# 2015 Amendments to the Washington State Energy Code

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The actual person in charge

# Energy Code Support in WA State

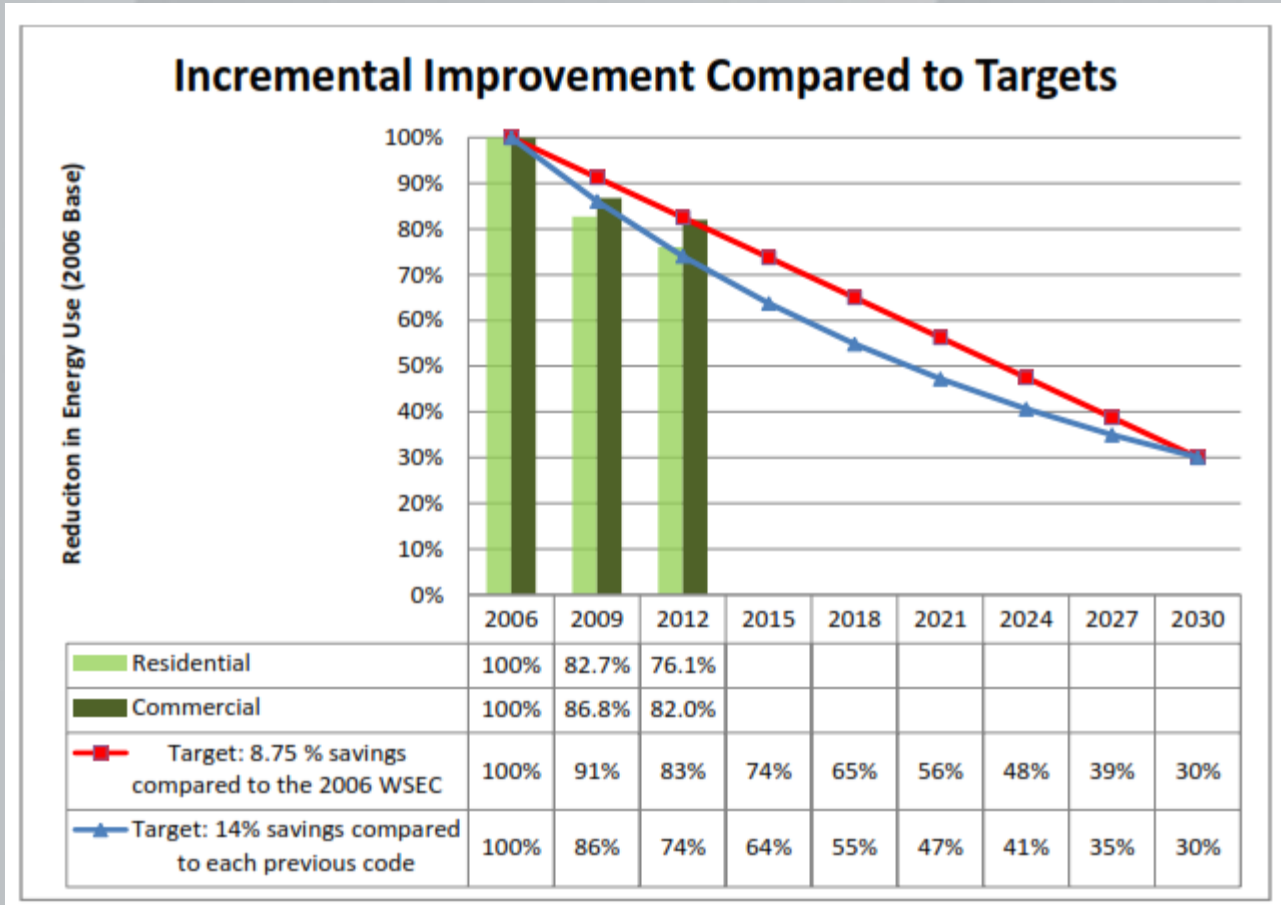
**Residential**

- Washington State University Energy Program
- 360-956-2042
- energycode@energy.wsu.edu
- www.energy.wsu.edu/code
- Gary Nordeen, Luke Howard, Tanya Beavers

**Non-residential**

- Northwest Energy Efficiency Council
- Lisa Rosenow
- 206-624-0283
- wsec@putnamprice.com
- www.neec.net

# Where are we at?




| | 2006 | 2009 | 2012 | 2015 | 2018 | 2021 | 2024 | 2027 | 2030 |
|---|---|---|---|---|---|---|---|---|---|
| Residential | 100% | 82.7% | 76.1% | | | | | | |
| Commercial | 100% | 86.8% | 82.0% | | | | | | |
| Target: 8.75 % savings compared to the 2006 WSEC | 100% | 91% | 83% | 74% | 65% | 56% | 48% | 39% | 30% |
| Target: 14% savings compared to each previous code | 100% | 86% | 74% | 64% | 55% | 47% | 41% | 35% | 30% |

# R101.2 Scope

**Residential buildings and their associated:**

- Sites
- Systems
- Equipment
- Includes R-2, R-3 and R-4 Three stories or less above grade

*This code shall be the maximum and minimum energy code for residential construction in each town, city and county.*

# R2, R3 and R4 Defined

- **R-2. Apartments, Convents, Sororities, etc.**
  Residential occupancies containing *sleeping units* or more than two *dwelling units* where the occupants are primarily permanent in nature.

- **R-3. Detached Single-Family and Duplex, Townhomes**
  Residential occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, R-4

- **R-4. Assisted Living, Rehab Centers, Halfway Houses, etc.**
  Buildings for more than five but not more than 16 persons, excluding staff, who reside on a 24-hour basis in a supervised residential environment and receive *custodial care*.

# R401.2 Tools for Compliance

- Prescriptive – WSU form
- Total UA Alternative – WSU form *
- Performance Approach – as required in R405

*Check WSU's Energy Code webpage for compliance tool information as it becomes available:*
*www.energy.wsu.edu/code*

*REScheck no longer available in WA State

# Prescriptive Form

**Prescriptive Energy Code Compliance for All Climate Zones in Washington**

*Project Information*

*Contact Information*

**This project will use the requirements of the Prescriptive Path below and incorporate the the minimum values listed. In addition, based on the size of the structure, the appropriate number of additional credits are checked as chosen by the permit applicant.**

Authorized Representative _____ Date _____

| All Climate Zones | | |
|---|---|---|
| | R-Value[a] | U-Factor[a] |
| Fenestration U-Factor[b] | n/a | 0.30 |
| Skylight U-Factor | n/a | 0.50 |
| Glazed Fenestration SHGC[b,e] | n/a | n/a |
| Ceiling[k] | 49[i] | 0.026 |
| Wood Frame Wall[g,m,n] | 21 int | 0.056 |
| Mass Wall R-Value[j] | 21[21h] | 0.056 |
| Floor | 30[g] | 0.029 |
| Below Grade Wall[c,m] | 10/15/21 int + TB | 0.042 |
| Slab[d] R-Value & Depth | 10, 2 ft | n/a |

*Table R402.1.1 and Table R402.1.3 Footnotes included on Page 2.

**Each dwelling unit in a residential building shall comply with sufficient options from Table R406.2 so as to achieve the following minimum number of credits:**

☐ **1. Small Dwelling Unit: 1.5 credits**
Dwelling units less than 1500 square feet in conditioned floor area with less than 300 square feet of fenestration area. Additions to existing building that are greater than 500 square feet of heated floor area but less than 1500 square feet.

☐ **2. Medium Dwelling Unit: 3.5 credits**
All dwelling units that are not included in #1 or #3. **Exception:** Dwelling units serving R-2 occupancies shall require 2.5 credits.

☐ **3. Large Dwelling Unit: 4.5 credits**
Dwelling units exceeding 5000 square feet of conditioned floor area.

☐ **4. Additions less than 500 square feet: .5 credits**

**Table R406.2 Summary**

| Option | Description | Credit(s) | | | |
|---|---|---|---|---|---|
| 1a | Efficient Building Envelope 1a | 0.5 | ☐ | | |
| 1b | Efficient Building Envelope 1b | 1.0 | ☐ | | |
| 1c | Efficient Building Envelope 1c | 2.0 | ☐ | | |
| 1d | Efficient Building Envelope 1d | 0.5 | ☐ | | |
| 2a | Air Leakage Control and Efficient Ventilation 2a | 0.5 | ☐ | | |
| 2b | Air Leakage Control and Efficient Ventilation 2b | 1.0 | ☐ | | |
| 2c | Air Leakage Control and Efficient Ventilation 2c | 1.5 | ☐ | | |
| 3a | High Efficiency HVAC 3a | 1.0 | ☐ | | |
| 3b | High Efficiency HVAC 3b | 1.0 | ☐ | | |
| 3c | High Efficiency HVAC 3c | 1.5 | ☐ | | |
| 3d | High Efficiency HVAC 3d | 1.0 | ☐ | | |
| 4 | High Efficiency HVAC Distribution System | 1.0 | ☐ | | |
| 5a | Efficient Water Heating 5a | 0.5 | ☐ | | |
| 5b | Efficient Water Heating 5b | 1.0 | ☐ | | |
| 5c | Efficient Water Heating 5c | 1.5 | ☐ | | |
| 5d | Efficient Water Heating 5d | 0.5 | ☐ | | |
| 6 | Renewable Electric Energy | 0.5 | | *1200 kwh | 0.0 |
| **Total Credits** | | | | | **0.00** |

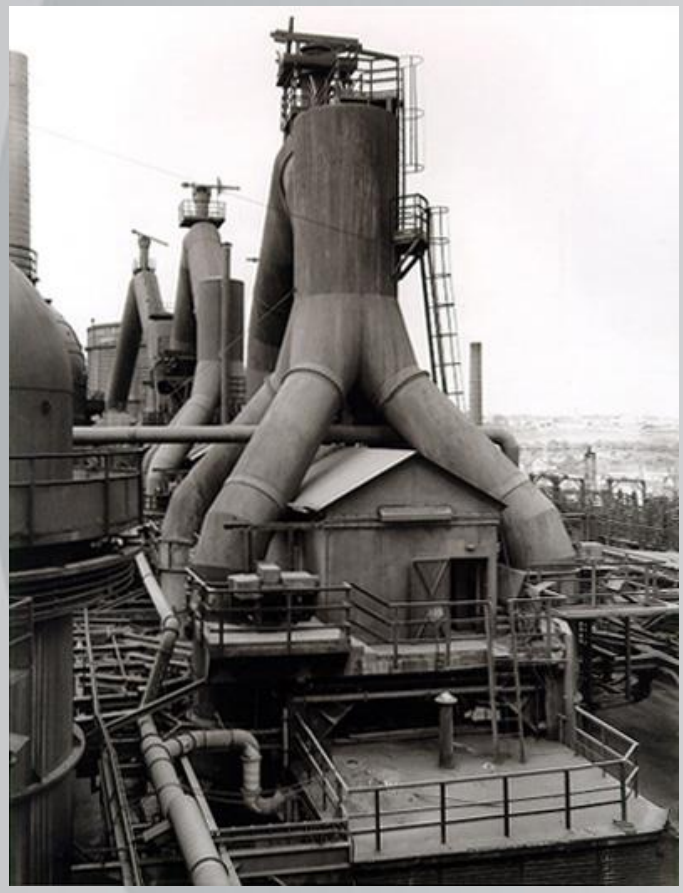
*Please refer to Table R406.2 for complete option descriptions

# Mechanical Piping Insulation

- Mechanical system piping capable of carrying fluids above 105F (41C) or below 55F (13C) shall be insulated to a minimum of R-6.
- **Exception**: Up to 200 feet of hydronic system piping installed within the conditioned space may be insulated with a minimum of ½-inch insulation.

# Heating System Sizing

- The output capacity of heating and cooling equipment shall not be greater than that of the smallest available equipment size that exceeds the loads calculated, including allowable oversizing limits.



# R403.3.1 Insulation (Prescriptive)

Ducts outside the building thermal envelope shall be insulated to a minimum of R-8.

Ducts within a concrete slab or in the ground shall be insulation to **R-10** with insulation designed to be used below grade.

**2” extruded foam**

# Duct Testing (R403.3.3)

Duct testing is not required when ducts and air handlers are located entirely within the building thermal envelope.

- A maximum of 10 linear feet of return ducts and 5 linear feet of supply ducts may be located outside the conditioned space and still qualify for this exception to testing.

# R403.5.4 Drain water heat recovery units.

Drain water heat recovery units shall comply with CSA 55.2. Drain water heat recovery units shall be in accordance with CSA 55.1.

# R403.7.1 Electric resistance zone heated units.

All detached one- and two-family dwellings and multiple single-family dwellings (townhouses) up to three stories in height above grade plane using electric zonal heating as the primary heat source shall install an inverter-driven ductless mini-split heat pump in the largest zone in the dwelling.*


*1.0 credits allowed from options package 3d

# Additional Energy Credits Table 406.2

Each dwelling unit in a residential building shall comply with sufficient options from Table R406.2 as to achieve the following minimum number of credits.

- This includes multifamily 3-stories or less

# Additional Energy Credits

**Small Dwelling Unit**

Dwelling units less than 1500 square feet in conditioned floor area with less than 300 square feet of fenestration area. Additions to existing building greater than 500 square feet of heated floor area but less than 1500 square feet.

- *This includes multifamily 3-stories or less*

**1.5 Credits**

# Additional Energy Credits

**Medium Dwelling Units**

- All dwelling units that are not included in #1 or #3.
- **Exception:** Dwelling units serving R-2 occupancies shall require 2.5 credits.

**3.5 Credits**

# Additional Energy Credits

**Large Dwelling Units**

- Dwelling units exceeding 5000 square feet of conditioned floor area.
- **Exception:** Dwelling units serving R-2 occupancies shall require 2.5 credits.

**4.5 Credits**

# Additional Energy Credits

**Additions**

Additions less than 500 square feet

**0.5 Credit**

# Option 2a

Reduce air leakage to 3.0 ACH50

Install good ventilation fan

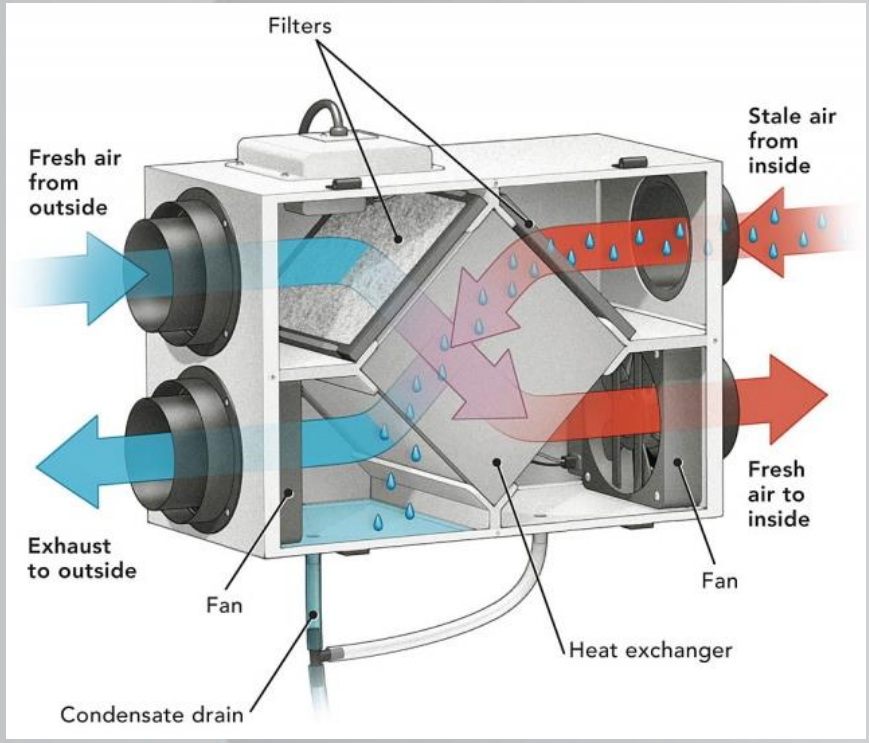
**.5 Credits**

# Option 2b

Reduce air leakage to 2.0 ACH50

Install HRV with efficiency of .70

**1.0 Credits**

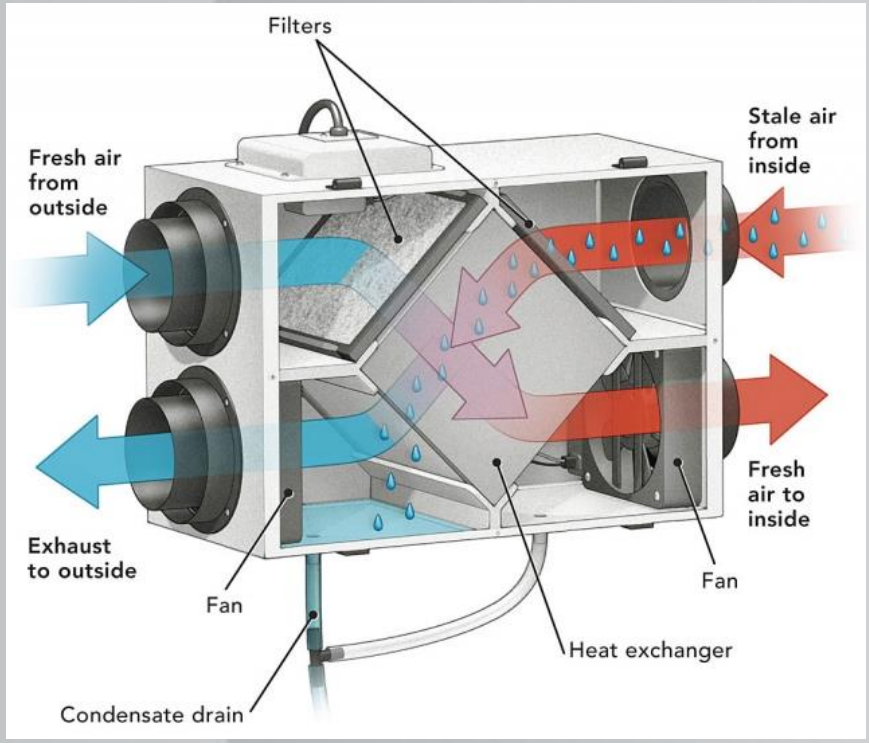


# Option 2c

Reduce air leakage to 1.5 ACH50

Install HRV with efficiency of .85

**1.5 Credits**



# Option 3a

Install a high efficiency furnace AFUE 94% min.

Install a high efficiency boiler AFUE 92% min.

**1.0 Credits**

# Option 3b

Install a high efficiency heat pump

Min HSPF of 9.0

1.0 Credits

# Option 3c

Install a ground or water source heat pump

Min COP of 3.3 (ground)
Min COP of 3.6 (water)

**1.5 Credits**

# Option 3d

Install a ductless split system heat pump

Must be home where the primary space heating system is electric zonal

Shall be installed and provide heating to the largest zone of the house


1.0 Credit

# Option 4

All ducts, heating and cooling components inside the conditioned space. Also includes boilers and hydronic piping, radiators, etc.

**1.0 Credits**

# Option 5a

Install flow restrictor on kitchen faucet and shower heads

**.5 Credits**

# Option 5b

Install gas, oil, or propane water heater. Min EF .74

**1.0 Credits**

# Option 5c

Install gas, oil, or propane water heater. Min EF .91

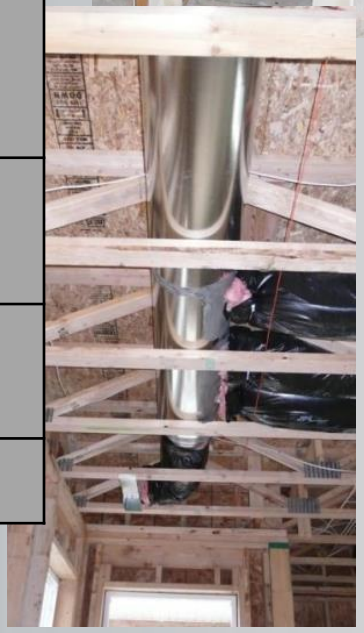
Solar water heating

Heat Pump water heater

**1.5 Credits**

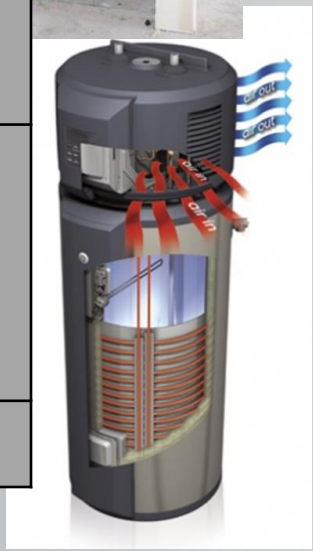

# Table 406.2
# How to meet the mark
## 1,501–5,000 sf homes (3.5 credits)

| Opt | Description | Pts |
|---|---|---|
| **3a** or **3b** | 94 AFUE Gas Furnace or 9.0 HSPF heat pump | 1.0 |
| **4** | All ducts and furnace located inside the conditioned space | 1.0 |
| **5a** | Kitchen sink and showerheads ≤ 1.75 GPM, lavatory faucets ≤ 1.0 GPM | 0.5 |
| **5b** | Gas water heater ≥ 0.74 EF | 1.0 |
| | **Total** | **3.5** |



# Table 406.2
# How to meet the mark
## 1,501–5,000 sf homes (3.5 credits)

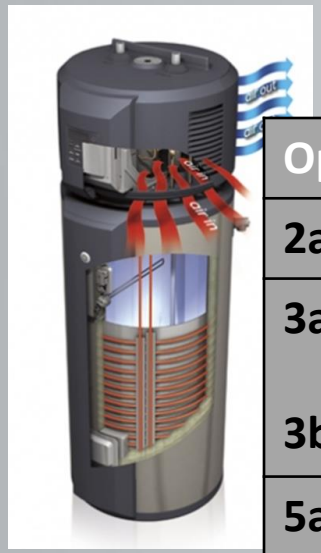
| Opt | Description | Pts |
|---|---|---|
| **1a** | R-38 Floors and U-0.28 Windows | 0.5 |
| **3a** or **3b** | 94 AFUE Gas Furnace<br>or<br>9.0 HSPF heat pump | 1.0 |
| **5a** | Kitchen sink and showerheads ≤ 1.75 GPM, lavatory faucets ≤ 1.0 GPM | 0.5 |
| **5c** | Gas water heater ≥ 0.91 EF<br>or<br>Electric water heater ≥ 2.0 EF | 1.5 |
| | **Total** | **3.5** |



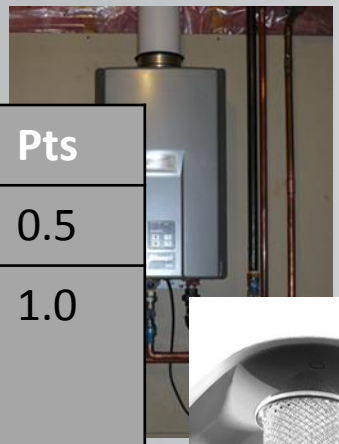
# Table 406.2
# How to meet the mark
## 1,501–5,000 sf homes (3.5 credits

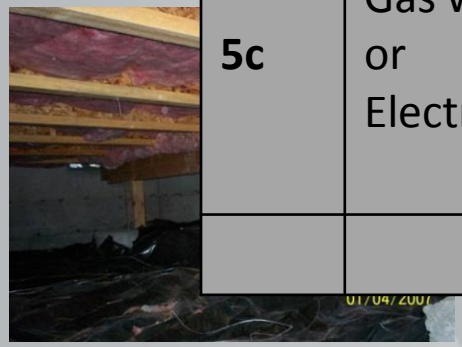

| Opt | Description | Pts |
|---|---|---|
| **1a** | R-38 Floors and U-0.28 Windows | 0.5 |
| **2a** | Air leakage ≤ 3.0 ACH @ 50pa | 0.5 |
| **3a** **or** **3b** | 94 AFUE Gas Furnace or 9.0 HSPF heat pump | 1.0 |
| **5a** | Kitchen sink and showerheads ≤ 1.75 GPM, lavatory faucets ≤ 1.0 GPM | 0.5 |
| **5b** | Gas water heater ≥ 0.74 EF | 1.0 |
| | Total | **3.5** |

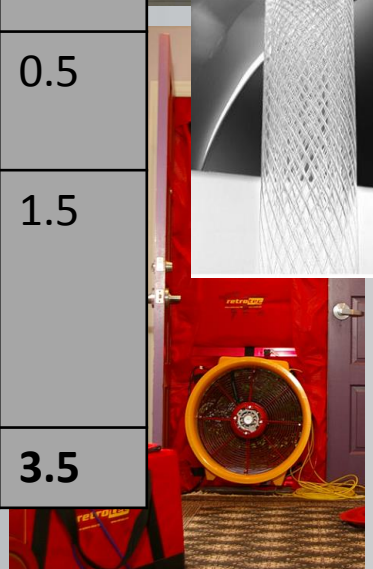
# Table 406.2
# How to meet the mark
## 1,501–5,000 sf homes (3.5 credits)



| Opt | Description | Pts |
|---|---|---|
| **2a** | Air leakage ≤ 3.0 ACH @ 50pa | 0.5 |
| **3a** or **3b** | 94 AFUE Gas Furnace or 9.0 HSPF heat pump | 1.0 |
| **5a** | Kitchen sink and showerheads ≤ 1.75 GPM, lavatory faucets ≤ 1.0 GPM | 0.5 |
| **5c** | Gas water heater ≥ 0.91 EF or Electric water heater ≥ 2.0 EF | 1.5 |
| | **Total** | **3.5** |







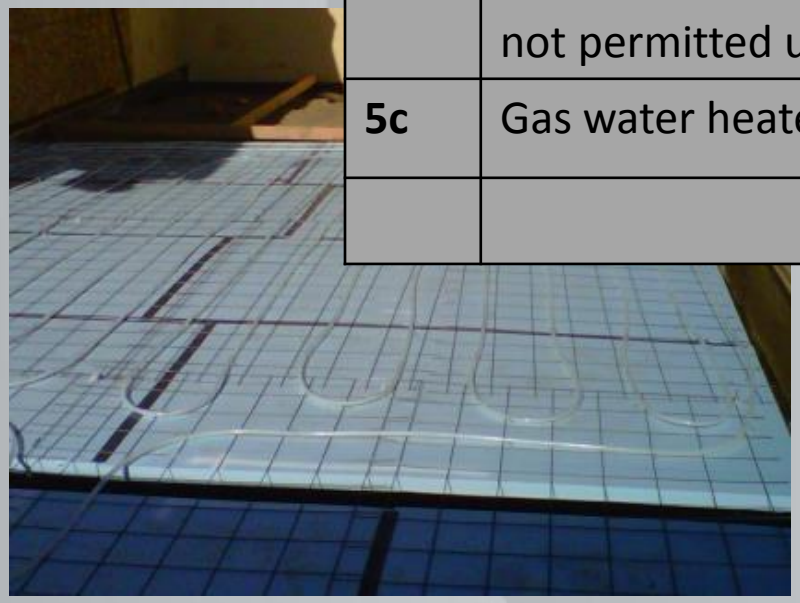
# Table 406.2
# How to meet the mark
## 1,501–5,000 sf homes (3.5 credits)

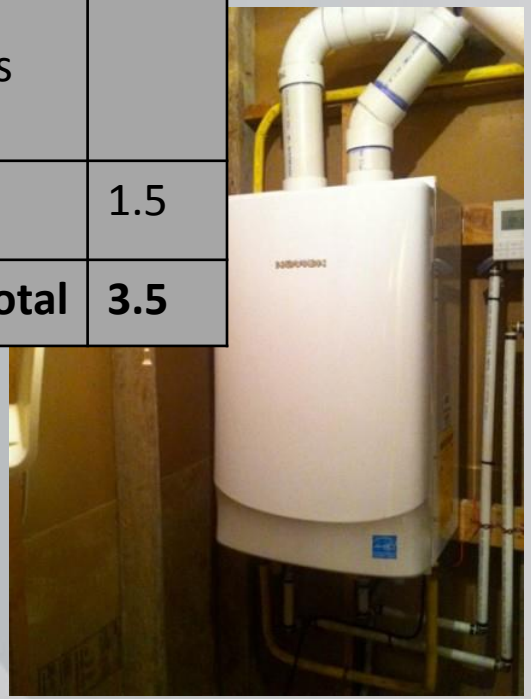
| Opt | Description | Pts |
|---|---|---|
| **1a** | R-38 Floors and U-0.28 Windows | 0.5 |
| **3d** | Ductless Heat Pump | 1.0 |
| **5a** | Kitchen sink and showerheads ≤ 1.75 GPM, lavatory faucets ≤ 1.0 GPM | 0.5 |
| **5c** | Electric water heater ≥ 2.0 EF | 1.5 |
| | **Total** | **3.5** |



# Table 406.2
# How to meet the mark
## 1,501–5,000 sf homes (3.5 credits)

| Opt | Description | Pts |
|---|---|---|
| **3a** | 92 AFUE Gas Boiler | 1.0 |
| **4** | All heating and cooling system components installed within the conditioned space. Electric resistance and ductless heat pumps not permitted under this option. | 1.0 |
| **5c** | Gas water heater ≥ 0.91 EF | 1.5 |
| | **Total** | **3.5** |





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