



## DEPARTMENT OF AEROSPACE ENGINEERING

### 19ASB303 AIRCRAFT MAINTENANCE ENGINEERING

#### UNIT II - GROUND SERVICING OF VARIOUS SUB SYSTEMS

##### Ground Units Used in Aircraft Maintenance

Ground units are essential tools and equipment used to maintain, service, and support aircraft operations while on the ground. They play a crucial role in ensuring the aircraft remains in optimal condition, adheres to safety standards, and is ready for its next flight.

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#### Key Ground Units and Their Functions

##### 1. Ground Power Unit (GPU)

- **Function:** Provides electrical power to the aircraft while it is on the ground and the engines or Auxiliary Power Unit (APU) are off.
- **Applications:**
  - Powering avionics systems for pre-flight checks.
  - Operating lights, air conditioning, and other systems during boarding.
- **Example:** A 28-volt DC or 115-volt AC GPU is used for modern aircraft like the Boeing 737 or Airbus A320.

##### 2. Air Start Unit (ASU)

- **Function:** Supplies compressed air to start the aircraft's engines when the onboard APU is unavailable or non-functional.
- **Applications:**
  - Starting engines of larger aircraft, such as Boeing 777 or Airbus A350.
  - Used in extreme weather conditions where the APU might struggle.
- **Example:** A pneumatic ASU connected to the engine bleed air system.

##### 3. Hydraulic Ground Power Unit (Hydraulic Mule)

- **Function:** Provides hydraulic pressure to test and operate hydraulic systems during maintenance.
- **Applications:**
  - Testing landing gear operation, flight control surfaces, and brakes.
  - Flushing hydraulic systems to remove contaminants.
- **Example:** Hydraulic test rigs used for the Boeing 747's landing gear systems.

##### 4. Aircraft Tug or Tow Tractor

- **Function:** Moves aircraft on the ground without using its engines, conserving fuel and reducing wear.
- **Applications:**

- Towing aircraft to maintenance hangars or parking areas.
- Repositioning aircraft for gate or runway access.
- **Example:** Electric tow tractors for small aircraft and diesel-powered tugs for larger aircraft like the Airbus A380.

#### 5. Fuel Bowser (Fuel Truck)

- **Function:** Supplies aviation fuel to the aircraft during refueling operations.
- **Applications:**
  - Refueling during routine maintenance or pre-flight operations.
  - De-fueling to inspect fuel tanks or during repairs.
- **Example:** Jet A-1 fuel trucks for commercial airlines.

#### 6. Air Conditioning Unit (ACU)

- **Function:** Supplies conditioned air (heating or cooling) to the aircraft cabin while on the ground.
- **Applications:**
  - Maintaining cabin temperature for passenger and crew comfort during boarding or maintenance.
  - Testing and troubleshooting the onboard air conditioning system.
- **Example:** Mobile air conditioning carts for ground use.

#### 7. Nitrogen Cart

- **Function:** Supplies nitrogen for inflating tires and pressurizing hydraulic systems.
- **Applications:**
  - Aircraft tire inflation to maintain proper pressure.
  - Pressurizing accumulators in hydraulic systems.
- **Example:** Portable nitrogen carts for routine maintenance.

#### 8. De-Icing Unit

- **Function:** Removes ice, snow, or frost from the aircraft's critical surfaces.
- **Applications:**
  - De-icing during winter operations to ensure safe takeoff.
  - Anti-icing application to prevent future ice accumulation.
- **Example:** Glycol-based de-icing trucks used at airports.

#### 9. Lavatory Service Vehicle

- **Function:** Removes waste from aircraft lavatories and replenishes them with clean water.
- **Applications:**
  - Regular servicing of lavatory systems before flights.
  - Ensuring passenger comfort and hygiene.
- **Example:** Vacuum-based lavatory servicing vehicles.

#### 10. Potable Water Truck

- **Function:** Supplies fresh water to the aircraft for passenger and crew use.
- **Applications:**
  - Filling water tanks for galley and lavatory use.

- Ensuring potable water supply for long-haul flights.
- **Example:** Water trucks with sterilized hoses for hygiene compliance.

### *11. Oxygen Servicing Cart*

- **Function:** Refills oxygen systems used for passenger masks and cockpit operations.
- **Applications:**
  - Supplying oxygen to emergency systems.
  - Refilling oxygen bottles after a deployment or routine check.
- **Example:** Portable oxygen filling carts used for commercial aircraft.

### *12. Fire Extinguishing Equipment*

- **Function:** Provides fire safety during maintenance and servicing.
  - **Applications:**
    - Emergency response in case of fire during fueling or repairs.
    - Ensuring safety during engine or APU tests.
  - **Example:** Foam-based fire extinguishers and fire suppression systems.
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