A350-900 PRELIMINARY DATA

AIRPLANE CHARACTERISTICS FOR AIRPORT PLANNING

AC

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LIST OF EFFECTIVE CONTENT

Revision No. 0 - Jul 01/11

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SCOPE

1-1-0 Purpose

**ON A/C A350-900

Purpose

1. General

The A350 AIRPLANE CHARACTERISTICS (AC) manual is issued for the A350-900 series aircraft to provide necessary data to airport operators and airlines for airport facilities planning.

The data given in this preliminary issue of the A350 AIRPLANE CHARACTERISTICS (AC) can be subject to change pending completion of the design and flight test phase. It is given for guidance only and does not constitute a contractual commitment.

This non-customized document conforms to NAS 3601 specification.

The A350 XWB is a new family of mid-size medium to long range new technology aircraft that will deliver superior fuel efficiency, passenger comfort, environmental characteristics and economics, with a global market coverage.
The aircraft is designed to offer multiple payload capabilities with a consistant range ability across the family.
The A350 XWB is equipped with two Rolls-Royce Trent XWB engines.
This engine will incorporate the most advanced technologies to provide the best aircraft performance, maintainability, lowest fuel consumption and environmental impact.
Reflecting market needs, the A350 XWB offers a high level of cargo hold capability and flexibility.
Two wide cargo doors and a Cargo Loading System (CLS) compatible with most lower deck cargo containers and pallet standards, allowing full interlining operations, ease the loading.
The A350 XWB provides easy and cost effective ground handling minimizing aircraft turnround time.
The innovative A350 XWB design increases planning flexibility to perform maintenance during the aircraft scheduled downtime.

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1-2-0 Introduction

**ON A/C A350-900

Introduction

1. This manual has the chapters that follow.

   A. Chapter 1 : SCOPE

   B. Chapter 2 : AIRPLANE DESCRIPTION
   This chapter contains general dimensions and other basic aircraft data.

   It covers:
   - Aircraft Weight Variants,
   - Aircraft dimensions,
   - Ground clearances,
   - Typical interior arrangement (passenger and cargo compartments),
   - Door locations, dimensions and clearances.

   C. Chapter 3 : AIRPLANE PERFORMANCE
   This chapter indicates the aircraft performance.

   It covers:
   - Payload / Range,
   - Take off and landing runway requirements,
   - Landing approach speed.

   D. Chapter 4 : GROUND MANEUVERING
   This chapter gives the aircraft turning capability and maneuvering characteristics on ground.

   It includes:
   - Turning Radii,
   - Visibility from cockpit,
   - Runway and Taxiway turn path,
   - Airplane parking and mooring.

   E. Chapter 5 : TERMINAL SERVICING
   This chapter provides information for the arrangement of ground handling and servicing equipment.

It covers:
- Airplane servicing arrangements / ramp layout,
- Turnround times,
- Ground servicing connections and locations,
- Engine starting pneumatic requirements,
- Ground pneumatic power requirements,
- Preconditioned airflow requirements,
- Ground towing requirements.

F. Chapter 6 : OPERATING CONDITIONS

This chapter contains data and safety/environmental precautions related to engine and APU operation on the ground.

It covers:
- Engine and APU exhaust velocities and temperatures,
- Engine noise data,
- Engine danger areas.

G. Chapter 7 : PAVEMENT DATA

This chapter gives the pavement data used for airport planning.

It covers:
- Landing gear footprint and static load,
- Charts for flexible pavement with Load Classification Number (LCN),
- Charts for rigid pavement with LCN,
- Aircraft Classification Number (ACN), Pavement Classification Number (PCN), reporting system for flexible and rigid pavement.

H. Chapter 9 : SCALED DRAWINGS

This chapter contains aircraft scaled drawings.

AIRPLANE DESCRIPTION

2-1-0 General Airplane Characteristics

****ON A/C A350-900**

General Airplane Characteristics

1. The following table provides characteristics of the A350–900.

Aircraft Characteristics	
	Basic Weights
Maximum Taxi Weight (MTW) Maximum Ramp Weight (MRW)	268900 kg (592824.0 lb)
Maximum Take Off Weight (MTOW)	268000 kg (590839.0 lb)
Maximum Landing Weight (MLW)	205000 kg (451948.0 lb)
Maximum Zero Fuel Weight (MZFW)	192000 kg (423288.0 lb)

Aircraft Characteristics	
Standard Seating Capacity	315 (2 class)
Usable Fuel Capacity (density = 0.785 kg/l)	138000 l (36456.4 USgal)
	108330 kg (238827.0 lb)
Pressurized Fuselage Volume	971 m3 (34291.0 ft.3)
Cockpit Volume	8.23 m3 (291.0 ft.3)
Passenger Compartment Volume	473.7 m3 (16729.0 ft.3)
Usable Volume, FWD CC (Based on LD3)	89.4 m3 (3157.0 ft.3)
Usable Volume, AFT CC (Based on LD3)	71.5 m3 (2525.0 ft.3)
Usable Volume, Bulk CC	12.3 m3 (434.0 ft.3)

NOTE : The values given in this table are common to all weight variants.

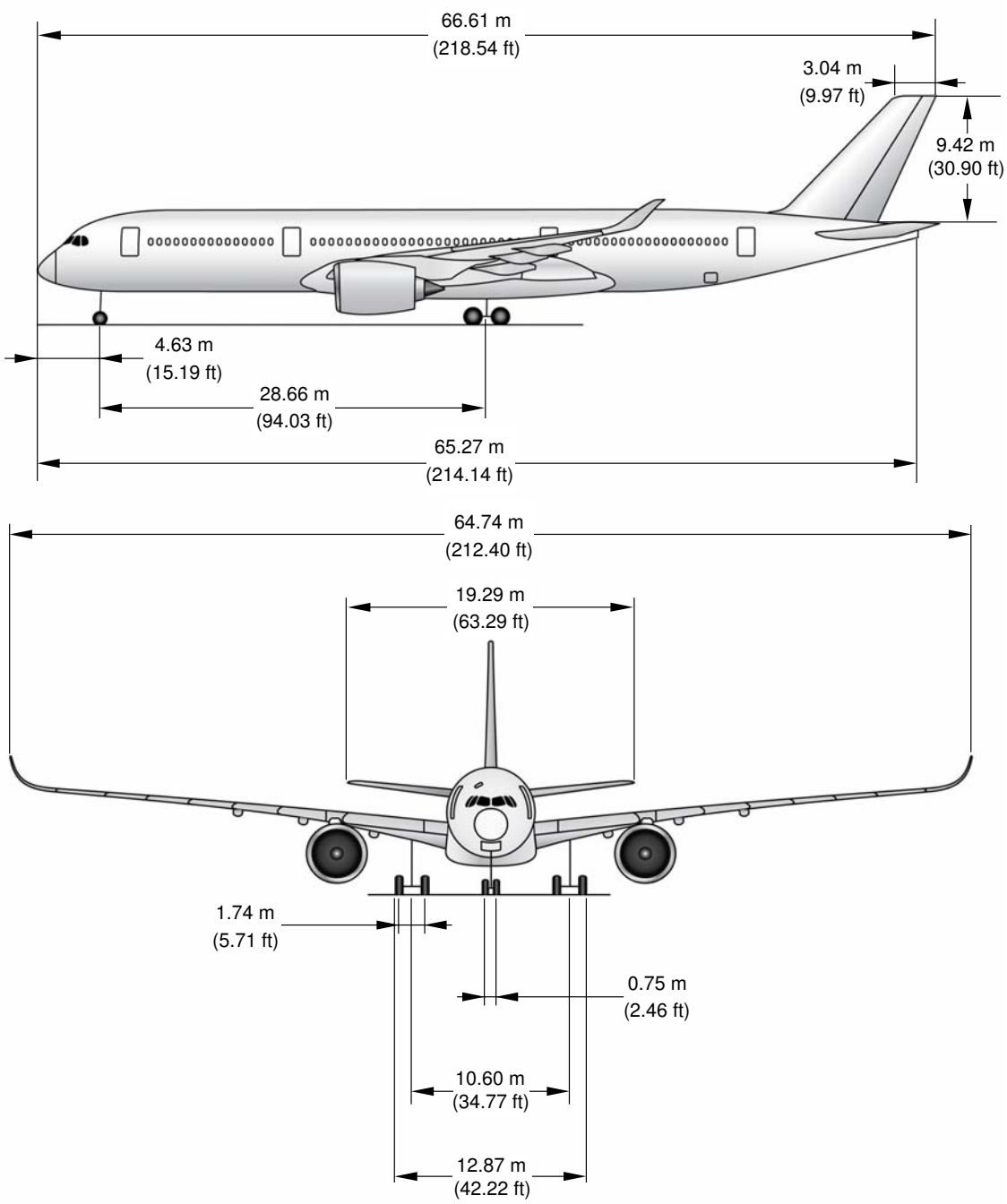
2-2-0 General Airplane Dimensions

**ON A/C A350-900

General Airplane Dimensions

1. This section provides general airplane dimensions.

**ON A/C A350-900



RELATED TO AIRCRAFT ATTITUDE AND WEIGHT

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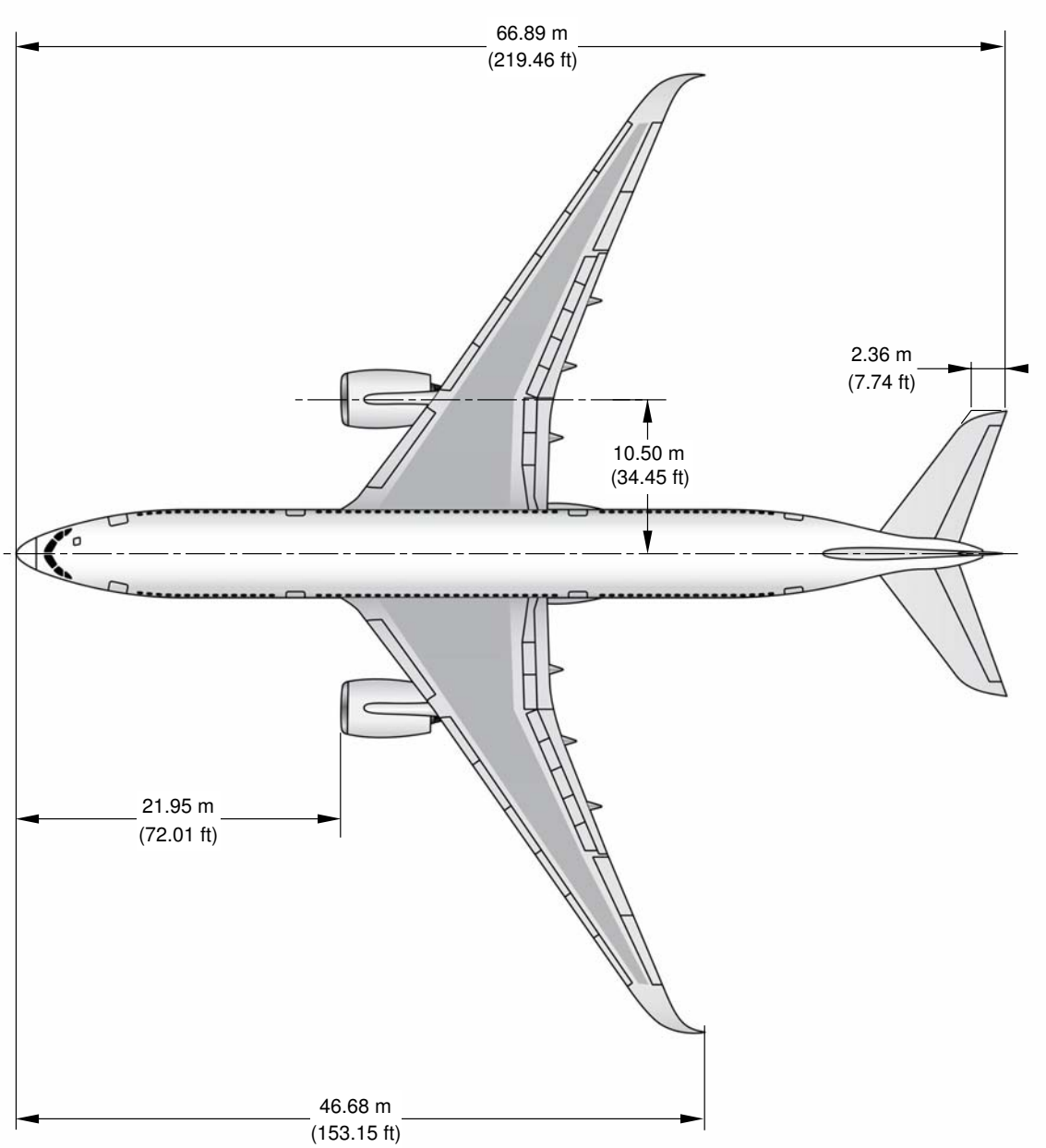
General Airplane Dimensions
(Sheet 1 of 2)
FIGURE-2-2-0-991-001-A01

**ON A/C A350-900



RELATED TO AIRCRAFT ATTITUDE AND WEIGHT

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General Airplane Dimensions
(Sheet 2 of 2)
FIGURE-2-2-0-991-001-A01

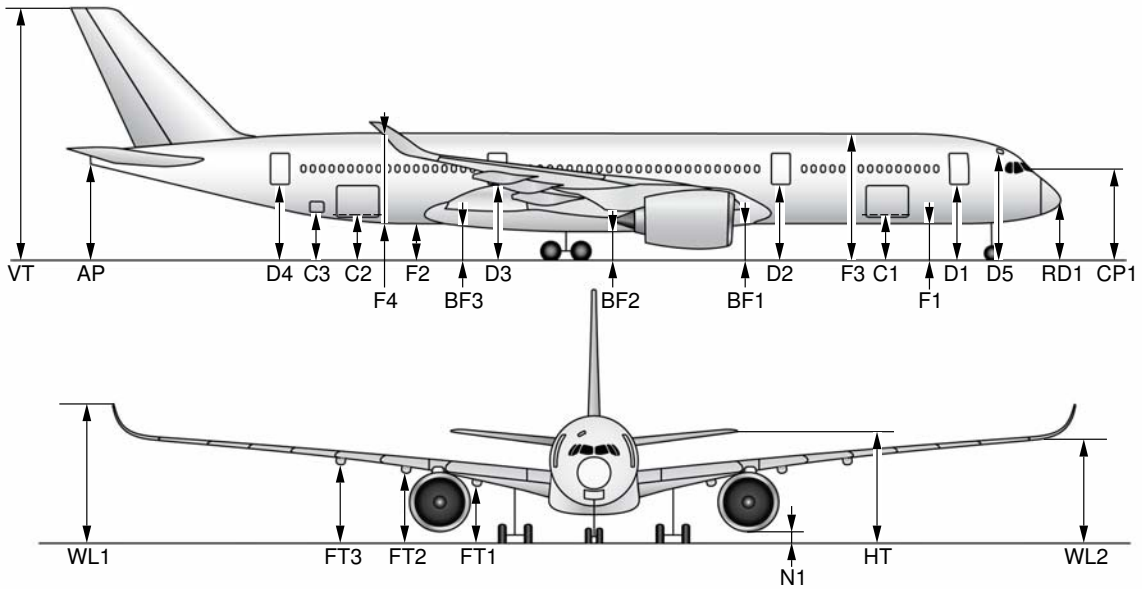
2-3-0 Ground Clearances

**ON A/C A350-900

Ground Clearances

1. This section gives ground clearances.

**ON A/C A350-900



A/C CONFIGURATION	MRW (268 900 kg) FWD CG (26%)		MRW (268 900 kg) AFT CG (33.1%)		(135 000 kg) FWD CG (20%)		(135 000 kg) AFT CG (40%)		A/C JACKED FDL = 6.5 m (21.32 ft)	
	m	ft	m	ft	m	ft	m	ft	m	ft
AP	6.61	21.69	6.55	21.49	6.83	22.41	6.52	21.39	7.72	25.33
BF1	2.44	8.01	2.46	8.07	2.56	8.40	2.66	8.73	3.71	12.17
BF2	1.93	6.33	1.93	6.33	2.07	6.79	2.08	6.82	3.16	10.37
BF3	2.52	8.27	2.50	8.20	2.68	8.79	2.59	8.50	3.71	12.17
C1	3.09	10.14	3.13	10.27	3.19	10.47	3.37	11.06	4.39	14.40
C2	3.25	10.66	3.22	10.56	3.43	11.25	3.29	10.79	4.43	14.53
C3	3.25	10.66	3.21	10.53	3.43	11.25	3.26	10.70	4.41	14.47
CP1	5.84	19.16	5.90	19.36	5.93	19.46	6.20	20.34	7.18	23.56
D1	5.05	16.57	5.10	16.73	5.15	16.90	5.37	17.62	6.37	20.90
D2	5.10	16.73	5.12	16.80	5.22	17.13	5.33	17.49	6.37	20.90
D3	5.17	16.92	5.15	16.90	5.32	17.45	5.27	17.29	6.37	20.90
D4	5.22	17.13	5.18	17.00	5.41	17.75	5.21	17.09	6.37	20.90
D5	7.25	23.79	7.31	23.98	7.33	24.05	7.61	24.97	8.59	28.18
F1	2.41	7.91	2.45	8.04	2.51	8.23	2.70	8.86	3.71	12.17
F2	2.53	8.30	2.50	8.20	2.70	8.86	2.58	8.46	3.71	12.17
F3	8.50	27.89	8.54	28.02	8.61	28.25	8.78	28.81	9.80	32.15
F4	8.41	27.59	8.38	27.49	8.59	28.18	8.45	27.72	9.58	31.43
FT1	3.72	12.21	3.71	12.17	3.87	12.70	3.84	12.60	4.94	16.21
FT2	4.53	14.86	4.52	14.83	4.68	15.35	4.64	15.22	5.74	18.83
FT3	5.17	16.96	5.16	16.93	5.32	17.45	5.27	17.29	6.38	20.93
HT	7.67	25.16	7.60	24.93	7.88	25.85	7.56	24.80	8.77	28.77
N1	0.74	2.43	0.75	2.46	0.87	2.85	0.93	3.05	1.99	6.53
RD1	3.98	13.06	4.04	13.26	4.06	13.32	4.34	14.24	5.32	17.45
VT	17.17	56.33	17.10	56.10	17.39	57.05	17.07	56.00	18.27	59.94
WL1	9.40	30.84	9.37	30.74	9.57	31.40	9.44	30.97	10.57	34.68
WL2	6.98	22.90	6.96	22.84	7.14	23.43	7.04	23.10	8.17	26.80

NOTE: PASSENGER AND CARGO DOOR GROUND CLEARANCES ARE MEASURED FROM THE CENTER OF THE DOOR SILL AND FROM FLOOR LEVEL.

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Ground Clearances
FIGURE-2-3-0-991-001-A01

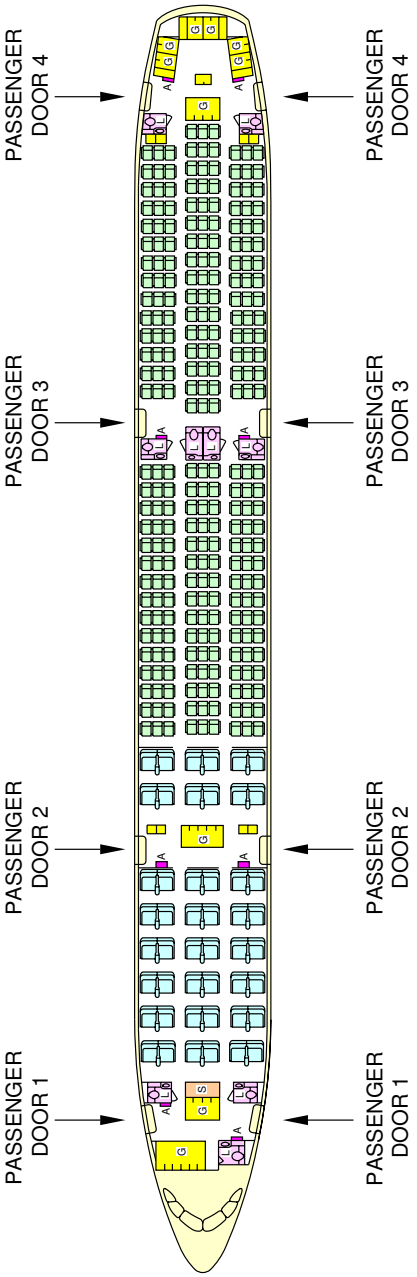
2-4-0 Interior Arrangements - Plan View

**ON A/C A350-900

Interior Arrangements - Plan View

1. This section gives the standard configuration.

**ON A/C A350-900



PASSENGER SEATS (315 TOTAL)
48 BUSINESS CLASS (6–ABREAST)
267 ECONOMY CLASS (9–ABREAST)
SEAT PITCHES: ECONOMY 32 in.
BUSINESS 60 in.

ITEM	DESIGNATION	
G	GALLEY	(12)
L	LAVATORY	(9)
A	ATTENDANT SEAT	(8)
S	STOWAGE	(1)

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Standard Configuration
FIGURE-2-4-0-991-001-A01

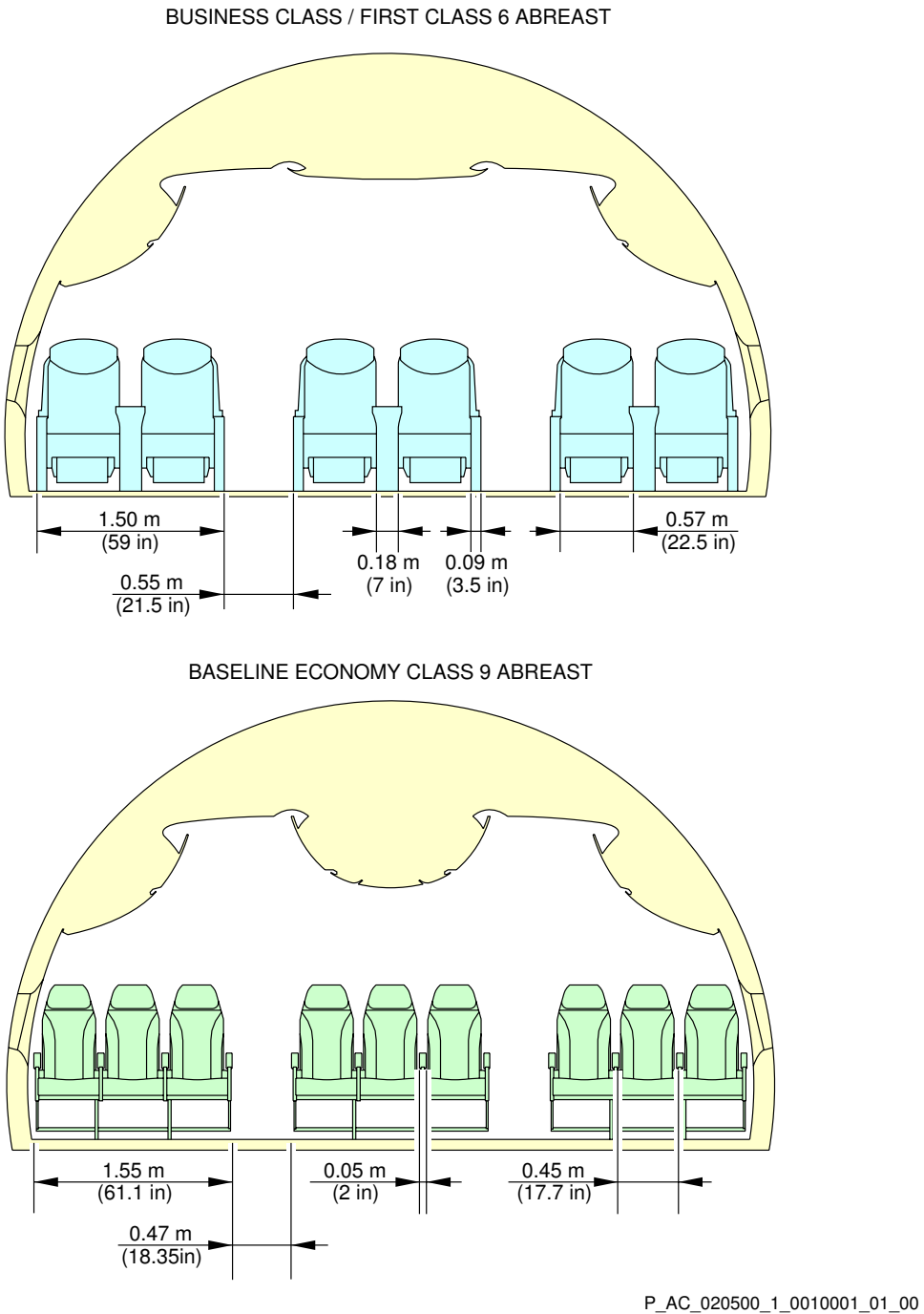
2-5-0 Interior Arrangements - Cross Section

**ON A/C A350-900

Interior Arrangements - Cross Section

1. This section gives the typical configuration.

**ON A/C A350-900



Typical Configuration
FIGURE-2-5-0-991-001-A01

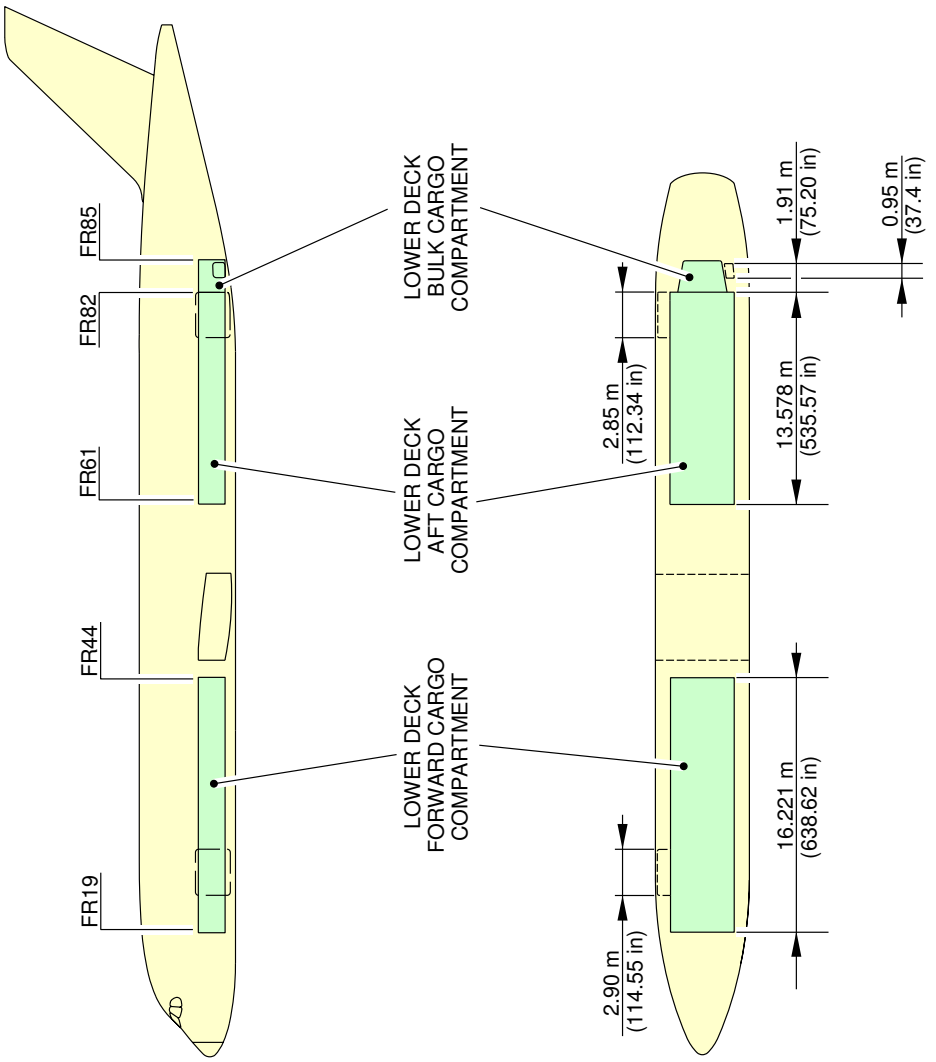
2-6-0 Cargo Compartments

**ON A/C A350-900

Cargo Compartments

1. This section gives cargo compartments :
   - Locations and dimensions,
   - Loading combinations.

**ON A/C A350-900



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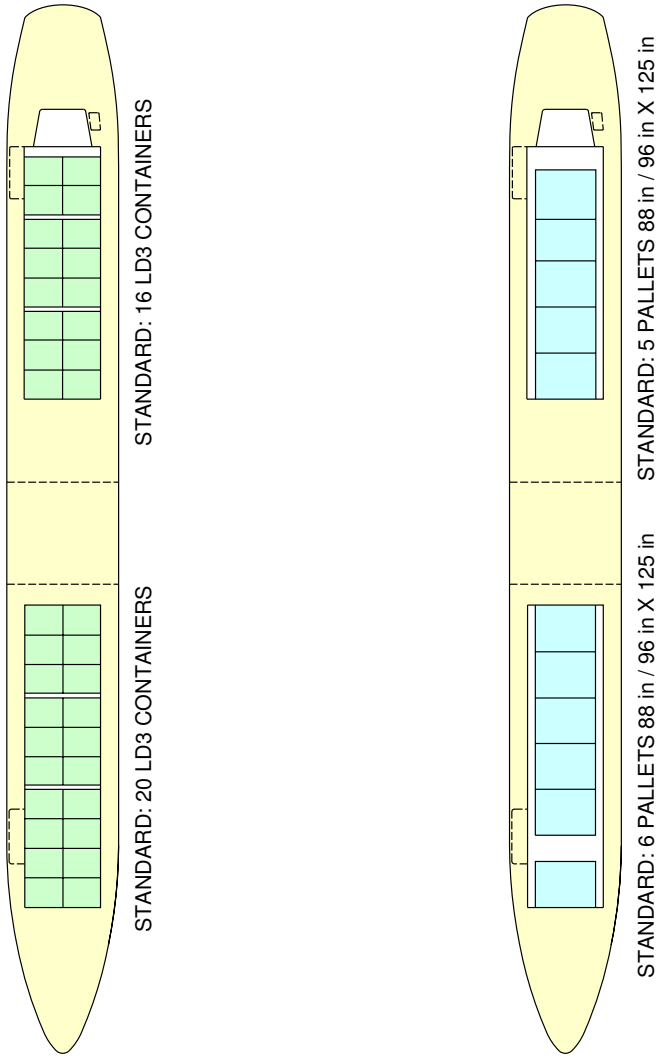
Cargo Compartments
Locations and Dimensions (Sheet 1 of 2)
FIGURE-2-6-0-991-002-A01

**ON A/C A350-900



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Cargo Compartments
Loading Combinations (Sheet 2 of 2)
FIGURE-2-6-0-991-002-A01

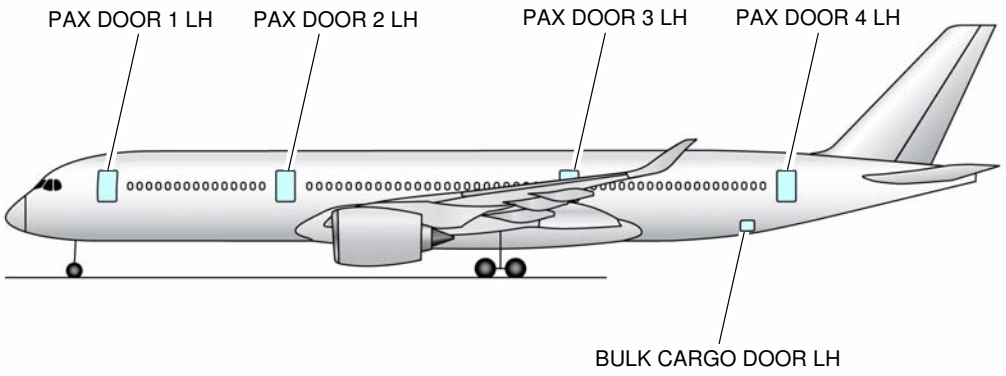
2-7-0 Door Clearances and Locations

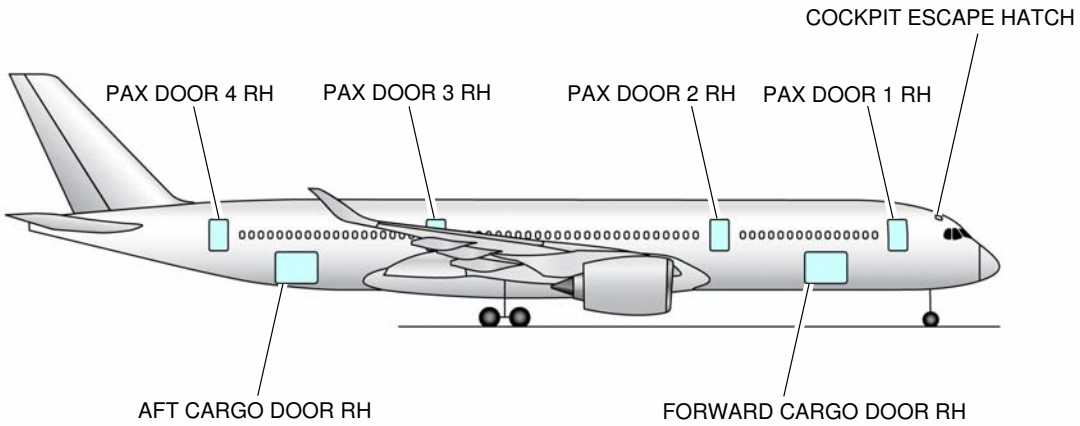
**ON A/C A350-900

Door Clearances and Locations

1. This section gives door clearances and locations.

**ON A/C A350-900





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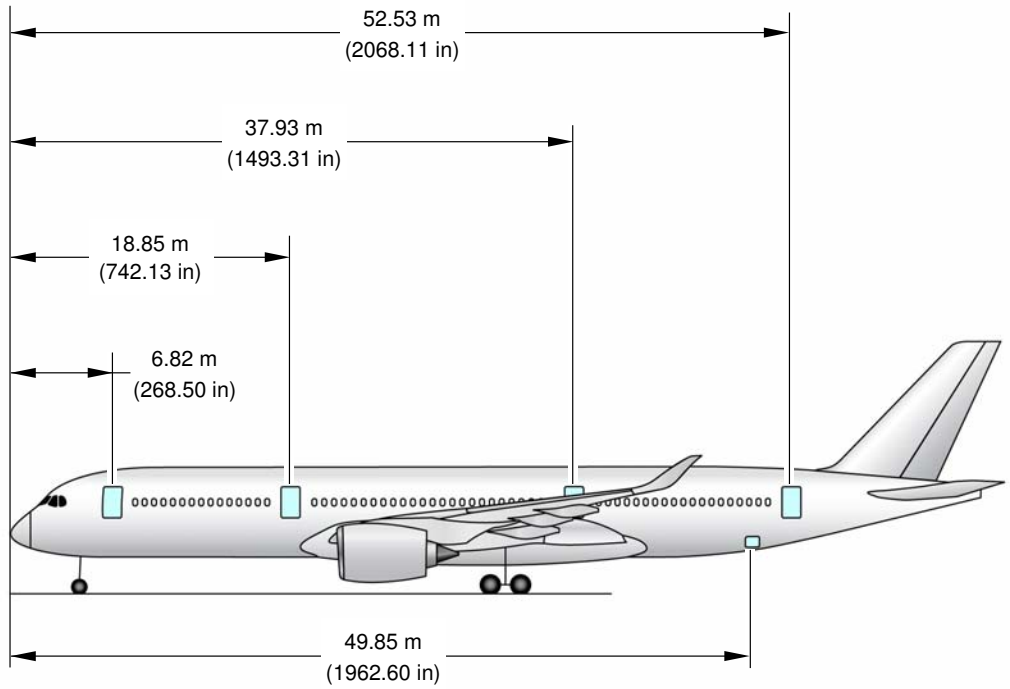
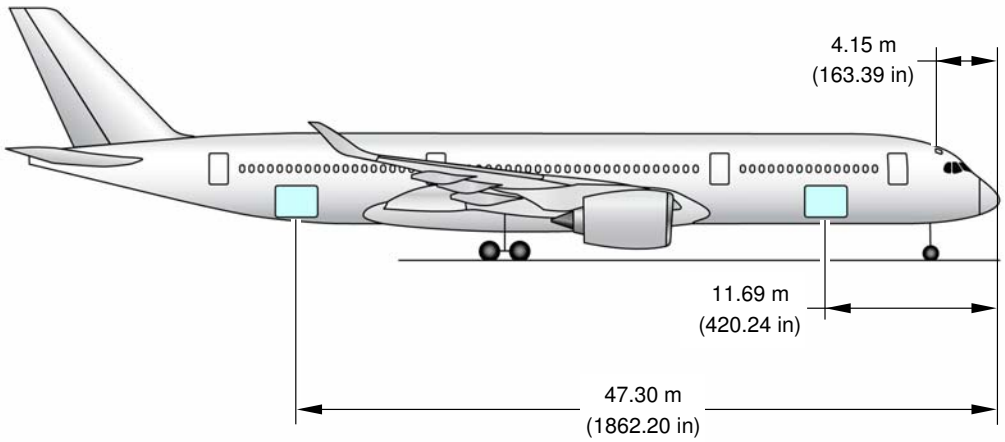
Door Locations
Door Identifications (Sheet 1 of 2)
FIGURE-2-7-0-991-001-A01

**ON A/C A350-900





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Door Locations
(Sheet 2 of 2)
FIGURE-2-7-0-991-001-A01

GROUND MANEUVERING

4-5-0 Runway and Taxiway Turn Paths

****ON A/C A350-900**

Introduction

1. This section gives the runway and taxiway turnpaths for the following configurations:
   - 90° Turn – Runway to Taxiway
   - 135° Turn – Runway to Taxiway
   - 180° U-Turn on Runway
   - 90° Turn – Taxiway to Taxiway
   - 135° Turn – Taxiway to Taxiway

   The turnpaths Runway to Taxiway and Taxiway to Taxiway are defined using 2 methods:
   - Oversteering method,
   - Cockpit over centerline method.

   The 180 U-Turn on runway is defined using the following method:
   - U-Turn using edge of runway method.

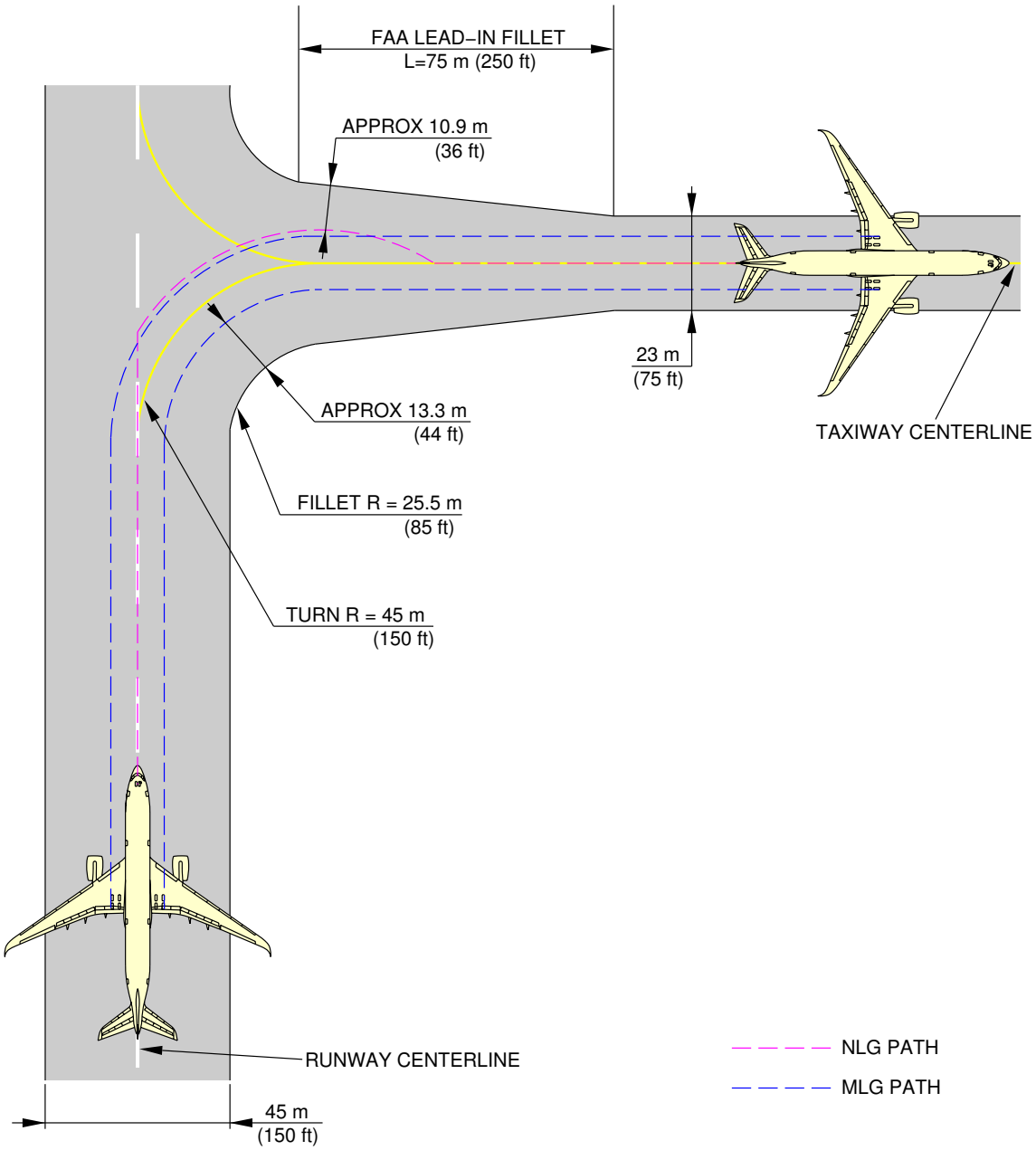
4-5-1 90° Turn - Runway to Taxiway

**ON A/C A350-900

90° Turn - Runway to Taxiway

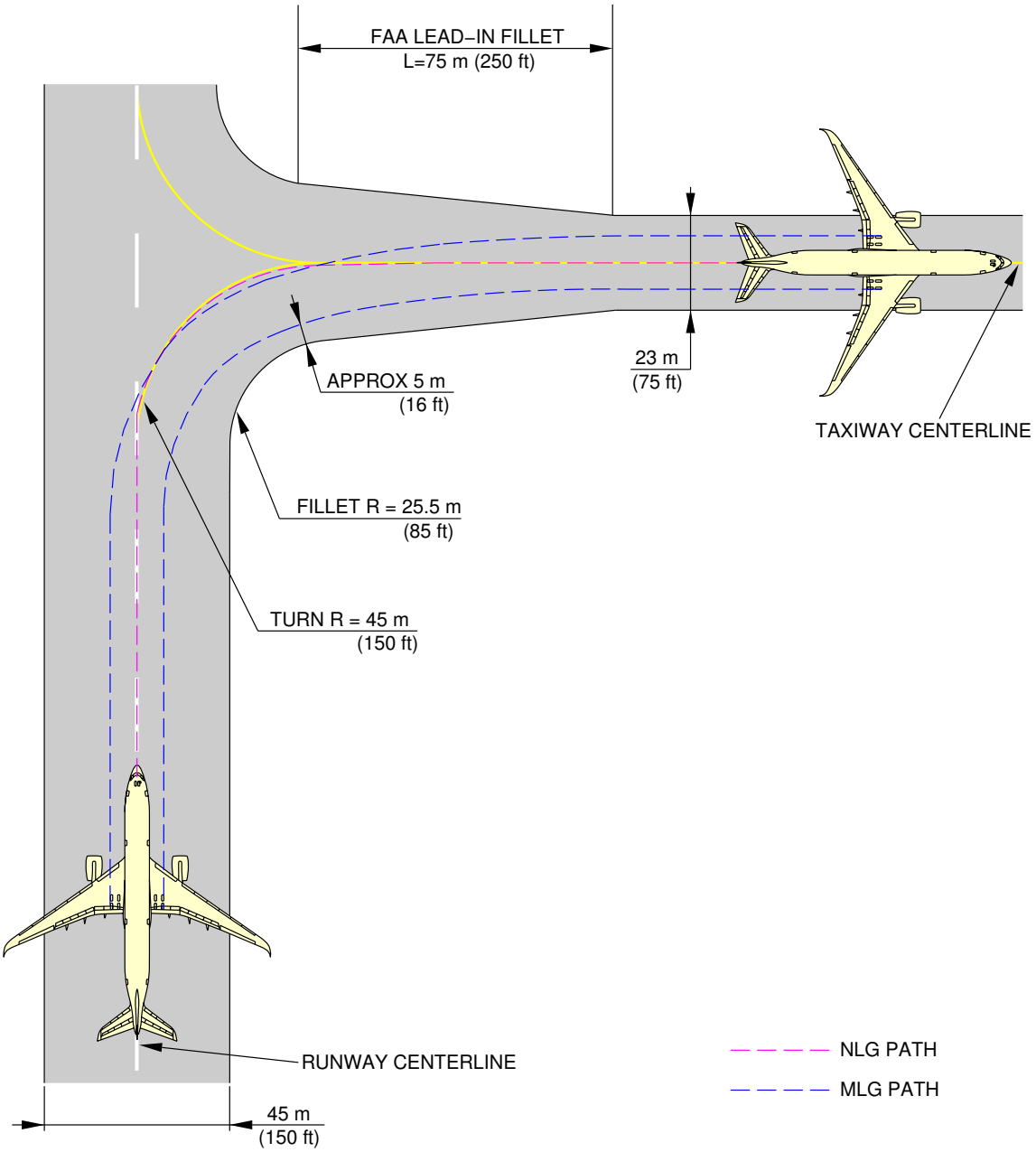
1. This section gives the 90° turn - runway to taxiway.

**ON A/C A350-900



90° Turn - Runway to Taxiway
Oversteering Method (Sheet 1 of 2)
FIGURE-4-5-1-991-001-A01

**ON A/C A350-900



90° Turn - Runway to Taxiway
Cockpit over Centerline Method (Sheet 2 of 2)
FIGURE-4-5-1-991-001-A01

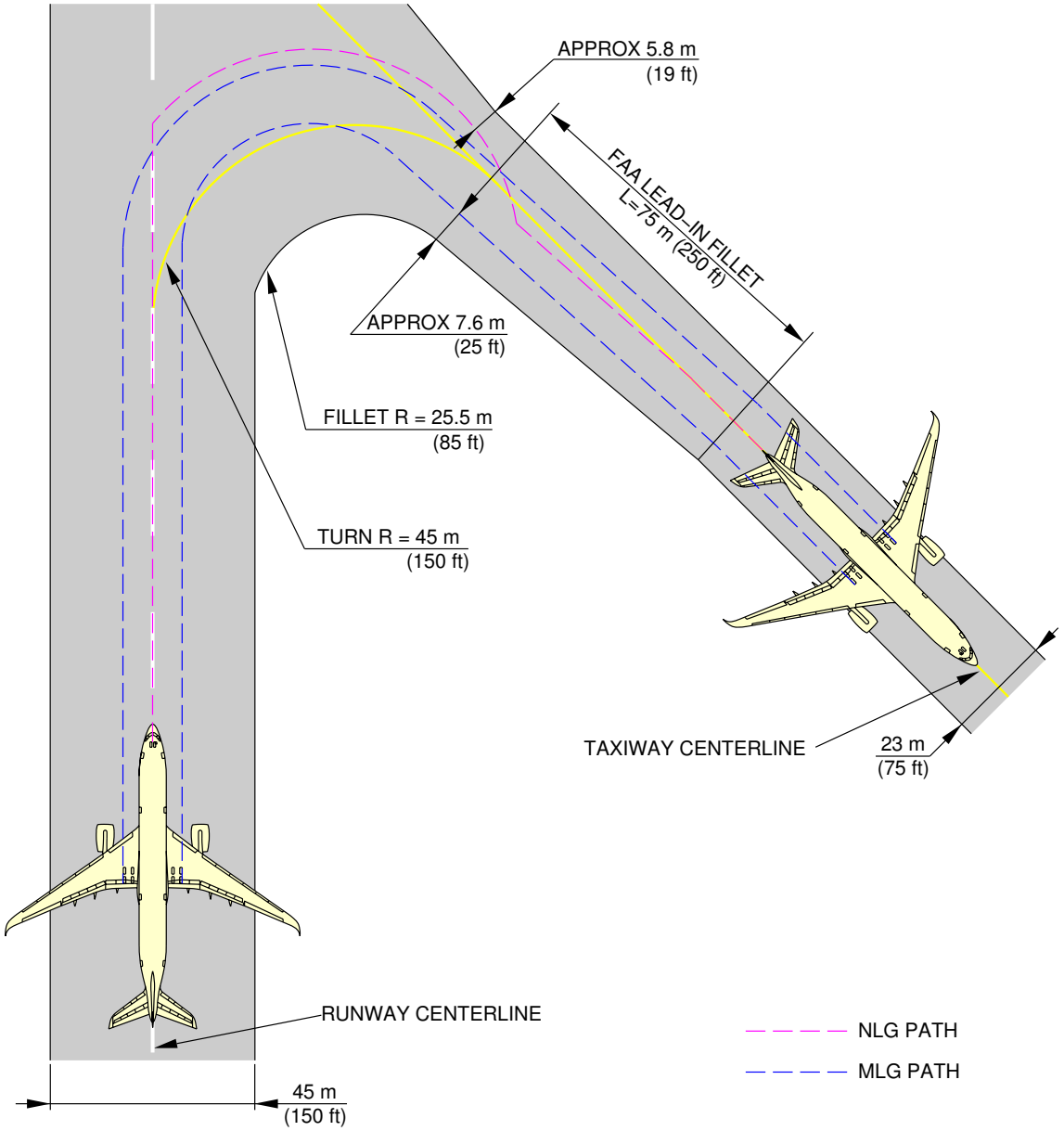
4-5-2 135° Turn - Runway to Taxiway

**ON A/C A350-900

135° Turn - Runway to Taxiway

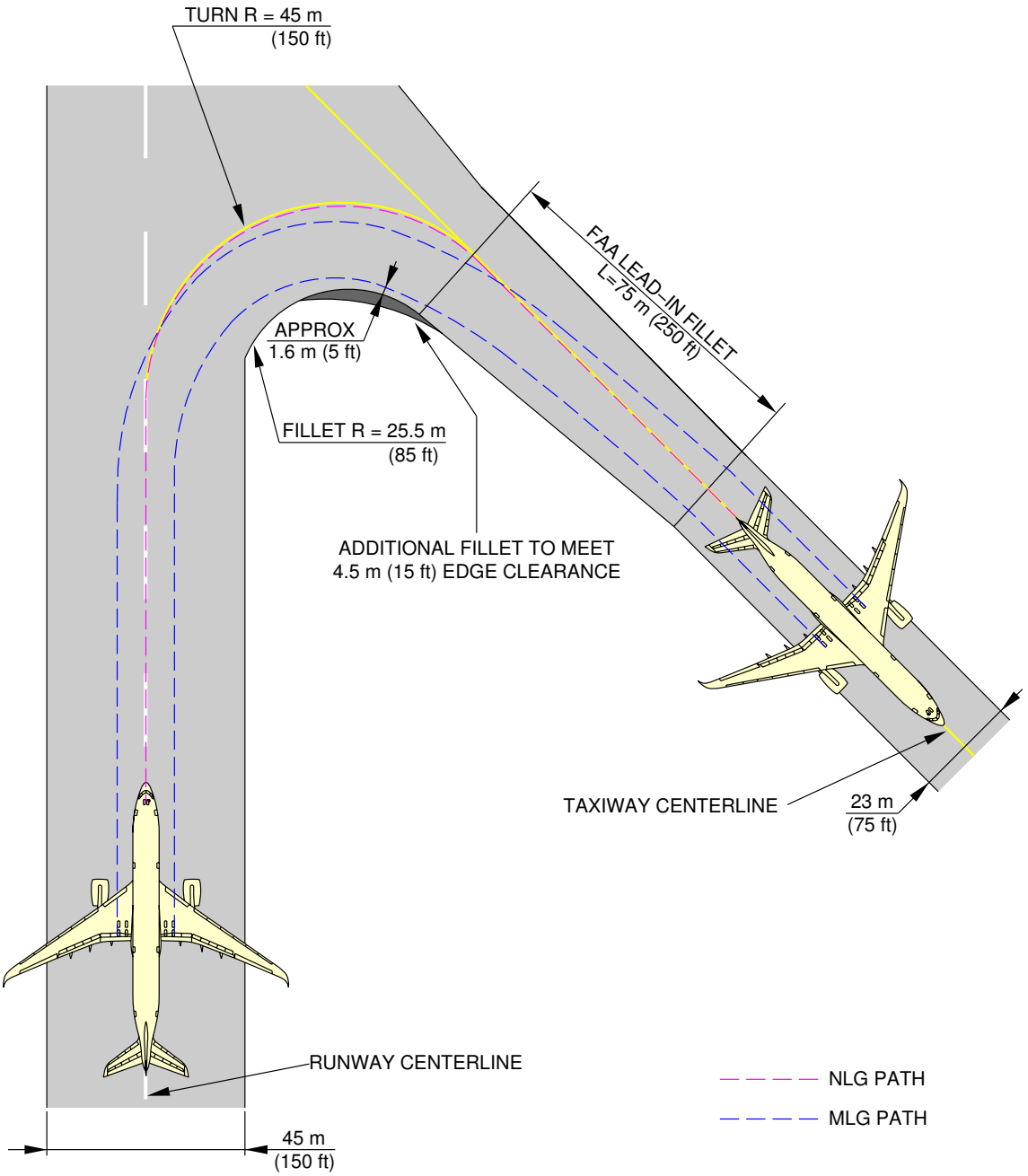
1. This section gives the 135° turn - runway to taxiway.

**ON A/C A350-900



135° Turn - Runway to Taxiway
Oversteering Method (Sheet 1 of 2)
FIGURE-4-5-2-991-001-B01

**ON A/C A350-900



135° Turn - Runway to Taxiway
Cockpit over Centerline Method (Sheet 2 of 2)
FIGURE-4-5-2-991-001-B01

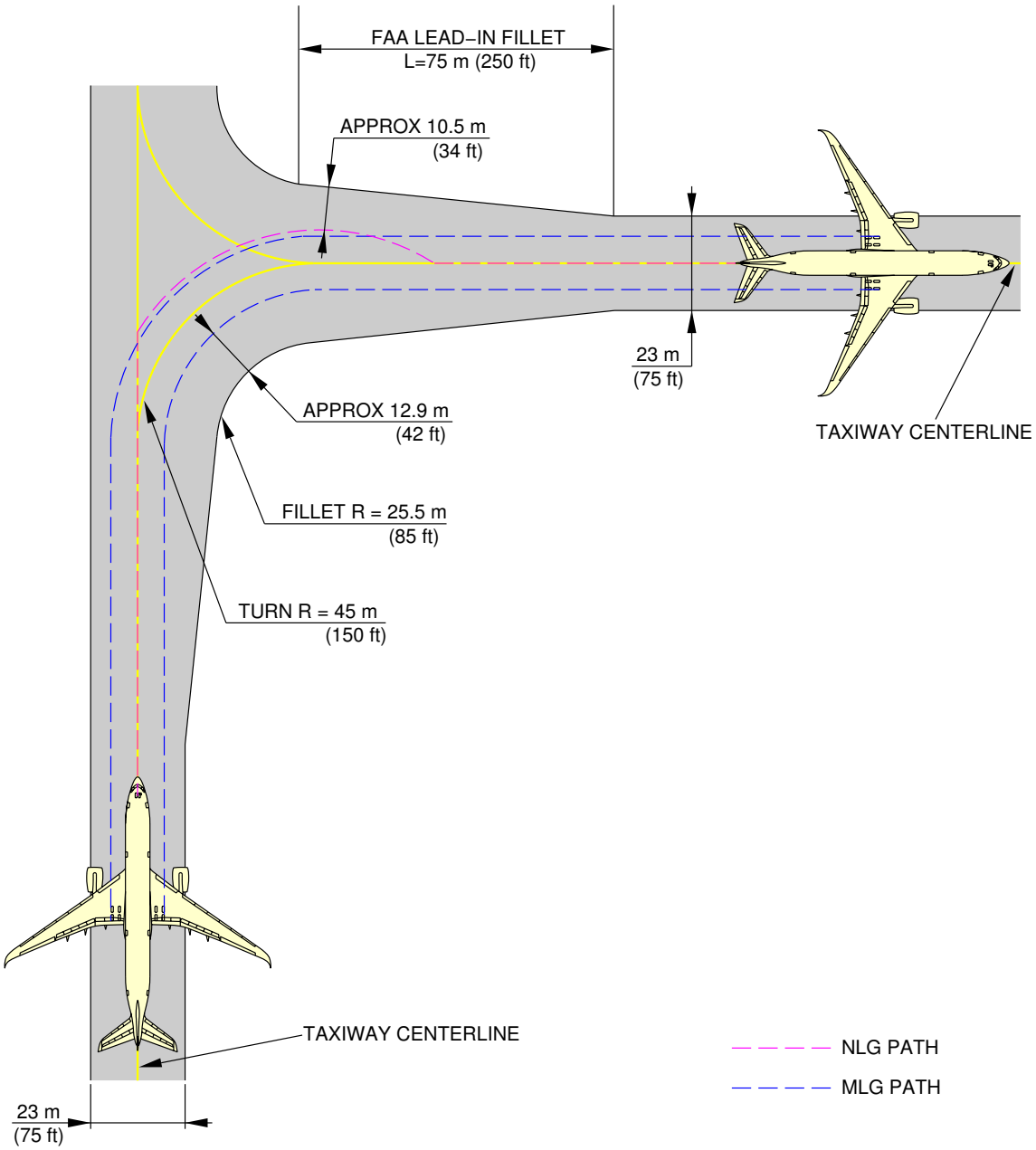
4-5-4 90° Turn - Taxiway to Taxiway

**ON A/C A350-900

90° Turn - Taxiway to Taxiway

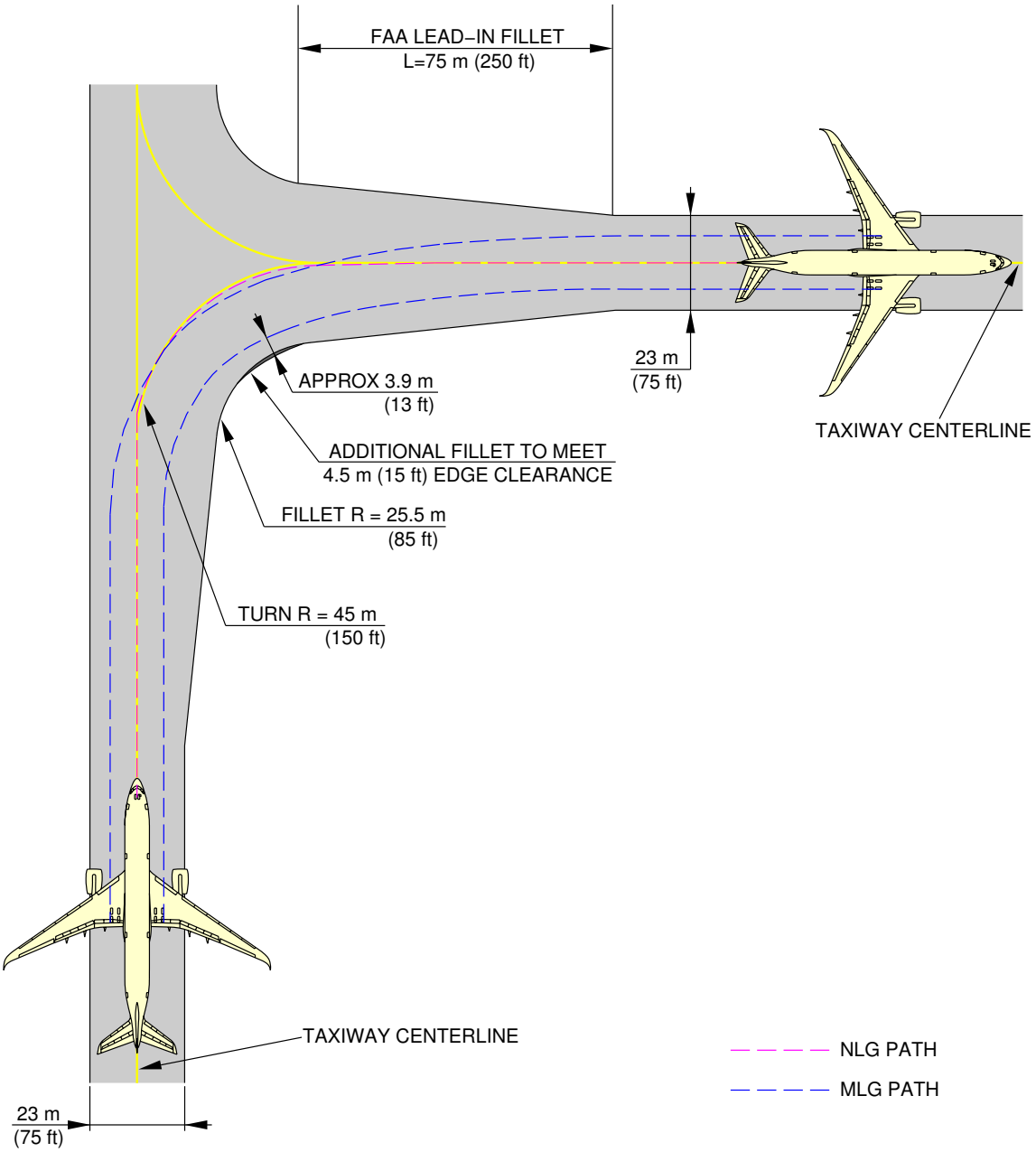
1. This section gives the 90° turn - taxiway to taxiway.

**ON A/C A350-900



90° Turn - Taxiway to Taxiway
Oversteering Method (Sheet 1 of 2)
FIGURE-4-5-4-991-001-A01

**ON A/C A350-900



90° Turn - Taxiway to Taxiway
Cockpit over Centerline Method (Sheet 2 of 2)
FIGURE-4-5-4-991-001-A01

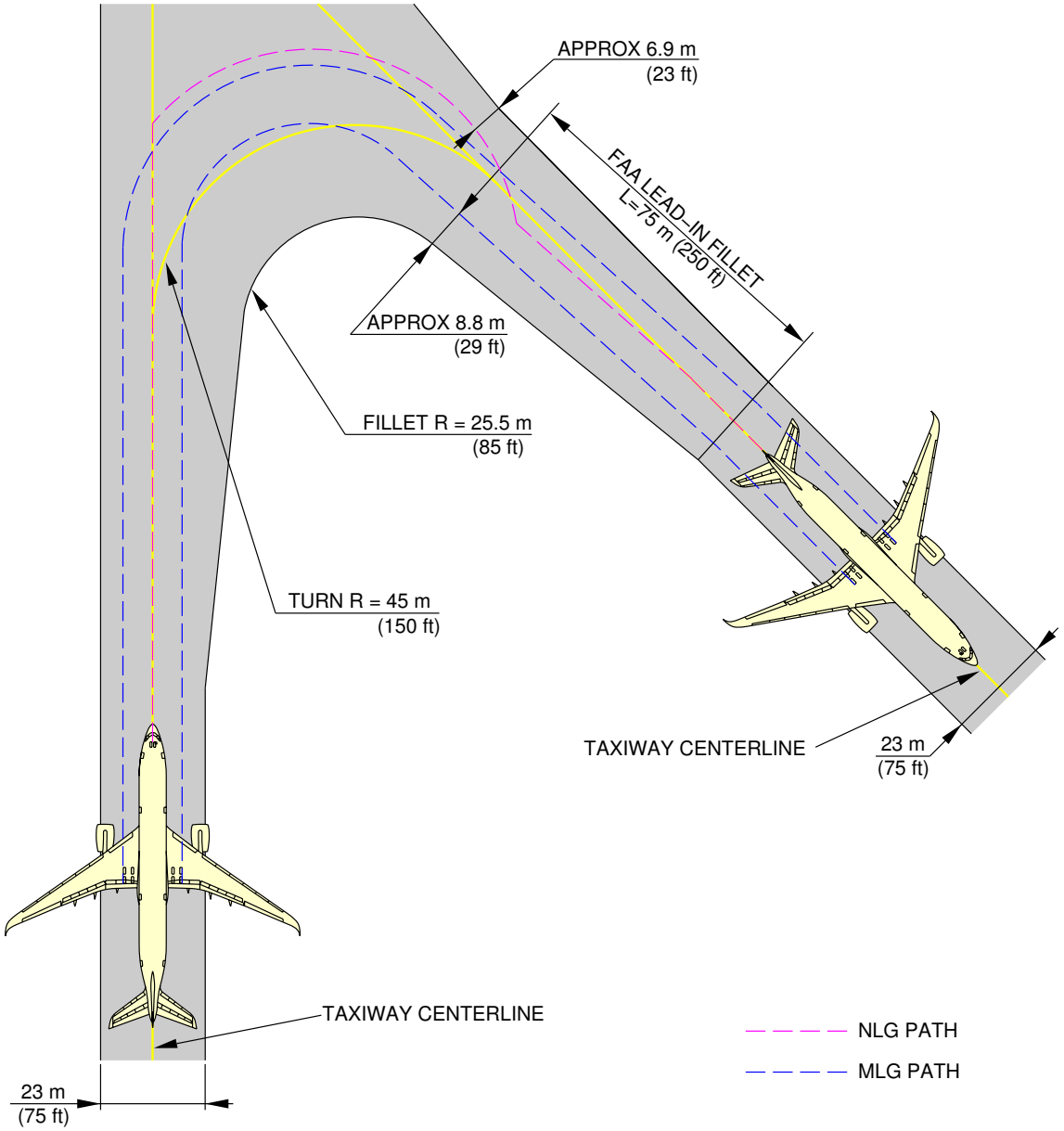
4-5-5 135° Turn - Taxiway to Taxiway

**ON A/C A350-900

135° Turn - Taxiway to Taxiway

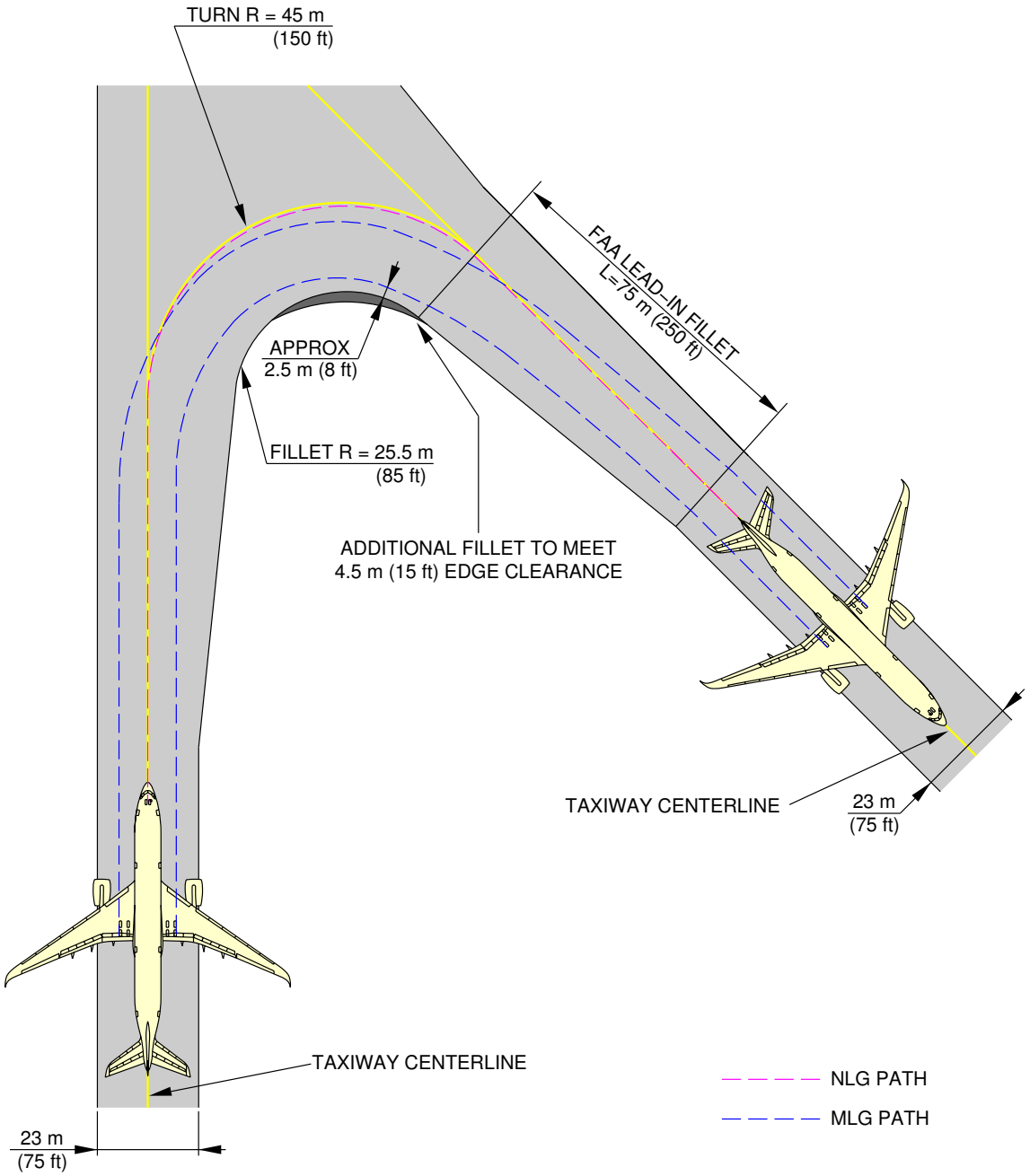
1. This section gives the 135° turn - taxiway to taxiway.

**ON A/C A350-900



135° Turn - Taxiway to Taxiway
Oversteering Method (Sheet 1 of 2)
FIGURE-4-5-5-991-001-B01

**ON A/C A350-900



135° Turn - Taxiway to Taxiway
Cockpit over Centerline Method (Sheet 2 of 2)
FIGURE-4-5-5-991-001-B01

TERMINAL SERVICING

5-0-0 Introduction

**ON A/C A350-900

Introduction

1. This chapter provides typical ramp layouts, corresponding minimum turnround time estimations, locations of ground service points and service requirements.

   The information given in this chapter reflects ideal conditions. Actual ramp layouts and service requirements may vary according to local regulations, airline procedures and the aircraft conditions.

   Section 5.1 shows typical ramp layouts for passenger aircraft at the gate or on an open apron.

   Section 5.2 shows the minimum turnround schedule for full servicing arrangements (turnround stations).

   Section 5.3 shows the minimum turnround schedule for minimum servicing arrangements (en route stations).

   Section 5.4 gives the locations of ground service connections, the standard of connections used and typical capacities and requirements.

   Section 5.5 provides the engine starting pneumatic requirements for different engine types and different ambient temperatures.

   Section 5.6 provides the air conditioning requirements for heating and cooling (pull-down and pull-up) using ground conditioned air for different ambient temperatures.

   Section 5.7 provides the air conditioning requirements for heating and cooling to maintain a constant cabin air temperature using low pressure conditioned air.

   Section 5.8 shows the ground towing requirements taking into account different ground surface and aircraft conditions.

5-1-0 Airplane Servicing Arrangements

**ON A/C A350-900

Airplane Servicing Arrangements

1. This section provides typical ramp layouts, showing the various GSE items in position during typical turnround scenarios.
   These ramp layouts show typical arrangements only. Each operator will have its own specific requirements/regulations for the positioning and operation on the ramp.
   For each ramp layout, the associated typical turnround time is given in a chart in Sections 5–2–0 and 5–3–0.

   This table gives the symbols used on servicing diagrams.

Ground Support Equipment	
AC	AIR CONDITIONING UNIT
AS	AIR START UNIT
BULK	BULK TRAIN
CAT	CATERING TRUCK
CB	CONVEYOR BELT
CLEAN	CLEANING TRUCK
FUEL	FUEL HYDRANT DISPENSER or TANKER
GPU	GROUND POWER UNIT
LDCL	LOWER DECK CARGO LOADER
LV	LAVATORY VEHICLE
PBB	PASSENGER BOARDING BRIDGE
PS	PASSENGER STAIRS
TOW	TOW TRACTOR
ULD	ULD TRAIN
WV	POTABLE WATER VEHICLE

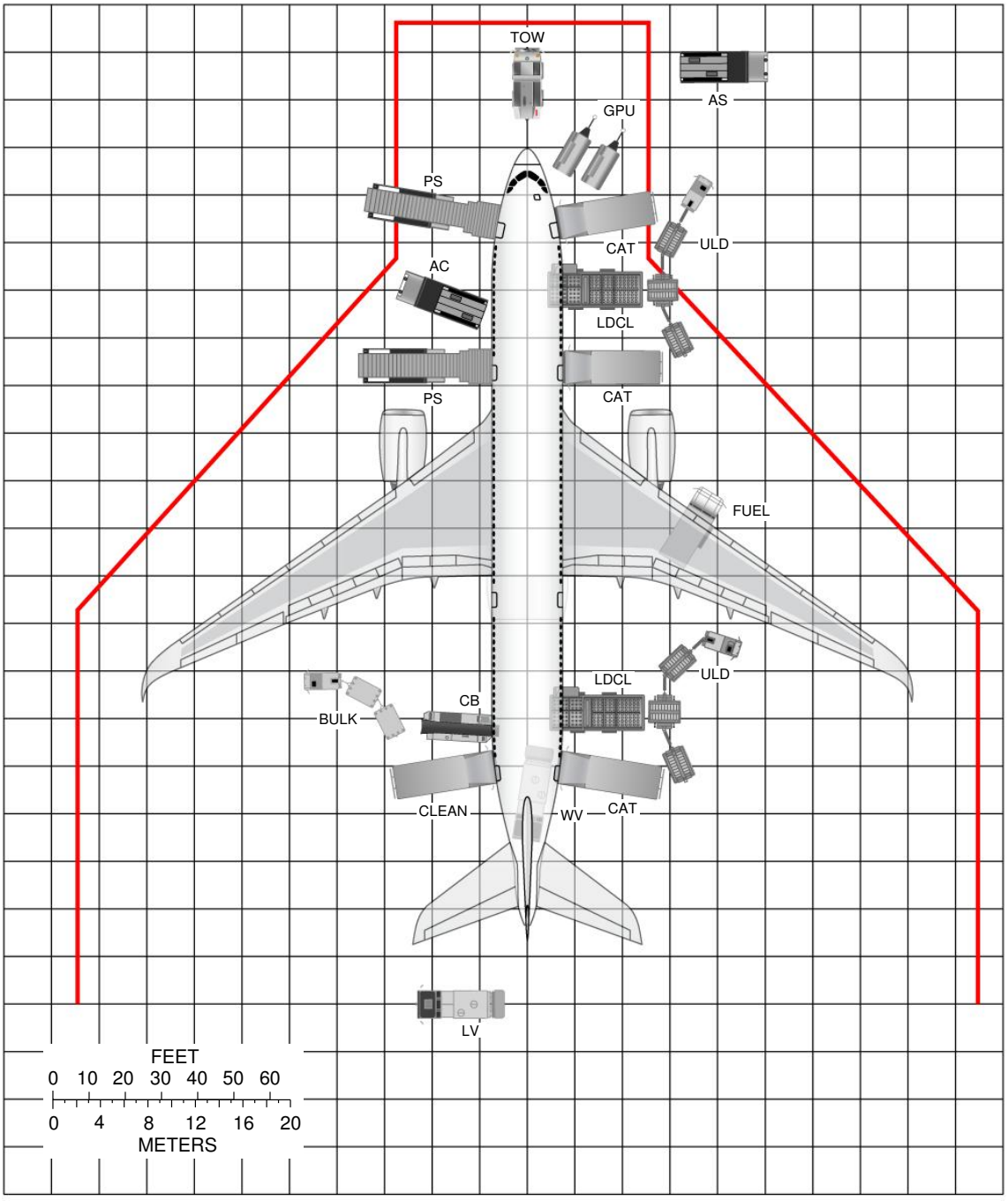
5-1-1 Typical Ramp Layout (Open Apron)

**ON A/C A350-900

Typical Ramp Layout (Open Apron)

1. This section gives the typical ramp layout (open apron).

**ON A/C A350-900



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Typical Ramp Layout (Open Apron)
FIGURE-5-1-1-991-001-A01

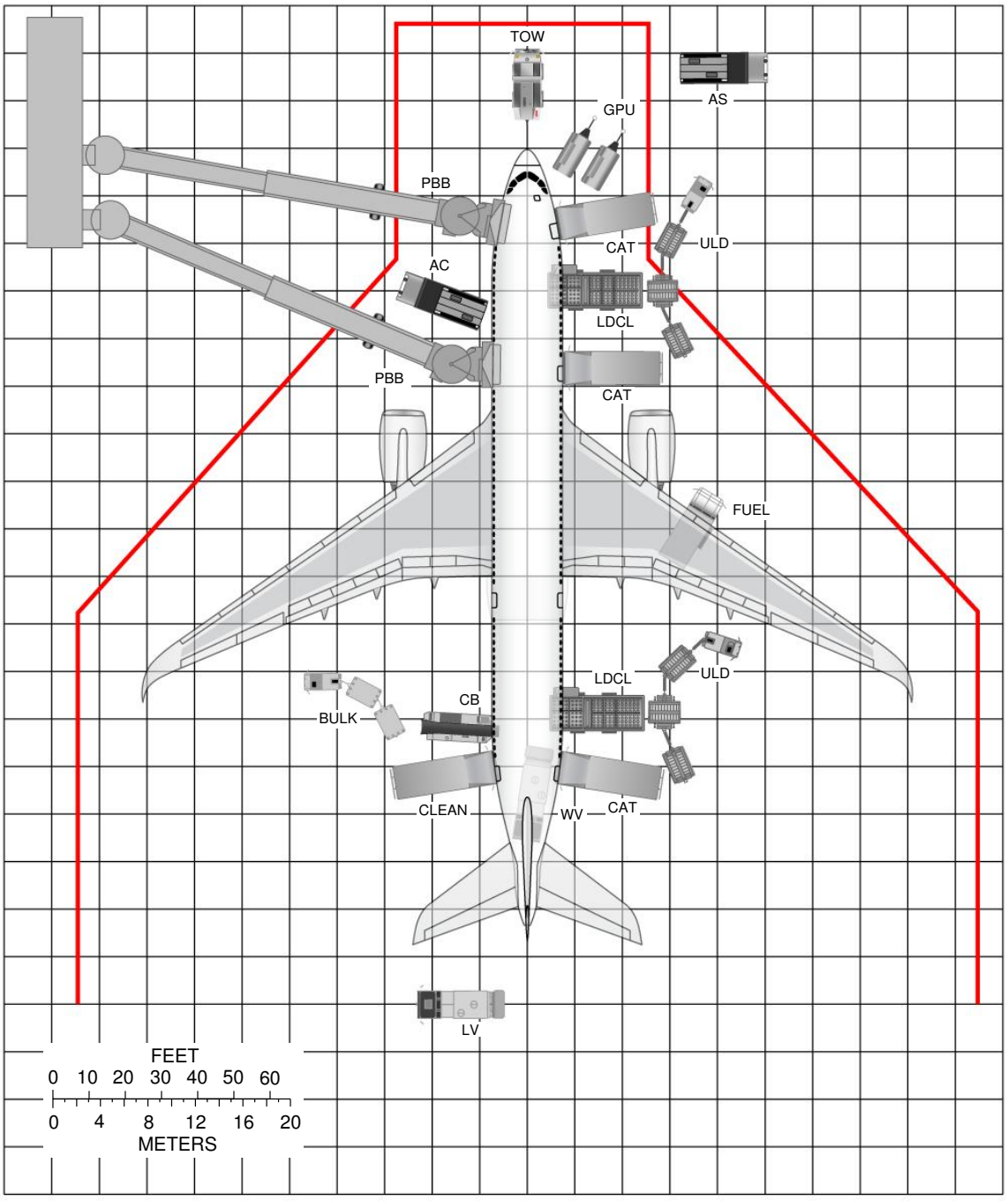
5-1-2 Typical Ramp Layout (Gate)

**ON A/C A350-900

Typical Ramp Layout (Gate)

1. This section gives the baseline ramp layout (gate).

**ON A/C A350-900



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Typical Ramp Layout (Gate)
FIGURE-5-1-2-991-001-A01

5-2-0 Terminal Operations - Full Servicing Turnround Time

**ON A/C A350-900

Terminal Operations - Full Servicing Turnround Time

1. This section provides typical turnround time charts showing the typical times for ramp activities during aircraft turnround.

   Actual times may vary due to each operator's specific practice and operating conditions.

   For each turnround time chart, the associated typical ramp layout is given in Section 5–1.

2. Assumptions for full turnround chart

   A. PASSENGER HANDLING

   315 pax (48 B/C + 267 Y/C)
   All passengers deboard and board the aircraft
   2 Passenger Boarding Bridges (PBB) used at doors L1 and L2
   Equipment positioning/removal + opening/closing door = 2 min
   Deboarding:
   - 158 pax at door L1
   - 157 pax at door L2
   - Deboarding rate = 25 pax/min per door

   Boarding:
   - 158 pax at door L1
   - 157 pax at door L2
   - Boarding rate = 15 pax/min per door
   - Last Pax Seating Allowance (LPS) + headcounting = + 4 min

   B. CARGO

   2 cargo loaders + 1 belt loader used
   Equipment positioning/removal + opening/closing door = 2.5 min
   Cargo exchange:
   - 4 pallets and 8 LD-3 for FWD cargo compartment
   - 4 pallets and 4 LD-3 for AFT cargo compartment
   - 1 000 kg (2 205 lb) in bulk cargo compartment

   LD-3 off-loading/loading times:
   - Off-loading = 1.2 min/LD-3
   - Loading = 1.4 min/LD-3

   Pallet off-loading/loading times:

- Off-loading = 2.4 min/pallet
- Loading = 2.8 min/pallet

Bulk off-loading/loading times:
- Off-loading = 9.2 min/tonnes
- Loading = 10.5 min/tonnes

C. REFUELLING

Block fuel for nominal range thru 2 nozzles
81 000 liters (21398 US gal) at 50 psi
Dispenser positioning/removal = 3 min (fuel truck change, if any = 5 min)

D. CLEANING

Performed in available time

E. CATERING

1 catering truck for servicing galleys at door R1 and R2
1 catering truck for servicing galley at R4
Equipment positioning + door opening = 5 min
Close door + equipment removal = 3 min
42 Full Size Trolleys Equivalent (FSTE) to unload and load:
- 10 FSTE at R1
- 7 FSTE at R2
- 25 FSTE at R4

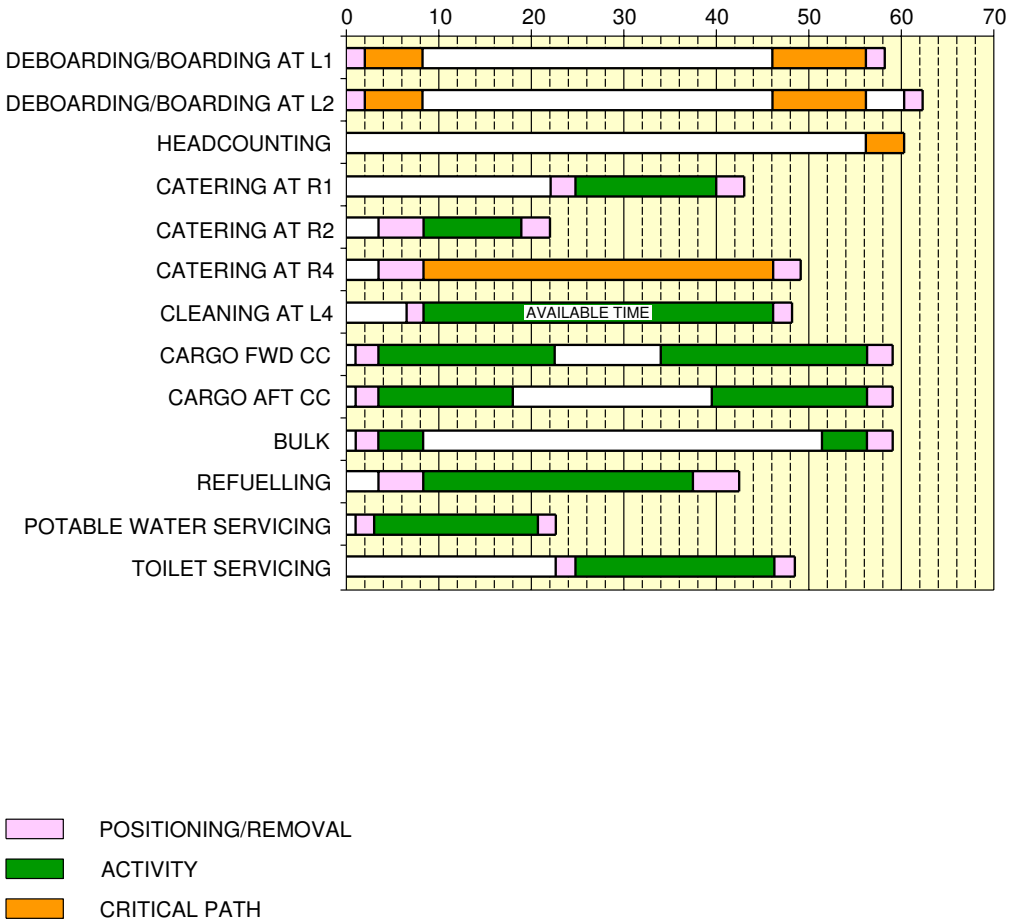
FSTE exchange time = 1.5 min/FSTE

F. GROUND HANDLING / SERVICING

Start of operations:
- Bridges: t0 = 0
- Other equipment: t0 + 1 min

Vehicle positioning/removal = 2 min
Ground Power Unit (GPU): up to 2 × 90 kVA
Air conditioning: two hoses
Potable water servicing: 100% uplift, 1060 l (280 US gal)
Toilet servicing: draining + rinsing

**ON A/C A350-900



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Full Servicing Turnround Time Chart
FIGURE-5-2-0-991-001-A01

5-3-0 Terminal Operations - Minimum Servicing Turnround Time

**ON A/C A350-900

Terminal Operations - Minimum Servicing Turnround Time

1. Assumptions for Minimum Turnround Time

   A. PASSENGER HANDLING

   157 pax (24 B/C + 133 Y/C)
   50% of passengers deboard and board the aircraft
   1 Passenger Boarding Bridge (PBB) used at Door L2
   Equipment positioning/removal + opening/closing door = 2 min
   Deboarding:
   - 157 pax at door L2
   - Deboarding rate = 25 pax/min per door

   Boarding:
   - 157 pax at door L2
   - Boarding rate = 15 pax/min per door
   - Last Pax Seating Allowance (LPS) + headcounting = + 4 min

   B. CARGO

   2 cargo loaders + 1 belt loader used
   Equipment positioning/removal + opening/closing door = 2.5 min
   Cargo exchange:
   - 4 LD-3 for FWD cargo compartment
   - 2 LD-3 for AFT cargo compartment
   - 500 kg (1102 lb) in bulk cargo compartment

   LD-3 off-loading/loading times:
   - Off-loading = 1.2 min/LD-3
   - Loading = 1.4 min/LD-3

   Pallet off-loading/loading times:
   - Off-loading = 2.4 min/pallet
   - Loading = 2.8 min/pallet

   Bulk off-loading/loading times:
   - Off-loading = 9.2 min/tonnes
   - Loading = 10.5 min/tonnes

   C. REFUELLING

   Block fuel for nominal range thru 2 nozzles

30% of max capacity (Max: 138.000 liters (36456 US gal) at 50 psi
Dispenser positioning or removal = 3 min (fuel truck change, if any = 5 min)

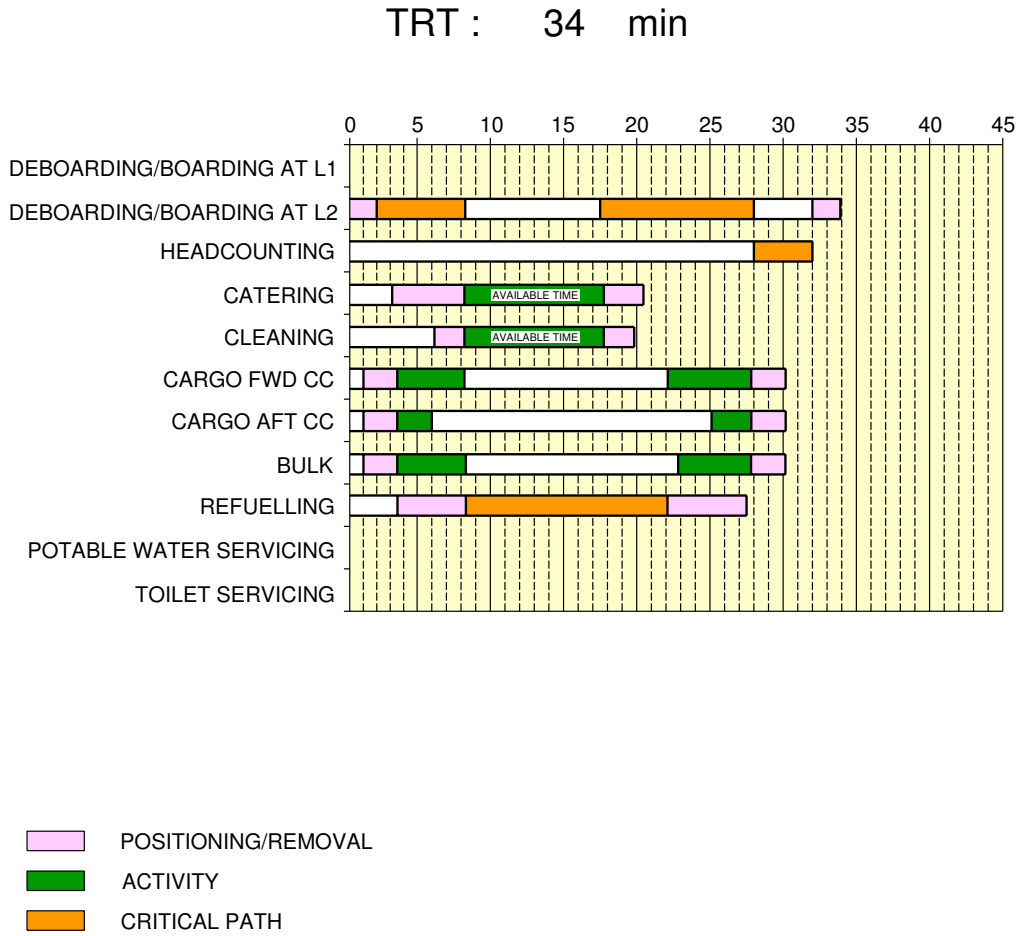
D. CLEANING
Performed in available time

E. CATERING
1 catering vehicle for catering uplift as required
Equipment positioning + door opening = 5 min
Performed in available time
FSTE exchange time = 1.5 min/FSTE

F. GROUND HANDLING / SERVICING
Start of operations:
- Bridges: t0 = 0
- Other equipment: t0 + 1 min

Vehicle positioning/removal = 2 min
Ground Power Unit (GPU): up to 2 × 90 kVA
Air conditioning: two hoses
No potable water servicing
No toilet servicing

**ON A/C A350-900



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Minimum Servicing Turnround Time Chart
FIGURE-5-3-0-991-001-B01

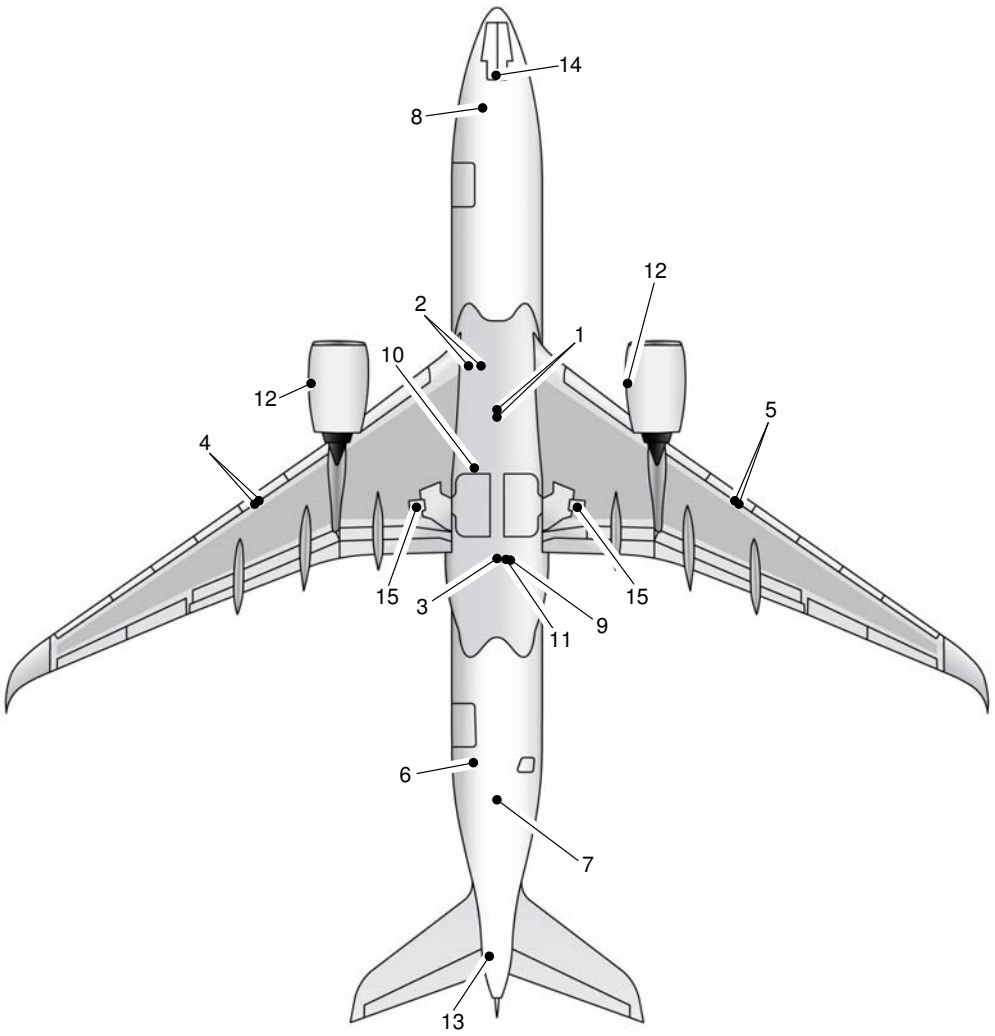
5-4-0 Ground Service Connections layout

**ON A/C A350-900

Ground Service Connections layout

1. This section gives the ground service connections layout.

**ON A/C A350-900



1 – AIR START UNIT CONNECTORS
2 – PRE CONDITIONNED AIR CONNECTORS
3 – REFUEL PANEL (BELLY FAIRING)
4 – PRESSURE REFUEL CONNECTORS (RH WING)
5 – PRESSURE REFUEL CONNECTORS (LH WING) – OPTION
6 – POTABLE WATER SERVICING PANEL
7 – WASTE WATER SERVICING PANEL
8 – GROUND ELECTRICAL POWER CONNECTOR
9 – HYDRAULIC SERVICING PANEL
10 – YELLOW HYDRAULIC GROUND CONNECTOR
11 – GREEN HYDRAULIC GROUND CONNECTOR
12 – ENGINE OIL SERVICING
13 – APU OIL SERVICING
14 – GROUNDING POINT NLG
15 – GROUNDING POINT MLG

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Ground Service Connections layout
FIGURE-5-4-0-991-001-A01

5-4-1 Grounding Points

**ON A/C A350-900

Grounding Points

1. Grounding Point Locations

	DISTANCE: Meters (ft)			
	AFT OF NOSE	FROM AIRPLANE CENTERLINE		MEAN HEIGHT FROM GROUND
		R SIDE	L SIDE	
On Nose Landing Gear	4.42 m (14.5 ft.)	0.07 m (0.23 ft.)		1.06 m (3.48 ft.)
On Left Main Landing Gear Leg	32.95 m (108.1 ft.)		5.13 m (16.83 ft.)	1.55 m (5.09 ft.)
On Right Main Landing Gear Leg	32.95 m (108.1 ft.)	5.13 m (16.83 ft.)		1.55 m (5.09 ft.)

A. The grounding stud on each landing gear is designed for use with a clip-on connector, such as an Appleton TGR.

B. The grounding studs are used to connect the airplane to approved ground connection on the ramp or in the hangar for:

(1) Refuel/defuel operations

(2) Maintenance operations

(3) Bad weather conditions.

5-4-2 Hydraulic System

**ON A/C A350-900

Hydraulic System

1. Ground Service Panel

	DISTANCE: Meters (ft)			
	AFT OF NOSE	FROM AIRPLANE CENTERLINE		MEAN HEIGHT FROM GROUND
		R SIDE	L SIDE	
Green Hydraulic Ground Access Door: 197 LB	36.37 m (119.32 ft.)		0.61 m (2.0 ft.)	2.39 m (7.84 ft.)
Yellow Hydraulic Ground Access Door: 194 KB	30.35 m (99.57 ft.)	1.51 m (4.95 ft.)		2.24 m (7.35 ft.)
Hydraulic Reservoir Servicing Access Door: 197 LB	36.42 m (119.49 ft.)		0.87 m (2.85 ft.)	2.51 m (8.23 ft.)

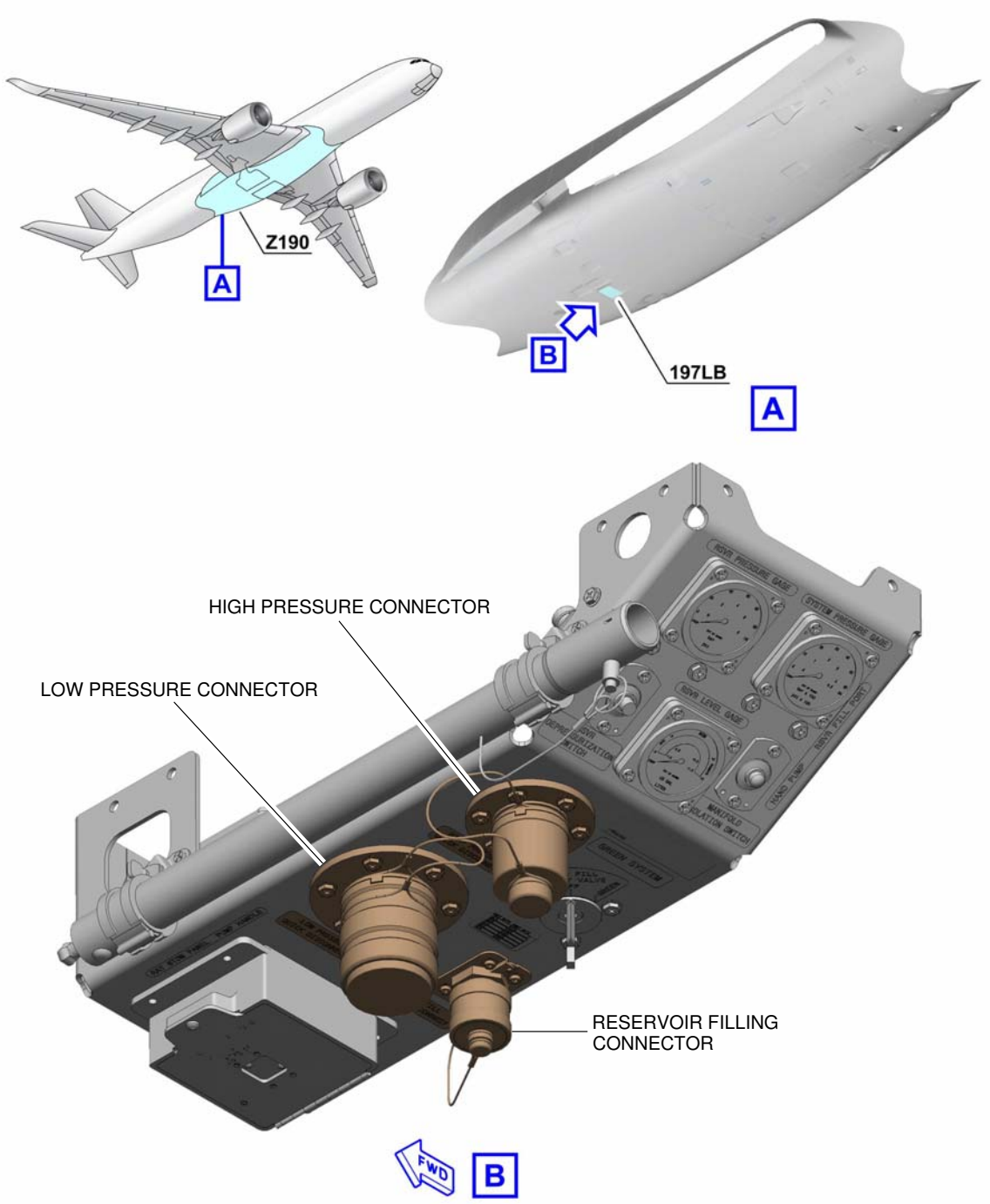
A. Reservoir pressurization

(1) One connector ETRTO V0.09.6, 1/4 in.

B. Reservoir filling

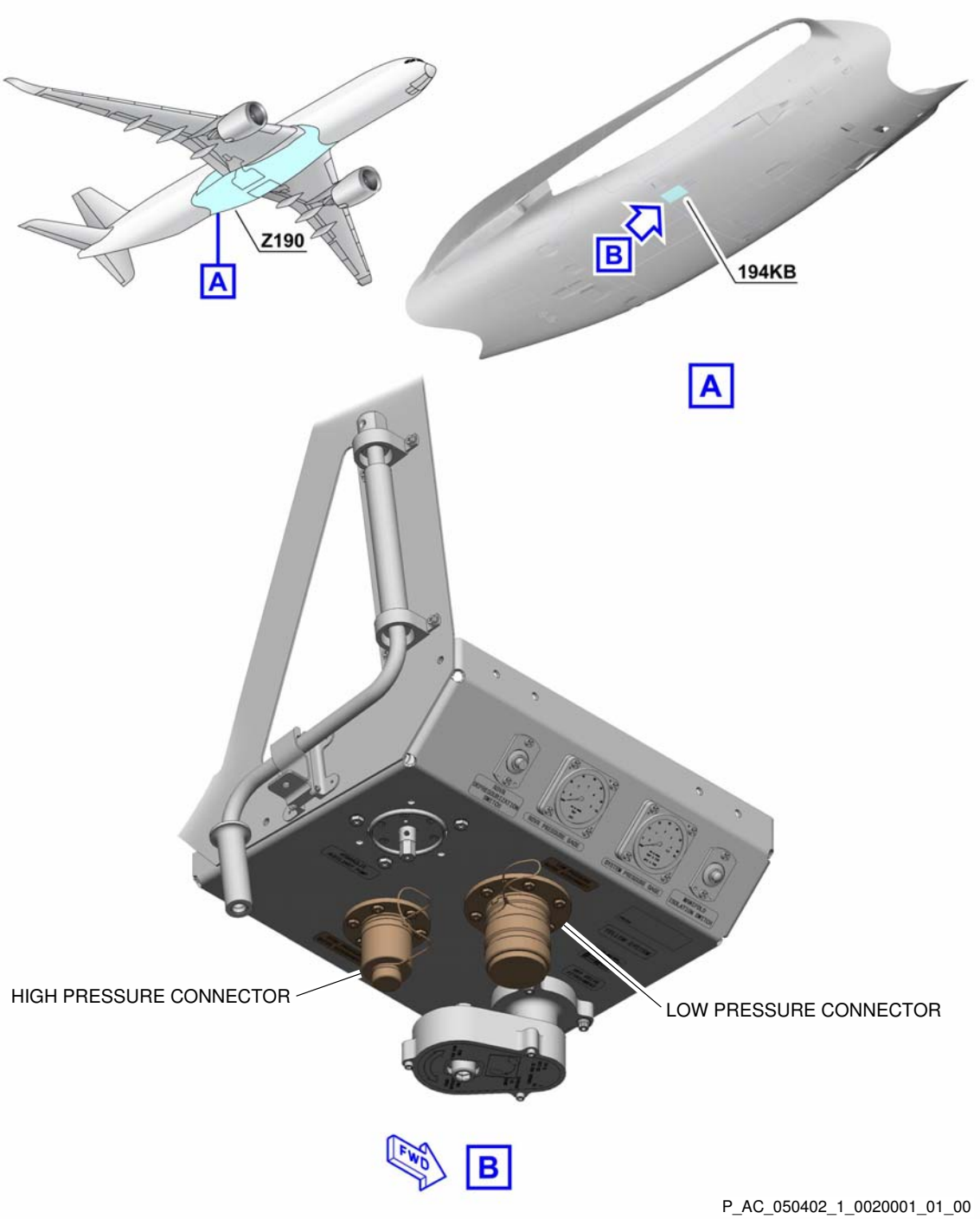
(1) One connector AE96993E, 1/4 in.

**ON A/C A350-900



Green Ground Service Panel
FIGURE-5-4-2-991-001-A01

**ON A/C A350-900



Yellow Ground Service Panel
FIGURE-5-4-2-991-002-A01

5-4-3 Electrical System

**ON A/C A350-900

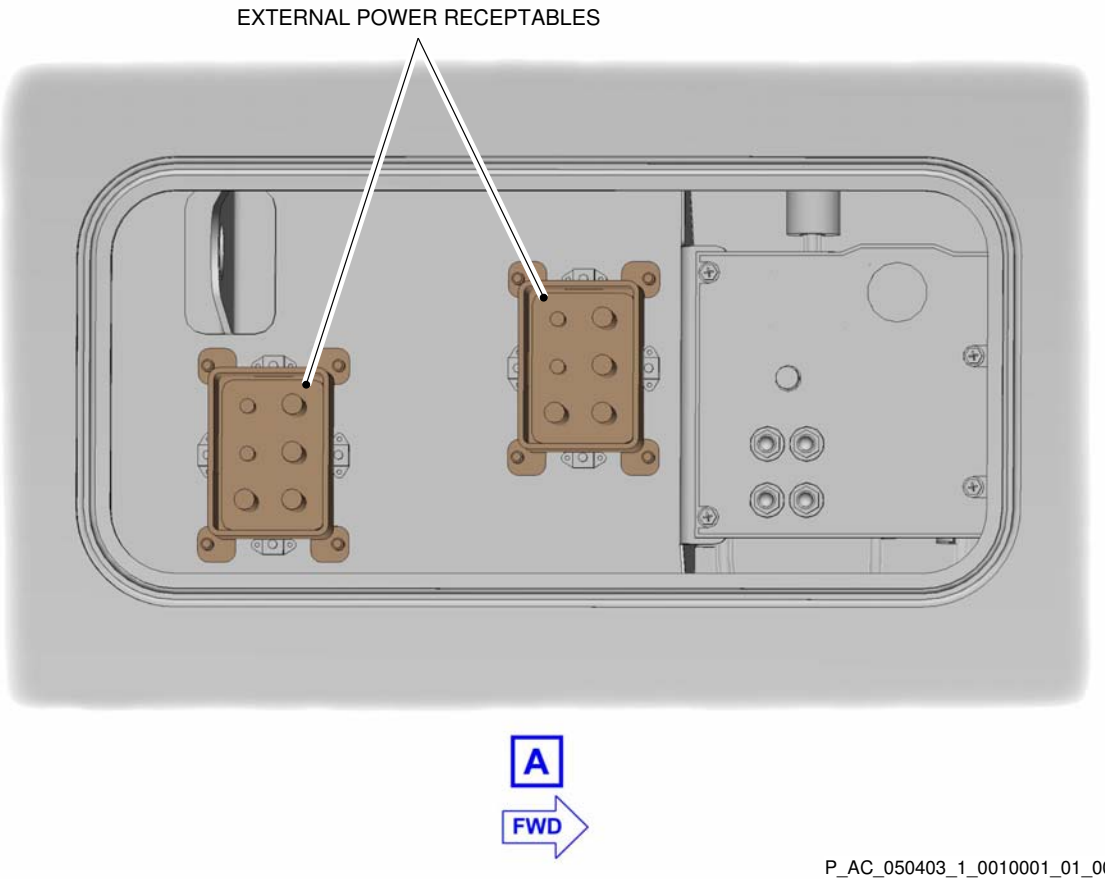
Electrical System

1. Electrical System

	DISTANCE: Meters (ft)			
	AFT OF NOSE	FROM AIRPLANE CENTERLINE		MEAN HEIGHT FROM GROUND
		R SIDE	L SIDE	
A/C External Power Access Door: 122 AR	6.62 m (21.72 ft.)	0.91 m (2.99 ft.)		2.82 m (9.25 ft.)

A. External power receptacles :
   (1) Tow standard ISO R461 receptacles - 90 KVA each.
B. Power supply :
   (1) Three phase, 115V, 400 Hz.
C. Electrical connectors for servicing :
   (1) AC outlets : HUBBEL 5258
   (2) DC outlets : HUBBEL 7472
   (3) Vacuum cleaner outlets : HUBBEL 5258.

**ON A/C A350-900



Electrical Service Panel
FIGURE-5-4-3-991-001-A01

5-4-5 Fuel System

**ON A/C A350-900

Fuel System

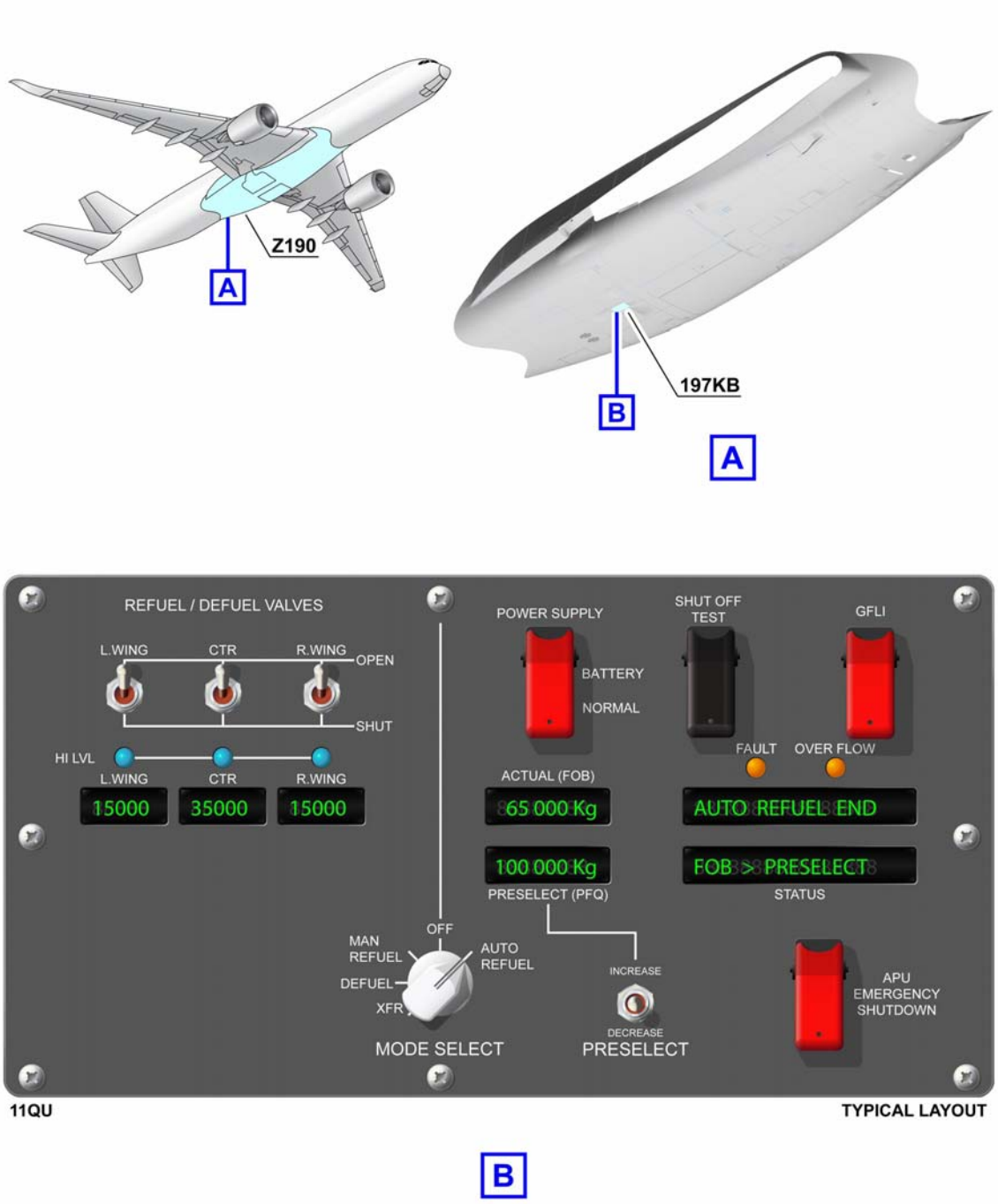
1. Refuel/defuel control panel and connectors

	DISTANCE: Meters (ft)			
	AFT OF NOSE	FROM AIRPLANE CENTERLINE		MEAN HEIGHT FROM GROUND
		R SIDE	L SIDE	
Refuel/Defuel Control Panel Access Door: 197 KB	36.31 m (119.13 ft.)	on centerline		2.32 m (7.61 ft.)
Refuel/Defuel Connectors, Left (Optional) Access Door: 523 EB	32.56 m (106.82 ft.)		15.83 m (51.94 ft.)	5.63 m (18.47 ft.)
Refuel/Defuel Connectors, Right Access Door: 623 EB	32.56 m (106.82 ft.)	15.83 m (51.94 ft.)		5.63 m (18.47 ft.)

A. Refuel/defuel connectors:
   (1) Two standard ISO R45, 2.5 in. on right wing
   (2) Two standard ISO R45, 2.5 in. on left wing (optional).

B. Refuel pressure:
   (1) Max. pressure : 3.45 bar (50 psi).

**ON A/C A350-900



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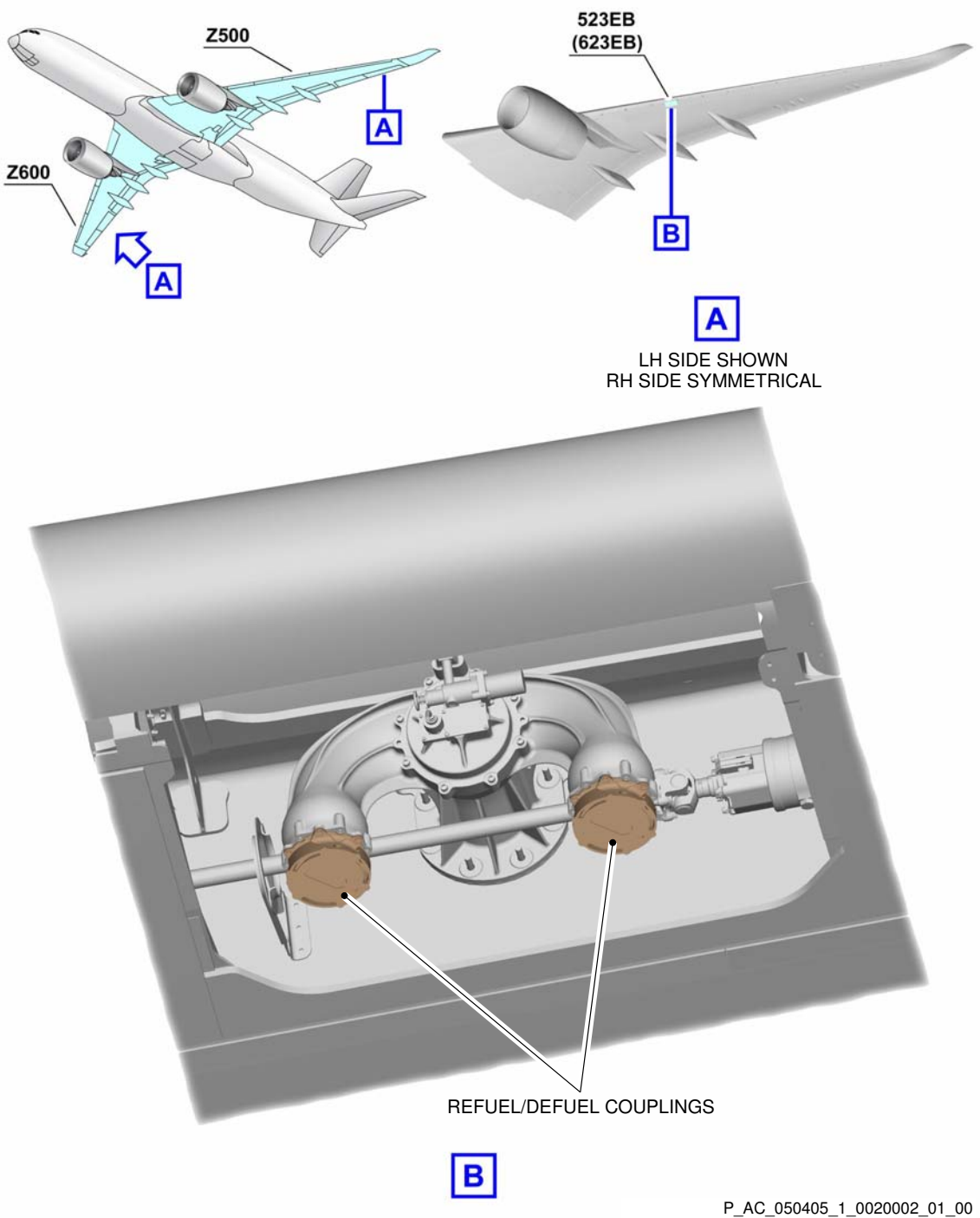
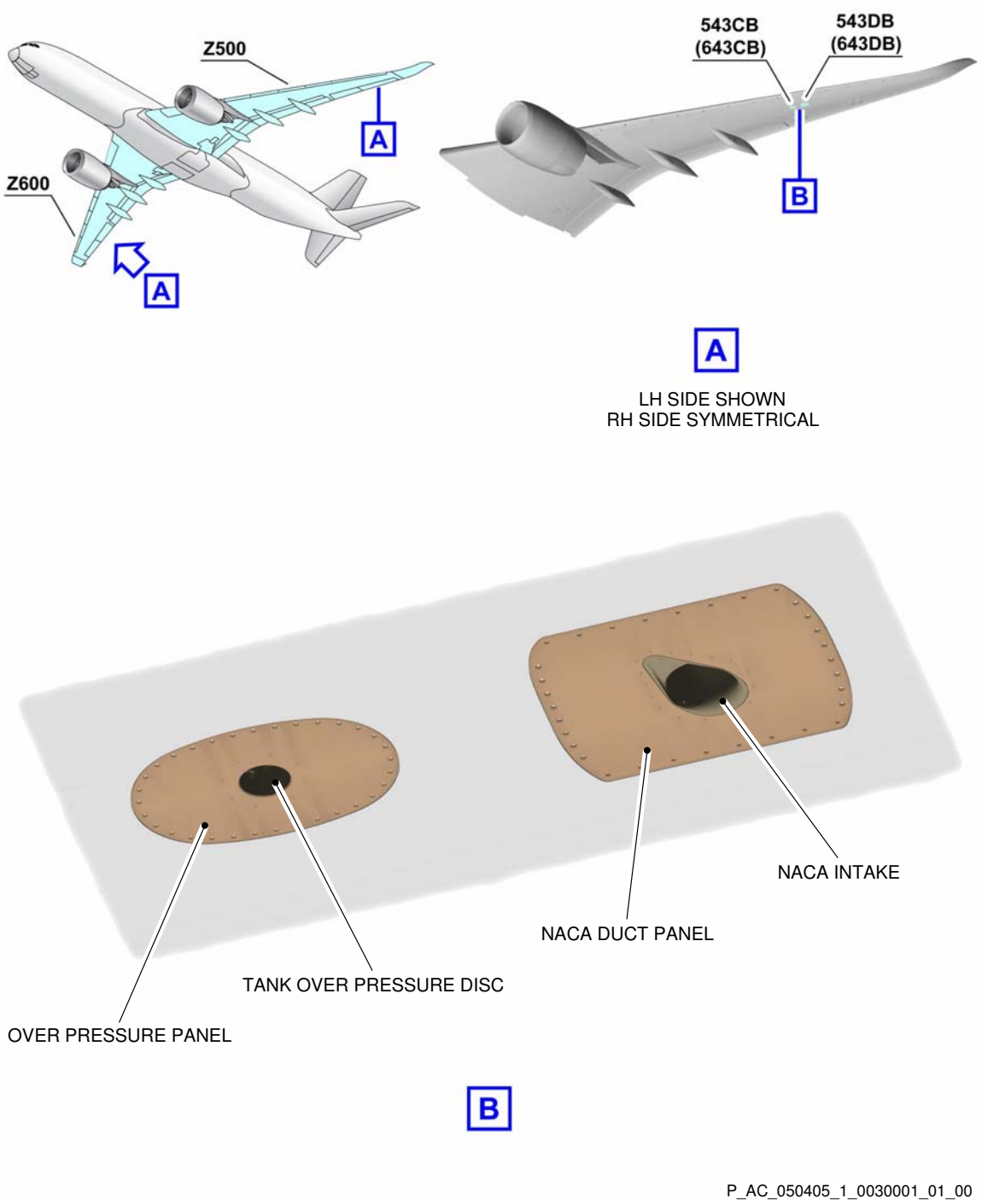
Refuel/Defuel Control Panel
FIGURE-5-4-5-991-001-A01

**ON A/C A350-900



Ground Service Connections
FIGURE-5-4-5-991-002-B01

**ON A/C A350-900



NACA and Over Pressure Locations
FIGURE-5-4-5-991-003-A01

5-4-6 Pneumatic System

**ON A/C A350-900

Pneumatic System

1. Low pressure connectors

	DISTANCE: Meters (ft)			
	AFT OF NOSE	FROM AIRPLANE CENTERLINE		MEAN HEIGHT FROM GROUND
		R SIDE	L SIDE	
Low Pressure Connector Access Door: 193 CB	23.58 m (77.36 ft.)	1.05 m (3.44 ft.)		2.59 m (8.5 ft.)
Low Pressure Connector Access Door: 194 CR	23.58 m (77.36 ft.)	1.87 m (6.14 ft.)		2.87 m (9.42 ft.)

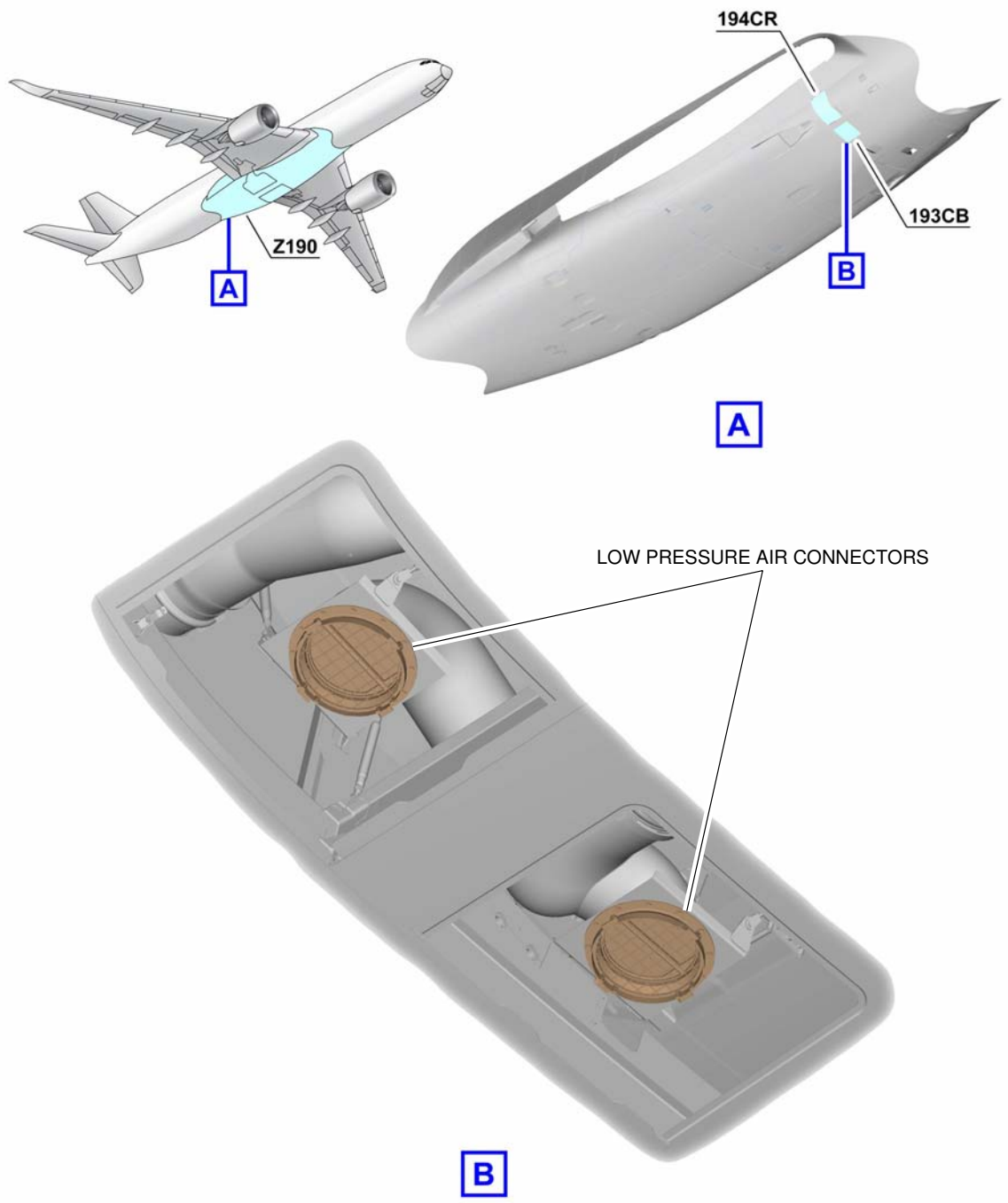
A. Connectors : Two standard MS33562 (ISO1034), 8 in.

2. High pressure connectors

	DISTANCE: Meters (ft)			
	AFT OF NOSE	FROM AIRPLANE CENTERLINE		MEAN HEIGHT FROM GROUND
		R SIDE	L SIDE	
High Pressure Connectors Access door: 193 KB	26.81 m (87.96 ft.)	on centerline		2.06 m (6.76 ft.)

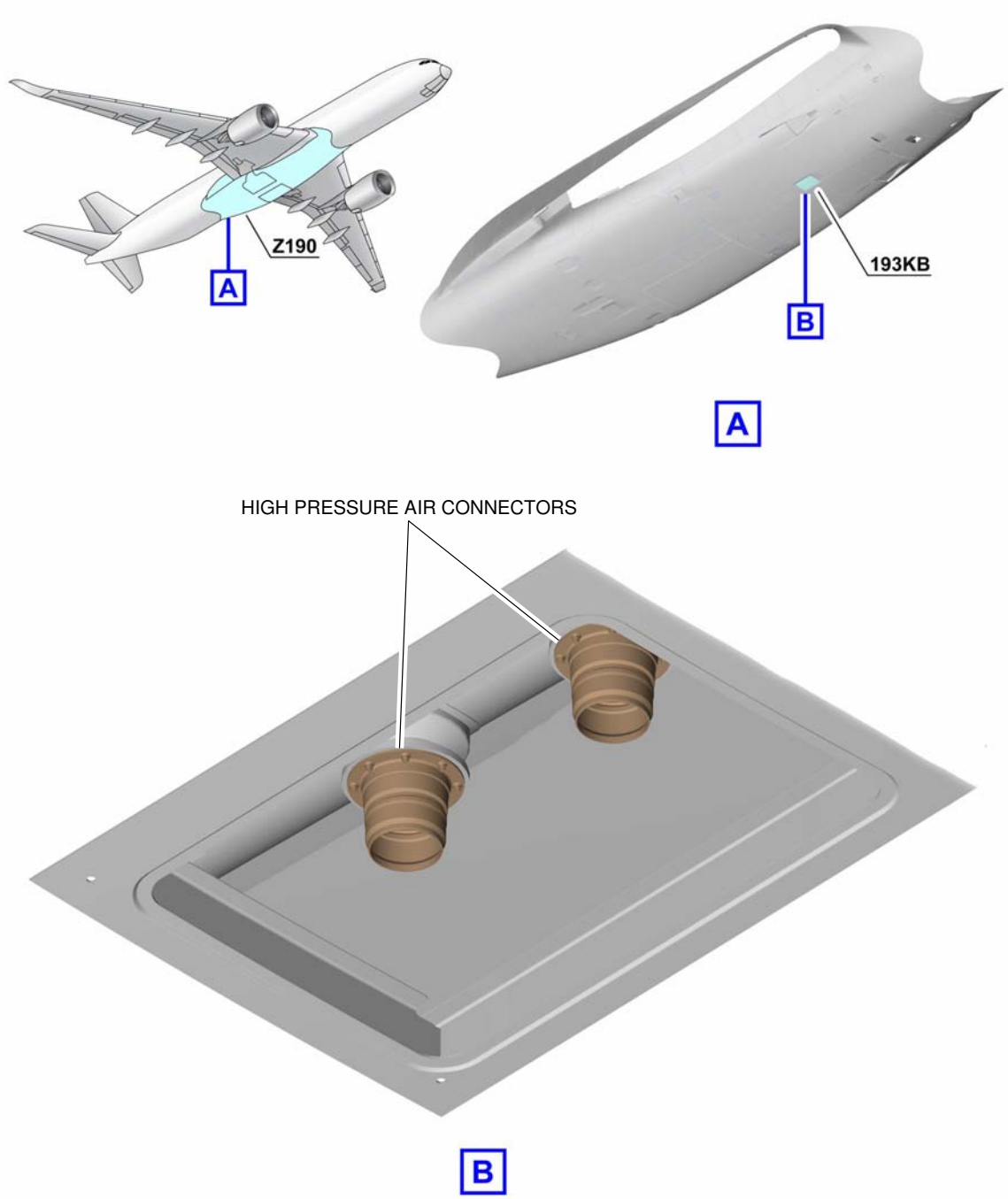
A. Connectors: Two standard MS33740 (ISO2026), 3 in.

**ON A/C A350-900



Low Pressure Preconditioned Air
FIGURE-5-4-6-991-001-A01

**ON A/C A350-900



High Pressure Preconditioned Air
FIGURE-5-4-6-991-002-A01

5-4-7 Potable Water System

**ON A/C A350-900

Potable Water System

1. Potable water system

	DISTANCE: Meters (ft)			
	AFT OF NOSE	FROM AIRPLANE CENTERLINE		MEAN HEIGHT FROM GROUND
		R SIDE	L SIDE	
Potable Water Ground Service Access Door: 164 AR	50.17 m (164.6 ft.)	1.57 m (5.15 ft.)		3.58 m (11.75 ft.)

A. Connectors :
   (1) Fill/drain nipple, ISO 17775, 3/4 in.
B. Capacity :
   (1) Standard configuration – 2 tanks: 1060 l (280 USgal)
   (2) Optional – 3 tanks: 1500 l (396 USgal)
C. Filling pressure :
   (1) Max filling pressure: 3.45 bar (50 psi)

5-4-8 Oil System

**ON A/C A350-900

Oil System

1. Engine oil servicing

	DISTANCE: Meters (ft)			
	AFT OF NOSE	FROM AIRPLANE CENTERLINE		MEAN HEIGHT FROM GROUND
		R SIDE	L SIDE	
Oil Engine 1 Access Door: 415 BR	24.76 m (81.23 ft.)		8.63 m (28.31 ft.)	3.23 m (10.6 ft.)
Oil Engine 2 Access Door: 425 BR	24.76 m (81.23 ft.)	12.26 m (40.22 ft.)		3.23 m (10.6 ft.)

2. APU oil servicing

	DISTANCE: Meters (ft)			
	AFT OF NOSE	FROM AIRPLANE CENTERLINE		MEAN HEIGHT FROM GROUND
		R SIDE	L SIDE	
APU Access Door 316 AR	62.52 m (205.12 ft.)	0.48 m (1.57 ft.)		6.45 m (21.16 ft.)

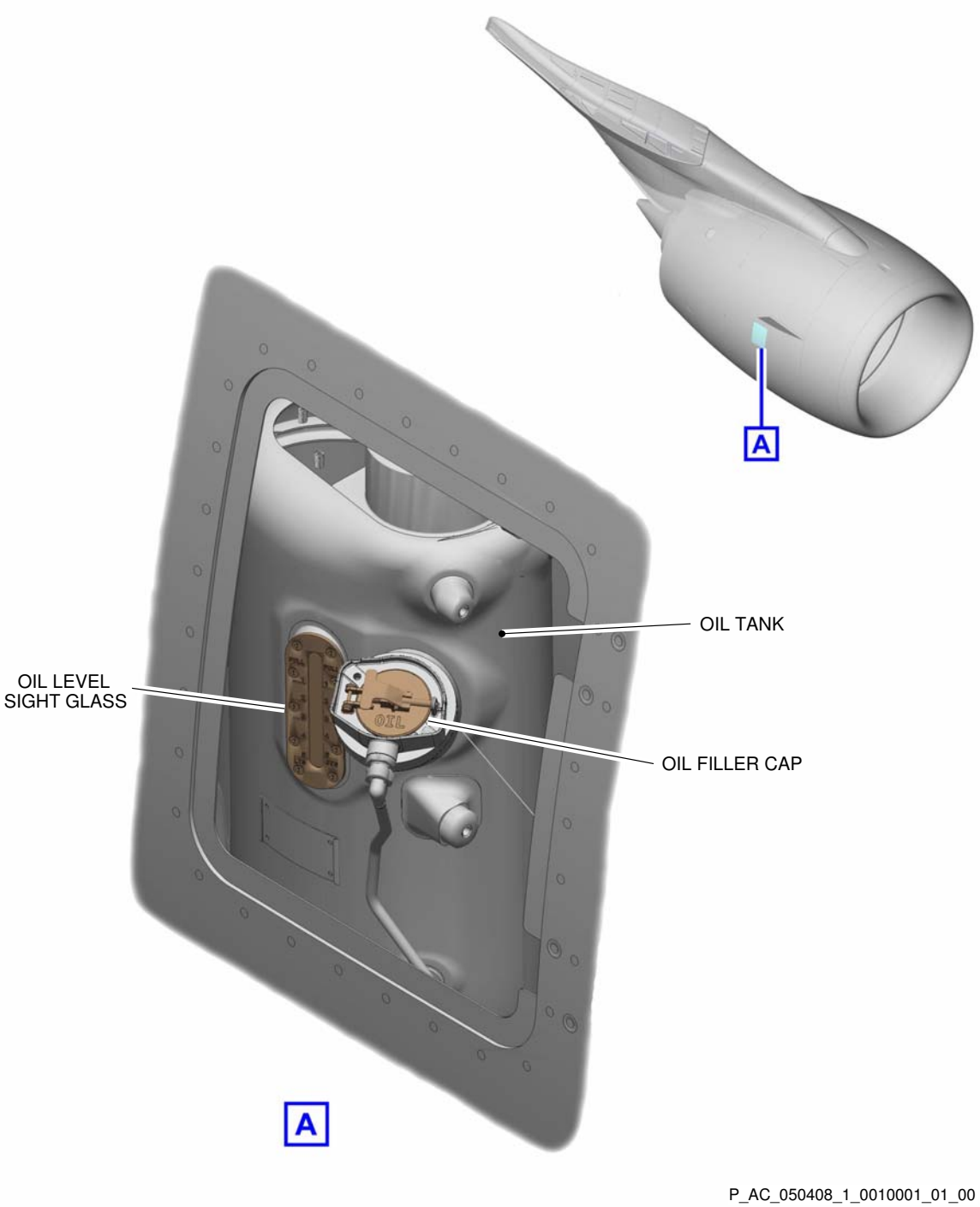
3. VFG oil servicing

	DISTANCE: Meters (ft)			
	AFT OF NOSE	FROM AIRPLANE CENTERLINE		MEAN HEIGHT FROM GROUND
		R SIDE	L SIDE	
VFG Engine 1 Fan Cowl: 415 AL	TBD		TBD	TBD
VFG Engine 2 Fan Cowl: 425 AL	TBD	TBD		TBD

4. Starter oil servicing

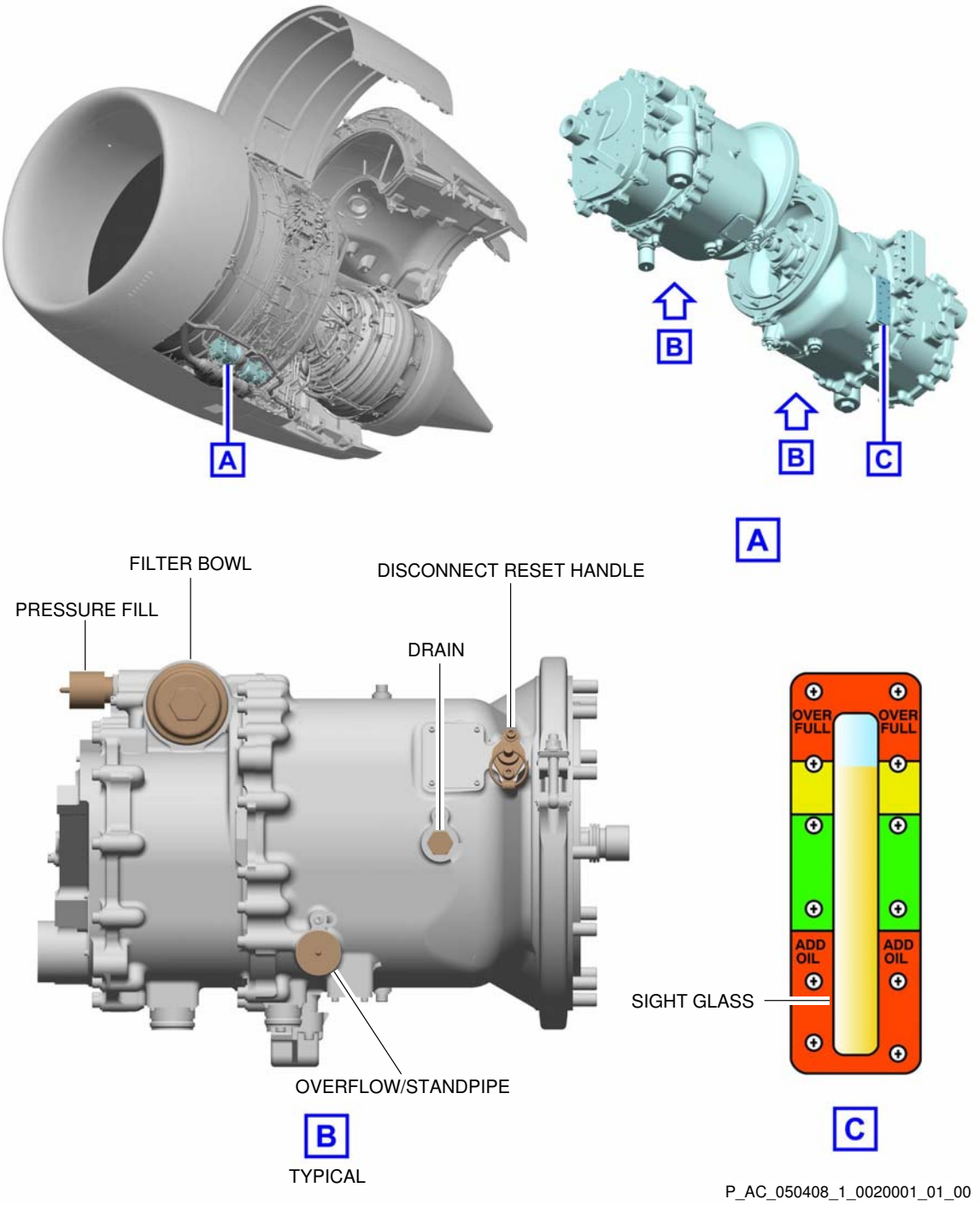
	DISTANCE: Meters (ft)			
	AFT OF NOSE	FROM AIRPLANE CENTERLINE		MEAN HEIGHT FROM GROUND
		R SIDE	L SIDE	
Starter Engine 1 Fan Cowl: 415 AL	TBD		TBD	TBD
Starter Engine 2 Fan Cowl: 425 AL	TBD	TBD		TBD

**ON A/C A350-900



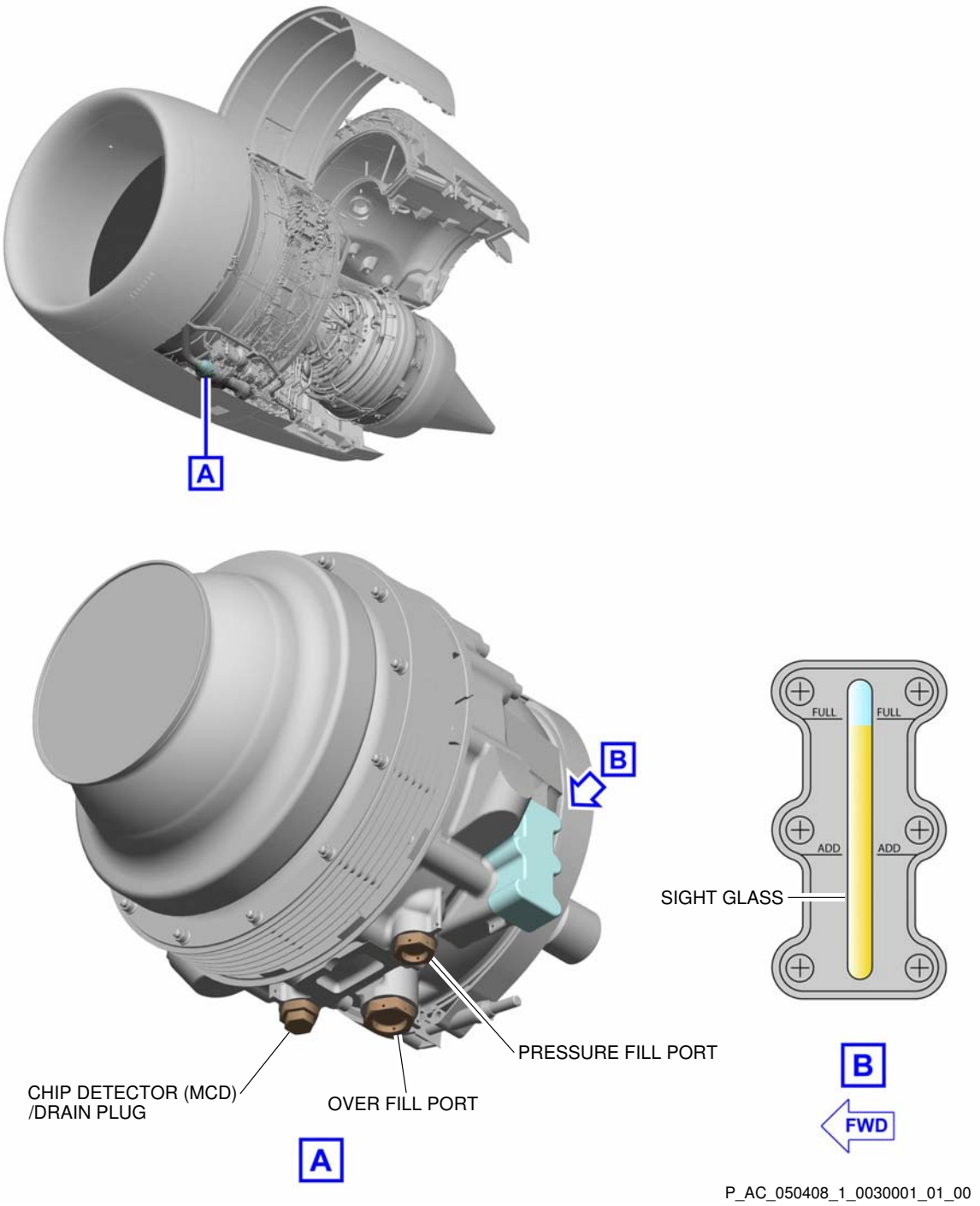
Engine Oil Servicing
FIGURE-5-4-8-991-001-A01

**ON A/C A350-900



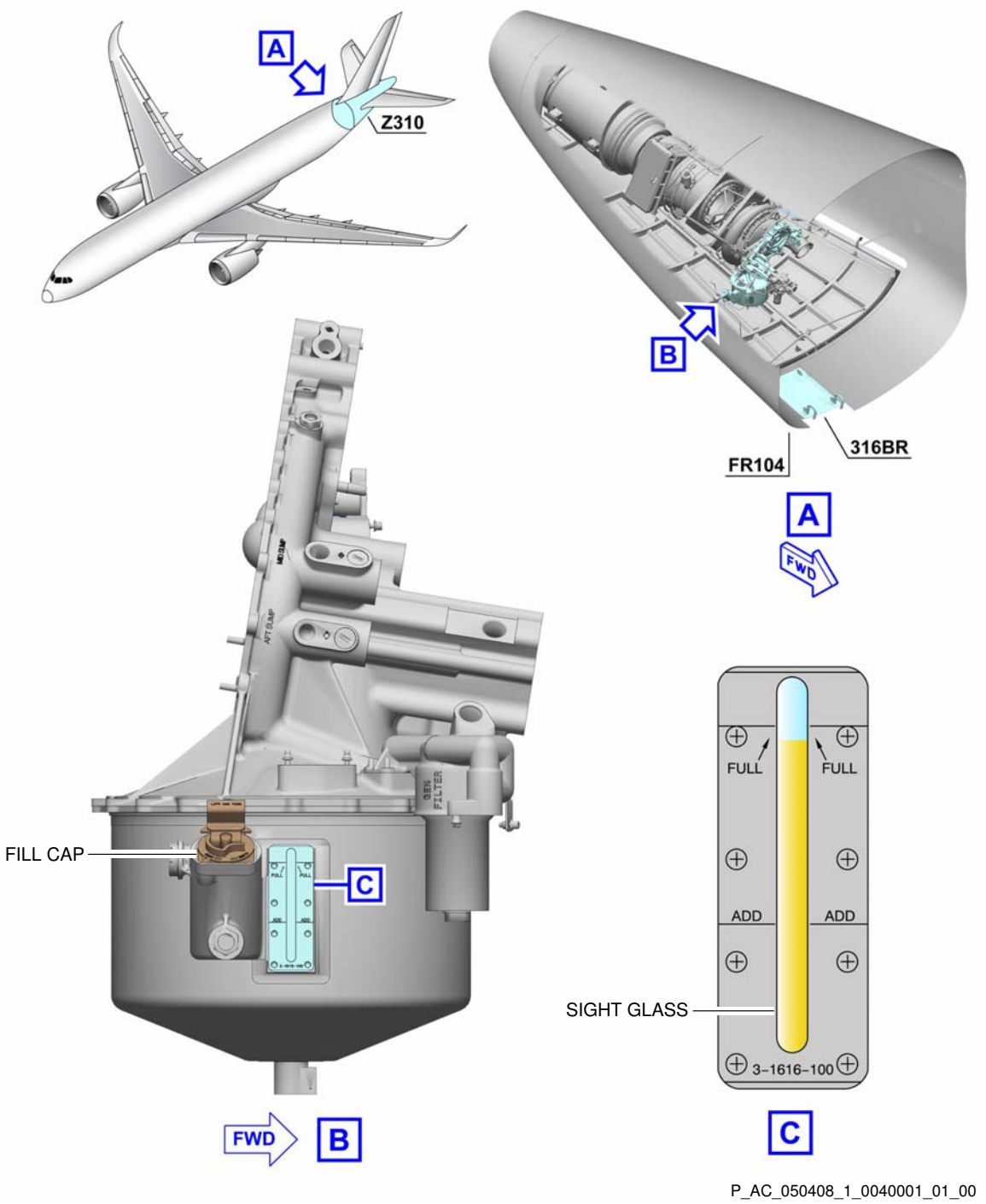
VFG Oil Servicing
FIGURE-5-4-8-991-002-A01

**ON A/C A350-900



Starter Oil Servicing
FIGURE-5-4-8-991-003-A01

**ON A/C A350-900



APU Oil Servicing
FIGURE-5-4-8-991-004-A01

5-4-9 Vacuum Toilet System

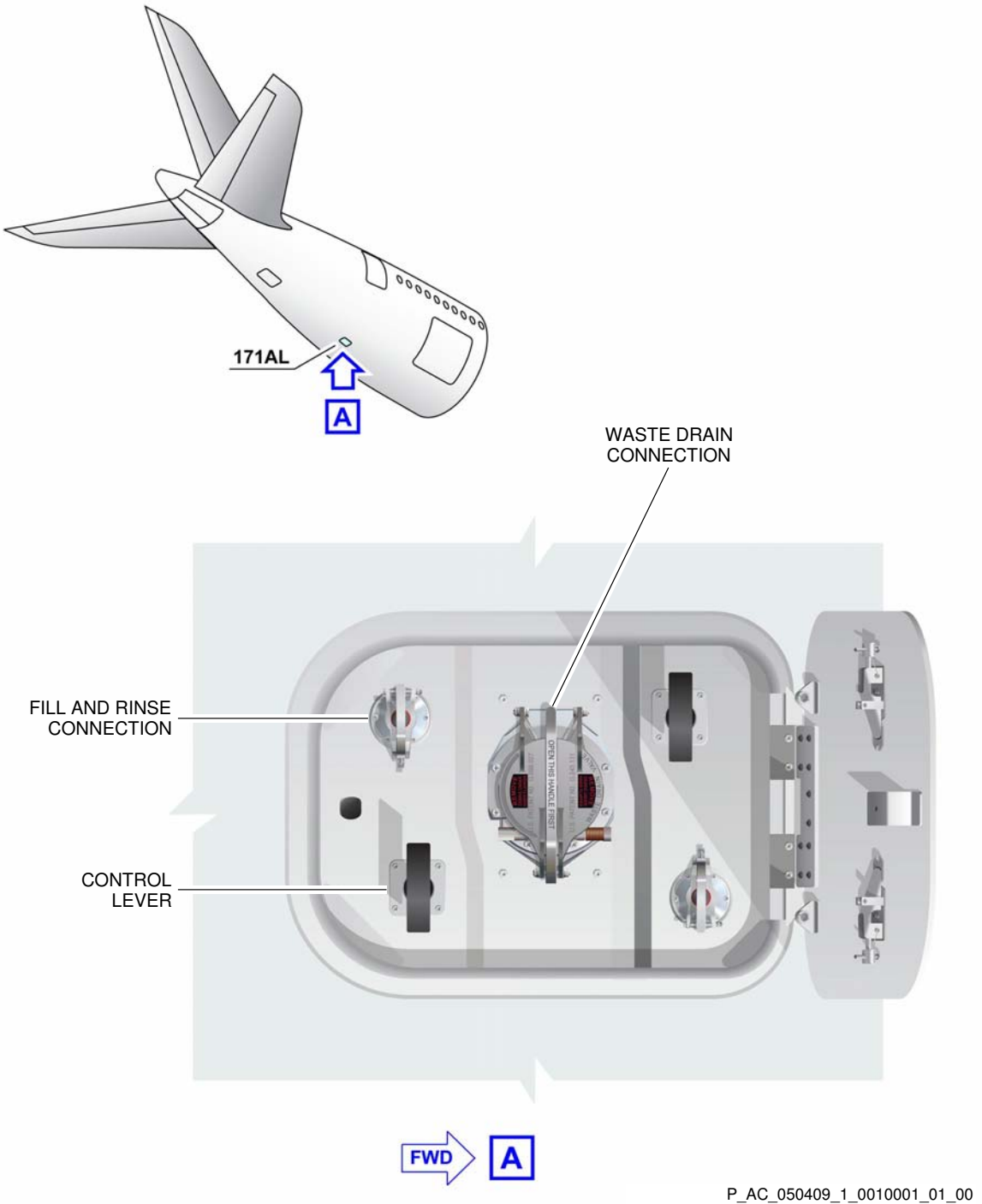
**ON A/C A350-900

Vacuum Toilet System

1. Waste water system

	DISTANCE: Meters (ft)			
	AFT OF NOSE	FROM AIRPLANE CENTERLINE		MEAN HEIGHT FROM GROUND
		R SIDE	L SIDE	
Waste Water Ground Service Access Door: 171 AL	52.21 m (171.29 ft.)	on centerline		3.69 m (12.11 ft.)

**ON A/C A350-900



Ground Service Panel
FIGURE-5-4-9-991-001-A01

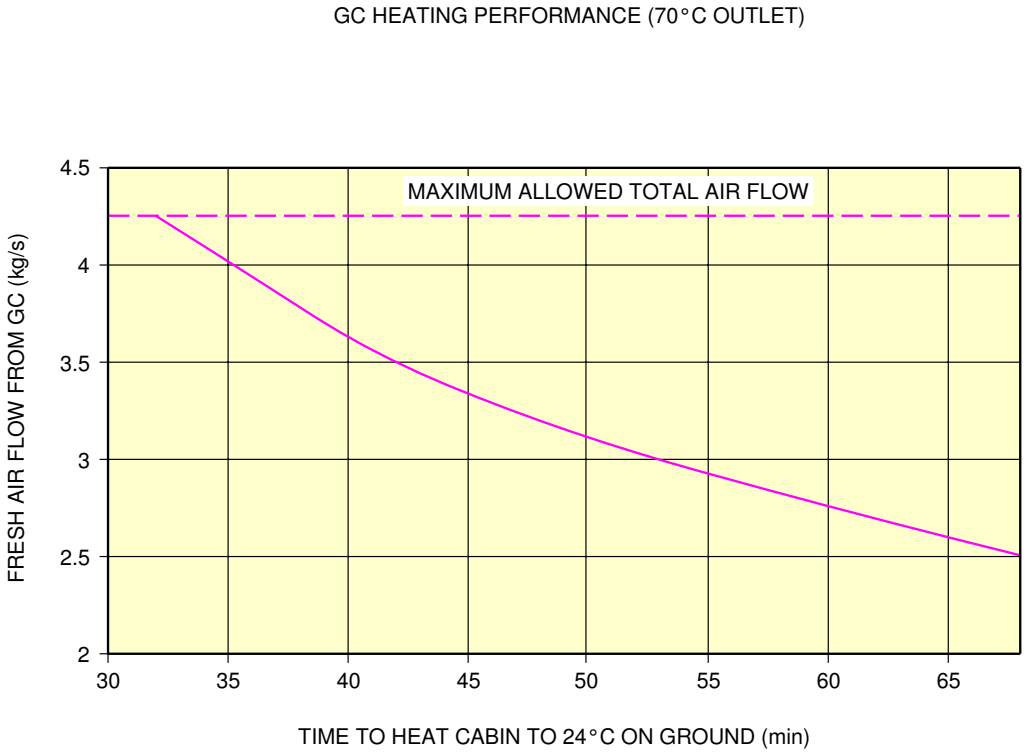
5-6-0 Ground Pneumatic Power Requirements - Heating

**ON A/C A350-900

Ground Pneumatic Power Requirements - Heating

1. This section provides the ground pneumatic power requirements heating.

**ON A/C A350-900



GROUND, COLD DAY (–23°C)

– NO PAX, NO ELECTRICAL CABIN HEATLOADS
– CABIN LIGHT "ON"
– NO SOLAR LOADS (BLINDS CLOSED)
– RECIRCULATION "ON" (DEFAULT SPEED)
– PCA OUTLET TEMPERATUR: 70°C
– INITIAL CABIN TEMPERATURE: –23°C

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Ground Pneumatic Power Requirements - Heating
FIGURE-5-6-0-991-001-A01

5-6-1 Ground Pneumatic Power Requirements - Cooling

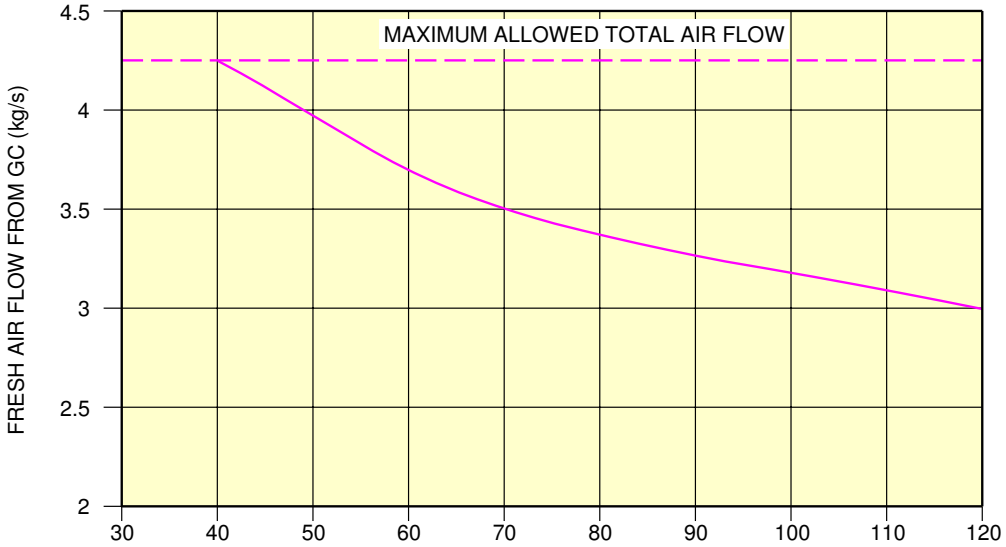
**ON A/C A350-900

Ground Pneumatic Power Requirements - Cooling

1. This section provides the ground pneumatic power requirements cooling.

**ON A/C A350-900

GC COOLING PERFORMANCE (2°C OUTLET)



GROUND, HOT DAY (38°C)

– NO PAX, NO ELECTRICAL CABIN HEATLOADS
– CABIN LIGHT "ON"
– NO SOLAR LOADS (BLINDS CLOSED)
– RECIRCULATION "ON" (DEFAULT SPEED)
– PCA OUTLET TEMPERATUR: 2°C
– INITIAL CABIN TEMPERATURE: 38°C

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Ground Pneumatic Power Requirements - Cooling
FIGURE-5-6-1-991-001-A01

5-8-0 Ground Towing Requirements

**ON A/C A350-900

Ground Towing Requirements

1. This section provides information on aircraft towing.

   The A350 is designed with means for conventional or towbarless towing.

   It is possible to tow or push the aircraft, at maximum ramp weight with engines at zero or up to idle thrust, using a towbar attached to the NLG.
   One tow bar fitting is installed at the front of the leg (optional towing fitting for towing from the rear of the NLG available).

   The first part of this section shows the chart to determine the draw bar pull and tow tractor mass requirements as function of the following physical characteristics:
   - Aircraft weight,
   - Slope,
   - Number of engines at idle.

2. Towbar design guidelines

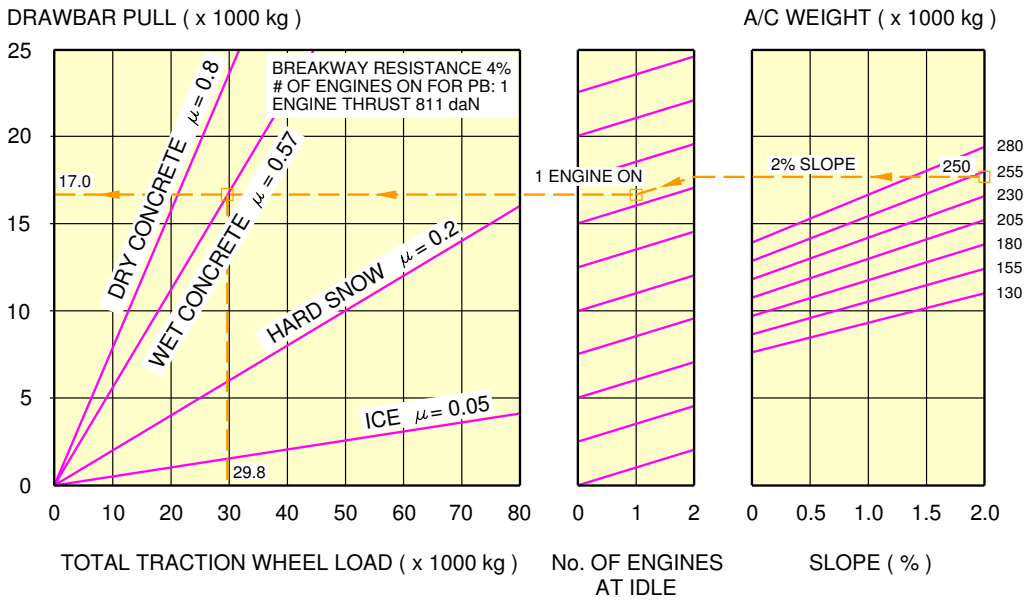
   The A350 towbar requirements are identical to the towbar requirements for the long range aircraft.
   - SAE AS 1614, "Main Line Aircraft Towbar Attach Fitting Interface",
   - SAE ARP1915, "Aircraft Towbar",
   - ISO 8267-1, "Aircraft - Towbar Attachment Fitting - Interface Requirements - Part 1: Main Line Aircraft",
   - ISO 9667, "Aircraft Ground Support Equipment - Towbars",
   - IATA Airport Handling Manual AHM 958, "Functional Specification for an Aircraft Towbar".

   A conventional type towbar is required which should be equipped with a damping system to protect the NLG against jerks and with towing shear pins :
   - A traction shear pin calibrated at 28 620 daN (64 340 lbf),
   - A torsion pin calibrated at 3 130 m.daN (27 7028 lbf.in).

   The towing head is designed according to SAE/AS 1614 cat. III.

   There is a variety of shear pin arrangements and the values of the shear pins depend on them.

**ON A/C A350-900



EXAMPLE HOW TO DETERMINE THE MASS REQUIREMENT TO TOW A A350 AT 250 000 kg, AT 2% SLOPE, 1 ENGINE AT IDLE AND FOR WET TARMAC CONDITIONS:

- ON THE RIGHT HAND SIDE OF THE GRAPH, CHOOSE THE RELEVANT AIRCRAFT WEIGHT (250 000 kg),
- FROM THIS POINT DRAW A PARALLEL LINE TO THE REQUIRED SLOPE PERCENTAGE (2%),
- FROM THIS POINT OBTAINED DRAW A STRAIGHT HORIZONTAL LINE UNTIL No. OF ENGINES AT IDLE = 2,
- FROM THIS POINT DRAW A PARALLEL LINE TO THE REQUESTED NUMBER OF ENGINES (1),
- FROM THIS POINT DRAW A STRAIGHT HORIZONTAL LINE TO THE DRAWBAR PULL AXIS,
- THE Y–COORDINATE OBTAINED IS THE NECESSARY DRAWBAR PULL FOR THE TRACTOR (17 000 kg),
- SEARCH THE INTERSECTION WITH THE "WET CONCRETE" LINE.

THE OBTAINED X–COORDINATE IS THE RECOMMENDED MINIMUM TRACTOR WEIGHT (29 800 kg).

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Ground Towing Requirements
FIGURE-5-8-0-991-001-A01

PAVEMENT DATA

7-1-0 General Information

**ON A/C A350-900

General Information

1. A brief description of the pavement charts that follow will help in airport planning.

   To aid in the interpolation between the discrete values shown, each airplane configuration is shown with a minimum range of five loads on the MLG.

   All curves on the charts represent data at a constant specified tire pressure with:
   - The airplane loaded to the maximum ramp weight,
   - The CG at its maximum permissible aft position.

   Pavement requirements for commercial airplanes are derived from the static analysis of loads imposed on the MLG struts.

   Section 7-2-0 , presents basic data on the landing gear footprint configuration, maximum ramp weights and tire sizes and pressures.

   Section 7-3-0, shows maximum vertical and horizontal pavement loads for certain critical conditions at the tire-ground interfaces.

   Section 7-4-0 contains charts to find these loads throughout the stability limits of the airplane at rest on the pavement.

   These MLG loads are used as the point of entry to the pavement design charts which follow, interpolating load values where necessary.

   Section 7-5-0 uses procedures 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 ICAO Aerodrome Design Manual, Part 3.Pavements, 2nd Edition, 1983, Section 1.1 (The ACN-PCN Method), and utilizing the alpha factors approved by ICAO in October 2007. The report was prepared by the U.S. Army Corps Engineers Waterways Experiment Station, Soils and Pavement Laboratory, Vicksburg, Mississippi".

   The line showing 10 000 coverages is used to calculate Aircraft Classification Number (ACN).

   The procedure that follows is used to develop flexible pavement design curves such as shown in Section 7-5-0.

A. With the scale for pavement thickness at the bottom and the scale for CBR at the top, an arbitrary line is drawn representing 10 000 coverages.

B. Incremental values of the weight on the MLG are then plotted.

C. Annual departure lines are drawn based on the load lines of the weight on the MLG that is shown on the graph.

Section 7-7-0 gives the rigid pavement design curves that have been prepared with the use of the Westergaard Equation. This is in general accordance with the procedures outlined in the Portland Cement Association publications, "Design of Concrete Airport Pavement", 1973 and "Computer Program for Airport Pavement Design", (Program PDILB), 1967 both by Robert G. Packard.

2. The procedure that follows is used to develop rigid pavement design curves such as those shown in Section 7-7-0.

A. With the scale for pavement thickness on the left and the scale for allowable working stress on the right, an arbitrary line load line is drawn. This represents the MLG maximum weight to be shown.

B. All values of the subgrade modulus (k values) are then plotted.

C. Additional load lines for the incremental values of weight on the MLG are drawn on the basis of the curve for k = 80 MN/m^3 already shown on the graph.

All Load Classification Number (LCN) curves shown in Section 7-6-0 and Section 7-8-0 have been developed from a computer program based on data provided in International Civil Aviation Organisation (ICAO) document 7920-AN/865/2, Aerodrome Manual, Part 2, "Aerodrome Physical Characteristics", Second Edition, 1965.

The flexible pavement charts in Section 7-6-0 show LCN against equivalent single wheel load, and equivalent single wheel load against pavement thickness.

The rigid pavement charts in Section 7-8-0 show LCN against equivalent single wheel load, and equivalent single wheel load against radius of relative stiffness.

Section 7-9 provides ACN data prepared according to the ACN/PCN system as referenced in ICAO Annex 14, "Aerodromes", Volume 1 "Aerodrome Design and Operations." Fourth Edition July 2004, incorporating Amendments 1 to 6.

The ACN/PCN system 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 corresponding Pavement Classification Number.

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

Numerically the ACN is two times the derived single wheel load expressed in thousands of kilograms.
The derived single wheel load is defined as the load on a single tire inflated to 1.25 Mpa (181 psi) that would have the same pavement requirements as the aircraft.
Computationally the ACN/PCN system uses PCA program PDILB for rigid pavements and S-77-1 for flexible pavements to calculate ACN values.
The Airport Authority must decide on the method of pavement analysis and the results of their evaluation shown 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 1.5 Mpa (217 psi)	U - Using Aircraft
	C - Low	Y - To 1 Mpa (145 psi)	
	D - Ultra Low	Z - To 0.5 Mpa (73 psi)	

Section 7-9-0 shows the aircraft ACN values for flexible pavements.
The four subgrade categories are:
- A . High Strength CBR 15
- B . Medium Strength CBR 10
- C . Low Strength CBR 6
- D . Ultra Low Strength CBR 3

Section 7-9-1 shows the aircraft ACN values for rigid pavements.
The four subgrade categories are:
- A . High Strength Subgrade k = 150 MN/m^3 (550 pci)

- B . Medium Strength Subgrade k = 80 MN/m^3 (300 pci)
- C . Low Strength Subgrade k = 40 MN/m^3 (150 pci)
- D . Ultra Low Strength Subgrade k = 20 MN/m^3 (75 pci)

7-2-0 Landing Gear Footprint

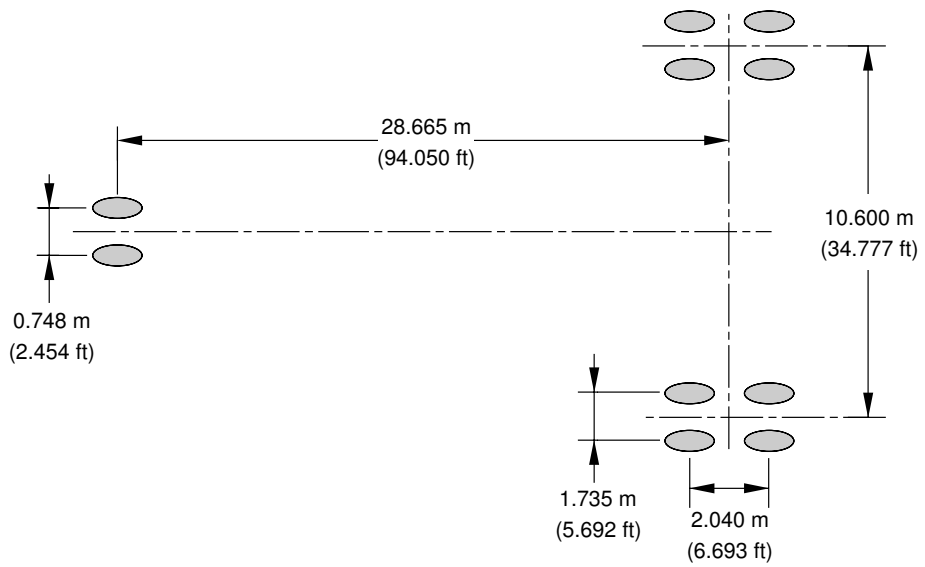
**ON A/C A350-900

Landing Gear Footprint

1. This section gives the landing gear footprint.

**ON A/C A350-900

MAXIMUM RAMP WEIGHT	268 900 kg (592 825 lb)
PERCENTAGE OF WEIGHT ON MAIN GEAR GROUP	SEE SECTION 7–4–0
NOSE GEAR TIRE SIZE	1050x395R16 28PR
NOSE GEAR TIRE PRESSURE	12.2 bar (177 psi)
WING GEAR TIRE SIZE	1400x530R23 42PR
WING GEAR TIRE PRESSURE	16.6 bar (241 psi)



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Landing Gear Footprint
FIGURE-7-2-0-991-001-A01

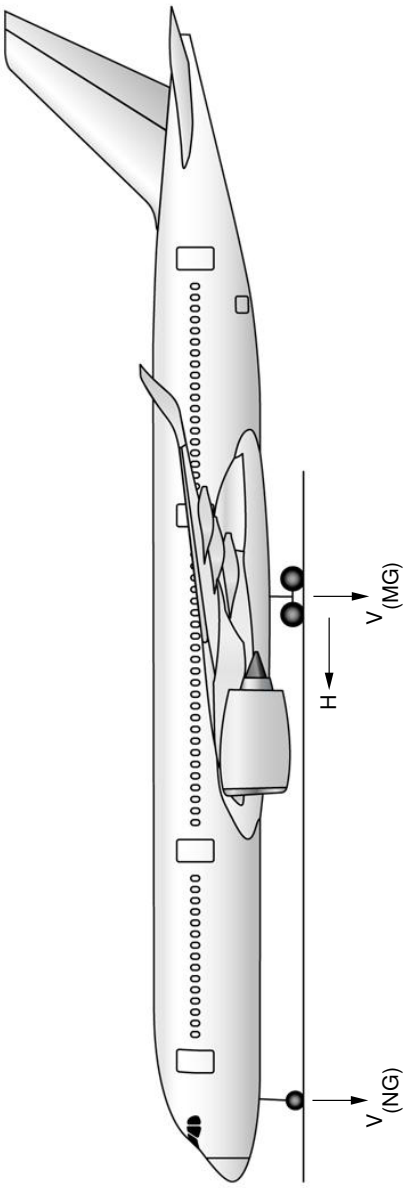
7-3-0 Maximum Pavement Loads

**ON A/C A350-900

Maximum Pavement Loads

1. This section gives maximum pavement loads.

**ON A/C A350-900



1	2		3		4		5		6			
			VNG				VMG (PER STRUT)		H (PER STRUT)			
MODEL	MAXIMUM RAMP WEIGHT		STATIC LOAD AT MOST FWD C.G. (1)		STATIC BRAKING @ 10 ft/s² DECELERATION		STATIC LOAD AT MAX AFT C.G. (2)		STEADY BRAKING @ 10 ft/s² DECELERATION		AT INSTANTANEOUS BRAKING COEFFICIENT = 0.8	
	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg
–900	592 825	268 900	51 575	23 400	85 500	38 780	277 700	125 960	92 125	41 790	222 150	100 770

$V_{(NG)}$ MAXIMUM VERTICAL NOSE GEAR GROUND LOAD AT MOST FORWARD CG
$V_{(MG)}$ MAXIMUM VERTICAL MAIN GEAR GROUND LOAD AT MOST AFT CG
H MAXIMUM HORIZONTAL GROUND LOAD FROM BRAKING
(1) MRW = 268 900 kg FWD CG = 25.5 % MAC AT A/C WEIGHT=268 900 kg
(2) MRW = 268 900 kg AFT CG = 33 % MAC AT A/C WEIGHT=268 900 kg

NOTE: ALL LOADS CALCULATED USING AIRPLANE MAXIMUM RAMP WEIGHT

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Maximum Pavement Loads
FIGURE-7-3-0-991-001-A01

7-4-0 Landing Gear Loading on Pavement

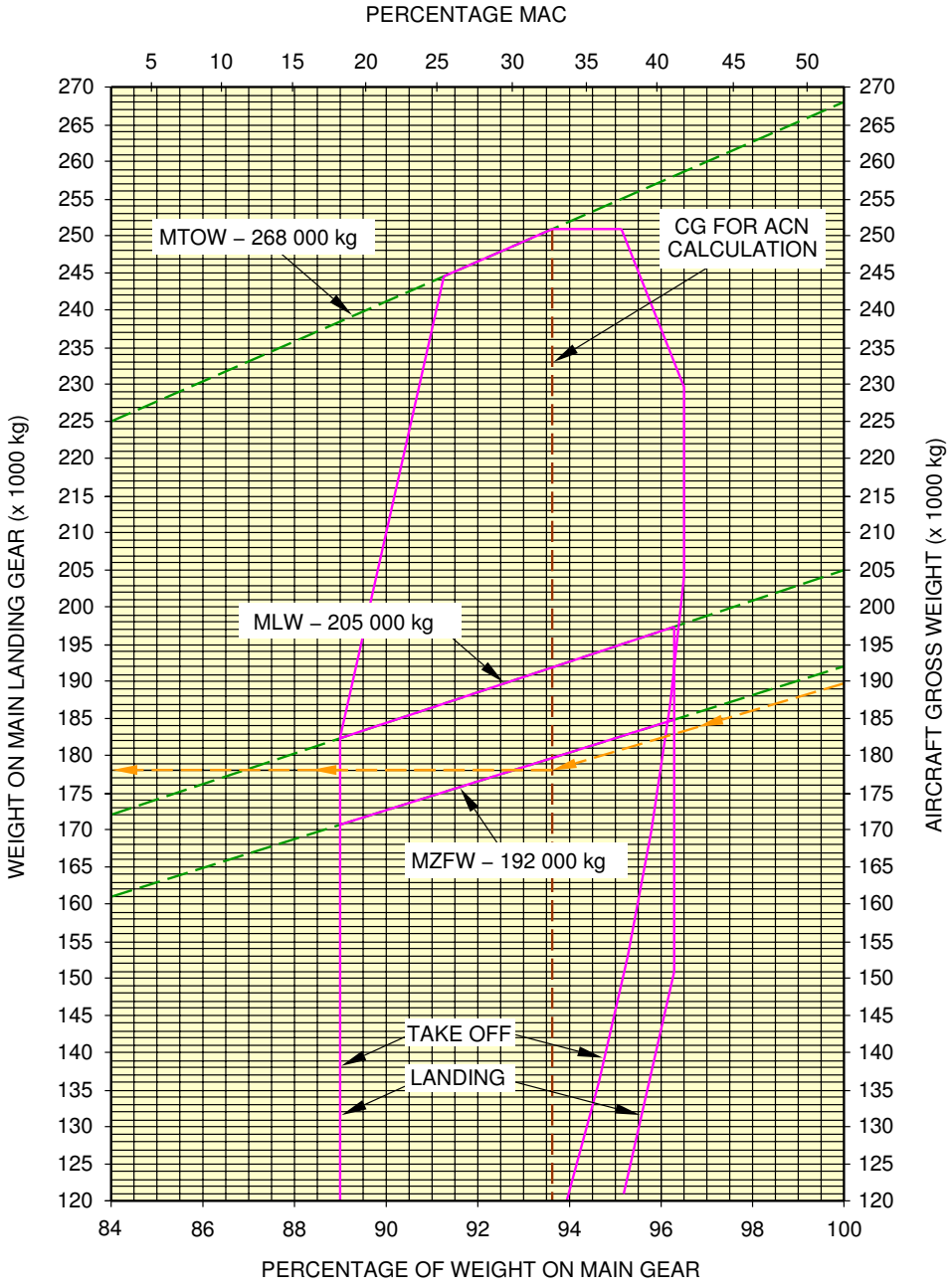
**ON A/C A350-900

Landing Gear Loading on Pavement

1. In the typical example shown in FIGURE 7-4-0-991-001-A, the aircraft gross weight is 190 000 kg (418 875 lb) and the percentage of weight on the MLG is 93.68 %.

   For these conditions the total weight on the MLG group is 178 000 kg (392 423 lb).

**ON A/C A350-900



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Landing Gear Loading on Pavement
MTOW 268 000 kg
FIGURE-7-4-0-991-001-A01

7-5-0 Flexible Pavement Requirements - US Army Corps of Engineers

**ON A/C A350-900

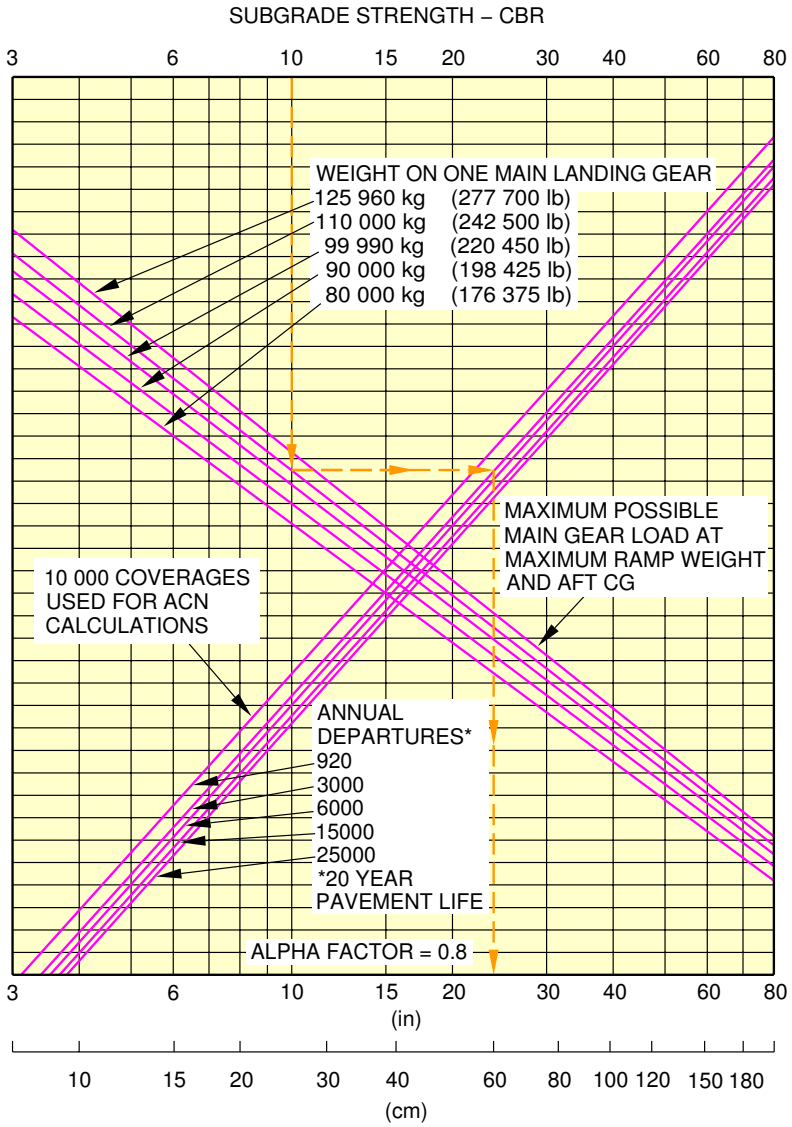
Flexible Pavement Requirements - US Army Corps of Engineers

1. To find a flexible pavement thickness, the subgrade strength (CBR), the annual departure level and the weight on one MLG must be known.

   In the typical example shown in FIGURE 7-5-0-991-001-A for:
   - A CBR value of 10,
   - An annual departure level of 3000,
   - The load on one MLG of 110000 kg (242500 lb),
   - The required flexible pavement thickness is 59.3 cm (23.34 inches).

   The line showing 10 000 coverages is used to calculate Aircraft Classification Number (ACN).

**ON A/C A350-900



FLEXIBLE PAVEMENT THICKNESS

1400x530R23 42PR TIRES
TIRE PRESSURE CONSTANT AT 16.6 bar (241 psi)

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Flexible Pavement Requirements
MTOW 268 000 kg
FIGURE-7-5-0-991-001-A01

7-6-0 Flexible Pavement Requirements - LCN Conversion

**ON A/C A350-900

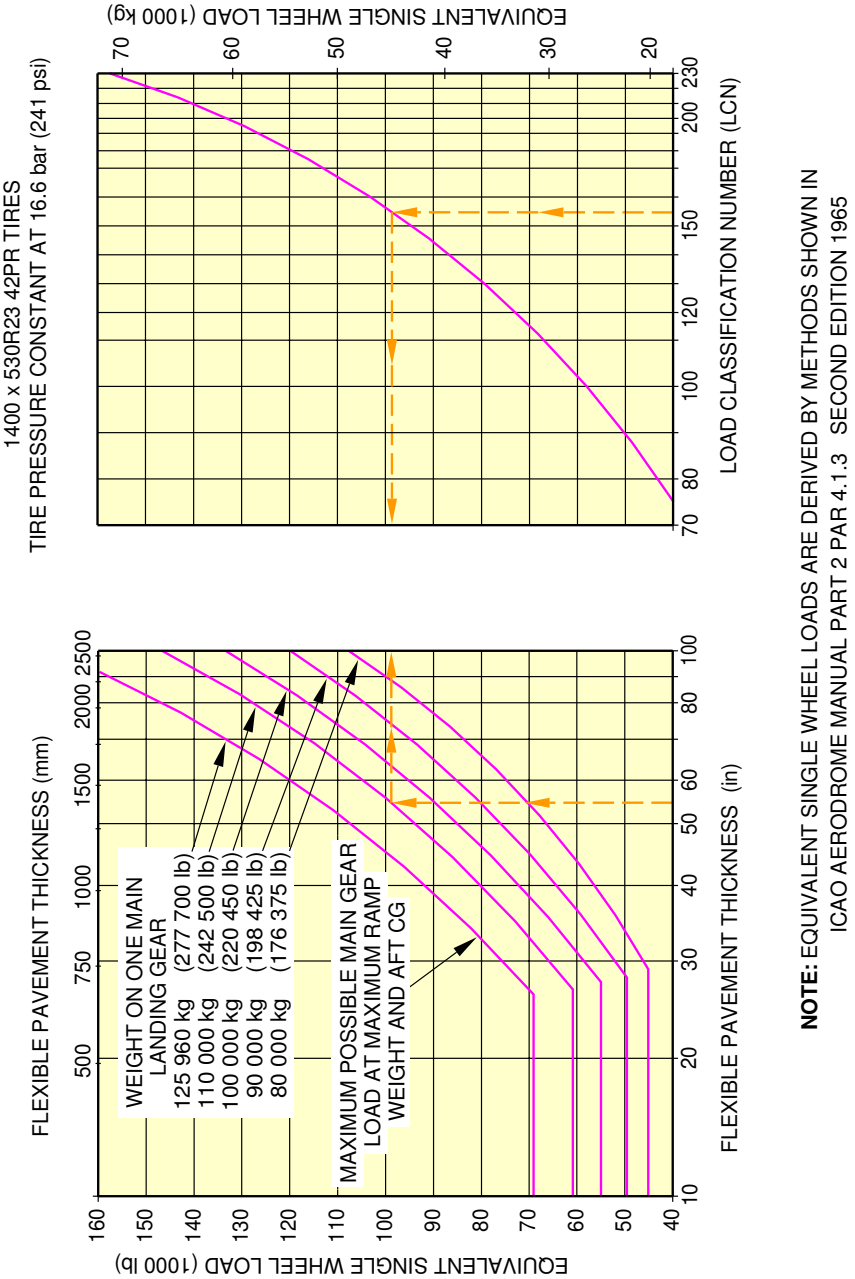
Flexible Pavement Requirements - LCN Conversion

1. To find the airplane weight that a flexible pavement can support, the LCN of the pavement and the thickness (h) must be known.

   In the example shown in FIGURE 7-6-0-991-001-A, the thickness (h) is shown at 1213 mm (55 in.) with an LCN of 153.91.

   For these conditions the weight on one MLG is 110 000 kg (242 508 lb).

**ON A/C A350-900



NOTE: EQUIVALENT SINGLE WHEEL LOADS ARE DERIVED BY METHODS SHOWN IN ICAO AERODROME MANUAL PART 2 PAR 4.1.3 SECOND EDITION 1965

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Flexible Pavement Requirements - LCN
MTOW 268 000 kg
FIGURE-7-6-0-991-001-A01

7-7-0 Rigid Pavement Requirements - Portland Cement Association De

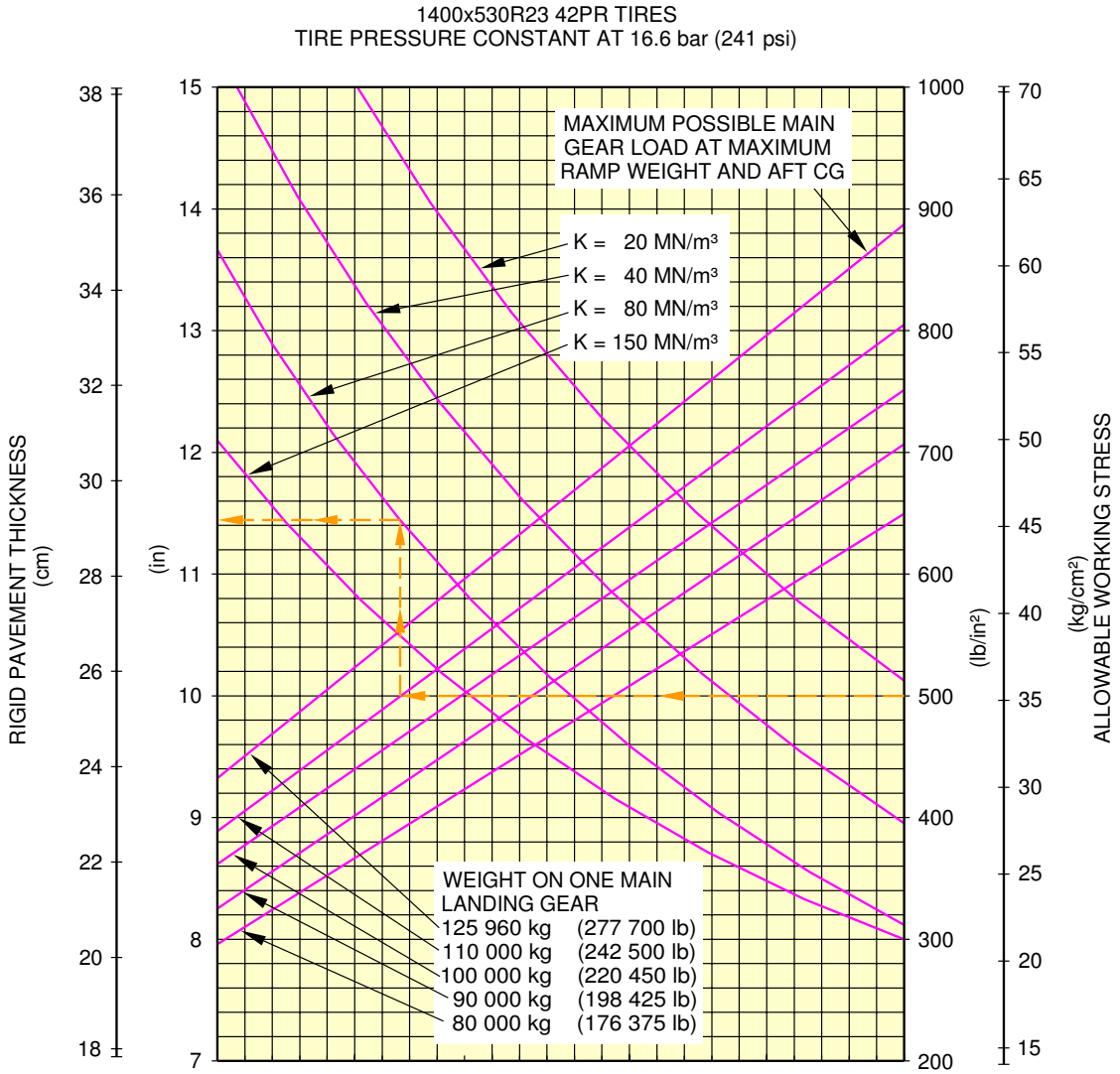
**ON A/C A350-900

Rigid Pavement Requirements - Portland Cement Association De

1. To determine a rigid pavement thickness, the subgrade modulus (k), the allowable working stress and the weight on one MLG must be known.

   In the typical example shown in FIGURE 7-7-0-991-001-A for:
   - A k value of 80 MN/m^3 (K = 550 lbF/in^3),
   - An allowable working stress of 35 kg/cm^2 (500 lb/in^2),
   - The load on one MLG of 110 000 kg (242 508 lb),
   - The required rigid pavement thickness is 290 mm (11.4 inches).

**ON A/C A350-900



NOTES:
THE VALUES OBTAINED BY USING THE MAXIMUM LOAD REFERENCE LINE AND ANY VALUES FOR K ARE EXACT. FOR LOADS LESS THAN MAXIMUM, THE CURVES ARE EXACT FOR K = 80 MN/m³ BUT DEVIATE SLIGHTLY FOR ANY OTHER VALUES OF K

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

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Rigid Pavement Requirements
MTOW 268 000 kg
FIGURE-7-7-0-991-001-A01

7-8-0 Rigid Pavement Requirements - LCN Conversion

**ON A/C A350-900

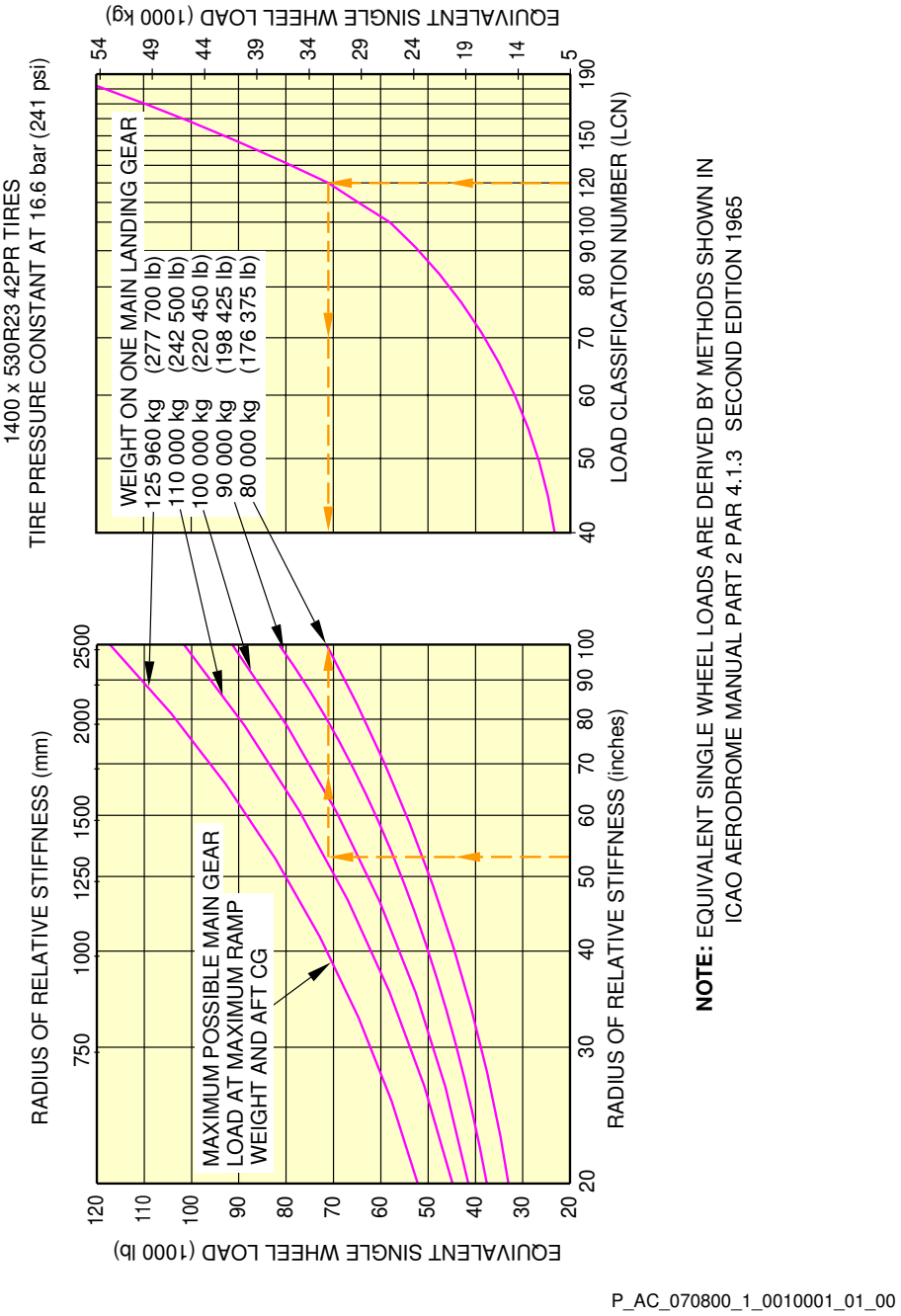
Rigid Pavement Requirements - LCN Conversion

1. To determine the airplane weight that a rigid pavement can support, the LCN of the pavement and the radius of relative stiffness (L) must be known.

   In the typical example shown in FIGURE 7-8-0-991-001-A, the radius of relative stiffness is shown at 1364 mm (53.7 in.) with an LCN of 119.

   For these conditions the weight on one MLG is 242 500 kg (110 000 lb).

**ON A/C A350-900



Rigid Pavement Requirements - LCN
MTOW 268 000 kg
FIGURE-7-8-0-991-001-A01

7-8-1 Radius of Relative Stiffness (L)

**ON A/C A350-900

Radius of Relative Stiffness (L)

1. This section gives the radius of relative stiffness.

**ON A/C A350-900

RADIUS OF RELATIVE STIFFNESS (L)
VALUES IN INCHES

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

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

d	k=75	k=100	k=150	k=200	k=250	k=300	k=350	k=400	k=550
6.0	31.48	29.30	26.47	24.63	23.30	22.26	21.42	20.72	19.13
6.5	33.43	31.11	28.11	26.16	24.74	23.64	22.74	22.00	20.31
7.0	35.34	32.89	29.72	27.65	26.15	24.99	24.04	23.25	21.47
7.5	37.22	34.63	31.29	29.12	27.54	26.32	25.32	24.49	22.61
8.0	39.06	36.35	32.85	30.57	28.91	27.62	26.58	25.70	23.74
8.5	40.88	38.04	34.37	31.99	30.25	28.91	27.81	26.90	24.84
9.0	42.67	39.71	35.88	33.39	31.58	30.17	29.03	28.08	25.93
9.5	44.43	41.35	37.36	34.77	32.89	31.42	30.23	29.24	27.00
10.0	46.18	42.97	38.83	36.14	34.17	32.65	31.42	30.39	28.06
10.5	47.90	44.57	40.28	37.48	35.45	33.87	32.59	31.52	29.11
11.0	49.60	46.16	41.71	38.81	36.71	35.07	33.75	32.64	30.14
11.5	51.28	47.72	43.12	40.13	37.95	36.26	34.89	33.74	31.16
12.0	52.94	49.27	44.52	41.43	39.18	37.44	36.02	34.84	32.17
12.5	54.59	50.80	45.90	42.72	40.40	38.60	37.14	35.92	33.17
13.0	56.22	52.32	47.27	43.99	41.61	39.75	38.25	36.99	34.16
13.5	57.83	53.82	48.63	45.26	42.80	40.89	39.35	38.06	35.14
14.0	59.43	55.31	49.98	46.51	43.98	42.02	40.44	39.11	36.12
14.5	61.02	56.78	51.31	47.75	45.16	43.15	41.51	40.15	37.08
15.0	62.59	58.25	52.63	48.98	46.32	44.26	42.58	41.19	38.03
15.5	64.15	59.70	53.94	50.20	47.47	45.36	43.64	42.21	38.98
16.0	65.69	61.13	55.24	51.41	48.62	46.45	44.70	43.23	39.92
16.5	67.23	62.56	56.53	52.61	49.75	47.54	45.74	44.24	40.85
17.0	68.75	63.98	57.81	53.80	50.88	48.61	46.77	45.24	41.78
17.5	70.26	65.38	59.08	54.98	52.00	49.68	47.80	46.23	42.70
18.0	71.76	66.78	60.34	56.15	53.11	50.74	48.82	47.22	43.61
19.0	74.73	69.54	62.84	58.48	55.31	52.84	50.84	49.17	45.41
20.0	77.66	72.27	65.30	60.77	57.47	54.91	52.84	51.10	47.19
21.0	80.55	74.96	67.74	63.04	59.62	56.96	54.81	53.01	48.95
22.0	83.41	77.63	70.14	65.28	61.73	58.98	56.75	54.89	50.69
23.0	86.24	80.26	72.52	67.49	63.83	60.98	58.68	56.75	52.41
24.0	89.04	82.86	74.87	69.68	65.90	62.96	60.58	58.59	54.11
25.0	91.81	85.44	77.20	71.84	67.95	64.92	62.46	60.41	55.79

REFERENCE: PORTLAND CEMENT ASSOCIATION

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Radius of Relative Stiffness (L)
FIGURE-7-8-1-991-001-A01

7-8-2 Radius of Relative Stiffness (Other values of E and μ)

**ON A/C A350-900

Radius of Relative Stiffness (Other values of E and μ)

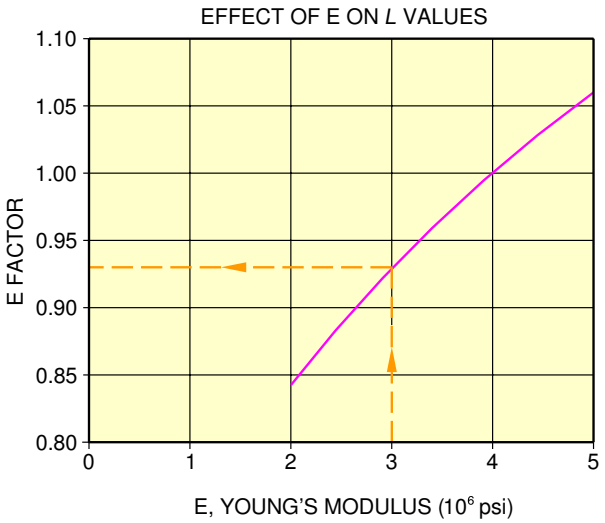
1. The table of Section 7–8–1 radius of relative stiffness, presents L values based on young's modulus (E) of 4 000 000 psi and poisson's ratio (μ) of 0.15.

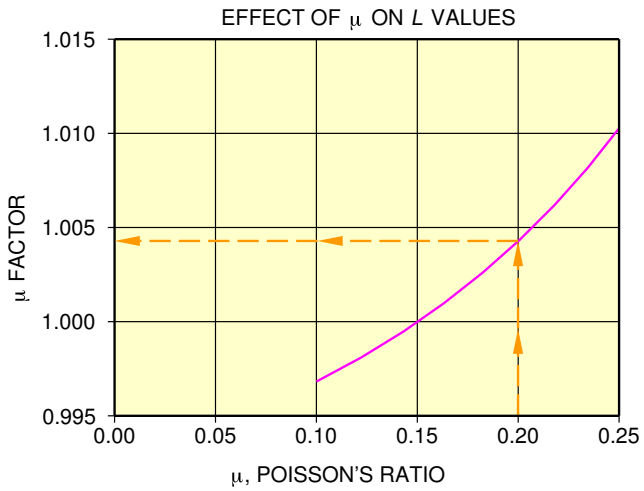
   To find L values based on other values of E and μ, see FIGURE 7-8-2-991-001-B.

   For example, to find an L value based on an E of 3 000 000 psi, the "E" factor of 0.931 is multiplied by the L value found in the table of Section 7-8-1 radius of relative stiffness.

   The effect of variations of μ on the L value is treated in a similar manner.

**ON A/C A350-900





NOTE: BOTH CURVES ON THIS PAGE ARE USED TO ADJUST THE *L* VALUES OF TABLE 7–8–1

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Radius of Relative Stiffness (Effect E and μ ON "L" values)
FIGURE-7-8-2-991-001-B01

7-9-0 Aircraft Classification Number - Flexible Pavement

**ON A/C A350-900

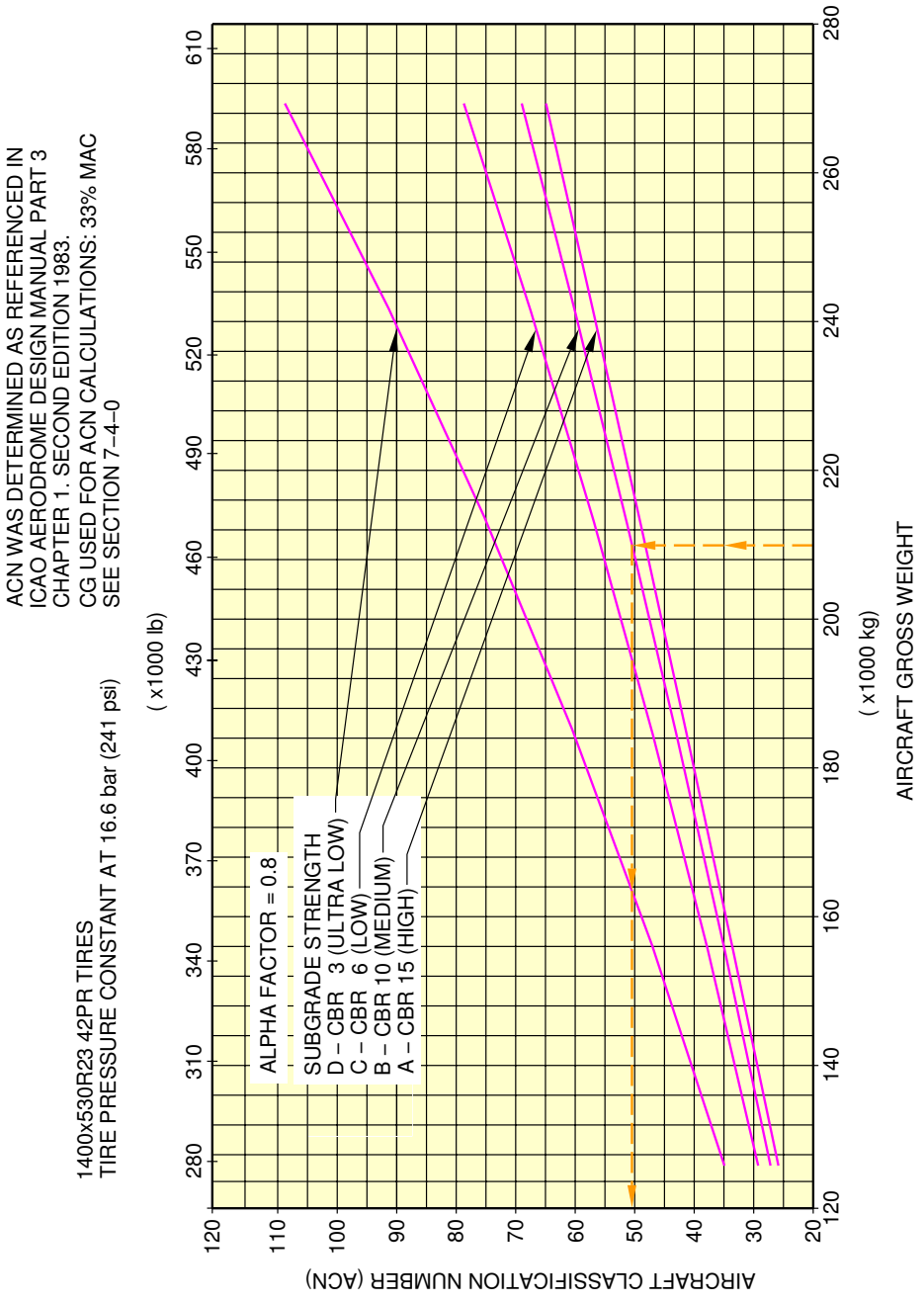
Aircraft Classification Number - Flexible Pavement

1. To find the ACN of an aircraft on flexible pavement, the aircraft gross weight and the subgrade strength must be known.

   In the example shown in FIGURE 7-9-0-991-001-A, for an aircraft gross weight of 210 000 kg (462 975 lb) and medium subgrade strength (code B), the ACN for the flexible pavement is 51.

   NOTE : An aircraft with an ACN equal to or less than the reported PCN can operate on that pavement, subject to any limitation on the tire pressure. (Ref: ICAO Aerodrome Design Manual Part 3 Chapter 1 Second Edition 1983).

**ON A/C A350-900



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Aircraft Classification Number - Flexible Pavement
MTOW 268 000 kg
FIGURE-7-9-0-991-001-A01

7-9-1 Aircraft Classification Number - Rigid Pavement

**ON A/C A350-900

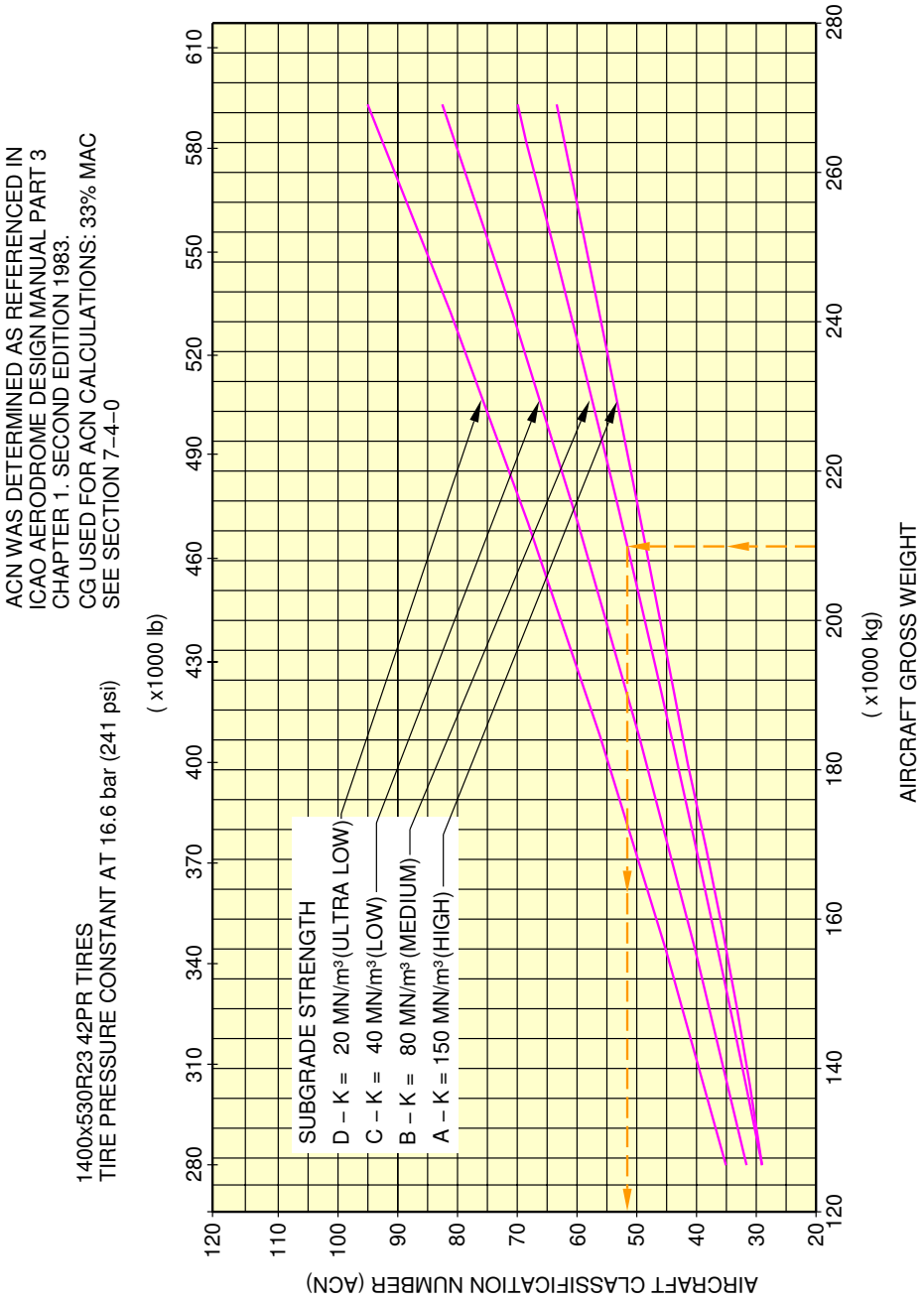
Aircraft Classification Number - Rigid Pavement

1. To find the ACN of an aircraft on rigid pavement, the aircraft gross weight and the subgrade strength must be known.

   In the example shown in FIGURE 7-9-1-991-001-A, for an aircraft gross weight of 210 000 kg (462 975 lb) and medium subgrade strength (code B), the ACN for the rigid pavement is 52.

   NOTE : An aircraft with an ACN equal to or less than the reported PCN can operate on that pavement, subject to any limitation on the tire pressure. (Ref: ICAO Aerodrome Design Manual Part 3 Chapter 1 Second Edition 1983).

**ON A/C A350-900



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Aircraft Classification Number - Rigid Pavement
MTOW 268 000 kg
FIGURE-7-9-1-991-001-A01

SCALED DRAWINGS

9-0-0 Scaled Drawings

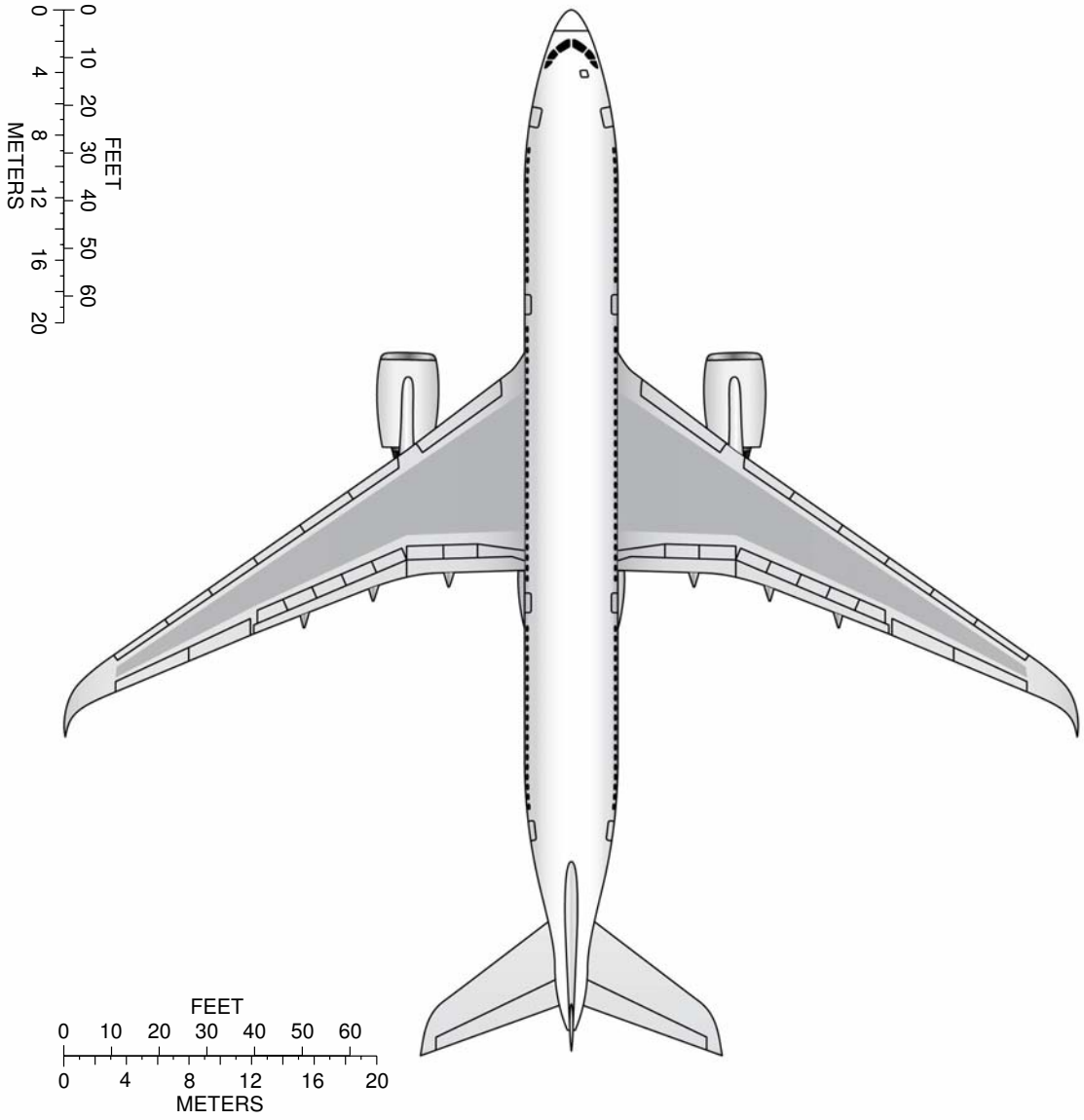
****ON A/C A350-900**

Scaled Drawings

1. This section provides the scaled drawings.

   NOTE : When printing this drawing, make sure to adjust for proper scaling.

**ON A/C A350-900



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

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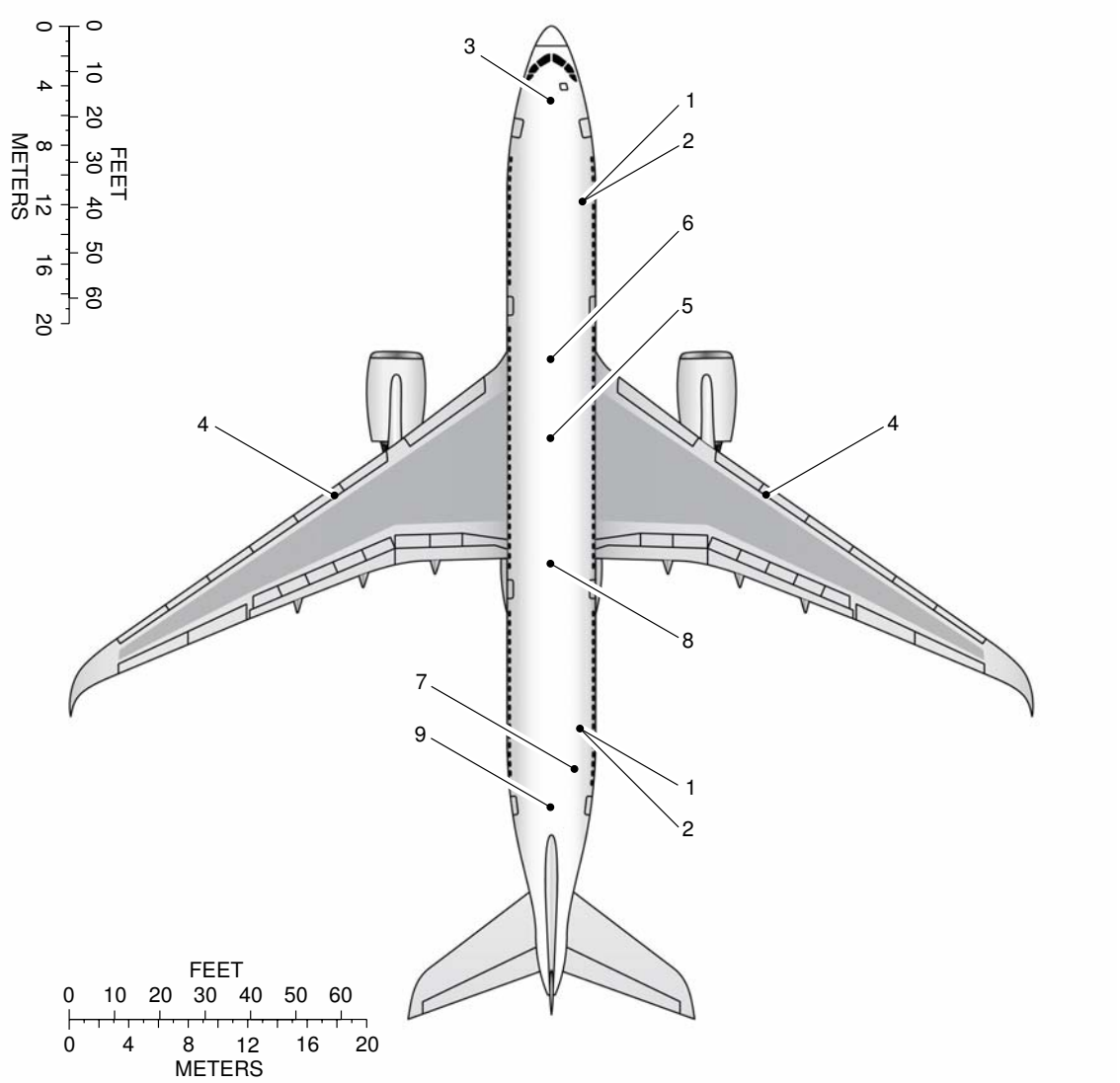
Scaled Drawings
(Sheet 1 of 2)
FIGURE-9-0-0-991-001-A01

**ON A/C A350-900



LEGEND:

1 CARGO CONTROL PANEL
2 CARGO DOOR CONTROL PANEL
3 ELECTRICAL GROUND POWER
4 FUEL COUPLINGS
5 HIGH PRESSURE AIR
6 LOW PRESSURE AIR
7 POTABLE WATER
8 REFUEL/DEFUEL PANEL
9 WASTE WATER

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

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Scaled Drawings
(Sheet 2 of 2)
FIGURE-9-0-0-991-001-A01