ASHRAE 55 Was Written for 3 Hot Months. India Has 9.

The global comfort standard assumes temperate summers. India is not temperate.

At a Glance

ASHRAE 55 assumes temperate climates with 3 months of significant heat. India has 9. March to November, people live in thermal conditions the standard never measured. Using 1960s American comfort science to define indoor air for Indian buildings is specification fiction. Easy Retrofit solutions skip this mismatch entirely. [1]

Deep Dive

ASHRAE Standard 55 Thermal Environmental Conditions for Human Occupancy (2020) was developed through experimental studies primarily conducted on subjects in North American climates. The foundational research, published across the 1970s and 1980s, collected comfort votes from subjects under laboratory conditions with controlled temperatures, humidity, and radiant environments. The subjects were predominantly young, healthy American adults studied during brief experimental windows: 30-minute to 2-hour sessions. [1]

The standard's comfort envelope defines an acceptable temperature band using two primary metrics: operative temperature (a weighted average of air and radiant temperature) and met, or metabolic equivalent units (a measure of heat generation from physical activity). For sedentary office work at one met, ASHRAE 55 specifies a comfort zone between approximately 20°C and 25°C, with a narrower preferred band of 21.5°C to 23.5°C. [2]

This specification was calibrated for populations in temperate regions with 3 to 4 months of summer heat. May through August in Boston. June through September in Chicago. These are the thermal conditions under which the standard's research base was developed. When applied to India, where heat runs continuously March through November, the standard assumes the Indian building user has the same comfort temperature as the Boston user: an assumption that biology refutes. [3]

Adaptive comfort theory, developed through long-term field studies in the UK, Brazil, Australia, and India, demonstrates that occupants in naturally ventilated buildings with sustained heat exposure shift their comfort setpoint upward. Research by Humphreys and Nicol (2002) showed that populations in climates with mean outdoor temperatures above 22°C develop comfort expectations 1 to 2 degrees Celsius higher than the ASHRAE standard predicts. In Indian climates with 9 months of heat, this shift is even more pronounced. [4]

IIT Bombay's field studies in Mumbai office buildings measured comfort votes from occupants working through March-to-November heat. The adaptive comfort model derived from this data specifies a comfort temperature band that drifts with outdoor seasonal conditions, acknowledging the occupant's physiological adjustment to heat. An engineer in Bengaluru adapted to 9 months of heat finds ASHRAE-specified 22°C uncomfortably cold. They have not lost the ability to sense temperature. They have acclimated. [5]

Buildings designed using non-adaptive ASHRAE setpoints consume extra energy to maintain American comfort in an Indian heat environment. The retrofit question is simple: why cool a 22°C setpoint for 9

months when the occupants, after 2 to 3 weeks of adaptation, would be comfortable and more productive at 24 to 25°C? Biothermal Microconditioning answers this by providing adaptive, zone-level cooling that follows occupant thermal comfort as it naturally shifts through the season. Easy Retrofit. One day deployment. No redesign of building systems. No respecification of mechanical HVAC. Just better physics for the context. [6]

Summary

ASHRAE Standard 55, the global thermal comfort baseline, was developed and validated in temperate climates with short, predictable summer seasons. Its comfort envelope operates reliably for approximately 3 months of the year: May through September in North America. India's heat runs March to November. Nine months. The standard's underlying research used subjects in controlled chambers during brief experimental sessions, not continuous adaptation to 9 months of sustained thermal stress. [1]

Indian researchers at IIT Bombay and IIT Kharagpur developed adaptive comfort models that account for long-term heat adaptation. These models show comfort temperature bands shift upward in populations experiencing sustained heat exposure. An Indian office worker adapted to March-to-November thermal conditions has a different comfort setpoint than the same person would in a 3-month heat environment. The body acclimate. The standard does not. [2]

Buildings designed using ASHRAE 55 specify identical setpoints across all seasons, with no drift for adaptation. This forces the HVAC system to maintain an American summer comfort standard for 9 months, consuming energy to sustain a thermal condition that occupants in adaptive conditions would find uncomfortably cold and wasteful. The outcome: premium electricity bills for perceived discomfort. Biothermal Microconditioning operates on the science that Indian researchers published: adaptive comfort, continuous cooling, measurable at breathing zone, no energy gridlock. [3]