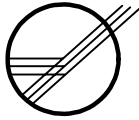


Aeronautical Information Circular

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AERONAUTICAL INFORMATION SERVICE

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AIC

No. 01/AACM/95
Date 27 Nov. 95

SUBJECT: *Aircraft Fuelling*

1. **THIS AIC APPLIES TO:**

Macau International Airport and all companies and personnel involved in aircraft fuelling.

2. **AIM**

To regulate fuelling procedures to reduce the risk of accidents and ensure the safety of the travelling public and airport employees

3. **PROCEDURES**

3.1 - FUELLING

3.1.1 - For the purpose of this Aeronautical Information Circular (AIC) “FUELLING” encompasses all the following operations:

- a) fuelling aircraft
- b) de-fuelling, total or partial, any type of aircraft.

3.1.2. - Operations carried out in maintenance hangars, such as tank gauging and flux checks, are not covered by this AIC. There must however be rules and procedures applicable to such cases, specifically set by the Airport Management and detailed in manuals or instructions approved by aircraft operators and fuel companies.

3.2 - AIRCRAFT FUELLING VEHICLES

Aircraft may only be fueled by vehicles specifically designed and approved for fuelling aircraft.

3.3 - FUELLING LOCATION

3.3.1 - Aircraft fuelling must only be carried out at a location approved by the Airport Management.

3.3.2 - Fuelling locations must be situated so as to ensure that fuelling equipment is placed more than 15 meters from buildings, except aircraft loading bridges.

3.4 - FUELLING SUPERVISION

Aircraft operators shall appoint a responsible engineer (hereinafter designated as “fuelling supervisor), in charge of ensuring the compliance with procedures set in this AIC and keeping in touch with the fuel company’s engineer in charge (hereinafter designated as “fuel company supervisor”). The engineers’ functions may be carried out by one single person, providing there is a written agreement between the parties or the companies concerned. Engineers in charge may supervise two or more fuelling operations simultaneously, if local conditions allow.

3.5 - ACCESS TO AIRCRAFT FOR THE PURPOSE OF FUELLING

The fuelling supervisor shall ensure that access to and from the aircraft is free from obstructions so that, in case of emergency, fuelling equipment can at all times be rapidly removed. The fuelling vehicle shall be capable of being removed from the aircraft without having to back up.

Vehicles and equipment must be placed so as not to obstruct the aircraft emergency exits.

3.6 - DRIVING AND OPERATING FUELLING VEHICLES

3.6.1 - All vehicles used to transport or dispense fuel, must always be operated by technically competent staff fully trained in the vehicle and equipment operation.

3.6.2 - At all times during the fuelling operation there must be a method of immediately stopping the flow of fuel.

3.7- HAND BRAKE, PARKING BRAKE, OR EMERGENCY BRAKE

3.7.1 - The driver must apply the parking/emergency brake before leaving the vehicle.

3.7.2 - The wheels of the aircraft and the fuelling vehicle must be chocked at all times during the fuelling operation..

3.8 - GROUNDING (EARTHING)/BONDING

Grounding is the discharge of static electricity to ground, Bonding is the equalization of the electrical potential between the fuelling vehicle and the aircraft.

3.8.1 - The equalization of the electrical potential between the aircraft and the fuelling equipment is a major factor for the safety of operation. Grounding (Earthing) is always unreliable and is only effective if carried out at specially installed grounding rods that are regularly tested and certified.

3.8.2 - The aircraft, the fuelling vehicle, and all accessories including hose nozzle, filters, funnels and other equipment through which the fuel passes must all be electrically bonded during

fuelling operations. Such connections must always be attached to the appropriate and approved bonding connections, both on the aircraft and on the fuelling equipment,

3.8.3 - Procedures to follow before any fuelling operation:

3.8.3.1 - When company procedures require grounding or earthing and when there are grounding rods installed in the apron, the aircraft and fuelling equipment must be grounded or earthed. The use of tow chains and conducting tires for grounding is not acceptable, and must only be considered only as an additional safety measure.

3.8.3.2 - The aircraft must be bonded to the fuelling equipment by approved cables or wires capable of ensuring the necessary equalization of electrical potentials.

3.8.3.3. - When the weather is very dry, staff must ensure that static build up in their clothing is released by discharging the static electricity to a suitable point on the aircraft and the fuelling vehicle.

3.8.3.4. - For overwing fuelling the hose nozzle must be electrically connected to the aircraft in order to equalize the potential before the fuel tank lid is removed and the nozzle must stay in contact with the aircraft at all times during fuelling..

3.8.3.5 -Fuelling from canisters or other containers requires special precautions identical to those mentioned above, including bonding the equipment to the aircraft before fuelling begins.

3.8.3.6 - Whenever used, funnels must be electrically connected to the hose nozzle and to the aircraft. In case suede is used, the metal ring the surrounds and fixes the hose must likewise be connected to the funnel. Funnel, hose nozzle and aircraft must be connected and the electrical potential equalized, even before the lid of the fuel outlet is removed.

3.8.3.7 - Spring clips and bolts for grounding (earthing) or bonding must be kept in good condition and checked regularly.

3.8.3.8 - After fuelling, bonding cables must not be disconnected before fuel tanks caps are installed. Removal of the bonding connection must always be the last operation.

3.9 - FUELLING ZONE

3.9.1 - The “fuelling zone” is the area within a range of 6 meters from the aircraft fuelling vehicle and the wing vents. This fuelling zone applies to all types of fuel.

3.9.2 - Smoking, using lamps or flashlights that are not explosion proof and switching on un-approved electrical equipment in the fuelling zone is not permitted.

3.9.3 - When fuelling is carried out in an area where smoking is normally allowed, highly visible, non smoking signs must be placed 15 meters from the fuelling equipment and the aircraft wing vents

- 3.9.4 - Fuelling staff must not carry matches, lighters or other flame producing means nor wear shoes with any kind of exposed iron or steel protection.
- 3.9.5 - During fuelling, equipment with metal wheels or covered with metallic rims capable of producing sparks are not permitted in the “fuelling zone”.
- 3.9.6 - Auxiliary Power Units (APUs), that release exhaust gases into the “fuelling zone” must be repositioned away from the area before the fuel tank caps are removed.
- 3.9.7 - If an APU is stopped or stalls during fuelling, it must not be started again until the fuelling operation is stopped and the risk of igniting fuel vapours is nil.
- 3.9.8 - Persons not directly associated with the fuelling operation are not allowed in the fuelling zone.

3.10 - FIRE EXTINGUISHERS

- 3.10.1 - If before starting a fuelling or fuel transfer operation a firefighting vehicle is not available, there must at least be one fire extinguisher with a minimum capacity of 50 kg of dry chemical, readily available. Fire Extinguishers must be serviced regularly according to the manufacturers recommendations and only operated by trained personnel.
- 3.10.2 - Fuelling staff must be fully trained in emergency procedures including summoning the fire fighting service, and be aware of the emergency shut down procedures for the fuelling operation.

3.11 - ASSISTANCE, MAINTENANCE, REPAIR OR TESTS ON AIRCRAFT DURING FUELLING

- 3.11.1 - During fuelling, the following rules must be observed in the “fuelling zone” with regard to aircraft maintenance, repair or test activities:
 - 3.11.1.1 - Propulsion engines may only be started if expressly authorized by the Airport Management. APUs may only be operated in compliance with the provisions in 3.9.6.
 - 3.11.1.2 - Only electrical equipment necessary for fuelling and aircraft servicing may be used during the fuelling operation

Note: Exemption from provisions in paragraphs 3.12.1.1 and 3.12.1.2 shall be ruled individually according to previous surveys submitted by concerned parties to the Civil Aviation Authority of Macau - AACM.

- 3.11.1.3 - Vehicles with engines running are not allowed in the “fuelling zone”, particularly those with electric ignition, unless specifically approved for use in hazardous areas. All aircraft service vehicles and equipment must be serviced regularly to ensure safe operation at all times.

- 3.11.1.4 - Bonding connections between ancillary ground electrical equipment and the aircraft must be made before removing the tank filler cap and must remain in place until fuelling has stopped.
- 3.11.1.5 - Battery-carts may be used in the “fuelling zone”, providing they have an electrical connection to the aircraft. Operating switches and controls must be completed out before removing fuel filler caps. The controls must not be changed until fuelling operations are complete.
- 3.11.1.6 - Vehicles operating in the “fuelling zone” must not drive or park under the aircraft wings or wing tank vents, except when approved by the fuelling supervisor or the fuel company supervisor.
- 3.11.1.7 - Aircraft combustion heaters must be turned off.
- 3.11.1.8 - No electrical or avionics equipment maintenance shall be carried out during fuelling. The exception may be minor maintenance or replacement of assemblies.
Any other tests or maintenance work must be delayed until fuelling is completed.
- Equipment operated on a basis of radio frequency impulses may not be used during fuelling, in particular meteorological radar, HF communication systems and galley equipment.
- 3.11.1.9 - Radiocommunication equipment approved for use in fuelling and ground service vehicles may be used.
- 3.11.1.10 - Maintenance works that are liable to create sources of ignition near fuel tanks and/or fuelling equipment may not be carried out. Floodlights and their feeders used in the “fuelling zone” must be an explosion proof design approved for use in hazardous areas.
- 3.11.1.11 - The number of persons and vehicles in the “fuelling zone” shall always be kept to a minimum.

3.12 - MAINTENANCE OF GROUND SUPPORT EQUIPMENT

- 3.12.1 - All vehicles and equipment operating on the apron must undergo regular maintenance to ensure that engines operate efficiently and safely.
- 3.12.2 - Operators must ensure that exhaust systems of vehicles and equipment operated on the apron do not constitute an ignition source.
- 3.12.3 - The airport authority may, by conducting spot checks, ensure that vehicles and equipment operating on the apron comply with provisions in 3.12.2.
- 3.12.4 - All vehicles or equipment with internal combustion engines operating on the apron must be equipped with spark arresting mufflers.

3.13 - FUELLING WITH PASSENGERS ON BOARD OR DURING LOADING/UNLOADING

3.13.1 - Fuelling may be carried out while passengers are on board the aircraft or during loading/unloading, providing the “fuelling supervisor” observes the following procedures:

3.13.1.1 - Tank filling is not done by gravity.

3.13.1.2 - Fuel to be dispensed belongs to the “JET A” type and the “JET B” mixture held in the aircraft’s tanks (if any) is lower than 5 percent.

3.13.1.3 - Fuel must contain an anti-static additive (ASA-3). If such is not the case, the flux must be reduced to 50 percent of that normally employed.

3.13.1.4 - Passengers must be informed that the aircraft will be fueled and that smoking, operating electrical devices, or producing any kind of flame or spark is not allowed.

3.13.1.5 - “No smoking” signs must be turned on in the cabin and safety belts unfastened.

3.13.1.6 - Whenever aircraft steps are used, they must be placed near emergency exits, that must be held open or half open and free from obstacles. The remaining emergency exits must be set in automatic position. A pilot or co-pilot must be in the cockpit during refuelling, and the recommended number of cabin crew for the passenger load must be available in case evacuation is required.

3.13.1.7 - When fuel vapours or any other hazards are detected inside the aircraft, the “fuel supervisor” must be immediately informed and the fuelling activity immediately stopped. Cabin activities using electrical equipment must be stopped until the situation has returned to normal,

3.13.1.8 - Ground service vehicles and equipment must not block the aircraft emergency exits.

3.13.2 - Whenever passengers must be moved to and from the aircraft during fuelling, the “fuel supervisor” must make sure that the following procedures are complied with:

3.13.2.1 - Passengers at ground level must not enter the fuelling zone.

3.13.2.2 - Passenger movements on the ground must always be directly controlled by the person in charge of the “fuelling zone”.

3.13.2.3 - Strict observance of non smoking rules during the abovementioned operation.

3.13.3 - The fire fighting service will be informed in advance each time refuelling is to be carried out with passengers on board.

3.14 - HELICOPTERS

- 3.14.1 - Under no circumstances will passengers be allowed to stay on board a helicopter during fuelling. In addition all passengers must stay outside of the refuelling zone.
- 3.14.2 - The engine(s) must be shut down during fuelling. Special circumstances may require that one or more engines remain operational during fuelling. under these circumstances special precautions as detailed in this AIC must be followed.
- 3.14.2.1 - Whenever the wind strength renders fuelling difficult, or when there are thunderstorms in a range of 3 nautical miles, fuelling with running engines will be suspended.

3.15 - FUEL LEAK

Whenever a fuel leak is detected all fuelling operations shall be immediately suspended.

- 3.15.1 - Minor fuel spills must be covered with an approved absorbent material and must be prevented from entering the Airport's sewage or storm drainage system. Fuel contaminated materials must be transported to a safe place for disposal. and removed as soon as possible. Tools used in such emergency conditions must be of a type that reduces the likelihood of sparks
- 3.15.2 - In case of spills spreading further than 2 meters, fuelling agents must:
 - 3.15.2.1 - Immediately stop the fuelling operation and stop the fuel flow..
 - 3.15.2.2 - Warn immediately the Airport Control Tower, Airport Firefighters and the Airport Operations Service.
 - 3.15.2.3 - Evacuate all persons from the affected area to a distance of over 15 meters from the edge of the spill with due regard to , the location of the spill, the direction of the flow of the spill and the wind speed and direction.
 - 3.15.2.4 - Prevent vehicles and persons from entering the area.
 - 3.15.2.5 - Restrict all activities under way in the vicinity of the spill, in order to reduce the risk of ignition.
- 3.15.3 - When the spill, regardless of the size, occurs near passenger loading/unloading bridges, Airport Firefighters must be immediately summoned.

3.16 - RADAR OPERATIONS

Aircraft parked less than 50 meters from operating radar stations or those being tested may not be fueled.

3.17 - AIRCRAFT BRAKES OR LANDING GEAR OVERHEATING

Caution should be exercised around aircraft landing gear and brakes and if an overheat condition is observed fuelling should not be commenced until the fuelling supervisor advises that it is safe to fuel the aircraft.

3.18 - DANGERS RELATED TO JET PROPULSION AIRCRAFT

Before and during fuelling, the “fuelling supervisor” must ensure that there is no danger to staff or equipment from hot exhaust gas from APUs or any other engines being operated in the immediate vicinity. Whenever the “fuelling supervisor” ascertains that there is a hazardous situation fuelling must be immediately stopped and only re-started when the fuelling supervisor advises that it is safe to resume fuelling.

3.19 - DANGERS RELATED TO STORMS

3.19.1 -Fuelling during storms should be avoided if at all possible.

3.19.2 - Fuelling while passengers are on board must be interrupted when high winds pose a danger to the fuelling operation, or when there are thunderstorms within a range of 3 nautical miles.

3.20 - USE OF PHOTOFLASHES

Photo flashes (flashbulbs or electronic flash) may not be used within a range of 3 meters from the “fuelling zone”.

3.21 - AIRCRAFT FUEL TANKS AND CONTAINERS

3.21.1 - All containers for aviation fuel must indicate clearly the type of fuel held therein and the date of the last service.

3.12.2 - No canisters or other containers may be used to fuel aircraft, unless their staunchness and fuel holding conditions were previously checked.

Chairman

José Queiroz