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## **Finch Cambridge**

Boston architect designs multifamily Passive House structure using REHAU tilt-turn windows

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# REHAU 4500 tilt-turn windows help multifamily project meet Passive House performance standards

Finch Cambridge was designed with two challenges in mind: Meeting Cambridge's urgent need for affordable housing and reducing greenhouse gas emissions in response to climate change.

In a city that has 25 percent of tenants considered "rent overburdened," Finch Cambridge is one of the largest affordable housing projects built in the past 40 years. The multifamily project added 98 one-, two- and three-bedroom units to the city's housing inventory in the summer of 2020.

With the goal of reducing the city's greenhouse gas emissions coming from buildings by 80 percent, Finch Cambridge was designed to meet one of the world's most energy-efficient building standards, Passive House, or Passivhaus, as it is known in Europe. Passive House is an advanced energy-efficiency standard that produces buildings with superior indoor air quality and thermal comfort while reducing energy needed for heating and cooling.

Finch Cambridge was designed by ICON Architecture, Inc, one of Boston's leading architectural firms. An authority on sustainable building design, the firm designed the first Passive House-certified commercial building in Massachusetts, The Distillery North, a market rate apartment building that opened in 2017.

For Finch Cambridge, ICON utilized innovative window products from REHAU and its trusted window fabricator, Starr Windows and Doors.

"There's a lot of performance requirements for Passive House certification, and the field testing for this project in particular had high standards," said Ioan Sita, vice president of Starr Windows. "The windows' thermal performance was most important."

Starr Windows has been fabricating REHAU windows and doors for nearly 10 years and suggested using the REHAU System 4500 tilt-turn window for the rigorous requirements of the Finch Cambridge project.

"We use the REHAU 4500 Series Window 98 percent of the time," Sita said. "It's all about balancing performance and dollars, and this is the workhorse system that we recommend because it gives our customers the best performance for the best value."

Michelle Apigian, Associate Principal, Practice + Sustainability Leader at ICON Architecture says the right windows and doors are essential for meeting Passive House thermal performance standards, which she describes as a thermos.

"We put a lot of energy and efficiency in the building envelope so that the building ends up doing the bulk of the work to control temperature and moisture," Apigian said.



That work includes additional air sealing at windows, doors and duct penetrations. Windows and doors are responsible for about a quarter of a structure's energy loss and are a critical factor in achieving green standards. REHAU System 4500 uses superior profile design with



multiple chambers, engineered compression-seal technology and high-quality uPVC formulation, allowing these tilt-turn windows to be up to 45 percent better than thermally broken aluminum.

To help maintain the interior temperature, whether it's hot or cold outside, all windows in the Passive House envelope at Finch Cambridge are triple-glazed and sealed with dual overlapping compression gaskets, providing a tight seal against air, sound and water infiltration. The glazing also offers exceptional acoustical performance, keeping the interiors quiet, despite their location in the bustling Cambridge neighborhood.

There are also exterior shades on the building's south facade featuring slanted slats that block the summer sun, prevent rain and snow accumulation, and allow solar heat through the windows when the sun is low in the winter sky.

"A Passive House structure is heated by passive solar gain and internal gains from people and equipment. The issue for most Passive House structures is not how to heat them but how to cool them efficiently," Apigian said.

When tackling Passive House construction, architects and contractors look at a measurement known as the U-factor. The U-factor measures the rate of heat transfer and shows how well the window insulates. U-factors generally range between 0.25 and 0.45; the lower the U-factor, the better the window insulates. The System 4500 tilt-turn windows feature a U-factor down to 0.18, important when meeting the performance requirements for Passive House certification.

In addition to Starr's expertise in window fabrication, ICON also benefited from Starr's location in Yonkers, New York, home to their fabrication facility.

"Our lead times are much less than importing similar windows. We can organize deliveries better and, if there are design or field-related issues, we can react quickly," Sita said. An example of this occurred when 80 windows needed to be reconfigured with sashes. Starr's team was able to meet that need within three weeks, helping keep the construction schedule stay on track for the May 2020 opening.

Using the REHAU System 4500 tilt-turn windows, Finch Cambridge is 40 percent more energy efficient than even the toughest building codes. In fact, this high-performance building beats LEED Platinum and Energy Star standards and earned the 2020 Prism Award for Best Affordable Community from the Builders and Remodelers Association of Greater Boston and Best Overall Project in the 2020 PHIUS Passive House Projects Competition.

"It's important to have premium products when you're working on a high-performance building like Finch Cambridge," said Adam Rucker, REHAU engineering technical specialist. "But more importantly, it's about the people and the expertise they bring to a project. It's exciting to see how we were able to help Starr Windows and ICON meet the affordable housing and sustainability goals they set."



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**Project:** Finch Cambridge, Cambridge, MA  
**Construction type:** Multifamily, 2020  
**Project scope:** 410 windows  
**Architect:** ICON Architecture  
**General contractor:** NEI General Contracting  
**Window manufacturer:** Starr Windows & Doors  
**REHAU systems used:** System 4500 tilt-turn windows

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