

32.1 Ice Detection and Protection

- ☐ Anti-Icing vs. De-Icing:
 - Anti-icing is the prevention of ice formation. It is used on critical areas like engine inlets and wing leading edges and is typically a continuous application of heat.
 - De-icing is the removal of ice after it has begun to form. It is typically a cyclical application of heat or mechanical force.
- ☐ Ice Detection: Systems that provide a warning to the flight crew when icing conditions are detected. They can be visual, or use vibrating probes or pressure sensors.
- ☐ Protection Systems:
 - Pneumatic De-Icing Boots: Rubber boots on the leading edges of wings and tail surfaces that are cyclically inflated with air to crack and break off accumulated ice.
 - Thermal Anti-Icing (Hot Air): Hot bleed air from the engine compressor is ducted through the inside of the wing and tail leading edges, heating the surface to prevent ice from forming. This is the most common method on jet aircraft.
 - Electrical Heating: Used for smaller components like pitot tubes, static ports, angle of attack vanes, and cockpit windows.

32.2 Rain Protection

- ☐ Windscreen Wipers: Electrically or hydraulically operated wipers, similar to those on a car.
- ☐ Rain Repellent: A chemical fluid that can be sprayed onto the windscreen. It causes the rain to bead up and be blown away by the airstream, improving visibility in heavy rain.