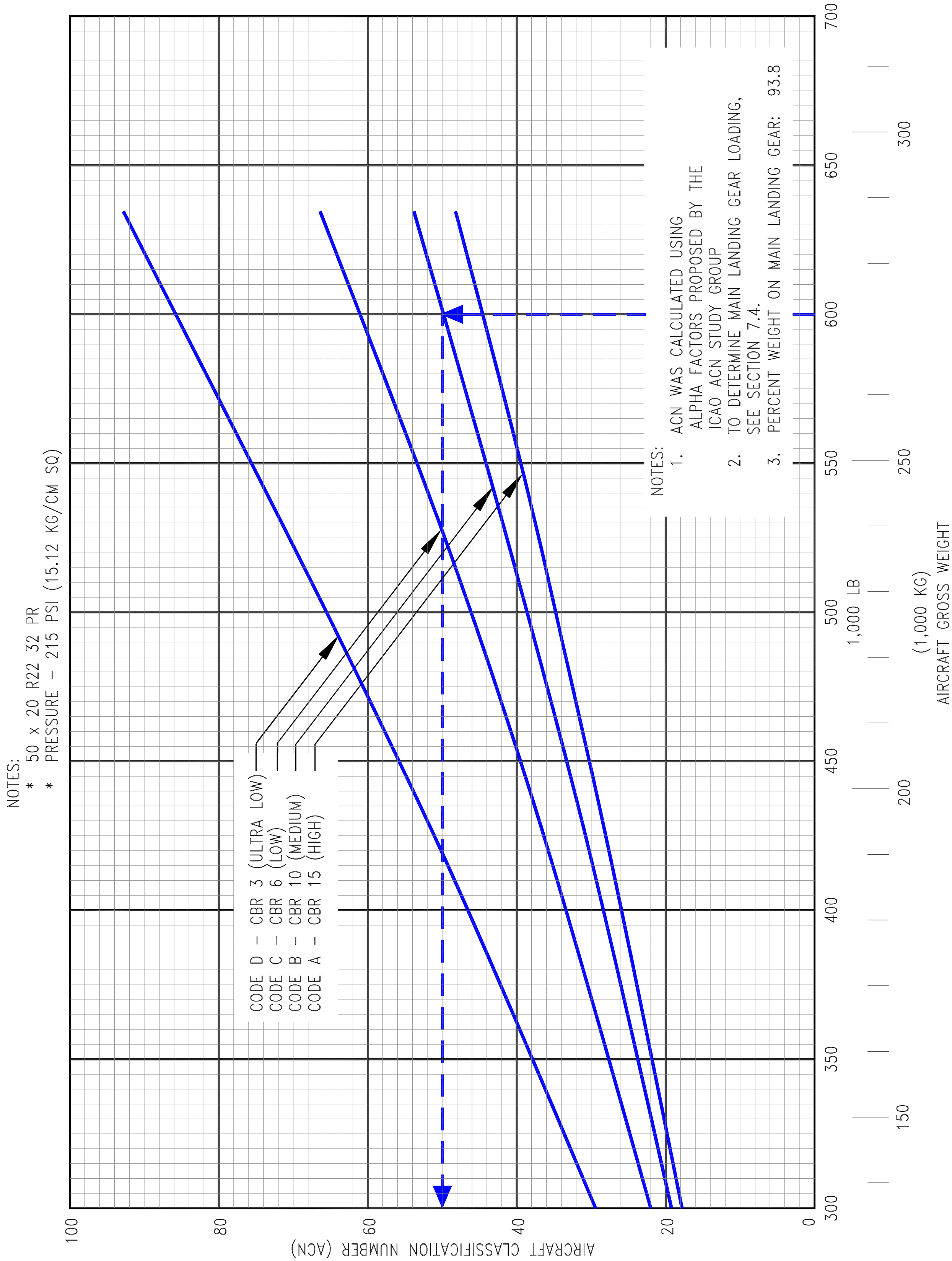
Similarly, for a 777-300 aircraft with gross weight of 600,000 lb on a medium subgrade strength (Code B), the flexible pavement ACN is 51 (Section 7.10.2) and the rigid pavement ACN is 58 (Section 7.10.4).

Notes: 1. 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: ICAO Annex 14 Aerodromes, First Edition, July 1990.)

2. The ACN values on the Flexible Pavement charts were calculated using alpha factors proposed by the ICAO ACN Study Group.

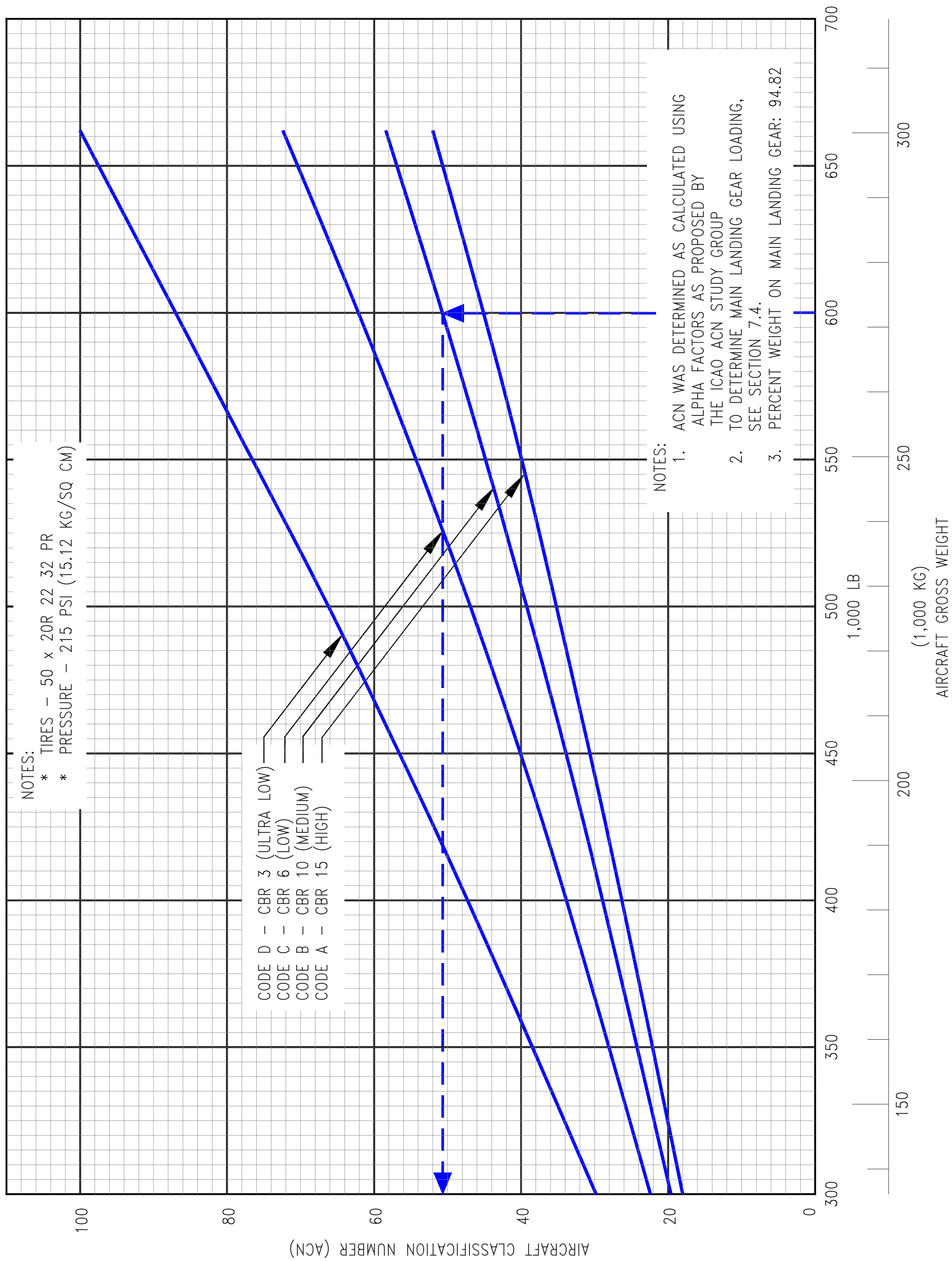
The following table provides ACN data in tabular format similar to the one used by ICAO in the "Aerodrome Design Manual Part 3, Pavements." If the ACN for an intermediate weight between taxi weight and empty fuel weight of the aircraft is required, Figures 7.10.1 through 7.10.4 should be consulted.

				ACN FOR RIGID PAVEMENT SUBGRADES – MN/m^3				ACN FOR FLEXIBLE PAVEMENT SUBGRADES – CBR			
AIRCRAFT TYPE	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
777-200	634,500(287,804)	46.89	215 (1.48)	50	63	81	99	48	54	66	93
	304,500(138,118)			22	22	26	33	18	20	23	30
777-300	662,000(300,278)	47.41	215 (1.48)	54	68	88	108	52	58	72	100
	347,800(157,759)			25	26	33	41	22	24	28	38



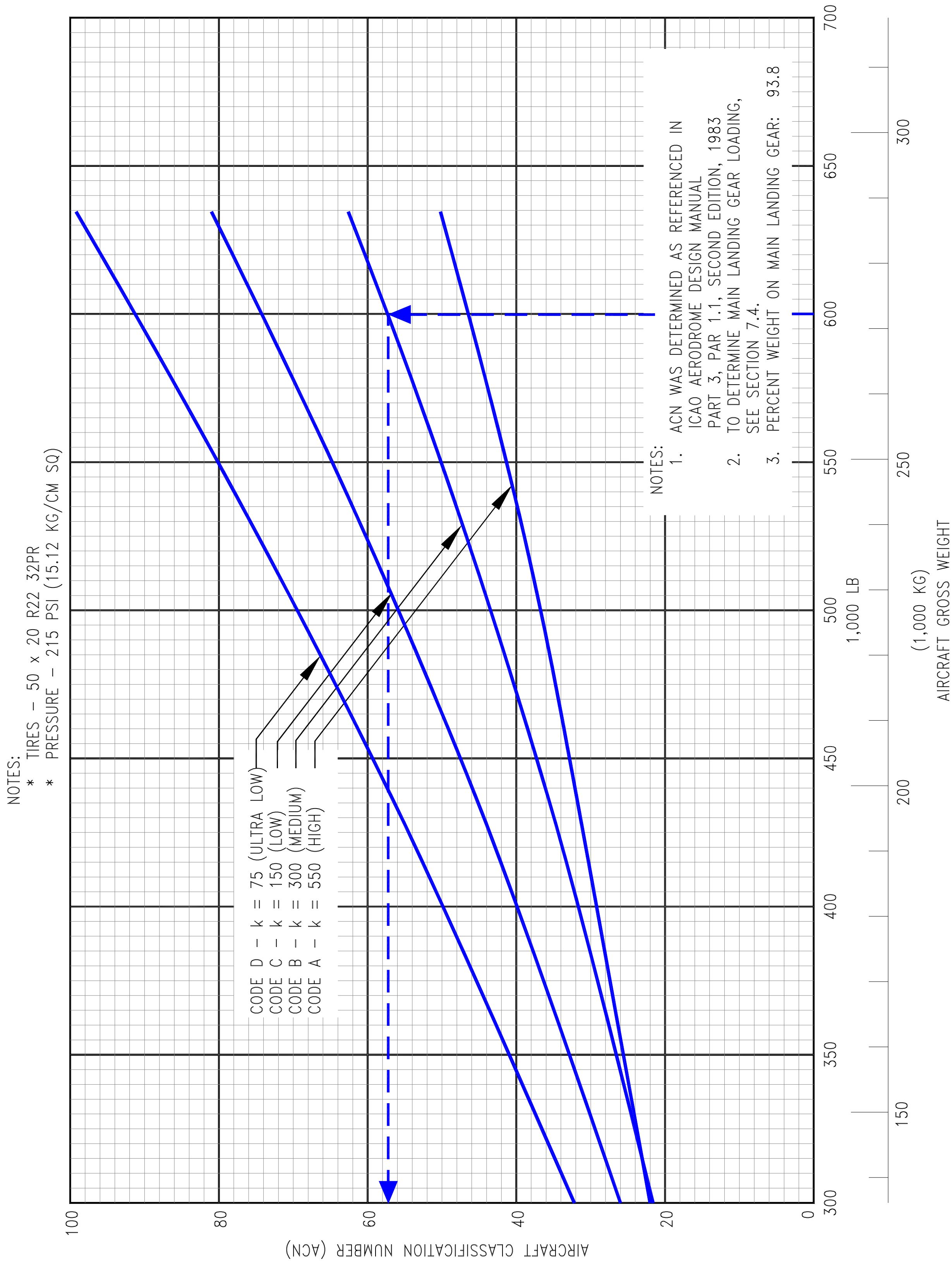
7.10.1 AIRCRAFT CLASSIFICATION NUMBER - FLEXIBLE PAVEMENT

MODEL 777-200

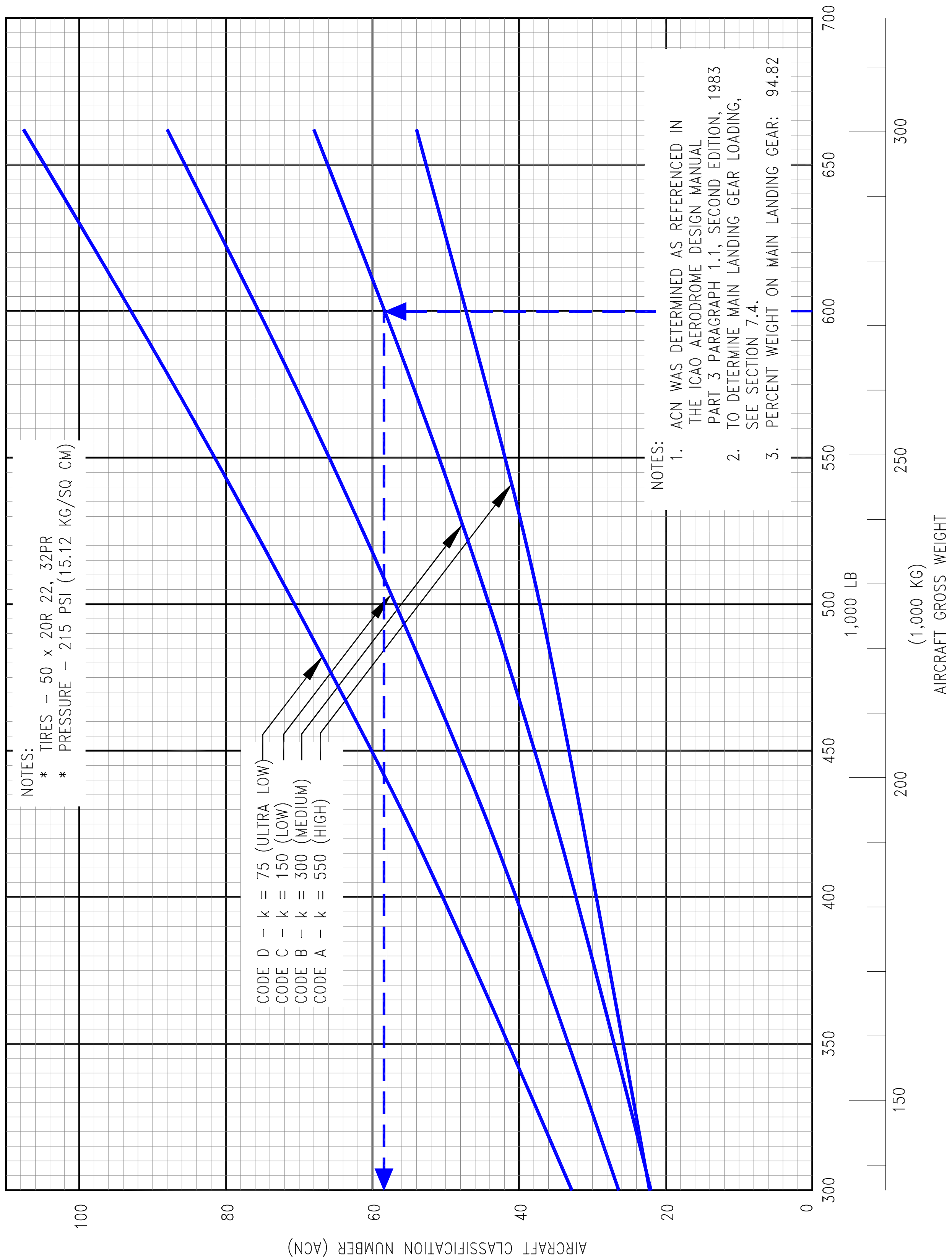


7.10.2 AIRCRAFT CLASSIFICATION NUMBER - FLEXIBLE PAVEMENT

MODEL 777-300



7.10.3 AIRCRAFT CLASSIFICATION NUMBER - RIGID PAVEMENT
MODEL 777-200



7.10.4 AIRCRAFT CLASSIFICATION NUMBER - RIGID PAVEMENT

MODEL 777-300

8.0 FUTURE 777 DERIVATIVE AIRPLANES

8.0 FUTURE 777 DERIVATIVE AIRPLANES

Several derivatives are being studied to provide additional capabilities of the 777 family of airplanes. Future growth versions could require additional passenger capacity or increased range or both. Whether these growth versions could be built would depend entirely on airline requirements. In any event, impact on airport facilities will be a consideration in the configuration and design.

9.0 SCALED 777 DRAWINGS

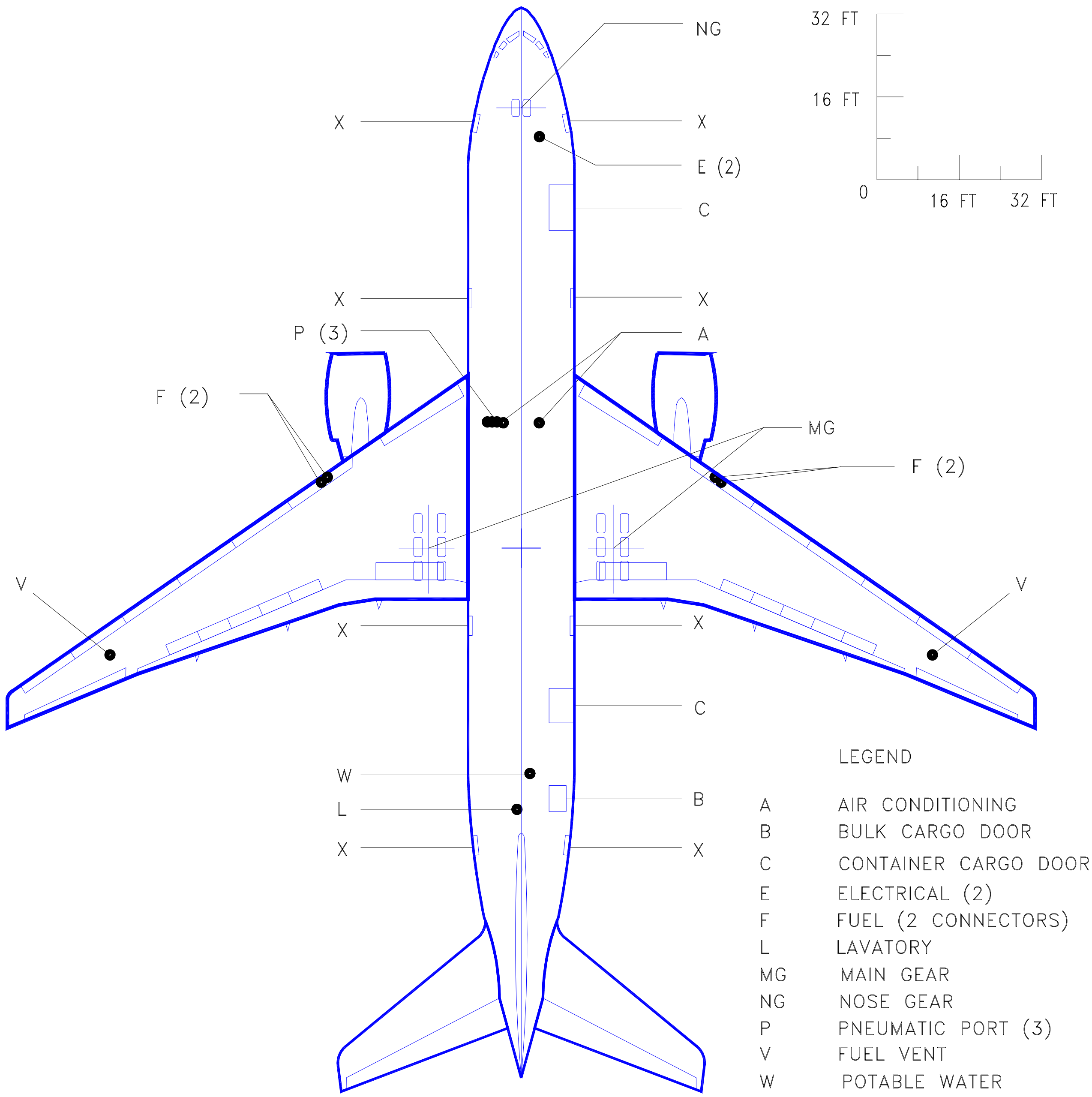
9.1 - 9.5 Scaled Drawings, 777-200

9.6 - 9.10 Scaled drawings, 777-300

9.0 SCALED DRAWINGS

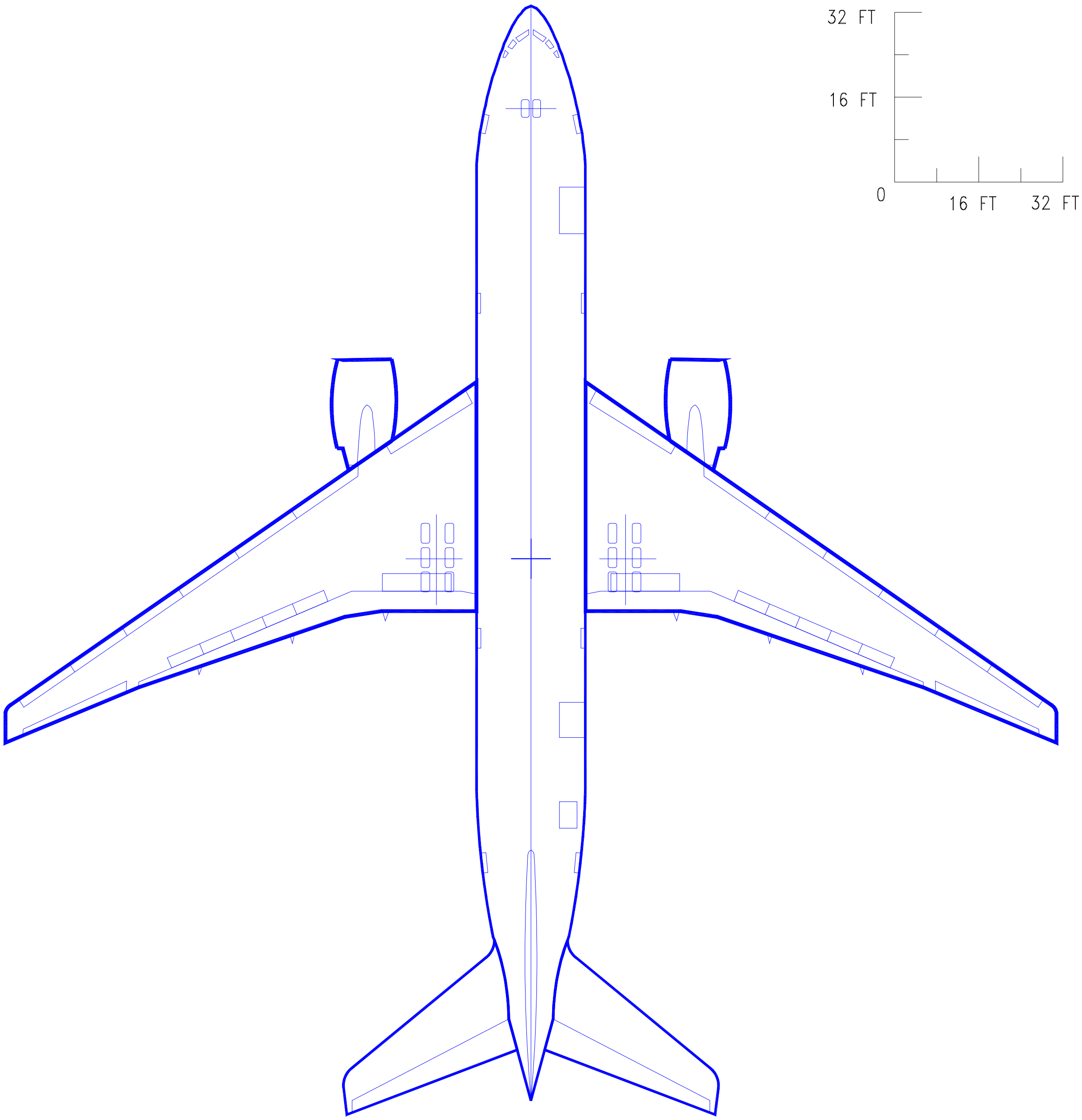
The drawings in the following pages show airplane plan view drawings, drawn to approximate scale as noted. The drawings may not come out to exact scale when printed or copied from this document. Printing scale should be adjusted when attempting to reproduce these drawings. Three-view drawing files of the 777 airplane models, along with other Boeing airplane models, can be downloaded from the following website:

http://www.boeing.com/airports



NOTE: ADJUST SCALE WHEN PRINTING THIS PAGE

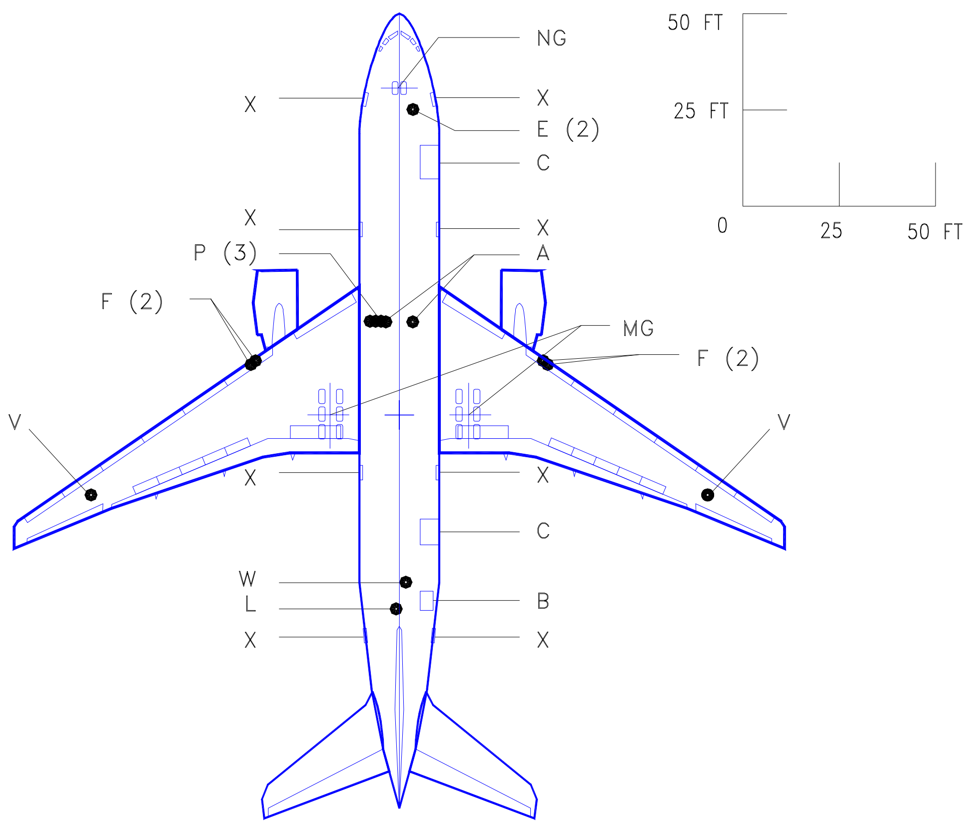
9.1.1 SCALED DRAWING - 1 IN. = 32 FT
MODEL 777-200



NOTE: ADJUST SCALE WHEN PRINTING THIS PAGE

9.1.2 SCALED DRAWING - 1 IN. = 32 FT

MODEL 777-200



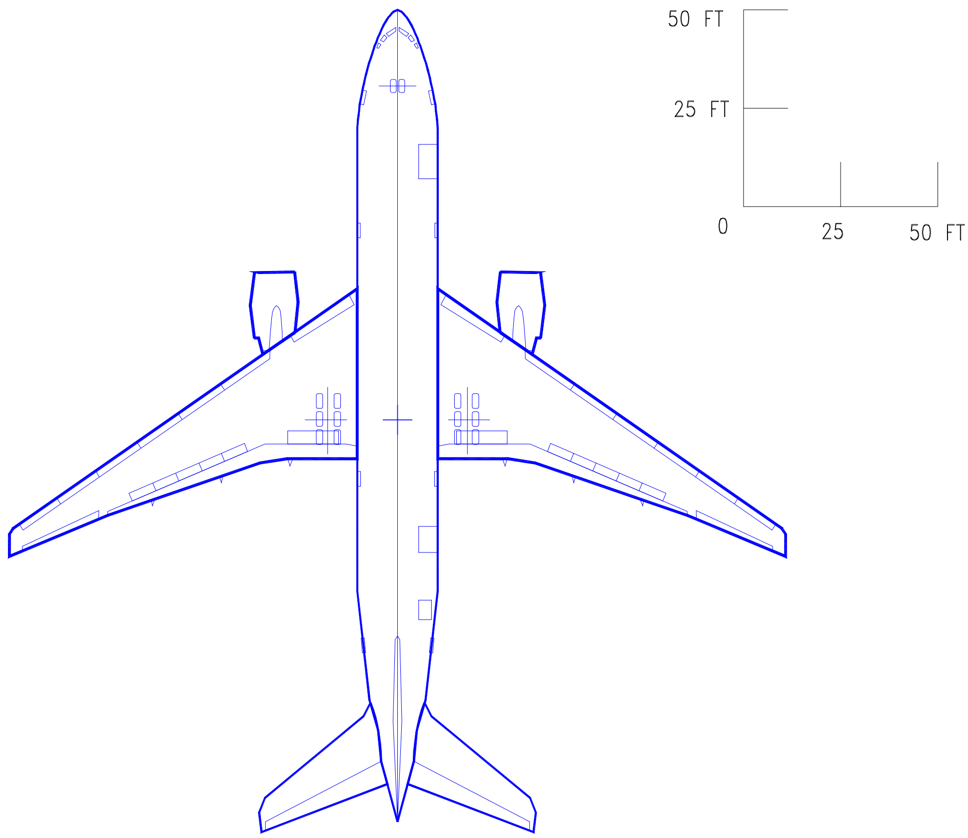
LEGEND

A	AIR CONDITIONING
B	BULK CARGO DOOR
C	CONTAINER CARGO DOOR
E	ELECTRICAL (2)
F	FUEL (2 CONNECTORS)
L	LAVATORY
MG	MAIN GEAR
NG	NOSE GEAR
P	PNEUMATIC PORT (3)
V	FUEL VENT
W	POTABLE WATER
X	PASSENGER DOOR

NOTE: ADJUST SCALE WHEN PRINTING THIS PAGE

9.2.1 SCALED DRAWING - 1 IN. = 50 FT

MODEL 777-200



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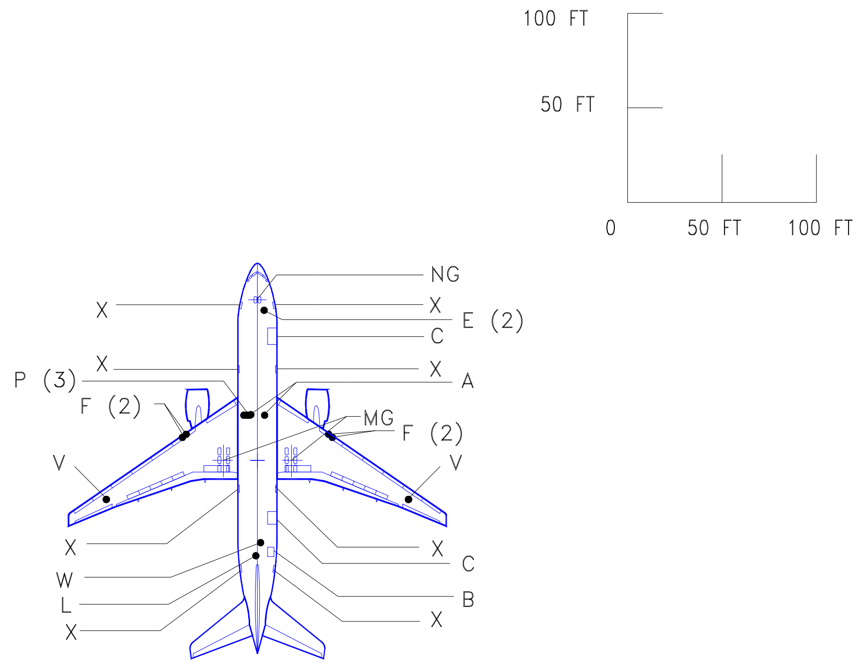
9.2.2 SCALED DRAWING - 1 IN. = 50 FT
MODEL 777-200



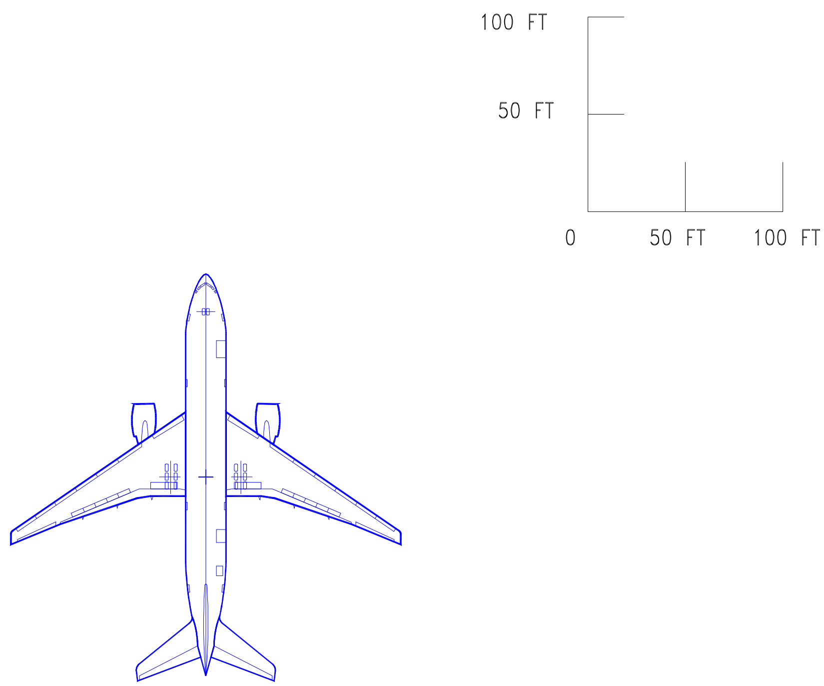
LEGEND

A	AIR CONDITIONING
B	BULK CARGO DOOR
C	CONTAINER CARGO DOOR
E	ELECTRICAL (2)
F	FUEL (2 CONNECTORS)
L	LAVATORY
MG	MAIN GEAR
NG	NOSE GEAR
P	PNEUMATIC PORT (3)
V	FUEL VENT
W	POTABLE WATER
X	PASSENGER DOOR

NOTE: ADJUST SCALE WHEN PRINTING THIS PAGE

9.3.1 SCALED DRAWING - 1 IN = 100 FT

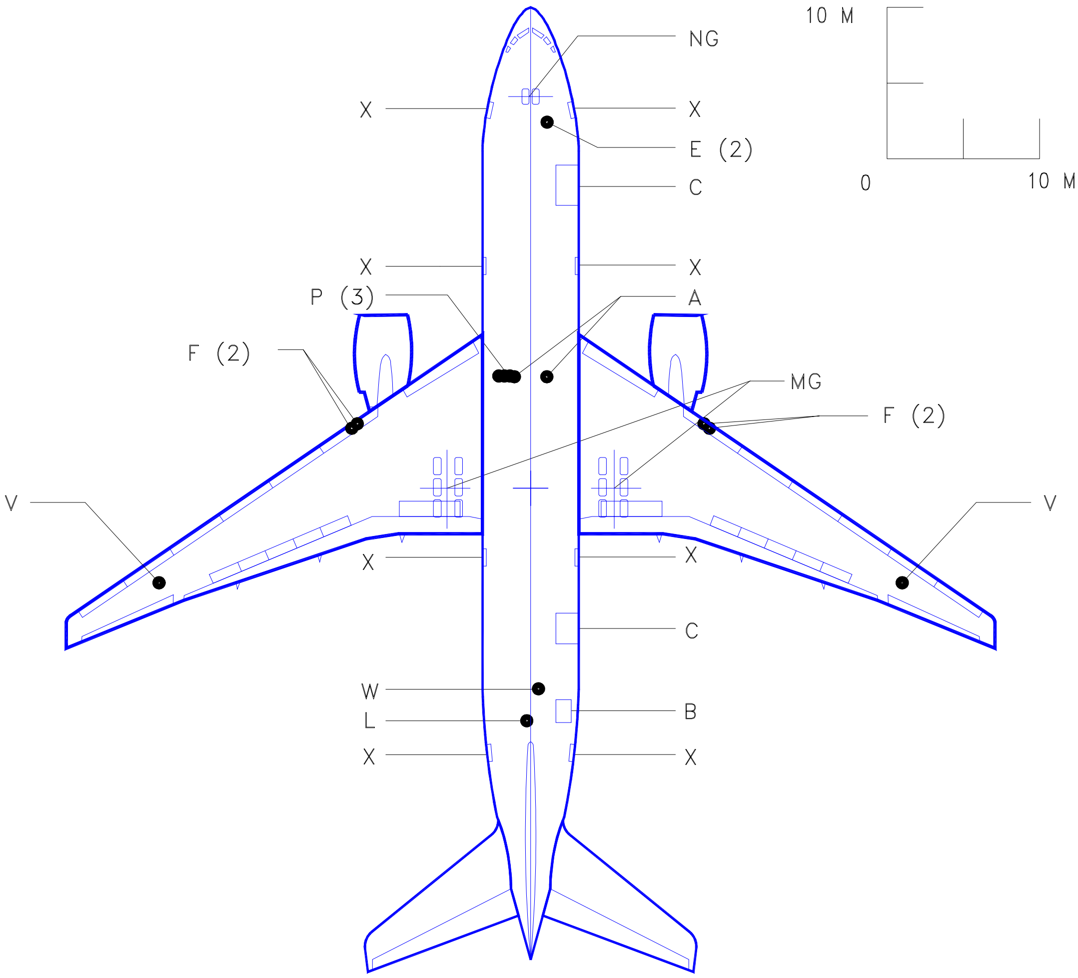
MODEL 777-200



NOTE: ADJUST SCALE WHEN PRINTING THIS PAGE

9.3.2 SCALED DRAWING - 1 IN = 100 FT

MODEL 777-200



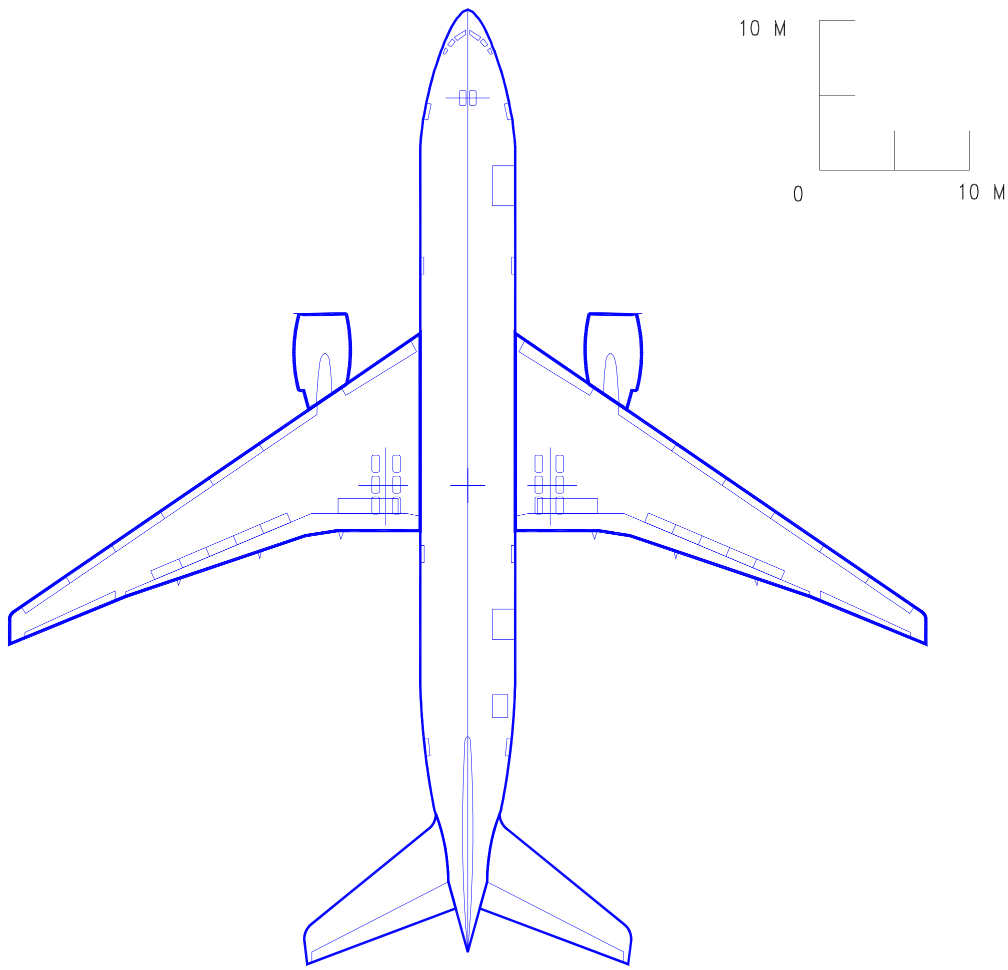
LEGEND

A	AIR CONDITIONING
B	BULK CARGO DOOR
C	CONTAINER CARGO DOOR
E	ELECTRICAL (2)
F	FUEL (2 CONNECTORS)
L	LAVATORY
MG	MAIN GEAR
NG	NOSE GEAR
P	PNEUMATIC PORT (3)
V	FUEL VENT
W	POTABLE WATER
X	PASSENGER DOOR

NOTE: ADJUST SCALE WHEN PRINTING THIS PAGE

9.4.1 SCALED DRAWING - 1:500

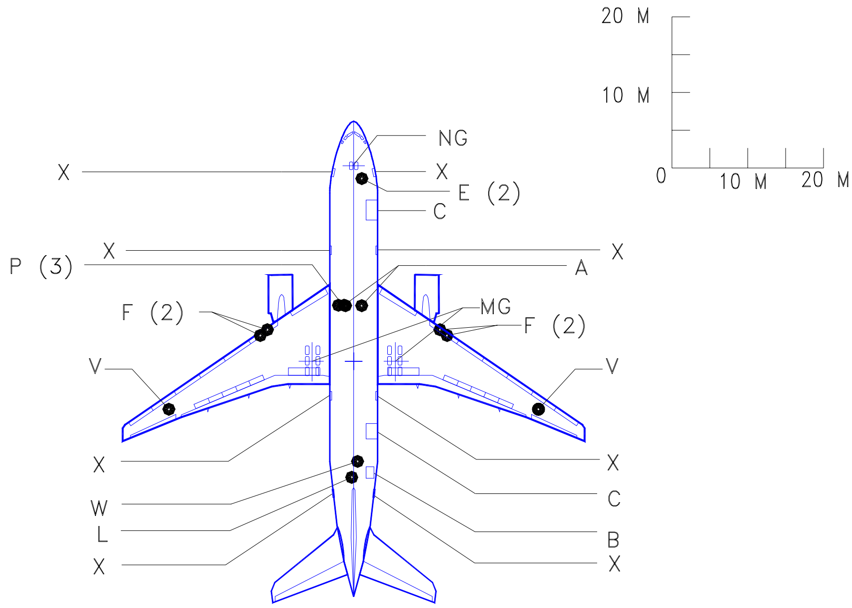
MODEL 777-200



NOTE: ADJUST SCALE WHEN PRINTING THIS PAGE

9.4.2 SCALED DRAWING - 1:500

MODEL 777-200



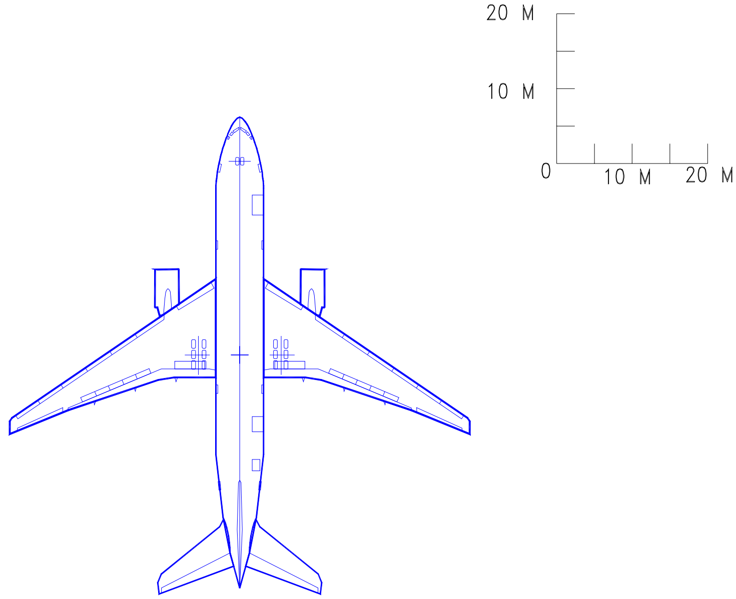
LEGEND

A	AIR CONDITIONING
B	BULK CARGO DOOR
C	CONTAINER CARGO DOOR
E	ELECTRICAL (2)
F	FUEL (2 CONNECTORS)
L	LAVATORY
MG	MAIN GEAR
NG	NOSE GEAR
P	PNEUMATIC PORT (3)
V	FUEL VENT
W	POTABLE WATER
X	PASSENGER DOOR

NOTE: ADJUST SCALE WHEN PRINTING THIS PAGE

9.5.1 SCALED DRAWING - 1:1000

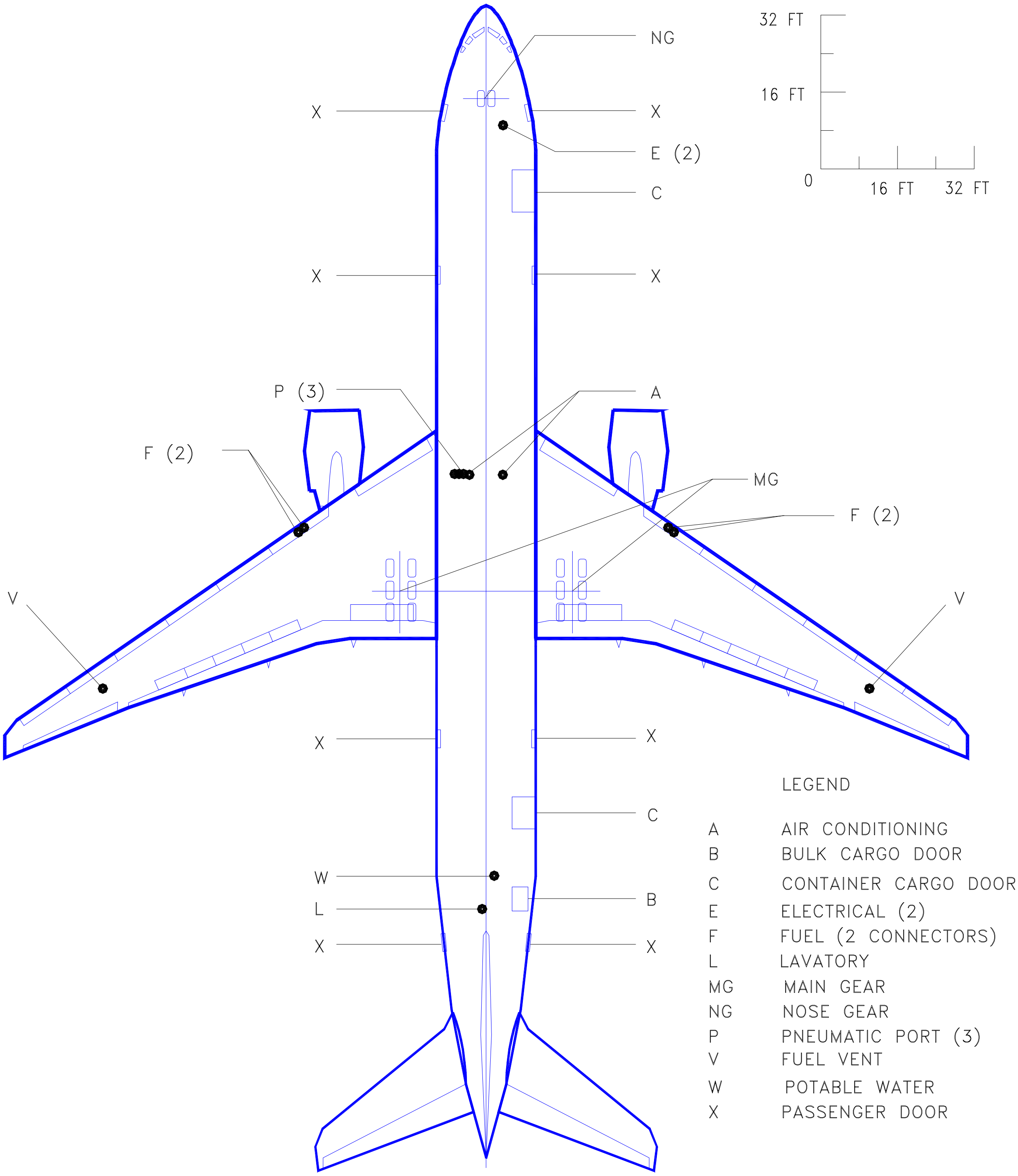
MODEL 777-200



NOTE: ADJUST SCALE WHEN PRINTING THIS PAGE

9.5.2 SCALED DRAWING - 1:1000

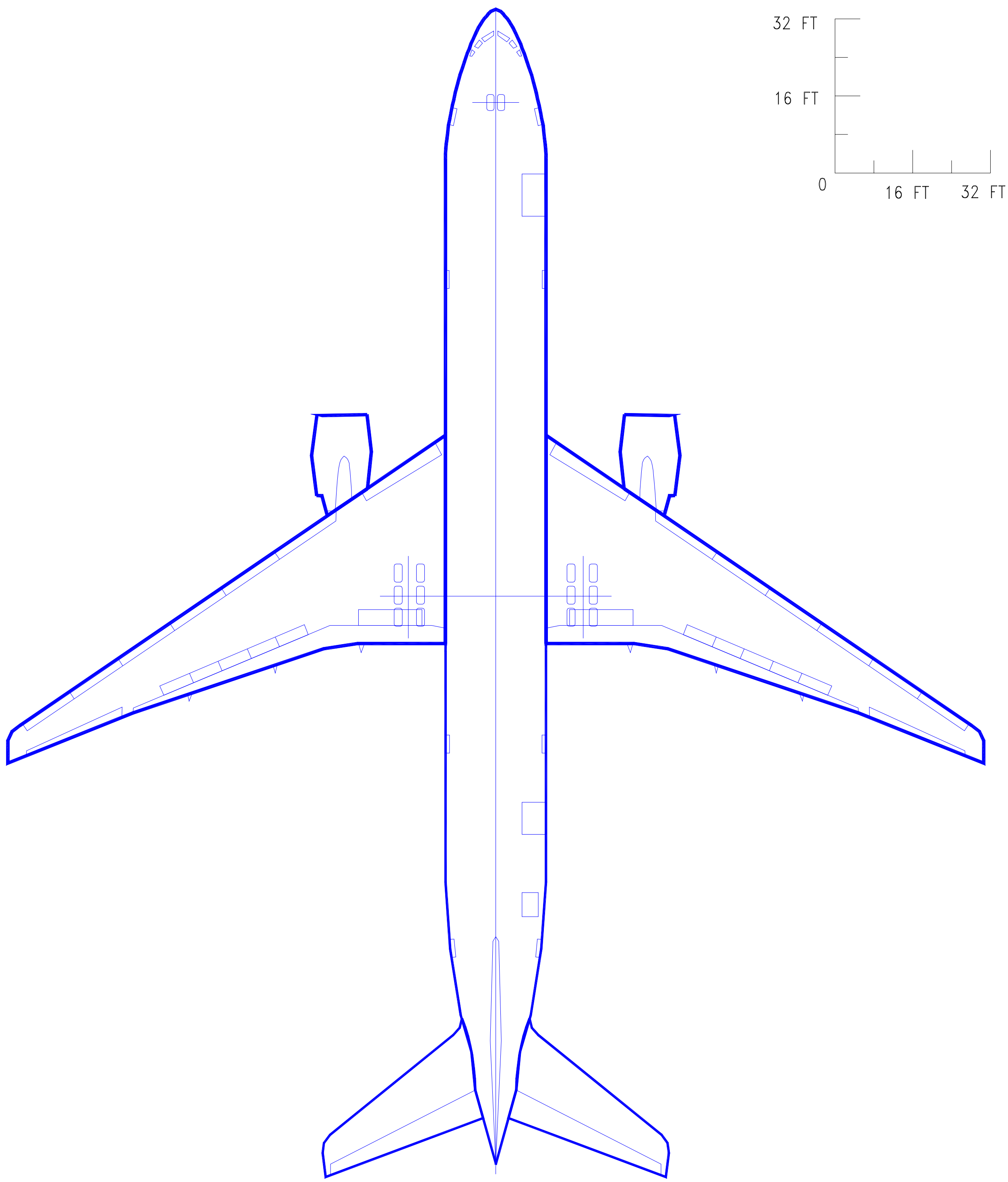
MODEL 777-200



NOTE: ADJUST SCALE WHEN PRINTING THIS PAGE

9.6.1 SCALED DRAWING - 1 IN. = 32 FT

MODEL 777-300



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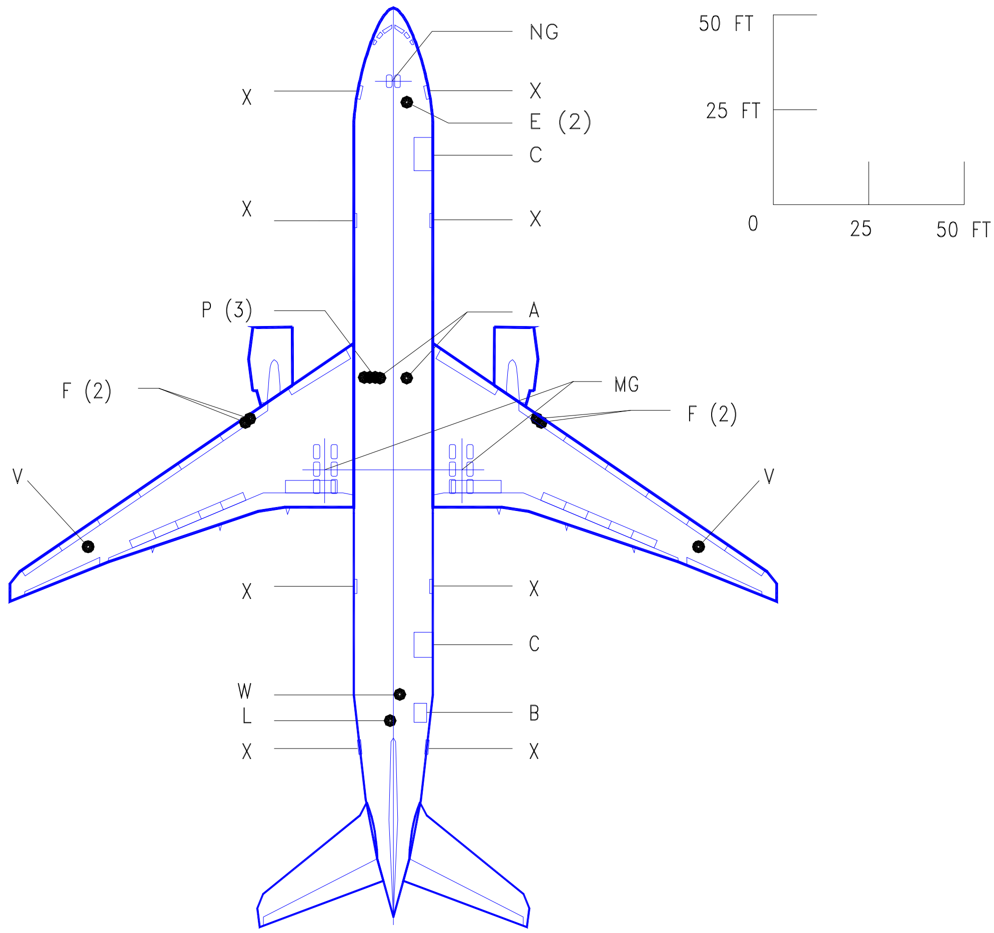
9.6.2 SCALED DRAWING - 1 IN. = 32 FT

MODEL 777-300



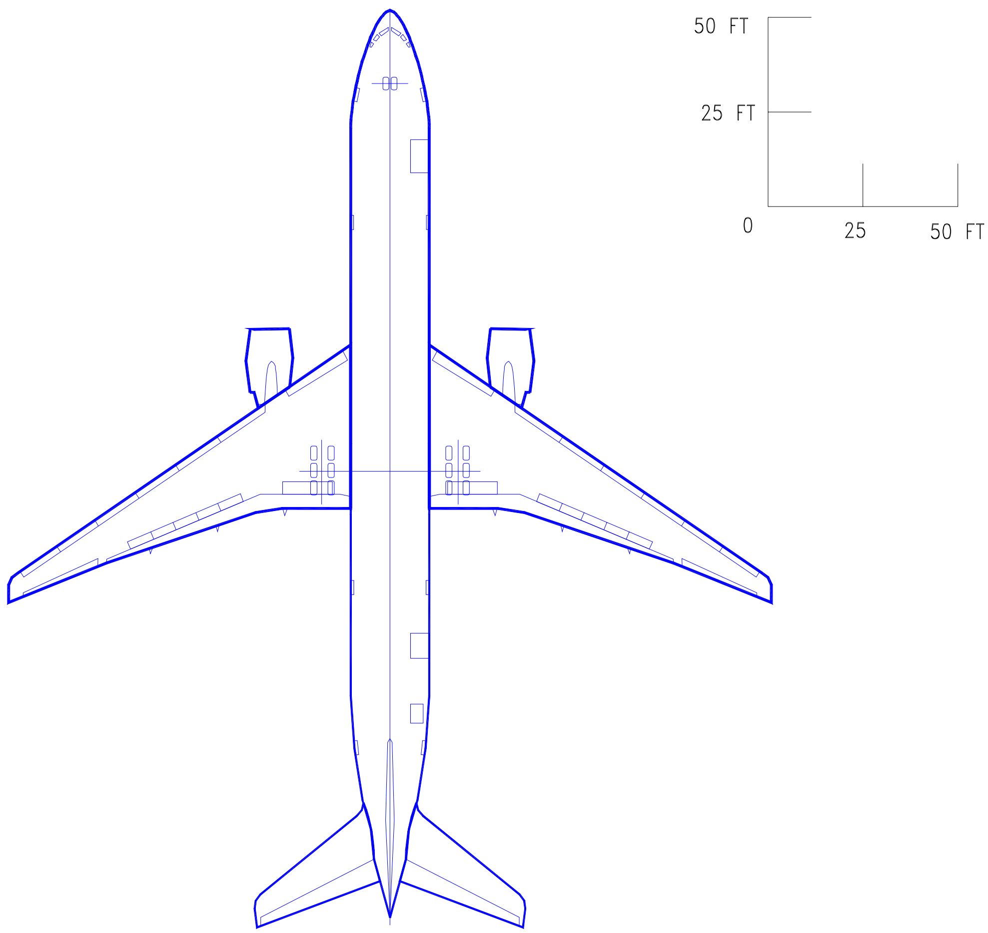
LEGEND

A	AIR CONDITIONING
B	BULK CARGO DOOR
C	CONTAINER CARGO DOOR
E	ELECTRICAL (2)
F	FUEL (2 CONNECTORS)
L	LAVATORY
MG	MAIN GEAR
NG	NOSE GEAR
P	PNEUMATIC PORT (3)
V	FUEL VENT
W	POTABLE WATER
X	PASSENGER DOOR

NOTE: ADJUST SCALE WHEN PRINTING THIS PAGE

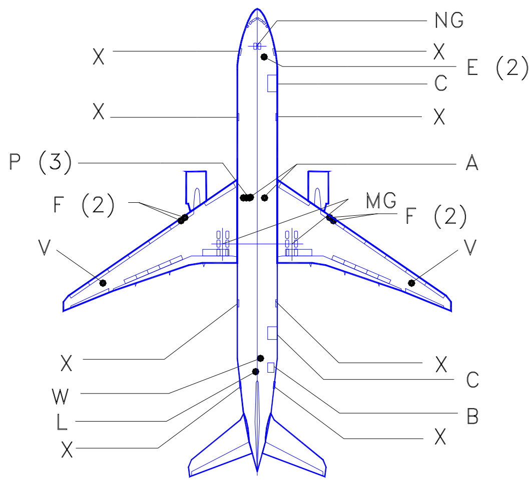
9.7.1 SCALED DRAWING - 1 IN. = 50 FT

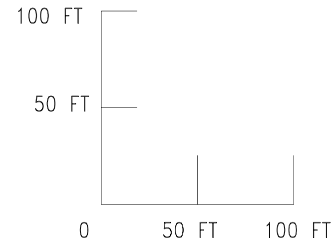
MODEL 777-300



NOTE: ADJUST SCALE WHEN PRINTING THIS PAGE

9.7.2 SCALED DRAWING - 1 IN. = 50 FT
MODEL 777-300



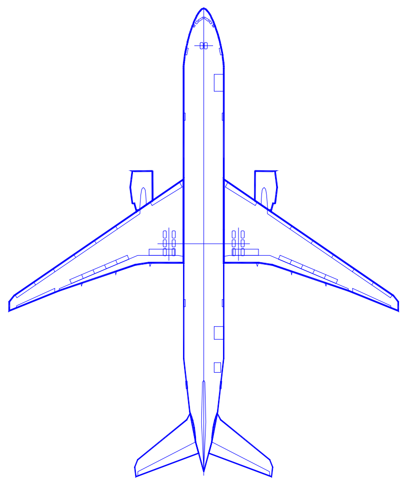


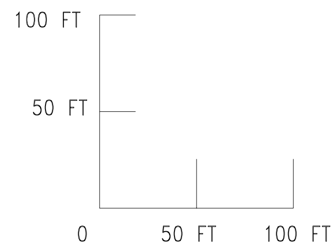
LEGEND

A	AIR CONDITIONING
B	BULK CARGO DOOR
C	CONTAINER CARGO DOOR
E	ELECTRICAL (2)
F	FUEL (2 CONNECTORS)
L	LAVATORY
MG	MAIN GEAR
NG	NOSE GEAR
P	PNEUMATIC PORT (3)
V	FUEL VENT
W	POTABLE WATER
X	PASSENGER DOOR

NOTE: ADJUST SCALE WHEN PRINTING THIS PAGE

9.8.1 SCALED DRAWING - 1 IN = 100 FT
MODEL 777-300





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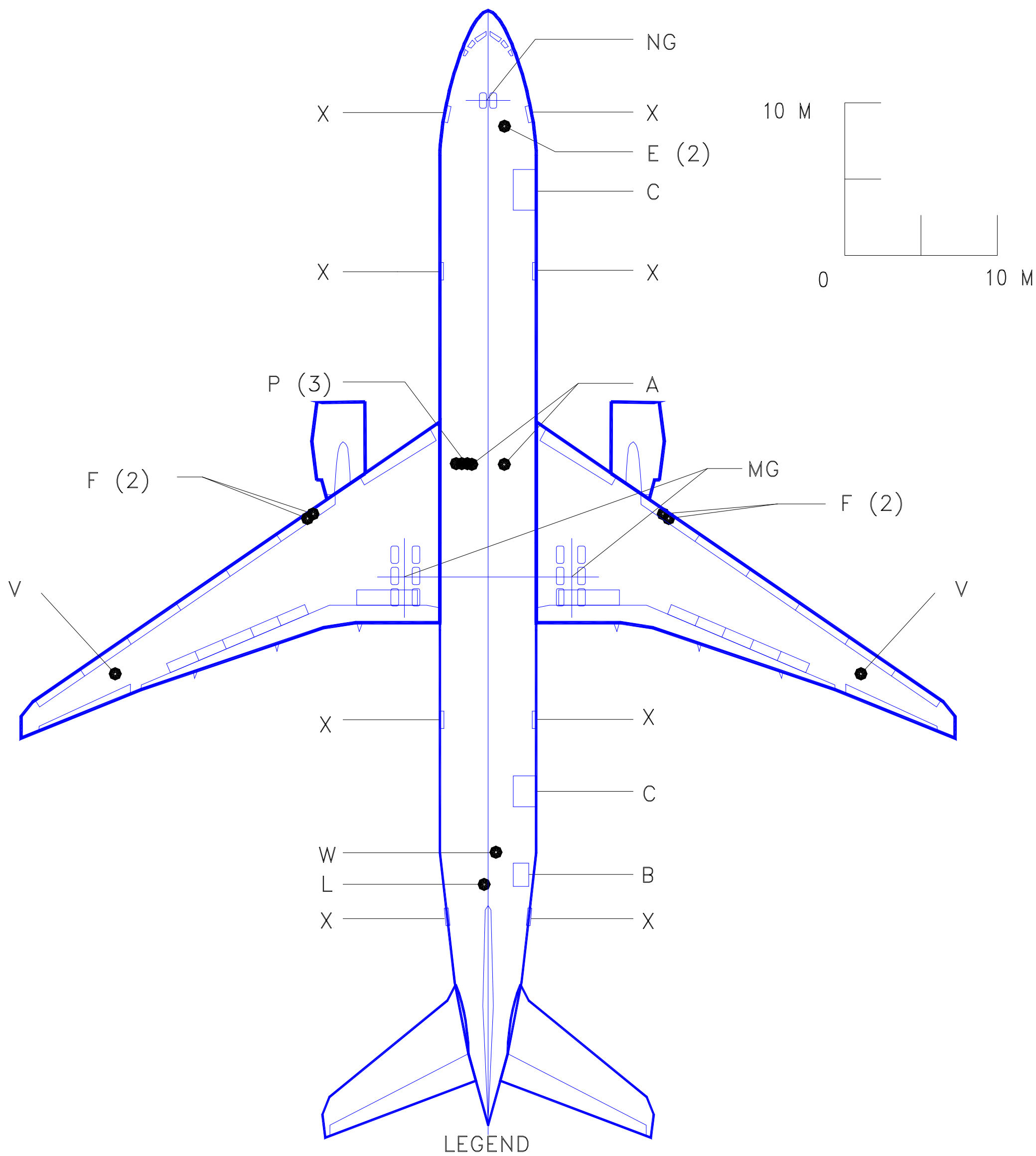
9.8.2 SCALED DRAWING - 1 IN = 100 FT

MODEL 777-300



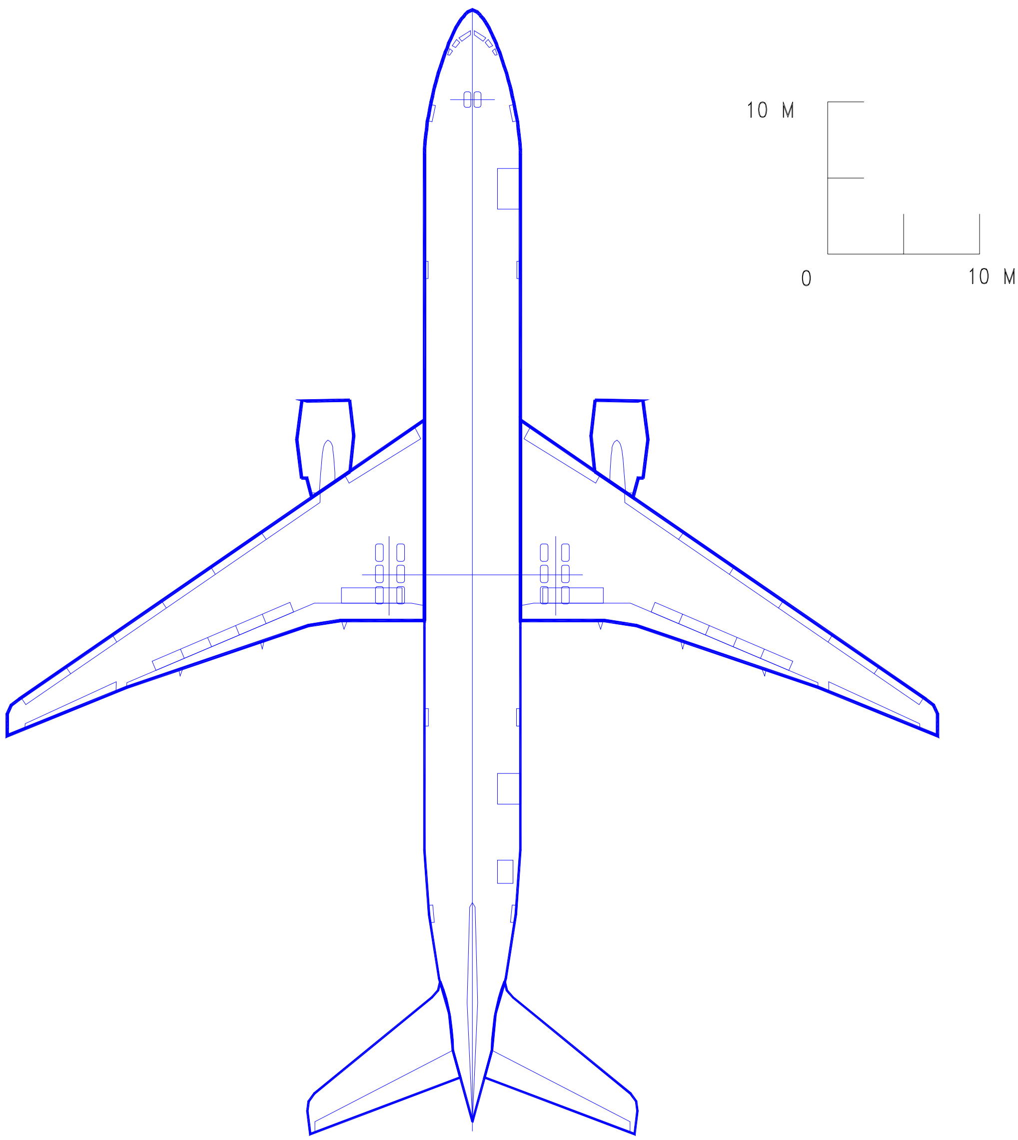
LEGEND

A	AIR CONDITIONING
B	BULK CARGO DOOR
C	CONTAINER CARGO DOOR
E	ELECTRICAL (2)
F	FUEL (2 CONNECTORS)
L	LAVATORY
MG	MAIN GEAR
NG	NOSE GEAR
P	PNEUMATIC PORT (3)
V	FUEL VENT
W	POTABLE WATER
X	PASSENGER DOOR

NOTE: ADJUST SCALE WHEN PRINTING THIS PAGE

9.9.1 SCALED DRAWING - 1:500

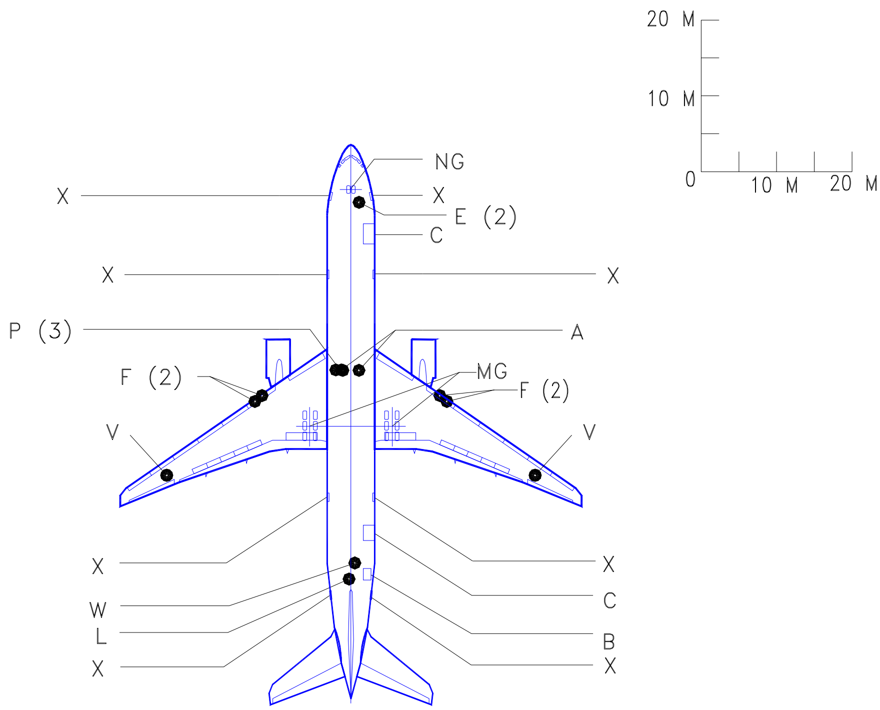
MODEL 777-300



NOTE: ADJUST SCALE WHEN PRINTING THIS PAGE

9.9.2 SCALED DRAWING - 1:500

MODEL 777-300



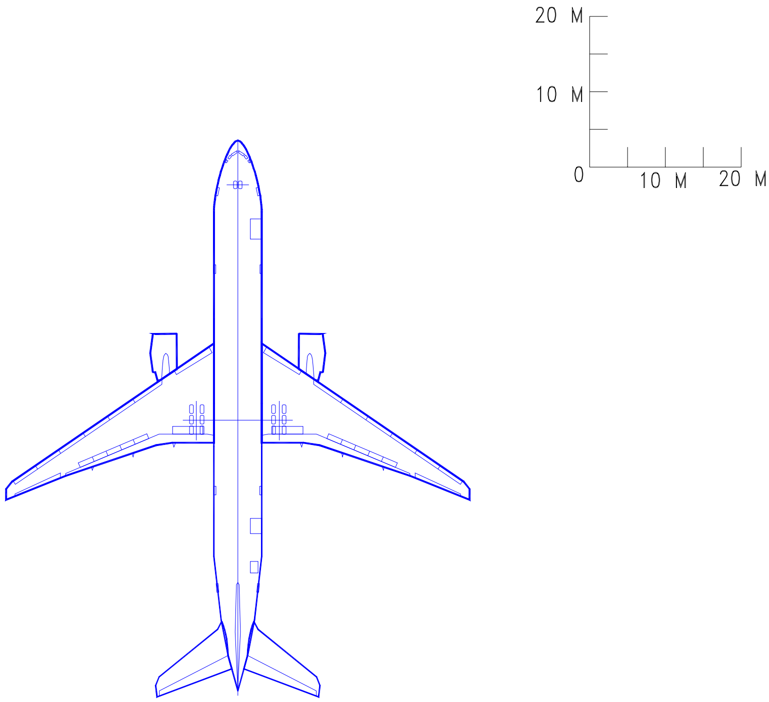
LEGEND

A	AIR CONDITIONING
B	BULK CARGO DOOR
C	CONTAINER CARGO DOOR
E	ELECTRICAL (2)
F	FUEL (2 CONNECTORS)
L	LAVATORY
MG	MAIN GEAR
NG	NOSE GEAR
P	PNEUMATIC PORT (3)
V	FUEL VENT
W	POTABLE WATER
X	PASSENGER DOOR

NOTE: ADJUST SCALE WHEN PRINTING THIS PAGE

9.10.1 SCALED DRAWING - 1:1000

MODEL 777-300



NOTE: ADJUST SCALE WHEN PRINTING THIS PAGE

9.10.2 SCALED DRAWING - 1:1000
MODEL 777-300