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# THERMAL COMFORT

*WHY IS THERMAL COMFORT IMPORTANT TO  
OUR WELL BEING?*



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## DESIGN STRATEGIES

### WHY IS THERMAL COMFORT IMPORTANT?

Comfortable people are productive people. By ensuring heating standards are **equitable** and are adjusted for the age and sex of most occupants, overall **wellbeing and happiness** can be improved, resulting in improved **productivity and performance**. Adding an element of **controllability** and providing equitable thermal settings create a comfortable environment, and improves the happiness and sense of respect in occupants.



### COMFORTABLE PEOPLE ARE PRODUCTIVE PEOPLE

When people are **too hot**, they work **less efficiently**. In a UK based study, workers reported they take **25% longer** to complete a task if the temperature is uncomfortably high. However, a study from Cornell has shown that **warmer** environments can **reduce typing errors** and **increase typing output** in offices. Other studies have shown that students' speed and accuracy varies based on temperature as well. **Errors increase** at lower temperatures, and **speed decreases** at higher temperatures.

**150% OUTPUT INCREASE + 44% ERROR DECREASE = 216% PERFORMANCE IMPROVEMENT**

"When the office temperature in a month-long study increased from 68 to 77 degrees Fahrenheit, typing errors fell by 44 percent and typing output jumped 150 percent." Susan Lang, *Study Links Warm Offices to Fewer Typing Errors and Higher Productivity*<sup>1</sup>



### THE INEQUITY OF THERMAL COMFORT

Heating and cooling standards for offices were developed in the **1960s** to accommodate the resting metabolic rate of a **40-year old man who weighs 154 pounds**, which can be uncomfortable for workers of varying body types and ages. An equitable environment makes people feel **valued**.

"An equitable environment makes people feel that they are respected and that their thoughts and opinions matter." AIA.org, *Design for Well-being*<sup>2</sup>



### CONTROLLABILITY

**Happiness** in an environment is directly related to **control** (i.e. being able to control the thermostat, or open a window). Achieving **self-actualization** requires an **environment free of distractions and discomfort**.

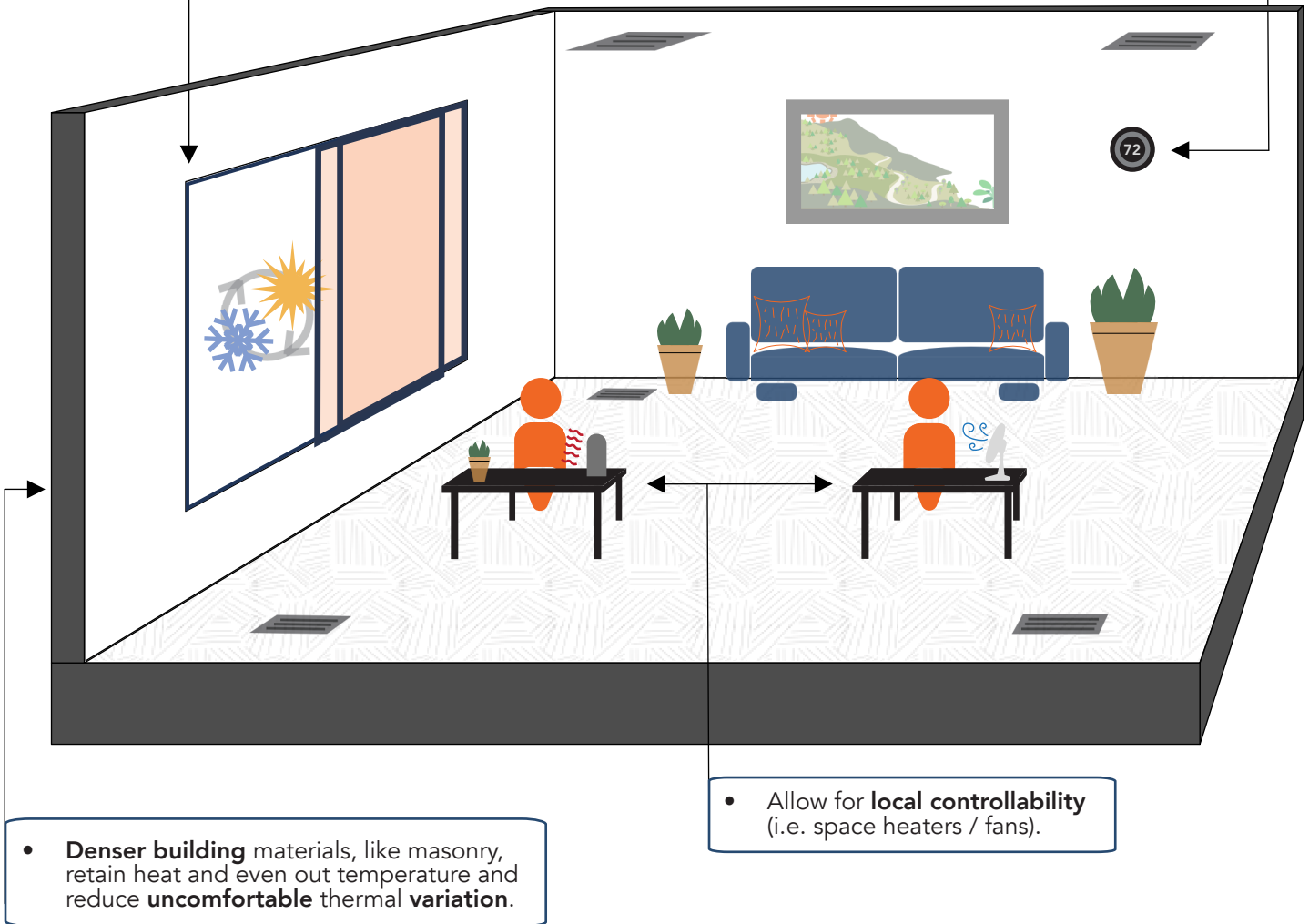
"Occupants report being more comfortable when they have control, whether or not they actually use them. Humans also report greater thermal comfort in spaces with operable windows." AIA.org, *Design for Well-being*<sup>2</sup>

- Don't **over-design** systems - i.e. for maximum occupancy.
- **Radiant systems** create more comfortable spaces than forced air.
- Implement **seasonal settings** to ensure humidity and temperature levels remain comfortable all year.

- If using forced air - space air registers **evenly** to minimize feeling drafts.

- Install **operable windows** to give occupants a sense of control.
- Be careful of window placement, because **radiant cold** can overpower room temperature.

- Set temperature to **please 80%** of occupants.



1 "Study Links Warm Offices to Fewer Typing Errors and Higher Productivity." Cornell Chronicle, 19 Oct. 2019, news.cornell.edu/stories/2004/10/warm-offices-linked-fewer-typing-errors-higher-productivity.  
 2 "Design for Well-Being." AIA, 2020, www.aia.org/showcases/6082617-design-for-well-being.  
 3 REV HVAC Division of EffectiV HVAC Inc. "Office Thermal Comfort: You Won't Believe These Numbers." REV HVAC, 7 July 2018, rev-hvac.com/office-thermal-comfort-great-financial-opportunity-employers.  
 4 Phyllis Korkki, *When the Office Gives You Chills*, The New York Times, June 29 2008.  
 5 Berkley Lab, *Indoor Air Quality Scientific Findings Resource Bank: Temperature and Office Work Performance*, iaqscience.lbl.gov, 2021.