

Task 28-11-03-004-001
Access Door for the Wing Surge Tank Removal

Effective on: UAL ALL

(Fig. Figure 401)

A. References

Reference	Title
28-11-00-912-425-001	Purging and Fuel Tank Entry (P/B 201)
28-11-98 P/B 201	FUEL TANK ENTRY AND BREATHING EQUIPMENT - REQUIREMENTS/SERVICE
<i>SEE AIPC 86-28-11-02</i>	Aircraft Illustrated Parts Catalog

B. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference Description

SPL-8436 Protective Ring - Wing, Lower Panel Access Door (Optional GSE)
Effective on: UAL ALL; 747-400B
(Part #: C28013-4, Supplier: 81205)

C. Location Zones

Zone Area

555 SURGE TANK LEFT FRONT SPAR TO REAR SPAR
655 SURGE TANK RIGHT FRONT SPAR TO REAR SPAR

D. Access Panels

Number Name/Location

555AB Access Door - Surge Tank
555BB Access Door - Surge Tank
655AB Access Door - Surge Tank
655BB Access Door - Surge Tank

E. Procedure

NOTE: Additional information useful to this procedure may be found in this reference:
• *SEE*
AIPC 86-28-11-02

Effective on: UAL ALL

SUBTASK 28-11-03-860-001

WARNING: OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (1) Do this task Purging and Fuel Tank Entry, TASK 28-11-00-912-425-001 .

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SUBTASK 28-11-03-010-001

- (2) Get access to the applicable access doors:

Number Name/Location

555AB	Access Door - Surge Tank
555BB	Access Door - Surge Tank
655AB	Access Door - Surge Tank
655BB	Access Door - Surge Tank

Effective on: UAL ALL

SUBTASK 28-11-03-864-022

- (3) All circuit breakers for fueling/defueling and fuel transfer operations for the tank to be opened must be pulled and tagged.

Power may be restored when the tank atmosphere is below 20% LEL (Lower Explosive Limit). Refer to PAGEBLOCK 28-11-98/201 for tank entry.

Effective on: UAL ALL

SUBTASK 28-11-03-034-003

- (4) Hold the clamp ring [4] and remove the bolts [3] (21 locations).

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SUBTASK 28-11-03-034-004

- (5) Remove the clamp ring [4] and the knitted aluminum gasket [5] from the access door [1].

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SUBTASK 28-11-03-034-015

- (6) Put the clamp ring [4] in a flat container.

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SUBTASK 28-11-03-024-005

CAUTION: DO NOT PUT AN OBJECT BETWEEN THE WING SKIN AND THE ACCESS DOOR TO OPEN THE DOOR. DAMAGE TO THE SURFACES THAT SEAL ON THE WING

SKIN OR THE ACCESS DOOR CAN CAUSE A LEAK.

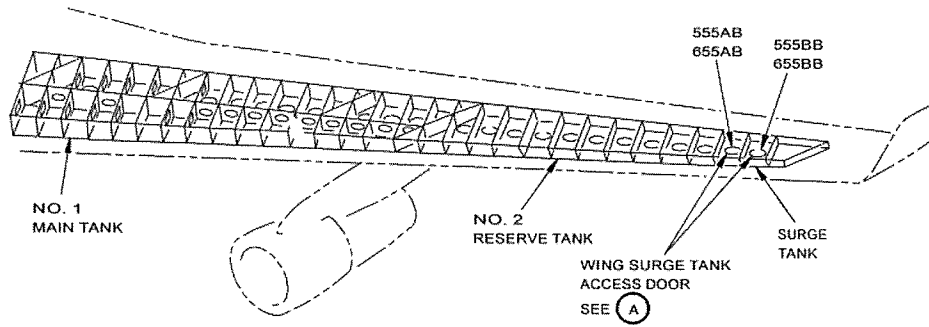
- (7) Push the access door [1] up and remove the access door [1] from the fuel tank.

NOTE: If the door cannot be easily removed, hit the door lightly around the edge with a rubber mallet.

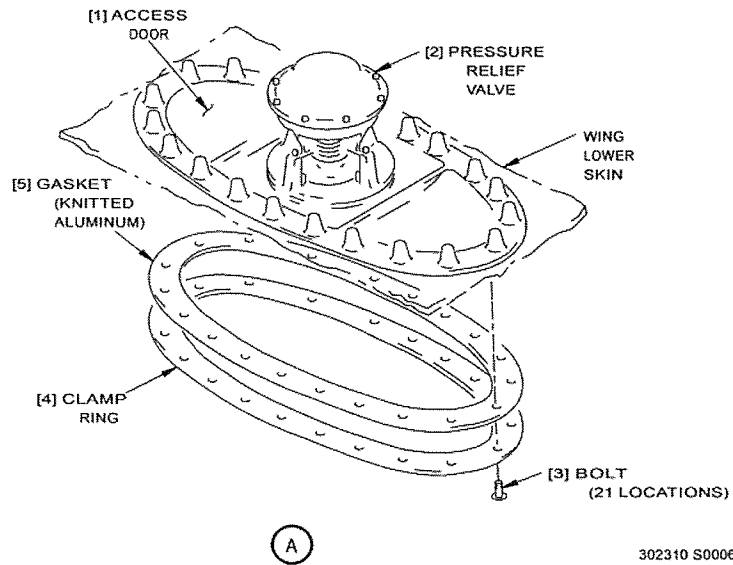
Effective on: UAL ALL

SUBTASK 28-11-03-034-006

- (8) Install the **protective ring** (SPL-8436) , around the access door opening.
-



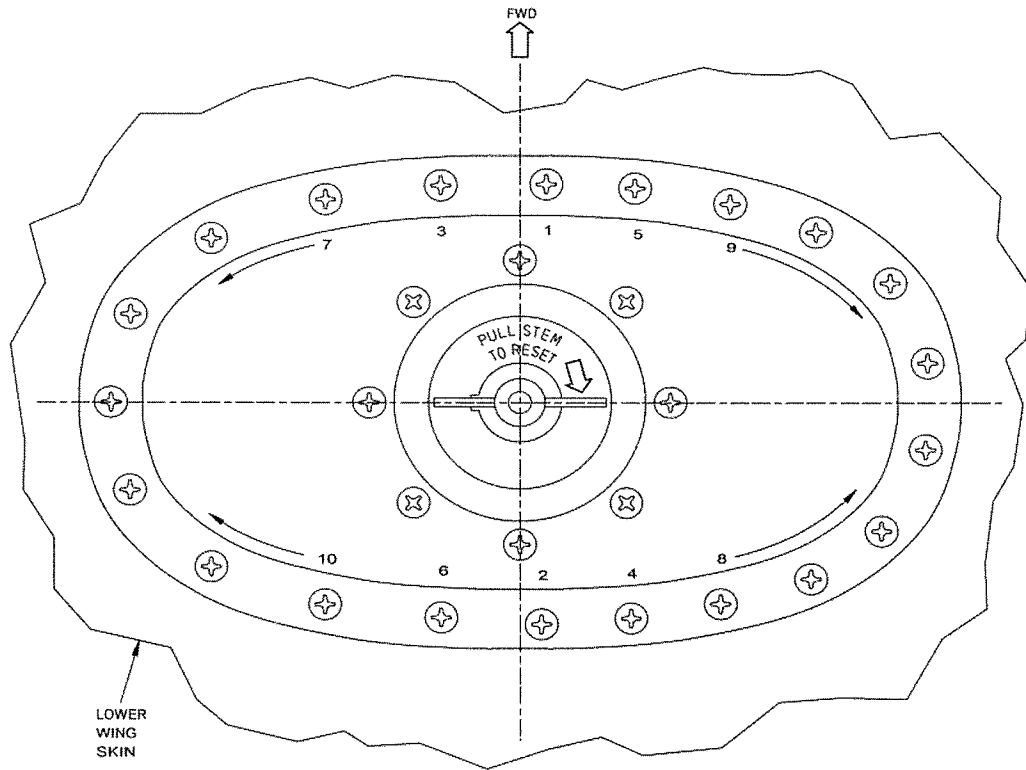
NOTE: THE 500 NUMBER SERIES IS USED FOR THE LEFT WING.
THE 600 NUMBER SERIES IS USED FOR THE RIGHT WING.



302310 S0006629325_V3

Figure 401. Wing Surge Tank Access Door Installation (Sheet 1) / 28-11-03-990-801
Sheet Effectivity: UAL ALL

Sheet Rev Date:
03/15/2012



NOTE: TORQUE THE MOUNT BOLTS IN THE SEQUENCE SHOWN BY THE NUMBERS. THIS WILL MAKE SURE FUEL DOES NOT LEAK AROUND THE ACCESS PANEL.

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Figure 402. Wing Surge Tank Access Door Bolt Torque Pattern (Sheet 1) / 28-11-03-990-802
Sheet Effectivity: UAL ALL

Sheet Rev Date:
10/18/2004

Task 28-11-03-404-007
Access Door for the Wing Surge Tank Installation
Effective on: UAL ALL

(Fig. Figure 401 , Fig. Figure 402)

A. General

- (1) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.
 - (a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801 .
NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.
- (2) D50050 (Aeroshell 14 helicopter grease) , is the recommended material for access door gasket installations. G50237 (Cor-Ban 27L Compound) , can still be used for access door gaskets, but should be replaced with D50050 (Aeroshell 14 helicopter grease) , as soon as practical.
- (3) Do not mix D50050 (Aeroshell 14 helicopter grease) , and G50237 (Cor-Ban 27L Compound) . If you apply a different material than what was used previously, make sure to remove all the old material from the clamp ring and the access door structure on the airplane.
- (4) It is recommended that a new knitted aluminum gasket [5] is used for the access door installation. Do the alternate procedure to re-use a serviceable knitted aluminum gasket [5] if a new part is not available.

B. References

Reference	Title
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-00-002-580-001	Fuel Tank Closure (P/B 201)
28-11-00-908-056	Replacement of the Molded Rubber Door Seal (P/B 801)
Fig. 28-11-02-990-802	Figure: Reserve and Main Tank Access Door Installation (P/B 401)
28-21-12-715-001	Wing Surge Tank Float Switch - Operational Test (P/B 501)
AIPC 28-11-02	Aircraft Illustrated Parts Catalog

C. Consumable Materials

Reference	Description	Specification
B00068	Alcohol - Denatured, Ethyl (Ethanol)	AMS 3002, MIL-E-51454 Type II
B00083	Solvent - VM&P Naphthas	TT-N-95 Type II, ASTM D-3735 Type III
D00504	Grease - Petrolatum	VV-P-236

Reference	Description	Specification
D50050	Grease - Multipurpose, Helicopter Oscillating Bearing Grease with Calcium Soap Thickeners - Aeroshell 14	MIL-G-25537
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A
G00251	Abrasive - Mat, Non-Woven, Non-Metallic	A-A-58054
G50237	Compound - Corrosion Inhibiting, Non-drying - Cor-Ban 27L	BMS3-38, NSN 6850-01-469-7645

D. Location Zones

Zone Area

555 SURGE TANK LEFT FRONT SPAR TO REAR SPAR

655 SURGE TANK RIGHT FRONT SPAR TO REAR SPAR

E. Prepare to Install the Access Door

NOTE: Additional information useful to this procedure may be found in this reference:
• AIPC 28-11-02

Effective on: UAL ALL

SUBTASK 28-11-03-210-005

(1) Examine the open tank for unwanted objects or material.

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SUBTASK 28-11-03-160-001

(2) Clean the open tank if it is necessary (TASK 28-11-00-002-580-001).

Effective on: UAL ALL

SUBTASK 28-11-03-434-008

(3) Remove the rubber cover from the access opening.

Effective on: UAL ALL

SUBTASK 28-11-03-114-009

(4) Clean all of these surfaces and the clamp ring [4]:

NOTE: Use a G00034 (cotton wiper) , moist with B00083 (solvent) .

(a) access door [1]

(b) Access door opening

(c) Sealing surfaces of the access door opening.

Effective on: UAL ALL

SUBTASK 28-11-03-211-002

(5) Make sure there is no corrosion on the access door [1], clamp ring, and lower wing skin electrical

faying surfaces.

F. Prepare the Molded Rubber Seal for Installation

Effective on: UAL ALL

SUBTASK 28-11-03-110-001

- (1) Do these steps to clean the molded rubber seal:
 - (a) Dampen a G00034 (cotton wiper) , with B00068 (alcohol) l.
 - (b) Lightly wipe the seals with the G00034 (cotton wiper) .

Effective on: UAL ALL

SUBTASK 28-11-03-211-001

- (2) Examine the molded rubber seal for these signs of deterioration:
 - (a) Cuts
 - (b) Delaminations from the access panel
 - (c) Chafing
 - (d) Flat spots
 - (e) Any condition which will not let the rubber seal form a fuel-tight seal.
 - (f) If there is a problem with the molded rubber seal, replace the seal (TASK 28-11-00-908-056) or the access door [1].

NOTE: You can remove the rubber seal on all impact-resistant access doors and all new replacement access doors (Fig. Figure 28-11-02-990-802).

Effective on: UAL ALL

SUBTASK 28-11-03-640-001

- (3) Apply a thin layer of D00504 (grease) , to the molded rubber seal.

NOTE: This will prevent damage to the rubber seal during subsequent access panel removal. It will also be easier to remove the access panel.

G. Prepare the New Knitted Aluminum Gasket for Installation (Recommended Procedure)

Effective on: UAL ALL

SUBTASK 28-11-03-110-003

- (1) Clean the clamp ring [4] with a G00034 (cotton wiper) , and G00251 (abrasive mat) .

NOTE: To remove dried corrosion inhibiting compound, use an G00251 (abrasive mat) .

Effective on: UAL ALL

SUBTASK 28-11-03-916-001

⇨ **28-AWL-16: CDCCL**

- (2) Make sure that both sides of the new knitted aluminum gasket [5] are filled with the correct grease or anti-corrosion compound.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801 , for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

(a) Use D50050 (Aeroshell 14 helicopter grease) , or G50237 (Cor-Ban 27L Compound)

NOTE: Do not mix D50050 (Aeroshell 14 helicopter grease) , and G50237 (Cor-Ban 27L Compound) .

Effective on: **UAL ALL**

SUBTASK 28-11-03-210-001

(3) Do a check of the manufacturing date (shelf-life) information on the replacement gasket container.

(a) If the knitted aluminum gasket [5] is more than five years old, do these steps:

1 Remove (De-grease) the old D50050 (Aeroshell 14 helicopter grease) , or G50237 (Cor-Ban 27L Compound) , from the knitted aluminum gasket [5].

⇒ **28-AWL-16: CDCCL**

2 Refill (Re-impregnate) both sides of the knitted aluminum gasket [5] with 0.5 - 1 ounce of new D50050 (Aeroshell 14 helicopter grease) , or G50237 (Cor-Ban 27L Compound) .

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801 , for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

NOTE: If you do not fill the aluminum mesh with the D50050 (Aeroshell 14 helicopter grease) , or G50237 (Cor-Ban 27L Compound) , the spaces with no grease or anti-corrosion compound can collect water. Do not apply too much grease or anti-corrosion compound or it can move out to the wing surface.

NOTE: Do not mix D50050 (Aeroshell 14 helicopter grease) , and G50237 (Cor-Ban 27L Compound) .

(b) If the knitted aluminum gasket [5] is less than five years old, it is not necessary to remove the old D50050 (Aeroshell 14 helicopter grease) , or G50237 (Cor-Ban 27L Compound) .

Effective on: **UAL ALL**

SUBTASK 28-11-03-420-001

(4) Put a new knitted aluminum gasket [5] carrier tray package face up on a flat surface.

Effective on: **UAL ALL**

SUBTASK 28-11-03-020-001

(5) Remove the paper cover from the carrier tray.

Effective on: **UAL ALL**

SUBTASK 28-11-03-420-002

(6) Since the hole locations are not symmetrical, carefully put the clamp ring [4] over the knitted aluminum gasket [5] (countersunk end of holes face up) so that the clamp ring [4] and gasket

holes align.

Effective on: UAL ALL

SUBTASK 28-11-03-420-003

- (7) Push the clamp ring [4] on the knitted aluminum gasket [5] until clamp ring [4] firmly touches the knitted aluminum gasket [5].

Effective on: UAL ALL

SUBTASK 28-11-03-420-004

- (8) Remove the clamp ring [4], knitted aluminum gasket [5], and release strip from the carrier tray as a unit.

Effective on: UAL ALL

SUBTASK 28-11-03-420-005

- (9) Put the unit, knitted aluminum gasket [5] side up, on a flat surface.

Effective on: UAL ALL

SUBTASK 28-11-03-420-006

- (10) Remove the release strip from the knitted aluminum gasket [5].

H. Prepare the Original Knitted Aluminum Gasket for Installation (Alternate Procedure)

Effective on: UAL ALL

SUBTASK 28-11-03-110-002

- (1) Clean the clamp ring [4] and knitted aluminum gasket [5] a G00034 (cotton wiper) , and B00083 (solvent) .

NOTE: To remove dried corrosion inhibiting compound, use G00251 (abrasive mat) .

Effective on: UAL ALL

SUBTASK 28-11-03-210-002

- (2) Do a check of the knitted aluminum gasket [5] for serviceability.

(a) A used knitted aluminum gasket [5] that meets the criteria that follows can be installed:

- 1 No fastener holes are torn
- 2 The knitted aluminum gasket [5] is not elongated or out of shape
- 3 The gasket rubber seals around the inner and outer periphery are a minimum of 0.015 in. (0.038 cm) thick.
- 4 No more than 10% of strands in all three layers are broken in any one area.

Effective on: UAL ALL

SUBTASK 28-11-03-390-002

⇨ **28-AWL-16: CDCCL**

- (3) Apply D50050 (Aeroshell 14 helicopter grease) or G50237 (Cor-Ban 27L Compound) , to both sides of the knitted knitted aluminum gasket [5].

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801 , for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

(a) Do not mix D50050 (Aeroshell 14 helicopter grease) , and G50237 (Cor-Ban 27L Compound) .

NOTE: The D50050 (Aeroshell 14 helicopter grease) , or G50237 (Cor-Ban 27L Compound) , must be the same on the clamp ring [4] and the access door [1] structure.

(b) Apply a 0.5 - 1 ounce layer of D50050 (Aeroshell 14 helicopter grease) , or G50237 (Cor-Ban 27L Compound) , equally to each side of the knitted aluminum gasket [5].

(c) Make sure D50050 (Aeroshell 14 helicopter grease) , or G50237 (Cor-Ban 27L Compound) , fully fills the mesh of the knitted aluminum gasket [5].

(d) Make sure there is a continuous layer of D50050 (Aeroshell 14 helicopter grease) , or G50237 (Cor-Ban 27L Compound) , on both sides of the knitted aluminum gasket [5].

I. Install the Access Door

Effective on: UAL ALL

SUBTASK 28-11-03-410-001

(1) Do the applicable steps in this task: Fuel Tank Closure, TASK 28-11-00-002-580-001 .

Effective on: UAL ALL

SUBTASK 28-11-03-210-003

⇨ **28-AWL-16: CDCCL**

(2) Make sure there is a phenolic strip around the outermost periphery of the access door that mates with the wing skin inside the tank.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801 , for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

Effective on: UAL ALL

SUBTASK 28-11-03-210-004

(3) Make sure there is no corrosion on the access door [1], clamp ring [4], and lower wing surface (skin) electrical faying surfaces.

Effective on: UAL ALL

SUBTASK 28-11-03-624-012

CAUTION: DO NOT APPLY TOO MUCH ANTI-CORROSION COMPOUND OR GREASE TO THE LOWER SURFACE OF THE WING. YOU CAN CAUSE DAMAGE TO THE ACCESS DOOR WITH HYDRAULIC PRESSURE FROM THE ANTI-CORROSION COMPOUND OR GREASE WHEN YOU INSTALL THE MOUNTING BOLTS.

(4) Apply 0.010 in. (0.254 mm) - 0.015 in. (0.381 mm) thick layer of D50050 (Aeroshell 14

helicopter grease) , or G50237 (Cor-Ban 27L Compound) , to the external area of the access opening (the area where the knitted aluminum gasket [5] contacts the wing skin).

- (a) Do not mix D50050 (Aeroshell 14 helicopter grease) , and G50237 (Cor-Ban 27L Compound) .

Effective on: **UAL ALL**

SUBTASK 28-11-03-424-013

- (5) Hold the access door [1] in the tank and set it on top of the opening.

Effective on: **UAL ALL**

SUBTASK 28-11-03-824-023

CAUTION: TO PREVENT FUEL SPILL, YOU MUST ALIGN THE LONG NUT RETAINER WITH THE NOTCH IN THE ACCESS DOOR OPENING.

- (6) Align the longer nut retainer on the access door [1] with the notch on the access door opening.

☞ **28-AWL-16: CDCCL**

Effective on: **UAL ALL**

SUBTASK 28-11-03-434-014

- (7) Put the knitted aluminum gasket [5] and the clamp ring [4] in position between the outer face of the access door [1] and the wing skin and install the 21 bolts [3].

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801 , for important information on Critical Design Configuration Control Limitations (CDCCLs).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

Effective on: **UAL ALL**

SUBTASK 28-11-03-434-018

- (8) Tighten the bolts [3] to 35 in-lb (4 N·m) - 40 in-lb (5 N·m).

NOTE: Start to tighten the mounting bolts from the centerline to the outboard direction and equally in both directions (Fig. Figure 402).

Effective on: **UAL ALL**

SUBTASK 28-11-03-864-021

- (9) Make sure the pressure relief valve [2] is closed.

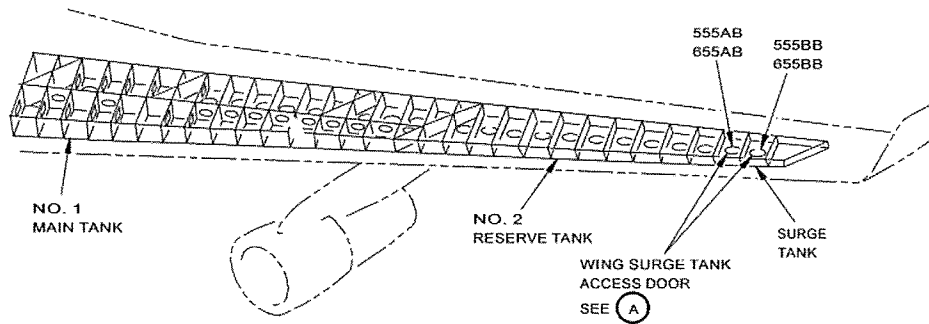
J. Access Door Installation Test

Effective on: **UAL ALL**

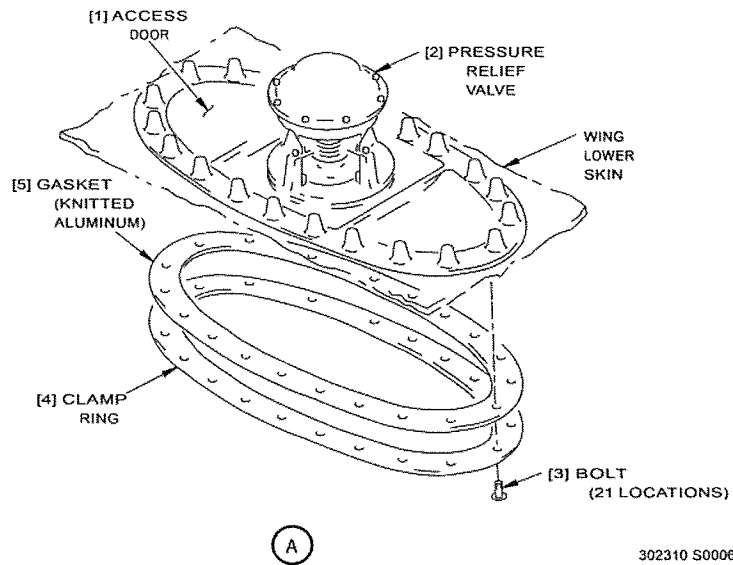
SUBTASK 28-11-03-794-020

- (1) Do a fuel leak check for the surge tank access door [1].

- (a) Do this task: Wing Surge Tank Float Switch - Operational Test, TASK 28-21-12-715-001 .



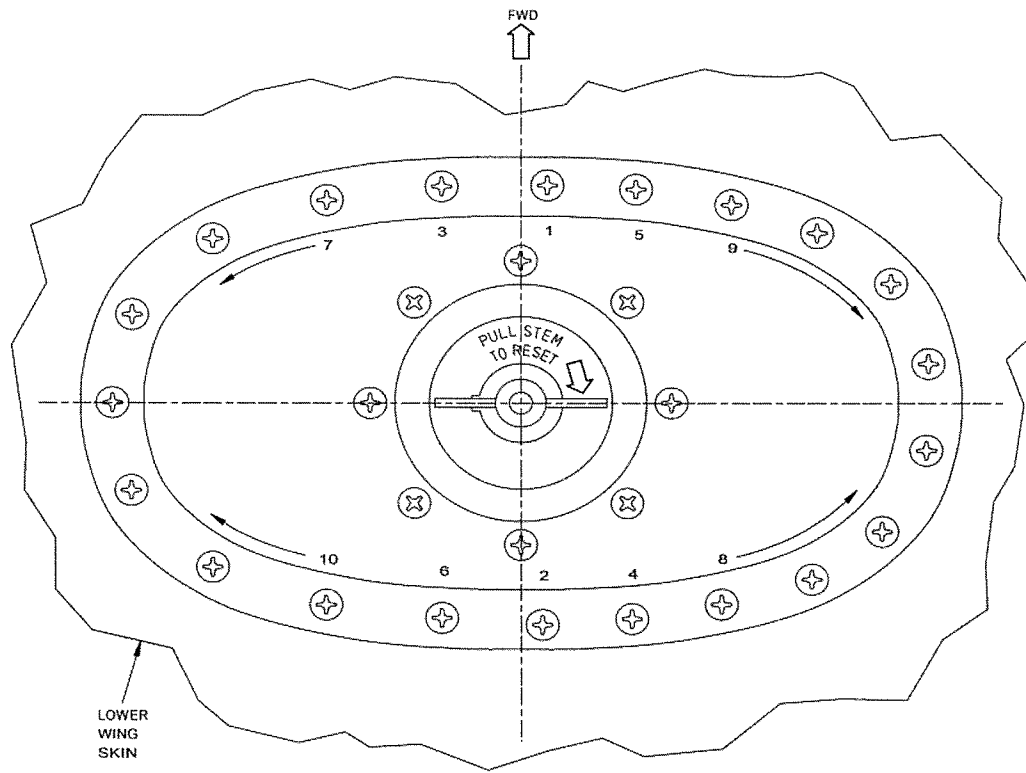
NOTE: THE 500 NUMBER SERIES IS USED FOR THE LEFT WING.
 THE 600 NUMBER SERIES IS USED FOR THE RIGHT WING.



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Figure 401. Wing Surge Tank Access Door Installation (Sheet 1) / 28-11-03-990-801
 Sheet Effectivity: UAL ALL

Sheet Rev Date:
 03/15/2012



NOTE: TORQUE THE MOUNT BOLTS IN THE SEQUENCE SHOWN BY THE NUMBERS. THIS WILL MAKE SURE FUEL DOES NOT LEAK AROUND THE ACCESS PANEL.

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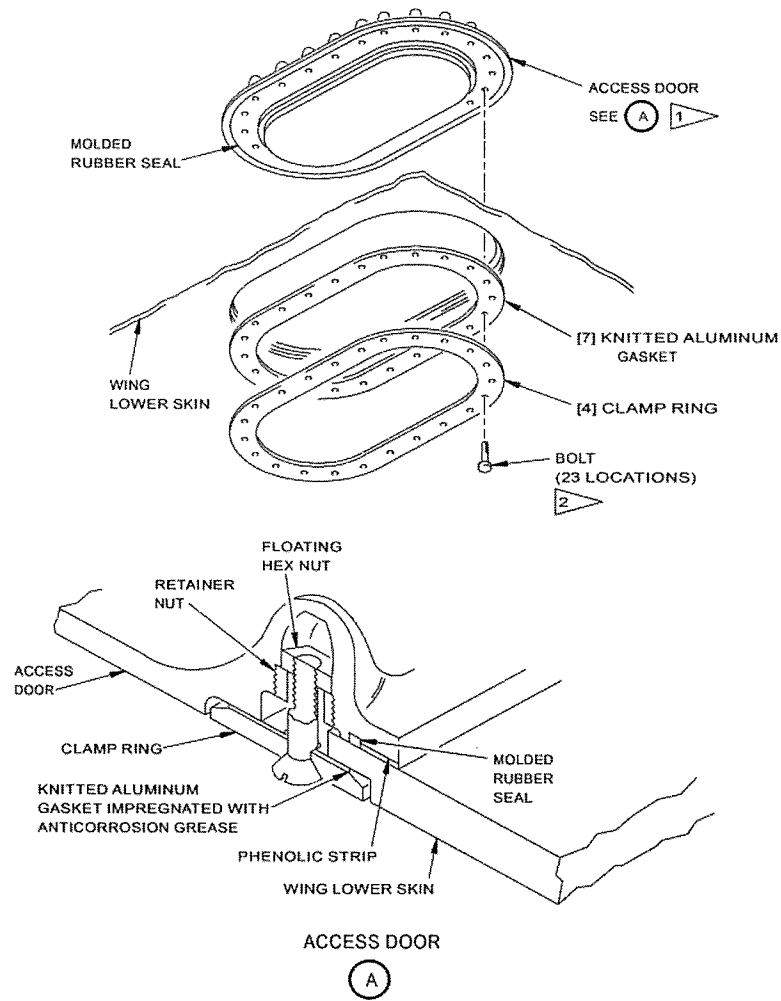
Figure 402. Wing Surge Tank Access Door Bolt Torque Pattern (Sheet 1) / 28-11-03-990-802
Sheet Effectivity: UAL ALL

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10/18/2004

TASK EFFECTIVITY (Filtering is on): 105

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03/15/2017

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NOTE: STANDARD DOOR SHOWN
 IMPACT-RESISTANT
 DOOR SIMILAR

- 1 [1] ACCESS DOOR
- 2 [2] IMPACT-RESISTANT ACCESS DOOR
- 3 [3] IMPACT-RESISTANT DOOR WITH MEASURING STICK
- 5 [5] BOLT FOR ACCESS DOOR
- 6 [6] BOLT FOR IMPACT-RESISTANT ACCESS DOOR

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Figure 402. Reserve and Main Tank Access Door Installation (Sheet 1) / 28-11-02-990-802
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Sheet Rev Date:
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TASK EFFECTIVITY (Filtering is on): 105

28-11-03-404-007
 03/15/2017

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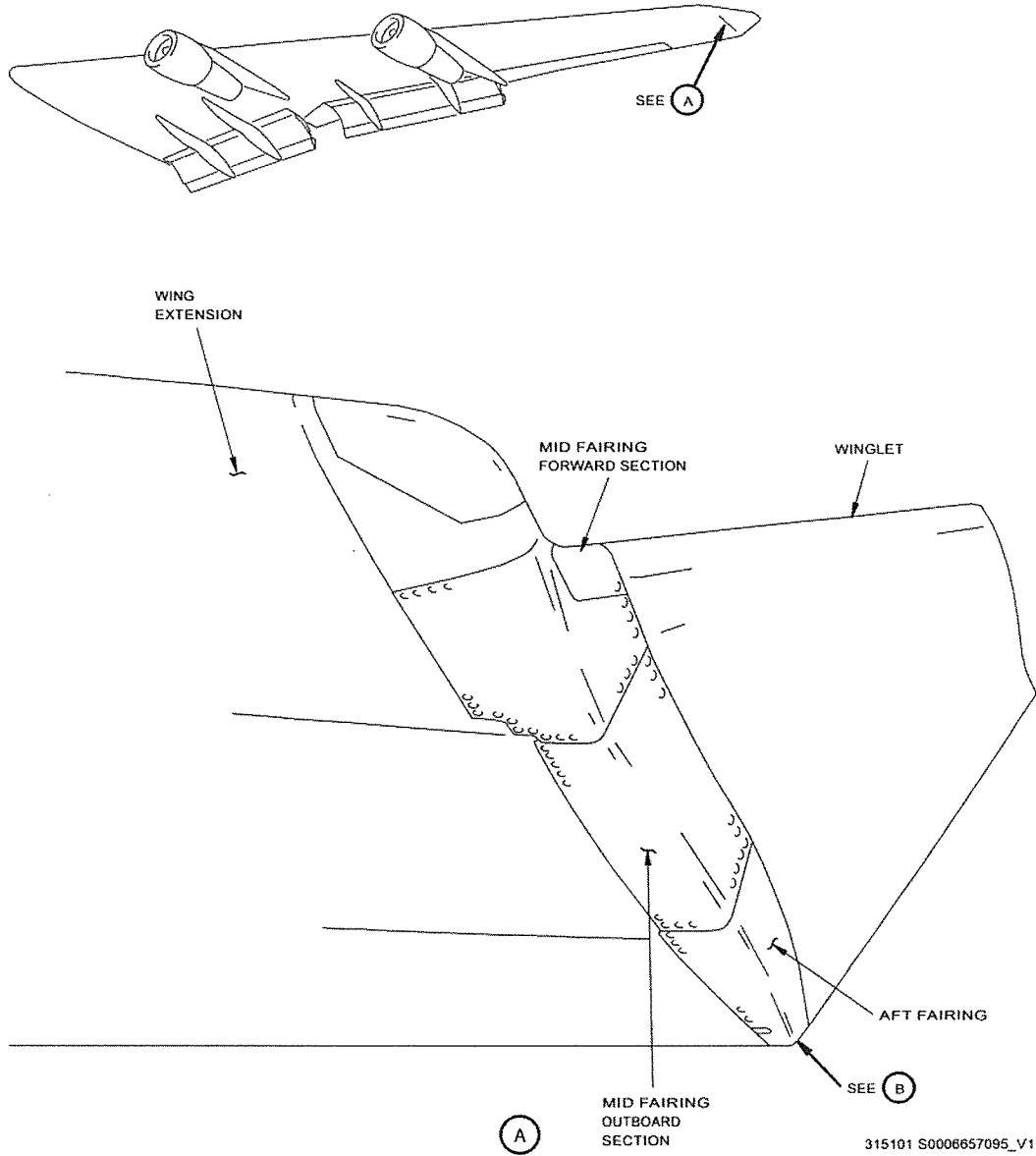


Figure 401. Winglet Installation (Sheet 1) / 57-28-01-990-803
Sheet Effectivity: UAL ALL

Sheet Rev Date: 10/18/2004

TASK EFFECTIVITY (Filtering is on): undefined

57-28-01-004-001
10/18/2004

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Task 28-11-00-912-515-001
Purging and Fuel Tank Entry Precautions
Effective on: UAL ALL

A. General

- (1) This task contains the precautions you must obey before you purge and enter the fuel tanks for maintenance.
This task contains these procedures:
 - (a) Purging and Fuel Tank Entry - Definitions
 - (b) Purging and Fuel Tank Entry - Airplane Precautions
 - (c) Purging and Fuel Tank Entry - Electrical Equipment Precautions
 - (d) Purging and Fuel Tank Entry - Equipment Precautions
 - (e) Purging and Fuel Tank Entry - Personnel Precautions
 - (f) Purging and Fuel Tank Entry - Adverse Weather Conditions Precautions
- (2) The next task, Purging and Fuel Tank Entry, contains the steps you must follow to purge and enter a fuel tank.

B. References

Reference	Title
12-11-01 P/B 301 Config 1 FUEL - SERVICING	
28-26-00 P/B 201	DEFUELING - MAINTENANCE PRACTICES
47-00-01-800-801	Nitrogen Generation System Precautions (P/B 201)

C. Tools/Equipment

Reference Description
STD-1129 Coveralls - Tyvek/Saranex 23-p (Approved Cotton Substitute), No Pockets
STD-7374 Gloves - Fuel and Solvent Resistant
STD-7380 Respirator - U.S. Bureau of Mines Approved (or Equivalent)

D. Consumable Materials

Reference Description	Specification
G00034 Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	BMS15-5 Class A

E. Purging and Fuel Tank Entry - Definitions

Effective on: UAL ALL

SUBTASK 28-11-00-912-373-001

- (1) Approved Persons:
 - (a) Persons who are trained and understand the dangers and procedures for fuel tank

entry and are responsible to make sure the airplane, equipment and the environment is safe for maintenance operations.

Effective on: UAL ALL

SUBTASK 28-11-00-912-374-001

(2) Approved Persons for Fuel Tank Entry:

- (a) Persons who are trained and understand the dangers and procedures for fuel tank entry.

Effective on: UAL ALL

SUBTASK 28-11-00-912-375-001

(3) Class I, Division 1, Hazardous Locations (or equivalent standard):

- (a) Locations where ignitable concentrations of flammable gases or vapors can exist under standard operational conditions.
- (b) Locations where ignitable concentrations of flammable gases or vapors may exist frequently because of repair or maintenance operations.
- (c) Locations where ignitable concentrations of flammable gases or vapors can exist because of leakage.
- (d) Locations where equipment problems or incorrect operation of equipment or processes can release ignitable concentrations of flammable gases or vapor, and can also cause failure of electrical equipment at the same time.

Effective on: UAL ALL

SUBTASK 28-11-00-912-376-001

(4) Class I, Division 2, Hazardous Locations (or equivalent standard):

- (a) Locations where flammable liquids or gases are handled, processed or used, but where the liquid, vapors, or gases will usually be in closed containers or closed systems. The containers or systems will not allow the release of liquid, gas or vapor in sufficient quantity to produce an ignitable fuel and air mixture unless the container or system fails or is damaged.

Effective on: UAL ALL

SUBTASK 28-11-00-912-377-001

(5) Explosion-Proof Equipment:

- (a) Equipment contained in a case that will not be damaged by an internal explosion caused by explosive vapors inside the unit.
- (b) Equipment which will not cause explosive vapors around the unit to ignite even when sparks, flashes or an explosion of vapor occurs inside the unit.
- (c) Equipment which operates at an external temperature which will not cause explosive vapors around the unit to ignite.
- (d) Equipment which has been approved by an independent test laboratory such as Underwriters Laboratories (UL) or Factory Mutual, for use in Class I Division 1 hazardous locations (or an equivalent standard).

Effective on: UAL ALL

SUBTASK 28-11-00-912-378-001

- (6) Fire-Safe Condition:
(a) 10% or less of the lower explosive limit (LEL).

Table 201.

<p style="text-align: center;">FIRE-SAFE CONDITION</p> <p>A FIRE-SAFE CONDITION OCCURS WHEN THE VAPOR CONCENTRATION IS LESS THAN 10 PERCENT OF THE LOWER EXPLOSIVE LIMIT (LEL).</p>
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Effective on: UAL ALL

SUBTASK 28-11-00-912-379-001

- (7) Health-Safe Condition:
(a) An atmosphere where oxygen content is a minimum of 19.5% to a maximum of 23.5% by volume at sea level, and the vapor concentrations are below the permissible exposure limits (PEL).

Effective on: UAL ALL POST SB 747-47-2006

WARNING: DO NOT BREATHE THE AIR FROM THE FUEL TANK UNTIL YOU MAKE IT SAFE. THE NITROGEN GENERATION SYSTEM DECREASES THE OXYGEN IN THE AIR. IF YOU BREATHE AIR THAT DOES NOT HAVE SUFFICIENT OXYGEN, DANGEROUS HEALTH CONDITIONS CAN QUICKLY OCCUR. DANGEROUS HEALTH CONDITIONS INCLUDE NAUSEA, UNCONSCIOUSNESS, AND CONVULSIONS. IF THE OXYGEN LEVEL OF THE AIR THAT YOU BREATHE IS VERY LOW, IT CAN KILL YOU.

- (b) The nitrogen generation system (NGS) decreases the oxygen content in the wing fuel tanks below the health-safe limits. Fresh air is composed of approximately 21% oxygen and 79% nitrogen. An atmosphere with less than 19.5% oxygen is an oxygen-deficient (low oxygen content) environment. You must fully ventilate the applicable fuel tank before you breathe the air in that fuel tank.
- (c) Because kerosene has a low vapor pressure, the concentrations are usually within the limits needed for a Health-Safe condition. Thus, you usually get very low (safe) values at usual temperatures (less than approximately 70°F). At tank temperatures of approximately 90°F, it is possible to get gas concentrations more than the Health-Safe value with kerosene.
- At tank temperatures of more than 90°F, it is possible to get gas concentrations more than the Fire-Safe value. It is also possible that a different type of fuel was kept in a tank that usually contains kerosene. If the purging procedure was not done, this causes high concentration values when you use the combustible gas indicator or air monitor with Photoionization Detector (PID).

WARNING: THERE IS NO HEALTH-SAFE LIMIT FOR JP-4/JET-B FUEL WHICH CAN CONTAIN BENZENE. IT IS POSSIBLE THAT BENZENE CAUSES CANCER.

- (d) Before you go into a fuel tank that contained JP-4 or JET B, wear a full-mask respirator with an attached breathing-air supply.

Table 202. HEALTH-SAFE CONDITIONS

HEALTH-SAFE CONDITION

A HEALTH-SAFE CONDITION OCCURS WHEN THE OXYGEN CONTENT IS A MINIMUM OF 19.5% TO A MAXIMUM OF 23.5% BY VOLUME AT SEA LEVEL, AND THE VAPOR CONCENTRATIONS ARE BELOW THESE PERMISSIBLE EXPOSURE LIMITS:

Fuel	Permissible Exposure Level Total Hydrocarbons TWA *[1] (ppm)	Lower Explosive Level (percent)
Aviation Gasoline	300	1.0
Jet A		
Jet A-1	160	0.7
JP-5		
JP-8		
*[1] TWA - Time Weighted Average		

Effective on: **UAL ALL**

SUBTASK 28-11-00-912-380-001

(8) Lower Explosive Limits (LEL):

- (a) The minimum concentration of flammable vapors in air below which propagation of flame does not occur on contact with a source of ignition.

Effective on: **UAL ALL**

SUBTASK 28-11-00-912-381-001

(9) Permissible Exposure Level (PEL):

- (a) The time weighted average airborne concentrations of substances at which it is believed that nearly all workers may be repeatedly exposed 8 hours a day, 40 hours a week, without adverse health effects.

NOTE: The PEL limits used in this procedure are the PEL limits used by Boeing personnel during fuel tank entry. If the local PEL limits are more restrictive than the ones given in this procedure, use the equivalent local PEL limits.

Effective on: **UAL ALL**

SUBTASK 28-11-00-912-382-001

(10) Purging or Purged (for Fuel Tank Entry):

- (a) Purging an aircraft fuel tank is defined as the removal of any fuel or fuel vapor that remains after the fuel tanks are sumped. A purged fuel tank contains a nonflammable atmosphere that can be maintained by mechanical ventilation.

Effective on: **UAL ALL POST SB 747-47-2006**

(b) AIRPLANES WITH A NITROGEN GENERATION SYSTEM:

Purging an aircraft fuel tank is also defined as the removal of the low oxygen content air caused by the nitrogen generation system. The low oxygen content air is removed by mechanical ventilation.

Effective on: UAL ALL

SUBTASK 28-11-00-912-383-001

(11) Unwanted Sources of Ignition:

(a) Unwanted sources of ignition include:

- 1 Open flames (matches, cigarette lighters etc.)
- 2 Electrical equipment (lights, motors, sparks from engine exhaust etc.)
- 3 Frictional hot spots
- 4 Electromagnetic energy (radio transmissions or radars)
- 5 Static electricity
- 6 Lightning

F. Purging and Fuel Tank Entry - Airplane Precautions

Effective on: UAL ALL

SUBTASK 28-11-00-912-384-001

- (1) Do the maintenance on the fuel tanks in areas which allow the free movement of air, fire fighting equipment and other emergency equipment.

Effective on: UAL ALL

SUBTASK 28-11-00-912-385-001

- (2) A rope barrier must be placed around the airplane, to identify the Class I, Division 1 hazardous locations. See Fig. Figure 201 for the distance requirements. The rope barrier must include signs or placards which state "DANGER - OPEN FUEL TANKS."

Effective on: UAL ALL

SUBTASK 28-11-00-912-386-001

- (3) The airplane must be correctly grounded to an approved ground before you defuel the airplane or open any fuel tanks.

Effective on: UAL ALL

SUBTASK 28-11-00-912-387-001

WARNING: DO NOT USE AIRPLANE ELECTRICAL POWER WHEN FUEL TANK ACCESS DOORS ARE OPEN. A FIRE OR EXPLOSION CAN OCCUR IF FUEL VAPOR IS IGNITED BY SPARK(S) FROM ELECTRICAL EQUIPMENT. A FIRE OR EXPLOSION CAN CAUSE SERIOUS INJURY OR DEATH TO PERSONS AND CAN CAUSE DAMAGE TO EQUIPMENT.

- (4) Before the fuel tank access doors are opened, all of the electrical power to and from the airplane must be removed. Placards which state that power should not be restored on the airplane until the fuel tank(s) are closed should be attached to applicable locations.

Effective on: UAL ALL

SUBTASK 28-11-00-912-388-001

- (5) The main, and APU batteries must be disconnected. Placards which state not to connect the batteries until the fuel tanks are closed should be attached to all disconnected battery locations.

Effective on: UAL ALL

SUBTASK 28-11-00-912-389-001

- (6) All safety, support and maintenance equipment must be in place before you open the fuel tank access doors. Movement of equipment can cause sparks which can cause fuel vapors to ignite.

NOTE: Minimal movement of equipment is recommended when the Low Explosive Limit (LEL) is above 10%. When the LEL is below 10%, all equipment can be moved safely.

Effective on: UAL ALL

SUBTASK 28-11-00-912-390-001

- (7) No painting operations are permitted on airplanes with open fuel tanks.

G. Purging and Fuel Tank Entry - Electrical Equipment Precautions

Effective on: UAL ALL

SUBTASK 28-11-00-912-391-001

WARNING: FOLLOW THE SUBSEQUENT RADIO AND RADAR LIMITS. FAILURE TO FOLLOW THE SUBSEQUENT RADIO AND RADAR LIMITS CAN CAUSE A FIRE OR EXPLOSION. A FIRE OR EXPLOSION CAN CAUSE SERIOUS INJURY OR DEATH TO PERSONS AND CAN CAUSE DAMAGE TO EQUIPMENT.

- (1) No radio or radar equipment should operate nearer to an open fuel tank than the distances specified in Table 203 .

Table 203. SEPARATION DISTANCE

POWER (EIRP ^[1]) OF EQUIPMENT TRANSMITTING RADAR OR RADIO	SEPARATION DISTANCE (FEET)	
	MAINTENANCE WITH OPEN FUEL TANKS PURGED	MAINTENANCE WITH OPEN FUEL TANKS NOT PURGED (or during purging)
More than 100 watts	200	200
25 to 100 watts	50	50
Less than 25 watts ^[2]	10	50
Radiating ground approach control or pattern surveillance radar	300	300
Open flame, heat sources, lighted smoking material, and any other potential ignition sources	50	50

^[1] EIRP is Effective Isotropic Radiated Power in watts

^[2] This category includes weather radar, mobile phones, pagers, two-way radios, etc. There are low power (explosion proof) radios that are approved for use in Class I division 1 hazardous locations that can be used safely in the vicinity of open, not purged, fuel cells and other areas containing fuel vapors.

Effective on: **UAL ALL**

SUBTASK 28-11-00-912-392-001

- (2) Fuel in the beam of operational high-powered radar which can produce a peak power density that exceeds 5 watts per square centimeter is hazardous. Electromagnetic energy of this intensity can ignite fuel vapors and cause a fire.

Effective on: **UAL ALL**

SUBTASK 28-11-00-912-545-001

WARNING: DURING OPEN FUEL TANK OPERATIONS, THE ENTIRE AREA AROUND THE AIRPLANE AND ANY ADJACENT AREAS THAT COULD COLLECT FUEL VAPORS ARE CLASSIFIED AS CLASS I DIVISION 1 HAZARDOUS LOCATIONS. THE HAZARDOUS LOCATION CLASSIFICATION APPLIES TO AIRPLANES BEFORE AND AFTER A FUEL TANK IS PURGED. THE CLASS I DIVISION 1 HAZARDOUS LOCATION EXTENDS FROM THE GROUND UP TO 18 INCHES ABOVE THE GROUND. ONLY USE ELECTRICAL EQUIPMENT WHICH IS APPROVED FOR THE APPLICABLE HAZARDOUS LOCATION.

- (3) Electrical equipment which is energized or operated within 50 feet horizontally and 18 inches or less above the ground of an open fuel tank and as shown in Fig. Figure 201 , must be rated explosion-proof for Class I, Division 1 hazardous locations. This includes energized plugs and receptacles. For radio and radar equipment (transmitting equipment), see Table 203 for separation distance requirements.

Effective on: **UAL ALL**

SUBTASK 28-11-00-912-394-001

- (4) Fig. Figure 201 shows the different classification of hazardous locations around airplanes with open fuel tanks.

Effective on: **UAL ALL**

SUBTASK 28-11-00-912-395-001

- (5) Only use approved explosion-proof flashlight that operate correctly in the fuel tanks.

NOTE: The use of explosion-proof lights in or near an open fuel tank is permitted only by approved persons. The air in the fuel tank must be 10 percent or less of the lower explosive limit (LEL).

Effective on: **UAL ALL**

SUBTASK 28-11-00-912-396-001

- (6) Only use explosion-proof flood extension lights and power cords which are approved to supply external light.

Effective on: **UAL ALL**

SUBTASK 28-11-00-912-397-001

- (7) Do not connect or disconnect electrical equipment from energized outlets (within 100 feet of an open fuel tank) unless the equipment is fitted with explosion-proof plugs.

Effective on: **UAL ALL**

SUBTASK 28-11-00-912-398-001

- (8) Do not use electrical test equipment which can cause sparks in a fuel tank.

H. Purging and Fuel Tank Entry - Equipment Precautions

Effective on: UAL ALL

SUBTASK 28-11-00-912-400-001

- (1) All metal work platforms or stands used for entry into the fuel tanks or located within a 50-foot radius of an open fuel tank (before and after the fuel tank purging) must be bonded to the airplane and grounded to an approved earth ground.

Effective on: UAL ALL

SUBTASK 28-11-00-912-401-001

- (2) Before you use ventilation equipment make sure the blower or venturi is connected to the airplane ground. The ventilation blower or the venturi must be explosion-proof.

Effective on: UAL ALL

SUBTASK 28-11-00-912-402-001

- (3) Air ducts must be bonded to form a continuous electrical conductor, and grounded in at least one place to a static electrical ground.

Effective on: UAL ALL

SUBTASK 28-11-00-912-403-001

- (4) If you use the ventilation equipment to exhaust fuel vapors from the tank, static build-up on or in the air ducts can reach a level where a spark can ignite the vapors and an explosion can occur. It is strongly recommended that the air ducts be coated inside and out with a conductive coating. Each section of the air duct must be correctly bonded to each other. Air ducts made from vinyl fabric are not recommended because vinyl is an insulator of static charges. If the air duct uses a metal helical wire to create a non-collapsible duct, make sure the wire is permanently attached to a metal or conductive plastic connection on each end of the duct section.

Effective on: UAL ALL

SUBTASK 28-11-00-912-404-001

- (5) Equipment used to ventilate the fuel tanks or provide warm or cool air must not be turned off with the air duct in the fuel tank. The fuel vapor from the fuel tank can enter the air duct and cause an explosion at the motor. Make sure the blower is on before you put the air duct in the fuel tank. Make sure the blower remains on until the air duct is removed from the fuel tank.

Effective on: UAL ALL

SUBTASK 28-11-00-912-405-001

- (6) When you remove an air duct from the fuel tank or disconnect the air duct at the blower, turn the duct 180 degrees away from the purging area. This will stop the flow of fuel vapor into the air duct line.

Effective on: UAL ALL

SUBTASK 28-11-00-912-406-001

- (7) During fuel tank maintenance, make sure there is continuous mechanical ventilation. The fresh

air flow from the ventilation equipment must maintain the oxygen levels between 19.5% and 23.5% by volume and the fuel vapor levels below 10% LEL (fire safe limit).

Effective on: UAL ALL

SUBTASK 28-11-00-912-407-001

- (8) Use a combustible gas indicator or an air monitor with Photoionization Detector (PID) to monitor the environment inside the fuel tank. The combustible gas indicator or air monitor with PID must be designed for Class I, Division 1 hazardous locations and calibrated for the correct type of jet fuel. The combustible gas indicator or air monitor with PID must be securely attached to a ladder or stand at the fuel tank entry location. As an alternate procedure, you can take an additional combustible gas indicator or air monitor with PID into the fuel tank to monitor the environment where you will do the maintenance.

Effective on: UAL ALL

SUBTASK 28-11-00-912-408-001

- (9) Obey these precautions for equipment and materials used to do maintenance in the fuel tanks:

- (a) Always use a check list to record all equipment, tooling and material that you bring into the fuel tank. Use the check list to make sure all maintenance items are removed before you close the fuel tank.
- (b) Do not use steel wool in the fuel tank. A piece of wire from steel wool is a potential ignition source.
- (c) Only use approved non-static plastic containers with rounded corners to hold tools and supplies.
- (d) Keep all sharp edged tools in the container at all times when not in use. Sharp edged tools can cause damage to equipment and sealant.
- (e) Only use G00034 (cotton wiper) , materials in open fuel tanks. When you wipe up fuel in the fuel tank, use a clean G00034 (cotton wiper) .

NOTE: Do not use paper towels or other paper products.

- (f) Solvents, sealants, or other materials used in the fuel tank can be a health and fire hazard. Use the correct protective equipment for the solvent or material that is used. Protective equipment includes: respirators, eye protection, protective clothes, gloves etc.
- (g) Keep the quantity of solvents that you use to a minimum. Only bring enough solvent in the tank to complete the maintenance.
Apply the solvent to a clean G00034 (cotton wiper) , not the airplane structure or sealant. After you finish with the G00034 (cotton wiper) , put the wiper in a polyethylene bag or remove the wiper from the airplane. This will keep the solvent vapor to a minimum.
- (h) Powered tools must be air driven.

WARNING: ONLY USE SHOP AIR OR BOTTLED AIR AS THE SOURCE OF GAS TO POWER AIR DRIVEN EQUIPMENT. GASES OTHER THAN SHOP OR BOTTLED AIR CAN REMOVE OXYGEN FROM A CLOSED AREA. IF YOU GO INTO A CLOSED AREA WITHOUT ENOUGH OXYGEN , YOU CAN BECOME UNCONSCIOUS OR IT CAN KILL YOU.

- (i) Only use shop air or bottled air as a gas source for air-driven tools. Do not use nitrogen, oxygen, carbon dioxide (CO₂) or any other non-air source of gas.

I. Purging and Fuel Tank Entry - Personnel Precautions

(Fig. Figure 202)

Effective on: UAL ALL

SUBTASK 28-11-00-912-409-001

- (1) Make sure the persons who will go into fuel tanks are approved persons for fuel tank entry.

Effective on: UAL ALL

SUBTASK 28-11-00-912-410-001

- (2) Make sure observers who will watch persons in the fuel tank(s) are approved as fuel tank entry observers.

Effective on: UAL ALL

SUBTASK 28-11-00-912-411-001

- (3) The fuel vapors in and from the fuel tank are explosive and hazardous to your health. The fuel tanks must be in a fire-safe condition when an initial fuel tank entry is made. You must wear an approved respirator with a breathing-air supply when you go into a fuel tank that is in a fire-safe condition. It is necessary to have a good flow of air through the fuel tank to get a fire-safe condition. The air must flow continuously during the fuel tank entry procedure.

Effective on: UAL ALL

SUBTASK 28-11-00-912-412-001

- (4) The fuel tank must be in a health-safe condition before you can go into the fuel tank without a breathing-air supply. When the fuel tank is in a health-safe condition, at a minimum, it is recommended that a half-mask respirator with an organic vapor filter be used. It is necessary to have a good flow of air through the fuel tank to get a health-safe condition. The air must flow continuously during the fuel tank entry procedure.

Effective on: UAL ALL POST SB 747-47-2006

SUBTASK 28-11-00-910-001

WARNING: DO NOT BREATHE THE AIR FROM THE FUEL TANK UNTIL YOU MAKE IT SAFE. THE NITROGEN GENERATION SYSTEM DECREASES THE OXYGEN IN THE AIR. IF YOU BREATHE AIR THAT DOES NOT HAVE SUFFICIENT OXYGEN, DANGEROUS HEALTH CONDITIONS CAN QUICKLY OCCUR. DANGEROUS HEALTH CONDITIONS INCLUDE NAUSEA, UNCONSCIOUSNESS, AND CONVULSIONS. IF THE OXYGEN LEVEL OF THE AIR THAT YOU BREATHE IS VERY LOW, IT CAN KILL YOU.

- (5) AIRPLANES WITH A NITROGEN GENERATION SYSTEM;
The nitrogen generation system directly decreases the oxygen content of the center tank and indirectly decreases the oxygen content of all the wing tanks. Obey these precautions before you breathe the air inside a fuel tank:
 - (a) The nitrogen generation system uses nitrogen-enriched air (NEA) to decrease the flammability of the center wing tank and to a lesser degree, the other wing tanks. NEA is hazardous in a confined space. NEA increases the nitrogen content and decreases the oxygen. If you breathe air without enough oxygen, it can have dangerous and immediate effects.
 - (b) The table below gives the physiological effects of a low oxygen content environment.

Table 204. Physiological Effects of a Low Oxygen Environment

	Sea Level Oxygen Content %	7000 FT Oxygen Content %
Decrease in night vision Increase in breathing volume Increase in heartbeat rate (pulse)	17 -19%	19.5 - 21%
Increase in breathing and pulse rates Decrease in muscular coordination	13 -16%	16 - 19%
Emotional upset Unusual fatigue Trouble breathing	11 -12%	13 - 15%
Nausea, vomiting Unable to do tasks Loss of consciousness	7 - 10%	9 - 12%
Intermittent breathing Unable to move Convulsions Death in minutes	0 - 6%	0 - 8%

- (c) If a person breathes air with a very low oxygen content (4 to 6%) it can cause the person to become unconscious in 40 seconds. The person must be rescued and given oxygen immediately. Even after the person is given oxygen, life-threatening health problems can still occur.
- (d) The low oxygen content air will stay in the fuel tank(s) even when the nitrogen generation system is not active. The nitrogen-enriched air is designed to flow into the center wing tank only. However, NEA is distributed to all of the wing tanks through the vent channels. The flow path of the NEA is from vent channels in the center wing tank to the surge tanks. From the surge tanks the NEA is distributed through vent channels to all of the wing fuel tanks. Also NEA from the surge tanks is pulled into the main and reserve tanks. An oxygen level below health-safe limits can exist in each of the fuel tanks. You must always fully ventilate the fuel tanks before you do a fuel tank entry. Mechanical ventilation will remove the NEA from the fuel tank(s) and supply air with an oxygen content within health-safe limits.
- (e) A person that breathes air with a low oxygen content cannot sense that the oxygen level is too low. The victim can become unconscious before the person is aware of the low oxygen content air. You must use an oxygen sensor to detect a hazardous low oxygen environment. Do not go into a fuel tank if you hear the aural alarm for the oxygen sensor.
- (f) Before you open the wing-to-body fairing for access to the center wing tank, obey the precautions in this task: Nitrogen Generation System Precautions, TASK 47-00-01-800-801 .
- (g) Fully ventilate the applicable fuel tank before you do a fuel tank entry.
- (h) Before you go into a fuel tank open the nitrogen generation system circuit breaker. You must also install the manual lock bolt into the NGS shutoff valve in the closed

position.

- (i) Continuously monitor the oxygen sensor (aural alarm and % oxygen) on the combustible gas indicator or air monitor with Photoionization Detector (PID). Make sure the oxygen level in the fuel tank stays between 19.5% and 23.5% by volume. Make sure there is an oxygen sensor at the fuel tank entry location for the observer, and one oxygen sensor at the location of the person(s) inside the fuel tank. Get out of the fuel tank immediately if the ventilation equipment stops or you hear the oxygen sensor alarm.
- (j) An organic vapor filter respirator will not help you breathe in a low oxygen environment.
- (k) If you are the observer and the person in the tank does not respond, do not enter the tank before additional help is available. Make sure that medical help is alerted. Do not try to rescue a person in the fuel tank without a breathing-air supply respirator and a lifeline.

Effective on: UAL ALL

SUBTASK 28-11-00-912-413-001

- (6) Hydrocarbon fuels that touch the skin can remove protective oils. Without protective oils, the skin can become dry, chapped, cracked, or possibly become infected. If a person breathes too much fuel vapor, the person can become dizzy, get a headache or lose his or her coordination. Jet fuel is composed of many different kinds of hydrocarbon molecules. Exposure to some of these molecules for a long time is known to cause cancer.

Effective on: UAL ALL

SUBTASK 28-11-00-912-414-001

- (7) Vapors from fuel or other materials (solvents etc.) used for fuel tank maintenance can replace oxygen from a confined area such as a fuel tank or dry bay. If a person goes into a confined area that contains fuel vapor (or other vapors) without an air supply, the person may not get enough oxygen. This may cause unconsciousness or death. Make sure the environment is continuously monitored with an approved combustible gas indicator or air monitor with Photoionization Detector (PID).

Effective on: UAL ALL

SUBTASK 28-11-00-912-415-001

- (8) No one is allowed to go into or remain in a fuel tank if:
 - (a) The flammable vapor concentration is more than 10% of the lower explosive limit.
 - (b) The oxygen content of the fuel tank is below 19.5% or above 23.5%
 - (c) The air ventilation system fails.
 - (d) A strong fuel odor is noticed.
 - (e) A person feels any physical problems, such as trouble breathing, dizziness, irritation, confusion, light-headedness, fullness in the head, ringing sensation on the ears, nausea, headache, difficulty in breathing, sensation of apparent suffocation, immobility, unusual behavior, failure to respond to communication, or other signs of illness.
 - (f) There is an observed or reported hazard which may reduce the level of safety.

Effective on: **UAL ALL**

SUBTASK 28-11-00-912-416-001

- (9) Persons who work in or near an open fuel tank must not:
- (a) Slide metal objects, such as tool boxes, ladders, etc.
 - (b) Carry matches or pocket warmers
 - (c) Wear shoes with metal clips or exposed nails
 - (d) Wear or use battery-operated devices such as hearing aids, electrical pacemakers or watches, pocket radios, cellular phones or paging equipment unless it is explosion-proof and permitted by approved persons.
 - (e) Use the tank wiring harnesses as handholds.

Effective on: **UAL ALL**

SUBTASK 28-11-00-912-417-001

- (10) Persons who work in an open fuel tank must wear approved fuel tank protective clothing. Protective clothing includes:
- (a) Cotton coveralls with non-sparking zippers or buttons. Do not wear wool, silk, nylon or other synthetic clothing.

WARNING: MAKE SURE THAT THE TEMPERATURE IN THE FUEL TANK DOES NOT GET TOO HOT. SARANEX 23P COVERALLS WILL KEEP BODY HEAT IN. IF THE FUEL TANK TEMPERATURE GETS TOO HOT, PERSONNEL CAN BECOME TOO HOT.

- (b) Saranex coveralls are also approved for use in fuel tanks.
- (c) Clean cotton boot socks or fuel cell boots.
NOTE: It is recommended that boot socks be worn over fuel cell boots when you stand in a fuel tank. This will reduce the chance that you will slip and fall down.
- (d) Clean cotton head cover (doctor-type hats) with tie strings or a lint free shower-type cap with an attached elastic headband.
- (e) Cotton or rubber gloves.

Effective on: **UAL ALL**

SUBTASK 28-11-00-100-001

- (11) If a fuel tank entry is necessary before two flights after a biocide treatment, do one of these:
- (a) Flush the fuel tank with untreated fuel a minimum of two times (PAGEBLOCK 12-11-01/301 Config 1 , PAGEBLOCK 28-26-00/201).
NOTE: After a biocide treatment, the concentration of biocide decreases to a lower level after the fuel tank is refueled two times.
 - (b) Or, move the treated fuel to a different fuel tank or defuel the applicable fuel tank (PAGEBLOCK 28-26-00/201).

WARNING: DO NOT GET THIS MATERIAL IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THIS MATERIAL. PUT ON A RESPIRATOR, EYE PROTECTION (GOGGLES, OR OTHER APPROVED PROTECTION), AND GLOVES BEFORE YOU USE THIS

MATERIAL. MAKE SURE THAT THERE IS SUFFICIENT AIRFLOW. KEEP THIS MATERIAL AWAY FROM SPARKS, FLAME, AND HEAT. THIS MATERIAL CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

- 1 Before fuel tank entry, put on this specific equipment: a full face STD-7380 respirator , STD-1129 coverall (approved cotton substitute) , and STD-7374 gloves .

NOTE: The biocide manufacturers Material Safety Data Sheet (MSDS) has information regarding the handling of the product. However, the MSDS is intended for the product before it is diluted in fuel. Once diluted, the concentration is greatly reduced.

Effective on: **UAL ALL**

SUBTASK 28-11-00-912-418-001

- (12) Persons who work in or near an open fuel tank must not remove or change clothes near an open fuel tank. You can create sufficient static electricity in the clothes to cause fuel vapor to ignite.

Effective on: **UAL ALL**

SUBTASK 28-11-00-912-419-001

- (13) Persons who work in fuel tanks must wear the correct respiratory protection for the fuel tank conditions.
 - (a) Persons that use respiratory protection must be trained and know the proper use and limitations of respiratory protection.
 - (b) An approved respirator with an attached breathing-air supply is necessary for each person who goes into a fuel tank that is in a fire-safe condition.
 - (c) An approved half-mask respirator with a organic vapor filter, at a minimum, is recommended for each person who goes into a fuel tank that is in a health-safe condition.
 - (d) Airline Hoods (or equivalent) should be worn by persons if the respirator does not fit correctly due to facial hair or other facial configurations.

Effective on: **UAL ALL**

SUBTASK 28-11-00-912-420-001

- (14) At each fuel tank entry location there must be an observer who is outside of the fuel tank. The observer's responsibility is to make sure that person(s) in the fuel tank are safe. The observer must remain outside of the fuel tank in visual contact with the access opening. The observer must be able to communicate with the person(s) inside the fuel tank at all times.
 - (a) There are two ways the observer and the person(s) in the fuel tank can communicate:
 - 1 A confined space communication system designed for aircraft fuel tank use.
 - 2 The observer and the person who will go into the tank can agree on a communication plan such as tugs on the safety rope at a set time interval.

Effective on: **UAL ALL**

SUBTASK 28-11-00-912-421-001

- (15) The observer must also keep a report that shows who is in the fuel tank and when that person comes out. A sign attached to the ladder or support equipment which states, "CAUTION - PERSONNEL INSIDE - MOVE NO EQUIPMENT", must be placed at the location of a fuel tank entry. When the personnel in the tank come out, the observer should remove the sign or place it where it does not show.

Effective on: UAL ALL

SUBTASK 28-11-00-912-422-001

- (16) Many local, state and national regulatory agencies require a confined space entry permit to be signed and approved before a person goes into a fuel tank. A pre-entry checklist is often required by the confined space entry permit. It is recommended that a pre-entry checklist be used before you go into a fuel tank.
Fig. Figure 208 is an example of a pre-entry checklist used at Boeing facilities.

J. Purging and Fuel Tank Entry - Adverse Weather Conditions

Effective on: UAL ALL

SUBTASK 28-11-00-912-423-001

- (1) When thunderstorms or lightning are within a 10 mile radius of the immediate area, open fuel tank maintenance procedures should stop.
Persons inside of the fuel tanks should get out. Air ducts inside the fuel tanks should be removed and the power for all support equipment should be switched off. The fuel tank access openings must be closed.

Effective on: UAL ALL

SUBTASK 28-11-00-912-424-001

- (2) Strong wind conditions can cause a build-up of static electricity. Large charges of static electricity can develop on support equipment while parked as a result of the movement of dust particles and air currents during strong wind conditions. Strong wind conditions can also cause the unwanted movement of items or equipment which can hit the airplane or injure persons. Wind gusts can damage the airplane structure. Fueling, defueling or open fuel tank maintenance procedures should stop if strong wind conditions are present.

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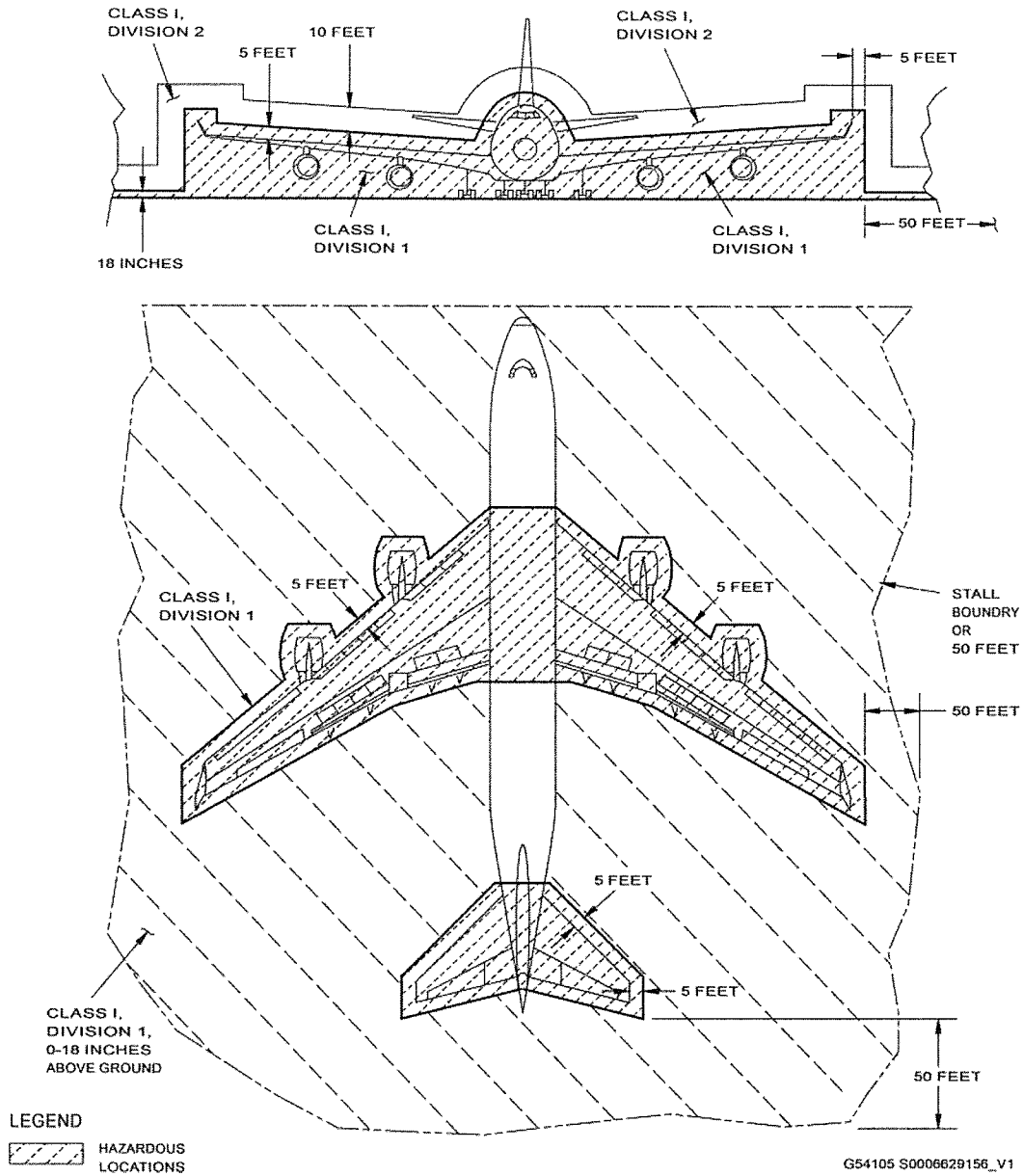


Figure 201. Hazardous Locations - Open Fuel Tank(s) (Sheet 1) / 28-11-00-990-818
 Sheet Effectivity: UAL ALL

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28-11-00-912-515-001
 03/15/2015

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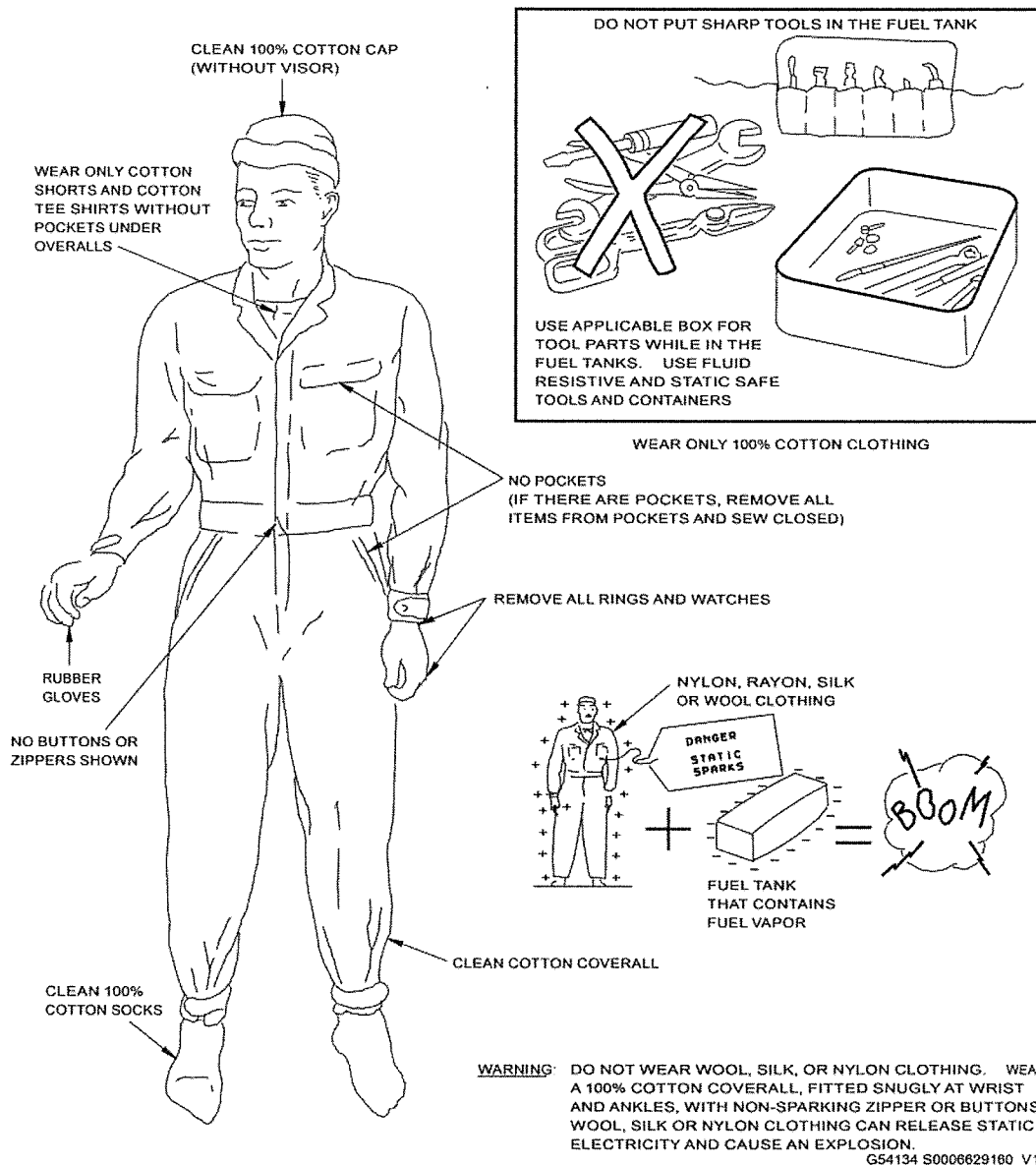


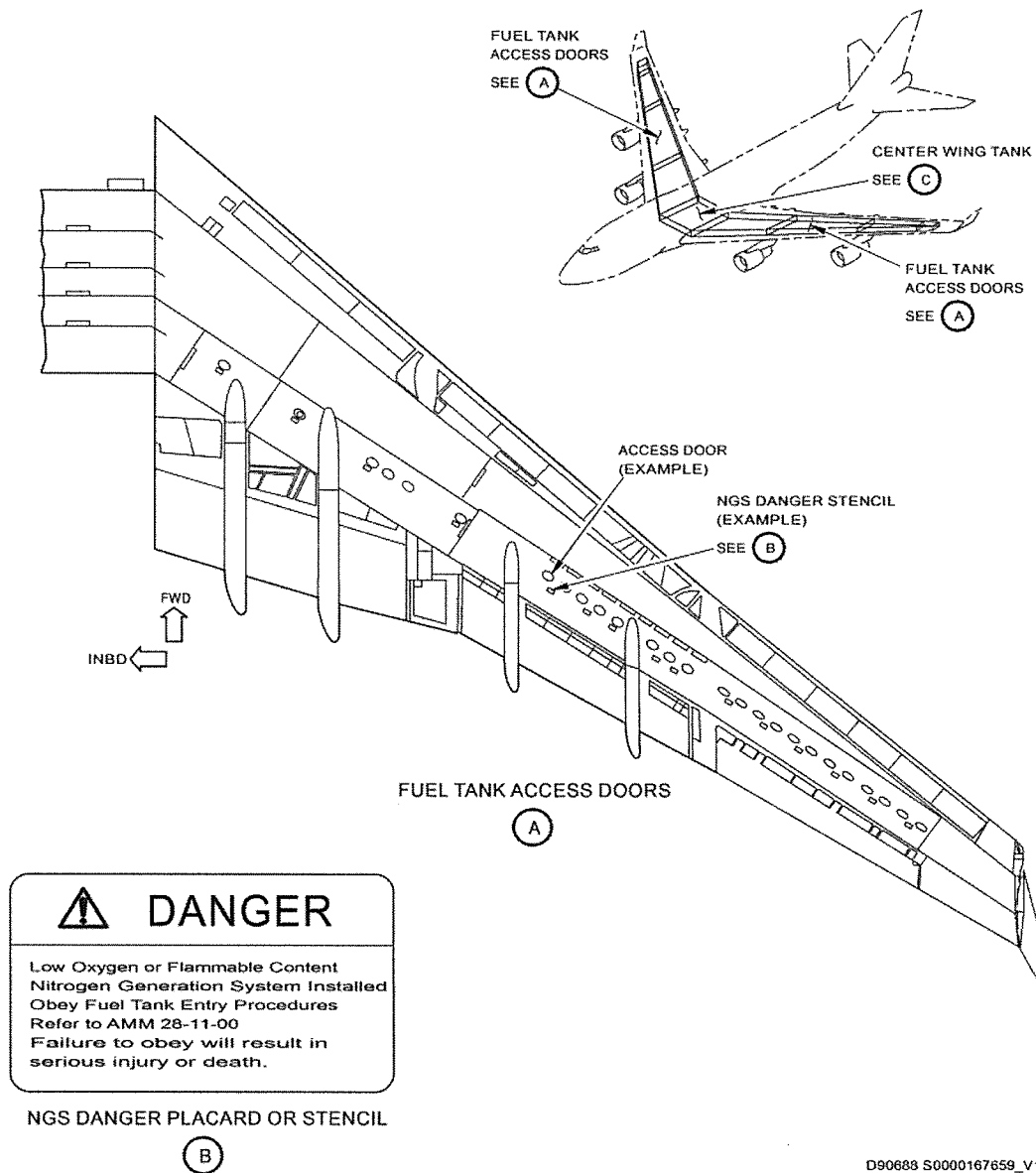
Figure 202. Fuel Tank Entry Precautions (Sheet 1) / 28-11-00-990-820
 Sheet Effectivity: UAL ALL

Sheet Rev Date: 11/15/2013

TASK EFFECTIVITY (Filtering is on): 105

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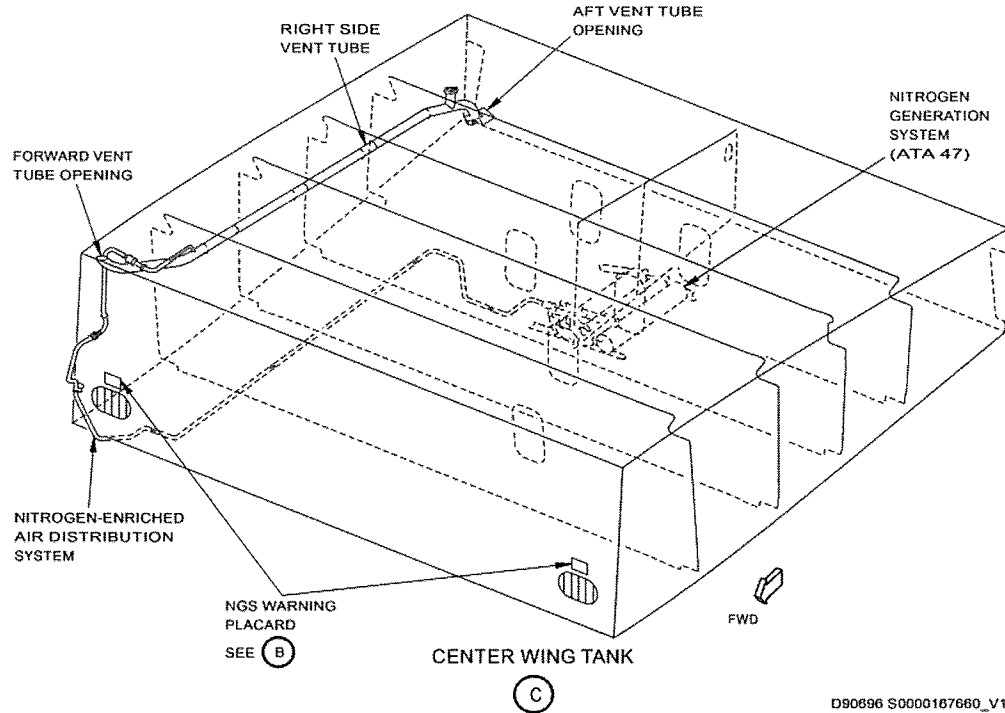
Figure 203. Nitrogen Generation System Precautions (Sheet 1) / 28-11-00-990-874
 Sheet Effectivity: UAL ALL POST SB 747-47-2006

Sheet Rev Date:
 11/15/2015

TASK EFFECTIVITY (Filtering is on): 105

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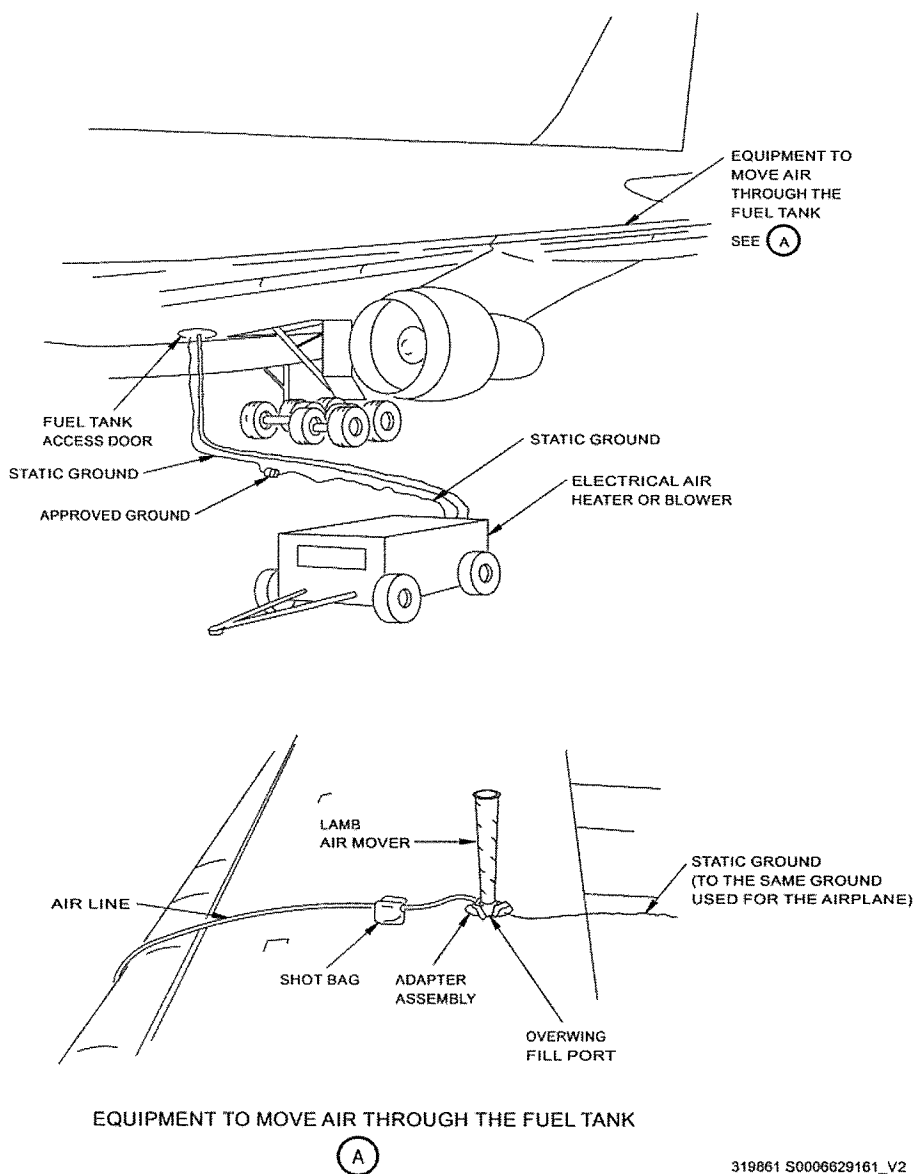
Figure 203. Nitrogen Generation System Precautions (Sheet 2) / 28-11-00-990-874
Sheet Effectivity: UAL ALL POST SB 747-47-2006

Sheet Rev Date:
11/15/2015

TASK EFFECTIVITY (Filtering is on): 105

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Figure 204. Tank Ventilation Equipment (Sheet 1) / 28-11-00-990-821
Sheet Effectivity: UAL ALL

Sheet Rev Date: 11/15/2013

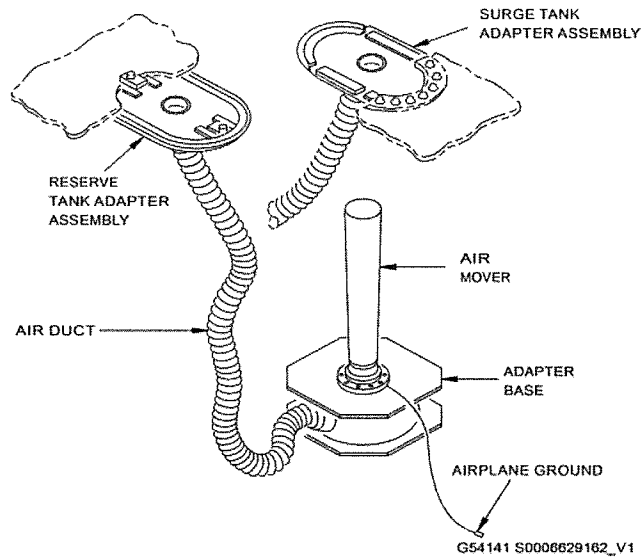


Figure 204. Tank Ventilation Equipment (Sheet 2) / 28-11-00-990-821
Sheet Effectivity: UAL ALL

Sheet Rev Date: 11/15/2013

TASK EFFECTIVITY (Filtering is on): 105

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03/15/2015

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EXAMPLE OF A WET FUEL CELL PRE-ENTRY CHECKLIST

This checklist must be completed prior to start of wet fuel cell entry and/or at shift change PRIOR to work assignment for the continuation of tank work started by a previous shift.

Wet Fuel Cell Entry Location

Area or Building: _____ Stall: _____ Airplane: _____ Tank: _____
 Shift: _____ Date: _____ Supervisor: _____

- 1. Airplane and adjacent equipment properly grounded.
- 2. Area secured and warning signs positioned.
- 3. Boost pump switches off and circuit breakers pulled and placarded.
- 4. No power on airplane: battery disconnected, external Power Cord disconnected from airplane, and external power receptacle placarded.
- 5. Radio and radar equipment off (see separation distance requirements).
- 6. Only approved explosion proof equipment and tools will be used for fuel cell entry (lights, blowers, pressure and test equipment, etc.).
- 7. Ensure requirements listed on Aircraft Confined Space Entry Permit are complied with, including appropriate personal protective equipment: OSH class 110 respirator at a minimum, approved coveralls, caps and foot coverings, and eye protection.
- 8. Trained attendant and confined space logsheet required for all wet fuel cell entries.
- 9. Aerators checked for cleanliness prior to use.
- 10. Sponges available for residual fuel mop out.
- 11. All plugs used have streamers attached.
- 12. Mechanical ventilation (venturis or blowers as necessary) installed to ventilate all open fuel cells.
 NOTE: Ventilation system must remain in operation at all times while fuel cells are open. If ventilation system fails or any ill effects such as dizziness, irritation, or excessive odors are noted, all work shall stop and fuel cells must be evacuated.
- 13. Shop personnel entering cells and standby observers have current "fuel cell entry" certification cards. Certification requires the following training:
 - Aircraft Confined Space Entry Safety
 - Respirator Use and Maintenance
 - Wet Fuel Cell Entry
- 14. Fire Department notified.

Meter Readings

- 15. Oxygen reading (%): _____ By: _____
- 16. Fuel vapor level reading (ppm): _____ By: _____
- 17. Combustible gas meter (LEL) reading: _____ By (FD): _____

I confirm that all entry requirements were met prior to any entry.

 Signature of Supervisor or Designee Date

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Figure 208. Fuel Tank Pre-Entry Checklist (Example) (Sheet 1) / 28-11-00-990-825
 Sheet Effectivity: UAL ALL

Sheet Rev Date:
 11/15/2013