

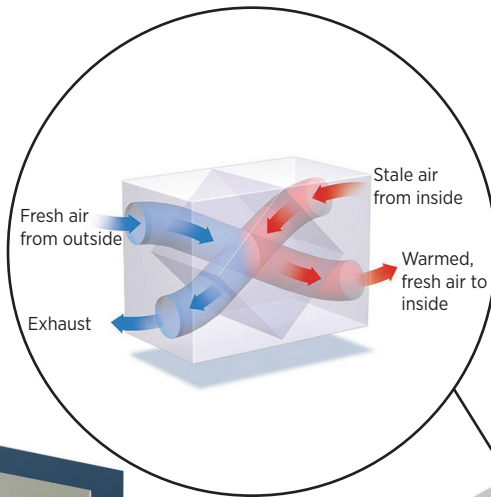
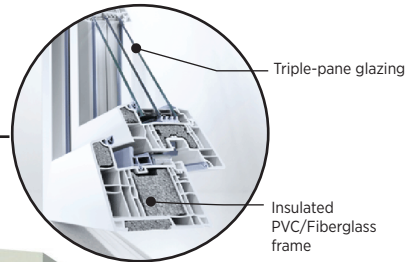
THE ANATOMY OF A PASSIVE HOUSE

Roof

The roof at Orchards at Orenco will have 12" of insulation--about 4x the amount required by code. The light color of the roof reflects solar radiation, keeping temperatures on the roof surface and in the building at comfortable levels in warmer months.

Windows

Windows often present a weak point in a building envelope's thermal performance, so it is important to find windows that perform well. The Orchards at Orenco Passive House will use a PVC-Fiberglass hybrid window frame with argon-filled triple pane glazing. These windows will have European-style tilt-turn operation, allowing the windows to close tighter than the double-hung or slider styles that are more common in the United States. — Image from Euroline

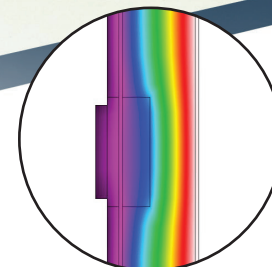


Heat Recovery Ventilator

The mechanical ventilation system and heat exchanger are critical to the building's energy efficiency and indoor air quality. The stale air exhausted from the kitchens and bathrooms warms fresh incoming air supplied to the unit bedrooms, making use of otherwise wasted energy. — Image from Broan

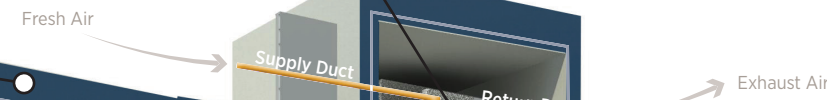
Solar Design

Smart design with regards to solar orientation is essential to keeping Passive House buildings comfortable, even in warmer months. Shading devices that allow the winter sun in but block the summer sun are an integral part of the building's solar design.



It's in the Details

In a superinsulated, airtight building, the design team and construction crew must work together to ensure every detail of the building is properly designed and constructed. Structural connections at balconies and other exterior elements, for instance, are often challenging areas that require copious amounts of coordination. — Thermographic analysis image, courtesy of Green Hammer



From the pages of Dwell to the New York Times, to various other architectural journals, chances are you've heard about Passive House. Often touted as "homes you can heat with a hair dryer," Passive House buildings boast energy loads low enough to make even the most environmentally-conscious homeowners drool. While the principles of the standard were born in North America in the 1970's, it was a German physicist, Dr. Wolfgang Feist, who developed the standard and built the first prototype in 1990.

Since then, the standard has taken off in many European countries and began to make inroads in the United States. Today, Passive House US has 97 projects registered, mostly single-family houses, but also small schools, community centers, churches, & commercial buildings.

REACH Community Development is exploring the benefits and challenges of applying Passive House building strategies to a development in Hillsboro, Oregon's Orenco station district. The fully realized Orchards at Orenco development will provide 150 units of workforce housing built in 3 phases. During Phase One of the project, REACH will build a 57-unit Passive House-certified apartment building, thus demonstrating the applicability of Passive House concepts to affordable multifamily housing at a scale that is currently unprecedented in the United States. Here are just some of the components that make up a Passive House:

Continuous Air Barrier

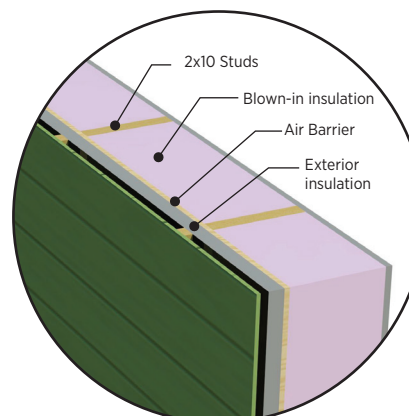
The Passive House standard has rigorous requirements for building airtightness. In order to achieve this, Passive House buildings have continuous air barriers that cut down on heat losses due to infiltration. During the detailing and construction of a building, the design team and construction crew must be prudent in maintaining the continuity of the air barrier.

Insulated Slab

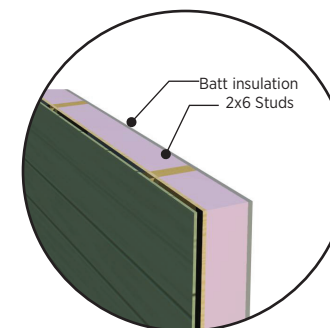
The ground floor slab sits on 4" of high-density foam insulation. The insulation continues underneath the structural footings and wraps around the vertical slab edge to meet the wall insulation.

Walls

The wall assembly is a critical piece of meeting the Passive House standard. While typical walls usually have 6" stud cavities filled with batt insulation, the walls at Orchards will have 10" stud cavities filled with blown-in fiberglass insulation as well as a layer of exterior rigid insulation.



Passive House Wall



Typical Wall

BENEFITS TO TENANTS

- Up to 90% reduction in energy bills
- Superior indoor air quality
- Balanced thermal comfort throughout the apartment
- Reduced outdoor noise inside apartments
- Innovative, forward-thinking living

OTHER SUSTAINABLE FEATURES

- Ample indoor bike parking
- Energy Star appliances
- Low-flow plumbing fixtures