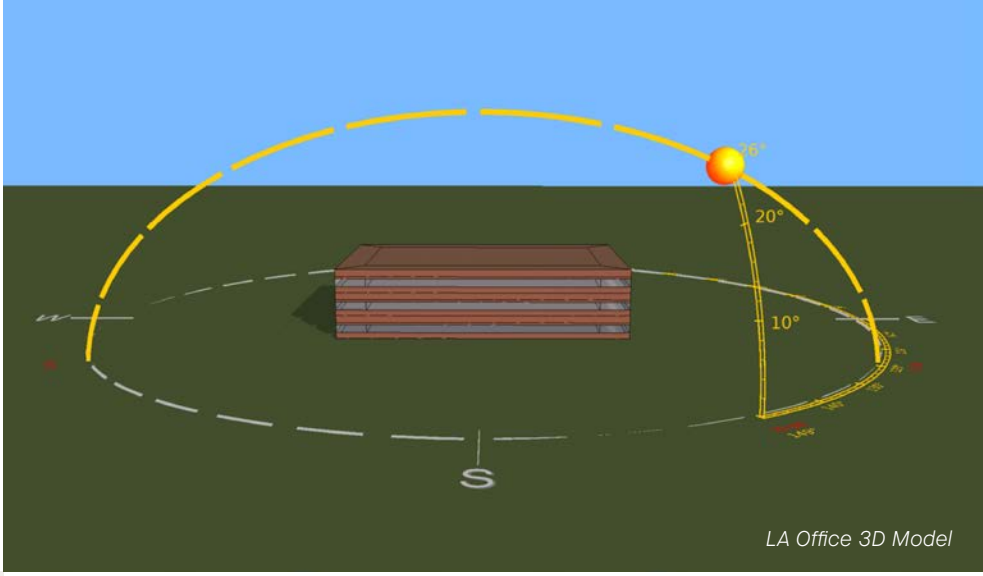
Armstrong®
World Industries



LA Office 3D Model

Location
Los Angeles, CA

Climate Zone
IECC Climate Zone 3B (Warm-Dry)

Building Type
Medium Office
(53,660 SF, 3 stories)

Retrofit
- Templok ceiling tiles used in all perimeter zones
- Passively moderate temperature using the thermal mass of Templok, reducing afternoon cooling and morning warm-up energy

Analysis
- Parallel simulations in IESVE (Standard ceilings vs. Templok ceilings)
- Zone-level temperature and heating/cooling load comparisons
- Impact on Energy Use Intensity (EUI) with Templok applied to the whole building

Results
- 11% More Comfortable Hours: Gained 319 hours over the simulated year in a comfortable indoor temperature range (68-74°F).
- 8% Lower Peak Load: Reduced the intensity of max cooling demand
- 4% Energy Savings: Reduced the overall heating and cooling EUI
- Net-Carbon Negative: Embodied carbon is paid back in just a few years via operational savings

Modeling Study

Moderating the Temperature in Perimeter Offices with Templok® Ceilings

Scenario

An energy model for a medium-sized office was developed in IES Virtual Environment (IESVE) software to evaluate the impact of Templok® ceilings on building performance. The study focused on perimeter zones, which experienced large temperature fluctuations due to solar gains during the day and heat loss at night. These zones typically required heating in the morning followed by cooling in the afternoon, an ideal opportunity for passive moderation via thermal mass. Templok ceilings utilize a Phase Change Material (PCM) that gradually melts as temperatures rise and freezes as they fall, helping to stabilize the indoor temperature ***(Fig 1)***.

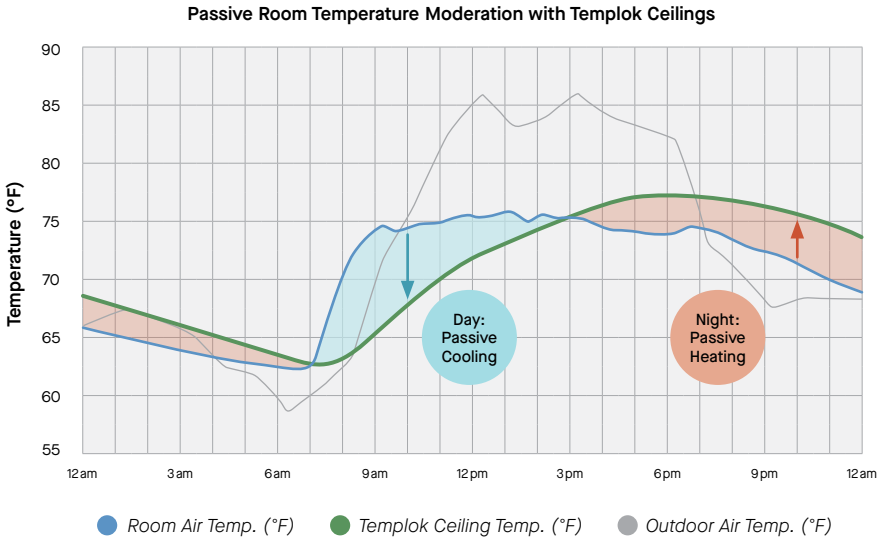


Fig 1: *Templok ceilings stay cooler as temperatures rise and warmer as temperatures fall, stabilizing the air temperature.*

Results

After applying Templok® tiles to 75% of the perimeter zone ceilings, the simulation results showed significant improvements in both occupant comfort and HVAC efficiency from the passive upgrade.

Enhanced Comfort

The Templok ceiling model achieved 319 additional hours in the annual simulation within a comfortable 68-74° F range, an 11% improvement over the baseline model with standard acoustic ceilings ***(Fig 2)***. Daily indoor temperature swings were moderated by about 2 - 3° F.

Load Reduction

The temperature-stabilizing effects of Templok ceilings allowed the building to operate more passively. Heating and cooling required by the perimeter spaces were reduced by 7% and 9%, respectively. The peak sensible conditioning provided by the HVAC system on the hottest day was reduced by 8% ***(Fig 3)***.

Energy & Carbon

Installing Templok ceiling panels across all zones reduced total heating and cooling energy by 4%. Due to these efficiency gains, Templok ceilings are net-carbon negative, more than offsetting their embodied carbon within just a few years of building operations.

Conclusion

Templok ceilings provide a significant boost to comfort and heating/cooling efficiency. These results demonstrate the value of Templok as a passive upgrade for interiors with fluctuating temperatures, enhancing thermal performance without sacrificing design. Design for comfort and meet your carbon goals, all while balancing temperature with Templok® Energy Saving Ceilings.

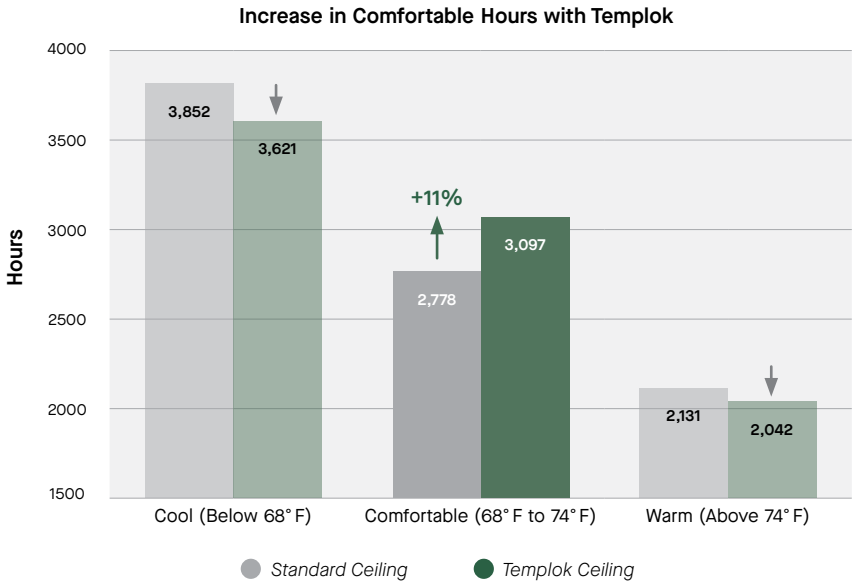


Fig 2: Annual simulation hours in cool, comfortable, and warm temperature ranges

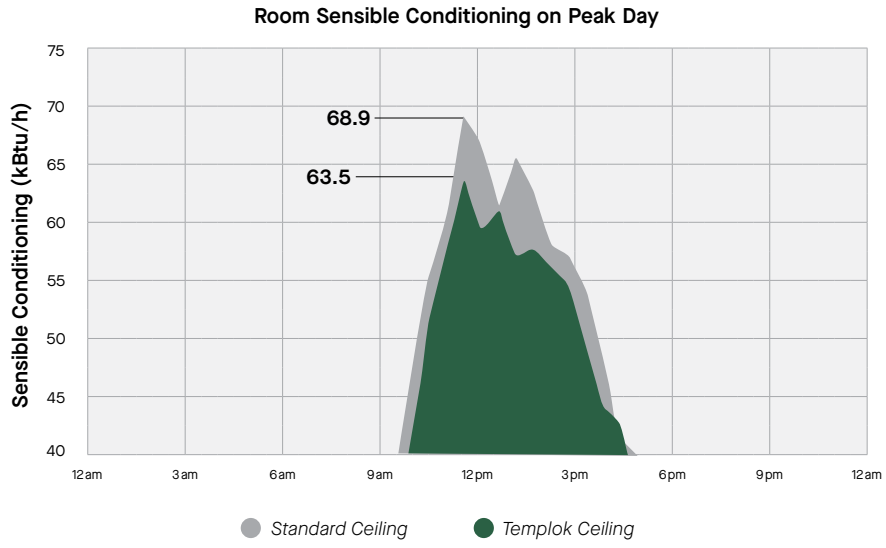


Fig 3: HVAC sensible conditioning to a perimeter zone on the peak cooling day with standard and Templok ceilings.