



Seattle Permits

— part of a multi-departmental City of Seattle series on getting a permit

Energy Code for Multifamily Buildings

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This Tip provides information about energy code requirements that specifically apply to multifamily buildings. In general, multifamily buildings must comply with the entire commercial energy code, but there are some differences for multifamily buildings.

Note that this Tip provides a general overview of the applicable code requirements but is not a substitute for reading the code itself.

Most Low-rise Multifamily* Buildings Must Conform to the Commercial Energy Code

The Seattle Energy Code (SEC) is divided into two stand-alone code portions: one for “residential buildings” and the other for “commercial buildings.” In the past, multifamily buildings have been split between the two, with low-rise (1 – 3-story) buildings in residential and taller buildings in commercial. Beginning with this 2021 code edition, most multifamily buildings of any height are classified as “commercial buildings.”

The one exception applies to low-rise buildings with exterior walkways to the units. One, two, and three-story multifamily buildings with units that are accessed directly from the outdoors are still classified as residential buildings.

*“Multifamily” does not include townhouses. For single-family and townhouse code requirements, see Tip 303A.

Building Envelope

Multifamily buildings are typically classified as a “Group R-2” occupancies. [SEC tables C402.1.3 and C402.1.4](#) show R-value and U-factor requirements for opaque wall assemblies, with separate columns for “Group R” and “All other” values. The only remaining difference between

the two columns in the R-value table is for metal stud walls, although the U-factors for the two are the same. The maximum allowable U-factors for multifamily and commercial buildings are the same. Fenestration U-factors are shown in Table C402.4.

The maximum fenestration area is 30 percent, with two options to increase that area to 40 percent. One option is for buildings with daylight zones covering at least half of the building floor area, and the other is for use of high-performance (lower U-factor) fenestration. Tip 428 contains further details on fenestration.

Air Barrier Testing

Multifamily buildings must be enclosed by a continuous air barrier extending around the entire building thermal envelope, and most multifamily buildings require pressurization testing for the entire building air barrier. The exception is for buildings with units that are entered directly from exterior balconies or walkways. Those buildings have a separate testing protocol for testing a sampling of apartments in the building, described in Section C402.5.2.

PTACs & PTHPs

PTACs and PTHPs (packaged terminal air conditioners and packaged terminal heat pumps) are installed in sleeves through the exterior wall and typically provide very poor insulation. The rate of heat loss through one of these units is as much as ten times the rate for the surrounding wall. Section C402.1.4.3 requires that these through-wall units be calculated as a separate wall assembly type, to provide a more realistic heat loss estimate. If more than 1 percent of the above-grade wall area of a multifamily building is made up of PTACs and PTHPs, then you must assume a U-factor of 0.500 for them. Since the maximum U-factor for metal stud walls is 0.055, and for wood stud walls is 0.051, you would have to use the component performance alternative in Section C402.1.5 to improve other envelope components enough to compensate for that extra heat loss.

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Note also that Section C403.1.4, exception 5, does not allow the traditional heat pumps that switch over entirely to electric resistance heating when the outside temperature falls below 40°F, but instead requires that the heat pump compressor continues operating down to 17°F, with the electric resistance coils delivering only supplementary heating. This excludes most PTHP units on the market.

Heat Pump Exception for Dwelling Units

Section C403.1.4 typically requires all space heating to be done with heat pump systems, but one notable exception is that 750 watts of electric resistance heating is permitted for each habitable room (typically a living room or bedroom) that has exterior windows. The allowance increases to 1000 watts for corner rooms with windows on two sides. For rooms adjoining an exterior wall but without any windows, 250 watts of electric resistance heating is allowed. This electric resistance heating is typically provided by baseboard heaters or cove heaters.

Thermostats

A 5-2 (5 weekdays/2 weekend days) programmable thermostat is required for each dwelling unit. See Section C403.4.9.

Balanced Ventilation

A “balanced ventilation” system is required for multifamily dwelling units, meaning that mechanical ventilation air must be supplied directly to each habitable space in the units, with mechanical exhaust and a heat recovery system that has 67 percent sensible heat recovery effectiveness. (Earlier code editions had allowed ventilation through “trickle vents” at the windows and a continuous exhaust fan in the bathroom, but that arrangement did not reliably provide enough ventilation.) Balanced ventilation can be provided by individual ERVs (energy recovery ventilation units) within dwelling units, or by larger rooftop or floor-by-floor systems. See Section C403.7.6.1. See also Table C403.8.4 for required efficacy of small fans, and Section C403.8.3 for efficiency of larger fan systems.

Insulation of Refrigerant Piping

“Mini-split” heat pumps that are frequently used for multifamily dwelling units typically consist of an indoor unit and an outdoor unit, connected by refrigerant piping. Section C403.10.4 specifies the minimum required thickness of insulation:

- 1-inch for hot gas lines outside of the building thermal envelope.
- 1/2-inch for hot gas lines inside the building thermal envelope.
- 1/2-inch for liquid line for mini-split units and where required by the manufacturer.
- No insulation on the liquid line for other heat pump types.

Water Heating

Domestic hot water for multifamily buildings must be heated by a heat pump water heating (HPWH) system, not gas or electric resistance. It may not be advisable to locate individual HPWHs in typical apartment units, because the cool exhaust air from a HPWH can be uncomfortable, and even quiet units might generate enough sound to be distracting. Central HPWH systems may be a better choice.

The demand load for dwelling unit hot water supply systems must be calculated using Appendix M of the Seattle Plumbing Code. You are allowed to provide piping that is one pipe size larger than that determined through the use of Appendix M.

For more detailed information about heat pump water heaters and other water heating system components, see Tip 424.

Each dwelling unit also requires a domestic hot water meter, which can be used for billing tenants. See Section C404.9.

Lighting

Ninety percent of the lighting in multifamily dwelling units must be high efficacy, as measured in lumens per watt, 45 lumens per watt for fixtures and 65 lumens per watt for the light sources within the fixtures. LED lighting almost always meets these criteria.

Electric Metering

Each dwelling unit in a multifamily building typically requires a separate electrical meter. This requirement is sometimes waived for certain affordable housing buildings that serve special populations, when approved by Seattle City Light. See Section C405.7.

Electric-ready Kitchens

Anywhere you install a gas appliance in a dwelling unit, you must also provide a functioning electrical outlet and circuitry to support a future electric appliance in the same location. See Section C405.7.1.

C406 Additional Efficiency and Load Management Credits

New multifamily (occupancy Group R-2) buildings must achieve 45 “energy efficiency credits” and 15 “load management credits.” See Table C406.1. You can select any combination of energy efficiency credits from Table C406.2 that totals at least 45, choosing from high-performing HVAC, water heating, building envelope, appliances and more. Separately, you can select any combination of load management credits from Table C406.3 credits that totals at least 15 credits.

C407 Total Building Performance Compliance Path (energy modeling)

You can use energy modeling to comply with the energy code to demonstrate an alternative design that achieves similar overall energy use. See Tip 423 for a more detailed discussion of this compliance path.

Multifamily buildings can get modeling credit for three “unregulated load types” shown in Table C407.3.4.1. By following the rules for the associated Section C406 energy efficiency credits, you can take credit for installing high-performance kitchen and laundry equipment.

C409 Metering

For multifamily buildings, metering and sub-metering are only required if the common areas are larger than 20,000 square feet. Common areas in this case means all the conditioned floor area of the R-2 occupancy portions of the building other than the area of the dwelling units themselves, and including corridors, stairs, lobbies, exercise rooms, etc.

C411 Renewable Energy

You must install an on-site renewable energy system (typically a solar panel array) of 0.50 watts capacity per square foot of conditioned floor area in the building or meet the requirements for one of the exceptions. If you don’t have enough available roof area, you can substitute 27 additional C406 energy efficiency credits

or an off-site array for the portion that doesn’t fit on the roof. You can also gift all or part of your required solar array to an affordable housing project.

Finally, note that qualified “affordable housing” is not required to provide renewable energy generation, although those buildings are still required to make a portion of the roof “solar-ready” for a future installation. See Tip 420 for further information regarding solar energy.

Selected Mechanical Code Compliance Issues for Multifamily

Although this Tip is primarily concerned with energy code compliance, below are a few mechanical code issues that have been frequently encountered in reviews of multifamily projects.

- **Corridor ventilation air.** You cannot use the corridor as a “duct” for supplying ventilation air to the dwelling units. The corridor ventilation won’t be considered as supplying air to the units if the building meets the following criteria (Section 601.2, exception 6.)
 - Corridor supply air is 100 percent outside air.
 - Each dwelling unit has its own ventilating air supply independent of the corridor air.
 - This is usually ensured by the “balanced ventilation” requirements for dwelling units.
 - For “other than high-rise” buildings, the corridor supply fan will automatically shut off when the corridor smoke detectors are activated. (Install smoke detectors per Section 606.2.4.)
 - For high-rise buildings, the corridor supply fan will automatically shut off either when the corridor smoke detectors are activated or upon a signal from the fire alarm system. The supply fan does not have to automatically shut off if it’s part of a stair or elevator pressurization system. (Install smoke detectors per Section 606.2.5.)

Cleanout location. If you provide clean-outs for exhaust duct risers serving ground-floor restaurants, or for any other duct or plumbing risers, that can only be serviced from within individual dwelling units, the service staff may encounter difficulties accessing those private spaces. Consider locating the access to such cleanouts in corridors or other public spaces.

Environmental air exhaust. (SMC Section 501.3.1, Item #3.) The term “environmental air” is used in the code to describe low-hazard ventilation and exhaust

air. Exhaust air from kitchens, dryers, and bathrooms must typically be 3 feet from property lines and operable openings, or 10 feet from mechanical air intakes. One exception is for ERV (energy recovery ventilation) units that have both intake and exhaust outlets located in an approved factory-built intake/exhaust combo fitting.

SMC Section 401.4, item 3, states that intake openings must be located at least 3 feet below any “contaminant sources” within 10 feet of the intake. This section also has an exception similar to the one in Section 501.3.1, allowing the ERV unit’s intake and exhaust to be close to each other. The ERV intake must have a 3-foot horizontal separation from any other “environmental air” (kitchen, bathroom, or dryer) exhaust outlets and from ERVs serving other dwelling units.

Distance of air intakes from lot lines. Air intakes, including intakes integral to ERV units, must be at least 10 feet away from the lot line of an adjoining property. (You can consider a property line along a street or alley to be the opposite side of the street or alley, if the air intake is at least 25 feet above the vehicle level.) See SMC Section 401.4, item #1.

Air intakes must also be located at least 10 feet away from vehicle areas such as streets, alleys, parking lots and loading docks, unless they are at least 25 feet above those areas. This is to protect the indoor air from vehicle exhaust such as idling trucks, and other sources of “hazardous and noxious” contaminants. See SMC Section 401.4, item #2.

Transformer vaults. (SMC Section 501.3.1, Item #6.) If your building contains a transformer vault, it must be separated from the rest of the building with 3-hour fire resistive rated barriers. Due to the possibility of a transformer fire, the vault exhaust ventilation openings must be at least 10 feet away from all of the following:

- Fire escapes
- Any required means of egress at the exterior
- Exit discharge (the path from the exit door to the public way)
- Exterior combustible materials
- Openings (such as windows) not fire protected per IBC section 705.8
- Operable openings and mechanical intakes
- Property lines that separate one lot from another, other than a public way
- Above or below any walking surface

Garage exhaust. (SMC Section 501.3.1, Item #5.) If your building has an enclosed garage or loading dock, the ventilation exhaust terminations must be located at least 10 feet away from:

- Property lines that separate one lot from another.
- Operable openings
- Mechanical air intakes (including energy recovery ventilation units)

You must separate the garage exhaust openings from any finished walking surfaces (other than alleys) by at least:

- 3 feet horizontally, or
- 10 feet above, or
- 10 feet below

Finally, if the garage exhaust extends to the roof, it must extend 3 feet above the roof.