Safe Aircraft Refuelling

Safe refuelling operations require strict adherence to procedures and careful application of the safety precautions, not only by the refuelling operators but also flight crew, the cabin crew and the other ground operators.

This article highlights the safety precautions that must be considered when refuelling an aircraft. It also describes supplementary tasks that are necessary if refuelling when passengers are on-board.

FIRE PREVENTION

The main threat during refuelling operation is the fire threat.
The general safety precautions for refuelling/defuelling are available in:
- the A220 AMP SERVICING – REPLENISHING AND DEPLETING - FUEL REPLENISHING AND DEPLETING
- the A300/A310 AMM SERVICING - REPLENISHING OF FUEL TANKS
- the A320/A330/A340 AMM SERVICING - FUEL - FUEL SYSTEM - SERVICING
- General Refuel/Defuel Safety Procedures
- the A380 AMM FUEL - REFUEL/DEFUEL SYSTEM - SERVICING - General Refuel/Defuel Safety Procedures
- the A350 MP FUEL - DISTRIBUTION - REFUEL/DEFUEL SYSTEM - MAINTENANCE PROCEDURES - General Refuel/Defuel Safety Procedures

In addition to the availability of the firefighting equipment and use of personal protection by the fuelling operator, bonding the aircraft and respecting fuelling safety zones is essential.

Bonding and grounding during refuelling/defuelling

Bonding

Bonding ensures electrical continuity between the aircraft and the refuelling vehicle, preventing any spark to appear when the ground operator connects the refuelling hose to the aircraft coupling.

It is mandatory to bond the aircraft to the refuelling vehicle/device before connecting the refuelling hose **(fig.1)**.

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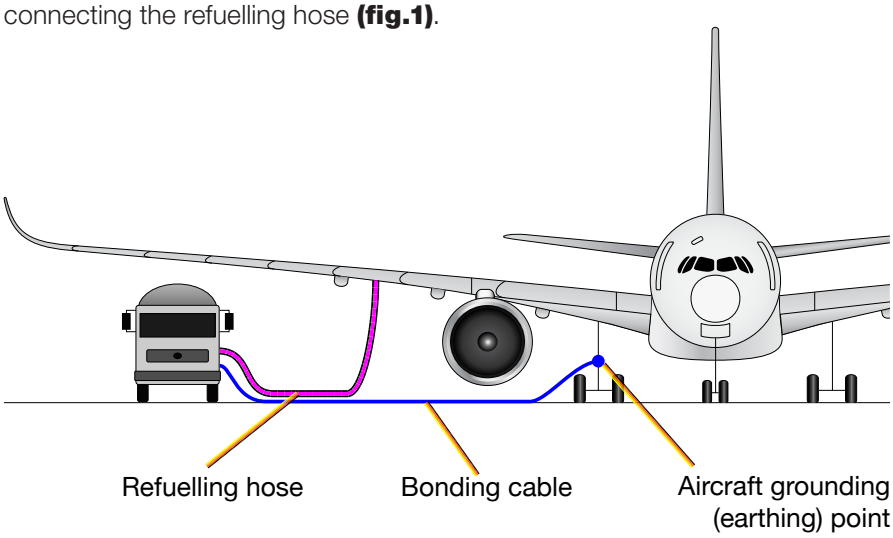
(fig.1)
Mandatory bonding during refuelling/defuelling operations



One of the aircraft grounding (earthing) points must be used to connect the bonding cable. Depending on the aircraft type, the grounding (earthing) points can be located:

- On the Nose Landing Gear (NLG)
- On the Main Landing Gears (MLG)
- On the wings
- On the engine air inlet
- At the High Pressure (HP) connector.

(fig.2)
Examples of placard used for grounding point identification

> “Airbus doesn’t request the grounding (earthing) of the aircraft or of the refuelling vehicle during refuelling operations but some local authority regulations may request it.”

Grounding (earthing) points are indicated by a placard to ease their identification **(fig.2)**. The type of placard may differ depending on its location and the aircraft type.

A cable section of 20 mm² or more is recommended to ensure sufficient bonding. The total electrical resistance of the cable between the A/C and the fuel tanker must not be more than 10 ohms.

Grounding (earthing)

Grounding ensures electrical continuity between the aircraft and the earth. Static electricity resulting from the flight or the environmental conditions on ground (wind with dust, sand, etc...) is discharged to the earth through the tires.

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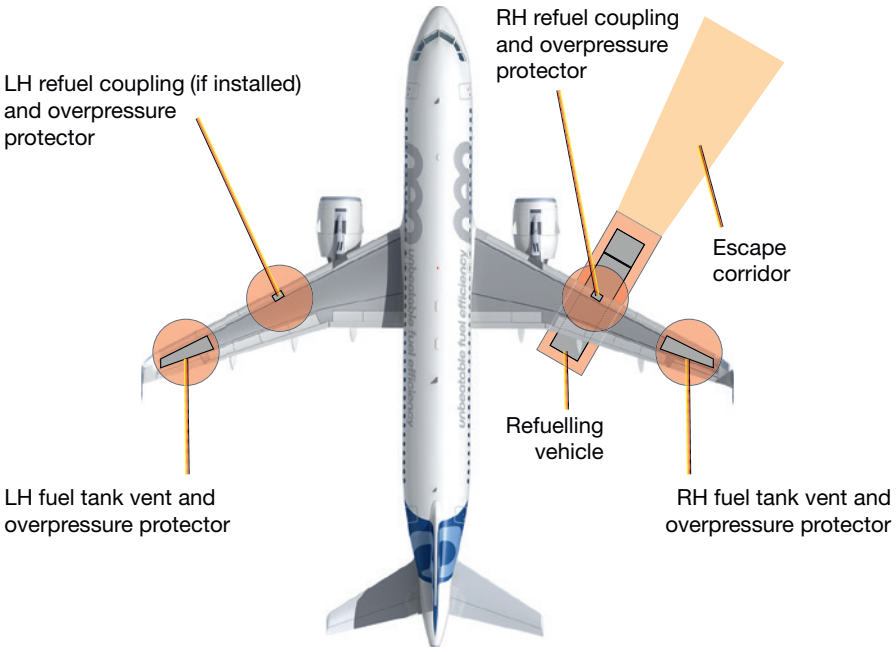
Refuelling safety zones

As an industry standard, a 3-meter safety zone must be respected around the area located under the NACA vents, overpressure protectors and refuel coupling(s) **(fig.3)**. These areas must be clear of any object or personnel. Their location can be found in the Refuel/Defuel Safety procedures of the AMM/AMP/MP. In addition, an escape corridor must be clear of obstacles so that the refuelling vehicle can leave the area in case of emergency. ■

(fig.3)
Example of the fuelling safety zones on an A320 aircraft



REFUELLING WITH PASSENGERS ON-BOARD

Today's short transit time used by some operators often requires refuelling operations while passengers are still -or already- on-board the aircraft.

It is essential for all actors to respect additional safety precautions and be prepared to initiate an emergency evacuation should it be required.

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Keep ground areas clear for slide deployment

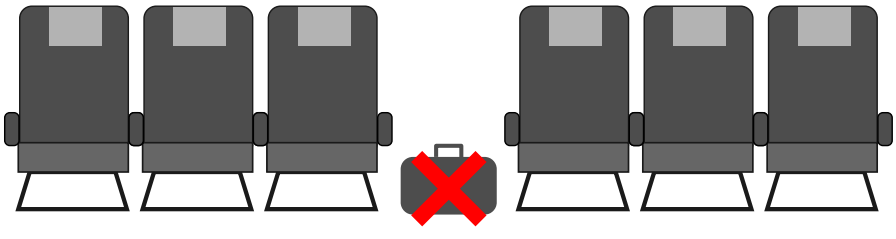
Depending on the ground servicing and catering operations, the area beneath the available exits must be clear to enable proper slide deployment in the case of an evacuation.

Cabin and passengers handling

The flight crew must switch OFF the SEAT BELT signs and switch ON the NO SMOKING signs (if installed) and inform the cabin crew when the refuelling/defuelling operation starts and ends.

The CCOM *SOP "Refuelling/defuelling - Refuelling/defuelling with passengers onboard"* provides the procedure and precaution to apply.

The cabin aisle(s) and exits must be free of obstacles that could impair the evacuation path. Cabin curtains must be secured in the open position and the cabin lighting should be ON.



The cabin crew must inform passengers that a refuelling operation is on-going and that they must not fasten their seatbelt to ease evacuation in the case of an emergency.

Each cabin crew should be prepared for an evacuation and at least one cabin crew member should be positioned at each door pair.

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For all refuelling operations, the safety of ground personnel, flight crew, cabin crew and any passengers onboard the aircraft is paramount. It is why the prevention of any unsafe conditions requires the refuelling vehicle or equipment to be bonded to the aircraft, preventing arcing or sparks. An exclusion area of 3 metres from the aircraft's vent tanks, overpressure protection or refuel coupling and equipment should be maintained during refuelling. The appropriate PPE should be worn by the operator and fire fighting equipment available with a defined escape corridor in the event of a fire.

The areas around the aircraft where escape slides deploy should be kept clear in case the flight crew or cabin crew must evacuate any passengers or personnel on board the aircraft. During refuelling operations with passengers on board, at least one cabin crew member should be positioned at each pair of aircraft doors. The cabin crew will also inform passengers when refuelling operations have commenced and instruct them to not fasten their seatbelt in case evacuation is required if there is an emergency situation.

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