

## UNDERSTANDING COMMON FRONT ROOM OVER GARAGE MISTAKES AND HOW TO AVOID THEM



Front rooms over garages in new construction pose unique challenges to high-performance design. It's important to pay close attention to how insulation, airtightness, and HVAC design interact and impact the above-garage envelope, because garages are not heated or insulated like the rest of a home. Conducting a thorough review of thermal boundaries, and knowing what potential issues to avoid, can result in better energy performance and more satisfied homebuyers.

### **SOLVING COMMON DESIGN AND PERFORMANCE ISSUES IN FRONT ROOM OVER GARAGES**

#### **CHALLENGE: MISTAKES WITH FRONT ROOM SUBFLOOR INSULATION**

It is especially important for insulation to be in contact with the underside of a front room subfloor. Incorrectly installed batt insulation results in gaps between batts and subfloors, which negatively impacts a home's energy performance. These gaps allow heat to transfer from conditioned front rooms into unconditioned garages, forcing HVAC systems to work harder and use more energy to heat and cool those rooms.

Adopting an integrated design approach that engages all relevant trades during design and installation decision-making could help avoid common issues with front rooms over garages.

With keen attention to detail and a commitment to energy efficiency, Ichijo USA in Tigard has built many homes with front rooms over garages and learned firsthand the important role subfloor insulation plays in keeping homes high performing. “Failure to properly install insulation poses a risk of thermal bridging, which may adversely affect the room’s performance,” said Masaki Narita, Ichijo USA’s Vice President.

### **SOLUTION: CONSIDER ALTERNATIVE INSULATION STRATEGIES**

One way to avoid the issue with gaps associated with batt insulation is for builders to use blow-in blanket insulation. When installed correctly, this type of insulation can completely fill in the cavities beneath the subfloors of front rooms and achieve a higher R-value. If you choose to install batts, ensure there are no gaps between the heated surface and the ceiling of the garage.

Effective insulation is crucial for front rooms over garages to function as living spaces. For Ichijo USA, implementing an insulation strategy that achieves superior home envelope performance necessitates enhancing air tightness. “In addition to the strategic placement of insulation, it is essential to implement measures that effectively obstruct external airflow,” said Narita.

### **CHALLENGE: ROUTING DUCTS THROUGH GARAGES TO ACCESS FRONT ROOMS**

In Oregon, state energy codes require all ductwork to be in a conditioned space or deeply buried. Exposed ductwork in unconditioned garages presents a big problem for energy efficiency and comfort.

To best ensure success, front rooms over garages need to be incorporated early in the HVAC design phase. If they aren’t, finding a way to [get ducts fully inside](#) after the fact could require costly workarounds. Figuring out that structural beams are in the way mid-build isn’t what anyone wants to experience.

### **SOLUTION: RETHINK DUCT DESIGN OR PLACEMENT**

Bringing ductwork into the envelope is a surefire way to address this challenge. For those using deeply buried ducts, double-check duct insulation values, and if using flex ducting with batt insulation be aware that any compression will compromise R-values.



BEFORE: Visible ductwork can be seen underneath the subfloor of a front room before insulation is installed.



AFTER: Blow-in insulation is added to completely fill in the cavities beneath the subfloor of a front room to prevent gaps.

In his work as a home inspector and Rater, Casey Phillips of Adobe Energy LLC in Gladstone has seen his fair share of front rooms over garages in new homes with poor duct design. “Limit ductwork under front rooms as much as you can,” he said. “But if you must, secure the ductwork high in the cavity and deeply bury it.”

Soffits or chases are an option for bringing ductwork into the envelope if space allows. However, this strategy can introduce other air-sealing and insulation challenges. Awareness of how unconditioned spaces like garages affect duct placement can inspire new best practices. “One of our fundamental design principles is to avoid placing plumbing and HVAC equipment above the garage whenever possible,” said Narita.

### **CHALLENGE: POTENTIAL AIR QUALITY AND COMFORT CONCERNS**

Ensuring front rooms over garages are designed and constructed properly is important for energy performance, it’s also critical for occupant comfort. Because ducts in these areas can easily be constricted or not fully within the envelope, builders can prevent callbacks for inconsistent heating and cooling by designing these spaces to be as efficient as possible.

Homeowner and resident health is another factor that front room over garage design or installation can influence. “Indoor air quality can suffer if details are missed,” said Phillips.

### **SOLUTION: CATCH ISSUES EARLY WITH A QUALITY ASSURANCE APPROACH**

Continuous air barriers in full alignment with the thermal boundary and insulation help keep front rooms over garages—and homes in general—tighter. “The areas around the baseboards are particularly susceptible to [thermal bridging and air infiltration](#), often representing a critical vulnerability in the building envelope,” said Narita.

A tight envelope helps a home’s heating and ventilation systems balance humidity, remove dust, pollen, and debris from circulated air more effectively, and lessen the chance of vehicle exhaust fumes infiltrating the interior. “Applying appropriate sealing and airtightness measures to these specific junctions is vital for maintaining the integrity of the building’s energy performance,” said Narita.



Improper ductwork planning in this subfloor under a front room leaves a duct below the ceiling assembly, requiring an additional boxed enclosure for securing insulation.

## SAVE TIME BY LEARNING HOW TO BYPASS ANTICIPATED CHALLENGES

“The builder, HVAC installer, and insulator should be collaborating on homes like these early in the design process,” said Phillips. Adopting an integrated design approach that engages all relevant trades during design and installation decision-making could help avoid common issues with front rooms over garages.

“Get the whole team on board with the ‘why.’ By not communicating or setting expectations, you can create issues and pass them on to the homeowner,” said Phillips.

Help prevent headaches on the jobsite by addressing potential thermal boundary challenges during the design phase. Here are a few resources and trainings about high-performance envelope and HVAC design strategies:

- [Using Building Science to Inform Envelope Design \(Training\)](#)
- [Simple Steps to Improve Ductwork Installations \(Training\)](#)
- [Floor Above Garage | Building America Solution Center \(Guide\)](#)



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—Casey Phillips, home inspector and Rater, Adobe Energy LLC