# Piedmont Airlines

## EMB-145 Fueling Procedures

# BE AWARE

IT IS YOUR RESPONISBILITY TO MAKE SURE YOU KNOW WHERE THE PIEDMONT AIRLINES AIRCRAFT FUELERS PROCEDURE MANUAL (AFPM) IS LOCATED AND HOW TO ACCESS (Federal Aviation Administration visited numerous Fueling Vendors recently and found many vendor personnel did not know how to access the AFPM!!)

IT IS YOUR RESPONSIBILITY TO ENSURE YOU HAVE THE MANUALS YOU NEED TO DO YOUR JOB AND THIS INCLUDES KNOWING WHERE TO FIND THESE MANUALS WHEN YOUR SUPERVISOR IS NOT AROUND!

Ensure access to the current revision of ATA 103, NFPA 407 and the Piedmont Airlines Aircraft Fuelers Procedures Manual (AFPM) is available to all Piedmont trained fueling personnel!!!

If you are unsure of your revision status, please feel free to contact Piedmont Airlines QA at DL_Piedmont_Mnt_QA@aa.com

All Piedmont Airlines Fuelers are required to have access to the following documents;

- Piedmont Airlines Aircraft Fueling Procedures Manual (AFPM)
- Piedmont Airlines EMB-145 Fueling Procedures Presentation for Training
- Form P/FTF02, Piedmont Fueler Training Record

These documents are found in current version on the American Eagle Regionals Website;

https://piedmont-airlines.com/vendors

https://piedmont-airlines.com/vendors

- Piedmont Airlines Aircraft Fueling Procedures Manual (AFPM)
- Piedmont Airlines EMB-145 Fueling Procedures Presentation for Training
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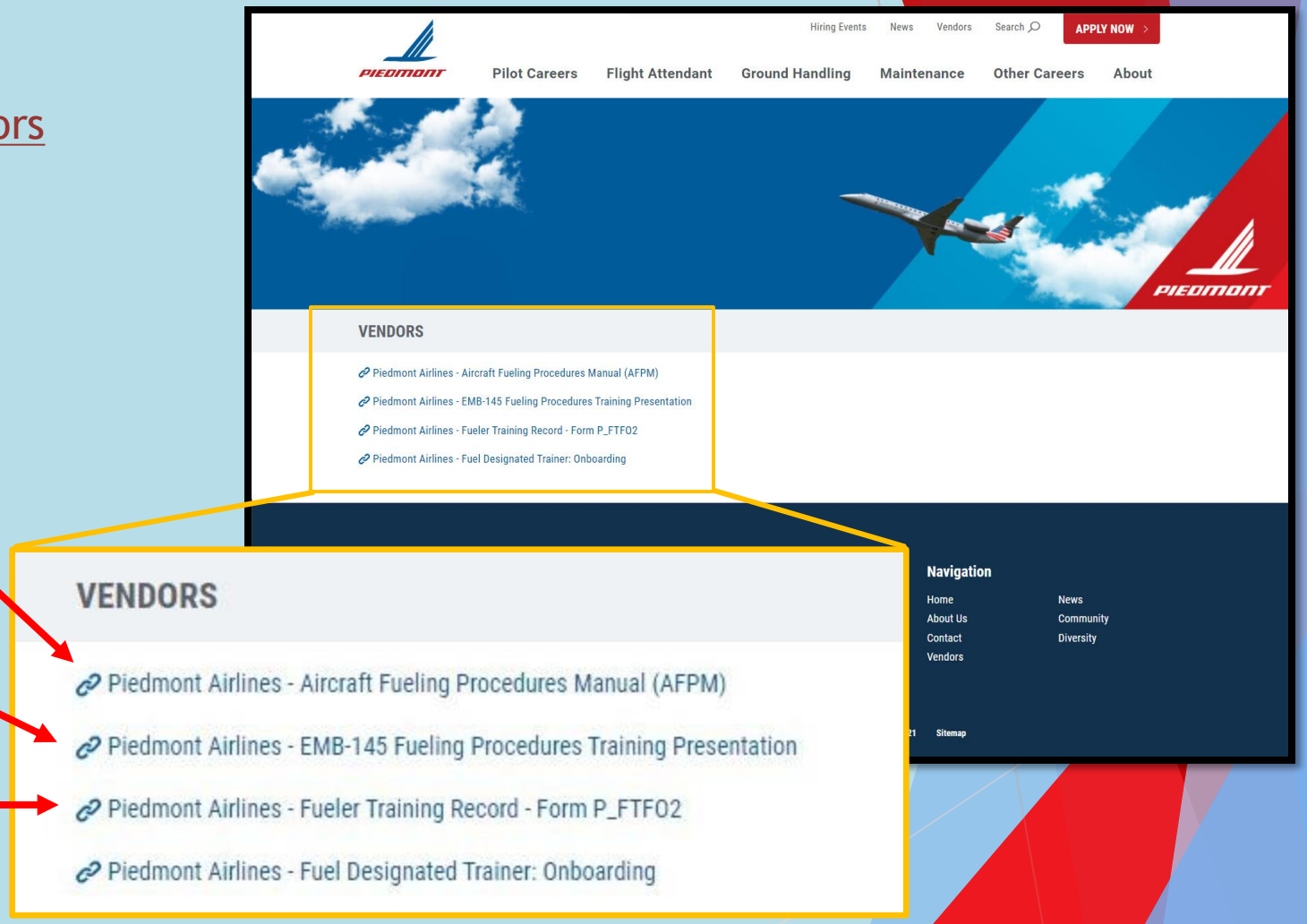
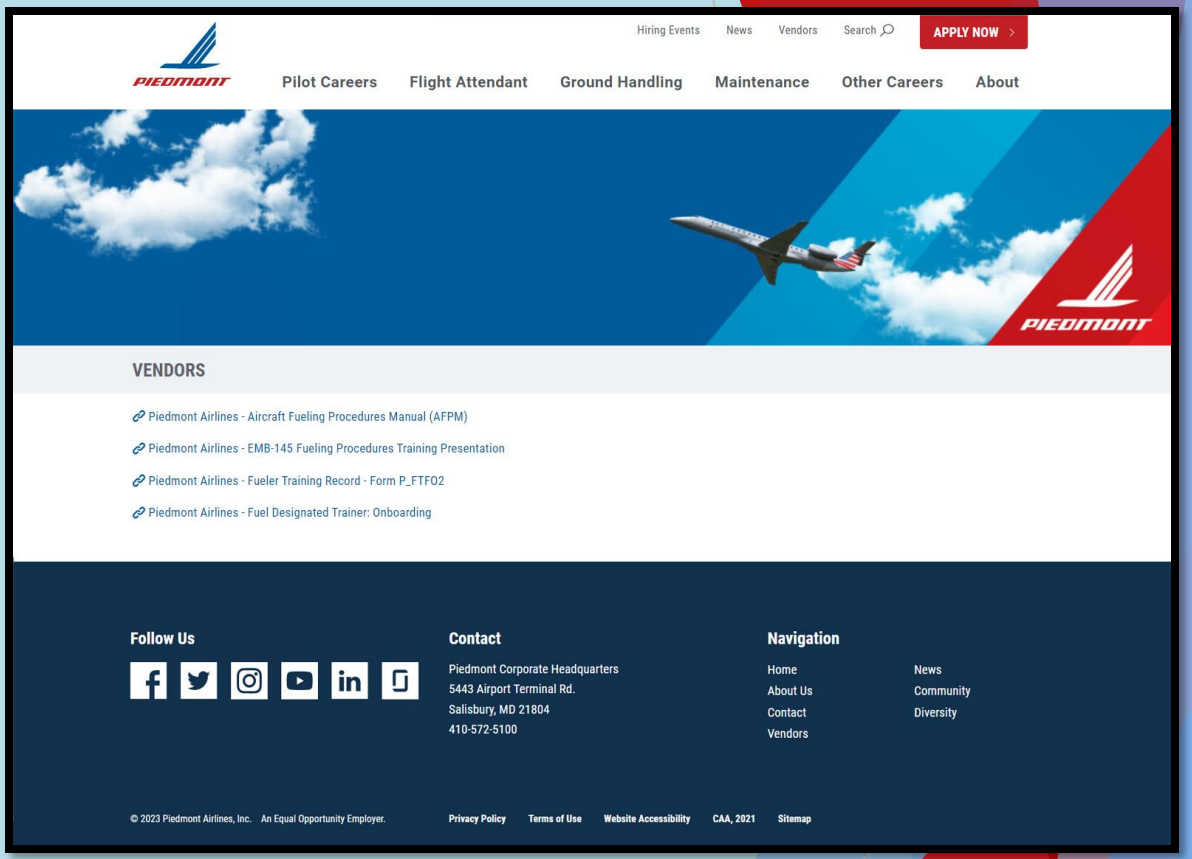


https://piedmont-airlines.com/vendors

Click the hyperlink of the document / file that is needed. The document will open or may be saved/printed, as necessary.



# Topics

General Safety
Human Factors
Aircraft Familiarization
Fueling Procedures
Alternate Indication Procedure
Overwing fueling
Defueling

# General Safety

# Personal Safety – Safety Equipment

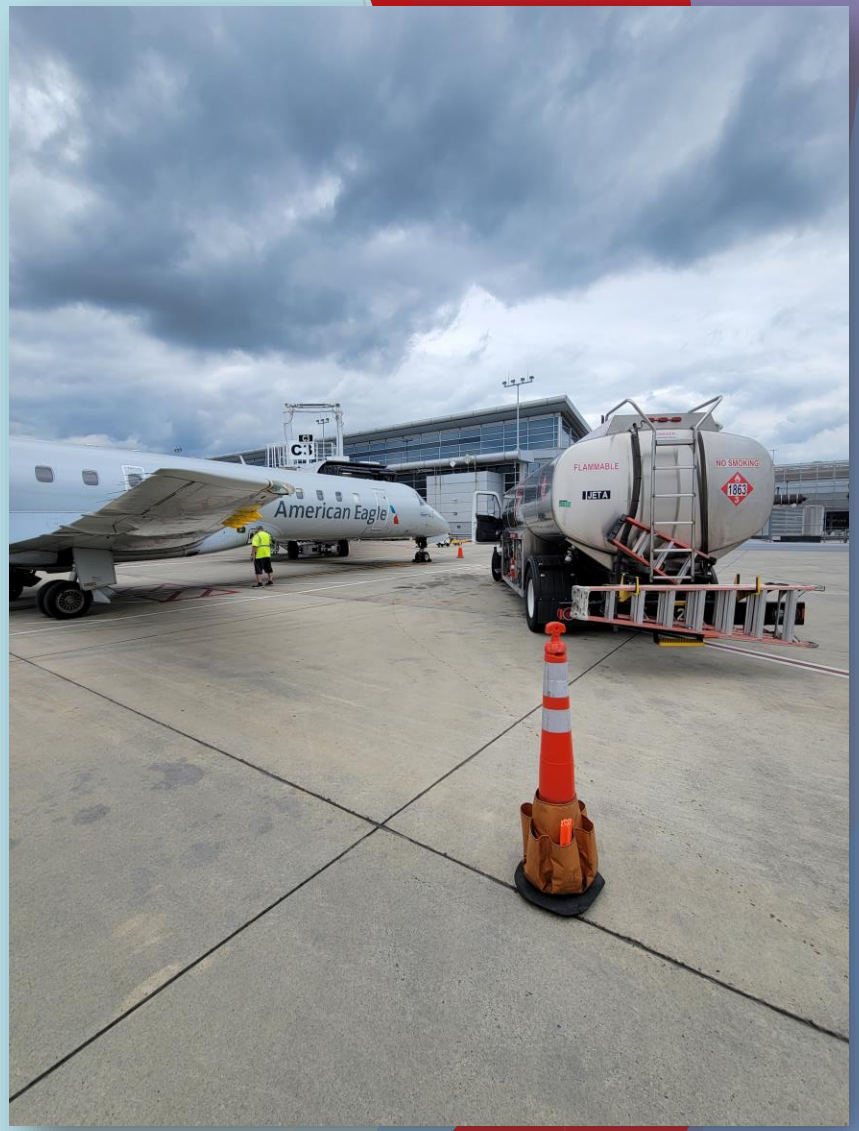
- Wear appropriate safety equipment for the job you are assigned
- Synthetic material can generate static charge.
  - Do not wear any synthetic clothing (Nylon). Wear only clothing made from natural fibers (cotton)
  - In the event of a fire, synthetic clothing can “weld” to the skin causing further damage. Cotton does not have this effect.
- Understand the caution and danger areas where ingestion or injury may occur. Secure all uniform and uniform accessories such as hats, fobs, scarves, rain gear, etc, that can be blown away or ingested into aircraft engines and equipment.

# Personal Safety
# Static Electricity

One of the most obvious safety precautions ground support personnel must take can be made even easier through static grounding reels. Using a cable reel increases safety during operations by providing a quick, convenient connection to prevent the buildup of static electricity in volatile areas. Used both in smaller airports' stationary fueling areas and on larger airports' fueling carts and trucks, reels must meet strict NFPA and ATA regulations for OEM truck and cart assembly.

Sources Include, but are not limited to:

- fueling truck / aircraft
- the hoses / nozzle



# Personal Safety
# Static Electricity

Static electricity may become an ignition hazard if:

- The static charge has sufficient energy to create a spark
- A gap exists in which the spark can jump across
- A mixture of fuel vapor and air are within a flammable range

# Personal Safety
# Static Electricity

Since it is impossible to prevent the presence of flammable vapors, we use methods to dissipate the static charge such as grounding or bonding. The purpose of which is to minimize electrical potential.

According to the NFPA 407-2001, grounding during aircraft fueling is not required.

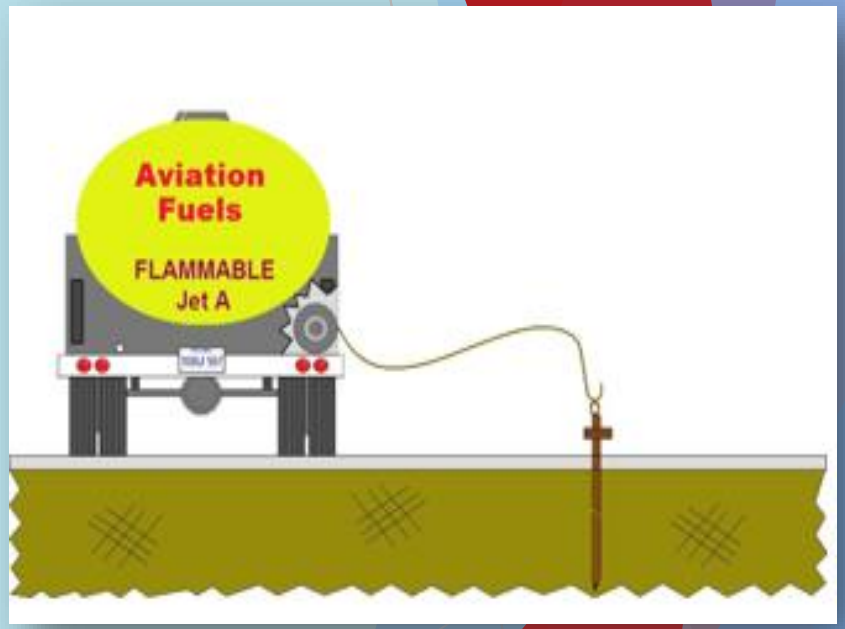
# Personal Safety
# Static Electricity

**Bonding**

The electrical circuit connection made between two units of equipment. The purpose of which is to minimize any electrical potential differences between them.

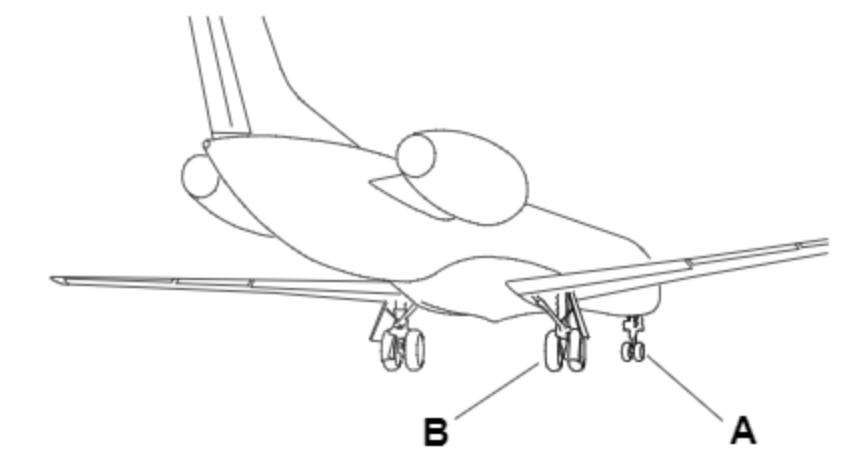
**Grounding**

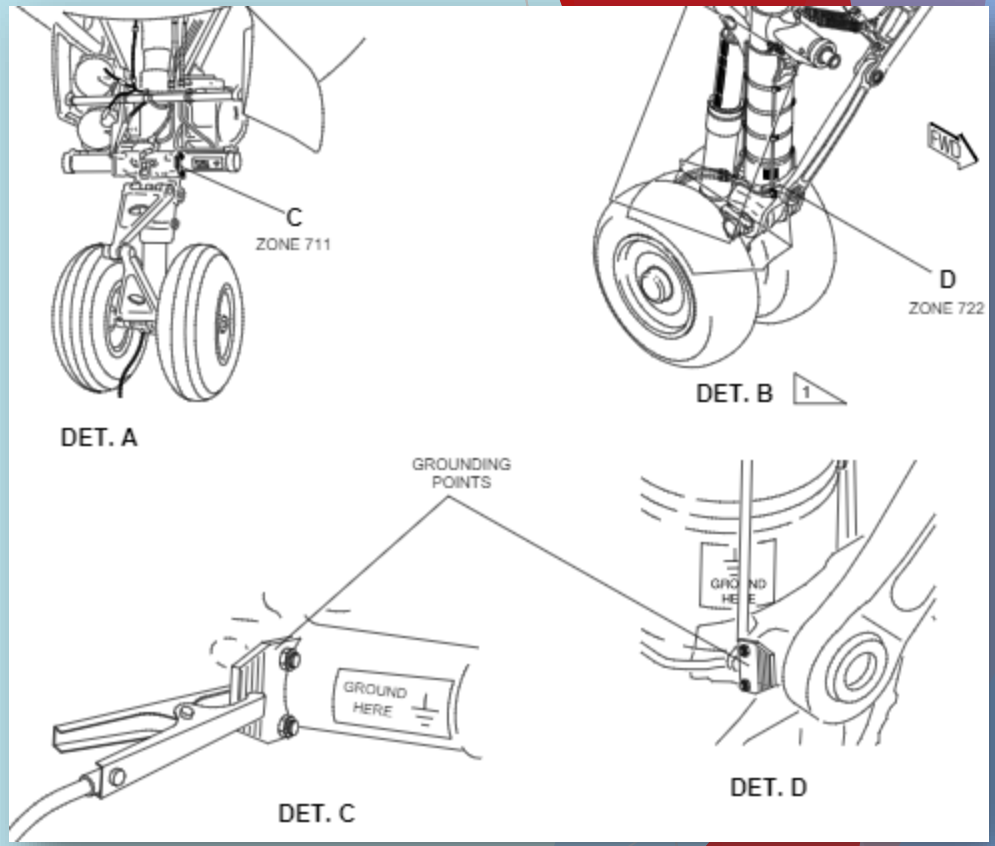
The electrical current connection made between a unit of equipment and the earth's surface. A current suitable type fire extinguisher should be kept in the area and the individuals involved familiar with its use. The purpose of which is to minimize any electrical potential differences between the equipment and the ground.



# Personal Safety
# Static Electricity

Primary Grounding Points Nose Landing Gear and Right Hand (RH) Main Landing Gear - Locations



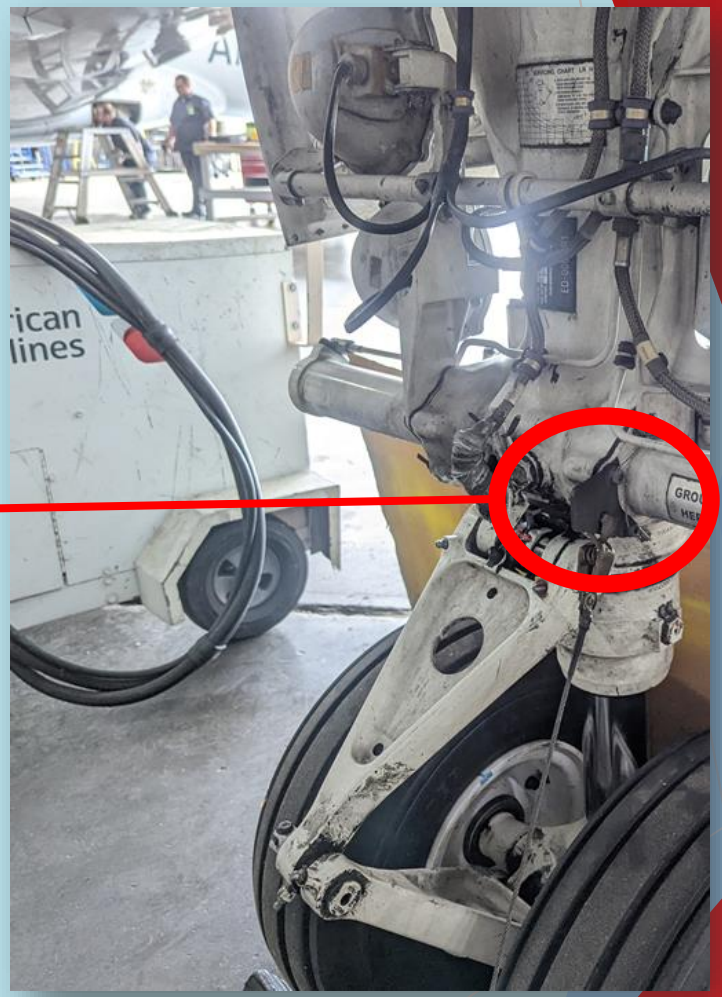



# Personal Safety
# Static Electricity

During any fueling procedure, bonding must be made first and at the following point on the landing gear from the fuel truck.

Primary Located FWD on the Right MLG

# Personal Safety
# Static Electricity



Nose Landing Gear Bonding Point

# Personal Safety
# Static Electricity


Alternative Ground Points at both Wing Leading Edges

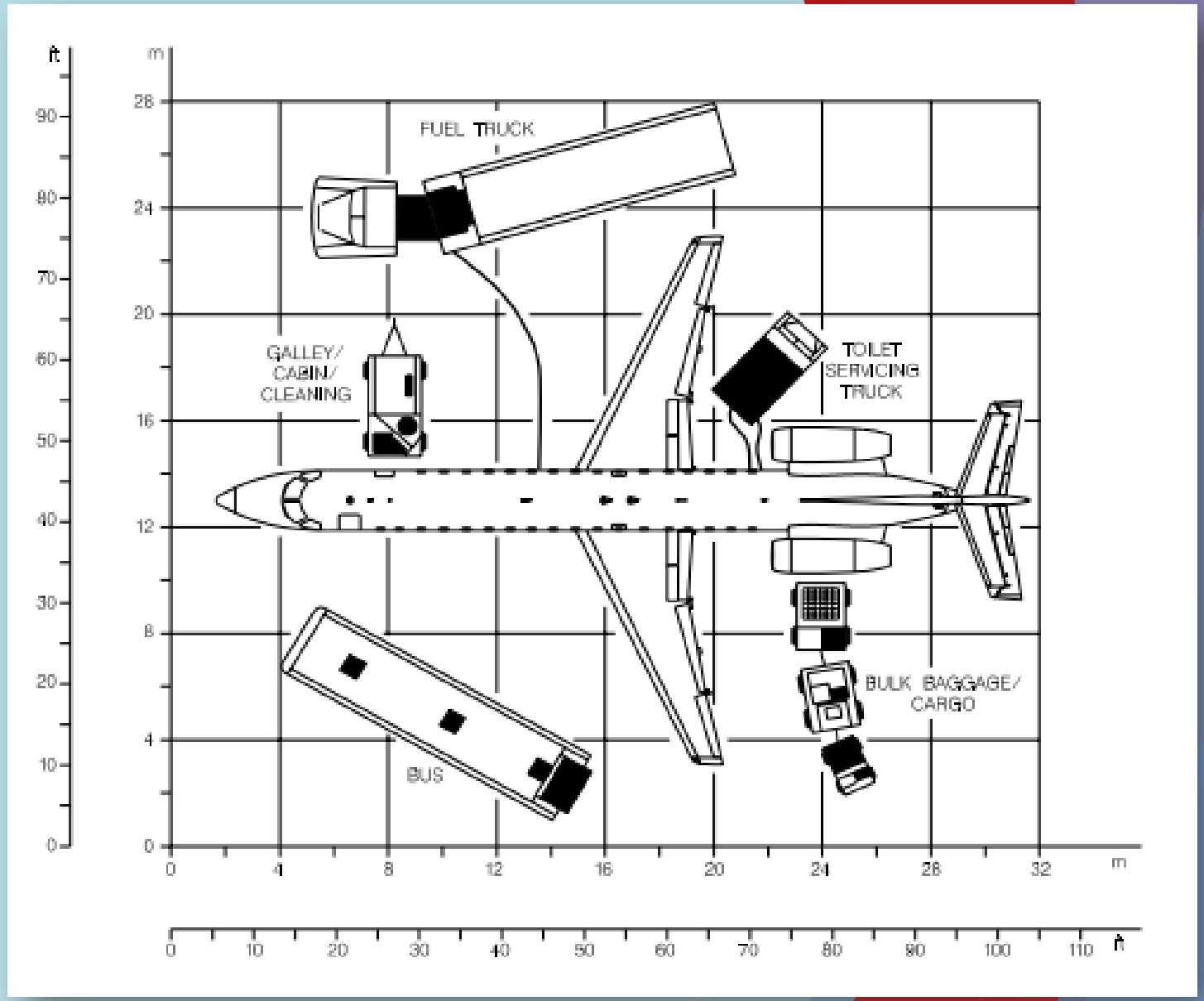
# Personal Safety
# Smoking / Cell Phones

- Smoking / Open Flames are NEVER allowed within the vicinity of the aircraft being fueled
- Always follow personal electronic procedures your company has in place.
- A current suitable type fire extinguisher should be kept in the area and the individuals involved should be familiar with its use. *Fire Extinguisher **shall** also be checked for proper charge prior to truck use.*

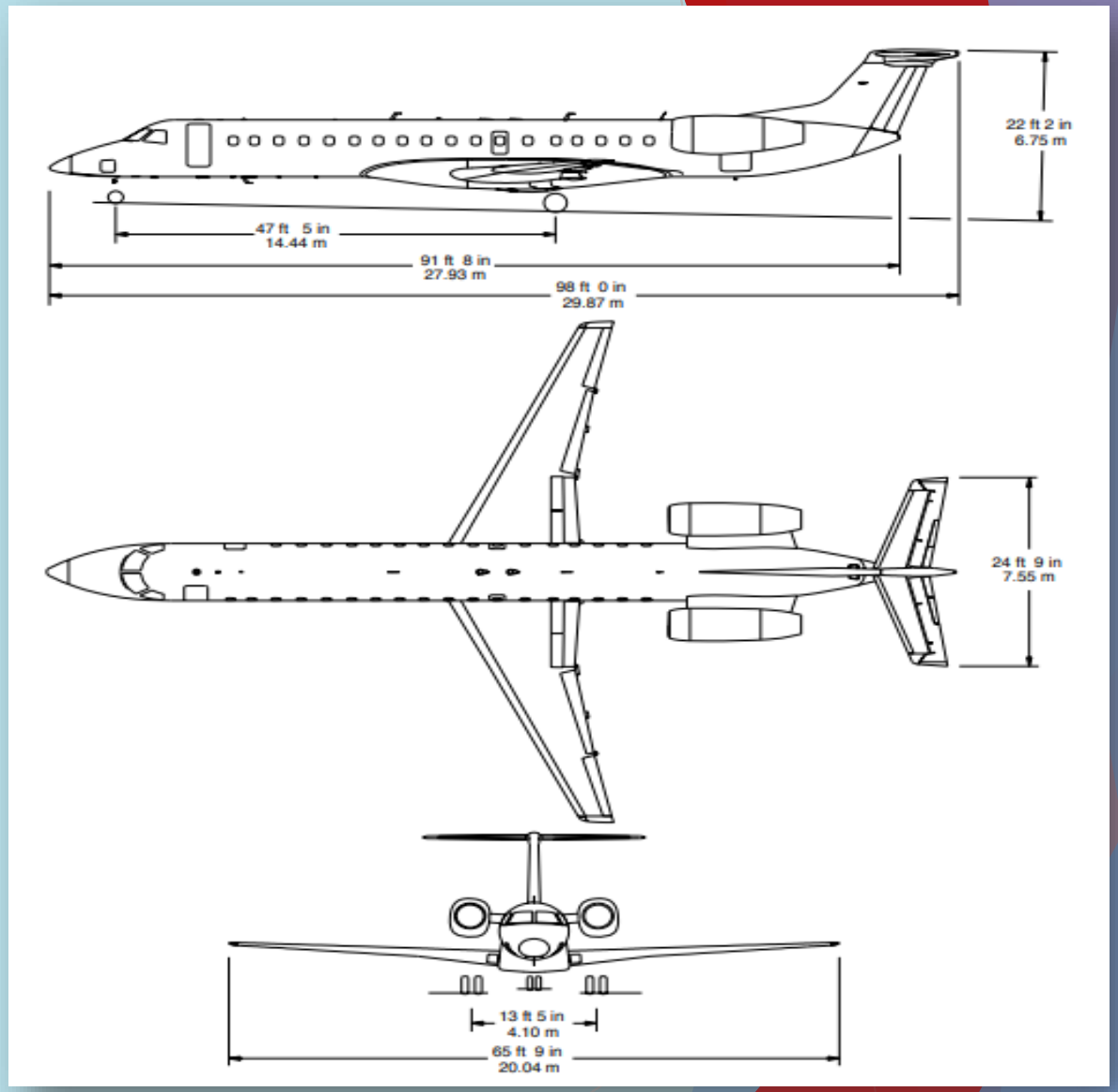
# Personal Safety Distance

- When approaching the aircraft, make sure to maintain proper safe distance from the aircraft.
- When in doubt, use another person to marshal your vehicle.
- Always use a guide man when backing a fuel truck.

# Personal Safety Distance and Dimensions

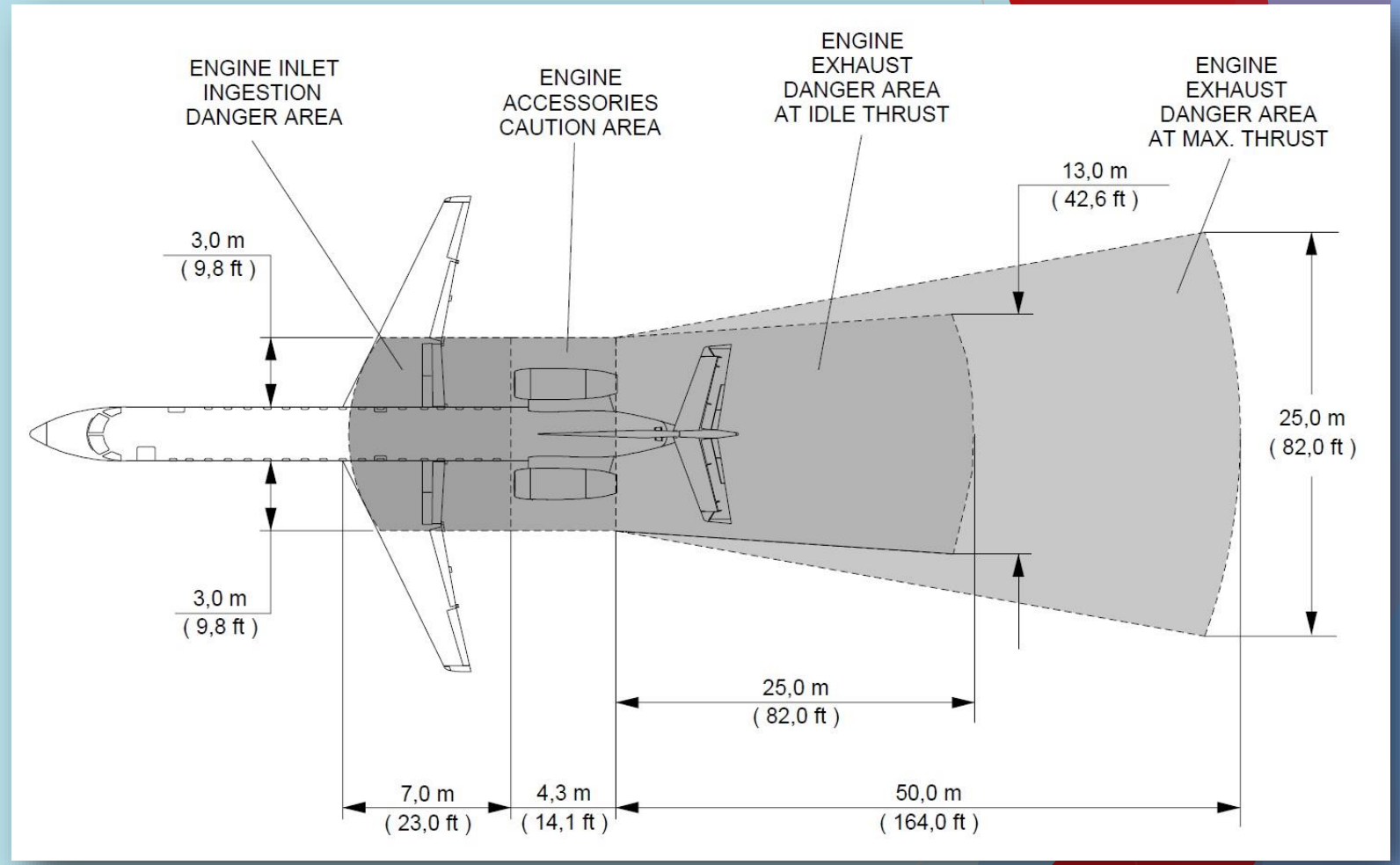


# Personal Safety Distance and Dimensions



For Reference -
Engine and Exhaust Hazard Areas.

It is your responsibility to understand the caution and danger areas where ingestion or injury may occur.



# Personal Safety
# Fuel Spill

- In the unlikely event of a fuel spill, it is your responsibility to notify the flight / ground crew immediately.
- If it becomes necessary to remove all personnel from the aircraft, never use the word “evacuate”. Evacuate may be interpreted to using all available exits. Use of overwing Emergency exits would place passengers directly in the fuel spill. In such a case, “**DEPLANE**” should be used.

# Personal Safety General

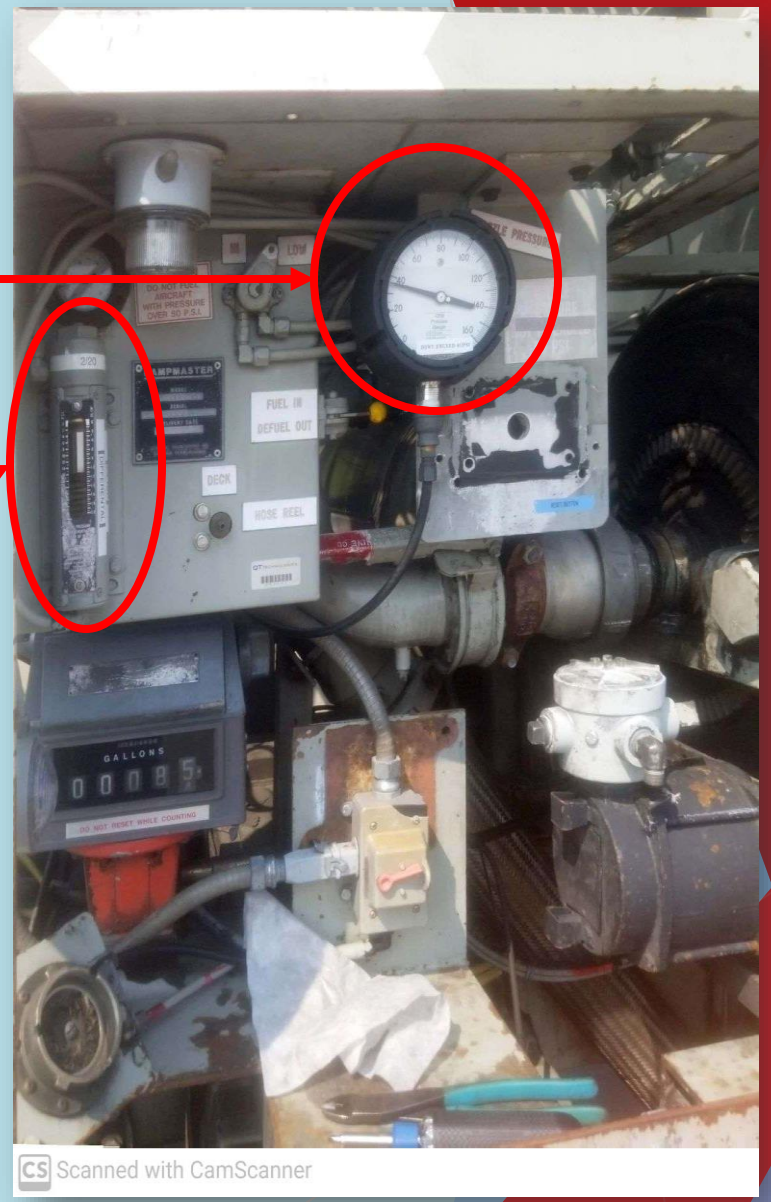
It is your responsibility to be familiar with your vehicle. It is important to know where all the safety features are and if they are in proper working order. Items include but are not limited to:

- Emergency Shut Off
- Fire Extinguishers
- All Shut Off Valves
- Interlock Override


# EMB-145 Aircraft Familiarization

# EMB-145 Aircraft Familiarization

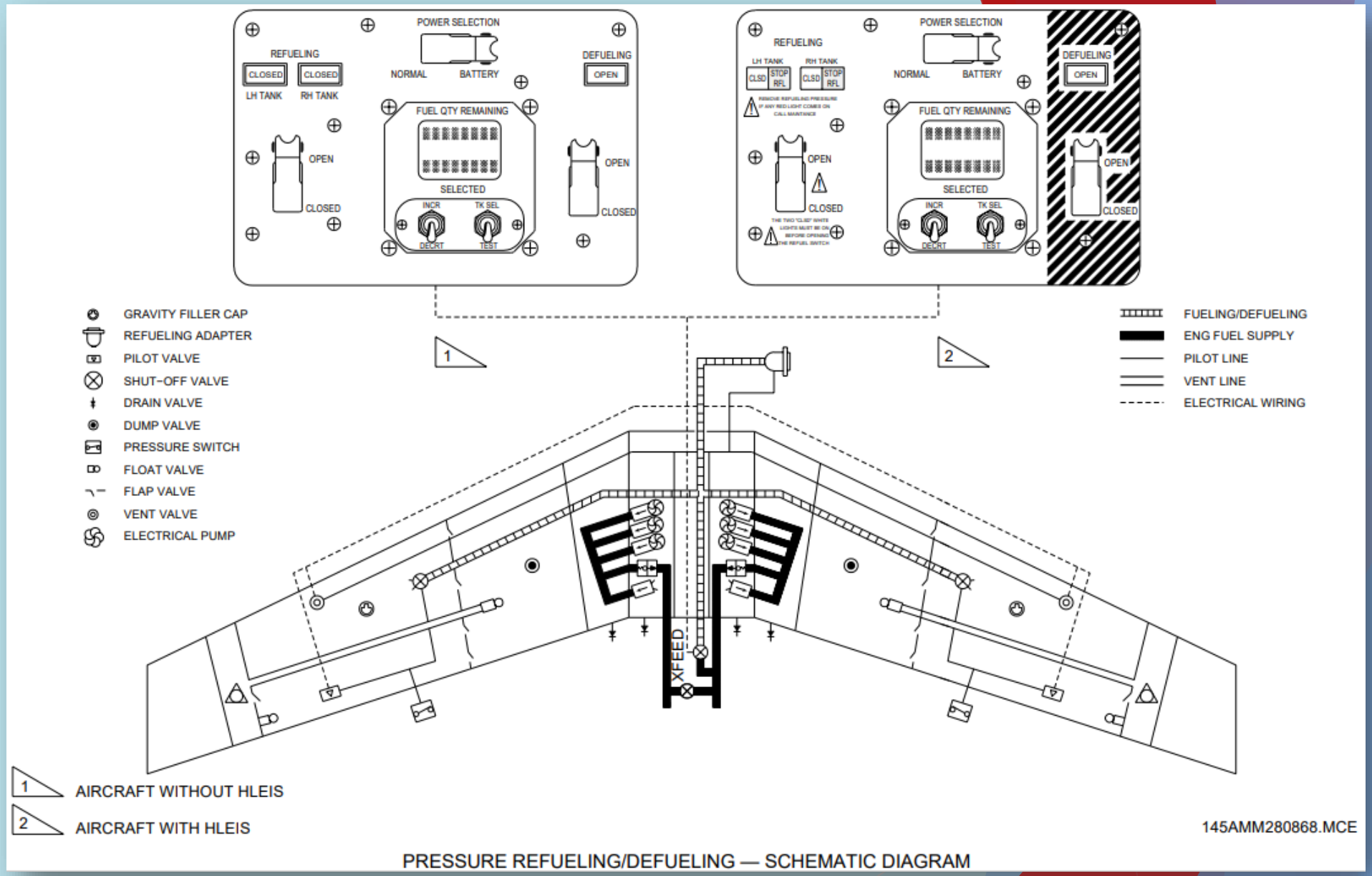
- Refuel/Defuel system has an adapter which permits the ground crew to refuel or defuel the aircraft.
- Refueling pressure should be **35** to **50** PSIG.
- Differential Pressure should be between 1 & 15 PSI. *Under 1 may mean the filter is being bypassed or suffered a rupture, over 15 signals a blockage.*
- Defueling will be accomplished with tank boost pumps.
- Fuel transfer can only be done on ground, using defuel valve, cross feed valve and boost pumps, with the assistance of maintenance or flight crew.



# EMB-145 Aircraft Familiarization

## Pressure Refueling / Defueling

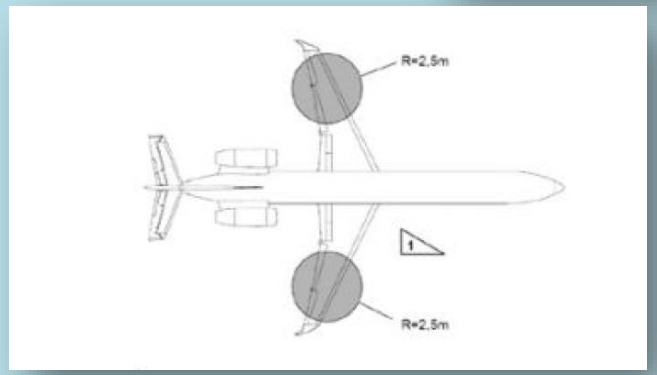
## Schematic Diagram




PRESSURE REFUELING/DEFUELING — SCHEMATIC DIAGRAM

# EMB-145 Aircraft Familiarization

- NACA Air Intake (Named after the developer National Advisory Committee for Aeronautics)
- Monitor the area around the air vent during fueling and as ambient temperature increases throughout the day. Fuel spills from the tank vents, in rare circumstances, can occur.
- DO NOT PARK ELECTRICAL OR MECHANICAL EQUIPMENT UNDER TANK VENTS AT ANY TIME!!!!



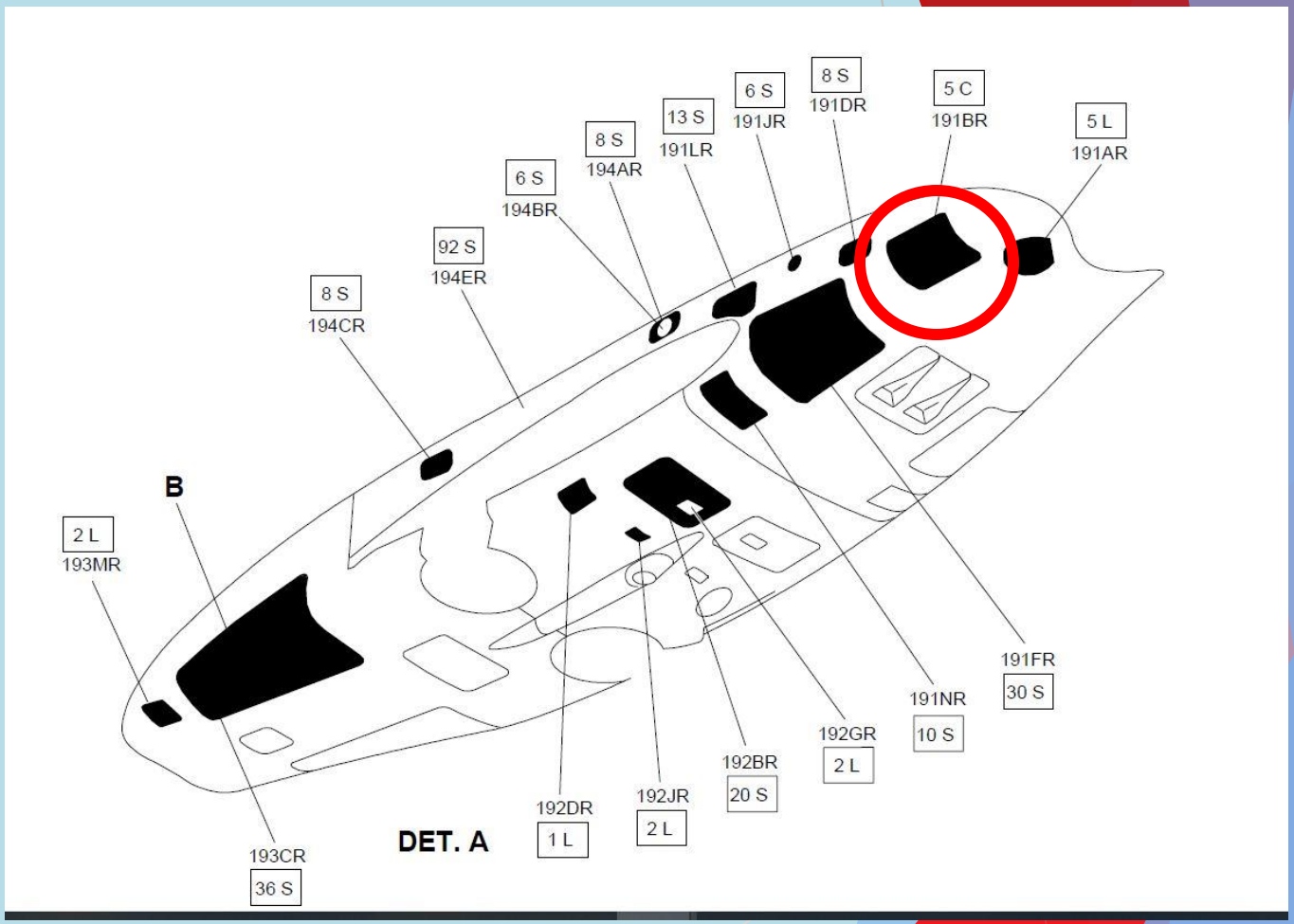
# EMB-145 Aircraft Familiarization

**Fueling Panel Access Door 191BR**

- Control panel located forward of the right wing, installed beside refueling/defueling adapter.
- Panel & service light illuminate automatically when door is opened.


# EMB-145 Aircraft Familiarization

**Fueling Panel Access Door 191BR**



# EMB-145 Aircraft Familiarization – Fuel Panel

- Access Door 191BR
- Please verify before closing that:
  - Fuel cap was installed
  - Fuel cap chain is connected
  - Battery switch was set to “Normal”
  - All latches are secure

***Imagine your screen door in a Thunderstorm, now picture your screen door slamming shut at ¾ the speed of sound. This is the reason you must check, check and Triple check.***

# EMB-145 Aircraft Familiarization – Fuel Panel

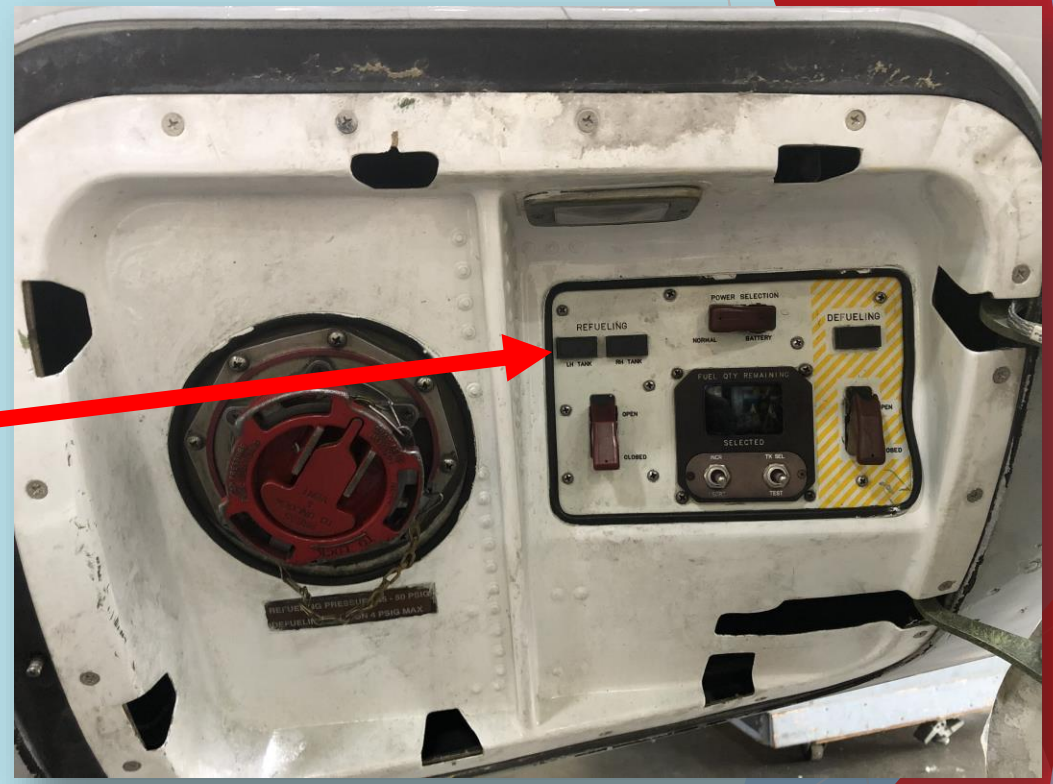
Supplies power to the pilot valves to open or close the refueling shut off valves.

<u>OPEN</u>

De-energize pilot valve to open refuel valve.

<u>CLOSED</u>

Energize pilot valve to close refuel valve.



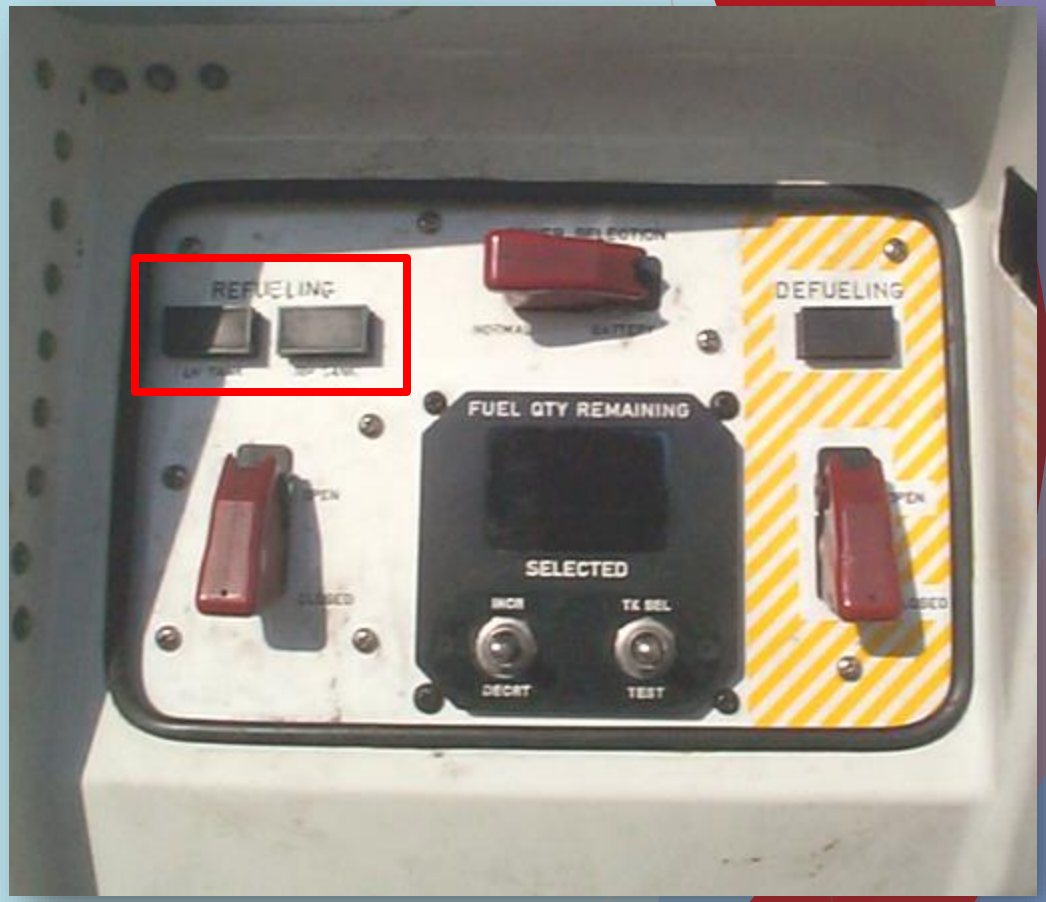
# EMB-145 Aircraft Familiarization – Fuel Panel

**Refueling Closed Light**

White light illuminates when associated refuel valve is closed.

ON: Refuel valve
CLOSED

OFF: Refuel valve
OPEN



# EMB-145 Aircraft Familiarization – Fuel Panel

**Defuel Shutoff Valve Switch**

Actuates defuel valve to open or close.

Illuminates when the defuel valve opens.

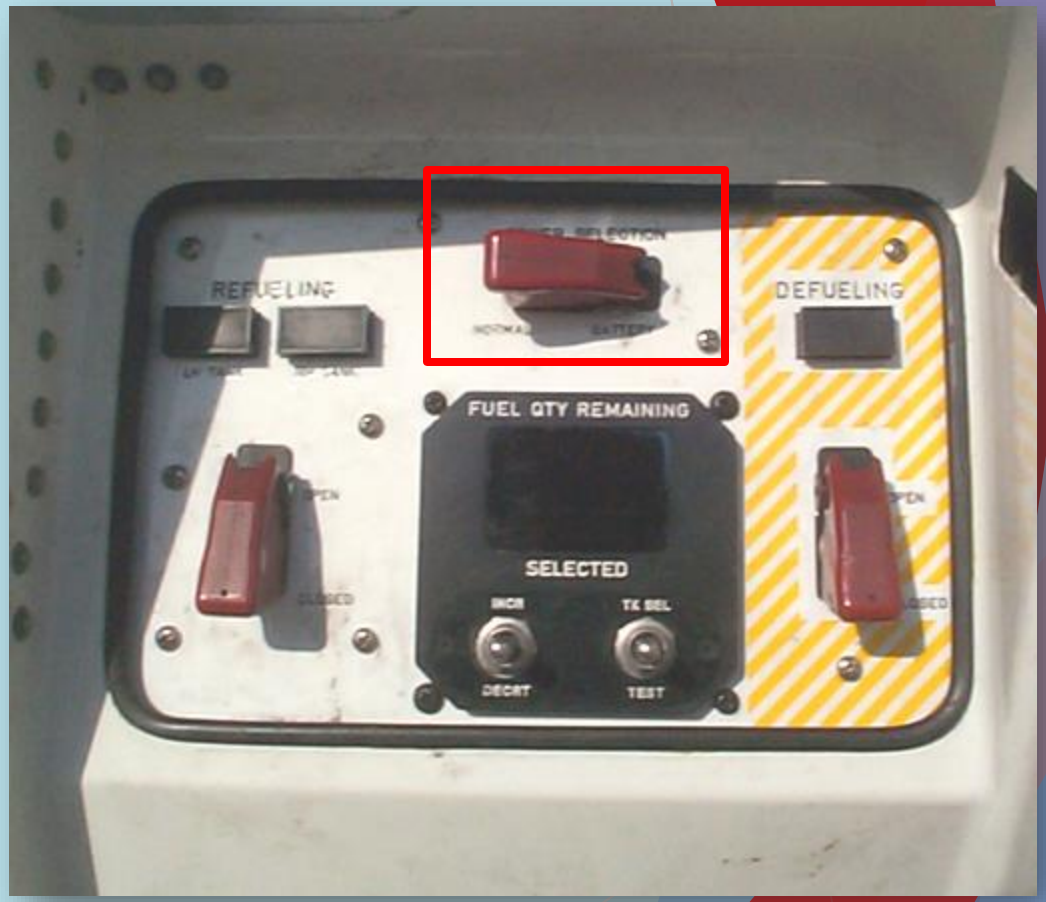
# EMB-145 Aircraft Familiarization – Fuel Panel

**Power Selection Switch**

Two position switch;

**NORMAL:** system is energized by the #1 DC bus.

**BATTERY:** system is energized by the #1Hot bus.



# EMB-145 Aircraft Familiarization – Fuel Panel

**Tank Select / Test Switch**

Two position switch;

**TK SEL:** selects fuel quantity displayed in upper display LT / RT, or Total

**TEST:** Initiates self-test, errors displayed as a failure code

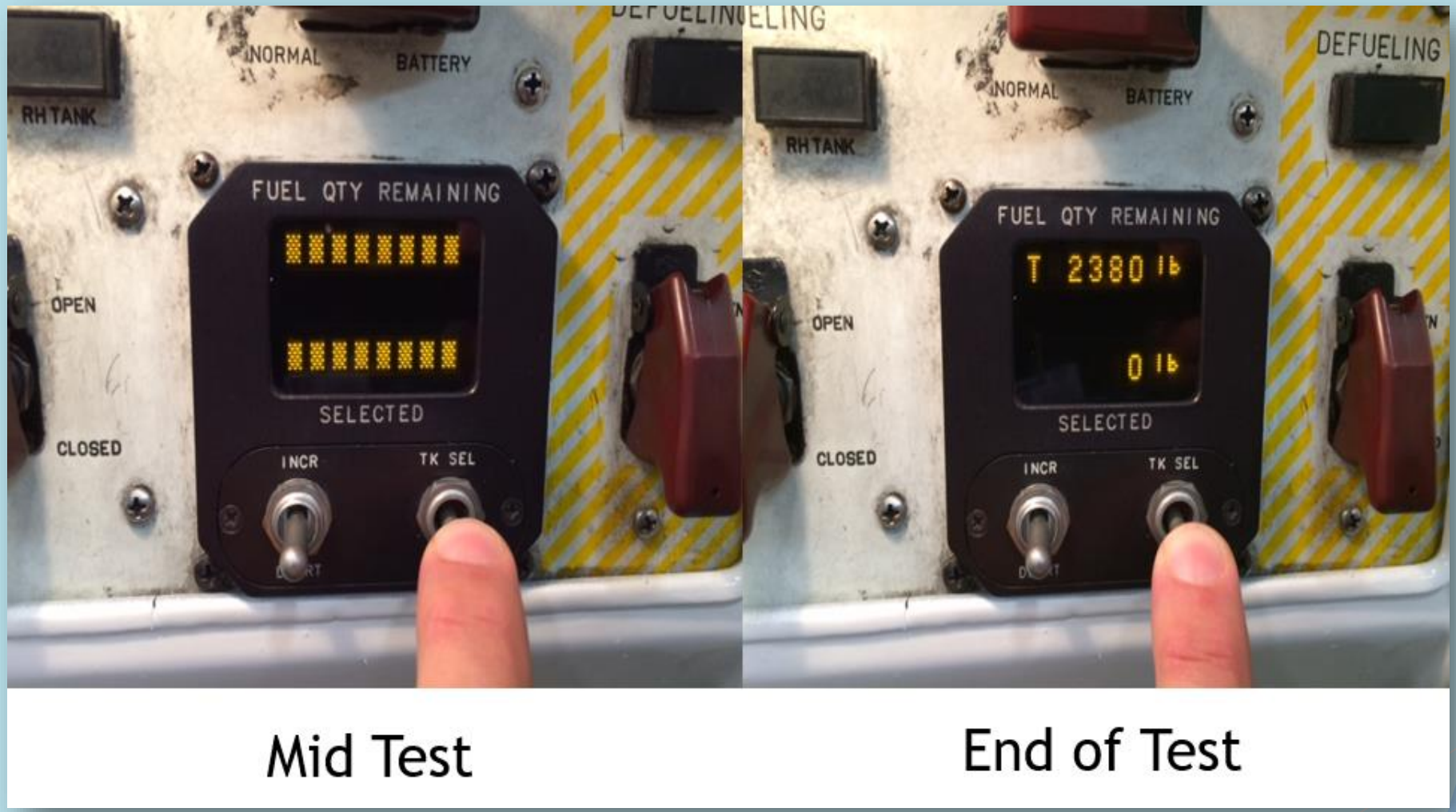
# EMB-145 Aircraft Familiarization – Fuel Panel

**Tank Select / Test**

Press and hold in TEST Position;

- Light Test Occurs
- Any Faults will display after Light Test

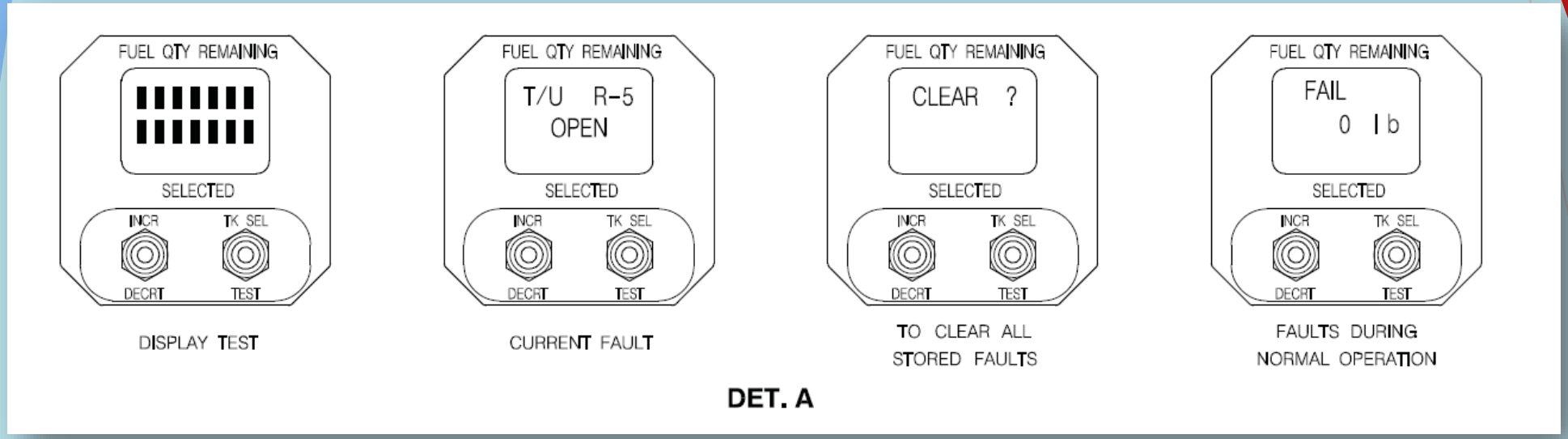
# EMB-145 Aircraft Familiarization – Fuel Panel




Mid Test

End of Test

# EMB-145 Aircraft Familiarization – Fuel Panel




Displays any faults (if applicable)
Contact Flight Crew with any faults found

# EMB-145 Aircraft Familiarization – Fuel Panel

Reference the Embraer EMB-145 AMM 28-23-00

FAULT CODE TABLE (Applicable to EMB-145LR, LU and EMB-135LR, KL Models)

| FAULT | FAULT CODES | | |
|---|---|---|---|
| | UPPER DISPLAY | LOWER DISPLAY | |
| Tank Unit Shorted | T/U X-Y-Z | SHORTED | - |
| Tank Unit Open | T/U X-Y-Z | OPEN | - |
| Tank Unit Out Of Range | T/U X-Y-Z | RANGE | * |
| Tank Unit Low Z Shorted | T/U X-Y-Z | LOZ SHRT | - |
| Low Level Sensor Shorted | LLS X | SHORTED | |
| Low Level Sensor Open | LLS X | OPEN | |
| Low Level Sensor Out Of Range | LLS X | RANGE | |
| Low Level Sensor Low Z Shorted | LLS X | LOZ SHRT | |
| Wire Hi-Z Shorted | HIZ X | SHORTED | * |
| Wire Hi-Z Open | HIZ X | OPEN | * |
| FCU Failure | FCU X | FAIL | * |
| FCU ARINC 429 Failure | FCU X | ARINC 429 | * |
| FCU Bad Configuration | FCU X | CONFIG | * |
| FCU Refuel Valve Driver Fail | FCU X | REFUEL | |
| FCU Non-Volatile Mem. Fail | FCU X | NVMEM | |
| Repeater Indicator Fail | IND | FAIL | |
| Select Switch Fail | IND | SWITCH 1 | |
| Set Switch | IND | SWITCH 2 | |

**NOTE:** X = "L" for left wing and "R" for right wing.
Y = Tank unit number (1 = inboard; 6 = outboard).
Z = Tank unit number 1 (A or B).
- Faults degrade accuracy of the quantity indication.
* Fuel quantity indication is set to unreadable condition (displaying dashes).
If the remaining faults occur, the pressure refueling is not available.

# EMB-145 Aircraft Familiarization – Fuel Panel

**Quantity Select Switch**

Two position switch used to increase or decrease selected fuel quantity.

**INCR:** to increase fuel on board

**DECR:** to decrease fuel on board. Values changed by 10,100, or 1000 increments.

# EMB-145 Aircraft Familiarization – Fuel Panel

**Fuel Quantity Remaining Display**

Displays fuel remaining as selected by the Tank SEL/TEST switch.

Tank selected is shown below indication:

**L**- left tank
**R**- right tank
**T**- total, both sides

# EMB-145 Aircraft Familiarization – Fuel Panel

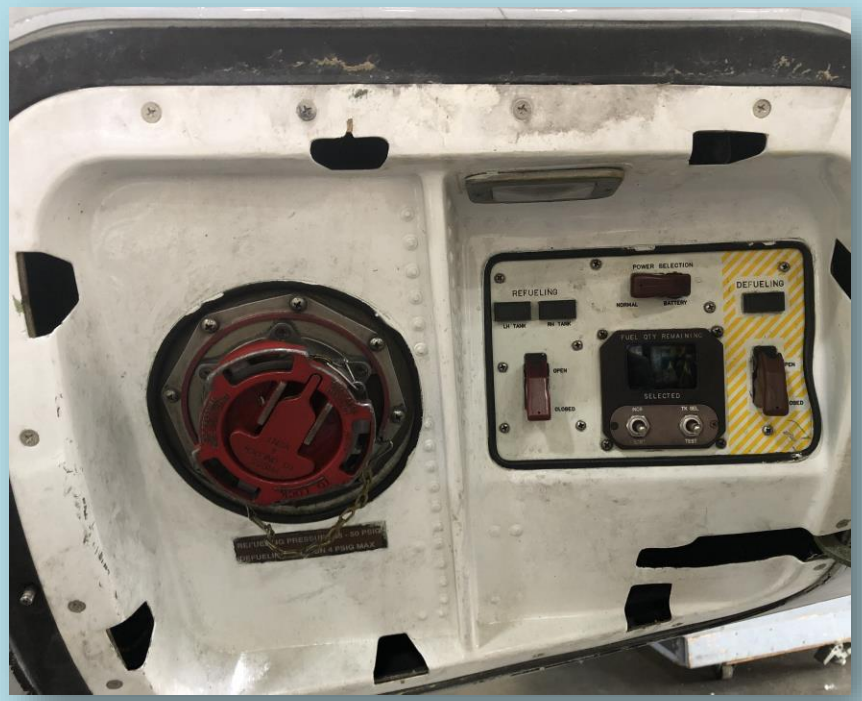
**Fuel Quantity Selected**

Displays total fuel quantity set through the **INCR/DECR** switch.

If fail inscription is displayed in Fuel Qty Remaining indicator.

Selected indicator displays failure code.

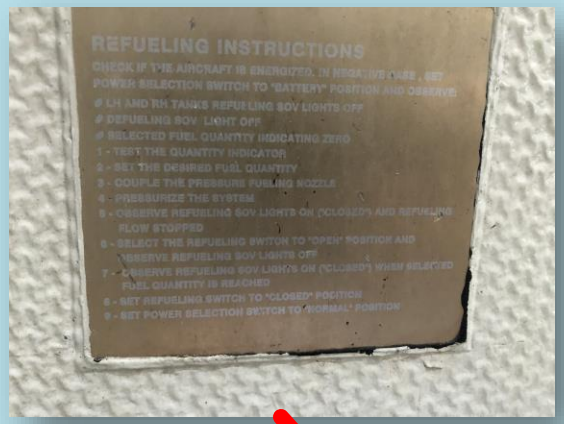
# EMB-145 Aircraft Familiarization – Fuel Panel





The Fuel Panel also provides a hookup for the fueling / defueling hose.

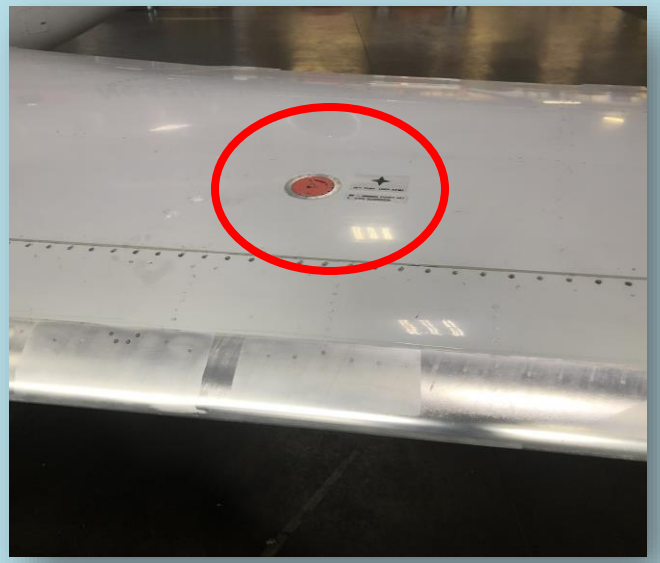
# EMB-145 Aircraft Familiarization – Fuel Panel



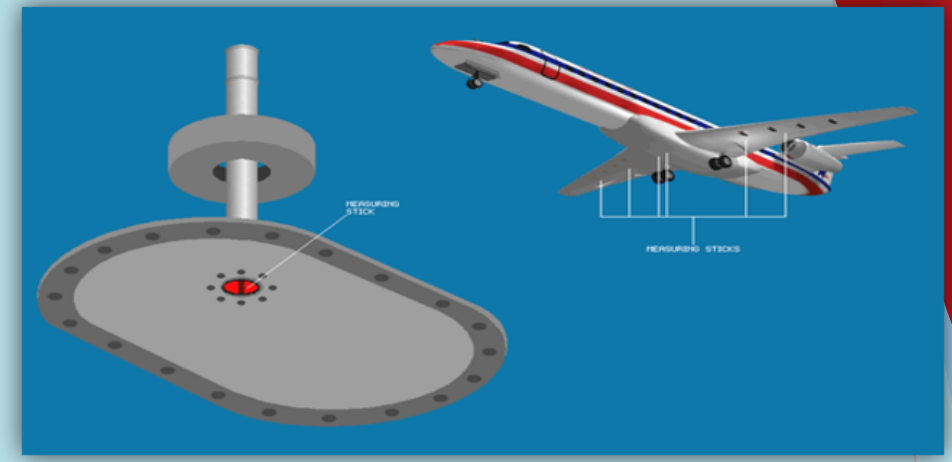


- Fuel Door Refuel/Defuel Instruction Placards
- If you're unsure always consult your supervisor or Piedmont Airlines Quality Assurance

# EMB-145 Aircraft Familiarization Gravity Fill Cap (Overwing)

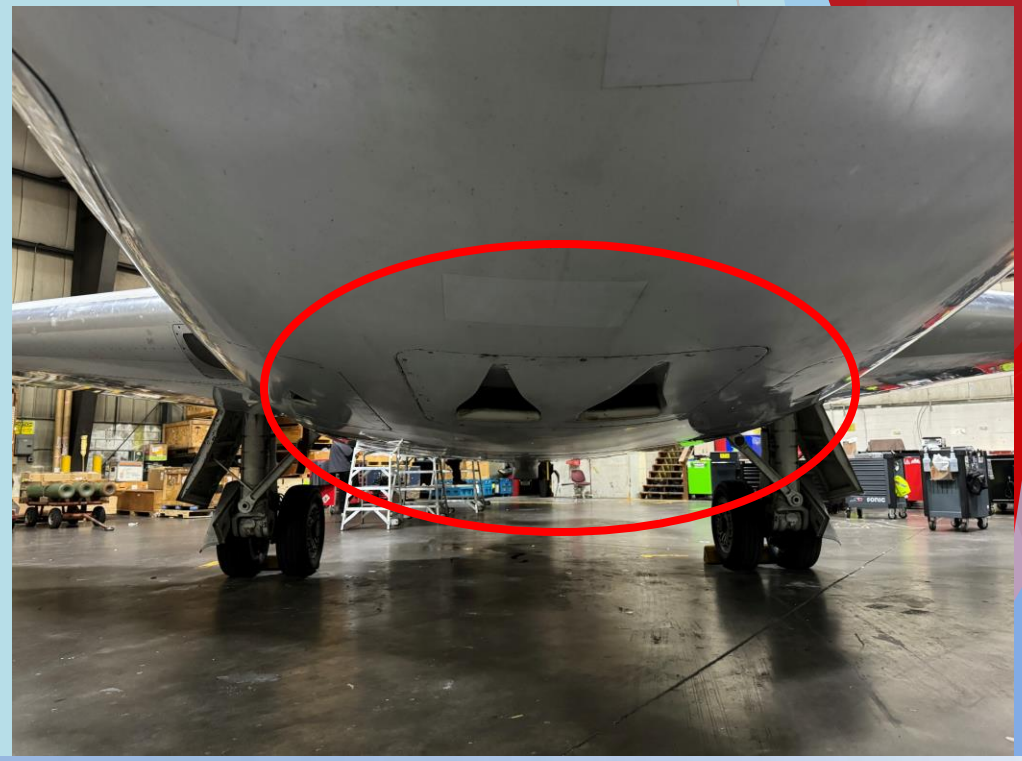



# EMB-145 Aircraft Familiarization Fuel Measuring Sticks



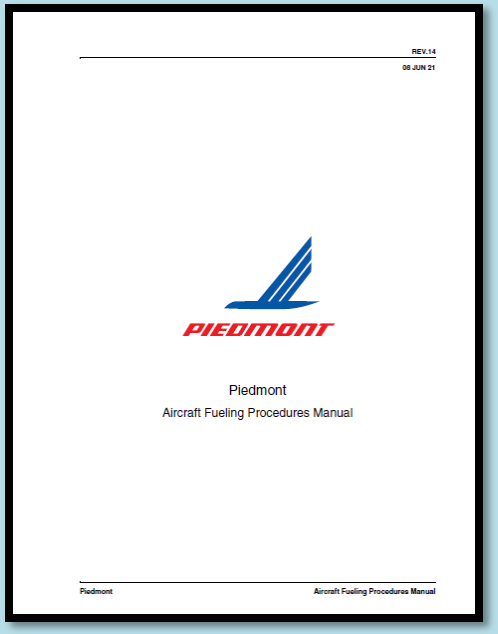

Be Aware - 2 NACA Air Inlets are located on the bottom of the aircraft belly fairing. Depending on operation of the aircrafts environmental system this area is a potential ingestion hazard.

*Secure all uniform and uniform accessories such as hats, fobs, scarves, rain gear, etc, that can be blown away or ingested into aircraft engines and equipment.*

# Fueling Procedures

# Fueling Procedures – EMB-145




**NOTE:**

**All personnel should thoroughly review the Piedmont Airlines Aircraft Fueling Procedures Manual prior to servicing aircraft.**

# Fueling Procedures – EMB-145 Preparation

1. Obey the Safety Conditions for the Fuel Servicing

2. Statically bond the aircraft to fuel source.

NOTE:
Make all bonding connections between the fuel source, aircraft, and fuel nozzle (refer to the requirements of the Local Regulatory Authorities).

3. Energize the aircraft with the external DC power supply or APU

NOTE:
If the external DC power supply is not available, set the POWER SELECTION switch to the BATTERY position, on the refueling panel.

4. Open access door 191BR

# Fueling Procedures – EMB-145 Refueling

5. Make sure that the REFUELING lights related to the LH and RH tanks are off.

6. Make sure that the DEFUELING light is off

7. Make sure that the SELECTED quantity indicator shows zero.

WARNING:

BEFORE YOU SET THE INDICATOR, MAKE SURE OF THE UNIT OF MEASUREMENT (POUND/KILOGRAM) THAT THE INDICATOR SHOWS.

8. Set the indicator to the necessary fuel quantity.

# Fueling Procedures – EMB-145 Refueling

9. Remove the protective cover from the pressure refueling adapter.

10. Make sure that the refueling adapter is in good condition. Look for knicks, gouges or broken lugs on the nozzle and single point adapter plate.

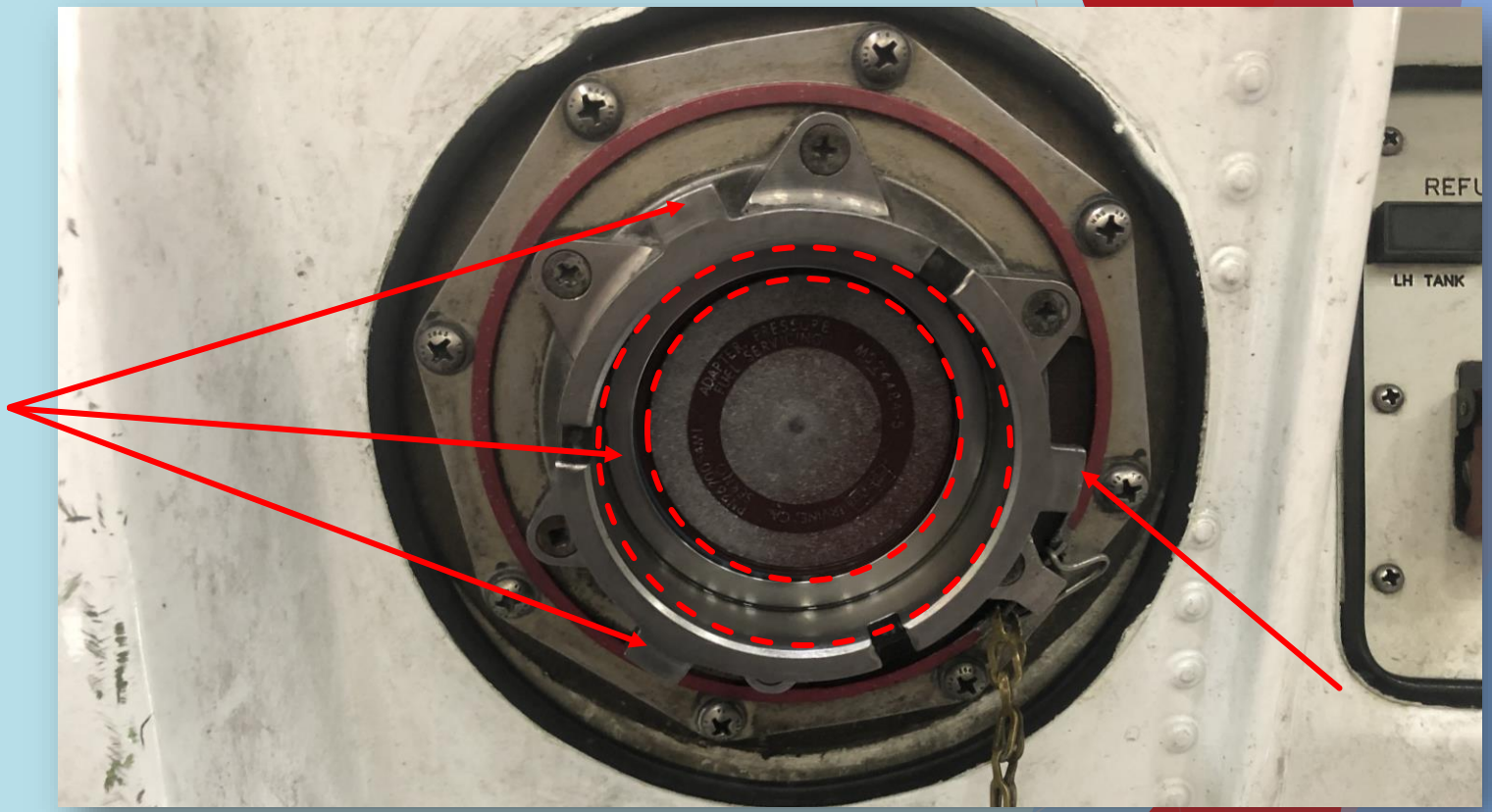
11. Connect the fuel nozzle to the pressure refueling adapter.

WARNING:

A BAD CONNECTION OF THE FUEL NOZZLE CAN CAUSE FUEL SPILLAGE, FIRE, OR INJURY TO PERSONS AND DAMAGE TO THE EQUIPMENT.

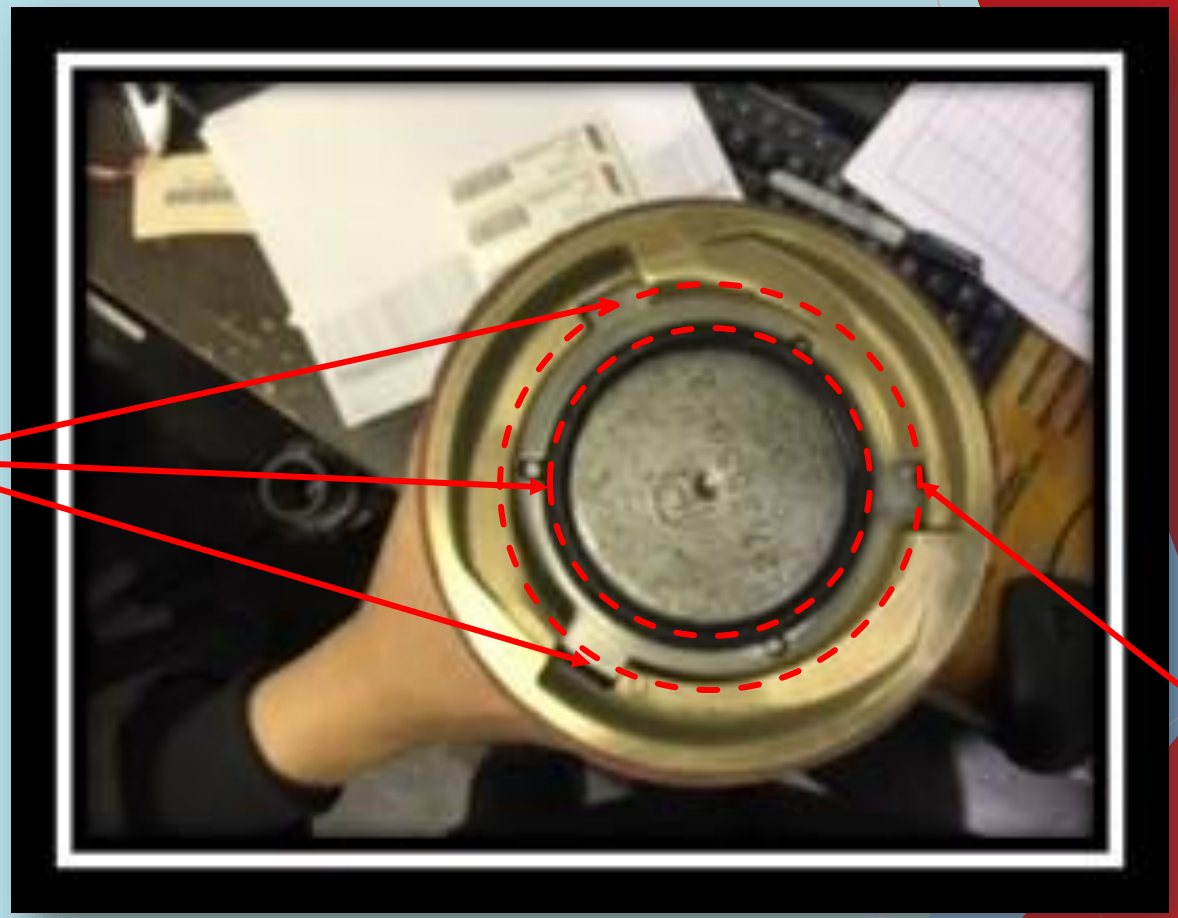
# Fueling Procedures – EMB-145 Refueling

Verify mating surface and lugs for obvious damage and debris



# Fueling Procedures – EMB-145 Refueling

Verify seal and lugs for obvious damage and debris



# Fueling Procedures – EMB-145 Refueling

12. Pressurize the system (35 - 50 psig).

13. Make sure that there is no leakage at the fuel nozzle connection.

14. Make sure that the REFUELING lights related to the LH and RH tanks come on (CLOSED or CLSD, as applicable) and the refueling flow stops.

15. Set the REFUELING switch to the OPEN position and make sure that the REFUELING lights related to the LH and RH tanks go off.

16. Make sure that the REFUELING lights related to the LH and RH tanks come on (CLOSED or CLSD, as applicable), when you have the set fuel quantity.

# Fueling Procedures – EMB-145 Refueling

17. Set the REFUELING switch to the CLOSED position.

18. Remove the fuel nozzle from the pressure refueling adapter.

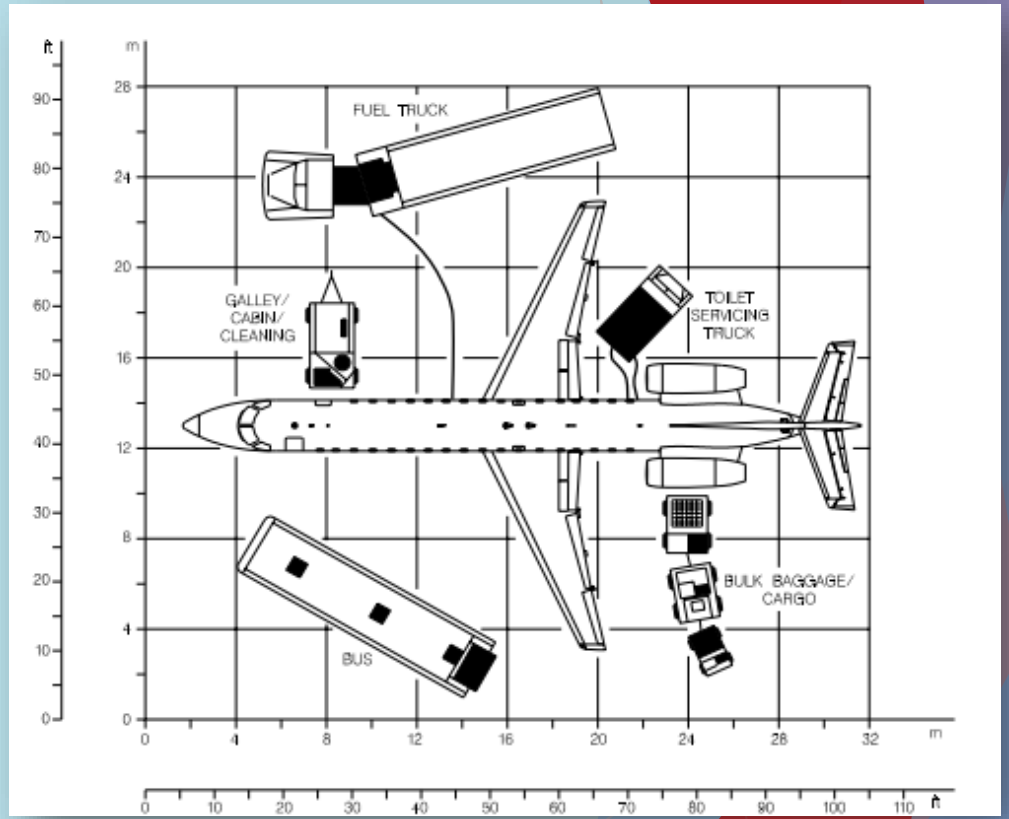
19. Install the protective cover to the pressure refueling adapter.

# Fueling Procedures – EMB-145
# Step 1

Ensure there are no malfunctions in any system of your fuel truck and that the brake system, emergency shut off, etc. are all in proper working order prior to approaching the aircraft.

# Fueling Procedures – EMB-145
# Step 1 - Continued

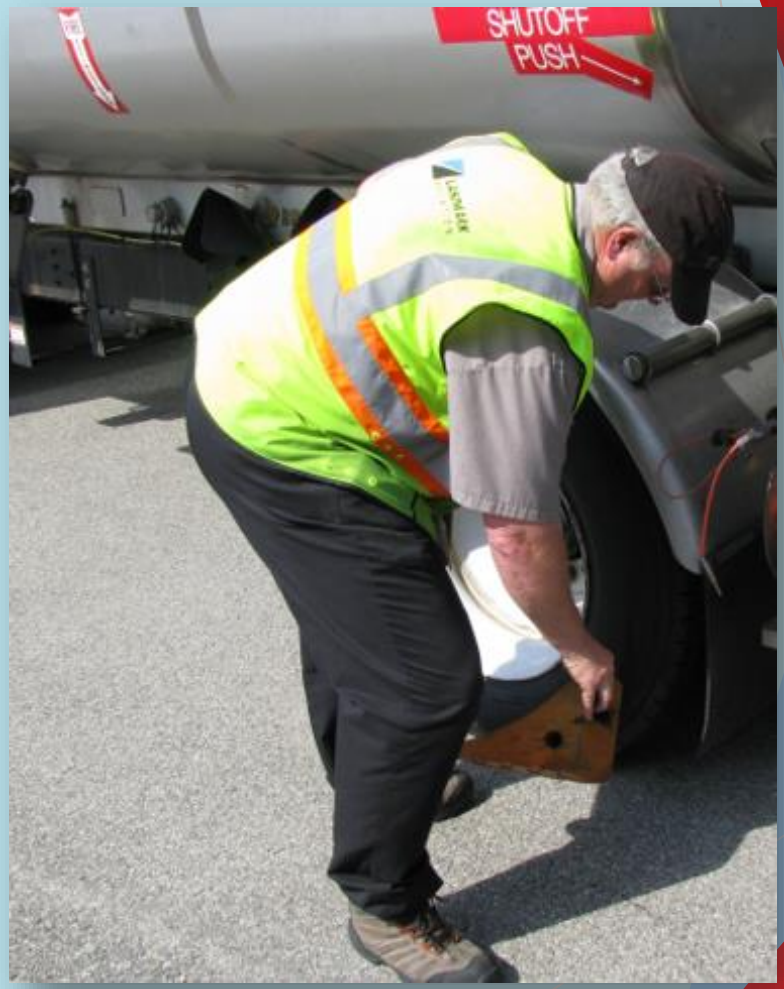
Ensure to test your brakes each time when approaching the aircraft and maintain the proper/safe distance from the aircraft.

# Fueling Procedures – EMB-145
# Step 1 - Continued

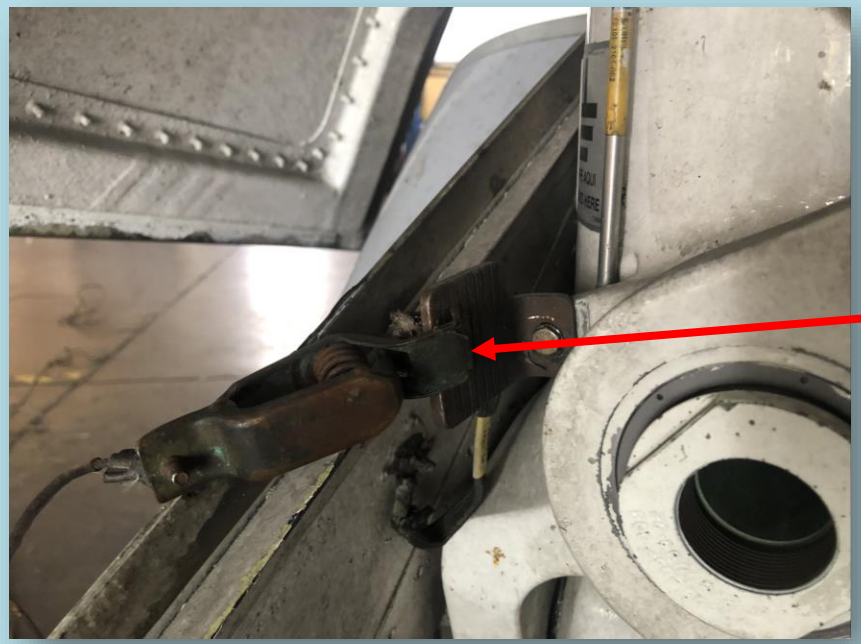
- When you exit your vehicle, ensure that the parking brake is set and you verify its operation.
- Chock the truck's tires each time you are to fuel the aircraft.

**Airport or company policy may differ.*



# Fueling Procedures – EMB-145 Step 2

- Bond the truck to the aircraft using the approved bonding points.
- *Refer to the requirements of the Local Regulatory Authorities*



# Fueling Procedures – EMB-145 Step 3

- Energize the aircraft with the external DC power supply or APU

# Fueling Procedures – EMB-145 Step 4

**Open access door 191BR**

- Control panel located forward of the right wing, installed beside refueling/defueling adapter.
- Panel & service light illuminate automatically when door is opened.

# Fueling Procedures – EMB-145 Step 5

- Ensure that the REFUELING lights related to the LH / RH tanks are OFF

# Fueling Procedures – EMB-145 Step 6

- Ensure that the DEFUELING light is OFF

# Fueling Procedures – EMB-145 Step 7

- Ensure that the selected QTY indicator is showing 0.

**WARNING:** BEFORE YOU SET THE INDICATOR, MAKE SURE OF THE UNIT OF MEASUREMENT (POUND/KILOGRAM) THAT THE INDICATOR SHOWS.

# Fueling Procedures – EMB-145 Step 8

- Set the indicator to the necessary fuel quantity.

# Fueling Procedures – EMB-145
# Step 9

- Remove the protective cover from the pressure refueling adapter.

# Fueling Procedures – EMB-145 Step 10

Make sure that the refueling adapter is in good condition:

- Do a check for missing or damaged lugs
- Do a check for signs of cracks and contamination.

*ALWAYS ENSURE DUST COVERS ARE IN PLACE TO PREVENT CONTAMINATION!*

# Fueling Procedures – EMB-145
# Step 11

- Connect the fuel nozzle to the pressure refueling adapter.

**WARNING:**

A BAD CONNECTION OF THE FUEL NOZZLE CAN CAUSE FUEL SPILLAGE, FIRE, OR INJURY TO PERSONS AND DAMAGE TO THE EQUIPMENT.

# Fueling Procedures – EMB-145 Step 12

- Pressurize the system (35 – 50 psig)

# Fueling Procedures – EMB-145 Step 13

- Make sure that there is no leakage at the fuel nozzle connection.
- Inspect all around the fuel nozzle.

# Fueling Procedures – EMB-145 Step 14

- Make sure that the REFUELING lights related to the LH and RH tanks come on (CLOSED or CLSD, as applicable) and the refueling flow stops.

# Fueling Procedures – EMB-145 Step 15

- Set the REFUELING switch to the OPEN position and make sure that the REFUELING lights related to the LH and RH tanks go off.
- Pumping will begin, be sure to monitor L/H & R/H tanks continually for imbalances and notify the crew if necessary.

MAX IMBALANCE IS 800 LBs!!!

# Fueling Procedures – EMB-145 Step 16

- Make sure that the REFUELING lights related to the LH and RH tanks come on (CLOSED or CLSD, as applicable), when you have the set fuel quantity.

# Fueling Procedures – EMB-145 Step 17

- Set the REFUELING switch to the CLOSED position. Switch toggled down and red cover closed.

# Fueling Procedures – EMB-145 Step 18

- Remove the fuel nozzle from the pressure refueling adapter.

# Fueling Procedures – EMB-145 Step 19

- Install the protective cover to the pressure refueling adapter.

# Fueling Procedures – EMB-145 Completion

1. De-energize the aircraft (if required).

NOTE:
If you used the POWER SELECTION switch at BATTERY position, set it back to the NORMAL position and close the switch guard.

2. Remove the bonding cable from the aircraft.

WARNING:
MAKE SURE THAT ALL THE SWITCH GUARDS ARE AT THE CLOSED POSITION ON THE REFUELING PANEL.

3. Close access door 191BR.

# Alternate Indication

# Fueling Procedures – EMB-145 Alternate Indication

- Fuelers may be requested to assist in using magna-sticks.
- Used to determine fuel quantity if the fuel quantity indicator system inoperative.
- NOTE: A/C must be in a level/flat attitude when magnetic dipstick readings are taken.

# Fueling Procedures – EMB-145 Alternate Indication

The fuel-measuring stick assemblies are on the wing and wing-stub lower surface. There are two of them in each half-wing and two in the wing stub.

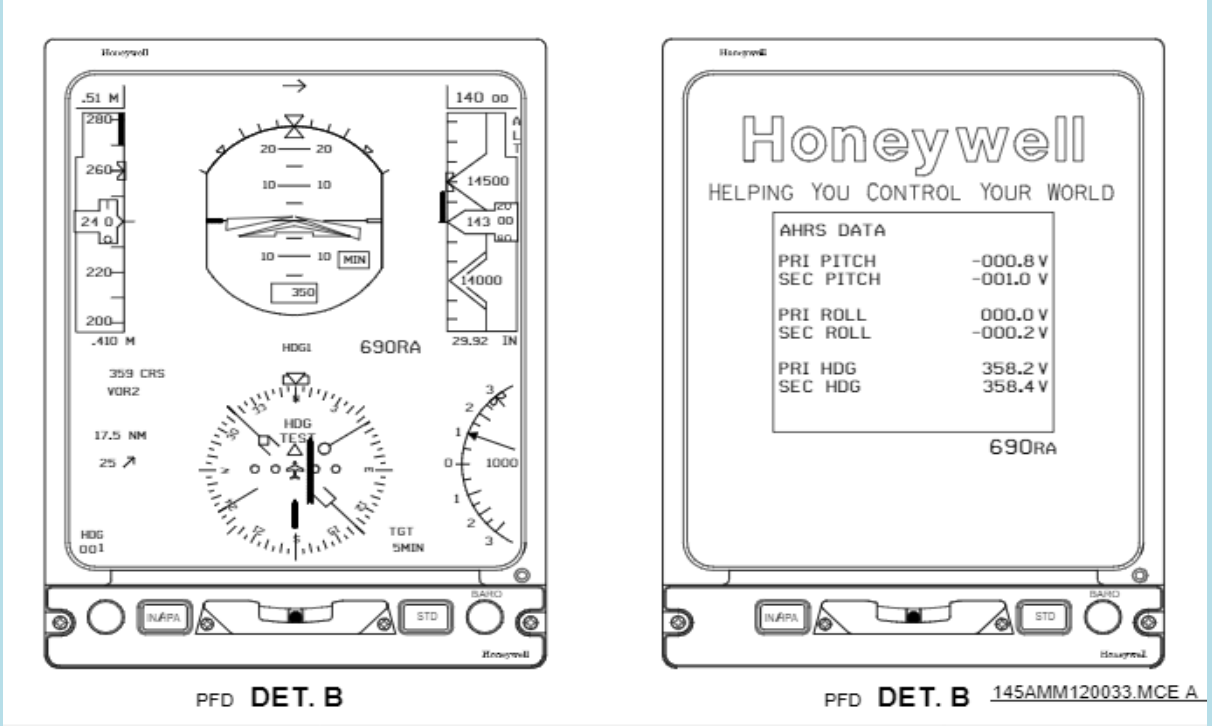
Each measuring point has a magnetic float, which holds a calibrated stick. The magnet is at the level of the fuel so when the stick is dropped it gives a visual indication of the total fuel quantity on the related side.

# Fueling Procedures – EMB-145 Alternate Indication


Stick numbering noted in video is the order in which the sticks are to be read numbering in the quantity charts goes inboard out.

# Fueling Procedures – EMB-145 Alternate Indication - Step 1

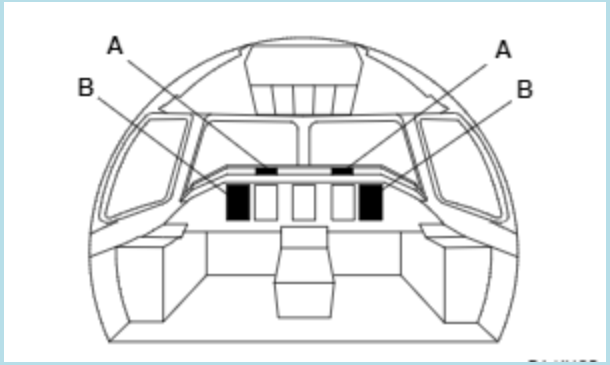
- Make sure that the roll angle is -1° to 1° and the pitch angle is -2° to 2°

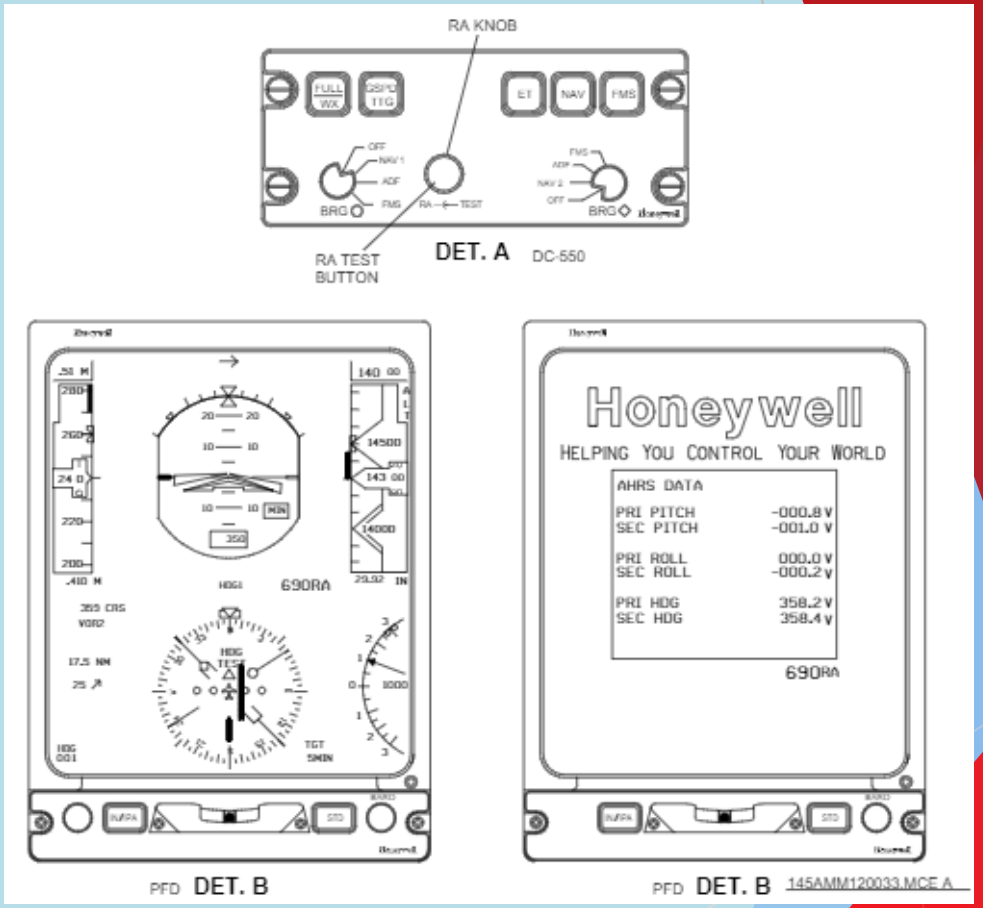



Note: This step should be performed by maintenance/flight crew and ground service

# Fueling Procedures – EMB-145 Alternate Indication – Step 2

- Use the RA knob, on DC-550 display controller (pilot / copilot side) and set the DH (decision height) to "690".

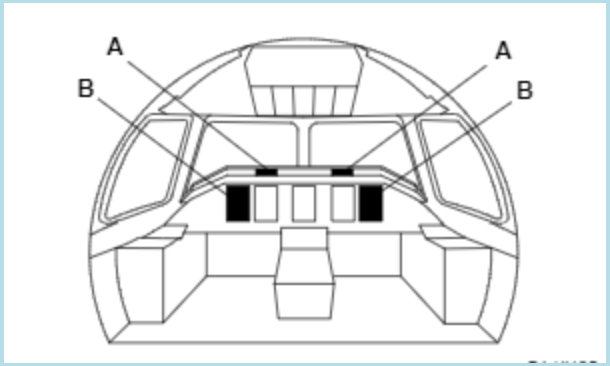


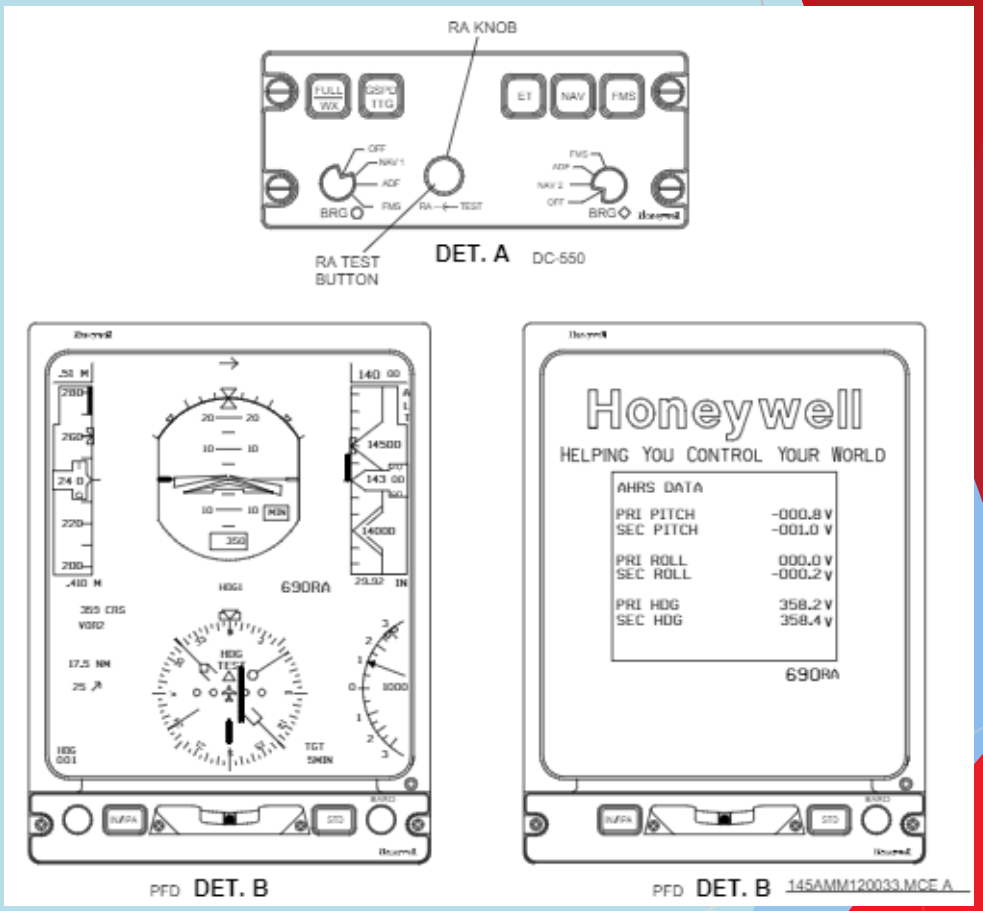




Note: This step should be performed by maintenance/flight crew and ground service

# Fueling Procedures – EMB-145 Alternate Indication – Step 3

- Push the RA test button and ET pushbutton, on the DC-550 display controller, at the same time and for a minimum of 10 seconds.
- The PFD display will show the pitch and roll values.



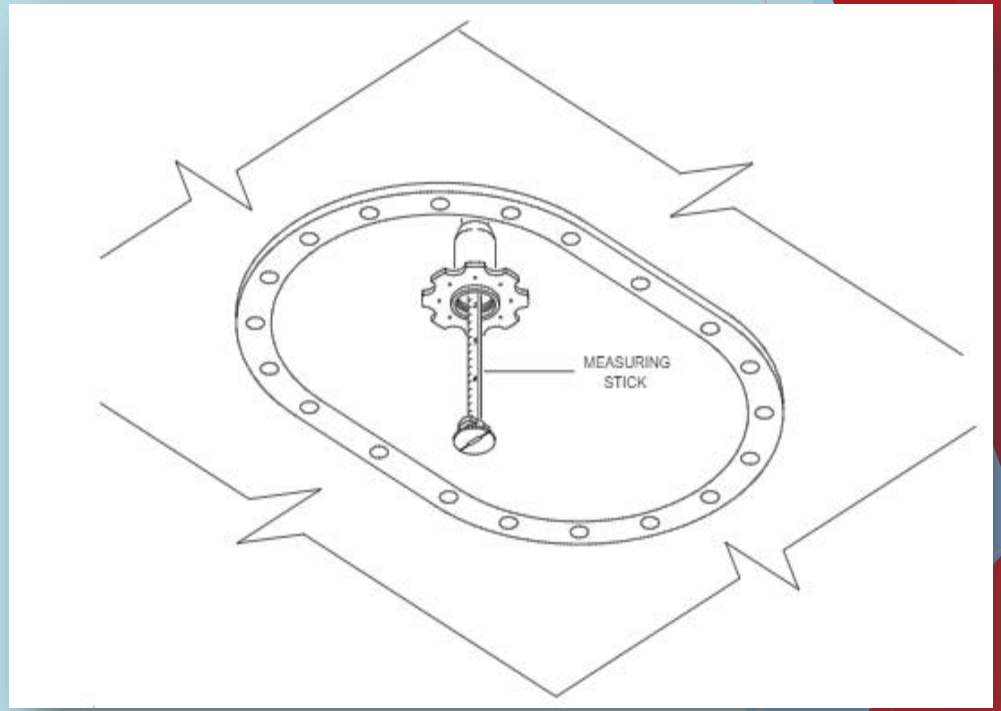

Note: This step should be performed by maintenance/flight crew and ground service

# Fueling Procedures – EMB-145 Alternate Indication – Step 4

- At the wing undersurface, turn the stick latch counterclockwise to release the stick from the housing and permit it to fall. Make sure that the stick falls freely until it is held by the magnetic float.

WARNING:

MAKE SURE THE STICK IS CLEAR AND CAN MOVE FREELY. IF STICK DOES NOT MOVE FREELY, A WRONG FUEL MEASUREMENT WILL OCCUR



# Fueling Procedures – EMB-145 Alternate Indication – Step 5

- To determine the fuel quantity in one of the wings, start the measurements from the wing tip and go in the direction of the wing root (outboard to inboard), until you have a point which is not at the lower stop ("zero" reading on the scale). The value found must then be entered in table 602.

Table 602 - Fuel Level Measurement (Continued)

| STICK INDICATION | FUEL QUANTITY (USABLE) [2] | | | | | |
|---|---|---|---|---|---|---|
| | STICK 1 (wing stub) | | STICK 2 (wing root) | | STICK 3 (wing tip) | |
| | LITERS | US GAL | LITERS | US GAL | LITERS | US GAL |
| 4.5 | 259 | 68 | 1286 | 340 | 2731 | 721 |
| 4.6 | 265 | 70 | 1300 | 343 | 2747 | 726 |
| 4.7 | 270 | 71 | 1313 | 347 | 2767 | 731 |
| 4.8 | 276 | 73 | 1326 | 350 | 2791 | 737 |
| 4.9 | 281 | 74 | 1339 | 354 | | |

# Fueling Procedures – EMB-145 Alternate Indication – Step 6

- After the fuel reading, return the stick up to its housing and lock it in position by turning clockwise.
- Belly access panel must be latched and secured if opened.

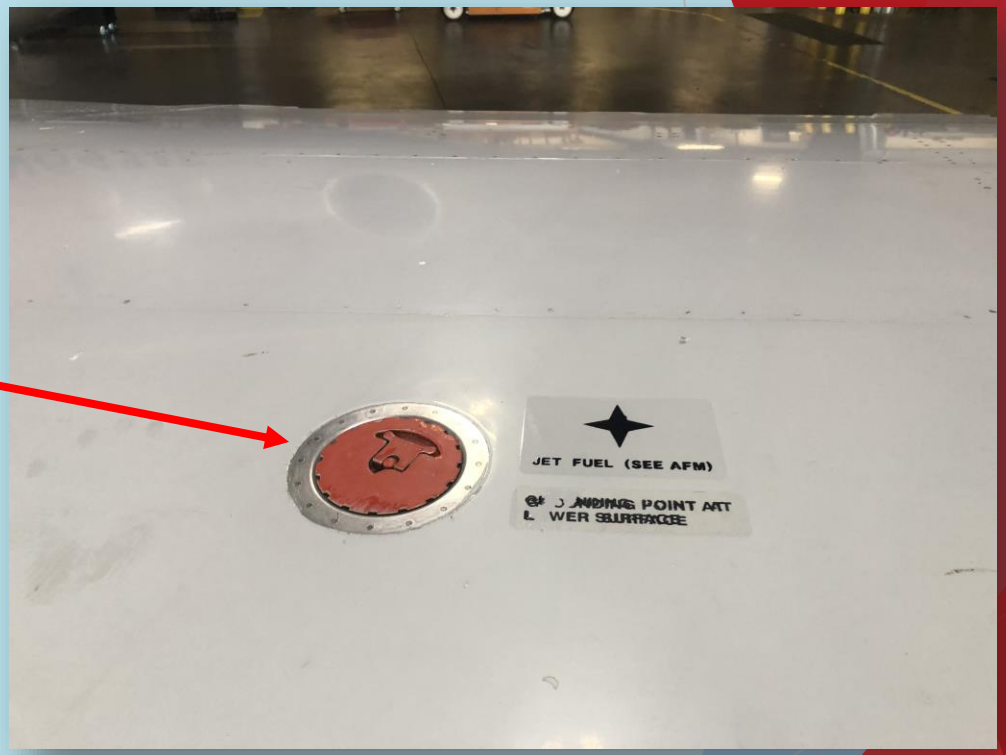
# Fueling Procedures – EMB-145 Alternate Indication – Review

***Information is for reference only, the Piedmont Airlines Aircraft Fueling Procedures Manual (AFPM) SHALL be used during reading***

# Gravity (Overwing) Refueling

# Fueling Procedures – EMB-145 Overwing Fueling

Gravity (overwing) refueling is provided by a Gravity Refueling Cap on the top of each wing, identified to the right. Grounding points are located at the lower surface of the wings for refueling using this method.



# Fueling Procedures – EMB-145 Overwing Fueling

Follow airport requirements when fueling and do not overwing fuel aircraft in inclement weather when water or debris will be introduced into the tank

Always bond the nozzle to the aircraft before opening the tank filler cap. Truck bonding is required in addition to the nozzle bonding.

This may require a clap/bayonets fitting to be made, or a dedicated nozzle with a bayonet fitting attached.

# Fueling Procedures – EMB-145 Overwing Fueling

Double bonding is required as bonding with the nozzle against the filler port has the potential to create a spark if there is a difference in potential energy between the truck and the plane or if the hose grounding cable becomes damaged internally.

*In the event a spark would be created, it would be directly above the open fuel tank.*

Disconnect static ground wires in reverse order when refueling/defueling is completed. Close cap, remove nozzle bond, remove aircraft bond.

# Defueling

# Fueling Procedures – EMB-145 Defueling

1. No smoking or any other kind of open flame is allowed in the vicinity of the aircraft.

2. Position a suitable type fire extinguisher in the immediate area of the aircraft and ensure that personnel involved in defueling are familiar with its use.

3. Bond aircraft and fuel tender.

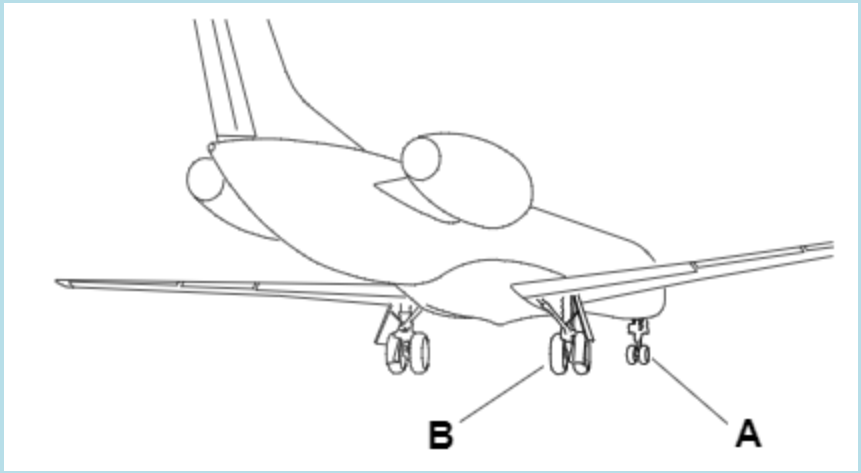
4. Ensure that all electrical power is off when manual defueling method is used. During defueling using auxiliary pumps, all electrical services must be off, with the exception of those required to monitor the operation.

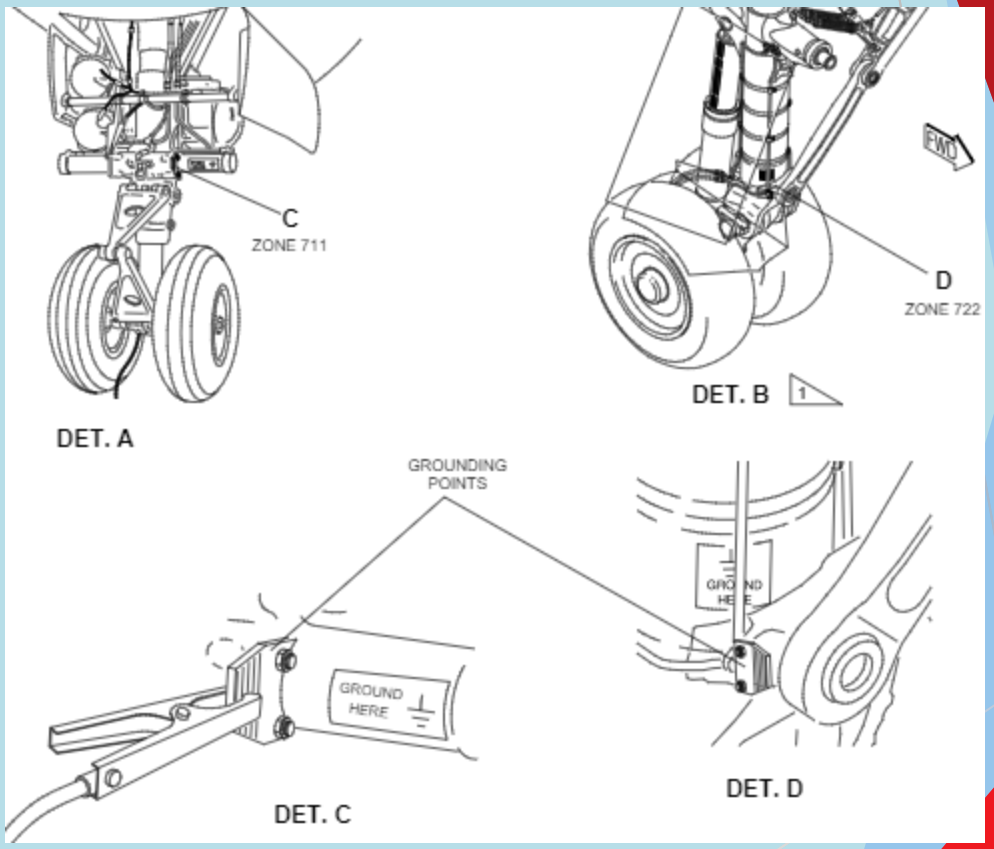
5. Avoid carrying out other work on the aircraft during a defueling operation.

6. Avoid spilling fuel as spilled fuel will greatly increase the fire hazard.

# Fueling Procedures – EMB-145 Defueling – Step 1

- Statically ground the aircraft at an approved grounding location.



# Fueling Procedures – EMB-145
# Defueling – Step 2

- Energize the aircraft with the external DC power supply or APU.

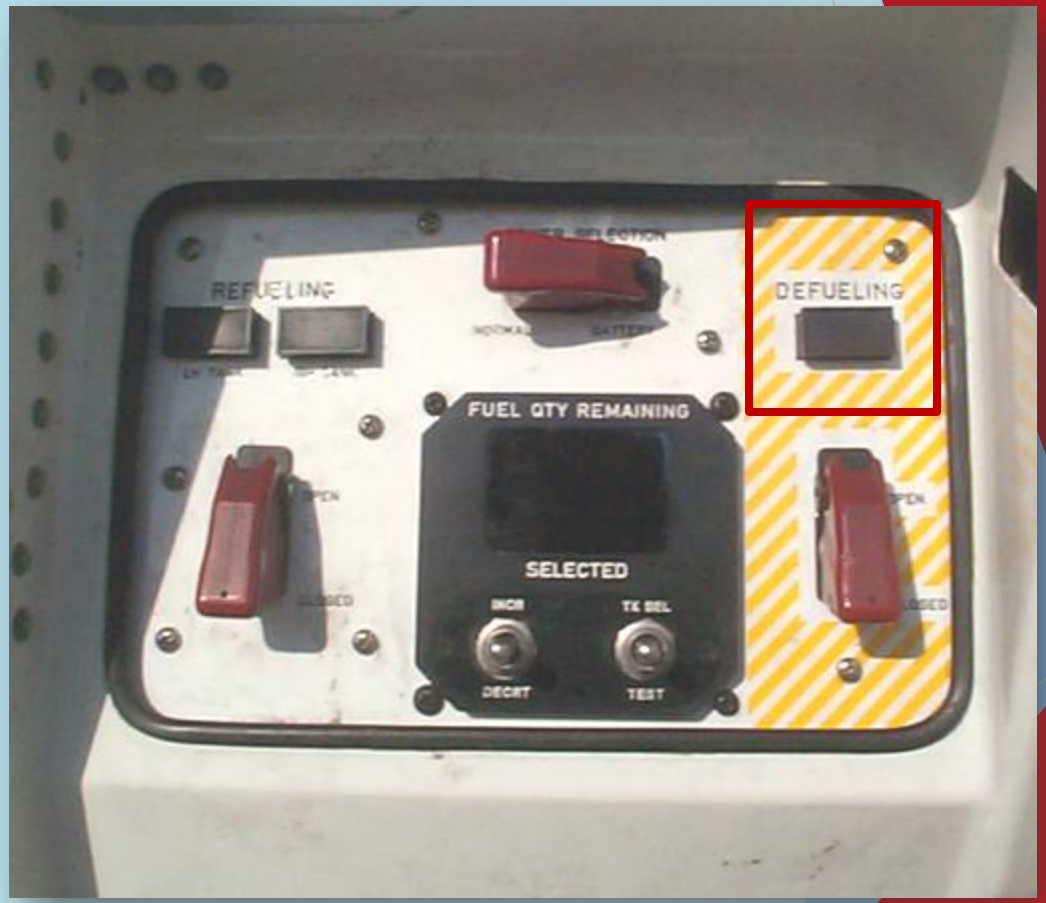
# Fueling Procedures – EMB-145
# Defueling – Step 3

**Open access door 191BR**

- Control panel located forward of the right wing, installed beside refueling/defueling adapter.
- Panel & service light illuminate automatically when door is opened.

# Fueling Procedures – EMB-145
# Defueling – Step 3 Continued

- Make sure that the DEFUELING light is off.



# Fueling Procedures – EMB-145
# Defueling – Step 4

- Remove the protective cover from the pressure refueling adapter.

# Fueling Procedures – EMB-145 Defueling – Step 5

Make sure that the refueling adapter is in good condition:

- Do a check for missing or damaged lugs
- Do a check for signs of cracks and contamination


# Fueling Procedures – EMB-145
# Defueling – Step 6

- Connect the fuel nozzle to the pressure refueling adapter.

**WARNING:**

A BAD CONNECTION OF THE FUEL NOZZLE CAN CAUSE FUEL SPILLAGE, FIRE, OR INJURY TO PERSONS AND DAMAGE TO THE EQUIPMENT.

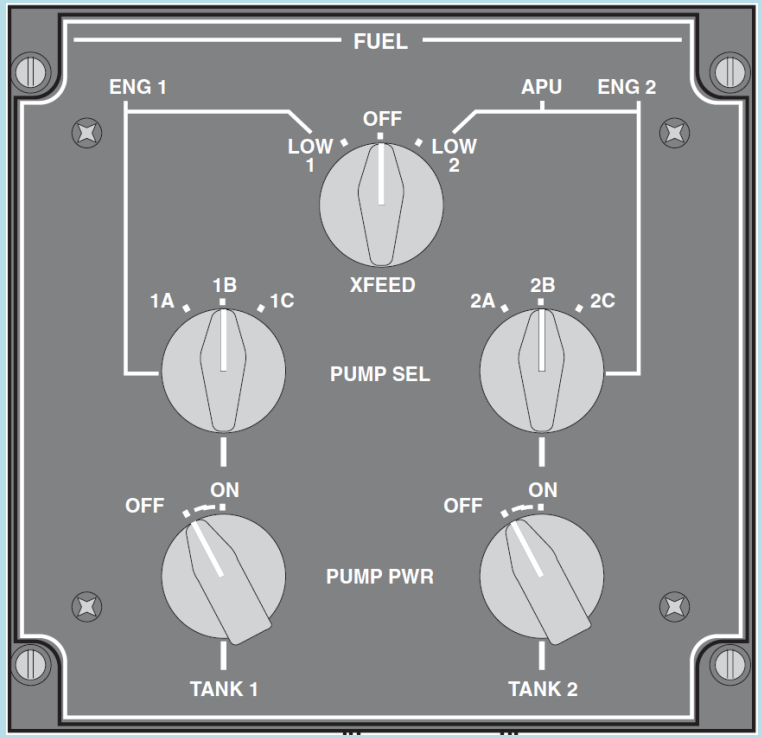
# Fueling Procedures – EMB-145
# Defueling – Step 6 Continued

- Set the DEFUELING switch to the OPEN position and make sure that the DEFUELING light comes on (OPEN).

# Fueling Procedures – EMB-145
# Defueling – Step 7

On the overhead panel, set the XFEED switch as applicable:

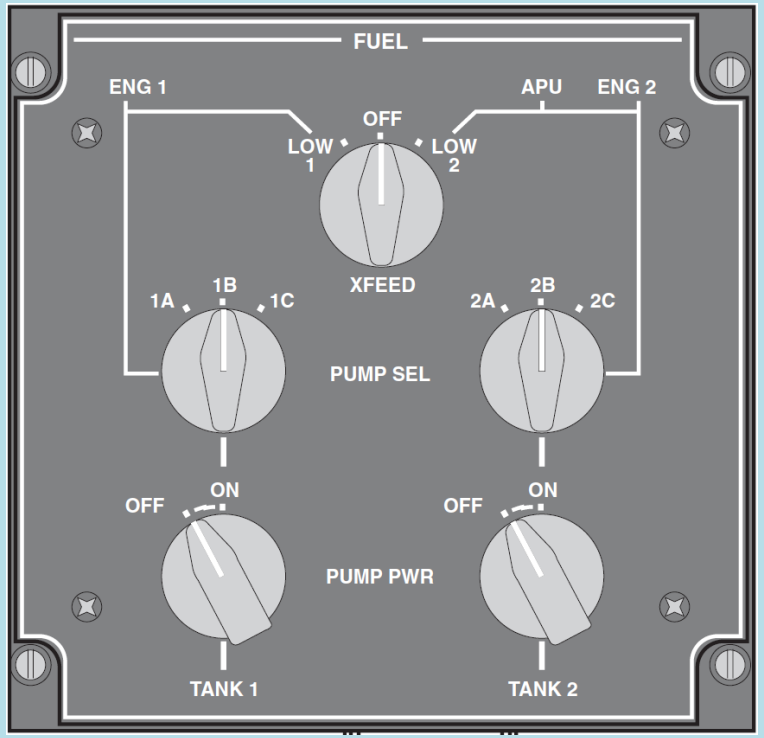
- To defuel BOTH tanks, set it to the LOW 2 position.
- To defuel the LH tank, set it to the LOW 2 position.
- To defuel the RH tank, set it to the OFF position.




Note:
This step is to be performed by the flight crew/maintenance

# Fueling Procedures – EMB-145
# Defueling – Step 8

- Set the PUMP PWR switches, on the overhead panel, to the ON position.

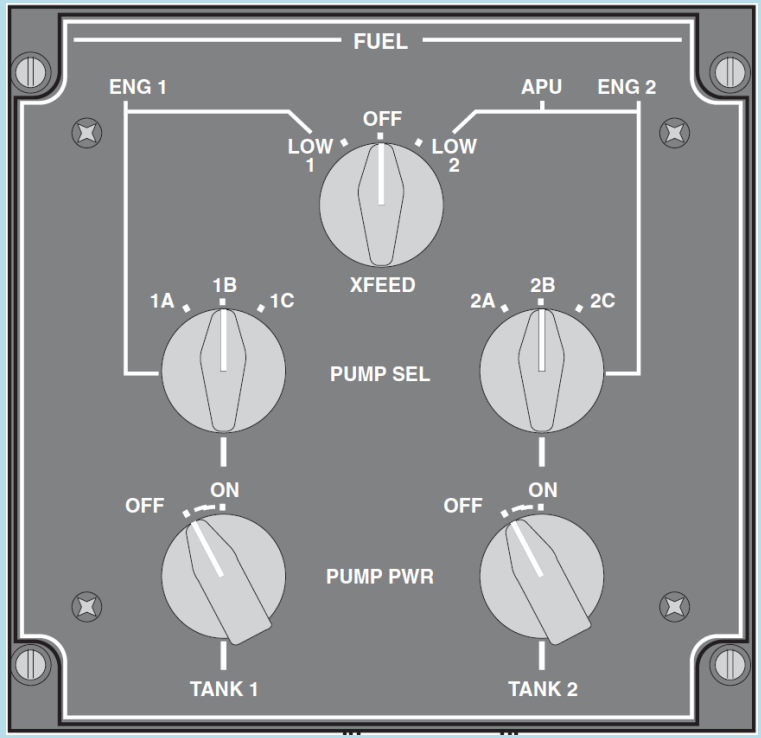



Note:
This step is to be performed by the flight crew/maintenance

# Fueling Procedures – EMB-145
# Defueling – Step 9

After setting the PUMP PWR switches, on the overhead panel to the ON position watch for fuel pump cycling.

NOTE:
If you see that the fuel pumps "cycle" (automatically change selection of the pumps one after the other), open the circuit breakers related to the pumps not selected with the PUMP SEL switches. For example, if pumps 1A and 2B are selected, open the PUMP 1B, PUMP 1C, PUMP 2A, and PUMP 2C circuit breakers.




Note:
This step is to be performed by the flight crew/maintenance

# Fueling Procedures – EMB-145
# Defueling – Step 10

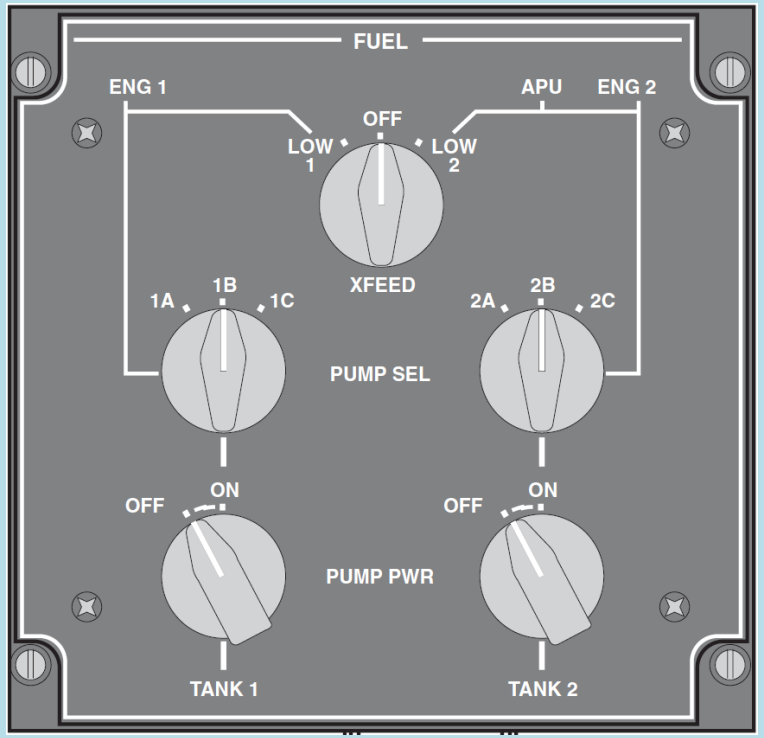
When you have only the necessary remaining fuel quantity, set the DEFUELING switch to the CLOSED position and make sure that its light goes off.

**CAUTION:**

DO NOT RUN ELECTRICAL PUMPS WITH A FUEL QTY IN BOTH TANKS BELOW 35 LTS (9.2 GAL) OR 28 KG (62 LB) DO NOT DO A DRY OPERATION OF THE FUEL PUMPS, DURING THE DEFUELING OPERATION.

# Fueling Procedures – EMB-145
# Defueling – Step 11

- Set the PUMP PWR and XFEED switches to the OFF Position.




Note:
This step is to be performed by the flight crew/maintenance

# Fueling Procedures – EMB-145
# Defueling – Step 12

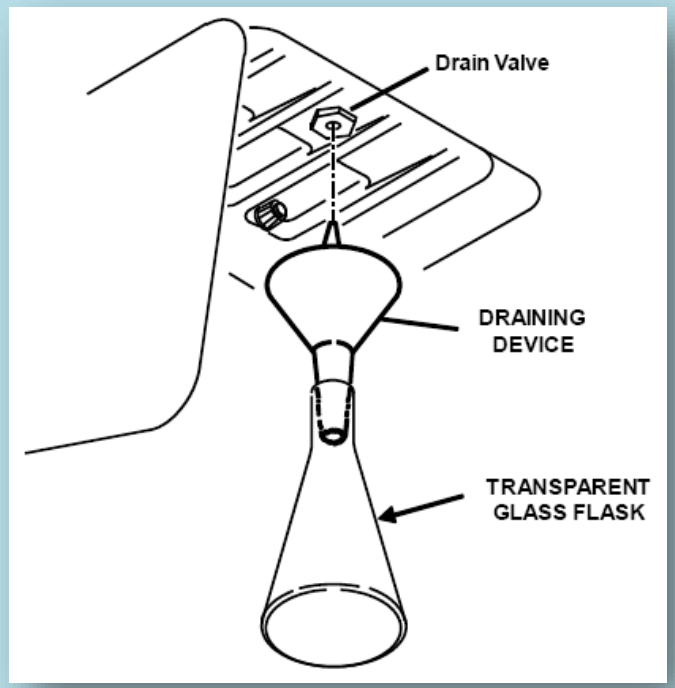
- Remove the fuel nozzle from the pressure refueling adapter.

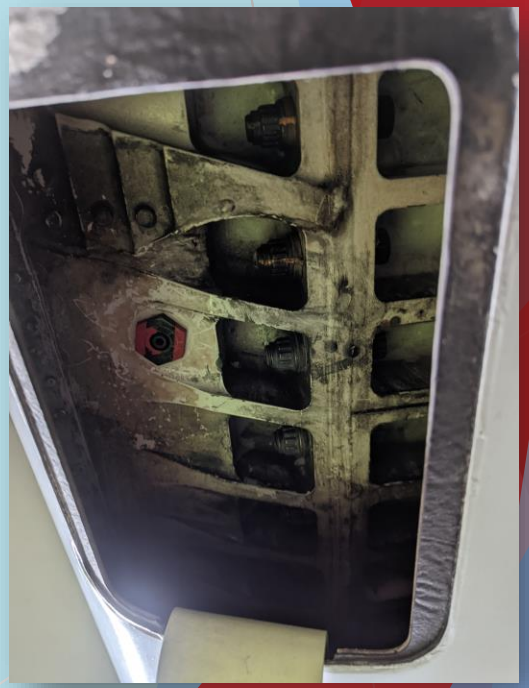
# Fueling Procedures – EMB-145
# Defueling – Step 13

- Install the protective cover on to the pressure refueling adapter.

# Fueling Procedures – EMB-145
# Tank Drain Valve

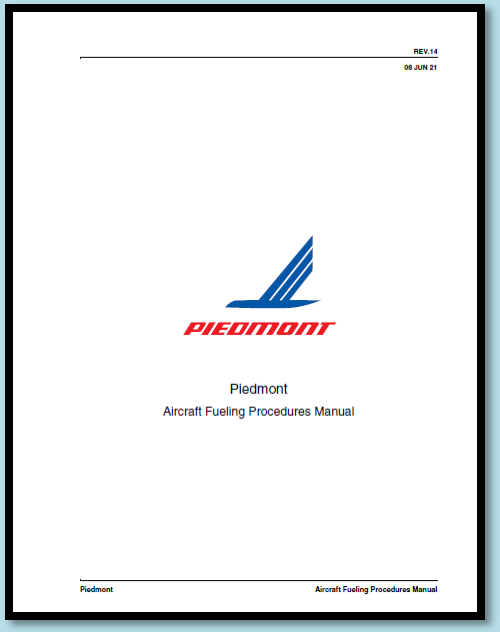
A manually operated drain valve is installed in each tank, in the lowest part of the wing stub. This permits fuel sampling and the subsequence draining of any water in the fuel tank to allow the fuel in the tank to be clear of water as required.

# EMB-145 Aircraft - Manuals

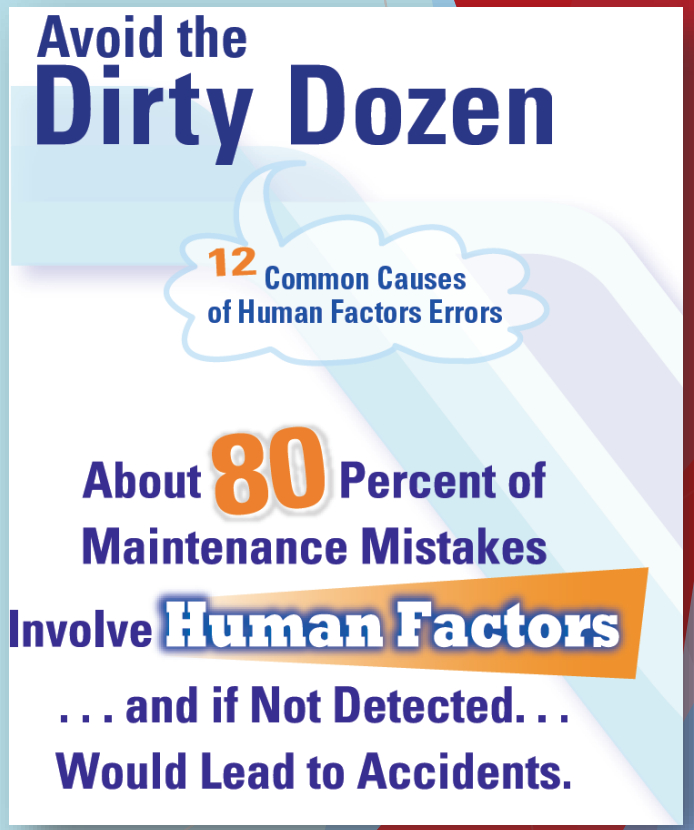
For any further questions, please
consult the Piedmont Airlines Aircraft Fueling Procedures Airlines Manual.(AFPM)



# Human Factors

The Dirty Dozen;

It has been determined by researching mistakes caused by people, that one or more of 12 common denominators (clues) are usually present. These are referred to as “The Dirty Dozen” root causes.

# Lack of Communication;

Poor communication (or Lack of) often appears at the top of contributing and causal factors in accident reports, and is therefore one of the most critical human factor elements.

Communication refers to the transmitter and the receiver, as well as the method of transmission. Transmitted instructions may be unclear or inaccessible. The receiver may make assumptions about the meaning of these instructions, and the transmitter may assume that the message has been received and understood. With verbal communication it is common that only 30% of a message is received and understood.

- Detailed information must be passed before, during and after any task, and especially across the turnover of shifts. Therefore, when messages are complex, they should be written down, and organizations should encourage full use of logbooks, worksheets, and checklists etc.

- Verbal messages can be kept short, with the most critical elements emphasized at the beginning and repeated at the end. Assumptions should be avoided and opportunities for asking questions both given and taken.

Ways to Improve your communication;

- Say the most important things in the beginning and repeat them at the end
- Use checklists

# Complacency;

Complacency can be described as a feeling of self-satisfaction accompanied by a loss of awareness of potential dangers. Such a feeling often arises when conducting routine activities that have become habitual and which may be “considered”, by an individual (sometimes by the whole organization), as easy and safe.

A general relaxation of vigilance results and important signals will be missed, with the individual only seeing what he, or she, expects to see.

Complacency can also occur following a highly intense activity such as recovering from a possible disaster; the relief felt at the time can result in physical relaxation and reduced mental vigilance and awareness. This particular psychological experience is referred to as a Lacuna.

Whilst too much pressure and demand causes over-stress and reduced human performance, too little results in under-stress, boredom, complacency and reduced human performance. It is therefore important, when conducting simple, routine and habitual tasks, and when fatigued, to maintain an adequate, or optimum, level of stress through different stimulation. Always expect to find a fault!

Avoid the tendency to see what you expect to see;

- Expect to find errors
- Don’t sign it if you didn’t do it
- Use checklists
- Learn from the mistakes of others

# Lack of Knowledge;

The regulatory requirements for training and qualification can be comprehensive, and organizations are forced to strictly enforce these requirements. However, lack of on-the-job experience and specific knowledge can lead workers into misjudging situations and making unsafe decisions. Aircraft systems are so complex and integrated that it is nearly impossible to perform many tasks without substantial technical training, current relevant experience and adequate reference documents. Furthermore, systems and procedures can change substantially and employees' knowledge can quickly become out-of-date.

It should not be a taken as a sign of weakness to ask someone for help or for information; in fact this should be encouraged. Checklists and publications should always be referred to and followed, and never make assumptions or work from memory.

Don't guess, know;

- Use current manuals / procedures
- Ask when you don't know
- Participate in training

# Distractions;

Distractions could be anything that draws a person's attention away from the task on which they are employed. Some distractions in the workplace are unavoidable, such as loud noises, requests for assistance or advice, and day-to-day safety problems that require immediate solving. Other distractions can be avoided, or delayed until more appropriate times, such as messages from home, management decisions concerning non-immediate work (e.g. shift patterns, leave entitlement, meeting dates, administrative tasks, etc), and social conversations.

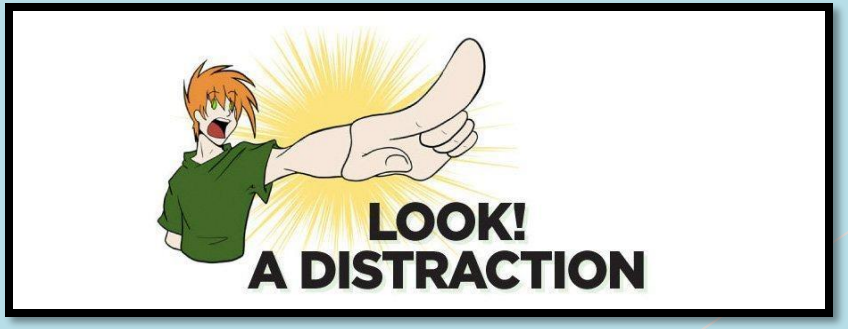
Psychologists say that distraction is the number one cause of forgetting things: hence the need to avoid becoming distracted and to avoid distracting others. Humans tend to think ahead. Thus, when returning to a task, following a distraction, we have a tendency to think we are further ahead than we actually are.

To reduce errors from distraction it is best to complete a task before responding.

- If the task cannot be completed without hurrying, then we can prominently mark (or "lock off") the incomplete work as a reminder to ourselves and anyone else who may complete the work.
- When returning to work, after being distracted, it is a good idea to commence at least three steps back, so that we retrace some steps before picking up the task again.
- If necessary, having someone else double-check our work using a checklist may be appropriate and useful.

Get back in the groove after a distraction;

- Use checklists
- Go back 3 steps when restarting the work



# Lack of Teamwork;

In aviation many tasks and operations are team affairs; no single person (or organization) can be responsible for the safe outcomes of all tasks. However, if someone is not contributing to the team effort, this can lead to unsafe outcomes. This means that workers must rely on colleagues and other outside agencies, as well as give others their support. Teamwork consists of many skills that each team member will need to prove their competence.

Some of the key teamwork skills include: leadership, followership, effective communication, trust building, motivation of self and others, and praise giving.

Build solid teamwork;

- Discuss how a task should be done
- Make sure everyone understands and agrees
- Trust your teammates

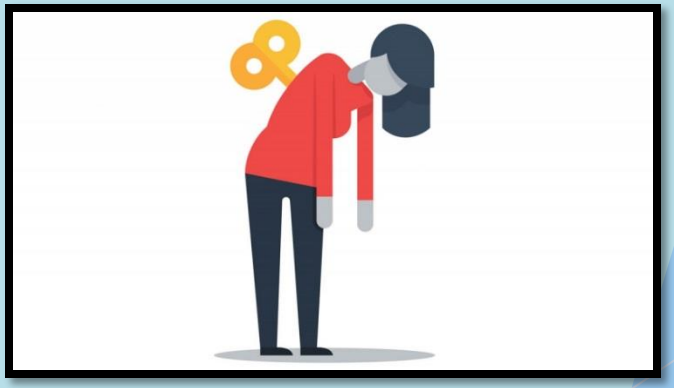
# Fatigue;

Fatigue is a natural physiological reaction to prolonged physical and/or mental stress. We can become fatigued following long periods of work and also following periods of hard work. When fatigue becomes a chronic condition, it may require medical attention but, workers should never self-medicate! As we become more fatigued our ability to concentrate, remember and make decisions reduces. Therefore, we are more easily distracted and we lose situational awareness. Fatigue will also affect a person's mood, often making them more withdrawn, but sometimes more irrational and angry.

It is a human problem that we tend to underestimate our level of fatigue and overestimate our ability to cope with it.

Eliminate fatigue-related performance issues;

- Watch for symptoms of fatigue in yourself and others
- Have others check your work
- Reduce use of alcohol and avoid drugs
- Eat a balanced healthy diet
- Regular sleep schedule
- Drink plenty of water



# Lack of Resources;

If all the parts are not available to complete a task, then there may be pressure on an individual to complete the task using old, or inappropriate resources. Regardless of the task, resources also include personnel, time, data, tools, skill, experience and knowledge etc. A lack of any of these resources can interfere with one's ability to complete a task. It may also be the case that the resources available, including support, are of a low quality or inadequate for the task.

When the proper resources are available, and to hand, there is a greater chance that we will complete a task more effectively, correctly and efficiently. Therefore, forward planning to acquire, store and locate resources is essential. It will also be necessary to properly maintain the resources that are available; this includes the humans in the organization as well.

Improve supply and support;

- Order parts before they are required
- Have a plan for pooling or loaning parts

# Pressure;

Pressure is to be expected when working in a dynamic environment. However, when the pressure to meet a deadline interferes with our ability to complete tasks correctly, then it has become too much. It is the old argument of Quantity versus Quality; and in aviation we should never knowingly reduce the quality of our work. Pressure can be created by lack of resources, especially time and, also from our own inability to cope with a situation. We may come under direct, or indirect, pressure from the Company, from clients and even our colleagues. However, one of the most common sources of pressure is ourselves. We put pressure on ourselves by taking on more work than we can handle, especially other people's problems, by trying to save face, and by positively promoting super-powers that we do not possess. These poor judgements are often the result of making assumptions about what is expected of us.

Learning assertiveness skills will allow a worker to say 'No', 'Stop!', and communicate concerns with colleagues, customers and the Company. These skills are essential, and when deadlines are critical, then extra resources and help should always be obtained to ensure the task is completed to the required level of quality.

Reduce the burden of physical or mental distress;

- Communicate concerns
- Ask for extra help
- Put safety first

# Lack of Assertiveness;

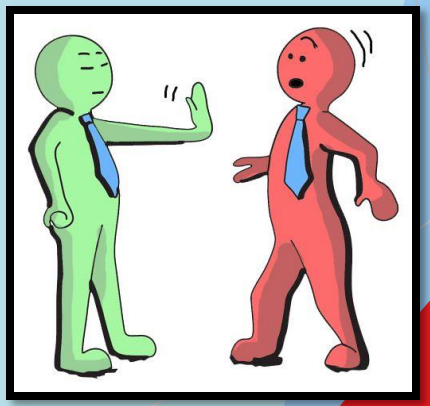
Being both unable to express our concerns and not allowing other to express their concerns creates ineffective communications and damages teamwork. Unassertive team members can be forced to go with a majority decision, even when they believe it is wrong and dangerous to do so.

Assertiveness is a communication and behavioral style that allows us to express feelings, opinions, concerns, beliefs and needs in a positive and productive manner. When we are assertive, we also invite and allow others to assert themselves without feeling threatened, undermined or that we've lost face. Speaking one's mind assertively is not to be confused with aggression. It is about communicating directly, but honestly and appropriately; giving respect to the opinions and needs of others, but not compromising our own standards.

Assertiveness Techniques can be learned and they focus on keeping calm, being rational, using specific examples rather than generalizations, and inviting feedback. Most importantly, any criticisms should be directed at actions and their consequences rather than people and their personalities; this allows others to maintain their dignity, and a productive conclusion to be reached.

Express your feelings, opinions, beliefs, and needs in a positive, productive manner;

- Express concerns but offer positive solutions
- Resolve one issue before addressing another



# Stress;

There are many types of stress. Typically, in the aviation environment, there are two distinct types - acute and chronic. Acute stress arises from real-time demands placed on our senses, mental processing and physical body; such as dealing with an emergency or working under time pressure with inadequate resources.

Chronic stress is accumulated and results from long-term demands placed on the physiology by life's demands, such as family relations, finances, illness, bereavement, divorce, or even winning the lottery. When we suffer stress from these persistent and long-term life events, it can mean our threshold of reaction to demands and pressure at work can be lowered. Thus at work, we may overreact inappropriately, too often and too easily.

Some early visible signs of stress include;

- Changes in personality and moods
- Errors of judgement
- Lack of concentration
- Poor memory
- Individuals may notice difficulty in sleeping and an increase in fatigue
- Digestive problems

Longer-term signs of stress include;

- Susceptibility to infections
- Increased use of stimulants and self-mediation
- Absence from work, illness and depression

Ways to manage stress before it affects your work;

- Take a rational approach to problem solving
- Take a short break when needed
- Discuss the problem with someone who can help

# Lack of Awareness;

Working in isolation and only considering one's own responsibilities can lead to tunnel vision; a partial view, and a lack of awareness of the affect our actions can have on others and the wider task.

Such lack of awareness may also result from other human factors, such as stress, fatigue, pressure and distraction.

Developing our foresight is essential in pre-empting the affects our actions may have on others. This is an attitude of professionalism and involves constant questioning *"what if …?"* Asking others to check our work and challenge our decisions is useful in gaining the relevant experience and expanding our awareness. Vigilance is closely related to situational awareness, and workplace procedures, such as scanning, two-way communication and use of checklists will help to maintain vigilance.

See the whole picture;

- Make sure there are no conflicts with an existing report, modification or work
- Fully understand the procedures needed to complete a task

# Norms;

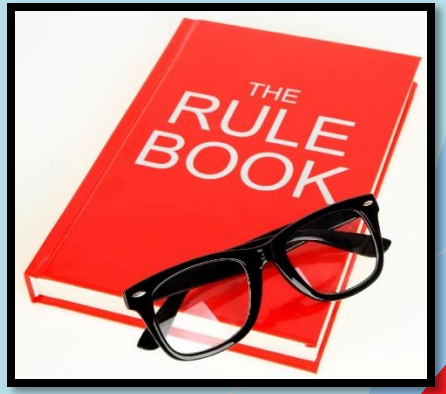
Workplace practices develop over time, through experience, and often under the influence of a specific workplace culture. These practices can be both, good and bad, safe and unsafe; they are referred to as “the way we do things round here” and become Norms.

Unfortunately, such practices follow unwritten rules or behaviors, which deviate from the required rules, procedures and instructions. These Norms can then be enforced through peer pressure and force of habit. It is important to understand that most Norms have not been designed to meet all circumstances, and therefore are not adequately tested against potential threats.

Rules and procedures should have been designed and tested, and therefore ought to be enforced and followed rigorously. Where workers feel pressure to deviate from a procedure, or work around it, then this information should be fed back so that the procedure can be reviewed and amended, if necessary. Developing assertiveness can allow workers to express their concerns about unsafe Norms, despite peer pressure.

Help maintain a positive environment with your good attitude and work habits;

- Existing norms don’t make procedures right
- Follow good safety procedures
- Identify and eliminate negative norms



Remember – No one is exempt from Human Factors…….


Additional Resources

FAA Human Factors Material

Now fill out your Piedmont Airlines Fueler Training Record Form P/FTF02 and have your Piedmont Airlines designated trainer sign for your completion.

The training documentation MUST be on file by the vendor at a location (electronic or paper) where it is available for inspection upon request by an American Eagle representative or other representatives of authorized agencies.  This documentation must be retained for a minimum of 3 years.

Completion records may be emailed to steve.hertz@aa.com

This completes this training presentation and record.