

Ventilative Cooling in the US

Standards and Regulations

Max Sherman, Lawrence Berkeley Laboratory

Geographical Context

- Lower latitudes in US
 - Higher sun angles; bigger diurnal differences
- Greater climate variations than Europe
 - East-to-West goes from Wet-to-Dry
 - North-to-South goes from Cold-to-Hot
 - Tropical to Arctic to Desert
- Regional variations abound
 - Regional/local regulations
 - Regional/local traditions and building practices

Occupant Expectations

- In warm/hot climates people expect air conditioning
 - Long period of warm discomfort not accepted
 - Businesses have it; people want it at home
- New homes come with air conditioning
 - In almost all parts of country. (e.g. not Maine, Alaska)
 - Even if only used a few weeks per year
- Seasonal & regional climate adaptations
 - People adapt dress, activity, expectations to climate
- Do not adapt hour-to-hour or day-to-day
 - No short-term “adaptive comfort”

Codes and Standards

- Ventilative Cooling is not a normally used term
 - Is not a requirement generally
 - Shows up in other ways
- Cooling loads considered even if no cooling installed
 - In most jurisdictions
- Energy calculation methods often assume a bit
 - Elevated air exchange when appropriate
 - Or dead-bands
- Energy calculation methods allow for options
 - Night cooling, whole-house fans, economizers
 - No adaptive comfort

What is an Economizer?

- Mechanically supplies large volume of outside air
 - 3 to 30 ACH when needed to displace cooling load
 - Typical for commercial buildings with air HVAC.
 - Operation integrated with HVAC system (dampers, controls)
- Whole-house cooling fans more typical for dwellings
 - Typically 5 to 50 ACH of exhaust; not HVAC integrated
 - Manually controlled by occupant; e.g need for openings
- Mechanical night cooling is a form
- Valuable in dry climates with large diurnal swings
 - Care needed in humid climates: latent storage

California Adds Requirement

- 2013 regulations will require ventilative cooling
 - But not by that name
 - Not fully final yet, but should be in next few months
- Prescriptive requirement for night ventilation in some zones
 - Whole house fan or economizers complies
 - May be traded for equivalent efficiency feature if using performance path
- Not aware of other residential requirements
 - Economizers have been required for commercial buildings in appropriate climates in south-west

Thank You