Preconditioned Air Systems
Keeping Passengers Comfortable

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Preconditioned air (PCA) systems cool and heat aircraft parked at the gate and pre-cool/pre-heat the passenger boarding bridges for passenger comfort during loading and off-loading operations. A life cycle cost analysis study can identify the most economical option for each airport based on number of gates, gate usage schedule, local utility rates, initial capital cost and terminal space availability.

For equipment to be effective, it must be sized so that it can accommodate varying sizes of aircraft serviced at each gate, and account for design temperatures assigned to its particular airport.

To determine a system’s size, designers:
- Consult gated flight schedules to see what types of planes each gate serves, and when such planes arrive and depart.
- Obtain the maximum ambient design temperature for the airport’s location, then calculate planes’ conductive and solar load conditions.
- Identify the largest type of plane to be served, during the hottest and coldest times of day during the hottest and coldest days of the year.
- Factor in heat gained when planes are full, have most of their electrical equipment operating, and are absorbing heat (or cold) from the outside.

PCA systems cool — or heat, if it’s winter — outside air to a range of 30 to 35 degrees, to be pumped into each connected plane and passenger bridge. Such air comes in at relatively high pressure so that it can make its way through the plane’s small ductwork for supply air.

The maximum volume of supply air is the pounds per minute of outside air cooled to 30 degrees (leaving coil temperature) required to meet aircraft cabin cooling load.