Passive House Case Study

The Passive House Network

Texas Pickle Hall

San Antonio, TX

Indoor Pickleball Facility

New Construction

PHI Database ID#: N/A

Certification Goal**:**

Status: **Pending**

Size: 31,079 FT2 TFA

Description: Texas Pickle Hall is San Antonio's Premier Pickleball Court for players of all skill levels.

DOE Climate Zone: 2a

Team:

Owner:
Pickle Realty Partners

Architect/Designer:
Urban Earth
urbanearth.us

PH Consultant:
Urban Earth
urbanearth.us

MEP Design:
Staengl Engineering
https://staenglengineering.com/

Structural Engineer:
Cook Engineering

Builder:
Modern Earth Construction
https://modernearth-tx.com/

Certifier:
Peel Passive House
https://www.peelpassivehouse.ca/

Texas Pickle Hall is an approximately 31,500 square foot, three-story, twelve-court indoor active entertainment facility focused on pickleball in Live Oak, Texas. It sits in a humid subtropical climate on the busiest stretch of Interstate 35 between Austin and San Antonio. It is believed to be the first large-scale active entertainment venue designed and built to Passive House standards seeking PHI certification.

The climate context makes the performance numbers meaningful. Live Oak sits in ASHRAE Climate Zone 2a, with average summer highs of 96°F, a record high of 111°F, and a frost-free period of 240 to 280 days. This is not a forgiving environment for high-performance building envelopes. The original mechanical design reflected that reality: seven conventional packaged units totaling 88 tons of cooling, scattered across all four façades of the building, drawing 286 kilowatts, or 84 percent of the building's entire electrical demand.

The decision to pursue Passive House certification changed the trajectory of every major system in the building. The envelope assembly is built around 8-inch Hebel autoclaved aerated concrete panels with a metal SIP roof at R-40. The bolt-up structural steel system was selected for its precision and speed, enabling tight integration between structure and mechanical-electrical-plumbing systems. On blower door test day, the building recorded 0.22 ACH50, 63 percent better than the Passive House standard of 0.6 ACH50. That result was earned through real-time air sealing collaboration with construction crews using a Coltraco Portascanner during the build.

Thermal Envelope

Ground:
Concrete slab on grade
uninsulated R-value: 0.918 hr·ft^{2}·°F/BTU

Walls:
8" Hebel AAC block with continuous exterior insulation U-value: 0.105 BTU/(hr·ft^{2}·°F) | R-9.6

Roof:
Ternium Multypanel SIPs
U-value: 0.024 BTU/(hr·ft^{2}·°F) | R-41

Doors:
Insulated exterior door U-value: 0.148 BTU/(hr·ft^{2}·°F) | R-6.8

Windows:
Kawneer 451UTCG Ultra Thermal Center Glazed aluminum storefront with 1" tempered insulated low-e glass (double pane)
Ug (center-of-glass): 0.25 BTU/(hr·ft^{2}·°F)
SHGC: 0.25
Installed whole-window Uw: ~0.28 BTU/(hr·ft^{2}·°F)

Shading Strategies:
Entrance shade structure on Eastern entrance elevation
All windows are east-facing into the interior courtyard, with shading reduction factored into the model from the building geometry

Mechanical Systems:

Ventilation:
Swegon Gold RX-50 (main court) + RenewAire HE 07IN (office)

Cooling/Dehumidification:
Daikin VRV with DX coil and hot-gas reheat

Domestic Hot Water:
40 gallon electric

PHPP Values

Climate:
Hot

Airtighness:
0.22 ACH50

Annual Heating Demand:
26,227 kBTU/yr

Heating Load:
2.64 BTU/(hr·ft^{2})

Cooling & Dehumidification Demand:
13.93 kBTU/(ft^{2}·yr)

Cooling Load:
2.64 BTU/(hr·ft^{2})

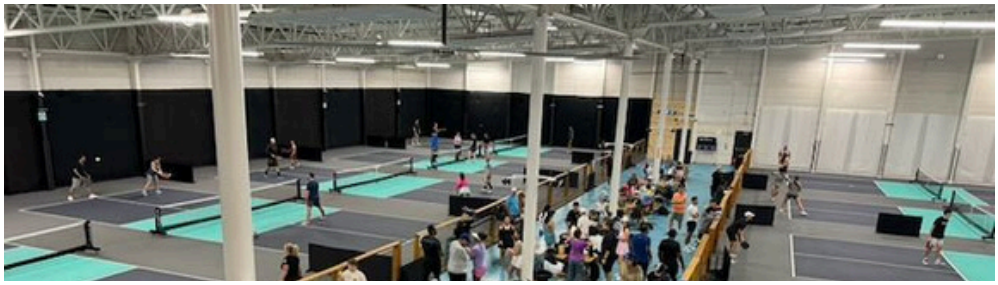
PE Demand:
44.0 kBTU/(ft^{2}·yr)

PER Demand:
19.6 kBTU/(ft^{2}·yr)

The envelope performance unlocked a mechanical transformation that is arguably more interesting than the envelope itself. The installed cooling system is 26 tons, a 70.5 percent reduction from the original design. Three outdoor units now sit clustered on the building's north side rather than distributed across all four façades, eliminating long heavy-gauge copper runs to every corner of the building and freeing three elevations from mechanical equipment entirely. The result is a cleaner, more architecturally coherent building. The electrical service dropped from 400 amperes to 200 amperes. HVAC electrical demand fell from 286 kilowatts to an estimated 45 kilowatts.

That transformation came with a problem the envelope created and the envelope could not solve. In a humid subtropical climate, suppressing the sensible cooling load as aggressively as a Passive House envelope carries a hidden risk: when the cooling equipment barely has to run, it barely dehumidifies, and a building can hold its temperature setpoint while humidity drifts past the comfort threshold. Here, moisture rather than temperature was the binding constraint.

The design answer was to decouple latent from sensible rather than oversize the cooling to chase it. Ventilation air is pre-tempered and dried at the Swegon Gold's energy-recovery wheel before it reaches a coil; a Daikin DX coil then overcools to remove the remaining moisture; and a hot-gas reheat coil returns the supply air to set point using recovered compressor heat, so no new energy is spent reheating air the system just cooled. The result is verified in the model: PHPP returns a frequency of excessively high humidity of zero percent, against an allowance of ten percent. In a climate this punishing, that number is arguably the project's most consequential outcome, and it is the part of the Passive House discipline that does not transfer from the cold-climate tradition the standard grew up in.



The business case for Passive House here operates on three levels. A tighter envelope means a smaller, cheaper mechanical system and less electrical infrastructure; capital that stays in the project. A building free of rooftop clutter and façade-mounted equipment presents better to the market. And a building that breathes well keeps players and spectators in the building longer; better indoor air quality drives dwell time, and dwell time drives revenue in an active entertainment model. Passive House here is not a sustainability credential. It is the operating strategy.