

Millhaus

Fort Collins, CO

Single Family Building

New Build

PHI Database ID#: 6131

Certification Goal:



Status: **Certified**

Size: 2,842 FT2 TFA with One Unit

Description: Millhaus was designed from 2018 into the beginning of 2019. The project became the second ever participant in the Emu Passive Pilot Program.

DOE Climate Zone: 5b

Team:

Owner:

Greg & Jeneen Fisher

Architect/Designer:

Greg D. Fisher, Architect
<https://www.gregdfisherarchitect.com>

PH Consultant:

Enrico Bonilauri, Emu Passive
<https://www.emupassive.com>

MEP Design:

Justin Topel & Kelly Clifton, Forge Mechanical

Structural Engineer:

Wendy Dworak, TD Structural Engineering
<http://www.tdstructural.com>

Builder:

Greg D. Fisher

Certifier:

Marco Filippi, Energy Plus Project

Blower Door Testing:

John Fassler, Fassler Consulting



Millhaus takes its name from the former Cherry Mill property upon which it resides and from the Passive “Haus” building principles to which it is certified. The mill serves as a metaphor for the regional modernistic architectural expression. The Passive House approach was integral to the entire design and construction process with a goal to prove that Passive House design and a quality architectural expression could be wedded with one enhancing the other.



When one romantically thinks of mills, images of pure gable forms juxtaposed with industrial elements come to mind. Over the years, these forms often lose their purity when they are expanded upon — sometimes the later additive elements form interesting compounds and sometimes they change the original stateliness to a more chaotic expression. In the case of Millhaus, the initial conception is expressed by a pure asymmetrical gable form. This form then “expands” with additional asymmetrical gables connected via flat roof hyphens which emerge as shading devices on the south sides where they are supported by steel “industrial” elements. All of this creates the compound concept, but one that is ordered and intentional as opposed to random and by chance.

Thermal Envelope

Ground:

Concrete slab over vapor barrier over rigid insulation

Walls:

Double stud wall with internal service cavity and vapor-open thermal insulation

Roof:

Different conditions including flat ceiling trusses, cathedral ceiling trusses, and “flat” roof framing with an internal service cavity and vapor-open thermal insulation

Windows & Doors:

Smartwin Triple pane glass with Argon fill & warm edge spacers provided by Advantage Architectural Woodwork

Shading Strategies:

Deep overhangs at southern glazing and recessed openings at all other orientations



Needless to say, creating a “compound” would not generally be aligned with the Passive House principle of creating simple, often boxlike, forms. Thus, much effort was given to balancing architectural expression with performance results. Numerous forms and options were studied and modeled in DesignPH from the earliest conceptions through the beginning of construction drawing to ensure both targets were achieved. This allowed the project to be fully certified, although the form factor is higher than ideal (FF=4.5).

Mechanical Systems:

Ventilation:

Balanced ventilation utilizing Zehnder ComfoAirQ 550 ERV

Heating:

Radiant floor with ground source heat pump

Cooling/Dehumidification:

Radiant floor with ground source heat pump

Domestic Hot Water:

Electric

Onsite Renewable Energy:

5.84 kW photovoltaic array



PHPP Values

Climate: 5b	Cooling & Dehumidification Demand: 3.80 kBtu/ft2/yr
Airtightness: 0.4 ACH50	Cooling Load: 3.8 kBtu/hft2
Annual Heating Demand: 4.40 kBtu/ft2/yr	PE Demand: 75 kWh/m2a
Heating Load: 5.48 Btu/hft2	PER Demand: 11.08 kBtu/ft2yr

The interior furthers the mill metaphor, most notably including a “food crib” (pantry) enclosed in perforated steel in a bar steel frame. This takes its cue from the tool cribs that were often at the heart of old mills and enclosed in steel elements or other materials to secure tools. The interior palette includes the extensive use of authentic natural materials such as wood and used brick contrasted with industrial elements. The espresso bar area also incorporates the desired character of traditional steel window frames, often used in old mills, but rather in a location that doesn’t compromise the thermal envelope.